RED PERIMETER DEFEATED

U.S. NAVAL SUPREMACY, COMPETITIVE ADAPTATION, AND THE THIRD BATTLE OF THE ATLANTIC, 1946-1981

DISSERTATION

vorgelegt von

Michael Haas

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Dedicated

to those taken by the sea

during the darkest years of the Cold War –

lest we grow too fond of our expedients.

Contents

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List of abbreviations

AA	anti-aircraft
AAM	air-to-air missile
AAW	anti-air warfare
ACW	anti-carrier warfare
ADM	admiral
AEW	airborne early warning
AEW&C	airborne early warning and control
AGI	Auxiliary, General Intelligence
AIP	air-independent propulsion
APL	*Atomnaya podvodnaya lodka*; atomic submarine
ASAT	anti-satellite
ASBM	anti-ship ballistic missile
ASCM	anti-ship cruise missile
ASM	anti-ship missile
ASMS	Advanced Surface Missile System
ASW	anti-submarine warfare
ASROC	anti-submarine rocket
ASTOR	anti-submarine torpedo
ASWOC	anti-submarine warfare operations center
ASuW	anti-surface warfare
AVMF	*Aviatsiya voyenno-morskogo flota*; Aviation of the Military Maritime Fleet
BPDMS	Basic Point Defense Missile System
CAG	carrier air group (until 1963)
CAP	combat air patrol

CAPT	captain
CDR	commander
CEP	circular error probable
CIA	Central Intelligence Agency
CIC	combat information center
CIWS	Close-In Weapon System
CNA	Center for Naval Analyses
CNO	Chief of Naval Operations
CODAR	Correlation, Detection and Ranging
COMINT	communications intelligence
CONOPS	operational approach and concept of operations
CPSU	Communist Party of the Soviet Union
CR	continuous rod
CV	fleet aircraft carrier
CVA	attack aircraft carrier (1952-1975)
CVAN	nuclear-powered attack carrier (until 1975)
CVB	battle carrier (1945-1952)
CVBG	carrier battle group
CVL	light aircraft carrier
CVN	nuclear-powered multipurpose carrier
CVS	anti-submarine warfare carrier
CVW	carrier air wing
CVY	*Charlie-, Victor-, Yankee*-class
DASH	drone anti-submarine helicopter
DCNO	Deputy Chief of Naval Operations
DF	direction finding
DIA	Defense Intelligence Agency
DIFAR	directional frequency analysis and recording

ECM	electronic countermeasures
ECCM	electronic counter-countermeasures
ELINT	electronic intelligence
EMCON	emission control
EORSAT	Electronic Intelligence Ocean Reconnaissance Satellite
ESM	electronic support measures
EW	electronic warfare
FOSIC	Fleet Ocean Surveillance Information Center
FOSIF	Fleet Ocean Surveillance Information Facility
FPE	foreign policy executive
GIN	Greenland-Iceland-Norway
GIUK	Greenland-Iceland-UK
Glavkom	*Glavnokomanduyushchiy*; Commander-in-Chief
GNP	gross national product
HEN	*Hotel-, Echo-, November*-class
HF/DF	high frequency direction finder
HULTEC	hull-to-emitter correlation
HUK	hunter-killer group
IJN	Imperial Japanese Navy
ICBM	intercontinental ballistic missile
IMINT	imagery intelligence
IR	international relations
IRBM	intermediate-range ballistic missile
ISTAR	intelligence, reconnaissance, surveillance and target acquisition
JCS	Joint Chiefs of Staff
JIC	Joint Intelligence Committee
JMSDF	Japanese Maritime Self-Defense Force
kts	knots (1 knot = 1 nmi/hour)

LAMPS	light airborne multipurpose system
LOFAR	low-frequency analysis and recording
LUT	*lageunabhängiger Torpedo*
MAD	magnetic anomaly detector
MaRV	maneuverable reentry vehicle
MIRV	multiple independently targetable reentry vehicles
MPA	maritime patrol aircraft
NAVFAC	naval facility
NCR	neoclassical realism
NHF	Naval Historical Foundation
NSA	National Security Agency
NTS	naval torpedo station
NTU	New Threat Upgrade
nmi	nautical mile (1 nmi = 2,025 yards = 1,852 m)
NOSIC	Naval Ocean Surveillance Information Center
NSPS	Naval Strategic Planning Study
ODB	offense-defense balance
ODT	offense-defense theory
OEG	Operations Evaluation Group
OIC	operational intelligence center
ONI	Office of Naval Intelligence
OPINTEL	operational intelligence
OPNAV	Office of the Chief of Naval Operations
OSD	Office of the Secretary of Defense
OSIS	Ocean Surveillance Information System
PL	*Povodnaya lodka*; submarine
PLAN	Chinese People's Liberation Army Navy
PLARB	*Podvodnaya lodka atomnaya s raketami ballisticheskimi*; atomic submarine armed with ballistic missiles

PLARK	*Povodnaya lodka atomnaya s raketami krylatymi*; atomic submarine with winged missiles
PLRB	*Povodnaya lodka raketnaya ballisticheskaya*; submarine with ballistic missiles
PLRK	*Podvodnaya lodka s raketami krylatymi*; submarine armed with winged missiles
psi	pounds per square inch
RADM	rear admiral
Ret.	retired
RMA	revolution in military affairs
RN	Royal Navy
RORSAT	Radar Ocean Reconnaissance Satellite
RV	reentry vehicle
RVSN	*Raketnyye voyska strategicheskogo naznacheniya*; Strategic Missile Forces
SAC	Strategic Air Command
SAM	surface-to-air missile
SECDEF	U.S. Secretary of Defense
shp	shaft horsepower
SIGINT	signals intelligence
SIOP	single integrated operational plan
SLBM	sea-launched ballistic missile
SLCM	sea-launched cruise missile
SLOC	sea lines of communication
SPA	SOSUS probability area
SOSS	Soviet Ocean Surveillance System
SOSUS	Sound Surveillance System
SS	ship, submerged
SSB	ballistic missile submarine
SSBN	ballistic missile submarine, nuclear-powered

SSC	coastal submarine
SSG	guided cruise missile submarine
SSGN	guided cruise missile submarine, nuclear-powered
SSIXS	Submarine Satellite Information Exchange Sub-System
SSK	hunter-killer submarine
SSKN	hunter-killer submarine, nuclear-powered
SSN	general-purpose attack submarine, nuclear-powered
STR	submarine tracking room
SUBROC	submarine-launched rocket system
SURTASS	surveillance towed array sensor system
TACTAS	tactical towed array sonar
TMA	target motion analysis
TNW	tactical nuclear weapon
TTPs	tactics, techniques, and procedures
USLANTFLT	U.S. Atlantic Fleet
USAAF	United States Army Air Force
USN	U.S. Navy
USNI	U.S. Naval Institute
USPACFLT	U.S. Pacific Fleet
USSR	Union of Soviet Socialist Republics
VADM	vice admiral
VA	attack squadron
VF	fighter squadron
VAH	heavy attack squadron
VCNO	Vice Chief of Naval Operations
VMF	*Voyenno-morskoy flot SSR*; Military-Maritime Fleet of the Soviet Union
VP	maritime patrol squadron
VVS	*Voenno-vozdushnye sily*; Military Air Forces of the Soviet Union

[1]

Introduction

NAVAL SUPREMACY, COMPETITIVE POSTURE CHANGE, AND THE COLD WAR AT SEA

1.1 Project outline

This dissertation investigates the dynamics of naval competition between the United States and the Union of Soviet Socialist Republics (USSR) during a thirty-five year period that eventually led to the U.S. Navy's adoption of the Reagan era Maritime Strategy.[1] Its focus is on the long-term pattern of military interaction between the military organizations that had primary responsibility for pursuing the Cold War competition at sea, the United States Navy (USN) and the *Voyenno-morskoy flot SSSR* ("Military Maritime Fleet of the USSR", henceforth: VMF). Throughout the period in question, these two powerful organizations prepared for war in the empty wastes of the North Atlantic, the Western Pacific and their peripheral seas. If that conflict had come to pass, it would have been the first naval war to feature guided missiles and nuclear weapons – and perhaps also the last. It would have revolved around one of the most vexing problems that the geography and the strategic realities of the Cold War confrontation imposed on the Western alliance. As a sea power separated from the likely theaters of conflict by millions of square kilometers of water, the United States relied on forward-deployed forces

1 The first 'official' version of *The Maritime Strategy* came together in the autumn of 1982, but the basic tenets had been under discussion for some time. For a detailed review of the process of formulating and refining the forward Maritime Strategy, see John B. Hattendorf, *The Evolution of the U.S. Navy's Maritime Strategy 1977-1986,* Newport Paper 19 (Newport, RI: Naval War College Press, 2004).

to reassure its NATO allies and deter attacks that might not meet the criteria for a full-scale nuclear response.[2] While the permanent elements of this forward posture could provide a "tripwire"[3] in case of Soviet military encroachment, reinforcing them in a crisis and sustaining them in a conflict would not have been a trivial matter. Regardless of the exact circumstances, it demanded the application of superior seapower to secure NATO's sea lines of communication (SLOCs) across the Atlantic and to reliably overcome what Mearsheimer has called "the stopping power of water."[4] Framed in terms of 21st defense debates, it would have required *operational access* – that is, "[t]he ability to project military force into [the] operational area with sufficient freedom of action to accomplish the mission."[5] In Cold War terms, Western analysts expected to find themselves fighting a Third Battle of the Atlantic, not unlike those fought during the world wars.[6]

This investigation will advance the case that this analogy of the Third Battle can serve as a useful framework for thinking about the U.S.-Soviet naval competition for only part of the Cold War era. To be more specific, the Cold War at sea can reasonably be divided into three

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2 For the purposes of this dissertation, the term 'sea power' will denote an actor in possession of 'seapower', which we agree "can be usefully defined as military power that is brought to bear at [and from the, MH] sea." Hedley Bull, "Sea Power and Political Influence," *Adelphi Paper* 16, no. 122 (1976), doi:10.1080/05679327608457271, 1. While this is admittedly a relatively narrow definition, it provides clarity where more recent attempts at definitions have been deliberately wooly and all-encompassing. To define seapower broadly, in terms of "the capacity to influence the behavior of other people or things by what one does at or from the sea," as Till proposes, leaves little room for a conception of 'maritime power' that can encompass civil aspects much more conspicuously and appropriately. Geoffrey Till, *Seapower: A Guide for the Twenty-First Century* (London: Routledge, 2009), 21. For his discussion of related concepts and terminology, which is generally excellent, see ibid., 20-38.

3 The concept was originally associated with the Eisenhower Administration's nuclear-centric New Look. See Richard A. Bitzinger, "Assessing the Conventional Balance in Europe, 1945-1975" (RAND, Santa Monica, CA, 1989), 11. On the New Look and the doctrine of 'massive retaliation', see e.g. Samuel F. Wells, "The Origins of Massive Retaliation," *Political Science Quarterly* 96, no. 1 (1981), doi:10.2307/2149675, 31-51; Andreas Wenger, *Living with Peril: Eisenhower, Kennedy, and Nuclear Weapons* (Lanham, MD: Rowman & Littlefield, 1997), esp. 13-84, 105-20.

4 John J. Mearsheimer, *The Tragedy of Great Power Politics* (New York, NY: W.W. Norton, 2001), 113-19.

5 Department of Defense, "Joint Operational Access Concept: Version 1.0" (Washington, DC, 2012), https://dod.defense.gov/Portals/1/Documents/pubs/JOAC_Jan%202012_Signed.pdf, 1. The most comprehensive study of questions of strategic and operational access is Sam J. Tangredi, *Anti-Access Warfare: Countering A2/AD Strategies* (Annapolis, MD: Naval Institute Press, 2013).

6 The term is used repeatedly throughout the literature on the Cold War at sea, but it is now most prominently associated with Cote's excellent study of the competition in undersea warfare, which will be referenced repeatedly in this study. Owen R. Cote, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarine,* Newport Papers 16 (Newport, RI: Naval War College Press, 2003).

periods. During the first period (c. 1946-1960), the U.S. Navy began to focus on power projection against Soviet land targets and the Soviet Union built a layered sea denial system that began to reach out further into the North Atlantic towards the end of this timeframe. During the second period (c. 1961-1981), the U.S. Navy effectively shifted its capability for nuclear strike from carrier battlegroups to its submarine force. Meanwhile, the VMF continued to develop an oceanic defense perimeter, which included a limited capability for nuclear strikes against targets in the continental United States. Towards the end of this phase, however, came a Soviet paradigm shift. Instead of investing further resources into an ever more expansive system of oceanic defense, the VMF's efforts were refocused on the near-seas zone. By the late 1970s, the VMF's far-seas defense capability was approaching high tide, largely as a result of decisions made in the late 1950s and early 1960s. But the focus of Soviet naval ambitions had returned to the Barents Sea and, in the far east, the Sea of Okhotsk. During the third and final phase (1981-1991), the Reagan era Maritime Strategy attempted to exploit this shift for strategic advantage. While the first two phases can be reasonably described as encompassing preparations at the level of naval postures for the eventuality of a Third Battle of the Atlantic, the third phase – which has received much of the attention of Western naval analysts, not least due to its bureaucratic significance for the U.S. Navy – is difficult to frame in those terms.

The focus of the present investigation is on the two phases that preceded the Soviet Union's tacit admission that it could not – and, perhaps, need not – effectively compete with the U.S. Navy on the high seas. Rather than during the third phase, as has often been claimed, it must have been during these earlier phases that the high-seas competition was essentially decided. The eventual outcome of the struggle for a meaningful naval advantage in the North Atlantic area raises important questions: *How did the U.S. Navy manage to maintain its military advantage in this area over the long term? Or, if we endeavor to see the issue through the eyes of a continental challenger of U.S. naval supremacy, why did the Soviet Union fail to develop an effective system for keeping the U.S. Navy's projection forces at bay?* These are the questions that this dissertation will explore in the form of a theoretically informed analysis of the first two phases of the Cold War at sea. Specifically, we will be looking at the contest between the VMF's posture of oceanic "sea denial"[7] – a more traditional, less controversial, and slightly narrower term than "anti-access/area denial"[8] – and the U.S. Navy's posture of sea control through "transoceanic"[9] power projection. This introductory chapter will briefly familiarize the reader with the setting of the Cold War at sea, lay out the purpose of the investigation and research design in some detail, explore the current state of research into this and related topics, and provide a brief overview of the chapters that follow.

SEAPOWER IN A NUCLEAR CONTEXT

The working assumption of many observers on both sides of the Cold War divide was – and had to be – that any major war between the superpowers was likely to escalate to a full-scale nuclear exchange, possibly with very little warning.[10] In effect, the superpowers would have moved from a state of peace or increased tension to full-scale nuclear war with only token involvement of all other conceivable levels of conflict.[11] But there existed at the heart of the

[7] One of Corbett's principles was that "[t]he object of naval warfare must always be directly or indirectly either to secure the command of the sea or to prevent the enemy from securing it." Julian S. Corbett, *Principles of Maritime Strategy* (Mineola, NY: Dover, 2004[1911]), 87. For a detailed discussion of sea denial postures and strategies, see Milan N. Vego, *Maritime Strategy and Sea Denial: Theory and Practice* (London: Routledge, 2019); Ian Speller, *Understanding Naval Warfare* (London: Routledge, 2019), 118-22. On the specific requirements of sea control and sea denial in marginal and constricted seas, see also Milan N. Vego, *Naval Strategy and Operations in Narrow Seas* (London: Routledge, 2003), 110-28.

[8] For an extended discussion and history of the concept, see Tangredi, *Anti-Access Warfare*, 32-74.

[9] Samuel P. Huntington, "National Policy and the Transoceanic Navy," *USNI Proceedings* 80, no. 5 (1954), https://www.usni.org/magazines/proceedings/1954/may/national-policy-and-transoceanic-navy.

[10] See e.g. Stephen J. Cimbala, *Strategic Impasse: Offense, Defense, and Deterrence Theory and Practice* (New York, NY: Greenwood, 1989), 53.

[11] For an understanding of what potential escalation levels were present, we can look to Nitze's "hierarchy of potential violence" that comprises ten levels. Paul Nitze, "The Relationship of Strategic and Theater Nuclear Forces," *International Security* 2, no. 2 (1977), doi:10.2307/2538729, 122-23. Reordered here in ascending order of conflict intensity, they are: "10. Political, economic, and psychological warfare; 9. Civil war or guerrilla war in its various forms; 8. Conventional war with client states only participating; 7. Conventional war with only a single superpower actively participating; 6. Conventional war with both superpowers actively participating; 5. Unilateral use by the country attacked of tactical nuclear weapons in self-defense on and over its own territory; 4. Forward Edge of the Battlefield (FEBA) nuclear war with both sides primarily using shorter range weapons close to the line of contact between the opposing forces; neither superpower using its intercontinental or gray-area weapons, and both superpowers avoiding the territory of the other; 3. Theater nuclear war in which intermediate gray-area weapons, such as the SS-20, Backfire, G-Class submarines, FB-

Cold War balance of "mutual assured destruction"[12] a series of paradoxes that could undermine the stabilizing logic of nuclear fear: What if the very stability of deterrence at the "strategic"[13] level – which threatened the use of nuclear weapons against the likely adversary's civilian population, industrial strength, and opposing strategic nuclear forces – made war more likely at lower levels of conflict?[14] What, in other words, if strategic nuclear deterrence worked *too well* and the other side arrived at the conclusion that it could get away with some forms of conventional aggression without triggering a massive nuclear response? What if, on reflection, the limitation of a conflict that had resulted from one of the more plausible scenarios – accident, miscalculation, or deterrence failure – looked like a better option than sacrificing hundreds of millions of lives to make a point about one's "nuclear resolve"[15]? What if there had been a use of nuclear weapons and both sides had decided that they had had enough, but the fighting had not stopped?[16] While some of the best strategic minds of the era tried to iron

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111, intermediate range cruise missiles, and the like, are used; 2. Intercontinental, primarily counterforce, nuclear war; 1. Intercontinental, primarily countervalue, nuclear war." ibid. Kahn famously came up with a much more elaborate, 44-step 'escalation ladder'. Herman Kahn, *On Escalation: Metaphors and Scenarios* (London: Routledge, 2017[1965]).

[12] Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon* (Ithaca, NY: Cornell University Press, 1990), 74-82.

[13] There is some confusion as to what exactly it is that differentiates the 'strategic' level from the 'tactical' and 'theater' levels. Logically, strategic forces are those that are earmarked to be used for *strategic effect*, i.e. to *directly* affect the opponent's ability to continue fighting. On strategic effects, see Colin S. Gray, "Understanding Airpower: Bonfire of the Fallacies," *Strategic Studies Quarterly* 2, no. 4 (2008), 51-52. Gray is right to insist that "[t]he critical difference between the strategic and the tactical is the quality of instrumentality. Strategic effect is distinctive in kind or quality from tactical effect, not in quantity. A vehicle does not become strategic because it is intercontinental in range rather than merely intraregional or even intracontinental. A weapon, a capability, a project, is *strategic only in its consequences*." ibid., 51. Emphasis added.

[14] The seminal statement of this so-called 'stability-instability paradox' is Glenn H. Snyder, *Deterrence and Defense: Toward a Theory of National Security* (Princeton, NJ: Princeton University Press, 1961). For a contrasting view, although not one that manages to dispel the paradox convincingly, is Jervis, *The Meaning of the Nuclear Revolution*, 19-22, 78-79.

[15] Richard K. Betts, *Nuclear Blackmail and Nuclear Balance* (Washington, DC: Brookings Institution, 1987), 193. On accidental nuclear war, see Bruce G. Blair, *The Logic of Accidental Nuclear War* (Washington, DC: Brookings Institution, 1993); Richard Ned Lebow, *Nuclear Crisis Management: A Dangerous Illusion* (Ithaca, NY: Cornell University Press, 1987), 104-53; Alexander George, *Deterrence in American Foreign Policy: Theory and Practice* (New York, NY: Columbia University Press, 1974), 534-49.

[16] One need not be a proponent of what was known as 'broken-backed war' to see this as a plausible turn of events. The latter concept was advanced primarily by naval officers who saw a long war as plausible – not least of all for bureaucratic reasons. See John Baylis, *Ambiguity and Deterrence: British Nuclear Strategy, 1945-1964* (Oxford: Clarendon, 1995), 144; Richard Moore, *The Royal Navy and Nuclear Weapons* (London: Routledge, 2015), 65-93. For a critique of the concept, see Kahn, *On Escalation*; Herman Kahn, *On Thermonuclear War* (New Brunswick, NJ: Transaction Books, 2010[1960]), 38.

out these and other major wrinkles in the otherwise sturdy cloth of nuclear deterrence, the truth was (and remains) that very little is known or understood about a world in which nuclear war is no longer a set of intellectual complications confined to "the deep, dark pit of nuclear strategy"[17] and becomes instead a part of the real world.

As a result, both U.S. and Soviet decision-makers soon discovered that they were not actually willing to rely on nuclear deterrence in any of its pure forms, and both sides made massive, sustained investments in conventional forces.[18] While U.S. and Soviet navies were both deeply involved in the grim business of strategic nuclear deterrence, they were also sure to play a central role in any conflict that remained limited to conventional or tactical nuclear options for more than a few days. In fact, in any 'protracted war' scenario, the survival of the Western alliance would have become successively more dependent on replenishment sealift with every gallon of fuel that was consumed and every shot that was fired.[19] Moreover, given NATO's dependence on strategic warning and prior mobilization to offset Soviet conventional strength, the same would apply in an extended crisis as well.[20] While it is true that a naval war in the North Atlantic would have been an alliance effort, the burden of maintaining naval supremacy with such scenarios in mind fell squarely on the shoulders of the U.S. Navy. There

[17] Fred M. Kaplan, *The Wizards of Armageddon* (Stanford, CA: Stanford University Press, 1991), 373.

[18] According to the CIA's estimates, Soviet average spending on the strategic offensive mission never exceeded 12.3 percent in any period during 1951-1990. Noel E. Firth and James H. Noren, *Soviet Defense Spending: A History of CIA Estimates, 1950-1990* (College Station, TX: Texas A & M University Press, 1998), 112. In the United States, there were three fiscal years during the 1945 to 1978 period in which *procurement* funding for strategic forces – as opposed to total spending – slightly exceeded or equalled that for general purpose forces. The shares were relatively even during 1945-50 and 1954-1961 and began to permanently diverge thereafter, with an overhang towards general purpose forces funding of roughly 10 billion per fiscal year on average (excluding additional spending for the war in South East Asia). Congressional Budget Office, "Assessing the Warsaw Pact/NATO Military Balance" (Budget Issue Paper for Fiscal Year 1979, CBO, Washington, DC, 1979), 47.

[19] On protracted war see Richard Hegmann, "Reconsidering the Evolution of the US Maritime Strategy 1955–1965," *Journal of Strategic Studies* 14, no. 3 (1991), doi:10.1080/01402399108437454, 303-305; John V. Hall, "Why the Short-War Scenario is Wrong for Naval Planning" (Professional Paper 354, Center for Naval Analyses, Alexandria, VA, 1982). See also Joel J. Sokolsky, *Seapower in the Nuclear Age: The United States Navy and NATO, 1949-80* (Annapolis, MD: Naval Institute Press, 1991), 125-76; Paul H. Nitze and Leonard Sullivan, *Securing the Seas: The Soviet Naval Challenge and Western Alliance Options* (Boulder, CO: Westview, 1979), 344-45, 376.

[20] See e.g. Barry R. Posen, "Measuring the European Conventional Balance: Coping with Complexity in Threat Assessment," *International Security* 9, no. 3 (1984), doi:10.2307/2538587, 94-102.

can be little doubt that the most critical missions would have overwhelmingly fallen to American seamen and naval aviators, with the Royal Navy making by far the largest alliance contribution and other navies providing capabilities to free up as many U.S. assets as possible for higher priority missions.[21]

If power projection from the sea – including, but not limited to the nuclear aspect – was one part of the *raison d'être* of what Samuel Huntington called "the transoceanic navy […], a navy oriented away from the oceans and toward the land masses on their far side,"[22] assuring operational access was the other. In practice, they soon became folded into one, as a new conception of "sea-air power"[23] began to frame carrier strikes against land targets as the best means of ensuring sea control.[24] This development was, in a very real sense, at the heart of the Cold War dynamic at sea during 1946-1981. Given the relative positions of the North American and Eurasian landmasses, and the difficulties of moving heavy forces and bulky materiel by

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[21] On the naval debate in NATO into the late 1960s, see Sokolsky, *Seapower in the Nuclear Age*, 7-47; Robert S. Jordan, *Alliance Strategy and Navies: The Evolution and Scope of NATO's Maritime Dimension* (New York, NY: St Martin's Press, 1990). On British awareness of the Royal Navy's limited role in countering Soviet submarines in the 1980s, see Peter Hennessy and James Jinks, *The Silent Deep: The Royal Navy Submarine Service since 1945* (London: Allen Lane, 2015), 559. On the Royal Navy in the Cold War, the gold standard work is still Eric Grove, *Vanguard to Trident: British Naval Policy since World War II* (Annapolis, MD: Naval Institute Press, 1987). While alliance burden sharing did extend into the naval arena to some extent, other alliance contributions are much more doubtful than the British one, certainly from an operational perspective. Focusing mostly on defensive sea control and supporting tasks, other European navies stood ready to take up some of the slack once the U.S. Navy shifted into high gear, but to claim that they were in a position to decisively influence a naval war between East and West is to engage in alliance politics. For an overview of NATO allies' comparatively modest naval capabilities at the height of the Maritime Strategy debates in the 1980s, see Stephen Roberts, "Western European and NATO Navies, 1982" (Professional Paper No. 399, Center for Naval Analyses, Alexandria, VA, 1982).

[22] Huntington, "National Policy and the Transoceanic Navy". Reduced to its essentials, seapower has *always* been about power projection against the land, as Corbett has emphasized: "Since men live upon the land and not upon the sea, great issues between nations at war have always been decided – except in the rarest cases – either by what your army can do against your enemy's territory and national life, or else by the fear of what the fleet makes it possible for your army to do." Corbett, *Principles of Maritime Strategy*, 14. The fundamental change in naval affairs that was wrought by 20th century technology – namely carrier aviation, guided missiles, and nuclear weapons – was that navies are no longer limited to the role of *enabler* and can now threaten the enemy's territory and national life directly and much more decisively than a slow-acting blockade ever could. At the same time, Corbett's insistence that "the object and end of naval warfare is the control of communications" (ibid., 91) continues to hold true in most cases short of strategic nuclear war.

[23] Daniel Yergin, *Shattered Peace: The Origins of the Cold War and the National Security State* (Boston, MA: Houghton Mifflin, 1978), 208.

[24] The basic outlines of this story are told extremely well in George W. Baer, *One Hundred Years of Sea Power: The U.S. Navy, 1890-1990* (Stanford, CA: Stanford University Press, 1998), 288-90.

air, it was reasonable to assume that a struggle for access would focus on the maritime approaches to the continental battlefield. It was not unreasonable to expect that the USSR, for its part, would make every effort to interfere with NATO's Atlantic "lifeline"[25] in case of war.

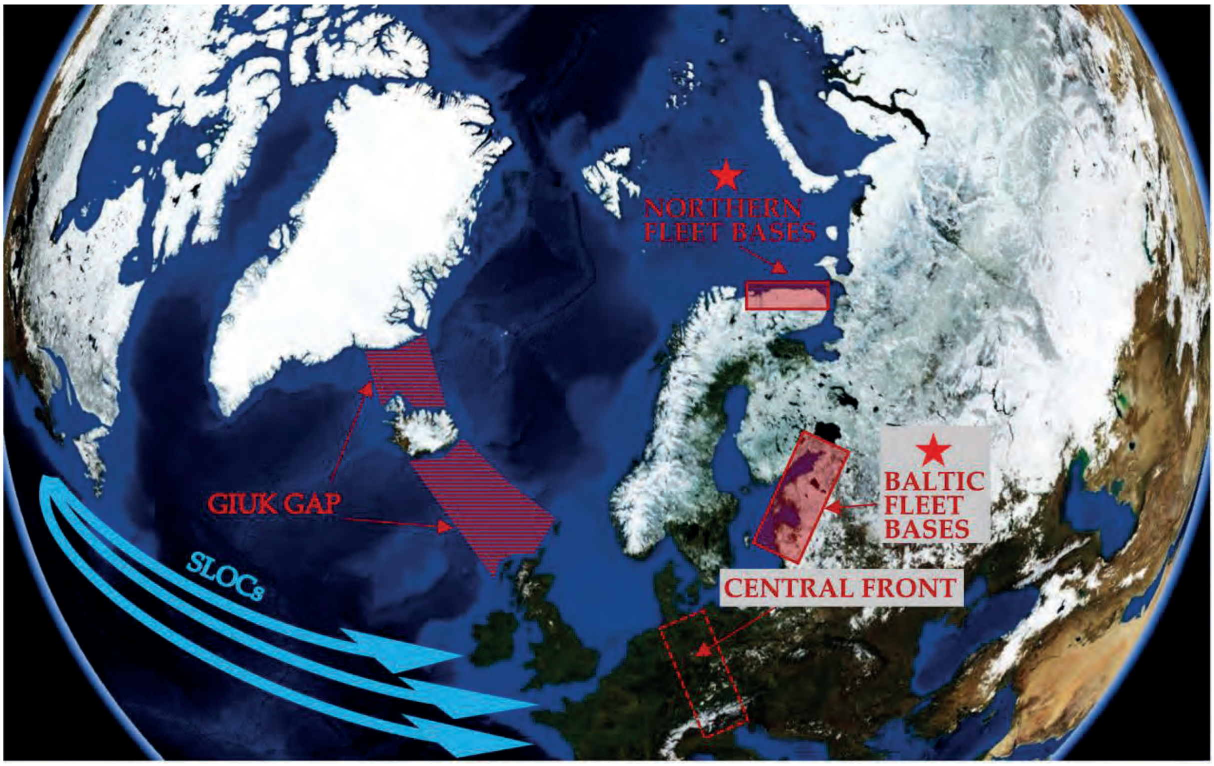

Fig. 1: The North Atlantic was the pivotal theater of the Cold War at sea. *(Own work/NASA WorldWind)*

The basic geostrategic setting of the confrontation is depicted in Figure 1 above. As readers with a background in strategic studies or military history will appreciate, there are unmistakable echoes of the two previous Battles of the Atlantic.[26] There are also critically important differences, however, which we will examine in some detail in Chapters 4 and 5. What all three scenarios had in common was a continental challenger on the Eurasian landmass, who was in a position to contest the Western sea powers' vital "control of communications"[27] across the

[25] Sokolsky, *Seapower in the Nuclear Age*, 126.

[26] An excellent overview of the Second Battle of the Atlantic from a strategic and operational perspective is Marc Milner, *Battle of the Atlantic* (Stroud: The History Press, 2014). For a more exhaustive study, see Clay Blair, *Hitler's U-Boat War: Volume 1: The Hunters, 1939-1942* (New York, NY: Random House, 1996); Clay Blair, *Hitler's U-Boat War: Volume 2: The Hunted, 1942-1945* (New York, NY: Random House, 2000). On the First Battle of the Atlantic, see. e.g. Edwyn Gray, *The Killing Time: The U-Boat War, 1914-18* (London: Seeley, 1972). An integrated view of the German submarine campaigns that facilitates comparison is provided by V. E. Tarrant, *The U-Boat Offensive, 1914-1945* (London: Arms and Armour, 1989).

[27] Corbett, *Principles of Maritime Strategy*, 90.

Atlantic. But, ultimately, the history of the Cold War at sea has much less in common with these earlier cases than a superficial look at various similarities would suggest. Far from posing a repeat of earlier continental challenges to Western naval supremacy, the introduction of nuclear weapons and of the means to deliver them from the sea fundamentally reshaped the dynamic of naval competition in the North Atlantic area over time, in ways that are not widely understood even today.

A 'SECURITY DILEMMA AT SEA'

For a start, it may come as a surprise to some readers that the most crucial mission the Soviet Navy was tasked with by the General Staff of the Armed Forces of the USSR throughout the Cold War period was not the interdiction of Western sea lines of communication, but *homeland defense* against nuclear-armed carrier strike groups and ballistic-missile carrying submarines (SSBNs).[28] While SLOC interdiction was often mentioned as a secondary or tertiary task, the consensus among Soviet naval planners was that it should only be pursued once the more essential objectives of defending the homeland and – later on – assuring the naval potential for strategic deterrence had been met.[29] In practice, this meant that there were never enough resources allocated to embark on the full-fledged 'Third Battle' against the Western lifeline that many U.S. and NATO planners feared. While this may sound like a controversial finding,

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[28] Some naval analysts realized this early on, but at an organizational level, the US Navy began to accept this only in the 1980s. Two notable sources making this case as early as the 1960s are Robert W. Herrick, *Soviet Naval Strategy: Fifty Years of Theory and Practice* (Annapolis, MD: Naval Institute Press, 1968), esp. 92-105; Central Intelligence Agency/Office of Research and Reports, *Soviet Naval Strategy and Its Effects on the Development of Naval Forces, 1953-63*, October 22, 1963, CIA/RR ER SC 63-3, CIA Historical Collection, ~~TOP SECRET~~ (declassified 21 May 2012), 65-119. This issue will be touched upon repeatedly in Chapters 4 and 5.

[29] For an excellent overview of the evolution of the VMF's Cold War mission structure, see Robert W. Herrick, "Roles and Missions of the Soviet Navy: Historical Evolution, Current Priorities, and Future Prospects," in *The Soviet and Other Communist Navies: The View from the Mid-1980s*, ed. James L. George (Annapolis, MD: Naval Institute Press/Center for Naval Analyses, 1986), 9-36.

recently declassified documents show that Western intelligence agencies eventually came to much the same conclusion.[30]

As things stood, the *possibility* that the VMF might move against the SLOCs and the real challenge to Western command of the seas that it posed were sufficient to require a determined response. NATO's alliance politics demanded that the United States provide sufficient assurances of continued support for the alliance in case of a long war that could not be pursued unless the SLOCs remained open.[31] The Soviet leadership, on the other hand, could not accept the untrammeled naval supremacy of the United States and its allies up to its coast, at a time when U.S. aircraft carriers had also become nuclear delivery systems.[32] The overarching consequence of the two sides' incompatible strategic imperatives was what one of the drafters of the Reagan administration's forward Maritime Strategy, CAPT (ret.) Peter Swartz, retrospectively describes as "a security dilemma at sea."[33] As the United States developed a carrier-centric posture designed to dispose of the prospective Soviet submarine threat to Western SLOCs across the Atlantic, the Soviet Union began to push its defensive perimeter outward to prevent carrier-borne strikes on its territory. In the process of doing so, the VMF acquired many of the same capabilities that it would presumably have employed in an offensive anti-SLOC campaign.[34] In the absence of an accurate understanding of the Soviet Union's naval force posture, it was reasonable to assume that this was indeed a high-priority goal of the burgeoning Soviet fleet. As we now know, it was not. Hence, the security dilemma logic of

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30 Central Intelligence Agency, *The Role of Interdiction at Sea in Soviet Naval Strategy and Operations: An Intelligence Assessment*, May 1978, CIA Historical Collection, ~~TOP SECRET~~ (declassified 16 June 2017); Central Intelligence Agency/National Foreign Assessment Center, *The Soviet Attack Submarine Force and Western Sea Lines of Communication*, April 1979, CIA Historical Collection, ~~SECRET~~ (declassified 14 June 2017). This study is among the first to make use of these newly released sources.

31 See e.g. Sokolsky, *Seapower in the Nuclear Age*, esp. Chapters 1-2.

32 According to Norris and Kristensen, carriers still deployed with roughly 100 nuclear weapons during the later stages of the competition, i.e. long after they had been taken off strategic nuclear alert duties. Robert S. Norris and Hans M. Kristensen, "Declassified: US Nuclear Weapons at Sea during the Cold War," *Bulletin of the Atomic Scientists* 72, no. 1 (2016), doi:10.1080/00963402.2016.1124664, 60.

33 Captain Peter M. Swartz, USN (ret.), interview with the author (Arlington, VA, 12 May 2016). I am grateful to Peter for suggesting this as a useful frame of reference. For a state-of-the-art review of the concept of the security dilemma, see Ken Booth and Nicholas J. Wheeler, *The Security Dilemma: Fear, Cooperation, and Trust in World Politics* (Basingstoke: Palgrave Macmillan, 2008). The role of the security dilemmas in long-term military competitions is further discussed in Chapter 2.

34 Ibid.

states "arm[ing] for the sake of security"[35] and rendering each other progressively less secure in the process would indeed seem to apply to the situation at hand. Although it is hardly the end of the story, it nonetheless provides a useful starting point for our analysis of the dynamics of naval interaction during the Cold War era.

The U.S. Navy eventually came to accept the essentially defensive nature of the Soviet naval build-up as a result of a decisive intelligence breakthrough in the late 1970s and early 1980s – a "special source"[36] that the select few who are privy to the details are still unable to comment on. In reality, the VMF was not so much shifting from an offensive to a defensive posture, as from an attempt at far-seas defense to a near-seas defense, thereby reversing its earlier shift in the opposite direction. In essence, once it became clear that enemy SSBNs were fundamentally unlike enemy carriers and could not be effectively countered by means of an oceanic defense system, the weight of the strategic defense effort was rebalanced in favor of the protection of the Soviet Union's own SSBNs. With a capability to launch from home waters against targets in the continental United States from the mid-1970s onwards, this could take the form of a near-seas defense in what Western analysts came to call "bastions"[37] well north of the Arctic circle. In other words, Soviet planners had come to recognize that the aspect of U.S. naval superiority that was most important for them to counter – the ability to strike the Soviet homeland with nuclear weapons – could not be broken by naval means focused on sea denial.

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[35] Kenneth N. Waltz, *Theory of International Politics* (New York, NY: Random House, 1979), 186.

[36] Two theories that have been discussed repeatedly revolve around the tapping of undersea cables by U.S. submarines inside Soviet territorial waters and the recruitment of one or several moles in the highest reaches of the Soviet General Staff. Both theories are plausible, and both may be accurate. See, e.g. Hennessy and Jinks, *The Silent Deep*, 531. For an account of U.S. cable-tapping operations, see Sherry Sontag and Christopher Drew with Annette Lawrence Drew, *Blind Man's Bluff: The Untold Story of American Submarine Operations* (New York: HarperCollins, 1998).

[37] For the basic outline of the story, see Hattendorf, *The Evolution of the U.S. Navy's Maritime Strategy 1977-1986*, 23-36; Christopher Ford and David Rosenberg, *The Admirals' Advantage: U.S. Navy Operational Intelligence in World War II and the Cold War* (Annapolis, MD: Naval Institute Press, 2005), 77-108.

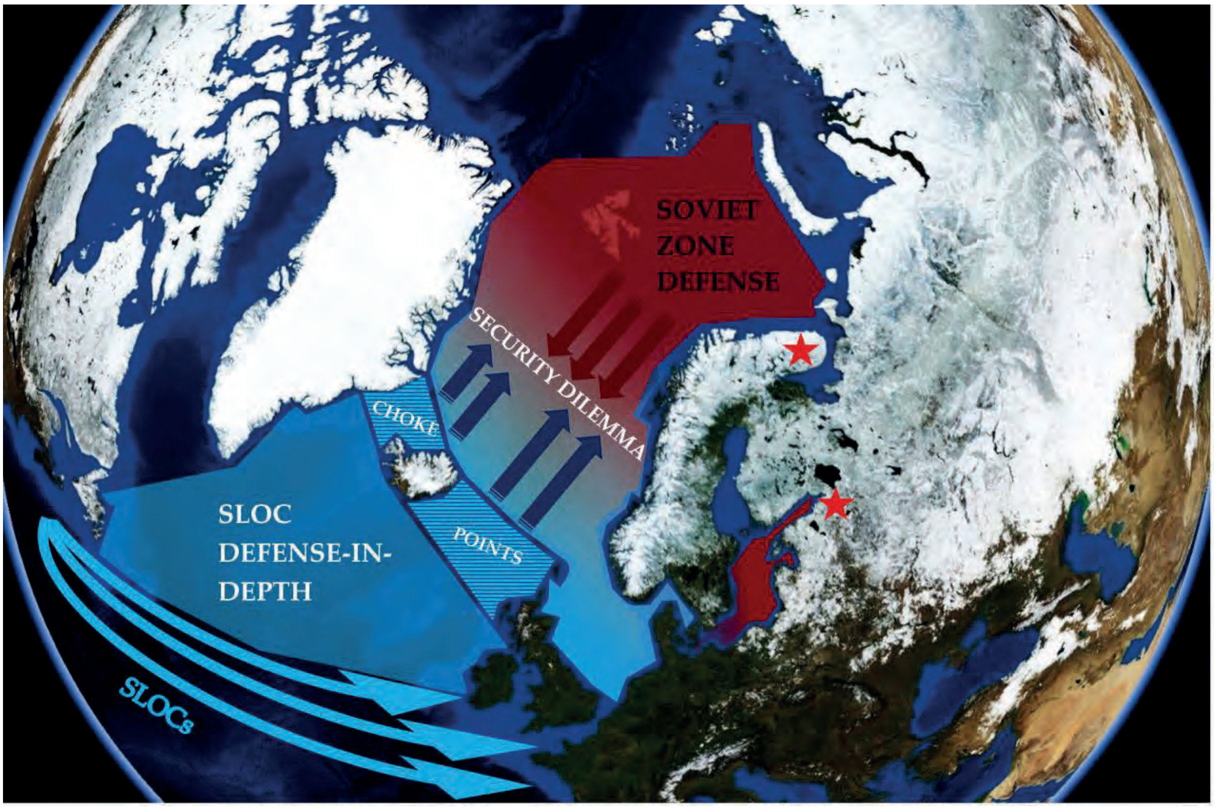

Fig. 2: The Cold War naval confrontation in the North Atlantic area as a security dilemma. *(Own work/NASA WorldWind.)*

There is, however, more to this story than meets the eye. U.S. naval initiatives that long predated the 1980s Maritime Strategy played an important role in bringing about this outcome. The U.S. Navy's adaptations to the Soviet threat made sure that the Soviet zone defense system ultimately failed in its main purpose: to pose a sufficient threat of conventional and tactical nuclear "denial"[38] – that is, to convince the U.S. Navy that the kind of far-forward, offensive naval strategy that was originally developed in the late 1940s and early 1950s would be too difficult and too costly to succeed. Without these various adaptations, it would have been much more difficult to reprise such a strategy from the early 1980s onwards and the Soviet threat of oceanic denial would have loomed considerably larger than it ultimately did. Hence, there are important conclusions to be drawn from this aspect of the competition as well. It is hoped that, to the extent that this dissertation manages to combine the various strands of the Cold War dynamic at sea into an analytical narrative, it will make a valuable contribution to

[38] John J. Mearsheimer, *Conventional Deterrence* (Ithaca, NY: Cornell University Press, 1983), 14.

our understanding of this defining case of naval competition under the conditions of the nuclear age. Having said that, to successfully guide the investigation and keep it focused squarely on its object, the research questions and approach need to be set out more closely. This will be the task of the next section.

1.2 Research problem and approach

Ultimately, the superpowers were fortunate enough never to find out exactly how the other would employ its naval forces in times of war. The interaction between the naval postures of the East and West nevertheless played a critical role in shaping the military and political realities of the Cold War era. The only sustained, large-scale naval rivalry to take place since the dawn of the "missile age,"[39] the competition between the superpowers played a pivotal role in the evolution of naval warfare after 1945. Although direct analogies are difficult, it is not an exaggeration to say that it was as significant in that respect as the Anglo-German naval race of 1898-1914 or the U.S.-Japanese antagonism of the interwar period.[40] For this reason alone, research into the Cold War at sea should be a core part of any 21st century strategic studies research agenda concerned with developments in naval forces.

The purpose of this dissertation is, however, more specific. It seeks to make sense of a puzzling outcome that may – or may not – repeat itself in this century. It starts from the observation that the U.S. Navy entered the Cold War with a clear-cut advantage over any potential

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[39] The concept can be traced to Brodie's classic *Strategy in the Missile Age* and, in its original context, it has a nuclear connotation. Bernard Brodie, *Strategy in the Missile Age* (Santa Monica, CA: RAND, 2007) Applied to naval warfare, self-propelled *missiles* had played an important role long before, of course – the torpedo being the foremost example. According to Watts, "the earliest instances of combat success with *recognizably modern* guided munitions occurred in 1943 [when] the German Navy introduced the first acoustic-homing torpedo, the G7e/T4 *Falke*." Barry D. Watts, "Six Decades of Guided Munitions and Battle Networks: Progress and Prospects" (Center for Strategic and Budgetary Assessments, Washington, DC, 2007), 3 (emphasis added). For the purposes of this study, the term should be read to denote both the wholesale replacement of guns, for both offensive and defensive uses, by various types of guided missiles in the aftermath of World War II, and the potential nuclear dimension of missile combat at sea.

[40] For an overview, see Peter Padfield, *The Great Naval Race: The Anglo-German Naval Rivalry, 1900-1914* (New York, NY: D. McKay, 1974); David C. Evans and Mark R. Peattie, *Kaigun: Strategy, Tactics, and Technology in the Imperial Japanese Navy, 1887-1941* (Annapolis, MD: Naval Institute Press, 2012), Chapters 8-13.

challenger, or a plausible constellation of challengers. Such advantages have been difficult to maintain over a period of decades in the face of a determined challenge. Looking back in history, Britain's naval supremacy in the North Sea and the United States' position in the Pacific each came under severe pressure within less than a decade of being openly challenged by Germany and Japan, respectively. Compared to these two pre-nuclear cases, the Soviet challenger defined its aims narrowly and focused very considerable resources on an objective that should have been relatively comparatively easy to attain: to raise the costs of far-forward naval operations against the Soviet Union sufficiently to force the U.S. Navy to lower its aim in that particular regard. Yet, after some thirty-five years of Soviet investment into a focused sea denial capability that was largely without equal in history, the U.S. Navy of the early 1980s nevertheless found itself in the position to propose a posture designed for far-forward, offensive operations no less ambitious than that envisioned during the late 1940s, which had spurred the Soviet defense establishment into action in the first place. *Why, given the significant technological and operational strides that the VMF made, did the long-term naval competition between the Cold War superpowers end with U.S. naval supremacy largely intact? Conversely, why did the VMF's ultimately reimagine its defensive system in terms of the much more circumscribed, near-seas defensive bastions of the 1980s, given that the task of oceanic perimeter defense should not have been insurmountable, given its largely negative aims and the sheer lethality of missile age weaponry?* To provide answers to these questions, the thesis will explore in detail the Soviet Navy's attempts to undermine U.S. naval supremacy and the U.S. Navy's efforts to keep a meaningful advantage over its opponent through several long modernization cycles, focusing on the two functional areas that were expected to pose the greatest challenges in any conflict with the Soviet Union: the contest between submarines and anti-submarine warfare (ASW) forces, and the competition between Soviet naval aircraft armed with anti-ship missiles and U.S. fleet air defenses.[41]

[41] For pragmatic reasons, the study does not give the same weight to anti-surface warfare (ASuW), as the main threat posed by Soviet surface combatants to U.S. surface units was their heavy missile armament,

THE CONCEPT OF POSTURE CHANGE

This dissertation proposes to study the dynamics of the competition for military advantage between the Cold War superpowers from a particular conceptual angle – namely, that of change in *naval postures*. By naval posture we mean *the product of decisions about the principles of naval force employment, the types of naval forces to acquire, and the manner in which they are to be deployed.*[42] A naval posture is not a *strategy* – it does not specify how particular political-military aims are to be pursued in war or in peacetime.[43] Rather, it is designed to provide military options to decision-makers. Postures set out, and thereby also narrow, the range of military ways and means that are plausibly available for strategists to work with. Hence, naval postures *shape* naval strategies in critical ways, but they do not *determine* them. Conversely, strategic choices – including those at the levels of grand strategy and national military strategy – provide *political-military direction* for posture planning. Hence, the relationship between the two concepts is really quite intimate, but they are not the same thing.

Even though the concept of strategy has been so diluted as to mean all things to all people, the proper realm of strategy is *the particular*: a strategy must be closely adapted to the challenges at hand. At the same time, strategy-making also requires sufficient flexibility to adapt to an evolving situation. "In historical practice," Gray finds, "strategies constantly need to be drafted for, and adapted to, dynamic circumstances."[44] Strategies *can* and sometimes *must* change practically overnight. A posture is usually developed over a period of years and even

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which is covered as part of the anti-air warfare (AAW) problem set. It also does not include a detailed discussion of amphibious operations. On the history of amphibious warfare during the Cold War era, see Joseph H. Alexander and Merrill L. Bartlett, *Sea Soldiers in the Cold War: Amphibious Warfare, 1945-1991* (Annapolis, MD: Naval Institute Press, 1995). For a functional overview of modern amphibious operations, see Ian Speller and Christopher Tuck, *Amphibious Warfare: Strategy and Tactics from Gallipoli to Iraq* (London: Amber Books, 2014).

42 Stratmann provides a workable definition of posture as encompassing the material and immaterial components of organization, equipment, armaments, tactics, command and control, and operational planning. His inclusion of strategy as a *component* of posture – rather than an intimately related, but analytical separate category – is, however, puzzling and requires a departure. Karl-Peter Stratmann, "Die Sicherheit des NATO-Abschnitts Mitteleuropa als strategisches Problem: Untersuchungen zur Glaubwürdigkeit der gegenwärtigen NATO-'Posture'" (Doctoral dissertation, Ludwig-Maximilians-Universität, 1978), 6.

43 Colin S. Gray, *The Strategy Bridge: Theory for Practice* (Oxford: Oxford University Press, 2010), 18.

44 Ibid., 41.

its most flexible element by far – the pattern of force deployment – can take weeks or months to adjust. Because "you go to war with the [forces] you have – not the [forces] you might want or wish to have at a later time,"[45] posture planning must be sufficiently broad-based to allow for the implementation of *different* strategies in different contextual settings. At the same time, there are only so many strategic options that a posture can support. Thus, there are many strategies that a well-designed coastal defense posture can serve well, but those that require escorting convoys across the Atlantic in force 10 gales will most likely fall outside its scope. A blue-water, sea control navy will be much more expensive to develop, but it will struggle almost as badly when it is sent into a vicious coastal scenario. A long-term military competition, in this perspective, involves the search for advantages in force posture that can support a range of plausible strategies that might be pursued in a crisis or conflict. The product of those strategies, when implemented, is *strategic effect*.[46] The product of military posture planning, on the other hand, is *credible options for the use of force*. It is the process by which these options are created, and by which postures are adapted over the long term, that will be at the heart of the research effort.

RESEARCHING THE DYNAMICS OF COLD WAR NAVAL POSTURES

Based on a detailed reconstruction of the U.S. Navy's efforts to maintain its starting position of naval supremacy in the "rimlands"[47] of Eurasia, and of the Soviet Navy's attempts to sow pervasive doubts about the U.S. Navy's prospects in a naval war so as to undermine that position, this dissertation seeks to unearth the patterns of naval posture change and to provide an improved understanding of why the Soviet challenge fell short of its ambition during the first and second phases of the Cold War at sea. To do so, we must first conceptualize the process of posture change and lay down some guidelines for the analysis of the extensive primary and secondary evidence that is available on the Cold War at sea. As we will see, there is no

45 Donald Rumsfeld, *Known and Unknown: A Memoir* (London: Allen Lane, 2013), 645.
46 See n. 12.
47 The concept is most prominently associated with the geostrategist Nicholas Spykman. See Saul Bernard Cohen, *Geography and Politics in a World Divided* (New York, NY: Random House, 1963), 46-49.

one theory or approach that we can adopt 'off the rack' to accomplish this and lay a solid foundation for an analysis of naval posture change that is *theoretically informed* and *systematic* in approaching the research problem, but that also retains sufficient *empirical richness and accuracy* to provide a detailed account. Hence, the approach that is eventually selected amounts to what Scharpf has called a "modular framework"[48] that deliberately seeks to combines aspects of different theories to maximize our ability to reprise a complex historical reality in a structured manner and analyze it in a way that does justice to our subject. This framework, which is summarized in Figure 3, combines elements of *neoclassical realism* with insights from *organization theory*. The main components of this framework are (1) the insistence that, in a long-term strategic rivalry, external military threats are a primary driver of state behavior, (2) the realization that military advantages are created and maintained by the actors themselves, rather than by technological or military change *per se*, (3) a focus on navies as bureaucratic actors that are motivated by a complex mixture of self-interest and state-level responsibilities, and (4) the expectation that military organizations' reactions to external threats will be shaped by their perception of the external environment and by the *mélange* of interests that drive them, but also by intrastate developments that are not under their direct control.

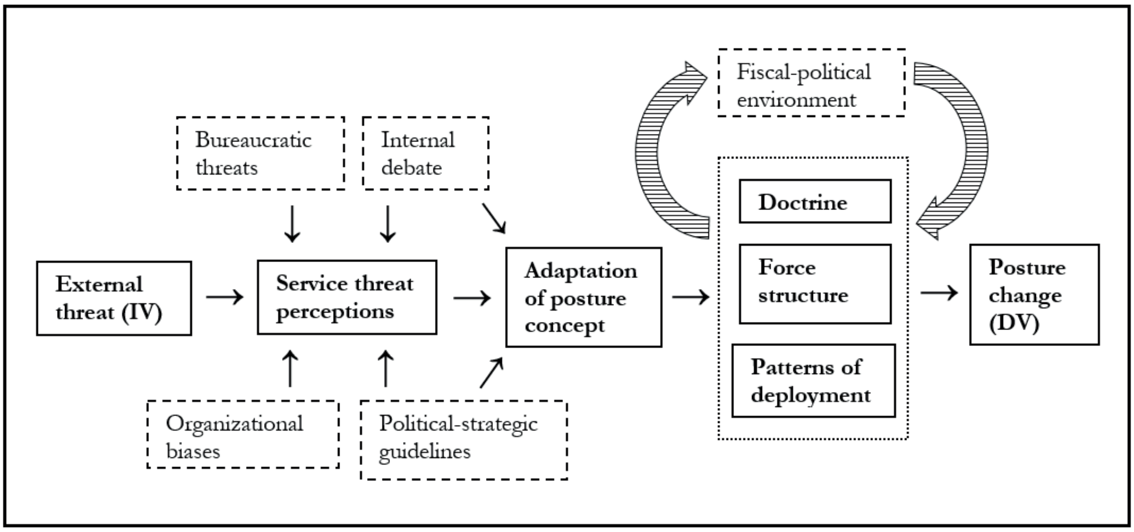

Fig. 3: The posture adaptation process

[48] Fritz W. Scharpf, *Games Real Actors Play: Actor-Centered Institutionalism in Policy Research* (Boulder, CO: Westview Press, 1997), 30-31.

The framework will be developed step-by-step in the course of a more detailed engagement with several strands of the theoretical literature in Chapter 2 and will be further specified in Chapter 3, which will also discuss the methods that will be used throughout the empirical chapters. While the main method will be *process tracing*, this will be combined with insights provided by a number of supporting methods that were originally developed by Cold War naval analysts, such as *hardware analysis* and *literary analysis*. These methods will also be outlined in greater detail in Chapter 3. In the next step, we will see how this effort can be located within the existing literature and why the synthetic approach that is proposed here will make a significant contribution to the state of knowledge in the field of international security and strategic studies.

1.3 Literature review

While geostrategic rivalries between sea powers and land powers – as well as among rival sea powers – have preoccupied generations of statesmen, naval strategists, and historians, they have evinced only sporadic interest among contemporary social scientists. The interdisciplinary field of strategic studies, preoccupied first with the vexing questions raised by the nuclear revolution and then with the crumbing of its nuclear-centric research agenda in the 1990s, has been only a partial exception in this regard.[49] Naval competition has been an even less prominent subject in the subdiscipline of security studies more broadly. There is a significant potential, however, for combining theoretical and historical approaches in search of a better understanding of the phenomenon in general, and of the Cold War case in particular. In the following, we will briefly review the different strands of the existing literature in turn.

[49] Among the 'academic strategists' of the second half of the 20th century, Bernard Brodie and Colin Gray are prominent exceptions in this regard. The overall picture is a different one, however: In their comprehensive review of the evolution of the security and strategic studies field, Buzan and Hansen can get away with not mentioning seapower as a relevant factor even once. Barry Buzan and Lene Hansen, *The Evolution of International Security Studies* (Cambridge: Cambridge University Press, 2010).

NAVAL COMPETITION AS A SUBJECT OF HISTORICAL ENQUIRY

Naval history is a rich subfield of military history that has brought forth a very considerable number of works that are of relevance to this investigation. While naval historians have traditionally focused on providing detailed analyses of naval battles and campaigns – a genre with a long pedigree that quite literally comprises thousands of works, which inevitably vary widely in depth and quality – the field has seen an impressive diversification over the last several decades.[50] In fact, some of the most relevant works in establishing the historical context of the present investigation do not neatly qualify as naval histories, in a narrow sense. Particularly relevant in this regard is a small number of works that explore the history of leading sea powers, and of competitions between sea and land powers, in a macrohistorical perspective.[51] Equally pertinent is a subset of the historical literature that explores interrelated issues of strategy, doctrine, administration, and technology development, sometimes in a very well-organized and integrated manner.[52] Some of these works provide deep insights into the dynamics of naval posture change and the pursuit of naval competitions that students of these matters would ignore at their peril. At the same time, the analyst should be wary of directly grafting insights from the historical literature onto the Cold War case, given the radical changes in warfare that shaped the U.S.-Soviet competition.

A third subset of works, which partially overlaps with the second, has explored particular instances of past naval competitions in considerable detail. Although other cases are also

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[50] For recent and fairly comprehensive overview, see Richard Harding, *Modern Naval History: Debates and Prospects* (London: Bloomsbury Academic, 2016). See also the papers in John B. Hattendorf, ed., *Doing Naval History: Essays Toward Improvement* (Newport, RI: Naval War College Press, 1995).

[51] Particularly worthy of mention are Clark Reynolds, *Command of the Sea: The History and Strategy of Maritime Empires* (New York, NY: Morrow & Co, 1974), Peter Padfield, *Maritime Supremacy and the Opening of the Western Mind: Naval Campaigns that Shaped the Modern World, 1588-1782* (London: John Murray, 1999); and Andrew D. Lambert, *Seapower States: Maritime Culture, Continental Empires and the Conflict that Made the Modern World* (New Haven, CT: Yale University Press, 2018). Mahan's *The Influence of Sea Power Upon History* may also be said to qualify, but despite its undeniable influence to this day, it is much more narrowly focused overall. A. T. Mahan, *The Influence of Sea Power Upon History, 1660-1783* (New York, NY: Dover, [1894]2012).

[52] Notable examples include Roger Morriss, *The Foundations of British Maritime Ascendancy: Resources, Logistics and the State, 1755-1815* (Cambridge: Cambridge University Press, 2011); Jon Tetsuro Sumida, *In Defence of Naval Supremacy: Finance, Technology, and British Naval Policy 1889-1914* (Annapolis, MD: Naval Institute Press, [1989]2014); and William M. McBride, *Technological Change and the United States Navy, 1865-1945* (Baltimore, MD: Johns Hopkins University Press, 2010).

relevant, studies of the Anglo-German and U.S.-Japanese rivalries – particularly those with a focus on strategy, technology and operational planning – have been most useful in preparing this dissertation.[53] There is, of course, a significant historical literature on the Cold War naval competition as well, which is briefly discussed below. These works are often excellent in capturing particular aspects or phases of a competition, and many of them were instrumental in preparing this study. At the same time, it must be said that the number of historical works that manage to combine breadth and analytical depth in an attempt to cover the entire Cold War at sea, or large parts of it, has remained relatively small.[54] Many of the more narrowly focused works are of very high quality and, collectively, they provide a wealth of evidence for an attempt at synthesis.

NAVAL COMPETITION IN STRATEGIC STUDIES

The second relevant field of enquiry, which is rooted in the tradition of strategic and military studies, is primarily concerned with the theory and uses of seapower. These works often explore the nature of seapower and the missions of navies in war and peace in fairly general terms and provide a solid overview of the peculiarities of naval forces and naval warfare, and the foundational concepts of naval analysis. Some of the broad surveys of the topic continue to shape current debates. Booth's *Navies and Foreign Policy*, Gray's *The Leverage of Sea Spower,* Till's *Modern Sea Power*, and Uhlig's *How Navies Fight: The U.S. Navy and its Allies* are among

[53] On the Anglo-German rivalry, see e.g. Padfield, *The Great Naval Race*; Paul M. Kennedy, *The Rise of the Anglo-German Antagonism, 1860-1914* (New York, NY: Humanity Books, 1988); Shawn T. Grimes, *Strategy and War Planning in the British Navy, 1887-1918* (Woodbridge: The Boydell Press, 2012); Matthew S. Seligmann, Frank Nägler and Michael Epkenhans, eds., *The Naval Route to the Abyss: The Anglo-German Naval Race 1895-1914* (London: Routledge, 2016). On the U.S.-Japanese rivalry see Evans and Peattie, *Kaigun*; Edward S. Miller, *War Plan Orange: The U.S. Strategy To Defeat Japan, 1897-1945* (Annapolis, MD: Naval Institute Press, [1991]2013). All of these works provide deep insights into naval operational concepts, technology and organization. On a somewhat less prominent case, see Nicholas Papastratigakis, *Russian Imperialism and Naval Power: Military Strategy and the Build-Up to the Russian-Japanese War* (London: I.B. Tauris, 2011).

[54] Some notable exceptions to the rule are Baer, *One Hundred Years of Sea Power*, 275-444; Jeffrey G. Barlow, *From Hot War to Cold: The U.S. Navy and National Security Affairs, 1945-1955* (Stanford, CA: Stanford University Press, 2009); and – with a stronger focus on an elaborate narrative – Michael T. Isenberg, *Shield of the Republic: The United States Navy in an Era of Cold War and Violent Peace, 1945-1962* (New York, NY: St Martin's Press, 1993).

the best examples in this regard.[55] They are complemented by a set of more specialized works on tactics and operational art, which accomplish the same at lower levels of analysis.[56] However, none of these contributions come close to providing, individually or collectively, a well-specified theory of great power naval competition.

Two subfields of the strategic and military studies literature are of particular importance in laying the foundation for such a theory. The first analyzes naval rivalries through the prism of arms racing and arms control.[57] While this is a relatively small body of research, it provides a distinct view of the competitive and reactive aspect of the phenomenon and, as a result, proves useful in examining the Cold War at sea. Like the literature on arms races more generally, this approach tends to direct attention towards specific armaments programs, how they interact with one another, and how they eventually become a contributing cause of instability and war.[58] This framing is particularly well-suited to the Anglo-German naval race of 1898-1914 and, to a lesser extent, the U.S.-Japanese competition in the 1930s. It accurately describes certain aspects of the Cold War naval rivalry, but does not work well as a standalone

[55] Ken Booth, *Navies and Foreign Policy* (London: Croom Helm, 1977); Geoffrey Till, *Modern Sea Power: An Introduction* (London: Brassey's Defence, 1987); Colin S. Gray, *The Leverage of Sea Power: The Strategic Advantage of Navies in War* (New York, NY: Macmillan, 1992); Frank Uhlig, *How Navies Fight: The U.S. Navy and its Allies* (Annapolis, MD: Naval Institute Press, 1994). Other important works include: Edward Luttwak, *The Political Uses of Sea Power* (Baltimore, MD: Johns Hopkins University Press, 1974); Eric Grove, *The Future of Sea Power* (Annapolis, MD: Naval Institute Press, 1990); Geoffrey Till, *Seapower: A Guide for the Twenty-First Century*, 3rd ed. (London: Routledge, 2013); Speller, *Understanding Naval Warfare*.

[56] Wayne P. Hughes and Robert Girrier, *Fleet Tactics and Naval Operations* (Annapolis, MD: Naval Institute Press, 2018); Milan N. Vego, *Operational Warfare at Sea: Theory and Practice*, 2nd ed. (London: Routledge, 2017).

[57] See, e.g.: Matthew S. Seligmann, "The Anglo-German Naval Race, 1898-1914," in Mahnken; Maiolo; Stevenson, *Arms Races in International Politics*, 21-40; Joseph Maiolo, "Naval Armaments Competition Between the Two World Wars," in Mahnken; Maiolo; Stevenson, *Arms Races in International Politics*, 93-114; Emily O. Goldman, *Sunken Treaties: Naval Arms Control Between the Wars* (University Park, PA: Pennsylvania State University Press, 1994); Geoffrey Till, *Asia's Naval Expansion: An Arms Race in the Making?,* Adelphi Paper 432-433 (London: Routledge/IISS, 2012).

[58] For an excellent overview of these debates, see Barry Buzan, *An Introduction to Strategic Studies: Military Technology and International Relations* (Basingstoke: Macmillan/IISS, 1987), 69-131. See also Barry Buzan and Eric Herring, *The Arms Dynamic in World Politics* (Boulder, CO: Lynne Rienner, 1998); Jeffrey A. Larsen and James J. Wirtz, *Arms Control and Cooperative Security* (Boulder, CO: Lynne Rienner, 2009).

explanation of the complex dynamics of posture change over a number of decades.[59] While it was, at times, marked by the immediate urgency and escalatory momentum that is often associated with an arms race, this rivalry was primarily a process of prolonged posturing for relative advantage in which changes in force structures, operational concepts, war plans and deployment patterns often came together gradually. Technology was one driver among others and threat perceptions were chronic, with some interspersed bouts of acute alarm. Naval arms control became a serious concern only briefly and then only in the waning days of the competition.[60] As a result, the contribution of the arms race and arms control literature will be to inform this study, rather than to provide the main analytical blueprint to work from.

The second subset of strategic studies looks at the evolution of specific naval strategies in much greater detail, often at a national level. While there is some overlap with the historical literature, these studies tend to be more systematic and more narrowly focused. Perhaps the best example of such a study of the U.S. Navy during the Cold War is Hegmann's *In Search of Maritime Strategy*.[61] As far as the its Soviet competitor is concerned, Robert Herrick's works on the history of Soviet naval strategy and doctrine perhaps come closest to providing an equivalent.[62] Some more recent analyses of U.S. naval strategy include Haynes' *Toward a New Maritime Strategy: American Naval Thinking in the Post-Cold War Era* and Bruns' *U.S. Navy Strategy & American Sea Power from "The Maritime Strategy' (1982-1986) to 'A Cooperative Strategy for 21st Century Seapower' (2007)*, both of which engage with the Maritime Strategy debates of the

[59] For an analysis of the U.S.-Soviet competition that is explicitly guided by arms race and arms control concepts, see Richard W. Fieldhouse and Shunji Taoka, *Superpowers at Sea: An Assessment of the Naval Arms Race* (Oxford: Oxford University Press, 1989). It should be noted that this particular framing coincided with attempts at making naval forces part of a more comprehensive arms control agenda and was never a prevalent approach in analysing superpower naval strategies. Peter Rudolf, *Amerikanische Seemachtpolitik und maritime Rüstungskontrolle unter Carter und Reagan* (Frankfurt am Main: Campus, 1990).

[60] For an overview of the Soviet proposals and the ensuing debate, see Ronald O'Rourke, "Naval Arms Control: A Bilateral Limit on Attack Submarines?" (Congressional Research Service, Washington, DC, 1990); Fieldhouse and Taoka, *Superpowers at Sea*.

[61] Richard Hegmann, "In Search of Strategy: The Navy and the Depths of the Maritime Strategy" (Doctoral Thesis, Brandeis University, September 1990).

[62] His book-length treatments of the subject are Herrick, *Soviet Naval Strategy*; Robert W. Herrick, *Soviet Naval Theory and Policy: Gorshkov's Inheritance* (Annapolis, MD: Naval Institute Press, 1989); Robert Waring Herrick, *Soviet Naval Doctrine and Policy, 1956-1986,* 3 vols. (Lewiston, NY: Edwin Mellen Press, 2003).

1980s, but have little overlap with the present study.[63] The two works also share a focus on analyzing successive high-level strategic documents in their respective context and both draw on the *CNA Capstone Strategy Series* – a comprehensive review of U.S. Navy strategic documents from 1970-2010 prepared by CAPT (ret.) Peter Swartz.[64] Although formal strategy documents, which should be seen as distinct from naval postures 'on the ground' or at sea, are not a focal point of the analysis, portions of the series have also been used as background material and evidence in preparing this dissertation.

Another important pillar of the literature directly addresses questions of maritime operational access and anti-access (or counter-projection) strategies. The main hub for this line of enquiry has been the Center for Strategic and Budgetary Assessments in Washington, DC.[65] A number of detailed, policy-focused studies of current and future anti-access threats have also been undertaken at the RAND Corporation and other think tanks.[66] The most comprehensive take on the anti-access problem is Tangredi's *Anti-Access Warfare: Countering A2/AD Strategies*.[67] Though clearly driven by the policy debate, Tangredi goes deeper in contextualizing this debate than most other authors have done and provides a framework for understanding anti-

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[63] Peter D. Haynes, *Toward a New Maritime Strategy: American Naval Thinking in the Post-Cold War Era* (Annapolis, MD: Naval Institute Press, 2015); Sebastian Bruns, "U.S. Navy Strategy & American Sea Power from "The Maritime Strategy" (1982-1986) to "A Cooperative Strategy for 21st Century Seapower" (2007): Politics, Capstone Documents, and Major Naval Operations 1981-2011" (Doctoral dissertation, Christian-Albrechts-Universität zu Kiel, 2014), accessed August 27, 2018, https://macau.uni-kiel.de/servlets/MCRFileNodeServlet/dissertation_derivate_00006090/Bruns_American_Seapower_1981-2011.pdf.

[64] The entire series of seventeen extensive Powerpoint briefings is available online: https://www.cna.org/research/capstone-strategy-series.

[65] See, e.g. Andrew F. Krepinevich and Robert O. Work, "A New US Global Defense Posture for the Second Transoceanic Era" (CSBA/Office of Net Assessment, Washington, DC, 2007); Andrew F. Krepinevich, "Why AirSea Battle?" (CSBA/Office of Net Assessment, Washington, DC, 2010); Jan van Tol et al., "AirSea Battle: A Point-of-Departure Operational Concept" (CSBA/Office of Net Assessment, Washington, DC, 2010); John Stillion and Bryan Clark, "What it Takes to Win: Succeeding in 21st Century Battle Network Competitions" (CSBA/Office of Net Assessment, Washington, DC, 2015).

[66] Roger Cliff et al., *Entering the Dragon's Lair: Chinese Antiaccess Strategies and Their Implications for the United States* (Santa Monica, CA: RAND, 2007); Roger Cliff et al., *Shaking the Heavens and Splitting the Earth: Chinese Air Force Employment Concepts in the 21st Century* (Santa Monica, CA: RAND, 2011); Eric V. Larson et al., *Assuring Access in Key Strategic Regions: Toward a Long-Term Strategy* (Santa Monica, CA: RAND, 2004); Peter Dutton, Andrew S. Erickson and Ryan Martinson, eds., *China's Near Seas Combat Capabilities* (Newport, RI: U.S. Naval War College/China Maritime Studies Institute, 2014).

[67] Tangredi, *Anti-Access Warfare*.

access threats that is not bound to a single threat or historical context.[68] While his analysis is far from complete, and his focus is on analyzing campaigns more than the peacetime military competitions that tend to precede them, his work also provides useful background material for this study. Finally, there also large and sophisticated technical literature on ship design, naval weapon systems and sensors, and developments in force structure and organization, which was indispensable in preparing this study and which will be referenced as necessary.[69]

All of the works mentioned above make important contributions to their respective subfields. However, none of them manage to systematically relate their analysis of naval competitions for access to broader concerns in the security studies field. As a result, they largely fail to bridge the gap between the academic and policy worlds in the way that such landmark studies as Pape's *Bombing to Win: Air Power and Coercion in War* or Biddle's *Military Power: Explaining Victory and Defeat in Modern Battle* have done for the employment of airpower and landpower, respectively.[70]

NAVAL COMPETITION IN INTERNATIONAL SECURITY STUDIES

While seminal academic works on the subject are few and far between, it is nonetheless worth looking beyond the specialized naval literature and considering the subject of the study in a broader international security framing as well. Perhaps unsurprisingly, the state of the literature that directly touches upon the question becomes considerably more threadbare as we enter into the territory of 'academic' security studies proper. Given the pervasive impact of transoceanic power projection on real-world international politics and the fact that the current,

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[68] Ibid., 75-106.

[69] Important works in this category include: Norman Friedman, *The Naval Institute Guide to World Naval Weapons Systems* (Annapolis, MD: Naval Institute Press, 1989); Siegfried Breyer and Norman Polmar, *Guide to the Soviet Navy* (Cambridge: Patrick Stephens Ltd, 1977); Norman Polmar, *The Naval Institue Guide to the Ships and Aircraft of the United States Fleet* (Annapolis, MD: Naval Institute Press, 1993); J. E. Moore, *Jane's Fighting Ships* (London: Jane's Information Group); David R. Frieden, *Principles of Naval Weapon Systems* (Annapolis, MD: Naval Institute Press, 1985).

[70] Robert Anthony Pape, *Bombing To Win: Air Power and Coercion In War* (Ithaca, NY: Cornell University Press, 1996); Stephen Biddle, *Military Power: Explaining Victory and Defeat in Modern Battle* (Princeton, NJ: Princeton University Press, 2006).

U.S.-led global security system is fundamentally shaped by its maritime geography, this is a serious deficit that must be pointed out. It is perhaps understandable that liberal, institutionalist, and constructivist scholars of IR would not ordinarily dwell at length on the relationship between the availability of military power and the ability to bring it to bear in far-flung corners of the planet, central though that relationship has been to the evolution of the global system under both European and U.S. leadership.[71]

However, the same cannot be said of the realist school of thought, which claims deep insights into the workings of power politics and inter-state security systems. In fact, despite their concern with military capabilities, most mainstream realists remain astonishingly vague in their accounts of how military power is actually converted into political outcomes. They also tend to practice a far-reaching agnosticism as to the "physical playing field"[72] on which the real-world struggle for global influence necessarily takes place. Notable exceptions are Boulding's *Conflict and Defense: A General Theory*, select passages in Mearsheimer's *The Tragedy of Great Power Politics*, and important contributions by Levy, Modelski, and Thompson.[73] The latter in particular offer a considerably more nuanced treatment of the specific contributions of naval power projection, which they effectively link to the broader debate about 'long cycles'

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71 Interestingly, economists like Findlay and O'Rourke seem more attuned to this reality than many IR scholars; see Ronald Findlay and Kevin H. O'Rourke, *Power and Plenty: Trade, War, and the World Economy in the Second Millennium* (Princeton, NJ: Princeton University Press, 2007). On maritime affairs, Wendt's constructivism contributes only the idea that "[g]roups lacking navigational technology […] will find their borders constrained by oceans, whereas sea-faring groups will not." Alexander Wendt, *Social Theory of International Politics* (Cambridge: Cambridge University Press, 1999), 213. While this may well be true, it arguably falls short of establishing him as an expert on the subject. That said, the social self-construction of sea and land powers is a rather fascinating topic that would arguably be worthy of serious enquiry by scholars of the constructivist persuasion. English-school theorist Martin Wight deserves some credit for discussing the dichotomy of seapower and landpower in some detail, even if one does not concur with his judgment that the utility of seapower has long been overstated and that it has been "[credited] with results that were due rather to propitious circumstances." Martin Wight, *Power Politics* (New York, NY: Leicester University Press, Holmes & Meier Publishers Inc., 1978), 71.

72 G. R. Sloan and Colin S. Gray, eds., *Geopolitics, Geography, and Strategic History* (London: Frank Cass, 1999).

73 Kenneth E. Boulding, *Conflict and Defense: A General Theory* (New York: Harper, 1962); Mearsheimer, *The Tragedy of Great Power Politics*, esp. 114-25; George Modelski and William R. Thompson, *Seapower in Global Politics: 1494 -1993* (Basingstoke: Macmillan, 1988); Jack S. Levy and William R. Thompson, "Hegemonic Threats and Great-Power Balancing in Europe, 1495-1999," *Security Studies* 14, no. 1 (2005), doi:10.1080/09636410591001465; Jack S. Levy and William R. Thompson, "Balancing on Land and at Sea: Do States Ally against the Leading Global Power?," *International Security* 35, no. 1 (2010), doi:10.1162/ISEC_a_00001, 7-43.

and hegemonic succession, that can otherwise be found in the security studies literature.[74] However, much of the work in question is of a quantitative empirical nature, and thus primarily a treasure trove of data linked to an internally consistent – if not necessarily comprehensive – analysis of hegemonic systems. In a 2010 article, Thompson, in conjunction with Jack Levy, expands on this earlier work by providing a well thought-out theoretical account of the balancing dynamics in the "global maritime system."[75] Levy and Thompson argue that sea powers generally do not provoke the kind of vigorous external balancing behavior that is often seen in continental systems, because they are seen as inherently less threatening: "Maritime powers have smaller armies, fewer capabilities for invading and occupying, and fewer incentives to do so. They pose significantly weaker threats to the territorial integrity of other states, particularly to other great powers, but greater threats to each other than to leading land-based powers."[76]

While they make a strong case that alliance building is indeed less likely against leading maritime powers, their well-specified theory obviously has little to say about *internal* balancing – that is, the acquisition of capabilities and the development of doctrinal concepts designed to offset the sea power's comparative military advantage.[77] In the following, the reader will find abundant evidence of Soviet internal balancing directed specifically against U.S. naval capabilities. It will also become evident that, even though sea powers may well be seen as *relatively* less threatening compared to proximate land powers that exert a similar level of military effort, the presence of an array of offensively-oriented projection forces within striking range of one's home territory does not inspire any particular trust in *absolute* terms. (In fact, if naval projection forces were perceived as inherently non-threatening, they would deliver a very poor return on investment, as far as deterrence and compellence are concerned.)

The conclusion that can be drawn from this review of the existing literature is that naval competition has not been – and most probably cannot be – adequately captured by mainstream

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74 The other classic treatment of that debate is: Robert Gilpin, *War and Change in World Politics* (Cambridge: Cambridge University Press, 1981).
75 Levy and Thompson, "Balancing on Land and at Sea", 8.
76 Ibid., 16.
77 The differentiation is first introduced in Waltz, *Theory of International Politics*, 168.

IR scholarship. Assessing the dominant sea power's ability to uphold its advantage in naval power projection in the face of organized resistance requires a more tailored and fine-grained approach. At the same time, we will see that relevant analytical instruments do exist and can readily be adapted to the task at hand. Having said that, none of the literatures discussed above can claim to provide a suitable framework that would allow us to analyze the Cold War at sea without reference to the other literatures. To put it somewhat pointedly, neither a traditional historical account, nor a winding discussion of the true meaning of seapower, nor a deliciously parsimonious structural theory is likely to provide the best answers to the questions we are pondering here. Rather, it is the combination of appropriate elements and insights from international security studies, strategic studies, and more narrowly focused naval analyses that holds the promise of significantly improving our understanding of the historical dynamics of the Cold War at sea. As a result, this investigation treads an intermediate path, and proposes a modular theory that can capture the naval competition between the superpowers to an extent that no individual approach can. On the downside, the resultant framework will not allow for sweeping generalizations. On the upside, it can be expected to reflect real-world dynamics more closely than a reliance on sparse structural theories or a conceptual discussion of seapower would do, while still providing considerable analytical leverage.

EXISTING STUDIES OF THE COLD WAR AT SEA

The literature on the Cold War at sea itself, some of which has already been referenced, is rather voluminous, often sophisticated, and densely packed with relevant information. At the same time, it also extremely fragmented and much of the available information has never been properly woven together into readable syntheses. While this is a deficit that is difficult to remedy – except perhaps by a monumental, multi-volume history – progress is certainly possible. As far as this present investigation is concerned, the number of high-quality sources that we can draw on is in the hundreds. For the period from 1946-1960, Barlow's *From Hot War to Cold* and Palmer's *Origins of the Maritime Strategy* cover much the same ground in the form of more general, analytical histories.[78] For the period from 1950-1970, Hegmann's *In Search of Maritime Strategy* accomplishes much the same thing, in an even more explicitly analytical format.[79] None of these studies focus on competitive posture change, but all of them provide essential background knowledge and the outlines of a narrative. Hattendorf's collections of key documents for the 1970s and 1980s, and on the Maritime Strategy in particular, are all extremely useful as well.[80] Swartz's briefing slides cover some of the same ground in a different but similarly detailed format.[81] On the other hand, the three volumes that came out of Michael MccGwire's Dalhousie seminars remain a key source of insight into Soviet naval strategy.[82] The same is true of Herrick's book-length treatments of Soviet naval strategy.[83] His three-volume literary analysis of Soviet statements on naval strategy and doctrine is an essential resource. The extensive collection of reports from the Center for Naval Analyses, which is referenced throughout, makes a similarly important contribution.

Professional periodicals like the U.S. Naval Institute (USNI) *Proceedings* and *Naval War College Review*, and yearbooks like *Brassey's Annual* are other indispensable sources of insight and factual information about the Cold War at sea. The same can increasingly be said of the Central Intelligence Agency's Historical Collection, the relevant contents of which have grown considerably and which is now also searchable online.[84] The U.S. Navy's own Operational Archives were difficult to access for much of the duration of this study, but some relevant primary documents could be obtained from other sources. Oral histories collected by the Naval Institute and the Naval Historical Foundation (NHF) can add another important element to a

[78] Barlow, *From Hot War to Cold*; Michael A. Palmer, *Origins of the Maritime Strategy: The Development of American Naval Strategy, 1945-955* (Annapolis, MD: Naval Institute Press, 1990).
[79] Hegmann, "In Search of Strategy: The Navy and the Depths of the Maritime Strategy".
[80] John B. Hattendorf, ed., *U.S. Naval Strategy in the 1970s: Selected Documents,* Newport Paper 30 (Newport, RI: Naval War College Press, 2007); John B. Hattendorf, ed., *U.S. Naval Strategy in the 19780s: Selected Documents,* Newport Papers 33 (Newport, RI: Naval War College Press, 2008); Hattendorf, *The Evolution of the U.S. Navy's Maritime Strategy 1977-1986*.
[81] See n. 64.
[82] Michael MccGwire, ed., *Soviet Naval Developments: Capability and Context* (New York, NY: Praeger, 1973); Michael MccGwire, Ken Booth and John McDonnell, eds., *Soviet Naval Policy: Objectives and Constraints* (New York, NY: Praeger, 1975); Michael MccGwire and John McDonnell, eds., *Soviet Naval Influence: Domestic and Foreign Dimensions* (New York, NY: Praeger, 1977).
[83] Herrick, *Soviet Naval Strategy*.
[84] Central Intelligence Agency, "Electronic Reading Room", https://www.cia.gov/library/readingroom/.

well-rounded picture.[85] A range of other sources bear mentioning but, for the sake of relative brevity, they will be introduced in the text as appropriate.

Overall, it is fair to say that the ground that is covered by this study is well-tilled and that most of it has been covered before in some form or other – for the most part while the Cold War competition was still ongoing or soon thereafter. That an extensive bibliography could be compiled during the research process serves to demonstrate this. However, in providing a theoretically informed, analytical account of the U.S.-Soviet naval rivalry during the 1946-1981 period with a distinct focus on the competitive interaction in naval postures, and in drawing together a highly fragmented knowledge base into a single narrative, this study makes a significant and original contribution to the field of security and strategic studies. It is the author's hope that this can be further built on by future research.

1.4 Plan of the dissertation

The main parts of the investigation will be laid out in four chapters. Two of those chapters are conceptually focused. In *Chapter 2*, we will review the pertinent theoretical literature. After first looking into the phenomenon of long-term strategic competition and the origins of military advantages, the chapter makes the case for a hybrid approach that combines elements of systemic and organizational theories to arrive at the best possible balance between analytical leverage and empirical accuracy in our consideration of the historical evidence. *Chapter 3* will first explicate the assumptions that underpin the hybrid approach and present a causal model as a guide for the empirical parts of the dissertation. It will then discuss the primary method – namely, process tracing – and the supporting methods, which are derived from the work of leading naval analysts. The evidence itself is presented in the two chapters that follow. *Chapter 4* details the process tracing outcomes for the 1946-1960 period, looking at anti-submarine warfare and anti-air warfare in turn, and laying bare the foundations of the U.S. Navy's long-term

[85] U.S. Naval Institute, "The U.S. Naval Institute Oral History Program," https://www.usni.org/press/oral-histories/about; Naval Historical Foundation, "Oral History Program," http://www.navyhistory.org/programs/oral-histories/.

advantage, which can largely be traced to this first phase. *Chapter 5* will review the process tracing evidence for the 1960-1981 period in a similar fashion, especially as it relates to VMF's shift from a near-seas posture to a more ambitious, oceanic posture and back again. By examining this second phase, which in many ways proved decisive, in detail we can identify many of the trends and decision points that resulted in the VMF's ultimate retrenchment and the U.S. Navy's successful defense of its long-term advantage at sea. Finally, in *Chapter 6*, will once again summarize the most important findings and provide an assessment of their relevance from a 21st century perspective.

Part I

Understanding military competition at sea

[2]

The dynamics of military competition

ENGAGING THE LITERATURE

2.1 The challenge: tracing competitive adaptation of naval postures

This thesis seeks to understand the United States Navy's overall success in maintaining a meaningful military advantage over its Soviet counterpart across the two most important functional dimensions – anti-submarine warfare and fleet air defense – of an intense naval competition that spanned more than four decades. Such an investigation can only be based on a detailed understanding of the specific geographic, strategic and technological realities of the U.S.-Soviet competition at sea, which in turn shaped the processes of competitive adaptation that unfolded between 1946 and 1981. In itself, the recourse to some high-level theory of state behavior that was designed to apply across a wide range of historical settings and circumstances is therefore unlikely to provide answers of sufficient granularity to meet the objective of this study. [1] To understand the U.S.-Soviet competition at sea, we must – above all – engage with the historical record.

[1] As Krause maintains, few scholars in the field of strategic studies have embraced the so-called 'scientific turn' and most have remained wedded to an understanding of the political and military spheres that is rather indifferent to the requirements of *formal* explanatory power. Joachim Krause, "Strategische Wissenschaft," in *Handbuch der Internationalen Politik*, ed. Carlo Masala, Frank Sauer and Andreas Wilhelm (Wiesbaden: VS Verlag für Sozialwis-

At the same time, to provide a solid foundation for this undertaking, an analytical assessment of the U.S.-Soviet naval rivalry should be guided by a structured and explicit framework for research that is both internally consistent and open to peer criticism. Moreover, it stands to reason that such a framework should not itself be derived from evidence provided by the case that is under investigation, which would render it self-confirming, and should rest on a broader evidentiary and theoretical base. Many elements of such a framework can be gleaned from an extensive literature on the dynamics of military competition between states, the main strands of which will be parsed for valuable insights below. We will *use* these theories extensively to guide and enrich our analysis, which Donald Puchala would remind us "is not the same thing as theorizing."[2] Some of the methods we will draw on were developed for the specific purpose of analyzing the Soviet navy or modern navies more generally. While the synthesis of theories, conceptual tools, approaches and methods that this chapter arrives at does not reflect an exclusive attachment to any one school of thought, it is firmly rooted in the strategic and military studies tradition, as well as in the security studies literature more broadly. Couched in the terms of political science methodology, this approach can be likened to the "modular"[3] explanatory strategies proposed by actor-centered institutionalists, who

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senschaften, 2010), 192. Ayson agrees that "[t]he issues that animate strategic studies reflect an overdeveloped interest in practice rather than theory." Robert Ayson, "Strategic Studies," in *The Oxford Handbook of International Relations*, ed. Christian Reus-Smit and Duncan Snidal (Oxford University Press, 2009), 558. That said, scholars in strategic studies have frequently engaged with and used existing theories, without slavishly adhering to any of them. On the scientific turn in international relations, see Andrew Linklater, "General Introduction," in *International Relations: Critical Concepts in Political Science*, ed. Andrew Linklater (London: Routledge, 2000), 2-3. The tenets of social science orthodoxy after the turn are notably expressed in Gary King, Robert O. Keohane and Sidney Verba, *Designing Social Inquiry: Scientific Inference in Qualitative Research* (Princeton, NJ: Princeton University Press, 1994). This intellectually inflexible and monistic approach has increasingly come under attack even from within the ranks. See e.g. Henry E. Brady and David Collier, eds., *Rethinking Social Inquiry: Diverse Tools, Shared Standards* (Lanham, MD: Rowman & Littlefield, 2010).

[2] Donald J. Puchala, *Theory and History in International Relations* (London: Routledge, 2003), 4.

[3] Fritz W. Scharpf, *Games Real Actors Play: Actor-Centered Institutionalism in Policy Research* (Boulder, CO: Westview Press, 1997), 30-31. Scharpf argues that such an approach is particularly relevant where multiple levels of analysis come into play and no single theory or causal mechanism provides a good grip on the entirety of the policy problem. He further suggests that any partial theories will usually have to be linked together by an overarching narrative. See also Adrienne Héritier, "Causal Explanation," in *Approaches and Methodologies in the Social Sciences: A Pluralist Perspective*, ed. Donatella Della Porta and Michael Keating (Cambridge: Cambridge University Press, 2008), 73-75.

share with the proponents of strategic studies a keen interest in understanding complex policy problems.[4]

Given its aim of unraveling the intricate dynamics of U.S.-Soviet competitive adaptation in the naval domain in some detail, the investigation is designed as an in-depth case study with empirical richness and accuracy in mind. In other words, even though its findings may be relevant in the context of other naval competitions – past, present, or future –, no quasi-scientific generalization is intended and no direct analogies are implied.[5] To provide a pertinent example, it is as yet unclear whether the emerging U.S.-China competition will exhibit similar patterns of competitive adjustment over the long term. While analysts of current events may want to carefully note both similarities and differences with past cases as this naval rivalry under 21st century conditions continues to take shape, nothing in these pages is intended as a 'blueprint' for how to compete, or not to compete, with China in the naval sphere. As Scharpf notes, in "comparative policy research […] the number of different constellations of situational and institutional factors will be extremely large – so large, in fact, that it is rather unlikely that exactly the same factor combination will appear in many empirical cases."[6] Any attempt at generalization should therefore be approached with the utmost caution and humility. As Lawrence Freedman reminds us, a failure to heed these limitations is likely to add to a graveyard of misplaced ambitions: "This is the problem with international relations theory masquerading as science: Too many variables; too few cases."[7]

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4 Scharpf, *Games Real Actors Play*, 30-31.

5 One of the few leading thinkers who successfully straddled the divide between academic IR and strategic studies emphasized that "the test for an academic contribution to International Relations is that it should have either historical or theoretical depth." Hedley Bull, "International Relations as an Academic Pursuit," *Australian Outlook* 26, no. 3 (1972), doi:10.1080/10357717208444445, 264. Which kind of depth the investigator should primarily aim for can only be determined with reference to the nature of the research problem. As far as the present study is concerned, not only is a single case study the most appropriate way to get to the bottom of the research problem – given the lack of truly comparable cases, there are also few viable alternatives. In methodological terms, the US-Soviet case was selected for its intrinsic importance in studying naval competition under missile-age conditions, its data richness, and its potential policy relevance as a foil against which to assess newly emerging naval competitions. On formal case selection criteria in political science, see Stephen van Evera, *Guide to Methods for Students of Political Science* (Ithaca, NY: Cornell University Press, 1997), 77-88.

6 Scharpf, *Games Real Actors Play*, 23.

7 Lawrence Freedman, *Deterrence* (Cambridge: Polity Press, 2004), 45.

The framework that is developed step-by-step in this chapter and laid down in the next is appropriately restrained in its scope and made up of four main components: a small number of assumptions, a notional causal model to guide our effort at historical reconstruction, an overall analytical approach that relies on a process tracing methodology, and a set of supporting methods that are largely inherited from leading Western naval analysts of the Cold War period. The resulting toolkit is practically oriented and pragmatic, rather than theoretically ambitious or elegantly scientific. It may not be free from imperfections, but it is well suited to the task at hand: *to provide a theoretically informed, analytically driven account of the struggle for naval advantage in the main, North Atlantic theater of the Cold War at sea, as it expressed itself in the competitive adaptation of U.S. and Soviet naval postures.*

In this chapter, we will engage with the pertinent literature, much of it of a conceptual and theoretical nature, in detail to carve out an appropriate approach for dealing with the research problem. The first part of the chapter will explore the nature of peacetime rivalries and the origins of military advantages that develop, or are lost, in their course. The second part of the chapter will review several strands of the literature on the dynamics of military interaction between states and military organizations. While no one approach allows us to understand the subject matter with sufficient granularity to satisfactorily address the research problem, the insights that we can draw out of these literatures ultimately allow for a solid grip on the issues at hand. The outlines of the approach that emerges from this chapter are then concretized further in Chapter 3, which will also introduce the methodical framework of the dissertation in some detail.

2.2 Strategic rivalry and peacetime military competition

2.2.1 Long-term strategic rivalries

Why do states compete for military advantage in the first place and why should we study this military aspect, rather than some other element of interstate competition? Before we embark on a discussion of how to research the *naval* component of any such contest in detail, we should briefly address these questions and, once again, underscore that the Cold War competition at sea did not take place in a vacuum. While the competition for military advantage – including, but certainly not limited to, the naval element – was in many ways central to the confrontation between the Cold War-era superpowers, it should be properly contextualized. A frame of reference that allows us to do so is provided by the literature on *long-term strategic rivalries*, which is notable for combining qualitative and quantitative methodologies rather productively.[8] As recent historical research has once more reminded us, strategic rivalries have been a fundamental reality of successive international systems throughout the last 2,500 years of recorded history.[9] Not all competitive military moves in the international system are linked to long-standing rivalries – but, as we will see, a surprisingly high proportion of them are. In the following, we will review the key features of strategic rivalries, like the one that unfolded between the United States and the USSR after 1945, and look into the role of peacetime military competition as a shaping force within them.

As is the case for most key concepts in the social sciences, there is no generally accepted definition of what constitutes an interstate strategic rivalry. There is, however, broad agreement on a number of core criteria: a strategic rivalry is an antagonistic state of relations that is entrenched, enduring, and most often militarized. Rivalries are *entrenched* because "hardening attitudes and increased belligerence"[10] with regard to an underlying conflict of interest have led to strong expectations of future hostility that are difficult to reverse, even as domestic and

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[8] Some authors have preferred the term *enduring rivalries* to refer to essentially the same phenomenon. For an extended discussion of the concept and research program, see William R. Thompson, "Identifying Rivals and Rivalries in World Politics," *International Studies Quarterly* 45, no. 4 (2001), doi:10.1111/0020-8833.00214, 559-68; Gary Goertz and Paul F. Diehl, "Enduring Rivalries: Theoretical Constructs and Empirical Patterns," *International Studies Quarterly* 37, no. 2 (1993), doi:10.2307/2600766, 147-71; Paul F. Diehl, "Introduction: Overview and Some Theoretical Guidelines," in *The Dynamics of Enduring Rivalries*, ed. Paul F. Diehl (Chicago, IL: University of Illinois Press, 1998), 1-28; Zeev Maoz and Ben D. Mor, *Bound by Struggle: The Strategic Evolution of Enduring International Rivalries* (Ann Arbor, MI: University of Michigan Press, 2002), 3-23.

[9] For an overview of some of the most consequential strategic rivalries, see James Lacey, ed., *Great Strategic Rivalries: From the Classical World to the Cold War* (Oxford: Oxford University Press, 2016). Also see the chapters in Paul F. Diehl, ed., *The Dynamics of Enduring Rivalries* (Chicago, IL: University of Illinois Press, 1998) and William R. Thompson, ed., *Great Power Rivalries* (Columbia, SC: University of South Carolina Press, 1999).

[10] Lacey, *Great Strategic Rivalries*, 3.

international circumstances change over time. The rival actors, in effect, become "prisoners of the past *and future*."[11] Hence, rivalries that have taken hold also tend to be *enduring*, in that they will persist through many cycles of interaction that can easily span decades – in some cases even centuries. Finally, such rivalries are either already *militarized* from an early stage, or in constant danger of becoming so, because the parties have come to see their respective opponent as a serious threat to their security interests.[12] They observe each other warily even in their peacetime interactions as "each state bases its security-related calculations on plans and actions it attributes to its rival."[13] Whereas some scholars have seen overt militarization as a constitutive element of strategic rivalries, others have required only a potential for future militarization.[14]

Irrespective of which of these two schools of thought one identifies with, it is militarization that provides the most compelling reason to study long-term strategic rivalries thoroughly and in depth. As a succession of major studies has found, they are strongly correlated with the incidence of interstate armed conflicts – more so than any other type of interstate relationship. Of ninety-five interstate wars they identified for the period of 1823 to 2003, Thompson and Dreyer find that 78 percent had among their participants at least one pair of strategic rivals fighting each other.[15] They conclude that "rivals become disproportionately likely to become engaged in conflict."[16] Colaresi, Rasler and Thompson identify forty-seven interstate wars in the 20th century, of which they see 87 percent as linked to strategic rivalries,

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[11] Thompson, "Identifying Rivals and Rivalries in World Politics," 569. Emphasis added. The dynamics created by successive "hardline" policy choices and their importance in making major wars more likely are also elucidated in Dale C. Copeland, *The Origins of Major War* (Ithaca, NY: Cornell University Press, 2000), 35-55.

[12] Maoz and Mor, *Bound by Struggle*, 7-8.

[13] Ibid., 7.

[14] Thompson, "Identifying Rivals and Rivalries in World Politics," 569-73; Lacey, *Great Strategic Rivalries*, 5. Lacey argues that *any* set of repeated competitive interactions, including in the commercial sphere, can increase the likelihood of militarization and that particular analytical attention should be paid to competitions in which overt militarization is avoided. While this view has practical merit, it also blurs the definitional boundaries between strategic rivalries and other types of international competition and is therefore conceptually unhelpful.

[15] William R. Thompson and David R. Dreyer, *Handbook of International Rivalries, 1494-2010* (Los Angeles, CA: CQ Press, 2012), 6.

[16] Ibid., 2.

and twenty-seven wars after 1945, of which 93 percent involved rivals of long standing.[17] Maoz and Mor agree that enduring rivalries constitute "a small group of [interstate] dyads [that] is responsible for a disproportionately large number of conflicts and wars."[18] In fact, many of the prominent historical cases discussed in the literature involved not just an individual conflict, but a succession of major wars. This pattern of serial crises and "conflict recidivism"[19] is historically intuitive, but – unlike the broader phenomenon of war-prone rivalries – it has not been studied across the entire universe of cases.[20]

It is almost equally important to note that, while most wars are fought by strategic rivals, less than half of the rivalries observed since the early 19th century have resulted in armed conflict. In fact, 54 percent of the rivalries that Colaresi, Rasler and Thompson examined did *not* result in war, even though more than 85 percent gave rise to militarized disputes.[21] At the same time, recent research has once again confirmed that the prospects of managing rivalries short of war are particularly bleak when one of the rivals is a leading power in fear of displacement. Looking at the subset of strategic competitions that involved challenges to the status quo by a rising powers, the Thucydides Trap Project at Harvard University found that twelve out of sixteen cases (75 percent) resulted in war.[22] Among a second group of fourteen less clear-cut cases that have not been considered in detail so far, only half led to war.[23] It is, of course,

[17] Michael P. Colaresi, Karen A. Rasler and William R. Thompson, *Strategic Rivalries in World Politics: Position, Space and Conflict Escalation* (Cambridge: Cambridge University Press, 2007), 21.

[18] Maoz and Mor, *Bound by Struggle*, 3.

[19] William R. Thompson, "Why Rivalries Matter and What Great Power Rivalries Can Tell Us about World Politics," in *Great Power Rivalries*, ed. William R. Thompson (Columbia, SC: University of South Carolina Press, 1999), 4.

[20] Colaresi, Rasler and Thompson, *Strategic Rivalries in World Politics*, 131. On serial crises, see also Michael P. Colaresi and William R. Thompson, "Hot Spots or Hot Hands? Serial Crisis Behavior, Escalating Risks, and Rivalry," *The Journal of Politics* 64, no. 4 (2002), doi:10.1111/1468-2508.00168, 1175–98. The peculiarities of rivals' crisis behavior are further explored in Michael P. Colaresi and William R. Thompson, "Strategic Rivalries, Protracted Conflict, and Crisis Escalation," *Journal of Peace Research* 39, no. 3 (2016), doi:10.1177/0022343302039003002, 263-87.

[21] Colaresi, Rasler and Thompson, *Strategic Rivalries in World Politics*, 90-91.

[22] "Can America and China Escape Thucydides's Trap? Case File," Belfer Center for Science and International Affairs, accessed July 3, 2019, https://www.belfercenter.org/thucydides-trap/methodology/thucydides-trap-potential-additional-cases. It appears that the probability of escalation to war is considerably higher across all dyads consisting of two major powers, compared to those involving a "minor-minor" or "major-minor" constellation. Colaresi, Rasler and Thompson, *Strategic Rivalries in World Politics*, 90.

[23] "Case File: Potential Additional Cases," Belfer Center for Science and International Affairs, accessed July 3, 2019, https://www.belfercenter.org/thucydides-trap/methodology/thucydides-trap-potential-additional-cases.

deliciously ironic that a *motif* identified by an ancient Greek historian based on his intimate knowledge of a single-case study should have this kind of general, enduring relevance for contemporary security studies research.[24]

From a policy-focused perspective, the empirical evidence raises important questions as to how strategic rivalries can be managed short of war, be it by military or non-military means. Interestingly enough, outside the well-known literatures on nuclear deterrence and short-term crisis management, there appears to have been little systematic research into this problem set.[25] The present study was not primarily designed with this deficit in mind, but an understanding of the dynamics of Cold War military interaction at sea can certainly contribute to our understanding of why this particular rivalry did not result in war. For the time being, suffice it to say that the U.S.-Soviet case clearly falls within the broad confines of the historical pattern: while it did not ultimately end in a major war, it was militarized from an early stage and resulted in vigorous military competition, as well as repeated military clashes between the main protagonists.[26] When it is seen as an instance of potential hegemonic displacement of

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[24] The relevant passage has been quoted time and again. Thucydides states that "[t]he real cause [of the Peloponnesian War], however, I consider to be the one which was formally most kept out of sight. The growth of the power of Athens, and the alarm which this caused in Sparta, made war inevitable." Robert B. Strassler, ed., *The Landmark Thucydides: A Comprehensive Guide to the Peloponnesian War* (New York, NY: Free Press, 2008); A Newly Revised Edition of the Richard Crawley Translation with Maps, Annotations, Appendices, and Encyclopedic Index, 16.

[25] Allison's historically grounded approach for managing U.S.-China relations is relevant and timely, but given the current trajectory of this crucial relationship, it can be no more than one of a number of starting points. His recent monograph is Graham T. Allison, *Destined for War: Can America and China Escape Thucydides's Trap?* (Boston, MA: Houghton Mifflin, 2017). Rasler, Thompson and Ganguly look into some of the factors that were present in rivalries that were ultimately defused. Unfortunately they present the results of their sophisticated theory-building exercise in such a way as to render them largely irrelevant in an off-campus environment. Karen A. Rasler, William R. Thompson and Sumit Ganguly, *How Rivalries End* (Philadelphia, PA: University of Pennsylvania Press, 2013). Overall, Thompson's own statement of two decades ago that "[d]escalation dynamics are probably even less well understood than the factors leading to escalation" remains in force – certainly as far as policy-relevant research is concerned. Thompson, "Why Rivalries Matter and What Great Power Rivalries Can Tell Us about World Politics," 18.

[26] It is now sometimes forgotten that, despite the sobering influence of the nuclear revolution on strategic affairs, the superpowers *did* engage in direct military action against one another on numerous occasions. Notable examples include hundreds of air-to-air engagements involving the Soviet 64th Fighter Aviation Corps during the Korean War, numerous surface-to-air missile engagements of U.S. aircraft by Soviet personnel during the Vietnam War, and the shoot down of more than two dozen U.S. and Soviet aircraft outside active combat zones. Although these clashes pale in comparison to many of the sustained military conflicts that marked earlier strategic rivalries, it would be misleading to claim that nuclear weapons reliably prevented the use of force by one superpower against

the leading power, the case is one of only four that were ultimately resolved short of major war, but given the small number of cases overall, this hardly makes it an outlier.[27]

To properly contextualize the military element of strategic rivalries, we should also review the literature's findings concerning the *substance* of such confrontations. The exact mixture of motivations that fuels and sustains a rivalry is, of course, case-specific. It is nevertheless useful to think through the range of possibilities in general terms. Colaresi, Rasler and Thompson contribute an analytical distinction between rivalries that are chiefly driven by *spatial*, *positional*, or *ideological* concerns, although they have to admit that – in practice – all three may well come into play.[28] The spatial component is driven by conflicts over territorial interests, the positional contest is about the actors' international standing, and the ideological dimension is about the projection of their preferred value systems.[29] In addition, they also posit a number of secondary types. For the purposes of the present study, the most interesting of these is the rivalry over access.[30] Such rivalries "are at least in part about contests over territory regarded to have strategic importance and/or providing a route toward some desired location."[31] Given that one of the main protagonists was an extraregional power that depended on strategic and operational access to be able to shape the conflict in accordance with its interests, and to defend its allies in case of war, it is difficult not to see the Cold War confrontation in those terms. It is therefore interesting to see that some of the leading scholars in the field fail to make this connection and believe that access rivalries have become less relevant since the 19th century.[32] At

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the other. For an overview of aerial warfare incidents, see Appendix I in James E. Wise and Scott Baron, *Dangerous Games: Faces, Incidents, and Casualties of the Cold War* (Annapolis, MD: Naval Institute Press, 2010). For a chronology of incidents at sea, which were often violent but generally did not involve exchanges of live fire, see David F. Winkler, *Incidents at Sea: American Confrontation and Cooperation with Russia and China, 1945-2016* (Annapolis, MD: Naval Institute Press, 2017), 215-52.

27 The other cases that were resolved short of war in Allison's tally are the rivalries between Portugal and Spain in the 15th century, the U.S.-UK rivalry in the late 19th century and France/UK versus Germany after German unification in the 1990s. See Belfer Center for Science and International Affairs, "Can America and China Escape Thucydides's Trap?".

28 Colaresi, Rasler and Thompson, *Strategic Rivalries in World Politics*, 78-80.

29 Ibid.

30 Ibid., 79. The other secondary motivations they make out are ethnic strife, competition for resources, and the harboring of dissidents.

31 Ibid., 81.

32 Ibid.

the same time it should also be acknowledged that access is probably best seen not as an original motivation of U.S.-Soviet rivalry but as a necessary precondition for the United States in order to pursue the rivalry successfully. As such it became a key factor in maintaining a rivalry that had its origins in the superpowers' incompatible conceptions of the postwar international order. As far as the overall picture is concerned, Lacey is undoubtedly correct in emphasizing the complex and somewhat contingent interplay of "fear, honor and interest"[33] on both sides of a rivalry and the resulting dynamics, rather than any one particular type of motivation.

This complexity and contingency is ultimately replicated at the level of ways and means as well: military competition is only one of the instruments which states rely on in pursuing whatever mixture of spatial, positional, ideological, access, or other concerns may motivate them. In many cases, commercial competition, alliance politics, adversarial diplomacy and propaganda will be of similar or perhaps even greater importance. All the same, it is their potential for militarization and the likelihood of their escalation to major war that sets long-term strategic rivalries apart from other types of interstate relationships and arguably makes them the most important type of relationship to study. Clearly, the militarized aspects of strategic rivalries are of particular interest if we are to understand the dynamics that fuel them and turn them into a systemic risk factor for the incidence of interstate wars. In the next step, we will examine how military advantages are created in the course of a peacetime strategic competition and why they are difficult to maintain over time.

[33] Lacey, *Great Strategic Rivalries*, 7-8. This is, of course, is another Thucydidean *motif* – one which, it must be remembered, is mustered by the Athenians in defense of their extensive empire building. See Strassler, *The Landmark Thucydides*, 43. For a sophisticated engagement with this view, see Richard Ned Lebow, *The Tragic Vision of Politics: Ethics, Interests, and Orders* (Cambridge: Cambridge University Press, 2003), 65-114; Michael W. Doyle, *Ways of War and Peace: Realism, Liberalism, and Socialism* (New York, NY: Norton, 1998), 49-91. Gray aptly describes it as "one of literary history's greatest feats of inspired reductionism." Colin S. Gray, *Strategy and Defence Planning: Meeting the Challenge of Uncertainty* (Oxford: Oxford University Press, 2014), 170.

2.2.2 The origins of military advantage

At the heart of this study is the question of why and how the U.S. Navy managed to maintain a meaningful military advantage over its Soviet competitor. This raises a number of basic questions: *what is a meaningful military advantage, where do such advantages come from, and how are they preserved or lost over time?* The answer to the first of these questions is relatively straightforward. As even the most cursory survey of military history would tell us, military advantages come in many guises. Hence, this study will define a military advantage simply as *an area of superior capability and/or competence with regard to the use of force*. Following Max Weber's well-established definition of power as "the probability that one actor within a social relationship will be in a position to carry out his own will despite resistance, regardless of the basis on which this probability rests,"[34] having a military advantage can be seen as a specific form of power between nations (or "conflict groups"[35] more broadly). Military advantages, like other forms of power, are necessarily *relative*: they can be assessed only with reference to some expected opponent or conflict scenario. Like other forms of power, the existence of a military advantage does not determine outcomes, it merely reflects an *increased chance* of shaping the social relationship in question – a militarized competition or conflict of some sort – in favor of the party that holds the advantage. A meaningful military advantage, then, is not one that guarantees a particular outcome, but one that allows a military organization to *maintain a sufficient level of confidence* in its ability to perform its missions in the face of enemy resistance and accomplish its main objectives in a timely manner, without suffering unacceptable losses in the process. Because, within the framework of a long-term strategic rivalry, this is an aim that both sides will regularly aspire to, some level of competition is almost inevitable.

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[34] Guenther Roth and Claus Wittich, eds., *Max Weber – Economy and Society: An Outline of Interpretive Sociology* Volume 1 (Berkeley, CA: University of California Press, 1978), 53. See also Richard Swedberg, *The Max Weber Dictionary: Key Words and Central Concepts*, with the assistance of Ola Agevall (Stanford, CA: Stanford University Press, 2005), 205.

[35] Robert G. Gilpin, "No One Loves a Political Realist," *Security Studies* 5, no. 3 (1996), doi:10.1080/09636419608429275, 7-8.

Perhaps the most critical analytical questions that we need to examine before this investigation can go ahead is *where military advantages come from* – and *how they can be maintained, or lost* in turn. The fact that military competitions tend to be both an expression and a key feature of strategic rivalries tells us little about why they unfold the way they do. We need a working theory of how advantages come about and how actors in the international system can harness them for their strategic purposes. Interestingly enough, there are two alternative and largely incompatible views on the origin of military advantage in the security and strategic studies literature. The first is held mainly by the disciples of offense-defense theory and based on the idea that military advantage is a systemic phenomenon – that is, a reflection of the overall state of military technology. The resulting balance of advantage cannot be traced to the actions that any one state takes,[36] but it can be reduced to a simple measure: the relative ease of offense versus defense. The second is most clearly expressed by Shimshoni's *military entrepreneurship theory*, according to which military advantages are "manufactured and destroyed by the actors themselves, endogenously."[37] As we will see, this is a far more accurate and useful take on the problem than offense-defense theorists can muster.

THE OFFENSE-DEFENSE BALANCE AND SYSTEMIC ADVANTAGE

Offense-defense theory (ODT) is an approach deployed by some mainstream security/strategic studies scholars to account for the impact of military technology on interstate relations. First proposed by Robert Jervis in 1978, ODT is basically an attempt to differentiate between two different states of the international system: one that instigates and rewards international aggression, and one that militates against it.[38] Which of the two states an international system is in depends on the *offense-defense balance* – that is, the relative ease of engaging in offensive or

[36] Sean M. Lynn-Jones, "Offense-Defense Theory and Its Critics," *Security Studies* 4, no. 4 (1995), doi:10.1080/09636419509347600, 690.
[37] Jonathan Shimshoni, "Technology, Military Advantage, and World War I: A Case for Military Entrepreneurship," *International Security* 15, no. 3 (1990), doi:10.2307/2538911, 187-215.
[38] See Robert Jervis, "Cooperation under the Security Dilemma," *World Politics* 30, no. 02 (1978), doi:10.2307/2009958, 167-214.

defensive military operations.[39] In other words, ODT assumes a system-wide offensive or defensive advantage, based on what technologies that are available at the time. In Jervis' formulation, "[w]hen we say that the offense has the advantage, we simply mean that it is easier to destroy the other's army and take its territory than it is to defend one's own. When the defense has the advantage, it is easier to protect and to hold than it is to move forward, destroy, and take."[40] From a Clausewitzian perspective, this is an absurd proposition. Assuming, as many adherents to the strategic studies tradition still do today, that there is "an essential unity to all strategic experience,"[41] Clausewitz believed that the balance between offense and defense reflects the innermost logic of military conflict. He went to considerable lengths to show that, due to its more circumscribed aims, "*the defensive form of warfare is intrinsically stronger than the offense.*"[42] The central passages of Book VI of *On War* are devoted to this thesis, on which much of his theory of war rests. Starting from what Butfoy describes as their "relatively mechanistic approach to strategic analysis,"[43] offensive-defense theorists have remained sanguine about the inconsistency of their views with what this considerably more developed body of military

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[39] The core texts on ODT include Charles L. Glaser and Chaim Kaufmann, "What Is the Offense-Defense Balance and How Can We Measure It?," *International Security* 22, no. 4 (1998), doi:10.1162/isec.22.4.44, 44-82; Jervis, "Cooperation under the Security Dilemma"; Jack S. Levy, "The Offensive/Defensive Balance of Military Technology: A Theoretical and Historical Analysis," *International Studies Quarterly* 28, no. 2 (1984), doi:10.2307/2600696, 219-38; Keir A. Lieber, *War and the Engineers: The Primacy of Politics over Technology* (Ithaca, NY: Cornell University Press, 2008); Lynn-Jones, "Offense-Defense Theory and Its Critics," 660-91; George H. Quester, *Offense and Defense in the International System* (New Brunswick, NJ: Transaction Books, 2002); Scott D. Sagan, "1914 Revisited: Allies, Offense, and Instability," *International Security* 11, no. 2 (1986), doi:10.2307/2538961, 151-75; Jack Snyder, "Civil-Military Relations and the Cult of the Offensive, 1914 and 1984," *International Security* 9, no. 1 (1984), doi:10.2307/2538637, 108-46; Stephen van Evera, "The Cult of the Offensive and the Origins of the First World War," *International Security* 9, no. 1 (1984), doi:10.2307/2538636, 58-107; Stephen van Evera, "Offense, Defense, and the Causes of War," *International Security* 22, no. 4 (1998), doi:10.1162/isec.22.4.5, 5-43; James W. Davis et al., "Correspondence: Taking Offense at Offense-Defense Theory," *International Security* 23, no. 3 (1999), doi:10.1162/isec.23.3.179, 179-206. Glaser's rational theory of international politics also depends heavily on ODT. Charles L. Glaser, *Rational Theory of International Politics: The Logic of Competition and Cooperation* (Princeton, NJ: Princeton University Press, 2010).

[40] Jervis, "Cooperation under the Security Dilemma," 187. What this formulation immediately lays bare is that the offense-defense debate has been almost exclusively focused on land warfare from the outset. This has largely remained so.

[41] Colin S. Gray, *Modern Strategy* (Oxford: Oxford University Press, 1999), 15.

[42] Carl von Clausewitz, *On War* (Princeton, NJ: Princeton University Press, 2008), ed. and transl. Michael Howard and Peter Paret, 358. Emphasis in the original. Scott Sagan recognized relatively early in the debate that this poses a serious problem for ODT. Sagan, "1914 Revisited," 161.

[43] A. Butfoy, "Offence-Defence Theory and the Security Dilemma: The Problem with Marginalizing the Context," *Contemporary Security Policy* 18, no. 3 (2007), doi:10.1080/13523269708404168, 39.

thought.[44] Jervis goes on to formulate two tests – both of them rather simplistic, one may venture to say – to establish the nature of the offense-defense balance in each particular empirical instance:

> "First, does the state have to spend more or less than one dollar on defensive forces to offset each dollar spent by the other side on forces that could be used to attack? If the state has one dollar to spend on increasing its security, should it put it into offensive or defensive forces? Second, with a given inventory of forces, is it better to attack or to defend? Is there an incentive to strike first or to absorb the other's blow? These two aspects are often linked: if each dollar spent on offense can overcome each dollar spent on defense, and if both sides have the same defense budgets, then both are likely to build offensive forces and find it attractive to attack rather than to wait for the adversary to strike."[45]

Much of the debate among the proponents of ODT, and between them and their critics, has flowed from these passages. Two concerns in particular have stood out in the academic debate: can the offense-defense balance be measured at all?[46] And is it the *objective* balance that matters or is it states' *perceptions* of it that influence their behavior?[47] While these are fascinating debates in themselves, and both of them remain to some extent unresolved, a more important finding for the purposes of the present study is that there are serious problems with the idea of system-wide advantages based primarily on technological factors.[48] Nor is it at all clear that leaders view the state of military technology as an exogenous constraint that is to be accepted, rather than a resource that can be manipulated for strategic advantage.

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[44] The potential responses from the ODT perspective are laid out in Lynn-Jones, "Offense-Defense Theory and Its Critics," 688-89.

[45] Jervis, "Cooperation under the Security Dilemma," 188.

[46] For the opposing view, see Glaser and Kaufmann, "What Is the Offense-Defense Balance and How Can We Measure It?"; Keir A. Lieber, "Mission Impossible: Measuring the Offense-Defense Balance with Military Net Assessment," *Security Studies* 20, no. 3 (2011), doi:10.1080/09636412.2011.599193, 451-59.

[47] See e.g. Shiping Tang, "Offence-Defence Theory: Towards a Definitive Understanding," *The Chinese Journal of International Politics* 3, no. 2 (2010), doi:10.1093/cjip/poq004, 237-44; Levy, "The Offensive/Defensive Balance of Military Technology," 222, 233; Davis et al., "Correspondence," 324-25.

[48] Perhaps most damning is the fact that this has occurred even to scholars who would basically retain Jervis' logic. Hence, Taliaferro has to admit that "it makes little sense to speak of a systemwide offense-defense balance in military technology." Jeffrey W. Taliaferro, "Security Seeking under Anarchy: Defensive Realism Revisited," *International Security* 25, no. 3 (2001), doi:10.1162/016228800560543, 138.

FROM SYSTEMIC TO ENDOGENOUS ADVANTAGES

The prevailing doubts concerning the systemic nature of military advantages are fueled by some of the best mixed-methods research in the field. In his cutting-edge study of the determinants of victory and defeat in modern warfare, Biddle finds that *force employment* explains battlefield outcomes far better than technology does.[49] In an earlier review of ODT, he concluded that "the large literature built around notions of the offense-defense balance rests on an unsound foundation: technological change is unlikely to induce the sweeping political consequences so widely attributed to it."[50] If we accept his conclusions, which are based on a far deeper engagement with the empirical record than offense-defense theorists have attempted, there is no reason to believe that the balance would be the same across an international system. On the contrary, if we acknowledge that the way in which states employ their military forces will account for a significant part of their battlefield performance – a view that most military historians would think entirely uncontroversial – the balance will be different for each dyad of states.[51]

Shimshoni raises two of additional and related concerns, which ultimately lead him to develop an alternative theory. His first concern mirrors the findings of Biddle's study: clearly, advantages are not based on technology alone, but on a combination of technological possibilities, operational and tactical force employment concepts, and competent planning. While technologies may eventually spread throughout the international system, the other two factors are undoubtedly shaped by unit-level processes.[52] The second concern is that, at the level of operational implementation, the idea of 'offensive' versus 'defensive' strategies starts to fall apart almost immediately. To achieve strategic aims, military organizations almost always

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[49] Stephen Biddle, *Military Power: Explaining Victory and Defeat in Modern Battle* (Princeton, NJ: Princeton University Press, 2006), 192-96. Lieber agrees that military outcomes do not appear to be primarily driven by technology. See Lieber, *War and the Engineers*, 150-52. This view is also notably supported by one of the very few explicit historical reviews. Mark Herman et al., "Military Advantage in History" (Booz Allen Hamilton/Director of Net Assessment, 2002).

[50] Stephen Biddle, "Rebuilding the Foundations of Offense-Defense Theory," *The Journal of Politics* 63, no. 3 (2001), doi:10.1111/0022-3816.00086, 743.

[51] Ibid., 743.

[52] Shimshoni, "Technology, Military Advantage, and World War I," 189.

have to combine offensive and defensive action at the lower levels of warfare.[53] The deeper we go into the empirics of operational design, the more threadbare the notion of "generic defense and offense"[54] starts to look. In fact, the notion of distinguishability is problematic even at the lowest tactical levels, where serious analysts have long found it difficult – even impossible – to draw a meaningful distinction between offensive and defensive weaponry, which many variants of ODT also require.[55] If strategic success actually hinges on the effective combination of offensive and defensive actions across all levels of warfare, and advantages are not primarily a product of system-wide technological change but instead shaped by unit-level variables, ODT ends up explaining very little. Together, Biddle and Shimshoni provide the basic elements of an alternative approach that is far more empirically accurate and credible than ODT, and which is outlined below.

Doubts have also been cast on another central idea of ODT, namely, that political and military leaders base their strategic decision-making on the system-wide technological balance, passively adapting to either the objective state of the balance or their interpretation of it. In one of the few broad-based empirical reviews of the theory, Gortzak, Haftel and Sweeny find that "[t]he perceived ODB [offense-defense balance], often argued to be the more important of the two measures, has no discernable effect on war or [military interstate dispute] onset."[56] Lieber goes on to turn the notion on its head: "[P]olitical and military elites tend not to shape their strategies on the basis of military technology, but rather to view the utility of new technologies through the lens of their current strategies."[57] Shiping Tang similarly believes that offense-defense theorists have it backwards and that leaders' focus on offensive

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[53] Ibid., 191-92. The main mechanism that adherents of ODT propose to explain broad-based shifts in the relative strength of offense and defense is technological change leading to increases in mobility or firepower. See e.g. Lieber, *War and the Engineers*, 34-45. If the *operational* impact of such changes does not neatly translate into *strategic* effects of the same nature – if, for example, greater operational mobility can also be employed for strategically defensive purposes, as indeed it has been – the picture is complicated very considerably.

[54] Ibid., 192.

[55] See John J. Mearsheimer, *Conventional Deterrence* (Ithaca, NY: Cornell University Press, 1983), 24-27; Colin S. Gray, *Weapons Don't Make War: Policy, Strategy, and Military Technology* (Lawrence, KS: University of Kansas, 1993), Shimshoni, "Technology, Military Advantage, and World War I," 192 n. 11.

[56] Yoav Gortzak, Yoram Z. Haftel, and Kevin Sweeney, "Offense-Defense Theory: An Empirical Assessment," *Journal of Conflict Resolution* 49, no. 1 (2016), doi:10.1177/0022002704271280, 86.

[57] Lieber, *War and the Engineers*, 153.

military options is likely to result from their expansive political aims, rather than the other way around.[58] If these criticisms are valid, they severely undermine the view that leader's actions are shaped by the balance, or their perception of it, rather than the other way around. In the end, even a staunch defender of ODT is forced to admit that "[t]here may be considerable truth in the view that states try to shape the offense-defense balance to create the offensive or defensive advantages that they deem necessary for their strategies."[59]

Overall, then, ODT's central claim – that military advantages are *systemic* phenomena and lead states to favor either offensive or defensive strategies across the board – does not hold up well under scrutiny. The same is true of the supporting claim that the observable variations in states' approaches are due to political leaders' interpretations (and misinterpretations) of the objective balance. Lieber believes that ODT has remained attractive mainly because "it offers a compelling argument for why intense security competition among states is not an inevitable consequence of the structure of the international system."[60] Be that as it may, it certainly does not provide a compelling – let alone fine-grained – explanation for why security competition unfolds the way it does in any particular strategic relationship.

Conversely, Shimshoni's alternative take on the origins of military advantage goes a long way in this regard. His core thesis, which is adopted by the present study, is that *military advantages are created and sustained at the unit level by military leaders and organizations*.[61] From an extensive review of offense-defense theory and its many inadequacies, Shimshoni derives four elementary statements on the nature of military advantage, which are worth quoting at length:

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58 Tang, "Offence-Defence Theory," 241-43.

59 Lynn-Jones, "Offense-Defense Theory and Its Critics," 690. Lynn-Jones promises "a comprehensive rebuttal" (663) to this and other major challenges to ODT, but falls far short of this ambition. His rebuttal of Shimshoni is particularly feeble. The fact that "*some* technological changes which influence the offense-defense balance are not the result of state-sponsored attempts at military innovation" (690) is hardly a knock-out punch against Shimshoni's alternative theory, which does not limit its aperture to technology as the main source of advantage to begin with. The assertion that the offense-defense balance, whatever its residual relevance may amount to, "is not shaped by the efforts of one state to develop advantages" (ibid.) will have left the critics similarly unfazed – and their case completely intact. Overall, the fact that this was the strongest defense that could be mustered in a seminal article written with the express intention of keeping ODT alive in the face of mounting criticism is devastating.

60 Keir A. Lieber, "Grasping the Technological Peace: The Offense-Defense Balance and International Security," *International Security* 25, no. 1 (2000), doi:10.1162/016228800560390, 103.

61 Shimshoni, "Technology, Military Advantage, and World War I".

> "First, [the advantage] must serve a grand strategic goal, or purpose. Second, it must be or may be created or engineered. Third, in producing it, leaders must take account of factors outside their control, adapt to these, and concentrate on manipulating three basic elements within their control: doctrine, war plans, and technology. Fourth, 'advantage' is relative to an opponent and fleeting, and therefore *creating it is a never-ending competitive enterprise*. […] This characteristic is perhaps the most significant. I argue that there is room for true entrepreneurship in this competitive process, and that the military advantage normally goes to the more entrepreneurial state."[62]

This perspective finally provides us with a glimpse of how peacetime military competitions take shape, how they are conducted, and why they produce a particular set of observable outcomes. Two implications of this alternative perspective stand out in particular. The first is that hard work is required to consciously uphold existing advantages, which will quickly begin to erode if the efforts made to sustain them are insufficient, or if the resources – intellectual and material – that are invested in sustaining them are inadequate. The second implication is that, far from applying all across an international system, advantages must be specifically tailored to one's competitor or competitors, as well as to the external parameters of the competition. In Shimshoni's words,

> "[s]tates do (or should) determine their military solutions in response to their strategic environment and in pursuit of grand strategic goals. Potential enemies, alliances, and the distribution of power constitute the strategic environment; also important are geography and topography, and socio-cultural constraints on (or advantages in) the use and application of force. Always remembering that 'advantage' is a relative notion, a central piece of the analysis must be devoted to one's opponents—their environment, their capabilities, their military doctrine. Armed with goals and this analysis, military leaders must find a way to execute the strategy. This entails the construction or creation of an integrated system of technology, doctrine, and war plans."[63]

In the context of a long-term strategic rivalry, the competitors will go through successive cycles of advantage-seeking and mutual adaptation, the outcomes of which will depend on the specific steps that are taken by each of the parties in search of a meaningful advantage, as well as

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[62] Ibid., 197. Emphasis added. Biddle endorses a very similar view, although he places primary importance on force employment. See Biddle, "Rebuilding the Foundations of Offense-Defense Theory," 743.

[63] Shimshoni, "Technology, Military Advantage, and World War I".

the interactions between those various steps. This search for advantage may or may not rise to the standard of actual *military entrepreneurship*, which aims for maximum surprise and disruption, for "consistently rejuvenated theories of victory."[64] But whether it is pursued vigorously and creatively by both sides or not, it will inexorably shape that aspect of a strategic rivalry that is pursued in peacetime with predominantly military means – the subject of our investigation, in the most general terms. To understand this process in detail, so that we may retrace it based on the available historical data on the U.S.-Soviet competition at sea, we can draw on several preexisting bodies of theory. As was discussed above, we will then go on to combine elements of those theories into a modular framework that provides greater explanatory power that any of them can provide individually, with respect to the case at hand.

2.3 Military interaction cycles: competing theories

2.3.1 The international system and unit-level strategic adjustment

Where should we begin our search for appropriate analytical instruments and approaches to investigate the long-term dynamics of the U.S.-Soviet competition for military advantage at sea? Although Shimshoni would immediately and with good reason direct our attention towards military organizations as key actors, the default unit of analysis in modern international relations is the state. Similarly, the level of analysis that is most commonly examined to explain the outcomes of strategic competition involves the interaction of states at the system level.[65] If competitions for military advantage can be successfully traced at this aggregate level, there is no need to go into greater detail and break down the main political units down into their component parts to understand historical outcomes after the fact. Since many of the most established theories in security studies operate at this level, we should at least explore the

[64] Ibid., 199.

[65] The classic treatment of levels of analysis in the security studies literature remains Kenneth N. Waltz, *Man, the State, and War: A Theoretical Analysis* (New York, NY: Columbia University Press, 2001).

possibility. Once it has become clear that a structural explanation will not do, we will then strike out in search of a more tenable, hybrid paradigm that accounts for state-level influences as well as systemic pressures.

THE FALSE ALLURE OF BALANCE-OF-POWER THEORY

The process by which the modern state came to dominate the international system, and scholars' ideas of it, was itself characterized by intense competitive adaptation over a period spanning roughly four centuries.[66] The dominant form of political organization that came out of this this process claimed "precise, hard boundaries"[67] and "absolute sovereignty"[68] within those borders. As a result, modern states could be conceived and theorized as a "unitary actors"[69] interacting in an international system that conditioned them to behave in ways that would ensure their long-term viability. In reality, it is difficult to overlook that the political and administrative structures of modern states are *anything but* monolithic. Even though he assumes otherwise in his defining take on balance-of-power theory, Kenneth N. Waltz himself clarifies: "We can freely admit that states are *in fact* not unitary, purposive actors."[70] Given that Waltz's structural realist theory has long been a key reference point for explaining competitive state behavior in the international system and that social science orthodoxy would have us "seek parsimony first, and then add on complexity,"[71] it is nevertheless worth considering what this most prominent theory in the security studies canon can tell us about the subject at hand. As will quickly become apparent, a detailed analysis of the naval element of an interstate

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[66] See, e.g. Barry Buzan and Richard Little, *International Systems in World History: Remaking the Study of International Relations* (Oxford: Oxford University Press, 2000), 256-66; Charles Tilly, *Coercion, Capital, and European States, AD 900-1992* (Oxford: Blackwell, 1997).

[67] Buzan and Little, *International Systems in World History*, 244.

[68] Ibid., 244-45.

[69] Kenneth N. Waltz, *Theory of International Politics* (New York, NY: Random House, 1979), 118.

[70] Ibid., 119. Emphasis added. Waltz can admit this because such "assumptions are not factual. One cannot therefore legitimately ask if they are true, but only if they are useful" (117-18).

[71] Robert O. Keohane, "Theory of World Politics: Structural Realism and Beyond," in *Neorealism and Its Critics*, ed. Robert O. Keohane (New York, NY: Columbia University Press, 1986), 188.

competition for military advantage will require us to move beyond such highly generalized theoretical constructs and engage the historical record using a more tailored framework.

The structural realist theory proposed by Waltz has few moving parts. Donnelly aptly observes that "[t]he structuralist project […] rests on maximum abstraction. The theoretical strategy is to make the fewest assumptions possible and use the smallest imaginable number of explanatory variables. Structural realists self-consciously sacrifice richness and depth for a simple, rigorous theory that holds widely across time and space."[72] The basic elements of Waltzian realism have been stated so many times that it is at risk of turning into a caricature of itself: states are "like units"[73] that interact under conditions of international "anarchy"[74] and maximize their aggregate "capabilities"[75] by means of "internal"[76] or "external balancing"[77] to ensure their survival in the face of opposing concentrations of power. While this intellectual austerity may have held considerable appeal in its own time, it is probably fair to say that Waltz did the realist tradition a disservice when he resolved to reduce it to the equivalent of "a theory of the market built up from assumptions about the behavior of individuals."[78]

In effect, structural realists can examine strategic adjustment only in the aggregate, as the abstract product of all unit-level actions undertaken to ensure the survival of the unit. "Since balance of power theory seeks to explain large-scale patterns of state action over long periods of time," Keohane maintains, "we could hardly expect the precision from it that we

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72 Jack Donnelly, *Realism in International Relations* (Cambridge: Cambridge University Press, 2000), 107.
73 Waltz, *Theory of International Politics*, 95-96.
74 Ibid., 111-16.
75 Ibid., 97-99.
76 Ibid., 168.
77 Ibid.
78 Ibid., 110. Although the point is hardly original, it should nonetheless be remembered that the realist school of political thought originated with what Doyle described as the 'complex realism' of Thucydides. Doyle, *Ways of War and Peace*, 49-92. See also Robert G. Gilpin, "The Richness of the Tradition of Political Realism," *International Organization* 38, no. 2 (1984), doi:10.1017/S0020818300026710; Richard Ned Lebow, *The Tragic Vision of Politics: Ethics, Interests, and Orders* (Cambridge: Cambridge University Press, 2003). The radical reduction of realism to its structural and systemic elements was touted as a necessary step on the way to a 'better' kind of social science but, in the context of this deeply rooted tradition, could scarcely count as progress. Against this backdrop, it is hard not to credit William Wohlforth's suggestion that Gilpin's *War and Change in World Politics* might have made a better springboard for a realist revival. See: William C. Wohlforth, "Gilpinian Realism and International Relations," *International Relations* 25, no. 4 (2011), doi:10.1177/0047117811411742.

expect from theories whose domains have been narrowed."[79] Structural realism provides an explanation of why states engage in balancing behavior, but it cannot explain why they chose to balance in certain ways, or emphasizing certain means over others – or why they sometimes fail to balance at all.[80] Because there is no functional differentiation among units and their internal makeup lies outside the purview of Waltz's theory, states are expected to react to environmental stimuli in roughly the same, predictable fashion. Structural realism provides what Resende-Santos describes as "a latent theory of [military] emulation,"[81] no more and no less than that. Specifically, Waltz holds that "[t]he possibility that conflict will be conducted by force leads to competition in the arts and the instruments of force. Competition produces a tendency toward the sameness of the competitors."[82] *What, then, explains the enduring asymmetries in the U.S. and Soviet approaches to naval warfare in the missile age?* To provide a satisfactory answer to what from a structuralist perspective can only be described as a puzzle, we have to embrace a considerably greater degree of complexity in our analytical approach. In fact, as Biddle has argued, the very idea of a single, undifferentiated 'balance of power' based some compound measure of military power should be viewed with suspicion: "[The] whole notion of a simple, unitary 'capability' fundamentally misrepresents military potential, which is inherently multidimensional."[83] What we can take away from Waltz's balance-of-power theory is that states will usually find it difficult to ignore systemic pressures for very long – all the more so in a threat-driven environment like the one that characterized the Cold War confrontation.[84] But, clearly, the structuralist perspective can provide at best a bare-bones account of

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[79] Keohane, "Theory of World Politics," 187-88.

[80] For a neoclassical realist take on this phenomenon of 'underbalancing', see Randall L. Schweller, *Unanswered Threats: Political Constraints on the Balance of Power* (Princeton: Princeton University Press, 2010).

[81] Jõao Resende-Santos, *Neorealism, States, and the Modern Mass Army* (Cambridge: Cambridge University Press, 2007), 13.

[82] Waltz, *Theory of International Politics*, 127.

[83] Biddle, *Military Power*, 192.

[84] In his test of structural realism against the historical record of Russian/Soviet empire building, Wohlforth found that the adaptation processes observed in this case were, at an aggregate level, broadly compliant with the theory's predictions. However, even in the context of this favorable outcome, he is sure to remind the reader that "[n]eorealist theory does not predict the precise nature of institutions and ideas; it merely predicts the rough manner in which states will be shaped by the international system." William C. Wohlforth, "The Russian-Soviet Empire: A Test of Neorealism," *Review of International Studies* 27, no. 5 (2001), doi:10.1017/S0260210501008099, 213-35.

why U.S. and Soviet naval forces (or other aspects of the competition, for that matter) evolved the way they did.

TOWARDS A HYBRID FRAMEWORK

Ultimately, we cannot begin to comprehend why the U.S. and Soviet approaches to warfare at and from the sea developed in such different directions without allowing that a number of additional variables were at play and that each of them had a highly significant impact – from the distinction between sea powers and land powers, to the importance of geographic position and historical experience, to the very different roles and organization of the opposing naval forces, to name just a few of the most important ones.[85] To understand the processes that shaped force structures, doctrines and deployment patterns – unit-level properties one and all – in any detail, we first have to let go of the 'unitary actor' and 'like units' assumptions. As Waltz himself would readily have conceded, threat-driven interactions at the system level can only explain aggregate international outcomes – that is, the fact that extensive military balancing behavior took place between the United States and the Soviet Union.[86] To claim that systemic pressures alone, as opposed to a combination of systemic pressures and specific unit-level properties, account for the massive variance in how the two sides adapted to the threat environment would be deeply implausible.

As they began to recapture the richness of the realist school of thought and move beyond the rudimentary balance-of-power narrative of *Theory of International Politics*, realists

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[85] As Levy and Thompson demonstrate, the introduction of the land power/sea power distinction into the structuralist framework goes a long way towards explaining why alliance formation and balancing behaviors are far from uniform across different types of international systems. See Jack S. Levy and William R. Thompson, "Balancing on Land and at Sea: Do States Ally against the Leading Global Power?," *International Security* 35, no. 1 (2010), doi:10.1162/ISEC_a_00001. That said, to explain the balancing dynamics in a particular global maritime system in detail once again requires going into considerably greater empirical depth.

[86] This why IR theories have long been subdivided into *theories of international politics and theories of foreign policy*. See: Kenneth N. Waltz, "International Politics Is Not Foreign Policy," *Security Studies* 6, no. 1 (2007), doi:10.1080/09636419608429298, 54-57; Gideon Rose, "Neoclassical Realism and Theories of Foreign Policy," *World Politics* 51, no. 1 (1998), doi:10.1017/S0043887100007814, 145.

themselves found Waltz's sparse structuralism wanting.[87] By the early 1990s, Jack Snyder had concluded that

> "recent exponents of Realism in international relations have been wrong in looking exclusively to states as the irreducible atoms whose power and interests are to be assessed. […] Contemporary political scientists are beginning to conceive of the state not as a unitary billiard ball in a system of other billiard balls, but as a pivot adjudicating between international *and* domestic pressures."[88]

In time, this renewed interest in the effects of state structure and intrastate political processes on foreign policy behavior gave rise to a new variant of realist theory that explicitly seeks to account for observed variances in strategic adjustment by including unit-level variables.

Using the structuralist understanding of strategic adjustment as their baseline, this new generation of realist scholars found that much of the variance in outcomes at the unit level could be explained by what they conceptualized as intervening variables. Their "neoclassical

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[87] See, e.g. Jack Snyder, *Myths of Empire: Domestic Politics and International Ambition* (Ithaca, NY: Cornell University Press, 1991); Stephen M. Walt, *The Origins of Alliances* (Ithaca, NY: Cornell University Press, 1987); Randall L. Schweller, "Bandwagoning for Profit: Bringing the Revisionist State Back In," *International Security* 19, no. 1 (1994), doi:10.2307/2539149; Randall L. Schweller, "New Realist Research on Alliances: Refining, Not Refuting, Waltz's Balancing Proposition," *American Political Science Review* 91, no. 4 (1997), doi:10.2307/2952176; Randall L. Schweller, *Deadly Imbalances: Tripolarity and Hitler's Strategy of World Conquest* (New York, NY: Columbia University Press, 1998). Levy and Thompson's articles on power balancing and the land power/sea power distinction as a further development of Walt's balance-of-threat theory are also in this tradition. See Jack S. Levy and William R. Thompson, "Hegemonic Threats and Great-Power Balancing in Europe, 1495-1999," *Security Studies* 14, no. 1 (2005), doi:10.1080/09636410591001465; Levy and Thompson, "Balancing on Land and at Sea". Unsurprisingly, the true disciples of a 'scientific' school of thought in international relations construed this return to a broader conception of realist thought as evidence of theoretical 'degeneration'. See John Vasquez, "The Realist Paradigm and Degenerative vs. Progressive Research Programs: An Appraisal of Neotraditional Research on Waltz's Balancing Proposition," *American Political Science Review* 91, no. 4 (1997), doi:10.2307/2952172; Jeffrey W. Legro and Andrew Moravcsik, "Is Anybody Still a Realist?," *International Security* 24, no. 2 (1999), doi:10.1162/016228899560130. For a response, see Peter D. Feaver et al., "Brother, Can You Spare a Paradigm? (Or Was Anybody Ever a Realist?)," *International Security* 25, no. 1 (2000), doi:10.1162/016228800560426. Schweller also expertly responded to the charge in a separate chapter. Randall L. Schweller, "The Progressiveness of Neoclassical Realism," in *Progress in International Relations Theory: Appraising the Field*, ed. Miriam Fendius Elman and Colin Elman (Cambridge, MA: MIT Press, 2003), 311-47. The 'degeneration' argument is alive and well, and has predictably been deployed against more recent, neoclassical realist scholarship as well. See Kevin Narizny, "On Systemic Paradigms and Domestic Politics: A Critique of the Newest Realism," *International Security* 42, no. 2 (2017), doi:10.1162/ISEC_a_00296; Davide Fiammenghi et al., "Correspondence: Neoclassical Realism and Its Critics," *International Security* 43, no. 2 (2018), doi:10.1162/isec_c_00332.

[88] Snyder, *Myths of Empire*, 19. Emphasis in the original.

realism"[89] (NCR) has since established itself as a major alternative to both structuralist and liberal theories of international relations.[90] Most of the research undertaken under the umbrella of this relatively new addition to the realist school of thought has focused either on the impact of "elite calculations and perceptions of relative power and domestic constraints"[91] on state behavior, or on the limits imposed by the state's "extraction and mobilization capacity"[92] – that is, its ability to actually make use of the latent power resources in its domestic environment.

The result has been a considerably more fine-grained understanding of the strategic adjustment process and its observable 'imperfections' both the level of theory as well as in terms of detailed case study research.[93] The metaphor that is often deployed to illustrate this

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89 The term is generally traced to Rose, "Neoclassical Realism and Theories of Foreign Policy". Rose's first cut at defining the new approach was based on his reading of a number of early works that are now often seen as foundational, including Thomas J. Christensen, *Useful Adversaries: Grand Strategy, Domestic Mobilization, and Sino-American Conflict, 1947-1958* (Princeton, NJ: Princeton University Press, 1997); Schweller, *Deadly Imbalances*; William C. Wohlforth, *The Elusive Balance: Power and Perceptions during the Cold War* (Ithaca, NY: Cornell University Press, 1993); Fareed Zakaria, *From Wealth to Power: The Unusual Origins of America's World Role* (Princeton, NJ: Princeton University Press, 1999). Another important, but less widely noted, reference point was Jennifer Sterling-Folker, "Realist Environment, Liberal Process, and Domestic-Level Variables," *International Studies Quarterly* 41, no. 1 (1997), doi:10.1111/0020-8833.00031, 1-26.

90 On liberalism, see: Andrew Moravcsik, "Taking Preferences Seriously: A Liberal Theory of International Politics," *International Organization* 51, no. 4 (1997), doi:10.1162/002081897550447; Doyle, *Ways of War and Peace*, 205-313.

91 Jeffrey W. Taliaferro, Steven E. Lobell, and Norrin M. Ripsman, "Introduction: Neoclassical Realism, the State, and Foreign Policy," in Lobell; Ripsman; Taliaferro, *Neoclassical Realism, the State, and Foreign Policy*, 28. See also Rose, "Neoclassical Realism and Theories of Foreign Policy," 157-61. A somewhat similar approach that is explicitly not in the realist 'camp' is taken in Richard Rosecrance and Arthur A. Stein, eds., *The Domestic Bases of Grand Strategy* (Ithaca, NY: Cornell University Press, 1993).

92 Jeffrey W. Taliaferro, Steven E. Lobell, and Norrin M. Ripsman, "Introduction: Neoclassical Realism, the State, and Foreign Policy," in Lobell; Ripsman; Taliaferro, *Neoclassical Realism, the State, and Foreign Policy*, 39. See also Rose, "Neoclassical Realism and Theories of Foreign Policy," 161-65; Jeffrey W. Taliaferro, "State Building for Future Wars: Neoclassical Realism and the Resource-Extractive State," *Security Studies* 15, no. 3 (2006), doi:10.1080/09636410601028370.

93 The outstanding theoretical work, and the best statement of an expansive vision of the utility and applicability of NCR, is now Norrin M. Ripsman, Jeffrey W. Taliaferro and Steven E. Lobell, *Neoclassical Realist Theory of International Politics* (Oxford: Oxford University Press, 2016). A useful theoretical study that takes a more limited perspective of the role and utility of NCR is Brian Rathbun, "A Rose by Any Other Name: Neoclassical Realism as the Logical and Necessary Extension of Structural Realism," *Security Studies* 17, no. 2 (2008), doi:10.1080/09636410802098917. Works that notably combine NCR theory with in-depth case study research include Schweller, *Unanswered Threats*; Amelia Hadfield-Amkhan, *British Foreign Policy, National Identity, and Neoclassical Realism* (Lanham, MD: Rowman & Littlefield, 2010); Tom Dyson, *Neoclassical Realism and Defence Reform in Post-Cold War Europe* (Basingstoke: Palgrave Macmillan, 2010); Paolo Rosa, *Neoclassical Realism and the Underdevelopment of China's Nuclear Doctrine* (Cham: Palgrave Macmillan, 2018); Asle Toje and Barbara Kunz, eds., *Neoclassical Realism in European Politics: Bringing Power Back In* (Manchester: Manchester University Press, 2012); Thomas Juneau, *Squandered Opportunity: Neoclassical Realism and Iranian Foreign Policy* (Stanford, California: Stanford University Press, 2015).

difference is that of a "transmission belt."[94] In the structuralist paradigm, systemic pressures are expected to translate relatively smoothly into unit-level actions designed to manage them. In neoclassical realism, any reactions to external stimuli for action are expected to be moderated and, more likely than not, modified by structures and preferences at the unit level.[95] To understand why each unit ultimately responded the way it did, we need to make the administrative and political structures of the state and the priorities set by key decision-making bodies an integral part of our analysis. The focus of NCR theorists has generally been on high-level political decision-makers – the so-called *foreign policy executive* (FPE),[96] which formulates and adjusts a state's grand strategy and its overall security strategy.

A small number of NCR-based studies have attempted to explain changes in states' military doctrines and postures based on this approach. In his recent study of China's nuclear doctrines, Rosa found that during the two historical phases he examined "different patterns of elite politics that dominated the Chinese political system […] have decisively affected the capacity of policymakers to develop a nuclear doctrine."[97] Because the Chinese process for formulating nuclear doctrine was exceptionally politicized, a straightforward application of NCR goes at least part of the way in explaining the 'underdeveloped' state of China's nuclear doctrine.[98] China is probably best seen an outlier in this respect. It is not clear that the same approach would work equally well for cases in which military organizations have a higher level of professional influence over the evolution of doctrine, as has arguably been the case in most modern administrative states at most times. This is also the direction that another NCR-based study of a similar subject matter would points us in: Narang choses as one of his intervening variables the nature of civil-military relations with regard to nuclear posture development.[99] He expects regional states in which military forces have greater independent decision-making

[94] Rose, "Neoclassical Realism and Theories of Foreign Policy," 147.
[95] Ripsman, Taliaferro and Lobell, *Neoclassical Realist Theory of International Politics*, 58-79.
[96] Steven E. Lobell, "Threat Assessment, the State, and Foreign Policy: A Neoclassical Realist Model," in Lobell; Ripsman; Taliaferro, *Neoclassical Realism, the State, and Foreign Policy*, 56.
[97] Rosa, *Neoclassical Realism and the Underdevelopment of China's Nuclear Doctrine*, 43.
[98] Ibid., 149-50.
[99] Vipin Narang, *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict* (Princeton, NJ: Princeton University Press, 2017), 36-39.

authority to arrive at substantially different nuclear postures.[100] Perhaps the most useful of the NCR-based approaches is suggested by Sten Rynning in his investigation of doctrinal change in the French Fifth Republic. As Rynning recognizes, even though politics may at times be the determinative factor, "[p]inpointing patterns of military influence is […] essential to a study of military doctrine."[101] While much of what he has to say is case-specific, he nonetheless lights the way in proposing a framework that looks beyond the foreign policy executive to the role of professional military officers to explain the dynamics of doctrinal change.

By allowing for the introduction of intervening variables, the neoclassical realist project comes much closer to providing a viable analytical framework for understanding why a state adapts to perceived threats in certain ways and not others. What NCR-based studies focused on military change ultimately demonstrate is that, to fully grasp the dynamics of competitive military adaptation, we need to disaggregate the state even further. Although the decisions of the foreign policy executive provide the outlines of military policy, the details of a state's military posture are not generally determined by the political leadership itself but shaped by military organizations' interactions with their political masters, as well as with other military organizations in the external and domestic environments.[102] Under most circumstances, then, *military organizations should be seen as key actors alongside the foreign policy executive*, where the formulation of military doctrine and the competitive adaptation of military postures is concerned.

The most relevant examples of such an approach are provided by works that adopt approaches that are structurally similar to NCR, but that self-confidently dispense with some

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[100] Ibid., 53.

[101] Sten Rynning, *Changing Military Doctrine: Presidents and Military Power in Fifth Republic France, 1958-2000* (Westport, CT: Praeger, 2002), 15.

[102] Once again, Rynning states this case eloquently. Even in circumstances of limited military influence (e.g. due to a painful historical experience of military interference), he believes that "military officers can influence the process of change by offering ideas to policy-makers searching for new policies, by withholding support and thus implicitly contesting political legitimacy, and by drawing on the daily contacts with foreign militaries to be inspired and shape doctrinal thinking within national institutions." Ibid., 17. Clearly, this case can be made even more strongly where such experiences are absent and where the role of military professionals in formulating military doctrine is well developed. On different modes in civil-military relations, more generally, see: Samuel P. Huntington, *The Soldier and the State: The Theory and Politics of Civil-Military Relations* (Cambridge, MA: Harvard University Press, 2008[1957]), 80-97.

of the constraints imposed by the high-level theoretical debates in the security studies literature. A particularly rich and apposite understanding of strategic adjustment at the unit level is outlined by the chapters in Trubowitz, Goldman and Rhodes' edited volume on *The Politics of Strategic Adjustment*. They criticize realists for framing "the process by which states select their grand strategies [as] remarkably bloodless, unencumbered by the political divisions, frictions, and cleavages that plague policymaking on the domestic front. Such a view is too stylized, mechanical, and apolitical."[103] While neoclassical realists would very much agree with their sense that "[t]he *nonunitary* and *bureaucratic* character of state institutions also limits and shapes the state's ability to react to changing and ambiguous external threats,"[104] Trubowitz and Rhodes go further in their desire to capture the complex institutional setup of the modern state. Unencumbered by possible charges of paradigmatic degeneration, they freely acknowledge the relevance of military organizations as well as other domestic pressure groups. Like March and Olsen in their classic essay, they see bureaucratic organizations as "political actors in their own right."[105]

At the same time, they are careful to avoid a cardinal mistake that has marred much of the literature on military innovation and civil-military relations: to unthinkingly credit and lazily reproduce "simplistic accounts of institutional behavior that presume bureaucratic organizations face insurmountable obstacles to undertaking self-conscious, intelligent, nonincremental adjustment in response to changed threats."[106] Their alternative view is all the more valuable because they can demonstrate its direct applicability to the question of naval posture change in their preceding chapters.[107] Unfortunately, from the point of view of the present

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[103] Peter Trubowitz and Edward Rhodes, "Explaining American Strategic Adjustment," in Trubowitz; Goldman; Rhodes, *The Politics of Strategic Adjustment*, 9.

[104] Ibid., 12.

[105] James G. March and Johan P. Olsen, "The New Institutionalism: Organizational Factors in Political Life," *American Political Science Review* 78, no. 3 (1984), doi:10.2307/1961840, 738.

[106] Peter Trubowitz and Edward Rhodes, "Explaining American Strategic Adjustment," in Trubowitz; Goldman; Rhodes, *The Politics of Strategic Adjustment*, 13.

[107] The most clear-cut example of this is Smith's chapter, which focuses on the Navy's capacity to formulate and implement meaningful conceptual and structural changes in the early 1990s. Due to the volume's historical setting and interest in understanding strategic adjustment in a more relaxed threat environment, the Cold War case itself was not examined. Edward A. Smith, "…From the Sea: The Process of Defining a New Role for Naval Forces in the Post-Cold War World," in Trubowitz; Goldman; Rhodes, *The Politics of Strategic Adjustment*, 267-301.

study, all of these consider phases in the history of the U.S. Navy that featured threat environments considerably less severe than that of the Cold War era. It is highly likely that unit level factors would be more clearly expressed under these circumstances than we can reasonably expect to find during any of the three phases of the Cold War at sea.[108] Hence, the specific findings presented in Trubowitz, Goldman, and Rhodes' volume are expected to be of limited relevance for our investigation. What is required, then, is a workable synthesis between NCR's *continued focus on systemic factors*, on the one hand, and the need to capture *the ability of military organizations to shape the search for military advantage* within the broad parameters set out by the political level, on the other.

Such a synthesis finally emerges when we engage with the Kimberly Marten Zisk's remarkable study of the Soviet General Staff's attempts to counter successive evolutions of Western air-land doctrine during the period from 1955 to 1991.[109] From her reading of organizational theory, and of the peculiar nature and responsibilities of military organizations, she deduces a crucially important hypothesis:

> "*Military organizations are likely to develop innovative doctrines on their own, in the absence of civilian intervention, when they interpret a foreign doctrinal shift as a threat to the success of their current war plans.* Because senior professional military officers believe that their institution's primary role is to defend state security, their interests extend beyond a narrow bureaucratic focus."[110]

In effect, the military planners' perceptions of the threat environment and their ingrained responsibility to counter severe threats posed by other military organizations will play a key role

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108 On the importance of the external threat level as a scope condition, from an NCR perspective, see: Norrin M. Ripsman, Jeffrey W. Taliaferro, and Steven E. Lobell, "Conclusion: The State of Neoclassical Realism," in Lobell; Ripsman; Taliaferro, *Neoclassical Realism, the State, and Foreign Policy*, 280-87. For a slightly more nuanced view, see Emily O. Goldman, "International Competition and Military Effectiveness: Naval Air Power, 1919-1945," in *Creating Military Power: The Sources of Military Effectiveness*, ed. Risa A. Brooks and Elizabeth A. Stanley (Stanford, CA: Stanford University Press, 2006), 162-66.

109 Marten Kimberley Zisk, *Engaging the Enemy: Organization Theory and Soviet Military Innovation, 1955-1991* (Princeton, NJ: Princeton University Press, 1993).

110 Ibid., 26. Emphasis added.

in shaping organizational responses and, by extension, the dynamic of a competition for military advantage that takes place in such an elevated threat environment.[111] Given that Zisk's framework was itself designed with the Cold War environment in mind, we can adopt this perspective with a high degree of confidence in its applicability to our investigation. The full significance of this outlook in bridging the divide between the systemic 'push' factors realists have emphasized and observable military initiatives will become apparent if we examine the search for military advantage from an organizational, rather than a state-level perspective.

2.3.2 Innovation, adaptation, and organizational survival

Much of the debate about military change since the early 1980s has revolved around a tug-of-war between structural realism and organization theory. In what is now considered the classic treatment of the subject, Barry Posen explicitly contrasts the two perspectives in a theory-testing format.[112] His *The Sources of Military Doctrine* undoubtedly set the tone for an important research program and, in doing so, has spawned a fruitful debate. At the same time, the main limitation of this highly influential work – its focus on the relative explanatory power of structuralist and organizational explanations, about which it ultimately does not have much to say – has cast an equally long shadow.[113] While we cannot fault Posen's logic when he states that "in the realm of *theory* these explanations are competitive, not complementary,"[114] the very

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[111] For some fascinating case studies of how military organizations may perceive, or misperceive, foreign military change, see Thomas G. Mahnken, *Uncovering Ways of War: U.S. Intelligence and Foreign Military Innovation, 1918-1941* (Ithaca, NY: Cornell University Press, 2002). On conceptual aspects, see pages 5-17. The prickly question of assessing opponents' intentions has more recently been tackled by Yarhi-Milo, although not specifically from the perspective of military intelligence. Keren Yarhi-Milo, *Knowing the Adversary: Leaders, Intelligence, and Assessment of Intentions in International Relations* (Princeton, NY: Princeton University Press, 2014), esp. 14-43.

[112] Barry R. Posen, *The Sources of Military Doctrine: France, Britain, and Germany between the World Wars* (Ithaca, NY: Cornell University Press, 1984), 34-80.

[113] Posen's main conclusion on this count is that in his subjective judgement "balance of power theory is a slightly more powerful tool than organization theory for the study of doctrine." Ibid., 239. This is a slightly dissatisfying finding, given that a decision to combine both, instead of conducting a rather toothless theory test, could have yielded an analytical instrument much stronger than either of the two perspectives individually.

[114] Ibid., 7. Emphasis in the original.

structure of his study stands in the way of an understanding of competitive military change as it is brought about *in practice*.

As has already been argued, to retrace the dynamics of Cold War naval competition (and perhaps those of other relevant cases as well) a hybrid framework is far more useful. Given that our case featured perceptions of a severe threat on both sides, we can assume – as neoclassical realism does – that systemic factors played a rather important role in shaping unit-level responses. At the same time, we have seen that a purely structural framework could provide at best a rough outline of the dynamics that took shape.[115] The next question that we will need to consider, then, is whether and to what extent existing organizational theories can fill in the many blank spaces that balance-of-power theory would leave us with, and contribute to a sufficiently rich and accurate understanding of the dynamics of military competition. In the next step, we will take a bottom-up view of how competition is pursued by military organizations and explore how this literature can add to our 'modular' analytical framework.

BUREAUCRATIC ESSENTIALISM VERSUS THE ORGANIC METAPHOR

So far, it has been established that military advantages are created at the unit – i.e., intrastate – level and that military organizations play a more important role in shaping competitive responses to external pressures than established realist theories would lead us to believe. *But how exactly does organizational behavior impact the search for meaningful military advantages?* According to most statements of the organizational perspective in the political science literature, one should expect organizational behavior to function primarily as an impediment to military

[115] Kier argues that the international system is altogether "indeterminate" as far as the selection of offensive or defensive doctrines is concerned. Elizabeth Kier, *Imagining War: French and British Military Doctrine between the Wars* (Princeton, NJ: Princeton University Press, 1999), 11-12. Strictly speaking, this is correct: a structural theory alone cannot explain why states act as they do in a military competition, and why they chose specific options among a range of possible alternatives. That said, her cultural theory would lead us to consistently understate the importance of systemic pressures in bringing about military change, as well as the extent to which other states' actions narrow down the range of viable responses.

change. In fact, military organization are often seen as prime examples of bureaucratic inertia. Jensen summarizes this view well:

> "The modern military, like all bureaucracy, is an iron cage prone to crowding out innovation in an effort to promote efficiency and existing processes. Civilian bureaucrats and military officers are expected to be unwilling or reluctant to escape this iron cage. This organizational resistance to change should be especially pronounced in peacetime, when there are few incentives to challenge existing routines and uncertainty about where or when the next war will be. Change in military organizations should be an anomaly."[116]

Few scholars in security and strategic studies have deviated from this accepted interpretation. According to Posen's reading of organization theory, major change is likely only if it is imposed from the outside by civilian intervention or by defeat in battle.[117] Even Stephen Rosen, who is much more willing to concede the possibility of self-administered change than Posen, concedes that "in bureaucracies the absence of innovation is the rule, the natural state."[118] Wilson, who takes a significantly broader view of bureaucratic institutions than either of his aforementioned colleagues, similarly believes that "[w]e should not be surprised that organizations resist innovation. They are supposed to resist it."[119] As for navies more specifically, Jervis reminds his readers that "[i]t is a commonplace that navies are even more hide-bound than most bureaucracies."[120] All of these scholars ultimately ask: how does innovation happen *in spite of* a military organization's ingrained resistance to change? At the same time, none of them would go so far as to claim that militaries *never* change of their own accord. In fact, Zisk and Jensen argue convincingly that significant changes in the military doctrines of the land forces

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116 Benjamin M. Jensen, *Forging the Sword: Doctrinal Change in the U.S. Army* (Stanford, CA: Stanford University Press, 2016), 3.

117 Posen, *The Sources of Military Doctrine*, 57. A clear opportunity for bureaucratic expansion is also seen as a potential external trigger for innovation. While it appears to be an option in such situations, Posen finds that it is "not necessarily a preferred one." Ibid., 47.

118 Stephen Peter Rosen, *Winning the Next War: Innovation and the Modern Military* (Ithaca, NY: Cornell University Press, 1994), 5.

119 James Q. Wilson, *Bureaucracy: What Government Agencies Do and Why They Do It* (New York, NY: Basic Books, 2000), 221.

120 Robert Jervis, "Navies, Politics, and Political Science," in *Doing Naval History: Essays Toward Improvement*, ed. John B. Hattendorf (Newport, RI: Naval War College Press, 1995), 47.

of both Cold War superpowers occurred throughout the Cold War, although at different frequencies.[121] How are we to resolve this tension?

To understand why militaries are willing to adapt in some circumstances and why they vigorously resist major changes of the kind most scholars define as innovative, we need to take a closer look at *what exactly it is* that they are resisting. Because they have been created to perform a spectrum of tasks that thus becomes a constitutive element of their bureaucratic being at the creation, all organizations cherish their basic missions and enviously protect them from outside interference. If possible, they will seek to expand the scope of their responsibilities further, both as a defensive buffer for the status quo and as a way of further increasing their influence, or preventing potential rivals from doing so.[122] The core responsibilities that set the organization apart from its rivals are at the heart of what Halperin calls *organizational essence*, or "the view held by the dominant group within the organization of what its missions and capabilities should be."[123] This view may not be shared fully by different constituencies within the organization, nor is it impervious to change over time, but the basic purpose of the organization will be quite settled at most times during its existence. Because it is at the heart of their self-conception and seen as critical to their bureaucratic well-being, organizations will vigorously resist any perceived challenge to their organizational essence.[124]

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[121] Zisk, *Engaging the Enemy*, 180; Jensen, *Forging the Sword*, 3-7.

[122] Morton H. Halperin and Priscilla Clapp, *Bureaucratic Politics and Foreign Policy*, with the assistance of Arnold Kanter (Washington, DC: Brookings Institution Press, 2006), 38-39.

[123] Ibid., 27.

[124] Unsurprisingly, there is an entire literature on the interactions of bureaucratic organizations within the domestic environment as well. Relevant works in this vein include Graham T. Allison and Morton H. Halperin, "Bureaucratic Politics: A Paradigm and Some Policy Implications," *World Politics* 24, S1 (1972), doi:10.2307/2010559, 40–79; Morton H. Halperin, "The Decision to Deploy the ABM: Bureaucratic and Domestic Politics in the Johnson Administration," *World Politics* 25, no. 1 (1972), doi:10.2307/2010431, 62–95; Robert J. Art, "Bureaucratic Politics and American Foreign Policy: A Critique," *Policy Sciences* 4, no. 4 (1973), doi:10.1007/BF01728472, 467–490; Lawrence Freedman, "Logic, Politics and Foreign Policy Processes: A Critique of the Bureaucratic Politics Model," *International Affairs* 52, no. 3 (1976), doi:10.2307/2616555, 434–49; Jerel A. Rosati, "Developing a Systematic Decision-Making Framework: Bureaucratic Politics in Perspective," *World Politics* 33, no. 2 (1981), doi:10.2307/2010371, 234–52; J. G. Clifford, "Bureaucratic Politics," *The Journal of American History* 77, no. 1 (1990), doi:10.2307/2078648,161-68; David A. Welch, "The Organizational Process and Bureaucratic Politics Paradigms: Retrospect and Prospect," *International Security* 17, no. 2 (1992), doi:10.2307/2539170, 112-46; Graham T. Allison and Philip Zelikow, *Essence of Decision: Explaining the Cuban Missile Crisis* (New York, NY: Longman, 1999), 143-96; Roger Hilsman, *The Politics of Policy Making in*

What this means for the prospect of innovation now largely becomes a matter of definition. As Wilson shows, organizations are often perfectly willing to embrace changes that do not pose an immediate challenge to their essence.[125] That is why he defines innovation not as "any new program or technology, but only those that involve the performance of new tasks or a significant alteration in the way in which existing tasks are performed."[126] By the standard he applies, the successive changes in the U.S. Army's basic doctrine during the Cold War era – which Jensen and Zisk explicitly investigate as cases of doctrinal innovation – do not qualify at all: "[A]t a deeper level, very little changed. […] Every alteration in doctrine and structure was based on the assumption that the war for which the army should prepare itself was a conventional war on the plains of Germany."[127] Because the U.S. Army was already committed to this task and comfortable with it, it did not resist changes that enabled it to better compete with its Soviet adversary. This perspective is compatible with the main findings of "professionalist"[128] scholars like Stephen Rose, who have argued that major innovations are possible even in the absence of outside interventions or defeats, if a new task is established *from within* the organization.

This discussion raises two important points. First, we must conclude that what a succession of scholars in security and strategic studies have discussed under the heading of military innovation only very partially overlaps with what we have described as *the search for military advantage within the framework of a long-term strategic rivalry*. The development of the U.S. Army's AirLand Battle doctrine in the late 1970s and early 1980s, which was driven by a few determined individuals and involved a significant change of posture vis-à-vis the Soviet armed forces, would certainly count as a competitive adaptation of the entrepreneurial kind

Defense and Foreign Affairs: Conceptual Models and Bureaucratic Politics, with the assistance of Laura Gaughran, and Patricia S. Weitsman (Upper Saddle River, NJ: Prentice Hall, 2003); I. M. Destler, *Presidents, Bureaucrats and Foreign Policy: The Politics of Organizational Reform* (Princeton, NJ: Princeton University Press, 2015); Bill Jenkins and Andrew Gray, "Bureaucratic Politics and Power: Developments in the Study of Bureaucracy," *Political Studies* 31, no. 2 (2016), doi:10.1111/j.1467-9248.1983.tb01340.x, 177–193. While this is a fascinating literature in itself, its findings are for the most part either self-evident or highly contradictory.

[125] Wilson, *Bureaucracy*, 222.

[126] Ibid.

[127] Ibid., 220.

[128] Jeffrey A. Isaacson, Christopher Layne, and John Arquilla, "Predicting Military Innovation" (Documented Briefing, RAND, Santa Monica, CA, 1999), 19-20.

in Shimshoni's book.[129] For Zisk – and, in her telling, for the Soviet General Staff – this was one of the most important competitive moves of the entire Cold War period.[130] It did *not*, however, involve a challenge to the organizational essence of either the Army or Air Force. If a rearrangement of core tasks, or creation of new tasks, is required for an organizational change to count as innovative, a great many cases of highly relevant competitive adjustments fall through the cracks. The implication is clear: military innovation is not – or not necessarily – the kind of military change that we should be concerned with in this study. We will explore this point further in the next section.

The second point that emerges is that to understand the type of change we *should* be examining – competitive military adaptation to create or maintain an advantage over a specific adversary or threat – we will have to embrace a different way of looking at organizations. The military innovation debate defines military organizations in terms of what we might call *bureaucratic essentialism* – i.e., their innate tendency to fight any attempt at changing their basic conception of themselves. The cases that are selected for examination generally involve organizations fighting fundamental changes that are perceived as threatening by the senior leadership at the time. Competitive adaptation, for the most part, does not involve such immediate challenges to the organizational essence. At the same time, it still goes far beyond opportunistic adjustments or routine updates of plans and hardware, even in the short-term. The significance of what is being undertaken is apparent to the actors involved. Cumulatively, over time, repeated competitive adaptation can effect striking and conspicuous changes. Perhaps most importantly, understanding this type of change requires us to relate organizational behavior to the external environment to a much greater extent than the military innovation literature has traditionally done.

This focal shift also raises another very important question: what if adaptive behavior in military organizations is actually much more common than the narrow focus on a few major

[129] For an excellent overview of this development, see: Richard Lock-Pullan, "How to Rethink War: Conceptual Innovation and AirLand Battle Doctrine," *Journal of Strategic Studies* 28, no. 4 (2007), doi:10.1080/01402390500301087, 679-702. See also: Robert R. Tomes, *US Defense Strategy from Vietnam to Operation Iraqi Freedom: Military Innovation and the New American Way of War, 1973-2003* (London: Routledge, 2007), 58-124; Jensen, *Forging the Sword*, 56-86.
[130] Zisk, *Engaging the Enemy*, 120-77.

innovations, which "were simply the most important in the history of the particular military organization,"[131] would suggest? After all, it is hardly surprising that such mega-changes are few and far between, and that many of them were vigorously resisted at first. But if the perspective of military innovation studies is unrepresentative of how military organizations most often change over time and how they interact with their environment, how can we better grasp their behavior? This is where the *organic metaphor* comes into play.[132] This is an analytical lens that would invite us to think of organizations "as living systems, existing in a wider environment on which they depend for the satisfaction of various needs."[133] In the case of military organizations, which are tasked with defending against outside threats, they can be seen as a subsystem of a larger organism – the state – on which they depend for the fulfilment of even their most basic needs, such as adequate budgetary and personnel. In the medium to long term, this continued flow of resources depends on the ability of the subsystem to perform the tasks it has been assigned as part of the organism's functional differentiation. The need for the subsystem to be responsive in order to ensure its own success, as well as that of the organism as a whole, is likely to be highest where the perceived severity of external threats is high and where there is some level of functional redundancy in the military subsystem of the body politic – that is, where the same tasks could potentially be performed by another service.[134]

Because the external threat environment changes over time, the capacity of the subsystem to fulfil its assigned role in the survival of the organism as a whole depends on its being able to evolve. Morgan defines such evolution in terms of "an ability to move to more complex forms of differentiation and integration, and greater variety in the system facilitating its ability to deal with challenges and opportunities posed by the environment. This involves a cyclical process of variation, selection, and retention of the selected characteristics."[135] The evolutionary analogy does not depend on this process being efficient. In fact, some proponents have

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[131] Rosen, *Winning the Next War*, 7.

[132] The classic summary of this perspective is: Gareth Morgan, *Images of Organization* (Thousand Oaks, CA: SAGE, 1997), 33-71.

[133] Ibid., 33.

[134] Ibid., 61.

[135] Ibid., 41. For an extremely comprehensive overview of organizational evolution, see the chapters in Joel A. C. Baum and Jitendra V. Singh, eds., *Evolutionary Dynamics of Organizations* (Oxford: Oxford University Press, 1994).

themselves pointed to "the importance of inertial pressures that often prevent organizations from changing in response to their environment."[136] Morgan also emphasizes that "[m]ost organizations are not as functionally unified as organisms."[137] This would seem to underline the possibility of competition among subsystems that some military innovation thinkers – notably Owen Cote – have emphasized as a source of change.[138] Moreover, the adaptation process is likely to be subject to some level of perceptual bias, which is a common feature of organizational behavior.[139] To what extent biases and organizational pathologies will skew the adaptation process is impossible to predict with any accuracy, but with hindsight, it would be quite possible to identify the imprints of such distortions.

Overall, the analogy is far from perfect (few analogies are), but it nonetheless serves to draw attention to the related internal and external pressures military organizations face for continuous and significant evolutionary change. Participation in this adaption process is necessary to ensure the systemic relevance, and ultimately the viability, of a subsystem in the long term. Military organizations may be able to resist demands for immediate, radical change almost all of the time, but *they cannot afford to become outmoded* as external challengers modernize and the other services seek to expand their resource base. As far as the military innovation research program is concerned, to ignore such adaptive change because it is 'merely evolutionary' and does not lead to some immediate recasting of the organization's essence is deeply misguided.

This leads us back to Zisk's hypotheses about military officers' willingness to embrace change in the absence of any manifest civilian intervention or catastrophic shocks to the system. In line with the professionalist interpretation, she expects senior officers "will react *both* to perceived threats to state security from abroad *and* to perceived bureaucratic threats to the

136 Morgan, *Images of Organization*, 62. See also Michael T. Hannan and John Freeman, "The Population Ecology of Organizations," *American Journal of Sociology* 82, no. 5 (1977), doi:10.1086/226424, 929–64.
137 Morgan, *Images of Organization*, 74.
138 Owen R. Cote, "The Politics of Innovative Military Doctrine: The U.S. Navy and Fleet Ballistic Missiles" (Doctoral dissertation, MIT, 1996), 70-94.
139 The classic treatment of perceptual biases and pathologies is still Robert Jervis, *Perception and Misperception in International Politics* (Princeton, NJ: Princeton University Press, 1976), 319-406.

military organization from within the domestic policy-making system."[140] In terms of organizational behavior, she further expects that organizations will favor solutions that simultaneously increase their resource base and that they tend to react to domestic threats to their essence first.[141] This, she believes, is because decisions to shift resources or responsibilities away from the organization would leave it internally weakened and potentially unable to tackle the external threat.[142] These hypotheses are both sensible and compatible with the organic perspective we have discussed above.

The overall picture that emerges is one of military organizations that are highly reluctant to embrace radical change, but much more willing to evolve in ways that mesh with their organizational essence, both to ensure the security and well-being of the state and their own continued relevance. The latter is inseparably tied to the former, by way of two mechanisms: The first is their being an organic part of a functionally differentiated whole that is seen as being threatened from the outside and for the defense of which they have been assigned direct responsibility. The second is their utter dependency on resources that are parceled out by the body politic and that may eventually be shifted or withheld if they are perceived to underperform in relation to what is required of them, or in relation to what other 'organs' in the military subsystem are thought to be capable of. In the next section, we will attempt to further set apart the type of change that results from this cyclical adaptation to the environment from other types of military change.

DELINEATING POSTURE CHANGE

Given that different ideas and definitions of what qualifies as military innovation remain prevalent in the literature, it is important that we further attune our analytical instruments to the specific type of change we will be studying. In what follows, we will review three main types of military change, namely fundamental change, posture change, and responsive military

140 Zisk, *Engaging the Enemy*, 14.
141 Ibid., 26-27.
142 Ibid., 27.

change. All are clearly worthy of consideration and study; but the purposes, extent and organizational implications of change differ markedly between them. As a result, they will not only occur with dissimilar frequencies and different levels of external visibility – they are also likely to involve different causal chains, which should be reason enough for researchers not to conflate them.

The first type of military change is *fundamental change*, which corresponds to the "major innovations"[143] that have generally been favored as study cases. What most clearly sets changes of this type apart is that they are "by definition unprecedented. Even if that innovation takes place in wartime, there will not have been much relevant previous experience."[144] The most prominent works in the military innovation literature, including Posen's *The Sources of Military Doctrine*, Rosen's *Winning the Next War*, and Parker's *The Military Revolution*, have looked into this type of change almost exclusively.[145] While these accounts differ both in their approach and their assessment of the roots of fundamental change, they are all concerned with the same type of phenomenon: the introduction of technologies and operational paradigms that fundamentally reshaped military organization and established new types of capabilities that often had pervasive consequences for how wars are fought. Essentially, this type of change reconfigures the organization's essence, or important aspects of it, and is likely to be contested as a result. Posen's case studies of change are the British implementation of the first integrated air defense system, Nazi Germany's development of a doctrine of armored deep penetration (*Blitzkrieg*), and France's reliance on the Maginot Line, "the first fortress system of

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[143] Rosen, *Winning the Next War*, 7.

[144] Ibid., 25.

[145] Posen, *The Sources of Military Doctrine*; Geoffrey Parker, *The Military Revolution: Military Innovation and the Rise of the West, 1500-1800* (Cambridge: Cambridge University Press, 1996); Rosen, *Winning the Next War*. Other key entries in this literature include: Cote, "The Politics of Innovative Military Doctrine"; Matthew Evangelista, *Innovation and the Arms Race: How the United States and the Soviet Union Develop New Military Technologies* (Ithaca, NY: Cornell University Press, 1988), esp. 22-49; Dima Adamsky, *The Culture of Military Innovation: The Impact of Cultural Factors on the Revolution in Military Affairs in Russia, the US, and Israel* (Stanford, CA: Stanford University Press, 2010). For a slightly dated, but otherwise excellent, overview of the research program as a whole, see Adam Grissom, "The Future of Military Innovation Studies," *Journal of Strategic Studies* 29, no. 5 (2007), doi:10.1080/01402390600901067, 905-34.

its kind,"[146] for strategic defense. Rosen's cases include *inter alia* the introduction of airmobile forces into the U.S. Army and of an effective paradigm for amphibious assault in the U.S. Marine Corps, of carrier aviation and submarine commerce raiding in the U.S. Navy, and of strategic bombing in the U.S. Army Air Forces. Because of their scope and far-reaching organizational impact, most analysts of military change would agree with Posen's hypothesis that shifts of this magnitude will be "rare"[147] and many would also share his conviction that they are a product of extreme circumstances or high-level interventions.[148]

Meanwhile, Parker presents his interpretation of a change with even more wide-ranging implications. He sees in the coming of disciplined, infantry-centric mass armies, scientific siege warfare, and long-range naval forces the outlines of an epochal shift in the organization of violence that underpinned the rise of the European nation states and their successful quest for global preeminence.[149] While parts of this particular account have been criticized as overstated or inaccurate, the early 1990s spawned a whole new debate about *revolutions in military affairs* (RMAs), which were now though to occur with much greater frequency.[150] The participants in this debate agree that an RMA is a particularly momentous form of major innovation: a technological and organizational change of such comprehensive and disruptive nature as to render an entire paradigm of warfare virtually irrelevant. There is little agreement, however, as to the

[146] Posen, *The Sources of Military Doctrine*, 106.

[147] Ibid., 54.

[148] Ibid., 55-57.

[149] Parker, *The Military Revolution*, 6-44. Many of the key contributions to this debate, including Michael Robert's initial take, have been collected in Clifford J. Rogers, ed., *The Military Revolution Debate: Readings on the Military Transformation of Early Modern Europe,* History and warfare (Boulder, CO: Westview Press, 1995).

[150] On this debate, see Andrew F. Krepinevich, "The Military-Technical Revolution: A Preliminary Assessment" (CSBA/Office of Net Assessment, Washington, DC, 1992[2002]); Colin S. Gray, *Strategy for Chaos: Revolutions in Military Affairs and the Evidence of History* (London: Frank Cass, 2002); Jan Helmig and Niklas Schörnig, *Die Transformation der Streitkräfte im 21. Jahrhundert: Militärische und politische Dimensionen der aktuellen "Revolution in Military Affairs"* (Frankfurt am Main: Campus, 2008); Keith L. Shimko, *The Iraq Wars and America's Military Revolution* (Cambridge: Cambridge University Press, 2010); Jeffrey Collins and Andrew Futter, eds., *Reassessing the Revolution in Military Affairs: Transformation, Evolution and Lessons Learnt* (London: Springer, 2015). The classic study of the much needed historical context is MacGregor Knox and Williamson Murray, eds., *The Dynamics of Military Revolution, 1300-2050* (Cambridge: Cambridge University Press, 2001).

exact criteria that an innovation, or complex of innovations, must fulfill to qualify for this rarefied category.[151] At a minimum, the thorough industrialization of warfare before and during World War I, the introduction of nuclear weapons, and the triumph of information technology from the 1970s onward are thought to have resulted in such revolutions during the 20th century.[152] While this was a highly relevant debate that, in a much more muted form, has continued into the 2010s, there is no need to add to it by introducing further dubious cases. The Cold War at sea *did* reflect the outlines of the nuclear and reconnaissance-strike revolutions, but the fact that these developments were taking place does not tell us why exactly the two navies evolved the way they did – *and not some other way that would also have been consistent with the wider evolution of the military sphere*.

Returning to the established minimum standard for fundamental changes – far-reaching structural and functional change to an existing service or "warfare community,"[153] or creation of a new set of tasks and corresponding service branch – the last century saw at least four such changes in naval warfare, which often featured important interlinkages:

- the submarine warfare revolution of the 1900s and 1910s,[154]
- the introduction of sea-based and land-based naval aircraft in the 1910s,[155]

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151 Murray and Knox's differentiation *military revolutions* and associated, but more circumscribed, *revolutions in military affairs* manages reconcile some of the internal contradictions of the debate, but even this conceptually mature approach does not fully resolve them all. Williamson Murray and MacGregor Knox, "Thinking about Revolutions in Warfare," in *The Dynamics of Military Revolution, 1300-2050*, ed. MacGregor Knox and Williamson Murray (Cambridge: Cambridge University Press, 2001), 6-14.

152 Krepinevich, "The Military-Technical Revolution," 4-5.

153 Rosen uses the term 'combat arm' to denote "a functional division within the military [specifically within a military service, MH] in which one weapon system dominates the way in which its units fight." Rosen, *Winning the Next War*, 7. The term 'warfare communities' is preferred in the U.S. naval context to describe the three main combat arms of naval aviation (centered on the carrier and its air wing), surface warfare (centered on cruisers and destroyers) and submarines (centered on nuclear-powered submarines of fast attack or ballistic missile-carrying type).

154 See e.g. Richard Compton-Hall, *The Submarine Pioneers: The Beginnings of Underwater Warfare* (Penzance: Periscope, 2003); Karl Lautenschläger, "The Submarine in Naval Warfare, 1901-2001," *International Security* 11, no. 3 (1986), doi:10.2307/2538886, 94-140; Lawrence Goldstone, *Going Deep: John Philip Holland and the Invention of the Attack Submarine* (New York, NY: Pegasus Books, 2018).

155 See e.g. Douglas V. Smith, *One Hundred Years of U.S. Navy Air Power* (Annapolis, MD: Naval Institute Press, 2013), 5-93; Stéphane Nicolaou, *Flying Boats & Seaplanes: A History from 1905* (Osceola, WI: MBI, 1998); Mark Lardas and Paul Wright, *World War I Seaplane and Aircraft Carriers* (London: Bloomsbury, 2016); Mark R. Peattie, *Sunburst: The Rise of Japanese Naval Air Power, 1909-1941* (Annapolis, MD: Naval Institute Press, 2001), 1-20.

- the replacement of the battleship by the aircraft carrier as the capital ship of the world's leading navies during the early 1940s,[156]
- the introduction of sea-based nuclear weapons from the late 1940s onwards.[157]

While some might want to add to that list, and the term 'revolution' in particular has been bandied about more liberally that perhaps it should have, these are the only *clear-cut* cases of major change, as Rosen would define it.[158] Each of these innovations ultimately led to the implementation of far-reaching structural shifts and changed how leading navies approach warfare at and from the sea. Together, they resulted in the creation of naval forces that were both far more powerful and, at the same time, far more relevant to happenings on land than during any previous period in history.

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156 See e.g. Geoffrey Till, "Adopting the Aircraft Carrier: The British, American, and Japanese Case Studies," in Murray; Millett, *Military Innovation in the Interwar Period*, 191–226; Thomas C. Hone, "Replacing Battleships with Aircraft Carriers in the Pacific in World War II," *Naval War College Review* 66, no. 1 (2013), 56–69; David C. Evans and Mark R. Peattie, *Kaigun: Strategy, Tactics, and Technology in the Imperial Japanese Navy, 1887-1941* (Annapolis, MD: Naval Institute Press, 2012), 291-352; Peattie, *Sunburst*, 129-67; James H. Belote and William M. Belote, *Titans of the Seas: The Development and Operations of Japanese and American Carrier Task Forces during World War II* (New York: Harper & Row, 1975). I deliberately do not include amphibious forces in this tally, although they do provide some fascinating case studies in their own right. On developments towards a fully rounded operational paradigm for amphibious warfare that Rosen is right to count as a major innovation, see Allan R. Millett, "Assault from the Sea: The Development of Amphibious Warfare between the Wars – the American, British, and Japanese Experiences," in Murray; Millett, *Military Innovation in the Interwar Period*, 50-95. See also Rosen, *Winning the Next War*, 80-85.

157 The introduction and evolution of sea-based strategic weapons is well-documented, especially on the American side. See e.g. Graham Spinardi, *From Polaris to Trident: The Development of US Fleet Ballistic Missile Technology* (Cambridge: Cambridge University Press, 1994). The Soviet case is poorly understood in the West and is discussed in much greater detail below. Tactical nuclear war at sea remains a relatively underexplored area of research. The best discussion of the implication of tactical nuclear use at sea is still Desmond Ball, "Nuclear War at Sea," *International Security* 10, no. 3 (1985), doi:10.2307/2538940, 3-31. We will have more to say on this subject as well in Chapters 4-5.

158 An excellent case in point is the much-touted *Dreadnought* 'revolution.' The development of the *Dreadnought*-type battleship was undoubtedly a highly significant event with far-reaching ramifications. But while it left previous classes of battleships outmatched and vulnerable, it did not fundamentally change how naval officers thought about war at sea, nor did it create a new service branch or, in an organizational sense, transform an existing one. The idea that "[s]upremacy at sea must, after all, be measured by the number of battleships we can put into the line," as the First Lord of the Admiralty from 1886-1892, George Hamilton put it, had been established long before *Dreadnought* was launched. Quoted in Nicholas A. Lambert, *Sir John Fisher's Naval Revolution* (Columbia, SC: University of South Carolina Press, 1999), 19. Nothing that transpired in the battleship race after 1905 qualifies as a fundamental military change. Had the Royal Navy fully replaced its ships of line with battlecruisers, the case for a major innovation would be much stronger, but it did no such thing. The battlecruiser issue has, of course, remained an eternal bone of contention among naval historians. Lambert's claim that this actual 'revolution' may have been close at hand has found its apologists as well as its detractors. Nicholas A. Lambert, "Admiral Sir John Fisher and the Concept of Flotilla Defence, 1904-1909," in *Technology and Naval Combat in the Twentieth Century and Beyond*, ed. Phillips P. O'Brien (New York, NY: Routledge, 2013), 72.

It is equally important to emphasize, however, that the introduction of submarine forces or naval air arms, and of doctrines for their tactical and operational employment, does not explain with any degree of accuracy why naval competitions since the 1910s have unfolded as they did. Even in the case of nuclear weapons – some would say *particularly* in the case of nuclear weapons – we need to look far beyond the initial, fundamental shift to understand how we got to where we are today. While a major change that is adopted by one or more actors will often be a *starting point* for increased competition, it does not in any meaningful sense account for how that competition develops in the medium to long term. While they form the backdrop for nearly everything that will be said in this monograph, the innovations mentioned above – which, by 1946, had either already taken hold or had already become visible on the horizon – are therefore not the primary subject of our investigation. Rather than with these more fundamental shifts *per se*, we are concerned with a second type of military change, which we will call *posture change*.

A military organization's *posture* is the living manifestation of its operational and strategic priorities. It is the functional expression of how leaders believe the organizational essence should be cross-referenced with the strategic aims passed down from the political level and translated into (1) *operational approaches and doctrine*, (2) *force structure*, and (3) *deployment patterns*.[159] Posture change will mostly be a top-down process in which military elites operate these three main levers of adaptation to maintain or improve their ability to execute established missions and protect their established organizational essence in the face of emerging threats. In the context of a long-term strategic rivalry, a service level effort at creating or sustaining an advantage over their expected opponent will express itself in repeated adjustments in some or all of these dimensions.

Cumulatively, this may result in very significant changes to the strategic outlook and operational mindset of the organization, as well as to its acquisition priorities. Given that we will study naval competition specifically, we will mostly deal with posture at the service level

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[159] This understanding of the concept of *posture* may not be universally accepted, but it is sensible nonetheless. Tang's definition comes close (Tang, "Offence-Defence Theory," 219).

and, to some extent, at the level of warfare communities. As has already been argued, repeated posture changes can also plant the seeds for a fundamental change. But the intention of such changes falls well short of bringing about a radical transformation of the organization in whole or in part. Thus, the development of AirLand Battle and of the technologies to support it in practice, may have constituted an important point of departure for what later turned into the so-called revolution in military affairs. But it was undertaken to offset the concrete threat posed by the numerical superiority of Soviet mechanized forces along the European Central Front, not to induce a revolution in military affairs. Ironically, that revolution eventually created pressures to drastically reorganize the US military *away from* the AirLand Battle paradigm and get rid of many of its heavy units.[160] Whatever its second- and third-order consequences may be, the fact remains that posture change is essentially geared towards improving the organization's relative position within a well-understood, competitive context. To this end, the organization will seek ways of employing existing forces more effectively and recapitalizing its force structure to better correspond to the foreseeable threat environment. Whereas fundamental changes are rare and the organizational costs of implementing it will often be considered prohibitive by the incumbent leadership, posture change can be a product of perfectly 'normal' organizational routines, or it can involve entrepreneurial efforts that do not amount to a fundamental challenge.[161] Previously examined cases of U.S. Navy innovation confirm that an important entrepreneurial component is usually present in cases of posture change, as well as those of major change.[162] The processes that collectively result in posture changes – observation of the external environment, threat assessment, operational concept development, procurement and deployment planning, renegotiation of the resource base – will take place almost continuously in any functioning military bureaucracy faced with a serious, identifiable threat.

[160] See e,g, William M. Donnelly, *Transforming an Army at War: Designing the Modular Force, 1991-2005* (Washington, DC: Center of Military History/United States Army, 2007).

[161] Pierce makes a related distinction between *sustaining* and *disruptive* innovations that is apposite here. Terry C. Pierce, *Warfighting and Disruptive Technologies: Disguising Innovation* (London: Frank Cass, 2004), 24-27. His view is the former "reinforce the capabilities of the organization, while disruptive innovations require new skills and routines." Ibid., 25.

[162] See Vincent Davis, *The Politics of Innovation: Patterns in Navy Cases* (Denver, CO: University of Denver, 1966), 33-36; Bradd C. Hayes, "Conclusion," in *The Politics of Naval Innovation*, ed. Bradd C. Hayes and Douglas V. Smith (Newport, RI: U.S. Naval War College/Center for Naval Warfare Studies, 1994), 91-93.

This should be true even where that bureaucracy is highly conservative as far as its core missions, main weapon systems, and basic organizational structures are concerned.

It is interesting to note that, while the concern with foundational change in general and RMAs in particular has given rise to a targeted and sustained research program, the same has not been true with regard to posture change. As a consequence, the concept of military innovation has become largely synonymous with fundamental change and the innovation literature offers little in way of explicit theoretical guidance for studying posture change. It can be argued that some works that have been framed as contributions to the traditional military innovation literature actually deal with posture change.[163] But given that posture change is actually a much more frequent and pervasive, there is still a conceptual deficit in need of correction. Perhaps the most important difference between the two literatures is that the fact that a change led to an innovation of some kind is not necessarily of primary interest when we are studying the competitive adaptation of military postures. Because the latter perspective is all about the dynamics of interstate competition, rather than some abstract idea of capability or organizational progress, the question of whether a change is *adequate to create, preserve or deconstruct a meaningful advantage* will be much more central to the analysis. The resulting shift in perspective is significant enough to require different conceptual tools and a tailored analytical framework.

Finally, there is a third type of change that has received considerable attention over the last two decades in particular: *reactive military adaptation* comprises limited, *ad hoc* modifications of existing procedures and systems that are often undertaken in a bottom-up fashion, as a reaction to immediate threats at the tactical or operational level. Recent wartime examples include the efforts undertaken by US and allied forces to keep their counterinsurgency postures viable in the face of escalating attacks featuring improvised explosive devices (IEDs)

[163] Without embarking on a wholesale renegotiation, this can arguably be said of some chapters in notable works like Williamson R. Murray and Allan R. Millett, eds., *Military Innovation in the Interwar Period* (Cambridge: Cambridge University Press, 1996); Theo Farrell and Terry Terriff, eds., *The Sources of Military Change: Culture, Politics, Technology* (Boulder, CO: Lynne Rienner, 2001); and Emily O. Goldman and Leslie C. Eliason, eds., *The Diffusion of Military Technology and Ideas* (Stanford, CA: Stanford University Press, 2003).

during the campaigns in Iraq and Afghanistan.[164] In other areas like electronic warfare (EW) and cyber operations, similar dynamics may take place in peacetime as well – once a new emitter or capability is detected, it may have to be countered immediately to manage an emerging vulnerability. Reactive adaptation efforts may originate at the lowest tactical levels. Some of them eventually develop into major, concerted programs, while others remained localized. While they can have important implications at higher levels of an organization and culminate in a major investment of resources, they tend to be reactive in a very immediate sense and usually do not result in the articulation of a positive vision for far-reaching adaptation at the service level. That said, it is nonetheless possible for short-term adaptation efforts to eventually spawn a posture change.[165] For example, the reintroduction of the long-forgotten practice of convoying was an immediate reaction to the German campaign of unrestricted submarine warfare during 1917-1918, reluctantly adopted once a number of other approaches had been tried and found ineffective.[166] Yet, it also led to the development of an operational posture for defensive sea control that formed the basis of Allied strategy and operations in two successive Battles of the Atlantic – and would have played a role in a third one, between NATO and the Soviet Union, had it come to pass. The broad ramifications of the German turn towards elastic

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164 On that case specifically, see Andrew Smith, *Improvised Explosive Devices in Iraq, 2003-09: A Case of Operational Surprise and Institutional Response,* Letort Papers (Carlisle, PA: U.S. Army War College/Strategic Studies Institute, 2011).

165 Important works examining this type of change and its broader implications include Williamson Murray, *Military Adaptation in War: With Fear of Change* (Cambridge: Cambridge University Press, 2011); Chad C. Serena, *A Revolution in Military Adaptation: The US Army in the Iraq War* (Washington, DC: Georgetown University Press, 2011); Theo Farrell, Frans P. B. Osinga and James A. Russell, eds., *Military Adaptation in Afghanistan* (Stanford, CA: Stanford University Press, 2013); Raphael D. Marcus, *Israel's Long War with Hezbollah: Military Innovation and Adaptation under Fire* (Washington, DC: Georgetown University Press, 2018); Aimée Fox-Godden, *Learning to Fight: Military Innovation and Change in the British Army, 1914-1918,* Cambridge Military Histories (Cambridge: Cambridge University Press, 2018).

166 See e.g. Lawrence Sondhaus, *German Submarine Warfare in World War I: The Onset of Total War at Sea* (Lanham: Rowman & Littlefield, 2017), 119-126; Dwight R. Messimer, *Find and Destroy: Antisubmarine Warfare in World War I* (Annapolis, MD: Naval Institute Press, 2001). Very interestingly, Abbatiello also traces the attack-at-source posture to World War I initiatives. See John J. Abbatiello, *Anti-Submarine Warfare in World War I: British Naval Aviation and the Defeat of the U-Boats* (London: Routledge, 2006), 59-80.

defense and infiltration tactics (*Sturmtruppentaktik*) in World War I are another excellent example.[167] Hence, it would seem that adaptive countermeasures are no less 'upwardly mobile' in principle than posture changes that provide the kindling for a major innovation.

Having outlined and specified the type of military change that is to be investigated here, and having delineated it to the best of our abilities, there is one more theoretical question to answer: *To what extent are the strategic competitors in a long-term militarized rivalry actually in control of the dynamic process of cyclical posture changes that they embark on? And even if the actors are fully in the driver's seat to begin with, can they remain so as the competition unfolds?* These questions, which once again confronts us with the prickly challenge of reconciling unit-level agency with the inevitable presence of structural forces unleashed at the systemic level, will be the subject of the next section.

2.3.3 Structural accelerators in the search for advantage

The danger of interstate military competitions slipping beyond the conscious control of political and military leaders on both sides and 'getting out of hand' is a long-standing *motif* in the study of international politics. The most prominent examples of this apparent take-over of structural forces are of conflicts that resulted from failed efforts to manage a militarized crisis. Lebow has called this the *loss-of-control* pathway to war.[168] Ever since the establishment of the discipline, of which international relations (IR) was itself a collateral consequence of World War I, generations of scholars and politicians have been reared on the lessons of the July Crisis,

[167] See Timothy T. Lupfer, "The Dynamics of Doctrine: The Changes in German Tactical Doctrine during the First World War" (Leavenworth Paper No. 4, U.S. Army Command and Staff College/Combat Studies Institute, Fort Leavenworth, KS, 1981); Patrick T. Stackpole, "German Tactics in the "Michael" Offensive" (M.A. dissertation, U.S. Army Command and Staff College, 1993); David T. Zabecki, *The German 1918 Offensives: A Case Study in the Operational Level of War* (London: Routledge, 2006); Biddle, *Military Power*, 78-107.

[168] Richard Ned Lebow, *Nuclear Crisis Management: A Dangerous Illusion* (Ithaca, NY: Cornell University Press, 1987), 75-103.

as they were put forth in such landmark works as Barbara Tuchman's *The Guns of August*.[169] Other accounts have adopted a macro-perspective of this key event and have emphasized that powerful structural forces were at play long before the descent into crisis. Some have emphasized what has more recently been framed as the *Thucydides trap*, or something close to it.[170] A second strand of the literature has examined the armaments policies of the great powers, and the Anglo-German naval arms race in particular.[171] As Mulligan has aptly summarized, the basic proposition is that "[t]he arms race before the First World War was a fundamental structural problem in the international system, which undermined peace between the great powers."[172] The exact contribution of the naval race between Britain and Germany in the eventual march to war is impossible to determine, but it has traditionally been seen as no less important

[169] Barbara Tuchman, *The Guns of August* (London: Penguin, 2014[1962]). John F. Kennedy famously used his personal read-out of *Guns of August* as a heuristic before and during the Cuban Missile Crisis. See Richard E. Neustadt and Ernest R. May, *Thinking In Time: The Uses Of History For Decision Makers* (New York, NY: Free Press, 1986), 15. He also had copies "placed in every one of the officers' day rooms on U.S. military bases around the world." Richard Reeves, *President Kennedy: Profile of Power* (New York, NY: Touchstone, 1993), 306. The loss-of-control theory of the entry into World War I has seen a recent revival, notably in Christopher M. Clark, *The Sleepwalkers: How Europe Went to War in 1914* (London: Penguin, 2014). Other notable contributions have questioned this narrative and emphasized the very considerable degree of fully conscious agency that was involved in precipitating the war. Particularly valuable is Richard F. Hamilton and Holger H. Herwig, *Decisions for War, 1914-1917* (Cambridge: Cambridge University Press, 2005).

[170] See fn. 22 above. For Allison's take on World War I, see Allison, *Destined for War*, 55-87. For an interpretation from the perspective of the strategic rivalries literature, see Karen Rasler and William R. Thompson, "Strategic Rivalries and Complex Causality in 1914," in *The Outbreak of the First World War: Structure, Politics, and Decision-making*, ed. Jack S. Levy and John A. Vasquez (Cambridge: Cambridge University Press, 2014), 65-86.

[171] Perhaps the definitive work in this tradition is David Stevenson, *Armaments and the Coming of War: Europe, 1904-1914* (Oxford: Clarendon Press, 1996). See also David G. Herrmann, *The Arming of Europe and the Making of the First World War* (Princeton, NJ: Princeton University Press, 1997). On the naval race more specifically, see E. L. Woodward, *Great Britain and the German Navy* (Oxford: Oxford University Press, 1935); Arthur J. Marder, *From the Dreadnought to Scapa Flow: Volume 1: The Royal Navy in the Fisher Era, 1904-1919* (Annapolis, MD: Naval Institute Press/Seaforth, 2013 [1962]); Jonathan Steinberg, *Yesterday's Deterrent Tirpitz and the Birth of the German Battle Fleet* (London: Macdonald, 1966); Volker Berghahn, *Germany and the Approach of War in 1914* (London: Macmillan, 1973); Barry H. Steiner, *Arms Races, Diplomacy, and Recurring Behavior: Lessons from Two Cases* (Beverly Hills, CA: SAGE, 1973), SAGE Professional Paper No. 2; Peter Padfield, *The Great Naval Race: The Anglo-German Naval Rivalry, 1900-1914* (New York, NY: D. McKay, 1974); Holger H. Herwig, *"Luxury" Fleet: The Imperial German Navy, 1888-1918* (New York, NY: Humanity Books, 1987); Paul M. Kennedy, *The Rise of the Anglo-German Antagonism, 1860-1914* (New York, NY: Humanity Books, 1988); Grant T. Hammond, *Plowshares into Swords: Arms Races in International Politics, 1840-1991*, Studies in international relations (Columbia, SC: University of South Carolina Press, 1993); N.A.M. Rodger, "Deutsch-englische Flottenrivalität, 1960-1914," in *Skagerrakschlacht: Vorgeschichte, Ereignis, Verarbeitung*, ed. Michael Epkenhans, Jörg Hillmann and Frank Nägler (München: Oldenbourg, 2011); Matthew S. Seligmann, "The Anglo-German Naval Race, 1898-1914," in Mahnken; Maiolo; Stevenson, *Arms Races in International Politics*, 21-40; Matthew S. Seligmann, Frank Nägler and Michael Epkenhans, eds., *The Naval Route to the Abyss: The Anglo-German Naval Race 1895-1914* (London: Routledge, 2016).

[172] William Mulligan, *The Origins of the First World War* (Cambridge: Cambridge University Press, 2013), 126.

than the continental arms race. This strand of the literature is of particular interest to us, for two reasons. The first reason is that it has a direct bearing on our assessment of the search for military advantage and of the role of structure and agency within it. The second is that it has been explicitly argued that the U.S.-Soviet rivalry at sea constituted a naval arms race, which would further increase the relevance and applicability of any findings from existing historical case study work.[173]

There are two partially overlapping phenomena to discuss here: The first is the *security dilemma*, which may induce states to see each other's defensive preparations as potentially aggressive. The second is the *arms dynamic* more specifically, which can potentially result in self-sustaining patterns of action and reaction, and may leave the contenders with an irrational superabundance of certain types of armaments in exchange for reduced security all around. Together, these related debates provide several important, if circumscribed, insights.

THE WAGES OF FEAR

Can states' responses to perceived military threats ever be fully rational and calculated? The findings of a century of security and strategic studies research suggest that the pervasive presence of uncertainty and fear in interstate relations make a perfectly balanced response to another state's military initiatives perhaps the least likely outcome of all – even if we were to implausibly put the irrationalities of organizational behavior and the frailties of human decision-making to one side for a moment. Because the stakes in a militarized competition between states are bound to be high and the consequences of underreaction are potentially catastrophic, overreaction is always a distinct possibility. On the other hand, a strong reaction designed to deter aggression may well end up exacerbating tensions and heightening insecurity overall – especially if one's counterpart did not, in fact, harbor any aggressive military designs to begin

[173] This argument is most explicitly laid out in Richard W. Fieldhouse and Shunji Taoka, *Superpowers at Sea: An Assessment of the Naval Arms Race* (Oxford: Oxford University Press, 1989).

with. The structural difficulty of getting an armed opponent's intentions right based on incomplete and possibly contradictory information has long been theorized as the *security dilemma*.[174] Tang has accurately described this as "one of the most important theoretical ideas in international relations."[175] John Herz's original formulation of that dilemma is still worth quoting at length:

> "Groups or individuals living [alongside each other without being organized into a higher unity] must be, and usually are, concerned about their security from being attacked, subjected, dominated, or annihilated by other groups and individuals. Striving to attain security from such attack, they are driven to acquire more and more power in order to escape the impact of the power of others. This, in turn, renders the others more insecure and compels them to prepare for the worst. Since none can ever feel entirely secure in such a world of competing units, power competition ensues, and the vicious circle of security and power accumulation is on."[176]

The literature is rich in variations on this theme, but the basic ingredients – anarchy, "irreducible uncertainty,"[177] cascading fear[178], action and reaction – are always the same. Credit for the pithiest framing of the *military* implications, and for the clearest linkage of the security dilemma and arms racing logics, should go to Waltz's version, "in which states, unsure of one another's intentions, *arm for the sake of security* and in doing so set a vicious circle in motion. *Having armed for the sake of security*, states feel less secure and buy more arms *because the means to anyone's security is a threat to someone else who in turn responds by arming*."[179] While some

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174 On the security dilemma in general, see John H. Herz, "Idealist Internationalism and the Security Dilemma," *World Politics* 2, no. 2 (1950), doi:10.2307/2009187; Jervis, "Cooperation under the Security Dilemma" Charles L. Glaser, "The Security Dilemma Revisited," *World Politics* 50, no. 1 (1997), doi:10.1017/S0043887100014763, 171-201; Shiping Tang, "The Security Dilemma: A Conceptual Analysis," *Security Studies* 18, no. 3 (2009), doi:10.1080/09636410903133050, 587-623; Evan B. Montgomery, "Breaking Out of the Security Dilemma: Realism, Reassurance, and the Problem of Uncertainty," *International Security* 31, no. 2 (2006), doi:10.1162/isec.2006.31.2.151, 151-85; Ken Booth and Nicholas J. Wheeler, *The Security Dilemma: Fear, Cooperation, and Trust in World Politics* (Basingstoke: Palgrave Macmillan, 2008). On the question of perceptions, Jervis' classic account of *spiral* and *deterrence* logics remains very impressive. Jervis, *Perception and Misperception in International Politics*, 58-113.

175 Tang, "The Security Dilemma," 587.

176 Herz, "Idealist Internationalism and the Security Dilemma," 157.

177 Glaser, "The Security Dilemma Revisited," 195.

178 On concepts of fear in modern realist thought, see Arash Heydarian Pashakhanlou, *Realism and Fear in International Relations: Morgenthau, Waltz and Mearsheimer Reconsidered* (Cham: Palgrave Macmillan, 2017).

179 Waltz, *Theory of International Politics*, 186. Emphasis added.

thoughtful criticisms of have been offered over the years, none have sought to dispel the notion that security dilemmas do occur and that they can contribute to a fraying of relations that may then result in an extended competition and, with some probability, a military conflict down the line.[180]

One basic conceptual problem that remains unresolved is that the security dilemma can be variously interpreted as a cause, a catalyst, or a symptom of militarized competition – perhaps even all of the above, and all at once. 'Defensive' realists have often seen it as a source of conflicts that could otherwise be prevented.[181] Conversely, 'offensive' realists would emphasize the essential rationality of expansionist security strategies. For this second group of thinkers, the security dilemma merely exacerbates patterns of competition between power-maximizing states that are, for all intents and purposes, inescapable.[182] For the purposes of this study, we can state with some confidence that the search for security provides only a partial explanation of superpower behavior. As will become apparent, we find a thorough blend of offensive and defensive motives on both sides of the Cold War confrontation – both in the lead-up to, and in the course of, the long-term strategic competition.[183] Hence, at the levels of both grand strategy and national military strategy, the security dilemma is better understood as a contributing factor, rather than a standalone guide to a complex and multilayered set of interactions. Interestingly enough, it is at the level of naval postures that we find the most convincing evidence of a collision of essentially defensive considerations. Contrary to Booth and Wheeler's interpretation in their state-of-the-art 2008 study, this also implies the dilemma of interpretation does *not* come to an end once the competitors have identified one another as a *strategic challenge*.[184] We will explore this aspect further in the next chapter.

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[180] Constructivists, in particular, have argued that security dilemmas are largely self-imposed and avoidable. See e.g. Alexander Wendt, "Constructing International Politics," *International Security* 20, no. 1 (1995), doi:10.2307/2539217, 77.

[181] Jervis, "Cooperation under the Security Dilemma," 187-88. For a study of the crucial July Crisis case from this perspective, see Jack L. Snyder, "Perceptions of the Security Dilemma in 1914," in *Psychology and Deterrence*, ed. Robert Jervis, Richard N. Lebow and Janice G. Stein (Baltimore, MD: Johns Hopkins University Press, 1991), 153-179.

[182] John J. Mearsheimer, *The Tragedy of Great Power Politics* (New York, NY: W.W. Norton, 2001), 35-36.

[183] Directly on this issue, from a standard security dilemma perspective, see Robert Jervis, "Was the Cold War a Security Dilemma?," *Journal of Cold War Studies* 3, no. 1 (2001), doi:10.1162/15203970151032146.

[184] Booth and Wheeler, *The Security Dilemma*, 9-10.

Another serious issue that needs to be addressed in the context of this present study is to do with Jervis' idea that the severity of the security dilemma is modulated by the state of the offense-defense balance.[185] Given that we have rejected the idea of systemic military advantages as empirically untenable, *can we say anything about the state of the competition and its impact at the level of the security dilemma?* Here, the fact that the security dilemma has as its reference point a dyadic constellation, rather than the system as a whole, works very much in favor of the perspective adopted here. The key to bringing security dilemma thinking into our modular analytical framework is Biddle's finding that "different pairs of potential opponents face different offense-defense balances."[186] In fact, as Shimshoni points out, a military advantage might only apply to some partial aspect of a dyadic competition or only under some circumstances. As a result, there could be a number of *different* offense-defense balances existing in parallel for each dyad, depending on the operational sphere and the scenario in question.[187] In either case, if we accept that the balance is determined by the interaction of the opponents' postures in each dyadic constellation, we can also retain the link to the security dilemma, as far as that particular dyad is concerned.

This rejection of a systemic *deus ex machina* – in the form of *a priori* defense dominance and the even more problematic idea of distinguishability of defensive weaponry – also has a bearing on the question of whether security dilemmas can be overcome at all, and if they can be overcome, how. Offensive realists arguably take the strongest position on this issue, with Mearsheimer declaring that "little can be done to ameliorate the security dilemma."[188] Biddle himself does see a potential for its mitigation, but not for elimination.[189] Starting from his dyadic theory, he concludes that "states cannot signal benign intentions unambiguously via their military policies. The strategic choices identified here as most defense-conducive require states to implement tactics that could also enable successful attack against neighbors who fail to avail

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185 Jervis, "Cooperation under the Security Dilemma," 186-214; See also Marco Nilsson, "Offense–Defense Balance, War Duration, and the Security Dilemma," *Journal of Conflict Resolution* 56, no. 3 (2012), doi:10.1177/0022002712438350, 467-89.
186 Biddle, "Rebuilding the Foundations of Offense-Defense Theory," 743.
187 Shimshoni, "Technology, Military Advantage, and World War I," 189.
188 Mearsheimer, *The Tragedy of Great Power Politics*, 36.
189 Biddle, "Rebuilding the Foundations of Offense-Defense Theory," 769.

themselves of appropriate strategies and tactics themselves."[190] While we should not expect to be able to simply transpose this finding to the naval domain, we will explore the implications of the dyadic perspective for the Cold War naval case in the following chapters.

Not entirely surprisingly, Booth and Wheeler provide a more pluralistic, and altogether more optimistic, set of answers in their inclusive review of security dilemma thinking. In fact, they devote much of their study to what they call *mitigator* and *transcender* logics found in English School/institutionalist and emancipatory accounts, respectively.[191] Their assessment that "the security dilemma cannot ultimately be escaped, but it can be transcended"[192] is worth restating. Their advocacy for what they call "security dilemma sensibility"[193] is particularly well-taken and relevant far beyond the academic debate. However, as far as entrenched rivalries are concerned, the grounds for optimism on this count are very limited. While major wars are never structurally preordained – and as a result can often be avoided, be it as a result of sensible competitive measures that make military conflict less attractive or of cooperative schemes – the underlying, severe and broad-based conflicts of interest are often intractable. Even if the security dilemma itself can indeed be transcended, which Biddle and others are skeptical about for good reasons, the grounds for competition and conflict would remain.[194] For the most part, then, we should expect regime- and trust-building measures to improve the *climate* within which competitions are being pursued, with the attendant positive side effects, rather than to resolve or transform militarized rivalries as such.

Finally, it is important to clarify how the potential presence of a security dilemma will figure in our hybrid model of military competition, which is populated by military organizations that are interacting with one another and their respective domestic environments based on a combination of threat-based and organizational considerations. As seen from this perspective, it is certainly possible – even likely – that the security dilemma will be one of the

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190 Ibid.
191 Booth and Wheeler, *The Security Dilemma*, 14-18, 83-257.
192 Ibid., 296.
193 Ibid.
194 For a discussion of conflicts of interest and the need to see them as conceptually distinct from the security dilemma, even from a defensive realist perspective, see Tang, "The Security Dilemma," 598-603.

structural drivers that provide high-level motivations for a search for military advantage. Moreover, the security dilemma may also directly come into play at the level of naval postures that we are primarily concerned with. At the same time, this is entirely compatible with our expectation that structural factors will not, in any real sense, account for the *content* of unit-level responses to the security environment, which will be determined by the hybrid causal chain outlined above (and further clarified below). In the next subsection, we will weigh the possible contributions of the closely-related literature on the security dilemma at sea and arms races.

A NAVAL ARMS RACE?

The arms race phenomenon has been a subject of extensive study in both security and strategic studies, and for good reason. According to Buzan's succinct take on the subject, "arms racing lies at the heart of what Strategic Studies is about: the way the instruments of force affect relations among the states that possess them."[195] The primary concern of the debate about arms races, which we have already traced to a lasting preoccupation with the origins of World War I, has generally been with their impact on the likelihood of conflict. The outcomes of this long-standing research effort are much less uniform than one might expect. While some scholars have gone so far as to claim that arms races almost always lead to war,[196] others have presented a much more nuanced picture, in which intense arms competition has sometimes made wars

195 Barry Buzan, *An Introduction to Strategic Studies: Military Technology and International Relations* (Basingstoke: Macmillan/IISS, 1987), 71.

196 This is the position that Richardson took in his classic study, which also outlined one of the first formal, mathematical models of arms races. See Lewis F. Richardson, *Arms and Insecurity: A Mathematical Study of the Causes and Origins of War,* 1960 vols. (Pittsburgh, PA: Boxwood Press). On Richardson's approach, see also Michael D. Intriligator and Dagobert L. Brito, "Richardsonian Arms Race Models," in Midlarsky, *Handbook of War Studies*, 219-38; Craig Etcheson, *Arms Race Theory: Strategy and Structure of Behavior* (New York, NY: Greenwood, 1989). For a somewhat less extreme version of the same position, see Michael D. Wallace, "Arms Races and Escalation: Some New Evidence," *Journal of Conflict Resolution* 23, no. 1 (1979), doi:10.1177/002200277902300101, 3-16; Michael D. Wallace, "Armaments and Escalation: Two Competing Hypotheses," *International Studies Quarterly* 26, no. 1 (1982), doi:10.2307/2600598, 37-56.

more likely and sometimes not.[197] Hammond's account is significant for challenging the common view that arms races' net effect is usually negative altogether, and claiming that their effects have just as often been stabilizing.[198] Glaser does not go quite as far, but agrees that arms racing can be a rational strategy and that "failing to build up arms can sometimes reduce a state's security."[199] Overall, the state-of-the-art in arms race research still presents a highly ambiguous picture as far as this crucial problem is concerned.

This picture is further confounded by the fact that arms races are believed to be closely linked to the phenomenon of strategic rivalries, which we have identified as a set of particularly war-prone interstate dyads above. It is not immediately apparent whether, and to what extent, arms races are responsible for this outcome. After all, "[i]t is political antagonism […] that defines the risk of war. Military competition is merely a symptom."[200] Even if one were to reject this basic reality, Colaresi and Thompson convincingly argue that an arms build-up is usually only one of a number of significant factors in the lead-up to a conflict, and that the exact contribution of each of those factors is extremely difficult to sort out.[201] Their preliminary empirical finding, which should be taken with several grains of salt, is that competitive arms build-ups are associated with an increased risk of war only when they take place in a rivalry

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197 The view that arms races need not end in war and may make war more *or less* likely, depending on the exact circumstances of the confrontation, is proposed *inter alia* in Samuel P. Huntington, "Arms Races: Prerequisites and Results," *Public Policy* 8 (1958), 41-86; John C. Lambelet, "Do Arms Races Lead to War?," *Journal of Peace Research* 12, no. 2 (1975), doi:10.1177/002234337501200204, 123-28; Paul F. Diehl, "Arms Races and Escalation: A Closer Look," *Journal of Peace Research* 20, no. 3 (1983), doi:10.1177/002234338302000301, 205-12; Paul F. Diehl, "Arms Races to War: Testing Some Empirical Linkages," *The Sociological Quarterly* 26, no. 3 (1985), doi:10.1111/j.1533-8525.1985.tb00231.x, 331-49; Michael D. Intriligator and Dagobert L. Brito, "Can Arms Races Lead to the Outbreak of War?," *Journal of Conflict Resolution* 28, no. 1 (1984), doi:10.1177/0022002784028001004; Randolph M. Siverson and Paul F. Diehl, "Arms Races, the Conflict Spiral, and the Onset of War," in Midlarsky, *Handbook of War Studies*; Gray, *Weapons Don't Make War*, esp. 47-64.

198 Hammond, *Plowshares into Swords*, 263. Gray somewhat unkindly frames this conclusion as "worth of Sir Humphrey Appleby. 'Arms races are as conducive to peace as they are to war.' In other words, yes and no." Colin S. Gray, "Arms Races and Other Pathetic Fallacies: A Case for Deconstruction," *Review of International Studies* 22, no. 3 (1996), doi:10.1017/S0260210500118571, 325.

199 Charles L. Glaser, "When Are Arms Races Dangerous? Rational versus Suboptimal Arming," *International Security* 28, no. 4 (2004), doi:10.1162/0162288041588313, 81.

200 Gray, *Weapons Don't Make War*, 57.

201 Michael P. Colaresi and William R. Thompson, "Alliances, Arms Buildups and Recurrent Conflict: Testing a Steps-to-War Model," *The Journal of Politics* 67, no. 2 (2005), doi:10.1111/j.1468-2508.2005.00320.x, 348-49. See also Toby J. Rider, Michael G. Findley, and Paul F. Diehl, "Just Part of the Game? Arms Races, Rivalry, and War," *Journal of Peace Research* 48, no. 1 (2010), doi:10.1177/0022343310389505

setting that features recurrent crises.[202] In another ambitious study of strategic rivalries – specifically those that involved high-intensity conventional arms races – Gibler, Rider and Hutchison conclude that the dyads that featured an arms race were, in fact, much more war-prone.[203] However, while they claim to have controlled for the level of perceived threat, they did so only by selecting cases of strategic rivalry.[204] Hence, there is a real chance that they might still have it backwards – i.e. that arms races were indeed a *symptom* of increased hostility in a subset of cases *within* the general category of strategic rivalries that featured the most severe threat perceptions to begin with, as opposed to an independent or contributing cause of war in those dyads. Not entirely to our surprise, the use of statistical methods falls far short of sorting out the complexity that is present in those cases and ultimately resolves very little.

Moreover, none of the studies that purport to establish a heightened risk of war even attempt to answer an important practical question first raised by Weede in his 1979 critique of Wallace's early entry into the genre of statistical arms race studies: what about "the effects of unilaterally opting out of an arms race or of not racing fast enough to keep up a military balance?"[205] We simply do not know if and under what conditions the refusal to engage in an arms competition, or to continue engaging in it, reduces the probability of conflict. While such behavior might lead to a desirable outcome in some dyads, specifically those that are made up of two status quo powers, it may well lead to increased aggression in dyads that include a revisionist opponent.[206] There is little *terra firma* here for policy recommendations of any kind – least of all for a recommendation not to engage in *some level* of competition where it appears

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202 Colaresi and Thompson, "Alliances, Arms Buildups and Recurrent Conflict," 358.

203 Douglas M. Gibler, Toby J. Rider, and Marc L. Hutchison, "Taking Arms Against a Sea of Troubles: Conventional Arms Races During Periods of Rivalry," *Journal of Peace Research* 42, no. 2 (2016), doi:10.1177/0022343305050687,

204 Ibid., 145.

205 Erich Weede, "Arms Races and Escalation: Some Persisting Doubts," *Journal of Conflict Resolution* 24, no. 2 (1979), doi:10.1177/002200278002400205, 287.

206 These different conditions have sometimes been debated as separate 'spiral' and 'deterrence' models of arms competition. While the former involves a security dilemma logic, the latter theorizes cases in which a strong military reaction will lead to stability. Jervis, *Perception and Misperception in International Politics*, 58-113; Robert Jervis, "Arms Control, Stability, and Causes of War," *Political Science Quarterly* 108, no. 2 (1993), doi:10.2307/2152010, 239-58; Charles L. Glaser, "Political Consequences of Military Strategy: Expanding and Refining the Spiral and Deterrence Models," *World Politics* 44, no. 4 (1992), doi:10.2307/2010486, 497-538.

prudent to do so. Clearly, the current state of research into arms races and their role in modifying the severity and war-proneness of rivalries still leaves much to be desired.

We will next look into a matter that is of critical importance for the present study and does not presuppose a reliable understanding of the relationship between arms races and war initiation. So far, we have considered the possibility that structural pressures could act as an accelerator for potentially irrational action-reaction dynamics in the context of the security dilemma. Arms races – even those that do not lead to war – are often seen as an extreme subset of cases involving such dynamics. As Gray has summarized, they are thought to "[work] by [their] own systemic logic or grammar, not by the policy logic of responsible statecraft."[207] In other words, it is assumed that the actors have forfeited effective control of their "abnormally intense"[208] competitive military behavior, not just in a short-term perspective of days or weeks, as would be the case in a military crisis management situation, but for the entire duration of an arms competition (or, at a minimum, some phases of it). Although there is no necessary connection to the probability of conflict, such a takeover of structural dynamics would pose serious problems for our view that *posture change results from unit-level, organizational reactions to somewhat underspecified structural incentives*. If this found to be a real possibility, we would then have to consider whether the U.S.-Soviet naval competition might qualify as such a case.

Is the view that arms races are a supercharged version of the security dilemma that the actors have essentially lost control over justified? Based on some of the more detailed and comprehensive reviews available to us, there is reason for skepticism on this count. There are two main problems with this widespread claim. The *first problem* is one of differentiation. As Buzan and Herring have found, "[o]ne of the striking things about the literature on the topic is that much of the subject matter does not fit comfortably within the metaphor of a race."[209] Gray takes this one step further: "I remain unpersuaded that arms race phenomena either can be defined usefully – a negative judgment which includes my own attempt at definition – or can be shown to 'work' in ways and to ends distinct from other conditions of strategic rivalry.

207 Gray, *Weapons Don't Make War*, 49.
208 Buzan, *An Introduction to Strategic Studies*, 69.
209 Barry Buzan and Eric Herring, *The Arms Dynamic in World Politics* (Boulder, CO: Lynne Rienner, 1998), 77.

In other words […] arms races comprise a non-subject."[210] While this line of argument is partly polemical, his point that there are no objective, or even circumstantially compelling, criteria for differentiating arms races from other forms of military competition is a valid one. Of eight definitional criteria proposed by Hammond, the only one that attempts to establish a level of intensity at which a military competition turns into an arms race – "an extraordinary and consistent increase in the level of defense effort of 8 percent of GNP [gross national product] per annum for both parties"[211] – is purportedly based on his empirical research but it remains far from convincing.[212] The other seven criteria could just as well be applied to a militarized rivalry that does *not* qualify as an arms race. Other authors have not done any better.

For example, in his study of the 21st century naval modernization in Asia, Till suggests seven criteria that can all apply to 'lesser' forms of arms competition, with the possible exception of a criterion for *intensity* that remains totally unspecified in practice:

- "driven by international rather than domestic imperatives;
- usually bilateral;
- intense in terms of effort, rapidity and expression;
- associated with high levels of political tension;
- operationally specific;
- indicative of high strategic stakes, and
- regarded as such."[213]

All of this throws into doubt the idea that arms races have a peculiar trajectory which leads to military competitions essentially spiraling out of control. Other than a *perception* that a competition has in some sense become "hypertrophic,"[214] it is not clear that the structural mechanisms that underpin arms races are substantially different from those in other competitive scenarios.[215] In fact, Buzan and Herring ultimately reject the call to abandon the concept of arms races

[210] Gray, "Arms Races and Other Pathetic Fallacies," 334.
[211] Hammond, *Plowshares into Swords*, 31.
[212] Gray, "Arms Races and Other Pathetic Fallacies," 327.
[213] Geoffrey Till, *Asia's Naval Expansion: An Arms Race in the Making?,* Adelphi Paper 432-433 (London: Routledge/IISS, 2012), 19.
[214] J. D. Singer, "Threat-Perception and the Armament-Tension Dilemma," *Journal of Conflict Resolution* 2, no. 1 (2016), doi:10.1177/002200275800200110, 90.
[215] For a typology of possible 'arms race' scenarios, see Colin S. Gray, "The Arms Race Phenomenon," *World Politics* 24, no. 1 (1971), doi:10.2307/2009706, 39-79.

altogether, not based on their identification of a distinctive *Eigendynamik*[216] of some sort, but because arms racing is "*an expression of intensified political rivalry* and because arms racing consumes more resources than less intense manifestations of the arms dynamic."[217] Overall, then, the suspicion that military competitions may have turned into arms races as a consequence of a deteriorating political-strategic situation is reinforced, rather than dispelled, as we zoom in more closely on the arms race phenomenon.

A *second problem* is closely related to the first and results in a dilemma for those who would posit a take-over of structural factors: *On the one hand*, unless one can demonstrate that arms races involve a distinctive pattern of self-sustaining and irrational overreactions, their internal logic does not, in any real sense, set them apart from other types of military competitions. In that case, they are best seen as a reflection of the political-strategic arc of a rivalry and correspond to the higher end of one and the same spectrum of *arms dynamics*.[218] In other words, this would make them a somewhat fuzzy subcategory of a much broader phenomenon. *On the other hand*, if they reflect a distinctly irrational and excessive approach to military competition, it is difficult to see in what sense they are *caused* by systemic pressures at all. On the contrary, we would have to conclude that they almost certainly originate in unit-level political or bureaucratic idiosyncrasies on one or both sides of the equation, as proponents of a "domestic structure model"[219] of arms racing have long claimed. In effect, then, arms races would represent cases of *over*balancing that result from unit-level threat perceptions that are out of whack

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216 The term is used as a loan word in this particular context by Evangelista as well as by Gray. Matthew Evangelista, "Case Studies and Theories of the Arms Race," *Bulletin of Peace Proposals* 17, no. 2 (1986), doi:10.1177/096701068601700212, 199; Gray, "Arms Races and Other Pathetic Fallacies," 326. Evangelista traces his adoption of the term to Dieter Senghaas, *Rüstung und Militarismus* (Frankfurt am Main: Suhrkamp, 1972).

217 Buzan and Herring, *The Arms Dynamic in World Politics*, 80. Emphasis added.

218 Ibid., 79-81.

219 Buzan, *An Introduction to Strategic Studies*, 94-104; Buzan and Herring, *The Arms Dynamic in World Politics*, 101-118; Dieter Senghaas, ed., *Zur Pathologie des Rüstungswettlaufs: Beiträge zur Friedens- und Konfliktforschung* (Freiburg: Rombach, 1970); Ferdinand Otto Miksche, *Rüstungswettlauf: Ursachen und Auswirkungen* (Stuttgart: Seewald Verlag, 1972); Graham T. Allison and Frederic A. Morris, "Armaments and Arms Control: Exploring the Determinants of Military Weapons," *Daedalus* 104, no. 3 (1974); Mary Kaldor, *The Baroque Arsenal* (London: André Deutsch, 1982); Mary Kaldor, "The Weapons Succession Process," *World Politics* 38, no. 4 (1986), doi:10.2307/2010167; David Holloway, *The Soviet Union and the Arms Race* (New Haven, CT: Yale University Press, 1983), 109-77; Evangelista, *Innovation and the Arms Race*; Nils P. Gleditsch and Olav Njølstad, eds., *Arms Races: Technological and Political Dynamics* (Newbury Park: Sage/PRIO, 1990); Theo Farrell, *Weapons Without a Cause: The Politics of Weapons Acquisition in the United States* (Basingstoke: Macmillan, 1997).

with any systemic incentives that are actually present. Rather than structural pressures crowding out unit-level factors, political-strategic irrationalities would serve to magnify any systemic effects far beyond the requirements of a modestly 'rational', 'calculated' or 'strategic' response to the prevalent systemic pressures. The content, as well as the magnitude, of any such overbalancing decisions would have been determined at the unit-level. The pathologies of those unit-level processes would then begin to spread through the system, and in time could establish a self-sustaining and potentially self-magnifying feedback loop. However, while there is a systemic component in this process, the causal chain in question has little in common with structuralist accounts and everything to do with the imperfections of the 'transmission belt' between the systemic and unit levels, as emphasized by neoclassical realists.

The same is actually true if excessive balancing results from a lack of information or from faulty intelligence: any decisions concerning the 'adequate' responses would again have been made at the unit-level. Rather than giving the actors *too little* choice over their actions and eliminating effective control over the process, the problem would come about because the system is providing them with *too much* interpretive leeway, thus giving free rein to all manner of unit-level biases and distortions in the course of the adaptation process. While this may not be a *desirable* outcome from the perspective of international stability, it is one that our hybrid model is well-equipped to handle. To briefly summarize, although there is a widespread belief to the contrary, *there is little reason to think that arms competitions ever spiral out of control as a result of structural pressures that somehow overwhelm states' usual margin for interpretation and premeditated action.*

If this finding is accurate, the hybrid model of military posture change is likely to apply whether a situation has been classified as an arm race or not. That said, we should nonetheless briefly establish whether the U.S.-Soviet naval competition can be qualified as an arms race – that is, "an extreme manifestation of the arms dynamic,"[220] to follow Buzan and Herring's sensible, middle-of-the-road approach. Unfortunately, this is not a straightforward question to answer, mainly because of the interconnectedness of the naval aspect of the Cold War strategic

[220] Buzan and Herring, *The Arms Dynamic in World Politics*, 80.

rivalry with its nuclear aspect in general, and with the competition in strategic nuclear weapons in particular. As a result, the *conventional* and *nuclear* aspects will have to be addressed in turn.

The classic example of a conventional naval arms race is still the Anglo-German naval race. It has retained this archetypal status for good reason. In fact, it confirms much of what has been argued above, in that it clearly represents a case of unit-level pathologies that worked their way through the international system to produce a situation that is extremely difficult to explain in structuralist terms. As Kennedy found in his study 35 years ago, Tirpitz's determination to pursue a vigorous naval build-up owed little to prudent strategic calculations and instead "fits in with the non-strategic aspects of the admiral's naval policy: with his Social Darwinism […]; with his belief that Germany should rely less on the landowners and the army as the future bases of economic power […]; with his internal political calculations […]; and with the natural feelings of a patriot and a serving officer that having only a 'second best' navy was not good enough."[221] Far from being a result of a security-seeking *Eigendynamik*, the tit-for-tat arms build-up that resulted flowed from this expansive vision. While the competition with Britain cannot be reduced to these factors, it thus appears that the accelerators of the Anglo-German naval competition were to be found primarily at the unit level. Seligmann's summary of this widely accepted interpretation is particularly incisive: "[T]his was an arms race that should not have taken place, where the challenger had no prospect of overtaking the leader, and where the only possible outcome was a humiliating defeat. Nothing has been written to date that would seriously undermine these conclusions."[222] Far from being a runaway train that neither side could stop, then, the *Dreadnought* race was fueled by a series of deliberate, domestically motivated policy decisions. Because Germany was trying to catch up in a highly symmetrical competition, and coming from a position far behind the leading power, the effort had to be intense and the window for success, if any, was short. The race eventually

[221] Paul M. Kennedy, *Strategy and Diplomacy, 1870-1945: Eight Studies* (London: Fontana Press, 1989), 157.
[222] Matthew S. Seligmann, "The Anglo-German Naval Race, 1898-1914," in Mahnken; Maiolo; Stevenson, *Arms Races in International Politics*, 22.

wound down because its economic burden and strategic opportunity costs had become unsustainable in a worsening continental climate.

If we accept this as the paradigmatic case of naval arms racing, the U.S.-Soviet naval competition does not qualify in any of the measures that have been proposed. It was neither extremely intense, nor marked by particularly rapid competitive cycles, nor were the respective efforts divorced from the actual threat environment, nor did the clearly inferior side delude itself about its chances of getting ahead against the odds, or overinvest in naval forces in particular. Overall, Stevenson's comparison between the Cold War at sea and the Anglo-*French* competition during the second half of the 19th century seems far more reasonable. The fact that a leading historian would explicitly describe this later case as a "naval competition"[223] rather than an arms race is revealing. There are, in fact, few accounts of the U.S.-Soviet naval dynamic that disagree with its characterization of the case as something less than an arms race. The fact that the most visible exceptions are publications that specially emphasize the fact that they approach the case from an arms control perspective, can serve as further confirmation of the rule.[224] This study will therefore adopt the position that the U.S.-Soviet conventional competition at sea does not qualify as an arms race, although the cycles of competitive posture change that we will be examining in detail could be seen as an example of the broader phenomenon of the arms dynamic in action.

Turning to the nuclear element, there is little doubt that the U.S.-Soviet competition in nuclear weapons qualified as an intense arms competition. There are few other cases that have more frequently or more consistently been discussed as examples of an arms race. While some accounts, including Hammond's rather meticulous study, have attempted to challenge this conventional wisdom head-on, it is much easier to make the case that the nuclear build-up

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[223] David Stevenson, "Before 1914: Introduction," in Mahnken; Maiolo; Stevenson, *Arms Races in International Politics*, 13.

[224] These are Fieldhouse and Taoka, *Superpowers at Sea*; Richard W. Fieldhouse, *Security at Sea: Naval Forces and Arms Control* (Oxford: Oxford University Press/SIPRI, 1990); Charles Daniel et al. "Superpower Arms Race at Sea," special issue, *Bulletin of the Atomic Scientists* 43, no. 7 (1987). Other works have explicitly addressed what they see as a conventional arms race, or closely linked the conventional and nuclear components. See e.g. Geoffrey Kemp, Robert L. Pfaltzgraff and Uri Ra'anan, eds., *The Other Arms Race: New Technologies and Non-Nuclear Conflict* (Lexington, MA: Lexington Books, 1975); Carlo Schaerf, Brian Holden Reid and David Carlton, eds., *New Technologies and the Arms Race* (Basingstoke: Macmillan, 1989).

was ‘abnormally intense’ than it is for the conventional naval aspect.[225] The historical and political science accounts that have described the outcomes of the strategic nuclear build-up as ‘excessive’ or ‘irrational’ probably number in the hundreds – and that might still be conservative estimate. As a matter of fact, even one of the sharpest critics of the concept continues to occasionally refer to the Cold War nuclear competition as an arms race.[226] And while Hammond’s critical intervention is well-taken, he is himself hard-pressed to discount the description, ultimately arriving at another ‘yes and no’ answer.[227]

That said, the competitive elements that are of primary interest to us only partially reflect the general pattern. To establish this, a brief discussion of both non-strategic and strategic nuclear weapons at sea is in order. Exact numbers are difficult to come by, but it is clear that, of the roughly 120,000 nuclear warheads built by the superpowers throughout the Cold War, a relatively small number were deployed as *tactical* nuclear weapons at sea.[228] For the U.S. Navy, Ball mentions 850 nuclear depth bombs and 310 air defense warheads, as well as 350 more modern warheads slated for procurement, in the mid-1980s.[229] American carriers are reported to have deployed with a complement of about 100 nuclear weapons for aerial delivery.[230] The Soviet total was probably substantially higher.[231] The main point, however, is that this was not one of the elements of the nuclear arms competition that were marked by a pattern of excessive actions and reactions leading to obviously ‘hypertrophic’ arsenals. If we add in the very different philosophies with which the superpowers approached nuclear warfare at sea and the fact that there seems to have been limited interaction between their postures, it is difficult to frame this as a ‘race’ at all. While the possibility of tactical nuclear war at sea should

225 Hammond, *Plowshares into Swords*, 232-35.
226 Colin S. Gray, *War, Peace and International Relations: An Introduction to Strategic History* (London: Routledge, 2007), 216-17.
227 Hammond, *Plowshares into Swords*, xx.
228 Hans M. Kristensen and Robert S. Norris, “Global Nuclear Weapons Inventories, 1945–2013,” *Bulletin of the Atomic Scientists* 69, no. 5 (2015), doi:10.1177/0096340213501363, 75.
229 Ball, “Nuclear War at Sea,” 11-12.
230 Robert S. Norris and Hans M. Kristensen, “Declassified: US Nuclear Weapons at Sea during the Cold War,” *Bulletin of the Atomic Scientists* 72, no. 1 (2016), doi:10.1080/00963402.2016.1124664, 60.
231 Donald C. F. Daniel, “The Soviet Navy and Tactical Nuclear War at Sea,” *Survival* 29, no. 4 (1987), doi:10.1080/00396338708442367, 318-20.

not be dismissed an insignificant fact of the naval competition, it was a small component of the nuclear arms dynamic overall.

The same cannot be said about the deployment of strategic nuclear weapons aboard submarines, which was a much more central aspect of the competition, although there were once again large asymmetries between the two sides in how they approached the contribution of ballistic missile submarines to their postures.[232] In the United States, the Fleet Ballistic Missile program became a co-equal element of the country's strategic nuclear posture relatively early on. On the Soviet side, this was not true until much later in the competition. A real effort was made to catch up in this area and by 1975, the Soviet Navy operated a similar number of modern SSBNs as its U.S. counterpart – although under much worse conditions from the standpoint of strategic and operational geography.[233] Up to that point, one can also describe the postures of the two sides as somewhat convergent. From 1975 onwards, this changed again and the superpowers' strategic nuclear postures at sea entered a phase of fundamental divergence in both operational approach and deployment patterns.

While all of this was part of an intense arms competition, the arms race framing adds little to our understanding and suggests a false symmetry between the U.S. and Soviet efforts in this area. It is undoubtedly true that ballistic missile submarines became a key element of the competition in naval postures. That said, even though there were important linkages, it would be a gross oversimplification to describe the Cold War naval competition as a mere appendage of a nuclear arms race in which both sides were engaged in a mad dash to outdo the other at every turn. The following chapters will present a much more complex and multifaceted picture that one would struggle to convey in the simple metaphors that dominate the literature on arms races. The expectation that our modular framework will better capture the intricate dynamics at play is broadly consistent with Gray's findings from five decades of research into these issues:

[232] We will look into these issues in greater detail in Chapter 5.

[233] Steve Zaloga, *The Kremlin's Nuclear Sword: The Rise and Fall of Russia's Strategic Nuclear Forces, 1945-2000* (Washington, DC: Smithsonian, 2014), 245.

> "The Soviet-American nuclear arms race certainly featured much interdependence of rival programmes. However, the internal dynamics of the competition had powerful, in some respects superordinate, influence on the arming behavior directed abroad as latent menace. One can argue that in the political, strategic, and technical-tactical interdependencies that characterized the arms competitive systems, each superpower competitor deserved to be regarded in good part as a variable independent of influence by its foreign rival. Each country competed in its own ways and for its own reasons of strategy. Interdependence was a defining reality of the competition, but the American assumptions and assertions about allegedly lock-stepped mechanistic action-reaction in rival weaponry, *were over-simple and unsafe* in a scholarly sense."[234]

Ultimately, to view the U.S.-Soviet competition in general, or its naval component in particular, in terms of a presumed take-over of the structural logic of the arms race would not do it justice. Having found that our hybrid framework is, if anything, likely to provide a superior and more nuanced understanding than an 'arms race' frame of reference can, we will now turn to one additional strand of the literature on military competition that is worthy of some attention. Based on the idea that the competitive behavior of the opponent can be proactively shaped with relative precision, this approach presents itself as the key to competitive success. In the next step, we will try to establish whether it can live up to its promise.

2.3.4 The competitive strategies approach

Having reviewed a range of different perspectives on the problem of peacetime military competition, one of the most intriguing questions about the subject still remains unanswered: is there an intelligible approach or set of guidelines that allows one side to outsmart the other in a long-term, peacetime military competition? Looking back on the United States' Cold War experience, some – predominantly American – analysts think there is.[235] In short, they believe

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[234] Gray, *Strategy and Defence Planning*, 59. Emphasis added.

[235] See the chapters in Thomas G. Mahnken, ed., *Competitive Strategies for the 21st Century: Theory, History, and Practice* (Stanford, CA: Stanford University Press, 2012). See also Thomas G. Mahnken, "Cost-Imposing Strategies: A Brief Primer" (Center for a New American Security, Washington, DC, 2014); Octavian Manea, "Lessons From Previous Competitive Strategies: Interview with Thomas G. Mahnken," Small Wars Journal, https://smallwarsjournal.com/jrnl/art/lessons-from-previous-competitive-strategies.

that the United States found a way of leveraging its understanding of the specific weaknesses of the Soviet system to lure the Soviet government into wasting precious resources on inefficient counter steps. Rosen defines these so-called *competitive strategies* as initiatives designed to "try to get competitors to play our game, a game that we are likely to win. This done by getting them to make the kind of mistakes that they are inclined to make, by getting them to do that which is in their nature, despite the fact that they should not do so, given their resources."[236] In other words, the competitive strategies approach aims to trip the opponent up by exploiting identifiable cognitive, political and organizational limitations.

As a frame of reference for thinking about military competitions and how to shape them in one's favor, the competitive strategies approach has much to recommend. It is also very compatible with the theoretical and analytical choices made in the present study. For example, it "focuses on peacetime interaction among and between defense establishments,"[237] particularly as it unfolds over the long term. It also agrees that "states interact through the prism of their own strategic cultures and preferences, domestic institutions, and bureaucratic politics."[238] The products could just as well be described as posture changes in search of competitive advantage. In many respects, then, the competitive strategies literature describes a kindred way of thinking about peacetime military interactions between strategic rivals. That said, it is also of rather limited utility in the context of our investigation.

For the purposes of this study, the dominant consideration is that the competitive strategies approach was largely derived *ex post* from the Cold War example. Thus, to apply it or build it into our modular approach would lead to more obviously self-confirming results than is the case with the other theories we can draw on. At the same time, we must also be aware that the history of the competitive strategies 'paradigm' is a history written in large part by its participants after the fact. We find little evidence of an explicit competitive strategies framework being applied by the U.S. defense establishment during the Cold War itself and to the

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236 Stephen P. Rosen, "Competitive Strategies: Theoretical Foundations, Limits, and Extensions," in Mahnken, *Competitive Strategies for the 21st Century*, 12.

237 Thomas G. Mahnken, "Thinking about Competitive Strategies," in Mahnken, *Competitive Strategies for the 21st Century*, 7.

238 Ibid., 8.

extent that one was applied, the boundaries between intuitive strategizing and the calculated application of a well thought-out, bureaucratically established approach remain unclear. The otherwise excellent chapters in *Competitive Strategies for the 21st Century* do little to dispel this impression.[239] Hence, the exact relevance of competitive strategies thinking as a conscious intellectual framework is never really established. Battilega's chapter is symptomatic in that it points to the problem, and quickly moves on: "Although these initiatives [including the 1980s Maritime Strategy] *may appear to be a collection of general U.S. force posture upgrades*, in fact each also directly targeted key aspects of the Soviet approach to warfare; they were *similar in spirit* to Competitive Strategies."[240] What we can take away for our investigation is that, from the 1970s onwards, elements of the U.S. defense policy community may have thought about the competition in ways that reflected – or are reflected in – the debate about competitive strategies. Given that both superpowers had competent military thinkers aplenty, we could also conceivably find evidence of a similar train of thought on the Soviet side.

2.4 Summary

After reviewing the most pertinent strands of the literature on military competition and posture change, we are not only in a better position to admire the diversity of applicable theories that the field of security and strategic studies has spawned, but also to conclude that there is sufficient compatibility and complementarity between them to make a modular approach worthwhile. It is true that each of the theories examined above provides valuable insights and some come close to furnishing a convincing explanation for variety and variations in naval

[239] Gouré makes a convincing case for a formalization from 1986 onwards, but not for the critical phases of the competition. David Gouré, "Overview of the Competitive Strategies Initiative," in Mahnken, *Competitive Strategies for the 21st Century*, 94-101. He also traces the intellectual roots of the approach to Porter's landmark book, which appeared in the early 1980s (ibid., 94 n. 17). Presumably, it would have taken – at the very least – a few years for this thinking to establish itself in the defense bureaucracy. See Michael E. Porter, *Competitive Strategy: Techniques for Analyzing Industries and Competitors* (New York, NY: Free Press, 1980).

[240] John A. Battilega, "Soviet Military Thought and the U.S. Competitive Strategies Initiative," in Mahnken, *Competitive Strategies for the 21st Century*, 118. Emphasis added.

postures. However, it is only by combining compatible elements from several of them into a tailored framework that we can hope to both reduce the empirical complexity of the case to a manageable level and still do analytical justice to it at the same time.

In this chapter, we have identified several central pillars of such a framework. *First*, we have noted that strategic rivalries tend to revolve around competitions for military advantage and that such advantages are not determined by the state of technology in the international system, but rather created by the actors themselves. *Secondly*, we have concluded that structural theories cannot, by themselves, explain how military competitions develop over time. While threat perceptions are the main driver of competitive adaptation, they do not tell us much about the responses that will be selected at the unit level, which are heavily influenced by decisions made by military organizations at levels below the foreign policy executive. *Thirdly*, we have found that a hybrid framework that embraces insights provided by organization theories can fill in many of the gaps that a systemic perspective would leave us with. *Fourth*, we have examined in some detail the role of structural accelerators that are thought to be beyond the actors' control and have concluded that these dynamics are heavily shaped by the actors and do not have the kind of *independent* explanatory power that has sometimes been suggested. *Finally*, we have taken note of the fact that that an opponent's competitive reactions can be deliberately manipulated and misdirected for advantage, although it has not been conclusively established that political and bureaucratic actors are capable of the exquisitely calculated planning that is necessary to goad an intelligent adversary and pursue such a course of action over extended periods of time.

With these preliminary findings in mind, it is time both further specify and solidify the approach that has been outlined over the course of this chapter and, at the same time, to discard those insights that – while fascinating and informative in their own right – do not provide the kind of analytical guidance or leverage that would justify their inclusion. At the same time, we also need to develop a methodology for applying the hybrid framework in practice. We will tackle both of these tasks in the next chapter.

[3]

Researching naval posture change

THE MODULAR FRAMEWORK CONCRETIZED

3.1 The competitive adaptation of naval postures

Based on an extensive review of the security and strategic studies literature, we have come to the conclusion that change in naval postures comes about because outward looking military bureaucracies react to external threats, both to maintain their ability to perform their accepted roles and missions in war – and, by implication, to be seen as capable of doing so – and to uphold, or possibly expand, their claim to a significant share of the nation's resources. The research question that we are seeking to address is why the U.S. Navy managed to maintain a meaningful advantage in anti-submarine warfare and fleet air defense in the face of a resolute Soviet challenge, even though such advantages are thought to be difficult to successfully defend in the long term and most often fleeting. *How is it that the U.S. advantage persisted through successive adaptation cycles and remained unbroken 35 years into a competition that was pursued with considerable ingenuity and at no small cost in national resources by its Soviet adversary?*

In the following sections we will explicitly restate the five basic assumptions underlying this investigation, provide a succinct rendering of the causal process we will be trying to retrace based on the available historical evidence, detail the overall approach we will adopt in reconstructing it, and specify which limitations and blind spots remain in our tailored, modular research framework. It is hoped that this will provide a framework for thinking about the evidence that is explicit, comprehensible, and open to scrutiny – and that will therefore provide a solid footing for the investigation that follows.

This chapter will set out the research framework in some detail and further discuss the concepts and approaches that are at the heart of the investigation. The first part of the chapter will specify the core assumptions that underpin the study, explicate the causal model we have already implicitly developed in the course of the last chapter, introduce the main method of process tracing, and lay out some of the limitations of this approach to causal analysis. The second part will further concretize a way of thinking about naval postures and outline an array of supporting methods that have been developed to analyze naval forces, operational concepts, and operations. Together, these various elements will provide the wherewithal to address the research problem set out above.

3.2 Five basic assumptions

The following five assumptions stake out the author's view of the subject and of the research problem, as it is summarized above. The framework that is developed here applies within these constraints. Thus, an analyst who fundamentally disagrees with some or all of these propositions is unlikely to arrive at the same conclusions, although it is certainly not impossible to arrive at similar conclusions based on a different set of assumptions.

ASSUMPTION #1: ENDOGENOUS MILITARY ADVANTAGES

Strategic studies researchers do not necessarily agree on where national advantages with regard to the use of force come from. In the previous chapter, we contrasted two very different ways of thinking about military advantages. The present study rejects the widespread view that advantages apply across the international system in the form of an offense-defense balance of military technology. Instead, it follows in the footsteps of Shimshoni and Biddle in characterizing advantages as endogenous to the units in the international system – that is, created by the armed forces of the states in question as part of their search for a competitive edge over their notional or actual opponents.[1]

ASSUMPTION #2: SPHERES OF PRIMARY RESPONSIBILITY

The second assumption we will make is that, while the foreign policy executive will lay down some general defense planning guidelines, military organizations have a sphere of primary responsibility within which they have considerable autonomy to shape their postures in line with perceived threats and their organizational essence.[2] They may not always get their way where the implementation of operational approaches, force structure goals and general deployment priorities is concerned, but they usually do unless civilian interventions are particularly vigorous and persistent. In a General Staff system like that of the Soviet Union, the service level plays a more muted role in formulating postures, although interservice conflicts certainly remain present.[3] The U.S. case, on the other hand, was marked by much greater service independence to begin with and saw increasing centralization, but not to the extent that it would have converged with the Soviet system.[4] The post-Goldwater-Nichols system of jointness has further shifted primary responsibility away from the individual services.[5] However, since the time frame of this investigation largely predates Goldwater-Nichols, which came into its own only in the 1990s, this shift is of no particular relevance here.

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[1] See Chapter 2, fn. 62.

[2] Morton H. Halperin and Priscilla Clapp, *Bureaucratic Politics and Foreign Policy*, with the assistance of Arnold Kanter (Washington, DC: Brookings Institution Press, 2006), 27.

[3] Marten Kimberley Zisk, *Engaging the Enemy: Organization Theory and Soviet Military Innovation, 1955-1991* (Princeton, NJ: Princeton University Press, 1993), 31-37. For a much more detailed review of the dynamics of the General Staff system, see Dale R. Herspring, *The Soviet High Command, 1967-1989: Personalities and Politics,* Princeton legacy library (Princeton, NJ: Princeton University Press, 2014[1990]).

[4] For a Navy-focused view, see Thomas C. Hone, *Power and Change: The Administrative History of the Office of the Chief of Naval Operations, 1946-1986* (Washington, DC: Department of the Navy/Navy Historical Center, 1989), 57-84.

[5] On the impact of Goldwater-Nichols on naval strategy, see Steven Wills, "The Effect of the Goldwater-Nichols Act of 1986 on Naval Strategy, 1987–1994," *Naval War College Review* 69, no. 2 (2016), 21-41.

ASSUMPTION #3: THREAT-BASED POSTURE PLANNING

The third assumption we will make is that the actions of military organizations are motivated by their responsibility to fulfil core missions in relation to some external threat. They are bureaucratic entities that pursue narrowly self-interested agendas, but their self-interest is perceived through a lens of professional concern with the aspects of national defense that falls in their purview.[6] Navies will propose reactions to external threats that benefit them over the other services and may seek to portray threats in ways that support their bureaucratic interests, but their actions are nonetheless driven by the ingrained responsibility to be in a position to win wars if necessary. Whether military services, let alone individual military officers, *consistently* act in this manner is another question, but we will assume that they *generally* do so as long as a clearly identified threat is present.

ASSUMPTION #4: ORGANIZATIONAL PURPOSE

We will assume that military organizations will react to these external threats in a self-interested and largely conservative manner. When evolutionary adaptation becomes necessary, they will implement significant changes without breaking the bureaucratic mold or rethinking the structure and purposes of the organization as a whole. When threatened from within the domestic environment, they will prioritize those interservice or political threats, which could directly affect their resources base, where as a failure to adjust to external threats would do so only indirectly and over time.

We will also assume that, while military services are not unitary actors, they are sufficiently hierarchical to ensure that actions that require a sustained implementation effort – including decisions about operational doctrine, acquisition, and deployment patterns – are expressions of an organizational logic that the relevant constituencies within the organization

[6] Zisk, *Engaging the Enemy*, 11-21.

by and large have to abide by.[7] While a full buy-in of these constituencies is clearly preferable, the hierarchical structure allows the central leadership to suppress dissent, unless that dissent is either extremely widespread or supported by particularly powerful actors within the organization. [8] Conversely, it is difficult – although perhaps not unheard of – for small factions to force their will upon the organization as a whole, in which case those initiatives themselves become an organizational undertaking. All of this applies even to an organization that, as Davis has found of the U.S. Navy, values "pluralistic decentralization"[9] both at sea and on shore. All other things being equal, we will assume that significant posture changes are generally undertaken *with sufficient unity of purpose to treat them as an organizational product*, rather than an isolated initiative of some faction within the organization.

ASSUMPTION #5: THE IMPORTANCE OF DOMESTIC CONSTRAINTS

While military organizations are given considerable latitude by the foreign policy executive as far as the development of postures and in the implementation of posture change is concerned, they depend on resources extracted from the domestic environment to function.[10] We will assume that, in any system of government that features overall civilian control over spending priorities, military organizations will face significant domestic constraints in implementing adaptations, especially where force structure planning and procurement are concerned. These processes may feature challenges to the organization's threat perceptions and priorities that may lead to a redirection of resources. Perhaps counterintuitively, we will as-

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[7] A comprehensive study of hierarchy and the role of obedience in military organizations is Nico Keijzer, *Military Obedience* (Alphen aan den Rijn: Sijthoff & Noordhoff, 1978).
[8] The latter case is central to Rosen's theory of fundamental military innovation. Stephen Peter Rosen, *Winning the Next War: Innovation and the Modern Military* (Ithaca, NY: Cornell University Press, 1994), 19-21.
[9] Vincent Davis, *The Admirals Lobby* (Chapel Hill, NC: University of North Carolina Press, 1967), 40-41.
[10] They essentially face a task that is functionally similar to the process neoclassical realism describes at the level of state-society relations as a whole. See Jeffrey W. Taliaferro, "Neoclassical Realism and Resource Extraction: State Building for Future War," in Lobell; Ripsman; Taliaferro, *Neoclassical Realism, the State, and Foreign Policy*, 194-226.

sume that the probability of such outside adjustments will *not necessarily* be higher in a democratic system of government, although any interventions will be more visible. Overall, the autonomy of military organization in designing their own postures will not be absolute, but a matter of degree and military initiatives will be subject to outside corrections. While radical corrections will be rare, smaller corrections will occur much more frequently and some will be sufficient to kill specific military initiatives, although this fate will not usually befall attempted posture changes as a whole.

3.3 Causal model and overall method

To get to the bottom of the research problem stated above, this investigation will have to retrace complex historical processes of posture change that shaped the Cold War at sea. To be able to make informed judgements in our weighing of the available evidence, we need to know what to look for. Specifically, we need to establish the notional causal chain that leads from changes in the external environment to specific responses in terms of operational doctrine, force structure, and patterns of deployment. The case study method is particularly well-suited to investigate the operation of such a series of causal mechanisms in great detail.[11] Without an outline of an uninterrupted causal sequence, we cannot employ the process tracing methodology that is at the heart of this undertaking with any success.[12] Therefore, we need to organize the modular explanation developed above into a causal model that can be readily applied to the historical evidence. The basic model, which can be applied to both the U.S. and the Soviet side is presented in Figure 4 below. This depicts the competitive adaptation process from a national perspective.

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[11] Alexander L. George and Andrew Bennett, *Case Studies and Theory Development in the Social Sciences* (Cambridge, MA: MIT Press, 2005), 21. See also Andrew Bennett, "Process Tracing and Causal Inference," in *Rethinking Social Inquiry: Diverse Tools, Shared Standards*, ed. Henry E. Brady and David Collier (Lanham, MD: Rowman & Littlefield, 2010), 207-19. For the contrasting perspective of a historian on the question of causation, see John Lewis Gaddis, *The Landscape of History: How Historians Map the Past* (Oxford: Oxford University Press, 2002), 91-109.

[12] George and Bennett, *Case Studies and Theory Development in the Social Sciences*, 218.

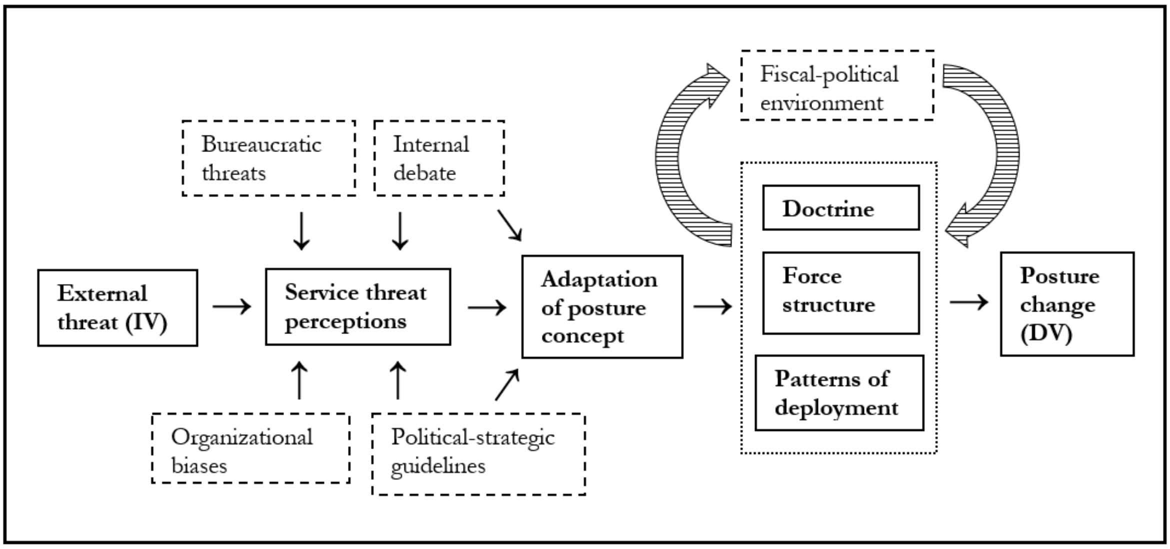

Fig. 4: The posture adaptation process

The differences between the two systems are discussed in some detail in Chapter 4. As we will see, the main impediment to a full application of the model to the Soviet system is the heavy imbalance of the available historical evidence, which means that the U.S. experience remains much better understood. This situation has improved somewhat over the last three decades, but the Russian polity today is fundamentally opposed to transparency, including about its Soviet past. Although the U.S. government is also making access to primary source materials more difficult than it used to, the difference is nonetheless stark. Figure 4 once again presents the main components of the modular framework, as they have been laid out above.

To summarize, we have specified an independent variable (IV, external military threat), a dependent variable (DV, posture change) and an intervening variable (INTV, unit-level threat perceptions). All of this is in keeping with the basic structure a neoclassical realist approach that is shifted downwards to the level of military organizations interacting with one another, within a set of guidelines laid down at the political-strategic level of the FPE. There are a total of five modifying variables that act upon the causal process: (1) political-strategic guidelines, (2) bureaucratic threats in the domestic environment, (3) entrenched organizational biases that are reflective of the organization's bureaucratic essence, (4) the level and quality of internal debate, and (5) the level of resources that can be extracted from the fiscal-political environment. While the first four of these variables are active primarily during the conceptual stage of a posture change, the last impacts the implementation phase and may necessitate changes that are not in keeping with the original concept. The importance of the modifying (or condition) variables is in moderating or intensifying the impact of the independent variable on the dependent variable.[13] It should also, once again, be mentioned that we have delimited the scope of the model, as it is developed here, to apply to competitive posture change in the peacetime setting of an active, long-term strategic rivalry. In the next step, we will take a closer look at the overall methodological approach that we will apply to trace the outline of the causal process in the historical evidence that is available to us.

PROCESS TRACING

Like many key concepts, methods and approaches in the social sciences, process tracing is somewhat contested. Highly intuitive in its basic form, it has become the subject of a specialized methodological literature of its own, which appears to be at least partly designed to immunize it against the charge – leveled by the disciples of hard scientific inference in the social sciences – that it does not quite live up to the standards of 'proper' (i.e. quantitative or quasi-quantitative) methodologies.[14] While practitioners of strategic studies will be unimpressed by such attempts to impose a monistic vision of scientific enquiry, and the same will apply to

[13] See Stephen van Evera, *Guide to Methods for Students of Political Science* (Ithaca, NY: Cornell University Press, 1997), 11.

[14] See e.g. Gary King, Robert O. Keohane and Sidney Verba, *Designing Social Inquiry: Scientific Inference in Qualitative Research* (Princeton, NJ: Princeton University Press, 1994), 86-87. This literature includes Andrew Bennett and Jeffrey T. Checkel, *Process Tracing: From Metaphor to Analytic Tool* (Cambridge: Cambridge University Press, 2015); Ingo Rohlfing, *Case Studies and Causal Inference: An Integrative Framework,* Research Methods Series (Basingstoke: Palgrave Macmillan, 2012); Derek Beach and Rasmus Brun Pedersen, *Process-Tracing Methods: Foundations and Guidelines* (Ann Arbor, MI: The University of Michigan Press, 2016), 150-67; Nina Tannenwald, "Process Tracing and Security Studies," *Security Studies* 24, no. 2 (2015), doi:10.1080/09636412.2015.1036614; Marianne S. Ulriksen and Nina Dadalauri, "Single Case Studies and Theory-Testing: The Knots and Dots of the Process-Tracing Method," *International Journal of Social Research Methodology* 19, no. 2 (2015), doi:10.1080/13645579.2014.979718; David Waldner, "Process Tracing and Qualitative Causal Inference," *Security Studies* 24, no. 2 (2015), doi:10.1080/09636412.2015.1036624; Bernhard Kittel and David Kuehn, "Introduction: Reassessing the Methodology of Process Tracing," *European Political Science* 12, no. 1 (2013), doi:10.1057/eps.2012.4,1-9; Peter A. Hall, "Tracing the Progress of Process Tracing," *European Political Science* 12, no. 1 (2013), doi:10.1057/eps.2012.6, 20-30; Ingo Rohlfing, "Varieties of Process Tracing and Ways to Answer Why-Questions," *European Political Science* 12, no. 1 (2013), doi:10.1057/eps.2012.7, 31-39.

neoclassical realist scholars in security studies,[15] it is nevertheless worth distilling from the now extensive literature on process tracing some basic characteristics and guidelines that may prove useful in organizing the investigation.

First of all, George and Bennett offer a useful definition of process tracing as "a procedure for identifying steps in a causal process leading to the outcome of a given dependent variable of a particular case in a particular historical context."[16] This is what we will attempt in the following chapters. The variant of process tracing that we will employ is a theoretically informed narrative.[17] This narrative will be geared towards analytical clarity rather than "thick description"[18] of historical processes. Thus, we will not attempt to break the causal process down to the maximum level of detail or provide a detailed chronological account, except where it is absolutely necessary with a view to solving the research problem. The main effort will be geared towards tracing the causal factors we have identified above, while also looking out for possible alternative explanations. While King, Keohane and Verba see a danger of expanding the scope of a process tracing effort to the point of "infinite regress,"[19] Vennesson makes it clear that pragmatic self-limitation is baked into the approach from the outset:

> "First, process tracing is focused. It deals selectively with only certain aspects of the phenomenon. Hence, the investigator is aware that some information is lost along with some of the unique characteristics of the phenomenon. Second, process tracing is structured in the sense that the investigator is developing an analytical explanation based on a theoretical framework identified in the research design. […] Third, the goal of process tracing is

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[15] In their *Neoclassical Realist Theory of International Politics*, Ripsman, Taliaferro and Lobell explicitly endorse process tracing as "[t]he most appropriate strategy for investigating causal chains in specific cases." Norrin M. Ripsman, Jeffrey W. Taliaferro and Steven E. Lobell, *Neoclassical Realist Theory of International Politics* (Oxford: Oxford University Press, 2016), 132.

[16] George and Bennett, *Case Studies and Theory Development in the Social Sciences*, 176. In fact, as Kittel and Kuehn show, it was only as a result of George and Bennett's attempt at formalization that the term "process tracing" became widely established. Kittel and Kuehn, "Introduction," 1-2.

[17] For a discussion of some common variants, see George and Bennett, *Case Studies and Theory Development in the Social Sciences*, 210-12. See also Rohlfing, "Varieties of Process Tracing and Ways to Answer Why-Questions," 32-38.

[18] Pascal Vennesson and Ina Wiesner, "Process Tracing in Case Studies," in Soeters; Shields; Rietjens, *Routledge Handbook of Research Methods in Military Studies*, 96.

[19] King, Keohane and Verba, *Designing Social Inquiry*, 86. See also Bennett, "Process Tracing and Causal Inference," 209; Milja Kurki, *Causation in International Relations: Reclaiming Causal Analysis* (Cambridge: Cambridge University Press, 2008), 102 n. 52.

> ultimately to provide a narrative explanation of a causal path that leads to a specific outcome."[20]

None of this suggests an unrestrained and potentially 'escalatory' research process in which the study of any important causal link leads to the inclusion of several more links, and so forth. On the contrary, the fact that process tracing is informed by theory prevents such an outcome by design, where a historical enquiry would largely have to rely on the good judgement and self-restraint of the investigator.

There are several important reasons for selecting an approach that has procedural discipline built into it: *First*, we are attempting an analysis of a macro-process of military competition, which spanned more than four decades and was marked by a very high degree of complexity. Under these circumstances only a structured approach is likely to keep the analytical effort sufficiently focused on the research problem. *Secondly*, the amount of historical evidence is such that an attempt to break down the processes to the full extent that we can would produce an entirely unwieldy and unreadable study, probably running to several thousand pages. *Thirdl*y, and perhaps counterintuitively, the evidence that is available is nevertheless too sketchy and incomplete to attempt a 'thick', let alone exhaustive narrative. Thus, we would be left with an extremely unbalanced account and an equally clumsy explanation, in which some causal factors and aspects of the process would be grossly overrepresented and others would remain almost totally opaque.

It is for similar reasons that the study does not adopt David Rosenberg's admittedly excellent framework for researching the process dimension of modern naval strategies: its enumeration of a total of seventeen clusters of variables paints a picture so comprehensive and perfectionist that the resultant account would be worthy of a masterful historian, but much

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20 Pascal Vennesson, "Case Studies and Process Tracing: Theories and Practices," in *Approaches and Methodologies in the Social Sciences: A Pluralist Perspective*, ed. Donatella Della Porta and Michael Keating (Cambridge: Cambridge University Press, 2008), 235.

too inclusive, and at the same time much too detailed, to serve the purposes of this study.[21] By implication, it would require a gargantuan data collection effort that would undoubtedly take an individual researcher many years to compile, analyze and process – if the necessary evidence is even available. Hence, this investigation has to contend itself with the limited findings that an effort of significantly lesser scope and depth can provide. Having said that, Rosenberg's framework is extremely useful as a guide to possible research areas of interest and his many incisive insights will be incorporated where possible.

While a primarily historical framework might lead us to open the aperture of the investigation beyond what is warranted or necessary, the approach that is pursued here has an important interpretivist element, nonetheless. It not only seeks "to establish and evaluate the link (or the absence of a link) between different factors"[22] as Vennesson would expect of a positivist study, but also "to look for the ways in which this link manifests itself and the context

[21] David A. Rosenberg, "Process: The Realities of Formulating Modern Naval Strategy," in *Mahan is Not Enough: The Proceedings of a Conference of the Works of Sir Julian Corbett and Admiral Sir Herbert Richmond*, ed. James Goldrick and John B. Hattendorf (Newport, RI: Naval War College Press, 1993), 141-75. The seventeen factors Rosenberg enumerates are worth quoting in detail: (#1) "*the nature of training and education programs, career patterns and professional specialization of officers in the naval service*" (150), (#2) "*the career patterns and operational, technical, and staff backgrounds of individual naval officers in significant (national or fleet) positions of leadership*" (151), (#3) "*the procurement costs, capabilities, operating patterns, and sustainment requirements of naval weapons systems*" (155), (#4) "*changes in tactical doctrine and/or operational art*" (156), (#5) "*the administrative structure, operational doctrine, strategic plans and command and control organization of tactical units*" (157), (#6) "*the sources of intelligence information, including their nature, their quality, and their frequency*" (ibid.), (#7) "*the process of intelligence production, analysis, and dissemination*" (ibid.), (#8) "*the structure, organization, and procedures of naval service-wide strategic planning*" (159), (#9) "*the structure, organization, and procedures of naval service-wide program and procurement planning*" (162), (#10) "*the state of research and development progress of a nation's naval warfare technology*" (166), (#11) "*the state of the national scientific and industrial infrastructure for research, development, and production of naval warfare technology*" (ibid.), (#12) "*character and personalities of naval service national leadership*" (167), (#13) "*the structure, organization and procedures of national strategic military planning*" (168), (#14) "*the structure, organizations, and procedures of national program and procurement planning*" (ibid.), (#15) "*the character and personalities of national defense leadership*" (ibid.), (#16) "*the character of the national political system as it relates to defense issues*" (171), and (#17) "*the character, structure, and status of the financial and economic systems as they relate to national defense.*" (ibid.) Emphases in the original. To an extent, one can find many elements of this comprehensive framework reflected in the much more modest approach outlined in this chapter. But, overall, Rosenberg's take on the problem is far more demanding. As he accurately remarks, "[t]he seventeen factors identified here could, *individually or in combination*, be the basis of a monograph on the U.S. Navy in the postwar period, or on other navies, or other military organizations in other periods of history" (172). Emphasis added.

[22] Vennesson, "Case Studies and Process Tracing: Theories and Practices," 232

in which it happens."[23] In practice, we will attempt to map out the causal links that were confirmed to be present for each chapter using a full-page graphical representation, while devoting the bulk of the narrative to a more detailed exploration of those links that seem most relevant in solving the research problem. In doing so, we will rely on a number of more specific supporting methods and approaches that are discussed below in the final part of the chapter.

LIMITATIONS

The approach outlined in this chapter has important limitations that should, once again, be stated explicitly. First, the present study is emphatically not an international history of the Cold War at sea. Such a history would have to be much broader in outlook, much more comprehensive in its mandate, and based first and foremost on a large volume of primary source materials from both sides of the Iron Curtain.[24] This effort ticks none of the essential boxes, nor does it even attempt to do so. While the final product may at times resemble a highly synthetic and analytical history of the U.S.-Soviet naval competition, with a relatively narrow focus on the question of operational access in general war, it remains a work of political science that relies on historical data to solve a fairly specific puzzle.

Addressing a related matter, it should also be emphasized that any military competition, whether it crosses the threshold into large-scale organized violence or not, is embedded in a *grand strategic context*, which encompasses not just military and geostrategic factors, but is shaped by economic, ideological and cultural elements as well.[25] How a military competition

[23] Ibid., 233.
[24] On the core characteristics of international histories, see Patrick Finney, "Introduction: What Is International History?," in *Palgrave Advances in International History*, ed. Patrick Finney (Basingstoke: Palgrave Macmillan, 2005), 1-35; Marc Trachtenberg, *The Craft of International History: A Guide to Method* (Princeton, NJ: Princeton University Press, 2008), 30-50; Andrew J. Williams, Amelia Hadfield and J. Simon Rofe, *International History and International Relations* (London: Routledge, 2012), 7-32; Colin Elman and Miriam F. Elman, eds., *Bridges and Boundaries: Historians, Political Scientists, and the Study of International Relations,* BSCIA studies in international security (Cambridge, MA: MIT Press, 2001), especially chapters 1-4 and 14-16.
[25] See William C. Martel, *Grand Strategy in Theory and Practice: The Need for an Effective American Foreign Policy*

eventually unfolds depends on the initial situation and on the long-term dynamics of posture change, but also on the impact of such apparently extraneous factors. While all of them are important in understanding the broader context of the competition, and while they may at times create significant countervailing pressures and incentives, they cannot be fully captured by an approach that is geared towards analyzing competitive change at the military level. Hence, it would not be unexpected if we were to find that such an approach would tend to overemphasize those factors that it is particularly well-suited to capture and likely underestimate the relevance – even as far as changes at the military level are concerned – of others. Therefore, it will be most accurate in capturing the dynamics of competition where pronounced military insecurity vis-à-vis a well-defined 'other' looms large in the actors' calculations and these concerns are not overridden by other considerations of a non-military nature.

Conversely, the framework proposed here is unlikely to produce satisfactory analytical results when looking at situations in which military security is a secondary concern and threats are ill-defined, fleeting, or subject to extreme fluctuation over time. As is the case with neoclassical realist works, and realism more generally, one would expect it to be ill-suited for situations of "threatlessness"[26] in which concrete planning goals and scenarios are enveloped by a "fog of peace"[27] and thinking about future conflicts is possible only in the abstract. While this

(New York, NY: Cambridge University Press, 2015), 7-55; Williamson Murray, "Thoughts on Grand Strategy," in *The Shaping of Grand Strategy: Policy, Diplomacy, and War*, ed. Williamson Murray, Richard H. Sinnreich and James Lacey (Cambridge: Cambridge University Press, 2011), 1-32; Richard Rosecrance and Arthur A. Stein, eds., *The Domestic Bases of Grand Strategy* (Ithaca, NY: Cornell University Press, 1993), especially chapters 1-3 and 7; Nina Silove, "Beyond the Buzzword: The Three Meanings of "Grand Strategy," *Security Studies* 27, no. 1 (2017), doi:10.1080/09636412.2017.1360073, 27-57.

[26] John Mueller, "Embracing Threatlessness: Reassessing U.S. Military Spending," in *American Grand Strategy and Seapower*, ed. Michael Gerson and Alison L. Russel (Alexandria, VA: CNA, 2011), 47.

[27] The most sophisticated treatment of the concept and of how states cope with such uncertainty is: Emily O. Goldman, *Power in Uncertain Times: Strategy in the Fog of Peace* (Stanford, CA: Stanford University Press, 2011), 12-35. See also Talbot C. Imlay and Monica D. Toft, eds., *The Fog of Peace and War Planning: Military and Strategic Planning under Uncertainty* (London: Routledge, 2006), especially chapter 1, 11, and 13. As discussed above, Ripsman, Taliaferro and Lobell emphasize that the applicability of neoclassical realism, or the lack of its applicability, depends primarily on whether there is clear threat information or not. In situations in which

is not a problem for the present investigation, the scope conditions should nonetheless be kept in mind.

It follows from this last point that we are emphatically not in the business of formulating a grand theory of naval competition in all places and at all times. The purpose of this study is to better understand the interactive element of the U.S.-Soviet naval confrontation by applying to it an analytical framework that is both systematic and explicit. If this undertaking should, by extension, provide useful heuristic strategies for thinking about current and future competitions at sea, this should be considered a welcome side effect. Any such inferences beyond the specific purview of the research problem outline above are not be mistaken for reliable generalizations of even the “contingent”[28] kind. The number of variables at play and the fact that there are very few comparable cases – none of which involved missile-age conditions – imply that the potential for generalization is necessarily limited. In the next step, we will address the important question of how to make reliable inferences about the evidence at hand, which is a rather delicate matter in and of itself.

3.4 Competitive adaptation: evidence and inference

3.4.1 The death (and timely resurrection) of naval analysis

During the Cold War era, the examination of Soviet naval developments was a well-developed art practiced by a small, but tight-knit group of civilian and military analysts. Their project, however, was geared towards a specific opponent and inevitably lost its drive as soon as the Soviet threat began to ebb away. To those who continued to pursue it, the 1990s opened up the unprecedented opportunity to enter into conversation with former Soviet naval officers

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such information is unavailable, other explanations will produce better analytical results. Norrin M. Ripsman, Jeffrey W. Taliaferro, and Steven E. Lobell, “Conclusion: The State of Neoclassical Realism,” in Lobell; Ripsman; Taliaferro, *Neoclassical Realism, the State, and Foreign Policy*, 282-87.

[28] George and Bennett, *Case Studies and Theory Development in the Social Sciences*, 216.

and shipbuilding experts. The work that was done during this winding-down phase provides some crucial building blocks for this present study. But with no fully-fledged challenger of U.S. naval supremacy on the horizon, the 1990s strategic "interregnum"[29] saw a predictable shift away from the kind of detailed, often technical analyses that are necessary to form a solid understanding of a competitor's future capabilities and intentions.

With the Soviet Union gone, the conceptual and theoretical strands of the literature almost inevitably gained in stature. To what extent did established ideas about seapower remain viable? What had really changed and what had not? How could navies re-conceptualize their mission spectrum to ensure their continued utility? How should 'old' and 'new' priorities be balanced in the face of uncertainty? In response to these and similar questions, Western experts produced a series of important works on how to think about seapower in the new era.[30] Some of the conceptual tools that this literature proposed remain valuable. Grove's ranking of navies according to their potential for power projection is one example.[31] His modified version of Ken Booth's trinity of naval roles (see Fig. 5) is another.[32]

At the same time, the quality of the seapower literature could not prevent the illusions of the age from taking hold. The subtle but important point that Grove's version of the trinity still stood firmly on its *military base*, and could not simply be 'turned over on its sides' as desired, appears to have been lost on some of the more enthusiastic proponents of post-Cold War *Zeitgeist*. In time, this fallacy took material form in the emergence of what Till has described as "*postmodern* naval policies," which were built upon the expectation that war at sea had become an implausibility and that navies would be tasked primarily with policing the fault lines

[29] Michael Cox, Ken Booth, and Tim Dunn, "Introduction," in *The Interregnum: Controversies in World Politics, 1989-1999*, ed. Ken Booth, Michael Cox and Timothy Dunn (Cambridge: Cambridge University Press, 1999), 4.
[30] Some of the best examples include Eric Grove, *The Future of Sea Power* (Annapolis, MD: Naval Institute Press, 1990); Colin S. Gray, *The Navy in the Post-Cold War World: The Uses and Value of Strategic Sea Power* (University Park, PA: Pennsylvania State University Press, 1994); Geoffrey Till, ed., *Seapower at the Millennium* (Stroud: Sutton Publishers, 2001); Geoffrey Till, *Seapower: A Guide for the Twenty-First Century* (London: Cass, 2004); Sam J. Tangredi, ed., *Globalization and Maritime Power* (Washington, DC, 2009).
[31] Grove, *The Future of Sea Power*, 236-41.
[32] Ibid., 234.

of an ever more globalized world.[33] While political scientists may have been at greater risk than naval historians, none of the scholarly or professional communities dealing with naval matters proved completely immune to the temptation of presentism.

In Europe in particular, seapower was increasingly reduced to its naval diplomacy and policing "modes of action,"[34] to the extent that these were sometimes seen as the 'true' *raison d'être* of navies. Thus, Booth's key comment on his original version of the trinity faded from view: "It is appropriate that the *military role* forms the base of the trinity, for the essence of navies is their military character. It is a navy's ability to threaten and use force which gives meaning to its other modes of action."[35]

Even where combat was still a real possibility, most navies were orienting themselves successively further away from the sea and towards the land. For the U.S. Navy, efficient power projection in relatively unopposed settings became the defining priority, and its sea control capabilities atrophied accordingly.[36] The likelihood that this order of priorities would

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33 Geoffrey Till, *Seapower: A Guide for the Twenty-First Century* (London: Routledge, 2009), 6-14. Much to his credit, Till's embrace of this supposed "transformation" always felt tentative and it is not surprising that the framing of the entire chapter had changed significantly by the 2018 edition. See Geoffrey Till, *Seapower: A Guide for the Twenty-First Century* (London: Routledge, 2018), 36-59.

34 Ken Booth, *Navies and Foreign Policy* (London: Croom Helm, 1977), 15. Emphasis in the original.

35 Ibid., 16. The idea that navies can be used *directly* in support of a nation's foreign policy has a long pedigree, of course. To suggest that this function can somehow be separated from their ability and willingness to fight at sea and/or to project force against the 'opposite coast' – in short, from their capacity to inflict violence – would, however, amount to a distinctly postmodern view. Breemer's judgement on this matter remains relevant: "There is no question that the demonstrative use of warships (so-called 'naval diplomacy') can serve important national political ends. But naval combatants are not designed and built for 'showing-the-flag'; their primary purpose is to *fight*, while 'presence' can be no more than a peacetime 'bonus' function." Jan S. Breemer, "Estimating the Soviet Strategic Submarine Missile Threat: A Critical Examination of the Soviet Navy's SSBN Bastion Strategy" (Doctoral dissertation, University of Southern California, 1987), 192. Emphasis in the original. On the political-military functions of navies short of war see also Edward Luttwak, *The Political Uses of Sea Power* (Baltimore, MD: Johns Hopkins University Press, 1974); James Cable, *Navies in Violent Peace* (Basingstoke: Palgrave Macmillan, 1989); James Cable, *Gunboat Diplomacy 1919-1991: Political Applications of Limited Naval Force* (Basingstoke: Palgrave Macmillan, 1994); James Cable, *The Political Influence of Naval Force in History* (Basingstoke: Macmillan, 1998); Christian Le Mière, *Maritime Diplomacy in the 21st Century* (London: Routledge, 2014); Kevin Rowlands, *Naval Diplomacy in the 21st Century: A Model for the Post-Cold War Global Order* (London: Routledge, 2018).

36 See e.g. Peter D. Haynes, *Toward a New Maritime Strategy: American Naval Thinking in the Post-Cold War Era* (Annapolis, MD: Naval Institute Press, 2015), especially 118-19.

be sustainable in the longer term was bound to be low – in fact, it carried within it the seeds of its own undoing. But, for a brief moment in history, the levitation trick worked well enough.

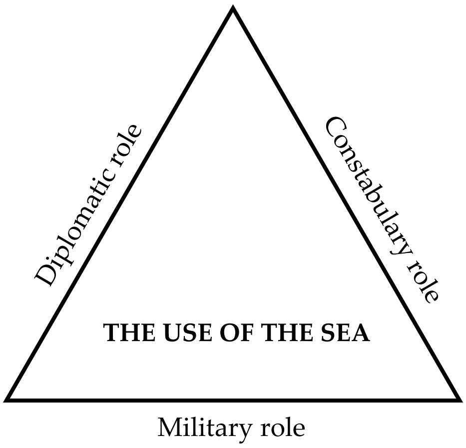

Fig. 5: Adapted 'Booth trinity' of naval modes of action *(Grove, Modern Seapower, 234)*

While many insights from the post-Cold War period remain relevant, the reality that the debates and ideas of the 1990s and 2000s were just as limited and context-dependent as the work of the Cold War naval analysts – possibly even more so – now appears to have by and large sunk in. As it became clear that U.S. naval supremacy would once again be challenged, notably by the Chinese People's Liberation Army Navy (PLAN), many of the categories of more traditional naval thinking were quickly reinstated. One of the key results of this development is the emergence of a literature that, at its best, can hold its own against the products of Cold War naval analysis.[37] In effect, we are witnessing the rebirth of a school of naval thinkers that are

[37] Some high-quality examples of detailed naval analyses of the PLAN's competitive trajectory are Lyle Goldstein and William Murray, "Undersea Dragons: China's Maturing Submarine Force," *International Security* 28, no. 4 (2004), doi:10.1162/0162288041588304, 161-96; Andrew S. Erickson et al., eds., *China's Future Nuclear Submarine Force* (Annapolis, MD: Naval Institute Press, 2007); Gabriel B. Collins and Michael C. Grubb, *A Comprehensive Survey of China's Dynamic Shipbuilding Industry: Commercial Development and Strategic Implications* (Newport, RI: U.S. Naval War College/China Maritime Studies Institute, 2008); Andrew S. Erickson, Lyle Goldstein and William S. Murray, *Chinese Mine Warfare: A PLA Navy "Assassin's Mace" Capability* (Newport, RI: U.S. Naval War College/China Maritime Studies Institute, 2009); Andrew S. Erickson and Lyle J. Gold-

unafraid to dive deep into the technical and operational aspects of the subject to derive valuable insights for policy and strategy.

As far as research into Cold War navies is concerned, however, this new literature adds only modestly to the toolset that was developed decades ago by participants. In fact, even though there are clear exceptions to this rule, one could argue that 21st century naval analyses *for the most part* still fall short of Cold War standards of sophistication. As a result, we can scarcely avoid standing on the shoulders of the Cold War masters of the trade in our attempt to derive meaning from the evidence that has since come to light. The set of supporting methods that is described here reflects this reality: it is based on the Cold War-era literature, with the addition of 21st century concepts and ideas where appropriate. The next sections will establish what exactly we will be dealing with as we retrace the competitive adaptation of naval postures, and how to use a supporting cast of methods to make meaningful inferences from historical phenomena and artifacts as we move along.

3.4.2 Thinking about naval postures

In their attempts to affect posture change, decision-makers and military planners manipulate three main variables: theories and concepts for the operational employment of their forces, overall force structure, and patterns of force deployment. Together, these elements shape the

stein, eds., *Chinese Aerospace Power: Evolving Maritime Roles* (Annapolis, MD: Naval Institute Press, 2011); Phillip C. Saunders et al., eds., *The Chinese Navy: Expanding Capabilities, Evolving Roles* (Washington, DC, 2011); Owen R. Cote, "Assessing the Undersea Balance between the United States and China," in *Competitive Strategies for the 21st Century: Theory, History, and Practice*, ed. Thomas G. Mahnken (Stanford, CA: Stanford University Press, 2012); Peter Dutton, Andrew S. Erickson and Ryan Martinson, eds., *China's Near Seas Combat Capabilities* (Newport, RI: U.S. Naval War College/China Maritime Studies Institute, 2014); Sarah Kirchberger, *Assessing China's Naval Power: Technological Innovation, Economic Constraints, and Strategic Implications* (Heidelberg: Springer, 2015); Andrew S. Erickson, ed., *Chinese Naval Shipbuilding: An Ambitious and Uncertain Course* (Annapolis, MD: Naval Institute Press, 2016); Stephen Biddle and Ivan Oelrich, "Future Warfare in the Western Pacific: Chinese Antiaccess/Area Denial, U.S. AirSea Battle, and Command of the Commons in East Asia," *International Security* 41, no. 1 (2016), doi:10.1162/ISEC_a_00249, 7-48; Peter Dutton and Ryan D. Martinson, eds., *China's Evolving Surface Fleet* (Newport, RI: U.S. Naval War College/China Maritime Studies Institute, 2017); Ryan D. Martinson, *Echelon Defense: The Role of Sea Power in Chinese Maritime Dispute Strategy* (Newport, RI: U.S. Naval War College/China Maritime Studies Institute, 2018).

range of strategic options that are available in a crisis or conflict, which in turn shapes peacetime interactions between potential enemies. But what exactly are we looking for when tracing posture change? What is the substance of a naval posture? And how can we analyze it? To provide working knowledge of these matters, this section will examine in greater detail each of the three main elements of naval postures: *operational paradigm and doctrine*, *force structure*, and *deployment patterns*. It will also outline the range of the functions that a broadly adequate posture must fulfil in the context of a long-term strategic competition.

OPERATIONAL PARADIGM AND DOCTRINE

An operational paradigm embodies a military organization's general theory of how to fight the next war: the notional missions to focus on, the types of operations to prepare for, and the guiding principles of force employment.[38] It is not a *strategy*, although it cannot avoid making some assumptions as to the type of adversary that will be fought and the kind of environment in which the fighting will take place.[39] Ideally, it would be tightly coupled with a conception of how to relate military action to overall political success, in which case it could be appropriately described as an "applied theory of victory."[40] *Doctrine* is a 'crystalized', organizationally

[38] The term is introduced in Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory* (London: Frank Cass, 1997), xix. The U.S. terms *operational approach* and *concept of operations* (CONOPS) are both considerably narrower. According to the U.S. Department of Defense definition, an operational approach is "[a] broad description of the mission, operational concepts, tasks, and actions required to accomplish the mission." United States Department of Defense, "DoD Dictionary of Military and Associated Terms" (Department of Defense, Washington, DC, 2019), https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/dictionary.pdf, 161. A CONOPS is even more specific and closer to an operational design.

[39] A strategy is necessarily specific to a given conflict (or, at the very least, a specified dyad). A strategy that is not tailored to the adversary and the environment that characterize that particular conflict is categorically unsound and likely to fail. See Colin S. Gray, *The Strategy Bridge: Theory for Practice* (Oxford: Oxford University Press, 2010), 38-41.

[40] Jonathan Shimshoni, "Technology, Military Advantage, and World War I: A Case for Military Entrepreneurship," *International Security* 15, no. 3 (1990), doi:10.2307/2538911, 187 n.1. On theories of victory more generally see William C. Martel, *Victory in War: Foundations of Modern Military Policy* (Cambridge: Cambridge University Press, 2007).

accepted expression of the incumbent operational paradigm that allows it to be transported, taught, empirically tested, and refined.

A military organization may subscribe to several operational theories and approaches at any one time. For example, land forces may have one set of operational principles for conventional warfare against a symmetrically configured opponent and a different one for counter-insurgency warfare. However, since an organization will find it difficult – for reasons of internal coherence and external justification – to pursue disparate priorities with equal vigor, or to maintain equal levels of competence and capability across the entire spectrum of plausible scenarios, one set of approaches will usually be dominant.[41] This organizationally dominant set of theories and concepts is the operational paradigm. In modern military organizations, attempts are often made to codify preferred operational approaches in the form of written doctrine with *ex cathedra* approval at the highest levels of the hierarchy. Force employment at lower levels of warfare may be even more closely specified by a formalized system of tactics, techniques and procedures. However, it would be a misunderstanding of doctrine to insist that it *must* be written down to count as such. Corum explains the interrelationship between theory and doctrine particularly well, when he states that

> "warfare is also a clash of ideas. Military theory provides a guide for military leaders in organizing their forces for war, theory forms the basis for officer education about war, and it plays a central role in determining which weapons will be built to fight a future war. Operational doctrine comes from theory and is constantly evolving. *Doctrine is the practical expression of theory* in that it is the stated manner in which the military leadership expects the large and small units of the military to conduct movement, logistics, and combat so as to successfully win a campaign or war."[42]

Doctrine must be *stated* in one form or another to have any organizational impact, but if it is also *constantly evolving*, written documents may not be the most effective way of transporting

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[41] The U.S. Army's doctrinal history since the early 1970s is an excellent example of the struggle to reconcile disparate operational paradigms. See e.g. Brian McAllister Linn, *The Echo of Battle: The Army's Way of War* (Cambridge, MA: Harvard University Press, 2007), 193-232.

[42] James S. Corum, *The Luftwaffe: Creating the Operational Air War, 1918-1940* (Lawrence, KS: University Press of Kansas, 1997), 3.

it in practice – and it is certainly not the only one. Therefore, incomplete codification or even a complete lack of written doctrine cannot be equated with an absence of doctrinal precepts as such. Moreover, Jensen's distinction between *formal* doctrine, on the one hand, and *informal* doctrine that "reflects a broader professional discourse in articles, field orders, personal letters, and so on,"[43] on the other, is also an important one. *Irrespective of the exact form that doctrinal constructs might take, the reliance on an operational paradigm that is widely understood and deeply ingrained in the organization is a precondition for purposeful, coordinated action in war.* Hence, the reliance on some form of doctrine is inescapable – even if it is called something else.

The Soviet armed forces certainly were no exception in this regard, even if the body of thought that was known as *military doctrine* was actually an intensely politicized, high-level expression of the Communist Party's views on future war. Within this peculiar system of thought, the development of operational principles and approaches was a more appropriate subject for *military science* and would have been codified as tenets of *operational art*.[44] Perhaps more controversially, the U.S. Navy is *also* not an exception in this regard. In this case as in others, the absence of explicit doctrinal documents is not a good indicator for the absence of generally accepted and widely understood operational methods and principles. For example, we now know beyond reasonable doubt that the German *Wehrmacht* never had a codified doctrine of *Blitzkrieg*, yet the principles of operational thought that it had instilled in its officers produced wars that made it look like it did – until its opponents caught on and turned the

[43] Benjamin M. Jensen, *Forging the Sword: Doctrinal Change in the U.S. Army* (Stanford, CA: Stanford University Press, 2016), 4.

[44] For a solid discussion of the Soviet terminology see Joseph D. Douglass, *Soviet Military Strategy in Europe* (Elmsford, NY: Pergamon, 1980), 8-19. Fast Scott and Scott's study is also valuable, in that it lets an array of primary sources speak for themselves. Harriet Fast Scott and William F. Scott, eds., *The Soviet Art of War: Doctrine, Strategy, and Tactics* (Boulder, CO: Westview Press, 1982). For a discussion of the basic operational concepts of the Soviet armed forces, many of which were adapted to the naval sphere, see William Thomas Lee and Richard F. Staar, *Soviet Military Policy since World War II* (Stanford, CA: Hoover Institution Press, 1986), 41-60. The application of formal operational art to the naval sphere is discussed in Russel H. S. Stolfi, "Soviet Naval Operational Art: The Soviet Approach to Naval Warfighting" (NPS Report 56-88-033, Naval Postgraduate School, Monterey, CA, 1988); David J. Kern, "Soviet Naval Operational Art" (M.A. dissertation, Naval Postgraduate School, 1988).

same set of guiding principles to their advantage.[45] The U.S. Navy is an even more clear-cut instance of the same phenomenon. It is true that Navy doctrinal publications have been few and far between.[46] The service's most prominent expert on fleet tactics has even said that "what little doctrine the Navy has, it ignores in favor of operational flexibility."[47] But should we take this to mean that the world's leading navy since the early 1940s, which prides itself on its ability to conduct persistent and often complex forward operations, has failed to develop an overarching concept for how to employ its forces productively? Does it not defy belief to claim that every Cold War-era naval planner, fleet commander, or commander of a multi-carrier battle group would make up the methods and principles according to which these vastly complex instruments of seapower operate as he goes along – and that this process would be repeated after every change of command?

In fact, quite the opposite is the case. It is certainly true that the USN has inculcated in its officers a highly pragmatic *command philosophy* that prizes adaptability and a facility for independent action, and which is entirely in line with the requirements of effective command at sea.[48] As John Hattendorf has written,

> "The U.S. Navy has typically regarded doctrine as general guidance to be implemented or ignored as the on-scene operational commander judges appropriate to the situation of the moment. The attitude is not unlike how naval commanders in the Age of Sail regarded

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[45] The authoritative account of German operational thinking in the lead-up to the Western campaign in 1940 is Karl-Heinz Frieser, *Blitzkrieg-Legende: Der Westfeldzug 1940* (München: Oldenbourg, 2005). An English translation is available by Karl-Heinz Frieser, *The Blitzkrieg Legend: The 1940 Campaign in the West*, with the assistance of John T. Greenwood (Annapolis, MD: Naval Institute Press, 2012).

[46] The most prominent attempt to establish written doctrine in the early post-Cold War era was "Naval Doctrine Publication 1: Naval Warfare" (Office of the Chief of Naval Operations, Washington, DC, 1994). According to Swartz, this saw "continued used as reference through 2010 (largely outside USN)," which speaks volumes as to its organizational relevance. Peter M. Swartz, "U.S. Navy Capstone Strategies and Concepts (1991-2000): Strategy, Policy, Concept, and Vision Documents" (CNA, Alexandria, VA, 2012), 57.

[47] Wayne P. Hughes, quoted in Peter M. Swartz, "U.S. Navy Capstone Strategies and Concepts: Introduction, Background and Analyses" (MISC D0026421.A1/Final, CNA, Alexandria, VA, 2011), https://www.cna.org/cna_files/pdf/D0026421.A1.pdf, 29. Hughes is also a staunch defender of the *importance* of naval doctrine, however. For a more detailed discussion of his views, see Wayne P. Hughes and Robert Girrier, *Fleet Tactics and Naval Operations* (Annapolis, MD: Naval Institute Press, 2018), 20-23.

[48] On the important distinction between doctrinal precepts and command philosophy, see Geoffrey Sloan, "Military Doctrine, Command Philosophy and the Generation of Fighting Power: Genesis and Theory," *International Affairs* 88, no. 2 (2012), doi:10.1111/j.1468-2346.2012.01069.x, 246-50.

> orders from their home governments; the decentralized regime of that era emphasized a commander's judgment as to how prudent it was to apply those orders in the light of the situation at the scene of action."[49]

However, this preference for flexibility and command initiative – which, one might say, amounts to an unwritten doctrinal preference in and of itself – partially obscures an even more important reality: *to allow for such far-reaching flexibility, the basic principles of force employment have to be extraordinarily stable and ingrained.* Where this is the case, a written statement of operational principles may not be required, at least in the absence of serious organizational crises. In that respect, U.S. naval doctrine can perhaps be said to resemble the British constitution. It is, to borrow Lord Hennessy's magnificent expression, "the hidden wiring"[50] of U.S. naval operations – largely unwritten, but clearly understood by those who shoulder the responsibility of command.

The basic components of the U.S. Navy's operational paradigm have been in place since World War II. They have remained stable throughout the Cold War and, to a large extent, beyond. They can be summarized here in an abridged form, although perhaps not without inflicting some violence upon them: in wartime, the U.S. Navy would project military power into the Eurasian rimlands by pushing carrier-centric strike forces far forward, to maintain operational access and engage the enemy both at sea and on land. Initially, this carrier-centric strategy had a strategic nuclear component, which was taken over by fleet ballistic missile submarines in the early 1960s. The second 'prong' of the Navy's offensive strategy would consist of attack submarines conducting simultaneous offensive operations up to the enemy's coastline. A fraction of the surface Navy would be detailed to protect sea lines of communication. The subordinate principles and methods of U.S. naval operations have largely been derived from these missions and the requirements they create. In limited war, a subset of the main wartime missions would be executed with an adjusted mix of surge forces as was deemed appropriate to the situation, while the remainder of the fleet continued to maintain a

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[49] John B. Hattendorf, ed., *U.S. Naval Strategy in the 1990s: Selected Documents,* Newport Paper 27 (Newport, RI: Naval War College Press, 2006), 3.

[50] Peter Hennessy, *The Hidden Wiring: Unearthing the British Constitution* (London: Indigo, 1996).

combat-credible presence in other regional "hubs."[51] In peacetime, U.S. naval forces have been doing much the same thing, without crossing the threshold of actual violence. The basic logic behind this approach is captured by the concept of "combat-credible forward presence."[52] Any additional missions were either directly derived from the focus on offensive power projection at and from the sea, or clearly subordinate to it.[53] This operational core of what Huntington famously called the "transoceanic Navy"[54] is described in greater detail in the next chapter.

What is important to note here is that, while it is true that the U.S. Navy has been less enthusiastic than its sister services in codifying its long-standing operational paradigm and calling the product 'doctrine', the operational paradigm itself is no less real – and no less stable – than those of the other services. It is embedded in officer education practices, fleet exercises and war plans (despite the progressive diminution of service responsibility for the latter). Like the more explicit doctrinal frameworks of the other services, it is supported by elaborate tactics, techniques, and procedures (TTPs) for carrier group operations, the employment of naval airpower, undersea warfare, and so forth. How the Navy's prioritization of far-forward, offensive power projection first came about is also explored in the next chapter. How it has evolved over time will become evident in Chapter 5.

FORCE STRUCTURE

The second variable that shapes naval postures is the availability of an appropriate combination of platforms and weapons to implement the specified operational priorities. The capital-

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51 Peter M. Swartz, "Sea Changes: Transforming U.S. Navy Deployment Strategy, 1775-2002" (CRM D0006679.A1, CNA/Center for Strategic Studies, Alexandria, VA, 2002), 50-51.

52 Ibid., 48-55, 102-03; Peter M. Swartz, "A Short History of the U.S. Navy in the Cold War (1945-1990): Strategy and Operations" (unpublished working paper, 2014).

53 Power projection and sea control are often framed as two separate missions, with the former directed at the 'opposite coast' and the latter at the oceans in between. If the transoceanic concept of naval power is our reference point – as indeed it should be – this is a false distinction. This point is further explored in Chapter 4.

54 Samuel P. Huntington, "National Policy and the Transoceanic Navy," *USNI Proceedings* 80, no. 5 (1954), https://www.usni.org/magazines/proceedings/1954/may/national-policy-and-transoceanic-navy.

and technology-intensive nature of naval warfare means that this has often been an overriding concern. As Lautenschläger has put it, "[w]hereas armies have historically armed and supported the man, navies have essentially manned and supported the arm."[55] Hence, the material artifacts of naval warfare tell us more about actual capabilities than they do on land. In an as yet unpublished article, Biddle makes the case that this is also clearly reflected in battle outcomes over the *longue durée*.[56]

The relationship between operational approaches and available forces is complex. Operational thinking that is not based on an estimate of the forces that can be generated for its implementation is out of touch with reality. At the same time, a version of the operational paradigm will at least implicitly guide force planners in their definition of requirements. Consequently, the articulation of operational priorities can play an important role in shaping future acquisition efforts. Given the expenditures and time horizons involved in bringing new platforms into the fleet in significant numbers, the lag time between the adaptation of operational principles and commensurate shifts in the force structure may be a decade or more. Considering that ships and submarines have realistic service lives of forty to fifty years and even an individual naval aircraft may last twenty years or more, the operational assumptions that are made in acquiring them become deeply embedded in the fleet for decades.[57] In the long run, then, force structure choices have a far more pervasive impact on the service-level operational alternatives that are available than either of the other two elements. While this effect is mitigated by the flexibility that is built into any multi-mission naval platform, it is nonetheless likely to be significant. Thus, the adaptation of the operational approach in line with changing threat perceptions and requirements is both enabled and, potentially, constricted by the force structure element.

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[55] Karl Lautenschläger, "Technology and the Evolution of Naval Warfare," *International Security* 8, no. 2 (1983), doi:10.2307/2538594, 5.

[56] Stephen Biddle, *Military Effectiveness and Naval Warfare*, Presentation at the Institute for Security and Conflict Studies, George Washington University (2018), https://youtu.be/VQzDcYUDCoM.

[57] For a related observation, see Barry R. Posen, *The Sources of Military Doctrine: France, Britain, and Germany between the World Wars* (Ithaca, NY: Cornell University Press, 1984), 14.

DEPLOYMENT PATTERN

Easily the most flexible element of a naval force posture is the preferred pattern of deployment, which is itself a combination of two variables: the geographic distribution of forces and the mode of deployment, which can be permanent, rotational, or reactive, to give just a few examples. Naval forces configured for long and far-flung deployments can be shifted from one theater to another with relative ease and sustained there as necessary, provided that an adequate logistical infrastructure is in place. As a result, this element of a naval posture can – at least in theory – be reconfigured within just a few weeks. The U.S. Navy in the postwar decades has come quite close to this ideal. The ability to quickly establish a new center of gravity for naval operations was demonstrated on numerous occasions during the Cold War era, from the many instances of short-term augmented presence due to regional tensions to the massive five-carrier concentrations that were not unusual during the more intense phases of the air war against North Vietnam. In practice, the main hubs for U.S. naval operations – the North Atlantic with its marginal seas and the Western Pacific – have remained in place from the early 1950s onward, with several marked changes in emphasis occurring between and within them.[58] The fact that naval patterns of deployment can be adapted at fairly short notice and with limited political consequences may be able to partially compensate for force structure adaptations that are slow to materialize. It can, thus, be an important enabler of posture change, especially in the short- to medium-term.

FUNCTIONS OF POSTURE PLANNING

A military organization's force posture is the face it shows to its potential opponents and, as such, it will have a significant impact on the course of strategic interaction, whether it is in peacetime, in a crisis or in a war. As far as this external face is concerned, we will differentiate

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[58] Swartz, "Sea Changes," 48-53. For an updated and expanded version, see Peter M. Swartz, "U.S. Navy Deployment Strategy Options: Based on a Historical Analysis from 1775" (CNA, Alexandria, VA, 2013), 65-79.

five functions, which are analytically distinct, even if they partially overlap in practice. The generic external functions of a given posture are *deterrence, assurance, military stability, warfighting, and war termination*.[59] (As we have seen, a posture also has important domestic and internal functions, in that it provides direction and serves as a justification for budgetary requirements.) To understand how the various requirements may shape the options that are available for competitive adaptation, we will briefly discuss each of these five functions in turn.

The *deterrent* function is to ensure that the opponent will consider the initiation of a conflict too costly or unlikely to produce sufficient gains to justify a military roll of the dice. Two approaches are often differentiated in the deterrence literature: deterrence *by denial* and deterrence *by punishment*.[60] While the former seeks to instill in a potential attacker the belief that he will be unable to attain his war aims with acceptable losses and within an acceptable time frame, the latter relies on the threat of unacceptable damage to the attacker's society, economy or system of government.[61] Depending on the exact circumstances, naval forces can pose threats of denial at sea – primarily by means of effective undersea, anti-air and anti-surface warfare – or on land, by means of strike warfare, close air support of friendly ground forces, and theater nuclear attack. They can also threaten punishment by means of close or (especially since the late 19th century) distant blockade, commerce raiding, and – most importantly – strategic nuclear attack.[62] The ability to have recourse to some or all these approaches is communicated through forward presence, exercises and demonstrations, and declaratory strategy. In

[59] To the planners' credit, these functions were explicitly addressed in the design of the 1980s Maritime Strategy. See e.g. John B. Hattendorf and Peter M. Swartz, eds., *U.S. Naval Strategy in the 1980s: Selected Documents*, Newport Paper 33 (Newport, RI: Naval War College Press, 2008), 162-91. As we will see, the Maritime Strategy also remains an excellent case study of the difficulties of reconciling the partially incongruous requirements created by the five functions.

[60] Lawrence Freedman, *Deterrence* (Cambridge: Polity Press, 2004), 37.

[61] Ibid. On conventional forces and deterrence by denial, see also John J. Mearsheimer, *Conventional Deterrence* (Ithaca, NY: Cornell University Press, 1983), 23-65.

[62] The whole range of employment options for naval forces that can ultimately also provide building blocks for deterrence is aptly summarized in Till, *Seapower*, 157-220; Ian Speller, *Understanding Naval Warfare* (London: Routledge, 2019), 115-68.

the nuclear era, more than ever, the deterrent function has come to take center stage in posture planning.

The *assurance* function represents a naval posture's contribution to alliance politics. It is distinct from the deterrent function in that it serves the positive purpose of convincing allies and partners of the earnestness of declared security commitments and the military ability to follow through on them. While effective deterrence manipulates fear to maintain stability, effective assurance takes into account the strategic and domestic-political needs of one's friends.[63] The means by which this is accomplished partially resemble those necessary for the deterrent function, but they can go well beyond the minimum requirements for deterrence alone: presence arrangements, regular combined exercises, political and military-to-military exchanges, provisions for interoperability, and responsive declaratory policies can all make an important contribution to assurance.

The *military stability* function of posture planning existed before the nuclear revolution, but its importance has increased considerably as a result of it. In a crisis, some types of postures are believed to create incentives for the opponent to strike or otherwise move first. [64] In the naval realm, surging forces out to sea as early as possible may offer important advantages in terms of survivability, as well as during the early phases of conflict. On the other hand, any indications of mobilization can lead to a strong military reaction on the other side and the crisis might be deepened as a result. At sea, 'getting in the first blow' may also offer greater advantages than in other operational spheres. Hughes counts it among his "great constants" of

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[63] See Jeffrey W. Knopf, "Varieties of Assurance," *Journal of Strategic Studies* 35, no. 3 (2012), doi:10.1080/01402390.2011.643567, 375-99. Interestingly enough, assurance is not nearly as well understood as some of the other functions.

[64] Richard Ned Lebow, *Nuclear Crisis Management: A Dangerous Illusion* (Ithaca, NY: Cornell University Press, 1987); Stephen van Evera, *Causes of War: Power and the Roots of Conflict* (Ithaca, NY: Cornell University Press, 1999), 35-71; Lebow, *Nuclear Crisis Management*, 75-103; Glenn A. Kent and David E. Thaler, *First Strike Stability: A Methodology for Evaluating Strategic Forces* (Santa Monica, CA: RAND, 1989); Forrest E. Morgan, *Crisis Stability and Long-Range Strike: A Comparative Analysis of Fighters, Bombers, and Missiles* (Santa Monica, CA: RAND, 2013).

naval warfare that "[a]t sea the essence of *tactical* success has been the first application of effective offensive force."[65] A posture that is configured for conflict prevention first and warfighting second should be based on an awareness of these dynamics, even where potentially destabilizing effects cannot be entirely avoided.

The *warfighting* function is perhaps the most straightforward one in theory, though not necessarily so in practice. Forces that are primarily configured for deterrence and assurance will have an inherent warfighting potential, as neither of the other functions can be effectively supported if they do not.[66] Whether they have sufficient training, munitions and logistics support, whether their systems work as intended in a combat situation, and whether commanders who excel at managing their forces in a peacetime forward presence scenario will be effective in a wartime environment are very different questions, however. Posture planning can address them only partially. What an adequate warfighting posture can ensure is that the right types of forces will be available early enough and close enough to the prospective area of conflict to make a difference, and that those forces will understand how to fight and sell their lives dearly in the initial phases of combat. Wartime adjustments of some magnitude will probably be unavoidable, but peacetime posture planning can nonetheless create the preconditions for success in war – or fail to create them, even with a posture that adequately fulfils the three previous functions.

Finally, the *war termination* function points to the requirement of fighting a war in such a way as to allow for its conclusion once the most important objectives have been attained, and before it reaches levels of intensity that will preclude a negotiated peace of some kind.[67] If a posture prefigures an operational approach that is highly escalatory or forces the opponent to

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[65] Hughes and Girrier, *Fleet Tactics and Naval Operations*, 194.

[66] For an interpretation of Soviet views on this linkage, which remains instructive, see Benjamin S. Lambeth, "How to Think About Soviet Military Doctrine" (RAND, Santa Monica, CA, 1978), 6-8.

[67] On the theory and practice of war termination, see e.g. Paul R. Pillar, *Negotiating Peace: War Termination as a Bargaining Process,* Princeton legacy library (Princeton, NJ: Princeton University Press, 1983); Stephen J. Cimbala, ed., *Strategic War Termination* (New York, NY: Praeger, 1986); Stephen J. Cimbala, *Nuclear War Termination: Concepts, Controversies and Conclusions* (Canberra: Research School of Pacif. Studies Australian National University, 1989); Hein Erich Goemans, *War and Punishment: The Causes of War Termination and the First World War* (Princeton, NJ: Princeton University Press, 2000); Dan Reiter, *How Wars End* (Princeton, NJ: Princeton University Press, 2009).

commit to total victory, it can be both military effective and self-defeating at the same time. Between nuclear-armed opponents, the possibility that a given posture might be so effective during the conventional phase that it forces the enemy to employ nuclear weapons deserves particular consideration. While the possibility that war termination might be the result of mutual societal exhaustion after a nuclear exchange may serve the purposes of pre-war deterrence extremely well, a deterrence failure is always possible and a posture that is more prone to loss of control during the initial phases of a conflict has distinct disadvantages once war termination short of nuclear near-extinction scenarios becomes a realistic concern.

This observation points to perhaps the most important dilemma military leaders face in devising an adequate force posture. Ideally, all five external functions would be well-integrated, and the approaches selected on serving one of them would be fully compatible with all the others.[68] In practice, this is unlikely to be the case. Thus, forces that are fully adequate for deterrence might be left with a set of unacceptable military alternatives if deterrence fails. Forces that may strike the perfect balance between warfighting potential and restraint to satisfy the assurance function may not deter a risk-prone adversary. Forces that are configured to win as quickly and a cheaply as possible may be confronted with a choice of striking first or losing their main advantage. And a posture that greatly improves the level of crisis stability may not have sufficient offensive potential to win quickly, if the opponent initiates war for reasons that have little to do with the fear of being struck first. A posture that fails to adequately cover one or more of the five external functions is unbalanced – perhaps dangerously so. Yet fully covering all of them at the same time may not be possible, or prohibitively expensive. The extent to which the inevitable tensions between the different functions are taken into account and managed is the best measurement of the *functional adequacy* of a posture. No posture can serve all five functions equally well, but a posture that is based on an awareness of all of them and seeks a balance that does not casually neglect any of them is perhaps less likely to

[68] On the basic tensions that make political-military integration difficult, see Posen, *The Sources of Military Doctrine*, 51-54.

lead to negative outcomes in a peacetime, crisis or wartime situation than one that is completely geared towards some dimensions of functionality to the exclusion of others.

Now that we know what to look for in the course of the process tracing effort, the most important question that remains to be answered concerns the need for supporting methods: given that the available evidence on the operational approaches, force structures and deployment patterns of both competitors – and of the Soviet side in particular – is bound to be incomplete and often contradictory, *how can we make sense of it all?* The remainder of this chapter is an attempt to specify ways of deriving inferences of sufficient quality from our uneven evidentiary base, as well as the limits that this effort inevitably faces.

3.4.3 Hardware analysis

The first and, at least in some respects, least problematic of the supporting methods that we will be relying on is *hardware analysis*. The basic idea behind this method is simple: if it is true that "navies have essentially manned and supported the arm,"[69] as Lautenschläger found, there should be a considerable amount of useful information embedded in platforms and weapons, as well as in the processes by which they were developed, procured, built and upgraded over time. Far from belonging into the much-maligned category of "bean counting"[70] exercises, hardware analysis is about *making substantial inferences from observed choices concerning naval systems*. To arrive at such inferences, however, we need to go well beyond the simple description of the opponent's force structures, or how they developed over time. As Epstein has emphasized "a mere enumeration of peacetime inventories […] does *not* constitute an analysis of military capabilities."[71] Rather, it is *the organizational assumptions and preferences that go into weapons development* that an analysis of naval platforms and weapon systems should try to unearth. The ambition is to arrive at a better understanding of the other dimensions of a naval

[69] Lautenschläger, "Technology and the Evolution of Naval Warfare," 5.
[70] Joshua M. Epstein, *Measuring Military Power: The Soviet Air Threat to Europe* (Princeton, NJ: Princeton University Press, 1984), 131.
[71] Ibid. Emphasis in the original.

posture, especially operational doctrine and likely force employment, and perhaps also of the threat perceptions and policies driving them.

There have been many attempts at good hardware analysis, but Michael MccGwire's writings come closest to presenting a coherent *system* for analyzing Soviet naval force structure developments and deriving meaning from them. MccGwire is widely recognized as one of the most accomplished naval analysts of the Cold War period and, along with Robert Herrick and James McConnell, has been called a "seminal practitioner of the art of understanding the Soviet Navy."[72] His contributions are spread out among a substantial body of work that will be cited throughout this study. It is possible, however, to introduce the main concepts and basic tools here, both to demonstrate the considerable utility of this approach and to lay bare its limitations. The section will also discuss possible alternatives to the approach proposed by MccGwire and look into some of the criticisms that have been made both of this approach, and of hardware analyses more generally.

THE MCCGWIRE APPROACH

The central idea of MccGwire's approach to hardware analysis is that warships and shipbuilding are the concrete expression of organizational perceptions, decisions and preferences, which in turn are the key to understanding Soviet naval policy.[73] In his own words, "[t]he

[72] Bradford Dismukes, "Introduction," in George, *The Soviet and Other Communist Navies*, 3. Dismukes' short account provides perhaps the best direct comparison of the contrasting approaches of these three key thinkers.

[73] This is most clearly expressed in Michael MccGwire, "The Turning Points in Soviet Naval Policy," in Michael MccGwire, *Soviet Naval Developments*, 176-209. The section relies heavily on this account. See also Michael MccGwire, "Current Soviet Warship Construction," in Michael MccGwire, *Soviet Naval Developments*, 136-43; Michael MccGwire, "Comparative Warship Building Programs," in Michael MccGwire, *Soviet Naval Developments*, 144-51; Michael MccGwire, "Parallel Naval Developments," in Michael MccGwire, *Soviet Naval Developments*, 163-71; Michael MccGwire, "Current Soviet Warship Construction and Naval Weapons Development," in MccGwire; Booth; McDonnell, *Soviet Naval Policy*, 424-51; Michael MccGwire, "Comparative Naval Building Programs: East and West," in MccGwire; McDonnell, *Soviet Naval Influence*, 327-36; Michael MccGwire, "Soviet Naval Programs," in MccGwire; McDonnell, *Soviet Naval Influence*, 337-63; Michael

number and characteristics of different types or classes of ships reflect the mix of operational requirements that was accepted at the time the production-design of each was finalized or subsequently modified."[74] He believed that, by relating the overall patterns of shipbuilding and the characteristics of successive classes of warships to information about force employment and operational activities, the core content of naval policy could be reconstructed with relative precision. His detailed assessment of Soviet naval developments, based in large part on this approach, remains as impressive today as it was forty-five years ago. Just as importantly, MccGwire provided a rather substantial collection of rules-of-thumb, which are all the more credible as a result of his experience as head of the Soviet Naval Intelligence Section in the British Defence Intelligence Staff from 1965-67.[75] While some of his findings are open to debate, the analytical tools that he provided have lost none of their utility – especially as far as the unresolved challenge of understanding Soviet moves based on imperfect information is concerned.

How, then, can hardware analysis help us understand U.S.-Soviet competitive adaptation cycles today? The first challenge – then as now – is *to trace observed trends backwards to decisions about posture*. While deployment patterns can be adapted relatively quickly, operational paradigms take, at the very least, several years to change, and force structures are much more stable yet. The implication is that "[a] shift in the pattern of operational employment of ships already deployed cannot of itself be taken as evidence of a fundamental change in naval policy rather than a desire to maximize the return on existing policy investments."[76] Therefore, the evidence for a major posture change is much stronger once it begins to manifests itself in

MccGwire, *Military Objectives in Soviet Foreign Policy* (Washington, DC: Brookings Institution, 1987), esp. 406-47. For additional context and some notes on the history of the method, see Ken Booth, "A Cold War Life, And Beyond," in *Statecraft and Security: The Cold War and Beyond*, ed. Ken Booth (Cambridge: Cambridge University Press, 1998), esp. 99-100.

74 Michael MccGwire, "The Turning Points in Soviet Naval Policy," in Michael MccGwire, *Soviet Naval Developments*, 176.

75 Booth, "A Cold War Life, And Beyond," 93.

76 Michael MccGwire, "The Turning Points in Soviet Naval Policy," in Michael MccGwire, *Soviet Naval Developments*, 205.

the force structure. This makes hardware analysis a method of choice in ascertaining such shifts – but not one that is without its downsides and challenges.

The first challenge is that shipbuilding is subject to significant "lead times,"[77] which need to be quantified in order to relate observations to decisions. MccGwire's rule-of-thumb was that a new ship design would take eight to twelve years to come to fruition, from the specifications of requirements to the delivery of the first vessel.[78] Based on this rule, we can expect that it will take up to fifteen years for the initial decision to implement a major change to unmistakably manifest itself in the fleet, with purposely designed fighting units becoming available in numbers. We can extend the same principle to aircraft and technically complex weapons systems as well, although the lead times will differ to an extent. A rule-of-thumb, however, is just that. To arrive at a reliable understanding of the underlying naval planning processes, we will at times have to go into considerable detail in the following chapters.

To complicate matters further, a decision to embark on new building programs or significantly change already existing programs will bump up against ongoing production processes. Because major subsystems and components are themselves subject to substantial lead times as well, programs may not immediately be brought to a halt, even if operational requirements have changed radically, because it would be both difficult and uneconomical to do so. MccGwire calls this "pipeline inertia."[79] His estimate was that platforms would continue to be produced for another two years after a decision to cancel – possibly longer, depending on the exact nature of the program. Also, the cancellation of a program less than four years before production start-up could be expected to have significant ramifications for the military shipbuilding sector.[80] All of these considerations would clearly limit the degree of freedom that a navy has in reshaping its force structures, even after a decision has been made. The Soviet system may have been even more sluggish than Western systems in dealing with large-scale

77 Ibid., 180.
78 Ibid.
79 Ibid., 181.
80 Ibid.

readjustments. The basic realities of lead times and pipeline inertia are not primarily a consequence of a nation's organization of its political economy, however, but instead a function of the sheer complexity of building modern warships, submarines, aircraft, and guided munitions with any efficiency.

Additional limitations result from the minimum economical size of a building program and the number of units a single production line can put out in a given timeframe. For the VMF during the 1960s, MccGwire estimates that production runs of less than four to six for large surfaces ships, twelve to sixteen for destroyers and similarly sized vessels, twenty-five to thirty for nuclear submarines, and forty to fifty for diesel submarines should be considered irregular.[81] While such irregularities need not indicate a major shift, they warrant particular attention.[82] As we will see, a significant number of building programs veered radically off their expected paths and each of these instances acts as an important marker in our reconstruction of the dynamics of U.S.-Soviet naval competition.

MccGwire's account also tells us that each active production line for the VMF could be expected to churn out a nuclear submarine or destroyer-sized surface vessel every two years.[83] Of course, smaller or simpler vessels could be produced faster, but even diesel-electric submarines still took about a year to complete during the 1960s.[84] This allows us to arrive at the preliminary deduction that the main alternatives available to decision-makers were either the economical option of a relatively slow and steady production run resulting in a gentle upward curve in capability, or a crash program utilizing a much larger number of parallel production lines, with accumulating costs for tooling, skilled personnel, and so forth. The latter would probably be justifiable if war was expected within a five- to ten-year period, and rather wasteful if it was not. Even in the case of a diesel submarine program, a manifold expansion of production capacities would have been required to accomplish a steep increase in numbers within a decade or less. As we shall see, the Soviet shipbuilding sector showed itself capable

[81] Ibid., 182.
[82] Ibid.
[83] Ibid.
[84] Ibid.

of such an expansion during the 1950s, but the observed pattern was generally along the lines of the first option thereafter.

Perhaps because a succession of such essentially 'normal' production runs would not have increased the operational capability of the VMF fast enough, MccGwire found that the Soviets had developed a specific design philosophy. Instead of fully developing successive 'generations' of platforms, they would rush new designs into production as quickly as possible and then successively increase their capabilities during the production run by applying improved subsystems as they became available.[85] As a result, the new platforms would not initially realize their full potential. MccGwire's verdict that "the Russians are great bluffers, and *know that their opponents must credit them with the capability inherent in a weapon's external design* even if it turns out to be of limited operational value in practice"[86] should always be kept in mind.

Finally, there is one further technical limitation that MccGwire put particular emphasis on in his later assessments of Soviet shipbuilding. Moving away from his more holistic assessments of Soviet shipbuilding during the early to mid-1970s, he found the VMF's apportionment of a particularly scarce resource – namely, nuclear reactors – to be useful in reconstructing Soviet naval policy.[87] Based on the allocation of 20 reactors per year, which was a known parameter derived from Western intelligence assessments he judged reliable, he was able to account for many of the twists and turns of the VMF's submarine building program from 1957 to 1982.[88] While this was a rather sparse account that has been partially overtaken by the sources that have since come to light, it provided an internally consistent explanation and projection of Soviet submarine building, at a time when neither was easily available. As is the case with MccGwire's earlier assessments, the underlying logic has largely stood the test of time.

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[85] Ibid., 183-84.
[86] Ibid., 183. Emphasis added.
[87] This is evident in MccGwire's *Military Objectives in Soviet Foreign Policy*, esp. 426-38.
[88] Ibid.

Moving beyond the pattern of naval acquisitions itself, how did a leading analyst believe they could be related to naval policy choices? For this next step, MccGwire outlined what he called "minimum-requirements testing."[89] The basic assumptions that underpin this approach are extremely well compatible with the causal model that guides our investigation. He takes as his starting point the observation that

> "[t]he security of the homeland is the irreducible core of any national strategy and has first call on the allocation of resources to military procurement and to the shaping of defense policy. Assessments of naval policy can start from this general rule and then look to see what other reasons there may be besides. In the case of the Soviet Navy, there is the additional constraint of Western maritime preponderance, which was overwhelming in 1945 and has persisted in varying degrees ever since. […] *Any Soviet naval staff that did not work out its contemporary operational concepts and future force requirements with this threat in mind would be negligent in its duty*."[90]

As a result, MccGwire finds that the first step in relating hardware to policy should be to examine the fit between the reasonable requirements for homeland defense and the actual building programs. This entails four steps, which can be summarized as follows:

(1) to see whether the threat and the reactions to it are reasonable in line with one another;

(2) to ascertain whether the capabilities that are being acquired exceed the plausible requirements for defense;

(3) to establish to what extent the capability profile is specialized for defense or geared towards a more flexible employment concept; and

(4) to see how the forces in question are actually being used and whether their operational employment lines up with their original design.[91]

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[89] Michael MccGwire, "The Turning Points in Soviet Naval Policy," in Michael MccGwire, *Soviet Naval Developments*, 195-98.

[90] Ibid., 195. Emphasis added.

[91] Ibid., 196.

MccGwire is explicit about the fact that such a 'requirements test' may not, by itself, yield an unambiguous assessment and should thus be correlated with other types of evidence.[92] As will be discussed in the next chapter, the ambiguities that are associated with an increasingly capable defensive posture was, in many ways, at the heart of the Cold War competition at sea.

A final, recurring element of MccGwire's assessments is the idea of "decision periods,"[93] which provide the main interface between the political and naval spheres. While it is tempting to frame these as the central decision points for competitive posture change as well, the empirics are unfortunately more complex than that. We will come back to this matter in the following chapters. For the time being, however, it should be stated unambiguously that the present study does not share MccGwire's ambition of leveraging hardware analysis to reconstruct the evolution of the Soviet Union's overall naval *policy*. Although there is some overlap, our focus on the interactions between U.S. and Soviet naval *postures* is both more circumscribed and geared towards a different aim – namely, to retrospectively uncover why and how the U.S. Navy managed to stay ahead of its challenger in the competition for operational access to the European continent. Hence, Soviet policy decisions at the central governmental level are of interest primarily due to of their knock-on effects at the level of naval posture, which are transmitted through some of the modifying variables in particular. These decisions are not, however, a main subject of our investigation. As a result, rather than considering it in depth here, we will rely on MccGwire's identification of Soviet political 'decision periods' as supporting *evidence* in later chapters.

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92 Ibid., 207.

93 MccGwire, *Military Objectives in Soviet Foreign Policy*, esp. 22-29, 381-447; Michael MccGwire, "Contingency Plans for World War," in George, *The Soviet and Other Communist Navies*, 61-81; Michael MccGwire, "The Evolution of Soviet Naval Policy: 1960-74," in MccGwire; Booth; McDonnell, *Soviet Naval Policy*; Michael MccGwire, "The Turning Points in Soviet Naval Policy," in Michael MccGwire, *Soviet Naval Developments*, 198-204.

ALTERNATIVE TAKES ON HARDWARE ANALYSIS

Besides the tools and perspective introduced by Michael MccGwire, there are several other avenues for hardware analysis that are open to us. The first and most technically developed of these is the detailed application of naval engineering techniques. This is an approach that was well-developed during the Cold War, and that has also continued to evolve. Based on an established, scientific methodology and extensive engineering knowledge, this literature provides far and away the best assessments of what is technologically possible and sensible, and how shipbuilding could be expected to evolve on the ground. In some cases, valuable comparative assessments were done, as were detailed analyses of individual platforms from an engineering perspective.[94] The main edge of this literature over MccGwire's approach is its acute awareness of how design limitations may lead to choices that are not of a strictly military-organizational nature at all. The analysis of nationally specific design philosophies can also yield interesting results. At the same time, a preoccupation with the details of design trade-offs and a strong reliance on established technical indicators also leads to a uniquely narrow and specific outlook, with few exceptions. These analyses are best adduced as evidence, rather than adopting the methodology as such.

A more recent example of a contribution that does manage to combine social science with an awareness of naval engineering concepts and shipbuilding indicators, and to do so harmonically, is Kirchberger's study of Chinese naval development.[95] Her study also introduces an alternative perspective on the overall pattern of shipbuilding activity, in the form of

[94] See, e.g. Nigel Brodeur, "Comparative Capabilities of Soviet and Western Weapon Systems," in MccGwire; Booth; McDonnell, *Soviet Naval Policy*, 452-70; James W. Kehoe, "Warship Design: Ours and Theirs," in MccGwire; McDonnell, *Soviet Naval Influence*, 364-86. For a more detailed study on a single platform, see Herbert A. Meier, "Methodology for Analyzing Foreign Warships," in MccGwire; McDonnell, *Soviet Naval Influence*, 394-98; Reuven Leopold, "U.S. Naval Ship Design: One Viewpoint," in *The Other Arms Race: New Technologies and Non-Nuclear Conflict*, ed. Geoffrey Kemp, Robert L. Pfaltzgraff and Uri Ra'anan (Lexington, MA: Lexington Books, 1975), 57-75; James W. Kehoe and Kenneth S. Brower, "Warship Design in the Future," in *The U.S. Navy: The View from the Mid-1980s*, ed. James L. George (Boulder, CO: Westview, 1985), 141-63. Relevant periodicals include *Maritime Defence International* and the *Naval Engineers Journal*,

[95] Kirchberger, *Assessing China's Naval Power*.

force structure analysis.[96] To accomplish this, Kirchberger groups PLAN vessels “according to vessel types and classes, age structure, and technological standards,”[97] which provides a valuable backdrop of more detailed discussions of combat capability. While the capability analysis she builds on top of this foundation is of a high standard throughout, the main technical indicator itself – fleet age structure – raises a concern that also applies to other such indicators: unless it is very carefully contextualized, it is prone to misrepresentation in what MccGwire would call a “colonel’s fallacy.”[98] By this, he means the widespread tendency of senior military officers and bureaucrats to remain stuck in a mid-level planner’s frame of mind, where “the concern is properly for an opponent’s capabilities, with hostile intentions taken for granted. But while worst-case analysis is appropriate to contingency planning, it is wholly inappropriate at the politico-strategic or ‘ministerial’ level of analysis.”[99] Because the fleet age structure of *any* fast-modernizing navy will show an improving profile over time, its cooptation as part of a ‘colonel’s fallacy’ would result in *any* such force appearing aggressive, even if the behavior of an opposing party is actually wholly consistent with a defensive posture. Because the ‘colonel’s fallacy’ is a common error of reasoning in military analysis, MccGwire would argue that requirements testing should not be left to others, but instead be performed by the analyst ‘at the source’. In this frame of mind, “[a]n opponent’s military capabilities are not ignored, but they are measured against his security requirements to discover whether there is any surplus that would indicate an aggressive plan of action.”[100] An *integrated* approach to capability analysis and requirements testing makes it much less likely that a good indicator will end up as key evidence for the bad analyses of third parties.

This brings us to the second alternative approach to hardware analysis, which has spawned a wealth of *platform- or weapon-centric accounts of technological developments* during the Cold War at sea. The best of these works also exhibit a deep understanding of operational

96 Ibid., 182-233.
97 Ibid., 182.
98 MccGwire, *Military Objectives in Soviet Foreign Policy*, 367.
99 Ibid.
100 Ibid.

concepts and activities. As such, they combine some elements of MccGwire's high-level analyses with a greater affinity for the engineering mindset of shipbuilding practitioners. Most of the accounts in question are quite specific, although some have attempted to provide an overview of the entire period (or large segments of it).[101] While their analyses of the U.S.-Soviet competition as a whole tend to be fragmentary, they point to the importance of factors that MccGwire was undoubtedly aware of, but which he does not examine in the same detail as other hardware analyses do. Many of these factors will be repeatedly referred to in the following chapters, including:

- propulsion choices and their impact on *range and speed*, as they relate to capability profile;
- the capabilities of *weapons* and *munitions* carried and the implications of *magazine size*;
- the quality of *sensors* and other electronics, and the prickly question of *targeting modalities*;
- considerations of *survivability*, as they relate to platform size and other design choices;
- *mutual dependencies* and *networking* of platforms, be it as a force multiplier or a liability.

Together, these design features provide substantial insights into force employment principles and operational patterns, which can only add to our understanding of posture developments overall. In addition to the major works of this subgenre of hardware analysis, which are referred to repeatedly throughout the empirical chapters of this study, there are countless examples of more *ad hoc* hardware analyses to be found, for the most part, in professional periodicals like USNI *Proceedings*. These often provide valuable insights on much more specific matters and which will be selectively referred to where suitable. On the whole, this category provides

[101] Some excellent examples include Norman Friedman, *Modern Warship: Design and Development* (Greenwich: Conway Maritime, 1979); Norman Friedman, *Submarine Design and Development* (Annapolis, MD: Naval Institute Press, 1984); Norman Friedman, *The Postwar Naval Revolution* (Annapolis, MD: Naval Institute Press, 1986); Robert Gardiner and Norman Friedman, eds., *Navies in the Nuclear Age: Warships since 1945* (London: Conway Maritime, 1993); Terzibaschitsch, Stefan. *Kampfsysteme der US Navy: Waffen und Elektronik auf amerikanischen Kriegsschiffen*. Hamburg: Koehler, 2001.

a treasure trove of quality evidence but, for the most part, these contributions lack MccGwire's acute sense for the bigger picture.

The third, and potentially most interesting, avenue that should be mentioned here is *wargaming*. This is fundamentally unlike any of the traditional, paper-based approaches outlined here, but potentially compatible with all of them. Wargames simulate "an intellectual battle which approximates the experience of command in times of war, where players control game elements that represent forces in combat."[102] Starting out in the 18th century as vastly expanded versions of boardgames like chess, wargames have been an established and institutionalized method for military training and experimentation since the late 19th century.[103] At the U.S. Naval War College, wargaming dates back to the times of Mahan. In the run-up to the Pacific War, the U.S. Navy gamed out successive versions of *War Plan Orange* against Japan, experimenting extensively with different options.[104] The Imperial Japanese Navy (IJN) did not permit its commanders the same degree of intellectual freedom in toying with alternative options, but wargaming nonetheless played a prominent role – including in the operational design phase for the Pearl Harbor raid.[105] The reliance on naval wargaming continued during the Cold War years.[106]

What makes wargaming an interesting approach for posture analysis, however, is not so much its use in a military context, which is widely known and accepted. It is the widespread availability of sophisticated game designs in the unclassified sphere, and the increasing acceptance of wargaming as a method that can be used productively in an academic context.[107]

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[102] Jon Peterson, "A Game Out of All Proportions: How a Hobby Miniaturized War," in Harrigan; Kirschenbaum; Dunnigan, *Zones of Control*, 3.
[103] For a solid history, see ibid., 3-31; Philipp von Hilgers, *War Games: A History of War on Paper* (Cambridge, MA: MIT Press, 2012). On the basic approach of U.S. naval wargaming see Francis J. McHugh, *U.S. Navy Fundamentals of War Gaming* (New York, NY: Skyhorse, 2013).
[104] See Norman Friedman, *Winning a Future War: War Gaming and Victory in the Pacific* (Washington, DC: Naval History and Heritage Command, 2019).
[105] Alan D. Zimm, *The Attack on Pearl Harbour: Strategy, Combat, Myths, Deceptions* (Havertown, PA: Casemate, 2013), 71-82.
[106] See e.g. Hal M. Friedman, *Blue versus Purple: The U.S. Naval War College, the Soviet Union, and the New Enemy in the Pacific* (Newport, RI: Naval War College Press, 2017).
[107] This achievement is at least in part down to Sabin's contributions including Philip Sabin, "Wargames as an Academic Instrument," in Harrigan; Kirschenbaum; Dunnigan, *Zones of Control*, 421-37; Philip Sabin, *Simulating War: Studying Conflict through Simulation Games* (London: Bloomsbury Academic, 2014).

The naval game system that remains the most capable – certainly as far as relating Cold War-era hardware to defense requirements, or testing the effects of alternative platforms, weapons and force structure concepts in concrete scenarios is concerned – is the *Harpoon* family of games.[108] Developed by Larry Bond and first published in 1981, *Harpoon* has gone through several major updates and is still being developed further, with its version 4.2 expected in the near future. Originally a tabletop game, it has also been fully digitized since. As far as the tabletop version is concerned, the *Harpoon* system provides an extremely detailed simulation of modern naval combat, with a 120-page rulebook that is open to all manner of additional adaptations. In short, it makes one of the best cases in point for Sabin's claim that

> "simulation modelling is a far more ambitious process than mere narrative description of the events concerned. Wargames bestow in miniature the almost God-like ability to rewind time over and over again and to experiment with all kinds of random variations and alternative decisions, thereby creating *the ultimate counterfactual sandbox*."[109]

The only real downside of wargaming as a supporting research method is the massive investment of time and intellectual resources that it requires, which makes it a difficult path to tread for an individual researcher. The best evidence of what is involved in making wargaming 'deliver' as a method comes from a case in which it was arguably used to good effect: in the writing of Tom Clancy's now-classic World War III novel *Red Storm Rising*. The players in this case were a mixed group of professional military analysts and seasoned *Harpoon* players, a full dozen strong, who played a single scenario – a saturation Tu-22M *Backfire* raid on a U.S./UK carrier battle group – three times. This included performing a good portion of the staff work that would have gone in developing the concept for such an attack in real life.[110] For validation purposes, in particular, such a sustained group effort is difficult to avoid. Having said that,

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[108] For an overview, see Don R. Gilman, "Harpoon: An Original Serious Game," in Harrigan; Kirschenbaum; Dunnigan, *Zones of Control*, 209-19. Currently the most interesting version to work with in a Cold War setting is *High Tide: The Cold War, 1980-1989 – A Decade of Naval Confrontation* (Clash of Arms Games, 2003), which includes an excellent collection of technical data as well.
[109] Sabin, *Simulating War*, 55. Emphasis added.
[110] Larry Bond, *Dance of the Vampires: A 1985 Cold War Harpoon Scenario* (The Admiralty Trilogy Group, 2013), 2-3; For the Clancy narrative, see Tom Clancy, *Red Storm Rising* (New York, NY: Berkley Books, 1987), chapter 20.

recent advances in 'civilianized' computer wargaming, such as WarfareSims' *Command: Modern Air/Naval Operations* follow-on to the *Harpoon* series may render the use of wargaming in Cold War naval research a more manageable proposition in the future.[111]

All things considered, there is much to be learned from each of the additional categories of hardware-centric analytical approaches and tools discussed in this section. The approach that is ultimately used throughout this study will emphasize three elements in particular that may not have received the full attention they deserve in MccGwire's framework:

(1) We should realize that design trade-offs are pervasive in naval (and aerospace) engineering and that the features of naval platforms are subject not only to operational requirements but also to stringent physical limitations that may be impossible to overcome within the constraints of a given set of parameters. Not every prominent characteristic of a system is necessarily or primarily going to be traceable to military or political-strategic considerations.

(2) The relevance of a *systematic* examination of the main technical characteristics of individual platforms, in addition to the overall pattern of construction, should also be underlined. Having said that, the nature and format of the study do impose certain limits on this ambition. At the end of the day, it is the competitive dynamics of posture change that we are interested in, not the evolving applications of military technology *per se*.

(3) Wargaming approaches would underscore the interactive nature of naval operations and the contingency of battle outcomes, which makes it difficult to arrive at firm conclusions as to the best, most plausible, or most likely courses of action in any given situation. The fact that the *most likely* outcome, *if* he could re-fight a battle fifty or one hundred times, would be a narrow victory does not ease a commander's real-world burden of responsibility. Given that a paper study can only consider a limited number of scenarios in any detail and will convey a picture that is necessarily selective, even in a long-form account, some humility is in order when making assessments about plausible alternative realities that ultimately did not come to pass.

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[111] WarfareSims.com, "C:MANO Professional, Academic & Student Edition," http://www.warfaresims.com/?page_id=3822.

In the next section, we will have to address some of the most prominent criticisms that have been made of hardware-based analyses in general, and of MccGwire's requirements testing approach in particular.

CRITICISMS AND CAVEATS

Several criticisms have been made of MccGwire's work on shipbuilding and force structure analysis, and of hardware analysis more broadly – some of them valid, others not. Perhaps the most common criticism concerns the comparative reliability of findings derived from different types of evidence. In one such passage, Ranft and Till write that "[t]he main problem is that the evidence is intrinsically ambiguous, whether it is derived from what the Russians have got or from what they say and do."[112] That is undoubtedly true. Hardware and acquisition patterns leave considerable room for interpretation. It is difficult to overlook, however, that all different types of evidence are not actually created equal. While they are all ambiguous *to some extent*, analyses of shipbuilding patterns and capabilities can draw on a substantial accumulation of 'hard' evidence that is difficult to dismiss out of hand: "[Hardware analysis] is not a panacea. But because it rests on a firm foundation of physical data, it does provide a relatively concrete form of reference against which to evaluate and interpret other types of evidence."[113]As a result, it is reasonable to insist it can lay a solid foundation for inferences from other sources – especially those that are derived from partial literary evidence that is often much more ambiguous. As Booth puts it, "[n]obody, including MccGwire, claims that hardware analysis is a full indicator [of prospective employment], only the most reliable one at hand."[114] In practice, no method should be relied on to the exclusion of others. But it is difficult to argue that one should start from the kind of evidence that leaves *more* rather than *less* room for interpretation as to what the opponent's main priorities are.

[112] Bryan Ranft and Geoffrey Till, *The Sea in Soviet Strategy* (Basingstoke: Macmillan, 1989), 2.
[113] Michael MccGwire, "The Turning Points in Soviet Naval Policy," in Michael MccGwire, *Soviet Naval Developments*. 207.
[114] Booth, *Navies and Foreign Policy*, 184.

The key point that speaks in favor of hardware analysis is that, while they are ambiguous to some extent, *capabilities reflect choices about matters of naval posture that are settled enough to warrant a concrete commitment of scarce public sector resources over a period of ten to fifteen years*. As long as the written record remains fragmentary, there is no better indication of priorities than that. MccGwire strongly believed that "[we] cannot avoid speculation, but we can control its quality."[115] In our attempts to control the quality of our speculations, an analysis of how material resources were actually put to use – *how the limited capacity to reshape a naval posture for the long run was allocated to specific projects* – remains the best starting point. Having said that, and while the order of precedence does matter, there is no doubt that the application of *several* methods with their distinct advantages and blind spots will generally produce better results than the reliance on any individual method can. MccGwire may have been one of the main practitioners of systematic hardware analysis, but that does not mean that he relied on this method to the exclusion of others. In fact, he would be the first to insist that hardware analysis should *not* be seen as a stand-alone approach. His specific claim was that "the capability that these ships comprise provides a concrete frame of reference against which to assess the implications of operational activity and public pronouncements."[116] While it is true that establishing such a frame of reference involves interpretations of an ambiguous evidentiary base – how, in a field of human activity that remains cloaked in secrecy, could it not? – the central claim itself stands undiminished.

Another criticism that deserves to be restated is that MccGwire relied on a view of the VMF as "a unitary, value-maximizing fleet-as-actor that deliberately and systematically translates its requirements into a set of 'capabilities'."[117] This is a potentially serious critique that deserves to be taken seriously. That said, the author of this study has found limited evidence to this effect. It is true that MccGwire proposed as a reasonable assumption the view that a military organization would be focused on averting threats to the homeland first and that we

[115] Michael MccGwire, "The Turning Points in Soviet Naval Policy," in Michael MccGwire, *Soviet Naval Developments*, 207.
[116] Ibid., 177.
[117] Breemer, "Estimating the Soviet Strategic Submarine Missile Threat," 229.

should use *this* as our starting point, rather than the 'colonel's fallacy' of assuming that all rivals' intentions are aggressive as a matter of course. However, he is quite explicit in stating that naval policies need not be related to 'minimum requirements' at all.[118] How well his view of the Soviet Navy in particular – the so-called MccGwire thesis, according to which "Soviet naval development was best understood as a counter to the weapons and doctrines of superior Western naval power"[119] – stands up to a 21st century review of the available evidence remains to be seen. As we embark on this review, it is worth remembering Wheeler and Booth's statement that "[i]n practice, there is always much more going on in the development of a country's military policy than a logical convergence of external interests and weapons acquisition."[120] Having said that, there is little reason to second-guess MccGwire's adoption of a *baseline view* of competitors' behaviors that ascribes to them motives that are not fundamentally different from our own.

A fourth criticism, also levelled by Jan Breemer, concerns a practical limitation that applies not just to MccGwire's approach, but to hardware analyses of all types, and that is potentially difficult to overcome: they "[presume] accurate intelligence about capabilities."[121] Although it is not at all surprising that incidents like the misattribution of certain capabilities to a new class of vessels occurred throughout the Cold War, and expert disagreements about novel capabilities are also to be expected, this is clearly not a trivial matter.[122] As Mahnken found in his study of interwar military intelligence, U.S. and other intelligence organizations have repeatedly missed foreign innovations, in both hardware and doctrine.[123] Although the

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[118] Michael MccGwire, "The Turning Points in Soviet Naval Policy," in Michael MccGwire, *Soviet Naval Developments*, 196.
[119] Booth, "A Cold War Life, And Beyond," 100.
[120] Ken Booth and Nicholas J. Wheeler, *The Security Dilemma: Fear, Cooperation, and Trust in World Politics* (Basingstoke: Palgrave Macmillan, 2008), 60.
[121] Breemer, "Estimating the Soviet Strategic Submarine Missile Threat," 230.
[122] Breemer mentions the misidentification of the SS-N-14 anti-submarine missile as an anti-ship weapon during the 1970s. Ibid.. Given that the SS-N-14 was based on the SS-N-9 ASM and later adapted for anti-ship use itself, this was hardly a catastrophic intelligence failure.
[123] Thomas G. Mahnken, *Uncovering Ways of War: U.S. Intelligence and Foreign Military Innovation, 1918-1941* (Ithaca, NY: Cornell University Press, 2002), 11-16. There is a reference to the Cold War at sea on page 16: "Not until the early 1980s did the U.S. intelligence community realize that the Soviet Union had developed concepts of naval warfare considerably different from those of the U.S. Navy." Although it will become evident that this is not strictly true, this framing is nonetheless reflective of the status of the debate.

overall record was not catastrophically bad, only four out of the nine innovations examined were fully uncovered in a timely manner. Three were missed completely.[124] Clearly, this is a major limitation when dealing with a 'moving target', although it is not one that applies to hardware analyses only. Two factors serve to mitigate the challenge. The first is that MccGwire essentially proposed a backward-looking approach – he does not claim to be in a position to keep track of Soviet naval developments in anything close to real-time.[125] While prediction is a necessity in the context of an entrenched strategic rivalry and deficiencies in methodology sometimes have to be accepted for what they are, this is also a topic MccGwire approached with some restraint.[126] The second factor applies to the present study in particular, and to historical accounts in general. Once the 'target' has stopped moving, additional information may start to come to light in significant quantities, as was indeed the case after the end of the Cold War. While the research problem at this stage is primarily of academic and historical, rather than immediate political-military nature, interest in Breemer's criticism grows progressively less pertinent as hindsight begins to kick in. Hence, the challenge it poses for our reliance on hardware analysis after the fact is a manageable one.

A final criticism that can be made of MccGwire's approach is that, at times, he may have been too ambitious in his attempt to not only make sense of the VMF's naval posture, but to arrive at second-order inferences about Soviet security and defense policy more generally. While he assiduously avoided the 'colonel's fallacy', his inferences concerning Soviet motives may sometimes stretch the evidentiary base in different, altogether more subtle ways. Although this is more evident where detailed hardware analyses are *absent* from his texts, and there certainly were worse offenders in this regard – even among the elite analysts of the Soviet Navy – the present study nevertheless takes a more circumscribed approach. The bottom line, however, remains unchanged: in a review of the long-term dynamics of the Cold War at sea,

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[124] Ibid., 162-64.
[125] Michael MccGwire, "The Turning Points in Soviet Naval Policy," in Michael MccGwire, *Soviet Naval Developments*, 178.
[126] Ibid., 196-97.

particular weight should be given to the analysis of observable naval capabilities and of the organizational choices they reflect.

3.4.4 *Literary analysis*

The main 'competitor' for hardware analysis during the Cold War was an approach that focused on Soviet public pronouncements and internal debates to establish the content of naval policies. The basic idea in this case was to start from what the Soviets *said* they would do and derive insights about roles and missions, force employment, and future developments primarily through exegesis of written materials. As was the case with hardware analysis, there were classified counterparts to the public debates. Some of those documents have since been declassified and can add to our evidentiary base.[127] However, many of the achievements of literary analysts, practitioners of "literary intelligence"[128] as some of them styled themselves, were based on their systematic reviews of the open source literature. As one would expect, the present study relies heavily on hermeneutics throughout, and for the empirical chapters in particular, but it should be stated at the outset that it will not engage in the kind of detailed literary intelligence collection and analysis that Cold War practitioners relied on. Rather than trying to reprise the lost art of prowling through scraps of bureaucratic declarations and debates in the original Russian language and applying to them a deep understanding of the rigid terminology of the Soviet official mind, it approaches the wealth of existing literary analyses from the perspective of the critical consumer. Hence, the actual application of this supporting method – narrowly defined as the engagement with the subtle meanings of Soviet primary source materials – has been left to others and the fruits of their considerable labor will add to

[127] A classic example would be Central Intelligence Agency/Office of Research and Reports, *Soviet Naval Strategy and Its Effects on the Development of Naval Forces, 1953-63*, October 22, 1963, CIA/RR ER SC 63-3, CIA Historical Collection, ~~TOP SECRET~~ (declassified May 21, 2012). A study based on the indiscretion of COL Oleg Penkovsky that specialists have long been aware of, and one that was one of the more extensive literature analysis efforts to grapple with Soviet naval matters on the CIA's part – and remains of some value today.

[128] Peter M. Swartz, "Understanding an Adversary's Strategic and Operational Calculus: A Late Cold War Case Study with 21st Century Applicability – U.S. Views on Soviet Navy Strategy and Operations" (COP-2013-U-005622-Final, CNA, Washington, DC, 2013), 37-38.

the overall picture we will paint as evidence. Having said that, it is nonetheless important to understand some notable differences in how literary analysis was applied during the Cold War. To bring out those variances, it is helpful to contrast and compare the approaches of the two most accomplished practitioners of literary analysis, Robert Herrick and James McConnell. In an additional step, we can then also ask how their methods differ from MccGwire's take on the problem.

Herrick was the first analyst, in 1968, to publicly broach the idea that the VMF's posture was preponderantly defensive in nature and geared towards homeland defense. His *Soviet Naval Strategy: Fifty Years of Theory and Practice* was considered a serious challenge to the U.S. Navy's institutional outlook – so serious, in fact, that it famously warranted the addition of a Publisher's Preface to justify the U.S. Naval Institute's decision to publish it at all.[129] Herrick was difficult to ignore for three reasons. Like MccGwire, he had been a naval intelligence officer before leaving the service. Secondly, and again like MccGwire, he read Russian and had lived in the Soviet Union. And third, he clearly was a serious historian of Soviet naval debates and understood where the VMF was coming from. He may have developed his style of densely sourced and historically contextualized literary analysis in part because he understood that his take on the subject would be controversial. Admiral (ADM) Arleigh Burke had encouraged him to proceed with his study and also contributed the foreword,[130] but while Burke was a towering figure, he had retired in 1961. That the expanding Soviet Navy essentially still remained wedded to the outlook of a coastal defense force, and that its more ambitious posture was not least of all a reaction to the threat of U.S. carrier strikes on the homeland, was not what the official Navy wanted to hear. Hence, Herrick had to make his case ironclad, and he chose to make it about history first, and only then about the present. At the same time, it is also true that there were few viable alternatives available to him. As he put it himself, "[a]lmost no useful and reliable information could be obtained from the few books in Western languages

[129] Robert W. Herrick, *Soviet Naval Strategy: Fifty Years of Theory and Practice* (Annapolis, MD: Naval Institute Press, 1968), xi-xii.
[130] Ibid., vii-ix, xvii.

that purport to treat of the Soviet Navy."[131] Since the Soviets did their best to wrap their naval development in a cloak of secrecy, doing his own literary analyses based on those Russian language materials available to him was Herrick's best chance of stating his case publicly.

In time, this developed into a powerful method for explaining Soviet naval developments largely in terms of the VMF's own statements and historiography of itself. While he was open to incorporating aspects of hardware analysis, this was the approach Herrick relied on for the rest of his career, including a number of chapters and articles as well as his 1989 volume on *Soviet Naval Theory and Policy*.[132] By this time, the potential troublemaker of the 1960s was widely recognized as "the master of Soviet naval history."[133] While it is an overstatement on Booth's part to claim that, by the mid-1970s, Herrick's and MccGwire's explanation of Soviet naval initiatives, which had earlier "attracted substantial disapproval from Western naval establishments […] had become a generally accepted one,"[134] they did have much of the highest-quality evidence on their side. Ironically, Herrick's most ambitious application of his method – a comprehensive three-volume set on *Soviet Naval Doctrine and Policy, 1956-1986* – was published long after the Cold War had ended.[135] It has only served to strengthen his case further, and even though Herrick's 'grand œuvre' has been cited sporadically before, this study is one of the first to make extensive use of it. Herrick's approach is particularly appealing because he often manages to contextualize his fairly esoteric evidence well-enough to let it speak for itself and make his case for him. While he frequently reads between the lines, he seldom does so in

[131] Ibid., xviii.
[132] Robert W. Herrick, *Soviet Naval Theory and Policy: Gorshkov's Inheritance* (Annapolis, MD: Naval Institute Press, 1989). His articles and chapters notably include Robert W. Herrick, "The Gorshkov Interpretation of Russian Naval History," in Michael MccGwire, *Soviet Naval Developments*, 206-21; Robert W. Herrick, "The USSR's 'Blue Belt of Defense' Concept: A Unified Military Plan for Defense Against Seaborne Nuclear Attack by Strike Carriers and Polaris/Poseidon SSBNs," in *Naval Power in Soviet Policy*, ed. Paul J. Murphy (Washington, DC: U.S. Government Printing Office/Department of the Air Force, 1978), 169-78; Robert W. Herrick, "Roles and Missions of the Soviet Navy: Historical Evolution, Current Priorities, and Future Prospects," in George, *The Soviet and Other Communist Navies*, 9-36.
[133] Bradford Dismukes, "Introduction," in George, *The Soviet and Other Communist Navies*, 5.
[134] Booth, *Navies and Foreign Policy*, 192 n. 30.
[135] Robert Waring Herrick, *Soviet Naval Doctrine and Policy, 1956-1986,* 3 vols. (Lewiston, NY: Edwin Mellen Press, 2003).

ways that an informed reader cannot fathom. In other words, he makes it relatively easy for skeptical minds to follow his argument and develop a level of trust in his assessments.

James McConnell stands out as the most purist exponent of literary intelligence analysis, and arguably also as the most fastidious in his interpretations. As an analyst in the Strategic Studies Department of the Center for Naval Analyses (CNA) during the 1970s and 1980s, he wrote a series of detailed and highly regarded interpretations of Soviet doctrinal writings and is credited – along with his CNA colleagues – with providing a key impulse for the U.S. Navy's admission that the VMF was, in fact, pursuing a defensive strategy centered on SSBN protection.[136] He clashed repeatedly with Michael MccGwire over the meaning of the so-called *Gorshkov series* of articles that appeared in *Morskoy sbornik* during 1972-73, as well as over Gorshkov's *The Seapower of the State*, which was published in 1976. Whereas MccGwire was convinced that the series was "an exercise in advocacy,"[137] and remained at least partially unconverted into the 1980s, McConnell believed that Gorshkov was "formulating a 'concrete expression of doctrine'"[138] and that "what has been interpreted as a modest amount of authority is really modesty in displaying authority."[139] He may well have been correct in these assertions,

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[136] This story is told extremely well in John B. Hattendorf, *The Evolution of the U.S. Navy's Maritime Strategy 1977-1986,* Newport Paper 19 (Newport, RI: Naval War College Press, 2004), 23-36. McConnell's notable works include James M. McConnell, "The Soviet Navy in the Indian Ocean" (Professional Paper No. 77, Center for Naval Analyses, Alexandria, VA, 1971); James M. McConnell, "The Gorshkov Articles, the New Gorshkov Book, and Their Relation to Policy" (Professional Paper No. 159, Center for Naval Analyses, Arlington, VA, 1976); James M. McConnell, "Military-Political Tasks of the Soviet Navy in War and Peace" (Professional Paper No. 148, Center for Naval Analyses, Arlington, VA, 1976); James M. McConnell, "Strategy and Missions of the Soviet Navy in the Year 2000" (Professional Paper No. 206, Center for Naval Analyses, Arlington, VA, 1977); James M. McConnell, "Doctrine and Capabilities," in *Soviet Naval Diplomacy*, ed. Bradford Dismukes and James M. McConnell (New York, NY: Pergamon Press, 1979); James M. McConnell, "The Interacting Evolution of Soviet and American Military Doctrines" (Professional Paper No. 412, Center for Naval Analyses, Alexandria, VA, 1980); James M. McConnell, "The Soviet Shift in Emphasis from Nuclear to Conventional: The Long-Term Perspective" (CRC 490-Vol. I, Center for Naval Analyses, Alexandria, VA, 1983); James M. McConnell, "The Soviet Shift in Emphasis from Nuclear to Conventional: The Mid-Term Perspective" (CRC 490-Vol. II, Center for Naval Analyses, Alexandria, VA, 1983); James M. McConnell, "Shifts in Soviet Views on the Proper Focus of Military Development," *World Politics* 37, no. 3 (1985), doi:10.2307/2010246, 317-43; James M. McConnell, "Analyzing Soviet Intentions: A Short Guide to Soviet Military Literature" (CRC 593, Center for Naval Analyses, Alexandria, VA, 1989).

[137] MccGwire, *Military Objectives in Soviet Foreign Policy*, 448-76.

[138] McConnell, "The Gorshkov Articles, the New Gorshkov Book, and Their Relation to Policy," 3.

[139] Ibid., 80.

although his interpretations of what it was that Gorshkov was expressing were much more tenuous at times. Steven Walt eventually provided an external assessment of the spat in a report for the CNA, in which he sided with McConnell in a number of respects but concluded that "many of the specific disagreements […] are probably indeterminate."[140]

The fact remains that McConnell's interpretations hinge on two critical assumptions: (1) that the *Glavkom* – the Commander-in-Chief or *Glavnokomanduyushchiy* of the VMF – and Soviet military writers more generally, meant what they said and would act accordingly, and (2) that the real meaning of Soviet writings often was to be found in "latent content,"[141] such as statements about history that were assumed to contain doctrinal precepts for present-day use. To provide one particularly central example, McConnell believed that Gorshkov's shift of the Soviet interpretation of the Battle of Jutland in favor of Admiral Jellicoe's caution, 'fleet-in-being' strategy amounted to a doctrinal endorsement of a defensive posture centered on keeping Soviet SSBNs in home waters and withholding them from any initial nuclear exchanges.[142] Much of his confidence in such assessment rested on a very close analysis of Soviet jargon, and its usage in official and semi-official writings. Usage of Soviet concepts like *oborona strany* (national defense) and *zashchita strany* (military-strategic tasks) was particularly central to McConnell's case.[143] It is hardly surprising, then, that Douglas Hart repeatedly referred to McConnell's work as an illustration for his claim that "[d]iscussions of Soviet doctrine in the

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[140] Stephen M. Walt, "Analysts in War and Peace: MccGwire, McConnell, and Admiral Gorshkov" (Professional Paper No. 458, Center for Naval Analyses, Alexandria, VA, 1987), 51.
[141] Hattendorf, *The Evolution of the U.S. Navy's Maritime Strategy 1977-1986*, 27.
[142] This debate is extremely well summarized in Breemer, "Estimating the Soviet Strategic Submarine Missile Threat", 178-86. Breemer's own reading of the same passages is damning: "Clearly, the Soviet admiral is reminding his audience that though capital ships, be they battleships at Jutland or SSBNs today, may have pride of place in a navy, they cannot be the sole measure of a fleet. The message is straightforward; the same cannot be said for the one McConnell claims to have deciphered." Ibid., 186. See also McConnell, "The Gorshkov Articles, the New Gorshkov Book, and Their Relation to Policy," 40-41; Walt, "Analysts in War and Peace," 27-30.
[143] Walt (*Analysts in War and Peace*, passim) provides an excellent accounting of McConnell's positions in this regard.

Western analytical community have come to resemble arguments over scriptural interpretation"[144] and chose him as the key example for what he pointedly describes as a "Talmudic"[145] school of thought in doctrine analysis. Overall, McConnell's style in literary analysis was that of a virtuoso: when he was at his best, he played the game at an entirely different level than most of his colleagues, but at times he also appears to struggle to explain how exactly he 'got there'. His judgements were clearly based on extremely thorough and systematic study of Soviet writings, down to a level of detail that is largely unmatched elsewhere in the literature, but they also strike the reader as intuitive in ways that are not fully transparent. Even Walt's sympathetic assessment eventually arrives at the conclusion that

> "McConnell's entire method consists of relating particular external events (which one can always interpret a number of ways) with a variety of specialized esoteric definitions based on extensive research into Soviet military conventions regarding language use. This has the practical effect of making his interpretations *by definition* idiosyncratic, because one cannot fully understand the logic of his arguments unless one is privy to the background definitions [deduced by McConnell himself; MH] upon which the interpretations are based."[146]

Dismukes reminds us of the potential practical consequences of leaving it to consumers to separate hard evidence from what might amount to inspired leaps of faith when he observes that

> "it is not uncommon today to encounter the loose observation that Soviet writings show (or perhaps 'Gorshkov himself has written') that the Soviets plan to put their SSBNs in bastions if war should come. Such observations are, in fact, correct only if one accepts that the Soviets engage in esoteric communication. The Soviets themselves have never publicly said *anything* explicit about their wartime SSBN employment plans."[147]

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[144] Douglas M. Hart, "The Hermeneutics of Soviet Military Doctrine," *The Washington Quarterly* 7, no. 2 (1984), doi:10.1080/01636608409550030, 81.
[145] Ibid., 82.
[146] Walt, "Analysts in War and Peace", 53.
[147] Bradford Dismukes, "Introduction," in George, *The Soviet and Other Communist Navies*, 7. Emphasis in the original.

The level of discourse that McConnell supported with his interpretations was extremely high by today's standards, as well as by those of his own time, and his contributions remain among the best and most important to come out of the forty-year project to understand the Soviet Navy. However, his conclusions do not necessarily flow from the evidence he presents in ways that a critical reader can easily ascertain. To fully buy into the McConnell paradigm, one has to be willing to trust the master's firm grasp of his subject – sometimes without having a way of knowing exactly why.

CRITICISMS AND CAVEATS

Several criticisms have been made of the literary intelligence genre and, while the evidentiary value of its best products is beyond doubt, some of them will be amplified here. The first issue that has been raised and that should be mentioned here is the extent to which literary analysis is subject to deliberate disinformation.[148] Given that this is a question that remains partially intractable even today, it is difficult to ignore the possibility. McConnell's take on the problem remains instructive:

> "Moscow is, of course, aware of alien eavesdropping; hence much of the rigid propaganda conventions, the misleading statements, the guarded language that borders on the opaque. The substance of the message is not affected, however; the Kremlin cannot afford to deceive its own cadres. If disinformation be defined as a communication that the Soviet elite, skilled in reading the literature of its specialty, would declare to be untruth, then there is very little disinformation in the Soviet press."[149]

Based on what we know, this statement may well be entirely accurate. However, in framing the issue in this manner, McConnell also raises the specter of rampant omission: if a system as paranoid about security issues as that of the USSR elects to avoid disinformation in the public discourse about highly sensitive questions of military planning, that discourse is instead likely

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148 Swartz, "Understanding an Adversary's Strategic and Operational Calculus," 40-41.
149 McConnell, "Shifts in Soviet Views on the Proper Focus of Military Development," 319.

to be very heavily sanitized indeed. The limitations that this imposes on an outside analysts' ability to conduct detailed analyses of military matters may not be catastrophic, but the potential for serious inaccuracies due to the reliance on severely abridged source material cannot be dismissed out of hand either.

The second issue that literary analysts have struggled with is the extent to which even Soviet doctrinal writings that have *not* been subject to disinformation or debilitating censorship can serve as an accurate guide to the content of Soviet naval posture. McConnell's insistence that Gorshkov's articles were an expression of doctrine that enjoyed "the force of a state law,"[150] while other contributions 'only' belonged in the less apodictic category of military science in some ways accentuates the tension between theory and practice. If it was publicly stated grand theory that determined operational employment, rather than professional debates among officers in the classified fora of the Soviet armed forces, what remained of the vaunted mainstay of Soviet military thought – of operational art? As Moltke the Elder famously remarked, strategy amounts to "a system of expedients."[151] In war, and even in the preparation for war, lawlike tenets must be either vague enough to allow for the expression of the professional judgement of military planners – and in this case they may not tell us very much about actual force employment – or they are inflexible enough to warrant their circumvention in practice, even if they are authoritative in theory. Literary analysis cannot, by itself, tell us which of the two we are dealing with. By insisting that the high-level political-military is determinative with regard to the operational paradigms of the armed forces, based on their reading *of that self-same discourse*, literary analysts created a logic that was internally consistent but completely unsubstantiated as far as its external validity was concerned.

This leads us straight to a third issue – namely, the need to complement any literary analysis with other types of evidence and the reticence in this regard of leading literature analysts, above all James McConnell. While we have focused on the core content of the hardware analysis method above, MccGwire's take on researching the Soviet Navy is ultimately best

[150] Quoted in McConnell, "The Gorshkov Articles, the New Gorshkov Book, and Their Relation to Policy," 77.
[151] See e.g. Arden Bucholz, *Moltke and the German Wars, 1864-1871* (Basingstoke: Macmillan, 2001), 56-57.

described as "eclectic,"[152] which was (and still is) one of its strengths. While one of the main selling points of his approach was that it provided an excellent grasp on what missions the VMF was actually structuring its forces for, he was also comfortable debating the definitional minutiae of the Gorshkov series with McConnell and putting "persistent and insightful pressure"[153] on the latter to argue his case more convincingly. The same did not necessarily apply to his counterparts. As was the case with other niche contributions to the field of Sovietology, theirs was a highly specialized pursuit, and it only became more so over time. McConnell's commitment to literary analysis was such that he largely saw it as a stand-alone approach – certainly as far as his own contributions to the debate were concerned. As Breemer recapitulated after exhaustive study of McConnell's opus, "this writer knows of only two instances in which McConnell has sought to match Soviet doctrinal 'evidence' with estimated hardware capabilities. In both cases, material evidence was picked-and-chosen to shore up selected literary-based conclusions."[154] It is probably fair to say that none of McConnell's colleagues who opted for more balanced approaches – MccGwire, Herrick, Robert Weinland and Bradford Dismukes and others besides would qualify on those grounds – attained quite the same level of penetration of the Soviet official mind, as it expressed itself on the page. The warning label that comes with the purist approach is that many of the most impactful literary analyses have been *just that*. The present study takes the position that, in a 21st century reexamination of the U.S.-Soviet competition for naval advantage, such one-sidedness should be avoided, and multiple types of evidence should be brought to bear whenever possible.

3.4.5 Operational patterns and exercises

As a tool for civilian analysts, systematic reviews of exercises and peacetime operational patterns are neither as well-established nor as widely practiced as the two approaches outlined above. This, of course, is all the more reason to ask what additional evidence exercises and

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[152] Bradford Dismukes, "Introduction," in George, *The Soviet and Other Communist Navies*, 4.
[153] Walt, "Analysts in War and Peace," 51.
[154] Breemer, "Estimating the Soviet Strategic Submarine Missile Threat," 178.

operations can provide. The amount of systematic research that has been done in this area is actually quite limited. The academic interest in exercises has picked up somewhat in recent years, with several publications coming out of a project at the University of Glasgow.[155] As far as the Cold War context is concerned, John Lehman's recent contribution is an interesting hybrid between personal memoir and detailed narratives of a succession of key exercises in the 1981-86 timeframe.[156] Lehman leaves little doubt that exercises were a critical element both in the formulation and implementation phases of the 1980s *Maritime Strategy*. Grove had made this point convincingly in his excellent *Battle for the Fiørds*, published in 1991, but the additional details and personal assessments Lehman provides are most valuable.[157] As far as patterns of operational activity in peacetime and limited wars are concerned, there are some good analytical assessments as well as a wealth of historical evidence to deal with. The relevance of these accounts to the question of posture change can amount from negligible to absolutely critical – in short, to a resounding 'it depends'. We will briefly address each of these two additional research areas in turn.

In Western attempts to make sense of Soviet naval developments, large exercises – notably the OKEAN series – have figured prominently at times, but the attention accorded to them has fluctuated wildly. Although exercises are most often mentioned in passing, usually as evidence of whatever point the author is trying to make about the global expansion of Soviet naval ambitions in the 1970s, some subject matter experts have attempted serious reviews.[158]

[155] Beatrice Heuser and Harold Simpson, "The Missing Political Dimension of Military Exercises," *The RUSI Journal* 162, no. 3 (2017), doi:10.1080/03071847.2017.1345118, 20-28; Beatrice Heuser, "Politische Dimensionen von Militärübungen und Manövern: Ein Projektbericht," *Zeitschrift für Außen- und Sicherheitspolitik* 11, no. 3 (2018), doi:10.1007/s12399-018-0712-y, 325-42.
[156] John Lehman, *Oceans Ventured: Winning the Cold War at Sea* (New York, NY: W. W. Norton, 2018), esp. 65-202.
[157] Eric J. Grove and Graham Thompson, *Battle for the Fiørds: NATO's Forward Maritime Strategy in Action* (London: Ian Allan, 1991).
[158] The best examples are Hanshermann Vohs, "OKEAN 75 – eine maritime Warnung [OKEAN 75 - a maritime warning]," *Zeitschrift für Seewesen* 72 (1975), 449-51; Bruce W. Watson and Marguerita A. Walton, "Okean-75," *USNI Proceedings* 102, no. 7 (1976), 93-97; Bruce W. Watson, *Red Navy at Sea: Soviet Naval Operations on the High Seas, 1956-1980* (Boulder, CO: Westview Press, 1982), 29-35. The most recent contribution to touch upon the issue is Edward Hampshire, "From Malin Head to 'Okean 75': Shadowing and Intelligence Collection Operations by Royal Navy Surface Ships 1975–1985," *Intelligence and National Security* 33, no. 5 (2018), doi:10.1080/02684527.2018.1437949, 659-74.

Naturally, U.S. intelligence took a major interest as well, and some useful insights are available from declassified documents. For example, the CIA documented the anti-carrier nature of the *VOLNA* exercise in 1970, known as OKEAN 70 in Western sources, which was elsewhere framed as an example of Soviet global ambitions (see Fig. 6 below). The analytical synopsis is worth quoting to provide an impression of how such matters were treated in finished intelligence products:

> "An example of high-level interfleet coordination for anticarrier strikes was demonstrated during Exercise Ocean in April 1970. This exercise included nearly simultaneous strikes against six widely separated simulated carriers. In this operation, naval TU-16s carried out ASM attacks in the Norwegian Sea, Sea of Japan, and North Pacific, while TU-95s of the strategic bomber forces attacked targets in the North Atlantic and Philippine Sea (see map below). *[EXCISED]* At the same time a cruise missile submarine made a mock attack in the Mediterranean."[159]

To account for more routine operations, Western analysts developed a methodology based on an indicator known as the "out-of-area sea day,"[160] which allowed them to trace the magnitude of Soviet activities with relative precision. Watson's study, *Red Navy at Sea*, remains the most comprehensive application of the concept. It is important to note that his definition of 'out-of-area' is quite expansive and "encompasses all the world's ocean areas except the Soviet inland waterways, coastal waters, and local exercise areas."[161] Hence, most observed operational activities that were not completely routine are classed as 'out-of-area', even if they were strictly related to homeland defense tasks. Other contributions have focused more narrowly on Soviet activities in particular areas, or on the motivations behind Soviet deployments.[162]

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[159] Central Intelligence Agency/Directorate of Intelligence, *Soviet Capabilities to Counter US Aircraft Carriers*, May 1972, CIA Historical Collection, ~~TOP SECRET~~ (declassified 14 June 2017), 24-25.
[160] Watson, *Red Navy at Sea*, 21.
[161] Ibid.
[162] See e.g. Bradford Dismukes and James M. McConnell, eds., *Soviet Naval Diplomacy* (New York, NY: Pergamon Press, 1979), chapters 2-4 & 6-7. Michael MccGwire, ed., *Soviet Naval Developments: Capability and Context* (New York, NY: Praeger, 1973), chapters 28-32; Michael MccGwire and John McDonnell, eds., *Soviet Naval Influence: Domestic and Foreign Dimensions* (New York, NY: Praeger, 1977), 23-28;

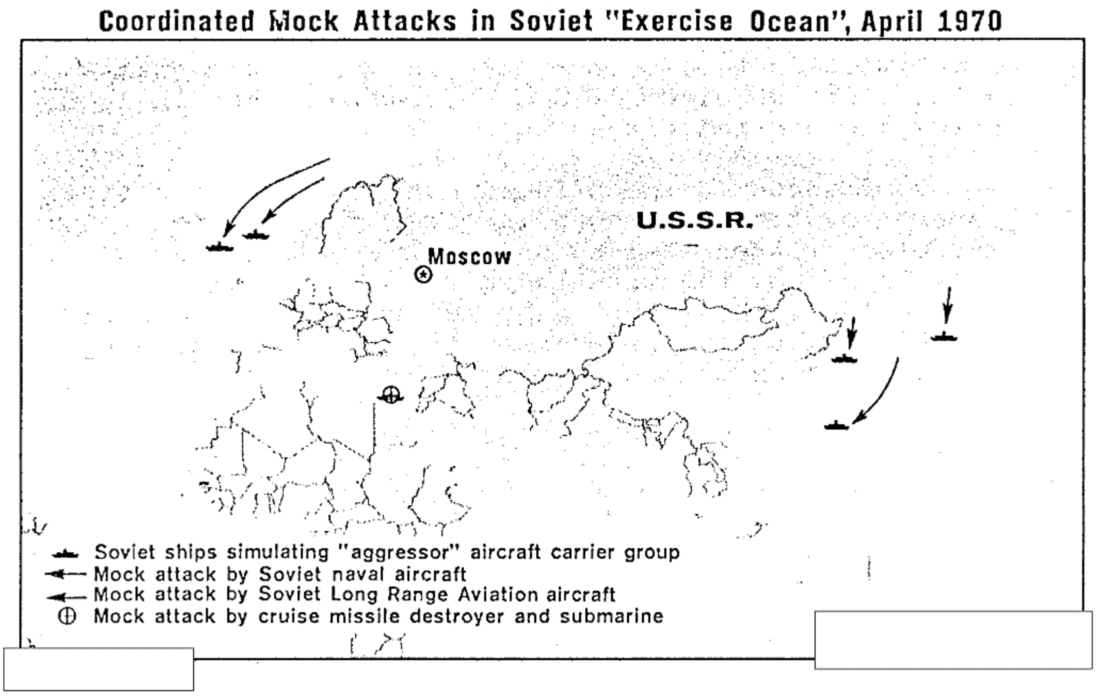

Fig. 6: CIA illustration of anti-carrier operations during OKEAN 70. *((Central Intelligence Agency/Directorate of Intelligence 1972)25)*

A great deal can also be learnt from observing the employment of navies in crisis operations and limited wars. For example, although a general war against the Soviet Union would have been a different matter entirely, wartime operations in both Korea and Vietnam involved extensive applications of carrier airpower that tell us quite a lot about the capabilities and limitations of U.S. naval aviation at the time.[163] Conflicts that did not directly involve either of the main Cold War competitors can provide extremely valuable evidence. The sinking of the INS *Eilat* (1967) and the Battle of Latakia (1973) in the Mediterranean theater, as well as the British experience in the South Atlantic (1982) all held important cues as to the nature of naval warfare

[163] See e.g. Richard Hallion, *The Naval Air War in Korea* (Tuscalosa, AL: The University of Alabama Press, 1986[2011]); Thomas McKelvey Cleaver, *Holding the Line: The Naval Air Campaign in Korea* (Oxford: Osprey Publishing, 2019); Jeffrey L. Levinson, *Alpha Strike Vietnam: The Navy's Air War, 1964-73* (Novato, CA: Presidio, 1989); John Darrell Sherwood, *Afterburner: Naval Aviators and the Vietnam War* (New York, NY: New York University Press, 2004); John Darrell Sherwood, *Nixon's Trident: Naval Power in Southeast Asia, 1968-1972* (Washington, DC: Naval Historical Center, 2008).

in the Missile Age.[164] In fact, even accidents like the 1967 fire aboard the USS *Forrestal* and the 1969 USS *Enterprise* fire, hold important clues concerning such critical questions as damage control and ship survivability.[165] Meanwhile, incidents at sea can provide important insights about the psychology of a potential wartime opponent.[166]

Unfortunately, there is also a tendency in Western naval thinking to mistake what navies *also do* in peacetime and limited war, both to further national objectives and to maximize their perceived utility, for their 'real' operational paradigms. The adherents of the "Cable school"[167] of naval diplomacy are the usual suspects in this regard. While the disagreement is ultimately irresoluble, there is reason to believe that this view is misguided. It is true, of course, that governments have long called upon their navies to engage in various forms of gunboat diplomacy and limited interventionism. The Soviet government was no exception in this regard. But to claim that this is the 'true' purpose of navies is a stretch even where Western navies are concerned, and all the more inaccurate with respect to the VMF.

The most controversial case in point is the 'global Soviet Navy' scarce of the 1960s and 1970s. An understandable overreaction to a growing but limited Soviet naval presence outside home waters, the fear of a Soviet shift to a truly globalized naval posture never materialized to the extent that many Western observers had so energetically predicted. Ultimately, we are left to debate the extent to which *any* of the capability that Soviet vessels flaunted in opportunistic peacetime displays of increasing naval modernity was designed for operations far from home. "The core of Moscow's Third World diplomacy of force lies in its capabilities for

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[164] On the Israeli experience, see Abraham Rabinovich, *The Boats of Cherbourg* (Annapolis, MD: Naval Institute Press, 1997). On the naval war over the Falklands, see e.g. Geoffrey Till, *Understanding Victory: Naval Operations from Trafalgar to the Falklands* (Oxford: Praeger, 2014), 138-88; Alastair Finlan, *The Royal Navy in the Falklands Conflict and the Gulf War: Culture and Strategy* (London: Frank Cass, 2004), 33-97.
[165] The official Judge Advocate General's reports on the *Forrestal* and *Enterprise* fires are available online at https://www.jag.navy.mil/library/jagman_investigations.htm.
[166] See David F. Winkler, *Incidents at Sea: American Confrontation and Cooperation with Russia and China, 1945-2016* (Annapolis, MD: Naval Institute Press, 2017).
[167] See n. 35 above.

countering U.S. carrier task groups,"[168] McConnell found in his contribution to perhaps the most thorough examination of the out-of-area phenomenon. The anti-carrier mission, of course, was the essence of zone defense – of what we have called the red perimeter. In other words, there *was no such thing* as Soviet naval forces designed specifically for Third World missions. Many Western analysts of the Cold War at sea will undoubtedly stick to their guns and insist that the global expansion of Soviet naval power was very real indeed – if only to ebb away again roughly in parallel with the shift in Western perceptions of Soviet naval strategy. As far as peacetime operational activity is concerned, there is good evidence to support this view. It is when observations of what the Soviet Navy *also did* are mistaken for evidence of *what it was all about* that the established narrative starts to go off the rails. The final word in the matter will, of course, have to be based on a comprehensive review of Soviet documents, if and when this becomes possible. But as far as the available evidence is concerned, there is little about the increase in out-of-area days during the 1960s and 1970s that cannot be explained by a combination of peacetime opportunism and domestic considerations on the part of VMF leadership cadres.

In the context of this study, the examination of operational activities and exercises should be properly framed as a supporting line of effort. Evidence on operations and exercises will help us firm up or otherwise correct the overall picture that emerges from a review of hardware and literary evidence. Interpretations that rely *primarily* on such evidence are more dubious and should be avoided in the context of posture analysis. Having said that, the systematic study of exercises and peacetime operations still has considerable untapped potential and, provided that it is combined with other evidence as appropriate, could be a promising avenue for historical as well as policy-relevant research in the coming decade.

[168] McConnell, "Doctrine and Capabilities", 21. The CIA found that the VMF generally assigned ageing units of lesser capability to 'political' missions and kept its newer units focused on 'anti-navy' tasks. Central Intelligence Agency, *Intelligence Report: Soviet General Purpose Naval Deployments Outside Home Waters: Characteristics and Trends*, June 1973, CIA Historical Collection, ~~SECRET~~ (declassified 1998).

3.4.6 Semi-structured interviews and oral histories

On both sides of the East-West divide, the Cold War competition at sea was a project pursued by large bureaucratic organizations and shaped by forces that often strike us as impersonal. The types of evidence that we have considered so far are largely an expression of those forces. Ships and aircraft, doctrines, finely tuned operational plans, complex exercises, and coordinated global deployments of thousands of men are all products of naval bureaucracies collectively going about their business, egged on by their conception of duty and by the relentless pressure of events. Inescapably, however, there is also a much more personal side to all of this: for more than forty years, hundreds of thousands of men and of women *lived* the Cold War at sea – or, to be more precise, some aspect of it. The best way to unlock this wealth of individual experience is to talk to them about it while we have the chance to do so.[169] It is true that there are well-understood limitations that should warn us against an overreliance on personal accounts of events that are now anywhere between thirty and seventy years in the past but, as we have already determined, the same is also true of other kinds of evidence as well. Like the other supporting methods, interviewing and oral history are best seen as contributing one important aspect in the search for a well-rounded picture.

What kind of insights can personal accounts provide that add to our understanding of the overall picture in ways that the other supporting methods cannot? As far as the present study is concerned, the main focal point in this regard has been the collection of participants' subjective perceptions of how the U.S.-Soviet competition developed over time and of the threat posed by Soviet seapower to U.S. naval supremacy. To get a better sense of how U.S. naval officers and analysts thought and felt about the Soviet challenge then, and how they think about it now, a total of

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[169] On interview techniques in general, see Rosalind Edwards and Janet Holland, *What is Qualitative Interviewing?* (London: Bloomsbury Academic, 2013); Karin Olson, *Essentials of Qualitative Interviewing* (London: Routledge, 2016); Herbert J. Rubin and Irene S. Rubin, *Qualitative Interviewing: The Art of Hearing Data* (Thousand Oaks, CA: SAGE, 2012). On oral history in particular, see Patricia Leavy, *Oral History: Understanding Qualitative Research* (Oxford: Oxford Univ. Press, 2011), http://site.ebrary.com/lib/alltitles/docDetail.action?docID=10443140; Valerie Raleigh Yow, *Recording Oral History: A Guide for the Humanities and Social Sciences* (Walnut Creek, CA: AltaMira Press, 2005); Donald A. Ritchie, *Doing Oral History: A Practical Guide* (New York, NY: Oxford University Press, 2003).

twenty semi-structured interviews were conducted in 2016 – all but one of them in person in the United States.[170] This turned out to be most enlightening and helpful. At the same time, it is difficult to overlook that the number of interviews of one kind or another that have been done with former participants in the U.S.-Soviet naval competition is now probably in the thousands. Only a tiny percentage of them is publicly available and repeating the effort is often not an option. For one, the researcher may lack the resources to embark on an extensive cross-country campaign of the United States or of the former Soviet Union. Even where this is not a problem, an increasing number of individuals who were in senior positions at the time will be unavailable or struggling with the unavoidable infirmities of very old age. Most of the senior decision-makers during the early phases of the confrontation have now regrettably passed on.

There are some notable exceptions to the deplorable fragmentation of interview-based evidence. Institutionalized oral history programs provide perhaps the best way of conserving living memories in such a way as to render them accessible for the long term. On the U.S. side, there are several such programs that have captured aspects of the Cold War at sea. The U.S. Naval Institute is understandably proud of its Oral History Program, which has been running since 1969.[171] While the Institute is independent, these can be considered the semi-official oral history record of the U.S. Navy. The Naval Historical Foundation's effort is younger, but just as expansive and also excellent in quality.[172] Together, they comprised more than 370 volumes at the time of writing, the majority of which are related to World War II or to the conflicts in Korea and Vietnam. There is plenty of evidence on the peacetime naval competition with the Soviet Union as well, and several volumes have been consulted extensively for this study.

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[170] The interviews that were conducted as part of the data collection effort for this study are listed in the bibliophraphy. While most of the interviews were with former participants in the events, there are some exceptions of particularly knowledgeable individuals that were tapped primarily for their expertise, rather than their personal experience of countering the Soviet Navy. On semi-structured interviews, see Brenda L. Moore, "In-Depth Interviewing," in Soeters; Shields; Rietjens, *Routledge Handbook of Research Methods in Military Studies*, 117-18.
[171] U.S. Naval Institute, "The U.S. Naval Institute Oral History Program," https://www.usni.org/press/oral-histories/about.
[172] Naval Historical Foundation, "Oral History Program," http://www.navyhistory.org/programs/oral-histories/.

As far as the limitations of personal accounts are concerned, they would seem to apply both to interviews that are tailored towards a specific research agenda and to the large oral history collections, which usually feature wide-ranging conversations about all aspects of a naval officer's career. The main caveat in both cases is that perceptions of an individual nature are often extremely valuable, as long as they are not mistaken for 'hard' evidence.[173] It is an inescapable peculiarity of the human mind that it does not store memories in their 'pristine' form but keeps processing important experiences as new information becomes available. While the effects may be very subtle, they are also pervasive. It is not given to us to control them, nor can an outsider reverse them through insistent prodding. Hence, rather than mining for what the interviewee originally felt, thought, or perceived, the researcher should respect a participant's memories for what they are. Contrastingly, it should also be noted that there can be important exceptions to the rule that interview material should not be considered 'hard' evidence of detailed chains of events, decision-making processes, and so forth. Interviews can certainly contribute to the unearthing of historical facts, *provided that there are sufficient means of corroboration*. In the first instance, these should be primary documents of some kind.

Another limitation is that, especially where *peacetime* military competitions are concerned, the group of individuals that is interviewed tends to consist almost exclusively of high-level decision-makers or particularly 'remarkable' individuals. While this is in some ways proper and unavoidable, the possibility that the perceptions of this group of individuals will be systematically different from those of other groups cannot be excluded. Given that setting up a 'control group' is often not a viable solution nor a viable option, this is primarily something to be aware of. Finally, it should be noted that individuals who have retired from military organizations or from positions of officialdom will still be affected by strict classification rules and, since they cannot be expected to have a comprehensive understanding of which information has since been released into the public domain, will often have to err on the side of caution. Having noted these limitations, interview-based research is nonetheless a vital means

[173] On questions of human memories as evidence, see Yow, *Recording Oral History*, esp. 35-45.

of learning about the past and it has been one of the principal supporting methods in the course of conducting this study.

3.4.7 The unknown and the unknowable

Having reviewed the specialized supporting methods that are available to us in the course of our process tracing of the U.S.-Soviet competition for military advantage at sea, we must ultimately come to the conclusion that there are some aspects of the subject that will remain difficult to capture reliably. To be more precise, there are two types of limitations that have remained intractable throughout the research effort: (1) there are some things we *could* know, but do not; and (2) there are things we *cannot* know and never will. We will address these problems in turn, and also break them down into several more specific challenges.

In the first category, the main limitation is one of *access to authoritative materials.* Requirements for naval systems, the exact content of operational plans, and the rationales of deployment patterns are all set out in official documents that are subject to extensive classification and may not become publicly available for decades – if at all. While a very substantial amount of formerly classified materials from U.S. archives is now in the public domain, and a good number of those documents have been incorporated into this study, there is much that we still do not know. What is true of the United States applies to the former Soviet Union in much greater measure. As a result, we may have to rely on sanitized, second-hand, or otherwise non-authoritative materials.

Secondly, there is a *difficulty of interpretation*. We cannot allow ourselves to overlook that even the most authoritative and/or most highly classified documents are no more than a snapshot of where a bureaucracy – or, to be more exact, some organizational unit or department of it – stood at a given point in time. Postures are developed and implemented within a specific organizational setting and themselves subject to interpretation by various bureaucratic constituencies. As a result, even where classification is not a problem, the exact meaning of operational precepts may not be immediately obvious. Official documents "may […] not tell the whole story or paper over serious differences of purpose."[174] Interviews can help provide important context for what we do find in primary and secondary source materials, but the caveats noted above apply. Because there may be important conceptual factors that we are completely unaware of, and because we are interpreting what is itself already likely to be a convenient interpretation of what was decided or discussed, we can never be completely certain that we have captured all the important aspects of the picture and we are likely to miss some of them completely.

Finally, we know that there may well be a discrepancy between the *declaratory and practical significance* of the various elements of a naval posture. As discussed, decisions about posture serve a number of practical functions. Their impact, however, varies significantly. They may reshape an organization completely within just a few years, or they may be taken and communicated as declaratory policy or propaganda. As a result, it is often difficult to establish whether opposing military organizations 'say what they mean and mean what they say' or whether "whatever [they] may superficially say […] should not be taken at face value."[175] Feeding into this, there is also an *ambiguity of observable evidence:* because official statements may be of limited utility or completely unavailable, much of what we know about postures is "derived by inference"[176] from empirically observable artifacts and behavior. As preferences of operational doctrine are usually "strongly reflected in the forces that are acquired by the military organization,"[177] procurement preferences and deployments provide important clues as to the contents of a naval posture. However, because the same forces could potentially be employed in other ways, and the same *posture* can support widely diverging *strategies*, this evidence may be quite ambiguous.

This reference to strategy brings us to the second category of limitations: those that concern the unknowable. As H. R. McMaster has written, "[w]ar is the final auditor of military

174 Fritz W. Ermarth, "Contrasts in American and Soviet Strategic Thought," *International Security* 3, no. 2 (1978), doi:10.2307/2626687, 142.
175 Lambeth, "How to Think About Soviet Military Doctrine," 3.
176 Ermarth, "Contrasts in American and Soviet Strategic Thought," 141.
177 Posen, *The Sources of Military Doctrine*, 14.

organizations."[178] How the opposing forces in the Cold War at sea would have performed against each other in the crucible of a missile-age war at sea, we do not know and never will. There are two types of effects, in particular, that we can speculate about, but that we cannot gauge with any certainty. The first type is *interaction effects:* the practical consequences of decisions about posture cannot be judged in isolation from the doctrine and operational approaches adopted by the adversary. In fact, some of the most critical effects of postures result from the contingent interactions between the opponents' military-conceptual frameworks and deployments which may be difficult – even impossible – to foresee.

The second type is *incomplete execution effects.* While postures shape actual military behavior in ways that are at least partially predictable, they do not, in any defensible sense, determine it. How political and military leaders decide to employ the forces at their disposal will only become fully apparent once war is upon them. Actual military operations may follow accepted operational principles and expected patterns of deployment closely, or not at all, depending on the exact circumstances of the situation.[179] There is, and has to be, a creative role for strategy in war, as well as in crisis situations. The extent to which preplanned options will be implemented is not in any way preordained. Posture provides options for strategy that reflect military-organizational preferences and some level of peacetime political-military guidance. By prioritizing certain types and lines of effort over others, posture narrows the range of plausible strategic options. But it does not determine how a war will be fought. As a result of these limitations, the practical task of posture analysis should be approached with considerable humility, especially as far as it concerns the probable real-world effects of what is being discussed or decided.

The closest we could come to understanding the dynamics of a Cold War era conflict at sea is through systematic wargaming or simulation modelling. A serious effort along those lines would have to include not just the application of a suitable framework, but an entire

[178] Jensen, *Forging the Sword*, vii.

[179] Karl-Peter Stratmann, *NATO-Strategie in der Krise? Militärische Optionen von NATO und Warschauer Pakt in Mitteleuropa,* Internationale Politik und Sicherheit 5 (Baden-Baden: Nomos, 1981), 143.

campaign of games using sensitivity analyses and/or Monte Carlo modelling of probabilities.[180] While such an effort is no longer as far out of reach for a single researcher, or a small research group, as they once used to be, it is still true that copious amounts of experience, highly specialized knowledge and especially *time* are required – all to reduce the level of uncertainty for a small range of plausible scenarios. Ultimately, the limitations discussed here are all at least partially irresolvable. Some will remain altogether insurmountable. All of them add, to borrow Donald Rumsfeld's now notorious terminology, to a set of "known unknowns"[181] that we have to contend with and finally accept in order to be able to engage in the kind of strategic studies and security studies research that this study represents.

3.5 Summary: finding a balance

In this chapter, we have set out a way of researching the dynamics of U.S.-Soviet competitive naval adaptation efforts, based on the earlier, step-by-step exploration of extant theories of military competition in Chapter 2. The overall approach of posture analysis that we have put together for this research project is, in many ways, about striking a balance – between the desire to put theoretical insights to use and the need to retain sufficient empirical depth, between different ways of thinking about the causal path that leads to posture change, between the various supporting methods outlined above, and also between confidence in our findings and humility in the face of persistent limitations.

The challenges of analyzing peacetime rivalries are considerable, and the peculiarities of researching a military competition in the absence of any conclusive evidence about how a conflict would have played out only adds to the challenge. In addressing our specific research problem, the decision to aim for empirical accuracy rather than for the greatest generalizability is both methodologically appropriate and consistent with the best traditions of the strategic

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[180] Alan Washburn and Moshe Kress, *Combat Modeling* (Dordrecht: Springer, 2009), esp. 263-66.
[181] Department of Defense, "DoD News Briefing - Secretary Rumsfeld and Gen. Myers, 12 February, 2002," https://archive.defense.gov/Transcripts/Transcript.aspx?TranscriptID=2636.

studies field. As Ripsman, Taliaferro and Lobell have noted for the 'neighboring' field of security studies research, an approach like the one developed here may be viewed as "comparatively inefficient"[182] by scholars who fully embrace the standards of 'scientific' research into complex social phenomena. What appears more relevant, from the perspective of an investigation like this one, is that the approach that is selected is appropriate and well-adapted to the subject at hand.

The approach and the specific methods that will be used to make sense of the array of historical evidence that is available to us in the following chapters meet this criterion. The supporting methods, in particular, were developed by military and policy analysts to grapple with the real-world problems of their time. In many cases, they still provide the best way of looking at the evidence that has since come to light and to reassess central aspects of the U.S.-Soviet naval competition from a 21st century perspective. If the modular framework that we have put together defies this expectation and performs poorly, the errors in conceptualization or application are the author's to bear. Having said that, we are now ready to step into the menacing, grey-in-grey world of the Cold War at sea.

[182] Ripsman, Taliaferro and Lobell, *Neoclassical Realist Theory of International Politics*, 178.

<u>Part II</u>

Reassessing the 'Third Battle of the Atlantic'

[4]

The interdiction threat that never was

ENGINEERING A LONG-TERM ADVANTAGE, 1946-1960

4.1 U.S. naval posture and the weight of the past

On the shortlist of clichés that the strategic studies tradition must contend with, military planners who earnestly and diligently prepare their forces to "fight the last war"[1] are not a surprise entry. Not every tired cliché is, however, necessarily inaccurate – and not in every case does the behavior in question lead to an undesirable outcome. For the first fifteen years of the Cold War confrontation, the United States Navy prepared to re-fight the Battle of the Atlantic against yet another continentally-minded challenger, equipped with more advanced submarines derived from late-war German technology and, towards the end of this first period, with a first generation of missile-armed naval strike aircraft. And it would do so in ways that were taken directly from the pages of the carrier admirals' Pacific playbook. The challenger, of course, was the USSR, primarily in the guise of its Military-Maritime Fleet (*Voyenno-morskoy flot SSR*, VMF) and its fledgling naval aviation component, the *Aviatsiya voyenno-morskogo flota* (AVMF).

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[1] Geoffrey Sloan, "Military Doctrine, Command Philosophy and the Generation of Fighting Power: Genesis and Theory," *International Affairs* 88, no. 2 (2012), doi:10.1111/j.1468-2346.2012.01069.x, 252.

The interdiction threat that never was

The submarine that was supposed to be at the center of the first part of this story was a Soviet version of the Type XXI – the final long-range "convoy killer"[2] that the Third Reich had brought to the production stage. Throughout the first stage of the Cold War competition at sea, this was the proximate threat that drove U.S. technology development and the main challenge to sea control that the U.S. Navy planned to defeat in case it should find itself fighting World War III. Over time, the expectation that hundreds of advanced diesel submarines would prey on Western shipping in the North Atlantic and the Western Pacific was etched into the minds of Western naval planners to the extent that alternative explanations of "the sources of Soviet naval conduct"[3] were no longer seriously entertained by most. Nor were they conjuring up monsters from thin air. The perception that the VMF submarine force was planning to follow in the footsteps of the German *U-Bootwaffe* was plausible enough and – as seen from the perspective of a maritime alliance, the very survival of which depended on the integrity of its sea lines of communication – even likely. If we follow the established view that any military threat is the product of an opponent's capabilities and intentions, rather than a mirror image of one's own worst fears, it nonetheless proved seriously inaccurate.

While it is now widely accepted that the interdiction of Western SLOCs in the North Atlantic and elsewhere was not the Soviet Navy's main priority during the latter stages of the Cold War, the idea that this came about only as a result of the VMF's creation of heavily defended Northern bastions for its ballistic missile submarines remains widespread.[4] The case made in this chapter is that, far from shifting to a defensive strategy only in the late 1970s, the USSR never actually intended to fight a Third Battle of the Atlantic – certainly not in terms of the implied meaning, as an interdiction battle to cut Western sea lines of communication. The essentially defensive orientation of the VMF had a fundamental impact on the techno-doctrinal

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[2] The term is used by to describe the unrealized Type XXVI 'Walter-Boot,' of which the Type XXI was a conventionally-powered derivative, in: William P. Gruner, "The German Type XXVI Convoy Killer Submarine," *The Submarine Review*, (1993).

[3] William H. J. Manthorpe, "A Background for Understanding Soviet Strategy," in *The Sources of Soviet Naval Conduct*, ed. Philip S. Gillette and Willard C. Frank (Lexington, MA: Lexington Books, 1990), 17.

[4] On the emergence of a consensus on the existence of Soviet defensive bastions, see Jan S. Breemer, "Estimating the Soviet Strategic Submarine Missile Threat: A Critical Examination of the Soviet Navy's SSBN Bastion Strategy" (Doctoral dissertation, University of Southern California, 1987), 163-262; Peter M. Swartz, "Understanding an Adversary's Strategic and Operational Calculus: A Late Cold War Case Study with 21st Century Applicability – U.S. Views on Soviet Navy Strategy and Operations" (COP-2013-U-005622-Final, CNA, Washington, DC, 2013), 17-26.

trajectory of its submarine force, the pattern of which repeatedly defied Western analysts' expectations. At the same time, the U.S. Navy's competitive adjustment to an anticipated threat that failed to materialize, similarly set the pattern for the development of its submarine and ASW forces for decades to come. By 1960, both sides were locked into path dependencies that would continue to shape their interactions into the 1980s. The same was true in another main area of competition, between Soviet land-based strike aircraft and U.S. carrier groups at sea. In this second case, which we will discuss towards the end of the chapter, Soviet initiatives caused less alarm initially, but this began to change over time.

Perhaps ironically, the misperceptions of U.S. (and allied) naval analysts generally served them well during this first phase of the competition, whereas accurate Soviet perceptions of the offensive nature of Western naval strategy did not result in the development of fully adequate defenses against U.S. power projection forces. Ultimately, this first phase of the Cold War at Sea demonstrates that the interactions between threats and the "influence of formative experiences,"[5] as they were captured in the U.S. Navy's organizational essence, were the critical shaping force of competitive adaptations. In the following, we will in turn examine the submarine and naval air threats, as they developed during the first phase, and attempt to arrive at some preliminary conclusions concerning the dynamics of the competition.

4.2 The Type XXI and U.S. threat perceptions

4.2.1 The anticipated threat

The U.S. Navy's initial take on the Soviet submarine problem unavoidably bore the imprint of recent wartime experience. In the Pacific, unrestricted submarine warfare against Japan had graphically demonstrated how the failure to raise effective ASW defenses and make up for shipping losses with sufficient wartime construction could wreak havoc on a major power's war effort. According to the Joint Army-Navy assessment of 1947, U.S. submarines had sunk

[5] Sloan, "Military Doctrine, Command Philosophy and the Generation of Fighting Power," 252.

1,113 Japanese merchant vessels, amounting to nearly 4.8 million gross tons of shipping.[6] As a result, Imperial Japan's defense of its maritime perimeter and, indeed, the home islands itself had become logistically untenable by late 1944 – long before the American fire bombing campaign of spring 1945, the atomic bombings, or the Soviet invasion of Manchuria.[7]

In the Atlantic, German interdiction efforts never came close to succeeding in the face of the extensive ASW system implemented by British, Canadian, and U.S. naval forces from early 1941 onwards. As Marc Milner states with refreshing clarity, "the Atlantic war was not within Germany's power to win – unless the Allies committed such colossal errors as to defeat themselves."[8] He concludes that "[t]he German attack on shipping complicated effective management of the Allied war effort, but for all its drama it had no appreciable influence on the outcome of the war."[9] And yet, with its 'submersible torpedo boats' all but purged from the seas, the *Kriegsmarine* had achieved a remarkable success: It had developed and operationally

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[6] See Joint Army-Navy Assessment Committee, "Summaries of Japanese Shipping Losses," https://www.ibiblio.org/hyperwar/Japan/IJN/JANAC-Losses/JANAC-Losses-2.html. Carrier and land-based tactical air power contributed significantly to the U.S. interdiction effort late in the war, accounting for another 687 merchants, amounting to 2.2 million gross tons. U.S. fears of an effective Soviet anti-shipping campaign from the air may be partially traceable to this experience, as well as to early German successes employing the land-based Fw 200 maritime patrol/strike aircraft against North Atlantic shipping routes in 1940-41. On Fw 200 operations, see Sönke Neitzel, *Der Einsatz der deutschen Luftwaffe über dem Atlantik und der Nordsee 1939-1945* (Bonn: Bernard & Graefe, 1995).

[7] As Pape argues, "over 75 percent of the tonnage destroyed was sunk prior to 1 January 1945. Thus, submarines had essentially won the tonnage war before air power could intervene to help. […] By late 1944 – prior to the initiation of strategic air attacks – the raw material base of Japan's war economy had been undermined and its industry was in steep decline." See Robert Anthony Pape, *Bombing To Win: Air Power and Coercion In War* (Ithaca, NY: Cornell University Press, 1996), 100. Blair agrees, arguing that "the third year of the submarine war against Japan was devastatingly effective," and succeeded in breaking the back of Japan's industries. He notes that "the postwar records credited 603 ships for about 2.7 million tons [being sunk by the commands]. This was more shipping and tonnage than in 1941, 1942, and 1943 combined (515 ships for 2.2 million tons). […] Including tankers and merchant ships, the net loss in 1944 was over 2 million tons." Blair further notes that the low levels of oil supplies even led the Japanese to launch "experiments in making oil from potatoes." Clay Blair, *Silent Victory: The U.S. Submarine War Against Japan* (Annapolis, MD: Naval Institute Press, 2001), 816-17.

[8] Marc Milner, *Battle of the Atlantic* (Stroud Gloucestershire: History Press, 2011), 255.

[9] Ibid., 256. The U-boat campaign did, of course, impose considerable opportunity costs on the allies. O'Brian argues that, in terms of its diversion of allied resources from more efficient uses, the U-boat war "can be considered a partial success." See Phillips Payson O'Brien, *How The War Was Won: Air-Sea Power and Allied Victory in World War II* (Cambridge: Cambridge University Press, 2015), 243. It should not be forgotten, however, that there were opportunity costs on the German side as well. Jones estimates that production of the Type XXI – which ultimately did not result in a single allied ship being sunk – consumed high-grade steel equivalent to perhaps 5,000 tanks and may have expedited the collapse of the Eastern front. See Marcus O. Jones, "Innovation for Its Own Sake: The Type XXI Uboat," *Naval War College Review* 67, no. 2 (2014), 10.

deployed the first 'actual' submarines, the *Elektroboote* of the long-range Type XXI and the coastal Type XXIII.[10] As the victors of the Second Battle of the Atlantic soon came to understand, the Type XXI in particular would have largely obviated the progress that had been made in ASW techniques during the war.[11] The new boat could fire a dozen pattern-running torpedoes in as many minutes, and another salvo of six within less than half an hour – all based on sonar data rather than visual target acquisition.[12] It could outrun most surface ASW vessels with a submerged speed of up to 17 knots, and operate at 'silent' speeds for up to seventy-two hours without snorkeling.[13] Once it had slipped away, it could recharge its massive batteries in less than three hours.[14] The allied navies would have been hard-pressed to bring this new boat to heel.[15] Of the few *Elektroboote* that became operational before the war ended, a few were attacked on the surface, but there is no indication that any were sunk while operating submerged, which was what they were primarily designed for.[16] In defeat, the German navy had

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[10] While the retrofitting of basic snorkels into Type VIIC and Type IXC boats from 1943 onwards allowed for greater underwater endurance, the first submarine that had been consciously designed to operate submerged for most of its deployment was the Type XVII, which was based on Helmuth Walter's hydrogen-peroxide propulsion scheme. After the complex and technologically immature closed-cycle design proved impractical to produce in any quantities, the long-range Type XXI and coastal XXIII were designed as more conventional, diesel-electric alternatives to the *Walter-Boote*. For a detailed treatment of the evolution of German submarine designs during the war, the standard reference work remains: Eberhard Rössler, *Geschichte des deutschen Ubootbaus* (Munich: Lehmanns, 1975).

[11] See Owen R. Cote, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines*, Naval War College Newport Papers 16 (Newport, RI: Naval War College Press, 2012), 13-14.

[12] Eberhard Rössler, *U-Boottyp XXI* (Bonn: Bernard & Graefe, 2002), 145-46.

[13] Norman Friedman, *Submarine Design and Development* (Annapolis, MD: Naval Institute Press, 1984), 57; Norman Polmar and Kenneth J. Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines* (Washington, DC: Potomac Books, 2004), 9.

[14] With only one electric motor charging the batteries, a normal charge could take up to six and a half hours. See Rössler, *U-Boottyp XXI*, 112. It was this combination of advanced capabilities that made the Type XXI unique. In fact, the IJN had designed a submarine that was superior to the XXIs in submerged speed. The I-201-class, of which only three were built, could make 19 knots but lacked the endurance, diving depth, state-of-the-art electronics and heavy armament of its German 'counterpart'. See Hangerer Lengerer, "The High-Speed Submarines of the I 201 Class," in *Warship 2006*, ed. Antony Preston, John Jordan and Stephen Dent (London: Conway Maritime Press, 2006), 59-77.

[15] The Type XXI also had some notable weaknesses. Its snorkel, in particular, required a major redesign. The perception that the boat could snorkel at 10 knots (cited, e.g. in Friedman, *Submarine Design and Development*, 56) was not borne out in an operational setting. The design speed proved unattainable due to vibration problems affecting both the snorkel and periscope and the maximum practical speed was limited to 6 knots. See Rössler, *U-Boottyp XXI*, 100.

[16] The known attacks are summarized in: Blair, *The Hunted*, 676-77.

changed the paradigm of undersea warfare and initiated a revolution that nuclear power would complete.

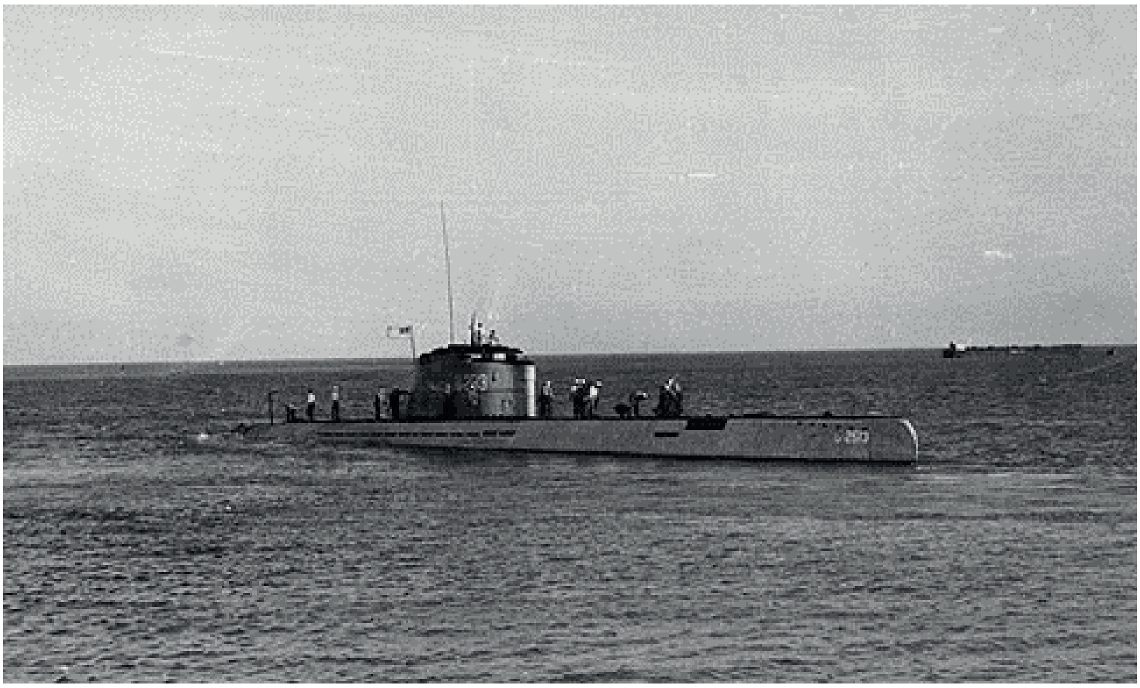

Fig. 7: U-2513 was one of two Type XXIs operated by the U.S. Navy after World War II. There are relatively few photographs of these submarines in their original combat configuration. If any exist of Type XXIs in VMF livery, they remain buried in Russian archives. *(U.S. Navy)*

It is hardly surprising, then, that the first phase of the undersea competition between the U.S. and Soviet navies was principally shaped by the legacy of World War II. As will be argued in the following, this was true not just in a technological sense. The reverberations of the great interdiction campaigns in the Atlantic and the Pacific considerably distorted the U.S. Navy's assumptions about the new challenge it was facing. The path-dependent results of these early misperceptions concerning likely Soviet building programs and operational concepts require a nuanced assessment: they had both a long-lasting negative impact on the quality of U.S. estimates concerning the Soviet submarine threat, and a largely positive impact on the Navy's postwar ASW efforts.

As part of the Potsdam Agreement of early August 1945, the surviving samples of the *Kriegsmarine*'s main U-boat types – thirty boats in total; the remainder was to be scuttled – were parceled out to the three major Allied powers. The U.S. and Britain received two Type

XXIs each and the Soviet Union received four of these 1,820 ton, long-range subs.[17] The UK also received two Type XXIIIs and the USSR received a single one of these 260 ton, coastal-type vessels.[18] In addition to its diplomatically sanctioned share of the spoils, the Red Army had captured a considerable number of individual hull segments, as well as blue-prints and machine tools related to the Type XXI program.[19] Like the Western allies, the Soviets also made a considerable effort to absorb as much as possible of the German knowledge base by apprehending, debriefing, and pressing into service key personnel involved in cutting-edge armaments programs, including those working on the *Elektroboote*.[20] As relations between the Western powers and their erstwhile Soviet ally began to deteriorate in late 1945 and continued to go south in 1946, the bottom line from an intelligence perspective was thus quite clear: *the*

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[17] Unless otherwise stated, all submarine displacement figures refer to submerged displacement in tons, rounded to full tens. There are some unfortunate inconsistencies in the literature as to the appropriate baseline unit, and both the *imperial (long) ton* and the *metric ton* are often used. A metric ton is 0.9842 long tons – conversely, a long ton is 1,016 kg. Unless an author is explicit in his usage of one or the other, I have made no attempt to reconstruct which of the two was used in a source. Within a strategic studies (as opposed to an engineering) framework, the differences are of no particular consequence.

[18] Ballantyne's description of the Type XXIII as "a pretty pointless craft" (Iain Ballanytne, *Deadly Trade: The Complete History of Submarine Warfare from Archimedes to the Present* (London: Weidenfeld & Nicolson, 2019), 475) would seem harsh, but given its limited endurance and extremely modest armament of two torpedo tubes with no reloads carried, it would have been of little use in high-seas interdiction operations. As a result, it did not figure prominently in postwar U.S. and allied threat perceptions. The design did serve as an important starting point for postwar German submarine construction, from the ill-fated *Klasse 201* of the early 1960s onwards. The *201s* and the much more successful *205s* and *206s* were small for their time, but still substantially larger than the Type XXIII at 450-500 tons and much more heavily armed with eight torpedo tubes. On German postwar designs, see Eberhard Rössler, *Die neuen deutschen U-Boote: die U-Boote der Bundesrepublik Deutschland Entstehung, Bedeutung, Einsatz* (Bonn: Bernard & Graefe, 2004).

[19] In an attempt to revolutionize not just the capabilities, but also the production process of German submarines, the Type XXI was constructed in a modular fashion from eight hull sections that were to be built and fitted out at one of 11 yards located all over Germany and transported to the lead shipyards only for final assembly. The stated aim was to cut down construction time from 460,000 man-hours to 260,000. See Friedman, *Submarine Design and Development*, 57. As a result of shoddy workmanship and a general decline in the quality of the materials available towards the end of the war, the build quality of the first several boats was extremely poor and they were restricted to training missions only. See Rössler, *U-Boottyp XXI*, 41-42. Many of the prefabricated segments were ultimately captured before assembly, as allied troops advanced into Germany.

[20] As its share of war spoils, and under the auspices of the Potsdam agreement, the Soviets received a range of German submarine technical documentation as well as a number of completed former Axis submarines. The Soviets also captured thousands of German technicians and scientists from their occupation zone; while the exact figure is unknown, common estimates suggest that 4,000 German submarine design and construction personnel ended up in the Soviet Union. See Jan S. Breemer, *Soviet Submarines: Design, Development and Tactics* (Surrey: Jane's Information Group, 1989), 78.

Soviet Union had in its possession all the necessary components to build the Type XXI, or a submarine based on its design, in large quantities.

Within the overall scheme of preparations for the eventuality of another global war, the possibility of a large-scale campaign against Western shipping was, of course, but one of the disquieting scenarios U.S. planners had to contend with.[21] The dominant strategic debates of the day concerned the proper integration of atomic weapons into national military strategy, as well as their employment and likely effectiveness in case of war.[22] Intimately related to this latter concern was the question of whether an air campaign alone could be sufficient to repel Soviet aggression and perhaps force a viable settlement, or whether a rather protracted war would be inevitable. With regard to the so-called "air-atomic strategy,"[23] opinions tended to quickly diverge along service lines: The United States Army Air Force (USAAF) – which, in September 1947, became the independent Air Force – was quite convinced of its war-winning potential. The Army and Navy expected something more closely resembling a replay of World War II, with the addition of atomic weapons.[24] It was the prospect of another drawn-out conflict, in which the European continent might be fully or partially lost to Soviet forces in the initial phase and would later have to be reconquered, that led to a renewed focus on sea lines of communication and, thus, on the submarine problem.[25]

The Navy, of course, had strong incentives to bring the ASW issue to the fore. Its bureaucratic survival depended on the existence of a credible threat at sea, a reality that was further accentuated by the brewing debate on defense unification.[26] In the foreseeable future, a much-expanded Soviet submarine fleet was the only challenge to Western sea control that

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[21] On the origins of U.S. war planning against the Soviet Union, see Michael S. Sherry, *Preparing for the Next War: American Plans for Postwar Defense, 1941-45* (New Haven, CT: Yale University Press, 1977), 159-90.

[22] David A. Rosenberg, "The Origins of Overkill: Nuclear Weapons and American Strategy, 1945-1960," *International Security* 7, no. 4 (1983), doi:10.2307/2626731, 3-71; Steven T. Ross, *American War Plans, 1945-50* (London: Frank Cass, 1996).

[23] See Edward Kaplan, *To Kill Nations: American Strategy in the Air-Atomic Age and the Rise of Mutually Assured Destruction* (Ithaca, NY: Cornell University, 2015); Harry R. Borowski, *A Hollow Threat: Strategic Air Power and Containment before Korea* (Westport, CT: Greenwood, 1982).

[24] See Richard Hegmann, "Reconsidering the Evolution of the US Maritime Strategy 1955–1965," *Journal of Strategic Studies* 14, no. 3 (1991), doi:10.1080/01402399108437454, 303-04; Steven T. Ross, *American War Plans, 1945-50* (London: Frank Cass, 1996), 18-19.

[25] Ibid., 28-32.

[26] Paolo E. Coletta, *The United States Navy and Defense Unification 1947-1953* (Newark, NJ: University of Delaware Press, 1981), 26-53.

fit the bill in terms of both magnitude and plausibility.[27] As early as June 1946, Fleet Admiral Nimitz had raised the issue at the highest level, reporting to President Truman that the number of Type XXI equivalents in Soviet service could reach "several hundred in operation by 1951."[28] This was backed up by an Office of Naval Intelligence (ONI) assessment presented at the first of a series of ASW Conferences, which offered a "conservative estimate"[29] of up to 300 Type XXIs in 1950.[30] When Vice Admiral Sherman briefed Truman in January 1947, he struck a more moderate tone, but estimated "a 1947 building capacity of 50 fleet [i.e. long-range] submarines."[31] He also restated the Navy's belief that "the Soviets are devoting great effort to the building of the German Type XXI submarine."[32] Sherman's figure of up to fifty long-range boats in 1947 actually went beyond the earlier ONI assessment, which expected no more than twenty operational boats in 1948, and no more than fifty in 1949, with a steep increase thereafter. Not long after, ONI assessed that Soviet yards could increase their capacity to an impressive thirty boats *per month* – or more than a thousand boats inside a three-year period – and that it would take them no more than five years to do so.[33] In 1950, naval intelligence thought 200 boats per year realistic and even as late as 1954, actual build rates of 140-160 boats per year were still expected for the near future.[34]

Other than an unnamed Soviet admiral, who in 1948 was quoted as advertising a long-term building program of 1,200 new submarines, there was little specific evidence to back up

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[27] There was some debate within the Office of the Chief of Naval Operations (OPNAV) as to whether the submarine threat or the air threat should take precedence. Michael A. Palmer, *Origins of the Maritime Strategy: The Development of American Naval Strategy, 1945-1955* (Annapolis, MD: Naval Institute Press, 1990), 4, 10-14, 30; David A. Rosenberg, "American Postwar Air Doctrine and Organization: The Navy Experience," in *Mahan is Not Enough: The Proceedings of a Conference of the Works of Sir Julian Corbett and Admiral Sir Herbert Richmond*, ed. James Goldrick and John B. Hattendorf (Newport, RI: Naval War College Press, 1993), 257-59, 265.

[28] Quoted in: Jeffrey G. Barlow, *From Hot War to Cold: The U.S. Navy and National Security Affairs, 1945-1955* (Stanford, CA: Stanford University Press, 2009), 164.

[29] CAPT George R. Phelan, quoted in: Ibid., 165.

[30] Ibid.

[31] Palmer, *Origins of the Maritime Strategy*, 96.

[32] Ibid., 96.

[33] Friedman, *Submarine Design and Development*, 101. The German yards had achieved a completion rate of 28 Type XXIs in December 1944. See Norman Polmar and Jurrien Noot, *Submarines of the Russian and Soviet Navies, 1718-1990* (Annapolis, MD: Naval Institute Press, 1991), 142.

[34] Friedman, *Submarine Design and Development*, 101. Breemer, for one, believes that the Soviet shipyards were quite incapable of putting out such numbers. See Breemer, *Soviet Submarines: Design, Development and Tactics*, 80.

those estimates.[35] But the potential threat of the Type XXI (or a close analogue) being let loose on Western shipping made the prospect of such a program difficult to ignore. Additionally, there was still the possibility that the Soviets would master Dr. Walter's intricate hydrogen-peroxide fuel cycle and manage to put it into industrial-scale production.[36] The resultant submarines would have been capable of even higher submerged speeds: the experimental V-80 had sprinted at an unprecedented 26 knots, and the pre-production Type XVIIA had managed a sustained run of more than five hours at 20 knots.[37] At the tactical level, Western ASW forces would be completely outmatched by such a submarine.

Conversely, at the operational and strategic levels, the ability to strangle U.S. and allied forces fighting in Europe still very much depended on the availability of the new submarines – be they of the *Elektro-* or closed-cycle type – in numbers. The German experience remains highly instructive in this regard: Deploying from ports on the Bay of Biscay, close as could be to its Atlantic hunting grounds, the *U-Bootwaffe* managed to keep scarcely more than 25 percent of its rugged and fairly basic boats operationally available at any one time.[38] Effective wolf packs could be formed only occasionally, and during some months there was scarcely a handful of boats at sea at all.[39] The upshot for a Soviet anti-SLOC campaign is clear: due to the much greater distances Soviet boats would have to travel to get to their hunting grounds and back to base, there either had to be *many more* of them, or the same number of boats would have to

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[35] See John Jordan, *Soviet Submarines: 1945 to the Present* (London: Arms and Armour, 1989), 23. Meanwhile, Breemer's tracing of the remark to Admiral of the Fleet Kusnezov (in Breemer, *Soviet Submarines: Design, Development and Tactics*, 81, 83) could not be verified by the author, and raises questions. Kusnezov had fallen from grace in 1947 and was facing a court martial in 1948. He got off relatively lightly and was demoted – not for the last time, as it turned out. The unnamed admiral's statement plays well with MccGwire's estimate of the postwar building program, which is reproduced in Polmar and Noot, *Submarines of the Russian and Soviet Navies, 1718-1990*, 140.

[36] The Soviets had not captured a complete *Walter*-boat but they succeeded in gaining access to the Walter design office at Blankenberg. Walter himself and his design staff were captured by the British. See Jordan, *Soviet Submarines: 1945 to the Present*, 22.

[37] See Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 2.

[38] Breemer, "Estimating the Soviet Strategic Submarine Missile Threat," 85; See also: British Admiralty, "History of U-Boat Policy, 1939-1945: C.B. 4501" (British Admiralty, London, 1946), http://www.uboatarchive.net/British%20Reports/U-boatPolicy.htm.

[39] For a detailed breakdown by month, see Gudmundur Helgason, "U-Boat Force Combat Strength," Uboat.net, https://uboat.net/about/contact.htm.

cruise *at much higher speeds* to allow for meaningful concentrations in time and space.[40] Since very high sustained transit speeds of 20 knots or more are achievable only with nuclear propulsion, only a very large number of long-range boats would do.[41] Even accounting for the increased lethality of Type XXI-style armament, the plausibility of a 1950s SLOC interdiction scenario remained very sensitive to this assumption.

It is important to note that the problem of numbers would be alleviated if forward operating bases could be quickly made available.[42] That said, anti-SLOC operations would have been most critical in a prolonged war that may not have resulted in such early successes. The impact of shipping losses to submarines is, after all, cumulative and thus becomes severely felt only over time. If the Soviet Union wanted to conduct a serious interdiction campaign from the outset, or in a scenario that might not result in an immediate collapse of Western defenses, the VMF *had* to be equipped with many hundreds of the Type XXI- or *Walter*-derived submarines.[43] In the absence of specific evidence, which was often difficult to come by until satellite

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[40] The Type XXI could – in theory – make a little more than 17 knots submerged, but would have drained its battery far too quickly when travelling at more than 8-10 knots. Polmar gives a range of 25 nmi at 16 knots, which is tactically useful but negligible from an operational mobility perspective. See Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 4. As a result Type XXI transit speeds may have been roughly comparable to those achieved during the first phase of the WWII campaign, when surfaced transits with sustained speeds of 10-12 knots were still possible.

[41] Long endurance at high speeds was, in fact, not one of the strong suits of closed-cycle propulsion. In practice, the user had to choose one or the other: the Walter scheme resulted in high speeds, while the alternative closed-cycle diesel resulted in longer endurance. See Ibid., 35. A 'slow' Walter submarine was also envisioned by the Royal Navy in the early 1950s, but the point remains the same. See Norman Friedman, *The Postwar Naval Revolution* (Annapolis, MD: Naval Institute Press, 1986), 196. The limitations of classic diesel-electric propulsion in this regard are, of course, well-established.

[42] According to Blair's landmark account, the first of the German forward bases at Lorient had little impact on the U-boat campaign in the first three months after the French surrender. By the end of the war, some 1,500 patrols had been launched from French ports, some 750 from Norwegian bases, and some 700 from Kiel and Wilhelmshaven. But, despite exceptional military successes and the best efforts of U-boat headquarters, the shift to forward operations took quite some time to unfold. See Clay Blair, *Hitler's U-Boat War: The Hunted, 1942-1945* (New York: Random House, 1998), 184; Gudmundur Helgason, "The U-Boat Bases," Uboat.net, https://uboat.net/flotillas/bases/.

[43] As the documentation for warplan *Bushwacker* noted, the *Walter*-type would be "exceedingly expensive to operate." See Joint Strategic Plans Group, JSPG 500/2, 8 March 1948, "Bushwacker" in *America's Plans for War Against the Soviet Union, 1945-1950: Vol. 8, Plan Bushwacker*, ed. Steven T. Ross and David A. Rosenberg (New York, NY: Garland, 1990), 164. While the German experience is only partially relevant in this regard and economies of scale were probably quite possible, a closed-cycle fleet would have remained a much more expensive proposition than either a 'high-low mix' of *Walter*- and diesel boats, or an exclusive reliance on diesel-electric types. In the event, nuclear propulsion – which was itself 'exceedingly expensive to operate,' by any reasonable standard – largely obviated the debate about the relative merits of Walter-based air-independent propulsion (AIP).

reconnaissance came into its own during the 1960s, U.S. intelligence assessments simply assumed that what was operationally necessary was also possible and, indeed, likely.

4.2.2 The anti-SLOC scenario and U.S. military planning

While intelligence assessments touted a major Soviet construction effort and the Navy was clear in its insistence that a long war was what potentially lay ahead, OPNAV's success in pushing the threat to allied SLOCs as a major concern in the joint planning process waxed and waned. As far as the declassified record is concerned, Joint Chiefs of Staff (JCS) war plans of the early Cold War era did project a growing threat and expected a Soviet interdiction effort of some magnitude.[44] Plan *Crankshaft* of May 1948 expected a major anti-SLOC effort even in the very near term. The planners' line of argument can only be described as a sterling case of "mirror imaging:"[45]

> "The Soviet strategists *must realize* the vital importance of the sea lines of communication and of certain sea areas to the Allies. Therefore, they *will exert* every feasible means at their disposal to deny to the Allies these sea areas and lines of communication in order to protect the USSR against the Allied offensives, to starve the United Kingdom into submission, and to seriously weaken the war-making capacity of the United States."[46]

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[44] Those joint U.S. war planning documents that are publicly available cover the period up until early 1951, when draft plan *Dropshot* was withdrawn from consideration. The projections contained in *Dropshot* covered the period up until 1957.

[45] On mirror imaging in this particular context, see Mats Berdal, *Forging a Maritime Alliance: Norway and the Evolution of American Maritime Strategy 1945-1960,* Forsvarsstudier 4/1993 (Oslo: Institutt for Forsvarsstudier, 1993), 47-50. See also John B. Hattendorf, *The Evolution of the U.S. Navy's Maritime Strategy 1977-1986,* Newport Paper 19 (Newport, RI: Naval War College Press, 2004), 23. The best systematic study of the phenomenon in a Cold War context is Robert B. Bathurst, *Intelligence and the Mirror: On Creating an Enemy* (Oslo, London: Sage/PRIO, 1993). The idea of the mirror image as a basic reality in U.S.-Soviet relations can probably be traced to: Urie Bronfenbrenner, "The Mirror Image in Soviet-American Relations: A Social Psychologist's Report," *Journal of Social Issues* 17, no. 3 (1961), doi:10.1111/j.1540-4560.1961.tb01682.x, 45-56. See also Christopher Jones, "Reflections on Mirror Images: Politics and Technology in the Arsenals of the Warsaw Pact," in Goldman; Eliason, *The Diffusion of Military Technology and Ideas*, 117-45. William Eckhardt and Ralph K. White, "A Test of the Mirror-Image Hypothesis: Kennedy and Khrushchev," *Journal of Conflict Resolution* 11, no. 3 (2016), doi:10.1177/002200276701100306, 325-32.

[46] Joint Strategic Plans Group, JSPG 496/10, 11 May 1948, "Crankshaft" in *America's Plans for War Against the Soviet Union, 1945-1950: Vol. 7, From Crankshaft to Halfmoon*, ed. Steven T. Ross and David A. Rosenberg (New York, NY: Garland, 1989), ~~TOP SECRET~~ (declassified 19 August 1977), 49. Emphasis added.

Nevertheless, SLOC protection remained a secondary concern in most short-term war plans, which relied on the air offensive to an even greater extent than medium- and long-range plans, which reflected an acute lack of forces, as well as funds to generate them.[47] As a result, the latter tended to me more responsive to the Navy's concerns. In a substantial annex on the naval operational concept, Plan *Bushwacker* of March 1948 made it clear that a modernized VMF submarine force "will present a very serious threat to our sea lines of communication by 1952."[48] It further explained that "it may be assumed that in the light of past experience [...] the use of submarines in unrestricted attacks against shipping would offer the most fruitful field of immediate employment for enemy submarine efforts."[49] *Bushwacker* estimated a total of "200 interim high submerged-speed submarines"[50] in the 1952 scenario. The number of ex-German Type XXIs that could be made available was estimated at sixty units.[51] Plan *Dropshot* of 1949 expected "[a]n intensive air and sea offensive against the British Isles, with the initial objective of neutralizing Great Britain as a serious military factor and of preventing the use of the British Isles as a base by United States forces"[52] in 1957. It accentuated this as "essential in achieving the ultimate objective"[53] from the Soviet side. *Dropshot* also expected more generalized submarine and air attacks against allied SLOCs, including "intensive antishipping submarine raids, involving as many as fifty long-range, high submerged-speed submarines and approximately sixty long-range conventional submarines"[54] in the Pacific.

As will be further detailed below, there was significant debate about the relative priority of submarine and air threats inside OPNAV as well. In 1949, the Air Warfare Division (Op-55) asserted that the submarine threat, as it stood, could be "effectively throttled early in the war"[55] and suggested an "aggressive anti-submarine campaign employing carrier air strikes,

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[47] Ross, *American War Plans, 1945-50*, 108-10.
[48] Joint Strategic Plans Group, JSPG 500/2, 8 March 1948, "Bushwacker" in *America's Plans for War Against the Soviet Union, 1945-1950*, 202.
[49] Ibid., 203.
[50] Ibid., 164.
[51] Ibid.
[52] Joint Chiefs of Staff, JCS 1920/5, Vol. II, 19 December 1949, "Dropshot" in *America's Plans for War Against the Soviet Union, 1945-1950: Vol. 14, Long Range Planning: Dropshot*, ed. Steven T. Ross and David A. Rosenberg (New York, NY: Garland, 1989), ~~TOP SECRET~~ (declassified 7 October 1973), 400.
[53] Ibid.
[54] Ibid., 417, 411.
[55] Rosenberg, "American Postwar Air Doctrine and Organization: The Navy Experience," 262.

aerial minelaying, and antisubmarine subs as the spearheads."[56] The fact remained, however, that the Navy had no effective technological counter to a future threat based on state-of-the-art German – as opposed to prewar Soviet – technology.[57] It was this very realization that had motivated ADM Sherman's initial statement, at the 1946 ASW Conference, that "the strategic counter to this sort of thing is high emphasis on attack at the source of the trouble."[58] As Navy ASW experts had found, any other course of action would leave the convoy escorts and hunter-killer groups with a major problem on their hands: statistically, close to a hundred attack runs would be required for a surface ship to sink a single Type XXI.[59] Detection rates and sinkings from the air would also be reduced by up to 94 percent, from World War II levels.[60] The unfavorable balance of resources required to deal with Type XXIs at sea made an approach based on killing them in port, on the slipways, and in the factories look distinctly more attractive.

As it began to find broad acceptance both within and beyond OPNAV, the 'attack at source' paradigm did not remain confined to submarine-related targets. The reliance on forward offensive operations to attrite an expanded and modernized Soviet submarine fleet was, however, prominently reflected in several war plans of the late 1940s. Thus, Plan *Reaper* listed "[a]ttack on enemy at the source"[61] as the highest priority in controlling allied lines of communication in case of war in 1954:

> "Principal operations, conducted by carrier task forces, submarines and land-based air, would be against targets in the Barents-Norwegian-North Baltic Sea areas; in the Mediterranean-Black Sea areas; and in the China-Kamchatka areas. One of the principal operations is to conduct an effective ASW campaign against the enemy submarine threat."[62]

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56 Ibid.

57 Both the limited nature of the short-term threat *and* the absence of effective response measures to the Type XXI threat were confirmed by Vice Admiral Low's special study of April 1950, known as the *Low Report*. See Joel J. Sokolsky, *Seapower in the Nuclear Age: The United States Navy and NATO, 1949-80* (Annapolis, MD: Naval Institute Press, 1991), 10.

58 Quoted in: Barlow, *From Hot War to Cold*, 165.

59 Ibid., 164.

60 Norman Polmar and Edward Whitman, *Hunters and Killers* (Annapolis, MD: Naval Institute Press, 2016), Vol. 2, 78.

61 See Joint Chiefs of Staff, JCS 2143/6, 29 November 1950, JOWP "Reaper", Joint Outline War Plan for a War Beginning 1 July 1954, "Groundwork" in *America's Plans for War Against the Soviet Union, 1945-1950: Vol. 15, Blueprint for Rearmament: "Reaper"*, ed. Steven T. Ross and David A. Rosenberg (New York, NY: Garland, 1990), 31, ~~TOP SECRET~~ (declassified 4 August 1980).

62 Ibid., 49.

The final draft for Plan *Dropshot*, which was eventually obviated by the budgetary bonanza that followed the surprise attack in Korea, listed "offensive operations to destroy enemy naval forces, shipping, naval bases, and supporting facilities"[63] third among its PHASE I priorities in case of war in 1957. This made it a key priority right after 'Secure the Western Hemisphere' and 'Conduct an Air Offensive against the Soviet Powers'.[64] After establishing that "[t]he principal threat from Soviet naval forces would lie in their submarine capabilities"[65] and briefly discussing other naval capabilities, *Dropshot* asserts that:

> "Offensive operations against the source of these threats are considered the most effective and least expensive means of neutralizing them. These operations would have as their primary objectives the destruction of naval and merchant shipping, submarine assembly and repair facilities, naval bases, and the air defenses of such supporting facilities. […] Operations against those targets constituting the source of Soviet naval strength would be conducted primarily by fast carrier task forces, hunter-killer groups and submarines, assisted by land based air."[66]

Based on what limited intelligence was available, the JCS assumed that a reconstituted U.S. Navy – employing the aggressive approach outlined *inter alia* by Op-55 – would be able to contain a Soviet interdiction effort in the initial phase of a conflict. In Phase II, allied forces would "move to increase our measure of control of essential lines of communications [sic]"[67] and eventually begin pushing the Soviet Union towards capitulation.

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[63] Joint Chiefs of Staff, JCS 1920/5, Vol. II, 19 December 1949, "Dropshot" in *America's Plans for War Against the Soviet Union, 1945-1950*, ~~TOP SECRET~~ (declassified 7 October 1973), 254.

[64] Ibid., 253a-54.

[65] Joint Chiefs of Staff, JCS 1920/5, Vol. III, 19 December 1949, "Dropshot" in *America's Plans for War Against the Soviet Union, 1945-1950: Vol. 14, Long Range Planning: Dropshot*, ed. Steven T. Ross and David A. Rosenberg (New York, NY: Garland, 1989), ~~TOP SECRET~~ (declassified 7 October 1973), 537.

[66] Ibid.

[67] Ibid., 598

4.3 The early Soviet submarine threat in retrospect

4.3.1 Soviet postwar submarine designs: a closer look

While the outcome of a conjectural conflict in the late 1950s will never be known, the expectation that the potential anti-SLOC threat could be contained by Western naval forces was most likely justified. The more dramatic Western projections of future Soviet submarine construction may have been technically conceivable, but we now know that none of them were remotely accurate.[68] The actual build rates during the first fifteen years of the Cold War, excluding the last offshoots of wartime programs that predated the Type XXI by years, are summarized in Table 1 below.

Table 1: Soviet construction of early-Cold War submarine designs[69]

Year	Completed	Soviet designation	NATO designation	Range category
1946	0	--	--	--
1947	0	--	--	--
1948	0	--	--	--
1949	0	--	--	--
1950	0	--	--	--
1951	1	Project 613	Whiskey	MR
1952	9	Project 613	Whiskey	MR
1953	30 2	Project 613 Project 611	Whiskey Zulu	MR LR
1954	44	Project 613	Whiskey	MR

[68] Friedman provides an alternative, more positive framing: "ONI erred by assuming that Stalin would be wise enough to emphasize the weapon the West feared most." See Friedman, *Submarine Design and Development*, 101. Of course, Stalin *did* emphasize that weapon, and his successor went *even further* than he had. They just didn't emphasize it to the extent ONI expected based on its preferred assumptions, as opposed to observable facts at the time.

[69] Jürgen Rohwer and Mikhail S. Monakov, *Stalin's Ocean-Going Fleet: Soviet Naval Strategy and Shipbuilding Programmes, 1935-1953* (London: Frank Cass, 2001), 223-24; Robert Waring Herrick, *Soviet Naval Doctrine and Policy, 1956-1986* Vol. 1 (Lewiston, NY: Edwin Mellen Press, 2003), 74-78. See also: Gorshkov, *Sea Power of the State*, 209; Polmar and Noot, *Submarines of the Russian and Soviet Navies, 1718-1990*, 281-87.

	4	Project 611	Zulu	LR
1955	67 2	Project 613 Project 611	Whiskey Zulu	MR LR
1956	49 8	Project 613 Project 611	Whiskey Zulu	MR LR
1957	14 9 1	Project 613 Project 611 Project 641	Whiskey Zulu Foxtrot	MR LR LR
1958	1 1 2 2	Project 613 Project 611 Project 633 Project 641	Whiskey Zulu Romeo Foxtrot	MR LR MR LR
1959	3 5	Project 633 Project 641	Romeo Foxtrot	MR LR
1960	5 6	Project 633 Project 641	Romeo Foxtrot	MR LR
TOTAL	215 10 26† 14	Project 613 Project 633 Project 611 Project 641	Whiskey Romeo Zulu Foxtrot	MR MR LR LR

MR = medium range; LR= long-range

* 18 or 19 units re-equipped as low-end SSGs

† 5 units converted to SSB version

The picture that emerges is quite clear: the number of long-range submarines launched for the VMF remained low throughout the entire period. Meanwhile, the number of *medium-range* units built did eventually increase very substantially. (The design features of these boats – which were also not Type XXI derivatives, by any reasonable standard – will be discussed in the next section.) As far as raw numbers are concerned, 1955-56 would remain the Cold War's busiest years for Soviet shipyards. Production of the early postwar designs went into steep decline soon after, as the advantages of nuclear propulsion became apparent and Khrushchev's "modernists"[70] began to question the utility of conventional forces in the nuclear era. Ultimately, the *perception* of the VMF's submarines as a major threat to Western SLOCs had a more lasting impact on the Cold War competition than the 1950s building program itself. As Jordan notes, early estimates that suggested that the USSR might be gearing up for a major anti-shipping campaign left an imprint on the Western debate "for at least the next twenty years."[71] His assertion that this "result[ed] in a series of errors regarding the capabilities, projected missions, and building rates of the various submarine types which subsequently entered service"[72] is entirely credible, and is also borne out by this study.

OPNAV's concern with the *possibility* of a massive construction effort putting out Type XXIs in the hundreds was, of course, not at all unjustified. The Navy and, to the extent that they assimilated Navy thinking, the JCS were planning against capabilities that the USSR was known to possess: the technological base to develop Type XXI- and perhaps *Walter*-derivatives, and the industrial base to produce them in worrisome quantities. Within that specific frame of reference, the numbers and Soviet lines of operation that were projected in war plans like *Bushwacker* and *Dropshot* reflected fairly balanced assessments of what was possible. More alarmist estimates – like Nimitz's "several hundred […] by 1951"[73] or ONI's expected build rate of 200 boats a year in the early 1950s – assumed that Soviet submarine construction might be designed to fuel a massive Third Battle of the Atlantic in the near future. In fact, an all-out construction effort of Type XXI-derived submarines at *any* point in time was plausible only if the VMF's main concern was assumed to be with SLOC interdiction.[74] However, while the expectation that such a program would materialize was not unreasonable in the late 1940s, by

[70] George E. Hudson, "Soviet Naval Doctrine and Soviet Politics, 1953–1975," *World Politics* 29, no. 1 (1976), doi:10.2307/2010048.
[71] Jordan, *Soviet Submarines: 1945 to the Present*, 23.
[72] Ibid..
[73] See n. 28.
[74] There were voices inside OPNAV who argued, correctly as it turned out, that it was not. See Palmer, *Origins of the Maritime Strategy*, 68. Rear Admiral (RADM) Fawkes, the British Flag Officer Submarines (FOSM) during the early 1950s, expressed similar views and warned against exaggerating the threat. See Peter Hennessy and James Jinks, *The Silent Deep: The Royal Navy Submarine Service since 1945* (London: Allen Lane, 2015), 82-83.

far the most significant finding concerning the Soviet approach to Cold War submarine warfare is that *it never did*. In the next step, we will examine the actual capabilities the VMF developed during 1946-1960 and why the threat they posed fell far short of Western expectations.

The USSR was, of course, no newcomer to submarine construction. In line with Young School thinking, submarines had been an integral part of its prewar approach to naval strategy.[75] In fact, at the outbreak of World War II, no other navy was operating nearly as many of them as the Red Fleet.[76] Not all of the Soviet prewar designs were of high quality, and the focus was plainly on coastal defense. Some of the larger types were, however, perfectly suitable for high-seas missions. The K-class, in particular, proved its value during the war, with Polmar and Noot describing them as a "highly capable craft and well-liked by the Soviet Navy."[77] But like the rest of the VMF submarine force, the K-class 'cruiser' was of conventional design – a "submersible torpedo boat"[78] with limited submerged endurance and speed – and posed no particular ASW challenge. In an open-ocean scenario, most Soviet subs of this era were markedly inferior to the *Kriegsmarine*'s mainstay Type VII and Type IX designs.[79] The leading Western navies had become highly proficient at countering this sort of threat, and while the steep draw-down of forces during 1945-47 would have made a reconstitution of the wartime ASW system a major organizational challenge, the knowledge and capabilities were both still available. If the USSR was going to challenge the Western sea powers in their preferred domain and pose a credible threat in the North Atlantic, German technology was its best bet by far.

In light of this fact, the production choices made in the late 1940s and early 1950s are quite instructive as to the motivations of the VMF's postwar submarine program. As will become evident, the USSR did not fully come around to the paradigm that the Type XXI had instated until about 1955, and switched the bulk of its efforts to nuclear propulsion soon

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[75] See Robert W. Herrick, *Soviet Naval Theory and Policy: Gorshkov's Inheritance* (Annapolis, MD: Naval Institute Press, 1989), 65-66; Robert W. Herrick, *Soviet Naval Strategy: Fifty Years of Theory and Practice* (Annapolis, MD: Naval Institute Press, 1968), 19-27.

[76] Polmar and Noot, *Submarines of the Russian and Soviet Navies, 1718-1990*, 95.

[77] Ibid., 88

[78] Karl Lautenschläger, "The Submarine in Naval Warfare, 1901-2001," *International Security* 11, no. 3 (1986), doi:10.2307/2538886, 102.

[79] To mention just a few of the relevant factors, none of the Soviet boats were snorkel-equipped, they had much inferior diving depths, and even worse habitability. While many sources fail to highlight this issue, German boats also suffered from uneven build quality in the later stages of the war. But Soviet boats had this problem from the outset, resulting in lower survivability.

thereafter. In addition to the non-adoption of the available German design, observable construction of *Soviet* designs up until the late 1950s does not point to a strong focus on SLOC interdiction either. As a result, we can state not only that the USSR never built any copies of the Type XXI, but that it followed a different path of development as a matter of preference.

The first of the postwar submarine classes was Project 613, known to NATO as the *Whiskey*-class. The initial design work for these boats was completed during the Great Patriotic War, at some point between 1942 and 1944. After the Soviet designers had gotten a first-hand look at the Type XXI, some adjustments were made – *which* specific adjustments is less clear. In any case, Project 613 was not designed from the ground up. It was – and remained – a development of the prewar S-class that sought to balance the new requirement for better submerged speed with very conservative Soviet design features.[80]

The vessel that resulted was nothing like the German 'convoy killer'. Its hull form was based on the S-class and retained the classic prewar saddle tanks. It was 25 percent smaller in submerged displacement and considerably less streamlined than the more modern German subs. Its electric motors were only about half as powerful as the Type XXIs, resulting in a serviceable – but not particularly impressive – submerged speed of 13 knots.[81] It sought to retain good seakeeping on the surface and initially kept the deck guns as well.[82] German designers had found that the retention of deck artillery increased water resistance by a significant 20-25 percent.[83] It stuck with the prewar concept of splitting the torpedo armament into forward and aft tubes, and carried only six reloads to the Type XXIs fourteen.[84] There is no mention in any

[80] Jordan, *Soviet Submarines: 1945 to the Present*, 25-26.
[81] Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 31.
[82] This gun is a bit of a mystery but appears to have been the rather unsuccessful SM-24 twin 57mm gun mount. A single 100mm is also reported as having been fitted on some units, which MccGwire believes would have been useful to counter amphibious forces. While Polmar and Moore are undoubtedly correct in describing it as an anti-aircraft gun, the 57 mm was another compromise, with reasonable effectiveness against many light-skinned surface targets as well. See ibid., 26; Michael MccGwire, *Military Objectives in Soviet Foreign Policy* (Washington, DC: Brookings Institution, 1987), 361 n. 12; Jordan, *Soviet Submarines: 1945 to the Present*, 30; NavWeapons, "Russia: 57 mm/78.7 (2.24") SM-24-ZIF, 57 mm/78.7 (2.24") ZIF-31," NavWeapons, http://www.navweaps.com/Weapons/WNRussian_57mm-78_zif-31.php.
[83] Rössler, *U-Boottyp XXI*, 18.
[84] To be fair, stern tubes were also retained in some postwar Western designs. However, in both cases this was largely a symptom of excessive conservatism, and of planning submarines around less advanced torpedoes. The German *Lageunabhängiger Torpedo* (LUT) could hit targets in the rear, as well as the frontal aspect. According to Rössler, this weapon "largely obviated" the additional stern tubes. See ibid., 146.

source of an advanced fire control system based on acoustic sensor data. Finally, and quite astonishingly, Project 613s were not equipped with even a basic snorkel during the postwar redesign effort, which left them tremendously vulnerable to tried and tested Western ASW methods. When a snorkel was eventually added, it performed even worse than the problematic German models. According to a former crew member, "a design flaw […] allowed exhaust gas to be sucked back into the submarine."[85] When a *Whiskey* was ordered to conduct a thirty-day patrol without surfacing, "the crew was so poisoned that their legs and hands were swollen to nearly twice their normal size. The Soviet Union chalked up the voyage as proof of the superiority of Soviet manhood."[86] To make a long story short, "German technology was not deployed to any significant extent"[87] in the *Whiskey*. As a result, in their original configuration, the 613s were more of the past than of the future – a step forward for the VMF, but by no means a major innovation.

None of this is to say that the submarine itself was necessarily a bad design. In fact, the *Whiskey* was a serviceable instrument for its assigned missions, which are discussed in detail below. Indeed, with at least 215 units built, Project 613 has remained the largest submarine program ever completed by any country in peacetime. But it became an adequate Cold War-era sub only as a result of later modifications: the addition of a snorkel (first observed in 1955, and presumably upgraded at some point thereafter), the removal of the deck guns for better streamlining, an improved sonar suite (first seen in 1957-58) and an electronic support measures (ESM) mast (after 1957), as well as further upgrades throughout its service life. What none of these improvements could change was the fact that the 613 had not been designed for long-range operations in the Atlantic.

[85] See Sherry Sontag, Christopher Drew and Annette Lawrence Drew, *Blind Man's Bluff: The Untold Story of Cold War Submarine Espionage* (London: Hutchinson, 1999), 153.
[86] Ibid.
[87] W. J. R. Gardner, *Anti-Submarine Warfare* (London: Brassey's, 1996), 13.

In fact, it had almost exactly the same range as the Type VIIC – but, if it was to operate against Atlantic convoys, it had to do so over twice the distance the German *Atlantikboote* typically had to cover.[88] As both ONI and the CIA eventually realized, the *Whiskey*

> "could not be effective against US sea lines of communication to Europe—which are some 1,800 to 2,400 nm distant. The W class, under optimum conditions, can remain on a patrol station located about 1,800 nm from its base for about 10 days. It is better able to defend the sea approaches to the USSR and interdict naval vessels in the Norwegian Sea."[89]

Since these were the missions the 613 had been designed for from the outset, this assessment was eminently sensible. Soviet engineers did, however, develop a long-range type in parallel to the *Whiskey*-class, which sheds further light on Soviet preferences during this first phase of the confrontation.

Project 611, known to Western analysts as the *Zulu*-class, was the largest submarine that the USSR had ever built at that point in time. At 2,600 tons, its submerged displacement was nearly twice that of the *Whiskey*, and 40 percent larger than the Type XXI's. It was more streamlined than the former and also had a better submerged speed of about 15 knots. At the same time, it appears that deck guns were still part of its initial configuration – an odd choice in a design otherwise optimized for good underwater performance, and one which was ultimately corrected.[90] Project 611 also had an unusual propulsion layout with three shafts, which led to suspicions that closed-cycle power units had been (or would be) fitted on the outer shafts. It appears that this was the designers' original intention, which was abandoned when problems in bringing the closed-cycle scheme into operational service proved to be more persistent than expected.[91] The *Zulu*'s lack of a snorkel – or, for that matter, the creep motors introduced on the *Whiskey* – might be explained as a result of the switch to an all-diesel power

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88 From the Northern Fleet bases in the Murmansk area to a useful position somewhere in the eastern North Atlantic (e.g. 53° N, 22° W – roughly on the same latitude as Dublin and on the same longitude as Reykjavik), a Soviet boat would have to cover at least 1,900 nmi each way, even on an unrealistically straight course. From Lorient, the distance is less than half that. Approximate distances at sea are best calculated using a specialized tool like the one available at www.searoutes.com.

89 Central Intelligence Agency, "The Soviet Attack Submarine Force Evolution and Operations" (Intelligence Memorandum, Central Intelligence Agency, Washington, DC, 1971), ~~SECRET~~ (declassified 14 September 2017), 8.

90 Jordan, *Soviet Submarines: 1945 to the Present*, 30.

91 Ibid., 28-29.

plant late in the design phase. But even so, these design features made little sense for a submarine that would have faced even greater exposure to Western ASW forces than its smaller sister. After the failed integration of closed-cycle propulsion on the *Zulu*, the VMF limited its only other attempt at series production to a coastal design.

Unlike their medium-range counterparts, the *Zulus* were quite capable of operating in the mid-Atlantic or even off the Eastern Seaboard. If they could make all or part of the transit on the surface, their range was better than 15,000 nmi. Once they had been retrofitted with snorkels, Western estimates were lowered to 9,500 nmi on a completely submerged patrol.[92] A main armament of twenty-two anti-shipping torpedoes for their six bow and four aft tubes was also appropriate for more extended patrol durations. While they were still subject to some of the same compromises that marked the *Whiskey*-class, the refitted *Zulus* came a good deal closer to matching the Type XXI's performance at extended ranges. That said, Project 611 was still no Type XXI equivalent, at a time when U.S. submarines were already beginning to move on from the German example. It was slower, undoubtedly noisier with its three-shaft layout and lack of effective quieting measures, and it had only a very basic sensor and electronics suite.[93] Again, later upgrades took care of several of these deficiencies, but the state of the art had clearly overtaken the *Zulu* before it ever left the drawing board.

[92] Polmar and Noot, *Submarines of the Russian and Soviet Navies, 1718-1990*, 283; Breemer, *Soviet Submarines: Design, Development and Tactics*, 286.

[93] Just as the first *Zulus* were being delivered, the Royal Navy demonstrated that much more quiet diesel submarines were possible – even compared to the fairly silent Type XXI. Importantly, HMS *Porpoise* achieved a major reduction in radiated noise even when snorkeling. See Hennessy and Jinks, *The Silent Deep*, 130. The *Zulu* attempted nothing of the kind – nor did its successor, the *Foxtrot*. Had the VMF decided to go down this path early on, the competition might have played out very differently.

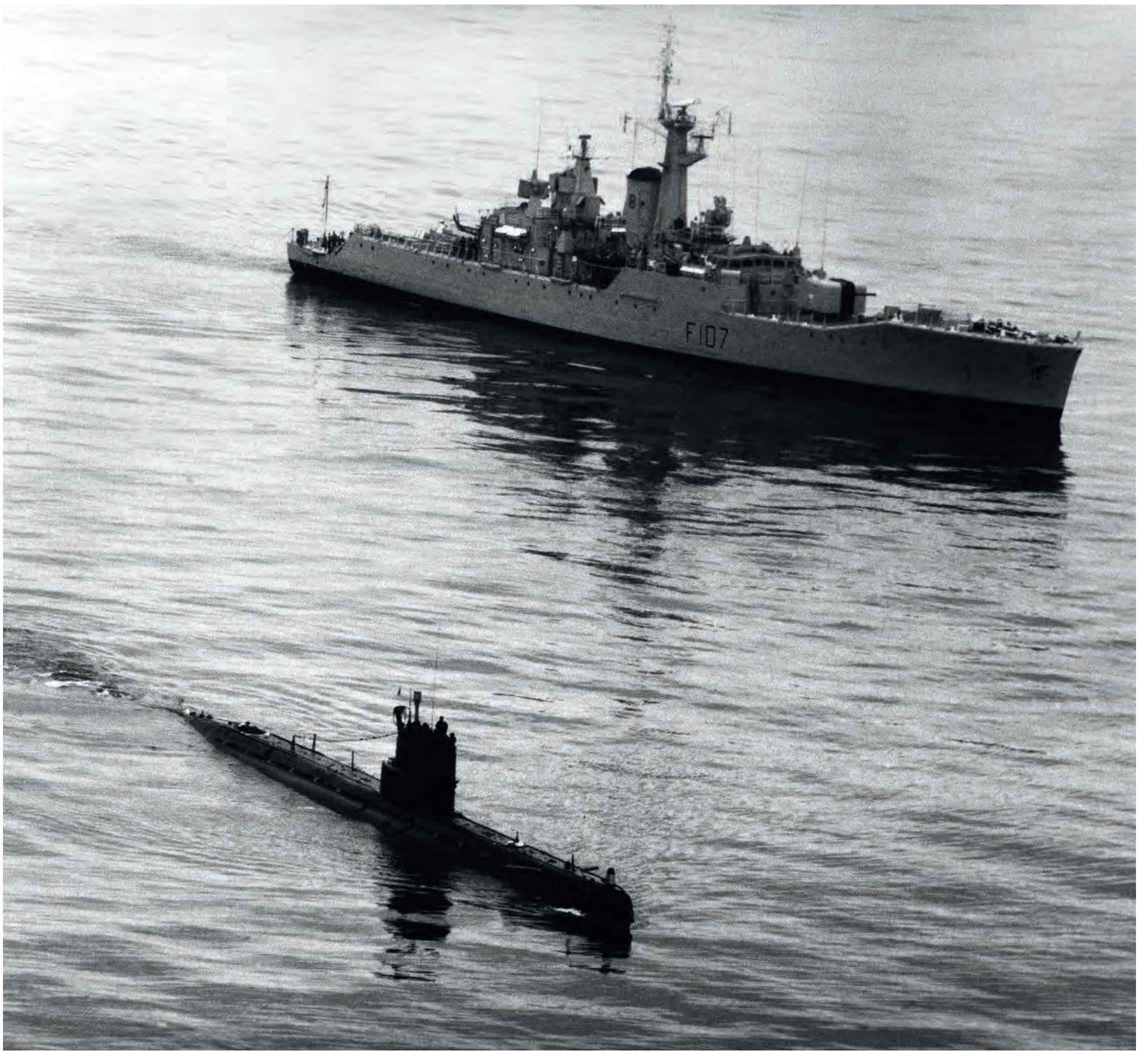

Fig. 8: A *Whiskey*-class submarine underway, with the British ASW frigate HMS *Rothesay* in trail. The relatively small size of the 613s is evident in this late-Cold War image. *(U.S. National Archives*)

Even more importantly, only twenty-one *Zulus* were ever deployed in the general-purpose configuration, while five others were redesigned to carry early ballistic missiles and several more were canceled. To put this number into perspective, the *Kriegsmarine* had built a 'long-range' Type IX for every three 'medium-range' Type VIIs. Given the increased ranges at which it would have to operate, a VMF submarine force optimized for combat in the North Atlantic should have aimed for a much *higher* proportion of long-range boats. The actual ratio of finished Z- and W-class hulls, however, was roughly 1:10. Had SLOC interdiction been the name of the game, this allocation of resources would have been shockingly inefficient, even by the standards of a planned defense economy.

In addition to the W- and Z-class boats, Soviet yards built thirty units of the much smaller Project 615 or *Quebec*-class, which U.S. naval intelligence initially endowed with an estimated range of up to 7,000 nmi.[94] Designed as general-purpose coastal boats or perhaps as close-in "interceptors,"[95] their actual range was less than half that.[96] While a closed-cycle system was to be fitted on this class, this was once again changed to a conventional propulsion layout after the first few units experienced serious incidents resulting from liquid oxygen leaks in the propulsion plant.[97] Dubbed the *zazhigalka* ("cigarette lighter"[98]) by its crews, with officers allegedly "receiv[ing] a 20-percent bonus – known as 'death pay'"[99] for serving on them, these early *Quebecs* were an extremely dubious showcase for the first AIP system ever installed on an operational submarine. While the VMF did not give up on closed-cycle propulsion altogether, none of the other designs that were considered left the drawing board – the technology was impressive, but under realistic conditions it never lived up to its promise.

As a result, when the next generation of more mature postwar designs came around, they were conventional diesel-electric types as well, and not much faster or more quiet than their predecessors. The medium-range Project 633 (*Romeo*-class) and long-range Project 641 (*Foxtrot*-class) were, however, superior in other respects. Notably, they had increased ranges of 9,000 and 17,000 nmi on snorkel, introduced better sensors, and could dive to 1,000 ft. The *Foxtrot* could apparently keep moving at creeping speeds for more than a week without snorkeling, which was a major improvement over previous classes.[100] Neither of the two programs was pursued to the extent that was originally envisioned, and they ultimately resulted in sixty-two *Foxtrots* and only twenty *Romeos* being commissioned.[101] It was with the delivery of the

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94 Breemer, *Soviet Submarines: Design, Development and Tactics*, 87.
95 Ibid.
96 Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 47.
97 Ibid., 44.
98 Central Intelligence Agency, "Problems in the Soviet Submarine Service" (Special Report, Central Intelligence Agency, Washington, DC, 1965), ~~SECRET~~ (declassified 28 September 2006).
99 Ibid.
100 Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 202. That said, Compton-Hall (*Submarine vs. Submarine*, 23) gives the endurance at maximum speed as one hour, which would not have made the *Foxtrot* a capable hunter over longer distances. For example, catching up with a convoy while submerged would have been well-nigh impossible. 641s were also not equipped as hunter-killers, although there apparently was a Western expectation that they would be. See Breemer, *Soviet Submarines: Design, Development and Tactics*, 99.
101 The *Foxtrot* production run for the VMF continued into the early 1970s and, for export purposes, beyond.

first of these improved units in 1958 that the Soviet submarine force began to live up to Western fears of a decade earlier. The VMF now had advanced diesel boats designed from the outset to survive in the kind of ASW environment that had broken the back of the German *U-Bootwaffe*, and with sufficient reach to cause some havoc on the main Atlantic shipping routes. Perhaps, in some very general sense, one could call them Type XXI derivatives with Soviet characteristics. Yet, by the time they entered service, *that paradigm had itself been superseded.*

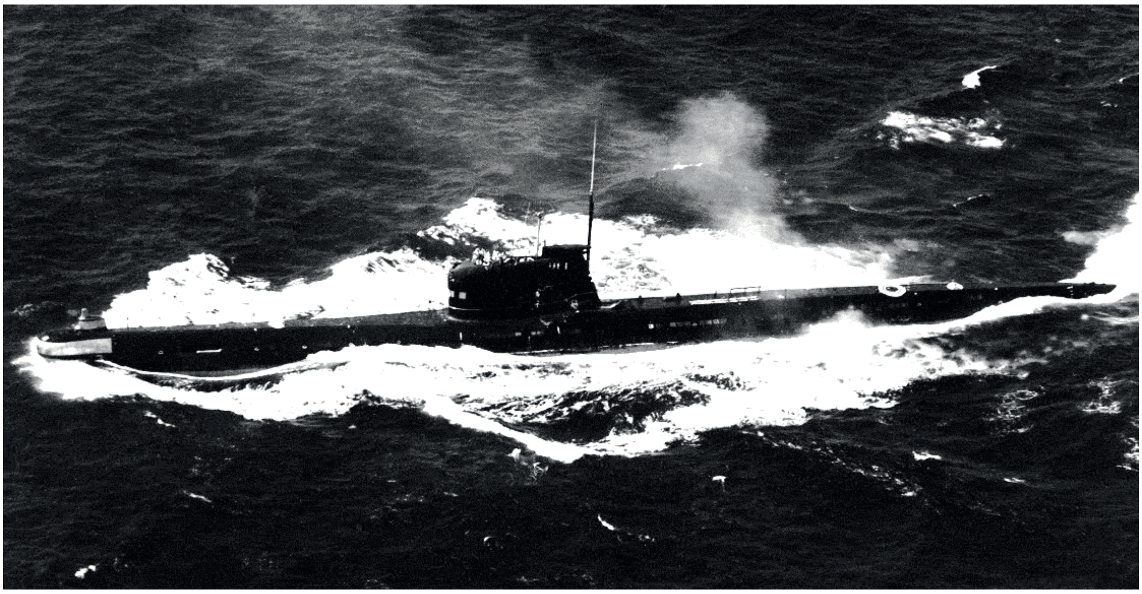

Fig. 9: The *Foxtrot* was the first Soviet submarine to transcend the performance of the Type XXI. By the time the first of these vessels went to sea, the USN and VMF were both shifting to nuclear power. They nonetheless posed a credible threat into the 1970s. *(U.S. National Archives)*

In the expectation of the massive Type XXI-based submarine threat that never came, the US Navy had begun to devise a new ASW system designed specifically to hunt down high-submerged-speed diesel subs. And on 17 January 1955, the first nuclear-powered submarine – the USS *Nautilus* – had set out on its shakedown cruise, proving that completely air-independent propulsion with unlimited operational range and sustained speeds of more than 20 knots had now become a reality. Barely a year and a half later, the U.S. Navy decided that it would stop building diesel boat altogether.[102] Before the VMF could rush into service a nuclear submarine of its own, the U.S. had completed five and laid down eleven more. Among them were six *Skipjack*-class nuclear-powered attack submarines (SSNs) that would do a jaw-dropping 33

102 Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 133.

knots and remain in service into the late 1980s.[103] Another revolution had come, and the U.S. Navy had engineered it. The Red Fleet, meanwhile, was once again behind the curve.

4.3.2 The reasons why: zone defense and the distant patrol mission

Before we move on to examine how the U.S. Navy developed an ASW posture that provided a suitable counter to the anticipated threat, however, we have one critical question yet to answer: if the VMF of the 1950s was not postured for a Third Battle of the Atlantic, to what end did Soviet shipyards churn out more than 250 modern diesel-electric submarines, before the available resources were eventually rebalanced in favor of nuclear construction? To take this line of inquiry even further, we have to ask ourselves why the VMF did not at least build intermediate-range boats that could operate against the Atlantic shipping lanes if so required, instead of medium-range units that could not. How come the Soviet submarine force was not even *structured for the possibility* of a more forward-leaning posture in case of war, when the dependence on trans-oceanic SLOCs was clearly an important Western vulnerability?[104]

The answer to these questions would seem to lie not so much in the inability of Soviet engineers and shipyards to build longer-range 'convoy killers' *en masse*, as in a clear set of priorities derived for the VMF from broader Soviet defense objectives.[105] While the point was

[103] The USS *Scorpion* was lost with all hands in May 1968 – the second and last loss of a U.S. nuclear-powered submarine. The last unit was decommissioned in 1990.

[104] Using the same amount of resources that went into separate classes of long-range and medium-range boats during the first decade of the Cold War, the VMF could have been equipped with perhaps 200 intermediate vessels that would have offered much better on-station times in the eastern portion of the North Atlantic or, for that matter, the North Pacific as well.

[105] Some have advanced the theory that the USSR was simply incapable of copying the Type XXI. See, e.g. Breemer, *Soviet Submarines: Design, Development and Tactics*, 80. Gilli also explicitly makes the case that the USN and the Royal Navy experienced difficulties copying the Type XXI. See Mauro Gilli, "The Struggle for Military-Technological Superiority: Complexity, Systems Integration and the Technological Challenges of Imitation" (Doctoral dissertation, Northwestern University, 2015). However, as far as the Soviet case is concerned, the evidence points in a different direction. According to a prominent Soviet engineer, the TsKB-18 design bureau began drawing up plans for a straightforward copy of the Type XXI, designated Project 614. But the design, which reflected German wartime priorities, was found to be insufficiently durable for a long service life and almost immediately discarded. See Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 24. However, even if Soviet decision-makers did face important

almost certainly debated behind closed doors, operating in numbers against convoys west of the Greenland-Iceland-UK (GIUK) gap was simply not envisioned as a principal mission focus for the VMF submarine force in a war with NATO. That is why, even at the planning stage, a long-range component of a single *Zulu* for every nine *Whiskeys* was considered perfectly adequate. This is where different national strategic needs and preferences led to a very different techno-doctrinal outcome. The Type XXI had been the *Kriegsmarine*'s final and potentially most successful attempt at creating the ultimate weapon system to accomplish one thing, and one thing only: "[T]o destroy Allied merchant shipping."[106] This is what the German theory of victory during both Battles of the Atlantic wholly depended on. The Soviet submarines of the early Cold War, however, were designed with a very different mission in mind: to shield the homeland from seaborne attack.

To come to grips with the VMFs preference of using submarines for missions *other than* SLOC interdiction it is important to once again remind ourselves of how Soviet Cold War naval strategy was a continuation of traditions predating the Great Patriotic War, and even the Soviet Union itself. The repeated failures Tsarist Russia had experienced in its attempts at building a Western-style battle fleet eventuated in the pragmatic 'active defense' paradigm of 1925-32 and the ideas of the Young School.[107] As we have seen, the latter was convinced that "the utility of the battleship had ended"[108] and that "[a] *balanced* naval force *should consist of light units*. […] Only submarines, PT boats, high-speed destroyers, and naval aircraft were essential."[109] It is true that the VMF continued to flirt with the idea of a much-expanded surface fleet and secured Stalin's approval for a fairly large-scale construction effort during 1936-40 and again during 1946-50. But in terms of the operational paradigm that was envisioned, it seems that the basic formula of later decades had begun to emerge even before Stalin passed from the scene.

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technological limitations, this would still not provide a compelling explanation for why they preferred next-generation replacements for their own S-class (the *Whiskey*) and K-class (the *Zulu*) over an intermediate-range boat patterned more closely on the Type XXI. Surely, an industrial base that was capable of building submarines of both longer and shorter ranges than required for such a boat was not technologically incapable of covering the middle ground as well.

[106] Ibid., 5.

[107] On active defense, see Herrick, *Soviet Naval Strategy*, 9-27.

[108] Ibid., 22.

[109] Ibid. Emphasis added.

Stated in the simplest terms, the postwar Soviet system was one of *deeply echeloned zones of defense* – a scheme that became much more expansive over time, but that was essentially retained even after the shift to defensive bastions as the main focal point of Soviet naval posture.[110] Described simply as 'zone defense' by other Cold War sources, but perhaps more accurately classified as an 'oceanic perimeter defense-in-depth,' this was a more ambitious take on sea denial than Russia's littoral strategies of the past. After all "her most likely opponents were now the traditional maritime powers, who had just demonstrated their capability to project and support continental-scale armies across vast distances of sea."[111] At the same time, despite its increased reach and a growing level of ambition over the following decades, zone defense was also categorically different from how the great sea powers of the West thought about naval warfare. In its earliest and most basic form, the zone defense system saw the VMF

> "prepare a defensive perimeter up to about 500 miles from the Soviet coast within which invading forces would come under increasingly severe attack as they headed for Russia. Beyond and at the outer limits of this perimeter, defending forces would be restricted to land-based bombers, long-range submarines (*Zulus*) and a few heavy ships […] whose exact function was not very clear. Closer in, the stress would be on huge numbers of medium-range and coastal submarines (*Whiskey*s and *Quebecs* respectively), more and more aircraft, a swarm of minor combatants, especially torpedo boats, dense minefields and last but not least, powerful batteries of coastal artillery."[112]

Herrick traces the theory behind this scheme to ADM Alafuzov's writings in the immediate postwar period, but Alafuzov was himself drawing on ideas developed several decades earlier.[113] Later on, the outermost or 'open-ocean' zone would increase in importance and the depth of the outer defense zone would reach out to at least 1,000 nmi from the Soviet coast.[114] As far as the submarine force is concerned, Moore, Flanigan and Helsen describe a "three-

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[110] Herrick, *Soviet Naval Theory and Policy*, 274-76.
[111] Michael MccGwire, "Naval Power and Soviet Global Strategy," in *Naval Strategy and National Security: An "International Security" Reader*, ed. Stephen van Evera and Steven E. Miller, Princeton Legacy Library (Baltimore, Maryland, [Princeton, New Jersey]: Project Muse; [Princeton University Press], 2014), 145.
[112] Bryan Ranft and Geoffrey Till, *The Sea in Soviet Strategy* (Basingstoke: Macmillan, 1989), 173.
[113] Herrick, *Soviet Naval Doctrine and Policy, 1956-1986*, 17-18; MccGwire, "Naval Power and Soviet Global Strategy," 145.
[114] Central Intelligence Agency/Office of Research and Reports, *Soviet Naval Strategy and Its Effects on the Development of Naval Forces, 1953-63*, October 22, 1963, CIA/RR ER SC 63-3, CIA Historical Collection, ~~TOP SECRET~~ (declassified 21 May 2012), 15.

tiered defense radiating from the Soviet homeland,"[115] which they also trace back to the immediate postwar period:

> "In essence […] the Zs could be seen as an early-warning platform, whose primary mission was to alert the Soviets to approaching hostile naval forces and to furnish some initial defense against them. The Ws, on the other hand, provided the main force and thrust of Soviet naval defense, while the Qs offered coastal patrol and final defense."[116]

If we factor in the succession of problems encountered with the infelicitous *Quebec* program, this mission structure fully aligns with observed submarine construction during 1946-1960, while a focus on SLOC interdiction far out in the Atlantic – once again – does not. According to First Secretary Khrushchev, the decision to largely abandon the heavy surface units in favor of an even stronger focus on submarines was made at the Party level, soon after Stalin's death.[117] At this stage, the planned construction of several hundred more diesel-electrics was already being thrown into disarray by the far-reaching implications of nuclear propulsion. With his savaging of the VMF's budget in 1956-57, Khrushchev came down decisively in favor of nuclear-powered – and nuclear-armed – submarines.[118] However, we can still see the offshoots of the original zone defense concept in the follow-on programs that were cut short. The *Foxtrot* was designed to take over the *Zulu*'s mission in the first line of defense. It was, in Breemer's judgment, still

> "a traditional ocean patrol type, intended to operate on a patrol line or barrier astride the expected line of advance of enemy surface forces. Its range, endurance and armament were adequate for the requirements of an oceanic tonnage war, but the weight of the evidence nevertheless suggests that coastal defence, albeit a [sic] greater distances, was the 'Foxtrot's' principal intended mission."[119]

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[115] K. J. Moore, Mark Flanigan, and Robert D. Helsel, "Developments in Submarine Systems, 1956-76," in *Soviet Naval Influence: Domestic and Foreign Dimensions*, ed. Michael McGwire and John McDonnell (New York, NY: Praeger, 1977), 152.
[116] Ibid.
[117] See Herrick, *Soviet Naval Strategy*, 75.
[118] While it may have been an overreaction to the technological trends of the day, Khrushchev's intervention seems broadly justified in retrospect. The construction of the planned surface vessels, in particular, would not have left the VMF better off in the long run. Whether a continuation of diesel-electric construction at a higher rate would have been beneficial is a more difficult question to answer.
[119] Breemer, *Soviet Submarines: Design, Development and Tactics*, 99.

The massive *Romeo* program – according to one source, the initial plan was for 576 units – was brutally curtailed as resources were shifted, and the overall defense effort was re-centered on missiles and nuclear weapons.[120] Had it been allowed to run its course, this massive construction effort would have pushed out the main perimeter to an extent that would have lent substance to the fears of Western intelligence services and allowed the VMF to operate in much greater density in areas that were previously limited to *Zulus* operating in handfuls. As it turned out, this task would fall to more capable nuclear-propelled vessels instead, with the corresponding disadvantage of production runs in the dozens rather than the hundreds.

4.4 Submarine hunters for a new era

4.4.1 From the SSK concept to the 'fast attack'

The U.S. Navy's adjustment to the anticipated threat from high-submerged-speed diesel submarines unfolded over a roughly ten-year period and can be divided into two stages. The first stage involved the promulgation and elaboration of the 'attack at source' concept, which has already been referred to, and which is also discussed in more detail in section 4.5. Treatises on anti-submarine warfare tend to disregard this part of the equation – perhaps because the ASW paradigm itself is so strongly associated with defensive sea control during both world wars.[121] In addition, direct attacks on supporting infrastructure and submarines in port were seen as largely unsuccessful in World War II.[122] The Navy was, however, perfectly serious about making the 'attack at source' approach a main focus of its ASW effort during the first decade of the

[120] Ibid., 101.
[121] Two exceptions to this rule are: Jan S. Breemer, "Anti-Submarine Warfare: A Primer" (Naval Postgraduate School, Monterey, CA, 1988); Gardner, *Anti-Submarine Warfare*.
[122] Brian McCue, *U-Boats in the Bay of Biscay: An Essay in Operations Analysis* (Washington, DC: National Defense University Press, 1990).

Cold War, and possibly beyond.[123] The second stage sought to recover the advantage the Western allies had built in dealing with the ASW problem at sea. The system that resulted from this line of effort had three main components: (1) submarines designed to hunt and kill other submarines, (2) long-range oceanic surveillance, and (3) an updated version of the air-surface team that had decided the Second Battle of the Atlantic.[124] The key to all three elements was passive acoustics. As the advances in this area began to show promising operational results, the need to kill submarines in port and erode their supporting infrastructure began to lose some of its urgency. What is perhaps most remarkable about this second stage is the systematic exploration of unproven concepts and the reliance on largely experimental approaches. This ultimately left the Navy prepared to deal not only with the expected diesel threat, but also with the even more difficult challenge posed by nuclear submarines.

The first key element of the postwar ASW system was the hunter-killer submarine. Ironically, the Type XXI itself pointed the U.S. Navy in this direction in the postwar search for a means of containing the threat that it posed. As postwar evaluations of its capabilities showed, the German design was extremely quiet for its time when operating on battery, but still produced copious amounts of detectable noise whenever it snorkeled.[125] This made it vulnerable to passive acoustic detection. Very conveniently, German submarines had also been equipped with a relatively advanced listening apparatus, the *Gruppenhorchgerät,* which could sometimes capture single vessels at distances of up to 10 nmi.[126] The hunter-killer concept was based on submarines carrying a more powerful version of this sensor and deploying across likely enemy transit routes, in areas that were suitable for setting up an ambush. Running on batteries, the hunter-killer would listen for noisy snorkelers, maneuver into position, and fire

[123] There are some notable disagreements on when 'attack at source' was abandoned as a key ASW method. Palmer (*Origins of the Maritime Strategy*, 161-67) argues that the offensive focus was lost during the 1950s. Hegmann (Richard Hegmann, "In Search of Strategy: The Navy and the Depths of the Maritime Strategy" (Doctoral dissertation, Brandeis University, September 1990), passim) makes the case that 'attack at source' lines of operation were still part of U.S. war plans in the 1960s.
[124] By far the best treatment of these developments and an indispensable take on the subject is: Cote, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines*, 13-40. On the early organizational history of SOSUS, see also: Gary E. Weir, "The American Sound Surveillance System: Using the Ocean to Hunt Soviet Submarines, 1950-1961," *International Journal of Naval History* 5, no. 2 (2006).
[125] Ibid., 14-15.
[126] The GHG was not unique to the Type XXI among German submarines, and the detection range was usually quite a bit below the maximum. But it was a capable sensor for its time. See Rössler, *U-Boottyp XXI*, 134-35.

acoustic-homing torpedoes at any hostile submarine trying to break out into the open ocean.[127] The immediate results of the Navy's efforts to bring this concept to fruition were the BQR-4 passive sonar, which was essentially an enlarged and improved *Gruppenhorchgerät,* and the *K-1*-class submarine. These original hunter-killer submarines (SSKs) were designed to be easily mass-produced in case of mobilization – plans called for as many as 970 to combat an expected threat of up to 2,000 Soviet Type XXIs, or 250 to go up against a more moderate force of 356 enemy submarines.[128] Like all other postwar diesel submarines in the U.S. Navy, they were actually built in small numbers, with an emphasis on testing and evaluation. Three *K-1*-class units were commissioned during 1951-52, and quickly established the validity of the ASW submarine concept. While initially designed for this specialized role, advanced passive sonar arrays eventually became the primary sensor on all U.S. Navy submarines. As a stopgap and additional test case for possible mobilization, seven World War II fleet boats were also converted to carry the BQR-4, starting in 1950.[129]

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[127] Cote, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines*, 14-15. Straight-runners like the Mark 16 were also initially used, but success rates would have been very low indeed.
[128] Norman Friedman, *U.S. Submarines since 1945: An Illustrated Design History* (Annapolis, MD: Naval Institute Press, 1995), 75.
[129] Ibid., 80-82. These boats were actually more capable in some respects than the smaller, more simple K-1s. See Polmar and Whitman, *Hunters and Killers*, 91. However, Friedman (*U.S. Submarines since 1945*, 83) notes operational restrictions in severe weather, which forced one of the conversions to operate on the surface during a storm. This was due to the increased air intake of the larger power plant, which the snorkel could not meet in high sea states.

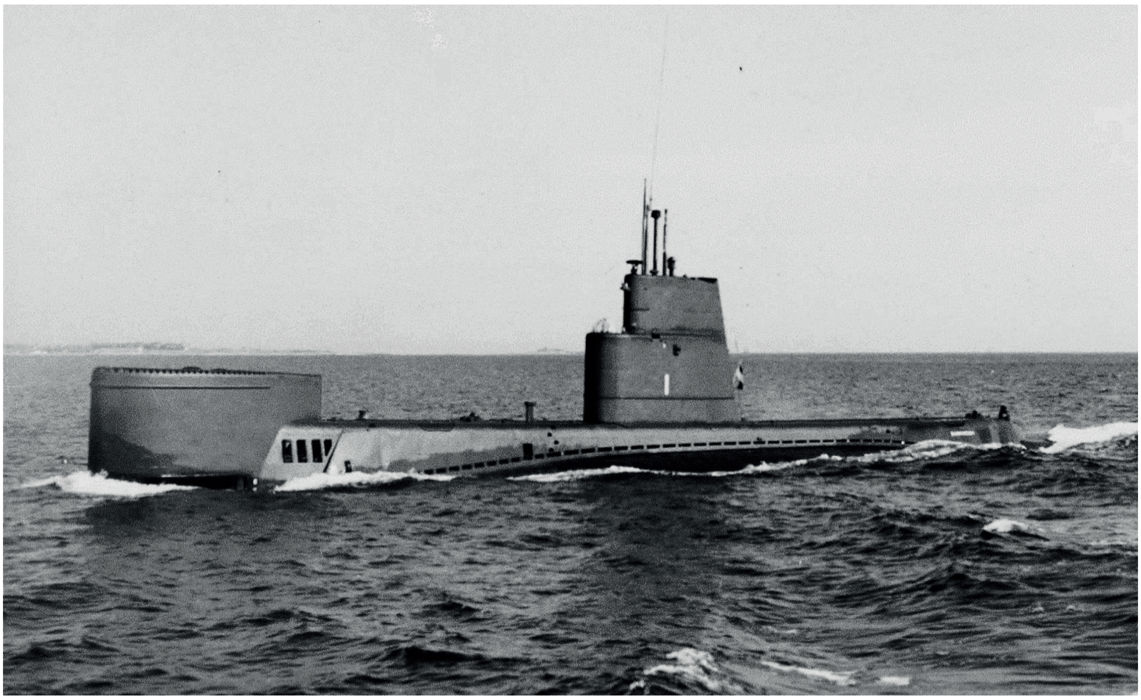

Fig. 10: The original hunter-killer submarine, USS *Barracuda* (SSK-1), with her unwieldy sonar dome containing the BQR-4 array. *(U.S. National Archives)*

The main disadvantage of these early SSKs was their slow speed, which was a result of their smaller, noise-optimized power plants. While a submerged speed of 8-9 knots was acceptable for forward 'barrier' operations against snorkeling diesel submarines, the VMF's turn towards nuclear propulsion after 1958 largely negated the combat value of the original SSKs. The small *K-1*s – later re-designated the *Barracuda*-class – also suffered from limited endurance. While nuclear power provided a solution to both of these problems, the thoroughbred hunter-killer was not meant to compromise its main traits of maximum sonar performance and quietness by balancing them against other desirable qualities. In the event, only a single SSKN – the USS *Tullibee* – was built before the concept of specialized hunter-killers was abandoned altogether.[130] As Friedman put it, the SSKs "were victims of their own success. The special SSK designation was dropped in 1959. From that time, *all* U.S. attack submarines have had the SSK role."[131]

With other nuclear boats as the main threat, the Navy decided that its best option was to combine the high speed of the *Skipjacks* with better quieting and sensors to create the 'fast

[130] She was never actually designated an SSKN, but this was her intended role. See Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 153.
[131] Friedman, *U.S. Submarines since 1945*, 85. Emphasis in the original.

attack' submarine as we know it. From the *Thresher/Permit*-class onwards, high operational and tactical mobility, much-reduced levels of radiated noise at slow speeds, and excellent sensors were all packed into a single, high-end platform. With at least four times the displacement of a *Barracuda* and a much more complex technological base, these state-of-the-art SSNs were large and expensive, and could not be built in very large numbers. That said, as an ASW platform for hunting their nuclear counterparts, they were in a class of their own. The VMF did not begin to field similarly well-balanced or lethal designs until the mid-1970s. In the meantime, the few 'fast attacks' that the Navy could send into battle would have been very unpleasant opponents to deal with. The techno-doctrinal evolution of the SSN force is covered in greater detail in the following chapters.

4.4.2 Networked surveillance on an oceanic scale

The second major element of the postwar ASW complex was long-range, wide-area oceanic surveillance, which was again based on rapid advances in passive acoustics. As government-sponsored research had discovered during 1943-44, the properties of deep water are such that sounds – specifically, those in the lower frequency spectrum – will often travel over thousands of miles and still remain distinguishable.[132] This also implied that the sound source would potentially be amenable to categorization and localization. Provided the necessary technical capabilities were in place, submarines would be liable to detection over much greater distances than any on-board sensor could ever achieve. The Navy's original intention in funding such a system was to do for allied convoys in a Third Battle of the Atlantic what communications intelligence produced by *Ultra* had done during World War II: to identify submarines, and gathering wolf packs in particular, early enough to route a convoy around them.[133] When it became apparent that the Soviets might soon begin using their subs as nuclear delivery vehicles, the need to establish an early warning capability against submarines approaching the

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[132] Edward C. Whitman, "SOSUS: The "Secret Weapon" of Undersea Surveillance," *Undersea Warfare* 7, no. 2 (2005), https://www.public.navy.mil/subfor/underseawarfaremagazine/Issues/Archives/issue_25/sosus.htm.
[133] Norman Friedman, *Network-Centric Warfare: How Navies Learned to Fight Smarter Through Three World Wars* (Annapolis, MD: Naval Institute Press, 2009), 243.

North American continent emerged as an even more pressing imperative.[134] Fortunately for the Navy, scientists had already achieved the necessary breakthroughs by the time this second threat began to materialize.

While the physics of sound propagation in water are highly complex, the key concern in filtering out a sound source of interest over long distances is whether a sufficient signal-to-noise ratio can be attained.[135] A combination of very large arrays – about 1000 ft in length – with a series of narrowband filters proved very effective in this regard.[136] The captured sounds would then be converted into visual form for interpretation, using a newly developed technique known as *low-frequency analysis and recording* (LOFAR).[137] This could be accomplished in near-real time. Given the amount of real estate that would be required, static emplacement of the arrays on the seabed and of the processing facilities on land was the only viable option, with armored cables running between them.[138]

The first full-scale hydrophone arrays of what would become the Sound Surveillance System (SOSUS) were emplaced off the Bahamas in 1952. A program to cover all of the Eastern Seaboard with a series of similar installations began the year after and was expanded to include the West Coast and Hawaii in 1954. The first of the Atlantic stations was declared operational in 1954. By the mid-1970s, installations in Iceland and off northern Norway, in the Aleutians and – possibly under Japanese control – off Hokkaido, expanded the system's coverage deep into to the VMF's main defensive perimeter.[139] Each set of arrays had to be paired

[134] Whitman, "SOSUS".
[135] Cote, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines*, 22.
[136] Ibid.
[137] See Nigel West, *Historical Dictionary of Naval Intelligence* (Lanham, MD: Scarecrow Press, 2010), 177. The acronym is also sometimes spelled out as 'long-frequency analysis and ranging'. Actually, approximate ranging and localization of a contact is often possible through triangulation, whereas a single sensor array will at best provide a line of bearing. See Cote, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines*, 25. LOFAR was also used aboard U.S. attack submarines for classification of contacts, but tracking relied on the opponent's broadband signature.
[138] The cables alone apparently cost 50,000 US$ per nautical mile in the mid-1950s. See U.S. Navy At Cape Henlopen, "Terminal Equipment Building of the Navy, Sound Surveillance System (SOSUS), Naval Facility (NavFac) Lewes," A Century of Service: The U.S. Navy on Cape Henlopen, http://www.navyatcapehenlopen.info/navfacterminalbuilding.html.
[139] Polmar and Whitman, *Hunters and Killers*, 126-27. The Japanese had an entirely separate system of hydrophones as well. For details on both of these systems, See Desmond Ball and Richard Tanter, *The Tools of Owatatsumi: Japan's Ocean Surveillance and Coastal Defence Capabilities* (Acton: ANU Press, 2015), doi:10.22459/TO.01.2015, 15-18.

with a shore installation, also known as a naval facility (NAVFAC), of which at least twenty-two were built.[140] At those facilities, the captured sound would be processed and recorded onto paper charts that displayed frequency content over time. In the case of a submarine contact, noise emitted by the propeller blades and certain types of on-board machinery would result in a fairly unique sound signature. Based on recordings of the characteristic narrowband sound sources – or 'tonals' – emitted by each Soviet and friendly class of submarines, contacts could be classified and sometimes tracked for extended periods of time. In time, these skills were honed to perfection. As one high-ranking participant remembers:

> "[W]e were able to determine frequency spacing, numbers of shafts on a contact, numbers of blades on each of those propeller shafts. If there was a turbine and a blade rate we could tell if there was a reduction ratio. If we knew what the ratio was we could pinpoint it to a particular submarine class or particular submarine perhaps. We got so good at it from 1965 up until 1985 that we were able to name the submarines. We had pet names for them. Even though they were […] built the same way and had the same reduction ratios and the same propulsion systems […] each one had their own unique operating characteristics or sources that we were able to detect."[141]

If the signature was received by several arrays, which would ideally be spaced far apart, the approximate location of the contact could be established by means of triangulation.[142] In those circumstances, SOSUS could not only provide early warning, but act as a wide-area operational sensor. In the best case, it would generate engagements by cueing tactical ASW forces towards so-called SOSUS probability areas (SPAs), in which an enemy submarine was expected to lurk. These areas were often quite large – up to 3,000 square nautical miles – but they

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[140] In his unclassified presentation, Jim Donovan ("Integrated Undersea Surveillance System (IUSS)," Unclassified Brief at ASW Seminar hosted by the Submarine League and Naval Historical Foundation IUSS Caesar Alumni Association, http://www.iusscaa.org/history.htm, slide 10) gives 22 for the mid-1970s. Polmar and Whitman (*Hunters and Killers*, 127) give a total of 26 known facilities, of which one was lost to a hurricane. Several more U.S. installations may have been erected in Japan, but presumably these have not been declassified or were formally under Japanese control.

[141] Naval Historical Foundation, "Ocean Surveillance during the Cold War: Sensing, Fusion, Exploitation" (Transcript of the 2010 Submarine Force Birthday History Seminar, Naval Historical Foundation, 2010), 12.

[142] Cote, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines*, 25; Whitman, "SOSUS"; Polmar and Whitman, *Hunters and Killers*; Naval Historical Foundation, "Ocean Surveillance during the Cold War".

nonetheless simplified the search problem to a significant extent.[143] Tracking first-generation nuclear submarines, in particular, proved to be well within the system's capabilities. In one rather famous instance in 1961, SOSUS maintained a track on the first *Polaris*-equipped submarine, USS *George Washington*, on its second patrol – all the way from Norfolk, Virginia to the SSBN forward base at Holy Loch on the Firth of Clyde.[144] Similar results were attained against Soviet ´nukes' soon thereafter, while diesel submarines – which had been the design basis, but which were only intermittently noisy while using their diesels – remained rather more difficult to track over long distances.[145]

4.4.3 Evolutionary change, persistent problems

This brings us to the final element of the postwar ASW complex. While SOSUS was clearly an impressive addition to the ASW toolkit, providing an initial cue was far from sufficient to successfully track and potentially sink an enemy submarine. In fact, the hand-off to tactical ASW forces at sea proved to be one of the weakest links in the new ASW 'kill chain'. If contacts could not be investigated within a few short hours, the track might well go cold. And even if the response was timely, the submarine might never be re-acquired. This put a premium on rapid response and, if at all possible, the availability of multiple types of sensors. Attack submarines were not particularly suitable for this task: they might not get into an SPA on time and if they did, all other forces would have to be held back to avoid friendly fire incidents. In addition, SSNs would give away their main advantage of stealth if they had to use their active sensors. Surface units similarly lacked the speed to act on intelligence provided by SOSUS in a timely manner, but could bring powerful active sonars and a substantial weapons suite to the fight.

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[143] The role of operational intelligence from other sources in further improving detection and tracking capabilities is discussed in more detail in Chapter 5.

[144] Whether the track was *continuous* is not evident from any of the known sources, but 'actionable' intelligence can be gleaned even from intermittent contacts.

[145] Whitman, "SOSUS". See also: VADM Gerald E. Miller, quoted in: John R. Benedict, "Taking a Long-Term Perspective on U.S. Navy ASW Objectives, Capabilities & Trends: Historical Survey & Projections, 1940-2020" (Presentation, Monterey, CA, July 23, 2009), slide 116. While the noise from a snorkeler does reach the deep sound channel, it may be attenuated by the properties of the water column. And, in any case, it is present only at certain intervals that may be separated by many hours, or even days, of silent running on batteries.

Aircraft, meanwhile, would be perfectly suitable for the initial search, but might not have sufficient persistence over the search area to carry a prolonged engagement through to the end.

The solution to this dilemma was of a more evolutionary nature, essentially reprising the combined air and surface action that had broken the back of the *U-Bootwaffe* during 1942-45. Interestingly enough, the Navy encountered major difficulties in making this work at the tactical level. However, before the service could even get to that stage, several technical problems also had to be solved. The maritime patrol aircraft (MPA), in particular, was in need of a new sensor. Radar – which had played a role in many submarine kills from the air during World War II – would be much less effective against a diesel submarine that exposed only its snorkel, rather than its entire sail and deck, and then only periodically. It would be almost completely useless against nuclear-powered opponents. What was required was a sensor, or a set of sensors, that could be effective against a submerged opponent from the air. Sonobuoys – air-dropped hydrophones with a radio data link – had already seen limited use during 1942-45.[146] The initial postwar attempts to build on that technology had not been particularly successful, but this changed once low-frequency processing began to find its way onto patrol aircraft. With this new capability, detection ranges increased dramatically.[147] The method of using sonobuoys as a source for narrowband analysis became known as *Jezebel*. Once the presence of a submarine had been confirmed, its approximate bearing could be established with the 'time difference of arrival' method also employed by SOSUS.[148] This second method – which was effective only as long as the submarine kept snorkeling long enough to drop a precisely spaced sonobuoy pattern of four – was known as *Correlation, Detection and Ranging* (CODAR).[149] Finally, a method of using practice depth charges in the manner of an active pinger – to bounce an echo off the submarine's hull – was developed to further narrow down the search area. This third technique was known as *Julie*.[150] According to one experienced officer of a

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[146] They were actually pioneered by the British, but the U.S. Navy was close on their heels. See Roger A. Holler, "The Evolution of the Sonobuoy from World War II to the Cold War," *U.S. Navy Journal of Underwater Accoustics*, 2014, https://apps.dtic.mil/dtic/tr/fulltext/u2/a597432.pdf, 325-26.
[147] Cote, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines*, 32.
[148] Owen R. Cote, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarine,* Newport Papers 16 (Newport, RI: Naval War College Press, 2003), 32.
[149] This required that two pairs of sonobuoys be dropped in a very precise pattern. See Holler, "The Evolution of the Sonobuoy from World War II to the Cold War," 332-33.
[150] Ibid., 333-34.

maritime patrol squadron (VP) officer, "Julie never worked."[151] The complexity of the localization schema was later reduced as better sonobuoys with directional listening and active search capabilities were developed, and helicopter-borne dipping sonars became widely available.

Aboard MPAs like the land-based P2V *Neptune* and the carrier-based S2F *Tracker*, sonobuoys were usually combined with two additional short-range sensors. The more lasting of these was the magnetic anomaly detector (MAD), which would register any large metallic objects blocking out the earth's natural magnetic field.[152] The second, which was dispensed with due to atrocious false alarm rates, was an exhaust sniffer designed to trace residual diesel fumes.[153] In both cases, the aircraft would have to fly a very narrow search pattern to have a good chance of detecting a submarine, which made these methods unsuitable for the initial reestablishment of a SOSUS contact.[154] Because sonobuoys could only be carried in limited numbers and going through a series of patterns could take quite some time, the cue on which the MPA was acting had to be fairly solid already, or there was a good chance that the submarine would escape. No such system was in place by 1960, but this would change during the second phase of the competition.

Finally, to increase the chances of holding and effectively prosecuting a contact, the idea was to bring surface ASW vessels into the fray as early as possible. The surface Navy's main tools would be quite similar to those already in service – active scanning sonars and rocket-propelled ASW weapons. However, it was soon recognized that significant evolutionary improvements were required in both areas. Wartime active sonars had been designed for use against slow targets and often could not keep the high-submerged-speed diesels fixed in their beams. They were as good as useless against *Nautilus* and her Soviet counterparts. The last of the forward-firing depth bomb launchers, *Weapon Alpha*, had already been designed

[151] Naval Historical Foundation, "Ocean Surveillance during the Cold War," 18.
[152] Louis Gerken, *ASW versus Submarine Technology Battle* (Chula Vista, CA: American Scientific Corp., 1986), 604-09.
[153] Ibid., 609.
[154] Naval Historical Foundation, "Ocean Surveillance during the Cold War," 18-19.

with the Type XXI in mind and remained moderately useful.[155] That said, the Navy realized early on that longer ranges were required for both active sonar and surface-launched weapons. The most impressive results were achieved by pairing the SQS-23 active sonar with the Anti-Submarine Rocket (ASROC) system, which both became operational towards the very end of this phase. The engagement range of up to five nautical miles that was achieved by this combination was a twelve-fold increase over *Weapon Alpha*.[156] Its payload of either a Mark 46 lightweight homing torpedo or nuclear depth bomb also made ASROC considerably more lethal, and it remained the surface Navy's standard ASW weapon for the remainder of the Cold War.[157] Unfortunately, it did not become widely available until the mid-1960s and took some time to make its impact felt in the fleet.

Fig. 11: A Pacific Fleet hunter-killer group centered on the Essex-class anti-submarine warfare carrier USS *Kearsarge* (CVS-33) at anchor in San Diego, 1961. (U.S. Navy)

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155 Norman Friedman, *Modern Warship: Design and Development* (Greenwich: Conway Maritime, 1979), 125-126. However, only a small number of destroyer leaders and destroyers were equipped with this weapon. The classic Mk 10/11 *Hedgehog* of World War II also remained in service into the 1960s.

156 ASROC had a range about twice that, but the 10,000 yard range of the SQS-23 was the best that any surface ship could manage with onboard sensors until the late 1960s. See Norman Friedman, *The Naval Institute Guide to World Naval Weapons Systems* (Annapolis, MD: Naval Institute Press, 1989), 381.

157 The nuclear-armed ASROC was a controversial system within the Navy but was retained as a backstop against the most agile VMF submarines, which it was feared would be able to outmaneuver the Mark 46 conventional payload. See Linton Brooks, interview with author, 9 May 2016, Arlington, VA.

Moreover, even with better sensors and more potent weaponry, the main challenge for the air-surface team was organizational in nature: coordination was not its strong suit. Exercises in the late 1950s cast a dim light on the combined arms performance of the hunter-killer groups, which were still the most prominent feature of the Navy's at-sea ASW effort. As Hegmann notes, "[i]n ASW exercise after exercise Navy defensive, tactical ASW proved ineffective in stopping submarine simulated attacks on friendly forces. […] Indeed in 1958 it took a HUK [hunter-killer group] two and a half days to find one diesel submarine, and that only when the submarine finally exposed itself to replenish its air."[158] In other words, even if SOSUS worked perfectly and SSKs had exacted their toll on transiting Soviet subs, successfully engaging those that did make it to the open ocean remained a challenge. As exercises against *Nautilus* had showed early on, the situation would deteriorate further once the VMF started operating nuclear boats of its own.[159] Technological progress by itself would not solve the problem: "ASW, to be effective, also had to be an *integrated* art, not only of machines and weapons but of men as well."[160] While the Navy understood this well, making the combined arms approach work at sea was no easy task.

The Chief of Naval Operations (CNO), ADM Arleigh '31-knots' Burke at the height of his tenure (1955-1961), kept prodding. After he had delivered a famously "unfortunate speech"[161] on the subject, Burke put RADM John Thach – a famed naval aviator – in charge of developing appropriate doctrine and tactical protocols. For two years, Thach's Task Group ALFA hunted friendly subs at sea and came closer to mastering the art than any other postwar hunter-killer group had – only to realize that the balance of resources needed to finish off a well-handled diesel sub remained unfavorable.[162] The expectation that SOSUS contacts could

[158] Hegmann, "In Search of Strategy: The Navy and the Depths of the Maritime Strategy," 287. While this was clearly not an impressive performance, it should be noted that a HUK still succeeds in its mission if can hold down a diesel for days and eventually force it to reveal itself, at which point it would be attacked and probably sunk. Hence, this episode serves to demonstrate the limitations of the HUK approach, but not a dramatic failure.
[159] Cote, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines*, 21.
[160] Michael T. Isenberg, *Shield of the Republic: The United States Navy in an Era of Cold War and Violent Peace, 1945-1962* (New York, NY: St Martin's Press, 1993), 742. Emphasis added.
[161] Friedman, *U.S. Submarines since 1945*, 109.
[162] Isenberg, *Shield of the Republic*, 747. On Task Group ALFA, see also: Thomas D. McGrath, "Antisubmarine Defense Group Alfa," *USNI Proceedings* 85, no. 8 (1959), 49-55.

be finished off quickly and reliably, and surface task forces consistently shielded from submarine attack, could not be met with existing means. Piecemeal attrition would almost certainly have defeated the VMF submarine force over time, but hunting submarines in the open sea would still be a painful process going into the next phase of the competition.

4.4.4 *A threat mitigated, but not defeated*

While it was combined arms ASW that left the Navy most exasperated, it should be emphasized that tactical coordination on the surface was not the only limitation of the new ASW system. SSKs and SSNs were an extremely scarce asset during 1955-1965, and there were arguably too few of them even thereafter. Moreover, their torpedoes up to and including the Mark 37 were essentially designed against the Type XXI threat and far too slow to catch early Soviet nuclear subs in most circumstances. Despite modifications, which otherwise improved the weapon's performance, this problem would persist into the early 1970s. Thus, a 'torpedo crisis' not unlike those experienced by both the U.S. and German navies during World War II, in which scores of excellent approaches were foiled by faulty or ineffectual weapons, was a genuine possibility.[163] Nuclear alternatives – the Mark 45 Anti-Submarine Torpedo (or ASTOR) the Submarine-launched Rocket system (SUBROC) – were under development by the time this phase of the competition ended, but a satisfactory solution for the torpedo problem remained in the distant future.

SOSUS, for its part, did not provide tactically useful information with any consistency, certainly during the first decade of its existence. In the late 1950s, the evaluation centers had *not even begun* building their later library of Soviet submarine signatures, which seriously called into question the system's operational utility at that point in time.[164] In fact, the first

[163] On U.S. torpedoes during the first phase of the competition, see Thomas Wildenberg and Norman Polmar, *Ship Killer: A History of the American Torpedo* (Annapolis, MD: Naval Institute Press, 2010), 151-54. On the U.S. torpedo crisis in World War II, see ibid., 102-114; Robert Gannon, *Hellions of the Deep: The Development of American Torpedoes in World War II* (University Park, PA: Pennsylvania State University Press, 1996), 73-94. On German torpedo problems, see Eberhard Rössler, *Die Torpedos der Deutschen U-Boote: Entwicklung, Herstellung und Eigenschaften der deutschen Marine-Torpedos* (Hamburg: E.S. Mittler & Sohn, 2005), 83-90.
[164] Polmar and Whitman, *Hunters and Killers*, 126.

actual *detection* of a Soviet submarine did not occur until 1962.[165] During the run-up to the Cuban Missile Crisis in early October 1962, none of the four Soviet *Foxtrots* making their way towards Cuba were tracked before they had reached the Western Atlantic.[166] False contacts were produced with mind-numbing regularity even in the 1970s.[167] Finally, SOSUS was also quite vulnerable to sabotage, and cables were regularly damaged even in peacetime.[168] In a crisis or the early stages of a conflict, NAVFACs outside U.S. territory – such as those on Jan Mayen and off Andenes in Norway, or at Keflavik and Höfn in Iceland – were also attractive targets for Soviet air strikes or special operations forces. As a result, important parts of the system might have been disabled before the war had even started.[169] In a high-intensity scenario, a number of key arrays and installations would probably have been destroyed immediately to deprive NATO of the continued use of an important force multiplier – be it by conventional or nuclear means. This left early warning of approaching SSBs and SSBNs in a prewar setting, and tactical cueing in a strictly limited war as the most plausible missions.

Despite these valid objections to the 'big picture' of a largely successful adjustment effort, Cote's assertion that the Navy "ended up nearly preempting the ASW challenge"[170] posed by the Soviet submarine force remains broadly accurate. This is particularly true in the context of actual, as opposed to projected, VMF capabilities at the time. Not only had the Navy formulated a comprehensive technological and operational response to the Type XXI threat. It was also well on its way to dealing with the even more daunting challenge posed by the first generation of Soviet nuclear submarines – all of which were armed with nuclear weapons of one type or another – from the late 1950s onwards. While U.S. analysts were almost totally wrong about Soviet intentions, the Navy's competitive adjustments resulted in an ASW complex that would have put the VMF's long-range submarines squarely on the defensive. There is little doubt that they would have been worn down eventually, especially if attempted to

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165 "IUSS History," IUSS Caesar Alumni Association, http://www.iusscaa.org/history.htm.
166 Benedict, "Taking a Long-Term Perspective on U.S. Navy ASW Objectives, Capabilities & Trends," slides 71-72.
167 According to one source, there were close to 470,000 SOSUS detections in 1968, of which 4,755 were classified as submarine contacts. The great majority of those were friendlies. The 600 confirmed Soviet contacts were split about evenly between diesel and nuclear boats. See Friedman, *Network-Centric Warfare*, 322, n1.
168 Polmar and Whitman, *Hunters and Killers*, 132.
169 Ibid.
170 Cote, *The Third Battle*, 40.

operate west of the GUIK gap or in the northeastern Pacific. Whether or not that advantage was sufficient to survive in the long run against a succession of increasingly more capable Soviet submarines was, of course, another matter. In the next section, we will consider the early development of the second key element of U.S.-Soviet competitive adaptation: the use of land-based strike aircraft against the U.S. Navy's mighty carrier force.

4.5 Opening a second front: naval strike aviation

4.5.1 The deep roots of the carrier-centric offensive posture

The organizational essence of the Cold War U.S. Navy was the projection of carrier-centric sea power in support of U.S. forward security commitments, against a potential adversary situated on the Eurasian landmass. Its key advantage, as it was perceived both by the Navy itself and by its opponent, lay in the ability to establish and retain access to the European rimlands, and utilize them as a staging area for offensive operations against relevant elements and sources of Soviet military power. As early as the summer of 1946, "[t]he Navy determined to meet that challenge as far forward as possible—in the European and Pacific maritime approaches to the Soviet Union."[171] In practice, that meant not just supporting U.S. allies, but also holding Soviet territory itself at risk. This "orientation toward the land"[172] was at the heart of the transoceanic naval posture, as it was described by Huntington. While it was not without alternatives, the transoceanic preference reflected the geopolitical realities of the confrontation, as well as the grand strategic objectives formulated by U.S. political leaders and civilian bureaucrats.[173] How the Navy chose to interpret these external demands and the ways in which it would ultimately discharge its missions was not at all unrelated, however, to its preexisting priorities and inclinations.

[171] Michael A. Palmer, *Origins of the Maritime Strategy: The Development of American Naval Strategy, 1945-955* (Annapolis, MD: Naval Institute Press, 1990), 30.
[172] Samuel P. Huntington, "National Policy and the Transoceanic Navy," *USNI Proceedings* 80, no. 5 (1954), https://www.usni.org/magazines/proceedings/1954/may/national-policy-and-transoceanic-navy.
[173] See e.g. Melvyn P. Leffler, "The American Conception of National Security and the Beginnings of the Cold War, 1945-48," *The American Historical Review* 89, no. 2 (1984), doi:10.2307/1862556, 346-81.

In fact, the basic operational elements of the transoceanic posture were largely in place in 1946 – the emergence of the attack submarine as the central ASW platform and the dominance of the nuclear mission by tactical aircraft and submarines being notable exceptions. Yet, even these later posture changes were grounded in the well-established missions of a service preoccupied with gaining, maintaining and exploiting operational access to the maritime environs of its adversaries' homelands. The main instrument for both sea control and power projection would be the same as during the final years of World War II: the fleet aircraft carrier.

In fact, we can date the origins of this paradigm even earlier. The U.S. Navy's offensively-oriented principles for carrier employment were established first in theory and then during a long series operational experiments and tests. The basic ideas can be traced back to the thinking of CAPT Henry C. Mustin on sea-launched strike operations during 1915-1917.[174] They were expanded, tested, and refined in the major maneuvers known as the Fleet Problems, which were conducted on an annual basis from 1923 to 1940.[175] A more systematic, if nonetheless very preliminary, approach was developed at the Naval War College during the first half of the 1920s. Pierce summarizes some of the most important findings: First, not unlike their Japanese colleagues, staff at the college realized that carrier air power would best be employed to deliver concentrated "pulses"[176] of firepower. Secondly, it followed that the total number of sorties that could be launched at any one time would be the decisive factor in inflicting the greatest possible damage on the opponent. Thirdly, it was found that the potential of carrier airpower would be severely hampered by the short-legged aircraft available at the time – a deficiency that was difficult to overcome until the technology had matured considerably.[177]

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[174] Jan van Tol, "Military Innovation and Carrier Aviation: An Analysis," *Joint Forces Quarterly*, Autumn/Winter 1997-98, 101-103. Mustin was patriarch to a dynasty of naval officers that continues to this day. It is oddly fitting that his grandson, the late VADM Hank Mustin, should have played such a central role in shaping the offensive Air-Navy of the 1980s. Admiral Mustin passed away weeks before the author was to interview him for this study in the spring of 2016.

[175] Craig C. Felker, *Testing American Sea Power: U.S. Navy Strategic Exercises, 1923-1940,* Texas A & M University military history series 107 (College Station, TX: Texas A&M University Press, 2007); Albert A. Nofi, *To Train the Fleet for War: The U.S. Navy Fleet Problems* (Newport, Rhode Island: Naval War College Press, 2010).

[176] Wayne P. Hughes and Robert Girrier, *Fleet Tactics and Naval Operations* (Annapolis, MD: Naval Institute Press, 2018), 84.

[177] Terry C. Pierce, *Warfighting and Disruptive Technologies: Disguising Innovation* (London: Frank Cass, 2004), 125.

At the same time, critics contended that carriers would be excessively vulnerable to both aerial bombardment and to the big guns of the battle fleet. In a passage that could be lifted straight from a policy article written in the 1970s – or, for that matter, the 2010s – British analyst James Bates observed a "growing preference"[178] for small carriers. This, he argued, was due to the fact that "[t]he huge Lexington and Saratoga (33,000 tons), the Kaga and Akagi (26,900 tons) and even our Eagle (22,600 tons) Furious, Courageous and Glorious (22,500 tons) are recognized as being *unduly large and vulnerable baskets with an overconcentration of eggs.*"[179] The themes of carrier size and vulnerability, concentration of striking power, and the range and composition of the air wing have dominated doctrinal and force structure debates ever since.

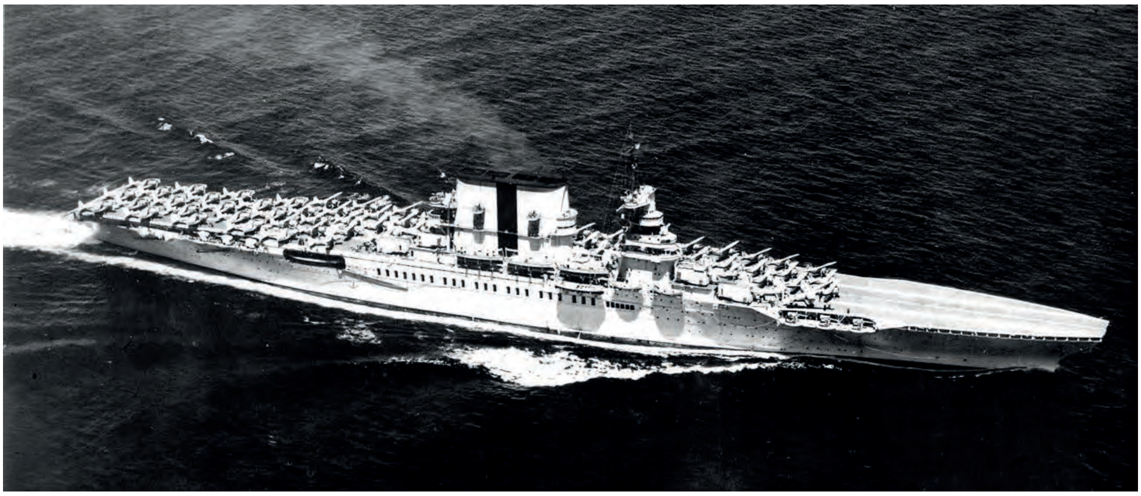

Fig. 12: USS *Saratoga* (CV-3), a supercarrier by the standards of her time, in May 1934. She was torpedoed on two separate occasions, struck by five bombs, and hit by three Kamikaze aircraft during WWII. As a target during Operation Crossroads, she survived the Navy's first nuclear test with little structural damage and was finally sunk by the second. *(U.S. National Archives)*

While these debates continued into the late 1920s, the Fleet Problems turned out to be extremely useful, allowing the Navy to explore the actual potential of naval air power in a number of operational scenarios. Hence, Fleet Problem I (1923) established a base level of credibility for naval aviation as an offensive instrument.[180] Fleet Problem V (1925), validated the progress the experimental carrier *Langley* was making and motivated carrier advocates to press for the

[178] James L. Bates, quoted in Wilson, *Attack Aircraft Carrier*, 36.
[179] Ibid. Emphasis added.
[180] Nofi, *To Train the Fleet for War*, 51-56.

swift completion of the *Lexington*-class carriers.[181] Fleet Problem IX (1929) saw ADM Joseph A. Reeves detach the newly completed *Saratoga* from the main body of the fleet and launch a major independent strike against the Panama Canal, in what is often seen as a signature moment in the early history of U.S. naval aviation.[182] As a result, the carrier-launched strike against a key land target was transformed from a theoretical possibility into a demonstrated capability less than a decade into the development of the carrier fleet.

The Navy's actual carrier doctrine could be considered "relatively advanced"[183] by 1939. While the idea of "employing multiple carriers as the core of a fast-striking force"[184] had captured carrier advocates' attention years before *Saratoga*'s dash to the Canal, few concrete steps were taken towards an operational paradigm centered on independent multi-carrier operations. The battleship had lost much of its erstwhile glamour, but its dominance was still very much intact at the time. In fact, as the interwar naval arms control regime fell by the wayside and the prospect of another world war began to loom, the significant sea powers – Britain, Japan, the U.S., Italy, France and Germany – all embarked on another round of competitive dreadnought-building. In the U.S., conceptual work, bureaucratic advocacy, and fleet experimentation had already created the possibility of a very different Navy, built around the carrier as its new capital ship.[185] But it would take the major strategic shock of Pearl Harbor

[181] Ibid., 73-82.

[182] Ibid., 109-19. Hughes reminds us that the aftermath was not particularly triumphant: "After launching the strike, the *Saratoga* was found and 'sunk' three times – by surface ships, by a submarine, and by aircraft from *Lexington*." Hughes and Girrier, *Fleet Tactics and Naval Operations*, 80.

[183] Thomas C. Hone, "Replacing Battleships with Carriers in the Pacific in World War II," *Naval War College Review* 66, no. 1 (2013), 57.

[184] Jan van Tol, "Military Innovation and Carrier Aviation: The Relevant History," *Joint Forces Quarterly*, Summer 1997, 85.

[185] The best comparative reviews of U.S. carrier development are Geoffrey Till, "Adopting the Aircraft Carrier: The British, American, and Japanese Case Studies," in *Military Innovation in the Interwar Period*, ed. Williamson R. Murray and Allan R. Millett (Cambridge: Cambridge University Press, 1996), 191-226; Thomas C. Hone, Norman Friedman and Mark David Mandeles, *American and British Aircraft Carrier Development: 1919-1941* (Annapolis, MD: Naval Institute Press, 1999); Emily O. Goldman, "International Competition and Military Effectiveness: Naval Air Power, 1919-1945," in *Creating Military Power: The Sources of Military Effectiveness*, ed. Risa A. Brooks and Elizabeth A. Stanley (Stanford, CA: Stanford University Press, 2006), 158-84; Emily O. Goldman, "Receptivity to Revolution: Carrier Air Power in Peace and War," in Goldman; Eliason, *The Diffusion of Military Technology and Ideas*; Michael Horowitz, *The Diffusion of Military Power: Causes and Consequences for International Politics* (Princeton, NJ: Princeton University Press, 2010), 65-97.

and three long years of all-out naval warfare in the Pacific for this possibility to be fully realized and implemented. The end result was the "institutional apotheosis"[186] of the U.S. Navy – and with it the offensively-employed fleet carrier.

Fig. 13: "Murderer's Row": A line-up of fleet carriers – USS *Wasp*, USS *Yorktown*, USS *Hornet*, USS *Hancock*, and USS *Ticonderoga* – at Ulithi in the Caroline Islands, 8 December 1944. *(U.S. National Archives)*

During the final phase of the war, fast carrier task groups of three to five carriers each were roaming the Pacific with almost unlimited freedom of action, often as part of much larger task forces. Operational concentrations of fifteen to twenty carriers were not uncommon towards the end of the war.[187] So powerful had the fast carriers become that they could be employed to systematically counter Japan's land-based air power at acceptable cost to themselves.[188]

[186] Peter D. Haynes, *Toward a New Maritime Strategy: American Naval Thinking in the Post-Cold War Era* (Annapolis, MD: Naval Institute Press, 2015), 15.
[187] Clark Reynolds, *The Fast Carriers: The Forging of an Air Navy* (New York, NY: Naval Institute Press, 2015), 320-79.
[188] See e.g. Thomas Hone, Norman Friedman and Mark David Mandeles, *Innovation in Carrier Aviation*, Newport Paper 37 (Newport, RI: Naval War College Press, 2011), 70.

Against an enemy who could muster such vastly superior forces, as well as an effective radar-based defensive system and superior operational intelligence, Hughes and Girrier find that "[t]he Japanese might as well have massed their forces and taken their chances, especially in 1942, when they had numerical superiority and qualitative equality. By 1944 nothing they could do mattered."[189] Militarily speaking, the fleet carriers and the vastly complex, tightly integrated organizations that had been built around them had become quite literally unstoppable. Politically and bureaucratically speaking, they were in danger of bombing themselves out of existence.

4.5.2 'Attack at source' implemented

The threat to the carrier during the late 1940s was much more severe than anything the Japanese or, indeed, the Soviets could muster – but it was not of a military nature at all. Rather, the early Cold War history of the U.S. carrier fleet and of the entire concept of the transoceanic Air-Navy itself was shaped by cut-throat bureaucratic competition. The Navy found that weaponizing the projected Soviet submarine threat in the intense interservice competition of 1946-1949 was its best hope of securing the future of naval aviation and eking out a meaningful nuclear role for itself.[190] To make its case, it conflated its undisputed responsibility for keeping the sea lanes open with the land-attack capabilities of its carriers, via VADM Sherman's 'attack at source' concept.[191] Henceforth, carrier air power would be the first line of ASW defense by striking submarines in port, their supporting infrastructures, the defensive installations that went with them, and the shipyards and industrial plants that built them.[192] Because submarine-related targets were spread across the four fleet areas of the Soviet Union, 'attack at source'

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[189] Hughes and Girrier, *Fleet Tactics and Naval Operations*, 98.
[190] Jeffrey G. Barlow, *Revolt of the Admirals: The Fight for Naval Aviation, 1945-1950* (Washington, DC: Naval Historical Center, Dept. of the Navy, 1994), 105-30; Palmer, *Origins of the Maritime Strategy*, 28-59; David A. Rosenberg, "American Postwar Air Doctrine and Organization: The Navy Experience," in *Mahan is Not Enough: The Proceedings of a Conference of the Works of Sir Julian Corbett and Admiral Sir Herbert Richmond*, ed. James Goldrick and John B. Hattendorf (Newport, RI: Naval War College Press, 1993), 245-78.
[191] George W. Baer, *One Hundred Years of Sea Power: The U.S. Navy, 1890-1990* (Stanford, CA: Stanford University Press, 1998), 287-89.
[192] Barlow, *Revolt of the Admirals*, 115-16.

against the VMF's submarine arm would involve operations by multi-carrier task forces from multiple vectors, with possible concentrations anywhere in the Mediterranean and the Northern Fleet area, as well as the Northwest Pacific. To be effective, 'attack at source' strikes had to begin as early as possible in a conflict, before the Soviet submarine force was flushed out to sea. In other words, large parts of the Soviet periphery would come under sea-borne attack almost immediately. For the U.S. Navy, the adoption of this concept meant nothing less than the survival of its carrier fleet and, hence, the ability to sustain its organizational essence in the face of a severe bureaucratic threat from the newly independent Air Force. As seen through Soviet eyes, it was a homeland defense *nightmare*: fifteen or more mobile airfields, each launching dozens of nuclear strike sorties a day from anywhere within 1,000 nmi of a Soviet coast, well-protected, and moving faster than any submarine in the Soviet Navy.[193]

Far from being a mere bureaucratic crowbar, 'attack at source' was the Navy's main operational paradigm for the use of its carrier forces at least into the mid-1950s.[194] Neither the limitations of the available systems, nor the practical difficulties of the task would stop a new generation of carrier admirals from making naval air power work against the Soviet Union. As early as March 1946, USS *Midway* (CVB-41) was sent into Arctic waters in the aptly named Operation *Frostbite*, to establish that carrier operations were possible in the high north and what the limiting factors were.[195] Conditions were found to be difficult and the experiment did not result in regular deployments north of the Arctic circle but, as a young lieutenant aboard *Midway* observed with undaunted optimism in *Proceedings*, the temperatures would be even lower and the wartime conditions even worse for an enemy who had to operate his aircraft from bases on land.[196] By November 1948, the basic outlines of the new paradigm had become quite distinct. According to a memorandum that was circulated by the Air Warfare section under the Deputy Chief of Naval Operations (DCNO) (Air):

> "The [carrier] task groups will be used offensively to keep our sea lines of communication open. The air groups will destroy enemy aircraft on the ground and in the air, bottle up

[193] Even the first vessel of the nuclear-powered *November*-class that was commissioned in July 1958 was still several knots slower than an attack carrier at high speed. See section 5.2.2.
[194] Hegmann, "Reconsidering the Evolution of the US Maritime Strategy 1955–1965," 310-12.
[195] Palmer, *Origins of the Maritime Strategy*, 32.
[196] E. B. Salsig, "Operation Frostbite: A Strategic Success," *USNI Proceedings* 72, no. 9 (1946), 1199-1204.

> enemy submarines and shipping by mining, attack enemy submarines and other naval forces at sea, disrupt enemy lines of communication, [and] destroy enemy air installations."[197]

The year after, this approach was formalized in a study on "The Future Development of Carrier Aviation" – known as the OP-55 study – which we will discuss in greater detail in section 4.5.4 below.[198] As had been hinted at the year before, naval planers were no longer just thinking about the presumptive Type XXI threat, but extending the same principles to Soviet land-based air forces as well. In 1951, the JCS gave the Navy official responsibility for naval-related strikes against Soviet land targets out to a radius of 600 nmi from its carrier task forces, as well as for the support of U.S. allied ground forces, and prepared a list of ninety-eight Soviet naval bases and 287 air bases to target in an air offensive.[199] Also in 1951, ONI was circulating a list of prospective targets for an air campaign against the Northern Fleet basing areas on the Kola Peninsula. The submarine bases at Rosta, Pechenga, Polyarnyy, Iokanga, and Varyenga (later Severomorsk) were all described as probable targets, as was the Sevmorput shipyard.[200] It is likely that the list continued to grow as the Kola was successively turned into a main hub of Soviet military strength.[201]

It does not come as a surprise, then, that the 'attack at source' concept found its way into *joint* war plans, including Plan *Dropshot*, quoted earlier. The map depicting 'Naval Air Target Coverage' in the finalized version of *Dropshot* is reproduced on the next page. Commenting on this map, Rose notes "the enormous depth of operations, in which only Outer Mongolia and western Siberia would lie beyond the range of naval air power."[202] Although the map only shows potential target *coverage*, not *operations*, it does demonstrate how much progress the advocates of U.S. carrier aviation – seen in its death throes by not a few observers only years before – had made at the dawn of the new decade. The Navy had succeeded in

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[197] Barlow, *Revolt of the Admirals*, 324 n. 34.
[198] Rosenberg, "American Postwar Air Doctrine and Organization: The Navy Experience," 261-63.
[199] George W. Baer, "Purposes and Platforms in the US Navy, 1945-90," in *Technology and Naval Combat in the Twentieth Century and Beyond*, ed. Phillips P. O'Brien (New York, NY: Routledge, 2013), 204.
[200] Berdal, *Forging a Maritime Alliance*, 17-18.
[201] Ibid., 22-36.
[202] Lisle Abbott Rose, *Power at Sea* (Columbia, MO: University of Missouri Press, 2007), vol. 3, 41-42.

making itself and its organizational essence about the Soviet Union, and it was offering a capability that the Air Force was not. If World War III turned out to be a long war – essentially a replay of World War II with the addition of nuclear weapons, as most of the war plans at the time still expected it would be – the Navy had an essential job to do and carrier task forces would be doing it.[203] From an organizational perspective, this was a case of highly successful, organic adaptation. In combining outward-looking and bureaucratic imperatives and translating them into a plan for significant, but evolutionary posture change, is also very much along the lines of the organizational behavior that our analytical model would lead us to expect. It is also important to note that parallel debates unfolded in Britain and in the NATO context and that essentially the same methods were proposed, but the level of actual buy-in on the part of the allies remained unclear.[204] Thus, for all practical purposes, we should consider 'attack at source' primarily a U.S. Navy concept.

To Rose, the *Dropshot* map also suggests that the Navy's conception of its role was already beginning to grow well beyond the original target set in the early 1950s.[205] His conclusions are worth quoting at length:

> "Since the heaviest and longest-range aircraft operating from the three *Midway* battle carriers would soon carry nuclear weapons, and an even larger and more capable 'supercarrier' [the *Forrestal*-class; MH] was being talked about in the wake of the North Korean invasion, the navy might even serve as a complement or supplement to the air force's Strategic Air Command (SAC). Indeed, the navy's forward-positioned carriers might well be better placed to deliver the first heavy nuclear or conventional blows of World War III than the air force.
>
> By 1952, […] most fleet carriers went on global deployments with atomic weapons in their bellies and were positioned, if not precisely where Dropshot proposed, then at least close enough so that twelve to thirty-six hours' hard steaming could place them there. The carrier was now on the periphery of the strategic-warfare game. Within just a few years, Dwight Eisenhower, pursuing his New Look strategy, would formally ratify the carrier's critical role."[206]

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[203] Baer, *One Hundred Years of Sea Power*, 337.
[204] Richard Moore, *The Royal Navy and Nuclear Weapons* (London: Routledge, 2015), 95-99.
[205] Rose, *Power at Sea*, 41-42
[206] Ibid., 42. While the term now has an unfamiliar ring to it, the *Midway*-class were indeed ordered as 'battle carriers' (CVBs) but were re-designated attack carriers (CVAs) from 1 October 1952.

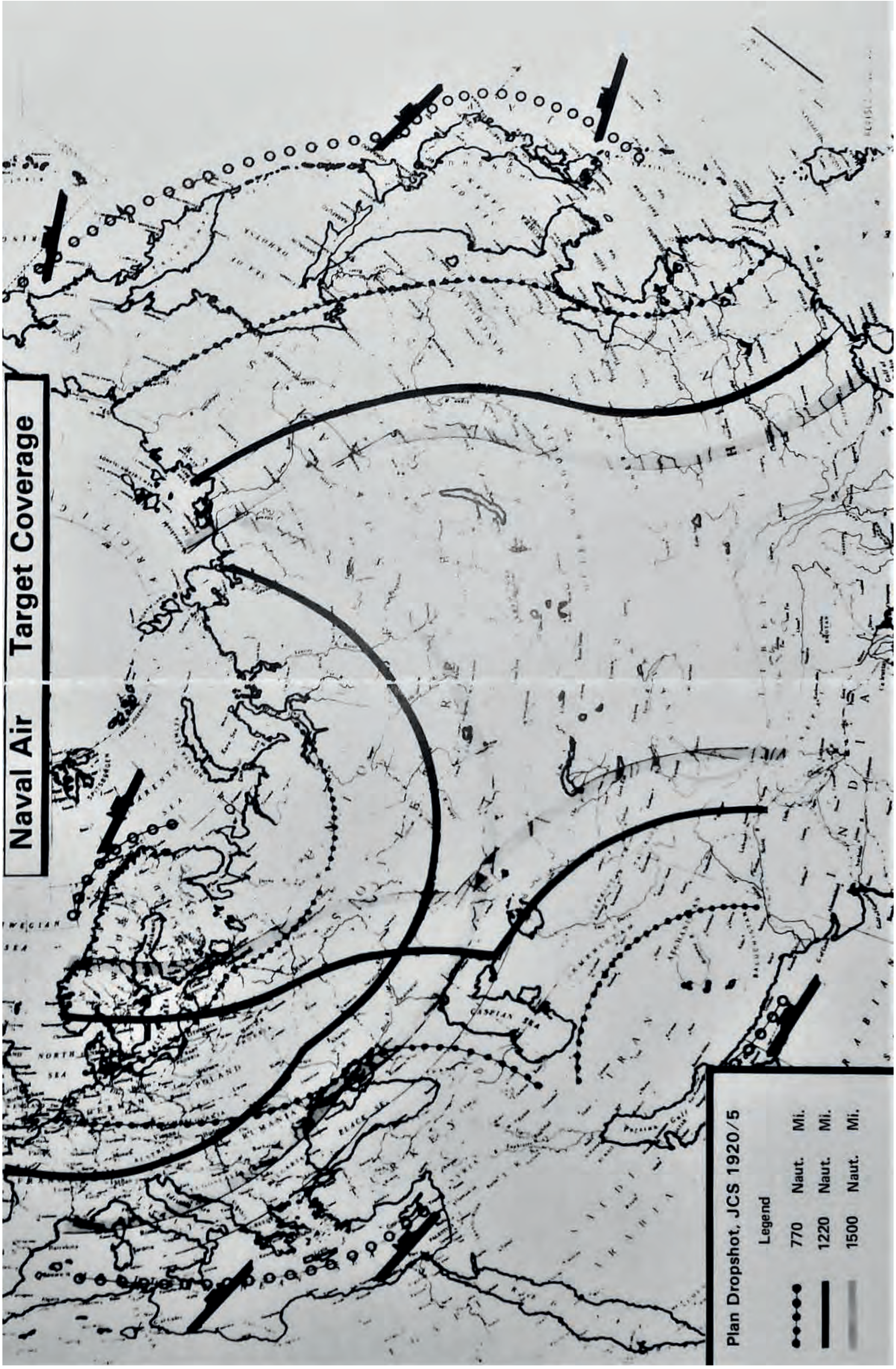

Fig. 14: Naval air target coverage of the USSR, according to Plan *Dropshot*. (*JCS 1920/5 [Vol. III], 543*)

By this time, the institutional and operational importance of the 'attack at source' doctrine was on the wane, as the at-sea components of the new ASW complex began to fall into place and the Soviet submarine threat proved less severe than anticipated. Without access to the war planning documents themselves, we do not know whether the forward, offensive element of U.S. Navy fleet-on-fleet operations was really "lost"[207] during this period, as Palmer believes it was. Richard Hegmann, for one, disagrees quite vehemently and finds considerable evidence of 'attack at source' thinking well into the 1960s.[208] Given that it eventually reappeared with some twists (and a vengeance) in the late 1970s, one might wonder if it had ever been truly gone.[209] What can be stated unequivocally is that the relative importance of the carrier's strategic nuclear missions increased as the 1950s wore on and that "targets of naval interest"[210] might have been less central to the carriers' operational employment in a general war. At the same time, their continued utility was now no longer in any doubt. Ironically, given the growing concerns over surface ship survivability in the nuclear age, it was the Navy's stake in the nuclear undertaking that had given the large-deck carrier a new lease on life.[211] In political terms, the Navy's responsiveness in Korea probably came a close second, although the idea that the limited war mission *alone* could have sustained a fifteen-carrier Navy in the 1950s political-strategic environment is problematic.[212]

At the high point of carrier-based strategic deterrence – roughly six months before the first *Polaris* submarine, the USS *George Washington* (SSBN-598), went to sea in the final days of 1959 – there were 1,124 nuclear weapons afloat in the Atlantic, the Mediterranean, and the

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[207] Palmer, *Origins of the Maritime Strategy*, 82-94.
[208] Hegmann, "In Search of Strategy: The Navy and the Depths of the Maritime Strategy," 290-331, 460-85.
[209] Palmer was the first one to explicitly make the connection through historical research. See Palmer, *Origins of the Maritime Strategy*, 93-94.
[210] Barlow, *Revolt of the Admirals*, 115.
[211] See Miller, *Nuclear Weapons and Aircraft Carriers*, esp. 28-39.
[212] To an extent, this changed in the 1960s and the Navy could not be faulted for emphasizing this aspect, as Arleigh Burke and others did at many occasions, even in an environment in which strategic nuclear planning reigned supreme. See e.g. Ken Jones and Hubert Kelly, *Admiral Arleigh (31-Knot) Burke: The Story of a Fighting Sailor* (Annapolis, MD: Naval Institute Press, 2014), 185. The fact remains, however, that even in the 1960s the limited war rationale could only support a stagnant force structure – and U.S. Secretary of Defense (SECDEF) McNamara was not at all unsympathetic to limited war thinking. As part of a justification for the large carrier force the Navy wished to maintain indefinitely, limited wars were an important – but apparently not a sufficient – element in the long term.

Pacific.[213] In fact, we now know that there were more nuclear weapons aboard U.S. Navy ships in 1959 than there were *in the entire Soviet armed forces*.[214] There was also an entirely new type of attack carrier under construction: the 90,000 ton, nuclear-powered USS *Enterprise* (CVAN-65). In operations off the coast of Vietnam in 1965, she would launch 165 strike sorties in a single day.[215] At the same time, according to Hendrix' recent study, the average unrefueled range of the carrier air group had increased by roughly 60 percent since 1943.[216] Evidently, as the U.S. Navy's attack aircraft turned into capable nuclear delivery vehicles and as the new carrier fleet itself was being modernized, the urgency of countering U.S. naval air was taken to a different level in the eyes of the Soviet political and military leadership. Something had to be done about the carriers – and the best way to quickly counter-concentrate (nuclear) fire-power against them was with naval aircraft.

4.5.3 Soviet naval aviation: pioneering missile combat

The instrument that would have to deliver these counter-concentrations of air power was the AVMF, with some level of support by Long-Range Aviation forces of the Soviet Air Force (*Voenno-vozdushnye sily*, VVS), if and when they were available for the task. At the time when the anti-carrier mission first emerged, in the mid-1950s, Soviet naval aviation was very much in a state of flux and not yet in any shape to effectively counter carrier-borne strikes. With relatively limited combat experience in World War II, the AVMF had to draw extensively on

[213] Department of Defense, "Nuclear Weapons Afloat: End of Fiscal Years 1953-1991," https://open.defense.gov/Portals/23/Documents/frddwg/weapons_afloat_unclass.pdf, 1.
[214] We get this rather significant insight by cross-referencing Department of Defense, "Nuclear Weapons Afloat: End of Fiscal Years 1953-1991" with Hans M. Kristensen and Robert S. Norris, "Global Nuclear Weapons Inventories, 1945–2013," *Bulletin of the Atomic Scientists* 69, no. 5 (2011), doi:10.1177/0096340213501363, 78.
[215] U.S. Navy, "USS Enterprise (CVN 65)," https://www.navy.mil/navydata/ships/carriers/histories/cv65-enterprise/cv65-enterprise.html.
[216] Jerry Hendrix, "Retreat from Range: The Rise and Fall of Carrier Aviation" (Center for a New American Security, Washington, DC, 2015), 19, 27.

foreign experience to find its way in the postwar period.[217] Fittingly enough, this meant studying the U.S. and Japanese performance in the Pacific War above all.[218] As this element of the Soviet naval posture began to result in a credible, land-based anti-carrier capability, it opened up a second front of competitive adaptation that would remain highly active into the 1980s.

In the late 1940s, the naval strike component of the AVMF was still a force of basic torpedo bombers like the Ilyushin Il-4, Tupolev Tu-2, and the lend-lease Douglas A-20 *Havoc* (known as the *Boston* in the UK and USSR). All of them had originally been meant for the VVS and were modified for naval use, as would largely be true of AVMF aircraft throughout the Cold War era.[219] In the early 1950s, these ageing types were complemented by the first jet-powered types, the relatively successful Il-28 *Beagle* and the more problematic Tu-14T *Bosun*.[220] The weapons of choice for anti-surface warfare at this time were conventional, 450 mmi torpedoes as well as the rocket-propelled RAT-52 torpedo, which offered a significantly better range of 10 kilometers.[221] While the concept of the anti-surface torpedo aircraft as such was in its twilight days, the aircraft themselves were certainly more capable than World War II-era types, with much higher speed and a search radar that would detect a carrier up to 50 kilometers away.[222] The well-known limitations remained, however: the aircraft still had to get relatively close and attrition would be high as a result. (The last ever operational use of torpedo aircraft took place in 1951 – not against a ship, but against the Hwacheon hydroelectric dam in Korea.[223]) From 1954 onwards, some specialized Il-28 squadrons were nuclear-capable and equipped with the 30-kt RDS-40, which is considered the Soviet Union's first tactical nuclear

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[217] On Soviet naval air operations during World War II, see Yefim Gordon, *Soviet Air Power in World War 2* (Hinckley: Midland, 2008), passim.

[218] Tokarev argues that the AVMF came up with some almost literal analogies. We will discuss this argument further in Chapter 5. Maksim Y. Tokarev, "Kamikazes: The Soviet Legacy," *Naval War College Review* 67, no. 1 (2014), 1-24.

[219] Yefim Gordon and Dmitriy Komissarov, *Soviet Naval Aviation, 1946-1991* (Manchester: Hikoki Publications, 2013), 83. This is currently the most comprehensive examination of the Cold War-era AVMF in English.

[220] Ibid., 83-92; 294-98; 314-17.

[221] Ibid., 354-55.

[222] Ibid., 88.

[223] Norman Polmar and Dana Bell, *One Hundred Years of World Military Aircraft* (Annapolis, MD: Naval Institute Press, 2004), 293.

weapon.[224] In addition, there were a number of mine-layer regiments, which might also have had some utility in an anti-carrier scenario.

What the AVMF really needed, however, was a weapon that could be fired from outside the combat air patrol (CAP) radius of American naval task forces, which would radically reduce the level of attrition that the attacking aircraft would suffer and allow regiments to be turned around for more attacks. Using high-level torpedo attacks – rather than the low-level, close-in attacks that had sometimes resulted in entire squadrons being wiped out during the Pacific War – was a start.[225] But the attackers would still have to run the gauntlet of an enemy task group's radar-directed defense-in-depth, which was far from perfect in the 1950s, but still one of the world's most dense and most tightly coordinated air defense environments.[226] One rather promising way to avoid the worst of this potential meatgrinder had been pioneered by the German *Luftwaffe* in the shape of the Hs 293, a rocket-powered, radio-guided glide bomb.[227] Provided that the range of such weapons could be increased substantially, and the guidance improved, the attacking aircraft would be able to hit distant targets from outside the range of U.S. fleet air defenses. A number of experiments in the late 1940s convinced Soviet engineers that this was the direction to go in and eventually produced the first practical, long-range anti-ship missile (ASM), the KS-1 *Kometa* (NATO designation: AS-1 *Kennel*).[228]

The *Kometa* was essentially a 'miniaturized' Mikoyan-Gurevich MiG-15 fighter jet that had been equipped with a radio command guidance system and a 800-kilogram warhead. With an effective range of 90 kilometers and a speed of slightly over 1,000 km/h, it still left the launching aircraft exposed to counter-attack while it guided the missile onto the target. [229] But

224 Gordon and Komissarov, *Soviet Naval Aviation, 1946-1991*, 90.

225 Norman Friedman, *Fighters Over the Fleet: Naval Air Defence from Biplanes to the Cold War* (Barnsley: Seaforth, 2016), 281.

226 Concerning the limitations of U.S. fleet air defenses in the 1950s, currently the best account is ibid., 296-317.

227 Martin J. Bollinger, *Warriors and Wizards: The Development and Defeat of Radio-Controlled Glide Bombs of the Third Reich* (Annapolis, MD: Naval Institute Press, 2011), passim; Carlo Kopp, "The Dawn of the Smart Bomb," Technical Report APA-TR-2011-0302, Air Power Australia, https://www.ausairpower.net/WW2-PGMs.html; Norman Friedman, *Seapower and Space: From the Dawn of the Missile Age to Net-Centric Warfare* (Annapolis, MD: Naval Institute Press, 2000), 134.

228 Ibid., 134-36.

229 Yefim Gordon, *Soviet/Russian Aircraft Weapons: Since World War Two* (Hinkley: Midland, 2004), 71-81; Friedman, *Seapower and Space*, 136-38.

with twenty-five times the range of a standard air-dropped torpedo and a flight time of roughly six minutes, where a torpedo attack would result in almost twice the exposure time (and to successive defensive layers), it was still a major improvement. The missile was first deployed in 1953 and the first aircraft to be armed with it was a modified Tu-4 bomber – a close copy of the American B-29.[230] This Tu-4K first took off in 1951 and could carry a KS-1 under each wing, as well as the radar and guidance system, with a combat radius of about 2,000 km.[231]

The Tu-4K served only for a few short years, with one regiment each in the Northern Fleet and Black Sea Fleet areas and were actually outlived by their torpedo-carrying predecessors.[232] According to a rather well-informed source, "the Soviet government seriously considered using these aircraft against US Navy aircraft carriers during the Korean War,"[233] but this could not be conclusively verified. In truth, the Tu-4 was of dubious value as an anti-carrier platform even when it entered service. In Korea, the largely identical B-29 had proven so susceptible to Soviet-made jet fighters that all daylight missions had been discontinued by October 1951.[234] While any bomber was bound to be vulnerable to some extent, even when escorted, the lumbering Tu-4s would have been easy prey for the new carrier-borne jet interceptors. The KS-1 missile itself was found more likely to retain some utility and was kept in service into the late 1960s.

The need for a more capable platform was met by the Tu-16 *Badger* medium bomber. The Tu-16 was one of the most adaptable and successful Soviet bomber designs of the Cold War and the naval version remained in service into the 1990s.[235] With the missile-carrying Tu-

[230] Gordon, *Soviet/Russian Aircraft Weapons*, 79. This was four years earlier than the CIA believed, making this one of the cases in which the threat was actually ahead of the projections. Central Intelligence Agency/Directorate of Intelligence, *The Soviet Naval Cruise Missile Force: Development and Employment*, December 1971, CIA Historical Collection, ~~TOP SECRET~~ (declassified 14 June 2017), 7.

[231] Gordon and Komissarov, *Soviet Naval Aviation, 1946-1991*, 313.

[232] Ibid.

[233] Gordon, *Soviet/Russian Aircraft Weapons*, 79.

[234] Conrad C. Crane, *American Airpower Strategy in Korea, 1950-1953* (Lawrence, KS: University Press of Kansas, 2000), 88-91.

[235] For a comprehensive developmental and operational history of the Tu-16, see Yefim Gordon, Dmitriy Komissarov and V. G. Rigmant, *Tupolev Tu-16: Versatile Cold War Bomber* (Atglen, PA: Schiffer, 2017). The *Badger* was also the aircraft at the heart of the 'bomber gap' controversy, that caused a public uproar in the

16KS entering service in numbers between 1954 and 1958, it quickly became apparent that the limiting factor would now be the missile. A new K-1M *Kobalt* search and targeting radar could detect maritime targets up to 180 km away.[236] The combat radius of 1,800 kilometers was perfectly adequate for what was still an early generation jet aircraft. The cruising speed of 800 km/h was also satisfactory, although its top speed of 990 km/h was not fast enough to run away from contemporary carrier-based fighters and would be vastly inferior to the next generation of U.S. Navy fleet defense fighters like the F8U *Crusader*.[237] As a result, the *Badger* would also remain quite vulnerable unless its standoff range could be increased further. The fact that the KS-1 severely degraded the performance of the aircraft during its attack run, forcing it to reduce speed to about 420 km/h and descend to below 4,000 meters to launch the missile, and then slow down even further to guide it, only added to the problem.[238] It was not lost on U.S. intelligence, either.[239] Hence, a new weapon was needed for the *Badger* to realize its potential. None of the programs that were undertaken to fulfil that requirement resulted in any actual capability before the early 1960s, and we will examine the further development of the AVMF's strike branch in Chapter 5. Finally, it should also be mentioned that the AVMF was still somewhat hedging its bets with regard to missile combat: there was also a more traditional Tu-16T version of the *Badger*, which was armed with up to six standard, 450 mmi torpedoes or assorted mines. Along with the AVMF's own fighter regiments, the torpedo and mining components were also shut down during Khrushchev's stringent defense rationalizations in 1960, leaving primarily missile carriers and land-based ASW aircraft.[240]

United States. For a recent reassessment of this episode, see Luke B. Wells, "The 'Bomber Gap': British Intelligence and an American Delusion," *Journal of Strategic Studies* 40, no. 7 (2017), doi:10.1080/01402390.2016.1267006, 963-89.

[236] Gordon and Komissarov, *Soviet Naval Aviation, 1946-1991*, 318.

[237] Ibid., 323. On the fleet defense fighters of this era, see Friedman, *Fighters Over the Fleet*, 238-79.

[238] Friedman, *Seapower and Space*, 137-38. Friedman also states that the KS-1 "could not be salvoed" (145). Gordon and Komissarov describe how, in practice, this limitation could be overcome to an extent with creative work-arounds. Gordon and Komissarov, *Soviet Naval Aviation, 1946-1991*, 103.

[239] Central Intelligence Agency/Directorate of Intelligence, *The Soviet Naval Cruise Missile Force: Development and Employment*, 10.

[240] The suitable strike aircraft in the VVS were simultaneously transferred to the AVMF. The VVS retained one weapon and aircraft that had been adapted to the anti-ship role. This was a Tu-95 *Bear* carrying the Kh-20 (AS-3 *Kangaroo*), which was originally designed as a strategic nuclear weapon. With low accuracy and a massive warhead, this was a weapon of last resort against an approaching task force.

Ultimately, even the developments of the 1950s left the AVMF a very different organization – one that would be fighting according to a novel operational paradigm that had yet to reach its full potential. Nevertheless, the future implications for the U.S. Navy's carrier-centric posture were clearly significant: "By about 1960 the U.S. Navy considered missile-armed 'Badgers' the most serious threat to carrier battle groups, whose main wartime task was to hit Soviet land targets. The carriers could outrun diesel-powered submarines, but not bombers."[241] Eventually, the submarine and airborne missile threats would begin to converge into a single paradigm of tightly orchestrated combined arms operations at sea. This possibility was already hinted at in a CIA analysis of the Soviet professional military literature from the 1950s and early 1960s:

> "The take-off lines for carrier strike aircraft must, under most circumstances, be within 1,000 nm of the USSR for strikes, even against peripheral targets. Obviously the area within the take-off line of carrier strike aircraft is considered the most critical, but it also is the area in which the Soviet Navy has at least some current defensive capability. It is in this general area that Soviet preemptive strikes against carriers would be made and where forces may be continually deployed. Forces that can be employed now to some extent and forces that are planned for future employment in this area include reconnaissance aircraft; aircraft armed with ASM's; and reconnaissance, torpedo, and cruise missile submarines with either nuclear or diesel propulsion. It is principally in this area that joint operation of aircraft and submarines will be carried out."[242]

While this would clearly complicate carrier task forces' defense problem, the practical challenges of implementing such a paradigm were more formidable than professional military science would have us believe. The convergence between submarine and naval air forces in pursuit of an effective anti-carrier capability will be further detailed in the next chapter.

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[241] Friedman, *Seapower and Space*, 138.

[242] Central Intelligence Agency/Office of Research and Reports, *Soviet Naval Strategy and Its Effects on the Development of Naval Forces, 1953-63*, ~~TOP SECRET~~ (declassified 21 May 2012), 15.

4.5.4 Darkening horizons: carriers versus land-based air

How would the U.S. Navy's carrier groups have fared against the first postwar generation of Soviet strike aircraft? While it is difficult to provide a conclusive answer, the story of U.S. fleet air defense during this first phase of the Cold War at sea is best described as one of considerable confidence in the main instrument of transoceanic power projection slowly turning into apprehension as 1950s progressed. The original optimism is repeatedly captured in key statements of the 'attack at source' concept. The Naval Strategic Planning Study (NSPS) 3 of March 1947 is fairly typical in that regard:

> "Carrier air power, operating from the highly mobile, self-defending, and self-sustaining sea bases embodied in the carrier attack force, is the only weapon in the possession of the U.S. which can deliver early and effective attacks against Russian air power and selective shore objectives in the initial stages of a Russo-American conflict."[243]

The background to statements like this is plainly discernible: The U.S. Navy had done it in the Pacific during 1944-1945 and would be able to reliably reproduce that success. NSPS 3 is remarkable, among other things, for stating this logic explicitly. Palmer's excellent summary is worth quoting in full:

> "Based on the Navy's World War II experiences in the Pacific, [NSPS 3] concluded that carriers could operate effectively in the face of quantitatively superior Soviet air power. The Pacific war demonstrated that mobility, concentration, and surprise were the key to successful carrier operations. Naval air accounted for 68 percent of the Japanese planes destroyed during the Philippines campaign, most of them on the ground. Land-based aircraft were less effective. Carrier planes carried a lighter bomb load but delivered ordnance with greater precision than land-based bombers. In addition, lack of forward air bases would characterize a Soviet-American war, just as it had the Japanese-American struggle."[244]

The Navy's assessment of the air threat tracks followed a similar pattern as those in the ASW area: the next war, it was assumed, would be fundamentally the same as the last one. In the Pacific, carrier task forces had become highly effective at wearing down the adversary's land-

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[243] Quoted in: Isenberg, *Shield of the Republic*, 131.
[244] Palmer, *Origins of the Maritime Strategy*, 35.

based air power at acceptable cost to themselves. By concentrating the defensive strength of several carriers in close proximity, they had eliminated the offensive advantage the Japanese had enjoyed at the outset of the war.[245] Ultimately, even Japan's embrace of Kamikaze attacks – essentially saturation raids using "human missiles"[246] – could not overcome carrier defenses with sufficiently high success rates to make a real difference. According to one postwar study, there were 2,550 Kamikaze sorties during the Philippines and Okinawa operations, of which CAP fighters downed 45-50 percent and anti-aircraft guns destroyed between half and two thirds of those that made it through the CAP screen. This still left 453 to inflict hits and near-misses, but not a single fleet carrier was sunk by Kamikaze.[247]

With this in mind, it is unsurprising that ADM Sherman felt the carriers could and, indeed, should be sent in "harm's way"[248] in a war against the Soviet Union, much like they had been against a capable opponent only a few years before. And it is difficult not to credit Sherman's assessment. As was the case with many of his fellow naval officers in OPNAV and in the fleet, his was a view based not just on historical analyses, but also on his personal experience as a participant. The ability of a carrier task force to survive in the face of determined attacks against it lay not in any of its individual elements, but *in the system* of task group operations the U.S. Navy had developed – and, on balance, that system had performed extremely well. Sherman had seen it in action against the IJN – indeed, he had himself *wielded* it as Nimitz' key operations planner. Now he and other veterans of fast carrier operations in the Pacific were confident that it could be successfully wielded against the Soviet Union as well. What is more, he was almost certainly right about that in 1947. Of course, the carrier would always be vulnerable to some extent. Sherman's own command, the USS *Wasp*, had been torpedoed out from under him by the Japanese submarine I-19 in September 1942. But a carrier group was an instrument of war – it was *meant to be* sent into harm's way. The risks could be minimized to

[245] Hughes and Girrier, *Fleet Tactics and Naval Operations*, 98.
[246] Carl Solberg, *Decision and Dissent: With Halsey at Leyte Gulf* (Annapolis, MD: Naval Institute Press, 1995), 143.
[247] Operations Evaluation Group, "Defense Against Kamikaze Attacks in World War II and its Relevance to Anti-Ship Missile Defense: Volume I: An Analytical History of Kamikaze Attacks Against Ships of the United States Navy During World War II" (Study 741, Center for Naval Analyses, Alexandria, VA, 1971), 73.
[248] Palmer, *Origins of the Maritime Strategy*, 35.

such an extent that they would be bearable, but they could never be eliminated. And they *were* bearable if experienced carrier admirals *were willing to bear them*.

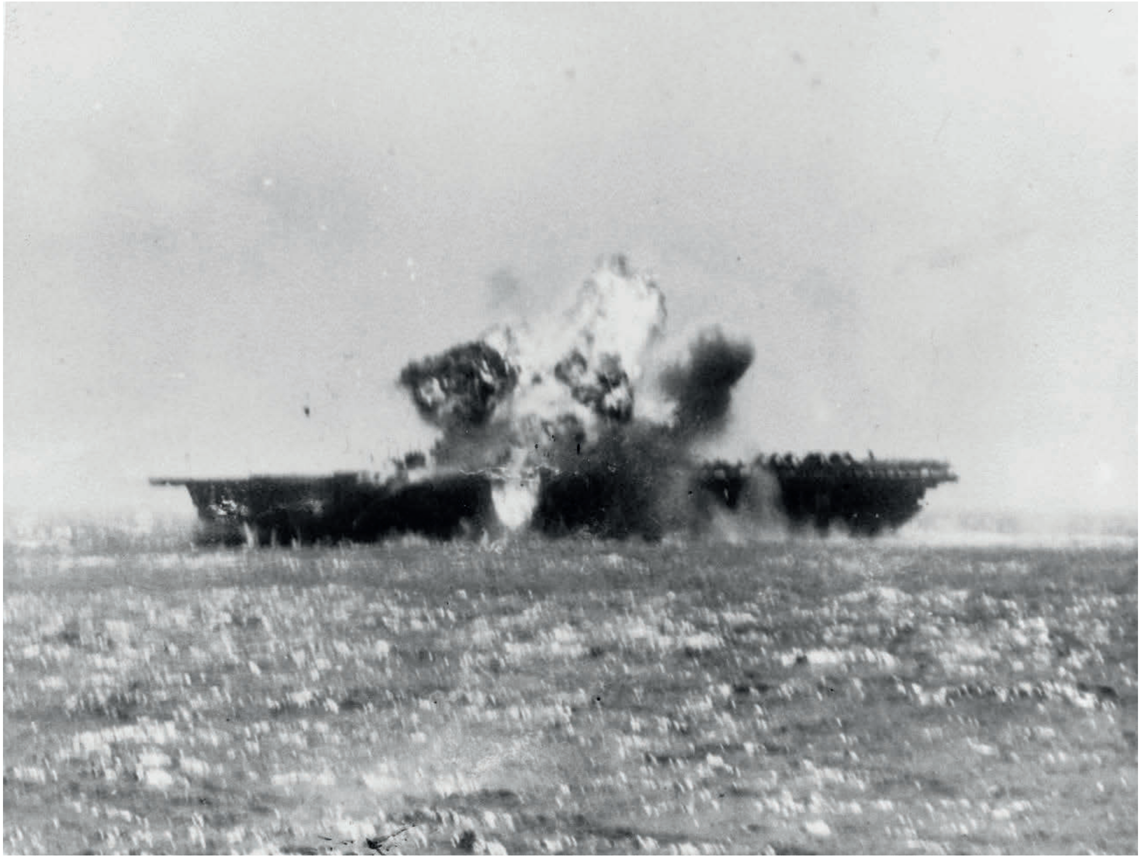

Fig. 15: USS *Essex* (CV-9) is struck by a Kamikaze during operations off the Philippines, 25 November 1944. She lost 15 of her crew in the attack. A testament to the robustness of the 24-ship class she led, and of U.S. fleet carriers more generally, she was back in the fight three weeks later and continued to serve in the active force until 1969. No *Essex*-class carrier was lost to enemy action. *(U.S. National Archives)*

At the same time, however, important aspects of warfare were changing rapidly, as the Navy well understood. What remains remarkable about the entire set-up proposed in NSPS 3, the OP-55 study and other documents of the time, is the implicit assumption that the VMF would let U.S. carrier groups steam into the Barents Sea to lay waste to its bases with nuclear weapons, but would not itself use tactical nuclear weapons against a set of suitably isolated military targets at sea. There is an air of implausibility about this, given that the U.S. Navy of the late 1940s and the 1950s had no compunction about using tactical nuclear weapons (TNWs) extensively and early in a conflict, but the idea remained strangely constant. In fact, the same assumption still figured prominently in the Maritime Strategy debates of the 1980s. Although we cannot know for certain what the Soviet threshold for the employment of TNW at sea was, this was almost certainly a misunderstanding of Soviet ideas about operational art and nuclear warfighting – and one that a new generation of carrier admirals might have paid dearly for.[249]

The Navy's argument was about more than recent history and carrier vulnerability, however. It was also an argument about the service's carrier-centric organizational essence, about still being *the right kind of Navy* in a new era. The Op-55 study made this case very explicitly:

> "Carrier aviation must retain the bulk of its strength in *offensive power* if it is to support a truly offensive Navy rather than a defensive one. Our Navy must carry out numerous functions other than defensive antisubmarine warfare and must possess the self-contained ability to move at will and wage offensive war against the enemy in the air, on the surface and below the surface."[250]

As if to confirm that a carrier offensive was not only the proper thing to do, but also urgently necessary, they made the case that land-based aircraft would actually be a more severe threat to NATO's SLOCs than submarines and had to be dealt with immediately in case of war.[251] To understand the bureaucratic and interservice dimensions of this story, it is worth considering how the Navy's most forceful competitor, the Air Force, viewed carrier operations. Jeffrey Barlow provides a short synthesis of various Air Force criticisms of the effectiveness of carrier air power during this period:

> "1) aircraft carriers are highly vulnerable to a variety of attacks by an enemy's air force and submarines;
> 2) carriers would be unable to operate in waters within range of a first-rate land-based air force;
> 3) carrier aircraft are inherently inferior to land-based aircraft in range, speed, and

[249] Damage limitation using counterforce attacks was a key tenet of Soviet military and nuclear policy for most of the Cold War. See e.g. William Thomas Lee and Richard F. Staar, *Soviet Military Policy since World War II* (Stanford, CA: Hoover Institution Press, 1986), 24. Ball also notes "the attractiveness of ships as nuclear targets" and concludes that, given the general inferiority of its naval combatants and asymmetric force design, "the Soviet navy must be expected to resort to the use of nuclear weapons at a fairly early stage in any major engagement at sea, particularly when it is called upon to destroy U.S. carrier task force." Desmond Ball, "Nuclear War at Sea," *International Security* 10, no. 3 (1985), doi:10.2307/2538940, 8-10, 27-28. This was probably even more true of the 1950s than it was of the 1980s.

[250] Quoted in Rosenberg, "American Postwar Air Doctrine and Organization: The Navy Experience," 262. Emphasis in the original.

[251] Ibid., 262.

combat capability;

4) carrier aircraft lack the requisite range to hit significant targets in the interior of a large land power;
5) the weight of a bombing effort that a carrier task force could employ against land targets is relatively insignificant."[252]

Of course, evidence can be adduced to support or undermine any and all of these criticisms. The point here is not to evaluate them in detail, but to illustrate the divergence of informed perspectives on the issue – a valuable demonstration of Miles' Law in public administration, according to which "where you stand depends on where you sit."[253]

Meanwhile, the Navy's own studies and exercises were a source of increasing concern as the 1950s wore on. There were several new problems for fleet air defense in a world of jet aircraft, anti-ship missiles, and nuclear weapons that could not be reduced to the same old formulae that had served late-World War II carrier concentrations so well. To counter massed air attacks, the carriers still had to be concentrated. But if nuclear attack was a possibility, they had to be dispersed. CAP fighters were now faster, but also had lower endurance, there were fewer of them and "none of the possible solutions using fighters was leakproof."[254] The first air defense missiles – the medium-range *Terrier* and *Tartar*, and the long-range *Talos*, collectively known as '3 T programs' – would start coming into the U.S. fleet in greater numbers in the late 1950s and early 1960s.[255] But, as yet, they were far from being an effective missile age equivalent to the countless anti-aircraft (AA) guns of a World War II fast carrier task force. Work had also begun on the much more advanced *Typhon* program – in some ways a precursor for the *Aegis* system – but it would take years to be fielded (and, as we will see, was eventually cancelled).[256]

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[252] Barlow, *Revolt of the Admirals*, 121.

[253] Barton J. Bernstein, "Understanding Decisionmaking, U.S. Foreign Policy, and the Cuban Missile Crisis: A Review Essay," *International Security* 25, no. 1 (2000), doi:10.1162/016228800560417, 156; Rufus E. Miles, "The Origin and Meaning of Miles' Law," *Public Administration Review* 38, no. 5 (1978), doi:10.2307/975497, 399-403.

[254] Friedman, *Fighters Over the Fleet*, 310.

[255] See Norman Friedman, "The '3 T' Programme: Part 1 and 2," in *Warship: Vol. VI*, ed. John Roberts (London: Conway Maritime, 1982), 158–166, 181–185; Marion E. Oliver, "Terrier/Tartar: Pacing the Threat," *Johns Hopkins APL Technical Digest* 2, no. 4 (1981), 256-60; William Garten and Frank Dean, "Evolution of the Talos Missile," *Johns Hopkins APL Technical Digest* 3, no. 2 (1982), 117-22.

[256] Milton Gussow and Edward C. Prettyman, "Typhon – A Weapon System Ahead of Its Time," *Johns Hopkins APL Technical Digest* 13, no. 1 (1992), 82-89.

In addition, the defender could now also rely on electronic warfare to counter guided weapons like the KS-1, which opened up new and – at this stage – largely unprecedented possibilities for the defense.[257] But while this field would experience explosive growth over the next several decades, there is little mention in the literature of electronic countermeasures being implemented at this stage.[258] Thus, even the rudimentary *Kometa* ASM still stood a good chance of doing serious damage. In one scenario of a Soviet attack involving KS-1 missiles, the Navy's Operations Evaluation Group (OEG) estimated that surface-to-air missiles would shoot down only three out of fifty attacking planes, with CAP fighters accounting for ten others, and fifteen out of a notional 100 missiles.[259] The end result would be a devastating 29 missile hits on the task force, all by missiles that could best be described as basic.[260] All was not well with the Navy's new model air defenses – and the AVMF's strike forces still had a number of unpleasant surprises up their sleeve.

4.6 Summary

At the end of the first period of the Cold War at sea, the Soviet challenge to Western sea control was slowly picking up steam. Clearly, here was a landpower that intended to balance against the naval capabilities of the Western alliance in earnest and with a significant investment of resources. Yet, if anything, the U.S. Navy was in a stronger position to counter the VMF's main, submarine-centric effort than it had been when the challenge first took shape a decade earlier. Several factors explain this somewhat puzzling outcome. *First*, it is important to realize that the threat submarines posed to the SLOCs was readily understood on both sides of the Atlantic and that the response in this case did not depend on the outcome of any lengthy debates about the nature or potential gravity of the threat. While the U.S. Navy ended up adjusting to the

[257] Karl Lautenschläger, "Technology and the Evolution of Naval Warfare," *International Security* 8, no. 2 (1983), doi:10.2307/2538594, 39-40.
[258] In his excellent case study work, Solomon mentions EW "soft-kill" systems optimized against the Tu-16s radar guidance system but does not date this development, nor do any of the other sources that were consulted. Jonathan Solomon, "Defending the Fleet from China's Anti-Ship Ballistic Missile: Naval Deception's Role in Sea-based Missile Defense" (Master's thesis, Georgetown University, 15 April 2011), 45.
[259] Friedman, *Fighters Over the Fleet*, 311.
[260] Ibid.

Soviet submarine program for the wrong reasons, this would seem to partially account for the fact that the adjustment process was relatively smooth during the early phase of the Cold War at sea. *Secondly*, the USN could also feed off its wartime ASW effort, which included a strong basic research component. The postwar development of a lasting advantage in passive acoustics rested on some of the preliminary findings drawn from that research. *Thirdly*, the overestimation of the VMF submarine fleet's potential for offensive operations, based on inaccurate assumptions about its purpose, led to a stronger techno-doctrinal reaction than an accurate understanding of the problem would have supported. This also meant that avenues of development that might otherwise have encountered greater bureaucratic resistance – such as the shift towards hunter-killer submarines as a leading element of the ASW program – were vigorously pursued early on. *Finally*, the idea that the VMF was dead-set on cutting NATO's lifeline across the Atlantic also supported an early focus on ASW against nuclear-propelled submarines, which promised to upset the existing equation of undersea warfare. As a result, the Navy was already planning against this even more serious threat before it ever materialized.

Along with Soviet techno-doctrinal and force design choices that appear questionable with hindsight, this combination of factors set the U.S. Navy on a path towards long-lasting superiority in undersea warfare. While historical contingency undoubtedly played an important part in realizing the underlying advantages, the complex relationship between inaccurate – but bureaucratically convenient – threat perceptions and reactions at the level of ASW posture goes a long way towards explaining the unequal footing on which the two navies entered the decisive second phase of the competition. At the same time, the U.S. reactions to the Soviet submarine threat were such that they were almost certain to exacerbate the security dilemma at sea, thus fueling further feedback loops over the following decades.

This is particularly true with regard to the 'attack at source' concept, which was adopted not only because it was considered an effective response to the submarine threat, but for bureaucratic reasons, including its consistency with the organizational essence of the carrier-centric Navy that had been spawned by the exigencies of the Pacific War. Given the strong focus on striking Soviet territory from the sea early in a conflict, the security dilemma logic applied here with particular force. At the same time, however, the threat posed by the carriers to the Soviet homeland could still be countered using relatively conventional naval means.

While a specialized, submarine-based element of the anti-carrier effort only began to emerge during the 1960s, we can already see the outlines of that reaction in the development of Soviet naval air forces.

Here, a different picture emerges – one that still very much allowed for a future in which carrier survivability would be reduced to such an extent that forward operations would become very difficult to justify. It is certainly fair to say that, by the end of this first phase, the U.S. side had not found a remedy that offered anything like the long-term, theater-wide potential of SOSUS or the frightful level of ASW capability that the fast attack submarine provided at the platform level. *Typhon* might have come close, but its price tag was ultimately much more impressive than the capabilities it provided, and its cancellation meant that U.S. fleet air defenses continued to fall short of their requirements. Thus, it was not until *Aegis* made its appearance in the fleet in the mid-1980s that surface ships came as individually capable vis-à-vis AAW threat they faced as SSNs were vis-à-vis their much less impressive Soviet counterparts. However, as was the case in both battlegroup and wide-area ASW, the U.S. advantage in AAW ultimately lay in the *system*, rather than the platforms themselves. In 1960, the U.S. Navy's AAW system for the missile age looked considerably more fragile than the slowly solidifying ASW system. As we will see, that fragility eventually abated and the threat from missile-firing aircraft and submarines remained manageable. Why this was the case, and how the VMF's submarine fleet developed from a zone defense force into the main element of a missile-armed, high-seas anti-carrier complex, will become evident in the next chapter.

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A shield and spear for the motherland

FROM BARRIERS TO BASTIONS, 1961-1981

5.1 Naval advantage and the search for security in the nuclear age

Following the U.S. Navy's head start into the nuclear age, the VMF did not lose a lot of time catching up. By 1958, it had launched its first nuclear-powered submarine, essentially still with the same four-year lag that had attended the Soviet Union's military nuclear program since the mid-1940s.[1] The breakneck speed inevitably came at a cost: the first generation of Soviet nuclear submarines was famously unreliable and accident-prone, killing scores of sailors over the decades.[2] While human and material casualties both occurred far more frequently than in the U.S., this was clearly seen as an acceptable price to pay while the calculations of Soviet military planners continued to revolve around the imperative of homeland defense. Unavoidably, this imperative took on even greater significance as Soviet decision-makers began to grapple with the implications of the nuclear revolution. The second phase of the competition thus resulted in a modulation of the original security dilemma at sea, in which an expectation of large-scale Soviet submarine construction had given rise to the 'attack at source' doctrine,

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1 Raymond P. Ojserkis, *Beginnings of the Cold War Arms Race: The Truman Administration and the U.S. Arms Build-Up* (Westport, CT: Praeger, 2003), 150.

2 For a complete overview of Cold War naval nuclear accidents involving these (and other) Soviet submarines, see P. L. Olgaard, "Accidents in Nuclear Ships" (NKS/RAK-2(96)TR-C3, NKS/Nordic Nuclear Safety Research, Roskilde, 1996). There is no comparable resource covering non-nuclear accidents, which tend to draw comparatively little attention, but it is understood that a number of such accidents also occurred.

which in turn vindicated the VMF's belief that a large submarine fleet was necessary to defend the homeland. During the 1960s, U.S. naval power projection very much remained at the center of Soviet force development, but the VMF now felt that it potentially could – and, indeed, had to – counter the U.S. Navy's offensive edge by targeting nuclear-armed aircraft carriers long before they reached their launch points. As we will see, this might also have included attacks on U.S. naval bases with sea-launched ballistic missiles (SLBMs). When the first Soviet missile submarines went to sea, the VMFs mission structure began to reflect this additional, more offensive approach to counter-projection operations. Meanwhile, the largest share of the VMF's resources for submarine construction went towards direct anti-carrier defense rather than nuclear strike missions. Hence, even as the Soviet approach to naval warfare became more ambitious in the 1960s and early 1970s, it essentially remained what it had always been: *territorial defense at sea*.

Concurrently, the U.S. Navy continued to prepare for a Third Battle of the Atlantic, with the unpleasant addition of potential nuclear strikes from submarines against its home territory. With the technological breakthroughs of the 1950s coming to full fruition, the service became more capable in wide-area ASW than ever before. SOSUS proved highly effective against early nuclear designs, which produced high noise levels *constantly*, where diesel-electrics had been noisy only intermittently.[3] Moreover, from the early 1970s onwards, the data the evaluation centers produced was fed into an all-source operational intelligence system that was not only more effective in tracking submarines, but less vulnerable under wartime conditions. With better cueing, a growing number of 'fast attacks' operating off enemy submarine bases and a fleet of ever more capable MPAs cutting down on reaction times, attrition rates were set to go up considerably. This would not only have relieved the expected pressure on the SLOCs, but also on the organic anti-submarine defenses of the offensively-oriented carrier battle groups (CVBGs), which were often lacking. Carrier vulnerability to submarine attack remained a factor, but clearly not enough of a factor to deter the U.S. Navy from experimenting with – and eventually adopting – even more offensive employment options towards the end

[3] Owen R. Cote, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarine,* Newport Papers 16 (Newport, RI: Naval War College Press, 2003), 21.

of this phase. As a result, we can conclude that the reliance on missile- and torpedo-armed submarines as part of the VMF's approach to counter-projection warfare, did not ultimately succeed in altering its opponent's operational preferences.

The Soviet failure to change its opponent's calculus is only partly attributable to the U.S. Navy's success in maintaining and further developing an increasingly dense and capable system for wide-area ASW. The competition in AAW also played a critical part in the eventual outcome. If the VMF had managed to stay ahead of its opponent in this field by introducing supersonic anti-ship missiles and survivable strike aircraft early on, and integrating them into a robust ISR and targeting infrastructure, as indeed it planned to do, the utility of the U.S. surface fleet would have been called in question to a much greater extent than ultimately was the case. This was particularly true after the *Typhon* failed to materialize and the U.S. Navy's ship-borne air defenses continued to rely on upgraded versions of the first-generation, '3 T' type systems into the 1980s. However, because technology development in this area of the competition was marked by considerable difficulties on *both* sides, the missile threat to the U.S. fleet remained at manageable levels. This is not to say that those missile-carrying strike aircraft and submarines that the VMF did deploy could not have inflicted grievous losses – including in *some* conventional-only scenarios. However, short of nuclear use, the relative fragility of the VMF's fledgling reconnaissance-strike complex meant that countermeasures could be designed with relative ease and that the AAW competition remained more balanced than it might otherwise have been. As a result, the carrier battle group model remained viable

An area in which the U.S. Navy soon found itself comfortably ahead, meanwhile, was the reliance on SSBNs for strategic deterrence. This brings us to the most important change in Soviet naval posture, which occurred towards the end of this second period – one that flowed from the VMF's inability to replicate its modest success in countering the carrier as a nuclear delivery platform in the field of anti-SSBN defense. As a result of this failure, the only option that remained open to it was to counter the U.S. Navy's sea-based nuclear weapons not with classical naval means but by making sure that its own SSBNs could strike the American homeland even while they remained securely ensconced in Soviet-controlled near-seas areas. While the resulting 'bastion' concept has been discussed at length elsewhere, the origins of that system and the context in which it emerged will be covered in some detail in this chapter.

5.2 A new kind of rivalry

5.2.1 Outlines of the future sea-based deterrent

The advent of nuclear propulsion brought with it a radical change in the submarine's combat potential. The most fundamental fact of life of diesel-electric submarine operations – the steep trade-off between speed and endurance imposed by limited battery capacity – no longer applied. The availability of unlimited energy, up to the fixed design output of the power plant, also meant that oxygen and freshwater could both be extracted directly from the undersea environment. As a result, the nuclear submarine did not depend on the surface for the entire duration of its patrol, with the important exceptions of communications and tactical reconnaissance, which were voluntary to some extent. As a result, the turn towards nuclear energy was an all but inevitable step for any power that wanted to seriously challenge the United States Navy at sea. Given the myriad of challenges that had to be overcome to construct a nuclear submarine that would not kill its crew in short order, the Soviet industrial base completed this turn in the shortest possible time and, by Western standards, cut too many corners in the process. The breakneck speed with which the shift to nuclear propulsion was accomplished nonetheless had an important long-term effect: the VMF remained viable as an undersea competitor for the following decades, despite the lower technical standard of its first- and second-generation nuclear submarines. However, before this nuclear turn would fully materialize, the VMF had to contend with an even more consequential innovation: the prospect of delivering nuclear weapons from a submarine platform against targets in the enemy's homeland. Together, these two developments would eventually reshape the Soviet Navy's way of doing business and fundamentally change the complexion of the Cold War competition at sea.

But, as yet, that change was still a long way off and the challenges that would have to be overcome were formidable.

In August 1949, the USSR became the second nation to successfully test an atomic weapon – in this case, the RDS-1 implosion bomb with a yield of 22 kilotons. This demonstrated nuclear capability was to remain an "existential"[4] deterrent vis-à-vis the United States for years to come. Despite speculations about one-way missions using the Tu-4A, the VVS did not have an intercontinental-range delivery system available until the mid-1950s.[5] It also lacked the forward bases the U.S. Strategic Air Command could depend on. It was in this situation that the VMF first began to make inroads with regard to capturing a portion of the nuclear strike mission. Breemer believes that the development of early SLBMs was initiated more or less in parallel with the first intercontinental ballistic missile (ICBM) programs.[6] Whether the submarine was actually seen as a practical intercontinental delivery system by Party leaders during this first phase is more difficult to establish.[7] What we do know is that, in September 1955, the VMF became the first navy in the world to launch a ballistic missile from a submarine. The missile was an early Scud derivative designated the R-11FM, with a range of perhaps 80-100 nmi, and the submarine in question was a *Zulu* – one of six that ended up serving as in the PLRB (*Povodnaya lodka raketnaya ballisticheskaya* or submarine with ballistic missiles) role, instead of in their original anti-surface patrol capacity. By comparison, the U.S. Navy did not launch the first UGM-27A *Polaris* missile from the USS *George Washington* until June 1960, but *Polaris* established an immediate technological lead of about ten years once it came online.

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[4] An existential deterrent is one which does not derive its effect from being operationally postured, but from its presence alone. See Marc Trachtenberg, "The Influence of Nuclear Weapons in the Cuban Missile Crisis," *International Security* 10, no. 1 (1985), doi:10.2307/2538793, 139.

[5] Steve Zaloga, *The Kremlin's Nuclear Sword: The Rise and Fall of Russia's Strategic Nuclear Forces, 1945-2000* (Washington, DC: Smithsonian, 2014), 15-16.

[6] Jan S. Breemer, "Estimating the Soviet Strategic Submarine Missile Threat: A Critical Examination of the Soviet Navy's SSBN Bastion Strategy" (Doctoral dissertation, University of Southern California, 1987), 48.

[7] Zaloga, *The Kremlin's Nuclear Sword*, 54.

Armed with only two of the short-range R-11FMs, which had to be launched from the surface, the modified *Zulu V*s provided a very modest level of capability.[8] Nonetheless, the VMF had been the first to put to sea a ballistic missile submarine that could theoretically launch against targets in the continental United States. To expand on this success, a dedicated SSB was derived from the *Foxtrot* design. The resulting Project 629 or *Golf*-class added one more missile tube and would carry a much larger, 350 nmi missile known as the R-13 (SS-N-4 *Sark*). With twenty-two *Golfs* built between 1958 and 1962, this would be the second largest class of Soviet ballistic missile submarines.[9] The ASW problem posed by these boats was in line with their patrol-type sisters, meaning that they were actually more difficult to detect than early nuclear submarines, but could be hunted to exhaustion once a good track had been established. They did not, by any reasonable standard, provide a secure second-strike capability, nor were they *intended* to do so – a point that will be elaborated on below. That said, the U.S. Navy could not be completely confident to sink all of them before they could launch, which meant that they would still have weighed on U.S. decision-makers' minds if deployed in a crisis.

The VMF was also initially neck and neck with the U.S. Navy in cruise missile development, but technical and bureaucratic setbacks resulted in repeated delays. The USN had initially adopted the German V-1 design and tested a reverse-engineered version of it – the KUW-1 or *Loon* – from submarines during 1947. The Navy's desire to field a cruise missile that could carry a nuclear warhead as soon as possible resulted in the *Regulus* missile and its supersonic follow-on, the *Regulus* II.[10] The Navy eventually commissioned four conventional and

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[8] Zulu II-IV were slight variations of the original patrol-type boats. See Norman Polmar and Jurrien Noot, *Submarines of the Russian and Soviet Navies, 1718-1990* (Annapolis, MD: Naval Institute Press, 1991), 283-84. The R-11FM's small 10-kiloton warhead in combination with its large circular error probable (CEP) also severely limited its utility against military targets, although there may have been a 500-kiloton version as well. Pavel Podvig, ed., *Russian Strategic Nuclear Forces* (Cambridge, MA: MIT Press, 2004), 309-12. As will be discussed below, this limitation was more relevant in the context of Soviet views concerning SLBMs, which were substantially different from those developed in the West.

[9] If the *Delta I-IV* are counted as subclasses of the, they relegate the *Golfs* to third place.

[10] David K. Stumpf, *Regulus: The Forgotten Weapon – A Complete Guide to Chance Vought's Regulus I and II* (Padacah, KY: Turner, 1996). A much more advanced ramjet design, known as *Rigel*, was also tested but discarded.

one nuclear-powered *Regulus* submarines between 1953 and 1960, but the surface-launched cruise missile (SLCM) compared unfavorably with *Polaris* and did not last long in U.S. service.

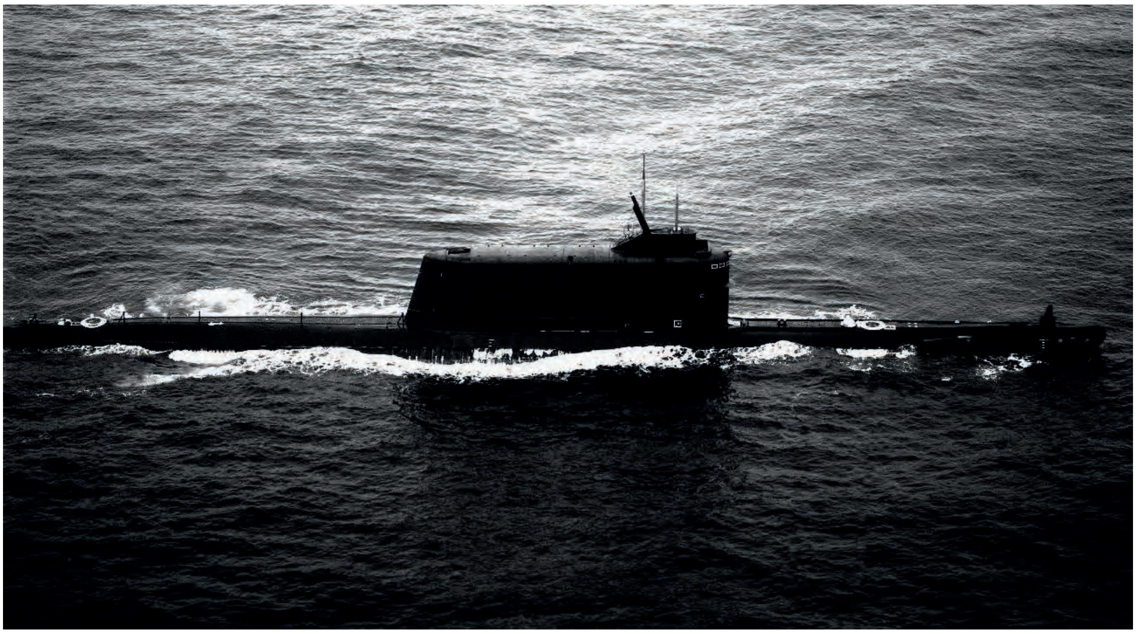

Fig. 16: Like its *Hotel*-class nuclear counterpart, the *Golf*-class carried three ballistic missiles in its elongated sail. After the switch to longer-range missiles and a much larger, Western-style missile battery in the *Yankee*, these early ballistic missile submarines were reassigned to the theater nuclear strike mission. *(U.S. National Archives)*

Early cruise missile development for the Soviet Navy followed a broadly similar path that might have led to an operational missile several years earlier, had it not been littered with bureaucratic complications.[11] After experimenting with several V-1 spinoffs that proved unsatisfactory, Soviet engineers eventually ended up with a relatively simple turbojet design as well.[12] Like *Regulus,* the weapon that eventually made it to sea was an unwieldy, inaccurate,

[11] Norman Polmar and Kenneth J. Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines* (Washington, DC: Potomac Books, 2004), 93-94.

[12] Polmar claims that the Soviets also worked on a ramjet missile program that failed, much like *Rigel*. Ibid., 94. However, Lardier and Baretsky, in their history of Vladimir Chelomey's missile designs, describe the 10XN as nothing more than a land-based version of the 10X, which was the Soviet V-1 copy. See Christian Lardier and Stefan Barensky, *Proton Launcher: History and Developments* (Hoboken, NJ: John Wiley, 2018), 5-12. According to this account, the twin-engine version Polmar refers to was the 16X, and all of these missiles were powered by technologically much less impressive pulse-jets, much like the V-1. The First Secretary's younger son, Sergei Khrushchev, who worked for Chelomey, states as much in a fairly recent interview. See Slava Gerovitch, *Voices of the Soviet Space Program: Cosmonauts, Soldiers, and Engineers who took the USSR into Space* (New York, NY: Palgrave Macmillan, 2014), 67-76.

surface-launched, nuclear-armed missile designed for use against land targets. Designated the P-5, or SS-N-3c *Shaddock* in NATO parlance, it exchanged the longer range of its American counterpart for (barely) supersonic speed and had a more streamlined launch procedure, but also an even more primitive guidance system.[13] The launch platform was a *Whiskey* with a single deck-mounted launcher for testing, and later with two such launchers or four launch tubes integrated into the outer hull.[14] A total of thirteen such conversions were undertaken. The missile itself was first tested in 1957 and introduced in 1959 – five years behind *Regulus*. Like *Regulus*, it served in a frontline role for only a few short years. By this time, however, the U.S. and Soviet 'technology trees' had diverged radically. Whereas *Regulus* spelled the end for the original Navy cruise missile program, the P-5 went on to serve as the basis for one of the pivotal weapon systems of the VMF: submarine-launched anti-ship cruise missiles (ASCMs).

5.2.2 HENs: the vulnerable first generation

As far as sea-launched nuclear weapons were concerned, the VMF's next step was to combine its two early missile systems – the R-13 and the P-5 – with the advantages of a nuclear-powered launch platform. In fact, *all three* of the first-generation nuclear boats were originally envisioned as long-range nuclear delivery systems, which was reflective of the national defense priorities at the time. Designated the *Hotel*-, *Echo*-, and *November*-classes by NATO and sharing the same VM-A reactor, they are often collectively referred to as the 'HENs'. Built in their basic configuration[15] between 1958 and 1964 they remained the most capable opponents Western ASW forces had to face into the late 1960s. The *November*-class, known as Project 627 to its designers, was actually the earliest of these designs. Taking a fairly courageous approach to technology development, the first serial production of Project 627A was laid down before the prototype went to sea in June 1958. As Jordan observes, "all the technological eggs were placed

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[13] Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 94-95.
[14] These variants were known as Single-Cylinder, Twin-Cylinder, and Long Bin, respectively.
[15] The modified *Echo II*-class remained in production until 1968.

into a single untried basket."[16] The result was an imperfect submarine with a troublesome propulsion plant, but one that was still superior to *Nautilus* and the subsequent *Skate*-class in most respects. With its twin reactors and novel hull form, the *November* was considerably faster – though not quite fast enough to keep pace with a *Skipjack* – and could also comfortably dive to 1,000 ft.[17] The retention of a double hull was not ideal in other respects but it did result in better survivability.[18] The Soviet engineers had furthermore even made a serious attempt at noise reduction.[19] All in all, the pre-series *Leninsky Komsomol* (K-3) and the twelve production boats that followed represented a remarkable achievement for the Soviet defense industry and the VMF.

That the *Novembers* made decent patrol submarines is all the more noteworthy because they had not been designed as such. Their original mission was to carry a single thermonuclear torpedo – the gargantuan T-15 – which was designed for use against enemy naval bases.[20] Whether this made it an 'attack at source' weapon or an interdiction weapon is a matter of interpretation. In any case, the VMF rejected this as the main mission for its first class of nuclear submarines, with ADM Kuznetsov himself stating its case. As a result of his vehement intervention, Project 627 was redesigned to carry a standard torpedo armament for use against surface targets.[21] While its original role was that of a 'missile sub' of sorts, it thus ended up as the nuclear-powered heir to the *Zulu*. As such, it had little in common with the new breed of

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[16] John Jordan, *Soviet Submarines: 1945 to the Present* (London: Arms and Armour, 1989), 49. While the observation as such is accurate, he is incorrect in suggesting that the prototype stage was skipped altogether and that the reactor was not tested before being installed. According to Polmar's later research, a full-scale power plant was installed at the Obninsk nuclear facility, about 100 km southwest of Moscow. See Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, p. 73. The *Victor III*-class submarine K-138 was later named after the town.

[17] The much higher efficiency of U.S. submarine designs even at this early stage is evident from the fact that the *November* translated the 36,000 shp provided by its two reactors into a speed of perhaps 30 knots at full power, whereas the *Skipjack* got 33 knots out of single-reactor, 15,000 shp propulsion plant.

[18] Jordan, *Soviet Submarines: 1945 to the Present*, 52-53.

[19] Polmar and Noot, *Submarines of the Russian and Soviet Navies, 1718-1990*, 165; Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 74-75.

[20] Ibid., 72. The concept of the Russian *Status-6* nuclear-armed drone that is said to be under development makes for an interesting comparison here. See e.g. Matteo Natalucci, "Russia completes testing of 'Poseidon' thermonuclear torpedo," February 20, 2019, https://www.janes.com/article/86583/russia-completes-testing-of-poseidon-thermonuclear-torpedo.

[21] Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 76.

U.S. Navy 'fast attacks' that were already being built during the same phase of the competition. Most notably, the *Novembers* did not have a well-established ASW role. Their passive sonar was half a decade or more behind the BQQ-2 installed in the contemporaneous *Thresher*-class.[22] The performance of the anti-submarine homing torpedoes they carried for self-defense was even less confidence-inspiring than that of their Western counterparts.[23] Finally, despite their designers' best efforts, they were still roughly 15 decibels – i.e. by a factor of 30 – louder than the *Thresher*/*Permit*-class when operating at tactical speeds of 6-8 knots.[24] As a result, they were much more easily detectable in most circumstances, and would have been less likely to counter-detect a U.S. submarine – even with a passive sonar of roughly the same quality.[25]

Because the *November* was for the most part required to operate against enemy surface task forces, whose noise levels were another order of magnitude higher and which would

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[22] It may be noted that the *Novembers* were designed years before the 594 class, but in operational terms the objection is beside the point: both designs went to sea during roughly the same period. Concerning Soviet sonars, Friedman's assessment that the MG-10/*Trout Cheek* set was still a direct development of the late-war German sets seems plausible. See Norman Friedman, *Seapower and Space: From the Dawn of the Missile Age to Net-Centric Warfare* (Annapolis, MD: Naval Institute Press, 2000), 362. Zelyakh's statement in the *History of Russian Underwater Acoustics* that the Soviet hardware of this era was "in no way inferior in its tactical characteristics to sonars of western countries" (465) is an interesting counterpoint. But as far as passive sonar is concerned, repeated encounters between U.S. and Soviet submarines tell a different story. V. E. Zelyakh, "Submarine Hydroacoustic Equipment: Hydroacoustic Systems for Submarines of the Pre-World War II and First Post-War Generations," in Godin; Palmer, *History of Russian Underwater Acoustics*, 455-70.

[23] The SET-53, which was the only submarine-launched ASW weapon available between 1958 and 1964, could not catch up with any U.S. nuclear submarine, except perhaps from an extremely favorable ambush position. See Weaponsystems.net, "Type 53 Torpedo," Weaponsystems.net, http://weaponsystems.net/weaponsystem/HH14%20-%20Type%2053.html. The source's criticism of its 100 kg warhead seems less justified, seeing that most light-weight ASW torpedoes have an explosive charge about half the size. Even if the damage inflicted amounts 'only' to a mission kill, this will still result in the loss of the submarine – though perhaps not its crew – in most wartime situations.

[24] See Tom Stefanick, *Strategic Antisubmarine Warfare and Naval Strategy* (Lexington, MA: Lexington Books, 1987). The reference here is to the broadband noise signature, which is most relevant for passive submarine *detection*, whereas LOFAR was used for *classification*. Polmar and Moore (Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 75) state that the *November* "was considered to be" as quiet, or as noisy, as a *Whiskey* or *Zulu* using electric motors when running at "medium speeds." Unless the latter had extremely loud electric motors or the reference is to a fully cavitating diesel-electric motor, this (presumably) Soviet perception may have been seriously inaccurate. Perhaps the noise level *was* about equal *in some part of the frequency spectrum*, but as a statement about Project 627's broadband noise signature it is difficult to credit. The fact that Antonov, Marinin and Valuyev (Alexander Antonow, Walerie Marinin and Nikolai Walujew, *Sowjetisch-russische Atom-U-Boote: Gefahr aus der Tiefe* (Augsburg: Bechtermünz, 2000), 14-15) make the same claim almost *verbatim* may reflect a honest conviction to this effect, but its merits remain dubious.

[25] See Stefanick, *Strategic Antisubmarine Warfare and Naval Strategy*, 273-79.

mainly have used active sonar for detection, this was probably not seen as major handicap within the Soviet frame of reference at the time. From the American perspective, the *Novembers* were an obliging target for SOSUS and the submarine-mounted passive arrays that were coming online just as the first of the Soviet nuclear boats were going to sea. The Navy leadership had not expected this to happen before the early 1960s, but the new threat had been anticipated and the capabilities necessary to deal with it were, for the most part, already being put in place.[26]

The next design to reach operational status was Project 658, the *Hotel*-class, which was built around the *November*'s reactor plant and the *Golf*'s missile compartment. With a retrograde hull form to give it sufficient stability while surface-launching its missiles, this design was otherwise unremarkable.[27] Its hull form slowed the *Hotel* down to 26 knots, but it could easily outrun any diesel-electric hunter-killer. This might well have been an essential skill in a wartime scenario: like all early Soviet nuclear submarines, the *Hotels* were about as noisy as a snorkeling diesel at slow speeds, and their noise level was at least an order of magnitude *higher* than that when they sprinted.[28] In other words, being detected was only a matter of time – a disadvantage that would only become more lethal as Western passive sonar technology got better and better. Like Project 627As, they were able to operate at depths of up to 1,000 ft, which would at least have allowed them to reduce cavitation noise, if they did have to 'run away' at high speed.[29] Whether the dubious build quality of these submarines would have allowed them to stand up to such abuse for very long is another matter. An interesting defensive feature was the installation of additional 400 mmi tubes for 'small-bore' anti-surface and ASW torpedoes, with two each in the bow and stern. The main purpose of these 'fire-and-

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[26] Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 79.
[27] Jordan, *Soviet Submarines: 1945 to the Present*, 63.
[28] According to a Navy source, the HENs produced about 160 db of broadband noise at low speeds and in excess of 170 db at 13-15 knots, which is still only about half the *Hotel*'s flank speed. See Stefanick, p. 277 n30. For the audiophile reader, a very rough comparison with decibel values in the air is obtained by subtracting 62 db from the values in water, which are calculated according to a different reference unit (1 micropascal @ 1 yard).
[29] Jan S. Breemer, *Soviet Submarines: Design, Development and Tactics* (Surrey: Jane's Information Group, 1989), 104.

forget' weapons would probably have been to focus the mind of a pursuing vessel's commander, while the SSBN made its escape.[30]

Besides its noisy and famously accident-prone machinery, the main operational limitation of the *Hotel* was the missile it carried.[31] While the 350 nmi range of the R-13 was an improvement over the even less impressive R-11FM, the boat's chances of survival against a fully alerted ASW screen off the U.S. coast were still marginal. Weinland states flatly that, as of January 1963, the Soviets had to contend with the fact that their SSBN fleet "could be prevented from striking the American continent by U.S. ASW forces."[32] The possibility of a capable skipper with steady nerves sneaking in an effective strike certainly could not be dismissed out of hand.[33] But given that the missile itself was largely invulnerable in flight, using a vulnerable platform to carry it over more than 90 percent of its distance to target was clearly a solution that left much to be desired. To their credit, the Soviet planners began to correct this flaw during the production run, and seven of the eight *Hotels* were upgraded to carry the submerged-launch R-21 (SS-N-5 *Serb*), which also doubled the range to 700 nmi. The same missile system was installed on fourteen *Golf*-class submarines during the late 1960s and early 1970s.

How exactly U.S. submarines and surface hunter-kill groups would have performed against the combined *Hotel*, *Golf*, and *Zulu V* threat is a scenario-dependent question we ultimately do not know the answer to. Unless an attack was executed as a 'bolt from the blue' by a small number of boats that had slipped past multiple lines of SOSUS arrays, the U.S. ASW

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[30] Friedman believes the emphasis was on anti-surface defense, while Jordan states the case for an ASW role. See Jordan, *Soviet Submarines: 1945 to the Present*, p. 54. Contrary to Jordan's account it was later discovered that the 400 mm tubes had not been installed on the *Novembers*. SSBNs and nuclear-powered, guided cruise missile submarines (SSGNs) had a need for self-defense weapons against submarines as well as surface hunters, so it stands to reason that both would have been carried, according to mission requirements.

[31] While serious nuclear and non-nuclear accidents occurred on several *Novembers* and *Echos* as well, Project 658's first-of-class K-19 has had a unique impact on Western popular culture by having both a book written and a movie made about the tragic 1961 loss-of-coolant accident that was responsible for her nickname: Hiroshima. The movie was the 2002 Hollywood effort *K-19: The Widowmaker*, directed by Kathryn Bigelow. The book is: Peter A. Huchthausen, *K-19: The Widowmaker* (Washington, DC: National Geographic Society, 2002).

[32] Robert G. Weinland, "The Evolution of Sovet Requirements for Naval Forces: Solving the Problems of the Early 1960s" (AD-A123 655, Center for Naval Analyses, Center for Naval Analyses, 1982), 23.

[33] The reaction time of the missile system was apparently a very moderate six to eight minutes from a pre-alerted state, which would have given ASW forces little time to catch the submarine on the surface. See Federation of American Scientists, "R-13 / SS-N-4 SARK," Federation of American Scientists, https://fas.org/nuke/guide/russia/slbm/r-13.htm.

complex that was in place by the mid-1960s could have inflicted significant levels of attrition before they reached their launch areas. Even more importantly, MPAs could have rendered boats equipped with the R-13 and R-11FM ineffective simply by flooding areas containing suspected submarine contacts with their search radars to deny them the opportunity to launch from the surface. The submerged launch capability and better reach of the upgraded *Hotel IIs* and *Golf IIs* made the simultaneous defense against them a much more serious challenge. At the very least, the effective denial of launch opportunities could no longer be assumed and the strategic value of these early missile subs increased accordingly. As will be discussed below, Soviet operational doctrine reflected this increase in capability fairly accurately, with a few years of lag time.

Lastly, there was the submarine that was designed around the P-5 cruise missile: the *Echo*-class PLARK (*Povodnaya lodka atomnaya s raketami krylatymi*; atomic submarine with winged missiles). A very distinctive design known to its creators as *Project 659*, it also retained the conservative hull form but had six canister-launched missiles stowed horizontally within its broadened deck casing, and deep notches serving as blast deflectors. Its submerged performance was roughly comparable to the *Hotel*'s. The unusual design resulted in additional flow noise, but this was probably not a major concern given the high base level of machinery noise.[34] Like the other first generation 'nukes', the *Echo* was an excellent target for the passive acoustics ASW regime the U.S. Navy had developed in response to the Type XXI. As a missile platform, it suffered from the same limitations that plagued the *Hotels*, *Golfs*, and *Zulu V*s: a surfaced launch procedure that exposed it to World War II-style ASW measures, and a missile with insufficient standoff range. However, while the deficiencies of the ballistic missile subs could be partially corrected by equipping them with a new weapon system, no such remedy was pursued for the *Echo* and the program was terminated after five units. Had the VMF not been an area defense navy to the bone, this might have closed the curtain on the *Echo*'s contribution to Cold War history. As will be explored in detail below, it was instead modified to become a mainstay of the anti-carrier concept – and by far the most numerous of the HENs.

[34] Jordan, *Soviet Submarines: 1945 to the Present*, 96-97.

5.2.3 Building a nuclear projection force – but to what end?

Before we move on to explore the rise of anti-carrier warfare and the U.S. Navy's reactions to it, the rebalancing of new submarine construction in favor of land-attack types during c. 1955-1961 requires that we address a weighty question: if the Soviet Navy's main missions were defensive in nature, how exactly does the nuclear strike mission fit into the picture? The answer involves sorting through some controversial issues based on incomplete evidence, but it can basically be broken down into three main components: early-Cold War military requirements, mid-1950s political pressure, and doctrinal specialization along service lines. Once these dynamics had played out and the basic course for the development of the Soviet Union's nuclear forces was locked in, the Navy had to settle for a very limited share of the nuclear strike mission, which was closely related to its defensive tasks. It had to wait for another decade before a new role for its SSBNs as a countervailing deterrent and secure reserve force started to gain acceptance, and even longer until it could deploy capabilities to match this burgeoning ambition.

The first factor in the VMF's early shift towards land-attack was the pressing need in the late 1940s and early 1950s to break the U.S. monopoly not just on atomic weapons, but also on long-range delivery – and to do so as quickly as possible. To this end, the submarine was seen as a viable nuclear weapons carrier along with strategic bombers and future land-based missiles.[35] As is often the case in cutting-edge technology development, the earliest attempts at constructing a submarine with land-attack capability failed.[36] As we have seen, the same was true of the T-15 nuclear torpedo program, which the VMF rejected towards the end of Kuznetsov's tenure as *Glavkom*. Other programs inevitably took a number of years to come to fruition. For example, the basic concept for the short-range R-11FM missile was proposed shortly after Stalin's death, and the missile became operational roughly five years later, in 1959.

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[35] Michael MccGwire, *Military Objectives in Soviet Foreign Policy* (Washington, DC: Brookings Institution, 1987), 94-95.

[36] See Lardier and Barensky, *Proton Launcher*, 11-12; Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 94. The former source includes two interesting drawings of the early P-2 and re-equipped K-class SSGs, which the author has not seen elsewhere.

Thus, the first set of land-attack capabilities that came online in the 1955-1961 timeframe was a result of the initial search for a suitable means of delivery to turn the products of the Soviet nuclear weapons complex into a credible warfighting capability.[37]

A second factor in the VMF's shift towards land-attack – and, indeed, the bureaucratic containment of its nuclear role soon thereafter – was the consolidation of political power in the hands of the First Secretary of the Central Committee of the Communist Party (CPSU), Nikita Khrushchev. As we have seen in Chapter 4, Khrushchev was fervently committed to the notion that any future military confrontation with the United States would take the form of a nuclear missile war and went to great lengths to foist his vision of war upon the Soviet armed forces. Given the inner workings of the Soviet system at the time – in which the formulation of military doctrine could still be directly impacted by the top echelon of the CPSU, and the Party leader in particular – this had an almost immediate (if only temporary) skewing effect on the national military strategy.[38] While we do not know that the VMF was *literally* fighting for its bureaucratic survival during this period, it was unquestionably under intense pressure to

[37] Soviet planners did not come around to the Western view of atomic weapons possessing deterrent capabilities that are distinct from their warfighting properties until much later in the confrontation. Khrushchev is now generally credited with having moved the Soviet Union closer to the 'assured destruction' paradigm. What is often conveniently forgotten is that his views were rolled back again beginning in 1961. A recent look at Khrushchev's effort to come to terms with the nuclear revolution is: Campbell Craig and Sergey Radchenko, "MAD, not Marx: Khrushchev and the Nuclear Revolution," *Journal of Strategic Studies* 41, 1-2 (2018), doi:10.1080/01402390.2017.1330683, 208-33. On the reversal in 1961, see Michael McCGwire, "Soviet Military Doctrine: Contingency Planning and the Reality of World War," *Survival* 22, no. 3 (1980), doi:10.1080/00396338008441887, 110-11.

[38] See, e.g. Sergei Chernyavskii, "The Era of Gorshkov: Triumph and Contradictions," *Journal of Strategic Studies* 28, no. 2 (2005), doi:10.1080/01402390500088346, 291. The notion – wide-spread in contemporaneous Western publications – that the CPSU directly held sway over military doctrine throughout the Cold War period is inappropriately simplistic. Rice, in her excellent account of the rise of the General Staff in Soviet military decision-making, sees Khrushchev's deep involvement in professional military matters as heralding the twilight of this system based on "personalistic intrusions" (64) by political leaders. She argues that his initiatives were met with considerable bureaucratic resistance even at the time – although he still got his way where major decisions like the establishment of the RVSN (*Raketnyye voyska strategicheskogo naznacheniya*, or Strategic Missile Forces) were concerned. See Condoleezza Rice, "The Party, the Military, and Decision Authority in the Soviet Union," *World Politics* 40, no. 1 (1987), doi:10.2307/2010194, 55-81. As Hudson shows, frictions between the Party, VMF, and Army views were ripe even at the time. See George E. Hudson, "Soviet Naval Doctrine and Soviet Politics, 1953–1975," *World Politics* 29, no. 1 (1976), doi:10.2307/2010048, 91-94.

demonstrate its relevance under Khrushchev's scheme.[39] The extremely rapid pace of technological change made the political pressure all the more difficult to deflect. That the nuclearization of the VMF was promoted only by a "small group of dissidents,"[40] as Hudson claims, frankly defies belief under the circumstances of the late 1950s.

In fact, it was eminently sensible for the Navy leadership to reframe the service's techno-doctrinal trajectory in terms of the new strategic direction. We know that the *Glavkom* did not share Khrushchev's vision of future war and considered it detrimental to the VMF's interests.[41] But even a less astute bureaucrat than Gorshkov might have realized that paying tribute to the First Secretary's "mania for nuclear missiles"[42] would help him shore up the VMF's tenuous standing within the defense system. It was only from a position of relative strength in this field that he could make the pitch for a more balanced building program a few years later, in 1962:

> "Modern submarines and missile-carrying aircraft comprise the principal striking forces of the Navy and are the essence of its power. Yet, there must be other forces besides the long-range strike forces both for active defense against any enemy within the limits of the defense zone of a maritime theater and for the comprehensive support of the combat and operational activities of the main striking forces of the Navy."[43]

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[39] There were influential advocates of abolishing the VMF, including Marshall of the Soviet Union and Minister of Defense (during 1955-57) Georgy Zhukov, but how close they ever came to achieving this aim is less clear. See Robert Waring Herrick, *Soviet Naval Doctrine and Policy, 1956-1986* Vol. 1 (Lewiston, NY: Edwin Mellen Press, 2003), 89-91.

[40] Hudson, "Soviet Naval Doctrine and Soviet Politics, 1953–1975," 97. His insistence (on p. 95) that Gorshkov was not a Party man is equally dubious. The *Glavkom*'s opposition to the scrapping of the *Sverdlov*-class cruisers, which Hudson adduces as evidence, was a simple act of bureaucratic politics that had little to do with his loyalty to the Party, or lack thereof.

[41] Even after Khrushchev's death, Gorshkov never named the disgraced First Secretary and Chairman, who had hoisted him to his position. But in his *magnum opus* as a theorist, *The Sea Power of the State*, he makes short shrift of the 'modernist' strand in Soviet strategic thought, which sought to systematize the primacy of the 'nuclear missile war': "[I]n our country, too, military research circles put forward extreme views, boiling down to a denial of the role of the separate branches of the armed forces and arms systems. The possibility of the fleet operating at sea was also denied and hence the country's need for it. […] Misunderstanding of the character of modern warfare and the influence on it of nuclear missile weapons and blind genuflexion to the 'omnipotence' of the atomic and hydrogen bombs led to a tendency for the armed forces to develop in a one-sided way." See S. G. Gorshkov, *The Sea Power of the State* (Oxford: Pergamon Press, 1979), 158.

[42] Herrick, *Soviet Naval Doctrine and Policy, 1956-1986*, 79.

[43] Quoted in: Robert W. Herrick, *Soviet Naval Strategy: Fifty Years of Theory and Practice* (Annapolis, MD: Naval Institute Press, 1968), 74.

While this was an important realization, the *Golf*-, *Hotel*-, and *Echo*-class construction programs that were brought to the realization stage during this period, along with the R-13 and P-5 missile programs, only went so far. It would be another decade before Gorshkov's Navy could field a sea-based intermediate-range ballistic missile (IRBM) that was roughly on a par with *Polaris* in its original A1 version – and even then, the lack of forward bases and the U.S. Navy's superior ASW system meant that it did not provide comparable capabilities.[44]

Ironically, the same set of ideas that accelerated the shift toward nuclear-propelled and nuclear-armed submarines during 1955-1959 effectively stunted the VMF's prospects of playing a bigger role in the strategic nuclear mission soon thereafter. In 1959, Khrushchev founded a new branch of the Soviet armed forces with explicit responsibility for nuclear missile strikes: the Strategic Missile Forces (*Raketnyye voyska strategicheskogo naznacheniya*, or RVSN).[45] The Navy's inability to provide a sufficient level of intercontinental capability with its first generation systems probably contributed to the decision to vest this mission in the RVSN *in its entirety*.[46] Given that the ability to hold at risk targets deep inside U.S. territory was its *raison d'être* and its only bureaucratic selling point, the new service branch had every reason to jealously guard its roles-and-missions turf against any intrusion from the VMF and VVS. Whereas the Strategic Air Command (SAC) ultimately had to "co-opt"[47] *Polaris* and sought to control it by way of its dominant influence in the Joint Strategic Target Planning Staff, the RVSN was more successful in staving off the bureaucratic threat posed by sea-launched missiles and managed to repeatedly "repel the Navy's assault on the [its] deep-strike citadel."[48] This began to

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[44] On how the U.S. Navy engineered this major lead in sea-based nuclear strike, see Owen R. Cote, "The Politics of Innovative Military Doctrine: The U.S. Navy and Fleet Ballistic Missiles" (PhD thesis, MIT, 1996); Graham Spinardi, *From Polaris to Trident: The Development of US Fleet Ballistic Missile Technology* (Cambridge: Cambridge University Press, 1994); Harvey M. Sapolsky, *The Polaris System Development: Bureaucratic and Programmatic Success in Government* (Cambridge, MA: Harvard University Press, 1972).
[45] On the early history of the RVSN, see Podvig, *Russian Strategic Nuclear Forces*, 144-47.
[46] Michael MccGwire, "Naval Power and Soviet Global Strategy," *International Security* 3, no. 4 (1979), doi:10.2307/2626766, 165.
[47] Fred M. Kaplan, *The Wizards of Armageddon* (Stanford, CA: Stanford University Press, 1991), 263.
[48] Robert W. Herrick, "Soviet Naval Mission Assignments: Part 1. Soviet SSBN Roles in Strategic Strike" (ADB082797, Ketron Inc. for the Assistant Director for Net Assessment, Navy Program Planning Office, Arlington, VA, 1979), vi. On *Polaris* integration, see David A. Rosenberg, "The Origins of Overkill: Nuclear Weapons and American Strategy, 1945-1960," *International Security* 7, no. 4 (1983), doi:10.2307/2626731, 60-65.

change only in the late 1960s, when the VMF's next-generation SSBNs were increasingly seen as an important reserve force.[49] In the meantime, the VMF's assets appear to have been treated as a largely separate resource to attack targets of direct relevance to its accepted core missions.

This brings us to the third factor of the shift towards offensive land-attack weaponry during 1955-1961. As had been the case with the Type XXI threat, Western analysts had a tendency to mirror-image the functional profile of Soviet SSBNs, turning them into a "doctrinal replica"[50] of the *Polaris* force. The U.S. Navy, and in time an increasing number of political players from President Eisenhower downward, thought of *Polaris* submarines as a 'finite' deterrent that should be deliberately withheld from an initial nuclear exchange.[51] In this view, the SSBN force was nothing more and nothing less than a priceless insurance policy against a disarming first strike. At the same time, for bureaucratic reasons, *Polaris* submarines were part of the Single Integrated Operational Plan (SIOP) for general nuclear war and in the early 1960s would actually have been used *alongside or even ahead of* SAC bombers in the initial strike against the Soviet Union.[52] Leaving aside the obvious incongruity between the *theory* of finite deterrence and the *practice* of tasking *Polaris* to blast Soviet air defenses in the first minutes of a nuclear war, Western analysts had an understandable propensity to think of the role of Soviet SLBMs as corresponding to either the one or the other.

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[49] McConnell's case for a withholding posture from the early 1970s onwards is convincing and a much better fit with the changing capability profile of the SSBN fleet than Herrick's case for an essentially static posture even after 1974, when the *Deltas* began to join the fleet. See James M. McConnell, "Military-Political Tasks of the Soviet Navy in War and Peace" (Professional Paper No. 148, Center for Naval Analyses, Arlington, VA, 1976), 2-3, 17-23.

[50] Breemer, "Estimating the Soviet Strategic Submarine Missile Threat," 70.

[51] The best overview of the development of Navy views on 'finite deterrence' from primary sources is: William Burr, ""How Much is Enough?": The U.S. Navy and "Finite Deterrence"," Electronic Briefing Book No. 275 National Security Archive, https://nsarchive2.gwu.edu/nukevault/ebb275/index.htm.

[52] On inflexibility in the SIOP with regard to Polaris targeting, see Kaplan, *To Kill Nations*, 160-61. We do not know for certain which targets *Polaris* was to be used against in the early SIOPs, but we know there were no withhold options for Polaris in the 1962 and 1963 iterations of the SIOP. Interestingly enough, there *was* a withhold option for naval air in SIOP-63. See William Burr, ""It Is Certain There Will be Many Firestorms": New Evidence on the Origins of Overkill," Electronic Briefing Book No. 108 National Security Archive, https://nsarchive2.gwu.edu/NSAEBB/NSAEBB108/index.htm. We also know that even SECDEF McNamara's 'assured destruction' scheme, which embraced *Polaris* as the primary countervalue weapon, 25 percent of *Polaris* missiles would still have been used against counterforce or counter-military targets. See Kaplan, *The Wizards of Armageddon*, 319.

In actual fact, the VMF's early ballistic missile submarines may have been *neither* a second-strike force *nor* a part of the main alert force designated to deliver an initial blow against 'strategic' targets in the United States. While there is an array of evidence to support the theory that the SSBN force eventually developed into the Soviet version of an assured deterrent beginning in the late 1960s, there is little to suggest that this shift occurred much before that.[53] And in his exhaustive study of SSBN-related Soviet sources for Op-96, Herrick also found "an overkill of flatly contradictory evidence to refute the view that Soviet SSBNs have [as of 1979], or ever had, a share in the initial deep strike against continental U.S. targets."[54] Rather, they were initially tasked with striking a naval target system that was seen as largely separate from the RVSN's main strategic targets, and to provide some additional firepower for later strikes or re-strikes. To add insult to bureaucratic injury, duplications of effort appear to usually have involved the RVSN striking naval-related targets, rather than the VMF striking 'deep' strategic targets.[55]

While there is limited evidence on this count, it appears that the target system assigned to the VMF until the late 1960s was largely made up of two categories: enemy naval forces in

[53] The chief advocate of the idea of a Soviet SSBN withholding strategy admits as much, although he was not 100 percent consistent on this point. See James M. McConnell, "The Interacting Evolution of Soviet and American Military Doctrines" (Professional Paper No. 412, Center for Naval Analyses, Alexandria, VA, 1980), 28-29. This role was qualitatively different from the 'nominal back-up' role Herrick identifies from the mid-1960s onwards, in which the SSBNs would basically have served as a re-attack capability for the RVSN and long-range air forces, or a numerical reserve if the main strike forces ran out of warheads to put on target. See Herrick, "Soviet Naval Mission Assignments," 42-43, 141-42. Significantly, the Soviet Union never even *claimed* a secure second-strike capability until 1974, when the third generation of Soviet SSBNs armed with the intercontinental-range R-29 were beginning to come online. See Weinland, "The Evolution of Soviet Requirements for Naval Forces," 35.

[54] Ibid., v. I rely on this source quite extensively here, because it is by far the most thorough examination of the evidence bearing on pre-1970s Soviet SSBN targeting by a leading scholar, despite its imperfections. While Herrick worked from open sources, declassified contemporaneous assessments like NIE 11-15-74 are far less convincing in their exposition of the logic behind Soviet SSBN targeting and appear to largely mirror-image U.S. concepts. See Central Intelligence Agency, *Soviet Naval Policy and Programs*, December 23, 1974, CIA Historical Collection, ~~TOP SECRET~~ (declassified 3 February 1996), 9-14.

[55] See Herrick, "Soviet Naval Mission Assignments," 24-25, 98. Looking beyond the VMF-RVSN rivalry, even the missile artillery of the Ground Forces saw an opportunity to partake in the defense against Western naval assets and argued its case in *Voennaya mysl* in the late 1960s. See Central Intelligence Agency, *Military Thought (USSR): The Rocket Troops of the Ground Forces in Combat with Naval Targets*, May 7, 1974, CIA Historical Collection, ~~TOP SECRET~~ (declassified 16 June 2017).

port, and their supporting infrastructure of naval bases and facilities.[56] The main focus of the PLARB force (*Podvodnaya lodka atomnaya s raketami ballisticheskimi*, or atomic submarine armed with ballistic missiles) appears to have been on carrier battle groups at anchor, which arguably would have made it first and foremost an anti-carrier asset during this period.[57] As we will see, both carriers and *Polaris* SSBNs were considered highly important targets in terms of reducing the nuclear threat to the homeland. Because strikes against CVAs and SSBNs in port could be framed in terms of both fleet-on-fleet combat and nuclear counterforce, it is unsurprising that the RVSN was also assigned the same mission.[58] A third category of targets was more discretionary and included coastal targets, for which the RVSN had primary responsibility but which could also be struck by SSBNs in some circumstances.[59] There is some evidence to suggest that this subset of targets – which included terminals of shipborne commerce – was linked to the possibility of conducting a secondary anti-SLOC campaign, which we will examine later in the chapter.[60] Even though a final assessment of SSBN targeting during this phase would have to be based on authoritative Soviet sources, Baer's qualification that it "was not part of a sea-control challenge"[61] appears difficult to uphold on closer examination.

While the VMF's partly involuntary emphasis on nuclear targets of unambiguous naval interest may seem surprising from a 21st century vantage point, it is worth noting that the U.S. Navy had once thought about both *Regulus* and *Polaris* in much the same way, before it went on to develop the finite deterrence concept.[62] Had ADM Burke been less successful in

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[56] Herrick, "Soviet Naval Mission Assignments," 24-25, 96.
[57] Ibid., 98.
[58] The overlap is also implicit in the basic offensive/defensive mission structure, which MccGwire derives from Sokolovskii and other "evidence available." MccGwire, "Naval Power and Soviet Global Strategy,", 142-143.
[59] Herrick, "Soviet Naval Mission Assignments," 26-28. The reality was that the VMF did not really have a capability to strike *anything other than* coastal targets until about 1967, when the *Golf*- and *Hotel*-classes had been converted to carry the SS-N-5, and the first *Yankee*-class vessels armed with the SS-N-6 missile began to join the fleet.
[60] Ibid., 45.
[61] George W. Baer, *One Hundred Years of Sea Power: The U.S. Navy, 1890-1990* (Stanford, CA: Stanford University Press, 1998), 395.
[62] Spinardi traces the shift in Navy thinking to 1957. See Spinardi, *From Polaris to Trident*, 33-34. This is largely consistent with the collection of pertinent documents in: Burr, ""How Much is Enough?": The U.S. Navy and

pushing secure second strike as an eminently sensible strategic role for fleet ballistic missiles, an alternative future for *Polaris* might have looked not so different from the VMF's operational concept for its 'boomers' up until the early 1970s. While the "meaning of the nuclear revolution"[63] may be plain enough with hindsight and the submarine-based invulnerable deterrent may look like it was an inescapable development, the role of historical contingency in realizing it should not be underestimated.

The bottom line concerning the role of Soviet sea-launched land-attack missiles from 1955 up until late 1960s is that the operational doctrine for their use linked them to the VMF's core mission of inflicting the greatest possible amount of damage to the enemy fleet before it could steam up to the Soviet coast and launch its nuclear-armed aircraft against the homeland. This began to change with the significant increase in range, numbers and survivability of the SSBN force during 1967-1974, but we don't know for certain when – and if – the shift was completed.[64] In the meantime, the development of a nuclear strike capability against naval and coastal targets clearly endowed the VMF's basic area defense strategy with a much sharper offensive edge. At the same time, it did not yet represent a revolution in the service's mission structure. Rather, it added a forward offensive instrument assigned to accomplish an existing

"Finite Deterrence"". Navy enthusiasm for the strategic role is known to have existed earlier, but remained muted – perhaps an ingrained lessons of the controversy surrounding Vice Admiral (VADM) Gallery's 1948 memorandum on a possible strategic nuclear role for the Navy. On this episode, see Jeffrey G. Barlow, *Revolt of the Admirals: The Fight for Naval Aviation, 1945-1950* (Washington, DC: Naval Historical Center, Dept. of the Navy, 1994), 117-21; Jerry Miller, *Nuclear Weapons and Aircraft Carriers: How the Bomb Saved Naval Aviation* (Washington, DC: Smithsonian Institution Press, 2001), 33-36.

[63] See Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon* (Ithaca, NY: Cornell University Press, 1990), 4.

[64] We simply do not know which targets were assigned to the VMF's late-Cold War SSBN fleet and which employment options existed. However, in a translation of the SECRET-level 1983 Combat Regulations of the VMF, we find the following passage, which would seem to suggest that the SSBNs had become a generic strategic nuclear asset: "Naval strategic nuclear forces are a component part of the strategic nuclear forces. They include strategic missile submarines and *are employed to carry out the tasks and operations of the strategic nuclear forces in accordance with the Supreme High Command's plans* to hit important targets both in military-geographic regions and in continental (oceanic) theaters of military operations." See Central Intelligence Agency, *Combat Regulations of the Soviet Navy - Chapter 1: The Navy and the Fundamentals of Combat Employment in Operations*, August 18, 1986, CIA Historical Collection, ~~TOP SECRET~~ (declassified 6 June 2017), 7. Emphasis added.

mission, especially in case the war *started out* as a nuclear missile war, which both sides thought plausible at the time.[65]

Ultimately, its lopsided rivalry with the RVSN and early exclusion from the ghastly 'main event' in a prospective missile war only served to spur the VMF on in its search for a strategic offensive mission. After realizing early on that it was his service's best hope of capturing a much larger share of the defense budget, Gorshkov spent the next twenty years laying siege to the RVSN's preeminent role in strategic nuclear warfare that had been cemented in the late 1950s.[66] His successes in the long attritional struggle to increase the VMF's relative stature probably owed as much to external factors – the political leadership's "desperate pursuit of parity,"[67] the growing vulnerability of land-based missiles, and the diminishing returns of a further expansion of the RVSN – as to the *Glavkom*'s wily bureaucratic maneuvering. Until these structural pressures had worked their way through the Soviet system, the center of gravity of the VMF's contribution to the national defense would lie elsewhere: namely, in holding a perimeter at sea against the U.S. Navy's nuclear-armed projection forces.

5.3 The rise and fall of anti-carrier warfare

5.3.1 The strategic defense imperative

Much like the long-range submarine caused prolonged anxiety among Western naval planners, it was the attack aircraft carrier that struck fear into the hearts of their Soviet counterparts during the first two decades of the Cold War at sea and, indeed, beyond. From the mid-1950s onwards, carrier air power was seen as a nuclear menace on a par with strategic bombers and

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[65] This was just one of the five scenarios Soviet planners envisioned, according to A. A. Kokoshin, *Soviet Strategic Thought, 1917-91* (Cambridge, MA: MIT Press, 1998), 128.
[66] Herrick, *Soviet Naval Doctrine and Policy, 1956-1986*, 147.
[67] Pavel Podvig, "A Desperate Pursuit of Parity," *Science & Global Security* 10, no. 3 (2002), doi:10.1080/08929880215325, 223-25.

land-based ballistic missiles. And while the latter certainly posed a severe threat to the survival of the homeland, the carrier was primarily – though not exclusively – the VMF's problem.

Although the roots of the zone defense scheme go back to a time when carrier air strikes were at most a futuristic feature of the international security environment, the threat from Western flattops became one of the central reasons to rely on such a system in the postwar period. U.S. fleet carriers had amply demonstrated their potential for power projection over great distances against Imperial Japan, replacing battleships as "the best way to transport fire-power across the Pacific Ocean."[68] During the final phase of the Pacific War, the fast carrier task forces had been transformed into a formidable land-attack air force that could successfully conduct concentrated operations into the teeth of land-band defenses.[69] During the final phase of the war, they showed that they were able, at some cost to themselves, to "destroy or neutralize massive enemy land-based air power and continental bases."[70] Combined with the U.S. armed forces' ability to launch large-scale, combined-arms amphibious assaults, this capability could not fail to catch the eye of Soviet military thinkers, as they began to settle into a Cold War mindset.[71] By 1948, the U.S. Navy was flying nuclear-capable aircraft off its fleet carriers for experimental purposes – a development that raised the possibility that carrier-launched nuclear strikes reaching far into the Soviet Union would soon become part of its standard repertoire. Unlike Western fears of a flood of Soviet Type XXIs choking off the sea lanes, this expectation proved entirely accurate.

Soviet defense planners saw the deployment of long-range, nuclear-armed strike aircraft on American fleet carriers as a dire threat to the Soviet homeland that could not go unanswered. As Wegener accentuates, "[w]hen the United States assigned to its aircraft carriers an atomic role […] Soviet territory was exposed to a threat *far more dangerous than any that had ever emanated from the possibility of enemy invasion*. By necessity, Soviet naval defense centered

[68] Baer, *One Hundred Years of Sea Power*, 136.
[69] The classic history of this development is: Clark Reynolds, *The Fast Carriers: The Forging of an Air Navy* (New York, NY: Naval Institute Press, 2015). The final shift towards land-attack is covered on pages 320-75.
[70] Ibid., 321.
[71] On Soviet threat perceptions concerning Western amphibious capabilities, see Jürgen Rohwer and Mikhail S. Monakov, *Stalin's Ocean-Going Fleet: Soviet Naval Strategy and Shipbuilding Programmes, 1935-1953* (London: Frank Cass, 2001), 74-78. See also: Gorshkov, *The Sea Power of the State*, 171.

around arming against this nuclear peril."[72] In the late 1950s, countering the carrier threat became the VMF's highest priority tasking, and Soviet perceptions of the threat posed by U.S. naval air forces remained acute even after *Polaris* became the USN's main nuclear strike weapon.

As seen from a U.S. perspective, the Soviet Union's major investments into anti-carrier warfare (ACW) was perhaps the most direct challenge to the USN's ability to maintain meaningful control of the seas on a global scale. While the VMF's preferred approach to ACW always had a distinct combined-arms flavor, it was clear from the outset that the submarine force would have to carry much of the burden – and it continued to do so for the remainder of the Cold War. The combined-arms nature of the ACW challenge will become much clearer when approached from an air-centric perspective, as we will do in section 5.5. However, the anti-carrier program could not fail to impact the U.S. Navy's ASW effort as well.

Interestingly enough, by the time the ACW effort came into its own the role of the carrier was already changing. By the time *Polaris* went to sea in the early 1960s and superseded the attack squadrons of the carrier air wing as the Navy's main nuclear power-projection tool, the new generation of 90,000 ton 'supercarriers' had proved their value and the future of naval aviation was assured for the foreseeable future. The strong focus on nuclear strike persisted into the 1960s and included the integration of carrier battle groups into SIOP-62. From SIOP-63 onwards, SECDEF McNamara released the carriers from nuclear alert force duties, but they remained available as part of various SIOP force generation options until 1976, and part of the nuclear reserve force even thereafter.[73] Hence, the VMF's concern was hardly misplaced, even though it was lagging behind U.S. posture changes by a number of years.

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[72] Edward Wegener, *The Soviet Naval Offensive: An Examination of the Strategic Role of Soviet Naval Forces in the East-West Conflict* (Annapolis, MD: Naval Institute Press, 1975), 24. Emphasis added.

[73] Miller, *Nuclear Weapons and Aircraft Carriers*; Andrew Faltum, *The Supercarriers: The Forrestal and Kitty Hawk Classes* (Annapolis, MD: Naval Institute Press, 2014), 27. The Navy considered SIOP integration a burden, because it severely constricted the carriers' flexibility. In essence, they were tethered to their specified launch points for the duration of a forward deployment. While others have almost exclusively emphasized limited war as the main focus of the carrier force after 1963, the reality is that McNamara's decision also freed up the CVBGs to go after naval-related targets – including those early linked to the 'attack at source' concept – again

As we have seen, the chief side-effect of the Air-Navy's success in future-proofing its main weapon system for the nuclear age was to focus the mind of Soviet planners squarely on how to kill carriers before they could reach their launch points and deliver devastating counter-military strikes across the length and breadth of the Soviet Union. This required that the VMF's reach be expanded in proportion to the increased combat radius of carrier-based strike aircraft. U.S. intelligence at the time correctly assessed that the Soviets would "shift from the long-held policy of defending the Soviet homeland in Eurasian (mainly Europe) littoral waters to a policy of attempting to counter the 'aggressor' in waters and bases farther from Soviet shores, even to the shores of the US."[74] After all, carriers with a strike range of approximately 1,000 nmi could do tremendous damage without ever entering the modest 300-500 mile 'outer' defense zone of old. Unless they were handled with extraordinary impudence by their commanders, they would have to be attacked well out to sea – or, in a Soviet version of 'attack at source', even in port.

The system that was developed to accomplish this, and eventually expanded to try and fend off the *Polaris* threat as well, later became known as the "Blue Belt of Defense."[75] This appears to have been an incarnation of the perimeter defense system that was designed specifically for multi-service, combined-arms operations against sea-borne nuclear threats.[76] As such, it would have represented the General Staff-level a response to what was considered a problem of critical national importance. Little in the way of reliable information is available on the overall system, the division of labor that was envisioned, or the level of integration across service lines. Hence, reference to the overall construct is made only where specific evidence allows us to link the Soviet Navy's roles with those of the other services.

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in a general war setting. See Baer, *One Hundred Years of Sea Power*, 377-79. The last frontline VAH was disbanded in 1970, but it appears that no deployments of heavy attack aircraft occurred after 1966/67. The conversion to much more flexible light and medium attack squadrons (VAs) was accelerated by the Vietnam War, which saw reconnaissance variant *Vigilantes* as well as electronic intelligence (ELINT) and tanker variant *Skywarriors* deployed, but little use of heavy attack aircraft.

[74] Central Intelligence Agency/Office of Research and Reports, *Soviet Naval Strategy and Its Effects on the Development of Naval Forces, 1953-63*, October 22, 1963, CIA/RR ER SC 63-3, CIA Historical Collection, 9.

[75] Robert W. Herrick, "The USSR's "Blue Belt of Defense" Concept: A Unified Military Plan for Defense against Seaborne Nuclear Attack by Strike Carriers and Polaris/Poseidon SSBNs" (Professional Paper 111, Center for Naval Analyses, Arlington, VA, 1973), 169-78.

[76] Ibid., 5-6.

As far as the VMF's major contribution was concerned, it was manifest that nuclear-powered submarines would have to play a prominent role in the anti-carrier task. A stealthy, survivable platform that could keep up with – or at least successfully maneuver against – a carrier battle group and carry a considerable number of large stand-off weapons would be an ideal means of executing anti-carrier strikes.[77] Given that defense against carriers was a task of national importance that involved weapons he saw as the wave of the future, Khrushchev provided the VMF with a new level of political backing. He made the point specifically, in considerable detail, and at a supremely important occasion in the Soviet political calendar – namely, in his report to the 22nd Party Congress in October 1961. The passage in question is worth quoting in full:

> "The Soviet Union is a continental power. Those who will want to start a war against us will have to overcome water barriers. That is why we are building up a powerful submarine fleet equipped also with target-seeking missiles so that we can sink in the ocean, hundreds of kilometers distant, vessels on their way to the borders of the socialist countries.
>
> The atom-powered Soviet submarine fleet, equipped with ballistic and target-seeking missiles, stands vigilantly guard over our socialist gains. It will retaliate crushingly against an aggressor, and against his aircraft-carriers, which, in case of war, will make a nice target for our submarine-launched missiles. *(Stormy applause.)*"[78]

Overall, the First Secretary's scheme of making 'nuclear missile war' the be-all and end-all of Soviet defense planning could only be described as a major bureaucratic threat to the VMF. Yet, with the first generation of ballistic missile subs falling short of the leadership's expectations, the strategic defense element became its saving grace. In the 1963-1968 timeframe, forty-eight submarines designed specifically for anti-carrier warfare – thirty-two SSGNs and sixteen

[77] *Forrestal*- and *Midway*-class carriers had a top speed of 33 knots, and even at a transit speed of only 25-27 knots, no diesel submarine could keep pace with a carrier group.

[78] N. S. Khrushchov, "Report to the Central Committee of the Communist Party of the Soviet Union to the 22nd Congress of the C.P.S.U." The Road to Communism: Documents of the 22nd Congress of the Communist Party of the Soviet Union (Foreign Languages Publishing House, Moscow, 1962), 64. Emphasis in the original.

SSGs – joined the fleet. During the same period, only three new SSNs and six SSBNs were completed.[79]

While there is no universal agreement on this point, there is reason to believe that the VMF's strong commitment to ACW remained very much intact even after carrier air had been largely displaced from the strategic nuclear role by *Polaris*.[80] Two years after the carriers had been withdrawn from the SIOP and once again become a purely operational asset at the disposal of theater commanders, Admiral of the Fleet Gorshkov wrote that they were "[t]he main element of the general-purpose naval forces […] and a highly trained reserve of strategic strike forces in a global nuclear war."[81] Far from seeing a waning role for the carrier, Gorshkov believed that the rise of the missile as the primary delivery system for nuclear weapons "did not influence the role of aircraft-carriers in the system of Anglo-American naval forces. Today these ships form the basis of the sea power of the US fleet despite the ever-growing threat from sophisticated missile weapons."[82] The U.S. Navy would begin to reinforce this perception almost as soon as the carrier had been withdrawn from the 'active' strategic nuclear forces.

As we will see, Gorshkov's insistence on the central role of the carrier, re-stated in an era in which ballistic missiles reigned supreme, also contained a tacit admission that Soviet attempts at developing an anti-SSBN posture had failed. This led to the realization that, at the level of national strategy, the VMF could neutralize the enemy's secure reserve force only by

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[79] Polmar and Noot, *Submarines of the Russian and Soviet Navies, 1718-1990*, 289, 294-300.

[80] For example, McConnell believes that the attrition rates envisioned against carriers by Soviet planners dropped from 30-70 percent in the 1960s, to 10-15 percent in the 1970s, but his judgement rests on semantic exegeses that are open to question. Hence, he chooses to interpret a statement calling for 'significant degradation' as falling in the lower bracket, whereas 'substantial degradation' falls into the higher bracket. He backs this up with two sources, but – in a classic example of his art – derives the lower standard for 'significant degradation' from a comment Gorshkov made about the Battle of Tsushima. As any good analyst would, he supplies the appropriate caveats himself. See McConnell, "The Interacting Evolution of Soviet and American Military Doctrines," 35-36. In this author's view, McConnell is probably right that the pressure to counter the carrier waned during the 1970s. But, given the abruptness with which other construction programs were curtailed, the building of the *Oscars* – which might well have resulted in the 20-strong class that was originally expected, had the Soviet Union not economically and politically collapsed – provides convincing evidence that counter-CVBG operations remained a priority even at the relative ebb tide of the carrier threat. On the *Oscar*-class, see Jordan, *Soviet Submarines: 1945 to the Present*, 166-74; Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 278-80, 291.

[81] Gorshkov, *The Sea Power of the State*, 172.

[82] Ibid., 171. Emphasis added.

deploying a secure reserve force of its own.[83] Countering American CVBGs may have remained a priority in 1978 and beyond partly because the Soviet side felt they *could* be countered within a traditional war-fighting framework – certainly to a much greater extent than *Polaris*, *Poseidon* or *Trident*. To the extent that this assessment was accurate, it was the result of two decades of techno-doctrinal development that was surpassed in persistence and earnestness only by the commitment to the secure SSBN force during the second half of the competition. At the heart of the anti-carrier undertaking were three generations of guided-missile submarines, which would each pose a different challenge for U.S. ASW forces.

5.3.2 Anti-carrier submarines: a high-priority effort

The history of the VMF's submarine anti-carrier programs was largely characterized by making do with suboptimal solutions, until all the most essential tactical characteristics could be brought together in a single, advanced system. MccGwire believes that a three-stage program was envisioned from the outset, with the first two generations as an 'initial' and 'interim' reaction, respectively.[84] As was the case with both its ballistic missile submarines and its SSNs, the Soviet Navy eventually managed to design and build a highly advanced system that met its operational requirements: the massive, nuclear-powered *Oscar*-class cruise missile submarine. But getting there was not a straightforward process and success did not come cheap, or easily. The first one of these massive 'carrier killers' was built at the Sevmash yard at the end of our investigation period in 1976, but it would not be delivered to the VMF until 1980. The inadequacies of the first two generations of anti-carrier boats gave the U.S. Navy precious time to adjust to the threat and field techno-doctrinal countermeasures that further reduced the level of capability that the VMF could bring to bear. As we will see below, the same pattern applied to the air threat posed by the missiles these submarines carried. As far as ASW is concerned, the SSGNs in particular suffered from faults that were at least partly self-imposed, and

[83] Whether this countervailing force had to be as *large* as the force it sought to neutralize is, of course, a different matter.
[84] MccGwire, *Military Objectives in Soviet Foreign Policy*, 428-29.

from the fact that some of the same deficits that marred the first generation were carried over into the second generation as well. Thus, ASW methods that had been developed for use against first generation vessels – essentially the results of the 1950s innovation process – by and large remained effective against the second generation as well.

Until the early 1960s, the VMF's most capable platform for countering the carrier threat were patrol submarines armed with nuclear torpedoes. The torpedo in question was the T-5 – a simple straight-runner with a 3-5 kiloton warhead.[85] This was the weapon *Foxtrot*-submarines famously carried during the Cuban Missile Crisis, although the risk of a desperate submarine commander using them without further specific authorization has probably been overstated.[86] In zone defense operations, the diesel-electrics of the 1950s had only the option of setting up an ambush and hoping that a battle group would pass right through their patrol area. In this case, an attacking submarine could either attempt to sink the carrier with conventional anti-shipping torpedoes after the inner screen had passed over it, or fire a T-5 from longer range – provided the necessary authority had been pre-delegated.[87] When the *November*-class came online, the ability to stalk a task force operating at transit speed improved markedly. With a speed advantage of no more than 3-4 knots at best, the submarine commander still had to be quite skilled to keep up if the enemy force was zig-zagging at all, which under wartime conditions it should have.[88] But combining the *November* and the T-5 clearly made for a much more effective damage-limitation capability against the carrier than the VMF had hitherto possessed.[89] As Hill notes, despite the early nuclear submarine's flaws "it certainly should

[85] Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 28.
[86] Ryurik A. Ketov, "The Cuban Missile Crisis as Seen Through a Periscope," *Journal of Strategic Studies* 28, no. 2 (2007), doi:10.1080/01402390500088304, 217-31.
[87] Predelegation is a prickly issue, but in the Soviet context the authority to fire missiles and/or employ nuclear weapons was *always* held by a shore commander. If the submarine had not been authorized to fire, it had to request permission to do so and risk being direction-found in the process.
[88] Zig-zagging is the most basic 'passive' anti-submarine measure. It is used to disrupt submarines' target motion analysis (TMA), increase the chances of breaking contact with any submarine that fails to react quickly enough to a course change, and mask the general course of the task force.
[89] Just *how* effective this capability would have been is more difficult to say. The lethal radius of the T-5 against an aircraft carrier would have depended on the depth of the water column, the nature of the sea bottom, and

have given pause to carrier group commanders to know that one was about."[90] That said, a torpedo attack *by itself* was not an ideal means for ACW. Whereas Soviet submariners had limited operational experience going up against well-organized battle group defenses, Western navies been shielding their high-value units from torpedo attack for decades. Their record was far from perfect, but of the twenty-three large fleet carriers of the U.S. Navy that saw combat in World War II, only one – USS *Wasp* (CV-7) – was lost to submarine torpedoes as the primary cause.[91] (Incidentally, her commanding officer at the time was then-CAPT Forrest P. Sherman, the CNO-in-the-making and later architect of 'attack at source'.)

Even with the standard loadout of two nuclear torpedoes in its tubes, the Soviet attacker still had to make it into the inner defense zone of the battle group and get away after leaving a 'flaming datum' of the most dramatic kind. With conventional torpedoes, the chances of getting close enough, sinking a carrier, and ideally staying alive to tell the tale were lower yet. What was required, then, was a real standoff capability that would allow a submarine to also attack from well outside the defensive ASW screen – something no torpedo could provide, but a missile weapon could.[92] Ideally such a missile would be effective during the conventional

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so forth, but was probably less than 500 meters in most conditions. Calculations can be done based on: Defense Nuclear Agency, "Section VIII: Damage to Naval Equipment," from Capabilities of Nuclear, 1960, ~~CONFIDENTIAL~~. If the torpedo did not kill the carrier outright, it might have left its flight deck and air group relatively undamaged and, depending on the depth of burst, might not have caused debilitating irradiation either. While an airburst has additional thermal effects, which account for more than a third of the energy released, fire damage is not a factor in a torpedo explosion. According to the DoD/DoE handbook of nuclear weapons effects "[e]ssentially all the thermal radiation emitted by the fireball while it is still submerged is absorbed by the surrounding water. When the hot steam and gases reach the surface and expand, the cooling is so rapid that the temperature drops almost immediately to a point where there is no further appreciable emission of thermal radiation. It follows, therefore, that in an underwater nuclear explosion the thermal radiation can be ignored, as far as its effects on people and as a source of fire are concerned." See Samuel Glasstone and Philip J. Dolan, eds., *The Effects of Nuclear Weapons* (Washington, DC: United States Department of Defense; Energy Research and Development Administration, 1977), 55. For further details, see 268-76.

[90] J. R. Hill, *Anti-Submarine Warfare* (Annapolis, MD: Naval Institute Press, 1989), 26.

[91] The USS *Wasp* was lost to the IJN submarine *I-19* in September 1942. The *Wasp* was a 'treaty carrier' built under the restrictions of the interwar naval arms control regime and particularly vulnerable to torpedo attack. The I-19 scored three excellent hits, including on her aviation fuel stores. The four other fleet carrier losses in World War II – of which one was a light aircraft carrier (CVL) rather than a fleet aircraft carrier (CV) – were all primarily due to air attack.

[92] Jordan, *Soviet Submarines: 1945 to the Present*, 117. A typical range for a Soviet torpedo during the 1960s was 15,000-25,000 yards.

phase as well. Nuclear use at sea was certainly seen as acceptable, if the very concrete alternative was increased nuclear devastation of the homeland. Hence, the intimate link between anti-carrier operations and tactical nuclear warfare that was established during the early phase proved very persistent, even as more capable conventional options became available: *every* dedicated ACW asset in the Soviet Navy could carry tactical nuclear weapons. Nevertheless, being stuck with tactical nuclear use as the *only* high-confidence option for countering the carrier was less than satisfactory.

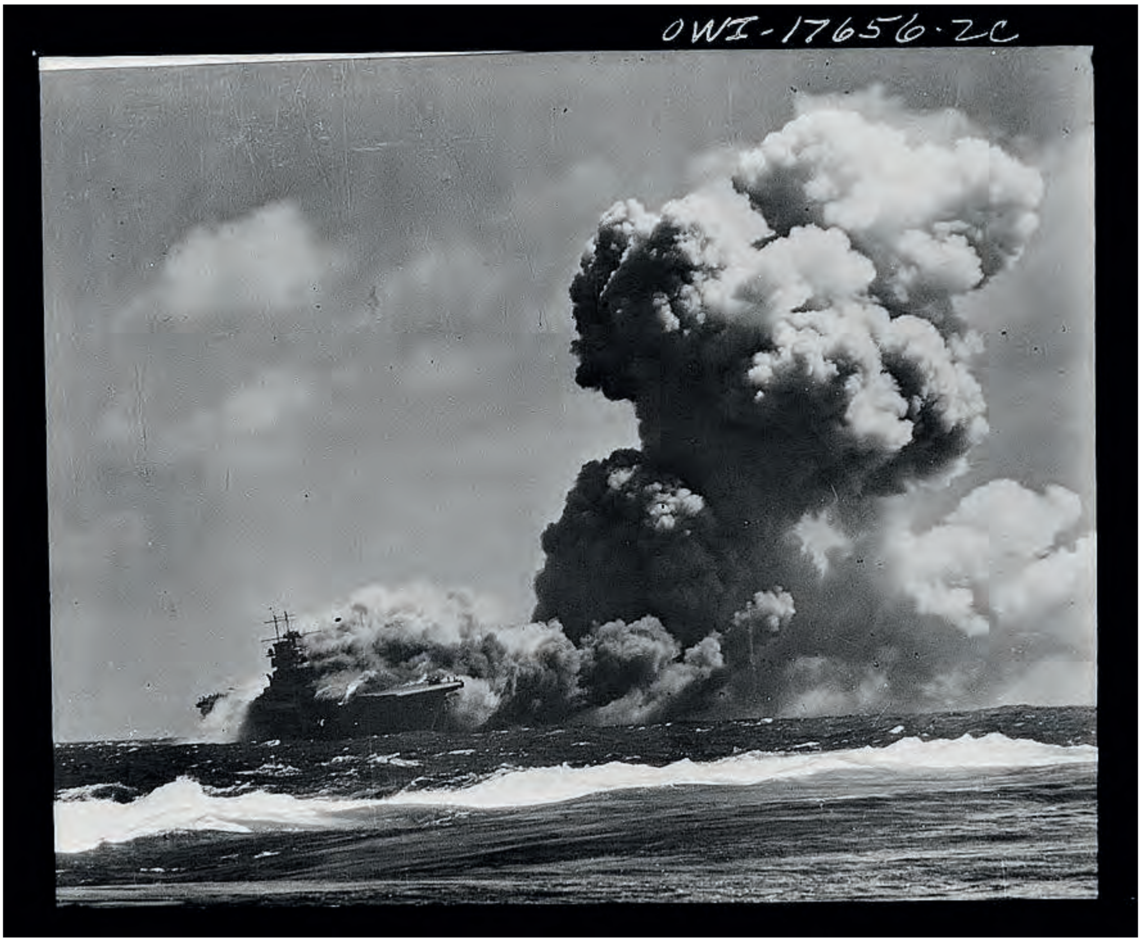

Fig. 17: The USS *Wasp* (CV-7) burns after falling victim to the IJN submarine I-19 off the Solomon Islands, 15 September 1942. This was the only loss of a U.S. fleet carrier to a submarine torpedo attack alone. *(U.S. Library of Congress)*

The near-term solution that the VMF pursued was highly pragmatic and reflected the urgency of fielding a viable anti-carrier defense: it was decided to adapt the existing *Echo*-class design to fire an anti-ship version of the P-5 land-attack missile, which had already been under simultaneous development. The P-6 missile – the SS-N-3a variant of the *Shaddock* to NATO – had a range of 250 nmi, which was unheard of for a submarine-launched anti-ship weapon at the time and put the submarine well outside any conceivable battle group ASW defense.[93] To make the *Echo* more suitable for its new role, an additional pair of launchers was added, for a total of eight. Jordan believes that the standard loadout was a mix of conventionally and nuclear-tipped missiles.[94] Six and two would appear to have been a sensible compromise, but since there was no way of distinguishing conventional and nuclear missiles using photographic materials, we do not know with any certainty. According to Antonov, Marinin, and Valuyev, the P-6 could be launched in a moderate to rough sea state, and the boat could keep moving at up to 10 knots.[95] Tracking and initial guidance of the missiles was performed by the dual *Front Door/Front Piece* antennae, which were stowed in the enlarged sail and rotated forward during the launch preparation stage. The chief limitation of the system was that there was no way the submarine itself could detect targets for its P-6s over the horizon, meaning that it would have to be part of what the Soviets later came to call a "reconnaissance-strike complex."[96] For secondary torpedo attack and self-defense, once the missiles were expended, Project 675s also carried four standard-caliber (533 mm) torpedoes and six of the smaller 400 mm weapons.[97]

Apart from the increased armament, the liabilities of the modified first-generation design were even greater than those of the original *Echo*. The lengthened hull and increased displacement cost the *Echo II* about 3 knots of speed compared to the land-attack version. This left it – at best – with a marginal capability for maneuver relative to its targets. Given the extreme range of the missile system by the standards of its time, this was probably seen as a perfectly acceptable trade-off. That said, the *Echo II* not only had to launch on the surface but – unlike the *Echo I*, which could submerge upon firing its autopiloted missiles – also had to remain surfaced during part of the missile's flight time, to designate a target based on the radar

[93] Ibid., 79.
[94] Ibid., 81.
[95] Antonow, Marinin and Walujew, *Sowjetisch-russische Atom-U-Boote*, 37. Firing the missiles in sea state 5 presumably would not have been the crew's favorite task, but it does not seem implausible either.
[96] Milan Vego, "Recce-Strike Complexes in Soviet Theory and Practice" (Soviet Army Studies Office/U.S. Combined Arms Center, Fort Leavenworth, KS, 1990), https://apps.dtic.mil/dtic/tr/fulltext/u2/a231900.pdf, ii.
[97] Yuri V. Apalkov, *Подводные лодки советского флота 1945-1991 [Submarines of the Soviet Fleet 1945-1991]* (Moscow: МОРКНИГА [MORKNIGA], 2009), vol. 1, 75.; Jordan, *Soviet Submarines: 1945 to the Present*, 81.

picture that was sent back to the submarine by an airborne source – the Tu-95RT maritime reconnaissance aircraft – via a video data link (VDL).[98] A new air search radar was installed for early warning of incoming enemy aircraft.[99] Obviously, if the submarine was detected on the surface, be it by radar or by direction finding, and sought out by a U.S. or allied air asset, its only recourse was to abort the missile launch and submerge as quickly as possible. As for passive detection, one can assume that the *Echo II* was at least as noisy as the earlier version, given that its power plant had to work harder to propel its lengthened hull at the same speed and the two additional blast deflectors would have further increased flow noise.[100] Its crews apparently called it "a rattling can"[101] – and that is according to a Russian source. Since the battle group's organic ASW defenses did not reach 200 nmi (or more) ahead of the main body and still primarily relied on active sonar during the 1960s and early 1970s, this was a handicap mostly during transit and while trying to get into firing position. However, with SOSUS entering its prime, vulnerability to passive detection long before the *Echo II* came within missile range played right into the U.S. Navy's hands. While it was perfectly understandable that the first-generation boats were not optimized to survive in an environment marked by a significant U.S. advantage in passive acoustics, a lack of improvement in this area threatened to make VMF submarines cooperative targets for decades to come.

Meanwhile, the *Echo II*'s combination of long-range missiles and a torpedo armament with optional nuclear warheads complicated the CVBG defense problem to some extent. The *Echo II* was certainly very noisy, but a carrier battle group was considerably louder still and silent SSN escorts operating in direct support were still in the distant future.[102] As a result, the SSGN also stood a chance of closing in with a battle group and doing serious damage from

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[98] Yefim Gordon and Dmitriy Komissarov, *Soviet Naval Aviation, 1946-1991* (Manchester: Hikoki Publications, 2013), 332; Carlo Kopp, "Maritime Strike: The Soviet Perspective," *Australian Aviation*, 1988, https://www.ausairpower.net/TE-Sov-ASuW.html.

[99] Jordan, *Soviet Submarines: 1945 to the Present*, 82.

[100] Antonov, Marinin and Valuyev claim that several measures were put in place to reduce noise levels, but do not provide any specific information as to the nature of these measures or how successful they were. See Antonow, Marinin and Walujew, *Sowjetisch-russische Atom-U-Boote*, 38.

[101] B. Y. Golubchik, "The Sonar System Kerch: The History of Its Creation," in Godin; Palmer, *History of Russian Underwater Acoustics*, 480.

[102] Regular 'direct support' for CVBGs became possible only as the construction of the *Los Angeles*-class, which was designed with this purpose in mind, began to swell the number of fast and quiet SSNs in the late 1970s.

within the screen, where it could deliver its attack while submerged. What is less clear is whether Soviet doctrine and command philosophy *permitted* an *Echo II*-skipper to make use of his increased tactical options. In fact, since highly orchestrated standoff attacks were envisioned, there is every reason to believe that it did not. Its reduced speed also limited the *Echo II* to approaches from the frontal quadrant, which would usually have seen the most intense ASW effort. Hence, its ability to double as a torpedo-attack submarine was modest – but certainly not low enough to discount it, especially during its heyday in the late 1960s and early 1970s.[103]

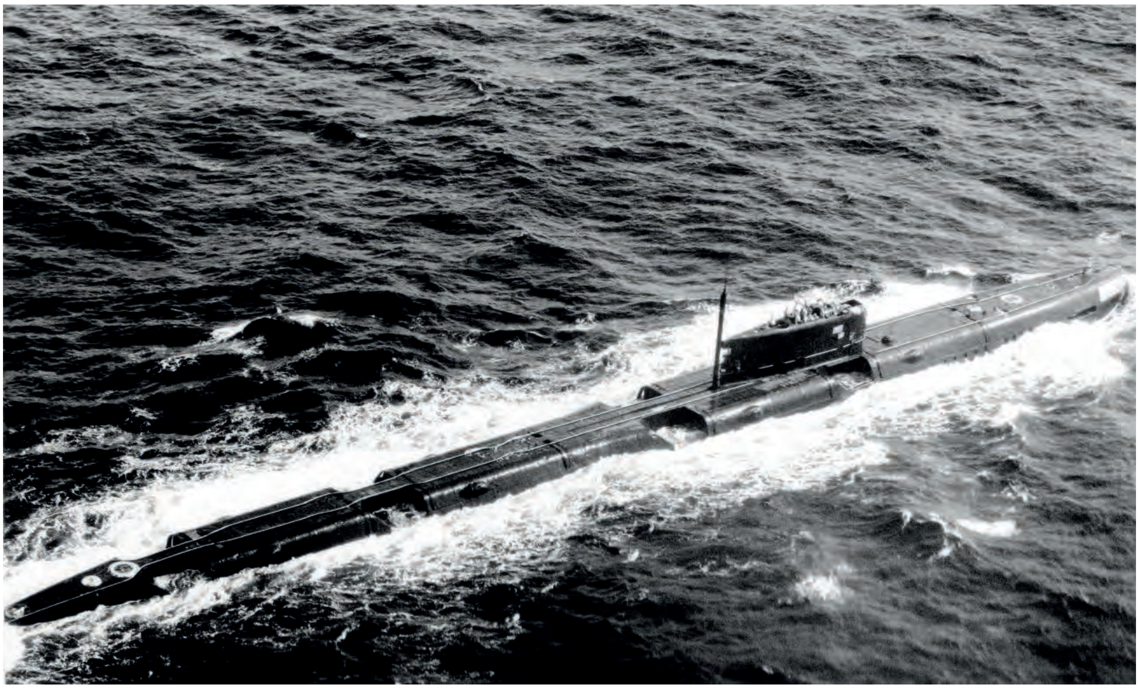

Fig. 18: An *Echo II*-class guided missile submarine in transit. The four pairs of recessed missile launchers are clearly visible, as are the blast deflector notches to the rear of each launch canister. (U.S. National Archives)

Overall, the shipyards at Severodvinsk and Komsomolsk put out twenty-nine units of Project 675 – the first in 1963 and the last in 1968. The fact that the number of hulls surpassed the *combined total* of torpedo-attack *Novembers* and land-attack *Hotels* and *Echo I*s was testament to

[103] By the time the *Echo I*s had all been converted into 659T torpedo submarines, their usefulness was starting to look more look dubious. With ten to fifteen years of service life left in them, the last were written off in the late 1980s. Like the rest of the HENs, they suffered their share of serious accidents and fires, but none were lost at sea.

the strong commitment of the VMF and the political-military class more broadly to the ACW mission. Doubtless, the VMF's first-generation anti-carrier platform had many serious flaws, but its significance should not be underestimated: if one had to date the shift from an *extended coastal defense* to an *oceanic area defense*, the 1963 introduction of the *Echo II* – a high-seas missile battery for long-range anti-ship cruise missiles (ASCMs) that was linked to a fledgling intelligence, reconnaissance, surveillance and target acquisition (ISTAR) complex – would make an excellent contender.

In a further demonstration of the importance that was attached to ACW at the service level and beyond, the inability to produce even larger numbers of nuclear propulsion units – a total of 110 (!) reactors went into the first-generation boats – led to the *Echo II*s being supplemented by a class of diesel-electric anti-carrier boats.[104] Project 651 (NATO designation: *Juliett*) was designed as a PLRK (*Podvodnaya lodka s raketami krylatymi*, or submarine armed with winged missiles) from the keel up and, at more than 4,200 tons, had a substantially larger submerged displacement than the previous generation of diesel boats. With their broad beam and blast deflectors, the 651s also "had all the hydrodynamic efficiency of a badly damaged brick."[105] Despite their bulk, they could carry only half as many missiles as its nuclear-propelled counterpart. With a top speed of 18 knots, the *Juliett* also had no chance of trailing, and little chance of closing in with, a CVBG. Hence, it had to rely on the very long range of its missiles to an even greater extent than the *Echo II*. The guidance and air search radars were identical with the nuclear boat, as was the launch procedure. 651s also had a secondary armament of six standard-caliber (533 mm) and four 400 mm torpedo tubes, apparently with no reloads for the former and eight reloads for the latter.[106] According to two otherwise reliable

[104] See Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 100; Jordan, *Soviet Submarines: 1945 to the Present*, 83. I do not count the single Project 645 submarine – an experimental design based on the *November*'s hull but equipped with lead-bismuth cooled reactors – as a HEN, because the VM-A pressurized water reactor was the critical shared feature of the production boats of the first generation.

[105] This according to Bruce Rule, "O JULIETT, JULIETT, Wherefore art thou JULIETT?," IUSS Caesar Alumni Association, http://www.iusscaa.org/articles/brucerule/o_juliett__juliett__wherefore__art_thou_juliett.htm.

[106] Providing a substantial number of defensive weapons and just enough offensive firepower to sink a target of opportunity, but not enough for a secondary attack role, would have been a sensible trade-off in a diesel-

sources, a large production run of seventy-two *Julietts* was planned, but there is reason to doubt this.[107] Jordan, for one, suggests that the low build rate (for a diesel) of two per year was more consistent with a program that was deliberately limited in scope.[108] Since the *Juliett* was designed as a supplement to the *Echo II*, which was itself only the first stage of the anti-carrier program, his is the more plausible account. In the event, sixteen were delivered during 1963-1968 before the project was terminated and the lead shipyard – Krasnoye Sormovo in Gorky – was shifted to nuclear construction.

Fig. 19: A *Juliett*-class PLRK resupplying at sea from a submarine tender. Her 'main battery' of four SS-N-3a anti-ship missiles could not be reloaded at sea. *(U.S. National Archives)*

electric cruise missile boat. In addition, two of the new ASB-30 nuclear replacement warheads were probably carried to be fitted onto standard 533 mm weapons when necessary. See Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 102, 28. Again, there is no agreement on the exact details concerning reloads, numbers and location of the 400 mm tubes, etc. While Polmar and Moore's thorough post-Cold War look at the subject remains a standard reference, J.V. Apalkov's more recent Russian-language account is stronger on some of these technical minutiae. See Apalkov, *Подводные лодки советского флота 1945-1991 [Submarines of the Soviet Fleet 1945-1991]*; Yuri V. Apalkov, *Подводные лодки советского флота 1945-1991 [Submarines of the Soviet Fleet 1945-1991]: ВТОРОЕ ПОКОЛЕНИЕ АПЛ [Second Generation of the APL]* (Moscow: МОРКНИГА [MORKNIGA], 2011), vol. 2; Yuri V. Apalkov, *Подводные лодки советского флота 1945-1991 [Submarines of the Soviet Fleet 1945-1991]: ТРЕТЬЕ и ЧЕТВЕРТОЕ ПОКОЛЕНИЯ АПЛ [Third and Fourth Generation of the APL]* (Moscow: МОРКНИГА [MORKNIGA], 2012), vol. 3.

[107] See MccGwire quoted in: Siegfried Breyer and Norman Polmar, *Guide to the Soviet Navy* (Cambridge: Patrick Stephens Ltd, 1977), 36; Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 100.

[108] Jordan, *Soviet Submarines: 1945 to the Present*, 84-85.

The nuclear submarine that Gorky would build once this transition was completed was the 'interim', second-generation anti-carrier boat. Known as Project 670 (NATO designation: *Charlie*), the platform itself had initially been designed as a cheaper, more numerous successor to the November. It was adapted to a dedicated anti-carrier configuration when a follow-on PLARK project was abandoned during the design stage.[109] The result was an innovative submarine, in several respects – and one that posed a more dangerous threat than it is sometimes given credit for. In terms of its basic design features, the *Charlie* was the first Soviet nuclear submarine that relied on a single reactor – the VM-4 – to drive a single shaft, as was generally the case in Western designs. It appears that this was primarily a way of reducing costs, and of enabling construction of a next-generation PLARBs and APLs (*Atomnaya podvodnaya lodka* or atomic submarine) during the same period.[110] Secondly, and even more importantly from an operational perspective, the *Charlie* introduced both submerged launch and the world's first sea-skimming anti-ship missile, the P-70 *Ametist* (SS-N-7 *Starbright*). Because of the missile's much shorter range of approximately 35 nmi, the boat could – under some circumstances and to some extent – do its own targeting using passive sonar. However, the *Kerch* sonar that was initially used on the *Charlie* limited the realistic range for an engagement without external support to about half the effective missile range.[111] While this was clearly a major flaw, it predisposed the 670s to attack from very short range, in effect using the P-70 as a "flying torpedo."[112] The extremely short warning times this entailed, the missile's low flight profile, and the ability to deliver an additional torpedo attack in short order, made it an unpleasant opponent to deal with.[113] With ten additional torpedo reloads for its four standard tubes, a 670

[109] Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 162.
[110] Ibid.
[111] See Defense Threat Informations Group, "Russian / Soviet Sea-Based Anti-Ship Missiles," Special Report derived from JED's "Destroyers & Carrier Killers" Defense Threat Informations Group, https://de.scribd.com/document/50289372/Russian-Soviet-Naval-Missiles. This was eventually remedied by the adoption of the *Rubin* sonar used on the Papa (see below).
[112] Jordan, *Soviet Submarines: 1945 to the Present*, 108.
[113] Author's interview with RADM Michael McDevitt, Alexandria, VA, 11 May 2016.

driven by an aggressive commander had a good chance of doing additional damage after its missiles were expended.

Despite the very different and more severe threat posed by a well-handled *Charlie*, two major flaws of the first-generation *Echo II* remained largely unremedied: the top speed increased very modestly to a still-insufficient 26 knots, and the noise level remained too high to evade detection under the conditions of a pervasive U.S. advantage in passive acoustics.[114] To be fair, advances had been made in both areas. The much more streamlined hull form and smaller wetted surface resulted in higher speed, despite the switch to a single reactor and the retention of the double hull. Apparently, the noise reduction measures that were adopted were also quite extensive and included mounting some equipment on springs, as well as a newly designed propeller.[115] We can conclude that there was an awareness of the inadequacies of the first-generation boats and that Soviet engineers were working to alleviate them. They were just not making progress at the same rate as their counterparts were, as a result of their ever more deeply ingrained obsession with passive sensors. As long as the Soviet deficiencies persisted, the U.S. Navy could maintain a crucial lead in sensor technology without fundamentally changing its preferred approach to the ASW problem.

During 1967 and 1972, eleven *Charlies* were delivered in the basic configuration described above. Six more units were built as improved 670Ms, or *Charlie II*s, during 1973-1980. This second pattern carried a new and considerably more capable missile, the P-120 *Malakhit* (SS-N-9 *Siren*) with an increased range of up to 55 nmi, and much better resistance to countermeasures. This came at the cost of a further reduction in speed to 24 knots, due to the additional drag produced by a lengthened bow section, to accommodate the new weapon. In other words, the definitive version of the *Charlie* still had to maneuver itself into a firing position much closer to the battle group than the *Echo II* before it. Whilst it had neither the speed nor

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[114] Jordan, *Soviet Submarines: 1945 to the Present*; Jordan, *Soviet Submarines: 1945 to the Present*, 81.

[115] Alexander Antonow, Walerie Marinin and Nikolai Walujew, *Sowjetisch-russische Atom-U-Boote: Gefahr aus der Tiefe* (Augsburg: Bechtermünz, 2000), 70. These measures appear to have been well behind the curve, as far as competition with the U.S. Navy was concerned. But it is important to note that there was a clear interest in more advanced quieting measures in the 1960s era designs.

the stealth to do so reliably in a broad range of circumstances, with the tactical situation in its favor, the presence of a 670M could potentially make for a very bad day.

Despite these step-by-step advances, it took the VMF until the early 1980s to conclude the 'interim' stage and field a truly advanced anti-carrier submarine. To understand why this was so, we must briefly delve into the troubled history of the submarine that was originally meant to fill this role: the experimental Project 661, or *Papa* to NATO. One of the most ambitious submarine designs of the Cold War era, on either side of the confrontation, the *Papa* was engineered for maximum advantage vis-à-vis a U.S. battle group. Its design speed was 38 knots – fast enough to catch up with a carrier from even the least favorable starting position, an even overtake it if necessary. Like the *Charlie I*, the *Papa* was armed with the submerged-launch P-70 *Ametist*. However, unlike the equipment on the smaller and less advanced 'interim' boat, its *Rubin* sonar reflected the state of the art in Soviet underwater acoustics research, and was optimized to "provide long-range detection of surface ships, especially multi-screw aircraft carriers."[116] With its unheard-of speed and improved sensors, the *Papa* promised to raise the VMF's anti-carrier capability to the next level.

Alas, Project 661's realization process was beset by debilitating problems and it never lived up to this promise, which ultimately led to its abandonment after a single vessel had been completed. Made almost entirely of titanium alloy, which no other nation had worked with in submarine construction (and none ever would), the *Papa*'s double hull began to develop extensive welding cracks before it was even completed. An industrial maximum effort was required to turn the first-of-class into a seaworthy submarine. The results were impressive, in some respects. Notably, the *Papa* far exceeded its makers' expectations in the important category of forward motion: during testing, it set a submerged speed record of 44.7 knots that remains unbroken to this day.[117] The tremendous amount of fluid resistance that acted upon the surface at such high speeds is said to have literally stripped the paint off its outer hull. The

[116] See Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 137. Unfortunately, Mikhailov's article in the *History of Russian Underwater Acoustics* (484-94) does not yield much additional information on the system. See Yu. A. Mikhailov, "The Birth of Rubin," in Godin; Palmer, *History of Russian Underwater Acoustics*.

[117] Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 139.

combination of flow noise and machinery noise also resulted in deafening sound pressure levels of around 100 db inside the submarine.[118] With noise levels within the hull reaching levels that could lead to irreversible hearing damage, the level of radiated noise was almost certainly at the extreme upper end of the scale as well. At the end of the day, Soviet engineers found themselves with a remarkable achievement under their belts – but not one that translated into a useful tactical advantage. Seeing that the construction of a class of *Papas* was going to result in extravagant costs without commensurate benefits, Soviet decision-makers sensibly decided to abandon the program in 1970.

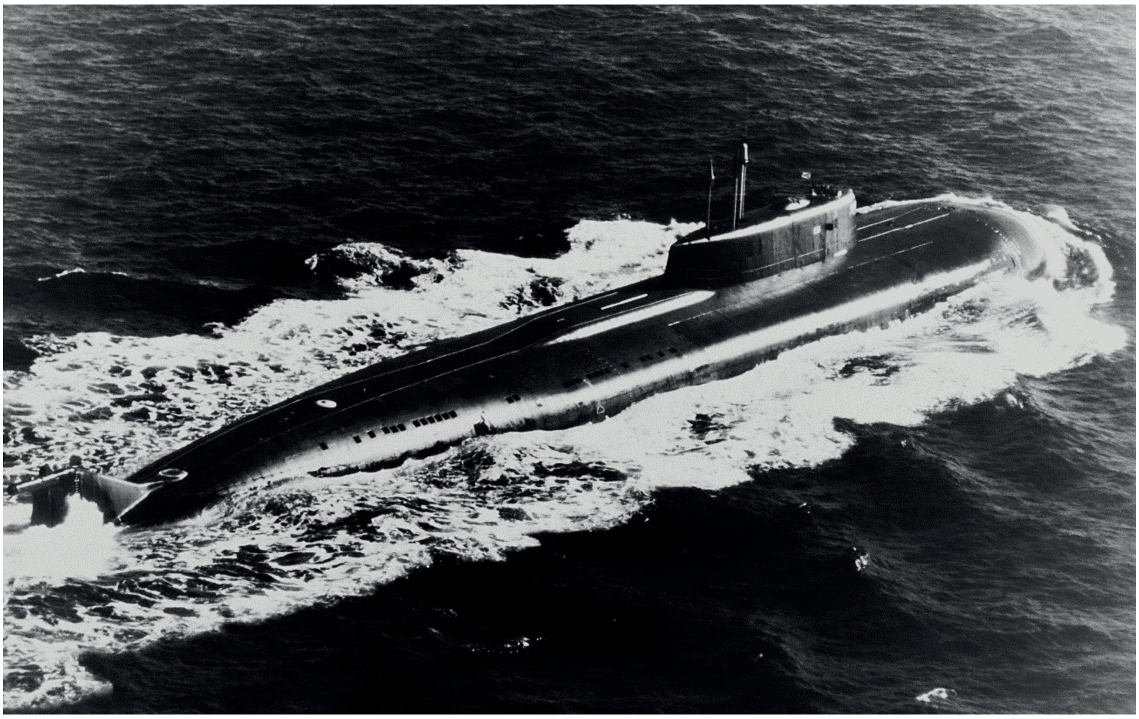

Fig. 20: The K-186, named after the city of Omsk, was the last *Oscar II*-class submarine laid down before the Cold War ended. She was overhauled during the 2000s and remains in service with the Russian VMF's Pacific Fleet. *(US National Archives)*

Hence, the search for a truly capable 'carrier killer' continued and the U.S. Navy was given more time to adjust to the prospective threat. In fact, it was not until 1978 that the third-generation threat began to materialize, with the construction of the first vessel of Project 949, known to Western analysts as the *Oscar*-class. After only two vessels, the initial configuration

[118] Antonow, Marinin and Walujew, *Sowjetisch-russische Atom-U-Boote*, 73-74.

was changed to an improved 949A (*Oscar II*) standard. When the first of these 19,000-ton leviathans – the *Krasnodar* (K-148) – went to sea in 1986, she was the vindication of the VMF's belief in the submarine as the backbone of its anti-carrier strategy. K-148 and her sisters were at once quiet enough to elude their hunters, fast enough to shadow a CVBG for days, and – if they were in capable hands – able to fire from a position of their choosing. While they still depended on a battle network to realize their full potential, they were so heavily armed that they could challenge a battlegroup's defenses even on their own. In short, the *Oscar IIs* were everything the VMF had been looking for, crammed into a hull with the displacement of a World War II era heavy cruiser, at great cost to the failing Soviet economy. They were an impressive asset for the bastion defense concept in their time. Ultimately, the Red Navy's most impressive achievement in challenging U.S. sea control from the deep came far too late in the game to make a real difference.

5.3.3 SS-NX-13: The anti-ship ballistic missile saga

Whilst the eventual perfection of the submarine as a cruise missile platform was by far the more operationally relevant outcome of the VMF's investment in ACW over a thirty-year period, it was not the only avenue that was explored. From the mid-1960s onwards, there was also a second track of techno-doctrinal developments that never led to an operational capability: the pursuit of a submarine-launched anti-ship ballistic missile (ASBM). In fact, there is considerable evidence to indicate that the second-generation SSBNs of Project 667A – the *Yankee*-class – were originally designed to carry such a missile. Given that the *Yankee* was the most numerous of all Soviet ballistic missile submarines, with thirty-four units completed during 1967 and 1972, the strong possibility that it was envisioned as a dual-purpose boat with an anti-carrier capability has important implications for our analysis.

Work on the VMF's next ballistic missile submarine started in the late 1950s, but progressed slowly after the RVSN was assigned sole responsibility for long-range nuclear missile strikes. However, the VMF still intended to capture a significant share of that mission and, after several failed or unsatisfactory submarine and missile designs, gained approval for the construction of a new class of 'nuclear submarine missile cruisers'. The 667A design that had ultimately made the cut was a major improvement over the *Hotels*, with a much more reliable reactor and a *Polaris*-like sixteen-tube missile battery fitted aft of the sail.[119] Leaving aside the number of missiles that were carried and the fact that one of the two missile options was an IRBM, the *Yankee* was a distinctly Soviet design, with the customary double hull, twin reactors, and twin screws. This configuration allowed for a top speed of 28 knots – about 6 knots faster than its American contemporaries, which were designed for low noise and shorter patrols from forward bases. However, the inefficiency of the design is evident from the fact that it took the *Yankee* close to 350 percent of the installed power of a contemporary U.S. ballistic missile sub to attain this advantage, which was only partially useful.[120] In fact, the 667As were notoriously noisy and easy to track, which was a highly undesirable trait in an SSBN, in particular.[121] The temptation to run at high speed during transit, which would usually take the *Yankee* through areas with excellent SOSUS coverage, made life even easier for Western ASW forces.

Western analysts have generally seen the *Yankees* as a "matching force,"[122] a Soviet copy of *Polaris* in the quest for strategic parity. There is undoubtedly some truth to this view, in that the VMF wanted a ballistic missile submarine with increased missile range and greater firepower, and political decision-makers were looking for a *Polaris* equivalent to brandish on the international stage. But in doctrinal terms, the fact that there was a second, tactical missile option for the *Yankee* complicates the "Red Polaris"[123] narrative very considerably. This missile was the R-27K anti-ship ballistic missile, with the NATO designation SS-NX-13.

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[119] The arrangement was not actually a copy of the *Polaris* boats, in that it was made up of two compartments of eight, rather than a single one. Podvig, *Russian Strategic Nuclear Forces*, 294-95.

[120] The U.S. Navy's SSBN 598, 608 and 616 classes – collectively known as the '41 for Freedom' – all shared the same 15,000 shp power plant based on the S5W reactor. The *Yankee* used a plant based on two VM-2-4s with a total output of 52,000 shp. See Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 182.

[121] Zaloga, *The Kremlin's Nuclear Sword*, 117.

[122] MccGwire, "Soviet Military Doctrine," MccGwire, *Military Objectives in Soviet Foreign Policy*, 96-97.

[123] Zaloga, *The Kremlin's Nuclear Sword*, 115-18.

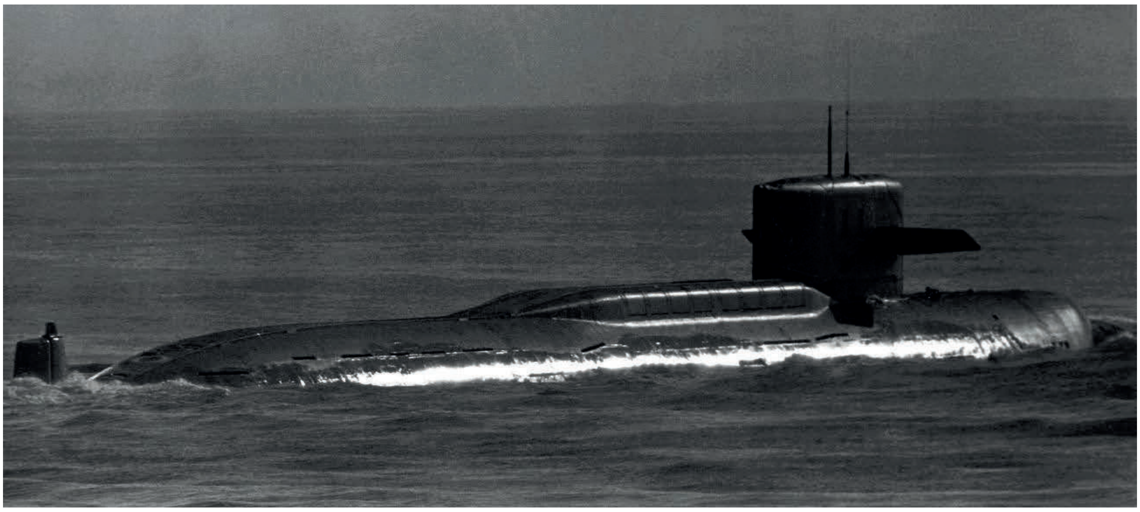

Fig. 21: A *Yankee*-class SSBN underway. If this type had been equipped with the R-27K tactical ballistic missile, as was originally planned, it would have added another dimension to the challenge to U.S. sea control. *(U.S. National Archives)*

As Robinson notes, the idea of using ballistic missiles against a moving target at sea was not entirely new.[124] The RVSN and its partisans had been looking at the possibility as a way of driving home the obsolescence of naval forces – a perception which Gorshkov himself seconds in his writings. In technical terms, the viability of the ballistic missile as an anti-ship weapon was primarily a matter of reducing the target location error, or sufficiently alleviating its effects:

> "In principle, any ballistic missile could be used effectively against ships within range if nuclear warheads were employed, if the target's position at time of warhead detonation could be accurately predicted or if the target could be accurately followed by a maneuvering weapon, if targeting data could be communicated promptly, and if the missile could be retargeted and launched promptly."[125]

Developed in parallel with the R-27 IRBM, which was the regular land-attack weapon carried by the 667A, the R-27K was designed to meet these criteria. The critical feature was the addition of a maneuverable reentry vehicle (MaRV) equipped with a one-megaton warhead, and a terminal guidance system.[126] The high yield meant that weapon-associated inaccuracies of up

[124] Raymond A. Robinson, "Incoming Ballistic Missiles at Sea," *USNI Proceedings*, June 1987, 67.
[125] Ibid.
[126] It has been suggested that this involved a passive radar homing system, which should have worked well enough against a carrier conducting flight operations. That said, if the specific emissions the seeker was looking for were not present, a considerable degradation of terminal accuracy would be the result.

to 2,600 meters would still have resulted in extensive damage to the carrier and that any escorts present within a 35 km^2 area would have sustained either severe or moderate damage as well. The kill radius, within which the carrier would have been sunk outright or catastrophically damaged, would have been roughly 2,000 meters.[127] Naturally, the targeting process would still have required offboard cueing – apparently using the satellite-based *Kasatka* tactical data link, which was later also used to target anti-ship cruise missiles.[128] The missile's footprint (i.e., the area within which the maneuvering warhead could find and home onto a target) has been estimated at about 30 nmi, although it is not entirely clear whether this refers to the longitudinal axis, an estimated diameter, or a radius.[129] It would follow that – even assuming the target location error is zero and 30 nmi is the footprint's radius – a CVBG travelling in a straight line at 25-30 knots could escape damage if more than an hour elapsed between the last position update and the arrival of the missile over its target.[130] However, with up to sixteen missiles available in a single attack, the carrier would have been unlikely to survive even if the area of uncertainty in which the CVBG could theoretically lurk after a given amount of time had elapsed, was considerably larger than this 30 nmi radius. Needless to say, there was no practical possibility for active defense against such an attack, although the reliance on a passive

[127] This is based on an airburst with a one-megaton yield, set to destroy an aircraft carrier using U.S. damage criteria. The Defense Nuclear Agency's standard for severe damage to a carrier is a peak overpressure of 30 pounds per square inch (psi). Moderate damage resulting in immobilization is expected at 20 psi for a carrier, whereas moderate damage to a destroyer is expected at 15 psi. See DNA, "Damage to Naval Equipment". Effects calculations can be done based on Samuel Glasstone and Philip J. Dolan, eds., *The Effects of Nuclear Weapons* (Washington, DC: United States Department of Defense; Energy Research and Development Administration, 1977). Alex Wellerstein's NUKEMAP (Alex Wellerstein, "Nuke Map," https://nuclearsecrecy.com/nukemap/) is a practicable 21st century alternative. On a side note, serious radiation effects for an airburst of this yield do not appear to extend much beyond the 20 psi blast radius and would inflict few additional casualties. Surface bursts are a different matter. See Glasstone and Dolan, *The Effects of Nuclear Weapons*, 334.

[128] See Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 180. On *Kasatka*, (NATO designation: *Punch Bowl*) see Friedman, *Seapower and Space*, 166-67. Obviously, other – probably less timely – means of cueing could also be employed.

[129] Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 170.

[130] The possibility of escaping the footprint would actually be slightly better than that, unless the azimuth of the missile's flight path is closely aligned with the carrier's course. In practice, due to the extreme velocity of the missile, the footprint is likely to resemble a somewhat distorted ellipse rather than a perfect circle.

seeker would have made strict emission control (EMCON) at least a partially effective countermeasure.[131]

In line with what had earlier been reported, an imagery intelligence (IMINT) report released in 2010 confirms that the anti-ship R-27K was tested at the Kapustin Yar missile range sometime after March 1968, soon after the land-based test program for the R-27 IRBM had been concluded.[132] Since it might have made sense to test the less technically complex land-attack version first, no matter which program was more highly prioritized at the time, it is difficult to draw any firm conclusions from this sequence. Interestingly, Zaloga states explicitly that *both* missiles were intended for use against targets of naval interest, which is in line with Herrick's account of Soviet SSBN roles, sketched out above.[133] It is also reported that the R-27K was tested from a modified *Golf*-class SSBN during 1973.[134] On 1 November 1973, the possibility of R-27Ks also being deployed on *Kara*-class missile cruisers made it into the Presidential Daily Brief.[135] In 1974, the CIA still expected the R-27K to enter service within the next two years.[136] However, for reasons that remain difficult to verify, the VMF chose to abandon the ASBM project. Possible explanations include the even more urgent threat posed by *Polaris*, the changing role of Soviet SSBNs, technical problems with the missile system, the lack of a reliable 'kill chain', or a connection with the SALT I arms control agreement. A combination of some

[131] On EMCON, see Robert G. Angevine, "Hiding in Plain Sight: The U.S. Navy and Dispersed Operations under EMCON, 1956-1972," *Naval War College Review* 64, no. 2 (2011), 1-17; Jonathan F. Solomon, "Maritime Deception and Concealment: Concepts for Defeating Wide-Area Oceanic Surveillance-Reconnaisance-Strike Networks," *Naval War College Review* 66, no. 4 (2013), 87-116. It must have occurred to Soviet guidance designers that the use of a passive radar seeker as the sole means of terminal guidance was not necessarily an optimal choice. Given that the R-27K was apparently designed by Chelomey's OKB-52, which displayed a preference for combining active and passive radar seekers in the P-500 and P-700 anti-ship missiles under development during the same phase of the competition, the lack of any kind of active guidance is surprising. See Michal Fiszer and Jerzy Gruszczynski, "Carrier Killers: Soviet and Russian Naval Anti-Ship Missiles, Part I," *Journal of Electronic Defense*, October 2003, 47-48. That said, one can imagine a variety of technical and non-technical explanations for why this path was not chosen.

[132] National Photographic Interpretation Center, *Missile-Related Activity at Kapustin Yar Missile Range Test Complex C Site 2, USSR (S)*, September 1982, CIA Historical Collection, ~~SECRET~~ (declassified 11 March 2010). This source also confirms that the program was terminated in 1973.

[133] Zaloga, *The Kremlin's Nuclear Sword*, 116.

[134] Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 180.

[135] Central Intelligence Agency, *The President's Daily Brief*, November 1, 1973, 3.

[136] Central Intelligence Agency, *NIE 11-15/74: Principal Judgements*, December 17, 1974, CIA Historical Collection, ~~TOP SECRET UMBRA~~ (declassified 31 August 2001), 5.

or all of these factors seems most probable.[137] Perhaps the least plausible explanation is MccGwire's insistence that the ASBM was also envisioned as a strategic ASW weapon for use against *Polaris* submarines and abandoned when it failed to provide an adequate capability.[138] Given that the R-27K's radar-homing seeker head would have been quite useless against a submerged submarine, it is not clear which advantages over a regular ballistic missile could possibly have been expected by its designers.

Leaving aside the question of whether a strategic ASW mission was ever intended for the R-27K, how might a *Yankee* armed with ASBMs have affected Soviet doctrine with regard to the anti-carrier mission? First of all, accounts differ as to whether land-attack and anti-ship missiles would have been carried by the same submarines. There was nothing to physically prevent such an arrangement, although Zaloga suggests that the R-27K would only have been carried by an outwardly indistinguishable 667V modification.[139] Naturally, if a mix of missiles had been available for deployment on a single submarine, the flexibility of the *Yankee* would have increased substantially. At the manageable cost of installing the *Kasatka* data link and, presumably, an adapted fire control system, each submarine would have been able to switch roles as necessary – even in the course of a single patrol. A related possibility, which McConnell raises, would have been the employment of the *Yankee*'s anti-ship weapon "against surface ASW, assisting SSBNs in the initial 'breakout' and promoting combat stability"[140] for operations in the Western Atlantic or the Eastern Pacific. (During the 1960s, surface ASW task

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[137] Interestingly, MccGwire suggests that the changing role of the SSBN in Soviet strategy was the main factor. See Michael MccGwire, "Soviet Naval Programs," in *Soviet Naval Influence: Domestic and Foreign Dimensions*, ed. Michael MccGwire and John McDonnell (New York, NY: Praeger, 1977), 341, 346 n.22.
[138] See K. J. Moore, Mark Flanigan, and Robert D. Helsel, "Developments in Submarine Systems, 1956-76," in *Soviet Naval Influence: Domestic and Foreign Dimensions*, ed. Michael MccGwire and John McDonnell (New York, NY: Praeger, 1977), 170-73, 176-77. They appear to suggest that the missile would have been "retargetable after launch" (177), but it seems highly unlikely that this would have taken the form of mid-course updates rather than the much more obvious solution of using an autonomous radar seeker onboard the reentry vehicle (RV). How such a seeker could have been effective against a submerged target is not discussed. As was more often the case in debates among the *cognoscenti* of literature analysis, they may be guilty of relying on a very literal interpretation of a few open-source statements from Soviet officials to make this case, which seems shaky in retrospect.
[139] Zaloga, *The Kremlin's Nuclear Sword*, 117-18.
[140] McConnell, "Military-Political Tasks of the Soviet Navy in War and Peace," 3. Unlike most analysts, he is prepared to admit that he has "nothing concrete to go on here; it only seems a reasonable hypothesis." (46)

forces often included an *Essex*-class anti-submarine warfare carrier (CVS) as well, which would have made this an anti-carrier mission of a different kind.) In effect, the *Yankee* would have provided for its own counter-ASW protection, and that of other units.[141]

Assuming separate land-attack and anti-carrier variants using essentially the same platform, the same tasks could still have been performed – just not by the same submarine. It would also still have been impossible for Western ASW forces to differentiate whether they were dealing with one version of the 'submarine missile cruiser' or the other. This would have confronted the *Yankee*'s hunters with the unpleasant reality of not knowing whether they were attacking the Soviet Union's strategic nuclear reserve, or 'merely' the VMF's anti-carrier forces.[142] However, as we will see later in this chapter, the U.S. Navy was not particularly impressed by the potential for inadvertent escalation that is associated with strategic ASW, and would probably have seen any *Yankee* as legitimate quarry.

Secondly, there were also new deployment options for a dual capable *Yankee*. If some had been assigned to anti-carrier duties, they could have been deployed in patrol areas much closer to home, which would have obviated the need to pass through SOSUS-monitored chokepoints during the outbound and inbound legs of their patrols. As a result, the survivability of these noisy platforms would have increased substantially, especially if they were assigned patrol areas in shallow waters or other areas with marginal acoustic conditions. In the event, relatively few *Yankees* were sent on forward patrols in any case, which led to a posture of *de facto* keeping most of them in home waters, even though the SS-N-6 could not reach U.S. targets from home waters.[143] Had the same submarines been equipped with mix of land-attack and anti-ship missiles, they could simultaneously have provided both anti-carrier defense in the Northern Fleet area and theater nuclear coverage of Northern Europe – including the *Polaris* forward base at Holy Loch, Scotland. This would have presaged the later SSBN 'bastion'

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[141] Ibid., 18.

[142] This problem of distinguishability is not completely unlike the one that the U.S. submarine force faced in the context of the Maritime Strategy's far-forward SSN operations – the critical difference being that these operations were *supposed to* target SSBNs. Barry R. Posen, *Inadvertent Escalation: Conventional War and Nuclear Risks* (Ithaca, NY: Cornell University Press, 1991), 139-40.

[143] On patrol rates, see Zaloga, *The Kremlin's Nuclear Sword*, 288 n.80.

doctrine and added an important twist to it, while reinforcing the VMF's basic direction of travel.

Overall, the flexibility of a dual-purpose platform and the diversification of the anti-carrier threat would probably have spurred greater U.S. investment in defensive measures, as well as strategic anti-submarine warfare earlier in the competition. On the Soviet side, it may well have resulted in the development of conventionally-armed ASBMs at some later date. What other implications a dual-purpose SSBN fleet would have had for the U.S. Maritime Strategy debates of the 1980s will never be known, but the possibility does make for some captivating counterfactual thinking. Following the VMF's decision not to make the anti-ship ballistic missile a staple of its SSBN fleet, it took another forty years before the U.S. Navy had to seriously contend with the threat these weapons posed. However, the potential of ASBMs to complicate the leading navy's sea control mission was not lost on future challengers.[144] As of 2019, the reemergence of the ASBM concept remains an important driver of the U.S. Navy's techno-doctrinal adjustment in the face of China's 21st century take on oceanic area defense.

5.3.4 The air threat: growing fangs

While the Soviet submarines force was awaiting delivery of its first Project 675 and Project 651 anti-carrier submarines in the 1960s, the AVMF's naval strike force was also growing into a sea denial instrument to be reckoned with. A steady stream of Tu-16s had already been received, with five regiments in service by 1960. Until the early 1970s, the number of missile-carrying *Badgers* would increase to 250, a large fraction of which would serve in the Northern Fleet area.[145] The fact that the aircraft itself had considerable potential for growth is perhaps

[144] The most comprehensive account of China's ASBM development is still Andrew S. Erickson, *Chinese Anti-Ship Ballistic Missile (ASBM) Development: Drivers, Trajectories, and Strategic Implications* (Washington, DC: Jamestown Foundation, 2013). See also Jonathan Solomon, "Defending the Fleet from China's Anti-Ship Ballistic Missile: Naval Deception's Role in Sea-based Missile Defense" (Master's thesis, Georgetown University, 15 April 2011).

[145] Gordon and Komissarov, *Soviet Naval Aviation, 1946-1991*, 104; 124. Ibid., 104, 124.

best illustrated by the fact that the Chinese People's Liberation Army is not only still *operating* license-built *Badgers* in 2019 but actually *building* new airframes for the H-6J naval version.[146]

On the other hand, the Soviet *Badger* of the early 1960s was still limited to the KS-1 missile, which severely constricted its flight profile. The capability that the *Kometa* provided was steadily improved, which is a testament to Soviet improvisation skills:

> "In early 1958 a crew captained by […] Col. V.I. Dubina successfully launched both missiles in a single sortie, guiding them all the way in. Shortly afterwards the Black Sea Fleet mastered a technique in which a single Tu-16KS guided three missiles (launched by several aircraft of course). Later, multiple KS-1s were repeatedly launched by different aircraft on diverging headings differing by up to 45°, using this technique. During naval exercises the missile strike units practiced concerted attacks on converging headings from four or even six directions."[147]

While U.S. task forces might have struggled to defend against even this moderate threat in the early 1960s, the basic KS-1 was at best only ever a stopgap. Even in the mid-1950s, the longer-term solution was expected to be a supersonic missile, which would also be carried by a supersonic aircraft. By 1955, planning was well under way for both. A prototype of what would eventually become the Tu-22 (NATO designation: *Blinder*) flew in 1958. The corresponding missile would be the Kh-22, which Western naval forces would come to know as the AS-4 *Kitchen*. The U.S. Navy could count itself lucky that major problems with the aircraft meant that the Kh-22 would not be operationally deployed until the early 1970s. As we will see, this threat would have been extremely difficult to counter in the 1960s. As things stood, however, the *Badger* would have to do the heavy lifting and would be equipped with a series of more capable missiles to improve its odds of overcoming the improving Western defenses.

The first of these weapons was the Mikoyan K-10 (NATO designation: AS-2 *Kipper*), which not only doubled the standoff range of the KS-1 but also introduced supersonic speed and on-board active radar guidance.[148] Moreover, the K-10 could be fired at an oblique angle,

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[146] Jane's Defence Weekly, "China's PLANAF Acquires New Variant of H-6 Strategic Bomber," IHS Jane's, https://www.janes.com/article/83736/china-s-planaf-acquires-new-variant-of-h-6-strategic-bomber.
[147] Gordon and Komissarov, *Soviet Naval Aviation, 1946-1991*, 103.
[148] See Friedman, *Seapower and Space*, 143-45; Yefim Gordon, *Soviet/Russian Aircraft Weapons: Since World War Two* (Hinkley: Midland, 2004), 81-88.

allowing the aircraft to make an 80 degree turn after launch, which would minimize its exposure to CAP fighters.[149] This in turn led the U.S. Navy to extend the CAP radius, and a succession of competitive adaptation cycles ensued, with each generation of Soviet missiles reaching further than the one before.[150] The main disadvantage of the K-10 was that a *Badger* could carry only one, rather than a pair. Of course, this becomes less of a limitation if we allow that tactical nuclear use against carrier groups was a real possibility – and, given the strategic nuclear mission of U.S. carriers into the 1960s, it was. Soviet naval officers believed that the VMF had to be capable of preemptive attacks, either in the first moments of the war or the final moments of a crisis, and involving a volume of fire that would make sure that the carrier itself would be reliably disabled. The best chance of achieving this was to use tactical nuclear weapons from the outset. Writing in *Voennaya mysl* in 1962, one Captain First Rank Mamayev identified the problem the VMF was facing:

> "Since a carrier strike large unit always carries nuclear weapons, and has its own means for their delivery one simply can not speak of *weakening* such a grouping. In all cases one must strive for its destruction before the carrier aircraft have reached the take-off line […] It is therefore more correct not to speak of weakening but of the *immediate destruction* of the strike carriers at the beginning of combat operations. The mere weakening of a grouping of the enemy's carrier forces does not remove the threat of a sudden nuclear attack by him, and does not decrease the strain on the forces detailed to repulse an enemy incursion from the air."[151]

In fact, almost all of the missiles that were deployed on the new Tu-16K-10 (*Badger*-C) were of the nuclear-armed K-10S variant.[152] This made the aircraft primarily a tactical nuclear platform with a conventional option, rather than the other way around. Equally importantly from the perspective of posture change, the K-10 was also the first anti-ship missile to fully embrace the 'mechanics' of missile combat, by providing the ability to orchestrate saturation attacks from multiple vectors: "In a group attack, up to eighteen missiles could be launched from one of

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149 Friedman, *Seapower and Space*, 144.
150 Ibid., 143.
151 Ye. Mamayev, "New Developments in Combat with Carrier Strike Large Units in the Initial Period of War", 1962, CIA Historical Collection/Translations from "Military Thought," 6. Emphasis added.
152 Gordon, *Soviet/Russian Aircraft Weapons*, 87. Reliable information on the warhead yield is difficult to come by, but at 1,000 kg the payload capacity of the K-10S was substantial.

several directions beyond the range of the ships' surface-to-air missile systems without having the missiles' guidance systems affect each other."[153] If all or most of these missile were nuclear-armed, they could wipe out an entire carrier group in a matter of minutes. Based on the outcomes of U.S. air defense exercises in the late 1950s (see Chapter 4), even a purely conventional attack of this size might have inflicted heavy damage. Overall, for two systems that were an expression of rapid technological change, the *Badger* and K-10 turned out to be a rather capable and long-lived combination.

The same was not true of another system that became operational during roughly the same period as the *Kipper*. The KSR-2, developed by Aleksander Bereznyak (also the head of the Raduga design bureau from 1967 onwards), was intended as a one-for-one replacement for the obsolescent KS-1 and as such was designed to be light enough to be carried in pairs. With low-subsonic speed and a range of 160 km, the most dramatic improvement compared to its predecessor was the reliance on on-board active radar guidance. Although this was a sensible development to improve the survivability of the launch platform, it proved to be the missile's Achilles heel, due to the low resistance of the seeker to electronic countermeasures (ECM). Together with its sensitivity to less-than-ideal weather conditions, this rendered the missile's performance suspect from the outset.[154] Moreover, although the *Badger*'s ability to carry two of the missiles, as opposed to a single K-10, theoretically doubled a regiment's firepower, the salvo size remained limited to twenty.[155] Given the poor performance of the original missile and the availability of a better alternative in the K-10, the KSR-2 was developed into an anti-radiation missile to target the U.S. Navy shipboard air search and engagement radars. This KSR-11 version was an important addition to the AVMF's arsenal at the time, but it had an all-important limitation of its own: it could only home onto radars while they were still operating and quickly lost all guidance if the target's air defense radar was shut down.[156]

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[153] Gordon and Komissarov, *Soviet Naval Aviation, 1946-1991*, 116.
[154] Ibid., 111.
[155] Ibid. It is important to note that early *Badger* variants were built to carry a specific missile payload. The aircraft, missile, and guidance system were tightly integrated at the design stage and there was little flexibility built into the entire weapon system. Later versions, notably the Tu-16K-10-26 variant introduced in 1969, could carry both the K-10 and KRS-2/5/11, which was a very considerable improvement.
[156] Ibid. See also Gordon, *Soviet/Russian Aircraft Weapons*, 99-101.

The final stages in the development of the missile-carrying *Badger* revolved around the Raduga KSR-5 missile (NATO designation: AS-6 *Kingfish*), which replaced the KSR-2, and its KSR-5P anti-radar variant, which replaced the KSR-11. Both missiles were far more capable than their respective predecessors. With supersonic speed in excess of Mach 2.5, increased ranges of up to 240 kilometers and much better ECM-resistance, they allowed the aging Tu-16 to remain a somewhat competitive participant in the anti-carrier game into the early 1980s.[157] As for the supersonic missile platforms, the AVMF had been waiting for since the late 1950s, this was a much more vexed story, which resulted in repeated setbacks in the Soviet search for a credible, airborne anti-carrier capability.

Fig. 22: An unarmed Tu-16 *Badger* shadowing USS *Kitty Hawk* (CV-63) during the final phase of the Cold War at sea. Such close shadowing by Soviet assets was central to the VMF's wartime employment concepts in the Mediterranean, but did not necessarily reflect those developed for the North Atlantic. *(U.S. National Archives)*

The prototype of what would become the Tu-22 *Blinder* was developed in the mid-1950s as 'Aircraft 105'. The Tu-22K missile carrier and its Kh-22 payload were originally expected to enter service in the early 1960s. However, the technical problems with the aircraft and the

[157] Ibid., 109-15.

missile, which both pushed the limits of aeronautical engineering at the time, were such that the complete weapon system was not inducted into service until 1971.[158] Ultimately, few missile-carrying *Blinders* were build and none of them were operated by the AVMF.[159] Although it was operated by a few Long-Range Aviation regiments from the early 1970s onwards, the formidable Kh-22 was still waiting for a naval strike aircraft to carry it into battle.

That aircraft was the Tu-22M *Backfire*, which actually had "absolutely no structural commonality"[160] with its earlier namesake and had been known as Tu-145 during its development. What it did have in common with the *Blinder* was an extended period of teething troubles, which meant that the first production aircraft did not become available until 1974. With its variable-sweep wing design, top speed of Mach 1.45, and heavy armament of up to three Kh-22M ASMs, this Tu-22M2 missile carrier would become the face of the airborne anti-carrier threat for the rest of the Cold War. In 1978, the further improved M3 version started production. Like the *Oscar*-class of PLARKs that were under construction during the same period, these aircraft finally realized the vision of the late 1950s, of an effective deterrent and war-fighting counter to the U.S. Navy's carrier groups. Also, much like the *Oscars*, the mature *Backfire* would find its main use in a defense concept that was considerably more circumscribed and overall very different in complexion from the far-seas barrier that had once been imagined. The AVMF eventually deployed nine regiments of *Backfires* – two in each fleet area, as well as an independent regiment.[161] The VVS had a further fourteen regiments that could be employed in support of naval missions if so directed.

Together with the highly capable Kh-22M missile in both conventional and nuclear variants, these aircraft became a central pillar of the anti-carrier element of the Soviet naval posture. The missile had a range of up to 500 kilometers, which amounted to only about eight

[158] The complete story of the *Blinder* and *Backfire* is covered in great detail in Yefim Gordon and Dmitriy Komissarov, *Tupolev Tu-22/Tu-22M* (Hersham: Midland, 2012). On the Tu-22 development process, see ibid., esp. 6-31.
[159] Friedman, *Seapower and Space*, 151.
[160] Gordon and Komissarov, *Tupolev Tu-22/Tu-22M*, 191. According to the authors, this was largely a cover-up of the failure of the original Tu-22 and of the steps that were taken to remedy the situation by building an entirely new aircraft, directed primarily at the RVSN and its partisans in the defense-industrial complex.
[161] Ibid., 330.

minutes of flight time at Mach 3.[162] With three different guidance variants and improved ECM-resistance, it was much more difficult to counter for Western air defenses than any of its predecessors. If it managed to score a hit, even the conventional warhead was powerful enough to "tear a 20-m^2 (215—sq. ft) hole in a ship's side and burn its way 12 m (30ft) into the interior; thus, the carrier would almost certainly go down after taking several hits even if the attackers were destroyed."[163]

Fig. 23: Unequal opponents: the massive Tu-22M *Backfire* strike aircraft and its nemesis, the F-14A *Tomcat* fleet defense fighter, in close proximity. *(U.S. Department of Defense)*

Overall, we can conclude that the air threat to U.S. Navy surface task groups would have been much more severe earlier in the competition, if the Tu-22 and Tu-22M programs had not run into major difficulties. By the time the Tu-22M2 became available in numbers, U.S. fleet air defenses were in much better shape to counter it, even though the task still remained formidable. As we will see below, the same was true of the tasks facing the attacking AVMF regiments as well, which makes the outcomes of a potential engagement fairly difficult to assess.

[162] Gordon, *Soviet/Russian Aircraft Weapons*, 101-108.
[163] Gordon and Komissarov, *Tupolev Tu-22/Tu-22M*, 328. We will take a closer look at this statement in section 5.4.2.

For the time being, it is sufficient to acknowledge that by the late 1970s, the AVMF's anti-surface capabilities were on a par with those of the VMF's submarines. On paper, these forces were powerful enough to severely maul U.S. carrier groups within a 1,000 km radius from the Soviet coast and, with diminishing effectiveness, beyond. At sea, a number of additional elements would come into play. These will be further discussed in section 5.4.1 below.

5.4 Containing the anti-carrier threat I: the ASW element

5.4.1 A balanced system with stubborn imperfections

Coming back to the threats the U.S. Navy faced from Soviet submarines, the American response unsurprisingly fell into two main components: defense against the platforms themselves and defense against the weapons they carried, with anti-ship missiles in particular triggering sustained techno-doctrinal adjustments. In this present section, we will look at the ASW part of the equation. As we will see, the Soviet approach of attacking the carrier with both long- and short-range submarine-launched weapons engaged a curious mixture of U.S. Navy strengths and weaknesses. Whereas wide-area ASW cued by SOSUS and other technical means improved greatly during the 1960s, and the independent hunter-killer groups also became more useful as a result, ASW at the battle group level languished. Moreover, effective wartime coordination of the constituent elements of the increasingly intricate ASW complex – even those that were individually effective – was not a foregone conclusion. Hence, in its initial form, the Navy's defense-in-depth approach to protecting its carriers may well have come apart at the seams, if sufficient pressure had been exerted upon it.

In the early 1970s, the basic division between offensive, wide-area ASW and fleet self-defense was further entrenched by the decision not to replace the ageing ASW carriers and instead add their mission load to that of the attack carrier force. The reclassification of the CVAs to general-purpose CVs was a sensible – perhaps even unavoidable – step in budgetary terms, and it did provide the carrier air wing with an organic ASW element that could reach far ahead off the main body.[164] That said, the defensive ASW task was never an easy fit for the battle group organization and could only ever establish itself as a secondary mission. "To get the offensive-oriented carrier thinking defensively in an environment as foreign to its nature as ASW"[165] proved to be a daunting task, and battle group defenses continued to lag behind for the remainder of the Cold War.

Fortunately for the U.S. Navy, its sustained investment in operational-level, wide-area ASW – i.e., the coordinated prosecution of submarine contacts on an oceanic scale – did result in a highly professionalized and tightly coordinated system. The combination of a layered ASW effort with a continuing acoustic advantage would probably have averted much of the harm that a more capable VMF submarine force could do from the mid-1960s onwards. Needless to say, perfect situational awareness resulting in an efficient utilization of resources at all the various levels of the ASW effort nevertheless remained a distant aspiration. In a major war, even one that remained conventional, losses to submarines armed with increasingly lethal weaponry were inevitable. Whether a carrier – or carriers – would have been among them is not a question that can be answered in the abstract. However, a systematic examination of the evolution of the U.S. anti-submarine warfare complex provides some important indications as to where the dyadic offense-defense balance stood during this second part of the oceanic competition.

5.4.2 Operational intelligence: the ultimate force multiplier

One of the most significant areas of progress in ASW during this second phase of the undersea competition was one that has long distinguished itself mainly by its opacity.[166] Next to the

[164] The Carrier Air Groups were designated Carrier Air Wings (CVWs) in 1963.
[165] Scott Kelly, "Carrier ASW: Can Do," *USNI Proceedings* 116, no. 1 (1990), 74.
[166] One side effect of this opacity is that this section can rely on relatively few high-quality sources. The most comprehensive study so far is Christopher A. Ford and David Alan Rosenberg, *The Admirals' Advantage: U.S. Navy Operational Intelligence in World War II and the Cold War* (Annapolis, MD: Naval Institute Press, 2014).

more visible elements of anti-submarine defense, operational intelligence (OPINTEL) can appear to be a world unto itself, and yet it was a key determinant of the performance of the ASW complex in its entirety. A brainchild of the British Admiralty, toughened up and refined during the Second Battle of the Atlantic, the key contribution of the OPINTEL process was to fuse intelligence from a multitude of – primarily technical – sources into a consolidated situational picture.[167] During 1939-1945, this was a task performed with increasing effectiveness by the Admiralty's Operational Intelligence Center (OIC), which was responsible for tracking all German submarine operations and disseminating 'actionable' intelligence to the frontline commands. At the center of the British system was the Submarine Tracking Room (STR), staffed by less than two dozen people even during some of the hottest phases of the battle. The deputy head of the STR, Patrick Beesly, describes the heart of the Allied ASW effort in the Atlantic as follows:

> "In the centre of the room was a large plotting table on which were displayed the current positions and routes of all British and Allied vessels and convoys in the North Atlantic and our estimate of the dispositions of the U-boats. On another chart table was a copy of the German Naval Grid […] and on the walls were other charts covering the South Atlantic, the Indian Ocean, or Norwegian Sea. Graphs and charts showing the number and location of U-boats in port, training, or building, as well as Allied shipping losses and replacements occupied the rest of the wall space. […] The STR had direct communications by scrambler telephone or telex to […] all major maritime commands in the United Kingdom. There was similar direct communication with Bletchley Park [the main wartime signals intelligence center, MH] and direct telephone and telex lines to the principal DF [direction finding, MH] stations throughout the United Kingdom."[168]

Based primarily on SIGINT, in the form of direction-finding cues and cryptanalysis of intercepted wireless traffic, but taking into account any available information whatsoever, the STR provided sufficient situational awareness to route most convoys around German submarine

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[167] On the British experience with OPINTEL during the Second Battle, see Patrick Beesly, *Very Special Intelligence: The Story of the Admiralty's Operational Intelligence Centre, 1939-1945* (London: Greenhill, 2000). The standard reference source remains: F. H. Hinsley and C. A. G. Simkins, *British Intelligence in the Second World War: Its Influence on Strategy and Operations,* 5 vols. (Cambridge: Cambridge University Press, 1979-1990).
[168] Patrick Beesly, "Operational Intelligence and the Battle of the Atlantic: The Role of the Royal Navy's Submarine Tracking Room," in *The RCN in Retrospect, 1910-1968*, ed. James A. Boutilier (Vancouver: University of British Columbia Press, 1982), 179.

concentrations. As the war progressed, the Allied navies also became more and more proficient at using OPINTEL to vector independent offensive assets – HUKs and maritime patrol aircraft – towards confirmed or suspected U-boat positions. At the height of the OIC's success,

> "intelligence could show precisely which areas, which convoys, and which ships were threatened, as well as which were clear of danger. Maximum available strength could be concentrated at the decisive points and other, safer targets almost stripped of their defenses. […] In the STR we knew at least as well as Dönitz what his U-boats were doing."[169]

While it is difficult to quantify the impact of operational intelligence, it is evident that this intimate understanding of its resources and dispositions put the *U-Bootwaffe* at a decisive disadvantage even while the Allied ASW effort at sea remained patchy. As the Allied navies began to expand their coverage of the North Atlantic theater with increased force levels in the air and on the surface, and with better area sensors, like airborne radar and shipboard direction finding, their advantage turned into crushing superiority. By late 1944, the *U-Bootwaffe* found that the operational approach on which it had relied for most of the war had become untenable – fast runs on the surface, centralized control via wireless, and effective concentration of forces based on regular position reports now exposed the boats to mortal danger.[170] If new tactical sensors, better platforms and more effective weaponry were immediately responsible for this outcome, it was the operational-level "sensor"[171] wielded by the OIC that told the forces at sea where to look – and, just as importantly, where *not* to look.

While the British contribution remained at center stage throughout the Battle of the Atlantic, the U.S. Navy adopted many elements of the OIC's system and developed an OPINTEL system of its own, with separate nodes for the Atlantic and Pacific theaters and important differences in approach between them. The Atlantic node was integrated with the British effort to a very large extent, although bureaucratic frictions were unavoidable.[172] Reflecting the different conditions in that theater, operational intelligence in the Pacific focused more on major

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[169] Ibid., 184.
[170] See, e.g. Marc Milner, *Battle of the Atlantic* (Stroud: The History Press, 2014), 204.
[171] On the idea of OPINTEL as a sensor, see Ford and Rosenberg, *The Admirals' Advantage*, 6.
[172] Ibid., 8-12. On the U.S.-UK intelligence cooperation, see Alan Harris Bath, *Tracking the Axis Enemy: The Triumph of Anglo-American Naval Intelligence* (Lawrence, KS: University Press of Kansas, 1998).

offensive operations and the Imperial Japanese fleet as a whole, but proved similarly effective in covering its areas of greatest concern.[173] Overall, it is probably fair to say that neither of the U.S. OPINTEL hubs quite matched the uncluttered efficiency of the British system. The more critical finding, however, is that the U.S. Navy quickly accepted the *paradigm* of OPINTEL fusion as a critical force multiplier. The approach it applied during the Cold War was very much an extension of the World War II system, even if they transcended the historical precedent in some respects – the sheer volume of data that had to be handled being the most important.

In fact, the US Navy's wartime plotting system never quite disappeared, even though it largely lay dormant during the first part of the Cold War naval competition. As we have seen, the most notable U.S. advances in oceanic surveillance during the first decade of the confrontation were of a technological nature. In addition to SOSUS, which made its first actual detections in 1962, the Navy worked on an improved direction-finding system to deal with burst transmissions that could not be triangulated with existing means – another *Kriegsmarine* innovation, adopted by the VMF in the late 1950s.[174] Run by the Naval Security Group – the service cryptologic element – and known as CLASSIC BULLSEYE, this global system became operational in the early 1960s and eventually comprised twenty-one U.S. and eight Allied installations.[175] Together, the SOSUS and high frequency direction finder (HF/DF) subsystems would form the foundation of the Navy's wide-area ASW coverage for the rest of the Cold War. The Navy also developed a space-based electronic intelligence (ELINT) system, which

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[173] Ford and Rosenberg, *The Admirals' Advantage*, 12-13. The standard accounts of the Pacific War from an intelligence-centric perspective are still: W. J. Holmes, *Double-Edged Secrets: U.S. Naval Intelligence Operations in the Pacific during World War II* (Annapolis, MD: Naval Institute Press, 1979); John Prados, *Combined Fleet Decoded: American Intelligence and the Japanese Navy in World War II* (New York, NY: Random House, 1995); Edward J. Drea, *MacArthur's ULTRA: Codebreaking and the War Against Japan, 1942-1945* (Lawrence, KS: University Press of Kansas, 1992).

[174] See Naval Historical Foundation, "Ocean Surveillance during the Cold War: Sensing, Fusion, Exploitation" (transcript of the 2010 Submarine Force Birthday History Seminar, Naval Historical Foundation, 2010), 2; Friedman, *Seapower and Space*, 175-76. On the German *Kurier* system for burst transmission, see Kathleen Broome Williams, *Secret Weapon: U.S. High-Frequency Direction Finding in the Battle of the Atlantic* (Annapolis, MD: Naval Institute Press, 1996), 53-54.

[175] See Matthew M. Aid, "The NSA and the Cold War," in *Secrets of Signals Intelligence during the Cold War and Beyond*, ed. Matthew M. Aid and Cees Wiebes (London: Frank Cass, 2001), 45. For technical details of the system, see Nick England, "AN/FRD-10 Circularly Disposed Antenna Array (CDAA) Receiving System," http://www.navy-radio.com/frd10.htm.

later became known as CLASSIC WIZARD.[176] Beating the Air Force to the punch, the service deployed its first ELINT satellites during 1960-1962, with Soviet air defense radars as their primary target.[177] Naval-focused ELINT collection continued after the National Reconnaissance Office took over the services' space-based reconnaissance assets, with a series of ocean surveillance spacecraft designated POPPY 1 through 7 (1962-1971) and PARCEA 1 through 8 (1971-1987).[178] Apparently, "it was not until the late sixties that the United States intelligence community began to evaluate the ability of elint [sic] satellites specifically to intercept the emissions of naval vessels and use them to track those vessels."[179] The OPINTEL function of space-based surveillance was initially used against the VMF's Mediterranean squadron, the 5th *Eskadra*, and became fully established by the mid-1970s.[180] It is, however, safe to assume that space-based ELINT played a more limited role in anti-submarine warfare operations than in oceanic surveillance more broadly, due to the relative lack of exploitable signatures, such as powerful radars.

As for the OPINTEL *system* that would tie together these various assets, it was only when one more strand of technological innovation – the rise of automated data processing – met a growing operational need in the aftermath of the Cuban Missile Crisis that an integrated oceanic surveillance system began to come together.[181] The Navy was first instructed to develop an integrated surveillance system as early as 1964 and it began to implement aspects of

[176] See Nigel West, *Historical Dictionary of Naval Intelligence* (Lanham, MD: Scarecrow Press, 2010), 59.
[177] Friedman, *Seapower and Space*, 101-103; Robert A. McDonald and Sharon K. Moreno, "Raising the Periscope: Grab and Poppy-America's Early ELINT Satellites" (National Reconnaissance Office, Chantilly, VA, 2005), https://nsarchive2.gwu.edu/NSAEBB/NSAEBB392/docs/37.pdf. While one might suspect a connection to 'attack at source', a bureaucratic rationale is perhaps even more convincing: In essence, a Navy asset now made a vital contribution to the SAC's operational planning for the execution of the SIOP.
[178] Dwayne A. Day, "Above the Clouds: The White Cloud Ocean Surveillance Satellites," *The Space Review*, 2009, http://www.thespacereview.com/article/1351/1.
[179] Dwayne A. Day, "Atop the Highest Mast: The Development of American Ocean Surveillance Satellites, Part 1 - POPPY," *Spaceflight* 51, no. 11 (2009), 427.
[180] See Dwayne A. Day, "A Flower in the Polar Sky: The POPPY Signals Intelligence Satellite and Ocean Surveillance," *The Space Review*, 2008, http://www.thespacereview.com/article/1115/1; Dwayne A. Day, "Atop the Highest Mast: The Development of American Ocean Surveillance Satellites, Part 2 - PARCAE and White Cloud," *Spaceflight* 51, no. 12 (2009), 464.
[181] Ford and Rosenberg, *The Admirals' Advantage*, 45-48.

such a system soon thereafter.[182] However, up until the late 1960s, ocean surveillance efforts were undertaken both in a centralized manner, by the Office of Naval Intelligence, and in a decentralized manner, at the level of fleets and operational commands. Information sharing between these various actors was complicated by the use of disparate methods of data collection, as well as by classification concerns.[183] The use of computerized data processing to estimate submarine and ship movements in real time was already technically possible, but the available data was filed in formats that were unsuitable for such treatment.[184] In other words, "the U.S. Navy had elements that could be developed into an ocean surveillance system, but they had not been designed to work together."[185]

This began to change during 1969-1972, with the establishment of the Ocean Surveillance Information System (OSIS). Based on the 6th Fleet's pioneering efforts at improving its situational awareness vis-à-vis an increasing VMF presence in its area of operations, as well as earlier attempts of the naval intelligence bureaucracy to harmonize information sharing and move towards near-real time plotting of enemy positions, this proved to be a major breakthrough.[186] As Ford and Rosenberg explain, "[s]imply put, "ocean surveillance information" was OPINTEL painted on a global canvas and incorporating a wider variety of sensors and analytical inputs than ever before imaginable."[187] OSIS consisted of several elements, which were interconnected by the fastest data links available at the time.[188] The central node, known as the Naval Ocean Surveillance Information Center (NOSIC), was erected in Suitland, Maryland and could be seen as a direct descendent of the Admiralty's Submarine Tracking Room. Focused on ASW, it was charged with providing a unified picture of Soviet submarine operations.[189] To this end, NOSIC analysts not only plotted submarine movements and wrote them

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[182] Naval Historical Foundation, "Ocean Surveillance during the Cold War: Sensing, Fusion, Exploitation", 4-5.
[183] Norman Friedman, *Network-Centric Warfare: How Navies Learned to Fight Smarter Through Three World Wars* (Annapolis, MD: Naval Institute Press, 2009), 166.
[184] Ibid.
[185] Ibid., 171.
[186] See Naval Historical Foundation, "Ocean Surveillance during the Cold War: Sensing, Fusion, Exploitation," 4-5.
[187] Ford and Rosenberg, *The Admirals' Advantage*, 45.
[188] Friedman, *Seapower and Space*, 348 n.21.
[189] Ford and Rosenberg, *The Admirals' Advantage*, 59-60.

up on a daily basis for their operational-level 'consumers'. They also began to develop a digital library of submarine acoustic signatures that allowed the Navy to more easily identify the unique signature of each Soviet submarine, rather than just classify them.[190] Just as important as NOSIC, although less narrowly focused on ASW, were the two Fleet Ocean Surveillance Information Facilities (FOSIFs) for the forward-deployed 6th and 7th Fleets, and three theater nodes known as Fleet Ocean Surveillance Information Centers (FOSICs).[191] Like their World War II precedents, these facilities were all about fusing intelligence inputs – whether they were derived from SOSUS, HF/DF, outside signals intelligence (SIGINT) materials, imagery intelligence, sightings, or other sources – into a single, coherent picture.[192] OSIS was up and running by the end of this second phase of the competition, although its development continued into the 1980s and limitations remained.[193] As the former OSIS practitioner and Director of Naval Intelligence, RADM Thomas Brooks, remembers,

> "[o]ur tasking was to maintain knowledge of where the Soviets were at all times and in real time. […] But did we ever achieve that? No, we never achieved that but we achieved a goodly

[190] Ibid., 62. Up to this point, individual submarines could sometimes be identified by skilled SOSUS or sonar operators, but there was no way of doing so reliably for each vessel. According to Ford and Rosenberg, this was considered part of the so-called hull-to-emitter correlation (HULTEC) methodology, which otherwise sought to 'fingerprint' Soviet vessels based primarily on their ELINT signatures. See also: Day, "Above the Clouds: The White Cloud Ocean Surveillance Satellites,", 177.

[191] Ford and Rosenberg, *The Admirals' Advantage*, 56-57; 60-61.

[192] Among the most important outside intelligence providers was the National Security Agency. The relationship FOSIF Rota, the 6th Fleet node, built via the Navy's service cryptologic element – the Naval Security Group – resulted in direct access to NSA materials without going through a lengthy process in each instant. This was unprecedented at the time. See Ibid., 57-58; Naval Historical Foundation, "Ocean Surveillance during the Cold War: Sensing, Fusion, Exploitation", 7. Later, the Air Force also provided regular access to its SR-71 strategic reconnaissance aircraft, for all-weather imaging radar coverage of Northern Fleet bases. One reason these flights were conducted was the SAC's fear of a depressed-trajectory first strike on bomber bases after a 'breakout' of *Yankee*-class SSBNs into the Atlantic. See Ibid. 7. However, beyond tracking *Yankee* sailings, a snapshot of the entire basing complex on the Kola peninsula could be gleaned from these overflights. According to one former Air Force officer involved in the program, "the driving reason we established a permanent SR-71 detachment in Europe was to meet the US Navy's critical need to monitor the status of the Soviet Northern Fleet, and in particular its nuclear submarine operations out of Murmansk on the Barents Sea." Quoted in: Paul Crickmore, *Lockheed Blackbird: Beyond the Secret Missions (Revised Edition)* (Oxford: Osprey Publishing, 2016), 349. Radar images taken with the Advanced Synthetic Aperture Radar System carried by the late-career SR-71, displayed on pages 400-402, give some idea of why the Navy was the last service to keep fighting for the SR-71 even after the USAF decided to retire it in the late 1980s. See also: Richard H. Graham, *Flying the SR-71 Blackbird: In the Cockpit on a Secret Operational Mission* (St. Paul, MN: Zenith Press, 2008), 189.

[193] Friedman, *Network-Centric Warfare*, 176.

> part of it. We […] tracked the most important and the most threatening of the Soviet naval platforms pretty much all the time and pretty much in real time."[194]

Needless to say, there were no guarantees whatsoever that this level of success in the peacetime setting could be replicated under wartime conditions. Nevertheless, even if the system was degraded over time, it would still be extremely useful during a crisis as well as during the initial phase of the conflict. While SOSUS and direction finding alone could often provide good results up until the mid-1970s, the all-source nature of the system rendered it not only potentially more accurate, but also more robust. With OSIS in place, a partial or temporary loss of SOSUS coverage became more bearable, although a complete loss of coverage would still have had a major impact on the level of situational awareness.[195] The fact that it was "as much a process or approach as a specific type of information provided to operational commanders"[196] reduced the dangers of overreliance on potentially vulnerable elements of the system. As long as sufficient inputs could be generated from whatever sources were still available and one or more OSIS hubs remained in operation, operational intelligence would be a central component of the Navy's ASW threat mitigation.

This applied not only to the anti-SLOC scenario Allied planners continued to fret about, but also to the anti-carrier threat. To keep CVBGs from running into dangerous concentrations of Soviet submarines in the first place, a tightly synchronized, theater-level ASW effort was the primary requirement. If submarines could be detected early in the game and the relevant information acted upon in time, the CVBG's defensive screen would not have to bear an outsized share of the burden and was much less likely to be overloaded by multiple, coordinated attacks. In effect, operational intelligence was at least as likely to keep U.S. carriers afloat as their ASW escorts were. That said, even at its best, OPINTEL could only set up engagements or avert them. In both cases, it could disrupt the VMF's plans but it could not *directly* impact the opponent's level of capability. This leads us to the second element of the maturing ASW

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[194] Naval Historical Foundation, "Ocean Surveillance during the Cold War: Sensing, Fusion, Exploitation", 5.
[195] This changed partially with the introduction of the Surveillance Towed Array Sensor System (SURTASS) in the early 1980s, but a theater-wide loss of stationary array coverage remained difficult to compensate.
[196] Ford and Rosenberg, *The Admirals' Advantage*, 45.

complex: independent, wide-area operations by fast attack submarines, maritime patrol aircraft and, to a lesser extent, surface hunter-killer groups.

5.4.3 Layered theater-wide ASW comes of age

During the first half of the 1960s, the Navy's approach to long-range antisubmarine operations matured considerably and took a form that remained current for the remainder of the Cold War confrontation, despite the shift towards a more aggressive forward ASW posture during the 1980s. Best described as a "layered"[197] theater-wide approach, this element of the ASW complex exploited cueing – mainly from SOSUS and HF/DF during c. 1962-1972 and increasingly from all-source OSIS hubs thereafter – to reacquire, track, and engage VMF submarines both during transit and in their area of operations. While the layered theater-wide approach was often described as a series of attritional "barriers"[198] Soviet submarines would have had to pass through, this may not be the most accurate description of how this element of the ASW effort would have worked in practice. It is true that the geography of the two main theaters – the Norwegian Sea and the Northwestern Pacific Ocean – favored the erection of barrier zones at certain chokepoints. In the European rimlands, the Spitsbergen-Bear Island-North Cape gap and the Greenland-Iceland-Norway (GIN) or Greenland-Iceland-UK (GIUK) gaps are obvious candidates. In the Pacific rimlands, the tight chain formed by the Kuriles and the narrow gaps between the continental Asia, Sakhalin, and the Japanese archipelago constricted VMF forces to an even greater extent.[199] Having said that, a major advantage of wide-area surveillance was

[197] John R. Benedict, "The Unraveling and Revitalization of U.S. Navy Antisubmarine Warfare," *Naval War College Review* 58, no. 2 (2005), https://digital-commons.usnwc.edu/nwc-review/vol58/iss2/6, 96.

[198] See e.g. Geoffrey Till, *Modern Sea Power: An Introduction* (London: Brassey's Defence, 1987), 64; Baer, *One Hundred Years of Sea Power*, 338.

[199] It should be noted that this did not make the Northwestern Pacific theater easier to surveil or patrol – on the contrary. ASW in these difficult waters was the Japanese Maritime Self-Defense Force's (JMSDF) area of expertise. On the JMSDF contribution, see Alessio Patalano, "Shielding the 'Hot Gates': Submarine Warfare and Japanese Naval Strategy in the Cold War and Beyond (1976–2006)," *Journal of Strategic Studies* 31, no. 6 (2008), doi:10.1080/01402390802373164, 859-95; Alessio Patalano, "'The Silent Fight': Submarine Rearmament and the Origins of Japan's Military Engagement with the Cold War, 1955–76," *Cold War History*, 2019, doi:10.1080/14682745.2019.1615894 (online pre-publication).

to allow long-range ASW forces to counter submarines – especially noisy ones, which made up most of the VMF's inventory – *almost anywhere* in the theater. Hence, one of the most important effects of the new approach was to free up ASW forces that would otherwise be rigidly tied to the narrowest points of the submarine transit routes to increase their chances of acquiring and engaging a "GOBLIN."[200] Hence, the ASW posture that Western ASW forces were expected to assume in wartime, based largely on static barriers in predictable locations, would probably have become more and more dynamic as the quality of OPINTEL outputs increased in the 1970s. There was simply no point in waiting for a good submarine contact generated by large-area surveillance to either reach a barrier – which might be many hundreds of nautical miles ahead – or go cold, if it could be pursued within the next air tasking cycle or by a friendly submarine standing in a favorable position close by. A less stringently *doctrinaire* view of what wartime ASW operations would have looked like would assume a more flexible, less predictable, layered approach in which every GOBLIN would have been prosecuted as far forward as reasonably possible, by the first suitable ASW asset that could be arrayed against it. At the very least, then, a combination of static 'barrier' and more dynamic 'area' operations was likely.

[200] GOBLIN is the ASW brevity code for a "submerged contact assumed to be hostile." See C. H. Gates, "Antisubmarine Warfare (ASW) Lexicon" (Technical Document 1727, Naval Ocean Systems Center, San Diego, CA, 1990), 4.

FAR FORWARD TO BEGIN WITH: THE 'FAST ATTACKS'

The first layer (or layers), closest to the sources of the opponent's submarine strength, would naturally have been formed by fast attack submarines. While SSNs could profitably be used in any area that sat astride a likely transit route and that was not patrolled by other ASW forces that might mistake them for a hostile contact, they were they only assets that could reliably operate inside Soviet sea denial zones. Hence, both US and British SSNs were earmarked for far-forward anti-submarine operations long before such operations became a bone of contention in the public debate about the Maritime Strategy. Palmer notes that As VADM John Thatch – the former Task Group ALFA commander and in charge of the Antisubmarine Warfare Force of the U.S. Pacific Fleet (USPACFLT) – wrote in 1963,

> "[k]iller submarines will be especially valuable for employment in waters near enemy submarine bases, where our surface ships and aircraft would become unduly exposed to increased air and missile threats. Equipped with the very latest electronic equipment and weaponry, these SSN's [sic], with their highly trained crews, represent our first building block in the development of a truly 'forward' ASW strategy."[201]

When construction of the *Sturgeon*-class attack boats began that same year, the design included not only extensive quieting measures but also features for under-ice operations and forward reconnaissance. The UK's *Swiftsure*-class attack submarines, the first of which was ordered in 1967, adopted similar priorities.[202] Also in 1967, the USN began to explore options for a follow-on to the *Sturgeon*s, the first of which was about to be commissioned. In a submission to the Office of the Secretary of Defense (OSD), the missions the next-generation attack submarine would have to perform were ranked in order of their relative importance:

"1. forward area (i.e., operations near enemy bases, which would test the undetectability of the submarine),

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[201] John W. Thach, "The ASW Navy of the Seventies," *USNI Proceedings* 89, no. 1 (January 1963), https://www.usni.org/magazines/proceedings/1963/january/asw-navy-seventies, 61-62.

[202] Peter Hennessy and James Jinks, *The Silent Deep: The Royal Navy Submarine Service since 1945* (London: Allen Lane, 2015), 365-70.

2. track/trail (e.g., of enemy ballistic missile submarines),
3. escort (direct support) [of CVBGs in particular, MH],
4. coordinated operations (open-ocean attacks on enemy submarines cued by friendly forces or fixed detectors such as SOSUS),
5. ancillary (e.g., anti-ship, mining, surveillance, landing of personnel, training, development)."[203]

While the *Los Angeles*-class that eventually succeeded the *Sturgeons* was not a direct descendant of this so-called CONFORM study, and direct support would probably have been rated higher in its original concept of operations, far-forward ASW remained very much at the top of the list of priorities. Thus, a strong focus on the VMF's 'front yard' existed long before Soviet defensive bastions became an accepted fact in the Western discourse, and forward SSN employment a matter of public concern. While details of Cold War submarine operations mostly remain classified, more than enough information has leaked to verify that U.S. and Royal Navy SSNs from the *Sturgeons* and *Swiftsures* onwards have also frequently been deployed in the closest proximity to Soviet bases in peacetime.[204] Again, this was true both before the 1980s Maritime Strategy was formulated and after it was put "on the shelf,"[205] as the expression goes. Just how far forward Western second-generation SSNs like the *Sturgeon*- and *Swiftsure*-classes would have been deployed is more difficult to ascertain, but the *density of expected contacts* had been an important factor to consider from the outset. As Compton-Hall explains: "NATO SSNs would most economically and advantageously be employed where Soviet submarines are most highly concentrated. […] [T]he most productive ASW operations will probably take place in choke points, *as far forward as possible*, where geography or minefields imply a reasonably

[203] Norman Friedman, *U.S. Submarines since 1945: An Illustrated Design History* (Annapolis, MD: Naval Institute Press, 1995), 164.
[204] See e.g. Hennessy and Jinks, *The Silent Deep*, passim; Sherry Sontag, Christopher Drew and Annette Lawrence Drew, *Blind Man's Bluff: The Untold Story of Cold War Submarine Espionage* (London: Hutchinson, 1999), passim. Forward SSN operations continued into the 1990s and, one would assume, to this day.
[205] Peter M. Swartz, "U.S. Navy Capstone Strategies and Concepts (1991-2000): Strategy, Policy, Concept, and Vision Documents" (MISC D0026416.A2/Final, CNA, Alexandria, VA, 2012), 3.

dense enemy submarine population."[206] This logic, which almost perforce underpinned the efficient employment of assets that were both very effective and in short supply, was clearly not an invention of the early 1980s.

Of course, none of this is to say that forward operations were the *only* variant of successful SSN employment in wartime, or that *all* SSNs would have been deployed far forward. Having said that, the use of 'fast attacks' on other missions – defense of friendly SSBNs, direct support for CVBGs and other vital formations, insertion of special operations forces, as so forth – implied a drain on numbers that only rendered the logic of submarine 'attack at source' more compelling. Additionally, submarines operating deep inside the enemy's home waters were well placed to provide critical intelligence on enemy methods and deployments in wartime, just as they so successfully did in peacetime.[207]

One widely acknowledged peacetime intelligence-gathering effort that might not have played an important role during actual conflict is trail operations.[208] While operations like these greatly improved the U.S. and UK understanding of Soviet submarine operations – again, in peacetime, with somewhat indeterminate implications for other scenarios – and provided some of the most important acoustic intelligence, there was no real reason to repeat such feats once the war had started. On the contrary, it would have been safe to assume that any skipper who failed to unflinchingly exploit a favorable tactical situation and ended up shooting second would not make it home.

[206] Richard Compton-Hall, *Submarine versus Submarine: The Tactics and Technology of Underwater Confrontation* (Newton Abbot: David & Charles, 1988), 78.

[207] It should be noted, however, that the 'fast attack' was not an optimal provider of raw OPINTEL inputs, as the relay of significant volumes of information in near-real time would have carried considerable risks. The Submarine Satellite Information Exchange Sub-System (SSIXS), which came into widespread use after 1977, improved the situation considerably due to its low probability of intercept. However, with a low bandwidth data link and the need to extend a communications mast for the duration of the transmission there was still some risk involved in heavily defended areas. On SSIXS, see Christopher P. Dever, "Submarine Satellite Information Exchange Sub-System (SSIXS)," GlobalSecurity.org, https://www.globalsecurity.org/intell/library/reports/2001/compendium/SSIXS.htm.

[208] See e.g. David C. Minton and Alfred S. Berzin, *From Opposite Sides of the Periscope: The Trail Is On* (Bloomington, IN: Archway Publishing, 2018), esp. 97-170; Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 173-74; Hennessy and Jinks, *The Silent Deep*, 379-83.

The second-generation nuclear submarines that the U.S. Navy would have sent into the forward ASW battle during this second phase – thirteen *Permit*-class vessels built between 1959-1967 and thirty-seven *Sturgeon*-class boats built during 1963-1975 – were designed according to a very consistent set of preferences. Like the *Skipjacks* before them, they were of single-hull construction (with the exception of the bow section, which contained the sonar dome) and powered by a single S5W reactor driving twin steam turbines, but a single propeller shaft. Also like their predecessors, they combined the large passive sonar array of the earlier SSKs with the high sustained speed that only a nuclear submarine could attain. However, what made them ideal ASW platforms was the addition of extensive and effective noise reduction measures, which early nuclear submarines had lacked. The doomed USS *Thresher* was the first SSN to bring all these design characteristics together. The noise reduction aspect was much more strongly emphasized in the development of the *Sturgeon* class, which sacrificed two knots compared to the *Permits* and up to seven knots compared to the *Skipjacks* to make space for additional quieting measures.[209] The systematic nature of this silencing effort resulted in a generous acoustic advantage vis-à-vis Soviet first- and second-generation boats. At the same time, lower levels of self-noise also increased the performance of the BQQ-2 sonar suite, which was already a first-rate system for its time. According to a contemporaneous estimate, the additional passive conformal array – originally associated with LOFAR classification – was able to detect a snorkeling diesel at a distance of up to 75 nmi, in suitable conditions.[210] This, in large part, explains the seemingly incongruous qualities the Navy sought for its ASW-focused 'fast attacks':

> "The combination of silencing (often associated with low speed) and high maximum speed may seem paradoxical. It was not; indeed it became particularly rational with the introduction of the new long-range sonars. A very quiet submarine with excellent sonars could expect to detect relatively noisy Soviet submarines at very long range, tens of miles or more, far beyond weapon range. Therefore, she had to run in to shoot. Alternatively, she could make a deep high-speed end run outside the target submarine's detection range to get ahead for a

[209] Friedman, *U.S. Submarines since 1945*, 146. On the proportional relationship between submarine tonnage and quietness, see Stefanick, *Strategic Antisubmarine Warfare and Naval Strategy*, 282.
[210] Norman Friedman, *The Naval Institute Guide to World Naval Weapons Systems* (Annapolis, MD: Naval Institute Press, 1989), 375-76.

bow sector shot. Such shots were particularly important when U.S. submarines were equipped with a homing torpedo, a Mk 37, which was only about as fast as its likely Soviet SSN target."[211]

This also points us towards the major unresolved weakness of the second-generation SSNs: while they were very good in nearly every other respect, the possibility of a 'torpedo crisis' persisted almost until the end of this second phase of the competition. In fact, the situation was worse than the above description of the issue lets on. To successfully attack a submarine target, a torpedo requires a speed advantage on the order of 50 percent.[212] In theory, the effectiveness of the Mark 37 depended on a number of other variables and well-understood design limitations.[213] By one unsourced estimate, this resulted in a "10-percent effectiveness against a 20-knot submarine,"[214] which one can probably interpret as a single shot probability of kill (SSPK) of 0.1 on average. In practice, according to a former commander of USS *Skipjack*, the weapon "had never hit anything that was going faster than 17.5 knots."[215] Designed during the era of the Type XXI scare, the Mark 37 was perfectly adequate when used as originally envisioned, against snorkeling diesels making a stolid 10 knots, and a major improvement over earlier models.[216] Alas, the growing number of Soviet nuclear submarines obviated those

[211] Friedman, *U.S. Submarines since 1945*, 141.
[212] Louis Gerken, *Torpedo Technology* (Chula Vista, CA: American Scientific Corporation, 1989), 142.
[213] Large parts of the tactical instructions for the use of the Mark 37 Mod 0 are public knowledge. See U.S. Navy, United States Navy Officer Requirements for Submarine Qualification - Mark 37 Torpedo, 1964, Historic Naval Ships Association. The wire-guided Mod 1 was even slower than the unmodified free-runner, but clearly superior against maneuvering targets. The Mod 0 was eventually upgraded to the Mod 3 standard, while the Mod 1 was further upgraded to the Mod 2 standard, with better seeker ranges and other small improvements. See E. W. Jolie, "A Brief History of U.S. Navy Torpedo Development: NUSC Technical Document 5436" (Naval Underwater Systems Center, Newport, RI, 1978), 107-108. In addition to its tactical inadequacies against nuclear-propelled opponents, the Mark 37 also had latent safety issues, which over the years have spawned considerable speculation as to whether a defective weapon could have been responsible for the loss of USS *Scorpion* in 1968. The most plausible of the Mark 37-related theories is laid out in some detail in: Sontag, Drew and Drew, *Blind Man's Bluff*, 99-120. While the causes of the sinking have remained open to question, a hydrogen explosion is now perhaps the most plausible contender. For a recent technical discussion of that theory and a critical review of alternative theories, see Bruce Rule, "Why the USS Scorpion (SSN 589) Was Lost 50 Years Ago," IUSS Caesar Alumni Association, http://www.iusscaa.org/articles/brucerule/scorpion_loss_50years.pdf.
[214] Friedman, *The Naval Institute Guide to World Naval Weapons Systems*, 431.
[215] Author's interview with Robert B. Pirie Jr., May 12, 2016, Alexandria, VA.
[216] Ibid.

design parameters, meaning they could generally outrun the Mark 37, unless it was fired from an exceedingly favorable tactical position. Thus, for a very substantial period of time, the assorted advantages of the U.S. submarine force – in terms of both technology and skill – had to be mustered simply to get into a workable firing position vis-à-vis its otherwise inferior opponents. The only readily available alternative was the nuclear Mark 45 ASTOR. Tipped with an 11-kiloton warhead, submariners would often half-jokingly credit the ASTOR with a P_k of 2 – "him and me."[217] From 1964 onwards, SUBROC provided an additional, stand-off option – but one that likewise involved nuclear use. Given the Navy's ingrained preference for conventional war and the rise of Flexible Response, neither was a satisfactory solution.

The torpedo problem was eventually resolved with the introduction of the Mark 48 Mod 1, large-scale deliveries of which began in 1972. After a lengthy development process that led to a contest between two possible variants of the same weapon, the Mod 1 was the torpedo the submarine force had been waiting for. Much depended on the new weapon more or less living up to the expectations: "All the analyses showed that if the Mark 48 didn't work, we were out of business."[218] With an estimated speed of 55 knots, a maximum diving depth in excess of 2,500 ft, four times the seeker range of the modified Mark 37 and perhaps three to four times the reach, the new torpedo was the most important addition to submarine ASW since the *Thresher* design had brought together speed, silencing and the long-range sonar.[219] Within just a few years, the change to the Mark 48 resulted in a manifold increase in lethality with minimal changes to the 'fast attack' platforms themselves. Seeing that every submariner's ultimate goal is to keep 'surfaces = dives', even those lucky enough to man the most advanced part of the VMF submarine fleet would now have to work much harder to make sure it remained so.

Ironically, almost simultaneously with the introduction of the Mark 48, a decisively improved version of the much-maligned Mark 37 – known as the NT37 – also became available. Equipped with a completely new engine section, this rebuild could do 36 knots, which

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217 Thomas Wildenberg and Norman Polmar, *Ship Killer: A History of the American Torpedo* (Annapolis, MD: Naval Institute Press, 2010), 156-57.
218 Author's interview with Robert B. Pirie Jr., May 12, 2016, Alexandria, VA.
219 Wildenberg and Polmar, *Ship Killer*, 184-91.

was probably sufficient to kill most first-generation nuclear boats with a double shot at closer ranges. This weapon was widely exported and used by several smaller Allied navies until the end of the Cold War and, indeed, beyond. Meanwhile, U.S. 'fast attacks' ended up carrying a mixed complement of Mark 48s (against high-end threats), Mark 37s (against the large number of low-end diesels in the VMF), and obsolescent Mark 16 pattern-runners and Mark 14 straight-runners (against surface ships that did not pose an immediate threat), which were eventually retired in 1975 and 1980, respectively.[220]

Unlike the 'torpedo crisis' the Mark 14 had caused during World War II, the torpedo problems of the Cold War did not result in skippers risking their boats and the lives of their crew to execute ineffectual attacks with a weapon they knew they could not depend on. The more leisurely pattern of peacetime competitive adaptation allowed the Navy to eventually adopt an extremely capable weapon that continued to evolve, and versions of which will probably remain in service half a century after the Cold War ended. However, in what would appear to be a case of prioritizing platforms over payloads to a potentially pernicious extent, it took the service longer than it reasonably should have to fix a basic flaw – one that might have triggered echoes of one of the most painful episodes in the history of the submarine force. This is all the more difficult to understand because the case of the Mark 45 proves that the industrial base was perfectly capable of developing and producing a much faster, deeper-diving torpedo in the late 1950s. Yet, for fifteen years – from the introduction of the *November*-class in 1958 until the Mark 48 became widely available in the fleet during 1973-1975 – the lack of a fully adequate, non-nuclear anti-submarine weapon remained a constraint on the submarine force's effectiveness as the first line of ASW defense. While there is every reason to believe that the advantage of the 'fast attacks' over their nuclear-propelled opponents in the VMF remained

[220] Some sources mention a Mark 37NTS version in U.S. service. The effort to develop the NT37 did, indeed, involve the Naval Torpedo Station (NTS) at Keyport, WA – but no specific evidence is available to support the view that the NT37 entered service in the U.S. Navy, let alone in large numbers. See, e.g.: Jim Christley, *US Nuclear Submarines: The Fast Attack* (Oxford: Osprey Publishing, 2007); Edward Monroe-Jones and Shawn S. Roderick, *Submarine Torpedo Tactics: An American History* (Jefferson, NC: McFarland & Company, 2014), 152. Unfortunately, the Cold War chapters in this latter book contain little specific information on the stated subject matter, despite such information being available.

substantial, the loss of even a few of them to the dauntless close-in tactics the Mark 37 necessitated would have been an unacceptable price to pay for the Navy's institutional inertia in the torpedo field.

WATCHING OVER THE MID-FIELD: MARITIME PATROL AIRCRAFT

Once they had run the gauntlet of forward-deployed SSNs, suffering a greater or lesser degree of attrition at the hands of the Mark 37, VMF submarines would have been subject to aerial attack by maritime patrol aircraft acting upon SOSUS cues, direction finding fixes, or other OPINTEL. Unlike submarines, the ability of ASW aircraft to cover very long distances within just a few hours allowed them to operate throughout much of the theater without sacrificing their flexibility beyond the current patrol cycle. Whereas SSNs had to be prepositioned and could be successfully rerouted only in favorable circumstances, patrol aircraft could be sent out reactively to investigate a specific datum. At the same time, their long endurance also allowed them to search much larger areas than a submarine or HUK could accomplish within any given timeframe. If, as RADM Hill emphasized, "[t]he antisubmarine battle must be conceived as a contest in depth,"[221] ASW aircraft added more to that depth than any other tactical element of the system.

The undisputed queen of the wide-area surveillance and long-range air ASW disciplines – with excellent reach and endurance, a full on-board sensor suite, a 20,000-pound weapons load, and considerable potential for further growth and modification – was, of course, the P-3 *Orion*.[222] Derived from Lockheed's *Electra* airliner and introduced in 1962, the

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[221] Hill, *Anti-Submarine Warfare*, 108.

[222] The most comprehensive guide to the history of the P-3 is David Reade, *The Age of Orion: Lockheed P-3 – An Illustrated History* (Atglen, PA: Schiffer, 1998). See also P-3 Orion Research Group - The Netherlands, "History of the Lockheed Martin P-3 Orion," P-3 Orion Research Group - The Netherlands, http://www.p3orion.nl/history.html; Richard S. Dann and Rick Burgess, *P-3 Orion in Action* (Carrollton: Squadron/Signal, 2004). An extensive collection of articles can be found at U.S. Navy Patrol Squadrons, "Lockheed P-3 Orion History," https://www.vpnavy.com/aircraft_p3_history.html.

P-3 lacked the mean looks of many tactical aircraft and could make an almost benign impression upon the uninitiated. Submariners the world around knew otherwise: in the highly specialized business of ASW, the *Orion* ranked – and still ranks – high among the most effective killing machines ever devised. It carried a capable surface-search radar, an outfit of eighty-four sonobuoys and associated on-board processing equipment, a magnetic anomaly detector, a modern ESM suite, and up to eight lightweight torpedoes (or three nuclear depth charges) in its internal bomb bay alone.

While the acoustic search methods were initially primitive and arduous for the sensor operators, successive updates added automated processing and classification capabilities as well as data links for direct comparison of onboard findings with SOSUS tracks.[223] By one account, every single aircraft of the P-3C configuration – first deployed in 1970 – contained a larger number of electronic parts than the entire fleet of 144 P-3Bs built just a few years earlier.[224] The concurrent introduction of the SSQ-53, or directional frequency analysis and recording (DIFAR), sonobuoy and the associated processors were a particularly important addition to the P-3s array of capabilities.[225] The DIFAR equipment was supported by an onboard library of acoustic signatures. While no sonobuoy could match the detection ranges or the level of detail that massive SOSUS arrays or the thousands of hydrophones in the sonar dome of a 'fast attack' could provide, the possibility to quickly locate and classify a contact with no more than a handful of DIFAR buoys made the P-3 an enemy to be reckoned with. While the SSQ-53 remained its most effective passive sensor, the 'workhorse' of the patrol community went through a series of major upgrade that successively improved its ASW suite and also made the P-3 an important pillar of the Navy's approach to anti-surface warfare, with the addition of the *Harpoon* anti-ship missile. With more than 550 aircraft built for the U.S. Navy alone and production continuing into the 1990s, the P-3 program was arguably among the most successful in the history of U.S. naval aviation. The aircraft was also widely exported and more than

[223] Naval Historical Foundation, "Ocean Surveillance during the Cold War: Sensing, Fusion, Exploitation" (Transcript of the 2010 Submarine Force Birthday History Seminar, Naval Historical Foundation, 2010), 18.
[224] P-3 Orion Research Group - The Netherlands, "History of the Lockheed Martin P-3 Orion".
[225] Owen R. Cote, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines,* Newport Papers 16 (Newport, RI: Naval War College Press, 2003), 51.

a hundred were built by Kawasaki Heavy Industries for the JMSDF. The capabilities and ruggedness of the *Orion* are such that it remains in service with the USN and more than a dozen other operators, sixty years after it first took to the air.[226]

While other nations have designed capable ASW aircraft – the UK's Hawker Siddeley *Nimrod* and multinational Breguet *Atlantic* being cases in point – and integrated many of the same capabilities, there is no doubt that P-3s would have borne the brunt of the Western aerial ASW effort in any confrontation with the VMF. The real strength of that effort was not derived from the aircraft and its onboard capabilities, however. Without cueing by OPINTEL, the great majority of MPA searches would have failed to produce tangible results, other than to keep any submarines they happened to encounter from snorkeling or messaging while the aircraft remained nearby. Indiscriminate area search operations would have been fairly unproductive even if they focused on choke points. For example, the GIUK line spans close to 650 nmi of water at its narrowest point – sufficient space for a well-handled submarine to make an undetected transit, if the approximate time and location of its breakout were unknown. It was the existence of an architecture which could direct MPAs to areas of interest measuring tens or hundreds of square nautical miles, within theaters that comprise hundreds of thousands of square nautical miles, that made wide-area search truly profitable. All tactical elements of the ASW complex profited from cueing, but none more so than patrol aircraft, with their fast reaction and short transit times.

[226] The last P-3Cs in U.S. active-duty patrol squadrons will be replaced by the P-8A *Poseidon* in the coming years. The P-3C will remain in use by other navies in the coming decades – possibly into the 2040s.

Fig. 24: A P-3A *Orion* of VP-49 ("Woodpeckers") patrols the North Atlantic, 22 January 1964. *(U.S. Navy)*

Whereas the intelligence inputs that made cueing possible were variable, the operational command structure that was designed to exploit them was highly centralized. For example, area ASW operations in the Atlantic were handled by Commander, Task Force 84 (CTF-84), whether they involved MPAs, surface hunter-killer groups, or submarines assigned to the task. CTF-84 was also in charge of SOSUS stations in his area of responsibility. Immediate coordination and tasking of assets was provided by Anti-Submarine Warfare Operations Centers (ASWOCs) in Keflavik, Rota, Lajes, Bermuda and Brunswick, ME. These in turn disseminated intelligence provided by their assigned MPAs.[227] How the layered approach to ASW worked in peacetime is demonstrated by continuous tracking operations against *Yankee*-class SSBNs deploying into the Atlantic.[228] During the first part of the transit, Norwegian P-3s based at Andøya and Bodø established and maintained contact. As a *Yankee* moved southwest through

[227] Friedman, *Network-Centric Warfare*, 160.

[228] This is based on Larry Robideau, "Third Battle of the North Atlantic 1962-1991," *Cold War Times* 6, no. 1 (2006), 14-20.

the Norwegian Sea, U.S. Navy or allied P-3s operating from NAS Keflavik took over, with support from Avro *Shackletons* or *Nimrods* flying from RAF Kinloss. In the mid-Atlantic, coverage was maintained from Keflavik and the British Isles and then passed on to Canadian MPAs from RCAF Greenwood and P-3s from Lajes and Bermuda.[229] That the peacetime system worked well is testament to the close cooperation between a core group of NATO allies that made aerial ASW one of the few truly multinational success stories. Broadly similar arrangements were later developed in the Mediterranean and in the Western Pacific.

It seems highly likely that the basic operational pattern described above would have persisted in a crisis, but would have changed significantly in wartime, as an almost exclusive focus on SSBNs would have been difficult to maintain. It is not clear that political considerations would have allowed CTF-84 to quickly destroy any forward-deployed or transiting *Yankees*, but – generally speaking – VMF submarines would have been attacked while transiting through successive MPA patrol zones. Designated patrol zones for 'fast attacks' might have been created between them, at some cost to the aerial element's operational flexibility. Eventually, this combination of far-forward (and possibly interspersed) attack submarines and successive 'mobile barriers' of anti-submarine aircraft promised sufficient effectiveness to obviate one of the main instruments of offensive ASW during the Second Battle of the Atlantic: the hunter-killer group. The changing role and ultimate demise of the HUK is the next strand in the U.S. Navy's adaptation to the Soviet submarine threat that we must examine.

THE SLOW DEATH OF THE SURFACE HUNTER-KILLER GROUP

Based on their positive operational record in World War II and the experimentation of Task Group ALFA, the U.S. Navy operated nine carrier-centric hunter-killer groups during the 1960s and into the early 1970s. Their natural mission was open-ocean, offensive ASW, but they

[229] Larry Robideau, "Third Battle of the North Atlantic 1962-1991," *Cold War Times* 6, no. 1 (2006), 16. See also William Perkins, "Alliance Airborne Anti-Submarine Warfare: A Forecast for Maritime Air ASW in the Future Operational Environment" (Maritime Air Coordination Conference, Kalkar, 2016), 12-14.

were also well suited to support carrier groups and convoys. This made them a valuable, 'intermediate' capability which could be used individually, or to reinforce other offensively or defensively oriented forces as necessary. Besides the *Essex*-class carrier, a typical group consisted of four destroyers in close support and four more which could easily be detached from the main body to prosecute contacts further afield. The air wing consisted of fixed-wing S-2 *Trackers* and rotary wing SH-3 *Sea Kings*. While the former were capable of basic sonobuoy tactics (as discussed in Chapter 4), the latter carried dipping sonars as their main sensors. The combination of the helicopters' mobility with the capabilities of the dipping sonar – a device resembling an enlarged and more powerful sonobuoy suspended by a cable – made them a dangerous close-in complement to the MPA. Surface units could be provided with variable-depth sonars that provided a somewhat similar set of advantages. In case of many FRAM II-modernized destroyers this was the SQA-10.[230] In case of the *Knox*-class ocean escorts (later re-designated frigates), the more advanced SQS-35 was used.[231] Both were more effective against submarines hiding under a thermal layer than hull-mounted units were. Other destroyers were, for the most part, equipped with the standard hull-mounted SQS-23 and SQS-26 sets. The latter was much more sophisticated in theory but had extended teething problems, which meant that the older SQS-23 was often more effective in real-world situations.[232] The problems with the advanced convergence zone (i.e. long-range detection) and bottom-bounce (i.e. continuous tracking) features were eventually ironed out and the SQS-26 became the highly capable system it had been envisioned as – but it took the Navy until the mid-1970s to achieve this.[233] By that time, the HUKs had already passed from the scene. Towed arrays, which were an even more impressive step up for the detection capabilities aboard surface ships, similarly came too late for U.S. hunter-killer task groups to make use of them. As was the case with

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[230] David Miller, John Jordan and Wolfram Schürer, *Moderne Unterseeboote: Technik, Taktik, Bewaffnung* (Dietikon-Zurich: Verlag Stocker Schmid, 1999); Stefan Terzibaschitsch, *Das FRAM-Modernisierungsprogramm der U.S. Navy* (München: Lehmanns, 1975), 14-15; Stefan Terzibaschitsch, *Kampfsysteme der US Navy: Waffen und Elektronik auf amerikanischen Kriegsschiffen* (Hamburg: Koehler, 2001), 205.

[231] Friedman, *The Naval Institute Guide to World Naval Weapons Systems*, 382; Terzibaschitsch, *Kampfsysteme der US Navy*, 208.

[232] Friedman, *The Naval Institute Guide to World Naval Weapons Systems*, 381-82; Terzibaschitsch, *Kampfsysteme der US Navy*, 212.

[233] Friedman, *The Naval Institute Guide to World Naval Weapons Systems*, 381-82.

land-based MPAs, the main weapons of the HUK were the lightweight torpedo – principally the Mark 46, which was carried by the S-2 *Tracker*, SH-3 *Sea King* and drone anti-submarine helicopters (DASH), and which served as the ASROC conventional warhead and as a close-in defense weapon on surface ships – along with the nuclear depth bomb, which might or might not have seen actual use.[234]

Like 'fast attacks' and patrol aircraft, hunter-killer groups profited from cueing by SOSUS, HF/DF, and other means and saw a corresponding rise in overall effectiveness. During the Second Battle, U.S. Navy HUKs – centered on four modified escort carriers and heavily relying on operational intelligence – had been responsible for fifty-three U-boat kills, or about ten percent of those lost at sea to direct enemy action.[235] With even better cueing and a much more advanced set of sensors, there was a good chance that the HUKs would be able to replicate this success to some extent. They would have been particularly useful again diesel-electrics, which would also have found it much more difficult to run away than their nuclear-powered sisters, and which remained difficult to track by passive means when operating on batteries. The high-power active sonars aboard postwar destroyers could largely obviate this advantage, once OPINTEL provided them with a good idea of where to look.[236] However, this unique advantage was not sufficient to justify a replacement of the *Essex*-class carriers, which were thoroughly worn out by the late 1960s. In some cases, their strength decks – a load-bearing static element of the carrier, which was essential for its structural integrity – had snapped in heavy weather.[237] Short of a complete rebuild, only new construction could provide sufficient air strength for future HUK operations. Due to the considerable investment in other ASW tools, the Air-Navy's strong commitment to the expensive *Nimitz*-class attack carrier program, and the looming block obsolescence of the FRAM and early postwar destroyers (which also

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[234] The older Mark 44 also remained in use until the late 1960s. The most common nuclear depth bomb was the B57, with a yield of 10 kilotons. Nuclear-armed ASROCs carried the W44 instead, but the yield was the same or very similar.

[235] Jeffrey G. Barlow, "The Navy's Escort Carrier Offensive," *Naval History*. See also William T. Y'Blood, *Hunter-Killer: U.S. Escort Carriers in the Battle of the Atlantic* (Annapolis, MD: Naval Institute Press, 2004).

[236] Owen R. Cote, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines,* Naval War College Newport Papers 16 (Newport, RI: Naval War College Press, 2012), 54-55.

[237] Norman Friedman, *U.S. Aircraft Carriers: An Illustrated Design History* (Annapolis, MD: Naval Institute Press, 1983), 351.

saw heavy use for HUK duty), this was not an option that the Navy leadership could sell to its platform communities or to Congress. With P-3s and 'fast attacks' taking up much of the slack, the sun was setting on the venerable HUK concept.

The last hunter-killer group was dissolved in 1974, and surface fleet ASW and battle group self-defense were essentially merged into one in the U.S. Navy. The HUK concept lived on for a few years in the debates about the Sea Control Ship – a small ASW carrier proposed in the early 1970s as part of ADM Elmo Zumwalt's 'high-low mix', but never realized.[238] As it were, even a CNO committed to the surface fleet in ways that his predecessors were not – Zumwalt was, of course, a destroyerman – could not arrest the demise of independent surface ASW groups. The VP and submarine communities had proven that they could effectively perform the wide-area role with limited support on the surface, and often none at all. The Air-Navy preferred large-deck carriers because – for all the talk about SSBNs being the new capital ships – they were still very much at the heart of its organizational essence, leaving Zumwalt with very limited choice in the matter.[239] The formal assignment of the ASW mission to the attack carrier force and the re-designation of CVANs as multipurpose CVNs was not intended to put an end to the debate, but it further diminished the chances that the HUKs would be resurrected any time soon.[240] Thus, the provision of dedicated, carrier-centric ASW task forces largely devolved upon the Royal Navy, which could provide the core of up to three HUKs during the 1970s and 1980s, and other allied contributors, which could have provided several more.[241] At the same time, the CVBG would be given a chance to up its game in anti-submarine defense. By the early 1970s, a change of pace along these lines was desperately needed.

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[238] Elmo R. Zumwalt, *On Watch: A Memoir* (New York, NY: The New York Times, 1976), 59-84; Terry C. Pierce, *Warfighting and Disruptive Technologies: Disguising Innovation* (London: Frank Cass, 2004), 155-63; Friedman, *U.S. Aircraft Carriers*, 351-57.

[239] Because they are concerned with measuring seapower rather than bureaucratic essence, Modelski and Thompson explicitly include SSBNs and SSNs as capital ship in their post-1945 data set. George Modelski and William R. Thompson, *Seapower in Global Politics: 1494 -1993* (Basingstoke: Macmillan, 1988), 85-92.

[240] On the CVBG concept, see Pierce, *Warfighting and Disruptive Technologies*, 152-54.

[241] David Hobbs, *The British Carrier Strike Fleet after 1945* (Barnsley: Seaforth Publishing, 2015), 461-80; Stephen Roberts, "Western European and NATO Navies, 1982" (Professional Paper No. 399, Center for Naval Analyses, Alexandria, VA, 1982).

5.4.4 *The weakest link: battle group self-defense*

Coming to the final part of the ASW story during this phase of the competition, we must first note an interesting paradox. Assessments of U.S. Navy anti-submarine warfare easily are the most conflicted of any warfare area, to the extent that some see effective innovation leading to a sustained advantage, where others credit the world's leading navy with "a tradition of sub-standard ASW."[242] How does this discrepancy come about? A large part of the answer would seem to stem from the simple fact that critics have tended to focus on ASW in a narrowly defensive sense and at the battle group level, where others have preferred to look at the wide-area architecture described above, and the significant advantages it conferred. Neither view is really accurate in isolation. Nor can they be aggregated into an undifferentiated whole, which would leave us with the self-contradictory belief that the Cold War Navy was both extremely good and very bad at one and the same thing. That said, both views contain a large kernel of truth, which we must sort out in the following.

In a first step, it is important to establish that the U.S. Navy's difficulties in CVBG self-defense are well-documented, including by serving naval officers at the time. While the Navy has always been understandably tight-lipped about these matters, circumstantial evidence abounds of both quiet nuclear submarines and modern diesels – like the British-built *Oberon*-class, Dutch *Zwaardvis*-class and German Klasse 206 – making their way into the 'sacrosanct' inner zone of the main body during exercises and turning it into a simulated killing ground.[243] While some aspects of his account may be open to debate, Thompson is certainly not mistaken in asserting that U.S. carrier defensive screens have proven less than impenetrable.[244] In 1982, a U.S. officer pinned down the problem quite accurately, when he argued that

[242] Roger Thompson, *Lessons not Learned: The U.S. Navy's Status Quo Culture* (Annapolis, MD: Naval Institute Press, 2007), 91.
[243] Ibid., esp. 15-39, passim.
[244] Ibid.

> "the fact remains that main body ships are generally poorly protected from those submarines that penetrate the outer passive detection systems. This situation is unacceptable, as the records of submarine warfare clearly show that *all* successful submarine attacks have been launched from the area currently left unsearched and unprotected."[245]

It is not clear that he included any formal or informal knowledge of Cold War exercise outcomes in his assessment of what the record shows, but his colleagues agreed that the Navy had a real problem on its hands. One U.S. submarine officer wrote that "[o]perating a submarine against a carrier is too easy; the carrier's ASW protection often resembles Swiss cheese."[246] As a result, carriers were successfully attacked "time and time again"[247] during exercises, according to his account. Writing about diesel-electrics specifically, a supremely experienced British submariner agreed almost word for word, stating that "open ocean NATO fleet exercises demonstrate, time and again, that a proportion of SSKs will get through the screen. Numbers are the key to success and the Soviet Navy has plenty."[248] Because well-designed diesel-electrics were often more quiet than nuclear boats when running on batteries and also presented smaller targets to active sonar, they posed a greater problem than first- and second-generation nuclear boats did in such close-in fights. As their nuclear counterparts got more quiet, the number of instances in which they made it through the screen probably increased quite significantly, but there is no reliable data that would allow us to quantify this shift. Apparently, at tactical speeds, the Royal Navy's *Trafalgar*-class SSNs (built during 1979-1991) were as quiet as the *Oberon*-class running on batteries.[249] Of course, it must be remembered that Soviet diesels did not have rafted propulsion plants at this stage and were relatively less quiet than Western boats, while the VMF's nuclear boats were consistently situated at the noisy end of the spectrum. New construction slowly began to change both of these deficiencies, but this only started to make a real difference from the mid-1970s onwards. Nevertheless, there is

[245] R. W. Atkins, "ASW: Where is the Inner Screen?," *Naval War College Review* 35, no. 1 (1982), 49. Emphasis in the original.
[246] John L. Byron, "The Victim's View of ASW," *USNI Proceedings* 108, no. 4 (1982), 39.
[247] Ibid.
[248] Compton-Hall, *Submarine versus Submarine*. 23.
[249] Ibid., 32.

no way around the fact that U.S. Navy battle groups were far more vulnerable to close-in submarine attack than the service leadership was willing to admit.

How did this state of affairs come about? Some have traced the deficiencies to the dissolution of the HUKs, which were specialized in ASW, and the false expectation that CVBGs – specialized in power projection at and from the sea – could take up the slack. In this view, "[t]he darkest hour for ASW occurred in the early 1970s, when […] the CV concept was adopted."[250] That said, warnings concerning the low quality of battle group ASW were never in short supply, either before or after that particular timeframe. The fact that many of the direst warnings from naval officers are from the 1980s points to a persistent problem that did not go away after CVBGs had been fully equipped with organic air ASW forces, and sufficient time to fully integrate them had elapsed. Providing one of the last Cold War accountings of the matter in 1990, a carrier ASW officer thought Byron's pessimistic assessment of a decade earlier – quoted above – was still "uncomfortably accurate"[251], although "not quite as true as it used to be."[252] While he was confident that the problem could be substantially alleviated through diligent organization aboard the carrier, we must conclude that battle group self-defense against submarine attack was, and remained, an Achilles' heel for the Cold War U.S. Navy.[253] As another practitioner wryly remarked in the waning days of the Cold War, "the U.S. Navy *has never done well* at battle group ASW. Whenever the same tactical platforms that do well at area ASW – MPAs, SSNs, towed-array frigates, etc. – are employed by the battle group commander, the results are very different."[254] In his terse and broadly accurate round-up of the problem, he concluded that "the Navy's battle group ASW performance adds up to less than the sum of its parts."[255]

The most convincing explanations for the bad state in which battle group self-defense remained throughout the Cold War are ultimately bureaucratic in nature. While it is true that

[250] Wayne D. Brown, "The Navy's Poor Relation," *USNI Proceedings* 113, no. 10 (1987), 149.
[251] Scott Kelly, "Carrier ASW: Can Do," *USNI Proceedings* 116, no. 1 (1990), 74.
[252] Ibid., 74.
[253] Ibid., 78.
[254] William J. Frigge, "Winning Battle Group ASW," *USNI Proceedings* 112, no. 10 (1987), 136. Emphasis added.
[255] Ibid., 134.

the hardware had its deficiencies and that there were never enough of the most capable systems, the increase in the ASW capability of the surface fleet was considerable during 1960-1975. In outer zone defense, the S-2 *Tracker* was not nearly as capable as a P-3C, but its replacement – the S-3 *Viking* – provided much of the same performance as an advanced land-based MPA, and with a higher level of automation.[256] As a result, the battle group could maintain effective surveillance of the zone 200-300 nmi outward from the carrier, in which an Echo II would likely launch its missiles. In the middle zone, many of the surface escorts were essentially the same ships that would otherwise have been attached to HUKs, often equipped with the initially problematic, but ultimately capable SQS-26 hull-mounted sonar. In some cases, a variable-depth unit was available as well. Towards the very end of this phase, the *Spruance*-class destroyer introduced the even more impressive SQS-53 hull mounted unit, which remained the standard on high-end ASW and multi-mission destroyers. Combined with rafted propulsion for lower self-noise and two embarked ASW helicopters, this made the *Spruance* an excellent submarine hunter – certainly in theory.[257] Finally, in the inner zone, passive detection was severely degraded, but the SH-3 *Sea King* and its active dipping sonar were perfectly capable of detecting any submerged opponents that had made it thus far. Overall, then, a lack of high-quality ASW tools can at best provide a partial explanation for the plight of CVBG self-defense. Critics of the Navy's task force ASW performance point to other issues, which were of an organizational rather than a technological nature. According to one officer from the HS community,

[256] David Reade, "S-3 Viking Twentieth Anniversary Review," *Airborne Log*, Fall 1993.

[257] From the late 1970s onwards, problems with the effectiveness of the screen appear to have persisted despite the introduction of even more capable tactical towed array sonar (TACTAS) systems like the SQR-18 and SQR-19. These were essentially miniature SOSUS arrays dispensed from a winch aboard an escort and towed behind the ship, which were supported by advanced onboard processing equipment. Together with embarked ASW helicopters like the SH-2 Light Airborne Multipurpose System (LAMPS) and later the SH-60 (LAMPS III), the long-range detection and classification of the towed array took surface ASW to the next level. According to Cote (Cote, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines*), the TACTAS/LAMPS combination "revolutionized surface ship ASW capabilities by combining the detection ranges heretofore only achieved at the tactical level by submarines deploying large, below layer, passive arrays with the rapid, long-range prosecution capabilities provided only by air ASW assets" (62). Nevertheless, penetrations of the inner zone continued and they still occur on a fairly regular basis today.

> "[t]he ASW module of a carrier is generally considered by the chain of command to be a "body locker" from which to draw officers to fill various administrative positions. […] The result is a frustrated officer who is not allowed to perform in his area of expertise. Those officers allowed to serve in the ASW billet to which they are assigned, serve under a lengthy chain of command that with rare exception […] will not have a single officer with more than a smattering of knowledge of, or expertise in, ASW."[258]

While it might come as surprise to some, this account is actually quite consistent with what one would expect from an at-sea military bureaucracy which has consistently venerated offensive striking power, while often viewing those engaged in defensive or supporting tasks with mild disdain. As Kelly explains,

> "[a]lmost every officer in the chain [of command, MH] wears wings, and there is a very definite 'aviator mentality' permeating every fiber of the ship. Carriers exist for power projection – and nobody does it better. The resulting state of mind quite naturally conjures up visions of F-14s thundering off the deck in afterburner, or A-6s bristling with bombs, far more readily than it does an S-3 buzzing around chasing something no one can see. *After all, the carrier's game is attack*: to heap destruction on the enemy and drive him from the seas. To a carrier, arguing with shadowy nuisances that hide under water is the business of escorts."[259]

This order of priorities, on what OPNAV declared would be true multipurpose units to which no fixed air wing would be assigned, led to such mundane consequences as S-3 pilots having to fight for their launch spot in what is a uniformly tight schedule of air operations, and ASW helicopters routinely being diverted to other missions, such as over-the-horizon scouting, anti-surface warfare, and plane guard duty.[260] In other words, the weakness of battle groups' close-in defenses was to a large measure self-inflicted. The CVA culture that was at least partially responsible for this outcome was deeply ingrained and did not change simply because the 'higher-ups' had decided that ASW squadrons should be allowed to usurp some of the precious deck space that more properly belonged to VF (fighter) and VA (attack) squadrons. Whether wartime pressures would have forced a change to the more balanced organizational

258 Brown, "The Navy's Poor Relation,", 152.
259 Kelly, "Carrier ASW: Can Do," 74. Emphasis added.
260 Ibid., 78.

paradigm that remained elusive over decades invites speculation but will ultimately remain another one of the 'known unknowns' in this investigation.

The most important question, of course, is one that is almost equally difficult to answer: just how vulnerable did the deficiencies of its large unit self-defense system leave the carrier in the face of determined opposition? To get a grip on this question, we must consider the comparative weakness of task force defenses in relation to the ASW complex as a whole. To ensure that the threat to the Navy's central weapon system remained at a tolerable level, the elimination of technical and tactical deficiencies at the level of the battle group was not the only task that called for sustained investment, but certainly an important one. The balance of the evidence supports the view that the Navy did not do enough in this respect. Organic carrier group defenses were leaky in 1960, they possibly declined even further during 1970-1975, and they improved only modestly thereafter. As a result, CVBG self-defense depended on the much more effective wide-area elements to reduce the density of enemy submarines to a level which the organic assets could probably deal with. This was not an unrealistic expectation, but one that was contingent on the dynamics of the conflict overall. From the late 1960s onwards, Western area defenses were of sufficiently high quality to prevent submarines from ever getting close to a CVBG main body in perhaps eight or nine out of every ten cases, but a perfect record could not be expected. Hence, as far as the ASW element is concerned, a very real possibility existed that the Soviet anti-carrier strategy might have succeed in some individual engagements, even if it would likely have failed overall. It is fair to say that the close-in submarine threat would probably have been manageable, but that it was never contained to the extent that the Navy could be confident – let alone *certain* – not to lose any flattops during hectic wartime operations, even in a war that stayed purely conventional. Any submarine that survived long enough to make it through the outer screen of defenses and into short-range missile or torpedo range stood a good chance of inflicting heavy damage. Because a carrier can take a far greater amount of punishment than a smaller ship can, this might or might not have translated into a permanent loss, but 'mission kills' were certainly plausible.

Once a carrier was crippled, further losses might have been incurred as the enemy could be expected to concentrate additional resources against it, and any escorts would likely have faced tactical and operational limitations in their attempts at shielding the capital ship from a mortal blow. Moreover, the collective risk to the battle group necessarily increased the closer to Soviet bases it was operating, due to both the higher density of submarines in those waters and the lower level of exposure to wide-area ASW defenses they would have faced before they could approach the carrier. Having said that, the fact that 'attack at source' operations using multiple carrier groups were nonetheless seriously considered far into the 1960s and again from the late 1970s suggests that this residual threat did not serve as an effective deterrent vis-à-vis the offensive-minded Air-Navy. In the next section, we will consider U.S. competitive adaptations in the area of fleet air defense, based on how Soviet land-based naval aviation and submarine-launched cruise missiles could be expected to come into play.

5.5 Containing the anti-carrier threat II: fleet air defense

5.5.1 The combined-arms sea denial challenge

At the height of the second phase of the Cold War at sea, the U.S. Navy's surface forces faced a maturing and increasingly intense air threat from Soviet missile-firing submarines, aircraft, and – to a much lesser extent – surface ships. As has already become clear, "the missile bomber changed the air defence problem because it had to be destroyed much further away from its target. Otherwise fleet air defence would have to concentrate on numerous relatively small missile targets rather than large bombers."[261] Essentially, the same problem applied to the missile-carrying submarine. At the same time, the reliance of missiles also reshaped the task that faced the attacker. To overcome the target's defenses, missile strikes had to be concentrated in time and simultaneously dispersed along several attack vectors to create confusion and overstretch the defender's resources. If anything, Hughes' long-standing maxim that "fleet battles

[261] Norman Friedman, *Fighters Over the Fleet: Naval Air Defence from Biplanes to the Cold War* (Barnsley: Seaforth, 2016), 281.

are won by attacking effectively first"[262] became even more central for both sides than it had been in competitions that predated the dawn of the missile age. In this section we will briefly consider the operational and tactical implications from the Soviet side, whereas the U.S. reactions during the second phase are discussed in the section 5.4.2 below.

What emerged from the VMF's anti-carrier efforts from the early 1970s onwards was essentially a combined-arms, oceanic reconnaissance-strike complex – although not a very robust one.[263] For the centralized, shore-based Soviet command system, coordinating attacks by a single element such as missile-carrying aircraft was a significant, but manageable challenge.[264] Essentially, each platform or unit would be arrayed according to well-understood principles that could be adapted to the situation at hand and a set of parameters would be provided for the strike, which would then be faithfully executed by the at-sea commanders.[265] On the other hand, effectively orchestrating air-launched missile strikes with those launched from submarines and – less prominently – surface required a far greater number of unequal moving pieces to come together at just the right time and in just the right way, while still relying on the centralized command arrangements that were typical of the Soviet armed forces. That was another matter entirely.

On paper, the Soviet Navy clearly had the capability to conduct massive saturation strikes against multiple task forces, using the full array of platforms and weapons, with either nuclear or conventional warheads. Around the mid-point of this second phase of the confrontation, the CIA credited the VMF with a total of 871 ASM launchers on high-seas platforms, of which 404 were on submarines, 385 were provided by aircraft, and 82 by surface ships.[266] In

[262] Wayne P. Hughes and Robert Girrier, *Fleet Tactics and Naval Operations* (Annapolis, MD: Naval Institute Press, 2018), 290.
[263] See Vego, "Recce-Strike Complexes in Soviet Theory and Practice," ii.
[264] On Soviet command arrangements, see Milan N. Vego, *Soviet Naval Tactics* (Annapolis, MD: Naval Institute Press, 1992), 52-73.
[265] Ibid., 186-253.
[266] Central Intelligence Agency/Directorate of Intelligence, *The Soviet Naval Cruise Missile Force: Development and Employment*, December 1971, CIA Historical Collection, ~~TOP SECRET~~ (declassified 14 June 2017), 29. The largest number of launchers (586) were actually provided by the VMF's numerous coastal defense vessels, which were relevant only in the near-seas areas.

practice, however, combined-arms strikes were difficult to pull off. To make sure that the various attacking units would effectively complement and support each other's efforts, three main ingredients were required: operational concentration, tactical concentration, and exquisite coordination and timing.

In concentrating its best assets for operations, the VMF always faced a major structural disadvantage: the "four-fleet handicap"[267] of having to cover not just the North Atlantic and Pacific fleet areas, but to maintain an adequate level of preparations in the Baltic and the Black Sea as well. Soviet naval assets were deployed in support of an extended perimeter defense posture in the most literal sense – that is, as part of an *all-around* defense against attacks from a number of plausible operational directions. Within the Soviet strategic defense mindset, the mobility of U.S. carrier forces and SSBNs left few other options. Thus, submarines and surface ships in particular would certainly have remained dispersed to a very considerable degree, with no real opportunity to concentrate overwhelming forces in any individual area of operations. On the other hand, explicit provisions had been made to concentrate AVMF missile regiments from different fleet areas. The speed with which aircraft could be redeployed from one end of the vast Soviet territory to another was a strong point of the system. According to Gordon and Komissarov, an entire division of up to sixty aircraft could be shifted between the Northern and Pacific Fleet areas in less than 48 hours, "with the aircraft armed and ready for action."[268] Having said that, even if *each* of the three other fleets would have been able to detached a full division of strike aircraft to fight in the North Atlantic area, this would still have left the Northern Fleet – which had the plurality of anti-ship cruise missile launchers to begin with – with only about 56 percent of the dedicated ACW assets in the VMF.[269] In a perimeter defense system with at least four main operational directions, operational concentration – even along such "interior lines"[270] of sorts – would always remain structurally difficult.

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[267] Robert W. Herrick, "The Gorshkov Interpretation of Russian Naval History," in *Soviet Naval Developments: Capability and Context*, ed. Michael MccGwire (New York, NY: Praeger, 1973), 309-10.
[268] Gordon and Komissarov, *Soviet Naval Aviation, 1946-1991*, 133-34.
[269] Central Intelligence Agency/Directorate of Intelligence, *Soviet Capabilities to Counter US Aircraft Carriers*, May 1972, CIA Historical Collection, ~~TOP SECRET~~ (declassified 14 June 2017), 8.
[270] On interior lines of operation, see e.g. Archer Jones, *The Art of War in the Western World* (Urbana, IL: University of Illinois Press, 2001), 70-72; *passim*.

Although careful planning and sufficient readiness levels were still required, a tactical concentration of significant portions of an individual fleet's combined-arms assets within a likely area of operations was also relatively easy to achieve. The same could not be said of the third requirement, however: the orchestration of combined-arms strikes at the point of attack was found to be a difficult challenge. While maximum concentration and the closest coordination of the individual elements were clearly desirable, Vego found that "[d]espite the impression to the contrary, there seems to be no coordination among strikes by aircraft, surface ships, and submarines in most of the Soviets' peacetime exercises. The reason is that the sheer number of Soviet platforms and their diversity complicate greatly any massed, coordinated strike by submarines, land-based aviation and large surface ships."[271] A late-1970s intelligence assessment similarly assessed that "[w]henever possible, antiship attacks by Naval Aviation would be coordinated with attacks by other antiship forces, especially submarines and surface ships. It is unlikely, however, that all the various forces would strike simultaneously."[272] In other words, effective force concentration in time and space was likely to extend only to the individual elements of the ACW complex, such as aircraft or submarines. This does not mean that no synergies were possible. For example, Soviet planners envisioned using the airborne element of an anti-carrier strike force to weaken and disorganize a CVBG's anti-submarine defenses.[273] But the ideal of "delivering a massive, concentrated, and coordinated initial strike by composite forces"[274] appeared to be difficult to attain. While Soviet command philosophy and technological limitations in command, control and communications certainly contributed

[271] Vego, *Soviet Naval Tactics*, 262.
[272] Central Intelligence Agency, *Naval Aviation in Soviet Antiship Attack Planning: An Intelligence Assessment*, September 1979, CIA Historical Collection, ~~TOP SECRET~~ (declassified 16 June 2017), vi.
[273] Mamayev, "New Developments in Combat with Carrier Strike Large Units in the Initial Period of War," ~~SECRET IRONBARK~~ (declassified December 2004), 17.
[274] Vego, *Soviet Naval Tactics*, 262.

to this situation, one suspects that wartime friction would have wreaked havoc with such elaborate planning in any case.[275] The advantages of relying on an overall, on-the-scene force commander might have offset these effects to some extent, but there was little chance of the VMF adopting this essentially Western-style model.

It is interesting to note that the Imperial Japanese Navy faced similar challenges in the development of its naval aviation component during the 1930s. Early schemes for the coordination of torpedo attacks from surface ships and naval aircraft had to be abandoned because they were found to be unrealistic.[276] Close coordination between submarines and naval aircraft was even more difficult, of course, and there is nothing to suggest that it was even attempted. In the end, what remained was a paradigm of "melding all the aerial attack systems […] – horizontal bombing, dive bombing, torpedo bombing, and fighter attacks – into a single system of massed aerial assault."[277] While the Japanese were ultimately quite successful in turning this into an operational effective means of naval warfare, they realized that "[t]he conduct of an operation of such complexity, precision timing, and risk required an expanded tactical organization, meticulous planning, rigorous training, skilled aircrews, and bold leadership to keep it from suffering a series of disastrous miscues."[278] If anything, what the VMF attempted was even more difficult. Instead of attacking from roughly 200-300 nmi away, as Japanese carrier forces were designed to do, the targets of Soviet ACW operations might be three or four times as far from Soviet shores. The decision to even launch a strike over such distances had to be based on a solid understanding of where the enemy was and what he might do next. Because carrier groups are fast-moving, distant operations required relatively recent ISR inputs, possibly even while the attack force was already in flight. Finally, the Soviet take on the idea of "closely phased operations by various types of aircraft"[279] in this case required long-range targeting using radars that would inevitably reveal the presence of a Soviet attack force,

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[275] See Central Intelligence Agency/Directorate of Intelligence, *The Soviet Naval Cruise Missile Force: Development and Employment*, 36.
[276] Mark R. Peattie, *Sunburst: The Rise of the Japanese Naval Air Power, 1909-1941* (Annapolis, MD: Naval Institute Press, 2001), 37.
[277] Ibid., 146.
[278] Ibid.
[279] Ibid.

even if it was not otherwise spotted. Hence, it is not surprising that the precise coordination with surface and subsurface assets would have posed additional problems that were best side-stepped in practice – attractive as they might have been in theory.

Instead of pursuing a perfectionist solution that was unlikely to work when put to the test, the VMF eventually chose to combine different techno-doctrinal solutions and approaches that were each adapted to the prevailing conditions in a particular theater.[280] For oceanic defense in the North Atlantic, the main weakness of the Soviet ACW system was scouting and reconnaissance. As we have seen, *Echo*- and *Juliett*-class submarines required offboard targeting support for their long-range ASMs to be effective. The same was true of the *Kynda*- and *Kresta I*-class, which were also armed with the SS-N-3b *Shaddock* but accounted for a much smaller fraction of the Soviet anti-carrier potential. *Badgers* and *Backfires* had powerful targeting radars of their own, with a much better radar horizon than a surfaced submarine, but they still required reconnaissance and cueing ahead of, and during, a raid to be effective. The main attempt at an effective solution to the targeting problem up until the mid-1970s was the Tu-95RT (*Bear*-D) ELINT and maritime reconnaissance aircraft.

A variant of the mid-1950s strategic bomber first introduced in 1964, the Tu-95RT had excellent range and endurance, and ample space for a massive radar and electronics installation. By the standards of its time, the aircraft offered an impressive level of capability: "A single TU-95RT could monitor an area of 8-10 million square kilometers […] in a single sortie and classify the detected targets. A regiment of *Bear-D*s could survey more than 90 million sq km […] and shadow two or three CTFs without let-up for 15-20 days."[281] There were also important downsides to the AVMF's reliance on the *Bear*-D, however. First of all, only a limited number were built, with twenty-six available in the Northern Fleet area and an equal number in the Pacific.[282] To perform their mission, they would have to operate against U.S. carrier groups repeatedly, on an almost daily basis. If too many of these critical assets were lost to enemy action in the process, the capability of the entire oceanic ACW system would decline

[280] Breemer, *Soviet Submarines: Design, Development and Tactics*, 119.
[281] Gordon and Komissarov, *Soviet Naval Aviation, 1946-1991*, 50-51. Emphasis in the original.
[282] Ibid., 51.

accordingly.[283] While the *Bear*-D's original role of actually guiding ASCMs onto target during the latter stages of their flight, as was the case with the *Shaddock*, was reduced to providing targeting data to the next generation of missiles prior to launch, it was still a potential weak link in the system. Because the Soviet dependence on the *Bear*-D was well-understood, it could be countered by means such as 'blip enhancers,' which allowed escort vessels or even fleet auxiliaries to emulate the radar signature of a carrier.[284] If the carrier could not be positively identified by radar from stand-off ranges, the attacking force would then have to rely on other types of reconnaissance aircraft to make the identification – most likely employing visual means, which would require a self-sacrificial level of effort on the part of the aircrews involved.[285]

An alternative – or perhaps rather complementary – technological approach to reconnaissance and targeting was provided by specialized satellites developed from the mid-1960s onwards. Known to the Soviets as US-A and US-P, and to the West as the Radar Ocean Reconnaissance Satellite (RORSAT) and Electronic Intelligence Ocean Reconnaissance Satellite (EORSAT), they were both less vulnerable and able to cover a much larger area more quickly than a manned reconnaissance flight could.[286] The exact capabilities of the two spacecraft are still a matter of some discussion. U.S. sources from the 1970s credit the RORSAT with the ability to detect an aircraft carrier even in difficult weather conditions and smaller ships in good weather, while later analyses are more skeptical – the exact merits of these claims are impossible to assess without access to Soviet data.[287] The EORSAT could detect shipborne radar emissions and apparently locate them to within two kilometers of the source, but like any passive sensor, it depended on the enemy using his radars in the first place.[288] Solomon makes the case

[283] There were also RM-variant Tu-16 *Badgers* equipped to provide guidance for K-10 missiles, but they lacked the range and endurance of the *Bear*. Ibid., 323. R-variant reconnaissance aircraft, both Tu-16Rs and Tu-22Rs, had radars and ECM suites, but their assigned mission as 'pathfinders' made their survival unlikely by design. See Maksim Y. Tokarev, "Kamikazes: The Soviet Legacy," *Naval War College Review* 67, no. 1 (2014), 77; Gordon and Komissarov, *Soviet Naval Aviation, 1946-1991*, 47.
[284] Solomon, "Defending the Fleet from China's Anti-Ship Ballistic Missile," 43-44; Tokarev, "Kamikazes," 77.
[285] Ibid.
[286] Asif Siddiqi, "Staring at the Sea: The Soviet RORSAT and EORSAT Programmes," *Journal of the British Interplanetary Society* 52 (1999), 399.
[287] See Ibid., 404; Solomon, "Defending the Fleet from China's Anti-Ship Ballistic Missile," 55.
[288] Friedman, *Seapower and Space*, 161.

that EMCON procedures often proved very effective in avoiding the detection and localization in peacetime.[289] Whether it would have been possible in a wartime situation for a carrier group to maintain effective EMCON for weeks at a time is, of course, a slightly different question. While full-scale *simulated* strikes against land targets were still possible from aircraft carriers observing EMCON procedures, performing an *actual* strike against an alerted opponent was yet another matter.[290]

As a 1983 intelligence report found, the RORSAT/EORSAT combination was "primarily a weapon targeting system for use during wartime or a crisis."[291] Under normal conditions, only one or two satellites of each type were in orbit, each with a lifetime of a few months at most. A full deployment in a state of tensions or a conflict was expected to be seven RORSATs and four EORSATs, with coverage focused on the most relevant portions of the Northern hemisphere.[292] Whether this expectation, which appears to have been deductively arrived at by assuming that targeting data had to be less than two hours old for a strike to have a chance of success, corresponded to actual Soviet planning remains an open question.[293] What is known is that, rather than providing two separate routes to the same target, the capabilities of the two spacecraft were supposed to be synergistic.[294] We also know that the RORSAT in particular suffered debilitating technical failures that may (or may not) have reduced Soviet confidence in the system.[295] Despite this troubled developmental history and the limitations of Soviet satellite ocean reconnaissance, the space-based ISR component of the anti-carrier complex appears to have been effective enough to justify the installation of the associated *Punch Bowl* satellite receiver on all of the most capable missile shooters and to eventually start retiring the Tu-95RT without a one-for-one replacement.[296]

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289 Solomon, "Defending the Fleet from China's Anti-Ship Ballistic Missile," 53.
290 On simulated strikes during EMCON, see Andy Pico, "History and Technology: How to Hide a Task Force," NavWeaps, http://www.navweaps.com/index_tech/tech-031.php.
291 Central Intelligence Agency/Director of Central Intelligence, *The Soviet Space Program*, July 19, 1983, CIA Historical Collection, ~~TOP SECRET~~ (declassified 1997), III-8.
292 Ibid., III-9.
293 Ibid.
294 Ibid., III-9.
295 Siddiqi, "Staring at the Sea," 409-11.
296 Friedman, *Seapower and Space*, 167.

While it lasted, the combination of more capable long-range reconnaissance assets with increasingly sophisticated missiles and strike aircraft certainly constituted significant progress in targeting U.S. task forces. It is also safe to say, however, that the basic vulnerability of the system to 'breaks' in the kill chain remained. Even the monstrous *Oscar*-class PLARK could not, by its own efforts, overcome the intractable problem of targeting and coordination that had beset its predecessors all along. Without timely inputs from RORSAT/EORSAT or another capable ISR asset, this potential apex predator was almost entirely blind. The North Atlantic was simply too vast and the sensor ranges of individual platforms too limited to eliminate such dependencies altogether.

This did not equally apply to the Mediterranean theater, where U.S. and Soviet forces often operated in close proximity to begin with. While close shadowing of CVBGs might also have been employed in the North Atlantic theater in a crisis, it was pervasive in the Mediterranean. It was there that the idea of a "battle of the first salvo"[297] took its most concrete shape. While long-range reconnaissance by *Bear*-Ds and other AVMF recce assets was frequently carried out, it was the near-constant presence of so-called Auxiliaries, General Intelligence (AGIs) and the maintenance of a surface presence in the immediate vicinity of U.S. task forces that stand out the most.[298] AGIs and other shadowing forces, collectively known as "tattletales,"[299] were also present in other theaters, but the confined nature of the Mediterranean theater meant that a Soviet preemptive attack was both more likely to succeed and possibly the only real chance to inflict severe damage on the Sixth Fleet presence before U.S. maritime supremacy would begin to tell.[300] The use of modified trawlers as well as regular warships in a role that would see them sunk in the first minutes or hours of a war may strike the Western observer as a desperate measure but, within the context of a U.S.-Soviet general war, one can see why the VMF came to consider it a practical and cost-effective solution to the difficult operational

[297] See e.g. Alan D. Zimm, "The First Salvo," *USNI Proceedings* 111, no. 2 (1985).
[298] Friedman, *Network-Centric Warfare*, 218-19.
[299] Ibid., 222-23.
[300] Central Intelligence Agency/Directorate of Intelligence, *Soviet Capabilities to Counter US Aircraft Carriers*, 24; Breemer, *Soviet Submarines: Design, Development and Tactics*, 119.

intelligence problem it faced. At the same time, the reliance on close shadowing locked the Soviet presence in the Mediterranean into the preemptive approach, with few other options.

Overall, it is still safe to say that the VMF's recce-strike complex for anti-carrier warfare remained relatively rudimentary and inflexible throughout. Its complexion changes somewhat if we think about the Soviet approach primarily in terms of a strategic defense effort that would have relied on tactical nuclear weapons, perhaps even from the outset. The CIA's assessment in the early 1970s was that the Soviet approach to ACW provided only a "limited conventional warfighting capability"[301] and was geared primarily towards tactical nuclear use. In either case, the losses that Soviet strike forces were expected to suffer were extremely high. This was apparently true even of the most capable regiments that had been reequipped with the Tu-22M2/3. According to Tokarev, "flying the Backfire in distant ocean combat" was strictly "a one-way ticket."[302] The 50 percent loss rates he mentions far exceed anything that Western nations were willing to subject their bomber crews to, even during the darkest days of World War II.[303]

Of course, the chances of survival were even more slim for any surface ships deployed in close proximity to U.S. naval forces. Although we are now in a much better position to understand the Soviet Union's naval posture on its own terms, one can still see without too much difficulty how the famous epithet of the "one-shot navy"[304] came into being. Having said that, if the scenario in question is a tactical nuclear war at sea, even a single shot might have been crippling enough to see U.S. surface forces constrained in their pursuit of offensive operations or even withdrawn from far-forward combat areas altogether, if only for political reasons.

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[301] Central Intelligence Agency/Directorate of Intelligence, *Soviet Capabilities to Counter US Aircraft Carriers*, 28-29.

[302] Tokarev, "Kamikazes," 71. While it is true that some WWII strategic bombing raids resulted in very high casualties for the attacking forces, the total loss rate of RAF Bomber Command during some of its most intense operations in 1943 and 1944 was 4.1-5.2 percent. Randall T. Wakelam, *The Science of Bombing: Operational Research in RAF Bomber Command* (Toronto: University of Toronto Press, 2009), 157.

[303] Tokarev, "Kamikazes," 78.

[304] Jan S. Breemer, "Rethinking the Soviet Navy," *Naval War College Review* 34, no. 1 (1981), 9-10.

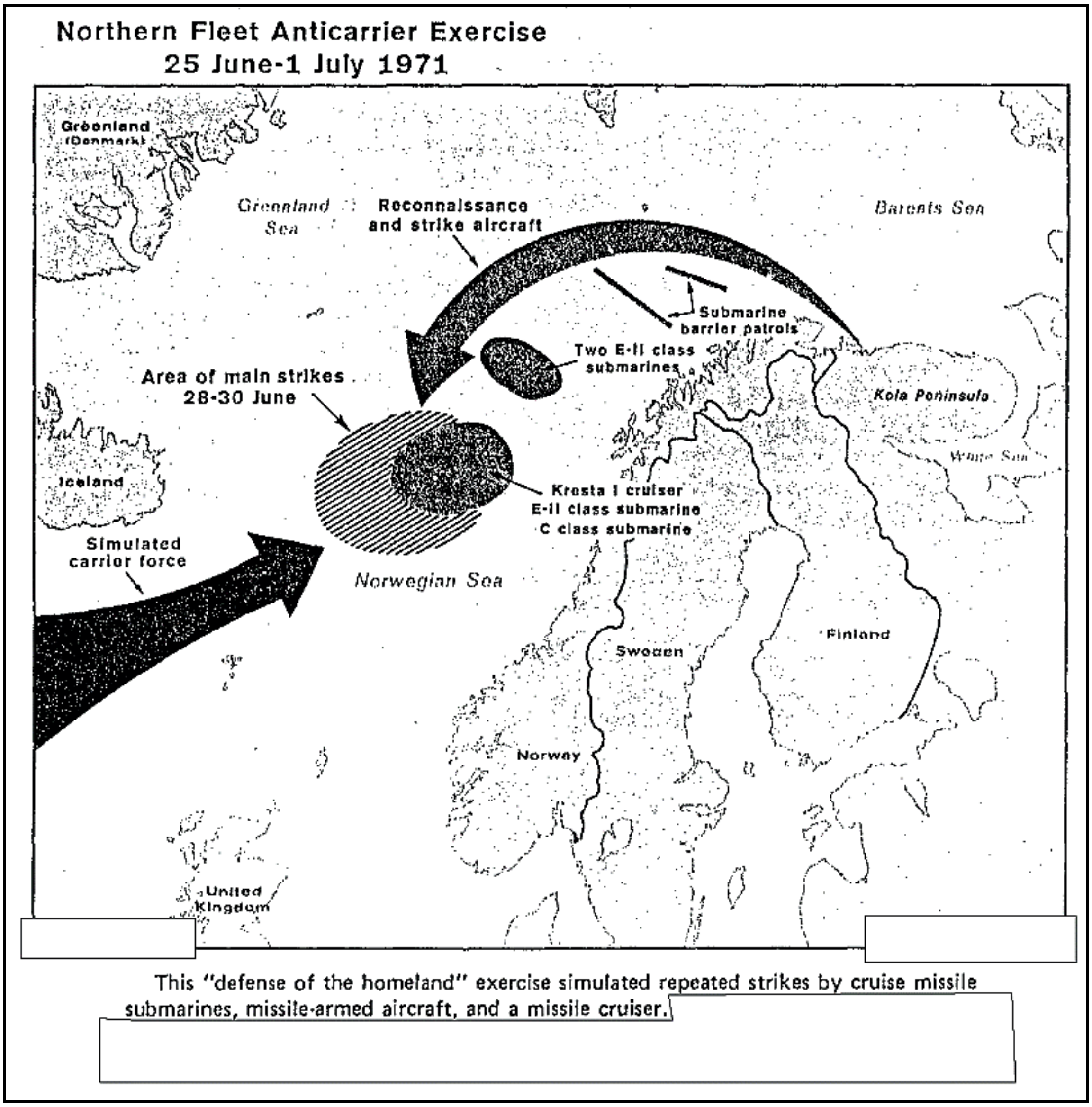

Fig. 25: Graphic representation of a Soviet combined-arms ACW exercise from a 1972 CIA intelligence report. (CIA, *Soviet Capabilities to Counter US Aircraft Carriers*, 23)

By far the most important fact to note, however, is that this fledgling and increasingly sophisticated recce-strike "system-of-systems"[305] could not possibly deal with the threat from what had quickly become the more relevant threat to the Soviet homeland: the United States' SSBN fleet. Although the USSR did make progress in oceanic surveillance and attempted to expand

[305] Barry D. Watts, "Six Decades of Guided Munitions and Battle Networks: Progress and Prospects" (Center for Strategic and Budgetary Assessments, Washington, DC, 2007), 31.

its oceanic cueing and targeting system to SSBNs, an ASW equivalent to the anti-carrier complex was nowhere in sight.[306] As the number of U.S. ballistic missile submarines swelled to an eventual forty-one, as the ranges of the fleet ballistic missiles they carried increased – from 1,200 nmi in the *Polaris* A1, to 2,500 nmi in the A3, to 3,200 nmi in a reduced-payload *Poseidon* – and the number of warheads each missile carried grew from one in the A1 to up to fourteen in the *Poseidon*, it became obvious that an effective strategic defense and damage limitation effort was slipping further and further out of reach. Whatever successes the massive ACW program had produced, they were unlikely to be replicated against the much more elusive, and at the same time more severe, nuclear threat from under the sea. We will return to this point in the final part of the chapter. In the meantime, even the impact of the combined-arms sea denial posture on the U.S. carrier force is worthy of closer examination, however – not least because it was moderated by a series of techno-doctrinal adaptations that once again changed the balance between attacker and defender in important ways.

5.5.2 Twilight of the carrier force?

The 1960s and 1970s were a critical period in the evolution of the U.S. carrier force. The central role the carriers had briefly played in strategic deterrence withered away as quickly as it had emerged. Towards the other end of the conflict spectrum, the flattops once again demonstrated their considerable value in crisis response and limited war scenarios. What the heavy reliance on naval air power during the Vietnam War – specifically from 1964 to 1972 – partially obscured, however, was that the relevance of sustained investments in a large carrier fleet was looking increasingly tenuous as far as a possible shooting war with the Soviet Union was concerned.[307] Although presence and limited war were seen as worthy pursuits for the carrier

[306] Friedman, *Network-Centric Warfare*, 223.
[307] The Vietnam War resulted in a total of seventy-one individual carrier deployments, involving seventeen different carriers and sixteen air wings from both the Pacific and Atlantic Fleets. The brunt of the effort was borne by three carriers that went through seven deployments each (*Hancock*, *Oriskany*, and *Ranger*) and five that deployed six times each (*Constellation*, *Coral Sea*, *Bonhomme Richard*, *Enterprise*, and *Kitty Hawk*). On the

fleets, the fact remains that the long-term sustainability of a posture centered on CVAs was not assured. The threat to the relevance of carrier forces was long-term, rather than immediate. At least while the limited war in Vietnam loomed large, "[t]he debate was less over the fundamental worth of carriers in principle and more over the numbers needed."[308] Even the much-maligned 'whiz kids' in Robert McNamara's Pentagon were not trying to do away with the attack carriers altogether.[309] But from the early 1970s onward, the principle of replacing CVAs one-for-one would no longer apply. As a result, the number of carriers would begin to fall, initially from fifteen to thirteen.[310] Based on the Air Force's assessment, which we can take to be as hostile towards naval air as was reasonably possible within the U.S. defense establishment, we can also conclude that eight carriers were the politically conceivable minimum at the time. In other words, the very worst case from the Navy's perspective might have been a dramatic reduction in attack carrier strength of 50-55 percent over a 10-15 year period. Had it not been for the continuous, large-scale use of carrier air power in Southeast Asia, the downward pressure on the force structure would probably have been pronounced enough to bring about at least part of this reduction. Against the backdrop of Vietnam, however, "OSD's analytical bark was worse than its budgetary bite"[311] and the established Navy force structure centered on fifteen attacks carriers remained unchanged. Thus, Pay's conclusion that the new generation of nuclear-powered carriers that would eventually form the backbone of the Air-Navy of the 1980s "owed their survival"[312] to the conflict in Southeast Asia is hardly an exaggeration.

The underlying issues that had invited close scrutiny of the carrier-centric posture in the first place did not end there, however, and they still boded ill for the long-term. It is true

whole, this made (and still makes) Vietnam the most intense and sustained use of carrier air power of the post-World War II era. See, John B. Nichols and Barrett Tillman, *On Yankee Station: The Naval Air War over Vietnam* (Annapolis, MD: Naval Institute Press, 1987), 171.

308 Richard Hegmann, "In Search of Strategy: The Navy and the Depths of the Maritime Strategy" (Doctoral Thesis, Brandeis University, September 1990), 407.

309 The outlines and main tenets of McNamara's analytically focused approach to defense planning are discussed at length in Alain C. Enthoven and K. Wayne Smith, *How Much is Enough? Shaping the Defense Program, 1961-1969* (Santa Monica, CA: RAND, 1971).

310 Hegmann, "In Search of Strategy: The Navy and the Depths of the Maritime Strategy," 411.

311 Ibid., 420.

312 John Pay, "Full Circle: The US Navy and Its Carriers, 1974-1993," in *Seapower: Theory and Practice*, ed. Geoffrey Till (London: Frank Cass, 1994), 125.

that naval aviators over North Vietnam had to face an exceptionally dense and increasingly unforgiving air defense system based on current Soviet technology. In fact, "[s]trike groups had to penetrate what at that time was the most intense and modern air defense environment in existence."[313] But carrier operations off North Vietnam were still an exercise in largely unopposed power projection right up to the coast.[314] The value of the carriers in such scenarios was not in doubt. However, if the comparative advantage of the Navy's capital ships in transoceanic power projection flowed primarily from their ability to operate with impunity a mere 90 nmi off the enemy's coast, their viability in higher-intensity contingencies was dubious at best.[315] At a more fundamental level, then, the carrier-centric posture was "threatened by a naval warfighting strategy that saw CVAs as irrelevant to general war."[316] If the carrier force no longer provided an offensive edge vis-à-vis the Soviet Union, and was reduced to providing a handy complement to land-based tactical air forces in lower-intensity conflicts, would the political level still see the need for fifteen carrier battle groups and, if so, for how long? Hence, it is unsurprising that the question of survivability once again came to the foreground, as soon as the Navy began to refocus its carriers on scenarios involving combat at sea against the VMF. This led to a crisis of sorts, but one that was ultimately mitigated rather successfully and with the carrier's potential to once more embrace a more offensive role still largely intact. In this section we will trace the developments and decisions that led to this outcome.

As discussed in the previous chapter, the debate about carrier vulnerability had a long pedigree, even during the early Cold War. In fact, what Vlahos calls the "panacea-weapon threat"[317] – the threat posed by cheap missiles to expensive capital ships – predated the first

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[313] James L. Holloway, "Tactical Command and Control of Carrier Operations," Colloquium on Contemporary History No. 4, https://www.history.navy.mil/research/library/online-reading-room/title-list-alphabetically/c/command-control-air-operations.html#Holloway.
[314] For a detailed review of carrier strike operations against North Vietnam, see e.g. Nichols and Tillman, *On Yankee Station*, esp. 99-116. See also John Darrell Sherwood, *Afterburner: Naval Aviators and the Vietnam War* (New York, NY: New York University Press, 2004); John Darrell Sherwood, *Nixon's Trident: Naval Power in Southeast Asia, 1968-1972* (Washington, DC: Naval Historical Center, 2008).
[315] According to Holloway, a deck-load ("Alpha") strike could be launched from as close as 30 nmi from the coast to maximize ordnance load. Holloway, "Tactical Command and Control of Carrier Operations."
[316] Hegmann, "In Search of Strategy: The Navy and the Depths of the Maritime Strategy," 423.
[317] Michael Vlahos, "A Crack in the Shield: The Capital Ship Concept Under Attack," *Journal of Strategic Studies* 2, no. 1 (1979), doi:10.1080/01402397908437013, 54.

aircraft carriers by half a century. In the 1950s and 1960s, the now diminished role of the torpedo as the erstwhile 'panacea weapon' was taken over by the anti-ship missile.[318] The existence of such missiles by itself was not sufficient to reshape the debate, however. There are three main reasons why the debate about the survivability and long-term viability of carrier-centric forces intensified considerably during the second phase of the Cold War at sea, and in the immediate post-Vietnam era in particular. One of those reason was the increasing virulence of the Soviet missile threat, which also saw its first demonstration on the world stage. Among naval officers and outside experts, the ASM threat had registered much earlier, but the event that was probably most significant in amplifying it was the sinking of the INS *Eilat* shortly after the Six-Day War. A British Z-class destroyer of World War II vintage, sold to Israel in 1955, the *Eilat* was operating in the Mediterranean off the Sinai Peninsula on 21 October 1967, when she was engaged by Soviet-provided *Komar*-class missile boats and sunk by three successive P-15 (SS-N-2 *Styx*) missile hits.[319] This made her the first vessel in the history of naval warfare to be lost to ASMs in combat. With the sinking of the *Eilat*, the ASM threat and its possible implications began to seep into the public consciousness.[320] The story did not end there, of course: The 1973 Battle of Latakia, in which Israeli missile boats sank all five of their Syrian opponents, showed that the capabilities of the *Styx* could be resoundingly defeated by a mixture deliberate planning, good tactics, and electronic countermeasures.[321] At the same time, Latakia also served to reinforce the expectation that missile combat at sea would be highly lethal.

The second source of renewed concern was the very visible susceptibility of the carrier fleet to accidental damage resulting in major loss of life. The 1960s saw three large and well-

[318] Ibid., 55.
[319] See Abraham Rabinovich, *The Boats of Cherbourg* (Annapolis, MD: Naval Institute Press, 1997), chapter 1.
[320] The Indo-Pakistani War of 1971, which saw the use of P-15 missiles by the Indian Navy, is also mentioned as a contribution factor. See Alva M. Bowen, "Aircraft Carrier Survivability: The Influence of Size" (Issue Brief No. IB82084, Congressional Research Service, Washington, DC, 1982), 5.
[321] Rabinovich, *The Boats of Cherbourg*, esp. chapter 9. The missile was, in fact, rather primitive. See e.g. Defense Threat Informations Group, "Russian/Soviet Sea-Based Anti-Ship Missiles," Special Report derived from JED's "Destroyers & Carrier Killers" Defense Threat Informations Group, https://de.scribd.com/document/50289372/Russian-Soviet-Naval-Missiles.

publicized carrier fires, all of them cause by malfunctions or mishandling of munitions or pyrotechnics. The 1966 fire aboard USS *Oriskany* killed 44 sailors and left 156 injured.[322] The 1967 *Forrestal* fire was the worst of the three, killing 134 and injuring 161.[323] The USS *Enterprise* fire in 1969 killed 28 and injured 314.[324] All of the conflagrations involved fueled aircraft and live ordnance; the *Enterprise* fire resulted in eighteen separate explosions, including a number of 500-pound bombs detonating on the flight deck.[325] All three carriers required extensive repairs, but none of them came close to suffering mortal damage. Despite the deficiencies in munitions handling, firefighting and damage control that these incidents revealed, the fleet carriers had once again shown their ability to survive one of the worst possible scenarios on a ship laden to the hilt with jet fuel and ammunition: an inferno on the flight deck. What appears to have stuck in the public mind, however, was the ease with which a carrier could turn into a bonfire and be put out of action even in low-threat environments, and by events far less malicious that a Soviet missile attack. Inevitably, the carrier fires were also picked up on by the Navy's bureaucratic competitors. An anecdote related by ADM James L. Holloway, later CNO from 1974-1978, is quite revealing in this regard:

> "In November 1967, as I was leaving a meeting of the Joint Navy-Air Force Technical Standards Committee in the OpNav conference room at the Pentagon, an Air Force general turned to me (I was in blue service uniform), pointed to a large photograph of a Forrestal-class aircraft carrier hanging on the wall, and said, 'Nice picture. What kind of ship is that?' I answered, 'That's an aircraft carrier.' He paused, smiled smugly, and said, 'Oh yes, I didn't recognize it. It isn't on fire!'"[326]

This points us in the direction of the third reason, namely, that the challenges posed by techno-doctrinal developments and contemporary events were amplified by interservice rivalry and forged into a bureaucratic weapon to undermine the carrier's future viability. A new nuclear-

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[322] Don Moser, "A Carrier's Agony – Hell Afloat," *LIFE Magazine*, November 25, 1966, 103-19.
[323] Judge Advocate General, "Investigation of Forrestal Fire" (Washington, DC, 1969), https://www.jag.navy.mil/library/jagman_investigations.htm.
[324] Judge Advocate General, "USS Enterprise Fire" (Washington, DC, undated), https://www.jag.navy.mil/library/jagman_investigations.htm.
[325] Ibid., ix.
[326] James L. Holloway, *Aircraft Carriers at War: A Personal Retrospective of Korea, Vietnam, and the Soviet Confrontation* (Annapolis, MD: Naval Institute Press, 2007), 250.

powered aircraft carrier was one of the biggest line items in the U.S. defense budget and, as such, made an excellent target for force reductions that might translate into additional spending on other priorities – not least because every carrier cut from the force structure also meant that fewer surface escorts were required. Holloway, who was later put in charge of defending the nuclear carrier from bureaucratic and political attacks, leaves little doubt about the fact that the Navy took this threat extremely seriously.[327]

By the time of the Congressional Hearings on the funding of CVAN-70, which would become the USS *Carl Vinson*, carrier vulnerability had become a real bone of contention, with some members of Congress vigorously arguing the case for smaller, cheaper carriers – a theme that would repeat itself during the mid-1970s, with equally limited consequences.[328] The Navy, for its part, had to acknowledge that the aircraft carrier was vulnerable to ASM attack, just like other surface units, but it also managed to spin the issue in such a way as to reaffirm the role of the carrier, including in a major war:

> "Although the anti-ship missile poses a threat to the carrier, this is poor logic upon which to base a reduction of carrier force levels. If our carriers cannot survive the Soviet missile threat then neither can any other surface ship, and our national strategy depends on that ocean shipping.
>
> The Soviet antiship cruise missile forces are, however, most vulnerable to our attack carriers. Therefore, our attack carrier force must be strong enough to survive and defeat the Soviet missile threat to assure the continued use of the ocean lines of support which are absolutely essential to the success of our national strategy.
>
> By sustaining a modern attack carrier force in being, the U.S. Navy can maintain naval supremacy over the USSR and all other nations supported by the Soviets as well as provide control of the sea where it becomes necessary in the national interest."[329]

Ultimately, this conservative argument carried the day, although it is probably also fair to say that the "putting too many eggs in too few baskets"[330] argument could not be conclusively refuted either. In fact, dangerous illusions about what could be expected of the carrier had already taken hold at the level of public perception. As Vlahos puts it, "the image of the Capital

327 Ibid., 251.
328 Ibid., 256-59. On the 1970s small carrier debate, see Friedman, *U.S. Aircraft Carriers*, 323-33.
329 United States Congress/Joint Senate-House Armed Services Committee, "CVAN-70 Aircraft Carrier: Joint Hearings" (U.S. Government Printing Office, Washington, DC, 1970), 84-85.
330 Bowen, "Aircraft Carrier Survivability: The Influence of Size," 2.

Ship has become irrevocably confused with the popular demand for invulnerability. So great a ship, at such great cost, can only be justified, it seems, if it is invincible."[331] In truth, the expectation that carriers could be reliably shielded from harm in a general war was never realistic at any point during the Cold War at sea.

At the same time, however, the large-deck carriers were still highly survivable compared to smaller surface units. The VMF apparently expected that it would take up to twelve conventional missile hits – but only a single nuclear hit, which once again serves to demonstrate the attraction for the inferior party of escalating to the tactical nuclear level – to reliably put a carrier out-of-action.[332] While the ASM's promise of at least a "theoretical single-hit kill probability"[333] was intact with regard to smaller surface ships, which could conceivably be sunk by an (un)lucky conventional hit, this was a most unlikely outcome for a Cold War-era attack carrier. At the same time, however, the question of survivability cannot, by any means, be reduced to platform type alone. There can be important differences even within the category of large-deck attack carriers and, even more importantly, in the 'defense-in-depth' tactical system that surrounds them. Survivability is clearly not a constant, even for ships of a more or less established type, and sensitive to both technological and doctrinal adaptations.

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[331] Vlahos, "A Crack in the Shield," 65.

[332] Tokarev, "Kamikazes," 77. The U.S. assessment with regard to the effectiveness of TNW was much the same. See Bowen, "Aircraft Carrier Survivability: The Influence of Size," 8. Damage assessments involving conventional weapons are altogether more complex and rather sensitive to the assumptions that are made.

[333] Vlahos, "A Crack in the Shield," 55.

Fig. 26: The USS *Enterprise* is burning off the coast of Hawaii, 14 January 1969. The conflagration was set off by an accidental warhead detonation of a 5-inch unguided rocket on the flight deck and quickly turned into the third major munitions fire aboard an attack carrier in as many years. (*U.S. Navy*)

What measures were taken, then, to ensure that the carrier would remain a useful instrument of naval power projection into the 1980s and beyond? In the remainder of this section, we will look at two basic types of counter-ASM adjustments: those in passive defense of the carrier and those in battle group active defense, both of which took place at more than one level. The first and most obvious way of thinking about carrier survivability is in terms of the passive defense features of the ships themselves – that is, the ability of the carrier to sustain battle damage and remain in the fight or, at the very least, survive the engagement. Here, at least some of the desired improvements could, in fact, be attained simply by building bigger carriers, which – and not to anyone's surprise – suited the offensive-minded Air-Navy well. The tonnage of Cold War-era carrier classes increased from 45,000 tons in the *Midway* design, to 60,000 tons in the *Forrestal*, to 80,000 tons in the *Kitty Hawk*, to 93,000 tons in the *Enterprise*, to 100,000 tons in the

Nimitz-class.[334] Of course, survivability was only one of a number of variables that drove this continuous upsizing. In some cases, such as the increased magazine size and aviation fuel storage of *Nimitz*-class carriers, other priorities were found to be more important. In addition, the flight deck itself – and, to an extent, the hangar deck below – remained the most vulnerable part of the ship, due to its particular exposure and the inevitable presence of large amounts of jet fuel and ordnance in a wartime situation. Overall, though, there is no doubt that passive defenses improved considerably as a result of increased size. An assessment of the possible advantages of smaller, more numerous, but less survivable carriers over the large-deck carrier concept is more complex.[335] It is difficult to argue that the U.S. Navy's continued commitment to the *status quo* of fewer, ever larger carriers was altogether unreasonable. At the same time, alternative concepts might also have been viable, if seriously attempted.

What is abundantly clear is that any situation in which sheer size might – or might not – save a carrier from destruction had to be avoided in the first place, to the greatest extent possible. Hence, a second category of measures that can be described in terms of passive defense was designed to reduce the effectiveness of the Soviet recce-strike complex. We have already touched upon the EMCON practices introduced during the 1960s and 1970s. While these were undoubtedly important, it was the combination of several approaches involving deception, dispersal and concealment that was expected to safeguard the valuable CVAs and ensure that their vulnerabilities remained at an acceptable level. Angevine's discussion of the *Haystack* concept of hiding the carrier's position within the task group formation shows that these efforts date back to the late 1950s, when nuclear use was temporarily considered more likely.[336] The main achievement of the concept in exercises was to prolong the survival of the carriers by a few crucial hours, but not to render them truly *survivable* in a more prolonged conflict.[337] In the late 1960s, the threat posed by *Echo*- and *Charlie*-class submarines led the U.S.

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[334] For details of each of these designs, see Friedman, *U.S. Aircraft Carriers*, esp. chapters 9, 12, and 14; Stefan Terzibaschitsch, *Flugzeugträger der U.S. Navy: Band 1: Flottenflugzeugträger* (München: Bernard & Graefe Verlag, 1986), 222-43; 246-308.
[335] Bowen, "Aircraft Carrier Survivability: The Influence of Size," 9.
[336] Angevine, "Hiding in Plain Sight," 3-6.
[337] Ibid., 5-6.

Navy to take these efforts further and, *inter alia*, strengthen acoustic deception to avoid successful detections whenever possible. These efforts, apparently centered on the Pacific Fleet and known as *Project Uptide*, appear to have been rather successful, although it is less clear how widely they were adopted in the fleet.[338] The USN also learned how to counter the new capabilities provided by satellite-based ocean reconnaissance, tracking EORSATs and RORSATs continuously and directing forces to implement deception and concealment measures.[339] To what extent these measures degraded the performance of Soviet ISR is not known, but there is a body of anecdotal evidence to suggest that concept development, specialized hardware, and repeated exercises were well worth the investment.

At the same time, defending carriers against missile attack also depended on the U.S. Navy's development of its own aerial reconnaissance-strike complex of sorts, to provide situational awareness and direction to battle groups' active defenses. These defenses were arrayed in depth, in three main layers: the *outer/combat air patrol* layer, the *area defense/surface-to-air missile* layer, and the *ship point defense* layer.[340] Perhaps the most critical element of the entire system was airborne early warning (AEW). With long-range ASMs as the main threat, this was the only approach that could provide adequate reaction times against Soviet strike aircraft in particular. Early experiments with carrier-based AEW started even during World War II and involved a number of modified TBM *Avenger* torpedo bombers. During the 1950s and into the early 1960s, the similarly configured AD *Skyraider* took over this task. Starting in 1958, the purpose-built E-1 *Tracer* considerably improved upon the capabilities of these early platforms. Finally, the 1960s saw the prolonged development period of what would eventually become the ultimate airborne early warning and control (AEW&C) aircraft: the Grumman E-2 *Hawkeye*,

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338 Ibid., 7-10.

339 Solomon, "Defending the Fleet from China's Anti-Ship Ballistic Missile," 52-53. At the same time, it should also be noted that EORSAT/RORSAT provided much of the impetus for the U.S. anti-satellite (ASAT) program, which thus belongs into the portfolio of active defense measures that eventually became available to the fleet – in this case courtesy to an Air Force effort. See e.g. Dwayne A. Day, "Smashing RORSATs: The Origin of the F-15 ASAT Program," *The Space Review*, 11 January 2010, http://www.thespacereview.com/article/1540/1.

340 See e.g. Chester C. Phillips, "Battlegroup Operations: War at Sea," *Johns Hopkins APL Technical Digest* 2, no. 4 (1981), 299; Ronald S. Farris and Richard J. Hunt, "Battle Group Air Defense Analysis," *Johns Hopkins APL Technical Digest* 2, no. 4 (1981), 302-03; A. A. Tinajero, "Fleet Air Defense: A Naval Problem" (Congressional Research Service, Washington, DC, 1979), 14-18.

the latest (E-2D) variant of which is still being built in 2019. The E-2 did not initially perform very well and the program actually was on the brink of failure for much of the 1960s. The E-2A version had to be heavily modernized almost as soon as it entered service and the mature E-2C did not see full-scale introduction until the mid-1970s.[341] Notwithstanding these trials, AEW and the concept of the airborne combat information center (CIC) formed the backbone of fleet air defense against an opponent armed with long-range ASMs.[342] As we have seen, the distant layer of the task group air defense system – the *combat air patrol zone* – was successively extended outward. Even with the somewhat limited capabilities of the AEW variant *Skyraider*, the AD-5W, the surveilled zone soon extended at least 200 nmi from the center for the task group.[343] The mature E-2C could make detections at ranges of up to 250 nmi from the aircraft, which would itself be on station 50 nmi or more from the center, and track 300 targets simultaneously.[344] The E-2s were – and, as a matter of fact, still are – central to the integrity of the outer layer, keeping CAP fighters organized and directing them in the face of Soviet deception attempts.[345]

Equally important was the platform that would do the fighting at the outer edges of the battle group's defense-in-depth. As was the case with the AEW system, the process of acquiring a fleet defense fighter that fit the bill was drawn-out and painful – even more so, in fact, than the E-2s road to real capability. The first of three main attempts at covering the growing requirements of fleet air defense was an aircraft known as the F6D *Missileer*.[346] A subsonic, low-performance 'missile truck,' the F6D was to carry a complement of six long-range *Eagle* air-to-air missiles. The *Eagle/Missileer* package would have complemented the *Typhon* long-range SAM, and together the two systems would have constituted a massive improvement in defending against Soviet saturation raids.[347] However, as we have seen in Chapter 4, *Typhon*

[341] Friedman, *Fighters Over the Fleet*, 328-29.
[342] On the CIC concept, see Friedman, *Network-Centric Warfare*, 57-62. On the central role of the new Naval Tactical Data System in making the airborne CIC possible, see Friedman, *Fighters Over the Fleet*, 328-29.
[343] Ibid., 293; Tinajero, "Fleet Air Defense," 20.
[344] Friedman, *Fighters Over the Fleet*, 329.
[345] On overall battlegroup AAW coordination, see Chester C. Phillips and Edward C. Prettyman, "Battle Group Antiair Warfare Coordination," *Johns Hopkins APL Technical Digest* 2, no. 4 (1981), 308-13.
[346] Friedman, *Fighters Over the Fleet*, 312-17.
[347] Ibid., 317.

was eventually canceled in 1963 over its excessive costs. The same fate befell the airborne *Eagle/Missileer* component, which was axed almost immediately by the incoming Kennedy administration. This left the Navy with a very considerable shortfall in fleet air defense capabilities. Instead of a balanced force of *Missileers* and F-4 *Phantoms*, the F-4 would now have to fill a role it was not designed for. As far as the long-range CAP requirement was concerned, SECDEF McNamara famously placed his hopes in the multi-service TFX program, later designated the F-111, with the explicit intention of cutting acquisition costs.[348] The F-111B naval variant proved to be overweight and underpowered, and was itself canceled in 1967, after all tweaks had proved insufficient to turn it into a truly capable and cost-effective platform.[349] What remained of the TFX debacle was a less-than-stellar engine, the new AWG-9 radar, and a long-range air-to-air missile (AAM), which would be known as the AIM-54 *Phoenix*. For a brief period, the Navy even considered going back to the original concept and turning its new A-6 *Intruder* medium attack aircraft into a subsonic fleet defense missile-carrier.[350] This intriguing possibility was soon abandoned in favor of a completely new, supersonic fighter program. By the early 1970s, this VFAX/VFX concept had begun to morph into the consummate fleet defense fighter of the Cold War: the F-14 *Tomcat*. All told, the Navy had lost almost a decade in which the relatively short-legged F-4 *Phantom* had to hold the line in the face of repeated, dramatic shifts in acquisition policy. It is fascinating to consider how this process would have unfolded if the AVMF had managed to successfully bring the Tu-22 *Blinder* and Kh-22 missile into frontline service *en masse* in the early-to-mid 1960s. As it turned out, both sides struggled almost equally in their attempts to bring mature, high-end systems into series production at bearable cost – a familiar story, if ever there was one.

The F-14 entered service in 1974, far over budget and still subject to controversy, but with very considerable potential for growth. Together with the E-2C, it formed the frontline in battlegroup defense for the next 30 years. In the 1970s, Tinajero called the E-2/F-14/AIM-54

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[348] Mark A. Lorell and Hugh P. Levaux, *The Cutting Edge: A Half Century of U.S. Fighter Aircraft R & D* (Santa Monica, CA: RAND, 1998), 96-102; Mark A. Lorell et al., *Do Joint Fighter Programs Save Money?* (Santa Monica, CA: RAND, 2013), 18-20.
[349] Friedman, *Fighters Over the Fleet*, 346-48.
[350] Ibid., 347.

combination "the most critical elements in the carrier air defense system."[351] Both the *Tomcat* as a platform and the *Phoenix* as its main payload had significant flaws, however. The TF-30 engines in the F-14A were not only on the weak side, but also prone to frequent mechanical problems as well as compressor stalls, which could be irrecoverable, resulting in ejection or death of the crew.[352] The *Phoenix* easily had the longest range of any AAM at the time, in excess of 60 nmi, but its powered flight phase was relatively short, its susceptibility to ECM raised question marks, it produced a visible smoke trail, and the effectiveness of its continuous rod (CR) warhead in likely fleet air defense scenarios was not assured. In fact, the General Accounting Office concluded that the Navy's own testing "showed that the effectiveness of the F-15A/*Phoenix* is marginal at best against the current and postulated threat,"[353] even as late as 1979. The details were withheld, but we can surmise that this referred to supersonic ASMs in particular.[354] Originally, the Navy had considered buying an even heavier missile with a second, terminal-phase rocket booster. The *Phoenix* did away with the second stage, which left it with much less energy to spare for radical course adjustments and made it less effective against fast and maneuverable targets.[355] Meanwhile, the CR warhead, which was fairly typical at the time, might not have been powerful enough to inflict catastrophic damage on a heavy, bomber-sized aircraft like the *Badger* or *Bear*.[356] A damaged aircraft will likely be forced to abort a long-range mission and may still be lost in any case, but only if there is sufficient structural damage. The missile was even less likely to be effective against a supersonic missile, because the CR design depended on exact lateral placement at the point of detonation, which is more difficult to achieve against a smaller, faster target – if that target could even be reached in the first place.

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351 Tinajero, "Fleet Air Defense," xxi.

352 See e.g. Bert H. Cooper, "The Navy F-14/Phoenix Weapon System: A Background Report on Major Program Developments, 1973-76" (Congressional Research Service, Washington, DC, 1976), 19-24.

353 U.S. General Accounting Office/Comptroller General, "Digest of Major Weapon System Reports Issued January and February 1979: Report to the Congress of the United States" (General Accounting Office, Washington, DC, 1979), 72.

354 The report states that the missile was adequate against the original design threat, but not the "current primary threat." ibid., 75.

355 Friedman, *Fighters Over the Fleet*, 314; 346.

356 Sam Waggener, "The Evolution of Air Target Warheads," Paper presented at the 23rd International Symposium on Ballistics (unpublished manuscript, April 2007), 69. The same limitation applied to all naval anti-air missiles at the time, AAMs and SAMs both.

As a result, the U.S. Navy discarded the CR design in later designs, including in the late-Cold War AIM-54C version of the *Phoenix*.

Fig. 27: A F-14A *Tomcat* from VF-111 (*Sundowners*) launches an AIM-54 *Phoenix* air-to-air missile. *(U.S. National Archives)*

Overall, the introduction of the E-2/F-14A/AIM-54 combination extended the Navy's battle group defenses further out and provided great potential for the future. Having said that, it began to come into its own only towards the end of this second phase, and its wartime effectiveness in its 'maritime air superiority' design scenario has remained untested. Nonetheless, after a long and grueling bureaucratic battle, the service now had a credible outer defensive layer to counter AVMF saturation attacks, ideally before they could fully materialize. As Tokarev shows, the Soviet side took the threat posed by this outer layer extremely seriously and expected grievous losses, which is itself quite significant.[357] Fiszer and Gruszczynski agree that

[357] Tokarev, "Kamikazes," 74.

"the E-2 and F-14 tandem became a nightmare for Soviet long-range reconnaissance and missile-carrying aircraft for years to come."[358] As was the case in the U.S. Navy threat assessment, the AVMF had to credit its opponent with the full theoretical capability inherent in those systems – even if it remained unrealized during most of the second phase of the Cold War at sea.

The next layer of a CVBG's defenses was the intermediate *SAM engagement zone*. Here, the cancellation of *Typhon* caused a real capability gap with regard to countering large saturation attacks in particular. The main limitation of the existing *Terrier*, *Tartar* and *Talos* systems – although not the only one – was the inability of their radars to track and engage a large number of targets simultaneously.[359] This imposed debilitating limitations on the practical rate of fire and made saturation a very real possibility. If we add in the fact that the main problem the shipboard SAM batteries had to deal with might very well have been leaking *missiles*, rather than aircraft – and that their kill probability against smaller, faster objects was bound to be lower – we can see that the inability to bring the *Typhon* to fruition was a serious set-back at the time. The most impressive part of the system on paper was the SPG-59 radar, which allowed for simultaneous tracking and missile guidance against up to 20 targets.[360] In reality, however, the radar proved overly expensive and unreliable during the prototype stage, which directly led to the program's cancelation. As Gussow and Prettyman conclude, "[t]he concepts, so brilliantly put forward by the Typhon team, could not be translated successfully into hardware by existing U.S. industries."[361] The *Typhon*'s SCANFAR derivative, which was installed aboard the nuclear-powered cruiser USS *Long Beach* and USS *Enterprise*, was equally unsatisfactory. The near-term solution to fill in the resulting gap was a totally reconfigured and considerably more advanced missile built into the existing *Tartar* airframe: the RIM-66 Standard Missile. With better range, reliability, and a secondary capability against surface targets, this was a significant upgrade to existing capabilities.

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[358] Fiszer and Gruszczynski, "Carrier Killers," 43.
[359] Thomas C. Hone, Douglas V. Smith, and Roger C. Easton, "Aegis – Evolutionary or Revolutionary Technology?," in *The Politics of Naval Innovation*, ed. Bradd C. Hayes and Douglas V. Smith (Newport, RI: U.S. Naval War College/Center for Naval Warfare Studies, 1994), 46-47.
[360] Ibid., 46.
[361] Milton Gussow and Edward C. Prettyman, "Typhon – A Weapon System Ahead of Its Time," *Johns Hopkins APL Technical Digest* 13, no. 1 (1992), 89.

At the same time, however, the pressing need for an effective shipborne counter against large missile raids remained. Therefore, another ambitious development program was launched, with much higher stakes than the Navy had faced a decade earlier and a determination to avoid making the same mistakes all over again. The fact that this Advanced Surface Missile System (ASMS) program – known as *Aegis* after 1969 – turned into such a significant and long-lasting success makes the fact that it came close to failing as well all the more interesting. Concerns over cost-effectiveness and a prolonged dispute over the need for nuclear-powered escorts saw *Aegis* almost continually teetering on the brink during the early 1970s.[362] It was only in 1975 that the program's future financing was finally assured – much to the credit of its chief architect, RADM Wayne Mayer, but also after President Ford himself had made it clear that he was taking an interest.[363] The advanced surface AAW system that was starting to take on a very concrete shape at this time had three main elements: (1) the SPY-1 phased array radar, which made it possible to track several hundred targets at once; (2) an entirely novel battle management system designed specifically to counter saturation raids with a hitherto unseen degree of automation, and (3) the improved SM-2 missile and related equipment.[364] Once these components had been forged into a reliable 'system of systems,' *Aegis* was perfectly suited to accomplish what its predecessors could not: killing bombers and ASMs *en masse*.

The fact that this resulted in one of the Cold War's most palpable capability gains for U.S. Navy surface forces is not in any doubt. Nevertheless, we still need to ask how much of a difference *Aegis* really made in reshaping the competition in the U.S. Navy's favor. In this respect, the main thing to remember is that the first *Aegis*-equipped cruiser, USS *Ticonderoga* (CG-47), was not commissioned into the Navy until 1983. All but three ships of her class of twenty-seven were commissioned after 1985. Hence, the impact of *Aegis* on naval operations

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[362] Hone, Smith and Easton, "Aegis – Evolutionary or Revolutionary Technology?," 49-56.
[363] Ibid., 56.
[364] On *Aegis* and its technical characteristics, see e.g. Tinajero, "Fleet Air Defense," 55-57. James D. Flanagan and George W. Luke, "Aegis: Newest LIne of Navy Defense," *Johns Hopkins APL Technical Digest* 2, no. 4 (1981), 237-42; Chester C. Phillips, "Aegis: Advanced Multi-Function Array Radar," *Johns Hopkins APL Technical Digest* 2, no. 4 (1981), 246-49; Ronald O'Rourke, "The Aegis Anti-Air Warfare System: Its Principal Components, Its Installation on the CG-47 and DDG-51 Class Ships, and Its Effectiveness" (Congressional Research Service, Washington, DC, 1984); Kenneth W. O'Haver et al., "Radar Development for Air and Missile Defense," *Johns Hopkins APL Technical Digest* 34, no. 2 (2018), 141-43.

was only beginning to alter the dyadic offense-defense balance at sea and Cold War tensions had begun to fade by the time that *Aegis*-equipped ships became available in numbers. Given the much larger number of ships that could profit from it in the near term, the so-called New Threat Upgrade (NTU) for existing *Terrier* and *Tartar* equipped ships could actually have been more immediately significant than *Aegis*.[365] At things went, the NTU – which was designed to allow forty-one legacy cruisers and destroyers to fire the SM-2 and combat large raids much more efficiently – came too late as well and would have begun to significantly change the AAW balance around the same time as *Aegis*.[366] Moreover, it should be emphasized that even *Aegis* and NTU did not provide anything like a *perfect* defense against large numbers of advanced ASMs. Saturation became much more difficult to achieve but was still possible.[367] Hence, factors like raid size and geometry, timing, and the effectiveness of Soviet ECM remained extremely important. Only under ideal circumstances – the rarest of states in any wartime scenario – could the first and second layer be expected to catch *all* the incoming missiles.

This brings us to the final layer of the CVBG's air defenses: the *close-in defense zone*. An effective last-ditch active defense was critical if the number of 'leakers' was to be whittled down to such an extent that a battle group could remain fully combat-capable and coherent even in the aftermath of a major saturation attack. The fact that at least some ASMs – perhaps a significant portion of them, especially until *Aegis* ships became available in numbers in the late 1980s – would probably make it through the first and second lines of defense was well-understood and accepted. As one study put it, "[s]ome 'leakage' missiles through the defenses appears inevitable."[368] The second phase of the Cold War at sea saw the introduction of several new systems to make sure that fleet air defenses could keep killing missiles even after they

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[365] The intention was for forty-one ships to be upgraded. Marion E. Oliver, "Terrier/Tartar: Pacing the Threat," *Johns Hopkins APL Technical Digest* 2, no. 4 (1981), 260.

[366] See e.g. Terry R. Betzer, "Terrier/Tartar: New Threat Upgrade Program," *Johns Hopkins APL Technical Digest* 2, no. 4 (1981), 260-82; George F. Emch, "Air Defense for the Fleet," *Johns Hopkins APL Technical Digest* 13, no. 1 (1992), 51-52.

[367] Tinajero, "Fleet Air Defense," 82. To be more specific, "[t]he principal problem is […] that three or four mechanically steered illuminators, such as the SPG-62 [the fire control radar aboard Aegis ships; MH], can only cope with a limited number of inbound ASCMs before it becomes mechanically impossible to keep up." Carlo Kopp, "Killing the Vampire," *Defence Today* 7, no. 3 (2008), 14.

[368] Paul H. Nitze and Leonard Sullivan, *Securing the Seas: The Soviet Naval Challenge and Western Alliance Options* (Boulder, CO: Westview, 1979), 180.

had made it through the outer and intermediate zones and were approaching their targets. The first point defense system to come into play against these leakers would be the Basic Point Defense Missile System (BPDMS), which used the RIM-7 *Sea Sparrow* missile as its effector. These missiles were also installed aboard the carriers themselves, starting in 1967.[369] It is not clear that the original version of the missile was very effective against supersonic ASMs in particular, but the system went through several upgrades to increase its capability along with the original *Sparrow* anti-air missile.[370] Against those leakers that BPDMS failed to shoot down, the Navy instituted a succession of 'soft-kill' systems including electronic countermeasures – the SLQ-17, SLQ-32 and WLR-8 – as well as chaff and decoy dispensers like the Mk33 RBOC and improved Mk36 SRBOC.[371] These were particularly effective against older ASMs that had not been designed with a strong ECM suit of their own, but electronic defense remained a very dynamic area for the remainder of the competition.

As the very last line of defense against missiles that were still incoming after they had run the gauntlet of active defense measures, the 1970s saw the development of the well-known Mk-15 *Phalanx* Close-In Weapon System (CIWS) – basically a M61 Gatling gun directed by a Ku-band radar to automatically engage targets that fit the parameters of an ASM with a stream of armor-piercing 20 mm shells at a rate of 50 rounds per second.[372] There were some doubts during the system's development phase as to its effectiveness against newer Soviet ASMs, which were both fast and rather sturdily built.[373] The fact that the VMF selected a 30 mm gun for its similar AK-630 CIWS may (or may not) indicate that the critics had a point. In either case, *Phalanx* was integrated on a wide range of U.S. Navy combatants – as well as some support ships – beginning in the early 1980s.

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[369] Brad Elward, *US Cold War Aircraft Carriers: Forrestal, Kitty Hawk and Enterprise Classes* (Oxford: Osprey, 2014), 43.
[370] Tinajero, "Fleet Air Defense," 59-60.
[371] Brad Elward, *Nimitz-Class Aircraft Carriers* (Oxford: Osprey, 2012), 27. For an overview of electronic defense capabilities, see Michael Puttré, ed., *International Electronic Countermeasures Handbook* (Norwood, MA: Horizon House Publications, 2004), *passim*.
[372] Tinajero, "Fleet Air Defense," 61.
[373] See the discussion in: United States Congress/House Committee on Appropriations, "Department of Defense Appropriations for 1974: Part 7 – Research, Development, Test, and Evaluation" (U.S. Government Printing Office, Washington, DC, 1973), 843-46.

All told, the U.S. Navy's ability to counter ASMs and implement an effective defense-in-depth of its CVBGs increased very significantly during this second phase – as did the VMF's capability for large-volume missile attacks. Looking at the net outcome concerning this aspect of the competition, is not clear that the carrier had become fundamentally more vulnerable than it had been during the first phase of the confrontation. What is clear is that severe damage to one or more carriers remained a distinct possibility in a U.S.-Soviet war at sea, that irreversible carrier *losses* were less likely, and that escalation to the tactical nuclear level would quickly have tipped the balance against the carrier. The survivability of escorts and support ships grew in line with the total defensive firepower of the system, although they were individually more susceptible to irreversible damage than were the carriers. Apart from the fairly general conclusion that U.S. Navy adaptation efforts were quite successful in maintaining the notional dyadic offense-defense balance, much would have depended on the specifics of the scenario – including such factors as technological and tactical surprise, deception, and ECM/ECCM effectiveness, which are extremely difficult to gauge.

If we look at the big picture, however, there is one finding concerning the second phase of the competition that is more significant than any of these: while the *perceived* shift towards greater carrier vulnerability was eventually also 'reversed' at a largely perceptual level during the late 1970s and the Maritime Strategy debates of the early 1980s, the *actual* shifts that had taken place at the level of strategic nuclear weapons platforms proved irreversible. Specifically, this phase saw the capabilities of U.S. and Soviet ballistic missile submarines grow to such an extent that the entire Soviet oceanic defense paradigm was up for a radical reassessment by the mid-1970s. The shape and meaning of these developments will be explored in the final section of this chapter.

5.6 The turn of the tide

In the mid-1970s, the VMF had available to it three basic options for the further development of its posture. The first option was to embrace a more globalized approach to naval operations, as many in the West feared it would. The second option was to continue to strengthen its oceanic defense perimeter and possibly expand it further, without changing its underlying posture, which remained centered on homeland defense. The third option was to retract and return to a more circumscribed version of perimeter defense focused on the peripheral seas that bordered the Soviet Union – primarily, the Barents and Arctic Seas in the North, and the Sea of Okhotsk in the East. With one notable exception, the leading Western analysts inside and outside the circles of government all agree that the Soviets chose the last of these three options and implemented a concept of bastion defense focused on the near seas, starting in the mid-to-late 1970s.[374] This section will seek to provide a sense of how and why this momentous shift came about. Although we cannot be certain with regard to Soviet motivations without access to materials that remain buried in Russian archives, it is possible to provide a relatively straightforward answer to that important question and, although other factors may have been part of the equation, a convincing case can be made in favor of this over other explanations.

In the first instance, it is important to acknowledge that there appears to have been some debate in Soviet naval and military circles over the merits of a more offensive approach – specifically, one targeting Western SLOCs, as NATO had long expected the VMF would. Herrick finds several instances in which VMF theoreticians appeared to argue for a more determined interdiction effort. The first such indication came in a major military-theoretical publication – *Boyevoi put' Sovetskogo voenno-morskogo flota*, which Herrick translates as *The Combat Course of the Soviet Navy* – in 1974.[375] The second indication came in Gorshkov's *The Sea Power of the State* itself, which appeared the year after. This was maintained in two reworked editions of the book, which appeared in 1976 and 1979.[376] None of these statements claimed more than a secondary role of SLOC interdiction, but they pointed towards the possibility of a more of-

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[374] That exception is Jan Breemer. He makes his case expertly and at length in his dissertation and later writings, but his take on the subject has not changed the mainstream interpretation very much. See Breemer, "Estimating the Soviet Strategic Submarine Missile Threat,"; , 33-39.
[375] Robert Waring Herrick, *Soviet Naval Doctrine and Policy, 1956-1986* Vol. 2 (Lewiston, NY: Edwin Mellen Press, 2003), 668.
[376] Ibid., 668-69.

fensive approach in the future. Together with other, less prominent statements, this led Herrick to conclude that "[b]y 1979 the Navy showed signs of having switched to favoring instead of opposing the anti-SLOC mission."[377] A related debate considered alternative options for achieving a SLOC suppression effect, which once again included strikes against ports of embarkation and disembarkation as a potentially more efficient approach than attacks on convoys at sea.[378] References to SLOC interdiction also continued into the 1980s, which may indicate that it had become a more accepted, if still secondary, mission.[379] How, then, are we to interpret this apparent shift, given that the established Western narrative emphasizes the retrenchment aspect of the bastion defense posture?

To understand why VMF officers suddenly began to talk up the relevance of interdiction, which they had long opposed as either too difficult to achieve or altogether unnecessary and undesirable, we once again have to 'zoom out' and consider the bigger picture. Two factors stand out in particular. The first is the growing stature of conventional war scenarios in both sides' military planning as the 1970s wore on.[380] As the possibility of a prolonged, conventional war began to look more and more plausible, the importance of SLOC defense for NATO increased more or less proportionally. As was noted in the Soviet debate, extensive prepositioning of U.S. materiel in Europe reduced the immediate necessity of interdiction, but its importance would grow the longer the conflict continued.[381] As had been the case during the 1950s, Western analysts and planners were acutely aware of this fact and unsettled by the possibility of a Soviet interdiction effort.[382]

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[377] Ibid., 672-73.

[378] Ibid., 681.

[379] Robert Waring Herrick, *Soviet Naval Doctrine and Policy, 1956-1986* Vol. 3 (Lewiston, NY: Edwin Mellen Press, 2003), 1149-71.

[380] See e.g. James M. McConnell, "The Soviet Shift in Emphasis from Nuclear to Conventional: The Mid-Term Perspective" (CRC 490-Vol. II, Center for Naval Analyses, Alexandria, VA, 1983); Samuel P. Huntington, "Conventional Deterrence and Conventional Retaliation in Europe," *International Security* 8, no. 3 (1983), doi:10.2307/2538699, 32-56; Diego A. R. Palmer, "The NATO-Warsaw Pact Competition in the 1970s and 1980s: A Revolution in Military Affairs in the Making or the End of a Strategic Age?," *Cold War History* 14, no. 4 (2014), doi:10.1080/14682745.2014.950250, 533-73.

[381] Herrick, *Soviet Naval Doctrine and Policy, 1956-1986*, 671-72.

[382] See, for example, the level of concern that is evident in Paul H. Nitze and Leonard Sullivan, *Securing the Seas: The Soviet Naval Challenge and Western Alliance Options* (Boulder, CO: Westview Press, 1979), an Atlantic Council policy study, 337-81.

The second, and even more salient, factor that we can identify as pushing Soviet naval authors towards a greater emphasis on SLOC interdiction had to do with the overall development of the VMF's mission structure. As we have seen, homeland defense and strategic strike were the defining priorities during the critical decision-making period of the early 1960s. But by the early 1970s, U.S. aircraft carriers had been reoriented towards limited war missions and the main strategic threat came from a much larger number of SSBNs, armed with missiles of increasing reach and destructive power. The parameters of the VMF's strategic strike mission, on the other hand, were about to change completely, with the introduction of submarine-launched ballistic missiles that could be fired against U.S. targets from the Soviet Union's near seas. As we will see, the desire to act against the SLOCs is best seen as one of a number of symptoms of the escalating pressure for major posture change that this entailed.

To arrive at an appropriate assessment of the Soviet debate about interdiction and see why it is best seen as a sideshow rather than as the main event, we can use as our starting point several recently released and very substantial U.S. intelligence reports on this issue. In 1978, and in a lengthy assessment of Soviet intentions and capabilities, the CIA found that "[i]nterdiction is a secondary mission to which the Soviets would allocate a small part (perhaps 10 percent) of their operational attack submarine force. Selected attacks on shipping, over a wide area of ocean, would in part be intended to disperse Western naval resources."[383] Three years later, an interagency report prepared together with the ONI, Defense Intelligence Agency and National Security Agency on the same question found that "it is not currently the intention of Soviet planners to conduct a large-scale interdiction campaign against sea lines of communication (SLOC) in a major war with NATO, although we believe they intend *some* interdiction."[384] Finally, as late as 1985, a study of the most recent developments in the Soviet interdiction debate concluded that "although the frequency of [the appearance of articles on

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[383] Central Intelligence Agency, *The Role of Interdiction at Sea in Soviet Naval Strategy and Operations: An Intelligence Assessment*, May 1978, CIA Historical Collection, ~~TOP SECRET~~ (declassified 14 June 2017), i; Central Intelligence Agency/National Foreign Assessment Center, *The Role of Interdiction at Sea in Soviet Naval Strategy and Operations*, February 1978, CIA Historical Collection, ~~TOP SECRET~~ (declassified 16 June 2017).

[384] Central Intelligence Agency, *Soviet Intentions and Capabilities for Interdicting Sea Lines of Communication in a War with NATO*, November 1981, CIA Historical Collection, ~~TOP SECRET~~ (declassified 1999), 1. Emphasis added.

the topic in Soviet journals in the previous three to four years; MH] suggests an increased Soviet interest in this mission, the substance of the articles does not appear to signal a change in Soviet naval mission priorities."[385] Even more significantly from the perspective of posture analysis, the review stated that "we see no evidence in writings or exercises that the Soviets are deemphasizing other missions in a way that would free additional submarines for SLOC interdiction."[386] As any good posture analysis would remind us, the range of possible activities and missions may be vast, but the same asset cannot be allocated twice. Each of these findings represents the bottom line of an extensive review of the subject and serves to emphasize the fact that, while interdiction was seen as potentially more desirable under the changed circumstances of the 1970s and 1980s, the VMF was not willing to back this up with a meaningful investment of scare resources.

Declassified intelligence reports provide one element of a reality check on Soviet ambitions to interdict the SLOCs towards the end of this phase of the competition. To explore this matter further, it also makes sense to briefly look into Soviet submarine building decisions with regard to the types that were not firmly linked to either the anti-carrier program or strategic deterrence. While Western observers like to describe these submarines as 'attack submarines,' in line with the terminology they are used to, the VMF simply used the term *atomnaya podvodnaya lodka* (APL). This could include true general-purpose nuclear submarines as well as types that were actually more specialized, but that did not fall in the PLARK or PLARB categories. The main examples of general-purpose submarines during the second phase of the Cold War at sea were the Project 671 APLs, which NATO designated the *Victor*-class. The most obvious example of a more specialized APL was the Project 705, or *Alfa*-class to NATO.

The base version of the *Victor* was developed alongside the *Charlie*- and *Yankee*-class starting in 1958 and shared with the latter the same VM-4 twin reactor installation. It retained Soviet characteristics like the double hull, but its layout with a more teardrop-like shape and

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[385] Central Intelligence Agency, *SLOC Interdiction Revisited: Recent Soviet Writings on Interdicting NATO's Sea Lines of Communication*, June 1985, CIA Historical Collection, ~~SECRET~~ (declassified 2 December 2009), i.
[386] Ibid.

single screw also appears to have been influenced by Western designs.[387] It was easily the fastest among the second-generation *Charlie-, Victor-, Yankee*-class (CVY) designs, with a top speed of 33 knots. The efforts that were made to pair high speed with improved quieting measures made it the most versatile of the bunch as well.[388] Project 671 (*Yorsh*) submarines were armed with six standard, bow-mounted 533 mm torpedo tubes and a dozen reloads, which cannot be described as a very heavy complement if we are to think of it as a long-range hunter. It is also worth noting that the bow sonar was larger than in the other second-generation designs.[389] As we have seen, Soviet sonar technology significantly lagged behind Western standards, but the *Victor* was certainly a more capable platform for ASW work than its general-purpose predecessor, the Project 627/*November*. The VMF was apparently quite sanguine about its Project 671 submarines, the first of which joined the fleet in 1967. Over the next five years, fourteen more were built, which made this the second-largest (sub)class of APLs in the Soviet Navy.

At the same time, the expectation that the design had further potential for growth and improvement led to the development of a substantially improved Project 671RT variant, known as the *Syomga* in Russian and as *Victor II* to NATO, with seven additional units joining the fleet between 1972 and 1978. The *Victor II* had several important new features that provide a window into the VMF's priorities in the mid-to-late 1960s. Perhaps the most important innovation was the introduction of 'rafted' machinery for better noise suppression.[390] At its most basic, this entailed the extensive use of rubber mounts to achieve acoustic decoupling from the hull – a technique that had been introduced in the West a full decade earlier in the *Thresher/Permit*-class.[391] Partly as a result of these measures the submarine had an enlarged diameter and was almost 10 meters longer. The *Victor II* also introduced an interesting weapon: a heavy 650 mm torpedo known as the 65-76 *Kit*. With wake-homing terminal guidance and a 450-kilogram warhead, this was an anti-surface weapon that could cripple a carrier and might sink an escort

[387] Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 157.
[388] As was the case with the other Soviet second-generation designs, the intent of building a quiet submarine was only very partially fulfilled – certainly by Western standards.
[389] Jordan, *Soviet Submarines: 1945 to the Present*, 112.
[390] Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 159.
[391] Friedman, *U.S. Submarines since 1945*, 142.

outright.[392] Wake-homing torpedoes are notoriously difficult to defend against and, as far as we know, the U.S. did not develop a reliable countermeasure to these weapons. The fact that the Soviet designers went to the trouble of integrating two larger-diameter torpedo tubes into Project 671RT indicates that this was considered a relevant capability for these submarines, which were apparently expected to help counter CVBGs as well as enemy submarines. The latter task was also supported by the installation of a more capable sonar set.

The same priorities were still evident in the final iteration of the design, the Project 671RTM *Shchuka*. With an even stronger emphasis on quieting, based on information that the Walker spy ring provided, and the addition of a towed array sonar, this *Victor III*-class became a truly dangerous opponent for Western attack submarines.[393] While it was still not as quiet as either the *Sturgeon*s or the *Los Angeles*-class, it was certainly an acoustic match for the *Permit*-class.[394] Resulting in a class of twenty-five vessels, this was also the largest APL program of the Cold War. With the first 671RTM joining the fleet in 1979, they remained in continuous production until 1990. It also provided the basis for the more advanced *Akula*-class, which was a follow-on in terms of design philosophy and even in designation (Project 971 *Shchuka-B*).

[392] NavWeapons, "Torpedoes of Russia/USSR: Post-World War II," http://www.navweaps.com/Weapons/WTRussian_post-WWII.php.

[393] Hennessy and Jinks, *The Silent Deep*, 547-51; 568. On the Walker spy ring, see also Pete Earley, *Family of Spies: Inside the John Walker Spy Ring* (Toronto: Bantam Books, 1988).

[394] See Stefanick, *Strategic Antisubmarine Warfare and Naval Strategy*, 274; Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 319.

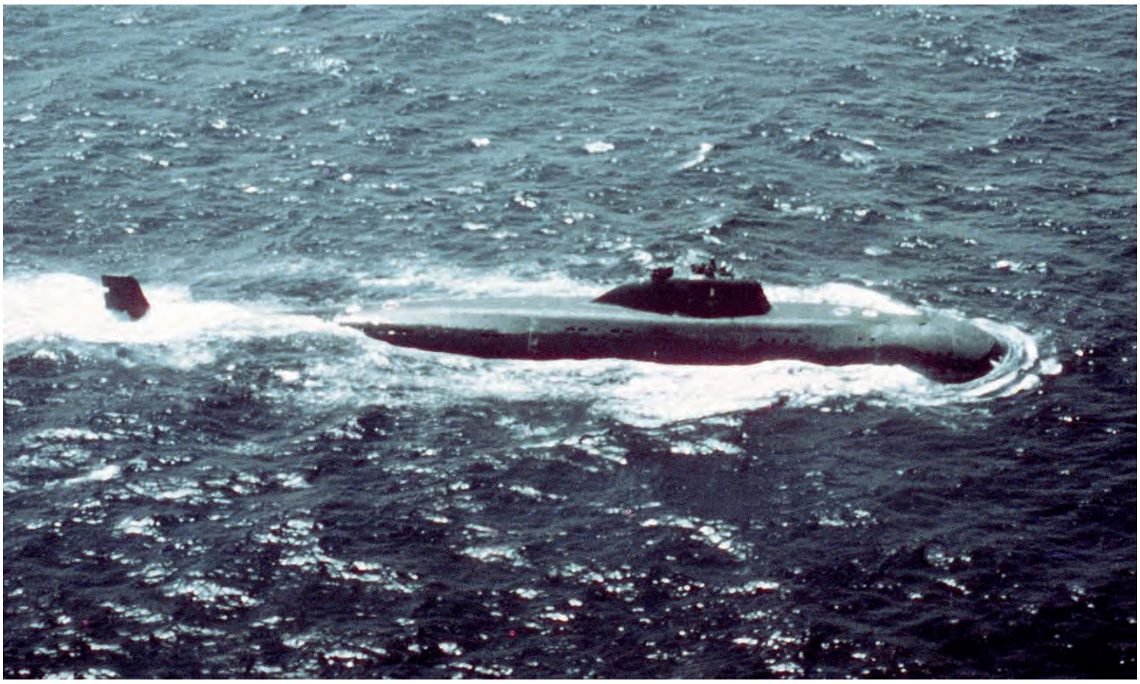

Fig. 28: The *Victor I* originated a lineage of true high-seas, general-purpose APLs, which were ultimately integrated into the more circumscribed, near-seas posture of the late 1970s and 1980s. *(U.S. National Archives)*

The acquisition of a total of forty-seven multi-mission APLs from 1967 onwards contributes to our understanding of the development priorities that shaped Soviet naval posture during this phase, but several interpretations remain plausible. The *Victor I/II*-class vessels were equally compatible with an expansion or contraction of the defensive perimeter, with a focus on interdiction or SSBN protection. Similarly, the strong emphasis on quieting in the *Victor III* is consistent with a realization of the general tactical value of noise reduction, based on the revelations of the Walker spy ring, but also with the search for a survivable platform that could operate in the central Atlantic, or even off the coast of the United States, much like U.S. and UK submarines operated just off the Soviet coast. It is only when we view this debate in the broader context of Soviet posture change that a clearer picture begins to emerge. We will further discuss the motivations behind the VMF's shift. However, as far as the *Victors* are concerned, there is little reason to second-guess Jordan's assessment that they were designed as ASW submarines to contribute to combined-arms defense against *Polaris* – while it was still considered possible – and as escorts for the vulnerable *Yankees* as they transited to their launch areas through the GIUK gap.[395] The flexibility of the Project 671 design also served the VMF well as it shifted from selective forward deployments to bastion defense and helps explain why the *Victor* and its derivatives saw a continuous production run lasting a quarter of a century.

Besides the increasingly formidable *Victor*, we also have another important data point to help us make sense of Soviet APL design priorities: namely, the Project 705 or *Alfa*-class. Although these submarines were built during much the same period as the *Victor I/II*, the *Alfa* was a different beast altogether. For starters, its hull was made of welded titanium, which most Western analysts though was physically impossible or, at the very least, far too expensive to pull off. It was only after one particularly diligent intelligence officer had managed to find an actual piece of titanium that could be traced to the *Alfa* in a scrapyard that U.S. intelligence changed its mind.[396] Instead of the pressurized-water reactors in other Soviet and Western designs, its single reactor used a liquid-metal coolant that allowed for considerably higher energy density.[397] This translated into a top speed of 41 knots, which was second only to the record-breaking *Papa*. Until the U.S. Navy specifically modified the Mk 48 torpedo in the early 1980s, it was probably fast enough to outrun the ASW weapons arrayed against it – at least in some scenarios.[398] The *Alfa*'s armament was comparable to the *Victor I*-class, with the addition of the 533 mm version of the SS-N-15 ASW missile. Beside its unusual reactor installation and high speed, the most remarkable feature of the *Alfa* was the unusual degree of automation that was incorporated into the design, which was difficult to achieve technically. In practice, this resulted in a much smaller crew but also in widespread reliability problems due to the unprecedented degree of complexity of the combat system.[399]

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395 Jordan, *Soviet Submarines: 1945 to the Present*, 114-15.
396 Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 143.
397 Jordan, *Soviet Submarines: 1945 to the Present*, 120-21.
398 The *Alfa* could probably have escaped long-range shots involving torpedoes that lacked a sufficient speed advantage with relative ease. A close-in ambush by an acoustically advantaged opponent lurking ahead of a transiting *Alfa* was always going to be very different matter. As usual, the respective technological advantages were important, but tactical skill could still carry the day.
399 Polmar and Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines*, 140.

Whereas the *Victor* was a multi-purpose, 'swing-role' submarine, the *Alfa* really *was* a thoroughbred interdictor – just not one designed to operate in far-seas scenarios for extended periods of time. On the contrary, it has been likened to a short-range "interceptor"[400] that could be quickly pushed out to sea to counter an emerging threat. What it emphatically *was not* is a long-endurance 'convoy killer' for duty west of the GIUK gap. Given that the basic design goes back to the late 1950s, the *Alfa* is best seen as part of the layered defense system that was envisioned at that time. In fact, its very high speed was most advantageous if it was transiting through a defended zone not too far from Soviet shores, because "navigating at 'hot rod' speed, the 'Alfa' would sound like a freight train and be acoustically 'blind'."[401] Ultimately, after the prototype had suffered a serious reactor accident, only five were built of the production variant, with the last one being commissioned in 1981. Some of the technological advances found their way into the Project 945 or *Sierra*-class APL of the 1980s, which eventually suffered a similarly truncated production run. Overall, the balance sheet of the *Alfa* program was decidedly mixed, but consistent with what we have already learned.

To sum up our findings so far, we can see that APLs did become a more prominent element of the VMF's force structure, during the 1970s in particular. As a result, the theoretical far-seas interdiction capability of the VMF submarine force was also expanded – not so much as a matter of design, but in line with its general capability development. Although neither the *Victor* nor the *Alfa* reflected a desire to build a 'convoy killer,' they could still sink merchant ship in significant numbers if tasked to do so – as could the submarines in the anti-carrier program and, in theory, even the SSBN fleet.[402] However, despite the exhortations by offensive-minded officers, an expansion of Soviet far-seas ambitions that might have led to such employment concepts is not what Western intelligence services observed in the late 1970s and early 1980s.

[400] Jordan, *Soviet Submarines: 1945 to the Present*, 116-17.
[401] Breemer, *Soviet Submarines: Design, Development and Tactics*, 128.
[402] If the location of a convoy was known with some precision and passed on expeditiously, it is even imaginable that early ballistic missiles with large-yield nuclear warheads could be used against it with some success. Having said that, it was certainly not a very efficient or doctrinally sensible use of the VMF's scare and rather vulnerable SSBN resources at the time.

On the contrary, analysts discovered such a notable shift towards a more narrowly defensive and geographically constrained posture that they were able to overcome some of the most deeply ingrained and incrusted Western ideas about the Soviet Navy and its operational preferences. As has been abundantly documented, it was this realization and acceptance of the fact that the VMF had settled on a geographically focused defense in what became known as the Northern and Okhotsk bastions that led to the development of the Reagan era Maritime Strategy.[403] But why *did* the Soviet Union ultimately start to turn away from its focus on extending the oceanic defense perimeter that had marked the 1960s and early 1970s? Although we cannot be *certain* of Soviet motivations based on the currently available evidence, there is little doubt that this story revolves around the development of the U.S. and Soviet SSBN forces.

The linchpin in this regard is the VMF's failure in coming to grips with what became known as the "counter-Polaris task."[404] As we have seen, there was never a convincing ASW equivalent to the massive, open-ocean anticarrier complex – and for good reason. While the 'improvised' *George Washington*-class SSBNs of the early 1960s were fairly noisy and the limited range of the *Polaris* A1 missile forced them to patrol east of the GUIK gap, within the theoretical reach of Soviet defenses, both these limitations were quickly eliminated. From the *Lafayette*-class onward U.S. ballistic missile submarines were significantly quieter than any Soviet submarine until the introduction of the *Akula*-class in 1984 and with the 2,500 nmi range of the *Polaris* A3, they could hit the Soviet homeland from their forward base in Holy Loch – in fact, they could do so without even leaving the pier.[405] While the VMF did construct powerful ASW forces centered on systems like the Project 1143 (*Kiev*-class) helicopter-carrying ASW guided missile cruiser, the Project 1134A (*Kresta II*-class), Project 1134B (*Kara*-class) and Project 1164 (*Slava*-class) large ASW ships, and the Ilyushin Il-38 ASW aircraft, the idea of hunting

[403] See e.g. John B. Hattendorf and Peter M. Swartz, eds., *U.S. Naval Strategy in the 1980s: Selected Documents,* Newport Paper 33 (Newport, RI: Naval War College Press, 2008), 32-34.
[404] Harlan Ullman, "The Counter-Polaris Task," in *Soviet Naval Policy: Objectives and Constraints*, ed. Michael MccGwire, Ken Booth and John McDonnell (New York, NY: Praeger, 1975), 585-600.
[405] Stefanick, *Strategic Antisubmarine Warfare and Naval Strategy*, 274; Spinardi, *From Polaris to Trident*, 66-72.

U.S. SSBNs in the central Atlantic was quite obviously untenable.[406] Given their own limitations and limited numbers, *Victor I/IIs* could not perform this mission all by themselves, either. The last of the '41 for Freedom' was commissioned in April 1967, at around the same time as the first *Victor I*, and even a decade later there were still far too few APLs to even seriously consider tracking and destroying the more quiet and plentiful Western SSBNs. Against *Polaris* A3 and its successors, damage limitation – whether preemptive or in the early days of a war – was simply no longer the promising course of action that it had once been, when it looked like the aircraft carrier might be the worst of the Soviet Union's strategic defense problem. Even after much a quieter APL became available in numbers, in the form of the *Victor III*, U.S. intelligence still believed that the Soviet anti-SSBN capabilities would continue to deteriorate and that "Soviet naval anti-SSBN operations will continue to be modest"[407] into the 1990s.

Given that homeland defense remained central to the VMF's mission, how could the service cope with this turn of events? The intuitive and almost inescapable answer was that it needed an actual matching force – one that would be similarly invulnerable and capable of inflicting catastrophic damage on the continental United States without having to run the gauntlet of Western ASW defenses in the North Atlantic. Because of the basic geostrategic asymmetry in which the U.S. could safely forward-base its SSBNs in Scotland and Spain, and the Soviet Union had no such options, duplicating the capabilities provided by *Polaris* did not create such a matching force. What was needed to offset the U.S. advantage in nuclear power projection from the sea was an intercontinental-range SLBM. The SS-N-6 carried by the *Yankee* had a range of 2,500 kilometers. What Soviet engineers had to achieve to allow Soviet SSBNs to confine their patrols to the heart of the Soviet defense zone was to triple that range. The quest for the corresponding missile began in the early 1960s but the usual lag time and the sheer difficulty of the task meant that it was not until December 1971 that a prototype was ready for testing. The R-29 (SS-N-8 *Sawfly*) was ultimately accepted into service in 1973. With

[406] On Soviet ASW efforts during this period, see e.g. Defense Intelligence Agency et al., *Soviet Approaches to Defense against Ballistic Missile Submarines and Prospects for Success*, March 1976, CIA Historical Collection, ~~TOP SECRET~~ (declassified 1999).

[407] John B. Hattendorf, *The Evolution of the U.S. Navy's Maritime Strategy 1977-1986*, Newport Paper 19 (Newport, RI: Naval War College Press, 2004), 110.

excellent reliability even during the test program, a range of 7,800 kilometers, an 800-kiloton warhead, and penetration aids to defeat future U.S. missile defense systems, the R-29 was a real game changer for the Soviet Navy. As Polmar and Noot emphasize, it allowed the VMF to "outflank the U.S. anti-submarine strategy of detecting and attacking Soviet submarines as they steamed south, through the Norwegian Sea and the [GIUK] gaps. The new Soviet SSBNs could remain within the more easily protected Arctic waters, or even in port, and still reach out to strike American cities."[408] In what amounts to the most brilliantly concise description of what this really meant, they state that the submarine-launched missile was "in essence becoming a mobile ICBM."[409]

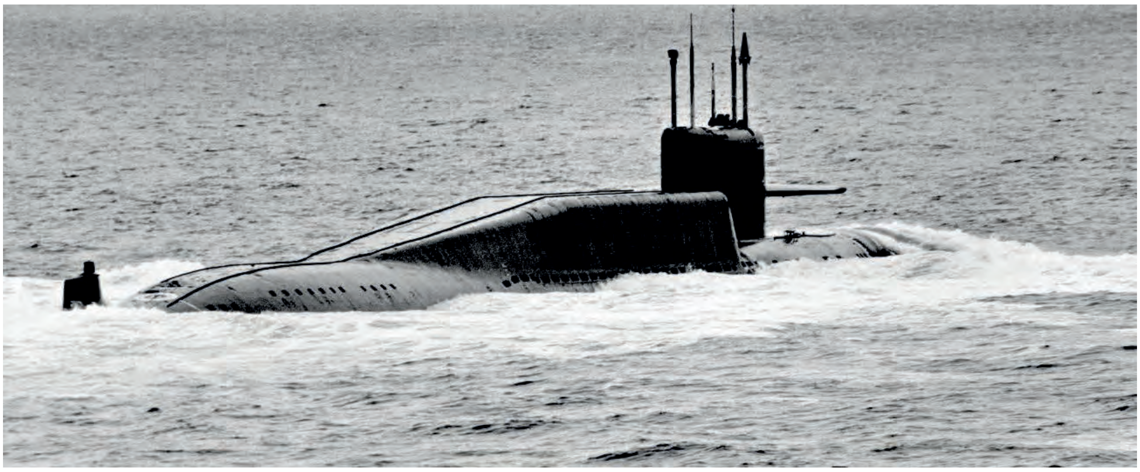

Fig. 29: Into the bastions: A *Delta II* caught on the surface, with its distinctive 'hump' containing an expanded missile battery of sixteen R-29Ds. These missiles could reach every part of the United States from Soviet-controlled waters. *(U.S. National Archives)*

To carry the new missile, the *Yankee* was developed further, with characteristic pragmatism, into the Project 667B *Murena* (NATO designation: *Delta I*), which was in turn modernized into the 667BD, 667BDR, and 667 BDRM (*Delta II-IV*) subclasses. The improvements from each subclass to the next were substantial but evolutionary. All *Deltas* carried variants of the R-29, which was developed further into the R-29D, R-29R, and R-29RM, relying on much the same philosophy. A total of forty-three *Deltas* were built between 1972 and 1990, and they remained

[408] Polmar and Noot, *Submarines of the Russian and Soviet Navies, 1718-1990*, 191.
[409] Ibid., 190.

the centerpiece of Soviet/Russian sea-based nuclear deterrence into the 2010s. While the specifics of the further development of the Soviet SSBN force – including the development of the Project 941 (NATO designation: *Typhoon*) heavy SSBN and its R-39 missile, which began to enter service towards the very end of this phase – are fascinating in themselves, any particular emphasis upon them only serves to obscure the thoroughgoing shift in the VMF's posture that was embodied by the basic *Delta I*/R-29 combination. The nature of that shift is easily summarized: with Western SSBNs as the main threat and nuclear parity at sea as the main claim the VMF could still lay to defending the homeland, the further expansion of the oceanic defense concept became a secondary concern and the more focused defense-in-depth of the Arctic SSBN patrol zones became the main event.

This final section has made the case that what ultimately determined the Soviet Union's naval trajectory towards the end of the second phase was its inability to counter *Polaris* submarines by classical naval means. This does not mean that the VMF did not try, but – by all reasonable standards – its efforts were doomed from the outset. Against a large SSBN force like the '41 for Freedom,' strategic defense was no longer a promising approach, certainly with the technological means at hand at the time. As a result, the *Delta* and SS-N-8 became the next best thing to a viable strategic defense: an actual matching force that could target the U.S. population centers, as well as SSBN bases on the Eastern seaboard from Northern Fleet piers. Because these long-range strike forces were the VMF's most relevant contribution to homeland defense from the mid-1970s onwards, defending the SSBNs from enemy encroachment into their likely patrol areas and strikes by Western naval forces against its bases became a central element of the new Soviet naval posture. The carrier threat had not disappeared, but it paled in comparison to the havoc that even a single SSBN could wreak. While U.S. carrier groups were a more attractive threat to plan against, because they could be countered more effectively using existing technology, the VMF's posture developed much like our analytical model would have us expect: it was visibly refocused on the more severe threat, with what we can describe as a moderate amount of lag time. Alternative explanations may gain in stature as new evidence becomes available, but based on the materials that are currently open to civilian researchers, this is by far the most consistent and logical explanation of the VMF's dramatic posture change in favor of a near-seas 'bastion defense' during the 1970s.

5.7 Summary

The second phase of the Cold War at sea was, in a very real sense, the decisive one. While the U.S. Navy's efforts to exploit the Soviet shift towards near-seas SSBN defense make for a fascinating story in itself, the timeline does not bear out triumphalist accounts that focus primarily on the 1980s Maritime Strategy as the decisive factor in turning the competition in the United States' favor. In making sense of this finding and reviewing the implications of the second phase for our understanding of the U.S.-Soviet rivalry at sea, two strands of the narrative are key. *First*, Soviet military thinkers correctly understood that the aircraft carrier's "pulsed"[410] firepower took on an entirely new significance in the nuclear age. Their attempts to counter that threat were modestly successful, but the resulting ACW system-of-systems remained brittle. This circumstance somewhat eased the task the U.S. Navy faced, but the challenge to surface ship survivability nonetheless remained a serious one. The ASW response, based on the across-the-board advantage the U.S. already enjoyed in underwater acoustics and wide-area defenses more generally, was formidable, although serious deficits remained in battle group self-defense. The AAW response did not result in the same level of advantage and might have proved insufficient, had the AVMF successfully deployed the Tu-22/Kh-22 combination during the early 1960s. Ultimately, the developmental difficulties on the Soviet side were such that the U.S. Navy had sufficient time to field the E-2 *Hawkeye*, F-14 *Tomcat* and AIM-54 *Phoenix*, and to begin development of a next-generation air defense system before the air threat took on its most serious form, in the guise of the Tu-22M/Kh-22M and the submarine/ship-launched P-700. It did not, however, *deploy* any *Aegis*-equipped ships in time to preempt that threat and any naval war up until 1983 would have been fought without the benefit of *Aegis*-equipped units, with wide-spread coverage becoming available only in the

[410] Hughes and Girrier, *Fleet Tactics and Naval Operations*, 84.

late 1980s. Hence, it is probably fair to say that battle group defenses depended on combat air patrol fighters and last-ditch – especially 'soft-kill' – defenses to a higher degree than was strictly desirable during this second phase. It should thus be emphasized that the U.S. Navy's adaptation efforts in both ASW and AAW were unevenly successful, and potential failure points can be identified.

Secondly, if has become clear that the U.S. decision to shift the naval contribution to strategic deterrence from the carrier and its attack squadrons to the missile-carrying submarine did more to shape the course of the competition than any countermeasure designed to offset the Soviet high-seas posture that emerged in the 1960s. If it had led the Soviet Union to pour massive resources into an unproductive area like strategic ASW, the U.S. reliance on SSBNs could have functioned as a 'competitive strategy'. Instead, the VMF successfully established parity in sea-based deterrence from the mid-1970s onward. As ACW defense lost some of its urgency and the '41 for Freedom' irrevocably slipped beyond the reach of its own ASW forces, the VMF confirmed that its force development, doctrine and deployments remained responsive to the main, nuclear threat to the homeland. In line with its consistent emphasis on strategic defense, the second phase of the competition thus ended with the VMF retreating from its earlier focus on contesting Western sea control at the forward edge of its defensive zone in the North Atlantic. What remains of the U.S.-Soviet competition up to the realization of this retrenchment is a wealth of evidence on how the U.S. Navy sought to maintain its substantial advantages and why the Soviet sea denial challenge in the North Atlantic did not succeed in creating denied zones for Western naval forces, even while it was the declared aim and focus of Soviet naval strategy to do so. We will go on to explore the broader significance of these findings in the concluding chapter of this dissertation.

[6]

Conclusions

THE 'RED PERIMETER' IN RETROSPECT

6.1 Naval supremacy sustained

As the Cold War at sea entered its final phase, several important outcomes of the long-term competition between the U.S. and Soviet navies were already becoming apparent. *First*, it was increasingly difficult to overlook that the VMF was making strides in traditional areas of weakness, specifically in submarine acoustics and quieting, based on its intelligence successes of the past decade. In other words, the Soviet Navy was now capable – at least in principle – of narrowing and perhaps closing the technological gap in crucially important areas of U.S. advantage. Hence, we can state with some confidence that its decision to turn its back on the oceanic focus of the previous decade was not due to a lack of technological competence. *Secondly*, due to the United States' own intelligence breakthroughs, it had become apparent that the VMF was not exploiting its advances to further expand its defensive perimeter and was instead refocusing its efforts on the near seas – specifically on the Barents Sea, the Arctic, and the Sea of Okhotsk. Soviet maritime balancing had resulted in an impressive array of capabilities, some of which could reach far into the Atlantic and the Pacific, and would continue to do so. But the idea that the Soviet Navy was hell-bent on 'going global' was on its way out. *Third*, there could also be little doubt that fears to the effect that the U.S. Navy might be displaced as the world's leading maritime power by such a Soviet push had been greatly exaggerated. In terms of relative capability – the only terms that matter – the VMF never reached a point at which it could expect to perform its oceanic denial mission with a high probability of success. For all its experiments with forward operations, in a global war involving the superpowers, there would be only one global navy. Even more importantly, the prospect of a climactic campaign for the control of the North Atlantic had abated and unless we are to dilute the main premises of a Third Battle of the Atlantic beyond recognition, the scenarios of reference during the final phase of the Cold War are difficult to describe in those terms.

What contemporary analysts could *not* know, of course, is that the Soviet near-seas naval posture that emerged in the mid-1970s would not eventually give way to another attempt at expanding the defensive perimeter outward in the future, up to and perhaps even beyond the GIUK gap. In fact, in the early 1980s, the U.S. intelligence community still expected the future Soviet defensive perimeter to extend up to 3,000 kilometers from Soviet shores.[1] There were several options available to the VMF that had not been seriously explored at this stage. For example, the AVMF had never fielded long-range escort fighters to protect its strike aircraft – or, indeed, attempted to provide them with air engagement radars and AAMs of their own. Although neither of these options was technically straightforward or easy to implement in practice, both routes nevertheless remained open. Once the needs of bastion defense were met, the VMF could also have deployed truly silent APLs or a cheaper and more numerous alternative to the *Oscar*-class. While these platforms would not have escaped eventual attrition in the ASW environment of the GIUK gap and the western North Atlantic, they could certainly tie down precious resources and thus contribute to bastion defense and a Soviet war effort more broadly.

With hindsight, Soviet submarine construction during the late 1970s and 1980s was almost certainly insufficient to both meet the requirements of bastion defense and forward-deploy large numbers of capable, first-line platforms at the same time. While peacetime attempts at operating far forward drew considerable attention, they were ultimately token and

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[1] John B. Hattendorf, *The Evolution of the U.S. Navy's Maritime Strategy 1977-1986,* Newport Paper 19 (Newport, RI: Naval War College Press, 2004), 109.

experimental.[2] Similarly, Tokarev's suspicion that the *Backfire* force would have been very heavily disadvantaged in distant operations is difficult to discount.[3] It is true, of course, that the bastion concept still encompassed a capability for oceanic perimeter defense, and that there was always going to be some overlap between the two, *but the paradigm had shifted.* The VMF's core mission for the remainder of the confrontation would be to defend its SSBN deployment areas in waters adjacent to the Soviet homeland and the clear implication was a much more focused and intense sea denial effort in the peripheral seas in the High North and the Far East. To claim that the continued acquisition of long-range-capable platforms like the *Victor III* and TU-22M3 could only mean that oceanic defense remained the VMF's chief priority is to gloss over the utility of these platforms, which were the products of ongoing acquisition programs first launched in the 1960s, in near-seas operations and to ignore the other core elements of posture – namely, doctrinal preferences and observable deployment patterns. If we take these elements into account, as indeed we should, the main outcome of the first two phases of the Cold War at sea was clear-cut: *At the end of our investigation period, after 35 years of peacetime competition at sea, the U.S. Navy stood undefeated, its global naval supremacy intact.* In this concluding chapter, we will both review our findings concerning the why and how of this outcome, as proposed in the original research question, and weigh their broader significance.

6.2 The limits of sea denial: seven significant findings

In setting out the terms for this investigation, we asked a question that is central to our understanding of the underlying dynamics of the Cold War at sea as well as of its eventual outcome: *Why, given the significant technological and operational strides that the VMF made, did the long-term naval competition between the Cold War superpowers end with U.S. naval supremacy largely intact?* With that question still firmly in mind, we can sum up the findings of this dissertation by formulating seven significant conclusions. Although we may not be able to expand any of

[2] The most famous episode is covered in Peter Hennessy and James Jinks, *The Silent Deep: The Royal Navy Submarine Service since 1945* (London: Allen Lane, 2015), 564-71.
[3] Maksim Y. Tokarev, "Kamikazes: The Soviet Legacy," *Naval War College Review* 67, no. 1 (2014), 71-74.

them into social-scientific generalizations, all of them remain relevant today and for the foreseeable future.

THE SOURCES OF LONG-TERM ADVANTAGE

To understand the principal result of the Cold War at sea – the U.S. Navy's retention of a meaningful advantage over its challenger in a notional naval war in the North Atlantic theater – there are three elements of the U.S. approach to competitive posture change that deserve particular emphasis. *First*, the U.S. Navy reacted early to a projected threat that had not yet materialized. As we now know, this threat was systematically exaggerated by U.S. and allied analysts, based on a fundamental misunderstanding of the Soviet naval posture, which in reality was geared towards near-seas defense rather than SLOC interdiction. However, this overreaction – which was shaped both by the U.S. Navy's struggle for bureaucratic relevance and by entrenched assumptions based on recent historical experience – nevertheless laid the foundation for a long-lasting superiority in undersea acoustics, submarine ASW and wide-area anti-submarine defense. Although it played a critical role in the U.S. adaptation to an expected high-seas submarine threat, the focus on forward carrier operations did not lead to a similarly sizeable advantage in fleet air defense during the first phase of the competition.

This points to the importance of several factors that were present in the ASW effort and either absent or less pronounced in the AAW effort. In its adjustment to the expected long-range submarine threat, the U.S. Navy could draw on an acute awareness of the strategic significance of a submarine campaign against the SLOCs, a strong basic research program coming out of World War II, a vigorous experimentation effort, and the submarine community's ongoing search for a new role. The Soviet air threat was also recognized as significant by naval planners, but the focus of naval aviators during much of the 1950s was on the nuclear mission, which flowed directly from national priorities and interservice bureaucratic pressures, while the surface fleet as a whole faced competing demands. It does not come as a surprise, then, that fleet air defense did not develop at the same pace as ASW defense during this early phase, with knock-on effects during the following decades.

Secondly, rather than settling for a modest advantage, the U.S. Navy exploited its initial successes and further built upon them without letting up. Thus, the service not only developed the concept of the multi-purpose, nuclear-powered, fast *and* silent attack submarine and made it the centerpiece of its forward ASW effort. It also made sure that successive classes of SSNs were built back to back and in sufficient numbers to stay ahead of the expected Soviet nuclear submarine program well into the future. The fact that the VMF did not deploy a truly comparable submarine until the late 1970s, when the first *Victor III*s entered service, demonstrates asymmetries in posture planning, but it is also indicative of the U.S. Navy's margin of technological advantage from the late 1950s onward. Not only did the VMF fail to catch up in general-purpose submarine design during the investigation period – for all we know, it did not even fully understand how serious the discrepancies in acoustic quieting and underwater sensing were, until the Walker spy ring spelled it out for its Soviet handlers in detail. Of course, this level of advantage was not achieved across the board and the competition in fleet air defense was altogether less lopsided, but the cascading advantage achieved in SSN development during the late 1950s and early 1960s remains an excellent example of the U.S. Navy's decisiveness in committing to what was then a radical concept, and the service's relative agility in implementing that concept and developing it further.

Thirdly, in countering Soviet initiatives, the U.S. response generally focused on breaking potential strategic challenges down into more manageable, techno-doctrinal problem sets and formulating solutions to them. Instead of adjusting its strategic outlook, the U.S. Navy applied this problem-solving, technologically focused approach to successive challenges and mitigated them sufficiently to be able to sustain its organizational preference for offensive power projection. If Soviet sea denial fell short of changing its competitor's mind about forward operations, it was not least because the U.S. Navy's response was effective in disassembling the VMF's challenge into its individual component parts and countering them at the techno-doctrinal level. If there is such a phenomenon as an "engineering approach"[4] in American strategic and military culture, the Navy's pursuit of the Cold War competition at

[4] Dima Adamsky, *The Culture of Military Innovation: The Impact of Cultural Factors on the Revolution in Military Affairs in Russia, the US, and Israel* (Stanford, CA: Stanford University Press, 2010), 81-87.

sea could certainly be described in those terms. While it must be said that a focus on techno-doctrinal solutions does not necessarily lend itself to replication at other times and against different opponents, we should nonetheless acknowledge that it served the leading sea power well enough during the 35-year period we have investigated.

THE 'THIRD BATTLE' WAS NOT DECIDED BY THE FAR-FORWARD ENDGAME

The 1980s have long been considered a defining period for the U.S. Navy. After two decades of perceived neglect at the hands of successive administrations, the Reagan era brought a windfall not only of funds to replace ageing ships, aircraft and equipment but also of public recognition and renewed confidence in U.S. naval capabilities. Of central importance in achieving this "naval renaissance"[5] was a series of strategic concepts collectively known as *The Maritime Strategy*. The undeniable success of naval planners in clarifying the U.S. Navy's purpose as an organization, its role in implementing a national military strategy, and its unique contribution to the U.S.-led Western security system at large still makes this an extremely relevant period to study. It may thus come as a surprise that this investigation should depart from the established narrative and find that the Cold War competition at sea was essentially decided during the *second* rather than the final phase of the competition.

The timeline, however, is very clear in this regard. Two periods are critical to our understanding of how U.S. naval supremacy was ultimately maintained. During the first period, the U.S. Navy established a technological lead, primarily centered on ASW, that the VMF could not overcome in time to allow it to compete at eye level in the central Atlantic. During the second period, the VMF adjusted its posture in line with its recognition of the fact that carriers were no longer the main threat, and that its primary mission of homeland defense should be refocused on its countervailing force of SSBNs and on their protection. Insofar as the U.S. Navy 'won' the Cold War at sea, it did so by turning practically the entire North Atlantic into a hostile environment for Soviet assets by the early 1970s and making sure that its SSBNs could not be countered by Soviet ASW assets like its carriers potentially could be by

[5] The idea of a 'renaissance' is explored in Frederick H. Hartmann, *Naval Renaissance: The U.S. Navy in the 1980s* (Annapolis, MD: Naval Institute Press, 1990).

the Soviet ACW effort. For all the serious internal challenges and shortcomings the U.S. Navy faced during the 1960s and 1970s, these achievements nonetheless predated the Reagan defense built-up.

Hence, this study makes the case that the competition was actually decided early on; and to the extent that it was *not* decided early on it, it was still decided long before *The Maritime Strategy* came along. The lag times associated with many of the key adaptations that came into the fleet during the 1980s confirm this. As we have seen, *Aegis* development began in the 1950s and the system had been extensively tested by the late 1970s. The *Los Angeles*-class SSN was a late 1960s design. The *Tomahawk* missile program dates back to the early 1970s. The *Ticonderoga*-class guided-missile cruiser was another 1970s design. The list goes on. A similar point can be made about the employment concepts of most of these systems, which did not change radically in the *Maritime Strategy* environment. It is certainly true that the Maritime Strategy debates succeeded in "making many more or less implicit ideas explicit,"[6] but the core elements – including far-forward carrier operations and ASW, under-ice submarine operations, the Outer Air Battle, and expanded use of EMCON and deception measures – were extensions of existing capabilities and concepts, many of which were *anything but* novel.

What followed in the 1980s was the exploitation of the advantages that the U.S. Navy had successfully built and maintained during the first and second phases, and the integration of existing and projected capabilities into a more developed 'umbrella' framework that proceeded from the knowledge that the VMF had already voluntarily ceded the high seas as a main focus of the Cold War competition. The final phase of the Cold War at sea saw the culmination of the U.S. Navy's success in maintaining a meaningful advantage over its Soviet counterpart. *The Maritime Strategy* secured the gains that had been made over the preceding decade and further expanded the margin of advantage that already existed at the end of the second phase. It can be credited for explaining the state-of-the-art of U.S. naval operations with a clarity and focus that had long been absent in both the Navy's internal debates and in the public discourse. It reasserted naval supremacy both intellectually and through its forceful displays of American seapower. The claim that it also *decided* the Cold War naval competition

[6] Norman Friedman, *The US Maritime Strategy* (London: Jane's, 1988), 2.

in the U.S. Navy's favor, on the other hand, is difficult to square with what we know about the longer-term dynamics of that competition and, thus, not supported by this investigation.

THE CENTRAL ROLE OF SEA-BASED NUCLEAR STRIKE FORCES

The history of the Cold War naval competition is, first and foremost, the history of seapower during the formative years of the nuclear age. 'Strategic' nuclear weapons fundamentally changed the dynamics of naval competition, certainly as far as the Soviet side was concerned. The Soviet obsession with the vulnerability of the homeland to sea-based strikes can almost certainly be traced to factors that predate the nuclear age, but the extent to which nuclear weapons amplified that concern is difficult to overestimate. For the Soviet armed forces of the Cold War era, war at sea was about strategic defense against a nuclear-armed naval opponent, front and center. While its level of ambition and elements of its posture changed over time, this was the VMF's organizational essence throughout the Cold War period. To claim that *any* other mission rose to the same level of importance or influenced Soviet naval posture planning to the same extent would require us to willfully ignore troves of the best available evidence and to inflate the importance of secondary concerns far beyond what the evidence supports.

As a result, we cannot fully understand the Cold War at sea if we examine it primarily through the prism of conventional naval operations. The U.S. Navy did not share the Soviet Navy's single-minded concern with strategic defense of the homeland – in the immediate sense of developing and deploying its forces to counter Soviet sea-based delivery systems, that is. The fact that even the anti-SSBN operations envisioned during the *Maritime Strategy* era were still justified as a means to an end with reference to SLOC defense illustrates just how stark the difference in outlook was.[7] There was no need, however, for both competitors to subscribe to the same logic for the dynamics of the confrontation to be driven by the existence of sea-based nuclear strike forces to an extent that is not widely understood outside a small group of issue experts. What we can take away from this historical reality is that both the context in which a naval competition takes place and the specific outlook of the opponent are

[7] Linton F. Brooks, "Naval Power and National Security: The Case for the Maritime Strategy," *International Security* 11, no. 2 (1986), doi:10.2307/2538958, 81-82.

deeply important in understanding its dynamics, as well as its eventual outcome. Naval postures should be expected to reflect not only narrowly defined naval concerns, but also the interaction between the competitors' security concerns more broadly – even those, and perhaps especially those, that strike the Western observer as alien, irregular, or irrational.

TACTICAL NUCLEAR WEAPONS AT SEA SHOULD BE A FOCUS OF RESEARCH

While the strategic nuclear element played a more fundamental role in shaping the Cold War naval competition, the lack of scholarly attention that has been paid to the prospect of tactical nuclear war at sea is remarkable in and of itself. TNW were introduced early in the competition and they became a pervasive feature of both sides' naval postures, especially in anti-submarine defense but also in Soviet anti-ship missiles and in some surface-to-air missile warheads. What is less clear is that the U.S. Navy's uneasy relationship with its TNW arsenal was matched by similar wariness and unease on the Soviet side.[8] In fact, nuclear war at sea was one of the areas in which the VMF may have enjoyed a significant advantage. Given that it was also the weaker of the two competitors and the one that was likely to be driven back and eventually pinned against the Soviet coast as a conflict progressed, we have to ask whether measures designed to make a U.S. conventional win more likely did not also significantly increase the probability of nuclear war at sea, rendering it a rather more likely scenario than most treatments of the subject would have us believe.

Of course, as long as the nuclear "balance of terror"[9] held, the VMF's sea denial posture did not actually have to carry the main burden of protecting the Soviet homeland. But if U.S. and Soviet planners felt the war could remain conventional, as they increasingly thought possible from the early 1970s onwards, the limitations of the VMF's ability to deter a U.S. naval push up to, and perhaps beyond, the Arctic circle fully came into play. The consequences are difficult to estimate in counterfactual terms, but the possibility that the U.S. Navy might have been disabused of the notion that the VMF would not use tactical nuclear weapons at sea relatively early in a conflict should strike us as rather significant. Interestingly enough, this is

[8] Desmond Ball, "Nuclear War at Sea," *International Security* 10, no. 3 (1985), doi:10.2307/2538940, 25-26.
[9] Albert Wohlstetter, "The Delicate Balance of Terror," *Foreign Affairs* 37, no. 2 (1959), 211-34.

an issue that did not figure very prominently in later criticisms of the far-forward *Maritime Strategy* of the 1980s.[10] How exactly the U.S. Navy imagined it would prevent the VMF from falling back on the routine use of TNW as it was pushed back into its main defensive zone has remained obscure. Of course, TNW will not necessarily figure as prominently in future naval competitions. But since their role is not well understood even in the Cold War case, and their attraction as a means of countering U.S. naval supremacy still persists, we would do well to study them much more closely than has hitherto been the case.

THE ENDURING CHALLENGE OF AIRCRAFT CARRIER VULNERABILITY

Much of this investigation has revolved around the development of Soviet anti-carrier forces as a response to the U.S. Navy's 'attack-at-source' paradigm. The VMF invested a very significant share of its resources in anti-carrier warfare and, for a time, embraced it as its main priority. The U.S. Navy's efforts to ensure the future viability of its attack carriers were similarly complex and resource-intensive and we have already concluded that they were highly significant in mitigating the anti-carrier threat to the extent that more aggressive carrier operations remained thinkable and bureaucratically viable even in the late 1970s and early 1980s. The ways in which technical and doctrinal solutions were combined in pursuing that outcome remain highly instructive today and for the future.

There is, however, a more general finding on carrier vulnerability to be drawn from this investigation as well – one that may ultimately be more significant: while it is true that carrier vulnerability was significantly modulated by techno-doctrinal developments on both sides of the Cold War competition, it is ultimately best seen as a constant rather than a variable. Like any warship, including previous capital ships, aircraft carriers that are deployed into the jaws of enemy defenses in a great power conflict may suffer significant – perhaps crippling – damage. Overall, U.S. fleet carriers from the *Essex*-class onwards have proven exceptionally

[10] A rare treatment of the subject in the context of the *Maritime Strategy* is Donald C. F. Daniel, "The Soviet Navy and Tactical Nuclear War at Sea," *Survival* 29, no. 4 (1987), doi:10.1080/00396338708442367, 318-35. Daniel believes that the Soviets would have been reluctant to use TNW first in an at-sea scenario, unless they were already being used on land (334), but there is little in the way of high-quality evidence to suggest that this was so. In the absence of such evidence, mirror-imaging was (and still is) a distinct possibility.

sturdy and survivable, despite suffering extreme damage in some cases. They are less likely to be lost to such damage than any other type of warship. But they have never been, and will never be, invulnerable or unsinkable. At the same time, they have proven themselves capable of operating in high-threat environments in the past and their survivability has grown, if not in proportion to the threat, then certainly to such an extent as to keep them viable unless, and until proven otherwise.

Historically, there has been only one factor that could quickly and reliably tilt the balance between threat and survivability in the attacker's favor: an ACW paradigm that fully embraced the destructiveness of tactical nuclear weapons would have rendered far-forward operations suicidal. Given that some leakage of missiles and torpedoes cannot be prevented in a real-life scenario, all-nuclear saturation attacks executed with some skill, using adequate platforms and weapons, could spell the end of any carrier battle group – no matter how well trained, led, equipped, or organized. This was true under Cold War conditions, and it remains true today.

THE FULL POTENTIAL OF SEA DENIAL REMAINS UNEXPLORED

One of the most interesting questions that the outcome of the Cold War naval competition raises is whether the VMF's failure to create credible sea denial zones beyond the near seas is primarily case-specific or if naval postures designed to achieve negative aims are doomed in general. Due to the nature of the investigation and because there are no truly comparable cases on record, we cannot possibly resolve that issue based on the findings of this dissertation. However, this may amount to a significant finding in itself. Since the historical data on large-scale, oceanic sea denial in the missile age is limited and the Soviet challenge was somewhat abridged by the VMF's reversion to the near-seas focus, we do not know what a maximum sea denial effort by one significant naval power against another can (or cannot) achieve. Thus, statements to the effect that sea denial postures are doomed to fail are certainly not sufficiently grounded in historical fact to amount to viable generalizations, and the same would seem to be true of countervailing claims as well. Can an all-out sea denial challenge drive a leading sea power from the high seas? We simply do not know. However, if the Cold War at sea is any indication, the capabilities that are necessary to achieve effective, full-scale sea denial will certainly *not* come cheap and there is, in fact, likely to be significant overlap with a sea control posture in the later stages of the challenge.

PAST MISCONCEPTIONS ARE A CAUSE FOR CONCERN TODAY

Looking back at Western assessments of the threat posed by the VMF on the high seas, several aspects of the analytical record should strike us as remarkable. *First*, it is encouraging that some analysts – often those who went against the grain, challenging organizational conformism and conventional wisdom, as Robert Herrick and Michael MccGwire did in their respective countries – made many of the right judgement calls early in the competition, based on limited information and working mostly from Russian-language sources. Because there are limits to what such individuals can achieve in the bureaucratic environment, there is a definite role for open-source analysis and expert debate outside the confines of government agencies in exploring such perspectives further. Based on the Cold War record, political decision-makers and officials who work to stifle such exchanges, including through rampant over-classification, would be doing the adversary a favor.

Secondly, it took the Western naval and intelligence bureaucracies decades to understand their Soviet opponent and even then, it was largely as a result of the contrarian perspectives of individual analysts ultimately taking hold. Even at the end of our investigation period, parts of the U.S. Navy itself were still actively resisting the finding that the Soviet Union's naval posture was, in fact, geared towards zone defense rather than SLOC interdiction. Of course, it is not surprising that large organizations are much less agile than individual analysts in reexamining accepted precepts and heuristics. The evidentiary requirements for organizational change *should* be higher than those an individual analyst can reasonably apply. After all, the consequences of writing an intelligence report or publishing a book and those of implementing significant change to an aspect of the national military strategy are of a different magnitude as well.

What is worrying, however, is that organizational resistance to change often appears to have been based on unquestioned assumptions rather than on an existing, evidence-based understanding of the adversary's calculus. Many of these assumptions were based on valuable, but not necessarily transferable experiences from past wars and competitions, which the VMF ended up defying. It is difficult to fathom how the *lack of* experience in naval warfare over the last several decades impacts the quality of our judgements today, or how it will bear on the quality of future research, but there is ample reason to guard against the intellectual indolence and disregard for conflicting evidence that was characteristic of many mainstream products of Cold War naval analysis.

6.3 Facing a future war at sea

Although this investigation has been focused on a particular historical case, it was not undertaken in a vacuum. The second decade of the 21st century has seen the return of long-term strategic rivalry as the central reality of international relations. Ongoing and future sea denial challenges will differ in important ways from those of the Cold War era. They will be shaped, among other factors, by altered public perceptions of conventional military operations, the changing and unclear nuclear-conventional balance, the prospective lethality of next-generation ship-killing weapons, the uncertain potential of new technologies like directed energy weapons and artificial intelligence, and the lack of responsive military-industrial capacities in the West.

At the same time, many of the broader questions that arose in the course of the Cold War competition will no doubt ring familiar for any student of U.S. defense planning in the early 21st century: *Can the U.S. remain politically engaged and militarily effective in shielding its allies overseas from coercion and political destabilization, even as prospective opponents develop new technologies and doctrines that are designed to undermine its forward military posture? How are stable deterrence and credible crisis response possible even as the vulnerabilities of U.S. naval and theater forces continue to grow?* Far from being an exercise of purely historical interest, then, this investigation can also speak indirectly to more contemporary concerns about anti-access and area denial strategies, which have focused on the Chinese People's Liberation Army (PLA) and on Russia's resurgent armed forces in particular.[11] As the underlying ideas and technologies spread, other actors may follow suit, potentially making power projection from the sea a much harder proposition that it has been at any time since the downfall of the Soviet Union.[12] It would seem therefore worthwhile to explore systematically and in detail the legacy of an earlier era that differed in circumstances but posed roughly similar problems, as far as the question of operational access is concerned.

Critics will be quick to point out some notable differences between the case examined here and newly emerging naval competitions: three decades of technological change, the diminished importance of the strategic nuclear balance, much higher levels of integration in the global economy, and a real reluctance to firmly commit to the military containment of potential adversaries, among others. Yet, even if one is inclined to grant all of these objections, the requirement for maritime operational access remains at the heart of the United States' global defense problem. As has long been recognized, effective deterrence short of the threat of all-out strategic nuclear war rests on the ability to instill in the opponent the firm recognition that a quick military victory, or one that comes without disproportionate costs and risks, is not in the cards.[13] The United States has, for the past seventy-five years, consistently forward-deployed a significant, but not preponderant, share of its military forces in support of treaty allies and 'strategic partners'. To avoid a breakdown of conventional deterrence, or to deal with any such breakdown in the event, it must rely on its ability to logistically sustain and augment these frontier forces as necessary. This has led to a renewed awareness that, without firm control over critical sea lines of communication, neither of these tasks looks feasible. Moreover, given that the U.S. has continues to invest heavily in carrier-centric power projection, any opposing land power would gain considerable advantages, in addition to its geographical proximity and much lower spending on naval forces, if this offensive potential

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[11] See: Stephan Frühling and Guillaume Lasconjarias, "NATO, A2/AD and the Kaliningrad Challenge," *Survival* 58, no. 2 (2016), doi:10.1080/00396338.2016.1161906, 95-116; Martin Zapfe and Michael C. Haas, "Access for Allies? NATO, Russia and the Baltics," *The RUSI Journal* 161, no. 3 (2016), doi:10.1080/03071847.2016.1193355, 34-41.

[12] This case was expertly made in Andrew F. Krepinevich, "Why AirSea Battle?" (CSBA/Office of Net Assessment, Washington, DC, 2010).

[13] John J. Mearsheimer, *Conventional Deterrence* (Ithaca, NY: Cornell University Press, 1983), 63-66.

cannot be effectively arrayed against it.[14] This is certainly no less true today than it was half a century ago.

However, despite our awareness of the continued relevance of these and other factors, the likely realities of a future war at sea have not sunk in. Our awareness of the extreme lethality of modern naval combat remains theoretical and the assumptions that are applied to potential conflict scenarios are often entirely naïve. To expect that a 21st century war at sea can be fought without grievous losses in ships, aircraft, sailors and aircrew far beyond anything the U.S. public – let alone those of its allies – are accustomed to, is to fundamentally misunderstand the nature of any such conflict. Given that such misunderstandings will, if anything, increase the likelihood of conflict, the time has arrived for naval analysts to firmly embrace the core of their profession and to consider earnestly and in great detail the momentous implications of a coming war at sea.

[14] The fact that China is investing heavily in anti-carrier forces, as did the Soviet Union before it, is testimony to the continuing relevance of this potential in the eyes of possible opponents. See e.g. Roger Cliff et al., *Entering the Dragon's Lair: Chinese Antiaccess Strategies and Their Implications for the United States* (Santa Monica, CA: RAND, 2007), 71-76.

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Bryan Clark	Washington, DC, 19 May 2016
Dr. Christine H. Fox	Laurel, MD, 19 May 2016
Dr. Norman Friedman	Arlington, VA, 10 May 2016
Dr. John T. Hanley, Jr.	Alexandria, VA, 12 May 2016
CAPT John Hammerer, USN (ret.)	Arlington, VA, 18 May 2016
RADM Jerry Holland, USN (ret.)	Alexandria, VA, 20 May 2016
ADM James “Ace” Lyons, Jr., USN (ret.)	Alexandria, VA, 11 May 2016
RADM Mike A. McDevitt, USN (ret.)	Arlington, VA, 11 May 2016
Dr. Robert J. Murray	Alexandria, VA, 9 May 2016
Ronald O’Rourke	Washington, DC, 13 May 2016
Dr. Sarandis “Randy” Papadopolous	Washington, DC, 20 May 2016
Hon. Robert B. Pirie, Jr.	Alexandria, VA, 12 May 2016
Norman Polmar	Arlington, VA, 10 May 2016
Prof. David A. Rosenberg	Washington, DC, 16 May 2016
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RED PERIMETER DEFEATED: U.S. NAVAL SUPREMACY, COMPETITIVE ADAPTATION, AND THE THIRD BATTLE OF THE ATLANTIC, 1946-1981

Deutschsprachige Zusammenfassung der Dissertation

gemäß §12, Absatz (2) der Promotionsordnung (Satzung) der Philosophischen Fakultät der Christian-Albrechts-Universität zu Kiel vom 19. Februar 2014

1. Einleitung

Die vorliegende Dissertation untersucht die Dynamik des militärischen Wettbewerbs auf See zwischen den Supermächten USA und Sowjetunion über einen Zeitraum von rund 35 Jahren, von 1946 bis 1981. Im Mittelpunkt stehen die langfristigen Anpassungsmuster zwischen den bürokratisch hauptverantwortlichen Organisationen: der United States Navy (USN) und der *Voyenno-morskoy flot SSSR* ("Militärisch-maritime Flotte der UdSSR", kurz: VMF). Während des fraglichen Zeitraums bereiteten sich die beiden führenden Marineorganisationen und ihre Alliierten intensiv auf einen Krieg in den Weiten des Nordatlantiks, des Westpazifiks und ihrer Nebenmeere vor. Wäre ein solcher Konflikt tatsächlich ausgebrochen, wären zum ersten und zugleich vielleicht auch zum letzten Mal in der Seekriegsgeschichte Lenkflugkörper und Atomwaffen in großem Umfang zum Einsatz gekommen.

Die Geographie des bestimmenden, nordatlantischen Schauplatzes stellte die NATO dabei vor beträchtliche Schwierigkeiten. Um die in Europa stationierten Kräfte der USA in einer Krise verstärken und das Gesamtdispositiv im Konfliktfall weiter aufrecht erhalten zu können, war der Schutz der Seeverbindungen quer über den Atlantik unabdingbar. Westliche Analysten erwarteten lange, dass sich die Seestreitkräfte der NATO-Verbündeten und damit vor allem die U.S. Navy schnell in einer „Dritten Atlantikschlacht"[1] wiederfinden würden. Diese Vorstellung erwies sich zwar als weitgehend unzutreffend. Unter den gegebenen Umständen musste die NATO jedoch mit einem entschlossenen Vorgehen der VMF gegen die verwundbaren Verbindungslinien rechnen.

Die Idee einer „Dritten Atlantikschlacht" wird dabei in dieser Dissertation zwar als nützlicher Bezugsrahmen für die maritime Mächtekonkurrenz des Kalten Krieges aufgenommen. Zugleich wird jedoch festgehalten, dass dies nur für einen Teil des Kalten Krieges auf See sinnvoll möglich ist. Dieser kann in drei Phasen unterteilt werden. In der ersten Phase (ca. 1946-1960) begann sich die U.S. Navy auf die Machtprojektion gegen sowjetische Landziele zu konzentrieren, während die VMF den Aufbau eines geschichteten Verteidigungssystem gegen nukleare Trägerangriffe vorantrieb, das gegen Ende dieses Zeitrahmens nur wenig in den Nordatlantik hineinragte. Die zweite Phase (ca. 1961-1981) war geprägt von der Verlagerung des strategisch-nuklearen Potentials der U.S. Navy von ihren Trägerverbänden hin zur U-Boot-Flotte. Unterdessen entwickelte die VMF ihr ozeanisches Verteidigungsdispositiv entscheidend weiter und bildete zugleich eine erste, noch sehr begrenzte Fähigkeit für Atomschläge gegen Ziele auf dem amerikanischen Kontinent aus. Dies führte nicht zuletzt auch zu einem verstärkten „Sicherheitsdilemma auf hoher See."[2]

Gegen Ende dieser Phase kam es jedoch zu einem erneuten sowjetischen Paradigmenwechsel. Anstatt weitere Ressourcen in ein immer umfangreicheres, ozeanisch ausgerichtetes *sea denial*-System zu investieren, konzentrierten sich die Bemühungen der Sowjetmarine ab Mitte der 1970er Jahre wieder wesentlich stärker auf die Nahzone. Der Schwerpunkt der sowjetischen Ambitionen auf See war von nun an wieder die Barentssee und im Fernen Osten das Ochotskische Meer. In der dritten und letzten Phase (1981-1991) versuchte die U.S. Navy anhand der *Maritime Strategy* der Reagan-Ära diese Verschiebung in eine umfassende Überlegenheit umzumünzen. Während die ersten beiden Phasen durchaus als umfassende Vorbereitungen auf der Ebene der „Posture"[3] für den Fall einer „Dritten

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[1] Vgl. Owen R. Cote, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarine,* Newport Papers 16 (Newport, RI: Naval War College Press, 2003).

[2] Interview mit CAPT Peter M. Swartz, USN (ret.), Arlington, VA, 12. Mai 2016.

[3] Vgl. Karl-Peter Stratmann, "Die Sicherheit des NATO-Abschnitts Mitteleuropa als strategisches Problem: Untersuchungen zur Glaubwürdigkeit der gegenwärtigen NATO-'Posture'" (Dissertation, Ludwig-Maximilians-Universität, 1978), 6.

Atlantikschlacht" beschrieben werden können, ist die dritte Phase aufgrund ihres Fokus auf dem maritimen Nahbereich der Sowjetunion schwer anhand dieses Konzepts zu fassen.

Der Schwerpunkt der vorliegenden Untersuchung liegt auf den beiden Phasen, die schließlich zu dem stillschweigenden Eingeständnis der Sowjetunion führten, mit der US-Marine auf hoher See nicht länger sinnvoll konkurrieren zu können und vielleicht auch nicht zu müssen. Statt in der dritten Phase, wie oft behauptet wurde, muss der Wettbewerb auf hoher See im Wesentlichen während dieser früheren Phasen entschieden worden sein. Das letztendliche Ergebnis der Seemachtkonkurrenz des Kalten Krieges wirft dabei wichtige Fragen auf: *Wie ist es der U.S. Navy gelungen, ihren militärischen Vorsprung langfristig zu stützen und zu erhalten? Warum gelang es der Sowjetmarine nicht, ein wirksames System zu entwickeln, um die Projektionskräfte der US-Marine dauerhaft in Schach zu halten?* Dies sind die Fragen, die diese Dissertation anhand einer theoretisch fundierten Analyse der ersten beiden Phasen des Kalten Krieges auf See untersuchen will. Konkret beschäftigt sie sich mit dem Wettbewerb zwischen der sowjetischen *sea denial*-Posture – ein etwas schmälerer und weniger umstrittener Begriff als das *anti-access/area denial* des frühen 21. Jahrhunderts – und den Anstrengungen der U.S. Navy zur Erhaltung der Seeherrschaft durch „transozeanische"[4] Machtprojektion.

Die beiden Hauptteile der Untersuchung sind dabei in vier Kapitel gefasst, wobei zwei dieser Kapitel konzeptioneller Natur und zwei auf die Empirie der Mächtekonkurrenz auf See fokussiert sind. Kapitel 2 befasst sich mit der einschlägigen theoretischen Literatur. Das Kapitel plädiert für einen hybriden Ansatz, der Elemente der System- und Organisationstheorien kombiniert, um das bestmögliche Gleichgewicht zwischen analytischer „Hebelwirkung" und empirischer Präzision in unserer Betrachtung der historischen Datenlage zu erreichen. Kapitel 3 entwickelt anschließend die Annahmen, die dem hybriden Ansatz zugrunde liegen sowie ein Kausalmodell als Leitfaden für die empirischen Teile. Ebenfalls in diesem Kapitel werden die Prozessanalyse (*process tracing*) als primäre Methode und mehrere unterstützende Methoden vorgestellt, die sich im Wesentlichen aus den Arbeiten führender Marineanalysten speisen.[5] Die beiden folgenden Kapitel präsentieren die

[4] Samuel P. Huntington, "National Policy and the Transoceanic Navy," *USNI Proceedings* 80, Nr. 5 (1954), https://www.usni.org/magazines/proceedings/1954/may/national-policy-and-transoceanic-navy.
[5] Siehe etwa: Sam J. Tangredi, *Anti-Access Warfare: Countering A2/AD Strategies* (Annapolis, MD: Naval Institute Press, 2013).

Ergebnisse der Prozessanalysen. Kapitel 4 beschäftigt sich mit der ersten Phase (1946-1960) wobei die zentralen Dimensionen der amerikanischen-sowjetischen Seemachtkonkurrenz – die Anti-U-Boot-Kriegführung und die Flottenluftverteidigung – nacheinander betrachtet werden. In diesem Kapitel werden die Grundlagen für den langfristigen Vorteil der US-Marine offengelegt, der weitgehend auf diese erste Phase zurückzuführen ist. In Kapitel 5 wird analog vorgegangen, wobei zunächst die Verlagerung der sowjetischen Anstrengungen hin zu einer ambitiöseren, ozeanischen „Posture" mit Fokus auf die amerikanischen Trägerkampfgruppen und anschließend die erneute Ausrichtung auf den Nahbereich untersucht wird. Anhand dieses *process tracing* lassen sich viele der Trends und Entscheidungspunkte identifizieren, die schließlich zum Erhalt der langfristigen Überlegenheit der U.S. Navy führten. Im Schlusskapitel werden die wichtigsten Schlussfolgerungen und Beobachtungen nochmals zusammengefasst und die Ergebnisse einer Bewertung aus der Perspektive des 21. Jahrhunderts unterzogen.

2. Einbettung in die Literatur

Während geostrategische Rivalitäten zwischen Seemächten und Landmächten – wie auch zwischen rivalisierenden Seemächten – Generationen von Staatsmännern, Marinestrategen und Historikern beschäftigt haben, haben die Sozialwissenschaften in den vergangenen 70 Jahren nur sporadisches Interesse gezeigt. Das interdisziplinäre Feld der strategischen Wissenschaft, das sich zunächst mit Fragestellungen im Kontext der thermonuklearen Revolution und anschließend mit dem – scheinbaren – Wegbrechen dieser Forschungsagenda in den 90er Jahren befasste, ist in dieser Hinsicht nur in Teilen eine Ausnahme. In der breiteren Subdisziplin der *Security Studies* sind diese Fragestellungen noch weniger verankert.[6] Die

[6] So kommt etwa die führende *intellectual history* der Disziplin ohne einen einzigen Verweis auf diese Zusammenhänge aus. Vgl. Barry Buzan and Lene Hansen, *The Evolution of International Security Studies* (Cambridge: Cambridge University Press, 2010). Wichtige Ausnahmen von der Regel sind: Kenneth E. Boulding, *Conflict and Defense: A General Theory* (New York: Harper, 1962); John J. Mearsheimer, *The Tragedy of Great Power Politics* (New York, NY: W.W. Norton, 2001), esp. 114-25; George Modelski and William R. Thompson, *Seapower in Global Politics: 1494 -1993* (Basingstoke: Macmillan, 1988); Jack S. Levy and William R. Thompson, "Hegemonic Threats and Great-Power Balancing in Europe, 1495-1999," *Security Studies* 14, no. 1 (2005), doi:10.1080/09636410591001465; Jack S. Levy and William R. Thompson, "Balancing on Land and at Sea: Do States Ally against the Leading Global Power?," *International Security* 35, no. 1 (2010), doi:10.1162/ISEC_a_00001, 7-43.

Kombination theoretischer und historischer Ansätze hat jedoch großes Potential, wenn es darum geht, das Phänomen der Mächtekonkurrenz auf hoher See und hier insbesondere den Fall des Kalten Krieges besser zu verstehen.

Die – meist zeitgenössische – Spezialliteratur über den Kalten Krieg auf See bietet hierfür eine solide Ausgangbasis. Gleichzeitig ist sie in Teilen schwer zugänglich und insgesamt stark fragmentiert geblieben. Ein Großteil der verfügbaren Informationen wurde noch nie zu einer lesbaren Synthese verwoben. Obwohl es sich hierbei um ein Defizit handelt, das in Form einer wissenschaftlichen Einzelleistung schwer zu beheben ist – außer vielleicht durch eine bislang ausständige, monumentale Gesamtbetrachtung in mehreren Bänden – sind nennenswerte Fortschritte durchaus möglich.

Was diese vorliegende Untersuchung betrifft, so liegt die Zahl der verwertbaren und hochwertigen Quellen, auf die zurückgegriffen werden kann, zumindest im höheren dreistelligen Bereich. Die Dissertation erschließt als Beitrag im Bereich der strategischen Wissenschaft somit kein historisches Neuland. Indem sie jedoch eine theoretisch unterfütterte, analytische Darstellung der Rivalität zwischen der U.S. Navy und der Sowjetmarine in den Jahren 1946-1981 liefert und den fragmentierten Kenntnisstand zu einer prozesszentrierten Synthese weiterentwickelt, leistet sie einen wichtigen Beitrag zum Verständnis dieser maritimen Mächtekonkurrenz, die in jüngster Zeit aus gutem Grund wieder stärker ins Interesse der Nachwelt gerückt ist.

3. Theoretische Grundlage und Analysemodell

Die Entwicklung eines angepassten Analyserahmens für die vorliegende Untersuchung bedurfte einer umfangreichen Beschäftigung mit mehreren relevanten Strängen der Theoriebildung im Bereich der Internationalen Beziehungen und der strategischen Wissenschaft. In Kapitel 2 der Dissertation werden mehrere wichtige Säulen eines solchen Rahmens identifiziert. Erstens wird festgehalten, dass sich strategische Rivalitäten tendenziell um die Ausbildung beziehungsweise den Erhalt militärische Vorteile drehen und dass diese Vorteile nicht in erster Linie vom Stand der Wehrtechnik im internationalen System bestimmt werden, wie es die *offense-defense theory* behauptet hat, sondern durch die Akteure selbst geschaffen werden.[7] Zweitens wird festgestellt, dass Strukturtheorien allein nicht erklären können, wie sich militärische Wettbewerbe im Laufe der Zeit entwickeln und warum sie in spezifischen Fallstudien zu den beobachteten Ergebnissen führen. Obwohl Bedrohungswahrnehmungen der hauptsächliche Treiber der militärischen Anpassung sind, sagen sie uns *per se* nur wenig über die Reaktionen, die auf der Ebene des einzelnen Staates formuliert werden und die zudem stark von den Präferenzen militärischer Organisationen auf der Ebene unterhalb der außenpolitischen Entscheidungsfindung beeinflusst werden. Drittens wird klar, dass ein hybrides Framework, das Erkenntnisse der Organisations- und Bürokratietheorie aufgreift, viele der Lücken schließen kann, die eine systemische Perspektive für sich genommen hinterlassen würde.

In Anbetracht dieser Zwischenergebnisse wird im Kapitel 3 ein Analyserahmen ausformuliert, der in besonderem Maße darauf ausgerichtet ist, die Muster und Dynamiken militärischer Anpassungsprozesse jenseits einer rein strukturellen oder rein organisationsbezogenen Anschauungsweise bestmöglich fassen zu können. Nachdem sich gezeigt hat, dass ein theoretischer beziehungsweise konzeptueller Ansatz „von der Stange“ diesem Anspruch nicht gerecht werden kann, handelt es sich hierbei um ein „modulares Framework“[8], das Elemente des neoklassischen Realismus mit Erkenntnissen aus der Organisationstheorie harmonisch verbindet. Die Hauptkomponenten dieses Analyserahmens sind (1) die strukturtheoretische Erkenntnis, dass externe militärische Bedrohungen in einer langfristigen strategischen Rivalität der primärer Treiber des Staatsverhaltens sind, (2) die Einsicht, dass militärische Vorteile von den Akteuren selbst geschaffen und aufrechterhalten werden, und sich keineswegs direkt aus systemischen Entwicklungsprozessen ergeben, (3) eine Fokussierung auf Marineorganisationen als bürokratische Akteure, die durch eine

[7] Siehe dazu: Charles L. Glaser and Chaim Kaufmann, "What Is the Offense-Defense Balance and How Can We Measure It?," *International Security* 22, no. 4 (1998), doi:10.1162/isec.22.4.44, 44-82; Robert Jervis, "Cooperation under the Security Dilemma," *World Politics* 30, no. 02 (1978), doi:10.2307/2009958; Jack S. Levy, "The Offensive/Defensive Balance of Military Technology: A Theoretical and Historical Analysis," *International Studies Quarterly* 28, no. 2 (1984), doi:10.2307/2600696, 219-38; Keir A. Lieber, *War and the Engineers: The Primacy of Politics over Technology* (Ithaca, NY: Cornell University Press, 2008); Sean M. Lynn-Jones, "Offense-Defense Theory and Its Critics," *Security Studies* 4, no. 4 (1995), doi:10.1080/09636419509347600 660-91; George H. Quester, *Offense and Defense in the International System* (New Brunswick, NJ: Transaction Books, 2002); Jonathan Shimshoni, "Technology, Military Advantage, and World War I: A Case for Military Entrepreneurship," *International Security* 15, no. 3 (1990), doi:10.2307/2538911, 187-215.

[8] Fritz W. Scharpf, *Games Real Actors Play: Actor-Centered Institutionalism in Policy Research* (Boulder, CO: Westview Press, 1997), 30-31.

komplexe Mischung organisationaler Eigeninteressen mit gesamtstaatlichem Verantwortungshandeln motiviert sind, und (4) die Erwartung, dass die Reaktionen militärischer Organisationen auf externe Bedrohungen durch ihre Perzeptionen der äußeren Umwelt aber auch durch innerstaatliche Entwicklungen geprägt sind, die sich ihrer unmittelbaren Kontrolle entziehen.

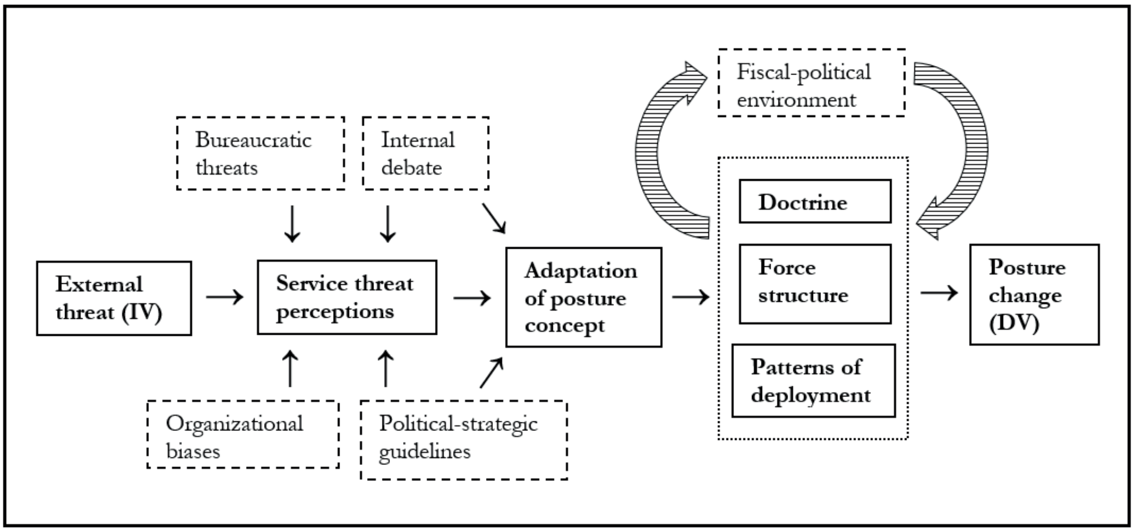

Abb 1. Analyserahmen: Anpassungsprozess militärischer „Postures“

Dieser Rahmen wird einerseits im Zuge der detaillierteren Auseinandersetzung mit der theoretischen Literatur in Kapitel 2 vorgezeichnet und Schritt für Schritt entwickelt und andererseits im Kapitel 3 näher spezifiziert.

4. Methodik

Ebenfalls in Kapitel 3 werden die Methoden dargestellt, die im Rahmen des Forschungsprozesses zum Einsatz kamen, der in den folgenden Kapiteln abgebildet ist. Während als Hauptmethode die Prozessanalyse (*process tracing*) zum Einsatz kommt, macht unser Erkenntnisinteresse zugleich auch den Einsatz einer Reihe von unterstützenden Methoden notwendig, die ursprünglich von professionellen Marineanalysten während des Kalten Krieges (weiter)entwickelt wurden. Hierbei ist insbesondere auf die Hardware-Analyse und die Literaturanalyse zu verweisen. Ihr Einsatz erfolgt unmittelbar im Zuge des *process tracing*, um aus dem vorhandenen Datenmaterial brauchbare Schlüsse über die einzelnen Prozessschritte ableiten zu können.

Wie viele Schlüsselbegriffe, -methoden und -ansätze in den Sozialwissenschaften ist auch die Prozessanalyse in Teilen umstritten. In ihrer Grundform sehr intuitiv, ist sie gerade in jüngster Zeit zum Gegenstand einer spezialisierten Methodenliteratur geworden. Diese Entwicklung scheint zumindest teilweise darauf abzuzielen, eine zentrale Methode der politikwissenschaftlichen Forschung gegen den Vorwurf der szientistisch orientierten Sozialwissenschaften zu immunisieren, wonach sie im direkten Vergleich mit quantitativen oder quasi-quantitativen Methoden nicht ausreichend spezifiziert sei. Dieser Diskurs wird kurz nachvollzogen und anschließend eine pragmatische Einordnung unseres Verständnisses der Prozessanalyse vorgenommen.

Im Bereich der unterstützenden Methoden ist unter anderem auszuführen, inwiefern sich die Hardware-Analyse von den vielfach kritisierten "Bean Counting"-Übungen abhebt und zu erläutern, warum sie wesentliche Rückschlüsse auf der Basis beobachteter Entscheidungen in der Entwicklung von Marinesysteme liefern kann.[9] Um zu solchen Schlussfolgerungen zu gelangen, müssen wir über die einfache Beschreibung der gegnerischen Streitkräftestrukturen beziehungsweise deren Entwicklung auf der Zeitachse deutlich hinausgehen. Vielmehr sind es die organisatorischen Annahmen und Präferenzen, die in die Waffenentwicklung einfließen, die eine Analyse von Plattformen und Waffensystemen aufdecken soll. Ziel ist es, ein besseres Verständnis der anderen Dimensionen einer „Posture", insbesondere der Doktrin und der Dislozierung, sowie unter Umständen auch der zugrundeliegenden Bedrohungswahrnehmungen zu erlangen.

Die wichtigste Ergänzung zur Hardware-Analyse während des Kalten Krieges war ein Ansatz, der sich verstärkt auf öffentliche Äußerungen sowjetischer Entscheidungsträger und interne Debatten konzentriert, um die Inhalte der Marinedoktrin und -politik freizulegen. Die Grundidee in diesem Fall war es, durch eine detaillierte Exegese mündlicher und schriftlicher Statements wichtige Erkenntnisse über strategische und operative Prioritäten über zukünftige Entwicklungen zu gewinnen. Die Methode stützt sich damit in hohem Maße auf die

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[9] Vgl. Joshua M. Epstein, *Measuring Military Power: The Soviet Air Threat to Europe* (Princeton, NJ: Princeton University Press, 1984), 131.

hermeneutische Sensibilisierung des Analysten. Anstatt zu versuchen, die verlorene Kunst der Analyse russischsprachiger, meist in marxistisch-leninistischer Terminologie gehaltener Materialien wiederzubeleben, nähert sie sich die Dissertation den vorhandenen literaturanalytischen Erkenntnissen aus der Perspektive des kritischen Konsumenten. In Summe ergibt so sich eine differenzierte Methodik, die in den beiden folgenden Kapiteln ein relativ ausgewogenes Bild der Mächtekonkurrenz auf See vermitteln kann.

5. Prozessanalyse der ersten Phase: 1946-60

Während der ersten Phase des Kalten Krieges auf See nahm die sowjetische Herausforderung rückblickend nur langsam Fahrt auf. Dennoch wurde deutlich, dass sich die sowjetische Landmacht ernsthaft und mit erheblichem Ressourceneinsatz gegen die Marinefähigkeiten des westlichen Bündnisses wappnen wollte. Obwohl die entsprechende Streitkräfteentwicklung im Laufe dieser Phase deutlich an Kontur gewann, war es allerdings die U.S. Navy, der es gelang ein tragfähiges Fundament für eine dauerhafte Überlegenheit zu schaffen. Im Fokus stand dabei die erwartete Bedrohung durch sowjetische U-Boote im mittleren Atlantik. Diese Bedrohung wurde auf beiden Seiten des Atlantiks gut verstanden und ihr Gewicht war aufgrund der historischen Erfahrungen unzweifelhaft. Außerdem konnte sich der Aufbau entsprechender Abwehrfähigkeiten auf Forschungsprogramme aus der Spätphase des Zweiten Weltkrieges, die eine starke Grundlagen-Komponente aufwiesen. Die Entwicklung eines dauerhaften Vorteils in der passiven Akustik nach dem Krieg beruhte unter anderem auf wichtigen Erkenntnissen dieser Forschungsanstrengungen. Drittens führte die Überschätzung des Potenzials der sowjetischen U-Bootflotte für offensive Operationen, basierend auf fragwürdigen Annahmen über ihren Zweck, zu einer stärkeren techno-doktrinalen Reaktion, als es ein genaues Verständnis der Problematik vielleicht erlaubt hätte. Dies bedeutete auch, dass Entwicklungswege, die ansonsten auf größeren bürokratischen Widerstand gestoßen wären – wie etwa die Umstellung auf Jagd-U-Boote mit Nuklearantrieb als zentrales Element der U-Bootabwehr – frühzeitig und energisch verfolgt wurden. Schließlich unterstützte die Idee, dass die VMF auf die Durchtrennung der Seeverbindungen der NATO zielte, auch eine frühzeitige Ausrichtung auf die U-Jagd gegen nuklear angetriebene Boote. Infolgedessen plante die U.S. Navy bereits gegen diese potentiell noch schwerwiegendere Bedrohung, bevor sie überhaupt zustande kam.

Zusammen mit sowjetischen techno-doktrinalen Präferenzen und Designentscheidungen, die im Nachhinein fragwürdig erscheinen, erlaubte diese Kombination von Faktoren der US-Marine die Ausbildung einer dauerhaften Überlegenheit in der Unterwasserkriegführung. Während historische Kontingenzen zweifellos eine wichtige Rolle bei der Realisierung der zugrundeliegenden Vorteile spielte, trägt die komplexe Beziehung zwischen überzogenen, aber bürokratisch bequemen, Bedrohungswahrnehmungen und Reaktionen auf der Ebene der U-Bootabwehr wesentlich dazu bei, die Ergebnisse dieser frühen Phase der Mächtekonkurrenz auf See zu verstehen. Gleichzeitig waren die Reaktionen der USA auf die Bedrohung durch die sowjetische U-Boot-Flotte so groß, dass sie das Sicherheitsdilemma auf See zusätzlich anfachten und in den folgenden Jahrzehnten weitere Rückkopplungsschleifen nach sich zogen.

Dies gilt insbesondere für das kontroverse *attack at source*-Konzept, das zuvorderst aus bürokratischen Gründen entwickelt wurde. Angesichts des starken Gewichts, das frühen Schlägen gegen sowjetische Marine-Infrastrukturen an Land zugewiesen wurde, war es in besonderem Maße geeignet, das Sicherheitsdilemma weiter zu verschärfen. Gleichzeitig konnte der Bedrohung durch die Träger noch mit relativ konventionellen maritimen Mitteln begegnet werden, was später gegenüber den *Polaris*-U-Booten nicht mehr möglich war. Obwohl sich erst in den 1960er Jahren ein spezialisiertes, unterseeisches Element der *anti-carrier warfare* (ACW) herauszubilden begann, wurden die Umrisse dieser Reaktion in den späten 1950er Jahren bereits in der Entwicklung der sowjetischen Marineluftstreitkräfte sichtbar.

6. Prozessanalyse der zweiten Phase: 1961-1981

Die zweite Phase des Kalten Krieges auf See war in vieler Hinsicht von entscheidender Bedeutung. Während die Bemühungen der U.S. Navy, die sowjetische Rückbesinnung auf die Nahbereichsverteidigung strategisch nutzbar zu machen auch weiterhin ein faszinierender Gegenstand der Forschung sind, steht die Prozessanalyse triumphalistischen Aussagen über den allesentscheidenden Einfluss der *Maritime Strategy* der 1980er Jahre klar entgegen. Um diese Schlussfolgerung nachvollziehen zu können und die Auswirkungen der zweiten Phase auf unser Verständnis der amerikanisch-sowjetischen Rivalität auf See offenzulegen, sind zwei Stränge des Narrativs entscheidend. Erstens verstanden die sowjetischen Militärtheoretiker schon früh, dass die „gepulste"[10] Feuerkraft des Flugzeugträgers im Atomzeitalter eine ganz neue Bedeutung gewann. Ihre Versuche, dieser Bedrohung entgegenzuwirken, waren zumindest teilweise erfolgreich, auch wenn das daraus resultierende ACW-System im Kern fragil blieb. Dieser Umstand erleichterte zwar die Aufgabe der U.S. Navy, die Überlebensfähigkeit von Überwasserschiffen zu gewährleisten, blieb aber dennoch eine ernstzunehmende Herausforderung.

Die Reaktion im Bereich der U-Jagd, die auf dem massiven Vorteil basierte, den die USA in den frühen 1960er Jahren in der Unterwasserakustik genossen, bleibt ein Musterbeispiel für einen zielführenden Anpassungsprozess, obwohl ernsthafte Defizite in der Selbstverteidigung der Trägerkampfgruppen bestehen blieben. Die Reaktion in der Flottenluftverteidigung führte nicht zu demselben Ergebnis und hätte sich als unzureichend erweisen können, wenn die VMF die Kombination aus überschallschnellen Anti-Schiff-Raketen und einer überlebensfähigen Trägerplattform – wie geplant – den frühen 1960er Jahren erfolgreich umgesetzt hätte. Letztendlich waren die Schwierigkeiten in der Technologieentwicklung auf der sowjetischen Seite so groß, dass die US-Marine unter anderem genügend Zeit hatte, die E-2 *Hawkeye*, F-14 *Tomcat* und AIM-54 *Phoenix* einzuführen und mit der Entwicklung eines Luftverteidigungssystems der nächsten Generation (*Aegis*) zu beginnen, noch vor die Bedrohung in Form von Tu-22M/Kh-22M ihre bislang schwerste Form annahm. Es bleibt jedoch festzuhalten, dass ein Seekrieg bis 1983 ohne mit dem *Aegis*-System ausgerüstete Einheiten geführt worden wäre, wobei eine weitreichende Abdeckung erst Ende der 80er Jahre möglich wurde. Somit kann man mit Fug und Recht behaupten, dass die Verteidigung der Kampfgruppen in wesentlich höherem Maße von den Abfangjägern der *combat air patrol* und von Verteidigungssystemen der „letzten Meile" abhängig war, als es in dieser zweiten Phase wünschenswert war. Es ist daher hervorzuheben, dass die

[10] Wayne P. Hughes and Robert Girrier, *Fleet Tactics and Naval Operations* (Annapolis, MD: Naval Institute Press, 2018), 84.

Anpassungsbemühungen der U.S. Navy in U-Jagd und Luftverteidigung nicht gleichermaßen erfolgreich waren.

Zweitens wird deutlich, dass die Entscheidung der USA, den maritimen Beitrag zur strategischen Abschreckung von den Trägergruppen und ihren Angriffsgeschwadern auf die Raketen-U-Boot zu verlagern, den Verlauf der Mächtekonkurrenz auf See stärker prägte als jede gezielte Gegenmaßnahme, die getroffen wurde, um die in den 1960er Jahren entstandene ozeanische „Posture“ der VMF ausgleichen zu können. Wenn sie die Sowjetunion dazu veranlasst hätte, massive Ressourcen in einen unproduktiven Bereich wie die strategische U-Bootabwehr zu investieren, hätte das Vertrauen der U.S. Navy in ihre SSBNs als eine „competitive strategy“[11] fungieren können. Stattdessen etablierte die VMF ab Mitte der 70er Jahre erfolgreich einen Ansatz der Parität in der seegestützten Abschreckung. Nachdem das ACW-Element einen Teil seiner Dringlichkeit verloren hatte und die westlichen SSBNs sich mit ihren immer weiter reichenden Raketensystemen dem Zugriff der sowjetischen Abwehrmittel vollends entzogen hatten, zeigte sich einmal mehr, dass die sowjetische Streitkräfteentwicklung weiterhin vor allem auf die größte nukleare Bedrohung für das Heimatland reagieren würde.

Im Einklang mit der konsequenten Betonung der strategischen Verteidigung endete die zweite Phase des Wettbewerbs damit, dass sich die Sowjetmarine vom vorderen Rand ihrer Verteidigungszone im Nordatlantik in ihre nördlichen „Bastionen“ zurückzog. Was von der US-amerikanischen und sowjetischen Konkurrenz bis zu diesem erneuten Paradigmenwechsel übrig bleibt, ist eine Fülle von Anschauungsmaterial dafür, wie es der U.S. Navy gelingen konnte, ihre erheblichen Vorteile über lange Zeit aufrechtzuerhalten, und warum es dem sowjetischen Herausforderer nie wirklich gelang, „Sperrzonen“ für westliche Seestreitkräfte zu schaffen, obwohl es das erklärte Ziel und der Schwerpunkt der sowjetischen Marine-„Posture“ war, ebendies zu erreichen.

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[11] Siehe dazu: Thomas G. Mahnken, ed., *Competitive Strategies for the 21st Century: Theory, History, and Practice* (Stanford, CA: Stanford University Press, 2012).

7. Schlussfolgerungen

Im abschließenden Kapitel der Dissertation werden die Ergebnisse der Prozessanalyse zusammenfassend behandelt und in den heutigen Kontext eingeordnet. Sieben Punkte erscheinen dem Autor diesbezüglich von besonderer Bedeutung:

1. Die bereits erwähnten Faktoren, die zur Entstehung und Erhaltung eines amerikanischen Vorteils insbesondere in der Unterwasserkriegführung beitrugen, werden nochmals breiter diskutiert.
2. Es wird festgestellt, dass die Ausbildung und Erhaltung dieser Vorteile entscheidend in den ersten beiden Phasen der Konfrontation stattfanden und die *Maritime Strategy* der Reagan-Ära diesbezüglich eine untergeordnete Rolle spielte.

3. Die zentrale Rolle seegestützter strategischer Nuklearwaffen wird besonders hervorgehoben. Aus westlicher Sicht wurde lange unterschätzt welch bestimmende Rolle die strategische Verteidigung im sowjetischen Marinekalkül spielte.

4. Es wird darauf hingewiesen, dass die Rolle taktischer Nuklearwaffen in westlichen Analysen aufgrund der operativen und taktischen Präferenzen westlicher Seestreitkräfte nie entsprechend durchdacht und gewürdigt wurde. Dieses Versäumnisses sollte sich die Forschung in Zukunft dringend aufnehmen und ein wesentlich besseres Verständnis dieses unterschätzten Faktors herausarbeiten.

5. Die Verwundbarkeit von Trägerkampfgruppen erweist sich als Gemeinplatz westlicher „Posture"-Debatten. Zugleich wäre sehr wohl mit schweren Schäden und eventuellen Verlusten beim Einsatz dieser Hochwerteinheiten zu rechnen gewesen. Während die konventionelle ACW-Bedrohung minimiert werden konnte, war dies im Bereich der taktischen Nuklearwaffen nie der Fall.

6. Ob *sea denial*-Ansätze grundsätzlich zum Scheitern verurteilt sind oder bei entsprechend konsequenter Umsetzung die Fähigkeiten einer überlegenen Marine aushebeln können, lässt sich auf der Basis der Untersuchung nicht eindeutig

beantworten. In der Tat dürfte das Potential jedoch wesentlich höher liegen, als dies im Kalten Krieg zur See der Fall war.

7. Die massiven Fehleinschätzungen westlicher Analysten über mehrere Jahrzehnte hinweg zeigen nachträglich den Wert vertiefter Reflexion bei der Beurteilung des Gegners auf der Basis unvollständiger Informationen, auch wenn ein direkter Vergleich mit heutigen oder zukünftigen Mächterivalitäten schwer möglich ist.

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