

NEEDS AND OPPORTUNITIES *in the* MODERN HISTORY *of the* U.S. NAVY

Edited by Michael J. Crawford



NEEDS AND OPPORTUNITIES IN THE MODERN HISTORY OF THE U.S. NAVY

The essays in this book examine what has been written, what has not been written, what should be written, and the challenges to writing on the modern history of the United States Navy in the subject areas of forward presence, operations, personnel policy, programming and acquisition management, science, social history, strategy, and technology. These are all subjects of intense interest to the U.S. Navy's leaders, planners, and operators. The authors are experts on their subjects. The Navy's goal in publishing these essays is that, while serving as guides to research and writing, they will stimulate historians to publish studies of the Navy's recent past that will help the Navy make wiser decisions informed by a keener understanding of the historical context.

Jacket photograph:

The U.S. Navy Ceremonial Guard assigned to Naval District Washington, D.C., stands in formation during Defense Secretary Ashton Carter's farewell ceremony at Joint Base Myer-Henderson Hall, Virginia, 9 January 2016.

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Department of Defense photo by
E. J. Hersom

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Introduction

The historian seeking to produce a study that will bring fresh understanding of the U.S. Navy's recent past will find helpful guidance in this book. Eight essays identify needs and opportunities in the modern history of the Navy in specific subject areas on which little has been published. The historian writing on any of these topics can rest assured that the resulting study will find an interested audience among the Navy's leaders, planners, and decision makers, for the subjects of these essays were selected based on the recommendations of many of those very leaders, planners, and decision makers.

Like operating a motor vehicle without a rearview mirror, leading the Navy, or any organization, without using history to inform decisions, is dangerous and unwise. Reference to history provides context, explains complexities, informs about what has worked and what has not, and alerts us to potential unintended consequences. For these reasons, the Navy's leaders seek wisdom in an understanding of the past. The Naval History and Heritage Command serves as the principal agent for providing the Navy's historical understanding. The stream of the Navy's history since the end of World War II, however, runs broad and deep, outrunning the limited resources of the command. The command, therefore, looks to academics and independent scholars to supplement their work in advancing historical insights useful to the Navy.

To promote the study of the modern history of the Navy by academics and independent scholars, the Naval History and Heritage Command engaged scholars from outside its bulwarks to report on ten areas of the Navy's recent history, identifying topics needing original or additional study and opportunities for making such studies. Given that the most neglected period of the Navy's history is the most recent, the scholars were enjoined to focus on the decades since World War II and especially the years since the end of the Cold War. The subject areas are the ones Navy leaders, the Navy's historians, and outside experts consulted by the Naval History and Heritage Command identified as pregnant with the greatest potential benefit to the Navy. These subjects are: forward presence, intelligence and information warfare, logistics, operations, personnel policy, programming and acquisition management, science, social history, strategy, and technology. Each of the engaged scholars presented a talk on his findings in the course of 2016 and 2017 and then was asked to prepare an essay embodying the findings.

The essays concerning intelligence and information warfare and logistics were unavailable at the time of publication.

There is one more area of the recent history of the Navy among those of primary interest to the Navy for which there is no historiographical essay: the U.S. Navy's institutional and cultural history between the end of World War II and the present. Needed are studies that consider the Navy's heritage and institutions, media image and popular representation, and the distinctive institutional culture of its various warfare communities—studies of what the essence of the Navy has been. In other words, what is the history of the Navy's institutional mindset since the end of World War II? None of the outside scholars whom the Naval History and Heritage Command approached was willing to tackle this subject. Perhaps you will be the exception and pursue a topic within this subject area!

This compilation of essays constitutes an agenda for future research and writing on the modern history of the U.S. Navy. The hope of the Naval History and Heritage Command is that it will inspire original historical studies that will inform the Navy's leaders and operators, providing them with a rearview mirror that enables them to steer the Navy with one eye on what has come before.



050305-N-41588-001 U.S. Navy photo by Lt. (j.g.) Caleb Swigart

The guided missile destroyer *Porter* (DDG-78), right, leads a pass in review formation during divisional tactics training trailed by the guided missile destroyers *McFaul* (DDG-74) and *Cole* (DDG-67), and the guided missile cruisers *Cape St. George* (CG-71) and *Anzio* (CG-68). The destroyers and cruisers were assigned to Commander, Carrier Strike Group Twelve, March 2005.

Chapter 1

Forward Presence in the Modern Navy: From the Cold War to a Future Tailored Force

by Thomas G. Mahnken

Forward presence is a central element of U.S. naval strategy. Since the earliest days of the republic, American forces have operated forward in peacetime and wartime. Forward operating naval forces have not, however, always been combat credible.

Before World War II, the U.S. approach to forward presence fluctuated and largely involved small detachments, which were supported periodically in peacetime or reinforced in time of war by major fleet units. Since World War II, for political, geographic, and technological reasons, the United States has maintained major fleet elements forward. Over time these forces were increasingly forward-based, usually in the territory of newly developed allies and partners, as well as forward-deployed, to allow the United States to maintain both permanent and intermittent presence in different areas of operation, or “hubs.”

Today, combat-credible naval forward presence is largely recognized as a key national advantage that helps defend American lives and property, protect allies, ensure the free flow of commerce, prevent the rise of a hegemon on the Eurasian continent, and help provide for the common good (to include not only humanitarian missions, but also the post-World War II global order of open trade, collective security, and adherence to international norms).

However, a range of domestic and international challenges has increasingly called into question the viability of this approach. In essence, it is difficult for a shrinking fleet to maintain combat-credible numbers and combinations of capable assets, and the growing scale and sophistication of counter-naval capabilities

posed by China, Russia, and Iran threaten to hold forward-operating forces at risk, thus undermining their combat credibility and ability to carry out missions of presence, deterrence, reassurance, and warfighting.

This essay examines the historical evolution of U.S. naval forward presence, with a focus on the post–World War II era; describes the current state of forward presence; and identifies alternatives that can inform Navy force structure and posture decisions.

Scholars and practitioners have examined U.S. naval forward presence. Their works can largely be divided into those that explore historical elements of forward presence and deployment strategy and those that evaluate options relevant to forward presence in light of resources, challenges, threats, and opportunities.

In the former category, Samuel Huntington’s “National Policy and the Transoceanic Navy,” published in 1954, divided the history of U.S. naval policy into a “Continental Phase,” an “Oceanic Phase,” and a “Transoceanic Phase.”¹ The seminal article summarized trends in U.S. naval history, articulated the need for service strategic concepts, and argued the Navy was effectively suited to counter threats in Eurasia.²

More recently, Peter Swartz’s 2002 Center for Naval Analyses (CNA) report, *Sea Changes: Transforming U.S. Navy Deployment Strategy, 1775–2002*, is the most elegant and comprehensive work on Navy deployment strategy.³ The report describes 25 distinct eras in Navy deployment strategy since 1775, including eight in the post–World War II era. It also identifies future deployment strategy options. Adam Siegel’s CNA report *The Use of Naval Forces in the Post-War Era: U.S. Navy and U.S. Marine Corps Crisis Response Activity, 1946–1990* serves as a detailed review of incidents in which naval forces were employed during the Cold War.⁴

In the early 1990s, the Navy argued that its peacetime combat-credible forward deployment strategy should be its principal force-sizing criterion, building on earlier arguments made throughout the Cold War and especially in the 1980s. The 1994 Navy Service Concept *Forward . . . From the Sea*, signed by Chief of Naval Operations Admiral Jay Johnson, codified that the “primary purpose of forward-deployed naval forces is to project American power from the sea to influence events ashore in the littoral regions of the world across the operational spectrum of peace, crisis and war.”⁵ Subsequent naval service concepts have reaffirmed this stance.

In terms of options for forward presence, Dov Zakheim and Andrew Hamilton’s 1978 Congressional Budget Office (CBO) report on the *Peacetime Presence Mission* illuminated the force structure and budgetary impact of

peacetime missions on the Department of the Navy.⁶ Many of the options presented in this work still serve as the basis for options under contemporary consideration. In 2010 Daniel Whiteneck, Michael Price, Neil Jenkins, and Peter Swartz wrote a CNA report, *The Navy at a Tipping Point*, that sounded the alarm on the unsustainable strain of existing models for combat-credible forward presence amid the shrinking fleet.⁷ In 2015, Eric Labs of CBO wrote a report identifying options for *Preserving the Navy's Forward Presence with a Smaller Fleet*.⁸ Later that year, Bryan Clark and Jesse Sloman of the Center for Strategic and Budgetary Assessments (CSBA) wrote a report also contending that the Navy and Marine Corps were *Deploying Beyond Their Means* and offering specific alternatives to maximize combat-credible forward presence.⁹

The aforementioned eight works are arguably the most important in terms of examining the broad discourse on American naval forward presence history and strategies available to the nation. Other works examined for this essay play an important role in complementing the key works by providing additional detail on specific historical periods or strategies, describing factors that informed the adoption of employment or deployment strategies, examining dynamics that challenge current deployment strategies, and advancing models and capabilities to address existing and projected gaps.

However, none of the works comprehensively reviews both the history of forward presence in the modern Navy and examines the range of alternatives available today. This essay seeks to contribute to the rich literature on the subject by examining previous secondary and published primary sources on the subject and offering options for national, Department of Defense, and Department of the Navy policymakers.

HISTORY OF FORWARD NAVAL PRESENCE

U.S. forward naval presence has deep roots in the nation's history. This essay focuses on the history of U.S. forward presence in four phases: from the Spanish-American War to World War II, from World War II through Occupation, the Cold War, and from the 1990s to the early 2000s. Nonetheless, the history of U.S. naval forward presence in the 18th and 19th century (largely what Huntington termed the Continental Phase) left an indelible mark on Navy culture and strategies that significantly informed the choices taken in the 20th century.

During the War of Independence, although most Navy ships and privateers operated in the western Atlantic and Lake Champlain, a number conducted

commerce raiding—and even amphibious raids—off British territory in the Caribbean and British Isles. After the war, the nation sold off its fleet given its high maintenance costs, and lacked a Navy until 1798 (although it started construction of six frigates in 1794).¹⁰

During the Quasi-War with France from 1798–1800, the nation’s naval forces focused on protecting American merchant vessels in the Atlantic and Caribbean; however, some ships deployed to the East Indies to escort American merchantmen.¹¹ From 1801 to 1805, President Thomas Jefferson deployed a squadron of Navy ships to blockade, bombard, and assault the Barbary states.¹² During the War of 1812, in addition to engagements on the Great Lakes and Lake Champlain, the Atlantic, and Caribbean, frigates and sloops deployed into the Pacific to attack British ships.¹³

After the war of 1812, the Navy transformed itself into a “globally-dispersed set of forward-stationed squadrons” directed to conduct commerce and whaling protection, primarily against pirates.¹⁴ The Navy established dedicated stations of varying duration across the world: the Mediterranean Station, the West India Station, the Africa Station, the Brazil Station, the Pacific Station, and the East India Station. Navy ships generally operated independently and seldom exercised with other ships.¹⁵ These forces also carried out diplomatic, scientific, and humanitarian missions.

Of consequence for U.S. naval posture, the 1817 Rush-Bagot Agreement between the United States and Great Britain dramatically limited naval forces on the Great Lakes and Lake Champlain to four small vessels for each party. This arms limitation agreement allowed the United States to increase its proportion of naval resources dedicated to other areas.¹⁶

From 1841 until nearly the end of the century, with the exception of the Civil War, the Navy adopted a deployment strategy that combined a home surge force for defense of the homeland from potential threats, principally Great Britain, with continued presence in forward stations and diplomatic and scientific expeditions. The most acclaimed of these expeditions was Commodore Matthew Perry’s opening of Japan with ships of the East India Squadron in 1853. The following year, the East India Squadron deployed its first warship up the Yangtze River.¹⁷

After the Civil War, Navy deployment strategy largely continued as before. However, the Civil War saw a dramatic reduction in the size of the U.S. merchant marine, primarily due to the result of ship owners transferring their flags for security and competitive reasons to Great Britain; consequently, the post-bellum forward presence force had significantly less U.S.-flagged commerce to protect.¹⁸ Nonetheless, it continued to conduct a range of commerce protection, diplomatic,

and humanitarian missions. This period exhibited dozens of missions in which U.S. naval forces conducted highly assertive uses or threats to use force in resolving disputes.

Phase I: Spanish-American War to World War II

Toward the end of the 19th century, the Navy gradually entered into Huntington's "Oceanic Era," a period in which the nation shifted its sights from homeland territorial defense to defense of its interests at sea and its overseas territories. During the Spanish-American War of 1898, the North Atlantic and Asiatic Squadrons conducted sea control operations in the Caribbean and the Philippines, respectively. Resounding victory in the war directly resulted in the U.S. acquisition of the Philippines, Guam, and Puerto Rico, and the subsequent annexation of the Republic of Hawaii through the Newlands Resolution. These new territories increased the defense responsibilities of the Navy and Army and contributed to an increase in peacetime-tailored forward presence forces in the Western Pacific and Caribbean.

The period's most influential navalist, Alfred Thayer Mahan, contended that apart from requisite forces for coaling stations, the Navy should consolidate its ships in a home battle fleet, rather than forward squadrons that could be destroyed in detail.¹⁹ Nonetheless, the Navy continued to maintain the North Atlantic Squadron, the European Squadron, the South Atlantic Squadron, the Pacific Squadron, and the Asiatic Squadron, with the preponderance of heavy naval forces in the North Atlantic Squadron. Forward squadrons continued their assertive practices, regularly using force or the threat of force throughout Central and South America, Lebanon, Turkey, Korea, and China.²⁰

During his first term in office, President Theodore Roosevelt diverted from regular peacetime naval posture by employing the global fleet to deter foreign intervention and signal support. Most notably, in 1903 he repositioned all Atlantic forces to the Caribbean and the Pacific Squadron (and a significant portion of the Asiatic Squadron) to near the Pacific coast of Panama in order to solidify U.S. support for an independent Panama and deter potential European intervention.²¹ The same year Roosevelt deployed the North Atlantic Squadron for a major diplomatic mission to France and Germany, thus forward-deploying the Navy's combat-credible force.²²

In 1905, Roosevelt eliminated the Mediterranean and South Atlantic Squadrons and over time reorganized the Navy into an Atlantic Fleet, a Pacific Fleet, and an Asiatic Fleet, with the majority of heavy battleships allocated to the Atlantic Fleet in support of War Plan Black to counter potential German naval

forces that might seek to establish an advanced base in the Caribbean.²³ Although the Atlantic and Pacific Fleets focused on sophisticated fleet exercises near the United States, they were occasionally surged for short deployments from 1905 to 1914 to signal diplomatic support to various states and demonstrate U.S. power.²⁴ These were frequently opposed by naval officers, who protested these distractions from fleet exercises in support of war plans. The most famous cruise for diplomatic purposes of this period was that of the Great White Fleet of 1907–1909, which highlighted the importance of refueling stations and the relative utility of oil over coal to power naval ships.²⁵

With the outbreak of World War I, the nation ceased deploying the Navy on forward surges, leaving it to concentrate on exercises in its Atlantic and Pacific Fleets in preparation for its potential involvement in the war. Small groups of forward naval forces in the Caribbean and China did conduct minor diplomatic and peacekeeping operations. Additionally, the opening of the Panama Canal in 1914 increased the ability of the fleet to consolidate.

During World War I, instead of the planned surface engagement with the German Navy, the Navy focused on sealift and escort across the Atlantic. While the majority of the fleet aggregated in the Atlantic to execute these missions, the Navy continued to maintain the Asiatic Fleet on station throughout the conflict. The size of the Navy increased from 224 ships in 1914 to 324 in 1917 to 774 by the end of World War I.²⁶

During the Inter-War Period, the large fleet consolidated first in 1919 into two equally-sized Atlantic and Pacific Fleets to prepare to counter either Great Britain or Japan and then in 1922 into a single United States Fleet largely based on the West Coast to counter Japan.²⁷ Avoiding forward deployments that were perceived as provocative, the U.S. Fleet focused on annual fleet exercises and experiments near the United States. The fleet was only deployed forward once this period, to Australia and the southwest Pacific in 1925, which elicited significant criticism from Japan.²⁸

During this period, the Special Service Squadron in the Caribbean and the Asiatic Fleet, with its subordinate Yangtze Patrol, conducted various diplomatic and peacekeeping missions. In 1937, during the course of the Sino-Japanese War, Japan sank the Yangtze Patrol gunboat *Panay* (PR-5) and attacked three Standard Oil tankers, which led to a reduction in Asiatic Fleet efforts to protect U.S. interests in China.²⁹

In May of 1940, after its annual Fleet Problem, President Franklin D. Roosevelt ordered the U.S. Fleet to remain in Hawaii indefinitely as a deterrent to Japan. Fleet Problem XXII, scheduled for January 1941 in the Central or North

Pacific, was subsequently cancelled in order to not provoke Japan.³⁰ In 1941 the U.S. Fleet was re-divided into an Atlantic Fleet (formerly the Atlantic Patrol Force), a Pacific Fleet, and a small Asiatic Fleet.³¹ This action further consolidated the force and placed the majority of modern ships in the Atlantic and Pacific Fleets.

In contrast to the modern Pacific Fleet, on 7 December 1941, the Asiatic Fleet consisted of one relatively modern heavy cruiser, *Houston* (CA-30), one old light cruiser, *Marblehead* (CL-12), 13 World War I-era *Clemson*-class destroyers, 29 submarines (a mix of older *Porpoise*-class and new *Salmon*- and *Sargo*-class boats), one pre-World War I destroyer tender, and a variety of older gunboats, minesweepers, and auxiliary support ships, old coastal Yangtze River Patrol vessels, the 4th Marine Regiment, and amphibian patrol aircraft.³² Overall, the Asiatic Fleet lacked the ability to deter credibly. Instead, at best it constituted a delaying force and at worse a tripwire, while the Pacific Fleet (and reinforcing Atlantic Fleet) represented the nation's deterrent force.

Phase II: World War II through Occupation

During World War II, the Navy was used to protect territory, defend allies, protect commerce, conduct sea denial, and project power. Initial Japanese attacks decimated the Pacific Fleet in Pearl Harbor and a series of battles in early 1942 near the Dutch East Indies sunk most of the Asiatic Fleet. The remnants of the attrited Asiatic Fleet were incorporated into the South West Pacific Area Command in February 1942.³³

The Pacific Fleet initially focused on raiding Japanese islands and countering the Japanese fleet, while Submarine Force Pacific conducted forward antiship patrols. By 1943, following a series of victories, the Navy reorganized its Pacific Fleet into a Third/Fifth Fleet, the Seventh Fleet (under the South West Pacific Area Command), a continued Submarine Force Pacific, and Twelfth, Eighth, and Fourth Fleets in the Atlantic. As the ability of the fleets to exert sea control increased, major U.S. naval forces focused on transoceanic power projection for strikes and amphibious assaults.

These forces were supported not only by a burgeoning network of advanced bases and afloat logistics forces that included sophisticated forward maintenance, battle damage repair with floating drydocks and other assets, and medical facilities, but also an underway replenishment capability that reached its apotheosis with the introduction of underway munitions transfer capability for aircraft carriers during the Iwo Jima campaign in 1945.³⁴

After World War II, the Navy continued to operate from a significant number

of bases in both theaters that had supported the conduct of the war. Additionally, the Navy established bases in occupied portions of the former Nazi and Japanese empires. Forces operating forward supported occupation and relief efforts and were envisioned as a temporary global overseas presence.

Phase III: Cold War

1946–1947

In the first couple of years following World War II, the nation reinstated a deployment strategy in which equally powerful combat-credible surge battle fleets were stationed on both coasts of the United States, and smaller presence forces were deployed forward in the Pacific and Europe. The Seventh Fleet, based in the Marianas, supported the occupations of Japan, Korea, and western Pacific islands, and also supported Marines in China. A small Naval Forces Mediterranean/Northern European Force maintained a presence in European waters.

This new deployment strategy reflected not only change in the geopolitical landscape, but also in the size of the Navy, given the lack of an identified maritime threat. By 1947 the Navy had been pared down from a 6,800-ship leviathan in 1945 to a still-imposing 842 ships, which included 14 fleet carriers and four battleships.³⁵

Furthermore, to some strategists the tremendous power of nuclear weapons seemed to obviate the need for large naval forces. As Bernard Brodie wrote in 1946,

The atomic bomb introduces the possibility that in another general war the utility of navies will be decided ashore rather than at sea. A nation which has had its entire economy destroyed may be able to put a fleet to scant use The traditional concepts of military security which this country has developed over the past fifty years—in which the Navy was correctly avowed to be our ‘first line of defense’—must be reconsidered.³⁶

Two atomic tests at Bikini Atoll in the summer of 1946 (Operation Crossroads) assessed whether nuclear weapons could destroy an entire dispersed fleet. Although test observers concluded that “ships under way will rarely constitute suitable targets for atomic bomb attack” given the limited degree of damage to the ships targeted, the Navy’s strategic and operational utility was under assault.³⁷

Regardless, Navy forward deployments continued to play an important role in this period—even though the majority of naval forces was at home in the surge

battle fleets. In 1946, amid Soviet pressure on Turkey and concern over Soviet presence in Iran, the battleship *Missouri* (BB-63) was employed to return the body of deceased Turkish ambassador to the United States to Istanbul, Turkey, as a sign of support for the Turkish government.³⁸ A subsequent port call in Piraeus, Greece, similarly signaled support for the Greek government.³⁹ The following month, as the Communist insurgency in Greece grew, the aircraft carrier *Franklin D. Roosevelt* (CVB-42) and its escorts visited Piraeus to again underscore support for the Greek government, and the U.S. government announced a policy in which Navy units would be permanently stationed in the Mediterranean.⁴⁰ Similar visits were conducted by U.S. naval units throughout Europe in the subsequent years. Thus, even during a perceived period of post-war retrenchment, the Navy re-established permanent forward presence in the western Pacific and Mediterranean.

1948 Onward

In 1948, the Navy began deploying combat-credible forces forward in peacetime to counter mounting Soviet and broader Communist threats. Gradually, the Navy returned in force to where it had ended the previous war and stayed forward in force throughout the Cold War (and until today). World War II had revealed that American security depended on ensuring that no hegemon could dominate Eurasia and that, if conflict did occur, the ability to control sea lanes to surge ground and air forces forward was essential. This experience informed the maintenance of superior naval forces.

National leaders sought to use the Navy to protect U.S. territory, defend allies, protect commerce, prevent the rise of a hegemon, and act for the common good. As such, the Navy would serve as an instrument of presence, deterrence, reassurance, and warfighting—all aiming to shape Soviet behavior.

This shift toward a Navy deployment strategy that used combat-credible forward forces was driven by the geopolitics of the Cold War and the state of military technology. In terms of geopolitics, the United States had frontline allies on the European continent and just offshore who required protection from Soviet intimidation. The seemingly high probability of a war rapidly breaking out gave urgency to maintaining a swift, combat-credible response that would serve operational aims in time of war. The ability of Soviet forces to launch their own nuclear strikes from 1949 onward, quickly advance onto allied territory with ground forces, and disperse their naval forces (some of which eventually fielded nuclear weapons) placed a premium on eliminating Soviet forces early in a

conflict. Lastly, by maintaining a forward force capable of achieving operational aims, the Navy aimed to reassure allies and deter Communist threats.

In terms of the state of military technology, naval forces—even carrier aircraft—initially exhibited relatively short strike ranges, which required naval forces to deploy far forward if they were to be ready for immediate employment in conflict. Furthermore, in order to translate U.S. maritime superiority into advantage against the Soviet continental power, the Navy would require new technological innovations that enabled strike from the sea, in addition to traditional sea control missions, especially securing Atlantic sea lines of communication.

In the 1948 Key West Agreement, the Navy obtained the right to control its own aviation assets and deploy nuclear weapons “in the carrying out of its function,” such as striking ports and inland airfields with aircraft that may sortie to attack the fleet.⁴¹ As a result, the Navy developed larger, angled-deck “supercarriers” that incorporated catapult assisted take-off, enhanced recovery systems, and strengthened flight decks capable of launching heavy, long-range jet aircraft. In addition, in the 1950s the Navy first developed carrier-launched nuclear bombers and then nuclear-powered ballistic missile submarines (SSBNs). Initial *Polaris*-class submarine launched ballistic missiles (SLBMs) featured an approximately 2,500-nautical mile range, requiring the forward deployment of SSBNs in order to reach requisite inland targets. These SSBNs were supported by tenders forward-based in Scotland, Spain, and Guam.⁴²

During this Transoceanic Phase, the Navy employed self-sustaining combat-credible permanently forward-deployed numbered fleets that largely mirrored those forces that would have been used in time of war. Organized into European (initially mostly Mediterranean and then also eastern Atlantic), western Pacific, and later Arabian Sea/Persian Gulf hubs, these forces primarily consisted of carrier battle groups (CVBGs) and amphibious ready groups (ARGs).

These front-line capital ships and aircraft forward-deployed from the United States, and over time many were also forward-based. Throughout the Cold War, U.S. naval forces were eventually homeported in Japan, the Philippines, Bahrain, Spain, Greece, Italy, the United Kingdom, Iceland, and Norway, among other countries.⁴³ This approach of placing front-line capital ships forward marked a major break from earlier deployment strategies in which forward-homeporting was reserved for small groups of second-line ships.

Although this approach increased the potential risk faced by fleet units compared to homeporting in the United States, it had both strategic and operational advantages. “Strategically, basing warfighting forces forward reduced American response time, showing the Soviets that aggression may be promptly

defeated or that punishment would be swift. Further, forward-based forces helped demonstrate American resolve to allies and partners concerned by the oceans separating them from the United States. Operationally, forward-based forces provide more forward presence, or enable the same presence to be maintained by a smaller overall fleet.”⁴⁴

As confrontation with the Soviet Union increased in the late 1940s, U.S. naval officers gradually shifted their preferred deployment strategy to one in which combat-credible forward presence forces permanently operated forward to deter Soviet aggression and shape the geopolitical environment. This posture first took hold in Europe as forces in the Mediterranean grew into the permanent presence of a CVBG, an amphibious task force, and supporting submarine and destroyer deployments. The force was renamed the Sixth Task Fleet in June 1948.⁴⁵ Later, a combat-credible forward presence posture was adopted in the western Pacific, with the deployment of a carrier task force to the western Pacific on a permanent basis in 1950.⁴⁶ Thus, the Navy adopted a two forward presence hub strategy in which at least two carrier task forces operated in each of the European and western Pacific hubs.

By the early 1950s, the “home fleets” (the First and Second, and after 1973 the Third in place of the First) conducted at-sea fleet exercise coordination for the Navy.⁴⁷ Of note, these exercises took place not only near the United States, but also far forward. Often the exercises aimed to “work up,” or prepare, naval forces for forward deployments, and these forces and already forward forces used exercises to demonstrate U.S. offensive capabilities and exercise freedom of navigation consistent with international law.

All the while, forward-operating forces continued to respond to a variety of crises. For example, following the withdrawal of Nationalist Forces from the Chinese mainland to Taiwan in 1949, Navy forces served to deter threatened Communist Chinese invasions of Taiwan and Nationalist invasions of Mainland China on various occasions, and in 1954 the Navy supported rescue efforts for a Cathay Pacific airliner that was shot down by People’s Republic of China aircraft (and during the course of operations downed three People’s Liberation Army aircraft that fired on U.S. aircraft).⁴⁸

Each of the forward fleets was considered capable of responding independently and supported by follow-on forces across the spectrum of operations. Although the Korean and Vietnam Wars did lead to the deployment of additional forces, and certain crises such as the 1956 Suez Crisis led to the surge deployment of additional forces, the Navy’s deployment strategy remained relatively constant.

The Navy’s procurement strategy fluctuated significantly during this period.

The post–World War II decline in the size of the fleet continued throughout the late 1940s, and in 1949 Secretary of Defense Louis Johnson cancelled the planned *United States* (CVA-58), the first of the so-called supercarriers, and would have established a Fiscal Year 1951 carrier force level requirement of four fleet aircraft carriers.⁴⁹ A series of congressional hearings and combat experience in Korea demonstrated the utility of a larger fleet in general—and a larger carrier fleet in particular—and the new Secretary of Defense, George C. Marshall, approved construction of the first supercarrier, *Forrestal* (CVA-59).⁵⁰ The size of the carrier fleet grew from 11 in 1950 to 26 in 1962, before declining as older and less capable carriers were replaced by new construction.

During the early Cold War, the Navy deployed three classes of capabilities that greatly enhanced its combat credibility: the aforementioned nuclear forces, the Military Sea Transport Service, and forward-operating intelligence units. In 1949 the Military Sea Transport Service (the progenitor of the Military Sealift Command) was created, ensuring capable sealift forces would be retained and deployed in peacetime and reducing the Navy’s reliance on the merchant marine for limited contingencies.⁵¹ This force not only addressed strategic sealift requirements, but also ensured that naval forces would have ready underway and afloat logistics (as opposed to slowly-surging support forces). Many of these forces were forward-deployed and some were forward-homeported.

The Navy also fielded various forward-operating intelligence units, with “Naval Communications Units” operating following World War II from Port Lyautey, Morocco, and Sangley Point, Philippines.⁵² Electronic intelligence aircraft operating from these home bases conducted operations from forward staging points to cover targets throughout Europe, the Middle East, and the western Pacific. Given surging collection requirements and growing numbers of other U.S. naval forces operating forward, the first Fleet Intelligence Center was activated at Port Lyautey, Morocco, in March 1954.⁵³

While the grand majority of Navy intelligence gathering missions by aircraft, ships, and other assets were conducted covertly, a series of attacks on and seizures of Navy intelligence-gathering assets in international waters and airspace in the late 1960s drew significant public attention. In particular the 1967 seizure by North Korean forces of *Pueblo* (AGR-2), the 1967 attack by Israeli forces on *Liberty* (AGTR-5), and the 1968 shootdown by North Korean forces of an EC-121 reconnaissance aircraft were notably covered by the press.⁵⁴

In the 1970s, the Navy continued a strategy of forward-deploying combat-credible forces in groups of two carrier task forces and amphibious ready groups in both the Mediterranean and western Pacific. However, under

the command of Chief of Naval Operations (CNO) Admiral Elmo Zumwalt, the Navy also planned to forward base those forces in the same regions.⁵⁵ In the Mediterranean, efforts to forward-base naval units in Italy and Greece progressed until political change in Greece and mounting budgetary limits constrained these initiatives. In the Pacific, however, starting in 1972, Japanese ports hosted a growing number of Seventh Fleet assets, including carrier and amphibious task forces. The homeporting of the carrier *Midway* (CVA-41) at Yokosuka in 1973 (and subsequent carriers) increased the credibility of extended deterrence over Japan and served as a bridge between the U.S. nuclear umbrella and Japan's non-nuclear policy.⁵⁶ Thus, the Seventh Fleet was forward-based, while the Sixth Fleet remained largely forward-deployed.

In the 1960s, growing Soviet presence in the Indian Ocean and receding British military power led observers to contend U.S. naval presence was wanting in the region.⁵⁷ In the early 1970s, in addition to its two hubs, the Navy began an intermittent but routine presence of carrier task forces in the Indian Ocean that grew to an almost permanent presence of carrier or surface combatant task forces by 1979.⁵⁸

The 1970s witnessed growth in the size and capability of the Soviet Navy, while the size of the Navy diminished from 885 ships in 1969 to 521 by 1981.⁵⁹ This decline notably included a major reduction in the number of aircraft carriers, amphibious ships, and submarines. Guided by Admiral of the Fleet of the Soviet Union Sergey Gorshkov, the Soviet Navy underwent a major quantitative and qualitative expansion that sought to inhibit the ability of Navy forces (in particular CVBGs) to operate within strike range of the Soviet Union. New bombers armed with antiship cruise missiles (ASCMs), nuclear attack and guided missile submarines with ASCMs, and satellites contributed to a deepening "reconnaissance-strike" complex capable of effectively locating and striking U.S. CVBGs.

These growing threats began to manifest themselves in the late 1950s and 1960s. In the 1950s, Soviet bombers could effectively hold at risk Sixth Fleet assets in the Mediterranean. In response the Navy developed new air defense technologies and tactical deception methods, tested through the Haystack Exercises beginning in 1957.⁶⁰ The introduction of Soviet nuclear-powered attack submarines (SSNs) in the late 1950s and SSNs armed with ASCMs in the 1960s again challenged Haystack tactics, forcing the Navy to devise new capabilities and new tactics under Project UPTIDE (Unified Pacific Fleet Project for Tactical Improvement and Data Extraction) for antisubmarine warfare groups (typically an ASW carrier, its air wing, and a destroyer squadron) to frustrate and defend

against missile and torpedo attacks by enemy submarines within moving or static areas of high tactical interest.⁶¹

In the 1970s and 1980s, the Navy developed new methods to track and exploit the poor sensitivity of Soviet radar ocean-reconnaissance and electronic intelligence ocean reconnaissance satellites, so that large warships, such as aircraft carriers, could maneuver to avoid and if necessary present their smallest radar cross sections and minimize emissions as satellites passed overhead.⁶² Additionally, in the early 1980s the Navy developed new capabilities and concepts for long-range air defense, such as Outer Air Battle and the Aegis weapon system, to counter Soviet bombers and incorporated U.S. SSNs into CVBG operations to counter quiet Soviet SSNs and SSGNs. However, the growing number of these sophisticated threats, coupled with a period of decreased readiness in the Navy, presented major challenges in the 1970s and early 1980s.

In 1981, President Ronald Reagan and Secretary of the Navy John Lehman proposed a 600-ship fleet. This fleet aimed to counter growing Soviet capability and capacity and ensure the Navy had sufficient capacity in peacetime to operate in multiple regions simultaneously. Consequently, peacetime operating forces significantly influenced the force size.

During the 1980s, the planned employment strategy of the “home fleets,” the Second and Third Fleets, increasingly took the form of multi-carrier operations off of Soviet Pacific strongholds and Scandinavia. In a series of exercises, the Navy trained to sustain the flow of reinforcements to Europe (and possibly some forces to Russia’s Pacific coast) during a conflict with the Soviet Union and conduct strikes from CVBGs in the northern Atlantic, eastern Mediterranean, and western Pacific. These aims were codified in the 1982 maritime strategy, elements of which were publicly released in 1986.⁶³

The 1980s witnessed the addition of a third forward deployment hub in the Arabian Sea, designed to counter Iranian threats in the vital waterway and ward off Soviet interference in the region. Although the Navy grew in the 1980s from 521 ships in 1981 to 594 in 1987, the addition of a third hub reduced the number of CVBGs normally forward in the other hubs from two to one.⁶⁴ The third hub also increased the number of Military Sealift Command prepositioning ships deployed to Diego Garcia.⁶⁵ Finally, the response of forward-deployed and home-based forces to numerous crises increased the length of ship deployments, leading to sailor dissatisfaction. In 1985, CNO Admiral James Watkins announced “a policy of six-month maximum peacetime deployments, thus setting a bound on deployments of combat-credible forces forward in the absence of war”—a policy that would be revised and greatly exceeded in the coming decades.⁶⁶

One technological change that reduced the level of forward deployment was the introduction of the long-range Trident SLBM. This new, longer-range missile reduced the need for forward-deployed support for SSBNs, and forward SSBN sites and tenders were gradually withdrawn, with Rota tenders withdrawing in 1979 and Holy Loch tenders in 1992.

1978 CBO Report on Peacetime Presence

In 1978, Dov Zakheim and Andrew Hamilton released a Congressional Budget Office report on Navy peacetime presence.⁶⁷ The report astutely observed that although combat-credible Navy overseas presence centered on CVBGs was a key aspect of U.S. political relationships with many of its overseas allies, the mission placed a substantial demand on naval forces and budgets.⁶⁸

The report identified that, regardless of wartime need, a minimum of 12 operational carrier battle groups was required to meet Navy peacetime missions of two CVBGs at each of two hubs. The report also identified an excessive concentration of the Navy's offensive striking power in carrier platforms and their airwings that required a large number of other defensive platforms to increase their survivability.⁶⁹

By contrast, U.S. aims in the Indian Ocean and the Middle East would likely not require CVBGs, but could instead be met with "lower-value forces" that would be less costly to procure and maintain, such as land-based aircraft to perform naval missions or landing helicopter assault ships or smaller conventional carriers with vertical/short take-off and landing aircraft.⁷⁰ This approach could also be applied to the permanent deployment of CVBGs to the eastern Mediterranean given the threat posed by bomber bases in the Soviet Union. Other alternatives to the Navy's posture included homeporting an additional carrier overseas (thus reducing the number of carriers required to support forward deployments) and moving to a flexible, as opposed to a permanent, deployment pattern.

Overall, the report foresaw the dilution of naval power as a third hub emerged and recommended consideration of alternatives that facilitated a more regionally-tailored, economical, and flexible approach to presence and crisis-response requirements than currently available, which "uniformly call for carrier forces in all regions."⁷¹ Many of the report's concerns and alternatives apply today.

1990s and Early 2000s

The fall of the Soviet Union and changes in the global environment led to

significant adjustment in Navy deployment strategy. Iraq's 1990 invasion of Kuwait and subsequent U.S. operations in the region increased Navy forward deployments in the Arabian Sea and Persian Gulf. In 1995 the Navy reestablished the Fifth Fleet, with its headquarters in Bahrain.⁷² Although the headquarters was forward-based, the majority of the fleet's combatant ships were forward-deployed from the United States. Although the Navy adopted the goal of maintaining three hubs in the Pacific, Mediterranean, and Arabian Sea/Persian Gulf, declining force levels (with the force shrinking to 337 active ships by 2001) and the reallocation of forces to other theaters frequently resulted in major presence gaps—in particular, CVBG presence.

The 1993 Department of Defense (DOD) Bottom-Up Review (BUR) aimed to restructure military forces for the post-Cold War era. The review sought to address the “dangers posed by nuclear weapons and other weapons of mass destruction; regional dangers; dangers to democracy and reform; and economic dangers.”⁷³ A near-simultaneous two major regional conflict (informed by the threats posed by Iraq and North Korea) served as the lead force-sizing and shaping construct, with peace enforcement and “Intervention Operations” as the second set of operations that would size and shape forces.⁷⁴

Recommending a fleet of 346 ships (including 11 active aircraft carriers, one reserve/training aircraft carrier, and 45–55 attack submarines), the BUR asserted that peacetime overseas presence needs, especially for aircraft carriers, could exceed those needed to win two major regional contingencies (MRC). Recognizing the utility of naval combatants to conduct a range of non-MRC missions, the review force structure was “sized to reflect the exigencies of overseas presence, as well as the warfighting requirements of MRCs.”⁷⁵

The BUR's assumptions and recommendations came under critical review, with observers commenting that the review's force structure was unaffordable under the William J. Clinton administration's proposed defense budget. Increased engagement and peace enforcement and intervention operations would stretch thin forces obligated for MRCs (especially as the fleet shrunk compared to the Cold War), and combatant commanders questioned assumptions and strategic enabler capacities in the plan to respond to two near-simultaneous MRCs.⁷⁶

The Navy informed and supported the incorporation of forward presence as a Navy-unique leading force-sizing criterion in the 1993 BUR.⁷⁷ Additionally, as threats to Navy sea control declined, the Navy emphasized its power projection capabilities across the range of operations and argued that its combat-credible forward deployment strategy was its principal force-sizing criterion and organizing concept.⁷⁸ Its 1994 service operational concept *Forward . . . From the Sea*

articulated the value of forward-deployed and based power projection forces,⁷⁹ and the 1997 Quadrennial Defense Review (QDR) similarly asserted that “the demands associated with maintaining overseas presence play a significant role in determining the size of our naval forces.”⁸⁰ Some observers commented that this combat-credible forward presence-based argument enabled the Navy to “win” the inter-service rivalry battle of the 1997 QDR, “by being able to fend off any potential further cuts to the centerpieces of its force structure—aircraft carriers.”⁸¹

In terms of naval force posture, the BUR identified the goal of being able to maintain a carrier strike group (CSG) and amphibious ready group (ARG) more or less continuously off Southwest Asia, Northeast Asia, and Europe (in the Mediterranean); however, in order to reduce the length of deployments while shrinking the force, the review identified “ways to fill gaps in carrier presence or to supplement our posture even when carriers are present” with ARGs, Tomahawk-launching cruisers, destroyers, and submarines, and land-based maritime patrol aircraft.⁸²

During the 1990s, the Navy greatly increased its support of military operations other than war around the world as well as its deployment of forces for partnership-building deployments off Africa, South America, and Southeast Asia. These operations and frequent combat operations employed Navy and other service forces at higher rates than anticipated by the BUR, leading to the reallocation of research, development, and acquisition funding to operations and maintenance accounts.

During this period, there were calls for experimental fleet battle exercises that mirrored those of the interwar years, and the Navy did conduct some fleet battle experiments and joint fleet exercises. However, these exercises—conducted in addition to a variety of forward-presence activities that demanded a large portion of the shrinking fleet’s available time—resulted in them largely transforming into work-up exercises that prepared fleet units for elements of forward deployment.⁸³

During the 1990s, the Navy’s repair ship and destroyer tender forces were eliminated, and the forward submarine tender force significantly cut, as most repair responsibilities shifted back to bases in the United States.⁸⁴ Throughout the Cold War, intermediate-level maintenance and repair increasingly became a function of forward-based and homeland-based depots ashore. By the 1990s, the Navy’s mobile logistics force (with the exception of the Combat Logistics Force underway replenishment assets) atrophied. Beginning with the deployment of prepositioning ships to Diego Garcia in 1981, the Afloat Prepositioning Force permanently forward-deployed ships with equipment and supplies (largely for Marine Corps, Army, and Air Force requirements) for immediate offloading

in contingencies. Overall, this trend reduced the ability of the Navy to conduct forward or transoceanic operations independent of land bases.

In the early 2000s, the Navy continued a deployment strategy of forward-deploying combat-credible forces, albeit in two-and-a-half rather than three hubs, with the Mediterranean receiving a de facto “half-hub” status as ongoing combat operations in Afghanistan and Iraq drew a greater proportion of naval forces and the size of the fleet continued to shrink.⁸⁵

Service strategies further elevated the role of combat-credible forward presence. The 2007 Department of the Navy and Coast Guard strategy, *A Cooperative Strategy for 21st Century Seapower*, identified it as a distinct strategic advantage for the nation, the aegis of the global economic system, and an essential feature to prevent wars in addition to winning them.⁸⁶ In 2015 a revised maritime strategy titled *Forward, Engaged, Ready: A Cooperative Strategy for 21st Century Seapower* continued to highlight forward presence as an enabler of deterrence, rapid crisis response, partner training, and maritime security.⁸⁷ Additionally the revised strategy explicitly named “challenges” from China, Russia, and Iran as reasons to maintain combat-credible forward presence to deter, and if necessary, defeat aggression.

Yet even during this period, the ever-increasing demand for forward presence was significantly outpacing forces available. In congressional testimony, Vice Admiral Conrad Lautenbacher, Deputy Chief of Naval Operations, declared that “it is no secret that our current resources of 316 ships are fully deployed and in many cases stretched thin to meet the growing national security demands,” and commentators bemoaned the “tyrannical hold” of presence that threatened to break Navy readiness.⁸⁸

THE CURRENT STATE OF FORWARD PRESENCE

More than a quarter century since the end of the Cold War, the United States still follows the same Cold War approach to forward presence. It persistently forward deploys and bases major combat-credible units in two to three hubs. Although the pattern of deployments has changed, with more forces allocated to the Arabian Sea and Persian Gulf and fewer to the Atlantic and Mediterranean, the fundamental deployment strategy remains the same. All the while, the Navy has contributed to large and small ongoing combat operations around the world and fielded other independent deploying assets to do engagement, crisis response, and short term surges.⁸⁹

Peter Swartz contends that the major factors that drive determination of deployment strategy include: the international environment, the domestic environment and strategic outlook, and technological innovation.⁹⁰ Arguably, all three have changed in a way that would suggest a need to reevaluate deployment strategy in general and forward presence in particular.

Challenges to Current Forward Presence

The growth and spread of precision strike capabilities and the cost of modes of forward operation call into question both the value and sustainability of the current U.S. approach to naval forward presence. A growing number of precision strike capabilities can hold forward-operating fleet assets at risk. These capabilities apply to adversaries such as China, Russia, and Iran, but also increasingly (albeit at lower levels of scale and sophistication) to smaller states and nonstate actors. Most notably, the People's Republic of China has developed antiship ballistic missiles (ASBMs) capable of engaging surface ships at ranges exceeding 2,000 nautical miles.⁹¹ These threats are complimented by Chinese and Russian aircraft, surface ships, and submarines that can fire a variety of missiles and torpedoes, and multi-phenomenology integrated surveillance and targeting complexes that challenge American counterintelligence, surveillance, and reconnaissance efforts—especially for forward operating vessels. While U.S. undersea superiority has long been regarded as a major advantage in potential contingencies, improvements in Chinese and Russian antisubmarine warfare capabilities may also threaten submarine operations in forward areas.⁹²

Analyzing these trends, a 2015 RAND Corporation report concluded that:

over the next five to 15 years, if U.S. and PLA forces remain on roughly current trajectories, Asia will witness a progressively receding frontier of U.S. dominance. . . . PLA forces will become more capable of establishing temporary local air and naval superiority at the outset of a conflict. In certain regional contingencies, this temporal or local superiority might enable the PLA to achieve limited objectives without 'defeating' U.S. forces.⁹³

The growing effectiveness of Chinese and Russian military forces may lead them to believe they can rapidly achieve campaign objectives and possibly even deter American intervention—especially if conducted in a low-intensity “gray zone warfare” manner. Conversely, these trends may undercut the combat credibility of U.S. forces to allies, diminishing the reassurance aims of forward-deployed capital units.

Overall, the Navy faces a range of threats that significantly exceed the scale and sophistication of those envisioned in the 1993 Bottom-Up Review and subsequent analyses that sized a Navy to defeat regional aggressors with “100–200 naval vessels, primarily patrol craft armed with surface-to-surface missiles, and up to 50 submarines.”⁹⁴ The Navy’s 2016 Force Structure Assessment called for 355 ships, in part based on the expectation that the force would suffer additional losses in conflict against a peer or near peer adversary. Of note, the 355 ship total was the “minimum force structure to comply with [Pentagon] strategic guidance” and was not the “desired” force size the Navy would pursue if resources were not a constraint, which would be a 653-ship fleet to meet all global presence and warfighting requirements with minimal risk.⁹⁵

Current forward presence models also face another challenge: The fiscal and opportunity costs of current modes of operation and the cost of the fleet are difficult to sustain. In the post-Cold War environment, the demand for naval forces has significantly increased. In the 1990s, the Navy did not reap a “peace dividend,” as it conducted “persistent operations in the Balkans, the Caribbean, and the Persian Gulf after Desert Storm, continued its role in Asia, and expanded its peacetime engagement as COCOMs [combat commands] increased ‘shaping’ activities.”⁹⁶ After 9/11, the Navy decreased its role in the Balkans and Caribbean but dramatically increased its homeland defense and ballistic missile defense roles, conducted major operations in Iraq and Afghanistan, and adopted new humanitarian assistance, maritime partnership building, littoral combat, and special operational forces missions. Overall, the Navy battle force has shrunk, while the number of ships on deployment has remained relatively steady and the Navy has increased its forward presence missions.⁹⁷ To achieve this, the number of ships undergoing maintenance or underway in the continental United States for training has decreased (with deleterious effects on readiness to conduct high-intensity operations against adversaries) and the length and frequency of deployments have increased (resulting in a reduction in time available for maintenance, a reduction in the time available for training, and negative impacts on morale).⁹⁸ Demand for additional naval forces in the European theater (in the North Atlantic and Mediterranean) to deter Russian aggression and hold at risk Russian or Syrian forces threatens to significantly increase demands on naval forces, absent a concomitant major reduction in naval forces elsewhere.

Although Navy leadership has hoped for a respite from operations to “reset” the force, the current national commitment to forward-deploying naval forces, centered around major fleet units, makes this challenging.⁹⁹ In a sense, the Navy has fallen victim to its own success in promoting and executing forward-deployed

combat-credible naval forces, with insatiable demand for more naval forces forward exceeding available supply. This imbalance applies not only to aircraft carriers, but even to amphibious forces, such as expeditionary strike groups, that are increasingly requested to not only counter major adversaries, but also to provide additional forward presence for engagement and counter-nonstate actor operations in the littorals.¹⁰⁰

Whereas the tempo of current operations strains the force, the Navy also faces another challenge: the continued decline in the size of its fleet. Since the 1980s, it has continued to shrink, almost without interruption, to 275 ships in 2017.¹⁰¹ Although the Navy aims to grow the fleet in its shipbuilding plans, it is unclear it will receive adequate shipbuilding funds to achieve those goals. Per the Congressional Budget Office, the Fiscal Year 2016 30-Year Shipbuilding Plan would be 32 percent more expensive than the Navy's historical average annual shipbuilding budgets,¹⁰² and if it received an average annual shipbuilding budget of \$16 billion (its recent historical average), the fleet inventory would decrease to 251 ships by 2044.¹⁰³ Even amid the decline in the size of the fleet, concern has been raised that the Navy has inadequately emphasized investments in modernization and readiness essential to ensuring forces are effective in combat against peer or near-peer adversaries. In a 2015 memorandum, Secretary of Defense Ashton Carter chastised Secretary of the Navy Ray Mabus that the Department of the Navy budget had "overemphasized resources used to incrementally increase total ship numbers [thus aiding the maintenance of forward presence] at the expense of critically-needed investments" for warfighting.¹⁰⁴ Absent major growth in the size of the fleet, these fiscal and operational dynamics present the Navy with a difficult choice: reduce forward presence to increase readiness at home or continue with the current course that risks undermining readiness and combat capability.

Options for Navy Force Planning

Naval forces can continue to play major roles in addressing U.S. national security challenges. While current forward deployment models appear unsustainable for operational and fiscal reasons, there are force planning options that can adjust naval capabilities, posture, and forces as appropriate. This essay examines three classes of primary options: status quo, status quo-plus, and withdrawal that relies on range.¹⁰⁵

The nation could choose to continue to pursue the status quo option for Navy deployment strategy and force structure. Under this option, easy to implement bureaucratically and politically (both domestically and internationally), the nation would continue to follow the same deployment strategy developed in the

Cold War. Innovations to the current approach could seek to “optimize” to maintain forward presence with a smaller fleet by increasing the length and frequency of deployments, basing more ships overseas, or rotating crews.¹⁰⁶

However, this approach would ultimately whistle past the graveyard. It would accept greater risk as the number of forces available forward decline due to the shrinking fleet and as growing strains on the fleet to maintain forces forward reduce readiness. Additionally, this approach would likely suffer from reduced combat credibility. Over time many classes of forward-deployed naval forces could be held at greater degrees of risk by adversaries.¹⁰⁷ This would undermine deterrence and reassurance objectives. It might even encourage opportunistic aggression by adversaries, since forward-deployed units organized around CSGs and ESGs (expeditionary strike groups) would neither be well suited to effectively counter low-intensity gray zone aggression nor be effectively suited to respond in mass with a surge force to counter high-intensity aggression because the readiness of forward-deployed forces would be prioritized over forces in the United States.

In a “status quo plus” option, the nation would continue to deploy combat-credible forces forward, but to reduce their vulnerability, it would employ alternative force packages and concepts. This could include the use of large-deck amphibious ships or smaller carriers to substitute for CVNs or the incorporation of additional offensive weapons on surface combatants, both efforts to disperse the combat potential of the fleet among a greater number of forces. Leveraging concepts such as distributed lethality and electromagnetic maneuver warfare, it would seek to create a resilient force that would still conduct operations forward.

Without the participation of CVN-based carrier air wings (CVW), this force may, however, lack the requisite firepower to effectively defend surface forces or conduct sustained offensive operations. Additionally, if counter-intelligence, surveillance, and reconnaissance (ISR) efforts were not as effective as desired, then the forward operation of the dispersed fleet could make it vulnerable to destruction in detail.

A third option is to withdraw from forward presence and rely on long-range strike capabilities, both within and without the Navy. Reducing the forward presence of major fleet units, such as CSGs, would decrease their risk to detection and destruction. The fleet could leverage long-range CVW aircraft and missiles to launch powerful strikes before withdrawing once more to a safer area.

This approach might be effective for high-intensity strike and sea denial operations; however, absent complementary lower campaign value forward-operating forces it would suffer difficulty demonstrating presence in a region or addressing low-intensity gray zone threats. Additionally, unless sufficient numbers of

relatively expensive, long-range munitions were procured, high munitions expenditure rates would be difficult to sustain over the course of a campaign.

An Alternative Approach to Forward Presence

All three classes of primary options face significant limitations. Instead, the nation requires a deployment strategy that distinguishes between the different peacetime and wartime tasks naval forces conduct and a force structure that matches these demands. Inextricably linked in effective strategic planning, both force posture and force structure must be tailored to current and future challenges.

Squadrons of forward-deployed forces would focus on peacetime presence, deterrence, assurance, and warfighting missions. These forces would consist of lower vulnerability assets (such as submarines) and lower campaign value assets (such as smaller surface combatants and various kinds of unmanned systems), yet would be able to reassure allies and deter weak adversaries. During a major conflict, these peacetime forces would be capable of conducting offensive operations for operationally-relevant periods of time. Guided by new operational concepts and grouped into force packages, this force would not be capable of assured defense of allies, but would be capable of significantly delaying or disrupting adversary aggression (instead of serving as a mere tripwire).¹⁰⁸ Some elements of these forces could include new heterogeneous architectures of manned-unmanned systems of systems, including patrol boats, frigates, submarines, and unmanned sensors and surface and undersea vehicles, that would be capable of holding adversary maritime forces at risk or providing long-endurance surveillance and targeting for standoff forces at low cost. When forward-deployed sea-based aviation assets are necessary, they would be fielded from large-deck amphibious ships and surface ships, not aircraft carriers. Non-low signature forward-operating forces would be expected to suffer relatively high attrition rates in a sudden, high-intensity conflict.

In such a conflict, surviving forward-deployed forces would complement the large surging warfighting force. This force would focus on multi-carrier, cross-domain, high-end warfare and would incorporate a mix of standoff and stand-in capabilities (such as CSGs with long-range CVWs, surface ships with standoff missiles, and submarines) and would have the requisite mass to conduct sustained operations from multiple, geographically distant axes. To ensure that a requisite number of surge forces would be capable of responding in an operationally-relevant period of time, a portion of the surge force would conduct fleet exercises and occasional cruises. The rest of the force would be maintained in the homeland at relatively high states of readiness.

Critical to the combined fleet would be a robust and redundant defense-industrial base capable of developing and supporting the fleet in peacetime and rapidly expanding production of defense platforms and systems in wartime to sustain a potential protracted, high attrition conflict.

In many respects, this bifurcated force posture would mimic the fleet's interwar period deployment strategy. The surge fleet would conduct "recurrent large-scale exercises in home waters [. . .] undistracted by the pull of a different actual peacetime employment strategy."¹⁰⁹ In contrast, however, to the Asiatic Fleet, forward-operating forces would have sufficient striking power to delay or disrupt adversary operations.

In 2016 the Center for Strategic and Budgetary Assessments (CSBA) conducted a congressionally-directed alternative fleet architecture study that generated a geographically tailored force similar to the one proposed.¹¹⁰ As discussed, the study divided forces into a forward-operating and geographically-tailored deterrence force and a surging maneuver force. Forces operated forward throughout the western Pacific, Indian Ocean and Persian Gulf, Mediterranean and North Atlantic, Africa, and Central and South America. To ensure credible coverage, the proposed fleet's total battle force consisted of 366 ships (408 if patrol vessels are counted).¹¹¹

The challenges to developing a new force structure and posture are likely to be both budgetary and social. Budgetarily, a number of studies, to include the Navy's 2016 Force Structure Assessment and CSBA's study, recommend growing the Navy to or past 350 ships. However, the nation may not devote the requisite level of funding to grow the fleet.¹¹² For instance, the average annual cost to procure CSBA's proposed alternative fleet architecture (including the wartime Combat Logistics Force) is \$23.6 billion, 20 percent greater than the Obama administration's President's Budget (PB) 2017 plan.¹¹³ The operations and maintenance costs associated with the proposed fleet architecture plan will cost an average of \$16.5 billion per year, 14 percent more than the PB 2017 level.¹¹⁴

Further, the United States has acculturated friends and adversaries to equate forward presence with commitment and CSGs as the primary sign of commitment. This situation places the United States in a delicate balance maintaining adequate levels of presence and combat credibility. Additionally, as the Navy fields more unmanned vehicles or other lower signature forces, it may face difficulty deterring adversaries or reassuring allies using these new platforms—especially if they are usually unseen. Additionally, lacking humans, unmanned systems may not pose the same tripwire barriers to adversaries, who may be comfortable neutralizing these systems with lowered expectations of escalation.

Nonetheless, an alternative Navy force posture and structure can be pursued and implemented. The Navy and senior DOD leaders should clearly articulate the need for higher overall defense and Navy budgets to develop Navy force structures and postures properly aligned with threats and opportunities. The Navy's post-1970 budgets have remained flat in real terms as a percentage of gross domestic product, while continually-increasing portions of the Navy budget are consumed by non-research and development, procurement, or maintenance costs.¹¹⁵ Absent a larger budget and reform of growing costs that do not contribute to military effectiveness, the Navy may be forced into a situation similar to that of early 20th century Great Britain, in which the Royal Navy reoriented its posture to meet the German threat in the North Sea, leaving the western Atlantic and eastern Pacific to the United States.¹¹⁶ In the 21st century, there is not a suitably capable, benevolent great power on the horizon.

Furthermore, even if the Navy's budget does not increase to the level required to procure and sustain the full alternative force structures (and it is essential that they increase), the proposed bifurcated deployment strategy could still be implemented by forces to varying degrees.

Additionally, dedicated alliance and partner engagement efforts and strategic signaling to adversaries would be critical to accustom states to combat-credible non-CSG forward-operating naval forces. Cognizant of the enormous initial alliance management challenges associated with this approach, with the right level of engagement, such an approach could overcome initial ally and partner concerns and result in an even more credible force, since both allies and partners and adversaries would recognize the operationally-superior combat performance and availability of the new force.

Strategic communication would convey that the force posture of this bifurcated fleet would not be a withdrawal from the region, but rather a growth in forward-operating low-signature and low-campaign value forces (that would likely result in a significant net increase in the total number of assets operating forward—many of them unmanned) and a repositioning of higher signature forces to an optimal deterrence and warfighting areas. Moreover, during the transition period from the current status quo deployment strategy to the new deterrence force/maneuver force strategy, uncertainty regarding U.S. operational capabilities in both forces (some of which would be unknown or poorly understood by adversaries) could significantly contribute to deterrence since that uncertainty could “tip cost/benefit calculations in favor of restraint.”¹¹⁷

CONCLUSION

Change in Navy deployment strategy has been constant. While the Navy has always had a forward presence, the character of that presence has adapted to fluctuations in the domestic power and interests of the United States, the global environment, and technological capabilities.¹¹⁸ Today, the nation faces changes in its domestic power with the prospect of new defense budgets, changes in the global environment with great power adversaries, capable regional actors, and nonstate actors all threatening it in different ways, and technological innovation on the part of adversaries and the United States alike that present major threats and opportunities.

A new force structure and posture strategy would address these major changes. In evaluating the strategic effectiveness of the alternative forward deployment strategy, three fundamental questions must be posed: how to measure presence; what is it that allies and friends pay attention to; and what is it that competitors pay attention to?

Careful examination by Navy leaders and policymakers would identify the proposed strategy's virtues. It would also recognize the capabilities and limitations of these naval forces. In particular, naval forces—even forward-deployed and present deterrence forces—may be limited in their ability to shape adversaries.¹¹⁹ Accordingly, shaping operations should be carefully evaluated and specifically targeted. Similarly, for some forms of aggression, including some gray zone warfare actions, the Navy may not be the best proactive or reactive U.S. government organization. Instead, whole-of-government efforts or efforts drawing on the capabilities of other organizations may be more effective. Lastly, it is likely that changing Chinese and Russian deployment patterns (including Chinese forward deployment in the Indian Ocean) will require further evolutions in U.S. deployment strategy.¹²⁰ A fleet that has the flexibility to tailor its forces forward and husband its power can more effectively respond to these challenges.

The continuation of a 70-year-old deployment strategy is an historical aberration, and it is increasingly operationally and strategically ineffective. The United States must adopt new, tailored approaches that employ more of the right forces forward for both peace and war and hold more of the right forces further back for employment in war. An approach that deploys differentiated deterrence and maneuver forces sets the Navy and the nation on a course for success.

Notes

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970215-N-3093M-001 U.S. Navy photo by Photographer's Mate 2nd Class Andrew Mckaskle

Diver Aviation Ordnanceman 1st Class David Ahearn attaches an inert satchel charge to a training mine, during exercises in waters off Naval Base Guantanamo Bay, Cuba.

Chapter 2

Writing U.S. Naval Operational History 1980–2010: U.S. Navy Mine Countermeasures in Terror and War

by Scott C. Truver

PERSPECTIVE

When Senior Historian Michael Crawford of the Naval History and Heritage Command (NHHC) invited me to prepare a paper on the “needs and opportunities in U.S. Naval History in the post–World War II” period, my first thought was: “Doesn’t he know? Political scientist . . . *not* historian?”

To be sure, I had taken several history courses while at college. However, I wondered about the relevance of “Renaissance and Reformation”—I was thinking about becoming a Lutheran minister—to my proposed NHHC “needs and opportunities” topic, which was:

Operations—the Navy’s security roles in reference to China and Southeast Asia, Africa, South America, and Europe, particularly since 1980, and the Navy’s role in counter-piracy since the 1820s.

So we met, and he assured me that all would be good.

We also agreed to rethink the discussion of counter-piracy since the 1820s and focus on the 1980 to 2010 period. The goal was to provide a perspective of the “post-Vietnam War, post–Cold War, post-9/11” Navy and assess how Navy operations have been addressed by means of a historiographical survey of the English-language literature:

- Identify what has been published on the subject of Navy operations from 1980 to 2010, including counter-piracy ops (operations)

- Explain the broader historical context and the subject’s historical significance
- Map out the scholarly landscape by reviewing everything of significance published on the subject, and
- Identify needs and opportunities to help set the agenda for the research and writing of the history of U.S. Navy operations for the next 20 years

His use of “Navy” operations and not “naval” or “maritime” meant that I was not to address the other two sea services—the U.S. Marine Corps or Coast Guard—just the U.S. Navy.

Nevertheless, I remained concerned by the inclusion of “everything of significance.”

Thus, one of my initial objectives was to set boundaries to the problem, to determine what exactly “Navy operations” and “everything of significance” could mean. I did a preliminary search of NHHC holdings, resources available at the Naval War College and Naval Postgraduate School libraries, the Center for Naval Analyses (CNA) library, the Library of Congress and JSTOR (Journal Storage), and Google Scholar, Google Chrome, and Bing. I focused only on *operations*—I did not include the much more numerous Navy, joint force, and international *exercises*—and came up with 158 identifiable/named operations from 1980 to 2010: There might well be more but there will not be fewer. These are listed in Appendices 1–3 (sources for these are in Appendix 1) and are summarized here:

▪ Operations by decade	
1980–89	49
1990–99	85
2000–2010	24
▪ Types of operations by intensity	
Peace operations/forward presence	15
Humanitarian assistance/disaster relief	15
Freedom of navigation	3
Maritime interception	3
Counter-piracy	3
Noncombatant evacuation	26
Show of force	49
Contingent positioning	20
Combat	24
▪ Frequency of operations	
Show of force	49

Noncombatant evacuation	26
Combat	24
Contingent positioning	20
Humanitarian assistance/disaster relief	15
Peace operations/forward presence	15
Counter-piracy	3
Maritime interception	3
Freedom of navigation	3
▪ Operations by world region	
Mediterranean	51
Arabian Gulf	32
Africa	27
Western Hemisphere	18
Pacific	14
Indian Ocean	6
Southwest Asia	4
United States	3
Europe	2
Red Sea	1

The 1990–99 period was the busiest with 54 percent of the total ops. The show-of-force ops were the most frequent with 31 percent. And, as would be expected, the Mediterranean/Arabian Gulf ops comprised most—53 percent—across all ten regions.

The challenge was multiplied by what I call “embedded operations.” This refers to an overarching operation under which subordinate operations were carried out. For example, Operations Sharp Guard and Decisive Enhancement from 1992–98 in the Mediterranean/Balkans region had 11 embedded ops:

▪ Sharp Vigilance 1992	show of force
▪ Maritime Guard 1992–93	show of force
▪ Deny Flight 1993–95	show of force
▪ Provide Promise 1994	contingent positioning
▪ Joint Endeavor 1996	peace operations/forward presence
▪ Decisive Edge 1996	show of force
▪ Deliberate Force 1996	combat
▪ Deliberate Guard 1996–97	show of force
▪ Joint Guard 1996–98	peace operations

- Joint Forge 1997–2001 show of force
- Deliberate Forge 1997–98 show of force

There was one other, but less extensive, instance of embedded ops—Continued Hope, Africa/Somalia 1993–95: Show Care, More Care, and Quick Draw. Still, individual bibliographical searches had to be conducted for each operation, using each of the nine search engines noted above and numerous key words and phrases for each, to ensure that I captured “everything of significance.” A quick assessment of time to complete was about 1,200 hours.

I again met with Michael: How can we cut this down and still meet the NHHC’s goals?

Because of my interest in naval mine warfare (MIW),¹ I suggested, and he agreed, to focus on two U.S. Navy mine countermeasures operations in the post-1980 era.

The first was the 1984 “Mines of August” state-sponsored terrorist mining crisis in the Red Sea and the Navy’s Operation Intense Look response.²

The second was Operation Candid Hammer in 1990–91, an embedded op to Desert Shield/Storm show-of-force, contingent positioning, and major combat operations. The last time the Navy confronted a similar mining event was off Wonsan, North Korea, in October 1950, when 3,000 Russian mines kept a United Nations amphibious task force at bay and prompted task force commander Rear Admiral Allen E. Smith to lament: “We have lost control of the seas to a nation without a navy, using pre-World War I weapons, laid by vessels that were utilized at the time of the birth of Christ.”³

Michael reminded me that the focus of the effort remained on the historiography of these two operations, not the operations themselves. My revised tasking was now:

- Identify what has been published on the subjects Operations Intense Look and Candid Hammer (and other Arabian/Persian Gulf MCM ops in Desert Shield/Storm 1990–91)
- Explain the broader historical context and Navy mine warfare’s historical significance
- Map out the scholarly landscape by reviewing everything of significance published on operations Intense Look and Candid Hammer
- Identify needs and opportunities to help set the agenda for the research and writing of the history of U.S. Navy mine warfare

In that regard, then, let me first address broader historical context and Navy mine warfare's historical significance.

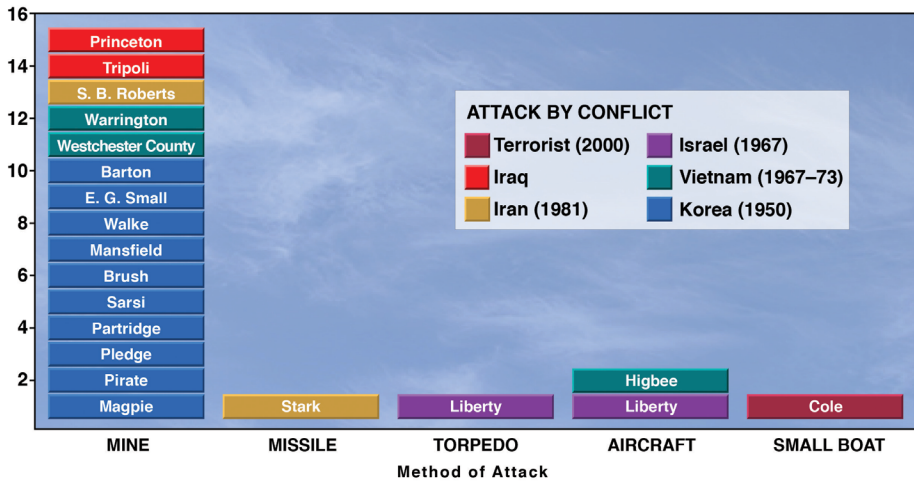
HISTORICAL CONTEXT AND SIGNIFICANCE

Sea mines and the need to counter them have been constants for America since Bushnell's *Turtle* in 1776.⁴ Mines figured prominently in the Civil War, Spanish-American War, both World Wars, Korea, Vietnam, several Cold War crises (including at least one hoax), and in Operations Desert Storm and Iraqi Freedom. In 2016, traditional navies as well as maritime terrorists have at their disposal mines and underwater improvised explosive devices to challenge military and commercial use of the seas.⁵

These “weapons that wait” are the quintessential global asymmetric anti-access/area-denial threat, pitting our adversaries' strengths against what they perceive as our naval and maritime weaknesses. They can be put in place by virtually any platform—aircraft, surface vessels and craft, submarines, and even ferryboats—and their low cost belies their effectiveness. World War I-era contact weapons bristling with “horns” can be as dangerous as highly sophisticated, 21st-century computer-programmable multiple-influence mines that can fire from the magnetic, acoustic, seismic, and pressure “signatures” of their victims.

In 2016, perhaps as many as a million sea mines of more than 300 types are in the inventories of more than 50 navies worldwide, not counting U.S. weapons. More than 30 countries produce and more than 20 countries export mines. Even highly sophisticated weapons are available in the international arms trade. The Navy's potential adversaries hold mines and mining in high regard: Russia is thought to have upward of 250,000 mines; China, 80,000 to 100,000; North Korea, about 50,000; and Iran, between 3,000 and 6,000 weapons.⁶ Worse, these figures are for sea mines, proper; they do not include underwater improvised explosive devices, which can be fashioned from 50-gallon drums and discarded refrigerators—virtually any container.

And, the Navy's experience attests to the seriousness of the mine threat: Since the end of World War II, mines have severely damaged or sunk four times more U.S. Navy ships than all other means of attack. Yes, four of these 15 mine victims were minesweepers clearing the way for U.N. naval forces during the Korean War, but that tragically underscores the dangers from mines—even MCM experts are at risk.



Source: U.S. Navy N85 and PEO LMW, 2009

Operation Intense Look, 1984⁷

The use of mines during the Arabian Gulf “tanker war” had only begun to ramp up and the mine strikes of the reflagged tanker MV *Bridgeton* and frigate *Samuel B. Roberts* (FFG-58) were several years away, when commercial vessels reported suspicious underwater explosions in the Red Sea in July and August 1984.

At least 16—and perhaps as many as 19—merchant vessels transiting the Gulf of Suez and the Red Sea as far south as the Bab el Mandeb claimed they had been mined. Various extremist groups avowed responsibility for planting mines in the international waterway—Islamic jihad being one of the more vociferous. Inasmuch as the first victim was the Soviet-flagged *Knud Jespersen* on 9 July, the Soviet *Red Star* military newspaper had another take on what it called “American aggression and imperialism in the Red Sea”:⁸

- Washington and its NATO allies are expanding their military influence in the Red Sea. They are mining the Red Sea in order to control Arab countries.
- Using the excuse that they plan to clear mines, NATO forces are expanding their military presence in the Red Sea and the Middle East.

Responding to actual Egyptian and Saudi requests, with Riyadh being particularly concerned about the safety and security of pilgrims making the annual Hajj to Mecca, U.S. Navy mine countermeasures and explosive ordnance disposal (EOD) teams joined an international mine hunt to search for the sources of the explosions. Egypt, France, Italy, Great Britain, The Netherlands, and the

Soviet Union deployed mine-sweeping and mine-hunting vessels and supporting EOD divers.

The U.S. Navy deployed four RD-53D airborne mine countermeasures (AMCM) helicopters from Helicopter Mine Squadron Fourteen (HM-14) equipped with the advanced AQS-14 mine-hunting side-scan sonar—this was the first real-world deployment of the “Q-14”—in addition to legacy in-service mine-sweeping systems. Responding to Saudi requests to sweep the ports of Jidda and Yanbu, the Commander Mine Warfare Command divided U.S. forces into two detachments. The first was supported by the Middle East Force flagship *La Salle* (LPD-31) and focused on sweeping those ports as well as the Bab el Mandeb to ensure safe passage for the aircraft carrier *America* (CV-66) and her escorts transiting from the Indian Ocean to the Mediterranean.

The second swept middle sectors in the Red Sea, supported by the coastal hydrographic survey ship *Harkness* (T-AGS-32). *Harkness* embarked an Atlantic Fleet EOD side-scan sonar detachment, and the amphibious transport *Shreveport* (LPD-12) supported the AMCM helos deploying the Q-14 mine-hunting sonars. However, U.S. MCM forces detected no mines.

The U.S. involvement in theater was from 13 August to 1 October 1984, less than two months.

International MCM forces swept several mines, including ordnance that dated to before World War II. Moreover, the British recovered, rendered safe, and exploited a recently deployed weapon—the absence of sea growth indicating it had not been in the water long—an advanced Soviet multiple-influence mine dubbed “99501” from markings on the mine case. It was of a design that heretofore had never been seen in the West.

It was later determined that Libya’s navy had acquired at least 16 of the advanced mines from East Germany (Moscow was reportedly furious with East Berlin), which had been deployed from the stern ramp of a Libyan commercial ferry, *Ghat*. Manned by a Libyan navy crew and the head of the Libyan mine-laying division, she entered the Red Sea southbound from the Suez Canal on 6 July, declaring she was carrying “general cargo,” returning northbound at the canal on 23 July.

“In light of the ease with which terrorists demonstrated their ability to mine this important international choke point,” mine warfare historian Tamara Moser Melia concluded:

MCM quickly became the focus of international concern. Studies soon noted the importance of coordination of international MCM forces and national

integration of mobile air, sea, and undersea MCM forces, the lessons repeatedly learned by U.S. MCM forces since Wonsan. The overall effect of such low-intensity mine warfare by terrorist organizations and the Third World reminded many nations of their own vulnerability to mines.⁹

Operation Candid Hammer/Gulf War MCM, 1990–91¹⁰

As it turns out, the actual title of the 1990–91 Desert Shield/Desert Storm–embedded MCM operations proved difficult to determine, with “Candid Hammer,” “Desert Sweep,” “Desert Clean Up,” and “Arabian/Persian Gulf MCM Ops” used by various sources. Furthermore, some characterized Candid Hammer as an “exercise” while others as an “operation.” Dates were uncertain, too, although a “mid-August 1990 to early October 1991” period for the overall U.S. Navy MCM/EOD deployment and operations seems reasonable. Nevertheless, these ambiguities complicated the Desert Shield/Desert Storm and post–Desert Storm bibliographical searches, compared to Operation Intense Look.¹¹

The need for U.S. and multinational Coalition partners’ MCM assets in Operations Desert Shield and Desert Storm was clear from the outset, given the use of mines by both sides in the Iran-Iraq war and the Navy’s experiences during Operation Earnest Will—Navy surface warship escorts of re-flagged merchant vessels. MCM deployment planning commenced immediately after Saddam Hussein captured Kuwait on 2 August 1990.

The six AMCM helicopters from HM-14 were ready to deploy to the Persian Gulf via strategic airlift on 4 August, but, because of priorities in airlift requirements, they did not depart Norfolk Naval Air Station until 4 October. Once in-theater, however, HM-14 was flying mine-sweeping training operations beginning on 11 October.

EOD detachments deployed to the Gulf in mid-August and immediately began in-theater training with multinational Coalition MCM forces. This training included the Desert Saber advance EOD MCM rehearsal/exercise in support of a planned amphibious assault north of Ash Shuabah on the Kuwait coastline that was cancelled and redirected as an amphibious raid on Faylaka Island. That, too, was cancelled because of the mine events of 18 February. EOD MCM operations began on 12 February 1991, and channel-clearance operations began when the ground war ended on 27 February.

Avenger (MCM-1, commissioned in 1987) and three 1950s-era ocean minesweepers (MSOs)—*Adroit* (MSO-509), *Impervious* (MSO-449), and *Leader* (MSO-490)—were transported onboard the U.S.-leased Dutch heavy-lift ship, *Super Servant III*, leaving Norfolk on 29 August and arriving at Bahrain on 3

October. The availability of such heavy-lift ships for surface MCM deployments is critical, as it significantly reduces wear and tear on ships and crews during long transits to overseas mine crises. After completing in-theater training and preliminary surveys, the MCM vessels commenced mine-hunting and -sweeping operations in suspected mine danger areas in the Gulf on 16 February 1991, a month after the air war began.

On 18 February 1991 two U.S. warships—*Tripoli* (LPH-10), which ironically had embarked the Navy's HM-14 AMCM helicopters, and the guided-missile cruiser *Princeton* (CG-59)—suffered mine strikes. Two Italian-made Manta bottom influence mines attacked *Princeton* (actually one was a sympathetic firing several hundred yards away from the first, which detonated right under the cruiser's keel) and a single LUGM-145 contact mine holed *Tripoli*. Although *Princeton* restored some strike and anti-air warfare capabilities (within 20 minutes or two hours, depending on the source), she ultimately was a mission kill and had to be towed to port. Despite a 16-by-20-foot gash below the waterline on her starboard side, *Tripoli* continued AMCM flight ops for another five days.

By all accounts the Iraqi use of naval mines was extensive and well planned. Moreover, because of a lack of focused intelligence, the Coalition did not know the extent and sophistication of the enemy's mine-laying efforts until after the Iraqi surrender. Then, the Iraqi military provided detailed charts showing the location and types of mines in ten minefields and lines, extending from off the Kuwait/Saudi border north to just west of the Ad-Darah oil fields. Following receipt of Iraqi mine charts on 4 March, concerted minefield clearance operations involving all MCM assets began in earnest with three goals: (1) open normal commercial shipping channels and ports; (2) sweep known minefields; and (3) complete area clearance of the Kuwaiti coast and the northern Gulf.

During the post-conflict MCM operations, six other countries joined the United States and United Kingdom assets: Belgium, France, Germany, Italy, Japan, and the Netherlands. Initially without the United Kingdom, the European countries formed an independent Coalition of MCM forces under the aegis of the Western European Union (WEU), with Belgium being the first to begin operations in March 1991. The U.S. and U.K. MCM forces continued joint operations until mid-April, when the Royal Navy's ships also joined the WEU Coalition. The Japanese operated independently, but with assistance from U.S. EOD forces, after entering the gulf in June. The WEU countries completed their MCM operations 20 July; the United States and Japan completed theirs in early October.

Naval historian Edward J. Marolda noted: "These mine countermeasures ships were critical to the success of the naval operation because the Iraqis had

established a minefield with almost 1,300 magnetic, acoustic, and other mines. The ships (and ship-based mine-countermeasures helicopters) cleared lanes through what they believed were the minefields.”¹²

HM-14 was called off the MCM task on 17 June and completed redeployment to Norfolk on 8 July. *Avenger* returned to the United States in August, and the three MSOs returned via heavy-lift ship in November. *Guardian* (MCM-5) self-deployed and arrived in mid-June 1991, remaining in the gulf until the spring 1992. This was the beginning of a constant U.S. Navy MCM presence there, with surface vessels, AMCM helicopters, and EOD MCM detachments deployed to the region.

Of the nearly 1,200 mines destroyed by Coalition MCM forces through October 1991, 200 were sophisticated acoustic/magnetic-influence bottom mines, including the Manta bottom mines that attacked *Princeton*. After hostilities ended, Iraq reported that it had laid 1,167 mines of all types. Caitlin Talmadge noted Operation Candid Hammer apparently cleared 907, or 78.6 percent, of the original mines, “an impressive rate of clearance.”¹³

Lieutenant Commander Colin K. Boynton challenged the “impressive” assessment. “These operations were performed under permissive conditions against the easiest of mines to sweep (moored contact mines) and more importantly, the mine hunters had an Iraqi chart showing mine locations in their possession.”¹⁴

EVERYTHING OF SIGNIFICANCE

With that as prelude, I began a focused search to build the bibliography of “everything of significance.” (See Appendix 4.) I revisited the nine original sources—NHHC; Naval War College and Naval Postgraduate School libraries; the Center for Naval Analyses library; the Library of Congress and JSTOR; and Google Scholar, Google Chrome, and Bing. The Library of Congress was difficult to maneuver, and many hours with JSTOR resulted in little of value; in fact, I culled only three publications:

- C. H. Stockton, “The Use of Submarine Mines and Torpedoes in Time of War,” *The American Journal of International Law* 2, no. 2 (April 1908): 276–84.
- Bradley A. Fiske, “Naval Preparedness,” *North American Review* 202, no. 719 (October 1915): 847–57.
- Franklin D. Roosevelt, “The Future of the Submarine,” *North American Review* 202, no. 721 (December 1915): 505–8.

Remarkably, Google Scholar identified many useful “hits.” But there was much chaff to winnow: A 14 May 2016 search of “US Navy/mine warfare/Operation Intense Look/Red Sea/1984” resulted in about 13,400 items to be reviewed. A similar search for Operation Candid Hammer produced much fewer results—three—and only a handful more when the search was broadened to “Desert Shield/Desert Storm Arabian/Persian Gulf War MCM operations 1990–91.”

The “mother lode” was the mine warfare bibliography constructed and maintained by Greta E. Marlatt, senior research librarian, Dudley Knox Library at the Naval Postgraduate School, Monterey, California. If a publication has the words “sea mine” associated with it, I have no doubt that Greta has it chronicled. I am particularly thankful for her excellent, cheerful, and long-suffering bibliographical assistance to this project. Likewise, Dr. Timothy O’Hara, research scientist at the Center for Naval Analyses, searched the CNA library and archives for this project.

GENERAL ARTICLES

The search turned up 215 articles related to Operation Intense Look, published between 9 July and 21 October 1984, but only 13 for Operation Candid Hammer/Gulf War MCM operations that spanned a year. Most of Operation Intense Look articles were “today’s news,” reporting what had transpired in the previous 24 hours or so, and thus should not be considered history by any stretch of the imagination. However, they were secondary sources for the more scholarly articles and publications.

Three articles published well after the Royal Navy found the Soviet/East German/Libyan mine and the Mines of August crisis ended have served as unofficial histories of the event. (Other than command histories of ships and helicopter squadrons, the only government document that discusses the Red Sea crisis in an historical context is the 1992 *Mine Warfare Plan*.¹⁵) These were the U.S. Naval Institute (USNI) *Proceedings/Naval Review* “Mines of August” article (May 1985); Jan Breemer’s “Intense Look: U.S. Minehunting Experience in the Red Sea” (August 1985);¹⁶ and retired Royal Navy Captain John Moore’s overview—“Red Sea Mines a Mystery No Longer,” *Jane’s Naval Review* (1985), which provides good information from the United Kingdom’s perspective. These have been referenced numerous times in subsequent publications that focus on naval mine threats and mine countermeasures requirements, capabilities, plans,

programs, technologies, and operations.¹⁷

Among what must be the many tens of thousands of articles and publications related to Operations Desert Shield and Desert Storm, the 13 articles specifically addressing mine countermeasures topics in Desert Shield/Desert Storm/Candid Hammer did provide historical perspectives, mostly lessons re-learned about the threat and the requirements for effective countermeasures.

For instance, Vice Admiral Stanley Arthur and co-author Marvin Pokrant's "Desert Storm at Sea" in the May 1991 U.S. Naval Institute *Proceedings* summarized what would be their book, *Desert Storm at Sea: What the Navy Really Did*, published in 1999, which devotes significant discussion of MCM. Two months later, U.S. Navy Captain J. M. Martin focused sharply on lessons "We Still Haven't Learned" in the July 1991 U.S. Naval Institute *Proceedings*, even as post-hostilities MCM "sweep" ops continued in the gulf. Likewise, Lieutenant Ernest Fortin, USNR, addressed the nature of the mine threat—"Those Damn Mines" in the February 1992 *Proceedings*—and how to counter it. In the October 1992 *Proceedings*, EOD Commander R. J. Nagle outlined the difficult challenges that the Navy's EOD forces confronted in the gulf. Finally, writing in the Summer/Fall 1992 *Amphibious Review*, Carle White discussed how the Navy's MCM assets addressed the shallow-water threat.

As noted, there was an important international component to the Shield/Storm/Candid Hammer MCM operations. David Foxwell had four articles (one with David Brown) in the *International Defense Review*—"The Gulf War in Review: Report from the Front" (5/1991); "MCM and the Threat Beneath the Surface" (7/1991); "Mine Warfare in an Uncertain World" (5/1992); and "Naval Mine Warfare: Underfunded and Underappreciated" (2/1993)—that addressed the challenges from the allies' perspectives. Similarly, Anthony Preston's "Allied MCM in the Gulf" (*Naval Forces* 4/1991) and Vice Admiral Josef De Wilde's "Mine Warfare in the Gulf" (*NATO's Sixteen Nations* 1/1992) remind readers that the global aspects of the threat demand collaboration and cooperation among friends.

BOOKS

I could find no book-length historical treatment specific to either Operation Intense Look or Operation Candid Hammer/Gulf War MCM—like, for example, the Naval Historical Center's history of mine-sweeping operations in North Vietnam, *Operation End Sweep*.¹⁸ Instead, several significant discussions were

found in publications dealing with the broader focus. I address these according to the operation.

Operation Intense Look

David Crist's *Twilight War: The Secret History of America's Thirty-Year Conflict with Iran* (2013) weaves a riveting story in chapter 13, which begins (235) "... [in] the morning of July 6, 1984, the small cargo ship *Ghat* left Libya on its way to the Eritrean Port of Assab. The round-trip journey through the Suez Canal normally took eight days, but nothing about this trip was routine. Instead of the usual cargo of foodstuffs and crated goods, *Ghat* carried advanced Soviet-made naval mines designed to detonate in response to the mere sound of a passing ship. Rather than her normal civilian crew, Libyan sailors, including the commander of Muammar Gaddafi's mine force, manned the pilot house. Once in the Red Sea, the sailors lowered the stern ramp and hastily rolled the mines off into the water."

Gregory Hartmann and I collaborated on the 1991 update of his original 1979 edition of *Weapons That Wait: Mine Warfare in the U.S. Navy*. The discussion of Operation Intense Look relies heavily on "Mines of August," but was updated to early 1991 (and thus does not include discussion of MCM in Desert Shield/Storm/Candid Hammer). New materials included conjecture that some of the Libyan-laid "99501" mines had only half-explosive charges, which was to ensure ships would be damaged but not sunk, and that Libya had specifically requested advanced weapons from Moscow to bolster Libyan coastal defense.¹⁹

Howard S. Levie's *Mine Warfare at Sea* (1992) devotes just three pages to Intense Look and provides little that is new.

Tam Moser Melia's "*Damn the Torpedoes*" (1991) provides better operational information, but in only two pages.

Operation Candid Hammer/Gulf War MCM

Anthony Cordesman and Abraham R. Wagner allocated eight pages to this operation in their 1,000-page *The Lessons of Modern War, Volume IV: The Gulf War* (1996), but they provided excellent treatment of the MCM activities (888). "Mine warfare was one of the few areas where the long pause between Iraq's invasion of Kuwait and the beginning of Desert Storm acted to Iraq's advantage. Iraq used the time to deploy an extensive set of minefields off of the coast of Kuwait, which affected both the Coalition's options for amphibious warfare and many of its other naval operations." They provided detailed information on the mine threat, mine fields and mine lines, and the capabilities of the Navy (890)—"The U.S. Navy had significant problems dealing with the Iraqi mine threat."—and

its international MCM Coalition partners (892)—“The British force took the lead in most of the mine countermeasures operations during Desert Storm” They concluded: “In short, mine warfare must be taken seriously from the start of a crisis” (897).

Marvin Pokrant’s *Desert Storm at Sea: What the Navy Really Did* (1999) devotes chapter 9 to mine countermeasures, a good deal of chapter 12 to post-hostilities mine clearance, and all of chapter 15 to “Observations on Mine Countermeasures.” Particularly important was its treatment of the role Vice Admiral Stanley Arthur, Commander U.S. Naval Forces Central Command, played in planning and execution of the MCM ops plan. He provides perhaps the best insight of the lack of intelligence about the mine threat, the *Tripoli* and *Princeton* mine strikes, U.S. and MCM Coalition partners’ capabilities, mine-clearance ops, and lessons learned (231): “Just as Iraq paid a price for allowing the Coalition to build up its forces unhindered for five months, the Coalition paid a price for allowing Iraq to lay mines without opposition. Once mines are in place, locating and clearing them under the guns of the enemy will always be hard and time consuming.”

Edward Marolda and Robert Schneller’s *Shield and Sword* devoted significant space to the treatment of the Iraqi mine threat, the U.S. Navy and Coalition MCM assets and capabilities, and pre-/post-conflict operations (322):

During the first three months of the mine-removal operation, the European mine clearing forces performed as would have been expected in a NATO conflict. Operating sophisticated ships and equipment, by mid-May the well-trained and experienced European seamen had destroyed or otherwise neutralized 750 sea mines. The Belgian and French mine hunters destroyed nearly 500 of them. The French mine hunter *Sagittaire* performed skillfully, neutralizing 145 mines in only 20 days. The U.S. and British forces destroyed fewer mines during the early months of the operation, in part because they were more concerned with clearing the existing lanes to the coast of Kuwait than systematically removing mines from identified minefields.

The European MCM forces finished their share of the mine clearance task on 20 July 1991. The U.S. Navy and the Japanese Maritime Self-Defense Force completed their MCM operations on 10 September 1991. *Guardian* (MCM-5), the last remaining MCM ship in gulf waters, departed on January 1992.

Finally, Andrew Lambert's "The Naval War" chapter in *The Gulf War Assessed* (1992) provides a detailed analysis of the naval campaign generally, but offers sharp judgment from a U.K./Royal Navy/European perspective about U.S. Navy MCM operation (127).²⁰

The major weakness of the USN lay in its limited mine countermeasures (MCM) force. With two new classes under construction, the USN had to rely on ships from the early 1950s and their solitary new Mine Countermeasures Vessel (MCMV), the USS *Avenger*. The strength in experience of RN and European MCM forces gave them a clear role, and made their presence a matter of urgency if the USN was to operate safely in waters which had already seen one mine campaign [1980s Tanker War].

These four books make a significant contribution to the historiography of Desert Shield/Storm MCM operations.²¹

Center for Naval Analyses Reports

I call out CNA because of its unique position as the Navy's think tank, a provenance extending back to the Operational Evaluations Group of 1945, if not earlier.

Three Center for Naval Analyses reports figure into the historiography of mine warfare in Candid Hammer/Desert Shield/Desert Storm, but not Intense Look.²² Sabrina Edlow and colleagues provided a chronology of U.S. Navy mining (as opposed to mine countermeasures) generally (April 1997). Specifically with regard to Desert Storm, CNA notes (1),

the United States employed naval mines during the opening days of *Operation Desert Storm*. Commanders were not allowed to conduct anti-surface warfare against questionable transitors within Iraqi territorial waters and, as a last resort, requested permission to mine. Four A-6s from *USS Ranger* [CV-61] sortied, but only three returned. (In all prior military uses of mines, the mining occurred toward the end of conflict—here it's at the initiation of the allied offensive.) On-scene commanders recalled no impact on Iraqi operations from this mining effort. They chose to discontinue mining operations.

Dwight Lyons Jr. and CNA colleagues discussed "The Mine Threat: Show Stoppers or Speed Bumps" (July 1993) and concluded (30), "the lesson from

Desert Storm is not that mine fields are impenetrable, but that if you ignore the threat, you pay for it.”

The third is Ralph Passarelli, *et al.*, *Desert Storm Reconstruction Report, Volume IV: Mine Countermeasures (U)*, Research Memorandum 91-180, October 1991. This remains classified.

Command Histories

Squadron and ship command histories provide some insight into the “deck-plate viewpoint” in both operations:

- *John T. Hall* (FFG-32): “After receiving urgent tasking, USS JOHN L. HALL got underway on 19 August and proceeded at best speed to Port Said, Egypt for a second southbound passage of the Suez Canal. . . . Shortly after midnight on 22 August, USS JOHN L. HALL entered the Suez Canal arriving at Port Suez by mid-morning on 23 August. Immediately exiting the Canal, USS JOHN L. HALL proceeded at best speed to gain visual contact on the Soviet Naval Task Force headed south in the Red Sea. For the next month, USS JOHN L. HALL conducted national interest surveillance operations against the LENI[N] GRAD (CHG-103) and her escorts. These operations were also in conjunction with Operation INTENSE LOOK, which was the joint U.S., French, British and Dutch Mine Countermeasure Operation in the Red Sea.”
- *Shreveport* (LPD-12): “. . . in response to orders received calling for embarkation of Helicopter Mine Countermeasures Squadron FOURTEEN, with four RH-53D helicopters. USS SHREVEPORT had been assigned as the support ship for Airborne Mine Countermeasures in conjunction with Operation ‘Intense Look’ in response to the mining of the Gulf of Suez and the Red Sea. . . . On the 10th of August, SHREVEPORT began her transit to the Gulf of Suez. . . . Arriving at Port Said on the 15th, SHREVEPORT embarked Egyptian pilots and immediately commenced her passage of the Suez Canal as an individual ship. The passage was completed in the record time of seven hours and forty-five minutes and SHREVEPORT continued south to her operating area off Ras Shukheir, Egypt, in the Gulf of Suez. Enroute on the 16th . . . SHREVEPORT anchored off Ras Shukheir on the 16th and was joined by USNS HARKNESS. The remainder of the day was spent conducting briefings aboard SHREVEPORT for commencement of mine hunting operations on the 17th. For the next thirty days, mine hunting operations continued in the Gulf of Suez from sunrise to sunset making use of available daylight hours.”
- Helicopter Support Squadron Four: “[W]hile embarked in USS NASSAU

through 11 Aug, the HC-4 Det set impressive standards by meeting 100 percent of assigned operational commitments. On 14 Aug 84, three days after the return of the NASSAU Det, X-4 was tasked with yet another unique deployment by providing support to operation ‘Intense Look.’ This deployment again demonstrated squadron versatility and the range of the aircraft capabilities, by providing responsive logistic support to this high visibility task force.”

The following command histories of ships and helicopters deployed to Intense Look and Candid Hammer/Gulf ops were not available or could not be accessed to meet schedules:

- AMCM Helicopter Squadron Fourteen, 1984, 1990–91 (classified)
- *Adroit* (MSO-509), 1990–91
- *Avenger* (MCM-1), 1990–91
- USNS *Harkness* (T-AGS-32), 1984
- *Impervious* (MSO-449), 1990–91
- *Leader* (MSO-490), 1990–91

Government Publications

In April 1992, the Department of Defense submitted its *Final Report to Congress: Conduct of the Persian Gulf War*, mandated by Title V, Public Law 102-25. It concluded that the Iraqi mine threat affected almost all naval operations during the Persian Gulf Conflict. From the outset, the principal mission of Coalition MCM assets was to clear a path to the Kuwaiti coast for naval gunfire support and a possible amphibious landing. Post-conflict assessments noted the Iraqi minefields were not placed to maximize their effectiveness and Iraqi forces deployed many mines improperly. Nevertheless, mines had considerable effects on Coalition maritime operations in the Persian Gulf (273, 286).

The May 1991 Department of the Navy/Chief of Naval Operations report, *The United States Navy in “Desert Shield/Desert Storm,”* served as a stepping stone in the development of the Navy’s first post-Cold War mine warfare plan. The conflict had

. . . again illustrated the challenge of mine countermeasures (MCM) and how quickly mines can become a concern. Because of the difficulty of locating and neutralizing mines, we cannot afford to give the minelayer free rein. Future rules of engagement and doctrine should provide for offensive operations to prevent the laying of mines in international waters. Our Cold

War focus on the Soviet threat fostered reliance on our overseas allies for mine countermeasures in forward areas. The MCM assets of our allies—on whom we have relied for MCM support in NATO contingencies for years—provided their mettle in the Gulf . . . highlighted the need for a robust, deployable U.S. Navy MCM capability (61).

The January 1992 *Mine Warfare Plan: Meeting the Challenges of an Uncertain World (U)*, was produced initially at the request of the Assistant Chief of Naval Operations (OP-03) but, as a result of increased awareness of the mine threat, the Chief of Naval Operations approved the plan and the programs it championed. “I believe there are some fundamentals about mine warfare that we should not forget,” Admiral Frank B. Kelso II noted in October 1991 (1). “Once mines are laid, they are quite difficult to get rid of. That is not likely to change. It is probably going to get worse, because mines are going to become more sophisticated.” Admiral Kelso was echoing the statement of Chief of Naval Operations Admiral Forrest Sherman, following the Wonsan MCM debacle of October 1950:

[W]hen you can't go *where* you want to, *when* you want to, you haven't got command of the sea. And command of the sea is a rock-bottom foundation of all our war plans. We've been plenty submarine-conscious and air-conscious. Now we're going to start getting mine-conscious beginning last week.²³

The objective of the 1992 plan was to put mine warfare within what later that year would be the . . . *From the Sea* strategic context. It surveyed post-World War II mine crises, including Operation Intense Look and Gulf War MCM ops, and it examined the changed strategic context, the nature of the global mine threat, enduring as well as emerging requirements, in-service capabilities to meet these needs, programs to address gaps and shortcomings, and resources to carry, bringing reality rather than rhetoric to the nation's mine warfare mission area.

Academic Materials

In addition to a handful of international law-related articles—Elsadig Yagoub A. Abunafeesa, “The Post-1970 Political Geography of the Red Sea Region with Special Reference to United States Interests” (1985); Juden Justice Reed, “Damn the Torpedoes!?: International Standards Regarding the Use of Automatic Submarine Mines” (1984); and Ronnie Anne Wainwright, “Navigation through

Three Straits in the Middle East: Effects on the United States of Being a Nonparty to the 1982 Convention on the Law of the Sea” (1986)—that touched upon the Red Sea mine crisis, if only tangentially, there has been a surprising number of mine warfare papers at war colleges and postgraduate schools. However, there is little that is new, and most use the Mines of August and Desert Shield/Desert Storm/Candid Hammer experiences to advocate for policy and programs.

For example, Lieutenant Commander Colin K. Boynton—“Operations to Defeat Iranian Maritime Trade Interdiction” (2000)—relies on previous discussions of Candid Hammer, such as they are, to counter Iranian use of mines in some future crisis. Lieutenant Commander Jason Gilbert—“The Combined Mine Countermeasures Force: A Unified Commander-in-Chief’s Answer to the Mine Threat” (2001)—highlighted past MCM challenges to argue for a revitalized international/maritime partners approach to combined MCM warfighting. Finally, Dr. Raymond Widmayer—“A Strategic and Industrial Assessment of Sea Mine Warfare in the Post–Cold War Era” (1993)—outlined a strategic framework for a robust mine warfare industrial base.

NEEDS AND OPPORTUNITIES TO HELP SET THE AGENDA

This survey of the historiography of two U.S. MCM operations reveals what might have been expected, *a priori*. As much as mines have had strategic, operational, and tactical impacts, MCM remains a niche warfare area—even more so when the Navy’s mines and mining are brought into the equation. The episodic nature of the threat, with sometimes years between events, generates an “out of sight, out of mine” philosophy. So it seems for histories of mine warfare operations, too.

There are the challenges of working U.S. Navy subjects that have classified materials. The CNA library has “thousands” of classified materials/reports/message traffic relating to Desert Shield/Desert Storm MCM, but I had no access to them.

That begs the question: Where to look for mine-warfare historical resources within the U.S. Navy? This is problematic, given the challenges of a fragmented warfare community with no single champion.²⁴ Mine Warfare in the Office of the Chief of Naval Operations—the Navy’s headquarters—is centered in the Director of Expeditionary Warfare, but other naval warfare sponsors have overlapping and sometimes competing responsibilities for ships, helicopters, and unmanned systems.

There is no single mine-warfare voice in the operating forces, and the mine

warriors suffer from organizational churn. In the acquisition community, an emphasis on mine warfare has all-but been eliminated from various program executive officer organizations from the mid-1990s through 2011:

- PEO (Project Executive Office)-MIW—created specifically to make MIW well and give it a competitive edge—MIW exclusive, no other warfare area
- PEO-MUW (Mine and Undersea Warfare)—mines listed first
- PEO-LMW (Littoral and Mine Warfare)—mines listed last
- PEO-LCS (Littoral Combat Ship) [MIW not even in the title]—some MIW “codes” were excluded altogether, e.g., PMS-408 (EOD)

Before 2006, the Commander Mine Warfare Command (COMINWARCOM)—in Charleston, South Carolina, and Ingleside, Texas—had operational control. Then the Navy disestablished it and stood up the Navy Mine and Antisubmarine Warfare Command—at San Diego, California—which commanded mine warfare as a secondary mission, but still at the flag officer level. The Navy disestablished that command in 2015 and established Surface and Mine Warfighting Development Command—still in San Diego—for ships and weapons. The operating force responsibility for the AMCM helicopters resides in the Commander, Naval Air Forces—San Diego—but the two AMCM helicopter squadrons are located in Norfolk, Virginia. And, the Naval Expeditionary Combat Command—Little Creek, Virginia—has had explosive ordnance disposal cognizance.

Conducting historical research in mine warfare thus looks to be a “Where’s Waldo?” evolution.

It does not help when the community shoots itself in the foot. Mine warfare expert George Pollitt explained,

When COMINWARCOM was in Charleston, there was an MIW archive kept at the Naval and Mine Warfare Training Center (NMWTC). This archive had operational data going back to before [World War I]. When COMINWARCOM moved to Corpus Christi, the archive was culled and the part that was retained was stored in boxes in the SECRET vault at COMINWARCOM. I was told that, when COMINWARCOM was disestablished, all the remaining archive was destroyed.²⁵

Looking ahead, since 1992 there has been no book-length publication focused solely on the history of mine warfare in the United States and elsewhere

(Hartmann/Truver, Levie, and Melia).²⁶ However, much has transpired since then: MIW vision, strategy, threats, requirements, capabilities, programs, and operations. The U.S. Navy confronted an Iraqi mine threat in Operation Iraqi Freedom (2003),²⁷ but nothing like 1990–91, and in May 2008 Tamil Black Tiger commandos used limpet mines to sink the (ill-named) MV *Invincible* (A-520), a Sri Lankan navy cargo ship loaded with explosives.²⁸

Perhaps it is time to update/revise *Weapons That Wait*.

My experience focusing on the historiography of Operations Intense Look and Candid Hammer/Gulf War MCM ops could easily be repeated in the other 156 or so global U.S. Navy Operations from 1980 to 2010 outlined at the beginning of this paper. Official sources will remain difficult to access due to classification, and where to locate materials remains uncertain. A first step would be to take advantage of NHHHC resources and the Navy library, as well as the Naval War College, Naval Postgraduate School, and (if access can be granted) CNA libraries. It should be expected that the names and dates of specific operations might not be correct. In this effort for Intense Look/Candid Hammer, I relied on numerous secondary sources, which at times had contradictory information.

At the end of the day, then, the issue is not whether we will experience a mining event, but when and where it will happen and whether we will be ready to defeat the threat. There are more than a million sea mines of more than 300 types in the inventories of more than 50 navies worldwide, not counting terrorist mines and underwater improvised explosive devices. I recall something about either learning from history or repeating it.

And, in that regard, I have no doubt that naval mines, like “The Poor,” will be with us, always.

Again, my thanks to Michael Crawford and the NHHHC for the opportunity to share my thoughts and to NHHHC’s Greg Bereiter for his commentary; to my colleagues George Pollitt and Norman Polmar for their technical and operational review; Greta Marlatt and Tim O’Hara for bibliographic support; and my bride Annmarie, who ignored my crankiness as the deadline drew near.

Naval History and Heritage Command Discussant Commentary

Dr. Gregory Bereiter, PhD, NHHC Historian, offered his insights regarding this review of mine warfare historiography.

My comments in response to Scott’s presentation will briefly address two issues. First, I’d like to consider the challenges of researching and writing about recent operational history in general. Second, I’d like to suggest some potential avenues for future historical work on mine warfare in the U.S. Navy.

Scott’s presentation has touched on a crucial challenge for naval historians in general: how to approach the recent past. While many problems and methods are similar regardless of the time period, recent history introduces particularly challenging obstacles, from ephemeral digital sources to surviving participants with a vested interest in how their history gets written. Historians who seek to write about recent operations—especially about its more obscure aspects (like naval mine warfare)—confront challenges and dilemmas that our graduate training does not entirely prepare us to navigate.

Historians are trained to research in archives. However, most official documents on recent mine warfare operations are classified—and will remain so for the foreseeable future. Thus, anyone “outside the family” attempting to write about recent mine-warfare developments won’t be able to access the documents they need to reconstruct a given event. This forces a heavy reliance on eyewitness recollections. But historians would never rely solely on what historical actors of, say, the 17th or 18th century said they were doing. Yet, despite the fallibility of memory, oral histories are sources of insights that cannot be found in written records. Our job is to bring myriad resources together, so that we might not only reconstruct what actually happened, but also interpret the meaning of what happened in the broadest terms.

Despite these challenges, avenues for future historical work on naval mine warfare certainly exist.

Some of the most exciting recent work on mine warfare focuses on the later 19th and early 20th centuries. Two recent articles in *The Journal of Military History* demonstrate the promise of current research into this topic. Timothy Wolters’ examination of Confederate “electric torpedo” development in the Civil

War provides a fascinating perspective on the ways in which mining technology, memory, and history were interconnected. Richard Dunley's assessment of the late 19th-century Royal Navy demonstrates how it proactively engaged with the new technology of controlled mining, shaping this technology to suit its particular strategic and cultural requirements.

There may also be an opportunity for historians to reexamine aspects of the North Sea Mine Barrage during World War I, which was established primarily on American initiative between March and June of 1918 in an effort to restrict the movements of U-boats from the North Sea into the Atlantic.

Historians of the Cold War-era Navy should also note that one of the key aims of NATO maritime strategy during the Cold War was to prevent the exit of Warsaw Pact naval forces through the Danish Strait or the Turkish Strait in European waters, or the exit of the Soviet Pacific Fleet through La Pérouse Strait and the Korea Strait in the Pacific.

Lastly, in light of present escalating tensions with Russia and China, both of whom together are thought to possess close to 350,000 sea mines, historians of the very near future will likely need to engage in comparative historical analysis of anti-access and area-denial warfare against these two maritime competitors.

Notes

- 1 It was by accident that I became interested in naval mine warfare—mine countermeasures, as well as mines and mining. An Air Force brat growing up in the 1950s, I remembered World War II submarine movies, particularly enthralled by Cary Grant's maneuvering the USS *Copperfin* through a defensive minefield in *Operation Destination Tokyo*. In 1979, I worked on a project to address the international legal regime related to the development and operation of a very long-range, accurate, stealthy, and precise remote-control, multiple-influence, submarine-launched mobile mine. My "Mines of August: An International Whodunit" appeared in the May 1985 U.S. Naval Institute *Proceedings/Naval Review*, 94–117. Since then my teams and I have provided research, analysis, and program support to the Navy's mine warfare community, including producing the service's first post-Cold War mine warfare plan in 1992—*Mine Warfare Plan: Meeting the Challenges of an Uncertain World (U)* (Washington, DC: Mine Warfare/EOD Branch [OP-363], Assistant Chief of Naval Operations for Surface Warfare [OP-03], Office of the Chief of Naval Operations, 29 January 1992) Unclassified. This also was produced in a classified version.
- 2 Earlier in 1984, several mines were planted in Nicaraguan ports and waters, damaging several ships and generating suspicions that the U.S. Central Intelligence Agency had assisted the anti-communist insurgents, the Contras, intent on overthrowing the Sandinista government. In fact, the mining operations were carried out by CIA-hired contractors without the Contras' knowledge. No mines were recovered, and the United States rejected the jurisdiction of the International Court of Justice. Howard S. Levie, *Mine Warfare at Sea* (Martinus Nijhoff Publishers, 1992), 162–63; Jude Justice Reed, "'Damn the Torpedoes!': International Standards Regarding the Use of Automatic Submarine Mines," *Fordham International Law Journal* 8, issue 2, article 5 (1984): 286–22; and the Report of the Select Committee on Intelligence, U.S. Senate, 98th Congress Second Session, 1 January 1983 to 31 December 1984, 4–12.

The Arabian Gulf Iran/Iraq "Tanker War" 1980–1988 also witnessed the indiscriminate use of naval mines. Martin S. Navias and E. R. Hooton. *Tanker Wars: The Assault on Merchant Shipping During the Iran-Iraq Conflict, 1980–1988* (London: Tauris Academic Studies, I.B. Tauris Publishers, 1996), ch. 6. See also George K. Walker, ed., "Chapter VI: The Tanker War and the Maritime Environment, The Tanker War 1980–1988—Law and Policy," *International Law Studies*, Naval War College Press 74 (2000): 481–604; and Michael A. Palmer, *On Course to Desert Storm: The United States Navy in the Persian Gulf* (Washington, DC: Naval Historical Center, Contributions to Naval History No. 5, 1992), 121–34. Ronald O'Rourke reported that of the 340 types of weapons used by both sides through 1987, only ten were mines. Mines were employed in 1987 for the first time since 1984, and the first 1987 mine attack occurred near Kuwait, a day after the Iraqi missile attack on *Stark* (FFG-31). The victim of the mining was a Soviet-flag ship chartered by Kuwait. Even counting some of the "unknown attacks" as mine-related, however, mining accounted for only a small fraction of all attacks. The significant attention paid to the mining threat might thus be seen in part as a reflection of the psychological effect that mines can generate. "The Tanker War," U.S. Naval Institute *Proceedings*, May 1988; <http://www.usni.org/magazines/proceedings/1988-05/tanker-war>.
- 3 Tamara Moser Melia, "Damn the Torpedoes": *A Short History of U.S. Naval Mine*

- Countermeasures, 1777–1991* (Washington, DC: Naval Historical Center, 1991); <http://edocs.nps.edu/dodpubs/topic/general/DamnTorpedoesWhole.pdf>, 76.
- 4 Roy R. Manstan and Frederick J. Frese, *Turtle: David Bushnell's Revolutionary Vessel* (Yardley, PA: Westholme Publishing, 2010); Gregory K. Hartmann with Scott C. Truver, *Weapons That Wait: Mine Warfare in the U.S. Navy* (Annapolis, MD: Naval Institute Press, 1991); Levie, *Mine Warfare at Sea*; and Melia, "Damn the Torpedoes,".
 - 5 Scott C. Truver, "Mines and Underwater IEDs in U.S. Ports and Waterways," *Naval War College Review* 61, no. 1 (Winter 2008): 106–27; CDR Michael C. Sparks, USN, "A Critical Vulnerability, A Valid Threat: U.S. Ports and Terrorist Mining," Paper, Joint Forces Staff College, Joint Advanced Warfighting School, 13 April 2005; and Peter von Bleichert, "Port Security: The Terrorist Naval Mine/Underwater Improvised Explosive Device Threat," dissertation, Walden University, 2015; <http://scholarworks.waldenu.edu/dissertations>.
 - 6 On the Chinese threat, see my "Taking Mines Seriously: Mine Warfare in China's Near Seas," *Naval War College Review* 65, no. 2 (Spring 2012): 30–66.
 - 7 In addition to the "Mines of August" article, see generally: Elsadig Yagoub A. Abunafeesa, "The Post-1970 Political Geography of the Red Sea Region with Special Reference to United States Interests," dissertation, Durham University, 1985; <http://etheses.dur.ac.uk/7876/>, 384, 394–400; David Crist, *Twilight War: The Secret History of America's Thirty-Year Conflict with Iran* (New York: Penguin, 2013), "The Invisible Hand of God," ch. 13, 235–55; Hartmann and Truver, *Weapons That Wait*, 250–55; Levie, *Mine Warfare at Sea*, 159–62; and Melia, "Damn the Torpedoes," 118–19.
- At my request, in June 2016, Dr. Timothy O'Hara, Research Scientist at the Center for Naval Analyses, searched the CNA library and archives for "Operation Intense Look," which resulted in no original analyses or sources that would help the historiography, and "Operation Candid Hammer," which turned up one citation.
- 8 Soviet News and Propaganda Analysis, based on *Red Star* (The Official Newspaper of the Soviet Defense Establishment) for the period 1–31 August 1984 (Washington, DC: Joint Special Operations Agency, Joint Chief of Staff, 1984), 10–11.
 - 9 Melia, "Damn the Torpedoes," 119.
 - 10 Department of Defense, *Conduct of the Persian Gulf War: Final Report* (Washington, DC: 1992), 273–78; Mine Warfare/EOD Branch (OP-363), *Mine Warfare Plan*, 8–17; Melia, "Damn the Torpedoes," 127–31; and Anthony Cordesman and Abraham R. Wagner, *The Lessons of Modern War, Volume IV: The Gulf War* (Boulder, CO: Westview Press, 1996), ch. 10, 810–17.
 - 11 There are other uncertainties, with some references noting a Candid Hammer exercise in November–December 1990 and others indicating operations in January–April 1991. In June 2016, Dr. O'Hara searched the Center for Naval Analyses library and archives for "Candid Hammer," turning up only one document, an archived classified DESRON (Destroyer Squadron) 15 report, with the (unclassified) name of the document, "Exercise CANDID HAMMER File, 20 Dec 90–11 Jan 9." Those dates match up with the discussion of a maritime patrol aircraft deployment: "1 Nov–Dec 1990: VP-4 ('Skinny Dragons') deployed to Diego Garcia in support of Desert Shield, and participated in exercise Candid Hammer while operating out of

a remote site at Massirah, Oman.” Michael D. Roberts, *Dictionary of American Naval Aviation Squadrons, Volume 2, The History of VP, VPB, VP(HL) and VP(AM) Squadrons* (Washington, DC: Naval Historical Center, 2000), 39.

On 16 January 1991, U.S. Central Command announced the completion of the exercise/operation “CANDID HAMMER, communications techniques/ mine warfare drills in central Arabian Gulf (Participants: USN, Royal Saudi, French, British, Canadian, and Australian naval forces);” <https://www.facebook.com/RememberingtheGulfWar/posts/467897699934301> and <http://www.history.navy.mil/research/library/online-reading-room/title-list-alphabetically/u/us-navy-in-desert-shield-desert-storm/january-1991.html>.

Also, naval analyst Caitlin Talmadge provided data specific to Candid Hammer, from 1 March to 20 April 1991. See, “Closing Time: Assessing the Iranian Threat to the Strait of Hormuz,” *International Security* 33, no. 1 (Summer 2008): 94–96.

During June 2016, I “pinged” on the U.S. Navy and foreign navy mine warfare community via an informal Internet mine warfare information service maintained by George Pollitt, a mine warfare expert at Johns Hopkins University Applied Physics Laboratory. He emailed the question—“Does anyone recall an Operation Candid Hammer in 1990–91?”—to several hundred recipients that included Gulf War commanders of the mine warfare group, commanders and crews of the MCM vessels, and AMCM helicopter pilots: “No.” It remains an enigma.

- 12 Edward J. Marolda, “The U.S. Navy in the Cold War Era, 1945–1991” (based on the chapter, “Cold War to Violent Peace,” in W. J. Holland Jr., ed., *The Navy*. Washington, DC: Naval Historical Foundation, 2000.), http://usnavymuseum.org/pdf/Activity_16_background.pdf, 28. See also, Edward J. Marolda and Robert J. Schneller Jr., *Shield and Sword: The United States Navy and the Persian Gulf War*. Washington, DC: Naval Historical Center, 1998, 68, 118, 122, 141–42, 148–49, 181, 192, 205, 212, 223–26, 231, 233, 247–51, 255–59, 277, 282, 321–25, and 442. There is no mention of Candid Hammer in a list of related operations at page 507.

- 13 Talmadge, “Closing Time,” 95.

- 14 Boynton, “Operations to Defeat Iranian Maritime Trade Interdiction,” paper, Naval War College, 4 May 2009.

Mine warfare expert George Pollitt, who was in-theater during “sweep” ops, recalls, “The MCM operations started in early February with AMCM, USS *Avenger*, three MSOs, and four Royal Navy *Ton* Class sweepers and continued through the end of June 1991. By my rough calculations, 650 square nautical miles were cleared during that period. The USN and RN forces operated alone until the WEU came in. Then all operated until 30 June. (The WEU came back to port on 20 July according to Marolda, but the USN was still operating, and I know that AMCM cleared nine mines using the Q-14 during the last two weeks they were out there.) Altogether I counted 25 ships and six AMCM helicopters clearing. The overall clearance rate was 0.2 square nautical miles per MCM asset day. It was true that some of the mines were cleared quickly by the French and Belgians after they knew the mine positions (they went straight down the mine-lines, as defined by the Iraqi charts), but that was only part of their assignment, and they were not assigned the entire area.” Email exchange, 9 August 2016.

- 15 Mine Warfare/EOD Branch (OP-363), *Mine Warfare Plan*, 21–22.

- 16 Breemer, "Intense Look: U.S. Minehunting Experience in the Red Sea," *Navy International* 90, no. 8 (August 1985): 478–82.
- 17 For example, writing in 2013, David Crist, *Twilight War*, ch. 13, 600n3, states, "By far the most comprehensive account of this operation" was the "Mines of August" article.
- 18 Edward J. Marolda, ed. *Operation End Sweep: A History of Minesweeping Operations in North Vietnam* (Washington, DC: Naval Historical Center, 1993).
- 19 "Coastal defense" or "offense" should not be discounted. As "regime change" in Libya was being carried out in the spring 2011, forces loyal to Gaddafi reportedly laid mines off the coast of Misurata. A NATO spokesperson noted three sea mines were discovered two miles off shore and destroyed, but there were fears that others remained as yet unfound and posed a threat, in what officials said was a clear breach of international law. VADM Rinaldo Veri of the Italian navy said the mining of a civilian port was "clearly designed to disrupt the lawful flow of humanitarian aid to the innocent civilian people of Libya," calling it another "deliberate violation" of Security Council resolutions. Rob Crilly, "NATO Warships Clear Misurata of Sea Mines as Gaddafi Remains Defiant," *The Telegraph*, 30 April 2011; <http://www.telegraph.co.uk/news/worldnews/africaandindianocean/libya/8485650/Nato-warships-clear-Misurata-of-sea-mines-as-Gaddafi-remains-defiant.html>.
- 20 Lambert, "The Naval War," in John Pimlott and Stephen Badsey, eds., *The Gulf War Assessed* (London: Arms and Armour, 1992), 125–46.
- 21 While Michael Palmer's *On Course to Desert Storm* provides valuable insight into the Navy's long history in the gulf, particularly the Tanker War (122–46), he nowhere gives mention of "The Mines of August" and leaves the history of Desert Shield/Desert Storm to others.
- 22 See note 9.
- 23 Melia, "*Damn the Torpedoes*," 79.
- 24 Scott C. Truver, "Wanted: U.S. Navy Mine Warfare Champion," *Naval War College Review* 68, no. 2 (Spring 2015): 116ff.
- 25 Email exchange, 9 August 2016.
- 26 CDR David Bruhn, USN (ret) published two books on MCM vessels in 2007 and 2009: *Wooden Ships and Iron Men, The U.S. Navy's Ocean Minesweepers, 1953–1994* (Westminster, MD: Heritage Books, 2007) and *Wooden Ships and Iron Men, Volume II, The U.S. Navy's Coastal and Motor Minesweepers, 1941–1953* (Westminster, MD: Heritage Books, 2009).
- Other books seek to advocate for a more robust mine warfare capability, for example: Oceans Studies Board, *Oceanography and Mine Warfare* (Washington, DC: National Research Council, National Academy Press, 2000); and Naval Studies Board, *Naval Mine Warfare: Operational and Technical Challenges for Naval Forces* (Washington, DC: National Research Council, National Academy Press, 2001).
- 27 RADM Paul Ryan, USN, and Scott C. Truver, "U.S. Navy Mine Warfare Vision . . . Programs . . . Operations: Key to Sea Power in the 21st Century," *Naval Forces* 90, no. 3 (2003): 28–32.
- 28 "Sea Tiger Commandos Sink SLN Supply Ship in Trinco Harbour," TamilNet, 9 May 2008; <https://www.tamilnet.com/art.html?catid=13&artid=25590>.

Appendix 1

U.S. NAVY OPERATIONS 1980–2010 (158)

Types of Operations: Peace Ops/Forward Presence, Humanitarian Assistance/Disaster Relief (HADR), Freedom of Navigation (FON), Maritime Intercept Ops (MIO)¹, Counter-Piracy, Noncombatant Evacuation Operations (NEO), Show of Force, Contingent Positioning, Combat

Names/Dates	Type	Region/Countries
1980–89 (49)		
Desert One 1980	Combat	Arabian Gulf/Iran
Creek Sentry 1980–81	Show of Force	Europe/Baltic/Poland
Iran-Iraq War 1981–82	Show of Force	Arabian Gulf/Iraq/Iran
Israeli Invasion 1981	NEO	Mediterranean/Lebanon/Israel
Al-Biqa Missiles I 1981	Show of Force	Mediterranean/Israel/Syria
Sadat Assassination 1981	Contingent	Mediterranean/Egypt
Yugoslav Unrest 1981	Contingent	Mediterranean/Adriatic/ Yugoslavia
Gulf of Sirte I 1981	FON	Mediterranean/Libya
Surveillance Ops 1981	Show of Force	Western Hemisphere/Nicaragua
ELF Sentry 1982–83	Contingent	Mediterranean/Egypt
Lebanon War 1982–84	Contingent	Mediterranean/Lebanon/Israel
Early Call 1983	Show of Force	Mediterranean/Egypt/Libya
Marine Barracks Bombing 1983	Combat	Mediterranean/Lebanon
Chad 1983	Peace Ops	Africa/Chad/Libya
KAL007 1983	Show of Force	Pacific/Soviet Union/S. Korea
Urgent Fury 1983	Combat	Western Hemisphere/Grenada
<i>Seaward Explorer</i> Rescue 1984	Contingent	Western Hemisphere/Cuba
Syria Attack 1984	Combat	Mediterranean/Lebanon
Lebanon Withdrawal 1984	Combat	Mediterranean/Lebanon
Iran-Iraq War 1984	Show of Force	Arabian Gulf

¹ MIO also included vessel boarding, search and seizure (VBSS) ops.

Names/Dates	Type	Region/Countries
Basra-Kharg Island Crisis 1984	Show of Force	Arabian Gulf
Intense Look 1984	Show of Force	Red Sea/Gulf of Aqaba/Libya
Ship Escorts 1984–1986	Show of Force	Arabian Gulf
Embassy Show of Force 1985	Show of Force	Mediterranean/Lebanon
Saudi Hijacking 1985	Contingent	Arabian Gulf
Lebanon Hostages 1986	Contingent	Mediterranean/Lebanon
Display Determination 1986	Contingent	Mediterranean/Turkey
Egypt Air Hijacking 1986	Contingent	Mediterranean/Morocco
TWA 847 Hijacking 1986	Contingent	Mediterranean/Lebanon
<i>Achille Lauro</i> Rescue 1986	Combat	Mediterranean/Italy
Gulf of Sirte II 1986	FON	Mediterranean/Libya
El Dorado Canyon 1986	Combat	Mediterranean/Libya
Yemen Civil War 1986	NEO	Indian Ocean/Yemen
Lebanon Hostages 1987	Contingent	Mediterranean/Lebanon
Pakistan Air Hijacking 1987	Contingent	Mediterranean/Cyprus
Nimble Archer 1987	Combat	Arabian Gulf/Iran
USS <i>Stark</i> 1987	Combat	Arabian Gulf/Iraq
Earnest Will 1987–88	Show of Force	Arabian Gulf/Iraq/Iran/Kuwait
Pneumatic Hammer 1987–88	Show of Force	Arabian Gulf/Iraq/Iran/Kuwait
Praying Mantis 1988	Combat	Arabian Gulf/Iran
USS <i>Samuel B. Roberts</i> 1988	Combat	Arabian Gulf/Iran
Jittery Prop 1988	Contingent	Western Hemisphere/El Salvador/ Nicaragua
Golden Pheasant 1988	Show of Force	Western Hemisphere/Honduras
Nimrod Dancer 1988–89	Show of Force	Western Hemisphere/Panama
Valiant Boom 1988	Show of Force	Western Hemisphere/Panama
Maldives Coup 1989	Contingent	Indian Ocean/Maldives
Classic Resolve 1989	Show of Force	Pacific/Philippines
Hurricane Hugo 1989	HADR	U.S. East Coast
Just Cause 1989–90	Combat	Western Hemisphere/Panama
1990–99 (81)		
Sea Angel 1990	HADR	SW Asia/Bangladesh
Sharp Edge 1990–91	NEO	Africa/Liberia

Names/Dates	Type	Region/Countries
Desert Shield 1990–91	Show of Force	Arabian Gulf/Iraq
Candid Hammer 1990–91	Show of Force	Arabian Gulf/Iraq
Desert Storm 1991	Combat	Arabian Gulf/Iraq
Provide Comfort 1991–97	Show of Force	Arabian Gulf/Iraq
Iraq MIO 1991–2000	MIO	Arabian Gulf/Iraq
Eastern Exit 1991	NEO	Africa/Somalia
Victor Squared 1991	NEO	Western Hemisphere/Haiti
Impressive Lift 1992	Peace Ops	Africa/Somalia
Iraq Nuclear Facility Strike 1992	Combat	Arabian Gulf/Iraq
Southern Watch 1992–2000	Peace Ops /MIO/ Combat	Arabian Gulf/Iraq
Sharp Guard/Decisive Enhancement 1992–98	Show of Force	Mediterranean/Balkans
Sharp Vigilance 1992	Show of Force	Mediterranean/Balkans
Maritime Guard 1992–93	Show of Force	Mediterranean/Balkans
Deny Flight 1993–95	Show of Force	Mediterranean/Balkans
Provide Promise 1994	Contingent	Mediterranean/Balkans
Joint Endeavor 1996	Peace Ops	Mediterranean/Balkans
Decisive Edge 1996	Show of Force	Mediterranean/Balkan
Deliberate Force 1996	Combat	Mediterranean/Balkans
Deliberate Guard 1996–97	Show of Force	Mediterranean/Balkans
Joint Guard 1996–98	Peace Ops	Mediterranean/Balkans
Joint Forge 1997–2001	Show of Force	Mediterranean/Balkans
Deliberate Forge 1997–98	Show of Force	Mediterranean/Balkans
Iraq TLAM Strikes 1993	Combat	Arabian Gulf/Iraq
Restore Hope 1993	HADR	Africa/Somalia
Korea/Nuclear Tensions 1993–94	Show of Force	Pacific/Koreas/Japan
Support Democracy 1993–94	Show of Force	Western Hemisphere/Haiti
Continued Hope 1993–95	Peace Ops	Africa/Somalia
Show Care	Peace Ops	Africa/Somalia
More Care	Peace Ops	Africa/Somalia
Quick Draw	Peace Ops	Africa/Somalia
Distant Runner 1994	NEO	Africa/Liberia
Support Hope 1994	HADR	Africa/Somalia

Names/Dates	Type	Region/Countries
USLO Withdrawal 1994	NEO	Africa/Somalia
Able Vigil 1994	MIO	Western Hemisphere/Cuba
Vigilant Warrior 1994–95	Show of Force	Arabian Gulf/Kuwait
Uphold Democracy 1994–95	Show of Force	Western Hemisphere/Haiti
Maintain Democracy 1995	Peace Ops	Western Hemisphere/Haiti
Sea Signal JTF 1994–96	MIO	Western Hemisphere /Cuba/Haiti
Greece/Turkey Tension 1995	Show of Force	Mediterranean
United Shield 1995	NEO	Africa/Somalia
Nuclear Reactor Negotiations 1995	Contingent	Pacific/Koreas
Vigilant Sentinel 1995–96	Show of Force	Arabian Gulf/Iraq
Sentinel Safeguard 1996	Show of Force	Western Hemisphere/Cuba
Assured Response 1996	NEO	Africa/Liberia
Quick Response 1996	NEO	Africa/Monrovia
Taiwan Flexible Deterrent 1996	Show of Force	Pacific/China (PRC)/Taiwan
Desert Strike 1996–97	Combat	Arabian Gulf/Iraq
Operation Monitor 1997	Contingent	Western Hemisphere/Cuba
Passive Oversight 1997	Contingent	Western Hemisphere/Cuba
Silver Wake 1997	NEO	Mediterranean/Albania
Guardian Retrieval 1997	NEO	Africa/Zaire
Noble Obelisk 1997	NEO	Africa/Sierra Leone
Bevel Edge 1997	Show of Force	Pacific/Cambodia
Silent Assurance 1997–98	Combat	SW Asia/Afghanistan
Northern Watch 1997–2001	Show of Force	Arabian Gulf/Iraq
Desert Thunder 1997–98	Show of Force	Arabian Gulf/Iraq
Desert Fox 1998	Show of Force	Arabian Gulf/Iraq
Bevel Incline 1998	NEO	Pacific/Indonesia
Autumn Shelter 1998	NEO	Africa/Zaire
Shadow Express 1998	NEO	Africa/Liberia
Safe Departure 1998	NEO	Africa/Ethiopia/Eritrea
Silver Knight 1998	NEO	Mediterranean/Albania
Determined Falcon 1998	Show of Force	Mediterranean/Balkans
Deliberate Guard 1998	Show of Force	Mediterranean/Balkans
Balkan Calm 1998	Peace Ops	Mediterranean/Balkans

Names/Dates	Type	Region/Countries
Infinite Reach 1998	Combat	Africa/Sudan/Afghanistan
Resolute Response 1998	NEO	Africa/Kenya
Desert Fox 1998	Combat	Arabian Gulf/Iraq
Eritrea NEO 1999	NEO	Africa/Eritrea
Shadow Express 1999	NEO	Africa/Liberia
Desert Viper 1999	Show of Force	Arabian Gulf/Iraq
Noble Anvil 1999	Combat	Mediterranean/Balkans
Shining Hope 1999	Peace Ops	Mediterranean/Balkans
Allied Force 1999	Peace Ops	Mediterranean/Balkans
Joint Guardian 1999	Peace Ops	Mediterranean/Balkans
Balkan Calm II 1999	NEO	Mediterranean/Balkans
Noble Safeguard 1999	Show of Force	Mediterranean/Israel
Avid Response 1999	HADR	Mediterranean/Turkey
East Timor Stabilize 1999–2001	HADR	Pacific/Indonesia
2000–10 (25)		
Determined Response 2000	NEO	Indian Ocean/Yemen
EP3 Incident (PRC) 2001	FON	Pacific/China (PRC)
Bold Samaritan 2000–2002	HADR	Pacific/Indonesia/East Timor
Sheltering Sky 2003	NEO	Africa/Liberia
Enduring Freedom 2001–2014	Contingent/ Combat	SW Asia/Afghanistan
Pegasus Venture 2002	Combat	Arabian Gulf/Iraq
Dynamic Response 2002–2003	Peace Ops	Mediterranean/Balkans
Shining Express 2003	Contingent/ NEO	Africa/Liberia
North Korea Nuclear Crisis 2003	Show of Force	Pacific/Koreas/Japan
Iraqi Freedom 2003–10	Combat	Arabian Gulf/Iraq
Unified Assistance 2004–2005	HADR	Pacific/Thailand/Indonesia
JTF Katrina 2005	HADR	U.S. Gulf Coast
Sea Horse 2005	Combat	Arabian Gulf/Iraq
Lebanon War II 2006	NEO	Mediterranean/Lebanon/Israel
Goodwill-Kaibigan 2007	HADR	Pacific/Philippines

Names/Dates	Type	Region/Countries
Sea Angel II 2007	HADR	SWA/Bangladesh
Caring Response 2008	HADR	Pacific/Samoa/Tonga/Solomon Islands/ Kiribati/Marshall Islands
Assured Delivery 2008	Show of Force	Russia/Georgia
Ocean Shield 2008–	Counter-Piracy	Indian Ocean/Gulf of Aden
Allied Protector 2009–	Counter-Piracy	Indian Ocean/Gulf of Aden
<i>Maersk Alabama</i> 2009	Counter-Piracy	Indian Ocean/Gulf of Aden
Deepwater Horizon BP Oil Spill 2010	HADR	U.S. Gulf Coast
Hot Rock 2010–11	HADR	Mediterranean/Sicily
Unified Response 2010	HADR	Western Hemisphere/Haiti
New Dawn 2010–11	Combat	Arabian Gulf/Iraq

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Appendix 2

U.S. NAVY OPERATIONS 1980–2010: TYPES OF OPERATIONS

Types of Operations: Peace Ops/Forward Presence, Humanitarian Assistance/Disaster Relief (HADR), Freedom of Navigation (FON), Maritime Intercept Ops (MIO)², Counter-Piracy, Noncombatant Evacuation Operations (NEO), Show of Force, Contingent Positioning, Combat

Name/Dates	Type	Region/Countries
Peace Operations (15)		
Chad 1983	Peace Ops	Africa/Chad/Libya
Impressive Lift 1992	Peace Ops	Africa/Somalia
Southern Watch 1992–2000	Peace Ops/ MIO/ Combat	Arabian Gulf/Iraq
Joint Endeavor 1996	Peace Ops	Mediterranean/Balkans
Joint Guard 1996–98	Peace Ops	Mediterranean/Balkans
Continued Hope 1993–95	Peace Ops	Africa/Somalia
Show Care	Peace Ops	Africa/Somalia
More Care	Peace Ops	Africa/Somalia
Quick Draw	Peace Ops	Africa/Somalia
Maintain Democracy 1995	Peace Ops	Western Hemisphere/Haiti
Balkan Calm 1998	Peace Ops	Mediterranean/Balkans
Shining Hope 1999	Peace Ops	Mediterranean/Balkans
Allied Force 1999	Peace Ops	Mediterranean/Balkans
Joint Guardian 1999	Peace Ops	Mediterranean/Balkans
Dynamic Response 2002–2003	Peace Ops	Mediterranean/Balkans
Humanitarian Assistance/Disaster Relief (15)		
Hurricane Hugo 1989	HADR	U.S. East Coast
Sea Angel 1990	HADR	SW Asia/Bangladesh
Restore Hope 1993	HADR	Africa/Somalia

² MIO includes vessel board, search and seizure ops.

Name/Dates	Type	Region/Countries
Support Hope 1994	HADR	Africa/Somalia
Avid Response 1999	HADR	Mediterranean/Turkey
East Timor Stabilize 1999–2001	HADR	Pacific/Indonesia
Bold Samaritan 2000–2002	HADR	Pacific/Indonesia/East Timor
Unified Assistance 2004–2005	HADR	Pacific/Thailand/Indonesia
JTF Katrina 2005	HADR	U.S. Gulf Coast
Goodwill-Kaibigan 2007	HADR	Pacific/Philippines
Sea Angel II 2007	HADR	SW Asia/Bangladesh
Caring Response 2008	HADR	Pacific/Samoa/Tonga/ Solomon Islands/ Kiribati/ Marshall Islands
BP Oil Spill 2010	HADR	U.S. Gulf Coast
Unified Response 2010	HADR	Western Hemisphere/Haiti
Hot Rock 2010–11	HADR	Mediterranean/Sicily
Freedom of Navigation (3)		
Gulf of Sirte I 1981	FON	Mediterranean/Libya
Gulf of Sirte II 1986	FON	Mediterranean/Libya
EP3 Incident (PRC) 2001	FON	Pacific/China (PRC)
Maritime Interception (3)		
Iraq MIO 1991–2000	MIO	Arabian Gulf/Iraq
Able Vigil 1994	MIO	Western Hemisphere/Cuba
Sea Signal JTF 1994–96	MIO	Western Hemisphere/Cuba/ Haiti
Counter-Piracy (3)		
Ocean Shield 2008–	Counter-Piracy	Indian Ocean/Gulf of Aden
Allied Protector 2009–	Counter-Piracy	Indian Ocean/Gulf of Aden
<i>Maersk Alabama</i> 2009	Counter-Piracy	Indian Ocean/Gulf of Aden
Noncombatant Evacuation (25)		
Israeli Invasion 1981	NEO	Mediterranean/Lebanon/ Israel
Yemen Civil War 1986	NEO	Indian Ocean/Yemen
Sharp Edge 1990–91	NEO	Africa/Liberia

Name/Dates	Type	Region/Countries
Eastern Exit 1991	NEO	Africa/Somalia
Victor Squared 1991	NEO	Western Hemisphere/Haiti
Distant Runner 1994	NEO	Africa/Liberia
USLO Withdrawal 1994	NEO	Africa/Somalia
United Shield 1995	NEO	Africa/Somalia
Assured Response 1996	NEO	Africa/Liberia
Quick Response 1996	NEO	Africa/Monrovia
Silver Wake 1997	NEO	Mediterranean/Albania
Guardian Retrieval 1997	NEO	Africa/Zaire
Noble Obelisk 1997	NEO	Africa/Sierra Leone
Bevel Incline 1998	NEO	Pacific/Indonesia
Autumn Shelter 1998	NEO	Africa/Zaire
Shadow Express 1998	NEO	Africa/Liberia
Safe Departure 1998	NEO	Africa/Ethiopia/Eritrea
Silver Knight 1998	NEO	Mediterranean/Albania
Resolute Response 1998	NEO	Africa/Kenya
Eritrea NEO 1999	NEO	Africa/Eritrea
Shadow Express 1999	NEO	Africa/Liberia
Balkan Calm II 1999	NEO	Mediterranean/Balkans
Determined Response 2000	NEO	Indian Ocean/Yemen
Sheltering Sky 2003	NEO	Africa/Liberia
Lebanon War II 2006	NEO	Mediterranean/Lebanon/ Israel

Show of Force (47)

Creek Sentry 1980–81	Show of Force	Europe/Baltic/Poland
Iran-Iraq War 1981–82	Show of Force	Arabian Gulf/Iraq/Iran
Al-Biqa Missiles I 1981	Show of Force	Mediterranean/Israel/Syria
Surveillance Ops 1981	Show of Force	Western Hemisphere/ Nicaragua
Early Call 1983	Show of Force	Mediterranean/Egypt/Libya
KAL007 1983	Show of Force	Pacific/Soviet Union/S. Korea
Iran-Iraq War 1984	Show of Force	Arabian Gulf
Basra-Kharg Island Crisis 1984	Show of Force	Arabian Gulf

Name/Dates	Type	Region/Countries
Intense Look 1984	Show of Force	Red Sea/Gulf of Aqaba/ Libya
Ship Escorts 1984–86	Show of Force	Arabian Gulf
Embassy Show of Force 1985	Show of Force	Mediterranean/Lebanon
Earnest Will 1987–88	Show of Force	Arabian Gulf/Iraq/Iran
Pneumatic Hammer 1987–88	Show of Force	Arabian Gulf/Iraq/Iran/ Kuwait
Golden Pheasant 1988	Show of Force	Western Hemisphere/ Honduras
Nimrod Dancer 1988–89	Show of Force	Western Hemisphere/ Panama
Valiant Boom 1988	Show of Force	Western Hemisphere/ Panama
Classic Resolve 1989	Show of Force	Pacific/Philippines
Desert Shield 1990–91	Show of Force	Arabian Gulf/Iraq
Candid Hammer 1990–91	Show of Force	Arabian Gulf/Iraq
Desert Storm 1991	Show of Force	Arabian Gulf/Iraq
Provide Comfort 1991–97	Show of Force	Arabian Gulf/Iraq
Sharp Guard/Decisive Enhancement 1992–98	Show of Force	Mediterranean/Balkans
Sharp Vigilance 1992	Show of Force	Mediterranean/Balkans
Maritime Guard 1992–93	Show of Force	Mediterranean/Balkans
Deny Flight 1993–95	Show of Force	Mediterranean/Balkans
Decisive Edge 1996	Show of Force	Mediterranean/Balkans
Deliberate Guard 1996–97	Show of Force	Mediterranean/Balkans
Joint Forge 1997–2001	Show of Force	Mediterranean/Balkans
Deliberate Forge 1997–98	Show of Force	Mediterranean/Balkans
Korea/Nuclear Tensions 1993–94	Show of Force	Pacific/Koreas/Japan
Support Democracy 1993–94	Show of Force	Western Hemisphere/Haiti
Vigilant Warrior 1994–95	Show of Force	Arabian Gulf/Kuwait
Uphold Democracy 1994–95	Show of Force	Western Hemisphere/Haiti
Greece/Turkey Tension 1995	Show of Force	Mediterranean
Vigilant Sentinel 1995–96	Show of Force	Arabian Gulf/Iraq
Sentinel Safeguard 1996	Show of Force	Western Hemisphere/Cuba
Taiwan Flexible Deterrent 1996	Show of Force	Pacific/China (PRC)/Taiwan
Bevel Edge 1997	Show of Force	Pacific/Cambodia
Northern Watch 1997–2001	Show of Force	Arabian Gulf/Iraq

Name/Dates	Type	Region/Countries
Desert Thunder 1997–98	Show of Force	Arabian Gulf/Iraq
Desert Fox 1998	Show of Force	Arabian Gulf/Iraq
Determined Falcon 1998	Show of Force	Mediterranean/Balkans
Deliberate Guard 1998	Show of Force	Mediterranean/Balkans
Desert Viper 1999	Show of Force	Arabian Gulf/Iraq
Noble Safeguard 1999	Show of Force	Mediterranean/Israel
North Korea Nuclear Crisis 2003	Show of Force	Pacific/Koreas/Japan
Assured Delivery 2008	Show of Force	Russia/Georgia
Contingent Positioning (20)		
Sadat Assassination 1981	Contingent	Mediterranean/Egypt
Yugoslav Unrest 1981	Contingent	Mediterranean/Adriatic/ Yugoslavia
ELF Sentry 1982–83	Contingent	Mediterranean/Egypt
Lebanon War 1982–84	Contingent	Mediterranean/Lebanon/ Israel
<i>Seaward Explorer</i> Rescue 1984	Contingent	Western Hemisphere/Cuba
Saudi Hijacking 1985	Contingent	Arabian Gulf
Lebanon Hostages 1986	Contingent	Mediterranean/Lebanon
Display Determination 1986	Contingent	Mediterranean/Turkey
Egypt Air Hijacking 1986	Contingent	Mediterranean/Morocco
TWA 847 Hijacking 1986	Contingent	Mediterranean/Lebanon
Lebanon Hostages 1987	Contingent	Mediterranean/Lebanon
Pakistan Air Hijacking 1987	Contingent	Mediterranean/Cyprus
Jittery Prop 1988	Contingent	Western Hemisphere/El Salvador/ Nicaragua
Maldives Coup 1989	Contingent	Indian Ocean/Maldives
Provide Promise 1994	Contingent	Mediterranean/Balkans
Nuclear Reactor Negotiations 1995	Contingent	Pacific/Koreas
Operation Monitor 1997	Contingent	Western Hemisphere/Cuba
Passive Oversight 1997	Contingent	Western Hemisphere/Cuba
Enduring Freedom 2001–14	Contingent/ Combat	SW Asia/Afghanistan
Shining Express 2003	Contingent/ NEO	Africa/Liberia

Name/Dates	Type	Region/Countries
Combat (24)		
Desert One 1980	Combat	Arabian Gulf/Iran
Marine Barracks Bombing 1983	Combat	Mediterranean/Lebanon
Urgent Fury 1983	Combat	Western Hemisphere/ Grenada
Syria Attack 1984	Combat	Mediterranean/Lebanon
Lebanon Withdrawal 1984	Combat	Mediterranean/Lebanon
<i>Achille Lauro</i> Rescue 1986	Combat	Mediterranean/Italy
El Dorado Canyon 1986	Combat	Mediterranean/Libya
Nimble Archer 1987	Combat	Arabian Gulf/Iran
USS <i>Stark</i> 1987	Combat	Arabian Gulf/Iraq
Praying Mantis 1988	Combat	Arabian Gulf/Iran
USS <i>Samuel B. Roberts</i> 1988	Combat	Arabian Gulf/Iran
Just Cause 1989–1990	Combat	Western Hemisphere/ Panama
Desert Storm 1991	Combat	Arabian Gulf/Iraq
Iraq Nuclear Facility Strike 1992	Combat	Arabian Gulf/Iraq
Deliberate Force 1996	Combat	Mediterranean/Balkans
Iraq TLAM Strikes 1993	Combat	Arabian Gulf/Iraq
Desert Strike 1996–97	Combat	Arabian Gulf/Iraq
Infinite Reach 1998	Combat	Africa/Sudan/Afghanistan
Desert Fox 1998	Combat	Arabian Gulf/Iraq
Noble Anvil 1999	Combat	Mediterranean/Balkans
Pegasus Venture 2002	Combat	Arabian Gulf/Iraq
Iraqi Freedom 2003–10	Combat	Arabian Gulf/Iraq
Sea Horse 2005	Combat	Arabian Gulf/Iraq
New Dawn 2010–11	Combat	Arabian Gulf/Iraq

Sources: See Appendix 1

Appendix 3

U.S. NAVY OPERATIONS 1980–2010 BY REGION

Types of Operations: Peace Ops/Forward Presence, Humanitarian Assistance/Disaster Relief (HADR), Freedom of Navigation (FON), Maritime Intercept Ops (MIO)³, Counter-Piracy, Non-combatant Evacuation Operations (NEO), Show of Force, Contingent Positioning, Combat

Name/Dates	Type	Region/Countries
Mediterranean (51)		
Israeli Invasion 1981	NEO	Mediterranean/Lebanon/ Israel
Al-Biqa Missiles I 1981	Show of Force	Mediterranean/Israel/ Syria
Sadat Assassination 1981	Contingent	Mediterranean/Egypt
Yugoslav Unrest 1981	Contingent	Mediterranean/Adriatic/ Yugoslavia
Gulf of Sirte I (Sidra) 1981	FON	Mediterranean/Libya
ELF Sentry 1982–83	Contingent	Mediterranean/Egypt
Lebanon War 1982–84	Contingent	Mediterranean/Lebanon/ Israel
Early Call 1983	Show of Force	Mediterranean/Egypt/ Libya
Marine Barracks Bombing 1983	Combat	Mediterranean/Lebanon
Syria Attack 1984	Combat	Mediterranean/Lebanon
Lebanon Withdrawal 1984	Combat	Mediterranean/Lebanon
Intense Look 1984	Show of Force	Red Sea/Gulf of Aqaba/ Libya
Embassy Show of Force 1985	Show of Force	Mediterranean/Lebanon
Lebanon Hostages 1986	Contingent	Mediterranean/Lebanon
Display Determination 1986	Contingent	Mediterranean/Turkey
Egypt Air Hijacking 1986	Contingent	Mediterranean/Morocco
TWA 847 Hijacking 1986	Contingent	Mediterranean/Lebanon
<i>Achille Lauro</i> Rescue 1986	Combat	Mediterranean/Italy

³ MIO also included vessel boarding, search and seizure (VBSS) ops.

Name/Dates	Type	Region/Countries
Gulf of Sirte II (Sidra) 1986	FON	Mediterranean/Libya
El Dorado Canyon 1986	Combat	Mediterranean/Libya
Lebanon Hostages 1987	Contingent	Mediterranean/Lebanon
Pakistan Air Hijacking 1987	Contingent	Mediterranean/Cyprus
Hot Rock 2010–11	HADR	Mediterranean/Sicily
Sharp Guard/Decisive Enhancement 1992–98	Show of Force	Mediterranean/Balkans
Sharp Vigilance 1992	Show of Force	Mediterranean/Balkans
Maritime Guard 1992–93	Show of Force	Mediterranean/Balkans
Deny Flight 1993–95	Show of Force	Mediterranean/Balkans
Provide Promise 1994	Contingent	Mediterranean/Balkans
Joint Endeavor 1996	Peace Ops	Mediterranean/Balkans
Decisive Edge 1996	Show of Force	Mediterranean/Balkans
Deliberate Force 1996	Combat	Mediterranean/Balkans
Deliberate Guard 1996–97	Show of Force	Mediterranean/Balkans
Joint Guard 1996–98	Peace Ops	Mediterranean/Balkans
Joint Forge 1997–2001	Show of Force	Mediterranean/Balkans
Deliberate Forge 1997–98	Show of Force	Mediterranean/Balkans
Greece/Turkey Tension 1995	Show of Force	Mediterranean
Silver Wake 1997	NEO	Mediterranean/Albania
Silver Knight 1998	NEO	Mediterranean/Albania
Determined Falcon 1998	Show of Force	Mediterranean/Balkans
Deliberate Guard 1998	Show of Force	Mediterranean/Balkans
Balkan Calm 1998	Peace Ops	Mediterranean/Balkans
Noble Anvil 1999	Combat	Mediterranean/Balkans
Shining Hope 1999	Peace Ops	Mediterranean/Balkans
Allied Force 1999	Peace Ops	Mediterranean/Balkans
Joint Guardian 1999	Peace Ops	Mediterranean/Balkans
Balkan Calm II 1999	NEO	Mediterranean/Balkans
Noble Safeguard 1999	Show of Force	Mediterranean/Israel
Avid Response 1999	HADR	Mediterranean/Turkey
Dynamic Response 2002–2003	Peace Ops	Mediterranean/Balkans
Lebanon War II 2006	NEO	Mediterranean/Lebanon/ Israel

Name/Dates	Type	Region/Countries
Arabian Gulf (32)		
Desert One 1980	Combat	Arabian Gulf/Iran
Iran-Iraq War 1981–82	Show of Force	Arabian Gulf/Iraq/Iran
Iran-Iraq War 1984	Show of Force	Arabian Gulf
Basra-Kharg Island Crisis 1984	Show of Force	Arabian Gulf
Ship Escorts 1984–86	Show of Force	Arabian Gulf
Saudi Hijacking 1985	Contingent	Arabian Gulf
Nimble Archer 1987	Combat	Arabian Gulf/Iran
USS <i>Stark</i> 1987	Combat	Arabian Gulf/Iraq
Earnest Will 1987–88	Show of Force	Arabian Gulf/Iraq/Iran
Pneumatic Hammer 1987–88	Show of Force	Arabian Gulf/Iraq/Iran/ Kuwait
Praying Mantis 1988	Combat	Arabian Gulf/Iran
USS <i>Samuel B. Roberts</i> 1988	Combat	Arabian Gulf/Iran
Desert Shield 1990–91	Show of Force	Arabian Gulf/Iraq
Candid Hammer 1990–91	Show of Force	Arabian Gulf/Iraq
Desert Storm 1991	Combat	Arabian Gulf/Iraq
Provide Comfort 1991–97	Show of Force	Arabian Gulf/Iraq
Iraq MIO 1991–2000	MIO	Arabian Gulf/Iraq
Iraq Nuclear Facility Strike 1992	Combat	Arabian Gulf/Iraq
Southern Watch 1992–2000	Peace Ops/ MIO/ Combat	Arabian Gulf/Iraq
Iraq TLAM Strikes 1993	Combat	Arabian Gulf/Iraq
Vigilant Warrior 1994–95	Show of Force	Arabian Gulf/Kuwait
Vigilant Sentinel 1995–96	Show of Force	Arabian Gulf/Iraq
Desert Strike 1996–97	Combat	Arabian Gulf/Iraq
Northern Watch 1997–2001	Show of Force	Arabian Gulf/Iraq
Desert Thunder 1997–1998	Show of Force	Arabian Gulf/Iraq
Desert Fox 1998	Show of Force	Arabian Gulf/Iraq
Desert Viper 1999	Show of Force	Arabian Gulf/Iraq
Pegasus Venture 2002	Combat	Arabian Gulf/Iraq
Iraqi Freedom 2003–10	Combat	Arabian Gulf/Iraq
Sea Horse 2005	Combat	Arabian Gulf/Iraq
New Dawn 2010–11	Combat	Arabian Gulf/Iraq

Name/Dates	Type	Region/Countries
Africa (26)		
Chad 1983	Peace Ops	Africa/Chad/Libya
Sharp Edge 1990–91	NEO	Africa/Liberia
Eastern Exit 1991	NEO	Africa/Somalia
Impressive Lift 1992	Peace Ops	Africa/Somalia
Continued Hope 1993–95	Peace Ops	Africa/Somalia
Show Care	Peace Ops	Africa/Somalia
More Care	Peace Ops	Africa/Somalia
Quick Draw	Peace Ops	Africa/Somalia
Distant Runner 1994	NEO	Africa/Liberia
Support Hope 1994	HADR	Africa/Somalia
USLO Withdrawal 1994	NEO	Africa/Somalia
Restore Hope 1993	HADR	Africa/Somalia
United Shield 1995	NEO	Africa/Somalia
Assured Response 1996	NEO	Africa/Liberia
Quick Response 1996	NEO	Africa/Monrovia
Guardian Retrieval 1997	NEO	Africa/Zaire
Noble Obelisk 1997	NEO	Africa/Sierra Leone
Autumn Shelter 1998	NEO	Africa/Zaire
Shadow Express 1998	NEO	Africa/Liberia
Safe Departure 1998	NEO	Africa/Ethiopia/Eritrea
Infinite Reach 1998	Combat	Africa/Sudan/ Afghanistan
Resolute Response 1998	NEO	Africa/Kenya
Eritrea NEO 1999	NEO	Africa/Eritrea
Shadow Express 1999	NEO	Africa/Liberia
Sheltering Sky 2003	NEO	Africa/Liberia
Shining Express 2003	Contingent/NEO	Africa/Liberia
Western Hemisphere (18)		
Surveillance Ops 1981	Show of Force	Western Hemisphere/ Nicaragua
Urgent Fury 1983	Combat	Western Hemisphere/ Grenada
<i>Seaward Explorer</i> Rescue 1984	Contingent	Western Hemisphere/ Cuba

Name/Dates	Type	Region/Countries
Jittery Prop 1988	Contingent	Western Hemisphere/El Salvador/ Nicaragua
Golden Pheasant 1988	Show of Force	Western Hemisphere/ Honduras
Nimrod Dancer 1988–89	Show of Force	Western Hemisphere/ Panama
Valiant Boom 1988	Show of Force	Western Hemisphere/ Panama
Just Cause 1989–90	Combat	Western Hemisphere/ Panama
Victor Squared 1991	NEO	Western Hemisphere/ Haiti
Support Democracy 1993–94	Show of Force	Western Hemisphere/ Haiti
Able Vigil 1994	MIO	Western Hemisphere/ Cuba
Uphold Democracy 1994–95	Show of Force	Western Hemisphere/ Haiti
Maintain Democracy 1995	Peace Ops	Western Hemisphere/ Haiti
Sea Signal JTF 1994–96	MIO	Western Hemisphere / Cuba/Haiti
Sentinel Safeguard 1996	Show of Force	Western Hemisphere/ Cuba
Operation Monitor 1997	Contingent	Western Hemisphere/ Cuba
Passive Oversight 1997	Contingent	Western Hemisphere/ Cuba
Unified Response 2010	HADR	Western Hemisphere/ Haiti

Pacific (14)

KAL007 1983	Show of Force	Pacific/Soviet Union/ South Korea
Classic Resolve 1989	Show of Force	Pacific/Philippines
Korea/Nuclear Tensions 1993–94	Show of Force	Pacific/Koreas/Japan
Nuclear Reactor Negotiations 1995	Contingent	Pacific/Koreas
Taiwan Flexible Deterrent 1996	Show of Force	Pacific/China (PRC)/ Taiwan
Bevel Edge 1997	Show of Force	Pacific/Cambodia

Name/Dates	Type	Region/Countries
Bevel Incline 1998	NEO	Pacific/Indonesia
East Timor Stabilize 1999–2001	HADR	Pacific/Indonesia
EP3 Incident (PRC) 2001	FON	Pacific/China (PRC)
Bold Samaritan 2000–2002	HADR	Pacific/Indonesia/East Timor
North Korea Nuclear Crisis 2003	Show of Force	Pacific/Koreas/Japan
Unified Assistance 2004–2005	HADR	Pacific/Thailand/Indonesia
Goodwill-Kaibigan 2007	HADR	Pacific/Philippines
Caring Response 2008	HADR	Pacific/Samoa/Tonga/Solomon Islands/Kiribati/Marshall Islands
Indian Ocean (6)		
Yemen Civil War 1986	NEO	Indian Ocean/Yemen
Maldives Coup 1989	Contingent	Indian Ocean/Maldives
Determined Response 2000	NEO	Indian Ocean/Yemen
Ocean Shield 2008–	Counter-Piracy	Indian Ocean/Gulf of Aden
Allied Protector 2009–	Counter-Piracy	Indian Ocean/Gulf of Aden
<i>Maersk Alabama</i> 2009	Counter-Piracy	Indian Ocean/Gulf of Aden
Southwest Asia (4)		
Sea Angel 1990	HADR	SW Asia/Bangladesh
Silent Assurance 1997–98	Combat	SW Asia/Afghanistan
Enduring Freedom 2001–14	Contingent/ Combat	SW Asia/Afghanistan
Sea Angel II 2007	HADR	SW Asia/Bangladesh
United States (3)		
Hurricane Hugo 1989	HADR	U.S. East Coast
JTF Katrina 2005	HADR	U.S. Gulf Coast
BP Oil Spill 2010	HADR	U.S. Gulf Coast

Name/Dates	Type	Region/Countries
Europe (2)		
Creek Sentry 1980–81	Show of Force	Europe/Baltic/Poland
Assured Delivery 2008	Show of Force	Russia/Georgia
Red Sea (1)		
Intense Look 1984	Show of Force	Red Sea/Gulf of Aqaba/ Libya

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Appendix 4

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100406-N-5528G-003 U.S. Navy photo by Mass Communication Specialist 3rd Class Patrick Green

U.S. Naval Academy midshipmen stand at parade rest during a brigade summer whites uniform inspection.

Chapter 3

Naval Personnel since 1945: Areas for Historical Research

by Donald Chisholm

Men matter most.

—Wayne Hughes, *Fleet Tactics and Coastal Combat*, 1999

A nineteenth century sailor would be bewildered in a modern warship, but regardless of the appearance of ships, there is one element, the most important of all, that remains unchanged—the man himself. Human nature in all the changing years has altered but little. It is the human element in warfare which may, if understood by the commander, prove to be the only way of converting an impossibility into a reality.

—*War Instructions* (F.T.P. 143 [A]), Admiral Ernest J. King, Commander-in-Chief, United States Fleet and Chief of Naval Operations, 1 November 1944

Is there any law that says a Yeoman must be a man?

—Secretary of the Navy Josephus Daniels, 1916

THE HUMAN ELEMENT IN NAVAL WARFARE

Nearly three years into World War II, Admiral Ernest J. King published his *War Instructions*, a central means by which he communicated his general guidance and intent to a vastly grown wartime Navy. It followed on two previous iterations, published in 1924 and 1934 by his predecessors, Edward Eberle and William Standley. By this point in the war, King and his principal subordinates had figured out, at the cost of considerable blood and treasure in actual combat, what mattered most among the several ingredients that, when combined, were likely to produce successful outcomes at sea. They got “it.” Thus, in stark contrast with the earlier publications, King’s version began not with naval organization, tactics, or technologies, but by discussing “the Human Element in Naval Strength.”¹ As Representative Fred Britten, Chair of the House Naval Affairs Committee, stated before the war, “Cold steel isn’t worth a damn in an emergency. You need men to direct it.”²

In Admiral King’s view, implicitly, the whole of the Navy’s personnel system existed to support the commander, who embodied the several military virtues:

- *Responsible courage*, both moral and physical—the moral courage to do the right thing and the physical courage to face any personal danger.
- *Decision of character*—ability to select the essentials, weed out the nonessentials, and fix the mind on the objective to be reached. This implies foresight and an imagination that can see all the advantages, all the chances, all the obstacles, in their true proportion and can decide firmly what is to be done.
- *Sound judgment*—which in its application may be called common sense, though it is not a common but rare quality, and is based on possession of all available facts.
- *Initiative*—the ability to understand and take advantage of new situations.³

King’s desiderata are no less relevant today. They form the very foundation of naval efficiency.⁴

At the same time, it must be emphasized that organizations are not intended to rely upon the fortuitous presence of either geniuses or heroes, or some combination thereof, for effectiveness, but rather on a cadre of competent professionals. Herman Wouk’s description of his fictional Victor “Pug” Henry makes this point:

[H]e is not a brilliant strategist like Raymond Spruance. He’s not a celebrated, flamboyant leader like William Halsey. What he is, is a backbone

officer, and it is the Victor Henry's who create the victories for the Spruances and Halseys.⁵

If an organization finds itself dependent upon geniuses and heroes for success, this suggests its larger system of personnel has not been effective in its purpose and task. How does/should/can the Navy produce the Pug Henry's (and his enlisted counterparts) it needs for success? The answers to this question underlie the development, maintenance, and adaptation of the Navy's personnel function.

That personnel constitute the core assets of any large-scale formal organization, such as a navy, may seem obvious, but aside from biographies of great and heroic naval leaders, naval historians have shown a disinclination to systematically address aspects of naval organization that produce the competent officers and enlisted personnel who support and embody the characteristics of effective commanders and subordinates.⁶ In any given period of the Navy's history, ample room exists for thoughtful study of naval personnel, but especially so from the conclusion of World War II to the present.

Two characteristics of blue water navies, such as the U.S. Navy, add special urgency to effectively addressing these matters. Once the Navy acquired the defining characteristics of a profession, for officers at least, this translated to a personnel system that admitted its members, with few exceptions, only at the most junior level. As a result, after 1916, through a progressive winnowing process of selection up, combined with graded retirement, the Navy has produced its senior leadership from those who were initially commissioned decades previous.⁷ It has also been accorded substantial autonomy in regulation of its officer corps and enlisted personnel. Notwithstanding various mechanisms since the American Civil War to rapidly and temporarily expand the officer corps during wartime, its leadership has been drawn almost exclusively from its existing regular officer corps.

At the same time, like other blue water navies, although the U.S. Navy deploys and operates at sea during peacetime much as it does during war, major actions involving the clash of fleets occur only every few generations.⁸ Thus, the Navy develops and maintains personnel against the requirement for performance in actions that may never come during the service lifetime of any given member. When such actions do come, they may not closely resemble known historic actions that have typically provided the foundation for predictions about future actions. The decisive battles of World War II in the Pacific were not fought by the much anticipated battle lines in relatively close quarters, but by carrier-based aircraft at such distances that the ships of the opposing fleets never visually sighted each

other.⁹ It was a new, more mobile naval warfare occasioned by technological changes that set in motion great perturbations within the Navy's formal structure and culture, during the interwar period, during the war itself, and afterwards. This suggests that flexibility and adaptability to unforeseen circumstances is required of the Navy's officers and enlisted personnel.

Compounding the problem, throughout its history the Navy has developed and maintained an image of the war at sea—since the 1890s, the Mahanian decisive fleet battle—it *wants* to fight. It has organized, trained, manned, and equipped itself to fight this war, even though it will with high probability actually have to do other things for which it has not prepared. As with its Army counterpart, the assumption has evidently been that preparation for “big war” will allow the Navy to be effective in its conduct of other, “lesser” operations.¹⁰

Arguably, decisive fleet actions have obtained in only two of its conflicts—during the Spanish-American War in the Philippines and Cuba, and during World War II in the Pacific. In the latter, protection of sea lines of communication and projection of power ashore via amphibious operations in both Atlantic and Pacific theaters, along with a *guerre de course* against Japanese shipping à la Corbett and Callwell, occupied a major portion of its attention and resources. Amphibious operations, in particular, required the design and construction of specialized shipping and development of amphibious tactics, techniques, and organization during the war, notwithstanding the seizure of forward operating bases in the Pacific as an early cornerstone of War Plan Orange's operational idea, and considerable thought given to the matter by the Marine Corps in the 1920s and 1930s. Following World War II, along with the rest of the military, the Navy's ships, aircraft, and personnel were greatly reduced in force, but the amphibious forces most dramatically of all its components. Although some, including, famously, General Omar Bradley, were persuaded that atomic weapons had rendered amphibious operations impossible, the United States found itself conducting four major such operations in the second-half of 1950. More recently, the submarine force found itself greatly reduced after the “end” of the Cold War and now must regenerate.

Moreover, the admittedly important mastery of a highly technical profession during peacetime has not necessarily translated into effective leadership in war. It is easier to teach and learn technology, tactics, techniques, and procedures than warfighting leadership and command—as Secretary of the Navy Gideon Welles discovered during the Civil War, and he was compelled to rework, amid the conduct of operations, the personnel system in order to promote and assign to duty the officers who could and would command and fight. The same problem

of personnel obtained during World War II—the senior officers in place at the outset were not always the ones who would ultimately carry the load for the fight. The probable compression of time in any future naval war suggests that the kind of sorting out process possible in earlier wars may be less feasible in the next go-around, creating more pressure to get it right before hostilities occur.

Although this essay has so far focused on the Navy's function in protecting the national interest, and the instrumental role of personnel in this effort, based on an image of the administrative organization as a mechanism for achieving certain objectives, with specified resources, in a particular environment, the Navy also serves its civilian masters in the broader context of a democratic republic. Since at least the immediate post-Civil War era, the Navy has functioned along with its sister services as a vast training and educational system that has supplied the private economy with individuals possessing essential skills and experience while offering individual Americans, very often from disadvantaged sectors of society, paths for social and economic mobility.¹¹

The Navy's personnel system and personnel tend to reflect, however imperfectly, the values, including biases of various sorts, of that larger society within which they reside and from which they are drawn. Sometimes it has lagged changes in societal values; in other times it has led change. At certain points, serious rifts in the larger society have been reflected in the Navy's internal dynamics, while at other times it has been somewhat insulated from them. The post-World War II period has seen both, as American society has struggled to come to terms with changing demographics and historic racial, ethnic, and gender bias, and more latterly, with sexual and gender identity. The Navy, as with its sister services, has also episodically faced the need to adapt to profound changes in values across generations in order to attract, retain, and employ effectively the young people it requires.

A DEARTH OF INTEREST

It seems sensible that systematic reflection on this organizational function and its place in both naval efficiency and American society would be of regular interest to historians, if not for its slim intrinsic appeal then to put the Navy in good stead for the future. But this has not been the case. In this deficit, the Navy does not sail alone—the personnel functions of few organizations private or public, civilian or military, generate much excitement among historians.¹² Personnel policies often include highly confidential organizational decisions—especially regarding

promotion and selection for leadership positions. Officers' memoirs either ignore the matter entirely or speak about it in elliptical, opaque terms.

However challenging it may be for any large-scale formal organization to engage regular academic interest in its personnel, the Navy has had additional competing factors to overcome. It has many bright, shiny objects in its ships, aircraft, and weaponry. Both visually and viscerally, its episodic operations and campaigns contain all those elements of human drama that contrive to draw one's ready attention—chance, extreme violence, pathos, brilliant and failed decisions, courage and its opposite, and both cruelty and kindness. Studying personnel must pale by comparison to these matters, which historically have dominated both professional and popular perceptions of the Navy's history.¹³ Even the staid programming and acquisitions processes seem to have more intrinsic draw. In this, personnel functions seem to occupy largely the same niche as naval organization and administration, which enjoyed a brief flirtation with the A-List for naval historians during World War II but has since attracted little systematic attention.¹⁴ Such describes the historiography of the Navy through the end of World War II. The same holds for the period, now more than seven decades long (!), since that war ended.

Beyond these general factors, other, specific elements have influenced the focus of historians during this particular period. World War II loomed so large in the mind's eye given its duration, scope, and complexity, not to mention that the Pacific war was the apotheosis of the Navy's vision of naval warfare, that little room existed for other pursuits—especially for naval administration—of which personnel resides as a minor subspecies. Samuel Eliot Morison did not publish the last installment of his multivolume *History of United States Naval Operations in World War II* until 1962. The Naval War College, appropriately, devoted considerable treasure to study of the signal battles, operations, and campaigns of the Pacific War, in order to capture important lessons for future naval officers who might not be afforded the opportunity to learn those lessons through their own experience in war.¹⁵ Then came the Korean and Vietnam Wars punctuating the consistent drumbeat of the Cold War, followed by the first and second Gulf Wars, Afghanistan, and presently the matter of Daesh, not to mention China rising and the resurgent and troublesome Russian Bear.

However, we are not entirely bereft of contributions to our historical understanding of the Navy's personnel since World War II. There are, foremost, articles in the U.S. Naval Institute's *Proceedings*, usually by serving officers, both junior and senior, typically about immediate problems of personnel; for example, stagnation in promotion, emerging requirements for expertise not at the time

resident within the Navy's personnel, or changes in Naval Academy curriculum. Consistent with their pre-war frequency, multiple such articles have appeared every year since World War II. They highlight internal perceptions of enduring and emerging personnel problems, sometimes indicate official attention, and thereby provide heuristics for those historians who might be paying attention.¹⁶ Similarly, policy papers commissioned by the Navy (also by the other military services and the Department of Defense) of private think-tanks, if not strictly histories, have often contained historical narrative and have, thereby, episodically and incidentally contributed to our historical understanding of the Navy's personnel.¹⁷ At a minimum, taken as a collectivity, these publications indicate what issues concerned the Navy's personnel at any given point in time and how they thought about them.

WHAT IS TO BE STUDIED?

So, the bad news is that we have little systematic study of the Navy's personnel by historians; the good news is that the field of study is entirely open. On agreeing to undertake this historiography, the author supposed a well-bounded, relatively narrow domain, but that simple notion was soon revealed as naïve, and well . . . simple. Not uncommon to historical research, the onion presented itself, and the practical challenge became one of setting reasonable limits rather than a struggle to find enough to address. The matter of personnel touches virtually every aspect of the organization. In this paper, the author proposes to limn out the field and boundaries of naval personnel for the purposes of the historian, with the larger objective of suggesting fruitful areas for future research.

For the purposes of this paper, the general subject area for histories of naval personnel includes the following:

1. Legal and administrative rules and procedures governing accession, training, education, promotion, assignment to duty, relief for cause, pay and benefits, retention and retirement of officers and enlisted personnel, and management of episodic requirements for personnel expansion and reduction as dictated by economy and world events.
2. Conceptualization of professional careers of officers and enlisted personnel; the flow through the several grades for officers and through the ranks for their enlisted counterparts; the preferred paths and associated milestones, both formal and informal, and their effects on who accedes to senior

- leadership positions, along with the relationship, formal and informal, between commissioned officers and enlisted.
3. Organization of naval personnel into line and staff corps: essentially the formal division of labor and specialization for the Navy. Also, the formal and informal delineation of the role and function of the naval reserves and their relationship to the regular Navy.¹⁸
 4. Conceptualization and reconceptualization of what defines the line officer and the relation of the line with the staff corps; ditto for what defines the differences between commissioned officers and the enlisted personnel.
 5. Form, organization, and place within the Navy of the administrative function for personnel.
 6. Changing societal valuation of the balance between profession and family.
 7. Social, economic, political, ethnic, and gender composition of the Navy's officers and enlisted personnel, and the conflicts, challenges, and processes of change associated with changing composition, including matters of explicit and implicit bias and discrimination.

The first five areas above comprise what historically have been the (largely) internally controlled and focused formal and informal aspects (including the Navy's organizational culture) of the Navy's personnel, aimed primarily—perhaps narrowly—at the Navy's warfighting efficiency. The last two directly address the role and function of the Navy (along with the other military services) in a American democratic society, which has, over the years, become less and less willing to advance, accept, or tolerate the exclusion of members of various groups defined by ascriptive traits, and includes the effects of those changes on the Navy's organizational culture.¹⁹ The present essay addresses the first five areas, with lesser attention to the last two. For a direct focus on social forces and the Navy, the reader is referred to Ed Marolda's fine "The Social History of the U.S. Navy, 1945–Present: A Historiographical Essay."²⁰

HOW MAY WE USEFULLY THINK ABOUT STUDYING IT?

The present essay approaches the Navy as an organization that perpetually invents and reinvents itself as it struggles to identify and come to terms with problems presented by its environment. As with other aspects of the Navy's organization, its personnel function has never actually reached a more or less permanent, stable resting point, where all its problems were solved, leaving it to proceed without

much friction or noise. That means, practically speaking, that it only sometimes has achieved a temporary equilibrium in which it has done a satisfactory job of addressing the problems it was able to identify and structure to that point, but the solutions to those problems themselves have produced unintended consequences, some of which were identified and assessed as undesirable and have had to be addressed as new problems.²¹

To a great extent this obtains because the Navy has always done and continues to operate as an open system in continual interaction with its environment, which changes in significant ways, at greater or lesser speeds, that the Navy can usually not control and can only occasionally predict accurately (but can endeavor to adapt to and sometimes hope to influence).²² This open-system status obtains, notwithstanding the Navy's relatively closed status as an institution. Its permeability has varied over time, which sometimes, in important ways, has left it out of synch with the broader society within which it resides and for whose security it exists. The net result has been and continues to be an organizational function that only ever is likely to be more than partially in balance with the problems it is intended to solve.

How might we usefully think about the environment for Navy and the dimensions of its personnel function as described above, in order to identify fruitful avenues of inquiry for historians? Let me suggest the following dimensions as a way to organize our thinking:

1. the nature of warfare, and, especially, the enduring nature of warfare at sea
2. character of the operations, campaigns, and war(s) U.S. military, but especially the Navy, conducts/fights, how it chooses to do so, and for which it must prepare in the foreseeable future
3. organizational and legal aspects, including joint organization and requirements
4. present state of play for technology and projected future trends, especially where technological expertise is readily transferable between the Navy and the private economy
5. social and cultural values and norms, particularly as they concern equality of treatment and opportunity for minorities and women, expressed through a variety of means, most importantly by elected and appointed public officials
6. demographic characteristics of the American population from whence are drawn the Navy's personnel, especially regarding ethnic mix and generational changes
7. state and trend lines of the domestic American economy

This essay focuses principally on the second through fourth environmental aspects and their effects on the dimensions of the Navy and its personnel outlined above. I wish to emphasize that although stated individually, these aspects inevitably interact in complex ways with one another, compounding their effects, direct and indirect, on the Navy's personnel function, which dimensions also interact in complex and frequently unpredictable ways, leaving the door wide open for unintended consequences to follow from purposive actions to reorganize the personnel system. Consequently, this essay is organized more or less chronologically rather than by personnel dimensions and environmental aspects. By emphasizing temporal context, this approach highlights the simultaneity of changes in and complex interactions among these key variables.

WHERE TO LOOK

As with any historical research, developing an understanding of naval personnel writ large or along specific dimensions translates to employing a wide range of primary and secondary sources. Congressional legislative activities, whether they result in a law or not, provide considerable grist for the mill: draft legislation, subcommittee and committee hearing testimony and reports, and transcripts of floor debates (in the *Congressional Record*) help to build a picture of important issues and the positions and thoughts of interested actors. They also help limn out the executive and legislative processes, formal and informal, by which draft bills become law, and how changes in them over time affect substantive outcomes.

Reports from the Congressional Budget Office and the Government Accountability Office (née General Accounting Office) serve similarly. Navy-generated data and reports through the Navy Personnel Command and its Bureau of Naval Personnel, along with reports from the Chief of Naval Operations' former Strategic Studies Group in Newport, are essential to any historical study. However, issues of security classification for post-World War II materials might hinder access, usage, and citation.²³ The National Archives maintains records of 50 years or greater for the executive departments—newer means going directly to the Navy. Even where data are not classified, its sensitivity, say for comparative promotion and command screen rates for different line communities, although worthwhile, tends to make it challenging to obtain. One might review the old print editions of *All Hands* (previously Bureau of Navigation *News Bulletin*, first published in 1922, the name changed in 1945), which are archived online and searchable, along with its contemporary online incarnation.

Finding and accessing documentary resources may prove to become more rather than less challenging with the trend toward electronic generation, communication, and storage of official papers intensifying over the past two decades.²⁴ Email, especially, may play a central role in personnel policy matters, but is particularly thorny to discover and access.

Think tanks and their studies occupy a kind of in-between ground. A World War II institutional innovation, such include nonpartisan stalwarts as the RAND Corporation (first organized in 1948) and the Center for Naval Analyses (initially organized in 1942) that produce under contract with the military services (and others) research, analyses, and recommendations on a range of issues, including personnel problems and policies. More recently, more partisan-focused organizations such as the Heritage Foundation (founded 1973) and the Center for a New American Security (CNAS, founded in 2006) have also produced useful reports and recommendations.

Oral histories and memoirs are also important primary sources but the historian may feel a little like a baleen whale straining many tons of sea water to get a few krill—references are there, and sometimes become important guideposts for further research, but one must sort through many words to find them. Neither have oral histories been systematically and consistently collected for naval officers (let alone enlisted personnel) as they have been for personnel of the other services. The U.S. Naval Institute maintains a significant, if not entirely up-to-date, collection, as does the Naval Historical Foundation, along with the Naval War College.

Published secondary sources include articles in general circulation newspapers, especially papers of record such as the *New York Times* and *Washington Post*, but also in local or regional newspapers that circulate in Navy-intensive geographic areas, such as San Diego (*San Diego Union-Tribune*—merged from two newspapers in 1992) and Norfolk (*Virginian-Pilot*). Specialized publications such as *Military Times* and its more focused *Navy Times* and *Marine Times* can be very fruitful. These are the modern descendants of the wonderful old print-weeklies, the *Army and Navy Journal* and *Army and Navy Register*. That they may be accessed and searched online eases research. Ditto for the wide array of Navy-focused blogs and websites that provide unique material for the last two decades and offer insights into the thinking of Navy officers. Along with oral histories and memoirs, these sources are particularly useful for divining how social issues and changes affect the Navy's personnel, sometimes generating strong feelings and "warm contentions" among competing groups.

Articles and letters published by the U.S. Naval Institute in its monthly

Proceedings magazine (in print and online) might be reasonably considered, depending on their authorship and content, as either primary or secondary sources. Articles in the *Naval War College Review*, first published in 1948 in print and recent years also online, with an online searchable comprehensive archive, are more likely to serve as secondary sources. It should also be remembered that since the unification of the services under the National Security Act of 1947, personnel policies have become increasingly, though not comprehensively, standardized across the several military services, which means that the researcher must cast a wider net.

Studies by scholars and pundits, published in book form, along with both academic and popular biographies, make up the final dimension of material suitable for historical research into Navy personnel matters.

Collectively, these primary and secondary sources may be employed to develop a reasonably complete narrative for both the broad trends and the dynamics of specific aspects in naval personnel since 1945.

BY THE TIME OF PEARL HARBOR AND INTO WORLD WAR II

In the nearly 150 years of its history from its rebirth in 1794 to the onset of World War II, the Navy devoted surprising time and effort—which included the inevitable false starts and errors of understanding—to figuring out a personnel function that would produce the Pug Henrys among its officers and their enlisted equivalents. It elaborated the structure of officer grades and enlisted ranks with their respective duties that endures largely intact today. It devised a scheme of specialization dividing responsibilities between line and staff and defined what it meant to be a line officer (although the exact places of aviators and non-aviators in the line were still under discussion).²⁵ The distribution of officers and enlisted into the grades and ranks had been refined and algorithms for its adjustment figured out, based largely on ratios of personnel to capital ship tonnage. It established and refined a multidimensional system of commissioning officers (Naval Academy, Naval Reserve Officers Training Corps, and Naval Aviation Cadets) and recruiting enlisted. A naval reserve of officers and enlisted had been established and institutionalized and its relationship to the regular Navy agreed upon.²⁶ Officer promotion by selection up from lieutenant(j.g.) to lieutenant through rear admiral was well-established (having been initiated in 1916 for the Navy's top three grades), and, if not universally acclaimed, accepted as legitimate by both

line and staff. It included a regularized calendar, well-defined precepts for the boards of officers who made the selections, and established procedures for the selection boards, many of which endure to the present day.

Career paths for officers were more or less defined, including progressive levels of responsibility, professional education (including a system of education by correspondence for enlisted personnel, initiated by Secretary of the Navy Josephus Daniels), and training.²⁷ Time in each grade had been normalized and the need for flow through the grades understood if not entirely achieved. In support of those paths and flow the Navy had in place a reasonably efficient system for assigning duty with a regularized and predictable annual rotation. The pay structure was well developed and deemed effective for its purpose. There was a system of graded retirement (based initially on age and then years of service) in place for officers and enlisted. In all of this it must be said that the Navy had advanced further toward a modern professional personnel than had its sister service. In fine, the personnel foundation had been constructed that would allow the Navy's effective expansion to a previously unimagined size during the course of prosecuting World War II.²⁸

But this relative success should not lead us to assume that the history of personnel had somehow ended on the eve of World War II. In fact, the demands of wartime dictated suspending many of the personnel procedures for the duration. For example, promotion by selection up gave way temporarily to promotion *en bloc* for regular and reserve officers alike. As well, a great many officers who had been separated from the service for non-selection, medical disability, or normal service-in-grade retirement were returned to active duty for the duration in order to meet exigent demands for more officers.²⁹

During this century and a half of problem solving, three central values emerged, in uneasy dynamic tension with one another, to dominate decisions about the Navy's personnel. Their relative importance varied substantially over time and continues to do so: *efficiency* (effectiveness) of the Navy, *equity* for individuals (more for officers than for enlisted during this period), and *economy*, which is to say near and long-term expense (including pay and allowances along with the cost of the retired list). The period from the Navy's inception in 1793 to the eve of World War II is accurately described as "from equity to efficiency." Early in the Navy's history, when *efficiency* and *equity* came into close conflict, the latter typically emerged triumphant. By 1916, however, and initial adoption of promotion by selection up for officers, the balance had tilted in favor of *efficiency* and so it has remained. *Economy* has waxed and waned in importance, growing during peacetime and diminishing in times of expansion and war. Since

9/11, however, the United States has been more or less in a continuous state of war in one place or another, with no relief in sight, which may mean the old approach to economy may have been overcome by events.

Thus, by the post-World War II period under consideration here, an effective main framework for the Navy's personnel function was in place. What did not emerge before the war, and indeed, after, however, was the inclusion of major portions of the American population into the Navy—including African Americans, Hispanic Americans, Filipinos, and women. Like the larger American society, the Navy remained racially segregated, both *de jure* and *de facto*, with women being treated only as necessary temporary accommodations to the exigencies of wartime. Unsurprising to social scientists who have studied political development, organizations in their values, culture, and form can only exist if reasonably consistent with the societies within which they reside.³⁰

The Navy was, historically, the most class conscious of the military services, with a great divide between officers and enlisted, a chasm reinforced both by formal rules and endless symbolic communication.³¹ And, as a self-consciously tradition-focused organization that venerated and exalted longstanding ways of doing business, from the Navy's perspective at the time, equal protection and equal opportunity were simply not problems to be addressed. Social and economic mobility, a historic latent function of the military generally, and especially afforded by the Navy—through training and education, responsibility, and pay and benefits—to those white Americans who would join were not available to many other fellow citizens. It would take an existential war and a virtually insatiable demand for personnel to begin that change.³²

IMMEDIATE POST-WAR CHANGES AND CHALLENGES: DRAWDOWN, LIMITED CONFLICTS, AND INTEGRATION

With the successful conclusion of World War II, the United States was left standing as the dominant Western power, and the prevailing notion of an "American way of war" had been reinforced.³³ The mid-1940 Navy comprised 13,162 regular and officers on active duty and 144,824 enlisted personnel. By mid-1945 it had grown to an astounding historical peak of 317,316 officers in all corps and 1,933,563 enlisted. Demobilization was relatively swift as historically has been the American wont. After all, only a small percentage of those officers and enlisted who had served for the duration were to be needed and just as few were interested in staying. Indeed, there was no reason to suppose that the United

States could not return to its historical stance of a small military establishment—the Atlantic and Pacific Oceans remained where they were, ICBMs were yet to come, the Soviet Union’s blockade of Berlin, its other adventures in Europe, and the North Korean attack on its southern brother had not yet put paid to that era’s “peace dividend.”

While the near-term challenge was to return recently mothballed ships to commission and activate the reserve personnel to run them for the duration of the Korean War, the Navy’s (and the other services’) challenge became how to maintain a permanently larger (than pre–World War II) establishment to confront what became a persistent Soviet threat. Fortunately, the draft was continued after the war, providing the Navy with the relative advantage of a greater appeal than that held by the Army, enhanced by a civilian economy that struggled to absorb the return of so many people who had served in the military. The status and role of the naval reserve and how it would support the Cold War Navy outside of a major hot war also came into discussion.

With the United States and its military now cast in a continuing and central role upon the world stage after the war, the tectonic plates of federal government organization also shifted dramatically. The growth of the federal administrative apparatus, incremental since the founding and accelerated during the Great Depression and again during the war, had left the President with an unsustainable span of control, no institutional presidency to assist him in running that apparatus, and a welter of agencies with overlapping and conflicting missions. At President Harry Truman’s request, former President Herbert Hoover returned from trout fishing in Wyoming to run a commission that comprehensively analyzed federal administrative management problems and proposed courses of action for their resolution.³⁴ In the national security domain, this endeavor coincided with a long-standing desire by advocates of a separate air force for a unified department of defense. Perhaps equally important, some of the nation’s most senior military leaders, such as George C. Marshall and Dwight D. Eisenhower, had emerged from their experiences in World War II with profound regard for the power of joint commands and staffs in the conduct of joint arms. For example, in his post-war narrative, Eisenhower emphasized several times the vital importance of what he called the “air-ground-naval team” even as he recounted his recurring efforts to ensure unity of command over his disparate forces.³⁵ The Navy’s days of independent steaming were coming to an end.

Not without considerable blood on the deck, as a piece of the larger reorganization of the federal government, the National Security Act of 1947 became effective 26 July of that year, establishing, among other things, a unified Department

of Defense, with a defense secretary superimposed above the service secretaries (no longer members of the cabinet), a legally formalized Joint Chiefs of Staff, and a new Department of the Air Force. It comprised the greatest changes in national security organization since the ratification of the Constitution.³⁶ This left the Navy with much less independence than previously to manage its own affairs, including those of its personnel. The Officer Personnel Act of 1947 (OPA) followed on 7 August 1947, with the stated intention of providing uniform rules and practices in personnel management across the services. Ironically, perhaps, this act adopted many of the key aspects of the Navy's officer personnel system as it then stood and made them applicable to the other services. Thus, while the new law was substantively congenial to the Navy, procedurally the sea service had lost a large measure of control over how to manage its personnel. This constituted only the beginning stage of a long series of incremental joint requirements that would reduce the Navy's independence.

These changes were followed less than a year later on 26 July 1948 by Truman's Presidential Executive Order 9981, which directed immediate desegregation of the armed forces. Major wars inevitably trigger unintended significant social, economic, and political changes. President Franklin Roosevelt had published an Executive Order on 25 June 1941 mandating non-discrimination in defense industry employment. To meet the requirements of economic mobilization for an existential war, every available and able American was needed. African Americans had been prohibited from enlisting in the Navy following World War I. In 1932, that ban was lifted, but only mess ratings were opened to them. On 7 March 1942, the Navy opened enlistment for "general service" in the Navy to black Americans. Although ultimately about 150,000 African Americans served in the Navy during World War II, they remained greatly restricted in the enlisted ratings open to them, were limited to a quota of ten percent per ship, and most neither went to sea nor saw combat. There were no male African-American officers until 1945.³⁷

Notably, the Navy had employed African Americans as stevedores in segregated units, and thereon hangs the tale.³⁸ On 17 July 1944, two ships being loaded with ammunition at the Navy's Port Chicago facility on Suisun Bay in northern California exploded, immediately killing more than 300 personnel, over 200 of whom were black. The explosion and aftermath proved to be a catalytic event in the history of African Americans in the Navy (and in the military more generally), although its effects would not begin to be felt clearly until Presidential Executive Order 9981.³⁹ For quite some time, the U.S. military and the Navy (even though it may have dragged its feet in implementing the required changes) led the broader civilian society in opening opportunities to black Americans, presaging similar

openings for American women, for gay and lesbian Americans, and more recently for transgender Americans. Still, it was not the beginning of the end, but more like Winston Churchill's famous "end of the beginning"—formal legal changes did not universally translate into actual practice.

The effects of mobilization during the Korean War and the subsequent drawdown led to what Congress believed to be military services top-heavy with commissioned officers. To redress this problem and to forestall it in the future, the Officer Grade Limitation Act of 1954 (OGLA) was enacted. It linked numbers of officers by grade in the unrestricted line and staff corps to the numbers of enlisted personnel.⁴⁰ This law shaped the Navy's reduction in force already underway following the Korean armistice.

That same year, on 17 May the U.S. Supreme Court handed down its epochal decision in *Brown v. Board of Education of the City of Topeka, Kansas*. The profound, widespread effects of this ruling took decades to unfold, followed by other federal rulings, and federal legislation, including the Civil Rights Act of 2 July 1964, the Voting Rights Act of 6 August 1965, and the Fair Housing Act of 11 April 1968 (passed barely a week after the assassination of Martin Luther King). All told, these laws comprehensively addressed the sources and loci of racial discrimination in the United States. Now more than 50 years later, American society and its military are still working through the challenges.

INTO THE 1960S AND 1970S

Racial conflict in the nation's urban areas in the 1960s and 1970s did not leave the Navy unaffected. Neither did growing opposition to the Vietnam War and generational differences between young officers and Sailors and their seniors, who had started their Navy careers during World War II. Aboard ship, relations between white and black Sailors were often strained, sometimes worse:

[R]ecruiting standards were lowered and basic-training shortened to fill the Navy's manpower needs more quickly and in fairer racial proportion. As much as anything, the new recruitment policies spelled trouble. Men lacking even an elementary education were entering an organization whose greatest demand was for personnel with high technical qualifications. Blacks were rushed from "street to fleet" in less than two months, only to find themselves performing the least attractive shipboard duties, usually under white supervision.⁴¹

Thus, efforts to redress racial problems may well have increased the potential for, if not the probability of, racial tension aboard ship, exacerbated by the high operational tempo and extended deployments.

The antiwar movement also found adherents in uniform and at times the lines on the two sets of issues coincided. In a number of cases, the situation deteriorated into violence. *Ranger* (CVA-61) suffered perhaps a dozen acts of deliberate sabotage while deployed June–October 1972, the most serious of which was committed by a white sailor who threw a wrench into the main reduction gears.⁴² A fire was deliberately set in *Forrestal* (CVA-59). On 11 October 1972, while she was operating as part of Operation Linebacker II off the coast of Vietnam, a full-bore riot broke out among white and black Sailors amid an antiwar protest in *Kitty Hawk* (CVA-63), leaving at least four dozen injured and 25 black Sailors and no white Sailors arrested.⁴³ Aboard *Constellation* (CVA-64), 130 sailors, all but nine of whom were African Americans, protested discriminatory job assignments and disciplinary proceedings, forcing the ship to return to San Diego.⁴⁴

To be sure, in 1970 President Nixon had named 49-year-old Elmo Zumwalt as Chief of Naval Operations. The admiral resolved to bring the “Navy’s treatment of ethnic or racial minorities, especially blacks, into conformity with stated national policy, not to say common fairness and decency.”⁴⁵ He moved rapidly to reduce racial and sexual [as it was then called] discrimination in the Navy and to increase enlistments of African Americans. Aboard the larger ships he emplaced minority affairs and human relations staff officers. Their efficacy was unclear. There were also his direct communications of policy decisions and their implementation to all hands via a total of 121 “Z-Grams,” and his relaxation of restrictions on facial hair and ethnic hairstyles, along with changes in uniforms, these, sincere efforts to address significant generational changes.

Zumwalt’s efforts were at times simultaneously staunchly opposed by his fellow senior officers and deemed insufficient by younger Sailors. He has not always been treated kindly by history and occasionally has been vilified. However, it is difficult to conjure what might have been done very differently by Zumwalt—all of American society’s institutions were under similar great stress during that time. Zumwalt allowed the Navy to bend, not break.⁴⁶

The military draft, which had been maintained continuously since 1940, was, by the Act of 22 September 1971, continued in effect only through June 1973.⁴⁷ Apart from those actually drafted, conscription had played a significant role in “encouraging” some of those American youth who “volunteered” for military service, especially in the Navy. Male registration for Selective Service was reinstated by Presidential Proclamation 4771 of 2 July 1980, but neither military

nor civilian leadership have displayed much appetite for an actual draft. Now over four decades in, the “all volunteer” force has largely been judged a successful policy and it would be useful to sort out its effects on the Navy’s personnel during that period.⁴⁸

Opposition to the Vietnam War in the American public and rising levels of a general societal malaise also had their effects on the Navy’s officer personnel. As with the other services, toward the end of the Vietnam War, the Navy lost substantial numbers of junior officers who decided that the seagoing life was not for them.⁴⁹ The Navy’s loss was the private sector’s gain. Although not readily empirically measurable, it also seems probable that individuals who might in a different time have opted for the Naval Academy or the NROTC now elected not to do so. We cannot know with any certainty who these individuals were but we may be reasonably confident that had they been commissioned and stayed in the Navy the senior officer corps in the late 1990s and early 2000s would have looked noticeably different.

More recently, the effects of the business models instituted by Admiral Vern Clark while Chief of Naval Operations included the systematic reduction of manning aboard ship and the decommissioning of ships—which were not replaced one-for-one. These changes, in which economic efficiency was to trump effectiveness, were not so troubling during the relative calm of the period immediately following the end of the Cold War, when deployments and operational tempo continued in predictable and bearable calendars.⁵⁰ However, the wars in Afghanistan, then Iraq, and now Syria and elsewhere, combined with the resurgent Bear and the rise of the Peoples Republic of China, have increased demand for naval forces—in the form of longer and more frequent deployments—that has stretched both materiel and personnel. Naval personnel who thought they were signing up for one contract are finding that they have gotten a somewhat different one, and one not altogether to their liking. Secular changes in demographics and social attitudes during the immediate post-war period and through to today, including more families with both parents working fulltime and decreased willingness to endure separations from families, have intensified the negative effects of increased personnel tempo. Some promising officers have resigned their commissions relatively early in their careers while other more senior successful officers have elected to take themselves out of the running for the flag grades by choosing duty assignments friendlier to their families but not in “flag track.”⁵¹

NAVAL RESERVE OFFICERS TRAINING CORPS

During the first five decades of the Navy's history, there was no rationalized, systematic mechanism for annually securing the right individuals in the right numbers as officers, and only inadequate means for their education and training. The numbers varied widely from year to year, based largely on requirements for patronage, rather than the needs of the service. Appointment as a midshipman was treated as a plum and indeed, for young men politically connected, half-pay provided a decent sinecure. Many never went to sea and ashore earned well-deserved reputations as dissolutes. Their education and training was better than haphazard, via a Corps of Mathematicians teaching aboard ship, but only just. Establishment of the U.S. Naval Academy in 1845 and a system for appointment of the appropriate number of qualified cadets thereto largely solved the problem of numbers and education for a stable peacetime Navy. As the demands of the Civil War showed, however, the Naval Academy would never be sufficient to supply officers to meet the requirements of a greatly expanded wartime Navy. For that conflict, the Navy accepted volunteer officers, largely from the merchant marine, for the duration. Enlisted personnel were increased by voluntary enlistments.

During World War I the vast expansion of the Navy occasioned by the Act of 29 August 1916 once again necessitated sourcing officers from other than Annapolis. The great lesson of the Great War was that some sort of permanent mechanism for temporarily expanding the Navy, especially its officer corps, needed to be put in place. Accordingly, in 1926, following the model of the Army's previously established Reserve Officer Training Corps (ROTC), the Naval Reserve Officers Training Corps (NROTC) was organized at a strength of 1,200 midshipmen at six universities. On graduation, the midshipmen were commissioned as reserve officers. The Naval Aviation Cadet program was created in 1935 to build a larger foundation of reserve officers in preparation for wartime expansion.

World War II's projected and actual requirements quickly exceeded the supply from the Naval Academy and existing reserve programs. In June 1940, as part of the Two-Ocean Navy Act, Naval Reserve Midshipmen's Schools were established at various colleges and universities, and, thus, the so-called "90-day wonders." In 1943, the V-12 program, again through colleges and universities, aimed to further increase the numbers of commissioned officers educated in the technical curricula the Navy required. Both programs worked wonderfully well to provide both line and staff officers. Notably, the V-12 program also had as

another stated objective: arresting the decline in college enrollment caused by the military draft and increasing the college population.

The Navy's modern Officer Candidate School (OCS) and staff officer equivalents evolved from World War II's V-7 and V-12 programs, and today comprises the third commissioning source for line officers. The Navy Aviation Officer Candidate School started training at Pensacola in 1947, while the Navy Officer Candidate School was organized at Newport in 1951. The two merged in 1994 at Pensacola, and in 2007 moved to Newport. Both programs ultimately came to reflect the requirements of permanently maintaining a large Navy during the decades of the Cold War—a policy decision unprecedented in American history. When and how NROTC and OCS graduates have been commissioned, whether as reservists or regulars, and the length and type of their post-commissioning commitments has varied over time with the needs of the Navy.

Although commissioning officers through NROTC and OCS was initially intended simply to provide means for temporary expansion, and was then institutionalized to produce a steady stream of officers above and beyond the capacity of the Naval Academy, these organizations have also come to serve other policy objectives (as the V-12 program did during World War II). The nation has found it desirable for a democracy to source officers from more than just the military academies. The education of OCS- and NROTC-commissioned officers overlaps with their Naval Academy counterparts in military science and relevant technical curricula, but their college studies overall range more widely. This has helped to serve the purpose of creating and maintaining an officer corps that broadly reflects the American population, especially important under the regime of an all-volunteer force, but also ensures a range of perspectives on the business of the Navy, enhancing creativity and organizational innovation.

Inevitably and understandably, these programs created internal conflicts in the officer corps, based on commissioning source, that were evident from the post-Civil War period through World War II. Naval Academy graduates, rightly or wrongly, have often been perceived to have an edge over their regular-Navy counterparts when it comes to promotion to the higher grades and selection for command. To be sure, quantitative data on these matters have not been readily available. This author suspects, but can muster no systematic evidence to support, that in recent decades such differences have attenuated due to the high operational tempo and a new generation.

Perhaps more important—at least more visible—than any conflicts internal to the officer corps, have been differences in values between the larger American society and the military more generally. The upheavals occasioned by the

Vietnam War in the 1960s and 1970s, and opposition to that war—sometimes violently—especially on the campuses of universities, led to the banning of NROTC programs from a significant number of schools and their absence from same for several decades, thereby and unfortunately truncating demographic sources for officers.

When the military was downsized following the collapse of the Soviet Union, just as enrollment at the Naval Academy was reduced so were NROTC enrollment numbers and programs reduced. In order to maintain access to students from the widest range of universities and colleges, while still reducing overall numbers and expense, NROTC programs were essentially merged into consortiums, in which students enrolled in one institution became part of programs located at other institutions. For example, under the command of a single Navy captain, the Chicago-area NROTC consortium had staffs at the Illinois Institute of Technology and Northwestern University, and also enrolled students from the University of Illinois, Chicago, and Loyola University.

At about the same time, the “don’t ask, don’t tell” policy of the Clinton administration led to serious discussions among both students and faculty on campuses—both with NROTC programs and without—about how to reconcile university nondiscrimination policies with U.S. military laws and regulations that discriminated against individuals openly homosexual, including enrollment in NROTC programs. The practical effect was, it appears, to delay direct reengagement of universities with the NROTC programs, even after Vietnam-era sentiments had largely faded from their campuses and even though after 9/11 the military has been increasingly perceived positively. With recent changes in federal law and Department of Defense regulations regarding sexual preference and gender identity, it is entirely possible that more civilian colleges and universities will rethink their policies concerning NROTC.

DOPMA

The first major reworking of officer personnel after OPA and OGLA did not come until the Defense Officer Personnel Management Act of 12 December 1980 (DOPMA). It went further than the earlier legislation with the specific aim to produce greater uniformity across the military services in the management of their officer personnel. It established relatively stable and predictable (“normalized”) career paths for officers, used graded retirement to protect equity for individual officers who were forced to retire for not having been selected for promotion (the

“up or out” rule after two “looks”). The objective was to produce a vigorous, relatively youthful, highly professional officer corps that would enhance military efficiency. It absorbed and modified the rules embedded in the earlier OPA and OGLA. Nearly four decades later, DOPMA is judged a mixed success but efforts to rescind or substantially modify it have not found sufficient support.⁵²

GOLDWATER-NICHOLS, JOINTNESS, AND EDUCATION

And now we come to the Goldwater-Nichols Act of 1986.⁵³ Problems in Operations Desert One, Just Cause, and Urgent Fury catalyzed a long-standing congressional inclination toward imposing requirements for jointness on the U.S. military services into action. This produced the Goldwater-Nichols Act, which created the combatant commands, elevated joint doctrine, and established Joint Professional Military Education (JPME) requirements for officers of all services. These changes wrought a profound realignment of service and joint responsibilities, resulting in changes in educational and experience requirements for promotion. The operational level commanders of the geographic and functional combatant commands became the ones to employ the forces provided by the Title 10 service chiefs. The service chiefs themselves suffered a reduction in formal power while the Chairman of the Joint Chiefs of Staff acquired more.

At the same time, technological changes in intelligence, surveillance, and reconnaissance coupled with greatly improved precision in weapons also altered the way in which the U.S. military goes to war, increasing the importance of joint staffs, joint planning for and joint command of operations. In this brave new world, a lieutenant commander not destined ever to command might, as a member of a joint targeting board on a joint commander’s staff, exercise a more profound influence on carrier air strikes than the embarked carrier air wing commander serving as the Navy strike warfare commander (under the composite warfare command concept), with a high probability of making flag. The apparent end of the Cold War, the absence of a deep-water naval threat (until recently), and near continuous conduct of low intensity land operations (punctuated by two invasions of Iraq) cast the Navy in a supporting role to land commanders (whose services have played dominant roles in writing joint doctrine). More recently, constraints on budget resources have impelled an increased reliance of each military service, including the Navy, on capabilities and capacities of its counterparts. Taken together, these changes suggest the wisdom of reconsidering how the Navy thinks about what it means to be a naval officer.

Naval officers found themselves subject to externally-imposed schoolhouse joint education milestones (Joint Professional Military Education I and II) that ran counter to a longstanding Navy indifference toward post-graduate education, unless such specifically advanced directly relevant technical knowledge (i.e., ordnance engineering, underwater acoustics, hydrography, and the like). Throughout its more than two-century history the U.S. Navy, like its progenitor the Continental Navy, and its British Royal Navy forebear, has maintained a certain ambivalence about “how to get good.” On the one hand, as an “old” service, it has tended to favor the “school of the ship” as the most effective means by which officers and enlisted alike might gain the requisite experience and expertise. On the other, it has recognized that as its foundational technologies became (and continue to become) vastly more complex some sort of formal training, if not education, concomitantly increased in practical importance.

Against the background of longstanding internal opposition to a “naval school” the Naval Academy was established in 1845—more than four decades after its Army counterpart was founded at West Point—with one portion of its cadets selected to engineering. Following merger of the line with the Corps of Engineers in 1899, the Annapolis curriculum came to be dominated by and known for engineering. The development and growth of Navy schools of all stripes became most dramatic during World War II given the mutually reinforcing demands imposed by rapid technological innovation and integration along the exponential expansion of its personnel. These schools were institutionalized in subsequent years to become an indelible part of Navy life. Following the war, technical education for officers continued in its place of honor, provided by the Naval Postgraduate School and civilian universities.

Against this ready acceptance, the Naval War College has, since its founding in 1884 in the former Newport Asylum for the Poor, enjoyed a peculiarly indifferent relationship with its service. Newport’s broader education regarding the profession of arms at sea loomed important during the interwar years, but was largely suspended for the duration of World War II, and although in recent times praised as the “Navy’s Home of Thought,” and esteemed highly by the other military services, seems never quite to have recovered its former luster in the post-war era.

In autumn 1950 Rear Admiral Arleigh Burke wrote to a young officer that in his view the best way to “get good” was still to go to sea. Officer career paths developed and were largely maintained that emphasize time at sea, and left little time for resident professional education. The Navy continued to emphasize the “school of the ship” and did not build into the normalized career milestones

required by DOPMA time for resident education. Where the other military services have historically valued resident graduate education and officers selected for that experience compete before selection boards, the Navy continues to employ its detailers to fill quotas for resident JPME schools. The Navy has favored distance education means for fulfilling JPME I requirements because they do not demand time away from the fleet and still provide the “check in the box.” To its credit, the Navy made completion of JPME I mandatory for successfully screening for O-5 command in the unrestricted line communities.⁵⁴ The surface warfare community has found ways to build time for resident JPME into its officers’ career paths.

At the same time, the Navy promised every officer one resident graduate education experience.⁵⁵ This means that officers who go to the Naval Postgraduate School for a master’s degree are also required to complete JPME I during their course of study. For the first two decades following Goldwater-Nichols, the Navy sometimes under-filled their quotas at the Joint Forces Staff College and regularly sought and gained waivers for JMPE II for their “hot runners.” Waivers largely went away in the mid-2000s at the insistence of Representative Ike Skelton (D-MO) and other members of Congress, and for a time the Navy had to work diligently to ensure that its officers could meet the requirements.

In addition to JPME I and II, for promotion to flag rank Goldwater-Nichols mandated joint tours, and designated specific billets that satisfied those requirements. And again, the Navy, like the other services, had to find room in officers’ career paths to satisfy them.⁵⁶

The years following Goldwater-Nichols saw extensive development of joint doctrine, but written largely by the other military services, especially the Army, and, not surprisingly, that joint doctrine has reflected those services’ cultures and preferences (for command and control and for planning processes, for example). To the extent that the Navy for some years eschewed an active role in the development of that doctrine it placed itself at a disadvantage, both because the substance of the doctrine did not necessarily favor Navy preferred ways of doing business and naval officers were not well versed in that substance. In recent years the Navy has come to recognize the practical value of JPME as a way of “breaking the code” of joint doctrine and has become increasingly active in producing both doctrine and officers who understand it so that the Navy can compete effectively with the other services—especially with the Air Force over control of the employment of carrier aviation—in the joint arena.

WOMEN IN THE NAVY

For most of its modern history, the Navy maintained an ambivalent attitude about women among its officers and enlisted personnel. Fleet Admiral Ernest King, for example, favored having women serve in the Navy, while Fleet Admiral Chester Nimitz decidedly did not. The Navy emerged from World War II having had some 86,000 women serve as nurses or in the Women Accepted for Volunteer Emergency Service (WAVES) under the provisions of the Naval Reserve Act of 1938 as amended by the Act of 30 July 1942, which established the Women's Reserve Program. Although the vast majority served in the United States in administrative capacities, a number deployed overseas and some were captured and held as prisoners by the Japanese. However, as had been the case during World War I, women in the naval uniform continued to be understood not as a long-term investment but as a temporary expedient during the war with a return to the status quo ante bellum intended.

However, in 1947 the Army-Navy Nurses Act established the Nurse Corps as permanent staff corps of the Navy and Army and granted permanent commissioned rank for nurses. And on 12 June 1948, President Truman signed into law the Women's Armed Services Integration Act, which enabled women to join the Navy in regular or reserve status and disestablished the Women's Reserve created by the acts of 1938 and 1942. This was no mere change in name; women for the first time were to serve alongside their male counterparts under the same organization, but the specialties open to women remained limited and among officers no flag rank was authorized. Subsequently, female reservists along with male reservists were recalled for active duty during the Korean War. Not until 1967 was a two percent cap on women in the Navy lifted.

Given new energy by the various civil rights laws passed in the 1960s, and having been passed by both U.S. House and Senate, on 22 March 1972 the Equal Rights Amendment was sent to the states for ratification, but ultimately failed to gain the required number of positive votes (38 states) within the time limit specified in the amendment. Less than four months later, on 7 August 1972, Chief of Naval Operations Elmo Zumwalt released Z-Gram 116.⁵⁷ It was nothing short of revolutionary.

Its objectives were to accord "women equal opportunity to contribute their extensive talents and to achieve full professional status." He prefaced the substance of the message by noting that (1) the imminence of the all-volunteer force had heightened the importance of women as a personnel resource; (2) he hoped soon to have the authority to utilize female officers and enlisted aboard

ship in order to maintain the Navy at the size required and allow for a proper, sustainable sea-shore rotation; and (3) he was establishing a task force to examine all laws, regulations, and policies that required change in order to “eliminate any disadvantages accruing to women from either legal or attitudinal restrictions.”

As had been the case for African Americans and women during World Wars I and II, some of the impetus for women’s inclusion came from a practical realism that continued discrimination imposed an opportunity cost on the Navy and the other military services, one likely to increase in severity under an all-volunteer force regime. The difference was that whereas the wars were temporary, this regime was likely to be long-term if not permanent.

Z-Gram 116 specified several actions already underway to achieve the objectives above:

- authorizing limited entry of women into all ratings
- assigning a limited number of women to sea duty on *Sanctuary* (AH-17) as a pilot program pending legislation that would authorize women to ships at sea
- removing existing restrictions on women succeeding to command ashore
- opening up the Civil Engineer and Chaplain Corps, thereby opening all staff corps to women
- expanding assignment of technically qualified unrestricted line women to restricted line billets
- offering paths to flag rank within the technical managerial spectrum as was being contemplated for men
- eliminating the practice of assigning women exclusively to certain billets and assigning qualified women to the full range of challenging billets
- opening midshipmen programs to women at all NROTC campuses and considering women for selection to joint war colleges.

The CNO enjoined all commanding officers to (1) accurately reflect the spirit and intent of Z-Gram 116 in their own commands; (2) “initiate similar equalization actions in matters within their purview in order to ensure that women are accorded full trust and responsibility to function in the assigned position or specialty;” and (3) be guided by standards of duty, performance, and discipline which are truly equitable for both men and women.”

Of course, the CNO could and did fundamentally alter the formal rules of the game, but the proof of the pudding would be in the behavior of officers and enlisted, all part of a self-consciously traditional culture loath to change. Organizational cultures are notoriously difficult to alter appreciably other than

over the long term. As with racial attitudes, the Navy's culture has historically reflected the broader American culture, even if at times it has been somewhat out of synch with it.

In the 20 years following Z-Gram 116, women were graduating from the Naval Academy and Aviation Officer Candidate School. They qualified as naval aviators; there were unrestricted line flag officers. They were screening for command ashore and afloat. Ships were delivered with habitability modifications for full gender integration. More than 2,600 Navy women participated in Desert Storm.⁵⁸

And yet, there was Tailhook in September 1991, which indicated with great force the distance full integration of women into the Navy had yet to go. Emotions still run high and opinions on what happened in Las Vegas still differ. Even today, it is challenging to find a carefully reasoned and empirically sound account and evaluation of Tailhook.⁵⁹

However, not entirely unlike the 1944 Port Chicago events and the 1972 riots aboard deployed Navy ships, Tailhook acted as a catalyst for change in both the formal laws, regulations, and policies concerning women in the Navy and for shifts in the Navy's organizational culture. It may be that relatively closed institutions like the military are likely only to make profound changes in their existing cultures following near-cataclysmic events like Tailhook, which then realign them with the broader society within which they reside.

The integration of women aboard ship and in the Navy more broadly has introduced specific challenges regarding privacy, harassment, and assault, along, apparently, with shifts in the causes for the reliefs of commanding officers, executive officers, and command master chiefs. In this, the Navy evidences a commitment to cultural change within, but this must be sustained for perhaps another generation.

TECHNOLOGY

Navies, and the U.S. Navy in particular, have always depended on the most modern and often the most sophisticated technologies of any given era, whether it be the sailing ship-of-the-line, coal-fired reciprocating steam engines, nuclear propulsion, use of radio communications, radar-directed naval gunfire, or GPS. In each major era the Navy has adapted its organization to the dominant technologies employed. But as technologies continue to evolve, this has periodically resulted in sharply punctuated equilibria. As an example, just as the Navy figured

out how to safely and effectively operate internal combustion engine propeller aircraft from its carriers, the introduction of the jet aircraft toward the end of World War II necessitated a very compressed adaptation embodied by the angled-deck carrier, replacement of hydraulic by steam catapults, and the hand paddles of the landing signal officer by the optical ball system, all accompanied by changes in carrier flight operation procedures.⁶⁰

Let me suggest, however, that the most momentous technological changes in the post-World War II period in terms of their effects on naval personnel were:

- (1) nuclear propulsion, initially for submarines, subsequently for surface ships
- (2) replacement of naval guns by guided missiles
- (3) vast expansion of the sophistication, complexity, and capabilities of electronic sensors
- (4) the extension of programmable microprocessors into virtually every aspect of the ship and aircraft.

Excepting its conventional propulsion, the new *Zumwalt* (DDG-1000) embodies and exemplifies each of these changes.

The peculiarities of nuclear propulsion (along with the advantage that nuclear-powered ballistic missile submarines gave the Navy in the post-World War II competition with the Air Force for strategic mission) led to a fundamental rethinking of what it meant to be an unrestricted line officer as profound as the 1899 amalgamation of the line with the engineers (the belated recognition that one could no longer fight a ship without a grasp of its engineering characteristics).⁶¹ Although the greatest consequences came for the submariners, early optimism about the potential of nuclear propulsion for the surface Navy led to changes there as well.⁶² Even the aviators were not immune. Nuclear-powered carriers as conventional aviation assets before them were/are by law to be commanded by naval aviators.⁶³ This ultimately, because of the career time required for nuclear qualification and deep-water command prior to carrier command, produced a fundamental divide between aviators who would become air wing commanders and those who would command the carriers.

Curriculum at the Naval Academy and for the NROTC programs was revised to reflect increased engineering requirements. Admiral Hyman G. Rickover acquired the institutional power to select the cream of Naval Academy and NROTC graduates for the nuclear power program, which imposed certain opportunity costs on the other officer communities. Time had to be built into already crowded career paths for nuclear power school, including aviators who

were selected to command nuclear-powered aircraft carriers.

Contemporaneous with the introduction of nuclear propulsion, the Navy began to shift to guided missiles for anti-aircraft defense, and cruise missiles for offensive strike against ships at sea and to project power against land targets.

The pre-World War II battleship captain, whose situational awareness was limited to visuals from his ship and radio messages from other ships and his organic scouting aircraft, who was expected to fight his ship at distances within the range of his main batteries and lay those guns with optical equipment, and whose battle station was to be the armored conning tower with only narrow slits for vision, was displaced by the World War II development of the radar-driven Combat Information Center (CIC) made necessary by the great closing speeds and lethality of Japanese aircraft.⁶⁴

The CIC and its associated electronic sensors continued to evolve rapidly following World War II, given urgency by the development of highly accurate anti-ship missiles with even greater speed and lethality than aircraft. With other technological changes that incrementally reduced ship manning requirements (including the continuing replacement of steam with gas turbines or diesels for propulsion of non-nuclear powered ships), the rise of the CIC began a fundamental alteration in the composition of the ship's complement. The deck and engineering sections were much reduced while increasing numbers of enlisted and officers alike were dedicated to sensors and weaponry rather than the maintenance and operation of the ship itself. Systematic cross-time comparison of functionally equivalent ships from 1945 forward would reveal, I would wager, the revolutionary character of these changes. In turn, educational and intelligence requirements for Sailors increased along with classroom training regimens. The higher order skills required of the operational specialists (along, of course, with engineers) has made them appealing to the private sector in ways boatswains, firemen, and gunners had never quite managed, thereby creating new issues of retention and turnover for the Navy.⁶⁵

Rising education levels for enlisted personnel to support their increasingly complex duties may well have lessened the divide between them and the officers, and has probably subtly altered the historic officer-enlisted relationship. Indeed, some, in both military and public policy domains, have called for the end of the officer-enlisted divide, calling it essentially a kind of social anachronism, an institutional arrangement inherited from the 18th-century British Royal Navy that reflected the enormous requirement for human physical labor to operate sailing ships.⁶⁶

Technological change, even as it offers innovations in the conduct of warfare,

occasions resistance because it also disturbs existing structures of power and known ways of doing business, as historians have demonstrated in studies of the Navy.⁶⁷

LINE OFFICERS AND STAFF CORPS

It might be said that the two most important questions for any large-scale formal organization, such as the Navy, are first, how to divide up the work so as to exploit the efficiencies of horizontal and vertical divisions of labor and specialization, and second, how to reintegrate that division of labor and specialization in order to produce a synthetic organization that effectively accomplishes its mission.

The Navy organizes its officer personnel into a complex array of line communities and staff corps. This organization has, for the most part, become more differentiated and specialized over the Navy's history. Stimuli for changes have largely been concentrated in the effects of technology, mission requirements, and environmental developments. Changes have not always been conflict free. How the Navy organizes its personnel into line and staff, the formal and informal relationships across officer groups, and their formal responsibilities speaks volumes to what the Navy thinks it needs by way of specialized expertise and how much relative value it places on any given area of expertise.

In general terms, the line has and continues to dominate, acquiring new expertise by organizing new officer communities and staff corps but limiting their responsibilities, authorities, and prestige, in order to maintain the line's definition of its own responsibilities and its preeminent place. Once upon a time, staff officers were accorded only "relative" or "assimilated" rank. Thus, a passed assistant engineer ranked with, but behind, his line officer lieutenant colleagues. Since World War II all naval officers have worn the same uniforms, with unique distinguishing insignia for staff officers, enjoy the same ranks, and are subject, generally, to the same promotion processes.

The Navy began at its 1794 rebirth with line or executive officers, medical corps, following shortly by pursers (which soon became paymasters, organized into a Paymaster Corps). It added a corps of mathematicians to teach midshipmen celestial navigation and other matters until the Naval Academy was established. From 1842 to 1899 there was a corps of engineers (when they were merged with the line and a new definition of what it meant to be a line officer emerged), and naval constructors and civil engineers were added. Beginning with the introduction of submarines and aviation, the line commenced differentiating itself into

various communities, which today number five unrestricted (URL): surface, aviation, submarine, special warfare, and explosive ordnance disposal (formerly special operations). Within each community, officers may specialize, usually informally, but in some cases formally. For a time some officers were designated as General Unrestricted Line (GURL).⁶⁸

A wide range of restricted line communities has developed over the past century, beginning with Engineering Duty Only, followed by Aeronautical Engineering Duty Only, Aerospace Maintenance Duty Officers, Intelligence, Cryptologic Warfare, Foreign Area, Public Affairs, Oceanographers, Information Professionals, and Human Resources. There are presently eight staff corps: Medical, Dental, Nurse, Medical Service, Supply, Civil Engineer, Chaplain, and Judge Advocate, the last having been organized only in 1967. Staff officers may and do command within their corps. Both restricted line and staff corps acquire officers from transfers from the line, from the service academies and reserve officer training corps programs, direct commissioning into the corps via officer indoctrination school, and from senior enlisted personnel, the latter often designated as “limited duty officers.”

There was and is no single, ineluctable linear path by which the Navy has organized its officers. Other navies, such as the British Royal Navy, have addressed mostly the same challenges by different modes of officer organization. For example, the Royal Navy has aboard ship line officers who command, along with engineer officers, and weapons engineer officers. The Navy’s organization of its personnel will not remain static but will continue to change episodically. Each decision taken regarding the organization and specialization of its personnel has created new challenges of authority and relationships.

All the way back in the post–Civil War period, the engineers recognized that absent an institutional home, they would have no real power within the Navy, and thus was born the Bureau of Steam Engineering. When naval aviation began to grow the aviators took a page from the steam engineers’ book and the Bureau of Aeronautics was established, with a portfolio of responsibilities, including detailing aviators to duty assignments. Naval aviation also might have become a separate flying corps, as obtained in the U.S. Navy and in the British Royal Navy, but in the mid-1920s the decision was made to retain aviators as an integral part of the unrestricted line.

For example, with the end of the Cold War, the vast Cryptologic community was reduced in size and status, its organization altered. In 2009 as cyber warfare and information operations became increasingly important, the Navy established the Information Warfare community, which in recent years has come

including Information Professionals, Cryptologic Warfare Officers, Intelligence Officers, Oceanographic Officers, and the like. This reorganization was specifically intended to merge intelligence with command, control, communications, and computers. In turn, the Navy now has a type commander institutionalized as Navy Information Forces with Fleet Cyber Command/Tenth Fleet as the operating force. Whether the information warfare officers, wholesale or in part, may at some point become an unrestricted line officer community is an interesting question for historians to consider.

THE GREAT DIVIDE

Of the several U.S. services, the Navy has historically maintained the greatest distinction between its officers and enlisted. This comprehends both differences in role and place aboard ship and social differences. Commissioned officers have tended to use the “distorting lens of class” through which to view the enlisted personnel and their officers.⁶⁹ The differences have been reinforced by pay, uniforms, berthing, messing, and other symbolic and substantive communications both at sea and ashore.

Consider messware. Although officers have always dined apart from the enlisted, from the 1890s forward, officers of the wardroom have eaten on specially contracted Navy china, using heavy hotel-grade silver plate utensils in the “Kings” pattern, served on white linen by enlisted stewards using an extensive array of silver plate pieces (tea pots, coffee pots, vegetable bowls, soup tureens, gravy boats, creamers, fish platters, and many more). Enlisted have eaten different food in their own messes on heavy restaurant plates and bowls, using stainless steel knives, forks, and spoons, served cafeteria style.⁷⁰

As a great maritime nation, the Navy was for more than a century able to draw principally upon already salty merchant seamen, vice landsmen, for its enlisted until World War I. The enlisted were effectively treated as infinitely substitutable with their replacements readily available. They were not considered professionals. Establishment in 1845 of the Naval Academy reinforced the differences between educated professional officers and the enlisted. During the Civil War, for example, heroic acts by commissioned officers were rewarded with advancement by lineal number of seniority and in grade, while the enlisted might only be awarded the newly created Medal of Honor, the supposition being that officers had careers while enlisted were largely temporary members of the service.⁷¹ Not until after the Spanish-American War, as the Navy began its expansion under Teddy Roosevelt

were the old “receiving ships” replaced by stations to train the vast untapped pool of young (lands) men from the Midwest and other inland areas—thus, the establishment of Great Lakes Naval Station in 1905 and its rapid growth during World War I to accommodate the vastly increased requirements for personnel, both commissioned and enlisted, occasioned by the Act of 29 August 1916, to that date the largest ship-building program in history.

Of course, this distinction did not come from Moses and the tablets, but evolved out of a vertical division of labor from a time when most heavy work aboard ship was accomplished through the physical labor of large crews of enlisted—hoisting barrels of salt pork and water aboard ship, raising and lowering ships’ boats, weighing anchor, setting sail, moving cannon, and the like. These tasks required neither keen intellect nor education for their successful performance. And, in fact, the enlisted were a pretty rough and ready group, with one important function of Marines aboard ship to provide enforcement of enlisted discipline and personal security for the commissioned officers. In contrast, commissioned officers (also styled “gentlemen”) performed the demanding intellectual work of navigation, sailing, and steam engineering, along with the support functions such as supply and weapons development. The problem remained as to what sort of individual would occupy the ranks immediately below the commissioned officers and above the enlisted.

The Royal Navy had developed a useful system in which a relatively small number of enlisted men might develop specialized expertise in important areas and aspire to become more or less career so-called “petty officers” or “forward officers.” Petty officers included master’s mates, captain’s clerks, stewards, and yeomen, who served in their rate at the pleasure of the ship’s captain and could be disgraced by him.⁷² On the other hand, warranted forward officers comprised the ship’s boatswain, gunner, carpenter, and sailmaker.⁷³ This system was in place from almost the beginning of the U.S. Navy. The precise boundaries between the forward and petty officers and the commissioned officers have varied significantly over time. The warranted “sailing master” served aboard larger warships as the individual principally responsible for the navigation of the ship.⁷⁴

Even though the warship has been and continues to be the most technologically complex system of every historical era, its technology has become exponentially more complex with time. The introduction of steam engineering, along with hydraulic and electrical systems during the 19th century began an accelerating trend in which mechanical energy was substituted for human energy aboard ship, and accordingly, the skills required for the warship’s effective operation began to change. As the Navy came to terms with redefining what it mean to be

a commissioned line officer in the 1890s, resulting in the merger of the engineer corps with the line in 1899, part of that adjustment included establishing rates of machinists to operate and maintain (still under the command of commissioned officers) the steam propulsion plants.⁷⁵ New technologies such as the automobile (or Whitehead) torpedo brought new ratings as did radio and the vastly increased use of electricity aboard ship. What was once a vast unwashed mass of enlisted personnel primarily used for physical labor aboard ship had begun to require complex skills, and in turn a system of different ratings, each with its own formal qualifications, and, with World War I, what would become a vast system of training organs.

In more recent years, with profound changes in the broader American society, these distinctions have begun to blur and have, perhaps, in the present day become a kind of social atavism deriving from the origins of the U.S. Navy's culture in that of the 18th-century British Royal Navy. Levels of education in the United States are much higher than before World War II. The all-volunteer military needs and has been able to insist upon higher educational attainment for its recruits than in the past, and this has helped to narrow the educational gap between enlisted and commissioned officers. It is not unknown for chiefs and warrants to have more formal education than the commissioned officers under whom they serve.

At the same time the composition of a warship's crew has greatly changed since World War II to reflect continued mechanization of tasks, shifts to nuclear and gas turbine propulsion, and the exponentially increased use of electronics for just about everything, but especially sensors and weapons. From about a dozen crude radar sets on its ships just before the war, the Navy acquired tens of thousands of radars for both ships and aircraft—ditto for sonars. The concomitant development of the Combat Information Center, which integrated command, sensors, and weapons aboard ship in turn required manning by highly trained specialist enlisted personnel, demand for which has continued to grow. The deck and engineering crew, once comprising the preponderance of enlisted personnel, on most ships now is in the minority, supplanted by operations and other technical specialists. This, of course, raises issues of retention for warranted and petty officers much as it does for commissioned officers—the skills and qualifications they develop in the Navy, once useful only in a maritime context, now have broad applicability in the civilian sector, which can usually offer more remuneration than the Navy.

The heightened requirement for technically sophisticated and experienced personnel, the concomitant development of professional careers for enlisted

personnel, and the all-volunteer force have conspired to increase the incentive for the military services, including the Navy, to retain their enlisted personnel, and petty and warranted officers. Boards to select for promotion to petty and warrant officers and milestones for career development, combined with caps on years of service unless promoted, have come to make the enlisted ranks more closely resemble their commissioned superiors.

Finally, we need take note of movement between enlisted and commissioned officers. Of the several services, as a matter of both tradition and practice, the Navy has been and remains the least willing of the several services to commission officers out of the enlisted ranks. It has done so during wartime emergencies and the need for temporary officers since the Civil War, with reversion back to enlisted status for most following the conclusion of the conflict. Following World War I, a number of former enlisted were granted permanent commissions in order to provide officers for naval aviation. At that time, such officers were labeled “mavericks,” and did not enjoy the same status or promotion rates as their Naval Academy brethren. Later they were known as “mustangs,” a term with similar negative connotation. In the post-World War II era, certain staff and other officer corps have increasingly sourced officers out of their enlisted personnel, with comparatively fewer so sourced for the unrestricted line communities.

The historian might usefully ask several questions about trends in the conceptualization of and distinction between enlisted and commissioned officers.

ENDLESS WAR, OPERATIONAL AND PERSONNEL TEMPO, RETENTION, AND THE RESERVE

Russell F. Weigley observed more than four decades ago that Americans historically have maintained a concept of a dichotomous state of war/not war.⁷⁶ To some extent this proved reasonably accurate as a description of relations among Western-style “states” and Western-style conventional warfare that involves the polite protocol of declaring war and its conclusion through formal peace treaty. And, for much of its history, the United States was insulated from the intrigues of Europe and Asia by the Atlantic and Pacific Oceans. This narrative survived the intercontinental ballistic missile and the four-decade “Cold War” with the Soviet Union, and conditioned the deliberate drawdown of the U.S. military following that war’s “end” in order to exploit the economic benefits of the so-called “peace dividend.”

However, it was never very apt as a description of relations between “states”

and non-state actors, and remains so. More important, with the rise of China as an antagonist to the United States over the past two decades, we see its unwillingness to engage with the United States in the form of conventional conflict at which we excel and a corresponding disposition toward other means of conflict (such as economic and information warfare) and a willingness to press U.S. limits up to the point of direct armed conflict.⁷⁷

Since 9/11 the United States has found itself involved in conflict with various incarnations of jihadism across the planet, at least one of which overtly has called for a Fabian war of exhaustion against the United States, with no end in sight to any of its ongoing commitments and the real possibility of expansion to other geographic areas.⁷⁸ The blurring of the U.S.-preferred lines between war and not-war by its antagonists, combined with the effects of the post-Cold War draw-down, and certain assumptions about the substitution of capital for personnel have, across the military services, led to an enduring relatively high operational tempo and a concomitant high personnel tempo. The military remains sized and organized for relatively short, high-intensity conventional conflicts. This has translated for the Navy into longer deployments and less time in home ports. Although the unplanned wear and tear on ships and aircraft is often the most visible manifestation of high tempo, increased stress on personnel has produced reasonable founded and genuine concern, in the absence of a draft, about recruitment and retention, especially of the best qualified officers and enlisted. Increased pay only goes part way in mitigating the problem, especially when the economy is strong and the private sector prizes the experience and abilities of military personnel. Officers and enlisted alike have skills and abilities readily translatable into private sector or civilian government jobs, and some, at least appear to believe that the sustained high personnel tempo “violates” the implicit contract or expectations they believe should govern their service lives.

These stresses have also affected the Navy Reserve. Peculiar to the Navy, its reserve has, for the most part, not been organized into deployable units, but has instead deployed individual reservists to augment its regular personnel. Some thoughtful individuals have begun considering whether the Navy’s reserve component might usefully be re-conceptualized and reorganized to recognize what appear to be permanently changed circumstances.⁷⁹ Put differently, reserve forces originally thought of as a force to be called up perhaps once in a generation have been and are being employed as an operational force, affecting several services’ profoundly.

CONCLUDING THOUGHTS

It is easy to miss the sweep of history when we are in the midst of events. It is easy to forget or to minimize how much change we may have experienced only a few years previously. And sometimes we find events of the distant past more compelling than what might be called “near history” and the world must wait for a future generation to tell that history.⁸⁰ Often we seem to learn as much about the period *when* the history was written as we do about the period *about which* it was written. When histories are written the mind’s eye tends to recur to some components of the human experience and not so much to others. And even (or perhaps especially) when it does investigate some less attended to subject matter what seemed fairly simple at the outset emerges as a finely detailed complex set of dynamics that defy easy simplification and generalization.

Every one of these difficulties beset the author in attempting for this paper to make sense of the broad history of naval personnel during the period since the end of World War II. And because virtually nothing that goes on in any organization leaves its personnel unaffected, it proved difficult to establish and maintain a useful set of boundaries for the subject. Pretty much everything concerning personnel was in play. Fortunately the task set was not to write the history but to limn out at least some of the areas worthy of closer attention by historians and to suggest some useful ways to think about them.

In the century-and-a-half of the Navy’s history up to World War II, it had contended more or less annually with enduring, cyclic, and emerging problems of its naval personnel. Many, if not all, of them will be familiar to the contemporary student of the Navy. It had managed to find reasonable formal solutions to these problems in laws, regulations, and policies, and, improbably perhaps, had built a distinctly more modern professional personnel system than its sister services. It had transformed itself from an organization focused on the protection of equity for individuals to one that regarded military effectiveness as the highest order of business, but still managed to provide protections for individuals. The plain fact is that it worked. In fact, if one knows the Navy’s personnel system on the eve of World War II, then arguably one understands the majority of the system in place today. That was and remains quite an achievement.

But of course history did not end. And although the nature of war (and of the sea) has not changed, and the human element remains its most important component, the environment in which the Navy moves continued to change in important ways, so that it has had to find ways of adapting. It successfully prosecuted the war against Japan largely on the terms it wanted.

At the end, the Navy found itself in the position to which it had for many years aspired: the most powerful such service in the world (and in history, for that matter). But Americans were tired of war and not so inclined to immediately accept the mantle of leadership in the world community and demobilization was swift, much as it had been following the Civil War and World War I. Events in Europe and Asia soon necessitated partial remobilization and ultimately continued maintenance of a large naval establishment for the Cold War, drawn initially at least from the capital investments of World War II, in terms both of materiel and personnel.

In charting its course, the Navy quickly found itself with reduced freedom of maneuver compared to what it had enjoyed up to the war. Establishment of the Department of Defense and the Joint Chiefs of Staff meant that the Navy was subject to real and external administrative and legal control at a level below the President and would be compelled to follow courses of action it had not charted for itself or negotiated directly with Congress. On the matter of personnel, initially it did not have to change much, as its system was essentially adopted DOD-wide. However, in subsequent decades its personnel, especially officers, would be subject to increasing externally-imposed constraints and restraints through OPA, OGLA, the all-volunteer force, DOPMA, and Goldwater-Nichols. There would be no going back. That the Navy now lives in a relentlessly “joint” world means that its personnel must understand the perspectives and processes of the other services and relevant civilian agencies more profoundly than at any time in its history, with implications for education, training, and career paths.

The pace and scope of technological change relevant to naval warfare accelerated rapidly after the war, with nuclear propulsion, guided and cruise missiles, jet aircraft, and electronic sensors heading the list. These innovations required changes in personnel, including how the naval officer was defined, the skills and abilities required of enlisted, the appropriate education and training, organization of specialized corps, the composition of ship’s complements, and the relationships between officers and enlisted. In these changes, the Navy was moving through problems analogous to ones previously encountered, and if the latter were not especially well-remembered, the personnel problems were mostly solvable. The novel problem was the ready marketability of highly sophisticated technological skills of officers and enlisted in the private economy. This, combined with the social and political pressures summarized below, led to significant challenges to retaining personnel, something the Navy had not previously confronted. Current technological trends, especially those associated with cyberwarfare, suggest that adaptation and exploitation of these technologies will require changes in the

organization of the Navy's personnel, how they are accessed, educated, trained, and retained.⁸¹ Associated with retention are military pay and benefits, which, for reasons of economy, have come under close scrutiny and their transformation begun.⁸² Expenditures on such things as graded retirement pay have historically gone some distance to ease the sting of non-selection and involuntary separation. Similarly, since 2001 regular military pay increases have compensated partially for higher personnel tempo and deployment frequency and duration. Both have been at the considerable cost of long-term commitment of resources by the taxpayer. In recent years, the mechanisms for military retirement have been revisited with an eye toward shifting more of the burden to naval personnel for retirement income. Ditto for the costs of medical care both on active duty and when retired.

If many of the challenges of personnel remained consistent with earlier periods, the post-war Navy has been subject far more to the social, political, and economic perturbations moving through American society. Issues of race and gender associated with shifts in the demographics of the American population, the structure of its economy, and attitudes of Americans became perhaps the most profound factors requiring the Navy to adapt. World War II set in motion new and powerful social and political forces in American society that have taken decades and will take decades more to address—compounded by the political and social turbulence of the 1960s and 1970s—because they required fundamental alterations of the Navy's organizational culture. The Navy did not make those adjustments easily nor are they complete today. American society's continued willingness to expand the participation of historically excluded groups, such as gays and lesbians, suggests that the business of adjustment will not end anytime soon.⁸³

The indirect effects of the Vietnam War for the Navy's personnel mostly had to do with retention of personnel, officers and enlisted alike, and the need to bend in order not to break under the social and political pressures of the time. It did so pretty well, though not to universal approbation, especially from the older, World War II generation of officers and senior enlisted personnel.

More recently, there was the continuing drawdown of the military across the board, based upon the idea of a "peace dividend" following the collapse of the Soviet Union, improvements in intelligence, and technological innovation that would reduce requirements for ships, aircraft, and personnel (including reduced manning aboard highly automated ships). Throughout, operational requirements have remained at least constant and episodically increased—the long war against Islamic extremist groups contributing mightily to high operational

tempo. The apparent resurgence of Russia and the rapid rise and aggressiveness of China suggest that the two decades following the end of the Cold War were anomalous rather than indicative. How the Navy manages these challenges for its personnel will have much to do with its future effectiveness.⁸⁴ Similarly, the issue of managing officer career paths seems destined to attract continuing attention.⁸⁵ And what should the overall contours for naval personnel look like into the future?⁸⁶

World War II ended more than seven decades ago; there has been a lot of history since, and not all of it has been beer and skittles. Here, naval historians, though still subject to the siren call of the Navy's shiny platforms and weapons and still attracted by the real dramas of operations, should find full-time employ in the study of the Navy's personnel. In so doing they have a genuine opportunity to contribute meaningfully to the Navy's future effectiveness.

Notes

- 1 The 1924 *War Instructions* started with organization, mission, and tactical command, while the 1934 version began with a discussion of the Navy's function in war and limned out its war organization. Neither provided a dedicated discussion of the human element in warfare.
- 2 Comments, on the floor of the House of Representatives, 15 May 1934, during a debate over selection up for junior line officers (O-2 to O-3 and O-3 to O-4).
- 3 *War Instructions*, 1 November 1944, 1. King neither discounted nor emphasized mastery of technical knowledge. However, he pointed out that technologies change and assumed that technical mastery was attainable and would be attained, but certain personnel characteristics essential to effective command remain immutable, more important, and more difficult to achieve.
- 4 Hughes sets "Men matter most" as the first of his six principles of naval warfare in his classic work. See Wayne P. Hughes, *Fleet Tactics and Coastal Combat*, 2nd Edition (Annapolis, MD: Naval Institute Press, 1999).
- 5 Herman Wouk, "Herman Wouk's Navy," U.S. Naval Institute *Proceedings* 121(1995): 29. Henry is the central protagonist of Wouk's sweeping historical novels of World War II, *The Winds of War* and *War and Remembrance*. Wouk's concept of Pug Henry and his real-world counterparts is another signal contribution to our understanding of the Navy through his fiction. Arguably, organizations that find themselves in the position of having to rely on heroes and geniuses are those that have failed to produce a sufficient number of competent professionals suited to executing the organizations' missions.
- 6 To be sure, naval biographies and memoirs can and have shed important, but typically indirect, anecdotal, or incidental light on matters of personnel. Heartburn over failure of promotion or selection to command has found its way into memoirs, and, aside from making real the personal consequences of organizational personnel systems, it sometimes points to personnel laws and regulations worthy of investigation. See, for example, Yates Stirling Jr. *Sea Duty: Memoirs of a Fighting Admiral* (New York: G. P. Putnam's Sons, 1939).
- 7 A profession generally is characterized by (1) status as a full-time occupation, (2) a relative monopoly on a specialized body of expertise, (3) dedicated educational and training bodies, (4) a professional ethos to govern its members, (5) attainment of a certain social and political standing that facilitates relative independence and the delegated authority to self-regulate its members. The U.S. Navy, arguably, was among the second wave of professions in the United States, marked in the mid-19th century by steam engineering and the birth of the Naval Academy.
- 8 The British Royal Navy, for example, went more than a century between the fleet actions of the Napoleonic wars and World War I's Battle of Jutland. Aside from its actions during the Spanish-American War, the U.S. Navy had never engaged in *bona fide* major fleet actions until 1942 at Coral Sea and Midway. Since World War II's October 1944 Battle of Leyte Gulf, there have been no fleet actions anywhere (I exclude Okinawa here). The last two U.S. Navy warships actually sunk by enemy action were *Pirate* (AM-275), mined and hit by enemy shore batteries, and *Pledge* (AM-277), mined, both at Wonsan in October 1950.

- 9 Ironically, the most significant single surface-only action of the Pacific Theater, October 1944's Battle of Surigao Strait, from the U.S. side was fought by the six Old Battleships, as they were called in Campaign Plan *Granite*, which were there to provide naval gunfire support for the Leyte landings, instead of the modern fast battleships, which, as part of the Interceptor Force were to steam eastward at the time. Similarly, the smaller, usually night, actions during the 1942–43 Solomons Campaign were fought primarily by U.S. cruisers and destroyers, as was the March 1943 Battle of the Komandorski Islands. However conceptualized, in the event the fast battleships served primarily as escorts, most importantly as anti-aircraft platforms, for the fast carriers, and as oilers for the screening destroyers.
- 10 On the more general problem of the inclinations of militaries to prepare for the war they want to fight versus the one they are actually fighting or will likely have to fight, Waghelstein comments, "There is a flaw in the American Military's love affair with doctrine. The services develop doctrine that presents their view of how the next war will be fought. This view is often a replication of the last war, particularly if it was a success. After the Gulf War the Air Force developed the Air Power doctrine that is, in essence, Desert Storm and the way air power influenced the outcome. That doctrine is the cornerstone of the Air Force's view of war in the 21st century. The Army's doctrine, Force XXI and FM 100-5/1993, emphasizes technology, planning and low casualty rates—again a validation of the Gulf War. The Navy and Marine Corps are a bit of an exception and have developed a blueprint 'Forward From the Sea' that portrays the role of Sea Power in the littorals, a role limited in Desert Storm. Rather than a rehash of Desert Storm, the Naval Services validated their traditional warfare roles across the full spectrum of conflict. In sum all the services are, as is prudent, developing a set of doctrines that deal with worst case scenarios, those that present the greatest threat to national security. Not surprisingly these scenarios envisioned are those that will require the maximum use of our power from our weapons systems and the commensurate force structure. What should be of equal concern is how will we deal with a threat that is not amenable to this vast array of combat power and technology. Given the lessons of history, this focus is not enough. We should also be focusing on how we will deal with the 'asymmetrical' challenges, on those scenarios in which our array of power may have less applicability. We have a history in which our preoccupation with the 'BIG WAR' has led us to ignore the 'little war's' requirements for minimal use of firepower, restraint in campaigning and patience over the protracted nature of the contest." John D. Waghelstein, "Preparing the U. S. Army for the Wrong War, Educational and Doctrinal Failure, 1865–91." *Small Wars and Insurgencies* Vol.10, No. 1 (Spring 1999): 1–33.
- 11 See, for example, Patricia Danette Light, *Marching Upward: The Role of the Military in Social Stratification and Mobility in American Society*. PhD Dissertation. Department of Sociology, Virginia Polytechnic Institute and State University. 1 May 1998. During the post-Civil War period, the Navy seconded engineers to the newly established civilian land-grant colleges in order to jump start engineering education in support of the rapidly industrializing U.S. economy.
- 12 The present author claims no special prescience or moral high ground. He was no less inclined to dismiss naval personnel as an uninteresting subject for serious study. He embarked on research for a book on how organizations adapt to environmental change, of which precisely one chapter was to consider the interwar battle between battleship sailors and aviators for the soul of the Navy. In the dim light of the old

- National Archives reading room, he stumbled across a series of 1934 memoranda that revealed starkly the near-violent conflict of Navy flag officers (then RADM Ernest J. King, Chief of the Bureau of Aeronautics, and RADM William D. Leahy, Chief of the Bureau of Navigation) over language to be included in precepts to the soon to be constituted initial junior line selection boards. It was riveting! Who knew? Over a decade later, he had published an entirely different book, this one on naval personnel, and never did write the book he initially intended. See Donald Chisholm, *Waiting for Dead Men's Shoes: Origins and Development of the U.S. Navy's Officer Personnel System, 1793–1941* (Annapolis, MD: Naval Institute Press, 2001).
- 13 During its 1981–2016 existence, the Strategic Studies Group in Newport, chartered annually by the Chief of Naval Operations to investigate and report on matters of import to him (and representing a substantial investment in personnel and other resources), addressed naval personnel matters directly only in its penultimate year of existence, when it considered the challenges of “talent management” for then Chief of Naval Operations Admiral Jonathan Greenert.
 - 14 To World War I, for administrative history, there was only Charles Oscar Paullin's series of *Proceedings* articles, ultimately published in 1968 as a compendium: *Paullin's History of Naval Administration, 1775–1911*, by the U.S. Naval Institute. Alas, Paullin addresses personnel only incidentally. Early in World War II, the Navy commissioned a number of professional historians, under the direction of Robert C. Albion, to produce focused histories of various aspects of the Navy's shore establishment. The effort was to parallel Morison's highly anticipated and much reprinted histories of operations. Except for a number of incidental articles, the sole published volume resulting from this research was Julius Fuhrer, *Administration of the Navy Department in World War II* (Washington, DC: Government Printing Office, 1959). The author stumbled over these bound typescript histories on the shelves of the Navy Department Library. For an overview of the administrative histories see: <https://www.ibiblio.org/hyperwar/USN/USN-Admin-Guide/USN-Admin-Guide-1.html>. Thomas C. Hone's *Continuity and Change: The Administrative History of the Office of the Chief of Naval Operations, 1946–1986* (Washington, DC: Naval Historical Center, 1989) is one of the rare administrative histories of the post–World War II Navy. Fortunately, as this paper was being written, under the aegis of the Navy's Naval History and Heritage Command, Hone's unique volume was in process of expansion and updating to cover the entire 100 years' existence of the office of the Chief of Naval Operations.
 - 15 Commodore Robert Bates headed the post–World War II history effort for the Navy at the Naval War College, which produced magisterial volumes on the Battles of Coral Sea, Midway, Savo Island, first and second Philippines Sea, and Okinawa, all produced with the stated objective of educating future naval officers who had not served in combat, in order to jump start effectiveness in future naval conflicts. In the foreword to every volume, it was noted that: “The present senior officers of the Navy are well aware of the reasons for changes in established doctrines and in the development of new ones. But this cannot necessarily be said of the commanders of the future, who very probably will be inexperienced in command in war.”
 - 16 *Proceedings* articles have performed the useful service of identifying and structuring personnel problems and often recommending courses of actions for their resolution. See, for example, James W. Sigler, “Repeating NASA's Deadly Mistakes,” U.S. Naval Institute *Proceedings*, Vol 133, No. 9 (September 2007): 48 ff. Sigler provided an

analysis of F/A-18 Hornet-squadron manning and the capacity to support war plans that materially affected Navy policy.

- 17 Since its establishment following World War II, the RAND Corporation has accrued an extensive corpus of studies of military personnel, some of which specifically focus on naval personnel. The Center for Naval Analyses has a similar, though not quite as extensive, record on same. The more recently established Center for a New American Security has jumped into ongoing debates over military personnel, generally. Federal legislative organizations, such as the Congressional Budget Office, Congressional Research Service, and General Accounting [Accountability] Office have also produced policy papers that include historical background material useful to historians.
- 18 In 2005, the “Naval Reserve” was restyled “Navy Reserve” to better communicate within and without the Navy its integral role in the Navy.
- 19 As used here, “ascriptive” refers to those characteristics of the individual that are primarily hereditary and over which the individual has little or no control, to be contrasted with an individual’s ability, volitional behavior, and achievement.
- 20 See Edward J. Marolda, “The Social History of the U.S. Navy, 1945–Present: A Historiographical Essay,” also commissioned by the Naval History and Heritage Command as part of its historiographical series. <https://www.history.navy.mil/research/library/online-reading-room/title-list-alphabetically/n/needs-opportunities-modern-history-us-navy/social-history-usnavy.html>. The essay, commissioned by the Naval History and Heritage Command, approaches the Navy’s history since 1945 from the perspective of its social variables, generally, which perforce address its personnel’s demographics and origins, and the organizational dynamics surrounding them, while the present essay considers its personnel more broadly, especially its administrative aspects, but cannot divorce itself from the social aspects.
- 21 See Chisholm (2001), ch. 1 on problem solving and institutional development. On the concept and implications of “unintended consequences” see Robert K. Merton, “The Unanticipated Consequences of Purposive Social Action:” *American Sociological Review* 1 (1936): 894–904.
- 22 On the concept of organizations as open systems, see James D. Thompson, *Organizations in Action: Social Science Bases of Administrative Theory* (New York: McGraw Hill, 1967); and W. R. Scott, *Organizations: Rational, Natural, and Open Systems*, 5th Edition (Upper Saddle River, NJ: Prentice Hall, 2002).
- 23 The present author elected to end his own study of Navy officer personnel in 1941 in part because of the sensitivity of the topic—the relevant actors to that date were deceased by the time of the research—but also because the problem of access to Navy documents and security classifications.
- 24 See, for example, General Accounting Office, *The Challenge of Electronic Records Management*. Statement of L. Nye Stevens, Director, Federal Management and Workforce Issues, General Government Division. Testimony Before the Subcommittee on Government Management, Information, and Technology Committee on Government Reform, House of Representatives. 20 October 1999; Kenneth Thibodeau, “The Electronic Records Archives Program at the National Archives and Records Administration” *First Monday*, Vol. 12, No. 7 (July 2007). http://firstmonday.org/issues/issue12_7/thibodeau/index.html; and Jessie Kratz, “The

- Challenges of Electronic Records.” <https://prologue.blogs.archives.gov/2016/10/09/the-challenges-of-electronic-records/>.
- 25 On the matter of naval aviators, see Donald Chisholm, “Big Guns versus Wooden Decks: Naval Aviation Officer Personnel, 1911–1941,” 52–78 in Douglas V. Smith (Editor), *One Hundred Years of U.S. Navy Air Power*. Annapolis, MD: Naval Institute Press, 2010.
 - 26 For a carefully researched and highly readable comprehensive history of the naval reserve, see David Winkler’s *Ready Then, Ready Now, Ready Always: More than Century of Service by Citizen Sailors* (Washington, DC: Navy Reserve Centennial Book Committee, 2014). The status of reserve officers and enlisted personnel relative to the line was solved formally even if informally the reserves remained in a decidedly second-tier status compared to the regulars. Moreover, some reserves, those commissioned through four-year Reserve Officer Training Corps (NROTC) programs, were more equal than reserve officers commissioned via the several wartime-only programs. Notably, a World War II ship’s deck log indicated commissioning source for each officer joining the ship’s company. Reserve officers commissioned through NROTC before the war typically advanced to lieutenant commander during the war, while the “lesser” wartime commissioned reserve officers only promoted to lieutenant.
 - 27 On the matter of correspondence-based education for the Navy’s enlisted personnel, see Richard McKenna, “The Wreck of Uncle Josephus,” 155–83 in Robert Shenk (Editor), *The Left-Handed Monkey Wrench: Stories and Essays by Richard McKenna* (Annapolis, MD: Naval Institute Press, 1984). Best known as the author of *The Sand Pebbles*, McKenna served in the old Asiatic Fleet from 1931–1941, thence through World War II aboard a troop transport in all oceans, and stayed through the Korean War, retiring in 1953. He credited Daniels’ education program for Sailors for much of his own development while in the service.
 - 28 See Chisholm (2001). Still, the place and status of aviators in relation to non-aviators had not been resolved and the so-called “hump” slowed promotion and hurt morale among junior officers, especially.
 - 29 The present author’s family history is emblematic. Commissioned as an ensign in the Naval Reserve in May 1936 through the NROTC program at the University of California, Berkeley, the author’s father, William K. Chisholm, went on his first active duty in July 1940 as a 28-year-old ensign aboard the four-stack destroyer *Brooks* (DD-232). By late 1943, he was a 31-year-old temporary lieutenant commander and went on to command a destroyer minesweeper, *Boggs* (DMS-3), and, subsequently, an amphibious unit, LSM Group 37, at Okinawa. As with other such officers, at the conclusion of the war he was confirmed as a permanent lieutenant commander.
 - 30 See Martin Landau, “Linkage, Coding, and Intermediacy,” *Journal of Comparative Administration* 2 (1971): 401–29; and Arthur L. Stinchcombe, “Social Structure and Organizations,” 142–93 in James G. March (editor), *Handbook of Organizations* (Chicago: Rand-McNally, 1965).
 - 31 On the interwar naval culture and its carryover into World War II and beyond, see Thomas C. Hone and Trent Hone, *Battle Line: The United States Navy 1919–1939* (Annapolis, MD: Naval Institute Press, 2006); and Theodore C. Mason’s remarkable trio of memoirs: *Battleship Sailor*. With a foreword by Edward L. Beach (Annapolis, MD: Naval Institute Press, 1982); *We Will Stand by You: Serving in the Pawnee*,

- 1942–1945 (Annapolis, MD: Naval Institute Press, 1990); and *Rendezvous with Destiny: A Sailor's War* (Annapolis, MD: Naval Institute Press, 1997); along with James J. Fahey, *Pacific War Diary, 1942–1945* (Boston: Houghton Mifflin, 1963). For a social history of the early Navy officer corps see Christopher McKee's brilliant *A Gentlemanly and Honorable Profession: The Creation of the U.S. Naval Officer Corps, 1794–1815* (Annapolis, MD: Naval Institute Press, 1991). For an analysis of the 19th century social aspects of the officer corps, see Peter Karsten, *The Naval Aristocracy: The Golden Age of Annapolis and the Emergence of Modern American Navalism* (Annapolis, MD: Naval Institute Press, 1972). When Karsten's book was first published, it quickly became known in some circles as the "Little Red Book," an unfavorable allusion to Mao's infamous publication known colloquially by the same name. That it was excellent work and continues to have legs is evidenced by its republication in 2008 by the U.S. Naval Institute. Social histories of the U.S. Navy owe a debt to Michael Lewis' several books on the British Royal Navy, beginning with *A Social History of The Royal Navy, 1793–1815* (London: George Allen & Unwin Ltd., 1960), which demonstrated the value of social histories for understanding the behavior of navies.
- 32 See Catherine N. Barry, *Moving On Up? U.S. Military Service, Education and Labor Market Mobility among Children of Immigrants*. PhD Dissertation. University of California, Berkeley, 2013. See also Patricia Danette Light, *Marching Upward: The Role of the Military in Social Stratification and Mobility in American Society*. PhD Dissertation. Department of Sociology, Virginia Polytechnic Institute and State University. 1 May 1998.
- 33 The "American Way of War:" Russell Weigley's argument that historically the United States has preferred to maintain a small military; if deterrence fails, mobilize massively, vanquish the foe, and return in relatively short order to victory parades, demobilization, and a peacetime military establishment. See his *The American Way of War: A History of United States Military Strategy and Policy* (New York: Macmillan, 1973). The size and prominence of the post–World War II U.S. military that several generations have become accustomed to seeing runs directly at odds with American history up to that point.
- 34 The scope of the Hoover Commission's work was breathtaking and unprecedented in American history. It left virtually no aspect of the federal government's organization unexamined. See Commission on the Reorganization of the Executive Branch of the Government, Task Force on National Security Organization, *National Security Organization: A Report with Recommendations*. January 1949. For an analysis of the Hoover Commission's work more broadly, see Ferrell Heady, "The Reorganization Act of 1949," *Public Administration Review* 9 (Summer 1949): 165–74; and "The Reports of the Hoover Commission" *Review of Politics* 11 (July 1949): 355–78.
- 35 See Dwight D. Eisenhower, *Crusade in Europe* (Garden City, NY: 1948), 152, 154, 158, 223, 261, 266, 384.
- 36 For the sea services' perspectives on defense unification, see Jeff Barlow, *Revolt of the Admirals: The Fight for Naval Aviation, 1945–1950* (Washington, DC: Naval Historical Center, 1994) and Gordon W. Kaiser, *The U.S. Marines and Defense Unification, 1944–47* (Baltimore, MD: Nautical and Aviation Publishing Company of America, 1996). Although President Roosevelt established a Joint Chiefs of Staff early in World War II, it had no legal status, and, as Fleet Admiral William D. Leahy

- pointed out, such left its function and importance entirely malleable by the President as he saw fit. See his memoir, *I Was There* (New York: McGraw Hill, 1950).
- 37 See Paul Stillwell, *The Golden Thirteen: Recollections of the First Black Naval Officers* (Annapolis, MD: Naval Institute Press, 2003). Two African-American nurses were commissioned in 1944.
- 38 Two days after Pearl Harbor, the National Association for the Advancement of Colored People (NAACP) telegraphed then Secretary of the Navy Frank Knox, requesting that all enlisted ratings be opened to African Americans. Knox denied the request. One week later the NAACP made the same request of President Roosevelt, who turned the matter over to his newly created Fair Employment Practices Committee, whose positive recommendation was negatively received by the Navy, whereupon the President sent a note to Secretary Knox suggesting that the Navy could probably find something for black Americans to do outside the mess ratings.
- The General Board recommended on 27 March 1942 against opening up all naval enlisted ratings to African Americans on the curious rationale that there were plenty of capable African Americans who would earn promotion, thereby placing them in supervisory roles over other Sailors, some of whom would be southern whites, and disciplinary issues undesirable during a war would arise. On 7 April 1942, the Navy announced that African Americans could enlist for “general service.” Two ship-manning experiments were conducted using all-black crews with white officers, a destroyer escort, *Mason* (DE-529), and a 173-foot submarine chaser, *PC-1264*. On these two ships, see Mary Pat Kelly, *Proudly We Served: The Men of the USS Mason* (Annapolis, MD: Naval Institute Press, 1995); and Eric Purdon, *Black Company: The Story of Subchaser 1264* (New York: Robert C. Luce, 1972). A white, Purdon was *PC-1264*’s commanding officer from commissioning in April 1944 to September 1945. Future flag officer [then] ENS Samuel Gravely reported aboard as the executive officer in May 1945, and saw her through decommissioning in February 1946.
- 39 See Robert L. Allen, *The Port Chicago Mutiny* (San Francisco: Heyday, 2006).
- 40 On at least two previous occasions Congress had attempted to reduce and limit the overage of naval officers. It froze the numbers and distribution of officers at their existing levels in 1842 in consequence of concerns over expense, and again in 1882 froze the numbers and distribution of officers, and also reduced annual admissions to the Naval Academy. See Chisholm (2001), chs. 8 and 16.
- 41 Leonard F. Guttridge, *Mutiny: A History of Naval Insurrection* (Annapolis, MD: Naval Institute Press, 1992, 260).
- 42 See the Associated Press news story of 20 November 1972 at <https://news.google.com/newspapers?nid=2519&dat=19721120&id=xm1eAAAAIBAJ&sjid=fGENAAAAIBAJ&pg=6059,2750985&chl=en>.
- 43 Gregory A. Freeman, *Troubled Water: Race, Mutiny, and Bravery on the USS Kitty Hawk* (New York: Palgrave Macmillan, 2009).
- 44 For an overview of race relations in the Navy during the Vietnam War, see Jon Darrell Sherwood, *Black Sailor, White Navy: Racial Unrest in the Fleet During the Vietnam War Era* (New York: New York University Press, 2007). To place the 1970s events aboard ship in larger context, see Christopher M. Bell and Bruce A. Elleman (Editors), *Naval Mutinies of the Twentieth Century: An International Perspective*

- (Cass Series: Naval Policy and History) (London: Routledge, 2003). Guttridge (1992), 258, asserts that by the end of 1972 “the United States Navy would log seventy-four instances of sabotage, more than half on aircraft carriers, none of them attributable to ‘enemy’ action.” He provides no source for this claim.
- 45 As quoted by Guttridge (1992), 259.
 - 46 For the Navy’s upbeat assessment of its own efforts, see “A Look at the Human Side: A Review of the Navy’s Long-Range Human Goals Plan” *All Hands* No. 682, November 1973, 3–17.
 - 47 See Bernard Rostker, *I Want You! The Evolution of the All-Volunteer Force* (Washington, DC: RAND Corporation, 2006) and Morris Janowitz, “The All-Volunteer Military as a ‘Sociopolitical’ Problem,” *Social Problems* 22 (February 1975): 432–49.
 - 48 See, for example, Karl W. Eikenberry, “Reassessing the All-Volunteer Force,” *Washington Quarterly* 36 (Winter 2013): 7–24; and Congressional Budget Office, *The All-Volunteer Military: Issues and Performance* (Washington, DC: 2007).
 - 49 Admiral Zumwalt’s second Z-Gram as CNO named the problem of retaining both officers and enlisted as the Navy’s single most important personnel challenge. He employed so-called Retention Study Groups to brainstorm ideas for improving retention rates, resulting in changes in post-deployment leave policies along with attire and grooming policies. See http://www.navy.mil/ah_online/archpdf/ah197208.pdf.
 - 50 Ship deployments during the Cold War came to be planned out years in advance, which allowed not only regularly scheduled time for yard availabilities, but a useful predictability for naval personnel and their families. That regularity went away during Donald Rumsfeld’s tenure as Secretary of Defense, amid the greater uncertainty attendant to the Afghanistan and Iraq wars and the declining number of ships in commission.
 - 51 The ground services appear to have been more immediately and profoundly affected than the Navy and the Air Force by the operational and personnel tempos occasioned by the wars in Afghanistan and Iraq, losing great numbers of captains and majors in the combat arms.
 - 52 See Donald J. Cymrot, Paul W. Mayberry, and Michael Mara, *Managing Military Careers* (Alexandria, VA: Center for Naval Analyses, 1998) and Pete Schirmer, Harry J. Thie, Margaret C. Harrell, and Michael S. Tseng, *Challenging Time in DOPMA Flexible and Contemporary Military Officer Management* (Washington, DC: RAND Corporation, 2006); and, more recently, Pete Schirmer and Dwight “Buzz” Philips. “A ‘Measured Approach’ To Managing Military Officers.” 15 July 2015. <http://breakingdefense.com/2015/07/a-measured-approach-to-managing-military-officers/>.
 - 53 *Goldwater-Nichols Department of Defense Reorganization Act of 1986*. Public Law 99-433—1 Oct. 1986. http://history.defense.gov/Portals/70/Documents/dod_reforms/Goldwater-NicholsDoDReordAct1986.pdf.
 - 54 This was an ingenious course of action—command screen boards are administrative vice statutory entities, allowing the Navy to change the requirements without having to seek changes in the law.
 - 55 Navy Graduate Education Review Board, “Transforming Graduate and Professional Military Education. Briefing. 2002.

- 56 The emerging vision for the development of joint officers was given fluent expression in Chairman, U.S. Joint Chiefs of Staff. *Vision for Joint Officer Development*. (November 2005). More recently, Gen. Dempsey outlined his own vision for military leadership. See Chairman, U.S. Joint Chiefs of Staff. "Desired Leader Attributes for Joint Force 2020," Memorandum to Chiefs of the Military Services, Commanders of the Combatant Commands, Chief, National Guard Bureau, and Directors of the Joint Staff Directorates, CM-0166-13, 28 June 2013. http://www.dtic.mil/doctrine/education/officer_JPME/cjcsvision_jod.pdf. Ironically, one of the coauthors of this document was a recently retired Navy surface warfare officer. On a Navy approach to jointness for officers, see James Stavridis and Mark Hagerott. "The Heart of an Officer: Joint, Interagency, and International Operations and Navy Career Development," *Naval War College Review* 62 (Spring 2009): 26–41.
- 57 <http://www.history.navy.mil/research/library/online-reading-room/title-list-alphabetically/z/z-grams-list-policy-directives-issued-admiral-zumwalt/z-gram-116.html>.
- 58 In 2015, the Navy Personnel Command published a detailed and useful historical timeline for women and/in the Navy. As a matter of interest, it contains no reference to what arguably was the most important event in the post–World War II period related to women—Tailhook and its aftermath. See <http://www.public.navy.mil/bupers-npc/organization/bupers/WomensPolicy/Pages/HistoryFirst.aspx>.
- 59 See Jean Zimmerman, *Tailspin: Women at War in the Wake of Tailhook* (New York: Doubleday, 1995); and William H. McMichael, *The Mother of All Hooks: The Story of the U.S. Navy's Tailhook Scandal* (New Brunswick, NJ and London: Transaction Publishers, 1997) for two substantially different analyses of the event and subsequent related actions and events.
- 60 Thomas C. Hone, Norman Friedman, and Mark D. Mandeles, "The Development of the Angled-Deck Carrier: Innovation and Adaptation," *Naval War College Review* 64 (Spring 2011): 63–78.
- 61 Chisholm (2001), chs. 18 and 19.
- 62 Think of the innovative *Bainbridge* (DLGN/CGN-25) and *Long Beach* (CGN-9), originally envisioned as the vanguard of an entirely nuclear-powered surface fleet.
- 63 Legislation requiring that aviation units, whether shore stations, aircraft squadrons, air groups, or wings, or ships be commanded by qualified naval aviators or naval flight observers was enacted in the late 1920s. Chisholm (2001), ch. 25.
- 64 See John Monsarrat, *Angel on the Yardarm: The Beginnings of Fleet Radar Defense and the Kamikaze Threat* (Historical Monography Series Naval War College No. 6) (Newport, RI: Naval War College Press, 1985).
- 65 See Lawrence Kapp, *Recruiting and Retention: An Overview of FY 2011 and FY2012 Results for Active and Reserve Component Enlisted Personnel* (Washington, DC: Congressional Research Service, 2013).
- 66 The original frigate *Constitution*, 370 ft. overall length and 2,200 tons, for example, required about 450 officers and enlisted, the vast majority of the latter being required to tend to its sails and fight its guns.
- 67 See, for example, Elting E. Morison, *Men, Machines, and Modern Times* (Cambridge, MA: MIT Press, 1966); Thomas C. Hone, Norman Friedman, and Mark D. Mandeles, *American & British Aircraft Carrier Development, 1919–1941* (Annapolis, MD: Naval Institute Press, 1999); and Mark R. Hagerott, *Commanding*

- Men and Machines: Admiralty, Technology, and Ideology in the 20th Century U.S. Navy.* PhD Dissertation. Department of History, University of Maryland, 5 August 2002. Morison (no relation to Samuel Eliot Morison) was the son-in-law of ADM William S. Sims and his biographer.
- 68 See Chisholm (2001), chs. 18 and 25 on the old Corps of Engineers and the naval aviation community, respectively. On the personnel and organization of naval aviation, also see Chisholm (2010).
- 69 See Michael J. Crawford, *Officers of Peculiar Skill: Petty and Forward Officers of the U.S. Navy, 1797–1860* (Washington, DC: Naval History and Heritage Command, 2017), 2.
- 70 Since the 1970s the degree of formality in the wardroom mess has diminished somewhat, with some wardrooms opting to eat the same food as their enlisted personnel, while the use of silver plate has also decreased.
- 71 See Chisholm (2001), 280. The Medal of Honor was not authorized for commissioned naval officers until 1915.
- 72 Crawford notes that “In the age of sail, petty officers, in contrast to those holding warrants or commissions, were appointed by a ship’s commanding officer and held their posts at the commander’s pleasure. ‘An Act for the Government of the Navy of the United States,’ enacted by Congress and signed by President John Adams on 2 March 1799, provided that ‘all officers not having commissions or warrants (or appointed commission or warrant officers for the time being), are termed petty, or inferior officers.’ The U.S. Navy has employed the term petty officer ever since.” See Crawford (2017), 1.
- 73 “They were designated forward officers because they berthed adjacent to each other in small cabins forward of the mainmast and shared a mess. They held warrants signed by the President and served during good behavior. Petty officers, in contrast, were appointed by a ship’s commanding officer and held their posts at the commander’s pleasure.” Crawford (2017), 15–16.
- 74 In time, sailing masters were divided into those not in the line of promotion and those in the line of promotion, and the title changed to simply “master.” They ranked immediately behind “lieutenant” and in front of “midshipman.” Ultimately, those not in the line of promotion were allowed to die out, while those in the line of promotion became lieutenants, junior grade.” See Chisholm (2001), chs. 6, 8, 10, and 16.
- 75 Addressing the same problem, the British Royal Navy adopted a different system of vertical division of labor. See Chisholm (2001), chs. 18–20.
- 76 Weigley (1973).
- 77 The clearest statement of this distinctly non-Western approach to state-on-state conflict is found in Qiao Liang and Wang Xiangsui. *Unrestricted Warfare* (Beijing: PLA Literature and Arts Publishing House, February 1999).
- 78 See, for example, Osama bin Laden’s 1998 declaration of war against the Americans. <http://www.mideastweb.org/osamabinladen1.htm>. On the matter of expanded jihadist war see warnings by ADM Harry Harris, Commander, U.S. Pacific Command. https://www.wsj.com/articles/jihadists-are-seeking-beachheads-in-asia-u-s-admiral-warns-1498636905?utm_source=Sailthru&utm_medium=email&utm_campaign=EBB%206.29.17&utm_term=Editorial%20-%20Early%20Bird%20Brief.

- 79 See, for example, Jacob Alex Klerman. *Rethinking the Reserves*. Santa Monica, CA: RAND Corporation, 2008. This monograph is based upon a study produced for the 2006 Quadrennial Defense Review. More recently, JPME students have entered the discussion. See Brian M. Howlett, “Rethinking the Operational Reserve.” A Research Report Submitted to the Faculty In Partial Fulfillment of the Graduation Requirements (Maxwell AFB, AL: Air War College, 7 February 2012); and Albert Orgain, “Preventing a Crisis in Sustainability: Recommendations for the Future Navy Reserve.” Thesis submitted in partial satisfaction of the program requirements for Advanced Studies in Naval Strategy. (RI: Naval War College, 13 June 2014).
- 80 I am indebted for the term “near history” to novelist Alan Furst, who has used it to locate in time his series of espionage novels, all of which are set in the late 1930s through the middle of World War II. See the end matter in *Night Soldiers* (New York: Harper Collins, 1998) [originally published in 1988].
- 81 These challenges have not gone unnoticed. See, for example, David Barno and Nora Bensahel, “Can the U.S. Military Halt Its Brain Drain?” *The Atlantic*, 5 November 2015. <http://www.theatlantic.com/politics/archive/2015/11/us-military-tries-halt-brain-drain/413965/>; and Congressional Budget Office, *Recruiting, Retention, and Future Levels of Military Personnel* (Washington, DC: 2006).
- 82 See Military Compensation and Retirement Modernization Commission, *Report* (April 2015). For earlier analyses of the problem, see for example, Michael Hansen and Martha Koopman, *Military Compensation Reform in the Department of Defense* (Alexandria, VA: Center for Naval Analyses, 2005); and Cindy Williams (Editor), *Filling the Ranks: Transforming the U.S. Military System* (Cambridge, MA: MIT Press, 2004).
- 83 For recent analysis of how minorities and women are doing in the Navy, see Amos Golan, William Greene, and Jeffrey M. Perloff, “U.S. Navy Promotion and Retention by Race and Sex,” January 2010. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1547800. And see Laura L. Miller, Jennifer Kavanagh, Maria C. Lytell, Keith Jennings, and Craig Martin, *The Extent of Restrictions on the Service of Active-Component Military Women*. (Washington, DC: RAND Corporation, 2012). See also Undersecretary of Defense, Personnel and Readiness, *Population Representation in the Military Services, Fiscal Year 2015 Summary Report* (Washington, DC: Department of Defense, 2015), one of an annual series of such reports from 1975. Some in the Navy today have noted that the diversity of perspective afforded by the integration of various ethnic groups into the Navy is likely to enhance its effectiveness. On the matter of the practical consequences for the Navy of cultural differences, see, for example, Lorand B. Szalay, and Jean A. Bryson, *Filipinos in the Navy: Service, Interpersonal Relations and Cultural Adaptation* (Washington, DC: American Institutes for Research, 1977). Michael Shawn Davis provides a historical analysis of black Americans in the Navy through 1955. It might serve as a useful guide for what could be written about the period since World War II. See his “Many of Them Are Among My Best Men: The United States Navy Looks at its African American Crewmen, 1755–1955,” PhD Dissertation (Manhattan, KS: Department of History, Kansas State University, 2011). On sexual assault and harassment, see Andrew R. Morral, Kristie L. Gore, and Terry L. Schell (Editors), *Sexual Assault and Sexual Harassment in the U.S. Military* (Washington, DC: RAND Corporation, 2016).

- 84 See Bernard Rostker, *Right-Sizing the Force: Lessons for the Current Drawdown of American Military Personnel* (Washington, DC: Center for a New American Security, 2013).
- 85 See Ann D. Parcell and Amanda Kraus, *Recommendations from the CNGR Implementation Plan: Exploring the Requirements of DOPMA and ROPMA* (Alexandria, VA: Center for Naval Analyses, 2010); and Ann D. Parcell and Jonathan D. Mintz, with David L. Reese, *Challenges for Navy Officer Personnel Management*. (Alexandria, VA: Center for Naval Analyses, 2014).
- 86 Naval Studies Board, Division on Engineering and Physical Sciences, National Research Council, *Manpower and Personnel Needs for a Transformed Naval Force* (Washington, DC: National Research Council, 2008).

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160324-N-XX566-253 U.S. Navy photo by Mass Communication Specialist 3rd Class Andre T. Richard

Ships assigned to the *John C. Stennis* (CVN-74) Strike Group and ships assigned to the Republic of Korea (ROK) Navy 1st Fleet Maritime Battle Group One steam together during Maritime Counter Special Operations Force exercise, which was part of Foal Eagle 2016. Foal Eagle is an annual bilateral training exercise designed to enhance the readiness of U.S. and ROK forces and their ability to work together during a crisis. Providing a ready force supporting security and stability in the Indo-Asia-Pacific, *John C. Stennis* was operating as part of the Great Green Fleet on a regularly scheduled U.S. Seventh Fleet deployment.

Chapter 4

The Historiography of Programming and Acquisition Management since 1950, with a Focus on the Navy

by Thomas C. Hone

INTRODUCTION

Military systems acquisition does not command public attention the way that combat operations always do. For example, there are several very good novels about the modern Navy, but I know of only one about modern Navy acquisition: *The Minotaur* (1990), by best-selling author and Navy veteran Stephen Coonts.¹ Many readers consider it the weakest of his novels featuring Navy Captain Jake Grafton, first introduced to the public in *The Flight of the Intruder* in 1986. Why do many of those who like the Jake Grafton stories not like *The Minotaur*? The answer is that it lacks the riveting action scenes of the first novel of the series. Unfortunately for authors of novels, the acquisition of a major military system is a complex, time consuming, and often tedious process. To be sure, there is often drama to the process, but not necessarily the heart-pounding type so often found in combat operations.

In some cases, the congressional debates over a specific system such as the Joint Strike Fighter grab the headlines, but acquisition, like budgeting, usually gets media attention only when there is immediate drama—some deviation from routine. In short, topics such as programming, budgeting, shipbuilding, and the cost of preserving the Navy's industrial base are usually left to journalists, analysts in organizations such as the Center for Naval Analyses or the RAND Corporation, and those who work in watchdog agencies like the Government Accountability Office (GAO). Note that I have not mentioned academic historians.

That is not to say that useful and insightful scholarly histories of military acquisition haven't been written since World War II. Some have, and this paper will cite them. I will also explain why the lines separating history from journalism and from analysis have been difficult to draw—why the post-World War II history of military acquisition has been a mix of the products of historians, journalists, and analysts. Finally, I will explain why, with the publication in the last decade of serious, detailed histories of the military acquisition process, this situation has changed, and changed very much for the better.

WHY THE HISTORY OF MILITARY ACQUISITION IS IMPORTANT

Since World War II, military acquisition—which includes military research and development—has been a major political issue. For example, is there a military-industrial complex? If so, just how does it operate? Why, if it exists, is it influential? And if indeed it is influential, then does its influence create problems new to the constitutional order of the United States? These questions have stimulated both public discussions and expert analysis since former President Dwight D. Eisenhower warned the nation about the “military-industrial complex” in his farewell address on January 17, 1961. There also have been fierce debates since the beginning of the Cold War about whether the armed services can obtain the equipment—the “systems”—they believe that they need at a cost that the nation can afford. These debates have drawn on case studies of acquisition management (and mismanagement). Many of those studies have not been written by historians but by journalists, or scholars who are not historians, or consultants, or faculty at Defense Department schools.

The history of military acquisition since World War II has been difficult for historians to write for two reasons. The first is that military acquisition has mattered politically, economically, and socially; therefore, studying it and writing about it has drawn scholars into the world of policy analysis and into public debates about national military policy—places where scholarship is often dominated by the urge to influence opinion. The second reason is that its study has posed methodological challenges to historians. How should its history be studied? Is it a type of business and therefore the province of the professional students of business and management? Can historians gain access to the information that they need, or must the historical profession wait for key records to be declassified? Can you write history without all the relevant records?

HOW SHOULD THE HISTORY OF MILITARY ACQUISITION BE STUDIED?

In an essay published in 1978, the highly regarded historian John Lukacs argues for history that is “microcosmic and sociographic, not sociological and generalizing.” By that he means history from the viewpoint of the participants.² But just how close must the historian be to the people that he or she is studying? To write a useful history of acquisition, must the researcher be or have been an active participant in the process? Is the field so arcane that only insiders can really understand it? Is the history of military acquisition therefore like the history of science, where the historian needs special preparation in order to work successfully?

Adding to the historian’s task is the fact that elements of specific acquisitions—stealth aircraft designs, for example—often have been highly classified, creating a significant barrier to researchers who want access to the relevant records. At the same time, acquisition professionals and senior executives in the Defense Department often want reliable lessons learned that they can use to improve their own work. To be useful, those lessons may have to be written and then briefed by people who can be trusted to prepare and handle classified information. So should at least some acquisition histories be classified? If not, then how should sensitive information be used, and how should it be cited? Moreover, in the absence of official, unclassified documents, what is the value of oral histories or of interviews and memoirs in studying both classified and unclassified military acquisition projects? And what is the proper way to study the relationship—obviously important—between acquisition and programming and budgeting? How do you study in a rigorous way activities that are both the province of specialists and highly classified without becoming part of the organizations that conduct these activities?

I believe that historians and other researchers are getting some serious studies that will help them answer the many questions that have been raised about military acquisition in the United States since the end of World War II. I also believe that some of the recent studies do what John Lukacs argued had to be done if history is to be trusted. In supporting my claim, however, I first have to review the existing literature and then show why recent work is a major step forward.

TO UNDERSTAND ACQUISITION IN THE COLD WAR, GO BACK TO WORLD WAR II

Perhaps the best book ever written on military acquisition in the United States came out of the Army's World War II history program: *Buying Aircraft: Materiel Procurement for the Army Air Forces*, written by Irving B. Holley Jr. and published by the Department of the Army's Chief of Military History in 1964.³ *Buying Aircraft* shows that most acquisition practices in place during the initial decades of the Cold War had their roots in World War II, when the emphasis was primarily on the mass production of essential items such as combat and transport aircraft, armored vehicles, and amphibious assault ships like the landing ship tank (LST). Research and development also mattered in World War II. As much as possible, the mass produced conventional weapons had to incorporate the latest technology, as in airborne radars. But to produce thousands of tanks, amphibious craft, and planes, the World War II acquisition workforce had to adopt planning, manufacturing control, and inspection practices borrowed from private industry, especially the automobile industry.

The strength of *Buying Aircraft* is the way that it links War Department procurement policy with actual practice. Holley recognizes the truth of the cliché "The devil is in the details," and masters the details, preserving them for later generations. *Buying Aircraft* combines an insider's understanding of details of procurement with an historian's broader perspective. It is the sort of history that John Lukacs argues is essential. An essential precursor to *Buying Aircraft* was Holley's wonderful *Ideas and Weapons*, published in 1953.⁴ The theme of *Ideas and Weapons* is clear from the book's subtitle: "A Study in the Relationship of Technological Advance, Military Doctrine, and the Development of Weapons." *Ideas and Weapons* is a work of historical investigation; it tells you what happened. It is also, however, a work of analysis; it tells you why things happened the way they did. It is also a study that encourages the reader to consider whether the patterns of the past might actually be repeated in a somewhat altered form in the future.⁵ Holley shows the way in the field of acquisition history. In a sense, he created it. Could others follow his example?

After World War II, military—and especially naval—historians tended to bypass acquisition and focus on operations. Samuel Eliot Morison's multivolume history of the Navy in World War II, for example, is a history of operations. The Navy Department did compile administrative histories in World War II, but what we today call acquisition was mainly covered in the histories of the Navy's bureaus.⁶ There was no overall study of Navy procurement or acquisition, and no

special, focused study to rival Holley's *Buying Aircraft*. There was also no Navy analog to the War Department's *Global Logistics and Strategy, 1940–1943* and the follow-on volume covering the years 1943–1945, both of which intelligently and thoroughly take on the subjects of strategic and operational logistics.⁷

MORE BACKGROUND: COLD WAR STUDIES OF ACQUISITION

From the perspective of historians interested in military systems acquisition, the Cold War was both the best of times and the worst of times. It was the best because so many new systems were developed and fielded. Each new system could be thought of as a case study in acquisition management, and some management (such as that leading to nuclear-powered attack submarines) was very impressive.⁸ However, it was also the worst because the military acquisition process developed for World War II was in some ways an actual obstacle to creating and sustaining an approach specially designed for the Cold War. How could a process suited to directing mass production be replaced by one dedicated to scientific research and to the rapid development of technologically sophisticated systems? How could the military services successfully drive innovation and then integrate innovative systems (such as powerful turbojet engines) into existing forces?

Fortunately, enough of a foundation for doing this development and integration had been created during World War II to carry the nation through the lean defense budget years after the war. There was no great failure of wartime acquisition to capture the attention of Congress, citizens, and historians, and so wartime acquisition was assumed to have been a success. In addition, the postwar years were filled with other issues concerning the management of national defense, including the debate over unifying the armed services, the proper control of atomic weapons, and the relationship between Navy and Air Force aviation.⁹ As Holley's *Buying Aircraft* shows, producing a detailed history of wartime acquisition took time—years of careful research and writing. What university history department could wait that long for a younger faculty member to produce such a study? Moreover, the major issue confronting those seriously concerned about national defense after World War II was the role of nuclear weapons in national strategy. Other topics accordingly received much less attention.

Despite these obstacles, there were eventually a number of Cold War studies of military systems (aircraft, submarines, radars, etc.) and even some very useful accounts of the processes through which these systems were developed and fielded.

However, the routine classification of documents during the Cold War years often restricted what information was available regarding the costs of systems, their characteristics, how they drew on advanced technology, and—especially—how they were manufactured and tested. Despite routine secrecy, there were numerous journalists' accounts of specific weapons and their genesis and development; some of the stories were thorough enough to be called histories. One example is Orr Kelly's *Hornet: The Inside Story of the F/A-18*, published in 1990. Another example, and one that is both history and analysis, is Glenn Bugos's *Engineering the F-4 Phantom II: Parts into Systems*, published in 1996.¹⁰

There were also historians of weapons and technology who combed the available records to describe what was developed, when it was procured, and then deployed. For example, there is a large audience of readers from many nations that is fascinated by military aircraft, and it has been well served by—among others—Barrett Tillman, author of many books on aircraft and aircraft carrier operations.¹¹ For those fascinated by warships, there are the illustrated design histories of U.S. battleships, aircraft carriers, cruisers, and destroyers by Norman Friedman.¹² Historians intent on understanding acquisition should not bypass these publications. They contain reliable information and insights related to acquisition (including logistics), as well as information about how aircraft and ships performed in combat.

Much military acquisition is about things, from infantry weapons to huge warships. If you want to understand where these come from and why they do what they do, you need to start with the things themselves. That means reading the books prepared for the audiences that are fascinated by the machinery of war and willing to pay for reliable guides to that machinery. If you do that, you can retrace the steps of researchers such as Norman Friedman, who began studying U.S. Navy ship designs and where they came from and progressed to studying the processes of warship design used in other navies, the technology of weapons design and support, the history of command and control systems used by modern navies, the military uses of space, and the development of unmanned air vehicles.¹³ In effect, Friedman built up knowledge and research expertise from the bottom by studying the particulars of weapons, sensors, and command and control systems. Over time, his studies have become more strategic and insightful, and his research interests wider—to even include an award winning study of the Cold War.¹⁴

There were also useful official histories produced during the Cold War years. Examples include a three volume history of the Atomic Energy Commission, histories of the Naval Weapons Center and the Navy's White Oak, Maryland,

laboratory, and U.S. Air Force history office studies of the development of Air Force aircraft and ballistic missiles.¹⁵ The Air Force History and Museums Program also released a history of acquisition management in 1997, and the service published an official history of the Air Force Materiel Command in 2006.¹⁶ In 2003, the U.S. Army Materiel Command's (AMC) history office published *A Brief History of AMC, 1962–2000*, and in 2006, the Department of the Army issued *U.S. Army Aviation and Missile Command: Chronological Highlights*. In 1983, the Center for Naval Analyses published the proceedings of an interesting conference on the Planning, Programming, and Budgeting System (PPBS), and in 2004, the Office of Program Analysis and Evaluation (PA&E) presented a “historical perspective” on PPBS at the 37th Annual Department of Defense Cost Analysis Symposium.¹⁷

The RAND Corporation also produced a number of studies of military research and development (R&D) and acquisition. Economist Burton H. Klein and his colleagues at RAND wrote a series of interesting papers on military R&D and acquisition over a 13-year period from 1958 to 1971.¹⁸ The analysts understood that the mass production models of World War II had been superseded by a new model of constant, routine R&D and production. That new model, however, had to be made up and refined as time passed. It could not be borrowed—as the mass production model had been borrowed—from existing organizations like the automobile industry. Accordingly, the analysts drew on concepts from economics, operations research, and academic studies of decision-making. These nonhistorical concepts were useful because major acquisition decisions were essentially political and bureaucratic ones.¹⁹

Under the auspices of the Business Executives for National Security, retired Army Colonel M. Thomas Davis, who had headed the Army's Program Development Division, wrote two thoughtful studies of the planning, programming, and budgeting process in 2000.²⁰ In 2003, the Institute for Defense Analyses issued a study entitled “Exploring a New Defense Resource Management System” (IDA Paper P-3756), and the Army War College published “PPBS to PPBE: A Process or Principles,” by Colonel Steven R. Grimes in 2008.²¹ Though quite useful, these studies tend to focus on how management processes work and not on the histories of their development.

David D. Acker, who served as an engineer and manager in the aerospace industry and was a specialist in aircraft and missile guidance systems, also helped draft the first major system acquisition directive while working in the Office of the Secretary of Defense. He eventually produced what might be considered the first comprehensive participant's history of post-Cold War military acquisition,

Acquiring Defense Systems: A Quest for the Best, in 1993, while teaching at the Defense Systems Management College.²² In 1996, Wilbur D. Jones, also a member of the faculty of the college, supplemented Acker's history with *From Packard to Perry: A Quarter Century of Service to the Defense Acquisition Community*, which describes the creation and operation of what is now the Defense Acquisition University.²³ Another participant-historian was Dov S. Zakheim, who served as Defense Department Comptroller from 2001 to 2004. Zakheim wrote an engaging and revealing memoir of his involvement, as the Deputy Under Secretary of Defense for Planning and Resources (1985–1987), in the project to produce Israel's ill-fated fighter, the Lavi.²⁴

Other relevant Cold War studies include the assessments of defense resource management by economist Charles J. Hitch,²⁵ who is acknowledged to be the father of the Planning, Programming, and Budgeting System when he served as Defense Department Comptroller under then–Defense Secretary Robert McNamara. There is also the classic study of the Navy's Polaris program by MIT political scientist Harvey M. Sapolsky,²⁶ and quite a bit of research by management analysts, especially J. Ronald Fox of the Harvard Business School.²⁷ Sapolsky's analysis of the Navy's ballistic missile submarine program was a model of its kind. However, its focus was not historical but instead (as the title makes clear) bureaucratic or—to use a less offensive term—organizational.

In 1962, Harvard Business School economists Merton J. Peck and Frederic M. Scherer produced *The Weapons Acquisition Process: An Economic Analysis*, a detailed study of a dozen major defense acquisition programs and of the interaction of industry professionals with their military counterparts. Their economic analysis identifies the three major factors in any major acquisition program: cost, schedule (or time), and product performance.²⁸ It also shows that trade-offs could be made among the three major factors, and it was their analysis that stimulated the use of quantitative metrics (such as cost/schedule control systems) in program management.²⁹

In the 1980s, researchers not then employed by the federal government or by a university also wrote very useful books and articles on military acquisition. Gordon Adams produced *The Iron Triangle: The Politics of Defense Contracting* for the Council on Economic Priorities in 1981. Thomas L. McNaugher, then on the staff of the Brookings Institution, published *New Weapons, Old Politics: America's Procurement Muddle* in 1989.³⁰ Both books, as well as a number of articles, popularized the metaphor of the iron triangle, the three-sided political relationship among defense contractors, military requirements officers, and members of Congress, and the way that the relationship dominated the military

acquisition process. Along with studies done by the GAO (now the Government Accountability Office), these publications highlight the continuing problem of rising costs for military systems.

However, then-Rear Admiral Donald L. Pilling (later the Vice Chief of Naval Operations) argued in his insightful *Competition in Defense Procurement* (1989) that the available evidence failed “to demonstrate statistically that procurement competition,” a key piece of acquisition reform, did “in fact reduce program cost.”³¹ Like I. B. Holley, Pilling was historian John Lukacs’s model investigator—an experienced, highly educated (PhD in mathematics) officer with an insider’s view of how decisions were made in the field of military acquisition. Pilling’s conclusions are sobering, though not quite as dramatically negative as those of Franklin Spinney in his *Defense Facts of Life: The Plans/Reality Mismatch*, published in 1985.³² Spinney argues that the Defense Department, given the way it practiced the acquisition of major systems, was on a sort of treadmill. The military services and the contractors they worked with would develop overly optimistic estimates of acquisition costs in order to gain a place in a service’s budget. Later, when the costs proved (almost always) to be higher than initially estimated, the number of systems procured would be reduced, leading to a military force with a smaller and smaller number of major systems.

Complementing these studies was the writing of journalist George C. Wilson, who for many years covered the Pentagon for *The Washington Post*. In 2000, he wrote a fine study of the defense budget process entitled *This War Really Matters: Inside the Fight for Defense Dollars*.³³ This slim volume, based on a series of interviews he conducted of Pentagon officials, was overshadowed by the attacks on the United States of September 11, 2001. It remains, however, a useful historical snapshot of defense budgeting because it illustrates the maneuvering over resources that took place within the Pentagon and among the military services before the terrorist attacks.

Another interesting memoir describing the interaction of the Executive Branch with Congress is James R. Locher’s *Victory on the Potomac: The Goldwater-Nichols Act Unifies the Pentagon*.³⁴ His perspective on civil-military relations and on the optimal chain of military command can be contrasted with that of former Secretary of the Navy John Lehman’s as presented in *Command of the Seas* or that in former Secretary of Defense Caspar Weinberger’s memoir, *Fighting for Peace*.³⁵ Moreover, what might be called “the Reagan years” or, for students of the Navy, “the Lehman years,” can be compared with a later time as presented by Robert M. Gates in his *Duty: Memoirs of a Secretary at War*, published in 2014.³⁶

HISTORIANS REDISCOVER ACQUISITION

To get an insightful and comprehensive historian's view of military acquisition, we had to wait for the publication of Paul A. C. Koistinen's *Arsenal of World War II: The Political Economy of American Warfare, 1940–1945*, in 2004. The subtitle is revealing. Koistinen defines the "political economy of warfare" as "the interrelations of political, economic, and military institutions in devising the means to mobilize resources for defense and to conduct war." He identifies four types of factors that shaped how the United States mobilized in wartime: "the level of maturity of the economy," "the size, strength, and scope" of the Federal Government, "the character and structure of the military services and the relation between them and civilian society and authority," and "the state of military technology."³⁷ He carried forward this perspective of political economy from his previous volumes, which covered the years from the creation of the American republic to World War II, and he also applied it to the Cold War years, in *State of War, 1945–2011*.³⁸

Koistinen chose the analytical perspective of political economy because military procurement (later more broadly defined by those doing it as "military acquisition") unavoidably involves the interaction of political and economic organizations (such as trade unions and industrial associations) and political and economic institutions (Congress, the defense bureaucracy, and the military services). Military acquisition is complex because it is a political as well as an economic and technical activity. This mix of politics, economics, law (especially contracting law), and technology is why Paul Koistinen chose to approach military acquisition from the perspective of political economy.

But is political economy history? Perhaps not. For example, in his survey of military acquisition from 1945 to 2011, Koistinen argues that the main lesson to be learned is that the military-industrial complex is "so entrenched in the economic, political, and social lives of the nation that it is nearly impossible to downgrade, let alone root out."³⁹ Koistinen agrees with Seymour Melman's argument that "the inefficiency and incompetence of the military-industrial sector inevitably spread out to affect, directly and indirectly, most functions of the civilian economy."⁴⁰ The result, according to Koistinen, has been a loss of American economic vitality and hence American power. This is obviously a very serious charge, and it illustrates how closely the study of history can be related to polemics about the meaning of history.

Economist Vernon W. Ruttan presents a very different perspective on the political economy of defense acquisition in *Is War Necessary for Economic Growth?* Ruttan argues in this book that Department of Defense investment

had in fact promoted technological advances in the following fields: jet aircraft, commercial nuclear power, semiconductors, mainframe computers, the internet, and satellite communications and navigation. Indeed, Ruttan's argument is that the U.S. economy is losing its vitality—despite the boom in personal digital devices—because the Defense Department is not investing in basic research the way it did during the early years of the Cold War.⁴¹ Whose assessment is correct? How can historical studies lead to an answer?

If John Lukacs was correct, if “Historical knowledge . . . is participant knowledge,”⁴² then how can one researcher get “participant knowledge” of a process that is so complex, so large, and that changes over time? The task is daunting, if only because—for the years since World War II—there is so much primary and secondary source material. This challenge of trying to survey such a huge mass of relevant material is perhaps the main reason why the literature on Cold War military acquisition contains interesting case studies of particular acquisition programs (like the F/A-18) and surveys of the development of specific types of systems, such as armored vehicles, but not many overarching historical assessments. Participant knowledge may be essential for detailed histories of specific programs, but it is almost impossible for anyone to participate in military acquisition at multiple levels in both government and private industry.

THE RECENT DEPARTMENT OF DEFENSE ACQUISITION HISTORIES

There is a way to tackle this methodological problem. At the end of the administration of former President William J. Clinton, the Under Secretary of Defense for Acquisition, Technology, and Logistics, Dr. Jacques Gansler, noted that “during the more than fifty years since the National Security Act of 1947, the Department of Defense acquisition function has experienced great change and received extraordinarily high public visibility and congressional attention. We are missing, however, a comprehensive record of Defense acquisition accomplishments and failures from which we may have an opportunity to learn.”⁴³ To remedy this problem, Gansler authorized funding for “The Defense Acquisition History Project,” the purpose of which was to cover in detail the history of military acquisition since World War II. Under Secretary of Defense Edward C. Aldridge continued the project, and it led to a symposium—“Providing the Means of War”—held at the Industrial College of the Armed Forces (ICAF) in September 2001.

At the symposium, historians and military analysts presented 15 papers of basically two types covering the years from 1945 to 2000.⁴⁴ The first surveyed the changes in military acquisition taking place across time. How did the laws governing acquisition change? How did military service acquisition organizations change? The second type dealt with specific acquisition programs or with issues identified as critical to the acquisition process. J. Ronald Fox, a distinguished student of acquisition on the faculty of Harvard Business School and a former assistant secretary of the Army, gave the keynote address at the symposium, and B. F. Cooling, an experienced historian and professor at ICAF, delivered the closing remarks. The symposium also included a panel discussion among Gansler; Paul Ignatius, a former secretary of the Navy; and Paul Kaminski, who preceded Gansler as Under Secretary of Defense for Acquisition and Technology.

The goal of the symposium was to discover what the various researchers could produce in a relatively short time. From the papers presented, it was clear that they had captured the major changes in military acquisition since World War II and had explored several of the most important acquisition issues. In short, the plan for the papers broke the history of military acquisition since 1945 into manageable pieces, relieving the historians brought into the project from the almost impossible task of trying to understand the whole history of military acquisition since the end of World War II.

Authors of the papers broke the chronology of acquisition into the following pieces: 1945–1958, 1959–1968, 1969–1980, 1981–1990, and 1990–2000. Specific acquisition programs addressed included the Navy's underwater sound surveillance system, early Air Force efforts to develop intercontinental ballistic missiles (ICBMs), the Navy's DASH maritime unmanned aerial vehicle, the Navy's FFG-7 frigates, the Army's Bradley fighting vehicle, and the Brilliant Pebbles missile defense system. Issues covered were the adequacy of contracts as the bridge between the military and industry, the value and potential drawbacks of concurrent development in a weapons program, the origins and effects of the Defense Acquisition Workforce Improvement Act, reducing acquisition schedules, and moving a system from research and development to initial production. The symposium papers and commentaries were published in 2005 as *Providing the Means of War: Historical Perspectives on Defense Acquisition, 1945–2000*.

In my view, *Providing the Means of War* is an essential publication for any historian interested in military acquisition since World War II. The papers and commentary in this volume tell you what acquisition is, how it differs from procurement, how it is governed by laws and regulations, and why it is a complex enterprise. As mentioned, the post-World War II disputes over service roles, the

control of nuclear material, the proper authority of the Secretary of Defense, and the nation's relationship with Europe and the Soviet Union overshadowed a series of changes in acquisition laws and organizations in the late 1940s and early 1950s.⁴⁵ In effect, changing the procurement model to an acquisition model was an incremental enterprise, if only because of the country's need during the initial stage of the Cold War to sustain a large conscript force that was equipped with adequate numbers of modern weapons.

One post-World War II lesson learned by the Air Force (an independent service as of July 26, 1947) was that it needed to abandon its wartime concept of acquisition as the mass production of aircraft and weapons and adopt a strategy of continuously developing technology and then integrating that technology into the service's organizational structure. But what way of doing that would be both effective and efficient, especially given constraints in defense funding? In short, how could the Air Force promote what came to be called an aerospace industry without creating a system of aircraft arsenals?⁴⁶ This was a major issue for the Air Force, which on its creation had inherited the Army Air Corps Materiel Division (for research and development) but did not inherit an in-house acquisition organization like the Naval Aircraft Factory.⁴⁷

The existing acquisition model was sequential. First a service conducted or sponsored research; then, based on that research, it explored the potential of an as yet undeveloped system. After exploratory development, a service acquisition organization could move ahead with prototype production and then, if the prototyping were successful, with quantity production. Once it was clear, however, that there was in fact a "cold" war between the United States and the Soviet Union, the model of sequential development and production was called into question, just as it had been in World War II. The practices put in place to deal with the drawbacks of the model of sequential development and production therefore mimicked somewhat the practices of World War II—parallel development (the USAF's decision to pursue simultaneously the Atlas and Titan ICBMs), concurrent development and production (used in missile and jet aircraft programs), and upgrades of existing systems.⁴⁸

What about the control and direction of acquisition inside the new Department of Defense? The 1958 Department of Defense Reorganization Act gave the Secretary of Defense real formal authority over military service budgeting and hence acquisition. Secretary of Defense Robert S. McNamara chose to use that authority aggressively. He and his assistants reduced the use by the services of cost contracts, created the Defense Supply Agency to procure items common to all the services, and championed the concept of Total Package Procurement,

where one contractor would develop, produce, and support a major system across that system's lifetime. But his major achievement in the field of acquisition was in structuring the development of the nation's nuclear forces, where he and his staff linked national strategy to nuclear war doctrine and then to acquisition.⁴⁹

There is no need to describe for military historians the political and bureaucratic backlash to Secretary McNamara's initiatives. But if he had been too strong an executive, infringing on the traditional—and perhaps even the legal—prerogatives of the military services, then what was the alternative? David Packard, the Deputy Secretary of Defense, provided the answer in 1970. It was a formal sequential process, mandated by the Secretary of Defense that was based on milestone reviews, and it became the basis for the 5000-series of Department of Defense Directives that still govern the process of acquiring major military systems. Under Packard—or because of Packard—the services adopted life-cycle costing, parametric cost estimating, and the idea of designing to cost, which made cost as important a governing factor in acquisition as schedule and performance.⁵⁰

The adoption of these initiatives did not fix military acquisition. It was one thing to develop and promulgate a logical, sequential acquisition process, but that process did not guarantee that what started it off—the adoption by a military service of a formal requirement—would lead to something that was both affordable and militarily effective. In the case of what became the Bradley fighting vehicle, for example, the General Accounting Office accused the Army of pushing ahead with a new system while it was still trying to figure out just how that system would be used. As critics of the Bradley pointed out, how could the infantry-carrying vehicle accompany the new M-1 tank when the tank was far better protected than the Bradley?⁵¹ The fracas over the Bradley ran right into the middle of the 1980s.⁵² Critics of the Army's acquisition process considered Bradley just another mistake like the reputedly failed Sheridan antitank tracked vehicle from the 1960s. Thoughtful critics saw the problem as one where the requirements process was not properly disciplined and therefore pushed unrealistic requirements on the Army's acquisition officials.

The solution to this sort of problem was a new round of legislative action. Congress funded the additional and modernized forces requested by Presidents James E. Carter and Ronald R. Reagan, but along with the increase in funding came new legislative mandates, including the Gramm-Rudman Deficit Reduction Act of 1984, the clause in the 1984 Department of Defense Authorization Act that required an office in the Defense Department to oversee operational test and evaluation, the Competition in Contracting Act of 1984, the Defense Procurement Improvement Act of 1985, and the Defense Acquisition Improvement Act of

1986.⁵³ David Packard was recalled to Washington to oversee yet another study of military acquisition. His study commission issued three reports between February and June 1986. Those reports argued that the acquisition process was still flawed, and Packard's group singled out a lack of cooperation between the services and the Office of the Secretary of Defense as a major source of problems. But Packard and those members of Congress who shared his views gained a victory in 1990 with the passage of the Defense Acquisition Workforce Improvement Act. The new law treated the acquisition workforce as a cadre of professionals who required special training and retraining as they advanced in their careers.⁵⁴

There was another wave of acquisition reform in the 1990s, this time triggered by the end of the Cold War and the need to shrink the size of the military and reduce the cost of acquisition. When he became Secretary of Defense in 1994, William J. Perry began a process of major acquisition reform. His initiatives included tailoring or even abandoning military specifications and standards in contracts, championing the use of "total quality management," fostering "dual-use" technologies, and writing solicitations to industry that were based on desired performance in order to push defense firms away from coming back to the Defense Department with only modifications of what they had already developed. He also created the post of Deputy Under Secretary of Defense for Acquisition Reform and gave the job to an experienced appointee. Congress weighed in with more legislation: the Federal Acquisition Streamlining Act of 1994, the Federal Acquisition Reform Act of 1995, and the Information Technology Management Reform Act of 1995. Perry's successor, William Cohen, inaugurated the Defense Reform Initiative in 1997, kicking off an effort labeled "the revolution in business affairs."⁵⁵

Providing the Means of War, which documented these and many other developments, was a success, and soon it was complemented by other studies. In 2008, the U.S. Army Center of Military History published Thomas C. Lassman's very useful history of research and development done by the military laboratories and research centers between 1945 and 2000.⁵⁶ Lassman's study methodology was innovative. He relies almost completely on unclassified sources, most from the national security trade press. He demonstrates that trade press publications can serve as a reliable and accurate source of changes within the services and the defense industry. In doing that, he highlights one way to overcome the unavoidable obstacles to research created by the classification of primary sources.

The historians executing the acquisition history project continued to produce fine studies. J. Ronald Fox, the dean of acquisition historians and analysts, cooperated with others involved in the project to produce *Defense Acquisition Reform*,

1960–2009: An Elusive Goal, in 2011.⁵⁷ Though this book focuses more on the 1990s than on earlier decades, it is wonderfully detailed and contains four excellent appendixes, one of which tracks changes to Department of Defense Directive 5000.1 from 1971 to 2008 and another that provides a chronology of 63 defense acquisition reforms from March 1966 to May 2001. The highlights of the acquisition history project, however, are four detailed acquisition histories. The first two are in print: Elliott V. Converse III's *Rearming for the Cold War, 1945–1960*, and Walter S. Poole's *Adapting to Flexible Response, 1960–1968*.⁵⁸ As of this writing (June 2015), three additional detailed studies are in draft form: *Department of Defense Acquisition History, Vol. III, 1969–1980*, with five chapters drafted by Walton S. Moody and the rest being prepared by David G. Allen; *Vol. IV, 1981–1990*, by Thomas C. Lassman and Andrew J. Butrica; and *Vol. V, 1991–2000*, by Philip L. Shiman.

These volumes, along with a separate compilation of primary source documents related to military acquisition, are the very useful and often insightful products of the Defense Acquisition History Project. Students of acquisition finally have detailed and thoughtful histories. The whole project is a credit to former Under Secretaries of Defense Jacques Gansler and Edward Aldridge and to their successors. Moreover, the project has come along like a deliberately planned and well-managed acquisition project. First was the symposium, which tested whether there was the talent available to produce excellent histories and whether a chronological organization would be suitable for a multivolume study. In effect, the symposium was a prototype, but it also produced some interesting and relevant case studies and, in that sense, it was like an advanced concept technology demonstrator. One of the better case studies is that of the Brilliant Pebbles project in the Strategic Defense Initiative Office, in which Donald R. Baucom, who had served as the official historian of the Brilliant Pebbles effort, shows how the same general policy guidelines could set the Office of the Secretary of Defense and a dedicated and innovative program manager at odds.⁵⁹

After the symposium came the 2008 study, based on what might be called the military-industrial complex's trade press. This was followed by J. Ronald Fox's 2011 effort to understand why defense acquisition reform was "an elusive goal." Now we also have two of the detailed acquisition history volumes and can look forward to three more. The success of the acquisition history project shows why it had to be a group effort. The subject—across time and multiple administrations and congresses—is just too large for one individual to comprehend. But the two volumes in print so far also show what good historians can do even if they lack an insider's or participant's perspective. One weakness of Paul

Koistinen's volume on the years 1945–2011 is his reliance on secondary sources, especially those that do not necessarily throw light on the day-to-day workings of military acquisition. The two volumes of the acquisition history project do not have that same weakness. They were written by historians who are more familiar with the details of the acquisition process and are therefore better able to understand and describe it.

THE STUDY OF INNOVATION AS A SUBSET OF THE STUDY OF ACQUISITION

Innovation in military acquisition forms an important subfield of the study of military acquisition in general. In the case of the Navy, both those with and without participant knowledge have produced such studies. Serious studies by insiders range from a detailed discussion of Admiral Hyman G. Rickover's administration of the nuclear-powered submarine program⁶⁰ to Admiral William Owens's account of how he and Admiral Frank Kelso altered the workings of the Office of the Chief of Naval Operations in the wake of the Cold War.⁶¹ Other studies of post-World War II naval innovation include Owen Cote's *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines*, James Blaker's *Transforming Military Force: The Legacy of Arthur Cebrowski and Network Centric Warfare*, and *Innovation in Carrier Aviation*, by the author of this paper and his coauthors, Norman Friedman and Mark D. Mandeles.⁶² In 1998, Mandeles also wrote a useful and insightful study of innovation in the development of the design of the U.S. Air Force's B-52.⁶³

Robert O. Work, a retired Marine colonel who served as Under Secretary of the Navy and is now the Deputy Secretary of Defense, is also a prolific writer and careful student of the Navy. While serving as an analyst with the Center for Strategic and Budgetary Assessments prior to being appointed Under Secretary of the Navy, he wrote unclassified but very detailed studies of the genesis of the littoral combat ship and the concept of seabasing.⁶⁴ There is, however, room for more research on innovation—assuming that there is adequate unclassified information to sustain a serious inquiry. Are there really general guidelines for promoting innovation in military acquisition, or does the field change all the time, blocking the utility of inferences often referred to as lessons learned? Joy D. Mikulcik addressed the issue of organizational culture and innovation in a 2004 study of the Air Force Materiel Command, and John T. Dillard took on the issue in 2003 of whether “centralized control” of acquisition programs was in fact

beneficial or harmful to innovation.⁶⁵ The products of the Defense Acquisition History Project will strengthen future versions of these sorts of investigations.

PROGRAMMING AND BUDGETING

The fields of programming/budgeting and military acquisition, though intimately related, are different, attract different types of people, and have spawned their own literatures. But what about the issues? Do these bring the two areas together? One major issue is methodology: how can two different areas of professional work that interact be systematically studied? Programming is supposed to bridge the gap between the different fields of budgeting and acquisition. Programmers are supposed to do the reviews that are so essential to the management of acquisition. But studies of the relationship of programmers to budget staffs on the one side and acquisition managers and their staffs on the other side tend to be done by management specialists and not by historians. Does this mean that historians have little to offer?

Likely making matters worse is the recent insistence by members of Congress that the Department of Defense empower “chief financial officers” to promote accrual-based accounting at the service level and “chief management officers” to do the same for “performance-based management.”⁶⁶ The pressure to make the military services (and the Defense Department generally) more like businesses has been steady, but it is not based on evidence that moving ahead with these changes will make the acquisition and programming/budgeting process more effective and efficient.⁶⁷ This is, I believe, one area where historians can contribute. To do that, however, they will have to study whether management innovations have been effective in private enterprises, and that is something the private sector may not allow.

OBSTACLES TO RESEARCH

Historians cannot do their work if they cannot see official papers, especially those that are generated in interactions between a government acquisition office and a private contractor. A good illustration is the story of the A-12, the Navy’s stealth carrier attack aircraft. Though canceled in 1991 by the Navy, the program’s legal issues dragged on for more than two decades and, because the government and the Navy’s contractors were at odds, it could not be clear to historians just which

pieces of evidence (including interviews) were reliable.⁶⁸ Moreover, the A-12 program was classified above top secret, and therefore it was going to take some years for all the pertinent information to become known. Classification obviously impedes research. In addition, far too little is known about the histories of the major defense firms. There are a few biographies that focus on key individuals, and a few case studies that cover specific systems, but nothing I know of to compare with Peter Drucker's *Concept of the Corporation*, a classic study of management in General Motors.⁶⁹ Some journalistic accounts of management in defense firms, however, suggest that the area is well worth scholarly study.⁷⁰

WHAT QUESTIONS SHOULD BE ASKED OF THE DATA?

Despite these obstacles to historical research, some questions are obviously important. Does it make sense to talk of a military-industrial complex? Is it a useful concept in studying military acquisition? If not, have historians developed a better concept? Has program budgeting been a useful, effective management tool? Is it still? How would we know? Do major military systems, such as ships, aircraft, missiles, and fighting vehicles, cost too much? If I compare the constant dollar cost of a ship today with the constant dollar cost of a similar ship from 50 or 75 years ago, what will I find? Is that sort of comparison even a historical exercise? Or is it a form of analysis that belongs to some other discipline, such as operations research or economics? What is the most effective way to study the influence of science and technology on the military services? How reliable are the oral histories of individuals involved in military acquisition or defense programming and budgeting? Was the Goldwater-Nichols legislation effective? How has implementing it influenced the planning, programming, budgeting, and execution process, or the defense acquisition process?⁷¹

The Navy embraced the Maritime Strategy in the 1980s. The literature on what the strategy was, who developed it, and how it was tested in exercises is large,⁷² but how exactly did it shape programs and budgets? According to Navy Captain Peter Swartz, who certainly possessed what historian John Lukacs called "participant knowledge," the essential historical records are those of OP-603, the Strategic Concepts Group in the Office of the Chief of Naval Operations. As Swartz observed in his 1987 *Addendum to "Contemporary U.S. Naval Strategy: A Bibliography,"* the "operator-strategists" in OP-603 worked almost entirely out of sight of "the general and national security affairs academic publics," and what they produced was "largely classified"⁷³ and adopted by senior Navy officers and

civilians such as Navy secretary John Lehman. This poses a very real problem of access for researchers, though the recent publication of *Toward a New Maritime Strategy: American Naval Thinking in the Post-Cold War Era*, by Captain Peter D. Haynes, shows what a careful researcher can achieve with the information that is available.⁷⁴

CONCLUSION

So where are we? First, I think that Lukacs has a point. Historians who write about programming or acquisition will find it easier to master the subject if they have experienced these processes first hand. But how can historians gain this knowledge? Even if they have firsthand knowledge, what historical concepts can they use to organize their knowledge? Second, the questions that matter to historians may not matter to the people and organizations that they are studying, and that may make it difficult if not impossible for historians to obtain the access to records that they need. If they or their students do eventually gain access to once classified records, how will they know that their reconstructions of events, motives, and the views of participants are correct? Third, researchers (and not just historians) always run the risk in investigating activities such as programming and acquisition of missing the point or of drawing questionable inferences. I believe these are the reasons why—for the Navy—there is no history that quite compares with I. B. Holley's *Buying Aircraft*.

However, the Defense Acquisition History Project has shown that there are historians capable of conducting the research, and the federal government has a good track record of releasing once classified documents. One of the major insights from such research is the deliberate development by the Cold War Navy of digital systems that allowed its antisubmarine forces to switch from active sensing and targeting of enemy submarines to passive sensing and then passive targeting of submerged enemy submarines.⁷⁵ This was ambitious and creative technological development, and now we know what was done and why it mattered. Just how it was done and who specifically did it is an area of study open to the next generation of historians.

Notes

- 1 Stephen Coonts, *The Minotaur* (New York: Dell, 1990).
- 2 John Lukacs, "The Historiographical Problem of Belief and Believers: Religious History in the Democratic Age," reprinted in *Remembered Past*, ed. by Mark G. Malvasi and Jeffrey O. Nelson (Wilmington, DE: ISI Books, 2005), 128.
- 3 Irving Brinton Holley Jr., *Buying Aircraft: Materiel Procurement for the Army Air Forces* (Washington, DC: Department of the Army, Office of the Chief of Military History, 1964). This volume was reprinted by the Office of Air Force History in 1989. Compare it with H. C. Thomson and L. Mayo, *The Ordnance Department: Procurement and Supply* (Washington, DC: Office of the Chief of Military History, Department of the Army, 1960). The latter lacks the detail and the insights found in *Buying Aircraft*.
- 4 Irving Brinton Holley Jr., *Ideas and Weapons* (New Haven, CT: Yale University Press, 1953). This volume was reprinted in 1983 by the Office of Air Force History.
- 5 Other related volumes in the U.S. Army's series on World War II are: C. M. Green, et. al., *Planning Munitions for War* (Washington, DC: Department of the Army, Office of the Chief of Military History, 1955), and H. C. Thompson and L. Mayo, *The Ordnance Department: Procurement and Supply* (Washington, DC: Department of the Army, Office of the Chief of Military History, 1960).
- 6 See Rear Adm. Julius Augustus Furer, *Administration of the Navy Department in World War II* (Washington, DC: Department of the Navy, 1959); Buford Rowland and William Boyd, *U.S. Navy Bureau of Ordnance in World War II* (Washington, DC: GPO, 1954); Duncan S. Ballantine, *U.S. Naval Logistics in the Second World War* (Princeton, NJ: Princeton University Press, 1949); Robert H. Connery, *The Navy and the Industrial Mobilization in World War II* (Princeton, NJ: Princeton University Press, 1951); and Archibald D. Turnbull and Clifford L. Lord, *History of United States Naval Aviation* (New Haven, CT: Yale University Press, 1949).
- 7 Richard M. Leighton and Robert W. Coakley, *Global Logistics and Strategy, 1940–1943* (Washington, DC: U.S. Army Center of Military History, 1955), and Robert W. Coakley and Richard M. Leighton, *Global Logistics and Strategy, 1943–1945* (Washington, DC: Office of the Chief of Military History, U.S. Army, 1968).
- 8 This notion that each new acquisition program was a case study in the acquisition process is one developed by Norman Friedman. In a conversation with me, he noted that the many comparisons of different acquisition programs by analysts (especially at RAND) were based on the assumption that each was a particular case of a general process, and that studying the cases was the key to better understanding the process.
- 9 See 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 Barlow, *Revolt of the Admirals: The Fight for Naval Aviation, 1945–1950* (Washington, DC: Naval Historical Center, Department of the Navy, 1994).
- 10 Orr Kelly, *Hornet: The Inside Story of the F/A-18* (Shrewsbury, England: Airlife Publishing, 1990), and Glenn E. Bugos, *Engineering the F-4 Phantom II: Parts into Systems* (Annapolis, MD: Naval Institute Press, 1996).
- 11 Barrett Tillman, *Hellcat: The F6F in World War II* (Annapolis, MD: Naval Institute

- Press, 2000); Tillman, *Wildcat: The F4F in World War II* (Annapolis, MD: Naval Institute Press, 2001); Tillman, *Dauntless Dive Bomber of World War II* (Annapolis, MD: Naval Institute Press, 2006); Tillman, *Corsair: The F4U in World War II and Korea* (Annapolis, MD: Naval Institute Press, 2014); and Tillman, *MiG Master: The Story of the F-8 Crusader* (Annapolis, MD: Naval Institute Press, 2014). This is just a sampling of Tillman's books in print. He also has numerous articles to his credit. See also Tommy H. Thomason, *U.S. Naval Air Superiority: Development of Shipborne Fighters, 1943–1962* (North Branch, MN: Specialty Press, 2007); and Thomason, *Strike from the Sea: U.S. Navy Attack Aircraft from Skyraider to Super Hornet, 1948–Present* (North Branch, MN: Specialty Press, 2009). Thomason, an experienced flight test engineer, is another student of aircraft development. See also Dennis R. Jenkins, *F/A-18 Hornet: A Navy Success Story* (New York: McGraw-Hill, 2000). This is an interesting account of a controversial aircraft and the development of modern fighters by another engineer who has written about contemporary Navy aircraft. This book is one of a series edited by the accomplished aerospace historian Walter J. Boyne.
- 12 Norman Friedman, *U.S. Aircraft Carriers: An Illustrated Design History* (Annapolis, MD: Naval Institute Press, 1983); Friedman, *U.S. Cruisers: An Illustrated Design History* (Annapolis, MD: Naval Institute Press, 1984); Friedman, *U.S. Battleships: An Illustrated Design History* (Annapolis, MD: Naval Institute Press, 1985); Friedman, *U.S. Amphibious Ships and Craft: An Illustrated Design History* (Annapolis, MD: Naval Institute Press, 2002); and Friedman, *U.S. Destroyers: An Illustrated Design History*, rev. ed. (Annapolis, MD: Naval Institute Press, 2004). As in Tillman's case, this is just a sampling of a long list of books, some of them quite analytical, such as *Network-Centric Warfare: How Navies Learned to Fight Smarter Through Three World Wars* (Annapolis, MD: Naval Institute Press, 2009). See also Norman Polmar, *Aircraft Carriers: A History of Carrier Aviation and Its Influence on World Events, Vol. II, 1946–2006* (Dulles, VA: Potomac Books, 2008); and Polmar and K. J. Moore, *Cold War Submarines: The Design and Construction of U.S. and Soviet Submarines, 1945–2001* (Dulles, VA: Potomac Books, 2005). Polmar, a contemporary of Friedman, has also published a number of books about naval warfare.
 - 13 Norman Friedman, *U.S. Amphibious Ships and Craft: An Illustrated Design History* (Annapolis, MD: Naval Institute Press, 2002); Friedman, *Submarine Design and Development* (Annapolis, MD: Naval Institute Press, 1984); Friedman, *The Postwar Naval Revolution* (Annapolis, MD: Naval Institute Press, 1986); Friedman, *Unmanned Combat Air Systems: A New Kind of Carrier Aviation* (Annapolis, MD: Naval Institute Press, 2010); Friedman, *Seapower and Space* (Annapolis, MD: Naval Institute Press, 2000); and Friedman, *Network-Centric Warfare: How Navies Learned to Fight Smarter Through Three World Wars* (Annapolis, MD: Naval Institute Press, 2009). Friedman also wrote what is likely the classic description of the trade-off process involved in setting warship requirements: *Modern Warship Design and Development* (New York: Mayflower Books, 1979). He also wrote *US Naval Weapons: Every Gun, Missile, Mine and Torpedo Used by the US Navy from 1883 to the Present Day* (Annapolis, MD: Naval Institute Press, 1985).
 - 14 Norman Friedman, *The Fifty-Year War: Conflict and Strategy in the Cold War* (Annapolis, MD: Naval Institute Press, 2000). You can see some of the roots of *The Fifty-Year War* in Friedman's *The Postwar Naval Revolution* (Annapolis, MD: Naval Institute Press, 1986).

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 - 21 *Exploring a New Defense Management System*, Paper P-3756 (Alexandria, VA: Institute for Defense Analyses, April 2003). Col. Steven R. Grimes, “PPBS to PPBE: A Process or Principles?” (Carlisle Barracks, PA: Army War College, 2008).
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 - 25 Charles J. Hitch and Roland N. McKean, *The Economics of Defense in the Nuclear Age* (Cambridge, MA: Harvard University Press, 1961). Also Hitch, *Decision-Making for Defense* (Berkeley, CA: University of California Press, 1965). Hitch was head of the economics program at RAND from 1948 to 1961, when he was appointed the Comptroller of the Department of Defense by Secretary of Defense Robert McNamara. It is worth finding and reading his four lectures on “Decision-Making in the Department of Defense,” April 5–9, 1965, published by the University of California at Berkeley. Also see his “Management Problems of Large Organizations,” *Operations Research* Vol. 44, No. 2 (March–April 1996), 257–64.
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- 31 Donald L. Pilling, *Competition in Defense Procurement* (Washington, DC: Brookings Institution, 1989), 15.
- 32 Franklin C. Spinney, *Defense Facts of Life: The Plans/Reality Mismatch* (Boulder, CO: Westview Press, 1985). Spinney was an analyst in the program analysis and evaluation office in the Office of the Secretary of Defense. His book was based on a Pentagon briefing that he had given for several years.
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- 36 Robert M. Gates, *Duty: Memoirs of a Secretary at War* (New York: Alfred A. Knopf,

- 2014). The title is revealing: “Secretary *at* War” instead of “Secretary *of* War.” In this, Gates describes his efforts to get special mine-resistant vehicles—MRAPs—to troops fighting in Iraq and Afghanistan. The account exposes the character of the acquisition process in the Department of Defense. The Secretary wanted to save soldiers’ lives, but Army acquisition professionals, reacting to the policy embodied in Department of Defense Directive 5000.1, did not want a one-off vehicle that would be used only in Iraq and Afghanistan and then abandoned.
- 37 Paul A. C. Koistinen, *Arsenal of World War II: The Political Economy of American Warfare, 1940–1945* (Lawrence, KS: University Press of Kansas, 2004), 2. For a different history of World War II mobilization, see Maury Klein, *A Call to Arms: Mobilizing America for World War II* (New York: Bloomsbury Press, 2013). Klein regards the “greatest generation” claim as a myth, and he uses mostly secondary sources to point out that national mobilization was often confused and almost always controversial. His perspective is useful for any student of mobilization in World War II because he has studied and written extensively about American industry, especially railroads.
- 38 Koistinen produced a set of five volumes on “the political economy of American warfare” (from p. 1 of *State of War, 1945–2011*; see below). Paul A. C. Koistinen, *Beating Plowshares into Swords: The Political Economy of American Warfare, 1606–1865* (Lawrence: University Press of Kansas, 1996); *Mobilizing for Modern War: The Political Economy of American Warfare, 1865–1919* (Lawrence: University Press of Kansas, 1997); *Planning War, Pursuing Peace: The Political Economy of American Warfare, 1920–1939* (Lawrence: University Press of Kansas, 1998); *Arsenal of World War II*; and *State of War: The Political Economy of American Warfare, 1945–2011* (Lawrence: University Press of Kansas, 2012).
- 39 Paul A. C. Koistinen, *State of War: The Political Economy of American Warfare, 1945–2011* (Lawrence: University Press of Kansas, 2012), 237.
- 40 *Ibid.*, 215. In *State of War*, p. 7, Koistinen notes that the “nearly overwhelming collection” of secondary sources “amply met the reference requirements for this book, without further research in primary documents.”
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- 44 Shannon A. Brown, ed., *Providing the Means of War: Historical Perspectives on*

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- 47 See William F. Trimble, *Wings for the Navy: A History of the Naval Aircraft Factory, 1917–1956* (Annapolis, MD: Naval Institute Press, 1990).
- 48 John Lonnquest, “Building Missiles: Concurrency and the Legacy of the Early Air Force ICBM Program,” in *Providing the Means of War*, 97–110.
- 49 Walter S. Poole, “Acquisition in the Department of Defense, 1959–1968: The McNamara Legacy,” in *Providing the Means of War*, 79–96.
- 50 Shannon A. Brown with Walton S. Moody, “Defense Acquisition in the 1970s: Retrenchment and Reform,” in *Providing the Means of War*, 141–68.
- 51 W. Blair Haworth Jr., “Moving Target: The U.S. Army Infantry Fighting Vehicle Program in the 1970s,” in *Providing the Means of War*, 183–98.
- 52 James G. Burton, *The Pentagon Wars: Reformers Challenge the Old Guard* (Annapolis, MD: Naval Institute Press, 2014). Burton illustrates the tension between a service acquisition process (in this case, the Army’s) and the efforts of the Office of the Secretary of Defense to discipline that process when it did not conform to the Department of Defense directive to conduct realistic live-fire tests of systems before approving full-rate production.
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- 54 James H. Edgar, “The Origins and Impact of the Defense Acquisition Workforce Improvement Act (DAWIA),” in *Providing the Means of War*, 261–82.
- 55 Philip L. Shiman, “Defense Acquisition in an Uncertain World: The Post-Cold War Era, 1990–2000,” in *Providing the Means of War*, 283–316.
- 56 Thomas C. Lassman, *Sources of Weapon Systems Innovation in the Department of Defense: The Role of In-House Research and Development, 1945–2000* (Washington, DC: Center of Military History, 2008).
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- 58 Elliott V. Converse III, *Rearming for the Cold War, 1945–1960* (Washington, DC: Historical Office of the Office of the Secretary of Defense, 2012), and Walter S. Poole, *Adapting to Flexible Response, 1960–1968* (Washington, DC: Historical Office of the Office of the Secretary of Defense, 2013).
- 59 Donald R. Baucom, “The Strategic Defense Initiative and Acquisition Reform: The Case of Brilliant Pebbles,” in *Providing the Means of War*, 225–60.
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- 62 Owen R. Cote Jr., *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines* (Newport, RI: Naval War College Press, 2003). James R. Blaker, *Transforming Military Force: The Legacy of Arthur Cebrowski and Network Centric Warfare* (Westport, CT: Praeger Security International, 2007). Thomas C. Hone, Norman Friedman, and Mark D. Mandeles, *Innovation in Carrier Aviation* (Newport, RI: Naval War College Press, 2011).
- 63 Mark D. Mandeles, *The Development of the B-52 and Jet Propulsion: A Case Study in Organizational Innovation* (Maxwell Air Force Base, AL: Air University Press, 1998).
- 64 Robert O. Work, *Naval Transformation and the Littoral Combat Ship* (Washington, DC: Center for Strategic and Budgetary Assessments, 2004) and Work, *Thinking About Seabasing: All Ahead, Slow* (Washington, DC: Center for Strategic and Budgetary Assessments, 2006).
- 65 John T. Dillard, *Centralized Control of Defense Acquisition Programs: A Comparative Review of the Framework from 1987 to 2003* (Monterey, CA: Naval Postgraduate School, 2003). Joy D. Mikulcik, *Challenges Facing Military Organizational Cultural Reform: A Study of the 2004 Air Force Materiel Command Reorganization*, AFIT/GRD/ENV/06M-10 (Wright-Patterson AFB, OH: Air Force Institute of Technology, 2012). For a candid assessment of changes to the defense acquisition process, see Mark Cancian, "Acquisition Reform: It's Not as Easy as It Seems," *Acquisition Review Quarterly* (Summer 1995), 189–98.
- 66 See Douglas A. Brook, et. al., "Implementation of the Chief Management Officer in the Department of Defense, An Interim Report" (Monterey, CA: Center for Defense Management and Research, Naval Postgraduate School, 2013).
- 67 See "Department of the Navy Business Transformation Plan, Fiscal Year 2013 & Fiscal Year 2012 Annual Report," approved by the Under Secretary of the Navy on 28 December 2012.
- 68 See James P. Stevenson, *The \$5 Billion Misunderstanding: The Collapse of the Navy's A-12 Stealth Bomber Program* (Annapolis, MD: Naval Institute Press, 2001), and Herbert L. Fenster, "The A-12 Legacy: It wasn't an Airplane—It Was a Train Wreck," U.S. Naval Institute *Proceedings* 125 (Feb. 1999), 33–39. Neither the article (written by a lawyer representing one of the parties to the court case) nor the book can be entirely trusted because the program documentation was so highly classified. The court case was not finally settled until 2014, almost 25 years after the Navy's decision to cancel the program.
- 69 Peter Drucker, *Concept of the Corporation* (New York: John Day, 1946). Drucker was a young and not yet famous management consultant when he persuaded

Donaldson Brown of General Motors to allow him to study how the firm was run. However, Alfred Sloan, the Chairman of GM, did not like *Concept of the Corporation*, and his dislike of the book may have persuaded other executives to close their doors to Drucker and others like him. There is one thoughtful memoir of a major company engineer and executive who dealt with the Navy after World War II: Edward H. Heinemann and Rosario Rausa, *Ed Heinemann: Combat Aircraft Designer* (Annapolis, MD: Naval Institute Press, 1980). There are also George A. Spangenberg's reminiscences (31 August 1997), available as *George Spangenberg Oral History*, 2010, at www.georgespangenberg.com. Spangenberg was a member of the Bureau of Aeronautics (later the Naval Air Systems Command) staff from the end of piston-engine aircraft through the swing-wing F-14. Heinemann is well known within the community of people who love airplanes as the designer of the SBD and BT2D in World War II and the A4D in the decade after the war.

- 70 See "How the Deal Was Done: The Lockheed-Martin Marietta Merger," by Ted Shelsby, *Baltimore Sun* (March 12, 1995), for an account of how leaders of defense firms reacted in response to the Department of Defense's warning after the Cold War that defense firms would have to merge or leave the field of defense acquisition. One of the key figures in this post-Cold War drama was Norman R. Augustine, chief executive officer of Martin-Marietta. He has not published a memoir. The closest he has come is "Managing to Survive in Washington: A Beginner's Guide to High-Level Management in Government" (Washington, DC: Center for Strategic and International Studies, 2000).
- 71 The literature on the Goldwater-Nichols act and its consequences is large. It includes articles defending the legislation: James R. Locher III, "Taking Stock of Goldwater-Nichols," *Joint Force Quarterly*, No. 13 (Autumn 1996), 10–16, and "Has It Worked? The Goldwater-Nichols Reorganization Act," *Naval War College Review*, Vol. LIV, No. 4 (Autumn 2001), 95–115. It also includes a very perceptive assessment by Archie D. Barrett, then the Principal Deputy Assistant Secretary of the Army for Manpower and Reserve Affairs, in *Joint Force Quarterly*, No. 13 (Autumn 1996), 13. These are just the tip of the iceberg. See also Linda H. Flanagan, *The Goldwater-Nichols Act: The Politics of Defense Reorganization* (Cambridge, MA: Harvard University Press, 1992); James Kitfield, *Prodigal Soldiers: How the Generation of Officers Born of Vietnam Revolutionized the American Style of War* (New York: Simon & Schuster, 1995); Thomas L. McNaugher and Roger L. Sperry, *Improving Military Coordination: The Goldwater-Nichols Reorganization of the Department of Defense* (Washington, DC: Brookings Institution, 1994); Adm. William J. Crowe and David Chanoff, *The Line of Fire: From Washington to the Gulf, the Politics and Battles of the New Military* (New York: Simon & Schuster, 1993); Jay C. Mumford, "Reinventing Government: The Case of the Department of Defense," *Public Administration Review* 56, No. 2 (March/April 1996), 219–20; Adm. William A. Owens and James R. Blaker, "Overseeing Cross-Service Trade Offs," *Joint Force Quarterly*, No. 13 (Autumn 1996), 37–38; Gen. Colin L. Powell, interview, "The Chairman as Principal Military Advisor" *Joint Force Quarterly*, No. 13 (Autumn 1996), 29–36; L. Parker Temple III, *Implosion: Lessons Learned from National Security, High Reliability Spacecraft, Electronics, and the Forces Which Changed Them* (Hoboken, NJ: Wiley-IEEE Press, 2012); Gordon N. Lederman, *Reorganizing the Joint Chiefs of Staff: The Goldwater-Nichols Act of 1986* (Westport, CT: Greenwood Press, 1999); and Charles Nemfakos, Irv Blickstein, Aine

S. McCarthy, and Jerry M. Sollinger, “The Perfect Storm: The Goldwater-Nichols Act and Its Effect on Navy Acquisition,” (Washington, DC: RAND, 2010). Most of the available literature is partisan, either supporting or criticizing the Goldwater-Nichols Act and its consequences.

- 72 See *The Maritime Strategy*, a special supplement to *Proceedings* of the U.S. Naval Institute, Jan. 1986; also Peter M. Swartz, *Addendum to “Contemporary U.S. Naval Strategy: A Bibliography”*, (Annapolis, MD: U.S. Naval Institute, 1987). The Swartz bibliography is understandably comprehensive because he was one of the developers of “The Maritime Strategy.” The importance of “The Maritime Strategy” to the Navy of the 1980s is clear. The Navy’s senior officers still discuss updating or revising it. The persistence of the idea of a maritime strategy unique to the Navy suggests a parallel to War Plan Orange developed within the Office of the Chief of Naval Operations in the 1920s. But did “The Maritime Strategy” influence the Navy the way that the Plan Orange did? Some possible answers to this question are in “The Maritime Strategy,” U.S. Naval Institute Professional Seminar Series, Naval Air Station, Jacksonville, FL, 29 May 1986. How would a historian know about this interesting publication if he or she did not have a contact within the U.S. Naval Institute?
- 73 See the *Addendum*, cited above, 14-1.
- 74 Peter D. Haynes, *Toward a New Maritime Strategy: American Naval Thinking in the Post-Cold War Era* (Annapolis, MD: Naval Institute Press, 2015).
- 75 Norman Friedman, *Network-Centric Warfare: How Navies Learned to Fight Smarter Through Three World Wars* (Annapolis, MD: Naval Institute Press, 2009).

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U.S. Navy photo

Chapter 5

The Navy, Science, and Professional History

by Gary E. Weir

This analysis will focus on the United States Navy as participant and patron in relation to the scientific community since the opening of the 20th century. The sciences that have played the greatest role in furthering the naval mission will take center stage, viz., physics, the earth sciences, and oceanography. This exploration will not venture into the literature relating to what the Office of Naval Research (ONR) would place outside the realm of federal basic research and exploratory development funding. Thus, the historical literature on the history of technology, and the applications that emerged from scientific work, will play no role here. That is a specialized field all its own. In the present essay, I shall critically touch on the more insightful works in the history of the Navy's interaction with the scientific community, seeking to reveal the direction and nature of current scholarly inquiry.

My work as a naval historian first touched the history of science when I began exploring the ocean environment as the submarine's natural habitat. I initiated work in the history of oceanography as soon as the ocean emerged in my research as a significant element in the design, construction, and operation of these remarkable vessels. From World War II onward, the environment below the ocean surface and its varying characteristics, especially temperature, pressure, and depth, defined the limits of submarine operations. These same attributes challenged engineers and designers as they developed successive generations of submarines. Of course the most important element in undersea warfare involves an understanding of ocean acoustics. As the submarine began to inhabit the ocean

depths for longer periods with silence and detection constant concerns, understanding the forces governing sound in the depths became essential. I needed to appreciate the scientific aspect of undersea warfare and how the Navy responded over the years to the challenges the ocean presented. Thus, more than a passing familiarity with the best literature on the Navy and the scientific community became necessary.

A review of the historiography in any field naturally leads a historian to look first at the broader treatments of the subject, which usually provide a foundation for further work. In this case a reader might expect that I would begin with comments on studies like James Phinney Baxter's *Scientists Against Time*, which reviewed in a penetrating manner the effort to mobilize science to defeat the Axis in World War II. In the process, Baxter won the Pulitzer Prize for history in 1947.¹ Moving to the Cold War, I might use David Allison's fine contribution on postwar naval research to Merritt Roe Smith's compendium, *Military Enterprise and Technological Change*.² For this presentation, however, I have decided to take quite another approach.

In my present position as chief historian at the National Geospatial-Intelligence Agency, I have learned to come to terms with the one perpetual feature of our history that emerges from every source, text, media, and oral history. I refer to the fault lines between the intelligence tradecrafts that came together to form our agency in 1996. The stovepipes that protect each tradecraft have, over the last 20 years, aggressively discouraged collaboration. In the late 1990s, our agency actually viewed the placement of cartographers and imagery analysts in the same office as a risky experiment. Thankfully, as a result of good leadership and some extraordinary developments in methodology, the divisions have softened considerably over the past decade.

As historians, we all realize that the cultural identity of professional communities and the traditions and practices that define them can strongly resist any effort at redefinition, combination, or prolonged collaboration. Very often, even the importance of the mission cannot persuade a stovepiped community to understand that a combination of skills may prove stronger by an order of magnitude for mission success than any singular approach.

As historians, we can also become too comfortable in our splendid isolation. Are we historians of science or naval historians? I imagine that all historical professionals can stand up and define themselves given their training and special interest. As long as we remain within our special category we feel safe. As naval historians, we take comfort in and satisfaction from exploring and understanding a culture that has absorbed many of us for decades. We examine the nature of

the naval experience, its ships, its internal structure, its leaders, and its role in the national defense. We carefully dissect the Navy's internal practices, its reward structure, its educational institutions, and its role in the national life.

What happens when we must invite a foreign element into our efforts to understand the Navy? What happened when a scholar like Frank Duncan had to wrestle with nuclear physics in his relentless effort, through multiple studies including a very fine biography, to understand his career-long, fascinating burden: Hyman George Rickover? Duncan touched the laboratory world of General Dynamics, General Electric, and Westinghouse. He had to explore the administrative interaction between the Navy and industry in the effort to create the nuclear Navy. He achieved an understanding of entities that were not naval in nature, which operated by different standards, and for the profit motive. He also offered some of the most important insights into the Navy's nuclear program produced by any historian. He managed this only because he reached outside his naval history experience, encountered the business, scientific, and engineering communities, and worked hard through research and human contact to understand those cultures. He revealed the product of their encounter with the Navy in his history of Rickover, the nuclear Navy, and in his earlier work on the Atomic Energy Commission with Richard Hewlett. He taught us the discipline of technology as Rickover viewed it and as industry and science understood it.³ He profitably crossed the cultural boundary through a concerted effort to understand all of the components that contributed to the understanding he wished to achieve and share.

William M. McBride's work on science and the Navy has accomplished much the same. In his work on the Navy's "alliance" with academia he demonstrated the nature of the conversation, born in the 19th century, between university-based science and naval officers. He also provided insights into the distinction between line officers and the engineering corps, that arm of the service constantly linked in many ways to scientific developments. The Navy of the Great War itself had a way to go before it realized how much it truly depended on science's growing knowledge of the natural world, especially in the area of undersea warfare. McBride permitted us to look closely at the opportunities World War I offered both to pure science and to naval officers motivated to enable science within the naval service.⁴

This need to reach beyond the boundaries of strictly defined naval history as suggested by Duncan and McBride also led Kathleen Broome Williams to explore the world of computer development in her biography of Rear Admiral Grace Hopper and the personal struggles of a number of important women in her

volume on the improbable female warriors who managed to penetrate the world of science and technology.⁵

In one of her warrior portraits, Professor Williams examines the career of a scientist of my acquaintance, Mary Sears. To understand the life of Mary Sears and her accomplishments, any historian would have to set aside all naval history assumptions and intellectually embrace Sears in her context as a marine biologist at the Woods Hole Oceanographic Institution (WHOI). Sears served in the Navy as a WAVE (Women Accepted for Volunteer Emergency Service) during World War II, but she became a vital part of the wartime role of ocean science and an important link with the Navy given her senior position at the Hydrographic Office. At one point in my research at Woods Hole, I uncovered a letter written by the institution director, Columbus Iselin, in which he accidentally referred to Sears with the male personal pronoun. She had become a natural part of the male-dominated ocean science community. Even as a WAVE she lived as a physical part of WHOI and a thread in the ocean science fabric.

Williams provides an excellent model for the type of historical analysis that can successfully and willingly cross between professional cultures to examine aspects of the naval experience that we can illuminate only in that way. She has successfully overcome the inclination to remain within the familiar cultural milieu of the Navy. Williams realized that in no other way could she reach Mary Sears and her fellow warriors.

Thus, this historian feels strongly that the best work examining the intersection between science and the U.S. Navy seeks to explore the relationship between two professional cultures and the extent to which that relationship affected the mission-related work of both.

In his work on nuclear testing and the broad ramifications of Project Vela Uniform, Kai-Henrik Barth reveals a situation in which government funding increased by a factor of 30 in the 1950s and 1960s in an effort to monitor Soviet nuclear testing. All of the services and their efforts to develop nuclear capability depended in part on the knowledge thus gained. In this case, Barth looked at the most powerful of the scientific groups that touched the defense establishment during the Cold War, those working in weapons-related physics. His analysis demonstrates that scientists in pursuit of knowledge—that is, science for its own sake in the purest form—did not compromise their intent by taking defense dollars to work on military projects. Barth strongly rejects the suggestion that defense money and influence distorted the goals of science and violated the intent of scientific inquiry. Both scientists and the United States government derived what they wanted from a mutual experience: an investment without compromise.

In Barth's view, the scientists involved saw the effort to monitor nuclear activity as an opportunity to advance their work while providing a byproduct that would satisfy the needs of those desiring to achieve an arms control treaty with the Soviet Union.

Many historians of science have energetically refused to agree. The Distortionist Theory as Barth describes it, pervades the history of science literature and appears in its clearest form in the writings of Paul Foreman, a historian of considerable influence, whose best works look into the early history of nuclear physics.⁶ He and some others believe that defense funding, and the motives behind the goals of the Navy or any other service, divert pure science from its quest for knowledge into avenues that corrupt the practice or reduce science to a support function for military or political ends. This view presents the possibility that any naval involvement in scientific work would naturally pervert the scientific process. This perspective has influenced the way some historians of science look at the relationship between scientists and any arm of the government, including the Navy.⁷

In his groundbreaking work on the laboratories at the Massachusetts Institute of Technology and Stanford University, Stuart Leslie lamented the tendency of defense dollars to often determine scientific projects and the policies that guide engineering, engineering education, and the development of technology. If some of the best and most provocative work happens relative to naval needs and goals, does that not skew the larger world of scientific progress, professional education, and the choices we make as a society? Leslie's work puts the question in a more compelling form than does Foreman. This author must also take care in reading Leslie because I am from that generation that experienced the Vietnam War and its effect on American society. The passion of the groups Leslie examines, from the student protesters on the one side to Charles Stark Draper on the other, brings me back to my days waiting for my number to come up in the draft lottery and I can feel that familiar social and political tension in his excellent narrative.⁸

However, while Leslie looks for science to divert attention from weaponry to more peaceful and constructive ends, he also sees the reasons for continued defense work at the laboratories, not all of which rested purely on the availability of funding. In my own effort to explore this same period, I discovered that underwater acoustics research not only offered the possibility of Soviet submarine detection, but also a much deeper understanding of the nature of the ocean, as well as ways of monitoring global warming, measuring tides, and determining water transport as well as the migration patterns of ocean mammals. Only by reaching across the boundaries between science and naval concerns can we attain this level of historical understanding.

We can see insights similar to those derived by Barth and some of Leslie's themes in Donald MacKenzie's historical sociology of nuclear missile guidance, *Inventing Accuracy*. MacKenzie very effectively illuminates the development of accurate missile targeting systems by Charles Stark Draper and others as both a product of a particular historical dynamic and as a social creation. He concludes that the achievement could only happen as a "complex process of conflict and collaboration." This author found MacKenzie's work very useful when working on *An Ocean in Common* and serving as head of contemporary history at the U.S. Naval History and Heritage Command. I followed MacKenzie's lead and, influenced by sociologist Clifford Geertz, closely examined the role of cultural translators in facilitating the kind of teamwork that both Barth and MacKenzie discovered as the primary factor enabling successful collaboration between science and the military services. Cultural translators would use their knowledge of both communities, developed over time, through war, friendship, common interest, and training, to enable the communication necessary to permit both scientists and naval personnel to work together effectively. In that way they sought to satisfy both themselves and the goals of their patron.⁹

Very often those who define themselves as historians of science naturally have further questions to ask about the present subject relationship from their own cultural perspective. The question of classification frequently and legitimately arises. With the results of much naval-inspired research shrouded behind classification markings, how can shared knowledge advance humanity, inspire other inquiries, or encourage international collaboration? In reality, has the military truly taken control of the direction and nature of fundamental research? The debate on classification, although considered naive by many naval historians, has emerged over the years as a very legitimate concern. Michael Dennis, a historian of science whose work I respect, asked a question a few years ago in an article synthesizing the contributions of many scholars to a single volume of the journal *Social Studies of Science*. I paraphrase:

What might have happened if the Navy declassified earlier than it did at the beginning of this century, the climate data that led many to eventually accept the reality of global warming?

This concern remains pressing and real. Might concerted action and policy come to the fore sooner?¹⁰ This problem still confronts both historians of science and naval historians, often unnecessarily. Declassification takes place far too slowly and far too late.

The earth sciences offer yet another conundrum. In an article examining military influence on what he calls the environmental sciences, historian of science Ronald Doel looked at the ways in which the Navy and other governmental groups influenced the selection of work considered essential, the ways in which scientists pursued these projects, and the selections of the questions they asked of the data. Can the process of scientific investigation and experimentation fall easily within the confines of an Office of Naval Research contract? ONR does not offer grants, but rather carefully composed contracts. In other words, can scientific inquiry have so clearly defined parameters that any scientist could project the beginning, middle, and end of an original research project in terms of a contract? What does this process do to the nature of scientific inquiry? Does this system encourage younger scientists to frame their work in a different way in an effort to achieve short-term results? In addition, if the system assists only those sciences the Navy values, does this amount to a setback for science in general?¹¹

In addressing Doel's very legitimate concerns, the early years of the Naval Research Laboratory (NRL) provide an interesting and profitable set of observations. In his excellent dissertation on the development of radar at NRL, historian David Allison commented on the early years of research practice at the new laboratory created by the Naval Consulting Board and Congress. A large measure of the resources necessary to carry out research at NRL certainly came from the Navy bureaus, but the basic research money largely came from Congress. The internal administration of NRL initiated projects and dispensed the resources, set priorities, and managed projects according to its own judgment.¹² Only when direct naval application loomed on the horizon did the bureaus assume direction.

When ONR emerged as the Office of Research and Inventions in 1947, it operated in much the same manner. Interviewing Gordon Lill, head of the geophysics branch of ONR and the premier source of oceanographic funding in the 1950s and 1960s, provided me with unique insights into ONR operation. Similar comments by Arthur Maxwell, Lill's deputy and later head of the Institute for Geophysics at the University of Texas, confirmed those insights. They both recalled that rules did not exist; they wrote them as they went along. The system was absolutely flexible. Their personal relationships with various major scientists, including a number of institution directors, led them to provide ONR's funds to those directors, permitting their trusted associates to invest the money for the Navy's purposes while serving science at the same time. Lill and Maxwell assumed the latter, and knew these friends and World War II veterans would make sure they never lost sight of the Navy's purpose. Columbus Iselin, Woods Hole director, once commented that without ONR money he and his colleagues

could do little more than explore Buzzards Bay in their smallest research vessel, *Asterias*.¹³

Did the system change over time? It did, but many historians of science assume that those who used and administered it in the 1950s and 1960s would recognize ONR practice in the 1980s and 1990s.¹⁴ No professional historian should make that assumption. This knowledge becomes analytically important when one realizes that one key to the nature of the naval-science relationship in the 20th century largely rests with organizations like the National Research Council, the Naval Consulting Board, NRL, and ONR. The last became far more influential and powerful than any of its government-inspired cousins. These issues and institutions need more professional historical attention.

In some cases, ONR's policies and the Navy's priorities did occasionally leave some avenues of scientific research out in the cold. Doel especially points this out. Remember, ONR represented the only source of government funding for science after World War II until the advent of the National Science Foundation (NSF) in 1950. For years after the arrival of NSF, ONR still acted as the premier investor of government funds in science. For the Navy's part, physical oceanography arose as one of the most important avenues of inquiry, especially in the realm of antisubmarine warfare and pro-submarine matters. As a consequence, the Navy paid little attention to disciplines like marine biology, which suffered from a lack of funding in the years after World War II, when ONR emerged as the premier source of funding for the ocean and earth sciences.

To those historically examining Navy-related scientific work, it often seems that the service's perpetual presence and considerable resources truly placed the scientific community in an awkward position. As a result, a number of influential works have analyzed certain topics in a way that resonates very well with the Distortionist Theory mentioned by Barth. One case in particular introduced me to the distortionist perspective as I initiated my research into naval oceanography back in the early 1990s.

In the summer of 1993, I rode a bus down from Logan Airport to Woods Hole, returning from a research visit to the Scripps Institution of Oceanography during my work on *An Ocean in Common*. Leaving the bus at the Martha's Vineyard ferry terminal, I noticed the scientist Allyn Vine walking down the street from his home on Juniper Point, just a short distance away. My wife had told him when I was due to arrive and he came down with a rather intense look on his usually jovial face. He carried with him a book entitled *A Fragile Power: Scientists and the State* by Chandra Mukerji, a sociologist attached to the communications department at the University of California, San Diego. He asked

me if I had seen the study and I had to admit that I had not, even though it had appeared roughly four years earlier. He gave me a questioning look and simply said that the book did not describe the world in which he matured as a scientist. He felt that the book's author had totally missed the mark.

In the days following that encounter I read the book and immediately understood the problem Vine had with it. Mukerji's thesis asserts that the Navy used the funds dispersed by ONR to reduce a cadre of scientists to the status of an auxiliary workforce, suitable for fulfilling the operational scientific needs of the service given the threats presented by the Cold War.¹⁵

It is my habit in working major projects to dive deeply into the archival primary sources with my own preliminary questions before exploring any extant secondary literature. While this may go against the graduate school grain, I believe it is important to have a preliminary grasp of the source material before appreciating how other historians and academics analyzed those documents and offered the conclusions they have drawn.

In the Mukerji case, this process proved particularly valuable. Initially, I noticed that I could not track any of the interview quotations, because the author granted all subjects anonymous attribution. A serious historian would want to evaluate the information offered by these people in a larger professional context. This could not happen in this study. I have done more than 400 oral histories in my career and no subject has ever asked me for anonymity. The need to withhold names seemed a bit odd in this case. The most important discovery I made while reading Mukerji's book related to ONR: While that office obviously played a very important role in her analysis, she never used the ONR records in RG-298 at the Washington National Records Center at Suitland, Maryland.

She explored the way the Navy and the oceanographic community interacted and never once used naval primary sources. Her analysis remained within the scientific stovepipe and followed carefully the observations of the eminent sociologist Robert Merton regarding the nature of the scientific community, its practices, expectations, and reward structure.¹⁶ Mukerji's work offered no insights into the nature of the Navy in its interaction with ocean scientists. Quotations offered from the interviews she conducted confirmed her thesis, but a reader could not evaluate the assertions or validate them in the context of the subject's work and career. As an informed historian in the field, I could only guess, which one simply cannot do.

Mukerji sees many scientists reduced to providing either sophisticated support to naval activity or the data necessary to operate naval weapons systems. As a scientist deeply involved in work with the Navy from the earliest days of

World War II, Allyn Vine, the creator of the submersible *Alvin* (DSV-2) and the scientist who perfected the bathythermograph, did not recognize the world she described. That is because that world never existed.

Doubtless, all of it seemed perfectly reasonable to the author of *A Fragile Power* as seen from the perspective of a sociologist working with sources directly related only to the scientific community. However, she examined a *relationship*, which implied the presence of at least *two* entities. In this case, each had a strong cultural heritage, its own practices, professional habits, and technical language. The naval culture does not shine through in any of her narrative and naval intrusion into the scientific world via ONR appeared as an alien influence. Very little suggested either a fluency with things naval or an appreciation of ONR and its internal practices, the latter often based upon close friendships developed during World War II between senior scientists and those tasked with dispensing ONR resources to various scientific specialties.

Professor Mukerji also failed to explore the common use of summer studies like Projects Hartwell (1950) and Nobska (1956) which gave birth to systems like the undersea sound surveillance system (SOSUS) and the submarine-launched Polaris missile system. The summer study rationale brought together a critical mass of scientists and naval personnel to examine closely, precisely defined naval needs and issues over the course of a summer. The dynamic here would have revealed a great deal about the relationship Mukerji sought to examine, but her study gives no indication that she knew these things existed. Summer Studies still perform this function, notably in the case of the on-call services of the *Jasons*, currently administratively supported by the Mitre Corporation.

The Mukerji study frequently appears in bibliographies of historical works on the Navy and science. Even when her views do not find universal acceptance, for some unknown reason they still help frame the debate and discussion over the Navy's relationship with science.

Any naval historian would find the results of historical analyses ignoring naval sources a bit questionable, both in a professional sense and as an indicator of simple research gone wrong. In an exceedingly long article, Naomi Oreskes explored naval research into oceanography and the discovery of the hydrothermal vents off the Washington and Oregon coasts.¹⁷ While using the archives of the Woods Hole Oceanographic Institution and Scripps—save for a small number of primary sources related to the Naval Research Laboratory—this piece of work also ignores the Suitland collection of ONR records in RG-298. Orestes drew conclusions about the nature of the collaboration between science and the Navy that do harmonize with the better contributions to the literature. However,

many of the links she makes in the course of her narrative contribute little to an accurate understanding of deep submergence, seemingly related projects, and the projects themselves.

Oreskes explores the origins of *Alvin* and *Aluminaut*, the deep-diving submersibles, linking them to the need to maintain the submarine acoustic warning nets in the Atlantic and Pacific, with secondary applications to basic science related to physical oceanography and ocean bottom geology. She never links the origins of *Alvin* to the 1963 loss of the nuclear-powered submarine *Thresher* (SSN-593). The inability to reach *Thresher* led the Navy to look more closely at this kind of vessel. Her assessment of Allyn Vine takes him at his word, that he saw himself as a Navy-related oceanographer. However, she never really tells us what that meant for Vine, but uses this identity to demonstrate the close link between Navy goals and intentions and the origins of these submersibles. Her article offers no naval sources that might confirm or contest her assertions. She also links the submersibles to Project Artemis, an active acoustic detection system proposed for the Atlantic based upon an active, at-sea sound source with submerged Texas towers holding the acoustic reflection receivers. She uses sources prepared by eminent scientists Robert Frosch and Alan Berman but fails to inform us that the project never came to fruition owing to the size and unwieldy nature of the components. The passive acoustic SOSUS system presented more than sufficient warning of a Soviet submarine presence.

Not having explored naval sources and oral histories, she also failed to discover the dual nature of the word “Artemis,” which presented some confusion at the time. While certainly the code name for the active system Oreskes described, it had another significant meaning. If she had read other studies or oral histories, especially those held by the Naval History and Heritage Command, she would have realized that Artemis, the goddess of the hunt, also stood, in many quarters within the scientific and submarine community, for a scientist actually named Hunt. Frederick V. Hunt of the Harvard Underwater Sound Laboratory issued the so-called bombshell report in May 1950, proclaiming the possibility of a passive system like SOSUS. Highly classified at the time, the very idea of a long-range, shore-based, passive acoustic detection system able to sweep an entire ocean in one hour, remained “behind the green door,” and needed a convenient name to permit even classified discussion. “Artemis” performed that function before “Jezebel,” “Michael,” and “Project Caesar” took its place. Without that knowledge, much of Oreskes’s narrative on Artemis becomes a bit confusing. Naval sources would have enabled a more coherent analysis.

Oreskes also briefly treats the summer studies used by the Navy and the

scientific community to solve problems and set priorities. Her article gives these gatherings only passing attention in spite of the remarkable products and ideas that emerged from them. As I mentioned earlier, these studies would provide an excellent subject for an in-depth study of the dynamic that ruled the relationship under examination here.

The affliction affecting Oreskes and Mukerji in different ways has reached even further in the history of science literature. It appears in the works published more recently by Jacob Hamblin.¹⁸ He produced a study examining international programs in oceanography during the Cold War. I was asked by the journal *Technology and Culture* to review the book, but when Professor Hamblin referred to civilian Assistant Secretary of the Navy James Wakelin as an admiral, I knew the study might present a few problems. Like Oreskes and Mukerji, Hamblin never used ONR records even though virtually every project he examined in the book doubtless drew on Navy funds during this period. He did use the strategic program files at the old Naval Historical Center's Operational Archives, but ignored the files on the Hartwell Summer Study, Project Nobska, and the Low Report housed in the same place. He understood the need to penetrate analytically down to the individual level, factoring in the personal relationships, but without the context that the ONR records would have provided. In an article derived from his book and published by the journal *Isis*, Hamblin concluded that

[D]espite the confluence of interests between the Navy and oceanographers, there was a decisive difference in their views as to the ultimate utility of basic research. This difference stemmed largely from scientists' limited perception of science as the capital for new technology and the Navy's perception of science as the collection of operational data for existing technology.¹⁹

The conclusion relative to "operational data" conforms exactly to the analysis presented by Mukerji. Hamblin consulted strategic program files, which would naturally review scientific inquiries underway that should provide immediate help addressing the perceived threats that any strategy must confront. Those who composed these records would take pains to make sure the weapons systems would perform. However, Hamblin never consulted the ONR files that would directly reveal the nature of the relationship between the Navy and the scientific community that would appear in the ONR records. Only then would the files from WHOI, Scripps, and other institutions actually make sense. Since ONR enabled many of the summer studies, the reasoning behind them and the relationships that made them so productive would also reside there. Hamblin's

work in the records of the National Academy of Sciences National Research Council files should have provided an additional naval perspective because of ONR involvement and the maritime emphasis of a good number of the projects he examined. Both in his book and the article on the Navy and science he published in *Isis* in 2002, naval culture does not emerge. He never took the time to explore the nature of the records sufficiently to understand the culture of the scientific community's partner in these cases. He remained within the stovepipe with all of his conclusions.

Many historians of science also feel that the ONR records reside under a cloak of classification. Actually, the bulk of the documents most useful in cases related to the environmental sciences and oceanography no longer carry restrictions or actually offer perfect cases for Freedom of Information Act (FOIA) actions. Furthermore, any exploration of these records should happen in conjunction with oral histories left by the major players. Professor Hamblin knew of the interviews resident at Scripps and Woods Hole, but never looked at those housed at the U.S. Navy's Operational Archive, done with many of the seminal players in these matters. Only through use of those interviews would the actual nature of the Navy-science relationship begin to emerge.

Unfortunately, no comprehensive history of ONR has yet appeared. The history sponsored by the Sloan Foundation and ONR written by Harvey Sapolsky in 1990 never achieved the scope envisioned by the original project. Professor Sapolsky felt obliged to turn his attentions elsewhere and the history became six rather brief chapters that did not deeply probe the nature of the organization or sufficiently explore its significance. The first three chapters provide a much needed exploration of ONR's origins, but the last chapters do not offer the detailed insight that the literature needs. That history still awaits composition. However, Professor Sapolsky did explore the changes in ONR, owing to close congressional oversight, that altered the habits of the first two postwar decades into the stricter contract system many of the history of science community currently identify with ONR practice.²⁰

As an avenue of naval-scientific advancement, albeit of a very different sort, the NRL commissioned science writer Ivan Amato in 1998 to prepare a 75th-anniversary narrative. Amato provided an excellent foundation for an appreciation of the laboratory's origins and achievement. This work provides a sound basis for appreciating the many very specific reports about NRL's scientific activity that do not historically reach outside the realm of naval culture.

To understand NRL's role in naval science, one has to appreciate the laboratory not as a commissioning agent on the ONR model, but as a practitioner.

In this role some of the best historical work comes from historians like David Allison, mentioned earlier, and the works of the late NRL historian David van Keuren on progressivism, science, and the military as exemplified by the NRL in its early years, as well as Hoyt Taylor's 25-year review of NRL's history penned in 1948.²¹ The functioning and nature of the laboratory emerged in studies like historian Bruce Hevley's examination of NRL's work in ultra-violet and X-ray astronomy.

NRL deserves a great deal more attention, especially for its work appreciating various geospatial aspects of the Earth. NGA has taken particular note of the NRL's activities in this sphere. A bureaucratic blunder caused the National Archives and Records Administration to dispose of the records documenting NRL's role in the Vanguard program. In spite of this tragedy, the 1969 history of that effort published as a NASA report took the naval effort out of the laboratory's realm and moved it into the larger initiative that drove the early space flight competition with the Soviet Union. This examination of the Vanguard missile and satellite program by Constance McLaughlin Green and Milton Lomask provided an indication of the Navy's role, exploring NRL's contribution as well as the support provided by ONR. These historians made a beginning that other documentation and oral histories might analytically resolve in the future.

The sources feeding the history of the Navy's relationship with science clearly demonstrate a work-in-progress led and facilitated by individuals who could appreciate the cultural divergence between the two communities and yet still recognize the possibilities. In writing his book *An Ocean in Common*, this author discovered this truth emerging repeatedly from all manner of primary sources. In the aftermath of World War I, the relationship and its productivity rested with personal ties between scientists and ranking naval officers. Two of the most important ocean scientists of the century, Roger Revelle and Richard Fleming, went to sea on their first major cruise because Thomas Wayland Vaughan, director of the Scripps Institution, knew the Hydrographer of the Navy who needed his help. Arrangements between professional colleagues counted for much of the opportunity for training and advancement. Allyn Vine, creator of the *Alvin* submersible, and J. Lamar Worzel, co-discoverer of the deep sound channel and its amazing acoustic transmission properties, found themselves at Woods Hole as World War II began. They came with Maurice Ewing, an emerging leader in the field of geophysics and at the invitation of Columbus Iselin, the director of the WHOI. Their ability to understand the Navy's needs and communicate the value of their work saved countless lives. Ewing taught them, as Kai-Henrik Barth demonstrated in his history, that they could do groundbreaking science while

satisfying the needs of their naval patron. The two were not mutually exclusive.

Friendships forged by the war did not end in 1945 with the conflict. Much of what ONR became rested on the personal trust established between naval officers and scientists, between ship-drivers and seekers, made firm by cultural translators who understood both communities and could facilitate between them. Part of the future in this field must determine how and why that changed. The relationships touched by the Navy had a flexibility and rested on a personal basis, much of which has eroded. We need to understand that process. A lack of understanding or just poor research and analysis has resulted in the distortionist view discussed earlier. The Navy's relationship with science and scientists became much more professionally intimate than many historians of science realize.

In conclusion, let me share with you a mistake that I made, one that I hope other naval historians will not repeat. When Allyn Vine gave me Chandra Mukerji's book, I read it, suspected the problems that it had, but I never sought to review it for the larger naval history community. I should have. A conversation about her approach needed to begin at that point. We now need to do these things. Naval historians need to enter this intellectual debate aggressively. We need to explore the history of science and the Navy in a way that respects Duncan, Barth, Williams, MacKenzie, Leslie, and others. We need to challenge analyses that fall terribly short and we need to fill gaps in the literature. We need to address the interaction between the Navy and science in a professional way; in a way that our graduate mentors prescribed all those years ago when we learned how to do history. In the coming days, if a young naval historian decides to look at the summer study phenomenon alone, so much about the relationship will emerge. Naval historians need to challenge those who have virtually ignored ONR and RG-298. You cannot validly examine the relationship in question here without the ONR records. It is simply not possible.

Find the excellent literature, not all of which I could address in my time here, learn from it, and build upon it. Because of some of the flaws I have mentioned, one can do a great deal in this field, but only by taking care to explore and understand the part of the relationship that remains external to the naval experience. Bring yourself to the point at which fluid intellectual movement between cultures becomes possible. Know the sources, interview as many of the players as you can. Your analysis will broaden and your insights deepen. That exploration will prove fascinating. In the process you will illuminate both the Navy and its most significant partner.

Notes

- 1 James Phinney Baxter, *Scientists Against Time* (Cambridge, MA: MIT Press, 1968).
- 2 David Allison, "U.S. Navy Research and Development since World War II," Merritt Roe Smith, *Military Enterprise and Technological Change* (Cambridge, MA: MIT Press, 1985), 289–328.
- 3 Francis Duncan, *Rickover and the Nuclear Navy: The Discipline of Technology* (Annapolis, MD: Naval Institute Press [Hereafter, NIP], 1990); *Rickover* (Annapolis, MD: NIP, 2001).
- 4 William M. McBride, "The 'Greatest Patron of Science': The Navy Academia Alliance and U.S. Naval Research, 1896–1923," *The Journal of Military History* 57: 7–33.
- 5 Kathleen Broome Williams, *Grace Hopper: Admiral of the Cyber Sea* (Annapolis, MD: NIP, 2004); *Improbable Warriors: Women Scientists and the U.S. Navy in World War II* (Annapolis, MD: NIP, 2001).
- 6 Paul Foreman, "Behind Quantum Electronics: National Security as a Basis for Physical Research in the United States, 1940–1960," *Historical Studies in the Physical and Biological Sciences* 18 (1987): 149–229.
- 7 Kai-Henrik Barth, "The Politics of Seismology: Nuclear Testing, Arms Control, and the Transformation of a Discipline," *Social Studies of Science* 33, no. 5 (October 2003): 743–81.
- 8 Stuart W. Leslie, *The Cold War and American Science: The Military-Industrial-Academic Complex at MIT and Stanford* (New York: Columbia University Press, 1993).
- 9 Donald MacKenzie, *Inventing Accuracy: A Historical Sociology of Nuclear Missile Guidance* (Cambridge, MA: MIT Press, 1993); Clifford Geertz, *Local Knowledge: Further Essays in Interpretative Anthropology* (New York: Basic Books, 1983).
- 10 Michael Aaron Dennis, "Earthly Matters: On The Cold War and the Earth Sciences," *Social Studies of Science* 33, no. 5 (October 2003): 809–19.
- 11 Ronald E. Doel, "Constituting the Postwar Earth Sciences: The Military's Influence on Environmental Sciences in the USA After 1945," *Social Studies of Science* 33, no. 5 (October 2003): 635–66.
- 12 David Allison, *New Eye for the Navy: The Origin of Radar at the Naval Research Laboratory*, NRL Report 8466 (Washington, DC: NRL, 29 September 1981), 52–53ff.
- 13 Gary E. Weir, *An Ocean In Common: American Naval Officers, Scientists, and the Ocean Environment* (College Station: Texas A&M University Press, 2001).
- 14 Harvey Sapolsky, *Science and the Navy: A History of the Office of Naval Research* (Princeton, NJ: Princeton University Press, 1990), ch. 1–3.
- 15 Chandra Mukerji, *A Fragile Power: Scientists and the State* (Princeton, NJ: Princeton University Press, 1990).
- 16 Robert K. Merton, *On Social Structure and Science* (Chicago: University of Chicago Press, 1996).
- 17 Naomi Oreskes, "A Context of Motivation: U.S. Navy Oceanographic Research and the Discovery of Sea-Floor Hydrothermal Vents," *Social Studies of Science* 33, no. 5 (October 2003): 697–742.

- 18 Jacob D. Hamblin, *Oceanographers and the Cold War: Disciples of Marine Science* (Seattle: University of Washington Press, 2005).
- 19 ———, “The Navy’s ‘Sophisticated’ Pursuit of Science: Undersea Warfare, the Limits of Internationalism, and the Utility of Basic Research,” *Isis* 93: 1–27.
- 20 Harvey Sapolsky, *Science and the Navy: A History of the Office of Naval Research* (Princeton, NJ: Princeton University Press, 1990).
- 21 David van Keuren, “Science, Progressivism, and Military Preparedness: The Case of the Naval Research Laboratory, 1915–1923,” *Technology and Culture* (1992); A. Hoyt Taylor, *The First Twenty-Five Years of NRL* (Washington, DC: Navy Department, 1948).

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160117-N-X1273-325 U.S. Navy photo by Mass Communication Specialist 2nd Class Justin Stumberg

Sailors aboard the *Arleigh Burke*-class guided-missile destroyer *Ross* (DDG-71) conduct sea and anchor detail before arriving at Rota, Spain, in January 2016. *Ross*, forward deployed to Rota, was on routine patrol in the U.S. Sixth Fleet area of operations in support of U.S. national security interests in Europe.

Chapter 6

The Social History of the U.S. Navy, 1945–Present

by Edward J. Marolda

INTRODUCTION

The special circumstances of the early Cold War significantly influenced the social evolution of the U.S. Navy. As the greatest political, economic, and military power on earth after World War II, the United States assumed the responsibility with the support of key allies for ensuring global peace and prosperity. This mission suggested the need to integrate into the Navy America's most intellectually and physically capable men and women, regardless of their race, gender, religion, or ethnic identity. The advent of nuclear weapons and nuclear-driven warships; sonars, radars, communications, and other electronic equipment; jet-powered aircraft; and ballistic and shorter-range missiles required the enlistment of America's most skilled workers and its brightest minds. Forward-thinkers argued that the Navy's global deployment could not be sustained by the limited number of mostly white, Anglo-Saxon men who constituted the pre-World War II Navy. So, the needs of the service called for the reduction of existing social and cultural barriers that had prevented the full exploitation of America's human resources.

Another factor influencing the change in the Navy's post-World War II demographic composition was the growing desire of many Americans for the equal treatment of all citizens. The positive contribution in World War II by women, African Americans, Asian Americans, Native Americans, and other members of minority communities had opened the eyes of some—certainly not all—of their fellow citizens to the patriotism of those groups and to their

often ill treatment by the military services. The exploits of Cook Third Class Doris Miller, the Tuskegee Airmen, and other black Americans who fought and died for their country but who suffered discrimination piqued the conscience of many. So too did the valiant service in Europe of the Army's Japanese-American 442nd Infantry Regiment, one of the most highly decorated units in U.S. military history, which was juxtaposed with the incarceration of Japanese-Americans at internment camps throughout the West. The courage of Ira Hayes, one of the flag-raisers on Iwo Jima, and Captain Ernest Evans, whose leadership and self-sacrifice helped win the Battle of Leyte Gulf, highlighted the contribution of America's first inhabitants. The fact that "Rosie the Riveter" and hundreds of thousands of other women replaced men in the production of airplanes, ships, weapons, and ammunition or transported combat aircraft overseas enlightened many of their compatriots about female skills in the workplace and in the military and potential for future employment in the armed services.

A fully integrated Navy devoid of sexism, racism, discrimination, and associated ills, however, was far from realized in the years following World War II. The naval service took positive measures to improve the lot of minority sailors during the latter half of the 20th century, but grudgingly and often as the result of pressure from the executive branch, Congress, progressive interest groups, and the female, black, Hispanic, and other communities. Too many Navy leaders doubted that members of the minority communities had the education, skills, or aptitude to serve alongside white male sailors in the fleet. Over time, minority men and women moved into the service's mainstream but progress was excruciatingly slow and sometimes painful for those sailors denied equal treatment by their Navy. Indeed, black sailors rebelled against what they considered discriminatory treatment during the late 1960s and early 1970s. Throughout their service but especially during the 1990s, many Navy females had to endure sexual discrimination and harassment while carrying out their duties. For years, Congress' combat exclusion law hindered the ability of women to operate with men on an even plane. Despite all the obstacles to their advancement, however, minority leaders and sailors took advantage of opportunities and ultimately established themselves as full-fledged members of the Navy family.

As will be elaborated on in this paper, historical coverage of social change in the modern U.S. Navy has been spotty, narrowly focused, and until the last 25 years mostly confined to specialized studies. Much of that work has reflected first-rate scholarship but it has not been incorporated into the major histories of the naval service. To remedy that deficiency and to prevent similar problems with future work, this author recommends two major historical endeavors:

A Social History of the United States Navy, 1945–Present

There is great need for a comprehensive social history of the U.S. Navy from World War II to the present. This era was one of the most dynamic in the struggle of American women, blacks, Asians, gays, and other minority sailors in the quest for dignity and equal opportunity in the naval service. No single work exists that encompasses the integration struggles and the Navy's actions to deal with institutional sexism, racism, discrimination, harassment, and associated ills. There are discernable periods of modern naval history that would support a chronological approach to the overall topic. For instance, the late 1940s saw passage of hopeful legislation on the integration of women and blacks followed by two decades of social retrenchment or at best modest achievement. Paralleling developments in American society, the 1970s witnessed social turmoil in the Navy and a renewed focus on improving the opportunities and service of naval personnel. The continued advances of women and African Americans during the 1980s were offset, at least for women, by the Tailhook scandal and related gender issues of the early 1990s.

The standard texts on the modern history of the U.S. Navy treat the service's social history briefly or not at all. Kenneth J. Hagan's 400-page *This People's Navy* (1991)¹ apparently refers to white male people since no blacks or women (other than Hawaiian Queen Liliuokalani) are indexed in the work. The same applies to George Baer's 450-page *One Hundred Years of Sea Power* (1994).² Other historians incorporate a few short paragraphs on key events. Paolo E. Coletta's 600-page *The American Naval Heritage* (1987)³ has a few brief paragraphs on women and blacks. The only mention of social issues in Nathan Miller's 300-page *The U.S. Navy* (1997)⁴ are two short paragraphs on the shipboard disturbances of 1972 and Admiral Elmo R. Zumwalt Jr.'s Z-Grams. Michael T. Isenberg's *Shield of the Republic* (1993)⁵ includes four full pages on social issues, but they are hardly balanced against the 800 other pages in his massive tome. The histories mentioned above end at the latest in the early 1990s, so there is great opportunity for a new work that carries the story forward.

Ample sources exist to support greater coverage of social issues, including records in the National Archives, Navy Operational Archives, and the collections maintained by the Naval War College, U.S. Naval Academy Library, and many other repositories. Only a handful of the U.S. Naval Institute's (USNI) more than 225 oral history volumes were accomplished with women, mostly related to their service in the World War II. A great many of the interviews with male naval leaders, however, contain rich and often frank discussions of social issues with which they dealt. The Naval History and Heritage Command (NHHC) holds

hundreds of interviews conducted with veterans of the Cold War and post-Cold War Navy. The command's Navy Reserve Combat Documentation Detachment 206 gathered hundreds more interviews with naval personnel who served in Iraq and Afghanistan. The Naval Historical Foundation holds 196 interviews, including those with Rear Admiral Mack C. Gaston, the first black commander of the Great Lakes Naval Training Center.⁶ The Military Women's Memorial Library holds additional interviews with Navy women.⁷

A History of the U.S. Navy in the 21st Century

With legislation now in place to combat sexism, racism, and other forms of outright discrimination and harassment, and with naval personnel the most diverse group in the Navy's history, there is need for a major historical overview. Unlike the general tomes identified above, this proposed work should include not only the leaders, strategies, combat operations, tactics, weapons, and technologies employed in Afghanistan, Iraq, and the fight against terrorism, but also how naval officers and enlisted personnel of all ranks have performed in these conflicts and how they have been influenced by them. We need to learn the stories of individual members of this diverse Navy who acted heroically and those who might not have earned distinction but served. Another important factor to be investigated is the much more robust role played by members of the Navy Reserve in this century's conflicts as compared to previous eras. Thousands of citizen sailors have participated as individual augmentees or in units during the wars in Afghanistan and Iraq. David Winkler's *Ready Then, Ready Now, Ready Always* (2015) on the Navy Reserve has covered some of this experience but much more needs to be done.⁸

An important topic within this overall study would discuss how female sailors, as routinely exposed to the dangers of combat as male sailors, have fared in the wars in Afghanistan, Iraq, and against terrorists. How have women handled Islamic cultural and religious taboos? Have women benefited from their gender in situations where men could not operate? Has sexual discrimination or harassment seriously compromised their service in the combat theater? What female leaders and sailors have earned distinction in combat? A number of works have been published on the exploits of Navy women in Afghanistan and Iraq, including Navy Nurse Cheryl Ruff's *Ruff's War* (2005)⁹ and Heidi Kraft's *Rule Number Two* (2007).¹⁰ Gail Harris in *A Woman's War* (2010) describes her experiences as a Navy intelligence analyst focusing on Saddam Hussein's activities in Iraq from 1991 to 2003.¹¹ Still, we need more work on the Navy story in this new century.

HISTORIOGRAPHY OF SOCIAL CHANGE IN THE MODERN U.S. NAVY

The late 1940s witnessed a major push by key naval leaders and female officers, many of the latter having served in the WAVES (Women Accepted for Voluntary Emergency Service) during World War II, for a more permanent status in the Navy. A key source on the WAVES in the war is Regina T. Akers, *Doing Their Part: The WAVES in World War II* (2000).¹² She argues that these Navy women made a significant contribution to the war effort that has not been widely recognized. In April 1947, Congress passed the Army-Navy Nurses Act that established the Navy Nurse Corps as a permanent staff corps. The WAVES also achieved permanent status in the Navy but it took an almost three-year effort by determined female leaders and supporters in Congress to bring it about. Hence, on 12 June 1948, Congress passed the Women's Armed Service Integration Act (Public Law 625) and President Harry S. Truman signed it into law on July 30. The measure provided for the permanent service of officer and enlisted personnel in the regular and reserve components of the armed forces. Few Americans, however, were prepared for an across-the-board integration of women into all the roles and missions of the military services, especially combat.

Despite the passage of Public Law 625 and measures taken by the Navy during the next two decades to integrate women into the service, not until the 1970s did significant published works begin to appear on the subject. The U.S. Naval Institute released *Lady in the Navy* (1972)¹³ by Joy Bright Hancock, who had served as an enlisted Yeoman (F) in World War I and as a high-ranking WAVES officer with the Bureau of Aeronautics in World War II. As one would expect, much of Hancock's memoir covers that early service. Hancock, however, was also a primary figure in the passage of Public Law 625 and she discusses at length the behind-the-scenes actions to get it passed. While Captain Hancock and her subordinates did most of the work preparing for the congressional hearings, male officers made the case to Congress. Hancock considered it entirely appropriate that male officers take the lead since women "were not in a position of sufficient authority."¹⁴ It also helped that Secretary of Defense James Forrestal, General of the Army Dwight D. Eisenhower, Fleet Admiral Chester W. Nimitz, and other distinguished leaders spoke in favor of the legislation. Regina Akers in her positive portrayal, "Joy Bright Hancock: Pioneering Spirit" (2013), concludes that Hancock "opened many doors for women in the naval service" and "did so with a strong sense of professionalism, innovative thinking, diplomatic skill, and open-mindedness."¹⁵

Senator Margaret Chase Smith (D-ME), another key figure with regard to Public Law 625, published her own biography, *Declaration of Conscience* (1972),¹⁶ which reinforces many of Hancock's observations. At one point, to support the employment of Navy women overseas, Smith observed "the Navy either needs these women or they do not."¹⁷ Elizabeth Allen in her *Navy WAVES* (1988)¹⁸ discusses the critical involvement of Smith and Hancock in the legislative process and provides a useful summary and chronology through 1988 of key dates relating to Navy women.

Other sources of information and insight can be found in the numerous oral history interviews conducted by the U.S. Naval Institute's John "Jack" Mason and Etta Belle Kitchen, the latter a member of the World War II WAVES. Included in the collection are the remembrances of Hancock (1969–70), Louise K. Wilde (1969), and Winifred Quick Collins (1969), of whom the latter two worked to overcome bureaucratic and institutional lethargy during the 1950s and served as Assistant Chief of Naval Personnel for Women (ACNP [W]) during the era.¹⁹ Additional interviews with female officers and enlisted personnel include those with Robin Quigley (1976), Mildred McAfee Horton (1969), Jean Palmer (1969), Elizabeth Crandall (1970), Frances Rich (1960), Eleanor Rigby (1970), and Tova Peterson Wiley (1969).²⁰ As with other oral histories and personal memoirs, these should be used with caution because they can be self-serving and colored by sometimes flawed remembrances. Nonetheless, the U.S. Naval Institute oral histories frequently provide insight into the actions taken by the Navy with regard to women and how these female leaders coped with the many challenges they faced. Quigley, for instance, related that long before she proposed dropping the term WAVES, Joy Bright Hancock had suggested the same thing. According to Quigley, Hancock had written a memorandum, the purpose of which was to "say she wished they would stop using the term . . . 'Wave Officer' because after all, the women were naval officers, not Wave officers."²¹

The most in-depth studies of women in the Navy can be found in *Crossed Currents* (1999)²² by Jean Ebbert and Marie-Beth Hall and *Serving Proudly* (2001) by Susan H. Godson.²³ Ebbert and Hall, both of whom had long connections to the service and married Navy captains, contend that "ours is not a particular feminist stance . . . [but our] sensibilities have been challenged by feminist thought." Hence, "while we have tried to show the genuine professional concerns that lie beneath some of the Navy's cautious attitudes and decisions about women, we have also described inequities the service has imposed on women."²⁴ Ebbert and Hall conclude, with justification, that Navy women have been "all but neglected by historians and biographers."²⁵ They make the

especially apt observation that before the 1980s, accurate and useful information on women in the Navy could only be found in small archival collections, newspaper, magazine, and journal articles, obscure memoirs, and interviews. To correct that deficiency, *Crossed Currents* incorporated extensive documentation from national and naval archives, libraries, special collections, wide-ranging secondary sources and memoirs, magazines and journals articles, oral histories, and personal interviews with hundreds of Navy men and women.

A key object of *Crossed Currents* was to “serve as a general text that will acquaint a wide audience with this nearly unknown aspect of 20th-century American history [and] a starting point for further research into naval, feminist, and social history.”²⁶ It was the authors’ intent to produce a balanced work that described the Navy’s acceptance of its need for women and pride in their accomplishments but also its reluctance to accommodate them. For the most part, they have achieved their goals. They successfully followed a chronological approach to the topic but also put emphasis on women at sea and in combat, pregnancy, child care, fraternization, sexual discrimination and harassment, lesbianism, female leadership, and other key issues.

Susan H. Godson’s *Serving Proudly* complements *Crossed Currents* in that both works thoroughly detail the history of women in the Navy in the 20th century. Ebbert and Hall focus solely on Navy women other than nurses, the latter of whom they conclude were deserving of separate treatment. In contrast, at the request of the Naval Historical Center (now Naval History and Heritage Command), which sponsored her work, Godson treats the two groups of Navy women in parallel. She acknowledges that while the nurses, who generally performed long-accepted roles in the military, did not face the same resistance from men as non-nurse women, the story of their service has many similarities. That argument has merit.²⁷

Godson is a PhD historian and author of *Viking of Assault: Admiral John Leslie Hall Jr. and Amphibious Warfare* (1982)²⁸ and other works. She admits that interviewing numerous women in preparation of the book was a learning experience since she had not served in the Navy. But her scholarship is first-rate and is supported by extensive research in the relevant collections of the National Archives, Navy archives, and other repositories and the secondary literature. Godson tracks the integration of women in chronological fashion. Close to half of the book deals with the World War II and previous eras but individual chapters cover developments in the late 1940s, the Korean War, Vietnam War, Gulf War, and the Tailhook scandal. While Godson’s *Serving Proudly* does not impart the same passion and insider feel as does Ebbert and Hall’s *Crossed Currents*, it does

not avoid contentious issues. Indeed, individual segments expand on pregnancy and motherhood, sexual harassment, and sexual discrimination. In short both *Serving Proudly* and *Crossed Currents* provide solid foundations of information and analysis on the history of women in the Navy through the 20th century.

A work that had a significant influence on the books by Godson and Ebbert and Hall is *Women in the Military* (1982; revised edition 1992)²⁹ by retired Air Force Major General Jeanne Holm. The author made the salient point that women were critical to the post-Vietnam, all-volunteer armed forces and that “so integrated are they [women] into the services, and on such a scale, that the United States could not go to war without them.”³⁰ Holm’s book includes a sizeable chapter entitled “Taking to the Air and the Sea” that discusses in detail the issues related to the integration of Navy women into the aviation and surface warfare communities. She relates that the experimental assignment of women to hospital ship *Sanctuary* (AH-17) in the mid-1970s was bound to fail since the Navy allowed a double standard to exist on the ship that fueled male resentment: “women stood no watches [and] were given the best assignments. . . . Single women were allowed to live in off-base housing, while the men lived in the barracks or onboard the tugs.”³¹ Holm’s 1992 revised edition included the service of military women in Grenada, Panama, and the Persian Gulf War.

A complementary work is Dorothy and Carl J. Schneider’s *Sound Off* (1988),³² which presents excerpts from interviews with 300 women from all the services. The topically arranged book looks at the issues of women in combat, feminism, pregnancy and childbirth, and the impact of military service on family life. The authors observe that, despite occasionally experiencing sexual discrimination and harassment, “most of our interviewees believe in an expanding future for women in the military.”³³

There is need for a study, similar to Sharon Disher’s *First Class: Women Join the Ranks at the Naval Academy* (1998),³⁴ on the first female sailors who went to sea in the 1970s and 1980s. There are ample oral history interviews, journal and magazine articles, and archival sources to support a work on the legislative and bureaucratic processes that enabled women such as Deborah Gernes and Catherine Leahey to join the crews of non-combatant and then combatant ships; the pluses and minuses of their reception by male officers and enlisted sailors; and the adjustments made by the Navy and the women to make that transition successful.

A NEW ERA FOR AFRICAN-AMERICAN SAILORS

In World War II, many citizens came to recognize the similarity between the harsh treatment of religious and ethnic minorities meted out by German Nazis and Japanese militarists and America's historic racism and abuse of blacks. A. Philip Randolph and other key black leaders enlisted the support of President Franklin D. Roosevelt and First Lady Eleanor Roosevelt to improve the status of blacks in the military. Hence, the Navy allowed the commissioning into the Naval Reserve of a small number of black officers (including one warrant officer), the subject of Paul Stillwell's in-depth study *The Golden Thirteen* (1993).³⁵ While Stillwell's well-written and evocative book focuses on World War II, one chapter provides a concise summary of developments with regard to blacks through the late 20th century and statistical information on black personnel in the Navy in 1992. Stillwell characterizes one of the Golden Thirteen, Dennis D. Nelson II, as "a 'tree shaker' who did much on behalf of black naval personnel in the years following World War II."³⁶ Nelson, although not a historian, authored a short overview entitled *The Integration of the Negro into the United States Navy, 1776–1947* (1948) published by the Navy Department.³⁷

Towering figures in the history of African-American integration into the U.S. military during much of the 20th century, Morris J. MacGregor and Bernard C. Nalty produced the 13-volume *Blacks in the United States Armed Forces: Basic Documents* (1977).³⁸ The work presents what they considered to be the most significant documents on the U.S. government's interaction with African Americans in the military service from colonial times to the close of the Vietnam War. Their research led the authors to conclude: 1) "when in need of manpower, the armed forces . . . turned to the Negro;" 2) "influential individuals, acting on principle but usually arguing in terms of increased military efficiency, prodded the armed forces toward acceptance of blacks and whites as equals"; and 3) "the black community, gathering strength and self-awareness, succeeded in exerting strong if sometimes indirect pressure upon personnel policies within the armed forces."³⁹ The publisher condensed that work in one volume entitled *Blacks in the Military: Essential Documents* (1981).⁴⁰ MacGregor then authored the incisive *Defense Studies: Integration of the Armed Forces: 1940–1965* (1981)⁴¹ for the Army's Center of Military History. That well-researched and authoritative analysis describes the successful effort to eliminate the "legal, administrative, and social barriers to the black American's full participation in the military service of his country."⁴² Given the racial difficulties experienced by the military services in the late 1960s and early 1970s, that conclusion appears overly optimistic.

In *Strength for the Fight* (1986), Nalty, a long-time federal historian, observes that “racism deprived generations of blacks of . . . basic rights, in the process imposing artificial limits on their opportunities within the military.”⁴³ With others, he makes the salient point that “the recurring need for manpower prevented the armed forces from continuing to indulge in the wastefulness of racism.”⁴⁴ Half of Nalty’s *Strength for the Fight* deals with the post–World War II era, which he covers in detail, especially the 1948 integration act and its consequences, the upheavals of the 1960s and 1970s, and the services’ successful handling of its racial problems in the 1980s. Another useful source on the topic is James T. Controvich, *African Americans in Defense of the Nation: A Bibliography*, which identifies relevant books, PhD dissertations, and journal/magazine articles on blacks in the Navy.⁴⁵ Significant information on the black experience in the military available nowhere else can be found in *Crisis*, the magazine of the NAACP; black newspapers such as the *Norfolk Journal and Guide* and the *Pittsburgh Courier*; and the NAACP papers maintained by the Library of Congress.

Improving the Navy’s efficiency in the Cold War became a driving force behind the integration of blacks but it had far to go to achieve that goal. In 1948, black sailors in the Navy’s enlisted force numbered only 4.3 percent of the total. Between 1946 and 1948, only 16 African Americans completed Officer Candidate School and only 14 blacks were commissioned through the Naval Reserve Officer’s Training Corps (ROTC) program. The one memorable event, long overdue, was the Naval Academy’s graduation and commissioning of Wesley A. Brown, the first African American to graduate from the institution that had been established more than 100 years before. The seminal work on Brown and his experiences in Annapolis is Robert J. Schneller’s *Breaking the Color Barrier* (2005).⁴⁶ Schneller, a professional historian, argues that Brown succeeded where other African-American midshipmen had failed because of a “convergence of forces that leveled the playing field.” This success resulted from a “push from the black community, national political imperatives, a shift in racial attitudes among the American people, direct intervention by leaders, and the strengths and abilities of individuals in the trenches.” One key asset was Wesley Brown himself, who possessed the “requisite talent.”⁴⁷

President Harry S. Truman breathed life into the integration effort, for the most part to win political favor with voters but he also opposed discrimination against African Americans. On 26 July 1948, the commander in chief issued Executive Order 9981, which mandated a policy of “equality of treatment and opportunity for all persons in the armed services without regard to

race, color, religion, or national origin.”⁴⁸ The order established a committee to advise the President on specific measures to improve the lot of minorities in the armed services. And in 1950, Secretary of the Navy Francis P. Matthews issued a policy statement prohibiting “discrimination based on race, color, religion, or national origin in enlistment, appointment, promotion, or assignment” of Navy personnel.⁴⁹

Starved of budgetary support in the late 1940s, the Navy found itself in great need of sailors at the outbreak the Korean War in June 1950. Enabled by Truman’s integration order, the Navy increased the number of blacks in the half-million-man service from almost 15,000 men in 1950 to 24,000 by the end of the conflict in 1953. No longer assigned to segregated units, black sailors served on board the Navy’s battleships, aircraft carriers, and other combatants. Ensign Jesse L. Brown was one of the first African Americans to earn naval aviator wings. He died when his attack plane went down in the mountains of North Korea while supporting the 1st Marine Division in its epic December 1950 battle and withdrawal from Chosin Reservoir. Theodore Taylor in his popular work, *The Flight of Jesse Leroy Brown* (1998), details the officer’s early life and education, training as a naval aviator, service on board aircraft carrier *Philippine Sea* (CV-47), and interaction with his wingman and Medal of Honor recipient, Thomas Hudner. Taylor relates the circumstance of Brown’s crash landing and death.⁵⁰

Lenwood G. Davis and George Hill’s *Blacks in the American Armed Forces* (1985) provides a useful guide to magazine and journal articles on black sailors in the Korean War.⁵¹ An important short summary of the African-American naval experience is Bernard Nalty’s contribution entitled *Long Passage to Korea* in *The U.S. Navy and the Korean War* (2007) series.⁵² Supported by Nalty’s deep understanding of the topic and knowledge of relevant sources, the illustrated monograph traces the history of blacks in the Navy from the American Revolution on but with an emphasis on the Korean War. Nalty is candid about the challenges faced by the Navy and its African-American sailors.

One problem that outlasted the Korean War was the racial composition of the Steward Branch, whose black sailors served white officers. Naval Academy history professor Frederick Harrod, in a scholarly USNI *Proceedings* article (1979), relates that Lester Granger, director of the National Urban League during the war, Congressman Adam Clayton Powell (D-NY), and others pressured the Navy to desegregate the branch and open up more general Navy billets to blacks.⁵³ At one point, Powell argued that “intelligent, ambitious Negroes are boycotting the United States Navy because they are not interested in making the world safe

for democracy by shining shoes, nor are they interested in fighting communism with frying pans.”⁵⁴ While only covering the 1930s and early 1940s, Richard E. Miller’s *The Messman Chronicles* (2004) analyzes the challenges faced by African-American sailors serving in the segregated Steward Branch.⁵⁵ The Navy redoubled its efforts to integrate Caucasian and Asian-Americans into the predominantly black branch, although that effort proceeded slowly during the 1950s.

WOMEN IN THE KOREAN WAR

Officer and enlisted women also answered the call to serve in the Korean War. The demands of the service increased the number of women in the Nurse Corps from 1,921 in 1950 to 3,405 at the peak of the conflict. The nurses did not serve ashore in Korea but on board ships of the Military Sea Transportation Service and at more than 150 medical stations in the United States and abroad. Nurses also served on board hospital ships *Consolation* (AH-15), *Repose* (AH-16), and *Haven* (AH-12) off Korea. Navy nurses died serving their country throughout the war, for instance when hospital ship *Benevolence* (AH-13) en route to Korea collided with a merchant ship in San Francisco Bay in August 1950. The following month, 11 Navy nurses were killed when the plane carrying them to the naval hospital at Yokosuka went down in the Marshall Islands. Altogether, the war claimed the lives of 29 nurses.⁵⁶

As recommended by the Defense Advisory Committee on Women in the Services (DACOWITS), President Truman launched a nationwide campaign in late 1951 to encourage female enlistment. Even though the Navy fell short of its goal of 11,000 women on active duty, 9,000 did wear Navy blue by war’s end. Overall, the number of women in the Navy tripled between 1950 and 1953.⁵⁷ While focusing for the most part on non-Navy women, William B. Breuer in his *War and American Women* (1997) provides a useful discussion of the activities of DACOWITS from its establishment through 1997 and the political issues connected with women in the military and in combat.⁵⁸

The standard texts on the Navy’s involvement in the Korean War, including Malcolm W. Cagle and Frank A. Manson’s *The Sea War in Korea* (1957), James A. Field’s *History of United States Naval Operations: Korea* (1962), and this author’s *The U.S. Navy in the Korean War* (2007), mention Navy nurses cursorily or not all.⁵⁹ More focused works include Jan Herman’s *Frozen in Memory* (2006), which covers in detail not only the activities and reminiscences of nurses

but also those of doctors, dentists, corpsmen, and other medical organizations and personnel.⁶⁰ The challenges faced by Navy nurses in Korea are also focused on in the Women in Military Service for America Foundation work *A Defense Weapon Known to be of Value* (2005).⁶¹ The Navy Nurse Corps records maintained by the Navy's Operational Archives provide a wealth of information on the Korean War experience of individual nurses as do the cruise books for the hospital ships that served there, which are held in the Navy Department Library.

INTO THE DOLDRUMS

Despite the passage of key legislation and the positive experience of the Korean War, neither the nation nor the Navy aggressively pursued better treatment for women and non-white men and their full inclusion in the service during the next two decades. Indeed, the period witnessed the continued relegation of women to second-class status. Nation-wide, African Americans, Hispanics, Asians and other minorities suffered injustices and mistreatment at the hands of racists north and south. The national fight over the civil rights and educational opportunities of African Americans was divisive, extended, and often violent.

The Navy's handling of the integration issue in some ways mirrored that of society at large, with improvement to the lot of its minority sailors slow in coming. No women could serve in combat aircraft or on board battleships, carriers, and other combatants. The custom of naval personnel referring to women in the service as "WAVES" well into the 1970s, long after the official end of that designation, only hardened the perception that the women were separate from the mainstream Navy. One ray of hope occurred in 1956 when President Dwight D. Eisenhower signed Public Law 585-84, which enabled the promotion of a small number of female lieutenant commanders and commanders. In some ways, things got worse for enlisted women. The Navy concentrated women in specific functional areas to avoid having to make special arrangements with regard to their housing, discipline, and administration. Hence, 90 percent of Navy women served in clerical or medical jobs.⁶²

Coauthors Ebbert and Hall conclude, however, that in the 1950s and early 1960s, when "women in the Navy might have disappeared altogether . . . they survived." The excellence of their work in the administrative, medical, and intelligence areas to which they were confined, and their determination to take advantage of opportunities, eventually convinced Navy men that they "could no longer view their female counterparts as a novelty; a momentary aberration."

An equally relevant observation was that the women “posed no threat to Navy men. The fields in which they excelled were seen as peripheral to the Navy’s chief reason for being, which was readiness for war at sea.”⁶³

A poignant and descriptive work on the experience of Navy women serving in the Vietnam War is former Lieutenant Commander Roberta “Bobbi” Hovis’ *Station Hospital Saigon* (1991).⁶⁴ Her reminiscence certainly helped refute the age-old perception held by many Americans that women could not handle the fears of a combat zone. Assigned to the Navy hospital in the South Vietnamese capital of Saigon in 1963, she found herself in the middle of a coup attempt against the government of President Ngo Dinh Diem. Gunfire from aircraft, artillery, tanks, and infantry weapons splattered her bachelor officer’s quarters (BOQ) and on a number of occasions narrowly missed hitting her. Jan Herman, former Historian of the Bureau of Medicine and Surgery, in his *Navy Medicine in Vietnam* (2010), Edward J. Marolda and Oscar P. Fitzgerald in their *From Military Assistance to Combat* (1986), and Thomas J. Cutler in his article “Purple for Christmas” (2015), discuss to a greater or lesser degree the service of Navy nurses in Vietnam.⁶⁵ The three works document the Navy’s award of Purple Heart medals to Nurse Corps Lieutenants Barbara Wooster, Ruth A. Mason, and Frances L. Crumpton, and Lieutenant (j.g.) Ann Darby Reynolds, for wounds they suffered during the Viet Cong terrorist bombing of the Brink Bachelor Officers Quarters on Christmas Eve 1964. They were the first female members of the U.S. Armed Forces to receive the award in the Vietnam conflict.

Herman’s illustrated monograph describes the work of the approximately 450 female and male nurses who served in Saigon and at the 600-bed Station Hospital Danang. Other nurses operated from hospital ships *Repose* (AH-16) and *Sanctuary*. Herman’s treatment of women as part of a team and in the overall context of Navy medicine in general is entirely appropriate. Navy nurses worked closely with general physicians, surgeons, psychiatrists, and other specialists, medical equipment technicians, hospital corpsmen, and of course the badly wounded soldiers and Marines coming in from the field. Naval Reserve Rear Admiral Maryanne Gallagher Ibach has posted a detailed and moving account of nursing in Vietnam as remembered by a number of women who served there.⁶⁶ Ibach observes that “my sense of our work, day to day, was that our success in saving lives was phenomenal.”⁶⁷ Lieutenant Commander Marie Joan Brouillette recalled that she “had never seen such teamwork before or since my tour in Vietnam.”⁶⁸ The *Repose* and *Sanctuary* cruise books and operational reports maintained by the Navy Department Library and the Navy archives provide information on the Nurse Corps’ wartime experience found nowhere else.

Integration of the corps during the 1960s involved not only women but also men. Once more, the needs of the service necessitated change. A drastic shortage of nurses throughout the nation and the naval service in 1964 prompted the Navy, in Godson's words, to do "the unthinkable: it allowed male nurses to enter the Nurse Corps."⁶⁹ In many ways, the experience of the first men who sought to join the exclusively female Navy corps suffered from the same prejudice and mistreatment suffered by women in the Navy at large. It was common for female nurses to resent the intrusion of men into what had traditionally been a female preserve. Since men are now fully integrated into the corps it would be instructive to learn how this process was managed. This topic deserves serious historical study.

Despite the example of the Navy women who risked death and injury and served with distinction in Vietnam and offshore, naval leaders, as Ebbert and Hall and Godson relate, believed that women, other than nurses, should not serve in the fleet. The primary champion of that view was the Navy's top woman, Captain Rita Lenihan, the ACNP (W). She didn't think "women belong onboard ship. . . . Their place is on shore and I don't think the day will come when women will be seagoing as the men." The captain added that "I don't think we'll ever be hearing of service women at Cape Kennedy ready to blast off into outer space."⁷⁰ Lenihan elaborates on her philosophy in oral histories and interviews conducted by the U.S. Naval Institute and Jean Ebbert. Hence, only nine female line officers served in South Vietnam. Despite the increasing need for military personnel during the war, the Navy also failed to exploit the readiness of American women to serve in the Navy itself. In 1960 and nine years later in 1969 there were still only about 6,000 women in the Navy of 600,000 to 700,000.⁷¹

Perhaps no other woman in the Navy's history has achieved as much renown as Rear Admiral Grace Murray Hopper. One of the most comprehensive works on her life and Navy career is Kathleen Broome Williams' *Grace Hopper: Admiral of the Cyber Sea* (2004).⁷² Williams' biography is an insightful analysis not only of Hopper's professional accomplishments and technical genius but also of her exemplary personal traits of perseverance, pedagogical excellence, and dedication to Navy service. Hopper also figures prominently in Williams' *Improbable Warriors: Women Scientists and the U.S. Navy in World War II* (2001), in which the author focuses on the scientific and technological accomplishments of four women, including Hopper, whose work significantly aided the Navy's war effort.⁷³ Williams highlights Hopper's need to "be at the forefront of her profession, never satisfied with the status quo." Williams adds, "it was her ability to sustain this eager probing with undiminished energy."⁷⁴

Other works on Hopper include Charlene W. Billings' *Grace Hopper* (1989),

a popular treatise that sings that admiral's praises while eschewing deep analysis.⁷⁵ Carmen Lois Mitchell's "The Contribution of Grace Murray Hopper to Computer Science and Computer Education" (1994), a PhD dissertation for the University of North Texas, discusses in detail Hopper's "philosophy of teaching and learning, and her pedagogical legacy for today's teachers and scholars of computer science and computer science education."⁷⁶ Hopper's Navy experience, however, is incidental to the piece. Kurt W. Beyer in his "Grace Murray Hopper: Technical Innovator" (2013) praises the admiral's "confidence in her abilities, leadership skills, sense of honor, and aggressive nature [that] allowed her to win over even the toughest critics" and serve as a "role model for generations of women in the computing industry and the Navy."⁷⁷

This author, in his chapter "Cold War to Violent Peace: 1945–1991" (2000) in *The Navy*, and a booklet entitled *Women in the United States Navy* produced by the Navy Diversity Directorate (N134) and the Naval History and Heritage Command (2011), presents short, useful analyses of Hopper's contributions.⁷⁸ One of Hopper's great strengths was her ability to make computer science understandable to the layman and in that regard she teamed up with Steve Mandell to write *Understanding Computers* (1984).⁷⁹ Articles on Hopper abound in Navy, computer science, electronic engineering, and other journals, identified in the Navy Department Library link <http://www.history.navy.mil/research/library/bibliographies/hopper-grace-admiral-select-bibliography.html>⁸⁰

When Hopper retired from the service in 1966, Navy leaders concluded that they could not lose her special skills and brought her back on active duty. In the following years, she continued to champion the applicability of computers for information management in American business and industry. Nonetheless, Grace Hopper considered her highest award to have been "the privilege and honor of serving very proudly in the United States Navy."⁸¹

Former Secretary of the Navy John Lehman included Rear Admiral Hopper in his book *On Seas of Glory: Heroic MEN* [capitals added for emphasis], *Great Ships, and Epic Battles of the American Navy* (2001).⁸² Despite his general ambivalence about women serving in the Navy, he gives her high praise for her tireless efforts to convince the service that computers were essential to future success in battle. Indeed, he observes that "more than any other person she kept the culture of the Navy focused on exploiting the digital revolution [and this] ever-widening lead in technology over the Soviets that came from this focus hastened the end of the Cold War."⁸³

AFRICAN-AMERICAN SAILORS IN AN ERA OF TURMOIL

As with Navy women, constraints on the service of African Americans limited their full or equitable integration into the Navy during the 1950s and 1960s. Naval leaders were not convinced that black sailors would improve the service's efficiency. Moreover, the Navy became complacent in the 1950s concluding that the previous and modest ongoing measures to improve the status of blacks in the service were sufficient. Even before the U.S. Supreme Court struck down the concept of "separate but equal" in *Brown vs. Board of Education*, the Navy enacted the Defense Department order prohibiting segregation in military schools, a plus for the Navy.⁸⁴

Despite Wesley Brown's accomplishment, by 1968 only three dozen black men or women had graduated from the Naval Academy. Robert J. Schneller, author of *Blue & Gold and Black* (2008), the definitive work on racial integration at the Naval Academy, observes that "black midshipmen were not yet fully integrated, professionally or socially."⁸⁵ These factors soured many in the black community on the Navy's primary institution for commissioning officers for the fleet. Schneller adds that black families also considered the Navy as "the epitome of snobbery" because the service still assigned many blacks to the Steward Branch [now termed Culinary Specialists]—to serve white officers.⁸⁶

The Civil Rights Commission, established in the late 1950s, suggested that "all but a few aspects of racial discrimination" had been eliminated from the military, but singled out the Navy which the commission felt had "shown little or no improvement" since Truman's integration order.⁸⁷ Inspired by the efforts of the Reverend Martin Luther King Jr. and others in the civil rights movement, in 1967 the Navy's Bureau of Personnel mounted a major, albeit largely unsuccessful, recruiting effort to double the number of black officers in the Navy within two years. Schneller relates that the percentage of African-American officers in the Navy rose only from 0.3 in 1965 to 0.7 in 1970. By that latter date, there were only three black captains in the service.

Samuel L. Gravely Jr., who became the first black admiral in 1971, deserves a full-length biography. A veteran of World War II, Korea, and Vietnam, Gravely was the first African American to command a combatant ship, to be promoted to flag rank, and to command a naval fleet. Gravely's life and naval career, spanning the years from 1944 to 1982, paralleled the ups and downs of black integration into the Navy. Oral histories and archival materials on Admiral Gravely are ample. A solid starting point for a work on Gravely is Paul Stillwell's "Samuel L. Gravely Jr.: Setting the Precedent" in Joseph J. Thomas' *Leadership Embodied*

(2013).⁸⁸ Stillwell observes that “one hallmark of a successful leader is the ability to go where no one has gone before, to light the way, and to serve as a role model and mentor so that others may follow. Samuel L. Gravely Jr. was such an individual.”⁸⁹

ZUMWALT

No individual has been more associated with the history of social change in the modern U.S. Navy than Admiral Elmo R. Zumwalt Jr., the Chief of Naval Operations from 1970 to 1974. Published books, book chapters, encyclopedia entries, and oral histories abound on this dynamo of a leader who served with distinction in command of naval forces in Vietnam and at the young age of 49 took the helm of the Navy over the heads of 33 more senior admirals. The starting point for any understanding of Zumwalt is his memoir, *On Watch* (1976).⁹⁰ The admiral was keenly sensitive to the inequities that he knew African-American, female, and other minority sailors suffered on a daily basis in the Navy. The admiral also understood that unless he took action to reverse the drastic attrition of naval personnel in the wake of the Vietnam War and America’s anti-military fervor at the time, the Navy would be in serious trouble. Hence, as in previous eras, the needs of the service loomed large.

Zumwalt was also a man of great ambition. As an indication that he had more in mind than reforming the fleet’s personnel policies, much of his 511-page *On Watch* focuses on Vietnam, aircraft carriers, a nuclear treaty with the Soviet Union, and his contentious relationships with Admiral Hyman Rickover, Henry Kissinger, and the Nixon administration. The admiral was supremely confident in his own abilities and the correctness of his views. As with most memoirs, *On Watch* is self-serving, selective in its use of information, and must be weighed carefully against other sources.

Not much help in that regard is Larry Berman’s tome, *Zumwalt* (2012).⁹¹ The author, a journalist and author of several books on the Vietnam War, raises hagiography to new heights. Much of the work relies on Zumwalt’s memoir; a complimentary oral history the admiral recorded with the U.S. Naval Institute; other USNI interviews with admiring former subordinates Alex Kerr (1984),⁹² Howard Kerr, W. Lewis Glenn, and Worth Bagley (the latter three in 1989);⁹³ Zumwalt family papers; and materials housed in Texas Tech’s Vietnam Archive. Restrictions with regard to still-classified information prevented Berman’s access to the official Zumwalt papers and other documentary records held in the Navy archives.

Still, Berman did not avail himself of unclassified Zumwalt-related command histories, operational reports, interviews, and other sources available at NHHC or in other relevant collections nationwide. Berman's treatment of his subject is superficial and one-sided and many of his interpretations argumentative.

One of the more balanced appraisals of Zumwalt's tenure as CNO and his activist programs is Thomas J. Cutler's chapter "Elmo R. Zumwalt Jr.: Hero or Heretic" in James C. Bradford's *Quarterdeck and Bridge* (1997).⁹⁴ Cutler concludes that Zumwalt's "methods were unquestionably radical and provocative, but they also achieved what had not been done before. Zumwalt's contention that traditional methods were prone to failure when revolutionary changes were needed makes sense, as viewed historically."⁹⁵ In "Elmo R. Zumwalt Jr.: Innovation" (2013), Cutler makes similar observations, characterizing the admiral as "one of the most controversial naval leaders of all time" who "both literally and figuratively . . . changed the U.S. Navy."⁹⁶ Norman Friedman in Robert Love's *The Chiefs of Naval Operations* (1980) relates that Secretary of Defense Melvin Laird and Secretary of the Navy John Chafee wanted Zumwalt for the job "because his views on the roles of blacks and women in the navy were more liberal than those of other senior admirals. He did not think that the navy had ever really tried to integrate blacks into the service and saw the general policy towards both blacks and women as tokenism."⁹⁷ Friedman's assessment is that Zumwalt offered the Navy "revolutionary solutions to its gravest problems, rather than the evolutionary changes with which most of the naval community felt comfortable. . . . Zumwalt was flamboyant: his style resembled the charismatic, vigorous military leader of the past, rather than the colorless, bureaucratic manager of modern armed forces."⁹⁸ Edgar F. Puryear Jr.'s *American Admirals* (2005) speaks about Zumwalt and his personnel reforms, but for the most part through the mouths of others, including Zumwalt himself and the historians who have written about the admiral.⁹⁹ The book presents page after page of needlessly lengthy block quotes. Despite eschewing much editorial comment, Puryear does conclude that Zumwalt "was a champion of change who dared to sail into the political mine fields . . . and was ever willing to 'rock the boat' in an attempt to correct what he perceived as the serious ills of the U.S. Navy during the early 1970s."¹⁰⁰

An especially balanced, thoroughly researched, and insightful work on the racial aspects of Zumwalt's tenure is John Darrell Sherwood's *Black Sailor, White Navy* (2007).¹⁰¹ Sherwood discusses the impact of Zumwalt's so-called "Z-Gram" communications to the fleet, each of which can be seen at the NHHC link <http://www.history.navy.mil/research/library/online-reading-room/>

title-list-alphabetically/z/z-grams-list-policy-directives-issued-admiral-zumwalt/list-z-grams.html.¹⁰² Z-Gram 66 (Equal Opportunity in the Navy), for instance, expressed Zumwalt's belief that "ours must be a Navy family that recognizes no artificial barriers of race, color, or religion." Sherwood covers the racial unrest that exploded on aircraft carrier *Kitty Hawk* (CVA-63), fleet oiler *Hassayampa* (AO-145), aircraft carrier *Constellation* (CVA-64), and many other Navy ships and shore stations in 1972 and 1973. Lenwood G. Davis and George Hill, eds., *Blacks in the American Armed Forces* (1985) is a useful compendium that identifies magazine and journal articles on blacks in the racial disturbances and other aspects of the Vietnam War.¹⁰³

To many observers, African Americans opposed the war in Vietnam, railed against the discrimination and harassment they experienced in the Navy, and ultimately rioted on board ships connected to Vietnam service. This is only one side of the story, however. Information and resources abound about black sailors who willingly served, shared the dangers and hardships of their white shipmates, often performed heroically, and valued their experience in the Navy. There is the need for a balanced history of the topic. Sherwood also describes the Navy's response to this turmoil and the success or failure of its efforts in the short and long term. Thoroughly vetted by subject-matter experts, Sherwood's work is based on interviews with many relevant naval personnel and research in the Chief of Naval Operations or "double zero" records, the information-rich official Zumwalt Papers, the Vietnam Command Files, and other primary source materials maintained in the Navy archives.

Sherwood probes the question of whether or not there was institutional racism in the Navy before 1972. He also explores the reasons why Zumwalt had become "a crusader for equal opportunity and affirmative action in the Navy."¹⁰⁴ Later chapters analyze the causes of the racial disturbances and the House Armed Services Committee's findings on them. Some senators from the South, retired flag officers, and other sympathetic commentators suggested that the disturbances resulted from black activism and the lax discipline and permissiveness of the Vietnam-era Navy.

Indeed, the list is long of those flag officers who railed not only against Zumwalt's handling of race issues but also other aspects of his personnel reform programs, especially Z-Gram 57 that sought to eliminate "Mickey Mouse" rules and regulations. Sailors could now grow beards and sideburns and communicate their concerns directly to the CNO in Washington. Oral histories recorded by the U.S. Naval Institute with Admirals Thomas H. Moorer, Kent L. Lee (1990), Robert L. J. Long (1995), Raymond E. Peet (1984), and other retired flag officers

reflect widespread dissatisfaction with what they considered Zumwalt's hasty and ill-thought-out social changes that he pressed on the Navy.¹⁰⁵ Thomas B. Hayward (2009), CNO from 1978 to 1982, recalled that "the Z-grams were always a big problem with me and with most of us. . . . Later, when I was CNO, I reversed a lot of them."¹⁰⁶ James D. "Jig Dog" Ramage (1993), a former fleet commander, contended that the Z-Grams had "generated an air of permissiveness, led to the deterioration of smartness, and the denigration of the CNO's authority."¹⁰⁷ Gerald E. "Jerry" Miller (1984), one-time colleague of Zumwalt on the Navy staff and former fleet commander, contended that "the chain of command was being destroyed. Bud [Zumwalt] was a great builder and a great destroyer." He added, "what a tragedy—for him and the Navy."¹⁰⁸ Historian Thomas C. Hone in his *Power and Change* (1989)¹⁰⁹ has observed that to some Navy officers Zumwalt had weakened "naval command authority—the chain of command [and] in the process he undermined the tradition of seniority."¹¹⁰

Admiral James L. Holloway III, who served as Zumwalt's Vice Chief of Naval Operations from 1973 to 1974, related in his interviews with this author (2012) that all the living CNOs concluded that "we've got to get rid of Zumwalt He's just tearing the Navy apart." Admiral George W. Anderson met with President Nixon to express the admirals' views and according to Holloway, "Zumwalt would have been fired if Watergate hadn't come along."¹¹¹

Holloway later observed that

Admiral Zumwalt does not qualify as a great leader because his command philosophy was not to lead but to accede to the wishes of the subordinate levels of the Navy. Unfortunately, he often did this without consideration of whether this permissiveness would be helpful to the overall mission of the Navy or hurt it. Admiral Zumwalt was a dashing figure, articulate and immensely popular with the junior officers and younger sailors who constitute the majority of the Navy. *But we must not confuse popularity with leadership* [Holloway's italics].¹¹²

Holloway also had decidedly mixed feelings about Zumwalt's approach to the problem of race relations in the Navy. Holloway believed the Navy profited from Zumwalt's actions to improve the lot of African-American sailors because "it highlighted a problem that nobody else would agree" about, but "my disagreement was the way it was done." Holloway felt that the racial awareness program was amateurish and not "professionally run."¹¹³

Both Zumwalt and Holloway, however, acknowledged that racism was

endemic to the Navy and worked to end it. A problem was the failure of blacks and whites to understand one another. As Sherwood has observed, “black sailors represented a changed civilian world, while the white chain of command represented a Navy culture stuck in the social and cultural world of the 1950s.”¹¹⁴ Sherwood is spot on when he concludes that by improving the image of the Navy in the black community, both Zumwalt and Holloway helped transform the service “into one of the best employers in the nation for minorities—a workplace often cited later as a model of racial harmony.”¹¹⁵

Sherwood correctly credits Holloway for carrying forward many of Zumwalt’s programs and Holloway’s institution of the Navy Affirmative Action Plan (NAAP). As documented in a University of Pennsylvania, Wharton School study entitled *Black and Other Minority Participation in the All-Volunteer Navy and Marine Corps* (1979), both services had high aims for their affirmative action programs, including the elimination of racial bias, the distribution of “minorities proportionately across paygrade and rank categories,” and an increase in the “total number of minorities in service, especially in the officer corps.”¹¹⁶ The study found that because of competition with private industry, both services “have had difficulty in finding minorities for their officer and higher skilled positions.”¹¹⁷ Nonetheless, the racial climate in the Navy had improved markedly by the late 1970s.

Zumwalt also took action to improve the lot of women in the Navy. He was keenly aware of the strength of the American feminist movement during the late 1960s, whose adherents called for greater equity and non-discrimination in the armed forces. Even though it was never ratified, the proposed Equal Rights Amendment to the Constitution reflected the support for a change to the status of women, as did the Equal Employment Opportunity Act of 1971.¹¹⁸ Zumwalt was also aware, with the abolition of the draft in 1973, of the Navy’s pressing need to enlist and retain qualified women for the “all-volunteer force.”

Zumwalt took concrete action with regard to women. In Z-Gram 116 of August 1972 the main purpose was to “eliminate any disadvantages to women resulting from either legal or attitudinal restrictions.”¹¹⁹ The communication gave enlisted women greater access to billets; assigned women to the (non-nurse) crew of hospital ship *Sanctuary*; and stated the intention to promote women to flag rank, and to command of shore-based units. Loanne Johnson, in *Making WAVES*, relates her personal experiences, not always positive, as an enlisted sailor in “this man’s Navy” during the post-Zumwalt years.¹²⁰

In this context, one woman who deserves biographic treatment is Captain Robin Quigley, the highest-ranking woman in the Navy from 1971 to 1973.

She took bold steps to eliminate the perception that women were somehow a “special” or separate category in the Navy; she strongly urged everyone to stop using the acronym WAVES, since that had no official standing after 1948. She abolished the billet of ACNP (W)—her own job—as anachronistic. She also recommended abolition of each Navy command’s special advisor for women’s concerns contending that commanding officers should directly handle all such issues. The captain, however, was much more conservative on other issues. In his memoir, Zumwalt suggests that Quigley lost favor with the administration because she upset Secretary of Defense Melvin Laird over the elimination of the ACNP (W) billet.¹²¹ Quigley later exclaimed, “that is an unbelievably preposterous misrepresentation of the facts. . . . The Secretary of Defense [had] not the foggiest thing to do with anything [regarding Navy women] until 1972, after I had told the Chief of Naval Operations I could not and would not endorse his program.”¹²²

Zumwalt does not reveal that he lost confidence in her because of her more traditional outlook. According to Quigley, however, the CNO was “most unhappy with my philosophy” and she alludes to the “hypocrisy of Admiral Zumwalt’s purported interest in women.”¹²³ She opposed women serving on naval vessels, taking flight training, or attending the U.S. Naval Academy. It was clear to Quigley that she was *persona non grata* with the CNO and that “they had to find out what to do with the squirrely lady. . . . Her next assignment needed to be something with a certain degree of high visibility, so that it would not look as though I had been fired or quit.”¹²⁴ Recognizing her ability to work in Washington was nil, Quigley agreed to accept command of the naval schools in San Diego, and despite her differences with the CNO, thus became the first woman to lead a major Navy command. Some naval leaders, both male and female, considered a number of measures instituted by Zumwalt and Quigley too radical and destabilizing and worked to reverse course. As one example, in 1979 the Navy established the billet of Special Assistant for Women’s Policy (OP-01[W]), in essence bringing back Quigley’s old job.

In general, the 1970s witnessed significant advances with regard to Navy women. In 1970, 6,633 women (.95 percent of all naval personnel) served on active duty but by 1979 that figure had risen to 24,644 (4.7 percent of those in service).¹²⁵ By 1979, out of 102 enlisted ratings, 91 (including 15 combat-related billets) were open to women. In April 1972, Zumwalt selected Alene B. Duerk, head of the Navy Nurse Corps, to be the first female flag officer.

The nurses made great strides integrating males into the corps. In 1970, only 156 men served alongside 2,273 female officers in the Nurse Corps but by 1979,

648 men represented 25 percent of the 2,551-person organization. In 1972, the first women entered naval aviation training and by the end of the decade many of them piloted helicopters and fixed-wing aircraft. In 1978, Lieutenant Barbara Allen became the first woman to qualify in jet aircraft. The practice of separating from the service pregnant women or women with dependents under 18, long the norm, was ended by 1975. Holloway opened the U.S. Naval Academy to women in 1976 and in 1978 authorized women to serve on board naval vessels other than hospital ships and transports.¹²⁶

Many Americans and most historians, including this author, credit Zumwalt, despite a number of programmatic missteps, with changing for good how the service accommodated the quest for dignity, equality, and opportunity by its men and women. In his eulogy of Zumwalt in 2000, President Bill Clinton observed that the admiral “worked in the face of wilting criticism and a highly resistant institutional culture to make the Navy do the right thing and make the Navy one of the most colorblind institutions in our entire nation.” He added that Zumwalt “had the vision to see a great future for the Navy” and that “the changes he brought about . . . will continue to shape the character and culture of our Navy for a long time in the 21st century.”¹²⁷

There is need for a balanced study of the personnel, disciplinary, social, and other changes that impacted on the Navy in the early 1970s. A work is called for that does not focus on any one aspect, for instance the actions taken to improve the lot of women, but looks at the influence of American society at large, steps taken (or not taken) by the Navy before Zumwalt’s time as CNO, and the lasting effects of those measures (good and bad) on the service. There are many more sources available to support this study.

THE PROMISE AND PROBLEMS OF THE 20TH CENTURY’S LAST DECADES

In the 1980s and 1990s, African Americans registered great gains in the Navy. As documented by historian Robert J. Schneller, at the naval academy “the 1,511 African-Americans admitted into the classes of 1980–99 represented a quantum leap over the 476 black midshipmen who entered into the classes of 1969–79.” He added that “by and large, black midshipmen, male and female, from the classes of 1980–99 looked back with pride at the Naval Academy as an unparalleled opportunity to obtain a first-class education, a gateway to the naval profession, and a ticket to a lucrative civilian career.”¹²⁸

Bernard C. Nalty wrote of the 1980s that “the eradication of the last vestiges of racial discrimination from the armed services yielded during this period of quiet to such objectives as improving relationships within military families and rehabilitating drug users and alcoholics.” In short, “years of progress in race relations had removed the worst manifestations of racism.” He ascribed this development to the improvement of race relations in society at large and the recruitment of a higher caliber of black and white sailors.¹²⁹

In 1994, Secretary of the Navy John Dalton raised the goal of African-American officers in the Navy to 12 percent, representative of the black population of the United States.¹³⁰ In 1996, Paul Reason became the first African American promoted to four-star flag rank when he took command of the Atlantic Fleet and accepted responsibility for 122,000 service men and women, 200 naval vessels, and 1,400 aircraft.¹³¹

Navy women also registered successes during the last decades of the 20th century. During the 1980s, the number of non-nurse Navy women rose from 30,000 to almost 58,000, the latter figure representing 9.5 percent of the men and women in uniform. Female officers began rising to the Navy’s flag ranks. Pauline Hartington, Grace Hopper, Frances Shea, Mary Nielubowicz, Mary Hall, and Roberta Hazard put on admiral’s stars during the 1980s.¹³² Regina Akers’ oral history interview with Roberta L. Hazard (1994) highlights how the admiral distinguished herself in a 32-year career during which she had a significant impact on improving the quality of service and training of Navy personnel.¹³³ Every year during the 1980s approximately 100 women entered the Naval Academy and many of them excelled as officers in the brigade of midshipmen, students, and athletes. In 1981, the first four Hispanic women and the first Native-American woman graduated from the Naval Academy.¹³⁴

But resistance within the Navy toward the service of women in non-traditional roles remained strong. In 1986, outgoing Chief of Naval Operations Admiral James D. Watkins called for a limit to the number of women in the Navy and his successor, Admiral Carlisle A. H. Trost, planned to implement that action. Only Secretary of Defense Caspar Weinberger’s intercession prevented that restriction from becoming a reality.

Chase Untermeyer, the Assistant Secretary of the Navy for Manpower and Reserve Affairs from 1984 to 1988, kept a diary of his daily interactions with Secretary of the Navy John Lehman and his successor James Webb. While Untermeyer’s work is self-serving and routinely reflects a one-sided view of matters, his *Inside Reagan’s Navy* (2015) opens a window into the decision-making of the Reagan-era secretariat.¹³⁵ Untermeyer relates that both

secretaries were unsympathetic to a proposal to assign women to non-combatant ships in the Mobile Logistics Support Force. Lehman reportedly worried that Navy wives would be up in arms about fraternization and compel their husbands to leave the service.¹³⁶

Webb, a highly decorated Vietnam combat veteran, was remembered by many even before he became Secretary of the Navy as the author of a November 1979 article in *Washingtonian* magazine entitled “Women Can’t Fight” that made the case that women were inherently unsuited for combat.¹³⁷ Once in office, Webb was so sensitive to the perception that he was anti-woman that he fired his Chief of Naval Personnel, supposedly unsympathetic to the plight of female sailors, but other factors apparently prompted the action. He announced in a meeting with the Women Officer’s Professional Association that he was reviewing policies regarding billet assignments, sexual harassment, and fraternization. But according to Untermeyer, Webb was “truly against women in the military and detests those who keep pushing the matter.”¹³⁸ Webb changed the title of the Mobile Logistics Support Force to the Combat Logistics Support Force to emphasize the legal prohibition against women being assigned to ships that might be involved in combat. When the new Secretary of Defense, Frank Carlucci, supported consideration of assigning women to oilers, ammunition, and stores ships in the logistics force, Webb intimated to Untermeyer that the Secretary of Defense “is going to have to get Ronald Reagan to tell me to do it.”¹³⁹ Despite his personal objections, in December 1987 Webb approved the assignment of women to 26 of the 37 ships in the force. Retired Master Chief Petty Officer James L. Leuci’s “Navy Women in Ships,” provides detailed information on individual women and the ships to which they were assigned and is an especially valuable resource.¹⁴⁰

Webb took action to preempt the release of a report by DACOWITS resulting from a tour of naval bases in August 1987 that found many women complaining about sexual harassment, poor communication between female sailors and their superiors, and discrimination on the job. At Secretary Webb’s direction, Admiral Trost ordered an investigation that produced the *Navy Study Group’s Report on Progress of Women in the Navy*.¹⁴¹ The 28-member study group, half of whom were women and included 20 officers, four master chief petty officers, and a “steering committee” of four flag officers, looked at 1) the progress of women in the service during the first years of the all-volunteer force; 2) the Navy’s use and execution of relevant policies; 3) sexual harassment and fraternization; and 4) the quality of life for female sailors. The report emphasized that “Navy women officers and enlisted personnel have experienced significant growth in

both numbers and in career opportunities during the last 15 years.”¹⁴² The study group recommended assigning women to ships of the Combat Logistics Support Force and shore-based fleet air reconnaissance squadrons, an improvement in career opportunities, establishment of a permanent captain billet (OP-01W) for the oversight on women’s programs, and promulgation of a policy on fraternization. One troubling finding of the study group was that “over half of the 1,400 women interviewed . . . indicated they had been victims of some form of sexual harassment in the Navy; nearly all those interviewed reported observing some form of sexual harassment.”¹⁴³ In that regard, the study group recommended greater Navy efforts to improve male attitudes toward their female shipmates. That report and a 1990 *Update Report on the Progress of Women in the Navy*,¹⁴⁴ both led by Rear Admiral Roberta L. Hazard, found that continued combat restrictions and the prevailing male-dominated Navy culture made it especially difficult for women to prosper in the service. The latter report bemoaned the “lack of acceptance, underutilization, and lack of equal treatment” of women in the service, one of the prime factors being the “highly emotional issues of pregnancy, single parenthood, and sexual harassment.”¹⁴⁵ In short, there remained problems aplenty with regard to the service of Navy women.

Real or suspected instances of sexual harassment in the Navy could quickly become national news, as was the case when pre-Army-Navy Game revelry in 1989 at the Naval Academy resulted in Gwen M. Dreyer being handcuffed to a urinal and photographed by male midshipmen. As related to this author in an interview with Joseph W. Prueher (2016), the Commandant of Midshipmen at the time, he considered the incident an issue for the academy to handle.¹⁴⁶ He spoke with both Dreyer and her father and punished the individuals involved but did not expel them from the academy. The incident, however, soon became a major news item across the country with many commenters characterizing Prueher’s actions as insensitive and inadequate. In an interview with the *Baltimore Sun* newspaper, the officer later admitted that he was surprised by the media’s attention and that he “would have handled the Dreyer case differently today. Ms. Dreyer deserved more sympathy . . . and those responsible for the incident possibly deserved harsher punishment.”¹⁴⁷ Convinced that Prueher had learned hard lessons from the experience and was an especially promising naval leader, Maryland Senator and woman’s advocate Barbara Mikulski helped keep the officer’s career on track. Joseph Prueher went on to serve as the Vice Chief of Naval Operations; Commander in Chief, Pacific; and the U.S. Ambassador to the People’s Republic of China. The episode is recounted in a balanced, well-researched chapter in John Hattendorf and Bruce Elleman’s *Nineteen Gun Salute* entitled “The Right

Skill Sets—Joseph Wilson Prueher (1941–)” (2010) by Bruce Elleman.¹⁴⁸ More over-heated and inaccurate coverage can be found in Greg L. Vistica’s screed, *Fall From Glory*.¹⁴⁹

By 1990, 331 officers and 7,803 enlisted women were serving afloat on board more than 100 naval vessels. Not unexpectedly, the new assignments could put women in danger, as occurred in 1987 when Iraqi air-launched missiles hit guided missile frigate *Stark* (FFG-31), operating in the Persian Gulf along with destroyer tender *Acadia* (AD-42) and her integrated crew. In this era of “firsts,” female officers became the first commanding officers and executive officers of training, recruiting, Military Sealift Command, and other commands. In 1987, Lieutenant Commander Deborah Gernes became the first executive officer of destroyer tender *Cape Cod* (AD-43) and later qualified for command at sea.¹⁵⁰

Other Navy women took to the skies and shared with their male counterparts the risks of flying military aircraft. Lieutenant Commander Barbara Allen Rainey, the first woman to become a naval aviator and qualify in jets, was killed in a training accident in 1982. Other women became naval aviators and naval flight officers, test pilots, helicopter pilots, and training instructors, or served in aviation-related navigation, intelligence, and communications billets. In 1988, Commander Rosemary Mariner became the first executive officer of a naval aviation squadron and later the first commanding officer of that unit. By 1990, 4,892 enlisted women served in aviation squadrons. Belying the observation of Captain Lenihan in the late 1960s, in 1984 Naval Reserve Commander Kathryn D. Sullivan, serving with the National Aeronautics and Space Administration, became the first woman to walk in space.¹⁵¹

HOMOSEXUALITY

Homosexuality and the Navy’s response to it is a subject that demands more comprehensive historical coverage. Homosexuality has gone down to the sea in ships from the dawn of time, but the issue gained nationwide attention in the late 1980s. Following an explosion that tore apart gun turret Number Two of battleship *Iowa* (BB-61) in April 1989, a Navy investigation concluded that sailor Clayton Hartwig had purposely triggered the blast with an electric or chemical detonator that killed him and 46 other sailors. The national media picked up rumors that Hartwig was a homosexual and had had a falling out with another homosexual sailor, an assertion never substantiated. Indeed, subsequent government-sponsored investigations contradicted the Navy’s findings and

blamed the explosion on a mechanical malfunction unrelated to human error.

The standard works on the U.S. Navy discuss homosexuality sparingly, if at all. Godson relates in several short paragraphs that until 1994 when President Clinton implemented the policy of “don’t ask, don’t tell,” lesbians and gays were routinely discharged from the service as a threat to good order, discipline, and national security.¹⁵² Ebbert and Hall provide a forthright, albeit short analysis of lesbianism in the Navy and how the service dealt with it during the late 20th century. They relate two instances, which received media attention, where a number of female crew members on board tenders *Norton Sound* (AVM-1) and *Yellowstone* (AD-41) were investigated for homosexual activity and some discharged from the service. The authors contrast the Navy’s handling of those cases with its routinely secretive discharge of gay male sailors. Ebbert and Hall add that during the 1980s, “of all the services, the Navy had the highest overall rate of discharge for homosexuality for both men and women.”¹⁵³

Randy Shilts’ *Conduct Unbecoming* (1993)¹⁵⁴ and Joseph Steffan’s *Honor Bound* (1992)¹⁵⁵ clearly support allowing homosexuals to serve in the military while Ronald D. Ray in his *Military Necessity & Homosexuality* (1993)¹⁵⁶ opposes that measure. E. Lawrence Gibson’s *Get Off My Ship* (1978),¹⁵⁷ the Rand Corporation’s *Sexual Orientation and U.S. Military Personnel Policy* (1993),¹⁵⁸ and *Gays and Lesbians in the Military* (1994) edited by Wilbur J. Scott and Sandra Carson Stanley, provide useful information on government policies and relevant literature. Nonetheless, despite these most recent studies, much more needs to be done to gain a full understanding of homosexuality’s impact on Navy since the end of World War II.

THE UPS AND DOWNS OF THE INTEGRATED NAVY

Tens of thousands of Navy women took justified pride in their accomplishments during the 1990s. The standard texts on the Navy’s involvement in the Persian Gulf War focus for the most part on political-military issues, strategy and tactics, and combat operations, but document some contributions of Navy women. Seventy-five thousand American naval personnel, including 3,700 women, deployed to the combat theater. This author and Robert J. Schneller, in their work *Shield and Sword* (2001), relate the experience of Lieutenant Commander Diane Cangelosi in dangerous flight operations near Kuwait and how another military woman, Army aviator Rhonda Cornum, endured torture, including sexual abuse at the hands of her captors.¹⁵⁹ *Shield and Sword* also makes the point that other

military women suffered death and injury when a Scud missile launched from Iraq killed or wounded 56 men and women of an Army Reserve unit at a support facility in Dhahran, Saudi Arabia.¹⁶⁰ Nonetheless, as with many histories of the Navy since World War II, *Shield and Sword*, Marvin Pokrant's two-volumes on the war at sea (1999),¹⁶¹ and Norman Friedman's *Desert Victory* (1991)¹⁶² do not provide in-depth coverage of female activities in the conflict. Perhaps this is a reflection of the fact that by 1990–91 many women were carrying out their duties in much the same way as their male counterparts.

For Jean Ebbert and Marie-Beth Hall, “the Gulf War . . . was a turning point for women in the Navy.”¹⁶³ The courageous and professional performance of Navy and other military women in the Persian Gulf War invigorated Americans who wanted to redefine, if not rescind altogether the 1948 law that barred women from combat. Hence, in November 1993, Congress enacted a legislative measure that enabled women to serve on combatant ships, with the exception of submarines and mine warfare vessels.

The 1990s produced a flood of books on women in the Navy. One of the most insightful is *More Than a Uniform* (1997)¹⁶⁴ by Winifred Quick Collins, who had served in World War II and the early Cold War and held the billet of Assistant Chief of Naval Personnel for Women from 1957 to 1962. Captain Collins made the point that “although the ‘woman’s revolution’ is often said to have begun in the early 1960s, we should recognize that at that time women in the Navy were *already* [original italics] performing important jobs which were unavailable to their civilian counterparts. The changes for women in the navy had become profound before the women’s revolution got under way.”¹⁶⁵

Doris M. Sterner's *In and Out of Harm's Way* (1996) is a chronological compendium of people, events, and other information relevant to the Navy Nurse Corps from its establishment in 1908 to the last years of the 20th century.¹⁶⁶ John P. and Marie C. Dever's *Women and the Military* (1995)¹⁶⁷ is a font of information on the women in the services as is Vicki L. Friedl's *Women in the United States Military* (1996).¹⁶⁸ The latter work provides a research guide and an annotated bibliography on the topic. The work specifically identifies archives and other repositories holding material on Navy women; congressional reports; relevant books, articles, and studies; and the best sources on such issues as family and pregnancy, sexual harassment, and women in combat. Margaret C. Devilbiss in her *Women and Military Service* (1990) uses a social science methodology to study the seminal policies relating to military women and analyzes ten “key issue areas” to determine their underlying causes.¹⁶⁹ A more specialized study is Deborah G. Douglas' *United States Women in Aviation* (1990) that looks at

military and civilian women who made a mark in aviation.¹⁷⁰ Individual chapters for the postwar period include the “Impact of the Women’s Rights Movement” of the 1960s and “Women with the ‘Right Stuff’” of the 1970s. Other useful sources include Lory Manning’s *Women in the Military* (2008) and Laurie Weinstein and Christie C. White’s *Wives and Warriors* (1997).¹⁷¹

SEXUAL HARASSMENT AND TURBULENCE IN THE NAVY

Navy women would remember the 1990s not only for their participation in combat operations and professional accomplishment but highly publicized and sensational episodes related to sexual harassment. The Tailhook scandal of 1991–92 rocked the Navy as no other gender-related issue of modern times. The annual meeting in September 1991 of the Tailhook Association, a group that looked at issues related to the Navy’s aviation community, degenerated into raucous parties and lewd behavior fueled by alcohol in certain areas of the hosting Las Vegas hotel. Female officers reported that inebriated male aviators had groped and verbally abused them as they made their way through the hotel. Lieutenant Paula Coughlin, a helicopter pilot and an admiral’s aide, reported the egregious behavior to her superiors. Dissatisfied with the Navy’s investigation of the matter, she went public and the activities at the Tailhook convention soon became heated national news.

The passion generated by Tailhook is clearly reflected in the works that cover the episode. On one side are books like Gregory Vistica’s *Fall From Glory* that heap calumny on the Navy for all manner of transgressions, real or imagined, and its “bag of dirty tricks.”¹⁷² His sensational approach and obvious antagonism to the naval leaders who worked to deal with Tailhook severely limits the book’s usefulness. Journalist William H. McMichael’s *The Mother of All Hooks* (1997) is written in much the same vein.¹⁷³ He regarded Tailhook as “a failure of leadership, deceptiveness, institutional entrenchment, loyalty over truth, abuse of power, [and] outright incompetence.”¹⁷⁴

A more even-handed treatment of Tailhook can be found in Jean Zimmerman’s *Tailspin* (1995).¹⁷⁵ She documents the entire episode with a focus on Lieutenant Coughlin’s role in it and the gross misbehavior that took place at the Las Vegas Hilton. For Zimmerman, a key issue was the combat exclusion law that prejudiced male aviators against their female shipmates and set them up for disrespectful treatment. Zimmerman, however, credits Admiral Frank B. Kelso, the Chief of

Naval Operations—the villain in the piece for many antagonists—as the man who “effectively ushered the Navy into a new era of including women in combat duty”¹⁷⁶ Admiral Stanley R. Arthur, the Vice Chief of Naval Operations under Kelso, in his interview with this author, provides significant insight into the leadership’s actions during Tailhook and especially those of Admiral Kelso.¹⁷⁷ Both Godson in *Serving Proudly* and Ebbert and Hall in *Crossed Currents* provide short balanced summaries of Tailhook.

Another angle on the Tailhook episode is provided in William B. Breuer’s *War and American Women* (1997).¹⁷⁸ The author of numerous popular military histories, Breuer praises the accomplishments of women throughout U.S. history but questions the wisdom of putting women in combat positions. He does not dispute the fact that sexual transgressions occurred in Las Vegas but rails against feminists and their supporters in Congress and the media who sullied the reputations of male officers who attended the convention but took no part in its misbehavior. He bemoans the damage done to the Navy in the scandal’s aftermath.

Malcolm Steinberg’s *Admiral Boorda’s Navy* (2011) is a misnomer in that the author has little or nothing to say about the Navy of 1994–96, instead focusing on the suicide of Admiral Jeremy Boorda, the Chief of Naval Operations following Kelso.¹⁷⁹ Steinberg argues that the pressures of gender issues helped influence Boorda to take his own life. Many of the events associated with Tailhook and related issues are discussed in the pages of the U.S. Naval Institute’s compilation of articles entitled *Women in the Navy* (2015) by Thomas J. Cutler.¹⁸⁰ The work provides an especially useful collection of articles that appeared in *Proceedings* from 1978 to 2014 and touched on women on ships, in naval aircraft, the combat exclusion legislation, and pregnancy.

Tailhook was not the only gender-related problem that commanded the Navy’s attention and received analysis in the sources identified above. In 1994, Admiral Arthur, who had commanded U.S. naval forces during the Gulf War and flown more than 500 combat missions in Vietnam, was compelled to withdraw his nomination to be Commander in Chief, Pacific. The principal reason was that he had endorsed an aviation command’s finding that Lieutenant Rebecca Hansen was unqualified for flight duty. Hansen charged that sexual harassment by a flight instructor, later disproven, had caused her failure.¹⁸¹ That same year, Lieutenant Kara S. Hultgreen became the first woman to qualify in the Navy’s top fighter, the F-14 Tomcat. Like many of her male counterparts over the years, Lieutenant Hultgreen was killed while recovering on board an aircraft carrier, an inherently dangerous maneuver. Some critics charged that to satisfy feminists the Navy put an unqualified woman in the pilot’s seat. Others said that a woman

should not have been exposed to such risk in the first place. In the end, the Navy determined that it mattered not in the least whether the pilot of that F-14 was male or female. Most of the sources treating Tailhook also include passages on Hultgreen's Navy experience and death on duty. An especially compelling work was written by her mother, Sally Spears, who "conscious of that [familial connection] tried very hard not to paint her as a saint or a prude or always in the right, a plastic perfect heroine."¹⁸² Spears' book works especially well in that regard.

THE FOCUS ON DIVERSITY

The major efforts after the 1990s to improve the status of women and blacks and to end discrimination also inspired the Navy to pay much closer attention to its Hispanic, Asian-Pacific, and other minority sailors and their contribution to the service. An earlier work on a minority member of the Navy was the autobiography *Carrier Admiral* (1967) by Vice Admiral Joseph J. "Jocko" Clark, of Oklahoma Cherokee ancestry.¹⁸³ Noted historian Clark Reynolds helped the admiral prepare the work on the latter's service in World War II. A much more polished and interpretive work on the admiral is Reynolds's *On the Warpath in the Pacific* (2005).¹⁸⁴ Reynolds describes Clark's early life and naval service, leadership in the carrier battles of World War II, and command of the U.S. Seventh Fleet during the Korean War. While Clark and Reynolds seem comfortable with allusions to Indian stereotypes, as depicted in the latter volume's text and illustrations, readers may find the treatment less than sensitive to contemporary tastes.

More recent publishing efforts have included works on other minority Navy leaders, for instance Sarandis Papadopoulos' chapter on Admiral Horatio Rivero Jr. in Bruce Elleman's *Nineteen-Gun Salute* (2010).¹⁸⁵ Papadopoulos argues convincingly that the intellectual and diplomatic skills of this Puerto-Rican-born officer served the Navy especially well. Rivero earned combat decorations in World War II and the Korean War, distinguished himself in leadership positions throughout the Cold War, and became the Navy's first Hispanic four-star admiral as the Vice Chief of Naval Operations during the critical early years of the Vietnam War. He then served as Commander in Chief, Allied Forces Southern Europe, and U.S. Ambassador to Spain. The NHHC's archive holds his papers and the U.S. Naval Institute has conducted an oral history with him. Rivero's contributions to the Navy and the nation cry out for more comprehensive biographical treatment.

Naval historians have also devoted attention to the contributions of minority

sailors in the fight against global terrorism. Thomas J. Cutler's *A Sailor's History of the U.S. Navy* (2005) recounts the bravery and professional skill of petty officers Tayinika "Baby Doc" Campbell, an African American, and Ernesto Garcia, an Hispanic-American, in the successful effort to save guided missile destroyer *Cole* (DDG-67) after her attack by Al Qaeda terrorists in October 2000.¹⁸⁶

The Naval History and Heritage Command, as tasked by the Navy Diversity Directorate (N134), has made a concerted effort to document the contribution of minority sailors who have served the Navy and the nation. Individual booklets published in 2010 and 2011 focus on Women, African Americans, Hispanics, Asian Pacific Americans, Native Americans, and religious diversity. We learn that 41,500 Native Americans, more than 90 percent of them volunteers, served in the Navy and the other military services during the Vietnam War.¹⁸⁷ Indicative of the advances Asian-Americans have made in the Navy, Harry B. Harris Jr., born in Yokosuka, Japan, to an American chief petty officer and a Japanese woman, in 2014 became the Navy's first officer of Asian ancestry to put on the four stars of a full admiral when he took the helm at the Pacific Command.¹⁸⁸ In 2007, Adam M. Robinson Jr. became first black Surgeon General of the Navy and Chief of the Bureau of Medicine and Surgery.¹⁸⁹ Rear Admiral Nora Tyson became the first woman to command a carrier strike group, which operated from aircraft carrier *George H. W. Bush* (CVN-77).¹⁹⁰ Hispanic-American Jacqueline DiRosa became the first woman to serve as both a Force and Fleet Master Chief, billets at the top of the Navy's enlisted ranks. While these booklets serve the purpose of highlighting the contribution of minority communities and individual leaders, and should be continually updated, they are no substitute for in-depth, thoroughly researched and analyzed histories and biographies that should be encouraged.

One individual who has distinguished herself in service to her country and warrants a full biographical study is Michelle J. Howard. She was the first African-American woman to achieve four-star rank in the Navy when she became the Vice Chief of Naval Operations in 2014. Subsequent tours included command of U.S. Naval Forces, Europe, and Allied Joint Force Command, Naples. Earlier in her career, Howard led Expeditionary Strike Group 2 in anti-piracy operations in the Gulf of Aden and served as Chief of Staff to the Director of Strategic Plans and Policy on the Joint Staff. Oral histories and other supporting materials are available in the Navy archives and other repositories.

CONCLUSION

Historical coverage and analyses concerning the integration of women, African Americans, and other minority sailors in the U.S. Navy of the Cold War and post-Cold War eras reflects the status of those groups at the time. During the 1950s and 1960s, when minority officers and enlisted sailors constituted a very small percentage of the personnel in the Navy and many of those minority members did not serve in the operating fleet, few works appeared in print to document their contribution. All that changed in the 1970s and early 1980s when the nationwide civil rights, feminist, and anti-establishment movements and opposition to the Vietnam War shined a spotlight on the status of African Americans and women in the Navy. Complementing the path-breaking works on African Americans by Morris MacGregor and Bernard Nalty were Frederick Harrod's salient analysis, Herbert Northrup's and Greenwood Press' documentary works, and especially Admiral Zumwalt's memoir *On Watch*. Scholars have also benefitted from the insider views of Joy Bright Hancock and Margaret Chase Smith through their autobiographies and the U.S. Naval Institute's recorded interviews with key female and male leaders of the previous eras. The floodgates opened wide in the 1990s with regard to publications on Navy women and gender issues. The Tailhook scandal generated a number of works, including solid analyses by Jean Zimmerman, Susan Godson, and Ebbert and Hall, and heated works by Gregory Vistica, William McMichael, Malcolm Steinberg, and William Breuer. John and Maria Dever, Doris Sterner, Winifred Quick Collins, Vicki Friedl, Sally Spears, Margaret Devilbiss, Lory Manning, Sharon Disher, and Deborah Douglas produced creditable works on various aspects of women in the Navy of the time. The issue of homosexuality in the military came to the fore with publications by Randy Shilts, Joseph Steffan, and Ronald Ray. The three most useful overviews of Navy women in the last half of the 20th century are *Crossed Currents* by Jean Ebbert and Mary Beth Hall, *Serving Proudly* by Susan Godson, and *Women in the Military* by Jeanne Holm. Supported by in-depth research in primary and secondary sources, and oral history interviews, these authoritative works present a wealth of information and sharp analysis on gender issues.

The 21st century has witnessed the publication of several first-rate, scholarly books focused on key aspects of the social history of the modern Navy. Robert Schneller's *Breaking the Color Barrier* and *Blue & Gold and Black* thoroughly document the integration of black Americans at the U.S. Naval Academy while John Darrell Sherwood's *Black Sailor, White Navy* provides a cogent interpretation of the Navy's racial troubles in the Zumwalt era. Finally, the Naval Institute's

oral history interviews with admirals Stanley R. Arthur, Joseph A. Prueher, and other key leaders shed significant light on the social issues that shook the modern U.S. Navy.

In short, a solid body of information and interpretive works exist relating to the experience of minority sailors in the momentous decades since the end of World War II. Study of that subject and that era of the Navy's history, however, is far from done. The American people and the naval service deserve a full-length, thoroughly researched and analyzed work on the social history of the late 20th century; and another that combines the strategic, operational, institutional, technological—and social aspects—of the Navy's momentous 21st century history.

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160130-N-CCR06-282 U.S. Navy photo by Mass Communication Specialist 2nd Class Blagoj B. Petkovski

A bulwark in American Navy strategy, the nuclear-powered aircraft carrier *Harry S. Truman* (CVN-75) transits the Persian Gulf. Her carrier strike group was deployed in support of Operation Inherent Resolve, maritime security operations, and theater security cooperation efforts in the U.S. Fifth Fleet area of operations.

Chapter 7

The U.S. Navy's Role in National Strategy, Especially Between 1980 and Today

by *Sebastian Bruns*

Cat: Where are you going?

Alice: Which way should I go?

Cat: That depends on where you are going.

Alice: I don't know.

Cat: Then it doesn't matter which way you go.

—Lewis Carroll, *Alice's Adventures in Wonderland*

INTRODUCTION

No matter whether you consider Lewis Carroll's cat as the Navy and Alice as the corresponding national strategy, or whether you read it the other way around: The U.S. Navy's role in national strategy and American strategy itself are so intertwined that it is nearly impossible to untangle enduring causal and reciprocal relationships. In fact, strategy making at a service level and the national level are complex, even chaotic processes with numerous elements, factors, and potentially disruptive influences that are highly likely to disappoint practitioners and researchers alike.

This is certainly challenging for the political scientist who might have happily retreated to complex and "ivory-towerish" theories and methods to analyze strategy making in complex environments. It can be equally difficult for a

naval historian, in particular one who is constrained by access to and availability of sources. Owing to the complexity of the subject, the political and military dynamics involved, and the observation that dominant sea power¹ has a shaping function (and always has had in human history), there is hardly ever a desired end state for strategy. More so, strategy is a living and breathing, sometimes coughing, thing. In a Western democratic presidential or parliamentary system where the primacy of civilian politics is one of the fundamental golden rules, Carroll's Alice and the cat thus could be seen as symbolic for the symbiotic relationship between a service and its political masters. If the path forward is unclear and the end goal is a mere set of ideas, then it does not matter whether one is on the right track. It is merely about not being incorrigibly wrong.

This paper discusses the Navy's role in American strategy, or in other words the paths and frameworks. The Marine Corps and Coast Guard will only be touched upon in passing and allied or foreign perspectives will only be referred to peripherally. First, the essay sheds a light on the historiography of the subject, seeking to give an overview of who writes, why, and how about the issues at hand. Second, the paper identifies some key debates. Third, it will look at existing literature, available and accessible sources, and potential barriers to reckon with.² Fourth, this chapter speaks on challenges and opportunities for assessing very recent Navy strategic history.

HISTORIOGRAPHY

A recent study found that each year between 2009 and 2013 close to 16,000 history books were published in America alone. That equals more than 40 books per day, ranging from popular histories to academic studies.³ Yet, even a cursory review reveals that there is little on Navy strategy and the service's role in national strategy. Is this the infamous "sea blindness" at work with the American people, authors, and researchers? After all, it must be assumed that very few people and almost no professional naval or strategy historians write on modern strategy (that is, inside the 30-year limitation usually imposed on official documents before these are made available to historians). The Navy, even though "open ship" events and fleet weeks regularly draw tens of thousands of fascinated visitors, apparently does not lend itself to historians with an interest in strategy. The Navy's strategic culture is difficult to transcend and the service has practiced forward operations since the end of World War II, which quite figuratively keeps them out of the eyes (and minds) of many Americans. The Navy and by extension

its approach to strategy are forward by definition—out of sight and out of mind for longer periods of time—and operationally focused by their own rationale. As retired Navy Captain Peter Haynes put it, “The institution’s locus remains these ‘forces,’ termed ‘the fleet,’ which is the reason why the rest of the Navy exists. Its requirements are never questioned, its importance never rivaled. Like operations, the fleet’s salience is supposed to be self-evident.”⁴ Needless to say, this thinking hardly motivates individuals within the naval branch to take up study in modern naval strategy because they are focused elsewhere, and it creates problems of its own.⁵ Then again, if a huge military branch such as the Navy operates forward, should it not have a concise strategy to begin with?

For the purpose of this paper, strategy is considered the *conditio sine qua non* with which naval power cannot be exercised effectively. In other words, this is “the art of directing maritime capabilities to attain political ends.”⁶ It is both an art and a science. More so, from the social sciences point of view, it is imperative to understand strategy as fundamentally interdisciplinary. It includes—but is not limited to—political, historical, geographic, geopolitical, technological, sociological, and even psychological (rational) nuances. This, in turn, may scare off professional historians (and it also does not necessarily encourage political scientists either). Strategy is usually understood as a ways-means-ends linkage to achieve specific goals or objectives. For the Navy, more specifically OPNAV, this means “to formulate an organizational strategy that enables the Navy to support higher-level policy objectives.” This type of strategy ideally should be framed by a conceptual analysis of the future security environment and U.S. defense policy. For OPNAV, Navy strategy is transformative in the sense that it offers a plan to create the Navy of tomorrow out of the Navy of today.⁷ The fundamental question that needs to be answered is this: Are you writing about war at sea—or the importance of the sea for strategic ends?

In principle, the literature of strategy is vast. The use of the term has expanded drastically, especially in the business sector since the 1980s. A November 2016 cursory search at Amazon.com’s book department yielded more than 240,000 titles for the keyword “strategy,” although these include anything from military strategy to business strategy, to self-help books for individuals seeking spiritual, financial investment, or relationship guidance. It is thus imperative to qualify what kinds of strategy are in the focus, and for the purpose of our profession and this paper these are: grand, military, and naval (or maritime) strategies.⁸

It is important to note that U.S. grand strategy, as opposed to the Navy strategy, is rather well reflected in the expert (academic) literature, although that should hardly come as a surprise given the United States’ dominant role globally

and its status as the world's remaining superpower. Grand strategy considerations mandate a global analytical approach by virtue of the scope it takes.⁹ This is where many political scientists and scholars of international relations come into play. Consider, for example, Samuel Huntington's groundbreaking essay from 1954 in which he identified three eras of U.S. policy: First, there was the Continental phase, followed by an Oceanic period, and finally the Transoceanic era.¹⁰ Huntington, who would later rise to write even more influential thoughts, remains such a key influence on the elements of a naval and maritime strategic concept that scholars have used his work as stepping stones to develop his concept further. Edward Rhodes, for instance, spoke of a fourth Cis-Oceanic era in 1999,¹¹ which was later adapted for the 21st century by Austrian scholar Nikolaus Scholik, who added a fifth stage for the United States: the Post-Oceanic—or global—era.¹²

The past four years have seen an increasingly widening body of literature on Navy strategy, but very few actually written by trained naval historians. Rather, these authors often come from genuinely different, even outsider backgrounds (including this author's own study). They include Swiss political scientist Larissa Forster, who published a quantitative study on U.S. Navy response from the sea in 2013;¹³ Captain Haynes, whose intellectual history of the Navy's post-Cold War strategic development hit book stores in 2015;¹⁴ R. B. Watts' book *American Sea Power and the Obsolescence of Capital Ship Theory*;¹⁵ and Peter Swartz' and Randy Papadopoulos' chapters in the 2016 *Routledge Handbook of Naval Strategy and Security*.¹⁶ Norwegian scholar Amund Lundesgaard's recently completed PhD dissertation on U.S. Navy force structure after the Cold War¹⁷ and this author's work complements that body of literature.¹⁸ Forthcoming is at least one more study titled *Bearing the Trident: The United States' System of Transoceanic Power Projection in Ascendancy and Crisis* by Austrian national Michael Haas.¹⁹ Concurrently, a number of studies relevant to the subject of U.S. Navy strategy, the Navy, and its naval allies have recently been published or will be forthcoming.²⁰

One may wonder why there is an increasing interest in more recent naval strategic history and the political use of sea power. Contextual trends, i.e., the reassessment of maritime strategic issues in this century in light of globalization, rise of other powers and a relative decline of U.S. power, and changes in the nature of war and warfare have also affected the U.S. role herein based on seeking an appreciation for the broader context of sea power. As Seth Cropsey noted, "Wide-ranging sea power is not so much an instrument of force [...] as a condition of stable commerce, effective diplomacy, and regional influence."²¹ However, there have been vast gaps in research and application of recent naval strategic

events and developments if one looks beyond the vast stream of think-tank papers and blog posts.

Beyond the news that is driving the defense and security policy day, the rising interest in naval strategic matters has to do with the Navy itself. For the first time since “The Maritime Strategy” of the 1980s with the CS-21/CS-21R updates (2007/2015), the Navy has been able to develop a conceptual narrative of how to employ naval power to achieve political objectives. The Navy’s shrinking fleet size, a development that caught the attention of various senior leaders, has also led many to reconsider what the Navy offers for U.S. national security and defense—and how much it costs.²² The advent of ever-more sophisticated technology such as drones and unmanned vehicles accelerates military change and relationships, with sketchy strategic-operational ramifications still. For the first time since the end of the Cold War in 1990, the United States is also in danger of giving up its sea control, both in confined and shallow waters as well as on the high seas. Perhaps, in recognizing the systemic nature of maritime security in a grand strategic sense, as Peter Haynes has shown, and providing a very real illustration how the Navy serves political ends through such measures as sea control, showing of the flag, power projection, and deterrence, the Navy finally turned around the adverse momentum of the land-centric (read: Army, Air Force, Marine Corps) campaigns in the Middle East following 2001. A final hypothesis relates to the broader economic and political environment: Beginning with the 2007 economic crises and accelerated by tectonic shifts in the international security environment from about 2014,²³ some cost-benefit issues for pricy gadgets like aircraft carriers have gained some interest, with underlying strategic debates being conducted since.²⁴

A number of recent doctoral dissertations on contemporary Navy strategy using methods of historical research have their foundation in CS-21 as an incentive to study the role of naval power in American policy. As a Norwegian colleague postulated, “With CS 21, the US Navy had an official strategy for the first time since the Maritime Strategy was published in 1986.”²⁵ Also, CS-21 was specifically billed as a maritime, not just a naval strategy, which made it attractive to researchers outside of the Navy’s own immediate community. Surely the largest push came from an asset that was well used for research, the ready-presented capstone documents study by retired Navy Captain Peter Swartz. His concise list of numerous issues on the military strategies since 1970 emitted from an internal Navy workshop in 2005. The original request to analyze three Navy strategies soon morphed into a multi-volume PowerPoint presentation with thousands of slides, which is a chronology rather than a narrative, but has invaluable raw data

in it. Concurrently, since 2004, Professor John Hattendorf's document collection has allowed researchers to follow the major naval strategic documents and the debate.²⁶ That said, it is beyond the scope of this paper to discuss the different views and finding of recent works on Navy strategy.

It is timely, though, to lay out some key debates and recurring themes in the literature. The following is a list of six broad groups of strands and lines.

1. *The Navy does not have a strategy/The Navy does not need a strategy.*

Among the most basic of debates, this issue was raised as early as the 1980s in the confrontation of then-Secretary of the Navy John Lehman and former Undersecretary of Defense for Policy in the Carter administration, Robert W. Komer. Komer became a very vocal critic of the 600-ship Navy idea pursued by Lehman and his disciples.²⁷ Another example for such a fundamental dispute can be traced in the two essays by John Mearsheimer, who labeled the 1980s "Maritime Strategy" a strategic misstep, and Colin Gray's emphatic support of such a maritime grand strategy.²⁸

2. *Should the Navy have a strategy at all?*

A related argument focuses on whether the service actually has a larger strategy, and a subset of strategies (such as for shipbuilding, retention, recruitment, etc.). Navy leadership would enthusiastically make the case that—of course—the Navy should have a strategy and that there is a strategy (like CS-21, CS-21R, "Forward... From the Sea," etc.)—in addition to a subset of strategies for other fields (regional, functional). Samuel Huntington, in his landmark 1954 essay, left no doubt that in his mind the Navy and the nation needed a strategic concept. A service strategy to describe and amplify global maritime aspects, recommend changes and professional judgements, and to organize, train, and equip is necessary. This was also reflected in some of the more academic debates of the 1980s.²⁹

Among the more recent fundamentalist critics who thought services in general should not mingle in strategic conceptualizations was Bush administration Secretary of Defense Donald Rumsfeld. Defense secretaries, especially those without a strong bond to the Navy, may favor the joint staff, the combatant commanders, and defense specialists inside and outside of government bureaucracy. Services could have visions or policies, but not strategies—a sentiment shared by those with a strict view on the primacy of politics over the military, or fans of the Goldwater-Nichols Act.

Note: There are important semantic differences between maritime and

naval and Navy strategies, or the names of capstone documents, a term coined by Swartz, then a senior researcher at the Center for Naval Analyses. As he put it, “USN [was] never rigorous in its approach to policy/strategy/concepts terminology. Definitions considered dull, unimportant, individual idiosyncratic approaches abound.”³⁰ In fact, there have been, in no particular order, strategies, doctrines, concepts, concepts of maritime operations, visions, concepts of naval operations, philosophies, politics, guidance, analysis, and PR pieces.³¹

3. *What is the best fleet design and force structure? What kind of conflict and future war should the Navy be prepared to fight? How “hard power” should a strategy be?*

Broadly speaking, there is a tendency to discuss force structures delineated from the aircraft carrier, still the major asset in the Navy. That debate is recurring, both in its fundamental version (carrier proponents vs. carrier dismantlers) and its more nuanced sister, namely what kind of aircraft carrier the nation needs. In the 1970s, it was Admiral Elmo Zumwalt’s High-Low mix that advocated for a combination of platforms. Shortly thereafter, President James Earl Carter Jr.—a nuclear submariner—pushed for the sea control ship, a light carrier that was to replace the conventionally and nuclear-powered big-deck aircraft carriers. His counterpart, Admiral James Holloway, emphatically rejected the idea³² and under Carter’s successor Ronald Reagan, the big-deck carrier school won out. In the absence of a sea-control challenger and with the power-projection and close air support missions of the 1990s and 2000s, the role of the carrier was increasingly looked at through a budgetary lens. Even the Air Force-driven RAND Corporation chipped in, producing a report highlighting the utility of the aircraft carrier in the modern day and age.³³ More recently, the debate came to light publically with the exchanges between retired Navy Captain Henry Hendrix (former director of Naval History and Heritage Command, now with the Washington-based think tank Center for New American Security) and retired Commander Bryan McGrath (team leader for the 2007 Cooperative Strategy writing process and deputy director of the Hudson Center’s Institute for American Seapower, Washington, DC). McGrath was also involved in a 2016 report on the validity of aircraft carriers.³⁴ The uniformed strategists are markedly quiet on this issue, at least when it comes to the public, perhaps wary of a reprise of the 1949 “Revolt of the Admirals.”

Roger Barnett’s 2009 postulate that a “fleet is like a hand of cards—you play the hand, not the individual card”³⁵—speaks to the validity of warships other than 100,000-ton carriers. One need not return to the schools of thought

of Alfred Thayer Mahan and Julien Corbett to illustrate the debate between those favoring capital ships as the bedrock of strategy (*Ticonderoga*-class guided missile cruisers or *Arleigh Burke*- and *Zumwalt*-class destroyers) and those who lobby for smaller vessels (fast patrol boats, frigates, or littoral combat ships) for the modern Navy. This needs to be seen against the background of where the Navy faces the most significant challenges, by whom, and what it is being asked to do by the President. For instance, in the post-9/11 years, the focus increasingly was on navies combatting non-state actors such as pirates, terrorist, or human traffickers in the littoral and coastal, confined and shallow waters. That tide has turned with an increase in blue-water challengers, such as China. The early 1990s saw a similar discussion between two camps.³⁶

The third major strand of thought concerns the role of nuclear weapons at sea, although that discussion is, for the time being, largely confined to the 1980s. It was nuclear escalation and the Maritime Strategy which concentrated seasoned analysts' minds.³⁷ Perhaps the pending replacement of the *Ohio*-class nuclear-powered ballistic and guided missile submarines (SSBN/SSGN) will bring fresh ideas to the role of nuclear weapons and the future of nuclear deterrence from the sea.

Below the threshold of devastating atomic war, the fourth strand relates to just how many conventional (or hybrid) conflicts the Navy should strategically be outfitted for. The range goes from one major war, to 1.5 (however one measures this) or to two. This obviously also concerns the kind of contingency that is expected, or as Edward Rhodes put it in 1999, if one is to fight a counter-military or a counter-societal campaign.³⁸ Finally, just where these contingencies will take place is of note. After all, with two extensive and expensive U.S.-led land-centric campaigns in Southwest Asia and a perceived turn to asymmetric warfare perpetrated by terrorists, insurgents, and other non-state actors, riverine (or brown-water) warfare as well as force protection in the wake of the attack on *Cole* (DDG-67) was in increasingly high demand.³⁹ A fifth strand focuses on peer competitors and their capabilities. China has notably gained significant attention here, although these works only rarely verbalize what the Navy's strategy and U.S. national strategy should do in response.⁴⁰

4. *What is the Navy concerned about? What is its place in national strategy?*

In contrast to the few published works that look at broader strands, continuities and changes in Navy strategy, comparatively many more studies focus on particulars. For example, one could look at the Navy through a technology lens as a common denominator that shapes naval missions and the particular

utility of naval assets in a given area such as strike, ballistic missile defense, cyber, special operations, electronic warfare, or logistics.⁴¹ Another prism to use are the particular missions of the Navy, a term that is nowadays understood as the set of overarching tasks around which planners build balanced naval forces. It is a most helpful tool for analysts to focus their view of assessing the naval contributions to U.S. national security and interests.⁴² The mission set changes based on what political and military leaders deem important. Today, for example, the Navy's missions include power projection, sea control, deterrence (both conventional and nuclear), and presence. Historically, the missions have included others such as coastal defense, humanitarian assistance/disaster relief, or amphibious assault, although this set has waxed and waned over time.

The focus on naval missions or technology is a debate that hardly ever is felt outside of expert circles. In fact, it is rare that the actual use of the Navy for political ends is discussed in public, with the argument between Secretary of Defense Ash Carter and Secretary of the Navy Ray Mabus over presence vs. warfighting capabilities of the Navy in 2015/2016 a very recent exception to the rule. It was slightly different in the Cold War against the background of nuclear parity, as a number of books can attest to. Some of these works continue to inspire naval strategy analysts today.⁴³

5. *Who makes naval strategy? Who creates, who interprets, who modifies, who implements it?*

This leads to a major fruitful debate, one that seeks to answer who makes strategy as such. To John Hattendorf (2004), it is the President, the Secretary of Defense, and OPNAV, where he attributes no congressional role in it whatsoever (in this sentiment, echoing Winfried Stallmann [2000]).⁴⁴ Peter Swartz, in his voluminous body of slides (2011), noted that it was various ranks who actually wrote naval strategy in OPNAV, ranging from lieutenant commanders to captains and even rear admirals. David Rosenberg, on the other hand, noted that process, rather than particularly gifted or empowered offices or individuals, was the key to understanding how strategy was formulated.⁴⁵ To the researcher, this severely complicates identifying the particulars of the subject. A couple of years after his first analytical piece, Rosenberg—together with noted military historian Jon Sumida—narrowed the particulars down to a catchy quintet: According to the two authors, it was machines, men, manufacturing, management, and money that literally made naval strategy.⁴⁶ The late German political scientist and German Navy Captain Wilfried Stallmann (2000) added a sixth “M”: (naval) mentality.

6. *What is the value of naval history and the enduring relevance of the classics?*

In lieu of very recent theorists and in acknowledgment of the relatively high number of constants in sea power and naval strategy, some of the classics receive recurring attention. Alfred Thayer Mahan, for instance, has been the subject of at least three major naval strategy books since 1990.⁴⁷ Julian Corbett, the British strategist of the early 20th century, has gotten less of such exposure, which may simply be due to his background rather than the enduring value of his theories. A similar fate can be diagnosed for Samuel Huntington, whose thoughts on the need for a strategic concept await rediscovery by academics and policy-makers alike.

A HARD LOOK AT SOURCES

For those historians interested in researching the Navy's role in national strategy, there are a number of starting points. First, there are the strategies themselves. Internet archives, but more importantly the collections in the Newport Papers, are formidable sources.⁴⁸ In fact, of the 40 or so capstone documents that the Navy has issued since 1980, only a handful remains classified.

Oral histories and recorded interviews are another viable source of information, although for the very recent history there is a lack of oral histories and interviewees might be hard to track down owing to the fact that they are very often still in office or in an official position.⁴⁹ The problems with this approach are manifold. These are, in essence, elite conversations with a particular narrow or too broad focus. Access to decision-makers willing to speak can be challenging, and interviews and a transcript are time-consuming undertakings. It is also challenging, in particular with charismatic interviewees, to assess the real impact of that individual's work on the national level, especially when it comes down to the attribution of successes and failures.

Existing literature can be broadly grouped into the classics, the more nuanced uses of maritime power in the Cold War, a reassessment for the post-Cold War world, and a few operational histories. The reader is kindly referred to this presentation's bibliography. Memoirs and (auto-) biographies are far and few in between. To date, the works on Elmo Zumwalt, Hyman G. Rickover, James Holloway, and John Lehman remain the only notable points of departure in this genre.⁵⁰ At the same time, there are still only a limited number of analyses of Navy strategy. Interestingly, and perhaps worthy of enquiry, two of these are from Germany (this author's forthcoming book will be the third).⁵¹

To reiterate a point made above, no dedicated study or research project, even

in the principally large field of legislative studies, exists on Congress's role and influence on recent naval strategy-making, something that a close examination of House of Representatives and Senate records and qualitative interviews with individuals from both chambers, and others such as the Navy legislative liaison office or Ron O'Rourke of the Congressional Research Service could help eradicate.

CHALLENGES AND BARRIERS

Social scientists will often encounter different obstacles when researching recent and/or policy-relevant issues, and naval strategy is no exception. First, there is a distinct lack of documentation about processes. One can try to retrieve memos and drafts of strategy documents, for example, only at a significant research expense because these often do not make it into archives. The relative lack of attribution and the differing strategy formulation practices make a pattern difficult to discern and consequently to find the right people or institutions to whom to look for original source material. Second, classification is also an issue, as with any national security problem. Where strategic documents are often un- or declassified (after all, a strategy is meant to inform a larger audience), drafts thereof remain classified and the more recent, internally aimed capstone documents are still out of reach. Third, a challenge particular to historians is one that is deeply rooted in their academic upbringing and ethos: the inability or even unwillingness to engage with ongoing political processes. By virtue, historians often are accustomed to looking at details more than at patterns and at individuals more than at processes. They are trained to work on issues at least three decades old (the average time for archival sources to be made available) so that they need not necessarily interact with current policy-making messes. At the same time, political scientists are often too focused on a narrow problem or a method or theory in order to connect the larger dots and provide practical expertise. The question of just who writes strategy, and to interpret accordingly without setting a gold standard from decades ago for something entirely more complex today—as the Maritime Strategy became a gold standard for many capstone documents of the 1990s, 2000s, and 2010s—is a very challenging one.

Fourth, something very particular to academic work in the military realm is the problem of “Outsider vs. Insider.” Military processes are inherently complicated to trace and track. To complicate matters further, the abundance of acronyms and coinages in military lingo is fabulous. From ship designations to Department of Defense branches, this is sure to frustrate many analysts who

are not familiar with how the military works, how it thinks, and how it enacts orders or policy objectives. It does not help that there is a certain periodization of military history—the fifth challenge—which potentially confuses the strands and lines that cross systemic changes (e.g., before/after the advent of nuclear weapons at sea, during/after the presidency of Ronald Reagan, before/after the end of the Cold War, etc.). Sixth, it is challenging to measure successful strategies altogether. Was, for instance, “The Maritime Strategy” a success, did it even win the Cold War? Or was it a failure, for many of its key components were never tested in anger because the Soviet Union was already on its way out anyway? Did it harm the Navy’s own strategic culture given how challenged the service was after the demise of the Soviet Union? These are some of the substantial disagreements in the scholarly and practical community.⁵²

Seventh, institutional learning is hard to measure because of the dynamics involved in how departments change, and the individuals who rotate through them. Eighth, causation does not imply correlation: Disentangling reciprocal causality is the supreme discipline for the strategy researcher. To complicate matters, as Swartz, Amund Lundesgaard, and Peter Haynes have repeatedly stressed from different angles, the Navy is fundamentally about operations. It devotes finite energy and time to strategic excellence because it strives for operational perfection. Ninth, what prism does the analyst use to focus the research? Is, for example, the type of warfare—nuclear, conventional, and unconventional—a valid lens through which to focus the analyses? What if they are more intimately intertwined? Isn’t one of them perhaps used as a strawman? How can this be balanced? What is missing? It goes without saying that a narrative is not necessarily an analysis.

Tenth, there is the issue of historical revisionism. Intentions and results are two very different cups of tea, but in hindsight things might make sense to the outside observer, especially when supported by evidence from oral histories or selective research. This also relates to the blame and praise assessments, especially in an era where bemoaning the lack of strategy is the rule, not the exception—except, naturally, at a given time in the past when strategy (to which the sender of such a message might often have a personal relationship!) was perfectly in place.⁵³

Finally, analysts need to take a hard look at the established views of the policy-makers. If it holds true that the President, the Secretary of Defense, and the Navy are the most important players in developing and implementing naval strategy (Stallmann in 2000 and Hattendorf in 2004 made these points clear), then why is there so surprisingly little from their point of view?

OPPORTUNITIES AND AVENUES FOR FUTURE RESEARCH AND WRITING

There is a vast field that demands research when it comes to naval strategy and its place in national strategy. It would be impossible to devise research questions for every single one of these, and some issues are arguably more pressing than others. Still, grant-making institutions, think tanks, universities, and research and dissemination institutions should look at these as possible prisms for work that really would make an impact in the naval strategic community:

- Strategic shocks and their context: How have pivotal events such as the end of the Cold War, the demise of the Soviet Union, 9/11, or the financial crisis impacted naval strategy, the thinking about maritime means and ends, and the use of the Navy? What contextual factors need to be considered?
- Naval strategy and sea power as a foreign policy tool: Where, when, and how was the Navy used as a foreign policy tool, from maritime diplomacy to coercion, from naval deterrence (conventional and nuclear) to capacity-building and confidence-building measures? What is the political value of a navy?
- Navy strategy and U.S. Congress: What is Congress' impact on naval strategy? Who were the major lawmakers for or against a strong Navy, how did they build networks, what tools do they have at their disposal? What's the role and impact of the Navy's legislative affairs shop on Capitol Hill, and how does it seek to influence the thinking about, and appreciation, of the Navy (from free pizza lunches for staffers to congressional delegations)?
- Navy strategy and the American public: What are the demographics of the Navy? Are there regional differences? How could the Navy's public image relate to strategy and the acceptance of the Navy, anywhere from music videos to *Top Gun*?
- Navy strategic relationships with other branches, allies, adversaries: How has the Navy worked with (or against) the Air Force, the Army, the Coast Guard, the Marine Corps? Which programs were affected, and what strategic consequences did this have? What were some of the key relationships to alliances (such as in the shaping of allied maritime and naval strategy) and adversaries (such as versus the Soviet Union)? Where are some causal links between naval strategies, e.g., the German navy's development since the 1980s in a strategic realm and how much was it informed/influenced by U.S. naval policy and strategy?

- Correlation: What are the relationships between strategies and naval operations, and between operations and the crafting of strategy? Which individuals have been able to test strategies live (through exercises, etc.), and/or how have seasoned operators informed naval strategy? What is the role of (disruptive) technology as a prism to think about, and operationalize naval strategy?
- Institutional learning: How has the Navy (OPNAV) organized to craft and execute strategy? Where have naval strategic thinkers gone as part of their tours (perhaps as legislative fellows or associated to universities and think tanks) and after their careers so that the effects of an unforgiving military system of rotating billets could be lessened?

CONCLUSION

Naval strategy and the role of the Navy in national strategy are deeply rooted in the normative and political history of the country, and its role and place in the world. Quite simply, almost every major war that the United States was involved in began with an attack on a U.S. warship.

Also, context is important if one attempts to make sense of the messy chaotic process that is naval strategy, and the place of the Navy and what it does in the national *raison d'être*. The current changing strategic environment needs historians who provide insights from the past to learn for the future and help address current problems. Thus stems the need to encourage younger colleagues to actively participate in the analysis and shaping of strategy: less sequential, more parallel, and in closest collaboration with other historians and political scientists, at home and in the English-speaking world abroad, for the very real ramifications of U.S. naval strategy and America's maritime approach to world politics. Historians need to be encouraged to write on recent and very recent strategy so that, as Seth Cropsey wrote in 2013, the victories of sea power are no longer silent. Such historians will place themselves in a unique position to influence policy.

Notes

- 1 As Geoffrey Till has remarked, sea power—*sea power* is American usage; *seapower* is British usage, but is also used by some Americans—is a relative concept. It should be understood as having an input or the means (such as navies, the defense industry) and an output or the ends (the capacity to influence other people or things by what one does at or from the sea). Geoffrey Till, *Seapower: A Guide for the Twenty-First Century* (London: Routledge, 2013), 25.
- 2 This is principally informed by the author's own experiences as a German national studying potentially classified issues from 5,000 miles away for his PhD dissertation between 2010 and 2014—*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* (Kiel, Germany: Christian-Albrechts-University Kiel, 2014). The dissertation will be published shortly as a revised monograph, *US Naval Strategy and National Security: The Evolution of American Maritime Power, 1981–2015* (Routledge, Abingdon, UK, and New York, forthcoming 2017).
- 3 Source: <http://www.humanitiesindicators.org/content/indicatordoc.aspx?i=393>. This is only rivalled by books on literature. It is two-and-a-half times as many as books dealing with the arts, three times the number of books on language, linguistics, and religion, and eight times the number of new books in the fields of gender/ethnic studies, and philosophy.
- 4 Peter Haynes, *American Naval Thinking in the Post-Cold War Era: The U.S. Navy and the Emergence of a Maritime Strategy, 1989–2007* (Monterey, CA: Naval Postgraduate School, 2013), 20.
- 5 Daniel Gouré, "The Tyranny of Forward Presence," *Naval War College Review* 54, no. 3 (Summer 2001): 11–24; "The Maritime Strategy" of the 1980s acknowledges (or rather, states) that naval forces prevent major global war through controlling crises and containing limited wars by way of being on-scene.
- 6 Eric Grove, *The Future of Seapower* (Annapolis, MD: Naval Institute Press [Hereafter, NIP], 1990), 11.
- 7 James Russell, James Wirtz, Donald Abenheim, Thomas-Durrell Young, and Diana Wueger, *Navy Strategy Development: Strategy in the 21st Century* (Monterey, CA: Naval Postgraduate School, 2015), 1.
- 8 The setting is important for one can easily get confused in the different altitudes. In 1967, Liddell Hart proclaimed that "Grand strategy should control military strategy;" his contemporary Henry Eccles in 1979 added that "Policy must dominate strategy; strategy influences policy." Strategy is perhaps best understood to be a loop series of questions that need to be answered (What do we want to do? How? What are we up against? What is available? What are the mismatches? Why do we want to do this?—see P. H. Liotta and Richmond Lloyd, "From Here to There: The Strategy and Force Planning Framework," *Naval War College Review* 58, no. 2 [Spring 2005]: 121–37, 122). This requires a significant degree of coherence, which is not always easy to accomplish.
- 9 For very general considerations about the U.S. role in the world, see, for example, Barry Posen, "Command of the Commons," *International Security* 28, (Summer

- 2003): 1, 5–46, in which he underlines that command of the commons was the fundamental base for a unilateral or multilateral hegemonic strategy of the United States and the source of American power and influence.
- 10 Samuel Huntington, “National Policy and the Transoceanic Navy.” U.S. Naval Institute *Proceedings* 80, no.5, (1954): 483–93.
 - 11 Edward Rhodes, “‘...From the Sea’ and Back Again. Naval Power in the Second American Century.” *Naval War College Review* 52, no. 2 (Spring 1999): 13–54.
 - 12 Nikolaus Scholik, *Seemacht im 21. Jahrhundert: Handbuch und Lexikon* (Vienna, Austria: Caesar Press 2015).
 - 13 Larissa Forster, *Influence Without Boots on the Ground: Seaborne Crisis Response* (Newport, RI: Naval War College Press, 2013).
 - 14 Peter Haynes, *Toward a New Maritime Strategy: American Naval Thinking in the Post–Cold War Era* (Annapolis, MD: NIP, 2015).
 - 15 R. B. Watts, *American Sea Power and the Obsolescence of Capital Ship Theory* (Jefferson, NC: McFarland, 2015).
 - 16 Peter Swartz, “American Naval Policy, Strategy, Plans, and Operations in the Second Decade of the Twenty-First Century,” and Sarandis (“Randy”) Papadopoulos, “Having to ‘Make Do’: U.S. Navy and Marine Corps Strategic Options in the Twenty-First Century,” Joachim Krause/Sebastian Bruns, *The Routledge Handbook of Naval Strategy and Security* (London: Routledge, 2016), 229–67 and 268–82, respectively.
 - 17 Amund N. Lundesgaard, *Controlling the Sea and Projecting Power: U.S. Navy Strategy and Force Structure After the Cold War* (Oslo, Norway: University of Oslo, 2016).
 - 18 See note 2.
 - 19 Haas is currently preparing the manuscript for submission by summer 2017.
 - 20 CAPT Joseph Gagliano, USN, *Congressional Policymaking in Sino-U.S. Relations During the Post–Cold War Era* (London: Routledge, 2014), is a study on the legislature and foreign policy (vs. the conventional wisdom that the President is the dominant figure); Nikolaus Scholik’s *Handbuch* is planned to be available in English in 2018; James C. Bradford, ed., *America, Sea Power, and the World* (Hoboken, NJ: Wiley-Blackwell, 2016), traces the relationship between the American Navy and the position of the United States on the global political stage over the past 250 years. Jeremy Stöhs’ *The Decline of European Seapower* (working title; Annapolis, MD: NIP, to be published in 2017) and a related dissertation project begun with the Institute for Security Policy/Center for Maritime Strategy and Security in 2016 will complement U.S.-centered works.
 - 21 Seth Cropsey, *Mayday. The Decline of American Naval Supremacy* (London: Gerald Duckworth and Co, 2014), 34.
 - 22 Recall the 2012 presidential debate between incumbent Barack Obama and challenger Mitt Romney, which famously included a short debate on U.S. Navy ship numbers. Recently, President-elect Donald Trump’s plan for a 350-ship Navy has raised the issue to a higher echelon.
 - 23 Recall the rise of ISIS/Daesh in Syria and Iraq, Russia’s illegal takeover of Crimea and the ensuing war in Ukraine, and the accelerating migration pressure.

- 24 Recent examples include debates and opinion pieces on the future of the (super) aircraft carrier as the principal force-generating platform of the U.S. Navy (CDR Bryan McGrath, USN [ret.] and CAPT Henry Hendrix, USN [ret.]), and an argument between Secretary of the Navy Ray Mabus and Secretary of Defense Ash Carter about presence vs. warfighting.
- 25 Amund Lundesgaard, *US Navy Strategy and Force Structure After the Cold War (IFS Insights No. 4, November 2011)* (Oslo: Institutt for Forsvarsstudier, 2011), 21
- 26 John Hattendorf, ed., *The Evolution of the U.S. Navy's Maritime Strategy, 1977–1986* (Newport, RI: Naval War College Press, 2004); John Hattendorf, ed., *U.S. Naval Strategy in the 1990s* (Newport, RI: Naval War College Press, 2006) and *U.S. Naval Strategy in the 1970s*, (Newport, RI: Naval War College Press, 2007); John Hattendorf, Peter Swartz, eds., *U.S. Naval Strategy in the 1980s* (Newport, RI: Naval War College Press, 2008). Follow-up editions for the 2000s and the 2010s are highly anticipated.
- 27 Robert Komer, *Maritime Strategy or Coalition Defense?* (Lanham, MD: Rowman & Littlefield, 1984).
- 28 John Mearsheimer, “A Strategic Misstep: The Maritime Strategy and the Deterrence in Europe,” *International Security* 11, no. 2 (1986): 3–57; Colin Gray, *Maritime Strategy, Geopolitics, and the Defense of the West* (New York: Ramapo Press, 1986).
- 29 Linton Brooks. “Naval Power and National Security: The Case for the Maritime Strategy,” *International Security* 11, no. 2 (Fall 1986): 58–88.
- 30 Peter Swartz, *U.S. Navy Capstone Strategy, Policy, Vision, and Concept Documents: What to Consider Before You Write One* (CQR D0020071.A1/Final, March 2009). Arlington, VA: CNA, 2009. https://www.cna.org/cna_files/pdf/D0020071.A1.pdf.
- 31 To a significant degree, the labelling also concerns the strategic culture and the audience one wishes to address. A strategist should answer questions such as “What is your audience?” “What do you want to say/achieve?” “How and where do you plan to implement it?” and “How do you hedge against self-fulfilling prophecies?”
- 32 James Holloway, *Aircraft Carriers at War: A Personal Retrospective of Korea, Vietnam, and the Soviet Confrontation* (Annapolis, MD: NIP, 2007).
- 33 John Gordon IV, Peter Wilson, John Birkler, Steven Boraz, and Gordon Lee, *Leveraging America's Aircraft Carrier Capabilities: Exploring New Combat and Noncombat Roles and Missions for the U.S. Carrier Fleet*. (Santa Monica, CA: RAND Corporation, 2006).
- 34 Seth Cropsey, Bryan McGrath, and Timothy Walton, *Sharpening the Spear: The Carrier, the Joint Force, and High-End Conflict* (Washington, DC: Hudson Center, 2015).
- 35 Roger Barnett. *Navy Strategic Culture: Why the Navy Thinks Differently* (Annapolis, MD: NIP, 2009), 79.
- 36 Jan Breemer, “The End of Naval Strategy: Revolutionary Change and the Future of American Naval Strategy,” *Strategic Review* 22, no. 2 (1994): 40–53. In this article, he noted that the U.S. Navy can focus directly on influencing events on land, thus moving from a strictly naval gray-ship focus to a broader maritime (littoral) leverage. Edward Rhodes, in “From the Sea... and Back Again,” took a contrary position.
- 37 Barry Posen. “Inadvertent Nuclear War? Escalation and NATO's Northern Flank.”

- International Security* 7, no. 2 (1982): 28–54; Geoffrey Till, *Maritime Strategy and the Nuclear Age*, 2nd edition (London: Macmillan, 1984); Robert Jervis, “Navies, Politics, and Political Science,” J. Hattendorf, ed., *Doing Naval History: Essays Towards Improvement* (Annapolis, MD: NIP, 1995), 41–49.
- 38 Rhodes, Edward. “‘...From the Sea’ and Back Again: Naval Power in the Second American Century,” *Naval War College Review* 52, no. 2 (1999): 13–54.
 - 39 Blake Dunnavent, *Brown-Water Warfare: The U.S. Navy in Riverine Warfare and the Emergence of a Tactical Doctrine—New Perspectives on Maritime History* (Gainesville: University Press of Florida, 2003), traces the evolution of riverine warfare in U.S. military operations from its informal inception in the 18th century to its establishment as a formal doctrine in the 20th century. On *Cole* (DDG-67), see Kirk Lippold, *Front Burner: Al Qaeda’s Attack on USS Cole* (New York: Public Affairs Publishing, 2013).
 - 40 Bernard Cole, *The Great Wall at Sea: China’s Navy in the Twenty-First Century* (Annapolis, MD: NIP, 2010); James Holmes and Toshi Yoshiara, *Red Star over the Pacific: China’s Rise and the Challenge to U.S. Maritime Strategy* (Annapolis, MD: NIP, 2013); Sarah Kirchberger, *Assessing China’s Naval Power: Technological Innovation, Economic Constraints, and Strategic Implications* (Baden-Baden, Germany: Springer, 2014).
 - 41 Norman Friedman, *Naval Institute Guide to World Naval Weapon Systems* (Annapolis, MD: NIP, 2006); VADM Arthur K. Cembrowski, USN, John H. Garstka, “Network-Centric Warfare: Origin and Future,” U.S. Naval Institute *Proceedings* 124, no. 1 (January 1998): 28–35.
 - 42 Stansfield Turner, “Missions of the U.S. Navy,” *U.S. Naval War College Review* 27, no. 5, (March/April 1974).
 - 43 James Cable, *Gunboat Diplomacy* (London: Chatto and Windus, 1971) and its revised version, *Gunboat Diplomacy 1919–1991: Political Applications of Limited Naval Force* (London: Palgrave Macmillan, 1994); Edward Luttwak, *The Political Uses of Sea Power* (Baltimore: The Johns Hopkins University Press, 1974), Sergej Gorshkov, *Seapower and the State* (Annapolis, MD: NIP, 1976 and 1979); Ken Booth, *Navies and Foreign Policy* (London: Routledge, 1977); Charles Allen, *The Uses of Navies in Peacetime* (Washington, DC: AEI Press, 1980).
 - 44 The congressional role in national and naval-strategy making would merit a policy-analytic study.
 - 45 David Rosenberg, “The Realities of Modern Naval Strategy,” J. Goldrick and J. Hattendorf, eds., *Mahan Is Not Enough: The Proceedings of a Conference on the Works of Sir Julian Corbett and Admiral Sir Hugh Richmond* (Newport, RI: Naval War College Press, 1993), 141–75.
 - 46 Jon Sumida and David Rosenberg, “Machines, Men, Manufacturing, Management and Money: The Study of Navies as Complex Organizations and the Transformation of Twentieth-Century Naval History,” J. Hattendorf, ed., *Doing Naval History. Essays Towards Improvement* (Newport, RI: Naval War College Press, 1995), 25–40.
 - 47 Gary Anderson, a U.S. Marine Corps colonel, submitted *Beyond Mahan: Proposal for US Naval Strategy in the 21st Century* (Newport, RI: U.S. Naval War College Press, 1990), where Jon Sumida, *Inventing Grand Strategy and Teaching Command: The Classic Works of Alfred Thayer Mahan Reconsidered* (Baltimore: Johns Hopkins

- University Press, 2000) and the very recent *21st-Century Mahan* edited by LCDR B. J. Armstrong, USN (Annapolis, MD: NIP, 2014) point to the enduring relevance of this strategist.
- 48 The 2000s and 2010s volumes are eagerly awaited by the community of scholars, who in the meantime have to resort to internet or physical archives to retrieve the naval strategies of that time.
 - 49 This author, when conducting interviews with naval strategists in 2012, found only one interviewee declining to engage in an academic conversation or oral history at all, two interviewees who did not want the discussion to be on the record, and one gentleman unable to find time because of his busy schedule.
 - 50 Elmo Zumwalt, *On Watch: A Memoir*, (New York: Quadrangle Books, 1976); for a biography of Zumwalt, see Larry Berman, *Zumwalt: The Life and Times of Admiral Elmo Russell "Bud" Zumwalt, Jr.* (New York: Harper, 2012). On Hyman G. Rickover, the "father of the nuclear navy" whose relevance is uncontested because the fundamentally strategic nature of nuclear issues and their relation to the next war of the United States, see Norman Polmar and Thomas B. Allen, *Rickover: Controversy and Genius* (New York: Simon and Shuster, 1981); Theodore Rockwell, *The Rickover Effect: How One Made a Difference* (Bloomington, IN: iUniverse Press, 2001); RADM Dave Oliver Jr., USN (ret.), *Rickover's Leadership Principles and the Rise of the Nuclear Navy* (Annapolis, MD: NIP, 2014); James Holloway, *Aircraft Carrier at War: A Personal Retrospective of Korea, Vietnam, and the Soviet Confrontation* (Annapolis, MD: NIP, 2007), which includes some autobiographic aspects of his time as CNO; John Lehman, *Command of the Seas* (Annapolis, MD: NIP, 2001). Lehman, a poster child for the 1980s Maritime Strategy, was harshly criticized by people such as Gregory Vistica in his *Fall from Glory: The Men Who Sank the Navy* (New York: Touchstone, 1997)
 - 51 Peter Rudolf, *Amerikanische Seemachtpolitik und maritime Rüstungskontrolle unter Carter und Reagan* (Frankfurt: Hessische Stiftung für Friedens- und Konfliktforschung, 1990); Wilfried Stallmann, *Die maritime Strategie der USA nach 1945: Entwicklung, Einflussgrößen und Auswirkungen auf das atlantische Bündnis* (Kiel, Germany: Christian-Albrechts-University Kiel, 2000). In addition, Peter Swartz's draft dissertation manuscript on the lines and strands of U.S. Navy strategy needs to be recognized, even if unfinished. See also Paul Ryan, *First Line of Defense: The U.S. Navy Since 1945* (Stanford, CA: Hoover Press, 1981).
 - 52 Specialists like George Baer and Joseph Bouchard noted separately that to be successful, naval strategy needed to align with national policy, whereas Roger Barnett and Sam Bateman, also independent from each other, saw alignment with the Navy's own strategic culture and the persuasiveness in the political environment as key indicators.
 - 53 After the publication of "A Cooperative Strategy for 21st Century Seapower" (2007), former Secretary of the Navy John Lehman and former Undersecretary of the Navy Seth Cropsey engaged in praise and criticism of the new capstone document. Both agreed, however, that the 1980s Maritime Strategy, to which they were both contributors at various levels, remained a gold standard.

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150421-N-YE579-301 U.S. Navy photo

One of the Navy's most technically advanced ships, the guided-missile destroyer *Zumwalt* (DDG-1000) is put to the test during acceptance trials with the Navy's Board of Inspection and Survey.

Chapter 8

The Historiography of Technology Since 1950, with a Focus on the Navy

*by Mark D. Mandeles**

INTRODUCTION

I thank Dr. Mike Crawford and the Naval History and Heritage Command (NHHC) for the honor of its invitation to prepare an essay on the subject of historiography of technology in the Navy in its speaker series, “Needs and Opportunities in the Modern History of the U.S. Navy.” Dr. Crawford charged me to consider three broad questions: What has been written? What has not been written? (Or, what has not been deemed important enough to consider in writing histories of naval and Marine Corps technology?) And, what should be written?

Three themes inform my discussion of selected work on the history of technology. First, the end of World War II marks a period in which, as historian Barton Hacker observes, “military authorities have come eagerly to accept or even promote . . . the introduction of new weapons.” Military authorities’ adoption of the idea that “doctrine might drive and control technological change” makes the post–World War II period very different from the past 200 years of military history.¹ Indeed, the idea that military technological change might be

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controlled and directed had ample precedent in the development of new industries in the late 19th century organized around telecommunications, photographic, electrical, and chemical technologies that exploited then-recent scientific discoveries. Industrial leaders recognized their dependence on science, and established research components—industrial research laboratories—to routinize scientific research to develop improved processes and products.² Post–World War II military leaders applied an existing and proven approach to improving products and processes.

The second theme concerns the post–World War II role of knowledge and analysis in making decisions and policy about public expenditures on inventive activity and technology development. The appropriate perspective on the role of knowledge and analysis in inventive activity concerns the co-evolution of institutions and military, social, political, and economic organizations; not whether a law-like generalization can be offered regarding the role of knowledge and analysis in individuals' efforts to invent or apply technology.³ This theme echoes the views of prominent military historians. For example, Barton Hacker notes that “the concept of military technology has grown beyond hardware to embrace ideas and institutions; organization, management, and doctrine have become as much a part of the field as weapon development.”⁴ Alex Roland adds that the military is a social institution and it “plays an enormously important . . . complex role in the development of science and technology.”⁵

My third theme concerns Frederick Pohl's observation: “A good science fiction story should be able to predict not the automobile but the traffic jam.”⁶ In other words, insight comes from describing and tracing interactions and contextual relationships—not just the technology itself. Pohl, an acclaimed science fiction writer, implies a better story involves examining interactions among inventions, modes of behavior, cultural history, political and social institutions, military organizations, and legacy stock of equipment, infrastructure, and hardware and social technologies.

Developing a capability—concepts, methodologies, organizations, and working relationships—to examine, assess, and predict “traffic jams” of naval (and, more broadly, military) operations requires overcoming challenges to the many ways the historical and analytical communities interact and work. This difficult task is worth pursuing to make discourse about national security questions more rigorous, and to increase the value to senior leaders of the products produced within the historical-analytical community.

WHAT HAS BEEN WRITTEN?

Several contrasts channel this historiography of technology relating to the U.S. Navy and U.S. Marine Corps between 1950 and the present. First, fewer histories of naval technology⁷ have been written than general histories of technology and histories of technology related to ground combat.⁸ Second, the historiography of naval and Marine Corps technology encompasses many topics. Deciding how to frame this historiography involved a good deal of search and rejection of themes, frameworks, and approaches.⁹ I conducted a quick JSTOR digital library search of terms “Navy,” “naval,” “weapons,” and “technology” between 1950 and 2016 and found more than 9,000 essays. I also reviewed every issue between 1959 and 2015 of the Society for the History of Technology’s journal, *Technology and Culture*, in what turned out to be a vain hope that a clear theme had been articulated by academics. I flagged more than 300 articles and almost 500 book reviews that piqued my interest and seemed relevant to my topic after I read the first few paragraphs. Alas, these articles offered far too many potential themes to consider each in an essay-length discussion.

I also decided against discussing nuclear weapons technologies for two reasons. First, although many unclassified memoirs, histories, and declassified studies of nuclear weapons technologies are available,¹⁰ detailed information about premises for decisions about specific technologies remain classified. Second, the literature on the development of nuclear weapons technologies provides essentially the same insights on inventive activity and technology development as could be found in unclassified literature on conventional naval and Marine Corps technology programs. I assume that impacts of administrative processes and bureaucratic organization on inventive activity and technology development would be similar for classified and unclassified programs begun at roughly the same time,¹¹ and therefore, unclassified descriptions of organizations and administrative processes provide useful general insights about management of technology development programs.¹²

For example, Massachusetts Institute of Technology political scientist Harvey M. Sapolsky’s *The Polaris System Development: Bureaucratic and Programmatic Success in Government* contains a classic description of the use of a formal management tool to disguise informal and flexible decision-making in planning and managing the development program. The story concerns how Vice Admiral William F. Raborn and key subordinates dealt with ambiguities and various political and technological uncertainties in the development of the fleet ballistic missile (FBM) program. Sapolsky identifies the role of program

evaluation and review technique (PERT), a dedicated management and assessment process, in shielding the FBM from Department of Navy and congressional supervision and review. Admiral Raborn (and managerial subordinates) received current program status information by “picking up a telephone and calling the relevant technical group or by ordering tickets and flying to the relevant locations.” The PERT management tool was irrelevant to managerial decisions about how to develop the FBM; the use of PERT as an “integrated, uniquely effective management system was a myth.”¹³

Several colleagues directed me to look at the discussion of current technology programs, such as the Department of Defense’s (DOD) Third Offset program (discussed below). Others suggested a relatively safe approach of reviewing academic disputes about the relationship between science and technology in inventive activity,¹⁴ or assessing policy debates about whether basic or theoretical scientific research precedes inventive activity—a position Vannevar Bush takes in three books published before 1950¹⁵—to justify the argument that more public funds should be expended on basic research, or examining the sources of technology in terms of the reorganization of labor,¹⁶ use of machines in manufacture, exploitation of manmade materials, and application of new sources of energy.¹⁷ With these thoughts in mind, what follows is an effort to provide context, synthesize, and summarize selected studies concerning technology related to Marine Corps and Navy missions.

THE HISTORIOGRAPHY OF MODERN MILITARY TECHNOLOGY BEGINS BEFORE WORLD WAR II

The historiography of military technology has largely concerned weapons, machinery, fortifications, and associated physical objects. Before World War II, some strands of thinking and research on institutions and social context of warfare complemented attention to physical objects. Sociologist William F. Ogburn proposed the hypothesis of cultural lag to explain a period of adjustment during which people become comfortable with, and learn how to use new technologies.¹⁸ Sir Charles Carter, in his 1982 presidential address to the British Association for the Advancement of Science, argues that British technologists and innovators too frequently attempted large leaps in technology—before the benefits of the new way of doing things became evident. Carter did not cite Ogburn’s cultural lag hypothesis, yet Carter’s argument broadly re-states Ogburn’s thesis and sociologist Arthur Stinchcombe’s observations about the “liability of newness”—the

period between the introduction of a physical or social technology and acceptance by users.”¹⁹ Needless to say, an understanding of the liabilities of newness is crucial to minimizing obstacles to the introduction and wide deployment of new technologies and operational concepts.

The pre-World War II work of two other scholars deserves mention. Historian and philosopher Lewis Mumford and sociologist Robert K. Merton examined social conditions under which technology—physical objects—were conceived, developed, and produced. They argued that technology advanced within a craft tradition, and that rapid technological advance was based on accumulating scientific knowledge.²⁰

The Mumford/Merton thesis shaped American World War II science and technology goals for applying knowledge to challenges encountered in combat. In 1941, the Office of Scientific Research and Development (OSRD) was established to mobilize academic researchers to develop weapons and associated technologies. OSRD’s efforts focused on the physics and engineering to develop new weapons and technologies and to improve existing technologies, leading to a vast array of devices and machines, many of which are described in more than 70 monographs produced by the OSRD. Some of these monographs discuss operational and technological issues relevant today to the Department of the Navy, including hypervelocity guns, recognition of underwater sounds, and subsurface warfare.²¹ Little, Brown and Company published some declassified OSRD monographs in its “Science in World War II” series in 1947 and 1948.²² Among these, my favorite is Lincoln Thiesmeyer and John Burchard’s *Combat Scientists*,²³ which contains a great deal of material directly relevant to “traffic jams” and present and future concerns, such as the diffusion of innovation, long-distance communications and policy coordination, and civil-military relations and cooperation in combat zones.²⁴

The notion that engineering and technology were applied science guided policy literature during World War II and especially in the immediate post-war period when OSRD director Vannevar Bush advocated continuing federal support for basic research that would lead to technological advances. He argued for the establishment of the National Science Foundation to provide theoretical research to inform and guide invention, the general development of technology, and refinement of technologies for practical uses. The Manhattan Project was a clear exemplar of this “research push” argument; it was prewar basic research in nuclear fission that guided the design and construction of two types of atomic bombs.²⁵

THE HISTORIOGRAPHY OF MODERN MILITARY TECHNOLOGY FOLLOWING WORLD WAR II

In the years following World War II, historians recognized and examined infrastructural and organizational legacies of the conflict and changes in institutional rules, organizations, and conceptual approaches military and civilian leaders brought to problems and challenges of national security. For example, Barton Hacker and Alex Roland provide excellent summaries of academic research through the 1990s (see footnotes 4 and 5). Merritt Roe Smith argues that following World War II, armed forces “promoted, coordinated, and directed technological change and . . . sometimes directly and sometimes indirectly affected the course of modern industry.”²⁶ The essays contained in *Military Enterprise and Technological Change* provide context and examples of the ways in which military requirements constrain and guide the organization and actions of large and small industry.²⁷ Most of the essays focus on the pre–World War II period. David K. Allison, however, examines post–World War II technology policy technology regarding the Sidewinder missile program and the Navy Tactical Data System in “The U.S. Navy’s Research and Development Since World War II.”

Comprehensive surveys of naval and Marine Corps technologies include performance characteristics and details about system development and operational use. Norman Friedman (who earned a PhD in physics) and Norman Polmar (who earned a degree in journalism and history) have provided indispensable and vital contributions to the study of naval technologies. Isaiah Wilson III produced a weapons technology database tailored to questions asked by political scientists.²⁸ The IHS Jane’s yearbooks cover many topics relevant to naval and Marine Corps systems, including *IHS Jane’s Fighting Ships* (first published in 1897), *IHS Jane’s Defence: Platforms*, *IHS Jane’s Defence: Air and Space*, *IHS Jane’s Defence: Sea*, *IHS Jane’s Defence: Sea Platforms*, *IHS Jane’s Unmanned Maritime Vehicles*, *IHS Jane’s C4ISR & Mission Systems: Maritime*, and *IHS Jane’s Underwater Warfare Systems*. In 1969, the Stockholm International Peace Research Institute (SIPRI), began publishing another important yearbook series, *Armaments, Disarmament and International Security*. The SIPRI yearbook provides an overview of developments in international security, weapons and technology, military expenditure, the arms trade and arms production, armed conflicts, and efforts to control conventional, nuclear, chemical, and biological weapons.

SELECTED POST-WORLD WAR II HISTORICAL RESEARCH ON NAVY WARFIGHTING SYSTEMS

In 1992, the Navy Laboratory/Center Coordinating Group and the Naval Historical Center began to collaborate on developing a comprehensive history of Navy research, development, test, and evaluation (RDT&E) and acquisition of Navy warfighting systems. The purpose of this joint effort was to “record Navy history associated with research, development, test, and evaluation and the acquisition of Navy warfighting systems.” The joint effort produced at least three publications on the Navy’s in-house technical capability and associated management and policy processes written by History Associates vice president Rodney Carlisle.²⁹ The first publication of this collaboration effort was *Management of the U.S. Navy Research and Development Centers During the Cold War Era*.³⁰ This report complements a 1976 Booz Allen Hamilton report that reviewed Navy research and development (R&D) management between 1946 and 1973.³¹

In *Management of the U.S. Navy Research and Development Centers*, Carlisle focuses on reports produced by the Department of the Navy, Department of Defense, Congress, private consulting organizations, and blue ribbon panels of experts on the management of RDT&E centers during the Cold War period between 1973 and 1992, such as the 1969 Office of the Director, Defense Research and Engineering *Project Hindsight*. *Project Hindsight*’s author, Raymond Isenson, surveyed the development of more than 600 then-current weapons technologies and assessed the impact of basic research on each weapon system’s cost-effectiveness.³² He concluded that technological advances in more than 90 percent of the weapons surveyed resulted from mission-oriented R&D rather than basic science. In an extensive review, Karl Kreilkamp argues that *Project Hindsight*’s methodology generated an overly simple and basically inaccurate description the interaction between technology and science.³³

In response to *Project Hindsight*, the National Science Foundation (NSF) funded *Technology in Retrospect and Critical Events in Science* (TRACES), a two-volume study prepared by the Illinois Institute of Technology Research Institute. TRACES did not apply the same methodology as *Project Hindsight* to identify whether and how technologies were enabled by basic science. The key political outcome of TRACES and *Project Hindsight* was that the NSF lobbied Congress to amend the NSF Act to permit the foundation to fund applied research.³⁴ Historian Edwin Layton concludes his discussion of *Project Hindsight* by noting that science and technology should be treated as a “complex whole capable of functioning as a working system,”³⁵ rather than treating either science

or technology as primary to the other.

The Relationship of Science and Technology: A Bibliographic Guide is a 40-page selected bibliography comprising more than 150 articles and books.³⁶ It surveys post-World War II themes, such as World War II origins of U.S. technology policy, panels, and commissions that attempted to anticipate the rate and direction of technological development; historians' views of technology and culture; mutual influences between scientific and technology development activities; establishment of research priorities; and Japanese industrial experience of relating science and technology.

Carlisle's *Navy RDT&E Planning in an Age of Transition* examines impacts on Navy policy and planning of international turbulence in the 1980s and 1990s.³⁷ His work in this period informed policy discussions of the 1990's Base Realignment and Closure process regarding (1) the existence and character of a link between basic scientific research and technologies developed at Navy laboratories and development centers, and (2) effectiveness of R&D conducted under different organizational arrangements, such as a government-owned facility that conducts research through engineering and maintenance, or contractual relationships that assign components of a research program to industry, universities, and private laboratories.

Two studies of note detail Office of Naval Research scientific and technological research: Ivan Amato's *Pushing the Horizon*³⁸ and Robert Buder's *Naval Innovation for the 21st Century*.³⁹ Then, in *The Sound of Freedom*, Carlisle and James Rife examine the evolution of Dahlgren Laboratory from a naval proof and test facility into a modern research and development center that contributes to many different naval weapons systems.⁴⁰ Finally, the U.S. Naval Institute recently released an edited volume, *The U.S. Naval Institute on Naval Innovation*, which contains essays on cyber, unmanned vehicles, and future weapons systems.⁴¹

NAVAL HISTORY AND OFFICE OF NAVAL RESEARCH WEBSITES

The Naval History and Heritage Command website lists the three science-technology studies written by Carlisle during the late 1990s, but there are no links to digitized versions of the reports. No studies produced more recently were listed.⁴²

The Office of Naval Research website contains interesting material, including the fourth version of the *Naval Science and Technology Strategy*,⁴³ and a list

of 61 Nobel laureates who received Office of Naval Research (ONR) funding support. Twenty-four Nobelists received the prize in physics, 26 in chemistry, nine in medicine and physiology, and two in economic science—Herbert A. Simon and Kenneth Arrow.⁴⁴

NATIONAL ACADEMIES OF SCIENCES, ENGINEERING, AND MEDICINE

The Department of the Navy has sponsored many hundreds of studies performed by the National Academy of Sciences (NAS) since the NAS was established in 1863. Political scientist Harvey Sapolsky provides details of the establishment and early operation of the Office of Naval Research in *Science and the Navy: The History of the Office of Naval Research*.⁴⁵ For our purpose of examining the development of technology in the Navy and the Marine Corps, it is enough to note that in 1946, the newly established ONR requested that the NAS establish a standing committee to advise the Navy on submarine design and systems technology. The resulting Committee on Undersea Warfare drew its initial membership from the Subsurface Warfare Section of the World War II National Defense Research Committee. In 1955, the ONR requested that the NAS accept responsibility for the Mine Advisory Committee, which had been established in 1951 to advise the Navy on research to develop mines and effective mine countermeasures.⁴⁶

These two proactive committees, composed initially of scientists and engineers, produced approximately 200 reports in the years between 1946 and 1973. In 1973, the Chief of Naval Operations asked the NAS president to extend the charter of its naval advisory committees beyond undersea and mine warfare and form an advisory organization “to which [the] Navy could turn for advice on any area of its responsibility involving the interplay of science and technology with other national issues.” The Naval Studies Board (NSB) was established in 1974 and assumed the missions of the Mine Advisory Committee and the Committee on Undersea Warfare. The board—organizationally located in the National Academies of Sciences, Engineering, and Medicine’s Division on Engineering and Physical Sciences—has advised the Navy on the basic and applied science associated with almost every area of the service’s overall mission.⁴⁷ It conducts studies of technology relevant to the Department of the Navy’s missions, such as the status of unmanned underwater vehicles. Other recent studies of interest conducted by the Naval Studies Board explore Navy cyber defense capabilities,

naval forces' response to capability surprise, and improving small unit leaders' decision-making abilities.

DEFENSE SCIENCE BOARD

Defense Science Board members are accomplished natural scientists, engineers, and mathematicians. The DSB website lists reports produced by the board from the 1970s to the present. The board considers many issues it believes should be brought to the attention of senior Defense Department and Service leaders, such as weapons systems, machinery, and associated objects, and topics that enable or support development of matériel. For example:

- In 2006, it examined the current adequacy and future needs for specialized skills necessary to maintain, upgrade, and design replacement strategic nuclear and non-nuclear strike systems. The board found that it has been difficult for the DOD to attract the “best and brightest science and engineering” talent; and the industry and government talent base is “marginally thin” in many current systems, and “may not be available for potential next-generation systems.” Furthermore, the DSB concluded that exploration of new concepts and technologies for strategic strike of challenging systems in the far term is inadequate and will require access to a new talent base with different skills. Current skills may not be able to cope with unanticipated failures requiring analysis, testing, and redesign, and human capital management systems, and strategies to identify, track, and retain critical skills are not implemented effectively.⁴⁸
- A 2006 joint study of the DSB and the United Kingdom Defence Scientific Advisory Council on critical technologies examined five major transformational technology areas—advanced command environments, persistent surveillance, power sources for small, distributed networked sensors, high performance computing, and defense critical electronic components. The report assessed that commercial off-the-shelf technology is insufficient to meet defense needs, and the two powers' lead in critical technologies is under threat from consolidation of the U.S. defense contractor base, migration off-shore of some critical manufacturing and design capabilities, and reduction in the numbers of personnel with experience in critical areas.⁴⁹
- In 2006, the DSB examined strategic technology vectors in a report comprising four volumes.⁵⁰ The board reviewed the range of missions U.S. forces are called upon to perform, including major combat, counterinsurgency, stability and

reconstruction, countering weapons of mass destruction, homeland defense, and disaster relief. These missions present different challenges, and the board identified the following four operational capabilities and technologies to deal with the range of missions faced.

- Capability 1: Apply understanding of behavior of individuals, groups, societies, and nations to conduct of missions. Technologies include immersive gaming environments, automated language processing, and human, social, cultural, and behavior modeling.
 - Capability 2: Observe people in varied environments and preserve data of observations. New suites of sensors enable this capability.
 - Capability 3: Extract actionable information from data.
 - Capability 4: Produce effects—offensive and defensive, kinetic and non-kinetic, lethal and nonlethal.
- In 2008, a joint DSB and Intelligence Science Board task force examined integrating sensor-collected intelligence. The task force proposed improvements to tasking, collecting, processing, data storage, fusion, and the dissemination of information collected by intelligence, surveillance, and reconnaissance systems. The task force’s two primary recommendations were to deploy urgent communications improvements including Transformational Satellite System and to metadata tag sensor-collected data as close to the sensor as possible.⁵¹
 - In 2012, the board examined the role of autonomy in DOD systems, and reported that autonomy technology is underutilized. Contributing factors include poor design, ineffective coordination of R&D across military services, and operational challenges created by the urgent deployment of unmanned systems without adequate time and resources to refine concepts of operations and training. The DSB proposed establishing a “coordinated science and technology program guided by feedback from operational experience and evolving mission requirements.”⁵²
 - In 2013, the board developed a framework to analyze technology and investments to support military capabilities required in 2030. The framework consisted of four categories that support development of technically sophisticated, complex, and expensive systems: coping with parity, achieving superiority through cost-imposing strategies, achieving superiority through enhancing force effectiveness, and anticipating surprise.⁵³
 - In 2015, the DSB released its report on strategic surprise, in which it examined how information about a potential adversary in eight domains may change DOD priorities and actions, and how DOD might regret its failure to respond. They are: countering nuclear proliferation; ballistic and cruise

missile defense; space security; undersea warfare; cyber; communications and positioning, navigation, and timing; counterintelligence; and logistics resilience.⁵⁴

CONGRESSIONAL TESTIMONY, CONGRESSIONAL RESEARCH SERVICE, AND GOVERNMENT ACCOUNTABILITY OFFICE

Testimony provided to House and Senate armed services committees, House and Senate appropriations subcommittees, and House and Senate authorization committees include statements by administration and military services officials, and expert reviews of programs and operations from academia and think tanks. For example, on 9 December 2015, the House Armed Services Committee's Subcommittee on Seapower and Projection Forces received testimony on "game-changing innovations" from Bryan McGrath, Managing Director of The FerryBridge Group, and Jonathan Solomon, Senior Systems and Technology Analyst, Systems Planning and Analysis, Inc. On 12 April 2016, the Senate Armed Services Committee's Subcommittee on Emerging Threats and Capabilities received testimony on the progress of Third Offset Initiative projects from Stephen Welby, Assistant Secretary of Defense for Research and Engineering, William B. Roper Jr., Director, Strategic Capabilities Office, and Arati Prabhakar, Director, Defense Advanced Research Projects Agency.

The Congressional Research Service (CRS) and the Government Accountability Office (GAO) are congressional independent, non-partisan agencies that produce reports and assessments of government programs, including the status of weapon systems programs, and issues related to weapons development. These reports may contain information gleaned from government or contractor sources, as well as empirical information developed by individual researchers. Naval analyst Ronald O'Rourke started working at CRS in 1984, where he writes reports for Congress on issues relating to the Navy. He briefs members of Congress and congressional staffs and has testified before congressional committees. Among the many naval technology topics he has examined include "Lasers, Railguns, and Hypervelocity Projectile," "Navy *Ford* (CVN-78) Class Aircraft Carrier Program," and the "Littoral Combat Ship."⁵⁵ O'Rourke updates reports after he receives information relevant to a current congressional discussion.

The GAO supports congressional oversight of federal programs by auditing agency operations, investigating allegations of illegality, reporting on how well

government programs meet their goals, and performing policy analyses. Its reports on Defense Department weapons systems programs typically include responses prepared by the Department of Defense Inspector General, and recommendations concerning how shortfalls and other program challenges may be fixed.⁵⁶

In addition to official government sources, and academic articles, monographs, and books, there are think tank and FFRDC sources, too many to review.

WHAT HAS NOT BEEN WRITTEN?

The question, “what has not been written?” invites a search similar to the one Sherlock Holmes undertook in the short story “Silver Blaze” regarding the “curious incident of the dog in the night-time”—that is, the dog that did not bark. Historical studies of military technology have mostly ignored questions, approaches, and concepts used by economic historians and social scientists to identify and analyze human-organizational interactions that are critical to the development and deployment of new military technologies.

Since the end of World War II, military and civilian officials and academics—including historians, social scientists, and policy analysts—have been keenly interested in technology related to military operations: how technologies operate, how technologies were developed, acquired, and deployed; and what impact various technologies would have on operations and outcomes. The development of nuclear weapons during World War II inspired additional questions and a large and growing literature. In 2016, the ongoing acceleration of scientific and engineering discovery, invention, and development has raised questions about whether the accelerating rate of invention might generate disruptive new military capabilities. For example, National Defense University analysts Jim Kadtko and Lin Wells argue that convergence of the rapidly advancing fields of biology, robotics, information, nanotechnology, and energy pose extreme national security policy challenges.⁵⁷

The following sections provide examples of research subjects, concepts, and ideas that can inform or provide context for histories of human-machine/technology-organization systems.

CONTEXT FOR NAVAL AND MILITARY TECHNOLOGY: “PATH DEPENDENCE,” INSTITUTIONS, AND ORGANIZATIONS

In *Men, Machines, and Modern Times*, historian Elting E. Morison notes that it is a “poor sort of past that only deals with what has happened.”⁵⁸ Historians have long known that some events and situations that occurred many years ago continue to exert an influence on the present and future. Military historian Ronald Spector notes, for example, that the struggles and triumphs in establishing the Naval War College continue to influence the entire Navy.⁵⁹ Economic historians have proposed the concepts of “path dependence,” institutions, and organizations to trace the influence of the past on the present and future.⁶⁰ This research presents a necessary empirical corrective to implicit and explicit “rational actor” models of decision-making about weapons development and employment. For instance, during the mid-1950s, Andy Marshall and Joseph Loftus criticized implicit RAND Corporation rational actor analyses of the placement of Soviet long-range bomber bases by citing Soviet military history of placing aircraft bases on the USSR’s periphery.⁶¹

We also can apply path dependence, institutions, and organizations to analyze the success or failure of militaries to alter their competitive positions through technological advancements.⁶² Path dependence explains how military systems differ, the extent to which they are sensitive to chance events or “initial conditions,”⁶³ and how military services have resisted abrupt and discontinuous change. A path-dependence analysis is not a simple extrapolation of current trends. Rather, it focuses attention on the many systemic—and sometimes, dynamic—social or political factors (such as coordination costs in changing an information-processing technology) that structure and constrain choices individuals make in organizations.⁶⁴

To describe initial conditions for particular paths, Nobel laureate in economic science Douglass North distinguishes institutions from organizations. He defines institutions as formal and informal rules that constrain and guide individuals’ decision-making in organizations. For example, constitutions and traditions are examples of “institutions”; constitutions are “formal” and traditions are “informal” rules. Institutions set the rules through which organizations and individuals act.⁶⁵

In the context of rapid, accelerating, and converging scientific and technological developments, the key to higher military performance is not technology; it is the relationship between institutional rules and organizations—and the

opportunities and challenges they establish for people to learn about the outcomes of their actions; to invent and innovate; to organize production more efficiently; to recruit, select, and promote personnel on the basis of merit; to design, test, and correct operational concepts; and to align means to ends effectively.⁶⁶

Institutions guide the way military organizations evolve, and more broadly determine the kinds of organizations that will arise in society as context for that evolution. For example, the laws and rules that reward productive economic activity created the conditions in the West whereby organizations such as partnerships and firms could emerge and succeed.⁶⁷ Such organizations are intimately concerned in the process of military technology development and acquisition. In the words of North, John Wallis, and Barry Weingast, such “organizations distinguish the Western European competition from military competition in the rest of the world.”⁶⁸ Looking at the U.S. vulnerability to cyber-attacks makes the point. Industry spokesmen have argued that the United States is vulnerable to cyber-attacks not simply because of its dependence on computer systems, but because U.S. institutions—that is, the private-public division of responsibility for the provision of public goods (e.g., electricity) and legal restraints on computer network monitoring—contribute to vulnerability.⁶⁹ Countries with closer ties between government and commercial sectors—e.g., the United Kingdom, Germany, Sweden, the Netherlands, and Singapore—have coordinated faster government–business responses to cyber-attacks.⁷⁰

These are not new phenomena. Economic historian Avner Greif found systematic differences in North African Islamic and Venetian trading societies traceable to contrasting beliefs about the role of the individual and institutions in society.⁷¹ Like China, the Islamic world was an early candidate for sustained economic growth. Its people possessed technological, architectural, literary, and scientific skills. At its peak, the Arab Empire exceeded the size of the Roman Empire, remaining a military threat to the West as late as the 17th century. Yet, with only a few exceptions, formal and informal institutions comprising the belief structure of the Islamic world mitigated intellectual evolution.⁷² As historian William McNeill writes, “by a curious and fateful coincidence, Moslem thought froze into a fixed mold just at the time when intellectual curiosity was awakening in Western Europe—the twelfth and thirteenth centuries.”⁷³

In Western thought, we find a convergence of arguments from economics, political science, and philosophy of science regarding the impact on behaviors of individuals and organizations of epistemological assumptions embedded in institutions.⁷⁴ The common threads are the long-term effect of institutional rules on individual and social behavior, and on human learning—what is learned and

shared.⁷⁵ For example, operations research analyst Russell L. Ackoff, and philosopher of science Sir Karl R. Popper separately argue that unconscious assumptions about the growth of knowledge affect conceptions of politics—and designs of governmental organizations and programs.⁷⁶

Describing the role of institutions over time in structuring decisions and decision-making has three implications for understanding the design process for Navy Department technology—and for a naval history research program that captures, documents, and contributes to internal feedback.

First, a set of institutions can generate parallel groupings of organizations and that feature different sets of behaviors, leading to vastly different results. For example, during the interwar period, the Army and Navy operated under identical formal institutional rules—the checks and balances and separation of powers embodied in the U.S. Constitution. Yet, the naval aviation community—but not the naval munitions/torpedo community—was able to exploit these formal institutional rules by creating an interactive relationship among the General Board, the Fleet, the Naval War College, and the Bureau of Aeronautics.⁷⁷ The primary effect of this multi-organizational arrangement was that the naval aviation community identified and reduced uncertainties in developing technology and operational concepts for the employment of aircraft carriers. Some early technological-operational options favored by high-level persons were rejected and not locked in, e.g., Rear Admiral William A. Moffett's preference for the use of airships.

In contrast, the Army—not developing aviation and armor with an analogous set of organizations and patterns of interaction—was unable to identify and exploit the potential operational advantages of mechanized warfare and tanks.⁷⁸ In noting the failure of *Journal of the U.S. Cavalry Association* editors to pay attention to mechanization, Edward Katzenbach observed, “one cannot help but be impressed with the intellectual isolation” of the U.S. Army in the 1930s.⁷⁹

Second, institutions and organizations can enhance prospects for success or hinder the invention, development, and successful employment of military technologies. Military organizations and patterns of interaction that can identify and exploit potentially revolutionary technologies and operational concepts are rare in the global population of military organizations that deal with acquisition and operations.

Third, the institutions and organizations in play when a potential military innovation appears and is refined for combat exert a powerful influence over the types of knowledge required for its exploitation, the types of knowledge generated from its exploitation, and the subsequent evolutionary path followed by the technology and associated operational concepts.

TECHNOLOGY-HUMAN-ORGANIZATION SYSTEMS: HIGH-RELIABILITY ORGANIZATION

High-reliability organizations are an example of a topic that I believe has not received attention in military history. Sociologist Charles Perrow's *Normal Accidents* was published in 1984. The book examined major systems failures and system damage that resulted from cascading "normal accidents"—small and random errors in organizations and processes designed to operate interdependently. Organizational processes that operate in a fixed and pre-determined sequence offer few opportunities to recover once an unexpected or unplanned sequence is initiated—errors cascade in time-dependent, interdependent, differentiated (low redundancy) systems and failures emerge elsewhere.⁸⁰ Such failures can be costly and deadly. In a study published in 1987, Paul Shrivastava surveyed 20th century industrial accidents involving the deaths of at least 50 people; half of these 28 accidents occurred in the years between 1977 and 1986, which suggests that the number of organizations operating hazardous and dangerous technologies has increased.⁸¹

To understand how some organizations have performed effectively while safely operating tightly-coupled and interactively complex technologies⁸² that present serious risks to operators and the public (or the potential for what Perrow called "normal accidents"), Todd LaPorte, Gene Rochlin, and Karlene Roberts conducted case studies of operations on aircraft carriers *Enterprise* (CVN-65), *Carl Vinson* (CVN-70), and *Theodore Roosevelt* (CVN-71),⁸³ the Federal Aviation Administration's Air Traffic Control System, and nuclear power operations (Pacific Gas and Electric's Diablo Canyon reactor).⁸⁴ Karl Weick, Paul Schulman, and others joined the research team, and additional organizations were studied, including the fire incident command system, and pediatric intensive care units.⁸⁵

These studies emphasized that (1) reliable organizations feature redundant communications pathways, search processes, and means to review and oversee performance;⁸⁶ (2) they operate in political and social environments intolerant of error; (3) the technologies individually and collectively are subject to potentially catastrophic error; and (4) the scale of possible consequences—such as nuclear war—precludes incremental learning through trial-and-error experimentation.⁸⁷

A review of "high reliability organizations" case studies identified properties that contribute to extraordinary performance in the use of complex technologies in difficult task environments,⁸⁸ including: (1) demanding technical and interpersonal selection criteria for positions;⁸⁹ (2) continual training and continuous

improvement efforts; (3) the attitude of “mindfulness” of the importance and necessity of identifying potential errors before they occur; (4) development of latent networks of expertise that are activated at identification of an unanticipated event;⁹⁰ and (5) alignment in organization structure of expertise and authority. Rear Admiral Dave Oliver describes the operation of these properties in his description of Admiral Hyman G. Rickover’s creation of the U.S. nuclear Navy.⁹¹

Some ongoing research on high reliability organizations, their properties, and mindful organizing focuses on how organizations become reliable and how mindful organizing emerges in organizations.⁹² This research places human error in a context similar to that described by statistician Ward Edwards Deming, when he argued that management should distinguish system error from individual error in industrial processes, because the vast majority of errors are a function of system-level structures, processes, and procedures.⁹³ Other studies of high-reliability organizations compare learning and innovation in the U.S. Navy *Los Angeles* (SSN-688)-class nuclear attack submarine program to Russian/Soviet navy nuclear attack submarine programs.⁹⁴

DISTRIBUTED HUMAN-MACHINE TEAMS

Research on the organization of distributed configurations of human-machine teams conducting different tasks is related to studies of high reliability organizations—and to Marine Corps experimentation on distributed operations. Yanni Alexander Loukissas and David A. Mindell, in a study of data visualization to examine technologically mediated human roles and relationships, note that “the study of distributed computer-human relationships requires new methods that are capable of picking up on multi-channel interactions.”⁹⁵ They developed methods to combine “individual, social, quantitative, and qualitative data in rich, graphical, real-time representations.”⁹⁶

We should anticipate that new forms of automation would change the arrangement and coordination of activities in organizations, and historians should be alert to such changes. Loukissas and Mindell argue research on new organizational configurations of human-machine teams addresses issues beyond those considered in conventional human factors studies that “emphasize workload, interface, and situational awareness,”⁹⁷ and include examination of the “social organization of human-machine teams and the cultural production of operator roles” that affect acceptance of new technologies.⁹⁸

BUREAUCRATIC CONFLICT: EXPERT AUTHORITY VS. POLITICAL AUTHORITY

Sociologist Max Weber examined conflict in bureaucracies between elected officials and technical experts, especially when officials issue decrees “ignored” by bureaucrats charged to implement them. In Weber’s words, “the political ‘master’ always finds himself, vis-à-vis the trained official, in the position of the dilettante facing the expert.”⁹⁹ Admiral Hyman G. Rickover addressed this issue frequently in his interactions with his fellow officers, and in his 1974 speech, “The Role of Engineering in the Navy,” to the National Society of Former Special Agents of the Federal Bureau of Investigation.¹⁰⁰ Admiral Rickover’s argument involved three issues. First, the Navy’s reliance on technologies of all kinds was increasing. Second, to take advantage of technology, the Navy must raise standards of knowledge and performance for all personnel. Third, the Navy was allowing receding standards of technical competence. In doing so, the Navy increased its dependence on industry, and relied on reorganizations and management fads to compensate for lower standards of technical competence.

Admiral Rickover explains shortfalls in Navy leadership by arguing that the Navy’s leaders have, at potential historical turning points, “misread history.” They have misunderstood the necessity of applying empirical premises to all manner of problems that derive from the Navy’s purpose—to defend our nation. Rickover develops his observation about the necessity of applying an empirical attitude and demonstrable knowledge to many problems by presenting a conceptual history of Navy Department decision-making. He begins with the period following the Civil War when Navy leaders retained “faith in [*Monitor*-type vessels] as major combatant ships long after other nations had recognized that they were only a brilliant improvisation addressing a specific problem. The main line of naval progress remained in Europe. We had misread the naval results of the Civil War.” During the 1880s, when the Navy was rebuilding, “the worst errors were caused by the imposition of the opinions of line officers on technical matters.”

“The rising tide of technological complexity has engulfed the design engineer ashore as well as the line officer engineer at sea. In both areas, these men now face demands far beyond those which confronted their predecessors.” In Rickover’s view, young officers must be able to understand the technical details of their equipment; they cannot do this without learning the basics of engineering and science.

Of course, once one learns the basics, one must devote the time and effort to remain current. When Nobel laureate Richard P. Feynman was a member of the *Challenger* shuttle investigation, he noted that managers, who earlier in their

careers had been engineers, estimated the likelihood of a shuttle failure at 1 in 100,000, and working engineers estimated likelihood of failure at 1 in 100.¹⁰¹ The three-order magnitude difference in estimates made by working engineers and managers reflects the type of issue Admiral Rickover highlighted in his history of conflict—between line and engineering and engineering duty officers—over what premises should guide decisions about development and use of technology in the Navy.¹⁰²

A crucial problem faced by Navy and Marine Corps commanding officers is that knowledge requirements for command have grown. All services face this problem. General Raymond T. Odierno explained the issue to me when I interviewed him in Baghdad in 2009. The increasing complexity of wartime decision-making involves overseeing and managing staff structures and processes to propose lines of operation and calculate and compare impacts, interactions, and tradeoffs of many policies and programs. The complexity of aligning the commander's staff structures, processes, procedures, and lines of operation with the task environment requires developing approaches to operational assessments and analyses that help commanders understand their mission(s); organizational structures, processes, and people; the operational environment; the ways and means to achieve desired ends; and the feasibility and wisdom of mission goals.¹⁰³ And commanders still have to defeat the enemy.

Rickover's political battles with much of the Navy and its military leadership are one instance of the conflict between authority of knowledge and of rank. As military organizations increasingly employ technologies, organization, and tactics that must be operated "under the rule of expert knowledge," it is inevitable that disagreements and conflicts will erupt between technical and non-technical officials. Practical implications of this conflict are revealed in the operation of the military personnel system, selection and promotion criteria, and the search for and accumulation of evidence by human capital professionals to justify criteria and premises for decisions.

WHAT SHOULD BE WRITTEN?

Some historians of technology argue that historiography of military technology should consider factors beyond those examined in traditional studies of weapons, battle tactics, and strategy.¹⁰⁴ Renowned historian Barton Hacker argues that "understanding technological change requires paying attention to interactions between technology and social institutions, because social change impacts

technology no less than technological change impacts society.”¹⁰⁵ He cites Walter Millis’s *Arms and Men* as an exemplar of historical analysis that integrates military policy, institutional history of the armed forces, and consequences of social and technological change. Millis, writing in 1956, notes that there is little literature that considers the “economic, social and political factors which affect all issues of military preparedness and war.” In reviewing the field, Millis cites Harold and Margaret Sprout’s 1939 *The Rise of American Naval Power* as the first study examining impact of institutions—“continuous factors within the fabric of our society”—on the development and employment of naval military power.¹⁰⁶

Future studies of naval and Marine Corps military technology should engage the concepts of path dependence, institutions, and organizations developed by economic historians, consider interactions of science and technology explicitly (under different conditions of synthesized, catalogued, and accessible knowledge); examine development, diffusion, and experimentation of technologies in military high-reliability organizations and distributed human-machine teams; and social, economic, and political factors cited by Walter Millis. Katherine Epstein’s *Torpedo*, published in 2014, is a recent example of a military history that examines development of a set of technologies with interpretation of events informed by six academic sub-fields of history: military, diplomacy, science and technology, business, legal, and policy.¹⁰⁷

To conclude, I would like to consider three topics relevant to the question of what should be studied: the DOD’s Third Offset Strategy, the development of acquisition processes appropriate to the Third Offset, and the organization of interdisciplinary and team-oriented historical research.

THE THIRD OFFSET AS A TOPIC IN NAVAL HISTORY OF TECHNOLOGY

In 2014, then-Secretary of Defense Chuck Hagel proposed the “Third Offset Strategy,” a set of efforts to maintain American military superiority over current and potential foes by developing new operational concepts and technologies. Secretary Hagel saw the strategy as following two previous initiatives. During the 1950s, President Dwight D. Eisenhower proposed the First Offset, a program to build U.S. nuclear forces to deter and counter the USSR’s conventional forces’ numerical superiority. In the mid- to late-1970s, Secretary of Defense Harold Brown guided the Second Offset: stealth, precision-guided munitions, and intelligence, surveillance, and reconnaissance systems to counter the USSR and Warsaw

Pact's improving military capabilities and numerical superiority of forces in central Europe. The proposed FY 2017 defense budget contains about \$3.6 billion in Third Offset research and development funding to demonstrate various capabilities.

The technologies proposed for the Third Offset are exciting and ambitious, and have captured the attention of most observers. I've randomly surveyed more than 20 articles and essays about the strategy.¹⁰⁸ Of these articles, almost all assume the technical goals are achievable and that higher technical performance is equivalent to higher operational capability; one article raises the possibility of glitches in the human-machine collaboration initiative.¹⁰⁹

Regardless of whether Third Offset human-machine collaboration capabilities involve learning machines that will "operate at the speed of light,"¹¹⁰ as Deputy Secretary of Defense Bob Work put it, individuals' information processing and computational abilities are limited and may not match the size and complexity of their tasks in combat. The following summarizes relatively recent research:¹¹¹

1. People have difficulty making decisions in unique and complex situations involving risk;
2. People have difficulty diagnosing the decision problem they face;
3. People perceive causality where none exists;
4. People have even more difficulty generating an adequate set of alternative actions from which to choose;
5. People's preferences may be inconsistent, and small changes in the way the problem is posed may produce complete reversals of preferences;
6. Complex cognitive tasks involving conscious and focused thinking entail steps performed serially;
7. Little is known about decision-making under the stress of emergency conditions;
8. Little is known about judgment and decision-making under time stress;
9. Decreasing time available for making a decision leads people to reduce the number of factors they consider;
10. Understanding group-level decision-making is not a simple matter of scaling up from individual-level decision-making—group size and interactions among personnel introduce new properties; and
11. People may plan to use certain kinds of information in some future situations (e.g., directing forces in combat), but will actually ignore that information when it is received—that is, information seen as relevant during planning becomes less salient in the heat of battle, when there are new and unexpected cues, actions, or information.

Appreciating the complexity of combat tasks is fundamental to a proper assessment of any organizational design for highly automated, rapid-response battle (and of selection criteria for high office and training to accomplish very complex and ill-structured tasks). Real-time interactions between human operators and complex computerized systems have an inherently higher probability of error in any unanticipated and unrehearsed crisis situation.¹¹²

Knowledge of how people integrate information and make decisions in rapidly changing situations is necessary for historians and analysts. Otherwise, they cannot understand and report on how human-machine collaboration capabilities perform and align with organizational tasks, roles, command relationships, and communications channels, or minimize errors in operations.

Historians would make a great contribution to knowledge about human decision-making in military organizations if they carefully described the Third Offset acquisition programs to design, experiment with, and test human-machine collaboration and automation. To automate a task, programmers must be able to state explicit rules and their sequence to accomplish it. Yet, for many tasks throughout a combat organization, such as those involving interpersonal interaction, or adaptability, or flexibility, and problem solving, the tasks are not amenable to mathematical treatment, and may never be so.¹¹³

Navy leaders have known for a very long time about what chemist and philosopher Michael Polanyi called “tacit knowledge,” or knowledge that is difficult to transfer via written or spoken instructions. For example, no one in the Navy, or outside it, can specify the sequence of every task that must be performed to get an aircraft off the carrier flight deck. A portion of the knowledge in the minds of Navy personnel enabling aircraft to launch and land is tacit. Similarly, retired Vice Admiral Lloyd M. Mustin reflected that use of weapons systems technologies involves more than application of theoretical physical principles:

Unfortunately, the basic knowledge of radar is really very simple, and what becomes critical in keeping this radar going at close to designed efficiency at sea has nothing to do with basic knowledge. It has to do with a whole host of minutiae, detailed technical specifics, and these are what the technician has to learn about. It takes time, and until he has learned them, it's a much slower job for him to troubleshoot and to tune up and so forth. This has nothing to do at all with the basic theory of the thing, what you need in order for it to work. The problem lies in the detailed specifics of how do you go about achieving what you really need.¹¹⁴

Knowledge of how people integrate information and make decisions in rapidly changing situations is necessary for historians and analysts. Otherwise, they cannot understand and report on how human-machine collaboration capabilities perform and align with organizational tasks, roles, command relationships, and communications channels; or how to minimize errors in operations.

ACQUISITION POLICIES APPROPRIATE TO THE THIRD OFFSET

The acquisition process and procedures used and created for the Third Offset Strategy also should be studied. This topic is rich in possible themes involving the social context of military technology. For example, a core element of the acquisition process problem is how to employ, exploit, and coordinate the information, knowledge, and products created by public and private sources of discovery, innovation, and analysis. Information and knowledge about military capabilities are limited and imperfect. To deal with this situation, a process is needed through which knowledge is communicated, acquired, and applied. The solution to the problem of organizing the acquisition processes is to harness and guide the interactions of people and companies—each of which possess, more or less, only partial knowledge about the task at hand.¹¹⁵

Commissions and blue ribbon study teams that developed recommendations to overhaul and modify the acquisition process conceived and justified their work as an effort to make the acquisition process rational—a process in which goals are set, ways and means are identified to achieve the goal, the courses of action compared, and the best solution chosen.¹¹⁶ The recommendations to improve acquisition developed in the “Weapons Systems Acquisition Reform Act of 2009” recapitulate the assumptions and logic used by previous commissions about the design of a rational process.

Yet, post-World War II American planning and management processes have not operated as their designers assumed and expected; many programs have suffered budget overruns, schedule delays, and performance shortfalls. In 2008, then-Secretary of Defense Robert Gates observed,

When it comes to procurement, for the better part of five decades, the trend has gone towards lower numbers as technology gains made each system more capable. In recent years these platforms have grown ever more baroque, ever

more costly, are taking longer to build, and are being fielded in ever dwindling quantities.¹¹⁷

Budget overruns, schedule delays, and performance shortfalls occur because acquisition programs have been designed under the incorrect—but widely held—assumption that the future growth of scientific knowledge and technical know-how can be planned and scheduled. The assumption ensures that during the decades-long periods to develop new major classes of ships, aircraft, and ground vehicles, the platforms would be eclipsed by the tempo of technological development of command, control, communication, computer, and intelligence capabilities. By the time the platforms have been delivered, the technological capabilities originally associated with them have become obsolete. The logical impossibility of predicting the growth of scientific knowledge makes it equally impossible to accurately estimate program costs and to predict the schedule and tempo of work to create new capabilities.¹¹⁸

Describing and explaining the social context of the acquisition process provides senior leaders with the type of information they need to change the “demand signal” about the performance of the acquisition system,¹¹⁹ and to request alternative sources of data or to experiment on organizational processes and procedures.¹²⁰

THE GHOST OF VANNEVER BUSH IN A “TRAFFIC JAM”

Vannevar Bush, Robert Merton, Ted Gold, and many others cited above may have been correct that theoretical research guides and supports practical technological applications, and a growing body of knowledge necessarily underpins commercial and military technological innovation. One element of a predictable naval and Marine Corps technology traffic jam is continuing conflict over the justification for basic research in apportionment of R&D monies—until evidence is developed for some aspects of the science-technology relationship under specified situations, such as using high technology–readiness level components. Some arguments supporting the pivotal role of basic research in technology development primarily rely on assertions made by officials managing science and technology programs.¹²¹

In 2003, members of the congressional armed services committees and the authorization conference committee expressed concern about stagnant investment in basic research for DOD. The *FY04 National Defense Authorization*

Act mandated an NAS assessment of the basic research portfolio of the Office of the Secretary of Defense, the three military departments, and the Defense Advanced Research Projects Agency to determine whether the portfolio includes adequate fundamental research. The conference committee report declared that DOD's "investment in basic research provides the foundation upon which our modern military is built. It is critical the basic research investment remain strong, stable, and focused on the fundamental search for new knowledge."¹²² In 2005, *Assessment of Department of Defense Basic Research* was published.¹²³ Among the findings relevant to this essay were:

- Ongoing discovery from basic research is often required through the applied research, system development, and system operation phases.
- A DOD trend in basic research emphasis is less effort in unfettered exploration, which historically has been a critical enabler of the most important breakthroughs in military capabilities.
- DOD basic research has been focused more narrowly in support of specified needs.

The Missile Defense Agency's shrinking R&D account is an example of an outcome whereby procurement and sustainment take "precedence over internal research and development because of contractual obligations and immediate needs."¹²⁴

Evidence from other domains regarding the science and technology interaction is anecdotal and may be subject to selection bias of choosing examples for review that support a thesis. For example, in 2012, the "Golden Goose Award" was established to

recognize the tremendous human and economic benefits of federally funded research by highlighting examples of seemingly obscure studies that have led to major breakthroughs in biomedical research, medical treatments, and computing and communications technologies. [Since 2012 G]roups of researchers have been recognized each year for breakthroughs in the development of life-saving medicines and treatments; game-changing social and behavioral insights; and major technological advances related to national security, energy, the environment, communications, and public health.¹²⁵

Evidence from academic studies of innovation over the last decade support the precedence of basic research for invention.¹²⁶

Previous studies of the interaction between basic science and technology development, such as the 1967 Project Hindsight and the 1968 NSF-sponsored TRACES, do not provide reasonable guidance to policy-makers or historians; these studies have been characterized as “cooked up”—that is, studies designed to prove a previously determined answer.¹²⁷ One crucial contribution the historical community can make to current and future top-level policy is to develop evidence appropriate to informing policy discussions and debates. Such evidence would entail a program to investigate, describe, document, and assess the theory-technology relationship in current and planned research on modern weapons systems. Methodologies to assess and trace science-technology interactions have improved since *Project Hindsight* was written,¹²⁸ and further methodological improvements are feasible by melding historical research and qualitative research methods into a study’s methodology.

ORGANIZATION OF INTERDISCIPLINARY AND TEAM-ORIENTED HISTORICAL RESEARCH

The Third Offset Strategy’s impact on Naval History and Heritage Command involves challenges and opportunities. The opportunities entail a program of analysis in the history program to contribute to the Fleet and combatant commanders in ways no other history program has. Ultimately, this line of historical analysis may result in a transformation of government history programs. A model for this type of organizational transformation might be the RAND Corporation in the late 1940s and early 1950s when small groups of interdisciplinary thinkers influenced the development of ideas, policies, and world views of the U.S. national security community. Andy Marshall, the former director of Net Assessment, was a co-author of a 2015 essay describing the early years of RAND and the “flaring of intellectual outliers.”¹²⁹ At RAND, three processes may have produced its early intellectual influence:

1. Independent, simultaneous generation of ideas through the imagination of individual scientists or historians or analysts;
2. Discoveries facilitated through processes that enable discussion and interaction; and
3. A group culture that expects and demands imagination, interaction, and consciousness of the group members’ distinctiveness.¹³⁰

BARRIERS TO RESEARCH

The opportunities are enticing to participate in a group intellectual effort. There are many obstacles and challenges to establishing such a group. Conducting research on ongoing technology projects requires knowledge and familiarity with technologies; organizational and sociological literature regarding the structure and performance of tasks, coordination, supervision, and feedback; and traditional historical research methods focusing on documents and tracing the development of ideas and actions over time. This research task imposes fundamental challenges to the researcher. First, the researcher must become well integrated into the organizations developing, deploying, or employing technologies. Even when the researcher has relevant knowledge of the technologies and technical issues and has been socialized and accepted in the organizations, the researcher is not a participant—in an operational sense—in the activity being studied.

The challenges are similar to those encountered by researchers seeking to conduct ethnographic and grounded sociological inquiry—e.g., familiarity with the culture of a particular organization may mask identification of important factors.¹³¹

My own limited experience in the Gulf War Air Power Survey and at the U.S. Joint Forces Command has reinforced the idea that analyzing a recent military campaign places a heavy diplomatic burden on the author. There are no easy ways to lift this burden. The differences between operator and policy-analysis subcultures generates strained relations between the two groups. Military officers are responsible for operations; policy analysts look at these operations as a source of data or means to an end—i.e., understanding how particular outcomes occurred. If not put tactfully, the policy analyst's probing and questioning—which are necessary components of his task—can easily be construed by the operator as criticism of his decisions or performance. Documenting mistakes—even minor errors—for hindsight analysis contains the implicit criticism that, if the policy analyst were in charge instead of the generals, these mistakes could have been avoided.

Historians and analysts, by reviewing the minutia of operations, can cause information regarding activities at theater headquarters or other places to be known to national command authorities and others. This information can be troublesome on various matters, including disagreements about budget priorities before Congress, disputes over roles and missions, and so on. Thus, it is almost inevitable that on issues such as how reputations are made and how resources are divided up in Washington, DC, even non-partisan and objective analysis can

receive a political reception.¹³² In a poignant story, Bart Hacker described how Department of Energy (DOE) leaders imposed bureaucratic delays on the publication of *Elements of Controversy* due to agency leaders' anxiety that Hacker had not read and incorporated comments from reviewers they trusted. DOE leaders could not refute Hacker's book with evidence; they imposed delays until Hacker arranged to have the book published by the University of California Press.¹³³

CONCLUSION

The Department of the Navy deals with growing practical challenges in management and leadership. Successful and sustainable performance in setting conditions to defeat the many threats and challenges facing the United States depend on conceptual clarity and quality of evidence underlying policies to organize, train, and equip military forces.

Although historians of technology have participated in interdisciplinary research,¹³⁴ any recommendation to historians to consider social science literature to complement and inform historical research and analysis must acknowledge only small successes alongside general failure to achieve research-based prescriptions for organizational design and practice. The store of social science knowledge grows slowly.¹³⁵ To the extent that social science can inform historical research, it is in promoting thoughtful questions and clear specification of concepts for organizational analysis.¹³⁶

Tasks of government military historians are not limited to collecting and organizing documents, and conducting oral history interviews. Historians embedded in operational units and at various headquarters echelons have the opportunity to observe and to collect participants' observations. The latter task requires historians to apply empirical social science research methodologies to collect and organize observations. The larger implications to the Navy of an expansion of military historians' professional skills involve building knowledge about the operation of human-technology-organizational systems to enable higher operational effectiveness of the Fleet.

Notes

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Acronyms

ACNP (W)	Assistant Chief of Naval Personnel for Women
AD	destroyer tender
AEC	Atomic Energy Commission
AGR	radar picket ship
AGS	coastal hydrographic survey ship
AGTR	technical research ship
AH	hospital ship
AMC	U.S. Army Materiel Command
AMCM	airborne mine countermeasures
AO	fleet replenishment oiler
ARG	amphibious ready group
ASBM	antiship ballistic missile
ASCM	antiship cruise missile
ASW	antisubmarine warfare
AVM	guided missile ship
BB	battleship
BUR	bottom-up review
CA	heavy cruiser
CBO	Congressional Budget Office
CG	guided missile cruiser
CIC	Combat Information Center
CL	light cruiser
CLF	Combat Logistics Force
CMH	U.S. Army Center of Military History
CNA	Center for Naval Analyses
CNAS	Center for a New American Security
CNO	Chief of Naval Operations
COCOM	combat command
COMINWARCOM	Commander Mine Warfare Command
CRS	Congressional Research Service
CSBA	Center for Strategic and Budgetary Assessments
CSG	carrier strike group
CV	aircraft carrier, multi-purpose

CVA	aircraft carrier, attack
CVB	aircraft carrier, large
CVBG	carrier battle group
CVN	aircraft carrier, multi-purpose (nuclear-powered)
CVW	carrier air wing
DACOWITS	Defense Advisory Committee on Women in the Services
DASH	drone anti-submarine helicopter
DDG	guided missile destroyer
DOD	Department of Defense
DOE	Department of Energy
DON	Department of the Navy
DOPMA	Defense Officer Personnel Management Act
DSB	Defense Science Board
EOD	explosive ordnance disposal
ESG	expeditionary strike group
FBM	fleet ballistic missile
FFG	guided missile frigate
FFRDC	Federally Funded Research and Development Center
FOIA	Freedom of Information Act
GAO	Government Accountability Office (formerly General Accounting Office)
GURL	general unrestricted line
ICBM	intercontinental ballistic missile
ISB	Intelligence Science Board
ISR	intelligence, surveillance, and reconnaissance
JPME	Joint Professional Military Education
JSTOR	Journal Storage
LCS	littoral combat ship
LMW	littoral and mine warfare
LOC	Library of Congress
LPD	amphibious transport dock
LPH	amphibious assault ship (helicopter)
LST	landing ship tank
MCM	mine countermeasures
MCMV	mine countermeasures vessel
MDA	Missile Defense Agency
MIW	mine warfare
MRC	major regional contingency

MSC	Military Sealift Command
MSO	ocean minesweeper
MSTS	Military Sea Transport Service
MUW	mine and undersea warfare
NAAP	Navy Affirmative Action Plan
NAS	National Academy of Sciences
NATO	North Atlantic Treaty Organization
NGA	National Geospatial-Intelligence Agency
NHHC	Naval History and Heritage Command
NMWTC	Naval and Mine Warfare Training Center
NPS	Naval Postgraduate School
NRL	Naval Research Laboratory
NROTC	Naval Reserve Officers Training Corps
NSB	Naval Studies Board
NSF	National Science Foundation
NTDS	Navy Tactical Data System
NWC	Naval War College
OCS	Officer Candidate School
OGLA	Officer Grade Limitation Act
ONR	Office of Naval Research
OPA	Officer Personnel Act
OPNAV	Office of the Chief of Naval Operations
OPS	operations
ORI	Office of Research and Inventions
OSRD	Office of Scientific Research and Development
PA&E	Program Analysis and Evaluation
PB	President's Budget
PEO	Project Executive Office
PERT	program evaluation and review technique
PLA	People's Liberation Army
PPBS	Planning, Programming, and Budgeting System
PRC	People's Republic of China
QDR	Quadrennial Defense Review
R&D	research and development
RDT&E	research, development, test, and evaluation
RN	Royal Navy
ROTC	Reserve Officer's Training Corps
SECDEF	Secretary of Defense

SECNAV	Secretary of the Navy
SIPRI	Stockholm International Peace Research Institute
SLBM	submarine launched ballistic missile
SOSUS	sound surveillance system
SSBN	ballistic missile submarine (nuclear-powered)
SSGN	guided missile submarine (nuclear-powered)
SSN	attack submarine (nuclear-powered)
TRACES	Technology in Retrospect and Critical Events in Science
UPTIDE	Unified Pacific Fleet Project for Tactical Improvement and Data Extraction
URL	unrestricted line
USNI	U.S. Naval Institute
WAVES	Women Accepted for Volunteer Emergency Service
WHOI	Woods Hole Oceanographic Institution

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Edward J. Marolda, PhD, served for many years as the U.S. Navy's Senior Historian at the Naval History and Heritage Command in Washington, DC. He earned an MA at Georgetown in European Diplomatic History and the PhD at The George Washington University in U.S. History. He has authored, co-authored, or edited 15 books on the history of the U.S. Navy with a focus on the Cold War in the Far East. His dissertation treated the U.S. Navy and the Chinese Civil War. A U.S. Army veteran of the Vietnam War, he has presented numerous lectures in the United States and overseas.

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Michael J. Crawford retired at the close of 2017 as Senior Historian at the Naval History and Heritage Command after a 35-year career as a Navy historian, during which he specialized in the age of sail, served as an editor of the Navy's award-winning documentary series, *Naval Documents of the American Revolution* and *The Naval War of 1812: A Documentary History*, and produced a distinguished record of publication of books and scholarly essays. He earned his bachelor's and master's degrees in history at Washington University, in his native St. Louis, Missouri, and his doctorate in American History at Boston University. In 2015 and 2016 he organized a series of talks on the historiography of the modern U.S. Navy by notable scholars of which this collection of essays is a byproduct.



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U.S. Navy photo by Mass Communication Specialist 3rd Class Andre T. Richard

An MH-60R Sea Hawk helicopter assigned to Helicopter Maritime Strike Squadron (HSM) 71 prepares to land aboard the aircraft carrier *John C. Stennis* (CVN-74) as the guided missile destroyer *Chung Hoon* (DDG-93) follows behind during a force transit, 11 August 2015.



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