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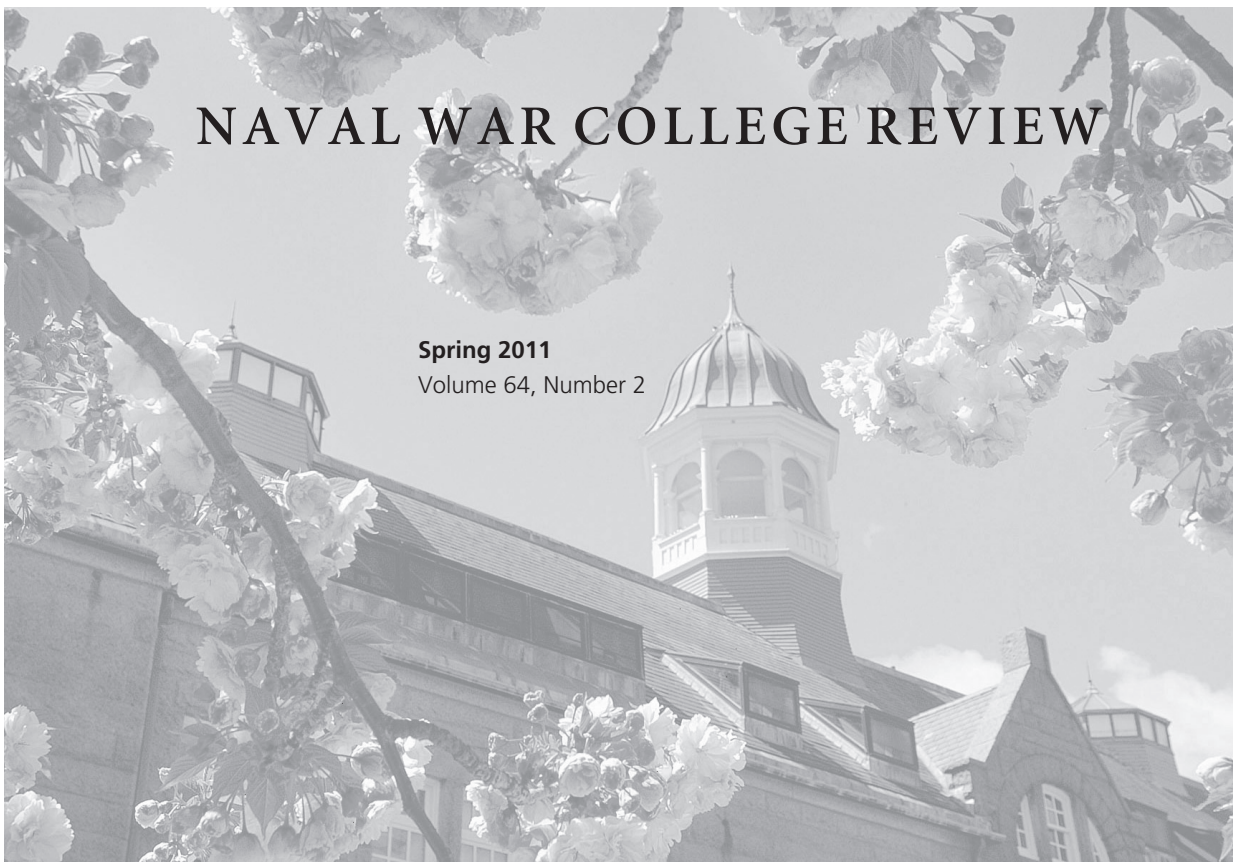
Cover

The littoral combat ship USS Independence *(LCS 2) alongside in Newport, Rhode Island, during a visit in October 2010. Numerous students, faculty, and staff of the College toured the vessel, which was in port to serve as a school ship for the Surface Warfare Officers School. The U.S. Navy's sixth warship to bear the name and the name-ship of its class,* Independence *was delivered in late 2009 and commissioned on 16 January 2010. The ship and its modular weapons suite are designed for multipurpose operations in the highly dangerous littoral zones—enclosed waters close to hostile shores, where warships face a challenging combination of shallow depths, complex hydrological conditions, and a variety of sophisticated sea- and land-based sensors and forces.*

U.S. Navy photograph by MCC (AW/NAC) Robert Inverso, USN



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Code 32, Naval War College
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Editor, Circulation, or Business
401.841.2236
press@usnwc.edu

Managing Editor
401.841.4552
managingeditor@usnwc.edu

Newport Papers, Books
associateeditor@usnwc.edu

Essays and Book Reviews
401.841.6584
bookreviews@usnwc.edu

Other Naval War College Offices
401.841.3089

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FROM THE EDITORS

The term "antiaccess/area denial" (A2/AD) is by now so familiar to military officers and analysts that it is virtually taken for granted as a fair description of the People's Republic of China's strategic concept for a potential clash with the U.S. Navy in the western Pacific. It is therefore somewhat odd that the Chinese themselves have no equivalent term in their military doctrine. In fact, as Vitaliy Pradun argues at length in the lead article of this issue, "From Bottle Rockets to Lightning Bolts: China's Missile Revolution and PLA Strategy against U.S. Military Intervention," the term is highly misleading if it is taken to suggest that the Chinese would only seek to deter, harass, or delay arriving American naval forces in the event of a conflict rather than to defeat them comprehensively. Pradun makes a compelling case that the latter is precisely what they intend and what explains in particular the rapid proliferation of Chinese antiship and other missiles of all types in recent years. This article nicely complements a series of pieces that have appeared in recent issues of the *Review* on related matters: Marshall Hoyler, "China's 'Antiaccess' Ballistic Missiles and U.S. Active Defense" (Autumn 2010); Toshi Yoshihara, "Chinese Missile Strategy and the U.S. Naval Presence in Japan," and Thomas J. Culora, "The Strategic Implications of Obscurants: History and the Future" (both Summer 2010); and Andrew S. Erickson and David D. Yang, "Using the Land to Control the Sea? Chinese Analysts Consider the Antiship Ballistic Missile," and Eric Hagt and Matthew Durnin, "China's Antiship Ballistic Missile: Developments and Missing Links" (both Autumn 2009).

In "Toward an African Maritime Economy: Empowering the African Union to Revolutionize the African Maritime Sector," Commander Michael L. Baker, USN, proposes an ambitious, holistic program for improving the maritime economy and infrastructure of the African littoral in response to challenges like illegal fishing, piracy, drug smuggling, theft of oil, and other consequences of the virtual lack of effective governance there. He argues that it is very much in the interests of the international community, working with and through the African Union, to provide support and financial aid to such an effort.

In "The Development of the Angled-Deck Aircraft Carrier: Innovation and Adaptation," Thomas C. Hone, Norman Friedman, and Mark D. Mandeles examine the watershed period in the history of naval aviation immediately following World War II. Then, several major technological breakthroughs—notably

the jet engine and nuclear weapons—raised large questions about the future and led to an array of innovations in the design and operational utilization of aircraft carriers. Central to this story is the collaboration between the aviation communities of the navies of the United States and Great Britain during these years. Strikingly, the most important of these innovations—notably the angled flight deck, optical landing aid, and steam catapult—originated with the British, not the Americans. This little-known story may hold interesting lessons for the U.S. Navy today with respect to its commitment to maritime security cooperation as well as technological innovation in the carrier force. A longer version of this paper will be published later this year as Newport Paper 37, under the title *Innovation in Carrier Aviation*.

Two articles revisit, if from very different angles, the Cold War at sea. Robert G. Angevine, in "Hiding in Plain Sight: The U.S. Navy and Dispersed Operations under EMCON, 1956–72," tells another little-known story—this one very germane to the challenges the Navy faces today from the emerging Chinese missile threat as discussed in our lead article. In "Alliance Naval Strategies and Norway in the Final Years of the Cold War," Commodore Jacob Børresen, Royal Norwegian Navy (Ret.), reminds us that Norway was once one of the key fronts of the Cold War and an important focus of U.S. and allied maritime strategy. A historian of the Royal Norwegian Navy as well as a participant in many of the events he describes, Børresen offers us highly relevant lessons in the difficulties of alliance management and the requirements of effective maritime security cooperation.

Finally, in "The Quiet Warrior Back in Newport: Admiral Spruance, the Return to the Naval War College, and the Lessons of the Pacific War, 1946–1947," Hal M. Friedman revisits a key period in the postwar history of the Navy and of the Naval War College in particular. This article is based on parts of several chapters in Professor Friedman's recent book *Digesting History: The U.S. Naval War College, the Lessons of World War Two, and Future Naval Warfare, 1945–1947* (Naval War College Press, 2010).

SURFACE NAVY ASSOCIATION LITERARY PRIZE

Every year the Surface Navy Association, with headquarters in Alexandria, Virginia, confers the Surface Navy Literary Award upon the author of the best professional article in any publication addressing surface Navy or surface warfare issues. We're delighted to report that two articles appearing in the *Review* have won honorable mention this year: "The *Zumwalt*-Class Destroyer: A Technology 'Bridge' Shaping the Navy after Next," by George Galdorisi and Scott Truver (Summer 2010), and "The Most Daring Act of the Age: Principles for Naval Irregular Warfare," by Lieutenant Commander Benjamin Armstrong, USN (Autumn 2010).

Vitaliy O. Pradun is a PhD student in political science at the University of Chicago. He has worked on research projects dealing with East Asian security, aerospace power, and military innovation. He is a research associate and foreign language specialist at the Chicago Center for Security and Terrorism.

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FROM BOTTLE ROCKETS TO LIGHTNING BOLTS

China's Missile Revolution and PLA Strategy against U.S. Military Intervention

Vitaliy O. Pradun

In March 1996, China conducted military exercises and live missile firings in the Taiwan Strait as a response to the increasingly pro-independence stance of Taiwan's president, Lee Teng-hui. The United States responded in turn by maneuvering two aircraft carrier groups into the island's vicinity. China and the United States did not come to a standoff, and the issue ended peacefully, although not without ominous messages being received by all parties. China had signaled its willingness to use military force to check Taiwan's incipient independence ambitions, and the United States had conveyed its resolve to defend Taiwan against aggression from the mainland.[1]

The incident, which made the possibility of armed conflict between the United States and China palpable for the first time in decades, precipitated a crisis in China's security planning. The Chinese leadership understood that if it were dragged into a military conflict with the Americans to reverse a Taiwanese declaration of independence or a like provocation, it would have no chance of prevailing in what it believes to be both a domestic issue and its most important (and increasingly volatile) security concern. The subsequent and still ongoing surge in China's military modernization, force-posture restructuring, and doctrinal overhaul has thus been energetically focused on constructing the capability to fight and win a regional war over Taiwan with the world's strongest and most technologically advanced military. This does not mean that China is hostile to the United States or that it expects to fight a war with the United States in the near future. However, it does mean that it sees armed conflict with the United States over conflicting regional interests as a possible and very serious contingency and that it is determined to be ready to meet it.

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Nevertheless, although American analyses of China's likely performance against Taiwan abound, to date there has been no attempt to define, map, and assess comprehensively China's likely operational strategy and its potential for success against *U.S.* forces. The main reason is that the literature on Chinese security policy has been generally skeptical of China's battlefield capabilities, leading many independent analysts to dismiss the military threat the People's Liberation Army (PLA)* poses to the American forces.[2] Furthermore, American analysts have attributed this view to the PLA itself and therefore, rather unduly, posited its unwillingness to engage the United States in combat. Instead, the dominant view in American policy circles is that China is pursuing what has been called an "access-denial strategy," aimed not at directly confronting U.S. forces but at circumscribing, slowing down, and imperiling their access to the theater of operation so as ultimately to delay their intervention or render it ineffective.[3]

According to consecutive versions of the U.S. Defense Department's (DoD's) annual *Military Power of the PRC* report, "China's approach to dealing with [U.S. military intervention] centers on what DoD's 2006 Quadrennial Defense Review report refers to as disruptive capabilities: forces and operational concepts aimed at preventing an adversary from deploying military forces to forward operating locations, and/or rapidly destabilizing critical military balances."[4] Similarly, the Congressional Research Service argues that "consistent with the goal of a short-duration conflict and a fait accompli, observers believe, China is constructing a force that can deter U.S. intervention, or failing that, delay the arrival or reduce the effectiveness of U.S. intervention forces."[5] A scholar at the Security Studies Program at the Massachusetts Institute of Technology concludes that "China's military preparations for potential conflict over Taiwan have focused on delaying or slowing the deployment of U.S. forces to the theater and potentially frustrating U.S. military operations around the island if a conflict erupts."[6]

According to such views, China seeks to "deter," "slow down," "disrupt," and "complicate" the *deployment* of American assets to the theater of operation rather than to engage them in combat. China's investment in such systems as naval mines, electronic-warfare capabilities, and antisatellite weapons are given as the evidence. Notably, some works go farther, claiming China's investment in conventional assets like submarines, aircraft, and missiles as evidence for a commitment to access denial. For example, according to a widely published retired U.S. Navy admiral, "The critical aspects of a new navy and the highly significant

* "PLA," or the People's Liberation Army, refers in this article to China's military in general, rather than its army branch alone. The army service is designated here the "PLA Army," the navy the "People's Liberation Army Navy," or PLAN, and the air force the "People's Liberation Army Air Force," or PLAAF. The Second Artillery is a quasi service responsible for land-based nuclear and conventional ballistic and cruise missiles.

synergies that may develop between it and the missile and air forces warrant full attention, because they are directed specifically at deterring, delaying, or complicating timely and effective U.S. access and intervention."[7]

The access-denial approach thus sees China's strategy as indirect, defensive, limited in scope and effect, and—owing to its putative reliance on disruptive technologies and conventional assets deliberately reconfigured for disruptive missions—inherently suboptimal compared to a conventional military campaign, which, this view assumes, will remain beyond China's means for some time. Most pointedly, a recent and highly influential RAND report on China's strategy concludes that "the possibility that the Chinese People's Liberation Army (PLA) might employ antiaccess measures in a conflict with the United States is the product of the PLA's view of the nature of modern war, its awareness of China's military weaknesses, and its recognition of U.S. military superiority."[8]

Nevertheless, evidence suggests that China's emerging strategy is actually much more ambitious, direct, and therefore dangerous for the United States. The access-denial assumption largely overlooks what I believe to be the most salient, but revolutionary, developments in the Chinese military—the wide proliferation of long-range ballistic and cruise-missile technologies and the convergence of Chinese military power around a missile-centric, rather than the conventional platform-centric, model of mass-firepower combat.

In analyzing these developments further, with particular attention to evidence of the missiles' technical capabilities and China's emerging C4ISR* architecture, it becomes clear that China's successes in missile technology have much more significant implications than previously thought. Rather than simply compiling a loose portfolio of individual disruptive capabilities, China is pursuing an ambitious program of military innovation in air and naval warfare geared toward not harassment but paralysis and destruction of the adversary's forces through a concerted campaign.

My thesis is not only that China's strategy is thus increasingly methodical but that, with its organizing missile-centric focus, it promises to transform *how* China's forces engage in combat in general, to supply them with previously unavailable military options against the United States, and to render irrelevant American superiority in a number of key areas. Since their first use in the 1996 Taiwan crisis, Chinese conventional missiles thus have gone from being militarily irrelevant spook weapons to highly accurate, flexible, and lethal modes of precise and concentrated firepower around which China's military strategy is increasingly converging. I argue that the impact of this change is significant

* Command, control, communications, computers, intelligence, surveillance, and reconnaissance. C2 and ISR are partial variations.

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enough that, absent a major effort to offset China's gains, the United States would no longer be able to win a regional air-naval war with China over Taiwan's status were it to occur.

This, of course, does not mean that China itches for a war or that in a cross-strait conflict it would prefer engaging the U.S. forces in a full-on military campaign rather than deterring them from intervening in the first place. In fact, the opposite is most likely true. However, even if China in fact prefers to deter the United States from intervening or to coerce withdrawal early on by imposing limited attrition, this does not lead us back to access denial. In reality, whether the United States intervened or not would be up to the United States, not China. China is realistic enough to understand that it would not be able to assure deterrence against the world's strongest power, with a security commitment to Taiwan, broad regional interests, and a reputation at stake. However, whereas the access-denial literature is strangely silent about what China plans to do if deterrence fails or once the delayed U.S. forces finally do arrive at its doorstep, evidence in China's weapon procurement and force structure suggests that its hopes of deterring American intervention in a Taiwan conflict altogether are underpinned by a capability not to delay and harass U.S. forces but to defeat and *destroy* them in a regional war. The purpose of my article is to assess this capability.

The remainder of the article is organized in the following fashion. The first section describes in some depth China's investment in a variety of missile technologies and the convergence of its conception of firepower combat around a missile-centric model. The second section discusses targeting and asset-coordination capabilities. The third and fourth sections strive to conceptualize China's operational performance on the battlefield and evaluate its potential for success against U.S. forces in a limited regional war. These sections address the novel combat options that missiles allow China, the mechanics of missile combat, and the level of threat it poses to the U.S. platform-centric forces. Specifically, the third section discusses operations against land-based and docked targets, the fourth—against moving targets at sea. The fifth section also assesses American missile defenses, from the perspective of Chinese missile capabilities and likely countermeasures against defenses. The concluding section offers policy considerations for the U.S. government and military.

CHINA'S FORCE STRUCTURE AND ITS IMPLICATIONS

Despite the prominent position U.S. government publications give to access denial, little in PLA doctrinal writings suggests that China is committed to a delaying or even a defensive strategy. As (paradoxically) admitted even by the cited RAND report, no term equivalent to "access denial" appears anywhere in Chinese military writings.[9] Quite to the contrary, Chinese doctrine emphasizes not

delaying or harassing tactics but a rapid and methodical offensive campaign aimed at first paralyzing and then annihilating the enemy as quickly as possible. It is true that the PLA doctrine discusses information and special-operations warfare and the like, but it never loses its offensive spirit, in that it clearly stipulates that contrary to what the access-denial approach argues, such operations would be a means rather than a goal and would be carried out "to produce the strategic and campaign superiority, creating conditions for *winning the decisive battle*" or "create favorable conditions for *the main force*."[10] The methodical nature of China's military doctrine is particularly striking in that it focuses not on delivering spread-out delaying attacks but on concentrating firepower against vital military targets. The bulk of Chinese military writings, including the 2008 China defense white paper, *The Science of Military Campaigns* (the primary doctrinal source for the PLA), and, unsurprisingly, *The Science of Second Artillery Campaigns,* focus on applying firepower efficiently and innovatively to achieve victory over the enemy's force as in a conventional military campaign, even if a limited one.[11] It is here that China's extensive investment in theater missile technologies takes root, and its staggering scope not only reinforces China's commitment to a missile-centric strategy but gives us important insights into the true ambitiousness of China's strategic and operational goals in a potential conflict with the United States.

Missiles are cheap, fast, expendable, risk no friendly casualties and, most importantly, are difficult to preempt. Moreover, they do not require air superiority to operate and offer a high, often even uninhibited, rate of defense penetration. China can thus use missiles not only to achieve strategic surprise but to dismember U.S. assets on the ground or at sea without putting its own hardware or personnel in harm's way. For this reason, missiles have permeated the PLA's doctrine for every important kind of operation, from denial to blockade, and the PLA officer corps views them more and more as *the* way to level the playing field against a superior adversary.

Hence, every type of theater missile China operates has seen substantial growth in numbers and improvement in lethality in the recent years, and these trends alone afford remarkable insight into China's apparent goals and priorities.[12] The Second Artillery's older DF-21 medium-range ballistic missile (MRBM) has an estimated maximum range of 2,150 km and a circular error probable (CEP) of seven hundred meters.[13] China has also begun the procurement of the much more potent DF-21A and, most recently, DF-21B. These missiles have an extended range of 2,500 km and are reported to use in-flight Global Positioning System (GPS) updates and a radar-correlation terminal-guidance system, which allows the DF-21A to achieve a CEP of fifty meters and the more accurate DF-21B one of a remarkable ten meters.[14] The DF-21/21A/21B missiles

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are carried by transporter-erector-launchers (TELs) and are capable of carrying unitary high-explosive (HE), submunition, chemical, nuclear, and electromagnetic-pulse (EMP) warheads.[15] The sheer number of these missiles has grown as well. The annual American report on China's military power put the number of DF-21/21As (CSS-5 Mod 1/2) at nineteen to twenty-three in 2005, forty to fifty in 2007, and eighty to ninety in 2010.[16] This means that since procurement started, the number of Chinese MRBMs has been increasing by ten or eleven missiles per year, with procurement still ongoing.

Although China is still a long way from matching the United States in military prowess across the board, its goal of defeating American forces in a limited theater war may well be within reach.

The Second Artillery has also built an inventory of hundreds of accurate, long-range land-attack cruise missiles (LACMs). China's HN-1/2/3 cruise missiles, launched from a variety of platforms, have ranges between six hundred and three thousand kilometers, and due to inertial and terminal TV guidance boast accuracies between fifteen to twenty meters for the HN-1 and a stunning five meters for the HN-2/3.[17]

The scope of operations now performed by the Second Artillery—which fields but one type of weapon, missiles—and its integration into the rest of the PLA are also remarkable. Although originally created as a nuclear command, the Second Artillery has been reorganized primarily for conventional strike, as most of the missiles it now operates are conventional ballistic missiles. Furthermore, using these missiles, it is now tasked with conducting many of the operations hitherto conducted only by aircraft and vessels in other services—including attacks against C4ISR targets, airfields, ports, logistics networks, and, soon, moving ships.[18]

To a similar extent, China's strategy for engaging U.S. aircraft carrier groups relies on missiles, as opposed to platforms. The original Congressional Research Service report cited above identifies, consistent with other analyses, the following as China's sea-denial threats to the United States: ballistic missiles (including those capable of attacking moving ships), advanced cruise missiles, land-based maritime attack aircraft, submarines, surface combatants, and naval mines.[19] Tellingly, every single one of these threats, save the last, relies on long-range antiship cruise missiles (ASCMs) to engage U.S. surface assets. To that end, over the past decade the PLAN has procured a large number of ASCMs, Russian-made and indigenous, specifically designed to attack U.S. carrier groups. Deployed to various platforms, these missiles are equipped with inertial guidance, in-flight GPS updates, and terminal radar guidance; they deliver HE warheads weighing from 165 to 513 kg. The most advanced missiles—the SS-N-22 Sunburn, on the *Sovremenny*-class destroyer, and the SS-N-27 Sizzler,

on the Kilo-class submarine—travel at supersonic speed and drop to just ten meters above the surface in the attack stage, making 10*g* maneuvers to evade defenses and attack at unexpected angles. Most critically, the vast majority of Chinese ASCMs are capable of ranges between 160 and 400 km, outranging the principal ASCM used by the United States and its allies, the RGM-84 Harpoon, by factors as large as 3.25.[20]

The most remarkable fact, though, is the extent to which ASCMs have pervaded the Chinese navy and naval aviation. The PLAN has fitted advanced ASCMs on four out of its five destroyer classes, two out of three frigate classes, five out of seven attack submarine classes, and just about every aircraft in its inventory, including the obsolete fighters and heavy bombers of 1960s vintage.[21] The PLAN is also heavily investing in fast attack craft (FACs), whose role appears to be exclusively that of dedicated missile platforms. The PLAN has fitted thirty-seven of its 190 older FACs with advanced ASCMs.[22] In 2004 it has introduced the Houbei/Type 022 class of ASCM-armed catamaran; as of the end of 2009, over sixty units were in service, with as many as a hundred expected by the end of the production run.[23]

In addition to standard LACMs and ASCMs, China has procured at least two types of advanced antiradiation missiles (ARMs). The first was an Israeli missile/drone, the IAI Harpy. Launched from a truck, the Harpy boasts a two-hundred-kilometer range and can loiter unnoticed for hours before identifying and striking a target either on land or at sea.[24] The second was the Russian Kh-31P, delivered by aircraft and boasting supersonic speed, a complex flight profile, a 110–200 km range, an eight-meter CEP, and the ability to attack targets on land, at sea, or in the air.[25]

Finally, China is on the cusp of deploying an additional capability for engaging moving U.S. carrier groups, again using missiles—the vaunted DF-21C ground-based antiship ballistic missile (ASBM), equipped with a maneuverable reentry vehicle (MaRV). The DF-21C, sometimes referred to as the DF-21D, DF-21E, or DF-25 depending on the source, has an estimated maximum range of 1,500 km. When fired at the target, the missile would deliver its reentry vehicle to the general vicinity of the carrier group, at which point a terminal-guidance suite—believed to be active-radar, infrared (IR), or laser—would seek the target and maneuver the reentry vehicle onto it at high hypersonic speed. Its maneuvers, carried out in a complex trajectory, are designed to guarantee penetration of antimissile defenses and then a hit.[26] The warhead type or types are unknown at this time but believed to be HE, armor-penetrator, submunition, or EMP. It appears that the missile went into production in 2010 and could be fielded as early as 2011. Extrapolating from the DF-21 yearly production cycles, we can expect to see ten or so new DF-21Cs deployed each year.[27] (See the table.)

CHINA'S THEATER MISSILES WITH RANGES OF 100 KM OR MORE

MISSILE	TYPE	LAUNCH PLATFORM	WARHEADS	RANGE	CEP
DF-21/21A/21B	MRBM	TEL	500 kg (DF-21), 600 kg (DF-21A/21B): HE, submunitions, EMP, nuclear, chemical	2,150 km (DF-21) 2,500 km (DF-21A/21B)	700 m (DF-21) 50 m (DF-21A) 10 m (DF-21B)
DF-21C	ASBM	TEL	n/k	1,500 km	5 m
DF-11/11A	SRBM	TEL	800 kg (DF-11), 500 kg (DF-11A): HE, submunitions, FAE, nuclear, chemical	280 km (DF-11) 350 km (DF-11A)	600 m (DF-11) 200 m or 20–30 m (DF-11A)
DF-15/15A	SRBM	TEL	500 kg: HE, submunitions, EMP, FAE, nuclear, chemical	600 km	300 m (DF-15) 10—30 m (DF-15A)
HN-1A/B, 2A/B, 3A/B	LACM	TEL, ship, submarine, aircraft	400 kg HE, submunitions	600—3,000 km	10 m (HN-1) 5 m (HN-2/3)
YJ-63	LACM	Aircraft	513 kg HE	100—200 km	n/k
Kh-31P	ARM	Aircraft	87 kg HE	110—200 km	8 m
IAI Harpy	ARM	TEL	100 kg HE	~200 km	n/k
SS-N-22 Sunburn	ASCM	Ship	320 kg HE	200—250 km	n/k
Kh-41 Moskit	ASCM	Aircraft	320 kg HE	250 km	n/k
SS-N-27 Sizzler	ASCM	Submarine	400 kg HE	300 km	n/k
YJ-6/61/62	ASCM	Aircraft	513 kg HE	110 km (YJ-6), 200 km (YJ-62)	n/k
YJ-2/83	ASCM	TEL, ship, submarine, aircraft	165 kg HE	120 km (YJ-2 TEL/ship/sub), 180 km (YJ-2 air), 160 km (YJ-83 TEL/ship/sub), 250 km (YJ-83 air)	n/k
YJ-91/12	ASCM	Aircraft	205 kg HE	400 km	n/k

Notes: FAE = fuel air explosive, i.e., incendiary. N/k = not known.

Sources: Lennox, ed., *Jane's Strategic Weapon Systems;* Saunders, ed., *Jane's Fighting Ships;* Fisher, *New Chinese Missiles Target the Greater Asian Region;* "Military: Chinese Missiles," GlobalSecurity.org; Lum, "China's Cruise Missile Programs," pp. 67-73.

It is illogical to consider that China, rigorously building up such fundamental advantages over the U.S. Navy as it is, is seeking merely to harass and slow down U.S. ships approaching Taiwan. Instead, China appears to be committed to securing the capability to win a regional-scale campaign against the U.S. Navy, and it appears to see transcending the platform-centric concept of naval warfare as the key to this goal.

In the end, China's overwhelming emphasis on missile technologies undermines the argument that it is merely pursuing access denial for two reasons. First, missiles are fundamentally destructive, rather than disruptive, weapons. Their wide proliferation within the PLA suggests a commitment to crippling the adversary's campaign effort and imposing maximum casualties on its forces, rather than merely impeding their deployment. In fact, it is likely that China would actually allow an adversary to mass its assets within striking distance, specifically to maximize the effectiveness of missile attacks. In either case, there is no reason to see the wiping out by missile strikes of a squadron of fighters at a forward operating base in Japan or Korea as merely disruptive and delaying rather than a conventional-battle goal of inflicting attrition on the adversary's assets, reducing its operational capability, and degrading its campaign effort while furthering one's own.

Second, China's missiles can target only forces that have already entered the theater. Only a few MRBMs and LACMs could strike land targets as far away as Guam, and none could target U.S. forces beyond the "second island chain."[28] Chinese ASCMs can attack targets at most four hundred kilometers from their launch platforms. As China's ability to operate those platforms—surface combatants, submarines, and aircraft—far from its shores remains limited and would be risky in any case, it would not be able to engage U.S. carrier groups until they were within hundreds of kilometers from Taiwan. Overall, China has procured close to a hundred MRBMs and hundreds of ARMs and LACMs, and it has armed nearly every boat, ship, submarine, and aircraft in its navy with supersonic ASCMs. Moreover, all these types of missiles above are highly effective against targets within the theater but are incapable of striking targets attempting to access it. In the end, then, it does not follow that China's primary strategy is access-denial or that its missiles somehow represent an extension of that strategy. Rather, its force structure and its weapon-procurement trends indicate strongly that China has instead maintained a commitment to the conventional aerospace/naval campaign, but revolutionized it by couching it in a missile-centric rather than platform-centric model of firepower combat. Moreover, as the destructive properties and the theaterwide (but clearly not transocean) ranges of China's missiles suggest, their advent points to a Chinese commitment to an energetic strategy of engaging and defeating an adversary directly in the theater, not merely delaying and disrupting its access, with uncertain options thereafter.

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However remarkable in itself the ongoing convergence of China's strategy around missile-centric concepts is, even more disturbing is the fact that theater missiles are showing real potential to expose the heretofore well-shielded weaknesses of U.S. expeditionary forces, including long forward-deployment times, the exposed state of equipment at forward operating bases, and the obsolescence of ASCMs carried by surface combatants. Furthermore, China's missiles, supported by recent strides in C4ISR, promise to provide the country with transformative options, long coveted but previously unavailable, that would offset or even render irrelevant American superiority in several key areas, including air defense and integrated naval warfare.

The fact that stationary targets are vulnerable to surprise air strikes has been apparent since even before Pearl Harbor. Nevertheless, in the recent decades it would have been nearly impossible for a regional adversary to carry out a successful air raid against a U.S. force assembling on the adversary's borders, due to constant American satellite surveillance of enemy forces, considerable flight distances involved, nonexistent or insufficient tanker support, formidable allied air defenses, and the marked superiority of U.S. fighters.

But China's conventional MRBM, LACM, and ARM technology allows it to attack U.S. forces not only with great precision and flexibility but with expendable airframes fired from safe distances, thereby overcoming the once-decisive limitations of Chinese aircraft. First, unlike aircraft, ballistic missiles are launched from mobile, widely dispersed, inconspicuous, and easily hidden or disguised TELs, which are nearly impossible to identify and track;[29] therefore, they do not betray their user's intent as they take their firing positions. In addition, because ballistic-missile flight times are no longer than several minutes, their launch would not provide sufficient warning for the aircraft to clear the tarmac. Second, again unlike aircraft, ballistic missiles do not need air superiority to operate and would be unaffected by screens of American or allied defensive fighters below them. Third, because MRBMs reenter the atmosphere at hypersonic speeds, there are currently no viable defenses against them and, as I argue below, there will not be in the near future. This ultimately means that if they are as accurate as analysts believe, their ability to destroy any stationary target identified by Chinese ISR assets, no matter how valuable to the United States, is all but assured.

The Chinese ability to threaten moving ships is equally remarkable. The vulnerability of U.S. surface assets to ASCMs has been evident for some time. Today, China's maritime strategy—acquiring missile technologies for which the U.S. surface assets simply have no effective defenses, integrating them into every combat arm of its navy, and developing the capabilities for C2 and ISR necessary to sustain concentrated missile raids against U.S. carrier groups—is doing for

the ASCM what blitzkrieg did for the tank. Rather than simply integrating a powerful weapon into existing doctrine and force structure, China has refined its doctrine and constructed a force structure in support of a weapon in order to fundamentally redefine that weapon's potential.

The unprecedented adaptation of ballistic missiles for antiship operations is equally transformative. Given its 1,500 km range and a flight time measured in minutes, China's revolutionary DF-21C ASBM not only offers its launcher virtual impunity from counterattack but represents potentially the most robust strike option currently possible. The speed, flexibility, range, and launcher survivability of the ASBM cannot be matched by any other weapon, and as will be seen, antiair warfare (AAW) and missile defenses and preemption would be of little use against it.

FINDING AND TARGETING U.S. FORCES

The most important question for many in considering the PLA's missile threat is whether China has the C4ISR architecture necessary to find and target U.S. forces. I argue that in just the past five years China has achieved a sufficient proficiency in this domain to manage a successful missile campaign.

China has deployed sky-wave and surface-wave over-the-horizon (OTH) radars in recent years, offering constant coverage as far out as three thousand kilometers within a field of view of sixty degrees. If, as is likely, China has built more than one site, it could have uninterrupted radar coverage of all the surrounding seas. These assets would be instrumental in locating and tracking U.S. surface forces within the theater. Although the radars are large systems, their locations might be unknown to the approaching force.

China's space-based ISR capabilities have grown exponentially in the past several years. As of November 2010, China has thirty optical, synthetic aperture radar (SAR), IR, and multispectral intelligence satellites in orbit. The PLA also operates three JianBing 3 and twelve YaoGan surveillance satellites, and several additional YaoGan platforms are expected in orbit each year. The JianBing 3 platforms offer optical and IR imagery with a resolution under two meters. In the more advanced YaoGan program, seven satellites are believed to be electro-optical, offering resolution of 0.6 to one meter;[30] five are believed to be SAR satellites, capable of all-weather imaging with five-meter resolution.[31]

China also operates a considerable number of less capable observation satellites producing optical, SAR, IR, multispectral, and hyperspectral imagery that is likely used for military intelligence as well as its primary civilian purposes.[32] These platforms include two CBERS/ZiYuan earth-observation satellites, two HuanJing and three ShiYan environment-observation satellites, three HaiYang maritime-surveillance satellites, three FengYun and one Chuangxin meteorological

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satellites, the Beijing-1 resources-observation satellite, and finally TianHui, a high-resolution (approximately five meters) mapping satellite.[33] To facilitate the relay of intelligence, China launched in 2008 a TianLian 1-01 data-relay satellite, offering near-real-time communication and coverage of 50 percent of the globe. The successor program, TianLian 2, envisions two satellites and 85 percent global coverage in this decade.[34]

According to an analysis by Eric Hagt and Matthew Durnin published in these pages in 2009, assuming a then-accurate total of twenty-two satellites with an off-nadir (i.e., side-to-side) field of view of sixty degrees, China could ensure that each area was revisited by a satellite every forty-five minutes, on average.[35] This would be sufficient to monitor stationary concentrations of aircraft and ships at regional bases. Also, the space-based ISR architecture may already be able to locate and track moving carrier groups, especially when combined with other ISR assets. Hagt and Durnin deemed the forty-five-minute revisit rate insufficient for tracking carriers continuously with space-based assets.[36] However, extrapolating from their study, having thirty satellites in orbit would reduce that interval to thirty or thirty-five minutes. Furthermore, the Hagt-Durnin model somewhat plays down the importance of other facets of China's ISR assets and their ability to overlay and complement each other. Significantly, a carrier group, once its general location has been detected by a certain ISR asset, does not need to be tracked by the same asset. General coordinates from the OTH radar or a satellite could be passed to a nearby submarine or to aircraft that would close in on the carrier to engage it or continue tracking it.

In addition to ocean-bottom sonar beds, China operates fifty-five submarines, all of which could assist with carrier detection and tracking. The boats of the relatively old and noisy Romeo and Ming classes would likely lie in wait with their engines stopped, serving as listening posts. Newer, quieter submarines would likely be able to track U.S. surface assets while shadowing them undetected. Many observers have pointed out the likelihood that China would fit a number of inconspicuous civilian vessels, such as fishing boats, with equipment to detect U.S. carrier groups and relay their locations. Finally, China would call on its surface combatants and maritime reconnaissance aircraft to assist in locating and tracking U.S. surface assets. In fact, China's Gaoxin Project is developing seven specialized variants of the indigenous Y-8 cargo aircraft, with versions specializing in electronic and signal intelligence collection, communication and data relay, and electronic warfare, all useful against American air and naval assets in the theater.[37]

China is also proficient in remote-communication technologies, which would be essential for coordinating assets in a high-intensity campaign. It

operates four dedicated military communications satellites: three FengHuo vehicles and the DongFangHong-4, launched in 2010.[38] Also, it has access to a number of commercial communication satellites, like Sinosat. China has also bolstered its AWACS* capability and is continuing to push for greater airborne C2 capability. The PLAAF has added four Y-8 early-warning planes and at least four A-50 Mainstay AWACS aircraft to its force in the recent years.[39] It is working on the KJ-200 and KJ-2000 projects, based on the Y-8 and A-50 platforms, respectively.[40]

Even more strikingly, China appears to be pursuing naval asset integration through Aegis-like technology. The first two ships of the PLAN's latest destroyer class, Luyang II, are designed as China's first ships capable of integrated air defense. The ships are equipped with the Tombstone phased-array radar with 360-degree coverage, a C2 suite, and state-of-the-art SA-N-20 AAW missiles, which more than double the range of the current PLAN air defenses and represent a leap toward correcting the PLAN's perennial weakness in this area of warfare.[41] Experts expect the new naval assets to make use of Russia's advanced AT2M data-link technology (analogous to NATO's Link 16), which should contribute to the integration of Chinese naval task forces.[42] The advent of the Luyang II class and PLAN integration not only increases the air-defense capabilities of Chinese surface combatants but allows them to be organized into battle groups. Self-sufficient, integrated battle groups operating phased-array radars could not only help track U.S. assets more efficiently but coordinate and concentrate their missile firepower, in support of one of the major tenets of China's missile strategy.

Every type of theater missile China operates has seen substantial growth in numbers and improvement in lethality in the recent years.

Finally, China is now capable of supplying navigation, positioning, and crucially, missile guidance systems through indigenous technology. China completed its first BeiDou 1 navigation constellation between 2000 and 2007, covering China and the immediate region; of the original four satellites, three are still active.[43] BeiDou 1's successor, BeiDou 2, or Compass, is China's own global positioning system; it has both civil and military applications, comparable to GPS, GLONASS, and Galileo. It has already launched the first five Compass satellites, offering coverage of most of the region.[44] China plans to extend the constellation to a total of ten satellites by 2012, achieving coverage of all of Asia, and to a complete network of thirty-five satellites, for global coverage, by 2020.[45] Many of China's extremely long-range ASCMs currently rely on GPS

* Airborne Warning and Control System.

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updates for guidance; should the United States jeopardize China's access to GPS during hostilities, China is already able to exercise the same capabilities with its current Compass structure.

This wealth of development in the recent years—the deployment of thirty military and dual-use intelligence satellites, a strong all-weather capability, OTH radars, sonar beds, and a large number of ISR-capable ships, submarines, and aircraft—has greatly illuminated China's "strategic view" and allows it to locate, track, and target U.S. assets on land and at sea much more easily. The PLA's impressive leap in integrated air defense reveals that technologically and operationally, the PLA is already capable of targeting U.S. assets in the theater. Hagt and Durnin suggest that by 2014 China would be able to locate and track U.S. carrier groups with its space-based ISR alone.[46] As additional technology comes on line—with a new satellite launch every several months—China's already sufficient ability to conduct coordinated air-naval operations and missile strikes is becoming stronger, which, together with the lethality of its ordnance, presents the loss-averse American assets with a powerful challenge.

ATTACKING LAND-BASED TARGETS

Consistent with its doctrine, China is likely to give priority to attacks on C4ISR assets, in order to paralyze American operations. This would include striking radars (with MRBMs, LACMs, or ARMs) and C2 centers (with MRBMs armed with earth-penetrating warheads). Importantly, this target set would also include AWACS and ISR aircraft on the ground; these aircraft are large and conspicuous enough to be easily visible and vulnerable to most elements of China's missile architecture.

Most attacks, however, would undoubtedly be concentrated against groups of unsheltered fighters on the ground. In Operations DESERT STORM, ALLIED SHIELD (the Kosovo campaign), and IRAQI FREEDOM, U.S.-led coalitions used 2,400, 1,055, and 1,801 aircraft, respectively, nearly all of them deployed directly to the theaters of operation.[47] During DESERT STORM, for example, coalition forces deployed 2,400 aircraft, of which seven hundred were land-based fighters.[48] The land-based fighters were deployed mostly to Saudi Arabia, at an average deployment rate of fifteen fighters per day and with an average concentration density of thirty-four aircraft per airfield.[49] In the two months between the start of deployment to the theater and the commencement of combat operations, these aircraft remained parked in open areas, their personnel housed in sprawling tent cities nearby.

A prominent 1999 RAND study of the vulnerabilities to missile strikes of assets and personnel so deployed found that given typical hardstand spacing, a ballistic missile with a five-hundred-kilogram unitary warhead could in a direct

hit destroy six fighters the size of F-15s.[50] More disturbingly, the study also reported that if the unitary warhead were replaced by a submunition dispenser containing 825 steel balls, the lethal area of the same missile would increase eightfold. A single missile covering such an area, according to the RAND authors, would thus be able to destroy eighty-two F-15-sized aircraft, or more than an entire air wing.[51]

Ten years later, in 2009, another RAND study, modeling attacks by short-range ballistic missiles (SRBMs) on all parking ramps of all ten of Taiwan's air bases, concluded that assuming warheads with eight hundred submunitions each and to a large extent regardless of CEP, a mere two missiles would be required to achieve a 90 percent chance of destroying all aircraft on a given ramp, or only one missile for a 70–80 percent chance. Given the overlap between hardstands, this would translate to needing from twenty-four to thirty-six missiles to clear all parking ramps on all ten bases.[52]

In the last decade, China has in fact adopted a submunition warhead for SRBM and MRBM delivery, unquestionably with this very mission in mind. Although its parameters are not known, it is most probable that the warhead uses a large number (in the hundreds) of steel balls or shards. If this is so, China very likely possesses an MRBM operational capability with ordnance lethal area and accuracy on a par with, or better than, that hypothesized in the studies above.[53] This means that if the United States were to deploy 340 fighters, with associated support aircraft, to ten forward operating bases, China could potentially destroy them all with as few as twenty DF-21/DF-21As, or only two missiles for each base.[54]

Missile attacks against individual aircraft shelters, in bases that possessed them, would be prohibitively costly. However, such bases would remain China's strategic priority, as the United States is likely to deploy its most capable fighters, including the F-22, to them. For these targets China would likely use MRBMs to cut runways, trapping the fighters; continue the attack with LACMs and ARMs against radars, surface-to-air missiles (SAMs), and other critical infrastructure; and then follow up with aircraft strikes targeting individual shelters by using much cheaper precision-guided munitions. The 2009 RAND model suggests that two missiles with CEPs of eighty-two feet (about twenty-five meters) carrying warheads with eighty-two earth-penetrator submunitions each would render a single runway inoperable with a 70 percent probability.[55] Notably, China could strike bases just outside the usual reach of its SRBMs—including those on Okinawa and Kyushu and in South Korea—by using lighter warheads on its numerous DF-15A SRBMs, thereby extending their range. An even easier solution would be to send SRBMs on boost-glide, or depressed, trajectories, which would increase their range by as much as 31.2 percent.[56]

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Chinese missiles would also pose a significant threat to U.S. ships entering ports around the region. The United States maintains a carrier group on continual patrol in the western Pacific, homeporting the USS *George Washington* strike group in Yokosuka, Japan, as part of that rotation.[57] The *George Washington* group remains in port about six months out of the year and is on patrol for the other six.[58] Even on patrol, it must periodically enter port for replenishment, maintenance, and other purposes. These requirements, in addition to potentially having to enter port to repair battle damage, would also apply to any additional carrier groups that the United States would maintain in the theater for a prolonged period of time, giving China's missiles a periodic set of lucrative, stationary targets that could be attacked with not only ASBMs and ASCMs but, every time the ships enter into dock, standard MRBMs and LACMs as well.

Finally, China could use missile strikes against vulnerable U.S. logistics networks. Each forward-deployed combat aircraft, such as an F-15C, requires about 133 tons, or three C-17 loads, of ammunition, force protection equipment, vehicles, personnel, and the like. According to one Chinese analyst, each F-15C consumes almost seventeen tons of fuel per day.[59] If supporting C2 and ISR aircraft are deployed with the fighters, the requirement for fuel rises substantially. As U.S. aircraft initially deploy with supplies for only two to five days, they rely thereafter on continuous airlift and sealift.[60] The dependence of American carrier groups on replenishment, particularly in fuel, is even more extensive. A single strike group requires sixty thousand tons of fuel and thirty thousand of aviation fuel every five days.[61] Although transport aircraft on the ground and supply ships in port could themselves be targeted, China might instead go for more lucrative repositories. Since most fuel, ammunition, and other equipment have to be stored in depots too large to be hardened, LACM attacks using standard HE warheads would imperil U.S. operations even if military platforms and transport vessels remained intact.

ATTACKING SEA-BASED TARGETS

The consensus in the American maritime-security literature and apparently the U.S. Navy itself is that its surface assets have no reliable defenses against Chinese- or Russian-made state-of-the-art ASCMs.[62] Because of the missiles' low flight profiles, brief flight times (twenty-five to thirty-five seconds), and resilience to electronic-warfare attack, they are difficult to track and either intercept or jam in flight.[63] Specifically, because they drop to only several meters above the water in the final stage of flight, they would effectively slip below not only the U.S. carrier radars but the minimum vertical range of AAW missiles. What is more, these missiles close in for the attack at supersonic speeds, and, as noted above, often make 10*g* turns to evade defenses and attack from unexpected angles.[64] This makes them

virtually impossible to intercept with AAW missiles. The only other shipborne system that the U.S. surface combatants could employ against them is the Vulcan Phalanx close-in radar-guided gun; however, its radar guidance is starkly insufficient for tracking and engaging objects performing evasive maneuvers at supersonic speeds.[65] Finally, although ASCMs like the Sunburn were once too short legged to engage U.S. ships, significant increases in their ranges over the past several years have effaced this reassurance. Furthermore, as already argued, range disparity allows the PLAN to target American assets from well outside the range of U.S. carrier groups' own ASCMs.

Observers believe China is developing the capacity to capitalize on this acute vulnerability by means of saturation missile raids launched simultaneously from a variety of platforms on, below, and above the sea surface, with intervals between launches on the order of only seconds to minutes.[66] Granted, it is unlikely that China would be able to synchronize simultaneous attacks by forces hundreds of kilometers apart for some time to come. However, given its proficiency in C2, satellite communications, and data relay, as well as theaterwide coverage provided by its OTH radars, sonar beds, and possibly disguised merchant vessels, China very likely is now capable of massing volleys from individual fighting squads, such as aircraft or surface-combatant strike groups, all of whose platforms can be cued to the target's location by the same C2 center. The PLAN believes—and, it appears, quite correctly—that if it can mount such attacks with adequate proficiency, the sheer number of missiles attacking from diverse azimuths in massed, sustained waves, even if not synchronized, would inevitably saturate American defenses and take a heavy toll on the exposed ships, which, reeling under the onslaught, would be unable to retaliate in kind. China's commitment to such a strategy is evident in its development of a force structure —including aircraft, submarines, surface combatants, and FACs—able to deliver ASCMs from multiple axes. The total number of missile carriers in the PLAN, multiplied by the number of missiles each carries, is truly formidable and, with the introduction of new vessels each year, is shifting the naval balance decidedly in China's favor.

The PLAN operates over seven hundred maritime strike aircraft, most already fitted with between two and four ASCMs or Kh-31P ARMs.[67] PLA doctrine describes aircraft as having advantages in ASCM delivery, in that they are fast, versatile, and highly mobile.[68] Furthermore, aircraft are safe from U.S. submarines and antiship weapons and, unlike other assets, they can be detected only by radar, and with no guarantee of that at low altitudes.[69] Finally, the ranges of air-launched ASCMs tend to be longer than those of their ship-, submarine-, and ground-launched counterparts. All this makes aircraft an effective and dangerous launching platform.

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Due to their inherent ability to go undetected anywhere in the theater, submarines are another leg of China's antisurface force structure. The PLAN operates twenty-nine submarines equipped with advanced ASCMs, each usually carrying eight missiles, with new units added each year.[70] Although more difficult to coordinate than surface combatant or aircraft strike groups, significantly slower than other assets, and, by virtue of operating alone, offering much smaller concentrations of missiles, submarines are currently China's stealthiest platform for antisurface warfare.[71] The deterioration of U.S. antisubmarine warfare capabilities since the end of the Cold War, China's marked numerical advantage in the theater, and the western Pacific's maritime topography's adverseness for submarine detection would make ASCM attacks by PLAN submarines a threat throughout a campaign even with extensive American antisubmarine warfare assets present.[72]

The PLAN also operates thirteen destroyers and twenty-two frigates equipped with ASCMs.[73] Although they lack the speed of aircraft and the stealth of submarines, they carry the most missiles, eight to sixteen per destroyer and four to eight per frigate.[74] Furthermore, China would likely organize its surface combatants into battle groups, each coordinated by a Luyang II–class destroyer, allowing concentration of firepower and AAW capabilities. Although coordination of synchronous missile volleys from widely separated assets may remain beyond China's means for some time, the integration capabilities of the Luyang II ships would already allow China to launch synchronized mass volleys from all surface combatants within each battle group led by a Luyang II.

Last but not least is the PLAN's rapidly growing FAC fleet. These vessels are small, stealthy, fast, and maneuverable, making them difficult targets. What's more, each craft carries four to eight ASCMs—the same armament as many of the PLAN's fleet ships. Perhaps their most important characteristic, though, is that given their low cost relative to that of surface combatants and submarines, they can be deployed in much larger numbers—it appears that as many as a hundred are planned by early next decade.[75] These factors not only make this modern-day "mosquito fleet" particularly well suited for executing mass ASCM strikes, but lessen the impact of the loss of any one craft, rendering any exchange of casualties with U.S. surface combatants inherently favorable to the PLAN. Although FACs themselves are limited to coastal areas, the long range of their ASCMs enables them to engage surface combatants five to six hundred kilometers to sea, putting U.S. ships within striking distance of China's territory at very significant risk.

Another weapon that warrants discussion is, of course, the DF-21C ASBM, which should see deployment beginning in 2011. Although due to ASBM cost and limited inventory, it is unlikely that China would use them in barrages, they

have remarkable capability nonetheless. The missiles are launched from inconspicuous TELs on land, cover their entire 1,500 km range in seventeen minutes, accurately maneuver onto their target within a wide radius, and—even with forced reduction of reentry speed, but provided accurate targeting—strike their targets at high hypersonic speed. The reentry vehicle entering at such velocity would be immune to shipborne AAW and close-in gun defenses. Moreover, as the next section discusses, because of standard countermeasures in the midcourse phase and complex reentry maneuvers, ASBMs also could not be intercepted by U.S. missile defenses. Maneuvering to get out of the missile's seeker would also likely prove ineffective. According to a 2010 analysis in this quarterly, it would take approximately thirty-five minutes from the detection of the target for the PLA to communicate its location to a relevant C2 center, issue an engagement order (with no delay assumed) to the launcher, and fire the ASBM, and for the missile to travel its full range. During these thirty-five minutes the carrier group could travel thirty-one kilometers, making a circle with a radius of thirty-one kilometers the missile's area of uncertainty and therefore the required seeker footprint for a single missile to find the target.[76] Although no authoritative data on the DF-21C's seeker footprint exist in the open literature, Chinese sources suggest twenty-, forty-, and hundred-kilometer footprints.[77] Given the missiles' high cost, it is unlikely that China would opt for an overly narrow footprint, making a hundred, or perhaps forty, kilometers more credible than twenty. Hence, chances are that each individual ASBM would be able to find its target and, once it does, achieve a virtually assured hit.

The U.S. Navy, as noted, has been aware of the difficulty of defending against ASCMs for some time. To this concern have been added those about ASBMs in recent years. For this reason, the American operational concept against antiship missiles has, since the late Cold War, stressed "killing the archer rather than his arrows."[78] The U.S. fleet's ability to kill arrows will remain dismal for some time to come. However, the most fundamental asymmetry represented by China's ASCMs and ASBMs is an ability to keep the archer himself well out of reach.

The SM-2 and Sea Sparrow AAW missiles have ranges of less than 170 km, and the subsonic Harpoon ASCM has a range of only 130 km.[79] On the other hand, to use just a few examples, the Sunburn has a range of 250 km, allowing the *Sovremenny*-class destroyer to attack American assets 120 km before it would come into range of surface-launched Harpoon missiles.[80] Similarly, the range of the air-launched YJ-91 is four hundred kilometers, which allows its vector, the Su-30MK2 fighter, to release the missile and safely turn back some 230 km before it could come into the range of ship-launched American AAW missiles.[81] The DF-21C has a range of 1,500 km, keeping its launcher beyond U.S. carrier groups' radar coverage.

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The U.S. Navy's ability to kill the archer usually has traditionally resided in its ability to engage firing platforms with carrier-borne aircraft. However, when flight decks are damaged by missile strikes, launching and recovering aircraft becomes impossible. Here, too, China's launcher architecture allows it a number of robust options.

Chinese aircraft generally lack the range to engage the enemy or protect the PLAN's surface combatants beyond a thousand kilometers or so from China's coast. It is therefore unlikely that China would use its aircraft at longer ranges, where they would be vulnerable to American carrier-borne fighters. Past perhaps a thousand kilometers from its coast, China would most likely rely on submarine-launched ASCMs and submarine- and land-based ASBMs to paralyze carrier air before the carrier groups could be engaged safely by other assets. Not only would the Chinese submarines *consistently* be able to get within firing range of the U.S. carriers due to the factors outlined above, but they would typically remain too far away to be countertargeted before they escaped.

China is pursuing an ambitious program of military innovation in air and naval warfare geared not toward harassment but to paralysis and destruction of the adversary's forces through a concerted campaign.

Closer than a thousand kilometers from the coast, countertargeting would become even more difficult. The submarine and ASBM threats would remain equally persistent. Also, Chinese surface combatants and maritime strike aircraft now threatening the carriers not only would have their own antiair capability, but would be covered by several thousand land-based PLAN and PLAAF fighters, several hundred of them comparable or superior to U.S. carrier-borne fighters. Apart from the threat they would pose to the carriers themselves, their persistence would make attacking Chinese surface combatants and maritime strike aircraft with carrier-borne fighters all the more difficult. Within five hundred or so kilometers of China's coast, the U.S. forces would also be within the range of FAC-launched missiles. Finally, within two hundred kilometers carriers would be vulnerable to all of the above plus land-based S-300 SAM batteries.

In addition to all this, the U.S. naval and air forces would be unable to countertarget ballistic-missile launchers, including ASBM launchers, on land. The United States would be unable to rely extensively on airborne ISR platforms, as they are highly vulnerable to Chinese SAMs. This would force the Americans to depend largely on space-based reconnaissance. Optical satellites, however, have trouble penetrating cloud cover, which is perennial in southwest China. As China extensively employs sophisticated camouflage, concealment, and decoy techniques, many of its assets would be indistinguishable to radar, or even optical satellites or airborne ISR.[82] Lastly, and most importantly, Chinese TELs

would operate in densely populated areas, where, even if not hidden inside buildings or under bridges, they would need to be identified among vast numbers of civilian vehicles. For these reasons a dedicated RAND study that extensively models attacks against Chinese TELs with the most advanced existing and developmental American technology concludes that they would be nearly impossible to target, especially at long ranges.[83]

In the end, it would be remarkably difficult for U.S. carrier groups to count on destroying Chinese missile launchers with airpower, or by any other means, before their own flight decks were disabled. The United States would be forced to try to shoot down Chinese ASCMs after all—and no effective technology exists to do so effectively and consistently.

OVERCOMING THEATER MISSILE DEFENSES

To cope with the rising missile challenge in the past several decades, the United States has invested heavily in active missile defenses.[84] Unfortunately, the current and projected American strategies are unlikely to provide any reasonable measure of effectiveness against China's missiles. For its part, China has invested in a number of countermeasures specifically meant to foil U.S. missile defenses.

Currently the U.S. theater missile defense (TMD) architecture is designed to engage ballistic missiles in their midcourse and reentry phases. The chief system to strike down missiles in the midcourse stage is the sea-based SM-3 missile.[85] The principal systems to engage ballistic missiles in the reentry phase are the Terminal High Altitude Area Defense (THAAD), for the "upper tier" of the atmosphere, and the PAC-3 SAMs and Navy's SM-2 Block IV SAM, for the lower tier.[86] However, even this multilayered defense network has serious, and probably insurmountable, limitations in terms of simultaneous-engagement volume, available interceptor inventories, and interceptor performance.

The first limitation is on the number of targets that it can realistically engage within a single time window. As no interceptor would have better than an 80 percent chance of success even under ideal conditions, it is almost certain that two interceptors would have to be fired per target. However, one "target" does not mean one *missile.* It is common for modern ballistic missiles to release chaff or from five to ten decoys, indistinguishable from the warhead to TMD sensors, during the midcourse phase.[87] The PLA also discusses firing previously decommissioned obsolete missiles, less accurate or capable armed weapons (some releasing their own decoys), and even cheaper SRBMs as "bait" for interceptors. Thus a volley of ten missiles could produce from fifty to a hundred targets, aside from chaff. The TMD system would be forced either to select targets randomly or to attempt to engage them all. Since the vast majority of the targets would be decoys, the former would offer an impracticably low probability of picking out

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the true warheads; the latter would exhaust the interceptor launch capacity at once. Either way, the TMD system would allow unengaged targets, many of them presumably warheads, to penetrate to their targets. Notably, whereas decoys would burn up during reentry, decommissioned or otherwise low-capability missiles would survive and continue acting as decoys against reentry-phase defenses. For these reasons, the PLA feels confident of its ability to saturate the defense in this way in each launch window.[88]

The second major limitation of the TMD is in interceptor inventory. For example, the United States is currently planning to procure 329 SM-3 missiles, tasked with midcourse stage interception, for its entire navy.[89] Because two interceptors would most likely be fired per target, that entire *inventory* might intercept at most 160 or so targets. However, it is fallacious to assume an exchange based merely on respective ballistic-missile and interceptor inventories. Factoring in decoys released in the midcourse stage, 160 targets could correspond to as few as sixteen to thirty-two actual missiles. If decommissioned missiles and the like are added, the number of high-value airframes the Chinese would need to deplete the entire SM-3 inventory falls even lower. Other interceptor systems are similarly limited in their inventories. This means that a number of concerted volleys of low-value missiles containing just several capable missiles, especially if equipped with decoys, would inevitably deplete the entire TMD inventory, let alone the fraction of it deployed to the theater.

The third limitation of the TMD lies in the doubtfulness of its interceptor capabilities. Few realistic data exist. For example, the SM-3 missile-based architecture has demonstrated sixteen successful intercepts in twenty attempts.[90] However, a prominent analysis suggests test conditions (which provide the basis for developers' claims) tend to be far from what the missiles would deal with in a real combat scenario.[91] What is more, the deployed systems are strictly limited in the kinds of targets they can intercept at all. Notably, the PAC-3 and SM-2 Block IV are designed for SRBM interception but would be ineffective against longer-range ballistic missiles, due to the targets' higher reentry speeds. The speed of a PAC-3 interceptor, the faster of the two, is only 2.5 kilometers per second, allowing it to intercept only missiles with ranges no longer than 1,500 km.[92] Indeed, U.S. forces deployed to the theater would be within 1,500 km of China's launch points. But the Chinese could respond by simply sending MRBMs on lofted trajectories, traveling the same horizontal distance but descending at much higher velocities and so easily outrunning lower-tier defenses. Also, although THAAD, PAC-3, and SM-2 Block IV missiles can engage objects descending on set trajectories, they cannot chase down MaRVs descending in unpredictable trajectories at high hypersonic speeds.[93] Finally, all lower-tier defenses have IR seekers; simply enclosing reentry vehicles in cooled shrouds would throw them off.

Hence, none of the missile defense systems in development by the United States could provide effective protection from Chinese missiles. Moreover, because fielding additional missiles and developing additional countermeasures are always substantially easier and cheaper than expanding or enhancing missile defenses, this is not an imbalance that the United States could realistically hope to redress. This prospect ultimately gives China three options for dealing with American theater missile defense. First, it could attack campaign-relevant targets regardless of TMD. Using decoys, high reentry speeds, and penetration aids, China would likely be able to strike its preferred targets with MRBMs and ASBMs, accepting the risk of potentially losing a few missiles to interceptors. Second, in the unlikely event that U.S. defenses proved particularly effective in intercepting individual missiles, sustained high-volume missile volleys, possibly including decommissioned missiles, could consistently saturate them, allowing the majority of the missiles in each wave to leak through. Third, China might attempt to target the TMD architecture itself early in the campaign. Attacking PAC-3 batteries with MRBMs, THAAD TELs with ARMs, and TMD-capable ships with either ASBMs or ASCMs would significantly degrade the TMD architecture and greatly facilitate subsequent missile strikes against campaign-relevant targets.

SKIPPING A GENERATION: POLICY CONSIDERATIONS

What China is poised to achieve is truly remarkable and unprecedented in modern warfare. Within just a few years, China would acquire the capability to attack —accurately, rapidly, and with nearly complete assurance—U.S. forces on the ground anywhere in the East Asian theater, regardless of the air and missile defenses the United States could bring forward. Chinese forces would be able to conduct wide-scale naval operations against battle groups as far as 1,500 kilometers from the mainland while remaining safely out of range themselves. Hence, although China is still a long way from matching the United States in conventional military prowess or combat proficiency across the board, its goal of defeating American forces in a limited theater war may well be within reach. The consequences for American war planning of failure to give due consideration to the tremendous threat posed by the Chinese missiles and the stark inadequacy of current and anticipated U.S. defenses against them may prove disastrous in a combat scenario. If the United States wishes to maintain its ability to intervene in a militarized Taiwan scenario, it is imperative that it take the measures necessary to offset China's missile threat.

To begin with, it is quite clear that TMD defenses lack the speed, accuracy, firing rates, and total interceptor inventories to cope with large numbers of sophisticated missiles equipped with countermeasures and, soon, maneuverable

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reentry vehicles. Additional investment into TMD would therefore be counterproductive; the funds devoted to it should be shifted to more promising capabilities. For instance, much effort must be put into improving the active and passive defenses against supersonic projectiles. It is crucial that theoretical and practical research on real-life supersonic ASCM flight and attack profiles and on effective defenses against them be conducted. Future American AAW missile developments should focus on trading horizontal range for speed, maneuverability, and the low interception altitudes required against sea-skimming ASCMs maneuvering at supersonic speed. Also, much greater attention should be given to a wide range of passive defenses, including radio-frequency emission controls, deception emitters, obscurants, decoys, and jamming.[94]

The U.S. Navy needs to reinforce its efforts to develop much stronger offensive capabilities at much longer ranges. Although it has high hopes for the long-range electromagnetic rail gun, even its projected range of 370 km may not be sufficient for future needs, leaving the new generation of ASCMs just as relevant as ever.[95] Some currently fielded ASCMs already reach 550 km. If there is any offensive technology in which the United States needs to skip a generation, it is precisely in projectiles with very long range and high closing speed sustained by onboard propulsion—namely, advanced antiship cruise missiles.[96]

The U.S. Navy should also develop a much stronger antiship capability for its submarines. Although its carrier groups would remain outranged by the Chinese naval ASCMs and vulnerable to land-based ASBMs, American submarines would be immune to these threats and just as difficult for the Chinese to detect as Chinese submarines are for the United States to detect. Hence, by trading some of the Tomahawk LACMs carried by *Virginia*-class submarines for ASBMs, the U.S. Navy would enable its submarines to attack PLAN surface forces effectively and in relative safety, despite its ASCM range deficiency. Furthermore, the U.S. Navy should strongly consider increasing the number of submarines that it operates in the Pacific theater.

Similarly, the U.S. Air Force should consider developing a more flexible forward-deployment plan for a Taiwan contingency. Although it would not be able to cancel out the threat from Chinese ballistic missiles, it could mitigate the threat through greater dispersal, camouflage, concealment, and use of decoys. Scattering small groups of aircraft among many airfields, increasing the spacing between parked aircraft, disguising large C4ISR aircraft, and deploying decoys would greatly reduce American losses to individual missile hits. It would also be essential to maintain as many aircraft in the air or on strip alert as possible.

Finally, a much greater role should be given to intercontinental bomber strikes. Although China's SAM network would make the cost of sending nonstealth B-52s and B-1s into Chinese airspace prohibitive, the nineteen available

B-2s could replace many forward-deployed ground-attack aircraft. One of the major developments that makes placing greater emphasis on a bomber force particularly appealing is the advent of 250-pound small-diameter bombs (SDBs), GBU-39, and from 2013, GBU-53.[97] The fielding of SDBs allows U.S. bombers to more than double their bomb loads without reducing the effectiveness of each individual bomb. Hence, whereas in the past the B-2 could carry at most eighty five-hundred-pound bombs, it can now carry at least 216 SDBs.[98] Capitalizing on its ability to carry dozens of highly specific advanced munitions or over two hundred SDBs, the B-2 bomber would be able to take out exponentially more enemy targets, with substantially fewer sorties, than was possible in any of the previous U.S. air campaigns. Moreover, unlike forward-deployed strike aircraft, it would be completely invulnerable to Chinese MRBMs and LACMs, as well as, in all likelihood, Chinese air defenses.

Nevertheless, giving intercontinental bomber strikes a greater role would not make forward-deployed aircraft any safer. Hence, the final consideration for war planning is developing an intercontinental strike capability that would prevent the need to base aircraft within the range of Chinese missiles at all. In the end, although ambitious, this concept would have many advantages and might be the only option for truly defeating China's missile-centric strategy. To construct this capability, the United States should maintain its commitment to developing and procuring in sufficient numbers a new stealth bomber currently slated for introduction in 2018.[99] Assuming that the 2018 bomber would, like the B-2, be able to carry 216 SDBs, a total stealth-bomber fleet of fifty (i.e., thirty-one 2018 airframes and the nineteen existing B-2s) could deliver 10,800 precision-guided bombs *in a single mission*.[100] Given the maximum fighter air-to-ground loadout of between six and nine precision-guided bombs, this would be equal to the maximum payload carried by between four and six *hundred* fighters flying three sorties each from forward operating bases.[101] However, unlike the forward-based fighters, the long-range bomber force would not require air superiority, fighter cover, in-theater operational or logistical support, or any forward infrastructure vulnerable to theater missiles at all. The bombers would take off from Hawaii, Alaska, or the continental United States, refuel over the western Pacific, deliver their ordnance, and return home, refueling over the Pacific once more, all within from twenty-four to thirty-six hours. This operations concept would simplify the air campaign; offer tremendous savings in time, material, and logistical support; render irrelevant China's tactical missile threat to U.S. aircraft operating in the theater; and allow for offensive action in as little as forty-eight hours after a warning order. Equipped with currently available and upcoming munitions for attacks against stationary and moving targets, the bomber fleet would be able to target not only China's C4ISR, airfields, and parked aircraft but

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moving PLAN surface combatants and landing craft, in conjunction with submarines and carrier groups.[102] Such a concerted air-surface campaign against Chinese efforts in the Taiwan Strait would largely deny China the use of its missiles to either deter or defeat the American intervention force.

Nevertheless, developing effective technology and operational concepts to offset the threat posed by Chinese missiles will take resources and considerable time. Meanwhile, by 2015, nearly all aspects of China's formidable missile-centric strategy, including ASBMs, will have matured. For some time into the future, then, the United States and Taiwan might be left staring at a wide-open window of vulnerability. However, the scope of this vulnerability should prompt Washington not to avoid or deny the problem or to attempt to address it with current technology ill suited to the task but to come up with innovative solutions. To put the risk in poignant context, as of the last day of 2010 the seven-year-old Iraq war had claimed the lives of 4,748 American personnel, taking a deep psychological toll of the military and society alike.[103] It is frightful to think that in an armed conflict with China a single saturation missile strike against a U.S. aircraft carrier, if it sank the ship, would claim nearly five thousand lives within hours. Whatever the American geopolitical interests or stakes for East Asian stability, until this possibility is effaced or at least greatly reduced, China's missile developments should remain of high interest to American security analysts, military officers, and policy makers alike.

NOTES

1. See Robert S. Ross, "The 1996 Taiwan Strait Crisis: Lessons for the United States, China, and Taiwan," *Security Dialogue* 27, no. 4 (December 1996); John Garver, *Face Off: China, the United States, and Taiwan's Democratization* (Seattle: Univ. of Washington Press, 1997); Andrew Scobell, "Show of Force: Chinese Soldiers, Statesmen, and the 1995–1996 Taiwan Strait Crisis," *Political Science Quarterly* 115, no. 2 (Summer 2000), pp. 227–46; and Suisheng Zhao, *Across the Taiwan Strait: Mainland China, Taiwan, and the 1995–1996 Crisis* (New York: Routledge, 2000).

2. See, for example, Robert S. Ross, "Comparative Deterrence: The Taiwan Strait and the Korean Peninsula," in *New Directions in the Study of China's Foreign Policy,* ed. Alastair Iain Johnston and Robert S. Ross (Stanford, Calif.: Stanford Univ. Press, 2006); and Richard C. Bush and Michael E. O'Hanlon, *A War like No Other: The Truth about China's Challenge to America* (Hoboken, N.J.: Wiley, 2007).

3. For prominent works in this approach, see Eric A. McVadon, *Recent Trends in China's Military Modernization,* testimony before the U.S.-China Economic and Security Review Commission, Washington, D.C., 109th Cong., 1st sess., 15 September 2005, and "China's Maturing Navy," *Naval War College Review* 59, no. 2 (Spring 2006); Cortez A. Cooper III, *Chinese Military Modernization: Informationization, Conventional Missiles, and China's Air and Naval Forces,* testimony before the U.S.-China Economic and Security Review Commission, Washington, D.C., 109th Cong., 2nd sess., 16 March 2006, p. 3; Ronald O'Rourke, *China Naval Modernization: Implications for U.S. Navy Capabilities —Background and Issues for Congress*

(Washington, D.C.: Congressional Research Service [hereafter CRS], 2 June 2006), pp. 35–36; Roger Cliff et al., *Entering the Dragon's Lair: Chinese Antiaccess Strategies and Their Implications for the United States* (Santa Monica, Calif.: RAND, 2007); Andrew S. Erickson and Michael S. Chase, "PLA Navy Modernization: Preparing for 'Informatized' War at Sea," *China Brief* 8, no. 5 (29 February 2008), www.jamestown.org; M. Taylor Fravel, "China's Search for Military Power," *Washington Quarterly* 31, no. 3 (Summer 2008), pp. 125–41; and Office of the Secretary of Defense [hereafter OSD], *Annual Report to Congress: Military Power of the People's Republic of China* (Washington, D.C.: 2010) [reports in this series hereafter cited as *Military Power of the PRC* (year)].

4. OSD, *Military Power of the PRC* (2005), pp. 15–16.
5. O'Rourke, *China Naval Modernization* (2006), pp. 35–36.
6. Fravel, "China's Search for Military Power," p. 131.
7. McVadon, "China's Maturing Navy," p. 92.
8. Cliff et al., *Entering the Dragon's Lair,* p. xiv.
9. Ibid., p. 17.
10. For "strategic and campaign superiority," Wang Houqing and Zhang Xingye, eds., *Zhanyi Xue* [The Science of Military Campaigns] (Beijing: National Defense Univ. Press, 2000), chap. 6, p. 3 [emphasis mine], available (selected chapters, trans. Alastair Iain Johnston) at www.people.fas.harvard.edu/. For "favorable conditions," ibid., p. 39 [emphasis original].
11. Wang and Zhang, *Science of Military Campaigns; China's National Defense in 2008* (Beijing: Information Office of the State Council of the People's Republic of China, January 2009); Yu Jixun, *The Science of Second Artillery Campaigns* (Beijing: PLA Press, 2004).
12. Mark A. Stokes, *China's Strategic Modernization: Implications for the United States* (Carlisle, Pa.: Strategic Studies Institute, 1999); McVadon, *Recent Trends in China's Military Modernization;* National Intelligence Council, *Foreign Missile Developments and the Ballistic Missile Threat to the United States through 2015* (Washington, D.C.: December 2005); O'Rourke, *China Naval Modernization* (2006), and *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress* (Washington, D.C.: CRS, 23 December 2009); Richard Fisher, Jr., *New Chinese Missiles Target the Greater Asian Region* (Alexandria, Va.: International Assessment and Strategy Center, 24 July 2007); Wendell Minnick, "China Developing Anti-ship Ballistic Missiles," *Defense News,* 14 January 2008.
13. Duncan Lennox, ed., *Jane's Strategic Weapon Systems,* 51st ed. (Coulsdon, Surrey, U.K.: Jane's Information Group, 2010), s.v. "DF-21 (CSS-5)." The CEP is the distance from the target within which 50 percent of the weapons will hit. For a technical discussion of weapon-accuracy calculation, see Morris Drells, *Weaponeering: Conventional Weapons System Effectiveness* (Reston, Va.: U.S. Institute for Aeronautics and Astronautics, 2004), pp. 70–93.
14. Lennox, ed., *Jane's Strategic Weapon Systems,* s.v. "DF-21 (CSS-5)."
15. For a useful article about dedicated EMP devices, see Carlo Kopp, "The Electromagnetic Bomb: A Weapon of Electrical Mass Destruction," GlobalSecurity.org.
16. OSD, *Military Power of the PRC* (2005), p. 45; ibid. (2007), p. 42; ibid. (2009), p. 66; Andrew Scobell and Larry Wortzel, eds., *China's Growing Military Power: Perspectives on Security, Ballistic Missiles, and Conventional Capabilities* (Carlisle, Pa.: Strategic Studies Institute, 2002).
17. Lennox, ed., *Jane's Strategic Weapon Systems,* s.v. "HN-1/2/3"; Robert Hewson, ed., *Jane's Air-Launched Weapons* (Coulsdon, Surrey, U.K.: Jane's Information Group, 2005); "Military: Chinese Missiles," GlobalSecurity.org; Geoffrey T. Lum, "China's Cruise Missile Programs," *Military Review* 84, no. 1 (January/February 2004), pp. 67–73.
18. James C. Mulvenon and Andrew N. D. Yang, *The People's Liberation Army as Organization: Reference Volume v1.0* (Santa Monica, Calif.: RAND, 2002), pp. 34–35.
19. O'Rourke, *China Naval Modernization* (2006), p. 37.
20. The data on missiles are from Lennox, ed., *Jane's Strategic Weapon Systems;* Stephen

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Saunders, ed., *Jane's Fighting Ships,* 111th ed. (Coulsdon, Surrey, U.K.: Jane's Information Group, 2008–2009); "Military: Chinese Missiles"; Lum, "China's Cruise Missile Programs"; and David Tanks, *Assessing the Cruise Missile Puzzle: How Great a Defense Challenge?* (Cambridge, Mass.: Institute for Foreign Policy Analysis, October 2000).

21. Lennox, ed., Jane's *Strategic Weapon Systems;* Saunders, ed., *Jane's Fighting Ships;* James Hackett, ed., *The Military Balance 2010: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: International Institute for Strategic Studies, 2010).
22. O'Rourke, *China Naval Modernization* (2006), p. 21, and *China Naval Modernization* (2009), p. 14.
23. Ibid.
24. Lennox, ed., *Jane's Strategic Weapon Systems,* s.v. "IAI Harpy."
25. Ibid., s.v. "Kh-31P." Its ability to attack airborne targets would be used to attack carriers' early-warning planes.
26. Marshall Hoyler, "China's 'Antiaccess' Ballistic Missiles and U.S. Active Defense," *Naval War College Review* 63, no. 4 (Autumn 2010); Andrew S. Erickson and David D. Yang, "Using the Land to Control the Sea? Chinese Analysts Consider the Antiship Ballistic Missile," *Naval War College Review* 62, no. 4 (Autumn 2009); Eric Hagt and Matthew Durnin, "China's Antiship Ballistic Missile: Developments and Missing Links," *Naval War College Review* 62, no. 4 (Autumn 2009); Mark A. Stokes, *China's Evolving Conventional Strategic Strike Capability* (Arlington, Va.: Project 2049 Institute, 14 September 2009).
27. Hoyler, "China's 'Antiaccess' Ballistic Missiles and U.S. Active Defense," pp. 88–89.
28. The "second island chain" extends from the Kurils to Indonesia, running through Japan and the Bonin, Mariana, and Caroline island groups. See, among many sources, "Military: People's Liberation Navy—Offshore Defense," GlobalSecurity.org.
29. See, for example, Alan J. Vick et al., *Aerospace Operations against Elusive Ground Targets* (Santa Monica, Calif.: RAND, 2001).
30. Steven Silvio Pietrobon, "Chinese Launch Record (1964–Present)," *Small World Communications;* "China Launches Military Satellites YaoGan Weixing-10," NASAspaceflight.com; "China Launches YaoGan Weixing-10, Press Forward with Lunar and Station Goals," NASAspaceflight.com. The systems include *YaoGan 1* through *YaoGan 8;* three separate satellites, *YaoGan 9A, 9B,* and *9C;* and finally *YaoGan 10* and *YaoGan 11. YaoGan 1* seems to be no longer functioning, bringing the total down to twelve; "Yaogan 1 Erupts," *Arms Control Wonk,* 11 February 2010.
31. "YaoGan Weixing/Remote Sensing Satellites," Sinodefence.com.
32. Pietrobon, "Chinese Launch Record"; Gu Xingfa and Yu Tao, "China Earth Observation Satellite Program: Future Systems for Agricultural Monitoring," *GEO: Group on Earth Observations,* www.earthobservations.org/; Hagt and Durnin, "China's Antiship Ballistic Missile," pp. 99–100; "Space: China," GlobalSecurity.org.
33. "Space: Tian Hui-1," GlobalSecurity.org.
34. "TianLian 1 Data Relay Satellite System," Sinodefence.com; Yan Liang, "China Blasts Off First Data Relay Satellite," Xinhua, 25 April 2008, xinhua.news.xinhuanet.com/.
35. Hagt and Durnin, "China's Antiship Ballistic Missile," pp. 100–101.
36. Ibid., pp. 101–102.
37. "Aircraft: Gaoxin Project," Sinodefence.com.
38. "Space: Feng Huo-1 [FH-1]," GlobalSecurity.org; Pietrobon, "Chinese Launch Record."
39. Hackett, ed., *Military Balance 2010.*
40. Ibid.
41. Saunders, ed., *Jane's Fighting Ships*, s.vv. "Luzhou Class (Type 051C) (DDGHM)," "Luyang II Class (Type 051C) (DDGHM)"; OSD, *Military Power of the PRC* (2009), p. 49.
42. "Kanwa: PRC Accelerates Anti-carrier Operations Studies," *Kanwa Defense Review,* 21 September 2005, www.kanwa.com/, available at Foreign Broadcast Information Service [hereafter FBIS] CPP 200509211477.1_de610a20583ab35d.
43. "BeiDou 1 Experimental Satellite Navigation System," Sinodefence.com.

44. "China Successfully Launches Fifth Satellite for Its Own Global Navigation Network," Xinhua, 1 August 2010.
45. "The Construction of BeiDou Navigation System Steps into Important Stage: 'Three Steps' Development Guideline Clear and Certain" [in Chinese], *China National Space Administration,* 19 May 2010, www.BeiDou.gov.cn/.
46. Hagt and Durnin, "China's Antiship Ballistic Missile," p. 103.
47. See U.S. Government Accountability Office [hereafter GAO], *Operation Desert Storm: Evaluation of the Air Campaign,* GAO/NSIAD-97-134 (Washington, D.C.: June 1997), p. 13; *Operation Allied Force,* RAND Research Brief RB-72-AF (Santa Monica, Calif.: RAND, 2006), available at www.rand.org/; and T. Michael Moseley [Gen., USAF], *Operation Iraqi Freedom: By the Numbers* (Shaw Air Force Base, S.C.: U.S. Air Force Central, 30 April 2003), p. 6, available at GlobalSecurity.org.
48. GAO, *Operation Desert Storm,* p. 13.
49. Christopher J. Bowie, *The Anti-access Threat and Theater Air Bases* (Washington, D.C.: Center for Strategic and Budgetary Assessments, 2002), pp. 16–18.
50. John Stillion and David T. Orletsky, *Airbase Vulnerability to Conventional Cruise-Missile and Ballistic-Missile Attacks* (Santa Monica, Calif.: RAND, 1999), p. 14. Although the model assumes a direct hit, since the lethal area is estimated to be nine hundred feet, or approximately 274 meters, in diameter, the missile can miss by a considerable margin and still be able to cover a large target set.
51. Ibid.
52. David A. Shlapak et al., *A Question of Balance: Political Context and Military Aspects of the China-Taiwan Dispute* (Santa Monica, Calif.: RAND, 2009), pp. 37–44.
53. China's known inventory of cluster munitions includes a 500 kg fuel-air-explosive cluster bomb with three HE submunitions, a 360 kg antirunway cluster bomb with sixteen penetrator submunitions, and a 340 kg antitank cluster bomb with 189 steel-ball submunitions; China country profile in Hewson, ed., *Jane's Air-Launched Weapons*. The 600 kg warhead used by the DF-21A/21B could be a larger version of the antitank bomb. More likely, since much less impact is needed to destroy soft targets like aircraft, the DF-21A/21B warhead could be an all-new design, encompassing a larger number of smaller munitions. Even so, the total number of submunitions is likely to be smaller than the 825 stipulated in Stillion and Orletsky's model. However, judging from previous experience the United States would be unlikely to fit more than thirty-four fighters on a single forward operating base (see Bowie, *Anti-access Threat and Theater Air Bases,* pp. 17–18), chances are that one or two Chinese MRBMs equipped with a submunition warhead would have the coverage to destroy them all.
54. Realistically, of course, the United States could keep a portion of its aircraft in the air at all times, but keeping all in the air would be logistically impossible. Also, it could put some aircraft on strip alert, but with MRBM flight times measured in minutes, only a few aircraft would be able to clear the parking ramps/runways before the missiles struck. Similarly, stacking the aircraft on the runway so as to generate sorties faster under alert would also concentrate them for easy strikes, as Egypt experienced in the 1967 Arab-Israeli War, especially if the incoming MRBMs or LACMs were undetected.
55. Shlapak et al., *Question of Balance,* pp. 37–41.
56. Stokes, *China's Evolving Conventional Strategic Strike Capability,* p. 33. It should be noted that because SRBMs would be vulnerable to PAC-3 interceptors, their use against protected sites would likely be preceded by MRBM or ARM strikes against PAC-3 radars.
57. "Military: Carrier Strike Group (CSG)," GlobalSecurity.org.
58. "Military: Exercises: Navy," GlobalSecurity.org.
59. Jiang Lei, *Modern Strategy for Using the Inferior to Defeat the Superior* (Beijing: National Defense Univ. Press, 1997), pp. 113–14.
60. For supplies, Li Qingshan, *The RMA and High-Technology War* (Beijing: Military Science Press, 1995), pp. 189–90.
61. Jiang, *Modern Strategy,* pp. 113–14.
62. See, for example, GAO, *Defense Acquisitions: Comprehensive Strategy Needed to Improve*

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Ship Cruise Missile Defenses, GAO/NSIAD -00-149 (Washington, D.C.: July 2000); Thomas J. Christensen, "Posing Problems without Catching Up," *International Security* 25, no. 4 (Spring 2001), p. 30; Lum, "China's Cruise Missile Programs," p. 68; and James C. Mulvenon et al., *Chinese Responses to U.S. Military Transformation and Implications for the Department of Defense* (Santa Monica, Calif.: RAND, 2006), pp. 63–65.

63. Tanks, *Assessing the Cruise Missile Puzzle,* pp. 3–4.

64. See endnote 20.

65. Saunders, ed., *Jane's Fighting Ships*. It should also be noted that U.S. assets carry missile countermeasures, such as Nulka decoys; however, their use against a determined adversary with a large number of superior ASCMs would be neither effective nor sustainable, forcing the United States to attempt direct interception.

66. See, for example, Thomas Ehrhard and Robert Work, *Range, Persistence, Stealth, and Networking: The Case for a Carrier-Based Unmanned Combat Air System* (Washington, D.C.: Center for Strategic and Budgetary Assessments, 2008), p. 199; Lyle Goldstein and William Murray, "Undersea Dragons: China's Maturing Submarine Force,"*International Security* 28, no. 4 (Spring 2004), p. 193; McVadon, "China's Maturing Navy," pp. 96–98; and "Kanwa: PRC Accelerates Anti-carrier Operations Studies."

67. See entries for Chinese maritime aircraft such as the Su-30 MK2 and Q-5 in Paul Jackson, ed., *Jane's All the World's Aircraft,* 101th ed. (Coulsdon, Surrey, U.K.: Jane's Information Group, 2010–11).

68. Wang and Zhang, eds., *Science of Military Campaigns,* chap. 6, p. 18.

69. In a highly publicized event, Russian fighters flew over the *Kitty Hawk* battle group undetected on two separate occasions on 17 October 2000; on 9 November the same year two reconnaissance planes were able to do the same. "Russian Fighter Planes Said to Fly over *Kitty Hawk,*" Xinhua, 14 November 2000, available at FBIS CPP20001114000152.

70. See entries for the Kilo, Yuan, and Song classes, in Saunders, ed., *Jane's Fighting Ships.*

71. The PLAN's newer submarines incorporate modern technologies—such as sound-dampening tiles covering the hull, seven-bladed propellers, and either nuclear or diesel-electric propulsion—that make it unnecessary to snorkel periodically for air. Goldstein and Murray, "Undersea Dragons," pp. 166–68.

72. McVadon, *Recent Trends in China's Military Modernization,* p. 17. For assessments of China's submarine challenge, see Goldstein and Murray, "Undersea Dragons"; John J. Tkacik, Jr., *China's Submarine Challenge* (Washington, D.C.: Heritage Foundation, 1 March 2006), available at www.heritage.org/; Richard Fisher, Jr., "Trouble Below: China's Submarines Pose Regional, Strategic Challenges," *Armed Forces Journal,* 6 March 2006, available at www.strategycenter.net/; and Bernard D. Cole, "Beijing's Strategy of Sea Denial," *China Brief* 6, no. 23 (22 November 2006), www.jamestown.org/.

73. Hackett, ed., *Military Balance 2010.* This includes all destroyer classes, except the Luda, and the Jiangwei I/II and Jiangkai I/II frigate classes.

74. Saunders, ed., *Jane's Fighting Ships.*

75. O'Rourke, *China Naval Modernization* (2009), p. 14.

76. Hoyler, "China's 'Antiaccess' Ballistic Missiles and U.S. Active Defense," pp. 92–94.

77. Ibid., p. 93. See also Hagt and Durnin, "China's Antiship Ballistic Missile," p. 94.

78. Owen R. Cote, Jr., *The Future of the Trident Force: Enabling Access in Access-Constrained Environments* (Cambridge, Mass.: Center for International Studies, May 2002), p. 11.

79. "Military: U.S. Missiles," GlobalSecurity.org.

80. Ibid.; Lennox, ed., *Jane's Strategic Weapon Systems,* s.v. "SS-22-N Sunburn." Even if U.S. ships managed to come into firing range, Chinese ships would outgun their American counterparts by a factor of two. Each U.S. carrier group typically includes two cruisers and three destroyers, each equipped with eight Harpoons. Modern Chinese destroyers, however, tend to carry sixteen advanced ASCMs each. This means that in a one-on-one engagement, a Chinese ship could fire two missiles for every one the American ship

fired. In addition, Chinese surface combatants would have a considerable chance of intercepting Harpoons with close-in guns, which would not be true for U.S. surface combatants.

81. Lennox, ed., *Jane's Strategic Weapon Systems,* s.v. "YJ-91."

82. John Wilson Lewis and Xue Litai, *Imagined Enemies: China Prepares for Uncertain War* (Stanford, Calif.: Stanford Univ. Press, 2006), p. 124.

83. See Vick et al., *Aerospace Operations against Elusive Ground Targets,* app. II.

84. For a discussion of missile defenses in Asia, see Stokes, *China's Strategic Modernization;* Thomas J. Christensen, "Theater Missile Defense and Taiwan's Security," *Orbis* 44, no. 1 (Winter 2000), pp. 79–90; Kenneth W. Allen et al., *Theater Missile Defenses in the Asia-Pacific Region,* Working Group Report 34 (Washington, D.C.: Henry L. Stimson Center, June 2000); Michael D. Swaine and Loren H. Runyon, *Ballistic Missiles and Missile Defense in Asia,* NBR Analysis (Seattle, Wash.: National Bureau of Asian Research, June 2002); Scobell and Wortzel, eds., *China's Growing Military Power;* and Alan D. Rombert and Michael McDevitt, eds., *China and Missile Defense: Managing U.S.-PRC Strategic Relations* (Washington, D.C.: Henry L. Stimson Center, 2003).

85. Scobell and Wortzel, eds., *China's Growing Military Power,* p. 119.

86. For THAAD, ibid., p. 123.

87. National Intelligence Council, *Foreign Missile Developments,* p. 83; Lisbeth Gronlund et al., *Technical Realities: An Analysis of the 2004 Deployment of a U.S. National Defense System* (Cambridge, Mass.: Union of Concerned Scientists, May 2004), p. 36. Decoys are a problem exclusive to the midcourse stage. Because there is no gravity or air resistance in space, decoys released by missiles can travel at the same velocity as the warhead. Since even simple decoys, like steel balloons, are difficult to distinguish from the warhead, missile defenses might need to target every individual object in a given cluster to ensure the warhead's destruction. This means using a disproportionately large number of interceptors.

88. Scobell and Wortzel, eds., *China's Growing Military Power,* p. 97.

89. Ronald O'Rourke, *Sea-Based Ballistic Missile Defense: Background and Issues for Congress* (Washington, D.C.: 22 December 2009), p. 6.

90. Ibid., summary.

91. Gronlund et al., *Technical Realities,* pp. x–xii.

92. Lennox, ed., *Jane's Strategic Weapon Systems,* s.v. "Patriot PAC-3."

93. For MaRV warheads, however, the reentry speed would need to be tempered, perhaps with retro-rockets, to allow the terminal seekers to function properly.

94. For a recent assessment see Thomas J. Culora, "The Strategic Implications of Obscurants: History and the Future," *Naval War College Review* 63, no. 3 (Summer 2010), pp. 73–84.

95. See "Electromagnetic Rail Gun," *Office of Naval Research,* www.onr.navy.mil/.

96. The Russian Shipwreck missile is believed to have a range of at least 550 km (possibly up to 625 km), inertial guidance with command update, and active-radar/IR and antiradar homing; "Military: P-700 3M-45 Granat/SS-N-19 Shipwreck," GlobalSecurity.org.

97. "Military: Systems—GBU-39 Small Diameter Bomb/Small Smart Bomb," GlobalSecurity.org. So far, the GBU-39 has been fielded on the F-15E Strike Eagle. The weapon will also be fielded on the F-16, F-22, and F-35 fighters and B-52, B-1, and B-2 bombers. "U.S. Air Force Selects Raytheon's GBU-53/B for Small Diameter Bomb II Program," *Raytheon,* www.raytheon.com/; "Department of Defense Announces Selected Acquisition Reports," News Release 1050-10, *U.S. Department of Defense,* 15 November 2010, www.defense.gov/.

98. "WMD: B-2 Spirit," GlobalSecurity.org. In the past, the B-2 maximum bomb load consisted of eighty Mk-82 gravity bombs. Modifications currently under way will allow each B-2 to carry eighty five-hundred-pound GBU-38 Joint Direct Attack Munitions. Most sources quote 216 as the likely number of SDBs that would be carried by the B-2.

99. Bruce Rolfsen, "Leader Says Future Bomber Won't Go Solo," *Air Force Times,* 18 October 2010; Michael Donley [Secretary of the Air

Force], "State of the Air Force: 2010" (remarks at the Air Force Association Conference and Technology Exposition, National Harbor Center at Oxon Hill, Md., 13 September 2010), available at www.af.mil/.

100. By comparison, twenty-three thousand munitions were dropped in the entire DESERT STORM campaign and twenty-eight thousand in Operation IRAQI FREEDOM. Realistically, of course, because the bombers would be carrying heavier, specialized munitions in addition to or instead of the SDBs, the total number delivered in each sortie would be lower. For the B-2's GBU-39 loadout, Jackson, ed., *Jane's All the World's Aircraft.*

101. With air-to-ground loadout, American fighters can carry a maximum of six to eight precision-guided bombs, such as the five-hundred-pound GBU-12. Fighters can also carry two GBU-39 carriages, or eight bombs in total. See ibid., s.vv. "Boeing F/A-18 Super Hornet," "Boeing F-15E Eagle," "Lockheed Martin F-16 Fighting Falcon," "Lockheed Martin (645) F-22 Raptor," and "Lockheed Martin F-35 Lightning II." For a source listing and diagramming all loadout configurations used on the F-15E in each of the recent operations, see *F-15E Info,* www.f-15e.info/.

102. Importantly, the extent to which intercontinental bombers should supplement or supplant carriers for land or surface attacks in a militarized conflict with China would depend on how much the United States can reduce the vulnerability of carriers to Chinese missiles. If their vulnerability remains acute, the United States might find their introduction into the theater at all too risky. If this be the case, it is important for U.S. planning not only to attempt to reduce vulnerability but also to invest in multiple options for antisurface warfare, lest the United States find itself without a viable antisurface capability in a potential war with China.

103. "Iraq Coalition Military Fatalities," iCasualties.org.

TOWARD AN AFRICAN MARITIME ECONOMY

Empowering the African Union to Revolutionize the African Maritime Sector

Commander Michael L. Baker, U.S. Navy

A key source of American leadership throughout our history has been enlightened self-interest. We want a better future for our children and grandchildren, and we believe that their lives will be better if other peoples' children and grandchildren can live in freedom and prosperity. The belief that our own interests are bound to the interests of those beyond our borders will continue to guide our engagement with nations and peoples.

NATIONAL SECURITY STRATEGY OF THE UNITED STATES, MAY 2010

The high profile of Somali piracy has brought the issue of African maritime security to the attention of world leaders and citizens. This crisis, however, is not the only challenge facing Africa "in the maritime"; rather, it is a symptom of a much deeper problem—that Africa suffers from weak maritime governance and the lack of a harmonizing vision for an African maritime economy. Every year in Africa billions of dollars' worth of fish is illegally captured, billions of dollars' worth of drugs and arms are shipped overseas, pirates capture and hold for ransom hundreds of mariners operating commercial and private vessels, bandits steal maritime oil worth billions of dollars, and thousands of liters of waste are illegally dumped. Some of these crimes flow into Africa from abroad (including much of the illegal fishing and narcotics trafficking), while others (such as piracy) go from the inside out. These nefarious activities are global in their reach and require global action if we hope to eliminate their impact.

Africa's maritime realm has deep significance for African and international actors. The oceans, ports,

Commander Baker is a U.S. Navy Foreign Area Officer specializing in African maritime security assistance. He is currently an international affairs fellow in residence at the Washington, D.C., office of the Council on Foreign Relations. He holds a bachelor of science degree (with honors) in history from the U.S. Naval Academy and a master's in international relations from Istanbul Bilgi University, as an Olmsted Scholar. He has served as the Southeast Asia political-military action officer for the Chief of Naval Operations and as the U.S. liaison officer to the Turkish Special Forces in Silopi, Turkey, and throughout northern Iraq. Commander Baker was a founding member of U.S. Africa Command, serving as desk officer for Nigeria, Senegal, Guinea-Bissau, Cape Verde, and Mali as well as, most recently, Regional Director for West Africa Engagement. In July 2011 he will assume duties as the defense and naval attaché to Madagascar, the Comoros, Mauritius, and the Seychelles.

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and inland waterways of the African continent are more than mere sources of food and energy; they are how Africa trades with the rest of the world. Accordingly, the African maritime sector holds the key to wealth and prosperity for the continent as a whole. If Africans hope to realize a prosperous future as stakeholders in an emerging market or even as global market leaders, they will need first to master the maritime domain. But for too long governments and institutions have turned blind eyes toward the African seas and allowed security problems, corruption, bureaucracy, and weak infrastructure to rob Africans and their honest partners of food, energy, wealth, and prosperity. Given the importance of the maritime in the global market, and hence in Africa, the United States and other international partners should consider ways to support maritime sector development in Africa, to help actualize plans, strategies, and partnerships that improve security, governance, infrastructure, and commercial investment. As the U.S. national security strategy clearly states, it is in the American interest to do just that. To highlight this reality, the National Security Council encouraged the Department of State and the U.S. Africa Command to hold an international conference to discuss the issues and solutions surrounding the African maritime domain in October 2010.

But more than simple collaboration on maritime security, the international community needs an African *strategy* for maritime development, a plan to tie together existing and future actions, to help establish an African maritime economy that creates wealth from the sea for Africans, and to mobilize international instruments so as to assist in implementing African maritime initiatives toward good governance. In short, we need to find a way collectively to revolutionize the African maritime sector and to chart a course toward an African maritime economy.

Putting complex, multinational plans into action is always challenging, especially on so large a scale—fifty-four countries are directly involved. Toward that end this article outlines some ideas, both immediate and long-term, for actualizing plans and coordinating efforts in pursuit of an African maritime economy. The central idea presented is that of an "International Charter for the African Maritime Sector," an agreement by which a global coalition would empower the African Union (AU) and its regional economic communities to help Africans create a secure, well governed, and efficient maritime domain, one capable of attracting investment and enabling global trade. To accomplish these goals the charter would provide technical assistance, resources, checks and balances, and oversight for the implementation of strategies and plans across the maritime spectrum; it would tie resource distribution to compliance with AU maritime policies; and it would offer significant international assistance in establishing

and enforcing African maritime laws, thereby allowing Africans initially to concentrate their resources on improving their maritime infrastructures.

This article also offers a way to organize African efforts throughout the maritime realm and the continent as a whole through a "Special Representative for the African Maritime Sector" at the African Union. The office would provide clear leadership in the maritime domain, aiming to tie together currently disparate efforts in infrastructure, security, safety, governance, trade, and commerce under one overarching strategy.

There are other simple steps that can be taken now, like expanding combined patrols and improving information fusion and sharing; this article addresses these. But first, let us examine the idea of prosperity from the sea and make the case for a comprehensive approach to achieving it, then assess some of the key, but disconnected, efforts that Africans and international partners have already undertaken. Finally, we will delve into the proposals for an international charter and special representative.

GROWTH AND PROSPERITY FROM THE SEA: THE CASE FOR A HOLISTIC APPROACH

In 2007 Africa accounted for a mere 2.7 percent of global trade, and less than 1 percent of African exports were in the form of manufactured goods (the lowest percentage of any region in the world).[1] Imports of manufactured goods from the European Union (EU), China, and the United States alone were nearly double the volume of African exported manufactures. Africa imported 14 percent of the total global agricultural trade (the highest percentage of any region in the world).[2] Raw commodities accounted for nearly 80 percent of all African exports, with oil representing close to 60 percent of that total.[3] If African states hope to break the cycle of poverty, they will have to spur real economic growth through more diversified trade and capture a greater share of the global market for manufactured and finished goods. It is one thing for, say, Exxon-Mobil to export oil in the present risky and inefficient maritime environment; it is a completely different matter for lower-margin companies like Gap Inc. to establish textile factories in that environment. In order to compete in the field of manufactured goods, African states will have to demonstrate to investors and companies that goods produced there can reliably get to market. The maritime sector, therefore, must feature prominently in any plans for sustained economic growth through the trade of manufactured goods.

Ninety percent of global trade moves over the oceans, and containerized traffic accounts for an increasingly large share of total maritime shipments.[4] This means that African countries hoping to spur growth through global trade will

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have to attract not only land-based companies but shipping firms as well. This poses a significant challenge for African countries, because the region's ports are currently the least efficient in the world; dwell times are nearly quadruple those of Asian ports, and no single African port ranks in the seventy most productive in the world.[5] One extra day in port can add $35,000 to the operating costs of a shipping company.[6] The increasing rate of containerized traffic places an additional burden on small African ports, which often lack the equipment necessary to load and unload containers. In West Africa, movement of twenty-five containers per hour is the norm, compared to 425 in many Asian ports.[7] In addition, many ports in Africa cannot handle ships of even average size;[8] add to this shortcoming the fact that the world shipping industry has been quickly modernizing its fleets, replacing older and smaller vessels with newer "megacarriers," and the picture for African maritime transport looks bleak. Africa's countries must make large improvements in their port infrastructures through expansion, maintenance, and improvement in efficiency if they hope to attract leading shipping companies; if they fail, "several coastal countries in West and Central Africa could become 'de facto' landlocked, having to bear approximately the same costs as a landlocked country."[9]

Port efficiency, of course, is not enough to draw business; a country or region also needs safe and secure waters, coupled with transparent and convenient trade regulations, to attract investment and maritime shipping. As it is, high rates of piracy and armed robbery at sea in the Indian Ocean and the Gulf of Guinea have elevated insurance rates and have even caused some shipping companies to avoid particular routes to or around Africa. Poor dredging and inadequate navigational aids add to the risks of operating ships in many parts of Africa. All of this leads to low traffic, which in turn causes governments to levy high tariffs to generate sufficient funds for port operations further discouraging shipping companies from operating in Africa.[10] As if that were not enough, African governments apply more bureaucratic red tape to maritime trade than does any other collective region, aggravating inefficiency and increasing opportunities for corruption.[11] It is an ugly cycle and a difficult one to break.

Breaking this cycle will require a coordinated, sustained effort across a broad front, nothing less than a campaign to revolutionize the African maritime sector holistically, across its entire spectrum—improving safety and security, governance, and industrial infrastructure and efficiency. There is no evidence in Africa now of any national, regional, or continental strategy of this kind. As a result, for example, while some countries, like Nigeria, have made improvements in port efficiency, their advances are offset by poor security—and vice versa.

Safety and security create confidence in a market, by reducing physical risks, cutting insurance costs, and improving operating timelines. Good governance offers assurance that economic activity (hence investments) will be handled equitably and transparently, with no hidden costs or lengthy delays. Industrial infrastructure serves as the backbone of maritime ventures, providing the necessary ways to move goods efficiently to and from markets. These three elements are necessary components of a coherent and efficient strategy to attract capital investment so as to develop or enhance national markets. Markets being necessary for jobs, wealth creation, and growth generally, it stands to reason, once again, that a comprehensive strategy to develop the African maritime sector is important not only for that sector but for the future prosperity of the continent as a whole.

A number of governments and international institutions (including the African Union) have developed good ideas to improve, say, security or transportation but too often have not carried them out. A comprehensive strategy should aid actualization of those plans, sequencing action, prioritizing funding, and offering clear direction to regional economic communities and national ministries as well as a confident vision for the international community.

AFRICAN UNION (AND RELATED) EFFORTS

In January 2010, during the fourteenth African Union Summit, the AU heads of state endorsed the "African Union Maritime Transport Charter" and the "Maritime Transport Plan of Action," and they affirmed the previous October's "Durban Resolution on Maritime Safety, Maritime Security, and Protection of the Marine Environment." (The charter and plan of action have gone to the fifty-three member states for ratification and will become official policy upon the approval of fifteen.) To those involved behind the scenes, the summit seemed a momentous occasion, a breakthrough for the maritime domain. After all, these documents are the culmination of a great deal of work by some individuals at the African Union, mostly within the Infrastructure and Energy Commission, who are certainly to be commended. Their titles sound both impressive and comprehensive. But in fact the papers beg for legitimacy due to a lack of inclusivity and weak enforcement mechanisms. Shortly after the AU summit other efforts to draft maritime strategies and plans started to emerge, but they have had little success, lacking the clear support of the African Union's leaders. Nevertheless, despite their lack of leadership support and unifying strategy, these documents do contain some of the key elements of success.

The Durban Resolution. From 12 to 16 October 2009, African Union maritime transport ministers held a conference in Durban, South Africa. There they

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endorsed the Maritime Transport Charter and the Maritime Transport Plan of Action, drafted previously (see below). They also issued what became known as the "Durban Resolution," declaring their shared commitment to tackle the issues of maritime safety, security, transport, and environmental protection. Specifically, they condemned piracy and expressed concern over toxic dumping and maritime pollution. Through this resolution the ministers called on the AU to assume leadership of the efforts they had endorsed, encouraged regional organizations and states to start taking action on them, and invited international organizations and global partners to be active participants.[12] The resolution is significant mostly for the fact it clearly signals the African states' wish—the latter confirmed by the heads of state at the annual summit—for AU leadership and their desire to partner with the international community. The resolution falls short, however, in terms of consensus, in that it came from a meeting of transport ministers only, with no coordination across other ministries before the conference.

The Maritime Transport Charter and Plan of Action. The charter adopted by maritime transport ministers in Durban in October 2009 was based on an original 1994 document updated between 2007 and 2009 by the African Union's Commission for Infrastructure and Energy.[13] The charter addresses a multitude of such areas as "promoting the growth and development of African merchant fleets," "encouraging" reform and efficiency in port operations, "encouraging" the expansion of information systems, and "promoting" the establishment of regional or national maritime funds for the development of maritime industry. The charter also calls for modernization and harmonization of maritime laws across subregions, expansion of maritime regulations, and improved transparency and accountability. Finally, it mentions the need to improve security capabilities and to counter piracy and armed robbery at sea.[14] Interestingly, it does not speak to illicit trafficking at sea or illegal, unregulated, and unreported (IUU) fishing. Also, and unfortunately, the charter fails to address adequately the dire condition of port infrastructure across the continent, which comes as a surprise, given that the African Union Commission for Infrastructure and Energy drafted the document.

Nonetheless, in a bold and important step, the Maritime Transport Charter proposes continental, regional, and national organizations that would carry out the maritime transport plan. Specifically, the charter urges the AU, the regional economic communities, and states to create a continental unit for the coordination of maritime activities at the African Union; regional and continental maritime administrations; maritime training institutions; councils to defend the interests of local shippers; and a fifteen-member continental "follow-up

committee" charged with holding periodic meetings to promote and monitor the implementation of the charter. The chief responsibility of these new bodies would be to carry out the Maritime Transport Plan of Action. Sadly, most of those bodies do not exist yet, and there is scant evidence that they are forthcoming. If the African Union and the regional economic communities do not implement and empower these oversight and representative bodies, there will be little reason to expect any positive effects from the Maritime Transport Charter or plan of action.

The Maritime Transport Plan of Action lays out seven objectives, with multiple sub-objectives: institutional and legal measures; capacity building; strengthening of maritime safety and security; enhancement of port performance; strengthening of inter-African and international cooperation; facilitation and financing of maritime transport and ports; and promotion of the development of maritime transport equipment.[15] The plan of action describes a host of necessary measures across a fairly broad spectrum of the maritime domain, and it assigns responsibility and timelines for each measure at the state, regional, or continental level. It does not, however, identify any means or priorities—a critical failure for anyone hoping to use the plan of action as a mechanism for maritime-sector development. It contains no sticks and no carrots.

All of these objectives and measures—we have mentioned only a few from a long list—come across more as lofty aspirations than as directives. The Maritime Transport Charter and its plan of action seem to lack authority, and their language begs the question of how institutions are to implement this broad agenda. Sure enough, though the African Union heads of state approved the Durban Resolution, the Maritime Transport Charter, and the Maritime Transport Plan of Action, these documents sit on a shelf, making no progress. Why? There are three likely reasons. First, as mentioned above, they are products of a single commission at the African Union—Infrastructure and Energy—and were approved through the meetings of transport ministers only. Other important organs of the AU, such as the Peace and Security and the Trade and Industry commissions, were not involved in their creation. Yet these three documents clearly creep into the "lanes" of other commissions and ministers, whose "buy-in" is required if they are to be implemented.

Second, as discussed above, while the documents call on the African Union to lead the implementation of maritime initiatives, the AU has no human or capital resources to assume such a role and has sidelined the creation of the "Continental Maritime Coordination Unit" mentioned above until a suitable donor takes an interest in funding it.

Finally, these documents on their own cannot convince Africans that revolutionizing the maritime sector is a worthwhile endeavor. They make no attempt

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to show the value of maritime trade, the costs of unsafe and inefficient practices, or the risks posed by persistent maritime threats. They are not tied to any grand strategy that achieves commitment at the national and regional levels and coordinates multi-ministerial efforts toward a common goal of prosperity from the sea. That is understandable, since it is certainly not the role of the Infrastructure and Energy Commission to develop such a thesis, but it remains disappointing nonetheless, because the plan of action puts forth a good many necessary and specific bureaucratic actions. If coupled with an overarching vision for the African maritime sector, a robust plan for improving maritime security, and separate plans for governance, maritime commerce growth, and financial and oversight mechanisms, the maritime transport documents could succeed.

The Draft "Maritime Strategy." Perhaps recognizing the need for a unifying vision, the African Union contracted with the Brenthurst Foundation (a South African think tank) and the Africa Center for Strategic Studies (a U.S. Department of Defense research institute at Fort McNair in Washington, D.C.) to provide the union's deputy chairman a maritime strategy for Africa. The resultant vision paper made a good case for the overarching importance of the maritime domain.[16] It also identified a number of areas that should be addressed by the African Union and its member states to improve safety, security, and the maritime economy. That strategy, however, remains a white paper, not official AU guidance. What is more, since no commission within the AU participated in its creation, once again a noble effort has failed to gain a sense of ownership among various actors within the African Union itself.

Experts Workshop on Maritime Security. Barely had the ink dried on the draft maritime strategy before another group embarked on a similar project. Feeling that the Maritime Transport Plan crossed into its purview and considering the draft maritime strategy an outsider's project, the African Union's Peace and Security Commission held an "Experts Workshop on Maritime Security" in Addis Ababa on 6 and 7 April 2010. The conference organizers aimed to generate discussion leading to specific inputs to a continental strategy for maritime security.[17] To their credit, they invited representatives of other AU commissions, welcoming a notable speech on maritime immigration by the commissioner of social affairs. The delegates emphasized the problems of maritime safety, security, and protection of the environment. They also underlined the need for legislation, implementation of agreements, and enforcement, all the while stressing that regional and international cooperation is paramount to success. The delegates broadly agreed that they needed to get to work on areas already covered by resolutions and agreements but also to develop an extensive maritime strategy that would give structure to Africa's efforts in the maritime realm.

Beyond these conclusions, however, the workshop bore little fruit. The top leadership of the AU did not attend, and the agenda did not address any aspect of the earlier draft maritime strategy. Although invited, no business leaders or economists attended the workshop, and so the workshop did not touch the economic aspects of the maritime domain. It remains to be seen whether the Peace and Security Commission can draft a comprehensive maritime strategy and garner the active participation of other commissions; there are reasons to doubt its staying power. Already stretched thin across several pressing peace operations, the commission has dedicated only one officer to work on maritime security, as a collateral duty; at the next sign of continental conflict it will likely struggle to maintain any focus on the maritime strategy and find it difficult to continue to coordinate a broad array of actors.

The Djibouti Code of Conduct. Another instrument, though not a product of the African Union, should be mentioned here. The International Maritime Organization (IMO) sponsored a meeting in Djibouti (the capital of the Republic of Djibouti) on 26 January 2009 to forge an agreement to cooperate in the investigation, arrest, and seizure of people reasonably suspected of piracy and to conduct shared operations.[18] Fifteen countries have signed so far: the Comoros, Djibouti, Egypt, Ethiopia, Kenya, Madagascar, the Maldives, Mauritius, Mozambique, Saudi Arabia, the Seychelles, Somalia, Sudan, Tanzania, and Yemen. The signatories pledged to review their national maritime laws to ensure they are adequate for criminalizing piracy; however, to date only the Seychelles and Kenya have actively upheld their agreements to try captured pirates in their courts.

Ironically, the IMO also led a second meeting, this one of African and Middle Eastern maritime security specialists, just as the 12–16 October 2009 Durban meeting was going on, but in Victoria, the capital of the Seychelles. Representatives from East Africa, the African Indian Ocean islands, and from father abroad met to discuss implementation of the Djibouti Code of Conduct. Unfortunately, the African Union was not represented at those meetings, most likely because its maritime experts were in Durban. During the meeting, working groups identified the need for technical assistance in creating national laws and for steering committees to monitor progress of implementation of the code. The delegations agreed that adequate training at all levels of maritime administration and law enforcement was important but also stressed the need to obtain naval and coast guard assets to conduct law-enforcement operations. Finally, they agreed that the IMO should establish a Djibouti Code implementation team.[19] (The IMO recently created that team, and its work is under way. Its successes and failures in the future will offer valuable insight into this type of cooperative approach and may give reason to expand it beyond counterpiracy operations.)

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These documents and efforts are largely technical in nature; they lack a defined end state, something that ties them together coherently and assures global partners that their resources would not be squandered. With its multiple, disparate initiatives in progress to develop specific strategies, charters, and plans of action, the African Union is in effect tackling symptoms, and in uncoordinated ways, without comprehensively addressing root causes—the lack of an authentically *African* maritime economy and of effective *maritime* governance. Whatever strategy or strategies emerge, it is clear that the AU and its members need a vision for the entire spectrum of the African maritime domain—and this would mean the involvement of every commission in the union, something that has not happened to date. Africa and its global partners need then some coherent technical mechanism to ensure consistent implementation of strategies, charters, and plans, as well as to distribute burdens. By endorsing the Durban Resolution, heads of state have called upon the African Union to lead efforts to improve the maritime sector. This leadership must produce guidance, oversight, and coherence for a wide variety of initiatives already ongoing at the national, regional, and international levels.

NATIONAL, REGIONAL, AND INTERNATIONAL INITIATIVES

Many African states and regional organizations, not waiting on leadership from the African Union, have embarked on a number of programs to address safety and security in African seas. Several of these efforts are visionary and effective; all suffer, however, from a lack of coordination among a broad set of stakeholders and therefore tend, as noted, to address only security symptoms rather than other core problems of governance and economic development. Nevertheless, all of them are commendable and could help to build momentum toward deeper, long-term solutions for the African maritime. The below are only a few of the most prominent examples.

The ECCAS Maritime Safety and Security Strategy. In October 2008, ECCAS, the Economic Community of Central African States, produced a study meant to help the regional bloc secure its economic interests in the maritime domain.[20] The draft offered an approach to protecting offshore oil resources, fisheries, and sea routes, as well as fighting a host of maritime crimes and achieving a reliable search-and-rescue capability.

ECCAS has conducted one combined maritime patrol, which is a step toward meeting its strategic vision for security. It has not yet undertaken a second patrol, however, which may be due to a lack of funds or to a lengthy planning process. In any event, ECCAS has focused on the security aspect of the operations, which is reasonable at this point. The real challenge will come when ECCAS tries

to tie security operations into law enforcement and judicial procedures ashore. Here it may benefit from the expertise and financial support of the AU or international partners.

Southern African Development Community Statement on IUU Fishing. On 4 July 2008, in Windhoek, Namibia, the ministers responsible for marine fisheries in the Southern African Development Community (SADC) met to take action on illegal, unreported, and unregulated fishing. The meeting reaffirmed the commitment of their countries generally to cooperate in regulating and enforcing fishing laws and to take the following measures: review and harmonize national fishing laws, strengthen fishing regulations, share information, and improve the monitoring of fishing, including multinational patrols.[21] While it is not clear that much action has actually occurred in the areas of regulation and legislation, the statement has spurred some of the countries to conduct joint patrols to enforce maritime laws.[22]

Southern African Joint Surveillance Patrols. Building on the momentum of the SADC statement on IUU fishing, in March 2009 the states of Kenya, Mozambique, South Africa, and Tanzania collectively sponsored the patrols in the Indian Ocean by the South African offshore patrol vessel *Sarah Baartman,* assigned to the environmental-protection service.[23] Embarked was an international team of eleven inspectors, with Kenya, Mozambique, and Tanzania each providing two inspectors, and South Africa five. During the one-month operation the team inspected forty-one vessels, levied ten fines, and seized six ships for violations of national maritime laws. In the highlight of the operation, the joint team seized a vessel in the Tanzanian exclusive economic zone carrying over three hundred tons of illegal tuna. Like the ECCAS patrol this operation focused on tactical procedures afloat; officials in Tanzania were left scrambling to determine what to do with the seized fish. In the end, they gave the fish to an orphanage, but with comprehensive planning at the outset they might have realized a greater gain by selling the fish on the market and donating some of the proceeds to the orphanage and applying the rest to continued operations.[24] As it was, funding challenges have caused these countries—including South Africa—to delay future plans to continue this type of operation. This is a possible candidate for international support.

MOWCA Agreements. The Maritime Organization of West and Central Africa (MOWCA) has drafted a number of policies and initiatives to promote safe maritime transport and maritime security in the eastern Atlantic Ocean. On 31 July 2008 MOWCA members agreed to a memorandum of understanding implementing a regional coast-guard network. Fourteen of the twenty coastal

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member states signed the agreement: Benin, Cameroon, Cape Verde, the Republic of the Congo, the Democratic Republic of the Congo, Côte d'Ivoire, Gabon, Ghana, Guinea, Guinea-Bissau, Nigeria, Senegal, Sierra Leone, and Togo. The memorandum established four operational patrol zones, stretching from Angola to Mauritania.[25] MOWCA aims to harmonize policy and regulation in West and Central Africa to comply with the International Ship and Port Facility Security Code, the Safety of Life at Sea Convention, the Search and Rescue convention, and the United Nations (UN) Convention on the Law of the Sea.[26] The organization is also working to establish an "Association of Maritime Administrations" in the region to promote harmonization and information sharing.[27]

So far, there is little evidence that MOWCA, without financial support and binding authority over member states, has achieved anything beyond formalizing its intentions on paper. But it is a potential regional leader for maritime issues on the Atlantic seaboard, and with funding and oversight it might be the regional agent for a number of the requirements in the AU's Maritime Transport Charter. Along these lines MOWCA specifically desires to create and manage a "Port Management Association of West and Central Africa," a "Union of African Shipper's Councils," an "Association of National Shipping Lines," and three maritime academies in West Africa (to be affiliated with the IMO's World Maritime University in Sweden).

"Regional Strategy against Piracy and for Maritime Security in Eastern and Southern Africa and the Indian Ocean." On 7 October 2010, a collection of ministers (mostly ministers of foreign affairs) of East and southern Africa held their second ministerial meeting of 2010 to address maritime security and piracy. This conglomeration of ministers met to bolster cooperation on maritime security among regional countries and with the European Union, as well as other international partners, such as the International Maritime Organization and the United States. This strategy is complemented by a "Regional Plan of Action." These two documents together are perhaps the best example of a comprehensive regional effort to tie functional areas of maritime security to strategic ends. The strategy has three main elements: addressing sources of Somali piracy inland in Somalia, bolstering international efforts, and improving African maritime security capacity.

Maritime Centers of Excellence. One can find maritime academies in each region of Africa—in Kenya, Côte d'Ivoire, Ghana, Nigeria, Egypt, and South Africa, to name a few—all aimed at delivering maritime education to port-authority administrators, merchant mariners, naval and coast guard officers, and marine police. International cooperation in these schools has been on the rise. Recently, for example, the Kenyan navy, the Global Maritime and

Transportation School, U.S. Africa Command, and the U.S. Naval War College have teamed to create a new curriculum at Kenya's Bandari Port Authority College, in Mombasa. These existing institutions could play important roles in standardizing maritime education across the continent and become key instruments in disseminating strategic guidance from the African Union for the improvement and coordination of maritime governance. As things stand now, however, these schools operate independently of one another, of the African Union, and of their associated regional economic communities.

Counterpiracy Task Forces. There are at least three multinational counterpiracy operations currently under way in the Gulf of Aden and the Indian Ocean near the Horn of Africa, as well as numerous other unilateral operations: the European Union's Operation ATALANTA, a NATO task force, Combined Task Force 151, the Chinese navy's Task Force 529, an Indian task force, a Malaysian task force, a Russian task force, and the Yemeni coast guard.[28] In all, more than thirty vessels are currently patrolling these waters to deter, prevent, and defeat acts of piracy, representing every continent except Antarctica and—despite the adoption of the Djibouti Code of Conduct—Africa. While these task forces bring the benefit of nonstop maritime patrols, they do not involve Africans in their operations, and they do not address crimes that are of high importance to Africa, namely, illegal fishing and illegal dumping. As a result, they do not forge trust and partnerships; rather, they are viewed with indifference in many parts of Africa, where governments and communities are very reluctant to take action against African pirates.[29]

The Africa Partnership Station. In 2007, U.S. Naval Forces Africa initiated a multinational effort to improve maritime safety and security in Africa through partnership with African navies and coast guards.[30] This initiative is known as the Africa Partnership Station (or APS);[31] it features engagement of a variety of types, including conferences, mobile training teams, and "banner ship" deployments, all geared toward building maritime awareness, capacity, capability, and regional cooperation.[32] U.S. Naval Forces Africa has led three Africa Partnership Station banner-ship deployments in West and Central Africa and one in East Africa; there have also been several deployments of smaller vessels for shorter durations. These deployments strive to train and exercise African maritime forces in tactics, techniques, and procedures so as to solidify their professionalism and, more broadly, address the need for maritime-sector development in Africa. Ships of the Netherlands and Belgium have flown the Africa Partnership Station banner on training missions in West and Central Africa, extending combined training and familiarization in these subregions, and helping to make the Africa Partnership Station a truly international effort. American agencies like the

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National Oceanic and Atmospheric Administration (NOAA) have put representatives on board APS ships, where they work with fisheries agencies, scientists, and universities to address fisheries management, weather issues, and other nonmilitary maritime topics.

NOAA's presence on the APS missions is a good sign, but other agencies—like the U.S. Agency for International Development and the Commerce Department—are notably absent. U.S. Naval Forces Africa would like to expand the scope of APS deployments in order to address maritime-sector development more broadly, but it lacks two necessary elements for taking that step: guidance and authority from the U.S. government and guidance from and coordination with either the African Union, a regional economic community, or an African state. In short, "ownership" of this initiative has to move above and beyond U.S. Naval Forces Africa if it is to accomplish its more far-reaching goals. The Department of State could take the lead on this mission, in partnership with the African Union.

African Maritime Law Enforcement Partnership. The United States and the government of Cape Verde initiated the African Maritime Law Enforcement Partnership (AMLEP) in June 2008.[33] This operation pairs African maritime boarding teams and police with U.S. Coast Guard boarding teams and U.S. Coast Guard or Navy vessels in combined operations to enforce African maritime law, along the lines of the Southern African Joint Surveillance Patrols. AMLEP has been a successful operation, by which partners have built their own capacities and improved the management of their maritime environments through combined maritime law enforcement. It offers an immediate operational framework for small African maritime forces, extending their reach throughout their territorial seas and exclusive economic zones. AMLEP operations focus on illegal fishing, narcotics smuggling, and other illegal trafficking.

To date U.S. Africa Command and U.S. Naval Forces Africa have conducted five AMLEPs (June 2008 and October–November 2008, with Cape Verde; July–September 2009, with Cape Verde, Morocco, Senegal, and Sierra Leone;[34] December 2009, with Sierra Leone; and June–August 2010 with Cape Verde, Senegal, Morocco, and Sierra Leone). France has provided cueing support (i.e., surveillance and vectoring by maritime patrol aircraft based in Dakar, Senegal), and U.S. Africa Command has coordinated the operations, through the Maritime Analysis Operations Center–Narcotics in Lisbon, Portugal. Two AMLEP operations resulted in five fisheries interdictions, including the program's first seizure (a Taiwanese fishing boat, subsequently auctioned), which sent a strong message to illegal operators but also generated the payment of significant fines

to Sierra Leone. The United Kingdom has conducted two AMLEP-like operations with Cape Verde, and Spain and Malta have expressed interest in joining the initiative. To date, the partnership has focused predominantly on operations at sea and hence has mostly practiced military capabilities; attempts have been made to incorporate other important categories of stakeholders, such as customs agencies, port authorities, fisheries management, national police, and transportation ministries, but much still needs to be done on those lines.

While AMLEP is ahead of the counterpiracy task forces in involving Africans, it lags behind in presence, patrolling only about two months a year. Given current financial constraints, global donors will have difficulty mustering the political will to extend missions of this type without confidence that investments will pay off in long-term stability and new markets. Given, however, an international mechanism that coordinates support efforts, offers transparent oversight of maritime governance reform, and ties funding to performance, donor countries may find reasons to sustain and expand joint maritime patrols in African waters.

A VISION FOR THE LONG-TERM DEVELOPMENT OF THE AFRICAN MARITIME ECONOMY

To take on a challenge as daunting, and as necessary, as developing maritime economies and solidifying maritime governance, infrastructure, safety, and security, the African Union, its commissions and regional economic communities, and its member states will need considerable participation from global stakeholders. Indeed, developing strategies and plans is no small feat, but it is far easier than converting ideas into realities, especially considering the resource and structural challenges that the AU and its members face. To complicate matters, the African maritime is marked by a variety of interdependent but different, unlinked, and uncoordinated policies, resolutions, codes, and activities. The scheduling of simultaneous meetings on major maritime issues in Durban and Victoria mentioned above was but one sign that the right hand is not working with the left. The contrast between operational success at sea and procedural disarray ashore in handling seized fish in the instance cited is another indicator of poor coordination and planning. Moreover, the very fact that the African Union initiated a workshop to develop a maritime security strategy during the same week that two think tanks delivered an independent draft strategy at the request of the AU itself reveals lack of clear vision and leadership. Add to all of this the absence of any plan to revitalize African maritime commercial sectors —or of any mechanism for oversight or enforcement of the continental maritime agreements that already exist—and one sees that haphazard attempts to address security issues can go nowhere.

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Yet some of the strengths of the African Union, such as its global profile and power to create mandates, could allow it to organize continental efforts to improve the maritime sector as a whole. Indeed, as we have seen, the African maritime transport ministers at the Durban conference called on the AU to exert just such leadership. To get things moving the AU could use its influence to broker a formal international agreement to coordinate and facilitate global participation in African maritime development, with an eye to empowering the AU itself to lead this revitalization. The International Maritime Organization has signaled an intention to do something of this nature in support of the Djibouti Code of Conduct, and the signatories of both that code and the Durban Resolution have encouraged global partners to take active roles.

One way to combine the efforts of global partners with those of Africans would be to create an "International Charter for the African Maritime Sector," under the combined leadership of the AU, the IMO, and the UN.[35] Under the International Charter global partners, both public and private, would acknowledge both their interests in the African maritime and their responsibilities toward it and would pool their resources, fiscal and material. The African Development Bank and the World Bank could jointly manage fiscal resources, releasing them only when the AU, IMO, or UN directed. African states or regional maritime organizations could choose to become members of the International Charter in order to contribute to the pool or to have access to its resources; the charter would establish requirements that states and organizations would have to meet. The African Maritime Transport Charter already identifies most of the requirements. The International Charter would simply construct a basic set of rules to enforce implementation; in other words, it would put teeth into the Maritime Transport Plan of Action and other relevant plans of action. If wisely constructed, these rules would in turn enable African states and organizations to develop good, noncorrupt maritime structures in accordance with the transport charter. The African Union and regional organizations like MOWCA or SADC would then be able to apply not only political oversight in goading members slowly into action but fiscal control—to stimulate implementation and, coupled with routine inspections, ensure honest practice. Global partners could also do more than just donate money, materiel, and systems: they could cooperate in maritime law enforcement.

It is one thing to patrol territorial seas occasionally and conduct random inspections. It is something else—involving a completely different level of governance —to regulate activity at sea transparently, monitor that activity effectively, and enforce laws consistently. Some governments would be tempted to invest immediately in maritime-response forces to take quick advantage of potential revenue from fines and sales of seized contraband. While this benefit is certainly

important, enlarging coast guards would require extensive capital investment and developed maintenance capabilities. Rather, under the International Charter global partners might form combined task forces in order to enforce African or international maritime law. Operating along the lines of the Southern African Joint Surveillance Patrols and the African Maritime Law Enforcement Partnership, these task forces would include African boarding teams, seamen, officers, information systems, and, where possible, vessels. Most of the principal ships, however, would come from global partners, distributing the costs and reducing immediate financial burdens on African states and organizations. Meanwhile, African maritime law-enforcement and security forces would increase their skills through continuous participation in these task forces.

Revenue obtained from fines and seizures generated by task force operations might go into an "African Maritime Trust" (managed, again, by the African Development Bank and the World Bank); global partners might match those funds if African states and organizations demonstrated good governance in the maritime. An African member state could request to withdraw funds from the trust to build elements of maritime governance, infrastructure, and administration, or, having met the regulations and rules, to upgrade and maintain its own weapon and law-enforcement equipment.

The idea here is that global partners (like South Africa, the United States, the United Kingdom, India, France, Brazil, China, Russia, NATO, and the EU, as well as companies like Maersk, Chevron, and Dubai Ports World) would provide operational platforms in the near term so that Africans could focus their time and money on other areas necessary to maritime economies and governance. These partners would also agree to provide maritime security assistance and capacity-building resources only through the International Charter. The AU, the IMO, and the UN would lead the charter, and the African Development Bank and World Bank would manage all finances. Eventually, after establishing elements of maritime governance and administration, and with the approval of the AU and the IMO, African states could access monies directly to enable them to increase their roles in the combined task forces, gradually replacing the global partners. With help of economists from the World Bank and the African Development Bank, the International Charter could loosely predict how long a state should need assistance—meaning that it would not have to represent an open-ended commitment from global stakeholders.

Agreement of major global partners to join the International Charter and provide maritime security assistance through its auspices only could have a resounding impact on the African maritime sector as a whole. This system would create a series of checks and balances, distribute the burden globally, and encourage fiscal responsibility and good governance. At the same time, it would

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relieve African states of some of the costs of security and enable them to invest first in maritime infrastructure, institutions, laws, regulations, and processes. This charter, in other words, would provide a road map, complete with ways and means, to establish authentic maritime economies and governance. To realize this goal the African Union will need to establish, at its headquarters, in its commissions, and within its regional economic communities, a strong foundation for maritime-sector development.

WHAT THE AFRICAN UNION CAN DO NOW

To make the International Charter for the African Maritime Sector a reality and actualize the African Union's existing maritime plans, the AU should take some important steps immediately. At the top of the list lies establishing clear leadership for the development and organization of an African maritime economy. The chairman of the union could designate one of the commissioners as the continental "lead" for maritime sector development; alternatively, the chair could appoint a "Special Representative for the African Maritime Sector"—a civilian from the private sector of strong character and well-known connections and background (ideally including maritime business experience)—who does not come from any of the AU's commissions but has the experience and authority to ensure authentic involvement from each. First, the special representative should form the Continental Maritime Coordination Unit and Maritime Transport Review Committee, as established by the Maritime Transport Charter. Next, the special representative should organize and mobilize the rest of the AU to play productive roles in the maritime domain; to date only two of the eight departments have done so—Energy and Infrastructure and Peace and Security. Maritime issues cut across the AU, and every commission has an important role to play, as the sidebar shows.[36]

After organizing the AU to deal more fully and aptly with the African maritime, the special representative should immediately begin engaging the private sector. The special representative will need to induce private enterprises to invest in African maritime industries and provide their perspectives and expertise in the development of African maritime plans and strategies. Maritime businesses will play decisive roles in the success of the maritime sector as a whole; African maritime businesses would benefit themselves in particular by helping policing efforts at sea, through the distribution of information and pressuring governments to implement standard regulations, invest in maritime governance, and (at least to the degree that it is in their respective interests) enforce maritime laws.

Next, the special representative should set the Maritime Coordination Unit four immediate tasks. First, the unit should begin assessing maritime laws across the continent and work to improve their harmonization. This is an important

AFRICAN UNION COMMISSION AND MARITIME ISSUES

Peace and Security: common security and defense policy
Political Affairs: civil society, refugees, human rights, transparency, and accountability
Infrastructure and Energy: transport (including maritime transport in its core function); tourism; energy; infrastructure (ports); cooperation on safety, security, and environmental protection; tariff harmonization; promotion of public/private partnership for transport, communications, tourism, and energy; interlocutor with IMO for maritime safety
Social Affairs: drug control and related crime, migration, and labor
Human Resources, Science, and Technology: information management and exchange, hydropower development
Trade and Industry: increased intra-African trade, access to global markets, and economic diversification
Rural Economy and Agriculture: fish management, protection, and regulation; management of natural resources and environment; water resource exploitation; protection of rivers and lakes from pollution
Economic Affairs: resource mobilization; vision and assessment for economic development; promotion of the private sector; coordination of development of African economies; monetary and fiscal policies.

step toward attracting investment and improving maritime governance; it would also support combined maritime law-enforcement operations or other forms of cooperative security and follows guidelines already established by the Maritime Transport Charter.

Second, the Maritime Coordination Unit—working with all African Union commissions, the regional economic communities (subregional treaty organizations recognized by the AU), and the private sector—should develop a clear strategy for a maritime economy that includes the enabling elements of governance, infrastructure, trade, safety, and security and plainly tells global partners where they can best contribute. Each AU commission and each regional economic community should then write a plan of action to achieve its particular responsibilities. Continental and global partners need a clear indication of priorities and key tasks, and the AU commissions need guidance for their roles.

Third, the Maritime Coordination Unit would naturally encourage the regional economic communities to involve themselves in their respective regional maritime administrations as established by the Maritime Transport Charter to promote standardization, integration, and implementation of plans and strategies. The AU can provide strategic leadership, but the regional economic communities will have to lead implementation on the regional level.

Fourth, the AU's Maritime Coordination Unit should immediately emphasize the fusing and sharing of maritime information in and among the continent's five early-warning centers. Maritime domain awareness is simply critical for understanding the maritime environment and the development of maritime governance. A great deal of "maritime domain awareness" capability already exists in Africa but is underutilized and ineffective. Fusing information in regional

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centers would encourage better use of equipment at the national level, encourage sharing of information at the regional level, and make a significant contribution to maritime regulation, maritime safety, and law enforcement.

With the Maritime Coordination Unit working on these measures, the special representative should focus next on maritime law enforcement. Both the Djibouti Code of Conduct and MOWCA's Gulf of Guinea Coast Guard network agreement call for combined maritime patrols to enforce international and African maritime laws. A host of global partners are involved in such operations, but the efforts are not well coordinated and African participation is spotty. The special commissioner should coordinate and formalize these partnerships to help provide an immediate law-enforcement capability, build African human capacity, and realize immediate financial gains from the enforcement of laws. Again the regional economic communities could play roles here, especially in brokering patrol agreements in sovereign waters.

Once the African Union establishes clear, strong leadership, it will be well positioned to lead the International Charter for the African Maritime Sector. The special representative can then begin the hard task of developing the technical mechanisms of the International Charter. The good news is that the other immediate actions, taken by now, will have built confidence in global partners.

Certain of these actions—law assessment, strategy development, information fusion and sharing, and combined operations—are relatively easy, inexpensive measures that would immediately demonstrate the African Union's sincerity and resolve to improve the African maritime sector. They would encourage global partners to join the International Charter and go a long way toward addressing maritime issues in and of themselves. Furthermore, the AU does not need to wait for the development of an overarching maritime strategy to begin taking some of these steps; there is already a charter to review the maritime laws, and the regional economic communities provide frameworks for fusing and sharing maritime information. Admittedly, and as noted below, coordinating global combined task forces may involve political or legal challenges, but it is important and should not be pushed aside for that reason. Adding African mariners to combined task forces should be easy (it is already being done, as mentioned above) and will pay big dividends in building human capacity.

WHAT GLOBAL PARTNERS CAN DO NOW

Global partners can continue and expand their efforts to provide platforms for African maritime law enforcement through current protocols, efforts, and relationships. They can also assist AU efforts to fuse and share information. Both are in the mutual interest of the international community and African partners.

Any of the existing counterpiracy task forces could include African boarding teams, thereby enabling African participation and ownership while improving African capacity. The most difficult impediments are likely legal factors surrounding the handling of captured pirates; after nearly two years of operations, however, these should not be insurmountable challenges. Of equal importance, global partners should work with the International Maritime Organization and the AU to consolidate these various task forces into one, coordinated organization in order to improve efficiency and simplify command and control. Under the leadership of the AU, the UN, and African states, such a force should expand its mandate to embrace the enforcement of international and African maritime laws, including those concerning illegal fishing and illegal dumping.

The Southern African Development Community and the United States could continue and expand their support in maritime law enforcement in, respectively, South and East Africa and West and Central Africa. Other partners—whether from Europe, Asia, the Americas, or Africa itself—could join these efforts by sending vessels and boarding teams to operate with Africans, expanding the breadth and duration of the patrols. Global partners could also formalize standing combined task forces; one might envision three to four combined task forces, aligned with the African Union's African Standby Forces (organized and managed by the regional economic communities), operating nonstop to help enforce international and African maritime law. These task forces could even be considered United Nations missions and the personnel employed allowed special UN mission pay and allowances, to encourage participation.

Global partners could provide technical and financial assistance to help the AU and subregional organizations fuse and share information. That would not only help African maritime domain awareness but provide valuable intelligence to maritime law-enforcement operations and improve safety for mariners. Taking these two steps would also enable the IMO, the AU, and the latter's members to begin work on the International Charter for the African Maritime Sector, as well as to concentrate on building and improving maritime governance, trade, commerce, and economies in Africa—leaving the more costly tasks of building coast guards and navies for the middle term.

Finally, there is no reason that stakeholders should delay training programs. Global partners should act quickly to dedicate money specifically to training maritime professionals in the military, police, and civilian sectors—especially in the areas of governance. Investing in human capacity could be as easy as incorporating more African ship riders on the existing international task forces or brokering exchanges of personnel between port authorities, and it is surely one of the most important aspects of building maritime institutions.

Safe and secure African seas, governed by fair and transparent regulations, are on the global agenda. African military and maritime leaders recognize the importance of the matter and have taken some steps to address a few issues. The policy documents, statements, and plans of action they have produced are important tools for organizing action—and combined patrols are important in and of themselves—but Africa lacks an overarching vision that could tie the various efforts together and strike at core problems (development and governance) rather than merely the symptoms (such as piracy). The world needs a strategy for an African maritime economy—a regime led by Africans with committed global partnership, a maritime economy benefiting African national economies and the global market. The African Union has taken some steps in this direction, especially through its Maritime Transport Charter. It is time, however, to move beyond policy papers and on to strategy-based action. Establishing a continental maritime economy—with improved governance, trade, infrastructure, safety, and security—is not an easy task, especially since it involves the laws of fifty-four countries and implies adherence to those laws by the rest of the world.

Establishment of an International Charter for the African Maritime Sector would be a way to meet these ends. Its goals would be to help African member states establish a regional maritime economy with capacity and capability in all maritime sectors; to provide security and law-enforcement support in the short and middle terms; to create a trust to fund improvements; and to erect checks and balances to promote good governance and noncorrupt, efficient, modern maritime structures. While Africa and the rest of the international community works to establish this charter, the African Union and its global partners should inculcate maritime leadership at the AU, review maritime laws, improve information fusion and sharing, and continue to enforce African maritime laws through combined operations. With these bold steps the African Union, its subregional organizations, its member states, and its global partners can make great progress toward an African maritime sector that generates the security, confidence, and efficiency necessary to spark the investment, trade, and jobs vital for the continent's prosperity.

NOTES

1. United Nations Conference on Trade and Development [hereafter UNCTAD], *Review of Maritime Transport 2009: Report by the UNCTAD Secretariat* (New York: 2009), p. 160.
2. Ibid., pp. 162–63.
3. Ibid., p. 160.
4. International Maritime Organization [hereafter IMO], "International Shipping and World Trade Facts and Figures," *International Maritime Organization,* October 2009, www.imo.org/.

5. Gylfi Pálsson, Alan Harding, and Gaël Raballand, *Port and Maritime Transport Challenges in West and Central Africa,* Sub-Saharan Africa Transport Policy Program (SSATP) Working Paper 84 (Washington, D.C.: SSATP, May 2007), p. 11, available at www4.worldbank.org/.
6. Ibid., p. xiii.
7. UNCTAD, *Review of Maritime Transport 2009,* p. 164.
8. Most sources use the measure of the TEU, or twenty-foot equivalent unit. According to UNCTAD (ibid., p. 38), the average vessel is now 2,618 TEUs. Pálsson, Harding, and Raballand, *Port and Maritime Transport Challenges in West and Central Africa,* reports (p. 9) that West African ports typically receive ships of 1,000–2,000 TEUs, due to inefficiency and poor dredging.
9. Pálsson, Harding, and Raballand, *Port and Maritime Transport Challenges in West and Central Africa,* p. xiii.
10. Ibid.
11. UNCTAD, *Review of Maritime Transport 2009,* p. 169.
12. African Union, Commission for Infrastructure and Energy, *Durban Resolution on Maritime Safety, Maritime Security, and Protection of the Marine Environment in Africa* (Durban, South Africa: 16 October 2009). The African Union heads of state further endorsed this resolution during the fourteenth annual African Union Summit in Addis Ababa, Ethiopia, in January 2010. This resolution is not yet official policy.
13. African Union, Commission for Infrastructure and Energy, "African Maritime Transport Charter" (Durban, South Africa: 16 October 2009). The African Union heads of state further endorsed this charter during the fourteenth annual African Union Summit in Addis Ababa, Ethiopia, in January 2010. This charter is not yet official policy.
14. Ibid., p. 16.
15. African Union, Commission for Infrastructure and Energy, *African Maritime Transport Plan of Action* (Durban, South Africa: 16 October 2009). The African Union heads of state further endorsed this plan of action during the fourteenth annual African Union Summit in Addis Ababa, Ethiopia, in January 2010. This plan is not yet official policy.
16. The Brenthurst Foundation, *Maritime Development in Africa: An Independent Specialist's Framework* (Johannesburg: E. Oppenheimer, June 2010).
17. The author had the good fortune of being invited to this conference. For that opportunity he thanks the organizers of the workshop and commends them for their interest in maritime security and their efforts at inclusivity.
18. IMO, *The Code of Conduct Concerning the Repression of Piracy and Armed Robbery against Ships in the Western Indian Ocean and the Gulf of Aden* (Djibouti: 29 January 2009) [hereafter Djibouti Code of Conduct].
19. IMO, *Report of the Sub-regional Meeting to Progress the Implementation of the Djibouti Code of Conduct* (Victoria, Seychelles: 16 October 2009).
20. Economic Community of Central African States, *Securing the Vital Interests of the ECCAS States of the Gulf of Guinea Structured around COPAX and Contributing to Synergy within the Gulf of Guinea Committee and ECOWAS* (Libreville, Gabon: October 2008).
21. Southern African Development Community, *Statement of Commitment by SADC Ministers Responsible for Marine Fisheries on Illegal, Unreported, and Unregulated Fishing* (Windhoek, Namibia: 4 July 2008).
22. In American parlance "joint" indicates the involvement of multiple military services. In Africa the word more often refers to multinational operations, which the U.S. military and NATO call "combined."
23. "Southern African Joint Surveillance Patrol Gets Tough on Illegal Fishers," *Stop Illegal Fishing,* March 2009, www.stopillegalfishing.com/.
24. Col. L. E. Kasai, Republic of Tanzania Navy, interview with the author, Mombasa, Kenya, March 2010.
25. "MOWCA Update 2/10: Sub-regional Coast Guard Network—14 MOWCA Member States Sign MOU," *Maritime Organization of West and Central Africa,* 31 July 2009, www.mowca.org/.
26. Ibid.

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27. "MOWCA Update 2/10: MOWCA to Establish an Association of Maritime Administrations/Merchant Marines (MAMA)," *Maritime Organization of West and Central Africa,* n.d., www.mowca.org/.
28. Christian Ménard, "Sur la piraterie maritime" (Paris: Assemblée nationale, Constitution du 4 octobre 1958, Treizième Législature, 13 May 2009).
29. Only Kenya and the Seychelles have taken any action against pirates, agreeing to try captured pirates in court.
30. The author is a primary source of information on this topic.
31. See Kathi A. Sohn, "The Global Fleet Station: A Powerful Tool for Preventing Conflict," *Naval War College Review* 62, no. 1 (Winter 2009), pp. 45–58, available at www.usnwc.edu/press/.
32. U.S. Naval Forces Africa uses the term "banner ship" to refer to large-deck platforms that deploy to Africa exclusively to conduct maritime safety and security training under the auspices, or "banner," of the Africa Partnership Station. To support "banner" ship deployments, Naval Forces Africa hosts multinational planning meetings involving each African and global participant in order to determine capacity or capability needs to be addressed during the cruise.
33. The author is a primary source of information on this topic.
34. Morocco and Senegal did not use boarding teams operating from American vessels; rather, the U.S. Coast Guard cutter *Legare* (WMEC 912) operated with partner-country craft.
35. Paul Collier discusses the concept of international charters in detail in his *The Bottom Billion: Why the Poorest Countries Are Failing and What Can Be Done about It* (New York: Oxford Univ. Press, 2008). The concept of the International Charter for the African Maritime Sector is derived from Dr. Collier's work.
36. African Union, *Report of the 3rd Ordinary Session of the Executive Council on the Proposed Structure, Human Resource Requirements and Conditions of Service for the Staff of the Commission of the African Union and Their Financial Implications* (Maputo, Mozambique: 4–8 July 2003), available at www.africa-union.org/. Departments are listed in order as found in the Maputo document. The word "maritime" is found in only two places in this document—pages 85 and 86, in the description of the duties of the Department of Energy and Infrastructure.

THE DEVELOPMENT OF THE ANGLED-DECK AIRCRAFT CARRIER

Innovation and Adaptation

Thomas C. Hone, Norman Friedman, and Mark D. Mandeles

In late 2006, Andrew Marshall, the Director of the Office of Net Assessment in the Office of the Secretary of Defense, asked us to answer several questions: Why had the Royal Navy (RN) developed the angled flight deck, steam catapult, and optical landing aid before the U.S. Navy (USN) did? Why had the USN not developed these innovations, which "transformed carrier design and made practical the wholesale use of high-performance jet aircraft," in parallel with the RN?[1] Once developed by the RN, how had these three innovations "jumped the gap" to the USN?

The detailed answers to these questions are in a study *(Innovation in Carrier Aviation)* that we submitted to Mr. Marshall.[2] In the present article we summarize the relevant, complex history contained in that study and draw some inferences about innovation from our findings.

Dr. Hone is a professor at the Center for Naval Warfare Studies in the Naval War College, liaison with the Office of the Chief of Naval Operations, and a former senior executive in the Office of the Secretary of Defense and special assistant to the Commander, Naval Air Systems Command. With his son Trent, he is the author of Battle Line: The United States Navy, 1919–1939.

Dr. Friedman has written more than thirty-five books on naval and national security subjects. His most recent books are Network-centric Warfare: How Navies Learned to Fight Smarter in Three World Wars *and* Unmanned Combat Air Systems: A New Kind of Carrier Aviation.

Dr. Mandeles, founder and president of The J. de Bloch Group, an independent consulting company, has served as a consultant to the U.S. Joint Forces Command, the Office of Net Assessment in the Office of the Secretary of Defense, and other Defense Department agencies and private industry. He is the author of The Development of the B-52 and Jet Propulsion: A Case Study in Organizational Innovation; The Future of War: Organizations as Weapons; *and* Military Transformation Past and Present: Lessons for the 21st Century.

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THE PROBLEM

In the winter of 1944–45, a committee of senior officers of the Royal Navy decided that in the future most carrier aircraft would be jets and that the design of carriers would have to be modified to "fit" the following characteristics of early jet aircraft:

- Jets landed at higher speeds than piston-engine aircraft. In fact, to have optimal control, the pilot

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would have to land with "power on" instead of killing his engine when the landing signal officer gave the "cut."

- Jets accelerated slower than piston-engine planes on takeoff. They would need to be catapulted off the carrier's deck.
- Early jet turbine engines consumed more fuel than piston engines, which meant that it was important to find ways to keep the jets in the air as long as possible, especially if jet fighters were to serve as the force's combat air patrol.[3]

The committee that had defined the problems of operating jet aircraft from carriers turned to the Royal Navy's technical experts at the Royal Aircraft Establishment (RAE) at Farnborough, England, for detailed methods of solving those problems.

In 1938, the RAE had created its Catapult Section, a branch of its larger Main Drawing Office. The Catapult Section was composed of skilled engineers, technicians, and "draughtsmen" who specialized in designing and testing catapults and arresting gear for Royal Navy carriers. This "ground crew" was assisted by experienced test pilots. In April 1945, the Catapult Section was renamed the Naval Aircraft Department. Its head was a civilian engineer named Lewis Boddington. He was already deeply involved in the task of finding a way to create a new kind of carrier for jet aircraft.[4]

On 7 June 1945, the Naval Aircraft Department submitted a "Proposed Programme of Experimental Work" to the head of the RAE. The goal of this effort was to test the feasibility of using jets without undercarriages on aircraft carriers. There were four stages to the department's plan. Stage 1 was a detailed program of experiments with models. During stage 1, a special concrete pit, two hundred feet by seventy feet, would be built at Farnborough in order to test a pneumatic deck. In stage 2, dummy aircraft (Hotspur gliders) would be dropped on and towed across a temporary "flexible deck." At the same time, the engineers at the RAE would be designing a full-scale deck for use at sea.

In stage 3, actual jet aircraft would test the flexible, or pneumatic, deck at Farnborough. Their tests would determine the proper procedures for landing a fighter without landing gear on a "flexdeck." Stage 4 would consist of tests at sea. By then the RAE hoped to have "a mechanical sighting instrument which will convey to the pilot by an automatic 'batsman' or by a relayed signal . . . the approach he is making and indicate the correction, if any."[5]

By June 1945, then, Boddington and his colleagues had identified two solutions to the problems outlined by senior Royal Navy officers the previous winter —a new form of landing deck and an improved means of guiding pilots of jets onto that deck. Boddington followed the 7 June proposal with a paper dated 17

July arguing that "the large increase in take-off speed which will result from the developments in the [jet] aircraft . . . , and the resulting necessity to remove the present free-deck take-off restrictions will demand assisted take-off under all conditions."[6]

There they were: a modified landing deck, a landing aid to assist pilots, and "assisted take-off under all conditions." These three ideas would make the modern aircraft carrier possible. They were "on the table," so to speak, in the summer of 1945. It would take ten years to go from this remarkable insight to the first really modern carrier, USS *Forrestal*.

ADAPTATION VS. INNOVATION

What about the USN? Were its carrier aviation specialists doing the same kind of thinking and planning as their counterparts in the RN? The answer is yes and no. At the end of 1944, for example, Vice Admiral Marc Mitscher, who had commanded Task Force 38 at the battles in and around the Philippines in October of that year, recommended to the staff of the Chief of Naval Operations (CNO) that an informal board consider developing an aircraft carrier design that would take account of the lessons learned during the major carrier operations of that year. His recommendation was seconded by the "type commander" of Navy air forces in the Pacific.[7]

The head of the Aviation Military Characteristics branch in the office of the Deputy Chief of Naval Operations (Air)—known as DCNO(Air)—Captain William T. Rassieur, accordingly studied the actual and potential impacts of new and heavier aircraft on the existing *Essex* class and on the larger *Midway*-class carriers then under construction. Rassieur's analysis considered the carrier air group and the carrier as a single system. His argument was that the purpose of this system was to generate sorties. To do that optimally, the carrier needed multiple catapults that could operate simultaneously. In addition, the carrier's aircraft elevators would need to be located at the edges of the flight deck in order to free up deck space for aircraft waiting their turns at the multiple catapults.[8]

By the end of June 1945, Captain Rassieur had submitted his analysis to the board that had been created on the basis of Vice Admiral Mitscher's recommendation. Early in July, the members of that board endorsed the concept of a carrier with "a radically redesigned flight deck and a new mode of operations."[9] In parallel with the deliberations taking place in the office of DCNO(Air), engineers in the Navy's Bureau of Aeronautics (BuAer) studied the potential of turboprop-driven aircraft on carriers. Their work led the chief of BuAer, Rear Admiral Harold B. Sallada, to propose to the CNO in December 1945 that the Navy develop and procure carrier-based bombers that could carry very heavy bomb loads.[10]

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The new DCNO(Air) was Vice Admiral Mitscher. He endorsed Sallada's recommendation, as did the CNO, Admiral Chester Nimitz. In February 1946 the Vice Chief of Naval Operations, Admiral (and aviator) DeWitt Ramsey, directed the Navy's Bureau of Ships (BuShips) to initiate a new carrier design study. As Norman Friedman discovered, BuShips had a new preliminary design (termed "C-2") ready in April.[11]

However, there was also another carrier concept under development in 1946. C-2 was a modification of the *Midway* design; its primary purpose was to carry and launch very large bombers. But the Bureau of Ships was also working on a new fleet carrier—a general-purpose carrier (CVB-X) to succeed the World War II *Essex* type.[12] CVB-X, which eventually became the ill-fated *United States* (canceled by the Secretary of Defense in 1949), was also designed to carry large bombers, for both nuclear and conventional missions.

The interest in nuclear attack inside the Navy was strong. BuAer produced an "outline specification" for what became the AJ Savage carrier bomber in January 1946.[13] Private firms were requested to respond to the specification, and senior military officers and civilians within BuAer met in March of that year to decide whether the plane could be developed.[14] The Aircraft Laboratory of the Naval Air Materiel Center (NAMC) was already developing preliminary bomber designs and gathering information on land-based bomber designs being considered by the Army Air Forces.[15]

In June 1946, Rear Admiral Jerauld Wright, the Deputy Chief of Naval Operations (Plans & Policy), had argued to the CNO, Nimitz, that the existence of nuclear weapons—even the large and heavy plutonium bomb used against Nagasaki in August 1945—justified building large, long-range carrier bombers and carriers to support them.[16] In July, the acting Secretary of the Navy, John L. Sullivan, wrote to President Harry Truman that the "high mobility of the Naval Carrier Task Force combined with its capacity for making successive and continuous strikes in almost any part of the world make this force a most valuable means of waging atomic bomb warfare."[17] As retired Vice Admiral Jerry Miller was to put it in 2001, the nuclear mission became the "only game in town" after World War II.[18]

Very quickly, the U.S. Navy went in a different direction from the Royal Navy. For the RN, the focus in 1945 and 1946 was on rethinking the design and flight-deck operations of an aircraft carrier to fit the characteristics of jet aircraft designed for the mission of convoy protection. The RN did not envisage a nuclear strike role for its carrier aircraft. The USN, by contrast, focused on heavy attack and then on nuclear strike—operations emphasizing new and larger aircraft on new and larger carriers. Unlike the RN, the USN had to prove that it

could play as an equal with a land-based air force (what would become in 1947 the U.S. Air Force) in the mission of nuclear strike.

But this meant that the U.S. Navy wanted to *adapt* carriers and carrier aircraft to a new mission, while the Royal Navy wanted to overcome the problems (higher landing speeds, the reduced responsiveness of turbojet engines, etc.) that made it almost impossible safely to operate jet aircraft on existing carriers at all. The RN's technical specialists at Farnborough understood that they had to innovate. The USN also had to innovate, but in a very different way and at a different level. It had to show that a relatively heavy bomber, weighing over sixty thousand pounds, could be launched from a carrier.[19] Making that happen was the primary mission of the U.S. Navy's carrier aircraft community after mid-1946.

THE RN AND THE USN GO IN DIFFERENT DIRECTIONS

In 1946, the engineers and technicians at Farnborough were actively developing and testing their prototype flexdeck, or cushioned carrier landing deck. The flexdeck was actually "an interim measure which, if used with existing jet designs with their undercarriages removed, would teach us a lot and show the way to the solution" of the problem of creating a new type of carrier. That, at least, was the view of Rear Admiral M. S. Slattery, the RN's Chief of Naval Research, in April 1945.[20]

After extensive tests of developmental models of flexible landing surfaces, the staff at Farnborough began working on a full-scale system in January 1946. As anticipated, some major problems developed. The "cushion" for the flexible deck was composed of a series of inflated, sausage-shaped flexible cylinders. On top of the cylinders was a flat rubber deck—the "carpet"—along which the landing aircraft was to skid. Tests with modified gliders dropped onto such a surface showed that a method had to be found to keep the weight of the landing aircraft from pushing one inflated cylinder over its neighbors and thereby reducing dramatically the cushion effect.[21]

The real problem confronting the ground crew at Farnborough, however, turned out to be the carpet itself. As one of the engineers observed, "nothing of this magnitude had been attempted before, [and] a great deal of experimental work with the manufacturers [was] necessary before the design could be finalized."[22] Beginning in March 1947, the engineers and technicians at Farnborough began testing a flexible deck two hundred feet long and sixty wide, complete with its own arresting gear cable. The first manned landing was made on 29 December 1947 by the noted RN test pilot Eric Brown, and it nearly cost him his life.[23] He was fortunate not to be seriously injured or killed.

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Tests continued in 1948, and Brown made "forty of these landings in all" at Farnborough.[24] Then the flexible deck was installed aboard carrier HMS *Warrior,* and Brown put a Vampire down on it for the first time on 3 November 1948. After a long string of successful landings, Brown argued in his report of the trials on *Warrior* "that the principle of flexible deck landing for undercarriageless aircraft is fundamentally sound. . . . It may even be that future swept-back and delta plan form aircraft will be forced to adopt this method of landing on carriers, since all calculations point to serious wheeled landing problems on such aircraft."[25]

Brown was puzzled that other navies did not perceive the utility of the flexdeck. He knew that the U.S. Navy's Bureau of Aeronautics had watched the progress of the RN's work, and he knew that engineers in BuAer were interested in it.[26] What he may not have known about, however, was the opposition to the flexdeck by BuAer's chief, Rear Admiral Alfred M. Pride.[27] Once Pride left BuAer and became the aviation type commander for West Coast aircraft in May 1951, the engineers in BuAer who thought that the flexdeck might have potential got the green light to develop a version for the U.S. Navy.[28] Though that version was eventually tested, the USN never adopted the flexdeck, mostly for the same reasons that the RN did not make it standard.[29]

In fact, for convoy protection the USN developed vertical-takeoff-and-landing aircraft—aircraft that convoy escorts could carry. BuAer issued a request for proposals to industry for such aircraft in 1948 and tested two unique experimental models in 1954–55.[30] Neither had the performance required.

In effect, the RN's technical experts worked on how to create an innovative carrier/jet combination after World War II. The work of their American counterparts was overshadowed by the U.S. Navy's effort to develop carrier aircraft that could carry the large nuclear weapon then in existence. The Bureau of Aeronautics ordered the AJ-1 Savage—"the smallest plane which can carry the atomic bomb"—from North American Aviation in June 1946.[31] The Savage was a piston-engine aircraft with a turbojet engine in its tail. At a loaded weight of over fifty-two thousand pounds, it was significantly heavier, as well as somewhat larger, than the North American PBJ-1H twin-engine bomber that was launched from and then recovered aboard USS *Shangri-La* (CV 38) in November 1944.[32] In November 1946, the Chief of Naval Operations "directed the DCNO(Logistics) to modify the three CVBs [*Midway*-class carriers] to permit the operation of AJ Savages carrying atomic bombs."[33]

This, then, was the pattern of USN development: first, develop the AJ-1 and design a successor jet-only bomber (the A3D Skywarrior); simultaneously, modify the three *Midway*s so they could operate the AJ-1; and third, design a new carrier built expressly for an aircraft with the weight and performance

characteristics of the A3D. In the meantime, to make it clear to senior officials in the administration of President Harry Truman that the Navy could operate nuclear-armed bombers from its carriers, demonstration flights would be launched from *Midway*-class carriers using long-range P2V-3C Neptunes, each weighing over seventy thousand pounds. All this was an audacious effort—nothing less than a gamble. Over a period of less than five years, the AJ-1 Savage was pushed prematurely into operations, the Bureau of Ships spent many man-years on the design of a "super" carrier, BuAer solicited bids for what became the A3D, and Navy pilots flew their P2V-3Cs off *Midway* and its two sisters.[34]

THE RN AND THE U.S. NAVY COME BACK TOGETHER

This series of events was very different from what was happening at RAE Farnborough. The flexdeck, though demonstrated successfully at sea, had proved not to be the solution to the challenge of merging jet aircraft with carriers. The basic problem was that the flexdeck left very little room to line up aircraft at the forward end of a carrier's flight deck to await their turns at the forward catapult. As Captain Dennis Cambell, an experienced naval aviator then serving as the Deputy Chief RN Representative at the Ministry of Supply, would recall, the "difficulties [with the flexdeck] were insurmountable." On 7 August 1951 he chaired a meeting of naval officers and technical experts to determine whether the RN could design a carrier capable of operating aircraft with or without undercarriages.[35] Lewis Boddington was one of the attendees.

The result of this meeting—where Cambell first presented his idea of an angled flight deck—and of some thinking by Boddington afterward was a flight deck angled enough to port so that any landing aircraft that did not successfully engage the arresting gear wires could accelerate, take to the air again, and rejoin the landing "pattern" to make another attempt.[36] In the meantime, Rear Admiral Pride, as chief of BuAer, had already directed the Naval Air Test Center (NATC) in Patuxent River, Maryland, to study means of making jet landings on carriers safer.[37] As we have already noted, Pride had refused to support the flexdeck concept, but he quickly embraced the concept of the angled flight deck—an idea that BuAer had considered in the 1930s for a combination cruiser/small-carrier design.[38]

Sources differ on just how the angled-deck concept jumped the gap between the Royal and U.S. navies. Contacts between Royal Navy and U.S. Navy aviation officers during World War II were very strong, and the RN continued to assign liaison officers to BuAer after the war.[39] British technical specialists also stayed close to their American contemporaries. For example, the U.S. Navy provided the RN in November 1948 a full set of deck plans for the eventually canceled carrier *United States* (CVA 58) and detailed drawings of carrier *Midway* (CV 41),

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along with information regarding the development of arresting gear suited to the larger carrier aircraft then being developed.[40]

In his memoir, Captain (later Rear Admiral) Cambell notes that he mentioned the angled-deck concept to a delegation of U.S. Navy officers in September 1951. As he recalls, "they said very little, but . . . they exchanged significant looks. A few weeks later we heard . . . that the USN were already planning to angle the flight deck of the carrier *Midway,* for a preliminary trial."[41] In his *Wings on My Sleeve,* test pilot Eric Brown noted that he had been directed by his superiors to take "with me details of a new idea to revolutionize carrier-deck landing" when he joined the U.S. Navy's test pilots at the NATC in late summer 1951.[42] Harold Buell, who commanded Fighter Squadron 84 on *Antietam* (CV 36) in early 1953, later remembered that Brown's espousal of the angled deck did not immediately gain support at the NATC, because Brown "was talking of only a four-degree deck angle, which would drastically limit the number of aircraft on a carrier deck during flight operations. . . . However, the idea sparked further thinking, and when the angle was increased to eight degrees . . . , it was decided to test the concept further."[43]

Preliminary tests in the spring of 1952 with an angled deck painted on *Midway's* axial flight deck were so promising that the U.S. Navy began converting *Antietam* to an angled-deck configuration in late summer that same year. In January 1953, tests at sea on *Antietam* were successful, and Carrier Air Group 8 spent just over two months learning how to use the new deck configuration during exercises off Guantanamo Bay, Cuba. As then–Lieutenant Commander Buell observed, "To an experienced tailhooker, landing a jet airplane on an angled deck was sheer bliss."[44]

It's important to note here that the experiments with the angled deck paralleled the introduction of the steam catapult into the U.S. Navy. After World War II, BuAer invested in three basic catapult types: improved versions of existing hydraulic catapults; an electrically driven design; and a slotted-cylinder, expanding-gas type that had been pioneered by German engineers during the war. An improved hydraulic catapult designated H-8 was installed on modernized *Essex*-class carriers, and it satisfactorily launched the first jets. But the hydraulic approach seemed to be nearing the limit of its effectiveness.[45] BuAer was developing heavier and heavier aircraft, such as the AJ Savage and what would become the A3D Skywarrior. In January 1949, therefore, Rear Admiral Pride reached the conclusion that slotted-cylinder, explosive-gas catapults would eventually replace the existing hydraulic equipment.[46]

The slotted-cylinder catapult was a long tube with a nearly full-length slot in its upper surface. A piston could be driven under pressure at high speed down the length of the tube. Fitted to the piston was a hook extending upward through

the slot, and the hook was attached to a bridle that could be connected to an airplane on the flight deck. Two problems faced the designers of slotted-cylinder catapults. The first was safely generating the expanding gas that would drive the piston down the cylinder at the proper rate of acceleration. The second was sealing the slot behind the piston as the piston traveled. The catapult developers working under the Bureau of Aeronautics could not solve these problems.[47]

BuAer's catapult developers knew about the Royal Navy's work on a steam catapult, but they ranked it third in importance, after their own explosive-driven and hydraulic models.[48] But by 1951 the Royal Navy was successfully launching aircraft from an experimental steam catapult built on top of the flight deck of the ex-carrier HMS *Perseus*. Rear Admiral Apollo Soucek, then the senior U.S. Navy aviator in the U.S. embassy in London, recommended that the U.S. Navy pay the cost of having *Perseus* demonstrate its steam catapult in the United States.[49] The Chief of Naval Operations approved the proposal, and *Perseus* arrived at the Philadelphia Naval Shipyard in January 1952.

The tests of the RN's steam catapult, performed while *Perseus* was tied up in the shipyard, were a signal success, but BuAer's Captain Sheldon W. Brown, head of the Ships Installations Division, was concerned that the installation on *Perseus* would not withstand the greater steam pressures used by U.S. Navy carriers.[50] In Philadelphia, and later at tests at Norfolk, Virginia, *Perseus*'s catapult used steam at a pressure of 350 pounds per square inch (psi). Brown warned that the steam catapult might not perform well with the 600 psi steam provided by the American propulsion plants. As it turned out, Brown's fears were not justified.[51]

By the spring of 1952, senior aviation officers in the U.S. Navy were convinced that the RN's steam catapult would work on their ships and would accelerate their heavy attack aircraft to flight speed. A year later, as we have seen, the angled deck had proved itself operationally. The next step for the U.S. Navy was to install both innovations in existing carriers and in carriers under construction, such as the new carrier *Forrestal* (CV 59). In the meantime, the RN was developing the mirror landing system that was to make possible the optical glide slope for landing on carriers.

In the summer of 1951, Lieutenant Commander Hilary "Nick" Goodhart, working under Captain Cambell, devised an ingenious method for guiding jet aircraft at the proper angle onto an angled flight deck. The idea was to use a light source at the stern of the carrier to project a "ball" of light into a stabilized mirror located next to the angled landing deck and angled at three degrees to the vertical. If the pilot, coming in to land, kept the ball right in the middle of the mirror, the plane would descend at the correct angle for a safe landing. Cambell endorsed the idea, and the technical staff at Farnborough, some of whom had been working on a radar-guided landing aid for some time, developed a

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prototype device and tested it successfully in March 1952.[52] An improved version of the prototype went to sea on carrier *Illustrious* in October.

In 1953, Lieutenant Commander (later Vice Admiral) Donald D. Engen, a USN exchange officer at the RN's Empire Test Pilots School at Farnborough, tested the optical landing aid at Farnborough and then at sea, on *Illustrious*. Engen recognized the value of the system and how it would complement the angled deck. He enthusiastically endorsed the RN's equipment and operations in reports to the Office of the Chief of Naval Operations and the NATC.[53] As a result, BuAer had an optical landing aid fully operational on *Bennington* (CV 20) in the summer of 1955.

Because it had more funds, the USN was able to combine the three innovations —angled deck, steam catapult, and optical landing aid—in a new carrier *(Forrestal)* before the RN could complete its new *Ark Royal*. *Forrestal* had been designed as an axial-deck carrier. Approved in the fall of 1950 for inclusion in the fiscal year 1952 shipbuilding program, *Forrestal* "was commissioned on 1 October 1955, despite having been redesigned (with an angled deck and steam catapults) during the course of construction."[54]

LESSONS LEARNED

It is always risky to draw lessons from a single case, because there is no guarantee that any future case will resemble closely enough the one under study. Nevertheless, we believe that some useful lessons can be gleaned from the research that we did for the Office of Net Assessment. We will cover these lessons as we answer the questions that were posed to us by Andrew Marshall.

Why did the Royal Navy develop workable catapults, the concept of the angled deck, and an effective optical landing aid before the U.S. Navy did? There is no one answer to this question. However, what is striking in this instance is the accuracy with which the RN's officers and technical specialists initially defined the problems posed by the adoption of jet aircraft. As we showed in our earlier study, *American & British Aircraft Carrier Development,* the RN's carrier arm had fallen behind its competitors in the U.S. and Japanese navies before World War II.[55] By the summer of 1945, a majority of aircraft on British carriers operating in the Pacific were American designs, and RN carriers were using what the USN called the "deck park" as an integral element of flight-deck operations.[56]

But the RN had a wartime staff-committee system that could and did recover from the errors made prewar, and the officers involved realized in the winter of 1944–45 that jet aircraft posed a series of interrelated problems for existing carriers. The RAE engineers at Farnborough defined those problems in quantitative terms and systematically analyzed potential solutions to them. The result was,

first, the flexdeck concept and then a series of experiments to demonstrate that the prototype flexdeck would actually work.

A complement to the flexdeck was a slotted-tube catapult designed to launch the jets without undercarriages. It was tested successfully at Farnborough in November 1953, but by then it had already been superseded by a steam-powered slotted-tube design that had been patented by Colin Mitchell in 1938.[57]

Fortuitously, everything came together for the RN in the summer and fall of 1951. The flexdeck was dropped in favor of the angled deck. The steam catapult proved itself reliable and effective in launching aircraft with landing gear. Commander Goodhart's concept of an optical (or mirror) landing aid turned out to be efficacious.

Where was the U.S. Navy while all this was going on? Its senior aviation officers were preoccupied with three issues: first, demonstrating that Navy carrier aircraft could carry nuclear weapons; second, defending naval aviation in the acrimonious dispute with (after the summer of 1947) the U.S. Air Force over service roles and missions; and third, developing reliable and powerful turbojet engines.[58] The larger Navy was also going through a series of major internal changes, including experiments with nuclear power and missiles, plans for deploying two major fleets (one each to the western Pacific and the Mediterranean), and adapting its staff structure in Washington, D.C., to a new pattern of national-security decision making.[59]

In effect, the U.S. Navy's leaders were distracted. They also suffered from the effects of a change made to the organization of OPNAV, the Office of the Chief of Naval Operations, during World War II: in 1943, the Secretary of the Navy had created a deputy Chief of Naval Operations for aviation. This decision centralized policy making for naval aviation inside OPNAV, but the senior officers there were, as we have noted, preoccupied with a range of demanding issues after 1945. What they therefore wanted from the Bureau of Aeronautics was aircraft that could carry nuclear weapons, facilities on the *Midway*-class carriers for the storage and assembly of nuclear weapons, and one or more new carriers to get the new heavy bombers within striking range of the Soviet Union. In a sense, the OPNAV officers were revolutionaries. They wanted to give the Navy's carriers a new role, a strategic role, but they also aimed only to *adapt* the existing concept of the aircraft carrier to a new family of heavy bombers.

For their part, the U.S. Navy's catapult designers believed that their planned innovations—especially the replacement of hydraulic catapults with new gas-powered, slotted-tube designs—would work, but they did not. In addition, the most pressing problem for the NAMC's engineers in the two years after World War II was developing a new barrier that could safely stop jets that had

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missed arresting gear wires as they landed.[60] The NAMC's engineers were struggling to adapt existing equipment and concepts to carrier aviation. Their counterparts at Farnborough, by contrast, began their postwar studies with an innovative mind-set and kept it. Consequently, it took aviator Rear Admiral Soucek to convince two successive chiefs of naval operations to bring the steam catapult to the United States for trials. The success of those trials convinced the CNO, then Admiral William Fechteler, to force the Bureau of Aeronautics to adopt it.

It was not sheer stubbornness that kept the U.S. Navy's catapult engineers from embracing the steam catapult. They simply did not think it would work with the high-pressure, high-temperature steam produced by the boilers of the U.S. Navy's carriers. Only the success of the trials with HMS *Perseus* compelled BuAer's specialists to change their minds, and even then they believed that their own designs would eventually prove superior to the RN's steam catapult.

Their resistance to the steam catapult is a sign that the consensus reached in the RN in 1945 regarding the new relationship between jet aircraft and carriers took longer to develop within the U.S. Navy. For example, the Bureau of Ships was saying *in 1953* that "the transition from propeller to jet propulsion . . . has . . . thrown the design of aircraft carriers into a transition stage. Some of the results of this transition, canted decks and steam catapults, are, of course, already with us. Another change less apparent, but still fundamental, is the shift in the aeronautical factor that exerts the predominant influence on the size of aircraft carriers."[61] What this sort of thinking shows, in our view, is that the USN's technical specialists were slower to grasp the nature of the jet-carrier relationship than their RN counterparts.

That is one major reason why the U.S. Navy did not develop the angled deck, steam catapult, and optical landing aid in parallel with the British. American aviators did recognize the need for deck-edge aircraft elevators, as Captain Rassieur's 1945 analysis shows, and the British picked up on this idea. However, OPNAV, BuAer, and BuShips lacked the shared understanding that placing jets on carriers meant that the carriers had to change in a fundamental way.

Put another way, there was no one forum where all the implications of operating jets from carriers could be put on the table. Instead, the USN moved along administratively through a series of negotiations among the organizations concerned. This was not a *failed* process—it produced carrier bombers capable of carrying nuclear weapons. But it was a *flawed* process, in that it needed the RN's innovations to make *Forrestal* and its successors effective strike platforms.

There is another factor to consider, that of creative and perceptive individuals. The RN had the creative engineer Lewis Boddington, the gifted test pilot Eric Brown, and officers like Dennis Cambell and Nick Goodhart. The U.S. Navy

drew on the talents of such aeronautical engineers as Edward Heinemann of Douglas Aircraft; on its own test pilots, like Donald Engen; and on the bureaucratic support provided by such officers as Rear Admiral (later Admiral) Arthur W. Radford, DCNO(Air) from January 1946 through February 1947. There was plenty of talent available to both navies, but having the right individuals in the right place at the right time is often a matter of chance, and chance favored the RN.

Still, making the best use of their talents does not have to depend on chance, which is why integrating organizations and processes are important. Committees are often disparaged as places where officials waste time. But committees and meetings of the right sort are often essential if innovation is to take place. It was from one such committee that the angled-deck concept came, and it was through meetings between U.S. and Royal Navy officers that the concept made its way from Britain to the United States.

Finally, why did the RN's innovations "jump the gap" so quickly between navies? The answer is clear from the available evidence. The close contact between U.S. Navy and RN officers and civilians that had developed during World War II continued afterward. There were exchange programs for test pilots; information was passed from American naval and aeronautical engineers to their British counterparts, and vice versa; and contacts made between senior uniformed officers facilitated communications. For example, Rear Admiral James Russell, BuAer chief in 1955, was a good friend of the RN's Dennis Cambell.

Perhaps the most important "lesson learned" is that uncertainty must be recognized and then dealt with openly and systematically in order for innovation to take place. The RN's officers saw right away that operating jets from aircraft carriers was a challenge and that overcoming that challenge would require innovative thinking. Civilians like Lewis Boddington accepted the challenge and innovated accordingly. When the flexdeck seemed to be not the right answer, Boddington jumped quickly to the angled deck. He and his colleagues dropped the flexdeck without asking for a chance to modify it. Their aggressive pursuit of *something that would work* marked the team of developers at Farnborough, and it seems always to be the mark of real innovators.

NOTES

The authors have developed the article's argument, background, and evidence in greater detail in *Innovation in Carrier Aviation,* forthcoming in 2011 from the Naval War College Press as the thirty-seventh in its Newport Papers monograph series. Newport Paper 37 will be available for sale online by the U.S. Government Printing Office and in PDF format on the Naval War College Press website.

1. Norman Friedman, *U.S. Aircraft Carriers: An Illustrated Design History* (Annapolis, Md.: Naval Institute Press, 1983), p. 263.
2. Forthcoming from the Naval War College Press as number 37 in its Newport Papers monograph series.
3. Norman Friedman, *British Carrier Aviation: The Evolution of the Ships and Their Aircraft* (London: Conway Maritime, 1988), chap. 13.
4. Geoffrey Cooper, *Farnborough and the Fleet Air Arm* (Hersham, Surrey, U.K.: Midland, 2008). See also "Undercarriage-less Aircraft, Operation from Aircraft Carriers: Development," minutes of a meeting held at the Ministry of Aircraft Production (MAP) on 18 April 1945 (SB61567), folder AIR 2/5785, Public Record Office, Kew, Richmond, Surrey, U.K. [hereafter PRO].
5. "Operation of Undercarriage-less Aircraft: Proposed Programme of Experimental Work," 7 June 1945 (Naval/2001-4/LB/43), folder Avia 13/654, PRO, p. 3.
6. L. Boddington, "Assisted Take-off for Future Naval Aircraft (A paper for discussion at the Naval Aircraft Research Sub-committee on 17th July)," folder Avia 13/654, PRO, p. 1.
7. Friedman, *U.S. Aircraft Carriers,* pp. 227, 230.
8. Ibid., p. 228. Captain Rassieur was a member of the informal advisory board that Vice Admiral Mitscher had wanted DCNO(Air) to create. See Chief of Naval Operations [hereafter CNO], memorandum to the twenty-six members of the board, "Advisory Board to assist CNO (DCNO[Air]) in formulating Recommendations as to the Characteristics of Naval vessels whose primary function is carrying and tending aircraft," 27 April 1945, Op 31-F-HBT:mlu, SC S1-1/CVB, ser. 099131. This memo was in the CominCh/CNO 1945–46 files at the Naval Historical Center (now Naval History and Heritage Command, hereafter NHHC), in the Washington Navy Yard, Washington, D.C., when Dr. Friedman conducted the research that resulted in his *U.S. Aircraft Carriers.*
9. Friedman, *U.S. Aircraft Carriers,* p. 229.
10. Ibid., pp. 231–32, 241. Rear Admiral Sallada described the results of studies of large, long-range turboprop carrier aircraft in a memo to CNO on 11 December 1945; see Chief, BuAer, memorandum, "Development of Large Bombers for Carrier-Based Operations; Discussion of," ser. C30035. CNO approved Sallada's recommendation that the Navy pursue the development of long-range carrier bombers and their escorts in a memorandum to BuAer, "Development of Large Bombers for Carrier-based Operations; program for," 28 December 1945, ser. 042P517, doc. 193018. Copies of these memos are in the SCB-6 file (on the canceled carrier *United States*) held by the Naval Aviation History office of NHHC.
11. Friedman, *U.S. Aircraft Carriers,* p. 241. Admiral Ramsey's directive to DCNO(Air) "to proceed with a detailed design study of the large bomber" is discussed briefly in CNO, memorandum to Op-04 and Op-05, "Development of Large Bombers and a New Class Aircraft Carrier for Long Range Operations," 7 February 1946, Op-09/EAH/ky, SC F1-5, ser. 09P09, CominCh/CNO 1945–46 files.
12. Friedman, *U.S. Aircraft Carriers.* A discussion of the two designs is in Chief, BuAer, memorandum to CNO, "Future Aircraft Carrier Design," 28 December 1945, Aer-E-34-GBC, CV/S1-1. This memo and those of 11 and 28 December referred to in note 10 above were in the CominCh/CNO 1945–46 files consulted by Dr. Friedman in his research for *U.S. Aircraft Carriers.*
13. "Outline Specification for Class VB Airplane" (OS-106), 14 January 1946, VB BuAer Correspondence Files, 1946, vol. 2 ("from Jan. 1st"), Record Group [hereafter RG] 72, National Archives and Records Administration [hereafter NARA].
14. Head, Aviation Design Research Branch (BuAer) to Director, Research & Development (BuAer), "Conference on Long Range Carrier Based Bomber: Results of," 15 March 1946, VB BuAer Correspondence Files, 1946, vol. 2, RG 72, NARA.
15. BuAer General Representative, Wright Field, Dayton, Ohio, to BuAer AC-5, "Air Materiel Center Design Proposals for Medium and Heavy Bombers: Forwarding of Information on," 7 June 1946, VB BuAer Correspondence Files, 1946, vol. 2, RG 72, NARA.
16. Jerry Miller, U.S. Navy [hereafter USN] (Ret.), *Nuclear Weapons and Aircraft Carriers: How the Bomb Saved Naval Aviation* (Washington, D.C.: Smithsonian Institution Press, 2001), p. 32.

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18. Miller, *Nuclear Weapons and Aircraft Carriers,* p. 94.
19. Capt. George B. Chafee, "Carrier Requirements for Future Aircraft," *Naval Aviation Confidential Bulletin,* July 1947, p. 19. Chafee describes the process of loading an AJ Savage with a nuclear weapon on the flight deck of a *Midway*-class carrier.
20. "Undercarriage-less Aircraft, Operation from Aircraft Carriers: Development."
21. Cooper, *Farnborough and the Fleet Air Arm,* p. 274.
22. Ibid., pp. 274–75.
23. Eric Brown, *Wings on My Sleeve* (London: Orion Books–Phoenix, 2007), pp. 177–78.
24. Ibid., p. 179.
25. Ibid., p. 190.
26. Chafee, "Carrier Requirements for Future Aircraft," pp. 16–17.
27. Vice Adm. Alfred M. Pride, "Oral History," no. 84, vol. 4, Naval Historical Collection, Naval War College, Newport, R.I.
28. Asst. Sec. of the Navy for Air John E. Floberg, "Trends in Naval Aviation," *Naval Aviation Confidential Bulletin,* February 1953, pp. 2–6.
29. Jan Jacobs, "Follow the Bouncing Cougar: The Flexdeck Program," *Hook* 12, no. 1 (Spring 1984), pp. 11–19. An article in the *Naval Aviation Confidential Bulletin* ("New Concepts in Carrier Deck Design," May 1953), pp. 2–8, noted, "It is recognized that the handling-equipment problem is one of the most serious that must be overcome in order to make the flexdeck concept work under all operational conditions" (p. 6). This was the same point made by Captain Cambell of the Royal Navy [hereafter RN] in 1951. See note 34 below.
30. The aircraft were the Convair XFY-1 Pogo, with contra-rotating propellers and a turboprop engine, and the Lockheed XFV-1 Salmon, a similar tail-sitting design.
31. The quotation is from a November 1947 BuAer letter cited by Friedman in his *U.S. Aircraft Carriers,* p. 244.
32. Data on both aircraft are in Gordon Swanborough and Peter M. Bowers, *United States Navy Aircraft since 1911,* 2nd ed. (Annapolis, Md.: Naval Institute Press, 1976), pp. 457–58.
33. Friedman, *U.S. Aircraft Carriers,* p. 244.
34. One notorious incident is recounted in John T. Hayward and C. W. Borklund, *Bluejacket Admiral: The Navy Career of Chick Hayward* (Annapolis, Md., and Newport, R.I.: Naval Institute Press and Naval War College Foundation, 2000), pp. 191–92.
35. Rear Adm. Dennis R. F. Cambell, RN, "The Angled Deck Story," no. 89-4-1, Dennis R. F. Cambell Collection (Coll. 337), Operational Archives, NHHC, p. 2. The notes of the meeting (no. 89-4-8), "Notes of D.N.D.P./D.C.N.R. (A)'s Meeting on 7.8.51 to discuss the Formulation of a Staff Requirement for the operational Version of the Flexible Deck," are in the same folder.
36. Boddington's note to the RN's Deputy Director of Naval Construction (also sent as a copy to Captain Cambell) is dated 28 August 1951. It is also in the Cambell Collection in the Operational Archives, NHHC.
37. Cdr. Harold L. Buell, USN (Ret.), "The Angled Deck Concept: Savior of the Tailhook Navy," *Hook* 15, no. 3 (Fall 1987), p. 14.
38. Pride, "Oral History," p. 197. On the "flight deck cruiser" of the 1930s, see Alan D. Zimm, "The U.S.N.'s Flight Deck Cruiser," *Warship International* 16, no. 3 (1979), pp. 216–45.
39. The close cooperation between the USN and the RN during World War II was no secret. See Owen Rutter, *The British Navy's Air Arm* (New York: His Majesty's Stationery Office and Penguin Books, 1944).
40. "Report of the visit of Mr. J. L. Bartlett & Mr. D. W. Smithers to the USA, November 1948," Naval Construction Department, folder ADM 281/109, PRO, p. 4. RN liaison officers are listed in BuAer phone books from this period; "BuAer, Directories & Correspondence Designations, 1 February 1946, 1 July 1946, 15 January 1947, 15 April 1947, 10 November 1947," box 88, Naval Aviation History Unit, NHHC.
41. Cambell, "Angled Deck Story," p. 3.
42. Brown, *Wings on My Sleeve,* p. 220.

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43. Buell, "Angled Deck Concept," p. 14.
44. Ibid., p. 19.
45. Chafee, "Carrier Requirements for Future Aircraft," pp. 17–18.
46. Chief, BuAer, to Naval Air Materiel Center, 14 Jan. 1949, file S83-2(C), 1949, vol. 1, BuAer Confidential Correspondence, RG 72, NARA. See also "Outline of ADM Pride's speech at the Naval Academy, 24 Mar. 1949," folder "BuAer, Naval Aviation programs," box 93, NAVAIR/BuAer, "Naval Aviation Programs, Etc.," Naval Aviation History Unit, NHHC, p. 4.
47. See the letters of 9 June 1949 (ser. 3125853) and 15 June 1949 (ser. 3125989), file S-83-2(C), vol. 2, BuAer Confidential Correspondence, RG 72, NARA.
48. Naval Aircraft Factory to BuAer, 8 October 1951, ser. 0482, file S83-2(C), vol. 3, 1951, BuAer Confidential Correspondence, RG 72, NARA.
49. U.S. Naval Attaché, London, "Trials of prototype steam catapult in HMS *Perseus,*" information report, Office of Naval Intelligence, 27 July 1951, Project Records Relating to Catapults, Launchers, Missiles, 1941–1953, box 3, entry 133, RG 72, NARA, p. 5.
50. Capt. Sheldon W. Brown, memorandum to Rear Adm. Lucien M. Grant, "Brief Comparison of British and American Slotted Cylinder Catapults," 8 January 1952 (Aer-SI), *Perseus* file, Project Records Relating to Catapults, Launchers, Missiles, 1941–1953, box 3, entry 133, RG 72, NARA.
51. Daniel K. Weitzenfeld [Rear Adm., USN (Ret.)], "Colin Mitchell's Steam Catapult: The Heart of Modern Aircraft Carriers," *Wings of Gold* 10 (Summer 1985), pp. 41–46.
52. Cooper, *Farnborough and the Fleet Air Arm,* p. 210.
53. Donald D. Engen [Vice Adm., USN (Ret.)], "Roger, Ball: How It Started," *Hook* 15, no. 3 (Fall 1987), p. 24. See also "It's Done with Mirrors," *Naval Aviation News,* November 1955, pp. 20–22.
54. Friedman, *U.S. Aircraft Carriers,* p. 257.
55. Thomas C. Hone, Norman Friedman, and Mark D. Mandeles, *American & British Aircraft Carrier Development, 1919–1941* (Annapolis, Md.: Naval Institute Press, 1999).
56. The "deck park" was a concept developed in the USN in the 1920s. As aircraft returned to a carrier, they were "parked" forward on the flight deck, shielded by wire barriers from planes landing. When all the planes had landed, the barriers were lowered and the planes in the deck park forward were pushed aft, where they were readied for their next flights.
57. Cooper, *Farnborough and the Fleet Air Arm,* pp. 200–205.
58. For details on the debates over roles and missions and the responsibility for the nuclear strike mission, see Jeffrey G. Barlow, *Revolt of the Admirals: The Fight for Naval Aviation, 1945–1950* (Washington, D.C.: Naval Historical Center, 1994). For details on jet engine development, see Mark D. Mandeles, *The Development of the B-52 and Jet Propulsion: A Case Study in Organizational Innovation* (Maxwell Air Force Base, Ala.: Air University Press, 1998), and Tommy H. Thomason, *U.S. Naval Air Superiority: Development of Shipborne Jet Fighters, 1943–1962* (North Branch, Minn.: Specialty, 2007).
59. For an overview of this period, see Jeffrey G. Barlow, *From Hot War to Cold: The U.S. Navy and National Security Affairs, 1945–1955* (Stanford, Calif.: Stanford Univ. Press, 2009).
60. Chafee, "Carrier Requirements for Future Aircraft," p. 17.
61. Friedman, *U.S. Aircraft Carriers,* p. 271.

HIDING IN PLAIN SIGHT

The U.S. Navy and Dispersed Operations under EMCON, 1956–1972

Robert G. Angevine

The ability to operate freely, unthreatened by adversaries seeking to track and target them or interfere with their communications, that the U.S. Navy's aircraft carriers have enjoyed for the last two decades is unlikely to continue. China has been developing an antiaccess/area-denial capability, centered on antiship ballistic missiles, that may soon be able to locate and attack U.S. carriers at considerable distances.[1] The Chinese People's Liberation Army has also developed concepts for information warfare that integrate computer network operations, electronic warfare, and kinetic strikes to degrade an opponent's ability to collect, process, and disseminate information.[2] If combined effectively, antiship ballistic missiles and attacks on information networks could endanger the U.S. Navy's command of the sea.[3]

Although the specific problems presented by antiship ballistic missiles and information warfare are new, the broader operational challenges are not. During the Cold War, the threat posed by Soviet naval aviation and submarines prompted the U.S. Navy to stage a number of experiments examining the conduct of dispersed operations at sea. Spreading out across a wide area, it was believed, would make U.S. naval forces harder to detect, identify, and target. In order to lessen the chance of detection further, the U.S. forces in the experiments strictly limited their communications. Dispersed operations under emission control (EMCON) represented a significant departure from more active and overt methods of operation and posed new operational challenges.

Dr. Angevine is the author of The Railroad and the State: War, Politics, and Technology in 19th-Century America *(2004) and articles on military approaches to technology, naval experimentation, and American military and naval intelligence. He received his PhD in military history from Duke University in 1999 and currently works as a defense analyst in the Washington area. He has taught at Duke, American, and George Mason Universities and now serves as adjunct assistant professor of history at George Washington University.*

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Navy experiments like the HAYSTACK and UPTIDE series therefore offer collectively an excellent opportunity to study organizational adaptation and change in response to new technologies and threats and to consider the conduct of distributed operations in the absence of a network.

THE U.S. NAVY IN THE 1950S

One of the primary challenges facing the U.S. Navy in the early years of the Cold War was how to employ its command of the sea to influence events ashore. The Soviet Union was essentially a land power; it did not possess a fleet capable of challenging American maritime supremacy. Instead, American and Western European policy makers expected a land attack against Western Europe and the Middle East to constitute the Soviets' principal offensive thrust in any future conflict.[4] As early as 1948, the U.S. Navy began envisaging an offensive strike force that would seek to slow the Soviet ground advance across Western Europe.[5] By 1956, the carriers of the Navy's Mediterranean-based Sixth Fleet were tasked with not only slowing any Soviet attack headed west and south but also striking key targets in the southern European part of the Soviet Union.[6]

In order for their aircraft to reach their targets, however, the Sixth Fleet's carriers had to move into the eastern Mediterranean, close to the Soviet Union, and survive there long enough to conduct launch operations. In the mid-1950s, the carriers' chances of doing so appeared slim. A series of air-defense exercises over the preceding years had demonstrated the fleet's inability to defend itself against even relatively small Soviet air raids.[7] In 1956, Admiral John H. Cassady, Commander in Chief, U.S. Naval Forces, Eastern Atlantic and Mediterranean, conceded in his annual report, "It is widely recognized that a carrier task force cannot provide for its air defense under conditions likely to exist in combat in the Mediterranean."[8]

The Haystack Concept

When Vice Admiral Harry Felt assumed command of Sixth Fleet in 1956, the fleet's ability to perform its primary mission was therefore questionable. Perhaps as a consequence, Sixth Fleet had the reputation of being a social rather than an operational fleet. Felt sought to change that reputation and improve the effectiveness of his new command by infusing the fleet's staff with new blood.[9]

One of the young officers Felt brought in was Lieutenant Jeremiah Denton.[10] Denton's background was in lighter-than-air aviation and electronic warfare. He had tested large airborne radars in blimps and served as the project officer for the WV-2, one of the Navy's first airborne-early-warning radar aircraft. Denton thus possessed a solid understanding of air defense operations, Soviet aerial attack capabilities, and airborne radar systems.[11]

Drawing on his extensive experience looking at radar scopes, Denton had developed an idea of how to extend the survival time of the Sixth Fleet's carriers during a general war.[12] He joined forces with Ralph Beatty, the Operations Evaluation Group analyst attached to Sixth Fleet, who had been working on mathematical techniques for calculating how a fleet of aircraft could find a carrier in a background of similar targets. Together, they began developing the new concept.[13]

Denton and Beatty argued that the Soviet bombers' greatest challenge was finding and identifying the Sixth Fleet's carriers. The fleet should therefore do everything in its power to "thwart and delay" recognition of the carriers. It should disperse widely and intermingle with commercial shipping in order to eliminate the unmistakable appearance on airborne radar scopes of the standard close, circular ("bull's-eye") formation. All nearby supporting units, including the destroyers serving as plane guards and screening the carriers against submarines, should disperse, and the carriers should operate independently. Strict control of all electronic emissions and the widespread use of deception would increase the effectiveness of the concept, which Denton dubbed "Haystack," because of its emphasis on making the carriers difficult to find.[14]

When Felt left Sixth Fleet after just six months to become Vice Chief of Naval Operations, he made a point of praising Denton, Beatty, and the Haystack concept in front of his successor, Vice Admiral Charles "Cat" Brown, and the entire Sixth Fleet staff.[15] Under Brown's command, Sixth Fleet began conducting experiments to test the Haystack concept. Small-scale tests began in October 1956.

The HAYSTACK Exercises

The first major exercise testing the Haystack concept, HAYSTACK CHARLIE, was conducted in January 1957 in the Mediterranean Sea about a hundred miles west of Sardinia. The primary objective of the two-day exercise was "to test the effectiveness of tactical deception as a method of striking force air defense." The exercise pitted two aircraft carriers, USS *Coral Sea* (CVA 43) and USS *Randolph* (CVA 15), their escorts, and their logistical support ships against a conventional submarine and land-based snooper and attack aircraft flying out of Naples and Malta. The carriers, which operated up to 250 miles apart, conducted simulated nuclear strikes against wartime targets and then retired, while the aggressor force tried to find and attack them as soon as possible.[16]

The exercise results suggested that tactical deception was effective. The carriers were able to avoid detection long enough to launch thirty to thirty-five simulated atomic strikes each day before being "attacked" by "aggressor" aircraft. Small groups of ships were employed effectively as decoys; they attracted attacks from several aircraft searching for the carriers. In particular, the guided-missile cruiser USS *Boston* (CAG 1) and two destroyers acted as an effective "missile

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trap" early in the exercise, shooting down several snooper aircraft trying to investigate the three closely packed radar blips.[17]

The results indicated, however, that the Haystack concept was still imperfect. Destroyers were frequently too close to the carriers. The three destroyers escorting *Coral Sea* were within ten miles of the carrier when the exercise began, enabling a snooper aircraft to detect the carrier in the first five minutes. The destroyers accompanying *Randolph* remained more distant, but they were still close enough to attract attention from snooper aircraft soon after the exercise started. Aircraft also tended to operate too close to the carriers. Aggressor aircraft attacked *Randolph* after intercepting the radar of an antisubmarine patrol plane circling the carrier. A snooper aircraft also detected the radar signal of an airborne-early-warning plane operating near a carrier.[18]

HAYSTACK DELTA, a seventeen-hour exercise, was held on 2 March 1957 in the Mediterranean Sea southeast of Malta and Sicily. The exercise emphasized passive air defense using traps and decoy groups. It matched two carriers, USS *Forrestal* (CVA 59) and USS *Lake Champlain* (CVA 39), against two conventional submarines and land-based attack, snooper, and electronic countermeasure (ECM) aircraft operating out of Naples and Malta.[19]

The exercise results again suggested that tactical deception was successful. The strike aircraft experienced significant problems identifying targets due to heavy cloud cover and squalls, careful emission control, and deceptive formations. Learning from past exercises, the destroyers in HAYSTACK DELTA remained farther away from the carriers and often paired with other ships to simulate carriers. The eight aggressor strikes detected thirteen possible military targets, but only one correctly identified a carrier *(Forrestal)* and its plane guard. Three strikes detected *Boston* and two accompanying destroyers, which were stationed in the expected direction of attack in order to draw strikes away from the carriers, and closed to investigate or attack. Two other strikes attacked oilers, which were paired with destroyers and being used as decoys for the first time.[20]

Emission control also proved effective. Only radar picket destroyers and sector air-defense ships, not carriers, used navigation aids. The aggressor ECM aircraft located the task force's operating area but could not locate or identify individual units, due to the suppression of electronic signals characteristic of particular ships.[21]

In order to experiment with the use of islands to hinder the identification of surface units by aggressor aircraft, the venue for HAYSTACK ECHO was moved to the Aegean Sea. The exercise, which was held from 9 to 11 April 1957, pitted *Forrestal, Lake Champlain,* and their escorts against two submarines and land-based snooper, ECM, and attack aircraft operating from Athens. The

primary objective, again, was to practice tactical control and air defense in a dispersed disposition.[22]

Postexercise analysis was to indicate that it had not realistically tested the Haystack concept, because of the requirement for nighttime air operations and the consequent need for the carriers to employ plane guards and tactical air navigation systems (TACANs). An aggressor ECM aircraft had intercepted *Lake Champlain*'s TACAN emissions shortly after the exercise began and vectored in snooper aircraft to track the carrier and strike aircraft to attack it. The initial two attacks had been successful, as were two later strikes; snooper aircraft had tracked *Lake Champlain* almost continuously for the rest of the exercise. *Forrestal* had been detected visually at 7:14 AM on 10 April and had been tracked continuously thereafter, although it had not been attacked successfully until 3:01 PM. ECM aircraft had also detected and successfully attacked the carriers on several other occasions during the exercise. The analysis concluded, "Air control without the use of TACAN by carriers is essential."[23]

Other attempts at deception in HAYSTACK ECHO were only moderately successful. The heavy cruiser *Salem* (CA 139) and two destroyers decoyed snooper aircraft into shadowing them for several hours, until daybreak revealed that the group was not a carrier and its escorts. The many islands in the operating area, however, did not appear to hinder the aggressor force's ability to find the carriers. Instead, they complicated the task force's efforts to defend itself. Landlocking of radars (the tendency of radar return from landmasses to mask contacts around them) severely handicapped the ability of the task force to detect aggressor aircraft and control its own aircraft. Moreover, once the carriers and decoy groups were located, they were unable to relocate quickly. The aggressors could thus ignore the decoys and concentrate their efforts on the carriers.[24]

The purpose of the Haystack concept was to develop tactics that would extend the survival time of U.S. carriers in the Mediterranean during the initial period of a nuclear exchange. After the conclusion of HAYSTACK ECHO, Brown declared the exercises a success. In a letter to the Chief of Naval Operations (CNO) that also went to all the major commands in the Navy, Brown claimed, "Haystack tactics have been proved effective in increasing the critical survival time available for launching counter strikes against aggressor bases under today's war conditions in this area."[25] When the exercise series began, the expected survival time for carriers in the Mediterranean had been less than two hours. During HAYSTACK CHARLIE, DELTA, and ECHO, the carriers, with one exception, survived for at least eight hours; half of the participating carriers survived for over fifteen hours.[26] Extending the survival time of the carriers by even a few hours gave them enough time to hit Soviet airfields and ports, thereby reducing

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the threat they faced thereafter. "As each hour without attack passes," Brown explained, "the chances of continued survival increases many fold."[27]

THE U.S. NAVY IN THE 1960S

The Sixth Fleet focused most of its attention on the threat posed by Soviet long-range aviation in part because there was no significant Soviet naval presence outside home waters at the time. In the mid-1950s Soviet surface combatants started to visit foreign ports occasionally, and they began conducting annual exercises in the North and Norwegian Seas in the late 1950s, but there were still relatively few Soviet submarines operating in the Mediterranean. The commander of the Sixth Fleet from 1958 to 1959, Vice Admiral Clarence E. Ekstrom, felt the submarine threat facing Sixth Fleet was "quite manageable."[28]

The developers of the Haystack concept expected that dispersing the destroyers screening the carrier would increase the carrier's vulnerability to submarine attack but considered the risk acceptable in areas where the submarine concentration was low or when the air threat exceeded the submarine threat.[29] By 1961 they were confident that the combination of dispersion, deception, and emission control would enable U.S. carriers to survive against enemy submarine attack long enough to conduct their retaliatory nuclear strikes, even in areas of relatively high concentrations of submarines, so long as those submarines were conventionally powered. Beatty estimated that a carrier could survive for an average of five days in a ten-thousand-square-mile area containing two conventional submarines.[30]

The introduction of the nuclear-powered submarine in the mid-1950s, however, revolutionized undersea warfare.[31] The first Soviet nuclear submarines began entering service in 1958 and soon threatened to render the Haystack tactics obsolete. By the early 1960s leading Navy officials were increasingly focused on how to counter the potential threat of nuclear submarines. A paper, "The Strategic Concept for Antisubmarine Warfare," circulated by the CNO, Admiral Arleigh Burke, identified hostile submarine activities as "foremost among the threats to our use of the seas."[32]

Compounding the challenge was the equipping of nuclear submarines with antiship cruise missiles. As early as 1960, Rear Admiral Jimmy Thach, one of the Navy's leading antisubmarine warfare (ASW) experts, predicted that submarine forces would increasingly rely on missiles as their primary weapons, even against shipping.[33] The Soviet Echo II class, a nuclear-powered submarine equipped with eight SS-N-3A (Shaddock) missiles, entered service in 1962. The SS-N-3A missile was, with the exception of certain aircraft, the longest-ranged antiship weapon in the world; it was capable of striking targets at sea from a distance of 250 nautical miles. Since the typical defensive perimeter of an American carrier

battle group extended only a hundred nautical miles from the center, an Echo II could remain outside the perimeter and potentially launch an attack undetected. After an exercise to test performance against Soviet nuclear submarines firing "standoff" missiles, one U.S. Navy commander concluded, "It is evident that the force would have had essentially no capability against such an attack."[34]

Although the cruise missile–firing submarine presented dangers, it also had weaknesses. Its chief problem was detecting and identifying its targets while preserving its own stealth. As Beatty observed, "The ability of a submarine to identify carriers by sonar alone in large dispersed dispositions is poor. Visual identification is usually necessary."[35] He recommended testing the effectiveness of dispersed formations against nuclear submarines and placing an increased emphasis on the development of acoustic deception tactics and equipment, particularly expendable acoustic decoys.[36]

The UPTIDE Concept

By the late 1960s, the Navy increasingly emphasized improving its ability to defend against missile-firing nuclear submarines. In June 1968, the commander in chief of the Pacific Fleet, Admiral John J. Hyland, initiated Project UPTIDE (Unified Pacific Fleet Project for Tactical Improvement and Data Extraction). One of the primary objectives of UPTIDE was to devise and evaluate tactics Pacific Fleet antisubmarine warfare groups (typically an ASW carrier, its air wing, and a destroyer squadron) could use to frustrate and defend against missile and torpedo attacks by enemy submarines within moving or static areas of high tactical interest.[37]

The driving force behind the UPTIDE series was Vice Admiral E. P. "Pete" Aurand. An innovator and iconoclast, Aurand suggested shifting the focus of the ASW effort from killing submarines to reducing their effectiveness by preventing encounters.[38] Echoing Beatty, Aurand argued that although the nuclear submarine was very fast and could remain submerged indefinitely, it was still essentially blind. An unassisted submarine relied heavily on passive acoustic sensors to detect, classify, track, and localize carriers and other high-value targets. Degrading the information the submarine received could significantly reduce its effectiveness.

The UPTIDE experiments focused on reducing the probabilities that the submarine would detect, identify, and localize its target. The probability that the submarine would detect its target could be reduced by strict acoustic and electromagnetic emission control. Aurand may have drawn inspiration from his previous observation of Soviet naval operations in the Sea of Japan. Aurand had noticed that Soviet radar antennas neither rotated nor emitted. He speculated that the Soviet navy's policy was to leave its radars turned off unless there was no

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other way to obtain desired information. Although it denied the Soviets early warning, Aurand believed, "such a policy has merit, especially when compared to the predominant practice of most U.S. ships to emit constantly." He concluded, "Finesse in the handling of emitters, electronic, visual, and acoustic should be developed by our ships, especially in the vicinity of Soviet ships."[39]

The probability that the submarine would successfully identify a detected target could be decreased through acoustic deception. The probability that the submarine would localize it (i.e., close to within range of its weapons) could be diminished by forcing the submarine to move slowly, by deploying good passive acoustic systems in all antisubmarine vehicles, especially helicopters and destroyers.[40]

The UPTIDE Experiments

Project UPTIDE developed in three phases from January 1969 to November 1972. In each phase, an ASW group examined various dimensions of the challenge presented by nuclear submarines firing cruise missiles.[41] The purpose of Phase I was to lay the foundation for Phases II and III by exploring the broad outlines of the problem, refining the experimental design and methodology, and developing procedures for processing and analyzing data. It examined the situation from the perspective of the enemy submarine and derived data on the submarine's capabilities to detect, identify, and fire its missiles at high-value targets. Phase I also established a baseline for comparison of conventional antisubmarine warfare tactics with UPTIDE tactics.[42]

Phase I consisted of three continuous free-play experiments (each a Hunter-Killer Antisubmarine Warfare Exercise, or HUKASWEX), which took place from January to March 1969. In each exercise, USS *Kearsarge* (CVS 33), its aircraft, and Destroyer Squadron 23, constituting Antisubmarine Warfare Group 1, tried to defend *Kearsarge* against two opposing submarines with simulated cruise-missile capabilities. The submarines participating in Phase I were USS *Pomodon* (SS 486) and *Medregal* (SS 480) for HUKASWEX 1-69 and USS *Snook* (SSN 592) and *Scamp* (SSN 588) for HUKASWEX 2-69 and 3-69. The results of Phase I underscored the magnitude of the threat posed by the cruise-missile submarine and established the key metric that would be used in Phase II—the survival time of the carrier. In 144 exercise hours, the submarines conducted three torpedo attacks and nineteen launch events simulating the firing of seventy-eight missiles at the carrier. Eighty-seven percent of the missiles were judged to have met the bearing parameters for acquisition of their targets. The average survival time of the carrier was nine hours.[43]

Phase II was the major data-collection and tactical-evaluation phase of Project UPTIDE. It consisted of four major experiments from September 1969 to

January 1971. The experiments were devoted to examining the effectiveness of dispersion, acoustic and electromagnetic emission control, simulation of the high-value target by surface escorts, and active acoustic deception against cruise missile–firing submarines in a scenario involving a carrier operating within a fixed area and simulating the launching of strike aircraft.[44]

The initial Phase II experiment, UPTIDE 2-B, took place in late September and early October 1969 and pitted Antisubmarine Warfare Group 3—consisting of USS *Hornet* (CVS 12), its aircraft, and Destroyer Squadron 31—against USS *Sculpin* (SSN 590) and *Razorback* (SS 394). By employing a dispersed formation, steaming below propeller cavitation speed (i.e., the speed at which the collapse of bubbles behind the blades becomes detectably loud), controlling emissions, and using escorts as "wolf trap" units to lure the submarines away, *Hornet* was able to avoid identification for the entire seven-day exercise. The submarines were deceived, lured, or confused for the majority of the exercise and spent nearly all the rest of the time in unproductive searches. Toward the end of the exercise, in frustration, *Sculpin* used strategic information to fire a spread of eight missiles at a range of two hundred miles. Significantly, two of them could have met the bearing parameters to acquire *Hornet*. Nevertheless, the commander of Antisubmarine Warfare Group 3 described the exercise as "an unprecedented success against the undersea adversary by an ASW group using a totally new concept in communications, formations, tactics, deception, and electronic/acoustic emission control."[45]

UPTIDE 2-C, held in January and February 1970, marked the introduction of a new tactical element—the acoustic deception device. The minesweeper USS *Leader* (MSO 490) was equipped with an active acoustic simulator called "Tergiversator," developed by the Naval Underwater Sound Center in New London, Connecticut. Tergiversator transmitted into the water carrier and escort propulsion noises and active sonar transmissions. Working together, *Leader* and the guided-missile cruiser USS *Chicago* (CG 11) were able to deceive the submarines USS *Plunger* (SSN 595) and *Snook*. After listening to the deception device's output for three hours, *Plunger* concluded that it was a heavy warship and fired two missiles at it. Meanwhile, *Hornet* was able to survive undetected for eighty-seven hours. Only when the carrier operated independently at high speed were the submarines successful in making a coordinated missile attack.[46]

The number and range of acoustic deception devices expanded significantly in UPTIDE 2-D, which was held in October 1970. Seven devices were employed, including an updated version of Tergiversator; two SADSAC (Small Acoustic Device Simulating a Carrier) buoys, developed by the Naval Underwater Research and Development Center; and four NYVOs (Nymph's Voices), developed

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by Magnavox. Once again the devices proved effective. They were able to mask the identity of USS *Ticonderoga* (CVS 14) for the first ninety-three hours of the exercise and induce *Sculpin* and *Snook* to dedicate two of their four launch events and nine of their sixteen missiles to them.[47]

The final exercise of Phase II, UPTIDE 2-E, underscored the dramatic impact that the experimental tactics could have on carrier survivability. Using UPTIDE tactics, *Ticonderoga* was able to avoid detection by *Plunger* and USS *Haddock* (SSN 621) for the entire 140 hours of the regularly scheduled exercise. On the last day, the carrier reverted to conventional tactics; it was targeted for simulated missile attacks within four and a half hours.

The principal finding from Phase II was that UPTIDE dispersion and deception tactics allowed carriers and their escorts to avoid consistently encounters with submarines. In nearly 650 exercise hours, there were just fourteen launch events, simulating the firing of fifty-six missiles. Moreover, less than one-third of the missiles met the bearing parameters for acquisition. On average, the submarines went a hundred hours between valid fire-control solutions on the carrier and were unable to conduct any torpedo attacks. In the four week-long exercise periods of UPTIDE Phase II, the "Blue" (i.e., U.S.) force achieved an average survival time of almost five and a half days for the high-value target between submarine-launched missile firings—an improvement by a factor of eighteen over Phase I results using conventional tactics.[48]

Phase III of UPTIDE, in two experiments from October 1971 to November 1972, examined transit scenarios and used a new measure of performance —miles safely traveled. The challenges the ASW group faced were increased to include integrated surface, subsurface, and air threats, but they were offset by corresponding increases in the group's capabilities. Among the new capabilities introduced were land-based patrol aircraft, towed passive sonar arrays, and helicopter-equipped destroyers. Acoustic deception devices were also used extensively, and with considerable success. Combining these new capabilities with UPTIDE tactics, the ASW group in UPTIDE 3-A was able to make good 86 percent of the nine hundred miles it attempted without a successful attack by a submarine. Only when three of the five acoustic deception devices being used broke down was the carrier detected and successfully targeted.[49]

The final exercise of the UPTIDE series, UPTIDE 3-B, occurred in October and November 1972. It added several new capabilities to the Blue forces, including two squadrons of land-based patrol aircraft and a helicopter-equipped destroyer. The Blue forces also successfully made tactical use of towed sonar arrays and Sound Surveillance System (SOSUS) information, although the slow towing speed of the towed arrays limited their utility in transit scenarios.[50]

DISPERSED OPERATIONS UNDER EMCON

The forces participating in the HAYSTACK exercises and those conducting the UPTIDE series struggled to command and control widely dispersed forces under EMCON. During the HAYSTACK exercises, Sixth Fleet sought to exploit "every available method of delivering message traffic that will permit the originating ship to maintain the highest practicable degree of electronic silence."[51] The fleet forbade the commanding officers of ships to use electronic means of communication unless absolutely necessary.[52] Instead, they were to employ visual signals, such as flag hoists or blinkers, to control flight operations and transmit messages.[53]

The fleet also urged the use of helicopters and airplanes to carry messages between ships. There was always the possibility of missing a message drop, but the helicopter or aircraft would typically carry extra copies of messages. The messages, enclosed in the equivalent of a buoy, would also float and could therefore be retrieved. Aircraft could also deliver messages to shore-based radio stations for relay to their ultimate destinations.[54]

In cases where electronic communication was necessary, the fleet relied on airborne relay of ultrahigh-frequency (UHF) transmissions, which are typically limited to horizon ranges and so are more difficult to detect than high-frequency transmissions. Although Soviet aircraft, submarines, and surface ships could intercept UHF transmissions, they had to be fairly close to the task force to do so. UHF was thus seen as a "relatively secure means of communication."[55]

Many of the methods UPTIDE forces employed were similar to those used during the HAYSTACK exercises. Among these were "bean-bag communications" (delivery of messages by helicopter) and airborne UHF relay. A central element of UPTIDE was the extensive use of an airborne-early-warning aircraft to relay UHF communications from the carrier to its escorts and other ships. During UPTIDE 3-A, antisubmarine aircraft and the carrier's combat information center used UHF so heavily that they nearly saturated the available circuits.[56]

The restriction to alternative methods and the near saturation of available circuits produced significant delays in communications. In HAYSTACK CHARLIE, inexperience with the alternative radio techniques used and the existence of too many units on the nets in each sector combined to produce long communications delays.[57] In UPTIDE 3-A, the delay times for messages with immediate operational relevance ranged from ten to 318 minutes. Even flash-precedence messages were delayed for up to sixty minutes.[58]

Diminished communications capabilities placed a premium on planning. To implement the Haystack concept, Sixth Fleet relied more heavily on doctrine and fixed plans.[59] According to the concept, "Movements of the fleet will

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be preplanned and promulgated as much in advance as possible, to allow maximum practicable electronic silence."[60] Before every port visit, Sixth Fleet would disseminate the "position and intended movement" (PIM), or route, that task forces would follow should there be a warning that nuclear war was imminent. To reduce the number of PIM-change messages, task force commanders were instructed to plan ahead and cover several days' movements with one message if possible.[61]

To minimize the volume of electronic emissions, Sixth Fleet also adopted a set of basic communications procedures. Preassigned alphanumeric groups indicated desired PIM changes or changes in ship stations. Simple aircraft codes were used to transmit classified information. Recipients of messages did not "Roger" or acknowledge receipt.[62]

UPTIDE similarly emphasized planning. Just prior to UPTIDE 3-A, the commander of Antisubmarine Warfare Group 3, Rear Admiral Carl J. Seiberlich, gave commanding officers of all his units the opportunity to work with his staff on the development of plans and options. The detailed and inclusive planning process produced significant benefits. As Seiberlich later explained to Aurand, he and his staff received valuable inputs, while "the commanding officers all feel that they have had a piece of the planning action, and understand our philosophy and objectives."[63] One of the focal points of the planning process was minimizing opportunities for detection of the carrier. UPTIDE tactics tried to reduce acoustic detectability through the use of noncavitating speeds where possible. Implementing the tactic required, according to the UPTIDE 3-A report, "judicious planning of the time and location when cavitating speeds were required."[64]

"THERE MIGHT BE SOME USEFUL IDEAS THERE"

As Ralph Beatty once noted, interest in deceptive formations and dispersed operations under emission control seems to be cyclical. Every few years a version of the same basic idea emerges. Each iteration of the concept has been a response to a different specific threat—such as nuclear attack by land-based aviation in the HAYSTACK series, cruise-missile attack by submarines in the UPTIDE series—and has therefore approached the problem with little reference to past efforts. Yet the basic challenge has remained the same: How can naval forces conduct effective operations while dispersing widely and minimizing communications in order to avoid detection and attack? Since the U.S. Navy is likely to face similar challenges in the future, it might do well to heed Beatty's suggestion: "Pay attention to what's happened before. There might be some useful ideas there."[65]

One of the useful ideas highlighted by a review of the U.S. Navy's experiments with dispersed operations under EMCON during the Cold War is the utility of alternative methods of communication. During the HAYSTACK and UPTIDE

exercises, the participating forces chose to limit their communications in order to minimize the adversary's ability to detect and identify them. They experimented with a wide variety of methods—both low-tech (flag hoists) and high-tech (airborne UHF relay). The ability to communicate and exchange information using a range of different methods and to relay communications from platform to platform proved invaluable.

As the participants in HAYSTACK and UPTIDE discovered, however, alternative communication methods typically have less capacity than more traditional ones. Consequently, it is important to develop detailed procedures for operating with diminished network capacity. Sixth Fleet included comprehensive appendices in its operations orders outlining the specific instructions for operating with diminished communications. The instructions spelled out which messages and which users should receive priority under various conditions and which procedures should be employed.[66]

It was also important to practice employing alternative means of communication. The forces participating in HAYSTACK CHARLIE experienced what analysts described as "excessive" delays, due in part to inexperience with the communications method employed. Similarly, air control in HAYSTACK DELTA was unsatisfactory due in part to controller inexperience.[67]

Even with the development of appropriate procedures and extensive practice, forces using alternative methods of communication experienced delays. According to the UPTIDE 3-A exercise report, the reduction in communications capabilities and use of alternative methods "extracted a price from the BLUE forces in terms of inadequate information exchange between the BLUE OTC [officer in tactical command] and his dispersed forces." "Information of value to the OTC from outlying units is often received late or not at all," the report explained, "and outlying units often lack the 'big picture' information held by the OTC."[68]

The delays and diminished flow of information inherent in the use of alternative communications methods underscored the importance of planning and decentralized decision making. The promulgation of plans as far in advance as possible enabled the commanders of the forces participating in the HAYSTACK and UPTIDE series to convey their intents before communications were diminished. The unit commanders, thus fully aware of their mission, were able to take the initiative, make decisions quickly, and implement them aggressively.

As U.S. naval forces increasingly operate under the threat of antiship ballistic-missile attack while relying on rapid communication and information exchange, potential adversaries are likely to seek to detect, track, and target those forces and disrupt their communication and information networks. In future contests for control of information, as Beatty warned a decade ago, it will be important to understand what works and what does not work.[69] The principles and practices the

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U.S. Navy developed while experimenting with dispersed operations under EMCON appear to fall in the former category. As Rear Admiral George P. Steele told Aurand after receiving a briefing on UPTIDE, "I was able to make use of a great deal of it [the UPTIDE concept], and I am a believer; it works, and very well."[70]

NOTES

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In his thirty-two-year career in the Royal Norwegian Navy before his retirement in 2000, Commodore Børresen commanded the submarines HNoMS Kobben, Ula, *and* Utsira, *as well as the frigate* Oslo. *Ashore, among numerous other postings, he served as Deputy Assistant Chief of Staff (DACOS) for Plans in the Operations Division, Defence Command North Norway (1985–86); military secretary to Defence Minister Johan J. Holst (1986–88); DACOS for Organisation on the Navy Staff of Headquarters, Defence Command Norway (1988–90); Assistant Chief of Staff (ACOS) for Operations, Defence Command North Norway (1990–93); Commander, Trøndelag Naval District (1993–94); DACOS for Operations/Logistics at Supreme Headquarters, Allied Powers Europe (1994–97) (assigned as Assistant Director of Operations for Bosnia during Operation* JOINT ENDEAVOUR *1995–97); and Chief of the Navy Staff, Headquarters, Defence Command Norway (1998–2000). He attended the Norwegian Institute for International Affairs, the NATO Defence College in Rome, and the National Defence College in Norway. Since his retirement he has been a consultant and a member of ministerial-level foreign-affairs and defense committees. He has published numerous articles, studies, reports, and papers; he is a coauthor of volume 5 of Norway's official defense history (2004) and a coauthor of or contributor to four other books.*

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ALLIANCE NAVAL STRATEGIES AND NORWAY IN THE FINAL YEARS OF THE COLD WAR

Commodore Jacob Børresen, Royal Norwegian Navy (Retired)

For those of us who served in the Norwegian armed forces, especially in northern Norway, the 1980s were exciting times. Norway seemed to be the focus of American and NATO attention. There was a continuous flow of high-ranking visitors to Defence Command North Norway (DEFCOMNON), from the staffs of Allied Command Europe (ACE) and Atlantic (ACLANT).[1] Every year thousands of allied soldiers, hundreds of aircraft, and dozens of ships arrived in the area to conduct advanced training and complex exercises. High points were the deployments of U.S. Navy aircraft carriers, elements of Supreme Allied Commander, Atlantic's (SACLANT's) Striking Fleet Atlantic, into northern Norwegian coastal waters in Vestfjorden, outside Bodø: in 1985, USS *America* (CV 66) and, in 1987, USS *Forrestal* (CV 59) in Exercise OCEAN SAFARI; in 1988, USS *Theodore Roosevelt* (CVN 71) and *Forrestal* in TEAMWORK; and in 1989, *America* in NORTH STAR.[2] We were witnessing, and took part in, what later turned out to be the culmination of the Cold War—the period of tension that eventually led to the collapse of the Soviet Union. Norway, neighbor to the Soviet Union and a coastal state on the North Atlantic and the Barents Sea, found itself at the geographical center of this final effort.

What is the relevance of these events today? First of all, it is part of our common recent history, which we do well to preserve and hand down to the generations that follow us. But the Soviet Union is gone, and with it the Cold War. The North Atlantic Treaty Organization (NATO) has been reorganized; with SACLANT disestablished, it has only one supreme operational commander. Nevertheless, the underlying assumption of this article, especially the second part, is that the events in northern Norway in the 1980s provide insights with

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regard to joint and combined planning, exercises, and operations that are still relevant to the United States and its allies as they prepare for coalition warfare elsewhere in the world. Their value lies not only in how divergent interests and differing opinions were handled between NATO supreme commanders. It has as much or more to do with how to handle diverging interests between sovereign allies and between sea-based and land-based commanders in situations where land forces are reinforced or supported from the sea. The notion that in a complex contingency, involving several sovereign nations and both sea-based and land-based forces, a single American or allied commander can simply assume operational command and get on with it may be simplistic.

The purpose of this article, then, is first to discuss some of the political challenges to the Norwegian government in the 1980s as a result of the increased importance to NATO and the United States of the alliance's northern flank. Sea control in the Norwegian Sea was seen as crucial for protecting transatlantic sea lines of communications and to taking out Soviet nuclear-powered ballistic-missile submarines (SSBNs). Second, I will elaborate on some of the implications, primarily at the operational and tactical levels, for Norway and the Norwegian armed forces of NATO's Concept of Maritime Operations (CONMAROPS) and the U.S. Maritime Strategy of the 1980s.[3]

GEOPOLITICAL AND MILITARY STRATEGIC BACKGROUND

Since the early 1960s the United States and NATO had formulated their military strategies and based their force and contingency planning on the doctrine of "flexible response."[4] The doctrine rested upon the mutual recognition that the United States and the Soviet Union both had the capability to destroy each other and their respective allies with nuclear weapons; it was an expression of the need to avoid a situation where the only response available to conventional aggression was nuclear retaliation. The implication was a need to be able to conduct conventional operations with an aim to deter hostilities or bring them to a halt prior to escalation to nuclear war. An effect was to increase the importance of the transatlantic lifelines, the ability of the United States to reinforce and resupply its own forces and those of its allies in Europe by sea, across the Atlantic Ocean.

The world of the 1980s was one of violent peace. Cold War tension appeared to be growing. At sea, the Soviet navy had grown significantly in strength and showed increasing tendencies toward belligerence. The U.S. response generally was to "roll back" the Soviet Union through greatly increased defense spending. Its primary focus for planning and force building was opposition to the Soviets in the European theater and support to NATO.[5]

As the Soviets increasingly based their nuclear deterrence on SSBNs, the majority of which were based on the Kola Peninsula, they needed to secure a wider

maritime defensive zone in the Norwegian Sea. In the event of war, the SSBN fleet would operate in the adjacent Barents Sea. Consequently, they saw, U.S. or NATO naval forces could not be allowed to take command of the Norwegian Sea. This Soviet mission of sea denial could require offensive action against Western naval forces. It might also entail a ground assault on northern Norway itself, in order to forward-base aircraft and help secure access for Soviet naval forces to the Norwegian Sea.[6]

To NATO, this ability to push the maritime defensive zone farther and farther out, potentially involving a ground invasion of northern Norway, was a dangerous new offensive factor in calculations of the balance of power, not only because NATO had to control these waters itself but because the allied perception was fundamentally one of defense. Unless the alliance was able to secure Norwegian territory, the Soviets would be in a favorable position to contest control of the seas. By securing important forward positions in Norway, the Soviet Union could deploy more effective land-based air cover for its naval forces.[7] In short, the loss of northern Norway could be decisive in the battle for the Atlantic. Therefore, the support of the land battle in Norway by naval forces was critical. The war could not perhaps be won at sea, but it could easily be lost there.[8]

NATO's response was the Concept of Maritime Operations of 1980. CONMAROPS highlighted the importance of containing Soviet forces through forward operations, of conducting defense in depth, and of gaining and maintaining the initiative at sea.[9] CONMAROPS was based first on deterrence. Should deterrence fail, the strategy was designed to mount a defense far forward in order to protect the territory of the alliance's European member nations.[10] The concept bracketed NATO's naval operations into five operational areas or campaigns: the Mediterranean lifelines, the eastern Mediterranean, the Atlantic lifelines, the "shallow seas," and the Norwegian Sea. The three latter campaigns involved Norway. At this time NATO was also developing elaborate contingency plans for the rapid reinforcement of Europe in the event of an attack by the Soviet Union and the Warsaw Pact. Each of these plans had forces allocated to it. An elaborate exercise program was developed whereby each plan would be periodically tested and the forces given opportunities to familiarize themselves with the plan and the area of operations. But above all, the exercises in each of several series served as deterrents in themselves, in the form of important political signals of alliance solidarity and shared credible will and ability to defend against attack.

The purpose of the Atlantic lifelines campaign was to protect the transportation of allied reinforcement and resupply across the Atlantic; the associated exercise series was known as OCEAN SAFARI. The shallow-seas campaign was designed to prevent the exit of the Soviet Baltic Fleet into the North Sea and to protect allied convoys in the North Sea and the English Channel; it was exercised

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in the NORTHERN WEDDING series. The Norwegian Sea campaign was meant to prevent the exit of the Soviet Northern Fleet into the Norwegian Sea and the North Atlantic and to provide sea-based support to allied air and ground operations in Norway. Its associated exercise series was TEAMWORK.[11]

The U.S. forward-oriented maritime strategy of the mid-1980s was drawn from both NATO and American national military strategies, and it provided that the U.S. Navy and Marines would wage global coalition warfare in conjunction with the Army and Air Force and the forces of allied nations.[12] As such, it dovetailed nicely with CONMAROPS, but in certain areas it went farther—for instance, in the taking out of Soviet SSBNS; operation of carrier battle groups (CVBGs) in coastal waters far forward, sheltered by the mountains surrounding the northern Norwegian fjords; and the concept of horizontal escalation. NATO's and the Americans' objectives in the Norwegian Sea were to repel a Soviet amphibious assault on northern Norway, support northern Norway against land threats, prevent Soviet use of facilities in Norway, and contain the Northern Fleet or destroy it at sea.[13] As opposed to CONMAROPS, which talked about *campaigns,* the U.S. Maritime Strategy dealt with *phases.*

Phase I was called "transition to war." In this phase there would be global forward movement of U.S. naval forces. Nuclear-powered attack submarines (SSNs) would move into positions far forward, including the Arctic, deep inside the Soviet sea-control and sea-denial areas. Battle groups would begin to form into multicarrier battle forces. Forward-deployed amphibious task groups would increase their readiness, and leading portions of a Marine amphibious brigade would fly to Norway to join their prepositioned equipment. Other Marine air-ground task forces would begin loading out. Sealift of multiservice reinforcements would commence. Britain's Royal Navy would send SSNs forward, and a British antisubmarine warfare (ASW) task group, centered on at least one carrier, would put to sea in the eastern Atlantic. British and Dutch marines would reinforce Norway. Allied army deployments too were important to the Maritime Strategy, including the movement of the British Mobile Force and the Canadian Air-Sea-Transportable (CAST) Brigade Group to Norway.[14]

In Phase II the purpose was to *seize the initiative,* as far forward as possible, preparatory to carrying the fight to the enemy. In the initial antiair warfare campaign, carrier battle forces would engage Soviet air attacks as far forward as possible in "outer air battles," to cause maximum attrition. Available land-based tactical air (TACAIR) would complement these efforts in the Norwegian Sea. Surveillance, intelligence, and raiding operations against command, control, and communication sites by U.S. Special Forces and American and allied marines in Norway would be valuable supplements.[15]

Phase III entailed *carrying the fight to the enemy*. Heavy strikes on the flanks culminating in attacks on Soviet territory would be conducted as battle forces massed and moved forward with reduced risk and higher confidence of success. In this phase the U.S. Navy would be projecting power ashore in support of the land battle. Amphibious operations would have the purpose of gaining leverage for war termination, securing strategic choke points, and recovering territory lost to Soviet attack.[16]

The desired culmination was *war termination on favorable terms.* This required putting such conventional (i.e., nonnuclear) pressure on the Soviets as to convince them that they would find no benefit in continuing aggression and in fact should retreat, while giving them no incentive to escalate to nuclear war. For the U.S. Navy, exerting this pressure meant neutralization or destruction of the Soviet navy and of ground and air forces on the Eurasian flanks, sea control, and intervention in the land battle.[17]

IMPLICATIONS FOR NORWAY AND THE NORWEGIAN ARMED FORCES

Prior to World War II, Norway's foreign policy had been based on neutrality, or nonalignment, a policy that went as far back as 1814. To the Norwegians, fighting Nazi Germany, from 1940 to 1945, as part of an alliance was thus something new. After the war there were strong political forces that wanted to return to a policy of neutrality. Accession to NATO in 1949 came about only after a ferocious political debate. What finally decided the issue was the realization that in the event of war between the United States and the Soviet Union, Norway would be pulled into the conflict whether it wanted to be or not. Nevertheless, and despite the fact that once the debate was concluded public support for NATO across the political spectrum was consistently strong, Norwegian governments, whether socialist or nonsocialist, had throughout the Cold War to balance carefully between policies of deterrence against and reassurance of the Soviet Union, and between integration with and screening against NATO.[18]

The concrete expressions of these considerations were Norway's base policy, its nuclear policy, and a series of restrictions on allied exercise activity in Norway. The base policy was first formulated in February 1949 in a note to the Soviet government stating that Norway would "not enter into treaties with any other states that contains an obligation to open up bases to the armed forces of foreign states on Norwegian territory as long as Norway has not been attacked or been subject to threats of an attack." At the NATO summit in 1957, the Norwegian prime minister, who was critical of NATO's nuclear strategy, declared that Norway would not store nuclear weapons on its soil in peacetime. In 1988

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Defence Minister Johan J. Holst further clarified Norwegian nuclear policy by announcing:

> In accordance with international agreements, Norway will not test, produce, or in any other way attain, nuclear weapons; nuclear weapons will not be stored in or deployed to Norway; Norwegian armed forces will not be trained in the use of nuclear weapons; Norway will not enter into any cooperation agreement with an aim to transfer nuclear weapons or information about nuclear weapons to Norway; special storage sites for nuclear weapons will not be established in Norway; Norwegian weapon systems will not be certified for use of nuclear munitions.[19]

In addition, throughout the Cold War there were limits on how many allied soldiers, aircraft, or ships could be present in Norway at any one time, in order not to undermine the base policy. As a measure of reassurance for the Soviet Union, allied units were not allowed to operate in the county of Finnmark, next to the Soviet border, or from Norwegian airfields or harbors or at sea or in the air east of twenty-four degrees east longitude.[20]

NORWEGIAN RESTRICTIONS AND THE U.S. MARITIME STRATEGY

The American "rediscovery" of NATO's northern flank in the 1970s and the resulting reinforcement plans; prestocking of materiel, fuel, and ammunition; and increased exercise activity in Norway in the 1970s and 1980s raised a political debate in the country over the interpretation and practice of Norwegian restrictions—the nation's nuclear and base policies and its constraints on allied training and exercises. At times the debate generated substantial pressure on the Norwegian government and put limits on how far Norway could go to accommodate allied, primarily U.S. Navy, requirements for support. Of the many issues that were affected by this debate and that caused problems for the government and strained Norway's relationship with the United States, I will briefly mention five, in their relations to the country's nuclear and base policies:

- Port visits of U.S. nuclear-capable ships and submarines
- Participation of nuclear-capable aircraft in training and exercises
- Prestocking for the U.S. Marine Corps
- Consequences for Norway of the concept of horizontal escalation
- Logistic support to the U.S. Navy by "forward operating locations" (FOLs).[21]

Visit by Nuclear-Capable Naval Units. The provision in Norway's nuclear policy whereby nuclear weapons would not be stored in or deployed to Norway meant

that visits by ships armed with nuclear weapons could constitute violations of that policy. In 1975 the prime minister, Trygve Bratteli, formulated what has been called the "Bratteli doctrine": "Our assumption, as foreign ships visit, has been and is that nuclear weapons are not carried on board. Norwegian authorities anticipate that allied, as well as other nuclear powers, respect this assumption." The doctrine thus took into account both the fact that warships, under international law, cannot be inspected by foreign states and that Western nuclear powers, by policy, neither confirmed nor denied that their ships were carrying nuclear weapons. The Bratteli doctrine was no more than a codification of established practice, but it nevertheless evoked strong reactions by the allied nuclear powers and by Norway's own Chief of Defence, General Zeiner Gundersen. He feared that the doctrine would lead to a sharp reduction in the visits by allied ships. The doctrine was thus allowed to slip silently into oblivion. In the early 1980s, reference to it was omitted from statements of diplomatic clearance of visits to Norway by foreign warships.

When Johan J. Holst was appointed Minister of Defence in 1986, he decided to reinstate the doctrine, by once more referring to it in diplomatic clearances issued for ship visits. The American reaction was immediate and strong, and Holst had to back down and accept a compromise whereby reference to the doctrine was only indirect. In 1992 Holst reversed his policy on this issue completely, stating that "Norway cannot conduct a policy whereby its allies must prove that they are not criminals."[22]

The Participation in Exercises of Nuclear-Capable Aircraft. In accordance with the limitations on allied exercises in Norway, the government put restrictions on the number and types of allied aircraft that could operate at any one time from Norwegian airfields or in Norwegian airspace. In particular, the government had problems with regard to nuclear-capable aircraft: the B-52 long-range bomber, the F-111D fighter-bomber, and the A-6 Intruder light bomber.

In Exercise ANORAK EXPRESS in March 1980, for example, B-52s based in Britain were to simulate attacks on targets in Norway and then return to base, without having landed on Norwegian soil. The mission was stricken from the exercise by the Norwegian government, and a general rule was established for later exercises whereby B-52s could participate only in other than offensive roles, only versions of the aircraft not certified or equipped to deliver nuclear weapons could take part, and B-52s would not land in the country other than in an emergency.

The F-111D was part of NATO's intermediate-range nuclear force (INF) and also of the strategic reserve of the Supreme Allied Commander, Europe (SACEUR). In this latter role it could be deployed all over ACE. When SACEUR's

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plan for cross servicing these aircraft at Norwegian airfields came up for approval in November 1983, the conservative Kåre Isaachsen Willoch government demanded that F-111Ds be omitted from the plan as far as Norway was concerned. Like the B-52, the F-111D was so prominently associated with NATO's nuclear strategy that regular visits to Norway by these aircraft or their inclusion in the allied plans for the country's defense would have been seen as eroding the Norwegian nuclear policy.

The A-6 Intruder, a nuclear-capable light bomber, also created problems for the Norwegian government. The aircraft was, for instance, initially not allowed to exercise in Norway, and storage of heavy equipment associated with the A-6 was excluded from the 1981 U.S. Marine Corps prestocking agreement, on the premise that storage sites containing an offensive capability like the nuclear-capable A-6 would be regarded as unacceptable provocations to the Soviet Union, by both the Soviets and the Norwegian public. But the A-6 was an integral part of the U.S. Marine Corps's inventory, and as Marine exercise participation in Norway increased in frequency and volume, regular involvement by A-6s became unavoidable. The first time A-6s in the air-to-ground role took part in an exercise in Norway was in TEAMWORK 1984, where they operated out of Bodø in northern Norway. Previously they had operated only out of Ørland, much further south in central Norway in the electronic-warfare role. This proved to be a breakthrough. From then on and well into the 1990s, the A-6 was a regular participant in NATO exercises in Norway, without causing political problems of any kind to the government.[23]

Prestocking for a U.S. Marine Corps Expeditionary Brigade. In 1981 American and Norwegian authorities signed an agreement to store the heavy equipment of a U.S. air-landed Marine expeditionary brigade (known as the NALMEB) in the central Norwegian county of Trøndelag. The original plan was to store the equipment in northern Norway, which was where the brigade would operate if it were deployed. This was hindered by strong political opposition in Norway, and a compromise solution had to be found farther south. As compensation, the heavy equipment for South Norwegian Brigade 6 was stored in the north. Also, the Marine brigade's air element was allowed to fly directly to its designated airfields in the north. The net result was thus a considerable strengthening of the defense of northern Norway.

What was the opposition to prestocking for the Marines in northern Norway all about? First, there were those who opposed any prestocking in Norway for the U.S. Marine Corps. Second, there were those who supported it in principle but not in northern Norway. The general opposition to prestocking must, I believe, be seen as a repercussion of the broad and general political opposition in

Norway to the war in Vietnam. The war, which had ended in 1975, was still fresh in memory. Also, the Marine Corps was seen as the epitome of American expeditionary capability; Norwegian politicians feared that prestocking its equipment would pull the country into American global strategy. There were also those who felt that storing equipment for foreign troops could undermine the Norwegian base policy, while others pointed to the fact that because the brigade was nuclear capable, the presence of its equipment would represent a challenge to the nation's nuclear policy.

Those who supported prestocking in principle but opposed it in northern Norway feared that a storage site there would provoke the Soviets and thus be contrary to the long-standing Norwegian policy of low tension in the north. This, by the way, was a general problem with the Maritime Strategy, as many Norwegians saw it. For the Norwegian government, which wanted to tie the United States to the defense of Norway, on the one hand, and on the other to minimize internal debate and political division over defense and security policy, handling the strategy was a difficult balancing act.[24]

Horizontal Escalation. In 1978 the dean of the Center for Advanced Research (as the present Center for Naval Warfare Studies was originally known) at the U.S. Naval War College, at Newport, Rhode Island, Francis J. "Bing" West (who, by the way, had participated with John Lehman in the development of "Sea Plan 2000," the precursor to the Maritime Strategy), coined the phrase "horizontal escalation." The phrase signified a concept whereby the U.S. Navy could improve the American bargaining position against the Soviet Union in the early stages of a war by forward maritime operations against the Soviet navy, including its strategic submarines, the SSBNs, thus confronting the Soviets with a choice between nuclear escalation and termination of hostilities.[25] When the Maritime Strategy started to materialize in the 1980s, the idea of horizontal escalation surfaced in the Norwegian debate. If the United States were to respond to a conflict with the Soviets in, let us say, the Persian Gulf by attacking the Northern Fleet base area on the Kola Peninsula, close to the Norwegian border, would that be in Norway's interest and in line with the Norwegian policy of low tension?

In 1986 Johan Holst feared that the U.S. naval strategy could result in Soviet pressure on the Scandinavian countries and in inadvertent escalation to nuclear war. He warned against what he called a "mediterraneazation" of the Norwegian Sea (referring to the permanent presence in the Mediterranean of both the U.S. Sixth Fleet and units of the Soviet Black Sea Fleet). At the same time, however, Holst was engaged in securing regular allied naval presence in northern waters, as that could reduce Soviet dominance and induce restraint on both sides. Again we see the double dichotomy of deterrence and reassurance of the Soviets and of

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integration with and screening against allies—that runs as a bright line through Norwegian Cold War defense and security policy.[26]

Logistic Support to Striking Fleet Atlantic. An important lesson learned from the participation of the *America* CVBG in OCEAN SAFARI in 1985 was the need to establish logistic support in the shape of forward-located depots of fuel and ammunition. For instance, the SACLANT fuel depot in Namsen, in central Norway, which had been established in 1983, held enough for only three days' consumption. In September 1985 the commander of Striking Fleet Atlantic (COMSTRIKFLTLANT), Admiral Henry C. "Hank" Mustin, USN, brought the matter up with Norwegian authorities. It was a subject that was going to haunt them for years, right up until the end of the Cold War, and that would put considerable strain on U.S.-Norwegian relations.

In the summer of 1987, American authorities approached Norway's Ministry of Defence with a request to establish FOLs for logistic support to the U.S. Navy along the Norwegian coast. The Norwegians wanted to postpone the question; the Americans were indignant at this lack of support. In 1989, after considerable U.S. pressure, the Norwegian government went along and initiated negotiations on the subject. The American proposal included four different measures. First was establishment of forward-located ammunition and fuel depots at Bodø. The second was provision of airfields and seaports suitable for the reception and onward movement to ships of replenishment stores and spare parts. The Værnes airport and Trondheim harbor in central Norway were identified as candidates. Third, there was a need for an FOL farther north. Brønnøysund, where there was a modern jetty with a deep berth and easy access to the open sea, was seen as the best alternative. It was located close to an airport, though its runway would have to be extended somewhat and an aviation fuel depot would have to be built. Fourth, agreement had to be reached on the earmarking and preparation of wartime ship-repair facilities. The U.S. Navy had already secured agreement with five shipyards in Norway for peacetime support; similar agreements had to be closed for wartime use. Not until 1991 was the Norwegian government ready to approve a modified logistics agreement. But by this time the Cold War was over, Striking Fleet had left the Norwegian Sea, and SACLANT was no longer interested.

And that was precisely why Defence Minister Johan Jørgen Holst and the Norwegian government had dragged their feet on the subject in the first place. Holst knew that the deployment pattern of the U.S. Navy was according to American needs, not Norway's wishes. He had observed that American strike carriers had been conspicuously forward deployed in the Norwegian Sea in the 1950s but had disappeared in the early 1960s when submarines took over the

nuclear-deterrence role. Now the U.S. Navy was back in the Norwegian Sea as a result of the forward maritime strategy, but he had no guarantee that this new engagement would last. On the contrary, strategies invariably change as political situations change and create new requirements and as developments in weapons technology bring forward new capabilities.

The considerable allied military presence in Norway in the 1980s—on average around ten thousand personnel in training and over fifteen thousand involved in exercises per year, in addition to a large number of ships and aircraft—had created an impression that allied soldiers were almost continually present in Norway and that this constituted an erosion of Norway's base policy. Moreover, the exercises and training had reached the limit of what Norway was able to support and still maintain control over the activity. In this situation, to rally sufficient political and popular support for the establishment of forward operating locations—a euphemism for forward bases—for the U.S. Navy required unusual political skill, and a positive result would come only at a considerable political price. It was a price Holst was not willing to pay, since the chances were that no sooner would the FOLs be in place than the U.S. Navy would leave once more—which, of course, is exactly what happened.[27]

STRIKING FLEET ATLANTIC IN NORTH NORWEGIAN WATERS

Let me now turn to some implications for the defense of Norway at the operational and tactical levels. A concrete expression in Norwegian waters of the U.S. forward maritime strategy was the deployment of Striking Fleet Atlantic to the northern Norwegian Sea and into the coastal waters of northern Norway. Striking Fleet (STRIKEFLT) was organized in four subordinate commands: the carrier, ASW, amphibious, and Marine strike forces.[28] STRIKEFLT thus contained naval, air, and ground forces, and it was capable of establishing sea control and air superiority as a basis for force projection ashore.

Accordingly, its routine deployment to northern Norway represented an enormous boost to the defense of the region, for three reasons. First, it contributed convincingly to deterrence, in that it demonstrated American determination and ability to defend Norway, not through altruism but for reasons of U.S. security. Moscow would have to regard it as highly probable that an attack on Norway would mean war with the United States. Second, it constituted a crucial contribution to the defense of Norway. The operation of STRIKEFLT, with its two or three mutually supporting CVBGs, in the Vestfjorden and adjacent ocean areas meant allied sea control and air superiority along the Norwegian coast at least as far north as Lyngen Fjord, the northernmost of the fjords that penetrate deep into the key defensive positions of the Norwegian army in inner Troms County. Depending on the number of CVBGs, Striking Fleet's presence off the

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Norwegian coast constituted a doubling of the number of air-defense fighters and a tripling of the number of fighter-bombers available to Commander, Defence Command North Norway (COMNON).[29] The most dangerous potential Soviet course of action in the event of war was considered to be an amphibious assault into the northern fjords to outflank the Norwegian army or attack it in the rear, in coordination with a simultaneous frontal assault on the defensive line between Lyngen Fjord and the Finnish border. Deployment of STRIKEFLT to the area would make such an assault a very risky undertaking.

Third, the planning and execution of complex joint and combined operational-level exercises that included integration of land-based and carrier-based air and amphibious landings raised the proficiency of COMNON's staff and of the Norwegian armed forces in general. Operations at the tactical level in the extremely target-rich environment of the major NATO exercises in northern Norway contributed to the efficiency and morale of Norwegian units on the ground, at sea, and in the air.

But there were challenges too. They were a result of deploying STRIKEFLT into a zone "up threat" (that is, in the direction from which the threat was expected) that was already the area of responsibility (AOR) of a "principal subordinate NATO commander," namely, COMNON, who had substantial naval, air, and ground forces under his own control. The complications were primarily related to airspace and water-space management and coordination in order to ensure the safety and security of "own units" and avoid "blue on blue" engagements while at the same time allowing the forces to fight effectively. The challenges can be grouped in four categories:

- Coordination and deconfliction of land-based and carrier-based air defense
- Shape and size of the amphibious objective area
- Employment of Marine air-component aircraft in support of COMNON's air campaign
- Coordination and deconfliction of COMNON and COMSTRIKFLTLANT naval operations in coastal waters.

In addition, there were issues regarding the conduct of complex joint and combined exercises in northern Norway in peacetime in such a way as to avoid accidents involving civilians and damage to civilian property. I shall briefly comment on each of these issues.

Land-Based and Carrier-Based Air Defense. As carrier battle groups approached the coast of northern Norway, their "outer defense zones," which could extend as far as three hundred nautical miles from the carriers themselves, would start to overlap COMNON's airspace.[30] As the carriers were under the command of

SACLANT but COMNON was under SACEUR, there was no higher-up command with overriding authority to take on overall responsibility for airspace management. This was nothing new. For many years, operating in the waters between Greenland, Iceland, and the United Kingdom (then famous as the "GIUK gap"), U.S. CVBGs had experienced the same problem in relation to the United Kingdom's air-defense region. The U.S. Navy of the 1980s strongly preferred to plan for and exercise coordinated, cooperative, and deconflicted (but separate) sea-based antiair and strike campaigns rather than integrated TACAIR operations over both the land and sea under one powerful, central operational theater-air commander—who would likely be, in many important scenarios, a U.S. Air Force officer.[31]

The result had been the so-called CADIMS (Coordinated Air Defense in Mutual Support) agreement between British and American authorities, with procedures for the deconfliction of carrier- and land-based air. CADIMS was now used as a template for a similar agreement between COMNON and COMSTRIKFLTLANT. The concept was simple; the agreement essentially divided the airspace between the two and set forth special procedures for aircraft of one command that for some reason had to enter the airspace of the other. For exercise purposes in peacetime, the dividing line ran parallel to the Norwegian coast; COMSTRIKFLTLANT had control of the airspace to seaward. This allowed COMNON to carry out his responsibility for the defense of Norwegian airspace prior to war. In a wartime situation the delineation of COMNON and COMSTRIKFLTLANT airspace would probably have run east to west, with SACLANT responsible up threat.[32]

Shape and Size of the AOA. In an amphibious assault, U.S. doctrine gave the commander of the amphibious strike force complete control at sea, on the ground, and in the air within the "amphibious objective area," the AOA. This control included, as a minimum, coordinating authority over all friendly units within the AOA. The AOA had to be large enough to allow for effective self-defense. Moreover, operational control over the Marine strike force, including its air component, would not pass to COMNON until the amphibious objective had been obtained. That could, realistically, take at least a week, often more. Consequently, when American planners arrived at COMNON planning conferences convened to organize amphibious assault exercises in Troms, they presented AOAs that encompassed all of COMNON's key defensive area in that county, plus the northern parts of Nordland County and large chunks of northern Sweden.

If it had been only a question of the defense of a generic country against a generic threat, as in NATO exercises today, this would not have been a big problem.

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But NATO's exercises in northern Norway during the Cold War were designed to test and refine NATO's contingency plans for war with the Soviet Union. Concepts and procedures for exercises had therefore to be as close to the real thing as peacetime safety regulations and political considerations (such as the necessity to avoid violation of Swedish airspace) would allow. To COMNON it was unacceptable to turn over to an allied commander (who might not even be under NATO command) control over his own key areas—where his entire anti-invasion force of four to six mechanized infantry brigades and a considerable number of naval ships, submarines, and fighter aircraft would be concentrated—in order that a single light Marine amphibious brigade could deploy. It did not make the situation easier that, according to plans, elements of the amphibious brigade's air component could deploy to northern Norwegian airfields immediately prior to or during the landing, when the shift of operational control to COMNON had not yet taken place.

To further complicate the issue, the amphibious commander would be a foreigner, with much less knowledge and experience of operations in the highly demanding terrain and climate of northern Norway than COMNON and his subordinate commanders. At the same time, it was unacceptable to the amphibious commander to land his units on the beach without being certain that he would be able to defend them effectively in the vulnerable landing phase before the amphibious brigade had time to regroup and get ready for combat ashore. Even if the assumption was that the amphibious brigade would land prior to hostilities breaking out, the very fact that it had done so would make the political situation so tense that hostilities could break out at any moment.

The issue of the AOA in northern Norway first went onto the agenda in the NATO command-post exercise WINTEX 1975. A solution that was acceptable to both parties would have to be based on confidence on the part of the Americans that COMNON had sufficient control in his area of responsibility that the size of the AOA could be reduced and its shape tailored to the geography in such a way that COMNON's units would not be unduly hindered in their movements while the amphibious landing was in progress. But a solution on those lines was not found until TEAMWORK 1984, and luckily we will never know whether the Americans would have accepted it in a real situation.[33]

Marine Aircraft in Support of COMNON's Air Campaign. In accordance with its operational concept, a U.S. Marine air-ground task force, or MAGTF, is an organic whole, and its air and ground combat components are integral parts that cannot be separated.[34] COMNON, on the other hand, considered that the U.S. Marine brigades could be more effectively employed in the defense of northern Norway if the ground combat component were placed under tactical command of the Norwegian 6th Division and the air component were under his own air

component commander, COMAIRNON, and integrated in the COMNON air campaign.

This was emphatically rejected by the Americans. It would constitute an unacceptable violation of their doctrine. Also, according to current plans, COMNON was allocated only operational control over the U.S. Marine brigade, and that did not include authority to divide it. COMNON had to give in on this point and accept that his ability to use his entire defense force in an optimal and flexible way, especially in the air, would be somewhat reduced. Anyway, given the considerable fighting capability of the Marine brigade, the net effect on the defense of Norway would be positive, compared to not getting the brigade at all. In the years of exercising together that followed, as mutual confidence and respect between Norwegian and American personnel increased, the Americans found it possible to compromise just a little: "excess sorties," ready sorties not employed by the Marine force commander in direct support of his force, were made available to COMNON for his air campaign.

Coordination and Deconfliction of Naval Operations. As noted, the boundary between SACLANT's and SACEUR's areas of responsibility ran parallel to the Norwegian coast, only a few nautical miles out.[35] As Striking Fleet crossed the line and approached the Norwegian coast, however, it did not change operational command or control to SACEUR but operated in accordance with current NATO procedures for "cross boundary operations." They required that all STRIKEFLT units establish radio communications with COMNON in order to report their positions and intended movement and to receive information about friendly units in the area, recognition procedures, IFF (identification, friend or foe) settings, and so on.

This was absolutely crucial in order to avoid blue-on-blue engagements. Especially along the coasts of northern Nordland and Troms Counties, every inlet was covered by powerful artillery units, gun and torpedo batteries, and minefields. Numerous fast missile and torpedo boats and coastal submarines would also be employed as part of Norway's anti-invasion scheme. In a real instance of the kind of scenario we are talking about, where STRIKEFLT had deployed in the defense of Norway against imminent attack from the Soviet Union, all Norwegian naval units would be on high alert and authorized to fire at darkened warships that entered territorial waters without responding to calls on the radio. Striking Fleet surface combatants and underway replenishment ships that entered Norwegian coastal waters prior to the arrival of the high-value units—for precursor operations, replenishment of fuel and stores, or other reasons—without listening on the appropriate radio frequencies or responding correctly when challenged would immediately be shot out of the water.

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Our concern was that what you do not regularly exercise and practice in times of peace, you will probably not automatically practice in the first phases of crisis and war, until you have learned your lesson the hard way. Another concern, from COMNON's perspective, was that this lack of adherence to agreed procedure reduced the value of the exercises to all participants and had a demoralizing effect on Norwegian naval and coast-artillery personnel, to whom the chance to interact with powerful allied units was something they had looked forward to immensely and prepared themselves for with enthusiasm.

In all the exercises I took part in or was involved with—and that is the majority of all the exercises carried out from 1968 until 1993—allied warships, especially those of the U.S. Navy, did not take this seriously. They very rarely responded to radio calls and generally ignored the presence of minefields. In a real situation, that could have proved catastrophic—but then, they probably would have learned quickly.

The Planning and Conduct of Major NATO Exercises. Running a complex, multinational live exercise in an area not closed to the general public is like putting together an intricate jigsaw puzzle. To prevent unnecessary traffic jams and road accidents, to keep ships from steaming into fishing nets, and in other ways to avoid damaging or hindering civilian activities is challenging enough. But the most daunting task was devising an exercise in the air that was sufficiently challenging to all participants but neither posed hazards or unnecessary restrictions on military sorties or civilian air traffic nor created a diplomatic scandal by repeated violations of Swedish airspace. It added to the complexity that Soviet aircraft routinely operated within or adjacent to that part of the exercise area that stretched into international airspace. The Soviet presence constituted a potential safety risk. It was necessary to allocate sorties in order to intercept and shadow the Soviet aircraft, and these sorties had to come out of the exercise air tasking order.

All air movement had to be meticulously planned in order to avoid low flying or breaking the sound barrier over inhabited areas or in the vicinity of fur farms. The whole setup had to be coordinated with the civilian air traffic routes—something that represented a challenge of its own, as civilian and military aircraft operated from the same airports and the airspace over Nordland and Troms is not large. The airspace was further limited in that military aircraft were allowed to approach the Swedish border no closer than twenty nautical miles. Nevertheless, through the 1970s and '80s, up until 1988, there were annually one or two violations of Swedish airspace, each an embarrassment to the Norwegian government.

The NATO exercises at times stretched the capacity of the civilian air-traffic control system to the limit. A special problem was keeping track of, and

deconflicting, carrier-based air under COMSTRIKFLTLANT and land-based air under COMNON. The combination of limited radar coverage and a shortage of civilian air controllers led to a situation where the traffic control system was unable to cover the large NATO exercises and at the same time deal with civilian traffic. During Exercise OCEAN SAFARI in September 1987, Scandinavian Air Lines had to cancel two daily flights between Oslo and northern Norway; the Ministry of Transport decided to close Norwegian airspace between Bodø and Alta, in Finnmark, to civilian traffic every morning and evening for the duration of the exercise.[36]

The U.S. Maritime Strategy and NATO's Concept of Maritime Operations put Norway on both Brussels's and Washington's military strategic maps in an unprecedented way. It contributed to increasing the credibility of American and NATO deterrence of the Soviet Union. It redressed the extremely unfavorable force balance between the Soviet Union and Norway, on the alliance's northern flank, and it brought considerable NATO infrastructure investment to Norway in the form of fuel and ammunition storage sites, hardened aircraft shelters, improved runways, communications and aircraft early-warning equipment, and the like. It also brought exercise activity that contributed to a considerable increase in the knowledge and proficiency of Norwegian defense planners and operators.

Nonetheless, this strategic centrality constituted a challenge to Norway's policy of low tension in the northern region and to such key elements of the nation's defense and security policy as its base policy, nuclear policy, and restrictions on allied exercise activity. It thus became the source of fierce internal debates over Norway's defense and security policy. These were debates that successive Norwegian governments sought to avoid, as it was believed that for a small country in an exposed strategic position to indulge in visible political divisions over its defense and security policy would only contribute to further weakening of that position.

The U.S. Maritime Strategy and CONMAROPS thus presented the Norwegians with a difficult task of balancing between, on the one hand, tying the United States firmly to the defense of Norway and, on the other hand, trying to minimize internal debate in a population traditionally skeptical of what it perceived as American interventionism. Alliance strategy in this way brought to the fore and made visible the recurring theme of a double dichotomy in Norwegian security and defense policy—that of deterrence and yet reassurance of the Soviet Union, and that of integration with and screening against allies—that ran as a thread through Norwegian Cold War defense and security policy from beginning to end.

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NOTES

The article is based on a presentation by the author to the Cold War Oral History Conference at Bodø, Norway, on 21 August 2007.

1. At this time Commander, Defence Command North Norway, COMNON, a Norwegian three-star general, was "double hatted" as national commander, subordinate to Chief of Defence Norway, and as an allied "principal subordinate commander" in the Supreme Allied Commander, Europe (SACEUR) chain of command. The boundary between Supreme Allied Commander, Atlantic's (SACLANT's) area of responsibility (ACLANT) and that of SACEUR (ACE) ran parallel with the Norwegian coast just a few nautical miles out to sea. A major part of NATO's air reinforcements, and all of NATO's naval and amphibious reinforcements to northern Norway, were, however, SACLANT forces. As units of SACLANT's Striking Fleet crossed into ACE and approached the Norwegian coast, they did not immediately or necessarily change operational command or control to SACEUR but generally operated in accordance with current NATO procedures for "cross boundary operations." For the purpose of submarine operations and naval surveillance, COMNON acted as a functional commander in the SACLANT chain of command.

2. The last Cold War deployment of U.S. carriers to Norwegian coastal waters prior to these had been in the NATO exercise MAINBRACE in 1952, when USS *Midway* (CVB 41) and USS *Franklin D. Roosevelt* (CVB 42) took part. Deployment of U.S. carriers into the Norwegian Sea was, on the other hand, not uncommon. From February 1954 U.S. carriers were incorporated into American plans for strategic nuclear warfare. This meant regular deployment into the Norwegian Sea to prepare for the offensive nuclear-strike role in the event of war with the Soviet Union. These deployments subsided with the introduction of the SSBN to the U.S. Navy from 1964 onward. Between 1964 (Exercise TEAMWORK) and 1985, U.S. carriers would regularly participate in NATO exercises in the North Atlantic and the Norwegian Sea, carrying out air interdiction missions and air support to forces on the ground in North Norway from positions out to sea. Rolf Tamnes, *The United States and the Cold War in the High North* (Oslo: ad Notam forlag AS, 1991); Joel J. Sokolsky, *Seapower in the Nuclear Age: The United States Navy and NATO, 1949–80* (Annapolis, Md.: Naval Institute Press, 1991); Kjetil Skogrand, *Norsk forsvarshistorie* [Official History of Norway's Defense Forces], vol. 4, *1940–1970* (Bergen: Eide forlag, 2004); and Jacob Børresen, Gullow Gjeseth, and Rolf Tamnes, *Norsk forsvarshistorie* [Official History of Norway's Defense Forces], vol. 5, *1970–2000* (Bergen: Eide forlag, 2004).

3. The U.S. Maritime Strategy was signed by the Chief of Naval Operations on 4 May 1984. For an extended treatment of its development, see John B. Hattendorf, *The Evolution of the U.S. Navy's Maritime Strategy, 1977–1986,* Newport Paper 19 (Newport, R.I.: Naval War College Press, 2004), available at www.usnwc.edu/press/. The signature date is on p. 296.

4. Sokolsky, *Seapower in the Nuclear Age,* pp. 92–93.

5. John B. Hattendorf and Peter M. Swartz, eds., *U.S. Naval Strategy in the 1980s: Selected Documents,* Newport Paper 33 (Newport, R.I.: Naval War College Press, 2008), pp. 7–8, available at www.usnwc.edu/press/.

6. Sokolsky, *Seapower in the Nuclear Age,* pp. 85–86.

7. Ibid., pp. 87, 98.

8. Hank C. Mustin, "The Role of the Navy and Marines in the Norwegian Sea," *Naval War College Review* 39, no. 2 (March–April 1986), pp. 2, 4.

9. Sokolsky, *Seapower in the Nuclear Age,* p. 2.

10. Mustin, "The Role of the Navy and Marines in the Norwegian Sea," p. 2.

11. Børresen, Gjeseth, and Tamnes, *Norsk forsvarshistorie,* vol. 5, p. 101.

12. Mustin, "The Role of the Navy and Marines in the Norwegian Sea," p. 2.

13. Ibid., pp. 4–5.

14. Hattendorf and Swartz, eds., *U.S. Naval Strategy in the 1980s,* pp. 74–77.

15. Ibid., pp. 78, 82–84.
16. Ibid., pp. 85–86.
17. Ibid., p. 92.
18. Rolf Tamnes, "Integration and Screening: The Two Faces of Norwegian Alliance Policy, 1945–1986," in *Forsvarsstudier: Defence Studies VI Årbok for Forsvarshistorisk forskningssenter—110 Forsvarets høgskole 1987,* ed. Rolf Tamnes (Oslo: Tano, 1987), and *United States and the Cold War in the High North,* p. 298.
19. Børresen, Gjeseth, and Tamnes, *Norsk forsvarshistorie,* vol. 5, pp. 108–109.
20. Skogrand, *Norsk forsvarshistorie,* vol. 4, pp. 161–74; Børresen, Gjeseth, and Tamnes, *Norsk forsvarshistorie,* vol. 5, pp. 106–18.
21. Tamnes, *United States and the Cold War in the High North,* pp. 289–94.
22. Børresen, Gjeseth, and Tamnes, *Norsk forsvarshistorie,* vol. 5, pp. 109–11.
23. Ibid., pp. 108–13.
24. Ibid., p. 63.
25. Tamnes, *United States and the Cold War in the High North,* p. 262.
26. Børresen, Gjeseth, and Tamnes, *Norsk forsvarshistorie,* vol. 5, p. 114.
27. Ibid., pp. 101, 114–15.
28. Eric Grove, "The Superpowers and Secondary Navies in Northern Waters during the Cold War," in *Navies in Northern Waters 1721–2000,* ed. Rolf Hobson and Tom Kristiansen (London: Frank Cass, 2004), p. 219.
29. Børresen, Gjeseth, and Tamnes, *Norsk forsvarshistorie,* vol. 5, p. 60.
30. Jacob Børresen, *USA-marinens operasjoner i Nord-Atlanteren og Norskehavet* [U.S. Navy Operations in the North Atlantic and the Norwegian Sea], Norwegian Institute for International Affairs Report 89 (Oslo: May 1985), p. 19.
31. Hattendorf and Swartz, eds., *U.S. Naval Strategy in the 1980s,* p. 15.
32. This section is based on my own unpublished notes from the time. During our work with the *Official History of Norway's Defense Forces* from 2000 to 2004 I was unable to confirm these arrangements in the COMNON archives. Interviews with colleagues from the Norwegian Air Force have, however, reinforced my belief that my notes and memory are correct in this matter.
33. Børresen, Gjeseth, and Tamnes, *Norsk forsvarshistorie,* vol. 5, pp. 63–64.
34. Once more, the only source of this section is my own unpublished notes from my time as DACOS Plans, Defence Command North Norway, in 1985, confirmed through conversations with officer colleagues I served with at the time.
35. This section too is mostly based on my own unpublished notes and recollections.
36. Børresen, Gjeseth, and Tamnes, *Norsk forsvarshistorie,* vol. 5, p. 103.

THE QUIET WARRIOR BACK IN NEWPORT

Admiral Spruance, the Return to the Naval War College, and the Lessons of the Pacific War, 1946–1947

Hal M. Friedman

War is about wreckage. Consequently, postwar periods tend to be about reconstruction, and that phenomenon is what this article is about. It sets the scene for a larger exploration (the subject of projected sequels to the recent book from which this article is adapted) of how a military-academic institution —the Naval War College, in Newport, Rhode Island—attempted to readjust to a peacetime period that entailed simultaneously the start of a new type of conflict for the United States (the Cold War) and with a revolutionary new weapon (the atomic bomb). While the Cold War and the Atomic Age were revolutionary in many respects, at their outset the staff, instructors, guest lecturers, and students at the Naval War College did not automatically or necessarily think so. To a great degree, American military officers in the immediate postwar period, while acknowledging that atomic energy weapons and "war during peace" were earth-shattering in one sense, fell back on fairly traditional strategic, operational, and tactical concepts for meeting these new challenges.[1]

The College was reconstituted after its reduced wartime status on a full-time basis under the presidency of Admiral Raymond Spruance and was charged with the strategic reformulation of American

Hal M. Friedman is associate chair of the Department of History and professor of modern history at Henry Ford Community College, Dearborn, Michigan. Professor Friedman took his master of arts and doctor of philosophy degrees in the history of international relations at Michigan State University in 1991 and 1995, respectively. Additionally, he teaches part-time as an adjunct faculty member of the Command and Staff College Distance Education Program within the U.S. Marine Corps University's College of Continuing Education; as an adjunct lecturer of strategy and policy in the U.S. Naval War College's Non-Resident Strategy and Policy Fleet Seminar Program; and as a section instructor in Norwich University's online Master of Arts in Military History Program. Dr. Friedman's most recent books are Arguing over the American Lake: Bureaucracy and Rivalry in the U.S. Pacific, 1945–1947, *2009; and* Digesting History: The U.S. Naval War College, the Lessons of World War Two, and Future Naval Warfare, 1945–1947 *(Naval War College Press, 2010). Dr. Friedman is a veteran of the U.S. Naval Reserve, having served several years as a personnelman.*

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naval policy for this atomic and Cold War context. Some of these reforms began before the war even ended; Vice Admiral William Pye, its wartime President, had called for an expanded institution capable of teaching a tenfold increase in officers by means of a three-tiered educational structure consisting of a Command and Staff course, the War College course, and an Advanced course. Pye remained until March 1946, presiding over six-month courses that had become the order of the day during the war and beginning preparations for returning to a full, two-year program. In addition, by the time the war ended the Naval War College had started to consider joint service education for officers from the other services as well as personnel from the State Department.[2]

The real change came, however, when Admiral Spruance became President in March 1946. Spruance not only brought his command experience from the Pacific War and his three previous tours at the College but intimately understood how radically different the Navy's responsibilities would be in the postwar period. These responsibilities would require a Naval War College that would foster intra- as well as inter-service and even interdepartmental cooperation. They also meant a College whose curriculum took logistics into account. Spruance was convinced that the study of logistics as an aspect of modern naval warfare was being seriously neglected. In Captain Henry Eccles, who would become the chairman of the College's Department of Logistics by 1947, the admiral found an officer who believed as strongly as he that logistics had to be studied alongside strategy, operations, and tactics.[3]

Spruance was also a student of military history, as can be seen in the establishment of the World War II Battle Evaluation Group in 1946. Under Commodore (later Captain and then Rear Admiral) Richard Bates, the Battle Evaluation Group was to study the recent war and derive lessons for use by officers seeking to improve their professional judgment. By 1950, Bates's team had produced studies on the battles of Coral Sea, Midway, and Savo Island; it was working on a multivolume work on the battle of Leyte Gulf when in 1958 it was disestablished for lack of funds. Related to these changes, Spruance replaced the College's "Sound Military Decision" format (so named for a 1937 booklet issued by the College under Rear Admiral Edward C. Kalbfus) with what he called the "Operational Planning Model." This approach produced a much simpler, more standardized Navy-wide process for estimating operational situations and formatting orders.[4]

As noted above, the radically changing situation in which the U.S. Navy might have to face off against the Soviet Union in a possible atomic-warfare environment was the reason that Fleet Admiral Chester Nimitz, Chief of Naval Operations, wanted Spruance as the new President of the Naval War College. Spruance's charge was to "revitalize" the College as thoroughly as possible. Not

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Courtesy Naval War College Naval Historical Collection

surprisingly, most of the "lessons learned" that he would bring came from the Navy's experience in the Pacific War, though the Atlantic was hardly ignored. Neither is it surprising that Spruance's addresses (the primary sources of this article), as well as lectures by instructors and guests and student theses (the other primary sources of my larger study) had a number of themes and issues in common. One of these themes was a continued focus on amphibious warfare, which was especially important, given the experiences of the Pacific War, to Spruance and many of the immediate postwar staff, instructors, and students. Another obvious topic was how atomic weapons would change naval ship design, strategy, and battle tactics—or not change them, as the case would sometimes be. In addition, there was considerable attention to the continued need for a balanced operational fleet, an adequate afloat train and shore-base system, and a first-rate merchant marine as elements of a total, integrated package of American sea power.[5]

Spruance additionally thought it vital that the Naval War College keep focused on the future of naval warfare, unlike in the interwar period, when surface warfare had been the dominant interest to the detriment of studying carrier and submarine warfare, logistics, and amphibious operations. This again was the reason for his emphasis on intraservice, as well as interservice, education and cooperation and for his call for the exercise of academic freedom at the College rather than searches for the "right" answers. He understood from his own career, especially the Pacific War, that there were no pat answers to strategic, operational, or tactical questions. The revitalized College would also be focusing on a new potential enemy, the Soviet Union. While Spruance was far from a Red-baiter and thought that the United States and the Soviet Union should be able to enjoy postwar cooperation, by 1946 the Cold War was becoming ever more apparent, and Spruance was convinced that the United States could not beat Russia in a war by invading and occupying its territory. Instead, he thought Western powers with highly mobile sea and sea-air power could hold Soviet attacks in Eurasia and eventually convince the Soviet people to overthrow their own government.[6] In some ways, this thinking marked continuity with the prewar

years, in that Spruance continued to argue that the Navy was the nation's first line of defense. But for the Navy itself, the Cold War was a major geographical reorientation, since the Pacific Basin was no longer to be the primary theater of operations, eclipsed now by the Atlantic and Mediterranean.[7]

Spruance's concerns and views are encapsulated in a series of speeches and statements delivered within a few months of 1946 and early 1947, a particularly significant period between the end of the war and the early formulation of "containment" as a coherent foreign policy in the fall of 1947. These transitional years offer a valuable window through which to explore institutions such as the Naval War College in transition from a hot war to a cold one. These addresses, in turn, reflect the understandings that Spruance brought to that seminal period from the war just ended.[8]

SPRUANCE AND THE POSTWAR FORMULA FOR AMERICAN NAVAL SECURITY

In mid-June 1946, Admiral Spruance delivered to Brown University alumni an address entitled "United States as a Sea Power." He began by telling his audience that it was American and British naval power in "coordinated operation" that allowed troops and aircraft to be used overseas. Focusing on the Pacific War, he gave some idea of the problems that arose with exercising that sea power. Noting that the United States was an insular nation with the size and natural resources that went with a richly endowed continent, Spruance reminded his audience that American intercourse with the rest of the world, with the exception of Canada and Mexico, was conducted by sea. Not even the proposed Pan-American Highway, he thought, would replace seaborne commerce with the rest of the Americas. The United States was "self-contained," but with the depletion of its natural resources, the growth of its population, and increasing industrialization, overseas trade would become even more important in both peace and war. Looking at the United States as an island, Spruance felt that the United States should remain the strongest sea power in the world; in time of war, sea power would be necessary to extend "sea control" over the various parts of the world's oceans and to restrict that of the enemy.[9]

Spruance went on to assert the need for both ship-based and shore-based aircraft, for which reason bases were another important part of sea power. He saw bases as a "vital necessity" in time of war, valuable assets that needed to be built up in peacetime and then held when war came. "If you are unable to hold them, your enemy will take them from you and use them against you. If you are able to hold them, but have no striking forces to operate from them, they play no active part and tend to become a liability." The basic ideas by which the United States won the war in the Pacific had existed prior to its outbreak, but some had to be

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further developed and elaborated. Carriers, for instance, had to be developed, especially in numbers, from the one or two available in 1942 to the quantity at sea in 1944. More carriers with better aircraft, as well as high-speed battleships, cruisers, and destroyers, gave U.S. forces mobility and then a "preponderance" against Japanese positions that "enabled us to accomplish with small losses what we could not do previously."[10]

Turning to amphibious operations, Spruance recounted how landings on enemy shores against opposition had been a focus of study since the First World War. These operations required new types of ships and landing craft, as well as equipment to get the troops over the beaches. Gunfire- and air-support techniques also had to be "worked out" so as to prepare for, cover, and support the landings and ground operations. Repeating what many of the College's lecturers and students had recently noted in their own work, Spruance reminded his audience that prior to the war there had been "intensive study" of amphibious operations by the Navy and Marine Corps as well as joint Army–Marine Corps maneuvers to put theory into practice. The landing craft, however, had not progressed beyond design and testing.[11]

Another problem was logistical support for naval forces when the fleet was operating far from fixed bases. Before the war, the Navy only had a small number of tenders, repair ships, and floating dry docks, and similarly small numbers of refrigerator, supply, ammunition, and refueling ships, only a few of which could transfer cargo at sea. When the loss of the Philippines left the United States without a base west of Pearl Harbor, Spruance began to see the Pacific War (as he had said in wartime) as "largely a matter of the seizure of advanced bases and their subsequent development for the support of fleet, air and ground forces."[12]

In selecting sites for conquest and development, the first requirement was suitability for airfields, the second the availability of good anchorages. Each base taken was selected with a view to supporting the next forward movement. "In order to move ahead as rapidly as possible, we took only such of the heavily defended Japanese positions as we actually had to have. The ones we did not take were cut off from Japan and left to die on the vine." Japanese ships could not venture into waters controlled by the U.S. fleet, and each bypassed Japanese airfield received, almost daily, such heavy bombing that it became a "sink hole" for Japanese aircraft. He took time to point out to the audience, however, that the tenacity of Japanese resistance was apparent in the fact that no bypassed Japanese garrison surrendered before the end of the war.[13]

Spruance next illustrated that in the South and Southwest Pacific, American operations had the advantage of large landmasses on which extensive shore installations could be built. Large bases were less vulnerable and allowed cargo to be turned around more cheaply and easily. However, they were difficult to "roll

up" during a forward movement. For instance, Spruance recalled that when offensive operations commenced in the Central Pacific in the summer of 1943, Funafuti in the Ellice Islands was the nearest base to the Gilbert and Marshall Islands that had a good anchorage. Unfortunately, Funafuti was 1,200 miles southwest of the Marshalls, seven hundred miles southeast of Tarawa Atoll in the Gilberts, and six hundred miles northwest of American Samoa. It also had very little land area that could be developed for shore installations and no deepwater channel for heavy ships. Airfield and anchorage facilities had the same limitation throughout the Ellice Islands, Gilbert Islands, Marshall Islands, and most of the Caroline Islands. The Navy was forced, therefore, to devote whatever land was available to airfields and airfield-support services, general maintenance facilities, radio stations, magazines, storehouses, fuel storage, water distillation, refrigeration, and electrical power plants. Given the physical space that these demands took up, the Navy knew, there would be no room for fleet facilities: "Everything we needed in this line would have to be afloat." Island facilities would be strictly for aviation support and island defense and would "contribute nothing of value to the fleet," with the exception of recreational facilities.[14]

Given this situation, and because the advance to the Gilberts and Marshalls was so rapid, it became necessary to organize mobile service squadrons that could keep the fleet operating thousands of miles west of Pearl Harbor for months. "As a matter of fact, once we took the Marshalls in February 1944 the fleet remained continuously in the Central and Western Pacific until the war was over and out [*sic*] Army had been landed in Japan." Individual ships went back to Pearl Harbor or the continental United States for battle-damage repair or major overhaul, but the fleet remained in the combat zone. "Command of the sea—which these days involves command of the air over it—had to be maintained at all times. It was the fleet which did this and which enabled us to push ever closer to the shores of Japan." Service Squadron 4 was organized in the fall of 1943. When Eniwetok in the Marshalls was taken in February 1944, the squadron, as would become the pattern, was moved to the Marshalls, where it became part of a reorganized Service Squadron 10 at Majuro Atoll. The growth of Service Squadron 10 was rapid. Oilers, provision ships, repair ships, destroyer tenders, ammunition ships, and supply ships arrived, supplemented by floating dry docks, concrete and steel barges, and ammunition lighters. All of these vessels and facilities were self-propelled, as were the harbor tugs, fuel barges, pontoon lighters, and numerous other smaller craft for the unloading of cargo and its transfer from ship to ship.[15]

The importance of Service Squadron 10 to the fleet could be seen, Spruance asserted, in the fact that the next operation was the Marianas, a thousand miles from Eniwetok. The Marianas would give the U.S. interior lines of operation

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against the Japanese, and the primary targets of Saipan, Tinian, and Guam had sufficient land area for a number of airfields and shore facilities, but again without deepwater, secure anchorages. Saipan provided some protection for an anchored fleet from the sea and from northeast trade winds but none from other directions or from submarine attack. Its weather was undependable (limiting the kinds of ship repair that could be done), and the harbor itself was too small. Tinian's harbor was suitable only for small craft, and Guam had "no anchorage off shore of any consequence." The port of Apra, Guam, was small, unprotected against swells, and undeveloped even after forty years of U.S. occupation ("I may say that this condition is rapidly being remedied today"). Spruance recalled that because of the hydrographic conditions in the Marianas, the carriers and battleships had to go back a thousand miles to Eniwetok to replenish ammunition since handling ordnance weighing up to a ton required, as he put it, "care."[16]

At this point, while fuel and aircraft could be transferred at sea, ammunition, as he mentioned, could not. The ammunition situation had not affected the Marianas operation, but Spruance had wanted the fleet to be able to do everything at sea except for major repair if it was going to operate closer to Japan. This meant that work had to be conducted at Pearl Harbor for the transfer of ammunition between ships at sea; the equipment developed there was tested during the Iwo Jima operation. A new command, Service Squadron 6, was established for this most recent type of operation; it was to ensure that the fleet could operate independently indefinitely, except for major repairs. Spruance told his audience at Brown that the technique proved itself at Iwo Jima and "paid off" during the battle of Okinawa. Service Squadron 10 continued to be an advanced base of sorts, servicing the fleet between operations from Ulithi Atoll, four hundred miles southwest of Guam, while Service Squadron 6 forward-deployed with the fleet.[17]

Logistics, to Spruance, was "the foundation on which large overseas operations must be built." He told his audience that in the future U.S. lines of communication would have to be secure and that the availability of enough shipping to move "enormous" quantities of supplies had to be certain. Fuel, ammunition, food, and aircraft would have to be "pipelined" all the way from the sources of production. Items could be stored at forward bases to promote efficient use of shipping, but beyond that the uses of forward bases would be quite limited. Spruance acknowledged that air transportation was "extremely valuable" for moving key personnel and critical cargo but thought it no substitute for surface shipping when it came to moving large numbers of personnel and volumes of freight overseas. "Aircraft operating over long flights require the movement by ship of fuel weighing several times the amount of pay load they carry."[18]

Spruance went on to the role played by American submarines in the Pacific War. "Had it not been for the magnificent job done by our submarines, there is no doubt in my mind that the war with Japan would still be going on." Pointing out that these submarines had sunk 60 percent of the merchant tonnage lost by Japan, he reminded his audience that they had been the only weapon the United States had in the first two years of the war that could get at Japanese trade routes; by the last year of the war, Japanese merchant ships had been driven from the open ocean. "The Japanese empire was built on the use of the sea. When they lost the shipping needed to bring in the raw materials to Japan and to send out the men, weapons and supplies needed by their outlying areas, the empire began to crack." If Japan had practically no navy or merchant marine left by the end of the war, however, the Imperial Japanese Army was still intact, and Japan still had over ten thousand aircraft. "But, between the strangulation by the blockade and the burning of her cities by the B-29 bombing raids, her economic framework was stripped bare and she had to capitulate."[19]

Spruance then asked rhetorically whether anything had changed since the end of the war that affected the need for the United States to remain the world's strongest sea power. To answer his own question, he suggested that two weapons —the guided missile and the atomic bomb—were new. Despite speculation that these new weapons might bring about a new kind of "push button" warfare, in which American cities would be quickly destroyed by an "unscrupulous and aggressive" enemy, Spruance thought that guided missiles would contain the atomic bomb threat. In the naval context, he argued that bombs and shells that missed their targets seldom damaged anything, that battles like Midway demonstrated that high-altitude bombing rarely achieved hits on ships, and that only pilots who came in close to their targets achieved hits. Japanese suicide pilots late in the war had done a tremendous amount of damage—but the kamikazes were, for Spruance, the ultimate guided missile. Spruance, however, did not think that long-range guided missiles launched hundreds or thousands of miles from their targets would come close to their targets unless the targets were quite large. Obviously not entirely envisioning the near-future threat of intercontinental ballistic missiles, Spruance asserted that "the geographic position of the United States renders us as secure as any country in the world, as long as we keep our potential enemy on the far sides of the Atlantic and Pacific Oceans. Sea power can do this."[20]

Still, he admitted, the atomic bomb was the major new and unknown factor in warfare. More would be known after tests were conducted at Bikini Atoll, but the analysis of those tests might take several months. If atomic bombs did not become more plentiful, Spruance doubted "if ships at sea will be found to be a very profitable target unless a major engagement is impending." Nevertheless, in

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a theme that would be emphasized in the following year's curriculum at the Naval War College, Spruance asserted that the bomb was so destructive within its effective radius that it could put a city, harbor, or anchorage seriously in danger.[21]

The fact that one bomb carried by a single long-range bomber could "do the work" of several hundred ordinary bombs was, to him, the real threat. Bombers on one-way missions were especially worrisome, since their radius of action was doubled, though Spruance thought the usefulness of such a mission would depend on visibility during the day, the amount of enemy territory to be overflown en route to the target, and the state of the defender's preparation and alertness. Coastal cities, he contended, would be "excellent" targets and difficult to defend if the approach was made over the sea, if the attack was made at night, and if the plane was equipped with good radar. "The practice of interception by night fighters will require much improvement before this ceases to be true." Similarly, coastal cities would be endangered if submarines could be equipped to fire atomic-armed rockets from their decks. Spruance thought that given all of this, until the United Nations had developed "far greater harmony" among the world's nations and far greater control of international affairs, "the United States must not give up the position it won with such effort and sacrifice during the recent war of being the strongest sea power. Unless we maintain that position, our influence abroad will weaken." In fact, Spruance thought the world now needed American help and guidance as it never had before.[22]

SPRUANCE AND THE USE OF HISTORY

On Independence Day 1946, Spruance delivered another address (to an audience of two people) in Newburgh, New York. He spent a significant amount of it discussing the American Revolution and the comparative advantages and disadvantages of Great Britain and the United States, given the preponderance of British naval power and the American lack of it. Not surprisingly, he noted the strategic mobility that naval power gave the British, and he cited George Washington's ideas on the advantages that naval superiority would have given the new nation if it had had a respectable navy.[23] Spruance then described, in contrast, U.S. naval power at the time the Japanese struck Pearl Harbor, by when the United States had expanded to the Pacific Ocean, acquired overseas territories and possessions, and had a navy that was "second to none." He called Pearl Harbor a "treacherous blow" that was nonetheless a "blessing," in that it "brought out [*sic*] people into the war without reservations." He pointed out the key leadership role by President Franklin Roosevelt and the importance of the American ability to raise a huge military and then mobilize industrially to equip and supply it. In particular, sea power (exercised by the United States, and the United Kingdom as well) ensured that the war was not fought in the home territory of

the United States—a theme that he emphasized in both earlier and later talks. Admittedly, American territories in Hawaii, Alaska, and the Pacific Islands had been attacked and in some cases lost, but, he argued, these setbacks all took place in the first six months of the conflict, when these territories were not properly defended and could not be adequately supported, and the seas in which they lay were under Japanese naval control.[24]

One key to American strategy at this time was holding the Japanese in place for the rest of 1942 through attrition warfare in the Central and South Pacific —wearing down Japanese airpower, "shattering" the myth of the Imperial Japanese Army's invincibility, and beginning to reduce, through a submarine offensive, Japan's ability to supply its empire with raw materials. Spruance outlined the two subsequent offensive prongs through the Central and South Pacific, under, respectively, Admiral Nimitz, then Commander in Chief, U.S. Pacific Fleet and Pacific Ocean Areas, and General Douglas MacArthur, Commanding General, U.S. Army Forces, Pacific, and Commander in Chief, Southwest Pacific Area. He emphasized the importance of the growing American material superiority in this phase of the war. Allied coordination of sea, air, and land forces cleared the way "to seize and develop the necessary bases," defeating the empire without landing a single soldier on the Japanese home islands.[25]

In the Atlantic, by contrast, the Allied need had been to contain the German submarine threat: "Shipping losses in the Atlantic had a direct effect on the shipping that could be spared for the Pacific, and, so, on the rate at which we could push the war against Japan." Spruance argued that though the European Theater of Operations was primarily a land war against a strong continental power, even there sea control had been necessary before American military and economic strength could be brought to bear on Germany. Generally, the European Theater and Spruance's view of the American Revolution convinced him that "while land power is necessary to win a major war, sea power is needed if one is to be fought overseas and not on own our soil." If the United States now retained its position as the world's greatest sea power, Spruance was convinced, it could remain a secure "island" between the Atlantic and the Pacific.[26]

SPRUANCE AND THE SENATE

A few days later, Spruance testified to the Senate Naval Affairs Committee on Senate Bill 2044, a bill that had been proposed by Senators Warren Austin of Vermont, Lister Hill of Alabama, and Elbert Thomas of Utah. The bill would have created a unified military structure that, the Navy felt, was most favorable to the Army. Spruance made clear that he had had no permanent duty in the Navy Department since 1929 and that his views would "be based primarily on what I saw of the war as it was fought in the Pacific." He asserted that the Navy continued to

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be the nation's first line of defense: "Only as we are able to control the Atlantic and Pacific Oceans will our potential enemies be kept far distant from our shores. Our armies and our air forces will then be able to go effectively to our enemies overseas and not theirs come to us." Control of the oceans would not prevent long-range submarines and aircraft from reaching U.S. coasts but, he believed, would make these operations much more difficult and less effective. Spruance argued that the bill lacked clear distinctions between the functions of the Army, the Navy, and the proposed independent Air Force. Nor did it affirm the right of each service to whatever "tools" it might need to carry out those functions, including the research and development of new weapons and equipment.[27]

Echoing Secretary of the Navy James Forrestal and Fleet Admiral Nimitz, by this time the Chief of Naval Operations, on this issue, Spruance further asserted that the problem was how best to "coordinate" policies and plans at a high level without preventing what he saw as necessary and healthy decentralization of implementation and execution. The services had to be brought to "pull" in the same direction but without "stifling" initiative within each: "Overcentralization tends to retard improvements and to prevent getting rapid action when that is required." He saw the bill as creating under the proposed "Secretary of Common Defense" a bureaucracy that would grow beyond policy making and coordination and interfere with planning and administration within the services. The character of future wars and the weapons with which they were to be fought was unclear and Spruance thought that a centralized bureaucracy would inhibit the imagination needed to prepare for such conflicts: "Try as we may, none of us is sufficiently gifted with prophetic vision to foresee what new tools the future will bring forth or what needs will develop for new tools."[28]

It was already clear, however, that World War II had confirmed the importance of aircraft in all forms of warfare. Spruance's own experience in the Pacific had proved that any fleet deprived of supporting aircraft was like a "boxer with one hand tied behind him." He classified "supporting aircraft" in two categories: ship-based (operating from carriers, battleships, and cruisers) and shore-based, of various types. All of these aircraft were necessary, especially those on carriers, since they gave mobility: a "multiplicity" of carriers permitted superior concentrations of aircraft to be brought against enemy positions, particularly in surprise attacks on enemy carriers and on aircraft on the ground. Land-based aircraft would help carriers effect surprise, not only with early information but by hiding the presence of U.S. carriers (by not exposing carrier-based planes on scouting missions). Carrier planes, meanwhile, could be preserved for strikes.[29]

Spruance gave the senators three examples of the value of shore-based air search in support of carrier operations. His first was the battle of Midway, where surprise had been vital to the U.S. force, since it had fewer carriers than its

opponent; it was important to strike first and not trade carriers on an even basis. The American carriers had waited northeast of Midway while the island's few PBY Catalinas searched the sectors from which the Japanese were most likely to approach. Carrier planes were used only to cover the two task forces' advance and prevent surprise and were recovered at night. An early report from one of the Catalinas allowed Task Forces 16 and 17 to get in the first blows and, ultimately, win the battle. "At Midway the cooperation between our search planes and our carrier task forces was vital." The scout planes reported enemy position, composition, course, and speed, but they could not provide constant tracking: "Our patrol plane pilots were handicapped by having to fly a slow, poorly armed seaplane, whose performance compared very unfavorably with the B-17s of that period. They could not remain near an enemy carrier for long without an excellent chance of being shot down by fighters."[30]

As his second example, Spruance related how during the Marianas operation in July 1944 Vice Admiral Marc Mitscher's Fast Carrier Task Force preceded Vice Admiral Richmond Turner's Joint Expeditionary Force in order to clear out Japanese air forces, conduct preliminary bombardments of Saipan and Tinian, and cover the amphibious forces. Spruance, commanding the Fifth Fleet, had thought surprise desirable, though not vital. The nearest American base was Eniwetok in the Marshalls, a thousand miles away. Some of Eniwetok's seaplanes, such as the PBM Mariners, could, however, move to Saipan with their tenders as soon as conditions warranted, and meanwhile its PB4Y Privateers (patrol bombers adapted from the B-24) flew searches from the Marshalls and even struck Japanese shipping at Truk, in the Carolines. Spruance told the senators that knowing the Japanese would search to the east of the Marianas and thus detect the Fast Carrier Task Force, he had arranged for two Privateers from Eniwetok to run "interference" and destroy or drive off any Japanese search planes. The sea-based Mariners could not have accomplished this mission.[31]

Spruance's third example also came from the Marianas operation. On the morning after the initial landing on Saipan, a submarine off the San Bernardino Strait reported that a large Japanese force had come out the night before. The report confirmed for Spruance that Vice Admiral Jisaburo Ozawa's First Mobile Fleet intended to prevent American seizure of the Marianas; all information on this force would be of "great importance." Recalling that the amphibious force had a small seaplane tender that could care for six planes, Spruance ordered six Mariners at Eniwetok to fly to Saipan. Five of these arrived, and four were sent out to search. Since they had radar, they could operate at night; in daylight, they probably would have been shot down by Japanese fighters. On the second night, one of the Mariners located Ozawa's force, but radio delays kept the report from Spruance and Mitscher for eight hours. The two commanders received the

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report only an hour before Ozawa's planes began their unsuccessful attacks on the Fast Carrier Task Force.[32]

From the latter example, Spruance drew for the senators the need for not only more comprehensive patrol plane coverage but also rapid teamwork, because naval actions were now so fast paced and the consequences so momentous. Teamwork, Spruance thought, best came from association, training, and indoctrination. All three examples illustrated that there were too many variables in war for everything to be planned and foreseen: "Our plans can be made out in great detail up to the time we hit the enemy. After that, they have to be flexible, ready to counter what the enemy may try to do to us and ready to take advantage of the breaks that may come to us." This required the man "on the spot" to know where he fit into the operation and to take the initiative on the basis of very brief orders.[33]

Spruance moved next to antisubmarine warfare (ASW) and the protection of shipping. He saw the latter as essentially a naval function; the Navy's responsibility for the protection of shipping overseas against air, surface, and subsurface attack began when ships left their ports. For this mission, the Navy needed minesweepers, small vessels, and aircraft. Antisubmarine aircraft were also needed to prevent submarines from lying in wait off port entrances and to escort convoys once they were at sea. Again, taking an example from Pacific War amphibious operations, Spruance recalled that the great masses of naval vessels and shipping concentrated to capture the Pacific Islands had had to anchor in open waters or lie offshore for weeks or months if no anchorage was available. This had been the case at Iwo Jima. Until airfields could be seized ashore and be made operational, aircraft from carriers were relied on for all forms of local air support, including ASW patrols; as soon as the airfields were operational, land-based Navy ASW planes took over. For this reason, at Okinawa, Spruance said, the first move was to seize a group of nearby islands, the Kerama Retto, with a small, protected anchorage that could be used as an advanced base. This anchorage allowed patrol seaplanes based on tenders to be employed. These Mariners patrolled day and night until they could be replaced by land-based planes from Okinawa once the airfields there were activated.[34]

The seaplane, Spruance argued, had an advantage over land planes in an amphibious operation, since it could move forward with its tender very early, as long as seas were calm enough to operate in. That was important because getting airfields operational for land-based planes took time, and it was vital to get extended searches and ASW patrols up at the earliest possible moment. Moreover, denying land-based planes to the Navy would also limit its ability to conduct strikes against ships—and to Spruance, attacks on ships in any form, with any weapon, were naval functions. Carrier aircraft, he said, were "particularly

effective" at this mission but could not perform the function of a long-range bomber. For sustained control of sea areas beyond the range of carrier aircraft, Spruance told the senators, long-range, shore-based planes that could hit ship targets were very valuable "tools."[35]

There was a caveat: "Please note that I desire to stress the ability of such long range planes to hit the ships they aim at. Dropping bombs in the water from a safe high altitude soon loses what little moral effect it may have in the beginning." An enemy is not deterred unless prohibitive losses are inflicted. From that viewpoint, Spruance told the committee, during the war Navy shore-based bombers had been much more effective against Japanese shipping than Army Air Forces (AAF) bombers: "Our planes came down to where they could make a good percentage of hits, whereas under Army training their bombers usually remained at safe altitudes where little success was possible." The senators had been given Japanese figures showing how Japan's warships and merchant ships were lost: the AAF had sunk only a small percentage. At Midway, in spite of extravagant claims by the AAF, the Japanese had reported not a single hit from AAF aircraft. "Fortunately, the presence of our three carriers and the magnificent performance of their aircraft won the battle in spite of the failure of the B-17s to contribute."[36]

Spruance saw failure also in the AAF's inability to strike Japanese ships during the fall and winter of 1944/45 in connection with the seizure of Iwo Jima, a failure that produced "disastrous" results. According to Spruance, the best way to prevent the Japanese garrison on Iwo Jima from being strengthened would have been to sink Japanese ships bringing men and material to the island, but because the fleet was needed to support the Palau and Philippine operations, the Navy could not closely blockade the island. That job was therefore left to the Army Air Forces. Although the AAF bombed the island almost daily, it did not stop Japanese support shipping. "As a result, the defenses of Iwo Jima were constantly being strengthened up to 16 February 1945, when the Fifth Fleet started the bombardment preliminary to the landings. . . . [The] heavy losses incurred by our Marines in its capture and the great value of the position, subsequently, to the B-29 effort against Japan are matters of history." Only then were the Japanese no longer able to maintain picket vessels to warn the Japanese home islands about B-29 raids.[37]

Okinawa provided another example of the need for close cooperation between search planes and carrier forces. On 7 April 1945, search planes detected the Japanese superbattleship *Yamato* and its escorts south of Kyushu. It was apparent that the force meant to strike American ships at Okinawa from the northwest, but it was without air cover, so two Mariners were able to remain in contact until carrier aircraft could strike. Spruance emphasized that to do their

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job the Navy search planes "had to be able to navigate accurately, they had to recognize what they saw, they had to know the general naval situation, and they had to be able to communicate their information rapidly. All this required a lot of naval training."[38]

Spruance also lectured the committee on the importance of mines as naval weapons. Used offensively in enemy-controlled waters, they could be laid only by aircraft or submarines. Mining, however, was "incidental" to the carrier aircraft's main employment of bombing and torpedo attack. In contrast, "the long range land plane bomber is a very useful tool for minelaying, particularly in enemy territorial waters." He acknowledged that AAF's B-29s had done a very effective job of mine laying in Japanese waters, "as they did in bombing the cities, but [mining] is and should be a Navy responsibility. The Navy should have the tools with which to do it."

Finally, Spruance turned to the Navy's need for the Marine Corps. He was concerned that Senate Bill 2044 did not safeguard fully the right of the Marine Corps to exist in the future: "I have too high an opinion of the Marine Corps, confirmed as a result of our operations together in the Gilberts, Marshalls, and Marianas and at Iwo Jima and Okinawa, to be willing to have any doubt exist on this subject." In general, Spruance concluded, Senate Bill 2044 would require "major revisions" because it did not guarantee for the services—especially the naval services—the weapons they would require to carry out their necessary roles in the next war.[39]

SPRUANCE IN GREAT BRITAIN

In late October 1946, Admiral Spruance delivered a talk to the Royal United Service Institution. While his account was largely a historical rendition of the Pacific War, it contained all the elements he thought were required for future American naval preparedness. Spruance, for instance, asked the audience to look at the war in the Pacific from a "naval point of view." To him, three things stood out as of particular interest in the development of the "art of naval warfare"; no single one of these things could have won the war, but without any one of them Spruance did not think that the United States would have been as successful "under the conditions as they existed in that ocean." The first was the "great increase" in the strength of the carrier air force. The large number of carriers available by the summer of 1943 gave the United States a "real" strategic air force, one that had great strength and mobility. This strength was great enough not only to overwhelm Japanese island outposts but—supported by the guns of the fast battleships, cruisers, and destroyers—to go "repeatedly" to the coasts of Japan itself. "Its mobility was such that the Japanese never could tell in what part of their far-flung empire it would strike them next."[40]

The second point was the improvement in the American ability to make amphibious landings against strong opposition. The many new types of landing ships and craft and improved techniques of naval gunfire and air support allowed the United States to land on and capture the bases needed. The third major factor was the capacity to provide logistic support at ever increasing distances from Pearl Harbor. "In the last analysis, it was our fleet strength which enabled us to move across the Pacific, to isolate the Japanese island positions we had selected for capture, to furnish the gunfire and air support for the landings, and to ensure the security of communications to our rear." Spruance asserted that as American forces got closer to Japan, continuous fleet support in advanced areas became more and more necessary; in fact, he thought, the foundations of U.S. operations were logistics. "Through the agency of our mobile service squadrons, built up from small beginnings, we were able to give our fleet the logistic support it needed when and where it was required, whether at sea or at advanced bases which moved across the Pacific as the fleet itself moved."[41]

Spruance wanted to be clear, however, that the war against Japan had not been won by naval might alone. Without the troops, both Army and Marine, that stormed ashore and captured islands, the United States would have been faced with a war of stalemate or of "exchanging raids on outposts[:] . . . It still takes the infantryman to capture and hold territory." Moreover, Spruance noted the "important factor" of the incendiary raids by the B-29s from the Marianas, raids that effected such "great destruction" on Japanese cities. Further, the "use of the atomic bombs on Hiroshima and Nagasaki was probably the deciding factor in causing the Japanese government to acknowledge their defeat." Thus, Spruance thought that modern global war required the coordinated use of all arms and weapons, backed by the full economic and industrial resources of the nation, and he thought that future studies of World War II would emphasize the importance that sea power played in bringing about the defeat of Italy, Germany, and then Japan.[42] Spruance was claiming, in other words, that the formula for future American national security—if there was to be such a thing—would be continuation of what the United States had done in the Second World War. Any future war would have the same general outlines as the last one.

SPRUANCE AT THE NATIONAL WAR COLLEGE

Spruance was back on the lecture circuit in early January 1947, this time presenting at the National War College on the "Future Strategic Role of Naval Forces." Spruance quickly went to his main focus—maintenance of the Navy as an "efficient fighting force" that might be the "strong right arm" of national policy. In terms of the future role of the Navy, this, to Spruance, meant more than ever that

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the lessons of the past had to be studied, but in conjunction with scientific and technological changes that would impact future naval weapons and tactics.[43]

Spruance described the primary function of the Navy in time of war as that of gaining and exercising control of sea areas required for the successful prosecution of the war and denying to the enemy those areas it needed. Neither goal could be entirely fulfilled, because submarines and aircraft had made previously safe and secure anchorages and harbors dangerous. Also, aircraft, mines, long-range guns, and torpedo boats had all extended the distance to seaward at which control could be exercised from land. As an example from the Pacific War, Spruance noted that Japan had been able to use the Strait of Tsushima and the Sea of Japan for communications right up to the end of the war. Still, Spruance saw the necessity of sea control as long as the bulk of the world's commerce had to be moved by surface vessels. As access to the sea had been "progressively" denied to Japan, its insular empire had "withered" and been brought near the point of "economic death."[44]

In terms of world politics, Spruance contended that the United States was an insular nation; its access to most other nations was by sea. However, he argued, World War II left the United States in a new situation, with armies of occupation in Germany, Austria, Italy, Japan, and southern Korea, as well as rights to bases in the newly independent Philippines, Micronesia, the Volcanoes, the Ryukyus, and the Aleutians. There was "no question" that the nation's frontiers now extended to Europe and Asia, and as long as this geostrategic situation continued, Spruance saw a need to keep the sea routes open. At present, there was no major naval threat to them, but the "surest way" to encourage competitive naval building was for the United States to allow the Navy to become weak.[45]

Spruance then contended that it was important to extend the front lines as far as possible from the continental United States in order to keep its production facilities intact (especially important given recent developments of long-range aircraft, guided missiles, and atomic bombs), extend its areas of sea control, and, by doing so, deny sea control to an enemy nation. Spruance returned to the idea that in naval warfare, bases had to be pushed forward if distant sea areas were to be brought under control; no matter how mobile and long-ranged naval forces were, they were still highly dependent on logistical support. While most logistical aspects of naval operations could now be done at sea, advanced bases were still necessary for repairing ships and organizing cargo for distribution to the fleet.[46]

Spruance told the students that in selecting amphibious objectives for the extension of sea control, it was important to combine sites for airfields with "extensive" and protected anchorages—though in the Pacific some sites had no

harbors at all, others only "minor" harbors, and others excellent harbors but only "moderately good" terrain for airfields. There had to be at least one airfield for local protection. However, both fleet and shore-based air support was important for "continuing" sea control, once seized. The war in the Pacific had "proved" that without fleet support "no outlying insular position could be held for long against assault by properly equipped and trained amphibious forces." Spruance thought, then, that the destruction of an enemy's naval power was still the first consideration in naval warfare: "This has always been true, and I can see no possibility of a change in this conception. A study of naval history will show, I think, that any country whose fleet was not ready and anxious to fight its opponent's fleet to destruction generally ended by being defeated at sea."[47]

An amphibious assault in a sea area controlled by the enemy combined "practically" all types of naval operations. All forces involved had to be protected against attack by enemy submarines and air forces, both en route to and at the objective. Mined waters had to be swept, gun bombardments and air attacks had to be delivered at the objective, searches and patrols had to be conducted, and actions with a major part of the enemy's fleet had to be fought, unless it had already been put out of action.[48]

Along with these actions went denial of sea areas to the enemy. Here, Spruance was thinking of large-scale raids conducted not for permanent occupation but to inflict damage. His World War II examples included strikes by U.S. submarines against Japanese shipping; by American aircraft from shore bases from which they could penetrate enemy-controlled waters; by naval task forces, principally carrier aircraft but sometimes gunships; by China-based AAF units along the China coast and Indonesia; and by naval patrol planes—both sea- and land-based—against shipping in the Yellow Sea, along the coasts of Korea, and in the Strait of Tsushima. Enemy countermeasures had merely drawn more raids by U.S. forces.[49]

Looking to the future, Spruance argued that in any future war the United States would be separated from its opponent by great stretches of ocean to the west and east. Since, he contended, no "great war" had ever been won merely by blows struck from great distances, the United States would have to get close to a distant enemy to deliver decisive blows. He acknowledged that the nation was vulnerable from the Arctic but thought that that region was an Army problem and that seizing it would be, in any case, a waste of energy as it would entail fighting the weather and natural obstacles rather than the enemy. Given these realities, Spruance argued that any likely future war would therefore require sea transportation on a major scale, with strategic bases for refueling, repair, and patrolling at key points along the routes in allied or neutral territory as well as in

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areas seized from the enemy. The more of these bases that could be obtained by State Department negotiation, the better; Spruance also speculated that the United Nations (UN) might ease the base-availability situation in a future war. The bottom line, nevertheless, was a need for amphibious operations even after the United States "came to grips" with the enemy, to push the war toward the enemy, protect home territory, and get into position to inflict damage on the enemy. Seeing a future war as one of attrition, like the Napoleonic Wars, the American Civil War, and the world wars, Spruance perceived amphibious warfare as a means, along with strategic bombing, to get at the enemy's production facilities and national resources.[50]

Spruance now turned to new technical developments in submarines, radar, guided missiles, and atomic energy. He was still hesitant to assess their impact on strategy and tactics. He was reluctant, for instance, to predict changes in submarine and antisubmarine tactics until more was known about increased submerged speed and radius of action of improved boats or countermeasures to them. With respect to radar, however, Spruance argued that improvements would not impact naval tactics much, "other than to clear away some of the fog of war and to permit better handling of forces."[51]

As for guided missiles, he classified Japanese suicide planes as "very effective" weapons. As he had in previous talks, he noted how many rounds of antiaircraft projectiles it had taken to bring down one Japanese plane, but he also pointed out that these weapons had not won the war for Japan. Essentially, Spruance doubted the United States could develop a guided missile with a brain as effective as that of a human pilot and therefore thought that long-range guided missiles would not be "much" of a hazard to ships at sea. If, however, missiles were made more effective against large targets ashore, they could impact future naval warfare. Guided missiles, therefore, were another reason for keeping the enemy at as great a distance as possible so as to minimize the hits American territory might take in a future conflict.[52]

He had no doubt, however, that atomic energy would have a "profound" impact on naval warfare. Sounding like some of the student officers in their 1947 theses on the subject, Spruance thought that atomic energy had tremendous potential as a weapon and a system of propulsion. However, its current scarcity as a weapon restricted its use to "concentrated and valuable" targets. Ships at sea, even formations, were not suitable targets, though they might be under critical conditions, such as just before an important sea battle. The use of atomic weapons against harbors and anchorages, on the other hand, had to be given important consideration by the Navy. "The potency of the bomb is so great that a one way flight by the aircraft carrying it to the limit of its range becomes good war."[53]

This meant to Spruance that either U.S. bases and ships at anchorage had to be dispersed or defensive measures against air attack, especially night raids, had to become more effective. "Since we cannot disperse our great cities, I think the night fighter problem must have a much better solution than existed on V-J Day." All of the significant American amphibious operations in the war had produced great concentrations of shipping, in spite of efforts to disperse them. An atomic bomb dropped on such a staging area would have "disastrous" results on the operation. If such bombs were not outlawed by the UN, Spruance thought, the Navy would have to figure out how to keep ship losses to a minimum during an amphibious operation or develop an "airtight" air defense. Here, Spruance was thinking either of increased air transportation of forces and material when airfields were available or cutting advanced-base requirements to bare minimums.[54]

As he had mentioned earlier, Spruance was fascinated by the idea of atomic-propelled ships and how that new technology would increase ships' speed, offensive and defensive capabilities, and sea-keeping qualities. It would also affect logistical requirements, since fuel was the most bulky item that had to be supplied. He did not think that so "radical" a departure as atomic substitution for petroleum could be realized in the near future, and he did not foresee an entirely nuclear-powered navy, but he perceived great operational advantages once the technical problems had been worked out.[55]

Summing up his National War College presentation, Spruance saw plenty of changes in weapons, methods, and procedures in naval warfare but no change in the future role of the Navy from gaining and exercising control of the sea and denying it to the enemy: "This will continue as long as geography makes the United States an insular power and so long as the surface of the sea remains the great highway connecting the nations of the world."[56]

In 1946, Admiral Spruance, following Admiral Pye's lead, began the transition of the Naval War College from its reduced wartime condition back to its peacetime status as the service's premier command and staff college. This transition entailed studying the global political and military situation so as to explore what would characterize future naval warfare. The basic assumptions were that the Soviet Union would be the next enemy and that warfare might involve atomic weaponry. To a great degree, however, neither staff, instructors, students, nor guest lecturers thought that future naval warfare would be radically different from previous conflicts. While acknowledging that atomic weapons and Cold War aspects of "war during peace" were earthshaking in one sense, Spruance and his officers fell back on fairly traditional strategic, operational, and tactical concepts to meet these new challenges. While many of them argued that it was a

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radically new world, they certainly did not see the Cold War and atomic weapons as spelling the end of U.S. naval forces, and they even foresaw naval missions that had a great deal of continuity with the past.[57]

Charged as President of the Naval War College with the strategic reformulation of American naval policy for this atomic and Cold War context, Admiral Spruance digested the lessons of the Second World War, especially from the Pacific, with particular focus on amphibious warfare and on how atomic weapons would change naval ship design, force strategy, and battle tactics. Not only did he dismiss the idea that navies were obsolete, but he saw an even greater role for the Navy in Cold War littoral operations. In summary, Spruance called upon the United States to maintain a balanced operational fleet, an adequate afloat train and shore-base system, and a first-rate merchant marine—all as components of a total, integrated package of American sea power.

Spruance had a difficult charge in this period. In an era of rapid demobilization, domestic reconversion, acrimonious debates over postwar roles and missions, and a foreign policy that was changing in a revolutionary way and at breakneck speed, he needed to translate the lessons of the war into new strategy, tactics, and procedures for employing the fleet against a landlocked enemy with a very alien ideology. Moreover, all of this had to be done on a slim budget and in a way that deterred future war, which was now to be avoided if at all possible, because of the existence of atomic weapons. Strategies providing for the security of the Republic had become infinitely more difficult to formulate and implement.

NOTES

This article is extracted and adapted by the author from various chapters of his *Digesting History: The U.S. Naval War College, the Lessons of World War Two, and Future Naval Warfare, 1945–1947.* The book was published by the Naval War College Press in spring 2010 and is available for sale by the U.S. Government Printing Office, online at bookstore.gpo.gov.

1. Hal M. Friedman, *Digesting History: The U.S. Naval War College, the Lessons of World War Two, and Future Naval Warfare, 1945–1947* (Newport, R.I.: Naval War College Press, 2010).
2. John Hattendorf, B. Mitchell Simpson, and John Wadleigh, *Sailors and Scholars: The Centennial History of the U.S. Naval War College* (Newport, R.I.: Naval War College Press), pp. 175–77.
3. Ibid., pp. 179–89.
4. Ibid., pp. 189–93.
5. Thomas Buell, *The Quiet Warrior: A Biography of Admiral Raymond A. Spruance* (Boston: Little, Brown, 1974), pp. 383–86.
6. Historians such as Michael Palmer, Richard Hegmann, and John Hattendorf have demonstrated that the Maritime Strategy of 1986 was not created by Secretary of the Navy John Lehman in the early 1980s but was originated in the late 1940s and developed throughout the remainder of the Cold War. The strategy included a relegation of the Pacific to subordinate status, after the Mediterranean and the Persian Gulf; American naval forces were to

keep Soviet forces in the Pacific occupied so they could not reinforce units in Europe and the Middle East; see Michael Palmer, *Origins of the Maritime Strategy: The Development of American Naval Strategy, 1945–1955* (Annapolis, Md.: Naval Institute Press, 1990). The strategy continued to develop in the 1950s and 1960s; see Richard Hegmann, "Reconsidering the Evolution of the US Maritime Strategy, 1955–1965," *Journal of Strategic Studies* 14 (September 1991), pp. 299–336. By the late 1970s, the Navy, especially the Strategic Concepts Branch of the Office of the Chief of Naval Operations (OPNAV) in Washington, D.C., as well as OPNAV's Strategic Studies Group and the Naval War College's Center for Naval Warfare Studies (the latter two groups located in Newport), was resurrecting the northern and western Pacific as regions of American naval power projection that would be critical in preventing the movement of Soviet reinforcements from the USSR's Far Eastern maritime provinces to Europe in case of a war with the North Atlantic Treaty Organization (NATO); see John Hattendorf, ed., *U.S. Naval Strategy in the 1970s: Selected Documents,* Newport Paper 30 (Newport, R.I.: Naval War College Press, 2007), and *The Evolution of the U.S. Navy's Maritime Strategy, 1977–1986,* Newport Paper 19 (Newport, R.I.: Naval War College Press, 2004).

7. Buell, *Quiet Warrior,* pp. 386–90.

8. Moreover, a narrative account is in order, since this is fairly new territory, historiographically speaking. While there are seminal works about the Naval War College in the interwar era and its impact on the Pacific War, there are few on its post-1945 period. The interwar works include Edward Miller, *War Plan Orange: The U.S. Strategy to Defeat Japan, 1897–1945* (Annapolis, Md.: Naval Institute Press, 1991); and Michael Vlahos, *The Blue Sword: The Naval War College and the American Mission, 1919–1941* (Newport, R.I.: Naval War College Press, 1980). A recent work that looks at the interwar period as a prelude to the Pacific War is Douglas Smith, *Carrier Battles: Command Decision in Harm's Way* (Annapolis, Md.: Naval Institute Press, 2006).

   The available works on the postwar period tend to be organizational histories and studies of the College; examples are J. S. Hurlburt, "War Gaming at the Naval War College, 1969–1989," *Naval War College Review* [hereafter *NWCR*] 42 (Summer 1989), pp. 46–51; Hattendorf, Simpson, and Wadleigh, *Sailors and Scholars;* Nepier Smith, "Historical Analysis of the Organizational Success of the Naval War College during the Twenty-five Years following the Second World War," Naval War College Advanced Research Project, 1974, cited in Hattendorf, Simpson, and Wadleigh, *Sailors and Scholars,* p. 248; Philip Crowl, "Education versus Training at the Naval War College: 1884–1972," *NWCR* 26 (November–December 1973), pp. 2–10; and James Barber, "The School of Naval Warfare," *NWCR* 21 (April 1969), pp. 89–96. When strategic in nature, they examine the College's role in a limited chronological sense. Some focus very early in the Cold War, such as Robert Fisher, "The U.S. Navy's Search for a Strategy, 1945–1947," *NWCR* 48 (Summer 1995), pp. 73–86. Others restrict themselves to much later in that conflict: Hattendorf, *Evolution of the Navy's Maritime Strategy,* and *U.S. Naval Strategy in the 1970s;* Robert H. Gile, *Global War Game: Second Series, 1984–1988,* Newport Paper 20 (Newport, R.I.: Naval War College Press, 2004); Bud Hay and Bob Gile, *Global War Game: The First Five Years,* Newport Paper 4 (Newport, R.I.: Naval War College Press, 1993); David Rosenberg, "Being 'Red': The Challenge of Taking the Soviet Side in War Games at the Naval War College," *NWCR* 41 (Winter 1988), pp. 81–93; Robert Wood, "The Conceptual Framework for Strategic Development at the Naval War College," *NWCR* 40 (Spring 1987), pp. 4–16; James Barber, "Mahan and Naval Strategy in the Nuclear Age: A Lecture Delivered at the Naval War College," *NWCR* 24 (March 1972), pp. 78–88; and Donald White, "Admiral Richard L. Conolly: A Perspective on His Notions of Strategy," *NWCR* 24 (November 1971), pp. 73–79. For an example of this type of literature from the post–Cold War period, see Kenneth Watman, "Global 2000," *NWCR* 54 (Spring 2001), pp. 75–88. In addition, there are papers on American naval strategy in a Cold War context written at the time under Naval War College auspices, originally either lectures by staff members or guests, or theses by students. These articles numbered in the dozens during the Cold War, but a sample

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from the 1950s and 1960s includes Robert Carney, "Role of the Navy in a Future War," *NWCR* 6 (June 1954), pp. 1–12; George Phelan, "Sea Power and Strategies for the Control of the Seas," *NWCR* 6 (June 1954), pp. 15–36; James Field, "Seapower and Military Strategy Today," *NWCR* 8 (April 1956), pp. 21–39, "Origins of Maritime Strategy and the Development of Sea Power," *NWCR* 7 (March 1955), pp. 1–23, and "The Influence of Sea Power on Modern Strategy," *NWCR* 10 (September 1957), pp. 31–52; J. F. McInteer, "The Significance of Seapower to the United States," *NWCR* 12 (September 1959), pp. 1–32; Joseph Bredestege, "Limited Nuclear War at Sea," *NWCR* 19 (February 1967), pp. 4–31; and Harry James, "An Analysis of Limited Maritime War," *NWCR* 19 (February 1967), pp. 33–74. A study of Admiral Spruance in the immediate postwar period complements these sources. So far, there is no monograph that treats the Naval War College's contribution to strategic policy throughout the entire Cold War.

9. Spruance, "United States as a Sea Power: Address Delivered by Admiral R. A. Spruance, USN, President, Naval War College to the Alumni of Brown University," 17 June 1946, folder 2, box 4a, record group [hereafter RG] 28, Naval Historical Collection, Naval War College, Newport, R.I., p. 1. The assessment that follows draws on this source.
10. Ibid., pp. 1–2.
11. Ibid., pp. 2–3.
12. Ibid.
13. Ibid.
14. Ibid., pp. 3–4.
15. Ibid., p. 4.
16. Ibid., pp. 4–5.
17. Ibid., pp. 5–6.
18. Ibid.
19. Ibid., p. 6.
20. Ibid.
21. Ibid., pp. 6–7.
22. Ibid.
23. Spruance, "Address Delivered by Admiral R. A. Spruance, USN, at Newburgh, N.Y., on 4 July 1946," folder 2, box 4a, RG 28, Naval Historical Collection, Naval War College, Newport, R.I., pp. 1–6.
24. Ibid., pp. 6–7.
25. Ibid.
26. Ibid., pp. 7–10.
27. Spruance, "Statement Prepared by Admiral R. A. Spruance, USN, for Delivery before Senate Naval Affairs Committee, Washington, D.C.," 10 July 1946, folder 2, box 4a, RG 28, Naval Historical Collection, Naval War College, Newport, R.I., pp. 1–2. The summary of this address draws on this source.
28. For Navy Department views on coordination rather than unification at this time, see Vincent Davis, *Postwar Defense Policy and the U.S. Navy, 1943–1946* (Chapel Hill: Univ. of North Carolina Press, 1966), pp. 207–59; Palmer, *Origins of the Maritime Strategy,* pp. 28–59; Jeffrey Dorwart, *Eberstadt and Forrestal: A National Security Partnership, 1909–1949* (College Station: Texas A&M Univ. Press, 1991), pp. 90–148; and Jeffrey Barlow, *Revolt of the Admirals: The Fight for Naval Aviation, 1945–1950* (Washington, D.C.: Naval Historical Center, 1994), pp. 23–130.
29. Spruance, "Statement," 10 July 1946, pp. 3–4.
30. Ibid., pp. 4–5.
31. Ibid., pp. 5–6.
32. Ibid., pp. 6–7.
33. Ibid.
34. Ibid., pp. 7–8.
35. Ibid.
36. Ibid., pp. 9–10. While Spruance was quite accurate about Midway, he was forgetting or ignoring the later superb performances by the AAF against Japanese shipping—including warships—using skip-bombing tactics. For the AAF at Midway, see Gordon Prange, *Miracle at Midway* (New York: McGraw-Hill, 1982), pp. 172–73, 176, and 224–28; for the development of skip-bombing tactics, see Donald Goldstein, "Ennis C. Whitehead: Aerospace Commander and Pioneer" (PhD diss., Univ. of Denver, 1970), pp. 103–104 and 123–38; and Thomas Griffith, *MacArthur's Airman: General George C. Kenney and the War in the Southwestern Pacific* (Lawrence: Univ. Press of Kansas, 1998), p. 82.

37. Spruance, "Statement," 10 July 1946, pp. 10–11. Again, Spruance's testimony was selective; a recent account of the Iwo Jima operation argues from primary sources that the seizure of the island might not have been necessary at all had the Navy and the Army Air Forces cooperated in conducting the B-29 raids. More specifically, carriers could have provided escort fighters to the heavy bombers. Unfortunately, neither service was willing to cooperate with the other; the compromise solution was to have the Marines assault the heavily defended island so that the AAF could operate P-51 Mustangs from Iwo. See Robert Burrel, *The Ghosts of Iwo Jima* (College Station: Texas A&M Univ. Press, 2006).
38. Spruance, "Statement," 10 July 1946, pp. 11–12.
39. Ibid., pp. 12–13.
40. Spruance, "Lecture Delivered by Admiral R. A. Spruance, U.S.N., before the Royal United Service Institution on 30 October 1946," folder 2, box 4a, RG 28, Naval Historical Collection, Naval War College, Newport, R.I., pp. 1–29.
41. Ibid.
42. Ibid., pp. 30–31.
43. Spruance, "Future Strategic Role of Naval Forces," 8 January 1947, folder 14, box 2, series 1, Spruance Papers, Naval Historical Collection, Naval War College, Newport, R.I., pp. 1–3. The assessment that follows draws on this source.
44. Ibid., pp. 3–5.
45. Ibid., pp. 5–7.
46. Ibid., pp. 7–9.
47. Ibid., pp. 7–10.
48. Ibid., pp. 10–12.
49. Ibid.
50. Ibid., pp. 12–15.
51. Ibid., pp. 15–16.
52. Ibid., pp. 16–18.
53. Ibid. See Friedman, *Digesting History,* chaps. 9, 11.
54. Spruance, "Future Strategic Role of Naval Forces," pp. 16–18.
55. Ibid., pp. 18–19.
56. Ibid.
57. See Friedman, conclusion to *Digesting History.*

REVIEW ESSAYS

IS DETERRENCE THE ONLY OPTION?

James J. Wirtz

Payne, Keith B. *The Great American Gamble: Deterrence Theory and Practice from the Cold War to the Twenty-First Century.* Fairfax, Va.: National Institute Press, 2008. 471pp. $19

With a few brief exceptions, the concept of deterrence has guided U.S. nuclear policy since 1946, the year that Bernard Brodie noted that the purpose of militaries had changed from fighting to deterring wars. Nevertheless, a small but persistent group of deterrence pessimists remain skeptical about many of the policies prompted by this so-called nuclear revolution, especially the U.S. decision in the 1960s to abandon any serious effort at damage limitation by forgoing a missile-defense program. In their view, deterrence is an incredibly risky way to guarantee national survival, because it ultimately turns over decisions about national existence to one's opponents, who are assumed to be both rational and risk averse. In their view, it would be better to have the capacity to deny one's opponents the ability to attack in the first place than to rely on the threat of punishment in retaliation for aggressive behavior.

Written by the leading deterrence pessimist of our day, *The Great American Gamble* is the quintessential description of the downside of deterrence, especially efforts at nuclear deterrence undertaken when both parties in a conflict are vulnerable to retaliation—a situation that came to be known during the Cold War as "mutual assured destruction." Keith Payne remains an adherent of Herman Kahn's conception of deterrence—that a deterrent threat, especially one involving extended deterrence, is inherently more credible when it is based on a war-winning strategy and force structure,

Professor James J. Wirtz is Dean of the School of International Graduate Studies, Naval Postgraduate School, California, and Director of the Global Center for Security Cooperation, Defense Security Cooperation Agency. He is coeditor of Complex Deterrence: Strategy in the Global Age *(2009).*

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generally described as an extremely favorable advantage in damage-limitation capabilities. The most credible form of nuclear deterrence would amount to an ability to fight and win a nuclear war, in the sense that damage-limitation capabilities would keep the amount of death and destruction suffered in a nuclear exchange to acceptable levels. A robust, prompt hard-target-kill capability, backed up with active (missile) defenses and passive (civil) defenses, thus becomes critical to effective deterrence.

By contrast, Payne is critical of Thomas Schelling's notion of stable deterrence, based as it is on such notions as "the threat that leaves something to chance" and the merits of learning to live with mutual vulnerability. Schelling believed that mutual societal vulnerability (i.e., forgoing damage-limitation strategies) would increase arms-race and crisis stability, eliminating what he considered to be likely pathways to nuclear war. Although Payne's description of Schelling's work is disparaging more in tone than substance, his primary complaint about the Nobel laureate's effort is that it does not address the problem of deterrence failure. While Kahn holds out the prospect of damage limitation in the aftermath of a failure of deterrence, Schelling can only hope for the unlikely prospect that the ensuing nuclear exchange will end before Armageddon.

It is difficult to argue with Payne's logic: a war-winning arsenal is the best deterrent threat, and a robust damage-limitation capability would of course be good to have if deterrence failed. But advocacy of these sorts of strategies during the Cold War was an oddly nonstrategic way of looking at the Soviet-American nuclear standoff. U.S. policy makers decided they had to learn to live with societal vulnerability, because they believed that a meaningful damage-limitation capability was beyond their grasp once the Soviet arsenal reached a certain size. No one actually chose mutual vulnerability; it was a situation that emerged after U.S. officials abandoned the notion of preventive war to head off the Soviet nuclear menace. One thus might be forgiven for thinking that Schelling's Nobel Prize in economics was actually in *home* economics—that is, for devising a recipe for turning the sourest of all lemons into lemonade.

The Cold War is now over. Mutual assured destruction no longer characterizes the "nuclear balance" that exists between the United States and other governments and nonstate actors. In other words, Kahn's conception of deterrence is now more relevant to the strategic setting than it once was. It is therefore not surprising that Payne was a leading architect of the George W. Bush administration's response to this new threat—the 2001 Nuclear Posture Review (NPR). The NPR proposed a new "strategic deterrent" that combined conventional precision-strike capabilities, new "boutique" nuclear weapons (e.g., low-yield earth-penetrating nuclear warheads), and missile defenses to deter, and if necessary defeat, these new opponents. Payne's advocacy of the NPR has gone hand in

hand with his repeated statements about the weaknesses of deterrence as a preferred strategy when facing today's rogues' gallery of terrorists, millenarians, dictators, and associated miscreants intent on arming themselves with weapons of mass destruction. Nevertheless, criticism of the NPR was immediate and overwhelming, if shallow—critics never admitted that its logic was sound and its policies coherent, or that concerns about arms-race and crisis instability were overblown when it came to deterring Iran, North Korea, or al-Qa'ida. Truth be told, Schelling's ideas had become accepted wisdom. Critics did not understand that the changing strategic setting had actually created the possibility for new strategic options.

The Great American Gamble is thus part manifesto, part history. It is a call to remember that deterrence is not the only option available to policy makers when they contemplate nuclear strategy, that a war-winning capability is the best deterrent, and that a robust damage-limitation capability will come in handy if deterrence fails. It also is a history of an idea that will not die, despite the fact that it has been twice defeated: first by Soviet capabilities and Schelling's ideas, and second by the total absence of any congressional or public support for the 2001 NPR.

Today, disarmament is the dominant trend in U.S. nuclear policy; nuclear modernization programs are virtually nonexistent, as operational forces suffer "glitches" produced by general inattention to detail. Payne's ideas are thus likely to strike contemporary readers as anachronistic. One can only hope the future confirms that judgment.

THE PROVINCE OF MORAL COURAGE

Donald Chisholm

Shisler, Gail B. *For Country and Corps: The Life of General Oliver P. Smith*. Annapolis, Md.: Naval Institute Press, 2009. 384pp. $39.95

Sixty years ago the 1st Marine Division (Reinforced) completed its epic fighting withdrawal, supported by naval aviation, from the Chosin reservoir. Although bloodied, it finished its embarkation on shipping at Hungnam on 14 December 1950 as an intact fighting unit, having brought with it virtually all its dead, wounded, equipment, and fighting spirit. The 1st Marine Division left behind a destroyed Chinese 9th Army Group, inflicting 37,500 combat casualties out of sixty thousand personnel. This justly famous feat of arms is still celebrated among Marines, knowledgeable soldiers, and military historians.

Oddly, Oliver Prince Smith, the division's commanding general and the person most responsible for its successful retrograde, remains relatively unknown even among present-day Marines. However, Smith warrants close attention, and plenty of it, not only to secure the historical record but to capture the lessons in leadership that his performance, not only in Korea but throughout his career, provides contemporary senior officers of all services. Gail Shisler, the general's granddaughter, has written a biography that accomplishes both objectives.

In April 1950, Oliver Smith received orders to command the 1st Marine Division, effective 31 July. His initial challenges were to reconstitute the division to war strength from its thin post–World War II manning and staffing (further reduced by a provisional brigade quickly sent to reinforce the Pusan perimeter), assemble its equipment and supplies, load out for Japan, and on arrival, plan for the Inchon landing. He did all these things in little more than a month. He subsequently led the division in the assault on Inchon, the operation to retake Seoul, the fumbled Wonsan landing, and the ill-fated drive to the Yalu (these last two problems not of his making). He then rehabilitated the division and continued to command it in combat through May 1951.

It may be that Smith has received less attention than his Korean War seniors, contemporaries, and subordinate commanders—say, Douglas MacArthur, Matthew Ridgway, and Lewis "Chesty" Puller—because he never manifested the color that readily attracts such audiences and was a

Donald Chisholm is professor of Joint Military Operations at the Naval War College.

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thoroughly modest man, in no way a constructor or manager of his public image, either during or after the fact. He was taciturn, not obviously emotive in the professional context, and remained enigmatic (not unlike the Navy's Raymond Spruance). He viewed MacArthur and other luminaries with a certain wry detachment and his own appearance on the cover of *Time* with faint amusement.

Some of Smith's contemporaries took him for a scholarly, bookish sort, useful in his way to the Marine Corps but not especially well suited for command of a division in combat. To be sure, Smith was a scholar; he studied at the French École de Guerre, and at Marine Corps Schools in Quantico he was known as "the Professor." Although he had missed the epic battles of World War I, Guadalcanal, and Tarawa, he was combat experienced, having served during World War II at New Britain and Peleliu, as assistant division commander to a difficult commanding general, and in Okinawa in the unenviable position of 10th Army assistant chief of staff. Absent General Smith's consummate professionalism and courage, the outcomes at Inchon, Seoul, and Chosin would have been decidedly less favorable, and certainly more costly, for the Marines and for the United Nations.

Smith's measure as a combat commander is found in his fundamental grasp of the implications of the factors of space, time, and force—he commanded at the tactical level of war but thought at the operational level. Three examples make the point. During October 1950, when MacArthur's headquarters already believed the war would be over before Christmas, Smith had come to think the opposite. Knowing the severity of Korean winters, he ordered warming tents, stoves, sleeping bags, winter footgear, and parkas in time to equip his division. The war did not end as MacArthur anticipated, and that winter proved to be one of the coldest on record.

Smith's pragmatic assessment of Chosin's rugged terrain and roads led him to build defensible redoubts, with airfields, at Koto-ri and Hagaru-ri in order to bring in supplies and troops and evacuate the dead and wounded. Photos of the withdrawal from Chosin show Marines walking, when there was space for them in the vehicles moving with them. Smith intentionally had his Marines walk out, knowing that if they rode they would be markedly less combat effective in the event of ambush.

No rear-echelon commander, throughout Smith constantly used the helicopter (the first combat commander to do so) and jeep to maintain both physical contact with his division and a practical situational awareness. Simultaneously, his visits to subordinates were not intrusions but rather the consultations of warriors that make for superb teamwork. Smith's deep concern for his men was marked in his daily personal log, wherein he kept detailed accounting of his casualties: the general always knew the cost of the objective and of command

errors. Perhaps the most telling photo of General Smith shows him standing alone among the graves in the Marines' cemetery at Hungnam in December 1950.

As officers move up through the grades, the relevant province of courage shifts from the physical to the moral, a matter that did not escape Smith, and he was well supplied with it. By this reviewer's count, on at least five occasions in 1950 Smith spoke truth to power, stoutly resisting plans or orders that in his professional experience and judgment were likely to cause loss of blood and treasure without achieving the objective. He insisted that not one but two amphibiously experienced regiments be employed for the Inchon landing, resulting in the withdrawal of the 5th Marines from the Pusan perimeter in time for the assault. Smith viewed as ill conceived, and so scotched, a scheme by X Corps to employ a unit of the 1st Marine Division for a rubber-raft crossing of the Han River to seize the Kimpo airfield. When urged by the X Corps commander (with whom from the beginning he had enjoyed at best a cool professional relationship) to speed his division's advance from Inchon to Seoul, he responded that the fighting was heavy and that he was already moving with the greatest dispatch possible. When he learned that the corps commander was attempting to issue orders in this regard directly to his regimental commanders, he quietly confronted him, and those efforts ceased. While Seoul was still hotly contested, Smith received corps orders for a night attack against apparently retreating North Korean units. His demurral again was correct: the North Koreans were advancing, not fleeing. During the October–November advance to the Yalu River, corps orders dispersed his division over a 125-mile stretch; when exhorted to move northward faster, Smith decided that he would "drag his feet," in the belief that the Chinese had entered the war with large, organized units and not the smattering of individual volunteers higher headquarters optimistically asserted.

This review has focused on but six months of General Smith's life and career, which of course do not define his four decades of service. They do, however, provide a lens through which he and the Marine Corps may be understood, and they represent what all organizations endeavor to achieve. Moreover, as with most leaders, Smith's contributions can be measured only with knowledge of the myriad less visible decisions and actions throughout his entire career—of which Shisler has recounted many in this book.

Another reason that Smith may not be well-known is that after Korea he was relegated to relatively invisible administrative posts on his return until retirement—possibly because he presented a profound challenge to the ambitions of others who actively sought the commandantcy. Notably, until his death in 1977 he maintained a mutually warm and deeply respectful relationship with another

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largely obscure but extraordinary Korean War officer, Vice Admiral James H. Doyle, the amphibious commander.

Shisler is not the first to publish a biography of General Smith. Clifton La Bree's *The Gentle Warrior* (Kent State Univ. Press, 2001) was assessed by this reviewer in this journal. I concluded then that while La Bree did not err in his portrait of the general, neither did he capture the essence of Smith's extraordinary persona that emerges from the extensive, well organized, and surprisingly intimate personal papers at the Marine Corps Historical Center. Shisler wrote to me after that review's appearance and allowed me to read an early draft of what became the present book.

She notes in her preface, "He was just my grandfather." The cynic might suppose that no man could be as good as O. P. Smith, that this book is simply "hagiolatry" by an adoring granddaughter. But the cynic would be flat wrong. Appropriately, Shisler's affection and respect for her grandfather provided the animus for the sustained labor required to see such a lengthy project to fruition. With the counsel of Marine Corps historians, Shisler has written a readable, carefully researched, well documented, and balanced (if sympathetic) biography of a man whose life is well worth knowing. In so doing she has joined a small group of "amateur" historians who have in recent years matched or exceeded the standards set by "professionals." As the general himself said to his wife about the fighting withdrawal from Chosin, "There is quite a story to be told and I hope some day it will be told properly. There is drama enough for anyone in a plain factual account of what transpired."

General Oliver P. Smith deserves greater recognition and his biography warrants a wide readership. It is a fine book.

BOOK REVIEWS

"ON THE CUSP OF A STRONG ALLIANCE?"

James Bellacqua, ed. *The Future of China-Russian Relations.* Asia in the New Millennium. Lexington: Univ. Press of Kentucky, 2010. 360pp. $50

China's rise increasingly forms a dominant theme of discussion in newspapers and academic journals alike, as Beijing's rapid growth will likely have a major impact on the security of the United States and its prosperity in the twenty-first century. A vital element to understanding the implications of China's rise is to examine closely the most important of Beijing's foreign-policy relationships.

This book, edited by James Bellacqua, fills a vital niche in this regard and belongs on the bookshelves of students of East Asia, Central Asia, and European security, as well as on those of general practitioners of international relations. Numerous crucial insights emerge from this rich volume, but among the most important themes is the apparent consensus among the contributors that Russia and China are not on the cusp of a strong alliance to oppose Washington. Rather, as one might expect, this relationship between these massive neighbors is uneasy, awkward, and rife with complexity.

Bellacqua deserves ample credit for bringing together an all-star cast of writers for this work. Thus Gilbert Rozman begins with sounding a warning that the China-Russia relationship should not be "underestimated," observing that "all . . . forces in recent years have failed to deter Russia's leaders from turning ever more toward China." On one hand, contributors warn that Russia-China military exercises have grown in scope and sophistication, while on the other hand, there are those who note that Russian arms sales to China seem to be in a rather precipitous decline. Rozman's analysis of the effect of Putin's leadership on the relationship is especially interesting. For example, he notes that Putin did not hesitate to remove a regional governor who had been stoking anti-Chinese sentiment in the Russian Far East.

An evaluation of the volatility in the evolving Russia-China energy relationship is a particular strength of this book. Indeed, the detailed chapter by Erica Downs is worth reading especially carefully. She makes a strong and logical argument that the twists and turns of their energy relationship have largely been determined by price. Downs

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writes, "During the 1990s, when oil prices were low, Russia pushed for expanded energy cooperation, but China . . . was reluctant. . . . The rise in world oil prices . . . turned the tables. . . . China became more eager . . . [and] Russia became increasingly reluctant to commit to deeper energy integration." Whether this "uncertain courtship" in the energy sector becomes a more serious relationship will depend on "world oil prices, China's willingness to pay more for natural gas, China's willingness to play by Russia's 'rules of the game' . . . and Russia's concerns about the 'China threat.'"

Another valuable contribution is the collection's examination of the interaction of regional security issues, such as in Central Asia or on the Korean Peninsula, with the Russia-China relationship. While the Taiwan issue is amply discussed, another regional security issue could well have a similarly potent influence on the trajectory of the overall relationship between the two countries. If Russia goes forward with a large planned sale of weaponry to Vietnam, including Kilo-class submarines, it will no doubt cause new tensions between Moscow and Beijing. This example serves to illustrate the broader importance of understanding the Russia-China relationship for world politics across all regions and therefore underscores the importance of this valuable book.

LYLE GOLDSTEIN
Naval War College

Francis, David J., ed. *U.S. Strategy in Africa: AFRICOM, Terrorism, and Security Challenges.* Oxford, U.K.: Routledge, 2010. 216 pp. $114

After a period of involuntary neglect due to pressing business elsewhere, the United States appears to appreciate Africa's elevated strategic importance in terms of counterterrorism and energy security, among other things, and to regard regional stability, democratic development, economic reform, good governance, humanitarian assistance, and the fight against HIV/AIDS as subsidiary objectives that are conducive to serving those two interests. This development makes this work by David Francis, holder of the Chair of African Peace and Conflict Studies at the University of Bradford, timely. Fortunately, it is also thematically well conceived, with part 1 laying out U.S. security policy and part 2 discussing African responses, the two comprising a broadly complementary set of earnest assessments by perceptive analysts.

In Washington, the conventional wisdom on U.S. Africa Command (AFRICOM) seems to be that although the Pentagon established it so awkwardly in 2007 that African leaders and populations worried that it was an instrument of neocolonialism, subsequent adjustments in strategic communication have largely allayed African fears. Perhaps unsurprisingly, then, former Deputy Assistant Secretary of Defense Theresa Whelan's tidy and professional précis of the American strategic perspective incorporates standard Pentagon palliatives and spin control. The next three chapters are more probing and provocative.

Daniel Volman makes a forceful argument that "the difference between AFRICOM and other commands—and the allegedly 'unfounded' nature of its implications for the militarization of the continent—are not as real or as

genuine" as advertised. Nevertheless, he appears to exaggerate the importance of AFRICOM as a geopolitical bulwark against China, as well as the role of the Combined Joint Task Force–Horn of Africa (CJTF-HOA), AFRICOM's sole major ground asset, as a platform for kinetic counterterrorism operations. Furthermore, the evolution of AFRICOM over the past two years has cast doubt on Volman's characterization of the command as inimical to "an international and multilateral partnership with African nations." J. Peter Pham, in his chapter on terrorism and security challenges, provides a fuller and more accurate picture of CJTF-HOA's primary function (essentially defense diplomacy) and a nuanced account of how AFRICOM might help harmonize African and American security interests.

M. A. Mohamed Salih is less sanguine on that score. His doubts, however, rest not on assumptions of malign American intent but rather on the insusceptibility of Africans' profound human-security problems to military solutions. In turn, Shannon Beebe, a senior Africa analyst in the U.S. Department of the Army, considers a human-security model for Africa that is self-consciously at odds with the traditional "state-centric realist paradigm." This may seem like pie in the sky to some, but it does contain some concrete elements —for example, free-trade zones to short-circuit corruption and lubricate economic activity.

The rejoinders on Africans' behalf range from wholesale condemnation to selective criticism of U.S. policy. According to Jeremy Keenan of the University of London, Africans predominantly see Washington's profession of concern for development and security as transparent cover for hegemonic assertions of "imperialist power." Wryly acknowledging the "cottage industry in policy discourse" that the establishment of AFRICOM has produced, Thomas Kwasi Tieku, a Ghanaian, focuses on the interplay of AFRICOM and the African Union (AU). He notes while the two are ostensibly compatible, partisan dialogue between Africans who fear that American preoccupation with oil supplies and counterterrorism will subordinate the AU and those who hope that AFRICOM will enable the AU the better to prevent, manage, and resolve conflicts has stalled U.S.-African multilateralism. He constructively urges conceptualizing the relationship in terms of hard, soft, and smart power in order to clarify AFRICOM's optimal contribution.

David Chuter offers a sweeping big-picture essay containing several sharp, if downbeat, insights. In particular, he suggests that the optimistic Western "assumption that a strong organisation can be created on the basis of weak states" is especially dubious in the African context. In his view, Africa needs to develop a model of security that "does not take Western ideas and experiences as a starting point." After Josephine Osikena's balanced survey of activity between Africa and other international actors (especially Brazil, India, and China), Francis himself provides a trenchant conclusion on the future of U.S.-African relations. Cued by signs of the potential privatization of U.S. military and security operations in Africa and by the disinclination of Western analysts to see salient links in Africa between poverty and political violence, he duly questions the capacity and will of the United States to do much more

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than attend to its own core security interests on the continent. More optimistically, he recognizes that the United States must remain open to debate on AFRICOM's proper role. Thus he recapitulates the sensible tone of this fine edited collection—hard-nosed but not hopeless.

JONATHAN STEVENSON
Naval War College

Koblentz, Gregory D. *Living Weapons: Biological Warfare and International Security.* Ithaca, N.Y.: Cornell Univ. Press, 2009. 272pp. $35

Gregory D. Koblentz, the deputy director of the Biodefense Graduate Program and assistant professor of government and politics at George Mason University, has written an outstanding analysis of one of the most significant national security challenges of the modern era. The author devotes five crisp chapters, written in easily understandable terms, to the complexities of the potential use of biologicals in modern warfare.

He describes the national security implications of the potential use of biological weapons by state actors as well as those with no state affiliation. One of the areas Koblentz addresses, in necessary detail, is the existence of many barriers to preventing proliferation of biological weapons by states, nonstate actors, and terrorists.

Koblentz uses case studies to review the biological warfare programs of Iraq, Russia, and South Africa, speculating on the strategic assessment of the risks and benefits each country may have considered in determining whether to proceed with the development of these offensive weapons. With each example the reader is able to understand better the nature of the biological threat and how truly difficult it is to control such a weapon once in an aggressor's hands.

The United States has the most powerful military force of modern times but is having a most challenging time defeating an asymmetric adversary in Afghanistan. When one considers the potential of a lesser state actor or a terrorist group to develop and use biological weapons against a militarily superior force, one is forced to ask *when* the use of this weapon will occur, not *if*. As Koblentz astutely points out, "Biological weapons were the first weapon prohibited by an international treaty, yet the proliferation of these weapons increased after they were banned."

This book is a must-read not only for the professional military officer, diplomat, and politician but for the average citizen as well. It is for anyone who wishes to gain a better understanding of the current biological weapon threat and is interested in or responsible for protecting the nation's vital interests.

ALBERT J. SHIMKUS, JR.
Naval War College

Potholm, Christian P. *Winning at War: Seven Keys to Military Victory throughout History.* Lanham, Md.: Rowman & Littlefield, 2010. 304pp. $39.95

Winning at War is the product of over forty years of academic inquiry into the nature of war by Christian Potholm, a professor of government at Bowdoin College. He proposes that throughout history there have been seven keys to

military victory: "superior weapons and technology entrepreneurship, superior discipline, sustained but controlled ruthlessness, receptivity to military and integrative innovation, the ability and willingness to protect capital from people and rulers, the centrality of superior will, and the belief that there will always be another war." Drawing on an array of historical examples from the Peloponnesian wars to the present, Potholm builds a case that there is a predictive formula for success. Application of this formula depends on strict objectivity, which explains why he applies a template of Mars through which to analyze the decision for war, its execution, and final results. Viewing human conflict through the cold, dispassionate lens of the god of war, for whom winning is all that matters, advances the process of distilling war to its essence.

The premise of this book is provocative for a couple of reasons. First, it may seem to the student of military history problematic that a scholar without prior military experience would presume to write authoritatively on war. After all, many classics of military theory and history were written by scholars who cut their teeth on the battlefield, such as Carl von Clausewitz, Mao Zedong, and Sir Basil Liddell Hart, who are among those with extensive military experience whose works are eminent today in the classrooms of our nation's service academies and war colleges. Second, the book provokes the curious to see whether the author really is on to something, having produced a work of unique value for policy makers and military strategists.

In fact, the quality of analysis in *Winning at War* debunks the myth that military experience is necessary to write authoritatively on war. Like Sir Julian Corbett, who never served in the Royal Navy yet became Britain's foremost theorist on joint strategy, Potholm's work deserves our attention because of his distinguished credentials. That being the case, what value does this book have to offer that cannot be derived from Thucydides, Sun Tzu, Clausewitz, or contemporary works like Colin Gray's *Fighting Talk: Forty Maxims on War, Peace, and Strategy* (2007)? Unlike these classic authors, Potholm draws his conclusions from a comprehensive survey of military history of over 2,500 years, being candid about his inclusion of non-Western examples in the analysis. Thus, the seven keys were derived from a vetting process that sought to eliminate the constraining factors of time and space. Yes, there is familiarity in each of the seven keys, but when considered collectively they provide a unique, succinct guide for when to avoid, initiate, conduct, or end a war.

Potholm addresses the book's relevance by applying the template of Mars to the current war against "radical jihadist Salafists." Holistic application of the template leaves one hopeful about American potential for defeating this type of "postmodern" insurgency. Ultimately, however, the author understands that Mars is rarely pleased by the way humans conduct war and that war is a contest of wills that are subject as much to emotion as to rationality. The objection to this book, if any, will be put forward by those who do not believe that war is a fundamental part of the human condition.

LT. COL. PAUL C. KRAJESKI, U.S. ARMY
Naval War College

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Murray, Williamson, and Jim Lacey, eds. *The Making of Peace: Rulers, States, and the Aftermath of War.* New York: Cambridge Univ. Press, 2009. 408pp. $93

There are countless books written on war but fewer on the problems of postwar or even intrawar peacemaking. This work thus offers top-quality case studies on a subject of enormous relevance. It will be of value to policy makers, academics, and general readers alike.

The Making of Peace is a collection of essays written by eminent historians known mainly for their writings on war. Sir Michael Howard's preface sets the bar high, observing that the usual war/peace dichotomy is artificial, since the historical default is perpetual conflicts "that need not necessarily be resolved by force, and it is the business of statesmen to ensure that they are not."

The book's central argument is that effective peacemaking requires in-depth knowledge of the past; a healthy awareness of the political, historical, and cultural context within which a war has taken place; and a full appreciation of the characteristics of the "other." As Murray writes in the introduction, "Without guideposts from the past to suggest paths to the future, then any road, no matter how irrelevant and inappropriate, will do. And such roads will inevitably lead to future conflicts." However, that is not to imply that there are easy solutions. At the core of this book are eleven rich case studies of postwar peacemaking in the Western world, including chapters by, of course, Williamson Murray, as well as Paul Rahe, Derek Croxton and Geoffrey Parker, Fred Anderson, Richard Hart Sinnreich, James McPherson, Marcus Jones, John Gooch, Colin Gray, Jim Lacey, and Fred Kagan. Sinnreich offers a thoughtful conclusion, "History and the Making of Peace," which ties together the major themes and offers three interesting "theories" of peace, all the while echoing B. H. Liddell Hart's dictum that the best way to formulate effective grand strategy is to look beyond a war to the nature of the peace.

Curiously, the editors stress the importance of knowing your adversary in peacemaking, but the volume suffers from scant attention to non-Western case studies. Although they anticipate this criticism, their ethnocentrism detracts from an otherwise sterling collection of cases, especially when the United States and its Western allies actively chase peace with non-Western adversaries. A more minor flaw is the absence of a bibliography of key sources on peacemaking, or even just those used in this book. Nonetheless, this is an impressive collection for students of strategy and history, as all serious policy makers, practitioners, and informed citizens ought to be.

AUDREY KURTH CRONIN
National War College

Iguchi, Takeo. *Demystifying Pearl Harbor: A New Perspective from Japan.* Translated by David Noble. Tokyo: I-House, 2010. 343pp. $60

This carefully researched book painstakingly corrects the diplomatic history surrounding Japan's attack on Pearl Harbor. The author is a retired Japanese ambassador who was the young son of the Japanese counselor in Washington, D.C., on 7 December 1941. Unlike too many Japanese writers, Iguchi

is no apologist for the sneak attack. Rather he objectively analyzes recently released empirical evidence that reveals the individuals truly responsible for delaying lawful notice to the United States about the coming attack. The fault did not rest with the embassy staff, as portrayed to the Tokyo war crimes tribunal, but with a conspiracy to cover up facts, a conspiracy that is now traceable to high-level officials who deliberately delayed Foreign Ministry telegrams. Moreover, the Japanese notes delivered to then–secretary of state Cordell Hull shortly after the attack were not declaration-of-war ultimatums as required by international law but watered-down notices about the termination of bilateral negotiations. The unmistakable conclusion from the evidence is that the officials in power wanted to catch the Americans off guard.

Iguchi writes from firsthand experience and with convincing passion about those in Japan who even now do not want to accept responsibility for their country's perfidious actions. He cites authoritatively from official, insider records, not only placing blame where it belongs but also clearing up the record to allow closure, moving to more open and honest U.S.-Japanese relations.

The book provides a detailed time-line context for the foreign policy pursued by Japan throughout 1940–41, when the focus of the Japanese military was on China and the Soviet Union. Iguchi rejects the thesis that American economic sanctions and demands for a complete withdrawal of Japanese forces from China forced Japan into war. Iguchi identifies powerful Japanese strategic thinkers who believed that the only way resource-poor Japan could win a war against the United States and Great Britain was by a quick and devastating surprise attack. Iguchi also documents contrary views held by influential Japanese leaders at the time who tried to halt the momentum for war.

Iguchi does not believe there was an American conspiracy to provoke war with Japan. He also rejects such myths as that Roosevelt knew in advance of the Pearl Harbor attack or that Churchill was responsible, meaning to draw the United States into war against Hitler.

The value of this book is in how candidly and accurately Iguchi documents the historical context for the Pacific War. He explains Japanese motives based on his unique personal experiences, reinforced by formerly classified internal Japanese records. There is no forgiving Japan's cowardly attack on Pearl Harbor, but there is much to admire about a senior Japanese diplomat who courageously does his best to set the record straight.

MYRON H. NORDQUIST
University of Virginia School of Law
Charlottesville, Virginia

Thomas, Evan. *The War Lovers: Roosevelt, Lodge, Hearst, and the Rush to Empire, 1898.* New York: Little, Brown, 2010. 413pp. $29.99

American journalist and historian Evan Thomas has once again proved why he is among the foremost modern scholars of American history, culture, and politics. *The War Lovers* is a captivating chronicle of war fever and calculated crisis manipulated by key leaders in the run-up to the twentieth century and culminating in the Spanish-American War. Thomas assembles a compelling

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historical record for the case that the war was a conflict of choice, shaped by powerful politicians and statesmen and exploited by a rabidly sensationalist newspaper editor. Reasons for their conduct abound, from simple machismo to earnest belief in the national interest, from greed to pure self-indulgence and an insatiable appetite for controversy. Thomas reveals an instructive case study for current military and civilian national security professionals on the causal factors for war and the agendas that influence national decision making. He weaves the archetypal cautionary tale, making clear that conflict is sometimes the product of irrational and intensely personal calculus rather than the pure strategic realpolitik taught in universities and the war colleges.

The author recasts the image of Theodore Roosevelt from that of the conventional wisdom—the loyal, altruistic model nationalist—to that of a sophistic, scheming demagogue willing to stage-manage U.S. foreign policy to his own egotistic ends and driven by psychological factors, including an extreme case of father worship. Roosevelt's self-loathing, in this view, was so complete that it transformed his outlook with absolute sincerity—introspection was not Roosevelt's strong suit. Similarly, Thomas paints the statesman and virtual New England hereditary peer Henry Cabot Lodge as a puppeteer, dancing marionettes across a stage to demonstrate his power and influence. William Randolph Hearst's legend as a muckraking proprietor of "journalism that acts" needs little exposition, but Thomas fleshes out his character with a healthy degree of cynicism and edgy historical humor. The author develops a plotline of interaction between these three principal actors and establishments—the Washington political establishment, embodied by Speaker Thomas Reed, the Boston Brahmin social establishment, and the Harvard set—showing the tensions and their resolutions in a way that makes the characters at once real, competent, ludicrous, vulnerable, haughty, adventurous, and patriotic.

Thomas himself is of relatively high birth, the son of a literary editor and grandson of a Princeton graduate and presidential candidate. Although educated at Phillips Andover, Harvard, and the University of Virginia's law school, he shows mercy in describing the conceit and self-importance of fellow Harvard men Roosevelt and Lodge.

The takeaway for this reviewer is that actors are more complex than the oversimplified caricatures that the modern press, the academy, and political society sometimes make them out to be. Roosevelt is often caricatured as a cigar-chomping outdoorsman and man of adventure, leading from the front in the Cuban campaign and earning accolades and medals for altruistic heroism. In reality, the picture of Roosevelt painted by Thomas is of a man not nearly so selflessly patriotic and capable but rather of one who was willing to subordinate the national interest to his own ends.

Thomas shows that in similar circumstances about a hundred years ago, similar actors with analogous agendas acted in comparable ways, perhaps for similar purposes. The image of Teddy Roosevelt, the purest American loyalist, charging up San Juan Hill to liberate Cuba from the malicious Spanish regime is insufficient to capture the total picture of the complex political,

military, and strategic confluence that led to the Spanish-American War. The question for the polity is how to design a system that marginalizes these personal agendas and ideologies to ensure that questions of war are indeed answered with morality, proper state behavior, and national self-interest as the foremost considerations. Books like *The War Lovers* are instructive in ensuring we are not doomed to repeat history, or at least that we can recognize it when we are.

LT. COL. ROBERT GRAY BRACKNELL, U.S. MARINE CORPS
Kabul, Afghanistan

Lieven, Dominic. *Russia against Napoleon: The True Story of the Campaigns of War and Peace.* New York: Viking, 2010. 618pp. $35.95

The Napoleonic Wars are not exceptions to the rule that the victor of war writes the history. Yet there is a strange omission: the mythic history of Napoleon and Russia has been produced almost wholly by the British and Germans and focuses on the events of 1813 and 1814. Yes, the disastrous French campaign in Russia is viewed as the beginning of the end and treated as Napoleon's mistake, but if the Russians are offhandedly thanked for the war of attrition they fought in 1812, their participation in Western Europe in 1813 and 1814 has been downplayed. This is despite the startling fact that 650,000 Russians operated in the West in those years and in fact trooped into Paris in March 1814.

Even historians of Russia have not made much of the role the Russians played in 1813–14. They could not do so, of course, given the lack of archival access. But one must also consider the impact of the myth of 1812, promulgated in *War and Peace* and later reinforced by the "populism" of the Russian Revolution. Tolstoy's myth emphasizes weather, great distances, Napoleon's overconfidence, and especially the heroism of the long-suffering Russian people, who overcame not only the French but the incompetence of the tsar and his advisers and generals. All this resonated well with the subsequent need of nineteenth-century revolutionaries and Soviets to downplay the successes of the old regime.

Dominic Lieven's *Russia against Napoleon* corrects the existing omission by bringing to light Russia's preparation for and the execution of its involvement in the diplomatic, political, and military struggle against Napoleon from the signing of the Treaty of Tilsit in 1807 until 1814. If Lieven is to be congratulated for being the first to use Russian sources, available only since 1990, he deserves greater praise for resisting the urge to make his story part of the eventual fall of the tsarist regime. One could really not ask for more in the way of a military history. It is exhaustively thorough, cognizant of the relationships of intelligence, diplomacy, and domestic politics to war, and properly limited in scope and conclusions.

Lieven convincingly demonstrates the real accomplishments in terms of strategy and execution of war of Alexander I, his foreign-policy advisers, Count Nesselrode's Paris intelligence apparat, and military officers. His greater achievement, however, is his focus on logistics and—what might seem to be a minor matter—the role of the horse. These are perhaps the largest and most

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interesting aspects of the Russian success story. If in 1807 the Russian state and army were inarguably "Old Regime" compared to the West, by 1814 the Russian ability to project military power beyond the country's borders was formidable. This project depended, most of all, on the ability to move and feed men.

To some, the role of "horsepower" in early modern war will seem a revelation, even though the fact that Napoleon could replace men but not the horses in Russia in 1812 is already well-known. Lieven tells us that the horse was the most significant military asset of its time: "The horse fulfilled the present-day functions of the tank, the lorry, the aeroplane and motorized artillery. It was in other words the weapon of shock, pursuit, reconnaissance, transport, and mobile firepower." Interestingly, nowhere does he say what immediately leaps to the reader's mind—that what the Russians knew about horsepower mirrored what the Soviets understood about tanks during World War II.

KENNETH M. JENSEN
McLean, Virginia

OF SPECIAL INTEREST

CALL FOR PAPERS: *JOURNAL OF INTERNATIONAL SECURITY AFFAIRS*

The editorial board of the *Journal of International Security Affairs* (ISSN 1532-4060) invites submissions of papers for its Fall 2011 issue. The *Journal,* published twice yearly by the nonprofit, nonpartisan Jewish Institute for National Security Affairs, covers U.S. military and global security issues affecting the United States and its allies abroad. All articles submitted to the *Journal* are confidentially refereed. Submission guidelines can be found at www.securityaffairs.org.

REFLECTIONS ON READING

Professor John E. Jackson is the Naval War College's manager for the Navy Professional Reading Program.

The Navy Professional Reading Program (NPRP) was established by the Chief of Naval Operations (CNO) in October 2006 to encourage sailors at all levels to participate in a self-paced program of professional development based on reading books on topics relevant to Navy professionals. Over 1,200 lending libraries of books were established on ships and stations throughout the Navy, and the sixty carefully selected books were stocked in Navy Exchanges worldwide. Feedback from the fleet has indicated a widespread awareness of the program and broad acceptance of the books that constitute the NPRP. Admiral Michael Mullen, then CNO, approved the initial sixty titles, and the present CNO, Admiral Gary Roughead, refined the list in October 2008 with the substitution of five new titles that replaced books deemed of lesser importance. The revised list of sixty books—designated "NPRP 2.0"—now constitutes the official NPRP library, which can be found at www.navyreading.navy.mil.

Within the NPRP library there are many excellent books of enduring value, and efforts are made to avoid wholesale changes that would create excessive turnover within the various collections. To provide structure to the program and to assist readers in focusing their interest in specific areas, the books are divided by subject matter into six broad categories (Critical Thinking, Joint and Combined Warfare, Regional and Cultural Awareness, Leadership, Naval and Military Heritage, and Management and Strategic Planning). While *any sailor* can read *any book,* the list is also stratified by grade level for readers interested in a suggested path to follow.

In preparation for the program's fifth anniversary, the entire library is being reviewed to identify books that might be "retired" to make room for new titles. Budgetary and shipboard storage constraints drive the need to maintain a steady state of sixty books per library set. While the NPRP Advisory Group is conducting a thorough review of newly published works and is revisiting the decisions that produced both the 1.0 and 2.0 lists, the NPRP program manager is also

seeking input from the Navy population at large. Factors to be considered in recommending books for inclusion in a new list, "NPRP 3.0," include:

- Is the book of interest and value to a large number of sailors? (Books that focus narrowly on subject matter that pertains to a small and specialized portion of the Navy are more appropriate to community-specific venues.)
- Is the book currently in print and available for purchase by the program office and individual sailors?
- Is the book clearly written and factually accurate?
- Does the book avoid advocacy for radical ideas and concepts that are incompatible with the Navy's core values?

Suggestions for books that should be considered for inclusion in the next revision of the NPRP should be forwarded by e-mail to navyreading@usnwc.edu or by mail to Navy Professional Reading Program, College of Distance Education, Naval War College, 686 Cushing Road, Newport, Rhode Island, 02841. Please provide the book title, publication date, publisher's name, and ISBN number (if known), and a brief (one-or-two-paragraph) synopsis of the book's content and of your opinion on its value to sailors and why it should be incorporated into the NPRP. Please also provide your contact information, in the event that additional information is needed.

Thanks in advance for helping to improve the Navy Professional Reading Program. Well-read sailors are effective sailors! Help us prepare our Navy for the challenging future ahead.

JOHN E. JACKSON