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# Hiding in Plain Sight—The U.S. Navy and Dispersed Operations under EMCON, 1956–1972

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# 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.

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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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1. Andrew S. Erickson, "China's Evolving Anti-access Approach: 'Where's the Next (U.S.) Carrier?'" *China Brief* 10, no. 18 (10 September 2010), pp. 5–8; 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), pp. 53–86; Eric Hagt and Matthew Durnin, "China's Antiship Ballistic Missile: Developments and Missing Links," *Naval War College Review* 62, no. 4 (Autumn 2009), pp. 87–115.
2. Bryan Krekel, *Capability of the People's Republic of China to Conduct Cyber Warfare and Computer Network Exploitation,* prepared for the U.S.-China Economic and Security Review Commission (McLean, Va.: Northrop Grumman Corp., 2009); Timothy L. Thomas, "China's Electronic Long-Range Reconnaissance," *Military Review* (November–December 2008), pp. 47–54; Timothy L. Thomas, "Chinese and American Network Warfare," *Joint Force Quarterly,* no. 38 (3rd Quarter 2005), pp. 76–83.
3. Robert C. Rubel, "Talking about Sea Control," *Naval War College Review* 63, no. 4 (Autumn 2010), pp. 38–47.
4. Jakub J. Grygiel, "The Dilemmas of US Maritime Supremacy in the Early Cold War," *Journal of Strategic Studies* 28 (April 2005), pp. 191–206; Philip Alphonse Dur, "The Sixth Fleet: A Case Study of Institutionalized Naval Presence" (PhD diss., Harvard University, 1975), p. 72.
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6. Grygiel, "Dilemmas of US Maritime Supremacy in the Early Cold War," pp. 191–206; Dur, "Sixth Fleet," p. 72.
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20. Ibid., pp. 27–31.
21. Ibid., pp. 25, 28.
22. Ibid., pp. 37, 42.
23. Ibid., pp. 42–46.
24. Ibid.
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