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THE UNITED STATES NAVY

Bruce F. Powers

Professional Paper No. 200

December 1977

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1401 Wilson Boulevard
Arlington, Virginia 22209

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DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

"The American Military Machine" is to be published early in 1978 by Hamlyn/Salamander Books in Great Britain. It is written for readers who are unfamiliar with the details of military affairs, and will be supplemented with photographs.

11 Dec 77

14 CNA - Professional Paper - 2000

12 46p.

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THE UNITED STATES NAVY

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A chapter for the book "The American Military Machine" to be edited by James E. Dornan, Jr.

All nations that have navies have them to exert some control over portions of the oceans. The United States is no exception. The far-flung successes of the U.S. Navy as World War II ended made it dominant in many parts of the world. Despite demobilization, this dominance continued into the 1960s. Today, the U.S. Navy has half as many ships as it had 15 years ago. Even so, it deploys versatile, capable fleets overseas and operates additional effective forces closer to the United States during peacetime. Today's U.S. Navy has 458 ships and 540,000 men and women on active duty. It is still the most capable navy in the world.

The U.S. Navy -- the ships and aircraft in it and how it is used -- has been shaped by many forces. This chapter begins by identifying them. Then, the composition of today's Navy is described, as well as changes in its composition that can be foreseen. Finally, unanswered questions concerning the Navy's future are examined.

FORCES THAT HAVE SHAPED THE NAVY

The most important of the forces that have shaped the Navy are the broad objectives the United States has for it. They are discussed now, followed by descriptions of the conflicts the U.S. Navy is most likely to fight in and the peacetime posture used to prepare for them. Those conflicts help set the objectives; they also point out the characteristics of opposing navies most needing U.S. Navy attention. Improvements in technology create

opportunities to shape a navy; limited budgets impose constraints. These, too, are discussed.

OBJECTIVES

The United States has a Navy in order to achieve several broad objectives. Among the peacetime objectives are insuring use of the seas by friendly merchant shipping, and influencing events far from U.S. shores. In wartime, conflict is to be confined to areas of U.S. choice. The U.S. Congress requires that the Navy be prepared to fight quickly when called upon, and to keep fighting when necessary. In order to achieve these objectives, U.S. Navy officers focus on more specific missions -- establishing control of sea and air space and projecting air, missile, or amphibious forces ashore.

Use of the seas

One of the objectives of U.S. foreign policy is to insure free use of the seas by merchant shipping with its trading partners. As the United States became increasingly dependent on foreign trade during the past century, its Navy grew to insure the uninterrupted flow of that trade. One reason U.S. Navy ships are deployed far from U.S. shores is to maintain that flow by deterring potential threats to it.

Events ashore, and navies in crises

These deployed forces also affect events ashore by their ability to intervene. Earlier in this century, intervention ashore meant several miles -- the range of a naval gun or an independent landing party. More recently, carrier-based aircraft have extended potential intervention ranges to hundreds of miles. Cruise missiles aboard ships could, one day, extend the range still farther.

Naval forces can move freely in peacetime. This flexibility becomes very important in crises, when naval forces can help signal their governments' intents by the stations they assume. Some of this stationing can be threatening but, if done outside territorial waters, the option to stop short of combat and pull away is retained. If, on the other hand, land forces are to influence crises, they must generally be so placed that the act of placement is itself hostile. Naval forces are therefore preferred for crisis management. U.S. Naval forces bring a wide range of potential capabilities to a crisis -- from a few interceptor sorties that can cover the ground forces of a small ally to large air strikes or amphibious assaults. This versatility gives added flexibility to U.S. government policy in a crisis. If the crisis turns to combat, the versatility permits U.S. participation without the full-scale commitment implied by the introduction of sizable ground forces. If a full-scale commitment is decided upon, Naval forces are often -- because of their position and the range of their capabilities -- the first committed. (The first American strikes against North Vietnam, for instance, were conducted by U.S. Navy forces in 1964. The demand for air sorties to support friendly troops in South Vietnam rose quickly in 1965. Even though it may be less expensive to fly air sorties from land bases, they take months to build. While construction was going on in 1965, an extra carrier flew the sorties needed.)

Confining conflict

When a crisis does turn into a conflict, one U.S. objective is to control it. Employing needed U.S. Navy capabilities far from U.S. shores enhances the likelihood of keeping conflict confined and away from North America or other areas of vital concern. Because the United States has major interests overseas, including the well-being of many allies there, local conflicts that spill over can be very damaging.

Prompt and sustained operations

In addition to operating at long distances, the U.S. Navy is expected to respond promptly and to continue to fight for months or even years. The requirement to go into action quickly means that naval forces must be ready. This is achieved by keeping them manned and equipped and exercising them regularly. The exercises stress likely combat employment and tend to be more sophisticated the closer the forces are to the scene of their likely employment. In particular, the forces regularly stationed in the Mediterranean Sea and in the western Pacific Ocean conduct multi-ship exercises that stress several types of naval warfare within the space of a few days.

The requirement to fight on also influences the design of the U.S. Navy. Staying power is built into individual ships; it also is achieved by providing both relief warships and ships that can replenish warships engaged in combat with ammunition, fuel, spare parts, and food. The replenishment ships permit warships to keep fighting, and to do so several thousand miles from the United States rather than returning home for replenishment. A network of overseas bases increases the flexibility and decreases the distances over which these replenishment ships must sail. Typically, warships retire a hundred miles or more from the combat area to replenish and then return to it. When warships need repairs or crew rest, the relief warships fill their place. Relief warships operate near the coasts of the United States in peacetime.

Specific missions

To achieve the objectives just described, U.S. Navy officers tend to focus on specific missions. The most important is establishing and maintaining control of sea and air space. Others are projecting military forces

ashore and operating in peacetime to make allies and potential foes aware of a U.S. Navy presence. Establishing sea control is generally viewed as a prerequisite to projecting naval forces ashore, as in a large-scale amphibious assault, for example. Moving a division or more of troops to assault a distant shore requires many transports. Such ships are lightly armed; their path must be kept safe from opposing forces. Even if the path is cleared beforehand, heavily armed escorts are needed to fend off opposing forces that may enter the cleared lane afterward. The clearing and escort tasks amount to establishment of control over sea and air space. Similar tasks are obviously required for a massive resupply by unarmed convoys, and even for the transit of task forces whose principal ships are aircraft carriers. Once an amphibious or carrier force has reached its operating area, control of the sea and air space there is necessary. If control of the operating area is subject to interruption, projection of air or landing forces ashore cannot be achieved reliably.

Shifts in missions

Emphasis has been shifting among U.S. Navy missions since World War II. Such broad objectives as insuring free use of the seas and influencing distant events have remained fixed. But specific Navy missions, such as projecting forces ashore, have shifted in relative importance as technology and the capabilities of potential opponents have evolved.

After World War II, the U.S. Navy quickly demobilized from 3.4 million men and thousands of ships to 350,000 men and a few hundred ships. Because the fleets of the United States and its allies faced no important opponents at sea, the U.S. Navy was still able to dominate the oceans. During the Korean War of 1950-53, for instance, ships of the U.S. Navy and the navies of some other U.N. members operated several thousand miles from the United

States. Unchallenged at sea, this force devoted itself entirely to air attacks, shore bombardment with naval guns, and amphibious landings.

About that time, U.S. Navy aircraft aboard carriers were assigned the mission of delivering nuclear weapons on targets in the Soviet Union. This mission influenced the design of carriers and their aircraft. Some aircraft became larger to carry the large nuclear devices of the time and to strike targets at ranges of a thousand or more miles. The carriers themselves grew larger to accommodate the large aircraft. Except for amphibious transports, the Navy subordinated its other large surface ships to escort or replenishment of the carriers. Beginning in 1960, the carriers gradually transferred the long-range delivery of nuclear weapons to submarines.

The U.S. Navy has operated nuclear-powered submarines since 1960 whose mission is firing ballistic missiles with nuclear warheads. These 'Polaris' and 'Poseidon' missiles can be launched from beneath the ocean's surface against targets in the Soviet Union or elsewhere. The submarine-launched missiles account for only some of the ability of the United States to shoot intercontinental nuclear weapons; it is described in more detail in the chapter on 'strategic' forces.

When the carriers turned over the mission of delivery of nuclear weapons against the Soviet Union to submarines, they resumed their earlier attention to closer targets. This shift of attention was accelerated in 1964-72 by the requirements for air sorties during the Vietnam War. Here, as in Korea, the absence of a naval threat permitted the carriers to mount sorties with maximum bombloads from close to shore and free their escorts occasionally to bombard it.

Potential challenges at sea have also caused shifts in emphasis among Navy missions. The Soviet Navy began its first regular deployments outside

home waters by deploying to the Mediterranean Sea in 1964. In 1967, such deployments became continuous. During that year, an Egyptian ship launched a cruise missile at the Israeli destroyer 'Eilath' and sank it. Similar missiles were carried by some of the Soviet ships that had recently arrived in the Mediterranean. There -- and, later, elsewhere as U.S. Navy operations in Vietnam decreased -- the Navy developed and exercised procedures for dealing with opposing surface forces.

Submarines have been a major concern to the U.S. Navy even longer, particularly in the Atlantic Ocean. German submarines nearly stopped the Atlantic flow of supplies to Europe in 1918 and again in 1942. After 1945, the Soviet Union acquired a large submarine force. Beginning in the mid-1950s, some older U.S. aircraft carriers were assigned exclusively to anti-submarine duty. They were therefore allotted antisubmarine helicopters and fixed-wing antisubmarine aircraft. Beginning in the early 1970s, for budgetary reasons, the carrier-capable antisubmarine aircraft have been placed aboard all carriers; the older carriers devoted to antisubmarine work have been retired. At the same time, nuclear-powered submarines besides those fitted with ballistic missiles have entered the U.S. Navy in large numbers, adding significantly to its antisubmarine strength. However, the ongoing modernization of the Soviet Navy's attack submarines with nuclear-powered ones has kept U.S. Navy attention on Soviet submarines. So has the regular appearance in sizable numbers of Soviet submarines in the Mediterranean and, less so, in the Pacific and Indian Oceans.

Although nuclear weapons for delivery by carrier-based aircraft were at first designed for use against the Soviet homeland, later nuclear weapons were developed for both offensive and defensive war at sea. Such weapons are no longer limited to aircraft carriers.

LIKELY WARTIME EMPLOYMENT

The Secretary of Defence has directed the Navy to be ready for a NATO war with Warsaw Pact forces, for a lesser contingency elsewhere, and for managing crises. U.S. forces are to be able to deal with the NATO war and a lesser contingency at the same time. This 'one and one-half war' strategy has been U.S. policy for almost a decade. (Earlier, it was two large wars and a lesser contingency.)

NATO conflict

A NATO war would place great stress on U.S. Naval forces. In such a war, they might be called upon to provide NATO ground forces with air support from carriers or to assist by landing Marines. To do either would require control of sea and air space in the vicinity. If the war went on for weeks or months, extensive sea control operations would be required of NATO navies so that NATO armies and air forces engaged in Europe could be supplied by merchant shipping from North America. Any of these missions, moreover, might involve use of tactical nuclear weapons.

With or without nuclear weapons, the U.S. Navy might be expected to participate extensively in such sea control while providing NATO land forces with more direct support. In such a conflict, the U.S. fleet would have to help fend off Soviet attacks at sea and cope with Warsaw Pact air defenses ashore. NATO, with the combined capabilities of its navies including the U.S., would find its hands full in dealing with these threats. If the U.S. Navy were called upon to fight a lesser war elsewhere at the same time, NATO would be especially taxed.

Smaller wars

Lesser contingencies that might require U.S. forces include the Middle East, Persian Gulf, and Korea. The U.S. Navy would probably play a large role in these contingencies. Besides its access to each area from the sea, the capabilities that the Navy has developed to be ready for a NATO war make it a tool the U.S. government is apt to use in these smaller wars. Third World combat would probably be slower than NATO combat and the opponents might be weaker than the Soviet Union. It is because of the potential Soviet foe that the U.S. Navy has acquired highly sophisticated weapons systems, such as the F-14 interceptor. Without the demands of a NATO war, they might not be needed in the U.S. fleet. But, because they are there, the U.S. fleet would probably prevail in lesser conflicts.

PEACETIME DEPLOYMENT POSTURE

The peacetime deployment posture of the U.S. Navy reflects where it is most likely to be employed in wartime and crises. The details of the peacetime disposition of the Navy will be described later, but the general character of the Navy's peacetime posture bears description now. It, too, has shaped the Navy.

The U.S. Navy deploys forward one-seventh to one-third of its warships -- depending on class -- in peacetime. Current practice has almost a third of the aircraft carriers deployed forward. On a typical day, two U.S. carriers are deployed to the Mediterranean Sea and two others to the western Pacific Ocean. (Carriers deploy overseas for approximately six months at a time.) These four carriers are backed up by nine others assigned to bases in the continental United States. The nine carriers based in the U.S. are in various states of operational training and repair, including

one or two in overhaul. A fourteenth carrier -- one without ammunition storage -- is used for training new pilots. It does not deploy.

Training

A carrier, its embarked aircraft, their pilots, the escorting ships, and their crews customarily train together for a deployment. This period of preparation builds working relationships and mutual confidence. Training includes advanced exercises in, for example, the North Atlantic during preparation for deployment to the Mediterranean. When a group of ships and aircraft deploys, it generally operates as a task group.

This arrangement takes advantage of the smooth working relationship built during work-up training. Amphibious ships are similarly grouped; because the embarked Marines make up a single fighting unit once they have landed and their effectiveness ashore depends partly on how well their landing is coordinated, there are obvious advantages to grouping their transports.

Altering disposition

The areas to which Navy task groups deploy forward are compromises between expected combat areas and points from which ships can be dispatched to more distant areas if the need arises. (Forward deployed ships move regularly for exercises and port visits.) The forces deployed forward are ready for combat, some of those to the rear are ready to augment those forward, and all have the ability common to all naval forces -- the freedom to move in crises that was described earlier.

In case of potential conflict, the carriers in that part of the world, together with escorts and other ships such as transports, are usually moved closer to the trouble spot. An additional carrier with supporting ships is sometimes dispatched from the United States. At least one such

carrier on each coast can be dispatched immediately, arriving in the Mediterranean in 4-5 days or in the western Pacific in 8-10. Another carrier on each coast can be dispatched 3-5 days later.

If a war lasted at least 6 months, required it, and the forces in the Mediterranean or western Pacific could spare a temporary loan of forces, as many as 10-11 carriers could be sent to the combat theatre. A much longer war would permit construction of additional carriers.

Bases

Naval bases in the United States provide the full range of services needed, including: overhaul, refueling, aircraft rework, ordnance storage, sensor calibration, and recreation. Recoring of nuclear power plants is also available. The many U.S. Navy bases overseas tend to provide a narrower range of services. Overhauls, including recoring, are not done overseas. Nor are repairs that can be deferred until the end of a deployment. Overseas bases exist to provide the services a deployed fleet must have to stay ready. In wartime, large-scale operations are often conducted to seize such bases overseas.

'Homeporting'

One way to ease the burden of a peacetime policy that puts so much of the fleet's warships forward is to station some of them overseas indefinitely, saving transit times. But, because all overhauls are done in the United States, indefinite overseas stationing has not been adopted. Instead, a compromise has been arranged for submarine and destroyer tenders and cruisers that serve as flagships overseas. It is known as 'homeporting,' and assigns some ships overseas for the full 4-7 years between major overhauls. More recently, a squadron of destroyers was 'homeported' in Greece

for three years. An aircraft carrier and a squadron of destroyers are now 'homeported' in Japan.

PAST TECHNOLOGICAL IMPROVEMENTS

About a hundred years ago, the United States Navy converted its ships from sail to steam. Steam was faster but required coaling stations along the routes. Moreover, because steam made large-scale operations more reliable, fleets covered larger areas. Since conversion from coal to oil, which is more easily transferred at sea than coal, direct and frequent dependence on bases for refueling has decreased. (The bases now serve more as storage points for such consumables as ammunition, jet fuel, and oil for ships, and as transit points for the spare parts on which the fleet increasingly depends.) Eleven of the Navy's surface ships, being propelled by nuclear power plants, are virtually free of the usual refueling requirements; however, the three large aircraft carriers, 'Enterprise,' 'Nimitz,' and 'Eisenhower,' need occasional replenishment of their aviation fuel. (A conventionally propelled carrier must, every few days, take on ship fuel as well as aviation fuel.) All U.S. Navy submarines constructed since 1960 have nuclear propulsion, making them less vulnerable to radar and visual detection than the diesel-electric submarines that regularly have to break the surface of the water.

Weapon and sensor ranges

The outcome of sea battles has always depended, in large part, on the ranges at which ships could detect each other, on weapon ranges, and on the ability of ships to absorb hits. The introduction of ironclad ships over a hundred years ago was followed by the development of armour-piercing ammunition for naval guns. The range of these guns was slowly extended to the range

of the visual horizon, about 20 miles, and then slightly beyond. Accuracy also improved. Aircraft first operated from ships to extend the range at which targets could be detected and identified -- beyond ship horizons -- so that naval gunfire could be concentrated against them. Later, the aircraft began to carry bombs and torpedoes. World War II proved surface ships to be vulnerable to attacks by aircraft; the carrier became the preeminent ship of the line. As with naval guns earlier, the range of aircraft operating from ships was increased. Their speed was improved by the introduction of jet engines in the late 1940s. This was followed by increases in the speed and altitude of aircraft designed to fight other aircraft and in the range and bombload of aircraft designed to strike surface targets, on sea and land.

Detection of targets had been largely visual, but World War II brought radar and sonar to ships, and radar to aircraft. Shipborne radar permitted detection of air targets far beyond the range of naval guns; guided anti-air missiles named 'Tartar,' 'Terrier,' and 'Talos' began to replace guns aboard U.S. Navy ships in the late 1950s, to take advantage of the larger detection range made possible by the radars and the greater accuracy of the missiles. In the late 1970s, 'Harpoon' surface-to-surface missiles began to supplant still more naval guns.

Similarly, high-powered shipborne sonars, such as the SQS-26, which arrived in the 1960s, extended the range at which submerged submarines could be detected. Airborne radar used for antisubmarine work and detections of surface ships at first was later extended to anti-air warfare. Radar allowed interceptors to detect other aircraft beyond visual range; air-to-air missiles of greater range than air-to-air guns soon followed. The heat-seeking (passive infra-red homing) 'Sidewinder' of 2-3 miles range

came first. It had to attack from the rear of the target. The 'Sparrow' missile, permitting attack at 10-15 miles and from any heading because of its radar guidance, followed. Only one 'Sparrow' at a time could be controlled by the F-4 interceptor that had fired it. This limitation was recently overcome by introduction of the F-14 interceptor with 60-mile 'Phoenix' missiles; the F-14 can control six at a time.

Force coordination

The arrival of long-range weapons and sensors in quantity in the U.S. fleet has made coordination of forces especially useful. When several ships and aircraft operate together in a task group, as is customary, the capabilities of their sensors and weapons overlap, often beyond the range at which any one of the ships or aircraft could, alone, destroy the target. Coordination of the sensors or weapons on several ships or aircraft is needed to take advantage of the overlap.

Coordination occurs by visual signals, as well as by radio, which was added in the past 70 years, and by high-speed computers, which arrived in the past 20. All U.S. Navy aircraft carriers, most cruisers, and several other surface ships have the Navy Tactical Data System (NTDS), providing computer-assisted target tracking and quick radio exchange of tracking data among ships.

The carrier-based E-2 aircraft, whose capabilities include a look-down radar for detecting and tracking targets that ships may not be able to detect, has a comparable Air Tactical Data System. It permits linking with the ships' NTDS, so that tracking data can be shared among all units. The most recent version of the land-based P-3 antisubmarine aircraft has the computer and communications capability to participate in this linking; carrier-based interceptors do, too. Though ships without NTDS have significant

radio capacity and other means of control, the margin provided by NTDS often causes an NTDS ship to be chosen by a task group commander as his flagship.

The coordination capability of the U.S. Navy was displayed in 1972. Five aircraft carriers with attendant escorts, air control ships and replenishment ships operated together in the Gulf of Tonkin. At times, this force operated more than a hundred aircraft in combat, tracking both them and potentially hostile aircraft, providing airborne refueling aircraft as needed, recovering pilots whose planes had been shot down over North Vietnam, tracking surface targets, and refueling and rearming ships while in motion.

Ship size

Because ships now carry computers, large radars, large sonars, and missile systems, they are larger than ever before. The equipment itself, the larger crews that must operate it, and greater comfort for those crews all have contributed to this growth. So have greater magazine and fuel capacities, to lengthen the time between replenishments. Most classes of U.S. Navy ships have at least doubled in size since World War II. The newest aircraft carriers displace 93,000 tons when fully loaded; in World War II, the largest ships were 59,000 ton battleships.

CONSTRAINTS

The U.S. Navy faces obstacles in achieving the objectives the United States has for it and in taking advantage of the technological opportunities it creates and that are presented to it. Opposing navies have already been mentioned. Another obstacle is limited funds.

Budget

Although almost \$40,000 million will be spent in 1978 on the U.S. Navy and Marine Corps (whose budgets are closely coordinated), many programs compete for these funds. In antiair warfare, for example, shipborne surface-to-air missiles compete with interceptors. Should new missiles be funded or existing interceptors be provided with more spare parts? Once such issues are resolved within the Navy Department, a proposed budget is sent forward. That budget competes with others for the limited funds available to the Defence Department. And so forth. The net result is that most programs do not get the funds their Navy sponsors ask for. The reductions take on meaning when the capabilities of potential opponents are considered.

Opponents

The principal potential opponent of the U.S. Navy is the Soviet Navy. It has more ships than the U.S. Navy, though less tonnage. The quality and sophistication of its operations have increased substantially in the past 20 years. The posture of the Soviet Navy had been principally defensive, emphasizing protection of the Soviet homeland by denying portions of the sea to Western navies. In the past decade or so, deployments far from the Soviet Union have become common.

Today the Soviet Navy has about as many ships in the Mediterranean as the U.S. Navy. Occasionally, they deploy a ship -- such as the 'Moskva,' 'Leningrad,' or 'Kiev' -- that is capable of operating aircraft. More important, several of the ships and submarines on the scene carry antiship cruise missiles. Both the number of missile-equipped ships and the total number can be doubled within a month, as was done in October 1973. Although the Soviet ships tend to stay in the eastern Mediterranean and the U.S.

ships in the western Mediterranean in routine peacetime operations, ships of both nations roam throughout the sea. During crises, they tend to intermingle. At such close quarters, the potency of the Soviet shipboard missiles, combined with the proximity to Soviet bases for missile-equipped aircraft, make a massed attack particularly threatening. If U.S. forces were to take the initiative in such circumstances, they would pose a serious threat to the Soviet Navy. The advantage to the force that strikes first inhibits the action both governments take with their fleets.

Unforeseen constraints

Some obstacles to orderly development of a navy cannot be foreseen. In the case of the U.S. Navy, the Vietnam War was such an interruption. Its emphasis on projection ashore demanded funds for carriers and their aircraft, for amphibious ships, for ships with naval guns, and for the unexpectedly large amounts of ammunition used. At the same time, the Navy's share of the Defence budget shrank because the combat loss rates of Army and Air Force equipment ashore had been unforeseen. The net result for Navy forces designed for sea control was accelerated obsolescence and relative inattention to replacement forces. That is still being corrected, as will be seen later.

TODAY'S U.S. NAVY

Having traced the forces that have shaped the Navy, the discussion now turns to what today's Navy is like -- its composition, disposition, organisation, leadership, manning, and capabilities.

COMPOSITION

Chart 1 shows the current composition of the U.S. Navy (note to editor -- Chart 1 shows the composition in mid-1978). (The designation of cruisers,

CHART 1

COMPOSITION OF THE U.S. NAVY, 1978

Active Ships

Aircraft carriers		13
Conventionally-powered	10	
Nuclear-powered	3	
Cruisers (7,800-17,500 tons)		28
Conventionally-powered	20	
Nuclear-powered	8	
Destroyers (4,000-7,300 tons)		70
Frigates (2,600-3,500 tons)		65
Attack submarines		78
Diesel-electric	7	
Nuclear-powered	71	
Amphibious transports		63
Mine warfare ships		3
Patrol boats		3
Underway replenishment ships		39
Auxiliaries		55
Ballistic missile submarines		41
With Polaris missiles	10	
With Poseidon missiles	31	
Total		458

Reserve Ships

Destroyers		28
Amphibious transports		3
Mine warfare ships		22
Auxiliaries		4
Total		57

destroyers, and frigates has changed recently.) Groups of U.S. Navy surface ships tend to be built around a carrier, amphibious ships or replenishment ships. Each such task group will need surface combatants with it in wartime. The total number of cruisers, destroyers and frigates is about 13 times as large as the number of carriers. Twenty or thirty surface combatants will provide defense as the lightly armed amphibious ships transit to the landing area and shore bombardment once there. A like number would escort the 8-10 groups of underway replenishment ships that would be needed to keep fighting ships on station. Yet others would be needed for convoy duty. All these wartime demands, when combined with the other demands likely in the Indian Ocean (where a MidEast Force of 3 Navy ships is maintained continuously in peacetime), in South American waters and elsewhere, would quickly tap the 163 surface combatants.

Besides the 458 ships assigned to the Navy, there are 4,663 aircraft assigned to the Navy and Marine Corps. Approximately 1,000 are aboard large aircraft carriers. Another few hundred, mostly helicopters, are aboard smaller ships, including amphibious assault ships. Land-based aircraft include 24 squadrons of 9 P-3s each.

Some attack submarines would be assigned to antisubmarine work in wartime, including 1-3 submarines to each of the task groups built around a carrier. These groups also would each include 4-7 surface combatants and be supported by P-3s and their own carrier-based aircraft.

DISPOSITION

Each ship and aircraft in the U.S. Navy is assigned to one of four fleets for operational control. Chart 2 shows the four fleets and their customary operating areas. The fleet to which any one ship or aircraft is

CHART 2

FLEETS OF THE U.S. NAVY

<u>Fleet</u>	<u>Operating Area</u>	<u>Home Port of Flagship</u>
Second	Atlantic Ocean	Norfolk, Virginia
Third	Eastern Pacific Ocean	Pearl Harbor, Hawaii (headquarters ashore)
Sixth	Mediterranean Sea	Gaeta, Italy
Seventh	Western Pacific Ocean	Yokosuka, Japan

assigned changes with time. Deployments overseas mean assignment to the Sixth or Seventh Fleet for several months. The approximate peacetime composition of those fleets is in Chart 3. After a deployment is concluded, the ship or aircraft squadron returns to the Second or Third Fleet, respectively. Then, the ship or squadron begins a new training cycle.

ORGANISATION

The overall management of this rotation is conducted by theatre commanders-in-chief. The organisation for operational control is shown in Chart 4, where the locations of the headquarters of the commanders-in-chief are also shown. The U.S. Navy organisation for management of force rotation is not symmetrical. In the Pacific Fleet, forces in the Third Fleet preparing for deployment are still controlled by the same commander-in-chief when assigned to the Seventh Fleet. When forces are deployed to Sixth Fleet from Second Fleet, their operations are controlled by separate commanders-in-chief. This asymmetry stems from the unified command structure for worldwide U.S. forces. That structure stresses three theatres, the Pacific, Atlantic, and Europe. Unlike U.S. Navy and U.S. Marine Corps forces, which are integrated within fleets as shown in Chart 3, the forces of the U.S. Army, the U.S. Navy, and the U.S. Air Force report to their unified theatre commanders-in-chief through commanders-in-chief of each service such as those shown in Chart 4. In Europe, the unified U.S. commander-in-chief has an Army component commander-in-chief, an Air Force component commander-in-chief, and a Navy component commander-in-chief (the C-in-C, U.S. Naval Forces, Europe).

The Commanders-in-Chief of the Pacific and Atlantic Fleets each have several subordinate commanders charged with administrative control of

CHART 3

PEACETIME COMPOSITION OF DEPLOYED U.S. FLEETS, 1978

SIXTH Fleet

Task Force 60
2 carriers
14 surface combatants

Task Force 61
5 amphibious ships

Task Force 62
1 reinforced USMC battalion

Task Force 63
6-7 underway replenishment ships
4 auxiliaries

Task Force 67
1½ maritime patrol squadrons
1 reconnaissance squadron

Task Force 69
4-5 attack submarines

SEVENTH Fleet

Task Force 72
3½ maritime patrol squadrons
1 reconnaissance squadron

Task Force 73
7-9 underway replenishment ships
7-8 auxiliaries

Task Force 74
6 attack submarines

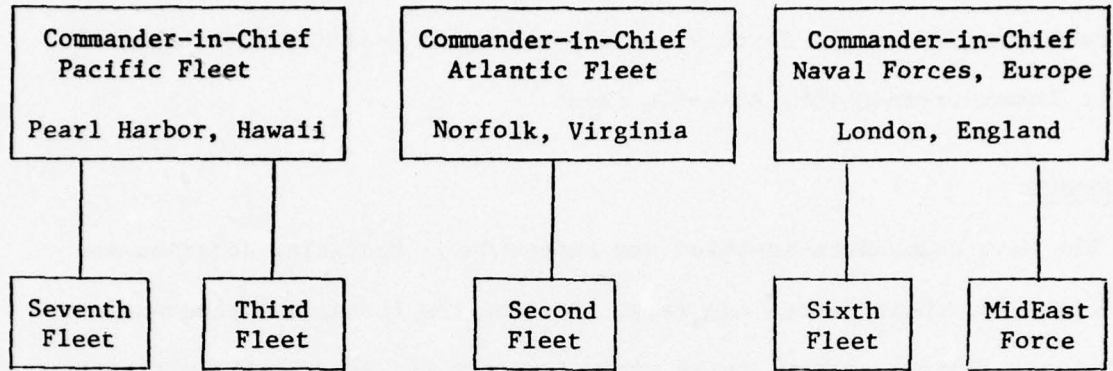
Task Force 76
8 amphibious ships

Task Force 77
2 carriers
19 surface combatants

Task Force 79
2 reinforced USMC battalions

CHART 4

FLEET ORGANISATION, U.S. NAVY, 1978



various types of forces. Each of these subordinate commanders tends to be concerned with one type of ship -- such as submarines -- and is responsible for development of tactics and doctrine and for provision of manpower, spare parts, safety standards, etc. to the ships. The ships and aircraft assigned to the Sixth Fleet are under the administrative control of the Commander-in-Chief, Atlantic Fleet.

LEADERSHIP

The Navy commanders-in-chief are autonomous. Operating doctrine and procedures for their forces can vary. Because the forces and personnel under their control rotate, these variations are not great. The ultimate unifying influence in the U.S. Navy is provided by the Chief of Naval Operations (CNO). Despite his title, the CNO commands no forces. He does, however, select the forces that will make up the Navy. He does so by considering the operational problems faced by fleet commanders, the postulated threat, guidance on U.S. strategy from the Secretary of Defence, emerging technologies, available manpower, and budget constraints. In selecting the forces that will make up the Navy, the CNO's effect on it comes 5 to 35 years after his decisions. The CNO is also responsible for more immediate concerns -- the provision of manpower and other resources to the fleet commanders-in-chief and for overall Navy policies. The current CNO, Admiral J. Holloway III, is completing his four-year term (note to editor -- he will do so in summer 1978). The CNO also serves as the Navy member of the Joint Chiefs of Staff, who direct worldwide U.S. forces through the unified commanders-in-chief.

MANNING

The U.S. Navy has about 540,000 men and women on active duty; all are volunteers. About 62,000 are officers, and 4,350 are cadets. Before 1973,

when the United States ended conscription, the Navy was composed almost entirely of volunteers, but some of them might otherwise have been drafted into the Army. The end of conscription has been accompanied by substantial increases in pay, now almost \$5,000, for recruits. In the post-conscription period, Navy manpower managers have stressed proper selection of recruits. Such indicators as graduation from secondary school are scrutinised to increase the chances of successful completion of enlistment and of the Navy's many schools that prepare recruits to operate and maintain increasingly sophisticated equipment.

CAPABILITIES

The operational strengths and weaknesses of the U.S. Navy are best viewed by recalling that it is structured to assert control over the oceans and, when necessary, over adjacent territory. Its principal potential opponent, the Soviet Navy, is, on the other hand, structured to deny that control.

Antisubmarine

In antisubmarine warfare, the U.S. Navy enjoys significant technological advantages that are buttressed by geographical advantages. U.S. antisubmarine sensors permit detections that allow attacks to be made at long range. Off-ship sensors and information-processing capabilities permit tracking of submarines, thus increasing the likelihood that attacks will be successful. Widespread and well-placed U.S. air bases for operation of P-3 antisubmarine planes give them an advantage. Because the large Soviet submarine force must move out of home waters to be useful in wartime and since the exit from those waters to the North Atlantic, in particular, is narrow, U.S. defenses can be concentrated. Attack submarines could be

stationed in barriers to take advantage of this. Despite these U.S. advantages, the size of the Soviet force and the slow pace of any anti-submarine campaign is apt to present vexing problems. If the Soviets deploy their submarines significantly before combat, high initial U.S. losses are possible.

Missile defence

The Soviets learned well the lesson taught by Japanese kamikaze attacks on American and British surface ships toward the end of World War II. Cruise missiles (low-flying homing weapons) have been fitted on some Soviet submarines and are now widely deployed on Soviet cruisers and destroyers. These pilotless missiles are directed against surface ships; they can be redirected in flight. They have proved their potency, as in the 'Eilath' sinking and in the 1971 Indo-Pakistani War. As described earlier, the intermingling of forces that sometimes occurs in crises tends to offer great advantage to the side that shoots first if it is willing to incur the risks of a war. The potential harm to U.S. surface ships from Soviet cruise missiles fired from intermingled positions is made more severe by the added possibility of prompt follow-up attacks with torpedoes fired by submarines. This combination, if effectively delivered, could disable many U.S. ships.

Projection

With reasonable prospects for eventual, if not immediate, establishment of sea control, U.S. capabilities to project naval power ashore can be addressed. It is here that most of the combat experience gained in Vietnam resides. Each U.S. aircraft carrier is a potent force. Its 24 A-7s, 13 A-6s, 24 F-4s or F-14s, and 20-25 other aircraft can mount a devastating strike of about 40 aircraft on several hours' notice. In a

strike of this kind, half the aircraft may carry bombs or air-to-surface missiles. The loads possible on today's carrier-based aircraft mean that such a strike could deliver 75 tons of bombs on targets as far as 300-400 miles from the carrier. When, instead of major strikes, more routine production of sorties is required, as often happened in Vietnam, a large carrier is capable of 110-120 sorties a day when operating aircraft for 12 hours and then resting for 12. This performance is possible at night as well as in daylight, and is readily sustained for a month or more. Such output can be interrupted, however. The example of the North Vietnamese Air Force shows how. This force of no more than 100 fighter aircraft prevented carriers in the Gulf of Tonkin and larger numbers of U.S. Air Force bases ashore from achieving maximum output. The usual way to measure fighter performance is the exchange ratio: in the case of the Vietnam War, MIGs lost versus U.S. fighters lost. The MIGs initially held their own at that, but were later overwhelmed. However, detections of MIGs near strike groups over North Vietnam sometimes caused heavily-laden attack aircraft to jettison their bombloads before reaching the target so as to decrease vulnerability to the MIGs. This, too, is a useful measure of the effect of the North Vietnamese Air Force. The most subtle measure captures the most pervasive effect the MIGs had. Ten to fifteen percent of the sorties flown from carriers in the Gulf of Tonkin were launched with air-to-air missiles instead of air-to-ground bombs in case MIGs should appear; they almost never did. Thousands of sorties that might have carried bombs did not.

Intervention

Despite the possibilities for interruption of carrier strikes or diversion of some of their aircraft to other missions, a carrier near a

friendly country's shoreline poses a considerable problem for a potential invader. Similarly, the amphibious assault capabilities of U.S. Marines embarked in Navy ships permit rapid landing of an effective force. Most amphibious transports can move at 20 knots and thereby create uncertainty regarding the choice of a landing site. The large replenishment force of the U.S. Navy can keep up with the amphibious force. It can also replenish the faster carrier task forces while they are underway, day or night.

Weaknesses

Despite many strengths, the U.S. Navy is noticeably weak in some areas. The problems of dealing with massed missile attacks have already been described. Task groups without carriers are limited in their ability to detect, identify, and track ships beyond visual range. As a result, effective use of the surface-to-surface 'Harpoon' missiles that are being installed in large numbers of surface combatants will be limited to visual or radar ranges unless friendly aircraft can help. The threat of large-scale use of mines by the Soviet Navy is not matched by large-scale mine countermeasure forces or exercises in the U.S. Navy -- the present active inventory includes only three mine warfare ships. The substantial ability of the U.S. Navy to manage massed forces at sea has depended on high-frequency (HF) radio communications. These signals, readily detectable at ranges beyond the horizon and susceptible to interference by jamming, are another weakness of the U.S. fleet.

TOMORROW'S U.S. NAVY

The composition of any navy changes only slowly because ships normally have useful lifetimes of 20 to 40 years. (Aircraft last about half as long.) In 1963, the U.S. Navy was composed of 916 ships, twice as many

as it has now. Many of these 916 were ships built toward the end of World War II and were retired by the mid-1970s; many others were constructed during the 1950s, as Korea and the Cold War pushed up the size of the Navy. In 1963, the U.S. Navy had 24 aircraft carriers; nine were smaller ones configured for antisubmarine work. There were 280 surface combatants, mainly World War II destroyers. The conversion to a nuclear-powered submarine force had just gotten underway. There were 12 nuclear-powered ballistic missile submarines and 16 such attack submarines. There are now 41 and 71, respectively. Seventy-nine of the 86 diesel-powered submarines that were in the 1963 inventory have now been retired. Most of the reduction in inventory since 1963 has come in mine warfare ships (from 87 ships to 3), underway replenishment ships (from 75 to 39), and auxiliaries (from 189 to 55).

Continued reduction in the number of U.S. Navy ships is not expected. In fact, moderate growth may occur in the next few years. Since the U.S. Congress authorizes shipbuilding only one year at a time, the fleet's future composition cannot be specified. However, the CNO and Secretary of Defence have based planning for a 1982 fleet on more than 500 ships. A few ships of each type (except carriers) might be added, but the most substantial growth would be in the numbers of frigates and attack submarines.

NEW SHIPS AND AIRCRAFT

One of the new ship types that will begin entering the inventory by 1982 is 'Trident.' These large (18,700-ton) submarines will carry 24 ballistic missiles each. The missiles will have a 4,000-mile range, permitting operation of the submarines over a much wider area than the 'Polaris' and 'Poseidon' submarines they will slowly replace. The increase in operating

area, the increased number of missiles per submarine, the quieter operation, and the expected reduction in frequency of overhauls should all make the 'Trident' force a more invulnerable and more potent ballistic missile force.

Before proceeding with a description of other weapons systems that will soon be entering the U.S. fleet, it is worth noting that eventual performance in the fleet seldom matches the claims made for a system before it is deployed. Those claims are generally made with implicit assumptions of near-perfect maintenance, a cooperative atmosphere or ocean, and perfect information available to commanders. Though such assumptions are unjustified, they color nearly all descriptions of future weapon systems.

Antisubmarine

Antisubmarine helicopters called 'Lamps' (Light Airborne Multi-Purpose System) are already aboard approximately 75 surface combatants. They are there to permit weapon delivery more quickly after detection and at longer range than possible while waiting for the surface combatant to move toward the contact. A replacement, 'LAMPS Mark III,' will begin entering the fleet in the early 1980s. Its longer range, sonobuoy capacity, and information-processing capability will permit it to take advantage of the longer range detections expected from high-powered sonars and towed passive sonar arrays on surface combatants. These arrays consist of hydrophones imbedded in a cable several hundred feet in length that is towed behind a surface combatant or submarine. Engine or other characteristic noise emitted by an opposing submarine can be heard through the hydrophones. The wide separation between hydrophones permits accurate determination of the opposing submarine's bearing, and the separation of the array from the noise made

by the towing ship as it moves through the water permits clear interpretation of the submarine's emitted noise. These capabilities, combined with improved data processing aboard the ship, should make possible more effective attacks with 'LAMPS III' or other antisubmarine weapons aboard surface combatants.

Another antisubmarine weapon, but one that does not require a ship's presence to be effective, is entering the inventory now. It is 'Captor', for enCAPsulated TORpedo. After drop by aircraft or ship, it moors itself to the bottom, and waits. Mine-like, it senses the passage of a submarine and then releases its torpedo at the submarine. The potential cost savings over maintaining barriers continually with ships or planes are obvious.

It has been 20 years since nuclear-powered attack submarines began joining the U.S. fleet in quantity. These boats were of 3,000-4,000 tons submerged displacement. Their replacements, the SSN-688 class of 6,900 tons submerged displacement, have begun to join the fleet and will continue to do so through the 1980s. The 688-class boats can exceed 30 knots underwater, are much quieter than their predecessors, and are fitted with the long-range BQQ-5 hull-mounted sonar. By 1990, there will be almost 40 of them in the U.S. fleet.

Antiair

Antiair warfare capabilities in the U.S. Navy should also be upgraded by the arrival of new systems. Prominent among these is the 'Aegis' surface-to-air missile system. It will depend on the SPY-1 phased array radar, permitting automatic detection and tracking, and on the 13-mile 'Standard' missile. Beginning in the early 1980s, 'Aegis' is to be deployed on variants of the 'Spruance' (DD-963) hulls propelled by gas turbines that were introduced in the mid-1970s. (These 'Spruance'

destroyers were the first U.S. ships constructed in large blocs by modular assembly techniques in a single shipyard. The Iranian Navy has ordered four of them.) Antiair capabilities are also to be upgraded by installation of the 'Phalanx' gun system, a 6-barreled 20 mm rapid-fire system designed to shoot down cruise missiles that pass through such outer defenses as 'Aegis.'

The sophisticated swing-wing F-14s began replacing F-4 interceptors in the mid-1970s. The F-14s are very expensive, and a less costly complement to them has therefore been sought for carrier service. The F-18 will begin appearing in the Navy and Marine Corps in the early 1980s. The savings it brings will be increased by using the same airframe for an attack airplane, the A-18. It will replace the A-7s that are now aboard the carriers. The effectiveness of carrier-based interceptors will be increased by deployment of an improved version of the first air-to-air missile, 'Sidewinder.' Because of greatly increased sensitivity to the heat emitted by opposing aircraft, the new 'Sidewinder' will not be limited to attacks from the rear of its target aircraft, but can be used from any bearing.

Antisurface

In the mid-1980s, the longer range 'Tomahawk' will augment the 60 mile 'Harpoons' that will, by then, be on many ships. (These surface-to-surface missiles are intended to restore offensive punch to surface ships after a long eclipse. The eclipse began when surface combatants were subordinated to defense of aircraft carriers and some of their guns were therefore removed to make way for surface-to-air missile systems.) When 'Lamps' is aboard the firing ship, identification of targets at ranges beyond the horizon is possible. 'LAMPS III' will extend that range further. So should satellite

systems for the detection and identification of surface targets. In fact, systems that stress management and processing of information rather than direct destruction of targets will claim an increasing share of U.S. Navy resources as it moves into the 21st century. Another current example is a set of communications satellites that use ultrahigh-frequency (UHF) radio signals. Unlike the widely used high-frequency (HF) signals that bounce off the ionosphere, UHF radio cannot be detected beyond the 20-mile line-of-sight horizon of the transmitting ship. Since the satellite is above the ship, it can receive the signal and relay it to distant points without betraying the position of the transmitting ship.

Amphibious

The U.S. Navy's amphibious force is being upgraded by delivery of five large ships called LHAs. As with the 'Spruance' destroyers, they were constructed by modular shipbuilding techniques. They offer large flight decks for helicopter lift of troops and cargo to the beach, well decks for ship-to-shore landing craft carrying tanks and other heavy equipment, and enough internal capacity to carry a reinforced battalion of troops and equipment. Until now, USMC battalions deployed at sea were spread among four or five ships.

UNANSWERED QUESTIONS

Some characteristics of the future U.S. Navy cannot be seen clearly.

The major question marks include:

- o Which should be stressed more in structuring the Navy, NATO or the Third World?
- o What is the role and future distribution of aircraft at sea?
- o How vulnerable are surface ships?

- o Can distant targets be located and identified accurately enough to use Navy surface-to-surface missiles at their maximum ranges?
- o How many surface ships should have nuclear propulsion?
- o How should attacks that employ nuclear weapons be countered?

Should the Navy be structured for NATO wars or for intervention in the Third World? Put another way, should sea control or projection ashore be stressed more? These questions underlie much of the current debate, both inside and outside the U.S. Defence Department, over the future of the U.S. Navy. The choice will affect the entire Navy, but its effect is seen most clearly in carrier and amphibious forces. If the U.S. Navy and Marine Corps are to participate in a NATO conflict with the Warsaw Pact, enough carriers must be built to make sure that enough will be near Europe when their air sorties are needed. (They are expected to be necessary in the Mediterranean, may be necessary in northern Europe, and could even be required in central Europe.) Similarly, a plan to employ USMC ground forces in central Europe would require them to have more tanks and other heavy equipment than they now have. If they were to move to Europe in amphibious ships, those ships would need more capacity, and other ships of the U.S. Navy would have to see to it that the amphibious ships could get to their objective area despite opposition. If, on the other hand, land bases can be depended upon to provide all the needed air sorties in Europe and NATO land armies can hold the line without help from amphibious troops, carriers and Marines can concentrate on preparations for Third World operations. This might mean fewer carriers would be needed in the U.S. inventory and that their aircraft might not face opponents as sophisticated or as concentrated as those in Europe. For the Marines, it would probably

mean lighter forces designed to intervene quickly and withdraw quickly. In either case, significant forces to keep the supply line to Europe open would be necessary in a long war.

Whether the Navy is oriented toward Europe or toward the Third World, the future of sea-based aircraft will be the subject of major debate over the next few years. There is general agreement that aircraft based on ships will be a continuing feature of the U.S. Navy, but how many aircraft, their design, and that of the ships that will operate them is not clear. As noted earlier, the number of carriers has been going down as the size of their aircraft has been going up. Meanwhile, the Soviets have deployed cruise missiles in quantities that might be able to put some carriers out of action early in a war. If the Soviets can attack several carriers successfully, a significant portion of the U.S. Navy's offensive punch would be blunted. Admiral Holloway sees a possible answer in aircraft that can take off and land vertically or over a runway a few hundred feet in length. This technology, known as V/STOL, may produce aircraft that can perform in flight as well as conventional aircraft. If such aircraft can be developed, smaller, more numerous ships could operate the aircraft. What size ships would be appropriate to operate them? How many? How many aircraft per ship? To begin to answer these questions, a squadron of V/STOL 'Harriers' was deployed to the Sixth Fleet along with conventional aircraft aboard the carrier 'F.D. Roosevelt' at the end of 1976. The 'Harriers' provided some answers and also reemphasized some questions. How reliable must aircraft be that are dispatched to smaller ships if they are to continue operating from them -- rather than filling their limited deck space with aircraft awaiting parts? How should aircraft maintenance be managed? If many ships with aircraft operate far apart, will they need

additional communications to coordinate all the aircraft? Which is more easily defeated -- a force of many smaller ships or a force of a few large ships?

How vulnerable are surface ships in an era of widespread cruise missiles? Proponents of submarines and of land-based aircraft say the era of navies built around surface ships is passing. Surface ships, however, cannot be matched for a combination of easy communications and on-station times running to weeks or months. Because of this, efforts to fashion effective defenses against antiship cruise missiles continue. These include direct defenses, such as 'Aegis,' 'Phalanx,' and F-14s, and indirect ones, such as dispersion of aircraft and shifting radio communications to UHF.

Another element of the decentralization of U.S. Navy offensive power is the widespread deployment of 'Harpoon' aboard surface combatants. As described earlier, taking advantage of the range of 'Harpoon' and, later, the 300-mile range of 'Tomahawk' requires a capability to detect, identify, hit and assess the damage to targets well beyond the horizon. This means integrating and passing information among ships and aircraft in such timely and reliable fashion that doing it presents major problems to the U.S. Navy -- a navy that already has made important advances in the management of information.

How many surface ships should be propelled by nuclear power? The advantages can be substantial. For an aircraft carrier, though, the investment in such propulsion costs up to twice as much as conventional propulsion. Over the ship's lifetime, though, the costs for aircraft are dominant and they do not depend on the means of propulsion. Freedom from the constraints of ship refueling, especially under sustained high-speed operating conditions, has to be balanced against the cost differences.

Building programs in the remainder of the century can produce somewhat different numbers of ships, depending on which propulsion plants are selected for them.

Attacks conducted with nuclear weapons present acute problems in defending a fleet. Soviet naval writers tend not to distinguish between use of nuclear and conventional weapons as U.S. writers do. Soviet writers also stress 'decisive strikes' and intimate that naval conflict will be brief. If strikes with nuclear weapons are to be the means to achieve these goals, defeating them may require more than defeating conventional strikes. Because nuclear weapons are more powerful and therefore need not be as accurate, stopping more of them is necessary to protect a fleet. Depending on the size of the warheads on the attacking weapons, it may be necessary to stop all of them -- a much more demanding task than stopping most. If systems such as 'Aegis' and 'Phalanx' cannot achieve it, then dispersal of defending ships may be necessary to prevent more than one from being disabled by a nuclear detonation. As the separation distance between ships increases, the communication that permits coordination of ships and aircraft becomes more difficult to maintain. If attacks with nuclear weapons are this disruptive to a fleet, then their use offers more advantage to the side whose mission is sea denial than to the assertive side.

The world's naval officers and other students of naval warfare have not yet reached agreement on which factors are most important in winning war at sea. Although it is possible to get general agreement on which factors -- the ranges of weapons, quality of fighting personnel, staying power of ships, ability to mass and coordinate forces, and the many other considerations discussed in this chapter -- are important, it is much more difficult to rank

the factors in order of importance. It is presently impossible to relate changes in one factor to changes in another in any systematic way. Because of that, debate over how to build and operate more effective navies and how to predict which one of them will prevail in combat continues. Such debate is ordinarily illuminated by combat experience, but there has been no major conflict between navies for more than 30 years. Navies are already quite different from what they were then; they will continue to change. The debate will go on.

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