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The U.S. Aircraft Carrier: Evolving Foreign Policy and Conventional Warfare Roles

A Case Study by Bernard Kritzer

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D E F I N I T I O N

THE U.S. AIRCRAFT CARRIER: EVOLVING FOREIGN POLICY AND
CONVENTIONAL WARFARE ROLES

S U M M A R Y

The U.S. Navy considers the large aircraft carrier as the appropriate ship to carry out a variety of diplomatic and military roles in furtherance of foreign policy objectives. These roles fall broadly under the categories of sea control and power projection.

Peacetime usage of the aircraft carrier focusses on the flexible deployment of naval forces that project U.S. power and influence abroad. The carrier's flexibility and mobility make it a self-contained force that can be quickly deployed and signal policy intentions without incurring the political and conflict escalation costs associated with the introduction of troops. Carrier deployments taking the form of military exercises and port calls have been used since 1945 to reassure and strengthen allies against internal and external threats.

The ability of the aircraft carrier to project power during a conventional war with the Soviet Union would be limited by the improvement in Soviet air defenses and the expansion of their naval forces. Equally significant, however, is the fact that the U.S. Navy cannot mass large numbers of carriers together such as in World War II (e.g., the U.S. Navy had eight carriers at Okinawa) and directly attack into the Soviet heartland. Given this constraint, the optimal conventional war utilization of carriers depends upon harnessing their flexibility and mobility and concentrating their power against limited targets. To the extent that the carrier works in conjunction with the Air Force or Allied offensive power, aircraft carrier operations can have a strong impact.

During conventional war with the Soviets, the application of carrier air power can be utilized in a number of ways and across a number of theatres. These activities include (1) bottling up Soviet offensive naval units in home waters, (2) facilitating passage of U.S. and Allied troops and equipment to support land engagements in Europe and the Far East, (3) eliminating Soviet naval forces, (4) supporting Allied amphibious operations and, (5) providing a measure of air defense against Soviet attack on Allied economic and logistical installations (e.g., the Japanese industrial base). In point of fact, the carrier in particular and naval strategy in general indirectly support the overall war through the movement of troops and equipment to reinforce the land war and the denial of access to the sea to Soviet naval units.

D I S C O N T I N U A T I O N

Next to the nuclear attack submarine, the Soviets fear the U.S. aircraft carrier. They remain concerned over its nuclear potential as well as its ability to attack the nuclear ballistic missile submarines. The Soviets have concentrated the bulk of their surface fleet, naval air, and submarines in home waters to protect against U.S. submarine and aircraft carrier attacks. The Soviets are also building several large carriers but it will take them a long time to develop a high level of multimission carrier operations.

The carrier constitutes an important element of U.S. Maritime Strategy of Deterrence, Forward Defense and Cooperation with the Allies. Its procurement and deployment are done with respect to countering Soviet competition during peacetime and their military threat during limited conventional war. While the carrier remains an appropriate ship for these elements of the maritime strategy, the carrier may be less useful with respect to growing world economic interdependence and the West's need for unconstrained access to the raw materials, fuels and markets in the developing nations. The use of carriers with respect to addressing Third World threats to world trade may amount to the proverbial swatting the fly with a hammer. Moreover, carriers are valuable and it may be inappropriate to expose them to terrorist threats or cruise missiles in the hands of irresponsible governments. Here, the answer may be to develop a small number of air capable surface ships that can handle Third World problems but may be inappropriate for the U.S./Soviet rivalry.

The large carrier appears less vulnerable and more survivable than other surface ships with respect to air attacks. The degree of vulnerability does increase in the event of massive saturation air attacks. However, the carrier remains vulnerable to Soviet attack submarines. This constant threat requires additional anti-submarine detection capabilities both on the carrier and the Aegis-based escorts in the battlegroups, and probably the inclusion of attack ASW submarines to support the carrier battlegroup.

The Navy's decision to develop fifteen carrier battlegroups stemmed in large part from its estimate of the force structure necessary to address the Soviet threat. The choice of the large carrier reflects the Navy's best evaluation of the state of naval air and ship technology and design as well as budget considerations, including the Congress.

Existing naval procurement actions can support 15 large carriers through the mid-1990's. The major decisions are due in the mid-1990's when the U.S. faces obsolescence of 8-9 carriers between 2000-2015. Spacing large carrier procurement out to one every 3-4 rather than every 2 years could sustain a large carrier fleet without crowding out other items from the naval construction budget. Meanwhile, the next 8-10 years offers the U.S. Navy the "window of opportunity" to develop new naval air and ship designs that can complement but not replace the large carrier. Vertical take-off technology, tilt rotor helicopters, and new naval hull designs offer opportunities to develop and test new prototypes without crowding items out of the naval procurement budget.

INTRODUCTION

The large attack aircraft carrier (hereafter referred to as CVA for conventional attack carrier or CVN for nuclear carrier) has been one of the most controversial defense issues since World War II. Commencing with the late 1940's debate between the Navy and the Air Force over Supercarriers and B-36 bombers and continuing to the present, the debate goes on regarding the role of naval air power within the overall maritime strategy, the costs and benefits of aircraft carriers and their relative vulnerability.

The current debate centers on whether or not the 15 large CVA/CVN's and their associated battlegroups are the appropriate ships to carry out U.S. Maritime Policy. The Reagan Administration contends that the 15 carrier battlegroups (CVBG's) constitute the absolute minimum number of carriers required to meet more than 40 U.S. treaty commitments and carry out operations in the event of a conventional war with the Soviet Union.¹ Other defense experts, such as Robert Komer and Jeffrey Record, argue that the Administration has overemphasized naval development, particularly the large aircraft carriers, at the expense of Army and Air Force modernization as well as cooperation with the Allies.² They further state that large carriers are expensive and vulnerable, particularly regarding their view of the Navy leadership's forward deployment of these ships in areas such as the Norwegian Sea. On the other hand, Admiral Stansfield Turner and Captain George Thibault advocate a maritime strategy, including 12 rather than 15 large carriers, cautious but flexible deployment of the carriers, and the expansion of air power throughout the fleet.³ They favor the wide dispersal of air power throughout the fleet. They argue for the development and application of V/STOL (Vertical Short Take-Off and Landing) on small sea control carriers and air capable ships.

The current debate covers old ground regarding the role of the carrier in the U.S./Soviet relationship but also raises new issues regarding the future roles and changes in the technology of warfare. The CVN's are expensive (\$3.4 billion in 1985 dollars) and take seven years to build and fit out. The air wings and related support facilities cost another \$3.5 billion per ship. Once commissioned, the CVN's currently under construction at Newport News should be capable of steaming with the fleet for 40-50 years.

The Reagan Administration's expansion of the U.S. carrier fleet from 12 to 15 ships occurs during the largest peacetime build-up of military forces and during a time of growing world economic interdependence. The Navy's budget authorization has grown approximately 40 percent between Fiscal Year (FY) 1980 and (FY) 1985. The construction costs for the large carriers come at the front end of the procurement cycle, while the costs to fit-out the carriers with eighty plus airplanes, electronic gear and onshore support suggest that naval spending will at least remain constant if not grow a bit to pay these costs.

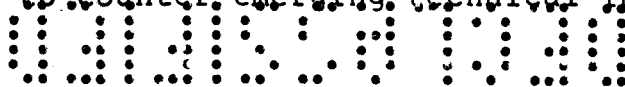
Separate but related are the bills for the surface escorts. While new carrier construction accounts for 9-10 percent of naval construction funds, the escorts represent about fifty percent. The Navy has opted for TICONDEROGA Class Aegis conventional (CG) and nuclear missile (CGN) anti-air cruisers. The conventional and nuclear cruisers cost approximately \$1.1 and \$1.3 billion respectively.⁴ The conventional destroyers selected are of the Aegis anti-air design and cost an estimated \$800 million.⁵

The Maritime strategy rests in large part upon the fact that the U.S., Western Europe and Japan depend upon almost unconstrained access to overseas resources and markets. The U.S. imports approximately one-third of its petroleum while Europe and Japan import approximately 60 and 99 percent respectively. The Navy's most recent Fact File points out U.S. overseas dependence in some degree on approximately 100 percent of the 93 strategic minerals in the U.S. inventory.⁶ Our Allies maintain an even higher degree of import dependence for raw materials.

In addition to navigation, the sea contains petroleum and other vital raw materials. The U.S. did not ratify the most recent Law of the Sea Accord. Absent this ratification, a nation can enjoy a two hundred nautical mile economic exclusion zone in which to utilize the resources on or in the adjoining seas.

Many of the raw materials and fuel supplies are located in developing nations. These countries have endured violent peace and occasionally war since independence. Many of them are coastal states that have acquired mobile patrol boats, jets with missiles and shore missile batteries. Nations that experience violent political change or border wars with their neighbors (e.g., Iran and Iraq) are likely to use these weapons to further their ambitions even if it risks disruption of the commerce of other nations.

Modern technology represents the other major factor. Today, missiles fly further and faster than aircraft. Tomorrow, they offer hope of delivering the payload more accurately and without danger to a pilot. Technical breakthroughs in ship detectability from overhead satellites, over the horizon targeting and the minaturization of electronic components in warheads will force changes in naval aircraft.⁷ We can expect R&D into Stealth applicability to naval aircraft. We will also continue to see smaller numbers of naval aircraft delivering weapons and larger numbers of sorties to identify targets and direct missiles onto those targets. Perhaps, most significantly, breakthroughs in sensors regarding ship location would increase the vulnerability of all surface ships. This in turn will require flexible deployment tactics to counter emerging technical improvements.



The major policy question requiring evaluation is: Do the large carriers and their battlegroups represent the best increment of offensive/defensive punch with respect to power projection during peacetime and the possibility of conventional war with the Soviet Union?

Addressing these issues requires understanding of the role of Navies. In this regard, the analysis will focus on how the U.S. Naval strategy affects foreign policy. Moving from the subject of naval policy in general to the specific mission(s) of aircraft carriers, the analysis will evaluate the following questions:

1. What does the U.S. Government (USG) want air power at sea to do?
2. Can land-based air power perform the job better?
3. What is the relative vulnerability of the aircraft carrier to surface based naval forces, submarines and aircraft?
4. What are the options available re carrier costs and size?
5. What are the prospects for V/STOL technology and applying air power more evenly throughout the fleet?
6. What are the Soviets doing in naval air power and how will they respond to U.S. actions?

THE ROLE OF NAVIES

Naval activity involves the use of the seas. Navies carry out national policies in terms of: (1) the passage of goods and people; (2) the passage of military force for diplomatic or military means, and (3) the exploitation of resources in or on the seas.⁸

The naval strategy of a country depends upon its power, military resources, economic strength and geography. For example, Czarist Russia maintained a coastal defense strategy befitting its resources and geography. On the other hand, Great Britain and later the United States have had a sea command strategy reflecting their need for access to overseas raw materials and markets as well as the need to honor treaty commitments.

The concept of sea control represents the dominating concept in Western naval thinking.⁹ Sea control recognizes the limitations on absolutist control of the sea. The latter limitations have been brought about by (1) the physical impossibility of absolute domination of the sea and, (2) the advent of the airplane, electronic surveillance sensors and the submarine.

Sea control connotes temporary control in limited areas and for limited times. In short, it involves the wartime movement of people and equipment to resupply overseas forces and the movement of ships to project power ashore. The corollary strategy for sea control is sea denial. It involves preventing the enemy for limited times and in limited areas from using the sea for its' purposes.

The U.S. depends on the sea for trade, resource exploitation and honoring over 40 treaty commitments to its Allies. The U.S. interest in a sea control strategy reflects its role as a global navy that can deploy forces on a worldwide basis without reducing forces required for the homeland defense. Currently, the Soviet Union is the only other nation that can be classified as a global navy.

During periods of peace, navies perform policing and diplomatic functions. The former include coastguard activities, resource development and commerce and the maintenance of law and order (e.g., interdicting drug smugglers). The diplomatic role involves power projection as an extension of foreign policy. These activities run a very fine gradient encompassing deployments that reassure allies, discourage adversaries and try to manipulate the behavior of friends and adversaries. The specific activities can take the form of port calls and joint exercises. The manipulation is for the purpose of achieving incremental changes at the bargaining table or within an alliance. Finally, peacetime power projection consists of favorable naval positioning in the event of war.

U.S. MARITIME STRATEGY

Chief of Naval Operations Admiral James D. Watkins' recent posture report to Congress articulates a very clear statement of the Administration's Naval Policy:

"The fundamental task of U.S. military forces is to deter war and preserve peace. Hence, our strategy is based on deterrence, forward defense, and alliance solidarity. The Navy's demonstrated deterrent value is based on forward deployments and flexibility. Our maritime strategy recognizes and depends on close cooperation with allies, and sister services. These principles infuse every aspect of force structure, strategy and operations."¹¹

Based upon Admiral Watkins' testimony, it appears that he believes that the three essential elements of the strategy are deterrence, forward defense and cooperation with the Allies. Deterrence is seeking to deter a threat at a particular point on the spectrum of conflict, but when deterrence fails, we seek to control escalation."¹² Deterrence under this approach requires a balanced 600 ship navy. The conventional underpinnings of the force structure rest upon fifteen carrier battlegroups and four surface action groups. The four reactivated NEW JERSEY class battleships provide the bulk of the offensive firepower for the surface action groups.

Forward defense means U.S. Navy forward deployed forces on a worldwide basis. These forces are deployed to: (1) support commitments to Allies and (2) if deterrence fails to give the U.S. flexibility with respect to fighting a conventional war. This concept emphasizes high degrees of readiness and sustainability. More important, this concept argues that skillful forward deployment is preferred in terms of avoiding the appearance of being indecisive and of the need to signal strength and flexibility to the Soviets.

Alliance solidarity contains two parts. In part it is subsumed under the concept of U.S. forward defense and deployment to assist our allies. Equally significant, it allocates various shared maritime responsibilities to the Allies. For example, the UK would be responsible for its coastal defense and some North Sea operations such as anti-submarine warfare while the French and the Italians would handle certain tasks in the Mediterranean.

The operational tactics underlying maritime strategy are sea control and power projection. The Navy appears to view sea control during wartime in terms of maintaining the sea lines of communications (SLOC's) to resupply our Allies. The corollary sea denial concept is to deny the Soviets entrance into the world oceans to destroy Allied convoys. Power projection during wartime entails destroying enemy maritime forces and supporting Allied land battles by projecting military power ashore through tactical air attacks. The goal of sea control and power projection during wartime is to seek to control war escalation and to secure war termination on favorable terms.

Admiral Watkins does address the Navy's role in guaranteeing commerce. He discusses the violent peace with respect to the developing nations. The Navy's view of global economic interdependence and developing national problems is clearly subordinated, however, to the U.S./Soviet military balance. The Navy must be equipped to fight the decisive battle or series of battles during a conventional war with the Soviet Union. The trade and access to raw materials issues are important but apparently on a lower priority than peaceful U.S./Soviet rivalries and conventional war contingencies. In short, the naval force structure, specifically the carriers, is based upon Soviet capabilities.

The Navy's concept of a forward offensive strategy has raised much controversy. The furor stems from Secretary of the Navy John F. Lehman's alleged preference for a strategy that would feature U.S. carrier battlegroups steaming into the Norwegian Sea early in a conventional conflict with the Soviet Union and fighting a decisive battle for control of the Norwegian Sea.¹³ Some very thoughtful critics argued that the tactics involved in sending a CVBG deep into the Norwegian Sea would subject it to coordinated attack from submarines, naval air and surface forces and almost certain decimation.¹⁴ Critics have charged that the

U.S. would be attacking on terms advantageous to the Soviets and "We will be shooting at his bullets while he is shooting at our ships."¹⁵

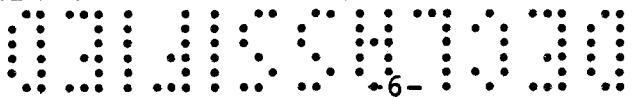


Before evaluating this particular issue, it is useful to understand the context in which the Navy leadership appears to have put forward the idea. Early in 1982, the Armed Forces were looking to securing Congressional approval for the conventional forces modernization program. In point of fact, the Navy was seeking approval for two additional NIMITZ class CVNs (i.e., the GEORGE WASHINGTON and the ABRAHAM LINCOLN). The Navy's advocacy of the forward offensive strategy emphasizing carrier strike power figured in this process.

Were the concept of forward deployment linked solely to carrier procurement, there would be merit in challenging the basic premises on which the carriers were procured and their relative cost/benefits and vulnerabilities. However, the forward deployment appears linked to several interrelated issues. First, the Navy was grappling with articulation of a strategy that went beyond "absorbing the first salvo." The Navy was tired of being in a position of having to accept the Soviet attack and responding to it on what it perceived to be the Soviets' terms. Further, the Navy leadership believed that articulation of some offensive philosophy would cause the Soviets to pause and have to prepare for a variety of U.S. moves. In short, the Navy was seeking flexibility of action and freedom of movement as distinguished from keeping most of the battlefleet in home port with several battlegroups being on deployment.

The need for flexibility of action appears to have given rise to the concept of "horizontal escalation".¹⁶ This concept states that if the Soviets attack the U.S. at point A, that U.S. military planners have the option to retaliate at point B, C., and so on. For the Navy, it meant projecting power through offensive attacks on the Soviet flank in Northern Europe and other areas.

Horizontal escalation remains an interesting intellectual concept, but one must be careful to separate the flexibility the concept confers from some of the problems it can pose. First, there is no guarantee that this tactic would induce the Soviets to alter their behavior. In fact it might persuade them to counter with their own brand of horizontal escalation. If for example, the U.S. responded to a Soviet attack on Iran with an attack on Cuba or the naval base at Cam Ran Bay, the Soviets might respond by attacking West Berlin or Norway. Certainly, the potential loss of the latter two would outweigh any gains from the U.S. action. The Soviet move on those targets would also result in rapid vertical escalation.



The final element in the Navy's concept of a forward offensive deployment was that it represented a message to reassure our European Allies in Norway and Scandinavia. Various policy statements appear to have been in part to reassure them and to seek expanded naval cooperation.

The original Lehmann concept of forward deployment has now evolved to a sequential type of strategy. In the event of conventional war with the Soviet Union, a series of naval engagements would probably occur before a U.S. carrier battlegroup moved north of the Greenland/Iceland/United Kingdom (GIUK) Gap into the Norwegian Sea. For example, the U.S. Navy would put the "cork in the bottle" in terms of keeping Soviet submarines and surface units from slipping into the North Atlantic. Other U.S. naval elements would attempt to apply the same tactics to the Soviet Black Sea and Pacific Fleets. Simultaneously with these developments, U.S. attack submarines would attack and attrite Soviet Northern Fleet units. During this time, some U.S. carriers would remain out of range of Soviet aircraft and constitute reserve strength.¹⁷ Other carriers would assist the first Allied troop and resupply convoys across the Atlantic.

Moving back to the original concept of offensive forward deployment in the Norwegian Sea, we see that it is fraught with many uncertainties. In chess, one attempts to keep one's King and Queen at the base of the board and not expose them to the opponent's pawns. The Soviets would gladly trade their surface forces and some attack submarines to sink several large U.S. carriers. Once the latter were sunk, Soviet access to the Atlantic and Western convoys would be relatively easier. Soviet interdiction of the Allied convoys and destruction of the receiving ports in Western Europe would be a decisive setback to the West; whereas the destruction of the Soviet Navy (except for their ballistic missile nuclear submarines -SSBN's) would not result in the military defeat of the Soviets.

The SSBN question poses another problem. The Soviets view their SSBN's as an invulnerable part of their nuclear deterrent. The bulk of their Northern Fleet, including air power, is dedicated to protecting these submarines. Reasonable men can argue but the Soviets might consider several CVBG's steaming in the Northern Sea, at the war's outset, and attacking naval units, port facilities and particularly the SSBN's as vertical escalation. To the extent they viewed U.S. strategy as aimed at destroying an important part of their nuclear deterrent, they might retaliate with nuclear weapons.

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ANALYSIS OF CARRIERS

1. The Role of Naval Air Power.

Moving from the general overview of U.S. Maritime Strategy, the first major issue is what does the USG want air power at sea to do?¹⁸ The scope of this question encompasses peace and wartime usages of carriers. In peacetime, the USG has deployed carriers in furtherance of foreign policy objectives. Presence as defined by port visits, exercises and long-term deployments shows the flag. In point of fact, presence can signal support for Allies and deterrence to would-be aggressors against U.S. allies. The key aspect is that the flexibility of a large CVN combined with its mobility allows it to be rapidly deployed and self-sustaining. There is no need for ancillary support nor does the U.S. have to insert ground troops at a high political cost. Warships are less disruptive psychologically and less offensive diplomatically. When the USG has signalled its policy, the carrier can be withdrawn rapidly.

Numerous examples abound of where the carrier represented the primary military tool available to the President. They include Jordan, September 1970; Indo-Pakistan, December 1971; Mining of Haiphong Harbor, May 1972; and the Yom Kippur War, October 1973. In their analysis of the use of military power without war, Blechman and Kaplan found that between 1946-1975 the U.S. resorted to military force without war in approximately 215 incidents.¹⁹ The U.S. Navy was involved in 177 or 80 percent. The aircraft carrier was used 106 times over the 30 year period. In point of fact, the carrier deployments were largely in those areas where the U.S. maintained a continuous carrier presence - the Mediterranean and the Pacific.

Any discussion of power projection during wartime would be premature without an appreciation of the "historical" role of the aircraft carrier within the U.S. Navy. During World War II, the fast carrier task forces played a decisive role in the Pacific Theatre. Frequently operating in pairs and sometimes as many as eight (e.g., off Okinawa), the carrier provided decisive victories that stopped and gradually destroyed Japanese naval power, while U.S. submarines destroyed the merchant ships carrying fuel and raw materials to Japan. The point to remember was that the Navy combined the flexibility and mobility of the carrier with large concentrations of offensive firepower (i.e., multicarrier groups) against limited targets (e.g., Truk or Okinawa). The result was generally a strong success.

Separate but related to this phenomenon was the naval war in the Atlantic. With the exception of the British use of carriers in the Western Mediterranean to supply the Island of Malta, aircraft carrier operations were less important. There were no major air-sea battles such as Midway, Santa Cruz and Leyte Gulf. The Germans maintained tactical air power from the European mainland and Italy that could strike out at carriers venturing close to shore. In this regard, the British lost several carriers in the successful effort to resupply Malta. The main element of the Atlantic naval war was the war of attrition between Allied escort vessels and merchant ships versus the dreaded German U-Boats.²⁰

The success of the aircraft carrier during Korean and Vietnam Wars reconfirmed U.S. Navy thinking. However, a number of changes were also occurring over the past twenty-five years. The Soviet Union has made impressive gains in its air defenses against land-based and/or naval air attacks. In addition to stronger air defenses, the Soviet naval air arm emphasizing Backfire and Badger bombers armed with cruise missiles, can range up to one thousand miles out into the Atlantic in search of U.S. aircraft carriers. Third, U.S. carriers no longer have the nuclear weapons delivery role under the Single Integrated Operations Plan (SIOP's). This role now belongs to the Trident SSBN's. Finally, the number of U.S. carriers have shrunk from 27 to 13 with three additional boats under construction. Given operational requirements and repairs, the Navy can only deploy a worldwide total of 5-6 carriers at a given time.

The key points are that we cannot continue to extrapolate from the Pacific experience and apply it to U.S. carrier operations towards the Soviet Union. Soviet defenses and air offensive power have improved. We cannot mass enough carrier offensive power to attack the Soviets directly and decisively affect the outcome of the war in a given battle. If the U.S. were to muster 4-5 carriers to wage a large battle, any President would be risking destruction of those carriers against destruction of the Soviet Navy. If both were destroyed, the advantage would clearly go to the Soviets. The Allies depend upon sea control to support the land war in Europe. Loss of sea control would ultimately spell loss of the landwar in Europe.

Having noted these caveats regarding the offensive power projection of carriers during any conventional war with the Soviets, we come back to how can the carriers contribute to the overall Allied strategy in Western Europe and the Far East? The key is the ability and ingenuity with which we utilize the mobility and flexibility of the carriers and combine their offensive power with the tactical power of the Air Force or the Allies in various instances and apply them to limited targets.

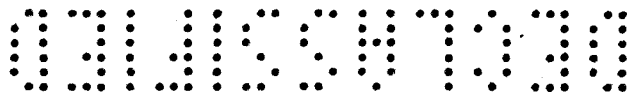
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Numerous examples abound regarding creative use of the carriers. In the Atlantic, the key would be for the carriers to survive the first exchange. Surviving carriers constitute a valuable reserve tactical air asset, particularly, if Air Force losses are heavy during the first weeks of the war. As the sequence of events unfold, one could expect U.S. attack submarines to go North and attempt to destroy Soviet submarines and surface ships. The carriers would remain near the GIUK gap and "cork the bottle" regarding Soviet naval units seeking release into the Atlantic. Other applications for carrier air power would be in assisting convoys across the Atlantic but more importantly providing tactical air cover for any Marine amphibious air operations. In the Atlantic Theatre, a carrier could also be employed to neutralize any Cuban threat to Allied shipping in the Western Hemisphere.

The Mediterranean Theatre also offers opportunities for creative deployments. The two carriers the U.S. generally deploys in the Mediterranean would have to ride-out the first exchange with the Soviet Mediterranean/Black Sea naval units by hiding in the inlets of the Aegean Sea. Then, the carriers could help Turkey in terms of maintaining closure of the straits. Other activities would include destroying Soviet naval units and cooperating with the Air Force and undertaking tactical air strikes against Soviet logistics and industrial targets in the southern part of the Soviet Union.

The U.S. Pacific Fleet enjoys a number of options beyond direct attack on Vladivostok. The first option is to close various straits and deny Soviet naval access into the Pacific. Second, the U.S. can attrite the large Soviet naval base at Cam Ran Bay, Vietnam and eliminate part of the threat to Allied shipping in the Indian Ocean. Finally, carrier air power can assist the Air Force in defending the Japanese industrial base.

The other major issue regarding aircraft carrier power projection centers around the defensive requirements necessary to defend the carrier. Today, the bulk of the carrier's planes and the firepower of the escorts are designed to protect the carrier. Approximately 24-34 of the 80-85 planes on a NIMITZ class carrier (Chart 1) are attack aircraft. In most cases, each ship has only one squadron of all weather, night attack planes (A-6's). Therefore, the key is to expand the offensive firepower of the battlegroup while still maintaining the necessary defense capabilities.



The expansion of the offensive capabilities of the battlegroup can be accomplished in a number of ways. First, the Navy can replace the aging A-7 Corsair squadrons with increased all weather, night attack planes in the form of additional A-6 Intruders. Second, part of the surface escorts (i.e., 1 Aegis cruiser and 5 destroyers) can be equipped with the Harpoon or Tomahawk cruise missile. As technology continues to improve, carrier aircraft such as the F-14 can be used in connection with other sensors as overhead spotters to guide the next generation of smart cruise missiles. The use of carrier aircraft to guide missiles will loom important in the future given the difficulty of training and retaining skilled pilots and the need to avoid exposing them to risk when missiles can also perform a mission.

The final way to expand the power of the battlegroup is through joint carrier operations. A single carrier operating against a strong enemy force must simultaneously conduct offensive and defensive operations. Operating two carriers together would allow one to handle defensive operations and allow the other the responsibility for conducting joint offensive operations with over 50 attack aircraft. In instances where another carrier is not available, the alternatives would be inclusion of a NEW JERSEY class battleship with the battlegroup, combined operations with Allied offensive naval units or U.S. Air Force tactical aircraft if the latter are available.

2. Land-Based Air Power

Simply stated the issue is whether land-based air power can perform better than carrier-based air power. The primary factors involve economic and foreign policy considerations. First, foreign military bases such as airfields remain vulnerable to changes in bilateral political relationships. The usage of the base is often dependent upon the identity of the U.S. and the host country's interests. Moreover, forward air bases and their ancillary support facilities are fixed assets that cannot be moved out of harm's way. On the other hand, an aircraft carrier generally evokes less hostile diplomatic and political reaction than ground deployment. Moreover, its mobility (30 knots) for the NIMITZ class CVN allows for rapid withdrawal from the scene.

The primary economic calculation involves the cost of leasing foreign bases against the price tag for a NIMITZ class carrier. These costs need to be evaluated over the long term life of the base and the carrier. One can assume that base lease costs and physical plant construction costs equal the cost to build one large carrier. Even assuming that operations and maintenance charges are comparable, the base results in an outflow of foreign exchange. The major foreign exchange outgo for a carrier is port liberty.

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3. Aircraft Carrier Vulnerability

Critics of the aircraft carrier have charged that it cannot survive against massed attacks from Soviet naval and air units. This argument has been extended to include carrier vulnerability to attacks from Third World nations armed with cruise missiles and other weapons.

Carrier vulnerability involves two interrelated issues. The first is the absolute and relative vulnerability of carriers to naval surface forces, submarines and air power. The other question centers on survivability.

The CVN/CVA is a large heavily armored ship with a large array of defensive assets. The carrier itself provides defense-in-depth with F-14 long range interceptors, and F-18 short-range interceptors. The carriers are also being equipped with point-defense missiles and gatling guns. The E-2C Hawkeye provides the communications network for the planes and the ships.

The related surface ships are comprised of an Aegis class anti-air cruiser and Aegis designed destroyers. The Aegis system contains a high-tech airborne tracking, targeting and fire control system that can simultaneously handle over 100 airborne trackings and targets. The destroyers will contain similar apparatus.

Naval exercises and tests have indicated that the carrier battlegroup air defense consisting of interceptors and Aegis has performed well in simulated actions against Soviet airplanes.²¹ The only apparent qualification regards the prospect of mass saturation attacks. Here, we have only the limited results of the Falklands War to go on, and this cannot be construed as an approximation of mass Soviet attacks.²²

Turning to anti-submarine warfare (ASW) we find a different pattern. The ASW elements of the CVBG consist of S-3 aircraft as well as the Lamps Mark III (SH-6-B) helicopter aboard the carrier. In those instances where the carriers are close to Allied shore air bases, the P-3 aircraft may also operate with the carrier. The destroyers (DDGX) are supposed to emphasize active submarine detection using the SQS-53 sonar.

The issue of submarine attacks on the battlegroups raises interesting questions. While the open literature is limited, one can glimpse a pattern of submarine penetration of the battlegroup.²³ Soviet submarines such as the new Oscar class boats can attack with up to 24 SS-N-19 cruise missiles (270 miles nautical range) and torpedoes.²⁴ Cruise missiles fired from the OSCAR class submarines constitute a major threat. Soviet nuclear attack subs of the VICTOR and SIERRA class represent a threat in terms of penetrating the carrier screen and launching modern torpedoes. The Soviets also have many very quiet diesel submarines (e.g., FOXTROT) that can lie in wait and attack ships steaming in their vicinity.

The other key element regarding Soviet submarines lies in tactics. Barring an unforeseen ambush on the high seas, naval movement close to Soviet waters would invite largescale attack by numerous submarines. The Soviets would be likely to make a large-scale, mass attack. They would risk numerous submarines to sink one or two of the U.S. carriers.

The expansion of the ASW detection capabilities of the battlegroup is needed. It can take the form of additional ASW gear and Lamps helicopters on the destroyers as well as the possible inclusion of attack submarines with the battlegroup.

The issue here is what increment of additional ASW can be added to the battlegroup at a low cost and not result in the Soviets adding a large new element of offensive countermeasures. The latter would of necessity require the U.S. Navy to spend yet again on further ASW measures.

Nuclear attack submarines (SSN) are reputed to be effective against Soviet submarines. The SSN's are expensive (\$0.6 billion apiece) are scarce (95 currently with the fleet). The SSN's are also dedicatd to other missions.

The addition of further ASW aircraft to the carrier would have to come at the expense of attack or all weather interceptors. Moreover, there is no guarantee that these planes would result in superior ASW performance even if they had full access to sensors.

The remaining option would be to enhance the ASW capability of the Aegis destroyers (DDG). The inclusion of towed-array sonar and Lamps Helicopters would be useful. This could be accomplished through modification of the destroyers in the form of reducing the range and scope of the Aegis anti-air system and the magazine space for the surface-to-air missiles. A recent Congressional report makes an interesting case for an alteration along these lines.²⁵ Substituting a modified Aegis fire control system of shorter range could result in savings sufficient to finance the towed array sonar and Lamps helicopters. The Navy plans to deploy the Lamps III on a number of escorts as well as the TICONDEROGA class cruisers. However, the plan to deploy 160 Lamps MK III means that some ships will receive no copters or the Lamps I Copter.

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The other major issue is survivability. A large CVN is heavily armored and contains an advanced damage control system. Barring a hit from a nuclear warhead or a conventional missile penetrating a magazine, the CVN/CVA can absorb more damage than any other surface ship. Separate but related to survivability is retention of the capability to perform its mission. A direct hit on the catapult area of a CVN/CVA might knock-out one or two but operations can be continued at a reduced rate from the other two. The other crucial areas would be the arresting gear and the command/communication center. This issue of mission interference suggests the need to deploy large carriers in pairs. If the catapults or arresting gear are damaged on one ship, operations can continue from the other ship.

4. Carrier Size and Cost

Aircraft carrier size and cost are a function of missions required, propulsion costs, high technology command/control facilities and jet aircraft.

The small V/STOL aircraft carriers such as the British Invincible and the Soviet Leningrad and Moskva average 20,000-22,000 displacement and carry a mixture of 12-24 helicopters and jump jets in the case of the UK ships.²⁶ The ship's range and ordinance capacities are limited. These ships can perform ground support functions and limited ASW work.

The three remaining principal carrier designs are the Soviet Minsk (44,000 tons) and the U.S. KITTY HAWK (65,000 tons) and the NIMITZ (80,000 tons and above).²⁷ The Minsk is primarily a V/STOL carrier that can accommodate jets (the Yak 37 Forger) and steam greater distances than the Moskva. It also carries anti-ship missiles. The Soviets have commissioned two of these ships and are working on two more.

The current NIMITZ class ships cost approximately \$3.4 billion in 1983 dollars (Table 4) to construct and an equal sum to fit-out with aircraft and supporting gear. The demand for high performance all-weather jet attack and interceptors (e.g., F-14) requires a large flight and hanger deck areas. The cost of carrier aircraft and electronics generally remains the same for a 50-60,000 ton conventionally powered carrier or an 80,000 ton nuclear one. The principal savings between the two is the reduction in the amount of steel. But, the latter fact will not result in the purchase of 2-3 medium-sized carriers in place of one NIMITZ CVN.

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This is not the place to address the benefits of nuclear versus conventional propulsion. There are, however, two relevant points regarding carrier costs and flexibility. The inclusion of nuclear reactors rather than conventional turbine engines yields a thirteen year supply of fuel. This eliminates the need for additional fleet oilers and increases the ability of the ship to go great distances at high speeds without refueling. Second, the absence of conventional engine rooms increases the space aboard to carry munitions and jet fuel and thereby increases operational capabilities.

5. V/STOL Technology

The previous section mentioned the Soviet and British V/STOL aircraft carriers. The state of U.S. Navy progress in this area is less clear.

The Marine Corps maintains two classes of helicopter carriers--the IWO JIMA and TARAWA class ships.²⁸ Both classes carry helicopters. The Marines are also developing the AV8B V/STOL jet for eventual deployment on some of these ships. The AV8B, the successor to the British Harrier and the AV8A will begin deployment in 1986. The AV8B will provide close-in air support over the beach.

The Navy appears to recognize the need for adopting the V/STOL concept but is moving slowly given its commitment to the 15 carrier battlegroups and other projects. The Navy recognizes the salient V/STOL issues: (1) Can air power be spread cost effectively throughout the fleet, and (2) can a high performance V/STOL aircraft be developed that is eventually comparable in capabilities to existing fixed wing aircraft such as the A-6, A-7, and F-14.

First comes the economic issue. Spreading V/STOL aircraft or a tilt rotor helicopter (JVX) across the fleet requires the provision of space aboard ships for fuel and hangars. This fact would require tradeoffs regarding ship size, magazine space and crew comfort, particularly on destroyers. Second, planes require jet fuel which translates into increased demand for oilers and other fleet support ships.

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The issue of additional fuel raises economic, logistics and vessel procurement questions. But it would be premature to address these in depth until there is a better data base in terms of the economic and technical prospects to modify certain ships and the performance of the planes.

Over the long term, V/STOL aircraft will not replace fixed wing jets aboard U.S. carriers of any size until they can match or exceed the performance of the former. A jet aircraft like the AV8B would need radar and night combat capabilities. Here, the Navy would be looking at a long-term process to address the physics problem that vertical takeoff absorbs more fuel and thereby limits ordinance capacity and range. Concurrent with these issues, V/STOL will compete for R&D funding with the next generation of fixed wing naval aircraft including the application of Stealth technology.

6. Soviet Aircraft Carrier Programs

Several years ago the Soviets decided to expand their naval air program and have begun constructing 1 or 2 large carriers of 65-70,000 tons. The Soviets have a long learning curve to catch-up on. Once their ship is commissioned they face a 5-10 year period in which they need to develop a combat ready aircraft carrier and related surface group.

The Soviet policymakers will probably employ their carriers as power projection pawns during peacetime. Assuming two carriers, one can expect one each to be initially deployed with the Northern and Pacific fleets. During conventional war the Soviet carriers would support homeland defense. Barring any element of surprise they are unlikely to engage in open ocean World War II aerial battles with their U.S. counterparts.

The Soviets appear to have no plans to construct additional V/STOL type carriers. Instead, they are concentrating on hybrid ships such as the Kirov that combine anti-ship and anti-air ordinance with limited air capacity in the form of helicopters. On balance, their theme remains the same, defense of the homeland with some power projection during peacetime.

STATUS OF U.S. AIRCRAFT CARRIER FORCES

The U.S. Navy currently maintains an active carrier force of thirteen ships of various sizes and capabilities (Table 2). The CORAL SEA and MIDWAY are approximately 40 years old and are scheduled to enter the training fleet in the early 1990's. The FORRESTAL class (FORRESTAL, SARATOGA, RANGER and INDEPENDENCE) are 25-30 years old and have or are currently undergoing service life extension programs (SLEP). The four remaining conventional carriers of the KITTY HAWK class (KITTY HAWK, CONSTELLATION, AMERICA and THE JOHN F. KENNEDY) represent highly upgraded versions of the FORRESTAL class.

The Navy currently has four nuclear carriers in operation and three are under construction. THE ENTERPRISE, the world's first nuclear carrier, has been on active duty for nearly twenty-five years. The NIMITZ class carriers (NIMITZ, EISENHOWER, and VINSON) are the newest carriers in point of service while three sister ships are currently under construction (See Table 2).

The Reagan Administration's primary conventional naval procurement objective is expansion of the large attack carrier fleet from 12 to 15 ships by 1990. The Administration has also decided to operate the carriers as part of battlegroups combining one attack carrier with an Aegis cruiser and five or six anti-air warfare (AAW) destroyers. The battlegroup may or may not be accompanied by ASW platforms in the form of attack submarines.

The fifteen carrier battlegroups constitutes the heart of the Administration's 600 ship Navy (Table 1). The other major elements are the four surface action battlegroups, each lead by a reactivated NEW JERSEY class battleship, and one hundred nuclear attack submarines.

The concept of the 600 ship Navy needs to be viewed in the context of the above-described force structure and the Administration's desire to reverse the rapid decline and obsolescence of the naval units. The U.S. Navy declined from 976 ships in 1960 to approximately 479 in 1980. In this regard, the aircraft carrier represents an interesting case study.

Towards the end of the Korean War, the U.S. began replacing the three MIDWAY (45,000 tons each) and twenty-four ESSEX (33,000 tons) World War II inventory through upgrades and the acquisition of the FORRESTAL class. The three MIDWAYS and nine of the twenty-four ESSEX class received upgrades to handle jets. Between 1955-75, the U.S. operated twelve-to-sixteen attack carriers (CVA) and nine to ten anti-submarine (CVS) carriers of ESSEX class origin.²⁹

The USG backtracked in the 1960's from the ENTERPRISE nuclear design and instead opted for conventional power in the KENNEDY and the AMERICA. The 30 billion dollar annual cost of the Vietnam War limited new naval procurement. Spending on new naval construction during the Nixon, Ford and Carter Administrations averaged approximately \$7 billion per year.³⁰ While the twelve ESSEX class anti-submarine carriers (CVS) were phased out by the late 1970's, the only new construction consisted of three NIMITZ class ships. The number of carriers fell from twenty-seven to twelve with the retirement of the FRANKLIN ROOSEVELT in 1977. The Ford and Carter Administrations debated the wisdom of a fourth NIMITZ class CVN versus several conventional attack carriers and the development of V/STOL based carriers. The bottom line was no new carrier procurement during the 1970's.

U.S. Navy

From a policy perspective, the new Reagan Administration sought to arrest what it perceived as the decline of U.S. carrier force levels and expand it by twenty-five percent from twelve to fifteen ships. This policy decision in turn drove the demand for surface escorts and in part for surface replenishment ships. The remaining demand for the 600 ship fleet came from amphibious ships to support sealift and the expansion of attack submarine forces from 90 to 100. As a result the shipbuilding budget during the first two years of the Reagan Administration was in excess of \$12 billion annually as compared to an average of \$7 billion during the previous Administrations.³¹

The Navy has already procured the additional carriers. They will join the fleet by 1992 at the latest. However, there will be backend costs in the form of airplanes, support facilities, etc., that will require continued high real levels of Naval spending.

The crucial issue regarding carrier procurement involves obsolescence of the FORRESTAL and KITTY HAWK conventional carriers during the first decade of the next century. The data in Table 3 shows that eight and possibly nine U.S. carriers will have to be replaced between 2000-2013. This involves one new carrier every 1 1/2 years. Rapid cost escalation in NIMITZ class (Table 4) combined with corresponding increases in airplane costs, suggest that each new vessel will certainly approximate the 1986 real cost of \$3.4 billion for the ship and an equal sum to outfit the LINCOLN and the WASHINGTON. There will be additional costs for surface escorts.

The procurement issue in turn reopens the policy question of what are the usages for the carriers and how to handle the high costs. Spacing new carrier procurement out every three years instead of every two (see Table 3) could stretch out the costs. However, the key issue should not be cost containment or procurement of ships that we are good at building. Rather, the issue revolves around what type of navy and naval air power will be needed in the future.

There is currently a 7-8 year hiatus until new carrier procurement is needed in 1993/1994. During this period the Navy should invest in R&D and a small amount of development work to determine the feasibility of expanding air power at sea. Some of the areas open for inquiry include but are not limited to:

- V/STOL Technology - The Marine AV8B and the JVX Tilt rotor helicopter offer a basis on which to begin design of new aircraft. The key will be the fuel economics of vertical lift and combat performance.

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- New Surface Combatants - It would be interesting to examine a hybrid ship combining offensive missile and limited airpower. This could take the form of a small V/STOL carrier or even the innovative concept of the Kirov class attack cruiser. The key is that industrial designs should not suffer from the "not invented here" syndrome. Another example would be an air capable high speed surface effects ships that could handle helicopters.
- Hull Technology - The small waterplane area twin hull (SWARTH) design deserves consideration with respect to air capable surface combatants and possibly a V/STOL carrier. SWARTH entails twin submerged hulls with vertical struts that make contact with and support the surface deck area of the ship.³²

Each of the above concepts represents ideas. But, the Navy now enjoys a window of opportunity to evaluate them. If V/STOL and air capable ships fail to pass economic, technical or other tests, nothing is lost. The Navy still retains its carrier fleet and replaces obsolescent ships with the superb NIMITZ design. If some ideas are successful, the new air capable ships will complement the existing carrier fleet.

Speculating on the number of carriers needed in the future or the hi/lo mix of carriers, V/STOL, and or air capable surface combatants is a tenuous and imprecise art. It is best left to others. The significant point is that there is no reason for the Navy not to enjoy the complimentary benefits of the NIMITZ CVN and some new air capable type ships. The former can maintain its role regarding peacetime power projection and a primary force in any conventional naval war with the Soviet Union. The smaller, open-ocean surface combatants can handle growing issues arising from world economic interdependence, the resource exploitation of the sea and political instability in the developing nations.

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CONCLUSIONS AND RECOMMENDATIONS

1. On balance the fifteen large carriers still offer an optimal combination of flexibility and mobility in the event of a conventional war with the Soviet Union. Until a superior air capable platform is developed, it would be premature and send the wrong signal if the USG discarded this resource.

2. To date the NIMITZ design represents the best combination of flexibility, mobility and operational capabilities. It would be difficult to construct two 50,000-60,000 ton conventional carriers with multi-mission capabilities in place of one NIMITZ class ship.

3. Notwithstanding these virtues, carriers like other surface ships remain vulnerable to submarines. The destroyers in the battlegroups should be equipped with additional ASW detection assets such as the Lamps III helicopters and towed array sonar even if it requires some reduction in their high tech anti-air systems.

4. The USG faces replacement of over half of its carrier force during the first decade of the 21st century. Stretching new carrier procurement out over one every three or four rather than every two years can mitigate budgetary considerations and prevent the crowding-out of other items from the naval construction budget.

5. The offensive firepower of the battlegroup should be diversified away from sole reliance on the two-to-three squadrons of attack aircraft on each carrier to include the installation of tactical cruise missiles on some of the surface escorts. The Tomahawk cruise missile offers promise, although its deployment aboard surface ships could become an irritating factor for arms control efforts.

6. The period from 1985 until 1992/93 when we must authorize another carrier confers upon the Navy a "window of opportunity" to conduct R&D in V/STOL and the expansion of air capabilities throughout the fleet. The Marine AV8B jet and the JVX Tilt Rotor helicopter represent a good base to start from. Surface effect ships, the SWARTH concept, and even the Soviet Kirov hybrid cruiser offer some interesting prospects for air capable designs.

7. The key issues remain the technical efficiency of V/STOL aircraft over time as compared to fixed wing and the economics and mission tradeoffs associated with air capability. Efforts to promote V/STOL and air capable ships will require time and money with no guarantee of an immediate payoff. If these efforts fail, we still have our large carrier forces. Success, however, would enable the Navy to expand air power at sea and develop sea control ships for the important world trade and resources issues without detracting from the carrier force structure necessary to meet the Soviet threat.

Separate but related to procurement issues is the question of tactics. The key remains to gain a tactical advantage over the enemy. At times this may require stealth, deception and dispersion of the carrier battle group. The U.S. must be able to confuse the enemy regarding the actual location of ships. We also need to operate large carriers together in order to capitalize on those instances when and where carrier offensive power can make a major contribution. Finally, protecting U.S. carriers through cautious deployment and flexible rules of engagement can deny the enemy the cheap kill and preserve the carriers as a vital reserve asset for major naval operations.

Future conventional naval warfare promises to be a series of widely dispersed engagements. There is unlikely to be a decisive "fleet against fleet" or "fleet against flank" battle. This calls for keeping our Kings at the head of the Chess Board and away from the other side's pawns.

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FOOTNOTES

1. The figure of 15 large carriers and their associated battle-groups appears to reflect a compromise between the number the Navy requested from the Joint Chiefs of Staff during the budget review process and competing military requirements. Defense analysts suggest that the Navy originally requested up to 24 carrier battlegroups (CVBG's) but settled for an increase of 25 percent, from 12 to 15 ships. See Jeffrey Record, "Jousting With Unreality," International Security, Winter, 1983-84.
2. Jeffrey Record, IBID, and Robert Komer, Maritime Strategy or Coalition Defense, Cambridge, 1984.
3. Admiral Stansfield Turner and Captain George Thibault, "Preparing for the Unexpected: The Need for a New Military Strategy," Foreign Affairs, Winter, 1982/83.
4. "Building a 600 Ship Navy: Costs, Timing and Alternative Approaches," Congressional Budget Office, March 1982, p. 67.
5. IBID, p. 67.
6. Navy Fact File, 7th Edition, pp. 4-6; also see U.S. Foreign Trade Statistics, 1984, Department of Commerce.
7. Admiral Bobby R. Inman, "Technology and Strategy," U.S. Naval Institute Proceedings, Sea Link 1984, pp. 45-51.
8. Kenneth Booth provides a stimulating discussion of the role of navies. See, Navies and Foreign Policy, New York: Crane, Russak, 1977.
9. Vice-Admiral Stansfield Turner, U.S. Navy, "Missions of the U.S. Navy," Naval War College Review, March-April 1974.
10. IBID.
11. Posture Statement by Chief of Naval Operations, Admiral James D. Watkins, Fiscal Year 1986, p. 24.
12. IBID, p. 24.
13. See for example The Battle for the Norwegian Sea, Public Broadcasting Corporation, USA, 1983 and Secretary Lehman's budget testimony to Congress.

14. Admiral Turner, "Preparing for the Unexpected," Commander E. W. Ortlieb (retired), "Forward Deployments: Deterrent or Temptation?" U.S. Naval Institute Proceedings, December 1984, pp. 36-40; and Gerald O'Rourke, "CVN's Forever! Forever!", U.S. Naval Institute Proceedings, July 1983, pp. 20-26.
15. Peter T. Tarpgaard, "Naval Forces for the Future - Quo Vadimus?" Policy Review, Summer 1983, p. 73.
16. Joshua Epstein, "Horizontal Escalation: Sour Notes of a Recurrent Theme," International Affairs, Winter 1983-84.
17. Captain Linton F. Brooks, "Escalation and Naval Strategy," U.S. Naval Institute Proceedings, August 1984, pp. 33-37.
18. The best systematic treatment of carriers remains John Lehman's, "Aircraft Carriers: The Real Choices," Georgetown Center for Strategic and International Studies, Volume VI, #52, 1978. Lehman appears to have derived part of his findings from the CVNX Characteristics Study Report, Office of the CNO, Department of the Navy, 1976.
19. Barry M. Blechman and Steven Kaplan, Force Without War, Washington, D.C., The Brookings Institution, 1978.
20. Ken Booth, Navies and Foreign Policy.
21. See interview with Admiral Lehmann in "The Battle of the Norwegian Sea," Public Broadcasting System, 1983, and Congressional Testimony of Admiral Lehmann and the CNO during the FY 1982-84 budget hearings.
22. Norman Friedman, "The Falklands War: Lessons Learned and Relearned," Orbis, Volume 26, #4, Winter, 1983. During the Falklands War, the Argentine aircraft armed with Escort missiles attacked and damaged or sunk a large number of British ships.
23. See interview with Commander Dean Knuth, in "The Battle for the Norwegian Sea," PBS, 1983. During the Falklands War (1982), several Argentine submarines appear to have penetrated the British destroyer escort and fired defective torpedoes.
24. Jane's Fighting Ships, 1983-84.
25. See the technical appendices of the CBO Study, "Building a 600 Ship Navy," 1982.
26. Jane's Fighting Ships, 1983-84.
27. IBID.

28. The Gold Book of Naval Aviation, 1985, The Association for Naval Aviation, Washington, D.C., pp. 243-254.
29. Michael McGuire, selected papers on "The 600 Ship Navy" and "The Cost of the 600 Ship Navy," Washington, D.C., The Brookings Institution, 1981-1982.
30. Peter Tarpgaard, "Naval Forces for the Future," Policy Review, Summer 1983, p. 74.
31. IBID, p. 74.
32. Captain S. E. Veazey (Retired), "New Shape in Ships," U.S. Naval Institute Proceedings, February 1985, pp. 39-47.

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TABLE 1
 SUMMARY OF U.S. NAVAL FORCES
 (As of 1 January 1985)

	<u>Actual</u>
<u>A. STRATEGIC FORCES</u>	
Nuclear Ballistic Missile Submarines (SSBN)	36
Support Ships	6
Subtotal -	<u>42</u>
<u>B. TOTAL STRATEGIC FORCES</u>	
<u>C. BATTLE FORCES</u>	
Conventional Attack Aircraft Carriers (CV)	9
Nuclear Aircraft Carriers (CVN)	4
Subtotal -	<u>13</u>
<u>D. SURFACE COMBATANTS</u>	
Battleships	2
Guided Missile Cruiser	20
Guided Missile Cruiser Nuclear	9
Destroyer	31
Guided Missile Destroyer	37
Frigate	53
Guided Missile Frigate	44
Subtotal	<u>196</u>
<u>E. SUBMARINES</u>	
Conventional Attack Subs	4
Nuclear Attack Subs	95
Subtotal	<u>99</u>
<u>F. Amphibious Warfare</u>	
Mobile Logistic Ships	59
Patrol Combatants	53
Mine Warfare	6
Subtotal	<u>3</u> <u>121</u>
<u>G. TOTAL BATTLE FORCES</u>	
<u>H. SUPPORT FORCES</u>	
Mobile Logistic Support Ships	21
Subtotal	<u>25</u> <u>46</u>
<u>I. TOTAL SUPPORT FORCES</u>	
<u>J. MOBILIZATION FORCES (CATEGORY A)</u>	
Surface Combatants (DD/FF/FFG)	10
Amphibious Warfare Ships	2
Subtotal	<u>12</u>
<u>K. TOTAL MOBILIZATION FORCES</u>	
<u>L. TOTAL U.S. NAVAL FORCES</u>	
	12
	529

Source: CNO's Report to Congress for Fiscal Year 1986, Department of the Navy, p. 47.

TABLE 2

CURRENT STATUS OF U.S. AIRCRAFT CARRIERS

(as of January, 1985)
Year

<u>Ship</u>	<u>Commissioned</u>	<u>Anticipated Decommissioning Date</u>
LEXINGTON (AVT16)	1943	Serves as fleet training carrier, to be decommissioned soon.
MIDWAY (CV41)	1945	1990
CORAL SEA (CV43)	1947	1992
FORRESTAL (CV59)*	1955	2000
SARATOGA (CV60)**	1956	2001
RANGER (CV61)****	1957	2002
INDEPENDENCE (CV62)***	1959	2004
KITTY HAWK (CV63)	1961	2006
CONSTELLATION (CV64)	1961	2006
ENTERPRISE (CVN65)	1961	2006
AMERICA (CV66)	1965	2010
JOHN F. KENNEDY (CV67)	1968	2013
NIMITZ (CVN68)	1975	2020
EISENHOWER (CVN69)	1977	2022
CARL VINSON (CVN70)	1982	2027
THEODORE ROOSEVELT (CVN71)	Est. 1/1987	2032
ABRAHAM LINCOLN (CVN72)	Est. 1/1990	2035
GEORGE WASHINGTON (CVN73)	Est. 1/1992	2037

NOTE: Assumes 45 Year Life Cycle for all ships that receive Service Life Extension Program (SLEP).

* Is currently completing SLEP program.

** Completed SLEP in 1982.

*** Entered SLEP program in April 1984.

**** Scheduled to follow INDEPENDENCE.

SOURCES: Jane's Fighting Ships, Budget Testimony of the Secretary of the Navy and the Chief of Naval Operations, for Fiscal Years 1985 and 1986; Commodore C. R. McGrail, "The Carrier Forces of the U.S. Navy," The Gold Book of Naval Aviation - 1985, pp. 187-190.

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TABLE 3

U.S. AIRCRAFT CARRIER PROCUREMENT CYCLE
(As of January 1985)

Ship	Projected Decommissioning Date		Date to Procure New Ship		Spacing Out of New Carrier	
	<u>A</u> (45 year life)	<u>B</u> (50 year life)	<u>A</u> (45 years)	<u>B</u> (50 years)	<u>A</u> (every 2 years)	<u>B</u> (every 3 years)
LEXINGTON*						
MIDWAY**						
CORAL SEA**						
FORRESTAL	2000	2005	1993	1998	1993	1993
SARATOGA	2001	2006	1994	1999	1995	1996
RANGER	2002	2007	1995	2000	1997	1999
INDEPENDENCE	2004	2009	1997	2002	1999	2002
KITTY HAWK	2006	2011	1999	2004	2001	2005
CONSTELLATION	2006	2011	1999	2004	2003	2008
ENTERPRISE	2006	2011	1999	2004	2005	2011
AMERICA	2010	2015	2003	2008	2007	2014
JOHN F. KENNEDY	2013	2018	2006	2011	2009	2017
NIMITZ	2020	2025	2013	2018	2011	2020
EISENHOWER	2022	2027	2015	2020	2013	2023
WINSTON	2027	2032	2020	2025	2015	2026
.....						
THEODORE ROOSEVELT	2032	2037	2025	2030	2017	2029
ABRAHAM LINCOLN	2035	2040	2025	2033	2019	2032
GEORGE WASHINGTON	2037	2042	2030	2035	2021	2035

NOTES:

1. Based upon 45 year life, 9 carriers must be replaced between 2000-2013.
2. Assumes either a 45 or 50 year life including SLEP.
3. Assumes the spacing-out of new carrier procurement at 2 or 3 year intervals depending on the physical condition of ships and availability of construction funds.
4. Assumes a 7 year lead to build a new CVN.
5. LEXINGTON to be decommissioned in 1987/88 and replaced by the ROOSEVELT. MIDWAY and CORAL SEA to become the air training carriers by 1990-92 and to be replaced by the LINCOLN and the WASHINGTON.

TABLE 4

AIRGRAFT CARRIER COST ESCALATION
 (\$ Million)

<u>Ship</u>	<u>Date Commissioned</u>	<u>\$ Cost - Then (Year)</u>
CORAL SEA (CV43)	October 1947	88
FORRESTAL (CV59)	October 1955	189
KITTY HAWK (CV63)	April 1961	265
ENTERPRISE (CVN65)	October 1961	451
NIMITZ (CVN68)	May 1975	695
THEODORE ROOSEVELT (CVN71)	Est. 1/87	2,094*
ABRAHAM LINCOLN (CVN72)	Est. 1/90	3,398**
GEORGE WASHINGTON (CVN73)	Est. 1/92	3,398**

SOURCE: Commodore C. R. McGrail, "The Carrier Forces of the U.S. Navy," The Gold Book of Naval Aviation for 1985, The Association of Naval Aviation, pp. 187-190.

* - Estimated in 1981 dollars.

** - Estimated in 1983 dollars.

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CHART 1

TYPICAL AIR WING ON LARGE AIRCRAFT CARRIER

<u>Number of Squadrons</u>	<u>Type of Squadron</u>	<u>Total Aircraft</u>
2	Fighter	24 F-14 or F-18 interceptors
2	Light Attack	24 A-7*
1	Medium Attack	10 A-6, 2 KA-6
1	Anti-Submarine Fixed Wing	10 S-3
1	Anti-Submarine Helicopter	6 SH-3
1	Electronic Warfare	4 EA-6B
1	Early Warning for Air Defense	4 E-2C
TOTAL -		84 Planes

SOURCE: U.S. Navy (1985) and John Lehmann, Aircraft Carriers: The Real Choices, The Center for Strategic and International Studies, 1978, Policy Paper #52.

* One Squadron of A-7 Corsair light attack aircraft is to be replaced by one squadron (12) of F(A)18 interceptors. The F(A)18 can be used interchangeably as a fighter or attack aircraft.

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In addition to the sources cited in the footnotes, the following books, documents, organizations were drawn on in the preparation of this paper...

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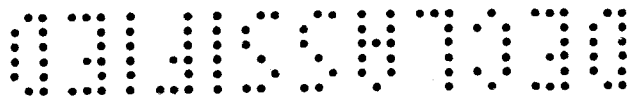
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INTERVIEWS

The following organizations were of assistance in preparing this paper:

1. U.S. Department of the Navy:
 - Office of Carrier Operations (OP-05)
 - Officers and crew of the USS CORAL SEA (CV-43)
 - Naval War College, Newport, Rhode Island
Departments of Strategy and Naval Warfare
 - Office of the Deputy Under Secretary for Policy
 - Retired Aircraft Carrier, surface ships, and submarine commanders.
2. Embassies of the United Kingdom and Norway, Office of the Naval Attache.

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