WHERE ARE THE CARRIERS?

Meeting World Wide Commitments
with a
Reduced Aircraft Carrier Force

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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The end of the Cold War has drawn national attention to the size and composition of the Navy. Eager to cash in on the "Peace Dividend," Congress appears intent on reducing the number of aircraft carrier battle groups (CVBG) and retiring all of the battleship battle groups (BBBG).

This paper discusses an employment plan for as few as eight operational CVBGs and investigates meeting some commitments and emergencies with two new naval forces as substitutes for carrier and battleship battle groups.

Recommendations are made for placing up to seven aircraft carriers in a rotating ready reserve, employing LHAs and LHDs as part of VSTOL strike carrier battle groups (VSBG), and creation of Tomahawk configured Surface Action Groups (SAG). Implementation of these recommendations is designed to provide the nation with eighteen battle and action groups while achieving overall force reduction.
ABSTRACT

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CHAPTER I
HOW MANY IS ENOUGH?

Aircraft Carriers (CV) have been the subject of debate since the end of World War II. Their size, number, propulsion, escorts, mission and even utility has touched off heated discussion on the floors of Congress, in the halls of the Pentagon, behind the closed doors of industry board rooms and in the national media. With the apparent end of the cold war, the number of carriers necessary to provide a creditable margin of defense and project power is once again the subject of debate.

Since "VJ" day, Presidents and Congress have fought annually over the "right" number of carriers. The carrier fleet has grown and declined with the winds of political fortune. Having reached an all time high during World War II, there were a mere seven attack carriers in service by 1950. The Korean conflict, the implementation of the Truman Doctrine and the Cold War brought many carriers out of mothballs. By the early sixties, the United States had about fifteen attack carriers (CVA) and a dozen anti-submarine carriers (CVS) in service.

As the Vietnam War ended Americans again perceived an opportunity to decrease the size of the military and redirect wartime funding. Eager to cash in on the peace dividend, the Ford and Carter administrations' force reduction plans spelled the death of the smaller anti-submarine carriers and consolidation of their capabilities.
on board twelve attack carriers.

Under the Reagan administration the pendulum swung the other way. With a six hundred ship mandate, the Navy undertook a massive shipbuilding program. This force was to have included fifteen carrier battle groups (CVBG) and four battleship battle groups (BBBG). These nineteen battle groups would have enabled the United States to employ a permanent presence of at least one deployed battle group (BG) in the Atlantic, Indian and Pacific Oceans, plus one BG in the Mediterranean Sea.

Now with another "peace dividend" at hand, Congress and the President appear intent on reducing the number of deployable battle groups. Two of the four battleships (BB) have been retired. While the Persian Gulf War has provided a brief reprieve, it appears likely that, once the conflict has passed the remaining battleships will be quickly placed in mothballs with several of the carriers not far behind. Once again debate has begun over how many carriers and escorts are enough.

In 1978, then future Secretary of the Navy, John Lehman posed seven questions that are helpful in determining not only the number of carriers required for defense and power projection but what size and type they should be:

1. "What is it that we want air power to do in the future?
2. Can land-based air power do the job better than sea based?
3. How vulnerable are aircraft carriers?
4. How many carriers are needed and what do they cost?
5. How essential is nuclear propulsion for aircraft carriers?
6. What are the practical options for the size of future carriers?
7. How will VSTOL technology affect the future of air power at sea?" 

There are no easy answers to Lehman's questions. Knowing today what is needed for tomorrow is complicated by the long lead time from individual ship conception through appropriation and construction to commissioning. Even a crystal ball would not make the task any easier as building an aircraft carrier alone, from keel laying to initial deployment, is a seven year process.

The problem is further exacerbated by the wide range of professional opinion as to how many battle groups are enough. A 1978 study determined that all out war with the Soviet Union and its allies would require seventeen to twenty-two CVBGs. The study also determined that peace time deterrence and rimland conflicts required a force of eight to thirteen CVBGs. What is significant is not the numbers themselves, but the five battle group variance in each set of figures. Why, because no one can accurately predict what any given scenario will require once hostilities commence.

Now comes the hard question, what as a nation do we want or expect our Navy to do? I would submit that Americans expect their Navy to respond to global interests which are governed by our national identity. These interests can be summed up into five basic principles:

1. As a maritime nation, we must protect our economic and commercial interests which extend to nearly every inch of the globe.
2. As a humanitarian nation we desire that all the earth's people have the basic necessities of life, a right we are willing to defend.
3. As a democratic nation we endeavour to guide other nations towards adopting democracy and enfranchising their populations.

4. Aggression in any form can not be tolerated (this includes armed conflict, subversion, terrorism, drugs, etc).

5. Americans and their property must be safeguarded at home and abroad.

In applying these five principles to an around the world survey, I believe there are eight areas of interest in which naval forces may be called upon to provide anything from showing the flag to hostile engagement.

First, a creditable deterrent must be made against possible Soviet aggression. It is clear that Soviets are intent on retaining their super power status and the military might that goes with it. In recent statements, President Gorbachev has linked the current round of repression in the Baltic states to his government's intention to remain a world leader.

Additionally, there is no indication that events of the last five years have weakened the Soviet Navy. In fact it appears that the Soviets have succeeded in trimming away obsolescent ships and systems in favor of a leaner more technically capable force.

While all out war with the U.S.S.R. appears unlikely, failure to maintain a creditable deterrent will increase the likelihood of Soviet influence in areas of traditional American interest. The Soviets have long studied the our use of gunboat diplomacy, the father of their navy Admiral Gorskov has written:

"Demonstrative actions by the fleet, in many cases, have made it possible to achieve political ends without resorting to armed struggle. Merely
by Putting on pressure with one's own potential might and threatening to start military operations."

Second, Eastern Europe will be unstable for several decades as these poor relations attempt to catch up to their affluent western cousins. Considerable political and social unrest will ferment as various nationalities vie for domination in these multinational countries.

Third, the Middle East (South West Asia) will continue to simmer under the desert sun. Regardless of the outcome of the Gulf War, the combination of wealth, abject poverty and religious prejudice will continue a state of unrest.

Fourth, Africa remains the dark continent. Here to economics are often the key to regional conflict. Tribal clashes, government repression, famine and expansionism all play their part in keeping these third world nations in or on the verge of conflict.

Fifth, Latin and South America (including parts of the Caribbean) remain unstable. Old jealousies, drugs, insurgencies and a love/hate relationship with their northern big brother contribute to regional tension. The potential for Brazil and possibly Argentina to shed their third world personas may cause additional strife should either or both of these emerging powers attempt to exert control over their neighbors.

Sixth, India has the potential to emerge as a world power. However, internal unrest coupled with a long standing dispute with Pakistan could plunge India into a civil war or regional conflict.
Seventh, as the survivors of the "long march" finally succumb to old age, the future of China under new leadership is unclear. The rapid change towards a more open society was abruptly halted in Tiananmen Square. China and South East Asia still remain behind the bamboo curtain with their intentions as inscrutable as ever.

Eighth, our historical relationship with Korea and the Philippines will necessitate our commitment of forces should our help be requested or if American interests become endangered.

These eight potential hot spots are bounded by four oceans and over twenty large seas, gulfs and bays. Given our far flung interests, the vast distances to be covered and the national desire to achieve our policy at the most economical cost, we come back to the question of how many battle groups enough?

During the 1990 session of the 101st Congress, debate indicated some sentiment for slashing the number of carrier battle groups to as few as eight. This writer does not intend to second guess the President, Congress or the Secretary of Defense as to what the correct number of carriers should be. Rather, assuming that the Navy will receive less than it asks for and using eight CVBGs as a worst case scenario, I believe it is possible to meet national objectives with this relatively small force.

In order to achieve a CV rotation plan that provides believable deterrence and maintain world wide capability, the Navy must be ready to creatively employ other assets as
credible power projection forces. I believe that this can be done by restructuring the fleet's existing assets and implementation of a revised carrier employment plan that allows rapid expansion to as many as fifteen CVBGs.
CHAPTER II
POWER PROJECTION

The heart of our national defense has been the maintenance of an ability to rapidly deploy a creditable deterrent force anywhere in the world. As the last Congress began to grapple with force reductions Secretary Cheney reminded the legislators of the country's need for power projection:

"The United States must retain the ability to project power to critical regions of the world to deter would-be aggressors, support the favorable resolution of crises, honor commitments to allies and friends, carry on the fight against illegal drugs, and maintain unimpeded access to the sea lanes ... U.S. Naval forces are especially suited to meeting these commitments. In particular, aircraft carrier battle groups, the core of the U.S. power projection capability, play a crucial role in the U.S. national security strategy."

From 1955 to 1975 the Navy was involved in approximately 92% of all international crises in which the United States choose to use a show of military force to influence the outcome. During the next ten years, 1976-1985, the Navy responded to fifty-one international incidents, most occurring in third world locations such as North Africa, the Middle East, the Far East and the Indian Ocean-Persian Gulf region. While it is noteworthy that CVBGs responded to thirty-five (69%) of these incidents, one tends to overlook that U.S. desires were accomplished with some type of naval force less than a CVBG in sixteen cases. Further, one can hypothesize that some of the incidents to which a CVBG responded could have been handled by a less
capable force. There are times when a CVBG is ordered to the scene of potential conflict simply because it is the closest naval asset available and not because the situation demands the carrier's capability.

In recent years, U.S. planners have come to recognize that there are other forces capable of providing a naval presence. For almost ten years the Navy has actively employed battleship battle groups in many of the roles traditionally assigned to the CVBG. The BBBG effectively combines state of the art technology as embodied in the Aegis anti-air warfare (AAW) cruiser, the Tomahawk cruise missile and the SSQ-89 anti-submarine warfare (ASW) system with the heavy armor and sixteen inch guns of the 1940's. Capable of operating independently in a medium air threat environment or in conjunction with carrier or land based fighter support in a high threat environment, the BBBG has proven to be an effective power projection asset.
CHAPTER III
SURFACE ACTION GROUPS

Realizing that operating battleships has become cost prohibitive an argument should be made for retaining their escorts as independent surface action groups (SAG). With slight restructuring a six ship SAG comprised of one vertical launch Ticonderoga (Aegis) class cruiser, one Leahy class cruiser, two vertical launch Spruance class destroyers and two Oliver Hazard Perry class guided missile frigates would possess a considerable offensive punch (figure 1). Possessing the equivalent offensive strike capability of 24 A-6B aircraft, this SAG can engage over 145 inbound air targets with 2 missiles each and has the capability of round-the-clock LAMPS MK-III operations for over the horizon targeting (OTH-T) and air electronic warfare (AEW). The SAG is also ideally suited for sea control, anti-submarine warfare, naval gunfire support and escort missions.

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<td>36 SM1-MR</td>
<td>4 HARPOON</td>
<td>2 LAMPS</td>
<td>1 76mm</td>
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* Tomahawks can be added one for one in place of SM2-MR

The advent of cruise missile technology as embodied in the Tomahawk (TLAM) has provided the means for a surface action group to have considerable striking power. A single
Spruance class destroyer with only half of her sixty-one vertical launch cells loaded with land attack Tomahawks, has the same firepower, range and equal, if not greater, accuracy as a flight of six fully loaded A-6B heavy attack aircraft.

While not every mission is suitable for Tomahawk employment, an operation like the 1986 Eldorado Canyon raid on Libya could be carried out by TLAM shooters. In the Eldorado Canyon operation a massive effort was mounted for the relatively small amount of punishment inflicted. The raid utilized twenty-four F-111's, six EF-111 jammers, (including six bomber and three jammer spares) and thirty KC-10/135 tankers. To the Air Force contingent the Navy added EA-6B jammers, EA-3 intel birds, EA-2C's, some forty A-7 and F/A-18 anti-radar missile shooters, fighter cover for both forces and two A-6B (10-plane) strike packages. Over 100 aircraft participated in the operation.

John Lehman notes that had the JCS not been insistent on a combined USN/USAF mission, the twenty A-6's on board the two on station carriers could have simultaneously struck all targets and achieved the same results. Assuming this is so, two vertical launch (VLS) Spruance class destroyers could accomplish the same type of mission, without risk of life, and still have missiles left in their magazines.

One of the political reasons for using carriers and battleships is that their arrival off a belligerent's coast provides a clear and visible manifestation of U.S. power and determination. Recent events in the Gulf War argue that a
Tomahawk configured SAG could achieve the same result. Thanks to modern communications, the world has been able to witness first hand the accuracy and destructive capability of the land attack cruise missile. Once the fog of the Gulf War lifts, even if we find that the Tomahawk was not quite as effective as originally reported, the power and potential of cruise missiles will remain embedded in the collective mind of the world. In the future, if the Secretary of State or a U.S. ambassador announces that a cruise missile SAG is off a belligerent's coast, these new tools of gunboat diplomacy will often be capable of achieving the same results as a carrier or battleship would have in the past.
CHAPTER IV

VSTOL CARRIER GROUPS

For more than twenty years, debate over small versus large aircraft carriers has been waged by naval analysts, congressional committees and in the Department of the Navy itself. Proponents of both sides use a staggering amount of statistics and examples to support their claims of why small carriers will or will not work. Further, each side tends to use the U.S. maritime strategy as the basis for their conceptualization.

The Navy's official position has always been that large deck carriers are the centerpiece of the maritime strategy. Only the CV(N) and her battle group are capable of effectively carrying the offensive to the enemy in a multi-threat environment. A large part of the Navy's argument is meant to counter the real threat posed by many small carrier advocates who not only want the mini-carrier, but desire to have several of them in place of the large deck carrier.

The dizzying degree to which both sides argue the merits of their respective cases covers every minute aspect of the issue from survivability to cost to mission to arcane subjects such as pitch and roll constraints. However, there is one facet of the debate which has not gotten much attention. When the Navy shifted to the big deck concept, carrier escorts had little capability. The technology advances that allowed carrier aircraft to achieve a high
state of proficiency in areas such as anti-submarine warfare, long range strike and anti-air warfare were not being carried over to the cruisers and destroyers. This led to an accurate perception that the CVs best defense, in all warfare areas, was resident in her wing. With the introduction of escort based ASW helicopters, the Aegis AAW system, the Tomahawk cruise missile and hundreds of other improvements; cruisers, destroyers and frigates are once again capable of defending an attack carrier.

Since the Falklands war, small carrier advocates have lobbied for building VSTOL carriers similar to those used by the British. Recently two academics from Catholic University (Mark A. Randol and Wallace J. Thies) published a thesis in the Naval War College Review, arguing that the Navy should have a mix of conventional and VSTOL carriers. While this essay, like many others, sights budgetary constraints as the prime argument, the authors make a compelling observation that CVBG's continue to be designed "for the most demanding contingency imaginable, namely projecting power directly against the Soviet Union."

Randol and Thies suggest that many missions could be handled by procuring additional Wasp class LHDs as VSTOL or Harrier carriers.11

In fact the Wasp class LHDs and their older sisters the Tarawa class LHAs are already capable of handling twenty-four to thirty-six Harriers with additional space for a half dozen LAMPS MK III (SH60) helos.12 There are six of these 40,000 ton multi-purpose amphibious assault ships in
commission (5 Tarawa & 1 Wasp) with four more Wasps in various stages of procurement and construction. When compared against the twenty Harriers that were carried on HMS Hermies and the eight Harriers on HMS Invincible, the only British carriers in the Falklands campaign, Tarawa and Wasp could be classed as super VSTOL carriers.\textsuperscript{\textcopyright 15

Already recognized as a power projection force, VSTOL carriers are currently operated by Great Britain, India, Italy, Spain and the Soviet Union. An American VSTOL battle group (VSBG), comprised of a Harrier configured LHA/LHD supported by Aegis and Tomahawk escorts is capable of meeting most of the missions currently assigned to CVBGs.

The centerpiece of a VSTOL battle group would be the U.S. Marine Corps AV8B Harrier aircraft. This all around fighter/bomber has proven its versatility in numerous exercises as well as combat missions in the Falklands and Persian Gulf. During the Royal Air Force's exercise "Big Tee" in 1972, twelve Harriers delivered over 1,100,000 lbs or bombs, 13,000 rockets and some 77,000 rounds of 30mm gun ammunition in thirty-six hours.\textsuperscript{\textcopyright 14 In air to air combat these subsonic aircraft proved equal, if not superior to their supersonic brothers. Conducting low altitude, one on one engagements, the Harrier pilot's ability to vector the plane's thrust nozzles results in extraordinary turn ratios and decelerations.\textsuperscript{\textcopyright 15 During the Falklands conflict British Harriers successfully engaged over 20 fast Argentinian jets, including the supersonic Mirage, without a single loss in air to air combat.\textsuperscript{\textcopyright 16}
There is a drawback to the LHA/LHD VSTOL battle group. While the LHA and LHD classes were designed to be AV8B (Harrier) capable, their intended purpose is to support an amphibious assault operation. Further, the increasing inventory of these ships is designed to offset the decommissioning of older amphibs. LHAs and LHDs are an integral part of the Navy's overall Marine Corps' lift capability. Therefore, taking these ships away from their primary mission could seriously degrade future amphibious operations.

Conversely, the only AV8Bs in the U.S. inventory belong to the Marine Corps. Therefore it would seem logical to include an amphibious ready group (ARG) as part of the VSBG. Though this may force a reconfiguration of the Marine Air Ground Task Force (MAGTAF), due to constraints in the number of troop carrying helicopters the ARG can carry, it would add a significant capability to the VSBG.

A typical VSTOL battle group with an accompanying ARG might look like figure 2, with one LHA/LHD, an Aegis cruiser, an Aegis guided missile destroyer, a Tomahawk destroyer and three guided missile frigates. The Aegis DDG provides enhanced AAW management while the three FFGs ensure close in AAW support for the Amphibs. For high threat missions, unlikely to include amphibious assault, the VSBG can detach the ARG element to proceed to a safe port or holding area.
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* Tomahawks can be added one for one in place of SM2-MR

fig. 2

Utilizing the LHA/LHD based LAMPS helos for over the horizon targeting and electronic warfare, the combination of Harriers and Tomahawks makes a formidable strike package. Harriers can also be utilized as Aegis directed combat air patrol (CAP). Combined with an extensive SAM umbrella the VSBG has a high probability of survival from most air threats. Additionally, this mix of combatants presents a highly capable ASW and ASUW force.

The VSBG is nearly self sufficient as the LHA or LHD is capable of refueling and carrying extra stores for her escorts. Unlike a CVBG nearly every flight deck in the VSBG is capable of acting as an operational or divert deck for the Harriers (AV8Bs need only 72 square feet for vertical take off and landing), adding an extra degree of versatility. During the Falklands campaign HMS Fearless and HMS Intrepid served as forward operations bases for Harriers.
CHAPTER V
CARRIER OPERATIONS

Under current employment cycles it takes three carriers in service to deploy one CVBG. Figure 3 gives an accurate depiction of carrier and air wing employment cycles. In other words, in order to have four carriers deployed with one in the Mediterranean, one in the Indian Ocean and one each in the Atlantic and Pacific, twelve carriers are required. This does not include carriers in overhaul or service life extension. With a worst case scenario of only eight carriers, it would be tough to support more than two CVBGs deployed at any one time.

CARRIER EMPLOYMENT CYCLE

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0 6 12 18

MONTHS:

fig. 3

Here too, it is necessary to make some basic assumptions:

-18-
First, the reason for a cutback in carriers and decommissioning of battleships is a perceived decrease in threat.

Second, the real objective of the cutback is to enjoy a significant savings in the defense budget.

Third, Congress has always been willing to transfer capability to the reserve force because of cost savings and the large plow back of defense money into the economy of local congressional districts.

Fourth, in the proposed cutback to eight CVBGs a ninth carrier would remain in the fleet for pilot training.

Working from these assumptions I propose maintenance of an operational reserve carrier fleet. In 1932, then Chief of Naval Operations, Admiral Pratt initiated an economy plan called the "Rotating Reserve." Under his plan, about half of the Navy's destroyers were laid up with skeleton crews. These destroyers were rotated on a one for one basis with active ships every six months - in effect one crew for two ships. While there were some problems with ship upkeep, caused by the frequency of turnover and limited operational time, the plan met its stated objectives of maintaining a large destroyer force, ready for rapid expansion, and achieving considerable budgetary savings.17

A similar plan for carriers could solve many of the problems associated with a reduction to eight CVBGs. Assuming building continues on CVN-74 (Stennis) and her follow on sister CVN-75 and the retirement of the two Midway class CVs proceeds as scheduled, the Navy will have a
sixteen carrier fleet by 1997. Placing seven of these ships in ready reserve with a third of their crew intact could significantly enhance overall readiness.

In addition to achieving Congress's primary objective of budgetary savings, these ships if periodically rotated with their active duty sisters would extend the service life of the entire carrier force (fig 4. gives sample rotation). By identifying and training reserve crew round out components and aircraft wings, at least four of the seven reserve ships could be ready for operations in thirty to sixty days with the remainder achieving full readiness in three to four months. Further, while in a reserve status all major yard work including class modifications and upgrades could be accomplished minimizing depot time for the active ships.

To facilitate faster activation in times of crisis two or three active duty air wings above the eight required for the operational CVBGs should be maintained. These wings in normal rotation would allow a slightly longer aviation work up schedule. In times of crisis they could deploy on the training carrier and two of the reserve carriers. Additionally, by identifying certain shore duty billets for carrier augmentation, two CV(N)s could be manned on short notice without reserve call up. This would allow the president the flexibility of quickly increasing the carrier force without the political implications of a reserve call up.
Should it be necessary to activate any of the reserve carriers, a quick marriage to an operational surface action group would provide the nation with a CVBG ready to go into harm's way.
CHAPTER VI
EMPLOYMENT

Using the eight CVBG base line, I envision four operational VSBGs and six SAGs to provide a total of eighteen battle and action groups. With the reserve carrier rotation plan, these forces, while in the aggregate somewhat less capable, are an improvement over the nineteen carrier and battleship battle groups proposed by the Reagan administration. This is due to an economy of force that allows all the groups listed to be operational, vice the three to five groups that would be in overhaul under the old plan. In addition to the eight CVs and four LHA/LHDs, only one hundred and eight combatants are necessary to make up these groups. There are more than sufficient ships in the inventory to meet this commitment and provide rotation assets. Additionally, this plan can be carried out without delaying Congressional plans for the early retirement of thirty-eight Knox class frigates.

To implement the plan, I envision three east coast CVBGs three VSBGs and three SAGs operating in a normal eighteen month employment cycle. This will provide three capable forces to cover the North and South Atlantic operating areas and the Mediterranean. VSBGs and SAGs should be able to operate without unacceptably high risk in these areas due to a reduced maritime air threat in the South Atlantic and the availability of air support from U.S. overseas shore bases and NATO allies in the North Atlantic.
and Mediterranean. In times of increased tension the CVBG can be positioned in the area of highest threat. With a provision for one east coast air wing to maintain a ninety-six hour notice standby provision for deploying on the training carrier, an extra dimension of readiness can be achieved.

In the Pacific there would be five CVBGs, three to operate in a six month deployment rotation to the Indian Ocean and two in rotation with a VSBG in the Pacific. The three west coast SAGs would also operate in the Pacific on an eighteen month employment cycle. This plan assumes that there will be a desire to keep a large deck carrier in the Indian Ocean operations area following the Gulf War. It also allows for a fairly quick transit of the Indian Ocean CVBG into the Mediterranean if warranted.

Because of the vast distances involved, only nuclear powered aircraft carriers should be assigned to the Pacific. In company with their nuclear cruisers, a CVN task unit could detach from its fossil fuel escorts and make a high speed dash in crisis response. Due to Japanese sensitivities with regard to nuclear power, this plan would necessitate replacing the conventional carrier currently stationed in Yokosuka with a VSTOL configured LHA/LHD.
CHAPTER VII
CONCLUSION

An eight carrier battle group Navy is insufficient to employ credible power projection, prompt gunboat diplomacy and ensure a rapid maritime response to all contingencies. Action must be taken to ensure that there are sufficient forces to respond to peace time contingencies and regional conflicts.

After the last big naval reduction, following Vietnam, it took six years to build from twelve battle groups to sixteen; and this was only accomplished by taking battleships out of mothballs. If we compare our potential needs to the Gulf War, it is doubtful that we could have pulled a carrier out of mothballs and had it fully operational with a trained wing embarked in five and a half months.

While Congress may be willing to leave additional battle groups in service there will be an overall cut eliminating all battleships and some portion of the carrier force. A shift now to other assets such as the VSTOL battle group and the surface action group would quell the big versus small carrier debate and garner support for retention of additional carriers in ready reserve. It will also preserve the right mix of modern escorts to quickly form an effective CVBG.
Finally, as never before, it will display the Navy's willingness to work with Congress to achieve a fleet that is capable of flexing to meet any challenge.
NOTES


2 Ibid., p. 11.

3 Ibid., p. 47.


12 Ibid, p. 22. *N.B.: many sources offer different figures for Harrier loading on LHAs and LHDs. I found no reference listing less than 20 AV8Bs and 6 LAMPS helos.


15 Lehman, J. Washington Papers, p. 72.

16 Ibid. p. 44.

17 Myles, pp. 51 & 189.


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