What Comes After LPD 17 Flight II?

The U.S. Navy's next surface combatant

by LtCol Noel Williams (Ret)

The Navy and Marine Corps must work together to develop the ship that will replace the San Antonio-class LPD because, by necessity, this new ship is likely to look nothing like its predecessor given a combination of emerging threats, new technologies, and persistent resource constraints. Converging operational requirements (function) suggest the opportunity for a convergence in ship design (form), and if the ship's function and form are similar, there is a great strategic advantage in developing a mission agile platform to take advantage of economies of scale, while also allowing for strategic tailoring of the fleet's mission profile to address emergent circumstances. Thus, the next amphibious ship and the next surface combatant could be the same platform. A mission-agile platform, coupled with platform-agile payloads, provides an architectural schema that offers improved operational capability and increased effectiveness at a reduced cost.[1]

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Demand and Design

Since World War II, efficiency has been the principal metric the Navy has followed for developing amphibious shipping—efficiency in moving the Marine Corps "payload." It made sense for the Navy to optimize for lift efficiency given that up until about a decade ago when the Marine Corps stated its amphibious ship demand in terms of lift capacity. The result has been a smaller amphibious fleet but with individually larger ships. With lift capacity being the preeminent criterion, the Navy naturally followed the same logic as commercial shipping companies have discovered that ever-larger ships reduce the cost per ton of cargo moved. While the Austin-class LPD was approximately 10,000 tons, the successor San Antonio-class was 25,000 tons displacement—2.5 times larger.

The Marine Corps now recognizes that lift is an inadequate metric for a future surface combatant confronted with peer adversary threats, near-ubiquitous sensors, and anti-ship missiles that pose a substantial risk to any surface ship. The threat has changed such that a more distributed fleet of smaller more numerous ships is required to avoid complete catastrophe if a ship is destroyed.[2]

Looking more broadly to the fleet as a whole, during this same seventy-plus year timeframe, the Navy has maintained an aircraft carrier-centric fleet architecture. The Navy's aircraft carriers are the most expensive combatants in the world, with the new Ford CVN-78 costing over $13 billion.[3] The Congressional Budget Office estimates it will cost roughly $380 billion (in 2018 dollars) to replace the naval aviation fleet.[4] This massive investment in aircraft carriers and their associated aircraft substantially constrains the Navy's fleet design options. While other nations have carriers and are building more, none have super carriers because none can afford them—with the exception of China, which is nevertheless building small numbers of more modest variants. Additionally, these expensive platforms must be protected, requiring a large proportion of surface combatants to be dedicated to their defense, thus making the carrier-centric fleet the fundamental structural element driving Navy investments. Unless this prevailing fleet architecture changes, ship requirements will substantially exceed resources in

Today's San Antonio-class amphibious transport dock ship or LPD will be replaced by the future LXX. What does the Marine Corps require in this new class of amphibious ship? *(Photo by Mass Communication Specialist 2nd Class Jesse Monford.)*

perpetuity, and the fleet will only be able to modernize at the margins.[5]

Options

The Navy has three options for modernizing the fleet. It can ask for more money, further reduce the size of the fleet, or change the fleet architecture by leveraging new technologies that achieve mission demands more efficiently.

Throughout living memory, the Navy has pursued the first option to achieve its assigned missions, to argue for more money to build and maintain the current carrier-centric fleet architecture. This consistency has consistently met with the same result—inadequate resources, thus necessitating a reduction in ship inventory. Given that the national economy is more leveraged than ever before, with the national debt at historic proportions and inflation at its highest level in 40 years, a strategy reliant upon substantial increases in budgets, a strategy that has not worked even in more healthy economic circumstances, is not going to succeed.

Even if the current fleet was the right answer, CBO Analysis of the Navy's Fiscal Year 2022 Shipbuilding Plan "estimates that the cost of shipbuilding for a fleet of 398 to 512 manned ships and unmanned vessels as envisioned in the 2022 plan would be about $25 billion to $33 billion (in 2021 dollars) per year, over 30 years, compared with an average of about $23 billion per year over the past five years."[6]

There is no shortage of defense commentators calling for greater investments in the fleet and the need for a larger fleet. They have been consistent in this perspective for several decades; meanwhile, the fleet continues to shrink. Recently, during the WEST 2022 conference, CNO Gilday "concluded—consistent with the analysis—that we need a naval force of over 500 ships … We need 12 carriers. We need a strong amphibious force to include nine big-deck amphibs and another 19 or 20 [LPDs] to support them. Perhaps 30 or more smaller amphibious ships to support Maritime Littoral Regiments … to 60 destroyers and probably 50 frigates, 70 attack submarines and a dozen ballistic missile submarines to about a 100 support ships and probably looking into the future about 150 unmanned."[7]

Unfortunately, it appears both the defense commentariat and the Navy maintain the need for the unattainable—more of today's fleet to meet tomorrow's demand as if the problem is simply needing more of today's ships rather than a fleet with improved fitness for purpose. Both communities implicitly affirm that the current fleet architecture is appropriate—we just need more of it to deal with a growing People's Liberation Army Navy.

The Chief of Naval Operations and the Commandant of the Marine Corps recently testified that a healthy amphibious fleet is a requirement.[8] Yet, while the LPD Flight II ship class is planned for thirteen ships, the President's budget submission truncated the program to only two ships.[9] The Navy's position that these ships are unaffordable given other more pressing needs, such as ballistic missile submarines and aircraft carriers, is correct if the carrier-centric fleet remains the objective.

Given that the Navy and Marine Corps leadership have affirmed the need for amphibious ships and Congress is contemplating legislation to create a floor of 31 amphibious ships, it is essential for the Navy and Marine Corps to work together on what comes after the truncated LPD Flight II-class. To begin this endeavor, it is important to recognize a fleet is an interdependent system of systems, making it essential to consider the fleet as a whole and not separate elements like amphibious ships and surface warfare ships operating in stovepipes. This is especially the case when surface warfare ships and amphibious warfare ships occupy the same sea space, face the same threats, and often contribute to the same sea control or sea denial missions.

Fortunately, missions, threats, and new opportunities are converging and combining to shrink the historic distinctions between surface combatants (warfare) and amphibious (transport) ships. This affords important opportunities should we recognize the tectonic forces at play and use them to our advantage.

As I explained in *A Fleet for the Unmanned Era*, fundamental changes in technology and associated threats and opportunities require a different fleet architecture to be affordable and fit for purpose.

Amphibious ships fall into two general categories, big deck and small decks, or more precisely, LHAs and LHDs for the former and LPDs and LSDs (rapidly retiring) for the latter. The big deck amphibious ships, LHAs and LHDs, are workhorses of the fleet operating as small aircraft carriers employing the F-35B, and as helicopter carriers employing light, medium, and heavy-lift rotorcraft, while their welldecks accomodate surface effect and standard displacement surface connectors for ship-to-shore mobility. This wide range of capabilities makes the big deck extremely versatile in peacetime, crisis, and war. The Marine Corps' investment in fixed-wing, rotary-wing, and emerging unmanned aviation platforms guarantees that big decks will be in the fleet for decades to come. Thus, the most pressing issue for the future of the amphibious fleet is the question of the future small deck ship.

LSDs are reaching the end of their service life and will soon be retired completely, leaving the LPD 17-class as the sole small deck amphibious ship class. The San Antonio-class LPD 17 began service in 2006, a decade after the contract award. Given a similar building trajectory, the time is now to determine what the next small deck amphibious ship should be.

In the aforementioned article, I argued the next small deck should be a Frigate Helicopter Dock (FHD). The FHD would be a large frigate of perhaps 10,000 tons displacement with a 48-cell vertical launch system, a flight deck to accommodate MV 22, the ability to carry a company of Marines, and possessing enough beam for an LCAC-capable welldeck. In the intervening years since that article, the Navy has chosen a more traditional frigate design, the Constellation-class with twenty ships currently planned.

Of note, the Chinese Navy is also considering a new Type 054B frigate that could be up to 6,000 tons dis-

placement and would be powered by an integrated electric propulsion system, carrying an array of anti-ship cruise missiles and at least one Z-20 helicopter or drone.[10] This indicates that both the People's Liberation Army Navy and the U.S. Navy recognize a platform that can be built affordably and in numbers while still providing a complete suite of sensors and weapons is an important fleet asset.

Having failed at convincing the Navy of the benefits of an FHD, what other options might be available for consideration? Since 2014, it has become even more obvious that unmanned systems have a substantial role in the future of naval combat given the commercially driven progress in autonomy, microelectronics, power, and control systems yielding incredible opportunities for reimagining the fleet. Sensing and precision fires have also evolved, presenting both threats and opportunities to be considered and concepts like Distributed Maritime Operations, Expeditionary Advanced Base Operations, and Stand-in Forces have been introduced.

In response to the need for greater sensor range and standoff, the Navy's Flight IIA destroyers are equipped with helicopter hangars. LT Mark Langford, the U.S. 7th Fleet's Deputy Public Affairs Officer stated, "U.S. Navy Flight IIA destroyers, with embarked helicopters and aircrews, greatly expand the range and capabilities of anti-submarine warfare throughout the Indo-Pacific with their ability to carry helicopters to areas beyond the reach of land-based helicopters."[11]

Thus, even though the FHD was not realized, the Navy has recognized the benefits of surface combatants with flight decks and hangars. As uncrewed surface and subsurface platforms evolve, it is no stretch of the imagination to see that welldecks will similarly be recognized as greatly expanding the utility of surface combatants. At this point, perhaps, the FHD concept can be revisited.

More Options

The Marine Corps has registered a requirement for a Light Amphibious Warship (LAW) for littoral mobility and maneuver. The Marine Corps wants 35 of these small ships that will be between 200–400 feet, displacing up to 4,000 tons with a crew of 40 sailors and the ability to embark 75 Marines. Armament will only be for basic self-defense consisting of a 25 or 30mm cannon and machineguns. However, these small vessels are not a replacement for traditional amphibious ships, and they are focused on providing shore-to-shore mobility. Thus, the Marine Corps wants to maintain 31 traditional amphibious ships in addition to 35 LAW.

An SH-60S Sea Hawk helicopter lands on the guided-missile frigate USS* Thach *while underway conducting maritime security operations. *(Photo by Petty Officer 3rd Class Torrey Lee.)*

Since the LAW is anticipated to be approximately 4,000 tons displacement and the LPD is 25,000 tons, the replacement small deck amphibious ship will naturally fall somewhere between these upper and lower bounds. The previously mentioned FHD was postulated to be around 10,000 tons displacement and given the imperatives for greater numbers to allow for greater dispersion of personnel and critical assets, the second alternative after the FHD would logically come in at around 6,000 to 8,000 tons to provide reasonable platform differentiation across the fleet.

The expected average cost of the LAW is $145M. The Iver Huitfeldt-class frigate of the Royal Danish Navy is a fully functional frigate of just under 7,000 tons, 455 feet in length, and costing approximately $325M per ship. Thus, this Danish frigate fits the size and price parameters for a small-deck falling between the LAW and the postulated 10,000 FHD while also being far smaller and cheaper than the current 25,000 ton, $1.7B San Antonio-class LPD. Within these length and displacement parameters, the Navy and Marine Corps could develop a highly flexible combatant that would serve many purposes across the fleet beyond an amphibious transport role.

The new LPD-S (small) would have a flight deck and welldeck. The flight deck would accommodate MV 22 take-off and landing and would have a hangar deck that could store various uncrewed aviation systems capable of vertical take-off and landing such as the VBAT 128. The welldeck would be too small for LCAC or LCU connectors but could carry an array of patrol craft and crewed and uncrewed surface and subsurface vessels. The under-utilized ESBs would be leveraged to carry traditional surface connectors and could be tethered to ARG/MEUs as required.

This LPD-S would accommodate a company of Marines who would also assist in flight deck and welldeck operations to gain maximum efficiency in crew size. It would not have complete combat systems such as the Constitution-class frigate; thus, it would operate as a remote magazine for other platforms or shore-based EABs. As efficiencies in processing power, autonomy, and

power storage and distribution progress, uncrewed vessels carried in the welldeck could be deployed to autonomously station-keep and provide offboard sensors such as multi-static radar nodes and self-defense weapons systems. Changing the uncrewed payload mix would allow for easy tailoring to accomplish anti-submarine, anti-surface, anti-air, or amphibious missions as desired. This sort of mission agility is necessary to get the most bang for the buck given budget-constrained ship numbers.

LPD-S would be a useful complement to the LAW, with the ability to command a LAW flotilla while the LAW could be used to move forces and materiel from the LPD-S to shore. Armed with approximately 32 vertical launch system cells and other canister-mounted missiles such as the Naval Strike Missiles, the LPD-S could provide substantial fires in support of stand-in forces, allowing them to focus more on reconnaissance/counter reconnaissance missions with a smaller signature and reduced logistics demand. A system of LAWs, EPFs, ESBs, LPD-S (small), San Antonio-class LPDs, and LHAs/LHDs would provide many options for persistent forward presence, engagement with allies and partners, scouting, screening, and kinetic and non-kinetic fires.

As sensors continue to improve in sensitivity and discrimination while becoming cheaper and therefore more proliferated (mobile phones to satellites), it will become impossible to hide. We must counter this challenge by producing smaller more distributed platforms to increase fleet resilience while focusing EAB and small combatant defenses on defeating terminal stage attacks through signature management, obscurants, deception, electronic countermeasures, close-in weapons systems, terrain masking, and operating within air defense umbrellas provided by the fleet, Joint Force, allies, or partners.[12]

Conclusion

Amphibious operations are more central to fleet operations than at any time since World War II. During that war, amphibious assaults captured island after island to extend the reach of fleet aircraft, ships, and submarines. Rather than rollback enemy anti-access/area denial systems, stand-in amphibious operations provide a sea and land-based advance force, to defend allied and partner terrain while scouting and screening for the fleet. This approach enables fleet operations as in World War II but without the necessity of conducting a bloody island-hopping campaign to achieve necessary positional advantage—stand-in forces are already there. This approach allows the fleet to engage at range without exposing its capital ships to higher density attack options available closer to the adversary's shore. The centrality of this contribution to sea control and sea denial means the priority the Navy assigns to amphibious ship acquisition should change to reflect its increasing importance to fleet operations. A replacement for the LPD is not just a Marine Corps desire, it is a fleet imperative.

Notes

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