Hudson Institute

Prepared statement by

Bryan Clark

Senior Fellow
Hudson Institute

Before the House Armed Services Subcommittee on Seapower and Projection Forces on "Future Force Structure Requirements for the United States Navy."

Chairman Courtney, Ranking Member Wittman, and distinguished members of the committee, I am honored to appear today for this discussion of the U.S. Navy's future force structure. The fleet is at an important crossroads. Nearly 20 years after the drive for transformation led to costly and problematic programs such as the Littoral Combat Ship (LCS), *Gerald R. Ford*-class aircraft carrier, and *Zumwalt*-class destroyer, the Navy is starting new ships in every vessel category. Smart decisions on the design of these ships, and of the fleet as a whole, will be essential to create a force that affordably supports future defense strategy and avoids mistakes of the past.

The Navy is arguably facing a once-in-a-century combination of challenges and opportunities as it embarks on a new family of ships. Like their predecessors during the years following the First World War, Navy leaders are reconsidering the relevance and survivability of the fleet's premier capital ship; emerging technologies are enabling new platforms and tactics that could disrupt today's fleet's design; rising peer competitors are threatening U.S. allies and the international order; and budget constraints prevent the Navy countering revisionist powers by simply growing the fleet with better versions of today's ships and aircraft.

And like the interwar period, the Navy will need a new fleet design to sustainably address its challenges and exploit its opportunities. Unfortunately, the Navy's current plans fail to deliver on these goals. By continuing to emphasize large multimission combatant ships, the force structure reflected in the PB 2020 Shipbuilding Plan and PB 2021 budget includes too few ships to distribute the fleet or create sufficient complexity to slow or confuse an enemy's attacks. Moreover, the fleet's weighting toward large manned platforms creates unsustainable operations and support costs the Navy is even now struggling to pay.[1]

The Navy needs a theory of victory

Navy force structure requirements rest on an implicit or explicit concept for how the Navy will deter aggressors or win if deterrence is unsuccessful. The last two decades of Navy assessments assembled requirements from the bottom up, building campaign plans to fight in canonical scenarios and determining the forces needed to succeed using modeling and simulation. These

[1] David Larter, "Despite Record Budgets the U.S. Navy is Short Hundreds of Millions for maintenance," *Defense News,* accessed at https://www.defensenews.com/naval/2019/08/19/despite-record-budgets-the-us-navy-is-short-hundreds-of-millions-for-maintenance/.

requirements, combined with the day-to-day naval presence needed by Combatant Commanders, resulted in a force structure requirement.[2] The bottom-up method of force structure planning, however, tends to rely on attrition-centric tactics that defeat an enemy in detail, rather than reflecting an overarching operational concept for overcoming specific opponents.

The home field advantage enjoyed by potential adversaries like China, Russia, North Korea, or Iran has allowed each to establish a robust network of sensors and weapons designed to raise the bar for U.S. intervention in their region. Under the protective umbrella of these systems, these rivals pursue a wide range of military and paramilitary actions below the threshold of violence that would provide a pretext for large-scale U.S or allied retaliation. As a result, U.S. commanders are forced to accept significant risk with a proportional response or deploy large, well-defended force packages that could be portrayed as unduly provocative. And if confrontation turns to conflict, adversaries' sensor and weapons networks could rapidly overwhelm the defenses of U.S. and allied naval forces.

Overcoming these threats in the face of technology proliferation and fiscal constraints will require more than simple attrition. New approaches described in DoD's Joint Warfighting Concept and the Navy's concepts for Distributed Maritime Operations and Littoral Operations in a Contested Environment suggest the Navy's theory of victory should instead rest on establishing a decision-making advantage over adversaries.[3] This approach, drawn from maneuver warfare, would combine defensive operations to foreclose enemy attack options with a diversity of offensive capabilities and complex force presentations to degrade adversary decisionmaking.[4]

Decision-centric warfare requires new operational concepts

The Navy's fleet design should prioritize a new set of characteristics to implement decision-centric warfare in the emerging strategic and fiscal environment:[5]

- Defensive capacity in each platform or force package to defeat a prompt adversary attack and enable U.S. forces to effectively fire their offensive weapons;
- Offensive weapons capacity distributed across numerous platforms and able to sustain strike and counter-maritime operations;
- Force package diversity at various scales to enable proportional responses to aggression;

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[2] Arthur Barber, III, "Redesign the Fleet," *U.S. Naval Institute Proceedings,* (Annapolis, MD: U.S. Naval Institute, 2019), accessed at https://www.usni.org/magazines/proceedings/2019/january/redesign-fleet.

[3] Philip Davidson, "Transforming the Joint Force: A Warfighting Concept for Great Power Competition," *PACOM.mil,* March 3, 2020, accessed at https://www.pacom.mil/Media/Speeches-Testimony/Article/2101115/transforming-the-joint-force-a-warfighting-concept-for-great-power-competition/.

[4] For more detail on decision-centric warfare, see Bryan Clark, Dan Patt, and Harrison Schramm, *Mosaic Warfare: Exploiting Artificial Intelligence and Autonomous Systems to Implement Decision-Centric Warfare,* (Washington, DC: CSBA, 2020), accessed at: https://csbaonline.org/research/publications/mosaic-warfare-exploiting-artificial-intelligence-and-autonomous-systems-to-implement-decision-centric-operations.

[5] The rationale and application of these metrics is detailed in Bryan Clark and Timothy A. Walton, *Taking Back the Seas: Transforming the U.S. Surface Fleet for Decision-Centric Warfare,* (Washington, DC: CSBA, 2019), accessed at https://csbaonline.org/research/publications/taking-back-the-seas-transforming-the-u.s-surface-fleet-for-decision-centric-warfare/publication/1.

- Complexity of force packages to counter adversary decision-making, based on the number of different ways a force package can deliver a warfighting effect; and
- Sustainable costs for procurement and operations and support.

Improving the Navy's performance in these metrics will require new approaches to important naval missions, as described below. A foundational element of these tactics is the distribution of naval forces as described in concepts for Distributed Maritime Operations and Littoral Operations in Contested Environments.[6]

Air and Missile Defense (AMD): More distributed formations will dilute adversary attack salvos, reducing the number of weapons each ship or force package may face. More disaggregated forces will also lend themselves to air defense tactics that focus on shorter ranges, allowing greater reliance on electronic warfare, directed energy weapons, and smaller surface-to-air interceptors that can be carried in larger numbers. The Navy's current layered air defense approach, including long-range interceptors like the SM-2 and SM-6, will be employed to project larger platforms such as amphibious assault ships and aircraft carriers.

Anti-Submarine Warfare (ASW): Today submarines and surface combatants contribute to ASW but will need to devote more of their effort to strike and air defense in the future fleet. The Navy will therefore need to increase its reliance on unmanned vessels and sensors to conduct ASW sensing, supported by unmanned and manned aircraft to pounce on targets with suppression weapons, rather than large, expensive torpedoes.

Land and Maritime Strike: The limited reach of today's carrier-based tactical aircraft and small number of refueling tankers planned by the Navy will constrain carriers' capacity for offensive operations from ranges where carrier strike group (CSG) defenses can defeat enemy weapons salvos. Although aircraft with standoff missiles can conduct strikes 1000 nm from a carrier without refueling, these weapons are the same price as their surface-launched counterparts and incur the additional cost of the air wing and carrier escorts. Strike operations will therefore increasingly be conducted by surface combatants, complemented by submarines for hypersonic missile attacks or strikes from inside highly-contested areas.

Amphibious Operations: Today's amphibious fleet is designed to support amphibious assaults from short-range, although it has been repurposed for other amphibious operations including disaster response and humanitarian assistance. Large-scale assaults will only grow more challenging in the future, while the need for Marines are increasingly needed to conduct widely-distributed missions ashore as part of the Expeditionary Advance Base Operations (EABO) concept. Despite their relatively small capacity, F-35 detachments or future Marine short-range air defenses can compel opponents to shift tactical aircraft to suppression or escort operations.

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[6] "CNO Visits Navy Warfare Development Command," Navy News Service, April 13, 2017, available at https://www.navy.mil/submit/display.asp?story_id=99893; "Littoral Operations In A Contested Environment," Marine Concepts and Programs, U.S. Marine Corps, available at https://www.candp.marines.mil/Concepts/Subordinate-Operating-Concepts/Littoral-Operations-in-a-Contested-Environment/.

Marine anti-ship missile launchers can similarly impact an opponent's maritime freedom of action.

Mining and Mine Clearance: Mining will be an important component of naval maneuver warfare as it inherently imposes dilemmas on an enemy. Mine clearing has been a rising priority for the Navy during the last decade and is a primary mission for the LCS. Although the LCS mine warfare mission package is delayed by performance shortfalls, its emphasis on unmanned systems reflects the future of offensive and defensive mine warfare. The portability and scaling possible with unmanned systems suggest the Navy should decouple mine warfare from the LCS and deploy these packages on a range of vessels to support minelaying and clearing.

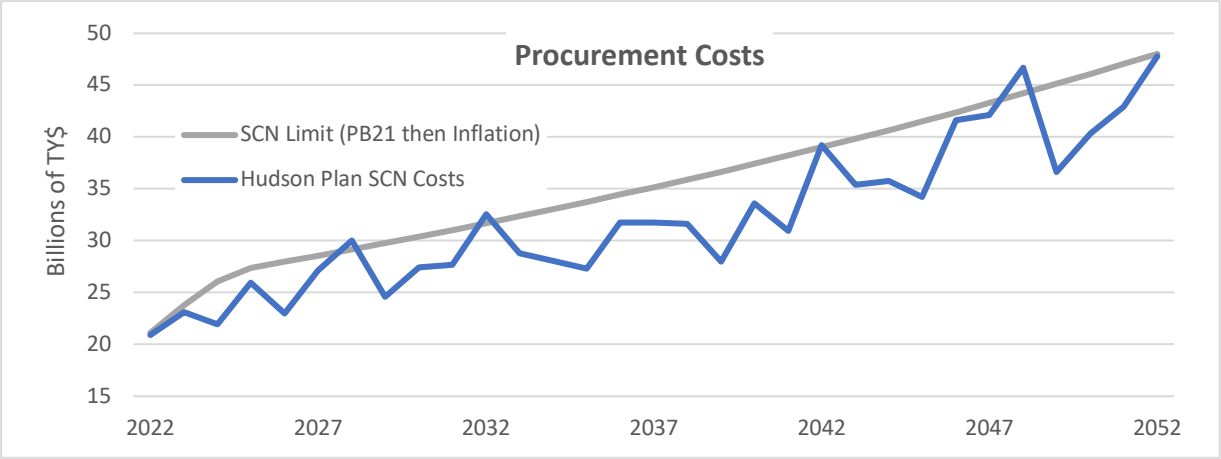
A new fleet design is achievable

The Navy can evolve to improve its distribution, offensive and defensive capacity, complexity, and cost in support of new concepts for maritime maneuver warfare. Hudson Institute developed a plan to implement maritime maneuver warfare that reflects these metrics, these results of which are depicted below for the 2045 timeframe.

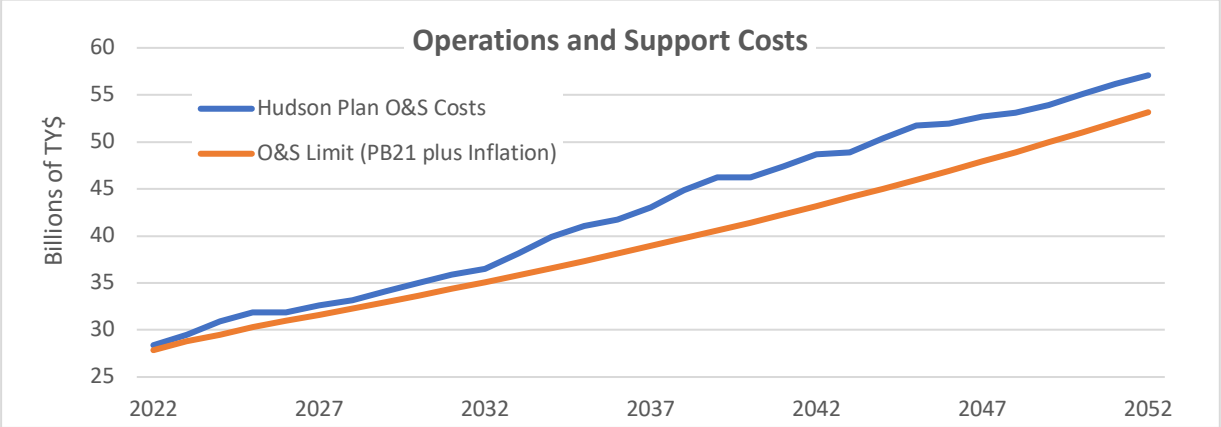
Proposed 2045 Navy Fleet

Nuclear Aircraft Carrier (CVN)	10
Large Surface Combatant - Cruisers (CG) and destroyers (DDG)	77
Small Surface Combatant – Frigates (FFG) and LCS	52
Corvette (DDC)	91
Medium Unmanned Surface Vessel (MUSV)	112
Nuclear Ballistic Missile Submarine (SSBN)	12
Nuclear Attack Submarine (SSN)	61
Nuclear Guided-Missile Submarine (SSGN)	0
Extra-Large Unmanned Undersea Vehicle (XLUUV)	40
Oiler (T-AO/T-AOE)	20
Dry Cargo and Munitions Ship (T-AKE/T-AKM)	19
Future Small Oiler (T-AOL)	20
Amphibious Assault Ship (LHA/LHD)	9
Amphibious Landing Dock (LSD) / Amphibious Transport Dock (LPD)	24
Future Small Amphibious Vessel (LAW)	27
Command and Support Ships	51
Manned vessels	473
Manned vessels and unmanned vessels (XLUUV and MUSV)	625

This architecture is estimated to be achievable within FY 2021's ship construction budget, adjusted for inflation, and the capacity of the shipbuilding industrial base, as shown below.



Notably, the architecture is projected to cost between 3 and 10 percent more to operate and support than is budgeted in FY2021, adjusted for inflation. The challenge of managing sustainment costs suggests the Navy should more explicitly incorporate operations and support expenses into its fleet design analysis.



Details of the shipbuilding plan, posture, and readiness processes for the fleet architecture described above are beyond the scope of this testimony, but major changes for each ship type are addressed below. For each of the force structure evolutions described, the Hudson fleet architecture assumes new platforms are fielded initially in prototype, with serial production starting after 2-3 years of evaluation and concept development

Aircraft carriers: The architecture continues to build *Ford*-class CVNs, but adjusts their construction frequency to 6 years, allowing the number of carriers to gradually lower to 10. This reduces the fleet's overall operations and support costs and reflects the changing role of carriers from the primary strike and air defense platform to one that is complemented by surface combatants in these missions.

Surface combatants: The architecture rebalances U.S. surface forces away from large combatants and toward smaller ships by slightly reducing procurement of new DDGs, retiring aging CGs and DDGs at their end of service life, and building new FFGs. Because the FFG only provides 1/3 of

a DDG's weapons capacity at about 2/3 the cost, the architecture does not substitute FFGs for DDGs and instead assumes they will be used as the lead ship in ASW and escort SAGs. To further distribute the fleet, increase the complexity of force packages, and enable sustainable fires, the architecture also constructs corvettes instead of the Navy's planned large unmanned surface vessel (LUSV). As part of strike-oriented SAGs, corvettes would carry offensive missiles and rotate through remote reload stations to sustain fires. Because they would be manned, however, corvettes could also conduct maritime security and other missions LUSVs would be ill-suited to perform.

Submarines: The architecture continues production of *Virginia*-class SSNs with the Virginia Payload Module. As adversary ASW capabilities improve the additional payload capacity would likely evolve from carrying missiles to deploy undersea vehicles and systems. Due to industrial base limits during construction of the *Columbia*-class SSBN, the SSN fleet does not reach 60 ships until the 2040s. The architecture follows the Navy's plan to build a fleet of 12 *Columbia*-class SSBNs.

Amphibious Vessels: The architecture rebalances today's amphibious fleet to better support the Marine Corps' emerging force design and EABO concept, although both are still under refinement. To provide longer range fires to widely-distributed Marines and support air operations from austere forward bases, LHAs and LHDs are employed primarily as Marine F-35B carriers. The architecture envisions LSDs and LPDs supporting establishment of expeditionary bases and larger amphibious operations such as noncombatant evacuation, humanitarian assistance, and disaster response. To meet the LSD/LPD requirement and sustain the amphibious ship industrial base, the architecture maintains LPD Flt II in production by procuring one every other year until a follow-on ship is developed in the 2040s. For movement of troops and equipment to and between distributed Marine bases, the architecture builds a new light amphibious warship.

Logistics and Support Vessels: The architecture expands logistics forces with new classes of vessels to enable more distributed sustainment concepts and increase the resilience of deployed naval formations. The proposed logistics fleet includes small oilers, large consolidated logistics tankers, dedicated weapon reload ships, additional medical and towing and salvage vessels, and more tenders to support the larger surface fleet and increasing numbers of deployed unmanned vessels. The fleet also provides sufficient funding for a new, flexible approach to strategic sealift.

A closing window of opportunity

Navy leaders need to establish force structure requirements and plans that address the U.S. military's operational challenges by exploiting conceptual and technological opportunities within the Navy's likely procurement and sustainment cost constraints. The past two decades of Navy force designs failed to meet these objectives because of their overly optimistic assumptions regarding budgets and research and development. Going forward the Navy will need to emphasize affordability and executability in its plans to gain the confidence of industry, the Congress, and allies abroad.

There is still time for the Navy to change course and develop a force better suited than today's fleet to long-term competitions with great and regional powers. Although the long-term changes proposed above to Navy fleet architecture would be significant, by acting now Navy leaders could begin an evolutionary approach that brings on new platforms after reasonable concept and design development while continuing production of proven ships to sustain the industrial base and recapitalize some of today's multimission vessels as they retire.

But the window for the Navy to start this evolution is closing. America's adversaries may intensify their efforts against U.S. allies if they perceive U.S. leaders are focused on domestic concerns and unwilling to begin new operations abroad. Fiscal constraints will also begin to foreclose options for the Navy to adopt a new fleet design. As shown above, operations and support costs for the fleet grow faster than inflation even with the proposed Hudson fleet architecture. Every year the Navy delays rebalancing the force to smaller, less-sophisticated, and less manpower-intensive platforms results in higher sustainment costs that will crowd out research and development or procurement of next generation ships, aircraft, and mission systems.

Like their predecessors between the World Wars, today's Navy leaders have an opportunity to establish an enduring advantage against U.S. competitors. Without significant change, however, the fleet could enter a spiral of rising costs, shrinking numbers, and technological irrelevance. The Congress should act to ensure this does not happen.