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STATEMENT BEFORE THE HOUSE ARMED SERVICES SUBCOMMITTEE ON SEAPOWER AND PROJECTION FORCES ON THE ROLE OF SURFACE FORCES IN PRESENCE, DETERRENCE, AND WARFIGHTING

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Chairman Forbes and Ranking Member Courtney, thank you for inviting me to appear before you today to present my thoughts on the role of U.S. Navy surface forces in presence, deterrence, and warfighting.

This discussion is timely, as today's U.S. Navy surface fleet is at a crossroads. At the beginning of this century, the Navy planned a new approach to surface warfare supported by a family of new ships: the CG(X) missile defense cruiser, DD(X) land attack destroyer, and sea control-focused Littoral Combat Ship (LCS).[1]

This new family of ships was intended to enable "network-centric warfare," wherein each ship would specialize in a small set of missions and aggregate their capabilities through a dense communications network. This would enable each ship to devote more effort to a smaller set of capabilities to address improving threats, while retaining the ability of the larger fleet to conduct the full range of surface operations. Networking, it was argued, would enable numerous, widely-dispersed LCSs to provide day-to-day presence for security cooperation and training missions while being able to integrate with less numerous, regionally-focused CG(X)s and DD(X)s for deterrence and warfighting operations. Each of those ships, however, is now cancelled or in transition, and the concept of

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[1] Sea control is defined by the Navy as, "The employment of naval forces, supported by land and air forces as appropriate, in order to achieve military objectives in vital sea areas. Such operations include destruction of enemy naval forces, suppression of enemy sea commerce, protection of vital sea lanes, and establishment of local military superiority in areas of naval operations." See U.S. Navy, *Naval Operations Concept 2010* (Washington, DC: U.S. Navy, 2010), available at http://www.navy.mil/ maritime/noc/NOC2010.pdf.

network centric warfare has been undermined by improving communications jamming and counter-targeting capabilities among our potential adversaries.

The Navy needs a new approach to surface warfare informed by the demands of a security environment that is not as benign or stable as it was in 2001. Fifteen years ago, a decade after the fall of the Soviet Union, the Navy was without a significant competitor. U.S. surface combatants could take sea control for granted and specialize in new missions such as ballistic missile defense (BMD), counter-piracy, or strike. Today the Navy's ability to achieve sea control is increasingly contested. Sophisticated anti-access/area-denial (A2/AD)[2] capabilities continue to improve and proliferate from near-peer competitors to other U.S. rivals, threatening U.S. freedom of action and challenging its security assurances to allies and partners. At the same time, instability is spreading through the actions of revisionist states such as Russia, China, and Iran, as well as the failure of governments in the Middle East and Africa. Despite these growing threats to U.S. security interests, the funding available to the Navy for new force structure and capabilities is projected to decline in the next decade due to a combination of rising personnel costs and legislative budget caps.

Fortunately, the Navy has an opportunity to adapt its surface fleet to address these challenges. Consider that in the next year the Navy will be:

- Identifying the systems and configuration of the Flight III *Arleigh Burke* destroyer, whose production has been restarted with the truncation of the DD(X);
- Determining specific requirements for the last 20 LCSs to make them more lethal;
- Implementing a plan to sustain its cruiser capacity given the cancellation of CG(X);
- Deciding the characteristics and acquisition approach for several surface fleet weapons and sensors; and
- Integrating into the fleet new ship classes such as the Joint High Speed Vessel (JHSV), Afloat Forward Staging Base (AFSB) and Mobile Landing Platform (MLP) that could reduce the demand for surface combatants.

The Navy should take advantage of these opportunities to achieve two main objectives:

[2] For the purposes of this paper, anti-access (A2) capabilities are associated with denying access to major fixed-point targets, especially large forward bases, whereas area-denial (AD) capabilities threaten mobile targets over an area of operations, principally maritime forces, to include those beyond the littorals. See Andrew Krepinevich, *Why AirSea Battle?* (Washington, DC: Center for Strategic and Budgetary Assessments, 2010), pp. 8–11.

1. Restore the ability of surface combatants to gain and maintain access for the joint force through sea control; and
2. Sustain the ability of the surface fleet to provide a stabilizing presence and conduct security cooperation operations with allies and partners.

Surface Warfighting and the Centrality of Sea Control

As described in DoD's Air-Sea Battle Concept and Joint Operational Access Concept, and as characterized by Navy leaders, the Service's current role in joint warfighting is gaining and sustaining access for the joint force.[3] This responsibility often falls to naval forces because they can conduct sustained large-scale operations from an offshore sanctuary outside the range of enemy land-based weapons and are often the first element of the joint force to arrive at the conflict area. In comparison, air forces require fixed land bases that may not initially be prepared to support sustained operations or may be located in close proximity to the adversary.

The surface fleet's main contribution to access is intended to be sea control, as described in the Naval Operations Concept, consisting of anti-surface warfare (ASUW), anti-submarine warfare (ASW), mine warfare (MIW), anti-air warfare (AAW) and strike warfare against shore-based missile launchers.[4] While ground, air, and other naval forces will likely contribute to sea control in a variety of situations, they also have competing power-projection missions such as amphibious assault, strike, and associated surveillance and reconnaissance. Only surface combatants retain sea control as their primary responsibility.

Increases in the number and capability of anti-ship missiles suggest that to achieve sea control in the future, surface combatants will need to defeat enemy aircraft, ships, submarines, and shore-based missile launchers before they are within weapons range of U.S. forces. Otherwise the size of incoming missile salvos may overwhelm surface combatant defensive capacity. In other words, the surface fleet will need to concentrate on "killing the archer," or offensive sea control, as opposed to "shooting down the arrow," or defensive sea control.

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[3] The Air-Sea Battle concept is subordinate to the Joint Operational Access Concept and focuses on defeat of A2/AD threats in air and maritime areas adjacent to and in the conflict area. See DoD, *Air-Sea Battle* (Washington, DC: DoD, 2013), available at http://www.defense.gov/pubs/asb-conceptimplementation-summary-may-2013.pdf; Admiral Jonathan Greenert, U.S. Navy, Chief of Naval Operations, Statement before the House Armed Services Committee, "Planning for Sequestration in FY2014 and Perspectives of the Military Services on the Strategic Choices and Management Review," September 18, 2013; Christopher Cavas, "China Dominates Naval Strategy Discussion," *Defense News*, June 17, 2014.

[4] U.S. Navy, *Naval Operations Concept 2010*.

Surface navy leaders recently proposed a concept called "distributed lethality" that would improve the surface fleet's ability to attack enemy ships and missile launchers.[5] In this concept, almost all Navy surface ships, including supply and amphibious vessels, would carry offensive surface-to-surface missiles, providing more opportunities to engage enemy platforms before they can attack and complicating the adversary's targeting picture with a large number of potential threats. The primary shortfall in this new concept is that it does not address the most significant constraint on surface fleet offensive capacity—air defense. In wartime CGs and DDGs will devote much of their weapons capacity to defeating incoming missiles, leaving little room for offensive weapons that attack enemy ships, aircraft, or submarines. Further, supply and amphibious vessels that add long-range surface-to-surface missiles will make themselves more important targets to the enemy without improving their ability to protect themselves from missile attack.

To improve its capacity to "kill the archer," the surface fleet should start with its existing surface combatant fleet instead of arming new classes of ships. CGs and DDGs in particular can protect themselves in a high threat environment and have the sensor and communication capabilities to coordinate long-range attacks. To free up weapons capacity on these ships for offensive missions, the Navy should consider new approaches for air defense at sea and ballistic missile defense (BMD) ashore.

Establishing a New Approach to Sea-Based AAW

The main battery of a large surface combatant (CG or DDG) is its vertical launch system (VLS) magazine, which has a relatively small capacity and cannot be reloaded at sea.[6] Offensive ASUW, AAW, ASW, and strike weapons compete for space in the VLS magazine with defensive AAW weapons, so each cell not needed for air defense could be devoted instead to either weapons that can attack ships, aircraft, and submarines, or missile launchers and sensors ashore. Today only about one-third of VLS cells in a standard peacetime load-out contain offensive weapons such as Tomahawk or SM-6 missiles that can engage enemy weapon launchers or aircraft before they are in range to attack. This ratio would likely shrink even lower in wartime due to the increased need for air defense in protection of aircraft carriers.

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[5] Vice Admiral Thomas Rowden, Rear Admiral Pete Gumataotao, and Rear Admiral Peter Fanta, "Distributed Lethality," *Proceedings*, U.S. Naval Institute, 141/1/1, No. 343, January 2015, available at http://www.usni.org/magazines/proceedings/2015-01/distributed-lethality.

[6] Flight 1 DDG-51s have 90 VLS cells, whereas Flight II and IIa DDG-51s have 96 VLS cells; a CG has 122 cells. There are several potential approaches for at-sea reloading that could be pursued to increase the effective capacity of a large surface combatant.

War at sea today and in the future will likely include large anti-ship cruise missile (ASCM) salvos launched from ships, submarines, and aircraft, as well as smaller numbers of anti-ship ballistic missile (ASBM) attacks launched from shore. Today's long-range ASCMs cost $1–3 million, while an ASBM costs about $6–10 million.[7] Given the highly favorable cost engage ratios, an adversary could be expected to launch dozens of them in each attempt to disable or destroy a $1–2 billion DDG or the $11 billion carrier it defends.

The surface fleet could increase its defensive capacity—and significantly redress the cost imbalance—by adopting a new medium-range approach to air and missile defense. Today large surface combatants employ an integrated, layered defensive AAW scheme designed to engage enemy aircraft and missiles multiple times starting from long range (from 50 nm to more than 100 nm) through medium range (about 10–30 nm) to short range (less than about 5 nm). Each layer is serviced by a different set of interceptors. Those that are part of the long-range layer (e.g., SM-2 and SM-6) are the preferred means of defense. They are also the largest (taking up the most VLS space) and often the most expensive interceptors[8]. Electronic warfare (EW) systems are only used at short range against missiles that leak through the long and medium-range layers.

This layered defensive AAW approach puts surface combatants on the wrong end of weapon and cost exchange ratios. Using today's Navy doctrine,[9] the entire VLS magazine of a DDG (if entirely devoted to air defense) would be consumed against fewer than 50 ASCMs—missiles that would cost the enemy about 2 percent the price of the DDG.[10] Better, longer-range interceptors only exacerbate

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[7] An Indian/Russian BrahMos ASCM is $2 million–$3 million. See "Indian Army Demands More Missile Regiments," *Strategy Page* (blog), January 26, 2010, available at: http://www.strategypage. com/htmw/htart/articles/20100126.aspx. A U.S. Tomahawk LACM (comparable in sophistication to many ASCMs) is $1.3 million. See *DoD, Fiscal Year (FY) 15 Budget Estimates: Weapons Procurement, Navy* (Washington, DC: DoD, 2014), available at http://www.finance.hq.navy.mil/fmb/15pres/wpn_ book.pdf. Two Chinese analysts, Qiu Zhenwei and Long Haiyan, published the ASBM estimate in 2006. See Andrew S. Erickson, "Ballistic Trajectory—China Develops New Anti-Ship Missile," *Jane's Intelligence Review*, 22, January 4, 2010.

[8] Navy Air and Missile Defense Command (NAMDC), *The Navy Update and Role in Integrated Air and Missile Defense*, Power Point Presentation (Dahlgren, VA: NAMDC, August 31, 2009), available at http://www2.navalengineers.org/sections/flagship/documents/comrelbrief11aug09part2.ppt.

[9] A common U.S. air defense tactic is to shoot two interceptors at an incoming missile, look for successful engagement, and then shoot again if necessary. Therefore at least two interceptors are expended on every incoming missile.

[10] A Flight II or IIa DDG-51 has ninety-six VLS cells. A nominal wartime loadout would be forty-eight SM-2 interceptors, sixteen SM-6 interceptors, thirty-two ESSMs (eight cells), eight ASW rockets, and sixteen Tomahawk LACMs.

the problem. The SM-6 air defense interceptor that enters service this year costs about $4 million,[11] while an advanced ASCM costs about $2–3 million[12]. Given normal air defense doctrine, each defensive engagement using SM-6s will cost two to four times that of the ASCM it is intended to defeat.

A defensive AAW scheme centered instead on medium-range (10–30 nm)[13] interceptors such as the Evolved Sea Sparrow Missile (ESSM) would improve both the Navy's weapon and cost exchange ratios. ESSM engagements would be cheaper[14] than SM-6 engagements, and the ESSM Block 2 in development will have a fully active seeker that should achieve similar effectiveness to the SM-6. More importantly, medium-range interceptors such as ESSM are smaller than longer-range interceptors and can be placed in "quad packs" in each VLS cell, quadrupling the ship's defensive AAW capacity and/or enabling fewer VLS cells to be devoted to defensive AAW weapons. Moreover, shifting the air defense scheme to 10–30 nm will also enable EW systems to be used instead of kinetic interceptors against some enemy ASCMs. This could free up additional VLS cells for offensive operations. (With a long-range air defense concept, EW systems are only used at close range when kinetic interceptors fail.)

Similarly, a medium-range defensive AAW scheme will better enable the surface fleet to integrate new weapons such as lasers and electromagnetic rail guns (EMRG) that will likely be mature in the early to mid-2020s.[15] Because they do not require VLS cells, increasing the use of these systems for defensive AAW will enable the Navy to shift additional VLS capacity to offensive weapons. Lasers

[11] For comparison, an SM-2 interceptor costs about $680,000. See *DoD, Fiscal Year (FY) 15 Budget Estimates: Weapons Procurement, Navy*.

[12] This is the cost of the Russia/India codeveloped BrahMos ASCM based on the Russian SS-N-26 Yahkont ASCM. The BrahMos ASCM is being actively marketed to Latin American and Southeast Asian militaries. See "Indian Army Demands More Missile Regiments," 2010; and "BrahMos Missile Can Be Exported to Southeast Asian, Latin American Nations," *Economic Times*, August 3, 2014. For comparison, a Tomahawk costs about $1.3 million. See *DoD, Fiscal Year (FY) 15 Budget Estimates: Weapons Procurement, Navy.*

[13] An escort will need defensive AAW capabilities that reach 20–30 nm to be able to defend nearby ships. For safety, Navy ships normally maintain at least 3–5 nm between ships. An ASCM travelling at Mach 2 will take about forty-five seconds to reach a targeted ship 20 nm away. An escort ship could engage the incoming ASCM with ESSMs at that range from 10 nm on the other side of the targeted ship. These engagements would occur more than 5 nm from the defended ship, after which the defended ship's point defenses—close-in weapon system (CIWS) and Rolling Airframe Missile (RAM)—would be in range to engage "leakers" that are not defeated by the ESSMs.

[14] An ESSM costs about $1.3 million. See *DoD, Fiscal Year (FY) 15 Budget Estimates: Weapons Procurement, Navy.*

[15] Ronald O'Rourke, *Navy DDG-51and DDG-1000 Destroyer Programs: Background and Issues for Congress*, RL32109 (Washington, DC: CRS, July 31,2014).

operate in a straight line from the weapon to the target and are limited by the horizon from engaging a sea-skimming ASCM at more than 10–15 nm, while power limitations in the emerging generation of lasers will constrain their effective range to about 10 nm.[16] An EMRG will be most effective against ASCMs and ASBMs from about 10–40 nm due to the time-of-fight of its unpowered projectile. At longer ranges the enemy missile could maneuver before the projectile would reach it.

Laser and EMRG weapons, however, will not be able to completely replace interceptors or point defense systems. Too much moisture in the air may reduce a laser's effectiveness, while clouds, dust, or fog can prevent the electro-optical directors that aim the lasers from "seeing" the target. An EMRG is not affected by atmospheric effects but will require more electrical power than a CG or *Arleigh Burke* DDG can generate. It will have to be initially deployed on a separate vessel such as a JHSV or *Zumwalt* DDG. And even when the required power levels are available, the EMRG rate of fire will only be 6–10 shots per minute, which will limit the enemy missile salvo size that can be engaged to between three and six missiles.[17]

A final advantage of a medium-range air defense scheme is that it acknowledges the challenges in obtaining over-the-horizon targeting data in an A2/AD environment where data links could be jammed. Detecting a sea-skimming ASCM at the SM-6's maximum range would require a surface sensor positioned more than 100 nm forward from the surface combatant or an aircraft at more than 10,000 feet altitude above the fleet. But a CG or DDG could detect the same ASCM at 10–30 nm using its organic sensors, including its embarked helicopter.

The Navy will still need the SM-6, however, for offensive AAW. The SM-6 can engage enemy aircraft outside their ASCM range and are much less expensive than the aircraft they are designed to destroy, producing a more advantageous cost exchange ratio than using the SM-6 against enemy ASCMs. Enemy aircraft also generally fly at higher altitudes than ASCMs, enabling them to be detected farther away by shipboard radars whose visibility is otherwise limited by the horizon.

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[16] Ronald O'Rourke, *Navy Shipboard Lasers for Surface, Air, and Missile Defense: Background and Issues for Congress*, R41526 (Washington, DC: CRS, July 31, 2014). Also, as lasers become more common in defensive AAW, potential adversaries may begin attempting to harden missiles against laser attack.

[17] For example, a nominal ASCM speed is Mach 3.5, or about 2500 kts, and EMRG projectiles will average about Mach 5, or about 3600 kts. The ASCM will travel about 6 nm between EMRG shots if it has a 10 shot/minute firing rate. If the ASCM salvo is initially engaged at 30 nm, the EMRG will be able to shoot five times at the incoming salvo before it arrives at the ship. With a SS-L-S doctrine, at most three missiles could be engaged, and with a S-L-S doctrine, at most five could be engaged.

When available, the engagement range for offensive AAW could be enhanced by over-the-horizon targeting information via existing datalinks.

This new approach to sea-based AAW would increase the capacity of surface combatants for air defense and enable them to shift more of their VLS cells to host offensive missiles. This would allow surface combatants to kill enemy archers, as opposed to defeating their individual arrows.

Implementing new approaches to BMD

Adding more offensive weapons to surface combatant VLS batteries will only improve surface fleet warfighting if those ships are not tied down providing BMD to allies and partners. BMD is a relatively new mission for surface combatants; prior to 2005 no Navy ships were assigned to BMD operations, and force structure requirements did not reflect an allocation for this mission.[18] Now the Navy plans to have 43 BMD-capable ships by 2019[19] and on average two large surface combatants continuously deployed in the Mediterranean Sea, Arabian Gulf, and Western Pacific Ocean to provide BMD for partners and allies overseas. Supporting these demands requires at least 18 CGs or DDGs.[20]

Large surface combatants are attractive for BMD overseas because they can protect a large area (or "footprint") since the Navy's SM-3 interceptor destroys the ballistic missile in its "mid-course" phase outside the atmosphere. But the CGs and DDGs assigned to BMD missions are largely unavailable for defending carriers, hunting submarines, or interdicting enemy aircraft. The geometry required to intercept a ballistic missile prevents the BMD ship from maneuvering outside of a relatively small area while the readiness needed to promptly respond

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[18] Ronald O'Rourke, *Navy Aegis Ballistic Missile Defense (BMD) Program*: *Background and Issues for Congress*, RL33745 (Washington, DC: CRS, July 31, 2014).

[19] Missile Defense Agency, "Aegis Ballistic Missile Defense: Status," available at http://www.mda.mil/system/aegis_status.html, accessed July 2, 2014; O'Rourke, *Navy Aegis Ballistic Missile Defense (BMD) Program*.

[20] This calculation assumes two BMD-capable ships are deployed in the Mediterranean as part of the European Phased Adaptive Approach and in defense of Middle East partners; two are deployed in the Middle East to defend Arabian Gulf partners; and two are deployed in the Western Pacific to defend Japan and South Korea. This level of deployment is consistent with press reports of BMD deployments and Navy leader statements. "Forward Deployed Naval Force" (FDNF) ships based in Rota, Spain, and Yokosuka, Japan, source European and Pacific BMD deployments, respectively. The FDNF operational model requires two ships for each one underway. BMD ships in the Middle East would deploy rotationally from the United States, requiring five ships for each one underway overseas. See Admiral Jonathan Greenert, U.S. Navy Chief of Naval Operations, Statement before the House Armed Services Committee, "FY 2014 Department of Navy Posture," April 16, 2013, p. 10; Christopher Cavas, "First U.S. BMD Ship Leaves for Rota," *Defense News*, February 1, 2014.

to enemy missile launches limits the sensor and personnel resources that can be spared for other missions.

The demand for BMD ships will very likely continue to increase. Over the next decade, U.S. competitors plan to deploy ballistic missiles with stealthier warheads and "penetration aids" such as decoys or jammers designed to confuse or deceive the Navy's interceptors. Rivals will also field longer-range ballistic missiles, which are faster and shrink the footprint that can be protected. More interceptors and more ships will therefore be required in the future to defend the same area. Unless an alternative method is developed to defend military and civilian targets ashore, an increasing number of CGs and DDGs will be consigned to BMD stations overseas.

Shore-based BMD capabilities could reduce the demand for BMD ships. Aegis Ashore provides the same large, multiple-country footprint against short and intermediate-range ballistic missiles as a BMD-capable CG or DDG and will be deployed to Europe starting in 2015.[21] This system includes the same AN/SPY-1 radar and Aegis BMD version 5.0 software being installed on DDG-51 Flight IIa ships along with a 24-cell VLS carrying SM-3 interceptors.

The Navy should pursue replacing today's BMD ship stations in the Middle East and Japan with Aegis Ashore to defend fixed locations against known threats. The cost of an Aegis Ashore system is about $750 million,[22] while a Flight IIa DDG-51 costs about $1.6 billion and a Flight III DDG-51 is estimated to cost $1.9 billion.[23] The 2–3 Aegis Ashore systems that could be purchased for the cost of one DDG would be able to take the place of 4–15 DDGs, depending on whether the DDGs are forward-based.

Achieving small combatant lethality

Any plan to improve surface fleet warfighting must address small surface combatants (SSC), which the Navy intends to be more than a third of the surface fleet by the middle of the next decade.[24] The only SSC the Navy is building today is LCS, which lacks the capability to engage enemy platforms outside their ASCM range or to defend nearby ships from air and missile attack. LCS is instead designed to deploy a single mission package for ASW, ASUW, or mine

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[21] Specifically, Aegis Ashore systems will be deployed to Poland in 2015 and to Romania in 2018.

[22] "SM-3 BMD, in From the Sea: EPAA & Aegis Ashore," *Defense Industry Daily*, available at http://www.defenseindustrydaily.com/land-based-sm-3s-for-israel-04986/, accessed July 4, 2014.

[23] Deputy Chief of Naval Operations (CNO), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for FY2015* (Washington, DC: DoD, June 2014).

[24] Ibid.

countermeasures (MCM) operations. The Navy recently announced a plan that would improve SSC lethality by modifying the last 20 LCSs to be fast frigates (FF). The new FF would carry the LCS ASW mission package, improved armor, additional self-defense systems, and long-range ASUW missiles in a topside "box" launcher.[25]

This plan will produce SSCs that are able to engage enemy ships outside their ASCM range. It will not, however, significantly enhance surface fleet warfighting. As A2/AD capabilities proliferate and improve, noncombatant logistics ships and civilian convoys will need to be protected in more places and situations from ASCMs launched by enemy aircraft, coastal launchers, surface ships, and submarines. CGs and DDGs will have to provide this protection since the LCS and planned FF have only self-defense AAW systems.[26] While the Navy is also evaluating incorporating the SLQ-32 SEWIP EW system into the LCS and FF, it will not eliminate the need for air defense interceptors in those situations where non-kinetic EW defense is unsuccessful.

The need for CG and DDG escorts will likely result in all the Navy large surface combatants being taken up for defensive missions in wartime and substantially degrade the surface fleet's overall combat potential. As shown in Figure 1 the Navy's requirement for large surface combatants is 88. Each of the Navy's 11 CSGs notionally includes five CG or DDG escorts[27] and at least 18 more will be tied up in BMD. That leaves at most 15 CGs or DDGs available for escort missions—assuming air threats do not require additional CSG escorts and ships are not lost in combat or laid up for repair of damage suffered in combat. Since

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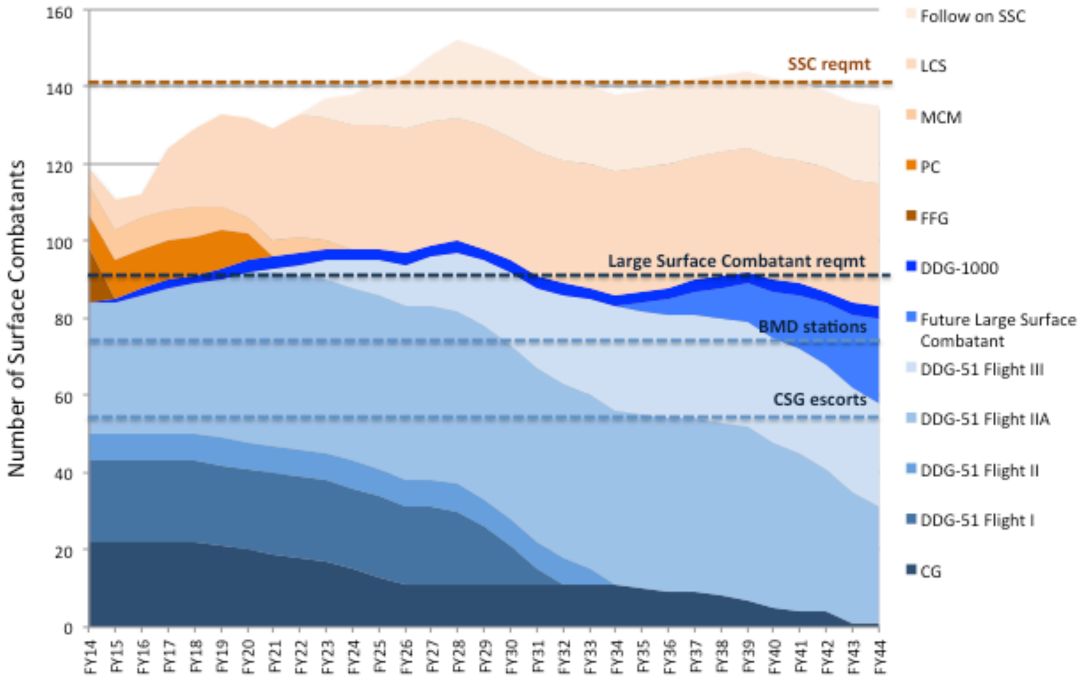
[25] Sam LeGrone, "SNA-Modified Littoral Combat Ship Class Changed To Fast Frigate," *USNI News*, January 15, 2015, available at http://news.usni.org/2015/01/15/sna-modified-littoral-combat-ship-class-changed-fast-frigate, accessed April 1, 2015; and Sam LeGrone, "Upgunned LCS Hulls Picked as Navy's Next Small Surface Combatant," *USNI News*, December 11, 2014, available at http://news.usni.org/2014/12/11/gunned-lcs-hulls-picked-navys-next-small-surface-combatant, accessed April 1, 2015.

[26] Given the LCS's short-range missiles, a defended ship would have to operate too close to the LCS to permit effective maneuvering and the LCS would have to be positioned between the incoming missile and the escorted ship or directly in front of or behind the escorted ship. To ensure the incoming ASCM is intercepted, two RAM would likely be shot at each incoming ASCM. This would result in the LCS's magazine of RAMs being exhausted after ten ASCM attacks. In the LCS's envisioned littoral operating environment, more ASCM attacks would likely occur before the ship could reload its RAM magazine.

[27] Department of the Navy, CNO, *Policy for Baseline Composition and Basic Mission Capabilities for Major Afloat Navy and Naval Groups*, OPNAVINST 3501.316B (Washington, DC: DoD, October 21, 2010), available at http://doni.documentservices.dla.mil/ Directives/03000%20Naval%20Operations%20and%20Readiness/03-500%20Training%20and%20 Readiness%20Services/3501.316B.pdf.

each convoy will require multiple escorts, it is likely all 15 will be needed for these operations.

Figure 1: Surface combatant inventory as described in Navy's FY 2015 30-year shipbuilding plan



It would be suboptimal to allocate large surface combatants with more than 90 VLS cells and multiple gun systems to defensive missions while SSCs with a dozen ASCMs constitute the surface fleet's wartime offensive capability. Instead, SSCs should escort noncombatant ships in place of CGs and DDGs. With the medium-range air defense scheme described above, the Navy could equip FFs with VLS magazines and lasers to provide them with a potent air defense capability at a range of 10–30 nm, enough for them to protect a nearby ship. While the LCS sea frame may only be able to support a 16 or 24-cell VLS magazine, with medium-range interceptors such as ESSM that fit four to a VLS cell, this would be as much air defense capacity as provided by today's DDGs.

Equipping the new FF with a VLS magazine would also enable it to carry offensive ASUW missiles such as the Naval Strike Missile and future Long Range Anti-Ship Missile (LRASM), or use multi-mission missiles such as the SM-2 in surface-to-surface mode. The Navy could thus increase the lethality of the FF against enemy surface ships while also relieving CGs and DDGs of escort duties, allowing them to go on offense as well.

PRESENCE AND READINESS FOR WARFIGHTING AND MARITIME SECURITY

The actions of revisionist states such as China and Russia are increasing demands from U.S. allies and partners for naval forces to support maritime security and training, and to provide a stabilizing presence. The gap between these demands and the supply of naval forces is growing. For example, due to sequestration and budget caps imposed by the 2011 Budget Control Act (BCA), naval deployments to U.S. Southern Command stopped entirely during 2013 and have not returned to their pre-2013 levels. [28] Worldwide, validated Combatant Commander requirements for presence have exceeded the fleet's inventory of ships by more than 50 percent over the last three years[29].

The Navy's requirement for 88 large surface combatants is designed to address projected needs for surface fleet warfighting and presence in stressing operational scenarios. According to the Navy's shipbuilding plan depicted in Figure 1 the fleet will reach this number in FY 2018. Because almost all of these ships are in the fleet, under construction, or on contract, the Navy is likely to reach its numerical objective. To meet its mission requirements, however, the surface fleet will need to improve the capability of individual ships as describe above.

While the Navy could have enough capable large surface combatants within the next few years, that does not guarantee those ships will be able to sustain naval presence overseas. Over the last three years, surface force leaders have cited manning, material condition, and training shortfalls as the most significant challenges facing the surface fleet[30]. The Navy recently announced an "Optimized Fleet Readiness Plan" (OFRP) that would lengthen operational cycles for large surface combatants and other CSG units to ensure sufficient time to train crews and maintain ships and aircraft between deployments.[31] This plan includes a single seven-month deployment over a 36-month cycle, which will produce less presence than today's deployment model. Therefore, the Navy will only be

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[28] Sam LeGrone, "Navy to Send Ship on Drug Patrols After Four Month Hiatus," *USNI News*, July 15, 2013, available at http://news.usni.org/2013/07/15/navy-to-send-ship-on-drug-patrols-after-four-month-hiatus, accessed April 1, 2015; Jennifer Lebron, "Greenert Provides Navy Update in Pentagon News Conference," *DoD News*, July 22, 2013, available at http://www.defense.gov/news/newsarticle.aspx?id=120497, accessed April 1, 2015.

[29] Kris Osborn, "CNO Tells Congress the US Needs 450-Ship Navy," *Military.com News*, March 12, 2014, available at http://www.military.com/daily-news/2014/03/12/cno-tells-congress-the-us-needs-450-ship-navy.html, accessed April 2, 2015.

[30] Thomas Copeman, *Vision for the 2026 Surface Fleet* (Washington, DC: DoD, 2014).

[31] Daisy Khalifa, "Gortney's Readiness: Predictable, Adaptable for Sailors," *Seapower Magazine*, April 8, 2014, available at http://www.seapowermagazine.org/sas/stories/20140408-gortney-redefines-readiness.html, accessed April 1, 2015.

successful in implementing OFRP if Combatant Commanders agree to accept a reduction in the forces deployed to their regions.

SSCs such as guided missile frigates (FFGs), minesweepers (MCM), and patrol coastal (PC) ships are intended to conduct less stressing missions such as security cooperation, training, maritime security, and mine clearing. But, as shown in Figure 1, by the end of this fiscal year, the Navy will have fewer than half its required number of SSCs as it decommissions its remaining FFGs faster than LCSs are delivered to replace them.[32] Although Figure 1 implies the number of SSCs will return to the required number by FY2024, it is based on the Navy's shipbuilding plan, which assumes future shipbuilding funding will exceed the historical average. Since DoD remains under the BCA budget caps until FY 2021, it is unlikely these higher levels of ship construction spending will be realized, and the number of SSCs built could very likely be lower than planned. Moreover, the Navy's planned FF ships will be more capable and therefore likely cost more than the LCS it will replace. This could further reduce the number of SSCs the Navy is able to build.

To address the large and persistent gap in SSC inventory and overseas presence, the Navy should equip noncombatant ships of the "National Fleet" to conduct some missions that would otherwise be performed by SSCs. The National Fleet formally consists of the U.S. Navy and U.S. Coast Guard, which together have 370 ships.[33] In the U.S. Navy's Battle Force there are about 60 noncombatant support and logistics ships, including (by FY 2016) seven JHSVs, two MLPs and one AFSB designed to host an array of unmanned systems, helicopters, and small boats. The National Fleet can also be considered to include the Maritime Sealift Command's 26 prepositioning ships and the Department of Transportation's 117 National Defense Reserve Fleet (NDRF) ships, 46 of which form the U.S. Navy's Ready Reserve Fleet.[34]

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[32] OPNAV N8, *Navy Combatant Vessel Force Structure Requirement, Report to Congress* (Washington, DC: OPNAV N8, January, 2013); Deputy CNO, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for FY2015*.

[33] The National Fleet is described in Department of the Navy, Office of the CNO and United States Coast Guard, Office of the Commandant*, National Fleet Plan* (Washington, DC: DoD, March 2014), and it consists of 290 Navy Battle Force Ships and ninety USCG cutters as of August 3, 2014. See Ronald O'Rourke, *Coast Guard Cutter Procurement: Background and Issues for Congress*, R42567 (Washington, DC: CRS, 2014).

[34] The forty-six RRF ships consist of thirty-five roll-on/roll off (RO/RO) vessels (which includes eight Fast Sealift Support vessels, FSS), two heavy-lift or barge carrying ships, six auxiliary crane ships, one tanker, and two aviation repair vessels. See Department of Transportation, "National Defense Reserve Fleet," available at
http://www.marad.dot.gov/ships_shipping_landing_page/national_
security/ship_operations/national_defense_reserve_fleet/national_defense_reserve_fleet.htm,

The LCS mission package concept could provide a way for these noncombatant ships to contribute in low threat environments to missions normally conducted by SSCs. In mine warfare and maritime security, for example, the LCS acts as a "mother ship," deploying off-board systems that conduct the mission, rather than as a tactical platform that directly does so. Mines are hunted today with autonomous vehicles such as the Mk-18 Mod 2 unmanned underwater vehicle (UUV) and neutralized with remotely operated systems including the SLQ-60 UUV. Similarly, pirates or traffickers are typically located using helicopters or unmanned vehicles such as the MQ-8C vertical take off UAV (VTUAV), and intercepted by rigid-hull inflatable boats (RHIB). These systems could also be hosted and deployed from a logistics ship, a JHSV or an AFSB.

Using noncombatant ships for military missions will require augmenting these ships' civilian crew with military personnel and establishing legal arrangements to allow the ships to use force to defend itself and other ships. These arrangements have already been made with the Afloat Forward Staging Base-Interim (AFSB-I) USS *Ponce,* which supports mine clearing, maritime security, and partner training today as a noncombatant ship in the Persian Gulf.

To facilitate the use of LCS mission packages on other ship classes, the Navy should separate the management of mission packages from the LCS program. An independent program executive for mission packages would ensure they are able to interface with a wide variety of combatant and noncombatant ships. Further, the separate organization could explore and develop new mission packages for operations such as disaster response, preventive medical care, signals intelligence, airborne surveillance, counter-illicit trafficking, and electronic warfare.

SETTING A COURSE FOR THE SURFACE FLEET

To sum up, the U.S. Navy has a limited window of opportunity to establish a new framework for surface warfare given changes in its planned family of surface combatants, a more demanding security environment, and continued fiscal challenges. This new approach will address, in particular, the diminishing offensive capability of large surface combatants and the growing gap between SSC supply and demand.

Establishing this new framework will require significant cultural changes for the surface fleet. For example, freeing up CG and DDG weapon capacity for offensive operations can only come by evolving the fleet's approach to air defense in ways that will increase its capacity while at the same time reducing the air defense's mission demands on the VLS magazine. And the only way the surface fleet can address the shortfall in SSCs–at least in the near term–is by enabling

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accessed August 3, 2014. That the national fleet could include MSC and NDRF ships was argued most prominently by now-Deputy Secretary of Defense Robert Work in a 2008 paper: Robert Work, *The U.S. Navy: Charting a Course for Tomorrow's Fleet* (Washington, DC: Center for Strategic and Budgetary Assessments, 2008).

noncombatant ships to perform operations that were previously conducted only by warships.

But these changes are possible. The key will be establishing an overarching and unifying concept for surface warfare, such as offensive sea control, and aligning the surface fleet's ships, weapons, sensors and processes to focus on supporting that concept. That will enable surface force leaders to establish priorities and make choices when fiscal constraints and external demands do not provide for easy decisions.

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