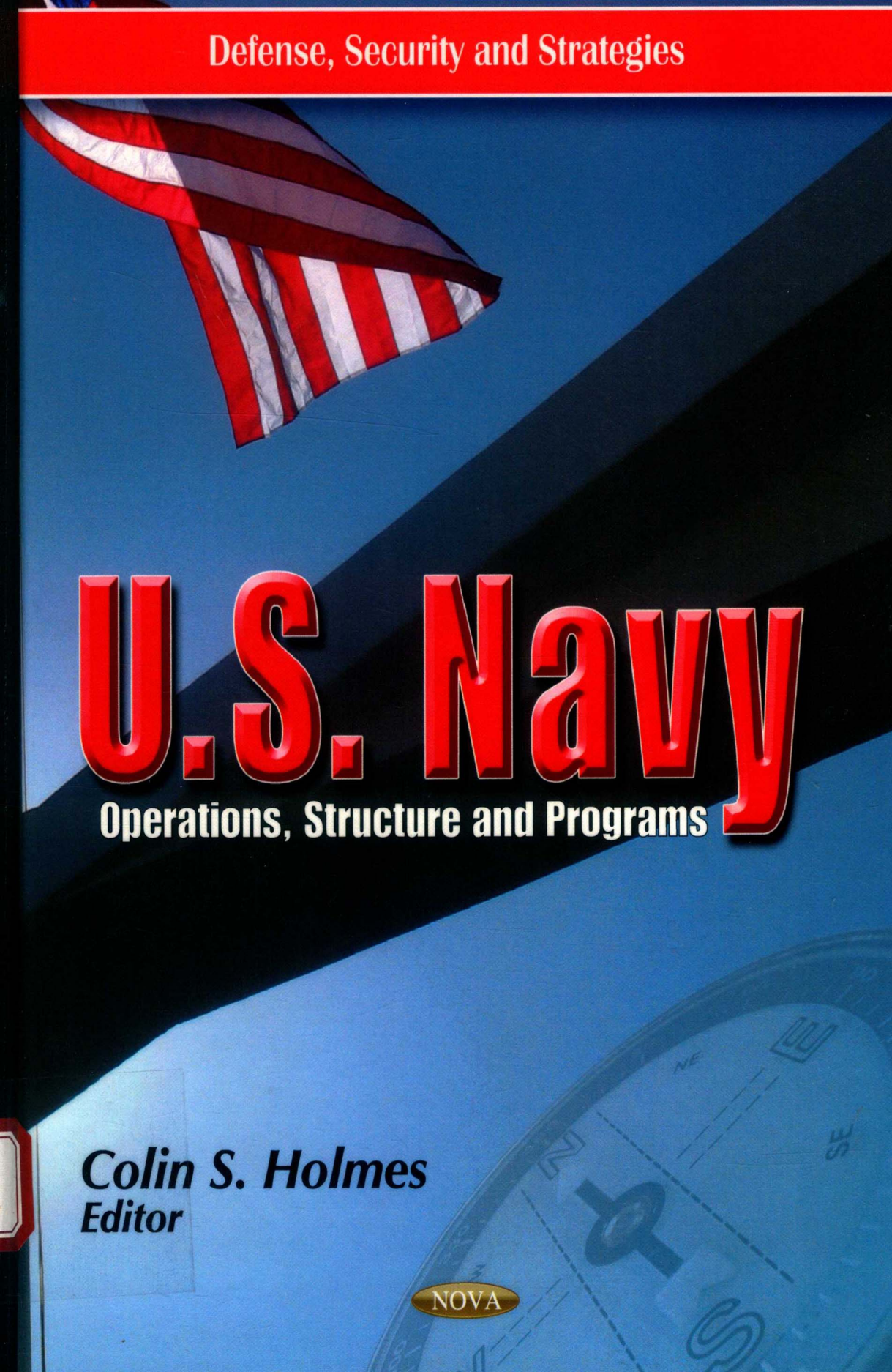


Defense, Security and Strategies



U.S. Navy

Operations, Structure and Programs

Colin S. Holmes
Editor

NOVA

DEFENSE, SECURITY AND STRATEGIES

U. S. NAVY: OPERATIONS, STRUCTURE AND PROGRAMS

COLIN S. HOLMES
EDITOR



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PREFACE

In February 2008, as part of its proposed FY2009 budget, the Navy submitted to Congress the FY2009 version of the annual 30-year shipbuilding plan, intended to support the Navy's goal of achieving and maintaining a 313-ship fleet. In 2008, the Navy had increased its estimate of the average annual cost to fund the 30-year plan by about 44% in real (inflation-adjusted) terms. The increase in the Navy's estimated cost for implementing the plan is so large that the Navy no longer seems to have a clearly identifiable, announced strategy for generating the funds needed to implement the plan. This book discusses concerns about the Navy's prospective ability to afford the 30-year shipbuilding plan, the status of Navy shipbuilding and the potential future size and capabilities of the fleet. This book also examines the new kind of destroyer called the DDG-1000, which raises several potential oversight issues for Congress, including the accuracy of Navy cost estimates for the program and program affordability. The background and issues for Congress on Homeland Security are explored in this book as well. This book consists of public documents which have been located, gathered, combined, reformatted, and enhanced with a subject index, selectively edited and bound to provide easy access.

Chapter 1 - The Navy wants to procure three new classes of surface combatants — the DD(X) destroyer, the CG(X) cruiser, and a smaller surface combatant called the Littoral Combat Ship (LCS). The Navy reportedly wants to procure a total of 7 DD(X)s, 19 CG(X)s, and 55 LCSs.

The first two DD(X)s are to be procured in FY2007, with each ship being split-funded (i.e., incrementally funded) across FY2007 and FY2008. The total estimated cost of the two ships is \$6,633 million, or an average of \$3,316 million each. The two ships have received a total of \$1,010 million in FY2005 and FY2006 advance procurement funding. The FY2007 budget requests an additional \$2,568 million in procurement funding for the two ships. The final \$3,055 million in procurement funding for the two ships is to be requested in FY2008. The Navy estimates that subsequent DD(X)s will cost roughly \$2.5 billion each. The first CG(X) is to be procured in FY2011.

The first LCS was procured in FY2005, three more were procured in FY2006, and the Navy's proposed FY2007 budget requests \$521 million to procure two additional ships. The estimated procurement cost of each LCS has grown to about \$260 million, an increase of about 18% over the original target cost of \$220 million. Section 124 of the conference report on the FY2006 defense authorization bill (H.R. 1815/P.L. 109-163) limits the cost of the two FY2007 ships to \$220 million per ship, or a total of \$440 million. The Navy's FY2007

unfunded requirements list (URL) — its “wish list” of items desired but not included in the FY2007 budget — includes an additional two LCSs for an additional \$520 million.

The DD(X), CG(X), and LCS programs raise several oversight issues for Congress, including the affordability of the DD(X) and CG(X) and the total cost of the LCS program. Options for Congress for the DD(X) program include approving the program as proposed by the Navy and supplementing the industrial base, if needed, with additional work; deferring procurement of the lead DD(X) to FY2008; procuring two or more DD(X)s per year; building DD(X)s at a single yard, or building each DD(X) jointly at two yards; terminating the DD(X) program now (or after procuring one or two ships as technology demonstrators), and supplementing the industrial base with additional work until the start of CG(X) procurement; and starting design work now on a smaller, less expensive cruiser-destroyer and procuring this new design, rather than DD(X)s or CG(X)s, starting around FY2011.

Options for Congress on the LCS program include shifting procurement funding for LCS mission modules to the Navy’s ship-procurement account; procuring a few LCSs and then evaluating them before deciding whether to put the LCS into larger-scale series production; procuring LCSs at a rate of up to 10 per year; procuring LCSs at a rate of less than 6 per year; and terminating the LCS program and instead investing more in other littoral-warfare improvements.

Chapter 2 - The Navy is procuring a new kind of destroyer called the DDG-1000. The ship was earlier called the DD(X). Navy plans call for procuring a total of seven DDG1000s. The first two were procured in FY2007 using split funding (i.e., two-year incremental funding) in FY2007 and FY2008. The Navy estimates their combined procurement cost at \$6,325 million. This figure includes about \$1.9 billion in detailed design/non-recurring engineering (DD/NRE) costs for the entire DDG-1000 class.

The Navy wants to procure the third DDG-1000 in FY2009; the Navy estimates its procurement cost at \$2,653 million. The ship received \$150 million in advance procurement funding in FY2008, and the Navy’s proposed FY2009 budget requests the remaining \$2,503 million. The Navy’s proposed FY2009 budget also requests \$51 million in advance procurement funding for the fourth DDG-1000, which the Navy wants to procure in FY2010.

The House Armed Services Committee, in its report (H.Rept. 110-652 of May 16, 2008) on the FY2009 defense authorization bill (H.R. 5658), recommended reducing the Navy’s request for FY2009 DDG-1000 procurement funding from \$2,503 million to zero, and increasing the Navy’s FY2009 request for DDG-1000 advance procurement funding from \$51 million to \$400 million. The report states that the \$400 million is to be used either for construction of DDG-1000s or for restarting construction of Arleigh Burke (DDG-51) class destroyers, which were last procured in FY2005.

The Senate Armed Services Committee, in its report (S.Rept. 110-335 of May 12, 2008) on the FY2009 defense authorization bill (S. 3001), recommended approval of the Navy’s requests for FY2009 procurement and advance procurement funding for the DDG-1000 program.

The DDG-1000 program raises several potential oversight issues for Congress, including the accuracy of Navy cost estimates for the program, program affordability and cost effectiveness, technical risk, and the program’s potential implications for the shipbuilding industrial base.

Chapter 3 - In February 2008, as part of its proposed FY2009 budget, the Navy submitted to Congress the FY2009 version of its annual 30-year shipbuilding plan. The 30-year plan is

intended to support the Navy's goal of achieving and maintaining a 313-ship fleet. The Navy first presented the 313-ship plan to Congress in February 2006.

Although the FY2009 30-year shipbuilding plan, if implemented, would generally be adequate to achieve and maintain a fleet of about 313 ships, it does not include enough ships to fully support certain elements of the 313-ship fleet consistently over the long run — shortfalls would occur in areas such as amphibious lift capability and the number of attack submarines. The FY2009 30-year plan, moreover, includes new assumptions about extended service lives for amphibious ships and destroyers. If these longer service lives are not achieved, it could increase the shortfall in amphibious lift capability and create a shortfall in the number of cruisers and destroyers.

The Navy this year has increased its estimate of the average annual cost to fund the 30-year plan by about 44% in real (inflation-adjusted) terms. The Navy's new estimated cost for implementing the 30-year plan is about 7% less than estimates issued by the Congressional Budget Office (CBO). The Navy downplayed CBO's estimates in 2007, referring to them in testimony as "worst-case analysis" or as an "extremely conservative" estimate.

The increase in the Navy's estimated cost for implementing the plan is so large that the Navy no longer appears to have a clearly identifiable, announced strategy for generating the funds needed to implement the 30-year plan, at least not without significantly reducing funding for other Navy programs or increasing the Navy's programmed budget in coming years by billions of dollars per year.

Concerns about the Navy's prospective ability to afford the 30-year shipbuilding plan, combined with year-to-year changes in Navyshipbuildingplans and significant cost growth and other problems in building certain new Navy ships, have led to strong concerns among some Members about the status of Navy shipbuilding and the potential future size and capabilities of the fleet. As a consequence of these strong concerns, some Members in hearings this year on the Navy's proposed FY2009 budget have strongly criticized aspects of the Navy's shipbuilding plan and indicated that they are considering making changes to the plan.

Chapter 4 - The Navy is currently developing technologies and studying design options for a planned new cruiser called the CG(X). The Navy wants to procure a total of 19 CG(X)s as replacements for its 22 existing Ticonderoga (CG-47) class Aegis cruisers. The Navy wants to procure the first CG(X) in FY2011 and the second in FY2013. The Navy wants the CG(X) to be a highly capable multi-mission ship with an emphasis on air defense and ballistic missile defense (BMD).

Section 1012 of the FY2008 defense authorization act (H.R. 4986/P.L. 110-181 of January 28, 2008) makes it U.S. policy to construct the major combatant ships of the Navy, including the CG(X), with integrated nuclear power systems, unless the Secretary of Defense submits a notification to Congress that the inclusion of an integrated nuclear power system in a given class of ship is not in the national interest. The Navy has studied nuclear power as a design option for the CG(X), but has not yet announced whether it would prefer to build the CG(X) as a nuclear-powered ship. Procurement of a nuclear-powered CG(X) in FY2011 would, under normal budgeting practices, involve funding the ship's long-leadtime nuclear-propulsion components in FY2009.

The Navy's proposed FY2009 budget requests \$370 million for research and development work on the CG(X). The Navy's proposed FY2009 budget does not request any advance procurement funding for the first CG(X).

The **House Armed Services Committee**, in its report (H.Rept. 110-652 of May 16, 2008) on the FY2009 defense authorization bill (**H.R. 5658**), recommended approval of the Navy's FY2009 funding request for research and development work on the CG(X).

The **Senate Armed Services Committee**, in its report (S.Rept. 110-335 of May 12, 2008) on the FY2009 defense authorization bill (**S. 3001**), recommended reducing the Navy's FY2009 funding request for research and development work on the CG(X) by \$120.8 million. The report stated that, due to the Navy's continued review of the CG(X) Analysis of Alternatives (AOA), CG(X) program activities planned for FY2008 and FY2009 cannot be executed according to the schedule in the FY2009 budget request.

The CG(X) program raises several potential oversight issues for Congress. Congress has several options relating to the program.

Chapter 5 - The Department of Defense (DOD), which includes the Navy, has been designated the lead federal agency for homeland defense (HLD), while the Department of Homeland Security (DHS), which includes the Coast Guard, has been designated the lead federal agency for homeland security (HLS). Several Navy activities contribute to HLS and HLD. The Navy's HLS and HLD operations raise several potential oversight issues for Congress, including Navy coordination with the Coast Guard in HLS and HLD operations.

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Chapter 1

NAVY DD(X), CG(X), AND LCS SHIP ACQUISITION PROGRAMS: OVERSIGHT ISSUES AND OPTIONS FOR CONGRESS*

Ronald O'Rourke

National Defense Foreign Affairs, Defense, and Trade Division

SUMMARY

The Navy wants to procure three new classes of surface combatants — the DD(X) destroyer, the CG(X) cruiser, and a smaller surface combatant called the Littoral Combat Ship (LCS). The Navy reportedly wants to procure a total of 7 DD(X)s, 19 CG(X)s, and 55 LCSs.

The first two DD(X)s are to be procured in FY2007, with each ship being split-funded (i.e., incrementally funded) across FY2007 and FY2008. The total estimated cost of the two ships is \$6,633 million, or an average of \$3,316 million each. The two ships have received a total of \$1,010 million in FY2005 and FY2006 advance procurement funding. The FY2007 budget requests an additional \$2,568 million in procurement funding for the two ships. The final \$3,055 million in procurement funding for the two ships is to be requested in FY2008. The Navy estimates that subsequent DD(X)s will cost roughly \$2.5 billion each. The first CG(X) is to be procured in FY2011.

The first LCS was procured in FY2005, three more were procured in FY2006, and the Navy's proposed FY2007 budget requests \$521 million to procure two additional ships. The estimated procurement cost of each LCS has grown to about \$260 million, an increase of about 18% over the original target cost of \$220 million. Section 124 of the conference report on the FY2006 defense authorization bill (H.R. 1815/P.L. 109-163) limits the cost of the two FY2007 ships to \$220 million per ship, or a total of \$440 million. The Navy's FY2007 unfunded requirements list (URL) — its "wish list" of items desired but not included in the FY2007 budget — includes an additional two LCSs for an additional \$520 million.

* This is an edited, reformatted and augmented version of a CRS Report for Congress publication dated February 2006.

The DD(X), CG(X), and LCS programs raise several oversight issues for Congress, including the affordability of the DD(X) and CG(X) and the total cost of the LCS program. Options for Congress for the DD(X) program include approving the program as proposed by the Navy and supplementing the industrial base, if needed, with additional work; deferring procurement of the lead DD(X) to FY2008; procuring two or more DD(X)s per year; building DD(X)s at a single yard, or building each DD(X) jointly at two yards; terminating the DD(X) program now (or after procuring one or two ships as technology demonstrators), and supplementing the industrial base with additional work until the start of CG(X) procurement; and starting design work now on a smaller, less expensive cruiser-destroyer and procuring this new design, rather than DD(X)s or CG(X)s, starting around FY2011.

Options for Congress on the LCS program include shifting procurement funding for LCS mission modules to the Navy's ship-procurement account; procuring a few LCSs and then evaluating them before deciding whether to put the LCS into larger-scale series production; procuring LCSs at a rate of up to 10 per year; procuring LCSs at a rate of less than 6 per year; and terminating the LCS program and instead investing more in other littoral-warfare improvements. This report will be updated as events warrant.

INTRODUCTION

Issue for Congress

The Navy wants to procure three new classes of surface combatants — the DD(X) destroyer, the CG(X) cruiser, and a smaller surface combatant called the Littoral Combat Ship (LCS). The Navy reportedly wants to procure a total of 7 DD(X)s, 19 CG(X)s, and 55 LCSs.

The first two DD(X)s are to be procured in FY2007, with each ship being split-funded (i.e., incrementally funded) across FY2007 and FY2008. The total estimated cost of the two ships is \$6,633 million, or an average of \$3,316 million each. The two ships have received a total of \$1,010 million in FY2005 and FY2006 advance procurement funding. The FY2007 budget requests an additional \$2,568 million in procurement funding for the two ships. The final \$3,055 million in procurement funding for the two ships is to be requested in FY2008. The Navy estimates that subsequent DD(X)s will cost roughly \$2.5 billion each. The first CG(X) is to be procured in FY2011.

The first LCS was procured in FY2005, three more were procured in FY2006, and the Navy's proposed FY2007 budget requests \$521 million to procure two additional ships. Section 124 of the conference report on the FY2006 defense authorization bill (H.R. 1815/P.L. 109-163), however, limits the cost of the two FY2007 ships to \$220 million per ship. The Navy's FY2007 unfunded requirements list (URL) — its "wish list" of items desired but not included in the FY2007 budget— includes an additional two LCSs for an additional \$520 million.

The issue for Congress is whether to approve, modify, or reject the Navy's proposals for the DD(X), CG(X), and LCS programs. Surface combatants are a major component of the Navy, and construction of surface combatants represents a significant share of the Navy's shipbuilding program. Decisions that Congress makes on procurement of surface combatants

will thus significantly affect future Navy capabilities, Navy funding requirements, and the U.S. defense industrial base.

Short CRS Reports on These Programs

Two short CRS reports — CRS Report RS21059, *Navy DD(X) and CG(X) Programs: Background and Issues for Congress*, and CRS Report RS21305, *Navy Littoral Combat Ship (LCS): Background and Issues for Congress*, both by Ronald O'Rourke — provide introductory overviews of the DD(X), CG(X), and LCS programs, respectively, for readers seeking short discussions of these programs. This long CRS report discusses these programs in more depth, particularly with regard to oversight issues and options for Congress.

Organization of This Report

The next section of the report provides background information on Navy surface combatants. The following section discusses potential oversight issues for Congress relating to surface combatant force-structure planning, the DD(X) program, the CG(X) program, and the LCS program. The subsequent section presents options for Congress on the DD(X), CG(X), and LCS programs. A final section presents recent legislative activity on the two programs. This report will be updated as events warrant.

BACKGROUND

Surface Combatants in the Navy¹

A Major Component of the Navy

Surface combatants are one of four major types of Navy combat ships, along with aircraft carriers, submarines, and amphibious ships.² Historically, surface combatants have accounted for 30% to 40% of the Navy's battle force ships.³ At the end of FY2005, they accounted for about 35% (99 of 282 battle force ships).⁴

Surface combatants typically are equipped with sensors (e.g., radars and sonars) and weapons (e.g., missiles, guns, and torpedoes) for detecting and attacking enemy submarines, surface ships, aircraft, anti-ship cruise missiles, and land targets. Many surface combatants also carry one or two helicopters to assist in these operations.

In descending order of size, surface combatants include battleships, cruisers, destroyers, frigates, corvettes (also called light frigates), and patrol craft.⁵ The Navy no longer operates battleships.⁶ The Navy's surface combatant force in recent decades has consisted largely of cruisers, destroyers, and frigates.⁷

Roles, Missions, and Capabilities

From World War II until the 1980s, surface combatants were viewed largely as defensive escorts for protecting other Navy surface ships (i.e., aircraft carriers, amphibious ships, and

auxiliary ships)⁸ and commercial cargo ships. During this period, the primary missions of surface combatants were anti-air warfare (AAW) and anti-submarine warfare (ASW), and designs for Navy surface combatant classes were determined in large part by decisions as to whether a given class should emphasize AAW, ASW, or both. Additional but more secondary surface combatant missions during this period included anti-surface warfare (ASuW) and attacking coastal land targets with guns.

The largely escort-oriented role of Navy surface combatants changed in the 1980s with the advent of three major new systems — the Tomahawk cruise missile, the vertical launch system (VLS), and the Aegis ship combat system. The Tomahawk gave surface combatants an ability to attack enemy targets at ranges comparable to targets that could be attacked by carrier-based aircraft. The VLS, which is a battery of vertically oriented missile-launch tubes that is countersunk into the ship's deck, permitted surface combatants to carry and launch an increased number of Tomahawks (and other missiles). The Aegis system — an integrated ship combat system that includes the sophisticated SPY-1 multifunction phased-array radar⁹ — significantly enhanced the AAW capability of surface combatants, giving them more potential for conducting operations independent of aircraft carriers.¹⁰ In the eyes of many observers, the Tomahawk missile and the Aegis system transformed surface combatants back into significant offensive combatants for the first time since the period before World War II.

The capabilities of Navy surface combatants are currently being enhanced by new networking systems such as the Cooperative Engagement Capability (CEC) for air-defense operations. Networking systems like these enable surface combatants, other ships, and aircraft to share large amounts of targeting-quality data on a rapid and continuous basis, permitting them to engage in what is called network-centric warfare (NCW).¹¹

In coming years, surface combatants are scheduled to take on a growing role as platforms for conducting ballistic missile defense operations.¹² The capabilities of surface combatants will also be enhanced in coming years by increased application of networking technology and by the addition of unmanned air, surface, and underwater vehicles,¹³ electromagnetic rail guns, directed-energy weapons such as lasers, and improved equipment for detecting and countering mines. Some of these developments are to be enabled by the application to surface combatants of advanced integrated electric drive propulsion technology.¹⁴ As these developments unfold, surface combatants will likely continue to play a significant role in defending both themselves and other friendly surface ships against enemy submarines, surface ships, aircraft, and anti-ship cruise missiles.

Service Lives

For planning purposes, the Navy credits its cruisers and destroyers with 35- or 40-year expected service lives (ESLs), its frigates with 30-year ESLs, and its patrol craft with 20-year ESLs. In practice, however, numerous surface combatants in recent years have been decommissioned well before the end of their ESLs for various reasons, including decisions (like the one following the end of the Cold War) to reduce the size of the Navy, shifts in Navy mission requirements that made ships with certain capabilities inappropriate, and high operation and support (O&S) costs that made ships cost-ineffective compared to other approaches for performing their missions. The Navy in recent years has decommissioned numerous cruisers, destroyers, and frigates well before the end of their ESLs.

Current Surface Combatant Force

As of the end of FY2005, the Navy's force of larger surface combatants consisted of 99 ships in three classes:

- 23 Ticonderoga (CG-47) class cruisers;
- 46 Arleigh Burke (DDG-51) class destroyers; and
- 30 Oliver Hazard Perry (FFG-7) class frigates.

The Navy at the end of FY2005 also operated 9 Cyclone (PC-1) class patrol craft.

The CG-47s, which have a full load displacement of about 9,500 tons,¹⁵ are equipped with the Aegis system and are commonly referred to as Aegis cruisers. A total of 27 were procured between FY1978 and FY1988 and entered service between 1983 and 1994. The first five lack VLS and consequently cannot fire Tomahawks; the final 22 are equipped with a 122-tube VLS. The Navy plans to decommission the first five by the end of FY2006. Four of the five were decommissioned by the end of FY2005. The Navy has planned to modernize most or all of the final 22 and keep them in service until they are about 40 years old.

The DDG-51s, which displace about 9,200 tons,¹⁶ are equipped with the Aegis system and are sometimes referred to as Aegis destroyers. They are also equipped with a 90- or 96-tube VLS. The first ship was procured in FY1985, and 62 have been procured through FY2005. By the end of FY2005, 46 had entered service (the first in 1991) and 16 were in various stages of construction. The Navy wants the three ships procured in FY2005 to be the final ships in the program. The Navy plans to give these ships a mid-life modernization that is intended in part to reduce their operating and support costs.

The FFG-7s, which displace about 4,000 tons, were designed as lower-cost, lower-capability surface combatants for use in lower-threat environments. They lack both the Aegis system and VLS. A total of 51 were procured between FY1973 and FY1984 and entered service between 1977 and 1989. Twenty-one were decommissioned by the end of FY2005. The Navy plans to decommission several more over the next decade. Of the 30 FFG-7s in service at the end of FY2005, 9 were operated as Naval Reserve Force (NRF) ships with crews consisting partly of Navy reservists.

All of these ships have landing pads for operating helicopters, and all but the first 28 DDG-51s have hangars for embarking and supporting 2 helicopters.

The PC-1s, which displace about 330 tons, are high-speed craft that were built to support special operations forces. They have also been used by the Navy and Coast Guard for port-security operations. A total of 13 PC-1s were procured between FY1990 and FY1996 for the Navy and entered service with the Navy between 1993 and 2000. The lead ship, PC-1, was donated to the Philippine Navy and commissioned into service with that navy in March 2004. Four other ships in the class have been loaned to the U.S. Coast Guard. PC-1s in service with the U.S. Navy are classified as local defense and miscellaneous support forces and consequently are not included in the total number of battle force ships in the Navy.

Surface Combatant Force-Structure Goal

The Navy in coming years is proposing to maintain a fleet of 313 ships, including 88 cruisers and destroyers — 7 DD(X)s, 19 CG(X)s, and 62 DDG-51s — and 55 LCSs.¹⁷ Under this proposal, surface combatants would account for about 46% of the total number of ships in the Navy. The 313-ship proposal, which replaces earlier Navy force-structure plans,¹⁸ has not yet been explicitly endorsed by the Office of the Secretary of Defense (OSD) as an official DOD planning goal.

Surface Combatant Industrial Base

Construction Yards

All cruisers and destroyers, and frigates procured since FY1985 have been built at two shipyards — General Dynamics' Bath Iron Works (GD/BIW) in Bath, ME, and Northrop Grumman's Ingalls shipyard (Northrop/Ingalls) in Pascagoula, MS.¹⁹ Both yards have long histories of building larger surface combatants. Construction of Navy surface combatants in recent years has accounted for virtually all of GD/BIW's ship-construction work and for a significant share of Ingalls' ship-construction work.²⁰

The two industry teams now involved in the LCS program plan are building their LCSs at other yards. The Lockheed-led team is building its LCSs at Marinette Marine of Marinette, WI, and Bollinger Shipyards of Louisiana and Texas; the GD-led team is building its LCSs at Austal USA of Mobile, AL.

The Navy's PC-1 class patrol boats were built at Bollinger Shipyards at Lockport, LA.

Overhaul and Repair Yards

Navy surface combatants are overhauled, repaired, and modernized at GD/BIW, Northrop/Ingalls, other private-sector U.S. shipyards, and government-operated naval shipyards (NSYs).

System Integrators and Supplier Firms

Lockheed Martin and Raytheon are generally considered the two leading Navy surface ship radar makers and combat system integrators. Boeing is another system integrator and maker of Navy surface ship weapons and equipment. The surface combatant industrial and technological base also includes hundreds of additional firms that supply materials and components. The financial health of the supplier firms has been a matter of concern in recent years, particularly since some of them are the sole sources for what they make for Navy surface combatants.

Other Elements

The surface combatant industrial base also includes naval architects and engineers who work for shipyards, systems integrators, supplier firms, and independent naval architectural engineering firms, as well as research and development organizations and laboratories in the Navy and at shipyards, system integrators, supplier firms, Federally Funded Research and Development Centers (FFRDCs), and universities and colleges.