Order Code RS21059
Updated April 21, 2006

Navy DDG-1000 (DD(X)) and CG(X) Programs: Background and Issues for Congress

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Summary

The Navy wants to procure 7 DDG-1000 (formerly DD(X)) destroyers and 19 CG(X) cruisers. The first two DDG-1000s are to be procured in FY2007, with each ship being split-funded (i.e., incrementally funded) across FY2007 and FY2008. The estimated cost of each of the first two ships is $3,291 million, for a total of $6,582 million. 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 $3,004 million in procurement funding for the two ships is to be requested in FY2008. The Navy estimates that the next three DDG-1000s will cost an average of roughly $2.5 billion each. The first CG(X) is to be procured in FY2011. The DDG-1000/CG(X) program poses several issues for Congress, the most prominent perhaps being the affordability of the DDG-1000/CG(X) design. For a longer discussion of the DDG-1000 and CG(X), see CRS Report RL32109, *Navy DDG-1000 (DD(X)), CG(X), and LCS Ship Acquisition Programs: Oversight Issues and Options for Congress*, by Ronald O'Rourke. This report will be updated as events warrant.

Background

The DDG-1000 (formerly DD(X)) destroyer and CG(X) cruiser are part of a proposed new family of surface combatants that also includes the small Littoral Combat Ship (LCS).[1] The DDG-1000 would have a full-load displacement of about 14,564 tons, which would make it roughly 50% larger than the Navy's 9,500-ton Aegis cruisers and

[1] The Navy announced on April 7, 2006, that it had redesignated the DD(X) program as the DDG-1000 program. The Navy confirmed that the first ship in the class, DDG-1000, will be named the Zumwalt, in honor of Admiral Elmo R. Zumwalt, the Chief of Naval operations from 1970 to 1974. The decision to name the first ship after Zumwalt was made by the Clinton Administration in July 2000, when the program was called the DD-21 program.

For more on the LCS, see CRS Report RS21305, *Navy Littoral Combat Ship (LCS) Program: Background and Issues for Congress*, by Ronald O'Rourke.

destroyers, and larger than any Navy destroyer or cruiser since the nuclear-powered cruiser Long Beach (CGN-9), which was procured in FY1957. The DDG-1000 is to be a multimission ship with an emphasis on naval surface fire support (NSFS). It would incorporate several major new technologies, and be equipped with two 155-mm Advanced Gun Systems (AGSs) and 80 missile tubes. It would have a crew of 125 to 175 persons, compared to more than 300 on current Navy destroyers and cruisers. In large part due to its reduced crew size, the DDG-1000 is to cost substantially less to operate and support (O&S) than the Navy's current cruisers and destroyers. The CG(X) would be derived from the basic DDG-1000 design, but would have a more powerful radar than the DDG-1000, as well as additional missile tubes rather than AGSs. The CG(X) might be larger and more expensive than the DDG-1000.

The Navy wants to procure a total of 7 DDG-1000s and 19 CG(X)s as part of a proposed 313-ship fleet.[2] The first two DDG-1000s are to be procured in FY2007, with each ship being split-funded (i.e., incrementally funded) across FY2007 and FY2008. The remaining five are to be procured at a rate of one per year in FY2009-FY2013. The first CG(X) is to be procured in FY2011.

The estimated cost of each of the first two DDG-1000s is $3,291 million, for a total of $6,582 million. 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 $3,004 million in procurement funding for the two ships is to be requested in FY2008. The Navy estimates that the next three DDG-1000s will cost an average of roughly $2.5 billion each. **Table 1** shows DDG-1000 and CG(X) funding through FY2011.

The Navy during the latter months of 2005 took steps to reduce the cost of the lead DDG-1000 by about $265 million, and follow-on DDG-1000s by about $214 million each. In spite of these actions, the total estimated procurement cost for the first five DDG-1000s ($14,200 million) has increased about 3.2% from the total shown in the FY2006 budget submitted to Congress in early 2005 ($13,761 million). Compared to figures in the FY2006 submission, the estimate for the first DDG-1000 remains unchanged, the estimate for the second DDG-1000 has increased by about 7.5% (even though this ship is now to be procured in FY2007, as opposed to FY2008 under the FY2006 budget submission), and the estimates for the next three ships have increased by an average of about 2.8%.

Until September 30, 2005, the DDG-1000 was being developed by a national industry team lead by Northrop Grumman's Ship Systems (NGSS) division (which includes the Ingalls Shipyard in Pascagoula, MS) and Raytheon Systems Company. The team also included General Dynamics' Bath Iron Works (GD/BIW) as well as Lockheed Martin, Boeing, and several other companies. The Navy ended the national industry team arrangement on September 30, 2005. Since then, the Navy has been managing the DDG-1000 program through a series of separate contracts with major DDG-1000 contractors, including NGSS, GD/BIW, Raytheon, and BAE Systems (the maker of the AGS).

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[2] For more on the proposed 313-ship fleet, see CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

Table 1. DDG-1000/CG(X) Program Funding, FY2002-FY2011

(millions of then-year dollars, rounded to nearest million)

	02	03	04	05	06	07	08	09	10	11	FY02-FY11
Research, Development, Test & Evaluation, Navy (RDTEN) account											
DDG-1000	490	895	1002	1120	1068	794	471	369	416	443	7068[a]
CG(X)	0	0	0	0	60	24	186	328	470	409	1477[a]
Subotal RDTEN	490	895	1002	1120	1128	818	657	697	886	852	8545[a]
Shipbuilding and Conversion, Navy (SCN) account (including advance procurement)											
DDG-1000 1	0	0	0	220	285	1284	1502	0	0	0	3291[d]
Construction	*0*	*0*	*0*	*0*	*12[b]*	*1271*	*1502*	*0*	*0*	*0*	*2785*
DD/NRE[c]	*0*	*0*	*0*	*220*	*273*	*13*	*0*	*0*	*0*	*0*	*506*
DDG-1000 2	0	0	0	84	421	1284	1502	0	0	0	3291[d]
Construction	*0*	*0*	*0*	*0*	*12[b]*	*1271*	*1502*	*0*	*0*	*0*	*2785*
DD/NRE[c]	*0*	*0*	*0*	*84*	*409*	*13*	*0*	*0*	*0*	*0*	*506*
DDG-1000 3	0	0	0	0	0	0	51	2556	0	0	2607[d]
DDG-1000 4	0	0	0	0	0	0	0	51	2650	0	2701[d]
DDG-1000 5	0	0	0	0	0	0	0	0	51	2259	2310[d]
DDG-1000 6+	0	0	0	0	0	0	0	0	0	50	50
CG(X) 1	0	0	0	0	0	0	0	0	0	3235	3235
Construction	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*2701*	*2701*
DD/NRE[c]	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*534*	*534*
CG(X) 2+	0	0	0	0	0	0	0	0	0	0	0
Subtotal SCN	0	0	0	304	706	2568	3055	2607	2701	5544	17485
TOTAL	490	895	1002	1424	1834	3386	3712	3304	3587	6396	26030

Source: Navy office of Legislative Affairs, March 6, 2006.

a. Figures do not include $1,111.4 million in RDT&E funding provided for DD-21/DD(X)/DDG-1000 program in FY1995-FY2001. Figures also do not include funding for the CG(X) radar in Navy R&D program element (PE) 0604307N. Additional funding required after FY2011. GAO has reported that total DDG-1000/ CG(X) RDT&E costs are roughly $10 billion.

b. Funding for procurement of long lead time materials (forgings) for AGSs for each DDG-1000.

c. Detailed design and nonrecurring engineering costs for the class.

d. In the FY2006 budget submission, the second DDG-1000 was to be procured in FY2008 rather than FY2007, and the estimated procurement costs of the first five DDG-1000s were $3,291 million, $3,061 million, $2,543 million, $2,630 million, and $2,236 million, respectively.

Under the Navy's previous DDG-1000 acquisition strategy of record, which was approved in February 2004, the first DDG-1000 would be built by NGSS, the second would be built GD/BIW, and contracts for building the first six DDG-1000s would be equally divided between NGSS and GD/BIW. In February 2005, Navy officials said they would seek approval from DOD to instead hold a one-time, winner-take-all competition between NGSS and GD/BIW to build all DDG-1000s. On April 20, 2005, DOD deferred this proposal as premature, but agreed to a Navy proposal to separate the DDG-1000 system-development and software-development contracts from the DDG-1000 detailed-design effort. Section 1019 of the Emergency Supplemental Appropriations Act for 2005 (H.R. 1268/P.L. 109-13) effectively prohibited a winner-take-all competition to build all DDG-1000s. The provision effectively required the participation of at least one additional

shipyard in the program but does not specify the share of the program that is to go to that additional shipyard.

On May 25, 2005, the Navy announced that, in light of Section 1019, it wanted to shift to the "dual-lead-ship" acquisition strategy now proposed in the FY2007 budget, under which two DDG-1000s would be procured in FY2007, with one to be designed and built by NGSS and the other by GD/BIW. The two yards might then compete for the right to build all subsequent DDG-1000s, in which case this strategy could be viewed as a deferred winner-take-all approach. Section 125 of the FY2006 defense authorization act (H.R. 1815/P.L. 109-163) again prohibited the Navy from using a winner-take-all acquisition strategy for procuring its next-generation destroyer. The provision effectively requires the participation of at least one additional shipyard in the program but does not specify the share of the program that is to go to that additional shipyard.

On November 23, 2005, the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD ATL) granted Milestone B approval for the DDG-1000, permitting the program to enter the System Development and Demonstration (SDD) phase. USD ATL also approved a low rate initial production quantity of eight ships (although the Navy now plans only seven), and separately approved a DDG-1000 Acquisition Program Baseline and Acquisition Strategy Report.

Issues for Congress

Accuracy Of Cost Estimates. Although the Navy, between 2004 and 2005, substantially increased its estimated DDG-1000 procurement costs, some analysts believe the Navy is still significantly underestimating these costs. The Cost Analysis Improvement Group (CAIG) within the Office of the Secretary of Defense (OSD) reportedly believed in 2005 that DDG-1000 procurement costs may be 20% to 33% higher than the Navy's revised estimates. The CAIG's estimate for the cost of the lead DDG-1000 at that time might have been $4.1 billion, while its estimate for the fifth DDG-1000 might have been $3.0 billion (as opposed to the Navy's estimate of about $2.24 billion). The Congressional Budget Office (CBO) estimated in 2005 that the lead DDG-1000 might cost as much as $4.7 billion, and that the fifth DDG-1000 might cost $3.4 billion.

Program Affordability and Cost Effectiveness. If DDG-1000 procurement costs turn out to be closer to the higher CAIG or CBO estimates, this could make it difficult for the Navy to procure DDG-1000s and CG(X)s in the numbers planned while still adequately funding other Navy needs. The CAIG and CBO cost estimates are at or above cost figures provided by DOD and Navy witnesses as figures that would make the DDG-1000 cost effective.

The Navy argues that the DDG-1000 is more affordable than it appears from looking only at procurement costs, because the ship will have lower O&S costs than existing Navy cruisers and destroyers. They also argue that the DDG-1000 would be cost effective because the higher procurement cost of the DDG-1000 compared to previous Navy surface combatants would be more than offset by the DDG-1000's improved capabilities. Skeptics could argue that reducing a ship's future O&S cost, though desirable, does not make that ship any more affordable to procure in the budget that funds its procurement, that the DDG-1000's lower O&S costs only partially offset its higher procurement costs, particularly when calculated on a present-value basis, as required by federal guidelines,

and that the ship's capability improvements, though substantial, may not be worth the ship's cost, particularly if that cost is closer to the CAIG or CBO estimates than to the Navy's estimates.

Potential Implications for Industrial Base. If DDG-1000/CG(X) procurement is limited for affordability reasons to one ship per year, and the program is divided between the two yards that currently build the Navy's larger surface combatants — the Ingalls shipyard of Pascagoula, MS, which forms part of NGSS and GD/BIW — then the DDG-1000 program would result in relatively low levels of surface combatant construction work at the two yards. If DDG-1000 production at some point is consolidated into one yard, the other yard could face a difficult business situation. If the other yard were GD/BIW, which focuses on building surface combatants, theoretical scenarios could include closure and liquidation of the yard, the "mothballing" of the yard or some portion of it, or reorienting the yard into one that focuses on other kinds of work.

Potential Implications For Force Levels. The Navy's proposed 313-ship fleet includes a requirement for a total of 88 cruisers and destroyers — 7 DDG-1000s, 19 CG(X)s), and 62 older Arleigh Burke (DDG-51) class Aegis destroyers. Assuming a 35-year average life for cruisers and destroyers, maintaining a force of 88 cruisers and destroyers over the long run would require steady-state procurement rate — that is, a long-run (35-year) average procurement rate — of about 2.5 ships per year.

A draft Navy 30-year shipbuilding plan dated December 30, 2005 falls short of this steady-state replacement rate over the next 30 years: The plan would procure an average of about 1.5 DDG-1000s and CG(X)s over the next 17 years, and then two DDG(X)s per year after that. (The DDG(X), not to be confused with the DDG-1000, is the Navy's notional long-term replacement for today's Arleigh Burke (DDG-51) class Aegis destroyers.) If the Navy's plan is implemented and extended to a full 35-year replacement period, the cruiser-destroyer force will reach 88 ships in 2016, peak at 95 ships in 2021, fall below 88 ships in 2027, reach a minimum of 62 ships (about 30% below the 88-ship goal) in FY2044-FY2046, and recover somewhat to a steady-state level of 70 ships — the steady-state level eventually maintained by procuring 2 ships per year, and about 20% below the 88-ship goal — after 2050. If, due to affordability considerations, no more than one DDG-1000 or CG(X) were procured in any given year, then a total of 17 (rather than 26) DDG-1000s and CG(X)s would be procured. The cruiser-destroyer force under this scenario would reach 88 ships in 2016, peak at 92 ships in 2020-2021, fall below 88 ships in 2025, reach a minimum of 54 ships (about 39% below the 88-ship goal) in FY2044-FY2046, and recover somewhat to a steady-state level of 70 ships after 2050.

Mission Requirements. The DDG-1000's size and procurement cost appear driven by the ship's total collection of payload elements, which reflect a February 2004 Operational Requirements Document (ORD) for the DDG-1000. Skeptics might argue that the ORD might not sufficiently account for how the DDG-1000's planned capability (and therefore cost) might reduce DDG-1000 numbers and therefore reduce the collective capability of the total DDG-1000 force. A potential question is whether some of the DDG-1000's planned capabilities are more critical than others, and whether the size and cost of the ship might be reduced by reducing the less-critical capabilities. As part of the effort mentioned earlier to reduce the recurring cost of the DDG-1000 design by about $214 million, the Navy decided to, among other things, reduce the AGS magazine capacity of the ship from 920 rounds to 600 rounds.

Technology Readiness. The DDG-1000 will incorporate several significant new technologies. GAO expressed concerns in past reports and testimony about whether these technologies will be sufficiently mature in time for the lead DDG-1000, about the Navy's lack of fallback options for many of these technologies, and about the potential for problems in technology development to add time and cost to the DDG-1000 program. The Navy argues that development of DDG-1000 technologies is proceeding well, that the new technologies will be sufficiently mature to support the lead DDG-1000 as currently scheduled, and that allowing more time for further maturing the technologies before proceeding with DDG-1000 procurement would add time and cost to the DDG-1000 and other programs.

Potential Options for Congress. Potential options for Congress, some of which can be combined, include the following:

- approve the DDG-1000 program as proposed by the Navy and supplement the industrial base, if needed, with additional DDG-51s, amphibious ships, transferred LCSs, Aegis ship modernizations, or Coast Guard Deepwater cutters;
- defer procurement of the second DDG-1000 to FY2008 to permit that ship to benefit more fully from lessons learned in building the first ship;
- procure two or more DDG-1000s per year to reduce DDG-1000 unit procurement costs and better support the industrial base;
- build DDG-1000s at a single yard, or build each DDG-1000 jointly at two yards;
- use a block-buy contract for DDG-1000s procured during the five-year period FY2007-FY2011;
- terminate the DDG-1000 program now, or after procuring one or two ships as technology demonstrators, and supplement the industrial base with other work; and
- start design work now on a smaller, less expensive cruiser-destroyer that preserves core DDG-1000/CG(X) capabilities, and procure this new design, rather than additional DDG-1000s or CG(X)s, starting around FY2011.

Legislative Activity for FY2007

As shown in **Table 1**, the Navy's proposed FY2007 budget requests a total of $3,386 million for the DDG-1000/CG(X) program.