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Navy DD(X) Destroyer Program: Background and Issues for Congress

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Summary

The DD(X) is a proposed new type of Navy destroyer. The Navy estimates that the first DD(X), which the Navy reportedly plans to procure in FY2007, would cost about $2.8 billion to design and build, including about $1 billion in detailed design and nonrecurring engineering costs. The Navy estimates that follow-on DD(X)s would cost $1.2 billion to $1.4 billion each to procure. If, however, DD(X) procurement costs turn out to be proportionate to procurement costs for today's Arleigh Burke (DDG-51) class destroyers, then follow-on DD(X)s could cost more than $2 billion each to procure. The Navy plans to follow the DD(X) with a cruiser variant of the design, called CG(X).

In early January 2005 it was reported that the Department of Defense (DOD) had reduced planned procurement of DD(X)s in its FY2006-FY2011 Future Years Defense Plan (FYDP) to one ship per year for the period FY2007-FY2011. Issues for Congress include the potential affordability and cost-effectiveness of the DD(X)/CG(X) effort, particularly if it is limited to a one-per-year procurement rate, the readiness of new technologies scheduled for the DD(X), naval surface fire support mission that the DD(X) is to support, and the implications of the DD(X)/CG(X) effort for the shipbuilding industrial base. For a longer discussion of the DD(X), see CRS Report RL32109.[1] This report will be updated as events warrant.

Background

The DD(X) destroyer program was announced by the Navy in November 2001 as part of a proposed new family of surface combatants that is also to include the small Littoral Combat Ship (LCS) and a future cruiser variant of the DD(X) design called the CG(X). The DD(X) replaced an earlier proposed destroyer called the DD-21. The DD(X) is to be a multimission destroyer with an emphasis on the naval surface fire support mission. It would have a full load displacement of about 14,000 tons, compared to about 9,000 tons for current Navy cruisers and destroyers. It would be equipped with two 155-

[1] CRS Report RL32109, *Navy DD(X) and LCS Ship Acquisition Programs: Oversight Issues and Options for Congress*, by Ronald O'Rourke.

mm (6.1-inch) Advanced Gun Systems (AGSs) for supporting Marines ashore, not less than 600 shells for those guns, and 80 missile tubes for Tomahawk cruise missiles and other weapons. 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 DD(X) is to cost substantially less to operate and support than the Navy's current cruisers and destroyers.[2]

The Navy reported to Congress in 2003 that it was thinking of procuring a total of 24 DD(X)s from FY2005 through FY2017 at a sustained rate of about two ships per year before shifting to procurement of CG(X)s in FY2018. Other reports suggested the Navy was considering procuring a total of 16 DD(X)s. The FY2005-FY2009 FYDP called for procuring the first DD(X) in FY2005, another two in FY2007, two more in FY2008, and three more in FY2009, for a total of eight ships through FY2009.

In August 2004 it was reported that the Navy had proposed to the Office of the Secretary of Defense (OSD) to move procurement of the lead DD(X) from FY2005 to FY2007, reduce the number of DD(X)s procured through FY2011 from 11 to seven, and accelerate the start of CG(X) procurement to FY2011. Assuming a "gap" year in the CG(X) program in FY2012[3] and the procurement of two final DD(X)s during that gap year, this proposal would result in a total production of nine DD(X)s.

In early January 2005 it was reported that DOD had reduced planned procurement of DD(X)s to one ship per year for the period FY2007-FY2011, for a total of five ships. Assuming a gap year in the CG(X) program in FY2012 and the procurement of one final DD(X) that year, this proposal would result in a total production of six DD(X)s.

The Navy in 2004 estimated that the first DD(X) would cost about $2.8 billion to design and build, including about $1.8 billion in hands-on construction costs for the ship and about $1 billion in detailed design and nonrecurring engineering costs (DD/NRE) for the class. The Navy proposed funding the first DD(X) through the Navy's research and development account rather than the Navy's ship-procurement account (known formally as the Shipbuilding and Conversion, Navy, or SCN, account), where Navy combat ships traditionally have been procured, and have it enter service in FY2011.

The Navy in 2003-2004 estimated that the fifth and sixth DD(X)s would have an average unit procurement cost of $1.2 billion to $1.4 billion in FY2002 dollars. The Congressional Budget Office (CBO) estimates that a class of 24 DD(X)s built at a rate of 2 per year would have an average unit procurement cost of $1.8 billion in FY2003 dollars. As shown in **Table 1** on the next page, the Navy's estimated procurement cost equates to a cost per thousand tons (CPTT) of light-ship displacement (i.e., the empty weight of the ship without fuel) that is 36% to 45% less than that of today's Arleigh Burke (DDG-

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[2] For more on the LCS and CG(X), see CRS Report RL32109, op. cit., and CRS Report RS21305, *Navy Littoral Combat Ship (LCS) Program: Background and Issues for Congress*, by Ronald O'Rourke.

[3] A gap year is an open year between the year in which the lead ship of a class is procured and the year in which procurement of follow-on ships in the class commences. Gap years have been a feature of many, but not all, Navy shipbuilding programs, and are intended to allow time to discover and fix lead-ship design problems before construction of follow-on ships begins.

51) destroyers, while CBO's estimate equates to a CPTT that is 18% less. If the DD(X) CPTT is set equal to that of the DDG-51, the DD(X) would cost more than $2 billion.

Table 1. Cost Per Thousand Tons (CPTT)

Ship	Cost (when procured at 2 per year)	Full load displacement (tons)	Light-ship displacement (tons)	CPTT	DD(X) CPTT compared to DDG-51
DDG-51	$1.25 bil.	~9,000	6,950	~$180 mil.	—
Estimates for DD(X)					
Navy	$1.2-1.4 bil.	~14,000	12,135	$99-115 mil.	-36% to -45%
CBO	$1.8 bil.	~14,000	12,135	$148 mil.	-18%
CPTT = DDG-51	$2.18 bil.	~14,000	12,135	$180 mil.	equal

The DD(X) is being developed by and would be built 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 includes General Dynamics' Bath Iron Works (GD/BIW) of Bath, ME, as well as Lockheed Martin, Boeing, and several other companies. The lead DD(X) would be built by NGSS; the second DD(X) would be built GD/BIW. The Navy has stated that contracts for building the first six DD(X)s would be equally divided between NGSS and GD/BIW.

Table 2 on the next page shows funding for the DD(X) program from the FY2005-FY2009 FYDP submitted to Congress in February 2004. Figures in the table will change when DOD submits its new FY2006-FY2011 FYDP in February 2005.

Issues For Congress

Affordability And Cost Effectiveness. One potential issue for Congress concerns the affordability and cost effectiveness of the DD(X)/CG(X) effort. Some observers have raised questions about the Navy's $1.2 billion-to-$1.4 billion estimated unit procurement cost for follow-on DD(X)s, for the following reasons:

- the Navy's estimate includes a $200-million range of uncertainty, suggesting the Navy has an incomplete understanding of potential DD(X) costs;
- CBO's estimate ($1.8 billion) is 29% to 50% higher than the Navy's estimate, suggesting that there are major analytical differences between the Navy and CBO regarding the potential cost of the follow-on ships;
- the Navy has not explained in detail why it believes the DD(X) will be any less expensive on a per-weight basis to build than the DDG-51; and
- the Navy has experienced substantial cost growth in other recent Navy shipbuilding programs, such as the LPD-17 amphibious ship program and the Virginia-class submarine program.

Reports of DOD's decision to reduce DD(X) procurement to one ship per year for the period FY2007-FY2011, if accurate, would suggest that unless the Navy's budget situation changes in a way that makes more money available for shipbuilding, the Navy may have difficulty funding more than one DD(X) per year while also meeting other spending needs. Since the procurement cost of the CG(X) is expected to be equal to or

greater than that of the DD(X), DOD's reported decision raises a similar possibility that unless the Navy's budget situation changes, the Navy may also be unable to afford more than one CG(X) per year while meeting other spending needs.

Table 2. Funding For DD(X) Program, FY2002-FY2009

(millions of then-year dollars)

	2002	2003	2004	2005	2006	2007	2008	2009	Total thru FY2009
Research, Development, Test & Evaluation, Navy (RDTEN) account									
Ship 1 construction	—	—	—	103	288	294	353	269	1307*
DD/NRE	—	—	—	118	349	252	127	87	933*
All other**	490	895	1059	1230	1097	791	439	259	6260*
Total RDTEN* **	490	895	1059	1451	1734	1337	919	615	8500*
Shipbuilding and Conversion, Navy (SCN) account									
Ship 2	—	—	—	—	49	2004	—	—	2053
Ship 3	—	—	—	—	49	1493	—	—	1542
Ship 4	—	—	—	—	—	49	1729	—	1778
Ship 5	—	—	—	—	—	49	1494	—	1543
Ship 6	—	—	—	—	—	—	49	1695	1744
Ship 7	—	—	—	—	—	—	49	1478	1527
Ship 8	—	—	—	—	—	—	—	1523	1523
Total SCN	0	0	0	0	98	3595	3321	4696	11710
TOTAL	490	895	1059	1451	1832	4932	4240	5311	20210

Source: Navy data provided to CRS by Navy Office of Legislative Affairs, February 20, 2004.

* Additional funding required in FY2010-FY2011 to complete construction of lead ship, and in years after FY2009 for DD/NRE and all other RDT&E.

** Funding for all RDT&E for the DD(X) program other than DD/NRE.

*** Figures do not include a total of $1,111.4 million in research and development funding provided for the DD-21/DD(X) program during the period FY1995-FY2001.

A prospective DD(X)/CG(X) procurement rate of one ship per year could raise questions about the cost effectiveness of the DD(X)/CG(X) effort, particularly when measured in terms of program unit acquisition cost, which is the average cost to develop and procure each ship. A total of roughly $10 billion in research and development funding has been programmed for the DD(X), and additional research and development funding would be required to modify the DD(X) design into a CG(X) design, making for a total of more than $10 billion in research and development costs for the combined DD(X)/CG(X) effort. Under the Navy's 2003 plan, this total research and development cost would have been amortized over a production run of 48 ships (24 DD[X]s and 24 CG[X]s), equating to an average of more than $208 million in research and development costs for each ship. If, however, a total of fewer than 48 DD(X)s and CG(X)s are built, the per-ship research and development cost would increase. If, for example, a total of 18 DD(X)s and CG(X)s are built (e.g., six DD(X)s plus 12 CG(X)s built at a rate of one per

year for 12 years), then the per-ship research and development cost would increase to more than $555 million per ship. For a 48-ship DD(X)/CG(X) production run, a lower estimate of unit acquisition cost might be something greater than $1.4 billion to $1.6 billion per ship (i.e., $1.2 billion to $1.4 billion to procure each ship, plus something greater than $208 million in per-ship research and development costs). For an 18-ship DD(X)/CG(X) production run, a higher estimate of unit acquisition cost might be something greater than $2.7 billion per ship (i.e., $2.18 billion to procure each ship, as shown in **Table 1**, plus something greater than $555 million in per-ship research and development costs). Skeptics could argue that the potential unit acquisition cost of the DD(X)/CG(X) effort may now be so high as to call into question the cost effectiveness of the program. Supporters could argue that even if unit acquisition cost has increased, the low annual operating and support costs of the DD(X) and CG(X) would keep the DD(X)/CG(X) effort cost effective when measured in terms of total ownership cost, which is the sum of acquisition cost plus life-cycle operating and support costs.

Readiness of New Technologies. Navy officials argue that they have taken steps to ensure that the several new technologies scheduled for the DD(X) would be ready for the lead DD(X), including the use of land-based engineering design models (EDMs) for verifying new technologies and increased levels of development funding. Skeptics are concerned that in spite of these steps, one or more critical technologies may not be ready for the lead DD(X). A September 2004 Government Accountability Office (GAO) report expressed concern about the maturity of several new technologies intended for the lead DD(X) and about the Navy's fall-back plans in the event that one or more of these technologies do not mature in time to support the Navy's lead-ship construction schedule.[4]

Naval Surface Fire Support Mission. The size and cost of the DD(X) reflects in part the presence on the ship of the two AGSs, which in turn reflects a Navy desire to increase the fleet's naval surface fire support (NSFS) capability. A November 2004 GAO concluded that "The Navy and Marine Corps have only recently begun the process to establish validated NSFS requirements that address the overall capabilities needed and the balance between different systems that will be required to provide effective, continuous, and sustaining support fire for forces operating ashore."[5] DD(X) supporters could argue that the geography of places like the Korean Peninsula as well as the ability of Navy ships to remain on station for months at a time without interruption are reasons for maintaining a robust Navy NSFS capability. DD(X) skeptics can argue that NSFS did not play a major role in U.S. military operations in Kosovo, Afghanistan, and Iraq, and that Afghanistan and Iraq highlighted new concepts for ground operations using smaller-sized ground units supported by aircraft armed with relatively inexpensive, all-weather precision-guided munitions, raising questions about the priority of NSFS compared to other investments.

Shipbuilding Industrial Base. Some observers, particularly those connected with the surface combatant industrial base, are concerned that the Navy's plan for transitioning from Arleigh Burke (DDG-51) destroyer procurement to DD(X)

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[4] Government Accountability Office, *DEFENSE ACQUISITIONS: Challenges Facing the DD(X) Destroyer Program*, GAO-04-973, Sept. 2004. See also General Accounting Office, *DEFENSE ACQUISITIONS: Assessments of Major Weapon Programs*, GAO-04-248, Mar. 2004, pp. 45-46.

[5] Government Accountability Office, *Information on Options for Naval Surface Fire Support*, GAO-05-39R, Nov. 2004, p. 2.

procurement would not provide sufficient work for the shipbuilding industrial base during the period FY2006-FY2011, and the ability of the CG(X) program (if it is limited to one ship per year) to support the industrial base after that. It may also lead to debate over the potential costs and benefits of alternative approaches for building DD(X)s and CG(X)s, such as building them at a single yard or building each one jointly at two yards (the approach used for building Virginia-class submarines). Options for providing additional work for the industrial base include procuring additional DDG-51 destroyers, accelerating procurement of amphibious ships, and expanding and accelerating the procurement of new cutters under the Coast Guard's Deepwater acquisition program.[6]

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

- approve the DD(X) program as proposed by the Navy and supplement the industrial base, if needed, with additional amphibious ships, DDG-51s, or Deepwater cutters;
- accelerate procurement of the lead DD(X) to FY2006 and the second DD(X) to FY2007 to better support the industrial base;
- defer procurement of the lead DD(X) to FY2008 to provide more time for maturation of key technologies;
- procure two or more DD(X)s per year to reduce DD(X) unit procurement costs and better support the industrial base;
- build DD(X)s at a single yard, or build each DD(X) jointly at two yards;
- terminate the DD(X) program now, or after procuring a single ship as a technology demonstrator, and supplement the industrial base with additional amphibious ships, DDG-51s, or Deepwater cutters until the start of CG(X) procurement.
- start design work now on a smaller, less expensive alternative to the basic DD(X) hull design — such as a ship about the same size as today's 9,000-ton cruisers and destroyers — and procure this new design, rather than CG(X)s, starting around FY2011.

Legislative Activity For FY2005

The conference report (H.Rept. 108-622 of July 20, 2004) on the FY2005 defense appropriations bill (H.R. 4613/P.L. 108-287 of August 5, 2004) provided $350.5 million in advance procurement funding for the DD(X) program — $221.1 million for the first DD(X), and $84.4 million for the second DD(X) — and directed that procurement of DD(X)s be fully funded in the Navy's ship-procurement account rather than incrementally funded in the Navy's research and development account as the Navy had proposed for the first DD(X). For more detailed information on the DD(X) in H.R. 4613/P.L. 108-287 and in the FY2005 defense authorization bill (H.R. 4200/P.L. 108-375 of October 28, 2004), see the Legislative Activity section of CRS Report RL32109, *Navy DD(X) and LCS Ship Acquisition Programs: Oversight Issues and Options for Congress*.

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[6] For more on the Deepwater program, see CRS Report RS21019, *Coast Guard Deepwater Program: Background and Issues for Congress*, by Ronald O'Rourke.