STATEMENT OF

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HEARING ON

SURFACE COMBATANT CONSTRUCTION PROGRAMS

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Chairman Taylor, Ranking Member Bartlett, distinguished members of the subcommittee, thank you for the opportunity to appear before you today. As requested, this statement provides observations and analysis on cost, schedule, performance, and associated risk regarding the following surface combatant construction programs:

- the Littoral Combat Ship (LCS) program (pages 1-6);
- the LPD-17 program (pages 6-10);
- the DDG-1000 program (pages 10-13); and
- the CVN-78 (CVN-21) program (pages 13-15).

LCS Program

Cost Growth

Estimated procurement costs for follow-on LCSs (defined here as seaframes to be procured in FY2009-FY2011) have grown substantially over the last two years, from an average of $223 million per ship in the FY2006 budget, to an average of $298 million ship in the FY2007 budget, to a current figure of somewhere between $350 million and $460 million per ship.[1] This cost growth has added hundreds of millions of dollars to the amount of funding the Navy will need each year between now and about FY2016 to execute its shipbuilding plan. LCS cost growth reported since January 2007 is one of three developments in recent months that have increased the risks associated with implementing the Navy's 30-year shipbuilding plan.[2]

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[1]For the calculation of the FY2006 and FY2007 figures of $223 million and $298 million, respectively, see Table 3 in CRS Report RL33741, *Navy Littoral Combat Ship (LCS) Program: Oversight Issues and Options for Congress*, by Ronald O'Rourke. The figure of $350 million is based on Navy statements earlier this year that LCS-1 might cost $350 million to $375 million; the figure of $460 million is based on the Navy's reported desire to have Congress amend the procurement cost cap on the fifth and sixth LCSs to $460 million per ship.

[2]The other two developments were the Administration's decision to increase Army end strength, and the Navy's addition of several ships to its 30-year shipbuilding plan. In a situation of finite defense budgets, funding to pay for additional Army personnel and equipment may come from the Navy and/or Air Force budgets, which could make it more difficult for the Navy to achieve the budget top line that it has assumed as part of its strategy for implementing the 30-year shipbuilding plan. In moving from the FY2007 version of its 30-year shipbuilding plan to the FY2008 version, the Navy decided to include several additional ships, but to not change its estimate of the average annual amount of funding needed to implement the plan. The resulting implicit assumption in the FY2008 plan is that Navy ships will cost slightly less, on average, than was assumed in the FY2007 plan. The Navy made this decision at about the same time that it was learning that one of its ships — the LCS — will cost substantially more, not less, to procure than the Navy had earlier

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Navy and industry officials testified to this subcommittee on February 8, 2007, that concurrency between design and construction was a significant contributor to the recent cost growth in the LCS program. Avoidance of concurrency in design and construction is an old lesson in shipbuilding and defense acquisition in general. In this sense, the LCS program is not so much an instance of new lessons learned as old lessons that were forgotten.

Navy and industry officials also testified at that hearing that design-construction concurrency resulted in part from the LCS program's rapid (compressed) acquisition schedule. In earlier years, the LCS program's rapid acquisition strategy was held up as an example of acquisition reform — specifically, of reducing acquisition cycle time. In retrospect, it might now be viewed as a case study in support of the old adage that haste makes waste.

Over the last several months, as information on LCS cost growth has come to light, the Navy has maintained its support for procuring 55 LCSs. Maintaining stability in planned numbers of ships to be procured can be conducive to cost control. At the same time, however, there is a risk, in expressing continued support for procuring 55 LCSs in spite of substantial cost growth in the program, of industry receiving an implicit message from the Navy that, at least in the case of the LCS, cost growth does not pose a significant risk of prompting a reduction in the number of ships to be procured. Such an implicit message might not be conducive to cost control in the LCS program.

Cost growth in the LCS program could, paradoxically, cause Navy officials to view the LCS as increasingly necessary. As the cost of the LCS increases, it puts added pressure on the shipbuilding budget and on the affordability of the Navy's shipbuilding plan. But the more pressure there is on the shipbuilding budget and on the affordability of the Navy's shipbuilding plan, the more Navy officials might believe they need to retain in the mix of ships to be procured at least one relatively inexpensive type of combat ship — and in spite of its cost growth, the LCS is the only such ship. In other words, from the Navy's potential perspective, you don't solve a problem in Navy shipbuilding affordability by eliminating the one relatively inexpensive type of ship you are planning to procure. If LCS costs continue to grow, they might eventually reach a point at which Navy officials might reconsider their support for the program. But recent Navy statements do not suggest that we are at that point. This paradoxical dynamic, to the extent that it exists, might not be conducive to cost control in the LCS program.

The Navy testified earlier this year that it was "overly optimistic" regarding what could be accomplished in the LCS program.[3] The Navy also testified earlier this year that, compared to CBO cost estimates for Navy ships, the Navy "budgets to a much more aggressive number." When asked whether "aggressive" meant optimistic, the Navy said it simply meant more aggressive.[4] The Navy

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[2](...continued)
estimated. See also the section entitled "Affordability and Executibility of Shipbuilding Plans" in CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

[3]Transcript of spoken testimony of Secretary of the Navy Donald Winter before the Senate Armed Services Committee on March 29, 2007.

[4]Transcript of spoken testimony of Vice Admiral Paul Sullivan before the Seapower and Expeditionary (continued...)

more recently has stated that in regard to the LCS program, "We have to be more honest about doing proper analyses about what these ships... cost."[5] This raises two potential questions:

- What is the difference between "overly optimistic" cost estimating and "much more aggressive" cost estimating?

- How does the Navy's current "much more aggressive" cost estimating — and the Navy's recently stated desire to "be more honest about doing proper analyses" for ships costs — compare with the policy articulated by DOD in 2002 and reaffirmed by DOD in 2003 to rely in its budgeting on "realistic costing," which DOD defined at the time as using either "the CAIG's estimates or with those estimates that are a product of agreement between the CAIG and the services that in fact might even be better than the CAIG estimates"?[6]

Amending The Cost Cap

On May 10, 2007 — a week after this subcommittee marked up its portion of H.R. 1585, the FY2008 defense authorization bill — it was reported that the Navy would ask Congress to amend the procurement cost cap on the fifth and sixth LCSs (Section 124 of the FY2006 defense authorization act [H.R. 1815/P.L. 109-163 of January 6, 2006]) from the current per-ship figure of $220 million to $460 million.[7]

One potential issue for the subcommittee is whether $460 million would be an excessive figure to use in amending the LCS cost cap. Prior to the May 10 news report, Navy testimony and other public statements had suggested that LCSs might cost upwards of $400 million each, or perhaps a bit more than $400 million each, to procure. The Chief of Naval Operations testified in February that he was "embarrassed" by cost growth on the LCS program.[8] In light of this, one question is

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[4](...continued)
Forces subcommittee of the House Armed Services Committee on March 20, 2007.

[5]Secretary of the Navy Donald Winter, as quoted in Zachary M. Peterson, "Winter Seeks More Control Over Industry," *Navy Times*, July 9, 2007: 13. (Ellipsis as in the article.)

[6]See, for example, the news transcripts of comments by the "senior defense official" on February 1, 2002, and January 31, 2003, available online at:
[http://www.defenselink.mil/transcripts/transcript.aspx?transcriptid=2596] and
[http://www.defenselink.mil/transcripts/transcript.aspx?transcriptid=1384]. The CAIG is the Cost Analysis Improvement Group within OSD.

[7]Geoff Fein, "Navy Seeks New LCS Cost Cap of $460 Million Each For Ships Five And Six," *Defense Daily*, May 10, 2007. The Navy stated in 2006 that it would treat the $220-million figure as a cap on basic construction cost (BCC) rather than on the more inclusive measure of end cost, even though the cost cap (Section 124 of the FY2006 defense authorization act [H.R. 1815/P.L. 109-163 of January 6, 2006]) refers to "the total amount obligated or expended for procurement of the fifth and sixth vessels...." Cost caps that have been legislated for other Navy ships using similar wording have been interpreted as applying to end cost. The Navy reportedly would treat the $460-million figure as a cap on end cost.

[8]Transcript of spoken testimony of Admiral Michael Mullen before the Defense subcommittee of the House Appropriations Committee on February 12, 2007. See also Megan Scully, "Navy Chief Is "Embarrassed'
(continued...)

whether Navy settled on the $460-million figure in part because it would permit the LCS program to experience some additional (albeit unanticipated or unwanted) cost growth without causing the Navy the additional embarrassment of exceeding a cost cap that Congress had amended at the Navy's request. From the Navy's perspective at least, there would be value in avoiding such additional embarrassment. At the same time, however, if the $460-million figure is somewhat higher than what the Navy currently expects the fifth and sixth ships to cost, then amending the cost cap to the $460-million level could create a situation in which additional cost growth to the $460-million figure might be viewed by some as acceptable. Such a view might not be conducive to rigorous cost control on the program.

Another potential issue for the subcommittee is whether the LCS cost cap should be amended to apply not just to the fifth and sixth ships in the program, but to subsequent ships in the class as well. The cost cap on the CVN-78 aircraft carrier program (Section 122 of the FY2007 defense authorization act [H.R. 5122/P.L. 109-364 of October 17, 2006]) includes caps for both the lead ship (CVN-78) and for any follow-on ships in the class. The cost cap on the LHA-6 (LHA[R]) amphibious ship program (Section 125 of the FY2007 defense authorization act) applies to any ship constructed under the program. The cost cap for the LPD-17 program (Section 126 of the FY2007 defense authorization act) includes individual caps for ships six through nine in the program — the final four ships that the Navy plans to procure.

Planned FY2010 Downselect

Lockheed Concern About Bias Resulting From LCS-3 Termination. Lockheed is concerned that the Navy's decision to terminate construction of LCS-3 will create a bias against the Lockheed LCS design in the Navy's planned FY2010 LCS design downselect, and also a bias against the Lockheed-led industry team in the planned follow-on competition to determine which firm or firms should build the winning LCS design.

Lockheed is concerned about a potential bias against its design in the LCS design downselect for two reasons. The first is that LCS-3 would have incorporated one modification of the design used for LCS-1. Lockheed is concerned that, without LCS-3 in built form, the Navy will not be able to confirm through real-world tests the improvement in ship performance resulting from this or other potential design modifications that LCS-3 would have incorporated. The second is that without building LCS-3, the Navy at the time of the downselect will lack a data point showing improvement in production costs for the Lockheed design in moving down the learning curve from LCS-1 to LCS-3. Lockheed believes this second data point would increase Navy confidence in the potential production costs of follow-on LCSs built to the Lockheed design.

Lockheed is concerned about a potential bias against the Lockheed-led industry team in the follow-on competition to determine which firm or firms should build the winning LCS design because, without LCS-3, the Lockheed-led team's LCS design staff, shipyards, and suppliers will

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[8](...continued)
By Overruns But Vows Vigilance," *National Journal's CongressDailyAM*, February 14, 2007 (also published as "Navy Official 'Embarrassed' By Cost Overruns On Combat Ship," *GovExec.com*, February 14, 2007).

go "cold," compared to the General Dynamics-led industry team's design staff, shipyard, and suppliers, who will build LCS-4 after LCS-2, and will consequently remain "hot."[9]

The Navy's position is that since the LCS design downselect — an operational "flyoff" conducted by the fleet — will be determined by fundamental differences between the two LCS designs, the additional performance resulting from design modifications planned for LCS-3 will not be a critical factor. The Navy says that since the fleet will make the flyoff decision based on the operational performance of the two designs, and not on acquisition-related factors such as potential construction cost, the absence of a second data point on the Lockheed LCS production cost learning curve will not be a factor in the decision.

The Navy's position on the follow-on competition to determine which firm or firms will build the winning design is that the Lockheed-led industry team would be brought back into a "hot" status in time for the competition if Congress funds the LCSs that the Navy wants to procure in FY2008 and FY2009 and some of those ships are then awarded to the Lockheed-led team.[10]

Treatment of LCSs Built To Losing Design. Under the Navy's restructured plan for the LCS program, a total of eight LCSs are to be procured through FY2009. Depending on how LCSs procured in FY2008 and FY2009 are awarded between the two competing industry teams, three to five of these nine LCSs might be built to the design that is not chosen by the Navy in the FY2010 design downselect. Compared to the LCSs built to the winning design, these three to five LCSs will likely have some unique operation and support (O&S) costs. The Navy could choose to operate these ships with their unique O&S costs, or sell them to foreign buyers, or modify their combat systems or other features so as to make them more like the Navy's other LCSs in terms of their O&S requirements. One potential oversight question for the subcommittee is when the Navy anticipates being able to report to Congress on its strategy for these three to five ships.

Total Acquisition Cost

Five years into the LCS program,[11] the total acquisition cost of the LCS program (including mission packages) remains unclear. Based on available data, and assuming that follow-on LCSs cost $350 million to $460 million each to procure, CRS estimates the total acquisition cost of a 55-ship LCS program (plus mission packages) at roughly $27 billion to $33 billion.[12] This is, however, a CRS estimate, not a Navy estimate, and there is considerable uncertainty about the program's total acquisition cost due to uncertainty about LCS seaframe procurement costs and the number and average cost of LCS mission packages.

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[9]The paragraphs summarizing Lockheed's position are based on consultations with Lockheed officials on July 17, 2007, and previous dates, and are presented here with Lockheed's permission.

[10]The paragraphs summarizing the Navy's position are based on consultations with Navy officials on July 16, 2007, and are presented here with the Navy's permission.

[11] Congress approved the initial increment of research and development funding for the LCS program in 2002, as part of the FY2003 defense budget.

[12]See CRS Report RL33741, Navy Littoral Combat Ship (LCS) Program: Oversight Issues and Options for Congress, by Ronald O'Rourke.

Refueling And Replenishment Requirements

A recent RAND analysis of the number and type of mission packages that might need to be procured for the LCS fleet identified the refueling and replenishment needs of the LCS fleet as an "emerging issue." The report stated:

> We did not evaluate means of refueling or replenishing LCSs at sea during our study; it was beyond our charter. However, our study highlights the large demand that the LCS fleet may place upon assets to provide refueling and replenishment and highlights the need to align fleet logistics with LCS CONOPS [concepts of operations]. We feel that this issue warrants careful consideration....[13]

RAND states that for purposes of its study, LCSs were assumed to have an unrefueled cruising range of 1,250 nautical miles at a "sprint speed" of 45 knots and an unrefueled cruising range of 3,900 nautical miles at an "economical speed" of 19 knots. These figures, RAND stated, are averages of the threshold and objective levels specified in the LCS Capabilities Development Document (CDD) for Flight 0, as reflected in two NAVSEA documents dating to 2003 and 2004.[14] If LCSs turn out to have unrefueled cruising ranges that are lower than those assumed in the RAND report, this could underscore the emerging issue identified by the RAND report.

LPD-17 Program

Execution Problems And Cost Growth

The LPD-17 program has encountered a number of execution problems since the program entered procurement. The first LPD-17, which was procured in FY1996, encountered a roughly two-year delay in design and construction. It was presented to the Navy for acceptance in late June 2005. A Navy inspection of the ship conducted June 27-July 1, 2005, found numerous construction deficiencies.[15] The ship was commissioned into service on January 14, 2006. In April 2007, it was reported that the first LPD-17 had thousands of construction deficiencies.[16]

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[13]Brien Alkire, et al, *Littoral Combat Ships: Relating Performance to Mission Package Inventories, Homeports, and Installation Sites*, RAND, Santa Monica (CA), 2007, pp. 80-81. (National Defense Research Institute, MG-528-Navy)

[14]Ibid, p. 99.

[15]Associated Press, "Shipbuilder: Navy Will Accept New Vessel," *NavyTimes.com*, July 21, 2005; Christopher J. Castelli, "Naval Inspection Report Finds Numerous Problems With LPD-17," *Inside the Navy*, July 18, 2005; Dale Eisman and Jack Dorsey, "Problems On New Ship A Bad Sign, Analyst Warns," *Norfolk Virginian-Pilot*, July 14, 2005; Nathan Hodge, "Navy Inspectors Flag 'Poor Construction' On LPD-17," *Defense Daily*, July 14, 2005. A copy of the Navy's inspection report, dated July 5, 2005, is posted online at [www.coltoncompany.com/newsandcomment/comment/lpd17insurv.htm]

[16]See, for example, Louis Hansen, "New Navy Ship San Antonio Found To Be Rife With Flaws," *Norfolk Virginian-Pilot*, April 14, 2007; Christopher P. Cavas, "Thousands of Problems Found On New Amphibious Ship," *DefenseNews.com*, April 23, 2007.

At various points over the years, Navy or industry officials have stated that the LPD-17 program was turning a corner, or getting back on track, or words to that effect. Some of these statements, at least, appear in retrospect to have been premature.

The LPD-17 program has experienced considerable cost growth. When LPD-17 procurement began, follow-on ships in the class were estimated to cost roughly $750 million each. Estimated procurement costs for the follow-on ships subsequently grew to figures between about $1,200 million and about $1,500 million. The Navy estimates the procurement cost of the ninth ship at $1,798.3 million. A relatively small portion of the cost growth in the program since its inception is attributable to the decision to reduce the program's sustaining procurement rate from two ships per year to one ship per year. Most of the program's cost growth is attributable to other causes.[17]

Navy Acceptance Of Incomplete Ships

The Navy accepted delivery of LPD-17 with about 1.1 million hours of construction work remaining to be done on the ship. This equates to about 8.7% of the total hours needed to build the ship, and (with material costs included) about 7% of the total cost to build the ship.

The Navy accepted delivery of LPD-18 with about 400,000 hours of construction work remaining to be done on the ship. This equates to about 3.3% of the total hours needed to build the ship.

The Navy projects that it will accept delivery of LPD-19 with about 100,000 hours of construction work remaining to be done on the ship. This would equate to about 0.8% of the total hours needed to build the ship.

The Navy states that it accepted LPD-17 in incomplete condition for four reasons:

- It permitted the fleet to begin sooner the process of evaluating LPD-17 through operational use so as to identify problems with the LPD-17 class design that need to be fixed in follow-on LPD-17s.

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[17]RAND estimates that halving a shipbuilding program's annual procurement rate typically increases unit procurement cost by about 10%. (Mark V Arena, et al, *Why Has the Cost of Navy Ships Risen? A Macroscopic Examination of the Trends in U.S. Naval Ship Costs Over the Past Several Decades*. RAND, Santa Monica (CA), 2006. p. 45. (National Defense Research Institute, MG-484-NAVY). The December 2006 Selected Acquisition Report (SAR) summary table, available online at [http://www.acq.osd.mil/ara/am/sar/2006-DEC-SST.pdf], states that in then-year dollars, changes in the LPD-17 program's production schedule (including the reduction in annual procurement rate) account for $768.1million in increased costs for the program, or about 11.2% of the increased costs caused by all factors. The other factors leading to increased costs were economic errors (meaning errors in projected rates of inflation), which account for $361.7 million; estimating errors, which account for $4,648.8 million; and "other," which accounts for $1,093.4 million. The LPD-17 program's total cost was also reduced by $4,037.8 million due to the reduction in program quantity from an originally planned total of 12 ships to the currently planned total of 9 ships. The resulting net change in the program's estimated cost is an increase of $2,832.2 million.

- It avoided further delays in giving the LPD-17's crew an opportunity to conduct post-delivery tests and trial events that are intended to identify construction (as opposed to class design) problems with LPD-17 itself.

- It permitted LPD-17 to leave the shipyard sooner and thereby mitigated schedule and cost impacts on other ships being built at the shipyard (other LPD-17s, LHD-8, and DDG-51s) that would have resulted from having LPD-17 remain in the shipyard longer.

- It reduced the cost of the remaining construction work to be done on LPD-17 because the work in question could be performed by repair shipyards that charge lower rates for their work than the construction shipyard.

Of the approximately $160 million in post-delivery work performed on LPD-17, a substantial fraction was for the 1.1 million hours of construction work remaining to complete the ship. (The rest was for post-shakedown and other work that normally occurs after a ship is completed and delivered to the Navy.)[18] This $160 million in work was funded through the post-delivery part of the outfitting/post-delivery (OF/PD) line item in the Shipbuilding and Conversion, Navy (SCN) account. Since OF/DP costs are not included in ship end cost, the reported end cost of LPD-17 will understate the ship's actual construction cost.

The Navy plans to fund post-delivery construction work on LPD-18 and LPD-19 through the completion of prior-year shipbuilding line item in the SCN account — a line item that is included in ship end cost.

Potential oversight questions for the subcommittee include the following:

- To what extent are cost growth and construction problems in the LPD-17 program due to poor performance by NGSS, poor performance by other contractors, inadequate program management and oversight by the Navy, Hurricane Katrina, and other factors?

- What specific actions have NGSS, other contractors, and the Navy taken, and what additional actions do they plan to take, to avoid further cost growth and construction problems in the LPD-17 program?

- Although the Navy in the past has accepted delivery of ships that were not complete, has the Navy previously accepted delivery of a ship with one million or more hours of shipyard construction work remaining to be done, and if so, when?

Secretary of the Navy Donald Winter's June 22, 2007, letter to the chairman and chief executive officer of Northrop Grumman, Ronald Sugar, states in part: "It is imperative that NGSS [Northrop Grumman Ship Systems] deliver future ships devoid of significant quality problems and that it meet its cost and schedule obligations." The letter does not list any specific negative consequences that

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[18]On July 16, 2007, CRS and CBO asked the Navy to break down the $160 million figure into ship-construction work and other work. The Navy's response was not provided to CRS in time to be incorporated into this statement.

might result for Northrop if Northrop does not meet this goal.[19] As such, this part of the letter might be viewed as essentially an exhortation on the Navy's part. It is possible that Secretary Winter simply did not wish to list any potential negative consequences in the letter. It is also possible, however, that the Navy may have few effective potential negative consequences that it could list. Perhaps the most significant potential negative consequence would be to take future work away from NGSS by either terminating shipbuilding programs, reducing planned numbers of ships to be procured, or transferring ships to other shipyards. The Navy, however, has limited ability to threaten NGSS with this outcome: The Navy has a stated requirement for its shipbuilding programs, has already reduced planned numbers of ships to be procured to relatively low or minimum-sustaining levels, and has limited flexibility to transfer the ships in question to other yards.

Secretary Winter's June 22 letter also states that the Assistant Secretary of the Navy for Research, Development, and Acquisition (ASN RDA) is planning quarterly reviews of NGSS and all of the ships under contract there. A potential question for the subcommittee is why the ASN RDA office is only now planning such quarterly reviews, and why such reviews are not being planned for all shipyards that build Navy ships, and all Navy shipbuilding programs. The ASN RDA has many responsibilities, including at present the critically important responsibility of ensuring that urgent acquisition needs related to operations in Iraq and Afghanistan are met without delay. But on the list of priorities that come after this urgent wartime responsibility, shipbuilding arguably would rank fairly high: Ships are central to the Navy; they are expensive, high-visibility items; the Navy's shipbuilding effort currently encompasses several new or recent designs; shipbuilding has experienced significant cost growth and other execution problems in recent years; and shipbuilding has been a strong concern of Congress for several years. The Navy periodically reviews its shipbuilding programs at levels below that of the ASN RDA, but as the Navy is now implicitly acknowledging, there is a difference between reviews conducted at lower levels and reviews conducted at the ASN RDA level.

Procuring An Additional LPD-17 In FY2008

The procurement of an additional LPD-17 at a cost of about $1,700 million is the top item on the Navy's FY2008 unfunded priorities list (UPL). This additional LPD-17would be the tenth ship in the class. Although the Navy currently plans to end LPD-17 procurement at nine ships, a tenth LPD-17 would be needed to achieve the Navy's goal, under its desired 313-ship force structure, of a 31-ship amphibious force that includes 10 LPD-17s.

Despite placing an additional LPD-17 at the top of its FY2008 UPL, the Navy in its testimony this year has expressed caution or even ambivalence about the idea of procuring an additional LPD-17 in FY2008, in part because the Navy believes that NGSS, on account of Katrina-related damage, would not be able to start construction work on an additional LPD-17 right away. Funding an additional LPD-17 in FY2008, the Navy has testified, could "result in, essentially, booking a ship, not really being able to build it."[20]

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[19] A copy of the letter was posted on the subscribers-only part of the *InsideDefense.com* website on July 9, 2007.

[20] At a March 28, 2007, hearing before the Defense subcommittee of the Senate Appropriations Committee, for example, Admiral Michael Mullen, the Chief of Naval Operations, when asked about the potential for (continued...)

Although NGSS might not be able to start construction right away on an additional LPD-17 funded in FY2008, Congress could nevertheless decide to procure the ship in FY2008. Congress might come to such a decision, for example, if it decides that is has the funding available this year, but perhaps not in a future year, to procure an additional LPD-17. A decision by Congress to fund two LPD-17s in FY2008 — the one that is in the Navy's FY2008 budget, plus the additional one that is in the Navy's FY2008 UPL — with the knowledge that the second ship might not be started right away could be viewed as somewhat analogous to Congress' decisions in FY1983 and FY1988 to fund the procurement of two aircraft carriers in a single year (CVNs 72 and 73 in FY1988; CVNs 74 and 75 in FY1988) with the knowledge in each instance that the second ship would be started some time after the first. (The keels for CVNs 72 and 73 were laid down on November 3, 1984 and August 25, 1986, respectively. The keels for CVNs 74 and 75 were laid down on March 13, 1991 and November 29, 1993, respectively.)

If Congress decides that there is insufficient funding in FY2008 to fully fund the procurement of an additional LPD-17, another option would be to split-fund the ship in FY2008 and FY2009. If the Navy, in next year's budget submission, were to exercise the authority granted by Congress in Section 121 of the FY2007 defense authorization act to use four-year incremental funding (as opposed to the current split funding) for the procurement of CVN-78, the FY2009 funding requirements for CVN-78 would be reduced, which could make it easier in FY2009 to accommodate a second increment of funding for the additional LPD-17.

DDG-1000 Program

Technical Risk And Navy As System Integrator

Over the past few years, GAO has reported on the technical risks involved in developing the several significant new technologies that are to be incorporated into the DDG-1000. The Navy over the years has worked to retire these risks. As these individual technologies mature, technical risk in the DDG-1000 program will shift more to the follow-on task of system integration — of getting

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[20](...continued)
funding additional ships in FY2008, began his response by stating:

> I think it would be, we — in responding to this, we look at the possibilities of being able to actually build ships.
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> One of the — and it's on my unfunded priority list, the number one ship is an LPD — LPD-17, which would be the tenth one. And it's a required LPD, but it's not been affordable.
>
> But the ability to actually do that, I think — and, in fact, because of the challenges we've had as a result of Katrina with the shipyard in that area, would — it would be very challenging. And it could well just, if it were added, result in, essentially, booking a ship, not really being able to build it.
>
> That said, it clearly would relieve some financial pressure that I've got in the SCN [account] on the — in the — in the program in later years.
>
> (Source: transcript of hearing. Mullen continued his response by commenting on the potential for funding additional ships of other types in FY2008.)

all ship's technologies to work together smoothly in a single platform. In past defense acquisition programs, system integration has often proven to be as least as challenging as the task of developing individual new technologies.

Since September 30, 2005, the Navy has managed the DDG-1000 program through a series of separate contracts with major DDG-1000 contractors, including NGSS, General Dynamics' Bath Iron Works (GD/BIW), Raytheon, and BAE Systems. Under this arrangement, the Navy is acting as the overall system integrator for the program.

Problems in the execution of the Coast Guard Deepwater program[21] and the LCS program have led to a reexamination in Congress this year of the concept of the private-sector lead system integrator (LSI), and to a desire among some Members to shift certain acquisition functions, including system design and integration, from the private sector, to where they had migrated starting in the 1990s, back to the federal government. The Navy's decision in 2005 to begin acting as the system integrator for the DDG-1000 program will make the program an early test of DOD's ability to once again perform the system-integration function following the downsizing of DOD's technical and acquisition workforce that occurred when acquisition functions were earlier transferred to the private sector. The DDG-1000 program, in addition to being an early test of DOD's abilities in this area, may represent a fairly challenging test, given the number of significant new technologies that are to be integrated into the ship.

Shared-Production Arrangement

NGSS and GD/BIW have agreed on a shared-production arrangement for building DDG-1000s. Under this arrangement, certain parts of each ship will be built by NGSS, certain other parts of each ship will be built by GD/BIW, and the remaining parts of each ship would be built by the yard that does final-assembly work on that ship. The arrangement can be viewed as somewhat analogous to the joint-production process for Virginia-class submarines that was proposed by industry and the Navy, and then approved by Congress in Section 121 of the FY1998 defense authorization act (H.R. 1119/P.L. 105-85 of November 18, 1997).

NGSS will be the final-assembly yard for one of the two lead DDG-1000s, and GD/BIW will be the final-assembly yard for the other. The difference in the two ships' construction schedules — about 6 months — is driven in large part by the production capacities of vendors making certain government-furnished equipment for the two ships. Until recently, it was expected that NGSS would be the final-assembly yard for the first ship and that GD/BIW would be the final-assembly yard for the second. On July 17 and 18, 2007, it was reported that the Navy is considering the option of instead assigning the first ship to GD/BIW and the second to NGSS. The potential switch reportedly is being considered by the Navy in part because the Navy believes it could provide some additional help in maintaining GD/BIW's work force as its DDG-51-related work begins to wind down, and because it could also provide some additional time for NGSS to recover from Katrina-related

[21] For additional discussion of the Deepwater program, see CRS Report RL33753, *Coast Guard Deepwater Program: Background, Oversight Issues, and Options for Congress*, by Ronald O'Rourke.

damage. The July 17 article reporting the potential switch stated that "a decision [from the Navy] is not expected before July 23," the day before this hearing.[22]

It is possible that the Navy might wish to have the two yards compete for the role of final-assembly yard for the third and subsequent ships in the class. Such a competition could be done on a one-time basis for all the ships in question, or serially, for each ship. One potential question for the subcommittee is whether competing the role of final-assembly yard for the third and subsequent ships, particularly if done on a one-time basis, would be consistent with the intent of Section 1019 of the Emergency Supplemental Appropriations Act for 2005 (H.R. 1268/P.L. 109-13 of May 11, 2005) and Section 125 of the FY2006 defense authorization act (H.R. 1815/P.L. 109-163 of January 6, 2006). Both of these provisions prohibit the Navy from using a winner-take-all acquisition strategy for the DDG-1000 program. The provisions require the participation of a second shipyard in the program, but they do not specify the share of the program that is to go to second yard.

Another potential question for the subcommittee is what implications, if any, the shared-production arrangement for the DDG-1000 program might have for the CG(X) cruiser program.[23] The Navy has testified that it would like to use the DDG-1000 design as the basis for the CG(X) design. If the CG(X) design is derived from the DDG-1000 design, supporters of the DDG-1000 shared-production arrangement might argue that it would make sense to extend the arrangement into the CG(X) program. Navy plans call for procuring DDG-1000s at a rate of essentially one ship per year, and for procuring CG(X)s at an eventual steady rate of two ships per year. Particularly given this difference in planned procurement rates, one potential question is whether a shared-production arrangement that makes sense for the DDG-1000 program would also make sense for the CG(X) program.

Procuring The DDG-1000 Currently Planned For FY2011

The Navy currently plans to procure the fifth DDG-1000 in FY2011, along with the first CG(X). The Navy might find it difficult to fund both a follow-on DDG-1000 and the lead CG(X) in a single year, particularly if the design for the CG(X) that emerges from the CG(X) Analysis of Alternatives (AOA) turns out to be more expensive than the "placeholder" cost for the lead CG(X) that appears in the FY2008-FY2013 Future Years Defense Plan (FYDP). One option for avoiding a potential funding tension in FY2011between the fifth DDG-1000 and the lead CG(X) would be to accelerate the procurement of the fifth DDG-1000 to FY2009 or FY2010. The resulting combined cost of the two DDG-1000s procured in FY2009 or FY2010, both of which would be follow-on ships, could be less than the combined cost of a fifth DDG-1000 and a lead CG(X) in FY2011. If funding is insufficient to fully fund the procurement of two DDG-1000s in either FY2009 or FY2010, another option would be to procure the accelerated DDG-1000 in FY2009 with split funding in FY2009 and FY2010, or in FY2010 using split funding in FY2011 and FY2011. An additional option would be to retain the fifth DDG-1000 in FY2011 and split fund either that ship, the lead CG(X), or both, across FY2011 and FY2012.

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[22]Christopher P. Cavas, "First DDG 1000 Could Shift To Bath," *Defense News*, July 17, 2007.

[23]For more on the CG(X) program, see CRS Report RL32109, *Navy DDG-1000 (DD(X)) and CG(X) Ship Acquisition Programs: Oversight Issues and Options for Congress*, by Ronald O'Rourke, and CRS Report RS22559, *Navy CG(X) Cruiser Design Options: Background and Oversight Issues for Congress*, by Ronald O'Rourke, and CRS Report RL33946, *Navy Nuclear-Powered Surface Ships: Background, Issues, and Options for Congress*, by Ronald O'Rourke.

Block Buy

Another possible option for Congress to consider would be to authorize the Navy to use a block-buy arrangement for procuring several DDG-1000s, particularly if Congress decides that there is a high likelihood those DDG-1000s will be procured. A block-buy arrangement, for example, could be used to procure the five DDG-1000s that are currently planned for procurement over the five-year period FY2009-FY2013.

The block-buy authority, which Congress created for procuring the first four Virginia-class submarines over the five-year period FY1998-FY2002, is similar to a multiyear procurement (MYP) authority in that it permits the Navy to use a single contract to procure several ships that are planned for procurement over a period of several years. A block-buy arrangement, like an MYP arrangement, can reduce the cost of the ships being procured by a few percent by giving the shipyards the confidence about future work that they need to support investments in workforce retention and development, and in new production equipment, that can better optimize the yards for producing the ships. The savings that would result from reducing the cost of a group of DDG-1000s by a few percent might be enough to procure, for example, another LCS.

Unlike an MYP arrangement, a block-buy arrangement does not include authority for making up-front economic order quantity (EOQ) purchases of long-lead items (which is how MYP arrangements can save an additional few percent on the cost of the ships being procured). Also unlike an MYP arrangement, a block-buy arrangement does not require the Navy to first demonstrate design stability in the program — a requirement that, in a shipbuilding program, is usually not considered met until the lead ship is delivered. This difference between a block buy and an MYP is significant, because under Navy plans, all seven ships in the DDG-1000 program are to be procured by the time the first ship is delivered, making it, from a practical standpoint, impossible to use MYP arrangement to reduce the cost of the DDG-1000 program.

Using a block-buy arrangement might be incompatible with the idea of having the two yards compete for the role of final-assembly yard for the third and subsequent ships in the program. If so, however, the potential savings of a block-buy arrangement might be comparable to the savings that might result from competing the final-assembly role. A block-buy arrangement could also make it difficult or expensive for the Navy or Congress to later change its mind about procuring the DDG-1000s covered under the arrangement, which is why having a high confidence in the procurement of these DDG-1000s would be beneficial.

When CRS raised the option of using a block-buy arrangement on the DDG-1000 program at a July 16, 2007, meeting with the Navy on the DDG-1000 and other shipbuilding programs, officials from the DDG-1000 program office appeared unfamiliar with the option. This may be because the option previously has been used for procuring submarines but not surface ships.

CVN-78 Program

Technical And Cost Risk

Technical and cost risks for CVN-78 were reduced by the Navy's decision in May 1998 to base the ship on the Nimitz (CVN-68) class hull design rather than on a new hull design, and by later

decisions to defer the procurement of the ship from FY2006 to FY2007, and from FY2007 to FY2008. GAO has identified remaining technical risks for the ship, particularly regarding the electromagnetic aircraft launch system (EMALS), the dual-band radar, and the advanced arresting gear. Information about the CVN-78 program provided by the Navy to CRS and CBO at a June 21, 2007, briefing suggests that the Navy's cost estimate for CVN-78 may be optimistic. In light of this, as well as cost growth in other recent Navy shipbuilding programs (including CVN-77) and recent Navy statements regarding the challenges involved in building lead ships (including LPD-17 and LCS-1), there appears to be a substantial possibility of cost growth on CVN-78.

Cost Cap

Section 122 of the FY2007 defense authorization act [H.R. 5122/P.L. 109-364 of October 17, 2006]) established a procurement cost cap for CVN-78 of $10.5 billion, plus adjustments for inflation and other factors, and a procurement cost cap for subsequent ships in the class of $8.1 billion each, plus adjustments for inflation and other factors. The Navy interprets these caps as being expressed in "FY2006 then-year dollars," meaning the cost of the ship in then-year dollars if the ship were procured in FY2006 rather than in FY2008 (for CVN-78) or in FY2012 (for CVN-79). The Navy states that the estimated then-year-dollar costs for CVN-78 and CVN-79 of about $10.5 billion and $9.2 billion, respectively, de-escalate into *FY2006* then-year dollar figures of about $10.0 billion and $7.4 billion, respectively.

One potential question for the subcommittee is whether the Navy is correct in interpreting the cost cap figures in Section 122 as being expressed in "FY2006 then-year dollars." If the Navy is correct in this interpretation, then CVN-78 could experience about $500 million in cost growth for reasons outside those permitted in Section 122 without exceeding its cost cap, and CVN-79 could experience about $700 million in cost growth for reasons outside those permitted in Section 122 without exceeding its cost cap. Other things held equal, this would reduce the chance that these ships will exceed their respective cost caps. At the same time, however, the existence of a cost cap that is higher than a ship's currently estimated cost might not be viewed as conducive to rigorous cost control on the ship, as it might encourage some to believe that cost increases up to the cap would be acceptable.

Four-Year Incremental Funding

Section 121 of the FY2007 defense authorization act authorized the Navy to use four-year incremental funding to procure CVN-78, CVN-79, and CVN-80. In its FY2008-FY2013 budget submission, the Navy did not use this authority and continued to budget for CVN-78 and CVN-79 using split funding (i.e., two-year incremental funding). The Navy has the option of using the authority when it submits its FY2009-FY2013 budget plan next year. As mentioned earlier, using the authority for CVN-78 would permit a reduction in the amount of funding required for the ship in FY2009. Other things held equal, that might permit additional things to be funded that year. It would also, however, increase funding requirements for CVN-78 in FY2010 and FY2011, which could, other things held equal, make it more difficult at the margin to fund other things in those years.

Option For Block Buy

One possible option for Congress to consider for the CVN-78 program, as for the DDG-1000 program (see earlier discussion), would be to authorize the Navy to use a block-buy arrangement, particularly if Congress decides that there is a high likelihood procuring CVN-79 and CVN-80. One option for a block-buy arrangement would encompass CVN-78 and CVN-79. If that option is not used, another option would be a block-buy arrangement encompassing CVN-79 and CVN-80. As with a block-buy arrangement in the DDG-1000 program, a block-buy arrangement in the CVN-78 program could reduce the cost of the ships covered by a few percent — perhaps enough, in the case of the CVN-78 program, to fund the procurement, for example, of an additional Navy auxiliary ship or two additional LCSs. As with the DDG-1000 program, the alternative strategy of a multiyear procurement (MYP) would likely not be available for CVN-78 and CVN-79 because the Navy won't be able to demonstrate design stability in the CVN-78 program — a requirement to qualify for MYP — until CVN-78 is delivered in FY2015, which is three years after the planned procurement year for CVN-79.

Mr. Chairman, distinguished members of the subcommittee, this concludes my testimony. Thank you again for the opportunity to appear before you to discuss these issues. I will be pleased to respond to any questions you might have.