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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 discusses the following:

- the implications of the Navy's FY2009 shipbuilding plan for reaching and maintaining the Navy's planned 313-ship fleet (pages 1-8);
- the potential effect on the shipbuilding plan if DDG-1000s experience significant cost growth (pages 8-9);
- potential options for changing the mix of ships procured so as to increase the number of Navy ships procured in the near term (pages 9-11);
- procuring additional DDG-51s instead of additional DDG-1000s (pages 11-13);
- the CG(X) program (page 13);
- issues relating to ships funded through the National Defense Sealift Fund (NDSF) (pages 13-16); and
- Navy capabilities needed to counter a future Western Pacific threat (pages 16-20).

Implications of FY2009 Shipbuilding Plan for Reaching and Maintaining 313-Ship Fleet

The FY2009 ship building plan — which in this statement refers to both the five-year (FY2009-FY2013) and 30-year (FY2009-FY2038) shipbuilding plans — contains a number of features with implications for reaching and maintaining the Navy's planned 313-ship fleet.

Roughly 40% Increase In Estimated Cost For 30-Year Plan

One of the most significant features in the FY2009 shipbuilding budget submission, compared to the FY2008 submission, is an apparent increase of roughly 40% in real (inflation-adjusted) terms in the Navy's estimated average annual cost to implement the 30-year shipbuilding plan.[1] This

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[1]The Navy last year estimated that the FY2008-FY2037 plan would cost an average of $14.4 billion per year in FY2007 dollars. The Navy's estimated cost for the FY2009-FY2038 plan appears to be roughly $20.1 billion per year in FY2007 dollars, or roughly 40% more. The Navy's estimate for the first 12 years of the plan (FY2009-FY2020) has increased to $15.8 billion per year in FY2007 dollars — an increase of about 9.7%. Its estimate for the final 18 years of the plan (FY2021-FY2038) appears to have increased to about $22.9 billion per year in FY2007 dollars — an increase of roughly 59%. (Although the Navy's report on the

(continued...)

roughly 40% real increase is not due to significant changes in the composition of the 30-year plan, because the types and quantities of ships to be procured under this year's (FY2009-FY2038) 30-year plan are generally the same as those in last year's (FY2008-FY2037) 30-year plan.[2]

As discussed further below, the Navy's report on the FY2009 30-year plan states that the Navy's cost estimate excludes the cost of the 12 replacement ballistic missile submarines (SSBNs) that are shown in the plan. Depending on the cost one assumes for these 12 SSBNs, including their cost might increase the roughly 40% figure in the previous paragraph to roughly 49% to 57%.[3]

In 2007, the Congressional Budget Office (CBO) estimated that last year's version of the 30-year plan would cost roughly 35% more per year to implement than the Navy was estimating. The Navy in 2007 downplayed CBO's higher cost estimate, referring to it in testimony as "worst-case analysis"[4] or as an "extremely conservative" estimate.[5] The Navy's new estimated cost for the FY2009 30-year plan, however, is now comparable to CBO's estimates for last year's plan.

In 2006 and 2007, CRS and CBO discussed in reports and testimony how the Navy's strategy for executing the shipbuilding plan depended on a series of five assumptions concerning the future size and composition of the Navy's budget and the costs of future Navy ships. As noted by both CRS and CBO in 2006 and 2007, all five of these assumptions could be viewed as risk items for the plan, because there were grounds for questioning whether each of them would be borne out.[6]

Although the Navy's strategy in 2006 and 2007 for executing the 30-year shipbuilding plan depended on a series of assumptions that could be viewed as risks, the Navy was nevertheless able to say that it had a strategy for generating the shipbuilding funds needed to implement the plan. That situation may now have changed: The Navy's new estimated cost for the 30-year plan is so much higher than the Navy's estimate last year that the Navy no longer appears to have a clearly identifiable announced strategy for raising the shipbuilding funds needed to execute the 30-year plan.

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[1](...continued)
30-year plan does not state an estimated average annual cost for the 18 later years of the plan, visual inspection of a graph in the report (Figure 1) suggests that the average figure for this period is roughly $22.9 billion a year in FY2007 dollars.) An average of $15.8 billion per year for 12 years and $22.9 billion per year for 18 years works out to a 30-year average of about $20.1 billion per year

[2]The FY2009-FY2038 plan includes 296 ships, or about 1.7% more than the 291 ships in the FY2008-FY2037 plan. The types of ships procured under the two plans are essentially the same, and the total numbers of each type being procured are similar.

[3]Using Navy and Congressional Budget Office (CBO) estimates for the cost of these SSBNs as presented in CBO testimony to this subcommittee on July 24, 2007, including the costs of 12 replacement SSBNs could increase the estimated cost of the 30-year plan by about $1.3 billion per year (using the Navy's estimate) to about $2.5 billion a year (using CBO's estimate).

[4]Source: Transcript of spoken testimony of Vice Admiral Paul Sullivan before the Seapower and Expeditionary Forces subcommittee of the House Armed Services Committee on March 20, 2007.

[5]Source: Transcript of spoken testimony of Allison Stiller before the Defense subcommittee of the House Appropriations Committee on April 25, 2007.

[6]See, for example, CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

Although the Navy, industry, and Congress can take various steps to minimize shipbuilding costs,[7] the magnitude of the Navy's apparent ship recapitalization financing challenge suggests that implementing the 30-year plan without reducing resources for other Navy priorities would likely require adding billions of dollars per year to the Navy's budget in coming years.

The Navy's apparent ship recapitalization financing challenge appears broadly similar to the Air Force's aircraft recapitalization financing challenge. But while the Navy and Air Force may be similar in terms of facing major financing challenges for recapitalizing their primary platforms, the two services are strikingly different in terms of how they are responding to that situation. The Air Force is responding by stating directly and repeatedly that the Air Force budget needs to be increased by about $20 billion per year for the next five years.[8] The Navy, in contrast, has studiously avoided asking for an increase to its programmed budget in recent years and stated instead that it will be able to finance its recapitalization goals by reducing other costs and operating more efficiently.

Consistent with its stated need for a $20-billion increase to its annual budget, the Air Force has submitted an FY2009 unfunded requirements list (URL) totaling $18.75 billion. This is more than four times the total in the FY2009 Navy URL ($4.59 billion), and more than three times the combined total in the FY2009 Navy and Marine Corps URLs ($5.90 billion, after adjusting for the presence of the same LPD-17 class amphibious ship in both the Navy and Marine Corps URLs).

The total additional funding discussed by Air Force officials — $100 billion over five years — would be enough to pay for roughly 45 ships in the Navy's 30-year shipbuilding program, according to the Navy's estimated cost for the 30-year plan, or roughly 4.5 years of the 30-year plan.[9]

The difference between the Air Force and Navy in terms of discussing the need for an increased budget is potentially significant. In a situation where two services both face significant recapitalization financing challenges, if one service is vocal about the need for a budget increase

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[7]Available measures include things such as:
— achieving year-to-year stability in shipbuilding plans,
— maintaining discipline in establishing and avoiding subsequent changes in ship requirements,
— achieving increased commonality between ship designs, including commonality in hulls as well as components,
— avoiding concurrency in design and construction;
— avoiding schedule-driven programs with compressed schedules;
— using competition where possible,
— using contracts with robust incentives for controlling costs,
— optimizing production among yards owned by a common parent firm,
— investing in improved production facilities,
— using multiyear procurement (MYP) or block buys,
— using incremental funding to avoid or mitigate budget spikes that can disrupt production profiles, and
— ensuring accountability in the execution of programs.

[8]See, for example, Gordon Lubold, "Air Force Argues For More Money," *Christian Science Monitor*, March 11, 2008; and Frank Oliveri, "A Budget Battle Takes Wing," *CQ Weekly*, March 10, 2008.

[9]Assuming an additional $1.9 billion per year over 30 years for procuring the 12 replacement SSBNs in the 30-year plan (i.e., an average unit cost of $4.75 for the 12 SSBNs), the Navy's total estimated cost for executing the 30-year plan appears to be about $660 billion ($22 billion per year times 30 years). A sum of $100 billion would pay for about 15.2% of these 296 ships, or 44.85 ships, or 4.55 years of the 30-year plan.

while the other is not, policymakers could develop an unbalanced understanding of the relative funding needs of the two services.

13 Fewer Ships in FY2009-FY2013

This year's shipbuilding submission includes 47 new construction ships in FY2009-FY2013 — a reduction of 13 ships, or about 22%, from the 60 new-construction ships that were planned for FY2009-FY2013 under the FY2008 shipbuilding plan. Most of the 13-ship reduction is due to an 11-ship reduction in the number of Littoral Combat Ships (LCSs) planned for FY2009-FY2013, which is a consequence of the Navy's restructuring of the LCS program.

3-Year Delay in Reaching 313 Ships

Under the FY2009 shipbuilding plan, the Navy is to reach a total of at least 313 ships in FY2019 — 3 years later than under the FY2008 shipbuilding plan. The 13-ship reduction in FY2009-FY2013 in the FY2009 plan appears to be a primary cause of this 3-year delay.

Shortfalls Relative to 313-Ship Goals

This year's 30-year shipbuilding plan, like the two previous ones, does not include enough ships to fully support all elements of the planned 313-ship force structure over the long run. As shown in **Table 1** below, however, the projected shortfall in the 30-year plan relative to the 313-ship force structure has been reduced from about 39 ships two years ago to 13 ships today.

Table 1. Projected Shortfall Relative to 313-Ship Force Structure

Projected shortfall by ship type, in numbers of ships, under the 30-year shipbuilding plan of...	Feb. 2006 (FY07-FY36)	Feb. 2007 (FY08-FY37)	Feb. 2008 (FY09-FY38)
Amphibious ships	1	1	0[a]
Cruise missile submarines (SSGNs)	4	4	4
Attack submarines (SSNs)	8	8	7
Cruisers and destroyers	~26	~10	0
MPF(F) ships	0	0	2
Total projected shortfall	~39	~26	13

Source: CRS analysis of Navy data.

a. Although the February 2008 30-year plan would support a force of 32 or 33 amphibious ships, as opposed to 31 called for in the 313-ship plan, the 32- or 33-ship force would include nine LPD-17 class ships, as opposed to the 10 called for in the 313-ship plan. The Marine Corps states that fully meeting the requirement for an amphibious force capable of lifting the assault echelons of 2.0 Marine Expeditionary Brigades (MEBs) would require a 33-ship amphibious force that includes 11 LPD-17s.

The reduction in the projected shortfall from about 39 ships two years ago to about 26 ships last year was due in large part to the insertion of additional destroyers into the final years of last year's 30-year plan. The reduction in the projected shortfall from about 26 ships last year to 13 ships this year is due in large part to a new assumption in this year's plan of a 5-year service life extension

(from 35 years to 40 years) for all 62 DDG-51 class destroyers, and additional service life extensions for four amphibious ships.

Although the FY2009 30-year plan assumes a 5-year service life extension for the DDG-51s, a Navy official was quoted after the FY2009 30-year plan was released as stating that the Navy has not yet officially approved the idea of extending the service lives of those ships.[10] One potential oversight issue for the subcommittee is why the 30-year plan assumed a 5-year service life extension for the DDG-51s if the Navy had not yet officially approved the idea. If the Navy approves the idea, a second potential oversight issue for the subcommittee is whether the Navy will actually be able to extend the service lives of the DDG-51s and operate them in a cost-effective manner for 40 years, given the wear and tear that might accrue on the ships in coming years, as well as the DDG-51 design's space, weight, and electrical-power capacities. If a 5-year service life extension for the DDG-51s proves infeasible or not cost-effective, a shortfall in cruisers and destroyers similar to that shown in the February 2007 column in **Table 1** might reappear.

10th LPD-17 and the Amphibious Force

The 313-ship plan calls for a total of 10 San Antonio (LPD-17) class amphibious ships. Congress, as part of its action on the FY2008 defense budget, provided $50 million in advance procurement funding for a 10th LPD-17 to be procured in a fiscal year after FY2008. The FY2009 shipbuilding plan, like last year's shipbuilding plan, does not include a 10th LPD-17, and calls for ending LPD-17 procurement with the ninth ship, which was procured in FY2008. A 10th LPD-17, at a cost of $1,700 million, is the number-two item on the Navy's FY2009 URL and the first item presented in the Marine Corps' FY2009 URL. Although items in the Marine Corps' FY2009 URL are not explicitly prioritized, the Marine Corps has testified that the 10th LPD-17 is the services' number-one priority in the URL.[11]

The FY2009 30-year shipbuilding plan would support a force of 32 or 33 amphibious ships, as opposed to a total of 31 called for in the 313-ship plan. This 32- or 33-ship force, however, would include nine LPD-17s, as opposed to the 10 called for in the 313-ship plan. The Marine Corps states that fully meeting the requirement for an amphibious force capable of lifting the assault echelons of 2.0 Marine Expeditionary Brigades (MEBs) would require a 33-ship amphibious force that includes 11 LPD-17s.[12] The Commandant of the Marine Corps has testified that:

> we've had some tremendous discussions with the Navy. We have come to an agreement on the numbers of [amphibious] ships, 33 [in inventory] to make 30 operational ships in order to give our nation that very necessary capability.
>
> And the Navy has looked at a way to extend some older ships that give us that 30 number for some period on through the FYDP, the five-year defense plan.

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[10]Zachary M. Peterson, "Destroyer Extension Part of 313-Ship Plan," *NavyTimes.com*, February 11, 2008.

[11]Source: Transcript of spoken testimony of Lieutenant General James Amos before the Seapower and Expeditionary Forces subcommittee of the House Armed Services Committee on February 27, 2008.

[12]The 33-ship force that would fully meet the 2.0 MEB lift requirement includes 11 large-deck amphibious assault ships (LHAs/LHDs), 11 LPD-17s, and 11 LSD-41/49 class amphibious ships.

Our only concern[13] with it, however, is that we have already, through previous agreement, [with] previous CNOs, and previous commandants, agreed on the 30 ships. That still represents about a 20 percent shortfall that those [Marine expeditionary] brigade footprints would require.

If we go with the old ships instead of newer ships, that shortfall becomes about 29 percent.

And we think there's a risk inherent with that that just concerns us greatly with the ability to provide that kind of capability to the nation.

Ergo, it [the 10th LPD-17] being our number one unfunded priority.[14]

Table 2 shows the Marine Corps' calculation of the amount of amphibious lift, in MEB equivalents, resulting from the 32- or 33-ship amphibious force that is projected in the Navy's FY2009 30-year shipbuilding plan. The table presents the five different elements of amphibious lift. In the table, a figure of 2.0 in a cell would meet the 2.0 MEB lift goal for that lift element, a figure of 1.0 would meet 50% of the goal for that element, and a figure of 1.5 would meet 75% of the goal for that element. As can be seen in the table, the Marine Corps projects significant shortfalls in certain lift elements, particularly vehicles (measured in square feet of storage space) and vertical takeoff or landing (VTOL) aircraft spots.

Table 2. Amount of Amphibious Lift, in MEB equivalents, Resulting From Amphibious Force Projected in FY2009 Navy 30-Year Shipbuilding Plan

	2008	2009	2010	2015	2020	2025	2030	2035
Troops	1.46	1.35	1.38	1.45	1.42	1.35	1.49	1.59
Vehicle (sq. ft.)	0.77	0.75	0.80	0.90	0.88	0.93	1.05	1.17
Cargo (cu. ft.)	2.02	1.90	1.92	2.07	2.04	1.95	2.28	2.49
VTOL aircraft	1.02	0.93	0.94	1.07	1.06	0.97	1.18	1.31
LCACs	1.81	1.75	1.79	1.79	1.75	1.77	1.65	1.50

Source: U.S. Marine Corps data provided to CRS, March 11, 2008. Calculations are based on a MEB that is sized to be carried aboard 15 amphibious ships.

Additional Virginia-Class Submarine in FY2011

Congress, as part of its action on the FY2008 defense budget, provided $588 million in advance procurement funding for a second Virginia-class submarine to be procured in a year prior to FY2012. The Navy has included this additional submarine in its shipbuilding plan and scheduled it for full funding in FY2011. The addition of this submarine to the shipbuilding plan reduces the projected attack submarine shortfall from 8 boats to 7, and the projected duration of the shortfall from 14 years (FY2020-FY2033) to 12 years (FY2022-FY2033).

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[13]The transcript at this point has the word "certain," but this appears to have been an error in transcription.

[14]Source: Transcript of spoken testimony of General James Conway before the Senate Armed Services Committee on February 28, 2008.

Congress has the option of accelerating the full funding of this additional submarine from FY2011 to either FY2010 or FY2009. Doing so could make it possible to fund another one or two additional submarines in FY2011 and/or FY2010, which would further reduce the projected depth and duration of the shortfall. If the second Virginia-class boat now planned for FY2011 were fully funded in FY2009, construction of the ship would not begin as quickly as would normally be expected for a submarine funded in FY2009 due to the ship having been funded with less than two years of advance procurement funding. Congress, however, has funded certain ships in the past in the knowledge that construction on those ships would not begin right away.[15]

The Navy has stated that it placed the additional submarine in FY2011 rather than FY2010 in part because placing it in FY2010 would create a 2-1-2 procurement profile in FY2010-FY2012 and the Navy was concerned about "the perturbation that that would create for the industrial base."[16] The Navy made the same argument in testimony in 2007. As noted in CRS testimony to this subcommittee in 2007,[17] this argument may overstate the industrial-base problems of a 2-1-2 pattern. If two boats were procured in a given year, followed by one boat the next year — a total of three boats in 24 months — the schedule for producing the three boats could be phased so that, for a given stage in the production process, the production rate would be one boat every eight months. A production rate of one boat every eight months might actually help the industrial base make the transition from the current schedule of one boat every twelve months (one boat per year) to one boat every six months (two boats per year). Viewed this way, a 2-1-2 pattern might actually lead to some benefits in production efficiency on the way to a steady rate of two boats per year. The Navy's own 30-year SSN procurement plan, like its 30-year plan last year, calls for procuring SSNs in a 1-2-1-2 pattern in starting in FY2029.

Two Previously Planned TAKEs Dropped From FY2009 Plan

The FY2009 shipbuilding plan does not include two Lewis and Clark (TAKE-1) class dry cargo ships that were scheduled for procurement in FY2010 and FY2011 under last year's shipbuilding plan. These two TAKEs, which would be the 13th and 14th to be procured, would serve — along with one of the TAKEs scheduled for procurement in FY2009 (the 12th ship) — in the Navy's planned Maritime Prepositioning Force of the Future, or MPF(F), squadron for implementing the Navy-Marine Corps sea basing concept. The Navy states that the 13th and 14th TAKEs were dropped from the FY2009 shipbuilding plan pending completion of a study on the MPF(F) concept of operations,

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[15]Congress, for example, funded two nuclear-powered aircraft carriers (CVNs 72 and 73) in FY1983, and two more (CVNs 74 and 75) in FY1988. In each case, Congress did so in the knowledge that the second ship funded that year would not begin construction until some number of years after the first.

[16]Source: Spoken remarks of Secretary of the Navy Donald Winter at a March 6, 2008, hearing before the House Armed Services Committee on the FY2009 Department of the Navy budget. Secretary Winter also stated that procuring the submarine in FY2011 would permit the submarine to incorporate, as much as possible, cost-reducing design changes currently being implemented in the Virginia-class design. A Navy budget point paper provided to CRS and CBO on March 11, 2008, states that the ship was scheduled for procurement in FY2011 rather than FY2010 because this "allowed the Navy to balance anticipated resources with requirements and supports the 30-year shipbuilding plan."

[17]Statement of Ronald O'Rourke, Specialist in National Defense, Congressional Research Service, Before the House Armed Services Committee Subcommittee on Seapower and Expeditionary Forces Hearing on Submarine Force Structure and Acquisition Policy, March 8, 2007, p. 12.

and that the Navy expects that the study will show a need for the two ships.[18] If so, the two ships might be restored in next year's Navy shipbuilding plan.

Cost of 12 SSBNs Excluded From Navy's Cost Calculation

As mentioned earlier, the Navy, in its report on the FY2009 30-year shipbuilding plan, excluded the cost of the 12 replacement SSBNs that are shown in the plan from its calculation of the estimated cost to implement the plan. A potential oversight issue for the subcommittee is why the Navy chose to exclude the cost of these 12 ships from its estimate. The Navy's report on the 30-year plan does not explain why. When asked at the House Armed Services Committee's March 6, 2008, hearing why the Navy chose to do this, the Navy responded that since the design of the SSBNs has not yet been determined, it was difficult for the Navy to derive an estimate for the cost of these ships.[19] The later years of the 30-year plan include other new classes of ships whose designs have not been determined; the Navy included the estimated costs for these ships in its calculation. This raises a question as to why the costs of the SSBNs were treated differently than the costs for these other future ship classes.

The Navy's SSBNs perform a mission of strategic nuclear deterrence, which can be viewed as more a national mission than a Navy one. From time to time in past years, observers have discussed whether it is appropriate for one service or another to be required to use funds from its own budget to pay for the performance of a national mission like strategic nuclear deterrence. The Navy's decision in the FY2009 30-year shipbuilding plan to exclude the cost of the 12 SSBNs from its estimated cost to implement the plan might be interpreted as a signal that, in light of its shipbuilding recapitalization financing challenge, the Navy is reviving (or reserving the option of reviving) this discussion in connection with the cost of the 12 replacement SSBNs.

Potential Effect on Shipbuilding Plan If DDG-1000s Experience Significant Cost Growth

As part of its FY2009 shipbuilding plan, the Navy has increased its estimated combined procurement cost for the seven planned DDG-1000s by about 6.9%.[20] Even with this 6.9% increase, CBO believes the Navy is significantly underestimating DDG-1000 procurement costs. CBO testified in 2007 that it believed the first two DDG-1000s will each cost about 60% more than the Navy estimated last year, that the other five ships in the program would each cost about 75% more than the Navy estimated last year, and that the complete seven-ship class consequently would cost

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[18]Source: U.S. Department of the Navy, *Report to Congress on Annual Long-Range Plan for Construction of Naval Vessels for FY 2009*, p. 9.

[19]Source: Transcript of hearing.

[20]Under the FY2008 shipbuilding plan, the Navy estimated the combined end cost of the seven DDG-1000s at $18,185 million in then-year dollars; under the FY2009 shipbuilding plan, the Navy estimates their combined end cost at $19,136 million in then-year dollars. There is no change in the years in which the ships are to be procured.

about 70% more than the Navy estimated last year.[21] CBO's 2008 estimates for the DDG-1000 program are unchanged from its 2007 estimates.[22]

Under CBO's estimates, the first two DDG-1000s, instead of having a combined cost of about $6.3 billion in then-year dollars, as the Navy now estimates, might have a combined cost of roughly $10.2 billion in then-year dollars,[23] which would be an increase of roughly $3.9 billion in then-year dollars. The remaining five ships in the class, instead of having a combined procurement cost of about $12.8 billion in then-year dollars, as the Navy now estimates, might have a combined procurement cost of roughly $20.7 billion in then-year dollars,[24] which would be an increase of roughly $7.9 billion in then-year dollars. Under CBO's estimates, the combined cost growth for all seven ships would be roughly $11.8 billion in then-year dollars, which is a figure roughly comparable to the total amount of funding in Shipbuilding and Conversion, Navy (SCN) appropriation account in certain recent years.

Cost growth of this scale, if realized, would put significant added pressure on the Navy's shipbuilding budget. Accommodating such added pressure on the shipbuilding budget would require either adding billions of dollars to the shipbuilding account, or deferring or canceling other ships now planned for procurement in those years, or both.

Cost growth on DDG-1000s could also have implications for estimating procurement costs for CG(X) cruisers, particularly if those cruisers are based on the DDG-1000 hull or a modified version of that hull. The Navy's placeholder cost estimates in the FY2009 shipbuilding plan for the first two CG(X)s, which the Navy plans to procure in FY2011 and FY2013, appear consistent with, and may have been derived from, the Navy's current estimated cost for the first two DDG-1000s. Since the Navy plans to procure 19 CG(X)s between FY2011 and FY2023, if cost estimates for CG(X)s rise in proportion to CBO's higher cost estimates for DDG-1000s, it could put significant added pressure on the Navy's shipbuilding budget from the early years of the next decade into the 2020s.

Potential Options for Increasing the Number of Navy Ships Procured in the Near Term

The subcommittee asked that this statement address the question of options for changing the mix of ships procured so as to increase the total number of ships procured in the near tem. One

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[21]Statement of J. Michael Gilmore, Assistant Director for National Security, and Eric J. Labs, Senior Analyst, [on] The Navy's 2008 Shipbuilding Plan and Key Ship Programs, before the Subcommittee on Seapower and Expeditionary Forces, Committee on Armed Services, U.S. House of Representatives, July 24, 2007, pp. 14-16.

[22]CBO informed CRS on March 5, 2008, that CBO's 2008 cost estimates for DDG-1000 procurement costs are unchanged from its 2007 estimates (though CBO, for purposes of its own presentation this year, is converting those estimates from constant FY2008 dollars to constant FY2009 dollars).

[23]The figure of roughly $10.2 billion is last year's Navy estimate for the two ships of $6,370 million, plus about 60%.

[24]The figure of roughly $20.7 billion is last year's Navy estimate for the five ships of $11,815 million, plus about 75%.

option for doing this — an option that Representative John Murtha, chairman of the Defense subcommittee of the House Appropriations Committee, has stated that the Defense subcommittee is considering — would be to defer procurement of the third DDG-1000, which the Navy wants to procure in FY2009, and use the funding programmed for that ship to instead procure a 10th LPD-17 and the 13th and 14th TAKEs in FY2009.[25] This option would trade a single ship for three individually less expensive ships.

There are many similar potential options for the period FY2009-FY2013. DDG-1000s or other ships of equal of greater individual cost that are planned for procurement during these years could be traded for larger numbers of individually less expensive ships of various kinds. Under this approach, the DDG-1000s or other ships whose procurement is deferred could eventually be procured in later years. Options for the individually less expensive ships to procure in the near term (FY2009-FY2013) include the following:

- the 10th and 11th LPD-17s;
- the 13th and 14th TAKEs;
- additional DDG-51s;
- naval gunfire ships based on the LPD-17 hull design;[26]
- Littoral Combat Ships (LCSs) currently planned for later years;
- Navy versions of the Coast Guard's National Security Cutter (NSC);[27]
- Joint High-Speed Vessels (JHSVs) currently planned for later years;
- MPF(F) LMSRs[28] currently planned for later years; and
- MPF(F) MLPs[29] currently planned for later years.

Another variant of this approach would be to use funding programmed for DDG-1000s in FY2011-FY2013 to instead procure CG(X) cruisers currently planned for later years. This option would not increase the number of ships procured in FY2011-FY2013, but it would accelerate the introduction of CG(X) capabilities (including ballistic missile defense capabilities) into the fleet.

Another variant of this approach would be to use the funding programmed for DDG-1000s to instead procure an equal number of additional Virginia-class submarines. This option would not increase the total number of ships procured, but it would further mitigate the projected attack submarine shortfall. Funding for the third DDG-1000, for example, could be used instead to accelerate to FY2009 the full funding of the second Virginia-class submarine now scheduled for

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[25]Source: Transcript of February 27, 2008, hearing on Navy shipbuilding before Defense subcommittee of House Appropriations Committee. See also, for example, Dan Taylor, "Murtha Mulls Cutting DDG-1000, Adding Two T-AKE Ships and 10th LPD-17," *Inside the Navy*, March 3, 2008, and Ashley Roque, "Murtha, Young Press Navy on Shipbuilding Plan, Look to Alter 2009 Budget," *CongressNow*, February 27, 2008.

[26]Such ships, armed with two 155mm Advanced Gun Systems (AGSs), like the DDG-1000, have been suggested as procurement options by CBO and the Center for Strategic and Budgetary Assessment (CSBA).

[27]Such ships reportedly has been proposed by Northrop Grumman; see Christopher P. Cavas, "Northrop Offers NSC-Based Vessel To Fill LCS Delays," *Defense News*, January 14, 2008.

[28]Large, Medium-Speed Roll-on/Roll-off ships to be used in the Maritime Prepositioning Force of the Future squadron.

[29]Mobile Landing Platform ships to be used in the Maritime Prepositioning Force of the Future squadron.

FY2011, which could facilitate a follow-on option of procuring an additional Virginia-class boat in FY2011.

Another variant of this approach would be to use some of the funding programmed for the third DDG-1000 (or for another relatively expensive Navy ship) to procure one or two new polar icebreakers for the Coast Guard. As discussed in a CRS report, two of the Coast Guard's three polar icebreakers have now exceeded their 30-year design lives, and one of those two ships is not in operational condition. The Coast Guard estimates that new polar icebreakers built to a certain notional design might cost about $800 million to $925 million each to procure.[30] The Coast Guard's third polar icebreaker, Healy, was funded in the SCN account in FY1990.[31]

Navy officials have stated that they do not require additional DDG-51s, and do not have mission requirements that would be met by a Navy version of the NSC. Navy officials have also stated that changing the mix of ships procured could cause problems for the industrial base.

Procuring DDG-51s Instead of DDG-1000s

At a March 6, 2008, hearing before the House Armed Services Committee on the Department of the Navy's FY2009 budget, committee members indicated that they are considering the option of not procuring additional DDG-1000s and instead procuring additional DDG-51s. These DDG-51s, it was stated at the hearing, could act as a bridge to a CG(X) design based on an enlarged version of the DDG-51 hull and powered by one-half of the Ford (CVN-78) class reactor plant.[32] The subcommittee asked that this statement address the question of the number of DDG-51s that might be procured under this option, and how the capabilities of those DDG-51s would compare to those of the DDG-1000s.

Two variations on this option might be envisaged. One would use the funding programmed for the third through seventh DDG-1000s to procure additional DDG-51s. The other would use the funding programmed for the third and fourth DDG-1000s to procure additional DDG-51s, and the funding for the fifth through seventh DDG-1000s to procure CG(X)s currently planned for procurement in later years, so as to accelerate the introduction of CG(X)s into the fleet.

A total of $12,957 million is programmed in FY2009-FY2013 for the procurement of the third through seventh DDG-1000s.[33] Based on potential DDG-51 procurement costs provided by the Navy to Congress in 2007,[34] this sum might procure 8 DDG-51s.

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[30]CRS Report RL34391, *Coast Guard Polar Icebreaker Modernization: Background, Issues, and Options for Congress*, by Ronald O'Rourke.

[31]The FY1990 Department of Defense (DOD) Appropriations Act (H.R. 3072/P.L. 101-165 of November 21, 1989) provided $329 million for the procurement of Healy in the SCN account. (See pages 77 and 78 of H.Rept. 101-345 of November 13, 1989).

[32]Source: transcript of spoken remarks of Representatives Gene Taylor and Jim Saxton at the hearing.

[33]This figure does not include $150 million in FY2008 advance procurement funding for the third DDG-1000.

[34]The Navy stated in 2007 that the combined procurement cost for two DDG-51s procured in FY2008 would
(continued...)

A total of $5,217 million is programmed in FY2009 and FY2010 for the procurement of the third and fourth DDG-1000s.[35] Again based on potential DDG-51 procurement costs provided by the Navy to Congress in 2007, this sum might procure 3 DDG-51s.

The DDG-1000 and DDG-51 are both multimission destroyers, but they have somewhat different mission emphases. The DDG-1000 design features a stronger emphasis on land-attack operations and operations in littoral waters. The DDG-51 design is more oriented toward blue-water operations. Consistent with its larger size, higher procurement cost, and greater use of new technologies, the Navy believes the DDG-1000 is more capable than the DDG-51 design in several respects. For a detailed comparison of the two designs based primarily on information provided by the Navy to CRS in 2005, see **Appendix A** to this statement. Under the option discussed here, the greater individual capability of the DDG-1000 design in certain respects would be offset to some degree by the greater quantity of DDG-51s — 3 DDG-51s vs. 2 DDG-1000s, or 8 DDG-51s vs. 5 DDG-1000s.

Opponents of procuring DDG-51s instead of DDG-1000s might argue that the Navy has stated that it does not require additional DDG-51s. Supporters might argue that DDG-51s are multi-mission ships for which the Navy would find good uses, and that the Navy might discover in coming years that it needs additional Aegis-equipped ships to perform the Navy's emerging mission of ballistic missile defense.

DDG-51 procurement costs are fairly well understood due to the DDG-51's long production run, while DDG-1000 production cost estimates have not yet been validated through actual construction. On this basis, procuring DDG-51s might pose less risk in terms of potential cost growth than procuring DDG-1000s.

The option of procuring the DDG-51s would result in higher life-cycle crew-related costs due to both the larger size of the DDG-51 crew (about twice the size of the projected DDG-1000 crew) and the larger number of DDG-51s.

Procuring DDG-51s instead of DDG-1000s could increase work for firms that supply materials and components for DDG-51s but not DDG-1000s, and reduce work for firms that supply materials and components for DDG-1000s but not DDG-51s. The Navy informed CRS on March 11, 2008, that a DDG-1000 would require, by Navy estimates, about 2½ times as much shipyard labor to build as would building a DDG-51.[36] Based on this information, procuring 3 DDG-51s would provide 60% as much shipyard labor as procuring 2 DDG-1000s, and procuring 8 DDG-51s would provide 64% as much shipyard labor as procuring 5 DDG-1000s.

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[34](...continued)
be $3.0 billion to $3.1 billion. (Source: Navy information paper dated March 12, 2007.) The equivalent cost for procuring two DDG-51s in FY2009 might be a few percent higher due to an additional year of inflation and additional costs to restart elements of the DDG-51 production line that have closed over the last year.

[35]This figure does not include $150 million in FY2008 advance procurement funding for the third DDG-1000, and $51 million in FY2010 advance procurement funding programmed for the fifth DDG-1000.

[36]Source: Navy Office of Legislative Affairs telephone call to CRS on March 11, 2008.

The DDG-51s procured under this option could be built to a modified design with improved capabilities. The option of building DDG-51s to a modified design has been discussed in CRS reports since 1994.[37] Building DDG-51s to a modified design could affect the ships' procurement cost and increase the technology and cost risks associated with their procurement.

CG(X) Program

Although the Navy wants to procure the lead CG(X) in FY2011, the Navy has not yet announced a top-level design for the CG(X), meaning a basic scheme for the ship's size, hull design, and principal design features. Navy officials have stated that they are still examining requirements and design options for the ship. The absence at this point of an announced top-level design for the CG(X) raises at least two potential oversight questions for the subcommittee:

- Is the Navy leaving itself enough time, following the eventual announcement of a top-level CG(X) design, to do the remaining design work needed to support the procurement of a lead CG(X) in FY2011? Is the Navy, in other words, at risk of getting into a situation of having to rush the CG(X) design effort?

- Since a nuclear-powered CG(X) procured in FY2011 would normally receive advance procurement funding in FY2009, at what point would the continued passage of time without an announcement of a top-level design for the CG(X) impinge on the timely execution of the option of procuring a nuclear-powered lead CG(X) in FY2011?

Issues Relating to the National Defense Sealift Fund (NDSF)

The National Defense Sealift Fund (NDSF) was established by the FY1993 Defense Authorization Act, as amended by the FY1993 Defense Appropriations Act, to fund the construction of Department of Defense (DOD) sealift ships.[38] The provision in the U.S. Code governing the NDSF (10 USC 2218) was amended in 1999 to, among other things, permit the NDSF to also be used for the construction of combat logistics force ships (i.e., Navy underway replenishment ships)

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[37] A 1994 CRS report presented the option of building DDG-51s to a lengthened configuration with a total of 128 VLS cells, as opposed to the 96 on the current Flight IIA DDG-51 design. (See CRS Report 94-343 F, *Navy DDG-51 Destroyer Procurement Rate: Issues and Options for Congress*, by Ronald O'Rourke, pp. CRS-27 to CRS-28. [out of print; available directly from the author]) In more recent years, CRS has presented the option of building a ship based on a lengthened version of the DDG-51 hull, with a displacement of about 11,000 tons, as one possibility for a potential lower-cost cruiser-destroyer design. See, for example, Appendix B of CRS Report RL32109, *Navy DDG-1000 Destroyer Program: Background, Oversight Issues, and Options for Congress*, by Ronald O'Rourke.

[38] Section 1024 of the FY1993 Defense Authorization Act (H.R. 5006/P.L. 102-484 of October 23, 1992; see pages 178-181 of H.Rept. 102-966 of October 1, 1992, the conference report on the act), as amended by Title V of the FY1993 Defense Appropriations Act (H.R. 5504/P.L. 102-396 of October 6, 1992). Although P.L. 102-396 was signed into law before P.L. 102-484, the paragraph on the NDSF in Title V of P.L. 102-396 states: "That for purposes of this paragraph, this Act shall be treated as having been enacted after the National Defense Authorization Act for Fiscal Year 1993 (regardless of the actual dates of enactment)."

and other auxiliary support ships.[39] Consistent with Congressional views expressed in committee reports on the FY2001 Defense Authorization Bill,[40] the NDSF since FY2003 has been used to fund the construction of Navy auxiliaries such as TAKE-1 class dry cargo ships.[41]

Ships whose construction is funded through the NDSF are not subject to the full funding policy in the same way as are ships and other DOD procurement programs that are funded through the procurement title of the annual DOD appropriations act. In explaining the use of NDSF funding, DOD in 1995 stated:

> The National Defense Sealift Fund (NDSF) is not a procurement appropriation but a revolving fund. Dollars appropriated by Congress for the fund are not appropriated to purchase specific hulls as in the case of, for example the Navy's DDG-51 program. Rather, dollars made available to the NDSF are executed on an oldest money first basis. Therefore, full funding provisions as normally understood for ship acquisition do not apply.[42]

11th TAKE Class Ship

The FY2009 shipbuilding plan requests funding for the procurement of an 11th TAKE in FY2009, even though Congress provided the funding that was nominally requested for this ship in FY2008. The Navy, in other words, is in effect requesting Congress in FY2009 to fund much of the procurement cost of the 11th ship for a second time. The situation arises because the Navy is using much of the funding provided for the procurement of the 10th TAKE to pay for $280 million in cost growth on the first nine TAKEs, and much of the funding provided for the 11th TAKE to complete the funding for the 10th.[43] As mentioned above, the Navy can shift TAKE funding in this way because TAKEs are funded through the NDSF, which is not subject to the full funding policy in the same way as are ships and other DOD procurement programs that are funded through the procurement title of

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[39]Section 1014(b) of the FY2000 Defense Authorization Act (S. 1059/P.L. 106-65 of October 5, 1999; see pages 792-793 of H.Rept. 106-301 of August 6 (legislative day, August 5), 1999, the conference report on the act).

[40]See H.Rept. 106-616 of May 12, 2000, the House Armed Services Committee report on the FY2001 Defense Authorization Bill (H.R. 4205), page 89; S.Rept. 106-292 of May 12, 2000, the Senate Armed Services Committee report on the FY2001 Defense Authorization Bill (S. 2549), page 93. See also H.Rept. 106-945 of October 6, 2000, the conference report on the FY2001 Defense Authorization Act (H.R. 4205/P.L. 106-398 of October 30, 2000), page 35 (Sec. 127).

[41]For an earlier discussion of the issue of the changing composition of the SCN account, including the transfer to the NDSF of ships previously funded in the SCN account, see Statement of Ronald O'Rourke, Specialist in National Defense, Congressional Research Service, before the House Armed Services Committee Subcommittee on Military Procurement hearing on The Navy's Proposed Shipbuilding Program for FY2003, March 20, 2002, pp. CRS-20 to CRS-23.

[42]DOD information paper on strategic sealift acquisition program provided to CRS by U.S. Navy Office of Legislative Affairs, January 25, 1995, p. 1. For additional discussion, see the subsection entitled "DOD Sealift and Auxiliary Ships in NDSF" in the Background section of CRS Report RL41404, *Defense Procurement: Full Funding Policy — Background, Issues, and Options for Congress*, by Ronald O'Rourke. For a similar discussion, see the section entitled "DOD LMSR-Type Sealift Ships" in Appendix C to CRS Report RL32776, *Navy Ship Procurement: Alternative Funding Approaches — Background and Options for Congress*, by Ronald O'Rourke.

[43]Source: Navy briefing to CBO and CRS on Navy's proposed FY2009 budget, February 8, 2008.

the annual DOD appropriations act. If the TAKEs had instead been funded through the SCN account, the $280 million needed to pay for the cost growth on the first nine ships would have been requested in the "completion of prior-year shipbuilding" line item in the SCN account, which arguably would have made the $280 million in cost growth on the first nine TAKEs more visible in budget-justification documents. One potential oversight issue for the subcommittee is whether law or regulations pertaining to the use of funding for ships procured through the NDSF should be altered to make the financing of cost growth on ships funded in prior years more visible in budget-justification documents than is currently the case.

MPF LHA(R) Proposed For Funding In NDSF

The FY2009 shipbuilding plan proposes to procure a modified amphibious assault ship (LHA) in FY2010, with advance procurement funding in FY2009, through the NDSF. The ship would form part of the MPF(F) squadron and is thus sometimes referred to as a MPF(F) LHA. One potential oversight issue for the subcommittee is whether the ship should be funded through the NDSF or through the SCN account.

The Senate Armed Services Committee, in its report (S.Rept. 110-77 of June 5, 2007) on the FY2008 Defense Authorization Bill (S. 1547), stated that it "does not agree with funding development and procurement for amphibious assault ships within the NDSF. This ship type is specifically not included within the scope of sealift vessels eligible for NDSF, defined within section 2218 of title 10, United States Code."[44] 10 USC 2218(c)(1)(A) states that funds in the NDSF may be used for, among other things, "Construction (including design of vessels), purchase, alteration, and conversion of Department of Defense sealift vessels." 10 USC 2218(l)(2) states:

> The term "Department of Defense sealift vessel" means any ship owned, operated, controlled, or chartered by the Department of Defense that is any of the following:
>
> (A) A fast sealift ship, including any vessel in the Fast Sealift Program established under section 1424 of Public Law 101-510 (104 Stat. 1683).
>
> (B) A maritime prepositioning ship.
>
> (C) An afloat prepositioning ship.
>
> (D) An aviation maintenance support ship.
>
> (E) A hospital ship.
>
> (F) A strategic sealift ship.
>
> (G) A combat logistics force ship.
>
> (H) A maritime prepositioned ship.
>
> (I) Any other auxiliary support vessel.

Items A through E above were included in Section 1024 of the FY1993 Defense Authorization Act (H.R. 5006/P.L. 102-484 of October 23, 1992), the section that established the NDSF.[45] Items F through I were added by Section 1014(b) of the FY2000 Defense Authorization Act (S. 1059/P.L. 106-65 of October 5, 1999).

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[44] S.Rept, 110-77, p. 429.

[45] As mentioned earlier, Section 1024 was amended by Title V of the FY1993 Defense Appropriations Act (H.R. 5504/P.L. 102-396 of October 6, 1992), though not with respect to items A through E.

For observers who judge that an MPF(F) LHA falls within the above definition, a potential follow-on question is whether such a ship, due to its cost, capabilities, or anticipated uses, nevertheless should be funded in the SCN account rather than the NDSF.

JHSVs Proposed For Funding In SCN Account

The FY2009 shipbuilding plan proposes to procure five Joint High-Speed Vessels (JHSVs) for Navy use in FY2009-FY2013 in the SCN account. Some observers might view the JHSVs as sealift-type ships, which might suggest that they should be funded through the NDSF, like other sealift ships. The Navy states that it views JHSVs not as sealift or auxiliary ships, but as "an operational maneuver platform." The Navy stated:

> The Marine Corps and Army intend to use JHSV as an operational maneuver platform to deliver operationally ready units over intra-theater ranges to shallow draft, austere/degraded ports across the full range of military operations in a permissive environment. SOCOM will use JHSV for SOF operations as they have done in the past with leased HSVs.
>
> JHSV is a non-combatant vessel and is not designed to survive weapon effects. The platform will use non-developmental technology, modified to suit military applications.[46]

When asked why the Navy is budgeting for its JHSVs in the SCN account rather than the NDSF, the Navy states:

> Due to the Marine Corps, Army, and COCOM expected utilization of JHSV and until a crewing strategy is determined/confirmed, SCN funding is appropriate for JHSV.[47]

A potential oversight issue for the subcommittee is whether the JHSVs, in spite of being referred to by the Navy as operational maneuver platforms, are nevertheless sealift-type ships that would normally be funded through the NDSF.

Navy Capabilities Needed To Counter A Future Western Pacific Threat

The country that currently appears to have the most potential for posing a significant military challenge in coming years to U.S. naval and other military forces in the Western Pacific is China. A CRS report first published in November 2005 and updated numerous times since discusses China's naval modernization and its potential implications for required U.S. Navy capabilities.[48] The discussion below is adapted from parts of this report.

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[46] Source: Navy point paper dated February 26, 2008, on the JHSV, prepared in response to questions from CRS.

[47] Ibid.

[48] CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities — Background and Issues for Congress*, by Ronald O'Rourke.

Near-Term Goal of China's Naval Modernization

There is a consensus among observers that a near-term goal of China's military modernization is to develop military options for addressing the situation with Taiwan. Consistent with this goal, observers believe, China wants its modernized military to be capable of acting as a so-called anti-access force — a force that can deter U.S. intervention in a military crisis or conflict in the Taiwan Strait area, or failing that, delay the arrival or reduce the effectiveness of U.S. intervention forces, particularly U.S. naval and air forces.

If China's current naval modernization effort continues, China in coming years could field a layered anti-access force in the Western Pacific consisting of the following:

- an outermost layer that could include nuclear-powered attack submarines (SSNs), maritime bombers and reconnaissance aircraft, and anti-ship ballistic missiles (ASBMs) equipped with maneuvering reentry vehicles (MaRVs) capable of hitting moving ships at sea;

- a second layer closer in that could additionally include non-nuclear-powered attack submarines and shorter-ranged land-based fighters and strike aircraft; and

- a third layer further inward that could additionally include surface combatants, land-based surface-to-air missiles, and mines.

Such a layered maritime anti-access force could be viewed as broadly analogous to the sea-denial force that the Soviet Union developed during the Cold War to deny U.S. use of the sea or counter U.S. forces participating in a NATO-Warsaw Pact conflict. One potential difference between the Soviet sea-denial force and China's emerging maritime anti-access force is that China's force could include MaRV-equipped ASBMs capable of hitting moving ships at sea.

Broader or Longer-Term Goals of China's Naval Modernization

Some observers believe that, in addition to a near-term focus on developing military options for addressing the situation with Taiwan, broader or longer-term goals of China's military modernization effort, including its naval modernization effort, include the following:

- asserting China's regional military leadership, displacing U.S. regional military influence, prevailing in regional rivalries, and encouraging eventual U.S. military withdrawal from the region;

- defending China's claims in maritime territorial disputes, some of which have implications for oil, gas, or mineral exploration rights; and

- protecting China's sea lines of communication, which China relies upon increasingly for oil and other imports.

These broader or longer-term goals are significant for at least three reasons. First, they imply that if the situation with Taiwan is somehow resolved, China will find continuing reasons to pursue its modernization effort.

Second, they imply that if China completes its planned buildup of Taiwan-related naval force elements, or if the situation with Taiwan is somehow resolved, the composition of China's naval modernization effort could shift to include a greater emphasis on naval force elements that would be appropriate for supporting these broader or longer-term interests, such as aircraft carriers, a larger number of nuclear-powered attack submarines, serial production of destroyers (as opposed to China's recent production of destroyer designs in ones and twos), underway replenishment ships, and overseas bases or support facilities.

Third, these broader or longer-term goals suggest that even if China's military never fires a shot in anger at an opposing military, China's military forces, including in particular its naval forces, will still be used on a day-to-day basis to promote China's political position in the Pacific. This creates an essentially political (as opposed to combat-related) reason for the United States or other countries to maintain a competitive presence in the region with naval and other forces that are viewed by observers in the Pacific as capable of effectively countering China's forces.

Implications for Required U.S. Navy Capabilities

Potential implications of China's naval modernization for required U.S. Navy capabilities can be organized into three groups:

- capabilities for a crisis or conflict in the Taiwan Strait area;
- capabilities for maintaining U.S. Navy presence and military influence in the Western Pacific; and
- capabilities for detecting, tracking, and if necessary countering Chinese SSBNs equipped with long-range submarine-launched ballistic missiles (SLBMs).

For the U.S. Navy, a crisis or conflict in the Taiwan Strait could place a premium on the following:

- on-station or early-arriving forces;
- forces with a capability to defeat Chinese anti-access weapons and platforms; and
- forces with an ability to operate in an environment that could be characterized by information warfare and possibly electromagnetic pulse (EMP) or the use of nuclear weapons directly against Navy ships.

In the scenario of a short-duration conflict over Taiwan, on-station and early-arriving U.S. Navy forces could be of particular value, while later-arriving U.S. Navy forces might be of less value, at least in preventing initial success by Chinese forces. Given the difficulty of knowing with certainty when a Taiwan Strait crisis or conflict might occur, having forces on-station at the start of the crisis or conflict is a goal that would most reliably be met by maintaining a standing forward deployment of U.S. Navy forces in the area. Maintaining a standing forward deployment of U.S. Navy forces in the area while also maintaining U.S. Navy forward deployments in other regions, such as the Persian Gulf/Indian Ocean region and the Mediterranean Sea, would require a Navy with a certain minimum

number of ships. Having early-arriving U.S. Navy forces could mean having forces based in locations Western Pacific locations such as Japan, Guam, Singapore, or perhaps Hawaii, rather than on the U.S. West Coast.

Defeating Chinese maritime anti-access forces would require U.S. Navy forces with capabilities for countering:

- large numbers of theater-range ballistic missiles (TBMs), including MaRV-equipped ASBMs capable of hitting moving ships at sea;
- large numbers of land-attack cruise missiles (LACMs) and anti-ship cruise missiles (ASCMs), including some advanced ASCMs such as the SS-N-27 and SS-N-22;
- substantial numbers of land-based fighters, strike fighters, maritime bombers, and SAMs, including some built to modern designs;
- a substantial number of submarines, including a few that are nuclear-powered and a significant portion that are built to modern designs;
- a substantial number of destroyers, frigates, and fast attack craft, including some built to modern designs; and
- potentially large numbers of mines of different types, including some advanced models.

For the U.S. Navy, maintaining regional presence and military influence in the Western Pacific could place a premium on the following, among other things:

- maintaining a substantial U.S. Navy ship presence throughout the region;
- making frequent port calls in the region;
- conducting frequent exercises with other navies in the region;
- taking actions to ensure system compatibility between U.S. Navy ships and ships of allied and friendly nations in the region; and
- conducting frequent exchanges between U.S. Navy personnel and military and political leaders of other countries in the region.

Detecting, tracking, and if necessary countering Chinese SSBNs equipped with long-range SLBMs could require some or all of the following:

- a seabed-based sensor network analogous to the Sound Surveillance System (SOSUS) that the U.S. Navy used during the Cold War to detect and track Soviet nuclear-powered submarines;

- ocean surveillance ships with additional sonars, which would be similar to the TAGOS-type ocean-surveillance ships that the Navy also used during the Cold War to help detect and track Soviet nuclear-powered submarines; and

- enough SSNs so that some can be assigned to tracking and if necessary attacking Chinese SSBNs.

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.

Appendix A: Comparison of DDG-1000 and DDG-51 Capabilities

This appendix provides an unclassified comparison of capabilities of the DDG-1000 and DDG-51 designs. It is based on information provided to CRS on June 10, 2005 by officers from the Navy's N76 (Surface Warfare) and PMS 500 (DDG-1000 program) offices. Some of the information has been updated to reflect changes in the DDG-1000 design since 2005.

Introduction

The DDG-1000 and DDG-51 are both multimission destroyers, but they have somewhat different mission emphases. The DDG-1000 design features a stronger emphasis on land-attack operations and operations in littoral waters. The DDG-51 design is more oriented toward blue-water operations.

Consistent with its larger size, higher procurement cost, and greater use of new technologies, the Navy believes the DDG-1000 is more capable than the DDG-51 design in several respects. The Navy states that it designed the DDG-1000 for "full-spectrum littoral dominance" and believes the DDG-1000 would be considerably more capable than the DDG-51 in littoral operations. The Navy believes that due to its reduced signatures, defensive systems, number of gun shells in its magazine, and ability to resupply gun shells while underway, the DDG-1000 would have considerably more capability than the DDG-51 to enter defended littoral waters and conduct sustained operations there. The Navy believes that due to its guns, aviation capabilities, special operations forces (SOF) support capabilities, and small-boat capabilities, the DDG-1000 would be able to perform more littoral missions than the DDG-51. The Navy believes that due to its radars and C4I/networking capabilities, replacing a DDG-51 with a DDG-1000 in a carrier strike group would increase the strike group's anti-air warfare (AAW) capabilities by about 20%. The Navy believes that due to differences in their sonar capabilities, the DDG-51 has more blue-water anti-submarine warfare (ASW) capability than the DDG-1000.

Growth Margin

The DDG-51 and DDG-1000 designs each have about a 10% growth margin. For the roughly 9,000-ton DDG-51, this equates to about 900 tons of growth margin, while for the roughly 14,500-ton DDG-1000, this equates to about 1,450 tons of growth margin.

Ship Mobility

The two designs are roughly equivalent in terms of maximum sustained speed, cruising endurance, and seakeeping (i.e., stability in rough seas). The DDG-1000's draft (28 feet) is somewhat less than the DDG-51's (31 feet). Other things held equal, this might give the DDG-1000 an ability to operate in (or be berthed at) places where the water depth is sufficient for the DDG-1000 but not for the DDG-51. The DDG-1000's length (600 feet) is greater than the DDG-51's (505 feet). Other things held equal, this might give the DDG-51 an ability to be berthed in spaces that are long enough for the DDG-51 but not for the DDG-1000.

Electrical Power For Weapons and Systems

The DDG-51 has 8 megawatts (MW) of electrical power for its weapon systems, while the DDG-1000 design, with its integrated electric-drive system, can provide up to 78 MW for its weapons and power systems by diverting power from propulsion to weapons and systems.

Signatures and Detectability

The DDG-1000 has a smaller radar cross-section and lower infrared, acoustic, and magnetic signatures than the DDG-51. The two designs are roughly equivalent in terms of the detectability of their radar and other electromagnetic emissions.

Survivability And Damage Control

The Navy states that the DDG-1000 would be able to keep fighting after an attack like the one that disabled the USS Cole (DDG-67) on October 12, 2000.

The two designs are roughly equivalent in terms of degree of compartmentalization and ship stability when flooded. The DDG-1000's vertical launch system (VLS) is more heavily armored than the DDG-51's. The DDG's fire-suppression system is automated only in the engine room and magazine, while the DDG-1000's system is automated throughout the ship, making it safer and more effective. The DDG-51's flood-control system is not automated, while the DDG-1000's is, which the Navy believes will make it more effective. The DDG-1000's electrical power distribution system is an "integrated fight-through" system, meaning that it is designed to automatically isolate damaged areas and reroute electrical power around them. All critical DDG-1000 systems are dual-fed, meaning that if power from one source is cut off, it can be routed through a second source. The DDG-51's electrical power distribution system lacks these features.

C4I/Networking Bandwidth

The C4I and networking systems on the DDG-1000 would have five times as much bandwidth as those on the DDG-51. The C4I/networking capability of the DDG-1000 are equivalent to that on the LHD-8 amphibious assault ship. In addition to improved warfighting capability, this increased bandwidth would provide sailors aboard the DDG-1000 a better ability to "reach back" to information sources ashore when conducting at-sea maintenance of shipboard equipment, potentially increasing the availability rates of shipboard equipment.

Flag-Level Command Facilities

The DDG-1000 has facilities for embarking and supporting a flag-level officer and his staff, so that they could use the ship as platform for commanding a group of ships. The DDG-51 does not have such facilities.

Anti-Air Warfare/Ballistic Missile Defense (AAW/BMD)

The radars on the two ships are roughly equivalent in terms of dB gain (sensitivity) and target resolution. The firm track range of the DDG-1000's dual-band radar — the range at which it can

maintain firm tracks on targets — is 25% greater for most target types than the firm track range of the DDG-51's SPY-1 radar. The DDG-1000's AAW combat system would be able to maintain about 10 times as many tracks as the DDG-51's Aegis system. The DDG-1000's radar has much more capability for resisting enemy electronic countermeasures and for detecting targets amidst littoral "clutter." As a result of the better performance amidst littoral clutter, the Navy believes that ships escorted by the DDG-1000 in defended littoral waters would have three times as much survivability as ships escorted by the DDG-51.

The two designs would use the same types of area-defense and point-defense interceptor missiles. They would also use the same flares, chaff, and decoys to confuse enemy anti-ship cruise missiles, but the Navy believes these devices would be more effective on the DDG-1000 because of the DDG-1000's reduced signatures.

Anti-Surface Warfare/Strike Warfare

The DDG-1000 would have considerably more naval surface fire support (NSFS) capability than the DDG-51. The DDG-51 has one 5-inch gun, while the DDG-1000 has two 155mm Advanced Gun Systems (AGSs). The DDG-51's gun can fire an initial salvo of 20 rounds per minute and can subsequently fire at a sustained rate of four rounds per minute (20/4). The DDG-1000's two guns have a combined firing rate of 20/20. The shells currently fired by the DDG-51's gun have a range of 13 nm. Future shells are to have a range of up to 62 nm. The shells to be fired by the DDG-1000's guns are to have a range of up to 83 nm, and consequently could cover up to five times as much area as a shell with a range of 62 nm. The shells fired by the DDG-51 carry eight pounds of explosive, while those fired by the DDG-1000 are to carry 24 pounds of explosive. When fired at less than maximum range, the shells fired by the DDG-1000 can alter their flight paths so that six to eight of them can hit a target at the same time; the shells to be fired by the DDG-51 do not have this capability. The DDG-51 carries 600 of the 13nm-range shells or 230 of 62nm-range shells, while the DDG-1000 carries a total of 600 of its shells. It might be possible to fit the DDG-51 with one of the 155mm guns to be carried by the DDG-1000; it would likely require the removal of both the DDG-51's 5-inch gun and its forward (32-cell) VLS. In this configuration, the DDG-51 might carry about 120 of the gun's 155mm shells.

The 155mm guns on the DDG-1000 could be replaced in the future with an electromagnetic rail gun or directed-energy weapon. The DDG-51 does not have enough electrical power to support such weapons.

Antisubmarine Warfare (ASW)

The DDG-51's sonar system is more capable for blue-water ASW operations, while the DDG-1000's system is more capable for littoral ASW operations. The DDG-1000's bow-mounted sonar and towed array can interact to more rapidly triangulate targets. The Flight IIA DDG-51 lacks a towed array. The DDG-1000's radar would have more capability than the DDG-51's radar for detecting submarine periscopes.

The DDG-51 has six torpedo tubes for firing lightweight (12.75-inch diameter) anti-submarine torpedoes, while the DDG-1000 has none, but the Navy does not believe these tubes to be of significant operational value against potential future threats. Both ships can launch lightweight

torpedoes from their helicopters or fire the Vertical Launch Antisubmarine Rocket (VLA), which is armed with a lightweight torpedo.

The ships would use the same countermeasures for confusing enemy torpedoes, but the Navy believes these countermeasures would be more effective on the DDG-1000 due to the DDG-1000's reduced signatures.

Mine Warfare (MIW)

The DDG-1000's bow-mounted sonar includes an in-stride mine-avoidance capability; the DDG-51's sonar suite has less capability for detecting mines. The DDG-51 can be built to a design that permits the ship to embark and operate the Remote Minehunting System (RMS); six ships in the DDG-51 program (DDGs 91 to 96) have been built to this design. The Navy says that the DDG-1000's reduced acoustic and magnetic signatures would translate into a significantly greater operating area in mined waters.

Missiles For Performing Above Missions

The DDG-51 has 90 missile-launching tubes in its VLS, while the DDG-1000 has 80. The DDG-51's VLS tubes can accommodate a missile up to 21 inches in diameter, 21 feet in length, and about 3,000 pounds in weight. The DDG-1000's VLS tubes can accommodate a missile up to 24 inches in diameter, 22 feet in length, and about 4,000 pounds in weight. The gas-management (i.e., heat-management) system of the DDG-1000's VLS tubes can accommodate a hotter-burning missile than the gas-management system of the DDG-51's VLS, so the DDG-1000 might be more capable of using future missiles if they are hotter-burning.

Aviation For Performing Above Missions

The DDG-51 can embark and operate two SH-60 helicopters but does not have electronics for launching and recovering unmanned aerial vehicles (UAVs). The DDG-1000 can embark, operate, and provide full maintenance for two SH-60 helicopters or one SH-60 helicopter and three UAVs. The DDG-1000's flight deck is larger than the DDG-51's and can accommodate all joint rotary-wing aircraft, including the MV-22, the CH-53, and the H-47. The DDG-1000's flight deck is 10 feet higher off the water and can therefore be used for full flight operations in a sea state (i.e., sea condition) that is at least one step higher (i.e., rougher) than is possible for the flight deck on the DDG-51.

Special Operations Forces (SOF) Support

The DDG-1000 has additional berthing for 20 SOF personnel (i.e., a platoon), as well as a space for SOF mission planning and spaces for stowing SOF gear. The DDG-51 lacks these features.

Boats

The DDG-51 can embark two seven-meter boats that are deployed and recovered with a davit. The DDG-1000 can embark two 11-meter boats and four rubber raiding craft that are deployed and recovered with a stern ramp, which permits faster and safer launching and recovering, and launch/recovery operations in higher sea states.

Habitability Features For Crew

On the DDG-51, enlisted crew berthing spaces accommodate 20 to 60 sailors each. On the DDG-1000, every sailor would have a stateroom, and each stateroom would accommodate four sailors. The Navy believes these features would improve crew quality of life, which can improve retention rates.