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Navy Ford (CVN-78) Class (CVN-21) Aircraft Carrier Program: Background and Issues for Congress

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Summary

The Navy's proposed FY2008 budget requests $2,724 million in procurement funding for CVN-78, the first ship in the Gerald R. Ford (CVN-78) class of aircraft carriers, also known as the CVN-21 class. The Navy's proposed FY2008 budget also requests $124 million in advance procurement funding for CVN-79, the second ship in the class, and $233 million in research and development funding for the two ships. The Navy's estimated procurement costs for CVN-78 and CVN-79 are about $10.5 billion and $9.2 billion, respectively. This report will be updated as events warrant.

Background

The Navy's Current Carrier Force. The Navy's current aircraft carrier force includes one conventionally powered carrier, the Kitty Hawk (CV-63), and 10 nuclear-powered carriers — the one-of-a-kind Enterprise (CVN-65) and 9 Nimitz-class ships (CVN-68 through CVN-76). The most recently commissioned carrier, the Ronald Reagan (CVN-76), was procured in FY1995 and entered service in July 2003 as the replacement for the Constellation (CV-64). The next carrier, the George H. W. Bush (CVN-77), also a Nimitz-class ship, was procured in FY2001 and is scheduled to enter service in 2008 as the replacement for the Kitty Hawk.[1]

The Aircraft Carrier Construction Industrial Base. All U.S. aircraft carriers procured since FY1958 have been built by Northrop Grumman Newport News Shipbuilding (NGNN) of Newport News, VA — the only U.S. shipyard that can build large-deck, nuclear-powered aircraft carriers. The aircraft carrier construction industrial base also includes hundreds of subcontractors and suppliers in dozens of states.

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[1] Another conventionally powered carrier, the John F. Kennedy (CV-67), was retired on March 23, 2007; for a discussion, see CRS Report RL32731, *Navy Aircraft Carriers: Retirement of USS John F. Kennedy — Issues and Options for Congress*, by Ronald O'Rourke.

CVN-77. CVN-77, which was named the George H. W. Bush on December 9, 2002, is to be the Navy's tenth and final Nimitz-class carrier. Congress approved $4,053.7 million in FY2001 procurement funding to complete the ship's then-estimated total procurement cost of $4,974.9 million. Section 122 of the FY1998 defense authorization act (H.R. 1119/P.L. 105-85 of November 18, 1997) limited the ship's procurement cost to $4.6 billion, plus adjustments for inflation and other factors. The Navy testified in 2006 that with these permitted adjustments, the cost cap stood at $5.357 billion. The Navy also testified that CVN-77's estimated construction cost had increased to $6.057 billion, or $700 million above the adjusted cost cap. Consequently, the Navy in 2006 requested that Congress increase the cost cap to $6.057 billion. Congress approved this request: Section 123 of the FY2007 defense authorization act (H.R. 5122/P.L. 109-364 of October 17, 2006), increases the cost cap for CVN-77 to $6.057 billion.

Gerald R. Ford (CVN-78) Class (CVN-21) Program. The Navy's successor to the Nimitz-class aircraft carrier design is the Gerald R. Ford (CVN-78) class design, also known as the CVN-21 design, which means nuclear-powered aircraft carrier for the 21st Century. Compared to the Nimitz-class design, the Ford-class design will incorporate several improvements, including an ability to generate substantially more aircraft sorties per day and features permitting the ship to be operated by several hundred fewer sailors than a Nimitz-class ship, significantly reducing life-cycle operating and support costs. Navy plans call for procuring at least three Ford-class carriers — CVN-78, CVN-79, and CVN-80 in FY2008, FY2012, and FY2016, respectively. **Table 1** shows funding for the three ships through FY2013.

Table 1. Funding for CVN-78, CVN-79, and CVN-80, FY1997-FY2013

(millions of then-year dollars, rounded to nearest million; figures may not add due to rounding)

	97-00	01	02	03	04	05	06	07	08	09	10	11	12	13	Total thru FY13
Procurement (Shipbuilding and Conversion, Navy [SCN] account)															
CVN-78	0	22	135	395	1163	623	619	736	2724	4072	0	0	0	0	10489
CVN-79	0	0	0	0	0	0	0	53	124	399	1620	465	3338	3192	9191
CVN-80	0	0	0	0	0	0	0	0	0	0	0	0	201	523	724
Subtotal	0	22	135	395	1163	623	619	789	2848	4471	1620	465	3539	3715	20404
Research and development (Research, Development, Test and Evaluation [RDTEN] account)															
CVN-78	308	231	277	319	306	350	301	273	205	175	143	110	108	107	3213
CVN-79	0	0	5	0	0	0	0	35	28	39	40	31	19	17	214
CVN-80	0	0	0	0	0	0	0	0	0	0	0	42	48	48	138
Subtotal	308	231	277	319	306	350	301	308	233	214	183	183	175	172	3565
TOTAL	308	253	417	714	1469	973	920	1097	3081	4685	1803	648	3714	3887	23969

Source: U.S. Navy data provided to CRS March 28, 2007.

Gerald R. Ford (CVN-78). Section 1012 of the FY2007 defense authorization act expressed the sense of the Congress that CVN-78 should be named for president Gerald R. Ford. On January 16, 2007, the Navy announced that CVN-78 would be so

named.[2] CVN-78 and other carriers built to the same design will consequently be referred to as Ford (CVN-78) class carriers.

The Navy wants to procure CVN-78 in FY2008 and have it enter service in FY2015 as the replacement for the Enterprise, which is scheduled to retire in 2013, at age 52. The Navy estimates CVN-78's total acquisition (i.e., research and development plus procurement) cost at more than $13.7 billion. This figure includes about $3.2 billion in research and development costs through FY2013, and a total of about $10.5 billion in procurement costs. The procurement cost figure includes about $2.4 billion for detailed design and nonrecurring engineering (DD/NRE) work for the CVN-78 class, and about $8.1 billion for building CVN-78 itself. Including the DD/NRE costs for a ship class in the procurement cost of the lead ship in the class is a traditional Navy ship procurement budgeting practice.

The Navy's proposed FY2008 budget requests $2,724 million in procurement funding for CVN-78. As shown in **Table 1**, under the Navy's proposed funding plan, the ship is to be funded over a total of nine years, with about 35.2% of its procurement cost provided in advance procurement funding between FY2001 and FY2007, about 26.1% to be provided in the procurement year of FY2008, and about 38.8% to be provided in FY2009. Dividing the main portion of the ship's procurement cost between two years (FY2008 and FY2009) is called split funding, which is a two-year form of incremental funding. Section 121 of the FY2007 defense authorization act (H.R. 5122/P.L. 109-364 of September 29, 2006) authorizes the Navy to use four-year incremental funding for CVN-79, CVN-79, and CVN-80.

CVN-79 and CVN-80. The Navy wants to procure CVN-79 in FY2012 and have it enter service in 2019. As shown in **Table 1**, the Navy's estimated procurement cost for CVN-79 is about $9.2 billion in then-year dollars, and the Navy's proposed FY2008 budget requests $124 million in advance procurement funding for the ship. The Navy wants to procure CVN-80 in FY2016 and have it enter service around 2023. The Navy's estimated procurement cost for CVN-80 is about $10.7 billion in then-year dollars. As shown in **Table 1**, the Navy plans to request an initial increment of $201 million in advance procurement funding for the ship in FY2012.

Procurement Cost Cap. Section 122 of P.L. 109-364 establishes 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 Ford-class carriers of $8.1 billion each, plus adjustments for inflation and other factors. The conference report on P.L. 109-364 (H.Rept. 109-702 of September 29, 2006) discusses Section 122 on pages 551-552.

Issues for Congress

Accuracy of Cost Estimate for CVN-78. Both the Congressional Budget Office (CBO) and the Government Accountability Office (GAO) have questioned the Navy's cost estimate for CVN-78. CBO testified in July 2007 that it estimates that CVN-

[2] For further discussion of Navy ship names, see CRS Report RS22478, *Navy Ship Names: Background For Congress*, by Ronald O'Rourke.

78 will cost about $1 billion more than the Navy estimates, and perhaps more than that.[3] GAO testified in July 2007 that the CVN-78 "faces risks in the area of cost because the estimate that underpins the budget is optimistic" and that "costs [for the ship] will likely exceed budget if technologies or other materials are delivered late or labor hour efficiencies are not realized."[4] Although the Navy publicly expresses confidence in its cost estimate for CVN-78, CBO testified in July 2007 that the Navy has assigned a confidence level of less than 50% to its estimate, meaning that the Navy believes there is more than a 50% chance that the estimate will be exceeded.[5]

Technical Risk. GAO testified in July 2007 that the CVN-78 program faces technical risks, particularly with regard to three new technologies that are to be incorporated into the ship — the electromagnetic aircraft launch system (EMALS), which is to replace the steam-powered catapults used on today's aircraft carriers; the advanced arresting gear, which is to replace the hydraulic arresting gear used on today's aircraft carriers; and the dual-band radar that is to be carried by both Ford-class carriers and the Navy's new DDG-1000 class destroyer. GAO testified that

> the Navy may face challenges in maintaining its design schedule [for CVN-78] because of delays in the development of the ship's critical technologies. Such delays could impede the completion of the ship's design and interfere with the construction of the ship.... The Navy has focused much attention on developing [CVN-78] technologies and has retired much risk. Yet risk remains. The schedule for installing CVN 78's technologies takes advantage of construction efficiencies. The shipbuilder has identified key dates when technologies need to be delivered to the yard in order to meet its optimal construction schedule. A number of CVN 78's technologies have an increased potential to affect this schedule because they are (1) located low in the ship and needed early in construction or (2) highly integrated or embedded in the ship's design.... While the Navy has mitigated the risk posed by some technologies, like the nuclear propulsion and electric plant, key systems, in particular, EMALS, the advanced arresting gear, and the dual band radar have encountered difficulties during development that will likely prevent timely delivery to the shipyard.[6]

Cost Cap. The Navy interprets the procurement cost caps for the CVN-78 program that were established by Section 122 of the FY2007 defense authorization act 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-

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[3] 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. 12-13.

[4] Government Accountability Office, *Defense Acquisitions[:] Realistic Business Cases Needed to Execute Navy Shipbuilding Programs, Statement of Paul L. Francis, Director, Acquisition and Sourcing Management Team, Testimony Before the Subcommittee on Seapower and Expeditionary Forces, Committee on Armed Services, House of Representatives*, July 24, 2007 (GAO-07-943T), p. 15.

[5] Statement of J. Michael Gilmore and Eric J. Labs, op cit, p. 13.

[6] GAO-07-943T, op cit, pp. 13-14.

escalate into *FY2006* then-year dollar figures of about $10.0 billion and $7.4 billion, respectively.

One potential question for Congress 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. Although Section 121 of the FY2007 defense authorization act granted the Navy the authority to use four-year incremental funding for CVN-78 and CVN-79, the Navy, in its FY2008-FY2013 budget submission, did not use this authority and continued to budget for the two ships using split funding (i.e., two-year incremental funding). The Navy has the option of using the four-year authority when it submits its FY2009-FY2013 budget plan next year. 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 make it more difficult at the margin to fund other things in those years.

More generally, proponents of using four-year incremental funding for carriers could argue that doing so would more fully mitigate the budget spikes associated with procuring aircraft carriers, and consequently further reduce the need to disrupt other programs by shifting them away from the year that the carrier is procured. Opponents could argue that the budget spike associated with procuring a carrier is sufficiently mitigated by two-year incremental funding, that shifting to four-year incremental funding would result in an 11-year funding profile for a ship with a nominal seven-year shipyard construction period, and that shifting to four-year incremental funding would encourage advocates of other defense programs to seek the use of incremental funding for their programs.

Block-Buy Contract. One possible option for Congress to consider for the CVN-78 program 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. Block-buy contracting was invented for the Virginia-class submarine program, where it was used to contract for the first four boats in the program over the five-year period FY1998-FY2002. 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. A block-buy arrangement in the CVN-78 program could reduce the cost of the ships covered in the arrangement by a few percent — perhaps enough to fund the procurement, for example, of an additional Navy auxiliary ship or two additional Littoral Combat Ships (LCSs). 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.

Supporters of a block-buy contract could argue that the potential savings, though fairly small in percentage terms, could be significant in absolute terms, in light of the combined construction cost of the two ships. Opponents could argue that it would tie the hands of future Congresses by creating a commitment to procure a ship that is not scheduled for procurement until a future fiscal year.

Legislative Activity in 2007

FY2008 Defense Authorization Bill (H.R. 1585/S. 1547). The **House Armed Services Committee**, in its report (H.Rept. 110-146 of May 11, 2007) on H.R. 1585 recommended approving the Navy's FY2008 request for procurement and advance procurement funding for CVN-78 program. The **Senate Armed Services Committee**, in its report (S.Rept. 110-77 of June 5, 2007) on S. 1547, recommended reducing by $20 million the Navy's FY2008 request for procurement funding for CVN-78 program and approving the Navy's FY2008 request for advance procurement funding for the program. The report stated:

> Within the budget for the CVN-78, the committee notes that the unit cost for the Ship Self Defense System (SSDS) is 150 percent greater than the similar system procured for the fiscal year 2007 amphibious assault ship, LHA(R). The committee has placed significant emphasis on the importance of the Navy's managing shipbuilding costs in other sections of this report on costs from the shipbuilding prime contractors. Given the high proportion of ship costs that accrue from sources other than the prime contractors, the committee believes that it is equally important for the Navy to manage the cost for Government-furnished equipment. The committee recommends a reduction of $20.0 million in SCN for the SSDS for CVN-78. (Page 95)

FY2008 Defense Appropriations Bill (H.R. 3222). **The House Appropriations Committee**, in its report (H.Rept. 110-279 of July 30, 2007) on H.R. 3222, recommended reducing by $20 million the Navy's FY2008 request for procurement funding for CVN-78 program and approving the Navy's FY2008 request for advance procurement funding for the program. The report stated:

> The Ship Self Defense System (SSDS) suite of equipment that will be installed on board the CVN-78 is a new capability system that is still under development. The $99,546,000 estimated cost of the system is more than double the cost of the current version of SSDS that is being installed on CVN-77 and also LHA-6. While the Committee recognizes that an increased capability is bound to bear an increased cost, it seems quite unreasonable that an incremental increase in capability will cost more than twice that of the current system. Therefore, $79,546,000 is provided for the CVN-78 SSDS, a decrease of $20,000,000. (Pages 228-229)

The **Senate Appropriations Committee**, in its report (S.Rept. 110-155 of September 14, 2007) on H.R. 3222, recommended reducing by $20 million the Navy's FY2008 request for procurement funding for CVN-78 program and approving the Navy's FY2008 request for advance procurement funding for the program. crsphpgw