

CRS Report for Congress

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Navy CVN-77 and CVX Aircraft Carrier Programs: Background and Issues for Congress

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Summary

For FY1999, the Administration is requesting funding for both CVN-77, a modified Nimitz (CVN-68) class nuclear-powered aircraft carrier to be procured in FY2001, and the CVX, an aircraft carrier planned for procurement in FY2006 that will be a further-evolved version of the Nimitz-class design. Issues for Congress to consider include FY1999 research and development funding for the two ships and the merits of the Navy's plan to incrementally evolve the Nimitz-class design.

Introduction

The issue. As part of its proposed FY1999 defense budget, the Administration is requesting \$38.5 million in research and development funding and \$124.5 million in advanced procurement funding for CVN-77, a modified Nimitz (CVN-68) class nuclear-powered aircraft carrier to be procured in FY2001, as well as \$190.1 million in research and development funding for CVX, an aircraft carrier planned for procurement in FY2006 that will be a further-evolved version of the Nimitz-class design. CVN-77 and CVX would replace two existing aircraft carriers, thereby maintaining the Navy's current planned force of 12 carriers. The issue for Congress is whether to approve, modify, or reject the Administration's funding requests and acquisition plans for CVN-77 and CVX. Congress' decision on this issue could have a substantial effect on future Navy capabilities, Navy funding requirements, and the U.S. shipbuilding industrial base.

CVN-77. If procured in FY2001, CVN-77 would be the Navy's tenth Nimitz-class carrier and would enter service in 2008 as the replacement for the Kitty Hawk (CV-63), which will then be 47 years old.¹ The Administration estimates the procurement cost of CVN-77 at about \$4.45 billion. The ship would be built by Newport News Shipbuilding

¹The previous 9 Nimitz-class carriers (CVN-68 through -76) were procured between FY1967 and FY1995. CVN-68 through -74 are now in service. CVN-75, the Harry S. Truman, will enter service later in 1998 as the replacement for the Independence (CV-62). CVN-76, the Ronald Reagan, is scheduled to enter service in 2002 as the replacement for the Constellation (CV-64). CV means conventionally powered aircraft carrier; CVN means nuclear-powered aircraft carrier.

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(NNS) of Newport News, VA, the builder of all 9 previous Nimitz-class carriers. The Administration wants CVN-77 to incorporate a variety of new technologies, including several that are intended to reduce the annual operating and support (O&S) cost of the ship by 15% compared to other Nimitz-class ships. Where feasible, some of these new technologies might be retrofitted onto the other 9 Nimitz-class carriers.

The Administration, as part of its proposed FY1998 defense budget submitted to Congress in February 1997, planned to procure CVN-77 in FY2002, with initial advanced procurement funding in FY2000. In response to this plan, NNS in March 1997 proposed an alternative funding profile, which it called the "Smart Buy" proposal, that would maintain FY2002 as the year of procurement and 2008 as the year that the ship would enter service, but would accelerate the start of advanced procurement funding to FY1998 and increase the total amount of advanced procurement funding provided through FY2001. NNS said that its proposal would close a gap in aircraft carrier construction work projected to occur between the end of basic construction work on CVN-76 (funded in FY1995) and the start of construction work on CVN-77 and thereby reduce the procurement cost of CVN-77 by about \$600 million (including about \$150 million in avoided inflation).²

The Senate recommended adding \$345 million in FY1998 funding to begin implementing NNS's "Smart Buy" proposal; the House recommended no funding. The conference agreements on the FY1998 defense authorization and appropriation bills provided \$50 million. Although not enough to implement NNS's "Smart Buy" proposal, this sum was viewed as an expression of Congressional support for eventually procuring CVN-77 in some fashion. Section 122 of the FY1998 defense authorization act (P.L. 105-85, H.R. 1119) authorized procurement of the ship, established a \$4.6 billion procurement cost cap for the ship, and directed the Defense Department to "make such plans for the CVN-77 aircraft carrier program as are necessary to attain for the program the cost savings that are contemplated" in NNS's proposal.³

The Administration in its FY1999 budget submission is proposing a funding profile for CVN-77 that differs from both its own FY1998 plan and NNS's March 1997 proposal. The Administration states that its new profile, which accelerates procurement of the ship to FY2001 while maintaining 2008 as the year the ship enters service, would close some of the projected gap in construction between CVN-76 and CVN-77 and would thereby reduce the cost of CVN-77 by about \$300 million (including about \$100 million in avoided inflation). In its FY1999 "wish list" — its list to Congress of items on which it would prefer to spend any funding that Congress may add to the Navy's FY1999 budget — the Navy included requests for an additional \$33 million in research and development funding and \$100 million in advanced procurement funding for CVN-77.⁴

²See CRS Report 97-720 F, *Navy Aircraft Carrier Procurement: CVN-77 "Smart Buy" Proposal*, by Ronald O'Rourke. Washington, 1997. (July 21, 1997) 6 p.

³See H.Rept 105-340 of October 23, 1997 (the conference report on H.R. 1119), p. 23-24 and 563-564.

⁴Schweizer, Roman. Spares, Maintenance Top Navy's Unfunded Priority List for FY-99. *Inside the Navy*, March 30, 1998: 1, 13-14.

CVX. If procured in FY2006, CVX-78 would enter service in 2013 as the replacement for the Enterprise (CVN-65), which will then be 52 years old and almost out of usable nuclear fuel.

The Navy originally wanted the CVX, also known as the CVX-78, to be a completely new, next-generation aircraft carrier. Under this plan, the CVN-77 was to have been, technologically, a transitional ship between the basic Nimitz-class design and the all-new CVX design. In late May 1998, however, the Navy decided that it could not afford to develop an all-new design for CVX-78, which reportedly would have required about \$7 billion in research, development and design funding. Instead, the Navy will continue to modify the Nimitz-class design with each new carrier that is procured. Under this strategy, CVN-77 and CVX-78 would be, technologically, the first and second ships in a series of transitional aircraft carrier designs.⁵ An all-new carrier design (including a new hull design different from that of the Nimitz class) might eventually emerge under this strategy, but this would not happen until CVX-79 at the earliest or, perhaps more likely, CVX-80 or CVX-81 (which might be procured around FY2011 and FY2016, respectively). Since CVX-78 would be a further-modified version of the basic Nimitz-class design, NNS would generally considered to be the lead contender to build the ship.⁶

When the Navy was planning for CVX-78 to be a completely new-design ship, it wanted the ship's total life-cycle cost (which includes procurement cost, 50 years of annual operation and support [O&S] costs, and post-retirement disposal costs) to be at least 20% less than that of the Nimitz-class design. To help achieve this, the Navy was aiming to reduce the size of the CVX's crew to about 50% of the Nimitz-class figure. The Navy also wanted CVX-78 to have less radar, infrared and acoustic detectability than the Nimitz class design. It is not yet clear how these goals will change as a result of the Navy's decision to procure CVX-78 as a further modification of the Nimitz-class design.

The Defense Acquisition Board (DAB) granted Milestone 0 approval (permission to enter the conceptual studies phase) for a program to produce an all-new CVX design on March 29, 1996, and the Defense Department is in the midst of a 3-part Analysis of Alternatives (AOA) for such a design. The first part began in March 1996 and was completed in October 1997. The second part began in November 1997 and was scheduled to be completed by September 1998. This phase was to have determined several major issues about the ship's design and cost, including its size and whether the ship should have conventional or nuclear propulsion. (The Navy reportedly favored a large, nuclear-powered design.) The third part of the AOA, which was to have confirmed and refined many of the basic design decisions reached in the second part, was scheduled to begin in October 1999 and be completed by April 2000.

⁵Holzer, Robert. Navy Sinks Futuristic Carrier. *Defense News*, May 25-31, 1998: 4; Eisman, Dale. Navy To Slow Down Or Scale Back Plans For The Next Generation of Carriers. *Norfolk Virginian-Pilot*, May 27, 1998; Schafer, Susanne M. Navy Slowing Research on Futuristic Carrier. Associated Press wire story,, May 28, 1998.

⁶For short discussions of actual or potential carrier-construction capabilities at U.S. shipyards, see CRS Report 96-785 F, *Navy Major Shipbuilding Programs and Shipbuilders: Issues and Options for Congress*, by Ronald O'Rourke. Washington, DC, 1996. (September 24, 1996) p. 20-25 and 29-30.

The Navy requested \$90.2 million in FY1998 funding for research and development on CVX technologies; Congress approved \$12.2 million (later adjusted by the Administration to \$11.9 million). The significant reduction from the request appears to reflect the view, set forth in the House National Security Committee's report on the FY1998 defense authorization bill, that "it is neither fiscally nor technically prudent to increase advanced carrier systems research and development for the CV(X) to the degree sought by the Navy," and that increased emphasis should instead be placed on the research and development program for CVN-77.⁷

FY1999 Congressional Action

Authorization. The House National Security Committee (HNSC) and the Senate Armed Services Committee (SASC), in their reports (H.Rept. 105-532 of May 12, 1998 and S.Rept. 105-189 of May 11, 1998, respectively) on the FY1999 defense authorization bill (H.R. 3616/S. 2057), approved the \$124.5 million in advanced procurement funding and \$38.5 million in research and development funding requested for CVN-77. The committees also approved the \$190.1 million requested for research and development of the CVX, but included similar provisions (Sec. 212 in both cases) that either make available (the HNSC version) or reserve (the SASC version) \$50 million of this funding for research and development on technologies that can also be inserted into CVN-77.

Appropriation. The Senate Appropriation Committee, in its report (S.Rept. 105-200 of June 4, 1998) on the FY1999 defense appropriation bill (S. 2132), approved the \$124.5 million in advanced procurement funding and \$38.5 million in research and development funding requested for CVN-77. The committee recommended a \$130-million reduction in the amount of funding requested for CVX research and development under program element (PE) 0603512N, Carrier Systems Development (see table below). Of this \$130 million, the committee stated that \$50 million should instead be used "exclusively for CVN-77 development" (in addition to the \$38.5 million in research and development funding the Administration had requested for CVN-77). The committee also recommended a \$35.7-million reduction in the amount of funding requested for CVX feasibility studies under PE 0603564N, Ship Preliminary Design and Feasibility Studies. Finally, the committee recommended a \$5-million increase to PE 0603564N

to establish a red team [i.e., an independent study team] to study a futuristic aircraft carrier concept. Under this plan, the team should evaluate the merits of a carrier designed for the JSF [Joint Strike Fighter] aircraft and assume other STOVL [short take off, vertical landing] and rotary wing aircraft will perform support missions. Furthermore, a primary goal of the program should be to reduce the crew requirements by 50 percent, a trend increasingly common in commercial ships.

The committee has also been informed that as part of CVX restructuring, the Navy plans to focus their initial research efforts on the development of the next generation nuclear powerplant and electrical system in order to begin construction of

⁷H.Rept. 105-132 of June 16, 1997, the committee's report on H.R. 1119 the FY1998 defense authorization bill, p. 181-182. See also page 608 of H.Rept. 105-340 of October 23, 1997, the conference report on H.R. 1119, and pages 117 and 120 of H.Rept. 105-265 of September 23, 1997, the conference report on H.R. 2266, the FY1998 defense appropriation bill.

CVX in 2006. The Committee expects the Navy to use the remaining CVX funding to begin development of this next generation nuclear powerplant. (page 110-111)

The House Appropriation Committee, in its report (H.Rept. 105-591 of June 22, 1998) on the FY1999 defense appropriations bill (H.R. 4103), approved the \$124.5 million in advanced procurement funding and \$38.5 million in research and development funding requested for CVN-77. The committee recommended a \$90-million reduction in the amount of funding requested for CVX research and development under program element (PE) 0603512N, Carrier Systems Development (see table below) and recommended a total of \$100 million for CVX research and development. The committee's report (H.Rept. 105-000) states:

The Committee supports a robust aircraft [carrier] technology development program, but given the uncertainty of the Navy's direction, recommends \$100,000,000 to continue technology development. The Committee notes that many of the areas for technology development contained in the carrier systems development budget might no longer be pursued under the Navy's new approach [for CVX], which is evolving and has not yet been approved by the Secretary of Defense. The Committee questions the wisdom of narrowly focusing all future carrier component technology development beyond CVN-77 on a limited number of propulsion and power technologies at the expense of all others.... The Committee directs that of the amount provided in this bill for aircraft carrier technology development, \$10,000,000 is only for engineering manufacturing development of infrared search and track. The Committee recommends bill language that precludes obligation of more than \$50,000,000 of the funds provided in the bill for aircraft carrier technology development until the Secretary of the Navy certifies in writing to the congressional defense committees that the Navy has a fully-funded program for development and installation of an infrared search and track device on CVN-77 prior to its acceptance by the Navy from the shipbuilder.

Issues for Congress

CVN-77 as transitional ship. What new technologies should be incorporated into CVN-77? Are they adequately funded in the budget? What effect will they have on the capabilities, cost, and technical risk of CVN-77? Which might be suitable for retrofitting onto older Nimitz-class carriers? What would be the cost to retrofit them, and what effect would they have on the capabilities and remaining life-cycle costs of these ships? How is this issue affected by the Navy's decision to have CVX-78 be a further-evolved version of the Nimitz-class design rather than an all-new design?

CVX acquisition strategy and funding. Should CVX-78 be a completely new-design ship, as originally planned by the Navy, or an evolved version of the Nimitz-class design, as now planned by the Navy? How do these two options compare in terms of research and development cost (particularly for FY1999), procurement cost, total ship life-cycle cost, technical and schedule risk, and ship capabilities? Given that sums of several billion dollars have been or will be spent to develop new submarine and tactical aircraft designs, why was a similar sum deemed unaffordable to develop a new aircraft carrier design? Given the Navy's decision last year to cancel the Maritime Fire Support

Demonstrator (Arsenal Ship) program,⁸ what, if anything does the Navy's recent decision to not have CVX-78 be an all-new design say about the Navy's ability or willingness to generate and implement new ship-design concepts?

Table 1. Funding for CVN-77 and CVX, FY1998-FY2003
(millions of then-year dollars, round to the nearest million or tenth of a million)

	FY98	FY99	FY00	FY01	FY02	FY03	Total
CVN-77 procurement funding							
FY98 Admin. budget (2/97)	0	0	695.4	0	4,484.7	0	5,180.1
NNS "Smart Buy" (3/97)	345	170	875	135	3,075	0	4,600
FY98 Congressional action	50						
FY99 Admin. Budget (2/98)	48.7	124.5	763.3	3,511.1	0	0	4,447.7
CVN-77 research and development funding (FY99 Admin. budget, Feb. 98)							
Funding in PE 0604567N ^a	33.8	38.5	35.5	40.3	27.0	10.3	185.4
CVX research and development funding (FY99 Admin. budget, Feb. 98)							
Total, including funding in:	45.7	190.1	198.2	159.9	184.3	257.2	1,035.4
PE 0604567N ^a	0	0	15.1	24.0	34.1	39.2	112.4
PE 0603564N ^b	33.8	40.6	15.4	0	0	0	89.8
PE 0603512N ^c	11.9	149.5	167.7	135.9	150.2	218.0	833.2

Sources: CRS Report 97-720 F, *Navy Aircraft Carrier Procurement: CVN-77 "Smart Buy" Proposal*, by Ronald O'Rourke. Washington, 1997. (July 21, 1997) p. 2, and information paper provided to CRS by U.S. Navy Office of Legislative Affairs, April 7, 1998. This table shows the Navy's original (February 1998) budget submission for FY1999, under which CVX would be an all-new design. Given the Navy's late-May 1998 decision to instead procure CVX-78 as a further-evolved version of the Nimitz-class design, some of these figures may be revised.

aShip Contract Design/Live Fire Test & Evaluation. PE means program element (i.e., line item).
bShip Preliminary Design & Feasibility Studies. Includes \$6 million in FY1998 funding to evaluate conventional and nuclear propulsion alternatives for the originally planned all-new CVX design.
cCarrier Systems Development. Includes \$6 million in FY1998 funding and \$55 million in FY1999 funding (\$20 million conventional and \$35 million nuclear) to evaluate conventional and nuclear propulsion alternatives for the originally planned all-new CVX design. Additional costs for developing a new reactor plant for CVX-78 would likely be funded with both Department of Defense funding (most likely in PE 0603570N, Advanced Nuclear Power Systems) and Department of Energy funding.

⁸See CRS Report 97-1044 F, *Navy/DARPA Maritime Fire Support Demonstrator (Arsenal Ship) Program: Issues Arising From Its Termination*, by Ronald O'Rourke. Washington, 1997. (December 10, 1997) 6 p.