



## CRS Report for Congress

# Navy CVN-21 Aircraft Carrier Program: Background and Issues for Congress

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### Summary

The Navy's proposed FY2007 budget requested about \$739 million in advance procurement funding for CVN-78, the first ship in the CVN-21 class of aircraft carriers, and about \$45 million in advance procurement funding for the aircraft carrier CVN-79, the second ship in the class — a total of \$784.1 million. The FY2007 defense authorization act (H.R. 5122/P.L. 109-364) authorized 4-year incremental funding for procuring aircraft carriers, established procurement cost caps for CVN-21 class carriers, increased the existing procurement cost cap for the CVN-77 aircraft carrier, permits the Navy to reduce the minimum size of the carrier force from 12 to 11 ships, and 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 will be named for Ford. The FY2007 defense appropriations act (H.R. 5631/P.L. 109-289) provides \$791.9 million in advance procurement funding for CVN-78 and CVN-79 — an increase of \$7.75 million above the requested amount. This report will be updated as events warrant.

### Background

**The Navy's Current Carrier Force.** The Navy's current carrier force includes two conventionally powered carriers (the Kitty Hawk [CV-63] and the John F. Kennedy [CV-67]) 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 at a cost of \$4.45 billion and entered service in July 2003 as the replacement for the Constellation (CV-64). The next carrier, the George H. W. Bush (CVN-77), was procured in FY2001 and is scheduled to enter service in 2008 as the replacement for the Kitty Hawk. The Navy plans to retire the Kennedy in FY2007 and thereby reduce the carrier force to 11 ships.<sup>1</sup>

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<sup>1</sup> For discussion of this issue, see CRS Report RL32731, *Navy Aircraft Carriers: Proposed Retirement of USS John F. Kennedy — Issues and Options for Congress*, by Ronald O'Rourke.

## Report Documentation Page

*Form Approved  
OMB No. 0704-0188*

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE <b>17 JAN 2007</b>	2. REPORT TYPE <b>N/A</b>	3. DATES COVERED <b>-</b>			
4. TITLE AND SUBTITLE <b>Navy CVN-21 Aircraft Carrier Program: Background and Issues for Congress</b>		5a. CONTRACT NUMBER			
		5b. GRANT NUMBER			
		5c. PROGRAM ELEMENT NUMBER			
6. AUTHOR(S)		5d. PROJECT NUMBER			
		5e. TASK NUMBER			
		5f. WORK UNIT NUMBER			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Congressional Research Service The Library of Congress 101 Independence Ave, SE Washington, DC 20540-7500</b>		8. PERFORMING ORGANIZATION REPORT NUMBER			
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)			
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)			
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release, distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>	<b>SAR</b>	<b>6</b>	

**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.

### **Navy Aircraft Carrier Acquisition Programs.**

**CVN-77.** CVN-77, which was named the George H. W. Bush on December 9, 2002, is the Navy's 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 has increased to \$6.057 billion, or \$700 million above the cost cap. Consequently, the Navy in 2006 requested that Congress amend Section 122 of P.L. 105-85 to increase the cost cap to \$6.057 billion.

**CVN-21 Program.** The Navy's successor to the Nimitz-class aircraft carrier design is the CVN-21 design. CVN-21 means nuclear-powered aircraft carrier for the 21<sup>st</sup> Century. Compared to the Nimitz-class design, the CVN-21 design will incorporate several improvements, including an ability to generate substantially more aircraft sorties per day, as well as features permitting the ship to be operated by a crew that is several hundred sailors smaller, significantly reducing life-cycle operating and support costs.

**CVN-78.** 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. On January 16, 2007, the Navy announced that CVN-78 will be named for President Gerald R. Ford.<sup>2</sup> The Navy estimates CVN-78's total acquisition (i.e., research and development plus procurement) cost at about \$13.7 billion. This figure includes about \$3.2 billion in research and development costs and 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-21 class, and about \$8.1 billion for building CVN-78 itself.

The Navy's proposed FY2007 budget requested about \$739 million in advance procurement funding for CVN-78. Congress has been providing advance procurement funding for CVN-78 since FY2001. As shown in **Table 1**, under the Navy's proposed funding plan, the ship is to be funded over a total of 9 years, with 35.3% of its procurement cost to be provided in advance procurement funding between FY2001 and FY2007, 32.1% to be provided in the procurement year of FY2008, and 32.6% 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 2-year form of incremental

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

funding. Although incremental funding is not consistent with the full funding policy that normally governs defense procurement, it has gained a measure of acceptance in recent years as a method for funding aircraft carriers and LHA/LHD-type large-deck amphibious assault ships. Since these are very expensive ships that are typically procured once every few years, using split funding can mitigate the budget “spikes” that would occur if these ships were fully funded in a single year. Accommodating such spikes within a finite Navy or DOD budget can require moving other Navy programs into neighboring years, which can increase the costs of these other defense programs by disrupting their production schedules. By mitigating budget spikes associated with funding carriers or LHA/LHD-type ships, split funding can reduce the need to shift other programs to neighboring years, avoiding the extra costs associated with disrupting their production schedules.<sup>3</sup>

**CVN-79 and CVN-80.** CVN-79 and CVN-80 would be very similar to CVN-78. The Navy wants to procure CVN-79 in FY2012 and have it enter service in 2019. The Navy reportedly wants its procurement cost to be no more than \$8.8 billion.<sup>4</sup> The FY2007 budget requests an initial increment of about \$45 million in advance procurement funding for the ship. The Navy wants to procure CVN-80 in FY2016. Its procurement cost would likely be similar to that of CVN-79, plus inflation. **Table 1** shows funding for CVN-78 and CVN-79 through FY2011.

**Table 1. Funding for CVN-78 and CVN-79, FY2001-FY2011**

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

	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	Total thru FY11
<b>Procurement (Shipbuilding and Conversion, Navy [SCN] account)</b>												
<b>CVN-78</b>	22	135	395	1163	623	619	739	3357	3407	0	0	10461
<b>CVN-79</b>	0	0	0	0	0	0	45	124	451	1679	541	2841 <sup>a</sup>
<b>Development (Navy research and development account)</b>												
<b>CVN-78</b>	231	277	319	306	350	303	274	196	174	141	95	2665 <sup>a</sup>
<b>CVN-79</b>	0	0	0	0	0	0	35	40	40	111	60	286 <sup>a</sup>

Source: U.S. Navy data provided to CRS February 16, 2006.

a. Additional funding to be provided beyond FY2011.

## Issues for Congress

**CVN-21 Acquisition Strategy.** One issue for Congress concerns the acquisition strategy to be used for the CVN-21 program. Specific questions here include 2-year vs. 4-year incremental funding, economic order quantity (EOQ) of long-leadtime components, and block-buy contracting.

**2-year vs. 4-year Incremental Funding.** Some observers in 2006 proposed shifting from 2-year incremental funding (i.e., split funding) to 4-year incremental funding

<sup>3</sup> For discussion of the full funding policy and incremental funding, see CRS Report RL32776, *Navy Ship Procurement: Alternative Funding Approaches — Background and Options for Congress*, by Ronald O'Rourke.

<sup>4</sup> Christopher P. Cavas, “U.S. Ship Plan To Cost 20% More,” *Defense News*, Dec. 5, 2005: 1, 8.

for procuring carriers. Under 4-year incremental funding, the main portion of the ship's procurement cost would be divided between the year the ship is procured and three subsequent years. In the case of CVN-78, shifting to 4-year incremental funding would result in the ship being funded over a total of 11 years (FY2001-FY2011).

Supporters could argue that 4-year incremental funding 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 2-year incremental funding, that shifting to 4-year incremental funding would result in an 11-year funding profile for a ship with a nominal 7-year shipyard construction period, and that shifting to 4-year incremental funding would further weaken the full funding policy, encouraging advocates of other defense programs to seek the use of incremental funding for their programs.

***Economic Order Quantity (EOQ) of Long-Leadtime Components.*** Long-leadtime components are components whose manufacturing times require that they be ordered before the end item itself (in this case, a ship) is procured. For nuclear-powered ships, long-leadtime components include, for example, nuclear propulsion components, which are typically ordered two years prior to the year the ship is procured. Some observers have proposed an up-front batch procurement of long-leadtime components for CVN-78, CVN-79, and CVN-80. An up-front batch procurement of long-leadtime items for multiple end items is referred to as an Economic Order Quantity (EOQ).

Supporters could argue that procuring long-leadtime components for all three CVN-21 class carriers through an EOQ could reduce the cost of these components by as much as 15%, reducing the total procurement cost of the three ships. Supporters could argue that the enduring value of aircraft carriers, the Navy's commitment to the CVN-21 design, and Congress' support over the last several years for procuring CVN-78, together make it very unlikely that DOD or a future Congress would change its mind about the need for CVN-79 and CVN-80. Supporters could argue that although EOQs normally take place only within programs that have been approved for multiyear procurement (MYP), for which the CVN-21 program has not been approved, Congress can nevertheless choose to approve the use of an EOQ for the CVN-21 program as a means of realizing cost savings.

Opponents could argue that an EOQ for all three ships would tie the hands of future Congresses — something that Congress traditionally tries to avoid in decisions on discretionary spending — by creating in the near term a financial commitment to fund the procurement of CVN-80, a ship that is not scheduled to be procured until 9 years from now, in FY2016, under the 114<sup>th</sup> Congress. In spite of the enduring value of carriers and DOD and Congressional support for the CVN-21 design, they could argue, potential changes over the next 9 years in the strategic environment, budgetary conditions, or technology make it less than certain that the Navy will still want to procure CVN-80 in FY2016. It would be inappropriate, opponents could argue, to use an EOQ for the CVN-21 program, because the program has not been approved for MYP. The program currently would not qualify for MYP, they could argue, because it cannot meet the requirement under the law governing MYP (10 USC 2306b) that candidate programs demonstrate design stability — a requirement that is normally met in shipbuilding programs by delivering at least one completed ship built to the design. Even if the CVN-21 program were to qualify for MYP, opponents could argue, the MYP law limits MYP arrangements

to end items that are to be procured over a period of no more than 5 years, meaning that the arrangement could cover CVN-78 and CVN-79, but not CVN-80. An EOQ covering long-leadtime components for all three ships, they could argue, would create an MYP-like commitment to procure end items over an unprecedented 9-year (FY2008-FY2016) procurement period.

**Block-Buy Contract For CVN-78 and CVN-79.** Another acquisition option would be to procure CVN-78 and CVN-79 under a block-buy contract. Block-buy contracts are similar to MYP arrangements in that they permit a single contract to be used to contract for the construction of multiple end items that are to be procured over a number of years. As with MYP, block-buy contracting can reduce the cost of the items being procured by a few percent by giving the construction facility (in this case, NGNN) the confidence about future business that is needed to justify investments that can better optimize its workforce and production equipment for the expected work. Unlike MYP, block-buy contracting does not require demonstration of design stability, and it does not include authority for using EOQ on long-leadtime items (which is the second way that MYP arrangements reduce the total cost of the end items being procured).

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; these boats were procured over the 5-year period FY1998-FY2002. Based on the Virginia-class experience, a block-buy contract for CVN-78 and CVN-79 might reduce the cost of the ships by a few percent. Since these two ships have a combined construction cost of about \$17 billion, a 3% reduction, for example, would equate to a savings of roughly \$500 million — about enough to procure a Navy auxiliary ship or two Littoral Combat Ships (LCSs).

Supporters of a block-buy contract for CVN-78 and CVN-79 could argue that such an arrangement would be consistent with both past practice in the Virginia-class program and congressional support for procuring CVN-79, as reflected, for example, in a decision to approve the Navy's requested for \$45 million in FY2007 advance procurement funding for CVN-79. Supporters could also argue that the potential savings from a block-buy contract, though fairly small in percentage terms, could be significant in absolute terms, in light of the combined construction cost of the two ships. Opponents of a block-buy contract for CVN-78 and CVN-79 could argue that it would tie the hands of future Congresses by creating a commitment to procure a ship (CVN-79) that is not scheduled for procurement until FY2012, and that this commitment would be much greater than the commitment created by approving the Navy's request for \$45 million in FY2007 advance procurement funding.

**Potential Alternatives to Large-Deck, Nuclear-Powered Carriers.** A second issue for Congress is whether to continue procuring only large-deck, nuclear-powered aircraft carriers like CVN-21 class ships, which have full load displacements of about 100,000 tons, or whether procurement of such ships should be replaced by, or supplemented with, procurement of smaller and less expensive aircraft carriers. Some observers have suggested procurement of smaller carriers such the 57,000-ton medium-sized carrier or the 13,500-ton high-speed carrier proposed by DOD's Office of Force Transformation in a 2005 report to Congress on potential alternative Navy force architectures, or an even smaller "pocket" carrier proposed a few years ago by the Naval Postgraduate School under the project name Corsair.

Supporters of smaller carriers could argue that they would have much lower unit procurement costs than large-deck carriers, would improve the fleet's ability to withstand enemy attack by putting fewer eggs (i.e., carrier-based aircraft) into each basket (i.e., each carrier), and that building a larger number of smaller carriers is consistent with idea under defense transformation for shifting over time to more highly distributed force architectures. They could also argue that technological improvements will permit smaller carrier air wings in the future to attack the same number of targets per day as can be attacked by today's larger carrier air wings. Supporters of continued procurement of only large-deck carriers could argue that smaller carriers are individually less survivable than larger carriers, that they are less cost-effective in terms of the number of aircraft they can embark and sorties they can generate per unit expenditure, and that the Navy is already moving to a more distributed force architecture through things such as Littoral Combat Ships (LCSs) and unmanned vehicles. They could also argue that even with the expected increase in the number of targets per day that a carrier air wing can attack, the Navy will continue to need large carrier air wings to meet future expected operational demands, particularly with a force of 11 carriers rather than 12 or more carriers.

## Legislative Activity

**FY2007 Defense Authorization Act (H.R. 5122/P.L. 109-364).** Section 121 of the act, which was signed into law on October 17, 2006, authorizes 4-year incremental funding for CVN-79, CVN-79, and CVN-80. Section 122 establishes a \$10.5-billion procurement cost cap for CVN-78, plus adjustments for inflation and other factors, and an \$8.1-billion unit procurement cost cap for subsequent CVN-21 class carriers, plus adjustments for inflation and other factors. The conference report on H.R. 5122 (H.Rept. 109-702 of September 29, 2006) discusses Section 122 on pages 551-552. Section 123 increases the previously legislated procurement cost cap for CVN-77 to \$6.057 billion. Section 1011 amends 10 USC 5062 to reduce the minimum required size of the carrier force from 12 operational ships to 11. H.Rept. 109-702 discusses Section 1011 on pages 804-805.<sup>5</sup> Section 1011 expresses the sense of the Congress that CVN-78 should be named for president Gerald Ford.<sup>6</sup>

**FY2007 Defense Appropriations Act (H.R. 5631/P.L. 109-289).** H.R. 5631 was signed into law as P.L. 109-289 on September 29, 2006. The conference report on H.R. 5631 (H.Rept. 109-676 of September 25, 2006) provides a total of \$791.9 million in advance procurement funding for CVN-78 and CVN-79 — an increase of \$7.75 million above the requested amount. The increase is for nuclear propulsion equipment. (See pages 178 and 179.)

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<sup>5</sup> For further discussion of this issue, see CRS Report RL32731, *Navy Aircraft Carriers: Proposed Retirement of USS John F. Kennedy — Issues and Options for Congress*, by Ronald O'Rourke.

<sup>6</sup> For further discussion, see CRS Report RS22478, *Navy Ship Names: Background For Congress*, by Ronald O'Rourke.