



## **CRS Report for Congress**

# **Navy-Marine Corps Strike-Fighter Shortfall: Background and Options for Congress**

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### **Summary**

Members of Congress this year have expressed concern about a projected inventory shortfall in Navy and Marine Corps strike-fighters. Some industry sources believe the shortfall is likely to be much larger than the Navy currently projects. Congress has several potential options for addressing the shortfall, including extending the service lives of existing strike-fighters and increasing planned procurement of strike-fighters. This report will be updated as events warrant.

### **Background**

**Navy and Marine Corps Strike-Fighters.** The Navy and Marine Corps, which are both part of the Department of the Navy (DON), each operate hundreds of strike-fighters, which are tactical aircraft that can conduct both air-to-ground (i.e., strike) and air-to-air (i.e., fighter) operations. Strike-fighters constitute the majority of the aircraft in each of the Navy's 10 active-duty aircraft carrier air wings (CVWs)<sup>1</sup> — of the 70 or more aircraft typically embarked on a Navy aircraft carrier, 44 are strike-fighters. Strike-fighters also constitute a significant portion of the Marine Corps' three active-duty Marine air wings (MAWs).<sup>2</sup> Some Marine Corps strike-fighters are assigned to Navy CVWs.

The principal strike-fighter operated by the Navy and Marine Corps is the F/A-18 Hornet/Super Hornet, manufactured by Boeing. The older A through D models of the F/A-18 are called Hornets, while the newer, larger, and more capable E and F models are called Super Hornets. The Navy operates more than 600 Hornets and Super Hornets, while the Marine Corps operates more than 200 Hornets, plus roughly 130 AV-8B Harriers, which are short takeoff, vertical landing (STOVL) attack aircraft.<sup>3</sup>

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<sup>1</sup> In the abbreviation CVW, CV means aircraft carrier and W means air wing. In addition to the 10 active-duty CVWs, the Navy also operates one reserve tactical air wing.

<sup>2</sup> In addition to the three active-duty MAWs, the Marine Corps operates one reserve MAW.

<sup>3</sup> As of April 2008, DON operated a total of 964 Hornets and Super Hornets, including 334 Navy  
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In coming years, the Navy plans to retire its Hornets and shift to a combination of Super Hornets and F-35 Lightning II Joint Strike Fighters (JSFs), while the Marine Corps plans to retire both its Hornets and Harriers and shift to strike-fighter force composed entirely of F-35s. The carrier-capable version of the F-35 intended for the Navy is designated the F-35C, while the STOVL version of the F-35 intended for the Marine Corps is designated the F-35B.<sup>4</sup>

**Strike-Fighter Procurement.** The first F/A-18E/Fs were procured in FY1997. A total of 493 are currently planned for procurement, with the final 22 to be procured in FY2012. Industry sources state that, under this schedule, suppliers of long-leadtime items for the F/A-18-E/F would begin to shut down starting in October 2010.<sup>5</sup> FY2009 is the fifth year of a planned five-year (FY2005-FY2009) multiyear procurement (MYP) arrangement for procuring 164 F/A-18E/Fs and 53 EA-18Gs.<sup>6</sup> A previous MYP arrangement covered F/A-18E/Fs procured in FY2000-FY2004.

A total procurement of 680 F-35 Bs and Cs is planned, including 320 F-35Bs and 360 F-35Cs, though the exact mix within the 680 total could change.<sup>7</sup> **Table 1** shows actual (FY2007-FY2008), requested (FY2009), and planned (FY2010-FY2013) procurement of F/A-18E/Fs, F-35Cs, and F-35Bs under DON's proposed FY2009 budget.

**The Projected Shortfall.**<sup>8</sup> DON's inventory of strike-fighters currently falls short of the number that Navy officials state is required to fully support requirements for CVWs and MAWs, and the Navy is projecting that this shortfall will grow in coming years. The Navy projects that a current DON strike-fighter shortfall of about 15 aircraft will grow to about 30 aircraft in FY2009, to more than 50 aircraft in FY2016, and to more than 90 aircraft in FY2017-FY2020, before declining to more than 50 aircraft in FY2021 and to roughly zero aircraft by FY2025. At its peak in FY2017, the Navy states, the projected DON strike-fighter shortfall will be 125 aircraft, of which 69 will be Navy strike-fighters. The Navy states that the projected DON strike-fighter shortfall, if applied entirely against Navy CVWs, would have the effect of reducing the number of active-duty CVWs during the period FY2016-FY2020 from 10 to 7.

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<sup>3</sup> (...continued)

Hornets, 311 Navy Super Hornets, 217 Marine Corps Hornets, and 102 additional Hornets in a shared Navy-Marine Corps repair pipeline.

<sup>4</sup> The version of the F-35 being procured for the Air Force is designated the F-35A.

<sup>5</sup> Source: Briefing from industry officials to CRS on April 10, 2008.

<sup>6</sup> The EA-18G Growler is an electronic warfare variant of the F/A-18 that is being procured as a replacement for the Navy's aging EA-6B Prowler carrier-based electronic warfare planes.

<sup>7</sup> For more on the F-35 program, see CRS Report RL30563, *F-35 Lightning II Joint Strike Fighter (JSF) Program: Background, Status, and Issues*, by Anthony Murch and Christopher Bolkcom.

<sup>8</sup> Unless otherwise indicated, information in this section is based on Navy briefing papers provided to CRS on April 24, 2008, and industry briefing papers provided to CRS on April 10 and 22, 2008.

**Table 1. Procurement of Navy and Marine Corps Strike-Fighters, FY2007-FY2013**

(funding figures in millions of then-year dollars, rounded to nearest million)

	FY07	FY08	FY09	FY10	FY11	FY12	FY13
<b><i>F/A-18E/F Super Hornet (USN)</i></b>							
Quantity	37	24	23	18	17	22	0
Total proc. cost	\$2,766	\$2,106	\$1,920	\$1,631	\$1,581	\$1,735	\$200
Unit proc. cost	\$75	\$88	\$83	\$91	\$93	\$79	—
<b><i>F-35 Lightning II</i></b>							
Quantity (total)	0	6	8	18	19	40	42
<b>F-35C (USN)</b>	0	0	0	4	6	15	17
<b>F-35B (USMC)</b>	0	6	8	14	13	25	25
Total proc. cost <sup>a</sup>	\$124	\$1,224	\$1,896	\$3,565	\$3,376	\$5,640	\$5,613
Unit proc. cost <sup>a</sup>	—	\$204	\$237	\$198	\$178	\$141	\$134

**Source:** FY2009 DON budget submission.

a. Total and unit procurement cost figures shown are for combined total of F-35Cs and F-35Bs.

The Navy states that the projected DON strike-fighter shortfall is the result of the several events over the last decade,<sup>9</sup> and that the Navy and Marine Corps have already implemented various actions to minimize the projected shortfall.<sup>10</sup> The Navy states that the projected shortfall is the “most optimistic” projection because it assumes, among other things, that the service lives of Hornets can be extended from the current planning figure of 8,000 flight hours to 10,000 flight hours, and that procurement of F-35s for DON will increase from year to year as currently planned and eventually reach a sustained rate of 50 aircraft per year.

<sup>9</sup> These events, the Navy states, include the following: (1) a decision made as part of the 1997 Quadrennial Defense Review (QDR) to reduce planned number of F/A-18E/Fs to be procured from 1,000 to 548; (2) subsequent decisions, made as a result of an initiative to more closely integrate the Navy and Marine Corps strike-fighter inventories, to further reduce planned procurement of F/A-18E/Fs from 548 to 462 (a figure that was later increased back to 493), and planned procurement of Navy and Marine Corps F-35s from 1,089 to 680; (3) a cumulative 39-month delay in the F-35 procurement schedule since 2004; (4) a decision made as part of the FY2008 budget submission to reduce the pace for increasing annual procurement quantities of F-35s toward a sustained annual rate; and (5) a revision in the Marine Corps’ plan for introducing the F-35 into its force structure. For more on the Navy-Marine Corps tactical aircraft integration initiative, see CRS Report RS21488, *Navy-Marine Corps Tactical Air Integration Plan: Background and Issues for Congress*, by Christopher Bolkcom and Ronald O’Rourke.

<sup>10</sup> As an example of such an action, the Navy is tracking the uses of individual Hornets so as to avoid situations where a Hornet needs to be retired before reaching its service life limit for flight hours because it has exceeded its service life limit for the number of arrested-wire landings onto aircraft carriers.

Although extending Hornet service lives to 10,000 flight hours is assumed in the Navy's "most optimistic" projection, the Navy has not yet determined whether such an extension is feasible and cost-effective. The Navy states that it "feel[s] fairly confident we can get to 10,000 hours on the Hornet, but we haven't finished the assessment yet." The Navy plans to finish the assessment by the end of this summer.<sup>11</sup> The Hornets were originally built for service lives of 6,000 flight hours, a goal that was later changed to 8,000 flight hours, which is the service-life planning figure for Air Force F-15, F-16, and F-22 fighters, and for the F-35. The only U.S. fighter-type aircraft that currently have a service life longer than 8,000 flight hours are the Marine Corps' AV-8Bs, which have a 9,500-hour service life.

If the sustained F-35 procurement rate turns out to be 35 aircraft per year rather than 50 per year, the Navy states, the projected DON strike-fighter shortfall would increase to more than 120 aircraft in FY2016, more than 160 aircraft in FY2017, and more than 200 aircraft in FY2019-FY2022, peaking at 229 aircraft in FY2022, and then decline to more than 120 aircraft in FY2025. Within that projection, the Navy states, the shortfall in Navy strike-fighters would exceed 80 aircraft for the period FY2017-FY2022, peaking at 109 aircraft in FY2020. The Navy states that this greater projected DON shortfall, if applied entirely against Navy CVWs, would have the effect of reducing the number of active-duty CVWs during the period FY2016-FY2020 from 10 to 6.

Some industry sources state that the strike-fighter shortfall is likely to be roughly twice as large as the Navy's "most optimistic" projection. They argue that the Navy's assumption that it can extend the service lives of Hornets to 10,000 flight hours is a high-risk assumption, given the material condition of Hornets today, including a recently discovered problem called stress corrosion cracking. They also argue that the F-35's initial operational capability (IOC) date may be delayed because of delays in completing the development of the aircraft, and that funding constraints may limit procurement of F-35s for DON to less than 50 per year. They calculate that if the F-35's IOC is delayed one year, and if budget constraints limit procurement of F-35s for DON to 42 per year, the projected shortfall in Navy strike-fighters would increase to 80 aircraft starting in 2010, and peak at 134 aircraft (versus 69 under the Navy's projection).<sup>12</sup>

**Reported Unsolicited Proposal from Boeing.** Boeing reportedly has made an unsolicited offer to the Navy to begin procuring an improved version of the F/A-18E/F featuring upgraded avionics. Under this proposal, the Navy could forego procuring F-35Cs while waiting for an even more advanced strike-fighter design that could become available for procurement around 2024.<sup>13</sup>

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<sup>11</sup> Zachary M. Peterson, "Balderson: Navy To Address Fighter Shortfall in POM-10 Planning," *Inside the Navy*, May 5, 2008; John T. Bennett, "USAF Joins Navy in Warning of 'Fighter Gap,'" *Defense News*, April 14, 2008; Geoff Fein and Emelie Rutherford, "Navy Taking Steps Now To Thwart Tactical Aircraft Shortfall Next Decade," *Defense Daily*, March 26, 2008.

<sup>12</sup> Source: Briefing from industry officials to CRS on April 10, 2008.

<sup>13</sup> See David A. Fulghum, "Boeing Plans Sixth Generation Fighters Along With Block 3 Super Hornet," *Aerospace Daily & Defense Report*, January 30, 2008; and Chris Amos, "A Super Duper Hornet," *Defense News*, April 7, 2008.

## Issues for Congress

**Size of Strike-Fighter Shortfall.** One issue for Congress to consider is the potential size of the shortfall. Key factors to consider in assessing this question include the likelihood that the Navy will be able to extend the service lives of Hornets to 10,000 flight hours, the likelihood that the F-35 will achieve its scheduled IOC, and the likelihood that DON will achieve a sustained F-35 production rate of 50 aircraft per year. Concerning the development schedule for the F-35, a March 2008 Government Accountability Office (GAO) report on the F-35 program states, “Three independent defense offices separately concluded that ... the [F-35 program] development schedule is likely to slip from 12 to 27 months.”<sup>14</sup>

**Potential Operational Implications of Shortfall.** A second issue for Congress to consider are the potential operational implications of the strike-fighter shortfall for either conflict situations or for meeting demands for day-to-day forward deployments of DON strike-fighters for purposes of regional deterrence and reassurance. The shortfall could lead to a reduction in the number of strike-fighter squadrons available for service, a reduction in the number strike fighters in each squadron, or both. Other things held equal, the larger the shortfall, the greater the operational risks might be in combat situations, and the more difficulty DON might have in sustaining day-to-day forward deployments of a certain number of strike-fighters. The operational implications of the projected strike-fighter shortfall might be weighed against the operational implications of other projected service inventory shortfalls, such as those for Navy attack submarines,<sup>15</sup> Navy amphibious ships,<sup>16</sup> or Air Force fighter aircraft.<sup>17</sup>

## Options for Congress

Options for Congress in addressing the projected DON strike-fighter shortfall include but are not limited to the following, some of which could be combined:

- request further information and analysis from DON and/or industry concerning the potential size of the shortfall;
- fund service life extensions of Hornets to as much as 10,000 flight hours, if such extensions prove feasible and cost effective;
- increase planned procurement of F/A-18E/Fs in coming years; and
- increased planned procurement of F-35s in coming years.

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<sup>14</sup> Government Accountability Office, *Joint Strike Fighter[:] Recent Decisions by DOD Add to Program Risks*, GAO-08-388, March 2008, summary page.

<sup>15</sup> See CRS Report RL32418, *Navy Attack Submarine Procurement: Background and Issues for Congress*, by Ronald O'Rourke

<sup>16</sup> See CRS Report RL34476, *Navy LPD-17 Amphibious Ship Procurement: Background, Issues, and Options for Congress*, by Ronald O'Rourke.

<sup>17</sup> See Marcus Weisgerber, “Darnell: Air Force Facing 800-Plane Fighter Jet Gap Between 2017-2024,” *Inside the Air Force*, April 11, 2008; and John T. Bennett, “USAF Joins Navy in Warning of ‘Fighter Gap,’” *Defense News*, April 14, 2008.

With regard to the third option, F/A-18E/F procurement could be continued for a few years beyond FY2012, until procurement of F-35s for DON begins to increase to higher levels. Alternatively, F/A-18E/F procurement could be continued for a longer period of time, so that a mix of substantial numbers of both F/A-18E/Fs and F-35s is procured for a certain number of years. A third option would be to begin procuring improved F/A-18E/Fs in lieu of procuring F-35s, while waiting for an even more advanced strike-fighter to become available for procurement around 2024. Supporters of increased F/A-18E/F procurement could argue that the F/A-18E/F is a capable aircraft, that it is less expensive to procure than the F-35, and that procuring the established F/A-18E/F design poses less risk of cost growth than procuring the new F-35 design.

With regard to the fourth option, supporters of increased F-35 procurement could argue that the F-35, as a newer design, is more capable than the F/A-18E/F, and thus more able to counter potential future military challenges, such as those that might be posed by improved Chinese military forces;<sup>18</sup> that the cost difference between the F-35 and the F/A-18E/F is not as great as it appears on first inspection because the procurement cost of the F-35 includes the cost for a number of ancillary pieces of equipment that are purchased separately for the F/A-18E/F; and that reducing or eliminating the F-35C buy for the Navy could reduce economies of scale in producing F-35s and thereby increase the cost of F-35s that are built for the Marine Corps, the Air Force, and foreign buyers.

DON officials, in addition to studying the feasibility of extending Hornet service lives to 10,000 flight hours, reportedly are considering the option of procuring an additional 50 to 282 F/A-18s and the option of either accelerating or slowing down planned production of F-35s.<sup>19</sup> The Navy reportedly would consider using a third MYP arrangement for F/A-18E/Fs procured in FY2010-FY2014, should F/A-18E/F procurement be increased.<sup>20</sup> The Navy reportedly is not interested in the option of skipping production of F-35Cs.<sup>21</sup>

## Legislative Activity for FY2009

The projected DON strike-fighter shortfall has been discussed at hearings this year on the proposed FY2009 DON budget.

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<sup>18</sup> For a discussion of this issue, see CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities — Background and Issues for Congress*, by Ronald O'Rourke.

<sup>19</sup> Vago Muradian, "U.S. Navy Struggles With 'Fighter Gap,'" *Defense News*, April 7, 2008. See also Philip Ewing, "Fearing Fighter Gap, Navy Mulls New Jet Buy," *NavyTimes.com*, March 6, 2008.

<sup>20</sup> See, for example, the short items entitled "Closing The Gap" and "...Up Front Cost," in the April 14, 2008 issue of *Defense Daily*.

<sup>21</sup> David A. Fulghum, Navy Wants F-35C and Perhaps More Super Hornets," *Aerospace Daily & Defense Report*, March 26, 2008: 1-2.