

An hourglass-shaped graphic with a globe inside. The top bulb is dark blue, and the bottom bulb is light blue. The globe is a darker shade of blue. The hourglass is centered on the page.

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

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**Abstract.** 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 Navy projections. Options for addressing the shortfall include extending strike-fighter service lives and increasing planned procurement of strike-fighters.

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## 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 Navy projections. Options for addressing the shortfall include extending strike-fighter service lives 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> In coming

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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 Hornets, 311 Navy Super Hornets, 217 Marine Corps Hornets, and 102 additional Hornets in a  
(continued...)

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 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.

**Table 1. Procurement of Navy and Marine Corps Strike-Fighters**  
(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.

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

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.

**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.

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. (The Hornets were originally built for service lives of 6,000 hours, a goal that was later changed to 8,000 hours.) The Navy's "most optimistic" projection also assumes 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.

Although extending Hornet service lives to 10,000 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 stated in late-April or early-May 2008 that it felt "fairly confident we can get to 10,000 hours on the Hornet, but we haven't finished the assessment yet."<sup>9</sup> In July 2008, however, it was reported that

Preliminary results from a continuing Navy review have found that keeping the A-through D-model Hornets flying longer will 'require additional inspections, modifications and a longer time out of service,' a Navy spokesman said....

'Our estimate of the strike fighter gap assumed we could proceed with the SLEP [service-life extension program on the Hornets] as planned,' the spokesman said. 'The scope and extent of the effect on the shortfall will take approximately four to six months to determine.' ...

... early results from the review also found 'hot spots' in the current [Hornet] fleet that could force the Navy to conduct inspections and further modify the aircraft to keep them flying for just 8,000 hours. "Additional study is required to determine whether or not these fatigue hot spots are unique or systemic," the spokesman said.<sup>10</sup>

If Hornet lives can be extended to 10,000 hours but the sustained F-35 procurement rate turns out to be 35 aircraft per year rather than 50 per year, the Navy states, the

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<sup>8</sup> Unless otherwise indicated, 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.

<sup>9</sup> Zachary M. Peterson, "Balderson: Navy To Address Fighter Shortfall in POM-10 Planning," *Inside the Navy*, May 5, 2008. The article was based on an interview with a Navy official that occurred the previous week.

<sup>10</sup> Megan Scully, "Navy's Fighter Jet Shortage May Be Worse Than Expected," *National Journal's CongressDailyPM*, July 18, 2008. Bracketed material as in the original.

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 argue that the strike-fighter shortfall is likely to be roughly twice as large as the Navy's "most optimistic" projection due to difficulties in extending Hornet lives to 10,000 hours and risks in the planned F-35 procurement profile. They argue that extending Hornet lives to 10,000 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>11</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>12</sup>

## 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 include the likelihood that the Navy will be able to extend Hornet lives to 10,000 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>13</sup>

**Potential Operational Implications of Shortfall.** A second issue for Congress to consider are the potential operational implications of the strike-fighter shortfall for

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<sup>11</sup> Source: Briefing from industry officials to CRS on April 10, 2008.

<sup>12</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.

<sup>13</sup> Government Accountability Office, *Joint Strike Fighter[:] Recent Decisions by DOD Add to Program Risks*, GAO-08-388, March 2008, summary page.

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.

## Options for Congress

Options for Congress to address 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 hours, if such extensions prove feasible and cost effective;
- increase planned procurement of F/A-18E/Fs in coming years;
- increased planned procurement of F-35s in coming years; and
- expedited procurement of a new long-range bomber.

Regarding 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.

Regarding 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>14</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 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>15</sup> The Navy reportedly would consider using a third MYP arrangement for F/A-

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<sup>14</sup> See CRS Report RL33153.

<sup>15</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.

18E/Fs procured in FY2010-FY2014, should F/A-18E/F procurement be increased.<sup>16</sup> The Navy reportedly is not interested in the option of skipping production of F-35Cs.<sup>17</sup>

Regarding the fifth option, CVWs and long-range bombers share important attributes. Neither requires in-theater bases and thus offer potential for prompt strikes in a crisis. Therefore, an increased inventory of long-range bombers could, in some ways, make up for a shortfall in DON strike fighters. Of course, long-range bombers have other attributes that do not mirror DON strike fighters, such as higher cost and lower potential survivability. This means that replacing DON strike fighters with long-range bombers would change the overall capabilities of DOD airpower, either negatively or positively, depending on the context. Current DOD plans call for fielding a new long range bomber by 2018, and bomber advocates have argued that a new bomber could be fielded in a more timely manner.<sup>18</sup>

## Legislative Activity for FY2009

**FY2009 Defense Authorization Bill (H.R. 5658/S. 3001).** Section 124 of H.R. 5658 as reported by the **House Armed Services Committee** would require the Secretary of Defense to submit a report on F/A-18E/F and EA-18G procurement for FY2010 through FY2015, including comparative costs and benefits of using annual versus multiyear procurement to procure the aircraft, and the Secretary's recommendation as to whether Congress should authorize multiyear procurement for the aircraft. The provision would also authorize, subject to the availability of appropriations, the Secretary of the Navy to obligate up to \$100 million of the amount authorized for F/A-18E/F and EA-18G procurement for use in cost reduction initiatives in FY2009. The committee's report (H.Rept. 110-652 of May 16, 2008) discusses Section 124 on pages 141-142.

The **Senate Armed Services Committee**, in its report (S.Rept. 110-335 of May 12, 2008), expressed concern about the projected DON strike-fighter shortfall, and its belief that the Navy's estimate of the size of the shortfall may be based on questionable assumptions. The committee stated that it believes that a multiyear procurement of additional F/A-18E/Fs may be helpful in reducing the shortfall, and that the Navy should explore all available options in determining how to address the shortfall. The committee expressed concern that a failure to establish the conditions for a multiyear procurement of F/A-18E/Fs could reduce the savings of such a procurement. The committee stated that it remains supportive of the F-35, and that Navy plans for procuring F-35Cs should not be affected if the Navy decides to pursue an F/A-18E/F multiyear contract. (Pages 123-124) Concerned by testimony that it received from DOD regarding aircraft shortfalls, the committee required (Sec. 171) DOD to annually submit a long-term plan for procuring tactical aircraft so that Congress can make rational judgements about which aircraft programs to fund.

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<sup>16</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>17</sup> David A. Fulghum, Navy Wants F-35C and Perhaps More Super Hornets," *Aerospace Daily & Defense Report*, March 26, 2008: 1-2.

<sup>18</sup> See CRS Report RL34406 for more information.