

# CRS Report for Congress

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## Air Force FB-22 Bomber Concept

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### Summary

The Air Force has expressed interest in developing a bomber variant of the F/A-22 Raptor to “bridge the gap” between today’s bombers and a follow-on bomber in 2037. Questions exist regarding the FB-22’s feasibility, cost, and combat potential. This report will be updated as events warrant.

### Background

In 2002 it was reported that Lockheed Martin Corp. had begun studying a radically modified version of the Raptor called the FB-22. This variant would seek to significantly increase the F/A-22’s air-to-ground capabilities, primarily through a redesign that would double the aircraft’s range and significantly increase the aircraft’s internal payload.<sup>1</sup> Some estimate that the delta-winged FB-22 could carry up to 30 of the developmental 250-lb Small Diameter Bombs. These potential improvements would likely result in some performance tradeoffs, such as reduced acceleration, speed, and maneuverability.

Although not officially part of the F/A-22 program, and still in the conceptual phase, the FB-22 idea has elicited enthusiasm from some Air Force leaders. Air Force Secretary James Roche reportedly favors the FB-22 as the potential platform of choice for providing better close air support for tomorrow’s ground forces.<sup>2</sup> Air Force leaders have also depicted the FB-22 as a medium-range bomber that could serve as a “bridge” between the current bomber force and a follow-on capability to be fielded in the 2037 time-frame. On April 29, 2004, the Air Force issued to industry a “request for information” on resources and technologies that might contribute to a regional, or interim bomber.

Other officials have reportedly shown less interest in the FB-22. Air Force acquisition chief Marvin Sambur said that the F/A-22’s developmental difficulties would

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<sup>1</sup> For more on the F/A-22, see CRS Report RL31673, *F/A-22 Raptor*.

<sup>2</sup> Ron Laurenzo, “Roche Envisions Close Air Support F-22,” *Defense Week*, July 1, 2002.

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have to be solved before the FB-22 could be considered.<sup>3</sup> Former DOD acquisition chief Pete Aldridge is reported to have said that there is “no need for another bomber to serve as an interim long-range strike capability because, for the time being, it’s more important to have better munitions than a new platform.”<sup>4</sup>

The costs of developing the FB-22 are debated. Some argue that by leveraging the F/A-22 cockpit, engines, computer systems, production methods and materials, the FB-22 could be produced relatively cheaply. Others argue that re-designing an aircraft to perform a mission it was not originally intended to perform is difficult, and usually costly. Some estimate that developing the airframe alone could cost up to \$1 billion.<sup>5</sup> In July 2003 it was reported that Air Force officials have discovered that the F/A-22 will likely not be able to carry external fuel tanks without encountering structural problems. The FB-22 could also encounter similar difficulties.<sup>6</sup> Also, some question the attractiveness of a medium range bomber with a relatively small payload. House Armed Services Committee Chairman Duncan Hunter, for example, commented that it was “counterintuitive that, as we have lost basing ...our modernization program has on the average encompassed acquisition of aircraft with shorter and shorter legs — that is, almost no bombers; in fact, no bombers; lots of fighters”<sup>7</sup>

In congressional testimony, Secretary Roche suggested that up to 150 FB-22s could be procured. Full-rate production could be achieved by FY2011, Roche estimates, if development funds were committed in FY2004.<sup>8</sup> However, no funds in the F/A-22 program have yet been devoted to the FB-22 nor has money been allocated to the bomber program from other sources. Consequently, potential costs and schedule of the FB-22 concept are still quite notional. How this multi-role aircraft would compete with — or conversely complement — the F-35 Joint Strike Fighter has not yet been determined.

## Issues

Many in Congress have promoted more emphasis on long range bombers, and have looked unfavorably on Air Force attempts to divest itself of portions of the B-1 and B-52 fleets.<sup>9</sup> Some note that the Air Force has resisted calls to speed up its schedule for procuring a new long-range bomber, and to take steps such as re-engining the B-52 fleet.

<sup>3</sup> Bill Sweetman, “Smarter Bomber,” *Popular Science*, June 25, 2002.

<sup>4</sup> “Interim Bomber?” *Aerospace Daily*, Aug. 12, 2002.

<sup>5</sup> “FB-22?” *Defense Daily*, Apr. 22, 2002.

<sup>6</sup> Laura Colarusso, “Plans to Extend F-22 Range Frustrated by Structural Limit Problems,” *Inside the Air Force*, July 26, 2002.

<sup>7</sup> “U.S. Representative Duncan Hunter (R-CA) Holds Hearing on the FY2005 Air Force budget Request,” FDCH Political Transcripts, Feb. 26, 2004.

<sup>8</sup> Lorenzo Cortes, “Air Force Issues Clarification on FB-22, FY’11 Delivery Date Possible,” *Defense Daily*, Mar. 10, 2003.

<sup>9</sup> H.R. 4200 (108-491) provides \$100 million (PE64015F) for a next generation bomber and strongly urges DOD to budget for a new bomber in the Future Years Defense Program. This report also recommends an increase of \$95.8 million to regenerate 10 B-1 bombers that the Air Force had retired (Items of Special Interest, p. 91).

The FB-22 appears to be the only bomber concept that Air Force leaders are discussing with any enthusiasm. Some question whether the FB-22 is a legitimate capability to be explored, or if it is an attempt to bolster the F/A-22 program in a challenging budgetary environment.<sup>10</sup> Air Force leaders counter by saying that the FB-22's potential combination of speed, survivability, range, and payload could make it a useful platform for attacking time-critical targets, which tend to be difficult to attack.<sup>11</sup>

Regardless of questions about the FB-22's potential cost and feasibility, policy makers may examine more closely Air Force assertions about the utility of the FB-22's potential capabilities. Alternatives to procuring the FB-22 exist, and are discussed below.

**Range.** Various estimates of the FB-22's un-refueled combat radius have appeared in the media. Many say that it will be "about twice" that of the F/A-22 (500-600 statute miles, depending on operational assumptions). Other estimates have ranged from 650 miles to 1,800 miles. Regardless of where the FB-22's actual capabilities may fall on this continuum, it appears to be clearly a different class of aircraft than today's long-range bombers, which typically exhibit un-refueled combat radii of 3,400 to 4,400 miles.

Air Force leaders say that bombers do not necessarily have to achieve long, un-refueled ranges like the current fleet, and that "regional" ranges would be useful. Secretary Roche has suggested that un-refueled range is not the most important capability in a bomber, because with access to aerial refueling aircraft (also called tankers) "almost anything is long range."<sup>12</sup> Secretary Roche also noted that "the majority of air strikes in Iraq came from shorter-range fighters and not the bomber fleets."<sup>13</sup>

While Secretary Roche's statements above appear factually accurate, they may not be as compelling when placed in context. Aerial refueling can extend the range of shorter ranged aircraft, but aerial refueling resources are finite. Many believe the current aerial refueling fleet to be strained, and adding medium range aircraft to the inventory, rather than longer range aircraft may stress the system further. Also, while fighter aircraft may have flown more combat sorties than did bomber aircraft in Operation Iraqi Freedom, bombers dropped more bombs.<sup>14</sup> In Operation Enduring Freedom, Air Force bombers flew more sorties than Air Force fighters, and also dropped more bombs.<sup>15</sup>

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<sup>10</sup> "New bomber?" *Aerospace Daily*, Aug. 5, 2002.

<sup>11</sup> John Tirpak, "Long Arm of the Air Force," *Air Force Magazine*, Oct. 2002. Lorenzo Cortes, "Roche Looking to Next Year for Near-Term Proposals on Strike Concepts," *Defense Daily*, Mar. 18, 2004.

<sup>12</sup> John Tirpak, "Long Arm of the Air Force," *Air Force Magazine*, Oct. 2002.

<sup>13</sup> Sharon Weinberger, "HASC, Air Force Spar Over Bomber Plans," *Defense Daily*, Feb. 27, 2004.

<sup>14</sup> Eleven B-1s flew one percent of all combat sorties, yet dropped 24 percent of the weapon tonnage and nearly half of the number of JDAMs. See Lance Bacon, "Back in the Big Game," *Air Force Times*, June 16, 2003; David Fulghum, "Baghdad Confidential," *Aviation Week & Space Technology*, Apr. 28, 2003.

<sup>15</sup> The B-1 flew just 5 percent of the sorties in Afghanistan, but dropped 40 percent of the ordnance and 70 percent of the JDAMs. Thomas Hargrove, "Oft-Debated Bomber Gets Shot At Saddam," *Scripps Howard News Source*, Apr. 8, 2003.

Additionally, long range bombers are less reliant on in-theater basing, allowing shorter range aircraft such to use the closest bases to theater in base-limited scenarios. Further, long range bombers can often fly combat missions directly from U.S. bases.

**Speed.** Air Force leaders have also said that the FB-22 is an attractive candidate for a regional bomber, because its speed, potentially up to Mach 1.8, would make it effective in attacking moving or time-critical targets. Secretary Roche is reported to have said that the Air Force needs a supersonic bomber to more effectively attack mobile targets, particularly as the United States is engaged in a prolonged war on global terrorism.<sup>16</sup> Chairman of the Joint Chiefs of Staff Gen. Richard Myers also stated that speed is critical in attacking rapidly moving targets, particularly in counter-terrorism operations.<sup>17</sup>

Improving the ability to attack time-critical targets will likely require faster targeting. However, it is not clear that employing faster aircraft is a critical part of this process. Those currently tasked with more effectively attacking time-critical targets are focusing their efforts on improving intelligence, sensors, communications, and decision making processes.<sup>18</sup> Air Force Chief Gen. John Jumper hopes these improvements can shorten the targeting cycle to 10 minutes or less. Improvements to decision making appear to be particularly promising. Officials report that they achieved a “50 to 100 percent improvement in hitting time sensitive targets from operations in Afghanistan and those in Iraq,” simply by more effectively delegating targeting authority.<sup>19</sup>

In recent operations in Afghanistan and Iraq, time-critical targets were frequently destroyed not by fast moving aircraft, but aircraft that were slowly loitering over the battlefield, such as B-52s and Predator UAVs. Many analysts have posited that the ability to loiter for long periods of time over a battlefield — thus being available to quickly drop a weapon once a time-critical target is identified — appears to have proven more valuable than the aircraft’s speed in attacking these kinds of targets.<sup>20</sup> Long loiter time is a direct function of long range. A fast, medium range bomber would not be able to loiter for as long as a slower, long range bomber, so it is not clear that an aircraft such as the FB-22 would be better suited to attack time-critical targets than existing aircraft.

**Payload.** The FB-22 is projected to carry up to 30 250-lb Small Diameter Bombs (SDBs), which are still in development. Air Force officials say this is a substantial improvement over the F/A-22’s projected payload of eight SDBs, and make it an attractive regional bomber. While 30 SDBs may compare favorably with the F/A-22’s capability, it appears insubstantial compared to the 320 SDBs that the B-2 is projected to carry. Coupled with a shorter un-refueled combat radius than today’s bombers, the FB-

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<sup>16</sup> Vago Muradian, “F-22 May be Modified as Speedy New Medium Bomber to Strike Moving Targets,” *Defense Daily International*, Jan. 18, 2002.

<sup>17</sup> *Ibid.*

<sup>18</sup> John Correll, “From Sensor to Shooter,” *Air Force Magazine*, Feb. 2002.

<sup>19</sup> Amy Butler, “Moseley: Time Sensitive Targeting Improved from Afghanistan to Iraq,” *Inside the Air Force*, June 20, 2003.

<sup>20</sup> Frank Wolf, “Navy FY’03 Budget Likely to Emphasize SSGN, CSBA Says,” *Defense Daily*, Jan. 31, 2002.

22's smaller payload makes it appear decidedly less capable of loitering over battlefields and attacking emerging targets than the B-1, B-2, or B-52.

In the wake of recent conflicts in Afghanistan and Iraq, Air Force leaders specifically pointed to the large payloads of precision guided munitions (PGMs) that bombers carried, as a distinct leverage point in the wars. For example, one Air Force general remarked "The fact that you can dynamically re-target precision ordnance and employ it *in mass* (emphasis added) from bombers is a very, very significant shift," in force effectiveness.<sup>21</sup> A bomber that can carry only 30 250-lb bombs may not offer the same "significant shift" in warfare capabilities. Additionally, long-range bombers are capable of carrying a wide variety of weapons. The B-52, for instance, can carry every munition in the Air Force's inventory. It is not clear if the FB-22 would be able to drop munitions other than the SDB.

**Survivability.** Air Force officials say that the FB-22's speed, maneuverability, and stealth make it an attractive medium range bomber, because these characteristics will ensure its survivability in hostile environments. It is not clear, however, that substantial and costly efforts need to be taken to further ensure combat aircraft survivability. Since Operation Desert Storm (1991) the services have flown over 400,000 combat sorties and lost only 39 combat aircraft: a survival rate of 99.99 percent.<sup>22</sup> None of these lost aircraft were bombers. While it may be that tomorrow's adversaries are more threatening to the bomber force than yesterday's adversaries, they may also be even less threatening. It is also not clear that it is worth the cost to invest in increased survivability for aircraft that are already very survivable. Further, employing stand-off munitions such as air-launched cruise missiles may be a more cost-effective means of increasing bomber survivability than the methods (speed and stealth) inherent in the FB-22.

**Potential Alternatives.** If policy makers seek alternatives to procuring the FB-22 or other medium range bombers, it appears that several options could be considered. The first option would be to accelerate new long range bomber development.<sup>23</sup> Many policy makers both inside and outside of Congress have encouraged the Air Force to more quickly deploy a follow-on to the B-1, B-2, and B-52, rather than wait for the 2030 time frame. As one example, Representative Mac Thornberry challenged the Air Force for not pursuing a new long range bomber. "There is just very little, if any, work going on to think about designs for a follow-up bomber. Aren't we being shortsighted in not pursuing platforms which have that global strike range?"<sup>24</sup>

A second option would be to augment today's bomber force or "bridge" to tomorrow's follow-on bomber with increased application of weaponized unmanned aerial vehicles (UAVs).<sup>25</sup> Unmanned Aerial Vehicles enjoy attributes that lend themselves to attacking time-critical targets such as long loiter times. Being unmanned and low cost also makes UAVs appropriate for use in high risk environments. The Predator UAV, for

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<sup>21</sup> John Tirpak, "Long Arm of the Air Force," *Air Force Magazine*, Oct. 2002.

<sup>22</sup> See CRS Report RS21141, *Military Suppression of Enemy Air Defenses (SEAD)*.

<sup>23</sup> See CRS Report RL31544, *Long Range Bombers: Background and Issues for Congress*.

<sup>24</sup> FDCH Political Transcripts. op cit.

<sup>25</sup> See CRS Report RL31872, *Unmanned Aerial Vehicles: Background and Issues for Congress*.

example, has already demonstrated its ability to destroy time-critical targets during the recent conflict in Afghanistan. New and more advanced projects indicate that the Services see value in fielding armed UAVS. The Army has recently weaponized the Hunter UAV, and is pursuing several armed unmanned aircraft concepts.<sup>26</sup> The Air Force and the Defense Advanced Research Projects Agency (DARPA) are developing a long-range unmanned combat air vehicle (UCAV), which has already dropped PGMs in testing.<sup>27</sup>

A third option might be to procure more B-2 stealth bombers. This idea emerged in 2001 when Northrop Grumman made an unsolicited proposal to build 40 more B-2 bombers for approximately \$545 million per plane, about one fourth the unit cost of the existing 21 aircraft.<sup>28</sup> This proposal has proven controversial, with several members of Congress in favor, and many DOD officials opposed. Proponents tend to emphasize the B-2's powerful combination of stealth, long range, and large payload, coupled with the opportunity to acquire them for "half price." Opponents say that the B-2 is "1980s technology" and very expensive to maintain.<sup>29</sup>

A fourth option would be to develop a bomber based on commercial aircraft. FB-22 opponents argue that its attributes of speed and stealth are not required. Instead, they say, bomber requirements would be better satisfied by converting large commercial aircraft to carry very large weapons payloads to long ranges and conduct strikes in permissive threat environments. Stand-off munitions could be used in high threat areas. FB-22 proponents stand by their opinions that speed and stealth are needed, and also argue that B-52s can already satisfy the bombing requirement in benign environments.

A fifth option may be to increase resources for, and reliance on, Navy strike aircraft. If increased quick-response bombing capability is required out to medium ranges, increasing the number and capabilities of Navy aircraft operating from carriers may be an attractive approach. The naval variant of the Joint Strike fighter is already projected to have a range of almost 700 statute miles, and increased payloads may be feasible, proponents of this approach could argue. Opponents could argue that an "FB-35" could not be developed on the same timetable as the FB-22, and the Navy has not, yet, shown any interest in such a concept.

Although questions remain about the FB-22's cost, feasibility, and requirements, supporters and opponents would likely agree that modifications to existing aircraft, even major modifications, are not uncommon, historically. The Air Force is, for example, modifying the B-52 to conduct stand-off radar jamming, a mission likely never envisioned by the bomber's manufacturer.

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<sup>26</sup> Stephen Trimble, "Viper Set to Strike with US Army's Hunter UAVs," *Flight International*, Mar. 22, 2004.

<sup>27</sup> "Boeing X-45A Makes First GPS-guided Weapon Drop," *Aerospace Daily*, Apr. 20, 2004.

<sup>28</sup> Nick Jonson, "Additional B-2 Bomber Acquisitions Unlikely to Fly, Analysts Say," *Aerospace Daily*, June 15, 2001.

<sup>29</sup> James Dao, "New Pentagon Debate Over Stealth Plane," *New York Times*, Dec. 11, 2001.