

Budget Option:

Reduce Planned Buy of F/A-22s, and Procure Radar Upgrade for the F-16 Instead

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(Millions of Dollars)	2005	2006	2007	2008	2009	2010	Total 2005-2009 ¹
Savings							
Budget Authority	2959	6072	899	570	164	296	10,960
Outlays	2959	6163	927	598	176	322	11,144

Recent conflicts have demonstrated that adversaries can disrupt U.S. air operations with surface-to-air missiles (SAMs). Despite U.S. air superiority, the proliferation of SAM technology threatens pilots and upsets mission planning. More advanced SAMs use phased-array radars that track multiple targets, and missiles with greater range and speed.² For these reasons, the Air Force is eager to reinvest in suppression of enemy air defense (SEAD) capabilities.

In the 1990s the Air Force cancelled its two primary SEAD assets, the F-4G *Wild Weasel* and EF-111 *SparkVark*. Much of the responsibility for SEAD fell to the Navy's fleet of EA-6B *Prowlers*. The *Prowlers* have proven effective in jamming enemy radar, but the fleet is aging and tethered to carrier groups.³ This restricts deep-strike SEAD missions. The Air Force has retained some independent SEAD capabilities by equipping F-16 fighters with HARM missiles designed to destroy enemy SAM installations. Pilots have expressed dissatisfaction with the F-16, however, complaining that it cannot provide 360° radar coverage. This means that they have to fly in tandem to fulfill the SEAD mission.

One possible solution to this problem is the Precision Location and Identification System (PLAID). This is a combined software/hardware package that upgrades the existing AN/ALR-69 radar warning

receiver on the F-16 Block 40/42. PLAID rapidly calculates the direction of a SAM radar array by digitizing existing receivers, thus providing expanded coverage for individual assets.

RDT&E on PLAID ended in 2003. Assuming that it succeeded during testing, we can project procurement costs for upgrading the existing F-16 Block 40/42 inventory (462 total). Open source cost estimates range from \$0.5 million to \$4 million per unit.⁴ Based on this range, the low end estimate for the PLAID upgrade is \$231 million in constant FY05 dollars. The high end estimate is \$1.8 billion.

Another way of dealing with the SAM threat is by purchasing platforms that are hidden to enemy radars. Advocates of the F/A-22 *Raptor* argue that its stealthy qualities make SEAD less relevant, since stealth reduces the enemy's ability to use SAMs. If this is the case, there is little need to upgrade the F-16, which carries weapons externally and produces an observable radar cross-section. But unlike SEAD-capable assets, the *Raptor* does not assist other aircraft. F/A-22s are also expensive, and cutting back on procurement will more than pay for the PLAID upgrade on existing F-16s. Cutting production of 100 F/A-22s will save roughly \$12 billion. This will still allow acquisition of more than 100 F/A-22s over the next several years.

Upgrading F-16s and reducing procurement of F/A-22s will save between \$10.2 and \$11.8 billion. Savings are determined by subtracting the cost of acquiring 100 *Raptors* (\$12 billion) by the costs of the PLAID upgrade (between \$231 million and \$1.8 billion).⁵ Total savings will decrease if Congress authorizes the PLAID upgrade on more platforms.⁶

Of course, the F/A-22 provides more than just avoidance of enemy defenses. It is probably the most advanced air-to-air fighter that has ever been produced. Its capabilities against enemy fighters are extremely impressive. For this reason, a smaller F/A-22 inventory will hedge against the need to reestablish dominance over future adversaries.

Planners should take into account the nature of the enemy threat in the near- and medium-term, when U.S. air superiority is not likely to face a serious challenge. The F/A-22 is survivable asset, though it is not designed to destroy enemy defensive capabilities. The upgraded F-16 will continue to perform a range of missions while providing more reliable suppression and destruction of enemy air defense. Moreover, PLAID software will allow the F-16 to operate independently if

communications are broken within networked strike packages. In other words, PLAID will allow individual F-16 pilots to perform the SEAD mission even after they lose contact with other planes.

Other SEAD platforms like unmanned aerial vehicles are still largely untested in practice. Integrating PLAID onto existing aircraft will provide an immediate and affordable upgrade for the Air Force.

¹ Projected savings are derived by subtracting the total cost of the PLAID upgrade (based on the average per unit cost) from the \$12 billion saved by procuring 100 fewer F/A-22s.

² Michael O'Hanlon, *Defense Policy Choices for the Bush Administration*, Second Edition (Washington, D.C.: Brookings, 2002), p. 106, and Owen R. Coté, Jr., "Buying... 'From the Sea': A Defense Budget for a Maritime Strategy," in Cindy Williams, ed., *Holding the Line: U.S. Defense Alternatives for the Early 21st Century* (Cambridge: MIT Press, 2000), pp. 147-150.

³ Brian W. Wages, "Examining USAF's Long-Range Vision," SDS International, August 1995, online at: http://www.sdslink.com/SDS_International/PDF_PUB/LRANGEV.PDF.

⁴ The low end estimate comes from the 1997 Air Force Mission Area Plan, which claimed that "Additional cost to completion is 78m" for 150 ship-sets over a four-year period. See http://www.fas.org/man/dod-101/usaf/docs/mast/annex_f/part15.htm. The high end comes from Karl Mueller, who proposes that \$600 million is needed to upgrade 50 F-15Ds by improving sensors, adding HARMs, and reconfiguring fuel tanks. (PLAID technology was originally tested on the F-15.) Assuming that the costs are spread evenly across the three upgrades, then \$200 million is allocated to work on the sensors. Thus \$200 million divided by 50 aircraft equals \$4 million per plane. Karl Mueller, "Flexible Power Projection for a Dynamic World: Exploiting the Potential of Air Power," in Williams, *Holding the Line*, pp. 239-240. Outlay rates are provided in the attached spreadsheet.

⁵ The F/A-22 estimate comes from O'Hanlon, *Defense Policy Choices*, p. 102.

⁶ The FY2004 House Armed Services Committee *National Defense Authorization Act* (H.R. 1588, p. 222) envisages 5,180 PLAID-equipped aircraft. Online at: http://www.house.gov/hasc/billsandreports/108thcongress/H1588_rh.pdf