

Information Memorandum
Update of Joint Strike Fighter (JSF) Alternate Engine Cost/Benefit Analysis

This memo provides historical background information on the JSF alternate engine program as well as a summary of the CAPE alternate engine cost and cost/benefit analyses that have been developed since 2007.

The Department has not funded an alternate engine for the JSF program since 2007 because in the Department's view, a second engine is unnecessary and too costly. This position is most recently reflected in the FY 2011 President's Budget submission which, once again, does not include funding for the JSF F136 alternate engine. The Department's position is based in part on updated analyses which continue to show that the business case for a JSF alternate engine is not compelling, and that the alternate engine program would require a significant DoD investment of additional resources within the FYDP.

Previous JSF Alternate Engine Analyses

The JSF F136 alternative engine program began in 1996, consistent with congressional direction. In the December 1997 Selected Acquisition Report, Navy and Air Force committed to funding the alternative engine throughout the Future Years Defense Program (FYDP). In the FY 2007 President's Budget, DoD recommended termination of the JSF alternative engine program. In response, Congress reduced JSF aircraft production quantities and reallocated the resources to the continued development of the F136 engine program. Congress also directed that the GAO, an FFRDC (i.e., IDA), and the CAIG develop separate, sequestered analyses of alternative engine acquisition strategies for the JSF program.

In March 2007, the CAIG (now CAPE) delivered an extensive cost-benefit analysis report on the F136 alternative engine acquisition strategies to the Congress. At that time, the CAIG found that the potential life-cycle cost savings from a competitive F136 engine acquisition strategy for JSF were not compelling, and estimated that the alternate engine would cost an additional \$1.2B in net present value. The report did document other potential benefits from a competitive F136 acquisition strategy such as providing a hedge against potential technical problems in the baseline F135 engine, and motivating increased contractor responsiveness through competition. The results of the 2007 CAIG analysis are similar to those presented in the 2007 IDA study. Both studies found that investment costs would not be fully recovered during the procurement phase of the program. In contrast, the 2007 GAO report to Congress was more favorable toward a competitive alternative engine acquisition strategy for reasons that are not

readily apparent. A February 2009 report from the Congressional Research Service¹ provides an excellent summary and comparison of the three reports provided to Congress in 2007.

Update of the 2007 Analysis

Since 2007, Congress has provided an additional \$1.3 billion in RDT&E funding in FY 2008-10 for continued development of the F136 alternative engine.

In 2010, CAPE was tasked to update the 2007 cost-benefit study of the competitive alternate engine acquisition strategy for the JSF. In response, CAPE updated two key factors in the 2007 analysis: 1) the additional appropriations through FY 2010 that had been directed by Congress for development of the F136 alternative engine, which now represent 'sunk costs'; and, 2) the cost estimates for the primary and second engine System Design and Development (SDD) programs based on more recent actual cost information from both engine programs. The CAPE 2010 update made no other changes to the extensive list of assumptions used in the 2007 report to Congress, including the assumption that competition would begin in 2014.

As expected, the 2010 update analysis indicates that a competitive engine acquisition strategy becomes slightly more attractive in an economic sense than the 2007 analysis for the report to Congress. This is because the costs of the SDD program for the second engine have become increasingly sunk with the additional directed congressional appropriations in FY 2008-10 for the F-136 development program. While the 2010 updated result is in fact more favorable to a competitive acquisition strategy than the 2007 analysis suggested, the fundamental conclusion remains the same: the potential life-cycle cost savings from a competitive sourcing of engines for the JSF program do not provide a compelling business case. In net present value terms, the estimated costs of a competitive engine acquisition strategy are projected to be approximately equivalent to a sole-source scenario, or at the breakeven point, as a result of the additional sunk costs for the F-136 development program during the last three years.

Implications of JSF Program Restructuring

During the preparation of the FY 2011 budget, the JSF program was restructured by adding four additional aircraft to the SDD flight-test program for the JSF aircraft, extending the duration of the SDD program by thirteen months, and reducing near-term JSF aircraft procurement quantities in accordance with the recommendations of an

¹ Bolkcom, Christopher, *Proposed Termination of Joint Strike Fighter (JSF) F136 Alternate Engine*, Congressional Research Service, February 18, 2009.

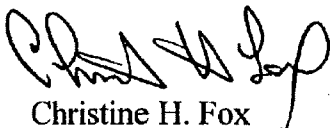
Independent Manufacturing Review Team (IMRT). Based on this restructuring, CAPE assesses that the competitive procurement of engines would now begin in 2017, three years later than the 2014 date assumed in prior analyses. This adjustment more appropriately reflects the programmatic and schedule changes incorporated into the restructured JSF aircraft development program, as well as the status of the alternative engine development program. It would provide necessary time to complete developmental qualification of the alternate engine. It would also provide a sufficient window for directed production buys to allow the second engine source to progress, with learning or cost improvement, to be positioned to compete more effectively with the primary engine source beginning in 2017.

Based on this assessment, CAPE analysis shows that it would require a DoD investment of \$2.9 billion (TY \$) over the next six years to get the alternate engine in position for competition. This investment would:

- Complete the development program (i.e., SDD) for the alternate engine.
- Fund an engine “component improvement program” (or CIP) to maintain engine currency.
- Perform directed buys of engines from the primary and second sources to prepare for a competition.
- Procure tooling, support equipment, and spares.

Differences in ‘sunk cost’ estimates

Congress has suggested that the alternative engine development costs are approximately 75% sunk, based on the total projected cost of the alternate engine development program (i.e., the SDD program), and question the need for the additional \$2.9B to get the second engine to competition. Although CAPE’s estimate of development (SDD) costs varies a little from Congress’ estimate, the major source of the difference is what is included in the cost to get to competition. The 75% estimate excludes associated Component Improvement Program (CIP) costs, which are recurring costs funded in the RDT&E appropriation that would continue through the duration of the JSF aircraft program. This figure also excludes all costs that would normally be funded in the procurement appropriation: the costs to perform directed buys of engines from the primary and second sources to prepare for a competition; and costs to procure tooling, support equipment, and spares to enable DoD to conduct competitive procurement of JSF engines beginning in 2017.



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