

**House Armed Services Committee – Air and Land Forces and
Seapower and Expeditionary Forces Subcommittees**

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**Subject: Institute for Defense Analyses Cost Estimate for the
Joint Strike Fighter Engine Program**

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I. Introduction

Chairman Abercrombie, Chairman Taylor and members of the subcommittees, it is my pleasure to appear before you today.

The John Warner Defense Authorization Act for Fiscal Year 2007 directed the Secretary of Defense to select a Federally Funded Research and Development Center to conduct an independent cost analysis of the Joint Strike Fighter (JSF) engine program. The Office of the Under Secretary of Defense, Acquisition, Technology and Logistics, asked the Institute for Defense Analyses (IDA) to perform this study. I will provide a summary of this work today. We expect to be providing a more detailed description of the analysis in a briefing to committee staff in the near future.

II. JSF Program

To date, the JSF engine program has been structured and executed to allow effective competition between two engines, the F135 (being developed by Pratt & Whitney) and the F136 (being developed by the Fighter Engine Team of General Electric and Rolls Royce). The engines are designed to be physically and functionally interchangeable, giving the Government flexibility in its selections. The planned production quantities are high enough that half of the planned purchase would represent a large production quantity to either contractor team. Based

on past experiences with engine competitions, the two engines can be expected to be price competitive, an important ingredient in a successful competition. These structural qualities are necessary for competition, but are an insufficient basis for a decision about whether a competitive program would benefit the Government. Our analysis examined the costs and potential benefits of these two approaches to providing engines for the JSF program.

III. Approach

We first considered the investments required to execute a competitive engine program. This analysis took account of costs associated with unique elements of the two engine designs and excluded costs associated with propulsion elements common to both engines, such as the lift fan, roll posts, and nozzle. We then determined the savings that would have to be achieved as a result of the competition to recover this investment and compared these savings to what has been seen in other competitive programs. Finally, we evaluated potential benefits of competition beyond price reductions.

IV. Investments Required for a Second Engine Program

Execution of a second engine program would require investments in all phases of the program life cycle. These investments include both direct investments, such as development costs for the second engine, and opportunity costs, such as the loss of economies inherent in larger production quantities. During System Design and Development, the F136 design must be completed; it must go through both ground and flight testing; and it must be managed and integrated into the JSF system by personnel at Lockheed Martin, in the Government, and at Pratt & Whitney. During production, the presence of a second engine would reduce the quantities Pratt & Whitney produces, consequently reducing the economies that would have accompanied a

larger purchase. The cost of initial spare parts and establishing repair depot capabilities would also be increased by introducing a second engine. In the support phase of the system's life cycle, the second engine would increase the costs of depot repair, sustaining engineering, software support, and component improvement programs. Our estimate of the sum of these investments, including opportunity costs, is \$8.8 billion in constant fiscal year 2006 dollars, before accounting for the price reductions that competition might produce. Of this investment, we estimate that \$2.1 billion would occur in fiscal years 2008–2012.

V. Potential Price Benefits from Competition

We examined the history of two engine competitions—the so-called Great Engine War and the dual sourcing of the F404 engine.

The Great Engine War was the U.S. Air Force-initiated competition in 1984 between Pratt & Whitney and General Electric for 2,000 F-15 and F-16 fighter engines. The F404 engine competition was a competitive dual-sourcing of engines used on U.S. Navy F/A-18 aircraft. In this case, Pratt & Whitney built engines to the General Electric F404 design and competed in four competitive procurement years, 1986 to 1989. The competition was subsequently terminated. We used two different methods to estimate savings for the Great Engine War and one for the F404 case, producing estimated gross savings ranging from 11 percent to 18 percent of engine procurement costs.

We also examined available studies of competitions that the Department of Defense conducted over the past 30 years for a variety of other systems. Unfortunately, we were not able to extract results from them that could be used as a primary means of evaluating the likely savings of a JSF engine competition. There were methodological differences among the studies,

and some studies did not describe clearly how the analyses were performed and what was included in the stated “savings due to competition.”

VI. Break-Even Analysis

To break even financially—or, in other words, to offset fully the estimated \$8.8 billion investment to establish the alternative JSF engine—would require a savings rate during the production phase of 40 percent on a net present value basis. Savings of this magnitude are implausible considering the 11 to 18 percent savings realized in previous engine competitions. If Operating and Support (O&S) costs were effectively competed in addition to procurement costs, the required savings rate would fall from 40 percent of procurement costs to 18 percent of total costs. Because the Department of Defense has not typically linked procurement and O&S costs in a single competition, we found no historical data with which to estimate plausible O&S savings under such an acquisition strategy.

There is a range of ways in which competition might affect prices for O&S services. Without explicitly competing support services, some O&S savings would flow naturally from the savings in a procurement competition. Spare parts, for example, could be expected to see some savings through this mechanism. Elements of O&S can also be tied to the procurement competition by adding O&S metrics to the procurement selection criteria. To take O&S competition a step further, all elements of O&S services could be packaged into a single acquisition covering design improvements, spare parts, and logistics support. This model is widely used by the commercial airline industry, which routinely bundles support contracts with the initial engine purchases, bringing support services directly into the purchase competition. We understand that the JSF program office intends to use an acquisition strategy that ties some elements of O&S costs to the procurement competition.

VII. Other Benefits of Competition

Competition has the potential to bring benefits in addition to price reductions. One such benefit is fleet readiness. The JSF will dominate the U.S. fighter attack force structure as no previous platform has. Having two independent engine types could minimize the impact of an engine anomaly that could ground or reduce the readiness of large numbers of aircraft.

Also, competition might improve contractor responsiveness. For example, it is generally agreed that the Government received improved contract terms, cooperation, and overall responsiveness from contractors when competition for fighter engines was introduced during the 1980s.

Finally, continuation of the F136 program would ensure that General Electric remains in the industrial base for high-performance military aircraft engines. Without the F136, General Electric's incentive and ability to maintain the skills unique to these types of engines would be uncertain, though General Electric would remain a leading supplier of commercial aircraft engines.

VIII. Conclusion

In summary, creating competition by developing, procuring, and maintaining a second engine would require an investment of about \$8.8 billion in constant fiscal year 2006 dollars, about \$2 billion of which would be required over the next five budget years. To have the potential for recovering this investment over the JSF's life cycle, both procurement and O&S service would have to be competed effectively, and such a competition would have to save about 18 percent of total procurement and O&S cost. The Department of Defense has little experience in integrating procurement and O&S in competitions, so we have no basis for estimating the plausible savings

under such arrangements. Competition can be expected to bring non-financial benefits in the form of fleet readiness, contractor responsiveness, and industrial base robustness.

That concludes my remarks. I will be happy to answer any questions.