

Injecting Competition in the Joint Strike Fighter Production Program

Can a Winner-Take-All Environment Become More Competitive?

The Department of Defense (DoD) should stick with its winner-take-all strategy to develop and produce the Joint Strike Fighter (JSF)—which is slated to become the workhorse fighter for the Air Force, Navy, and Marine Corps. But as a hedge to ensure that later versions of this next-generation aircraft have the most effective and innovative radar, computer, and software technologies, the DoD should consider spending money to keep a second developer and producer of these vital electronics components in the market. An investment in a second source of such mission systems, the electronics eyes and ears of the JSF, could be relatively modest. But it would provide future decisionmakers with the option to competitively develop a next-generation mission system source when and if it were needed.

So concludes a recent RAND study of competitive strategies for the Joint Strike Fighter, performed over the summer and early fall of 2000. The study, conducted in RAND's National Defense Research Institute, examined both near-term and long-term competition options. The study's bottom-line defense policy conclusion is that putting one company in charge of the overall production of the JSF makes the most economic sense. If two or more competitors developed and built this next-generation aircraft, the DoD likely would not see lower overall program costs. That's because splitting production between two competitors involves higher front-end investments and recurring costs that probably would not be recovered through price reductions that might result from competitive forces.

BACKGROUND OF JOINT STRIKE FIGHTER PROGRAM

The JSF program is a joint endeavor by the United States and the United Kingdom to develop and deploy a family of highly common and affordable strike aircraft to meet the operational needs of the Air Force, Navy, Marine Corps, United Kingdom, and other U.S. allies.

The JSF is expected to be one of the largest acquisition projects in history, worth some \$300 billion (then-year dollars), and the only new major fighter aircraft program planned for the next 30 years. Over the next several decades, these aircraft are slated to replace all F-16s, A-10s, and AV-8Bs in the U.S. inventory, the F/A-18C/Ds in the Marine Corps inventory, and Harriers in the UK inventory; and to augment the Navy's F/A-18E/Fs. By 2026, some 3,000 of these jet fighters are planned to be integrated into U.S. and UK forces. The DoD expects that additional sales to U.S. allies could approach 3,000 aircraft.

In 1996, the DoD named the Boeing Company and the Lockheed Martin Corporation as the JSF's two finalist prime contractor competitors. Since then, each has been engaged in concept demonstration efforts, flown test vehicles, and pursued other extensive preliminary development efforts—all in hopes of winning the JSF development and production contract, to be awarded in fall 2001. But as Boeing's and Lockheed Martin's efforts have unfolded, senior DoD officials and members of Congress have voiced concerns that awarding the JSF to one company could lead to a situation in which the United States might be paying more for weapon systems or purchasing less technologically sophisticated platforms than it would under more robust competition.

IDENTIFYING COMPETITIVE OPTIONS IN A WINNER-TAKE-ALL ENVIRONMENT

The DoD asked RAND to explore and identify opportunities and options to introduce competition during the production phase of the JSF. The principal study criterion RAND researchers used was the likelihood that such competition would reduce the overall cost of JSF production.

Using quantitative and qualitative measures, RAND researchers examined the chances that the DoD would save overall JSF program costs if it pursued several alternative competition paths. In the quantitative analysis, the RAND

team developed a break-even model to gauge the likelihood that the DoD would recoup its costs if it invested in a second JSF producer. RAND augmented these quantitative data with extensive discussions with both contractor teams and the Joint Strike Fighter Program Office staff regarding the feasibility and desirability of various competition strategies. This qualitative analysis allowed the RAND team to gauge whether the prospect of saving overall costs via a particular competition path was reasonable. RAND also examined the DoD's experience with introducing competition in 62 weapon system and component procurement programs between 1960 and 1990.

RAND's examination of the DoD's past experience with introducing competition into weapon system procurements suggests that second producers of electronics have been more likely to generate savings in production costs than have second producers of missiles and ships. As the table shows, half of the DoD programs involving competitively produced electronics that the research team reviewed were able to reduce overall costs by 30 percent, but only one in 10 competitive missile and ship production efforts was able to do so.

Fraction of 62 DoD Competitive Production Programs Achieving Savings

Savings Achieved (%)	Missiles and Ships	Electronics
> 0	7/10	9/10
>10	5/10	8/10
>20	3/10	6/10
>30	1/10	5/10
>40	Nil	3/10

But such a 30-percent cost reduction is just the level of savings the DoD would need to achieve if it were to bring a second competitor into the JSF program. RAND's break-even analysis suggests that such a second competitor would need to offer the DoD this level of savings across a range of the JSF's elements—forward, center, and aft fuse-

lage; landing gear; ejection seat; wing; edges; tail; and mission systems. Given DoD's past experience with missiles and ships, RAND found that such savings from competition would be difficult, if not impossible, for the JSF program to achieve in the near term in any of these areas.

With the exception of the mission system, all these areas would be equally unpromising in the far term (a decade or more in the future). Many of the enabling computer and electronic technologies are evolving rapidly, and we can expect several major upgrades in mission systems during the life of the JSF.

The study suggests that the DoD investigate establishing a "shadow" industry team to begin developing system architectures and component technologies that would be tailored to the JSF and focused on technological advancement, cost reduction, and any new mission requirements that might emerge. That team would then be prepared to compete to develop and produce an integrated suite of mission equipment for a future upgraded JSF.

NEAR-TERM AND FAR-TERM POLICY IMPLICATIONS

These findings have two policy implications:

- *Policymakers should stick with the winner-take-all strategy for near-term development and production of the JSF.* Despite the potential advantages that might accrue, establishing a competitive production line for part or all of the JSF would require a front-end investment, together with increases in recurring costs, that probably would not be recovered through price reductions that may result from competitive forces.
- *Policymakers should consider funding a potential future competitor that would be capable of competing to develop and manufacture the next major upgrade of the mission system equipment.* This strategy would ensure that future managers have the option of a competitive second source, one that might not otherwise be available.

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RAND research briefs summarize research that has been more fully documented elsewhere. This research brief describes work done for the National Defense Research Institute; it is documented in Assessing Competitive Strategies for the Joint Strike Fighter: Opportunities and Options, by John Birkler, John C. Graser, Mark V. Arena, Cynthia R. Cook, Gordon Lee, Mark Lorell, Giles Smith, Fred Timson, Obaid Younossi, and Jon G. Grossman, MR-1362-OSD/JSF, 2001, 138 pp., \$25.00, ISBN: 0-8330-3009-4, available from RAND Distribution Services (Telephone: 310-451-7002; toll free 877-584-8642; FAX: 310-451-6915; or email: order@rand.org). Abstracts of RAND documents may be viewed at www.rand.org. Publications are distributed to the trade by NBN. RAND® is a registered trademark. RAND is a nonprofit institution that helps improve policy and decisionmaking through research and analysis; its publications do not necessarily reflect the opinions or policies of its research sponsors.

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RB-7111-OSD/JSF (2001)