

Does Buying the F-22A Under a Multiyear Contract Save Money?

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Key findings:

- A multiyear procurement of three lots of F-22A fighters would save an estimated \$411 million—about 4.5 percent of the total contract value.
- Seventy percent of the \$411 million can already be traced to substantiated savings estimates identified by the contractors.
- These proposed savings approach the 5.5–17.7 percent savings in total contract value estimated in other multiyear aircraft procurements.
- F-22A estimated savings on a dollars-per-aircraft basis are higher than for all historical fighter and attack aircraft and just above the median for all aircraft.
- The F-22A program has fewer opportunities for multiyear savings than do most historical programs.

What NDRI Researchers Did

Congress specifically asked for a comparison between multiyear procurement of 60 F-22A aircraft with associated engines and three single-year contracts for 20 aircraft and engines. Second, it wanted to know how the F-22A multiyear contract compared with savings estimates for other multiyear aircraft contracts dating back to 1982. To answer these questions, NDRI researchers identified three tasks:

- Estimate the costs of buying 60 aircraft and associated engines (including spares) under single-year contracts at the rate of 20 aircraft per year.
- Substantiate contractor-proposed savings, and compare them with the difference between multiyear negotiated prices and single-year estimates.
- Report the cost savings resulting from historical and ongoing aviation-related (aircraft and aircraft engines) multiyear procurement contracts back to FY 1982.

Results

Estimate of Multiyear Procurement (MYP) Cost Savings

Typically, the cost of building an aircraft goes down over time as the production line workers become more efficient and manufacturers find more effective and efficient ways to run production lines. NDRI researchers estimated the cost of single-year contracts in three cost-improvement scenarios. One assumed that the cost improvement seen in the first six lots built would continue through the next three. A second assumed that the improvement in the last two lots is more indicative of what will occur in the next three. And the third assumed that the costs of the last lot are more representative of what will happen in the next three. They then compared their

Buying defense weapon systems under multiyear contracts rather than a series of single-year contracts can save costs because contractors can buy materials in more economic quantities, schedule workers and facilities more efficiently, and reduce the burden of preparing multiple proposals. The U.S. Air Force is in the process of awarding a contract for 60 F-22A aircraft over three years. Congress wants to assure itself that the proposed contract will yield the promised savings and asked for an independent review of the estimated savings. The National Defense Research Institute (NDRI) performed that review and has published its results in *F-22A Multi-Year Procurement Program: An Assessment of Cost Savings*.

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estimated costs for single-year contracts with the cost of the multiyear contract negotiated between the contractors and the U.S. Air Force. The difference between the single-year contract under the three assumptions and the multiyear contract appear in the table.

The research team considered the second assumption to be the one that would yield the most realistic estimate. Thus, although the savings ranged from \$274 million to \$643 million, the most realistic estimate of the savings from the multiyear contract is \$411 million. As a percentage of the total contract, savings under each of the three assumptions are 3.1 percent, 4.5 percent, and 6.9 percent, respectively.

Substantiating Contractor Cost Savings Estimates

To substantiate the reasonableness of the estimated savings, NDRI researchers reviewed the methodology for computing savings under the contractor-proposed savings initiatives, evaluated its feasibility, and ensured that the savings were incorporated into the negotiated contract values for the multiyear contract by tracing each initiative into the final contract price. They organized savings into six categories. The contractors proposed savings totaling \$311 million in then-year dollars; NDRI researchers substantiated \$296 million. Of the six categories, the buy-out of materials and parts and support labor savings account for almost three-fourths of the savings. Thus, about 70 percent of NDRI’s most realistic estimate of \$411 million can be traced to substantiated savings estimates identified by the contractors.

Historical MYP Cost Savings Comparisons

When NDRI researchers analyzed historical programs that had multiyear contracts, they found that proposed program savings estimates from 1982 through 2007 varied from 5.5 percent to 17.7 percent. Estimated savings for fighter and attack aircraft during this period ranged from 5.7 percent to 11.9 percent. Virtually all claimed savings of historical programs are initial pre-award multiyear procurement estimates compared with single-year procurement estimates; after-the-fact validation of savings is extremely rare. A qualitative examination of these programs and many of the pre-1995 programs suggested that achieving subcontractor and vendor quantity discounts is a key factor in obtaining savings on multiyear procurement programs.

Comparison of Cost Savings Estimate

The figures that follow provide two additional ways of thinking about the savings for the multiyear procurement by comparing the F-22A estimated savings with those of the savings estimated for historical programs. The first arrays the results of NDRI research as a function of the percentage of contract savings relative to a single-year procurement (SYP) contract.

Estimated Multiyear Savings By Cost-Improvement Curve Assumption (\$ millions)

Assumption	Lot 7 Savings	Lot 8 Savings	Lot 9 Savings	Total Savings
Lots 1 to 6	\$43	\$108	\$123	\$274
Lots 5 and 6	\$48	\$153	\$210	\$411
Lot 6 only	\$65	\$229	\$349	\$643

NOTE: All amounts are in then-year dollars.

The left bar shows historical data for all fixed-wing aircraft that underwent a multiyear procurement from 1982 to 2007 and indicates the low, median, and high values. The next bar presents the data for fighter and attack aircraft only, displayed in a similar fashion. Finally, the last bar shows savings based on the three sets of cost-improvement assumptions. NDRI-estimated savings are low compared with estimated historical values for both the all-aircraft programs mix and for just fighter and attack aircraft.

Another way to evaluate savings is by the dollars saved per aircraft. Figure 2 is similar to Figure 1, except that the metric is dollar savings per aircraft in FY 2005 dollars. In this case, NDRI-estimated savings are high by historical standards for fighter and attack aircraft but well within the historical range for all aircraft with multiyear contracts since 1982. This can be partially explained by the higher unit cost of the F-22A compared with other fighters.

Figure 1 Savings Percentage Relative to SYP Value

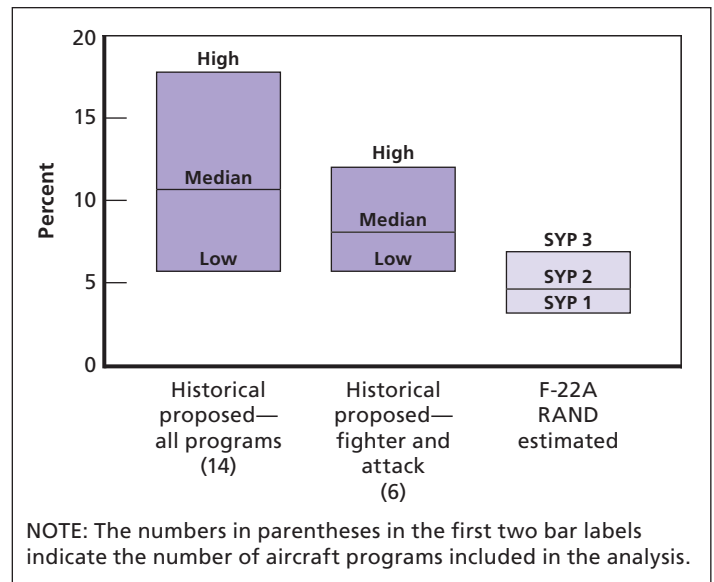
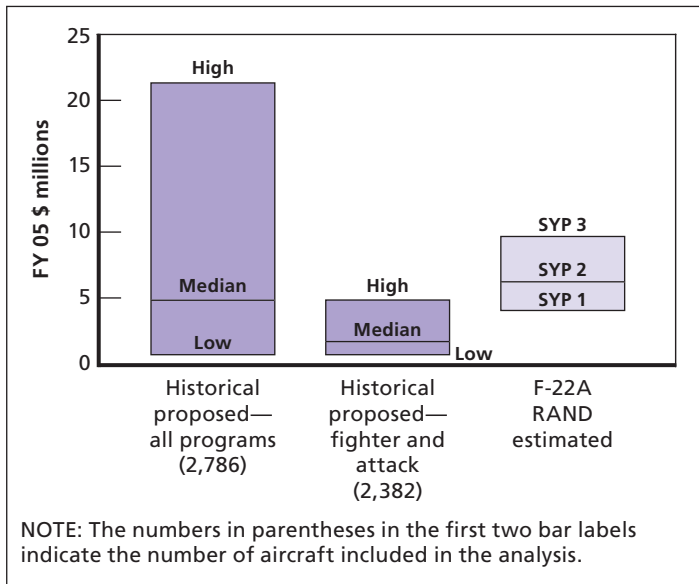


Figure 2
Dollar Savings per Aircraft



In sum, NDRI researchers find that examining the issue of multiyear savings using several approaches produces a consistent range of results, and they indicate that the savings attributed to the multiyear contract by the contractors appear to be reasonable. ■

This research brief describes work done for the RAND National Defense Research Institute documented in *F-22A Multi-Year Procurement Program: An Assessment of Cost Savings*, by Obaid Younossi, Mark V. Arena, Kevin Brancato, John C. Graser, Benjamin W. Goldsmith, Mark A. Lorell, Fred Timson, and Jerry M. Sollinger, MG-664-OSD (available at <http://www.rand.org/pubs/monographs/MG664/>), 2007, ISBN: 978-0-8330-4196-8. The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors. **RAND**® is a registered trademark.

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