Saving the Government Money
Recent Examples from RAND’s Federally Funded Research and Development Centers

The RAND Corporation’s three defense-based federally funded research and development centers (FFRDCs) help the government organizations responsible for U.S. national security meet challenges that call for both sustained analytic attention from multidisciplinary teams over many years and rock-solid trust engendered by rigorous safeguards against conflict of interest.

Through their enduring collaboration with defense policymakers, the three FFRDCs at RAND (see box) have developed unsurpassed expertise, or “research capital,” on issues of defense policy and its interrelated technological, operational, and financial dimensions. Often, the FFRDCs apply this research capital by helping their Department of Defense (DoD) sponsors save the government money while solving national security problems.

The table on page 2 lists illustrative projects that have helped save the government money or that have the potential to do so. We summarize the projects on the subsequent pages. (When publicly accessible documents are available, we provide references and links.)

These projects are representative of numerous RAND analyses that have been conducted within the FFRDCs and have yielded similar benefits over the years. Together, the analyses account for billions of dollars in savings and cost avoidance.

Ways That RAND Analyses Have Saved DoD Money

RAND projects that have helped the government with cost savings and cost avoidance fall into three classes:

- Savings have been achieved or are ongoing.
- Savings have been projected and will accrue, assuming the government follows RAND’s recommendations.
- Savings have been enabled following RAND’s independent validation.
### AN OVERVIEW OF RECENT SAVINGS ACHIEVED, PROJECTED, OR VALIDATED BY RAND RESEARCH

#### SAVINGS ACHIEVED OR ONGOING

<table>
<thead>
<tr>
<th>Description</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost-Effective Options for Intratheater Airlift</td>
<td>$475 million per year</td>
</tr>
<tr>
<td>Using Air Force Aircraft to Reduce Intratheater Airlift Costs</td>
<td>Up to $500 million per year, $200 million per year</td>
</tr>
<tr>
<td>Recommending Against Winglets for Tankers</td>
<td>$1 billion to $2 billion</td>
</tr>
<tr>
<td>Integrating the DoD Supply Chain</td>
<td>$100 million to $200 million per year</td>
</tr>
<tr>
<td>Helping the Army Better Manage Its Clothing Inventory</td>
<td>$100 million saved in FY 2011</td>
</tr>
</tbody>
</table>

#### SAVINGS PROJECTED

<table>
<thead>
<tr>
<th>Description</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reforming Military Retirement</td>
<td>$2.3 billion to $7.7 billion per year</td>
</tr>
<tr>
<td>Slowing the Rate of Increase of Military Pay</td>
<td>$5 billion to $17 billion</td>
</tr>
<tr>
<td>Upgrading Air Force Aircraft Avionics for Air Traffic Management</td>
<td>Close to $7 billion</td>
</tr>
<tr>
<td>Making the Reserve Retirement System Similar to the Active System</td>
<td>$790 million per year</td>
</tr>
<tr>
<td>Beddown Alternatives for the F-35</td>
<td>$580 million per year</td>
</tr>
<tr>
<td>Block Buys of F-35 Joint Strike Fighters</td>
<td>$1.6 billion to $2.2 billion per year</td>
</tr>
<tr>
<td>Centralizing Selected Aircraft Maintenance Activities</td>
<td>$300 million per year</td>
</tr>
<tr>
<td>Reshaping Air Force Agile Combat Support (ACS) Forces</td>
<td>Hundreds of millions of dollars per year</td>
</tr>
<tr>
<td>Optimizing Army Use of Recruiting Resources</td>
<td>Hundreds of millions of dollars per year</td>
</tr>
<tr>
<td>A More Cost-Effective Option for Replacing UH-1N Helicopters</td>
<td>$1 billion</td>
</tr>
<tr>
<td>Reducing Procurement and Sustainment Costs of JSF Training Aircraft</td>
<td>$550 million to $800 million per year</td>
</tr>
<tr>
<td>Enhanced Use of PMA Parts and DER Repairs in Commercial-Derivative</td>
<td>Upward of $80 million per year</td>
</tr>
<tr>
<td>Fuel Reduction for the Mobility Air Forces</td>
<td>$60 million per year</td>
</tr>
<tr>
<td>Avionics Upgrades for Surveillance Technology Modernization</td>
<td>$36 million per year</td>
</tr>
<tr>
<td>Consolidating Maintenance Career Fields</td>
<td>$30 million per year</td>
</tr>
<tr>
<td>Evaluation of F-35C Fleet Replacement Squadron Fighter-Support Aircraft</td>
<td>$20 million to $52 million</td>
</tr>
<tr>
<td>Changes to Technical Training for Enlisted Personnel</td>
<td>$7 million per year</td>
</tr>
</tbody>
</table>

#### SAVINGS VALIDATED

<table>
<thead>
<tr>
<th>Description</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Validating the Combat Air Forces Restructure Plan</td>
<td>$3.6 billion in cost avoidance validated</td>
</tr>
<tr>
<td>Increasing Reserve Component Force Management Flexibility at Lower Cost</td>
<td>Estimated $200 million to $300 million per year</td>
</tr>
<tr>
<td>Reorganizing the Air Force Materiel Command</td>
<td>$100 million per year</td>
</tr>
<tr>
<td>Multiyear Contracting for F-22 and F119 Sustainment</td>
<td>Estimated $340 million to $450 million in savings validated</td>
</tr>
</tbody>
</table>

**NOTE**: Dollar amounts are in nominal dollars current with the year of the study or savings. Some savings are thus underestimated in 2016 terms.
Cost-Effective Options for Intratheater Airlift (2010)

$475 million per year in costs avoided over the life of the systems

PAF developed and employed a methodology to allow the Air Force to determine the most cost-effective way to provide intratheater airlift. PAF ensured that its recommendations met the needs defined in the Mobility Capabilities Study and the requirements of eight other missions subsequently identified by the Air Force and the Office of the Secretary of Defense.

With regard to the Air Force’s plan to retire 129 combat delivery C-130Es, PAF’s analysis demonstrated that the Air Force should recapitalize the retiring aircraft with C-130J-30s rather than C-27Js, as some had advocated. The analysis concluded that the C-130J-30 is the cost-effective alternative for all the missions considered. The C-27J offers approximately 40 percent of the cargo capacity at about two-thirds of the cost and was neither cost-effective nor appropriate for five of the missions. The two aircraft options have comparable short- and soft-field performance under operationally consistent circumstances.

PAF concluded that recapitalizing the retiring C-130Es with C-130J-30s instead of C-27Js would save $17 billion over the life of the systems on a net-present-value basis, or an average of $475 million per year.

The Air Force had begun to procure 38 C-27Js but in FY 2012 decided both to stop acquiring C-27Js and to divest the ones it had procured. Thus, the intratheater cargo fleet will be recapitalized with C-130J-30s, as recommended by PAF.

Using Air Force Aircraft to Reduce Intratheater Airlift Costs (2011)

Up to $500 million per year in savings projected at 2009 activity levels, $200 million per year in savings achieved in commercial tender program alone

Using C-17 and C-130 Air Force aircraft as well as commercial aircraft, DoD daily moves large amounts of cargo within the U.S. Central Command (USCENTCOM) theater, which includes Iraq and Afghanistan. PAF compared the costs of Air Force and commercial airlift and found that, for USCENTCOM’s 2009 demands, both C-17s and C-130s provided more cost-effective delivery than commercial providers.

Holding the number of C-17s and C-130s at 2009 levels but redistributing cargo assignments (such as increasing the use of C-17s for long sorties) could have reduced 2009 intratheater airlift costs by $175 million. Increasing the number of Air Force aircraft and decreasing the use of commercial aircraft could have saved between $390 million and $500 million. Some savings would persist even if the cost of Air Force airlift increased substantially and that of commercial airlift decreased substantially from 2009 levels. PAF recommended that the Air Force employ decision-support tools to assist with daily airlift cargo allocation.

The Air Force reported that these PAF findings shed important light on the issue for senior leadership, which gave the Air Force and combatant command analysts the opportunity to influence changes in the commercial tender program (a subset of the intratheater airlift considered in the analysis). This resulted in a reduction in USCENTCOM’s commercial tender program cost from $450 million to $250 million annually during operations in Iraq and Afghanistan.

Recommended Winglets for Tankers (2010)

$1 billion to $2 billion in costs avoided

In a congressionally mandated study, PAF assessed the potential costs and savings of adding winglets to the KC-135R/T and KC-10A fleets. PAF concluded that although adding winglets would modestly improve performance, it was not likely to reduce operating costs for either fleet under most circumstances. In fact, the proposal could result in a net increase in such costs. If the weight and structural stress caused by adding winglets were to reduce tanker service life, the net costs could be considerably higher. Furthermore, adding winglets would increase aircraft wingspan and thus could affect operations on and around parking aprons, taxiways, hangars, and other base infrastructure components.

PAF thus recommended against adding winglets to either aircraft fleet, for a cost avoidance of $1 billion to $2 billion on a net-present-value basis. PAF noted that the decision should be reevaluated if fuel costs increase significantly.

Integrating the DoD Supply Chain (2011–2015)

$100 million to $200 million per year in savings under way

From 1995 to 2010, DoD made a number of supply chain improvements, increasing performance and efficiency. However,
these improvements aimed at enhancing processes within functions rather than across the entire supply chain. An NDRI team showed that large opportunities for improvement remained by taking a “total systems view” and formulating solutions from a cross-functional perspective spanning DoD organizations and suppliers.

For instance, NDRI worked with the Defense Logistics Agency (DLA) to create stock-positioning logic for minimizing total system costs. The core principle in this logic was the need to incorporate all functional costs for systemwide optimization rather than minimize the cost of each isolated function, which can lead to suboptimal system-level outcomes. DLA adopted this new logic into its resource planning system. Through extensions of this logic, NDRI also proposed both a long-term plan for DoD’s strategic distribution network (affecting the number and roles of major DoD distribution hubs) and a scheduled-truck planning model. These proposals were adopted as well.

In 2014, the NDRI recommendations for optimizing total supply chain outcomes and costs were incorporated into the DoD Supply Chain Materiel Management Procedures. The associated DoD innovations are now generating savings of $100 million to $200 million per year. These innovations have a direct impact on military personnel deployed to conflict zones by helping ensure that they have what they need, when they need it—all at less cost.


Integrating the Department of Defense Supply Chain, Eric Peltz et al., 2012, www.rand.org/t/TRA174

Helping the Army Better Manage Its Clothing Inventory (2011–2013)

$100 million saved in FY 2011

More than 90 central issue facilities (CIFs) located at major U.S. Army installations around the world issue organizational clothing and individual equipment (OCIE) to active component soldiers and deploying National Guard and Army Reserve soldiers. The value of OCIE inventory held at CIFs in the continental United States is substantial, having reached more than $1 billion. As the Army reduces the size of its force, soldiers return material to the CIFs, thus increasing inventory. An additional complication is the Army’s decision to change its uniform pattern. Transitioning to a new pattern will generate obsolete material. However, while there is a cost to holding excess material, there are risks and costs associated with disposal.

As part of continuing efforts to help the Army better manage OCIE, the Arroyo Center was asked to develop a methodology to identify the excess and help the Army manage its disposal. The Arroyo Center developed a web-enabled collaboration tool that allows Army managers to work with CIF personnel to set appropriate inventory levels and identify material no longer needed locally. This material is then made available to other CIFs or can be removed, thus reducing storage and handling costs across the Army.

In the first phase of this work, Arroyo Center researchers worked collaboratively with the Army to design and implement the web-based tool. Thanks to the reductions in wholesale replenishments and the increases in lateral transfers, the Army reduced its FY 2011 centralized OCIE budget by $100 million. Work in this area continues to help the Army transition to a more efficient distribution system for OCIE.


Reforming Military Retirement (2015)

$2.3 billion to $7.7 billion per year in projected savings

Over the past several years, NDRI has provided extensive analysis to support military retirement reform efforts in DoD, including analytic support during internal deliberations of the Military Compensation and Retirement Modernization Commission (MCRMC). Using its Dynamic Retention Model, NDRI analyzed many retirement plan alternatives—including MCRMC’s retirement reform plan that blends a defined benefit plan, defined contribution plan, and continuation pay in the 12th year of service—to replace the defined benefit-only system. One feature of MCRMC’s plan is that members of the active component can choose how to structure the defined benefit portion of the plan, giving them choice over the timing and amount of benefit payments. The NDRI analysis of this plan showed that the current size and experience mix of the force could be sustained while decreasing the overall cost of the military compensation and retirement systems. In the long run, the cost savings of the MCRMC plan could range from $2.3 billion to $7.7 billion per year, depending on how the plan is ultimately structured.

**Slowing the Rate of Increase in Military Pay (2012)**

$5 billion to $17 billion in savings projected over ten years

Budgetary pressures to reduce the federal deficit raised the question of whether DoD could realize savings in the military personnel budget without jeopardizing the nation’s ability to sustain a high-quality all-volunteer force. NDRI’s study answering that question pointed to two favorable trends. First, manpower demand would decrease, by some 80,000 soldiers and 20,000 marines, simultaneous with the drawdown in Afghanistan. Second, the factors influencing supply have also been favorable: Military pay has grown greatly relative to civilian pay in the past decade, the services’ active and reserve components have met or exceeded their numerical recruiting goals, and at the same time recruit quality has increased. The evidence from the NDRI study indicates that the nation has taken care to pay its service members well, compared with civilian benchmarks, and that some easing of the growth in compensation could occur without putting force management at risk. NDRI proposed several options for slowing the rate of increase, such as temporarily dropping the increase rate below that of civilian compensation, or freezing basic pay for a year; **such changes could produce cost savings totaling $5 billion to $17 billion over ten years.**

*Should the Increase in Military Pay Be Slowed?* James Hosek et al., 2012, www.rand.org/tr/TR1185

**Upgrading Air Force Aircraft Avionics for Air Traffic Management (2011)**

Close to $7 billion in projected cost avoidance

Without upgrades, the communication, navigation, and surveillance capabilities of several Air Force aircraft—including the C-5, C-17, KC-10, and KC-135—will not be in compliance with future air traffic management mandates around the world. Non-compliance with these mandates would prevent these aircraft from flying the most-fuel-efficient routings and altitudes and would increase air travel times.

PAF developed a methodology to determine the savings if these aircraft were upgraded so as to meet future mandates for global airspace access. PAF used this methodology to demonstrate that upgrading would avoid nearly $7 billion in Air Force costs over the life of the systems on a net-present-value basis, or about $240 million per year. The savings would come primarily from reduced fuel usage. These savings were calculated at a future fuel cost of $3 per gallon; even if fuel prices fall to $1 per gallon, the upgrade would still reduce net costs.

PAF recommended that the Air Force modernize the avionics for the C-5, C-17, KC-10, and KC-135 to comply with forthcoming air traffic management mandates. PAF’s findings helped to inform the Air Force’s decision to upgrade these aircraft, and the FY 2014 President’s Budget references the PAF research.

*Assessing the Cost-Effectiveness of Modernizing the KC-10 to Meet Global Air Traffic Management Mandates*, Anthony D. Rosello et al., 2009, www.rand.org/tr/MG901

*Modernizing the Mobility Air Force for Tomorrow’s Air Traffic Management System*, Sean Bednarz et al., 2012, www.rand.org/tr/MG1194

**Making the Reserve Retirement System Similar to the Active System (2014)**

$790 million per year in projected savings

The Arroyo Center analyzed how offering a retirement annuity immediately to vested members of the Army reserve component (RC)—both enlisted personnel and officers—would affect RC participation and Army active component (AC) retention, both in the steady state and during the transition period. Arroyo researchers also estimated the change in personnel costs in the steady state and considered how quickly RC participation and AC retention would change if currently serving RC members were given a choice between the two retirement systems.

Modeling results suggest that offering an immediate retirement annuity would change retention patterns among both the RC and AC forces. Overall, the RC force would decrease in size, become more junior, and leave the Army with less seniority. The policy would have small but discernible effects on AC retention: It would increase in midcareer but decrease near and immediately after retirement vesting. In the steady state, Army personnel costs would fall, largely because the AC force would become more junior, more AC members would separate prior to 20 years of service, and those who do make it to 20 years of service would tend to leave the Army with less seniority. Decreases in RC costs would also contribute to the cost savings.

If AC force size were held constant, and if continuation pay were offered to sustain RC force size, total cost savings for the Army would be $790 million annually in the steady state. Results are expected to be qualitatively similar for all the other services.

**Beddown Alternatives for the F-35 (2013)**

$580 million per year in projected savings, plus $200 million in one-time projected savings

As currently planned, the F-35 Joint Strike Fighter is the most costly aircraft acquisition program in DoD history. One approach to ensuring program affordability could be to increase the number of Primary Aerospace Vehicles Authorized (PAA) per F-35 combat-coded squadron, with a resulting reduction in the number of such squadrons, which could reduce a variety of costs. PAF explored the impact of increasing the PAA per squadron, adjusting the mix of PAA across the active and reserve components, and adjusting the percentage of the active component PAA assigned to home-station locations in the continental United States.

Researchers considered 28 beddown alternatives, with a maximum of 36 PAA per squadron, and determined that all beddowns could satisfy surge deployment requirements and most could also satisfy rotational requirements. Raising the F-35 squadron sizes from 24 to 30 PAA in the active and reserve components while raising the squadron sizes from 18 to 24 PAA in the Air National Guard could save more than $200 million in one-time support equipment requirements, more than $400 million in annual pilot absorption flying costs, more than $180 million in annual maintenance manpower costs, and more than 10 percent in annualized facilities costs. The projected savings would increase if the Air Force were to select a posture with 36 PAA in the active and reserve squadrons and 24 PAA in the Air National Guard squadrons. *Assessment of Beddown Alternatives for the F-35*, Ronald G. McGarvey et al., 2013, [www.rand.org/t/RR124](http://www.rand.org/t/RR124)

**Block Buys of F-35 Joint Strike Fighters (2016)**

$1.6 billion to $2.2 billion in projected savings over three years

In 2015, the United States and partner governments in the F-35 program began considering the use of a three-year block buy contract for procuring the F-35 aircraft in production lots 12–14 (corresponding to fiscal years 2018–2020). The proposal is intended to reduce costs relative to a series of annual contracts for the F-35 program.

As part of its decision on whether to pursue the block buy, the F-35 Joint Program Office (JPO) asked PAF to assess the potential cost savings available to the F-35 program. PAF’s savings estimate, which focused on recurring flyaway costs, was approximately $2.2 billion, or a 4.8-percent savings relative to the combined cost of annual contracting. These savings were computed relative to an annual contracting baseline cost estimate provided by the F-35 JPO. In addition, PAF examined an alternative “hybrid” block buy approach that is under consideration, in which a subset of countries would enter a block buy contract for lots 12–14, with the remaining countries possibly entering the contract for the latter two lots. Under this hybrid approach, the projected savings were reduced to $1.6 billion to $1.9 billion.

The PAF team recommended that the JPO consider, as part of a complete business case analysis, the potential risks associated with block buy contracts as well as the projected cost savings.

**Centralizing Selected Aircraft Maintenance Activities (2010)**

$300 million per year in projected savings

Air Force flying wings include maintenance organizations that are responsible for both mission-generation and significant non-mission-generation maintenance. PAF identified alternatives for reconfiguring aircraft maintenance units to better support evolving steady-state and contingency operations. In particular, PAF suggested consolidating certain non-mission-generation wing-level maintenance at a network of centralized repair facilities (CRFs) to improve effectiveness and efficiency.

PAF estimated that these measures have the potential to save up to $300 million per year for the F-16, KC-135, and C-130 fleets, because the reductions in maintenance manpower greatly exceed the transportation costs and infrastructure investments needed to establish CRF networks. These manpower reductions are achieved from economies of scale: Larger-scale CRF operations are better able to achieve high levels of manpower utilization.

The CRF approach would also improve effectiveness, making an average of more than 30 C-130 aircraft available, due to a decreased flow time for inspection operations. The Air Force’s Repair Network Integration effort is undertaking a phased implementation approach to extend the use of such centralized maintenance concepts to weapon systems that are currently maintained using wing-level repair capabilities.


* Analysis of the Air Force Logistics Enterprise: Evaluation of Global Repair Network Options for Supporting the C-130*, Ben D. Van Roo et al., 2011, [www.rand.org/t/TR813](http://www.rand.org/t/TR813)

Hundreds of millions of dollars per year in projected savings

Operations Iraqi Freedom and Enduring Freedom imposed unique demands on Air Force agile combat support (ACS) forces and put stress on several career fields. PAF was asked to analyze how well the Air Force’s ACS forces are postured to meet emerging requirements and to suggest ways to improve that posture.

The Air Force sizes and shapes many non-maintenance ACS career fields to meet the requirements of home-station installation operations rather than expeditionary operations. This often results in a discrepancy between the supply of ACS forces and operational expeditionary demands. PAF developed new metrics to quantify expeditionary ACS capacity by synthesizing planning scenarios and deployment rules, assessed the capacity of the current ACS manpower mix to support expeditionary operations, and assessed the benefits of alternative ACS manpower mixes in terms of recurring savings (maintaining constant home-station manpower authorizations).

PAF’s analysis revealed that, by rebalancing ACS manpower, the Air Force could both reduce military end strength and increase expeditionary capacity. Although active-duty end-strength reductions would be accompanied by civilian billet increases (to maintain home-station support), each rebalance option with end-strength reductions would realize net cost reductions while increasing expeditionary capacity—up to a point. An ACS rebalance that maximizes expeditionary capacity might afford little reduction in end strength or savings. But a rebalance that includes, for example, a 25-percent reduction in military end strength from that maximum-capacity alternative could still result in a greater than 50-percent increase in expeditionary capacity over the current force—and more than $300 million in annual savings. Further savings could be achieved from further end-strength reductions, if the Air Force is satisfied with its current expeditionary capacity.


Optimizing Army Use of Recruiting Resources (2016)

Hundreds of millions of dollars per year in projected savings

The Army typically spends from $1 billion to $1.4 billion per year on recruiting. Most of this money goes for recruiters, enlistment bonuses, and television advertising. The Arroyo Center showed that if the Army could use the optimal mix of these resources, it could dramatically reduce the cost of recruiting.

However, what constitutes the optimal mix of resources varies from year to year. It depends on a number of factors, including the number of enlistments needed, enlistment eligibility policies, and the economy. In general, recruiting is easier when job opportunities in the civilian economy are poor. Recruiting becomes more difficult as the economy improves, the number of recruits needed increases, or eligibility is tightened.

Over a wide range of conditions, recruiters and advertising are relatively inexpensive in comparison with enlistment bonuses. However, increased use of recruiters or advertising requires sufficient lead time. Therefore, for the optimal mix to be fully achievable, the Army must be proactive in its planning and reasonably accurate in its planning assumptions about recruiting goals and economic conditions.

The Arroyo Center developed a model to help Army planners identify the optimal mix of resources and enlistment eligibility policies for different scenarios. By using the Arroyo Center model, which is being developed into an interactive tool, the Army could reduce its recruiting expenditures by hundreds of million of dollars per year, depending on economic conditions, recruiting goals, and timing.

Recruiting Strategies to Support the Army’s All-Volunteer Force, Bruce R. Orvis et al., 2016, www.rand.org/t/RR1211

A More Cost-Effective Option for Replacing UH-1N Helicopters (2014)

$1 billion in projected acquisition cost avoidance

The Air Force operates a fleet of 62 UH-1N helicopters for security in intercontinental ballistic missile fields, emergency reaction airlift, and other missions. These aircraft cannot meet their mission requirements, and the Air Force has been planning since 2006 to replace them with a more capable helicopter, called the Common Vertical Lift Support Platform (CVLSP). Through the CVLSP program, the Air Force planned to procure helicopters with a flyaway cost of $28 million apiece. Funding for the CVLSP program was canceled in 2012 because, at that price and with expected future budgets, the helicopter was judged to be unaffordable.

In September 2013, the Air Force Global Strike Command requested that PAF carry out a business case analysis of potential replacement options for the UH-1N. The PAF analysis found that the CVLSP helicopter was larger and more expensive than required and that the relevant mission requirements would be most cost-effectively met by helicopters with a flyaway cost in the range of $15 million; the analysis identified several cost-effective
Reducing Procurement and Sustainment Costs of JSF Training Aircraft (2016)

$550 million to $800 million in projected savings

The F-35 Joint Strike Fighter (JSF) is expensive to acquire and sustain. Because a large number of the aircraft will be used for initial qualification training (IQT) of pilots, the JSF Joint Program Office asked an NDRI team to examine the potential for cost savings on the training aircraft. The team found two areas of potential savings: reducing alternate mission equipment (AME) and managing stealth characteristics.

AME refers to military equipment—for example, weapon-carrying pylons—that can be added to or removed from a weapon system depending on mission needs. Evaluation of the training syllabus and discussions with training subject-matter experts found that not all of the F-35’s ordnance stations are used for IQT. NDRI analysts focused on the procurement of the F-35A, which is the F-35 variant for the U.S. Air Force, because the Air Force is buying the most training aircraft and does not normally rotate its training aircraft through operational squadrons. The Air Force could save money by limiting the AME procurement for training squadrons to only what is required by the IQT syllabus. The range of potential life-cycle cost savings from reducing AME procurement and storage for the F-35A is almost $500 million.

As for managing the stealth characteristics, the F-35A’s radar cross-section (RCS) is generally not measured during training sorties. Moreover, the effect on the RCS of defects in maintaining the aircraft’s low-observable (LO) signature is not displayed to the pilot in training, and other factors further limit the utility of LO maintenance in training squadrons. Therefore, the potential may exist to defer or remove some or all of the LO maintenance tasks for training aircraft, thereby reducing the manpower, parts, and supplies required for maintaining the aircraft’s LO signature. As the F-35 is still in development, the alternative LO management approach must be carefully monitored, particularly to evaluate the LO degradation that may occur with the aircraft flying in its full operational envelope. Nonetheless, a conservative estimate of the potential life-cycle savings from reduced LO maintenance, based on manpower savings alone, ranges between $62 million (a 5-percent manpower reduction) and $308 million (a 25-percent manpower reduction).

Overall, the total potential savings from these two strategies ranges from about $550 million to $800 million.


Upward of $80 million per year in projected savings

The U.S. Air Force spends roughly $3 billion per year on aircraft engine maintenance. The Navy also spends hundreds of millions of dollars on aircraft engine maintenance each year. NDRI analyzed the extent to which DoD might decrease its operating and support costs, without loss of safety or reliability, through an increased use of Parts Manufacturer Approval (PMA) parts and Designated Engineering Representative (DER) repairs on military engines that share many of the same parts used on commercial jet engines. PMA parts and DER repairs are provided by third-party companies and certified by the Federal Aviation Administration.

The NDRI team focused on two case study engines: the CF6-50C2 (or F103) and the CFM56-2. The CF6-50C2 (or F103) is used on the Air Force KC-10. The CFM56-2 powers the Navy E-6B and Air Force KC-135 and RC-135; the CFM56-2A is used on the Navy E-6B, and the CFM56-2B (or F108) is used on the Air Force KC-135 and RC-135.

The NDRI team found the most compelling evidence of potential cost savings to be on the Air Force F103 engine used on the KC-10. The analysis of F103 overhaul costs when using PMA parts and DER repairs found savings per overhaul of roughly 20 to 25 percent on average, or over $1 million per overhaul, totaling over $200 million from FY 2010 to FY 2013 (in FY 2014 dollars), or an average of $50 million per year. The NDRI team also found that purchases of commercial, used, and refurbished parts for six F108 National Stock Numbers (NSNs) in FY 2012 and FY 2013 resulted in an average savings of 61 percent on those items, or over $64 million (in FY 2014 dollars) over the two-year period. With over half of Air Force spending on engine maintenance being paid for commercial-derivative engines, NDRI estimated that if DoD made greater use of commercial refurbished parts or of PMA parts and DER repairs for its commercial-derivative military engines, it could save upward of $80 million each year.

Applying Best Practices to Military Commercial-Derivative Aircraft Engine Sustainment: Assessment of Using Parts Manufacturer Approval (PMA) Parts and Designated Engineering Representative (DER) Repairs, Mary E. Chenoweth et al., 2016, www.rand.org/t/RR1020z1
Fuel Reduction for the Mobility Air Forces (2015)
$60 million per year in projected savings

Reducing aviation fuel use is an ongoing goal for military and civil operators, and the Air Mobility Command is feeling increasing pressure to further reduce fuel use by implementing and following known best practices. Although the Air Force has achieved significant fuel reductions in recent years, it must continue to pursue cost-effective options to reduce fuel use. A PAF team considered 16 options for reducing fuel use and determined that 12 of these were cost-effective. However, about half of these had some negative implications. At 2015 fuel prices, six options were both cost-effective and could be reasonably implemented: engine-out taxiing, always flying at optimum altitudes and speeds, continuing to reduce aircraft weight, reducing the use of aircraft auxiliary power units (APUs) by using ground equipment instead, ensuring that loads are properly balanced, and installing microvanes on the C-130 fleet. Implementing all six options could save $60 million per year in fuel costs at 2015 fuel prices.

$36 million per year in projected cost avoidance over the life of four airframes

The ongoing modernization of the National Airspace System (NAS) aims to increase NAS capacity, reduce flight delays, improve aviation safety, and minimize fuel use and emissions. A key component of the transition to the Next Generation Air Transportation System within the United States is Automatic Dependent Surveillance–Broadcast (ADS-B) Out, a surveillance technology that allows for more-precise tracking of aircraft by air traffic controllers. Avionics upgrades are necessary for Air Force trainer and fighter fleets to meet ADS-B Out equipage requirements and continue operating beyond 2020 within much of the NAS as they do today. Failure to modernize would lead to increased fuel use and flying hours, resulting in higher operations and support (O&S) costs.

PAF assessed the cost-effectiveness of existing modernization plans for six aircraft types: the T-1A, T-6A, T-38C, F-15C/D/E, F-16C/D, and F-22. PAF found modernization to be cost-effective for two of the trainers—the T-1A and T-38C—with payback periods of approximately two and eight years, respectively. In the case of the fighters, however, the modernization plans at the time of the analysis were preliminary, consisting of low-cost, software-only upgrades that would not alter the external characteristics of the aircraft.

The analysis showed that modernization for the T-1A would cost $33 million but yield an annual cost avoidance of $11 million; for the T-38C, the cost would be $21 million, with an annual benefit of $7 million; for the F-16C/D, a cost of $36 million and an annual benefit of $16 million; and for the F-22, an upfront cost of $15 million, with an ongoing annual benefit of $2 million. In sum, total upfront modernization costs of $105 million for four airframes would avoid ongoing O&S costs of $36 million per year.

Consolidating Maintenance Career Fields (2016)
$30 million per year in projected savings without reducing readiness

PAF analyzed the potential consolidation of Air Force maintenance specialties for the KC-135 fleet. Such a consolidation would entail additional costs, because the maintainers would need to be trained across a broader range of skill sets. But it would also yield benefits, because each maintainer would be able to carry out a wider range of maintenance tasks, reducing the number of maintainers needed to ensure that all tasks could be done in a timely fashion. The analysis found that such consolidation for the active-duty KC-135 fleet at three main operating bases, at which 90 KC-135s are based, could save $30 million per year without reducing readiness. Alternatively, $20 million could be saved per year while increasing sortie generation capacity by 7 to 10 percent. PAF expects that similar savings opportunities could exist for the new KC-46 tanker, though not enough data on its maintenance requirements were available in time for the analysis.

Consolidating Air Force Maintenance Occupational Specialties, Thomas Light et al., 2016, www.rand.org/t/RR1307
Evaluation of F-35C Fleet Replacement Squadron Fighter-Support Aircraft Options (2014)

$20 million to $52 million in projected cost avoidance

The Navy and Marine Corps are in the process of fielding the F-35C Joint Strike Fighter aircraft, an advanced fighter with low-observable characteristics. The F-35C poses some challenges in the area of “adversary” fighter-support aircraft that are needed for training. The F-35C is considered to be an option for the adversary role, which could increase the number of F-35C flight hours, aircraft required, and wear and tear on the aircraft, thus depleting its useful service life. Moreover, the F-35C is an expensive aircraft to operate. The research objective was geared to examine the demand for support aircraft, the potential for alternative aircraft to support training, the costs of alternative aircraft, and the potential cost avoidance that could be achieved by using aircraft other than an F-35 in the adversary role. NDRI analysts concluded that alternative aircraft options do exist (with some tradeoffs), and cost avoidance could be achieved through their use. In the aggregate, the use of aircraft other than the F-35C as adversary fighters could result in cost avoidance ranging from $20 million to $52 million (over the time period of FY 2013 to FY 2028), depending on the airframe used.

Changes to Technical Training for Enlisted Personnel (2010)

$7 million per year in projected savings

PAF investigated training for nine Air Force Specialty Codes (AFSCs) with significantly high attrition and washback rates. High attrition and washback rates drive higher costs by increasing needed schoolhouse capacity, since additional seats are needed for students who will not complete the course and for students who need to retake training blocks. The investigation led to recommendations for changes in each AFSC and for changes that cut across all AFSCs.

One example of a cross-cutting recommendation is the proposed modification of a program that places boot-camp-like restrictions on students in technical training. The program demotivates the high-aptitude individuals who meet the more stringent entry prerequisites for the longer, more demanding courses. The findings also highlighted areas in which recruiting can continue to improve on providing specialty information to recruits, especially helping them to understand the physical challenges of the pararescue, combat-controller, and explosive-ordinance-disposal (EOD) training codes. Furthermore, the study recommended the use of non-cognitive screening tools for EOD and selected battlefield airmen occupations. These and other changes PAF recommended could save the Air Force $7 million per year by reducing attrition and washback in technical training courses.

Validating the Combat Air Forces Restructure Plan (2010)

$3.6 billion in cost avoidance validated

At the request of Congress, PAF assessed how an Air Force–proposed restructuring of combat air forces would affect force structure, capabilities, spending, and manpower. The plan was to accelerate the retirement of 257 aging fighter aircraft to realize savings in operations and maintenance, aircraft modifications, and manpower so as to free funds that could then be applied to critical Air Force needs. Congressional approval for the Air Force to proceed with its proposed divestiture was contingent on an independent assessment of the policy action by an FFRDC.

PAF analysis found that retiring the older aircraft would not significantly add to operational or inventory risks and that Air Force estimates of projected cost avoidances appeared plausible. Although the early retirement of 257 fourth-generation fighter aircraft would not significantly add to risks, the Air Force would face an extended period of operational, acquisition, and sustainment risks with or without the restructuring. PAF’s confirmation of the validity of the restructuring plan answered the congressional requirement for an independent assessment and allowed the Air Force to proceed with the plan, which was estimated to yield a cost avoidance of approximately $3.6 billion through FY 2015. Building on this plan, the Air Force is achieving additional savings by making further reductions and consolidations of fighter force structure.

Increasing Reserve Component Force Management Flexibility at Lower Cost (2012)

Estimated $200 million to $300 million per year in savings validated

Because reserve component (RC) members are increasingly used in an operational capacity, the 11th Quadrennial Review of Military Compensation (QRMC) proposed paying reservists daily basic pay and allowances in the same way as active component (AC) members, regardless of type of duty. To analyze the new
compensation policy, NDRI used a stochastic dynamic programming model to simulate the effects of 11 variants of the proposal on AC retention, RC participation, and cost relative to the current approach. The new QRMC approach changes daily compensation, points earned toward retirement, when retirement may be taken, and supplemental pay. NDRI found that the new approach can meet RC force requirements, even without a decrease in retirement age, but that supplemental pay is critical to ensuring this. Another advantage of the proposed compensation policy is that it offers the opportunity for enhanced force management flexibility as force requirements and economic conditions change. NDRI found that the new approach—with supplemental pay set to hold RC prior force size constant—is less costly than the baseline by $200 million to $300 million annually.

Cash Incentives and Military Enlistment, Attrition, and Reenlistment, Beth J. Asch et al., 2010, www.rand.org/t/MG950

Reorganizing the Air Force Materiel Command (2012)
$100 million per year in savings validated

Spending cuts imposed by the Budget Control Act of 2011 resulted in the need to significantly reduce civilian authorizations at the Air Force Materiel Command (AFMC). The command’s leadership responded with a major reorganization to reduce staff functions while implementing the Office of the Secretary of Defense’s product support business model, which keeps cradle-to-grave weapon system program management under the Service Acquisition Executive. Several members of Congress had concerns about how the reorganization might affect weapon system sustainment and, through the National Defense Authorization Act for 2012, directed the Secretary of the Air Force to have an FFRDC review the proposed reorganization.

In January 2012, PAF was tasked to conduct this review, which included an analysis of proposed manpower savings and an assessment of the impact on weapon system life-cycle management and support to the warfighter. PAF verified manpower savings of approximately $100 million per year resulting from the reorganization and recommended some additional process enhancements. AFMC has implemented some of the recommendations, which have the potential to enhance support to warfighters and further improve efficiencies. In particular, the House Armed Services Committee noted that AFMC was implementing a PAF recommendation to develop and use a suite of metrics to track mission performance against goals and thus facilitate root-cause analysis of any inefficiencies resulting from the reorganization.


Multiyear Contracting for F-22 and F119 Sustainment (2011)
Estimated $340 million to $450 million in savings validated

The Air Force asked PAF to evaluate savings from multiyear sustainment contracts proposed by Lockheed Martin for the F-22 air vehicle and by Pratt & Whitney for the F119 engine. For the F-22 air vehicle, about two-thirds of the sustainment work could be awarded in multiyear contracts. For these sustainment costs, PAF assessed potential multiyear savings of $340 million to $450 million, or 10 to 13 percent of the costs. The key to these savings is that a multiyear contract would motivate the contractor to make investments that would ultimately reduce costs over the life of the contract.

For the F119, savings possibilities were limited by uncertainty in the scope and timing of major engine overhauls due to occur between 2013 and 2017. Furthermore, PAF found only about $10 million in savings, or 1 percent of engine sustainment costs, likely to result from work that could be awarded in multiyear contracts. As a result, PAF recommended that the Air Force consider a multiyear contract with Lockheed Martin for F-22 air vehicle sustainment work but that it wait to do so with Pratt & Whitney until the uncertainty in the timing and cost of F119 engine overhauls is reduced.

The Air Force did not subsequently request proposals for multiyear sustainment contracts for the F-22, but the program office planned to reevaluate its approach in future years. If the Air Force decides to continue contractor logistics support for the F-22, it would make sense to reconsider multiyear contracting for the next sustainment contracts beginning in 2018. By then, the uncertainty over F119 major engine overhauls will be reduced, and it should be possible to evaluate prospective savings on a multiyear engine sustainment contract as well.
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