Skip all front matter: Jump to Page 1

This product is part of the RAND Corporation monograph series. RAND monographs present major research findings that address the challenges facing the public and private sectors. All RAND monographs undergo rigorous peer review to ensure high standards for research quality and objectivity.

Mark V. Arena, Irv Blickstein, Abby Doll, Jeffrey A. Drezner, James G. Kallimani,
Jennifer Kavanagh, Daniel F. McCaffrey, Megan McKernan, Charles Nemfakos,
Rena Rudavsky, Jerry M. Sollinger, Daniel Tremblay, Carolyn Wong

MANAGEMENT PERSPECTIVES PERTAINING TO ROOT CAUSE ANALYSES OF NUNN-MCCURDY BREACHES

VOLUME 4

Program Manager Tenure,
Oversight of Acquisition
Category II Programs, and
Framing Assumptions

Prepared for the Office of the Secretary of Defense

Approved for public release; distribution unlimited

RAND NATIONAL DEFENSE RESEARCH INSTITUTE

The research described in this report was prepared for the Office of the Secretary of Defense (OSD). The research was conducted within the RAND National Defense Research Institute, a federally funded research and development center sponsored by OSD, the Joint Staff, the Unified Combatant Commands, the Navy, the Marine Corps, the defense agencies, and the defense Intelligence Community under Contract W91WAW-12-C-0030.

Library of Congress Cataloging-in-Publication Data is available for this publication.

ISBN: 978-0-8330-8205-3

RAND OFFICES

SANTA MONICA, CA • WASHINGTON, DC

PITTSBURGH, PA • NEW ORLEANS, LA • JACKSON, MS • BOSTON, MA

DOHA, QA • CAMBRIDGE, UK • BRUSSELS, BE

www.rand.org

Summary

In light of continuing program cost growth and observations by the U.S. Government Accountability Office (GAO) placing defense acquisition on the high-risk target list, Congress has become particularly concerned about the execution of major defense acquisition programs. This concern, coupled with the reality of shrinking defense budgets, led Congress to enact statutory provisions that would focus greater policymaker attention on the oversight of major defense acquisition programs (MDAPs) and other large, costly programs.[2] For example, the Weapon Systems Acquisition Reform Act of 2009 (WSARA) established a number of requirements affecting the operation of the Defense Acquisition System and the duties of the key officials who support it, including the requirement to establish a new organization in the Office of the Secretary of Defense (OSD) with the mandate to conduct and oversee performance assessments and root cause analyses for MDAPs.[3]

In March 2010, the director of the Office of Performance Assessments and Root Cause Analysis (PARCA) determined that he required support to execute his statutory responsibilities and turned to federally funded research and development centers and academia to help with the research and analysis of program execution status. RAND was among the institutions engaged to carry out root cause analyses, which it has completed for six programs to date.[4]

In addition to the root cause analysis of Nunn-McCurdy breaches in specific acquisition programs, the PARCA director posed some additional questions to RAND to determine whether they affect the management of such programs or might provide a useful perspective in managing them. One pertained to program manager (PM) tenure, which was not a featured cause in the analyses RAND had previously performed. However, PARCA asked RAND to calculate current PM tenure using easily available sources, in part to determine whether tenure periods have increased since policy guidance designed to lengthen tenure was published in 2005 and 2007. A second question posed was whether existing decentralized systems used to track the cost growth and

[2] Public Law 111-383, Ike Skelton Defense Authorization Act for Fiscal Year 2011, December 20, 2010.

[3] Public Law 111-23, Weapon Systems Acquisition Reform Act of 2009, May 22, 2009.

[4] Blickstein et al., 2011, 2012.

performance of acquisition category (ACAT) II programs are sufficient, or whether additional centralized guidance and control from OSD are warranted. Additional oversight may provide transparency of ACAT II performance and contribute to more efficient acquisition processes. However, new reporting and control requirements will place additional burden on the defense agencies and military departments as well as on the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (OUSD (AT&L) and the PARCA office, which is given the authority to issue guidance on ACAT II programs by WSARA and will bear responsibility for any additional oversight. The third question dealt with the management of cost and schedule risk and whether the identification of key assumptions, which we call framing assumptions, could be a useful risk management tool.

Program Manager Tenure

Program manager tenure is frequently mentioned in regard to improving acquisition outcomes and accountability. Policies have attempted to enforce longer program manager tenure over the past few decades, because it has been found in at least one study that longer program tenure is one of the building blocks for program success typically leading to lower cost growth.[5] GAO reported in 2007 that PM tenure was 17.2 months in the programs it reviewed.

PARCA asked RAND to calculate current PM tenure using easily available sources to provide an understanding of the length of PM tenure. Part of the motivation behind this request was to see if tenure periods have been increasing since policy guidance designed to lengthen tenure was published in 2005 and 2007.

Results

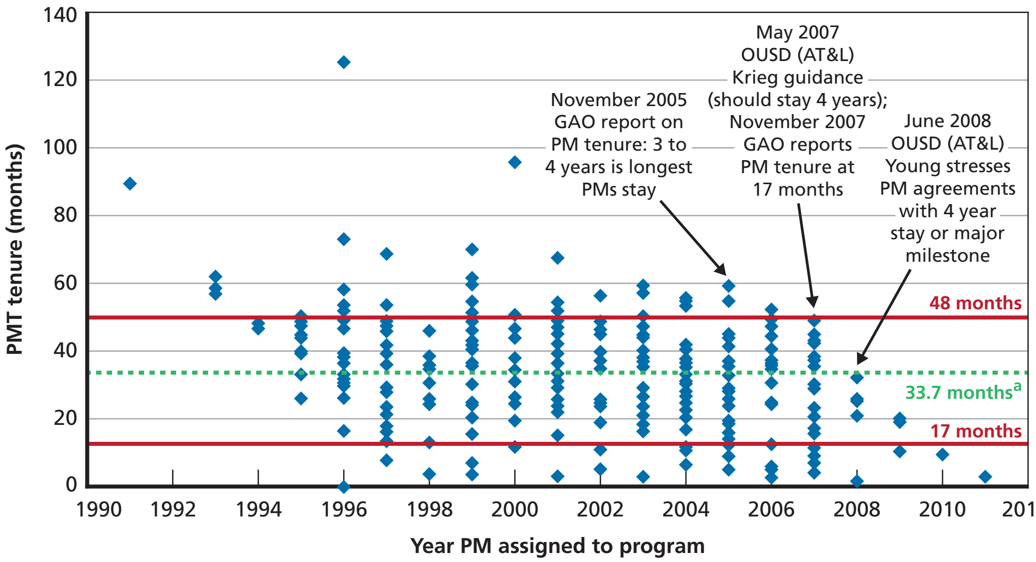
To quantify PM tenure using current data, we extracted program point-of-contact data from Selected Acquisition Reports (SARs) from calendar years 1997 through 2011. Our final database, excluding incomplete tenure periods, contained 370 program manager tenure periods from 136 programs submitting SARs from 1997 to 2011 (both annual and quarterly).

Using the largest available dataset of program manager tenure periods that had been completed, we calculated that the average tenure for those program manager periods was 33.7 months, which aligns more closely to the GAO statement in 2005 regarding PM tenure (no more than three to four years) rather than the November 2007 statement of 17.2 months. The results of this set of data are presented in Figure S.1. We also calculated tenure by eliminating several outliers in terms of tenure length, and we

---

[5] 1st Lt Christina F. Rusnock, *Predicting Cost and Schedule Growth for Military and Civil Space Systems,* thesis, Wright-Patterson Air Force Base, Ohio: Air Force Institute of Technology, AFIT/GRD/ENC/08M-01, March 2008, p. 99.

Figure S.1
Average Number of Months PM Is Assigned to Program (full dataset)



[a]RAND calculated average of 370 program manager terms using 1997 to 2011 SAR data.
SOURCE: SARs (1997–2011).
RAND *MG1171/4-S.1*

included only tenure periods that started between 1997 and 2008. The result was an average of 33.2 months, only slightly lower than the average from the larger dataset.

This initial data analysis did not help us answer the question regarding PM tenure periods after the 2005 and 2007 PM tenure policies, however, because there were too many tenure periods that had not been completed after 2008. We therefore also conducted a statistical analysis that includes open tenure periods. One challenge in introducing open tenure periods to this analysis is that these periods cause bias in the average, because the program managers have not finished their tenure in a particular program, which makes the overall average shorter than if they had. We applied a statistical approach that calculates probable tenures for open periods. (See the discussion in Chapter Two for details).

Given this statistical treatment, the data provide some support that program managers remained in positions longer after the release of the revised guidelines in 2007. However, because of the small numbers of positions and the large number of open positions among those beginning in 2006 or later, the differences among groups are not statistically significant, and the observed differences could be chance occurrences rather than real difference among the groups of positions.

Additional years of data for these positions and new positions starting in 2011 or later could help to establish if the differences among groups demonstrate persistent changes to practice after the release of the revised guidelines. But even if the differences proved to be persistent, they might not have been caused by the revised guidelines. We would need to rule out other potential sources of change before we could make that attribution. However, analysis of additional data would be a valuable first step to exploring fully the effects of the 2007 guideline change.

Observations

Our research leads us to the following observations:

The intent of policies to lengthen PM tenure may not have been achieved. PM tenure has been reviewed/quantified periodically during the last 40 years. It is difficult to assess whether these policies have been successful based on previous data and studies and current data.

No enforcement mechanism has been readily apparent over time. This could be because enforcement is limited because of the fundamental conflict that exists between what military officers need to do to be promoted and their tenure as program managers. Unless these two are aligned such that lengthy tenure in a program can be advantageous for promotion, then it appears unlikely that these tenure policies will consistently yield positive results.

We cannot determine whether the policies of 2005 and 2007 have helped to lengthen PM tenure. A statistical analysis using open/closed tenure periods indicated that the estimate of the mean time in position for tenure periods starting after 2007 is biased, because of the large number of tenure periods that remain open at the last data collection. This creates an average that is lower than if all PM tenure periods in a sample have both a beginning and an ending. Using these same data, we found that PMs are less likely to stay as long in their tenure periods, meaning that 75–85 percent will likely reach two years, but only 50 percent will likely reach three years. PMs that started in tenure periods after the policy change are much more likely to remain in those periods longer than PMs starting in periods between 2005 and 2007.

We also found that adjusting for a variety of data issues (outliers, open periods, etc.) will give us more confidence in the data but will only minimally change the result of PM tenure during the last 14 years for MDAPs.

By taking into account closed program manager tenure periods, we found that PM tenure is on average 33 months. This result is much higher than GAO's 2007 figure of 17.2 months for 39 programs but includes a larger sample size covering more years and does not include any open periods.

In conclusion, this analysis has been able to quantify PM tenure using current data but cannot definitely say whether recent policies regarding PM tenure have had any positive effect toward lengthening tenure over the last several years, because there are still too many open tenure periods during that time period.

Performance of ACAT II Programs

Because additional reporting and control requirements come with costs, the decision to mandate additional guidelines for ACAT II programs may be warranted only if there are problems with the existing system that result in cost growth and schedule slippage and that can be dealt with by more centralized oversight. To determine if such performance issues do plague current ACAT II programs, we conducted two sets of analyses, one on a sample of ACAT II programs and one on a comparable set of MDAPs. Both sets include programs from across military departments and procurement program categories (e.g., aircraft, weapons, shipbuilding and conversion). We evaluate program performance focusing specifically on unit cost growth over the program's life and instability in annual quantity procured over time. Then, we compared the overall performance of the ACAT II and MDAP samples. This comparison leads to some general inferences about the performance of ACAT II programs under the current system of oversight, their performance relative to MDAPs, which are subject to more centralized monitoring and requirements, and the need for additional centralized reporting and control requirements.

For our analysis, we rely on budget information provided by the military departments and included in the President's official budget justifications as well as congressional hearings and testimony to construct program narratives. The information includes summary information on cost and quantity for the past, current, and requested fiscal year. We used the information to select ten ACAT II programs and seven MDAP programs, covering all procurement program categories across all three military departments. We used the information to construct time series datasets of unit cost and annual quantity procured for each program in our sample by collecting and integrating annual data on cost and quantity provided in these budget documents.

Using the time series data on program cost and quantity, we graphed annualized unit cost against annualized quantity. We assessed these graphs looking at large revisions and sharp fluctuations in quantity and cost as well as slow growth over time. To explain cost growth or periods of apparently weak performance, we matched the narrative information on each program to the unit cost graphs.

Results

Although our sample size and composition prevent a meaningful statistical comparison of cost growth, our qualitative assessment of program performance should have some general application to acquisition programs. Furthermore, our intention was to conduct broad assessment of the performance of the two program types to determine whether ACAT II programs appear to perform, on average, better or worse than MDAPs, rather than to provide precise metrics on this performance or precise quantification unit cost growth over time. We find that, overall, both ACAT II and MDAP programs perform reasonably well once they have entered production. In both cases, programs experience some cost growth and some instability in unit cost and annual quantity procured over the period considered. However, in neither case do we observe crippling instability, runaway cost growth, or severe production delays. Of the ACAT II programs we consider, we find that four show no reason for concern, five have some issues of minor concern, and three warrant some more significant concerns. Across the board, ACAT II programs in our sample are more significantly affected by instability in unit cost than by actual cost growth. Instability is particularly likely early in the lives of new ACAT II programs, associated with development and modernizations. There also seems to be a clear relationship between unit cost and quantity. Much of the cost growth that we do observe occurs as a result of downward revisions in procurement quantities, perhaps stemming from changes in demand associated with the contingencies in Iraq and Afghanistan.

Programs in the MDAP sample can similarly be distributed across the three performance categories: no serious concerns, minor concerns, and some concerns. Our assessment places three programs in the first category, three in the second, and only one in the third. As was true for ACAT II programs, several MDAP programs show some cost growth over their program life (including projected out-years), and some have experienced periods of instability associated with modernizations and fluctuations in demand. However, several also show a decrease in average unit cost over the period considered.

Our assessment suggests that ACAT IIs reach a level of performance currently, without rigorous centralized oversight, that is at least equal to that of MDAPs operating with centralized reporting and control requirements and oversight.

Framing Assumptions

Defense acquisition programs routinely must estimate cost, schedule, and technological performance far in advance of actual work. And they must account for differences in acquisition strategy and market conditions. As a result, programs must make assumptions about their programs and the conditions that might affect them. When these assumptions prove faulty, they can cause the program to miss important cost and schedule benchmarks, which can lead to breaches of Nunn-McCurdy thresholds. Key assumptions are called "framing" because of the influence they have on program performance. This exploratory research was done in an attempt to define framing assumptions in a way that others can use them to assess and, potentially, control program risk and to explore the possibility of identifying them for a selected set of programs.

Results

We arrived at the following definition for a framing assumption:

A framing assumption is any explicit or implicit assumption that is central in shaping cost, schedule, and/or performance expectations.

A framing assumption has the following five characteristics. First, the consequences of the assumption being wrong will significantly affect the program in a way that matters (e.g., significant cost growth or schedule slippage). In other words, the assumption is important to the success of the program. Second, the consequences of the assumption being wrong cannot be avoided. Third, the outcome or certainty with respect to the assumption is unknown (there is some risk). Fourth, the consequences of the assumption failing or holding true do not hinge on other events or chain of events. Finally, a framing assumption should typically distinguish a program from all other programs. An example of a framing assumption might be that "competitive prototyping will save 5 percent of the procurement cost." This would be opposed to an assumption that held, "the contractor will perform well," which would be common to all programs.

Researchers then examined five defense programs in various stages of maturity:

- Advanced Pilot Training (APT) System
- Joint Light Tactical Vehicle
- Joint Precision Approach and Landing System
- Littoral Combat Ship Modules
- Space Fence.

For each program, we attempted to identify framing assumptions in three categories: technological, management incentives and program structures, and mission requirements. The results appear in Table S.1.

A similar exercise using the seven programs on which RAND conducted a root cause analysis yielded similar results, i.e., researchers were able to apply the definition to the programs and identify framing assumptions. Note, however, that identifying framing assumptions is typically much easier after the fact, and the reason for the root cause analyses was that the programs had already breached the Nunn-McCurdy thresholds.

The important finding of this research is that it is possible to define framing assumptions and apply them to programs that are in their early stages, which is when program managers would want to do this to help them manage program risk. The efficacy of using framing assumptions to manage risk remains to be seen. However, this research suggests some common characteristics for such assumptions. One is that the assumption needs to focus at a high level and not on the fine-grained detail of the program. Additionally, framing assumptions should be relatively few in number; about three to five seems right. Clearly, more assumptions could be identified, but the focus must fall on the ones that can truly affect the program's outcomes. Assumptions need

Table S.1
Framing Assumptions Identified for Five Acquisition Programs

Program	Technological	Management Incentives and Program Structures	Mission Requirements
APT System	Training aircraft (both airframe and avionics) will be nondevelopmental.	Potential customers will want to buy the APT with minimal modifications.	Current training scenario is valid: Use of existing T-38 can be extended until 2020. Simulators can be used instead of actual flight time (to save money).
Joint Light Tactical Vehicle	Incremental/open architecture will reduce risk and allow for more efficient upgrades. Competitive prototyping will reduce risk and cost.	A Joint Army and Marine Corps program will save money as requirements are compatible.	The services have effectively assessed long-term and short-term needs.
Joint Precision Approach and Landing System	Incremental development will lower risk, while COTS/GOTS hardware and software will lower costs.	Navy is the best service to lead acquisition with the ordering of the increments driven by the Navy's more demanding requirements.	System is suitable for all types of air vehicles.
Littoral Combat Ship Modules	Sea frames and modules can be independently developed: Spiral/incremental development will lower risk. Can successfully test modules on other ship platforms. New capabilities can be added easily.	New, open business model approach allows for independent development of sea frames and modules: Leveraging PARMs and other programs. Benefits of open architecture/commercial practices. Government suited to act as system integrator. RDA can be program focal point (4 PMs, 3 PEOs, 2 SYSCOMs).	The Navy is willing to drop requirements (in spiral context) to keep to schedule.
Space Fence	Capability is achievable despite some immature technologies at the outset. Can scale technology to track order of magnitude greater number of objects (radar components, software interoperability). Competitive prototyping reduces risk and cost.	Block approach is a more effective acquisition strategy. The legal, diplomatic, and political issues with site decisions can be resolved easily.	Minimal manpower required to operate and support system. Two instead of three sites will be sufficient to meet operational goals.

to be revisited as the program moves through the acquisition process, because they can change or even be supplanted by other assumptions. Implicit assumptions are more difficult to identify than the explicit ones.

As mentioned, the utility of framing assumptions as a risk management technique remains to be demonstrated. A useful extension of this research would be to examine the assumptions of a broader range of programs to identify those that might be problematic.