

## Key Issues Causing Program Delays in Defense Acquisition

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I recently released a memorandum with the Under Secretary of Defense for Acquisition, Technology and Logistics (USD[AT&L]) summarizing two independent assessments of the key issues causing program delays. The USD(AT&L) had chartered a team to assess concerns from the acquisition community suggesting that testing drives undue requirements, excessive cost, and added schedule into programs. Concurrently, I conducted a systematic review of recent programs to address the questions of whether testing delays programs, what other causes create program delays, what is the duration of the delays, and what is the marginal cost of operational test and evaluation. The results of both studies indicated that testing and test requirements do not cause major program delays or drive undue costs. Our Joint memorandum addressed other problems that were identified in the two studies.

The USD(AT&L) study, based on interviews with senior leaders within the Office of the Secretary of Defense (OSD) and Service leaders with responsibility for program management and oversight, developmental testing, and operational testing, found no significant evidence that the testing community typically drives unplanned requirements, cost, or schedule into programs. The study team found that tensions are often evident between programs and the test community and that for the most part these are normal and healthy; however, the study identified four potential improvements to these relationships and interactions:

1. stronger mechanisms for a more rapid adaptation to emerging facts,
2. a requirements process that produces well-defined and testable requirements,
3. alignment of acquisition and test strategies (i.e., programs lack the budgetary and contract flexibility necessary to accommodate discovery), and

4. open communications between programs and testers, early and often, with constructive involvement of senior leaders.

At the time of writing, we are working with USD(AT&L) to implement changes to the Department of Defense (DoD) acquisition policy (DoD 2008), which we expect will help realize some of the potential improvements listed above.

### Causes of program delays

My review examined 67 major programs that experienced significant delays and/or a Nunn McCurdy breach. (The study is available at <http://www.dote.osd.mil/pub/presentations.html>.) Thirty-six of the 67 programs experienced a Nunn McCurdy breach, and six programs were ultimately canceled. Two of the 36 Nunn McCurdy programs experienced no delays to their schedule. We characterized the programs as exhibiting any of five categories of problems that caused delays:

1. manufacturing and development (to include quality control, software development, and integration issues),
2. programmatic (scheduling or funding problems),
3. performance in Developmental Testing (DT),
4. performance in Operational Testing (OT), and
5. conducting the test (such as range availability, test instrumentation problems, and test execution problems).

Of the 67 programs, we found that 56 programs (84 percent) had performance problems in testing (DT, OT, or both) while only eight programs (12 percent) had issues conducting the tests that led to delays. Only one program had delays solely attributed to the test. (The U.S. Army's Force XXI Battle Command Brigade and Below [FBCB2] operational test was delayed for 1 year because the test unit was deployed.)

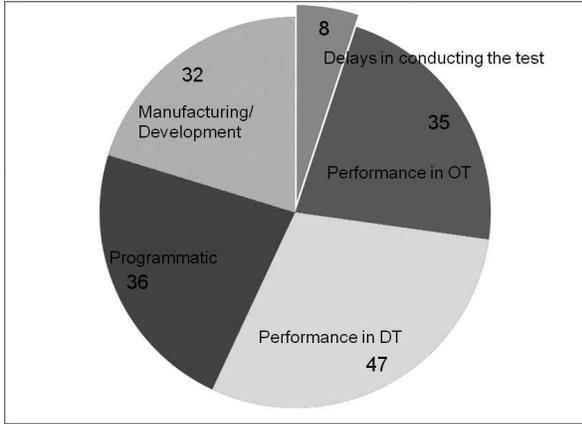


Figure 1. Reasons behind program delays: Programs are more likely to be delayed because of the results of testing vice the testing itself.

Figure 1 shows the distribution of delay cause categories for the 67 programs. There were 158 instances of issues that caused delays for the 67 programs. Many of the programs had multiple problems that fell into more than one of the five categories of reason for delays. There were eight test conduct problems and 82 program performance problems discovered during test—an order of magnitude difference. Clearly, programs are most often delayed because of the results of testing, not the testing itself.

**Length of delays**

The length of delays for the programs examined varied from none (for two of the Nunn McCurdy programs) to 15 years. Thirty-seven programs were delayed by more than 3 years. The delays were measured against the most recent previously published schedule, so in a sense the total delays could be even longer relative to the original planned schedule. Six of the programs were eventually canceled, and one had the Milestone B rescinded.

**Cost of OT**

Both the USD(AT&L) and the Office of the Director, Operational Test and Evaluation (DOT&E) studies noted that the marginal cost of testing is a small portion of the overall program budget; however, the cost can be a large percentage of the budget in the year(s) in which it occurs. Because the testing occurs at the end of the development process, programs typically have few degrees of freedom (and resources) left to work issues.

We evaluated marginal cost to programs of Operational Test and Evaluation (OT&E) as a percentage of total acquisition cost. A review of 78 recent test programs in the U.S. Army, Air Force, and Navy showed that the average marginal cost of OT&E is 0.65 percent of the total acquisition cost. It also appears that some programs truly have negligible OT&E costs relative to program acquisition costs (OT&E <0.1 percent) and that most program OT&E costs are less than one percent. Few programs that we reviewed (seven out of 78) required more than 1.5 percent of program acquisition costs for OT&E. For programs with OT&E costs above average, we found that low program acquisition cost, expense of test articles, and test article expendability were the dominant drivers of high relative OT&E cost. Figure 2 shows the distribution of the marginal cost of OT&E for the 78 programs we examined.

**Summary**

The Decker Wagner report commissioned last year by the Secretary of the Army addressed the Army’s failure rate of procuring new development programs (Army 2010). The study found that between 1990 and 2010, the Army terminated 22 Major Defense Acquisition Programs (MDAPs) and that 15 of those terminations have occurred since 2001. Further, excluding the Future Combat System (FCS), the Army spent greater than

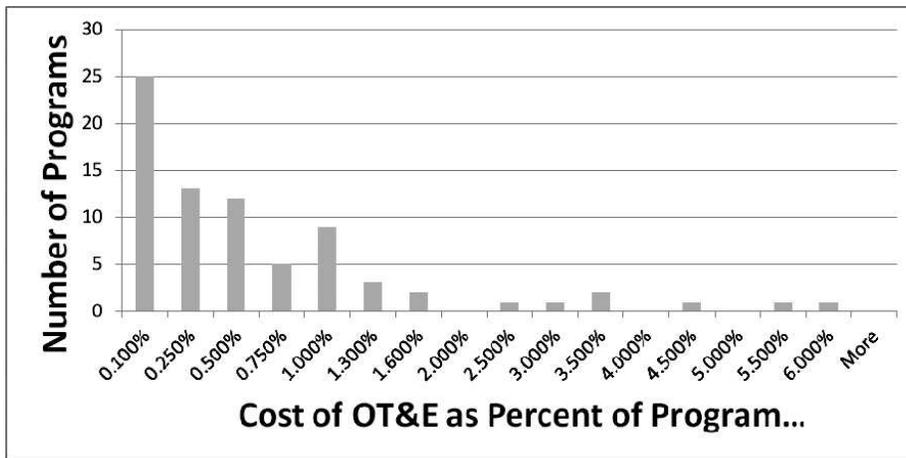


Figure 2. Marginal cost of operational test and evaluation relative to program acquisition cost.

one billion dollars *per year* since 1996 on programs that were eventually canceled before completion. The study cited many reasons for the failed programs, including unconstrained requirements, weak trade studies, and erosion of the requirements and acquisition workforce. However, none of the reasons cited included T&E. In fact, earlier and more robust T&E may have revealed problems and solutions earlier in the program when they would have been less costly to fix, or allowed decision makers to cancel or restructure before wasting billions of dollars.

Finally, in his recent testimony before Congress, Dr. Carter stated his opinion on reducing the average acquisition timeline:

*“...[acquisition] time is best reduced by ensuring reasonable requirements are set, by being willing to trade away requirements that prove to be excessive, and by controlling requirements creep so that development time can be constrained. I support rigorous developmental and independent operational test and evaluation to provide accurate and objective information on the capabilities and limitations of defense systems to both acquisition executives and warfighters and to ensure contractors deliver products that meet requirements.” (Carter 2011)* □

*DR. J. MICHAEL GILMORE was sworn in as director of Operational Test and Evaluation on September 23, 2009.*

*A presidential appointee confirmed by the United States Senate, he serves as the senior advisor to the Secretary of Defense on operational and live fire test and evaluation of Department of Defense weapon systems. Previously, Dr. Gilmore was the assistant director for National Security at the Congressional Budget Office (CBO). Dr. Gilmore is a former Deputy Director of General Purpose Programs with the Office of the Secretary of Defense, Program Analysis and Evaluation (OSD[PA&E]). Dr. Gilmore served with Program Analysis and Evaluation for 11 years. Earlier, Dr. Gilmore worked at the Lawrence Livermore National Laboratory; Falcon Associates; and McDonnell Douglas Washington Studies and Analysis Group where he became manager, electronic systems company analysis. Dr. Gilmore is a graduate of Massachusetts Institute of Technology, Cambridge, Massachusetts, where he earned a bachelor of science degree in physics. He subsequently earned master of science and doctor of philosophy degrees in nuclear engineering from the University of Wisconsin, Madison, Wisconsin. E-mail: mike.gilmore@osd.mil*

## References

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This course will review and provide examples in each of the following subject areas:

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- Introduction to system T&E and the relationship to SE
- T&E perspective on the systems engineering process
- Essential elements and tools of Project Management and how they relate to SE and T&E, to include Work Breakdown Structure (WBS) and Earned Value Management System (EVMS)
- SE and T&E perspective on specifications and design criteria, to include requirements analysis and creating requirements that are testable, verifiable, and designed to facilitate integration
- T&E role in formal design reviews and milestone reviews
- T&E role in program planning and special considerations for spiral development
- Verification by analysis, demonstration, test and inspection, to include criteria for selecting the verification type
- Management of T&E, to include writing a Master Test Plan and developing a T&E friendly WBS and EVMS
- Developmental and technical tests (DT); operational tests and customer testing (OT); the various types, uses, and responsibilities; and the importance of operational testing to the commercial as well as military markets
- Integrated testing
- Organizational considerations to facilitate T&E, to include the use of Integrated Product Teams, including combined or integrated test teams, to improve technical, operational and cost/schedule performance.

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