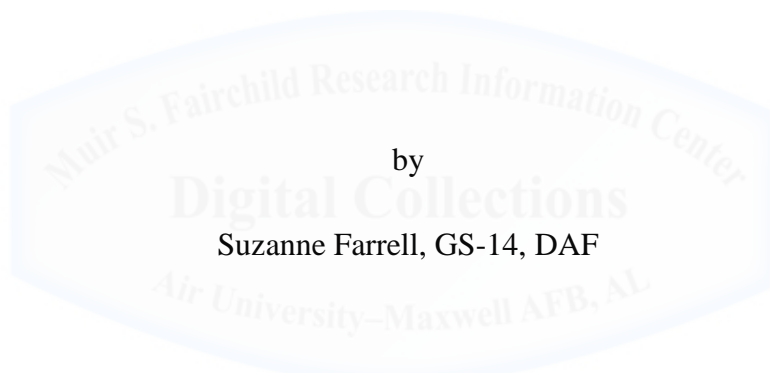


AIR WAR COLLEGE

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WHAT'S THE HOLD UP?

Reconciling Acquisition Timeline Differences



A Research Report Submitted to the Faculty

In Partial Fulfillment of the Graduation Requirements

Advisor: Dr. Margaret Sankey

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Biography

GS-14 Suzanne Farrell is assigned to the Air War College, Air University, Maxwell AFB, AL. Ms. Farrell entered civil service with the Department of the Air Force in March 1985. She served in various information technology positions including Computer Programming Audit Lead, Systems Programming Lead, and Local Area Network Manager at the Air Force Research Laboratory, Brooks AFB, TX. In August 1998, Ms. Farrell transferred to a career-broadening position in weapon systems acquisition, assigned to the Combat Information Transport System (CITS) program, Hanscom AFB, MA where she served as Program Manager (PM) for the Telephone Management System and Voice Switching System projects. In 2001, she accepted a position in acquisition program management as the Deputy Branch Chief, CITS Program Office. Ms. Farrell spent the last 16 years at Hanscom AFB where she served as Deputy PM, Single Integrated Air Picture; Program Control Chief, Family of Advanced Beyond-Line-of-Sight Terminals (FAB-T); Deputy PM, FAB-T; Program Manager, Ground Element Minimum Essential Emergency Communications Network System. Prior to her current assignment, Ms. Farrell performed in a Key Leadership Position as Deputy PM of the Three-Dimensional Expeditionary Long-Range Radar program.

Abstract

The chain of command for Major Defense Acquisition Programs (MDAPs) is short and straight. In most cases, responsibility and authority is limited to, and rises up, from the Program Manager, to the Program Executive Officer, to the Service/Component Acquisition Executive and, for ACAT ID programs, to the Defense Acquisition Executive. Other staff and organizations provide support and advice.

MDAP Milestone A, B, and C reviews require the submission of an independent cost estimate. The Air Force Cost Analysis Agency prepares this estimate, called the Service Cost Position (SCP) for Air Force MDAPs. Cost estimators use historical cost, schedule and past-performance data and models as the basis for the SCP. The SCP presents, by budget appropriation, the forecast of a program's total lifecycle costs, aligned with its estimated program schedule. Within the Fiscal Year Defense Program, the SCP further separates estimated costs by year.

When a Milestone decision authorizes a program to proceed into a new phase, the Milestone Decision Authority approves the cost estimate. This action essentially serves to “lock” the budget amounts and associated schedule of major events at the SCP forecast.

Usually the SCP schedule parallels the program's acquisition strategy. On occasion, it does not. This may result in a situation where program execution is constrained by the historical performance of previous programs and a financial organization, rather than the acquisition chain of command, drives the program's acquisition strategy.

This paper considers whether the remedy is a change in cost estimating methodology, but concludes that other options are less risky and more readily available. The final recommendation includes a cooperative effort that leverages existing tools and the combined expertise of program

management, cost estimators, contracting personnel and the industry team to reconcile differences and influence the SCP such that the approved budget and schedule align with the intent of the chain of command.



Introduction

Do defense acquisition cost estimating methodologies, based on historical cost, schedule and performance data and scheduling models, prevent acceleration of an acquisition program and unintentionally undermine the authority of the acquisition chain of command?

Program managers should not allow the ICE to become a self-fulfilling prophecy.
- DoDI 5000.02¹

What is Defense Acquisition? The Department of Defense (DoD) obtains military capabilities necessary to support the National Security Strategy through what is known as Big “A” Acquisition. Three primary decision support systems, or processes, are key: requirements, budget and acquisition. Identification of needed capabilities or requirements results from the Joint Capabilities Integration and Development System (JCIDS). Resource and budget allocations flow from the iterative Planning, Programming, Budgeting and Execution (PPBE) process. The Defense Acquisition System (DAS) manages execution of acquisition programs in the purchase, or development and delivery, of a needed capability.²



Figure 1. DoD Decision Support Systems, Big “A” Concept and Map
(Reprinted from Defense Acquisition Portal, Defense Acquisition University, “Acquisition Process,” accessed 8 December 2015, <https://dap.dau.mil/aphome/Pages/Default.aspx>.)

Several categories of acquisition programs exist. One reason is to clarify required levels of review and identify the decision-making authority. In general, the largest programs are designated Major Defense Acquisition Programs (MDAPs) based on their estimated costs.³ The Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) may also so-designate certain programs because of special interests.⁴ MDAPs are also known as Acquisition Category I (ACAT I) programs. USD(AT&L) determines the program's milestone decision authority (MDA), identifying programs as ACAT IC where the service component holds the authority, or as ACAT ID where USD(AT&L) is the MDA.⁵ This paper focuses on cost estimates and the acquisition chain of command for MDAPs.

Within the Defense Acquisition System, MDAPs typically include three major milestones. Milestone A approval starts the Technology Maturation and Risk Reduction (TMRR) phase of a program. Milestone B approval closes TMRR and authorizes entry into the Engineering and Manufacturing Development (EMD) phase. Milestone B, also known as "program initiation", is the point where an acquisition program's cost, schedule and performance targets are first base-lined for future execution assessment. Milestone C marks the beginning of the Production and Deployment (P&D) phase. The streamlined acquisition chain of command, or decision-making authority, is normally limited to the Program Manager (PM), Program Executive Officer (PEO), Service Acquisition Executive (SAE) (by right of delegation from the Service Secretary) and, in many cases, the Defense Acquisition Executive (DAE).⁶ (Different treatment may apply to highly sensitive, classified programs.) Functional personnel and other organizations advise and support the management chain of command.⁷

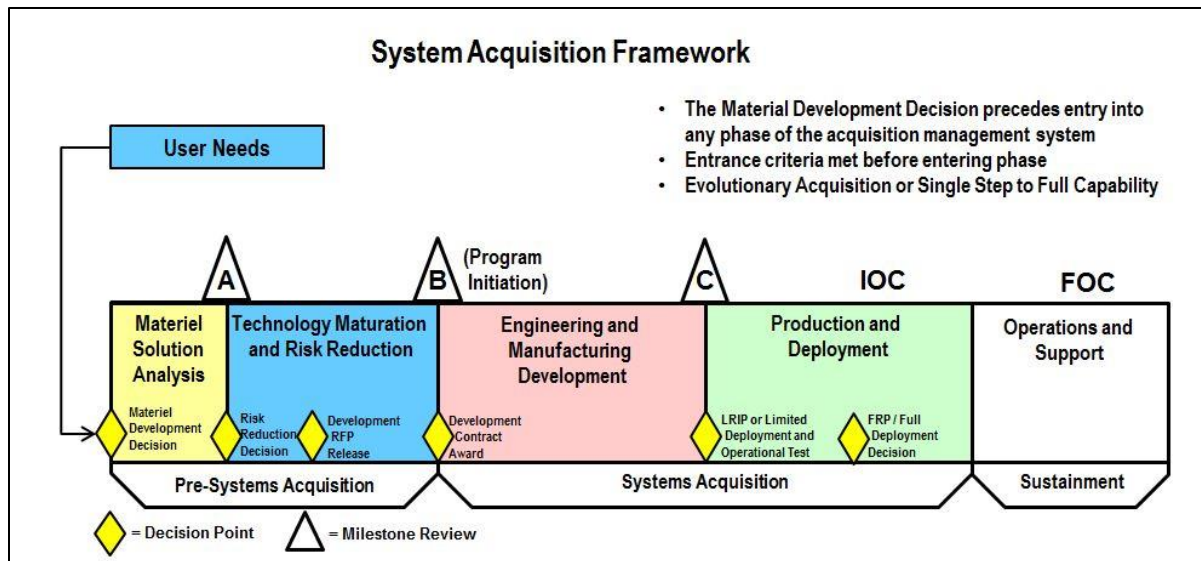


Figure 2. Systems Acquisition Framework

(Adapted from Defense Acquisition Portal, Defense Acquisition University, “System Acquisition Framework,” accessed 8 December 2015, <https://dap.dau.mil/aphome/das>.)⁸

The milestone reviews and decisions for MDAPs require submission of an independent cost estimate (ICE).⁹ These estimates are critical for determining the affordability of a program. This includes assessing whether the estimated cost falls within the service’s future budget plan and whether the service is willing to pay that cost for the capability needed. For ACAT IC programs, the service provides this estimate. For ACAT ID programs, there may be two estimates: one from the DoD level, prepared by the Office of Cost Assessment and Program Evaluation (CAPE), as well as one from the service component. The independent cost estimate developed by the service component is its official cost position, also known as the Component Cost Position. The Air Force calls it the Service Cost Position (SCP).¹⁰

At the most basic level, the independent cost estimate translates a program’s requirements into a probable total life cycle cost including “all developmental costs, procurement costs, MILCON costs, operations and support costs, and disposal costs.”¹¹ Cost estimating is a rigorous and disciplined process, essentially requiring a full analysis of all aspects of an acquisition program. Whenever possible, cost estimators use historical past performance data to

forecast costs and schedules. Without actual data, estimators may use data from analogous systems and/or extrapolation to develop the estimate.¹² In estimating the cost of a new program, estimators traditionally start with historical cost and schedule data from other existing programs and modify their models for differences between programs.¹³ The end-product SCP is a well-documented, comprehensive program analysis with a time-phased, most-probable total life-cycle cost estimate and corresponding program schedule. Within the Future Years Defense Program (FYDP), the SCP allocates estimated costs by year for each budget appropriation based on the forecasted schedule of major program events. Usually, the independently estimated schedule closely parallels that found in the program's acquisition strategy. What happens if it does not?

When the independent cost estimate does not align with the program management's strategy, it contradicts the acquisition chain of authority. Because the ICE becomes the basis of a program's official budget and the approved schedule relates directly to the annual allocation of budget appropriations, a difference can directly affect the ability of a program to execute according to plan. This paper focuses on the use and impact of the ICE, or SCP, within the DAS. In particular, it considers how cost-estimating methods might limit the flexibility of acquisition programs in terms of schedule and budget, resulting in a situation where program execution is constrained by the historical performance of previous programs and financial staffs drive a program's acquisition strategy rather than the acquisition chain of command. This begs the question: are changes needed in current cost estimating methodology?

Thesis

Admittedly, in at least two recent Air Force cases, the SCP schedule differed from the schedules laid out in the programs' acquisition strategies. Approval of the SCP resulted in annual budget re-allocations to align with the estimate's cost and schedule forecast. This may

restrict the program's ability to execute to its original timeline. However, this should not necessitate further change in methodology; a recent test case in SCP development could be applied. Instead, this paper proposes program leadership work within the system to provide conclusive evidence that schedule acceleration is a realistic and achievable option. The tools already exist: lessons learned from previous successes in cost and schedule reduction, Better Buying Power initiatives, and SCP development test case successes. Integration of these tools with innovative pre-Milestone Request for Proposal (RFP) development provides a unique opportunity to incentivize contractors to propose options for productivity improvements. In this way, the chain of command, cost estimators and industry, through contractor proposals, work together to verify the feasibility of an accelerated schedule and influence the SCP while it is still in development. Then, when the SCP is subsequently approved at the milestone review, the program's official budget and schedule are aligned with the intent of the acquisition chain of command.

Differences in estimates represent areas where more dialogue may be needed...
– Brian Brofueher¹⁴

Background

When the SCP Schedule and Program Acquisition Strategy Differ

At least two Air Force cases exist where the SCP schedule differed from the schedule laid out in the programs' acquisition strategies: the Joint Surveillance Target Attack Radar System Recapitalization (JSTARS Recap) Program and the Trainer-X Replacement (T-X) Program. Air Force leadership is concerned this difference may limit faster program execution. Although detailed documentation was not readily available on open source for either of the programs, representatives from JSTARS Recap and the Air Force Cost Analysis Agency (AFCAA) were willing to discuss details to illustrate the concern. Mr. Tommy Appleby, JSTARS Chief

Financial Officer, and Mr. James Campbell, AFCAA Branch Chief, provided perspectives and information from the program office and cost estimating team in telephone discussions. Key facts are captured below.

The JSTARS Recap program recently experienced a schedule disconnect as described above. Representatives from both the program office and the cost agency confirmed the following facts.¹⁵ The Service Cost Position for Milestone A forecast the most likely completion date for Initial Operational Capability would be one year later than the program's acquisition strategy indicated. At the Milestone A decision review, the MDA authorized JSTARS Recap entry into the TMRR Phase and approved the SCP. The Air Force subsequently adjusted the program's budget, moving production money one year to the right. This essentially introduced a new program risk. If the PM and PEO are able to execute the program faster, as they believe they can, both the program and their contractor(s), may find themselves at a standstill waiting a year for production funds. For JSTARs, this happened early at Milestone A and there should be time to recover before production funds are required. If it had happened at Milestone B, it would be a more pressing issue.

A Brief Look at Acquisition Cost Growth and Cost Estimating

Previous RAND Project AIR FORCE work has concluded that the Department of Defense (DoD) and the military departments historically have underestimated the cost of new weapon systems...

- RAND Report MG670, 2008¹⁶

The RAND Corporation, under contract with the Air Force, completed a study to determine the sources of cost growth in 35 MDAPS. Their 2008 report found the largest single source of total cost growth, over 40%, could be attributed to management decisions regarding requirements, quantities and schedules.¹⁷ However, the second largest area of cost variance, 15%, was categorized as errors, 10% of which were related to cost estimates.¹⁸ The listed

definition of this cost variance category was “Program re-budgeting caused by an inappropriate initial estimate of costs.”¹⁹

There is clearly a need to improve the quality and accuracy of cost estimates.
- RAND Report MG670, 2008²⁰

State of Current Cost Estimation

Current cost estimation has improved since that time. Comprehensive and rigorous, the process and product are conservative by design. DoD policy calls for the cost estimate to forecast the most likely, or expected, full cost of a program with a high level of confidence the program can be completed without sizable cost growth.²¹

Cost estimators work to eliminate bias and false optimism that might lead to underestimation and use historical cost, schedule and past performance data as the foundation for their estimates whenever possible. Their task essentially requires a full analysis of all aspects of an acquisition program. For example, the cost estimate must include predicted costs for every program risk to provide an ability to handle risks when realized. Funding for risk, however, can be contentious. Leadership or decision authorities may remove or reduce risk dollars from cost estimates, especially when budgets are tight. Such a decision, however, could become a direct source of cost growth when potential risks become active issues. .

Without realism and objectivity in the cost estimating process, bias and over optimism creep into estimates that advocates of weapon systems prepare, and the estimates tend to be too low.

- GAO Cost Estimating and Assessment Guide²²

Recent Test Case Furthering SCP Accuracy and Realism

The Air Force recently experimented with developing the Service Cost Position in conjunction with a pre-Milestone B source selection. Cost estimators, under non-disclosure agreements, had limited access to technical proposal material in order to build cost models for

each proposed solution. Once a winner was clear, cost estimators returned to run that particular model with contractor-specific cost data and finalize the SCP. This estimate should prove more accurate than those developed without insight into technical design and associated prices. If, in the future, a Request for Proposal allowed for, or incentivized, options for schedule acceleration with convincing proof (i.e., detailed Work Breakdown Structure and Cost/Price Basis of Estimate), cost estimators could incorporate a shorter schedule into the pre-Milestone cost estimate.

Uses of Cost Estimates

Independent cost estimates are required at major milestone reviews and decision points to inform and support leadership in affordability-based decisions. At Milestone B approval, the Milestone Decision Authority authorizes a program to enter a new phase. He/she also approves the cost estimate and sets affordability requirements, usually unit production cost and sustainment cost levels. The Air Force adjusts the program's budget, moving funds as necessary to align with the SCP's annual breakout of costs and schedule of major events. The Acquisition Program Baseline (APB) document captures the approved cost, schedule, performance and affordability goals and becomes the baseline by which leadership measures program execution; any breach requires MDA review.

Better Buying Power and Acquisition Reform – A Change in Mindset

We are a nation at war, and the Department does not expect the defense budget to decline. At the same time, we will not enjoy the large rate of growth we experienced during the years after September 11, 2011. We must therefore abandon inefficient practices accumulated in a period of budget growth and learn to manage defense dollars in a manner that is, to quote Secretary Gates at his May 8, 2010 speech at the Eisenhower Library, “respectful of the American taxpayer at a time of economic and fiscal distress.”

- Ashton B. Carter, 28 June 2010²³

First introduced in 2010 in the face of continued cost growth and the reality of future budget austerity, Better Buying Power (BBP) 1.0 was DoD's call to deliver affordable warfighting capabilities by doing "more without more."²⁴ In November 2012, DoD released updated initiatives in BBP version 2.0 and the most recent update, BBP version 3.0, in April 2015.^{25, 26} In his implementation directive, Frank Kendall described BBP 3.0 as the "continuing effort to increase productivity, efficiency and effectiveness of the Department of Defense's many acquisition, technology and logistics efforts."²⁷ Emphasis on several key BBP concepts has continued over time. Many are applicable to this paper: program affordability, lifecycle cost control, will-cost versus should-cost, continuous process improvement, and acquisition authority.

Affordability is concerned with whether estimated program costs falls within the service's future budget plan and how much the service is willing to pay for the capability needed.²⁸ It includes execution of the program within the affordability cost ceilings set by the MDA.²⁹ Immediately on release, BBP 1.0 implemented affordability-based decisions at milestone reviews for all MDAPS. This included requiring affordability targets as early as Milestone A, as well as presentation of engineering "cost versus capability" trade studies and baselining specific affordability requirements, or ceilings, at Milestone B. A realistic cost estimate is critical to affordability determinations.³⁰

BBP 1.0 also introduced the concept of will-cost/should-cost management. Essentially, the independent cost estimate, based on historical cost data and scheduling models, is a program's will-cost.³¹ Should-cost derives from the proactive identification and implementation of opportunities for increased efficiencies that might result in cost reduction without loss of needed capability. This might include lean design and continuous process improvement efforts. Should-cost rejects the notion that past performance data, the basis of the ICE, equates to cost

effective program management.³² In fact, the long history of acquisition cost growth over initial approved estimates proves otherwise. In a Defense AT&L article, Dr Carter attributed the problem to a misaligned perspective where acquisition personnel viewed the independent cost estimate as a floor instead of a cost ceiling.³³ Should-cost management provides incentives for the benefit for both government and industry; savings should be shared. While a single program's cost growth "taxes" other programs within the service portfolio, should cost reductions do the opposite.³⁴ Realized should-cost savings typically remain within the service's total budget authority and are used for top priorities in their portfolio.³⁵ Likewise, industry benefits from higher profits and/or increased cash flow. Government individual and program-level performance ratings reflect should cost successes. Similarly, Contractor Performance Assessment Reporting System (CPARS) reports recognize industry's successes. These past performance ratings can be a key consideration in competing for future government contracts. Finally, because leadership generally does not cancel affordable programs, the continuity of work supports stability of the industrial base and the specialized workforce it employs.³⁶

Cost-conscious engineering trades, affordability baselines and should cost management all contribute to reduced lifecycle costs. Another example of life cycle cost control also supports promotion of effective competition: implementation of open systems architecture and modular systems design enables "plug and play" system updates and component-level competition.³⁷ For the most part, the initiative to eliminate unproductive processes targets government bureaucracy and lengthy schedule timelines. Identification and elimination of non-value added processes, such as too-frequent reviews and reporting requirements, can reduce a program's cost and schedule.

Finally, for each service component, BBP 1.0 introduced a senior-level decision authority for acquisition of services. BBP 2.0 and 3.0 expanded the focus and called for renewed emphasis on the chain of command for all acquisitions, explicitly re-stating the chain of command as well as the support role of staff and other organizations.³⁸

Air Force Should Schedule Initiative

The Air Force recently announced a new Should Schedule initiative to address an increasing number of schedule breaches.³⁹ Briefly, the plan is to explore the effectiveness of paying contractors to accelerate delivery on three small pilot programs.⁴⁰ This may eventually develop into something akin to this paper's recommendation for cutting labor hours and leveraging common parts or processes. The office responsible for this effort is still working implementation details. Only time will tell whether lessons learned on the small pilot programs will apply to larger MDAP execution. Today, Should Schedule is not yet ready for prime time.

Case Study in Successful Cost Reduction and Schedule Acceleration

The Navy's Virginia-class Submarine program provides one of the best examples of successful schedule acceleration and cost cutting without any reduction in capability. Initial actions occurred long before the introduction of Better Buying Power, but now align very well with current guidance.

In 1992, Secretary of Defense Cheney cancelled the Navy's Seawolf submarine program.⁴¹ It was proving too expensive to build and was no longer relevant to current threats at the end of the cold war.⁴² Only three of the submarines were built at an estimated 60% cost growth over the original per-unit cost projection of \$2.75 billion each.⁴³ The Navy went back to the drawing board to design a new class of attack submarine, the Virginia-class, that was not only affordable, but with the capabilities to defeat modern threats and the flexibility to adapt to

future challenges.⁴⁴ The intent, from the start, was to design for affordability, but Congress added a wrinkle. There were only two shipyards capable of building nuclear submarines; unlike previous submarine construction, Congress wanted a joint production arrangement for industrial base reasons.⁴⁵

Like many new acquisition programs, the Virginia-Class Program Office (PMS 450) had a rough start. The first few ships were delivered late and over budget.⁴⁶ By 2005, the program was experiencing unaffordable cost and schedule growth. As long as construction costs were over budget, the program was paying for use of two shipyards when they could only afford to build one ship a year.⁴⁷ The Chief of Naval Operations issued a challenge: the program had to reduce per-ship acquisition costs from \$2.4 billion to \$2.0 billion before they could increase production to two ships a year.⁴⁸

Captain David Johnson was Program Manager (PM) at the time. He mobilized the program office, prime contractor and lead shipyard into a cooperative team effort focused on cutting costs.⁴⁹ Booz Allen Hamilton was brought on as a consultant in design for affordability.⁵⁰ The first step was to analyze the historical cost data to understand the biggest cost drivers.⁵¹ Two key areas emerged: construction time and cost of labor and materials.⁵² With the ground rule that changes could not result in loss of capability, the team examined each of the largest cost drivers.⁵³ They developed, evaluated and prioritized candidate actions in terms of feasibility, potential for savings, return on investment and achievability.⁵⁴ The team attacked on all fronts. Two examples of their work follow.

A redesign of the ship itself and modification to the construction method leveraged the efficiencies of work done in manufacturing facilities rather than at a construction site.⁵⁵ Instead of joining ten pre-fabricated sections together at the construction site, there would be only four

larger “super modules”.⁵⁶ The first delivery under this new design saved 15 months of construction time and six months of shakedown activity.⁵⁷ This, in turn, reduced overhead and labor hours.

Shipyards were encouraged to present business case proposals for process and infrastructure improvements that would lower costs.⁵⁸ If the Navy agreed with the analysis, they funded the project, 50% up front and 50% at completion with a caveat.⁵⁹ If the project did not deliver as planned, the Navy could recoup all funds.⁶⁰ In 2008, Navy investment was over \$60 million while savings from the projects was over \$422 million.⁶¹

Working together with Lean Six Sigma consultants, the government and industry team “cut labor hours by an estimated 17 percent” and considered more than “150 discrete design change and production-process improvements.”⁶² By achieving nearly all the prescribed cost and schedule reductions, the program was then able to take advantage of multi-year procurement and economic order quantity purchasing, doubling their production from one submarine per year to two and saving the final prescribed \$200 million per ship.⁶³ All told, Johnson saved four billion dollars in overall program costs and shaved two full years off the construction schedule.⁶⁴

In 2007, the Virginia-Pilot reported the Newport News shipyard would deliver the USS North Carolina (4th in the fleet) “on time and on budget” after having previously delivered the USS Texas “a year late and 25 percent over budget”.⁶⁵ The program has continued to make improvements; in 2011, the USS Mississippi beat schedule by a full year and saved \$60 million.⁶⁶ Captain Johnson is now a Vice Admiral serving as the Principal Military Deputy, Assistant Secretary of the Navy for Research, Development and Acquisition.⁶⁷

Other programs should explore lessons from the Virginia-class submarine and applicability of contract requirements and Request for Proposal (RFP) development that enables and encourages process-improvements.

Programs must actively work to deliver platforms with the right capabilities for the current complex battle space and tomorrow's unforeseen challenges, while simultaneously driving excessive expenses out of the equation. Few programs have met those requirements as successfully and consistently as the Virginia-class submarine program.

- Captain David Goggins, 2013⁶⁸

Synthesis

Some limits to program acceleration do relate directly to the program baseline for cost, schedule and performance. The cost-estimating process is conservative for a reason, well proven, and should not be changed to accommodate unproven schedule assertions. Recall the GAO's warning about optimism and too-low estimates above. The rigor of cost estimation is critical not only to program affordability, but also to overall Service and DoD acquisition affordability. When cost growth occurs on one program, the larger enterprise must absorb the increased costs, affecting other programs in the portfolio and it effectively reducing the buying power of the enterprise. The cost estimate is only one thread in the tightly woven fabric of the larger Big "A" Acquisition system. Better to address the few one-off cases individually rather than change the process for all and risk unintended consequences that may adversely affect accuracy of estimates and skew affordability for the majority. . What other options might exist?

Because budget profiles are not particularly flexible, a program may not be able to achieve more than expected in any given year, especially if it requires additional funding or a different budget appropriation. It would depend on the amount of funding needed and timing of the need. Budget rules seem to play a larger part than cost estimates in constraining program

acceleration. However, one cannot expect changes in the PPBE process. Much like “too-big-to-fail” banks, PPBE is too large and interconnected. Successfully coordinating a change through today’s contrarian Congress is also highly improbable.

The Air Force, as discussed above, announced it is developing a Should Schedule initiative. Information so far indicates a focus primarily on contract schedule incentives on three small programs, but details of implementation are still in the works. In the past, such schedule incentives required careful consideration and contract construction to avoid tension with primary contracting evaluation factors such as cost. This is not a viable option yet; it is unproven even on a small scale. It needs more time in the oven.

The responsibility and authority for program execution lies in the acquisition chain of command. This chain is clear; staff and other organizations provide support; they should not drive acquisition strategy. This implies that neither should an independent cost estimate. It falls to program management to provide convincing proof that an accelerated program schedule is realistic and achievable. The tools already exist.

The most consistently reliable method of shortening schedule is to make the most of contractor expertise to reduce labor hours and leverage common parts and processes. Industry has significant experience in detailed work breakdown and schedule analysis. The industry team knows best whether, and where, schedule margin exists. They know what processes can pull double duty, speeding the learning curve. They have their own risk and opportunity programs and can identify potential process improvements. We should leverage their expertise. The Virginia-class submarine program is a case in point; it achieved significant successes in both areas without loss of required capability. Although Better Buying Power did not exist at the time, actions taken align very closely with many of today’s BBP tenets. In fact, Dr. Carter’s

guidance memorandum for BBP 1.0 uses the Navy program as an example for open systems architecture and technical data rights.⁶⁹ Other programs should explore lessons from the Virginia-class submarine program. Application of their post-contract successes might well apply to future pre-contract efforts such as contract requirements and RFP development that enables and encourages process-improvements in time to influence the independent cost estimate.

The SCP development test case presents a unique opportunity, especially in combination with contracting efforts to capture details of viable contractor productivity proposals.

Recommendations

- The cost-estimating process is conservative for a reason and well proven; it should not be changed.
- Differences between the SCP schedule and management's acquisition strategy signal the need for dialogue between the teams.
- Program management should provide convincing proof that an accelerated schedule is realistic and achievable.
- Utilize lessons-learned from the Virginia-class Submarine Program and Better Buying Power initiatives to improve program productivity.
- Provide appropriate incentives and leverage contractor expertise.
- Integrate incentives into pre-Milestone contracting efforts to allow contractors to propose options for reducing cost and schedule. Require data necessary for evaluation.
- Continue using the SCP development test case process. Incorporate data from viable options to influence development of the Service Cost Position before the Milestone decision.

- Capture these efforts as should-cost initiatives so realized savings remain at the service component level for reallocation.

Conclusion

Air Force acquisition leadership has concerns that current cost estimation methodology may constrain programs from executing faster than historical data indicates and, inadvertently, override the acquisition chain of authority. This does not mean current cost estimating methodology should change. In a few known cases, the schedule laid out in the Service Cost Position has differed from the schedule in the program's acquisition strategy; this may constrain accelerated program execution in the future. The JSTARS Recap program is a case in point.

Defense acquisition relies on the rigor and discipline of cost-estimation to maintain overall affordability across the enterprise. Rather than risk negative impacts on overall affordability, it is better to address the few cases individually. DoD has provided the necessary tools in Better Buying Power; lessons learned from other program successes are readily available. Their continuous use is expected through the program lifecycle. However, a unique opportunity now exists to leverage them in pre-Milestone contracting activities to incentivize contractors to propose options for productivity improvements. Not without precedent, the government should be able to craft a win-win situation for DoD and industry alike. When combined with the recent SCP development process, the chain of command and industry, through contractor proposals, will be able to prove the feasibility of an accelerated schedule and influence the SCP schedule. At the end of the day, cost and schedule savings are achieved, affordability increased, and the differences between SCP schedule and acquisition strategy reconciled before the Milestone decision. Once approved, the program's official budget and schedule are aligned with the intent of the acquisition chain of command.

Notes

¹ DoD Instruction (DoDI) 5000.02, *Operation of the Defense Acquisition System*, 7 January 2015, ENCLOSURE 2, 77.

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³ Defense Acquisition Portal, Defense Acquisition University, “Glossary of Defense Acquisition Acronyms and Terms,” accessed 8 December 2015, <https://dap.dau.mil/glossary/pages/2191.aspx>.

⁴ Bradford Brown, *Introduction to Defense Acquisition Management*, 10th ed. (Fort Belvoir, VA: Defense Acquisition University Press, August 2010), 19.

⁵ Defense Acquisition Portal, Defense Acquisition University, “Glossary of Defense Acquisition Acronyms and Terms,” accessed 8 December 2015, <https://dap.dau.mil/glossary/pages/1382.aspx>.

⁶ Bradford Brown, *Introduction to Defense Acquisition Management*, 10th ed. (Fort Belvoir, VA: Defense Acquisition University Press, August 2010), 25.

⁷ DoD Instruction (DoDI) 5000.02, *Operation of the Defense Acquisition System*, 7 January 2015, 73.

⁸ Defense Acquisition Portal, Defense Acquisition University, “System Acquisition Framework,” accessed 8 December 2015, <https://dap.dau.mil/aphome/das>.

⁹ DoD Instruction (DoDI) 5000.02, *Operation of the Defense Acquisition System*, 7 January 2015, 51.

¹⁰ Air Force Instruction (AFI) 65-508, *Cost Analysis Guidance and Procedures*, 6 June 2012, 5.

¹¹ DoD 7000.14-R, *Financial Management Regulation Volume 2B Chapter 18*, September 2015, 18-23 – 18-24.

¹² Air Force Instruction (AFI) 65-508, *Cost Analysis Guidance and Procedures*, 6 June 2012, 35.

¹³ United States Government Accountability Office, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, GAO-09-3SP, March 2009, 89.

¹⁴ Brian Brodfuehrer, “Better Metrics for Better Communication as a Foundation for Better Program Buying Power: Dialogue Between Program Oversight and Program Execution Organizations,” *Defense AT&L* Vol. XL No. 5 (September-October 2011): 34.

¹⁵ James D. Campbell (FMCIH Branch Chief, Air Force Cost Analysis Agency) and Tommy R. Appleby (Chief Financial Officer, JSTARS Recap), in discussion with the author, 10 September 2015, 5 November 2015, and 10 February 2016.

¹⁶ Joseph G. Bolten et al., *Sources of Weapon System Cost Growth: Analysis of 35 Major Defense Acquisition Programs*, RAND Report MG670 (Santa Monica, CA: RAND, 2008), Summary xiii.

¹⁷ Ibid., Summary xvii.

¹⁸ Ibid.

¹⁹ Ibid, Summary xv.

²⁰ Ibid., 50.

²¹ Air Force Instruction (AFI) 65-508, *Cost Analysis Guidance and Procedures*, 6 June 2012, 8.

²² United States Government Accountability Office, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, GAO-09-3SP, March 2009, 6.

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