

ACQUISITION & LOGISTICS

# SMART DECISIONS: MANAGING COMPLEXITY AND RISK IN DEFENSE ACQUISITION & LOGISTICS

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# A MULTIDIMENSIONAL APPROACH TO MANAGING COMPLEXITY AND RISK IN DEFENSE ACQUISITION AND LOGISTICS

## **THE ACQUISITION AND LOGISTICS CHALLENGE: OVERWHELMING COMPLEXITY**

As we return to “peacetime” acquisition practices, stakeholders across the defense community struggle with a mix of new and old challenges. The newer issues stem largely from the growing expectations associated with more rapid fielding and the benefits experienced over the past decade of swift feedback on performance. These shifting expectations have created a strong and growing desire to complement the “evolutionary acquisition” approaches with ones with a specific time frame within which useful military capabilities will be fielded. These types of changes will take time, but in the meantime, acquisition and logistics professionals face the ongoing and timeless challenge of operating within an incredibly complex system. While it is widely acknowledged that this increased complexity is due in large measure to the rising level of acquisition bureaucracy/policy demands, senior officials should recognize that we are also asking a lot more of our weapons systems. For example, they require expanding interoperability requirements, meeting increased data bus needs, addressing asymmetrical threats, and most recently, infusing platform cybersecurity into our systems and subsystems. These expanded expectations, while important, add significantly higher oversight burdens to already busy program managers.

The acquisition process, particularly the acquisition of large-scale systems, has always been fraught with pitfalls and challenges, but in recent years, the complexity of designing, building, and fielding these systems has often overwhelmed even the most competent program managers. The Government Accountability Office (GAO) has diligently documented the accelerating growth in cost overruns and delays. In March 2014, GAO reported that 80 of the Pentagon’s largest weapons systems were

collectively more than \$480 billion over their original cost estimates for research and development, procurement, and other acquisition costs—a total cost overrun of about 42 percent.<sup>1</sup> The programs also projected an average delay of 28 months in delivering initial operating capability. In a separate report, the GAO highlighted the challenges of managing information technology (IT) projects, stating, “Federal IT investments too frequently fail to be completed or incur cost overruns and schedule slippages while contributing little to mission-related outcomes. GAO has found that the federal government spent billions of dollars on failed and poorly performing IT investments which often suffered from ineffective management, such as project planning, requirements definition, and program oversight and governance.”<sup>2</sup>

GAO’s findings, supported by independent research and academic studies, estimate that 60 to 80 percent of all acquisitions in recent years have been delivered late, exceeded cost, failed to deliver what they were supposed to, or did not deliver anything.<sup>3</sup> Ultimately, the warfighters and users of these systems suffer the consequences. And those consequences are many. As costs rise, the services must reduce the number of platforms and systems they acquire. Weapons systems do not perform to expectations. Soldiers in the field receive radios that cannot communicate effectively. Command posts cannot seamlessly share intelligence data. Delays in acquiring new technologies and systems render them obsolete before they ever reach warfighters’ hands. Increasing costs and delays in maintenance and repair diminish readiness. Overall, the operational effectiveness of our military services declines, as does the military’s ability to meet its mission requirements.

## **A NEW PERSPECTIVE: RE-IMAGINING ACQUISITION AND LOGISTICS**

In the DoD procurement process, individual platforms and systems move through the acquisition milestones in a linear, step-by-step process that essentially treats each platform and system as though it were independent of the others. Each has its own program manager, funding line, milestones, schedule, etc. This linear process applies rigorous discipline and oversight to the procurement of weapons and supporting systems, but it also masks the inherent complexity of the acquisition and logistics process. This deceptive simplification results in a focus on the specialization of each step, making it difficult to manage the procurement of complex system-of-systems. This narrow focus takes the program manager's attention away from the broader range of responsibilities and tasks that are essential for program success.

Booz Allen recognizes that a mix of new and old challenges must be confronted in acquisition and logistics. Defense programs have long struggled with unstable budgets, changing requirements, and difficulties effectively managing the logistics tail. However, these problems have become more severe with the rise of complex programs and the multidimensional acquisition environment, which significantly complicates challenges and magnifies risks. The diverse list of obstacles and challenges facing major programs today illustrates the multidimensional nature of program management:

**Expanding Requirements.** Officials establish unrealistic or unnecessary requirements before acquisition begins, while “requirements creep” also may occur after acquisition has started point programs and system-of-systems programs, which have numerous stakeholders, are especially susceptible to requirements overloading.

**Budget Shortfalls and Instability.** Program managers often receive fewer resources than needed to meet cost, schedule, and performance supportability requirements. Then, even after funding is approved, it is vulnerable to budget cuts, sequesters, and other disruptions. Budget shortfalls, combined with expanding requirements, force program managers to make constant tradeoffs among cost, schedule, performance (requirements), supportability,<sup>4</sup> and quantity.

**Mismatched Contracting Approaches.** Contracting offices may adopt less-than-ideal contracting strategies for the programs they support. For example, a contracting office under pressure to keep near-term costs low might adopt a Low Price, Technically Acceptable (LPTA) strategy that is not appropriate for a complex engineering and integration program. Similarly, a contracting office might adopt a small-business strategy—perhaps to meet agency goals or mandates—that brings in small businesses that do not have the capabilities to meet the program's requirements.

**Bureaucratic Processes.** The DoD 5000 series regulations enforce discipline and fairness, but they are not conducive to rapid or streamlined acquisition. In addition, program managers often feel constrained by complex rules that seem to create roadblocks rather than pathways for solving problems and achieving success. Even when all goes well, a newly built system may become obsolete as a result of emerging technologies before completing the acquisition because the acquisition process cannot keep pace with technological change.

**Constantly Changing Threats.** As threats change, so do requirements, but traditional acquisition processes do not facilitate rapid changes in design or construction of weapons systems in response to the new threats.

**Acquisition Workforce Challenges.** The retirement of skilled acquisition staff has left many programs with younger employees who lack the institutional knowledge or experience to effectively navigate the acquisition process. Similarly, because military officials typically rotate through programs every 2 years, they also may lack a complete picture of the programs they manage or support. In addition, many acquisition offices have lost much of knowledge and skill needed to manage technical baselines and program risk because that responsibility has shifted to industry in recent years. As a result, program officials may not anticipate problems before they arise, and when presented with challenges, they may not understand all of the options afforded by acquisition regulations to remedy those problems.

**Managing Multiple Stakeholders.** Multiple operators and users, perhaps geographically dispersed, may be using the platform or system for alternative (and often competing) mission needs. In addition, powerful third-party interests, often without “legal” authority but having the ability to shape public opinion and program decisions, can impose unfunded mandates, requirements, or modifications on a program. Unfortunately, multiple sponsors, each with control over funding streams, may have conflicting expectations regarding a program’s requirements and goals. These stakeholders can disrupt, slow, or even kill a program.

**Lack of Analytical Skills and Tools for Rigorous Decisionmaking.** Program officials often lack the data, tools, and skills to objectively assess options and identify the best solutions for meeting cost, schedule, performance, and supportability goals. As a result, they cannot apply the necessary rigor and discipline to manage programs and costs, even when billions of dollars are at stake.

**Immature or Unproven Technologies.** A program may rely on high-risk software development or emerging technologies that will continue to evolve—or perhaps be supplanted by competing technologies—over the course of a program.

**Difficulty Managing Logistics.** Maintenance and repair can represent as much as 80 percent of a program’s lifecycle costs. Nevertheless, many maintenance programs do not have the ability to track and monitor the vast and expanding number of suppliers and spare parts. They also lack the capability to optimize sparing levels at depots to reduce the mean time between repairs. These problems slow the availability of spare parts, drive up costs, hamper maintenance, and diminish readiness.

**Poor Prioritization Between Acquisition and Operations/Support.** When an acquisition program must take actions to stay under cost caps, supportability considerations do not get equal consideration with cost, schedule, and performance. When an acquisition program gets into trouble with respect to cost overrun, the first things cut usually include training and logistics. The main reason for this imbalance is the adverse impact appears later in the cycle, thus making it less visible to the immediate decisionmaker. This shortsighted prioritization inevitably condemns the warfighter to the nearly impossible task of maintaining a weapons system with a poorly conceived logistics plan.

**Integrating complex systems of systems.** Today’s Joint Services enterprise provides a great many benefits to the warfighter but also creates the need for interoperability among disparate systems. The prevalence of interdependent systems increases the complexity of managing technologies, suppliers, sponsors, and other program elements, particularly in a linear acquisition environment that does not easily facilitate meeting the multidimensional integration challenge.

One of the hallmarks of the modern acquisition and logistics environment is that many important decisions and activities take place beyond the program managers’ direct control. From increasing requirements and decreasing budgets to mismatched contracting strategies, changing threats, changing technologies, finicky stakeholders, and interdependent but quasi-independent systems, program managers must monitor

and manage a host of people and activities outside their traditional purview. Attention to individual issues and problems as they arise in the traditional linear milestone process remains important, but to truly improve management of a platform or system throughout its lifecycle, program managers must expand their perspective to see how all of these diverse variables fit together in the entire acquisition and logistics process. The variables are both independent and interdependent. The acquisition and logistics system is both linear and multidimensional. Managing programs in this complex environment requires a new way of thinking and a new approach.

### **PROPOSED APPROACH: MULTIDIMENSIONAL PROGRAM MANAGEMENT**

DoD leaders understand these challenges and have initiated Better Buying Power and other initiatives to address them. For example, Better Buying Power 2.0 and 3.0 advise program officials to adopt contract vehicles that are appropriate for the intended products or services, tie requirements to affordability, design for technology insertion, and use Modular Open Systems Architecture to stimulate innovation.<sup>5</sup> Despite these initiatives, many program officials still struggle to control costs, avoid delays, and mitigate risks in acquisition programs. The problem we see is that program officials remain focused on the individual steps in the milestone acquisition process; they have not yet widened their management perspective to incorporate the entire acquisition and logistics activity chain. It is not that the individual steps are unimportant, but they should not be viewed in isolation from other variables in that broader activity chain. Attention to the full range of multidimensional activities will enable better-informed decisions about the individual steps. In addition, it will enable programs to unlock the power of reform-minded efforts such as Better Buying Power. In Booz Allen's work supporting acquisition and logistics programs, we have helped program officials make what we call "Smart Decisions" in managing today's complex,

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multidimensional programs. Smart Decisions are decisions informed by cost and risk issues and supported by data analytics, while looking at all of the program variables together. Three main principles guide our multidimensional approach for Smart Decisions in acquisition and logistics:

#### **Embrace a Multidimensional Perspective**

"Acquisition professionals have to be able to think on many levels, integrate inputs from many perspectives, balance competing needs, and satisfy many stakeholders and customers," said Frank Kendall, Under Secretary of Defense Acquisition, Technology and Logistics.<sup>6</sup> Consequently, program managers need to build and support a culture that recognizes and addresses the inherent complexity of modern acquisition and logistics.

In doing so, they will expand the perspective of the entire program office to encompass the many programs and systems whose development and progress will affect their own. With this expanded perspective, acquisition officials will focus greater attention on the logistics requirements of their programs. By considering the impact of their decisions on the logistics tail, acquisition officials can help reduce lifecycle program costs while strengthening readiness and extending the lives of weapons systems. Studies show that more than 60 percent of a weapon system's cost falls in the sustainment phase of the lifecycle, yet that cost is a major part of the planning process within the acquisition community. Acquisition officials' expanded perspective will also bring into focus the growing number of stakeholders that, to a large degree, have accompanied the rise of joint programs and systems of systems. How might this

broader perspective be translated into action? Two examples show how program managers could proactively manage some of the key stakeholders:

- To avoid problems that may arise as a result of ambiguous governance authorities or multiple sponsors with divergent expectations, program managers can develop charters that detail specific authorities and decision rights, along with relationship maps with the sponsors, at the beginning of the acquisition cycle.
- Program managers can mitigate problems that often arise during the acceptance and transfer of the new systems by creating mechanisms to involve users throughout the acquisition lifecycle. Managed well, sponsors, users, and other stakeholders will provide valuable support to help program managers overcome obstacles and achieve program goals. Managed poorly, they can disrupt budgets, change requirements, and slow or even kill a program.

Overall, the multidimensional perspective will keep program managers and staff focused on the interdependencies among multiple systems as their individual systems move in a linear path through the acquisition milestones. In this way, the multidimensional approach cultivates one of the key principles underpinning Smart Decisions—examine risk and costs among all program variables in the acquisition and logistics activity chain.

### **Challenge Conventional Habits and Thinking**

The DoD 5000 series regulations contain considerable flexibility and authority that program managers can use to put into action their multidimensional perspective—that is, to apply innovative solutions and techniques for managing complex programs. Here are just a few examples showing program managers’ options and room to maneuver within the regulations:

- When a proposed contracting strategy does not adequately support their program, program officials do not have to submit passively. Rather, they can work with contracting officers to evaluate contracting alternatives and identify the best contracting vehicle to support their technical baseline. A rigorous cost/ benefits/risk analysis will help make the best decision clear to all parties.
- By moving to government-owned, open architectures and standardized interfaces, program managers can help facilitate integration and interoperability of systems of systems. Defense leaders have touted the benefits of using an open systems approach in the Better Buying Power initiatives, as has GAO, which said DoD programs that have implemented an open systems approach expect to avoid considerable repair and upgrade costs.<sup>7</sup> However, GAO also found “a general cultural preference within the services for acquiring proprietary systems that puts lifecycle decisions in the hands of the contractors that developed and produced those systems.” This finding underscores the need for acquisition officials to challenge conventional thinking and approaches.<sup>8</sup>
- Defense programs can adopt agile development, incremental delivery of modular systems, prototypes and partial solutions, and similar innovative techniques to help them manage immature technologies. These techniques will also help them insert emerging technologies into weapons systems and speed the deployment of mission-critical systems. Module designs and “block” development strategies can enable programs to incorporate last-minute requirements. These techniques are new, but many program offices do not have the experience or confidence to adopt them.

Just as the acquisition regulations contain a variety of contract types that program managers can choose from to adopt a contracting strategy best suited to their program's requirements, the regulations also contain many options for designing, developing, and acquiring platforms and systems. Flexibility within the regulations offers opportunities, not roadblocks, for program officials who have the knowledge and experience to make the processes and rules work to their advantage. Successful programs often draw on the expertise of consultants with broad-based knowledge and skills to help them see opportunities where they once saw barriers, as well as to help them implement techniques for acquiring new technologies. In this way, the flexibility inherent in the regulations can empower program offices to innovate and create a sure path to mission success.

### **Unlock the Power of Data Analytics**

The amount of data collected and stored by federal agencies is growing exponentially, yet so is the potential value of that data, if used more fully. Program managers can leverage the data they collect about their platforms and systems, as well as about their acquisition processes, to improve visibility and management. Doing so will enable objective, fact-based decisionmaking.

The following examples show how program managers can expand their use of data analytics to streamline acquisition, overcome challenges, reduce risk, and increase program performance at every stage of acquisition and logistics:

- DoD could help program managers by digitizing acquisition documents to streamline document sharing and create data that can be analyzed by decisionmakers.<sup>9</sup> The DoD effort to digitize the Information Support Plan (ISP) illustrates the benefits of creating web-based artifacts. By creating automated tools for collecting, sharing, and analyzing program data, DoD can arm program officials with the most accurate and up-to-date information about their programs,

leading to more powerful insights to anticipate and mitigate program risks. This can drive a more holistic approach to eliminating redundant processes and reducing administrative burden across all milestone phases.

- Program managers could leverage acquisition data to improve analyses and decisionmaking related to cost, schedule, performance, and other program variables. For example, this capability would enable managers to measure the potential impact of a proposed change in requirements or compare the potential risks of using different types of contracting strategies. These objective insights would also enable program managers to better manage the expectations and demands of their many sponsors, users, joint partners, and other stakeholders. The process would help align diverse stakeholders toward meeting a common goal and foster consensus by providing an unbiased and transparent view of cost, performance, and other variables, thus allowing participants to objectively evaluate and select solutions.
- Robust data analytics could improve logistics management in very clear ways: when a program manager asks a data-driven question he or she will be able to get a consistent answer now and in the future, but should be informed by whatever new data are available. For example, during the acquisition phase, program managers could evaluate how alternative technical approaches would potentially affect future costs for maintenance and repair. During the operations and support phase, program managers could manage suppliers and spare parts more effectively to ensure the availability of components. Similarly, rigorous analyses of component usage could help determine the volume of spares needed for certain parts; with this more certain knowledge, Navy ships, for example, would not have to devote

space to carrying around spare parts that will never be used. Finally, data analytics can support condition-based maintenance, which reduces costs and improves performance, as components are replaced when they actually wear out (or are predicted to fail) rather than based on a replacement schedule.

- By adopting Product Lifecycle Management (PLM) technologies and processes, programs can effectively manage and centralize technical data and perform reliability, availability, maintainability and cost (RAM-C) analytics to enable affordable system operational effectiveness (ASOE) decisionmaking. PLM is a consistent set of business solutions that support the collaborative creation, management, dissemination, and use of product definition information, spanning from product concept to end of life. It provides a structured, authoritative product information repository for weapons systems. RAM-C analytics incorporates key system, product support, and supply chain data to model and simulate total lifecycle costs and readiness impacts of critical design and support modifications. PLM technology enables decisionmakers to identify the best acquisition decisions to optimize lifecycle costs and exploit the knee in the operational availability ( $A_o$ ) curve.

Data analytics does not eliminate complexity. Rather, it delivers visibility and understanding that renders the complex acquisition environment easier to monitor and manage. As a result, data analytics can give program managers unprecedented insights for better decisionmaking that ultimately supports warfighters' readiness and missions. Successful programs have drawn on the expertise of consultants with skills across data science, acquisition, and other related disciplines to make Smart Decisions informed by cost and risk and supported by the most rigorous data analytics.

## **BOOZ ALLEN: YOUR ESSENTIAL PARTNER FOR MULTIDIMENSIONAL ACQUISITION AND LOGISTICS**

Booz Allen is uniquely positioned to bring the skill sets together that will enable Smart Decisions in multidimensional acquisition and logistics programs. Our single profit and loss (P&L) center allows for rapid and seamless integration of diverse skill sets, and, as a result, we operate with an enterprise mindset. In addition, we have an organizational structure that allows us to collaborate on technical innovation, operations expertise, and acquisition acumen for a multidimensional approach. Other benefits include the following:

- Booz Allen has been a leader in innovative acquisition and logistics for decades. Booz Allen has a long history of working in the full range of acquisition and logistics, starting with requirements development and contracting strategy to rigorous analysis of cost, schedule, performance, and risk throughout a program's lifecycle. We have always taken a holistic view of acquisition and logistics challenges and have brought our data science and engineering-focused consulting skills to bear on the most complex and challenging issues our clients have faced.
- The addition of Booz Allen Hamilton Engineering Services (BES) is turbo-charging our already powerful engineering capabilities. Recognizing the increasingly critical role that highly technical systems of systems will play in military operations, we have been steadily expanding our supporting capabilities. With the acquisition of BES last year, we expanded an already solid engineering base to include many specialized capabilities crucial to an integrated approach to acquiring and maintaining weapons systems.
- Integrated prowess = engineering + operational + acquisition expertise. The 2014 Quadrennial Defense Review (QDR) highlights the inherent tension among capacity, capability, and modernization in developing

military systems today, particularly complex systems of systems. Managing this tension at an acceptable level of risk and performance means that technical engineering actions associated with weapons systems need to be directly informed by operational requirements and acquisition realities.

- Deep technical expertise is grounded in broad experience. Today's integrated approach to building platforms and systems creates a multidimensional challenge that requires the highest level of technical expertise. We offer highly qualified personnel who possess deep experience with government and industry, and who are providing the thought leadership and innovation that is driving innovation in the acquisition and logistics space.

## **CONCLUSION**

Program executives and managers recognize the challenges of modern acquisition and logistics, but many struggle to manage the multidimensional complexities and risks, particularly those that fall outside of the traditional purview of the linear acquisition process. The solution to these multidimensional challenges is multidimensional thinking and approaches based on three principles; (1) Program managers can begin by embracing and building a multidimensional mindset within their entire program office. (2) Armed with an understanding of their full range of responsibilities, program officials can challenge conventional thinking by using the flexibility inherent in the regulations to design an acquisition strategy tailored to their program's requirements and goals. (3) In addition, program managers can exploit the advanced analytics capabilities that are widely available today. Data analytics can provide visibility and insights across all dimensions of a program, making complexity easier to manage.

This is an empowering strategy. By following these three principles, program managers can become masters of both linear and multidimensional acquisition processes. They can exercise more rigorous control and confident oversight of their programs. In addition, they can reduce program risks and better position themselves to deliver programs on time, at expected cost, and to expected performance, enabling both program managers and their warfighter customers to achieve their mission goals.

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## NOTES

1. *Defense Acquisitions: Assessments of Selected Weapon Programs*, March 2014, pp. 6, 164.
2. *GAO's 2015 High Risk Series: An Update*, February 11, 2015, GAO Highlights.
3. Coles, Jeffrey P., Kimberly Kirkpatrick, and Robert R. Voldish, Booz Allen Hamilton, *Why Major Systems Acquisitions Fail to Meet Expectations—A Primer*, p. 2.
4. Supportability (logistics) is usually the first area reduced in the acquisition process, often resulting in a large lifecycle bill for the military operators.
5. For example, adopting the Affordable System Operational Effectiveness (ASOE) model which addresses the contributions of both system design (quality) and logistics footprint (quantity) to TOC
6. *Better Buying Power 3.0 Interim Release*, Sept. 19, 2014, p. 3.
7. "Defense Acquisitions: Review of Private Industry and Department of Defense Open Systems Experience," June 26, 2014, p. 3. See also p. 15.
8. As an example of open architecture advantages in software licensing, 80 percent of the Army C4ISR community's operating budget for the past year was consumed to simply buy licenses. Given the growing use of digital/cyber operations, this approach is not likely to be sustainable—an open architecture can help alleviate this.
9. For an indepth discussion of this proposal, see Scott Gooch, Peter Andrejev, Nicolas Bruno, and Brian Rich, "Driving Acquisition with Data, Not Documents," *Defense AT&L*, May–June 2014, p. 35–37.

# ABOUT OUR AUTHORS

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Trey Obering is a Booz Allen Hamilton Officer and expert in acquisition and program management. Obering works with aerospace clients in the Air Force Materiel Command, Air Force Space Command, and NASA markets. Prior to joining Booz Allen, he led a comprehensive review of the National Reconnaissance Office for the Director, National Intelligence, which provided a new charter for that organization. He retired from the US Air Force as a Lieutenant General with more than 35 years of experience in space and defense systems development, integration, and operations. Obering was the DoD Acquisition Executive for the nation's \$10 billion per year missile defense portfolio.

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## About Booz Allen

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