EXCERPT FROM THE

PROCEEDINGS

OF THE

NINTH ANNUAL ACQUISITION RESEARCH SYMPOSIUM THURSDAY SESSIONS VOLUME II

Competition and the DoD Marketplace

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Deputy Assistant Secretary of the Navy for Research, Development, Test, and Evaluation

Published April 30, 2012

Preface & Acknowledgements

Welcome to our Ninth Annual Acquisition Research Symposium! This event is the highlight of the year for the Acquisition Research Program (ARP) here at the Naval Postgraduate School (NPS) because it showcases the findings of recently completed research projects—and that research activity has been prolific! Since the ARP's founding in 2003, over 800 original research reports have been added to the acquisition body of knowledge. We continue to add to that library, located online at www.acquisitionresearch.net, at a rate of roughly 140 reports per year. This activity has engaged researchers at over 60 universities and other institutions, greatly enhancing the diversity of thought brought to bear on the business activities of the DoD.

We generate this level of activity in three ways. First, we solicit research topics from academia and other institutions through an annual Broad Agency Announcement, sponsored by the USD(AT&L). Second, we issue an annual internal call for proposals to seek NPS faculty research supporting the interests of our program sponsors. Finally, we serve as a "broker" to market specific research topics identified by our sponsors to NPS graduate students. This three-pronged approach provides for a rich and broad diversity of scholarly rigor mixed with a good blend of practitioner experience in the field of acquisition. We are grateful to those of you who have contributed to our research program in the past and hope this symposium will spark even more participation.

We encourage you to be active participants at the symposium. Indeed, active participation has been the hallmark of previous symposia. We purposely limit attendance to 350 people to encourage just that. In addition, this forum is unique in its effort to bring scholars and practitioners together around acquisition research that is both relevant in application and rigorous in method. Seldom will you get the opportunity to interact with so many top DoD acquisition officials and acquisition researchers. We encourage dialogue both in the formal panel sessions and in the many opportunities we make available at meals, breaks, and the day-ending socials. Many of our researchers use these occasions to establish new teaming arrangements for future research work. In the words of one senior government official, "I would not miss this symposium for the world as it is the best forum I've found for catching up on acquisition issues and learning from the great presenters."

We expect affordability to be a major focus at this year's event. It is a central tenet of the DoD's Better Buying Power initiatives, and budget projections indicate it will continue to be important as the nation works its way out of the recession. This suggests that research with a focus on affordability will be of great interest to the DoD leadership in the year to come. Whether you're a practitioner or scholar, we invite you to participate in that research.

We gratefully acknowledge the ongoing support and leadership of our sponsors, whose foresight and vision have assured the continuing success of the ARP:

- Office of the Under Secretary of Defense (Acquisition, Technology, & Logistics)
- Director, Acquisition Career Management, ASN (RD&A)
- Program Executive Officer, SHIPS
- Commander, Naval Sea Systems Command
- Program Executive Officer, Integrated Warfare Systems
- Army Contracting Command, U.S. Army Materiel Command

- Office of the Assistant Secretary of the Air Force (Acquisition)
- Office of the Assistant Secretary of the Army (Acquisition, Logistics, & Technology)
- Deputy Director, Acquisition Career Management, U.S. Army
- Office of Procurement and Assistance Management Headquarters, Department of Energy
- Director, Defense Security Cooperation Agency
- Deputy Assistant Secretary of the Navy, Research, Development, Test & Evaluation
- Program Executive Officer, Tactical Aircraft
- Director, Office of Small Business Programs, Department of the Navy
- Director, Office of Acquisition Resources and Analysis (ARA)
- Deputy Assistant Secretary of the Navy, Acquisition & Procurement
- Director of Open Architecture, DASN (RDT&E)
- Program Executive Officer, Littoral Combat Ships

James B. Greene Jr.   Keith F. Snider, PhD
Rear Admiral, U.S. Navy (Ret.)   Associate Professor

Panel 17. Enabling an Open Architecture Environment

Thursday, May 17, 2012	

11:15 a.m. – 12:45 p.m.	**Chair: RADM James D. Syring,** USN, Program Executive Officer for Integrated Warfare Systems
	
	Competition and the DoD Marketplace
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	    Deputy Assistant Secretary of the Navy for Research, Development, Test, and Evaluation
	
	Historical Analysis of Costs, Risks, and Uncertainties: Moving From a Proprietary to an Open Architected Systems, Open Business Acquisitions Management Approach
	    Tom Housel, Scott Cole, and Russel Wolff
	    Naval Postgraduate School
	
	Market Forces and the Defense Acquisition Marketplace
	    William Schmidt, *ANGLE Inc.*

James D. Syring—Rear Admiral Syring graduated from the United States Naval Academy in 1985 with a Bachelor of Science degree in marine engineering and was commissioned as an engineering duty officer. He completed his Master of Science degree in mechanical engineering from the Naval Postgraduate School in 1992. Syring is also a graduate of the Defense Systems Management College and a member of the Acquisition Professional Community.

Syring received his surface warfare officer qualification on board the USS *Downes* (FF 1070) where he served as auxiliaries and electrical officer and subsequently as electronics material officer. His engineering duty officer tours include ship superintendent for the USS *Port Royal* (CG 73) and Aegis test officer for new construction DDG 51 class ships on the staff of the supervisor of shipbuilding, Pascagoula, 1992–1996; combat systems, test and trials officer in the DDG 51 Aegis Shipbuilding Program Office (PMS 400D), 1996–1999; and combat systems baseline manager at the Aegis Technical Division, responsible for new construction Aegis baseline computer program development, 1999–2001. Syring served as director for surface combatants, Office of the Assistant Secretary of the Navy (Research, Development, and Acquisition), where he advised the secretary on all acquisition matters related to CG 47, DDG 51, DDG 1000, and LCS class ships from 2001 until 2003. His next assignment was as the technical director for the DDG 1000 Shipbuilding Program, serving in that capacity until 2005.

Most recently, Syring served as program manager for the U.S. Navy's DDG 1000 Program (2005–2010). As program manager, he was responsible for total ship systems engineering and acquisition of DDG 1000 and associated technologies, including integrated power systems, dual band radar, and the advanced gun system. Syring currently serves as the program executive officer for Integrated Warfare Systems (PEO IWS).

Syring's personal awards include the Legion of Merit (two awards), the Meritorious Service Medal (four awards), Navy Commendation Medal, and Navy Achievement Medal.

Competition and the DoD Marketplace

Nickolas H. Guertin—Mr. Guertin is the director for transformation in the Office of the Deputy Assistant Secretary of the Navy for Research, Development, Test, and Evaluation. He has extensive experience in Open Systems Architecture product development for weapons, sensors, and ship systems. He also has expertise in ship construction and repair. He leads the transformation of business, technical, and cultural practices for OSA acquisition of national security systems as a coordinated Naval Enterprise effort. He also leads the chartered Department of Defense OSA and Data Rights Team supporting the Better Buying Power initiative. [nickolas.h.guertin@navy.mil]

Brian Womble—Mr. Womble is the deputy for open architecture in the Office of the Deputy Assistant Secretary of the Navy for Research, Development, Test, and Evaluation. He spent the first half of his career working as a system developer in the telecommunications industry in Dallas, TX. In 2001, Mr. Womble joined Lockheed Martin in Manassas, VA, on Open Architecture efforts within the U.S. Navy Submarine ARCI program. He joined the Navy civilian workforce in 2009 and is now leading efforts to transition the Naval Enterprise to Open Systems Architecture through an Open Business Model. [brian.womble@navy.mil]

Abstract

The looming budget crisis brings opportunity for improving acquisition performance. Major Department of Defense (DoD) budget cuts are certain, creating an even greater need to rein in costs. From almost every vantage point—including ship, aircraft, space-ground system development, military construction, modernization, and sustainment—acquisition costs have escalated (Ewing, 2012). A new strategy is needed to drive down costs, spur innovation, and improve acquisition performance. It is these authors' belief that by using an Open Business Model, Open Systems Architecture practices, and simultaneously creating a competitive marketplace, the DoD can significantly reduce the impact of the coming budget cuts. This paper identifies the general aspects of an alternative acquisition model. We will report a relevant example of success that had dramatically better acquisition performance than the current one and will discuss how the DoD can transition to this model to avert the coming crisis for the U.S. DoD Enterprise.

Introduction

The looming budget crisis brings opportunity for improving acquisition performance. Major Department of Defense (DoD) budget cuts are certain, creating an even greater need to rein in costs. From almost every vantage point—including ship, aircraft, space-ground system development, military construction, modernization, and sustainment—acquisition costs have escalated (Ewing, 2012). A new strategy is needed to drive down costs, spur innovation, and improve acquisition performance. It is these authors' belief that by using an Open Business Model, Open Systems Architecture practices, and simultaneously creating a competitive marketplace, the DoD can significantly reduce the impact of the coming budget cuts.

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Transforming the DoD Enterprise

In the 1990s the Navy's submarine program was in a similar crisis, with escalating costs, inflation, and lagging technical superiority. The aggressive acquisition decisions made in the face of a reduced budget and an increasingly capable threat have been well documented (Guertin & Miller, 1998). From this early crucible, the Navy created the Acoustic Rapid COTS Insertion (ARCI) program, which still thrives today. Several key decisions that

drove its success involved reducing systems to smaller, separately acquirable components; increasing the number of industry participants; applying common products across several platforms; and using competition to increase access to innovation.

The problems that faced the submarine program then are now being realized across the naval portfolio and, for that matter, in the rest of the Armed Services. The DoD can build on the Navy's past successes and fundamentally change the defense acquisition landscape using this tested and proven model. The challenge is to enlighten the DoD's corps of program managers to the alternative model and to strategically exercise acquisition choices with a well-crafted plan.

Crafting a Marketplace

To create more acquisition choices, we must operate with an Open Business Model that allows more defense contractors to participate in our efforts, using periodic competitions to keep prices low and innovation flowing. Open Systems Architecture will be mandated in our designs to facilitate loose coupling and high cohesion.

A sound technical foundation is necessary, including technical standards, interfaces, and cyclical updates that are controlled and managed to serve the government's best interests. In this model, contractors are rewarded for ethical behavior, outstanding products, and superior performance. Competition will incentivize on-time deliveries, innovation, and continuing production efficiencies while driving prices lower. The marketplace must be fair and even-handed and provide incentives for higher profits through cost reduction. Negative incentives are uniformly and justly applied for unethical or destructive behavior. A sound understanding of how and where to level the competitive playing field is critical to constructing and managing an Open Business Model to achieve desired goals.

What Makes a Marketplace Successful

Free Flow of Information

The power of the Internet revolution is not the computers, switches, software, and infrastructure that form what we refer to as "the Internet." The power is in the information that is delivered to the end user. The Internet is a positive tool in providing decision criteria that can allow a contractor to extract the best from its resources and help the DoD get the best products for the best prices at the right time.

Property Rights and Protections

Respecting contractors' copyrights as documented in the FAR and DFARs regulations displays important support by the government program manager for the fairness of the marketplace. Program managers will assert government data rights through contracts and must use care to manage program deliveries. When time for a periodic competition nears, selective data will be made available to qualified bidders, allowing prospective contractors a fair chance to win the new contract.

Trust Between Participants

In a research and development (R&D) program, there are numerous opportunities for participants to violate trust. Faithfully reporting faults or bugs, delivering on time, and honestly reporting completion status are examples of good behavior. Participants also rely on government program managers to be fair and benevolent judges for enforcing marketplace rules (judging performance equitably, not playing favorites among participants, etc.). In a marketplace, trust is especially needed in transactions that take a relatively long time to complete, a condition native to an R&D project.

Competition

Competition works for the DoD because sellers are rewarded by securing a contract when lowering their prices and bringing desirable, less expensive, new ideas to the marketplace. On markets, author-economist John McMillan (2002) says, "Competition sets prices right, inducing resources to flow to their highest-value uses. It disciplines those competing to operate efficiently. It generates information about demands and supplies. It brings lower transaction costs than the alternative of case-by-case bargaining does. Creating the conditions for active competition is one of the main tasks of market design." Competition thins any one participant's ability to exercise power over the marketplace and prevents one party from having a decisive effect on the overall marketplace.

Negative Consequences

One danger in designing a marketplace is to overlook negative consequences relative to overall design. An example is a market where only current contract holders are allowed to participate, a situation that can contribute to vendor lock and escalating prices. The marketplace is affected by technical conditions as well, such as cases where proprietary "special" tools are allowed to be used for code generation or other development activities and are not made available to other competing bidders. Proprietary data-modeling tools fall into this category. Another example involves unintended consequences that occur through overzealous application of the government data rights, which could cool innovation and drive out financially weaker partners.

Governance

Transaction costs represent inefficiencies in the marketplace, accompanied by risk. Risk increases overall costs, which are borne by the customer (ultimately, the government). Part of governance is to make sure that all activities, rules, and regulations are necessary, applied evenly, and reduce transaction costs such that free trade is encouraged.

A Level Playing Field

All programs seek the best possible performance at the most affordable cost. The most effective mechanism to get quality products and lowest prices is to facilitate and cultivate an open, competitive marketplace. For a government program manager, this is good business sense. Typically, our performance demands are unique in that there are few pure commercially available goods that meet our needs. We are a unique buyer for things that must be uniquely crafted. The market we buy from has a relatively small number of suppliers (defense firms). There is no "invisible hand" (Smith, 1776) that will fill our demands for the goods we desire. Competition is the most effective means to the lowest price, while simultaneously improving performance and increasing design robustness. The logic flow in Figure 1 lays out the decision process steps to establish and maintain an open, competitive DoD marketplace.

Figure 1. Open Systems Architecture and Data Rights Drive Acquisition Performance

Fielded programs have already completed initial development and are in the sustainment phase; many have needs for improvements. As a matter of practice, it takes several years and substantial cost to develop a completely new platform or weapon, but it takes relatively minor investments to make incremental upgrades. Upgrade programs have historically been driven by specific platform architectures and are usually tightly coupled with the original platform vendor. Imagine developing a whole new aircraft or competing for all aspects of a ship weapon system just to upgrade a component. Competition for product improvements is far more efficient at the component level and is the most risk-prudent approach for making changes to our existing inventory of military equipment.

Introducing competition in long-running programs can be challenging. Platform unique architectures that were conceived and delivered via a platform-focused contractor tend not to lend themselves to quickly or easily integrating capabilities from outside (third-party) sources. To begin solving this problem, systems engineering skills in both government and industry must be learned to facilitate necessary changes to system architectures in accommodating new components.

Another crucial element to competition is ensuring that it is possible for a non-incumbent to win. Conversely, competition is real only when it is possible for the incumbent to lose. All bidders to a request for proposal (RFP) must have access to the right information that will level the intellectual playing field and facilitate the ability for any qualified vendor to bid and win. This highlights two problems that the government must solve: (1) what is the minimum set of information that should be made available and (2) how can it be shared with minimal risk? The government must be strategic in releasing information delivered from its incumbent contractor to ensure that critical artifacts are shared at the right time and place, commensurate to facilitating competition over the product's life cycle. Program managers and resource sponsors must be aware of the value of requesting those deliverables in the contract and must demand delivery so that the data is available when needed.

Once the needed data and information have been identified and delivered, how can the government ensure that they are subsequently sharable? For the vast majority of the military warfighting systems we have procured in the past, the government has paid for all or part of the development. When the government pays for development, license rights are conveyed by regulations and statute. Under appropriate circumstances, the government can share intellectual property across the vendor community. Although the government has long had these rights to data, it has not often effectively asserted them, nor has it requested the minimum data needed to ensure life cycle competition. This is certainly one of the reasons that so many programs are vendor locked. Understanding the government's rights in each piece of data, both technical data and computer software, is a behavior that must become automatic across the acquisition community, especially in new start programs, so that competition can be established and sustained. The *DoD OSA Contract Guidebook for Program Managers* (DoD, 2011)is an excellent resource for program office staff to use to help ensure that the critical elements of a system are captured during the design and production phase.

The government has two main fiduciary responsibilities: (1) get the best product for the warfighter and (2) get the best deal for the taxpayer. Systems engineering skills, program management practices, and acquisition acumen must be improved to meet this challenge.

To put competition into integrated systems, the program manager should divide a large acquisition into smaller business units that are just large enough to be worth the time and effort to compete (on both the government's and industry's sides), yet small enough to be managed as a module that can be developed with workable autonomy (loosely coupled). Opportunities exist for bringing in a variety of smaller components that can replace or provide additional items that are needed by the warfighter.

Engaging Resource Sponsors

With new budget constraints, sponsor organizations are beginning to see the value of having common systems that can be used across many platforms. Additional arrangements to work out the details and plans for system development and production sharing efforts are required to make strides into combining program resources. The practice of coordinating sponsor investments can and must become part of the Enterprise funding model, thus finding a way to merge "similar" systems into "common" product lines paramount (Guertin & Clements, 2010). Reuse of completed, tested, and certified systems must be the norm for the way forward.

Integrator or Application Developer

Separating roles in system research and development contracts will help preserve a competitive environment. There is a fundamental conflict of interest in our classic arrangement of having the prime integrator also be the application developer. This flaw precludes having a market of component providers from a variety of firms. In this case, the integrators are profit-motivated to keep the work that is most desirable in-house and relegate the less desirable and less profitable tasks to others. It would be healthier for the marketplace to divide the contract structure such that the integrator is limited to integration. The role of the applications developer would be contracted to a different entity. Industry would then be motivated to enforce modularity and well-defined system interfaces to create healthy, stand-alone components with low coupling and high cohesion. The "prime" fills a mentoring role as a business partner whose main function is to ensure that the resulting design is open and supports continuous competition across the life cycle for capability improvements. Figure 2 illustrates this concept. There are also hard-won lessons learned

from other defense acquisitions that attempted to establish these market forces that can be captured and applied to this DoD Enterprise acquisition model (Yakovac, 2007).The most important requirement is to ensure that component products go through a rigorous validation and verification stage before being promotable to integration.
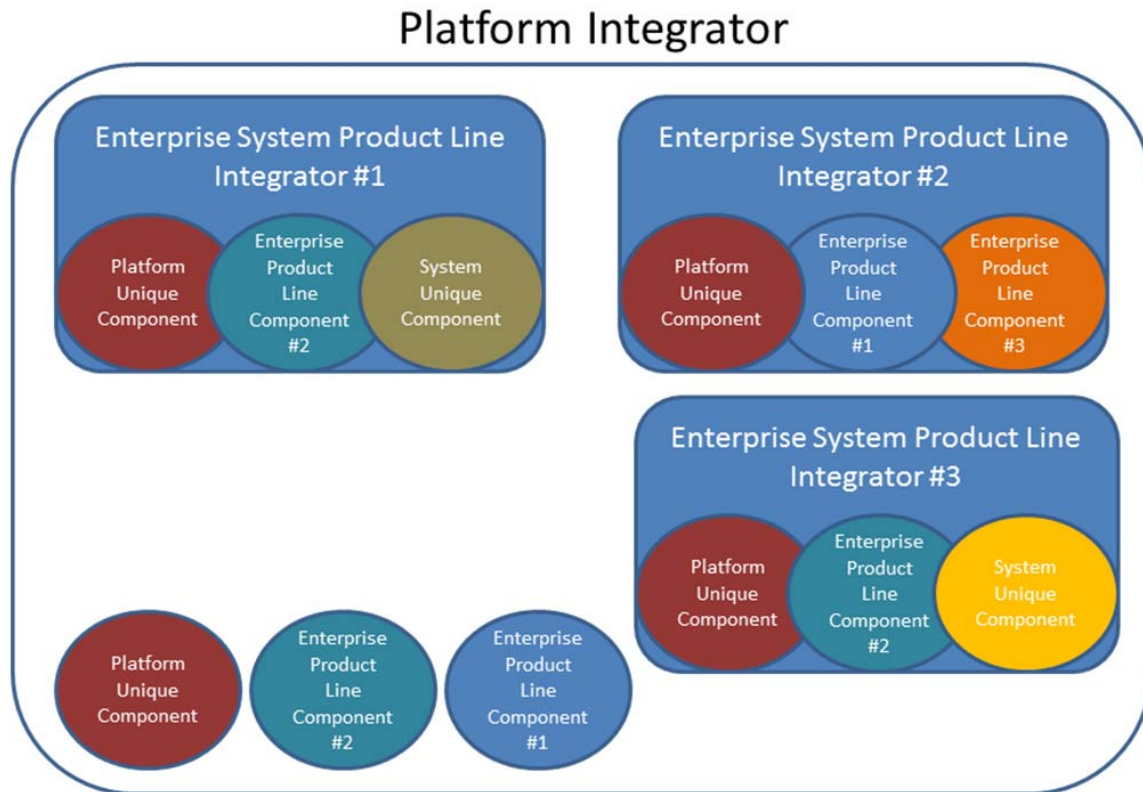
Platform Integrator

Figure 2. Common Product Lines and Component Integration Into Systems and Platforms

Commonality and Just-in-Time Contracting

Contracting organizations are already under heavy workloads. There are two mechanisms that will greatly simplify the DoD's contracting workload for warfighting product R&D and increase our ability to gain greater cost performance from our investments. The first is to strategically reuse common products, based on best Enterprise value. This will decrease the number of contracts required. The second is to capture the contracting tactics used successfully by programs that are achieving the benefits of OSA and make those tactics more repeatable. We propose that the DoD establish a small number of contract templates (e.g., platform integrator, system integrator, component provider, hardware integrator, and independent test agent), based on the highly successful *DoD OA Contract Guidebook for Program Managers* (DoD, 2011). Using these templates, the DoD can increase clarity in our business strategy and use consistent contract incentives to achieve well-defined goals and speed the delivery of contract actions. This will decrease the inherent complexity with creating unique and uncoordinated contracts for very similar types of work. These changes will offset the need to increase the number of contracts used in a typical development in order to resolve the inherent conflict of interest associated with being both an integrator and a component developer. A key benefit of creating this tiered structure is to decompose our systems development projects into smaller contracts that are inherently

more efficient and effective at meeting cost and schedule requirements (The Standish Group International, 1999). Another benefit of this approach is that contracts typically take years to prepare and compete. Most of them are unique ground-up compositions that are tailored for particular programs and particular platforms. Unique contracts result in poor communications from the government to industry, especially in addressing a clear government business strategy.

Government Roles

In order to realize the changes discussed in this paper, the DoD must lead. Definition and structure must be dictated for a new DoD marketplace. Participants should understand what their rights (use and ownership) are with regards to intellectual property. A sense of fairness should pervade the marketplace, with the spirit of healthy competition and respect at all levels for legal and ethical behavior.

Summary

Slow and costly business and engineering principles of the past have produced a situation in which the DoD will soon not be able to support its warfighters with adequate materiel solutions. We must take advantage of work and progress that has been achieved by reusing proven solutions. Difficulties in contracting must be addressed to improve throughput so that more businesses can participate and contracts are awarded on a more manageable schedule. Delegating specific roles for integrators and application developers would help maintain a competitive and fair environment. Ultimately, the marketplace is crafted by the contract language, and as such, that language must incentivize Open Systems Architecture behavior. Introducing mandatory contract templates can help correct issues that exist with our program-specific contracts.

Finally, the submarine program of the 1990s is an example of success, which continues today to save taxpayer dollars using an Open Systems Architecture acquisition model. The path is to transform the DoD marketplace, create an atmosphere of reuse, and use Open Systems Architecture to deliver best value to the warfighter.

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