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## Making Acquisition Measurable

Buck, Kevin; Hanf, Diane

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OF THE  
EIGHTH ANNUAL ACQUISITION  
RESEARCH SYMPOSIUM  
WEDNESDAY SESSIONS  
VOLUME I

## **Making Acquisition Measurable**

Kevin Buck and Diane Hanf, The MITRE Corporation

**Published: 30 April 2011**

Approved for public release; distribution unlimited.

Prepared for the Naval Postgraduate School, Monterey, California 93943

Disclaimer: The views represented in this report are those of the authors and do not reflect the official policy position of the Navy, the Department of Defense, or the Federal Government.



ACQUISITION RESEARCH PROGRAM  
GRADUATE SCHOOL OF BUSINESS & PUBLIC POLICY  
NAVAL POSTGRADUATE SCHOOL

The research presented at the symposium was supported by the Acquisition Chair of the Graduate School of Business & Public Policy at the Naval Postgraduate School.

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## Preface & Acknowledgements

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During his internship with the Graduate School of Business & Public Policy in June 2010, U.S. Air Force Academy Cadet Chase Lane surveyed the activities of the Naval Postgraduate School's Acquisition Research Program in its first seven years. The sheer volume of research products—almost 600 published papers (e.g., technical reports, journal articles, theses)—indicates the extent to which the depth and breadth of acquisition research has increased during these years. Over 300 authors contributed to these works, which means that the pool of those who have had significant intellectual engagement with acquisition issues has increased substantially. The broad range of research topics includes acquisition reform, defense industry, fielding, contracting, interoperability, organizational behavior, risk management, cost estimating, and many others. Approaches range from conceptual and exploratory studies to develop propositions about various aspects of acquisition, to applied and statistical analyses to test specific hypotheses. Methodologies include case studies, modeling, surveys, and experiments. On the whole, such findings make us both grateful for the ARP's progress to date, and hopeful that this progress in research will lead to substantive improvements in the DoD's acquisition outcomes.

As pragmatists, we of course recognize that such change can only occur to the extent that the potential knowledge wrapped up in these products is put to use and tested to determine its value. We take seriously the pernicious effects of the so-called “theory–practice” gap, which would separate the acquisition scholar from the acquisition practitioner, and relegate the scholar's work to mere academic “shelfware.” Some design features of our program that we believe help avoid these effects include the following: connecting researchers with practitioners on specific projects; requiring researchers to brief sponsors on project findings as a condition of funding award; “pushing” potentially high-impact research reports (e.g., via overnight shipping) to selected practitioners and policy-makers; and most notably, sponsoring this symposium, which we craft intentionally as an opportunity for fruitful, lasting connections between scholars and practitioners.

A former Defense Acquisition Executive, responding to a comment that academic research was not generally useful in acquisition practice, opined, “That's not their [the academics'] problem—it's ours [the practitioners']. They can only perform research; it's up to us to use it.” While we certainly agree with this sentiment, we also recognize that any research, however theoretical, must point to some termination in action; academics have a responsibility to make their work intelligible to practitioners. Thus we continue to seek projects that both comport with solid standards of scholarship, and address relevant acquisition issues. These years of experience have shown us the difficulty in attempting to balance these two objectives, but we are convinced that the attempt is absolutely essential if any real improvement is to be realized.

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

- Office of the Under Secretary of Defense (Acquisition, Technology & Logistics)
- Program Executive Officer SHIPS
- Commander, Naval Sea Systems Command
- Army Contracting Command, U.S. Army Materiel Command
- Program Manager, Airborne, Maritime and Fixed Station Joint Tactical Radio System



- Program Executive Officer Integrated Warfare Systems
- Office of the Assistant Secretary of the Air Force (Acquisition)
- Office of the Assistant Secretary of the Army (Acquisition, Logistics, & Technology)
- Deputy Assistant Secretary of the Navy (Acquisition & Logistics Management)
- Director, Strategic Systems Programs Office
- Deputy Director, Acquisition Career Management, US Army
- Defense Business Systems Acquisition Executive, Business Transformation Agency
- Office of Procurement and Assistance Management Headquarters, Department of Energy

We also thank the Naval Postgraduate School Foundation and acknowledge its generous contributions in support of this Symposium.

James B. Greene, Jr.  
Rear Admiral, U.S. Navy (Ret.)

Keith F. Snider, PhD  
Associate Professor



## Panel 4 – Improving IT Acquisition

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Wednesday, May 11, 2011	
11:15 a.m. – 12:45 p.m.	<p><b>Chair: Michael McGrath</b>, Vice President, Systems &amp; Operations Analysis, Analytic Services, Inc.</p> <p><b><i>IT Acquisition: Expediting the Process to Deliver Business Capabilities to the DoD Enterprise</i></b></p> <p>Jacques Gansler and William Lucyshyn, University of Maryland</p> <p><b><i>Making Acquisition Measurable</i></b></p> <p>Kevin Buck and Diane Hanf, The MITRE Corporation</p> <p><b><i>Command and Control Rapid Prototyping Continuum (C2RPC) Transition: Bridging the Valley of Death</i></b></p> <p>Nicholas Gizzi, PMW 150</p>

**Michael McGrath**—Vice President, Systems and Operations Analysis (SOA), Analytic Services, Inc. Dr. McGrath became the vice president in October 2007. He leads ANSER's operations in the Science and Technology, Enterprise Systems and Planning, and Operations Analysis and Management mission areas. He is responsible for developing and delivering services that enable the clients of Analytical Services, Inc., to address critical challenges in national security and public safety, and to improve the effectiveness of public-sector programs. Dr. McGrath leads a workforce whose expertise spans a wide range of technology and application domains in research, acquisition, information systems and defense operations.

Dr. McGrath served as Deputy Assistant Secretary of the Navy for Research, Development, Test, and Evaluation from February 2003 to September 2007. His role was to aggressively drive new technologies from all sources across Navy and Marine Corps platforms and systems and to develop programs to bridge the gap in transitioning from science and technology to acquisition. He was also responsible for integrating test and evaluation with the evolutionary acquisition process. His leadership was key to the restructuring of the Future Naval Capabilities program, the success of the Rapid Technology Transition program, and the establishment of the Navy Enterprise T&E Board of Directors and the Navy Lab and Centers Competency Group.

Prior to his return to government service in 2003, Dr. McGrath spent five years as vice president for Government Business at the Sarnoff Corporation, a leading R&D company with both commercial and government clients. He was responsible for developing programs to meet government needs for innovative dual use technologies in sensors and microelectronics, networking and information technology, and bio-technology.

Dr. McGrath's previous government experience includes weapon system logistics planning and management at Naval Air Systems Command, acquisition policy in the Office of the Secretary of Defense, and several technology management positions. He was the first OSD Director of the Computer-aided Acquisition and Logistics Support program. At DARPA, he managed programs in Agile Manufacturing, Electronic Commerce Resource Centers, and Affordable Multi Missile Manufacturing. He also served in leadership positions for several DoD-wide initiatives to improve manufacturing and reduce the cost of defense systems. As the Assistant Deputy Under Secretary of Defense (Dual Use and Commercial Programs), he directed the Commercial Technology Insertion Program, the Commercial Operating and Support Savings Initiative, and the Department's Title III industrial base investments.



Dr. McGrath holds a BS in Space Science and Applied Physics (1970) and an MS in Aerospace Engineering (1972) from Catholic University, and a doctorate in Operations Research from George Washington University (1985). He was an adjunct associate professor at GWU in 1987–1988. He is active in several industry associations and study groups, including studies by the Defense Science Board and the National Research Council.



## Making Acquisition Measurable

**Kevin Buck**—Principal Economics and Business Analyst, Center for Acquisition and Systems Analysis (CASA). Mr. Buck provides investment, portfolio, and performance analyses and management solutions for Defense, Intelligence, and Civilian Agency sponsors. He is a Principal Investigator for a MITRE research project related to streamlining transparency, accountability, and performance management improvement. Mr. Buck has a Bachelor of Science in Marine Transportation from the U.S. Merchant Marine Academy, and a Master of Science in Industrial Administration from Carnegie-Mellon University. He has served in the U.S. Navy (enlisted and officer). [kbuck@mitre.org]

**Diane Hanf**—conducts multi-discipline, systems/software engineering and acquisition investigations on various technology assets, such as Web 2.0-based services and applications. She is currently conducting research on the use of gaming to investigate acquisition changes needed to support rapidly changing component-based systems. Ms. Hanf has bachelor's degrees in Electrical Engineering (Oklahoma State), Wire Communications Technology, and Business Administration (Wayland Baptist) and a Master of Science degree in Systems Engineering from Johns Hopkins University. [dhanf@mitre.org]

### Abstract

The ultimate objective of our investigations was to establish a foundation for improving how acquisition performance is managed. Our project looked broadly across the four principles highlighted in NDAA Section 804 and subsequently focused on the challenges that program managers might face in measuring adoption and impact of the user engagement principle. We discovered that the principles are interrelated and that an understanding of how acquisition success will be measured is critical to understanding the principles' contribution to successful acquisition outcomes. Our research focused most extensively on the challenges that Government program offices face in ensuring early and continual involvement of the user, measuring/monitoring user engagement in achieving program/system objectives, and determining the impact of user involvement. Based on direct interaction with users of Government systems and program capabilities, our research resulted in the identification of essential elements for an effective user engagement program, codification of key user types and characteristics, candidate high-priority user engagement metrics, lessons learned in deriving metrics, relevance of performance management principles for measuring user engagement, and insights from users for improving how program offices can more effectively and efficiently engage users in the process of delivering required capabilities.

### Report Summary

*“Information technology (IT) offers immense capability in terms of agility, flexibility, responsiveness, and effectiveness. It enables nearly all of our military combat capability and has become a necessary element of our most critical warfare systems. However, there is growing concern within Congress and among DOD leadership that the nation’s military advantage may be eroding. The deliberate process through which weapon systems and information technology are acquired by DOD cannot keep pace with the speed at which new capabilities are being introduced in today’s information age—and the speed with which potential adversaries can procure, adapt, and employ those same capabilities against the United States.”*





MITRE Technical Report (MTR) 110102, “Making Acquisition Measurable—FY 2010 NDAA Section 804 Principles” summarizes the results of preliminary investigations undertaken by MITRE’s “Making Acquisition Measurable” (MAM) Capability Development Team to support Government programs in measuring the adoption and impact of four Information Technology (IT) acquisition principles. These principles are identified within Section 804 of the FY 2010 National Defense Authorization Act (NDAA) as critical to a new IT acquisition process that must be created by the Department of Defense (DoD). The four principles include:

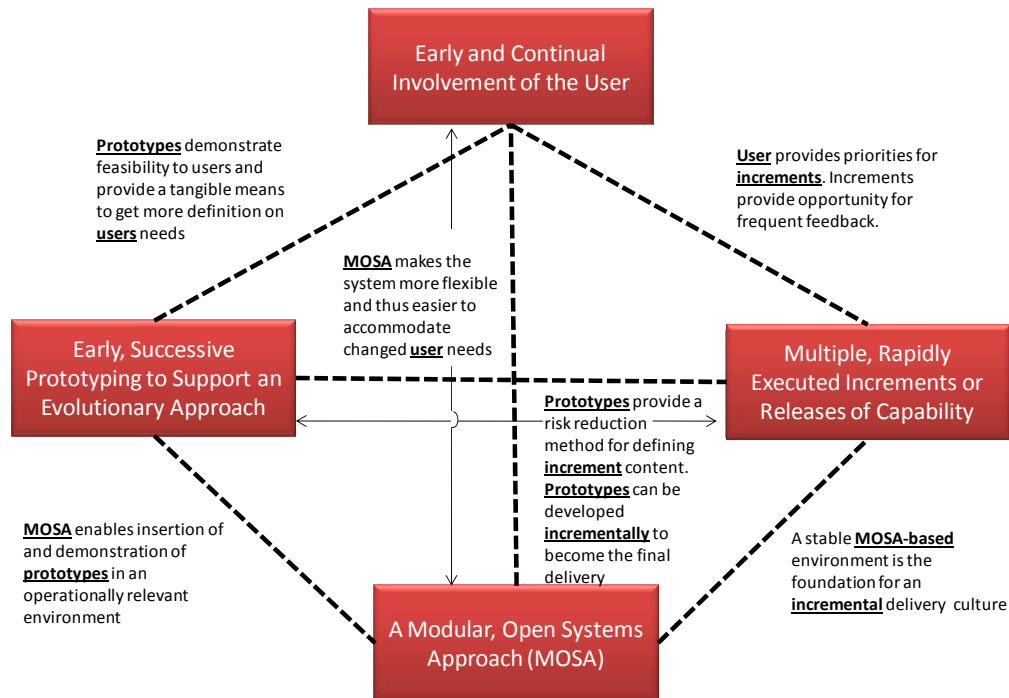
- Early and continual involvement of the user;
- Multiple, rapidly executed increments or releases of capability;
- Early, successive prototyping to support an evolutionary approach; and
- A modular, open-systems approach.

The ultimate objective of our investigations was to establish a foundation for improving how acquisition performance is managed. The absence of a formalized and standard performance management methodology has been noted by the House Armed Services Committee Panel on Defense Acquisition Reform as a critical area of weakness. To create a foundation for improved performance management, the team needed to better understand how program managers can more effectively and efficiently do the following:

- Account for the unique nature of IT in their performance measurement and program management;
- Apply performance metrics to determine whether desired outcomes from their programs and acquisitions will likely be achieved;
- Identify in a proactive manner whether course corrections are needed or expectations should be adjusted;
- Leverage best practices, lessons learned, and existing tools/analyses to improve data collection, performance measurement, acquisition monitoring, and acquisition execution decision-making; and
- Ensure that performance management efforts support improved performance (e.g., timely delivery of required capabilities, services, or products to the end-user).

The project looked broadly across the four principles highlighted in NDAA Section 804 and subsequently focused on the challenges that program managers might face in measuring adoption and impact of the user engagement principle. We discovered that the principles are interrelated and that an understanding of how acquisition success will be measured is critical to understanding the principles’ contribution to successful acquisition outcomes. Figure 1 illustrates key relationships among the four principles.





**Figure 1. Relationship Among Section 804 Principles**

Incremental deliveries and supporting underlying processes, for instance, should provide early opportunities to learn about the changing user environment. Designing user interfaces using MOSA principles should reduce user training needs and allow for more rapid deployment of components that have changed because of user needs. Applying prototypes should provide a tangible presentation of the evolving or proposed system, which should enrich user-developer interactions.

Our research focused most extensively on the challenges that Government program offices face in ensuring early and continual involvement of the user, measuring/monitoring user engagement in achieving program/system objectives, and determining the impact of user involvement. Based on direct interaction with users of Government systems and program capabilities, our research resulted in the identification of essential elements for an effective user engagement program, codification of key user types and characteristics, candidate high-priority user engagement metrics, lessons learned in deriving metrics, relevance of performance management principles for measuring user engagement, and insights from users for improving how program offices can more effectively and efficiently engage users in the process of delivering required capabilities.

## References

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