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**The Failures and Promises of an Operational Service-Oriented
Architecture: The ROI of Operational Effectiveness in Addition to
Acquisition Efficiency at the Navy's Op Level of War**

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Prepared for the Naval Postgraduate School, Monterey, California 93943

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Preface & Acknowledgements

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)
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- Office of Procurement and Assistance Management Headquarters, Department of Energy

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

Keith F. Snider, PhD
Associate Professor



Panel 15 – Analysis for Enhanced Acquisition Decision-Making

Thursday, May 12, 2011	
9:30 a.m. – 11:00 a.m.	Chair: J. David Patterson, Executive Director, National Defense Business Institute, The University of Tennessee <i>The Effect of Processes and Incentives on Acquisition Cost Growth</i> Doug Bodner, Bill Rouse, and I-Hsiang Lee, Georgia Institute of Technology <i>The Failures and Promises of an Operational Service-Oriented Architecture: The ROI of Operational Effectiveness in Addition to Acquisition Efficiency at the Navy's Op Level of War</i> Richard Suttie, U.S. Naval War College, and Nicholas Potter <i>The Theory and Feasibility of Implementing an Economic Input/Output Analysis of the Department of Defense to Support Acquisition Decision Analysis and Cost Estimation</i> Eva Regnier and Dan Nussbaum, NPS

David Patterson—Executive Director, National Defense Business Institute, University of Tennessee. Mr. Patterson is establishing an institution inspiring business innovation for both government and industry at the University of Tennessee in the College of Business Administration by providing practical, sound assistance in creating economically efficient and effective Defense business and acquisition programs. He is responsible for preparing funding proposals and budgets and for recruiting and managing university staff, professors, other faculty members, and key subject-matter experts engaged in relevant research and resource development tasks.

Prior to his current duties, he was the Principal Deputy Under Secretary of Defense (Comptroller). As the Principal Deputy, he was directly responsible for advising and assisting the Under Secretary of Defense (Comptroller) with development, execution, and oversight of the DoD budget, exceeding \$515 billion, with annual supplemental requests of more than \$160 billion. He was also responsible for developing legislative strategies and developing and implementing DoD financial policy, financial management systems, and business modernization programs. In June 2005 Mr. Patterson was appointed to lead the Defense Acquisition Performance Assessment Project, a comprehensive evaluation of every aspect of the Defense Department acquisition system and decision making processes.

From August 2003 to June 2005, Mr. Patterson held duties as The Special Assistant to the Deputy Secretary of Defense. In the capacity as Special Assistant, Mr. Patterson was responsible for managing the Deputy Secretary of Defense's personal staff as well as providing direction and advice to the Office of the Secretary of Defense Staff on a wide range of national security operations and policy subjects. He contributed to the Department of Defense support to the United States' mission to establish free and economically successful societies and governments in Iraq and Afghanistan. Additionally, Mr. Patterson supported the Deputy Secretary in the areas of military commissions for detainees in the Global War on Terrorism and major defense acquisition programs.

Before returning to government service, Mr. Patterson was a founding and managing partner at Bucher, Hutchins, Kohler and Patterson, Inc., where he led the firm's commercial consulting practice, developing management strategies for acquiring new business. From 1999 to 2001, he was the Vice



President and Site Manager for Steven Myers and Associates' support to Lockheed Martin Corporation's winning Joint Strike Fighter competitive proposal preparation.

Between 1993 and 1999, Mr. Patterson held a variety of responsible, executive positions at McDonnell Douglas Corporation (later The Boeing Company), beginning as the Senior Manager for Market Research and Analysis on the C-17 military air cargo aircraft and later as Director, International Business Development. He was responsible for developing and executing the business capture strategy that won U.S. Government Defense Acquisition Board approval to procure 80 additional C-17s, completing the first contract for 120 aircraft. Mr. Patterson led the Boeing business development team that launched the initiative to introduce a commercial version of the C-17; the BC-17.

Mr. Patterson served in the Air Force from 1970 to 1993, retiring in the rank of colonel. During that time, he held responsible leadership and management positions, with assignments at the air wing level as a C-5A aircraft commander and Deputy Operations Group Commander, at major command headquarters, Headquarters, U.S. Air Force, the Office of the Chairman, Joint Chiefs of Staff and the Office of the Secretary of Defense, Inspector General. In 1986, Mr. Patterson was the Air Force Fellow at the American Enterprise Institute. He served in Vietnam flying O2As as forward air controller.



The Failures and Promises of an Operational Service-Oriented Architecture: The ROI of Operational Effectiveness in Addition to Acquisition Efficiency at the Navy's Op Level of War

Richard Suttie—Assistant Dean of Academics, Naval War College. Professor Suttie oversees research and war gaming operations, and he researches the future of naval strategy for the Chief of Naval Operations. Captain Suttie logged more than 3,500 hours in a variety of naval aircraft, primarily the P-3 Orion. He served on Battle Group staffs embarked on USS *Midway* and USS *Missouri*, and had aviation command in 1996. He was subsequently assigned to attaché duty at the American Embassy in London. A native of San Diego, he is a graduate of USC.
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Nicholas Potter

Abstract

This paper and presentation will share four years of research by the Naval War College into the operational requirements for a service-oriented architecture (SOA) for the Navy's operational level of war applied at the Navy's Maritime Operations Centers (MOCs). It will also argue that the cost-benefit analysis for SOA must be the improved operational effectiveness of the organization, not just the lower costs of data management and reduced redundancies of legacy systems. It will share a model for such an evaluation, and a model for proper protocols and data management for implementation. This paper argues that the proper cost-benefit analysis of service-oriented architecture is not possible without an operational integrated architecture that explicitly captures the role-based decision making protocols mapped to the core operational and enterprise-wide processes necessary to improve operational effectiveness. This paper and presentation will share this research and its direct application to the design and implementation of SOA for the Navy's Operational Level of War.

Report Summary

This paper and presentation will share four years of research by the Naval War College into the operational requirements for a service-oriented architecture (SOA) for the Navy's operational level of war applied at the Navy's Maritime Operations Centers (MOCs). It will also argue that the cost-benefit analysis for SOA must be the improved operational effectiveness of the organization, not just the lower costs of data management and reduced redundancies of legacy systems. It will share a model for such an evaluation, and a model for proper protocols and data management for implementation.

A primary goal of information technology (and related knowledge management acquisition) has been to optimize and obtain efficiencies related to coherence to legacy IT systems and protocols. Improving different IT characteristics such as speed and coherency are seen as the primary metrics of cost-benefit analysis and system's effectiveness. Some offer that a requirement to improved efficiency would be to better understand the tasks within the work breakdown structure and the functionality of the systems themselves. However, this depends on the Enterprise Architecture satisfactory reflecting the requirements for data exchange from the operational requirement. It often does not, and does not in the critical domain of the operational level of war, where importantly a properly



designed SOA (such as Consolidated Afloat Networks and Enterprise Services, CANES) would have a profound impact on operational performance of warfighting decision making.

Research at the Naval War College has yielded a methodology which can establish an architecture that would be both accurate and dynamic, and well serve SOA design leading to a full benefit analysis.

The paper and presentation will share CBCA (Capabilities Based Competency Assessment) research conducted over the last four years by the Naval War College. CBCA has produced a data model which identifies and defines the critical nodes for the operational architecture across the Navy's Maritime Operations Centers MOCs, and places that work in a dynamic workforce environment which allows architects and IT designers to capture the necessary business (operations) context for correct rules and protocols for data management.

This paper argues that the proper cost-benefit analysis of service-oriented architecture is not possible without an operational integrated architecture which explicitly captures the role-based decision making protocols mapped to the core operational and enterprise-wide processes necessary to improve operational effectiveness.

Operational effectiveness is improved by synchronizing and enabling delivery of valid and reliable information (data + data context) with the right content (information + process context) to the right user (role + content).

MOCs are operational planning nodes within the Navy's numbered fleet commands. They are inherently joint, process driven, and globally connected.

CBCA research has developed a methodology that delivers the visibility, sequencing and coherency (data convergence) necessary for the performance of roles within and across the MOCs. The research and outcomes argue that any return on investment or cost-benefit analysis must use operational effectiveness as the primary measure, and demonstrates one method to do so.

This paper and presentation will share this research and its direct application to the design and implementation of SOA for the Navy's Operational Level of War.

