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**Analysis of Modular Open Systems Approach (MOSA)
Implementation in Navy Acquisition Programs
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Analysis of Modular Open Systems Approach (MOSA) Implementation in Navy Acquisition Programs

Presenter: Rene Rendon, PhD, is on the faculty of the Naval Postgraduate School where he teaches graduate acquisition and contract management courses. Prior to his appointment at the Naval Postgraduate School, he served for more than 22 years as an acquisition and contracting officer in the United States Air Force. His Air Force career included assignments as a contracting officer for major space and weapon systems. Rendon has earned Bachelor, Master's, and Doctorate degrees in Business Administration and has taught for the UCLA Government Contracts program. Dr. Rendon is the Chair of ISM's Federal Acquisition and Subcontract Management Group, a member of the ISM Certification Committee, as well as on the Editorial Review Board for the ISM *Inside Supply Management*. He is a member of the NCMA Board of Advisors, as well as associate editor for its *Journal of Contract Management*. Dr. Rendon has published articles in *Contract Management*, the *Journal of Contract Management*, *Program Manager*, *Project Management Journal*, and *PM Network,* and is co-author of *Contract Management Organizational Assessment Tools* published in 2005.

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Introduction

This research continues the exploration of the use of the modular open systems approach (MOSA) as a method for implementing an evolutionary acquisition strategy in Department of Defense (DoD) programs. The background on the initial DoD and Navy policy on using a MOSA approach in defense acquisition is presented, followed by a review of the initial research findings. A discussion is then provided on the Navy's method for assessing its implementation of a MOSA approach in its acquisition programs. This discussion will focus on the use of the Naval Enterprise Open Architecture Assessment Tool (OAAT). The primary purpose of this continuing research is to provide an analysis of the results of the OAAT assessment of Navy acquisition programs.

Background on MOSA Policy

DoD 5000.1 states that, "a modular open systems approach shall be employed where feasible" (Under Secretary of Defense (AT&L), 2003, May 12a; 2003, May 12b). Furthermore, in April 2004, the USD (AT&L) issued a memorandum stating, "all programs subject to milestone review shall brief their program's MOSA implementation status to the Milestone Decision Authority (MDA) to determine compliance" (Under Secretary of Defense (AT&L), 2004, April 5).

Later that year, the Office of the USD(AT&L), Director of Defense Systems, issued instructions for MOSA implementation and identified the Open System Joint Task Force (OSJTF) as the DoD lead for MOSA. This memo also identified MOSA as, "an integral part of the toolset that will help DoD achieve its goal of providing the joint combat capabilities required

in the 21st century, including supporting and evolving these capabilities over their total life-cycle" (Under Secretary of Defense (AT&L), 2004, July 7).

In addition, in August 2004, Assistant Secretary of the Navy (Research, Development & Acquisition) (ASN (RDA)) issued a policy statement that developed a single Navy-wide Open Architecture to account for Surface, Air, Submarine, C41, and Space domain unique requirements. That memo also assigned PEO IWS overall responsibility and authority for directing the Navy's OA Enterprise effort. An OA Enterprise Team comprised of OA domain leads, ASN, OPNAV, and SYSCOM representatives was chartered and led by PEO IWS. The Team collectively oversees the development and implementation of the processes, business strategies, and technical solutions which support cross-Enterprise requirements in addition to domain-specific needs. The Enterprise Team will also define an overarching OA acquisition strategy and develop guidance that addresses incentives, intellectual property issues, contracting strategies (i.e., integrator's vs. prime's), and funding alternatives (ASN (RD&A), 2004).

Finally, in a 23 December 2005 letter, Deputy Chief of Naval Operations (Warfare Requirements and Program) established the Navy-wide requirement for OA and laid out the priorities on which it wants Naval OA to focus. The letter, "establishes the requirement to implement Open Architecture (OA) principles across the Navy Enterprise." It establishes the OA Council (OAC) of representatives of N6/N7 Division

Directors to work with the OAET on the requirements. The letter directs the OAC, PEO IWS 7.0, and the OAET to focus assessment priorities in support of the following capabilities: Track management, Combat ID (CID), Data fusion, Time-critical Targeting & Strike, and Integrated Fire Control (IFC).

Initial Research Findings

The purpose of the initial MOSA research was to explore both the use of the modular open systems approach (MOSA) as a method for implementing an evolutionary acquisition strategy, as well as the implications of using such an approach on the contracting process.

Although the phases of the contracting process are the same for MOSA-based programs as they are for non-MOSA-based programs, this research found that the specific activities conducted and documents developed during the execution of these contracting phases have a direct influence on the success of a MOSA-based program. For example, the various options for allocating roles and responsibilities between the government and the contractor for the various steps in the acquisition process will influence the amount of "openness" in the program and the contractor's motivation for meeting the desired level of openness.

This research indicated that the greater degree of jointness in acquisition roles and responsibilities, as well as the greater degree of contractor-developed acquisition documents, will lead to a higher level of openness.

This initial research also identified early involvement and participation by industry in developing requirements and acquisition strategy as a key factor in successful MOSA-based programs. Program offices managing a MOSA-based program should conduct extensive market research and industry conferences to achieve this contractor involvement. A best-value contract strategy that is tailored to emphasize technical performance in open-based systems and COTS systems is also a critical factor in meeting higher levels of openness in MOSA-based

programs. A contract strategy which involves developing source-selection evaluation factors specifically weighted to emphasize an open systems approach will be critical for MOSA-based programs.

As important as the acquisition strategy is the structure of the contract of a MOSA-based program.

This research identified the use of incentive-fees, award-fees, and award-term contract incentives as integral to the success of MOSA-based programs. These incentives, if structured appropriately, are effective tools for motivating and incentivizing contractors to achieve higher levels of openness in the design and development of systems.

Finally, the consistent and aggressive use of the contractor past-performance information system, as well as the development and establishment of lessons-learned programs and best practices will be essential as more and more MOSA-based programs are initiated. As contractors performing work on MOSA-based programs begin to realize that the DoD is insistent on using open systems in developing its major weapon systems, they should begin to dedicate the required resources to this method of developing weapon systems.

Internal Assessment of MOSA Implementation

The focus of this follow-on research is to analyze the effectiveness of the implementation of MOSA in Navy acquisition programs by investigating the results of MOSA-internal assessments, specifically the results of the Open Architecture Assessment Tool (OAAT). The results of this research will prove beneficial to senior Navy officials by providing data points on MOSA implementation by analyzing the consistency of MOSA compliance status and internal assessments for specific Navy acquisition programs.

The OAAT is a tool designed to assist Navy program managers in assessing the "openness" of their programs. It aligns to the Open Architecture Assessment Model (OAAM) as approved by ASN(RDA) and provides a reproducible and objective method of conducting program assessments.   Specifically, the OAAT is an analytic tool that evaluates responses to a set of interrelated questions to provide program officers with an objective and evidence-based assessment of the degree that a program exhibits openness along two axes: business and technical. The degree that openness is implemented is presented in terms of business/programmatic and technical criteria. The business/programmatic dimension criteria include questions that address: Open Architecture, Modular Open Design, Interface Design and Management, Treatment of Proprietary Elements, Open Business Practices, Peer Review Rights, and Technology Insertion. The technical dimension criteria cover essential OA design tenets of Interoperability, Composability, Reusability, Maintainability and Extensibility.

The OAAT assessment score summary provides a summary of the ratings for each of the evaluated areas (See Figure 1).

Business Areas	Technical Areas
Open Systems Approach	**Design Tenet: Interoperability**
Open Architecture	**Design Tenet: Maintainability**
Open Modular Design	**Design Tenet: Extensibility**
Interface Design and Management	**Design Tenet: Composability**
Treatment of Proprietary Elements	**Design Tenet: Reusability**
Open Business Practices	**General Design Tenet**
Peer Review Rights	
Technical Insertion	
Commercial Standards	
Compliance	

Figure 1. Ratings of Evaluated Areas

In addition, an OA assessment matrix that displays the program current state with respect to business and technical openness is also provided in the assessment summary. Each of these areas (business and technical) is rated on a scale of 0 to 4. (See Figure 2.) The results of the OAAT assessment could then be used by the program manager to help improve the program with respect to Naval Open Architecture.
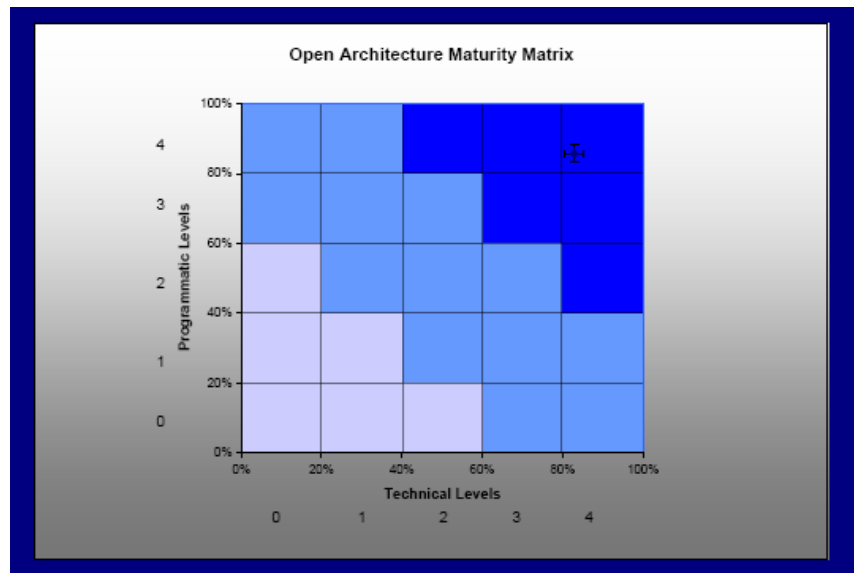

Figure 2. Open Architeture Maturity Matrix

This is an executive summary of the complete research report. The complete research report may be accessed from the Naval Postgraduate School website www.nps.navy.mil/gsbpp/acqn/publications.

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