DEFENSE ARJ EXECUTIVE EDITOR

Welcome to the *Defense Acquisition Review Journal* (*ARJ*) theme edition on Systems Engineering: Best Practices and Lessons Learned. Systems Engineering (SE) is an integrated composite of people, products, and processes that give us the capability to satisfy a stated need or objective. The SE function within the acquisition framework consists of two significant disciplines: technical knowledge and engineering management. Throughout the acquisition process, SE provides the Program Manager with a disciplined, structured, and collaborative approach to transform requirements into well-designed and supportable results.

Our featured authors for this edition are Scott Flood and Paul Richard. Their article, "An Assessment of the Lead Systems Integrator Concept as Applied to the Future Combat System Program," discusses the vision of former Army Chief of Staff General Eric Shinseki for the transformation to a lighter, more lethal, and more survivable force. The vision, which became the Stryker Brigade Combat Team, called for an immediate off-the-shelf solution to stimulate the development of doctrine, organizational design, and leader training as the Army began to develop new technologies to field the objective force. The Army's response to this challenge was to initiate a revolutionary acquisition program that utilizes an innovative system development paradigm called a Lead Systems Integrator (LSI). The intended purpose of the LSI was to provide systems engineering and management oversight throughout the development phases of the program, and to be responsible for the delivery of a system-of-systems capable of engaging in net-centric warfare. From the start, the LSI was to focus on "systems engineering, systems integration, and systems planning and control to get the best of industry to work the hardware."

The following article, "The Fortress and the Bazaar: Open-Source and DoD Software," by David Lechner and Harold Kaiser, highlights the application of an open-source software project model for DoD software systems development. The tenets for this model were first laid out in an original paper entitled, "Cathedral and the Bazaar," written by Eric S. Raymond in 1998. This article explores the implications of this model as it applies to defense weapons systems software. The attributes, problems, and benefits of open-source software are also discussed. Open-source projects are

collaborative, rapidly updated and released, and pushed by highly motivated volunteers working with a diversity of interests, skills, and hardware sets. Benefits of open source for DoD include greater reliability, lower software development and maintenance costs, and more rapid evolution.

David Cottengim's article, "Irreducible Truths of Software-Intensive Program Management," examines lessons learned in software engineering management. For decades, the acquisition community has applied standard engineering and scientific principles to improve software development methods and techniques. The contention of the article is that the odds are overwhelmingly against a software-intensive program achieving the goals and objectives established in its initial Acquisition Program Baseline. By any objective measure of success, almost every software program is going to deviate substantially from its cost, schedule, and performance baselines. Reasons for this lack of success and possible solutions are discussed.

The next article, "An Index to Measure and Monitor a System-of-Systems' Performance Risk," by Paul R. Garvey and Chien-Ching Cho, builds on existing methodology for measuring the technical performance risk of a system to that of a system of systems (SoS). The classical approach combines an individual system's Technical Performance Measures (TPMs) into an overall measure of performance risk, defined as a Technical Risk Index (TRI). This article extends this approach so a similar index can be developed for a system composed of many independent or connected systems that come together as a whole to provide an SoS capability.

The following article, "Rubrics Cubed: Are We Prisoners of ORSA-Style Decision-Making?" by COL Christopher R. Paparone, USA, and Dr. James A. Crupi, asserts that acquisition professionals who have developed psychological and cultural preferences for ORSA-style decision making may be blinded to other decision-making rubrics and the valuable insights that can be derived from them. The authors provide insight into those alternatives and demonstrate the way in which decision makers can see complex cause-and-effect relationships and diagnose a "rubrics cubed" decision-making pattern. An expanded decision-making logic, beyond the single ORSA-based method, requires the decision maker and staff to consider multiple decision-making paradigms and causal stories simultaneously. All of these types are present to some degree, in some combination, all of the time. Together, they create a context in which the professional must diagnose each decision situation. Various positions within (and constituencies' outside) the organization may perceive the above decision patterns differently. An intricate view of the prevailing and shifting patterns appropriate for the decision at hand must be adopted by the decision maker.

The last article, "Lessons Learned from the Development of the Fiber Optic Guided Missile (FOG-M)," by J. Daniel Sherman, examines the development of the Fiber Optic Guided Missile (FOG-M) and explores the role of the *product champion* during development. The FOG-M illustrates the types of problems encountered in defense contracting when contracts lack sufficient controls or incentives, including problems associated with strategic alliances between two defense contractors. This investigation also illustrates how inter-organizational design can be modified so that the role of a laboratory organization can be more effectively integrated with the defense contractor. Finally, the research results demonstrate how the history of FOG-M may have been

radically different if the policies and principles of *DoD 5000* had been enacted earlier and an evolutionary acquisition strategy been employed.

The *Defense ARJ* staff is preparing the journal for the 2006 print year. Our theme editions will focus on technology transition, ethics in government, contracting issues in acquisition, and problem solving in the 21st century, please see the *Defense ARJ* Guidelines for Contributors and Calls for Authors at the end of this edition.

Last but not least, the *Defense ARJ* staff says goodbye to TSgt. Scott A. Miller, USAF, who has been reassigned to Scott Air Force Base, IL. TSgt. Miller, a Visual Information Specialist, recreated charts and graphs into the proper format for the journal for the past three years. He also has been responsible for the layout of the *Defense ARJ* cover. TSgt. Miller's absence will be greatly felt by the remaining members of the *Defense ARJ* team. He is an accomplished illustrator as well, and we are honored to feature one of his drawings in this edition. I along with the rest of the staff wish TSgt. Miller well in all of his future endeavors.

Dr. Paul Alfieri
Executive Editor
Defense ARJ

TSgt. Scott A. Miller, USAF, is the NCO in Charge of the Visual Arts and Press Department at the Defense Acquisition University. With nearly 16 years of service with the Air Force, TSgt. Miller has served both domestically and abroad. In 1985, he graduated from the Art Institute of Pittsburgh with an Associate's degree in Visual Information/ Graphic Design.

BIOGRAPHY