

Special Issue: Integrated System Evaluation: A Consumer/Warfighter Perspective

Jerry M. Couretas, Ph.D.
JDMS Special Issue Editor
Lockheed Martin Corporation
jerry.m.couretas@lmco.com

This is the second special issue in a series relating to system architecture effectiveness. The first (April 2006) edition's papers spanned COTS/GOTS to specialty tools and ranged in scope from description to evaluation.

Recalling the body of these efforts, we had

- Levels of component interoperability (*Muguira and Tolk*),
- Alternative Maritime Security Architectures (*McCarthy, Wyllie, Vaidyanathan, and Paulo*),
- Architectures and the Procurement Process (*Hamilton*), and
- Structured Mappings from DoDAF to DEVS (*Mittal*).

Continuing in the same spirit, this second edition's authors were chosen for their system implementation and evaluation considerations. These authors haven't taken their lessons from the real world and leavened their models with cutting edge best practices; thereby revealing architectural design insights shown here for the first time.

For example, Mittal, Mak, and Nutaro develop executable simulations from whole cloth using their innovative OV-8 and OV-9 augments to add resolution to the extant set of operational views. These new DoDAF activity and coupling descriptions, respectively, are parlayed, via the standard software engineering Model-View-Controller design technique, to produce an end-to-end transportation guidance simulation to address the problem of aircraft tractability.

While Mittal runs the gamut from concept to quantified simulation, Couretas steps back to take a look at how the term *architecture* has been used and morphed between the worlds of software and military systems engineering. This includes looking at how the respective architecture evaluation techniques fit with respect to a system under consideration. He also provides a structured technique (SES/SEAE) to look at design alternatives.

While Couretas reviews "architecture" over the historical set of system description and evaluation

techniques, Saulson goes directly to the COTS/GOTS world and constructs a state-of-the-art tool for evaluating aerospace architectures. This work leverages industry best practice from the architectural design tools available (Telelogic's System Architect and Sparta's SEAS) to provide a seamless system for quickly evaluating air/space architectural campaign concepts.

While Saulson's end-to-end design and evaluation tool describes air/space architectures in terms of their campaign operational effectiveness, Els, Reichelt, and Cooper dig into the human enterprise and initiate a new line of questioning concerning architecture risk. Remembering, from Couretas, that the term *enterprise* connotes a human organization/system, we see that the work of Els rounds out this special edition so that we have a full accounting, here via the human factors, for each element of an "enterprise architecture." Els brings the enterprise's importance to life through using an example from software engineering project management to show how feedback loops, in combining independently negligible risks, can aggregate to result in catastrophic productivity outcomes. This is an especially important insight with the high mortality rate of "big" software projects; systems that we rely on for business, health care, and physical security.

Els' description of the enterprise risk provides a sad story too often duplicated in the real world. While her description of big project software development risk proves sobering for even the least managerially inquisitive amongst us, her work also provides a beacon for the social value that structured enterprise description and evaluation provides. With a high proportion of our major software projects resulting in failure and DoD system procurements often overrunning their initial cost estimates, the importance of good enterprise architecture design cannot be overstated. Each author is thereby moving us, in his/her own way, via structured description fortified by "hard knocks" understanding, to a place where enterprise architecture development cost fluctuations cease being a menace to society.