

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

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## Introduction

The word “architecture” has become a contemporary moniker for the range of highly interconnected, or “complex,” systems that provide the technical underpinning to our daily communications. Consequently, architecture description and design are now central topics in working to describe, and therefore manage, the building of these networks that we rely on.

While architectures surround and serve us daily, this special edition honors a select group of authors who are pioneering the descriptive and prescriptive techniques that provide the intellectual foundation for the design tools that the next generation of engineers and information system scientists will use to build of our future technical systems, ever more connected, in providing the information appliances that will facilitate day-to-day life.

*“An Integrated Systems Architecture to Provide Maritime Domain Protection,” by McCarthy, Wyllie, Vaidyanathan, and Paulo*

Describing the tools that will cultivate our future worlds of the artificial is denominated in the market maturity of the tool along with the nature of the tool; description or evaluation. McCarthy, Wyllie, Vaidyanathan, and Paulo begin with an architectural approach that is used to look for the proverbial (nuclear) “needle in the haystack.” Multiple alternative architectures are generated to evaluate shipping policies, sensor distribution, and freight search procedures to prevent our containerized cargo system from becoming a nuclear delivery system.

*“Applying a Methodology to Identify Structural Variances in Interoperations,” by Muguira and Tolk*

While McCarthy’s paper brings out the value of architecture evaluation, in the broad terms of cost

and casualty avoidance, Muguira and Tolk take a step back to show us how the architecture components come together with their Levels of Component Interactivity Model (LCIM). The LCIM is a critical first step to understanding and synchronizing architecture component “views” that make up structured frameworks, such as the DoDAF.

*“Extending DoDAF to Allow Integrated DEVS-Based Modeling and Simulation,” by Mittal*

Muguira’s hierarchical description is followed by Mittal’s explication of how to take an architecture and map it to a structured discrete event (DEVS) simulation. Mittal’s mappings include a hierarchy of machine to machine information recognition that enhances general architecture description and provides a mechanism to clarify the symbiosis of a design.

*“A Conceptual Model for Interoperable Command and Control Acquisition,” by Hamilton*

While Mittal provides the dynamics to previously static architectural descriptions, along with astute insight in the form of suggestions for future view implementations, Hamilton gives us an overall context for the relation between the customer community, system requirements, architectures, and the overall procurement process.

## Conclusion

Hamilton’s overview clarifies how a system like McCarthy’s Maritime Defense Protection (MDP) architecture is shown to be a capability gap and requires further evaluation. Constructing an architecture and ensuring the views are synchronized, via Muguira’s LCIM is a key first step before translating the architecture to dynamic simulation using Mittal’s mappings.