GSAW 2005 Tutorial E:

Systems Engineering and Architecture Frameworks for Operationally Responsive Ground Systems

Length: Half day

Overview:
An objective of systems engineering (SE) is to fully understand the customer's problem for which the created/modified system is intended to solve, such that the resultant design is technically feasible and programmatically executable by a supplier. Typical SE products that capture the problem include artifacts such as concepts of operations and requirements. Problem definition (or understanding) is often an iterative process, between the customer and supplier to refine the problem and reach consensus on a proposed solution. Typically, the proposed solution is captured as a design or architecture that is responsive to the technical and/or programmatic constraints. Architectures are models that define the system and many alternative architectures may be considered before consensus is reached.

The architecture of the system well depends on your point of view, but all the views should be consistent. While the customer may be thought of as a singular entity, in many acquisition or development environments, the customer may include many stakeholders such as operators, product/service consumers, maintainers, and other ancillary groups. Similarly, the customer may also be thought of a singular, but may often be composed of organizations from varied disciplines, other vendors and/or service providers. In this broadened and potentially more complex description of customers and suppliers, it is reasonable that the architecture is also not singular, but varies based on the perspectives or view.

It is in part from this realization, that there are many views of the architecture, that the seminal papers on architecture frameworks first emerged in the late 1980's. Architecture frameworks as described today refer to a set of views, as defined by the framework. As with other systems, Operationally Responsive Ground Systems (ORGS), may have a multitude of customers/suppliers and are constantly evolving, but may also have greater impetus for being able to rapidly change or reconfigure. Whereas architectures may be thought of as system definitions to guide implementation, in this case architectures also need to serve another purpose, that is to guide reconstitution.

This tutorial will explore following topics

- SE fundamentals
- System Architecture Frameworks from then to now
- Using Architecture Frameworks for ORGS.

Instructor: Rosalind Lewis, The Aerospace Corporation

Biography:
Rosalind (Roz) Lewis is the Principal Director of the Acquisition and Planning Subdivision at The Aerospace Corporation. In this position, Ms. Lewis manages four departments that provide support a variety of customers in the areas of system reliability analysis; programmatic analysis and modeling to include cost, schedule and risk analysis; and system engineering and acquisition strategy development support. Ms. Lewis joined The Aerospace Corporation in 1987 as a Member of the Technical Staff in the Computer Science Laboratory, where she developed software tools for experiment mission planning, network scheduling system requirements, and fault tolerant technology. As a program office Senior Project Engineer/Lead, she led a multi-disciplinary effort to develop a digital imagery dissemination system, studied the impact of GPS-aided satellite navigation on network resources and supported cross segment systems engineering and integration. In 1999, she joined the RAND Corporation as a Senior Engineer, where she conducted and participated in studies regarding the acquisition, development and use of space systems, including GPS and Galileo; and other studies

related to the development and applications of information and communication technologies. Ms. Lewis holds a B.S. degree from USC in Computer Science, a M.S. degree from Polytechnic University in Computer Science, and a M.S. degree in Systems Architecture and Engineering from USC.

Description of Intended Students and Prerequisites:
TBD