GSAW 2018 Tutorial F:

Model Based Systems Engineering for Ground Systems

Length: Full day

Overview:
Course Outline:

Section 1 – MBSE Introduction and Overview
- Overview of Model-Based Systems Engineering
- Fundamental Concepts of Modeling
- Models of Computation
- Computer-Aided Verification Techniques
- Example Application of Models in Systems Engineering

Section 2 – Front End Diagrams
- Package Diagrams ◦Diagram, description, purpose, and benefits
    - Model organization
    - Package relationships (contains, imports, extends)
    - Specialized packages: views/viewpoints, libraries, profiles

- Use Case Diagrams ◦Diagram description, purpose, and benefits
    - Use case, actor, and subject
    - Basic relationships: association, include, extend, and generalization
    - Scenarios

- Requirements Diagrams
    - Relationship between requirements and use cases
    - Creating requirements diagrams
    - Requirements relationships to other model elements
    - Representing requirements in tables and matrixes
    - Building a use case model using the basic set of SysML constructs

Instructors: Myron Hecht and Mark McKelvin, The Aerospace Corporation

Biographies:
Myron Hecht is a Senior Project Leader at The Aerospace Corporation where supports large satellite and ground systems acquisitions by the U.S. Air Force including GPS, military communications, and other applications.   His current research is on Model Based System Engineering and its application to quantitative and qualitative reliability, availability, and safety analysis methods. He has previously made research contributions in the areas of integrated hardware/software reliability modeling analysis, fault tolerant computing, and real time distributed control systems. Myron is consultant to the Nuclear Regulatory Commission in digital instrumentation and control systems, a lecturer at the UCLA School of Engineering and Applied Sciences teaching both reliability and model based systems engineering, and has served on multiple standards committees for systems engineering, reliability, computers in nuclear power plants, and software in avionics systems. He is an author of 90 refereed publications in reliability,

safety, products liability, and systems engineering. He holds a B.S. in Chemistry, and M.S. degrees in nuclear engineering, an M.B.A., and a J.D. degree all from UCLA.

Mark McKelvin's bio highlights:
- Engineering Specialist at The Aerospace Corporation
- Lecturer at the University of Southern California – Systems Architecting and Engineering Graduate Program, Viterbi School of Engineering
- Prior roles at the Jet Propulsion Laboratory, California Institute of Technology – Software System Engineer – Fault Protection Engineer – Electrical Systems Engineer
- Ph.D, UC Berkeley Electrical Engineering and Computer Sciences – Design, Modeling, and Analysis Research Area – Emphasis on Fault

Description of Intended Students and Prerequisites:
Familiarity with ground systems architecture and general systems engineering processes.

What can Attendees Expect to Learn:
MBSE background and fundamentals, Types and uses of SysML diagrams, use of SysML in an MBSE process.