GSAW 2015 Tutorial B:

A Model-Based Approach to Architecting Ground Data Systems

Length: Half day

Overview:

The course will begin with the motivation for deriving re-usable, model-based, viewpoints. Following the motivation a set of common GDS domain viewpoints will be introduced, each of which will be elaborated into the resulting view (or response to the viewpoint). An example of a common GDS viewpoint would be identifying what software performs particular functions for the system. The elaboration for each viewpoint will include:
1. The concepts needed to describe the system in order to respond to the viewpoint
2. The language embedding chosen to represent the concepts
3. The model-based implementation of the viewpoint definition
4. The model-based output of the viewpoint implementation

A sample ground data system design for a generic mission will be used throughout the tutorial to implement the prescribed viewpoint elaboration process. Discussion is encouraged throughout the tutorial, but we will allot the last half-hour for questions and discussions.

Instructors: Elyse Fosse, Kathleen Crean, Marc Sarrel, NASA/Jet Propulsion Laboratory, California Institute of Technology

Biographies:

Elyse Fosse is a member of the Ground System Architecture and Systems Engineering group at the Jet Propulsion Laboratory. Elyse has contributed to MBSE development tasks in the mission operations systems, ground data systems, and flight systems domains. She has a master's degree in Applied Mathematics from Claremont Graduate University.

Kathleen Crean is the Technical Group Supervisor of the Ground Data System Engineering group in the Mission System Engineering section at the Jet Propulsion Laboratory. She has worked on ground data systems and science data systems across the life cycle for Earth and planetary missions, including roles in software development, systems engineering, and mission operations. She is an advocate for infusing model-based systems engineering techniques into ground systems engineering. Kathleen earned her A.B. In physics from Occidental College and her M.S.E. in Aerospace Engineering from The University of Texas at Austin.

Marc Sarrel is a systems engineer in JPL's Mission Control Systems section. For the past five years, he has applied Model Based Systems Engineering to various system engineering tasks in the space-flight ground systems domain. He has worked on the Spitzer and Cassini missions as a Mission Operations System Engineer and a Ground Data Systems Engineer, and has written ground processing software. He has a master's degree in Computer and Information Science from The Ohio State University, a bachelor's in Computer Science from Washington University in St. Louis, and has worked at JPL for twenty-four years.

Description of Intended Students and Prerequisites:

Participants should be personnel responsible for designing, maintaining, and/or analyzing ground data systems. Familiarity with Model Based Systems Engineering (MBSE) is useful but not required. Familiarity with a specific modeling language (e.g., SysML, UPDM) is not required.

What can Attendees Expect to Learn:

At the completion of this course participants should understand the constructs of a viewpoint as well as understand the motivation for model-generated responses to viewpoints. They will also have an understanding of how JPL is leveraging SysML, UPDM, and other modeling languages to create a re-usable ground data system modeling framework and how they may use the work discussed to generate viewpoints pertinent to them.