

GSAW2005 Tutorial I:

An Introduction to Message-Bus Architectures for Space Systems

Length: Half Day

Overview:

This course presents technical and programmatic information on the development of message-based architectures for space mission ground and flight software systems. Message-based architecture approaches provide many significant advantages over the more traditional socket-based one-of-a-kind integrated system development approaches. The course provides an overview of publish/subscribe concepts, the use of common isolation layer API's, approaches to message standardization, and other technical topics. Several examples of currently operational systems are discussed and possible changes to the system development process are presented. Benefits and lessons learned will be discussed and time for questions and answers will be provided.

Instructors: Dan Smith, NASA Goddard Space Flight Center Brian Gregory, Interface & Control Systems, Inc.

Biography:

Dan Smith has 25 years of experience developing satellite ground systems. He was the technical lead on the early Hubble Space Telescope mission control center, the Program Manager for NOAA's 5-satellite GOES weather satellite control system, and chief architect for Globalstar's constellation control center which now handles 52 satellites and nearly 2000 satellite contacts per day. Mr. Smith became a NASA employee in September 2001 with an assignment to infuse commercial practices and satellite constellation concepts into NASA. His "GMSEC" architecture uses standardized messaging to allow any of a large set of functional components to be easily integrated in a "configure-and-go" manner to support a wide variety of current and planned NASA missions. He has an MS degree from George Washington University and has taught software courses at the University of Maryland and George Washington University.

Brian Gregory has been engineering satellite systems for more than 10 years with Interface & Control Systems, Inc. Mr. Gregory has been a lead member of the product development team for Interface & Control System's Commercial Off the Shelf (COTS) SCL (Spacecraft Command Language) software system. SCL uses the message bus architecture to provide a distributed and scalable system for both flight and ground automation. Mr. Gregory's has been integral in the development of the ICS "Software Bus", a messaging abstraction layer that allows the integration of various Message Oriented Middlewares (MOMs) with the SCL COTS solution without core software refactoring. In 1998, he participated in the development of the FUSE (Far Ultraviolet Spectroscopic Explorer) ground system that used the SCL messaging architecture to simplify the transition from integration & test to flight operations. In 2002, he participated in the reengineering of NASA's EO-1 that used messaging to integrate the legacy flight software with SCL's expert system. Recently he has been applying his experience to the development of the GMSEC messaging Application Programming Interface (API), a generic messaging layer designed to facilitate the fast and easy integration of components using GMSEC standards.

Who Should Attend:

Participants should have a basic understanding of ground systems. In addition, it is helpful to have some software development background or software development process understanding.