

GSAW 2018 Tutorial G:

Introduction to Space Domain Task Force (SDTF) Specifications – XTCE, GEMS, SOLM, XUSP

Length: Half day

Overview:

- I. Introduction
 - a. Who are your instructors?
 - b. What are your expectations for the tutorial?

- II. XML Telemetry and Command Exchange (XTCE)
 - a. What is XTCE?
 - b. Overall Structure of an XTCE document
 - c. Data Types
 - d. Containers
 - e. The Telemetry Side of an XTCE document
 - i. Parameters
 - ii. Containers
 - ii. Alarms

 - f. The Command Side of an XTCE document
 - i. Command elements
 - ii. Command processing flow
 - g. TrivialSat (Hello, World in XTCE)
 - h. Programs using XTCE

- III. XTCE US Government Satellite Conformance Profile (XUSP)
 - a. Why Does XTCE need a Conformance Profile?
 - b. Structure of the XUSP specification
 - c. Using Xpath to test conformance
 - d. The XUSP template XTCE document
 - e. Extending the telemetry definitions in the XUSP template
 - f. Extending the command definitions in the XUSP template
 - g. Programs using XUSP

- IV. Break

- V. Ground Equipment Monitoring Service (GEMS)
 - a. What is GEMS?
 - b. Model-Driven Architecture and the GEMS monitoring model
 - c. GEMS Messages
 - i. GEMS-XML
 - ii. GEMS-ASCII
 - iii. GEMS-JSON (Future)
 - d. System Considerations for using GEMS
 - i. Device Definitions
 - ii. Data Transport
 - iii. Authentication

- iv. Versioning
 - v. Transports & Encryption
 - e. Programs/vendors using GEMS
- VI. Satellite Operations Language Metamodel (SOLM)
 - a. What is a Language Metamodel?
 - b. What are the benefits of using SOLM?
 - c. The basic elements of SOLM: Procedure, Activities, Parameters, Commands, Actions.
 - d. The SpacePython definition and mapping in SOLM
 - e. Portability Considerations
 - f. Programs/vendors using SOLM
- VII. How the Specifications Work Together
 - a. All of the specifications contribute to a maintainable ground system
 - b. Future specifications to aid ground system maintainability
 - c. Web Links, Contacts.

Instructors: Brad Kizzort, Harris Corporation; Gerry Simon, Kratos Integral Systems; and Luis Rodriguez, AMERGINT Technologies

Biographies:

Brad Kizzort – has been building ground operations and I&T systems for spacecraft for over 25 years. He is currently chief technologist for the Harris’ OS/COMET product and is responsible for insuring that OS/COMET evolves to meet new and existing customers’ requirements for spacecraft monitoring and control. Brad was one of the original contributors to the SOLM specification and was task force chair for the publication of XTCE 1.2, XTCE 1.1, XUSP 1.0, and SOLM 1.0.

Gerry Simon – has 33 years of experience in software, hardware, and systems engineering within the space and telecommunications industries, including positions as System Engineering Manager, Chief Engineer, Chief Technologist, and Chief Architect. Gerry was one of the original contributors to the XTCE specification and task force chair for the publication of XTCE 1.0

Luis Rodriguez – Luis has 15 years of experience developing and delivering solutions in the space communications industry. He is currently the front-end software architect at AMERGINT Technologies focusing on evolving solutions to meet customers’ needs with new technologies. Luis was the other original author of the GEMS specification and a current co-chair of the SDTF.

Description of Intended Students and Prerequisites:

Some familiarity with spacecraft operations would be helpful in understanding the purpose of each of the specifications. The tutorial assumes no prior knowledge of any of the specifications. The tutorial will be useful for managers and system engineers interested in understanding the scope and applicability of the specifications.

What can Attendees Expect to Learn:

Attendees will be introduced to the concepts behind each of the Object Management Group (OMG) Space Domain Task Force (SDTF) published specifications.

- XML Telemetry and Command Exchange (XTCE)
- Ground Equipment Monitoring Service (GEMS)
- Satellite Operations Language Metamodel (SOLM)
- XTCE US Government Satellite Conformance Profile (XUSP)

They will learn the requirements covered by each of the SDTF specifications.

They will learn what types of satellites and satellite programs can benefit from adopting each specification, how to apply the specification to a specific satellite program, and how the specifications can work together to reduce satellite ground system acquisition and maintenance costs.