

Working Group Outbrief

Ground System Architectures Workshop



Session 11C

Enabling Game-Changing Innovation Through
Model-Based Engineering

*Ryan Noguchi and Robert Pettit IV,
The Aerospace Corporation*

Ground System Architectures Workshop



Session 11C

Session Goals

- Open discussion on Model Based Systems Engineering and Model Based Software Engineering for Ground Systems
 - Case studies
 - Lessons learned
- Opportunities for Enabling Game Changing Innovation in Ground Systems through MBSE
 - Anyone have experience with this?
 - Architecting, Acquisition, Development, Operations
 - How does MBSE need to evolve to better do this?
- Introduce Community Roadmap for Advancing the State of the Practice of MBSE
- Opportunities for Collaboration

Ground System Architectures Workshop

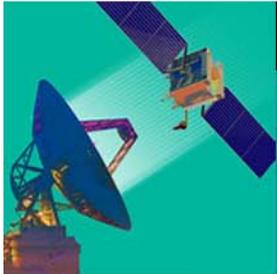


Session 11C

Discussion Interest Items

- Learn about MBSE, how it's being used
- Use of MBSE to improve automation
- Experiences with adoption/infusion
 - Where has it been a game changer?
 - How do you start?
 - Transition from lab environment to customers
- Use of MBSE to capture enterprise perspective
- MB software engineering – reverse engineering, testing tools
- Community of Interest, sharing cases studies and lessons learned
- Application in conjunction with Lean SE, Agile software development
- SysML vs UPDM, integrating models among programs
- Use of MBSE to assess and compare data architectures

Ground System Architectures Workshop



Session 11C

Community Discussion

- Discussed MBSE for NOAA/NASA JPSS ground system architecture
- Cultural divide between architects, systems engineers, operators
- Educating stakeholders is one of the biggest challenges
- Models capture corporate knowledge before it gets lost
 - Integrate knowledge from many sources into a coherent whole
- Capturing “as-is” enterprise/systems and validating the model aren’t easy, but necessary
- Tools assessment/survey
 - Share results among community, perhaps do as a community
- Relation of MBSE to agile development
- Impact on milestone reviews
- Need to understand and clarify needs for models (for different users)

Ground System Architectures Workshop

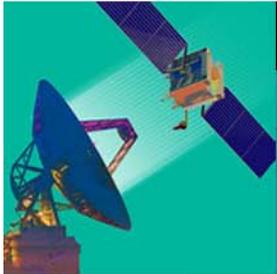


Session 11C

Innovations MBSE Can Enable

- MBSE used for ESA to develop space science data simulators
 - Enables creation of simulators from the models with minimum of extra effort
- Potential innovative applications
 - Model-driven testbed configuration
 - Test as you fly, automate and simplify V&V process
 - “What if” testing of the model
 - Improve quality of the systems engineering & acquisition, program management processes
- Risk reduction vs. ROI

Ground System Architectures Workshop



Session 11C

Areas for Collaboration

- Establish a Ground Systems MBSE Community of Interest
 - Perhaps supported with INCOSE and/or NDIA infrastructure
- Collaboration on common ground station model, modeling approaches, and expected model contents for the community
 - Standard model profile, reference architecture/model
 - Need to balance tradeoffs between commonality and flexibility
- Tools assessment/survey
 - Share results among community, perhaps do as a community
 - Educate vendors on our community's needs for these tools
 - Esp. tool interoperability and demystifying certification for secure networks
 - Need to address these on a more systematic basis
- Community could develop a tutorial (briefing book) product to demystify MBSE to improve stakeholder/organizational acceptance of MBSE
 - Focus on the ground system domain
 - Document case studies