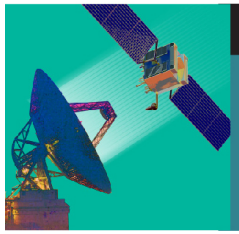
Working Group Outbrief

Ground System Architectures Workshop

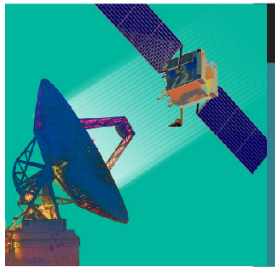


Session 11D

Achieving a Smarter Ground Enterprise Through Model-Based Engineering

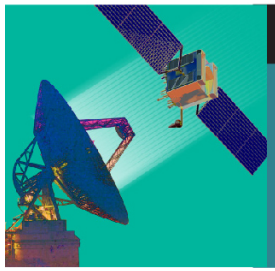
Ryan Noguchi and David Gayek,
The Aerospace Corporation

Approved for public release. OTR 2019-00520.



Session Goals

- Highly interactive discussion of the community's lessons learned and best practices in Model-Based Engineering (MBE) with broad participation from the assembled participants.
  - *Discuss key challenges and opportunities*
  - *Share lessons learned and success stories*
  - *Discuss how MBE can help enterprises to re-architect and re-engineer themselves to become smarter, more efficient, and more effective*



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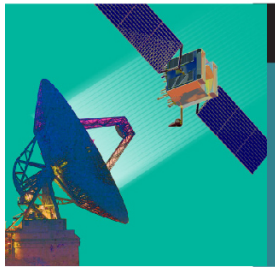
Presenters/Panelists

- None



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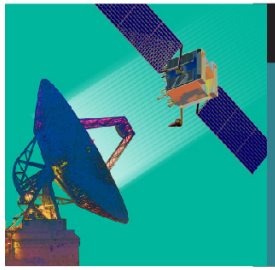
Participants' Interests

- Learning about MBSE, how people are using it, how programs are deploying it
- Status of ongoing MBSE transition activities
- Transformational objectives
- Understand MBSE implementation very early in the system lifecycle
- How to make enterprise ground systems more flexible, agile
- Application to DevOps, transition of enterprise to service oriented
- How are other folks using modeling and integrating between programs/orgs
- How are people approaching infusion of MBSE?
- How are people deploying MBSE on legacy programs vs new programs
- Application to security domain
- How do we change program organizational structure to better implement MBE?



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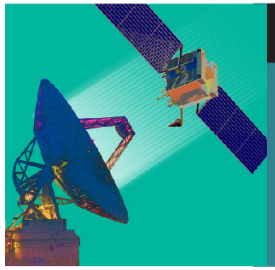
Properties of the Intelligent Ground System Enterprise

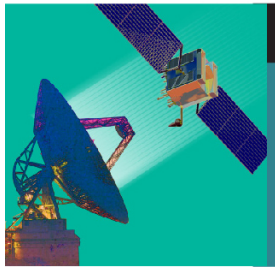
- More resistant to cyber attack, automated countermeasures
- Improved resilience to threats of all types
- Minimize staffing needs, goal of complete automation
- Achieve continuous Devops across all systems, including hardware
  - *Synchronization of separate segments*
  - *Transition from legacy to new systems seamlessly*
- Baking in security as we evolve to service oriented architecture
- Adapting to new missions quickly
- Enhanced enterprise component trust to allow enterprise to process different security/proprietary data for different users
  - *Currently systems are single-string, developed uniquely for each customer*
- Enumerating assumptions that constitute service contracts (security, technical)
- Better handling of anomalies, error detection, self-healing, adaptive
- Automate the mundane tasks, let the analysts focus on the critical thinking
  - *Enables improvement of quality and efficiency*
- Knowledge-based support, Tier 2/3 support and analysis improved through intelligent agents, IoT



Session 11D

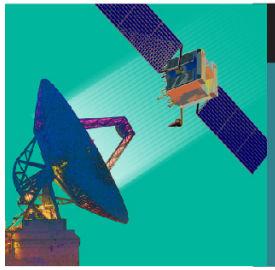
Properties of the Intelligent Ground System Enterprise

- Rapid technology insertion and replenishment
  - *Leverage existing advanced technologies*
  - *On-ramps and off-ramps of technologies*
- Common ontology
- Automated error detection and operator warning to enable operator to apply corrections
  - *In the future, enable automation of that corrective action*
- Enable stakeholders to ask questions and get answers quickly
  - *Natural language processing*
  - *Automated discovery of and integration of analysis services, data sets, etc.*
  - *Automated execution of end-to-end analyses and visualization of results*
- Agility in determining what the intelligent enterprise should do



Key Points

- Many perspectives on the intelligent enterprise and what it needs
- Organizational structure challenges
- Culture challenges
- Challenge between specifying contract do MBSE vs. providing models
  - *Don't want to constrain implementation or exclude contractors*
  - *But want to support acquirer needs for models as part of their MBSE process*
  - *INCOSE/NDIA collaboration: DEIXWG – Digital Engineering Information Exchange Working Group*
- Lots of interest in "How to deploy MBSE"
  - *Started with problem framing—defined objectives for the intelligent enterprise*
  - *Then decide what MBSE capabilities to develop to achieve those objectives*
- From documents to models, the problems of obtaining common understanding are the same but the amplitude and duration are different
- Need for presentation layer between models and the artifacts we produce



Next Steps

- Desired properties of the intelligent enterprise could be achieved through some offline collaborative activities to develop products that address participants' interests
  - *E.g., white papers, case studies, etc.*
  - *Potentially sustain collaboration via NDIA, INCOSE, etc.*