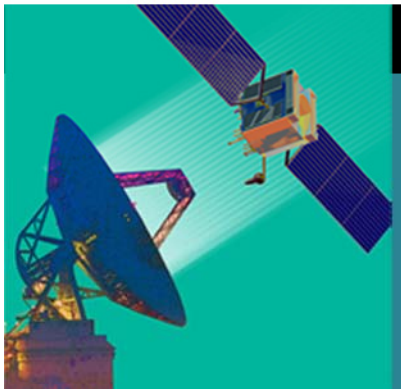
Working Group Outbrief

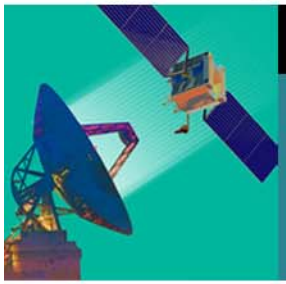
Ground System Architectures Workshop



Session 11D

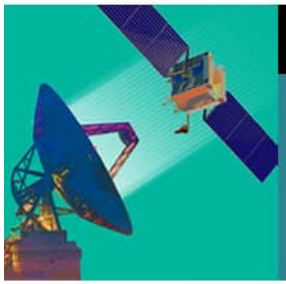
Assessing the “Cyber-Resiliency” of Space Ground Systems

Frank Belz, Jandria Alexander, The Aerospace Corporation



Session Goals

- Explore the cyber-resilience of space ground systems
  - What is cyber-resilience?
  - How do we achieve it?
  - How do we know whether we have it?
  - Where should investments be made to improve it?



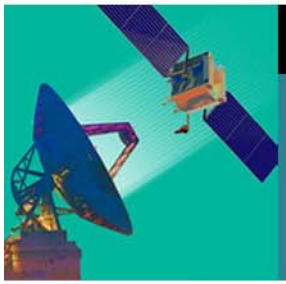
Panelists/Presenters

Panel

- Dawn C. Meyerriecks, Office of the Director of National Intelligence
- Michael Koller, European Space Agency / ESOC
- Peter Reiher, The Aerospace Corporation
- Jean Michael, The Aerospace Corporation

Participant Presenters

- Deb Bodeau, Rich Graubart, MITRE: Cyber Resilience Engineering Framework
- Daniel Faigin, Aerospace: 800-53 and CNSSP 12 Updates include resiliency



- Level of adversary matters. Hactivists COP; sophisticated adversaries using combinatorial attacks to come at us. Defense in depth okay for run of the mill. Sophisticated, assume they're inside, then go from there.
- 30% commercial, 30% highly tailored, 30% custom.
- Technologists must lead. <Dilbert cartoon>.
- Satellite System Engineering has never addressed that someone might want to break satellites from the inside out
- If you want to be on the Internet, you must embrace constant change.
- Apply the most resources to the most critical issues

Key Points

- Cyber-resiliency for space systems is immature and evolving
- Opportunity exists to leverage related work in resiliency, fault tolerance, and associated system engineering specialty topics
- But challenges abound
  - Solutions may not be the same
  - Cross mission solutions in space
  - Measuring resiliency for space

Conclusions

- Complexity is the root of much evil
  - Simplicity may shrink attack surface but
    - It may focus adversarial attention
    - It may lack recovery capabilities
- Easy for conversation to revert to prevent, recover, when challenge is operating through
- When is system resilience equivalent to mission resilience
- Security and Resilience and not necessarily in synch