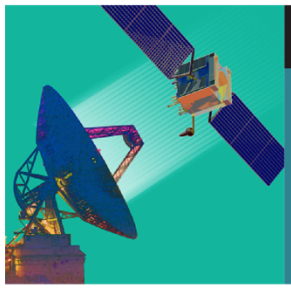
Working Group Outbrief

Ground System Architectures Workshop



Session 11C

Realizing Resiliency in Space Systems Working Group: Raw Meeting Notes

Donald Sather, The Aerospace Corporation

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Session Goals

- Discuss the challenges and opportunities in achieving the goal of resiliency: the ability to maintain mission success despite the many threats and failure scenarios which may be encountered

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Panelists

- John Heskett – Kratos RT Logic
- Steven Grippando, NOAA
- Lt Col Matt Loyer, USAF
- Dan Smith, NASA

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Key Points

- International and national policy and governance of space is not keeping up with the exploitation of space
  - Technical solutions are easy, policy development and it's implementation can take many years
- Keep real mission in mind when considering redundancy
  - It often isn't flying satellites
- The definition for "resiliency" is mission dependent
- Identify emergency minimum capability (over some time-frame) and plan for it
- A *common* ontology for space will help define resiliency across programs in common terms
- Think about resilience in new ways:
  - *Adapt* resilience requirements to mission and enterprise needs
    - Perhaps develop classes of missions each with different resiliency requirements for each
      - Resiliency then becomes a design topic at every major design review
  - What can be *traded* to improve resilience: performance, availability, usability, schedule, NRE costs, O&M costs, risk
  - Look outside of the system to find other dependencies that affect can resiliency (i.e. mains power)
- Resiliency scope must be end-to-end:
  - Build into architecture, business models (Government & Industry), contracting, acquisition strategies and policies
  - Build-in resilience at every phase, location, layer, communication path – take a whole system view
- Think in terms of enterprise solution composed of services
  - Developed, deployed, and evolved via agile processes in a "DevOps" environment

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Conclusions

- National and International policy and governance regarding space, especially non-GEO orbital regimes, is already late to need
  - Need to start
- Resiliency must keep in mind the ***real*** mission
  - Identify the emergency minimum capability required – something is often better than nothing
  - Must look across the entire system, and even outside, to achieve it
- Abstraction from H/W (virtualization/containerization), service based architectures, agile developments featuring “DevOps” environments all add new opportunities to achieve resiliency and maintain it in a rapidly changing environment
  - New processes and strategies will likely be needed