



Securing US Space Infrastructure

Bob Maskell

Space Systems Architect

Cisco Space Initiatives

Vision:

One day, every manned and unmanned spacecraft will be a node in the Internet. One world, one network. Terrestrial and space communications will be indistinguishable.

Mission:

To define and develop integrated architectures that encompass space and terrestrial systems using open standards.

Implications of the Vision

- **The bus, payloads and network are inextricably entwined on each spacecraft**
- **Control and management must be thought of in terms of all space based assets, not by individual satellites or constellations**
- **Collective knowledge through crosslinked constellations enables Space Situational Awareness.**
- **No longer will T&C represent individual data points, but will be the comprehensive status of all space borne assets.**

Space Situational Awareness

- **Own System Status**
 - Location**
 - Operational Parameters**
- **Adversary System Status**
 - Location**
 - Trend Analysis**
 - Intent**

Space Situational Awareness

- **Space Situational Awareness requires**
 - **Profound Knowledge**
 - **Understanding of the System**
 - **Understanding of Variation**
 - **Psychology of the System**
 - **Continuous learning**
 - **Cross-constellation correlation of system parameters**
 - **Rapid determination of anomaly cause**
 - **Natural environment**
 - **Environmental abnormalities**
 - **Man-made**
 - **Deliberate**
 - **Unintentional**

Limitations of Current Control Segment

- **Profound knowledge limiting factors**

Small sampling points

T&C transmission bandwidth

No inter-domain knowledge sharing

Single point ground control, segregated by system

Payload, network & bus treated as separate systems

Summary

- **The extension of networking to space based systems requires a new paradigm for control and management of both the network and the space systems**
- **Control and management of future systems must contribute to overall space situational awareness and protection of space based systems**

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