



# Securing US Space Infrastructure

**Bob Maskell**

**Space Systems Architect**

# Cisco Space Initiatives

Cisco.com

## 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

Cisco.com

- **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**

# CISCO SYSTEMS

