

A large satellite dish antenna is the central focus, mounted on a tall, white, lattice-structured tower. The dish is a complex, white, grid-like structure. In the background, there are rolling hills and a small, white, single-story building with a dark roof. The sky is overcast with grey clouds. The entire scene is in grayscale, with the text overlaid in color.

# Satellite Control Network Trends and Prospects for Interoperability Commercialization Trends

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# Benefits

## ◆ Long term cost savings

- Commercial providers can reduce costs through shared assets
  - Support multiple customers
- Commercial systems provide no total cost of ownership traditionally found in government owned systems
  - All functions including initial outlay of capital, system upgrades, m&o, systems engineering, systems integration, logistics, and negotiation of all contracts and licensing
- Provide short term surge support reducing requirement to build and maintain additional assets
  - Loading peaks
  - Critical surges
  - Enables better architectural solutions

# Barriers

## ◆ Technical Issues

- Each agency, and sometimes each mission, has unique technical requirements
  - SGLS/USB major cost driver because of feed and transmitters
  - M&C incompatibility
  - Communications connectivity non-standard
  - Time tagged telemetry and critical command timing
  - Prioritization
  - Security

## ◆ Business Issues

- Anticipated commercial market delayed
  - NASA use of commercial systems happening, but slower than anticipated
  - LEO/MEO satellite provider business failures reduced available capital and market
- Commercial providers are not non-profit organizations
  - Initial setup costs can be significant
  - Providers need “up-front” money or long-term commitments that justify capital
- Savings are frequently long term
  - May actually cost more initially

# Areas of Success

- ◆ **CSOC Commercialization and Sales has led to cost savings**
  - **WAN outsource continues to reduce costs**
  - **Ground Network privatization program moving forward, has potential for major savings and operations concept innovations including:**
    - **Development of commercial contracting for rapid procurement of capacity**
    - **Interoperable mesh network architecture for high availability and mission/site interoperability**
    - **Opportunity for privatization of NASA assets through the GFE process with eventual transition for complete responsibility and ownership**
    - **Unfortunately, SOMO and CSOC restructure has delayed the full implementation**

# NASA Ground Network Commercialization History

- ◆ 1999: Triana award to USN (mission delayed), site not yet operational for contracted mission
- ◆ 1999: EPGN award to DataLynx (7 missions), site operational in 2000
- ◆ 1999: Approval of an ID/IQ concept for rapid acquisition of TT&C services
- ◆ 2000:
  - March: ID/IQ Briefing to Industry
  - June: ID/IQ Procurement
  - December: ID/IQ Awards
  - December: Approval of GN Privatization Program
- ◆ 2001: Successful transition of Svalbard Ground Station
- ◆ 2002: Planned transition/privatization of Poker Flat systems
- ◆ 2003: Planned transition/privatization of Wallops Flight Facility systems

# NASA GN Lessons-Learned

- ◆ **GN commercialization possible**
  - **Successful operational use of commercial systems demonstrated:**
    - HTSI DataLynx for EPGN (12% of current on-orbit robotic support)
    - SDS for Norway consolidation (22% of current on-orbit robotic support)
    - University of Chile for Southern hemisphere support (2% of current on-orbit support)
  - **Developed an integrated operations concept for centrally managed scheduling**
- ◆ **Business operations concept is as important as the technical operations concept**
  - **Look to reduced total cost of ownership, not short term costs**
    - Individual initiatives can appear to “cost more” but when treated as an entire network program can result in significant cost reductions through reduction in overhead functions like systems engineering, systems integration, logistics, operations and maintenance
- ◆ **Potential Roadblocks**
  - **Lack of a strong government “sponsor” or “champion”**
  - **Transition costs are not free and reductions do not happen instantaneously**
  - **Organization rewards and incentives typically dependent on organizational size, not on subcontractor management**
  - **Marketing that can lead to misperceptions of capabilities and risks**

# Recommendations for future

- ◆ **Requirements should be architecture driven**
  - viable ops concept that defines applicable mission subset (some missions may be inappropriate for support on commercial assets)
  - cost (life cycle) as an independent variable
- ◆ **Establish capacity management working group**
  - SCNC and CSOC manage majority of federal load anticipated for commercial providers
  - Provides opportunity for commercial providers participation to disclose other customer demand and capacity forecasts
- ◆ **Standardize protocols (command, telemetry, and M&C)**
- ◆ **Support proficiency demonstrations at multiple providers to:**
  - foster industry
  - prove performance
  - further incentives for business investment
  - they will be there when you need them