Commercialization of NASA’s Ground Network

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What is CSOC?

- **Consolidated Space Operations Contract**
  - Awarded to Lockheed Martin Space Operations Team in September 1997
  - Consolidates 17 contracts across 5 NASA centers
  - $3.4 B/10 years
  - Government cost savings estimate of $1.4 B
Past Commercialization Successes

- Fully commercial WAN outsource with savings in excess of $20M/y
  - New customer signed for use of available capacity
- Space Network (TDRSS) commercial customer - potential >$5M/year
  - Required regulatory licensing for commercial use of government-allocated spectrum
    - 18 month activity
Past GN Commercialization Successes

- Three Initiatives Commenced in 1999
  - Cost avoidance (RTS development and installation) to NASA in excess of $20 M
    - Triana - awarded to USN
      - NASA “operational readiness” to be certified prior to Triana mission
    - EOS Polar Ground Network (EPGN) - awarded to HTSI/Unlockx
      - NASA EPGN “operational readiness” certified - currently taking passes
    - EPGN Backup - awarded to Kongsberg/Lockheed Martin Space Data Services
      - NASA EPGN “operational readiness” certified - currently taking passes
Moving to the Future GN Architecture and Operations Concept

• GN Commercialization Lessons Learned:
  – Contracting and operational readiness very time consuming
  – Causes bottleneck for new mission support
  – NASA Policy Shift
    _ CSOC can market available capacity; however, NASA will not compete with commercial providers if available
  – Commercialization and operational readiness certification is driven dominantly by culture and less technical capabilities

• Result:
  – GN Commercialization Plan - Dec 1999
    _ Transition NASA assets to commercial sector
  – CSOC institutional organization to manage GN commercialization
    _ Operational readiness definitions and process being codified
  – Indefinite Delivery/Indefinite Quantity (ID/IQ) Concept Generated
    _ Rapid acquisition of capacity and vehicle to transition assets
ID/IQ Background

• Briefing to Industry held on May 16, 2000
• RFP Released in June 2000
  – 14 Respondents
  – 7 Qualified TT&C providers
  – Next open enrollment planned for January 2002
• Ground Network Program Initiated in August 2000
  – Approved for implementation by NASA
Potential for NASA

- Current NASA Annual GN Costs (inside and outside of CSOC) - approx $30M
- Estimated Annual Costs after Full Commercialization - approx $16M
• ID/IQ is a Flexible Contractual Mechanism Between CSOC and Commercial Providers
  – NASA and other government customers receive discounted services based on volume of purchases (NASA, other federal agencies, international, or commercial)
  – Rapid Acquisition of Data Service Support
    _ LEO, suborbital, STS support, labor, MUE
  – Multiple Providers for Risk Management
    _ Service acquisition through rapid task orders
    _ Ability to “load” level across providers
  – Fosters a competitive pricing environment
  – Vehicle to transition assets (GFE process)
    _ Companies take over total cost of ownership
    _ Recoup costs through price per pass/minute schema
Preferred Provider Classification

- Network Provider - Offers multi-site TT&C stations, operations and wide area networks
- Resource Provider - Offer single site station and operations, may not have end-to-end TT&C
- Engineering Service Provider - Offer niche engineering services, emergency services and contingency services
- Special Hardware and Software Provider - Offers MUE and special H/W, S/W
Preferred Providers

- **Network Providers**
  - DataLynx, Kongsberg/Lockheed Martin Space Data Services, Universal Space Network
  - Resource Providers
    - Johns Hopkins Applied Physics Lab, Satellite Applications Centre, University of Chile

- **Engineering Service Providers**
  - ai Solutions, RT Logic, Software Corporation of America, SpaceHab, TSI Telesys

- **Special Hardware and Software Provider**
  - AZ Tech, Austin Information Systems
CSOC Added Value

- Why not go directly to providers?
  - Time and procurement cost savings
    - CSOC is a federally competed contract vehicle
    - ID/IQs are competed contract vehicles
  - Access to multiple providers
  - Load management
  - Potential reduction in costs for operational readiness through use of provider systems under current operation
  - Potential reduced communications costs through existing WAN
  - Discounted pricing based on overall purchased capacity
  - Access to NASA assets either in current GN or as they become GFEd to preferred providers
CSOC Plans for Commercial Providers

- Full commercial services for LEO mission load excluding STS and Deep Space Network
  - Approximately 50 passes per day growing to approximately 75 by 02/03
  - Most are polar, some low inclination
- Also investigating potential for
  - Commercial replacement for MILA/PDL
  - Commercial architecture to replace McMurdo
  - Commercial augmentation of DSN 26 m network
- Attract new customers to commercial service providers (adds additional load to providers)
  - New missions already requesting pass/LEO support
  - Other federal, international, and commercial users
Architecture Issues

- Manage capacity to minimize cost/unit service and provide availability through fault tolerance
  - Optimize loading across a set of preferred provider RTSs
  - Minimize requirements for:
    - New site activation and readiness certification
    - Nonstandard services - minimize mission unique equipment and migrate to commercial standards and systems for communications, security, etc...
    - New communications services
  - Develop and manage to RMA performance
  - Minimize interfaces to maximize scheduling flexibility

- Interleave GN reqts with commercialized WAN capability
  - Use commercial communications protocols when possible
  - Develop inverse relationships for available capacity to reduce overall cost per unit service
Current Ongoing Activities

- Capacity analysis
- Mission/RTS compatibility analysis
- WAN loading assessment
- Task order development
- Operational readiness certification of other systems
- Development of RMA data for performance assessment and architecture management
- Implementation of Integrated Operational Architecture based on commercial standards and systems
Summary

• CSOC commercialization is depending on the success of these commercial TT&C providers
  – We are planning on allocating NASA’s entire GN load to these systems
  _ This should foster the development of a robust and competitive service industry

• CSOC is developing a commercial architecture to manage to customer requirements
  – Not just buying passes and WAN bandwidth--developing an integrated operational commercial architecture

• This is a pathfinder program that can provide lessons-learned to other stakeholders