

PANAMSAT

Ground Control System Issues for Multi-Mission Operations

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PAS Multi-Mission Operations

- Current PAS Fleet Operations
 - 27 Satellites
 - 6 Different Models (One Manufacturer)
 - 3 Different Ground Control Systems (GCS)

- Mid-2003 Operations
 - 33 Satellites
 - 7 Different Models (Two Manufacturers)
 - 4 Different GCS

- Future
 - Unknown

Key Reasons for GCS Upgrade

- **Obsolescence**
 - Hardware
 - Availability Becoming Scarce
 - Maintenance Costs Increasing
 - Software Support Skills
- **Minimize Staffing**
 - Operators
 - Support Staff
- **Operational Flexibility**
 - Ability to Support Any Satellite Make/Model
 - Ability to Interface with Different Ground Equip (BBU, ACU etc.)
 - Ability to Support Future PAS Business Plans

Key Requirements for GCS Upgrade

■ Scalability

- One System for All Satellite Types
- Additional Satellites Easily Added
- Multiple Satellites Controlled From Single Workstation
- Easily Reassign Satellites to Different Workstations
- Performance/Processing Speed Requirements Maintained

■ Maintenance

- Ease of Upgrades (Involving Operational Spacecraft)
- Hardware Availability
- Available Staff Skill Sets
- Acceptable Level of Self-Sufficiency

Key Requirements for GCS Upgrade (Continued)

- Standard HMI
 - Operator and Support Staff Training Minimized
- Cost
 - Minimize Staffing Requirements
 - Minimize Maintenance Costs

Key Obstacles

- Transition of Current Fleet
 - Proprietary Data
 - Validation of Operational Procedures
 - Transition of Archive Data

- Cost
 - Desired versus Needed Requirements
 - Budgetary Constraints

- Staffing
 - Support Required for GCS Upgrade While Maintaining Current Systems

GCS Architecture Considerations

- COTS
 - No True COTS for Multi-Mission Operations
 - Individual Operator Requirements
 - Unique Satellite Requirements
- Centralized Versus Distributed Servers
 - More Hardware versus Ease of Failover/Upgrade
- Use of Software Development/Interface Standards
 - Ease of Plug and Play (Both Customer and Vendor)
- Maintenance and Licensing Fee Structures
 - Floating versus Node Locked
 - Site versus Spacecraft or CPU

GCS Architecture Considerations (Continued)

- Customer Configurable
 - How Much is Enough?
 - Complete API
- Vendor Support
 - Responsiveness
 - Product Integrity
 - Warranty Support
- Expected Product Life
 - Hardware
 - Software