Evolving Legacy Systems

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NRO and the Intelligence Cycle

- Mission Partner Responsibility
- Collection Management
- Collection
- Processing
- Exploitation
- Dissemination
- Archiving
- Customer Needs

OPS Cycle

NRO Responsibility
GSPO Responsibility -
Mission Ground Stations (MGS)

- Multiple Legacy Ground Elements for:
  - Planning
  - Flying
  - Distributing
  - Processing
- Developed and Maintained by Multiple SPOs
- All Systems Operated by Ground SPO
Ground SPO’s Operations Today

Mission Partner/Other SPO Responsibility
- Tasking
- Priorities
- Satellite C&C
- Satellite Data

GSPO Responsibility
- Operate
  - Satellite Constellation
  - Ground Stations
- Resource Planning
- Resource Optimization
- Performance Monitoring
- Infrastructure

Mission Partner/Other SPO Responsibility
- Data:
  - Exploitation
  - Processing
  - Forwarding
  - Archiving
MGS - Similarities and Differences

MGS 1
- Primary Mission B
- Pascal
- HVAC
- Contractor 7
- Logistics

MGS 2
- Primary Mission A
- HVAC
- Contractor 6
- Logistics

MGS 3
- Contractor 3
- Distributed components
- UNIX
- Ethernet
- SUN

- Spacecraft receivers
- Downlink format
- Contractors 1 & 2
- Fortran
- ATM Nets
- Hewlett Packard

MGS 1
- VAX/VMS
- Contractors 4 & 5
- Storage Arrays
- Gigabit Ethernet
- IBM

- Primary Mission C
- C++
- HVAC
- Contractor 8 & 9
- Logistics

UNCLASSIFIED
Change Drivers

EXTERNAL:

- Declining resources on orbit
- Increasing demands for enhanced responsiveness
  - Data where and when users need it
- Added requirements for user visibility into systems and tasking
- Increasing demands for interoperability with non-NRO systems

INTERNAL:

- Declining budgets and greater external scrutiny of program
- Minimal synergy in stovepipe architectures
- Quicker turnaround required on user enhancements and user tasking
GSPO Response

- **Ground Merged Architecture (GMA)**
  - Evolutionary Upgrade Mission Ground Stations
  - Six Segments:
    - Merged Mission Management - M3S
    - Site Support Services - SSS
    - IOSA Ephemeris Server - IES
    - Signal Data Distribution - SDDS
    - Midas 2K - M2K
    - System Utilization and Performance Reporting - SUPR
  - Key Decision: Consolidate All Mission Management into One MGS
Mission Management - What Is It?

- Manage resources at MGS
  - Space systems
  - Infrastructure
  - Processing
- Build and execute daily mission plan
  - a priori and realtime optimizing of mission resources
  - mission priority driven
- Interface point with central tasking organization
- Control point to disseminate status, tasking, reporting
Today’s Mission Management

Site 1
- Cooperative Tasking
- Local Mission Management LMM1

Site 2
- Cooperative Tasking
- Local Mission Management LMM1

Site 3
- Cooperative Tasking
- Local Mission Management LMM1
Merged Mission Management - Phase 2

Main Site

Constellation Planner

LMM1  LMM2  LMM3

Status Consolidator

Mission Assessment
Merged Mission Management - Phase 3

Main Site

Constellation Planner

Consolidated Mission Management

Status Consolidator

Mission Assessment
Summary

• GMA Mission Management will follow Evolutionary Path
• Final Implementation depends upon experiences learned with consolidated mission management (Single Site)
• Major Challenges:
  – Phased Implementation
  – Pulling Disparate, Aging Legacy Systems into Planned Architecture
  – Developing Common Operational Philosophy
• GMA Mission Management Exploits and Depends upon Commercial/DoD:
  – Technology
  – Lessons Learned
  – Evolutionary Techniques