Multi-Mission Space Ops Center (MMSOC)

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DET 12/VOC

&

Mark W. Stafford
The Aerospace Corporation
Overview

- Background
- MMSOC Vision
- Missions
- MMSOC Cost Efficiency
- Development & Acquisition Schedule
- MMSOC Advantages
- Mission Readiness
- Summary
MMSOC

“A single facility [entity] to perform satellite ops for AFSPC Space Vehicles (SVs) not currently supported by SMC SPOs… With potential to support a wide variety of missions … and be a satellite command and control spiral evolution resource for RDT&E of new systems.”

-- CONOPS for Satellite Operations Mission, Appendix F
HQ AFSPC/XO, May 01

Current funding profile:

<table>
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<th>YEAR</th>
<th>FY03</th>
<th>FY04</th>
<th>FY05</th>
<th>FY06</th>
<th>FY07</th>
<th>FY08</th>
<th>FY09</th>
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MMSOC Vision

- **Single Space Operations Facility**
  - Space ops for “Specialized” AFSPC Satellites
  - Perform other assigned missions
    - NRO, NASA, NOAA
- **Wide Variety of Missions**
  - Future Space Prototypes
  - Unique AFSPC programs
  - Boosters/Classified Ops
- **Combined Task Force**
  - AFSPC & Reserve personnel
  - Contractor Ops
- **Spiral Evolution Resource**
  - RDT&E of new systems
  - AFSPC resource for spiral development
- **Flexibility, Continuity, and Stability**
  - Support legacy and future programs
  - Geographically separated backup

Cradle-to-Grave Concept

Disparate SOCS

- Semi-Operational
- Evaluation/Test
- Post-Operational
- Surrogate SOC
- Residual Operations
- Acq Support

Today
(Fragmented/Inefficient)

Future
(Integrated/Interoperable)

Det 12 VO
Missions

• Heritage Onizuka/Schriever Missions (BRAC Realigned)
  – Legacy Boosters (on-going)
  – EELV (Oct 2005)
  – Defense Support Program (through 2005)
  – GPS Launch/Early Orbit (through 2005)
  – Midcourse Space Experiment (ongoing)

• Counterspace Systems
  – Interim Satellite as a Sensor (Nov 2004)
  – Classified R&D (2005 and on)

• Post-R&D Operational Assets
  – Coriolis (2005)
  – C/NOFS (2006)
  – STP Sat, Orbital Express (2007/8)
MMSOC Cost Efficiency

- SMC Det 12/VO has extensive experience in SATOPS DT&E and end-to-end mission readiness
- Use historical data to produce accurate cost estimates
  - LOC estimates not generally used or accurate
- Rely on mission complexity and reuse of existing software/hardware to determine costs
  - MUS is estimated and a determining factor in cost
  - Communication requirements a driving force, but consistently going down
    - Sharing bandwidth and infrastructure between programs important
  - Number and structure of telemetry points & commands critical
- Consider sustainment costs before purchase and program accordingly
  - Review yearly for better cost alternatives
Development & Acquisition Schedule

- Satellite Ground Systems (FY07-08)
  - 10 strings, multiple ground systems in two SOCs
- Dedicated Antenna (FY07)
  - SAFB with multi-band capability
- Commercial Antenna Connectivity (FY05-08)
- Facility Build Out (FY07-08)
  - Multi-level security
  - Three separate SOCs (2 at SAFB, 1 at KAFB)
- Communication infrastructure and backbone (FY07)
MMSOC Advantages

- MMSOC Use of COTS
  - Multiple missions and ground system requirements drive a flexible architecture and open interfaces
  - Must be willing to trade requirements and con ops for budget and schedule
  - Minimize COTS modification to ensure schedules are met
  - Working relationship with vendors critical
  - Do not become mission dependant on one COTS product
    - Continue to test competitors products and provide feedback to reduce switching costs
    - Push vendors towards standards
  - Maintain Open dialogue with vendors
MMSOC Advantages (cont)

- **Flexibility**
  - Try to use standard commercial interfaces and protocols when possible
  - Platform Independence

- **Reliability**
  - Maintain different database environments on operational system with promotion schedules based on successful test
  - Little to no offline or offsite development decreases probability of errors
  - All software/hardware performance is tracked and a problem report databases is maintained and communicated to vendors

- **Maintainability**
  - Must program hardware/software upgrades in the budget to ensure technology refresh and compatibility
MMSOC Advantages (cont)

• **Spiral Evolution/Rapid Prototyping**
  – Provides initial capability at a reduced cost and risk
  – Provides initial insight into development
  – Provides opportunity to redirect efforts and experiment with new technology (failure is an option)

• **Maintain common core system infrastructure**
  – New missions reuse as much of the core as possible
  – New missions pay for modifications
  – Try to infuse new technology from each customer into the core to increase capability and reduce costs when possible
Mission Readiness

- Developers and Operators are Partners
  - Both must be involved from the beginning
  - Reduces rework and requirements modification and creep
- Developmental Testing
  - Build prototypes and test with real assets and operators during development when possible
- A collaborative environment between the warfighter (50 SW) and the developer (SMC/Det 12)

→ a "golden handshake" between operators, acquirers, testers, & developers
Summary

- Total systems engineering approach is critical to mission success
- Relationship with COTS vendors significant component of mission assurance
- MMSOC heritage provides agile response for detailed (high-end) operations with unique/emerging missions
- MMSOC built on a “golden handshake” between operators, acquirers, testers, & developers
- MMSOC can contribute to AFSPC’s emerging mission sets -- counterspace has the earliest need
SMC Det 12/VOC
Center for Research Support

Space Operations Testbed
- Providing Rapid Capability to
  - Prototype
  - Evaluate
  - Activate
- Access to Ground/Space Assets
- 24/7 Contractor Operations
- Residual Satellite Operations

CERES (VOC)  
Schriever AFB, CO