



# *Multi-Mission Space Ops Center (MMSOC)*

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DET 12/VOC**

**&**

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The Aerospace Corporation**





# Overview

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



# MMSOC – Not a New Idea

## 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:

Interim SOCTF funding:

MMSOC funding:

YEAR	FY03	FY04	FY05	FY06	FY07	FY08	FY09
Funding	0.172	4.370	4.518	4.619	22.299	24.028	27.297



# 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

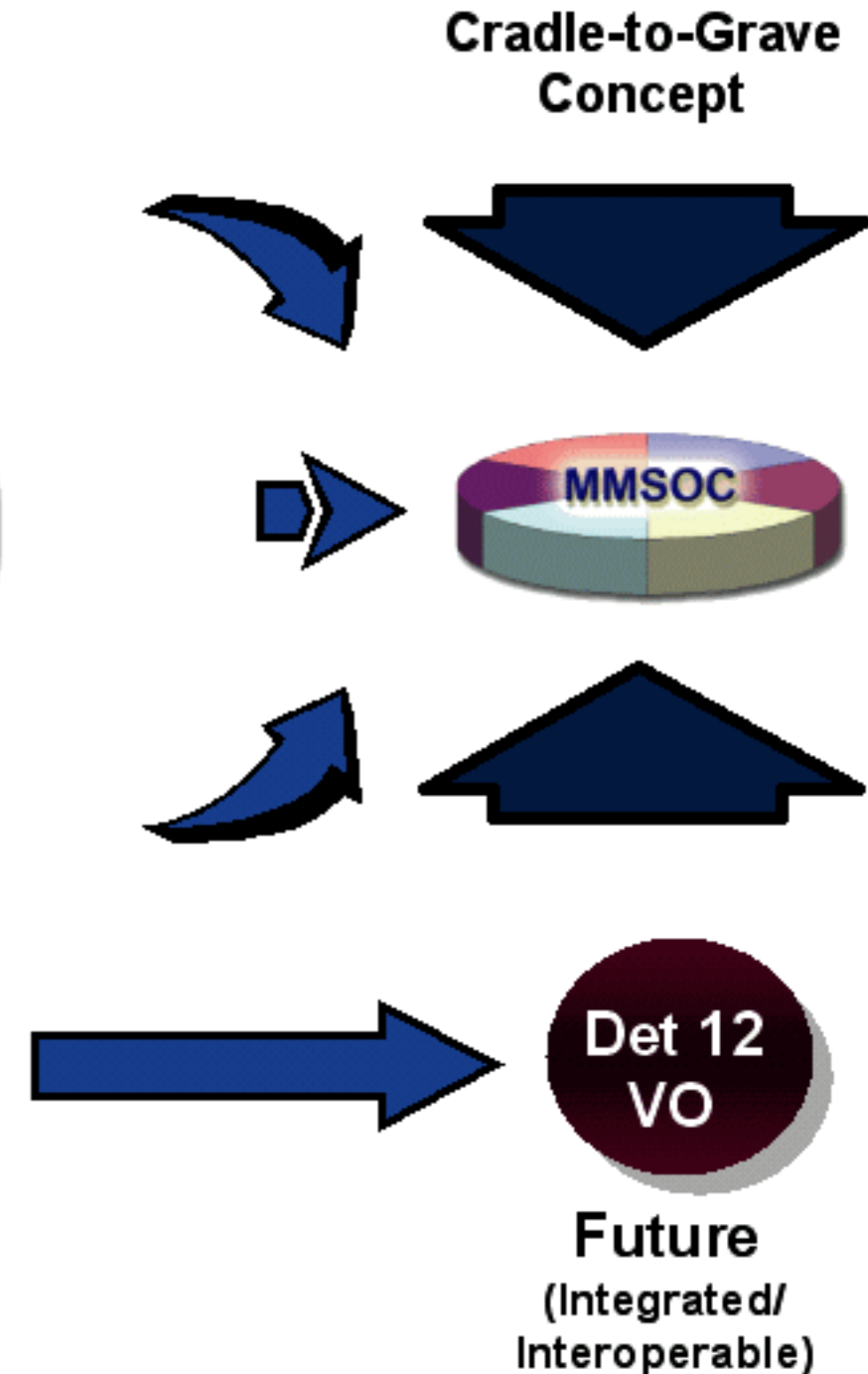
- RDT&E of new systems
- AFSPC resource for spiral development

## • Flexibility, Continuity, and Stability

- Support legacy and future programs
- Geographically separated backup



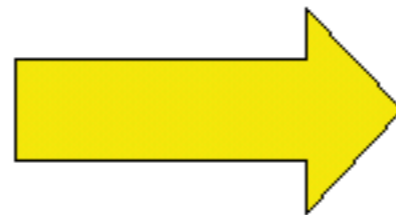
**Today**  
(Fragmented/Inefficient)





# Missions

- **Heritage Onizuka/Schriever Missions (BRAC Realigned)**
  - Legacy Boosters (on-going)
  - NASA Shuttle Support (Aug 2004)
  - 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)
  - TACSAT-2 (2006)
  - C/NOFS (2006)
  - STP Sat, Orbital Express (2007/8)



**#1 Future  
Mission Set**

*Rapid transition  
of new  
technology to  
the warfighter*



# 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**



**1/7 SOPS**



**Det 12/VO**



**MMSOC**



# 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 Col Neumeister



## SMC Det 12/RP



**ROCKET SYSTEMS  
LAUNCH PROGRAM**  
Col Thongchua



## SMC Det 12/VO



**SPACE VEHICLE OPERATIONS**  
Col Miller

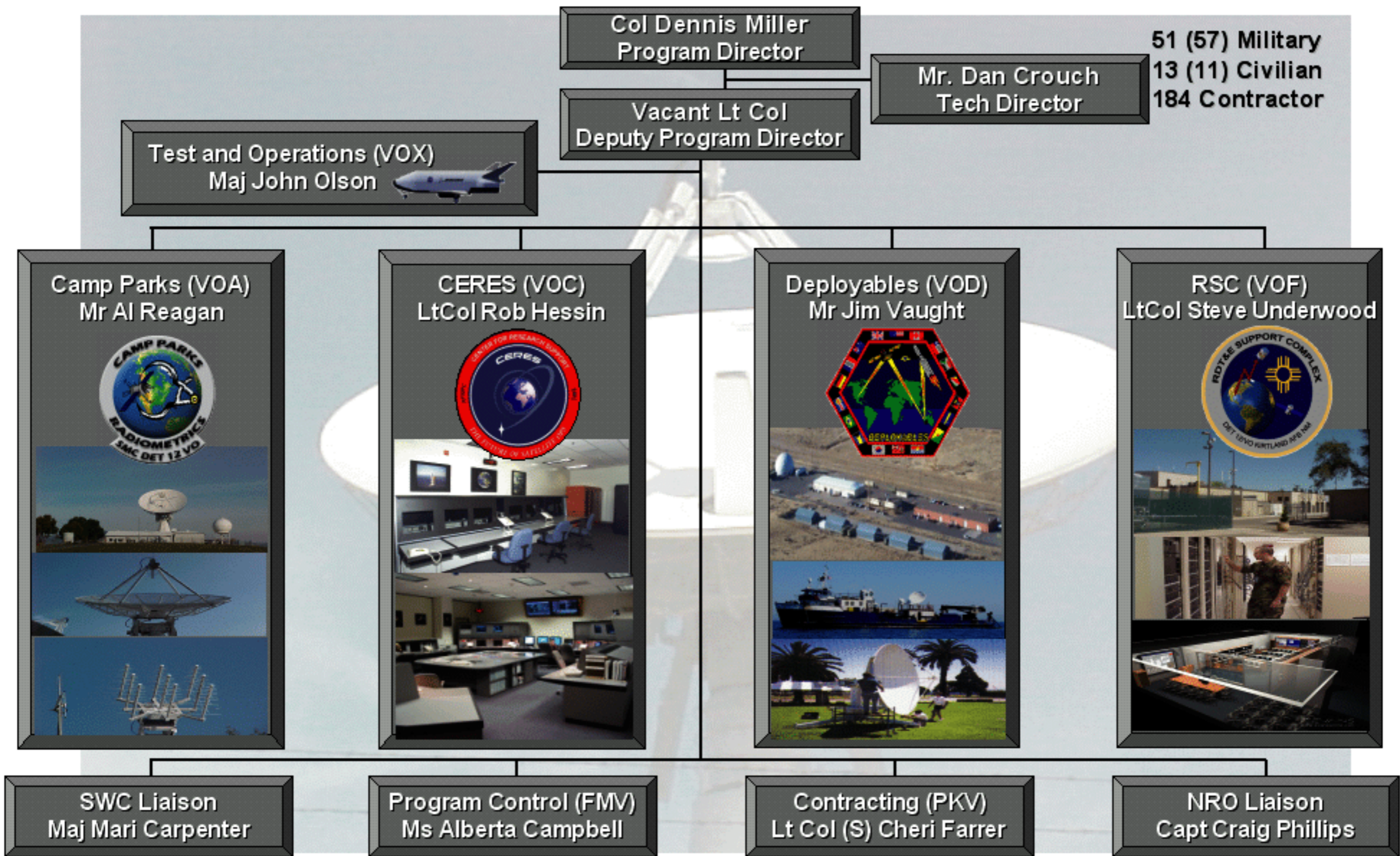
## SMC Det 12/ST



**DoD SPACE TEST  
PROGRAM**  
Col White



# SMC Det 12/VO Who We Are





# 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**

*Space Ops  
Concepts and C2  
Systems*

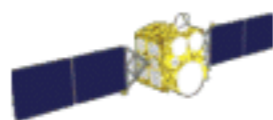


**CERES (VOC)**

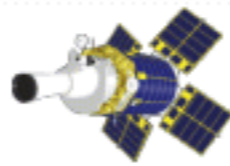
**Schriever AFB, CO**



DMSP



DSCS III



DSP



DSCS II



GPS