



Multi-Mission Satellite Operations Center Ground System Architecture (MMSOC GSA)

***Ms Tiffany Morgan
SMC/SDTC
29 Feb 2012***



Motivation

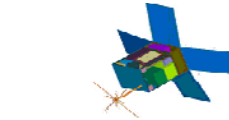
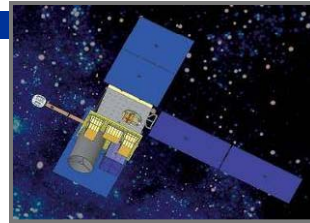
- **SMC/SDT is responsible for the low cost, rapid deployment of ground systems for one of a kind spacecraft**
- **Current ground system development times run from 12 to 20 months, depending on vehicle complexity**
- **Transfer of vehicles from one ground system to another runs about 8 months (medium complexity)**
- **SMC/SDT continues working to reduce both development and sustainment costs**



MMSOC GSA Description



SOC 11 - Schriever AFB



RSC - Kirtland AFB

- **MMSOC GSA Concept:**
 - Modular COTS-based system employing a net-centric, service-oriented architecture
 - Utilize open architecture standards to enable responsive, net-ready operations
 - Rapid, seamless transition of R&D satellites to support residual capability operations
 - Reduce ground system development costs and schedule
- **Missions Supported:**
 - Multiple missions at multiple locations in multiple classification environments...
 - R&D/Experimentation
 - Residual COCOM Capabilities
 - Operational satellites
- **Collaborative Mission Partners:**
 - Operational Units: 50 SW, 310 SW, SMC/SD
 - SPO: Space Test and Operations Division
 - Space System Developers: AFRL, ORS, STP, SMC
 - Other: AFSPC 6, NASA, NAVY, Aerospace (Chantilly), Lockheed Martin, LinQuest



Open System Architecture



MMSOC GSA Vision

Today

FY 14

Stove Piped Arch



Open System Arch

24/7 Operations/ 70 ppl



Single Shift (8-5)/ 35 ppl

Man-In-The-Loop



Automated Contacts

AFSCN



Organic/ AFSCN/ USN

**Open Architecture
&
Standardized Interfaces**



Every Sat an App



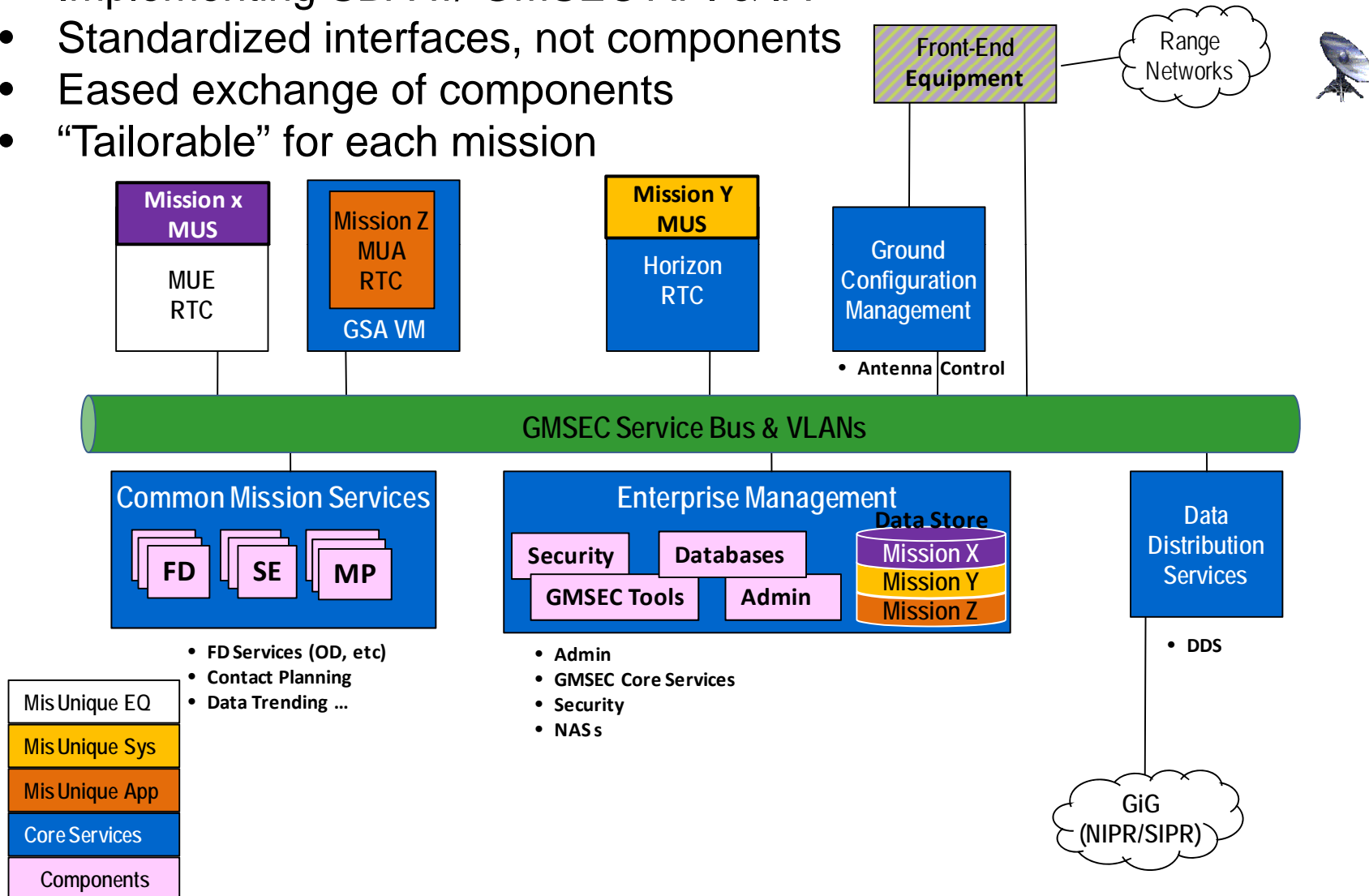
MMSOC GSA Status

- **Key Events**
 - **MMSOC GSA system acceptance Jan & Apr 2010 (RSC & SOC-11)**
 - ***L&EO & on-orbit operations for STPSat-2 & ORS-1***
 - **ORS-1 operational acceptance**
- **Current Status**
 - **TacSat-3 ported from legacy C2 (Octant) to MMSOC GSA**
 - **Service Bus Architecture Critical Design Review held mid-Feb**
- **Upcoming Milestones**
 - **Demonstration of back-up capability between SOC's**
 - **Long-line distributed Ops demonstration**
 - **Minimize HITL by leveraging STP and organic ground antenna**
 - **Migrate to a GMSEC Service Bus Architecture**



MMSOC GS SBA

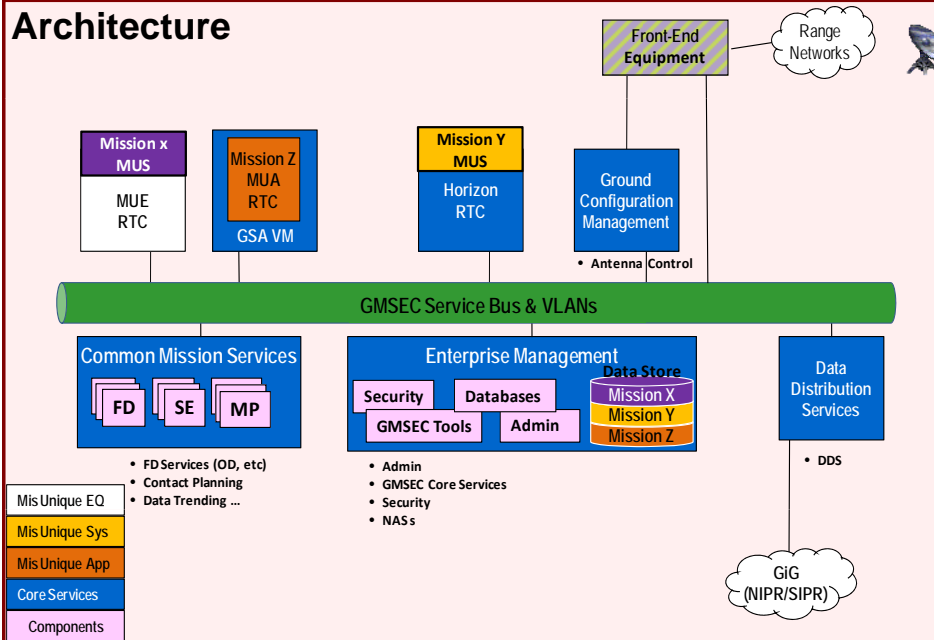
- Implementing SBA w/ GMSEC API & IA
- Standardized interfaces, not components
- Eased exchange of components
- “Tailorable” for each mission





MMSOC GSA

Architecture



Facts

- MMSOC GSA Developed under EDS 2006 contract
- HORIZON software core
 - Mission planning for two STPSat-2, ORS-1
 - Integrated VMOC with mission planning
- Open System Goals:
 - Service Oriented Architecture
 - Reusing and Exposing Services
 - Modularity
 - Standards
 - Space-to-Ground ICD
- Interoperability with other enterprise architectures

Program Status

- System Acceptance Review for SOC-97 (RSC) - 1Q FY10
- System Acceptance Review for SOC-11 (SOPS) - 2Q FY10
- Successful STPSat-2 (at SOC-97) Flight OPS since Nov 10
- Successful ORS-1 (at SOC-11) Flight OPS since June 11
- Implementation of Service Bus Architecture underway
 - Using GMSEC standard
 - CDR completed/Phase II in contracts

RSC2 Mission Description

- Design, develop, test, procure, operate, and sustain a standard satellite ground system for the R&D, ORS, and operational communities (MMSOC GSA)
- Through fielding of a responsive satellite control system, AFSPC will be able to rapidly transition satellites from R&D to Ops and enable rapid transition of space capabilities to Combatant Commanders
- Design, develop, test and integrate Mission Unique Software into the core ground system

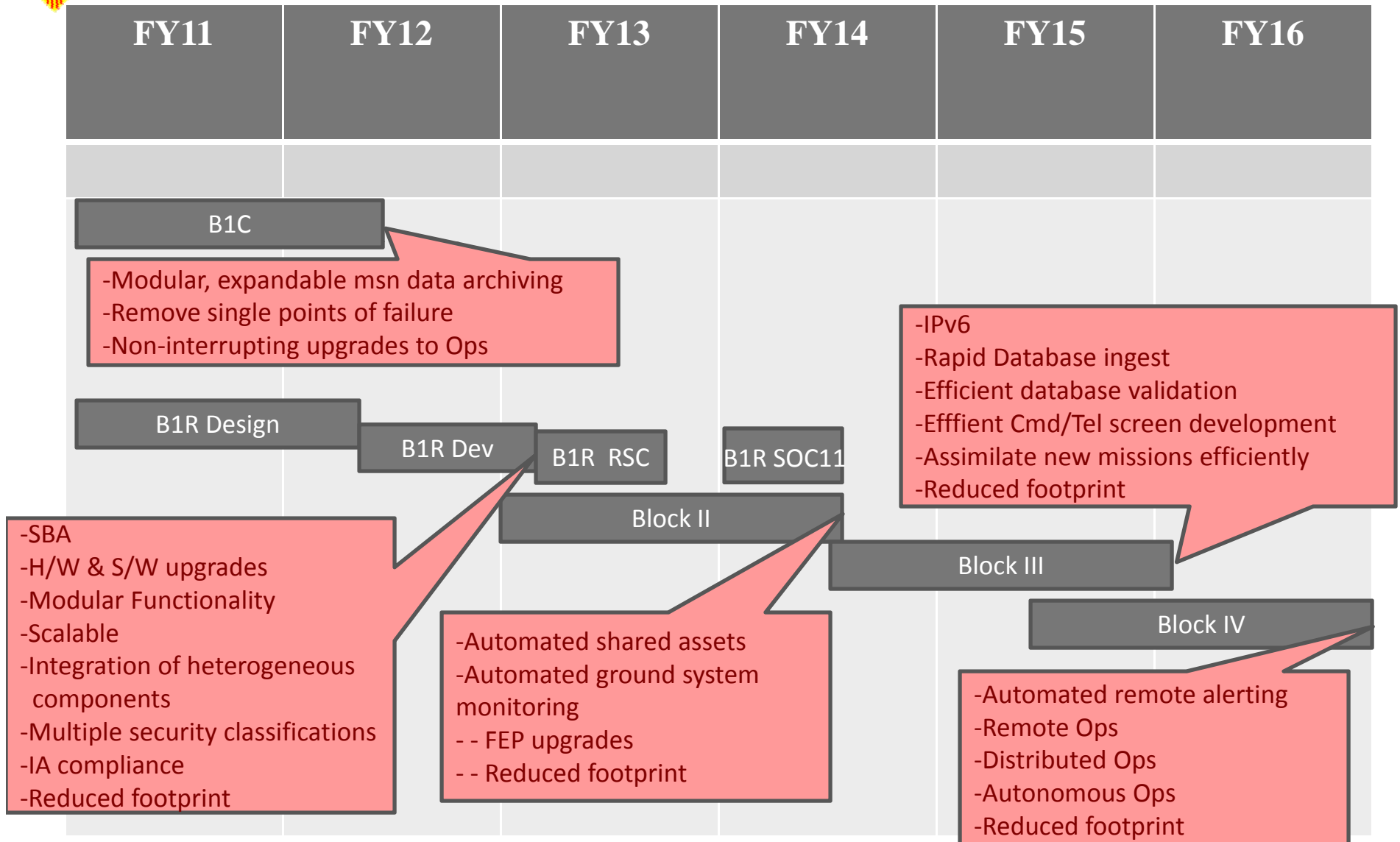


Current MMSOC GSA Block I Capabilities

- **Full TT&C and contact planning**
 - Legacy Mission Planning concept
 - 4 simultaneous contacts – different satellites
 - Recording Capability (Raw Black Data)
- **Support end-to-end test (e.g. FCT, LBCT)**
- **Conduct L&EO and On-Orbit Ops**
 - STPSat-2 / ORS-1 validated concept
- **Tasking**
 - Standardized Tasking
 - Multi-classification level tasking ingestion
 - Move ingested tasking file data among SOC functions (i.e. embedded data upload)
- **Orbital analysis/maneuver planning**
 - GPS Data Analysis
 - Tracking Data Analysis
- **Data product generation**
 - i.e. Command History, analysis report
- **Data distribution**
 - P2P
 - Multiple Classification Levels
- **Support multiple missions with multiple classifications**
- **Payload Test Center**
 - Reconfigurable as indpnt Ops floor



Vision: The MMSOC GSA enable responsive, low cost space operations for research and operations satellite missions.





CV-1

Vision: The MMSOC GSA enable responsive, low cost space operations for research and operations satellite missions.

2011 -
2016

