Future Visions of AFSCN

Path to the Future

Maj Ray Pry
SMC/CWX
3 March 1999
Satellite and Launch Control Systems Program Office (SMC/CW)

Col Barry Morgan  
Program Director

Col Randy Odle  
Deputy Program Director
SMC/CW Mission

Sustain and Modernize the Worldwide Ground Systems Providing Launch Control for Space Lift Vehicles; Tracking, Telemetry and Commanding for On-Orbit Satellites and Test Support for Ballistic Missiles and Space Experiments
Role of SMC in the AFSCN Mission

**DESIGN, DEVELOP, ACQUIRE, MODIFY AND SUSTAIN**
the
**AFSCN**
in support of
**CURRENT AND FUTURE SPACE SYSTEMS**
CW Organization

- Single PM for each program
  - Align resources programmatically
  - Simplify organizational complexity
  - Merge units

- Reduce duplicate efforts

- Balance resources across two programs

- Better aligns with vertical strategy
AFSCN Modernization

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AFSCN Modernization

SATELLITE AND LAUNCH CONTROL SYSTEMS PROGRAM OFFICE

CRD

SCORD

NSP

DPG

LRP

MAP

ConOps

NSP

DPG

LRP

MAP

ConOps

SATELLITE AND LAUNCH CONTROL SYSTEMS PROGRAM OFFICE
Network Evolution Drivers

- Command & Control Segment Sustainment
- NSSA Recommendations
- Commercialization/Privatization Opportunities
- Other Possible Influences
CCS Sustainment

- CCS Sustainment can’t continue indefinitely
  - Too expensive/obsolescence
  - Current sustainment contract expires in 2003
- TT&C Mission Transition to SatSPOs
  - Integrated mission / TT&C capability
- SSCS Did Not Materialize
  - Common core issues
- “Common Look, Touch, Feel”
  - Utilize advances in HMI
Standard Satellite Control System (SSCS)

• SSCS Background
  – Common core TT&C design for all satellite programs
  – Standard solution to get us off of CCS
  – Point solution selected

• But
  – Several programs with independent solutions
  – Common Core Issues

• Therefore
  – TT&C mission moved to SATSPOs
    • Could tailor solution based on mission drivers
  – Standardize thru “common look, touch, feel”
Common Core Issues

- Mission is paramount; varies considerably
- Don’t build another DSM
- Commercial space activity dominating military space activity
- Where is future taking us?
- Window of Opportunity
Human Machine Interface

- Difficult to understand mnemonics
- Critical telemetry out-of-view
- No summary State of Health
- No commonality

- Intuitively understandable telemetry
- Easy to assess State of Health status
- Common look, touch, and feel
National Security Space Architect
Satellite Control Architecture Evolution

National Space Policy
“DoD will coordinate with other departments and agencies, *as appropriate*, to foster the integration and interoperability of satellite control for all governmental space activities.”
NSSA Vision
c. 2010 - 2015

Average Data Rate (Mb/s)

User Satellite Altitude (km)

Enduring
Shared
Ground System

Specialized Ground Terminals
or
Government Relay

Commercial Service
or
Government Relay

Specialized Ground Terminals

Note: No Limitation on Crosslinks
SatOps ADT Recommendations

- Migrate Uplink to USB
- Implement Efficient Waveform
- Eliminate Radiometric Tracking
- In-Band Control

Space Architecture Vision - Migration to Space and In-Band Nominal Operations

SATELLITE AND LAUNCH CONTROL SYSTEMS PROGRAM OFFICE
Commercialization/Privatization

• Military-specific Operations (C2 Applications)

• Hardware & Software Interfaces
• Operational Data & Information Transformation

• TT&C and Busses
• Data Handling Processes
• Commercial Remote Sensing
• Commercial Catalogue (COTS)
• Commercial Communication Assets
  • Satellites
  • Terrestrial Comm Services
  • Mobile Comm Services

Commercialization Initiatives Should Be Chosen Carefully

Source: LRP, Page 116
Commercial Space Opportunities Study (CSOS)

**SCHEDULE**

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<td>Brief CORONA</td>
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**GOALS**

- Reduce TOA
- Release AF personnel
- Stimulate industry

**PANEL STRUCTURE**

- Integration
- Communications
- Launch and Launch Range
- Remote Sensing
- Navigation
- Satellite Control

- Operational Control Nodes
- Command & Control
- Remote Tracking Stations
- Communication

**EXTENT OF COMMERCIALIZATION**

- GOCO
- Purchased Services
Other Possible Influences

- Satellite Support Needs
- AFSCN/SSN Consolidation
- Future POM $s
- New Acquisition Strategy
- Et al
New AFSCN Contracts

Yesterday's Contracts

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Today's Contracts

Command & Control Segment
- NOUC: Network Operations Upgrade Contract
- CCSC: Command & Control Sustainment Contract
- Network Integration Contract

Range & Communications Segment
- RCDC: Range & Comm Development Contract
- DSC II: Depot Support Contract
- Network Integration Contract

Tomorrow's Contracts?

O&M Contracts

SATCHELLITE AND LAUNCH CONTROL SYSTEMS PROGRAM OFFICE
What’s In the Future

• In-Band TT&C
• Commercialization/Privatization
• Efficient Spectrum Use
  – Eliminate/Reduce Radiometric Tracking ?
  – Migration to USB ???
  – Efficient Modulation !
• Asset Consolidation
• Interoperability
• “Plug and Use”
• Reduce Infrastructure/O&M Costs

Assured access to space
Future of AFSCN

- Mission Evolution
- Architecture Evolution
- Interface Evolution
- Commercialization

**Satellite Command & Control (TT&C)**
- System Design Driver Is Satellite **Assured Access**
- Launch, Early Orbit, Anomaly Resolution, Normal Ops

**Satellite Connectivity for Mission Data**
- System Design Driver Is Link **Capacity**
- T&C Usually Integrated With Mission Link

**Architecture Continuity**
*AFSCN Mission/Functionality Remains*