White Sands Missile Range’s Flight Termination System Modernization (FTSM)

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• Command Control & Flight Termination (CC/FTS)

• In-flight vehicles

• Protect public and personnel

• Mandated – DoD 3200.11

• Initially: RCC (IRIG) Tones (RCC 208)

• Later: Enhanced Flight Termination System (RCC 319)
History: CC/FTS at WSMR

• OOPS! Juarez Cemetery

• Initially: RCC (IRIG) Tones (RCC 208)

• Recently: EFTS Messaging (RCC 319)

…but the Legacy System has a number of shortfalls…
Current (Legacy) WSMR FTS

- All equipment is nearly **20 years old**!
  - TIME, MONEY, MISSIONS
  - Limited replacement parts availability
- Capable of RCC (IRIG) *or* EFTS, not both at same time
- Must be constantly manned to be reliable for missions
- SONET via TDM capability, only (no TSN connectivity)
- Limited, heavy frequency band use
Background: Scope

Work Assignment Order:
Provide complete, modernized WSMR Command Control and Flight Termination System (CC/FTS)

• 4 Fixed Sites
• 2 Mobile Vans
• Range Control Node
• Test Bed
  • Range Control Node
  • Fixed Site
Methods of Communication:
SONET (TDM)
TSN (CoIP) - NEW
WSMR FTS Modernization Effects (Logistical)

• New equipment (warranties and replacement parts)

• IA Compliance

• Reducing Sustainment Footprint

• Transportable Equipment

• Follow-on Technical Support
WSMR FTS Modernization Effects (Technical)

- RCC tones *and* EFTS on concurrent mission
- CoIP on WSMR TSN, maintaining SONET via TDM
- Increased frequency bands, including those with less traffic
- Human Interface
  - Old switches, but new “smarts” (PLDs, PoE and IP Networking)
- Full Remote Control of System
  - Power Up, Cycling
  - Centralized (Range Control Node) and
  - Distributed (fixed sites, mobiles)
Range Control

Background: Basic Infrastructure

SITE 1 – Fixed Site (Remote or Manual Operation)

SITE 2 – Fixed Site (Remote or Manual Operation)

SITE 3 – Fixed Site (Remote or Manual Operation)

SITE 4 – Fixed Site (Remote or Manual Operation)

Destruct Boxes
Flight Safety Operators

Range Control Interface
FTS Command Monitor
IM Operator

OCDF Cell
OCDF
TDC

Communication Network

Primary/Redundant FTS Computers

Command Transmitter
Amplifier
Exciter
RCC
EFTS
Power Supply

Project Interface

Same Configuration as Fixed Sites

Mobile 1
Mobile 2

EFTS/RCC Receivers

FTS Command Monitor (OCDF)
FTS Command Monitor (TDC)

FTS

Primary/Redundant Project Interface Computers

RCC
EFTS
Project Interface

Same Configuration as Fixed Sites
FTSM Planning and Design Timeline

- No Spare Parts
- Increased Failures
- No TSN Connect
- IA Non-Compliance

Concept FTSM → WAO to TRAX → Integrated Product Team

- Key Performance Parameters
- Major System Requirements

Market Research → Range Site Visits

- June 2014
- July 2014
- March-April 2015
- June 2015

Industry Day
FTSM Planning and Design Timeline

**Integrated Product Team**

- **Key Performance Parameters**
- **Major System Requirements**

**Major System Requirements**

- **System Requirements Document**
- **Scope of Work**
- **Requirements Verification Matrix**

**Request for Proposal** → **Negotiations** → **Vendor Selection** → **Base Delivery Award**

- **March 2015**
- **September 2015**
- **November 2015**
- **January 2016**
Logistical Coordination: Range Control Node

- Side-by-Side installation
  - Real-estate availability
  - Commo tray space
  - Power availability

- Demo of existing equipment (eventually)

- Installation of New Equipment
  - Connections
  - Cabling
  - Equipment

- Communications Connection to TSN

- Configuration of Human Interface components...
Human Interface: Smart Command Boxes

SMART COMMAND BOXES (BASE)
Human Interface: Smart Command Boxes

SPECIAL TEST EQUIPMENT (BASE)
Logistical Coordination: Fixed Sites

• Side-by-Side installation (at first Fixed Site)
• Demo of existing equipment
• Installation of New Equipment
• Communications Upgrade to TSN Connectivity
• Power Upgrades, esp. for Side-by-Side
Human Interface: Software
Human Interface: Software
Logistical Coordination: Communications

TSN Connection

= IA Compliance

= Switch/Router access and upgrades

= Re-certification
Logistical Coordination: Mobile

- Demo of existing equipment
- Installation of New Equipment
- Communications Upgrade to TSN Connectivity
FTSM Delivery Timeline

**Base Delivery**
- Range Control Node
- 1 Fixed Site
  - Subcontract Award Day 0
  - Prelim Design Review Day 15
  - Critical Design Review Day 60
  - Factory Acceptance Test Day 375
  - Site Acceptance Test Day 410
  - Integration Day 425
  - Initial Certification Day 450

**Option 1 & 2**
- IM Test Bed
- 3 Fixed Sites
  - Option Exercise Day 0
  - Factory Acceptance Test Day 300
  - Site Acceptance Test Day 330
  - Integration Day 345
  - Initial Certification Day 370

**Option 3 & 4**
- 2 Mobiles
  - Option Exercise Day 0
  - Factory Acceptance Test Day 270
  - Site Acceptance Test Day 300
  - Integration Day 315
  - Initial Certification Day 330

**FINAL SYSTEM CERTIFICATION** early 2019
Current Project Support Efforts

- IM Commo Support – site infrastructure (TSN, Sonnet)
- WSMR TSN Working Group Support and Updates
- WSMR IA Concurrence – Tenant Security Plan
- Power Requirements – site infrastructure (side-by-side)
- Commo Rack configurations and cooperation
- RO, SE, IM, Command Group Participation
Questions?

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Thank you!