

Distributed Test Operations: Lessons Learned from Geographically Separated Control Rooms

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Overview

- What/Why
 - Framing the Issue
 - What is the Benefit
 - Development: Where are We At / Going
- How
 - Establishing Eglin – Edwards Link
 - Challenges
 - Lessons Learned
 - Future Considerations



Framing the Issue

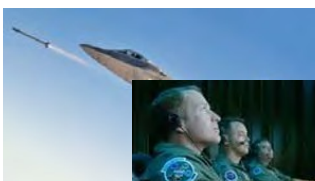
AFTC – Strategic Goal # 1

Unite the geographically-separated testing sites around the country
into “One Enterprise Team”

- Air Force Test Center (AFTC)
 - Recapitalize existing resources across the test enterprise
 - Utilize engineering expertise regardless of location
 - Reduce duplication of test efforts & assets
- Distributed Test Operations (DTO)
 - Take advantage of personnel, facilities and resources



Potential Scope



Edwards AFB

- Aircraft EMD Specialty
- 5th gen flight test



Eglin AFB

- Weapon focus
- 4th gen integration
- AFSEO



What is the Benefit

- AFSEO Support at Edwards
 - 2+ days of travel per DE
 - TDY costs
 - (Hotel, Per diem, Cars)
 - Engineers not at desk
 - (Travel days & Flights)
 - Potential for mission cancellations
 - (Maintenance, Weather)
- Utilizing IRDS
 - No time lost for CANX
 - Can train 10+ personnel
 - Cancellations
 - Personnel can return to work
 - Resources can be reallocated
 - Costs:
 - Complete mission: ~\$2k
 - Canceled mission: ~\$1k
 - Non-schedule: ~\$50



Development: Where are We At / Going

- Initial Approach – Non-Interference
 - System Development, Proof of Concept
 - Remote Control Room Demonstration
 - Observing Missions in Real-Time
 - AFSEO Training
- The Next Step – Remote Mission Execution
 - F-16 Flutter Test: Acft Ops @ Edwards / Control Room @ Eglin
 - Not Truly a “DTO” Event
- The Endgame – Multiple Active Control Rooms
 - True DTO with Mission Personnel Active at Multiple Locations

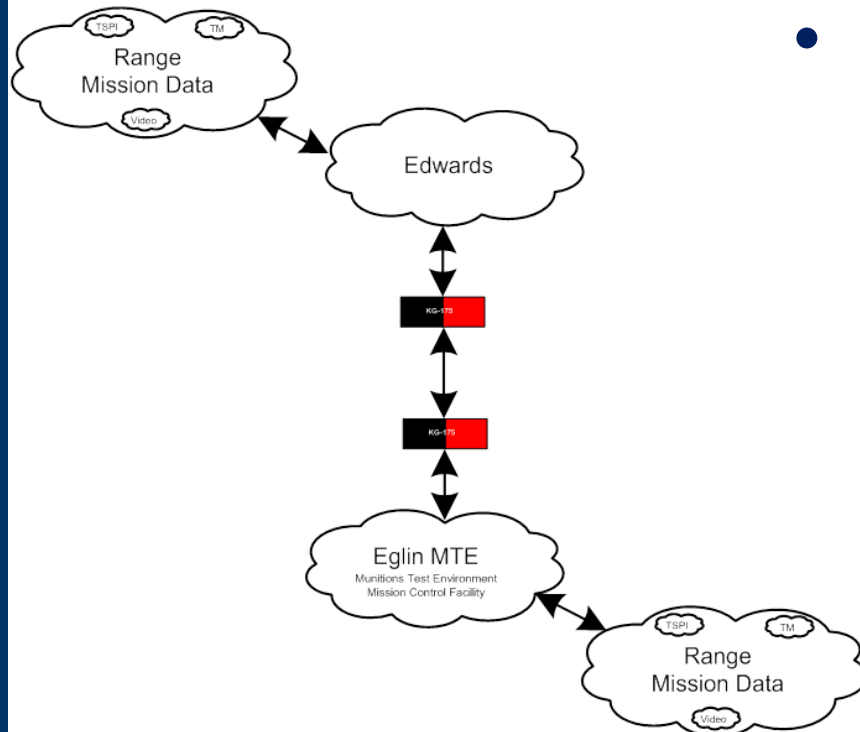


Started off as a Proof-Of-Concept

- **Could Seek Eagle (SE) monitor missions remotely at Eglin?**
 - Mission support crew at Edwards
 - TM database/display files
 - Discipline Engineer monitoring at Edwards
 - Team DE monitoring at Eglin
 - Analyze Data
 - A/C TM Data and A/C TM Video
 - Weapon Data
 - Listen/Talk on COMM nets



Eglin-Edwards Link



- Equipment Requirements
 - Utilized Telemetry Network processor
 - Utilized DREN nodes
 - MOA/ATO establish
 - Established Network Encryption
 - Identified specialize equipment
 - Various TM video decoding needs
 - Different A/C Instrumentation
 - Utilized same COMM system
- Database and Displays:
 - IRIG Standard – TMATS
 - IADS standard display system both ranges
 - Manually developed database attributes



DTO Mission Supported

- **Seek Eagle Demonstrations – Streamed to Eglin**
 - F16 – 17 Scheduled, 6 Completed
 - F35 - 44 Scheduled, 20 Completed
 - F22 – 14 Scheduled, 3 Completed
- **Other DTO – Streamed to Edwards**
 - F35 – 6 Scheduled, 4 Completed
- **Raytheon support – Streamed to Tucson**
 - Via SDREN → TM data only



Challenges Overview

- Execution Level

- Control Room Operations
- Control Room Training
- Mission Briefing
- Scheduling
- Cancellations



- Enterprise Level

- Who owns the test?
 - Aircraft OG?
 - Control Room OG?
- Safety Process
- AFTC vs TW Range Priority
- Test Conduct Stds





Facilities and Control Rooms Challenges

- Facilities and Control Rooms Setup
 - Unique A/C instrumentation requirements
 - Differences in range SOP, Culture, and Language
 - Time Differences
 - Non Existent de-confliction process
 - Additional coordination of COMM line checks
 - Growing pains with COMM usage
 - Data line check coordination
 - Missions setup file changes
 - File transfer process
 - No non-TM – range maps
 - No additional video (non-TM)
 - Local and remote mission assets coordination





Facilities and Control Room Considerations

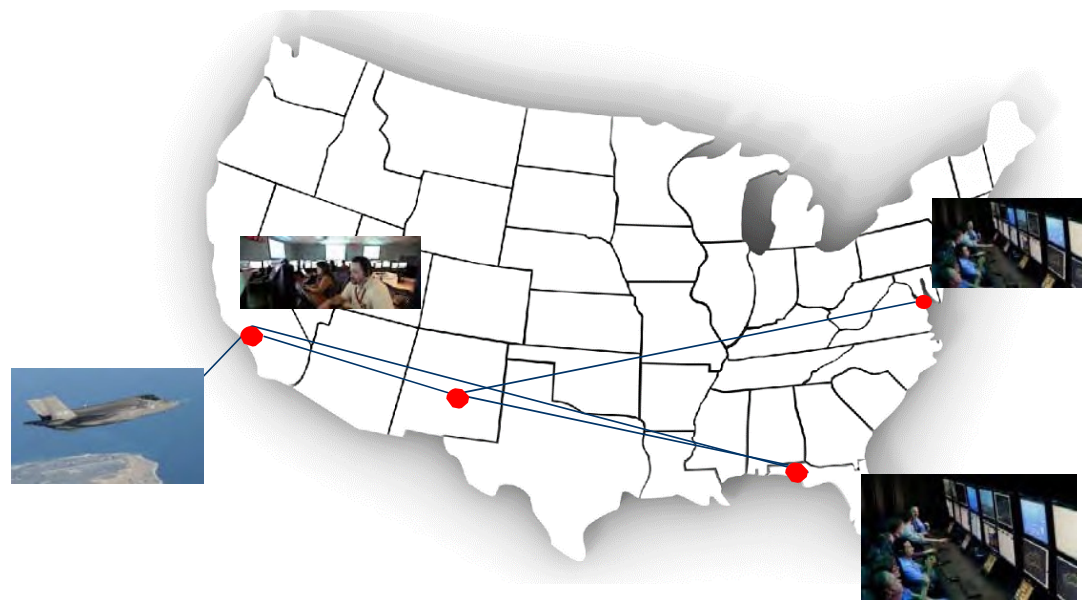
- Standardized equipment
- Standardized Display Software
- Standardized formats – PCM Definition
- Scheduling Business rules for DTO?
- DTO mission scheduling priority
- Establish link integrity in Mission Room
- Establish business rules for DTO mission support files





Execution Challenges (in the weeds)

- Control Room Operations
 - Remote vs. Split
 - Roles & Responsibilities
 - Human Factors
 - Team familiarization
 - Non-verbal comm
 - Phased approach
 - TC & DE Training (Trust)
- Other Issues
 - Mission Brief
 - Late Schedule Changes
 - Mission Cancellation





Enterprise Challenges & Considerations

- Test Approval Authority
 - Which org has final approval?
- Safety Approval
 - How many safety reviews do we need?
- Scheduling
 - “Center” Scheduling Enterprise
- Range to Range Priorities
- Financial
 - How do programs pay for all this?
 - Moving funds have been an issue
 - Need for a singular accounting system?

Who owns this test??



Operators?



Range?



Control?



What's the path forward?

• Short Term

- Continued training of AFSEO personnel on 5th gen test
- Expanding AFTC knowledge of 5th gen test beyond Edwards
- Utilization of IRDS for large test programs

• Long Term

- Developing the one enterprise goal
- AFTC Distributed CONOPs & Instructions
- Easier multi-base testing
 - Scheduling Programs
 - Money Transfer
 - Training Qualifications



What's the path forward?

- **Leadership Emphasis for Edwards and Eglin DTO Support**
- **96TW Long Range and Short Range Initiatives**
 - Several 96 Test Wing initiatives currently being addressed for the integration of Edwards and Eglin DTO missions
- **AFTC – DTO instruction/policy/SOP Initiatives**
- **AFTC – Center Scheduling system initiatives**



Thanks for your support!

- 412th Test Wing
 - 412 RANS
 - 416 FLTS
 - 773 TS/ENFS
 - 411 FLTS
 - 461 FLTS
- 96th Test Wing
 - 96 RNCS
 - Air Force SEEK EAGLE Office
 - 40 FLTS

QUESTIONS?