Drop Towers

Purpose

To help evaluate the effects of dropping an item (bare and packaged) upon its structural and functional integrity

Capabilities

Site 3 - 30 ft (9 m) Drop Test Facility

- Drop capacity: 1,000 lbs
- Three Impact Surfaces:
  - 3 in of steel on 24 in of concrete
  - 3 in of steel on compacted earth
  - Concrete/steel mixture

60 ft (18 m) Drop Test Facility (focus is on verifying item safety)

- Drop capacity: 4,000 lbs
- One Impact Surface: 5 in of steel on 24 in of concrete

Shock

Purpose

To help evaluate if the item under test meets the performance specifications after exposure to the designated shock level; includes verification of explosive safety for transport by naval ship

Capabilities

- Total weight installed on anvil plate may not exceed 550 lbs which limits test item and associated shipping and packaging hardware to a total of 250 to 300 lbs (depends upon the fixture required)
- Three impacts with respect to each major axis (vertical, longitudinal, transverse)
- Hoist Assembly - manual or electric
- Remote operations may be conducted to test hazardous items

Hazard Classification/Deflagration

Purpose

To help evaluate the effects of heat and flame upon munitions

Typical Tests

- Fast Cook-Off: engulfs the test item in the flame envelope and record its reaction as a function of time
- Slow Cook-Off: subjects the test item to a gradual increase in temperature until a reaction occurs
- Sympathetic Detonation: simulates a reacting munition which may transmit blast, shock, flame, fragments or other debris to other munitions stored in vicinity
- Thermal propagation
- Thermal conductivity
- Insensitive Munition (IM)

Nondestructive Testing

Purpose

To investigate the material properties of an object, material or system without impairing its future usefulness

Capabilities

- Physical measurements
- Non-destructive inspections
- Material properties testing
- Mass properties measurement

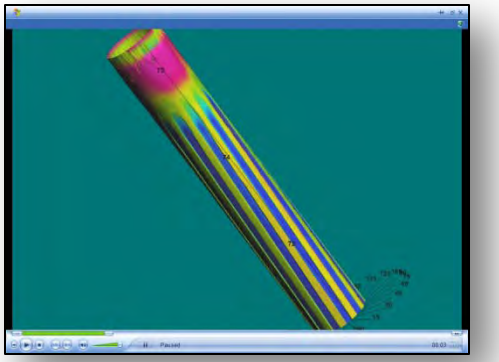
Physical Test (Metrology)

NDT Inspections Methods

- Magnetic Particle
- Eddy Current
- Ultrasonic
- Liquid Penetrant
- Visual
- Thermography
- Gun Tube Video Borescope
- Laser-based Barrel Wear

Physical Measurements

- Length and Weight
- Diameter
- Load
- Force
- Displacement
- Flow
- Angular
- Coordinate



Mass Properties

- Moments-of-Inertia
- Center-of-Gravity
- Mass
- Field of view/fire
- Copper crusher gages

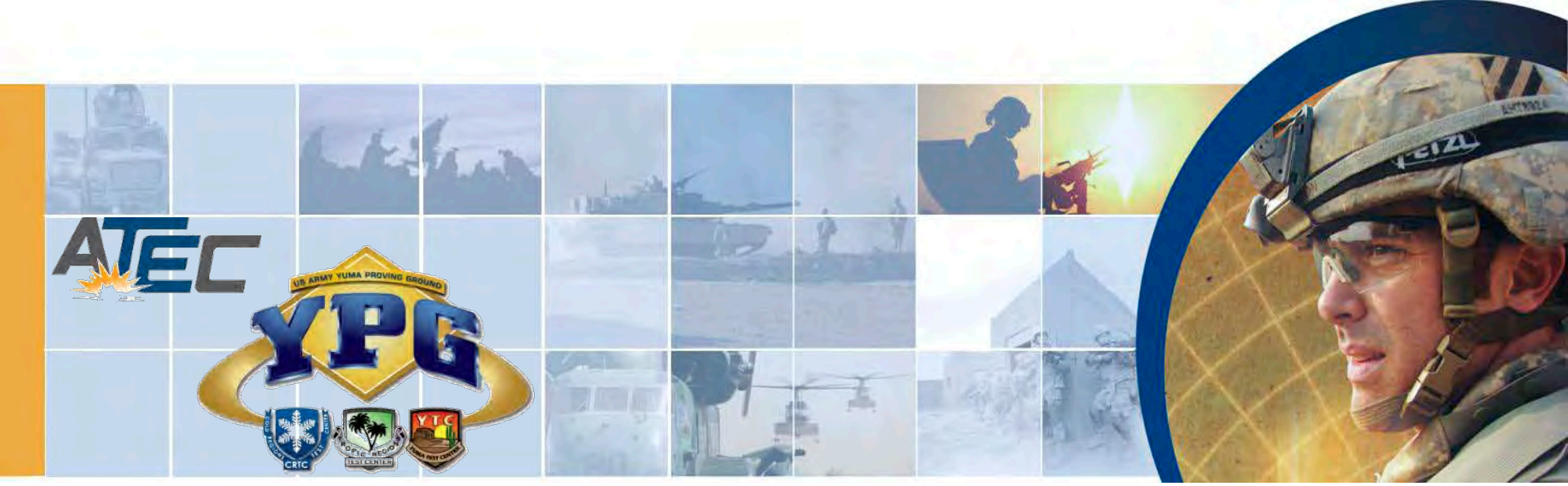
Metrology & Simulation Division Workload and Contract Support

Workload (FY11)

- Over 38K direct labor hours
- Average of 9 reports per month
- Over 373,176 chamber hours
- Conducted 73 environmental tests

Contract Support

- Engineers
- Engineering technicians
  - climatic, vibration, radiography, rough handling, physical test
- Ammunition handling/conditioning
- Ammunition recovery
- Technical writers
- Administrative support
- Instrumentation development/operations
- Database operations
- Equipment design/development
- Support services
  - carpenters/electricians, HVAC

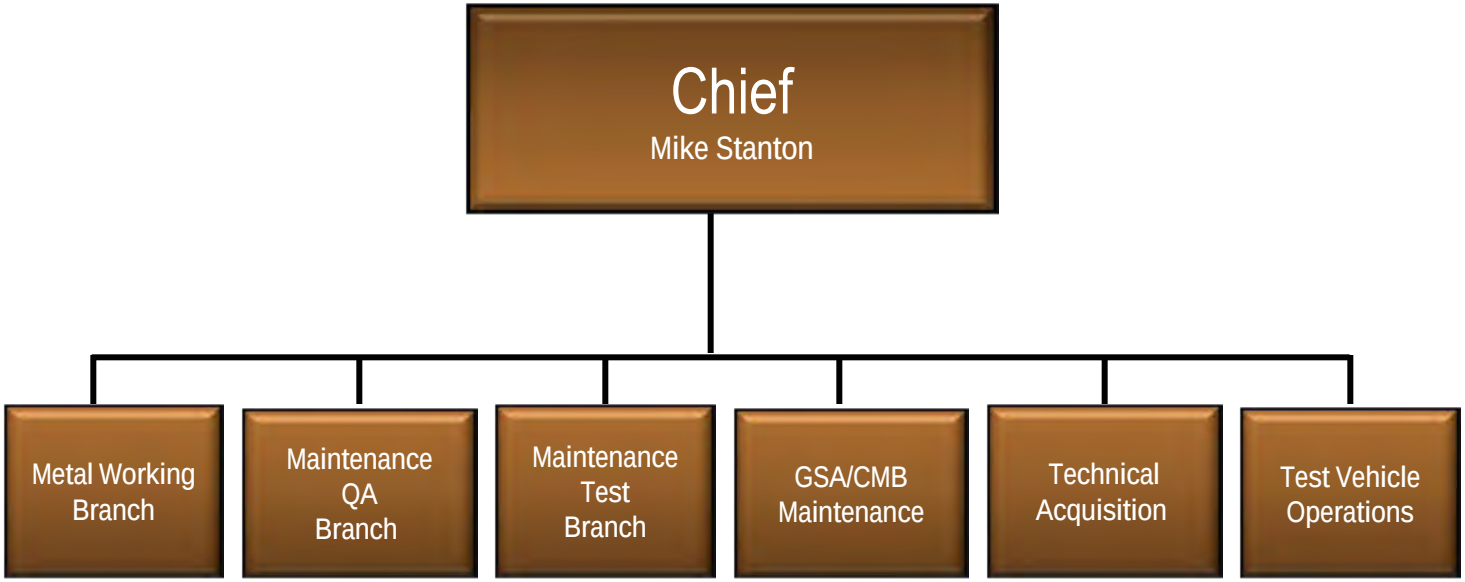


Operations and Maintenance Division

Michael Stanton, Chief

Army Proven
Battle Ready

Operations and Maintenance Division



Operations and Maintenance Division Mission/Purpose/Capabilities

Mission/Purpose: Provide quality maintenance and operational support to the Combat and Automotive Division, Munitions and Weapons Division, NACCITEC and their customers.

Maintenance

- Artillery Maintenance
- Test Vehicle Maintenance
- YTC Fleet Vehicle Maintenance
- YPG Fleet Vehicle Maintenance
- Generator Maintenance
- GSA Maintenance
- GFE Maintenance
- Small Arms Repair

Test Operations

- Integrated Systems Testing
- Direct Fire Weapons Testing
- Small Arms Testing
- Communications Testing
- Test Vehicle Operations
- Recovery Operations

Operations Support

- Equipment Management
- Machine/Welding Shop
- Maintenance Control
- Supply

If it shoots, moves or communicates, personnel of the Maintenance Division either maintain, repair, operate, test or inspect it

Equipment & Facilities

Equipment

Over 1,800 vehicles and miscellaneous pieces of equipment maintained

GSA Vehicles – 927

Ambulances - 6
Fire Department Vehicles -13
Buses - 6
Sport Utility Vehicles - 37
Mobile Cranes - 13

Generators Sets - 137
Conditioning Chambers - 27
Instrumentation Support Equipment- 44
Wreckers - 15
Excavators - 6
Graders - 11
Scrappers - 8
Fuel Tankers - 15
Forklifts - 108

YTC Support Vehicle Fleet - 97
Artillery Weapons Fleet - 50
CASD and M&W Test Vehicles - 100+
Small Arms - 200

Maintenance Facilities

Test Vehicle Maintenance Team
Test Vehicle Maintenance Team
Armor System Test Team
TVMT/ASTT
Metal Working Branch
Combined Maintenance

Other Facilities

1 Scrap Metal Remediation Area
2 Hazardous Waste Areas
2 Small Arms Rooms
3 Tool Rooms
7 Supply Locations
4 Supply Points
3 Wash Racks
Commercial Scales
Fording Basin
Tilt Table
Winch Facility
Weigh Station

Armor Systems Test and Test Vehicle Operations

- Support Functions
  - Armament Testing
  - Armament Maintenance
  - Small Arms Repair
  - Test Vehicle Operations
  - Equipment Management
  - Maintenance Quality Control
  - Supply

Mission: Provide Operation, Maintenance and Diagnostic support for all Integrated Systems, Direct Fire Weapon & Communication Systems and Automotive Durability Support

Facilities/ Equipment Capabilities:
The facility is 20,941 sq ft and has a 1,000,000 sq ft motor pool/storage yard

- Maintenance space accommodates up to 10 Combat/Tactical Vehicles
- Contains a fully equipped tool room
- Supports all tracked vehicle operations and dispatch

Test Vehicle Maintenance and Weapons Maintenance

- Support functions
  - Test Vehicle Maintenance
  - Weapons Maintenance (Artillery) Maintenance
  - Maintenance Quality Control
  - Small Arms Room
  - Supply

Mission: Support all Combat & Automotive Division, Munitions & Weapons Division and NACCITEC automotive /weapons maintenance requirements

Equipment Maintained: Scheduled/Unscheduled maintenance of all Light/Heavy Tracked, and Light/Heavy Wheeled Tactical Vehicles

Facilities/ Equipment Capabilities:

- 57,000 + sq ft of shop space and 275,000 sq ft maintenance /yard
- Overhead Cranes (5) Mobile Cranes (2)
- Contains a fully equipped tool room
- Satellite Maintenance Facility Bldg. 3506 (Accommodates 6 light /medium vehicles)

Combined Maintenance and Metal Working Branch

Mission: To Provide all YTC and YPG Support E quipment Maintenance

- Facilities/ Equipment Capabilities:
  - Vehicle Maintenance Capacity (20 bays)
  - Cranes 40 ton and 20 ton
  - Supply Point and Fully Equipped Tool Room

- Metal Working Branch
  - Machine Tool Operations
  - Welding and Fabrication
- Combined Maintenance
  - YPG Fleet Vehicle Maintenance
  - YTC Fleet Vehicle Maintenance
  - Generator Maintenance
  - GFE Maintenance
  - GSA Maintenance
  - Safety
  - Supply
  - Tire Repair
  - Training
- Maintenance Quality Control Branch
  - Production Control
  - Quality Assurance
  - Quality Control

Maintenance Division
FY11 Workload

TEST VEHICLES & WEAPONS MAINTENANCE

- Work Orders: 4,632
- Man Hours: 92,430
- Parts: $1,696,730.00
- Supply System Requistions: 14,788
- Credit Card Purchases: 326
- Inventory Control Line Items: 23,590

COMBINED MAINTENANCE

- Work Orders: 2,341
- Man Hours: 17,434
- Parts Cost: $834,125.00
- Supply System Requisitions: 485
- Credit Card Purchases: 1,941
- Inventory Control Line Items: 4,612

METAL SHOP

- Work Orders: 1,310
- Man Hours: 36,400

GSA

- Work Orders: 4,106
- Man Hours: 6,545
- Parts/Supplies: $315,115.00

Maintenance Division
Contract Support Functions

Test Vehicle Maintenance - Automotive Mechanics
Mission: Provide Heavy/Light Tracked and Heavy/Light Wheeled Tactical Vehicle Maintenance Support.
Status: *Augmented*

Weapons Maintenance Test - Automotive Mechanics
Mission: Provide Automotive Maintenance Support for all Self Propelled Artillery Systems
Status: *Augmented*

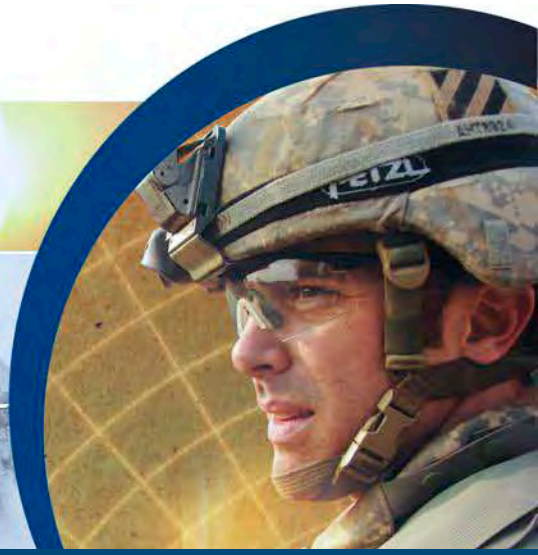
Armor Systems Test - Weapon Station Operations (WSO's)
Mission: Provide Operational Support for all Onboard Integrated Weapons Systems
Status: *Augmented*

GSA/Combined Maintenance - Automotive Mechanics
Mission: Provide Automotive Maintenance Support for all Garrison, YPG and YTC Non- Combat and Non-Tactical Support Vehicles
Status: *Full Function*

Test Vehicle Operations - Test Vehicle Operators
Mission: Provide Operational Support for all Test Vehicle Durability Testing Conducted at YPG
Status: *Full Function*

Machine Tool and Welding &Fabrication - Machinists and Welders
Mission: Provide Machine Tool and Welding /Fabrication Support for all Sustainment and Test Operations Conducted at YPG
Status: *Augmented*

Technical Acquisition - Engineering Techs, Material Expeditors, Supply Techs
Mission: Provide Supply/Parts and Tool room Support for all Maintenance Division and Test Commodity Operations at YPG
Status: *Full Function*

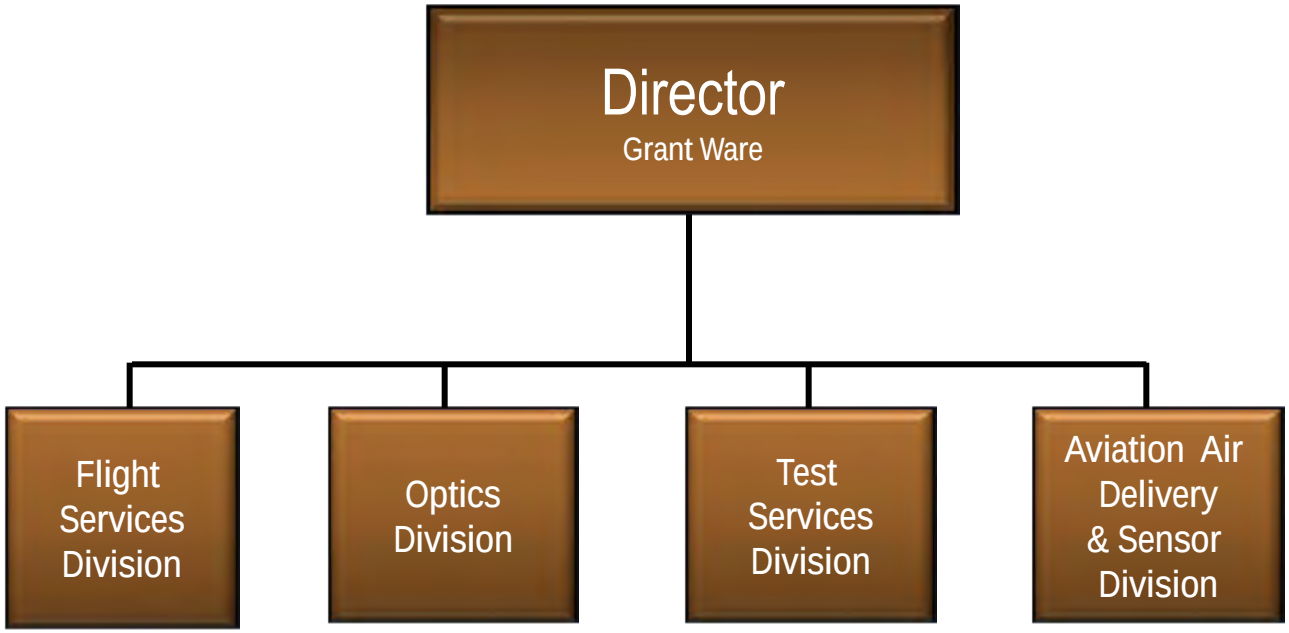


Air Combat Systems Test Directorate

Grant Ware, Director

Army Proven
Battle Ready

Air Combat Systems Test Directorate



Air Combat Systems Directorate
Core Mission

- Air Delivery Systems
  - Personnel Parachutes
  - Cargo Parachute
- Aviation Systems
  - Aircraft Armaments
  - Unmanned Aircraft
- Sensor Systems
  - Sensor Integration
  - Sensor Performance
- Support Services
  - Flight Detachment and Operations
  - Telemetry and Data Processing
  - Mission Control
  - Geodetic Survey and Control
  - Optical Data Collection
  - Meteorological Data

Air Combat Systems Directorate Major Customers

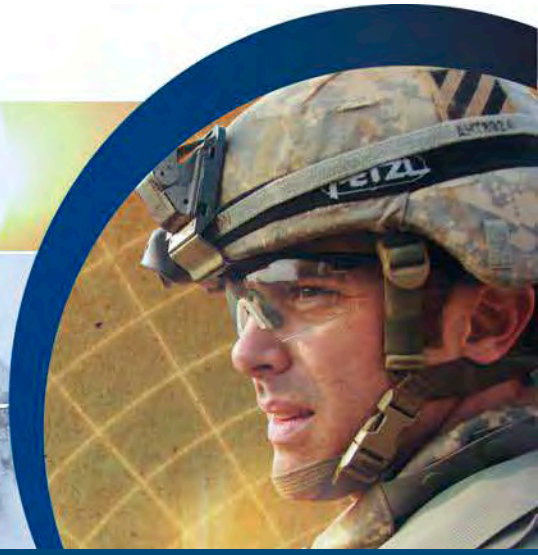
- PEO Aviation (Redstone Arsenal, AL)
  - PM AAH (Apache)
  - PM ARH (Advanced Reconnaissance Helicopter)
  - PM UAS (Unmanned Aircraft Systems)
- PEO Combat Support & Combat Service Support (CS&CSS, Warren MI)
  - PM Force Sustainment Systems (FSS)
- Natick Soldier Systems Center
- Intelligence, Electronic Warfare and Sensors (IEWS, Aberdeen, MD)
  - PM Night Vision/Reconnaissance, Surveillance, and Target Acquisition (PM NV/RSTA)
- Communications-Electronics Research, Development, and Engineering Center (CERDEC)

Air Combat Facilities

- Major Facilities (91 total)
  - Chet Janosky Hangar
  - Air Delivery Complex
  - Maintenance Hangar
  - Old Hangar
  - Air Combat Main Directorate Building
  - Castle Dome Heliport
  - Telemetry
  - UAS Complex
  - Sensor Facility

Air Combat Systems FY11Workload

- 15-20% of YTC workload
- 175 active test programs in Aviation and Air Delivery
- Over
  - 200 MY direct labor in Aviation and Air Delivery
  - 1,300 UAS test and training sorties
  - 13,000 air operations at LAAF
  - 60,00 aerostat flight hours (training and test)
  - 2,600 weapons, sensor, and support sorties
  - 4.4M lb of air dropped material
  - 1,400 air drops and 700 personnel jumps
  - 4,000 Meteorological balloon launches
  - 2,000 High Speed and Geodetic Survey missions

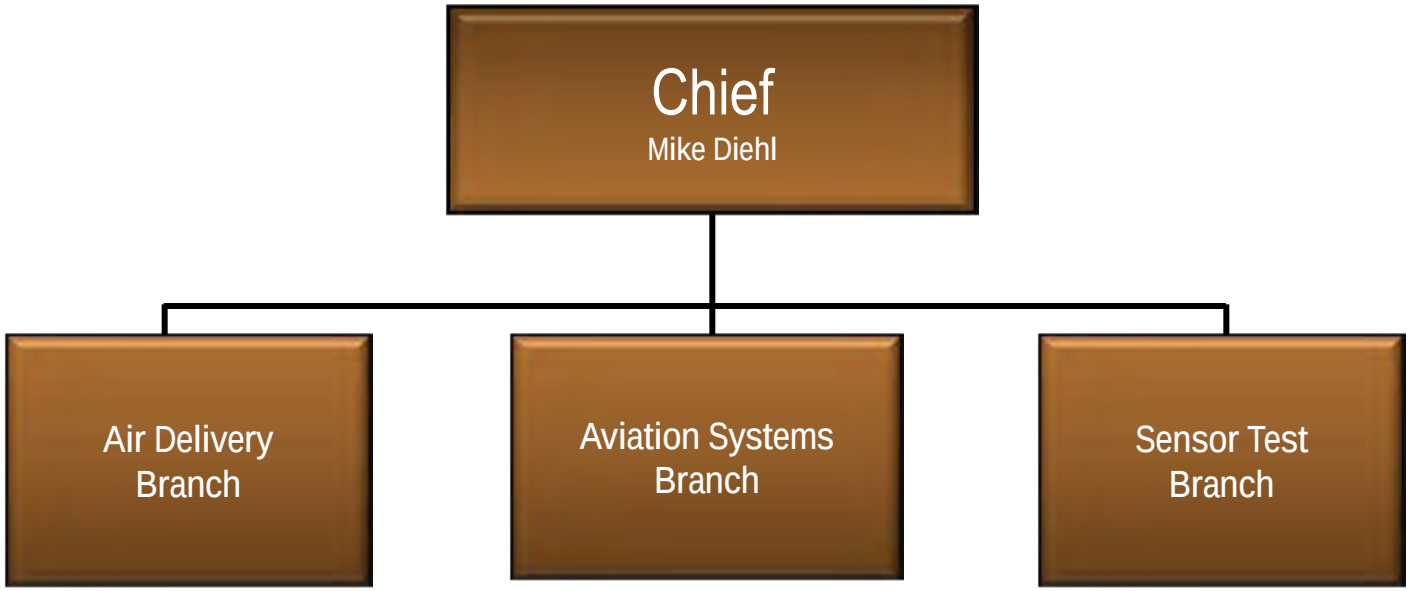


Aviation, Air Delivery, and Sensor Division

Mr. Michael Diehl, Chief

Army Proven
Battle Ready

Aviation, Air Delivery, and Sensor Division



Test Mission Areas

- Developmental and operational testing of performance, safety, and reliability for
  - Rotary wing armament systems
  - Air armaments munitions
  - Air Armaments production acceptance
  - Unmanned aircraft systems and weapons
  - Personnel parachute systems
  - Cargo parachute systems
  - Ammunition airdrop certification
  - Air and ground sensor systems
  - Unattended ground sensors
  - Soldier systems

Execute aviation, air delivery, and sensor testing to provide information to support acquisition decisions and materiel release.

Aviation Systems Branch

Apache Block II HELLFIRE

Errant HELLFIRE

A-160 Hummingbird

- Organization
  - Aircraft Operations and Armament
  - Aircraft Munitions and Targeting
  - Unmanned Aircraft Systems

Killerbee

Fire Scout

- Capabilities
  - Fire Control Radar Evaluation
  - Munition Accuracy/Impact Scoring
  - Laser Designation Accuracy Scoring
  - Sensor Resolution Performance
  - Targeting Systems Target Location Error
  - Aircraft/Air Vehicle Navigation Performance
  - 2.75” Rocket Motor and Fuze Performance
  - Weapons Safe Separation/Roll Tip-Off
  - Time Space Position Information for Aircraft, Missiles, and Rockets
  - Weapons debris mapping

Air Delivery Systems Branch

- Organization
  - Precision Air Delivery Systems Team
  - Personnel and Cargo Parachute Systems Team
  - Airborne Test Force

- Capabilities
  - Personnel Parachute Systems and associated components
  - Precision Air Delivery Systems
  - Non-precision Air Delivery Systems
  - Ammunition Airdrop Certification Testing
  - External Air Load Transportability Certification Testing
  - Soldier Systems

Sensor Systems Branch

- Organization
  - Force Protection (FP) Team
  - Intelligence Surveillance & Reconnaissance (ISR) Team


Sensor Resolution Targets


Aerostat Testing

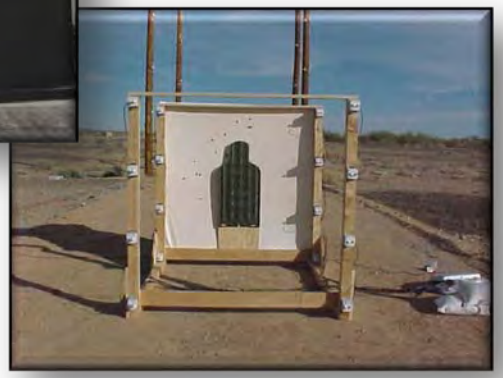

YTC's Caravan Sensor Testbed


Grey Eagle Sensor Testing

- Capabilities
  - EO/IR Sensor Performance
  - Laser Characterization
    - Designation Accuracy
    - Boresight Repeatability
    - Boresight Retention
    - LRF accuracy
  - RADAR (SAR/GMTI) Characterization
    - Resolution, Pd, FAR, TLE
  - Unattended Sensor Characterization
    - Acoustic/Seismic performance
  - System of Systems Interoperability

Threat Target Group

- Organization
  - Electronics
  - Engineer Technician
  - Welders



- Capabilities
  - Threat Target Support
    - Operation radar support
  - Steel Targets
  - Remote Control (pop-up, vehicle)
  - Acoustic Scoring
  - Field Equivalent Bar Targets

Our Role in the Testing Process
Complex Integrated Systems

- Improved Mast Mounted Sight Sensor Processor
- Improved Data Modem
- Battlefield Combat Identification System
- Embedded GPS/INS
- Improved Master Controller Processor Unit

- Aviation Mission Planning Station
- Data Transfer Cartridge
- Digital Map
- SINCGAR SIP
- Video Image Crosslink

We test a wide variety of systems, including complex integrated systems - Kiowa Warrior and Apache Helicopters. This picture shows Kiowa firing a Hellfire missile. The Hellfire safety fan - 400 square kilometers and altitudes to 37,000 feet.

Advanced Ram Air Parachute System (ARAPS)

- Key Features
  - Replaces the currently fielded MC-4 System
  - Increased Glide Ratio (4:1)
  - Deployable by both Static Line and Military Free Fall
  - Altitude Range of 3,500 ft AGL-35,000 ft MSL
  - Reduced Opening Shock/Addresses Leg Fatigue during HAHO Missions

- Developmental Testing (2Q-4QFY12)
  - 254 Instrumented Live Jumps
  - 87 Mannequin Drops
  - Test Focused on Flight Performance of both the Main and Reserve Canopies
  - Flight Performance Data Captured by YTC developed instrumentation such as PPAKs, Strain Links, and Wind Packs
  - All testing performed by ATF Test Parachutists

Instrumentation

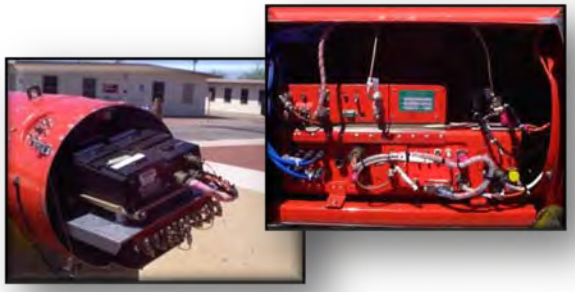
- **Tracking Instrumentation**
  - Kineto Tracking Mount (KTM) with cameras
  - High Speed Imagery

- **Global Positioning Systems**
  - Ground vehicle GPS position instrumentation
  - Airborne GPS Instrumentation

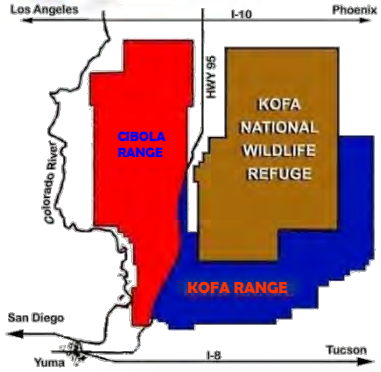
- **Real-Time Mission Control**
  - Real-time analysis
  - Command and Control
  - Safety

- **Radar**
  - MPS-25 Tracking Radar
  - Weibel 240 Watt CW Doppler tracking radar

- **Test Item Instrumentation**
  - Aircraft Instrumentation
  - Encryption Instrumentation



YTC Air Combat Systems
Test Directorate UAS & Aviation Test



One 4,000 ft runway; Hangar/office space

One 1,500 ft paved runway w/ 500 ft dirt overrun; 500 ft x 500 ft paved landing pad; Multiple hangars

Two 6,000 ft runways; Hangars/office space

Cibola Range (75 Km x 28 Km)

Instrumentation	Weapons Firing
Sensor Performance	Navigation Accuracy
Laser Operations	Air Vehicle
Performance	

Two runways (4,000 ft and 2,500 ft)
Hangars/office space

One 5,000 ft dirt runway

One 4,000 ft runway
Integrated Operations and Maintenance Facility

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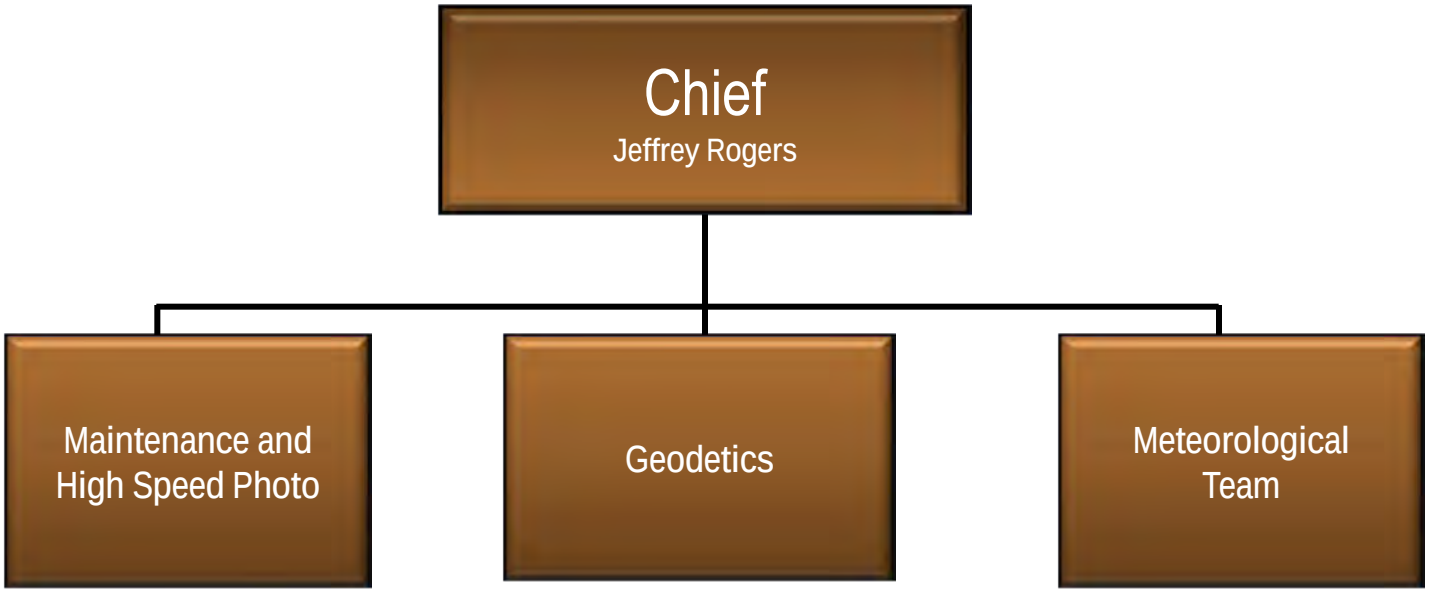
U.S. Army Yuma Proving Ground

Optics Division

Mr. Jeff Rogers, Chief

Army Proven
Battle Ready

Optics Division

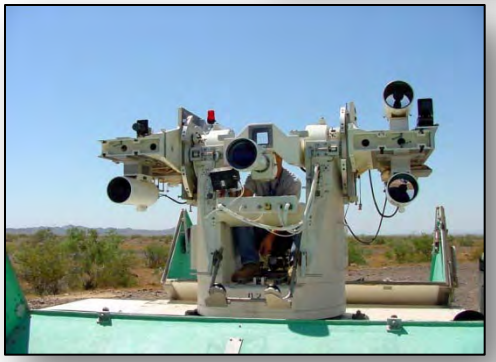


Test Mission Areas

- Provide Meteorological Instrumentation and Support
  - Forecasting and measuring atmospheric conditions
  - Upper altitude air conditions
  - Scintillation
- Provide Geodetic and Mapping Instrumentation and Support
  - Geodetic and GPS land survey
  - Line-of-Fire
  - Behind the gun verification
  - Data processing, archiving, and mapping
- Provide Optical Instrumentation and Tracking Support
  - High speed imagery collection
  - Television imagery collection
  - Munition trajectory time and space position information
  - Imagery processing and scoring
  - Precision trigger systems

Optical Tracking

- Various manned and unmanned platforms
  - — Kineto Tracking Mounts
  - — Portable Tracking Mounts
- Used to track fast and slow moving objects
- Configures, moves, and emplaces mounts to meet specific mission requirements
- Performs operator level maintenance on tracking mounts, prime movers, generators, and other related ancillary equipment



TV Instrumentation

- Installs camera systems on aircraft weapons systems, at firing positions, at impact areas, and on targets, and target systems
- Installs transmitters, receivers, and relays as required to transmit video data from source to ultimate terminal
- Records scientific data on test items and targets using various standard, high resolution/high definition, and infrared camera systems
- Acquires, processes, and reduces the image data in the form and format required for the test

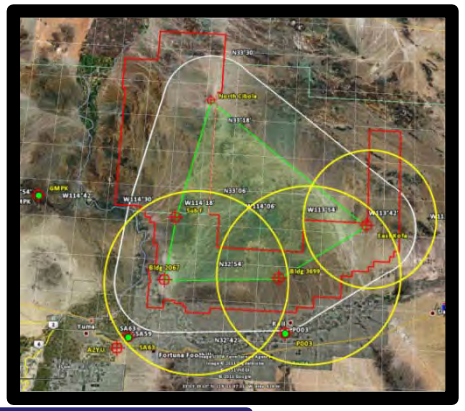
Photo Optical Imaging

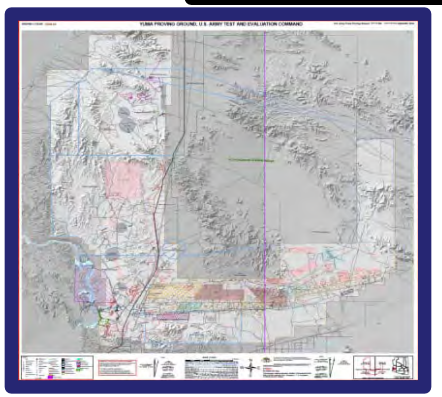
- High-Speed
  - Setup and operate high speed optical instrumentation cameras and systems
  - Select and employ the appropriate combination of optical systems to meet test requirements

- Still Photo
  - Operates various high resolution digital still camera systems to record pre-mission, post mission, and test events
  - Performs image processing, printing, and archiving

Geodetics Branch

- Geodetic Measurements & Data Processing
  - Provide geodetic control utilizing state of the art instrumentation & sensor positioning/orientation in support of the YPG mission
  - Utilize state-of-the-art conventional, satellite (GNSS/GPS), and gravity surveying techniques to collect, process, adjust, and analyze data
- Geographic Information Systems (GIS)
  - Capture, store, analyze, manage, and present data with reference to geographic location data
  - Provide a scalable enterprise geodatabase, innovative geographic analysis techniques, professional services, and cartographic products





- Range Optical Measurements
  - Verify gun position layout meets all safety requirements and provide near real time data results using Field to Database (F2DB)

Range Optical Measurements

- Performs range observations for range and deflection measurements
  - From various tower, bunker, and mound locations throughout YPG and off the installation
- BG or Behind the Gun
  - Ensures correct elevation and azimuth of the weapon
- Event Tracking
  - Submunitions, illuminating canisters, and other items under test
- Acquires and records events/ projectile impacts through triangulation

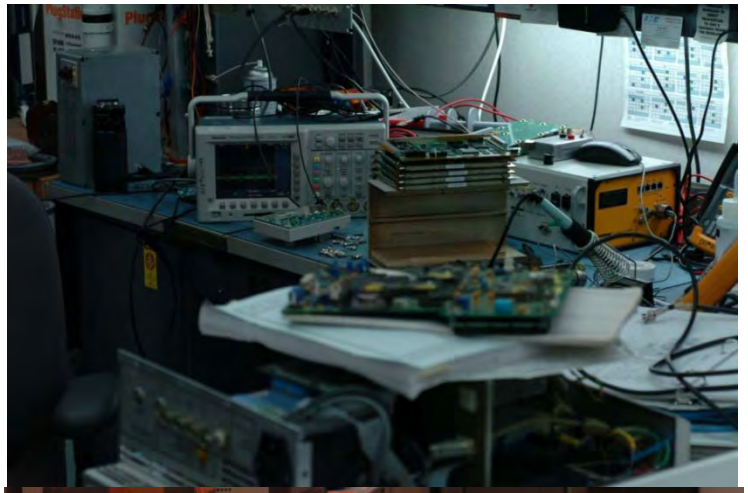
U.S. Army Yuma Proving Ground

Data Reduction

- Types of data provided
  - Position, velocity, acceleration, and attitude data
  - TSPI - Time, Space, Position, Information
- Participates in the design and re-design of software
- Reduces data in format, amount and within times constraints of mission requirements

Electro Optical Maintenance

- Repairs and maintains various electronic, mechanical, and optical equipment used to obtain test data on YPG
  - electronic cameras, lenses, recorders, and displays
  - coaxial, microwave, and optical fiber transmission systems
  - triggers, illumination and timing sets
- Fabrication of mechanical parts



Meteorological Support

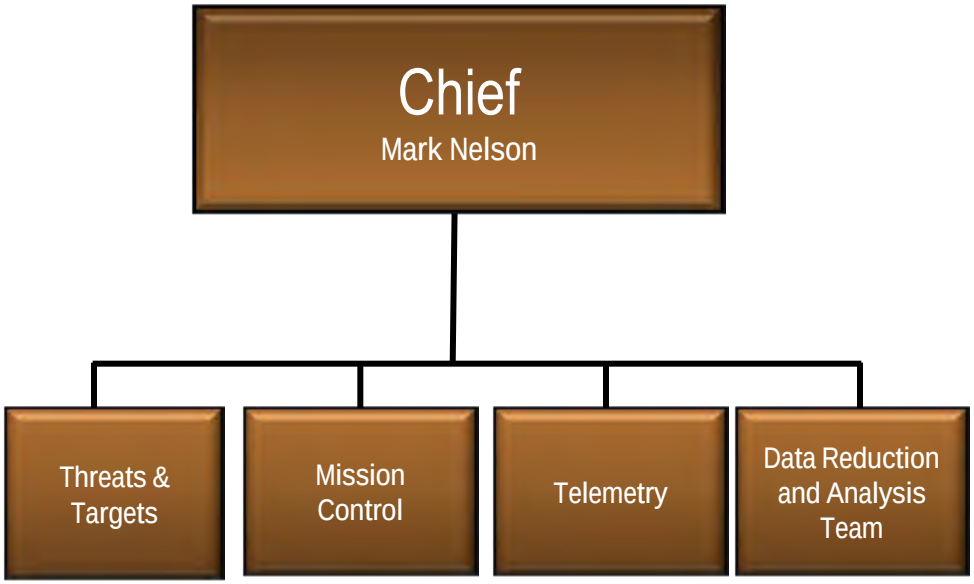
- Operates various meteorological equipment to provide upper air and surface weather data
- Performs operator level maintenance on various types of meteorological equipment

Technical Services Division

Mr. Mark Nelson, Chief

Army Proven
Battle Ready

Technical Services Division



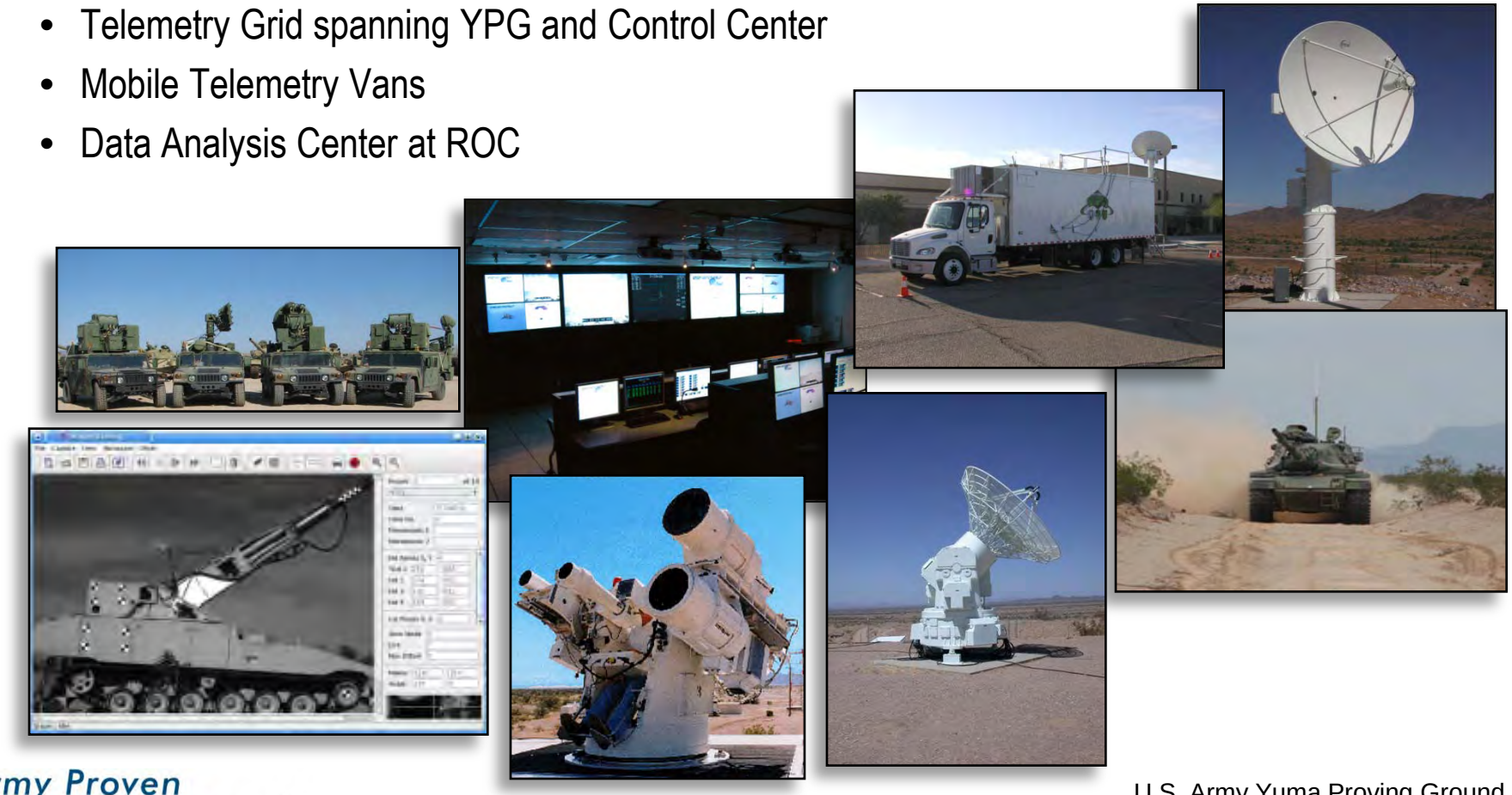
Test Mission Areas

- Data Reduction and Analysis Team
  - Integrated data analysis
  - Time and space position data processing
  - Processing software development
- Mission Control
  - Test event control
  - Real-time analysis
  - Situational awareness
  - Quick look reports
- Telemetry
  - Real-time data analysis
  - Post test data recording (onboard and downlink)
  - Aircraft instrumentation integration
  - Air worthiness development support
- Threat Systems &Target Simulation
  - Target depot management
  - Remote control target operation
  - Target characterization validation
  - Multi-service support

Provide test officers with data and information during test planning, execution, and analysis

Instrumentation & Facilities

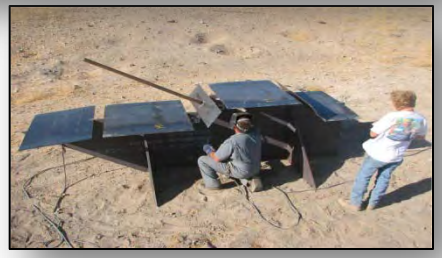
- Threat Systems & Target Simulations Center on KOFA / PEO STRI- PM ITTS – TMO POC
- Real-Time Mission Control Center at ROC
- Mobile Mission Control
- Telemetry Grid spanning YPG and Control Center
- Mobile Telemetry Vans
- Data Analysis Center at ROC



Instrumentation & Facilities

Threat Systems & Target Simulations (TS2)

- YPG is one of five depots for the Target Management Office (TMO)
- Manages over 200 Foreign Threat Systems and Targets, of which 133 are TMO Assets
- Fabricates, maintains and operates Remote Controlled Targets, Thermal Targets, and Foreign Man Pads, SA-7, SA-14, and SA-16 simulators
- Supports MCAS-Yuma Airborne Training Activities with realistic 3D Steel Targets



U.S. Army Yuma Proving Ground

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Data Reduction and Analysis

Mark Nelson
Technical Services Division

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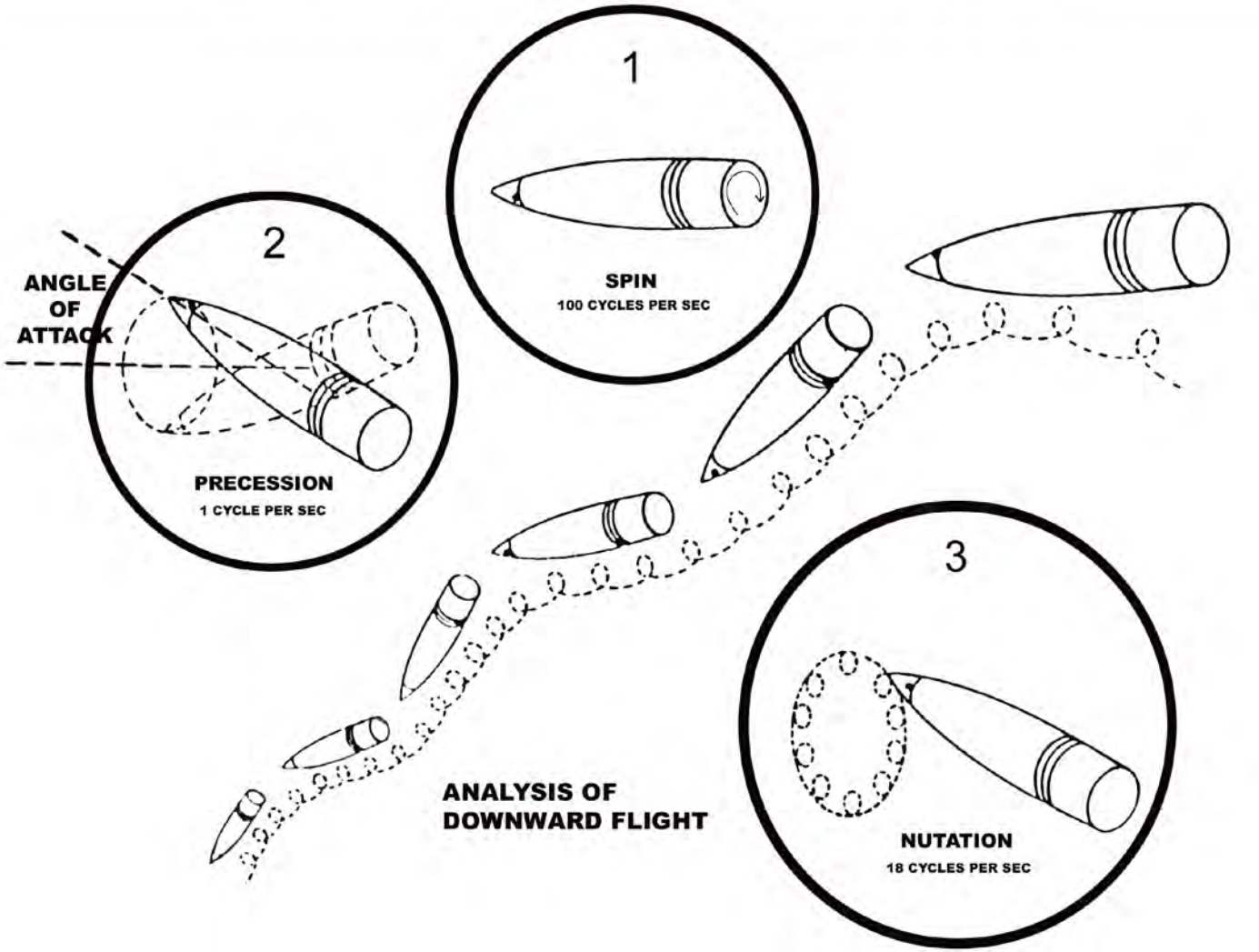
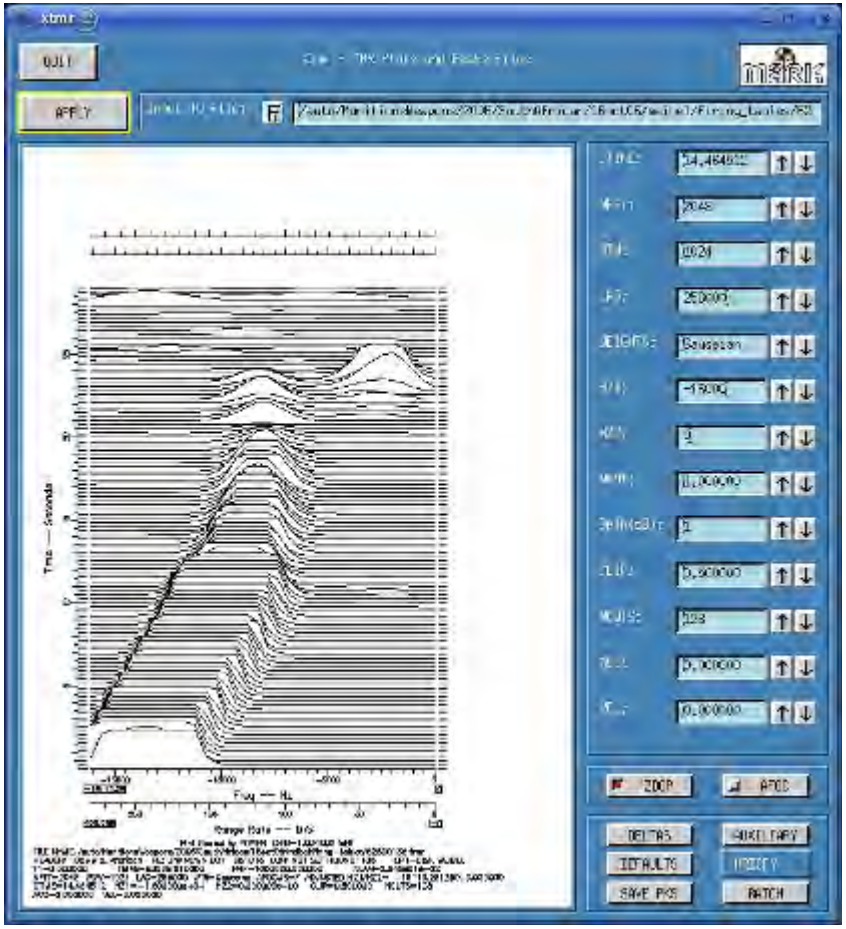
Types of Tests Supported

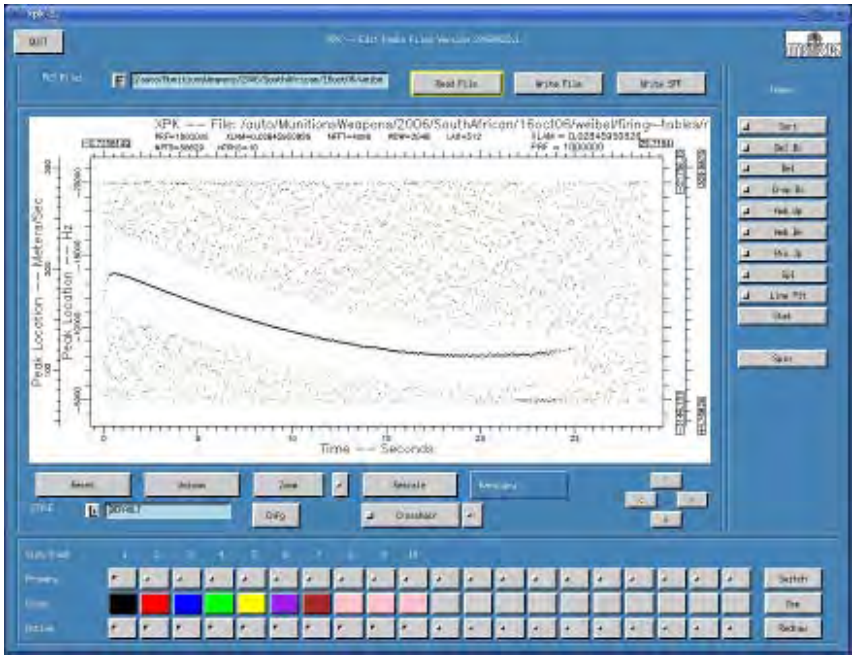
- Air Delivery
  - ATPS, AGAS, ALVADS, ARAPS, Bailout, CRIIS, Dragonfly, EMRBM, Firefly, HALO, JCA, JPADS, LCADS, LCLA, LCMC, MRT, NASA ARES, NASA ORION, PCADS
- Aviation Systems
  - APKWS, Army Flight Test, CSP, IDAS, JCM, M146, M151, M156, M229, M255, M264, M274, M278, M423, M433X, M781, MK66, MK149, Navy Launcher, RASE, ZUNI
  - Apache (MTADS, Block 2)
  - Longbow (Weapons & Sensors, Weapons & Sights, Block 3)
  - Sensors (JBSP, REU, Telluride)
- Combat Systems
  - AKE, M910E1, M919, MRM, TERMKE
- Munitions & Weapons
  - 120mm LA MET, ACTP, AKE, APMI, CCF, CMCO-NAVY, CMS, CRAM, ERGM, Excalibur, IDAS, JBB, LCRM, M1130, M185, M276A1, M278, M314A3, M781, M782, M930, M933A1, NGK, Paladin, PGK, PIM, SMART 155, South African, Star Fin, Stryker, XM1063, XM982

BODY MOTION TERMINOLOGY

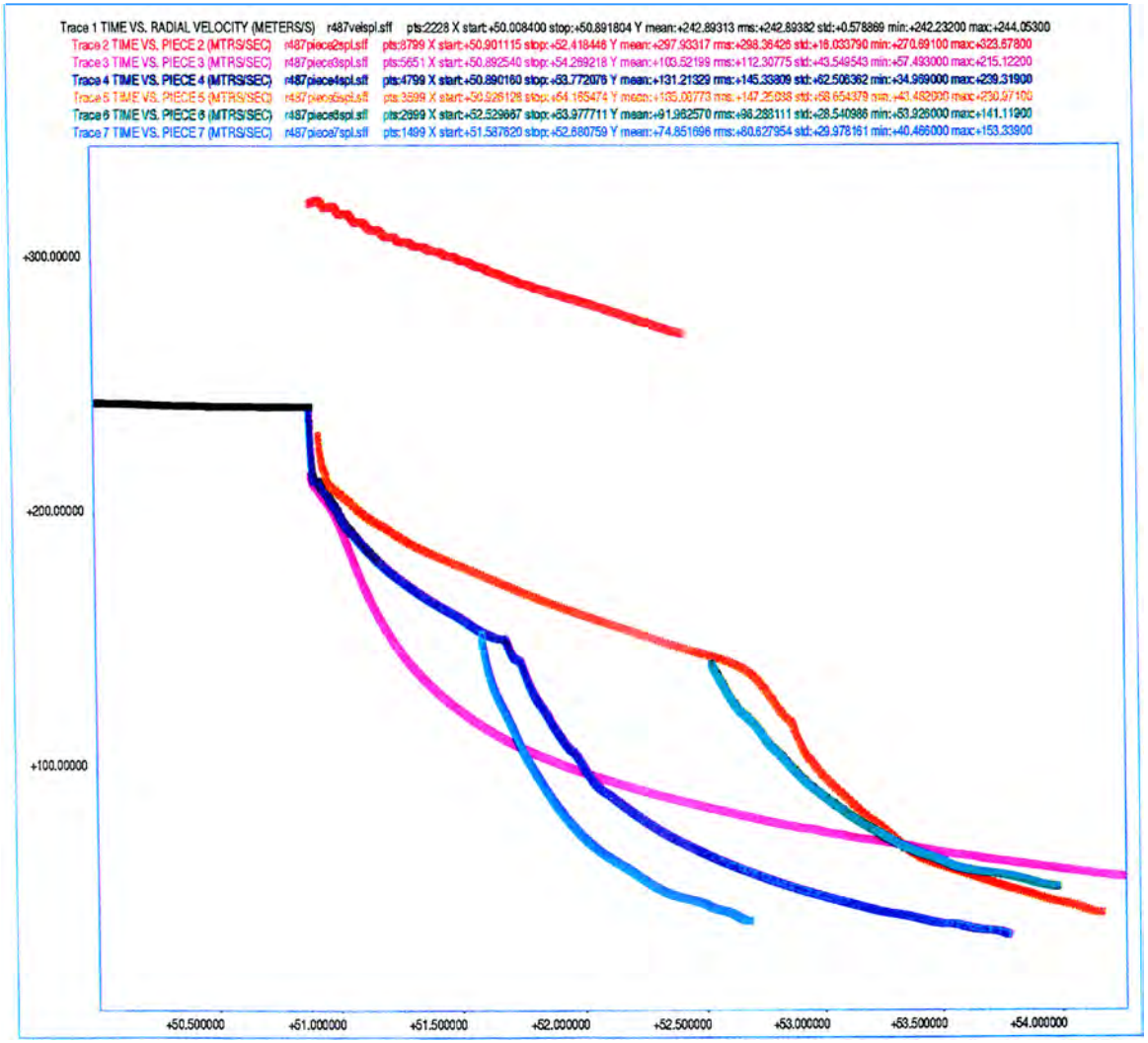


Data Reduction



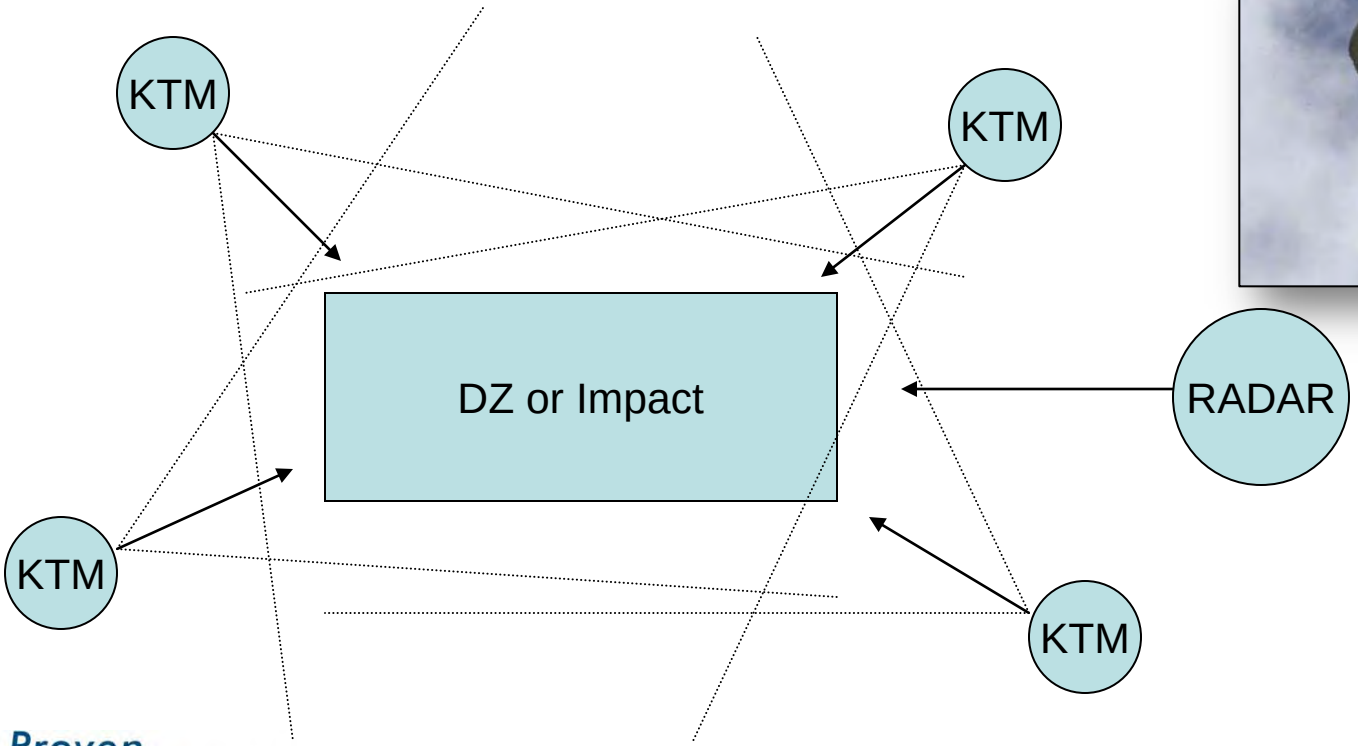


Radial Velocity Submunitions

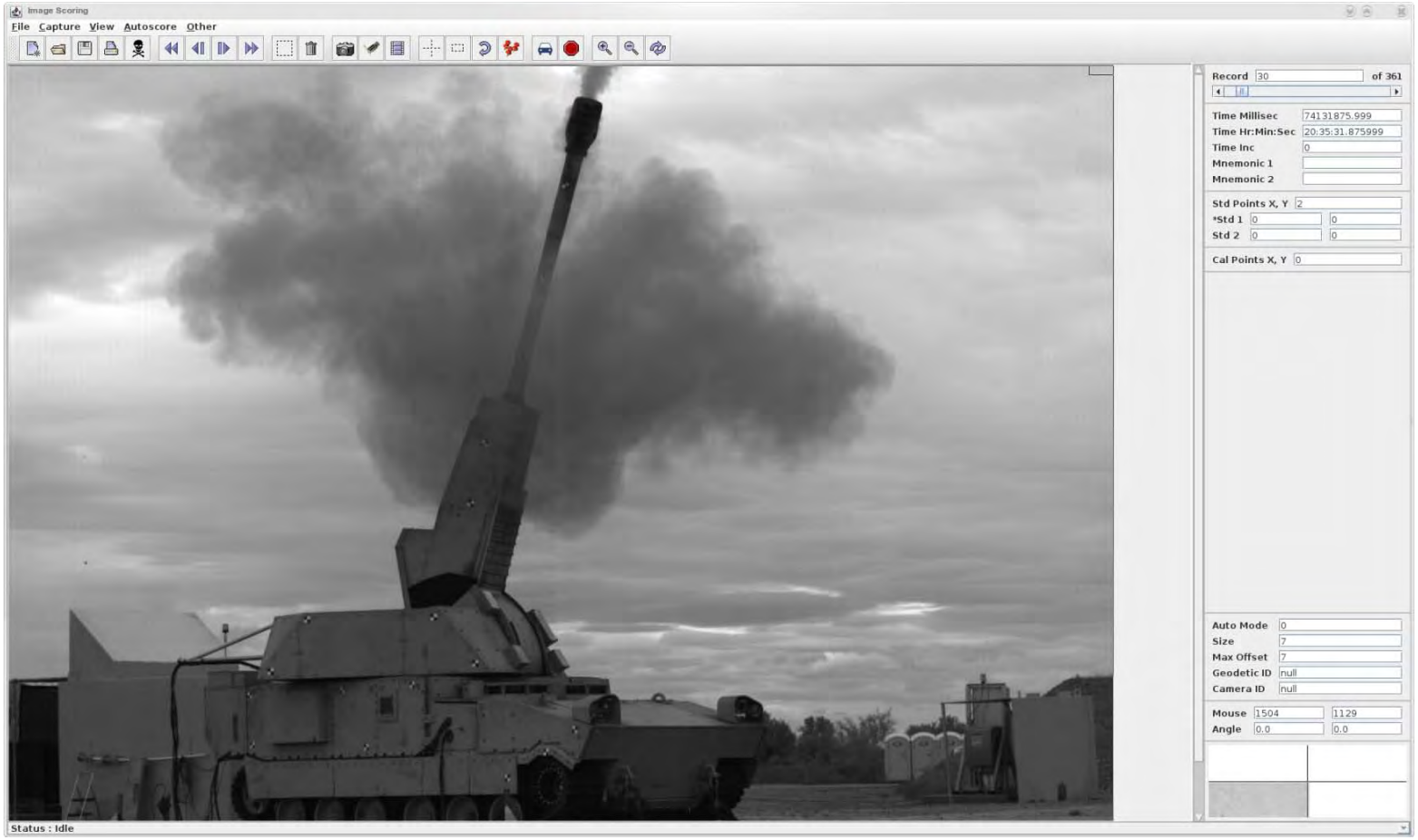


Odle Solution

- Software Processing for Multiple Camera Trackers
- Single Radar Solution (Range, Azimuth, and Elevation)

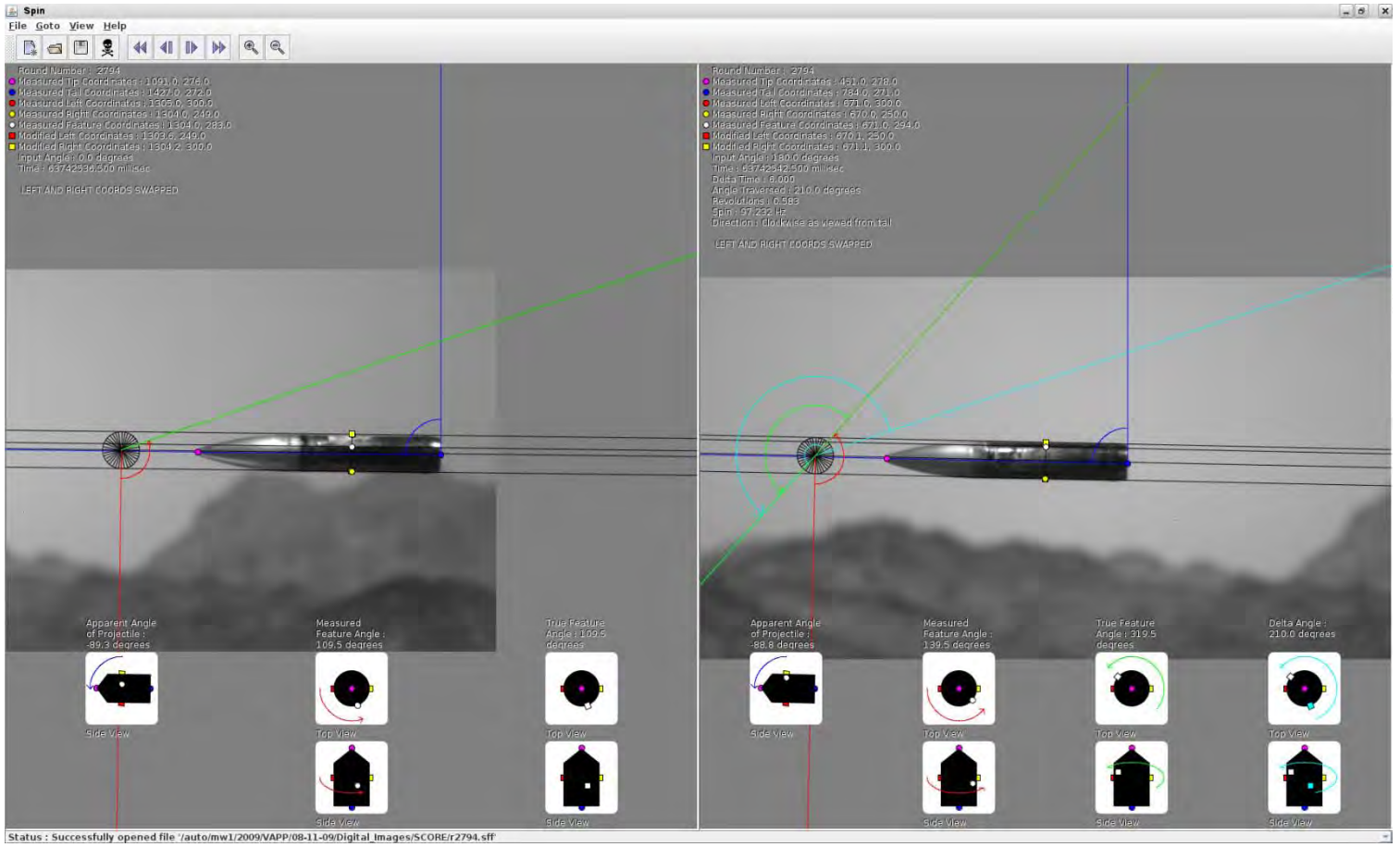


Platform Image Analysis



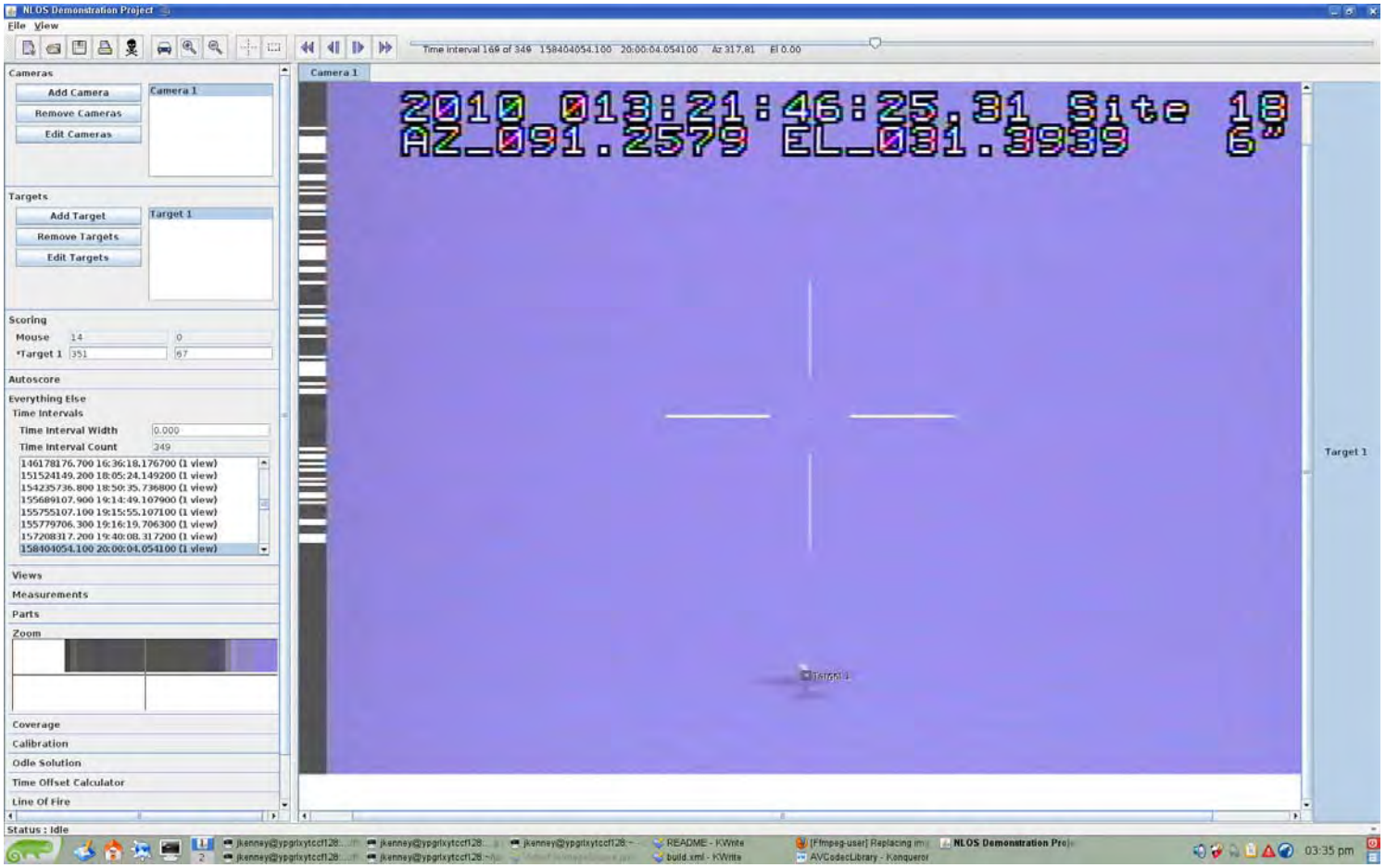
Digital Image Scoring

Projectile Image Analysis



Software used to calculate spin rate, pitch and yaw from high-speed camera images

KTM Image Analysis



Software used to calculate Azimuth and Elevation corrections from KTM images

Telemetry

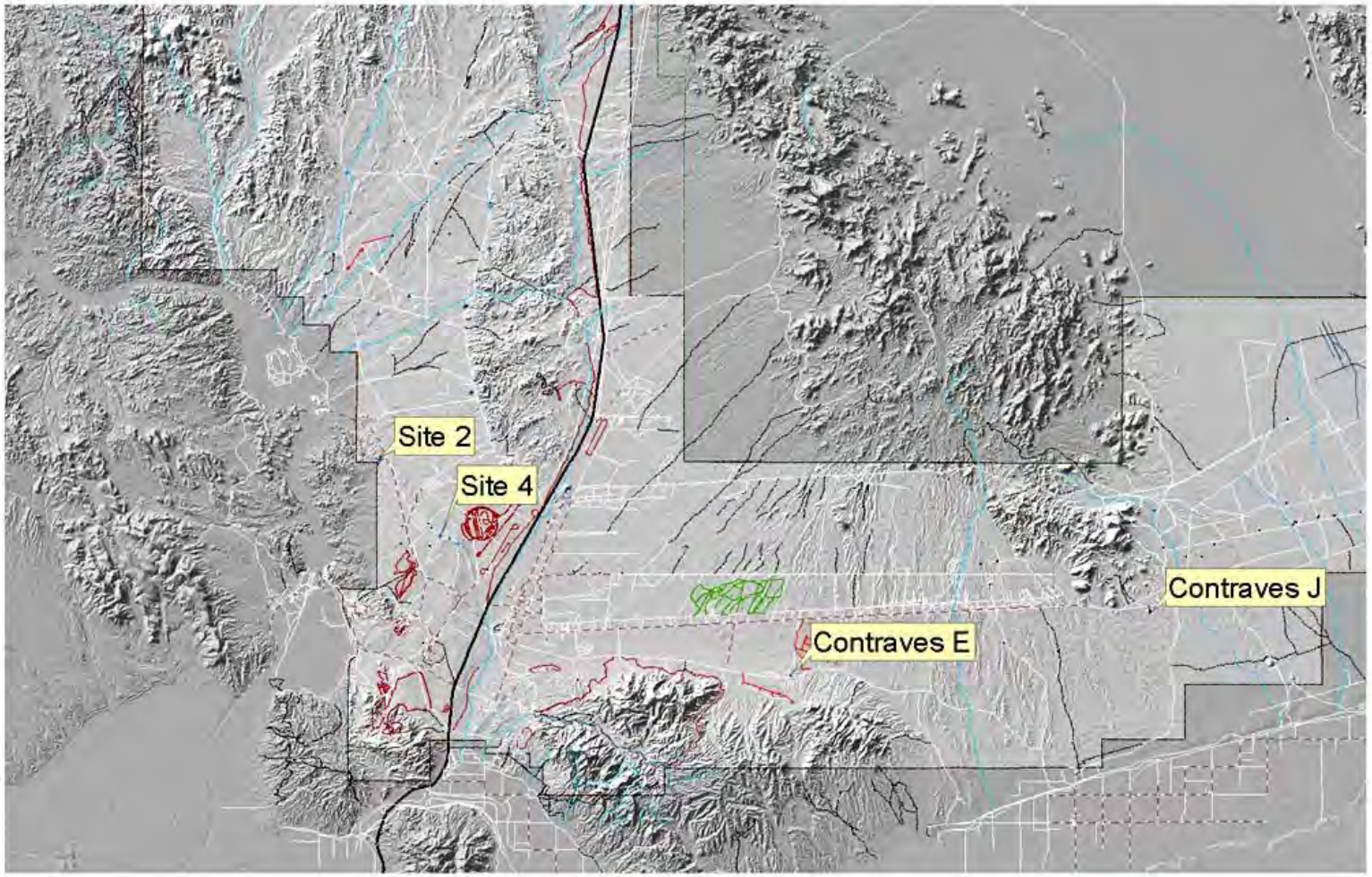
Mark Nelson
Technical Services Division

Army Proven
Battle Ready

Telemetry Features

- Fixed sites provide coverage for 95% of YPG airspace
- Telemetry vans fill gaps and support standalone missions
- Telemetry supports simultaneous missions
- Redundant RF downlinks, multiple tracking antennas, and Best Source Selector all work together to provide best data quality

South Cibola and KOFA Range TM Sites



Site 4 is Central Telemetry, other 3 are Remote Antennas

Telemetry Center

One of Four Antenna Control Consoles

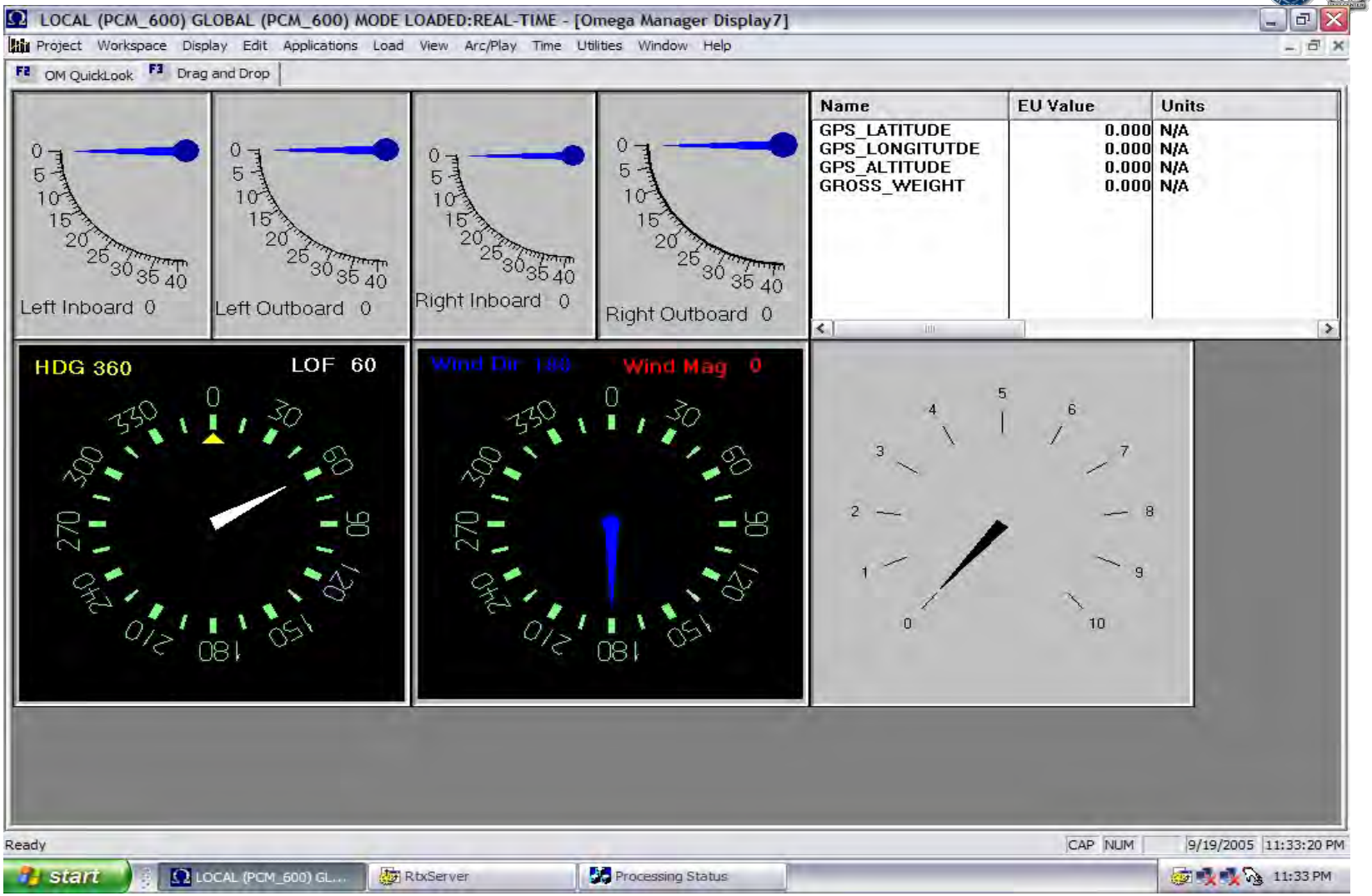
TM Remote Antenna 2, E or J

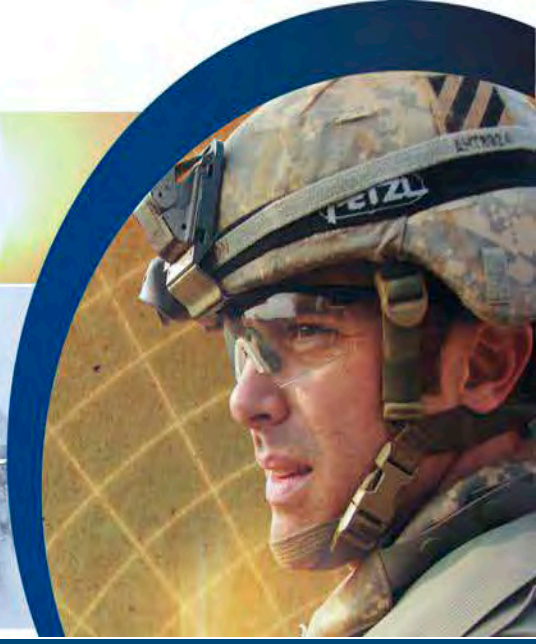
10’ Remote Antenna

Telemetry Vans

- Two Telemetry Vans
- Full Telemetry functionality: tracking, display, and recording
- Fiber connectivity over RDTS fiber
- Deployable to CRTC, Tropical test areas or elsewhere
- Deployable by C-17

Assessment of Test Article Behavior





Mission Control and Real-Time

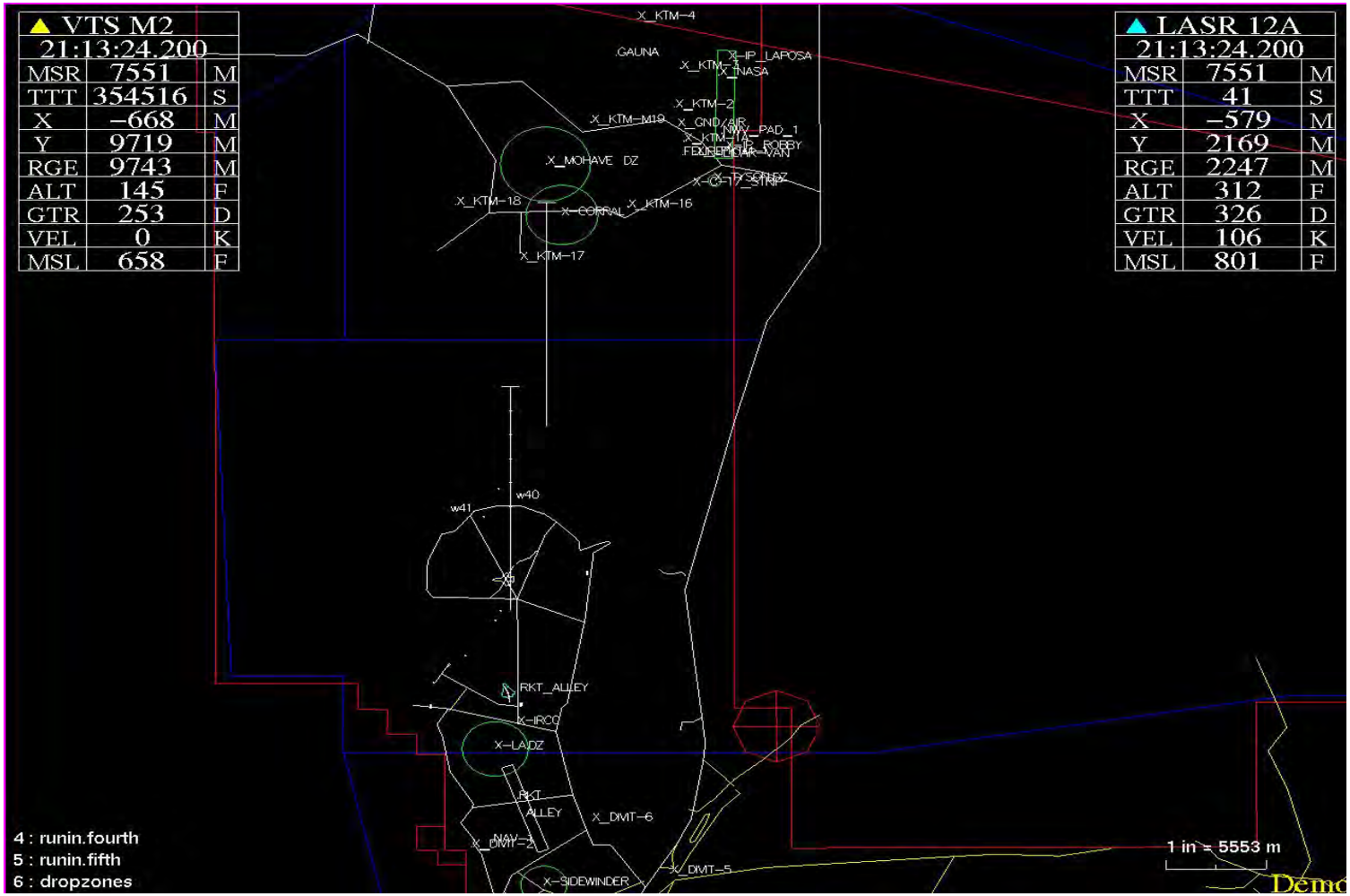
Mark Nelson
Technical Services Division

Army Proven
Battle Ready

The Role of Mission Control and Real-Time

- Real-Time Tools and Expertise Provide:
  - Command & Control of Range Instrumentation
  - Data Acquisition, Archive, and Playback
  - Test Decision Support
  - Safety Monitoring
  - Precision Test Execution
  - Ability to simulate TSPI for Training and Test Rehearsal

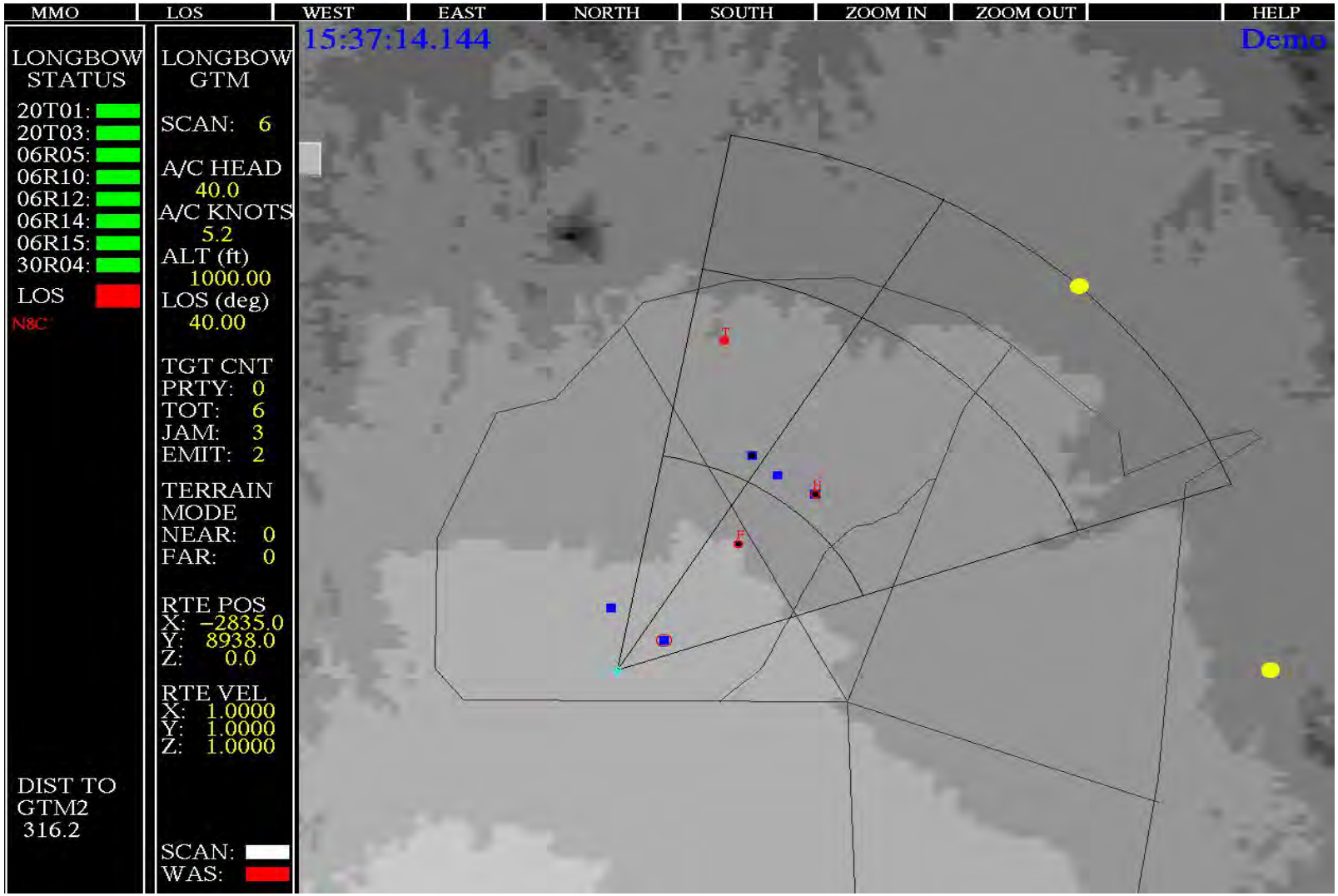
Test Article Movement Coordination

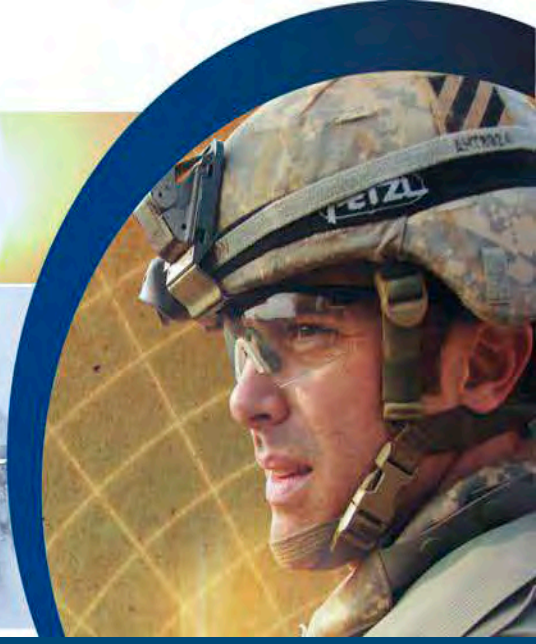


Test Decision Support

- Identifies problem during testing - allowing us to give immediate feedback to customers
- Fusion of YTC range instrumentation to provide optimal real-time assessment of test article behavior
- Fusion of test article's data with YTC range instrumentation to provide test article performance

Fusion of Test Article and Range





Threat Systems and Target Simulations

Tommy Gwynn/Mark Nelson
Air Combat System Test Directorate

Army Proven
Battle Ready

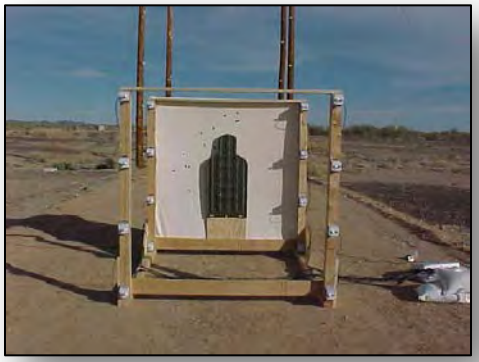
Target Maintenance Section

Our mission:

- To provide support for testing new technologies to engage enemy weapons systems and ground targets
- Maintain and operate targets and other technical target systems

Types of Targets

- Provides real and simulated target sets for testing
- Provides acoustic scoring targets for small arms as well as large bore weapons
- U.S. and Former Soviet Bloc targets

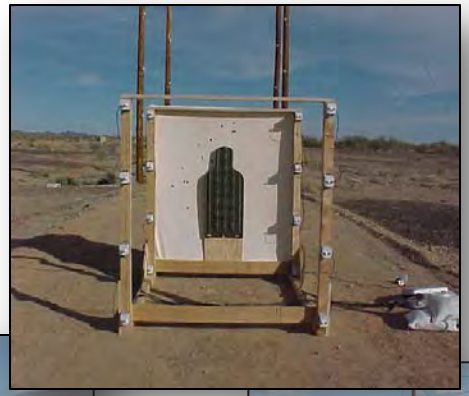


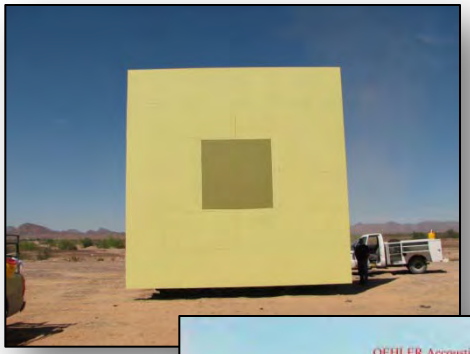
Tests Supported

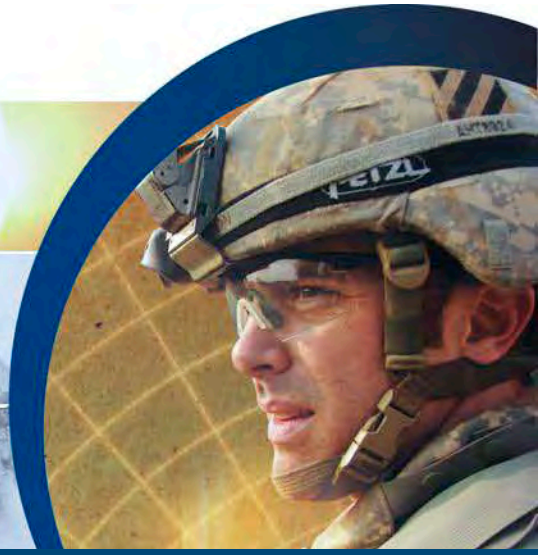
- Future Combat Systems
- Excalibur
- Mid Range Munitions
- XM-8 Small Arms Weapon
- Multiple Detection and Recognition systems testing
- Firing Missions
- Destructive Tests
- Unmanned Ground Systems

Personnel

- Mechanics - work on all vehicles in fleet to include former Soviet and US tanks, personnel carriers, self-propelled howitzers, command and control vehicles, and towed howitzers, operate all vehicles in fleet during testing, maintain CDL licenses.
- Technicians - work on all acoustic scoring targets, build and create heating ovens for temperature testing, build moving targets for small arms as well as large weapon systems, operate all scoring and pop-up target ranges. Remote control target operations. Build 2 and 3 dimensional targets for live fire exercise and tests





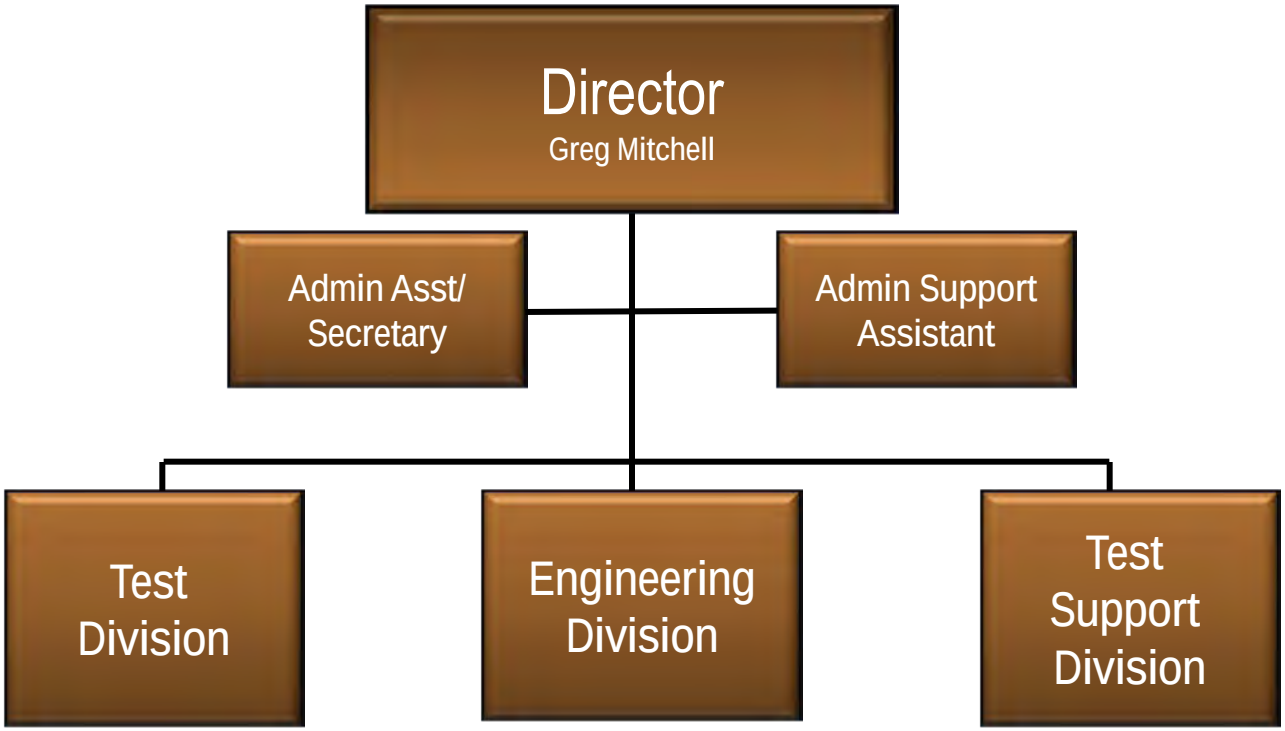


National Counterterrorism/Counterinsurgency Integrated Test & Evaluation Center (NACCITEC)

Mr. Greg Mitchell, Director
NACCITEC

Army Proven
Battle Ready

NACCITEC Directorate



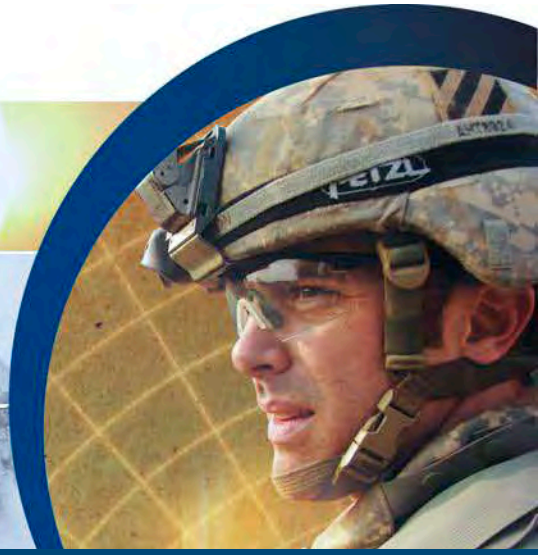
NACCITEC Vision/Mission

Our Vision: A world without the threat of terrorism. Until that time, we dedicate ourselves to the quest of fielding new technologies and equipment and improving tactics for defeating terrorism worldwide, while minimizing risk to our war fighters, by providing the best test services available.

Our Mission: Test evolving technology, equipment, and tactics to defeat global terrorism and protect our war fighters to guarantee democracy, security ,and freedom for the American people

FY11 Tests

- Unmanned Ground Vehicle – 4
- Theater - 2
- Rapid Reaction - 5
- Multiple Technologies - 20
- Joint Test Tunnel Range - 3
- CREW - 68
- CIED ISR and Detection - 28



National Counterterrorism/Counterinsurgency Integrated Test & Evaluation Center (NACCITEC)

Mr. Javier Sardina, Senior Engineer
NACCITEC

Army Proven
Battle Ready

Test Division

Intelligence, Surveillance and Reconnaissance (ISR) Branch

- Counter – Improvised Explosive Device (C-IED) Sensor and Detection System Testing
- Airborne Electronic Attack Testing

Crew Systems Branch

- Counter Radio Controlled Improvised Explosive Devise (RC-IED) Electronic Warfare Testing
- Counter RC-IED Performance and Compatibility Testing

Asymmetric Threat / Irregular Warfare / Special Projects Branch

- C-IED Unmanned Ground Vehicles (UGV) Systems Testing
- Ground Based Electronic Attack Compatibility Testing
- Gunshot Detection Testing
- Tunnel Sensor Testing

Safety and Scheduling
Data Reduction and Analysis

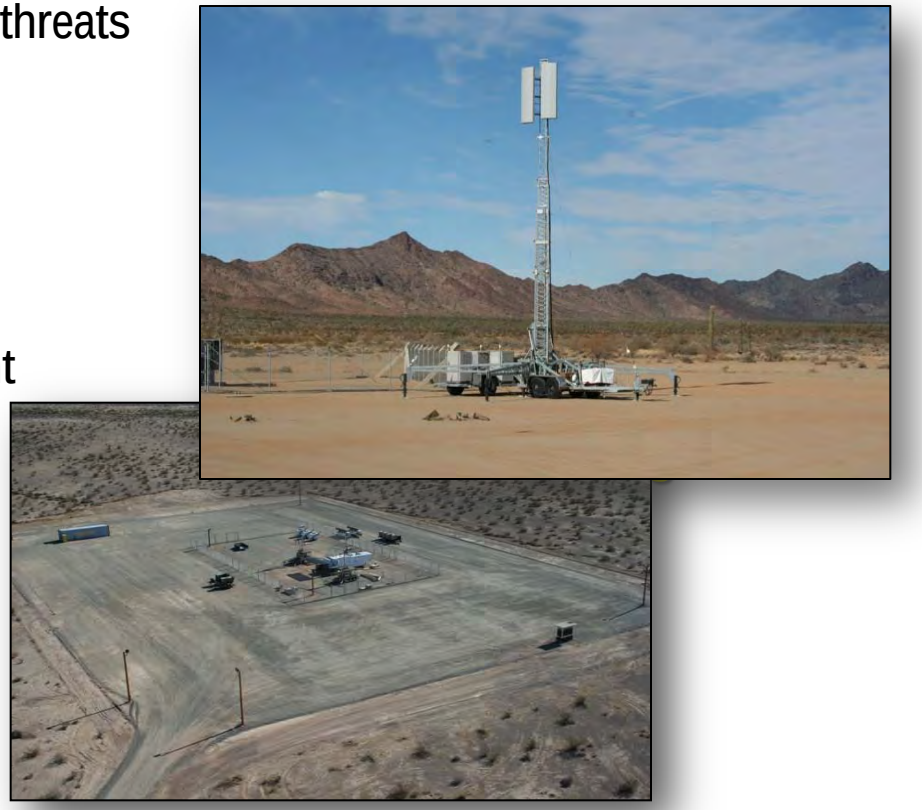
Engineering Systems Support Division

Threats Branch

- Provide, operate and maintain Advanced Communications Networks (6)
- Advanced Communications technical consulting for customers
- Operate and maintain “drones” to provide traffic on Networks
- Network capability to China Lake, Pt Mugu and Naval Post Graduate School
- Provide, operate and maintain instrumented threats
- Collect threat data for test

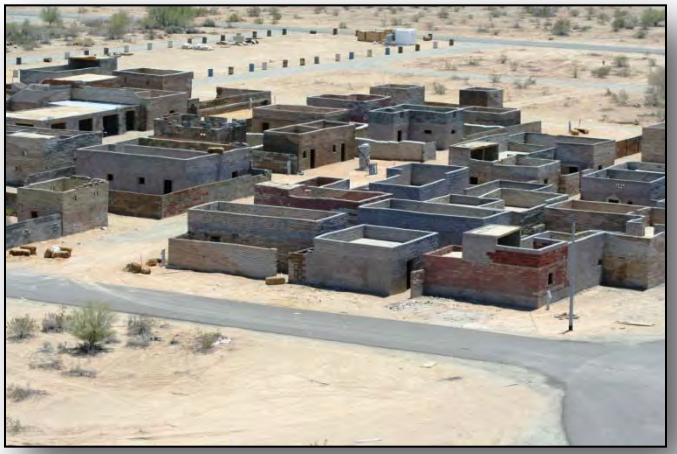
Test Tech Support Branch

- Provide Electromagnetic Environment
- Oracle database support
- Radio Frequency (RF) spectrum management
- Spectrum Electronic Attack clearances
- Frequency modeling and analysis
- Instrumentation research for test
- Spectrum monitoring for test



Test Support Division

- Provide administrative support
- Write test plans and reports
- Edit test plans and reports
- Post test plans and reports to central database
- Post weekly and bi-weekly activity reports
- Post weekly test schedule
- IT support for directorate
- Track training requirements



Electronic Proving Ground
Counterterrorism/Counterinsurgency Division

- Blue Force Communications (BFC) Electromagnetic Compatibility (EMC) with System Under Test (SUT)
- Interoperability, System on System (EMC)
- Electromagnetic Environment (EME) Effects on SUT
- RF Safety Measurements
- Threat Transmitter/System under Test (SUT) Configuration Management (CM)

Technologies Tested

- Electronic Warfare/Attack
  - — CREW
  - — C-IED Neutralization
- Intelligence, Surveillance and Reconnaissance (ISR)
- IED Detection Systems
  - — RF detection
  - — Change detection
  - — Wire detection
  - — Acoustic/Seismic detection
- Integrated Surveillance and Reconnaissance Systems (e.g. PGSS)
- Advanced Sensor Testing/Sensor Fusion
- Explosive Detection
- Platform Integration Testing

We Support All Aspects of Counter IED and Counterterrorism Testing…from research and development through fielding

Types of Testing

- Isolate critical performance capabilities and limitations
- Test system of system performance of integrated command, control and communication systems
- Theater support testing
  - optimize system performance for specific threats
  - isolate problems identified in fielding, assist in corrections
  - provide quality assurance for programming changes
- Interoperability/Electromagnetic Compatibility
  - CREW against CREW compatibility of new systems
  - CREW against other electronic systems (e.g. UAVs)
- CREW Vehicle compatibility
- Robust determination of antenna patterns (Ft. Huachuca)
- RF safety measurements
- Full system safety assessment
- Blue Force Communications Compatibility (EPG)

Direct support and analysis to CIED Mission TTP to Theater

Joint Experimentation Range Complexes (JERC)

Providing robust, highly flexible test environments that will challenge system performance to ensure maximum capability to disrupt the Kill Chain thereby increasing force protection.

Urban Representation

CAPABILITIES

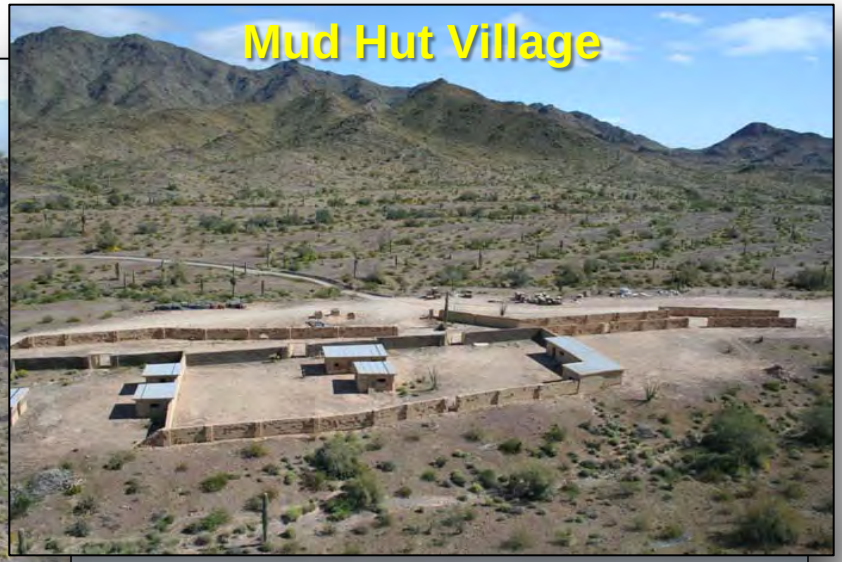
- Significant urban features (Culverts, Buried Inert Munitions, Guard Rails, Medians, Bridges)
- Over 300 buildings
- 50 Hz and 60 Hz power
- Extensive EME Capabilities
- Advanced Communications Networks
- Integrated Mission Control Center

Urban/Suburban Representation

CAPABILITIES

- Over 9 miles of improved and unimproved roadway
- 50Hz and 60Hz overhead power
- Over 70 buildings
- “Rolling hill” terrain features
- Extensive EME Capabilities
- Advanced Comms Networks
- Integrated Mission Control Center

Developing World/Mountainous



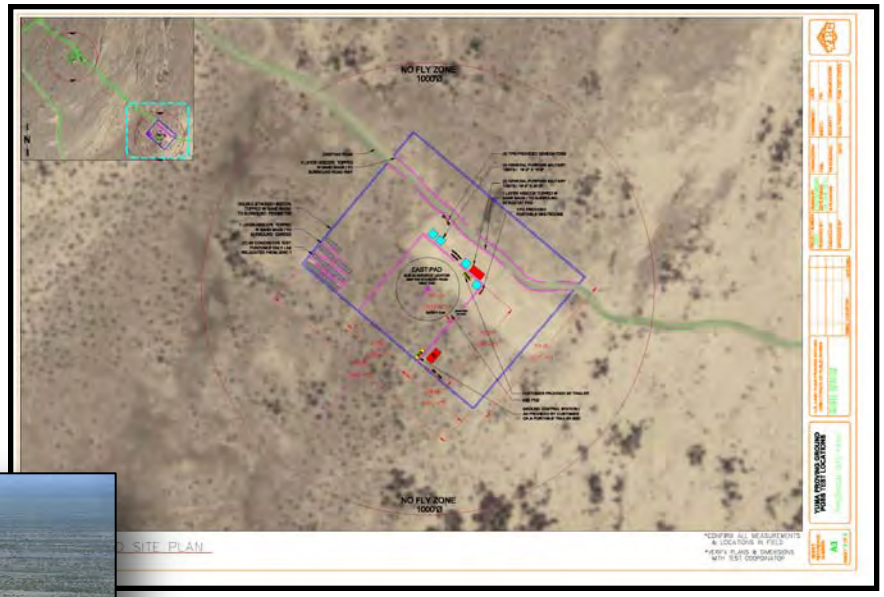
CAPABILITIES

- 8 Miles of Crude Roads – 2 Distinct Loops, Spurs
- Switchbacks, Crowns, Gullies, Washes, Grade to 40%, Culverts
- Primitive Roadblocks, Rudimentary Bridges, Tiered Village, Walled Compound, COP/Observation Point

Force Protection
Forward Operations Base (FOB)

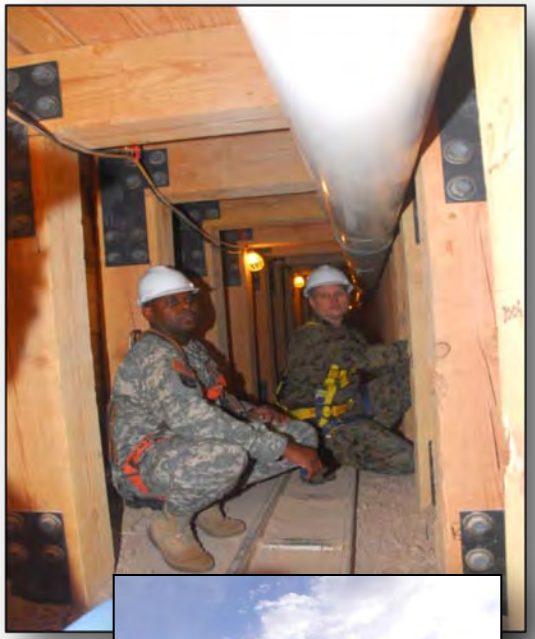
- The Force Protection FOB is sponsored by OSD, RRTO

- The FOB is utilized for test support for networked equipment and sensors for the detection and ultimate defeat of Improvised Explosive Devices



- The Force Protection FOB currently supports the Persistent Ground Surveillance System (PGSS) Operation

Joint Test Tunnel Range (JTTR)



U. S. Northern Command, (USNORTHCOM) sponsored Rapid Reaction Tunnel Detection (R2TD), Joint Capability Technology Demonstration (JCTD) Project

CAPABILITIES

- Simulate tunnels which have been identified and represent the soil conditions where those tunnels are located
- Locate and characterize cross-border tunnels
- Test sensor technologies that provide full perimeter, persistent coverage of targets of interest
- Test technologies that provide near real time tracking of the transit of explosives, drugs and humans

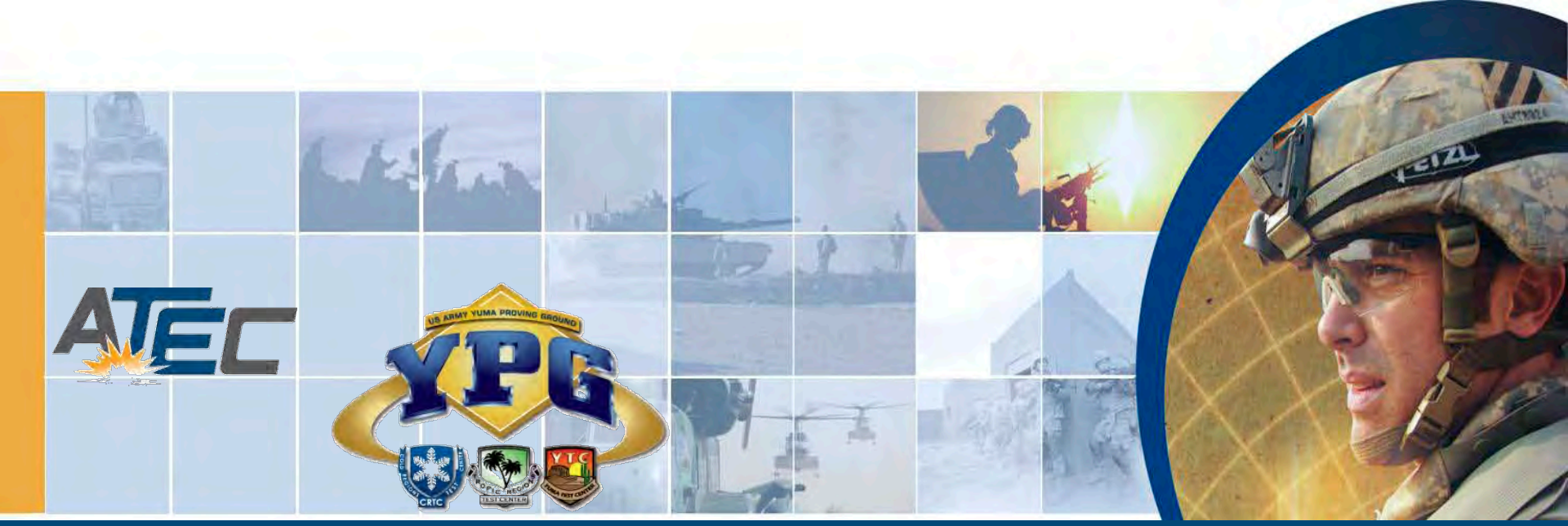
Range Support Services
Contract Support

- Test Directors/Project Engineers
- Data reduction support
- Vehicles operations and maintenance
- Instrumentation development/operations
- Threat System Operators
- Threat system exploitation
- Cellular Network operations/maintenance
- Data Collectors
- Support services (carpenters/electricians)
- High speed photo/optics/still photography/ground and air video
- Ammunition recovery
- Technical Writers/Report Editors
- Geodetic survey
- Mission Control system operations/maintenance
- Data Clerks
- IT Specialists
- Intelligence analysis/reporting

Adaptability Adds Value

- Desert environment is important today but other environments will be important tomorrow!
- Tactical representation at this site challenges system performance independent of environmental representation
- Once performance is understood in this controlled environment, testing can be relocated to the specific natural environment or large-scale infrastructure site
- Our test team maintains critical expertise that can be applied anywhere

Expertise and flexible instrumentation provides long term value of these investments. Provides the ability to take the fight anywhere across the globe.



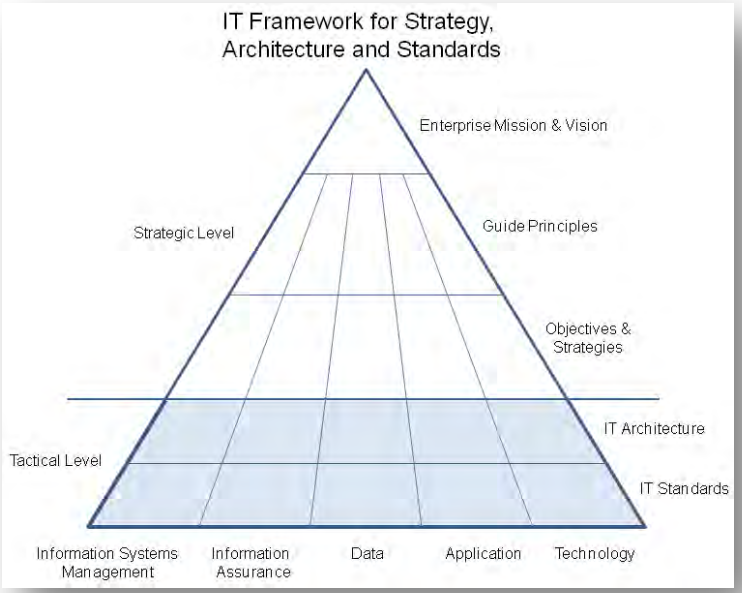
Network Enterprise Center (NEC)

Mike Davis, Director

Army Proven
Battle Ready

Mission Statement

The NEC mission is to use Information Technology to aid in conducting rapid testing in direct support of the Army War Fighter, providing capabilities and limitations analyses of weapon systems to enable deployment decisions for rapid fielding to the Combat Soldier.



Three YPG Mission tasks that must be supported are:

- Gain and maintain information dominance (command, control, communications, computer, and intelligence (C4I))
- Enable effective and adaptive range operations through providing highly capable and available network infrastructure and communications
- Provide outstanding service and support to the sustaining base.

Major Mission Areas

- *Range Communications*
  - *Test event connectivity (wired / wireless / point-to-point)*
  - *Spectrum Management & Frequency Monitoring*
  - *Infrastructure Comms Sustainment, Gap Analysis, Solution Development*
- *IT Project Management*
  - *Needs & Solutions, IT Initiative Planning, IT Project Management / Execution*
- *IT Operations*
  - *Networks, Servers, Storage, Application Sustainment, Patch Management, Help Desk, Workstation Maintenance, Tech Refresh*
- *Installation Support*
  - *Telephone/E911, Radio Maintenance (LMR/ATC/G2A), Cable, Commercial Internet, Facility Connectivity*
- *Visual Information*
  - *Graphic Arts, Video, Marketing Collateral, Official Photos, Video Teleconferences (Secure & Non-secure)*
- Information Assurance
  - Governance, Certification & Accreditation, Evaluation of Purchase/Change Requests, COMSEC, Compliance Monitoring
- Contract Oversight
  - POTS Telephone, Blackberry/Cellular, VOIP Phones, Purchase Validations

Legend

Plain: Government only

Bold: Mixed (Government & Contract)

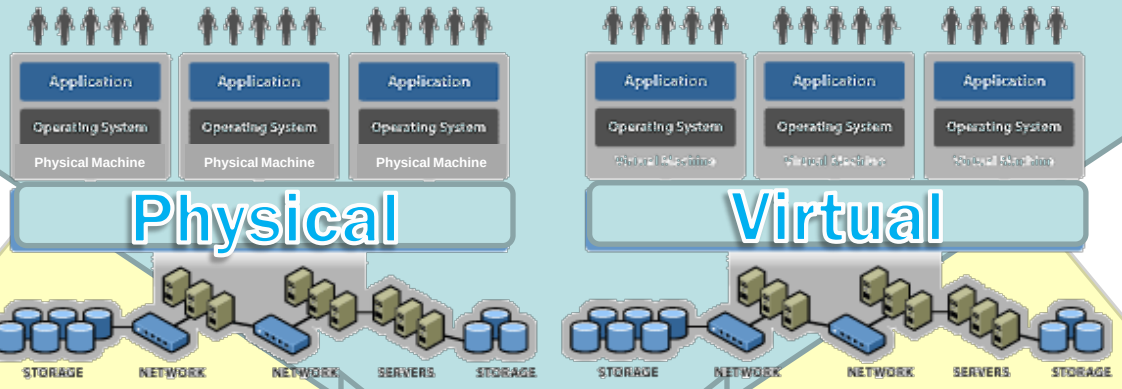
Underlined: Majority Contract

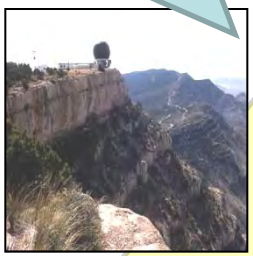
Adaptive to Customer Requirements

"ISP"
Industry, Academia, MWR

LandWarNet
Operational

Live Test Events & Data



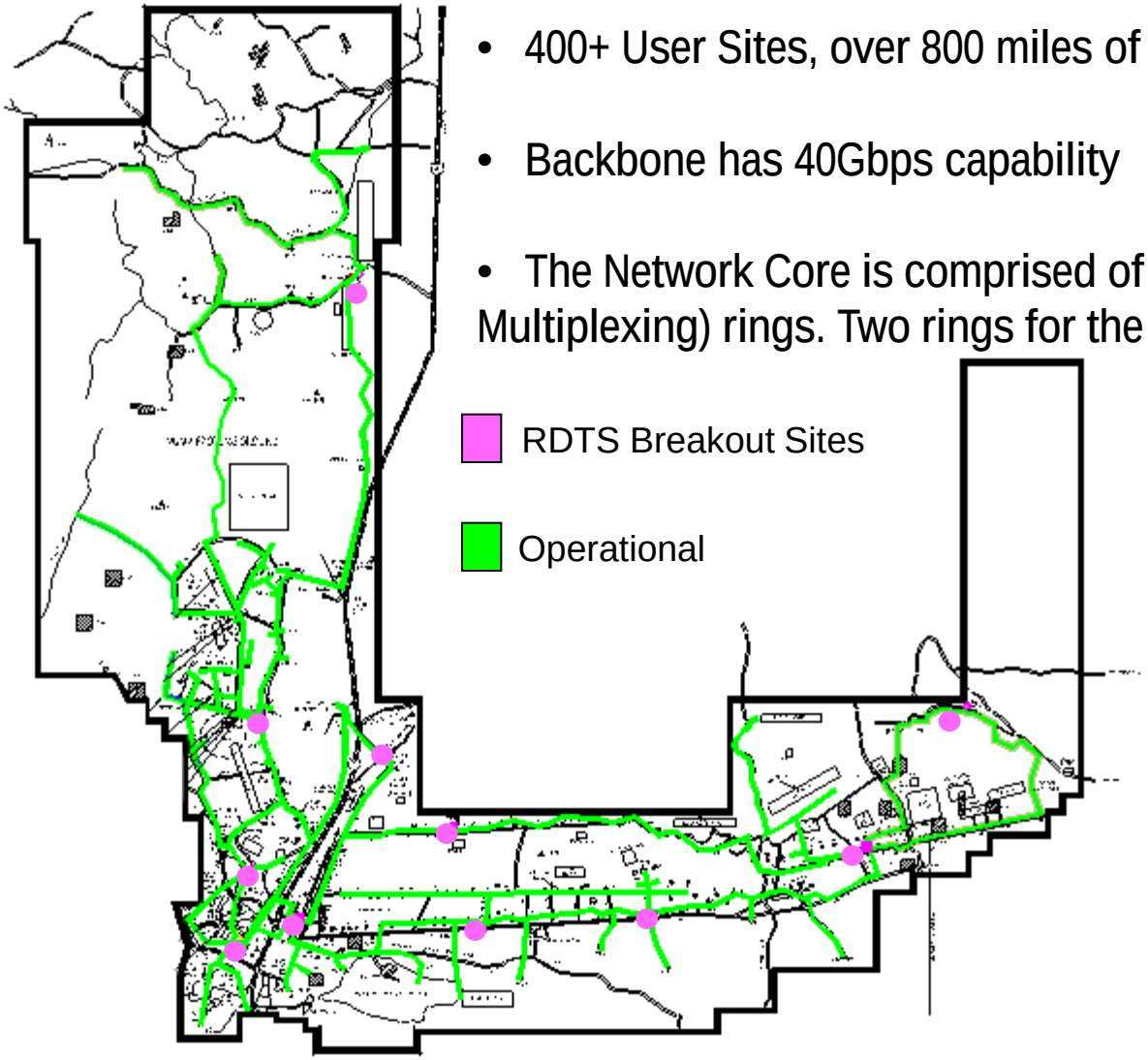


Range Linkage
(Wired, Point-to-Point, Wireless)

Modeling & Simulation
Virtual / Constructive

RDT&E
DREN, S-DREN, JMETC, IO Range

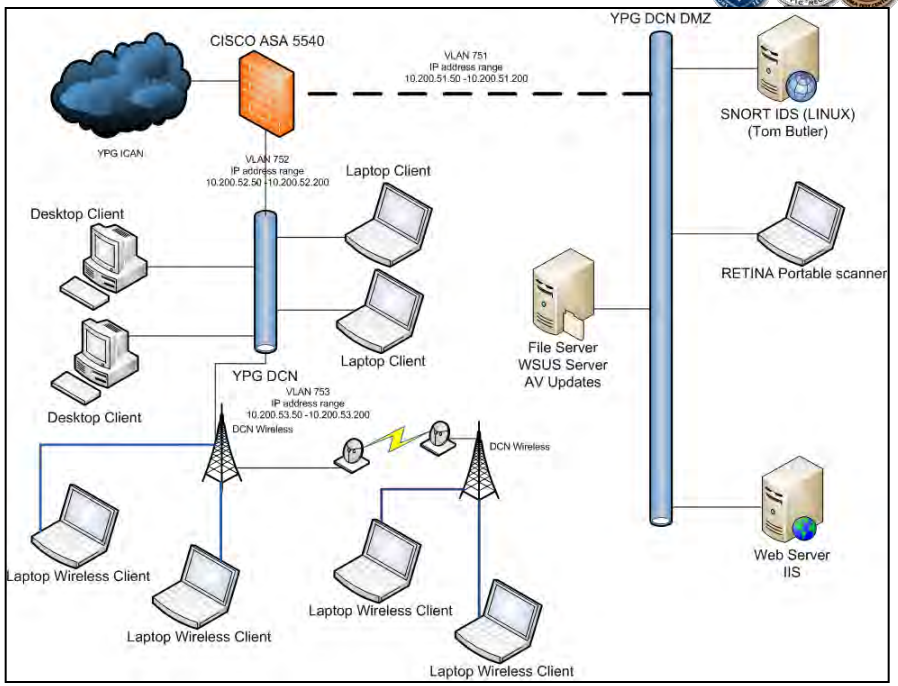
Range Digital Transmission System (RDTS)



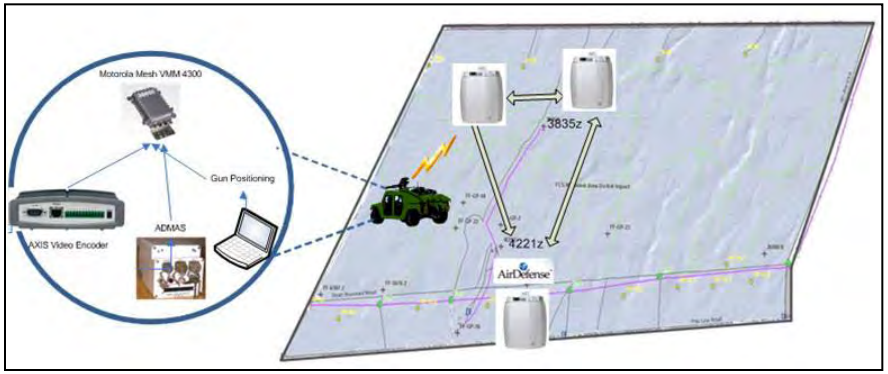
- 400+ User Sites, over 800 miles of fiber cable
- Backbone has 40Gbps capability
- The Network Core is comprised of 3 DWDM (Dense Wavelength Division Multiplexing) rings. Two rings for the ranges and an interconnect ring
- Each ring can carry 40 channels with a top speed of 10Gbps per channel
- Provides telemetry, voice, telephone, and data
- Provides video transport throughout the range

Data Collection Network (DCN)

- **An accredited isolated enclave to meet compliance and regulatory guidance associated with Data Collection devices and methods**
- **Instrumentation has to reside in a *secure enclave***
- **Ability to operate isolated from the LandWarNet**
- **Ensuring network security and accreditation**
- **Provide a secure, capable and segregated network without limiting effectiveness**
- **Wireless is supported for vehicle testing.**



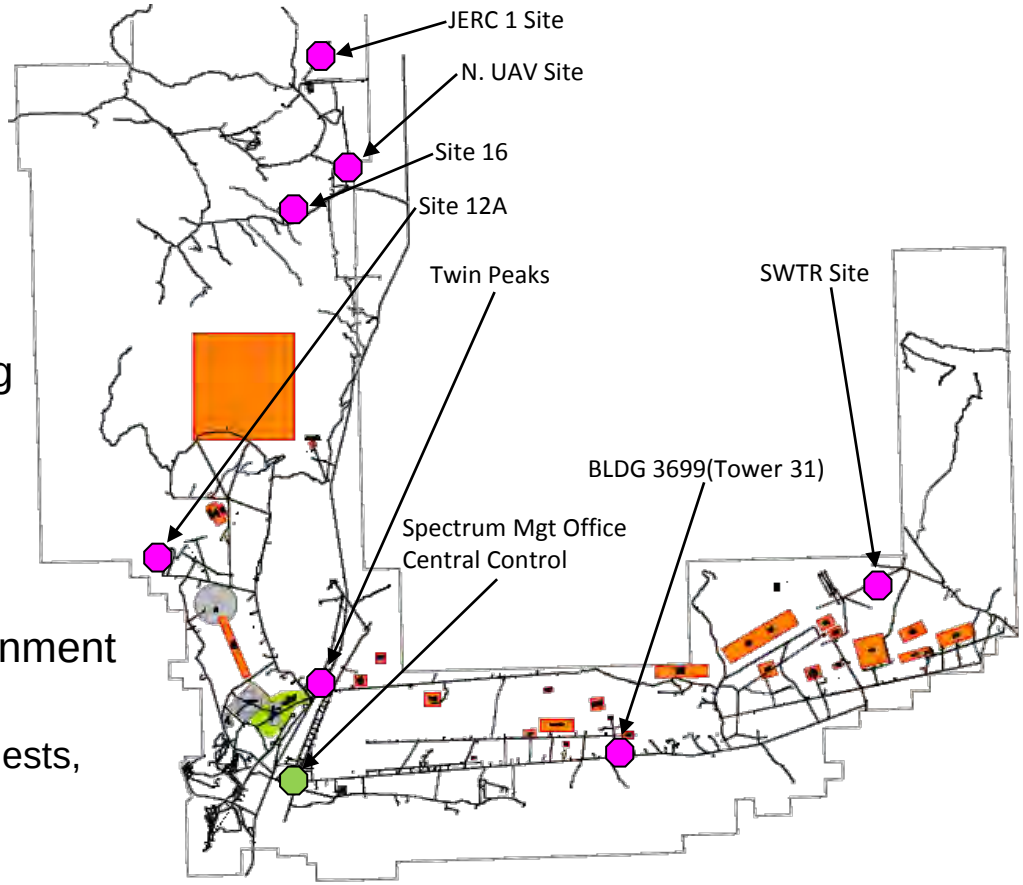
DCN logical OV-1



Wireless OV-1

Frequency Management

- Spectrum Acquisition System Network (SASN)
  - 7 networked, fixed sites
  - 1 mobile site (also networkable)
  - 20 MHz to 40GHz
  - Directional Finding and Geolocating
  - Common operating picture
- Automation for Frequency Management
  - Temporary Radio Frequency Assignment (TRFA)
    - ✓ Approval/disapproval, update requests, current approval list
    - ✓ Requirement description
    - ✓ Equipment and antenna attributes
    - ✓ TRFA conditions



SASN site locations on YPG

Environment Benchmarks

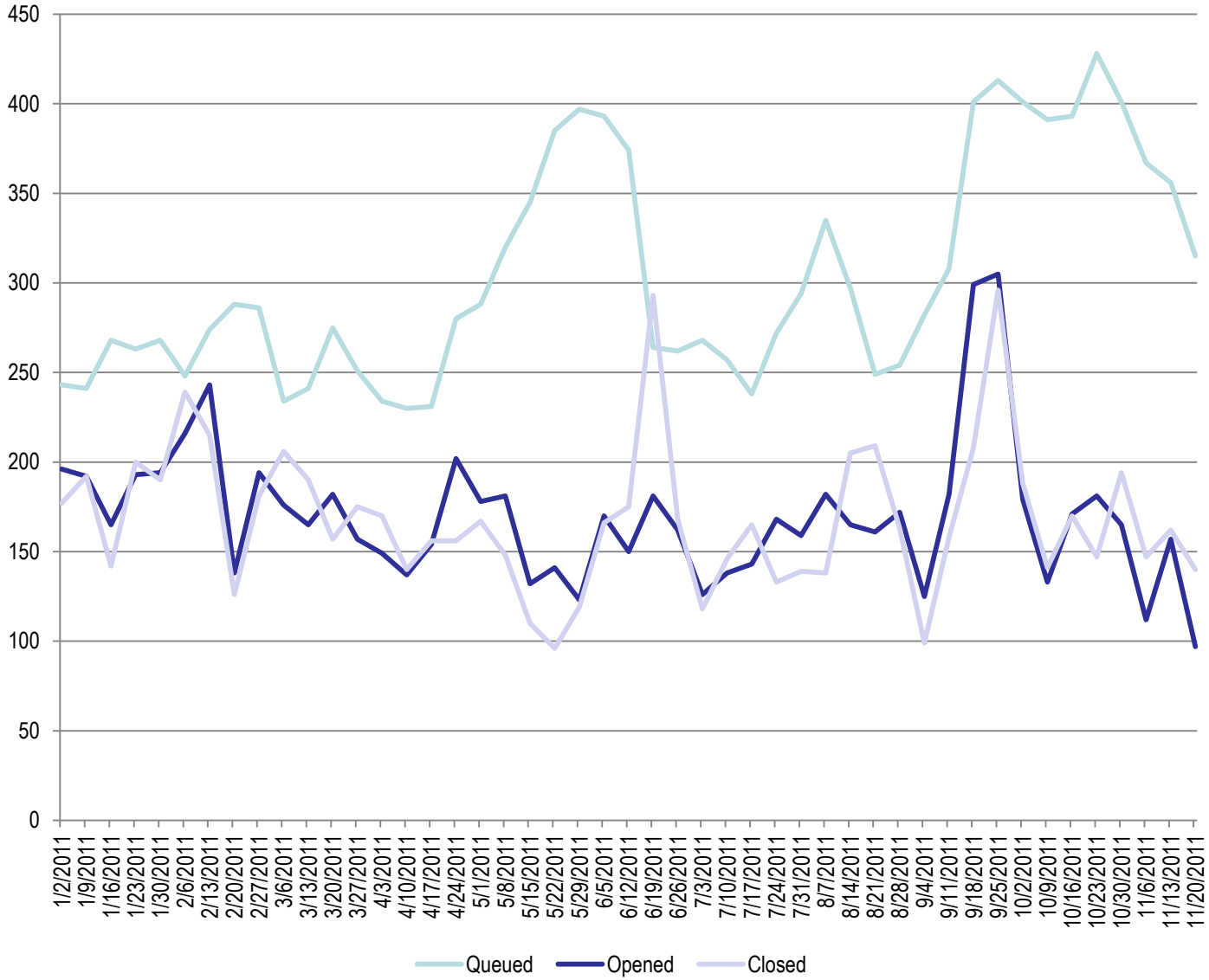
Range Communications

- Spectrum Management (2x Spectrum Action Officers)
- Radio Maintenance → Supports all Land Mobile Radios, Air Traffic Control Radios, and Air to Ground
- Kofa Technical Control (KTC) → Supports 140 Firing Programs / Month
- Cibola Technical Control (CTC) → Supports 95 Air Drops / Month
- Cable Systems Section (CSS) → 700 miles of fiber optic, 400 miles of copper
- Base Telephone (9,788 Phones, 12,096 Capacity)

IT Environment

- ~150 Unclassified Servers (Both Physical and Virtual, ~120 Win/~30 Linux)
- 25 SIPRNET Workstations, 10 SIPR Servers
- 100.5 TB Provisioned Storage Capacity
- >510 Network Devices (Routers, Core & Distribution Switches, Firewalls)
- 266 Networked Printers, >526 Directly Connected
- 10 Gbps backbone x 4 λ
- OC3 DREN WAN Connection
- T1 → DS3 NIPRNET WAN Connection
- >3000 Sq Ft Consolidated Data Center

Weekly Work Order Open/Close Comparison

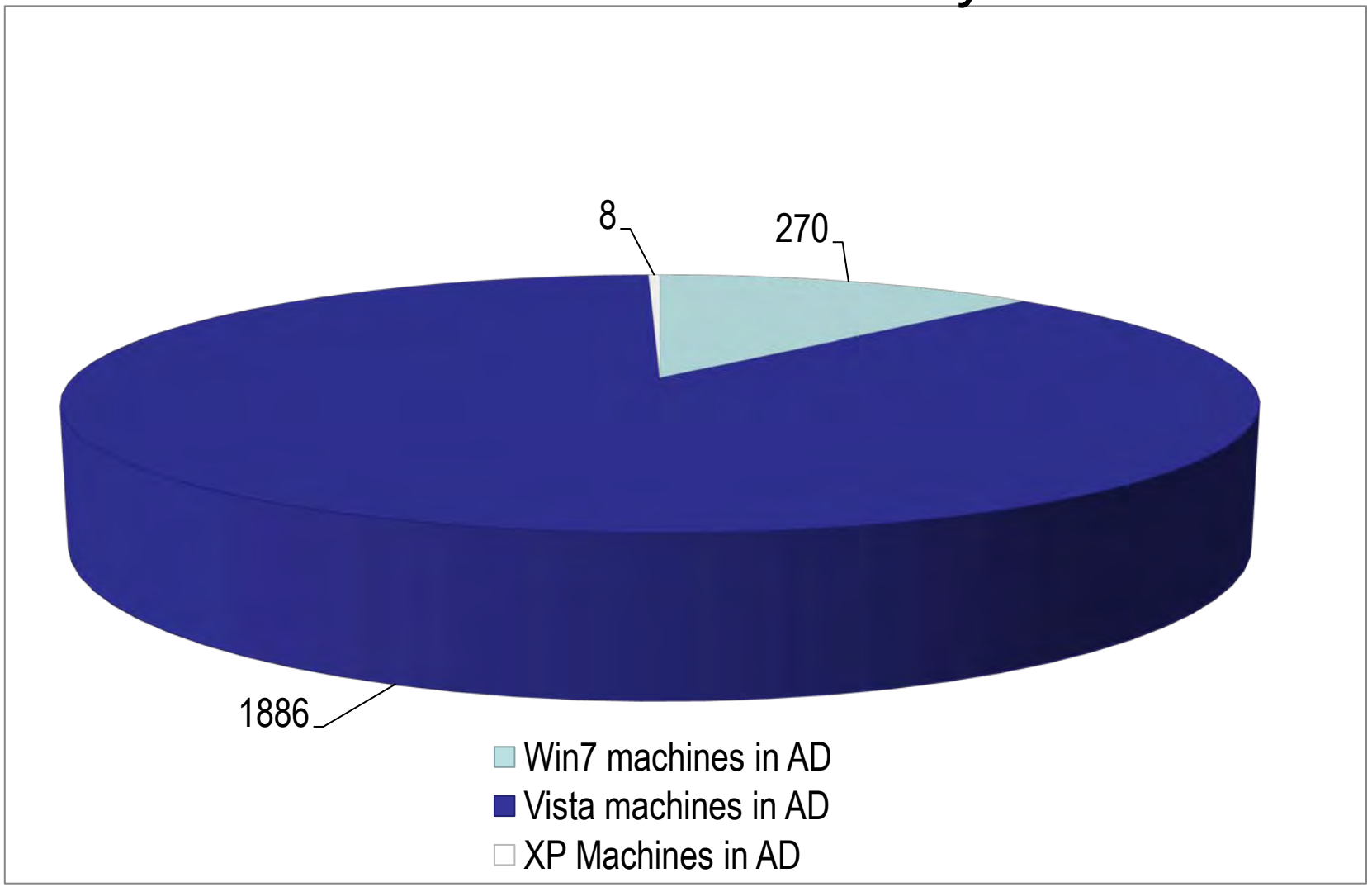


$\bar{X}$ = 304.3

$\bar{X}$ = 170.0

$\bar{X}$ = 168.5

Distribution of operating systems in YPG Active Directory



Summary

- The YPG NEC's primary focus is in support the YTC test mission
- The test mission product is data and the YTC's goal is to provide that data to the test community efficiently and effective
- To this end, the NEC has established a very capable infrastructure (DREN OC-3) and IT initiatives to promote state-of-the-art data management to customers
- JMETC connection is being established for joint testing, virtual extension available now
- Secure data processing is being expanded; cross domain capability is under needs and solutions study
- Support to YTC test mission is robust and leading edge, with scalable internals and adaptive to emerging requirements

Questions/Wrap Up

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