



TTS 2004 Industry Day

Aberdeen Test Center

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Agenda



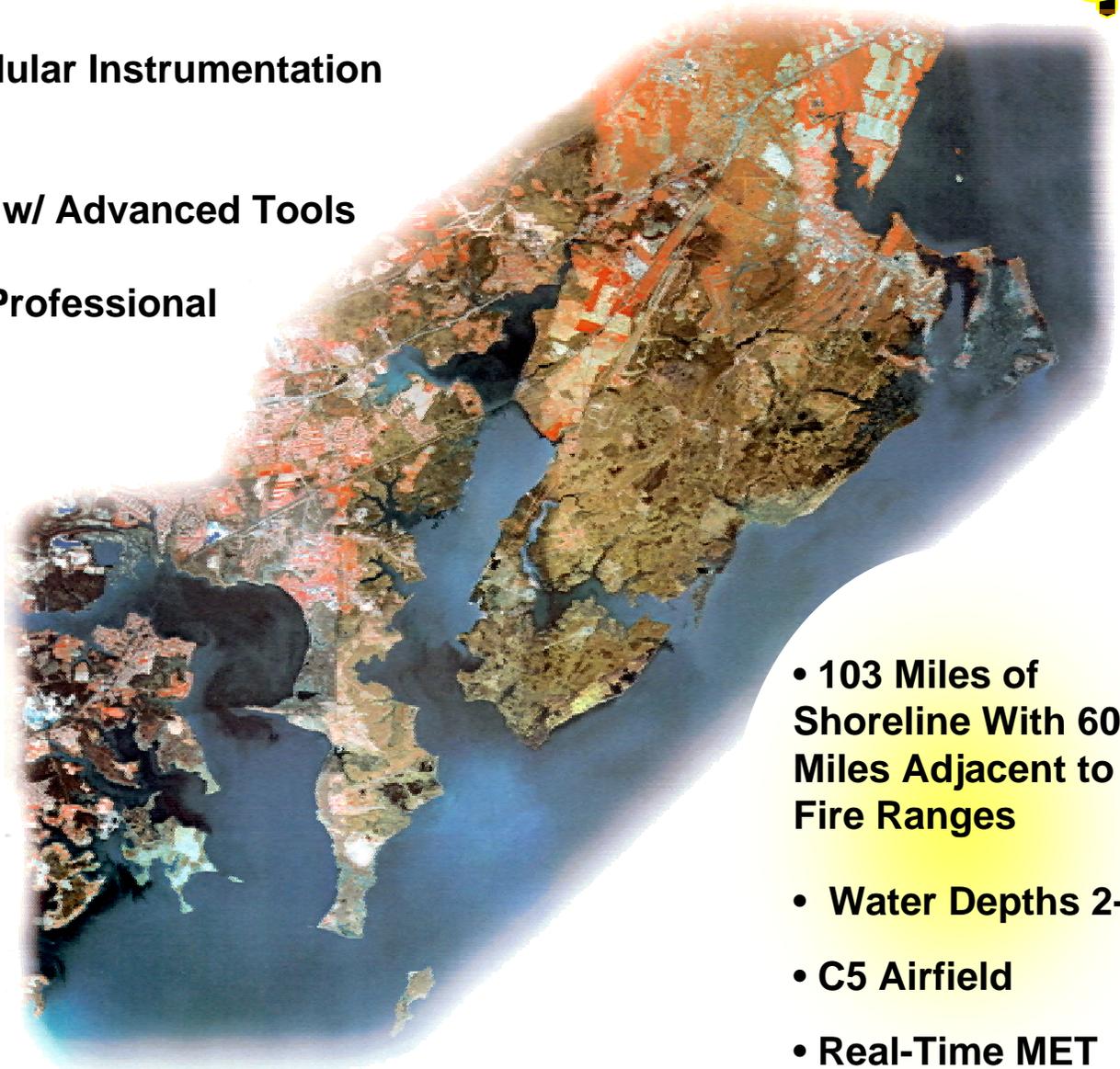
- **ATC Overview**
- **Technology Challenges**
- **Major Investments**
- **Support Contracts**
- **Contact Information**



Aberdeen Test Center



- Open Air Ranges w/ Modular Instrumentation Suites
- Traditional Laboratories w/ Advanced Tools
- Fabrication Facilities & Professional Craftsman Shops
- Domestic & Foreign Land / Sea-based Targets & Threats
- Isolated / Secure / Hardened Surface & Sub-surface Opportunities
- Temperate Zone
- > 52K Ground Acres



- 103 Miles of Shoreline With 60 Miles Adjacent to Live Fire Ranges
- Water Depths 2-14'
- C5 Airfield
- Real-Time MET



ATC Test Capabilities



- **Vehicles**

- Reliability, Availability & Maintainability
- Vulnerability / Survivability
- Transportation Environments

- **Weapons / Weapon Systems**

- Small Arms to Large Caliber
- Direct / Indirect Firing
- Supersonic Ballistics
- Armor Testing

- **Warfighter**

- Equipment
- Operational Testing

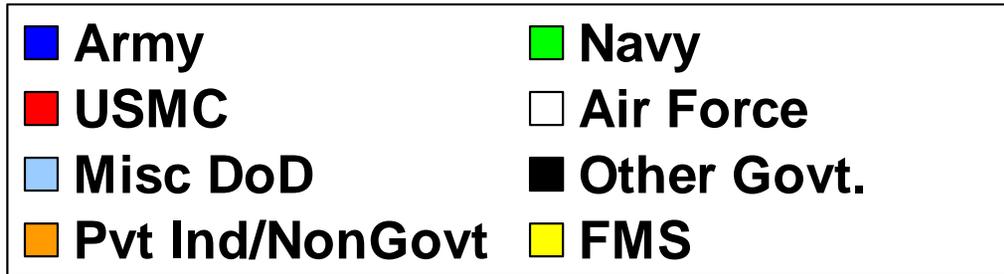
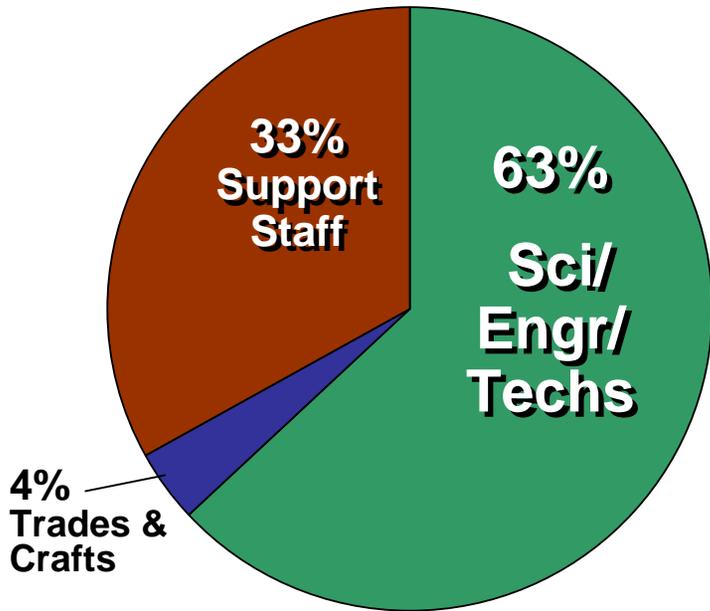
- **Other**

- Electromagnetic Interference
- Underwater Explosions
- Human Factors
- Analytical Chemistry

- **And More**

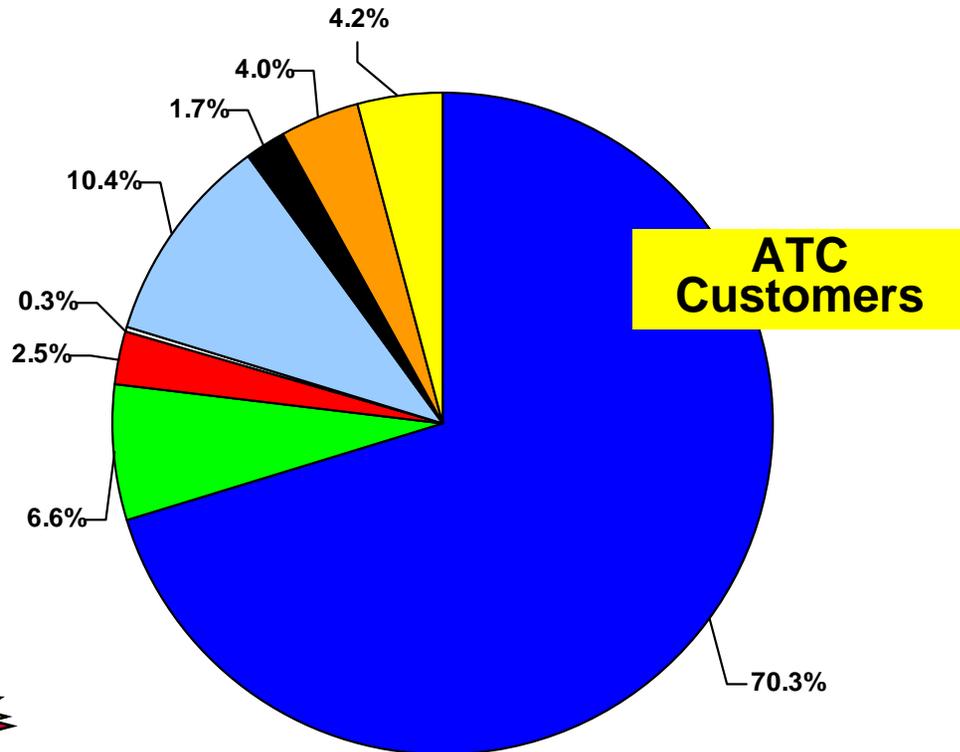


PERSONNEL & CUSTOMERS



Civilian	741
Military	30
Contractor	<u>755</u>
TOTAL	1,526

**APG
Range
Commander**





Test Operations



	FY 92	FY 01	FY02	FY03
Tests managed	1,162	1,068	1,070	1,125
Reports furnished	165	166	165	216
Large Caliber Rounds fired	26,220	8,860	6,182	7,992
Miles driven	270,222	229,078	388,671	350,478
Miles Simulated	350,000	527,500	159,650	420,638
Test Incident Reports issued	18,779	21,795	27,540	39,902
Customer Base	350	597	607	615





WINNING THE WAR ON TERRORISM



STRYKER



Dry Support Bridge



Centerline Deflector Kit



AT4-CS Recoilless Rifle



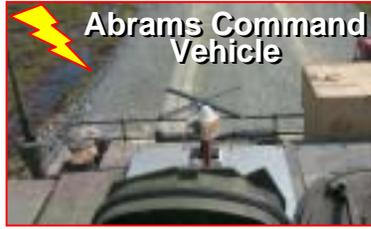
Abrams Rear Protection Package



*"Aberdeen Test Center is the only training range available to us on the East Coast capable of supporting complete Joint Sea/Air/Land live-fire mission scenarios."
-- CDR Patrick Sullivan USN SPECWARCOM Group Four.*



M26 Advanced Taser (Stun Gun)



Abrams Command Vehicle



XM1066 40mm Thermobaric Cartridge



FN 303 Less Lethal System



Blue Force Tracker



Commercial Aircraft Survivability



Up-Armor FMTV



SLAT Armor



Threat Containment Units



Up-Armor HMMWV



Airborne Mine Neutralization

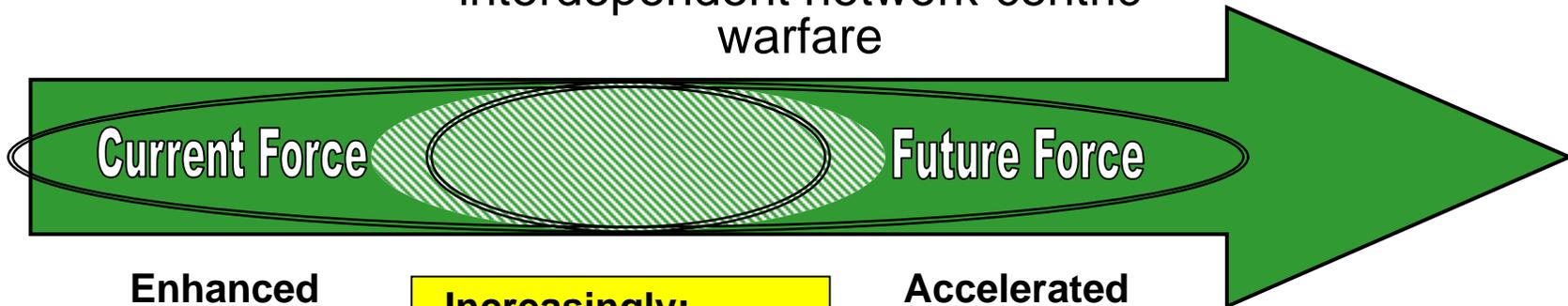


ARMY TRANSFORMATION ROADMAP



Evolving Army Transformation

Fully Networked Battle Command capabilities bridge from the Current to Future Force and enable interdependent network-centric warfare



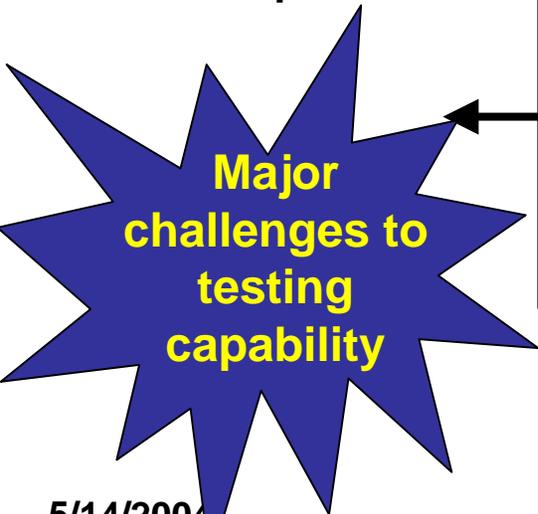
Enhanced Capabilities

Increasingly:

- Integrated
- Expeditionary
- Networked
- Decentralized
- Adaptable
- Decision Superior
- Lethal

Accelerated Development and Fielding of DOTMLPF Solutions

Enduring Characteristics of Army Transformation: Responsiveness, Deployability, Agility, Versatility, Lethality, Survivability, and Sustainability fully support Future Joint Force Attributes





Mission



- Provides to DOD, other government agencies, foreign governments, academia, and the private sector
 - **Comprehensive test and training services both real and simulated**
 - **Expert knowledge and technical services**
 - **Manufacturing and fabrication capabilities**
 - **Instrumentation and facilities**
- **Exploits emerging technologies in the development of leading edge instrumentation and test methodology**
- Maintains and enhances DOD's only temperate climate, general purpose proving ground
- Mission accomplishment is through the use of modern project management techniques, environmentally conscious processes, innovation, and a trained and flexible work force. Service is tailored to specific customer requirements



Technology Challenges

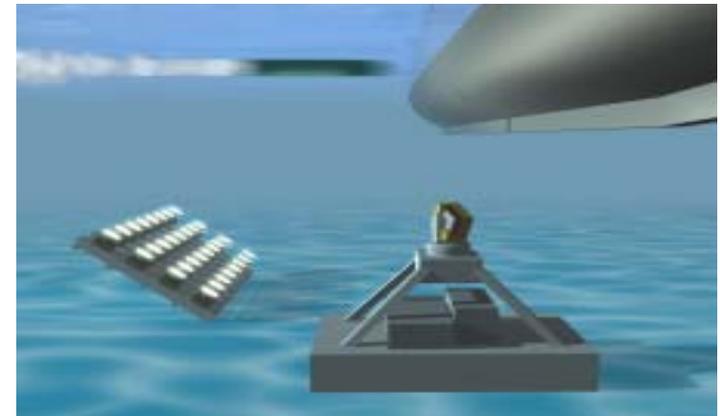
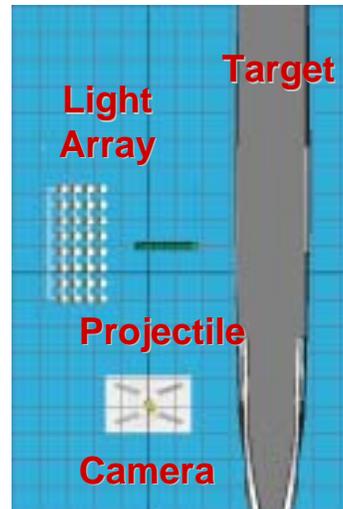
Underwater High Speed Imaging System



Shortfall: High-speed imaging of underwater events

Acquisition Considerations:

- Limited visibility due to turbid water
- Illumination for transmission through obscurants (smoke, particulate)
- Strong explosively driven shock waves
- Depths up to 60 feet
- Signal transmission to the surface for near real time review
- Remote operation with pan tilt control





Technology Challenges

Frangible Anthropomorphic Dummy



Shortfall: Measure blunt trauma hazards in combat environments for both hostile & friendly humans.

Acquisition Considerations:

- Evaluate injury potential in hazardous environments
- Replace \$100K Hybrid II crash dummies, which are too expensive and do not accurately evaluate complex blunt trauma events
- Artificial material needed to mimic bone fractures
- Use x-ray to evaluate injuries
- Results must be considered acceptable to medical community



Fragment Impact



Falling Object Impact



Evaluate Land Mine Hazard





Technology Challenges

Active 3D Projectile Follower System



Shortfall: Real time tracking of projectiles in flight in 3D

Acquisition Considerations:

- Track projectiles in real time **without pre-determined flight profile**
- 3 dimension capture and playback system to evaluate characteristics
- Use with imaging systems up to 10,000 frames per second at 1K x 1K resolution
- Ability to track multiple sub-munitions along a flight path such as canister rounds and active protection projectiles
- Velocity measurement tools



POC: Mr. Dave Jennings 410-278-3325



Technology Challenges

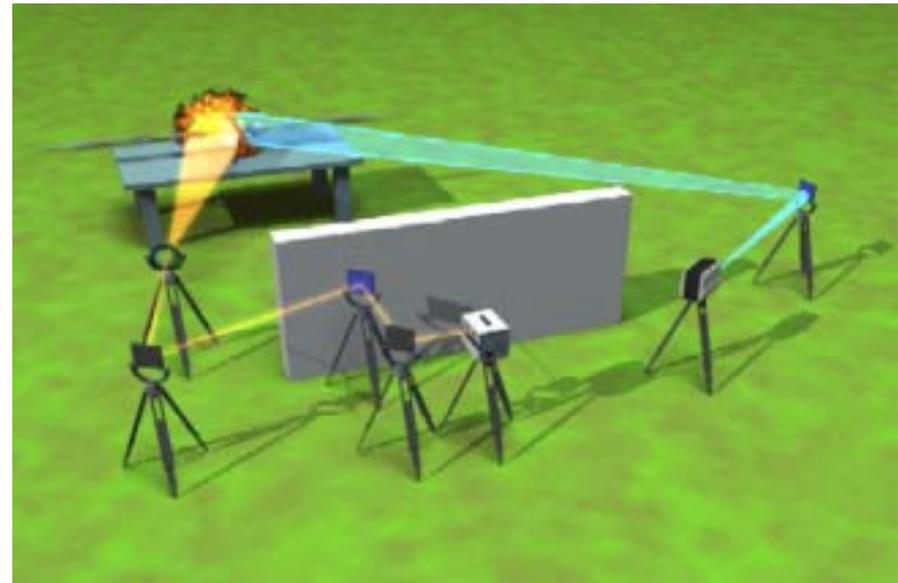
Monochromatic Laser Light Source



Shortfall: Ability to illuminate the interaction between threat and counter munitions during impact/detonation for high speed imaging

Acquisition Considerations:

- Provide continuous or pulsed light at 10k Hz
- Light source must be compatible with standard high speed digital imaging CMOS sensors
- Area of coverage minimum 10 feet horizontal x 8 feet vertical
- Light source must overcome ionization and blast generated by detonation/interaction at a distance of at least 50 feet from impact
- Portable system for range operations
- Remote control operation and triggering





Technology Challenges



Image Analysis - Arena fragmentation testing

Shortfall: Means to measure fragmentation patterns during arena testing. Replace high speed film currently used with digital imaging capability.

Acquisition Considerations:

- 180 degree field of view coverage
- Acquire impact data relative to 5-degree increments on the arena periphery.
- Must be high-speed, calibrated, blast-hardened
- Image processing and analysis:
 - Capability to uniquely identify and track numerous simultaneous fragments from statically detonated munitions to achieve velocity and impact data.



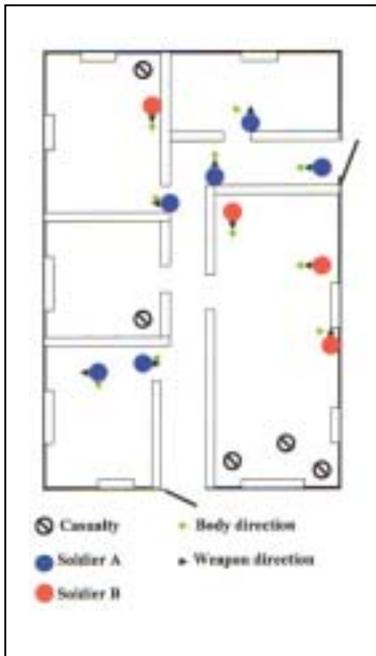
Technology Challenges

Real-time Position Tracking

Shortfall: Accurate knowledge of each player's (soldier, vehicle, civilian) position and orientation during small unit engagements

Acquisition Considerations:

- 1 accuracy (~1cm), possible orientation (~5°)
- 2 real-time update rate (>5Hz), low latency (<100 ms)
- 3 minimally invasive (smaller than a cigarette pack)
- 4 ability to be used in different environments (indoor, underground, wet)



Example Systems



LandWarrior GPS

4



Combat Simlas
SimCity

2

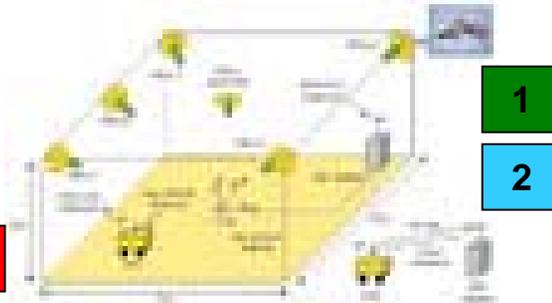
3

4



DARPA SUO-SAS

4



GPS Pseudolites

1

2

Technology Challenges

Biomedical Sensors

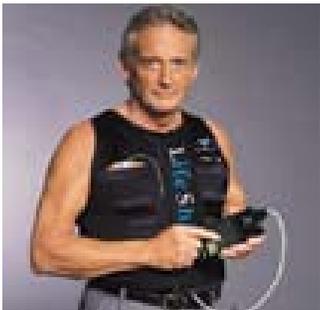


Shortfall: Ability to objectively measure physiological and neurological functions of a soldier during testing exercises to aid in the measurement of stress and to promote a better understanding of warfighter limitations.

Acquisition Considerations:

- 1** minimal invasive (very few leads to connect to the soldier as well as total size of the sensor package, allows soldier to exercise)
- 2** ability to track an entire range of human functions (vital signs, EKG, EEG, hormonal levels)
- 3** real-time recording/transmission (reasonable update rate as well as the capability to monitor the information through wireless communication)

Example Systems



LifeShirt

- 1**
- 2**



Crystal Monitor

- 2**
- 3**



VmaxST

- 1**
- 2**
- 3**



Technology Challenges

Ballistic Trajectory Sensing



Shortfall: Ability to non-invasively determine shot origination and trajectory during small unit engagements.

Devices in development today can pinpoint the location of a shot as well as identify the type of weapon used. Investigations on how to expand these ideas could provide a completely non-invasive technique for collecting data during testing/training engagements.

Acquisition Considerations:

- 1** position accuracy, range and bearing to originating shot
- 2** ability to identify type of weapon/ammunition
- 3** capable of distinguishing multiple shots simultaneously

Example Systems



PDCue

1



Pilar

1

2



BBN Counter Sniper System

1

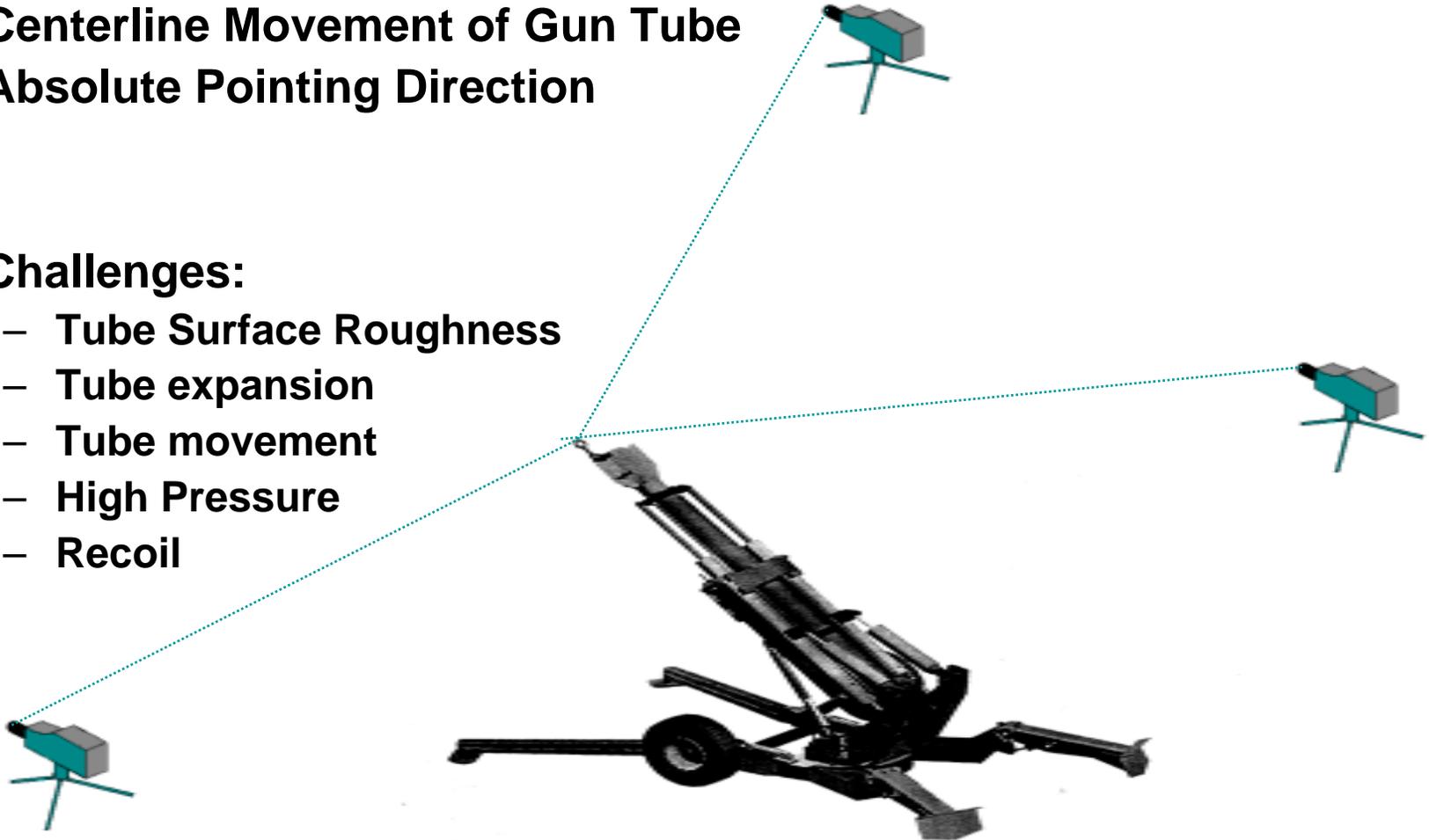
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Technology Challenges

Muzzle Position Measurement System

- Centerline Movement of Gun Tube
- Absolute Pointing Direction

- Challenges:
 - Tube Surface Roughness
 - Tube expansion
 - Tube movement
 - High Pressure
 - Recoil





Technology Challenges

Subsonic, Airburst Munitions Scoring

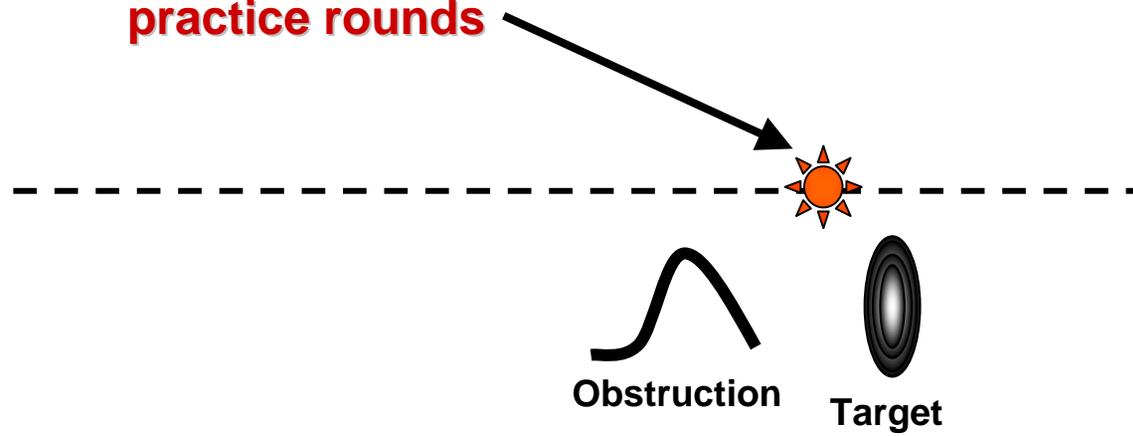
No air burst from target
practice rounds

Weapon



Weapon Data:

- Shooter position
- Range to target



Calculate:

- Burst Position
- Lethality

Target Data:

- Target Position
- Bullet $x,y,z(t)$
- Frag pattern



Technology Challenges

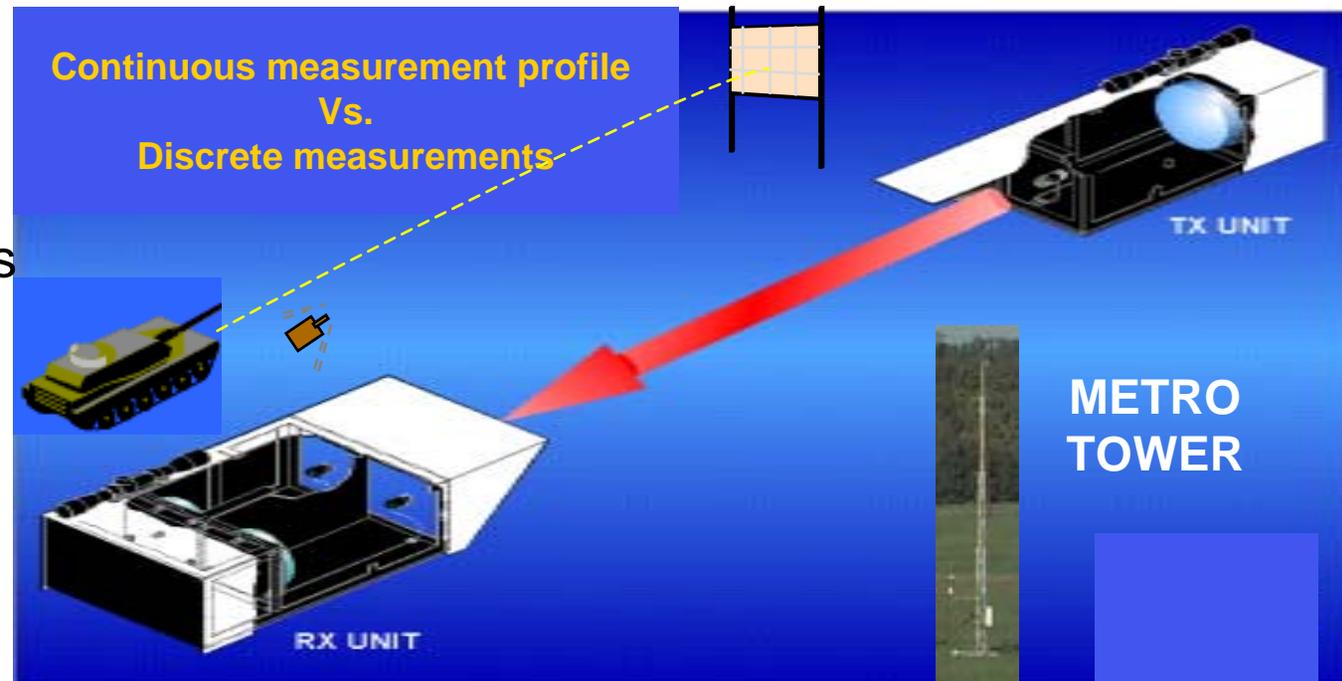


Remote Sensing of Crosswind in Varied Terrain

Shortfall: Measuring crosswind along a $\frac{3}{4}$ km line-of-fire in complex terrain.

Acquisition Considerations:

- Must measure along or very close to munitions' parabolic trajectories.
- Must operate under all weather conditions.
- Must provide at least four spatially-integrated measurements over 4 km range.





Technology Challenges



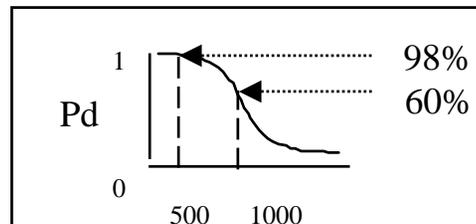
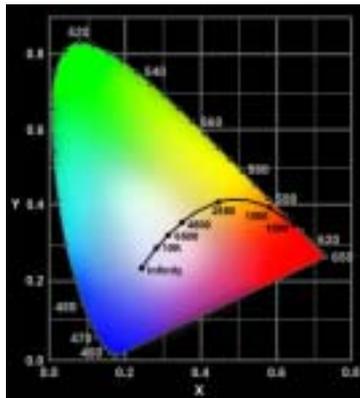
High Resolution Color Image Projection System

Shortfall:

Digital color image projection system.

Acquisition Considerations:

- Capability to present field collected, high-resolution color images to human observers in a laboratory setting.
 - Resolution: match what a system would present the human eye
 - Color Fidelity: Original color image calibration must be preserved
 - Image Realism: Accurate representation of the range-to-target
 - Update Rate: Desired - Flash card; Objective - 30-Hz





Major Investments



- **MAJOR INSTRUMENTATION PROJECTS**

- \$ VISION: Test and Training XXI Implementation

- FY06 – Fiber Optic Network II

- Fire Power Instrumentation

- Net-Centric Communication Testing

- Automotive Technical Evaluation Facility Instrumentation

- **CTEIP PROJECTS**

- \$ Land and Sea Vulnerability Test Capability

- \$ Roadway Simulator

- Joint Warfighter Test and Training Suite

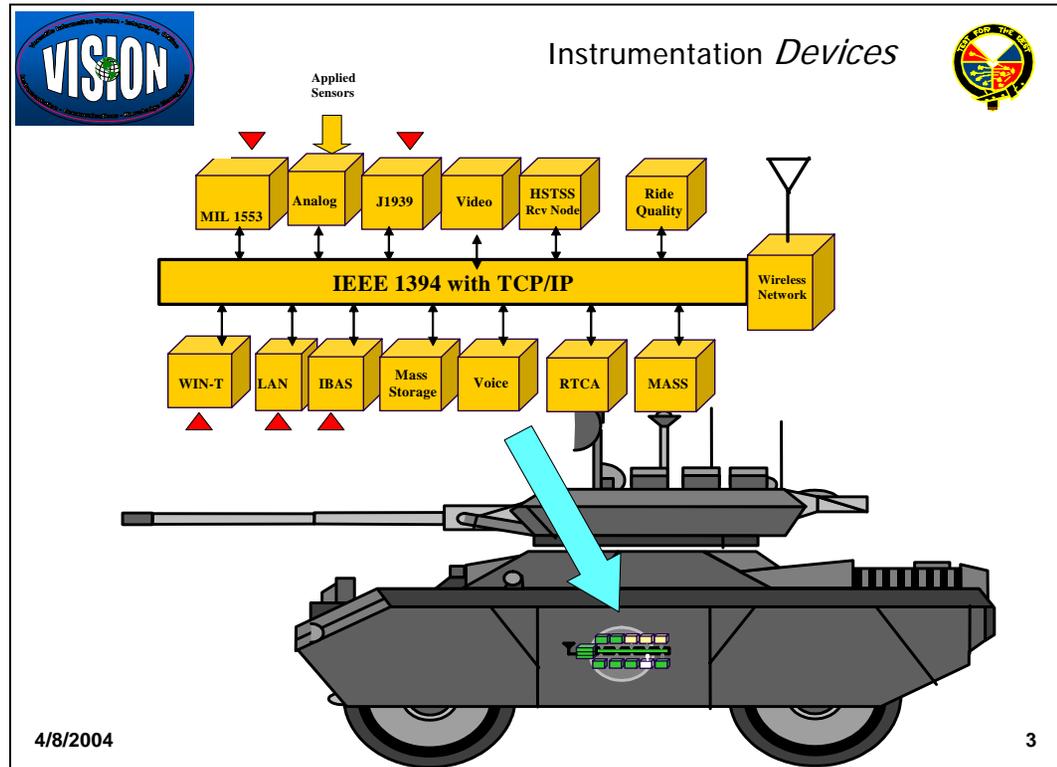


Major Instrumentation



Versatile Information Systems Integrated On-line (VISION)

- Funded Program
- Comprehensive approach to information collection, management and ultimate transformation into knowledge
- Incorporates
 - Modular Instrumentation Suite
 - Seamless Communications
 - Digital Library





Major Instrumentation



Fiber Optic Network II

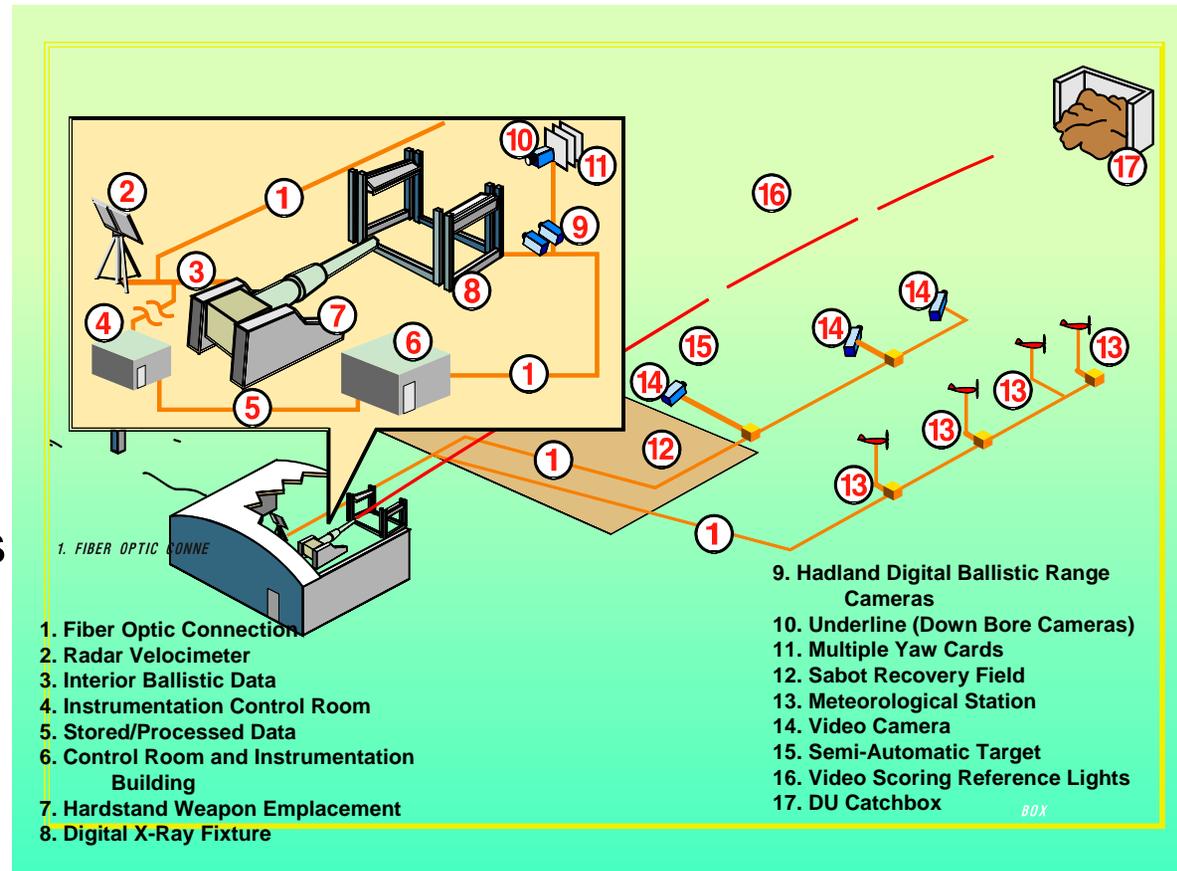
- **Extends** existing ATC Network Infrastructure
- Provides **high-speed** communications
- Provides **secure** communications
- Provides enabling infrastructure for implementation of VISION and Distributed Testing within ATC

**Projected
FY06 funding**

Major Instrumentation

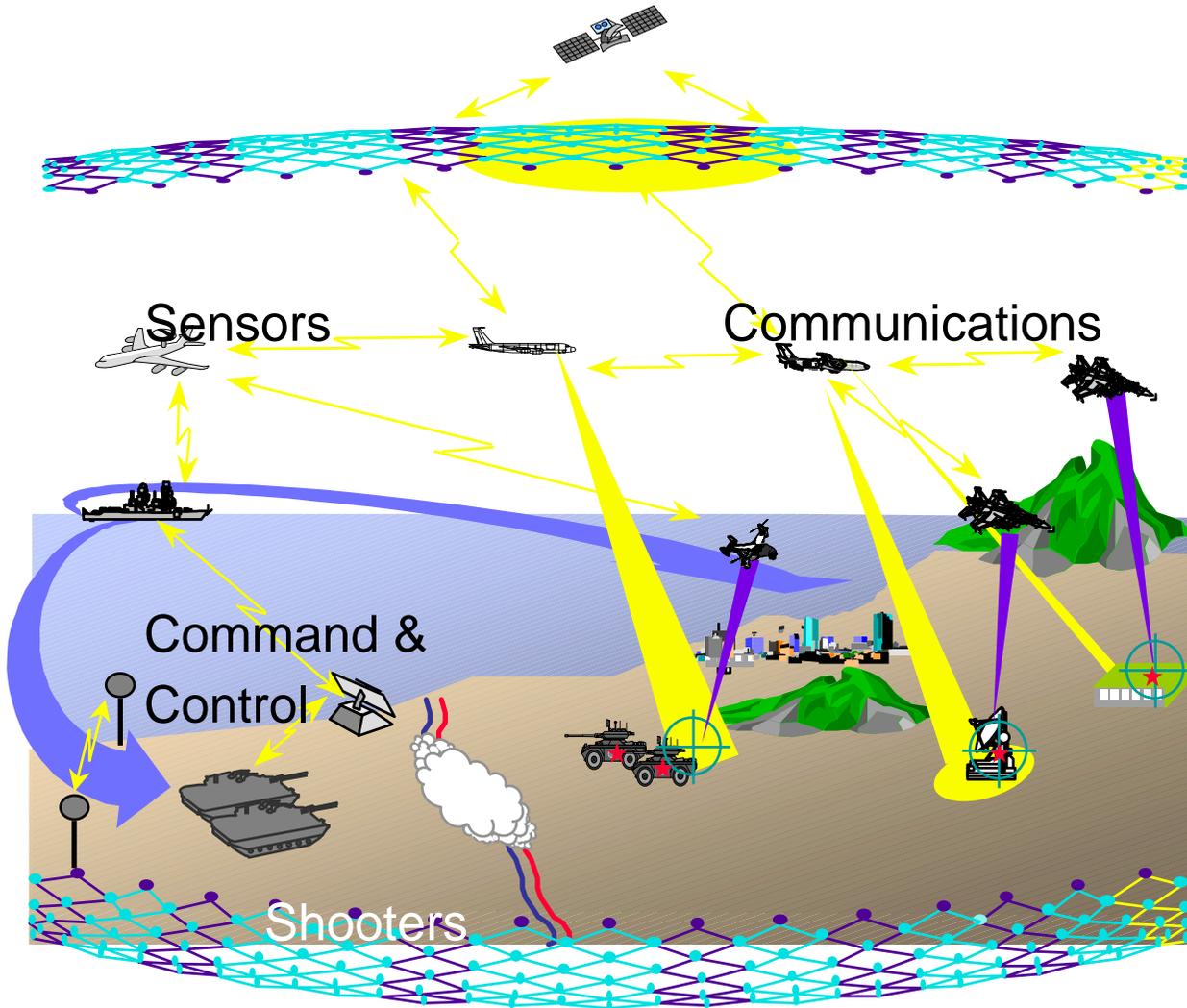
Fire Power Instrumentation

- Provides Instrumentation for Evaluation of Advanced Guns & Munitions
- Supports Legacy and Interim Guns & Munitions
- Improves Ballistic Measurement Capabilities
 - Transducers
 - Calibration Equipment
 - Air-burst Munitions Target Scoring System
 - Near Real-time Ballistic Analysis



Major Instrumentation

Netcentric Communication Testing



Emerging Operational Concepts

- Dominant Maneuver
- Precision Engagement
- Focused Logistics
- Full-Dimensional Protection
- Network Centric Operations

Enabled by

- Information Superiority



Major Instrumentation



Auto Tech Evaluation Facility Instrumentation

- Provides Instrumentation Suite for proposed Automotive Technology Evaluation Facility (ATEF):
 - On-board data acquisition suites
 - Real-time monitoring of data
 - Multi-vehicle tracking stations
 - High-speed duplex data communications
 - Unmanned Ground Vehicle guidance system
- Instrumented ATEF will be the future hub for testing of all manned and unmanned automotive systems at ATC
- Supports testing of military applications of the Intelligent Transportation Systems technologies

**ATEF MCA
FY07
FYDEP**



Major Instrumentation



Objective Force Unit of Action Air/Ground Testbed

- Joint ATC/ATTC project with supporting elements from Industry Partners and other Test Centers
- Unit of Action Battlespace
 - Aviation (Rotary, Fixed)
 - Ground Troops (Dismounted, Mounted)
 - Ground Vehicles (Autonomous/Guided, Mounted)
- Battlefield Emulation Stimulation System
- SOCOM / CTEIP Pilot Program
- Simulated / Stimulated Immersed Environments
 - Constructed, Live, Virtual
 - Distributed Networked Between Assets (Resident, Outreach)
 - Multi-dimensional (Close, Peripheral, Perimeter)

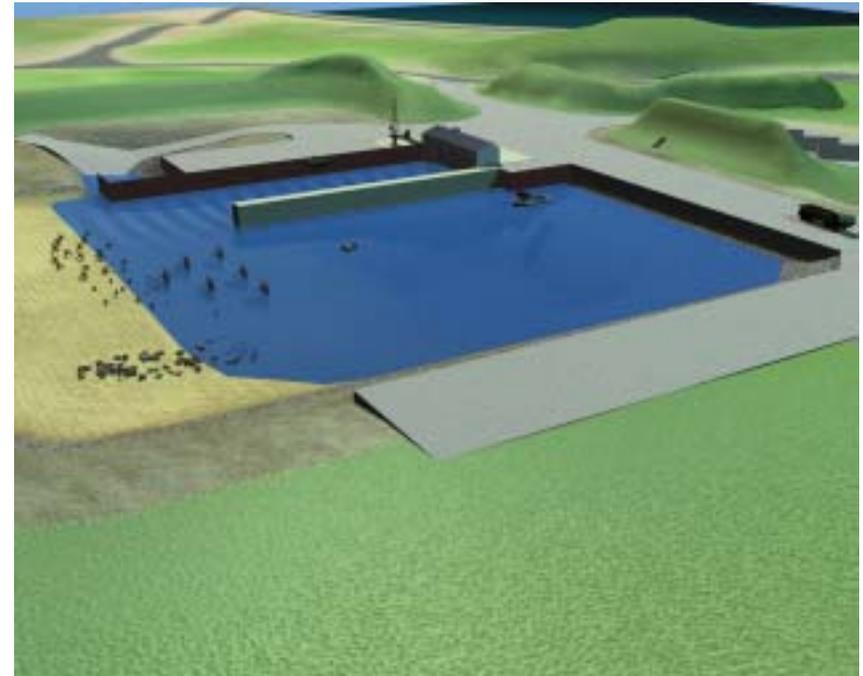


CTEIP



Land and Sea Vulnerability Test Capability

- Facilitates determination of lethality of developmental and deployed weapons against a variety of targets.
- Provides a versatile and integrated complex of test ranges.
- Supports validation of computer simulation models, including vulnerability and lethality models.
- Overall, supports:
 - Littoral Region testing
 - Mine/countermine lethality testing
 - Very High Speed Data Acquisition of Ballistic Shock
 - Special Operations in the underwater environment
 - Acoustic/shock effects of underwater explosions
 - Underwater missile/torpedo launch capabilities
 - Prediction, modeling and simulation of water ranges and resulting damage.



POC: Mr. Sid Steelman 410-278-5140



CTEIP

Roadway Simulator



- Funded Project for a Vehicle-in-the-loop Simulator
- Allows performance and safety testing of wheeled vehicles in a laboratory environment
- Accommodates two axle vehicles to 26,000# GVW
- Accommodates tandem axle vehicles to 60,000# GVW
- Designed to accommodate tractor trailer combinations to 80,000# GCW
- Designed to accommodate multi-axle/multi-steering vehicles; i.e. FCS





CTEIP

Joint Warfighter Test and Training Capability



- Provides tools, methodologies, instrumentation, facilities and infrastructure to perform T&E of Human Dependent Systems
- Provides capability to test and assess the impact of warfighter performance on overall system performance
- Conversely, provides capability to test and assess the impact of system operation (and operating environment) on the warfighter
- Primary focus areas:
 - Performance
 - Survivability
 - Informational Awareness
 - Human Effects

POC: Mr. Paul Tennant 410-278-8642



Mission Support Contracts

Contact Information



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Aberdeen Test Center

Major Support Contracts



- Title: **Test Support Services**
- Objective: Provide engineering, automotive, warehousing, and gunner and ammunition test support for numerous test programs
- Contract Type: IDIQ
- Estimated Cost: \$192M
- Duration: 1 base year plus 4 option years
- Estimated RFP Release: Nov 05
- Estimated Award Date: Sep 06



Aberdeen Test Center

Major Support Contracts



- Title: **Data Services**
- Objective: Provide data collection support to include Reliability, Availability and Maintainability (RAM) and Integrated Logistics Support (ILS) data on various automotive, electronic, general equipment and ordnance materiel. Also, provides data transcription, editing of technical reports and clerical support.
- Contract Type: T&M
- Estimated Cost: \$50M
- Duration: 1 base year plus 4 option years
- Estimated RFP Release: Jun 04
- Estimated Award Date: Nov 04



Aberdeen Test Center

Major Support Contracts



- Title: **Welding and Fabrication**
- Objective: Provide on-site quick-reaction capabilities for fabrication of test support material, equipment, and modifications or repairs to a wide variety of test items
- Contract Type: T&M
- Estimated Cost: \$8M
- Duration: 1 base year plus 4 option years
- Estimated RFP Release: Jun 04
- Estimated Award Date: Oct 04



Contact Information



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Summary



- **We need your help with testing challenges.**
- **We welcome your ideas/proposals in areas where we have not yet perceived a need.**