"Building Next Generation Range Capabilities"

Central Test and Evaluation Investment Program (CTEIP)

Gerry Christeson
Test Resource Management Center
20 October 2010

Test Resource Management Center (TRMC)

NDAA 2003
Established
TRMC

- DoD Field Activity
- Direct Report to USD(AT&L)
- ★★★ SES Director

Oversee
T&E Budgets

Major Range & Test Facility Base (MRTFB);
Other T&E Facilities
Within & Outside DoD

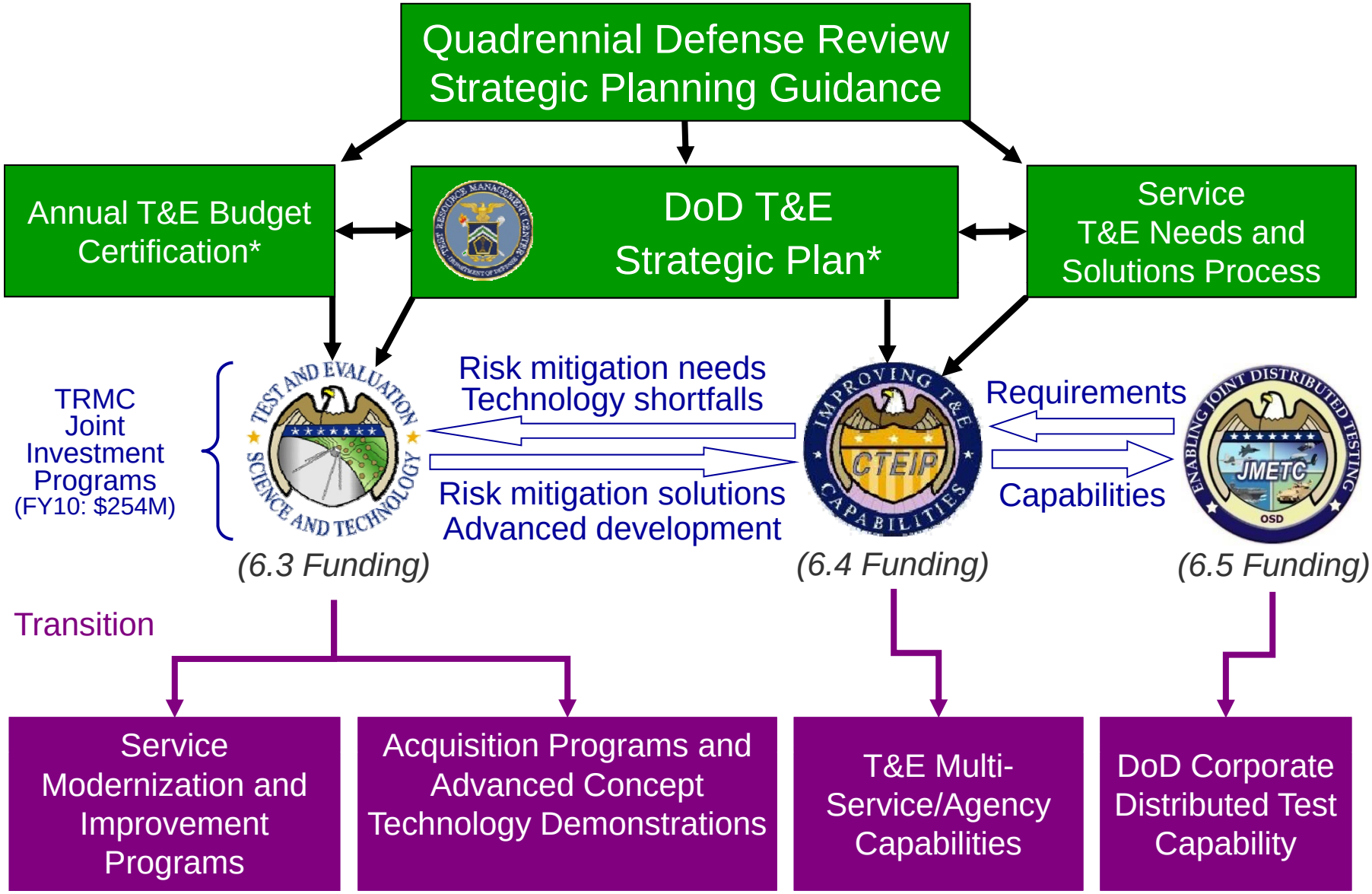
Biennial 10-Year
Strategic Plan for
DoD T&E Resources

Annual T&E Budget
Certification

Military Departments
& Defense Agencies

Administer
Centrally-Funded T&E
Investment Programs

T&E Investment Planning Process



Central Test & Evaluation Investment Program (CTEIP)

Mission: Develop or Improve Major Test Capabilities that have Multi-Service Utility

- **Initiated DEPSECDEF – 9 November 1988**
- **Established in FY91 by Congress**
- **6.4 RDT&E funds**
- **Purpose**
  - **Have multi-Service utility**
  - **Be developmental**
  - **Be non-procurement**

47 Active Projects

T&E Master Plans (TEMP) References

Precision Portable Underwater Tracking System
- SSN-774 "Virginia Class" Attack Submarine mine warfare testing

Multi-Spectral Anti-Radiation Missile Air Defense Array
- AGM-88E Advanced Anti-radiation guided missile testing

Threat Systems Project (TSP)

- 1-2 year requirement horizon
- EMD of target capabilities
- Address shortfalls in threat systems representation
- Coordinated with DOT&E

Joint Improvement & Modernization (JIM)

- 3-5 year requirement horizon
- EMD of Major Test Capabilities
- Must address joint requirements
- Services & Agencies budget for O&M over Life-Cycle of delivered capabilities

Resource Enhancement Project (REP)

- 1-2 year requirement horizon
- EMD of instrumentation needed to address an emergent requirement
- Must address OT shortfalls
- Coordinated with DOT&E

25 JIM, 9 Threat, 13 REP – 47 projects / subprojects

CTEIP - JIM Funding Criteria

- Support multi-Service/Agency test capability need
  - Traceable to DoD Strategic Plan for T&E Resources
  - Promotes interoperability & standardization across DoD
- Developmental in nature (not procurement)
- Does not duplicate existing capability
- Technology Readiness Level 6 or better
- Executable considering technical, cost, and schedule risk
- Service/Agency agree to life cycle support

Enhancing Range Capabilities

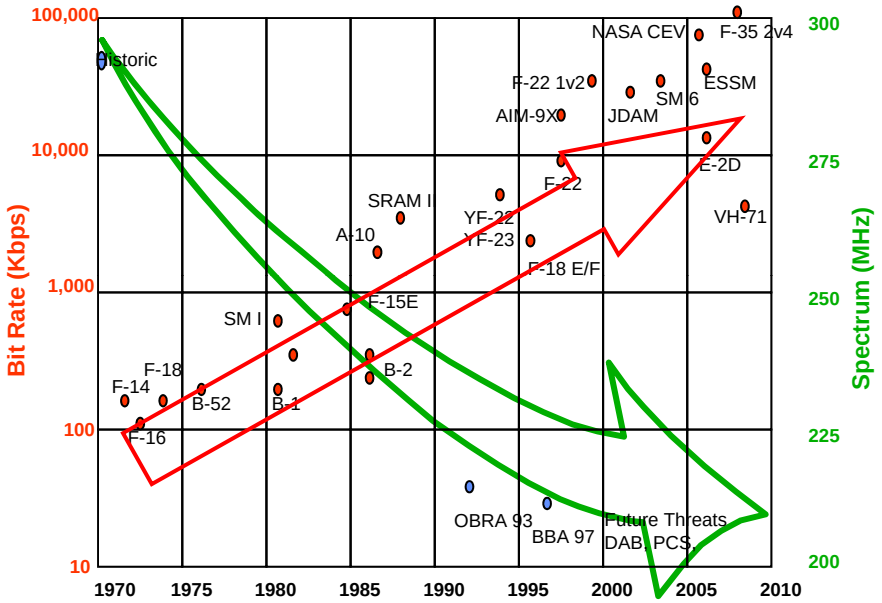
Key CTEIP Projects

Challenges	Initiatives
Spectrum efficient telemetry network that is adaptable and robust	**iNET** – integrated Network Enhanced Telemetry
Safe-realistic testing of Large Footprint Weapons	**SFSS** – Subminiature Flight Safety System
Real-time TSPI for Systems Under Test	**CRIIS** – Common Range Integrated Instrumentation System
Aircraft Survivability – Advanced Infra-Red Countermeasure (IRCM) Testing	**JMITS** - Joint Mobile IRCM Test System **TAPS** - Towed Airborne Plume Simulator **MSALTS**- Multi-Spectral Sea and Land Target Simulator **JDIGS**-Joint Distributed IRCM Ground Test System
Testing in an Urban Environment	**JUTC** -Joint Urban Test Capability Project
Systems of systems testing of interconnected net enabled weapons systems	**InterTEC** – Interoperability Test and Evaluation Capability
Testing of revolutionary warfighter capabilities	**DETEC** – Directed Energy T&E Capability

Spectrum Efficient Technology

Drivers

Spectrum and Data Rates Trends



Challenge

- Develop a T&E capability that:

  - Uses available spectrum more efficiently by dynamically changing bandwidth during test events.

  - Reduces test and re-test time by fixing data drop-outs and enabling data selection during tests.

Programs

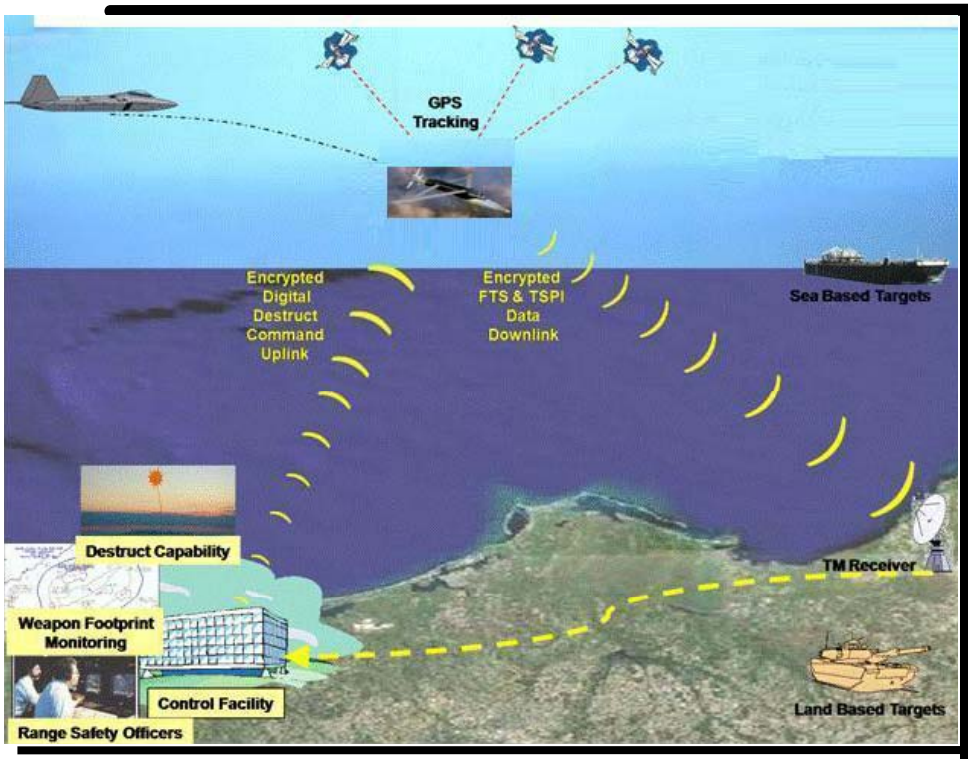
- Integrated Network Enhanced Telemetry (iNET) Block 1 Project
  - Enhances current 1-way Serial Streaming Telemetry (SST) systems with a 2-way network capability

- Develop and field equipment to effectively use WRC2007 allocated C-band spectrum

Goals

- IOC for C-Band Serial Stream Telemetry at AFFTC and NAWC-AD in FY12
- Test initial iNET Block 1 prototype capability at Edwards Air Force Base and Naval Air Station Patuxent River in FY13.

Safe Realistic Testing of Large Footprint Weapons



Challenge

- Range safety constraints limit testing of longer range (large footprint) standoff weapons without flight termination systems (FTS).
- Limited unused space inside modern weapons requires flight termination systems to be subminiature in size (10 to 16 inch^3).

Programs

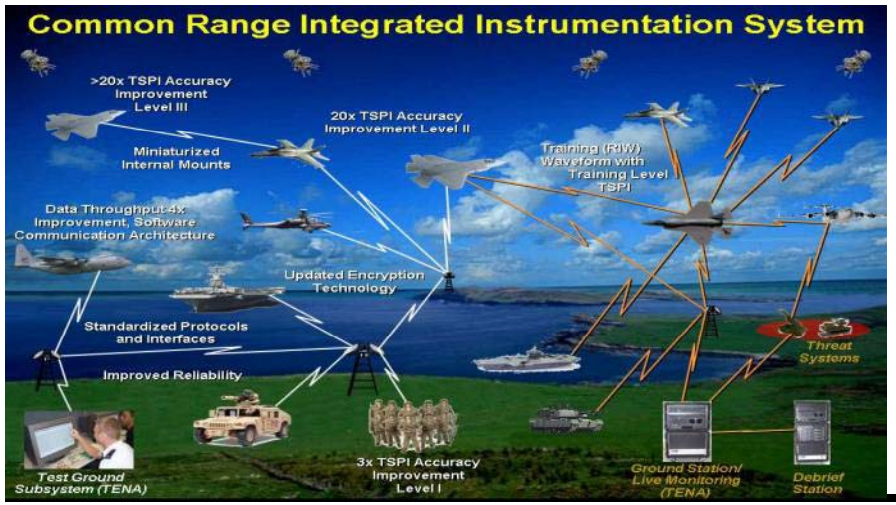
- Subminiature Flight Safety System (SFSS)
- Leverages completed CTEIP projects
  - Joint Advanced Missile Instrumentation (JAMI) provides GPS-based TSPI and real time post flight data processing.
  - Enhanced Flight Termination System (EFTS) provides new digital and encrypted flight termination link.

Goals

- Fewer operational and range safety constraints on flight test of long range weapons.
- Test/Demonstrate modularized SFSS (FTS) design on MALD in FY12.

Real Time Time Space Position Information (TSPI) for Systems Under Test

Drivers

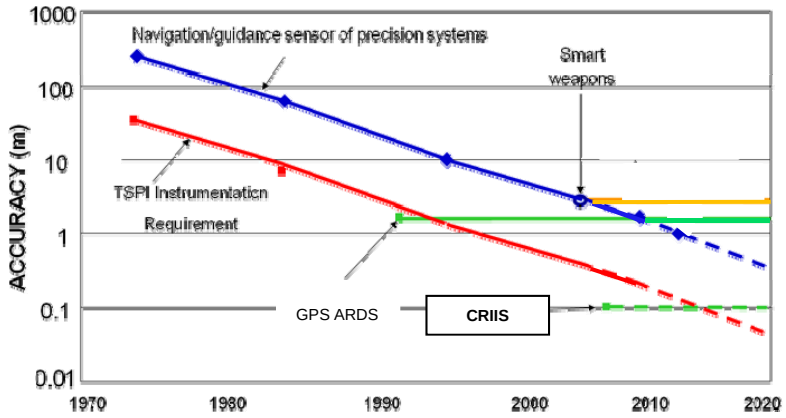


Programs

- **Common Range Integrated Instrumentation System (CRIIS) - First real-time, high-precision (sub-meter) TSPI range system**
- **Joint Advanced Missile Instrumentation (JAMI) First hybrid GPS engine able to track in 100G environment.**

Challenge

Greater TSPI accuracy to evaluate future high accuracy platforms.



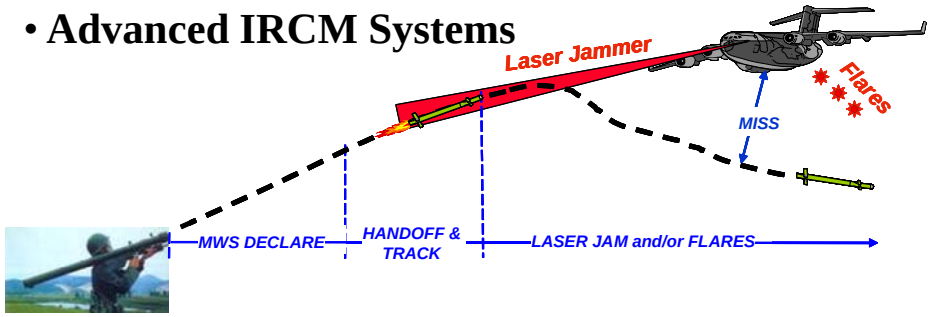
Goals

- **Sub-meter TSPI for Air/land/Sea Applications**
- **Field systems that replace current ARDS inventory starting in 2014.**

Infra-Red Countermeasure (IRCM) T&E

Drivers

- **Advanced IR Missiles**
- **Advanced IRCM Systems**



Not feasible to fire missiles at manned aircraft to test IRCM system effectiveness

Programs

- **Ground Based Missile Simulators**
  - **-JMITS** - Joint Mobile IRCM Test System
  - **-MSALTS**- Multi-Spectral Sea and Land Target Simulator
- **Airborne Missile Simulator**
  - **-TAPS** - Towed Airborne Plume Simulator
- **Installed System Environments**
  - -Joint Distributed IRCM Ground Test System (**JDIGS**)

Challenge

Present IRCM system-under-test with a realistic representation of an incoming missile

Missile Simulators

Ground Based (JMITS)

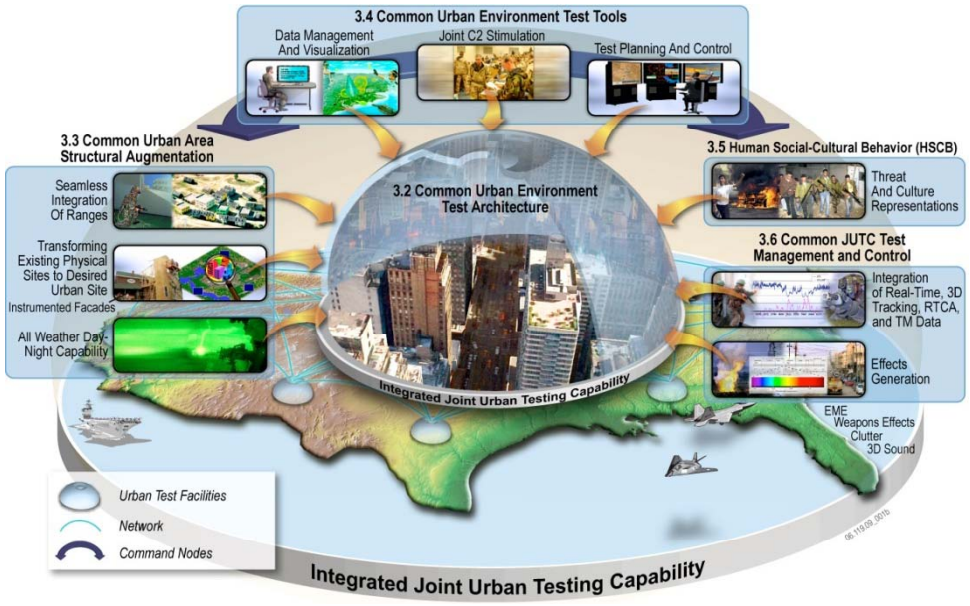
Airborne (TAPS)

Successes

- **Two JMITS Units Delivered and Operational**
  - – Included in Navy and Air Force IRCM TEMPs
  - – Initial deployments include CH-53 and CV-22
- **TAPS Flight Testing Completed Aug 2010**
  - – Ready for LAIRCM NextGen Operational Test
- **IRCM Test Resource Requirements Study Complete**
  - -DoD Investment road-map for test resource needs
- **Development of Advanced Simulation Tools**
  - – Distributed testing (ISTF, HITL, Open Air)

T&E in an Urban Environment

Drivers



Challenge

- **Develop operationally realistic, technically relevant, Brigade and below urban environment DT and OT capabilities**
- **Geographically representative physical, electro-magnetic and population effects.**
- **Measure both the effects of UE on systems under test (SUT) and SUT effects on UE domains (e.g. collateral damage) .**

Programs

- **Joint Urban Test Capability (JUTC) Project**
  - **-FY2010 New Start**
- **Planning to leverage JMETC/InterTEC /TENA network, tools, and capabilities to integrate virtual and constructive urban environment events with live urban tests.**

Successes

- **Urban Environment Test Capability (UETC Study)**
  - Army led, Joint/ Interagency analysis of UE requirements, current capabilities and possible solutions
  - Precursor to JUTC project
  - Final Report due Oct 2010
- **Next Generation TSPI Study complete**
  - Identifies technologies for use in GPS-Denied urban environment

Net-Centric Warfare Testing

Net Enabled Weapons Testing

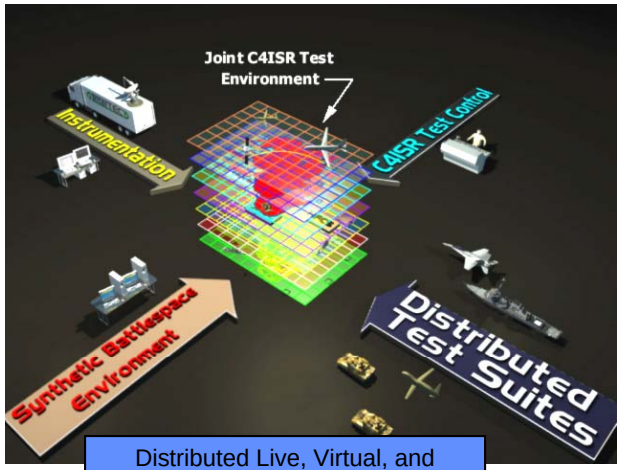
Drivers

- **Interoperability testing of systems of systems**
- **Testing of Net Enabled Weapons**
- **T&E must exploit networks ,e.g., the Global Information Grid**
- **Joint service test & training exercises are increasing in frequency and complexity**

Programs

- **Test and Training Enabling Architecture (TENA) –** Enables interoperability among Live, Virtual, and Constructive (LVC) test facilities.
- **InterTEC –** Tools to construct, control, instrument, capture data from operationally relevant distributed test
- **Joint Gulf Range Complex Upgrade -** Integrate and extend test environment for net enabled weapons at Eglin AFB.

Challenge



Distributed Live, Virtual, and Constructive Testing

Successes

- **InterTEC:** Spiral 1&2 provide s 24 test tool applications at 23 DoD sites. Spiral 3, to be fielded in FY11/12 enhances system reliability and adds the NR KPP certification process.
- **Joint Gulf Range Complex:** Demonstrated the ability to exchange all essential Link-16 messages and tested the system with live moving targets on the range.

Testing of Revolutionary Warfighter Capabilities

Drivers

Challenge

- Revolutionary new High Energy Laser (HEL) and High Power Microwave (HPM) systems and technologies are being developed to defend against a variety of threats (rockets, artillery, mortars, ballistic missiles, IEDs, UAVs, C4ISR, seekers, and electronics systems).

- The DoD T&E community needs measurement systems, tools, and threat simulators to test them.

Programs

- **Directed Energy T&E Capability (DETEC) developed 12 T&E capabilities**
- **DETEC II Roadmap for Service use in nominating new projects.**

Successes

- **HEL, 5 capabilities fielded at the High Energy Laser Test Facility (HELSTF) at WSMR, NM addressing:**
  - Airborne and Ground Target Irradiance Measurement
  - Target Reflected Energy Measurement
- **HPM, 7 capabilities fielded at both Naval Air Warfare Center Weapons Division at Pt. Mugu, CA and WSMR, NM addressing:**
  - Narrowband and Wideband Threat Simulators
  - HPM Sensor Suite
  - HPM Propagation Measurement

Questions?

CTEIP: An effective multi-Service partnership providing essential T&E capabilities