



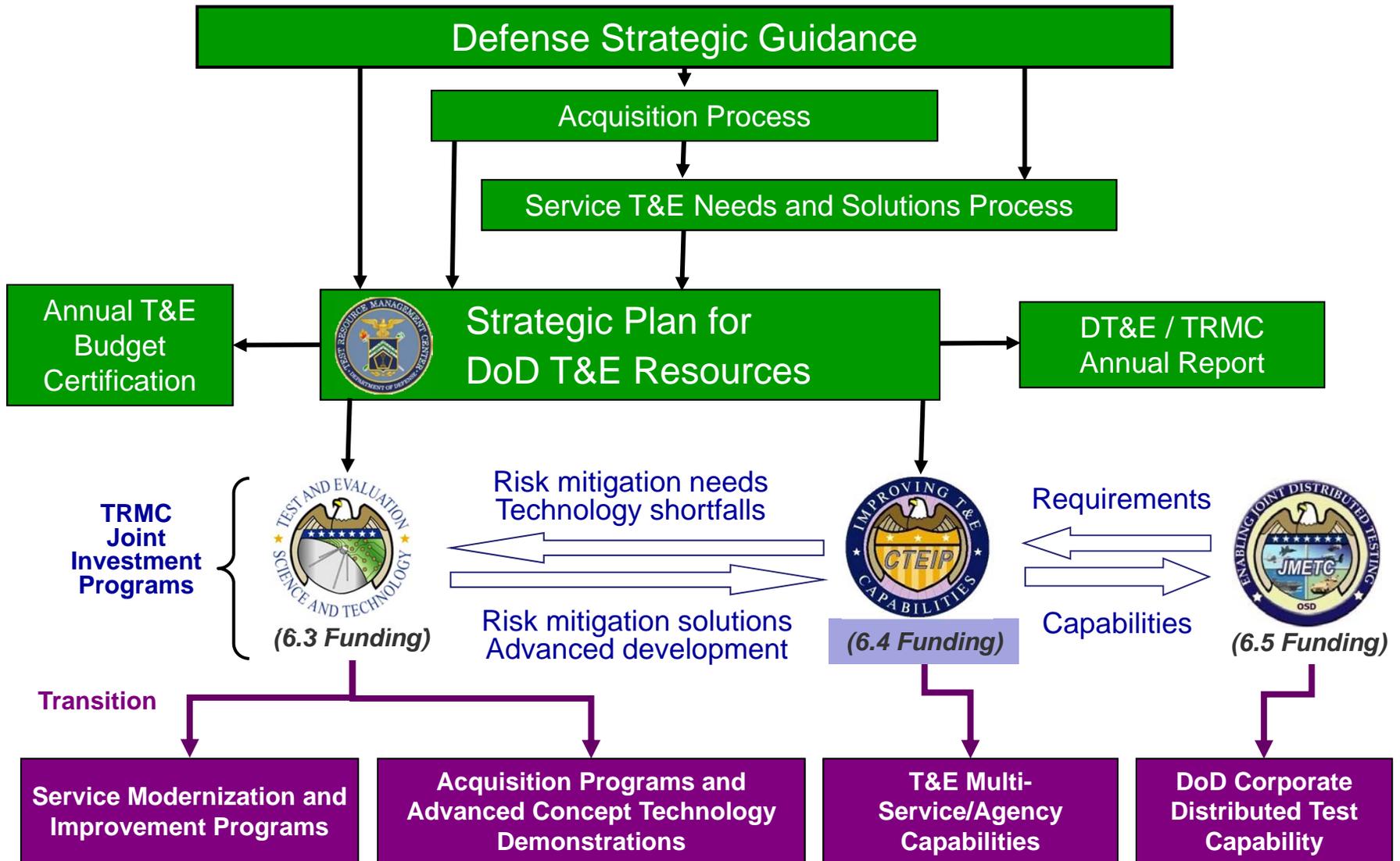
# Central Test and Evaluation Investment Program (CTEIP)

24 June 2013



# The TRMC “Blueprint”

## Putting Test Capabilities on the DoD Map





# TRMC Investment Programs Overview



## Test Technology Development

### T&E/S&T



- Established in FY2002
- Develops technologies required to test future warfighting capabilities
- BA 3 RDT&E funds
- 8 Test Technology Areas
  - Electronic Warfare
  - Cyberspace
  - High Speed/Hypersonics
  - Autonomous Systems
  - Net-Centric Systems
  - Directed Energy
  - Advanced Instrumentation
  - Spectrum Efficiencies

## Test Capability Development

### CITEP



- Established in FY1991
- Develops or improves test capabilities that have multi-Service utility
- BA 4 RDT&E funds
- 43 current projects
  - 19 projects developing core Joint capabilities
    - 3 projects improving interoperability test cap.
  - 13 projects improving threat representations used in testing
  - 11 projects addressing near-term OT shortfalls

## Distributed Test Integration

### JMETC



- Established in FY2007
- Provides infrastructure for distributed Joint and Cyberspace testing
- BA 5 RDT&E funds
- 73 current sites
  - Expanding to 84 sites
- Maintains
  - Network connections
  - Security agreements
  - Integration software
  - Interface definitions
  - Distributed test tools
  - Reuse repository



# 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

**43 Active Projects**

## T&E Master Plan (TEMP) References

### MILSATCOM Atmospheric Scintillation Simulator

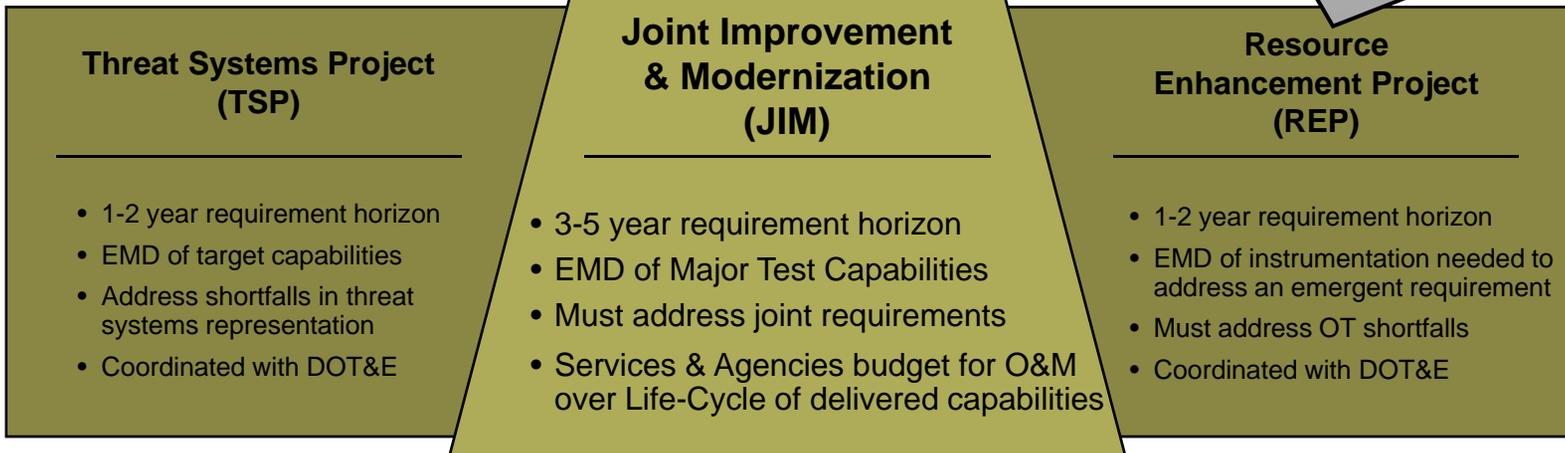
- AEHF survivability and effectiveness testing in realistic atmospheric environments

### Ground Mounted Seeker Simulation

- Advanced open-air SAM simulator to support IDECM Block IV effectiveness testing

### Precision Target Signature - Performance Mover (PTS-PM)

- Radar reflective/mobile tgts to support Gray Eagle UAS testing



**11 TSP, 19 JIM, 13 REP = 43 Projects**



# CTEIP JIM Criteria

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- **Support multi-Service/Agency T&E need**
  - **Promote interoperability and standardization across DoD**
- **Developmental (not procurement)**
- **Not duplicate existing capability**
- **Technology Readiness Level 6 or better**
- **Executable risk (technical, cost, and schedule)**
- **Service/Agency life-cycle ownership agreements**



# Nomination Process: Role of the T&E Executive Agent



*Reliance Panels propose CTEIP candidates based on validated Reliance Area needs & solutions*



*TSMEs review CTEIP candidates for adequacy with prioritization recommendation to TRAG*



*BoD (ES) endorses CTEIP proposals with priority to TRMC*



*FY16 POM/BES Submit*

|      |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |
|------|---|---|---|---|---|---|---|---|---|---|---|------|---|---|---|---|---|---|---|---|---|---|---|
| 2013 |   |   |   |   |   |   |   |   |   |   |   | 2014 |   |   |   |   |   |   |   |   |   |   |   |
| J    | F | M | A | M | J | J | A | S | O | N | D | J    | F | M | A | M | J | J | A | S | O | N | D |



# Governance: OSD Test Investment Coordinating Committee (OTICC)

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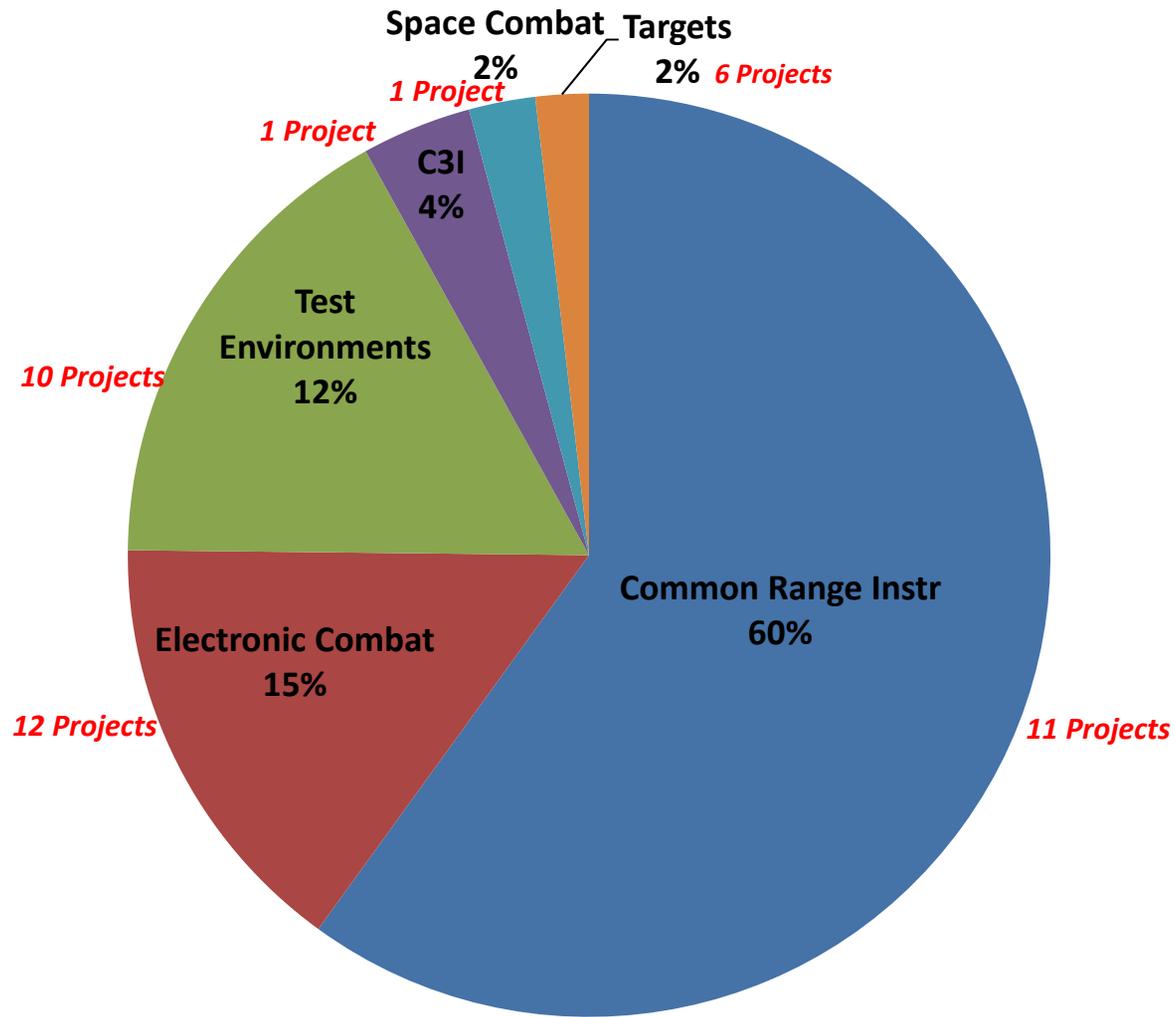
- **Purpose:** Advisor to Director TRMC
- **Chair:** Prin. Dep. Dir. TRMC
- **Exec. Secretary:** PM CTEIP
- **Membership:** DASD DTE, ASD (R&E), Army, Navy, AF, MCOTEA, MDA, DISA, DTRA, DOT&E, PM CTEIP, PM T&E/S&T, TETRA,
- **Responsibilities:**
  - Oversight of CTEIP (including the Resource Enhancement Project) and T&E/S&T
  - Interface with T&E Executive Agent on issues related to needs and material solutions
  - Review projects entering CTEIP Phase II (Milestone)
  - Applicable members approve/coordinate individual project documents



# Project Information



# FY12-13 Funding By Test Resource Area





# Key Development Areas

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- **Safe, Realistic Testing of Large Footprint Weapons**
- **Accurate Time-Space-Position Information (TSPI)**
- **Infrared Countermeasures (IRCM) End-to-End Test Capabilities**
- **Spectrum Efficient Technology**
- **T&E for Unmanned Aerial Systems**
- **Electronic Warfare Test Capabilities**



# Safe Realistic Testing of Large Footprint Weapons



## Challenge

- Longer range (large footprint) of new missiles necessitates the use of flight termination systems for flight safety
- Limited unused space inside modern missiles requires flight termination systems to be subminiature in size (~18 inch<sup>3</sup> vs. ~96 inch<sup>3</sup>)

## Program Example

- 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

- More realistic operational test of long range weapons- eliminate range safety constraints
- Reconfigurable, modular, low power design suitable for high dynamic environments
- Demonstrate on multiple ranges in FY16

## Development Status- Successes

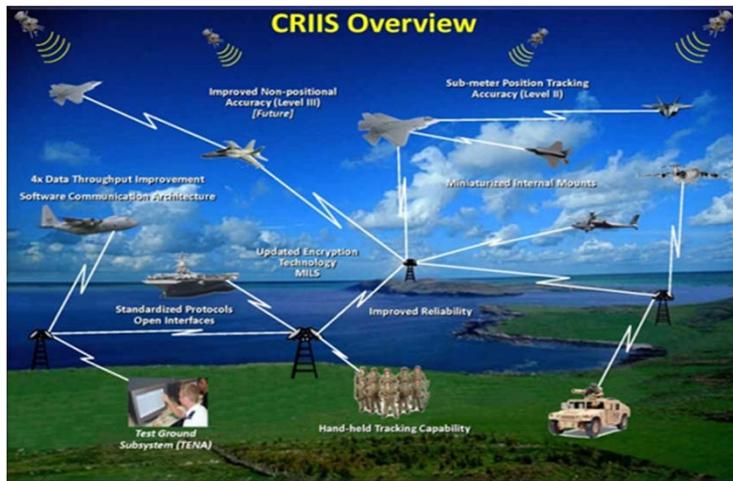
- Currently completing Development Verification Testing (DVT) with Critical Design Review (CDR) in August 2013
- Plan to award JASSM integration contract in December 2013. (JASSM is demonstrator and first customer.)



# Accurate Time Space Position Information (TSPI)



## Drivers

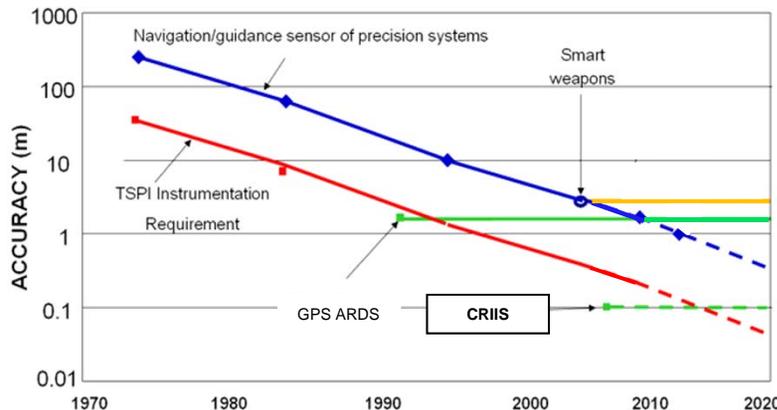


## Program Example



- **Common Range Integrated Instrumentation System (CRIIS) - First real-time, high-precision (sub-meter) TSPI range system**
  - Adds 2 new internal mount configurations for F-22, F-15, F-18, and F-35
  - New high throughput ground station for Army, Navy & AF ranges

## Challenge



Provide precise “Ground Truth” TSPI for high accuracy future Systems Under Test (SUT)

## Goal

- **Replace ARDS starting in 2015:**
  - Fielded for 25 years on 10 MRTFB ranges, training venues, foreign military end-users
  - Variants: P5 Combat Training System, others

## Development Status- Successes

- **Successful CDR in 2012**
  - Options for Inc. 1 & 3 not executed due to absence of need with Service concurrence
- **Test Readiness Review in July 2013**
- **Production decision planned for 2014**

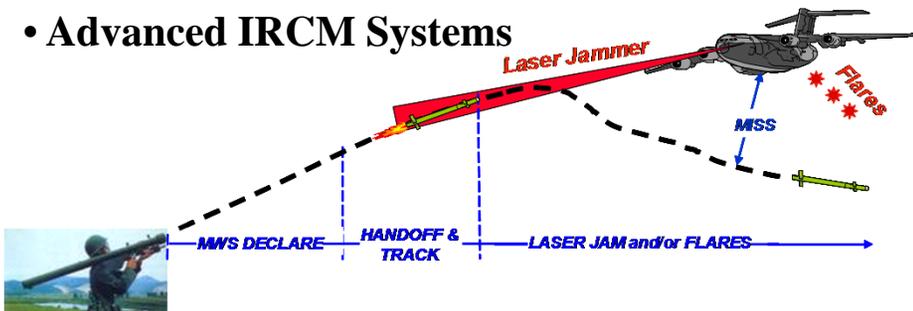


# Infra-Red Countermeasure (IRCM) Test Capability Portfolio



## Drivers

- Advanced IR Missiles
- Advanced IRCM Systems



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

## Challenge

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



Ground Based (JMITS)

## Missile Simulators



Airborne (TAPS)

## Program Examples

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

## Development Status Successes

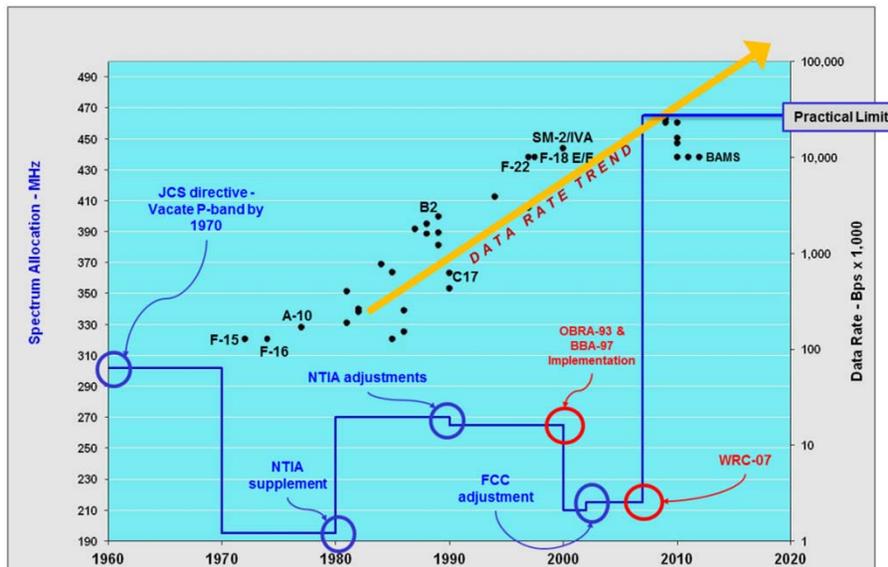
- Missile Signal Processors in the Loop (SPIL)
- MSALTS
  - In assembly and test with IOC in late 2013
  - DOT&E buying a third set
- TAPS
  - Successfully used in LAIRCM NexGen Operational Testing
- JDIGS
  - Block A (MWS/Flares) to complete in FY14
  - Block B (DIRCM T&E) to start in FY15
- IRCM Test Resource Requirements Study Update
  - Addressed urgent HFI testing needs



# Spectrum Efficient Technology



## Test Capability Driver Spectrum and Data Rates Trends



## Challenge

- Develop a Range Telemetry capability that:
  - Provides more efficient/effective ways to use available spectrum
  - Reduces test and re-test time by fixing data drop-outs
  - Enables selective data acquisition during tests
  - Expand use to 4-5 GHz C-Band

## Program Example

- Integrated Network Enhanced Telemetry (iNET) Block 1 Project
  - Enhances current 1-way Serial Streaming Telemetry (SST) systems with a 2-way network capability
  - Leverages Service and TRMC initiatives to develop C-band spectrum for downlink
  - Leverages T&E/S&T projects addressing:
    - 1) network handoffs, 2) multi-path mitigation, and 3) forward error correction

## Goal

- Install and test iNET prototype Block 1 capability at two ranges by FY2015.

## Development Status- Successes

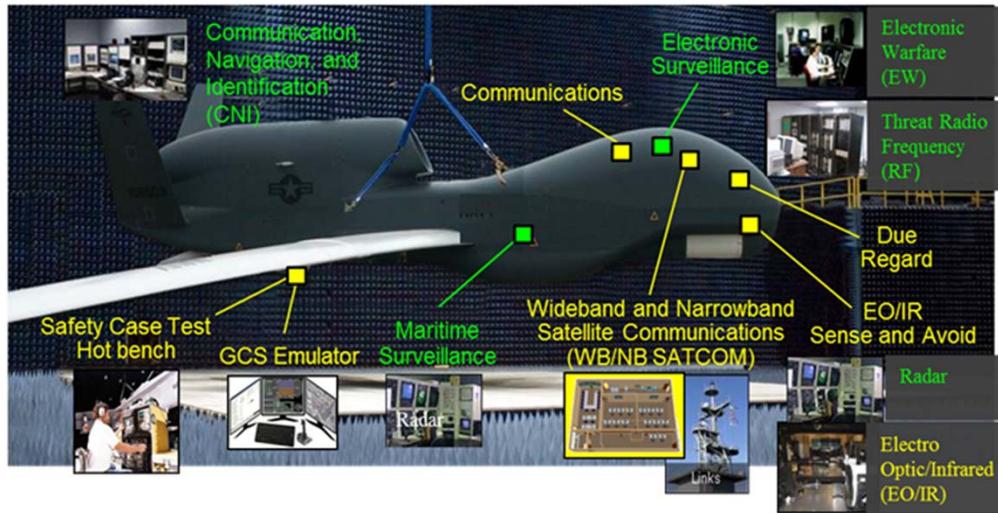
- iNET Spiral 1 CDR complete in February 2013.
- Integration testing at Southwest Research Institute (SwRI) System Integration Laboratory to start in July 2013.
- Initial flight test planned for early 2014.



# T&E for Unmanned Aerial Systems



## Drivers



## Program Example

- **Joint Unmanned Aerial System Mission Environment (JUAS-ME) Project**
  - **Airspace Integration** – test UAS safety cases, collision avoidance and sense and avoid payloads
  - **Manned-Unmanned Integration** – test UAS control and handoff procedures
  - **Networking and Interoperability** – STANAG compliance, data links and beyond line of sight communications

## Challenge

- **Develop a set of interoperable Army, Navy, and Air Force ground test simulators that support:**
  - **Program of Record test schedules & requirements:** e.g. Gray Eagle, Shadow, Triton, & Reaper
  - **Simulated National Airspace (NAS) testing** to support safety cases and lost link maneuver protocols
  - **OSD Unmanned Systems Integrated Roadmap FY2011-2036**

## Goal

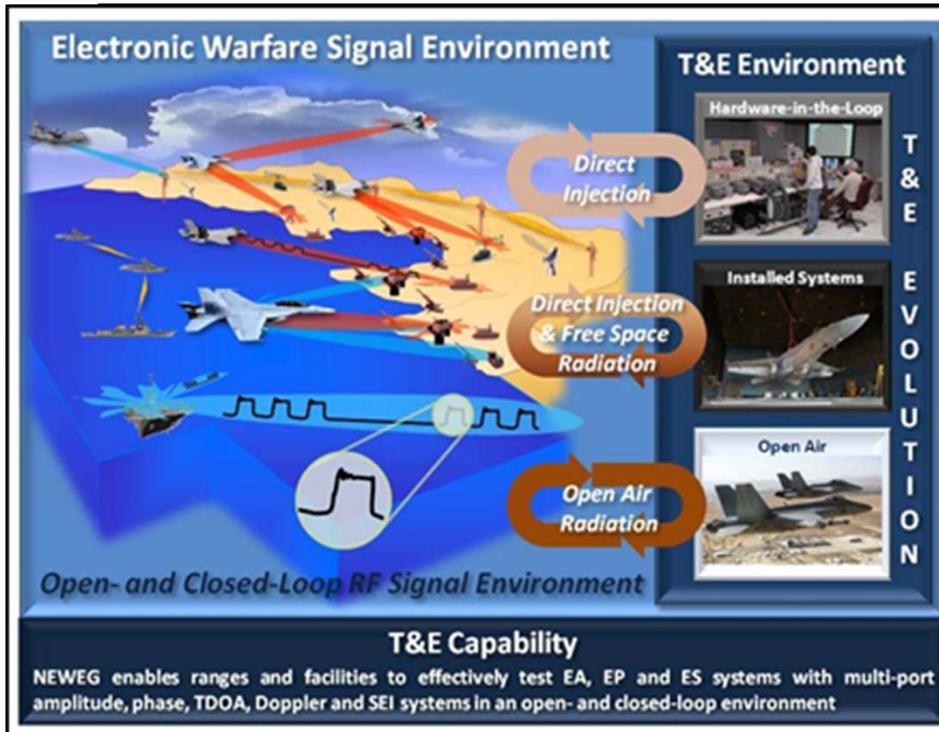
- **Field initial Block 1 capability at Patuxent River in late FY13.**
- **Full fielding through Block 3 at Redstone Arsenal and Wright Patterson AFB by FY16.**

## Development Status- Successes

- **Successful prototype testing of Block 1 in April 2013**
- **Critical Design Review complete in April 2013**
- **On-schedule to field Block 1 in late FY13**



# Electronic Warfare



## Challenge

Increasing sophistication and capabilities of threat radars and the increasing detection and processing capabilities of EW systems driving the need for higher fidelity simulator and open air testing capabilities. **Rebalance - Strategic Pivot Focus on West Pac Threats.**

## Program Example

- **Next-Generation EW Environment Generator (NEWEG) – Provides the products to:**
  - Multiple jammer characterization system for dynamic stimulation and measurement of multiple EW and radar signals (Block A)
  - A high fidelity, modular, scalable, reconfigurable EW environment generator for EW systems testing (Block B)

## Development Status-Successes

- **NEWEG Block A is on accelerated development schedule**
  - CDR completed September 2012
  - Integration events in February & May 2013
  - Facility installation & testing 1<sup>st</sup> Qtr FY2014
  - Operational 2d Qtr FY2014
- **NEWEG Block B**
  - Entered Phase I Oct 2012
  - IOC FY2016
  - Provides scenario control and signal generation interfaces for open-air system development



# Resource Enhancement Project



# Purpose of REP

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- **“REP funds critical, near-term (usually two years or less) operational test (OT) shortfalls whose non-availability for scheduled OTs could introduce high risk in the development and evaluation of new weapon systems and system upgrades.”**
- **“REP provides a rapid response to unforeseen OT&E issues, such as emergent test requirements, new threat developments, new technologies, and operational test changes mandated by the Congress...”**
- **Candidate projects are nominated by the Service OTAs, validated by the REP WG, prioritized by the DOT&E, and approved by the TRMC for funding and execution.**



# Governance: REP Working Group (REP WG)

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- **Purpose:** Advisor to DOT&E and TRMC for REP project execution
- **Chair:** CTEIP Deputy PM, DOT&E AO (O-6)
- **Membership:** ATEC, COMOPTEVFOR, AFOTEC, MCOTEA, JITC, DOT&E, CTEIP Deputy PM
- **Responsibilities:**
  - **Validate OT requirements and ensure project proposals meet REP criteria**
  - **Oversight of respective Service OTA projects**
  - **Coordinate with Services and other OTAs to ensure capabilities developed are maintained**
  - **Foster standards-based commonality and interoperability among T&E investments**
  - **Applicable members approve/coordinate individual project documents**



# REP Criteria

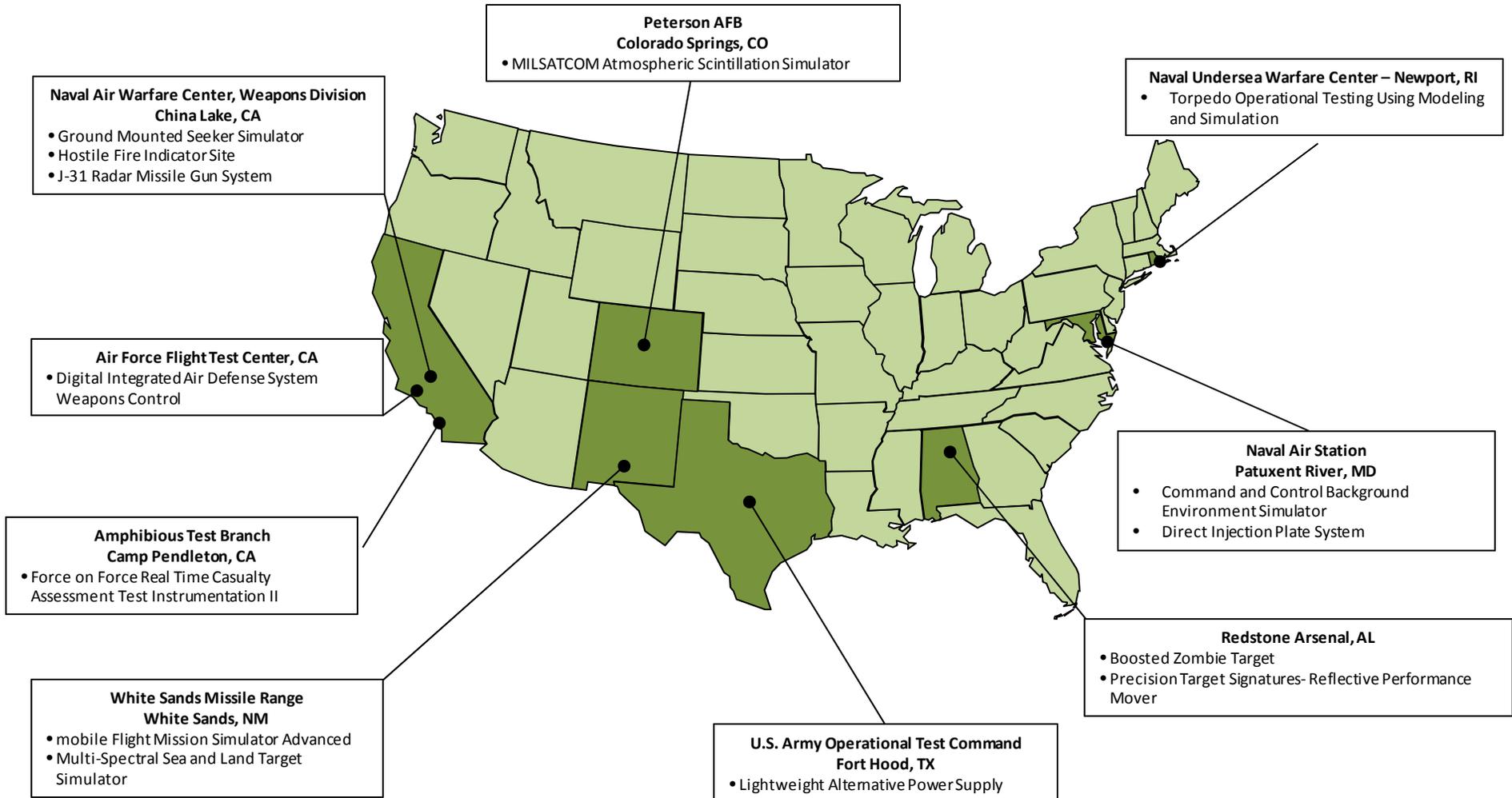
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- **Project proposal must resolve a documented, near-term OT shortfall**
- **OT capability must developed, delivered, fielded, and accredited within 3 years**
- **No unnecessary duplication of effort**
- **Project proposal must be executable (cost, schedule, performance, risk)**



# FY2013 CTEIP REP Project Fielding Locations





# 2014 REP Project Selection Process



| Activity                                     | Date          |
|--|---------------|
| REP Data Call                                | July 2012     |
| Proposal White Paper Submission              | October 2012  |
| Proposal Brief Submission                    | December 2012 |
| Candidate Proposal Briefs to REP WG          | December 2012 |
| Candidate Proposal Briefs to Action Officers | February 2013 |
| REP WG Prioritization                        | March 2013    |
| DOT&E Decision Memorandum                    | May 2013      |
| TRMC Program Funding Memorandum              | June 2013     |



# Threat Systems Project



# Purpose of TSP

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- **TSP funds short-term, low cost technologies and innovations to improve threat representations for T&E**
- **Candidate projects are nominated by the Services, validated by the TSWG, prioritized by DOT&E/TETRA, and approved by TRMC for funding and execution.**
- **Projects usually under \$2M and no more than 2-3 years in development**



# Governance: Threat Systems Working Group (TSWG)

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- **Purpose:** Advisor to DOT&E and TRMC for TSP project execution
- **Chair:** CTEIP Deputy PM, DOT&E (TETRA)
- **Membership:** Army, Navy, Air Force, USMC, JITC, DOT&E (TETRA), CTEIP Deputy PM
- **Responsibilities:**
  - Validate T&E threat representation requirements
  - Oversight of respective Service projects
  - Foster standards-based commonality and interoperability among T&E investments
  - Applicable members approve/coordinate individual project documents
  - Coordinate with other Services to ensure capabilities developed are maintained



# 2014 TSP Project Selection Process



| Activity  | Date        |
|---|-------------|
| Threat Simulators Data Call                                       | October 12  |
| Threat Simulators Proposal Submission                             | December 12 |
| Threat Simulators Proposal Briefs to Threat Systems Working Group | January 13  |
| TRMC CTEIP Criteria Determination (Threat Systems Projects)       | February 13 |
| DOT&E TETRA Threat Systems Candidate Project Prioritization       | March 13    |
| DOT&E TETRA TSP Funding Recommendation Memo to CTEIP              | May 13      |
| CTEIP TSP Funding Approval Memorandum to DOT&E TETRA              | May 13      |



# Additional Information



# CTEIP Recent Successes

## JIM Projects



| Project/Subproject Name  | Description   | CTEIP Project Type |
|--|---|--------------------|
| Gulf Range Mobile Instrumentation Capability (GR-MIC)  | GR-MIC developed a transportable instrumentation capability that provides a platform for remote test, command and control, collection, storage and relay of various data types. GR-MIC extended the Eglin Test and Training Range's Link 16 and telemetry coverage well into the Gulf of Mexico to enhance testing of net-enabled weapons.  | JIM                |
| Joint Gulf Range Complex Upgrade (JGRCU)   | JGRCU expanded the simulation capability at the Eglin AFB Guided Weapons Evaluation Facility (GWEF) to support network-enabled weapons system of system testing such as aircraft weapons and targeting systems, in a live-virtual-constructive (LVC) test environment at the Gulf Range. JGRCU leverages the Design & Rapid Evolution of Airborne Munitions Systems (DREAMS) weapon simulation system and a low cost F-15E simulator at the GWEF. | JIM                |
| Joint Installed Test Facility Pre-Planned Product Improvement – Advanced Radar Environment Simulator (JISTF P3I ARES). | The JISTF P3I project provided the Navy JISTF, Air Combat Environment Test and Evaluation Facility (ACETEF), Patuxent River, MD and the Air Force JISTF, Benfield Anechoic Facility (BAF), Edwards AFB, CA a generic radar stimulator integrated with other mission models in these facilities that is capable of presenting dynamic, multiple angle-of-arrival target returns to a System Under Test (SUT).                                      | JIM                |



# CTEIP Recent Successes

## JIM Projects



| Project/Subproject Name   | Description  | CTEIP Project Type |
|---|--|--------------------|
| Pacific Region Interoperability Test and Evaluation Capability (PRITEC) | PRITEC enhanced the Pacific Missile Range Facility, Kauai, HI infrastructure by inserting DoD Test and Training Enabling Architecture (TENA) technology at the sensor level.   | JIM                |
| Tri-Service Signals Library Study (TSSLS)                               | TSSLS was conducted as a precursor to the proposed FY2013 Synthetic Battlefield Emitter System (SBES) project. TSSLS analyzed Electronic Attack and Electronic Support requirements, particularly the test capabilities necessary to produce or replicate communications signals.  | JIM                |
| Space Threat Assessment Testbed (STAT)                                  | STAT reached Initial Operational Capability in FY 2012. STAT provides Arnold Engineering Development Complex (AEDC), Arnold AFB, TN with a ground test satellite component simulation capability that replicates the space environment supporting early design and performance assessments.  | JIM                |
| Common Range Integrated Instrumentation System (CRIIS)                  | CRIIS provides the Major Range and Test Facility Base (MRTFB) with the capability to collect highly accurate time, space, position information (TSPI) and selected aircraft data bus information needed for advanced weapon systems testing. During FY 2012 the CRIIS project successfully completed its Critical Design Review and started component development and testing. | JIM                |



# CTEIP Recent Successes REP and TSP Projects



| Project/Subproject Name                           | Description  | CTEIP Project Type |
|---|--|--------------------|
| Digital Remote Vector Equipment (DRIVE)           | Provided the capability to remotely navigate the Navy Self Defense Test Ship (SDTS). This capability enables testers to simulate realistic engagements and to conduct live-fire test and evaluation of shipboard self-defense systems sensors and weapon systems against real-world threats. | REP                |
| Tactical End-to-End Closed Loop Simulator (TECLS) | Provides test ranges with the capability to evaluate the effectiveness of the Joint Allied Threat Awareness System (JATAS) against Man-Portable Air Defense Systems (MANPADS).   | REP                |
| Improved Advanced Threat Simulator (IATS)         | Provided the Department an analysis of improved threat surface-to-air missiles and recommendations for developing closed-loop threat simulators for use on open-air test ranges.   | TSP                |



# CTEIP Challenges



- **Drive toward balanced budget plan (Must consider possible FY14+ Sequestration Reductions)**
- **Strengthen focus on capturing and implementing best practices that promote better risk management (cost, schedule, performance) in CTEIP projects**
- **Continue constructive dialog with T&E Execs on fashioning an improved Reliance process that is more responsive to leadership priorities**
- **Maintain momentum toward active OTICC involvement in CTEIP execution**
- **Establish high confidence execution baseline(s) for high priority EW Test Infrastructure development projects(s)**