



# The DoD T&E/S&T Program

**George Rumford**  
Program Manager

**Test Resource Management Center  
Test & Evaluation / Science & Technology Program  
(TRMC, T&E/S&T)**

**NDIA 12<sup>TH</sup> Annual Science & Engineering Technology Conference**



# Test Resource Management Center (TRMC)



- **DoD Field Activity**
- **Direct Report to USD(AT&L)**

☆☆☆ SES Director

## **Oversee Test Infrastructure**

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

## **Develop T&E Strategic Plan**

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

## **Administer Corporate T&E Investment Programs**

Centrally-Funded T&E  
Investment Programs  
(T&E/S&T, CTEIP, JMETC)

## **Certify T&E Budgets**

Annual Certification of  
Military Departments &  
Defense Agencies T&E  
Budgets



# The STEWARD of the DoD Test Infrastructure



## Major Range and Test Facility Base (MRTFB): The "Critical Core"

24 Sites: Army-9; Navy-6; Air Force-7; Defense Agency-2

30,000 personnel  
Military, Gov, Contractor

18,000 sq. mi. of land  
180,000 sq. mi. of air space  
( > 1/2 of all DoD land)

Replacement Value = \$25B

*DoD Directive 3200.11*



Cold Region Test Center, AK

Keyport

China Lake

30<sup>th</sup> Space Wing

Point Mugu

Air Force Flight Test Center

Yuma

Tropic Region Test Center, HI & Puerto Rico

PMRF

U.S Army Kwajalein Atoll

Nevada Test and Training Range

Utah Test and Training Range

West Desert Test Center

Electronic Proving Ground

High Energy Laser Systems Test Facility

DISA, JITC

White Sands Test Center

46<sup>th</sup> Test Wing (Includes 46<sup>th</sup> Test Group)

DISA, NCR

Aberdeen Test Center

Naval Air Warfare Center-Aircraft Division

Arnold Engineering Development Center

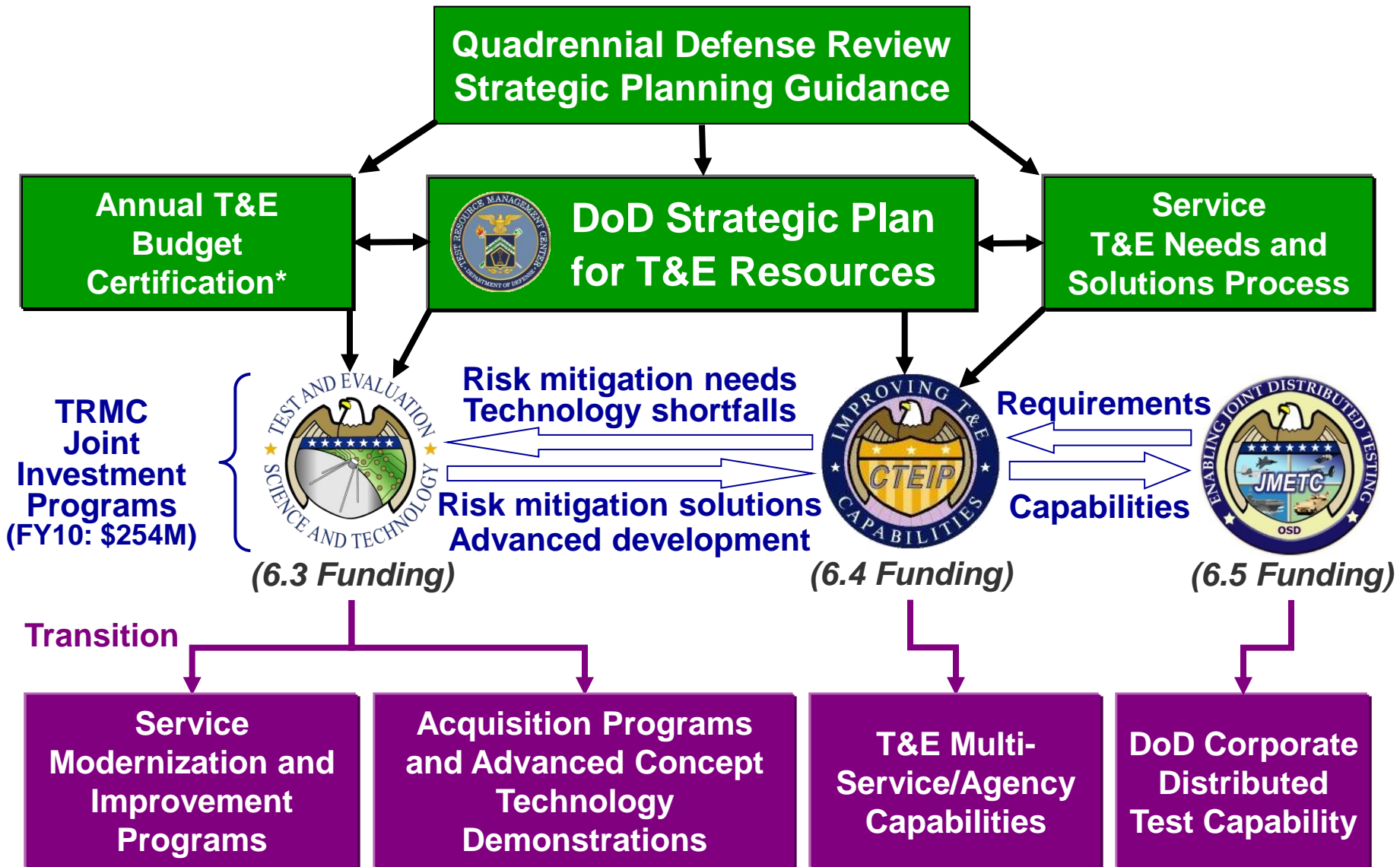
45<sup>th</sup> Space Wing

Atlantic Undersea Test and Evaluation Center

**Legend:**  
Army, Navy, AF, Defense Agency



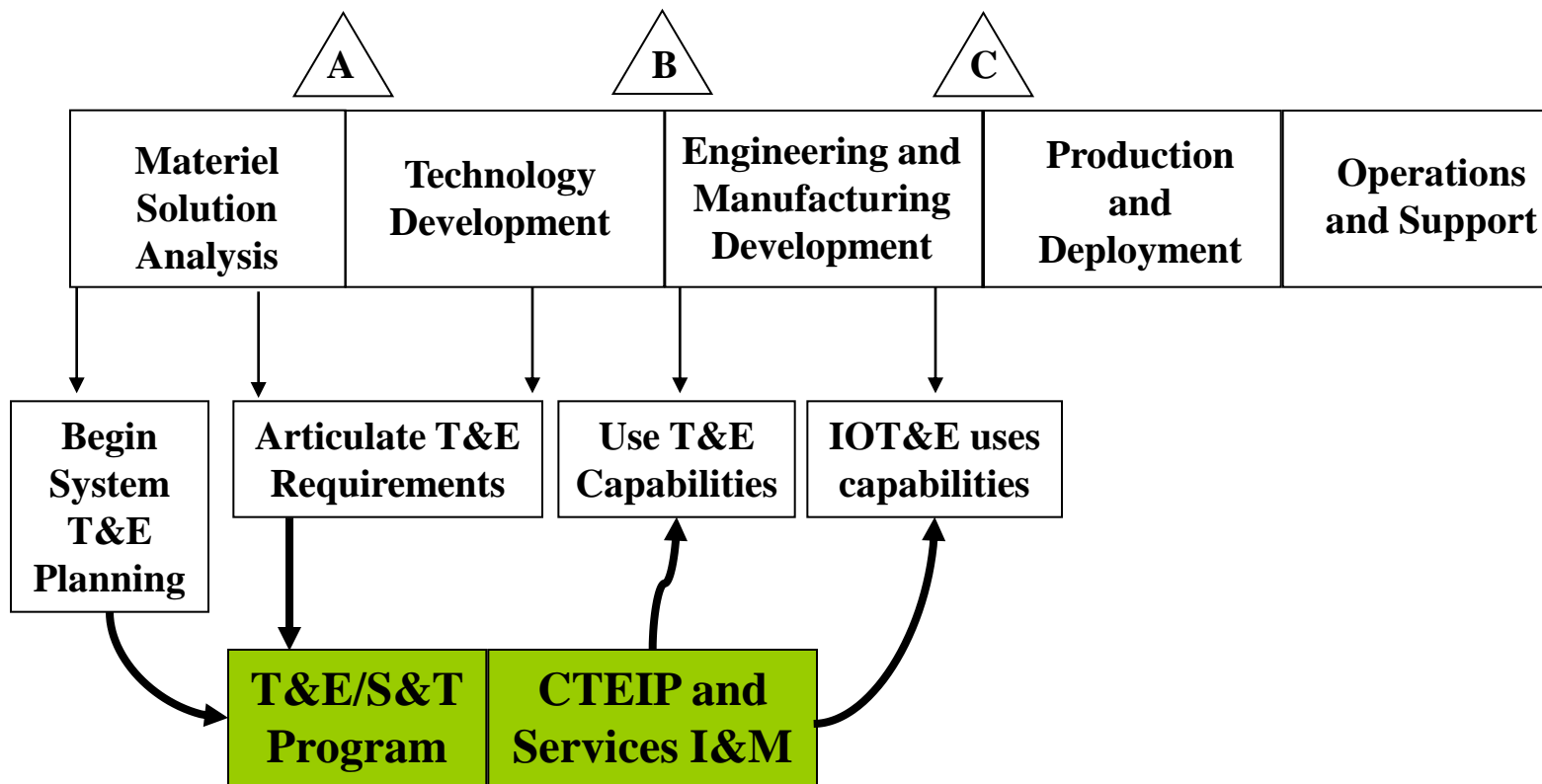
# Synergy through Aligned Investment





# T&E Capability Development Cycle

**Challenge: T&E Capabilities are available in time to provide useful insight to decision-makers and warfighters**



**Cycle for Test Capability Development Must Begin Early**



# T&E/S&T Program Overview



**Mission: Develop Technologies Required to Test Future Warfighting Capabilities**

- Established in FY02
  - Joint DDR&E / DOT&E Initiative
  - Transitioned to TRMC in FY05
- RDT&E Budget Activity 3 funds
- Purpose
  - High Risk / High Payoff R&D for Testing
  - Foster technology transition to major DoD test ranges
  - Risk reduction for test capabilities developments

**92 Active Projects**

- Annual Broad Agency Announcements (BAAs)
  - Academia
  - Industry
  - Government Laboratories
- Tri-Service working groups
  - Validate requirements
  - Evaluate proposals
  - Facilitate technology transition
- Central Oversight – Distributed Execution

As of 15 April 2011

## Seven Test Technology Areas

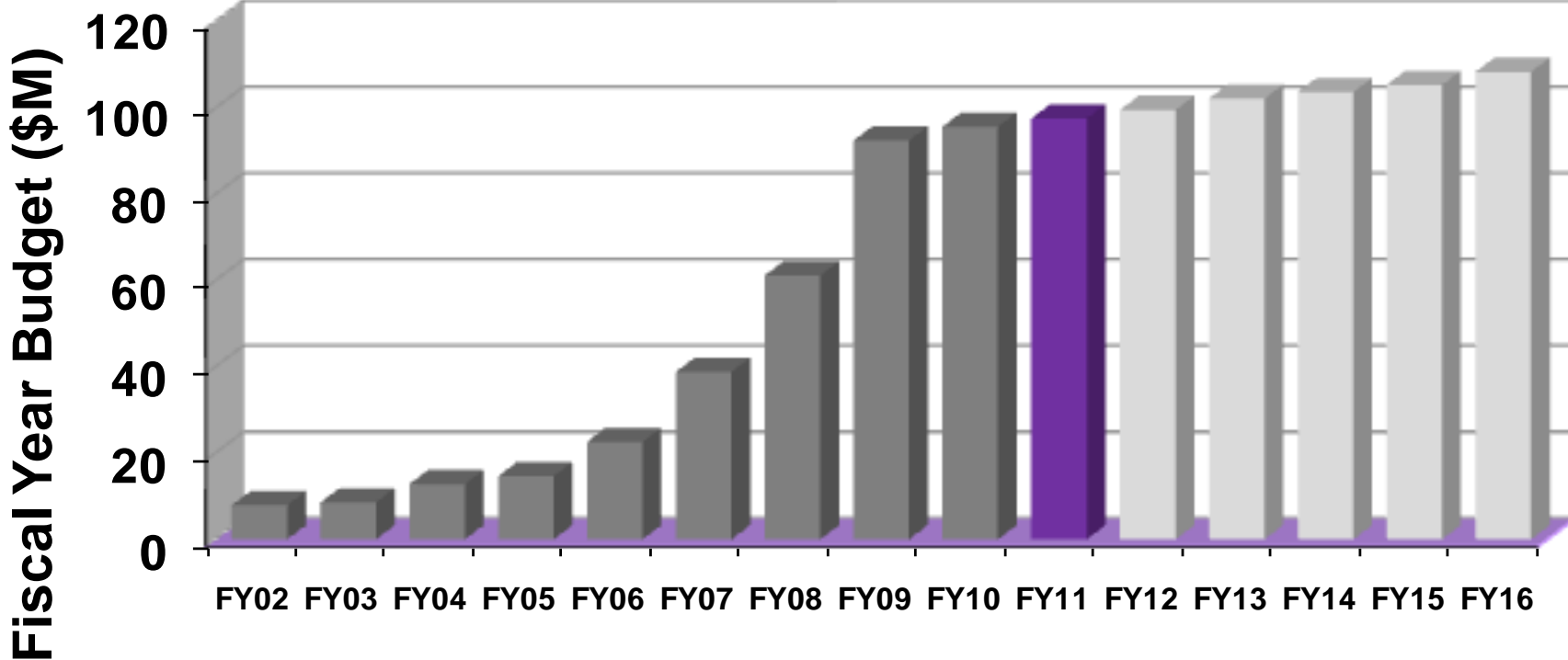


FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016
\$95.7M	\$97.6M	\$99.6M	\$102.2M	\$103.7M	\$105.4M	\$108.4M

**Shaping Technology into Tomorrow's T&E Capabilities**

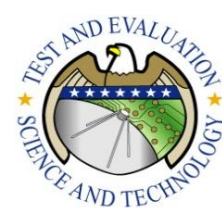


# T&E/S&T Program Annual Budget Historical (FY02) to Future Projection (FY16)





# Top DoD S&T Priorities



- SECDEF memo dated 19 April 2011
- Seven priority DoD S&T investment areas
  - 1) Data to Decisions
  - 2) Engineered Resilient Systems
  - 3) Cyber Science and Technology
  - 4) Electronic Warfare / Electronic Protection
  - 5) Counter Weapons of Mass Destruction
  - 6) Autonomy
  - 7) Human Systems

**What will we need to TEST these technologies?**





# T&E/S&T Program Overview



**Mission: Develop Technologies Required to Test Future Warfighting Capabilities**

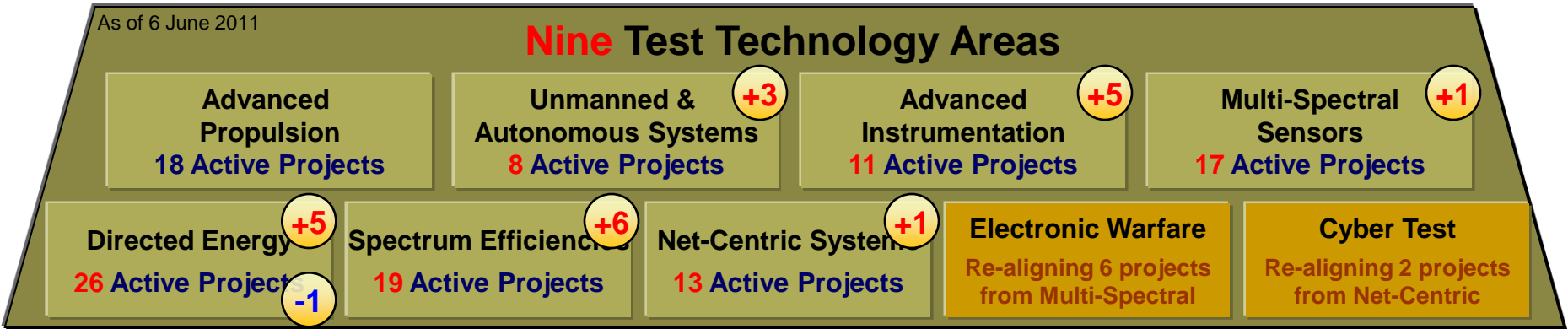
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**112 Active Projects**

- Annual Broad Agency Announcements (BAAs)
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As of 6 June 2011

## Nine Test Technology Areas



FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016
\$95.7M	\$97.6M	\$99.6M	\$102.2M	\$103.7M	\$105.4M	\$108.4M

**Shaping Technology into Tomorrow's T&E Capabilities**



# T&E/S&T Program

## Test Technology Areas



### Test Technologies for:

- **Enhanced Test Capabilities**
  - Advanced Instrumentation Systems
  - Spectrum Efficient Technology
- **Emerging Warfighting Capabilities**
  - Directed Energy Weapons
  - Hypersonic Vehicles
  - Multi-Spectral/Hyperspectral Sensors
  - Net-Centric Warfare Systems
  - Unmanned and Autonomous Systems
  - **Electronic Warfare Systems**
  - **Cyber Operations**

**112 Active  
Projects**

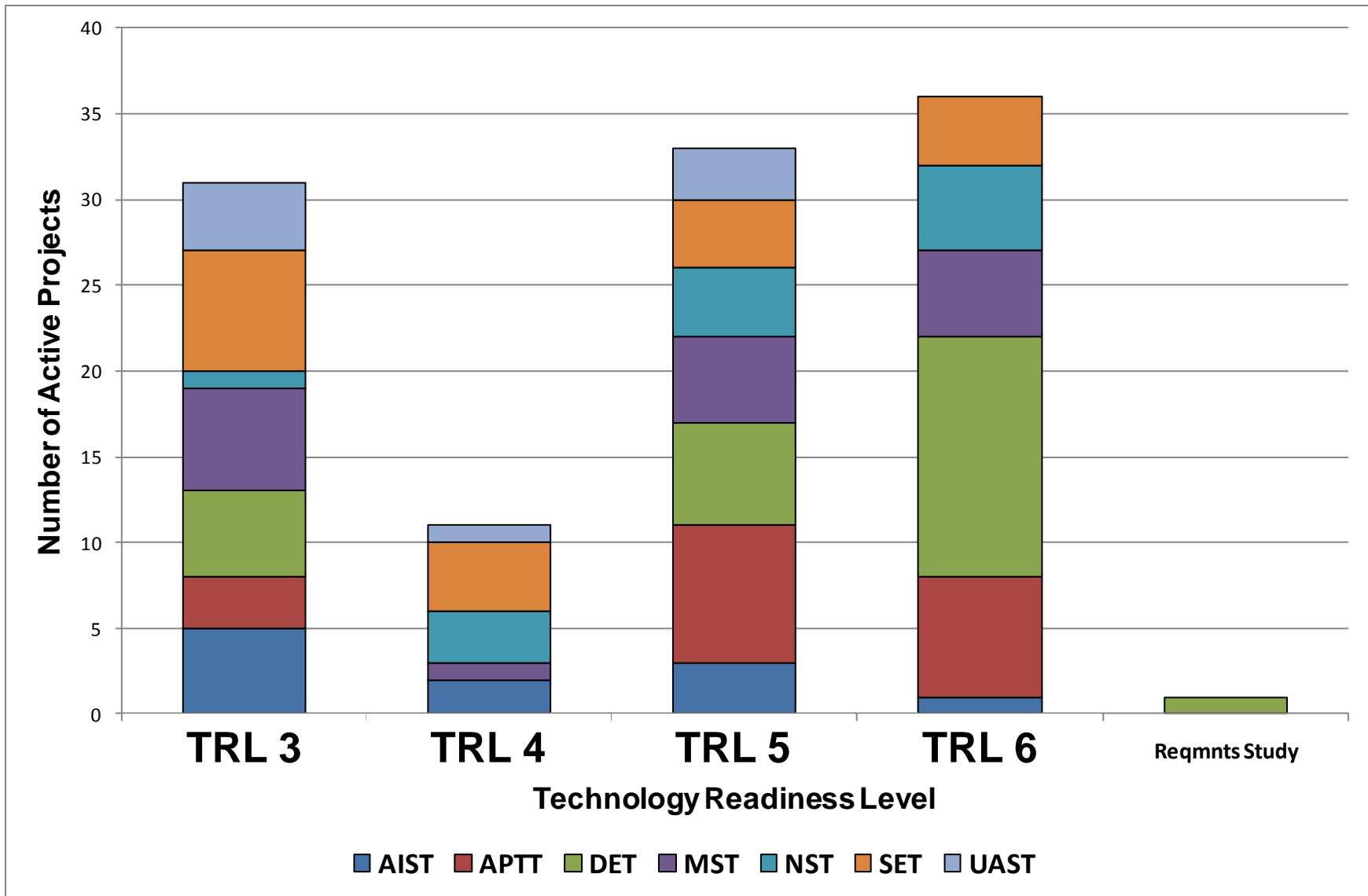
***New Test Technology Areas***

***Each Test Technology Area has a Tri-Service Working Group with T&E and S&T participants***



# Technology Maturity by TTA

(Current T&E/S&T Portfolio of 112 Active Projects)





# T&E/S&T Executing Agents

- TRMC HQ
- Army
- Navy
- Air Force

AIST: Naval Undersea Warfare Center  
Newport, RI

MST: Aberdeen Test Center  
Aberdeen Proving Ground, MD

NST & CTT: Naval Air  
Warfare Center  
Pt. Mugu, CA

APTT: Arnold Engineering  
Development Center  
Tullahoma, TN

PM: TRMC HQ  
Arlington, VA

SET: Edwards AFB  
Lancaster, CA

DET & EWT:  
PEO for  
Simulation,  
Training and  
Instrumentation  
Orlando, FL

UAST: Space and Naval  
Warfare Systems Command  
San Diego, CA

**Central Oversight – Distributed Execution**



# T&E/S&T Executing Agents

- Army**
  - **Minh Vuong, Army PEO-STRI**
    - Directed Energy Test (DET)
    - Electronic Warfare Test (EWT)
  - **Frank Carlen, Army Aberdeen Test Center**
    - Multi-Spectral Test (MST)
- Air Force**
  - **Ed Tucker, Air Force AEDC**
    - Advanced Propulsion Test (APTT)
  - **Tom Young, Air Force AFFTC**
    - Spectrum Efficiency Technology (SET)
- Navy**
  - **Gil Torres, Navy NAVAIR (Pt. Mugu)**
    - Net-Centric Systems Test (NST)
    - Cyber Test Technologies (CTT)
  - **George Shoemaker, Navy NUWC (Newport)**
    - Advanced Instrumentation Systems (AIST)
  - **Steve Koepenick, Navy SPAWAR**
    - Unmanned and Autonomous Systems Test (UAST)



# T&E/S&T Program Industry / Academia Days 2011



- **18-20 October 2011 in Atlanta, GA**
  - Overview of the T&E/S&T Program
  - Overview of all Nine (9) Test Technology Areas
  - Preview of the T&E/S&T Broad Agency Announcement topics
  - Contracting and proposal requirements
  - Individual meetings with the T&E/S&T Program Manager and Test Technology Area Executing Agents

***To request future announcements:***

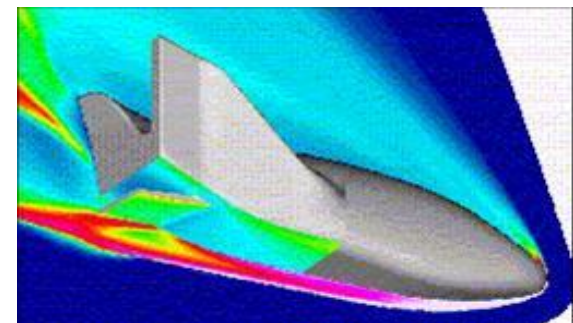
***[www.trmc-test.org/i-a\\_days](http://www.trmc-test.org/i-a_days)***



# Determining Position of a System Under Test without Using GPS



- **Emerging challenges for Time-Space-Position Information (TSPI) instrumentation**
  - Test operations in GPS-denied environments (urban, caves, dense foliage, undersea)
  - Hypersonic vehicles in a plasma field
  - Micro autonomous systems
  - Large-scale System-of-Systems environments
  - Low Observable (LO) Systems that can not mount external instrumentation





# Improving Testing of Undersea Systems in a Realistic Operational Environment



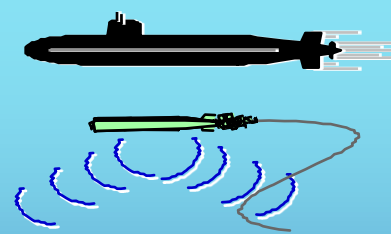
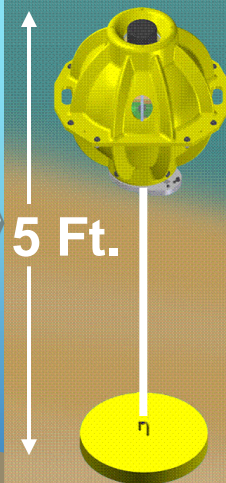
**Needs: Provide submarine undersea tracking during test events - without sub needing to ping!**

DARPA-developed chip scale atomic clock

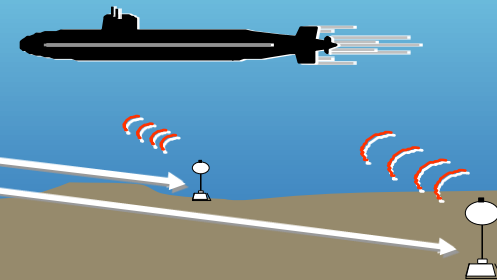
Key issues: Maintain clock accuracy, operate week+ without update



Insertion into undersea pingers



Highly accurate track is displayed in real-time on board the tracked submarine



T&E/S&T – CTEIP transfer: Providing critical test needs, validate crucial warfighting systems

OT for Common Broadband Advanced Sonar System (CBASS) Torpedo

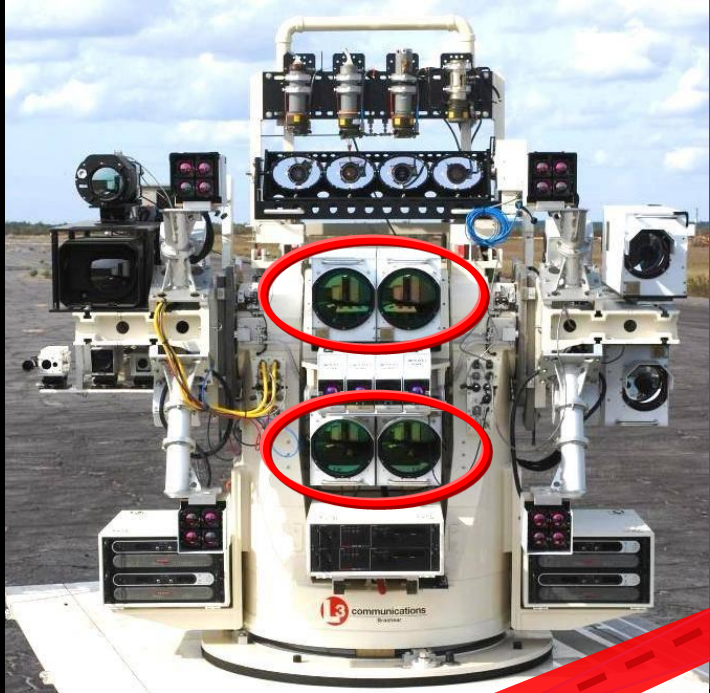




# Improving Testing of IRCM Systems



JMITS “paints” UV & IR signatures on IRCM systems and characterizes laser and flare countermeasures



*Both Units Delivered Directly to Test*

**Eglin AFB (DoN LAIRCM Testing on Navy CH-46)**

**China Lake (LAIRCM Testing on AFSOC CV-22)**

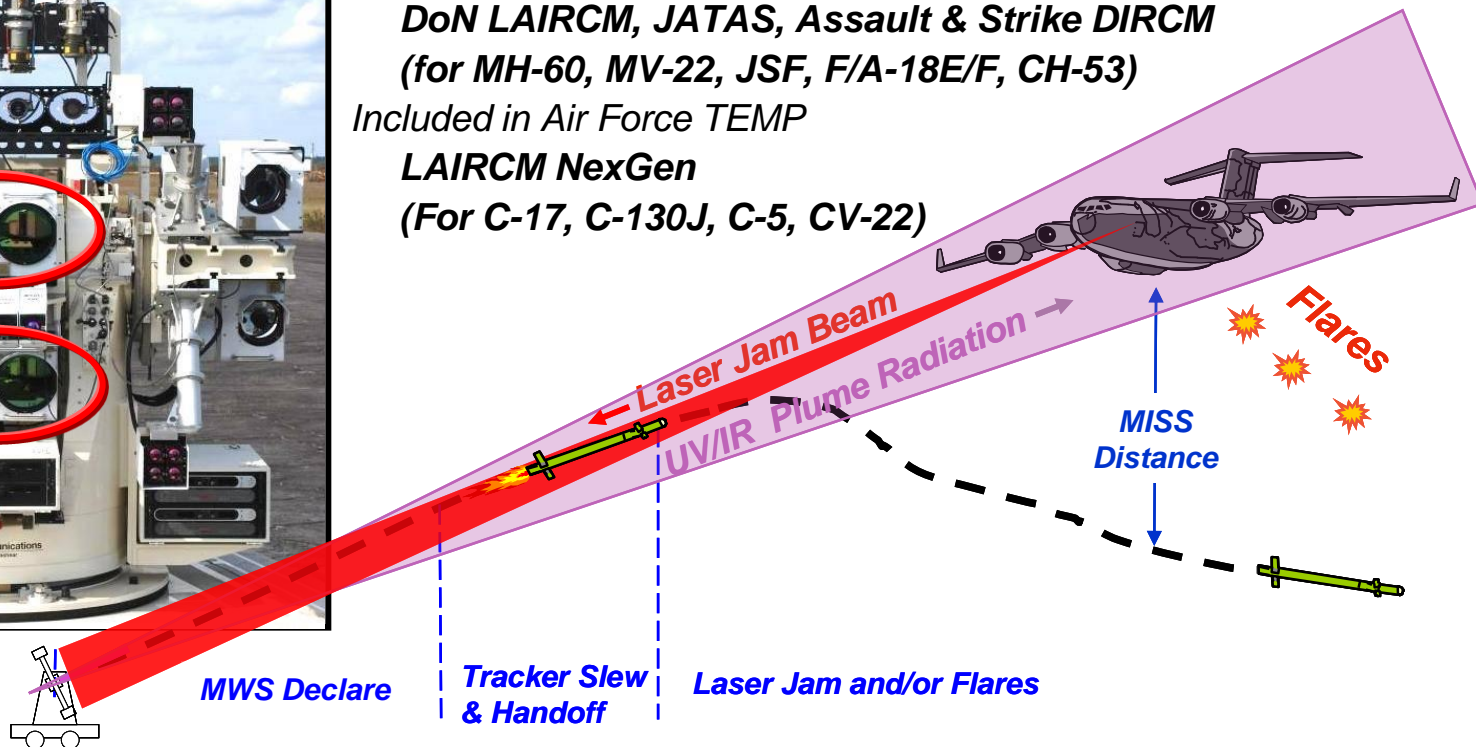
*Included in Navy TEMP*

**DoN LAIRCM, JATAS, Assault & Strike DIRCM  
(for MH-60, MV-22, JSF, F/A-18E/F, CH-53)**

*Included in Air Force TEMP*

**LAIRCM NexGen**

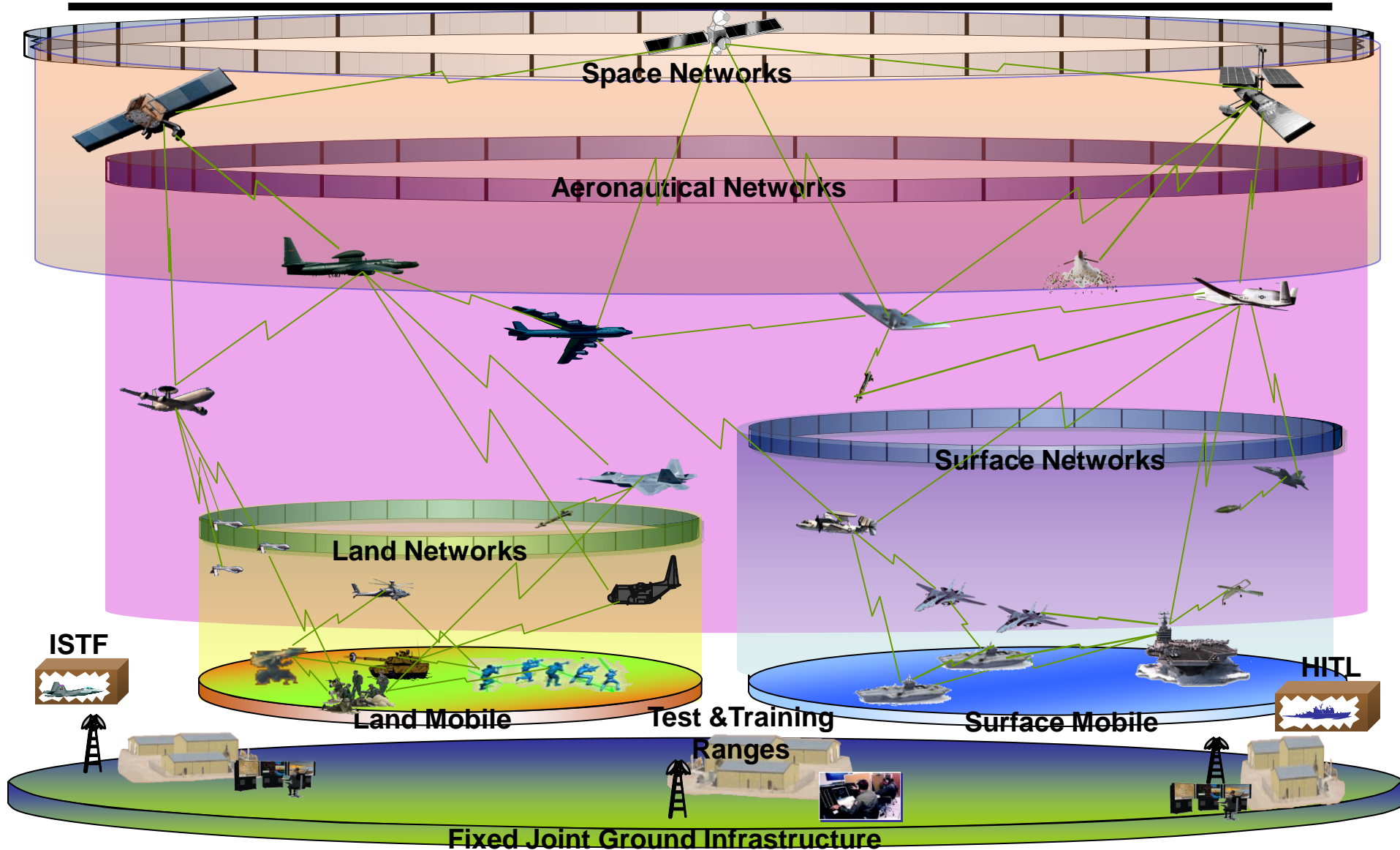
**(For C-17, C-130J, C-5, CV-22)**



**Required T&E/S&T Development for Higher Power Continuous Wave Infrared Sources**

- To simulate long range shots within MANPAD operational envelopes
- To simulate longer range RF SAMs during multi-spectral testing (RF & IR)
- Two Colors (IR-Red & IR-Blue)

# Improving Real-time Data Throughput Across the Test Environment





# T&E/S&T Program Project Selection Process



## Drivers



<http://www.fedbizopps.gov/> → Search for “TRMC”

Solicitations are issued through  
<http://www.fedbizopps.gov>

**Tri-Service Test Technology Area Working Groups**

- Executing Agent
- T&E Community Reps
- S&T Community Reps
- Subject Matter Experts

**Needs/Requirements**

PROGRAM REQUEST FOR QUOTATION  
SPECTRUM EFFICIENT TECHNOLOGIES FOR TEST AND EVALUATION  
DATED: 9 JULY 2010  
Project Manager: Mr. Paul Oringer  
Contracting Officer: Mr. David Wilson

**Solicitations**

Embedded Instrumentation for Test and Evaluation  
Technology Solution for EI  
Submitted To: AFFTC/PKD  
In Response to BAA 000-04-C-1PKD  
Submitted by: Company XYZ, University of ABC, GRS Laboratory, Anywhere, USA 12345

**White Papers**

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**Proposals**

**Dec – Jan**

**Feb – March**

**May – June**



Program Manager

Final Selections

**September**

**Executing Agent**

Recommendations

**Source Selection Evaluation Team**

- Working Group
- Subject Matter Expert
- Contracting Reps

**July – August**

**Funding Decision**



# The Proposal — Key Criteria

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- **Meets a T&E Need**
- **Requires S&T work**
- **High Payoff**
- **Broad application (more than one DoD test activity)**
- **High potential for transition to development of a test capability**



# T&E/S&T Program Summary



- **T&E/S&T Program initiated to address critical T&E needs tied to S&T drivers**
  - Advancing the state of the art in T&E technologies
- **The only DoD S&T program dedicated to T&E**
- **Annual Call to Industry, Academia, and Government Laboratories to address test capability needs**
- **Competitive technology developments to get the best technologies possible to the test community**
- **Focused on transition into needed test capabilities**

**Looking Ahead, Responsive, and Agile**



# Questions?



**Please stop by our booth in  
the exhibit hall**

## **Contact Information:**

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**Test Resource Management Center  
T&E / S&T Program**

**George.Rumford@osd.mil**