



The DoD Test & Evaluation / Science & Technology (T&E/S&T) Program

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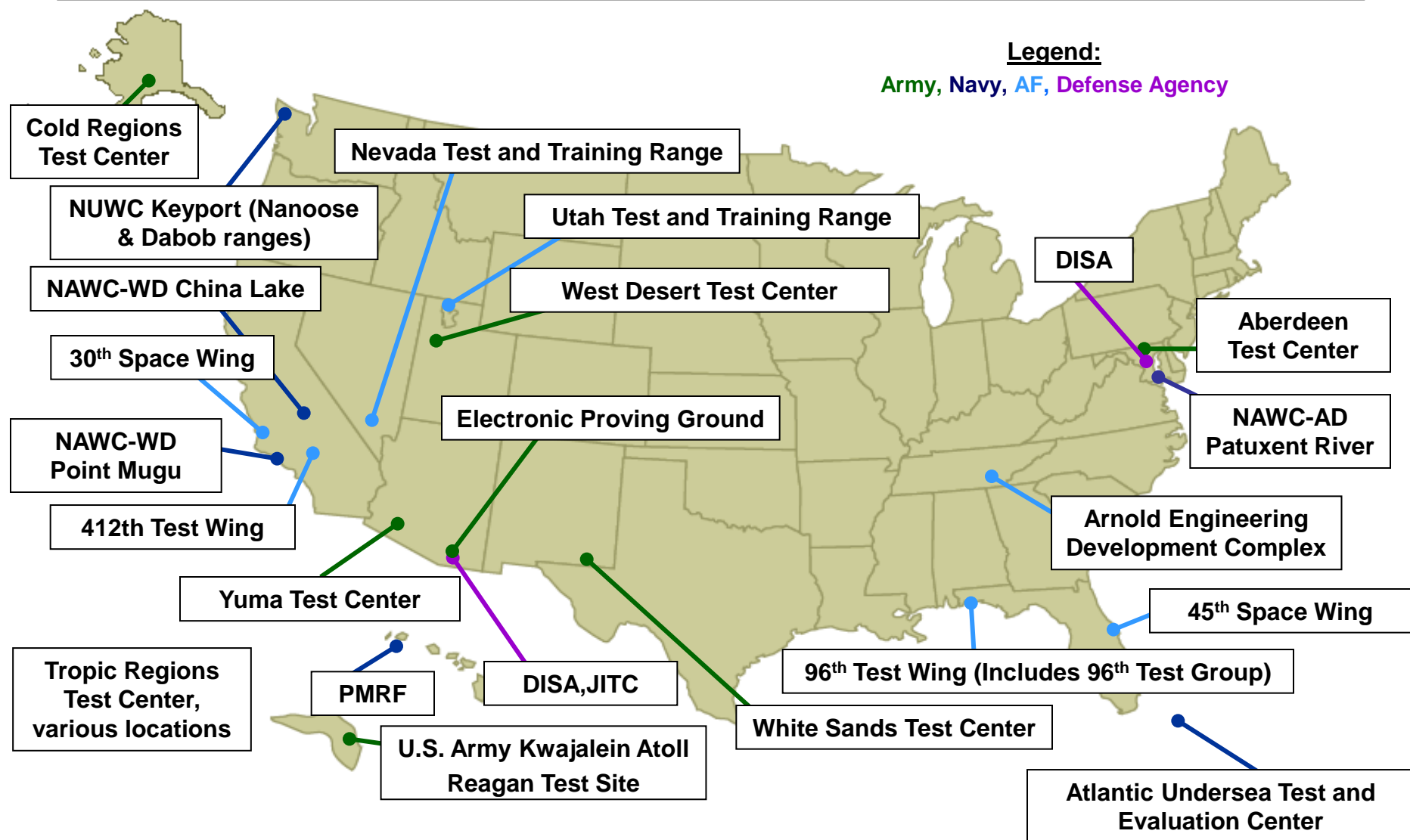
NDIA 15TH Annual Science & Engineering Technology Conference
Hyattsville, MD
8-10 April 2014



The STEWARD of the DoD Test Infrastructure

Major Range and Test Facility Base (MRTFB): The “Critical Core”

23 Sites: Army-8; Navy-6; Air Force-7; Defense Agency-2





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
- ~\$95M / year
- 8 Test Technology Areas
 - Electronic Warfare
 - Cyberspace
 - High Speed/Hypersonics
 - Autonomous Systems
 - Net-Centric Systems
 - Directed Energy
 - Advanced Instrumentation
 - Spectrum Efficiencies

Test *Capability* Development

CTEIP



- Established in FY1991
- Develops or improves test capabilities that have multi-Service utility
- BA 4 RDT&E funds
- ~\$150M / year
- 43 current projects
 - 19 projects developing core Joint capabilities
 - 11 projects improving threat representations used in testing
 - 13 projects addressing near-term OT shortfalls

Distributed Test *Integration*

JMETC

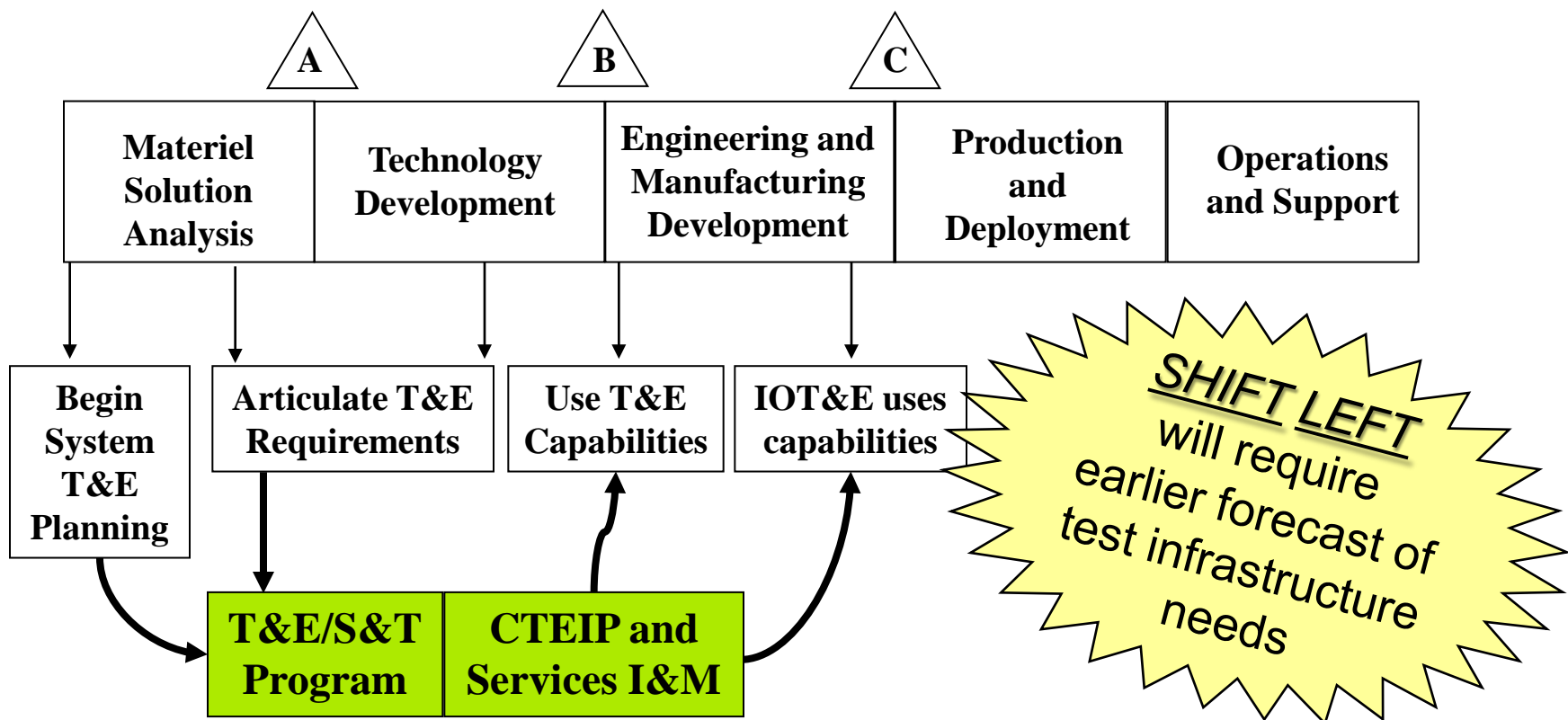


- Established in FY2007
- Provides infrastructure for distributed Joint and Cyberspace testing
- BA 5 RDT&E funds
- ~\$19M / year
- 78 current sites
 - Expanding to 93 sites
- Maintains
 - Network connections
 - Security agreements
 - Integration software
 - Interface definitions
 - Distributed test tools
 - Reuse repository



T&E Capability Development Cycle

Challenge: T&E Capabilities must be 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

82 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

Current Test Technology Areas

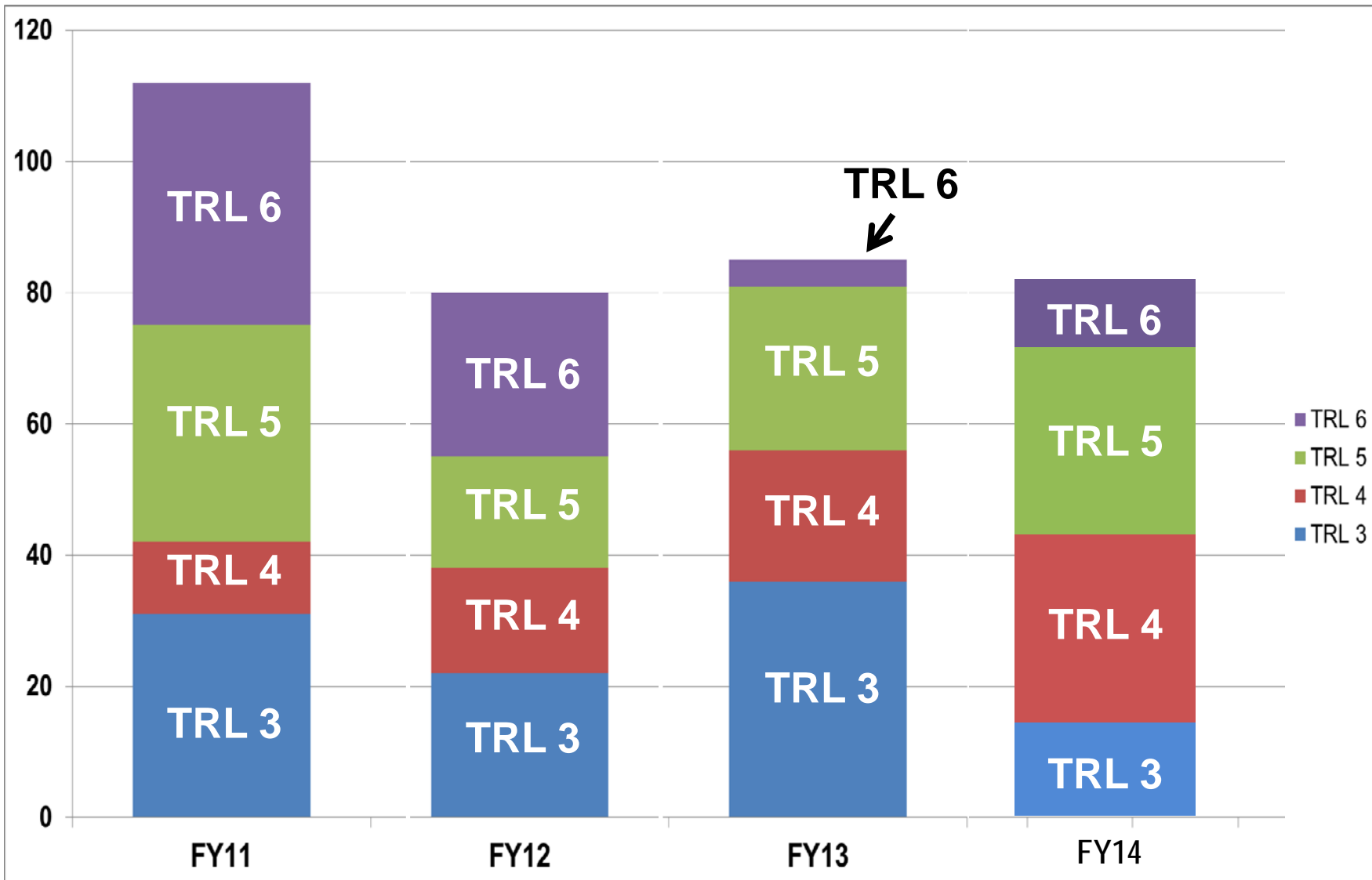
High Speed Systems 14 Active Projects	Unmanned & Autonomous Systems 4 Active Projects	Spectrum Efficiency 13 Active Projects	Advanced Instrumentation 11 Active Projects
Directed Energy 14 Active Projects	Cyberspace 3 Active Projects	Electronic Warfare 15 Active Projects	Net-Centric Systems 8 Active Projects

Shaping Technology into Tomorrow's T&E Capabilities



Project Portfolio Snapshot

Technology Readiness Level by Fiscal Year





T&E/S&T Program

Broad Agency Announcements



- Topics for Industry, Academia, and Government Laboratories to propose test technology solutions
- **In-cycle Process**
 - Declared schedule for white paper submissions (deadline)
 - Requires an allocation of available funding
 - Priority over out-cycle white papers (must be processed first)
- **Out-of-cycle Process**
 - White papers submitted anytime after "in-cycle" deadline
 - Offerors "highly encouraged" to contact Executing Agent before submitting white paper
 - Ensures interest
 - Can address whether a 'chance' exists for funding
- All BAAs include an **"Other Test Technologies"** topic to enable offerors to propose test technology developments that were not previously identified by the Government

All T&E/S&T BAAs are always open for new white papers



Location of T&E/S&T BAAs



www.fbo.gov

Keyword: TRMC

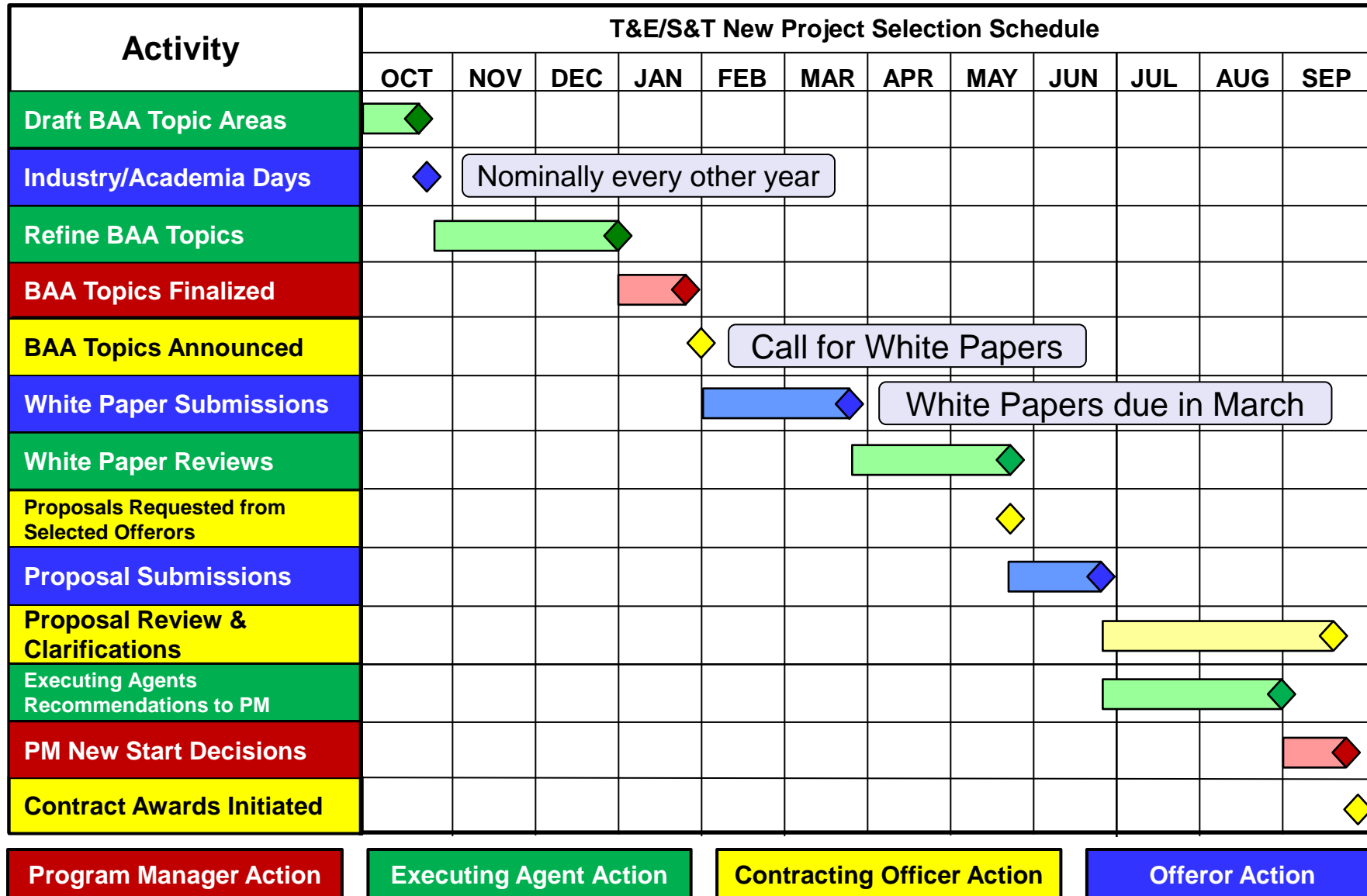
**Note: Change search criteria for “Posted Date”
from “Last 90 Days” to “<blank>”**

**Updated Topics
Being Posted
by End of June**

**Out-of-Cycle Only
Must Discuss Concept
with Executing Agent
Prior to Submittal**



T&E/S&T New Project In-Cycle Selection Schedule





T&E/S&T BAA Upcoming Plans



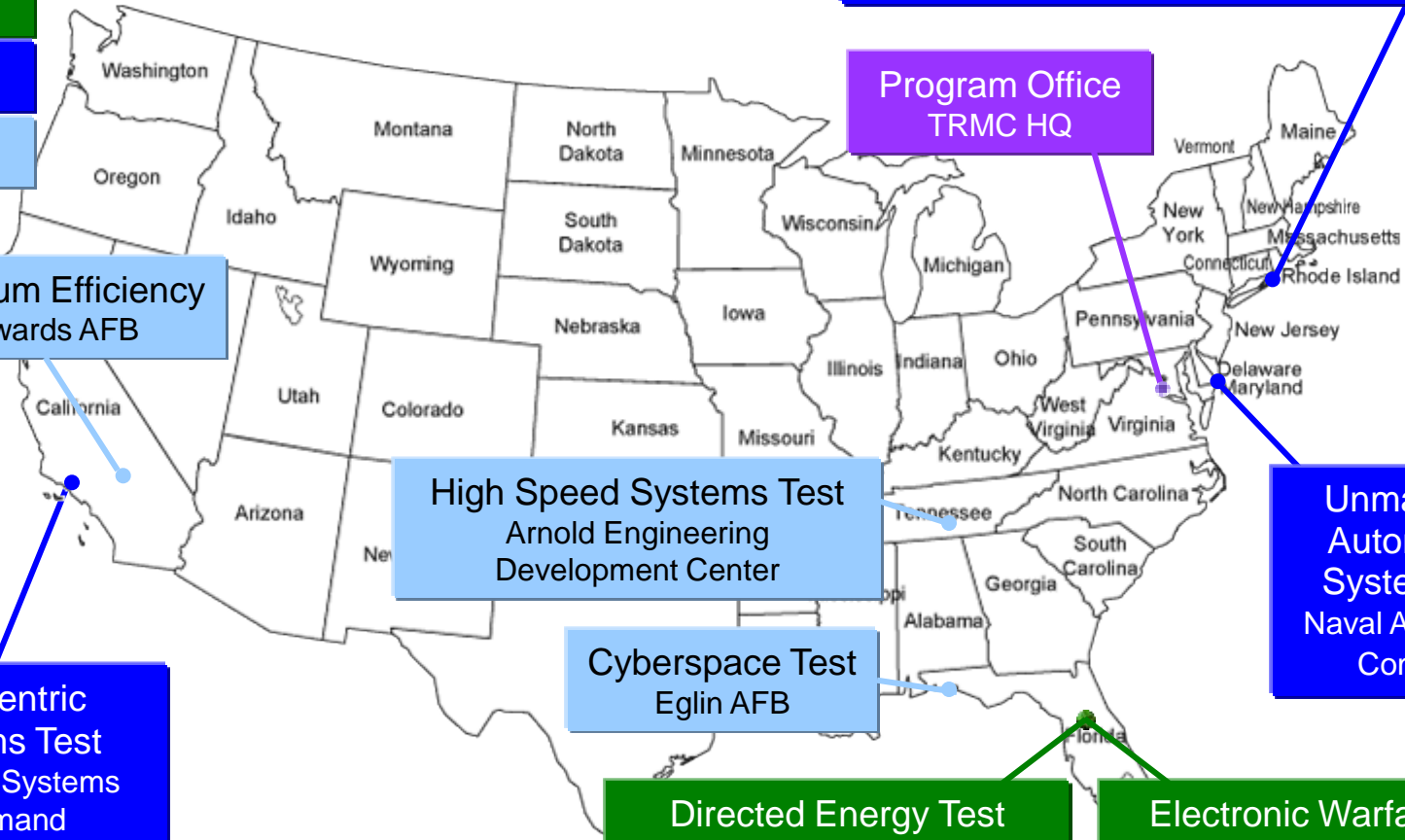
- **May – June 2014**
 - Updating all BAA test technology topics on www.fbo.gov
- **June – December 2014**
 - Only accepting out-of-cycle white papers
Remember: Contact the Executing Agent prior to submitting white paper
- **Early December 2014 (rather than in October)**
 - Planning to conduct an Industry Day meeting (location TBD)
 - Refinement of BAA test technology topics
 - Review of contracting and selection processes
 - Opportunities for 1-on-1 discussions with PM and Executing Agents
 - Will be announced on www.fbo.gov
- **Late January 2015**
 - Update of all BAA test technology topics on www.fbo.gov
 - Initiate In-Cycle Selection Process
 - White Papers due in March (exact date to be determined)



T&E/S&T Test Technology Area

Executing Agent Organizations

- TRMC HQ
- Army
- Navy
- Air Force



Central Oversight – Distributed Execution



High Speed Systems Test T&E/S&T Test Technology Area



Executing Agent

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Development Center

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- **Current Portfolio: 14 Projects**
- **FY14 Budget: \$18.95M**
- **5 Domains with 11 Current Topics**
 - **Advanced Propulsion: 4 Topics**
 - **Aerodynamics & Aerothermal: 1 Topics**
 - **Flight Test and Evaluation: 2 Topics**
 - **Computational Tools for Flow Fields: 1 Topic**
 - **Instrumentation for Flow Fields: 3 Topics**
- **Significant Technology Needs**
 - **Propulsion Scaling Test Techniques**
 - **Combined Cycle Propulsion Test Methods**
 - **Hypersonic Flight Erosion Test Methods**
 - **Thermal Protection System Ablation Testing**



Electronic Warfare Test T&E/S&T Test Technology Area



Executing Agent

Minh Vuong

U.S. Army PEO-STRI

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- **Current Portfolio: 15 Projects**
- **FY14 Budget: \$15.57M**
- **2 Domains with 15 Current Topics**
 - **Electro Optics: 8 Topics**
 - **Radio Frequency: 7 Topics**
- **Significant Technology Needs**
 - **Full-Range Surrogate Missile Technology**
 - **High-Speed EO/IR Scene Generation**
 - **Missile Body & Plume Attitude Measurement**
 - **Real-time, High-Fidelity, High-Density RF Signal Generation**
 - **Multi-Beam Characterization**
 - **Radar Clutter Simulation**



Net-Centric Systems Test T&E/S&T Test Technology Area



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- **Current Portfolio: 8 Projects**
- **FY14 Budget: \$14.52M**
- **3 Domains with 12 Current Topics**
 - **System of System Testing: 4 Topics**
 - **Improved Test Automation: 3 Topics**
 - **Modeling & Simulation for Test: 5 Topics**
- **Significant Technology Needs**
 - **Flexible Test Harness Generator**
 - **Automated, Rapid, Agile Test Planning**
 - **Removing biases in Distributed Testing**
 - **Rapid Analysis of Voluminous Unstructured Data (“Test Data to Decision”)**
 - **Determining Required M&S Fidelity in Tests**



Advanced Instrumentation Systems

T&E/S&T Test Technology Area



Executing Agent
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- **Current Portfolio: 11 Projects**
- **FY14 Budget: \$10.04M**
- **6 Domains with 24 Current Topics**
 - **Time Space Position Info: 7 Topics**
 - **Advanced Sensors: 9 Topics**
 - **Advanced Energy & Power: 4 Topics**
 - **Non-Intrusive Instrumentation: 2 Topics**
 - **Range Environment Encroachment: 1 Topic**
 - **Human Systems: 1 Topic**
- **Significant Technology Needs**
 - **TSPI without GPS (or with limited GPS)**
 - **Measuring body armor / helmet effectiveness**
 - **Measuring cognitive workload**



Directed Energy Test T&E/S&T Test Technology Area



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- **Current Portfolio: 14 Projects**
- **FY14 Budget: \$7.25M**
- **3 Domains with 10 Current Topics**
 - High Power Microwave: 6 Topics
 - High Energy Laser: 3 Topics
 - Special Interest Area: 1 Topic
- **Significant Technology Needs**
 - Neutron Environment Simulator to replicate required nuclear effects test environments
 - In Chamber HPM Source
 - HPM Electronic Failure Analysis
 - Characterizing beam propagation through atmosphere & maximizing laser test windows



Spectrum Efficient Technology

T&E/S&T Test Technology Area



Executing Agent

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- **Current Portfolio: 13 Projects**
- **FY14 Budget: \$7.06M**
- **3 Domains with 10 Current Topics**
 - **Wireless Technologies: 5 Topics**
 - **Telemetry Networking: 2 Topics**
 - **Spectrum Management: 3 Topics**
- **Significant Technology Needs**
 - **Multiple Access Schemes for Serial Streaming Telemetry**
 - **Modulation Agile Radio for Test Applications**
 - **Channel Estimation and Equalization**
 - **Steerable Multiband Antenna (L-band, S-band, & C-band) for Airborne Test Articles**



Unmanned & Autonomous Systems Test T&E/S&T Test Technology Area



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- **Current Portfolio: 4 Projects**
- **FY14 Budget: \$5.92M**
- **2 Domains with 7 Current Topics**
 - **Autonomous System Test Planning: 3 Topics**
 - **Autonomous System Performance Assessment: 4 Topics**
- **Significant Technology Needs**
 - **Predicting Autonomous Behavior for Testing**
 - **Enhancing Safety of Autonomous Testing**
 - **Testing of Autonomy Functional Components**
 - **Measure Autonomous System Reliability and Performance**



Cyberspace Test T&E/S&T Test Technology Area



Executing Agent

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- **Current Portfolio: 3 Projects**

- **FY14 Budget: \$3.95M**

- **3 Domains with 8 Current Topics**

- **Cyberspace Test Planning: 3 Topics**

- **Cyberspace Threats: 2 Topics**

- **Cyberspace Test Execution/Analysis: 3 Topics**

- **Significant Technology Needs**

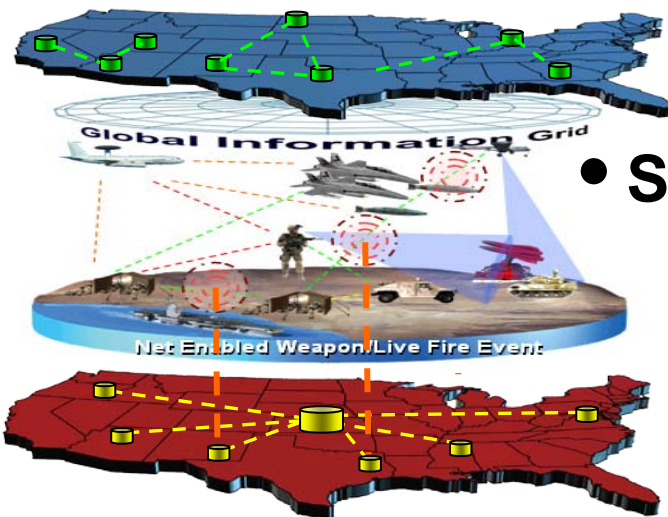
- **Cyberspace test visualization**

- **Defining cyberspace test measurements**

- **Improved, scalable cyberspace threat representations**

- **Advanced cyberspace instrumentation**

- **Improved cyberspace analysis**





The Proposal — Key Criteria



- **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?



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