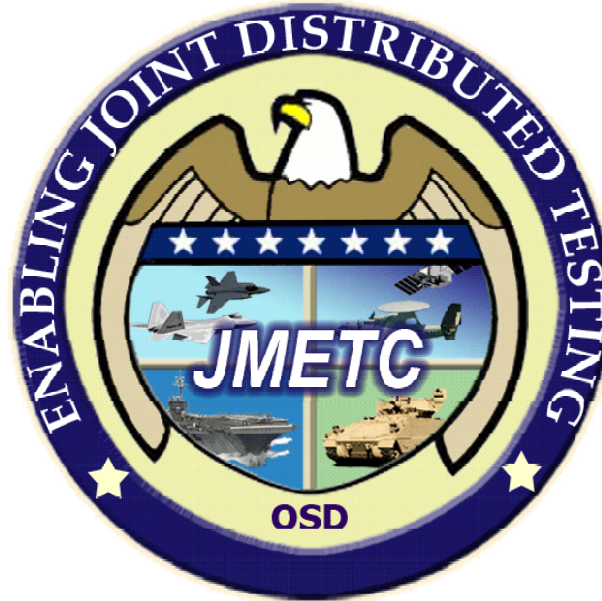


Joint Mission Environment Test Capability (JMETC) Improving T&E with Distributive Test Capabilities



Briefing for: NDIA Systems Engineering Conference

Marty Arnwine

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Joint Mission Environment Test Capability**

Oct 30, 2013



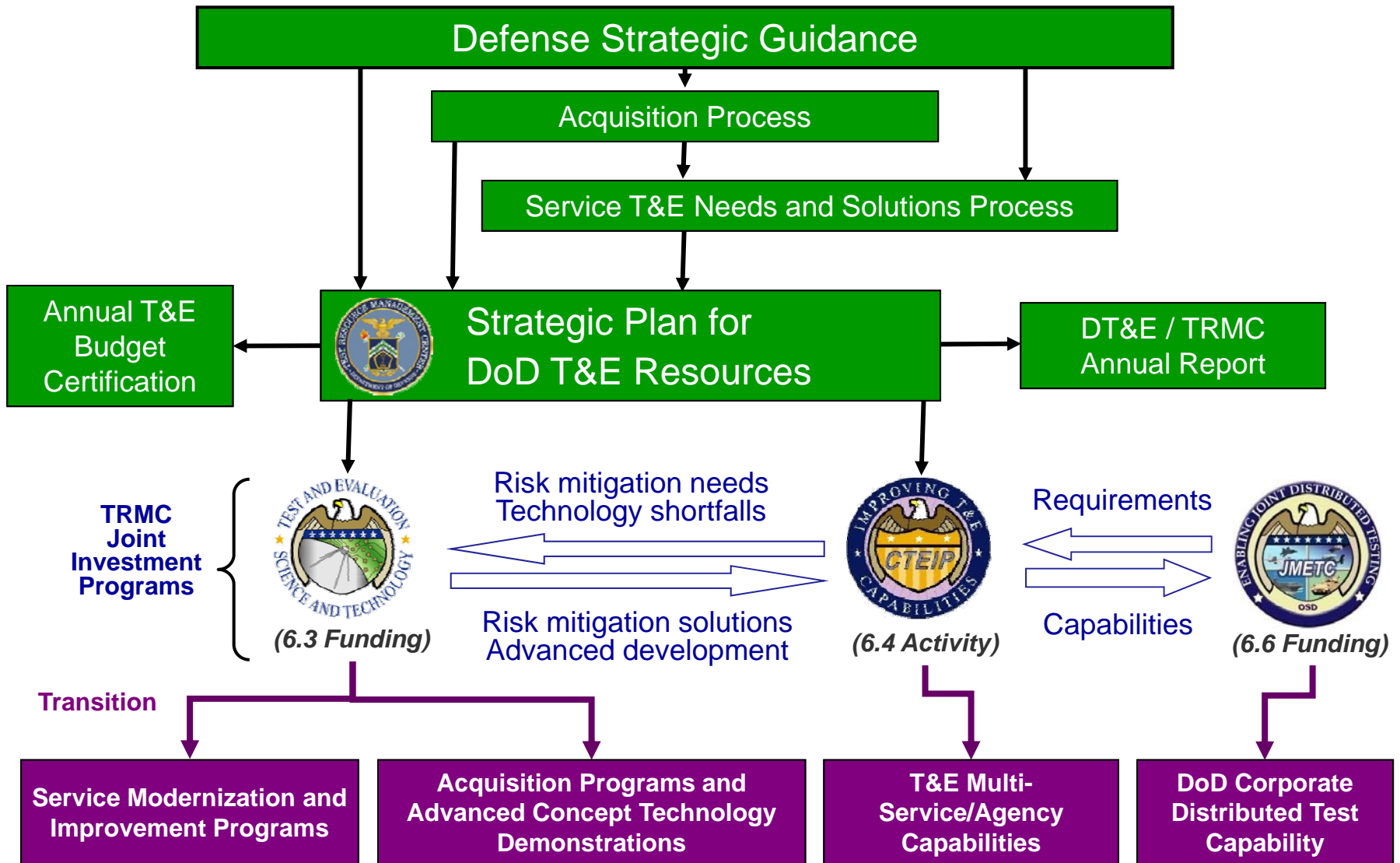
Agenda



- **TRMC**
- **Distributed Testing**
- **JMETC**
- **Cyber T&E**
 - **JMETC Activities supporting Cyber T&E**
 - **Regional Service Delivery Points**
 - **JMETC 2.0**
 - **National Cyber Range**
- **Conclusion**

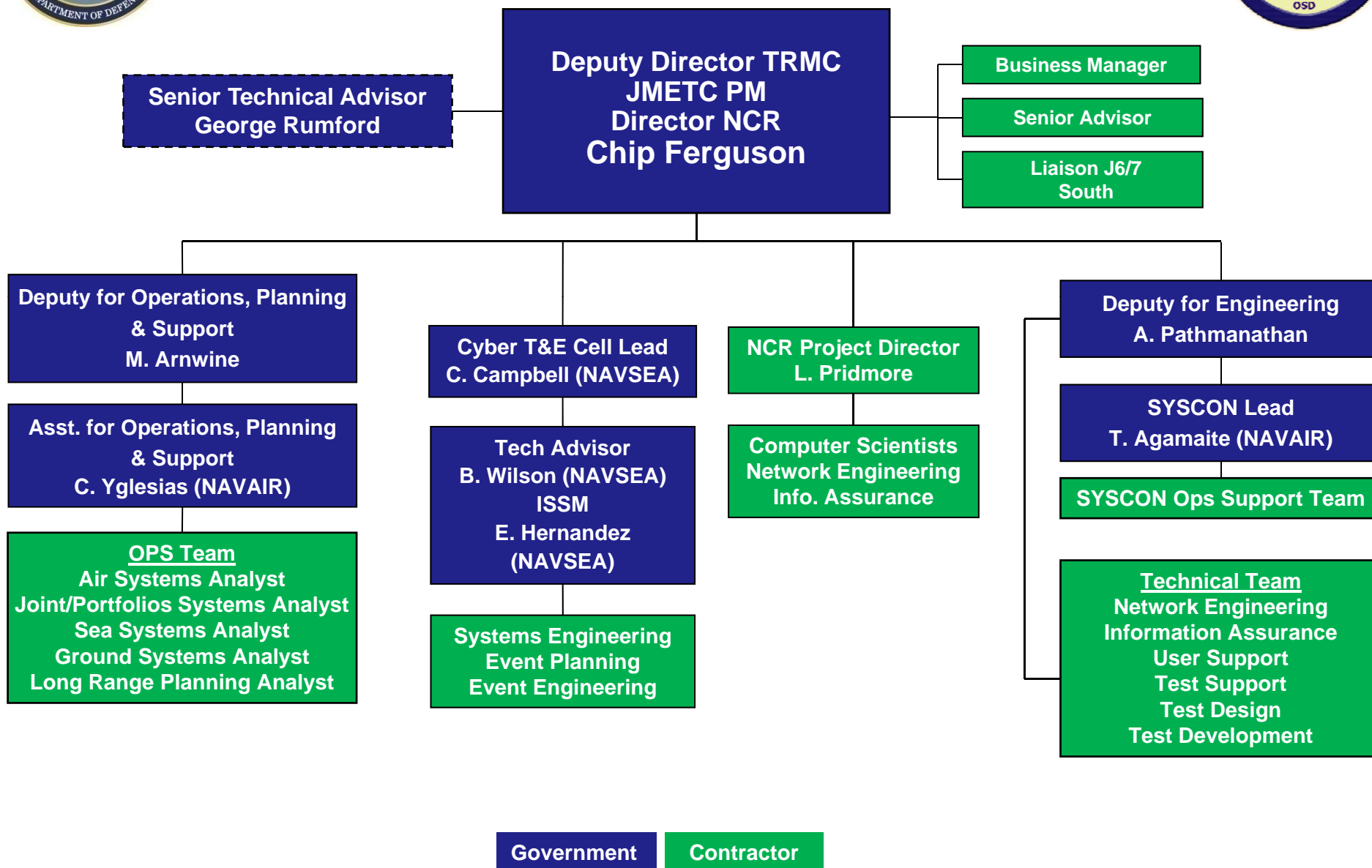


The TRMC “Blueprint”: Putting Test Capabilities on the DoD Map





JMETC Organization





What is Distributed Testing?



A process, preferably persistent and continuous, for linking various geographically separated live, virtual, and constructive sites and capabilities together in a distributed environment, for use across the acquisition life cycle, to support and conduct the Test and Evaluation (T&E) of a system or systems-of-systems in a Joint and cyberspace environment.

**A new way of thinking for many in the
Test and Evaluation Community**



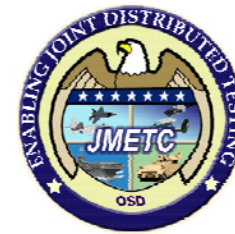
The JMETC Mission



JMETC provides the ***persistent and robust infrastructure (network, integration software, tools, reuse repository)*** and ***technical expertise*** to integrate Live, Virtual, and Constructive systems for test and evaluation in a Joint Systems-of-Systems and cyber environment

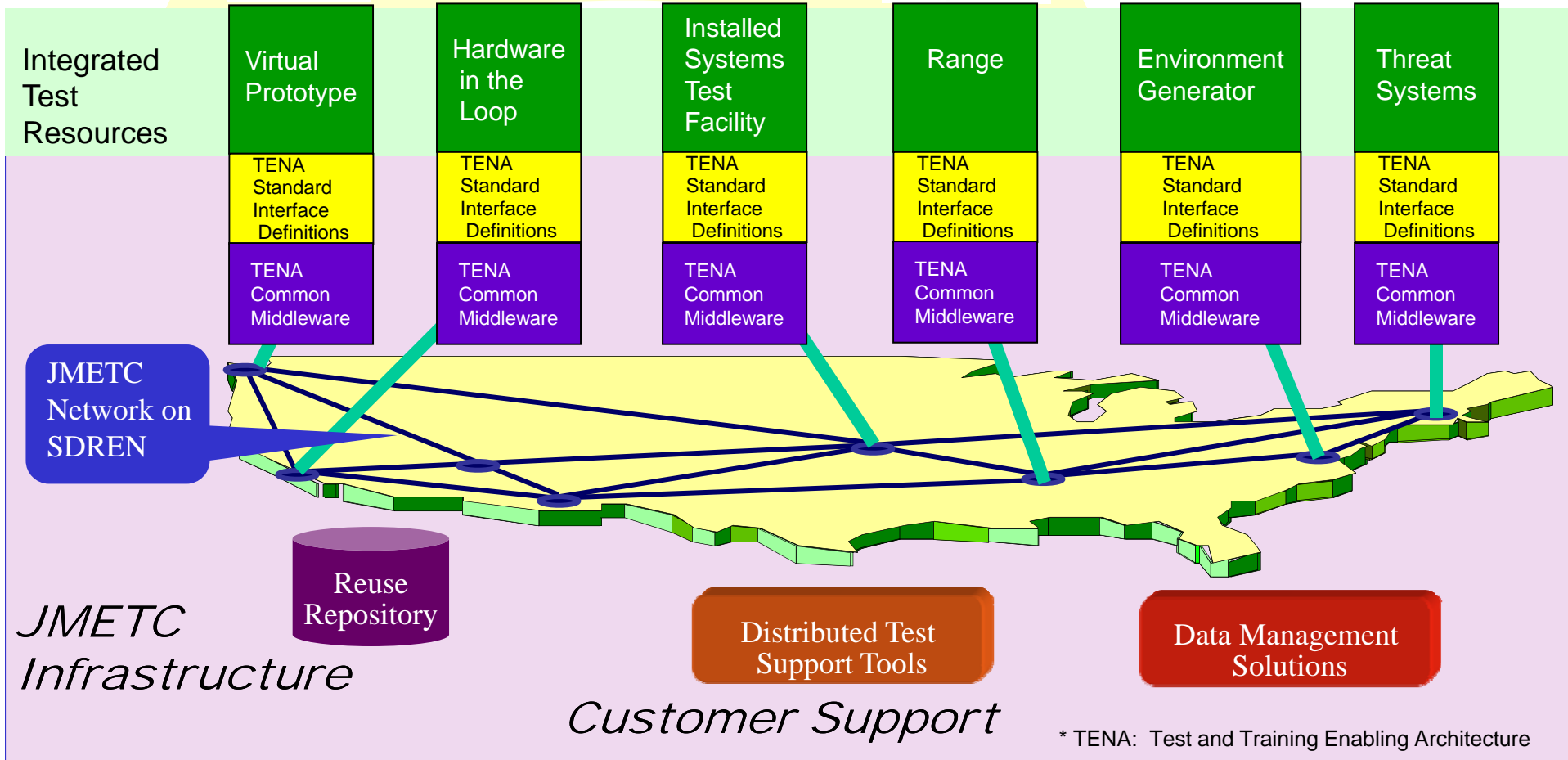
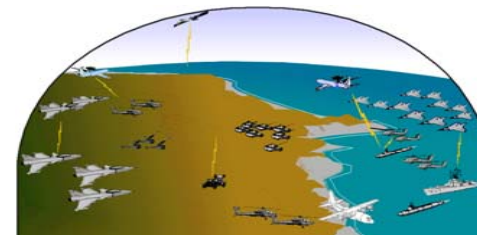


JMETC Enables Distributed Testing



Joint Operational Scenarios

Systems Under Test

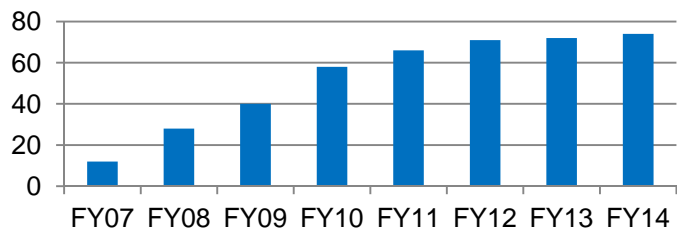
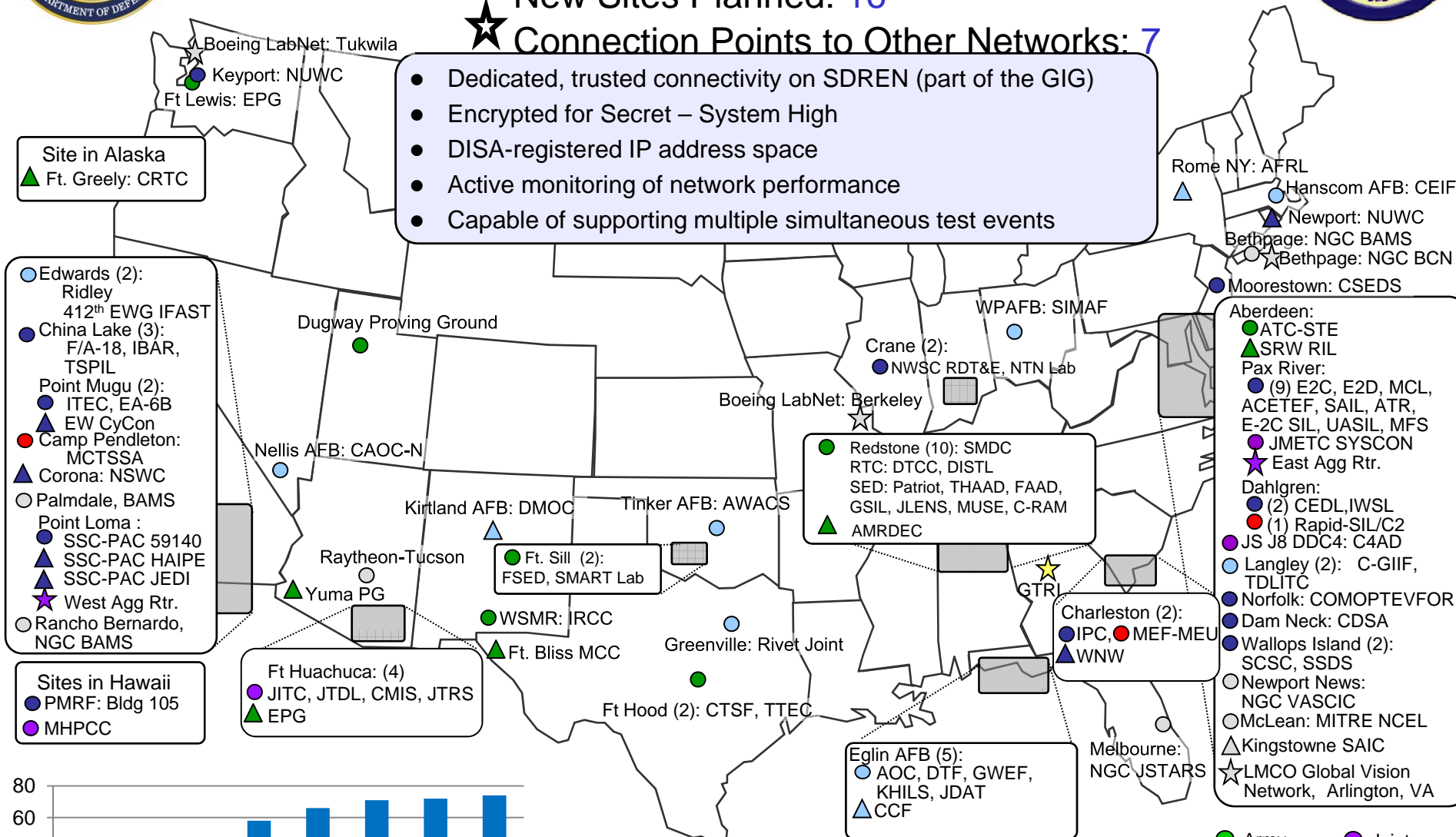




JMETC Connectivity

- Functional Sites: 75
- ▲ New Sites Planned: 16
- ★ Connection Points to Other Networks: 7

- Dedicated, trusted connectivity on SDREN (part of the GIG)
- Encrypted for Secret – System High
- DISA-registered IP address space
- Active monitoring of network performance
- Capable of supporting multiple simultaneous test events



As of 18 Oct 2013

- Army
- Air Force
- Navy
- Marines
- Joint
- Industry
- Academia



Major FY13 Events

<u>Customer</u>	<u>Event</u>	<u>Execution Dates</u>	<u>Onsite Support</u>
Navy	Accelerated Mid-Term Interoperability Improvement Program (AMIIP) (Multiple Tests)	Oct 2012 - Sep 2013	Yes
Joint	JITC Joint Interoperability Tests (JIT) (Multiple Tests)	Oct 2012 - Sep 2013	Yes
Air Force	Air Force Systems Interoperability Test (AFSIT) (Multiple Tests)	Oct 2012 - Sep 2013	-
Navy	TRITON	Oct 2011 - Sep 2012	Yes
Joint	Joint Track Manager Concept - Demonstration (JTMC-D)	Oct 2012 - Nov 2012	Yes
Joint	JIAMDO Correlation/De-correlation Interoperability Test (C/DIT) Coalition and U.S. only	Oct 2012 - Sep 2013	Multiple
Joint	JIAMDO Joint Tactical Air Picture (JTAP)	Oct 2012 - Dec 2012	Multiple
Air Force	AGILE Fire Phase VII	Jan 2013 - Mar 2013	Multiple
InterTEC	InterTEC Cyber Event (ICE) FY13	Oct 2013 – Feb 2013	Multiple
Marine Corps	Virtual Rapid Prototyping Laboratory	Jan 2013 – Feb 2013	Yes
Joint	Red Flag	Jan 2013 – Mar 2013	Yes
Navy	Joint Distributed IRCM Ground test System(JDIGS)	Oct 2012 - Sep 2013	-
Air Force	AIM9x	Feb 2013	Yes
Marine Corp	G/ATOR	Feb 2013 – May 2013	Yes
Air Force	AGILE Fire Phase VIII	Jun 2013 - Sep 2013	Multiple
Navy	E-2D Testing	Jun13 – Aug 13	-



JMETC Customer Testing Success

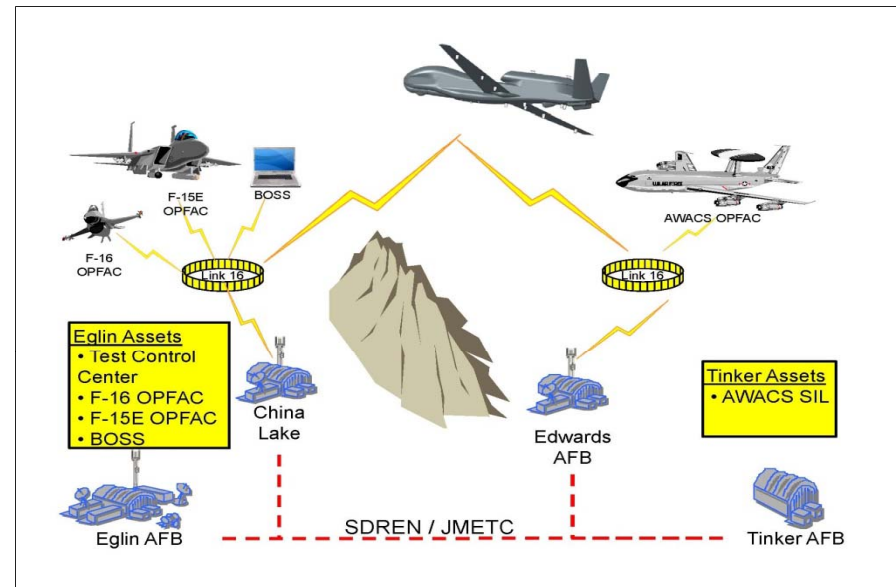


Battlefield Airborne Communication Node (BACN)

Joint Urgent Operational Need

August 13 – September 15, 2010

- Integration of BACN payload onto multiple platforms for solution to urgent in-theater need :
 - Combat requirement for beyond line-of-sight comm
 - Relay, bridge, and range extension for ground forces and supporting aircraft
- Distributed Testing in Fall 2010 included Live-fly , DT, and Operational Utility Evaluation



IMPACT

- Efficient integration of DT and OT
- Testing completed despite many of the required assets not being available on-site
- Distributed Testing saved “\$1.2M” (OTA)
- Urgent capability fielded-quickly!



JMETC Customer Testing Success



AIM-9X Air to Air Missile Captive Carry Tests (On-going)

- Capability to remotely observe live seeker head video and real-time position of the test aircraft presented in a 'gods-eye' view of the China Lake Range
- Remotely monitor live aircraft communications between the test aircraft and China Lake Range Control
- JMETC connects Naval Air Warfare Center Weapons Division China Lake, CA Open Air Range to the COMOPTEVFOR Norfolk, VA via the Integrated Battlespace Arena (IBAR)



IMPACT

- Increased capability for Operational Testers to observe more DT & OT test flights (20 captive carry tests and 10 live fire tests)
- Reduced COMOPTEVFOR's OTA's test observation time from 3 days (including travel) to actual range test time
- Utilized existing JMETC infrastructure, IA and engineering expertise in coordination with Navy MRTFB facility to deliver capability with no additional cost to Operational Testers

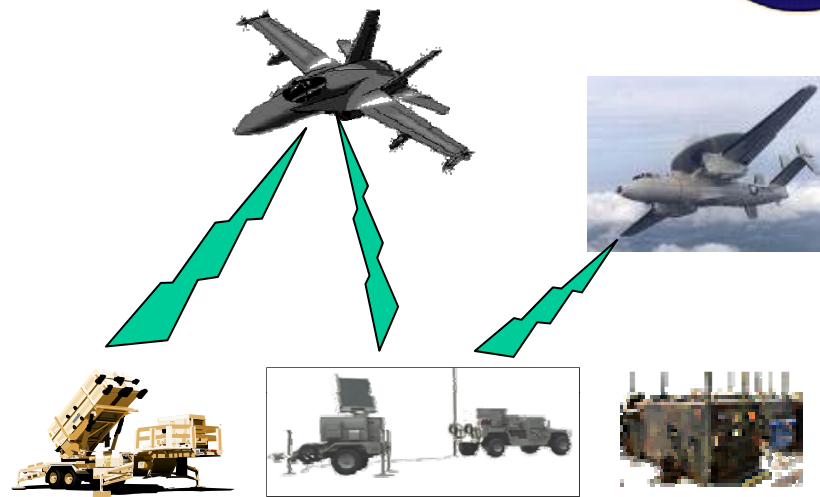


JMETC Customer Testing Success



Air Combat Environment Test & Evaluation Facility (ACETEF)

- NAWC Facility at NAS Patuxent River. Responsible for evaluating electronic signatures from new threat systems and developing appropriate counter measures.
- When new EW threat detected against Naval aircraft, an updated Mission Load Verifier (MLV) is generated for on board warning systems.
- ACETEF must verify each MLV file and symbology prior to fleet wide release.
- JMETC enables a 3000 mile connection from ACETEF and Electronic Warfare Lab (Pt Mugu, CA)



IMPACT

- Quicker support, less risk to combat forces
- Enables an almost immediate T&E of new MLVs...time to deployed units cut by 30 days.
- Less unprotected exposure to active threats.



Cyber



Cyber T&E



- Test and Evaluation must accurately and affordably measure cyberspace effectiveness and vulnerabilities of DoD systems.
- DASD(DT&E) with TRMC and JMETC are addressing requirements for building **Cyberspace T&E Process, Methodology, Infrastructure, and Workforce.**

**JMETC has embarked on the Cyber T&E mission in
FY13**



Past Cyber T&E Activities



- InterTEC Cyber Events (ICE)
 - FY 10
 - FY 12
- Comprehensive Study of the DoD T&E Infrastructure
 - Track 5, Cyber Infrastructure
 - Completed December 12
- USD(AT&L) Assigned Responsibility for the National Cyber Range to TRMC
 - October 1, 2012



Cyber T&E Mission in FY13



- Operationalizing the National Cyber Range (NCR)
 - TS/SCI Authority to Operate received July 25, 2013
- Partnership with DOT&E, TSMO, JIOR
 - Regional Service Delivery Points
 - Cyber T&E Support Cell
- Developing Cyber T&E Use Cases
- Cyber Range Interoperability Standards (CRIS)
- Cyber T&E Investments
 - Regional Service Delivery Points (RSDP)
 - Visualization & Instrumentation
 - Environments – blue and red
 - Common Framework (CRIS)
 - Support Acquisition System Tests



Cyber T&E Mission - Future



- RSDPs
 - One per year
- Deploy Some NCR Tool(s) to the Community
 - Start with the Test Specification Tool
- Develop a Wireless Capability for the NCR
 - NCR, NRL, MITRE
- Create Red and Blue Environments
 - TSMO
 - NCR
- Comparative Test of NCR
- JMETC 2.0
- Cyber Quick Reaction Test



Regional Service Delivery Points



RSDP Nominal Configuration



Networking
Rack

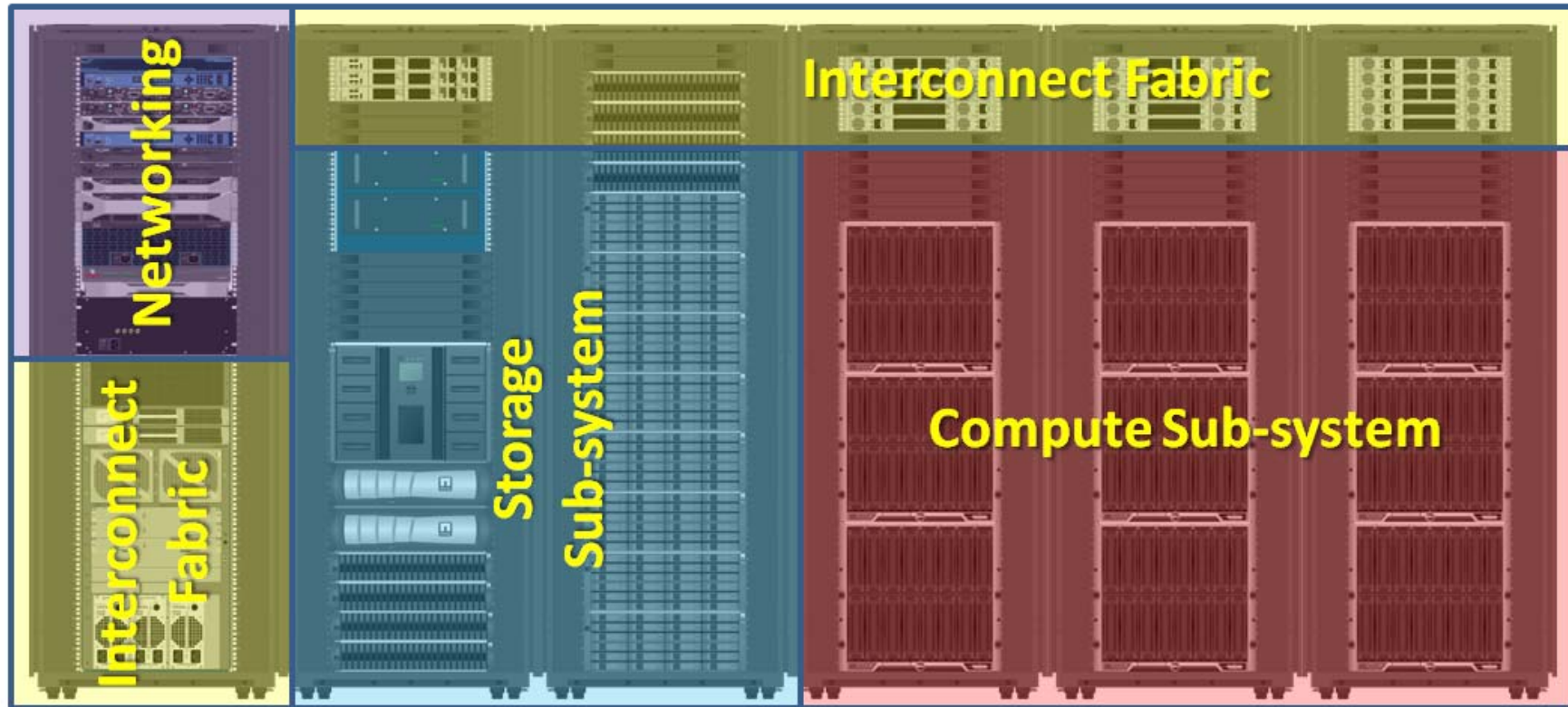
Storage
Rack 1

Storage
Rack 2

Compute
Rack 1

Compute
Rack 2

Compute
Rack 3





Regional Service Delivery Point

- The addition of *Regional SDPs (RSDPs)* will provide:
 - **The capacity** to create persistent cyber-threat environments
 - **The capability** to deploy customer required range services (i.e. traffic generation, simulation, instrumentation, visualization, and integrated event management)
 - **A scalable architecture** to increase capacity and capabilities as needed by the Cyber T&E user community
 - **Be flexible and adaptable** to users requirements in a more realistic cyber environment, which is inherently prone to frequent change
 - **Leverage the latest advances in technology** to deliver cost and performance efficiencies (virtualization, convergence, rapid reconstitutability)
- RSDPs will be *placed* at key sites located throughout the CONUS and select OCONUS locations to support DoD cyber testing and training

RSDP serve as the foundation of Cyber T&E Infrastructure to effectively and efficiently meet DoD capability and capacity demands for Cyber testing and training



JMETC 2.0 Capabilities and Services



- RSDPs will support the following capabilities and services on JMETC 2.0
 - Cyber Range Management
 - Common Range Services (at all classification levels)
 - Customer Environment Emulation (virtual and hardware-in-the-loop)
 - Multi-Tenancy with MILS Data-at-Rest Protections (at multiple classification levels)
 - Ability to save and re-deploy range configurations
 - With the architecture and capacity to address additional requirements as they are defined

The RSDP is intended to be the *platform* to address Cyber T&E Range infrastructure interoperability gaps



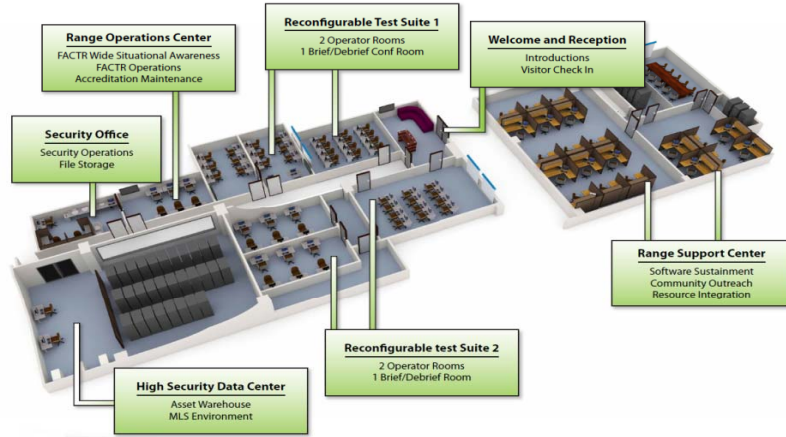
National Cyber Range



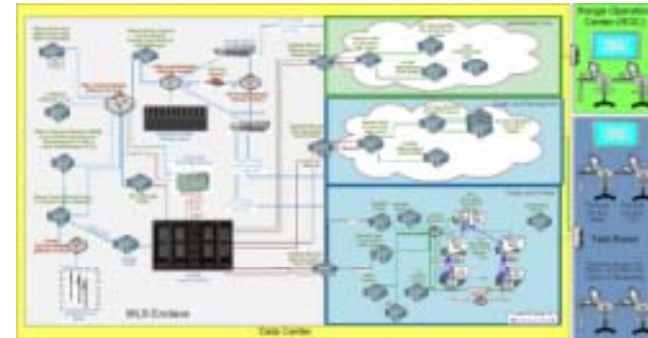
What is the NCR?



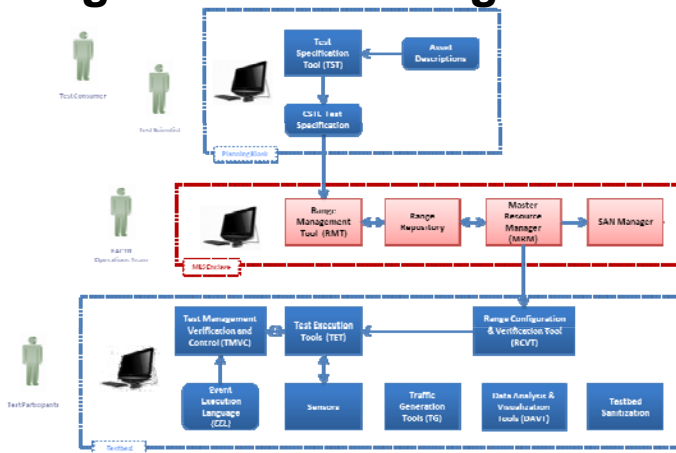
Computing Assets/Facility



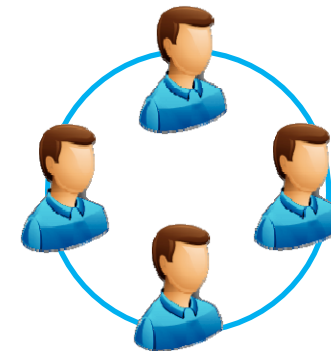
Encapsulation Architecture & Operational Procedures



Integrated SW Testing Toolsuite

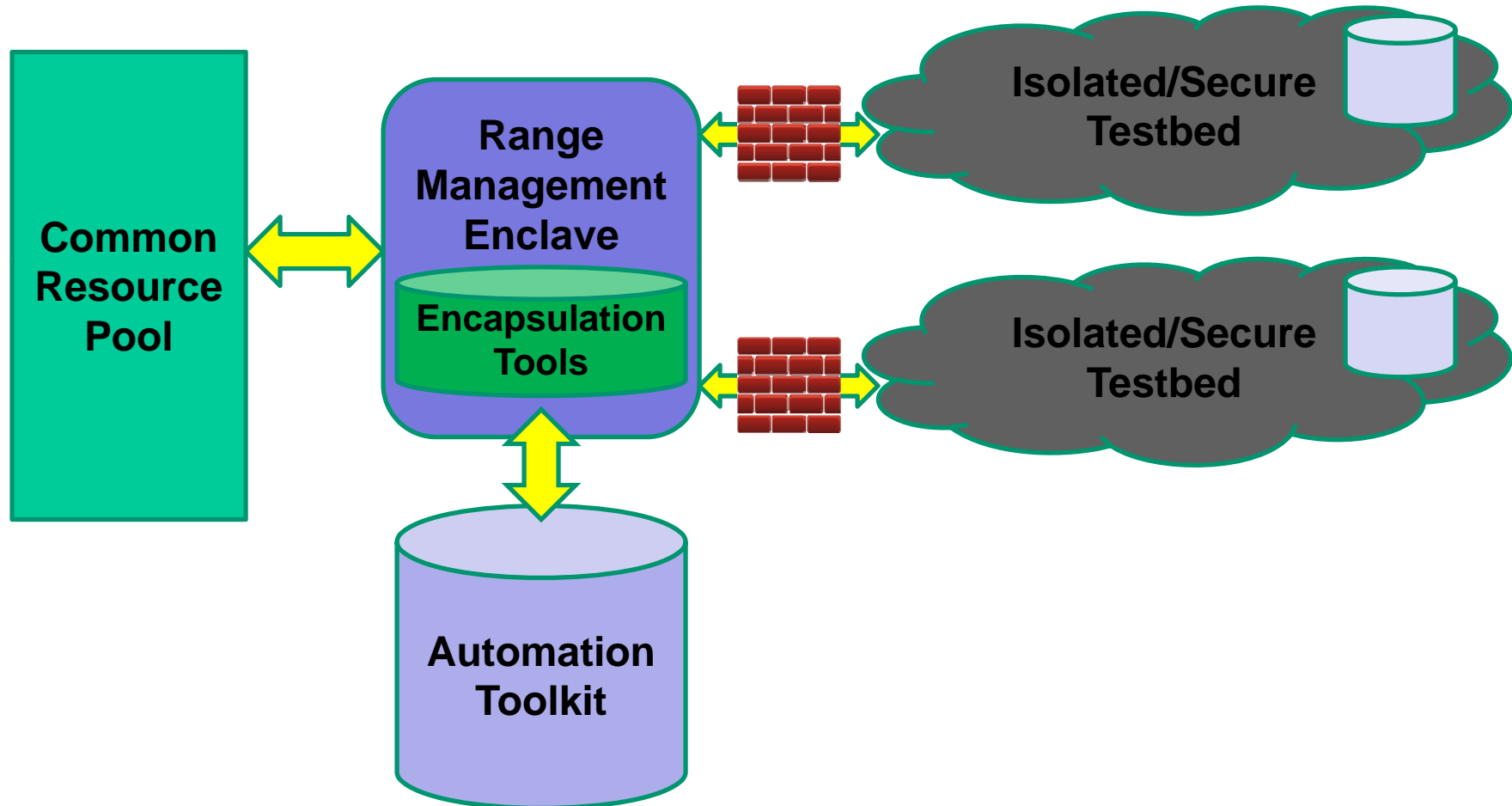


Cyber Test Team





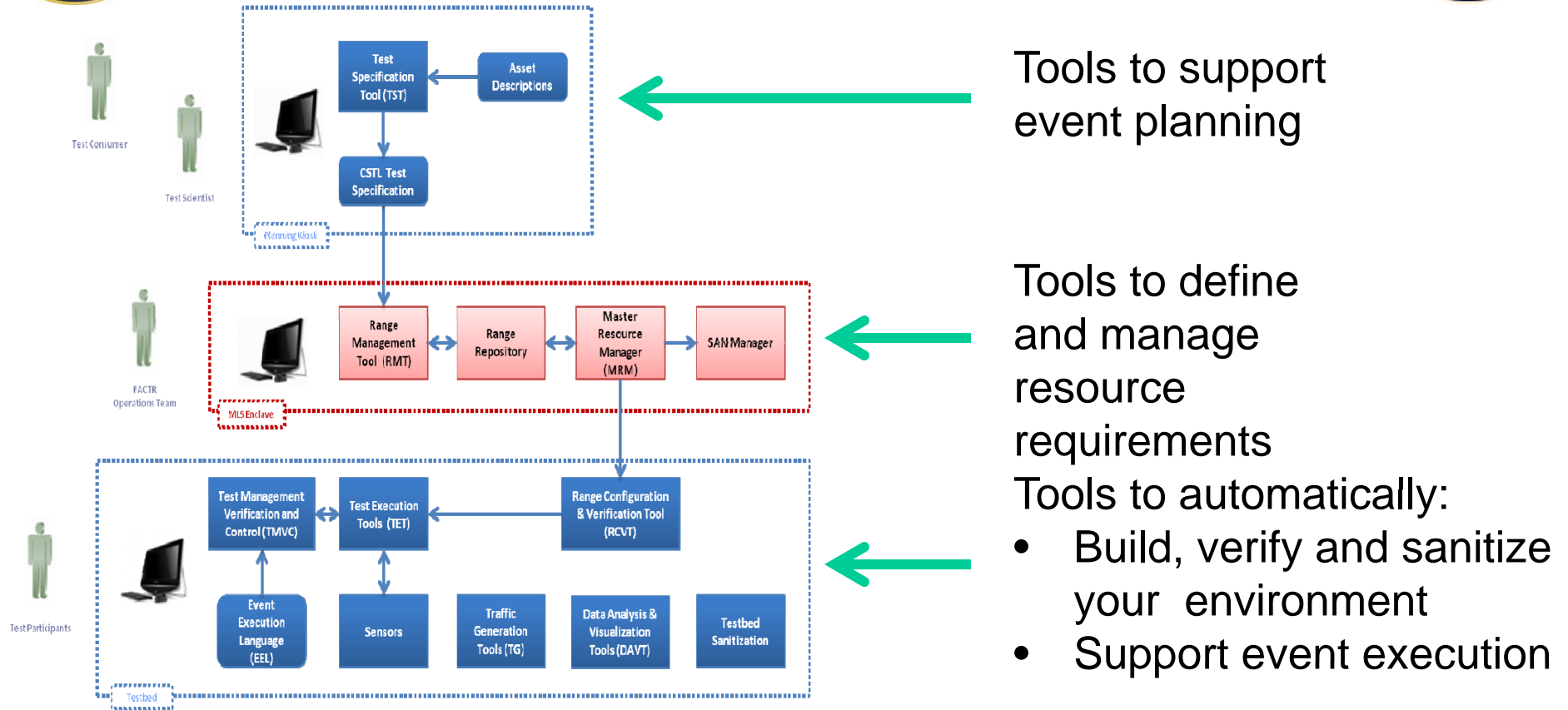
Reconfigurable Range Concept



Partitions a common pool of resources into multiple independent testbeds



Automation Toolkit: End to End Support



Tools to support event planning

Tools to define and manage resource requirements

Tools to automatically:

- Build, verify and sanitize your environment
- Support event execution

Faster, more reliable, event environment creation and execution



NCR Event Schedule



	Week 1	Week 2	Week 3	Week 4	Week 5
JULY	Dev, I&T	Dev, I&T	Dev., I&T	Dev., I&T	Dry Runs
AUGUST	1	2	3	4	5
	(original Test Week)	Test Week			
			Dev, I&T	Dev., I&T	
RSC - August	Basic-Dev, I&T	Basic- Exec, DA,CO			
SEPTEMBER	1	2	3	4	5
	I&T	Dry Runs	Dry Runs	Integration Env.	Integration Env
	Dry-runs	Test Week	Data Analysis & CO		Scaled- Dry Runs
OCTOBER	1	2	3	4	5
	Integration Env	Integration Env	Integration Env	Test Week	
	Scaled- Test	Dev., IT&	Dev., I&T	Dry Runs	
NOVEMBER	1	2	3	4	5
	Test Week	Data Analysis & Closeout	Dev, I&T	Dev, I&T	
	Test Week	Test Week	Data Analysis & CO		
DECEMBER	1	2	3	4	5
	Dry Runs	Test Week	Data Analysis & CO		
				Range Shutdown	Range Shutdown
	Enhanced- Dev., I&T	Enhanced Dev., I&T	Enhanced Dev., I&T		

- Oblivion:
- Quartz:
- Basic
- Scaled
- Enhanced
- Future
- Light:
- Nimbus:
- Meridan:
- Plasma:



Summary



- The concepts of Distributed Testing and Cyber T&E are new to many in the T&E community
- TRMC & JMETC have demonstrated multiple efficiencies and successes for our DoD customers
- JMETC continues to update and improve the infrastructure and other capabilities needed for Distributed Testing and Cyber T&E
- The National Cyber Range is mission ready and available now

JMETC is investing in Cyber T&E infrastructure and standards



JMETC Program Points of Contact



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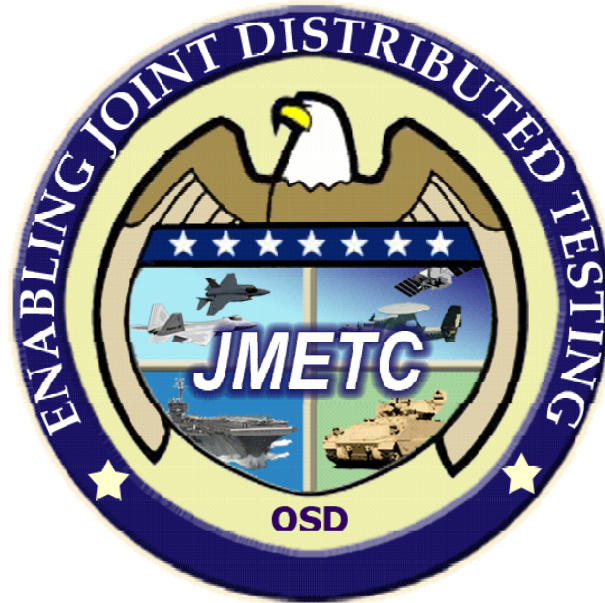
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Questions?