Joint Mission Environment Test Capability (JMETC)
Improving Distributed Test Capabilities

NDIA Annual T&E Conference

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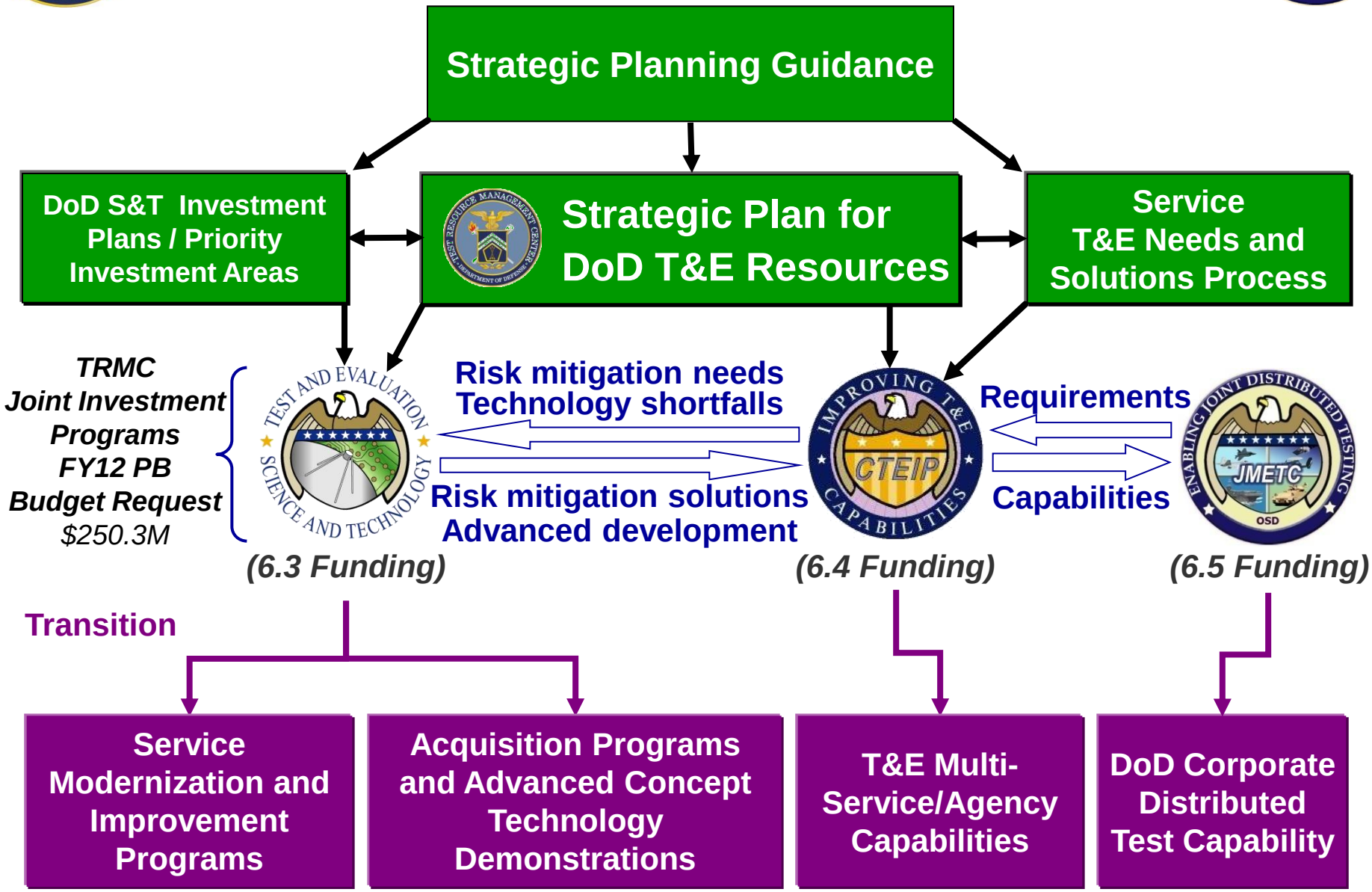
March 13, 2012

Agenda

- TRMC
- Distributed Testing
- JMETC
- Efficiencies of JMETC Supported Testing
- JMETC Infrastructure
- JMETC Supported Events
- Summary

The TRMC "Blueprint":
Putting Test Capabilities on the DoD Map

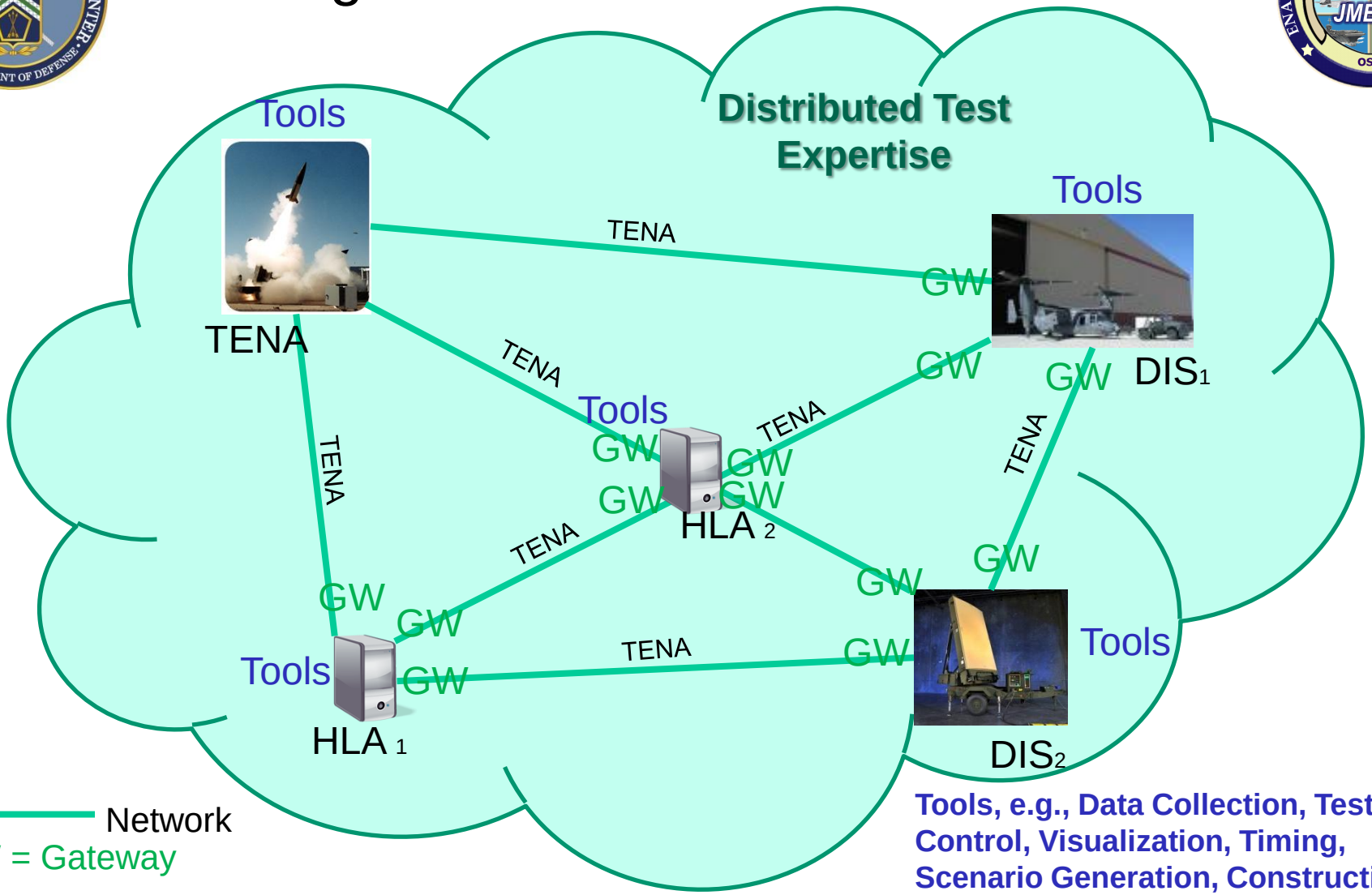


What is Distributed Testing?

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

Providing the Distributed Test Infrastructure



Tools, e.g., Data Collection, Test Control, Visualization, Timing, Scenario Generation, Constructive Simulation Interfaces (OneSAF, JSAF, etc.)**, Infrastructure Performance** (measuring throughput, packet loss, latency, etc.)

JMETC is more than a network!

Why Consider Distributed Test?

- Is there a requirement to exchange data within your system or within a system-of-systems (SoS)?
- Do you have a requirement to address SoS interoperability issues early in the acquisition process?
- Do you have adequate numbers of systems under test for live testing?
- Do you have adequate numbers of “supporting cast” (supporting systems, C4ISR assets, etc.) for live testing?
- Do you have adequate threat types, fidelity, and density in realistic numbers at realistic ranges for live testing?

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 cyberspace environment

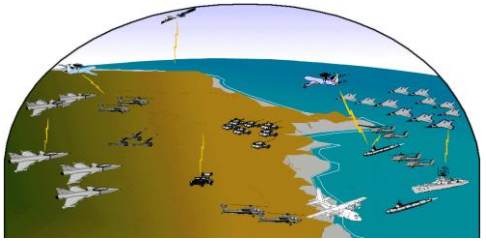
JMETC Enables Distributed Testing

Joint Operational Scenarios

Systems Under Test



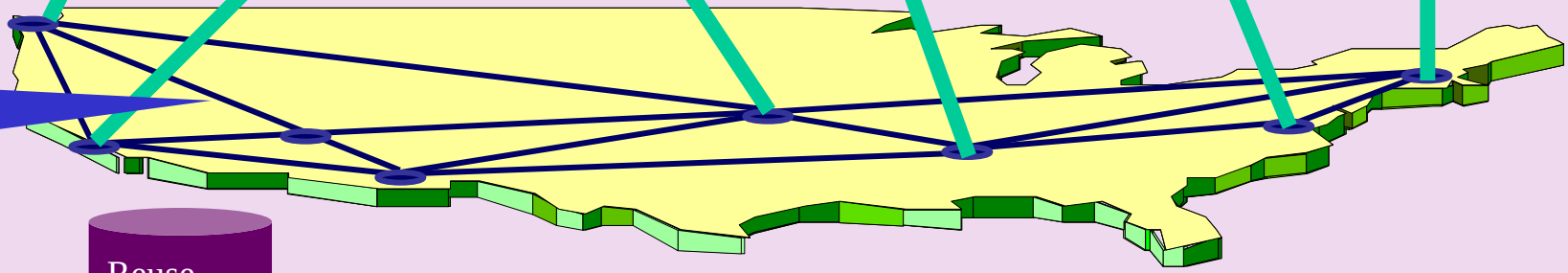




Integrated Test Resources

Virtual Prototype	Hardware in the Loop	Installed Systems Test Facility	Range	Environment Generator	Threat Systems
TENA Standard Interface Definitions	TENA Standard Interface Definitions	TENA Standard Interface Definitions	TENA Standard Interface Definitions	TENA Standard Interface Definitions	TENA Standard Interface Definitions
TENA Common Middleware	TENA Common Middleware	TENA Common Middleware	TENA Common Middleware	TENA Common Middleware	TENA Common Middleware

JMETC Network on SDREN



Reuse Repository

JMETC Infrastructure

Distributed Test Support Tools

Data Management Solutions

Customer Support

* TENA: Test and Training Enabling Architecture

JMETC Connectivity

- Functional Sites: 67
- New Sites Planned: 12
- 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

Boeing LabNet: Tukwila
Keyport: NUWC
Ft Lewis: EPG

Site in Alaska
Ft. Greely: CRTC

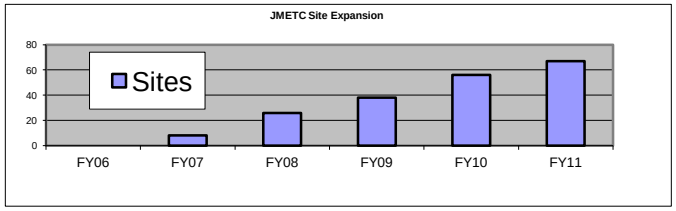
Edwards (2):
Ridley
412th EWG IFAST
China Lake (2):
F/A-18, IBAR
TSPIL
Point Mugu (2):
ITEC, EA-6B
El Segundo:
NGC B-2
Camp Pendleton:
MCTSSA
Corona: NSWC
Palmdale, NGC BAMS
Point Loma :
SSC-PAC 59140
SSC-PAC HAIPE
West Agg Rtr.
Rancho Bernardo, NGC BAMS

Sites in Hawaii
PMRF: Bldg 105
MHPCC

Dugway Proving Ground
Schriever AFB: JEWL
Nellis AFB: CAOC-N
Yuma PG
Ft Huachuca: (4)
JITC, JTDL, CMIS, JTRS
WSMR: IRCC
Tinker AFB: AWACS
Ft. Sill: FSED
Greenville: Rivet Joint
Ft Hood (2): CTSF, TTEC
Boeing LabNet: Berkeley
WPAFB: SIMAF
Crane: NWSC RDT&E
Redstone (10): SMDC
RTC: DTCC, GMAN
SED: Patriot, THAAD, FAAD, GSIL, JLENS, MUSE, SIV
(2) SED-PSEM, AMRDEC
GTRI
Charleston (2): IPC, MEF-MEU
Hurlburt Field: C2DAC
Eglin AFB (5):
AOC, DTF, GWEF, KHILS, JDAT
Melbourne:
NGC JSTARS

Hanscom AFB: CEIF
Bethpage: NGC BAMS
Bethpage: NGC BCN
Moorestown: CSEDS

Aberdeen: ACCN
Pax River:
(8)ESTEL E2C/D, MCL, ACETEF, SAIL, ATR, E-2C SIL, UASIL, MFS
JMETC SYSCON
East Agg Rtr.
Dahlgren (2): CEDL,IWSL
JS J8 DDC4: C4AD
Langley (2):
C-GIIF, TDLITC
Norfolk: COMOPTEVFOR
Dam Neck: CDSA
Wallops Island:
(2) SCSC, SSDS
Newport News:
NGC VASCIC
McLean: MITRE NCEL
LMCO Global Vision Network, Arlington, VA

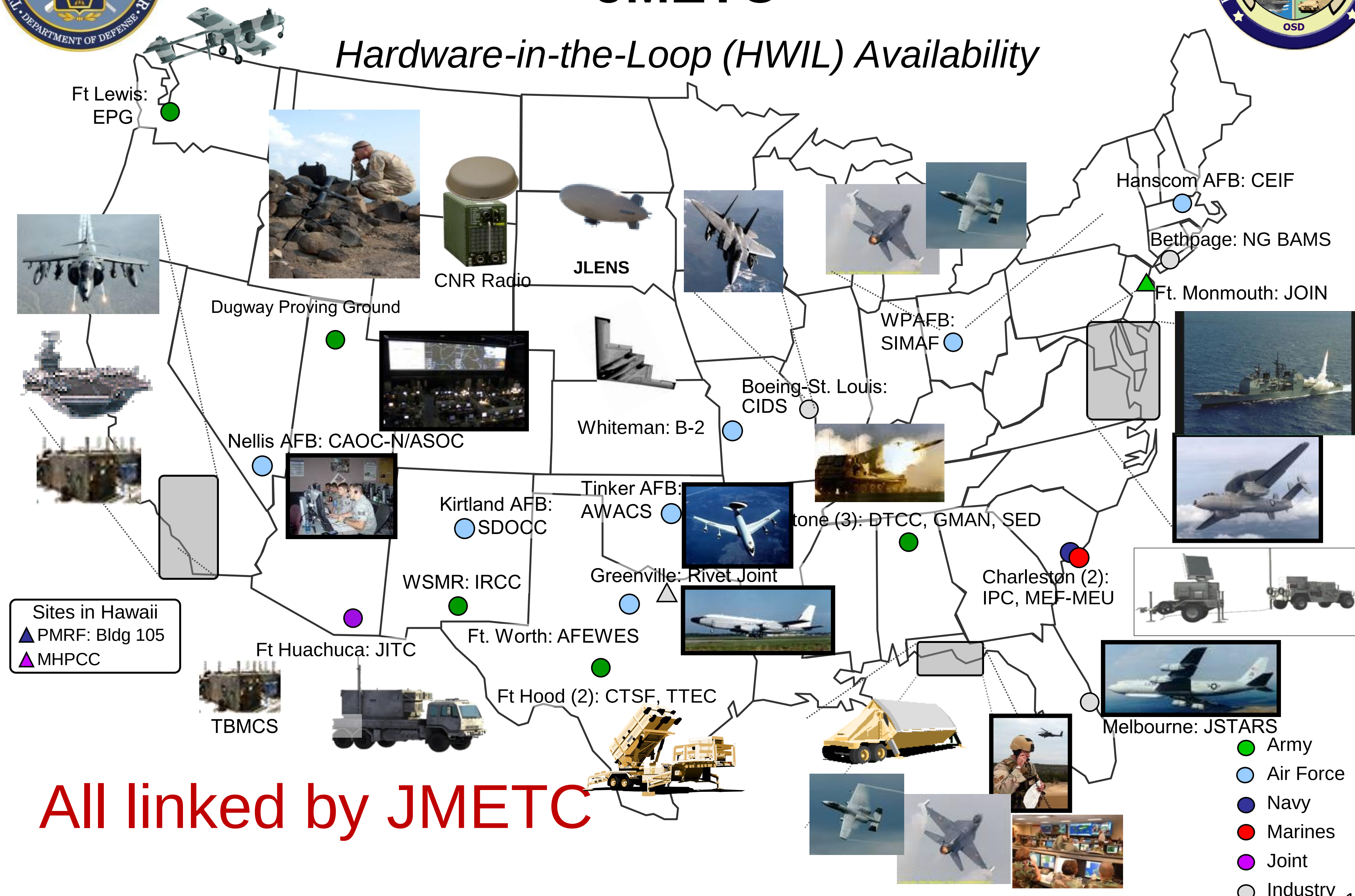


As of 27 Feb 2012

Army
Air Force
Navy
Marines
Joint
Industry
Academia

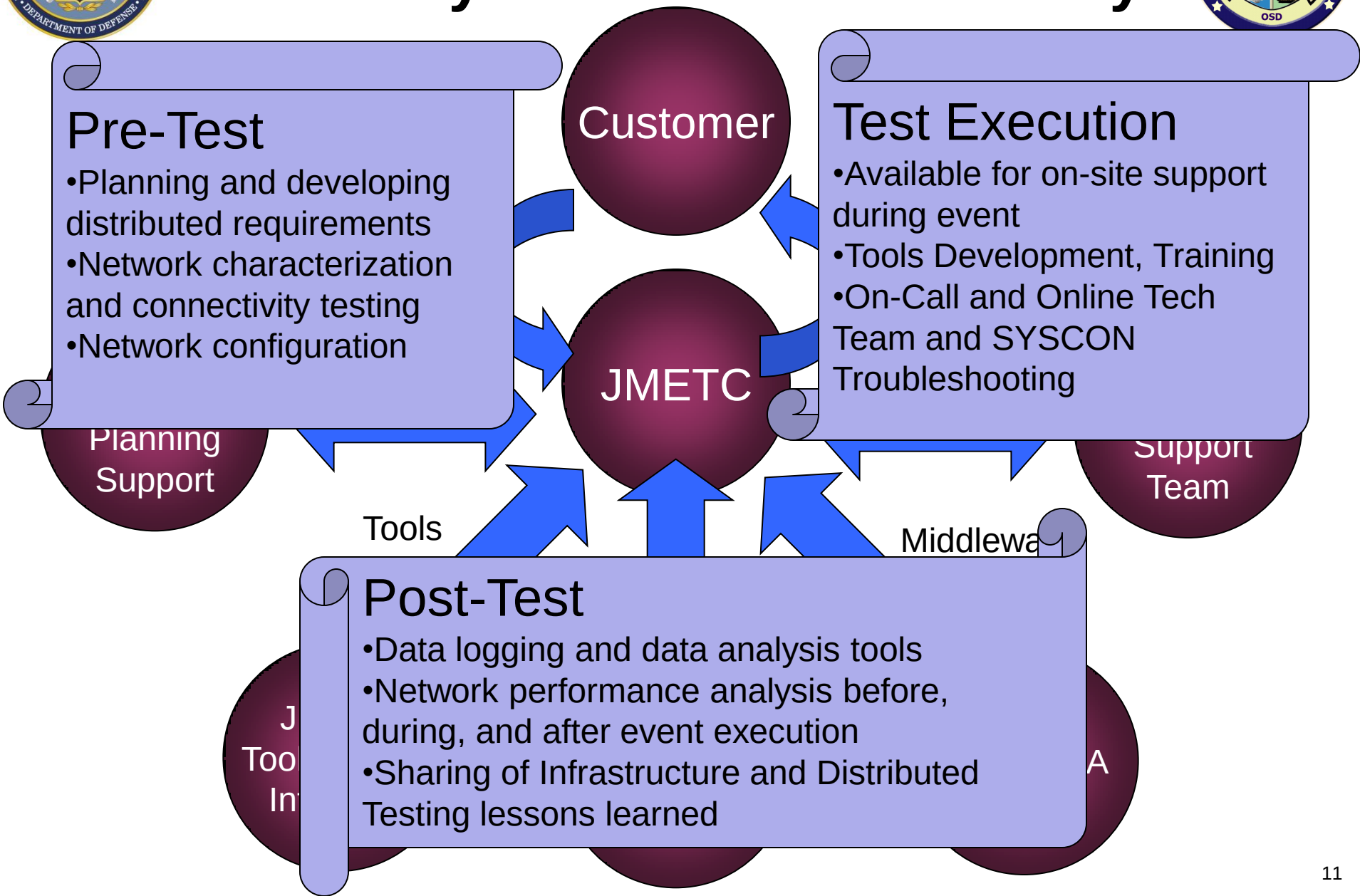
How a Test Planner Should View JMETC

Hardware-in-the-Loop (HWIL) Availability



All linked by JMETC

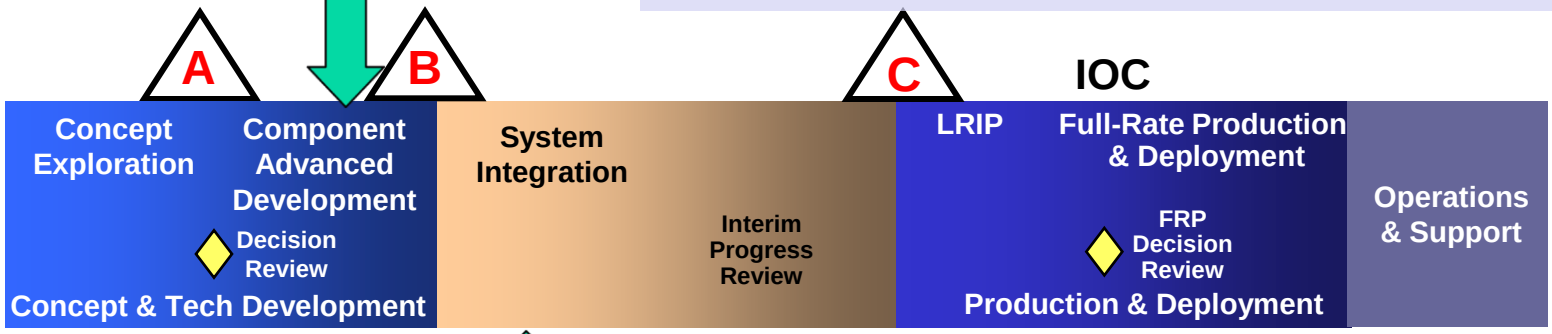
You worry about the test
We worry about the connectivity



The Future of Distributed Testing: Test-Fix-Test Across the Acquisition Life Cycle

Outline Distributed Testing and JMETC requirements in TEMP

Rapid Acquisition, Developmental Test, Operational Test, Interoperability Certification, Net-Ready Key Performance Parameters testing, Joint Mission Capability Portfolio testing



Pre-Systems Acquisition

Systems Acquisition
(Engineering & manufacturing development, demonstration, LRIP & production)

Sustainment

Enables <u>early</u> verification that systems work stand alone and in a Joint Environment

Helps find problems early in acquisition – when they are less costly to fix

Creates robust environment for common prototype analysis

Provides subject matter expertise to integrate distributed facilities

JMETC enables continuous testing across the acquisition life cycle

JMETC reduces acquisition time and cost

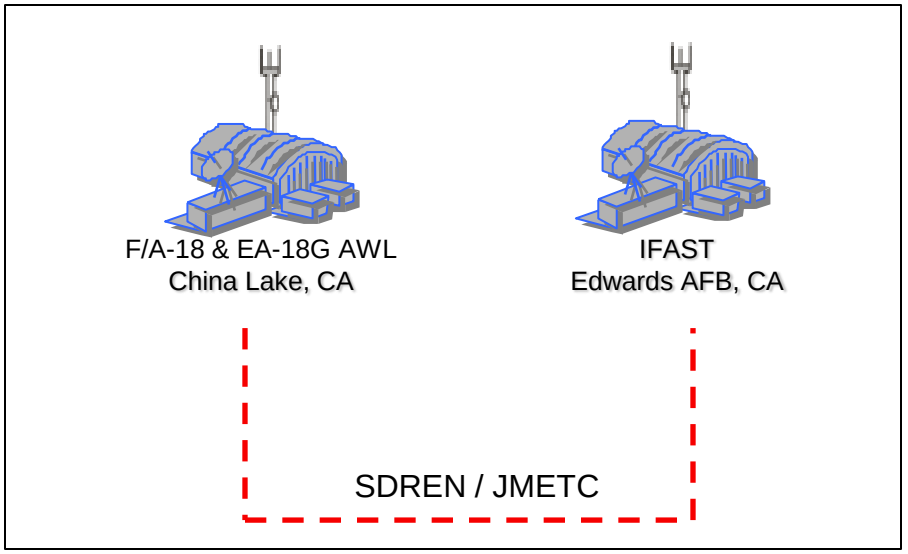
By Providing

- Readily-available, persistent connectivity
- Standing network security agreements
- Common interoperability software for integrating test assets
- Certified test tools for distributed testing

JMETC Customer Testing Success

F-16 and F/A-18 Link 16 Interoperability Testing

- Investigated the ability for USAF F-16 Falcon and USN/USMC F/A-18 Super Hornet aircraft to exchange Link 16 information
- JMETC Systems Control (SYSCON) and the Secret Defense and Engineering Network (SDREN) Network Operations Center (NOC) remotely configured and tested local network assets to extend connectivity to additional assets within the facilities
- Program scheduled and executed within 7 days in Dec 2011



IMPACT--Efficiency, Lower Technical Risk, and Cost Savings

- Over 30 different test points assessed
- Identified potential communication issues on the F-16 which will be confirmed once the collected data is thoroughly analyzed

Interoperability Certification

Joint Interoperability Test Command (JITC): Joint Tactical Data Link (JTDL) Testing

- JITC conducts interoperability assessments, standards conformance, and interoperability certification testing of joint tactical data links in HWIL and operationally realistic environments to validate the implementation of approved standards in a Joint environment.
- Typically 5/year

IMPACT--Joint Interoperability

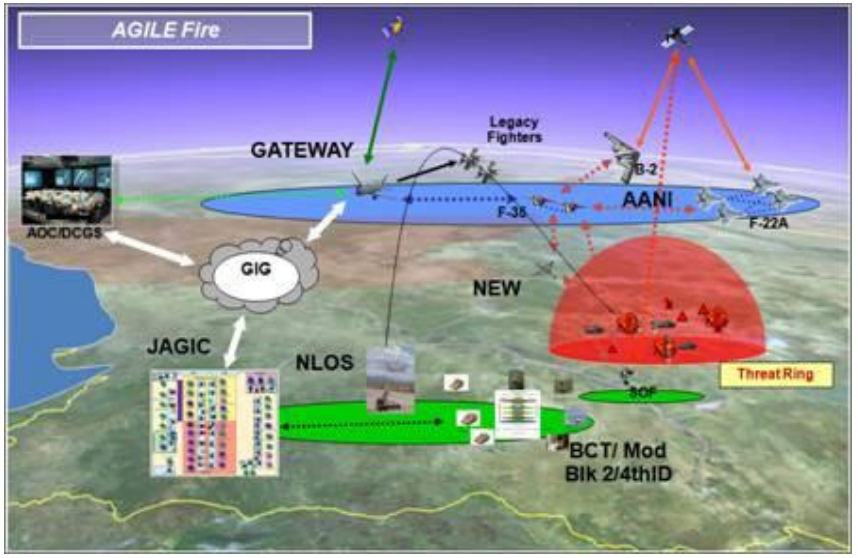
JITC 12-02

- Tactical Data Link, Variable Message Format C2 for: B2B, E3 AWACS, E2 Hawkeye, Forward Area Air Defense System, Advanced MANPADS
- Testing completed ahead of schedule

JMETC Customer Testing Success

Air-to-Ground Integrated Layer Exploration (AGILE)

- Sponsored by the Simulation and Analysis Facility (SIMAF), USAF Air Systems Command
- LVC venue for selected initiatives to explore Joint airspace integration procedures and data exchange requirements within and between Air and Ground domains to execute Joint Fires
- JMETC provides infrastructure and technical support for all AGILE events
- AGILE VI scheduled for Aug 2012



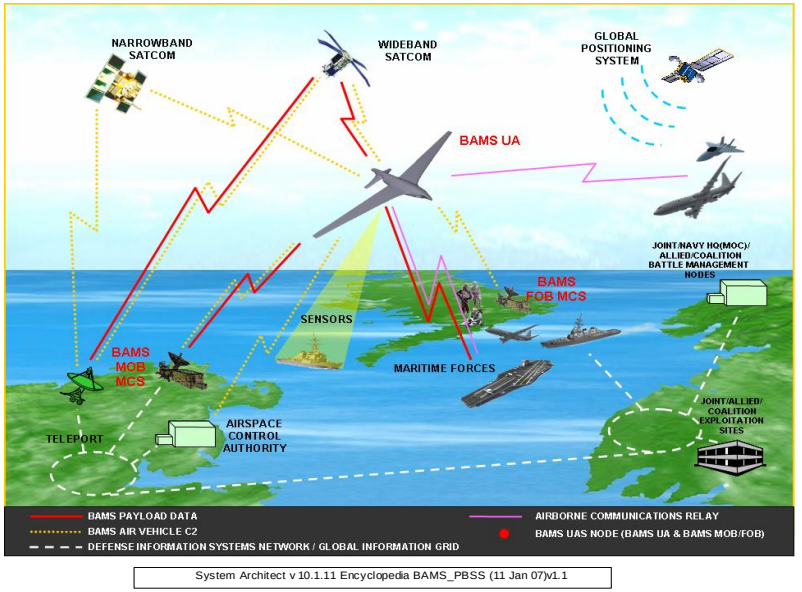
IMPACT--T&E Efficiencies

- AGILE Phase V MainEx: Feb, 2012
  - 13 sites connected by JMETC
  - 7 programs Including: Network Enabled Weapon (SDB II), Digitally Aided Close Air Support and Joint tactical Air Picture
  - Operationally realistic LVC scenarios
  - 80% of systems were live

JMETC Customer Testing Success

Broad Area Maritime Surveillance System (BAMS)

- Integrated SoS providing multi-sensor persistent maritime ISR to the Maritime Patrol and Reconnaissance Force
- Distributed testing used as solution for distinct test data and network requirements
  - Programmatic needs
  - Engineering needs



IMPACT--Efficiency, Lower Technical Risk

- Test early/test often
- Real time connectivity between system developer (NG) and Navy System Integration Laboratory (Pax) to address risks before flight testing

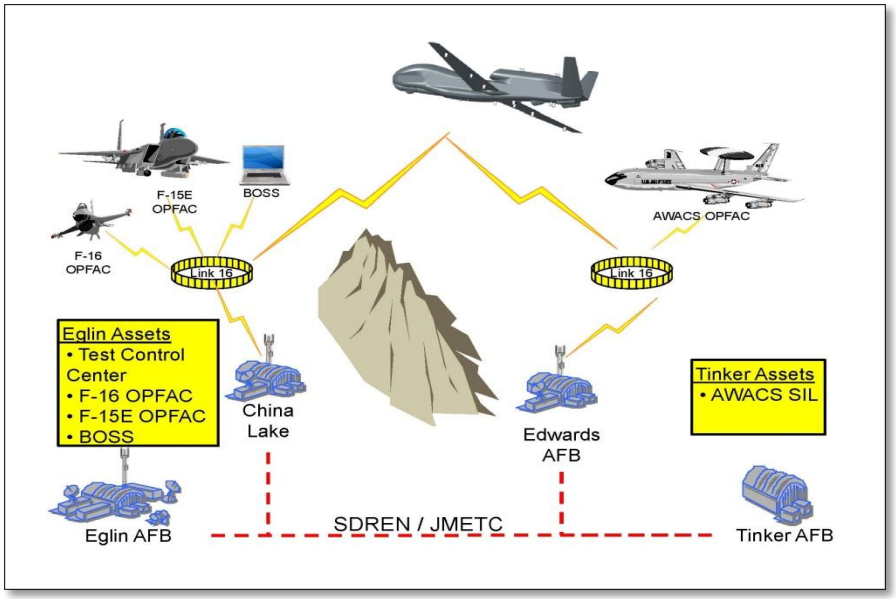
JMETC Customer Testing Success

Battlefield Airborne Communication Node (BACN) Joint Urgent Operational Need

- Integration of BACN payload onto multiple platforms for solution to net-centric warfare challenges of:
  - Beyond line-of-sight comm
  - Relay, bridge, and range extension for ground forces and supporting aircraft

- Distributed testing included Live-fly DT and Operational Utility Evaluation in Fall 2010

- Testing will continue throughout FY 2012 to include BACN upgrades, platform acceptance and additional platform testing



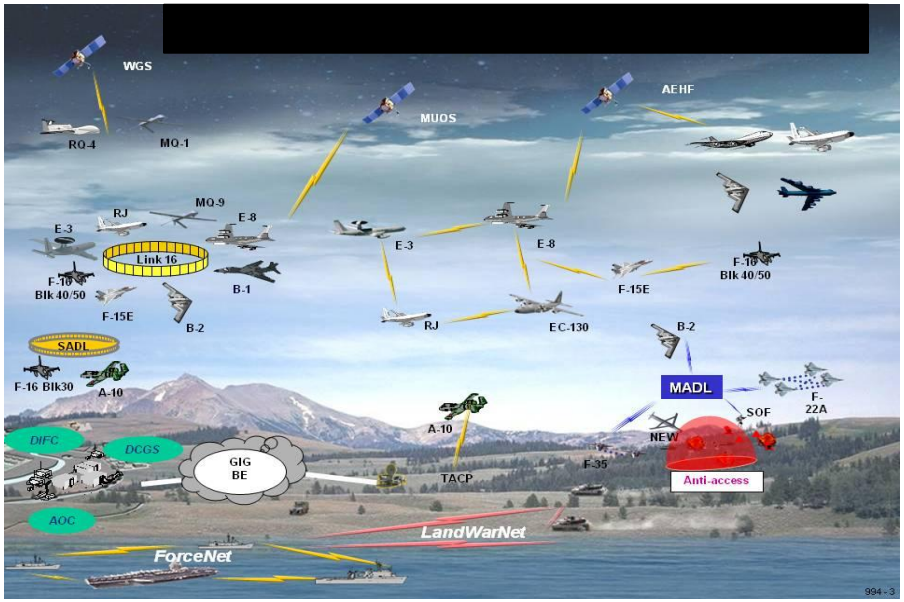
IMPACT--Cost Savings and Better Product

- Efficient integration of DT and OT
- All required assets not available on-site
- Distributed testing saved “$1.2M”
- Urgent capability fielded

JMETC Customer Testing Success

Recent distributed test event at a major test facility

- C2 Interoperability upgrade to National strategic asset
- Significant software and interoperability problems found during initial distributed testing
- Discovered system NOT ready for open air testing



IMPACT--Risk Reduction Early Identification of Problem

- Early distributed testing led to early identification and correction of interoperability issues
- No range or flying costs

JMETC FY12 Major Events

Customer	Event	Record Event Dates*
Joint	JITC Joint Interoperability Tests JIT 12 - 1,2,3,4,5 (Continuous)	October 2011--September 2012
Navy	Broad Area Maritime Surveillance (BAMS) Environment Integration	October 2011--September 2012
Air Force	Air Force Systems Interoperability Test (AF SIT) 12-01, 02	October 2011-January 2012
Air Force	AGILE Fire Phase V, Phase VI	February--August 2012
Marine Corps	Ground/Air Task Oriented Radar Developmental Testing	March --September 2012
Joint	JIAMDO Correlation/De-correlation Interoperability Test (C/DIT) Integration Events (Continuous) OCONUS	February--September 2012
Joint	AGILE Fire Phase VI	August 2012
Joint	JIAMDO Joint Tactical Air Picture (JTAP) (Coincides with AGILE Fire Phase VI)	August 2012
Joint	JIAMDO Joint Sensor Integration JSI	August 2012
Army	Network Integration Event/Network Integration Rehearsal (NIE/NIR) Risk Reduction	3d/4th QTR 2012
Navy	Accelerated Mid-Term Interoperability Improvement Program (AMIIP)	December 2011--May 2012
Army/Navy	Vengeance	January--May 2012
Navy	NavAir Integrated Warfare Capability (IWC)	March--August 2012

* Each event is normally preceded by 1-3 spirals: Connectivity Check, Integration, and Dry Run

Initiatives

JMETC Moves Forward with JIOR in Cyber Test Capability

- JMETC continues using the SDREN to support secret-level requirements, adjusting as needed to meet customer test requirements
- JIOR continue serving the training/COCOM customers and solutions
- JMETC and JIOR leverage each other's capabilities
  - For Cyber testing, see (mission) effects on the JMETC; leverage JIOR, TSMO, and others for threats
  - JMETC leverage JIOR for TS/SAP/SAR and coalition testing

JMETC is investing in Cyber infrastructure and standards

Marine Corps Air Control Sqdn 24 Wireless Range Extension

- USMC Systems Command's Product Group (PG-11) is creating an Integration and Test Facility at MACS-24 near the Dam Neck campus in Virginia Beach, VA
- JMETC is supporting with hardware upgrade, and capabilities expansion of PG-11's Analysis and Reduction for Operational Assessment (ARORA) mobile T&E semi-trailer.
- Connecting ARORA at MACS-24 to the JMETC Infrastructure via a wireless range extension capability to Combat Development Systems Activity (CDSA), Dam Neck

Support more Marine acquisition programs with distributed testing

Digital Fast Fourier Transform (DFFT)

- JTRS JPEO needed LVC solution due to limited test assets.
  - DFFT determined to be a potential capability for "RF over the wire."
- JMETC and JTRS JPEO conducted an Analysis of Alternatives and developed a plan to test selected products with the JTRS Hand Held and GMR radios.
- Test report release pending, but If successful, this solution may also be applicable at Edwards AFB, Army NIE, and other test sites/events.
- JMETC/JTRS JPEO developed a capability to allow for distance transmission of RF energy via the IP based network.
- Still have to tackle the "hard" problem – time slot allocation.

Phase II in planning stages to determine how best deliver full test utility

Additional JMETC FY12 Initiatives

- Enterprise Cross-Domain Solutions (CDS) to identify an efficient rule set development and approval
  - “Proof of Concept” SimShield CDS deployed at Dahlgren
- InterTEC Tools Transition & Sustainment
  - The Services and JITC are partnering with JMETC to begin InterTEC Tool Sustainment upon conclusion of CTEIP project in FY13
  - InterTEC Tools will be integrated into the JMETC Reuse Repository
- Service Specific Software Certification of JMETC tools
  - TENA has received Air Force and Navy software certifications,
  - We have submitted TENA for Army certification
  - Other potential efficiencies may be found in Application Virtualization and Cloud computing

JMETC Users Group

- **Purpose is to focus on technical requirements and solutions relevant to current and future distributed testing needs.**
  - **Technical and Management level representatives identify core infrastructure requirements, and most importantly resolve issues**
- **Quarterly meetings of JMETC customers, acquisition programs, test events, ranges, LVC sites, tools and network providers**

- **An established forum for the Distributed Test Community to:**
  - **Identify core infrastructure requirements and use cases**
  - **Identify, investigate, and resolve issues**
  - **Identify opportunities to collaborate**
  - **Discuss available solutions, tools, and techniques**
  - **Share lessons learned**

Next JMETC Users Group Meeting:

- Scheduled for May 8-9, 2011
- Location: SW USA (Phoenix?)
- Anticipated Tracks:
  - User Requirements
  - Security/Info Assurance
  - Data Management
  - Cyberspace T&E
  - Distributed Test Tools
  - Threats

Summary

- JMETC is here and proven!
  - Many sites and systems already connected
  - Demonstrated efficiencies
  - Robust capability – ability to execute multiple events simultaneously, across the spectrum of T&E and acquisition life cycle
  - Multiple examples of JMETC value added for customers
  - Provides Acquisition T&E programs flexible and efficient T&E at lower cost and technical risk
  - JMETC offers support to develop our customer's distributed test requirements

JMETC enables both Acquisition and T&E Communities to partner for a better product, faster, and at a lower cost!

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Questions?