Joint Test and Evaluation Methodology (JTEM) Overview:
Precision Strike Testing in a Joint Environment

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Overview

- Background
- JTEM Test Concept
- Capability Test Methodology
- Joint Mission Environment Definition
- Assembling the Joint Mission Environment
- FY07 Test Event w/ Precision Munitions
- JTEM Products

Background: Testing in a Joint Environment Roadmap

Transformation Planning Guidance

- Joint "concept-centric" approach for capability development
- Integrated architectures define parameters of joint capabilities
- Need to test capabilities and architectures in a realistic joint environment

Signed April 2003

Strategic Planning Guidance

- Need realistic T&E in a joint operational context
- Directed DOT&E to develop a roadmap to identify changes necessary to ensure T&E is conducted in a joint environment to enhance fielding of joint capabilities

Signed March 2004

Testing in a Joint Environment Roadmap

- Build Joint Mission Environment from mission requirements defined by JCIDS
- Required for entire acquisition process, not additional test
- Defines infrastructure required:
  - -- Network connectivity
  - -- Service environments
  - -- Program-specific

Signed November 2004

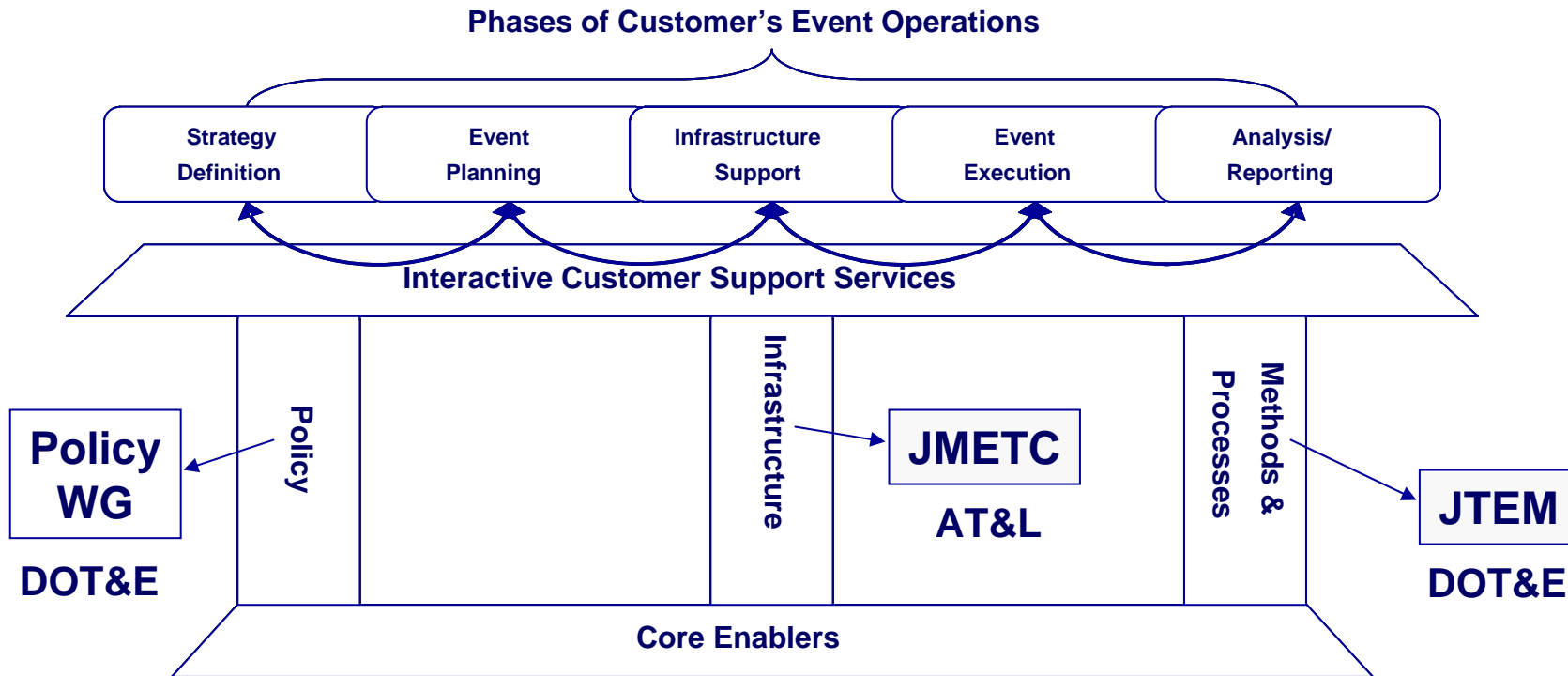## *Recognized need for T&E Transformation*

DOT&E – Director of Operational Test and Evaluation
JCIDS – Joint Capabilities Integration and Development System
T&E – Test and Evaluation

Background: JTEM Role in the Roadmap Implementation

Phases of Customer's Event Operations

Strategy Definition	Event Planning	Infrastructure Support	Event Execution	Analysis/ Reporting

Interactive Customer Support Services

Policy

Infrastructure

Methods & Processes

Policy WG

DOT&E

JMETC

AT&L

JTEM

DOT&E

Core Enablers

Methods & Processes Working Group Issues delineated in Implementation Plan form basis for JTEM methodology

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AT&L – Acquisition Technology and Logistics
JMETC – Joint Mission Environment Test Capability
DOT&E – Director of Operational Test and Evaluation
WG – Working Group

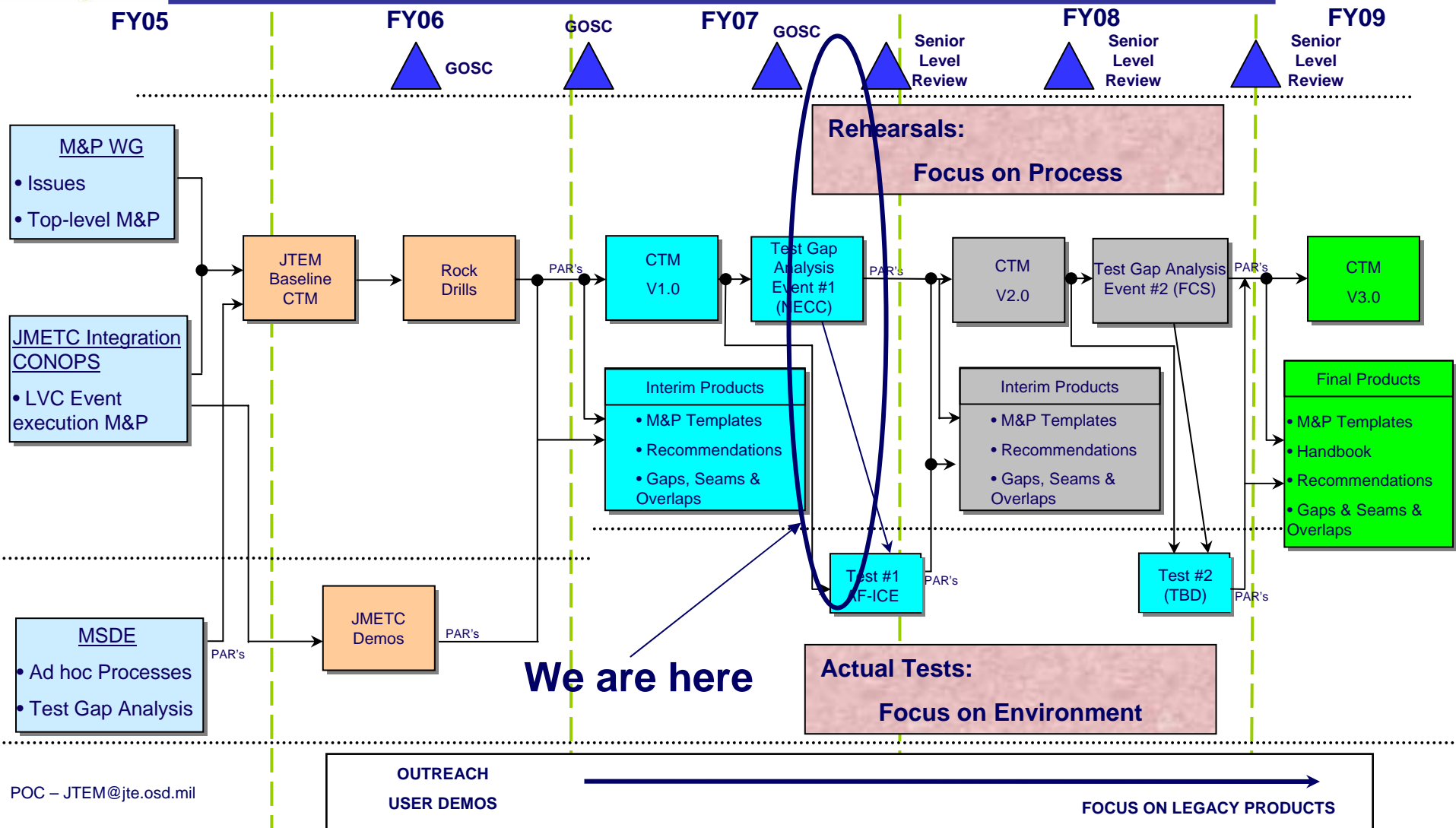# Background:
JTEM Problem Statement

Processes and methods for designing and executing tests of system of systems in the joint mission environment are not well defined or understood. Nor is there a clear understanding of how to assess system performance as it pertains to capabilities supporting joint missions.

Overall Goal: Recommended Best Practices for a consistent approach to describing, building, and using an appropriate representation of a particular Joint Mission Environment across the acquisition lifecycle.

JTEM Test Concept

GOSC

GOSC

GOSC

GOSC

Senior Level Review

Senior Level Review

Senior Level Review

M&P WG
- Issues
- Top-level M&P

JMETC Integration CONOPS
- LVC Event execution M&P

MSDE
- Ad hoc Processes
- Test Gap Analysis

JTEM Baseline CTM

Rock Drills

JMETC Demos

PAR's

PAR's

PAR's

CTM V1.0

Test Gap Analysis Event #1 (NECC)

PAR's

CTM V2.0

Test Gap Analysis Event #2 (FCS)

PAR's

CTM V3.0

Rehearsals: Focus on Process

Interim Products
- M&P Templates
- Recommendations
- Gaps, Seams & Overlaps

Interim Products
- M&P Templates
- Recommendations
- Gaps, Seams & Overlaps

Final Products
- M&P Templates
- Handbook
- Recommendations
- Gaps & Seams & Overlaps

Test #1 AF-ICE

PAR's

Test #2 (TBD)

PAR's

We are here

Actual Tests: Focus on Environment

OUTREACH

USER DEMOS

FOCUS ON LEGACY PRODUCTS

AF-ICE - Air Force Integrated Collaborative Environment   **CONOPS -** Concept of Operations   **CTM** - Capability Test Methodology **FCS** - Future Combat System
GOSC - General Officers Steering Committee   **JMETC** - Joint Mission Environment Test Capability   **LVC** – Live, Virtual, Constructive   **M&P WG** - Methods and Processes Working Group   **MSDE** - Multi-Service Distributed Event   **NECC** - Net-Enabled Command & Control   **PAR** - Process Anomaly Report

JTEM Capability Test Methodology (CTM) v1.1

**6 Steps
14 JTEM
Processes**

1. Characterize Test

- Program Introduction Document (PID)
- Statement Of Capabilities (SOC)

- Develop Test Concept
- Develop Evaluation Strategy
- Technical Assessment

2. Plan Test

- Develop Test Design
- Perform LVC Distributed Environment Analysis
- Develop Test Plan

0. Develop T&E Strategy

- T&E Strategy (TES)
- T&E Master Plan (TEMP)

- Develop Capability/SoS Description
- Develop Joint Operational Context for Test (JOC-T)
- Develop Evaluation Strategy Outline
- Develop/Refine Capability Crosswalk

Test Concept

Joint Operational Context for Test

Integrated Vignettes LVC Distributed Environment Design

3. Implement LVC Distributed Env.

Joint Mission Environment

- Design LVC Distributed Environment Configuration
- Integrate LVC Distributed Environment

Test Data

Test Control & Monitoring

5. Evaluate Test

- Analyze Data
- Evaluate SoS Performance & Joint Mission Effectiveness

4. Execute Test

LVC – Live, Virtual, Constructive
SoS – System of Systems

Joint Mission Environment (JME) Definition

	A	B	C	IOC	FOC
JCIDS	Concept Refinement **Concept Decision**	Technology Development	System Development & Demonstration **Critical Design Review**	Production & Deployment LRIP/IOT&E **FRP Decision Review**	Operations & Support
JROC	Pre-Systems Acquisition		Systems Acquisition		Sustainment

Constructive **Virtual/Live** **Live**

Joint Environment

Evaluation Continuum — Constructive — Virtual — Live

Concept Dev — Sys Design — System Dev — D T&E — IO T&E — Operations

Scenarios	**Terrain**
Threat systems	**Weather**
Blue forces	**Propagation effects**
Order of battle	**Logistics**
TTP/Doctrine	

Instrumentation
Time-Space-Position Information
Test/event control
Data reduction/analysis tools

DT&E – Development Test and Evaluation   **FRP –** Full Rate Production   **IOT&E –** Initial Operational Test and Evaluation   **LRIP –** Low Rate Initial Production   **JCIDS –** Joint Capabilities Integration and Development System   **JROC –** Joint Requirements Oversight Council   **TTP –** Tactics, Techniques, and Procedures   **T&E –** Test and Evaluation

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A physical test range has pre-existing infrastructure, configured so multiple systems under test (SUTs) can independently conduct live test missions simultaneously, usually geographically separated.
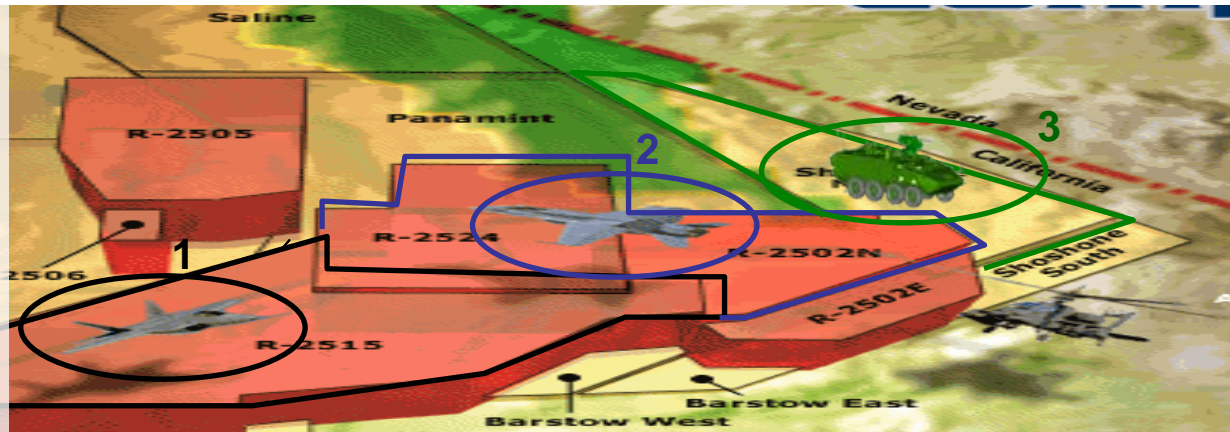
A "logical" test range is a LVC-DE with pre-existing LVC infrastructure, configured so multiple SUTs or SoS under test can independently conduct test missions simultaneously, separated by their JME.
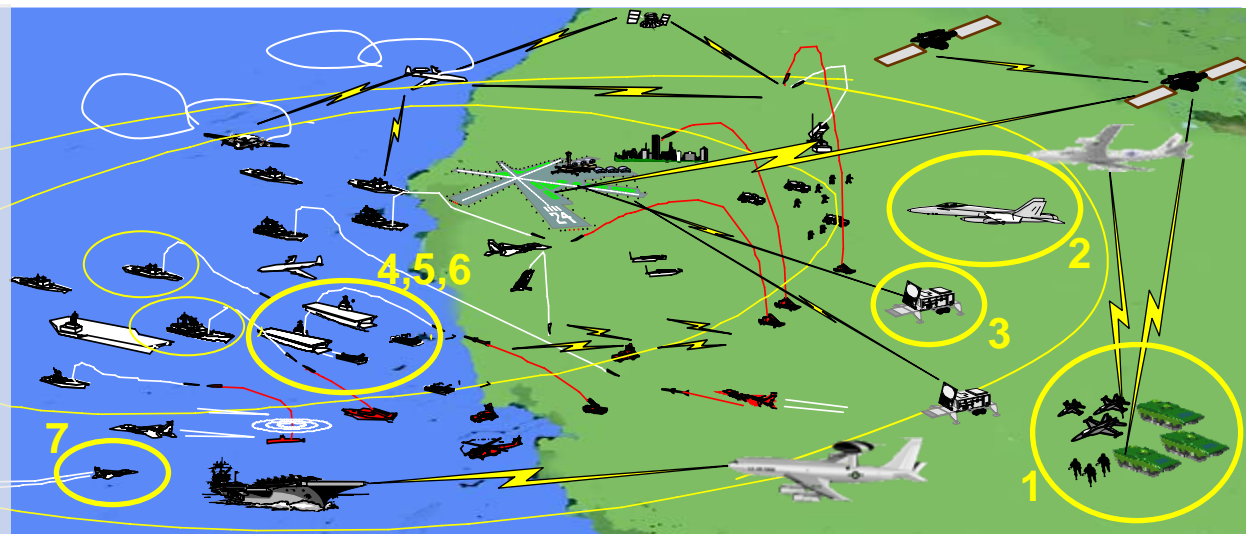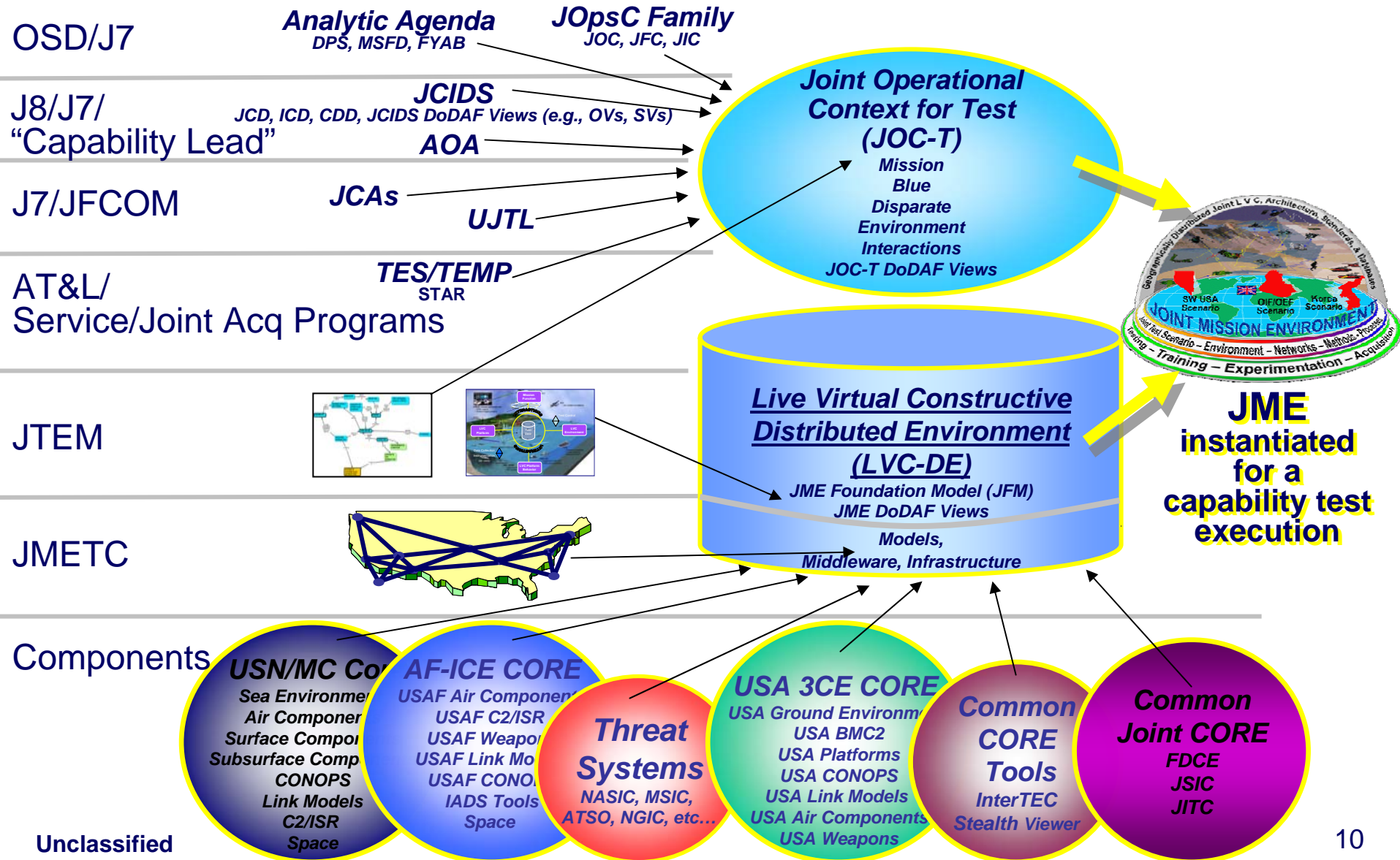
SUT 1 – JCAS
SUT 2 – SEAD (EF-18G)
SUT 3 – DCA (Patriot PAC-3)

SUT 4 – Maritime Propositioning Force
SUT 5 – Ship Self Defense System

SUT 6 – CSAR (MV-22)
SUT 7 – OCA (F-35)

Assembling the JME

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FY07 Test Event:
Precision Munitions Use Case

- **Joint Missions**
  - **Joint Close Air Support**
  - **Joint Fires**

Event Execution:
6-10 August 2007

- **Participating Systems**
  - **Network-Enabled Weapon**
  - **Non Line-of-Sight Launch System with Precision Attack Missiles**
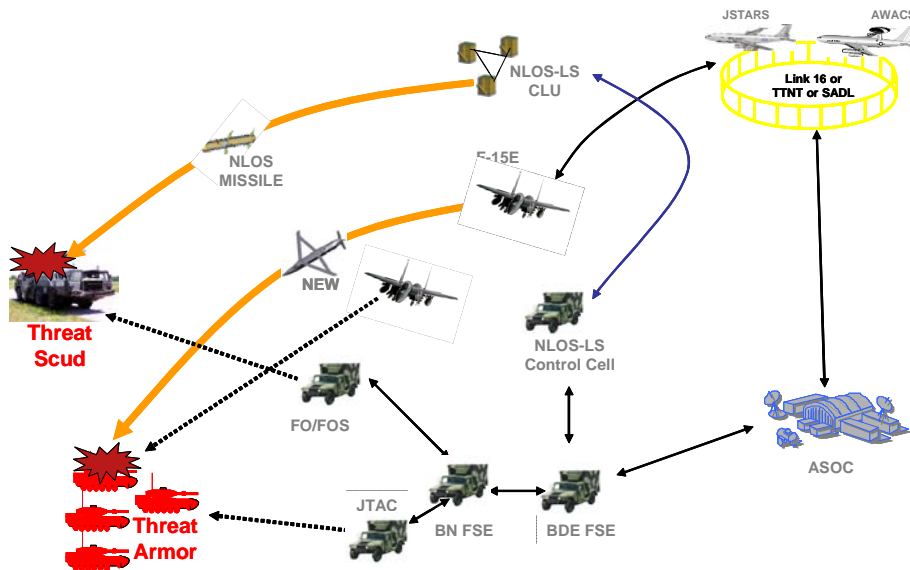
Test Activity: Testing in an Joint Environment during Development Test and Evaluation

Overall Test Goal: Use contributions to joint mission effectiveness to determine which of the tested weapon design and Joint TTP alternatives warrant further development.

FY07 Test Event:
Precision Munitions Use Case

Test Vignette:

NLOS-LS CLU

NLOS MISSILE

F-15E

Link 16 or TTNT or SADL

NEW

Threat Scud

NLOS-LS Control Cell

CAOC

FO/FOS

ASOC

JTAC

BN FSE

BDE FSE

Threat Armor
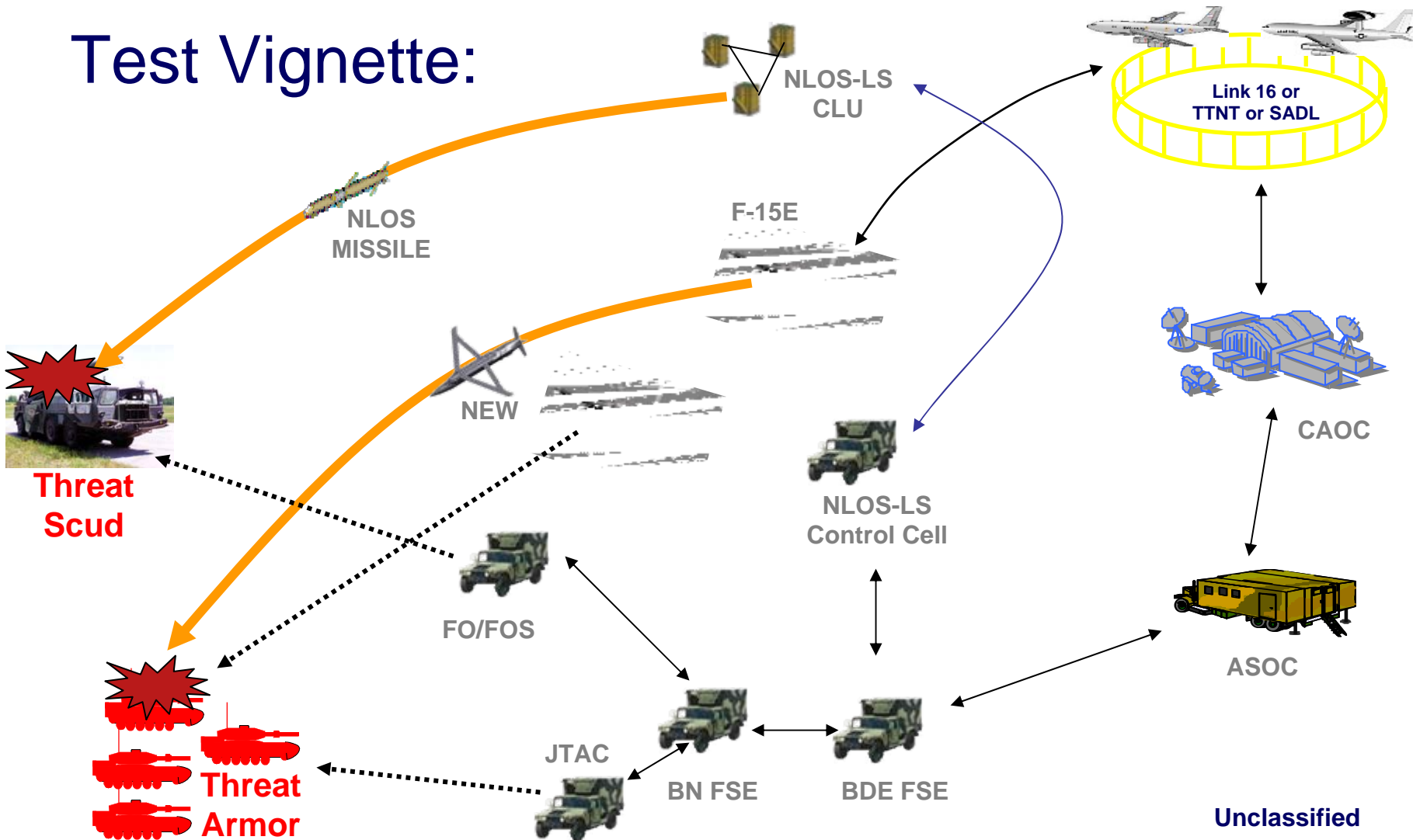
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ASOC – Air Support Operations Center   **AWACS** – Airborne Warning and Control System   **BDE –** Brigade   **BN** – Battalion   **CLU** – Container Launch Unit   **FO** – Forward Observer   **FOS** – Forward Observer Software/System   **FSE** – Fire Support Element   **JSTARS** – Joint Surveillance Target Attack Radar System   **JTAC** – Joint Terminal Attack Controller   **SADL** – Situation Awareness Data Link   **TTP** – Tactics, Techniques, and Procedures   **TTNT** – Tactical Targeting Network Technology
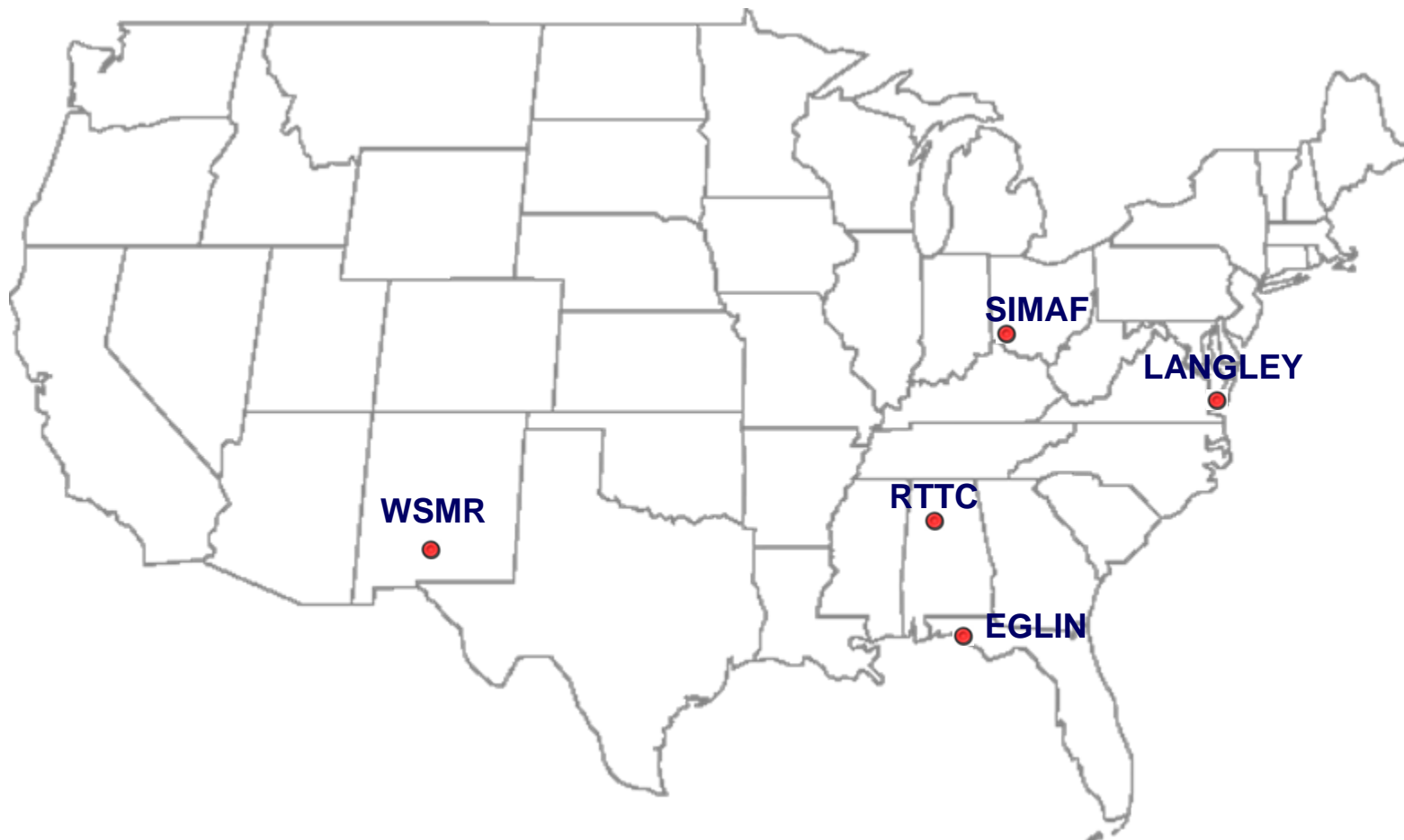
Precision Munitions Use Case: Test Objectives

- **Determine the ability to perform the NEW handoff function over Link-16.**

- **Determine the impact of airspace deconfliction on attack timelines when NEW and NLOS systems are employed in potentially conflicting situations that require the generation of an ACMR.**

- **Evaluate Guidance Message continuity after successful NEW handoff.**

Precision Munitions Use Case: Distributed Test Environment

RTTC – Redstone Technical Test Center   **SIMAF –** Simulation and Analysis Facility   **WSMR –** White Sand Missile Range

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Precision Munitions Use Case: Distributed Test Configurations

Function	Primary Configuration	Backup Configuration
JTAC	WSMR (Constructive)	Eglin (Live)
NEW	SIMAF (Constructive)	Eglin (Constructive)
Launch Aircraft	SIMAF (Virtual)	Eglin (Virtual)
Targets	WSMR (Live)	SIMAF (Constructive)
CAOC	Langley (Virtual)	Langley (Virtual)
NLOS-LS	RTTC (Constructive)	RTTC (Constructive)

JTEM Products Overview

Capability Test Methodology (CTM) Process Model

CTM Ontology:
- **Capability Evaluation Metamodel**
- **JTEM Lexicon**

JTEM Process Anomaly Report DB

Type 1

M&P TEMPLATES:
- **PID/SOC**
- **Test Plan**
- **SDD**
- **JFM**
- **JCER:**

Joint Testing Checklists

Transitions to JCIDS/DOT&E

Type 2

Handbooks for Test & Acquisition Community:
- **CTM PM/Capability Manager Handbook**
- **CTM Action Officer Handbook**
- **JMe Analysis Guidebook**

Transitions to DOT&E

Type 3

Recommended Changes to Acq. Instructions & Directives:

Supplements or Changes to DAU T&E Management Guide

Transitions to AT&L and/or DOT&E

Type 4 ⟶ Transitions to ⟶ Type 1, 2, 3 Products and other Joint Environment COI Organizations

GAPS, SEAMS, & OVERLAPS:
- **Input Issues (M&P WG, MSDE, CTTRA)**
- **Rock Drill, Gap Analysis, Test Event Issues & Watch List Findings**
- **Process Anomaly Reports (PARs) with associated actions**

QUESTIONS?