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System of Systems Interoperability

- Evolving Capability to Support the Warfighter -

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What is Interoperability?

“Ability of systems, units, or forces to provide services to and accept services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together.”

(JCS Pub 1)

- **Interoperability today is the number one problem in joint force & combined operations -- CINC's top issue**
- **Getting worse, not better, as new coalition partners develop, complex systems are acquired, and “fixes” to past problems are applied in stove-piped fashion**
- **Joint Vision 2010 calls for increasingly network centric warfare, dependent upon fully interoperable systems**

MISSION

Help enable the full range of joint and combined operations, through Interoperability and Coalition Warfare initiatives, providing an acquisition focus, and working with C³I, the Joint Staff, JFCOM/ CINCs, the test community, the Defense Agencies, the Services, and Coalition Partners.

Key Initiatives

- **Mission Capability Management (MCM)**
- **Family of Interoperable Operational Pictures (FIOP)**
- **Joint Distributed Engineering Plant (JDEP)**

Mission Capability Management (MCM)

The Need to Evolve to MCM

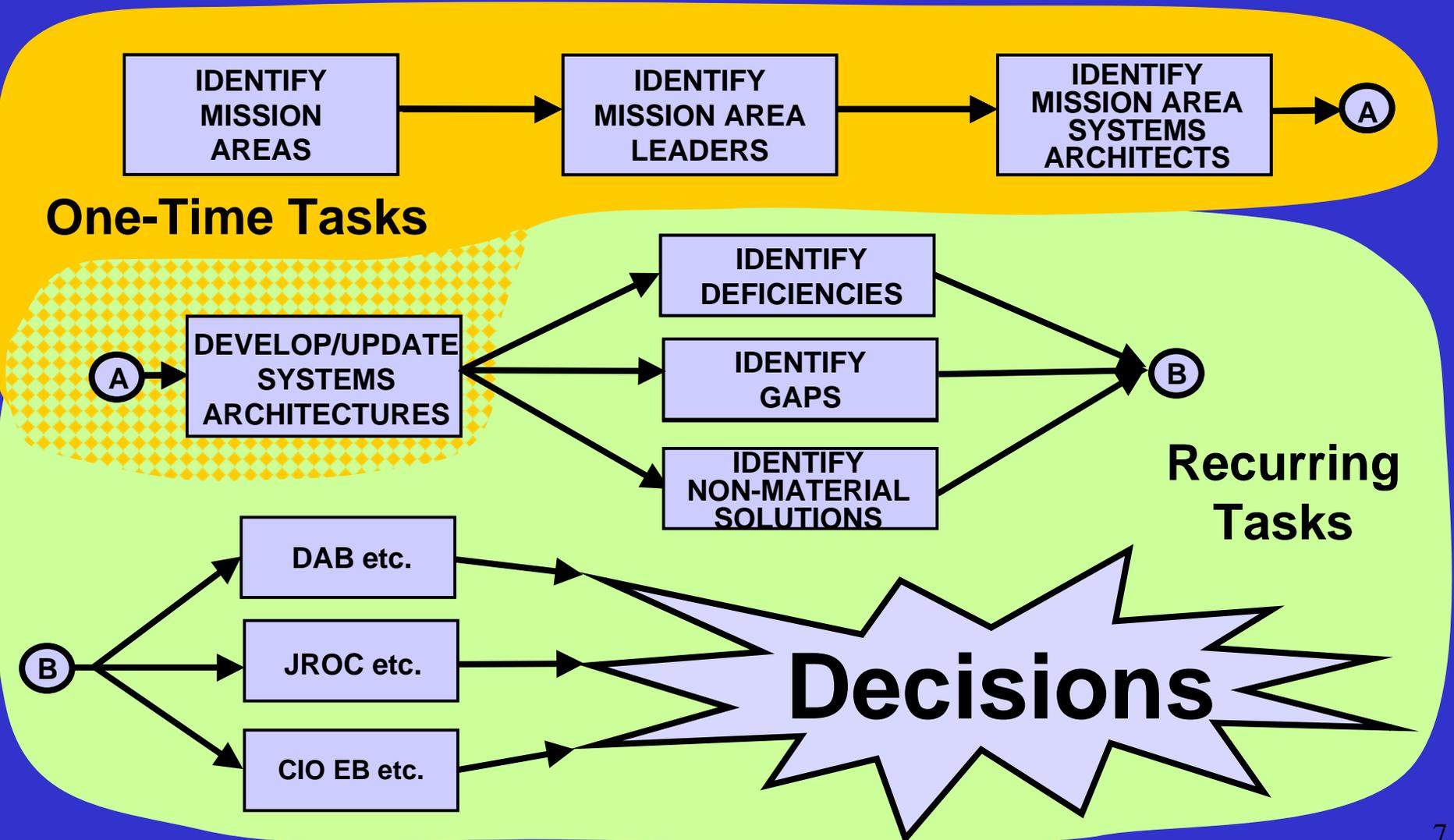
Gulf war, Kosovo, Bosnia, and Y2K all demonstrated the criticality of systems interoperating within a dynamic model

- **Improve Interoperability**
- **Support CINCs Operations**
- **Improve Coalition Capability**

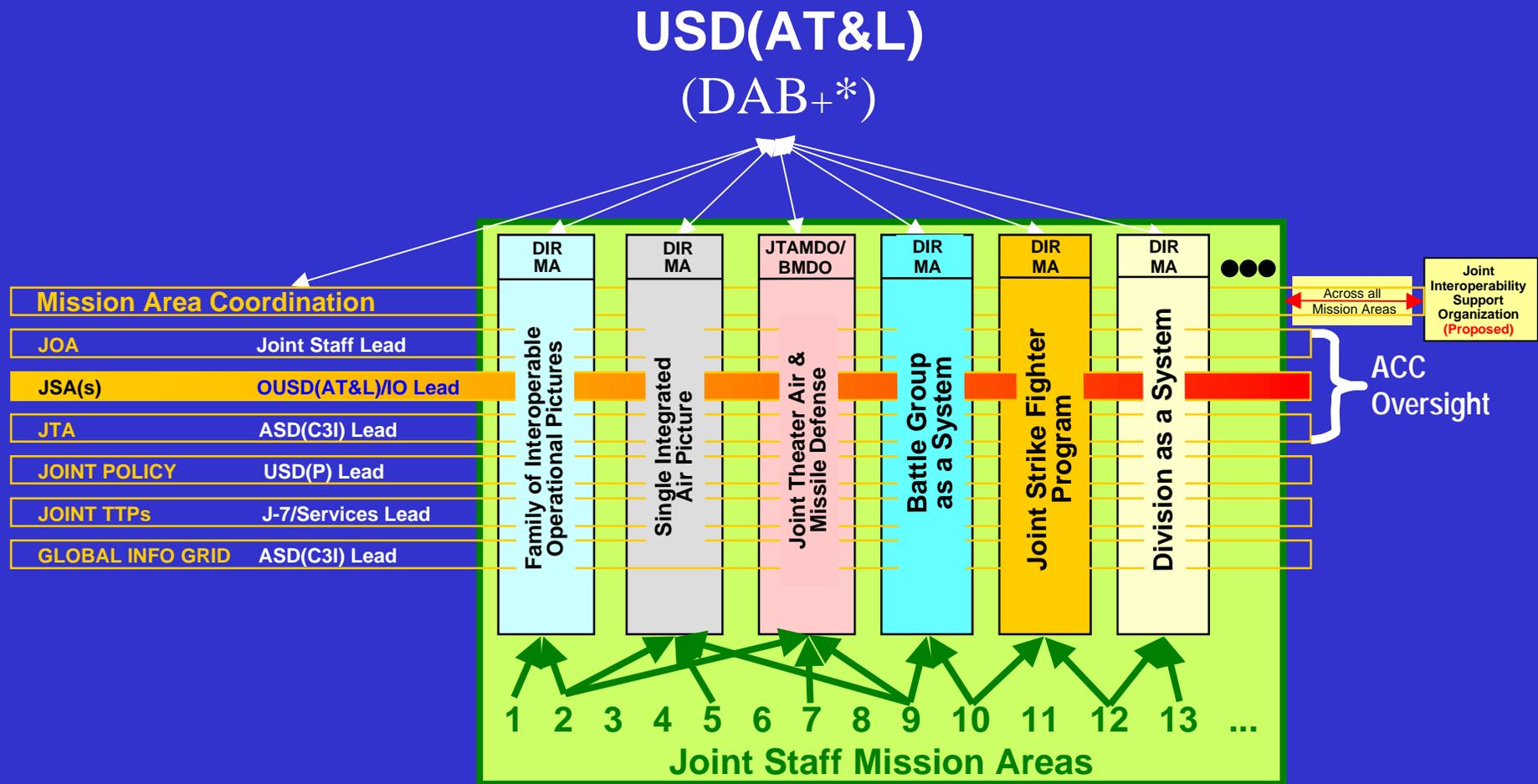
“Key to capitalizing on these assets is interoperability among the Services” - Vice Adm. William J. Fallon, Commander of the U. S. Second Fleet and Striking Fleet Atlantic

Mission Capability Management (MCM) (Implementing System-of-Systems Capability)

PROCESS



Mission Capability Management (MCM) (Implementing System-of-Systems Capability) IMPLEMENTATION



* The Defense Acquisition Board is augmented as necessary by PSAs, Joint Staff, CINCs, and Service representatives to discuss the issues

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The Problem (1 of 2):

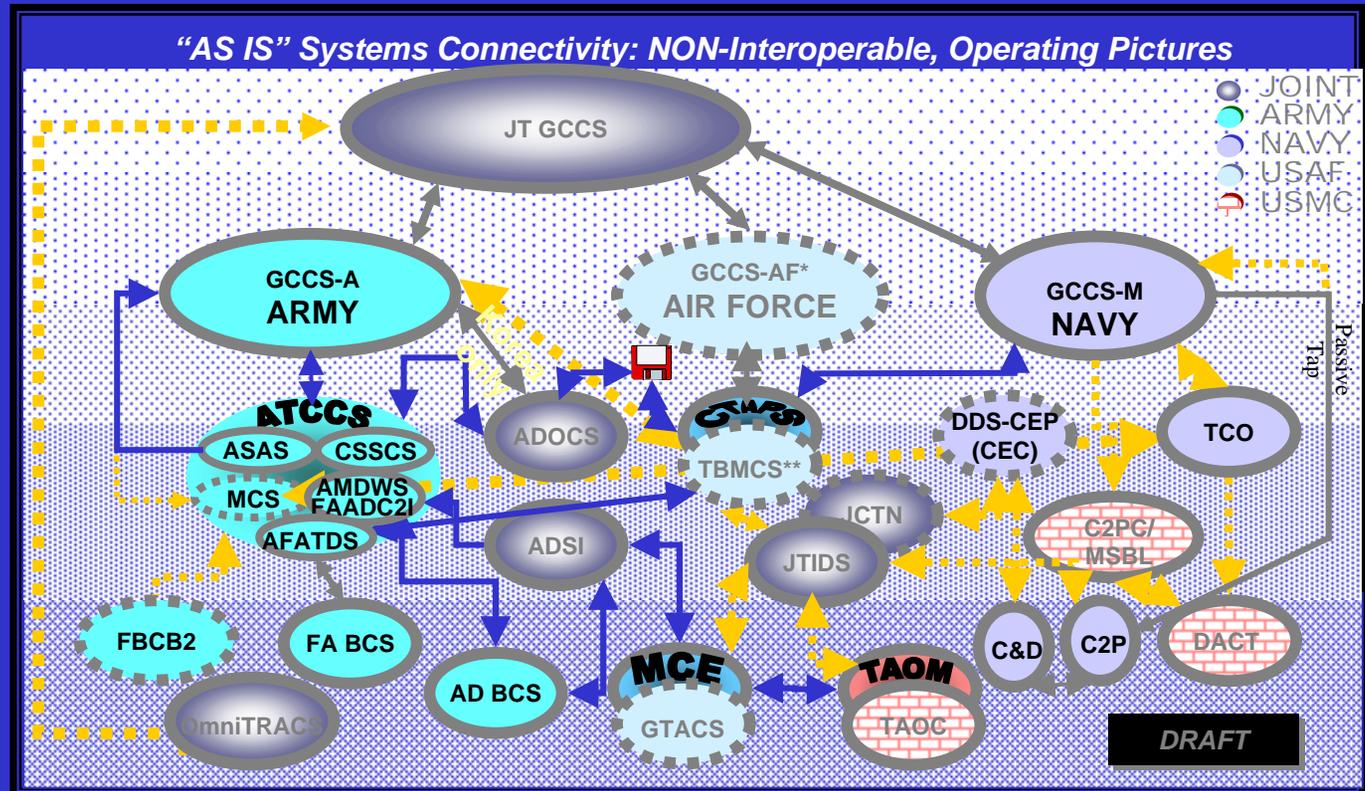
No Coherent View of the Battlespace from CINC to Soldier/Sailor/Airman
Inability to Prosecute a Coordinated Strategy

USER CONCEPT CORRESPONDING SYSTEMS

CINC Operational-level pictures

JTF Tactical-level pictures

Firing Unit Aero, Ground, Maritime pictures



Key Interface status System status = Implemented = Planned, but not imp. * Not a program
= Implemented = Planned

- *The cause:* multiple systems, conceived and developed individually
- *Compounding the problem:* systems, TTP, missions are changing continuously, new coalition partners, and stovepiped intelligence dissemination

Non-interoperable operating pictures = fratricide & leakers

The Problem (2 of 2)

- Individual system requirements have been generated vice SoS required capabilities for the “family of pictures”
 - Ideally, required capabilities should drive system requirements
- No “big picture” assessment for this family of relevant operating pictures has been done in the Department
 - We need to call attention to it and move forward!

The Solution (1 of 2)

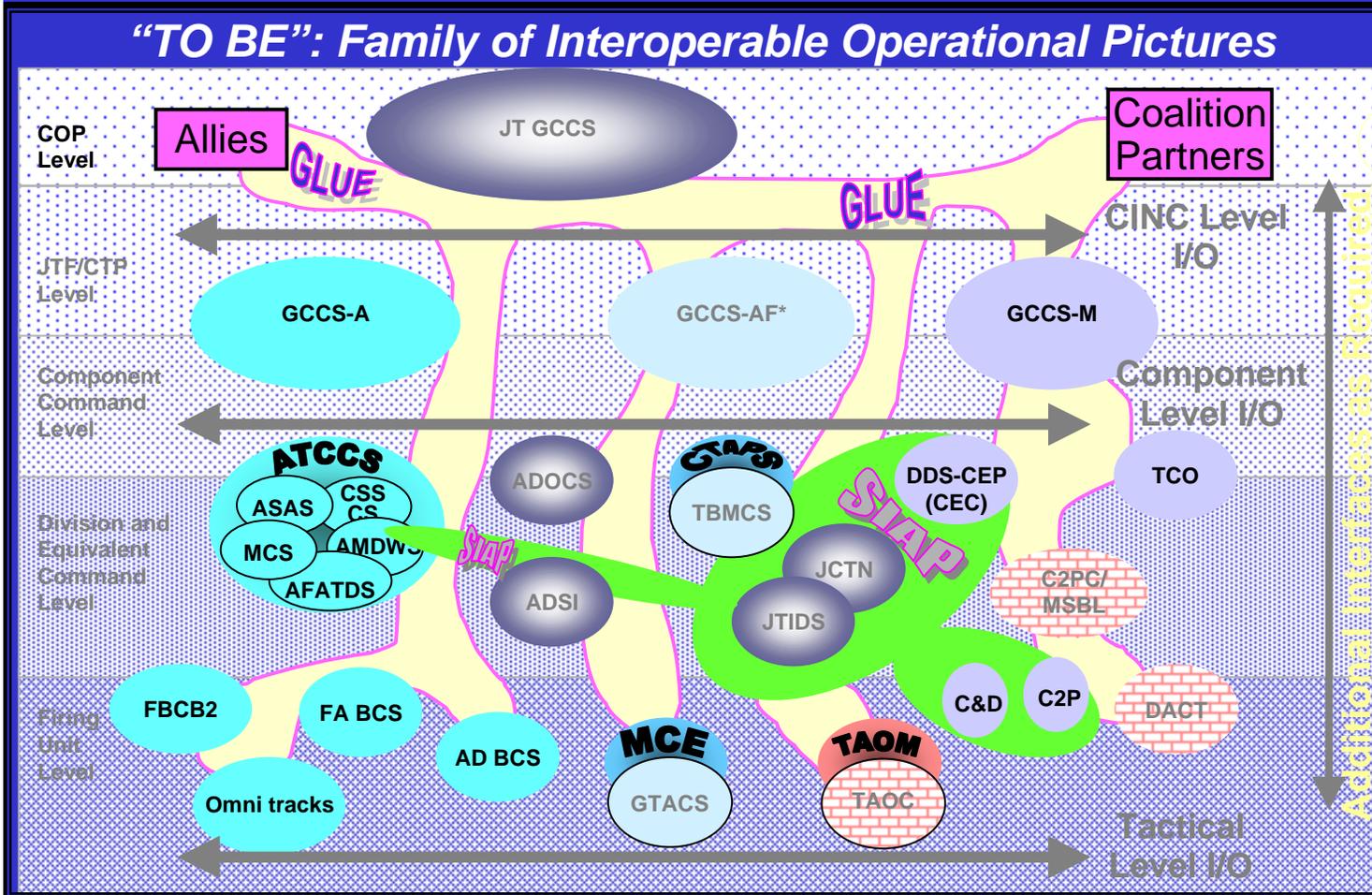
“A *Family* of Interoperable Operational Pictures” (FIOP)

- **More than just situational awareness - includes battlespace management, fire support, logistics, intelligence, etc.**
- **Name is in line with a potential ministerial initiative, synonymous with the Common Relevant Operating Picture (CROP), JFCOM J9 initiative**

The Solution (2 of 2)

How to Implement the FLOP Concept

Optimum horizontal and vertical system connectivity across Service lines and between echelons.



More tactical-level cross-Service comms

Should be based on required capabilities at each echelon

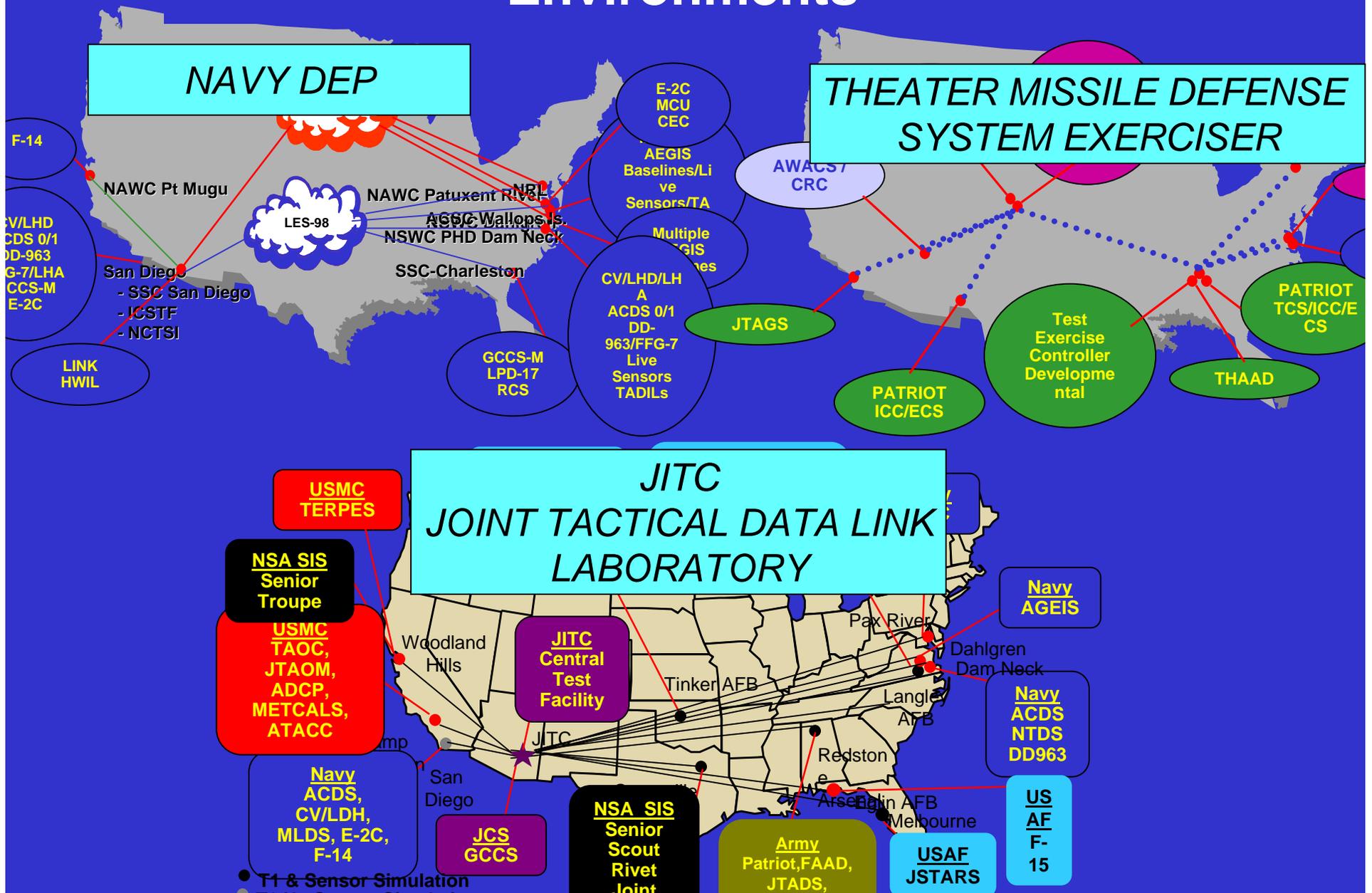
What does "glue" mean?

- JOINT
- ARMY
- NAVY
- USAF
- USMC

Key Initiatives

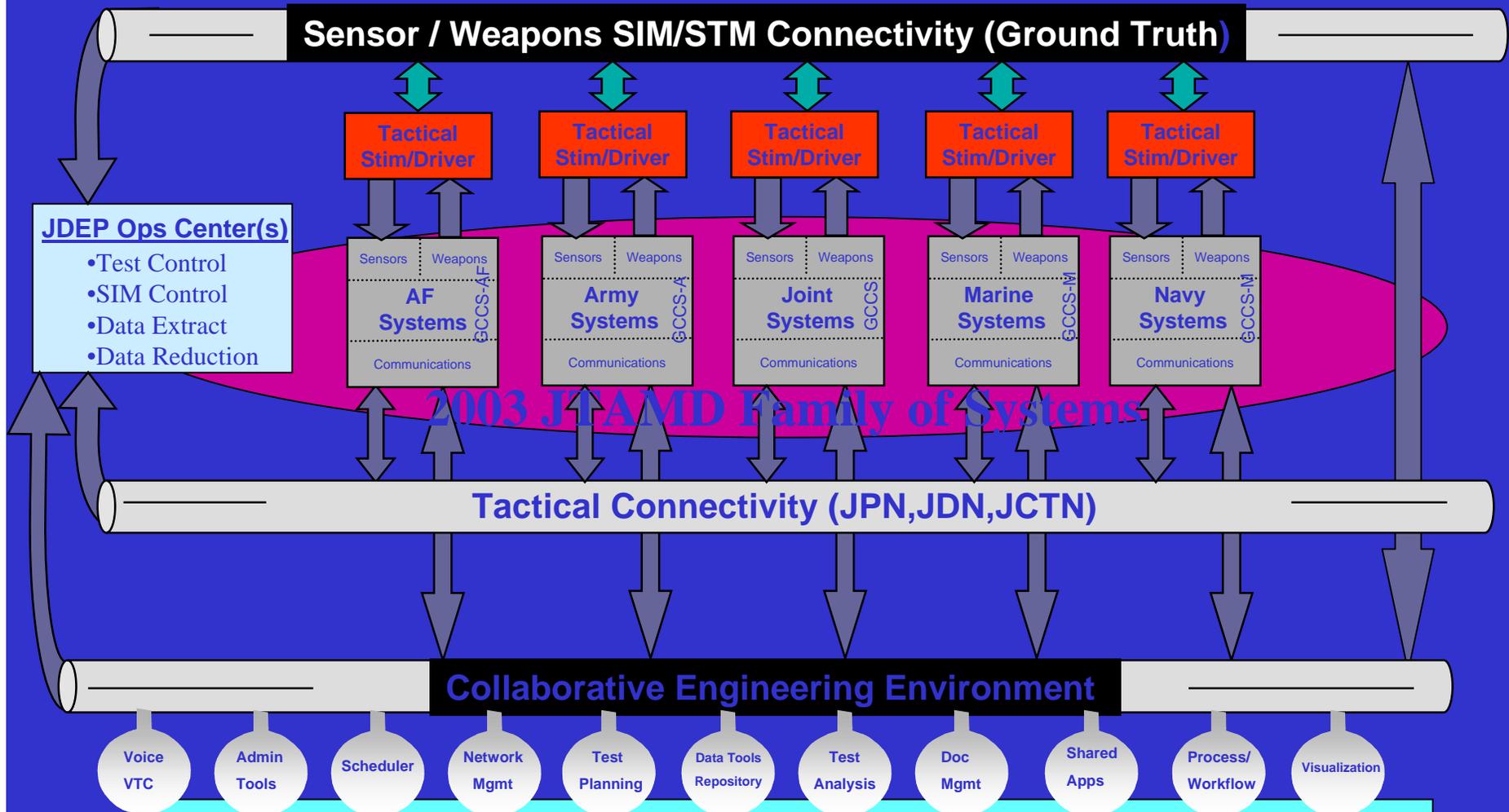
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Distributed Engineering & Test Environments



JDEP CONCEPT

(Combat Systems/BMC4I Hardware in the Loop)



Built upon Collaborative Engineering Environment,
and migrates from DIS to HLA

So, where does M&S come in?

- **There is a “blurring of the lines” between real systems and simulations**
- **Simulation is the only feasible way to develop & test a system-of-systems**
- **M&S interoperability is fundamental to success**
 - **Simulation Based Acquisition (SBA) is the future for systems acquisition**
 - **Joint Distributed Engineering Plant (JDEP) is a primary contributor developing new systems and fixing legacy systems**
 - **Both of the above will improve systems interoperability**
- **Exploiting HLA will aide systems interoperability**

-- Interoperability --

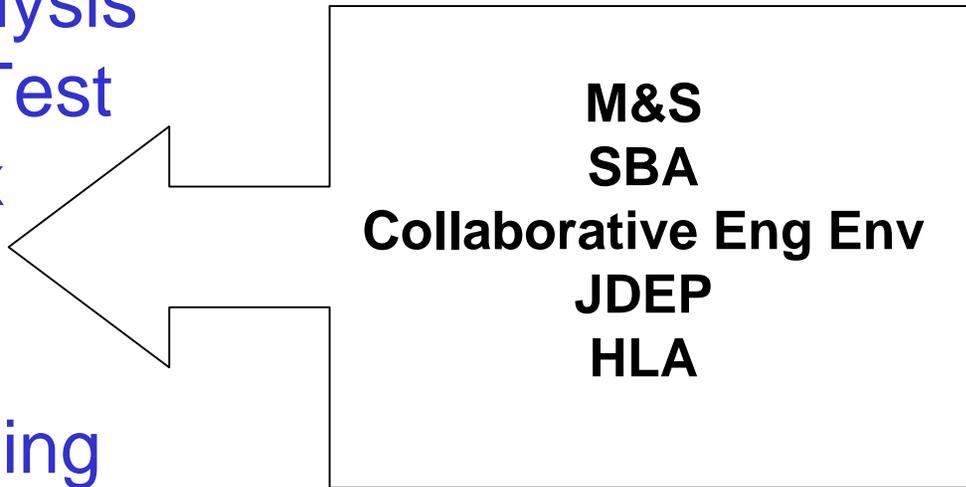
What Better Resource Than M&S?

Clearly, if we want to achieve 100% of warfighting capability -- we must develop, test, operate and sustain fully interoperable weapons systems.

Function

- Requirements Analysis
- System Design & Test
- Legacy System Fix
- Certification
- Training Exercises
- Contingency Planning
- Operations

Essential Tools



M&S
SBA
Collaborative Eng Env
JDEP
HLA

Summary

- Modeling and Simulation Indispensible
- “Coalition Friendly” Strategy
- Partnership with Industry



