DoD Interoperability and Advanced Engineering Environments

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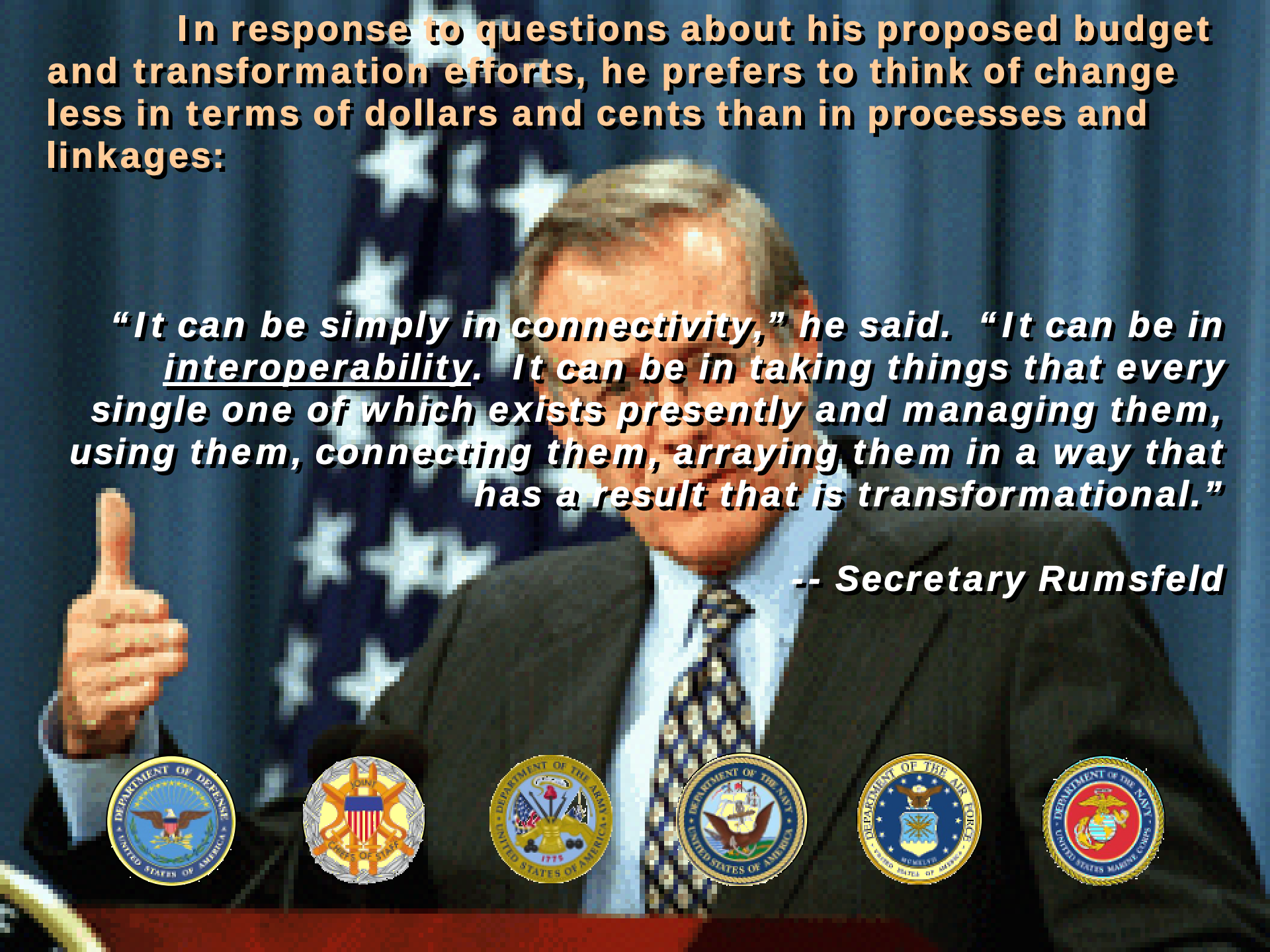


In response to questions about his proposed budget and transformation efforts, he prefers to think of change less in terms of dollars and cents than in processes and linkages:

"It can be simply in connectivity," he said. "It can be in interoperability. It can be in taking things that every single one of which exists presently and managing them, using them, connecting them, arraying them in a way that has a result that is transformational."

-- Secretary Rumsfeld

Modeling & Simulation is Essential to Interoperability

- **For Specific Mission Area Capability Initiatives**
- **For Systems Architectures and Systems Engineering**

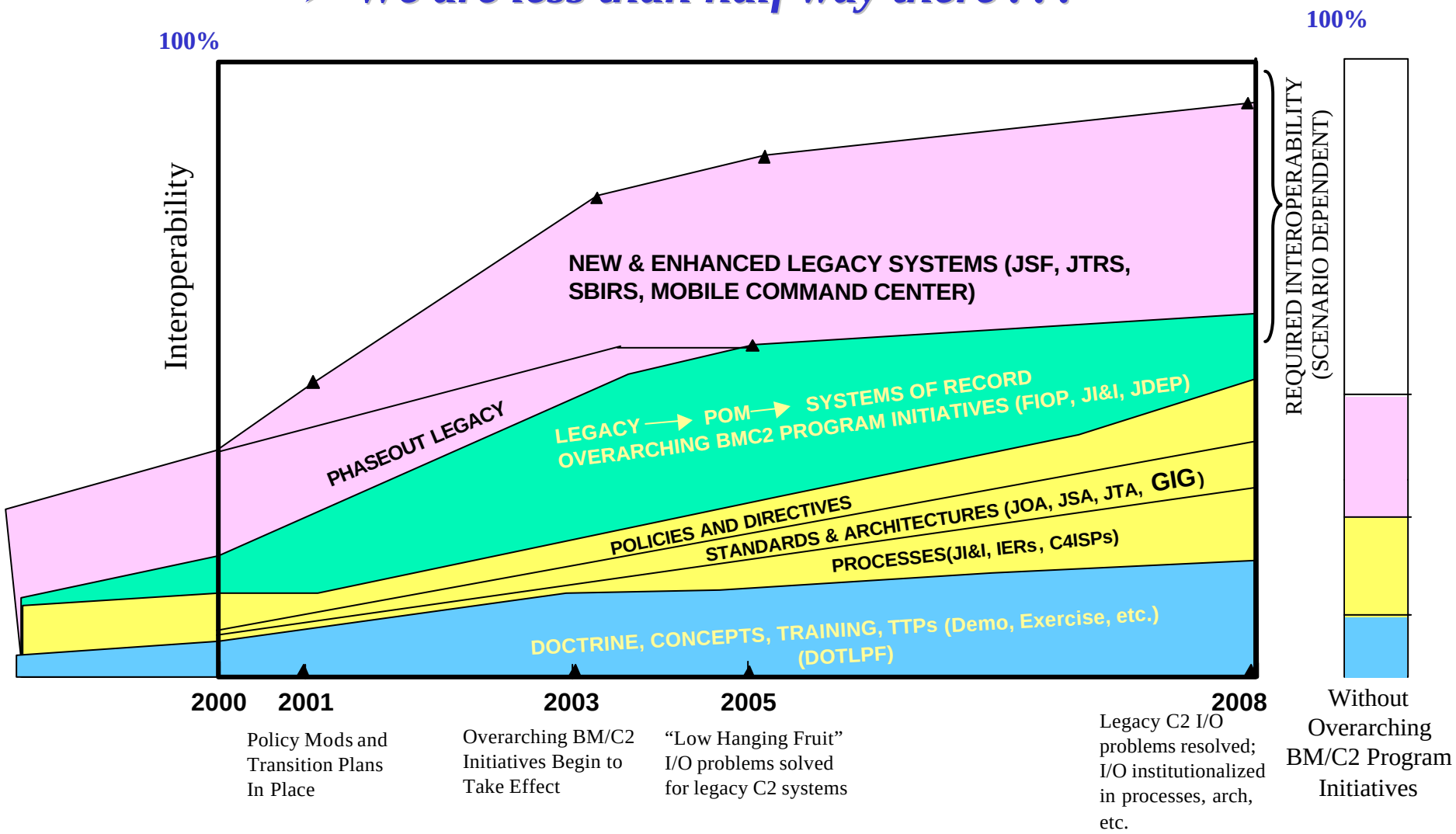
Outline

- **Importance of Interoperability to the Department**
- **Overarching Initiatives**
  - ✓ **Family of Interoperable Operational Pictures (FIOP)**
  - ✓ **Single Integrated Air Picture (SIAP)**
  - ✓ **Single Integrated Ground Picture (SIGP)**
  - ✓ **Shared Tactical Ground Picture (STGP)**
  - ✓ **Precision Engagement/Time Sensitive Targeting (PE/TST)**
  - ✓ **Combat Identification (CID)**
  - ✓ **BFT, etc…**

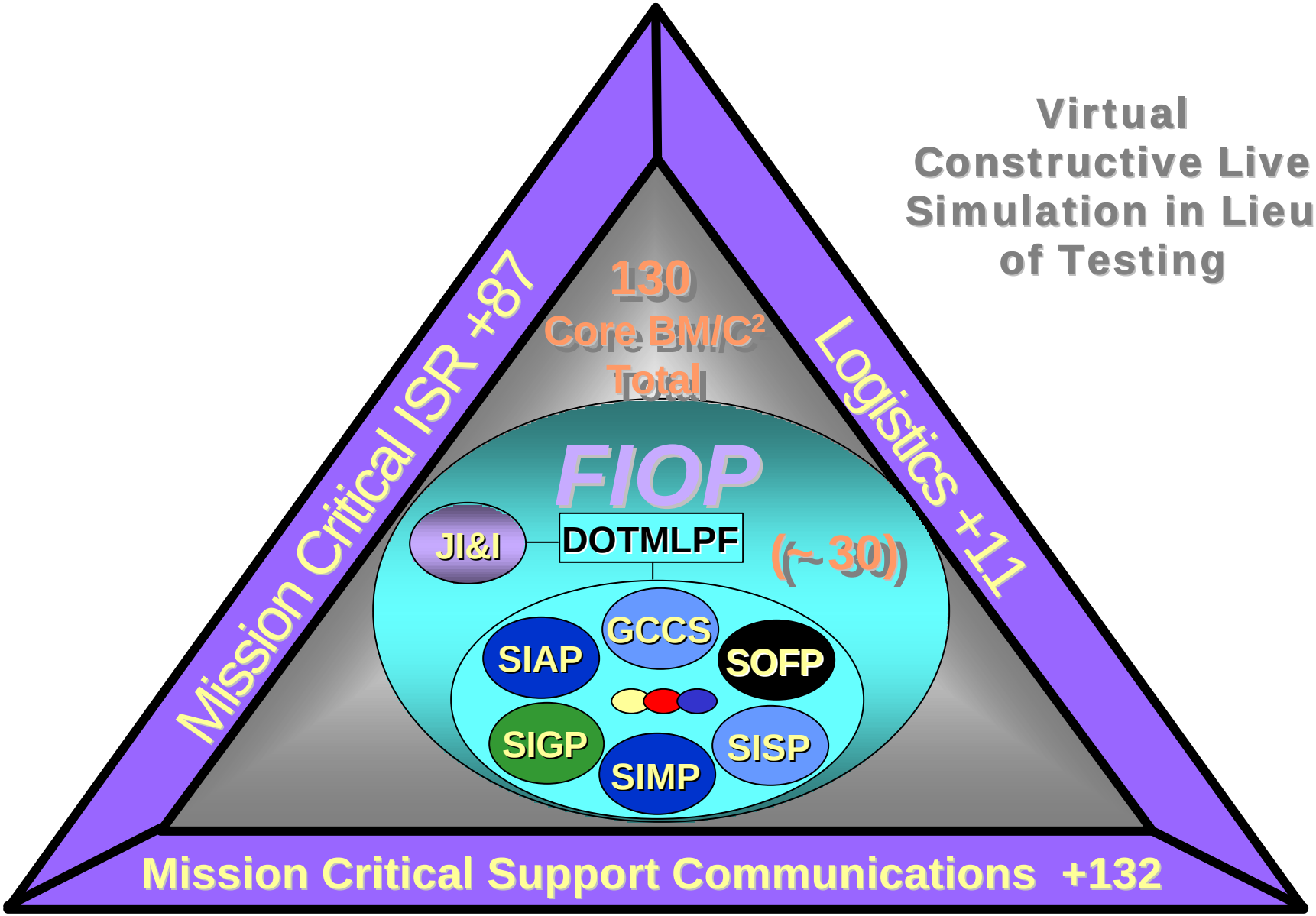
  Joint Distributed Engineering Plant
- **Institutionalizing Interoperability**
  - ✓ **Modeling and Simulation**
  - ✓ **System of Systems (SoS) Mission Areas and Capabilities**
  - ✓ **Developing Systems Architectures with Emphasis on "Open Systems**
  - ✓ **Laying the Systems Engineering Foundation**

Advanced Engineering Environments Are a Critical Enabler

- **Four major components are needed to address interoperability**
- ***We are less than half way there . . .***



Making BM/C² Interoperable by 2008



Virtual
Constructive Live
Simulation in Lieu
of Testing

(Total Mission Critical to phase out or make interoperable–360)

Today's Problem - $36B

As of Jun 00

Inadequate interoperability = fratricide, leakers, lack of effectiveness

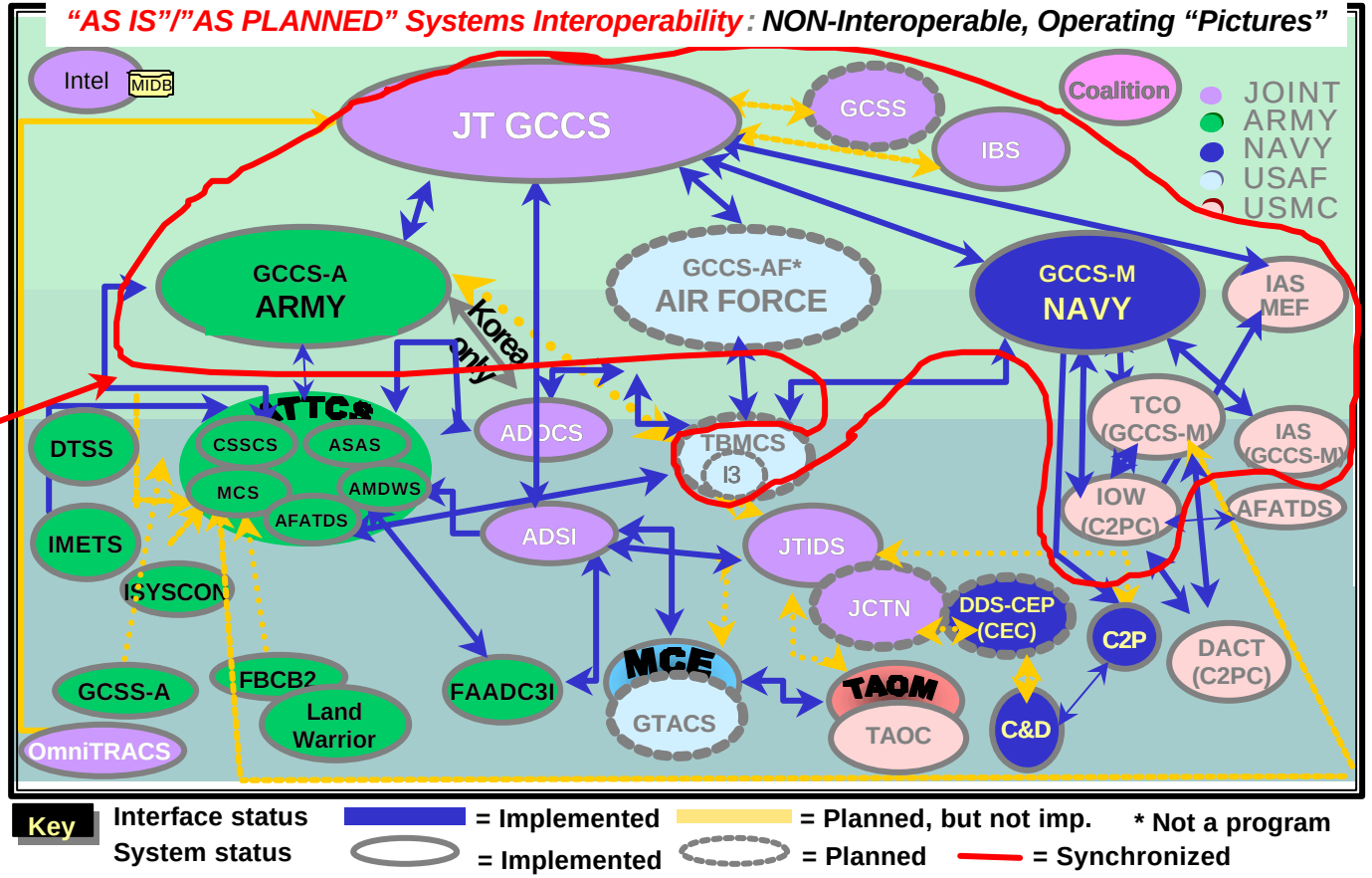
USER/CONCEPT | **CORRESPONDING SYSTEMS: "As-Is / As Planned"**

CINC Operational-level "pics"

JTF Tactical-level "pictures"

Capability to synch these systems IF identical COE level & SW version w/ COP Synch Tools

Firing Unit **Aerospace, Ground, Maritime "pictures"**



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

Notes:
•Some Svc systems deployed on other Svc platforms
•As is depicts presence in at least one CINC theater

Service Led FIOP

•LEAN, MOSTLY VIRTUAL ORGANIZATION

FIOP Systems Engineer
All Services
(AF Led)

JFCOM JI&I

Doctrine, Organization, Training, Materiel, Leadership, Personnel, Facilities (DOTMLPF)

JROC (COP)
FIOP Task 1
(AC2ISR Led)

SIAP
(Navy Led)

SOFP
(SOCOM Led)

CTP

ForceNet
(SIMP-Navy Led)

SIGP
(Army (CECOM Led)

SISP
(Air Force Led)

Legend:

Establishment of SE Orgs will be via JROC (no preset timeframe)

Joint Distributed Engineering Plant (JDEP)

SIGP - Single Integrated Ground Picture
SIMP - Single Integrated Maritime Picture
SISP - Single Integrated Space Picture
SIAP - Single Integrated Air Picture
COP - Common Operational Picture
CTP - Common Tactical Picture
SOFP - Special Operation Force Picture

OUSD AT&L FIOP Tasks

- Ensure FIOP follows spiral acquisition strategy
- Recommend 80% solutions to those known, most pressing problems
- Recommend a lead Service Systems Engineering organizational structure
- Recommend a funding profile

Current State of FIOP

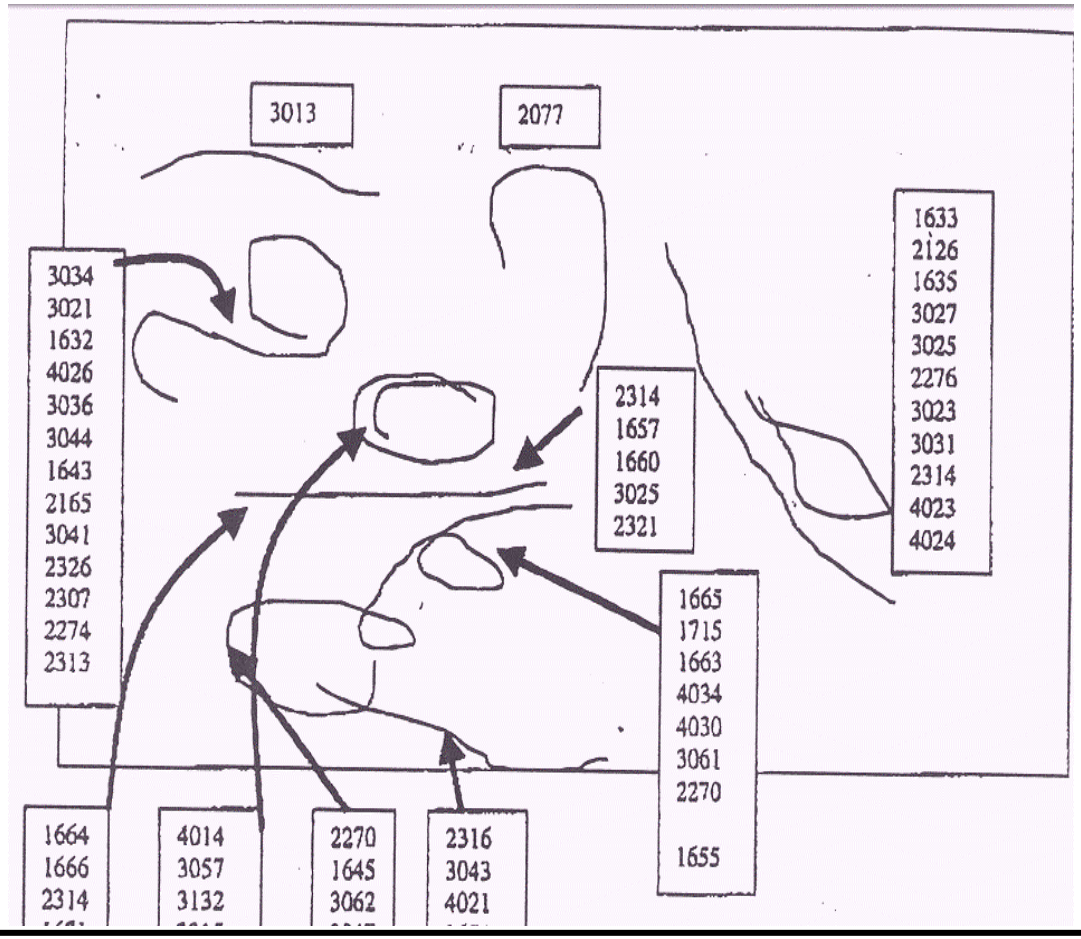
- **Spiral 1(JROC FIOP):**
  - **Task 1.1 – Web Enabled Execution Management**
  - **Task 1.2 – Tactical COE Workstation**
  - **Task 1.3 – COE VMF Processing**
- **Spiral 2:**
  - **Data Federation/Fusion Strategy**
  - **Friendly Forces SA**
  - **Red Force SA**
  - **Fire Support**
  - **ISR Management**
  - **JDN/JPN Integration**
- **Spiral 3:**
  - **TBD**

Single Integrated Air Picture (SIAP)

- SIAP is “Leading the Way” for FIOP
- SIAP should evolve into a seamless component of the FIOP, SIGP, SIMP, SISp, COP and CTP
- SIAP addressed the need for “one track per target,” which will reduce fratricide by reducing operator confusion.

Single Integrated Air Picture (SIAP)

"Today's Air Picture Problem"



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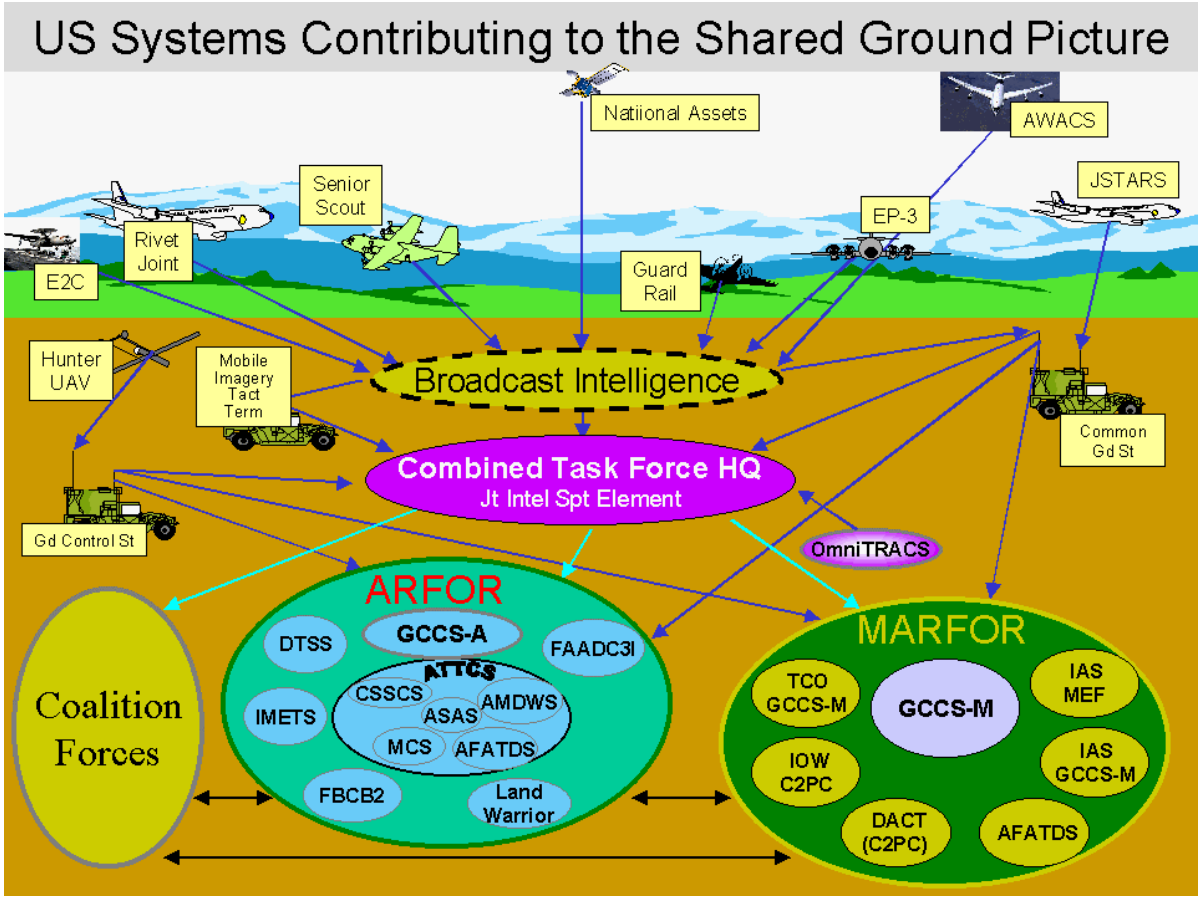
14 minutes of track history

Avg track lifetime is 2 minutes.

Constant turnover of target designation limits warfighter ability to make decisions.

Single Integrated Ground Picture (SIGP)

- **Multi-Service Command & Control Flag Officer Steering Committee drafting SIGP CONOPS**
- **Coalition Partners (5-Powers) interest in common ground picture**

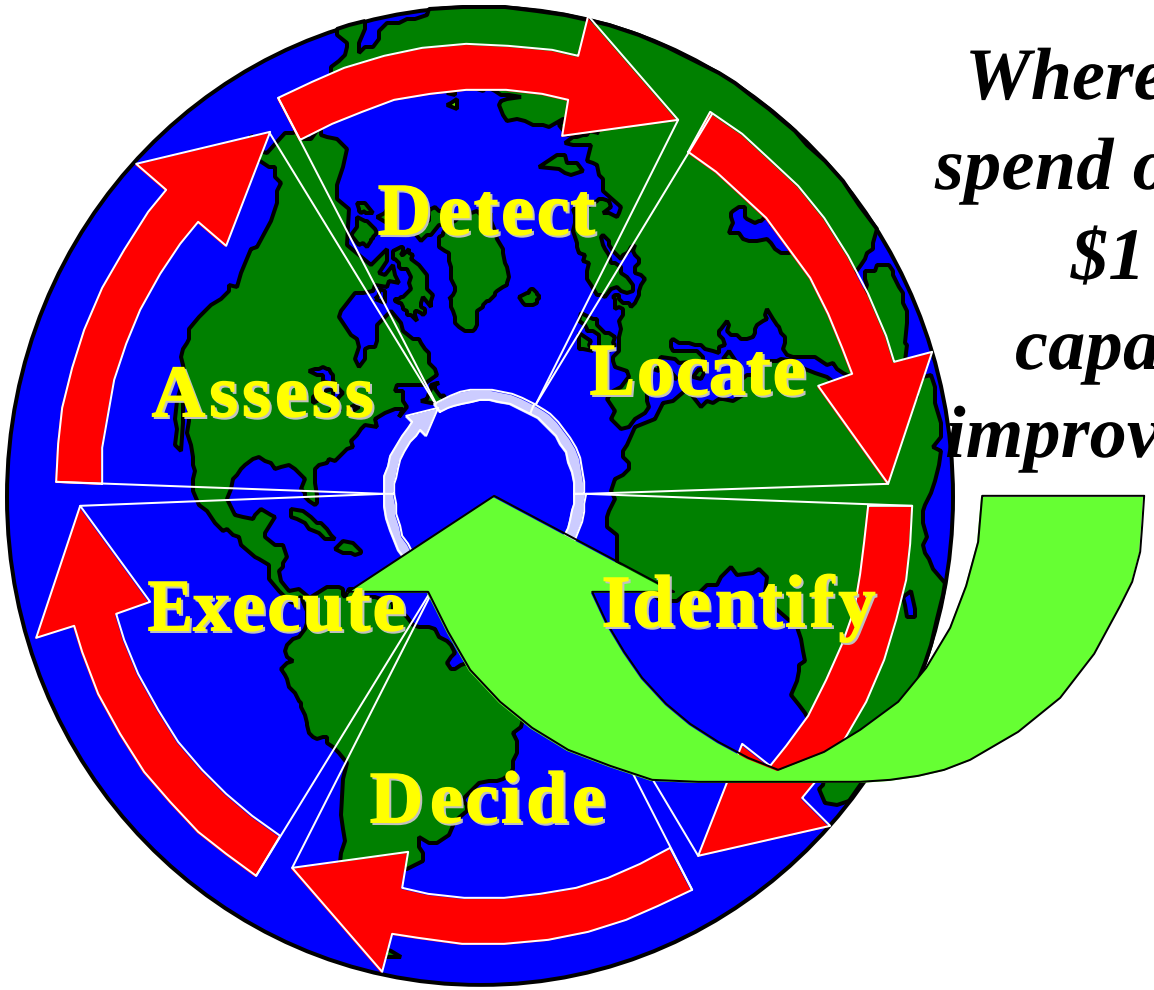


Shared Tactical Ground Picture:
"Five Power Quick Win Activities"

- **Integration of Multiple Sensors**
- **Enabling Communications architectures to support the tactical war fighter**
- **Data combining to support targeting of mobile objects**
- **Tracking and identification of Friendly Forces**
- **Leveraging of emerging data sharing technologies**
- **Technologies for the management and display of data for the STGP**

Precision Engagement / Time Sensitive Targeting (PE/TST)

First Order Assessment will support JROC's Precision Engagement Strategic Topic

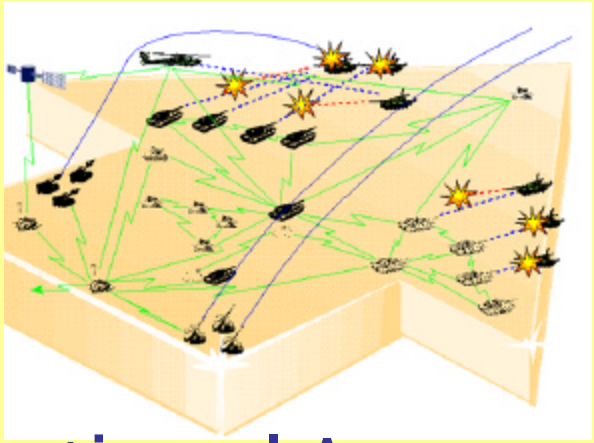


Where do we spend our next $1 for capability improvement?

Precision Engagement / Time Sensitive Target Integration

- **Summer 2001 Defense Science Board (DSB) Study on Precision Targeting completed August 2001**
- **Under Secretary Pete Aldridge's 21 Sep 2001 tasking**
  - **Build on work and recommendations of DSB, continue the ongoing work by the AT&L led TST group, feed into the overall Precision Engagement effort, develop a plan of actions and milestones**
- **Met with DSB sub-leads, Service and Agency Acquisition and Operational/Requirements POCs, Program Managers and technical representatives.**
- **Scrubbed recommendations against feasibility, delta cost and schedule, value added to Precision Engagement, PE gaps**
- **Flag group chose top eight (8) recommendations which have been designated as "PE Package Block 0"**

Combat Identification (CID)



PLUS

Situational Awareness Target Identification

Equals

Fratricide Reduction and Increased Combat Effectiveness

Products= •"Don't shoot me" systems
•Situational awareness systems

plus

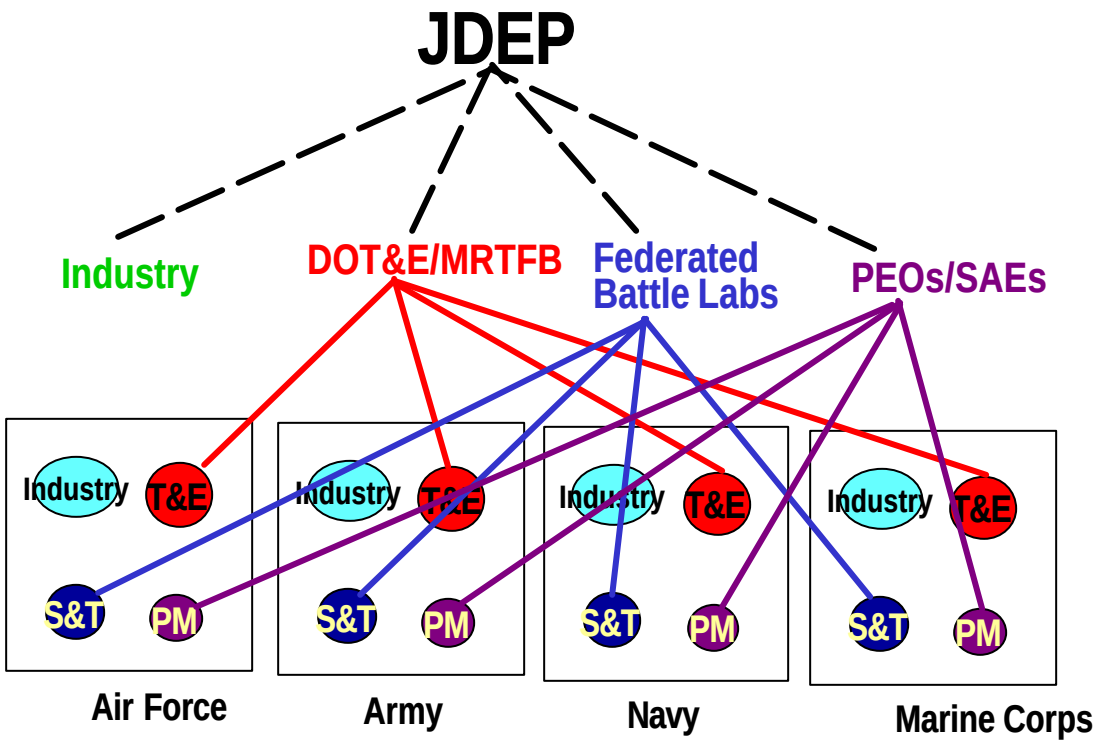
•Operational concept for CCID in CAS, MOUT, Mounted-dismounted Ops

Combat Identification (CID)

- **A top concern for US/Joint/Coalition Interoperability**
  - **Many lives have been lost due to failures in CID**
- **Leading an effort with C3I and Joint Staff to focus on the ground combat element of CID - where we are weakest**
- **"Joint CID Ground Study" developing systems architecture & companion investment strategy for Army, Navy, Marine Corps, and Air Force CID systems**

OSD/AT&L Champion to Implement this initiative

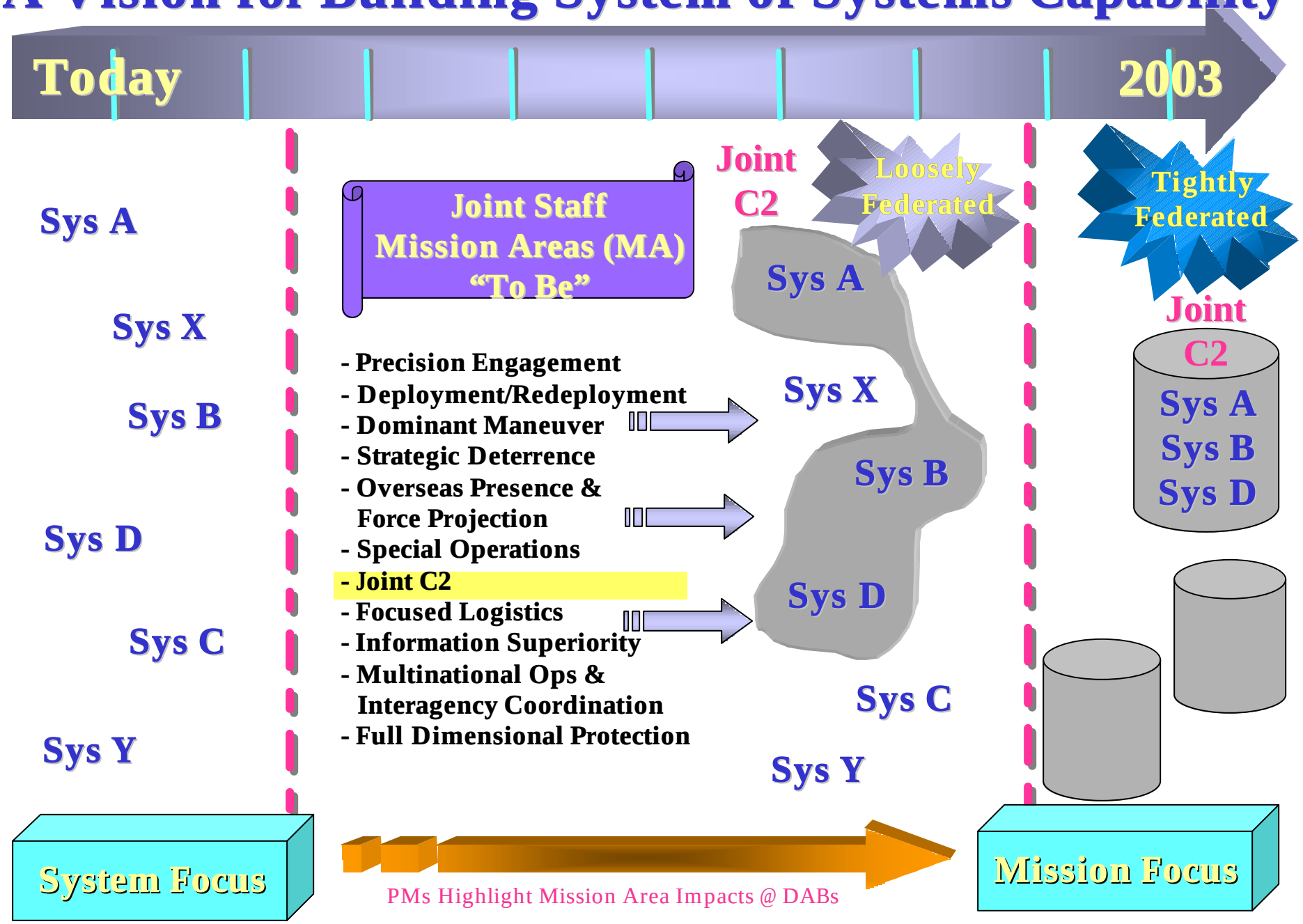
Joint Distributed Engineering Plant



- **JDEP provides the cooperative technical and programmatic framework for creating interoperable systems of systems**
- **Simulation is a critical to distributed environments for SOS development, testing and warfighter assessment**

New approaches to war fighting require new systems engineering capabilities

A Vision for Building System of Systems Capability



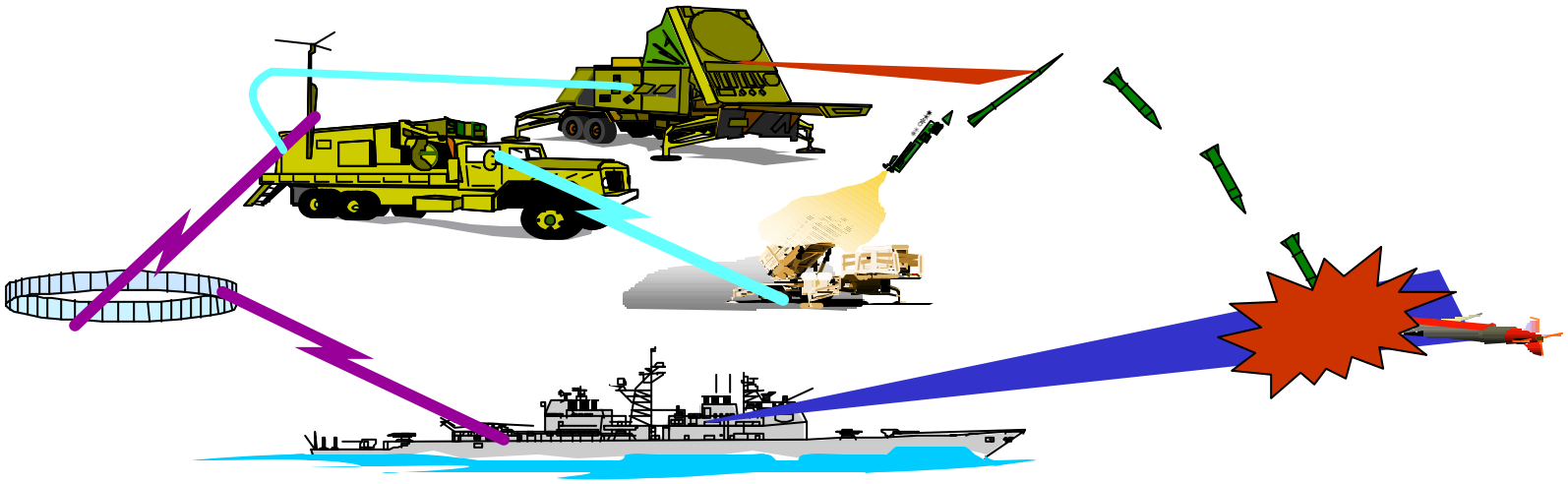
Conclusion

- **Interoperability *is* Effective Joint and Combined Operations**
- **Need to build mission area system of systems capabilities**
- ***New systems of systems engineering capabilities are key to the Departments success in systems of systems***
- ***Simulation is a core component fo advanced engineering environments***

BACKUPS

WHAT IS INTEROPERABILITY ?

"We will connect Information systems and weapons in new ways"
President George Bush
New York Times, 25 March 2001



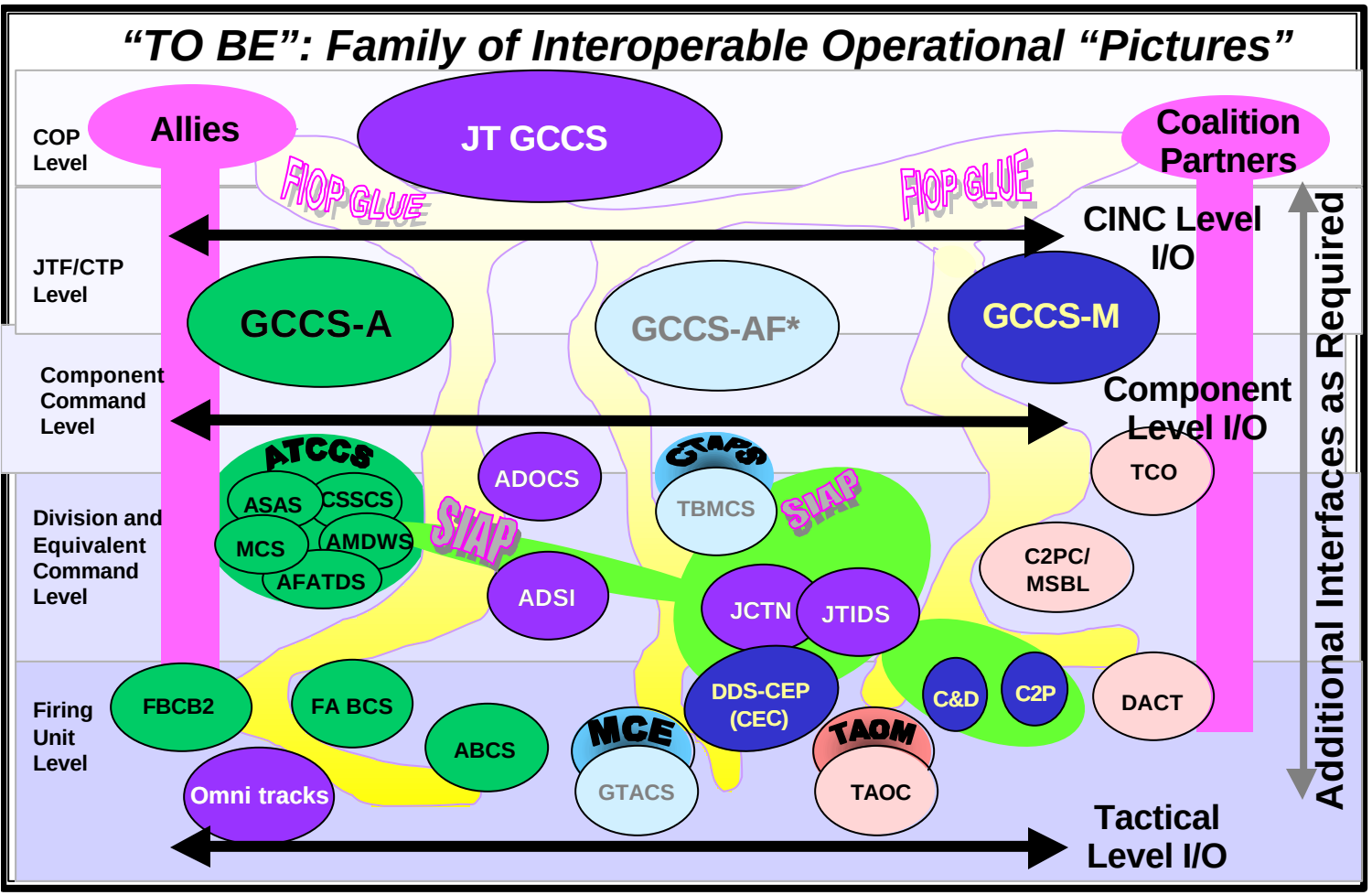
"The ability of systems, units, or forces to provide services to and accept services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together."

(JCS Pub 1)

Focus is on Effective Joint and Combined Operations

The Solution: A Conceptual View of FIOP as Glue

Needed horizontal and vertical system interoperability across Service lines and between echelons.

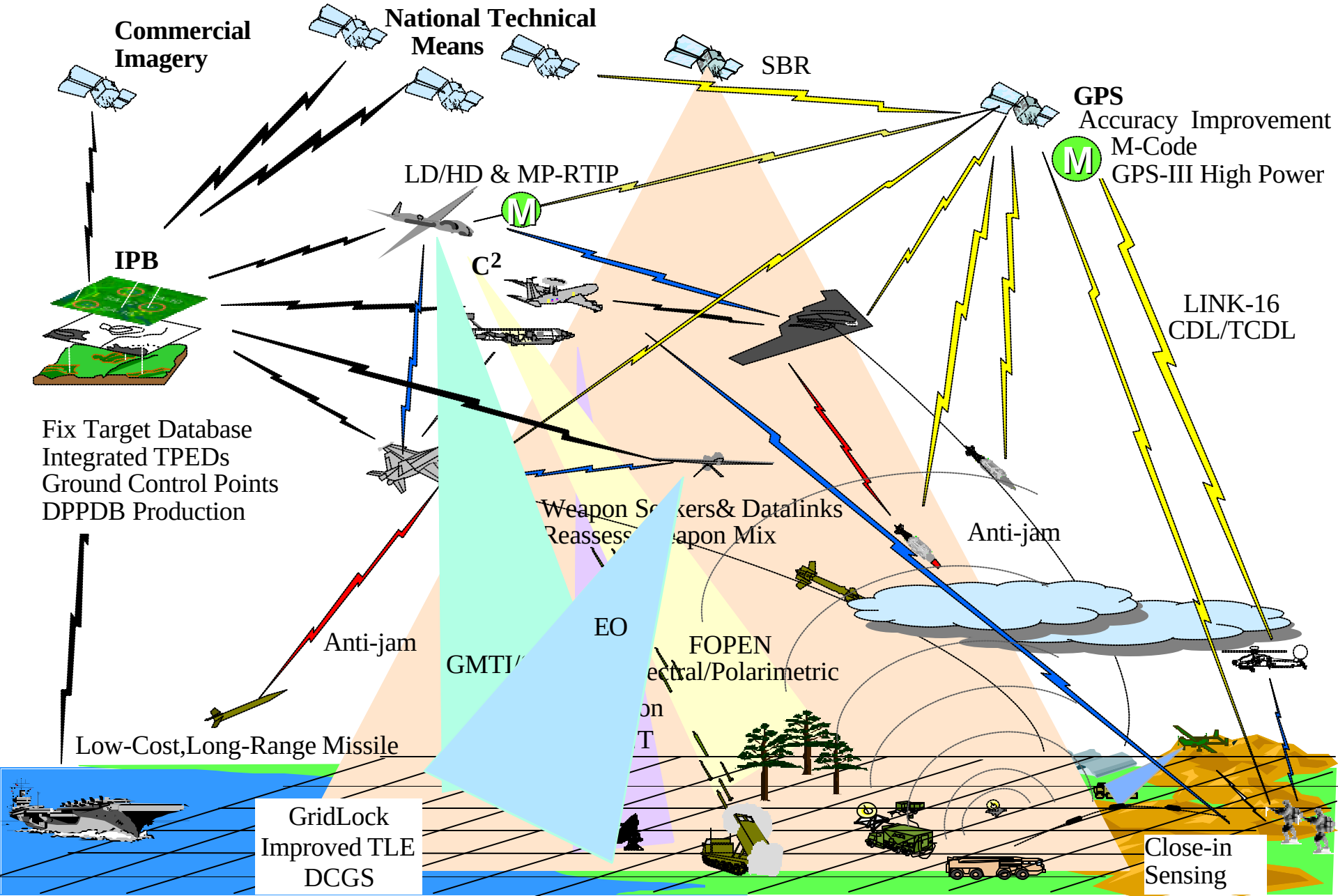


FIOP Glue:

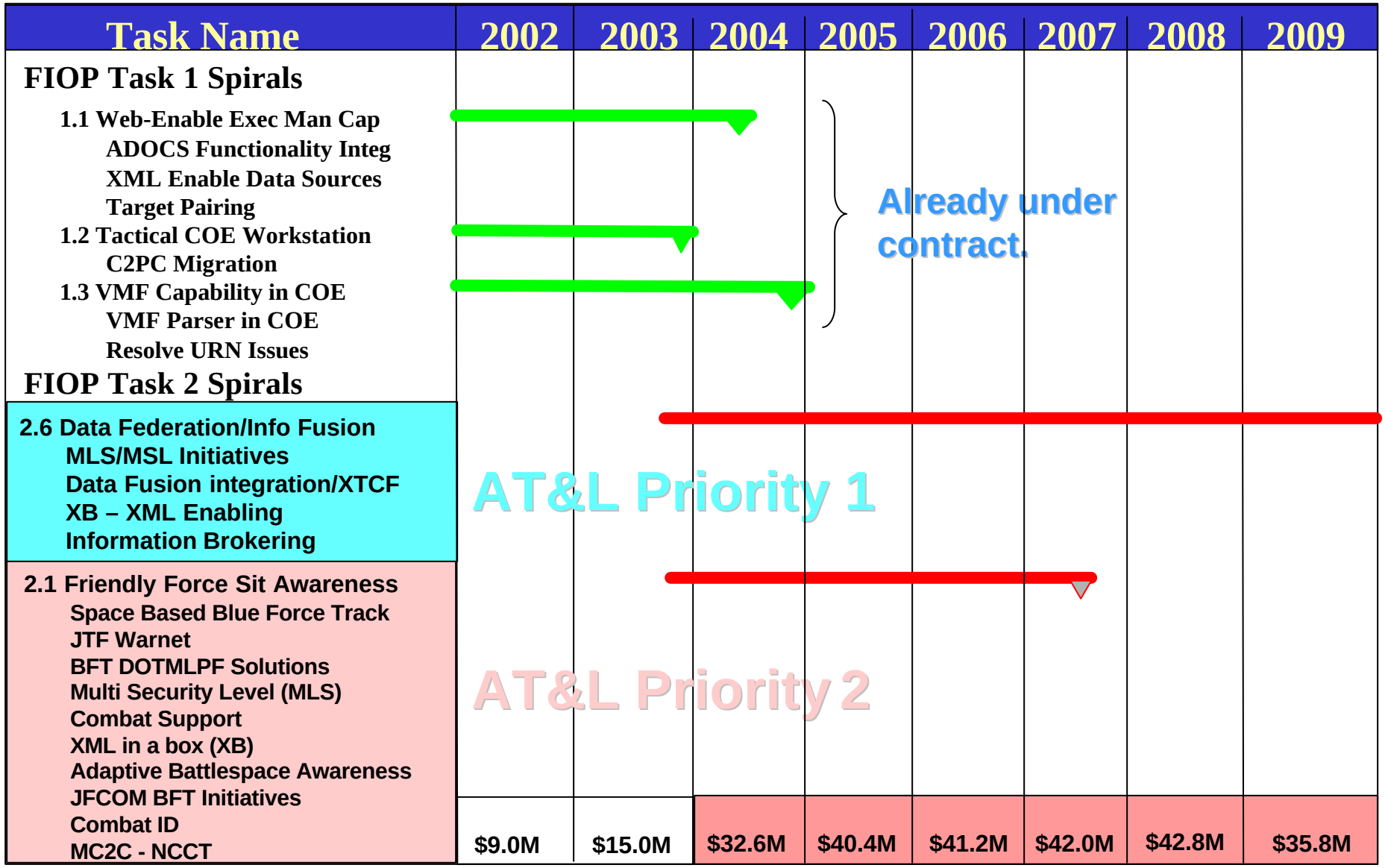
- Federating Data Strategy "Information"
- Fusion Strategy
- Multi-Level Security Architecture
- Direction Vector for Relevant Department Initiatives

JOINT
ARMY
NAVY
USAF
USMC

Precision Engagement (PE) /Time Sensitive Strike (TST)



FIOP Priorities



FIOP Priorities

Task Name	2002	2003	2004	2005	2006	2007	2008	2009
FIOP Task 2 Spirals (cont.)								
2.2 Red Force Situation Awareness TCT Funct – JTAT Tools RFT DOTMLPF Solutions GCCS I3 Track Amplification JSTARS Application Integration	AT&L Priority 3							
2.3 Fire Support (Fires/Counterfires) Joint Fires Imitative Naval Fires Network	AT&L Priority 4							
2.4 ISR Management Generic Area Limitation Envir (GALE LITE) 5 Minute War ISR-Manager Data Federation Joint Collection Mgt Tasking	AT&L Priority 5							
2.5 JDN/JPN Integration Link 16/IP Gateway	AT&L Priority 6							
	$9.0M	$15.0M	$32.6M	$40.4M	$41.2M	$42.0M	$42.8M	$35.8M