Interoperability

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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 then in processes and linkages:

"It can be simply in connectivity," he said. "It can be in <u>interoperability</u>. 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

Outline

- **Why are we here?**
  - **State of Interoperability in the Department**

- **What are we doing about it?**
  - **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)**
  - **Future Vision**
    - ✓ **System of Systems (SoS)**

IO – Interoperability Programs

- **Key Overarching Initiatives**
  - **Family of Interoperable Operational Pictures (FIOP)**
  - **Single Integrated Air Picture (SIAP)**
  - **Precision Engagement / Time Sensitive Targeting (PE/TST)**
  - **Combat Identification (CID)**
- **Policies and Processes**
  - **Building Systems of Systems Capabilities**

    (Key Role of Systems Engineering and Simulation)
  - **Architectures**

    (Operational, Systems, Technical, emphasis on Open Systems)

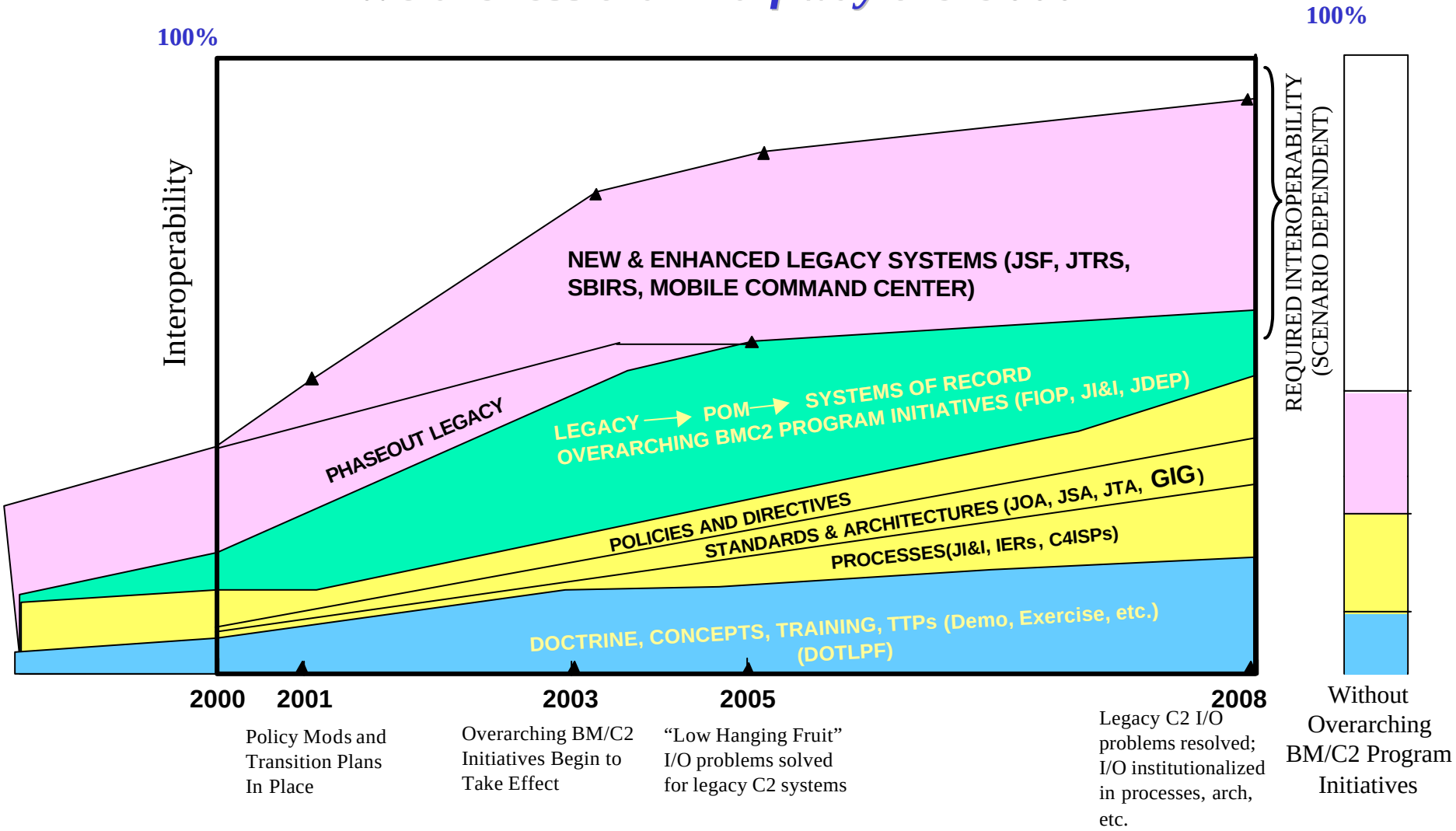
What is Interoperability?

"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 a <u>critical problem in joint force & combined operations</u> -- CINC's top issue**
- **<u>Getting worse, not better</u>, as new coalition partners develop, complex systems are acquired, and "fixes" to past problems are applied in stove-piped fashion**
- **Joint Vision 2020 calls for <u>increasingly network centric warfare</u>, dependent upon fully interoperable systems**

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



Today's Problem

As of Jun 00

Inadequate interoperability = fratricide, leakers, lack of effectiveness

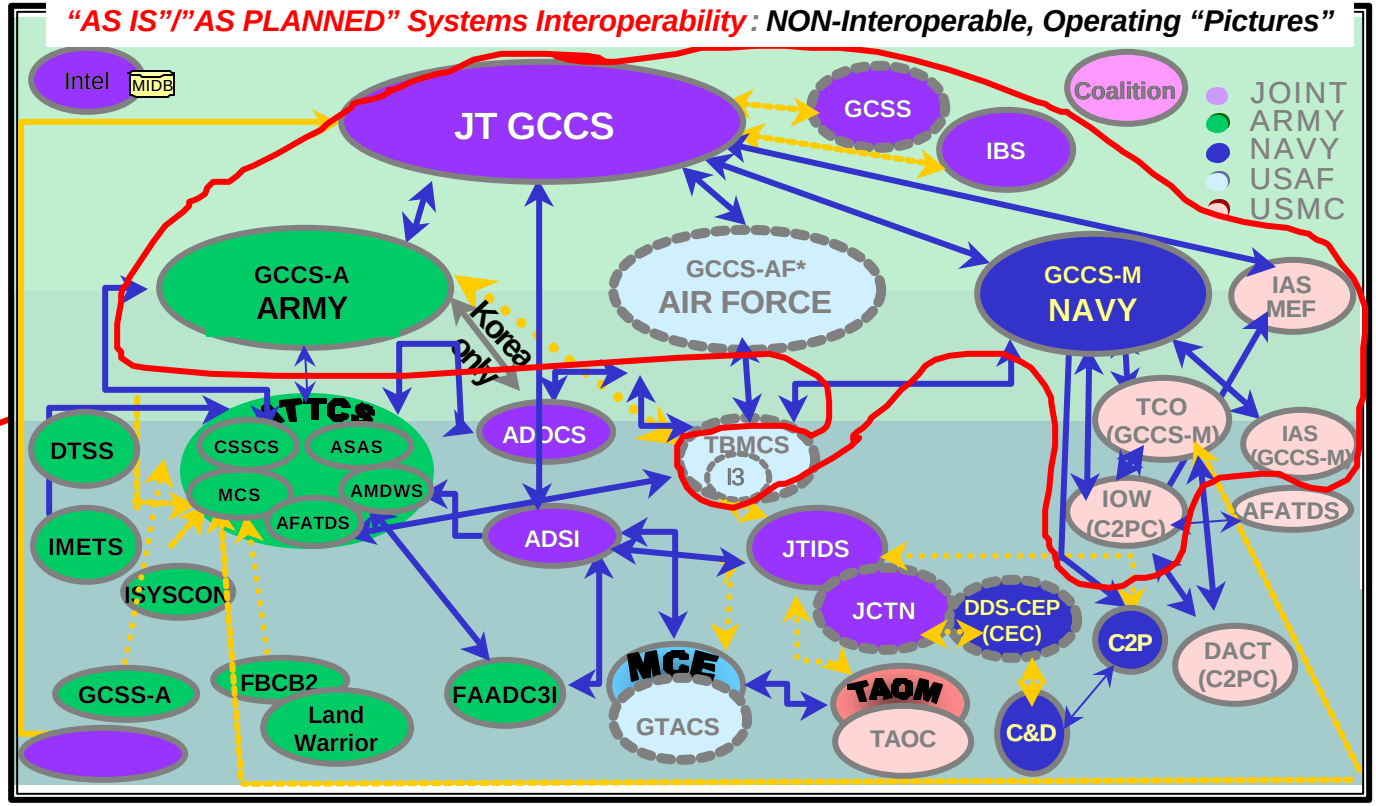
USER/CONCEPT | **CORRESPONDING SYSTEMS: "As-Is / As Planned"**

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"



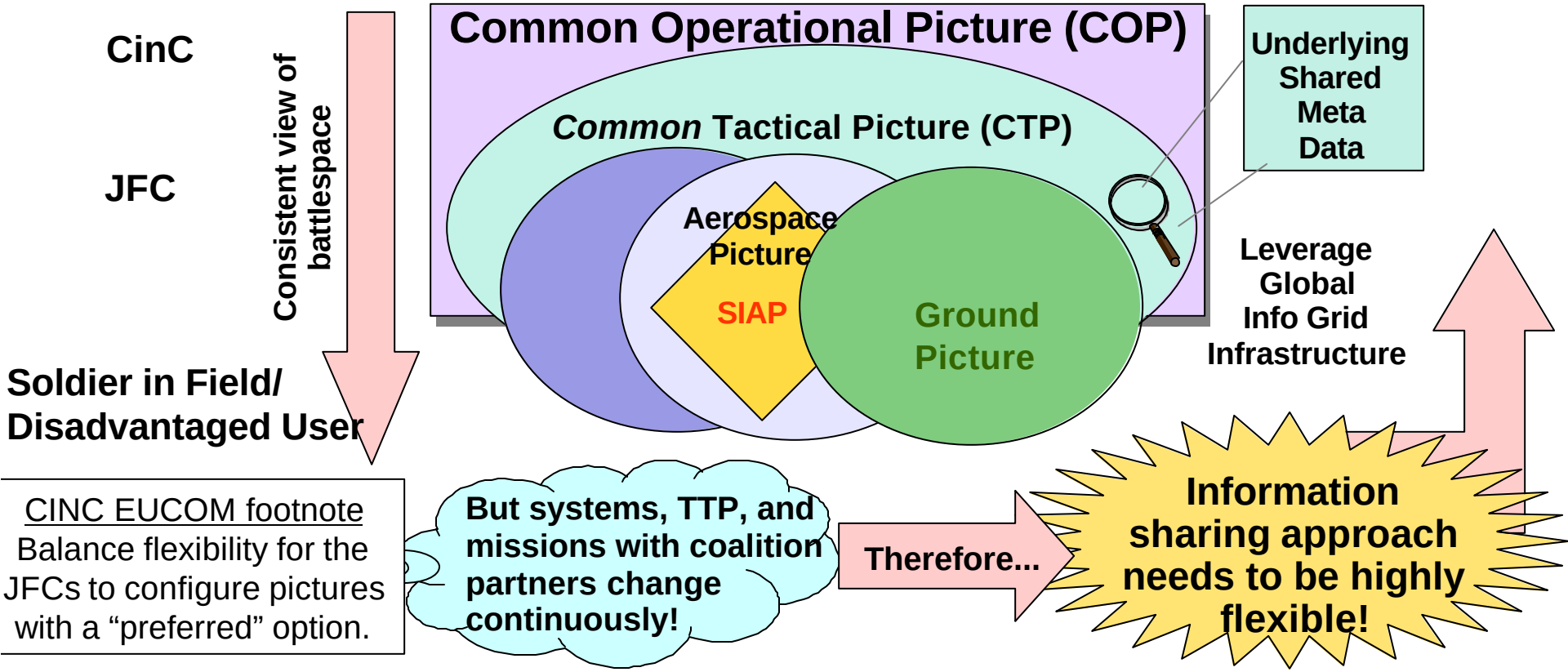
- *The cause*: multiple systems, conceived and developed individually
- Compounding the problem: systems, TTP, missions changing continuously, new coalition partners, stovepiped intelligence dissemination

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

Conceptual Solution

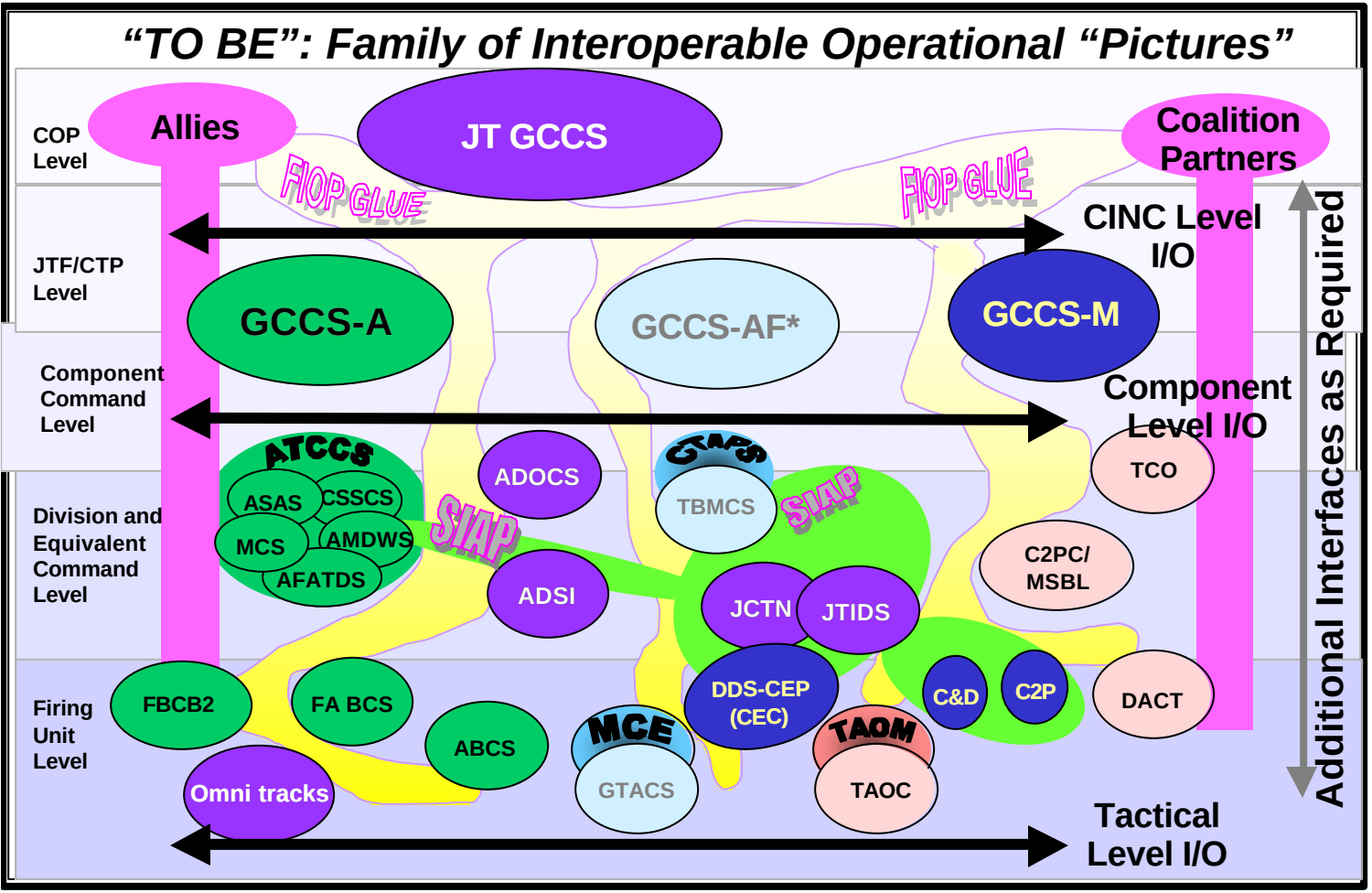
A Family of Interoperable Operating "Pictures" (FIOP) for Battle Management

Joint Staff/JFCOM/Service/Agency stakeholder's agreed-upon graphic:



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

Service Led FIOP

- SENIOR BUT LEAN ORGANIZATION

FIOP Systems Engineer
(Service Lead)
USA/USMC/USN/USAF
Warfighters/Engineers

- BULK OF NEW $$ MIPR'd TO SERVICE EFFORTS

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

SIMP
(Navy Led)

SIGP
(Army/MC 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

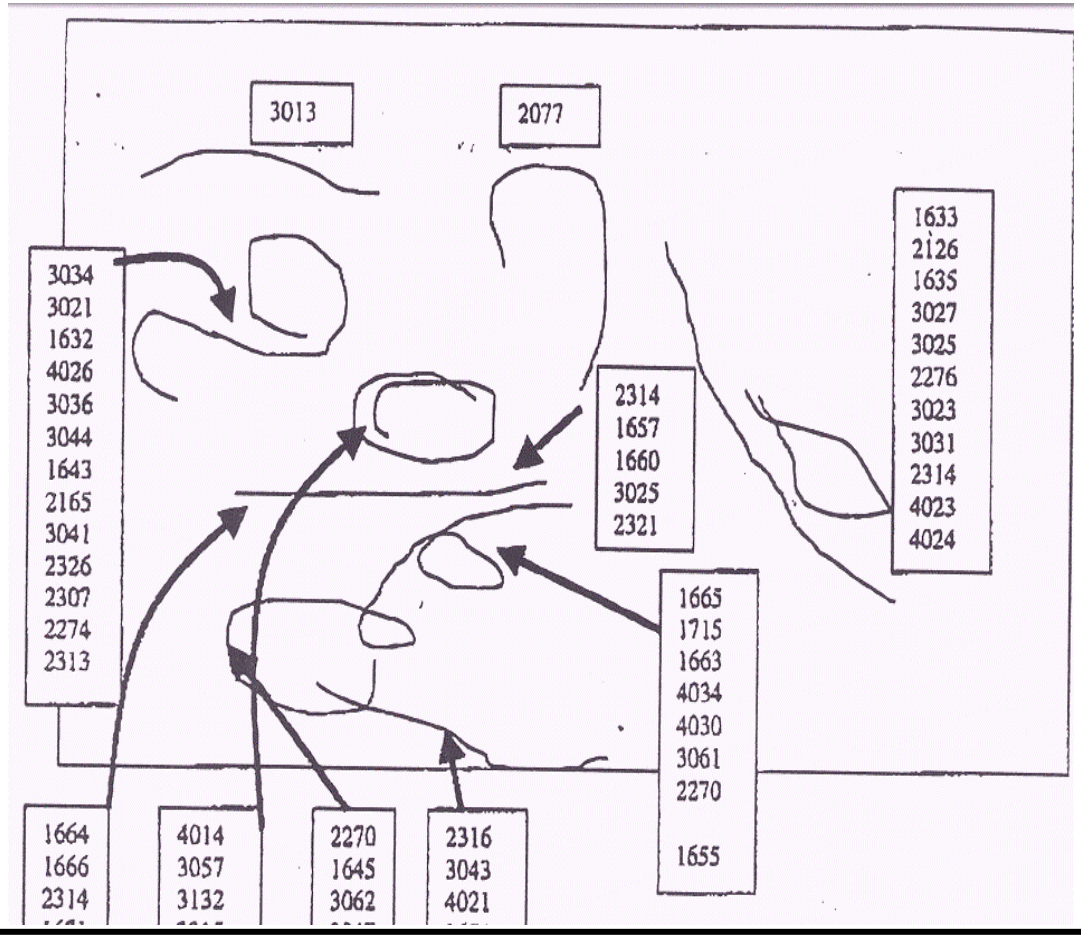
OUSD AT&L FIOP Tasks

- 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:**
  - **Friendly Forces SA**
  - **Red Force SA**
  - **Fire Support**
  - **ISR Management**
  - **JDN/JPN Integration**
  - **Infrastructure Services**
- **Spiral 3:**
  - **TBD**

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.

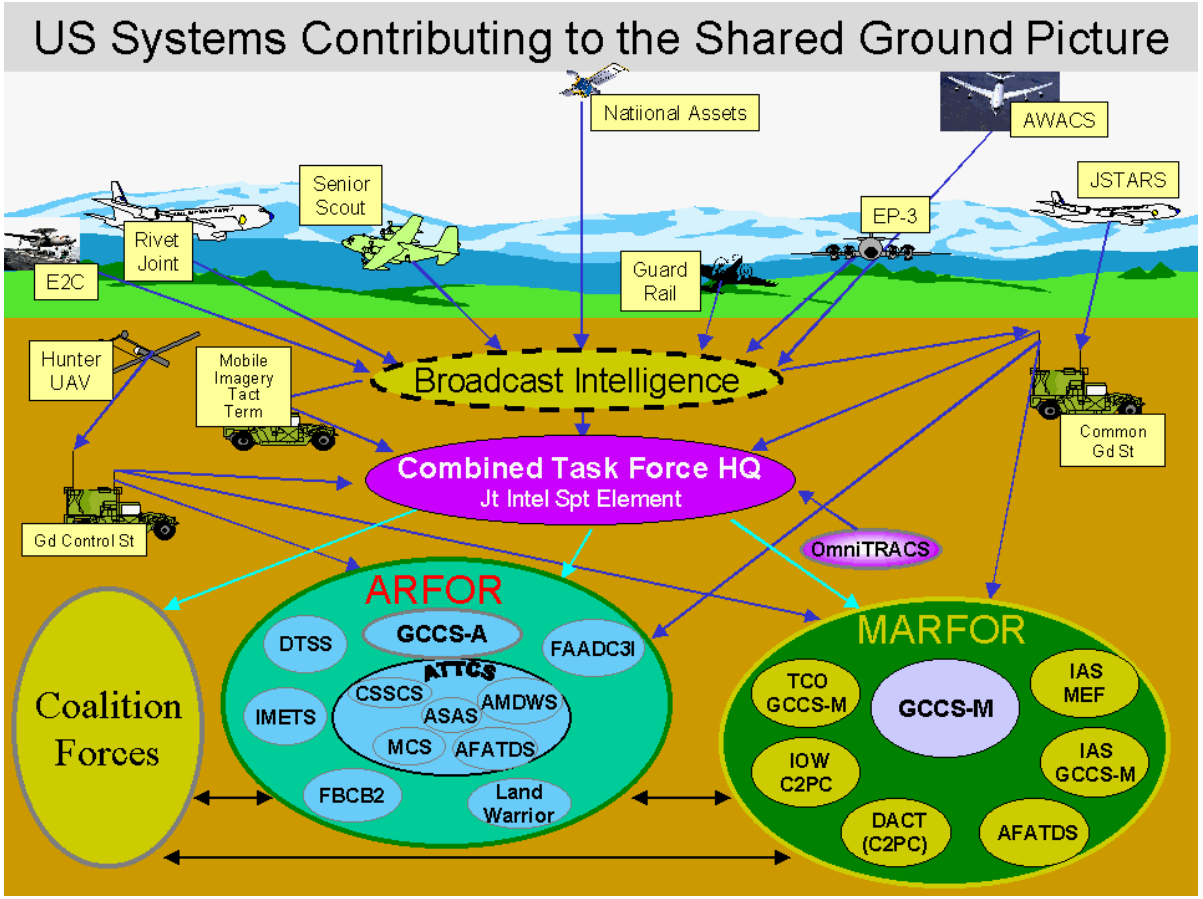
Constant turnover of target designation limits warfighter ability to make decisions.

Single Integrated 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 Ground Picture (SIGP)

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

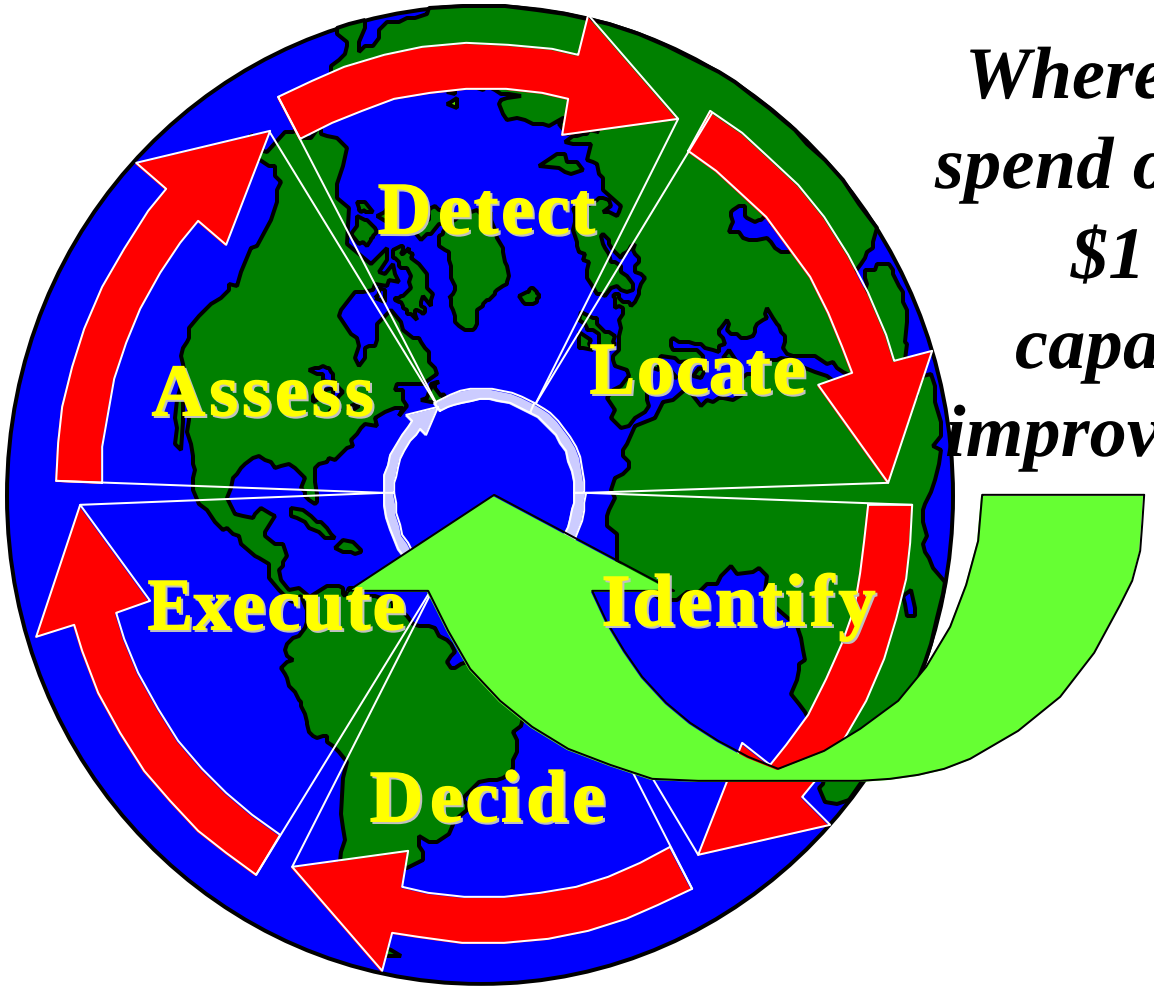


Shared Tactical Ground Picture:
"Five Power Quick Win Activities"

- **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?

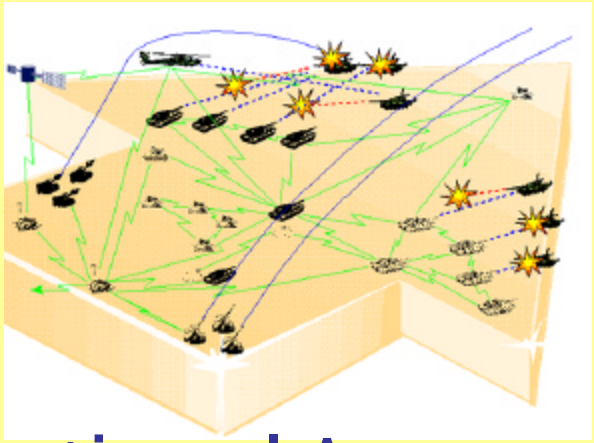
Under Secretary Pete Aldridge's tasking on:
Precision Engagement /
Time Sensitive Target Integration

- Build on work and recommendations of the Defense Science Board (DSB)
- Continue the ongoing work by the AT&L led Time Sensitive Targeting (TST) group
- Feed into the overall Precision Engagement effort
- Develop a plan of actions and milestones for Precision Targeting, to include TST
- Complete this task by April 2002

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 ID



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

Fratricide

"I want to take the moral high-ground here and make sure we fix the fratricide/CID problem. We need to do this right!"

- General Sheehan -

Coalition Fratricide Incidents:

- **WWII: US air causes 300 UK, Canadian & Polish casualties.**
- **Desert Storm:**
  - **USAF A-10 destroys 2 UK Warriors; KIA 9, WIA 11**
  - **USA M1 shoots UK Infantry wounding 2**
  - **USAF/Qatari AF drops bombs on Kingdom of Saudi Arabia force; KIA 4**
- **ASCIET 99 / 00: 8 / 3 Incidents**

US Fratricide Incidents:

- **From New Georgia Burma to Desert Storm, fratricide rate ranges from 12% to 17%!**
- **NTC 15%**

Fratricide continues to be a problem!!

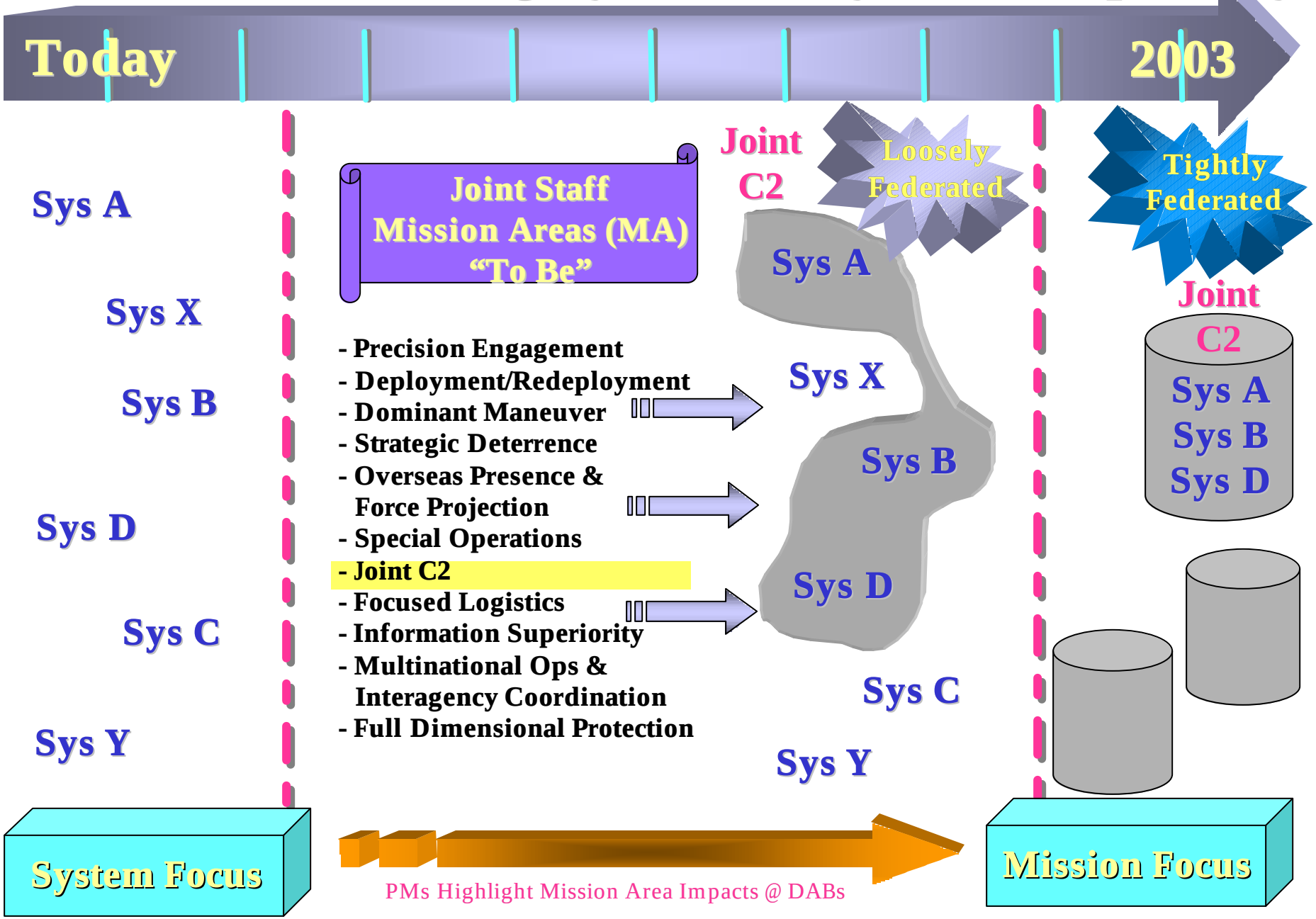
This has been exacerbated by alliances with multi-national forces containing similar equipment as that of potential enemies!

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

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**
- ***FIOP* is Key to Implementing Decision Superiority**
- **Efforts must evolve in Cooperation with Allies and Coalition Partners, *especially for CID***
- **Systems Engineering and Systems Architectures *required to ensure transformation***
- **Must Harness and Adapt Commercial IT Technology and Processes, *with emphasis on open systems***

Questions ?