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 . . .

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

**DOCTRINE, CONCEPTS, TRAINING, TTPs**
- (Demo, Exercise, etc.)

**POLICIES AND DIRECTIVES**

**STANDARDS & ARCHITECTURES (JOA, JSA, JTA, GIG)**

**PROCESSES (JI&I, IERs, C4ISPs)**

**LEGACY SYSTEMS OF RECORD**

**NEW & ENHANCED LEGACY SYSTEMS (JSF, JTRS, SBIRS, MOBILE COMMAND CENTER)**

**OVERARCHING BMC2 PROGRAM INITIATIVES (FIOP, JI&I, JDEP)**

**PHASEOUT LEGACY**

**REQUIRED INTEROPERABILITY (SCENARIO DEPENDENT)**

Interoperability

- 2000
- 2001
- 2003
- 2005
- 2008

Policy Mods and Transition Plans In Place

Overarching BM/C2 Initiatives Begin to Take Effect

“Low Hanging Fruit” I/O problems solved for legacy C2 systems

Legacy C2 I/O problems resolved; I/O institutionalized in processes, arch, etc.

Without Overarching BM/C2 Program Initiatives
Making BM/C² Interoperable by 2008

Mission Critical ISR +87

130
Core BM/C²
Total

Mission Critical Support Communications +132

(130)
Core BM/C²

Total

FIOP

Virtual
Constructive Live
Simulation in Lieu
of Testing

SOFP

DOTMLPF

SIGP

SIMP

SISP

GCCS

JI&I

SIAP

(~ 30)

Logistics +11

Mission Critical ISR +87

Mission Critical Support Communications +132

(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**

CINC Operational-level “pics”

JTF Tactical-level “pictures”

Firing Aerospace, Unit Ground, Maritime “pictures”

**CORRESPONDING SYSTEMS: “As-Is / As Planned”**

“AS IS”/“AS PLANNED” Systems Interoperability: NON-Interoperable, Operating “Pictures”

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

- **Notes:**
  - SomeSvc systems deployed on otherSvc platforms
  - As is depicts presence in at least one CINC theater
Establishment of SE Orgs will be via JROC (no preset timeframe)
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.
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

US Systems Contributing to the Shared Ground Picture
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)

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

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

Detect
Assess
Locate
Identify
Execute
Decide
• 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)

Situational Awareness Target Identification

Equals

Fratricide Reduction and Increased Combat Effectiveness

Products:
- “Don’t shoot me” systems
- Situational awareness systems

PLUS

Training

Doctrine Tactics, Techniques & Procedures

- Operational concept for CCID in CAS, MOUT, Mounted-dismounted Ops
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.
Joint Staff Mission Areas (MA) “To Be”

- Precision Engagement
- Deployment/Redeployment
- Dominant Maneuver
- Strategic Deterrence
- Overseas Presence & Force Projection
- Special Operations
- Joint C2
- Focused Logistics
- Information Superiority
- Multinational Ops & Interagency Coordination
- Full Dimensional Protection

PMs Highlight Mission Area Impacts @ DABs

AT&L / JS “Mission Area Reviews”
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 Department's success in systems of systems

- Simulation is a core component for advanced engineering environments
WHAT IS INTEROPERABILITY?

“"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

“We will connect Information systems and weapons in new ways”
President George Bush
Needed horizontal and vertical system interoperability across Service lines and between echelons.

**The Solution: A Conceptual View of FIOP as Glue**

**FIOP Glue:**
- Federating Data Strategy “Information”
- Fusion Strategy
- Multi-Level Security Architecture
- Direction Vector for Relevant Department Initiatives

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**“TO BE”: Family of Interoperable Operational “Pictures”**

<table>
<thead>
<tr>
<th>COP Level</th>
<th>Allies</th>
<th>JT GCCS</th>
<th>Coalition Partners</th>
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**Additional Interfaces as Required**

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

- Commercial Imagery
- National Technical Means
- SBR
- Precision SIGINT
- FOPEN
- Spectral/Polarimetric GridLock
- Improved TLE
- DCGS
- IPB C
- Fix Target Database
- Integrated TPEDs
- Ground Control Points
- DPPDB Production
- LD/HD & MP-RTIP
- GPS
- Accuracy Improvement M-Code
- GPS-III High Power
- LINK-16 CDL/TCDL
- Low-Cost, Long-Range Missile Weapon Seekers & Datalinks
- Reassess Weapon Mix
- GPS, GMTI/SAR, EO, LD/HD & MP-RTIP
- Anti-jam
- FOPEN Spectral/Polarimetric
- Close-in Sensing
- GridLock Improved TLE
- DCGS
## FIOP Priorities

### FIOP Task 1 Spirals

1.1 Web-Enable Exec Man Cap
   - ADOCS Functionality Integ
   - XML Enable Data Sources
   - Target Pairing

1.2 Tactical COE Workstation
   - C2PC Migration

1.3 VMF Capability in COE
   - VMF Parser in COE
   - Resolve URN Issues

### FIOP Task 2 Spirals

2.1 Friendly Force Sit Awareness
   - Space Based Blue Force Track
   - JTF Warnet
   - BFT DOTMLPF Solutions
   - Multi Security Level (MLS)
   - Combat Support
   - XML in a box (XB)
   - Adaptive Battlespace Awareness
   - JFCOM BFT Initiatives

2.6 Data Federation/Info Fusion
   - MLS/MSL Initiatives
   - Data Fusion integration/XTCF
   - XB – XML Enabling
   - Information Brokering

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- AT&L Priority 6

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