Interoperability & Standards

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Should this be the State of Interoperability ?

“The results resemble nothing so much as islands of automation in an archipelago of isolated systems with a sea of custom interfaces, which much be either designed and maintained by an in-house navy or installed and supported by privateers”

Open Architecture controllers, IEEE Spectrum, June 1997

Interoperability

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

Joint Publication 1-02
(emphasis added)

Interoperability is more than just information exchange -- it impacts systems, process, procedures, organizations and missions

Information Technology

Information Technology: Any equipment or interconnected system …of equipment that is used in automatic :

- acquisition
- storage
- manipulation
- management
- movement
- control
- switching
- interchange
- transmission
- reception

of data or information by the executive agency

National Security Systems

National Security Systems: Any telecommunications or information system operated by the United States Government, the function, operation, or use of which --

- **involves intelligence activities;**
- **involves cryptologic activities related to national security;**
- **involves command and control of military forces;**
- **involves equipment that is an integral part of a weapon or weapons system, or**
- **is critical to the direct fulfillment of military or intelligence missions.**

CIO Responsibilities under Clinger-Cohen

- Foster Re-engineering of “Business” Processes
- Develop, maintain, and facilitate the implementation of a sound and integrated information technology architecture for the executive agency
- Assure investment management & strategy

(Clinger-Cohen Act of 1996, 40 U.S.C. 1425)

DoD CIO Responsibilities Under Title 10

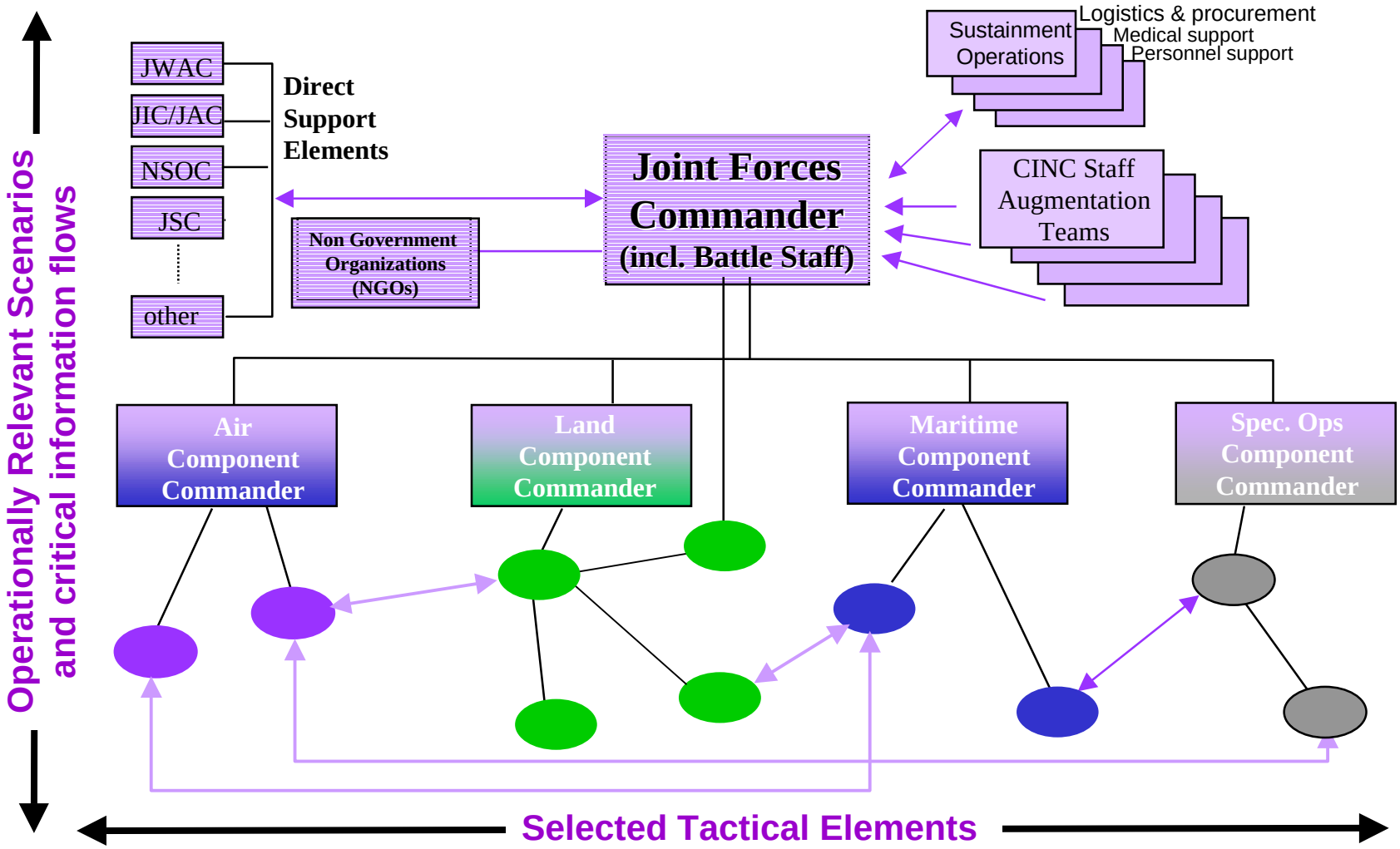
The Chief Information Officer of the Department of Defense shall—

- **Review and provide recommendations to the SECDEF on DoD budget requests for information technology (IT) and national security systems (NSS)**
- ***Ensure the interoperability of IT and NSS throughout the DoD***
- **Ensure that IT and NSS standards that will apply throughout the DoD are prescribed**
- **Provide for the elimination of duplicate IT and NSS within and between the MILDEPs and Defense Agencies**

(10 USC, Section 2223)

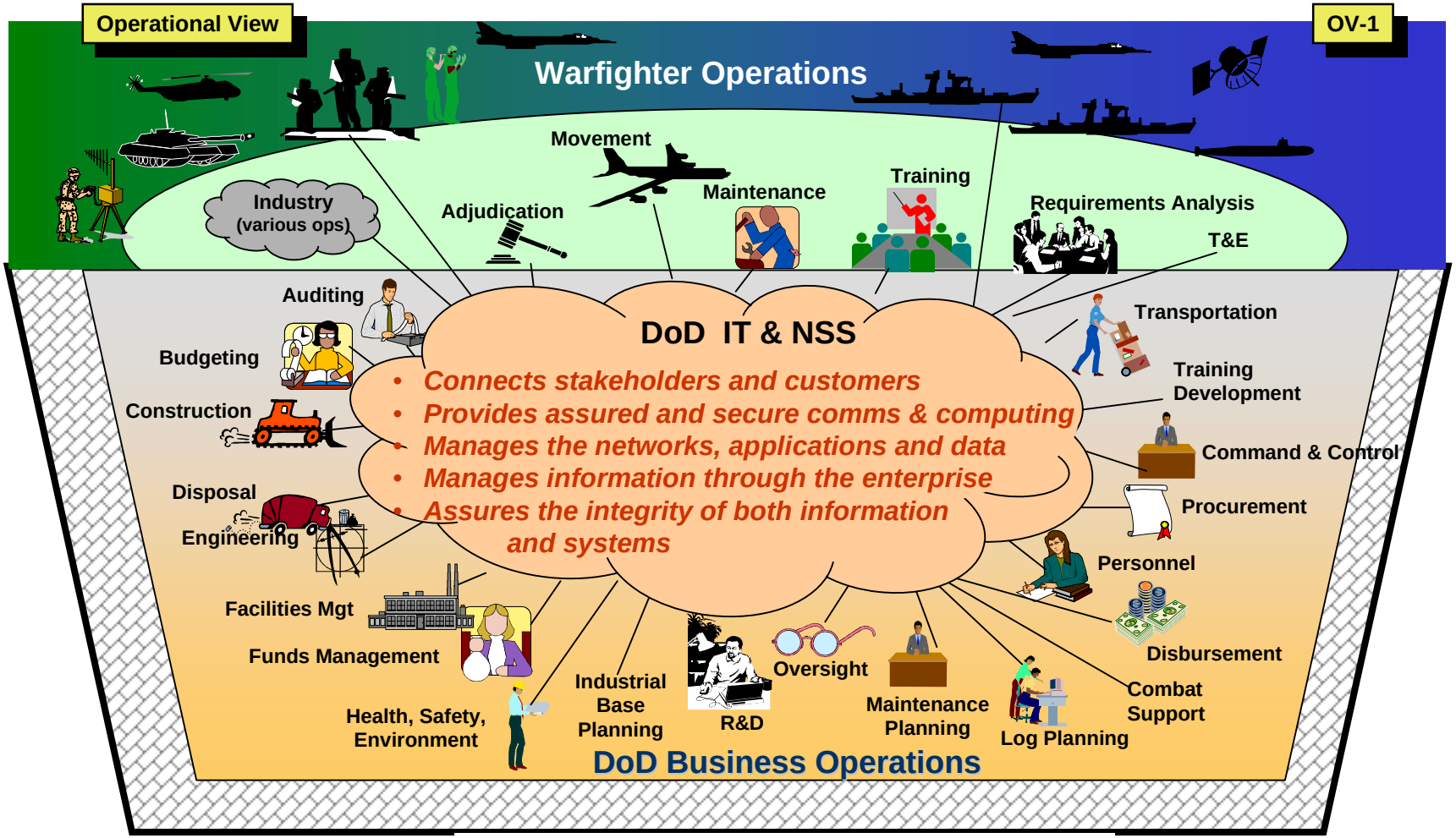
Process Focus - Joint Forces

Combat and Sustainment Operations



One DoD - Two Revolutions

Revolutions In Military and Business Affairs

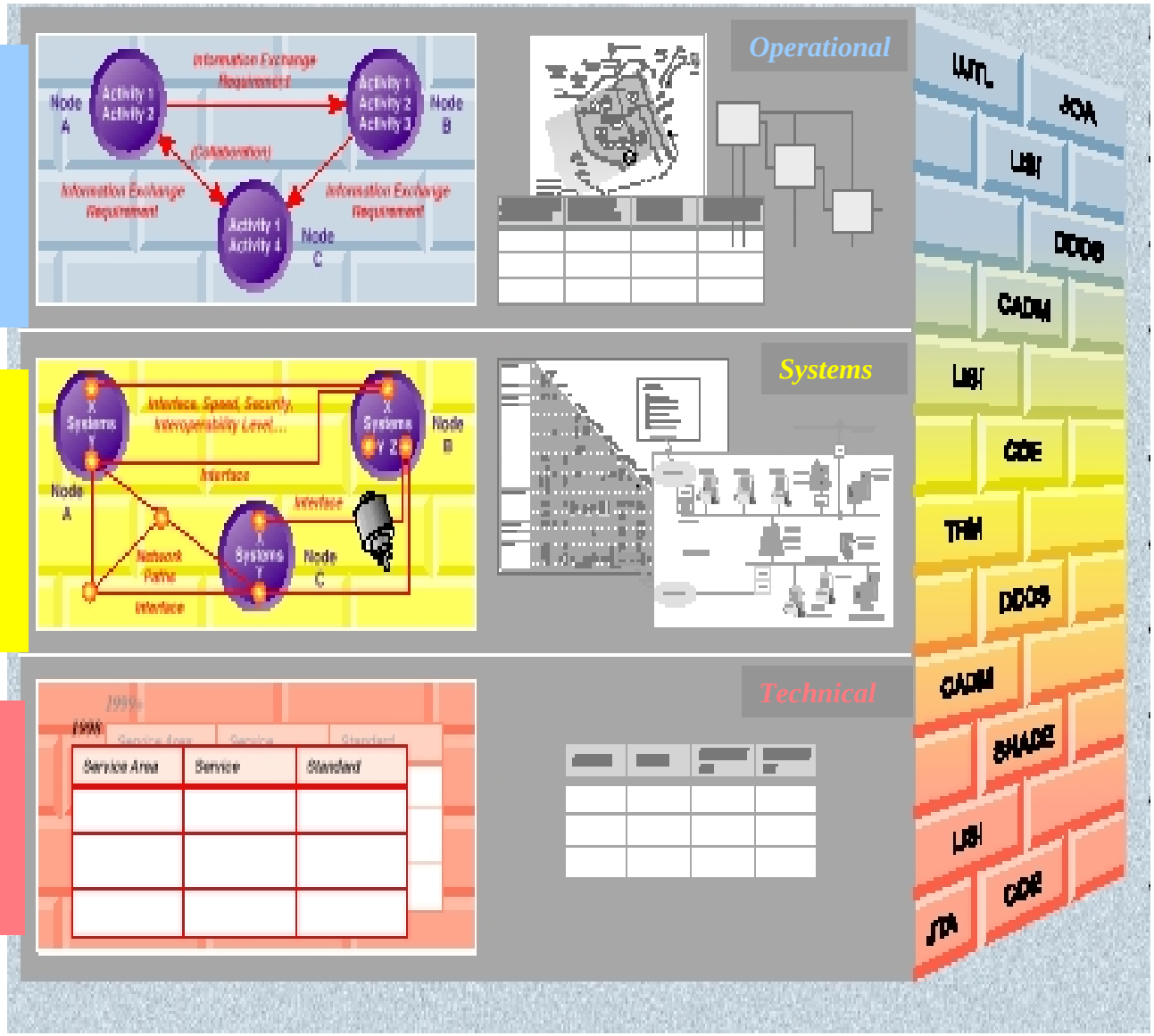


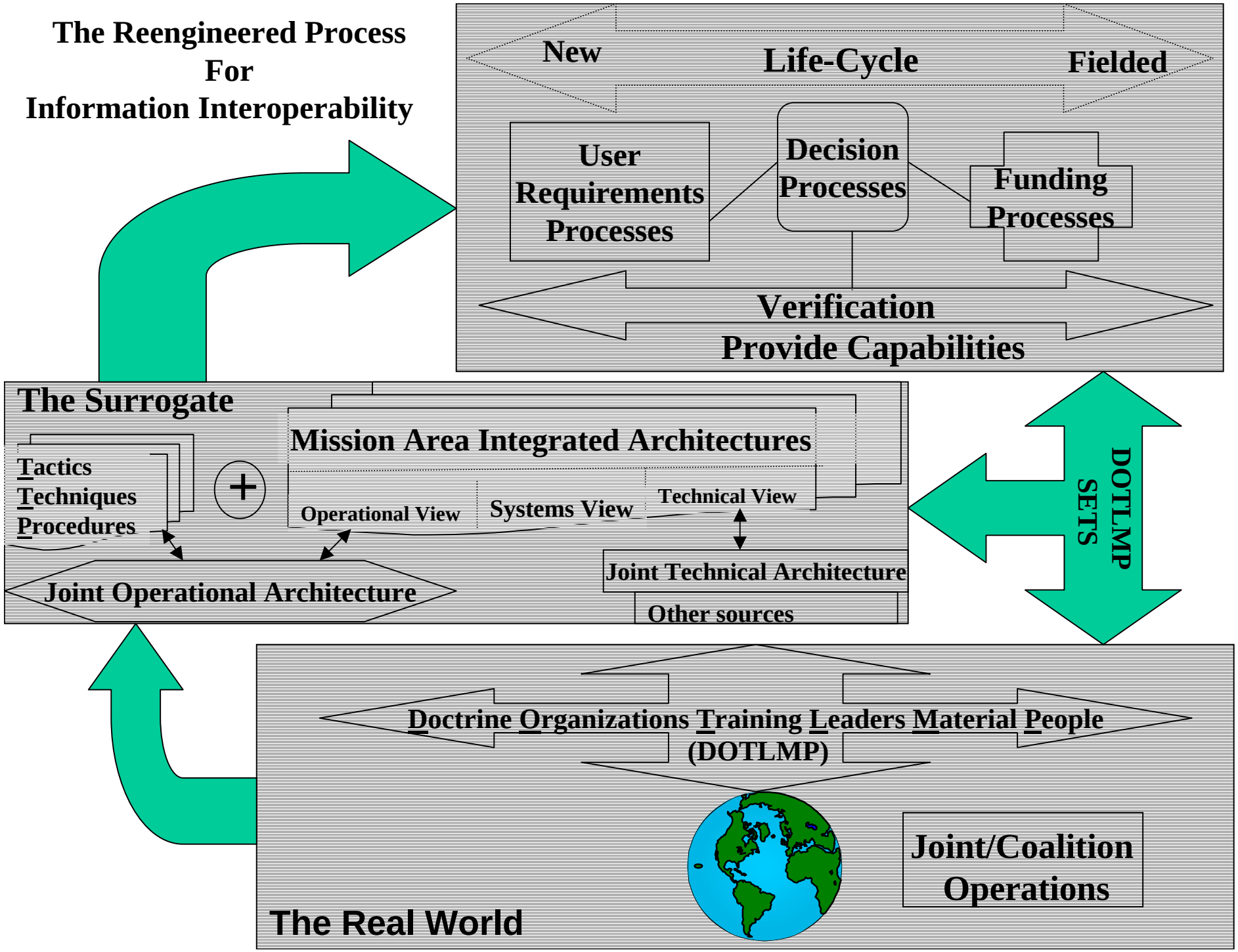
One Architecture - 3 Views

The Operational View
describes and interrelates the operational elements, tasks and activities, and information flows required to accomplish mission operations.

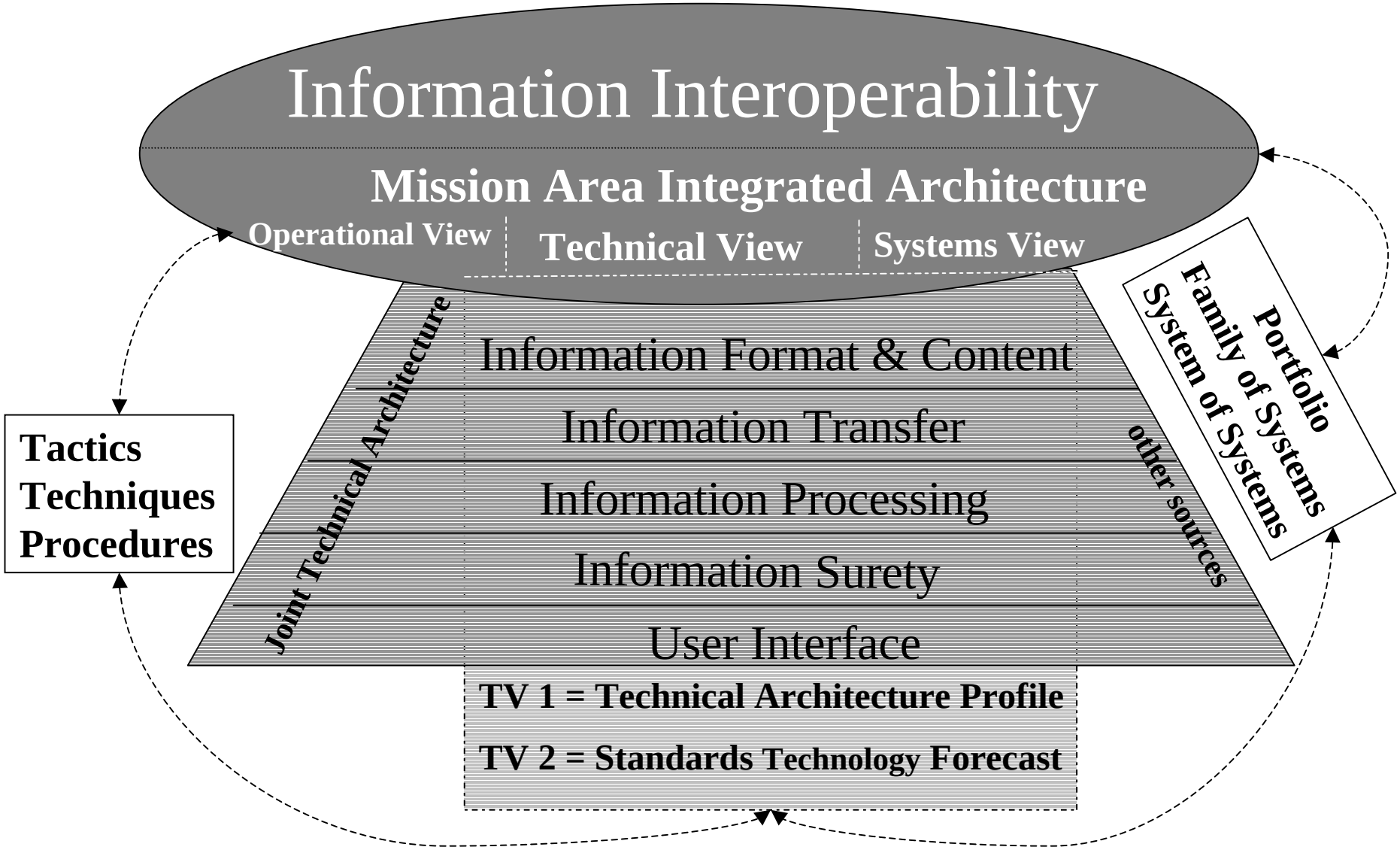
The Systems View
describes and interrelates the existing or postulated technologies, systems, and other resources intended to support the operational requirements.

The Technical View
describes the profile of rules, standards, and conventions governing systems implementation.

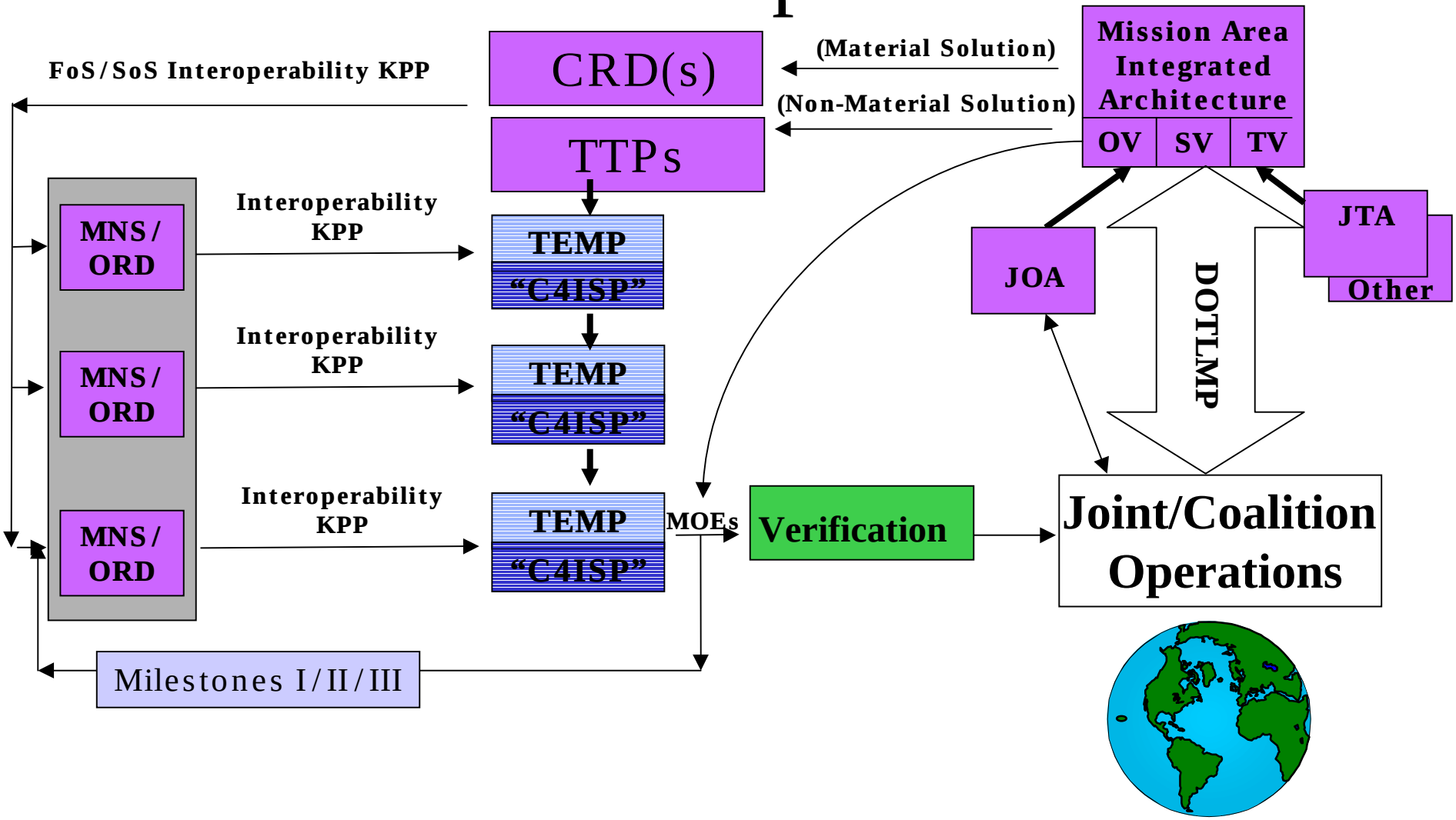



The Reengineered Process
For
Information Interoperability
New
Life-Cycle
Fielded
User Requirements Processes
Decision Processes
Funding Processes
Verification
Provide Capabilities
The Surrogate
Tactics
Techniques
Procedures
+
Mission Area Integrated Architectures
Operational View
Systems View
Technical View
Joint Operational Architecture
Joint Technical Architecture
Other sources
DOTLMP SETS
Doctrine Organizations Training Leaders Material People
(DOTLMP)
Joint/Coalition Operations
The Real World

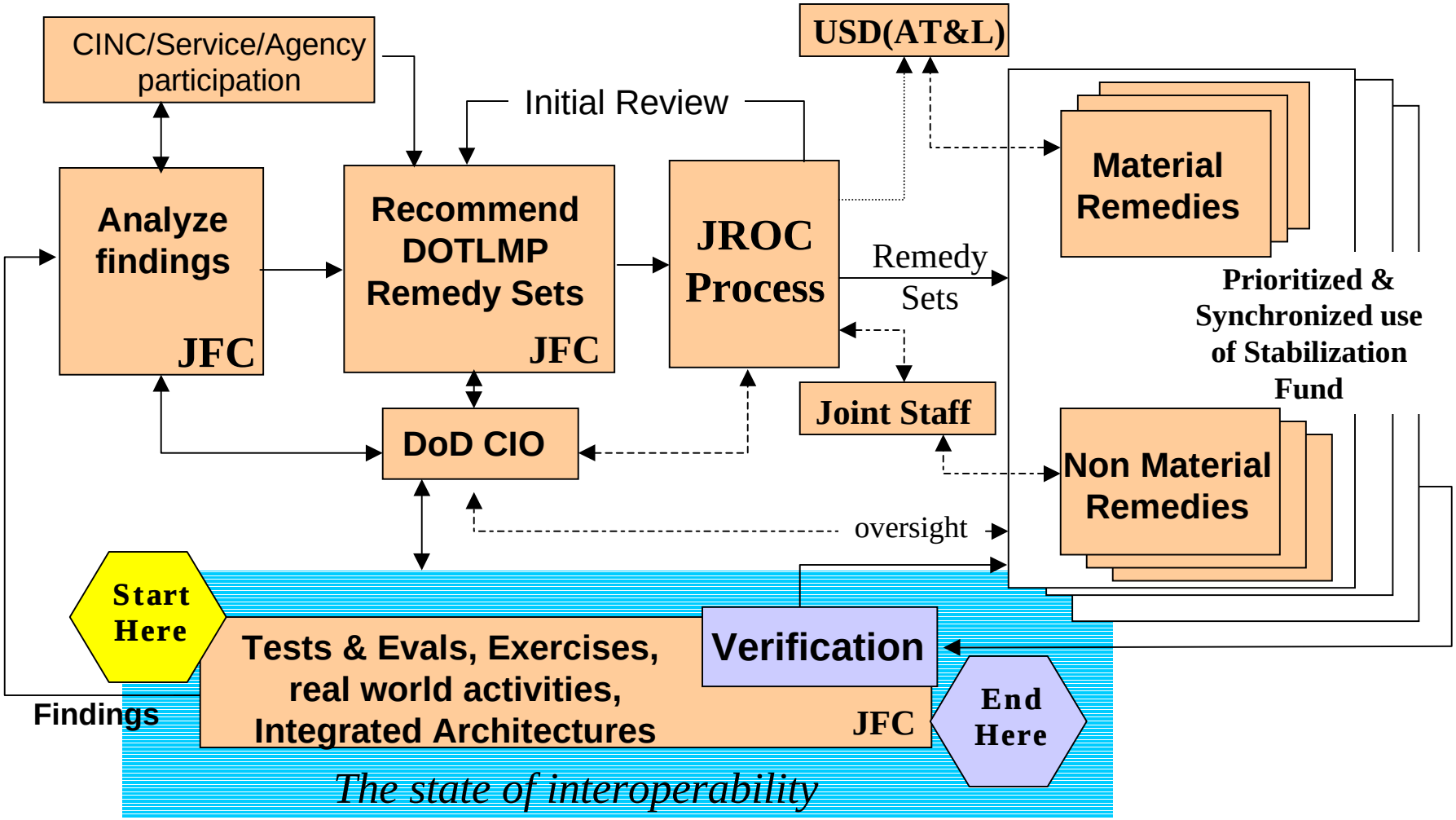
Interoperability & Standards



Interoperability Process for 5000 Series Capabilities



Interoperability Process for Existing Capabilities



Providing Priorities and Direction for Information Interoperability

cross cutting Defense wide authorities and responsibilities

DoD CIO | **USD(AT&L)** | **VCJCS** | **CINC JFCOM**

Senior Level Oversight & Direction

DOT&E | **USD(C)**

CINCs
Services
Agencies
OSD PSAs

Joint Interoperability & Integration Organization

Provide

- **DTLOMP synchronization & rationalization for New Capabilities**
- **DOTLMP Remedy Sets & use of Interoperability Stabilization Fund $s for fielded capabilities**

Material Aspects

- PMs & PEOs
- Service Systems Commands
- Defense Agencies
- Jc2I2G (CIPOs & JFPO)
- Component Acquisition Executives
- "Family of Systems" Managers

Interoperability findings

- JWCAs
- JMRRs
- JT&E.
- JITC
- Joint Exercises
- Joint Experiments
- JULLS
- AARs
- Coalition/Combined Operations

Non Material Aspects

- Doctrine Working Group
- "School Houses"
- TTP developers

Global Information Grid

Definition

Globally interconnected, information capabilities, associated processes and personnel for

collecting processing
storing disseminating
managing information
on demand to warfighters, policy makers, and supporters

The GIG includes -

all owned and leased communications
computing systems and services
software, applications and data
security services

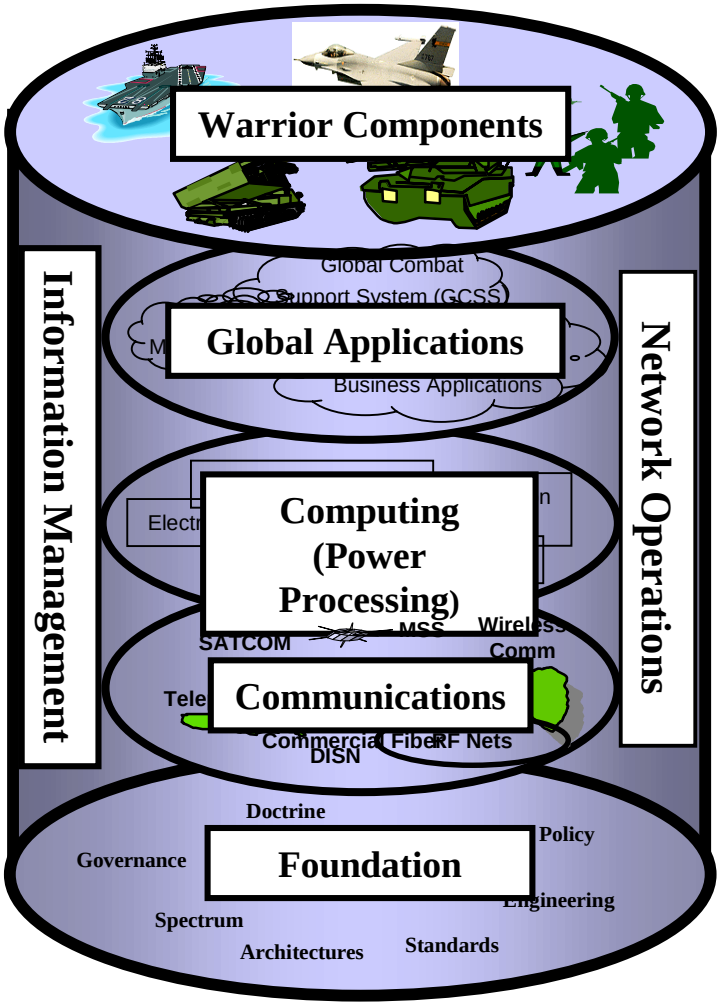
The GIG supports –

Department of Defense
National Security activities
Intelligence Community
missions in war and in peace.

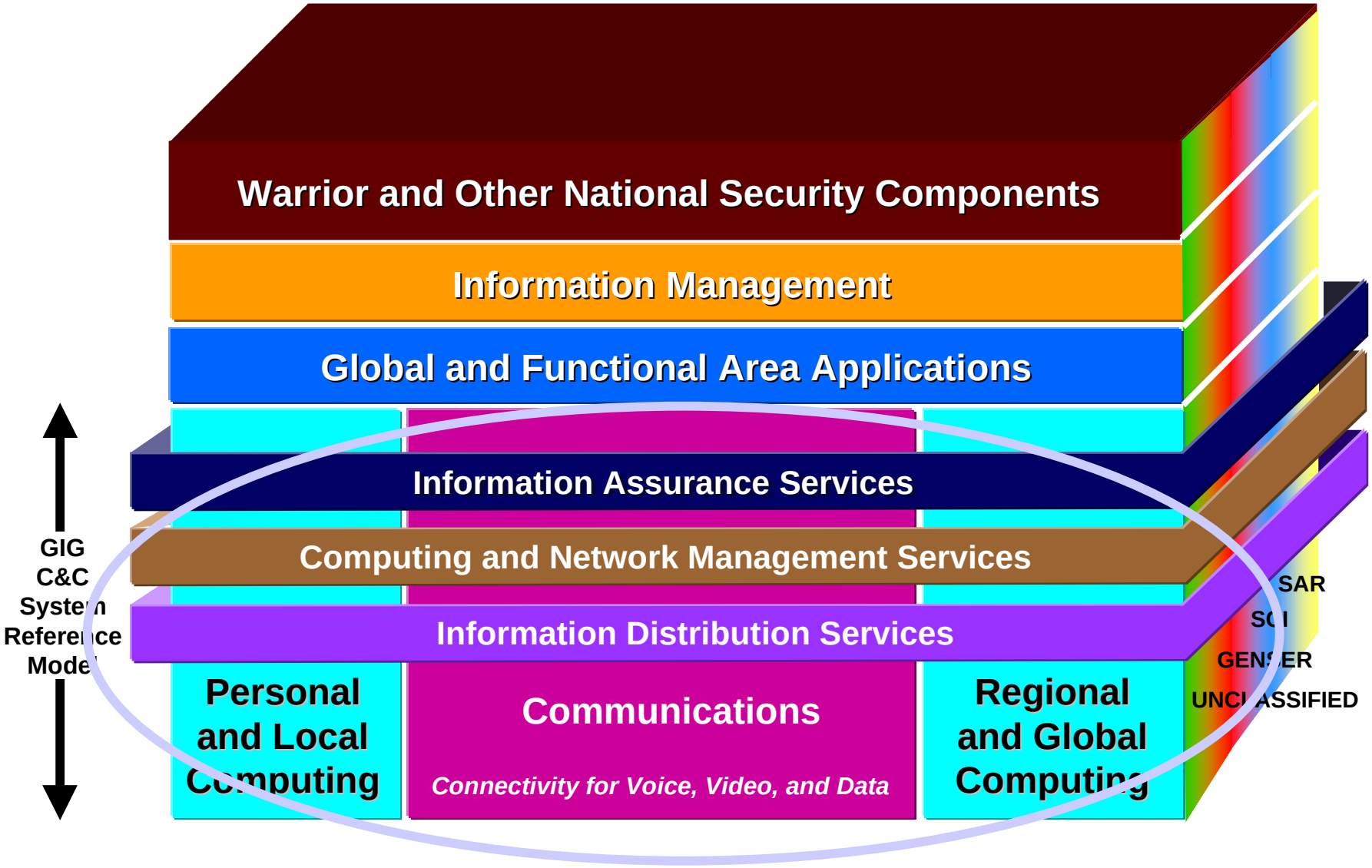
The GIG provides capabilities from all operating locations -

bases posts camps stations
facilities mobile platforms deployed sites

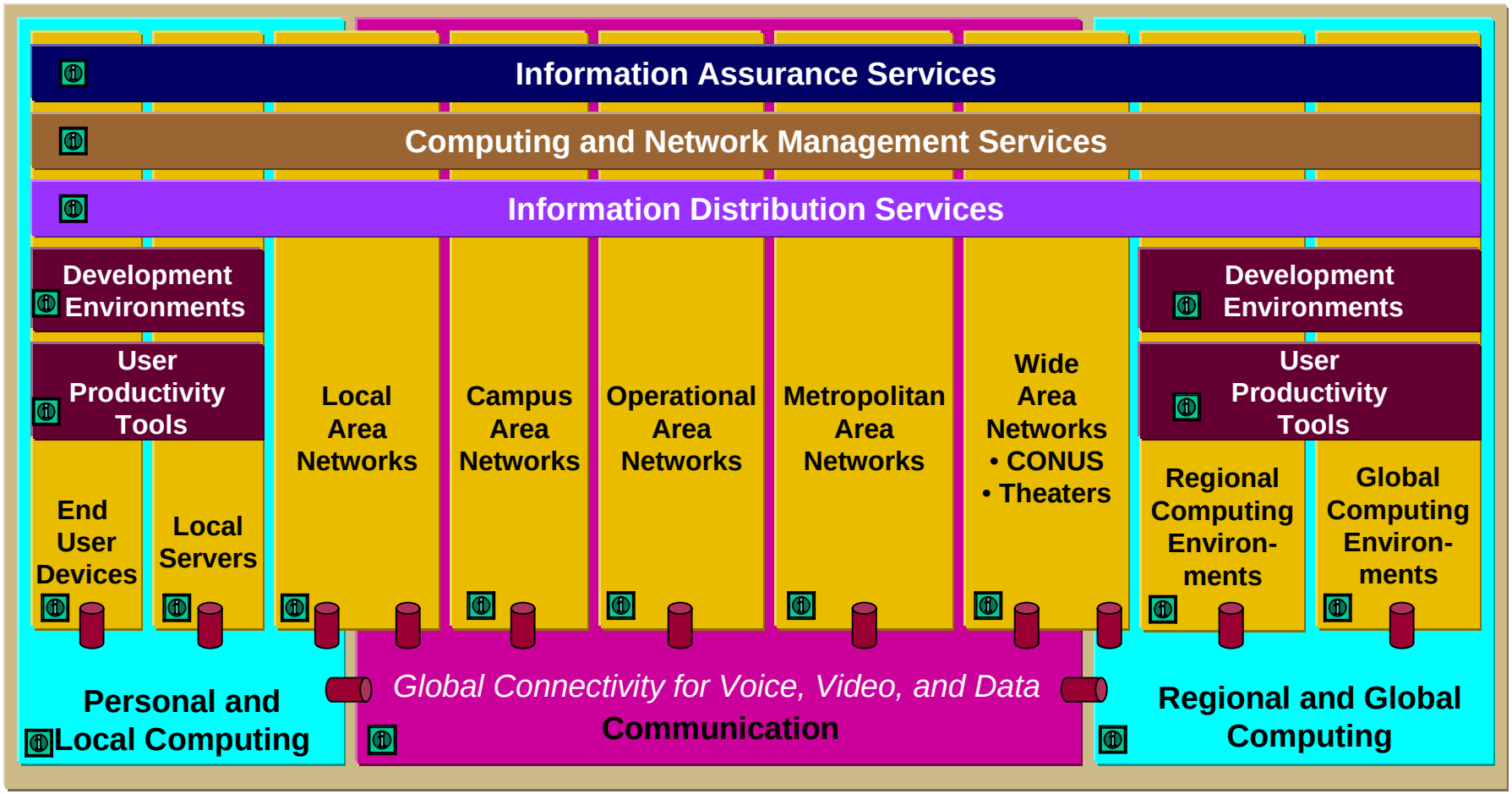
The GIG provides interfaces to coalition, allied, and non-DoD users and systems



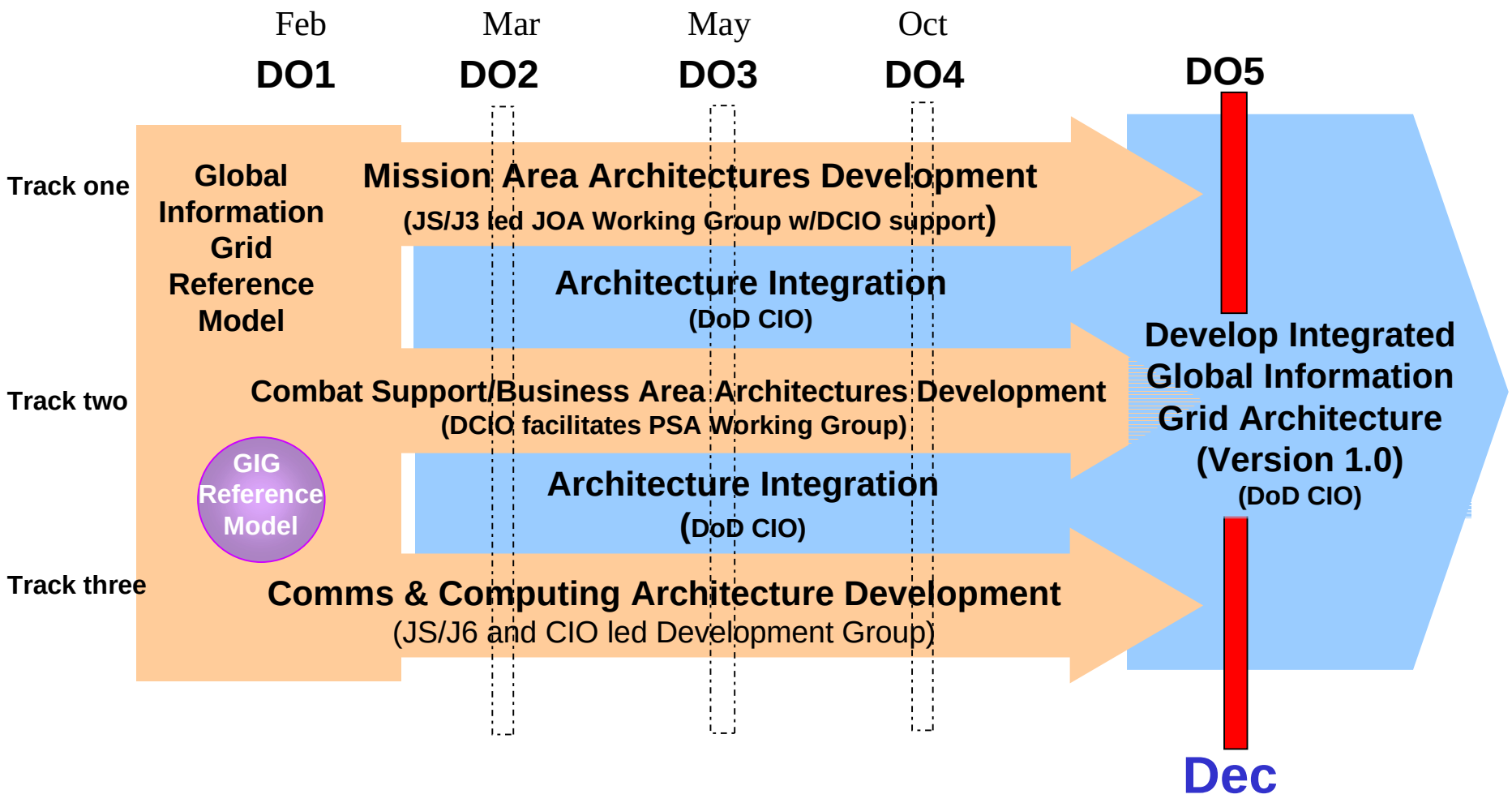
The GIG Systems Reference Model



GIG Computing &Communications System Reference Model



Three Track Architecture Process

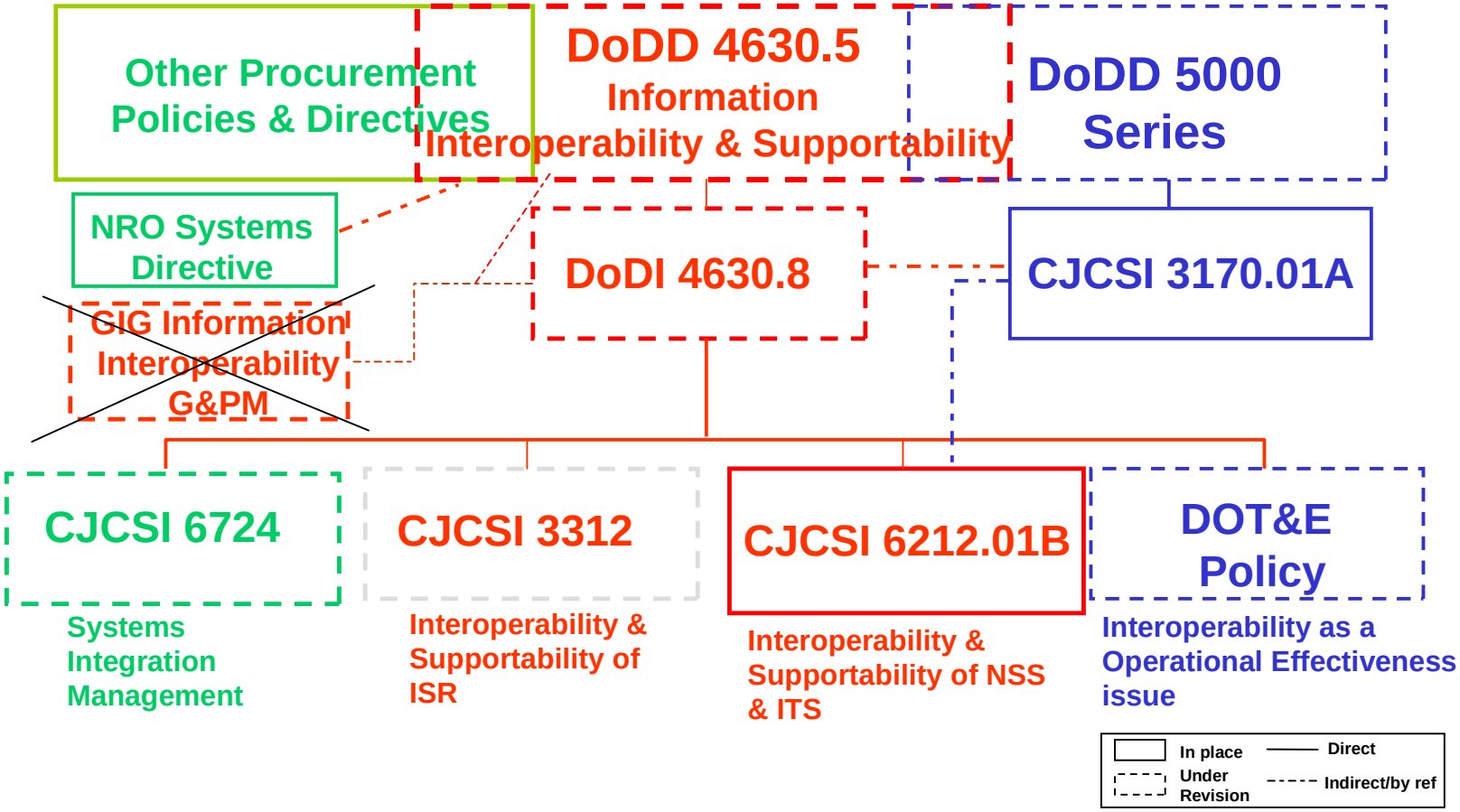


DO(x) - CIO EB Decision Opportunity

GIG Architecture Version 1.0 Product Summary

- **Integrated GIG Architecture Views**
  - **GIG Operational View**
  - **GIG Systems View**
  - **GIG Technical View**
- **Integrated Architecture Dictionary and Style Guide**
- **Architecture Derived Shortfalls/Recommendations to Influence Investment Strategy**
- **Lessons Learned**
- **GIG Architecture Version 2.0 Plan**
- **Provided on CD ROM(s)**

Streamline Policies & Instructions



Now is the time to take advantage of this window of opportunity

Interoperability & Standards

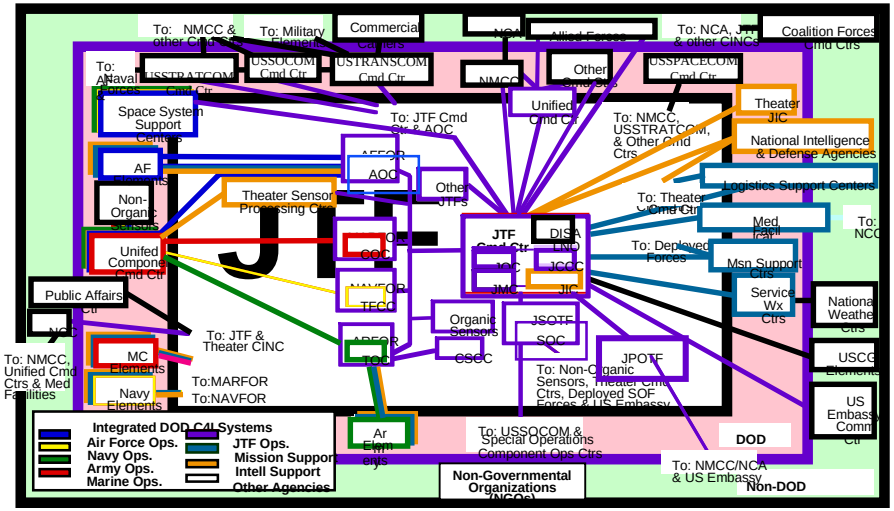
A Critical element in the DoD CIO ability to ensure the interoperability of IT and NSS throughout the DoD is:

A robust standards oversight and direction process and organizational structure that rationalizes, synchronizes and prioritizes the full spectrum of IT standards activities across the Department

BACKUP

The Situation Today

More than 400 different mission and functional software applications support JTF Commanders



- Most of our (coalition) joint operations are an ad hoc group of available and ready land, naval, and air units
- What's needed is the ability to assemble the right communications, sensors, databases, command and control and information systems to support each different (C) JTF and to have well established processes and procedures

… its déjà vu all over again

JTA Implementation Rules

- **Mandated for <u>all</u> emerging, and changes to an existing capability that produces, uses, or exchanges information in any form electronically; crosses a functional or Component boundary; and/or gives the warfighter or DoD decision maker an operational capability.**
- **Use of an applicable JTA mandated standard must consider the cost, schedule,or performance impacts, and if warranted a waiver from use.**
  - **Waivers can be granted only by a Component Acquisition Executive or equivalent**
  - **All Waivers require the concurrence of USD(A&T) and ASD(C3I)/DoD CIO (see memo for details)**
- **Required for all DoD Acquisition Categories, Advance Concept Technology Demonstrations, Advanced Technology Demonstrations, Joint Warrior Interoperability Demonstrations, Battle Laboratory projects, and any other non-traditional or non-DoD 5000 series acquisitions that meet these criteria.**
- **Each DoD Component and cognizant OSD PSA is responsible for:**
  - **implementation to include compliance assurance, programming and budgeting of resources, and scheduling**
  - **Submission of a new or revised implementation Plan**

USD(A&T)/ASD(C3I)/JS(J6) Memo, 30 Nov 1999

Interoperability & Architectures

- **Architecture is a key means for controlled orderly approach for achieving interoperability**
  - **Done for a mission area (e.g. Force Protection), business Area (e.g. logistics), or organizational (e.g. CJTF) perspective (A Top Down or horizontal approach to complement with bottoms up)**
  - **Forward focused and evolutionary (organization, process, and technology)**
  - **Used for acquisition and resource decisions, as well as user requirements development**
  - **Interactively team developed - operators, systems developers, standards developers, and technologists.**

A History Of Separate Fixes

1996

- C4I Support Plan (C4ISP)
- Joint Technical Architecture (JTA)

1998

- DoD CIO Director Information Integration & Interoperability
- Architecture Framework mandate for use
- JTA extended to cover space, weapons, M&S etc
- C4ISR Support Plans begin to appear

1999

- Info Exchange Requirements recognized (independent of Archs)
- Interoperability as a KPP (Section 912 initiative)
- Interoperability recognized in MNS, ORDS, CRDs
- Formation of the JC2I2G (Section 912 initiative)
- DOD CIO receives Title 10 Interoperability Responsibility
- OUSD(AT&L) Director of Interoperability

2000

- Interoperability named as a DAES Report Item
- DOT&E proposes Interoperability oversight board & Watch List
- Rewritten CJCSI 6212.01B
- Joint Distributed Engineering Plant (JDEP) proposed
- SIAP effort started

...

DoD CIO Responsibilities and Authorities

- **Subsection-E Clinger-Cohen Act of 1996**

  (Section 5121, Head of the Exec Agency; Section 5125, Agency CIO)

- **Executive Order 13011, "Federal Information Technology"**

  (Defines the Executive Agencies and Establishes the Federal CIO Council)

- **SecDef Memo, dated June 2, 1997, "Implementation of Subdivision E of the Clinger-Cohen Act of 1996"**

  (Delegates Responsibilities to DoD CIO)

- **10 USC, Section 2223**

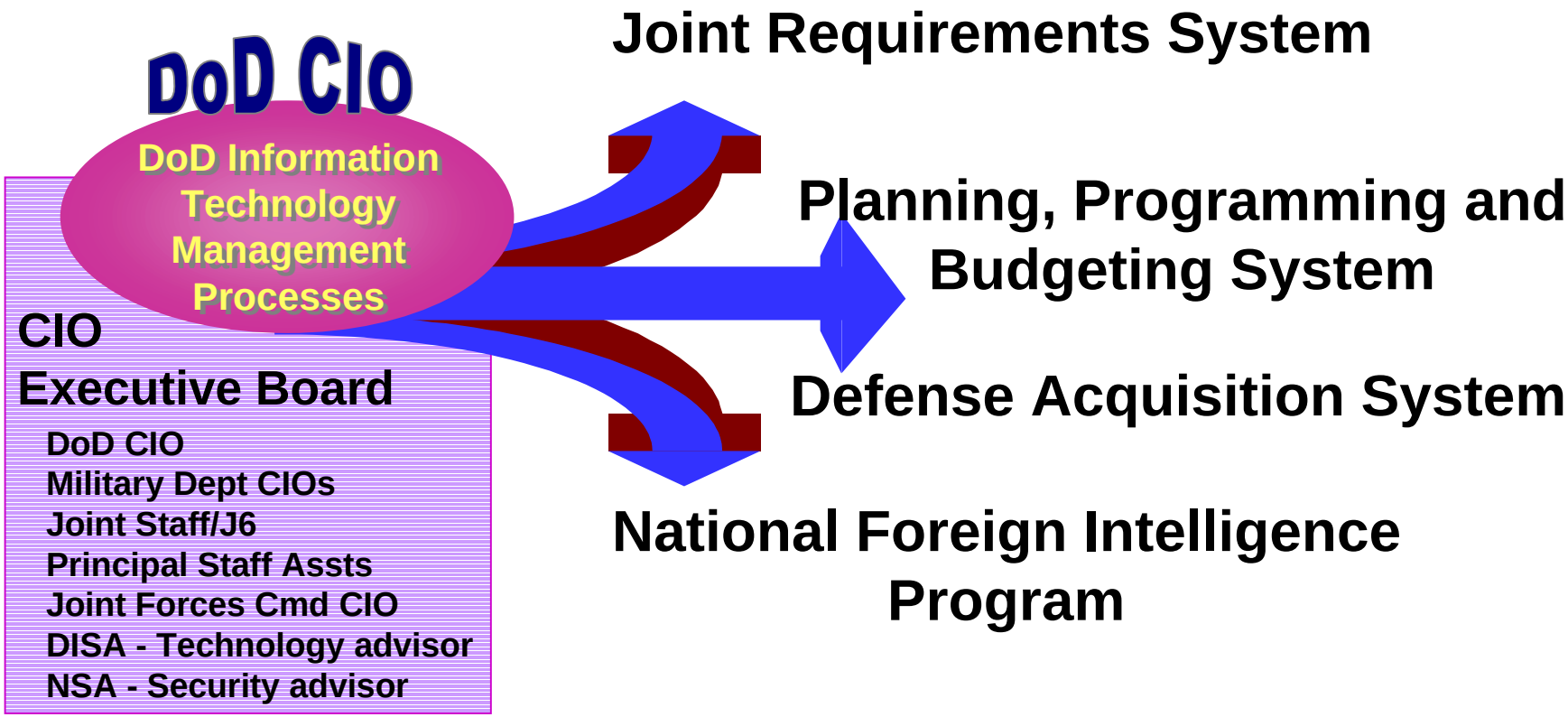
  (Revision to Title 10 - Additional Responsibilities of DoD and MILDEP CIOs)

- **FY2000 DoD Appropriations Act, Section 8121**

  (Registration and Certification of Systems)

Information Technology and National Security Systems

Collaborate with DoD Processes



Supporting the implementation of the Revolutions in Military and Business Affairs

Military Department CIOs

The Chief Information Officer of a military department, with respect to the military department concerned, shall—

- ***Review budget requests*** **for all information technology (IT) and national security systems (NSS)**
- ***Ensure that IT and NSS are in compliance*** **with standards of the Government and the DoD**
- ***Ensure that IT and NSS are interoperable*** **with other relevant IT and NSS of the Government and the DoD**
- ***Coordinate with the Joint Staff*** **with respect to IT and NSS**

(10 USC, Section 2223)

Represents the Service Equities

What's Wrong With The "As Is Process"?

- Input based - emphasizes paper compliance not operational outcome
- MNS or ORD documentation triggered; important "programs: may not have ORDs (e.g., GCCS, ACTDs, CINC Initiatives)

Paper Based

- Detail is insufficient for the purpose of conveying "certifiable" interoperability requirements
- individual System Certifications will be difficult if not impractical given the large number of systems (e.g., Y2K experience); not an FOS approach

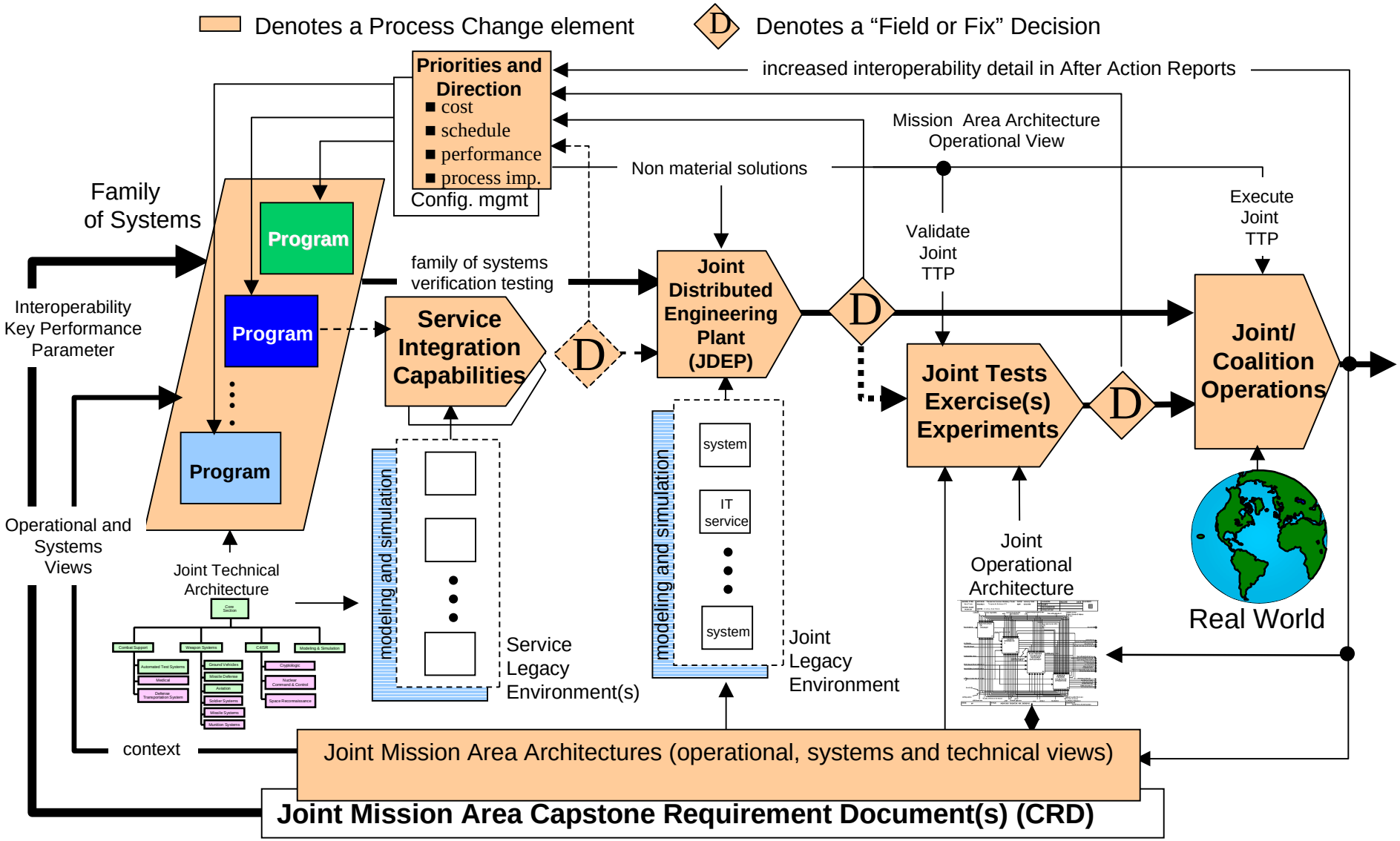
Out of date

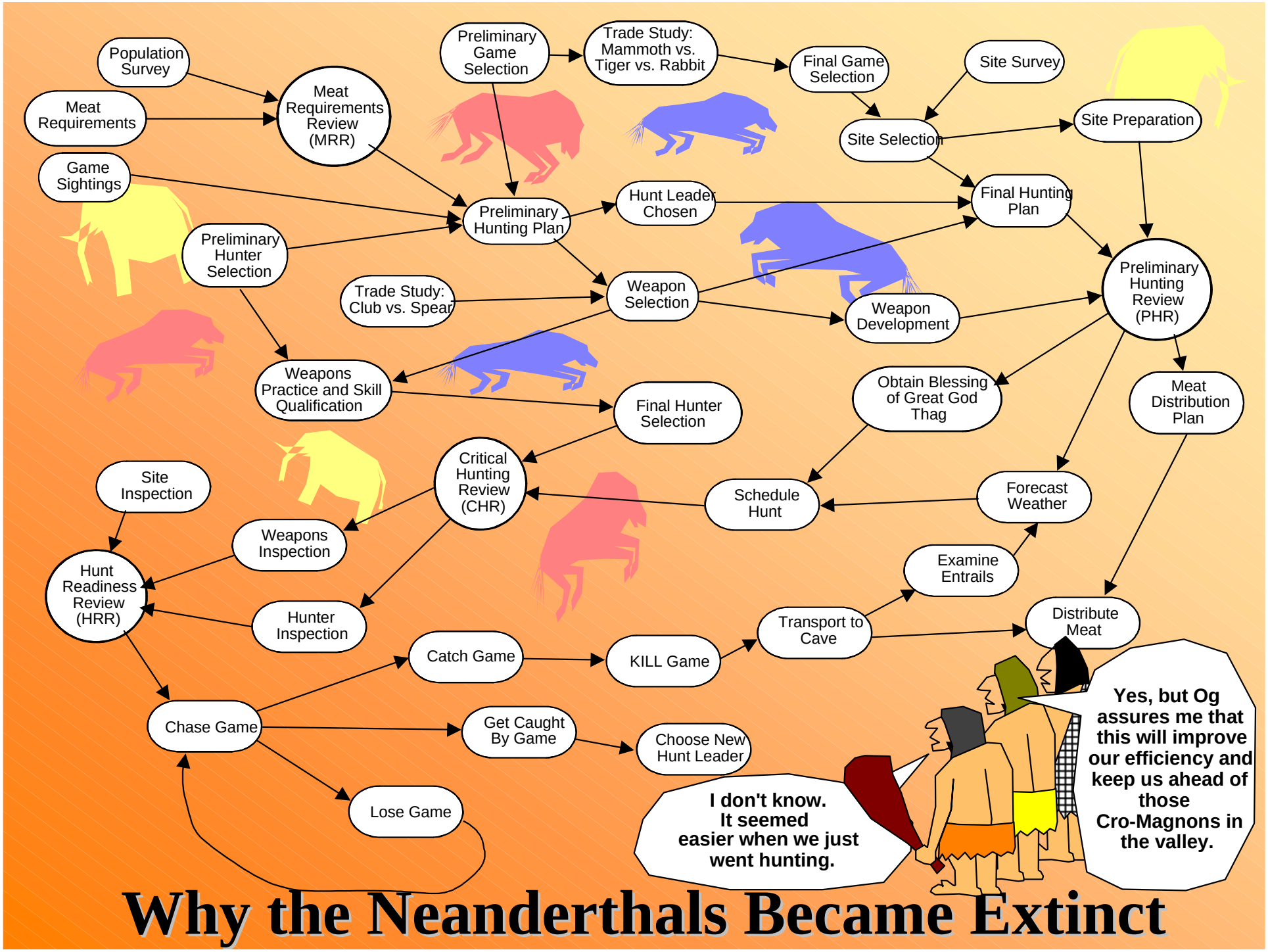
- Applies to All ACATs but approach is optimized for major C3I systems: not based on the value of information handled by the system; post MS III T&E not well addressed - *critical for software intensive systems*
- System by System - Bottoms Up check list approach. Failure of the interoperability certification test places a system on a "watch list"

Not Actionable

- No clear relationship to acquisition or resource allocation decision making processes (I.e, the process does not result in decisions to fix problems)

Outcome Based Interoperability Process




Population Survey
Meat Requirements
Meat Requirements Review (MRR)
Game Sightings
Preliminary Hunter Selection
Preliminary Game Selection
Trade Study: Mammoth vs. Tiger vs. Rabbit
Final Game Selection
Site Survey
Site Selection
Site Preparation
Preliminary Hunting Plan
Hunt Leader Chosen
Final Hunting Plan
Trade Study: Club vs. Spear
Weapon Selection
Weapon Development
Preliminary Hunting Review (PHR)
Weapons Practice and Skill Qualification
Final Hunter Selection
Obtain Blessing of Great God Thag
Meat Distribution Plan
Critical Hunting Review (CHR)
Schedule Hunt
Forecast Weather
Site Inspection
Weapons Inspection
Hunt Readiness Review (HRR)
Hunter Inspection
Examine Entrails
Transport to Cave
Distribute Meat
Catch Game
KILL Game
Chase Game
Get Caught By Game
Choose New Hunt Leader
Lose Game
I don't know. It seemed easier when we just went hunting.
Yes, but Og assures me that this will improve our efficiency and keep us ahead of those Cro-Magnons in the valley.
Why the Neanderthals Became Extinct