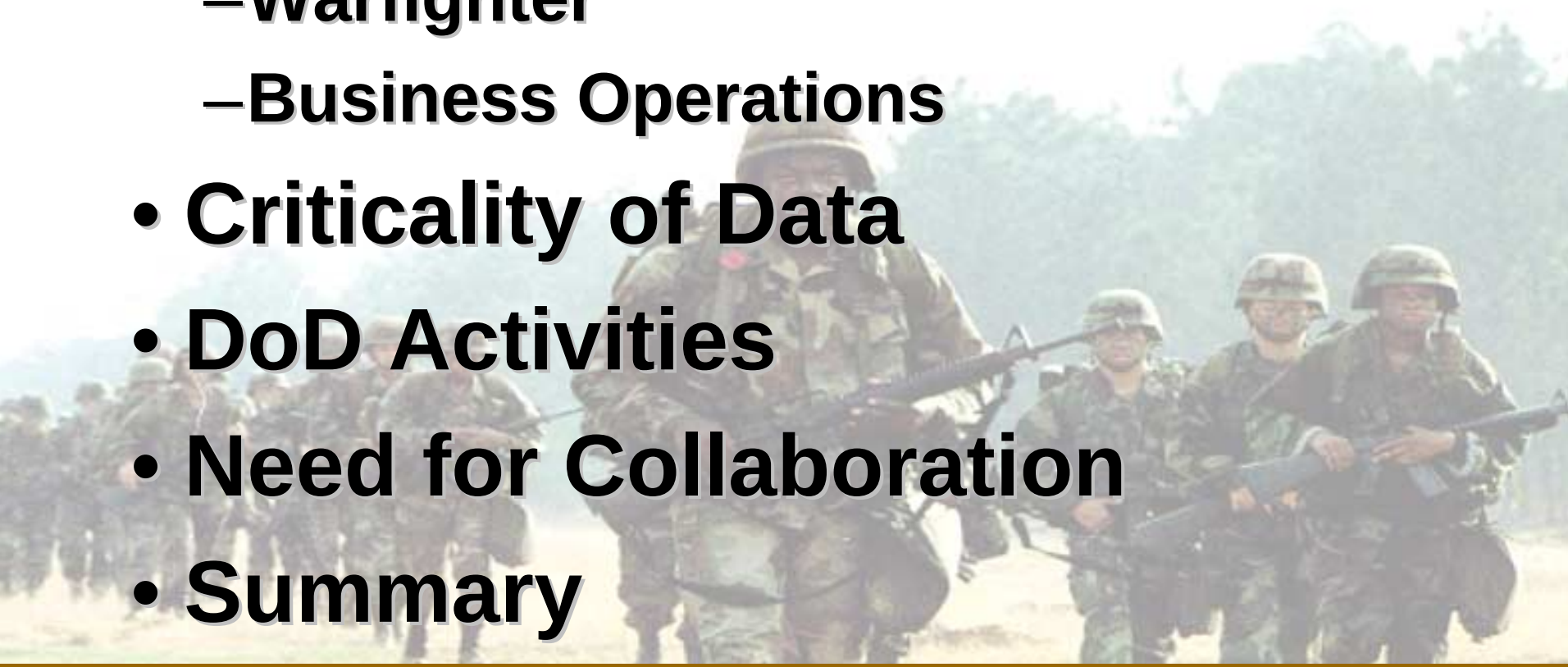
Interoperability Summit
Orlando
27 June 2002

INTEROPERABILITY CHALLENGES in the U.S. DoD

Ron Dorman
Principal Director
DISA Interoperability Directorate

Outline

- Interoperability Challenges
  - Warfighter
  - Business Operations
- Criticality of Data
- DoD Activities
- Need for Collaboration
- Summary



Information – not Military Might –
Will Dominate Battlefields of 21st Century

Information Sharing for the Virtual Enterprise

Information Superiority

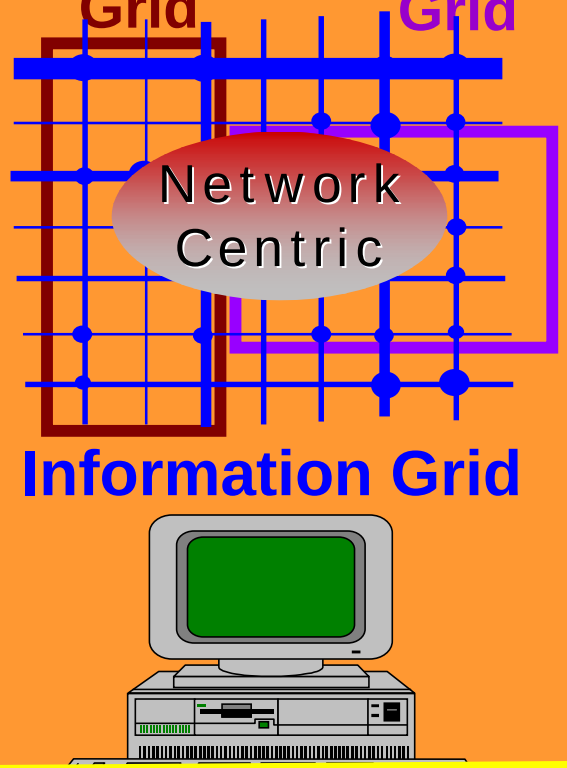
Enabling Concept

Requires

- Seamless Architecture & Systems Integration
- Responsive Information Collection, Processing & Dissemination
- Offensive & Defensive Information Warfare

Others...

Concept

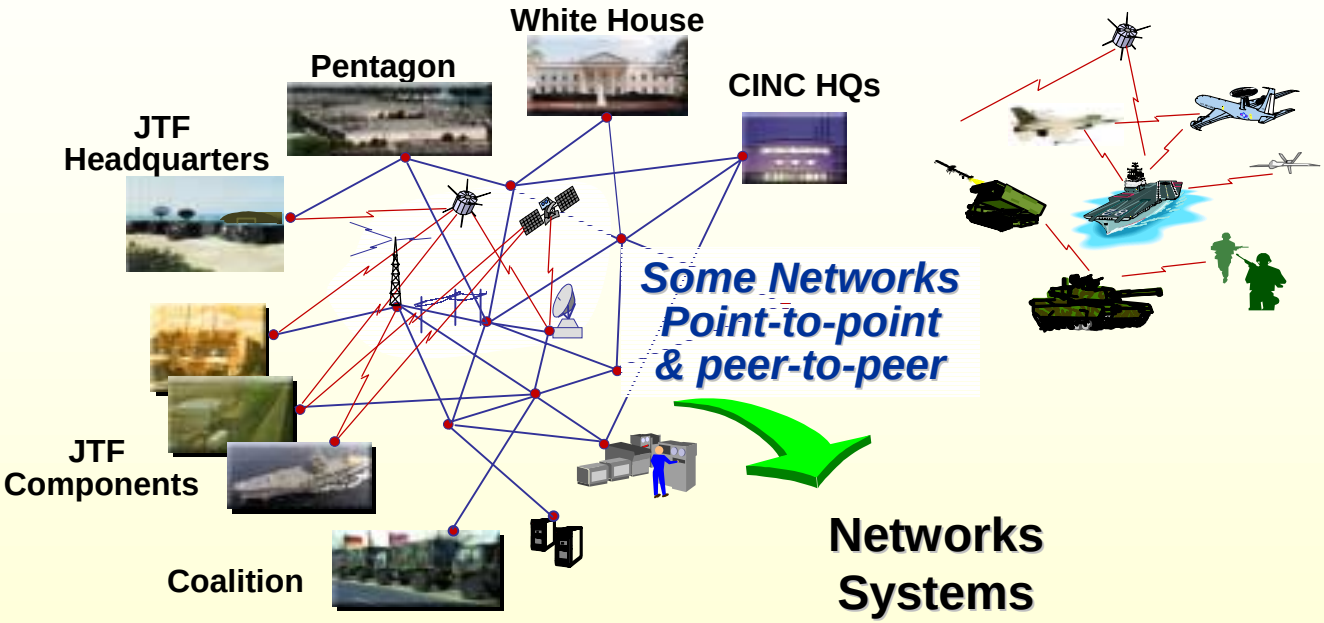


End States

- Common operational picture
- Collaborative planning capability
- Networked sensors
- Enhanced C2 systems
- Precise battlespace knowledge

Information Superiority

Today's Operational Environment

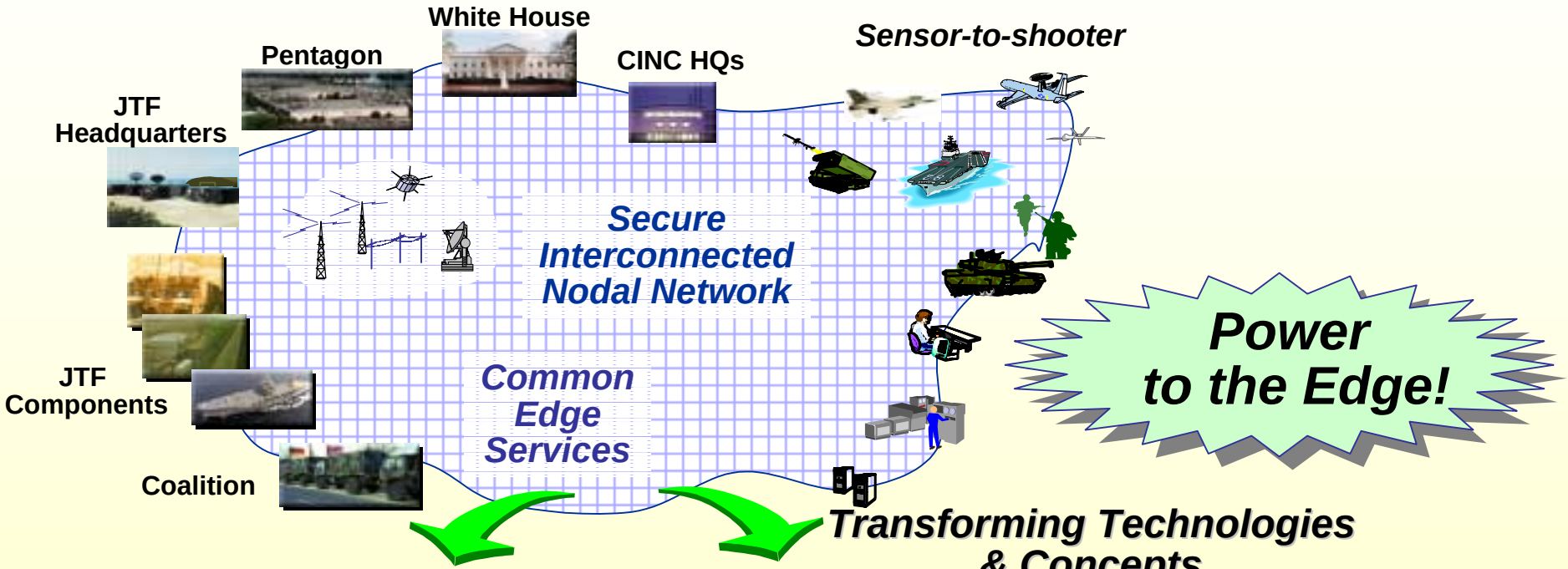


Too many stovepipes
Limited interoperability
Not enough bandwidth

JTF Environment

Varying missions & locales
Varying force sizes/types
Varying JTFs & coalitions
Varying comms & equipment
Varying information needs

Tomorrow's Operational Environment



- ***Worknets Capabilities & Relationships***
- ***Information available closest to the person with realistic context***

Transforming Technologies & Concepts

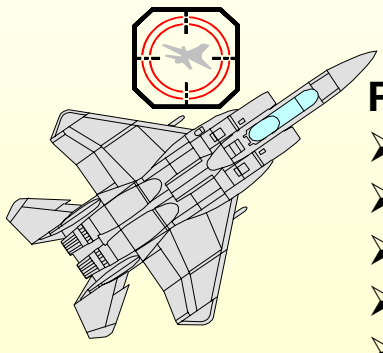
Ubiquitous, secure & robust network
Deploy collaborative capabilities
Populate network with quality data
Continuously refresh content
Secure & assure the network & info
Data as a global resource

Right Data, Right Place, Right Time!

Warfighter DATA Needs

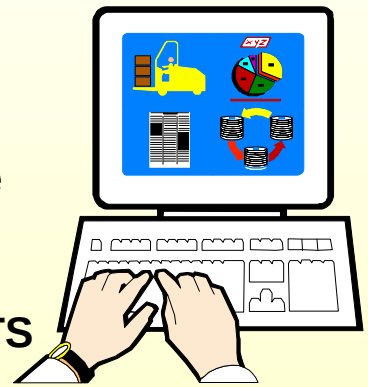
AWARE/ACTION — *Data Needs* — ANALYSIS

COCKPIT



REAL TIME
- Predictable Performance
- Streamlined Data
- Tightly Coupled
- Closed-Proprietary
- Hard-wired Push

DESKTOP



NON-REAL TIME
- Variable Performance
- Complex Data
- Loosely Coupled
- Open-Extensible-COTS
- Dynamic Push/Pull

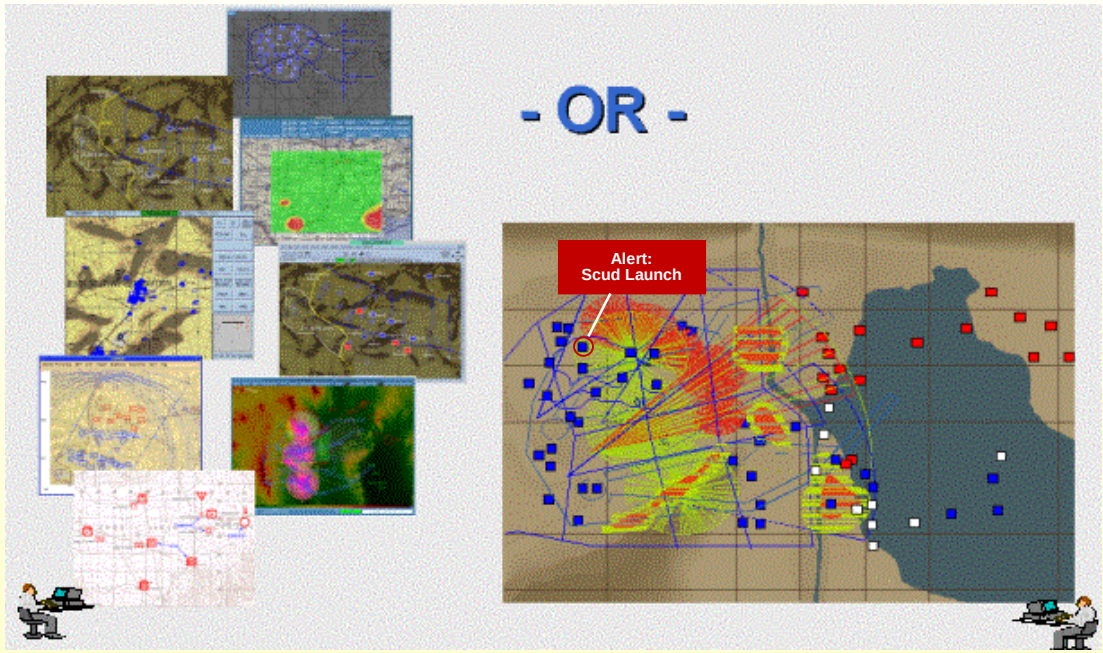
TOP DOWN — ***MARKET-BASED***

TIGHT — *Spectrum of Control* — LOOSE

When Data Interoperability Is Not Enough

Eyeball Integration

- *Disparate data sources*
- *Multiple pictures*
- *Little or no integration*

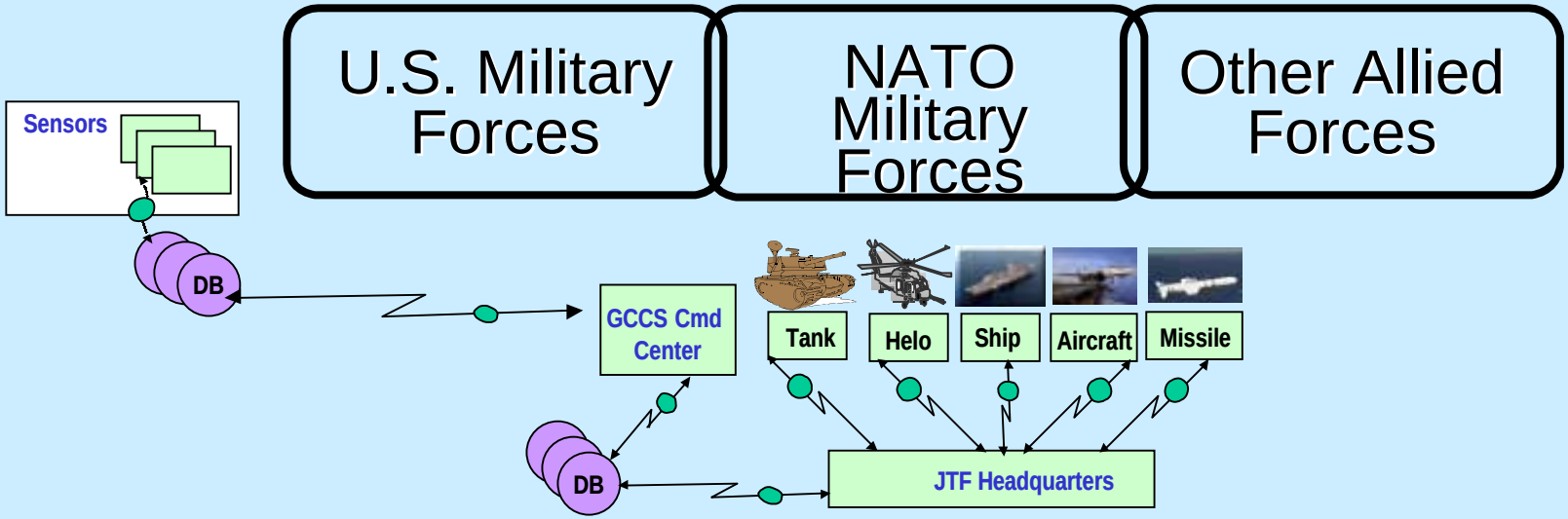


Fused Picture

- *Tailorable view*
- *Interoperable trusted data*
- *Value-added decision support*
- *Alerts – push, broadcast*

Eyeballing a Scud intercept -- Why value-added is <u>not</u> optional

Joint Operations Also Require Interoperability for Multi-National Forces



- **Multi-national Joint interoperability depends upon the ability to share data. Realistic assessment includes an evaluation of the effectiveness of IT standards used**

The Defense Department's top adviser to the Joint Chiefs of Staff [LTG Kellogg, J6] on information technology issues says the federal law that entitles the military services to equip their own forces should be revised to ensure that the services buy systems capable of sharing data.

Overview of DoD's New Approaches to Data Issues

- **Data Engineering Initiatives**
- **Market-driven Data Management**

Key Management Mechanism

What data is available?

Which data is better?

Developers and Users/Warriors
Asking for Help!!

Who has it?

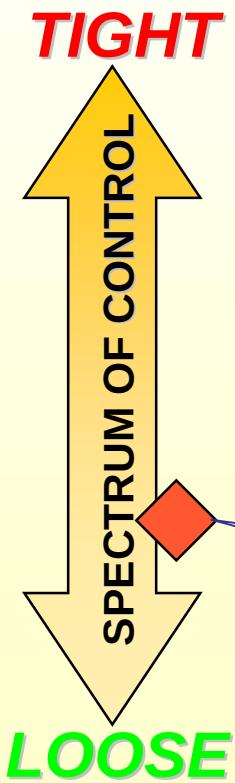
How do I get it?

Market Visibility

DATA MANAGEMENT

Management Options - *Contrasting Styles*

What Management Style will best work?



Top-down, **"Command"**

versus

Market-Driven

Recommended Approach:
Market Driven with *Some* Controls

New Info Systems Paradigm

➢ Publish and Subscribe Challenges

- How, where and what do data resources publish?
- How do users find resources and subscribe?
- How is data product or service delivery achieved?

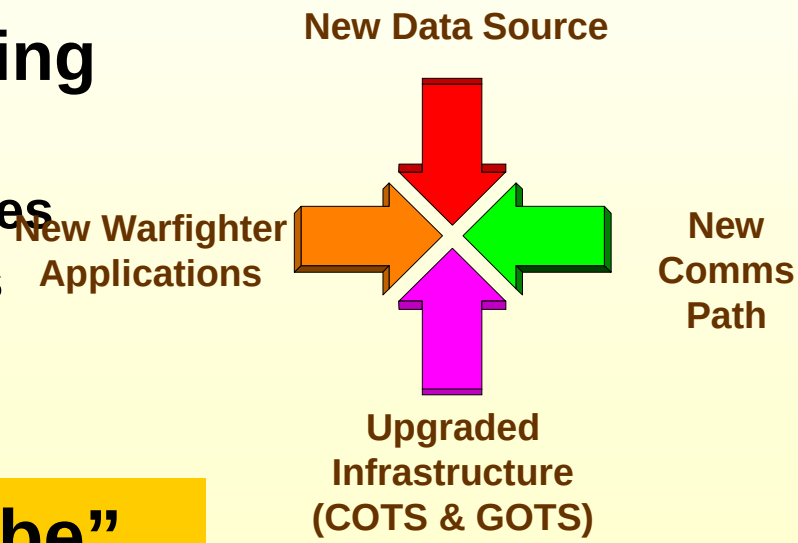
- Context: Global Information Grid (GIG)
  - Massively Networked Environment
  - Many complex interconnections
  - Numerous, frequently changing data resources
  - Dynamic network architectures (e.g., crisis-specific)

Flexible and Responsive <u>Management</u> is Crucial!

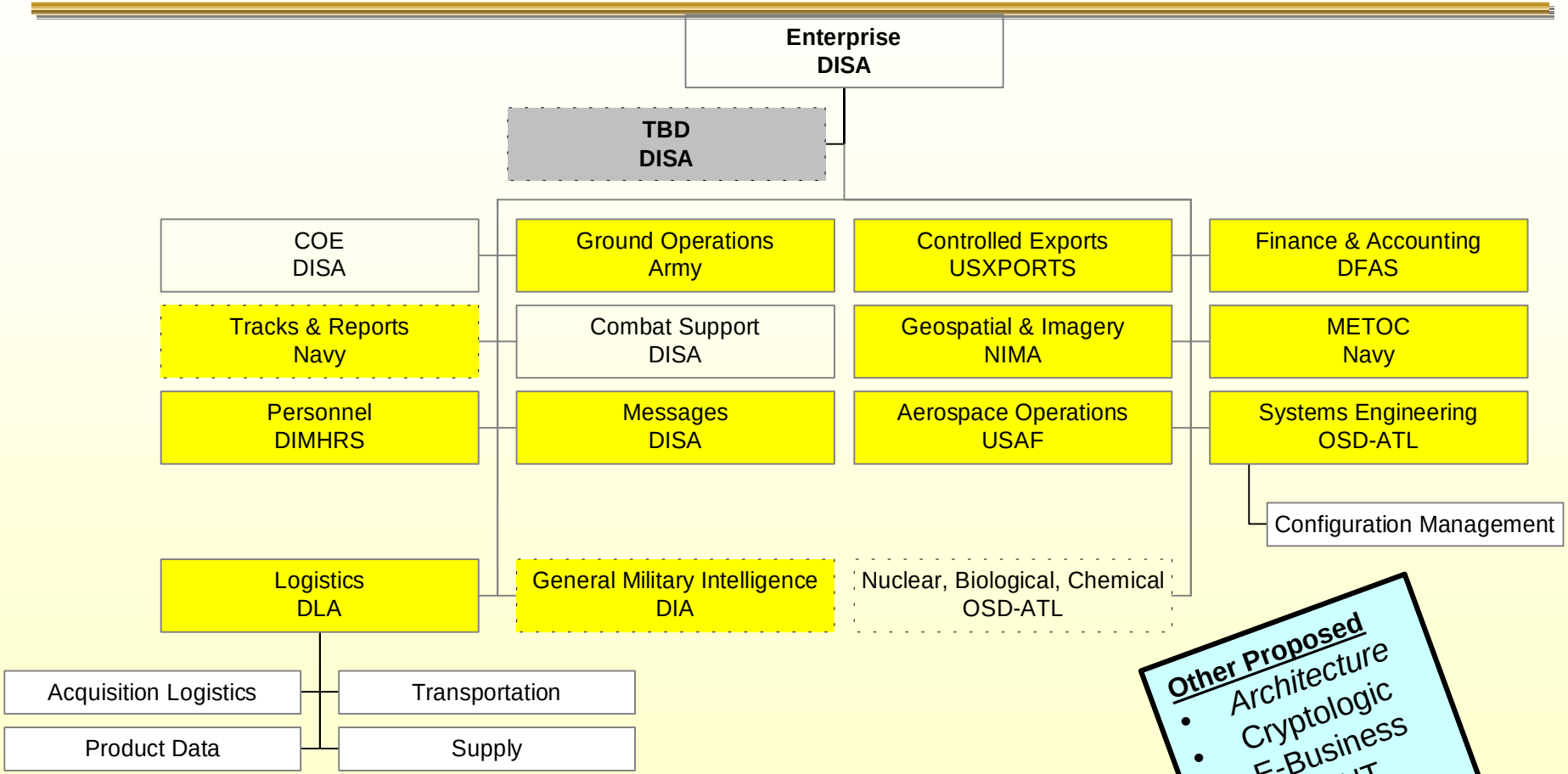
Market-Driven Data Management Objective

- **Strategy for Data Resource "Accreditation" that Allows Network Components to be Independently Upgraded without Requiring Complete "System" re-baselining and re-accreditation**
  - **Add/Remove Data Sources or Services**
  - **Add/Remove Communications Paths**
  - **Update Infrastructure Components**
  - **Add/Remove Applications**

➢ **Define "Publish and Subscribe" Architecture for Data Resources**

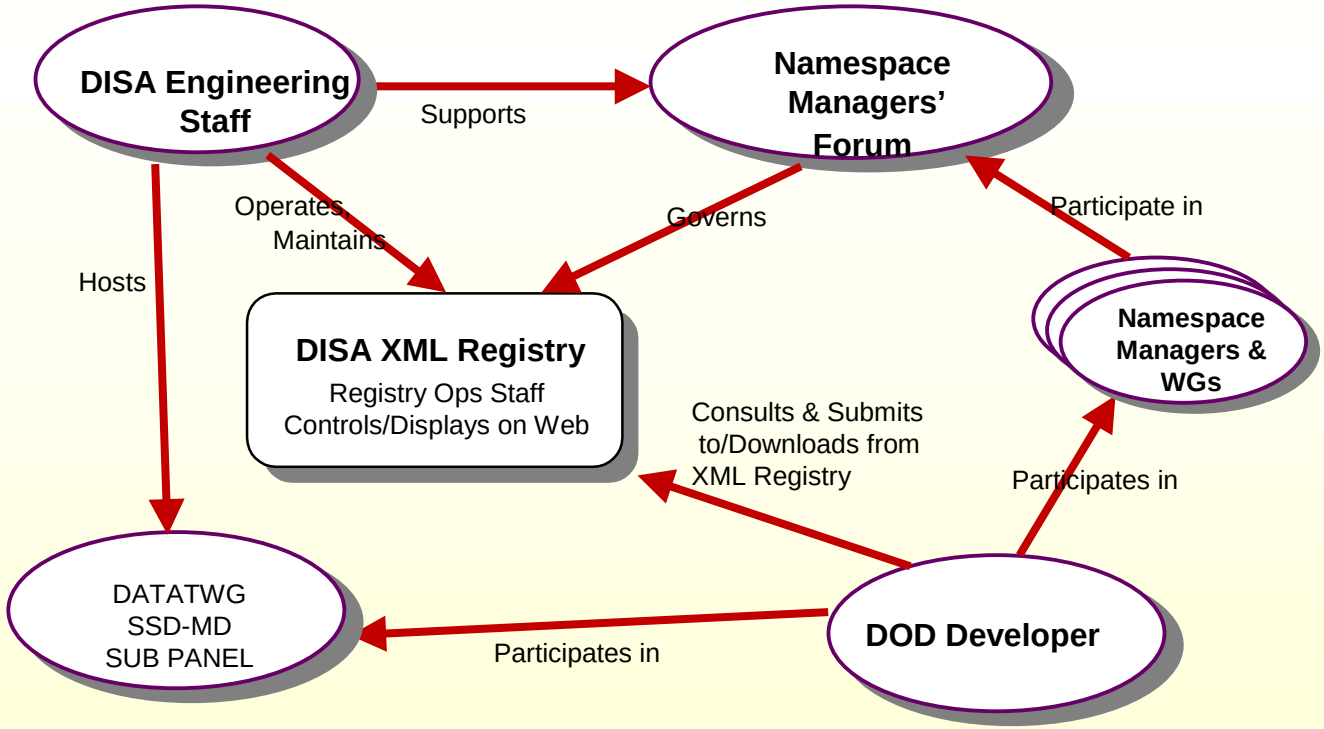


Registered XML Namespaces
Communities of Interest



Formal Process to Establish New COIs

XML Repository Governance



- **Management arrangements to accomplish registration and to perform the Clearinghouse function.**
- **Organizations and processes provide developers with a straightforward means to**
  - **Comply with the registration requirement**
  - **Acquire detailed XML technical information**
  - **Have a voice in formulating DoD XML directions**

Some Current DoD Project Examples

- DISA Program Support
- PDML Project
- DAML (DARPA Agent Markup Language)
- PLCS Project

DISA Program Support to Enable Secure, Plug-N-Play Interoperability for the Warfighter

DoD TRM
provides planners & designers a tool to identify IT services & interfaces required to enable . . .

DoD JTA
provides the minimal set of standards Jointly adopted for services & interfaces to enable . . .

DoD COE
selects the products for standards-supported & unique services & interfaces to enable . . .

JITC
tests standards-based performance in acquired & built systems to enable . . .

Sensors:
- Intel
- Satellite
- Aircraft

DB

Sample Interfaces:
- Data
- Comm
- Protocols
- Formats

Cmd Center
- GCCS/GCSS
- DMS

Interoperability for the Warfighter





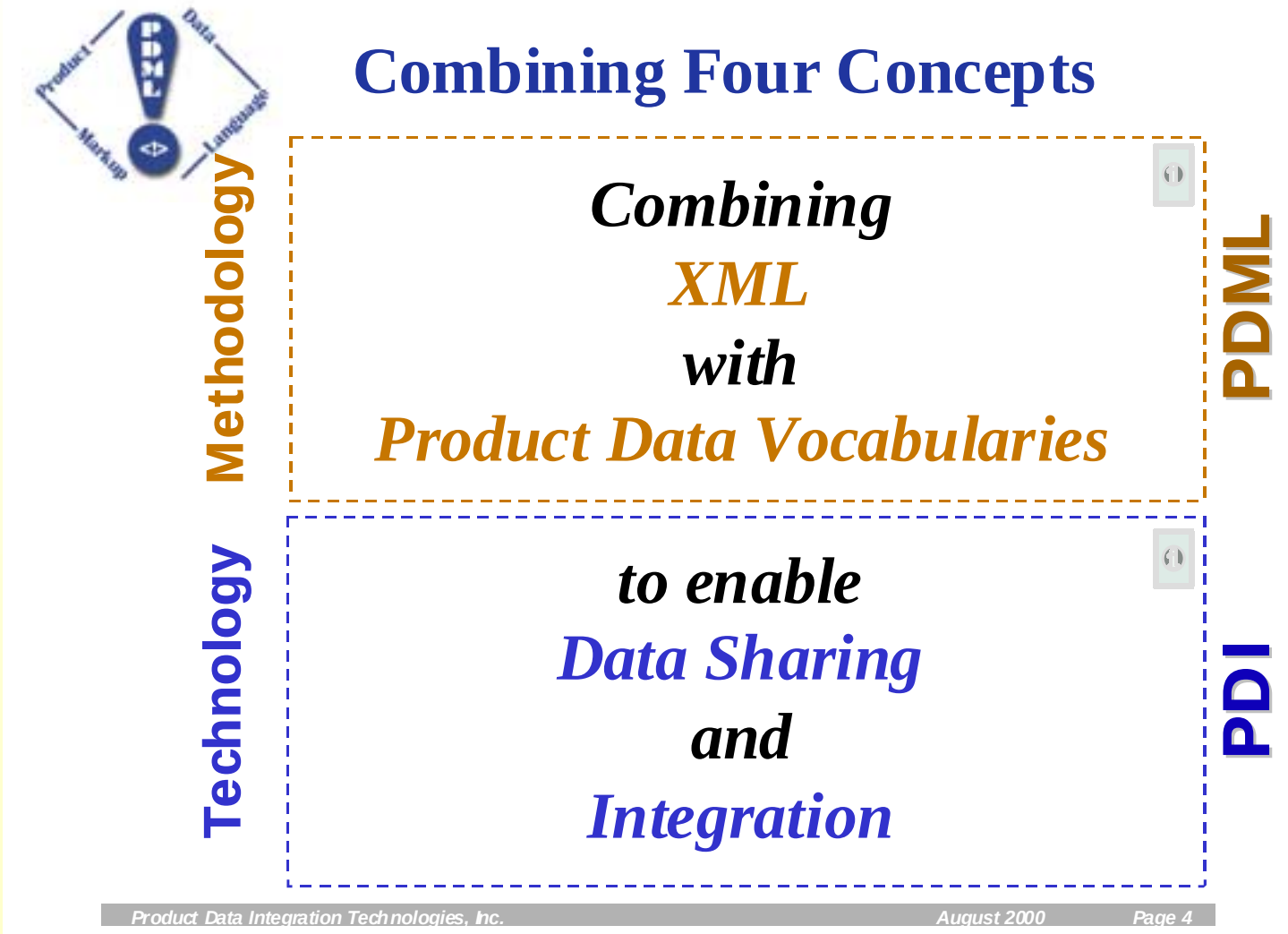
Tank | Helo | Ship | Aircraft | Missile

e.g. JOPES

DB

JTF Headquarters

PDML
Combing 4 Concepts



DAML
(DARPA Agent Markup Language)

The goal of the DAML effort is to develop a language and tools to facilitate the concept of the semantic web.

- **Create technologies that will enable software agents to dynamically identify and understand information sources**
- **Provide interoperability between the agents in a semantic manner**

Product Life Cycle Support Standard (PLCS) Business Requirements

Finnish Defence Forces

FORSVARSDEPARTEMENTET
The Royal Norwegian Ministry of Defence

FMV

SAAB TECHNOLOGIES

DET NORSKE VERITAS

HÄGGLUNDS VEHICLE

BOEING

Baan

AEROSYSTEMS INTERNATIONAL

Rolls-Royce

Pennant

PTC

LSC GROUP

BAE SYSTEMS

LOCKHEED MARTIN

INDUSTRIAL & FINANCIAL SYSTEMS IFS

PLCS Membership

Reduced Cost of Ownership

- ***Users of products are seeking improved availability, reliability, maintainability and lower cost of ownership.***

Protect investment in product data

- ***Users of information systems want more open platforms to reduce IT costs and ensure longevity in use of information***

Sustainable Business Growth

- ***Companies are seeking to make money through the life cycle support of their products to improve profits, improve quality and be more competitive***

Business Problem

- ***How to keep the data needed to operate and maintain a product in line with the changing product over its in-service life?***


Approaching:
Too Many Players!
Too Many
Standards!

Standards Process

- **De jure vs Consortia**
- **Organizations don't actually compete: each has a role, scope, and purpose**
  - **Consortia best for rapid technology development**
  - **Formal de jure process best for fine tuning and consensus-building**
  - **but not vice versa!**

More Than Standards...

Enterprises need commercially available products that ***seamlessly*** work together and can be ***integrated*** into existing business process and manufacturing and distribution systems.

Bottom Line

Scaleability, Security & Interoperability!!!

EXPECTATIONS
Our Challenge to Standards Activities:

- Foster development of open, interoperable specifications and standards
- Encourage participation of users with real business needs
- Reduce duplication of effort/ fragmentation
- Establish the means to provide open visibility of standards project goals, scope, participants and status
- Manage standards development as a project and not an academic activity
- Create incentives to reward collaboration

Web Enabling Example

- Goal is for systems to be portable, cross-platform interoperable, and platform independent
- Web-enabling can make interoperability much more practical and affordable.
- Many ways exist to web-enable systems—danger of propagating existing stovepipes.
- Requires mandating minimal set of standards and implementation conventions
- Requires Web Services/XML standards activities to cooperate

Web Services Security
Example

XML Related Security

- **Will the XML Security Specifications be Sufficient?**
  - **XML Encryption**
  - **XML Digital Signature**
  - **XML Key Exchange**
  - **XACML**
- **Are these all that is Needed?**
- **Will they Integrate with the PKIs?**

Intelligent Agents

- **How do we Handle Security with the Intelligent Agent Initiatives?**

Who Needs to Work Together on These Issues?

- **Who will Take Leadership to Pull These Together?**

STANDARDS …. An Assessment

- Platform: POSIX, CDE, X/Motif, NFS, Sockets, Real-Time
  - MIA: Platform Aware Interface
- Network: IP, Qos/CoS
  - MIA: Wireless & Mobile Computing, VoIP, Bandwidth Sensitive Use
- Directory: LDAP
  - MIA: Common use White Pages & Schema
- Enterprise Management: SNMP
  - MIA: Meaningful Management Framework APIs, Mobile Computing
- Data Sharing: SQL, HTML, UML, T.120, H.323
  - MIA: Virtual Collaboration Workspaces, Geospatial Information, Portals, Business Rule Capture
- Messaging & Transaction Processing: SMTP, X,12, XML
  - MIA: Common use Blue, Yellow, Green, Brown Pages, Prioritization
- Security
  - MIA: Meaningful Application-Level APIs, Key Management Services, Wireless, Privacy

What Can You Do?

- **Emphasize Secure Interoperability and Integration with Your Sponsors and Partners**
  - **Flexibility and Balanced Evolution with Industrial Technology Base Critical**
- **Define Standard Processes and Detailed Evaluation Criteria for Common Products**
  - **Accreditation Process Overhaul/Streamlining**
- **Recognize this is NOT an Engineering Exercise**

Partner With Us ….
Technology and Standards Are MISSION CRITICAL!


Our secret weapon is...
Our People

BACK UP

For More Information

- URLs:
  - DAML www.daml.org
  - SHADE http://dii-sw.ncr.disa.mil/shade
  - DoD Data Program www.disa.itsi.mil
  - DoD Data Emporium http://diides.ncr.disa.mil/shade
  - COE www.disa.dii-coe.mil
  - DoD IT Standards www.disa.cfs.mil
  - Meta Data Standards www.iso.jtc1/sc32.ch
  - PLCS www.plcs.org
  - JTA disa.itsi.mil


DEFENSE INFORMATION SYSTEMS AGENCY