Net Centric Operations Conference

Norfolk, VA
"Facilitating Net Centric Operations & Warfare"

13-16 March 2006

Agenda

Monday, 13 March 2006

Tutorials:
"Hot Topics in NCO Deployment Maturity", Moderator: C. Stephen Kuehl AIAA NCO PC Chairman

- Net-Centric Data Strategy, Mr. Dan Risacher, OSD
- Challenges in Building Net-Centric System-of-Systems, Mr. James Smith, Carnegie Mellon Software Engineering Institute (AIAA NCO PC)

Tuesday, 14 March 2006

Government Executive Panel:
· Transforming the Way the DoD Manages Data, Mr. Michael Krieger, Director Information Management, OASD(NII)/ DoD CIO
· Maritime Domain Awareness Data Sharing COI, CAPT John Macaluso, COMDT CG-66, USCG R&D Manager
· Time-Sensitive Target Community Of Interest (TST COI), Col John Rudolph, Air Force C2 & ISR Center/CCT
Industry Executive Panel: *"The Premier Defense Association!"*
Industry Consortium Panel:

- Dr. Kevin J. Reardon, Captain, USN (Ret.), Executive Director, NCOIC
- Hans W. Polzer, Lockheed Martin, Vice Chair, NCOIC Services & Information Interoperability WG
- Sheryl Sizelove, Boeing, Vice Chair, NCOIC Technical Council
- Michael Curtis, IBM, Chair, NCOIC Technical Council

ISR Working Group:

- USD(I) DoD POC's:
  - Kevin Meiners
  - COL Carpenter
- NCOIF POC's:
  - John Osterholz, BAE Systems
  - Kelly Brown, EMSolutions

Industry Support for DoD: A Collaborative Model that Works, Greg Gardner VP, Government and Homeland Security Solutions, Oracle Corporation

Wednesday, 15 March 2006

Luncheon Speaker:
· Transforming National Security, Mr. Terry Pudas, OSD, Acting Director Office of Force Transformation
US STRATCOM Panel:
· Network-Centric Enterprise for Global Operations, Maj Gen Roosevelt "Ted" Mercer, Jr., USAF, Director, Combat and Information Operations, US Strategic Command
· Net-Centricity and Global NetOps, COL Carl Hunt, USA, Director Technology and Analysis/J9, Joint Task Force Global Network Operations, US Strategic

Command
· Knowledge Management in a Net Centric Environment, Col Mark Lorenz, USAF, Chief, J6 Knowledge Management US Strategic Command
· USSTRATCOM Global C2, Mr. Dave Gelenter, USSTRATCOM/J86

Thursday, 16 March 2006

Pannel: Information Sharing Environment
· Information Sharing Environment, Dr. Clark Smith, Director for Technical Group, Information Sharing Environment, Office of the Director for National Intelligence
· Information Sharing Organizational Challenges and Potential Path to Success, Rahul Gupta, Partner and Kevin Keenan, Manager, PRTM Management Consultants

Net Centric Operations Conference

NATIONAL DEFENSE INDUSTRIAL ASSOCIATION
STRENGTH THROUGH INDUSTRY & TECHNOLOGY

Facilitating Net Centric Operations & Warfare

March 13-16, 2006
Norfolk Waterside Marriott, Norfolk, VA
Event # 6120

Agenda & Call for Displays

Supported By
Office of the Assistant Secretary of Defense, Networks & Information Integration/DoD Chief Information Officer [ASD(NII)/DoD CIO], United States Joint Forces Command (US JFCOM), US Strategic Command (US STRATCOM)

With Technical Co-sponsorship by
The American Institute of Aeronautics & Astronautics (AIAA)
&
The Association For Enterprise Integration (AFEI)

Conference Objective

The objective of this Conference is to help identify the courses of action that the Department of Defense should be taking to achieve true Net Centric Operations, throughout the operating environment of the US military forces and to meet the needs of joint warfighters. It will explore the current initiatives with their status and implications, such as Joint Battle Management Command & Control, Information Assurance, Net Centric Data Strategy and other initiatives, ISR Integration, and others. The Conference provides a forum for senior members of The Office of the Secretary of Defense, Joint Staff, US Joint Forces Command, US Strategic Command, and the US Army, US Air Force, US Navy and US Coast Guard to dialog with their Industry counterparts on the issues surrounding the achievement of Net Centric Operations. Speakers will discuss current policies and requirements, status of key initiatives, operational needs and strategies, and the implementation strategies needed to achieve the ultimate goals of integrated joint warfighting. It will also address the sharing of intelligence information across the Federal Government in response to Section 1016 of the Intelligence Reform & Terrorism Prevention Act of 2004 as part of the global war on terrorism.

Background

Net Centric Operations is a critical enabler to both current and future DoD operations whether combat, combat support, operations other than combat and DoD as a business. Net Centric Operations is a vision for information sharing that leveraging the constructs of the public Internet and World Wide Webs and involves changes in processes, organization, personnel, information and materiel. This vision of net centricity is simply described as the empowerment of all users, regardless of time or location to easily discover, access, integrate, correlate, and fuse data and information needed to support their mission objectives: while all protect and defend both the information and information systems. This vision can only be reached by coordinated efforts among Industry, the Office of the Secretary of Defense, the Joint Staff, Combatant Commanders, Defense Agencies, and the military Services, working together in a collaborative environment. This Conference provides a major collaborative environment to continue and further the needed dialog.

Who Should Attend

- Government
- Military and Industry Program/Project Managers
- Senior Engineering Managers and Personnel
- Design Engineers & Support Staff
- C3I Specialists, and those involved in major new DoD thrusts involving Information Technology, Precision Strike/Time Sensitive Targeting, Interoperability, and major weapon systems design.

Attendees will have the opportunity to dialog with senior OSD, Joint Staff, Combatant Commanders, and Industry on issues involving Net Centric Operations within and across the Federal Government.

Conference Chair

Mr. Bob Rassa, Raytheon

Conference Technical Program Chairs

Mr. Jack Zavin, OASD(NII), Mr. C. Steve Kuehl, AIAA NCO PC Chairman (Raytheon Technical Services, Co., LLC)

"The Department of Defense finds this event meets the minimum regulatory standards for attendance by DoD employees. This finding does not constitute a blanket approval or endorsement for attendance. Individual DoD component commands or organizations are responsible for approving attendance of its DoD employees based on mission requirements and DoD regulations"

Preliminary Agenda

Please visit
http://register.ndia.org/interview/register.ndia?~Brochure~6120
for updates

Sunday, March 12

4:00pm-6:00pm Registration

Monday, March 13

8:00am-4:30pm Registration

8:30am-4:00pm **Tutorials**, sponsored by AIAA
*There is an additional cost for these tutorials

8:30am **NC Data Strategy Tutorial**
The Department of Defense Net Centric Data Strategy provides a key enabler of the Department's Transformation, by establishing a foundation for managing the Department's data in a net centric environment. The tutorial will describe the implementation of this strategy and how it will make information visible, accesible, and understandable.

10:30am **Portfolio Management in the DoD Information Assurance Domain**
What Portfolio Management is in the IA Domain; The Governence Process within the IA Domain; Metrics for the Portfolio; POM 08 and beyond 5

12:00pm Lunch for Tutorial participants only

1:00pm-5:00pm **Challenges and Recommendations in Building a Net Centric System-of-Systems**
This tutorial will present current perspectives and recommendations on critical programmatic and technical challenges confronting organizations developing, acquiring, fielding, and sustaining a heterogeneous network centric System-of-Systems comprising a mixture of COTS/GOTS/other reuse and developed systems. Topics include programmatic/organizational interoperability, cost and schedule estimation, system migration, and current technology limitations, enablers, and forecasts.

Tuesday, March 14

7:00am-5:00pm Registration

7:00am Continental Breakfast

8:00am Conference Welcome
Mr. Sam Campagna, Director, Operations, NDIA

8:10am Conference Opening
Mr. Bob Rassa, Director, System Supportability, Raytheon Space & Airborne Systems

8:15am **Conference Keynote**
Dr. Linton Wells, II, Principal Deputy ASD(NII)/DoD CIO

9:15am **Government Executive Panel:**
As the DoD continues to develop the key operational capability to conduct net centric operations, interoperability will be less about building hard-wired interfaces between systems and more about enabling unanticipated users to get the information they need when, where, and how they need it. The Net Centric Data Strategy (codified December 2004 in DoD Directive 8320.2) provides the foundations for managing the Department's data in a net centric environment, to include organizing around Communities of Interest (COIs). The panel members will discuss their experiences in jump starting this key enabler of the Department's transformation.
Moderator*:* Dr. Margaret Myers, Principal Director, (Dep CIO), OASD(NII)
Panelists:
- Mr. Michael Krieger, Director Information Management, OASD(NII)/ DoD CIO
- Mr. Andrew Cox, Deputy PEO C4I & Space, USN SPAWARSYSCOM
- Col Charles Murray, USAF, Director, Global Communications & Information
- Mr. Terry Edwards, Director Enterprise Architecture, HQ DA/G6/CIO

10:15am **Break**

10:30am **Government Executive Panel Continued**

12:00pm Lunch
Luncheon Speaker: VADM Stanley Szemborsky, USN, Director and Principal Deputy Director of OSD, PA&E

1:30pm **Industry Executive Panel:**
Industry plays an essential partnership role with the Department as the supplier of military systems, equipment and information technology services. This industry panel highlights the work of two industry groups that are helping to shape the future: the Association for Enterprise Integration (AFEI) and the Network Centric Operations Industry Consortium (NCOIC). Under DoD sponsorship, AFEI has organized six working groups that are addressing policy and strategy for ISR as a Community of Interest, Information Assurance, Architecture, Enterprise Services and Data Strategy, Communications and Networks, and Commercial Acquisition in the context of net centricity. The NCOIC Technical Council, with DoD participation, is focused on developing products to support the building of net entric systems, including a Net centric Interoperability Framework, a Network Centric Assessment Tool, and Systems Engineering Best Practices. Representatives of these groups will discuss progress in achieving net centricity and the critical challenges that lie ahead.
Moderator: Mr. John Osterholtz, Vice President, Center For Transformation and Chief Technology Officer, BAE Systems
Panelists:
- Dr. Kevin J. Reardon, Captain, USN (Ret), Executive Director, NCOIC
- Ms. Sheryl Sizelove, Boeing, Vice Chair, Technical Council, NCOIC
- Mr. Hans Polzer, Lockheed Martin

3:00pm Break

3:30pm **Industry Executive Panel Continued**

5:00pm–6:00pm Reception, Display Area

Wednesday, March 15

7:00am-5:00pm Registration

7:00am Continental Breakfast

8:00am LTG John R. Wood, USA, Deputy Commander, US JFCOM

8:45am	US JFCOM Initiatives and Operations in a Net Centric Environment Panel US JFCOM: Supporting the warfighter by facilitating joint integration, interoperability, and experimentation in the net centric environment. Panel members will discuss their unique experiences in implementing various net centric initiatives in support of joint communities of interest. **Moderator:** Lt Col Kenneth Lang, USAF, Chief, Net Centric Transformational Operations, C4 Transformation Division (US JFCOM/J69) **Panelists:** - Ms. Leslie Winters, Chief, Net Centric Information Integration (US JFCOM/J61) - Dr. Rob Bearsworth, Lead, Time Sensitive Targeting Community of Interest (US JFCOM/J61) - Mr. Troy Turner, Section Head, C4 Interoperability (ACT) - COL Kelly Mayes, USA, Director, Campaign Planning (US JFCOM/J9) - Ms. Lisa Hollowell, Lead, Joint Battle Management Command and Control (JBMC2) (US JFCOM/J8)
10:15am	Break
10:30am	**US JFCOM Panel Continues**
12:00pm	Lunch **Luncheon Speaker**: Mr. Terry Pudas, OSD, Acting Director Office of Force Transformation
1:30pm	**Conference Keynote** Gen James E. Cartwright, USMC, Commander, US Strategic Command

2:30pm	**US STRATCOM Panel:** US STRATEGIC COMMAND Virtual Collaboration and Net Centric Operations: Enabling Global, Joint Combat Operations **Moderator:** Maj Gen Roosevelt "Ted" Mercer, Jr., USAF, Director, Combat and Information Operations, US Strategic Command **Panelists:** - COL Matt Allaire, USA, Chief, Information Operations Integration/J39, Joint Functional Component Command Space & Global Strike US Stragetic Command - COL Carl Hunt, USA, Director Technology and Analysis/J9 Joint Task Force Global Network Operations US Strategic Command - CAPT Gary Sandala, USN, Chief, Requirements and Capabilities/J8, Joint Functional Component Command and Network Warfare US Strategic Command - Col Mark Lorenz, USAF, Chief, J6 Knowledge Management US Strategic Command - Col John Roberts, USAF, Director, Directorate of Intelligence, Joint Information Operations Command US Strategic Command
3:15pm	Break
3:30pm	**US STRATCOM Panel Continues**
5:00pm–6:00pm	Reception, Display Area

Thursday, March 16

7:00am-12:00pm Registration

7:00am	Continental Breakfast
8:00am	**Panel**: Consistent with section 1016 of the Intelligence Reform and Terrorism Prevention Act of 2004 (Public Law 108-458, IRTPA) and several Executive Orders, work has been ongoing to transform the current Information Sharing Environment (ISE) to a more robust environment that will integrate and connect existing elements into a cohesive framework by providing common policies, guidelines, systems, and architecture. The ISE must ensure appropriate access to, and the sharing, integration, and use of, information by Federal, State, local, and tribal agencies with counterterrorism responsibilities, and, as appropriate, private sector entities, while protecting the information privacy and other legal rights of Americans. Getting actionable information to decision makers remains a high priority for the United States and a necessity for winning the war on terror. The panel members will discuss their agencies efforts and progress in implementing the ISE. **Moderator:** Dr. Clark Smith, Director for Technical Group, Information Sharing Environment, Office of the Director for National Intelligence. **Panelists:** Please visit the NDIA website for the latest list of panelists.
10:15am	Break
10:30am	**Panel Continues**
12:00pm	Conference Adjourns

Registration Fees

The 2006 Net Centric Operations Conference registration fees are as follows:

	Early	Regular	Late
	Before 1/21/06		After 2/24/06
Government/Academia/Allied	$630	$695	$765
Industry NDIA Member	$720	$795	$875
Industry Non-NDIA Member**	$770	$850	$935
Monday Tutorial	$150	$150	$200

Registration Information

To register online for this conference please visit http://register.ndia.org/interview/register.ndia?~Brochure~6120. You can also visit the NDIA web site at www.ndia.org and select "Schedule of Events". Once there, select 2006 March and scroll down to the Net Centric Operations Conference and select, then scroll down the page to "REGISTER" and select. **Review your information and select "submit" one time only and then select "confirm".** On-line registration will close after February 24, 2006. You must register on-site after this date.

-or-

You may fax the completed registration form contained in this brochure to (703) 522-1885.

-or-

You may mail the completed registration form contained in this brochure to: Event # 6120, National Defense Industrial Association, 2111 Wilson Boulevard, Suite 400, Arlington, VA 22201-3061.

Payment must be received at the time of registration.

Registrations will not be accepted over the phone.

Registration fees include admittance to all sessions (excluding Tutorials), continental breakfasts, receptions, lunches, coffee breaks, and other logistical and administrative expenses.

** Registration fee for Non-NDIA members includes a one year non-refundable NDIA membership of which $15.00 is for your subscription to National Defense magazine.

Cancellations Reminder

Cancellations received prior to January 20, 2006, will receive a full refund. Cancellations received before February 24, 2006 will receive a refund minus a cancellation fee of $75.

NO REFUNDS FOR CANCELLATIONS RECEIVED AFTER February 24, 2006.
SUBSTITUTIONS ARE WELCOMED IN LIEU OF CANCELLATIONS.

Hotel Information

A limited number of rooms have been reserved at the Norfolk Waterside Marriott, 235 East Main Street, Norfolk, VA 23510. To make your reservation please call the hotel directly at (757) 627-4200 or (800) 228-9290.

Industry $119 Government $67*
* or the applicable government per diem rate at the time of arrival.

To ensure the discounted NDIA rate, please make your reservations early and ask for the NDIA Room Block. Rooms will not be held after **February 20, 2006**, and may sell out before that date. Rates are also subject to increase after this date. The government per diem rate is available ***only*** to active duty or civilian government employees. ID will be required upon check-in. Retired military or government civilians do not qualify for the government rate.

Attendee Roster

An attendee roster will be distributed at the conference. In order for your name to appear in the conference attendee roster, you MUST register by February 24, 2006. There will be *NO* additional updated versions distributed after the conference.

Displays

There are spaces available to display at the 2006 Net Centric Operations Conference. Make plans now to take advantage of this prime sales opportunity. To sign up for a display, you can fill out the form contained in this brochure or download it at http://register.ndia.org/interview/register.ndia?~Brochure~6120, and FAX the completed form to (703) 522-1885.

ADA

NDIA supports the Americans with Disabilities Act of 1990. Attendees with special needs must call (703) 522-1820 prior to February 24, 2006.

Attire

Appropriate dress for this conference is business attire for civilians and class A uniform for military.

Proceedings

Proceedings will be available on the web through the Defense Technical Information Center (DTIC), and will be available two to three weeks after the conference. You will receive notification via e-mail that proceedings are posted and available on the web.

Identification Badges

During conference registration and check-in, each participant will be issued an identification badge. Please be prepared to present a picture ID. Badges must be worn at all conference functions.

National Defense Magazine

Advertise in National Defense Magazine and increase your company's exposure at this conference! National Defense will be distributed to attendees of this conference as well as other NDIA events. For more information contact Dino Pignotti at (703) 247-2541 or via fax at (703) 522-4602.

Inquiries

For questions regarding the conference, direct your questions to Britt Bommelje, Meeting Planner, at (703) 247-2587, or bbommelje@ndia.org.

Net Centric Operations Conference

Norfolk Waterside Marriott, Norfolk, VA

March 13-16, 2006 • Event #6120

National Defense Industrial Association
2111 Wilson Boulevard, Suite 400
Arlington, VA 22201-3061
(703) 522-1820 • (703) 522-1885 fax
www.ndia.org

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3 Ways to sign up: 1. Online with a credit card at www.ndia.org
2. By fax with a credit card — Fax: 703-522-1885
3. By mail with a check or credit card

Address change needed

NDIA Master ID/Membership # _____ Social Security # _____
(if known—hint: on mailing label above your name) *(last 4 digits – optional)*

Prefix _____
(e.g. RADM, COL, Mr., Ms., Dr., etc.)

Name First _____ MI _____ Last _____

Military Affiliation _____ Nickname _____
(e.g. USMC, USA (Ret.) etc.) *(for Meeting Badges)*

Title _____

Organization _____

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Address *(Suite, PO Box, Mail Stop, Building, etc.)* _____

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Phone _____ ext. _____ Fax _____

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Signature* _____ Date _____

Preferred way to receive information

Conference information address above Alternate *(print address below)* E-mail

Subscriptions address above Alternate *(print address below)*

Alternate Street Address _____

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** By your signature above you consent to receive communications sent by or on behalf of NDIA, its Chapters, Divisions and affiliates (NTSA, AFEI, PSA, NCWG, WID) via regular mail, e-mail, telephone, or fax. NDIA, its Chapters, Divisions and affiliates do not sell data to vendors or other companies.*

By completing the following, you help us understand who is attending our meetings.

Primary Occupational Classification. *Check ONE.*

A. Defense Business/Industry
B. R&D/Laboratories
C. Army
D. Navy
E. Air Force
F. Marine Corps
G. Coast Guard
H. DOD/MOD Civilian
I. Gov't Civilian (Non-DOD/MOD)
J. Trade/Professional Assn.
K. Educator/Academia
L. Professional Services
M. Non-Defense Business
N. Other _____

Current Job/Title/Position. *Check ONE.*

A. Senior Executive
B. Executive
C. Manager
D. Engineer/Scientist
E. Professor/Instructor/Librarian
F. Ambassador/Attaché
G. Legislator/Legislative Aide
H. General/Admiral
I. Colonel/Navy Captain
J. Lieutenant Colonel/Commander/Major/Lieutenant Commander
K. Captain/Lieutenant/Ensign
L. Enlisted Military
O. Other _____

Year of birth _____
(Optional)

Registration Fees

	Early *before 1/20/06*		Late/Onsite *after 2/24/06*
Government/Academia[1]	$630	$695	$765
Industry Member	$720	$795	$875
Industry Non-member[2]	$770	$850	$935
Additional Tutorial	$150	$150	$200

No refunds for cancellations received after 2/24/06. **Substitutions are welcome in lieu of cancellation.**

[1] Includes a free three-year NDIA membership and *National Defense* magazine for Military and Government employees (first time members only).

❑ No do not sign me up for the membership.

[2] Registration fees for non-NDIA members include a one-year non-refundable NDIA membership—$15.00 will be applied for your subscription to *National*

Payment Options

Check *(payable to NDIA)*
Cash
Government PO/Training Form # _____
VISA
MasterCard
American Express
Diners Club

If paying by credit card, you may return by fax to (703) 522-1885.

Credit Card Number

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Exp. date ☐☐/☐☐

_____ _____
Signature Date

Questions? Contact Meeting Planner, Britt Bommelje
Phone: (703) 247-2587 **email:** bbommelje@ndia.org
Mail to: NDIA, Event #6120
2111 Wilson Boulevard, Suite 400
Arlington, VA 22201
Fax to: (703) 522-1885

2006 Net Centric Operations Conference

March 13 - 16, 2006

Norfolk, VA

Registration for Displays Event #6120

Name _____

Title _____

Company Name _____

Division/Dept. _____

Address _____

City/State/Zip _____

Phone _____

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e-mail _____

Display/Exhibits Requirements:

All displays must be of the simple table-top or pop-up style standards. Space per display shall not exceed 10 ft. wide by 6 ft. deep. Minimal hardware to be utilized (computer systems for demonstrations are OK). No formal decorating company is involved. Companies must bring their own displays and plan to do their own set-up. Standard 2.5 x 6 ft. draped folding tables and chair will be provided for each display space. No other props or setups (pipe & drape, plants, etc.) will be utilized.

Display Hours:

Displays are to be set up by 5:00 PM March 13 and should remain in place until after the morning break on March 16. Displays must be removed by 4:00 PM March 16.

Cost: Displays (includes one exhibitor and electrical hook-up): $**1,000.00**

Display Rules & Regulations

1. If NDIA should be prevented from holding the conference for any reason beyond NDIA's control (such as, but not limited to, damage to the building, riots, strikes, acts of government, or acts of God) or if a displayer cannot occupy the assigned display space due to reasons beyond NDIA's control, then NDIA has the right to cancel the conference or any part thereof, with no further liability to the displayer other than a refund of display space fee, less a proportionate share of the conference cost incurred.
2. Neither the management of the host facility nor NDIA shall be liable for the damages, loss or destruction to the displays by reason of fire, theft, accident or other destructive causes. Displayer shall lease space at his sole risk. Neither the management of the host facility, NDIA, nor any of their agents, servants or employees will be accountable or liable for accidents to displayers, their agents or employees.
3. The displayer shall be liable to the host facility and/or NDIA for any damage to the building and/or the furniture and fixtures contained therein which shall occur through acts or omissions of the displayer.
4. Displayer assumes the entire responsibility and hereby agrees to protect, indemnify, defend and hold harmless NDIA, the host facility, their officers, employees, and agents against all claims, losses and damages to persons and property, governmental charges or fines, and attorney's fees arising out of or caused by displayers installation, removal, maintenance, occupancy or use of the display premises or any part thereof, including any outside display areas.
5. Displayer acknowledges that NDIA does not maintain and is not responsible for obtaining insurance covering displayer's property. Displayers are advised to obtain business interruption and property damage and loss insurance to cover such occurrences.

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Deadline for sign-up is March 6, 2006, (make checks payable to NDIA - Event # 6120)

Payment Options

Check *(payable to NDIA)* Cash Government PO/Training Form #

VISA MasterCard American Express Diners Club

Credit Card Number _____ Exp. date _____

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2006 Net Centric Operations Conference
March 13-16, 2006

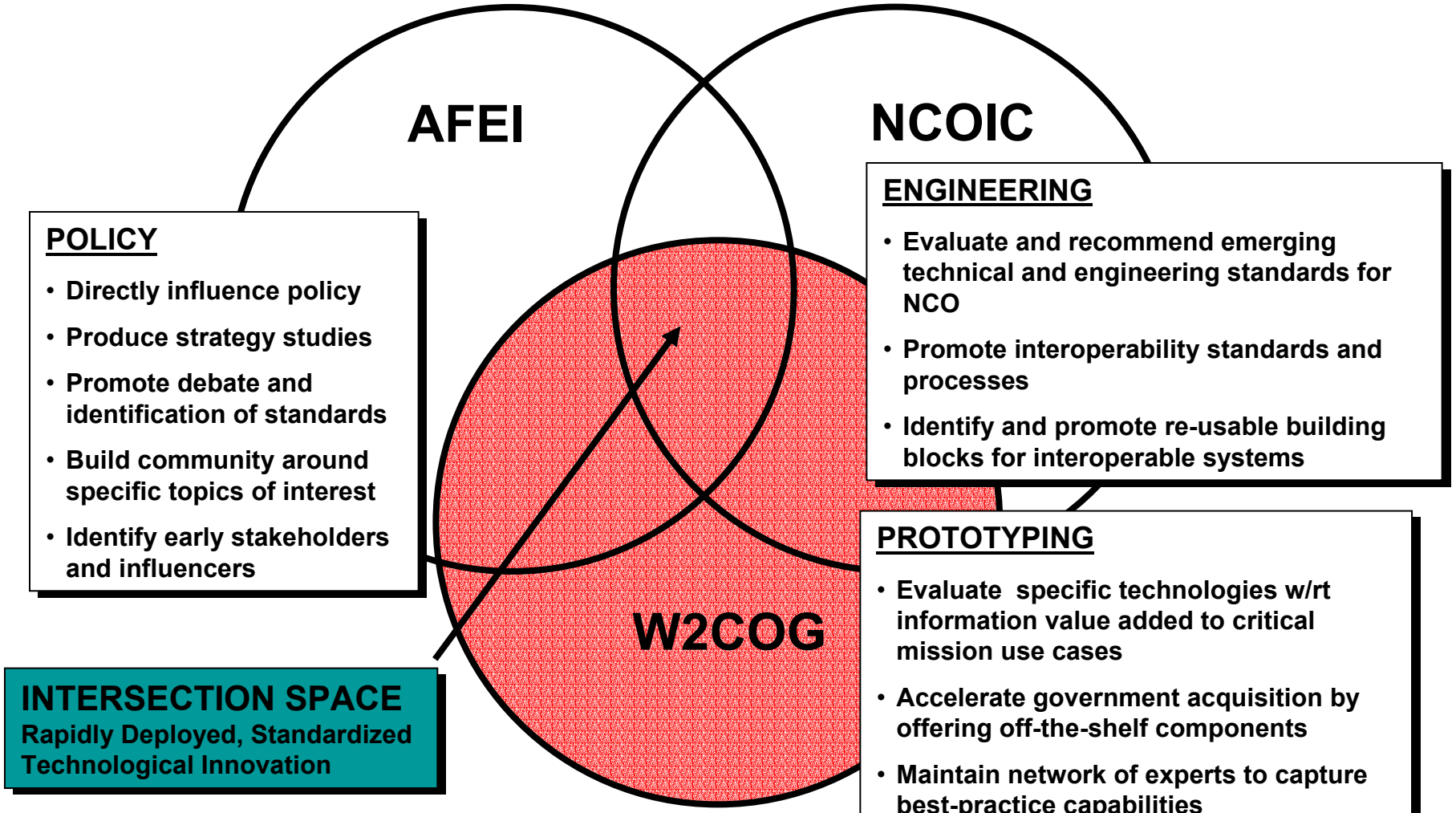
Industry Support for DoD: A Collaborative Model that Works

Greg Gardner

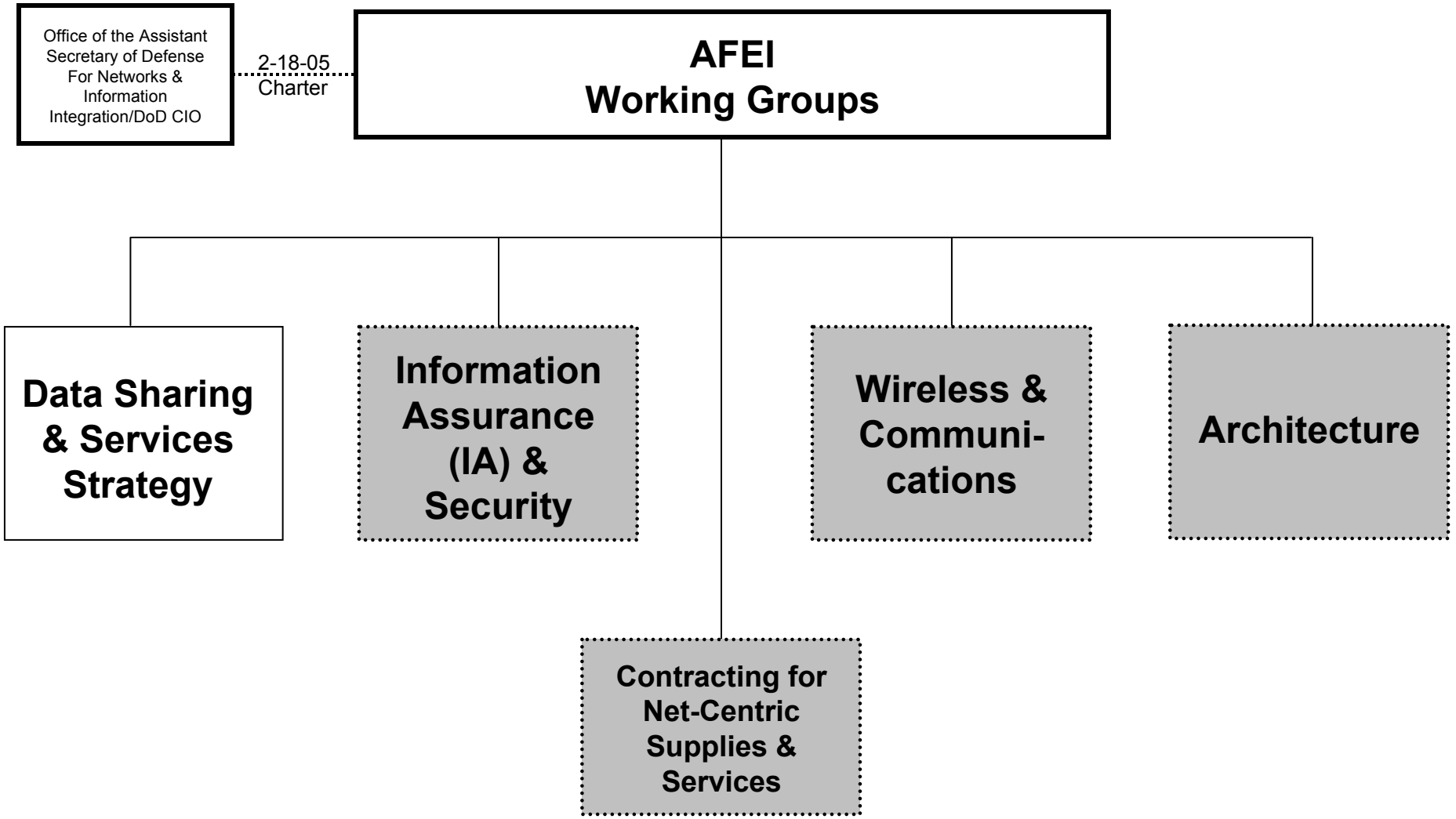
VP, Government and Homeland Security Solutions

Oracle Corporation

Who's who…?


AFEI
NCOIC
W2COG
POLICY
• Directly influence policy
• Produce strategy studies
• Promote debate and identification of standards
• Build community around specific topics of interest
• Identify early stakeholders and influencers
ENGINEERING
• Evaluate and recommend emerging technical and engineering standards for NCO
• Promote interoperability standards and processes
• Identify and promote re-usable building blocks for interoperable systems
PROTOTYPING
• Evaluate specific technologies w/rt information value added to critical mission use cases
• Accelerate government acquisition by offering off-the-shelf components
• Maintain network of experts to capture best-practice capabilities
INTERSECTION SPACE
Rapidly Deployed, Standardized Technological Innovation

Association for Enterprise Integration



Data Sharing WG Contributors:

- Absolute Computer Tech
- BAE SYSTEMS
- Booz Allen Hamilton
- Battelle Memorial Institute
- Boeing
- CACI
- CISCO
- Data Systems Analysts, Inc.
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- SRA
- Systinet
- Titan
- Unisys
- Weblayers
- Westbridge Technology

Special Thanks…

- Joan Baumstarck (EDS) (Co-Chair)
- Ed Barger, (Boeing)
- Michael Crooks (WebLayers, Inc.)
- Marty Dowd (L-3 Communications Titan)
- Moses Kamai (Battelle Memorial Institute)
- Charlie Kille (Raytheon Company)
- Laura Lee (SPARTA, Inc.)
- JoLee Loveland Link (Volvox, Inc.)
- John Link (Volvox, Inc.)
- Hans Polzer (Lockheed Martin)
- Arnie Rausch (Eagan McAllister Assoc, Inc.)
- Andras Szakal (IBM)

AFEI WG Charter
(signed by DoD CIO 18 Feb 2005)

1. Support the migration to an open business model that supports full competition but enables horizontal integration of the resulting capabilities and systems, regardless of who developed or provides the system.
2. Review and comment on industry-wide frameworks which will support horizontal integration of platforms and systems.
3. Provide and industry advisory service for the DoD CIO regarding net-centric strategies, programs, acquisitions, implementation, and containment.
4. Provide industry-wide critiques and analysis in response to government stakeholders.
5. Provide a forum for industry discussion and collaboration on evolving enterprise service models.
6. Annually review the continuing benefits of this committee and take appropriate action to dissolve or continue

Data Sharing WG Accomplishments

- White Paper, “Responding to the Challenges of Net Centric Operations,” Nov 17, 2004
- White Paper, “Industry Best Practices for Achieving Service Oriented Architecture,” Apr 22, 2005
- White Paper, “Facilitating Shared Services in the DoD,” Feb 12, 2006
- White Paper, “Shared Services: Performance Accountability and Risk,” initial draft in development…due early Summer 2006

Responding to the Challenges of Net Centric Operations: The Questions Asked

- How can OSD NII be more effective in "getting the word out" to all net-centric stakeholders?
- How best to approach industry standards?
- What does industry need from government to address new business models?

Responding to the Challenges of Net Centric Operations: Report Summary

- Increase the AFEI Support Role
  - Regular outreach and education
  - Standing working groups and tasking
  - Access to Government
- Task AFEI to create candidate Standards Governance Infrastructure framework and present to DoD CIO
- Request AFEI draw together net-centric organizations for more efficient and effective dialog with DoD
  - NCOIC, W2COG, W3C, OMG, OASIS, IEEE, Etc

Industry Best Practices for Achieving SOA: Task

- Recommend acquisition models that DoD could use to acquire services and for industry to provide services.
- Explore the role of information technology (IT) integrators and vendors in a Service Oriented Architecture (SOA) environment.
- Provide industry input on best commercial practices, service environment business models, internal industry practices, and applicability of those practices and models to DoD.
- Address interest, risk, liabilities, advantages & disadvantages of industry opn of Global Information Grid Enterprise Services (GIG ES).
- …and…review lessons learned from managed service efforts and industry business cases.

Industry Best Practices for Achieving SOA: Report Summary

- Report only "frames the starting point" for SOA analysis
- First iteration of SOA discussions:
  - Rapidly evolving technology and best practices
  - Contains basic explanations of SOA and services
  - Non-technical
  - Consensus views
- "…the principal lesson of this study is that SOA is simply a tool that must be implemented by engaged, attentive, and committed senior leaders who demand a culture of information sharing and improved organizational effectiveness."

Facilitating Shared Services: Task

"What should be the tenets of DoD policy that constrain industry and the government from developing redundant services, that incentivize industry and the government to reuse services, as they become available, and that mitigate the risks to both industry and the government of employing those services across distinct programs."

Facilitating Shared Services: Focus Areas

- Governance and Control Policy
- Common Information Standards and Technical Standards Policy
- Security, Trusted Information and Certification Policy
- Performance Accountability and Risk Policy
- Incentives for Government and Industry

Governance and Control Policy

- Definition:
  - *Provides the legal and management processes to ensure services sharing*
- Top 3 Issues:
  - Lack of awareness of existing services, no mechanism to discover existing services
  - No process for getting mods on reused services funded and prioritized
  - Risk of independent, non-collaborative portfolios
- Top 3 Recommendations:
  - Portfolio managers as ‘guardians’ w/ process to collect and exchange information on emerging needs and on planned services
  - DoD CIO implement DODD 8115.01 to lead a cross-Mission Area governance forum (i.e. an Enterprise Portfolio Managers’ board) to oversee Enterprise Portfolio Monitoring of DoD Portfolios
  - Recommend that Military Service-based acquisition practices be flagged as an issue for resolution by DoD

Common Information Standards and Technical Standards Policy

- Definition:
- *Provides the policy to enable interoperability in shared-services by creating common standards for the multiple net-centric communities & technologies.*
- Top 3 Issues:
  - There is a critical need for common standards that address SOA core services with enough detail to eliminate vendor differences
  - Industry is not motivated to provide a seamless, heterogeneous SOA infrastructure
  - Standards for SOAs and net-centric operations are currently unclear, evolving, and potentially competitive
- Top 3 Recommendations:
  - The differentiation between standards and requirements needs to be clearly defined
  - To ensure a “need to share” framework, DoD CIO must define the common information and technical standards for shared-services and codify these into a “Book of Knowledge” to be used by those who do business with DoD
  - SOA standards need to be extended to eliminate vendor specific solutions that prevent interoperability

Security, Trusted Information and Certification Policy

- Definition:
  - *Describes policy needed to support the parallel challenges of assuring information access and interoperability, while maintaining necessary security and trust in both information and information-sharers.*
- Top 3 Issues:
  - Due to prolonged security processes, C&A of new services and technologies is often obtained long after they are mature and ready for use
  - A core obstacle to information sharing is the security process
  - Lack of awareness of existing services, no mechanism to discover existing services
  - Secure and trusted information involves a complex (and sometimes contradictory) set of issues revolving around “trust”
- Top 3 Recommendations:
  - Each portfolio and sub-portfolio should have a single Designated Approving Authority (DAA) Officer
  - DoD CIO needs to fast-track the establishment of a cross-community C&A mechanism
  - Establish a security framework that supports authentication and authorization based on a common set of user attributes

Performance Accountability and Risk Policy

- Definition:
  - *Describes policies to mitigate risk to both industry and government employing reusable services across distinct programs.*
- Top 3 Issues:
  - Inadequate confidence in existing services availability, reliability and Key Performance Parameters
  - Little government guidance on approved, certified or available services that should be reused by industry and other government programs
  - No mechanism to learn about an existing service's performance record
- Top 3 Recommendations:
  - Historical performance records on available services need to be made more visible
  - Interoperability testing policy, as currently provided in DODD 4630.5 / DODI 4630.8, is focused on technical standards. Policy should be modified to address cross-domain *mission* interoperability within and between portfolios as the SOA environment grows
  - Additional government guidance for program managers (PMs) should be developed to address the issue of life cycle service liability of service providers for shared-services

Incentives for Government & Industry

- Definition:
  - *Describes policy that provides a favorable climate, inducement, and/or reward for sharing services; or provides a deterrent or penalty for not sharing services.*
- Top 3 Issues:
  - PMs (consumers) and industry (service providers) are neither required nor motivated (beyond basic budget savings) to reuse existing services
  - There is no mechanism in place to address the liability for the contractor or PM who proposes to reuse existing services from outside of their program
  - Existing services rarely satisfy new users without discussion and collaboration. There is no incentive system that fosters government agencies and industry to seek this discussion and collaboration.
- Top 3 Recommendations:
  - DoD should adopt monetary, non-monetary and hybrid incentive models that foster service sharing
  - A core service (e.g., Enterprise Service Management) should be required to collect the necessary usage information to support “fee-for-service” or “pay-by-the-click” models, aligning service provider actions with service consumer needs
  - The Defense Acquisition System needs to incorporate evaluation criteria for service reuse, akin to the “small business credit”, that places greater weight on reuse of available services in new capability proposals.

DoD CIO Follow up…

- Request for 10 focused papers…
- First 3:
  - Late Spring 2006
  - Tenet: Common Information Standards and Technical Standards
  - The goal of the DoD is to promote an SOA development that is also net-centric. Describe the characteristics of an architecture that is both net-centric and service-oriented, and map that to existing/new DoD Architectural Framework (DoDAF) products.

  - Late Spring 2006
  - Tenet: Government and Industry Incentives
  - What specific changes, if any, would industry recommend for the DODD 5000 acquisition process to maximize the value of services for the Department? For example, what changes would industry recommend for Milestone A, B, and/or C deliverables for a predominantly service based program or a program that is planning on using multiple services in delivering capabilities?

  - **Early Summer 2006**
  - **Tenet: Performance Accountability and Risk**
  - **If industry were going to reuse a service in the development of a capability, what performance metrics would government need to publish in order for industry to have adequate confidence in the consumed service?**

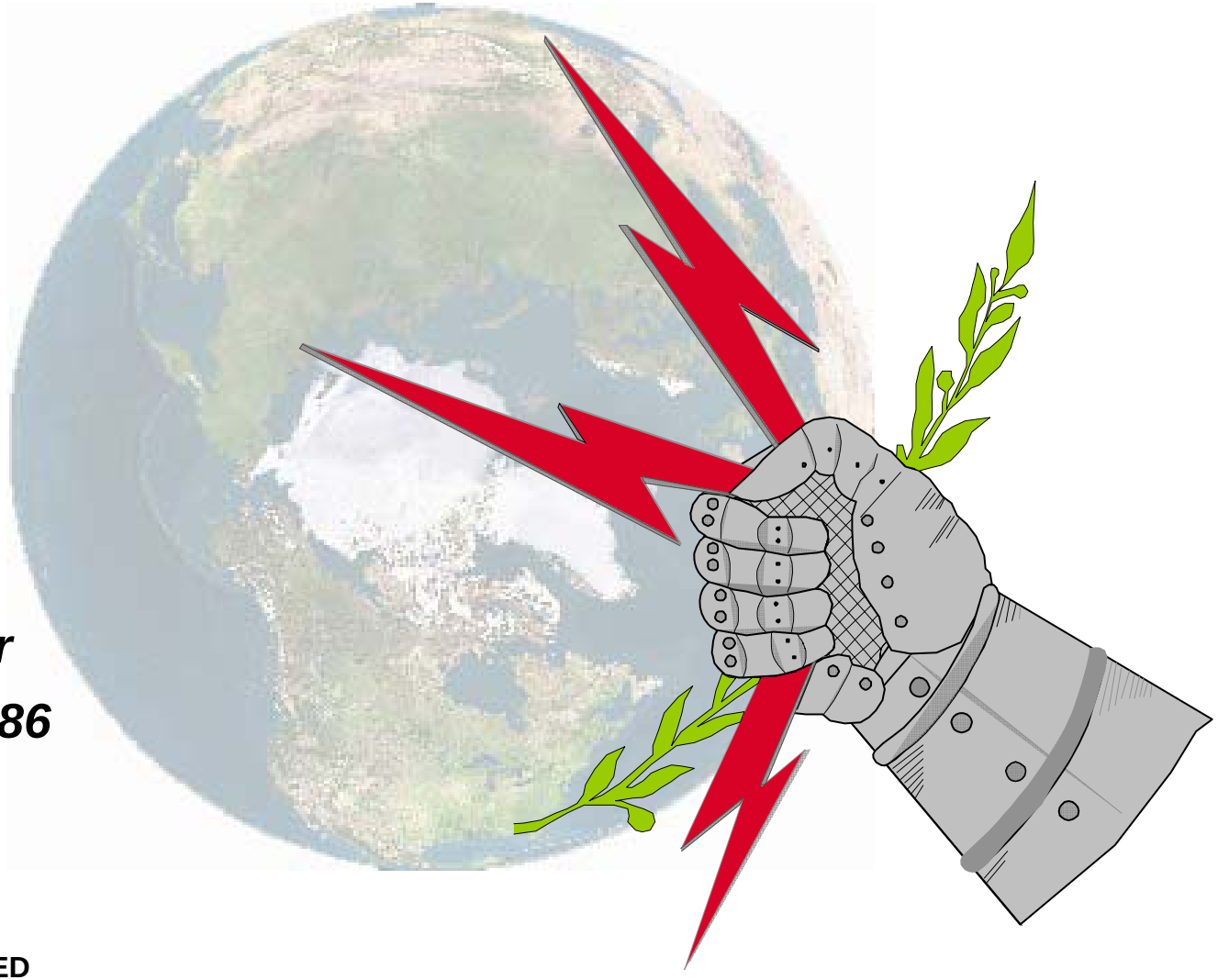
DS3 Team Next Steps

- Refine definition of “Net-centric” in Task 1 by 31 March and hand off to AFEI
- Define requirements for C&A by 31 March and hand off to AFEI
- Initial draft of response to Task 3 by 31 March…then begin iterative refinement

Conclusions

- Model works; mutual value
- Evolutionary process
- Hard work required
- Lots to do
- Join us…

USSTRATCOM
Global C2



Mr Dave Gelenter

USSTRATCOM/J86

Mar 2006

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The Vision

"Our objective is a global, persistent, 24/7 collaborative environment-comprising people, systems, and tools. Our future structure must support real time command and control at both the global and local levels as well as enable dynamic, adaptive planning and execution in which USSTRATCOM, the regional combatant commanders, and other geographically dispersed commanders can plan and execute operations together."

General Cartwright – SASC Testimony, 16 MAR 05

C2 Desired Attributes

- Collaborative Information Environment
  - Global, persistent, 24/7
  - Global situational awareness
  - Dynamic planning & execution
  - User Defined Operational Picture
- Infrastructure
  - Survivable & distributed (support National Command Capability)
  - IP based
  - Service Oriented Architecture
- Knowledge Management
  - Ubiquitous, assured access to information across allies, government and industry
  - Horizontal and vertical information integration
  - Share data IAW DoD data strategy
- Acquisition
  - Agile, flexible, & faster delivery of capabilities
  - Leverage existing systems and technology
  - Expose data as a service
  - Integrate current and future programs/eliminate stovepipes

Meeting the Challenge

Today's challenges:

- **Modernize aging legacy nuclear infrastructure**
- **Integrate missile offense and defense for seamless battle management**
- **Develop WMD consequence management capabilities**
- **Create foundation for robust and integrated Global command capability**

Where we need to go:

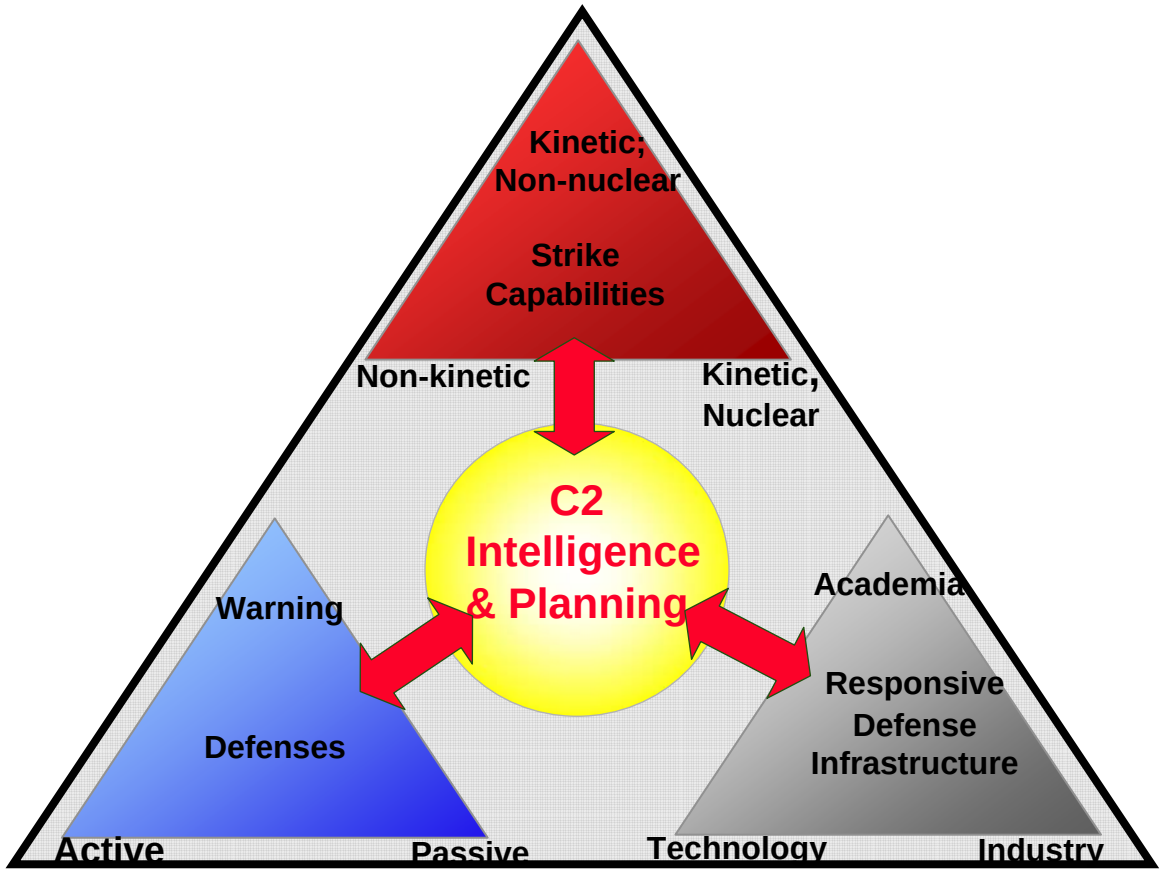
- **Transition from single purpose systems to distributed, multi-function capabilities**
- **Migrate Nuclear C2 to Distributed, Network/IP based 'Global C2'**
- **Global C2 'ties-together' all elements of New Triad Power**
  - **Enables timely response to today's asymmetric security challenges**
  - **Enables a broad mix of options - offense, defense, kinetic & non-kinetic**
  - **Enables real-time intelligence, collaborative planning & decision making**

Global C2 is a Key Enabler of New Triad Capabilities

Global C2 For the New Triad

- **All legs and elements supported by collaborative environment**
- **Focuses National power and New Triad capability**
- **Enables, unfettered, real-time, communications among all New Triad users**
  - **Shared situational awareness via tailored operational displays**
  - **Standing and ad-hoc Communities of Interest (horizontally and vertically integrated)**
  - **Collaboration, up, down, across & through all New Triad elements**
- **Intelligence and Planning available at all Nodes**
  - **Collaborative, distributed and ubiquitous**

Enabling The New Triad



….Command and Control, Intelligence & Planning - the "Force" that Pulls the New Triad Together…..

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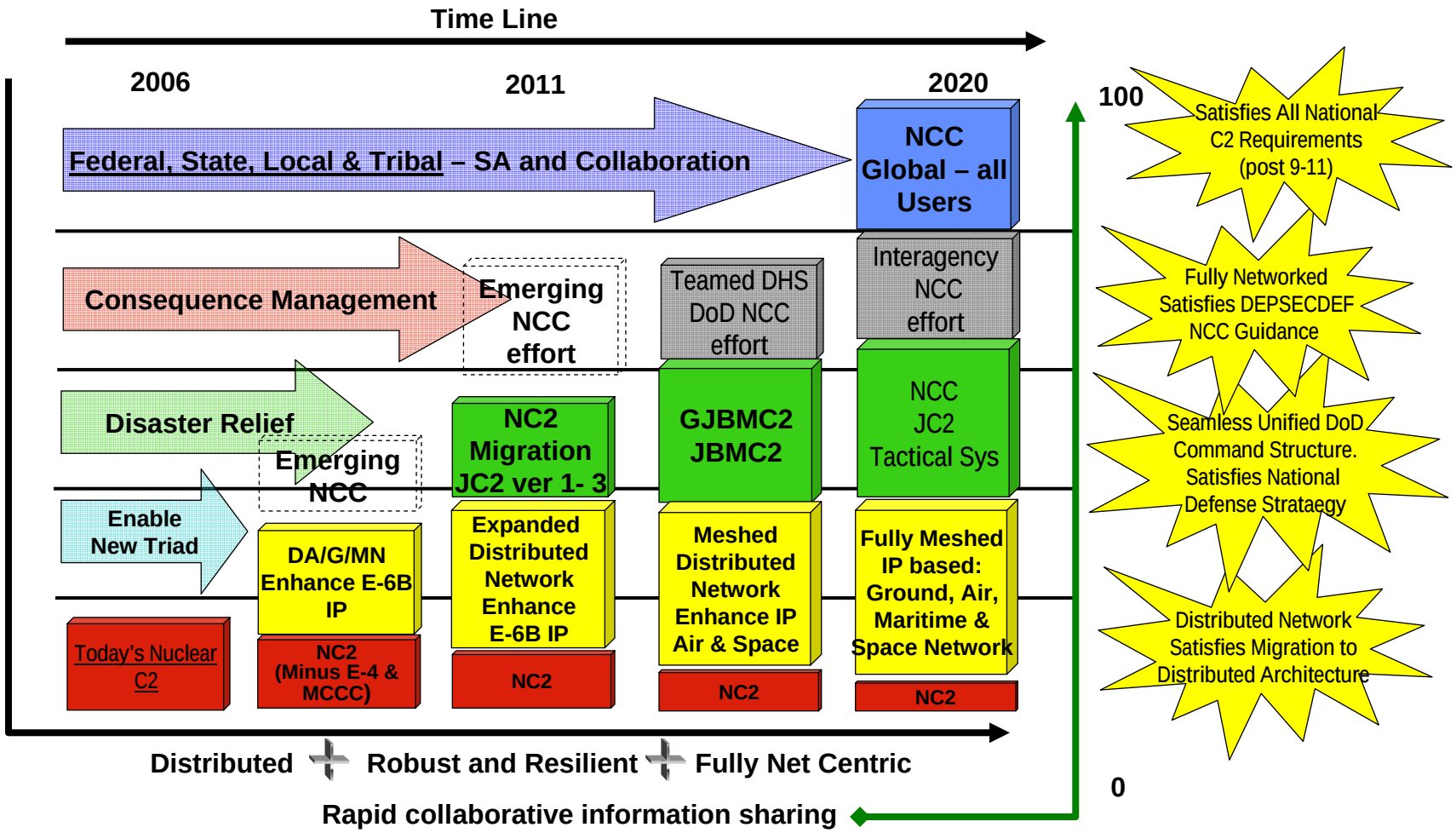
Building Toward a Global C2 Capability



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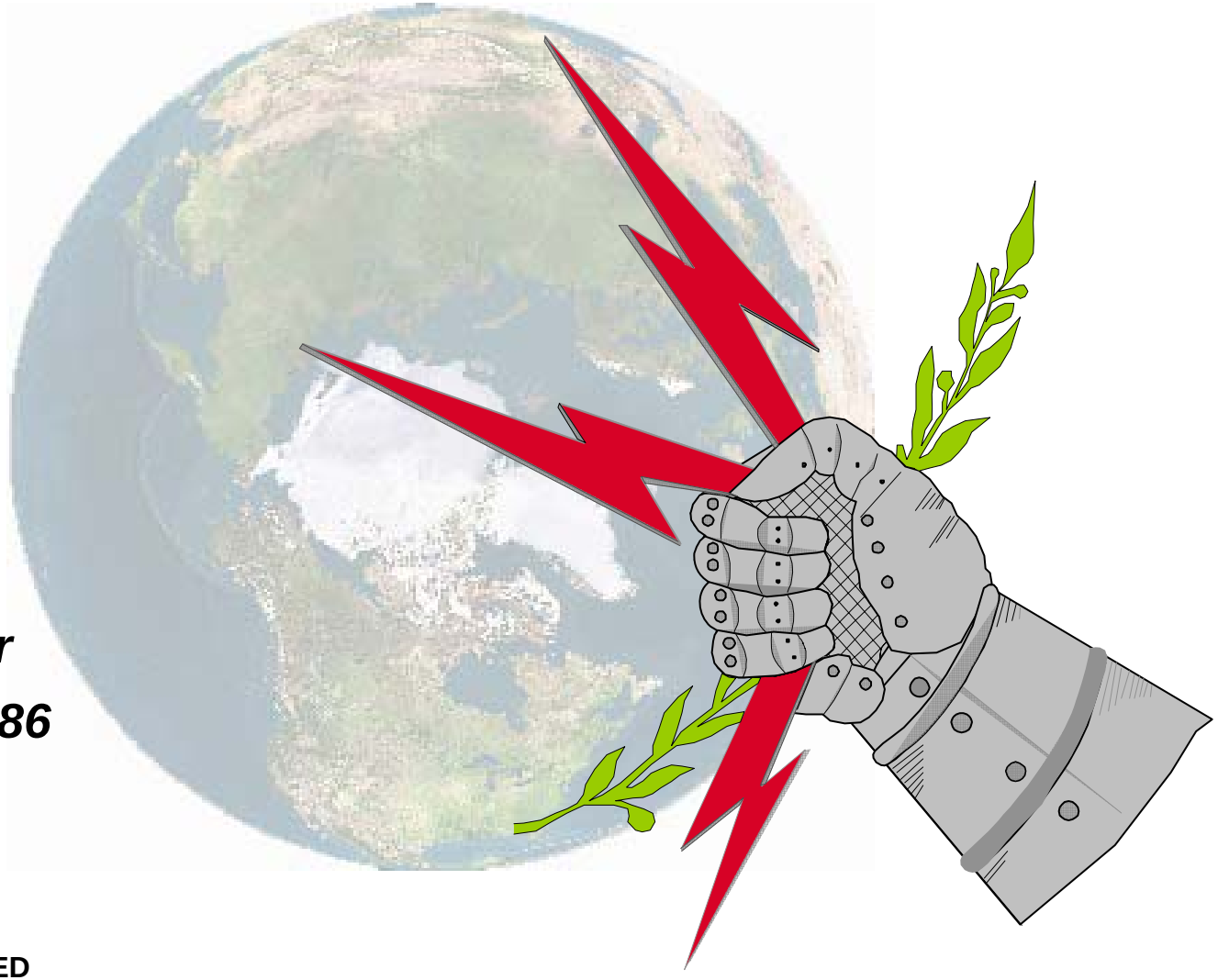
USSTRATCOM
Global C2



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PRTM

Management Consultants

Leading Thinking
For Lasting Results

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Information sharing

Organizational challenges and potential path to success

A changing world requires a different approach to sharing and communicating information

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Lack of effective information sharing is a source of major concern for protecting the homeland

Although terrorism information sharing has improved significantly since September 11, major change is still required to institute effective information sharing across the Intelligence Community and with state, local, and tribal governments

WMD Commission

…"this breakdown in communications was the result of a number of factors, including differences in the agencies' missions, legal authorities and cultures. Information was not sufficiently shared, not only between different intelligence community agencies, but also within individual agencies, and between the intelligence and the law enforcement agencies"

"Joint Inquiry"

"The president should lead the government-wide effort to bring the major national security institutions into the information revolution. He should coordinate the resolution of the legal, policy, and technical issues across agencies to create a 'trusted information network"

9/11 Commission

The U. S. government has access to a vast amount of information…But it has a weak system for processing and using what it has.

9/11 Commission

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The government responded to these concerns with legislation and executive orders

Legislative

- Homeland Security Act of 2002 creates DHS
- Intelligence Reform and Terrorism Prevention Act of 2004 creates DNI

Executive

- Executive Order 13388 of October 25, 2005
  - Further Strengthening the Sharing of Terrorism Information to Protect Americans
- Executive Order 13356 of August 27, 2004
  - Strengthening the Sharing of Terrorism Information To Protect Americans
- Executive Order 13311 of July 29, 2003
  - Homeland Security Information Sharing

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However, meaningful advances in sharing of essential information have yet to materialize

In January 2005, the Government Accountability Office designated information sharing for homeland security as a government-wide high risk area largely because "many aspects of homeland security information sharing remain ineffective and fragmented."

On December 5, 2005, the 9/11 Public Discourse Project—composed of 9/11 Commission members—assigned government-wide information sharing the grade of 'D' citing that:

> *"…designating individuals to be in charge of information sharing is not enough. They need resources, active presidential backing, policies and procedures in place that compel sharing, and systems of performance evaluation that appraise personnel on how they carry out information sharing."*

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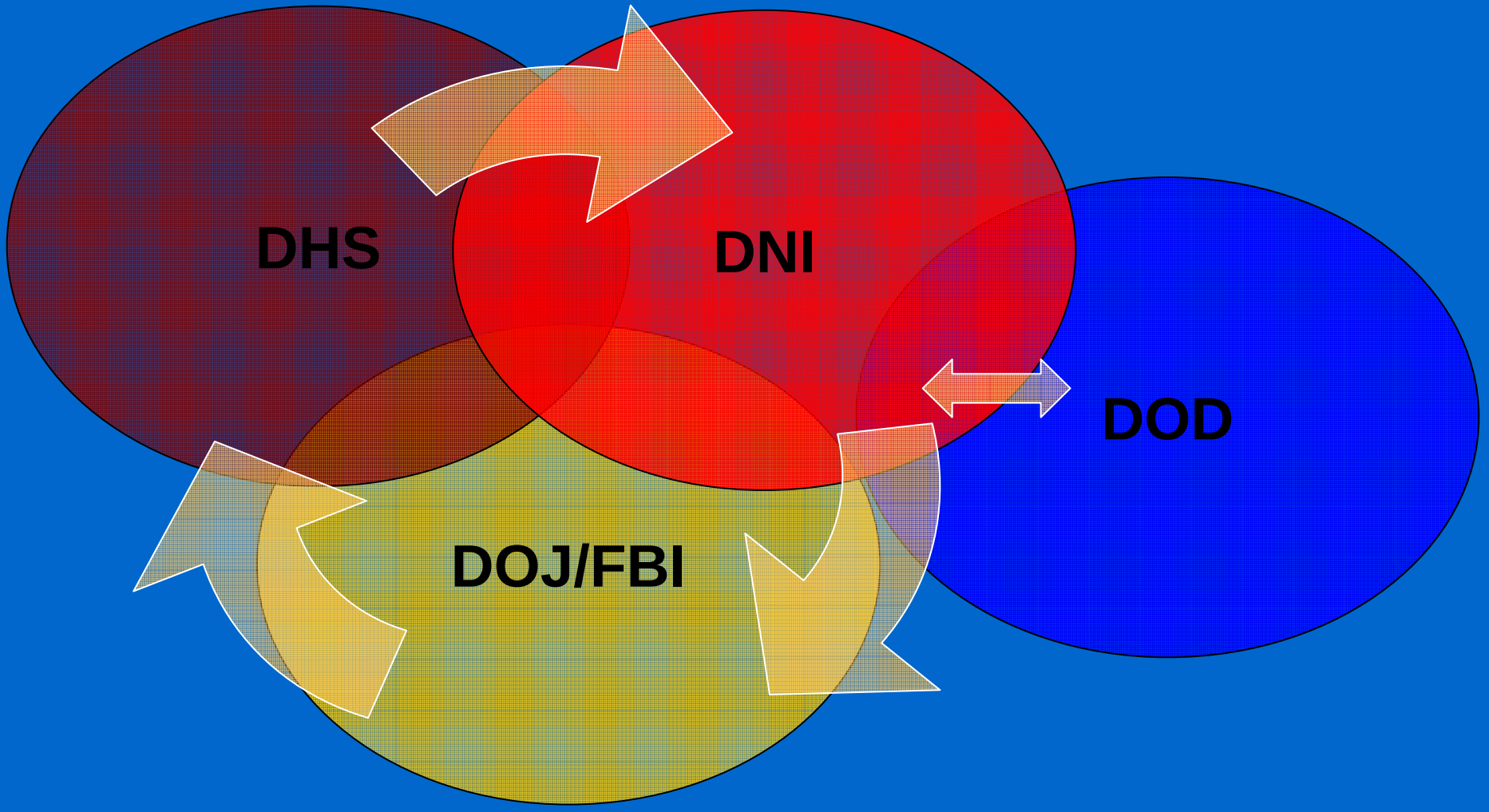
Leadership is necessary to set the direction and drive meaningful outcomes for effective ISC



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Advances in IS and communications will require a complete review of the information attributes

- Legal
- Privacy
- Data Protection
- Ownership
- Technical
- Cultural
- Educational
- …

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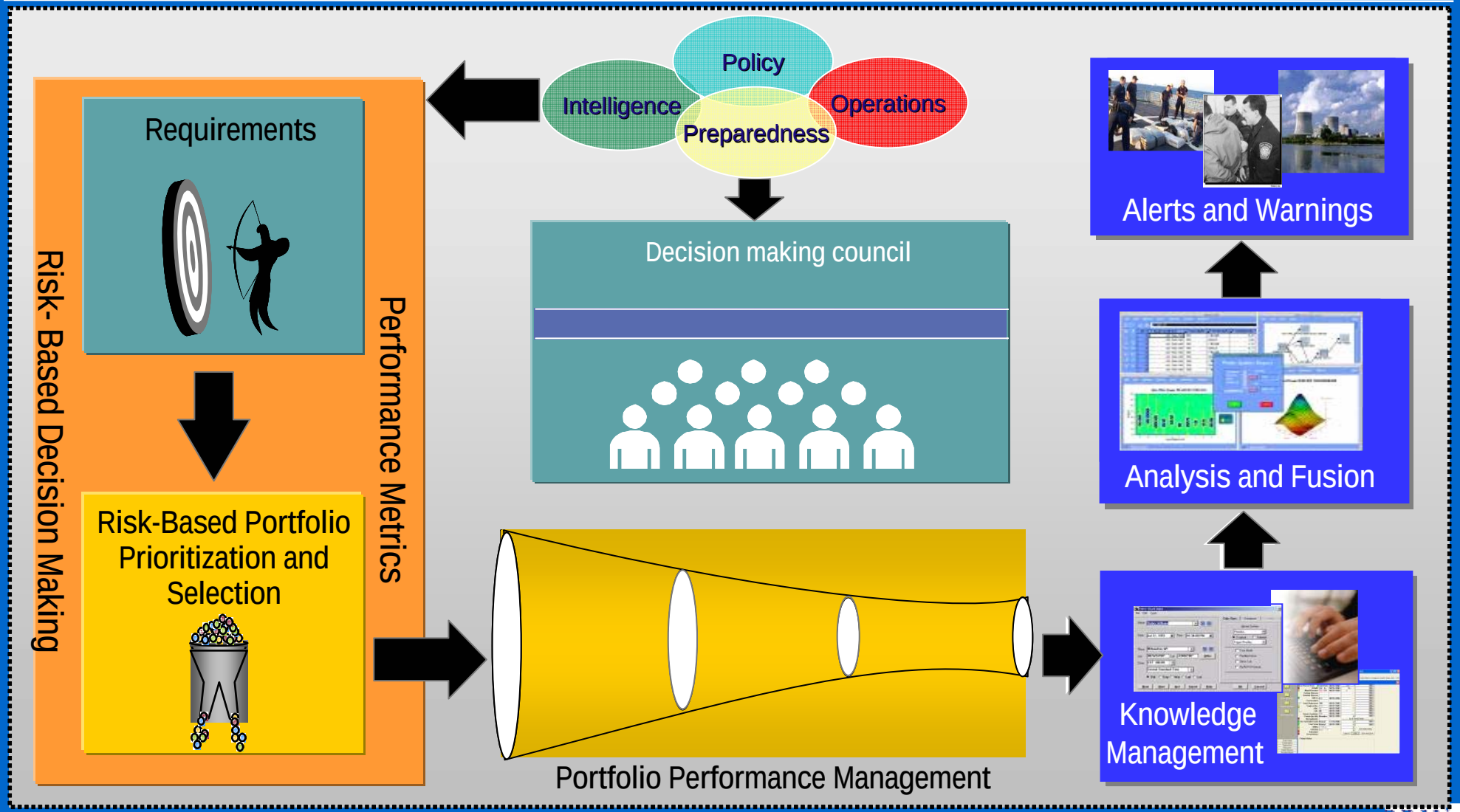
A governance model is necessary to transform information sharing and drive its progress



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Performance metrics are ultimately designed to drive action and advance the mission

Information Sharing Goals

ACCESS

Do I have all the information I need to connect the dots?

Value Chain

ANALYZE

How do I effectively filter and fuse to connect the dots?

Value Chain

ACT

How can I use this knowledge to impact the mission?

Metrics are needed at each step along the information sharing value chain

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Net-Centricity
and Global NetOps

COL Carl W. Hunt, Ph.D.
J9, Director of Technology and Analysis
15 March 2006

THE OVERALL CLASSIFICATION OF THIS BRIEFING IS
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Net-Centricity

Net-Centric Operations & Warfare (NCOW) is…

…the application of Net-Centricity to the activities of the Department of Defense, both day to day business and warfighting.

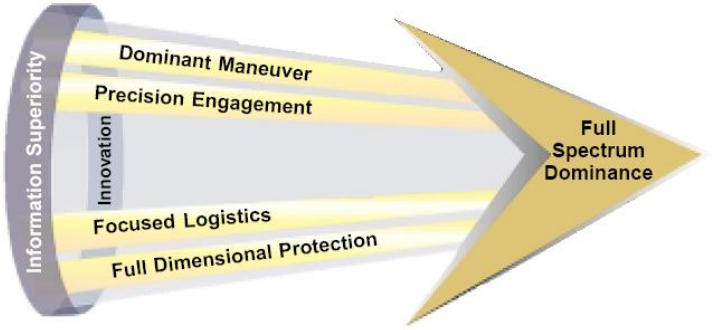
Net-Centric Operational Environment (NCOE)…

…provides the Joint Force with pervasive knowledge through the full integration of 3 critical components: Knowledge Management (KM), Network Management (NM) and Information Assurance (IA).”

Net-Centric Warfare (NCW) is…

… an information superiority-enabled concept of operations that generates increased combat power by networking sensors, decision makers, and shooters. In short, the application of Net-Centricity to warfighting is “Net-Centric Warfare.”

NCOW is the approach to operations and warfare by which DoD will achieve the goals and objectives of Joint Vision 2020.



Transforming to Net-Centricity

Transformational Satellite Communications

Presidential Communications

Teleports

Joint Tactical Radios

High Bandwidth Network Backbone

Joint Command and Control & Coalition Info Sharing

Combat Support Enterprise Computing

Net-Centric Enterprise Services

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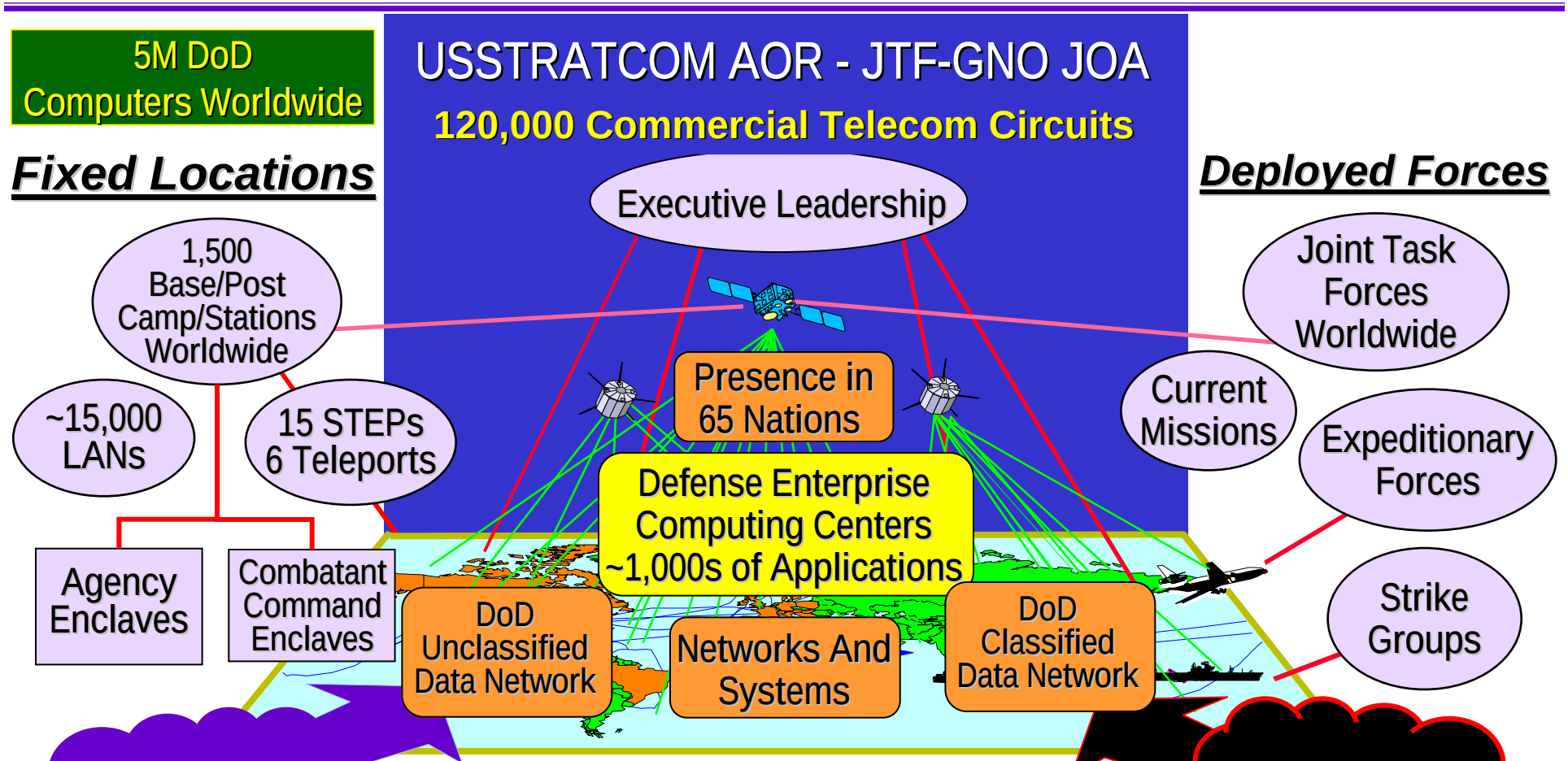
The Operational Environment



Globally interconnected end-to-end infrastructure supporting war-fighters, policy makers, and business processes.
DoD CIO Memo, 22 Sep 1999

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The Threat: Growing; Sophisticated; and Organized

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December 1998 – January 2003

Most activity was from moderately skilled individuals

- **Hackers, Script kiddies**
- **Criminals**
- **Individual unfocused efforts**

February 2003 – Present

Shift to a series of intrusion focused sets by skilled and organized actors (possibly nation state sponsored)

- **Titan Series Sets**
- **Organized crime, BotNets**

"Recent exploits have reduced operational capabilities on our networks. Failure to secure our networks will weaken our warfighting ability and potentially put lives at risk." DEPSECDEF Aug 04

Global NetOps Defined

"We must change the paradigm in which we talk and think about the network; we must 'fight' rather than 'manage' the network and operators must see themselves as engaged at all times, ensuring the health and operation of this critical weapons system."

~ Secretary of Defense Donald Rumsfeld

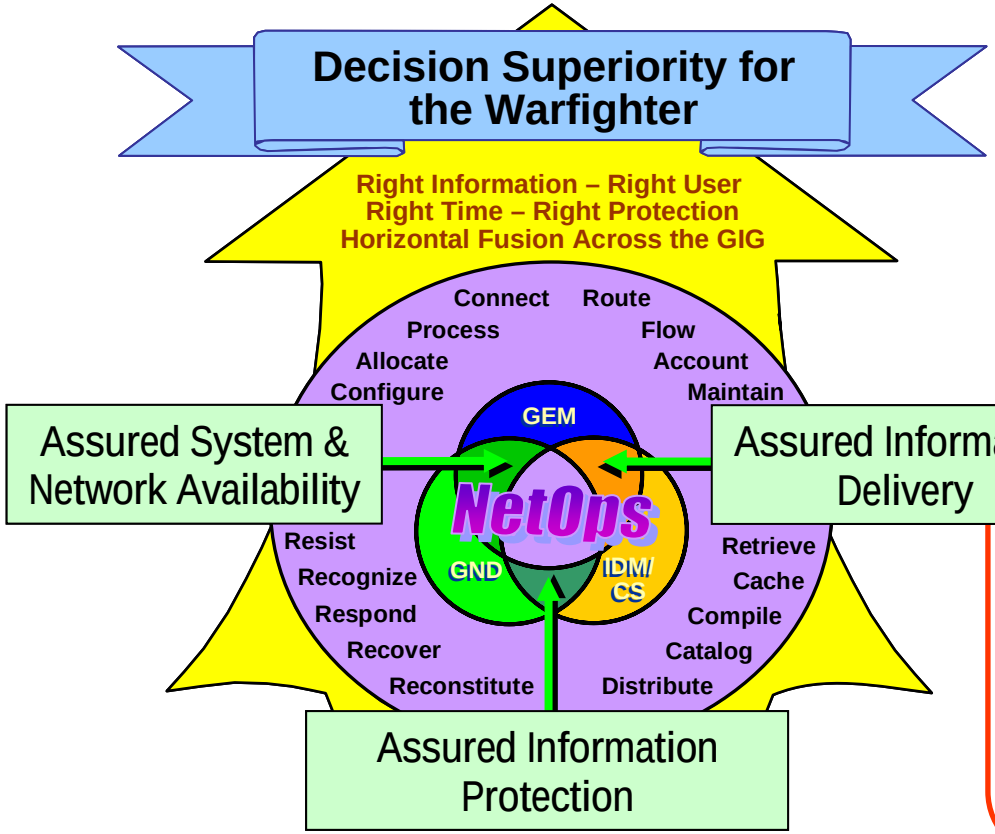
"NetOps is the operational construct that the Commander, US Strategic Command (CDRUSSTRATCOM) will use to operate and defend the Global Information Grid (GIG)"

~ USSTRATCOM, Joint CONOPS for GIG NetOps
15 Aug 2005

It is the mission that executes every day, worldwide, 24x7x365

NetOps – The Construct

NetOps is end-to-end across all GIG assets, in support of all Operational Environments



NetOps is the Operational Construct for operating and securing the GIG in support of Network Centric Operations and Warfare

Key Attributes

- Operational Commander in Charge
- Organizational Structure Established
- TTPs Defined, Established
- Integrates Net Management & Defense
- Shared Situational Awareness

"The source of flexibility is the synergy of the core competencies of the individual Services, integrated into the joint team." **Joint Vision 2020**

A Changing Operational Environment

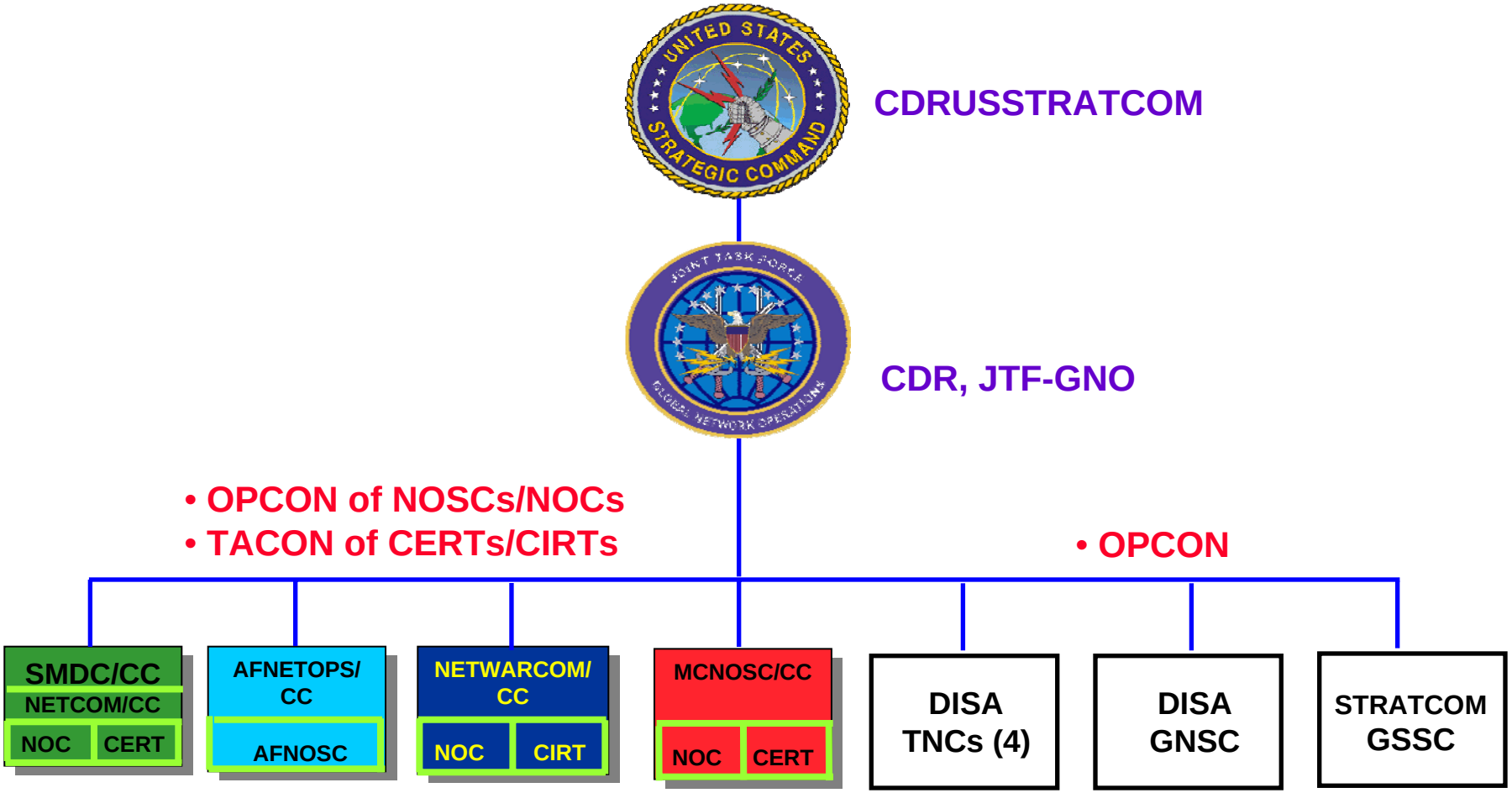
NetOps & JTF-GNO are important

- Transformational Communications
- Increasing Complexity
- Increasing Threats to the GIG
- Unclear C2, Roles and Responsibilities for Operating & Defending the GIG

"… Single-most transforming thing in our force will not be a Weapon System, but a set of interconnections…"

Secretary of Defense, Donald Rumsfeld, August 2001

Assigned Component Forces



"Commanders working with Commanders"

NetOps Mission and Relationships

Allied Partnerships

Department of Homeland Security
National Cyber Security Division (US CERT)

Nat'l Cyber Response Coordination Group

Nat'l Comm Sys (Watch)
Nat'l Coord Center

Law Enforcement/ Counter Intelligence Center

Joint Staff

Combatant Commands

Private Sector

Information Sharing & Analysis Centers

- Telecommunications
- Banking & Finance
- Transportation
- Info Technology
- Carnegie Mellon Univ.

Intelligence Community

- CIA
- NSA
- DIA

Federal Law Enforcement

- FBI
- DCIOs
- DSS

DISA

Engineering
Acquisition
Software Dev

DOD CC/S/A CND Forces

Questions?

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA
DEPARTMENT OF THE ARMY
1775
DEPARTMENT OF THE NAVY
DEPARTMENT OF THE AIR FORCE
JOINT TASK FORCE
GLOBAL NETWORK OPERATIONS
UNITED STATES
STRATEGIC COMMAND

Back-Up Slides

Cyber Crime – Threat to the GIG

- 26 Year-old Venezuelan, Rafael Nunez-Aponte, aka "RaFa" pleaded guilty to hacking DOD computers
- Time served 7 months, deported in Dec 05

Grand Jury

No. CR

) INDICTMENT

v.)

) [18 U.S.C. § 371: Co

JEANSON JAMES ANCHETA,) 18 U.S.C. §§ 1030(a)

) (a)(5)(B)(i), and 10

- 20 Year-old American, Jeanson James Ancheta, aka "syzt3m" indicted by DOJ
- 17-count indictment, alleges he controlled 1000's of computers remotely
- Pleaded guilty to 4 felonies - Jan 06, awaiting sentence

Indictments the result of groundbreaking inter-agency analysis

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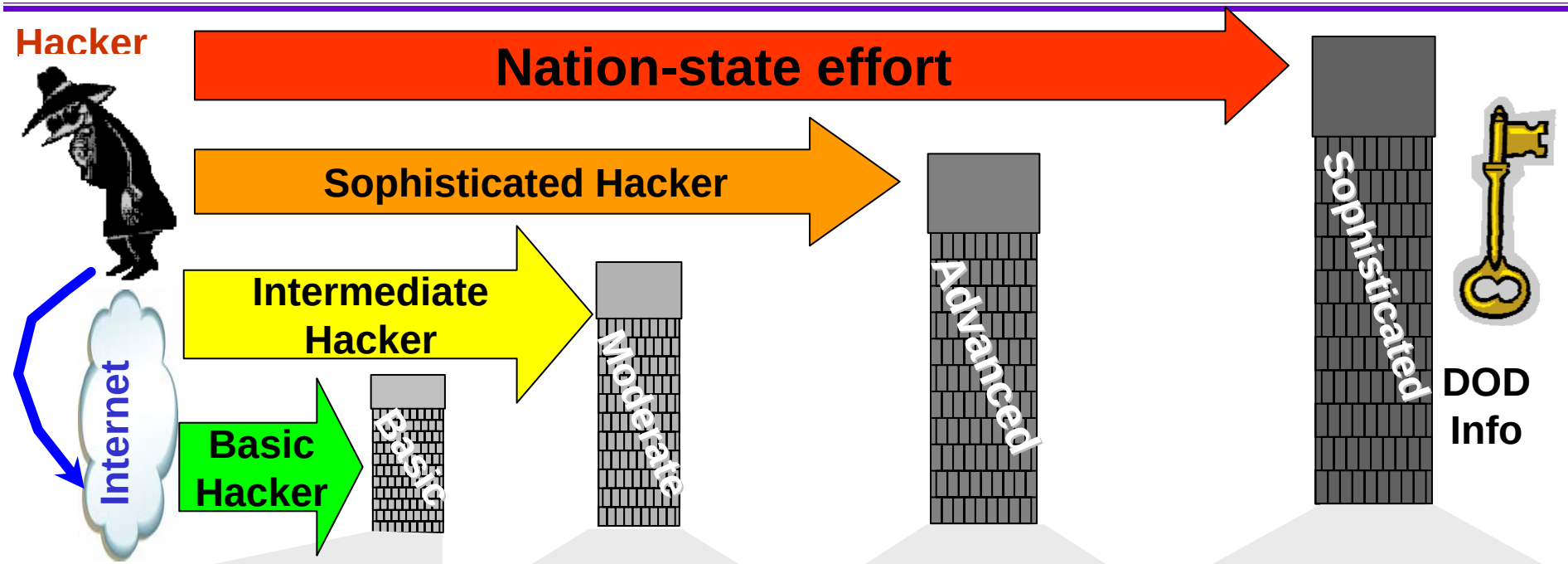
DOD Defense-in-Depth Strategy



Basic Defenses

- Host Intrusion Detection
- Block high risk applications
- Traffic Filtering
- Anti-Virus/Spyware
- Patch Management
- User awareness

Moderate Defenses

- Firewall management
- Password changes
- Configuration mgt.
- Automated scanning
- Network IDS
- Risk management

Advanced Security

- Policy based
- Configuration control
- Account auditing
- Disciplined growth
- Baseline management
- Analysis tools
- Security Scanner

Sophisticated Global Security

- Command involvement
- Standard response procedures
- Shared Situational Awareness
- Password Policy Enforcement
- CAC/PKI
- Accountability
- Limited internet connections

Aggressive CND Measures: No silver bullets!!!

Network Centric Operations Industry Consortium Panel

Dr. Kevin J. Reardon
Mr. Hans W. Polzer
Ms. Sheryl Sizelove
Mr. Michael Curtis

NDIA NCO Conference
Norfolk, VA
March 14, 2006

www.ncoic.org

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Approved for Public Release

Agenda

- **Consortium Overview and Role in NCO**
  - ***Dr. Kevin J. Reardon***, Captain, USN (Ret.)
    Executive Director, NCOIC
- **Enabling Net-Centricity – NCOIC's Role**
  - ***Hans W. Polzer***, Lockheed Martin
    Vice Chair, NCOIC Services & Information Interoperability WG
- **Technical Role and Value of NCOIC**
  - ***Sheryl Sizelove***, Boeing
    Vice Chair, NCOIC Technical Council
- **NCOIC's Current Position and Vectors**
  - ***Michael Curtis***, IBM
    Chair, NCOIC Technical Council

Network Centric Operations
Industry Consortium

Consortium Overview and Role in NCO

March 14, 2006

Dr. Kevin J. Reardon
Captain, USN (Ret.)
Executive Director, NCOIC

Our Scope

DoD, DHS, NATO and MoD International Force Transformation

- NCO is the underlying foundation of “Force Transformation” in DoD and throughout the armed forces of our allies
- Force Transformation is a new strategic context
  - New Theory of War based on Information Age principles and phenomena
- New relationship between operations abroad & homeland security dealing with a considerably broadened threat context:
  - State/Non-State
  - Nodal/Non-nodal
  - Symmetric/Asymmetric
  - Traditional/Unrestricted

Our Mandate

Enable Transformation Through NCO

- Joint transformation requires an “intellectual infrastructure” that includes:
  - Enhanced training programs
  - Development of an International Network Centric Environment
  - Provision of assured Interoperability
  - Path breaking concept development and experimentation
  - Effective programs to capture and implement lessons learned
  - Common and open interoperability standards

Admiral Edmund Giambastiani, Jr. USN
Vice Chairman, Joint Chiefs of Staff

- “Knowledge is both a fundamental principle and instrumental resource in our efforts to secure our borders and people. The Department has made widespread coordination and information sharing the hallmark of our new approach to homeland security.”

Tom Ridge
former
Secretary, Department of Homeland Security

Also Our Mandate

Global Participation & Engagement

"I have two major goals:

1. Make NATO transformation needs as transparent as possible to industry
2. Stop wasting money on R&D that is ongoing in Europe and the US

The consortium can help me to achieve these goals. We need industry involvement. What you are doing is important and it has to be done. Let me know what I can do to help."

General Kujat, Former Chairman of the NATO Military Committee

"We can work together on the building blocks NATO needs to achieve network centric operations. There are several ways we can move forward to collaborate on technical activities."

Marshall Billingslea, Assistant Secretary General for Defense Investment

Consortium Vision and Mission

Responding to the Need

- Vision:

Industry working together with our customers to provide a network centric environment where all classes of information systems interoperate by integrating existing and emerging open standards into a common evolving global framework that employs a common set of principles and processes.

- The Mission of the Consortium is to help accelerate the achievement of increased levels of interoperability within, and among, all levels of government involved in Joint, Interagency and Multinational (JIM) operations.

Why the NCOIC?

Industry Leadership to Reduce NCO Time-To-Market

- Forum for Subject Matter Experts to Collaborate on NCO Initiatives
  - Better Understand Customer's NCO Vision, Goals, and Objectives
  - Exchange Strategies and Proven Approaches to Enhance System Delivery
- Committed to Establishing Open, Interoperable Systems using Common Best Practices and Systems Engineering Techniques
  - Facilitates Consistency Across Industry
  - Advocates for Open and Interoperable Systems Design
- Companies Collaborating to Accelerate Transformational Efforts
  - Understanding Industry's Responsibilities and Acting
  - Addressing the Problem, Taking Initiative, Understanding the Requirement

Consortium exists to exchange ideas and produce process and technology deliverables that facilitate force transformation through NCO

Introducing the Consortium

Member Companies

- Leading international aerospace, defense, IT systems and professional services firms who have extensive experience with:
  - DoD
  - Intelligence Agencies
  - DHS
  - NATO
  - MoDs
  - International Law Enforcement Community
  - State/Provincial and Local Governments.
- Companies of all sizes, “think tanks” and academic institutions
- Open:
  - Participation open to all,
  - Fair, equitable, and vendor-neutral processes,
  - Work based on relevant industry open standards and practices.

NCOIC Members

Total Members: 82

Tier 1 Members (23)

- BAE Systems, Inc.
- Boeing
- Cisco Systems
- Deloitte & Touche
- EADS
- EFW
- EMC
- General Dynamics
- Harris Corporation
- Hewlett-Packard
- IBM
- Intel Corp.
- ITT Industries
- L-3 Communications Integrated Systems
- Lockheed Martin
- Northrop Grumman
- Oracle
- Raytheon
- Rockwell Collins
- Saab
- SAIC
- Sun Microsystems
- Thales

Tier 2 Members (2)

- Alcatel Government Solutions
- Factiva

NCOIC Members

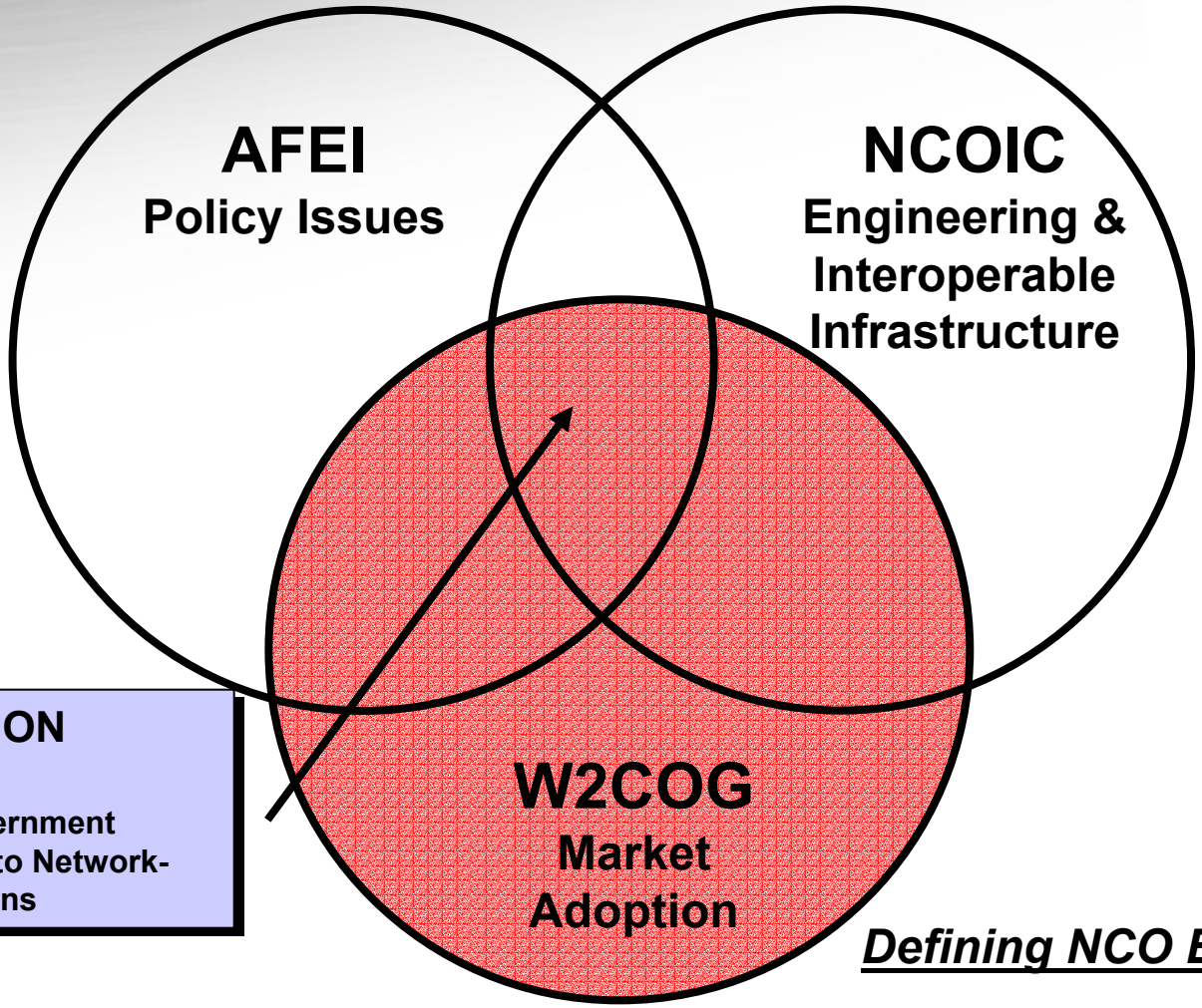
Total Members: 82

Tier 3 Members (57)

- The Aerospace Corporation
- AFEI
- Anteon Corporation
- Argon ST
- Ball Solutions Group
- BearingPoint
- CACI
- Camber Corporation
- CB Technologies
- Ciena Government Solutions
- Cryptek
- Crystal Group
- Cubic Defense Applications
- DataPath
- DCN
- EDISOFT S.A.
- Engenio Information Technologies
- Ericsson
- Finmeccanica
- FlightSafety International
- Honeywell
- INDRA
- Innerwall
- Innovative Concepts, Inc
- Institute for Defense Analyses
- Instrumentointi Oy
- International Data Links Society
- Interoperability Clearinghouse
- Israel Aircraft Industries
- Johns Hopkins University APL
- LynuxWorks
- Marconi Communications Federal
- Maritime Technology Centre R&D Institute
- MBL International, Ltd.
- Microsoft
- MITRE
- Military Communication Institute
- Motorola
- Objective Interface Systems
- OrderOne Networks
- Real-Time Innovations
- Rheinmetall Defence Electronics
- RUAG Electronics
- SAP Labs
- Sikorsky Aircraft
- Smiths Aerospace
- SPARTA, Inc.
- SRI International
- SuprTEK
- Systematic Software Engineering A/S
- Systems Integration & Development
- Terma A/S
- Themis Computer
- University of Maryland, CSHCN
- Wakelight Technologies
- West Virginia High Tech Consortium Foundation
- Wind River Systems

Transformation through Collaboration

Aligning the Sum of the Parts



INTERSECTION SPACE
Successful Government Transformation to Network-Centric Operations

Defining NCO Best Practices

NCOIC Advisory Council

Senior Government Engagement and Advice

Chairman	Dr. Paul G. Kaminski
US Army	Lt Gen Steven W. Boutelle, USA
NGA	Mr. Steven Wallach
Intelligence Community	Mr. Bill Dawson
NATO HQC3S	Maj Gen Georges D'Hollander, Belgian Army
OUSD (AT&L)	Dr. Vitalij Garber
OASD (NII)	Ms. Priscilla E. Guthrie
US Air Force	Lt Gen Michael Peterson, USAF
DHS	Mr. Lee Holcomb
US Navy	VADM James D. McArthur, Jr., USN
USAFA	Gen James P. McCarthy, USAF (Ret.)
At large	Mr. Arthur L. Money
Swedish DMA	Maj Gen (ret) Staffan Näsström
DISA	Lt Gen Charles Croom, USAF
JCS/J6	LTG Robert M. Shea, USMC
NATO ACT	Maj Gen Ruud van Dam, AF Netherlands
JFCOM	LtGen John Wood, USA
NATO C3A	Mr. Dag Wilhelmsen
French MoD	BGen Blandine Vinson-Rouchon
Australian MoD	MAJGEN Mike Clifford
German MoD	Mr. Uwe H. Giesecke

NCOIC / Government Interaction

- Advisory Council
  - Joint Executive Council / Advisory Council meetings
  - Australian and European representation being increased
- Affiliation Relationships
  - OSD OFT
  - NATO ACT
  - W2COG/NPS
- Cooperative R&D Agreements (CRADA)
- NCOIC participation in government activities
  - US Navy Open Architecture Review
  - OSD/NII Net-Centric Implementation Documents (NCID) Review
  - OFT and NDU Education and Outreach Initiatives
  - NATO ACT NEC conference sponsorship/participation
  - NATO C3 Board briefings/contributions
- NCAT Tool approved for use by participants in
  - EUCOM-led Coalition Warrior Interoperability Demonstration (CWID)

Consortium Technical Approach

5 "Parallel" Strategies - Helping our customers to:

- Complete thorough and rigorous analysis of government architectures, capability needs, and mandated standards to identify commonalities, synergies, conflicts, gaps and potential areas for improvement
  - Customer Requirements Team
- Develop a Systems Engineering framework to organize and relate applications, data, and communication elements used by suppliers and system integrators to build and deploy NCO systems
  - Architectures and Standards Analyses Team
- Identify the widest possible community of standards-based product types
  - Building Blocks Team
- Develop a program for education for NCO
  - Education and Outreach Team
- Plan and implement strategies to develop effective collaborative engineering environments
  - Engineering Processes Team

Network Centric Operations
Industry Consortium

Enabling Net Centricity - NCOIC's Role

March 14, 2006

Hans W. Polzer, Vice Chair
NCOIC Services and Information Interoperability (SII) WG

Why Net Centricity?

- Greater operational effectiveness for an investment
- Two major paths
  - Improve the asset or system itself (Path A)
    - Training, employment techniques, better performance, multi-mission capabilities, etc.
  - Improve the ability of the asset/system to work synergistically with other assets/systems (Path B)
    - Data Links, “Enterprise” Architectures, Joint Operations, Net Centric Operations, Service Oriented Architectures, etc.
- Path A has been the primary investment path, but
  - Returns on asset performance improvements are decreasing
  - Adoption limited by Increasing asset cost and “globalization” of asset base
- Path B is increasingly the preferred, net centric path to greater operational effectiveness

Operational Effectiveness Enablers

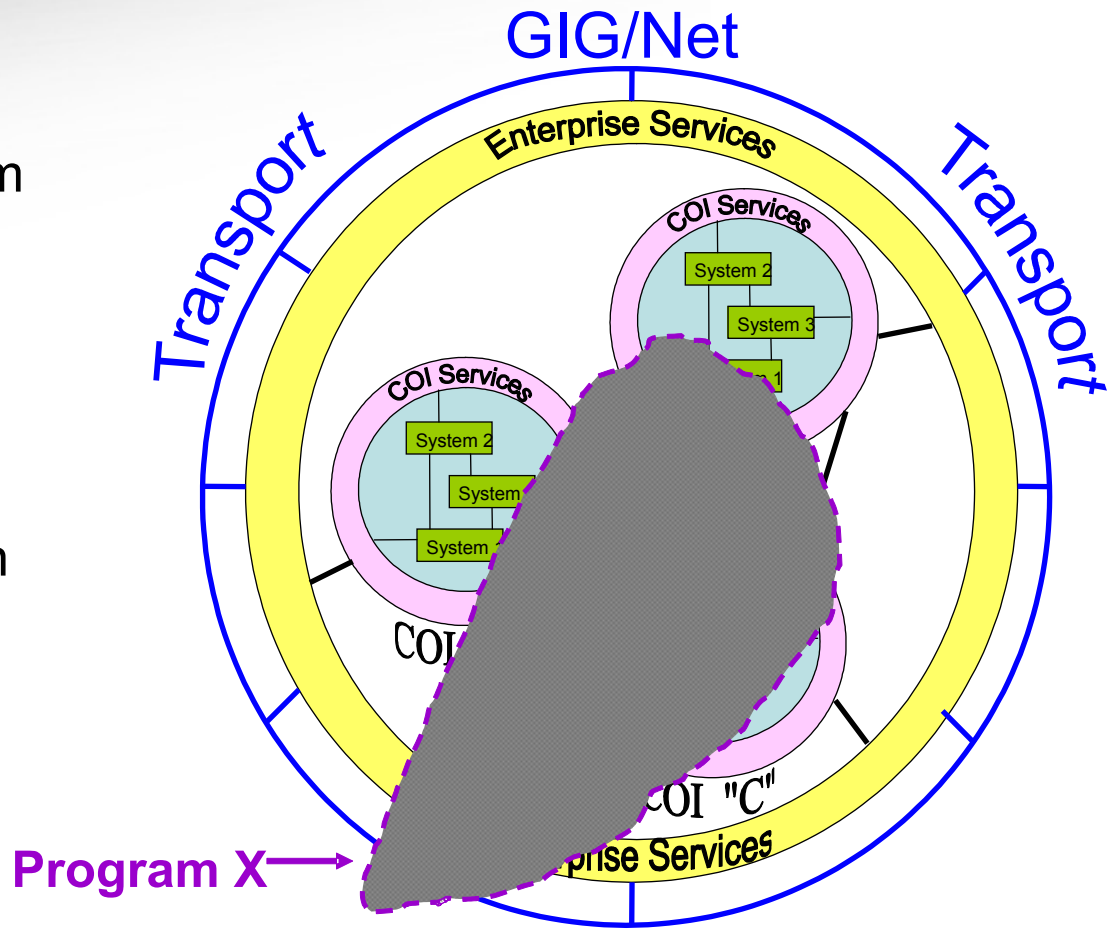
- Pervasive Connectivity
  - GIG, NNEC, Intranets, Internet, Data Links, Sensor Networks
- Service Oriented Architectures
  - Enable interoperation across different hardware/software execution environments
- Net Centricity
  - Adds the notion of dynamic scope and crossing system and enterprise/COI/Domain boundaries via the Net
- Collaborative Culture and Incentives (“Coopetition”); Learning Organizations
  - Enables services to be exchanged on the Net
  - Fosters Social/Collaborative Computing, KM
  - Silicon Valley vs Route 128 Business Model
  - Joint, Coalition perspective rather than just Service or Domain

The Essence of Net Centricity

- More than networks, SOA and NR-KPP
- It's about working with "others" via the pervasive net
- Anticipate and prepare for scope and context changes
- Monitor the environment continuously
- Leverage and share what's available
  - Across program/system boundaries
  - Across capability & domain boundaries
  - Across enterprise & national boundaries
- But prepare to deal with failure/threats
- Mostly a political/business/social model issue
  - Governance within investment/ownership domains
  - Incentive models and risk management between/across investment/ownership domains

A Net Centric Ecosystem Model

- Programs focus on Capabilities (JCIDS)
- Capabilities cut across system and COI boundaries
- Systems support multiple COIs and Capabilities via services
- Services are valued based on how well they support multiple and new Capabilities
- Programs are valued based on how well they create and use Capabilities from multiple services



Summary

- Greater Operational Effectiveness drives Net Centricity
- Net Centricity is more about crossing organizational, asset and domain boundaries than anything else
  - Enabled by the Net
  - Expected by the emerging global culture
- Requires an “Ecosystem” perspective rather than a program-centered view
- Cross-organization institutions needed to foster this
- NCOIC is one such institution

Network Centric Operations
Industry Consortium

Technical Role and Value of NCOIC

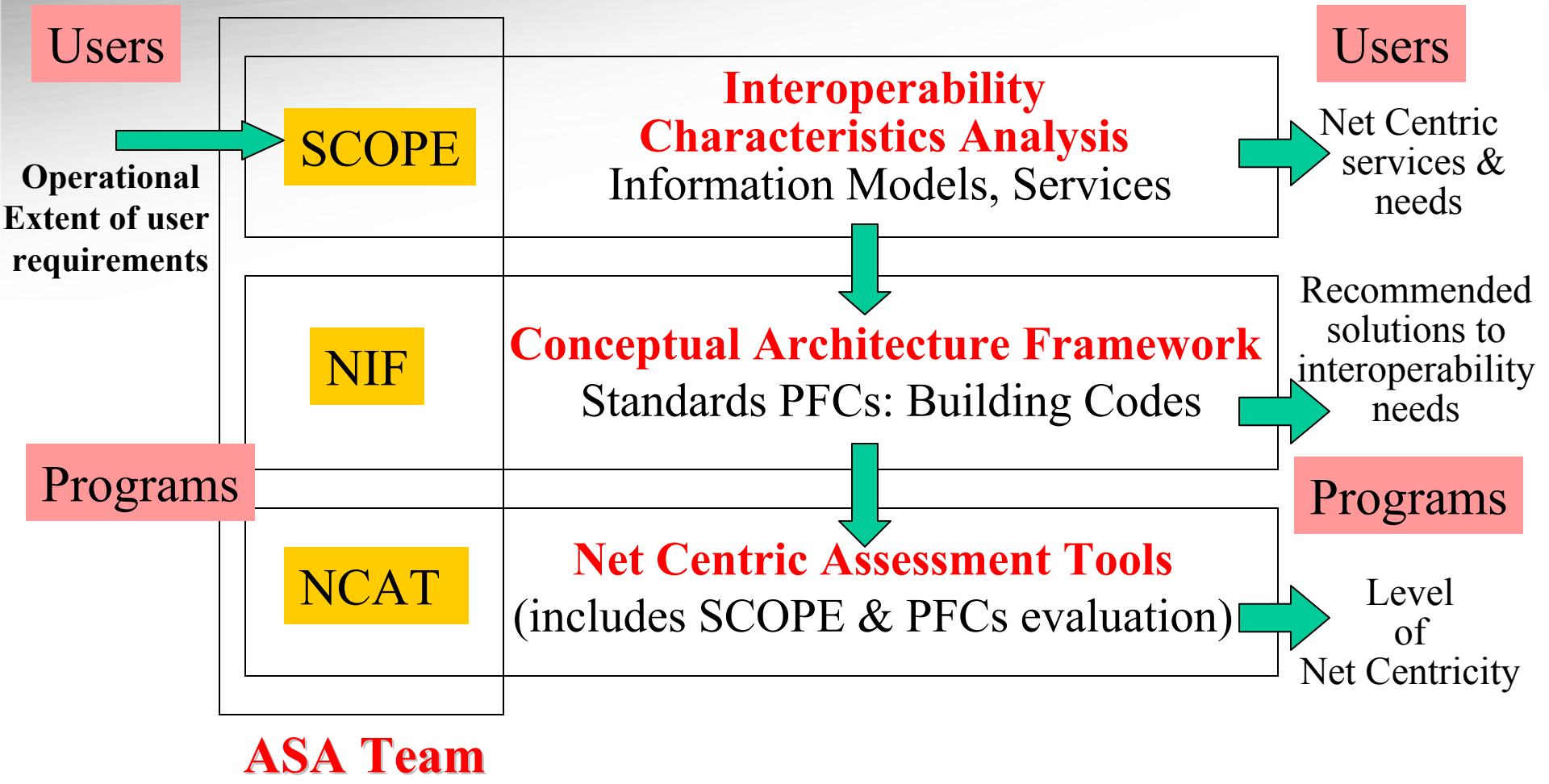
March 14, 2006

Sheryl Sizelove, Vice Chair
NCOIC Technical Council

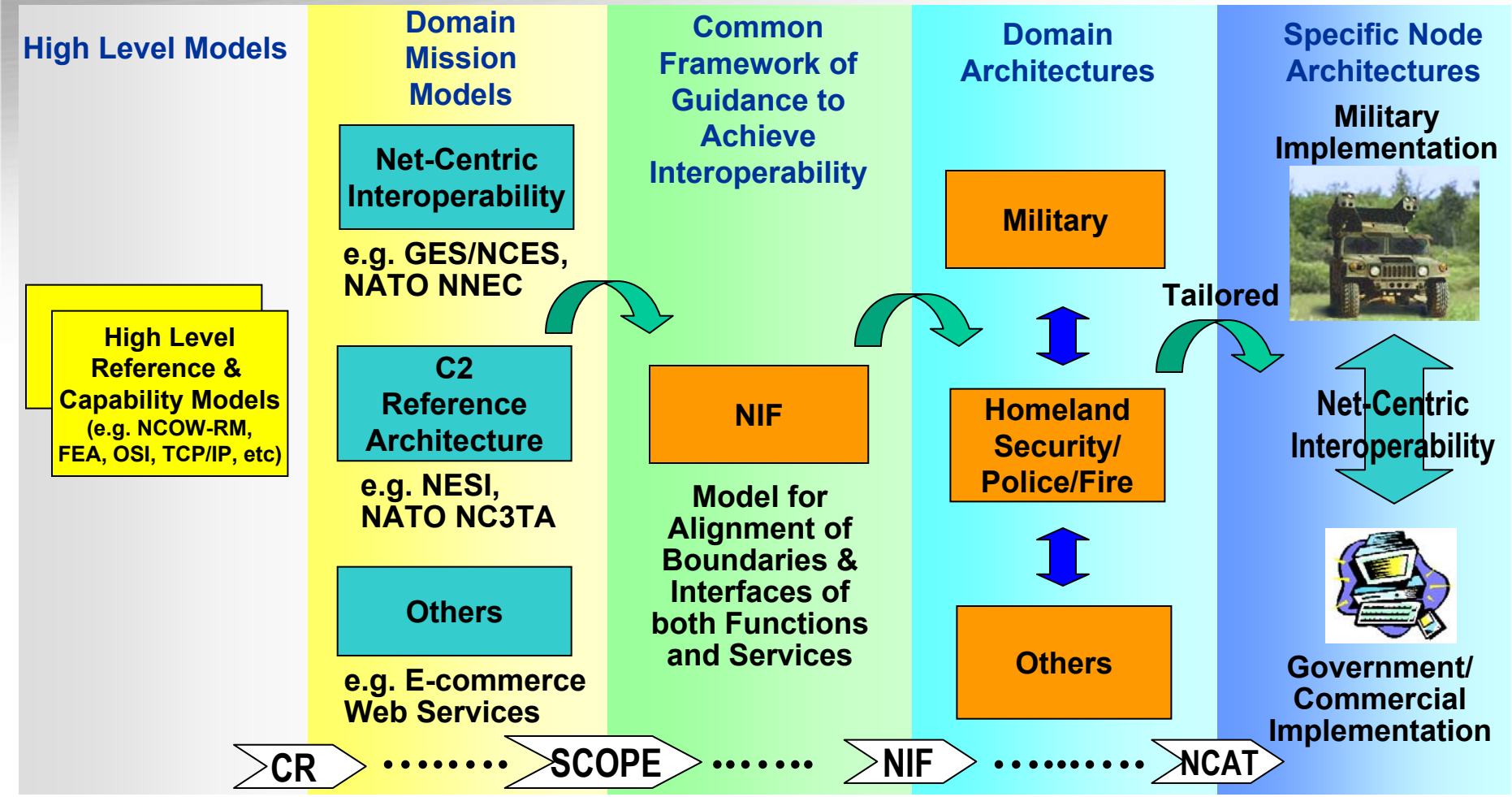
How Does NCOIC Help

- Provides a forum for
  - Understanding the diverse technical perspectives of Net Centricity
    - Ranging from Individual Systems to Global Systems of Systems
  - Exploring the technical consequences of the evolution to Enterprise orientation and Transformational change
    - Political, Social, and Business drivers of technology
- Establishes a cross-organizational institution for developing technical deliverables that help to:
  - Definitize the specific technical nature of interoperability needs for Legacy, Current, and Future System of Systems
  - Recommend solutions to those needs
  - Evaluate how well the resulting designs meet the user's interoperability needs

Interrelationship Between 3 Major NCOIC Technical Deliverables



The Role and Value of the NCOIC



NCOIC Technical Deliverables: Work Breakdown Structure (WBS)

DRAFT 2006-03-10

Building Codes

- NCO Interoperability Framework (NIF)
  - Operational Descriptions
  - Protocol Function Collectors (PFC)
  - Service-Based Model & Components
- Mobility
  - Mobile Network Objectives (MNO)
  - Mobile Network Evaluations (MNE)
- Information Assurance Framework
- Legacy System Integration
- System-Of-Systems Management (Enterprise Service Management)
- Modeling & Simulation Standards

Building Blocks

- CONOPS
- Use Cases
- Product Categorization
- Building Block Database
- Library of Shared M&S Objects

BLACK = In Progress
BLUE = Planned
GREEN = Future

Support Products

- Customer/Industry Initiative Database
- Customer Document Reviews
- Distance Learning Modules
- Lexicon
- Net-Centric Analysis Tool (NCAT)
  - Model Compliance Verification
- Systems Engineering Process Handbook
  - Work Product Management
  - Product/Process Assessment
- Modeling & Simulation
  - Lab Survey
  - Integrated Demonstrations
- Reverse BAA Support
- Interoperability Analyses
  - SCOPE Model & Ontology
  - Interoperability Root Causes & Ontology
  - Net-Centric Tenets & Ontology
- Compliance Evaluation of Products
- Culture Change/Transformation/Human Factors

Liaison

- Affiliates
- Executive/ Advisory Council
- Business Council
- Customer Outreach

Taskings

- Consulting Tasks
- Partnering Tasks
- "Killer Applications"
- etc.

Summary

NCOIC is Serving Government Users

- Addressing the Technical Aspects of Interoperability
  - SCOPE to definitize service and information representation across systems/organizations
    - Details of the technical nature of interoperability needs
  - NIF to align customer domain/COI architectures
    - Recommend solutions to interoperability needs
  - NCAT to measure the fit of systems to those architectures
  - And other Technical Deliverables to serve our Customers

Network Centric Operations
Industry Consortium

NCOIC's Technical Position and Vectors

March 14, 2006

Mike Curtis, Chair
NCOIC Technical Council

Where We Are

- NCAT Beta
  - Member Companies
  - Advisory Council Staff
  - EUCOM (CWID, Combined Endeavor)
  - NATO (CWID)
- NCOIC Interoperability Framework
  - Scope Model
  - Service Oriented Architecture
  - Protocol Functional Collections
  - Global Attributes
  - Incorporation of Broad Input

Where We Are

- Technical Working Groups
  - Mobility (MNO, MNE)
  - Information Assurance
  - Services and Information Interoperability
    - (Scope Model, Semantics and Ontology, Tooling)
  - Ground Stations
- Themes
  - Service Oriented Architecture
  - Validation (versus valuation, evaluation, certification ?)
    - PFC's, NCAT, MNE, NIF
  - The Essence of Net Centricity
    - The technical level where common standards and COTS apply
    - The real requirements (necessary for NCO)
  - Non-defense inputs

Where We Are

- Collaborations
  - DOD organizations -- FORCEnet, SPAWAR, Navy OA, AFRL
  - NATO (ACT, NC3A,CWID)
  - US COCOMs (EUCOM, JFCOM [NIPA] …)
  - US OSD (DISA, NII, OFT)
  - Other industry groups (AFEI [NCOIF], W2COG, OMG, TOG…)
  - Many dovetailed technology groups (OGC, AIAA …)
    - From software to satellites
    - and everything else that depends on information

Where We Are Going

- NCOIC is 1.5 years old
  - Technical work is just beginning.
  - 250+ attendees at the last plenary
  - 80 members
  - International recognition as THE forum for NCO
- NCOIC Fellows
- NATO alignment
- Affiliates Council
  - AFEI, W2COG, OMG, TOG, OGC, AIAA +++
  - Common ground to align and coordinate around NCO
  - NCOIC hosts, everyone benefits

Where We Are Going

- Case Studies
  - Sense and Respond Logistics (SRL)
    - NOT just weapon on target
    - End to End integration and flexibility
    - Much relevant commercial experience
  - Complex Humanitarian Disaster (CHD)
    - Cuts across many organizations and resources
    - A wide set of scenarios and focus areas
    - All about collaboration
    - Collaborating with many organizations
- Interoperability Demonstrations
  - NATO, DISA, NII, SDF, member companies

NCOIC Is THE Forum for NCO

Questions or Comments for the Panel?

Net Centric Operations Conference

Industry Panel

"The Premier Defense Association!"

Looking for Net-centricity?

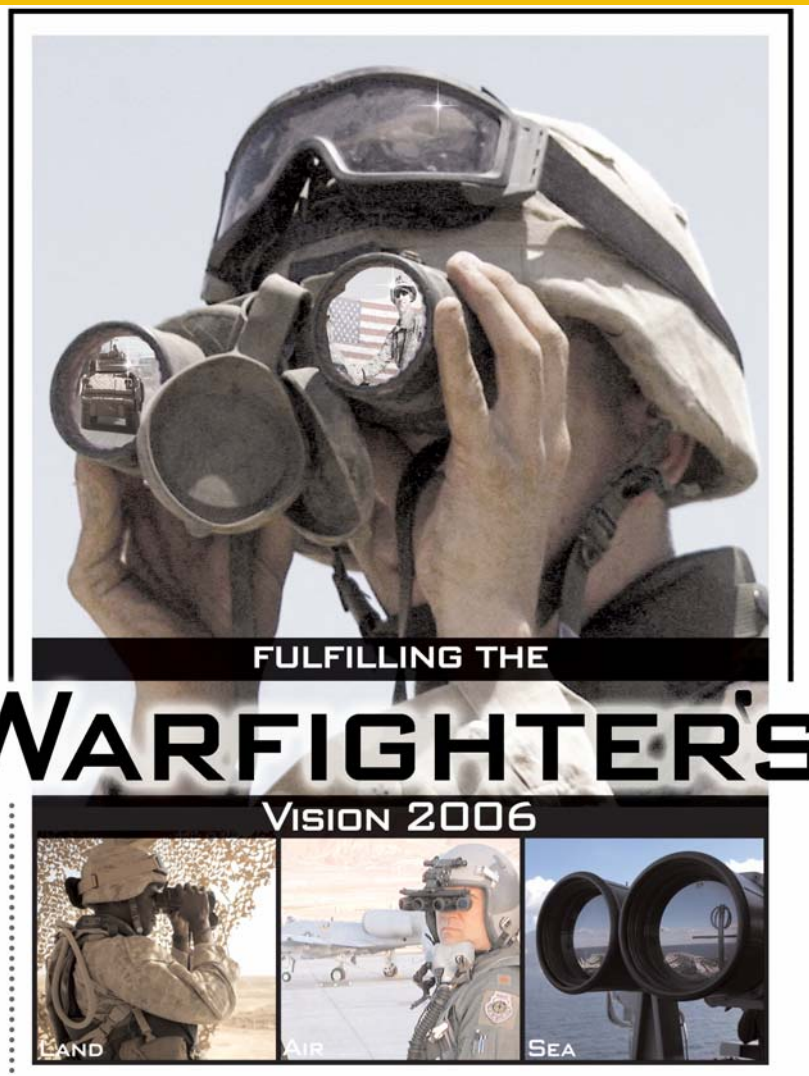
General John P. Abizaid
Commander, CENTCOM

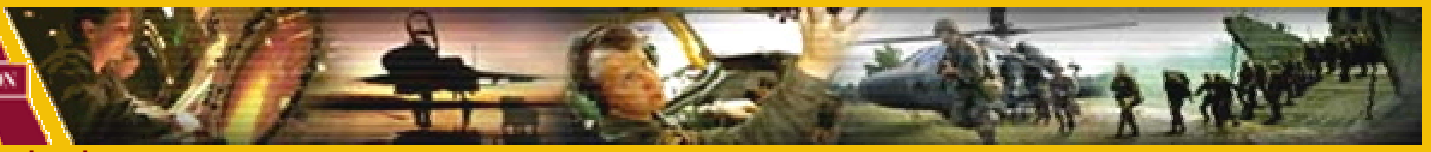
Are we delivering what **they** need, when **they** need it?

The value of net-centricity is in ***increasing operational capability***.

Net-centricity is attribute of how we work:

- people
- process
- technology





Collaboration is Now Essential

- ✓ New Mental Models
- ✓ New Business Models
  - ✧ "last supper" brought on the "great consolidation"
  - ✧ Net-centricity will engender the "age of connection"
  - ✧ Industry as EQUAL partner
- ✓ Net-centricity is now an attribute of operations
  - ✧ Information-centric

Industry Panel

- ✓ Kevin Reardon, Executive Director NCOIC
- ✓ Sheryl Sizelove, Boeing
- ✓ Hans Polzer, Lockheed Martin
- ✓ Mike Curtis, IBM

Break

- ✓ Greg Gardner, Oracle
- ✓ Kelly Brown, EM Solutions
- ✓ Darrel Lowry, Enterra Solutions

NCO Industry Forum

ISR Working Group

USD(I) DoD POC's: Kevin Meiners
COL Carpenter

NCOIF POC's: John Osterholz, BAE Systems
Kelly Brown, EMSolutions

NCO Industry Forum

NCO Industry Forum

- NCO Industry Forum
  - Jointly Chartered by DoD CIO and AFEI
    - Charter signed on Feb 17, 2005
      - Dr. Linton wells, DoD CIO
      - Hon Jacques Gansler, UMD
      - RADM Ray Witter USN (ret.), Northrop-Grumman
  - Participation open to all with legitimate interest
  - Governance by AFEI Members
    - Chairs of Working Groups
    - Board of Directors
  - Collaborate with DoD on NCO issues
  - Filter out business development

NET-CENTRIC OPERATIONS INDUSTRY FORUM

NCO Industry Forum Mission

- Support the migration to an open business model that supports full competition but enables horizontal integration of the resulting capabilities and systems, regardless of who developed or provides the systems.
- Review and comment on industry-wide frameworks which will support horizontal integration of platforms and systems.
- Provide an industry advisory service for the DoD CIO regarding the net centric strategies, programs, acquisitions, implementation, and sustainment.
- Provide industry-wide critiques and analysis in response to government stakeholders.
- Provide a forum for industry discussion and collaboration on evolving enterprise service models.

Net-Centric Operations

- NCO is massive, complex, and evolving
  - Industry feels the “Winds of Change” – direction?
  - Legacy “Stovepipe” system companies face uncertainties
  - Some companies are focusing on new opportunities
- “New” Balance needed among Commercial Industry, Defense, and IT providers
  - Identity Management
  - Service Oriented Architectures
  - Meta Data Modeling
  - Semantic Web
  - Information Sharing Paradigm

NCO Industry Forum
Working Group Focus Areas

OASD (NII)/DoD CIO and AFEI Charter 2/18/05

Net-Centric Operations Industry Forum (NCOIF)
Dr. Jacques S. Gansler, Chairman

Data Sharing & Service Strategy
(GIG ES IAC)
Mike Krieger

Enterprise Services
Data Strategy
SOA
Web Services

Information Assurance (IA) & Security
Bob Lentz & NSA

Assured Info Sharing
Network Defense
Identity Management
Network Availability

Wireless & Communications
Dr. Jost, OASD NII

Commercial Wireless
Policy
Mobile Networks

Architecture
George Wauer, OASD NII

NCOW Reference Model
"Right-sized" Architecture

Intelligence, Surveillance and Reconnaissance
Kevin Meiners, USD (I)

ISR SOA interoperability
Horizontal Integration
ISR COI Information Sharing

Commercial Acquisition Practices
Ray Boyd (ESI & e-Gov)

Commercial Practices
Business Models

April 5, 2005

NCO Industry Forum Working Group Leads

OASD (NII)/DoD CIO and AFEI Charter 2/18/05

Net-Centric Operations Industry Forum (NCOIF)

Working Groups Proposed by OSD And Accepted By AFEI

Data Sharing & Service Strategy
(GIG ES IAC)
Mike Krieger

Information Management Directorate
DoD POC: Jennifer Schultz OSD(NII)
NCOIF POCs: Greg Gardner, Oracle
Joan Baumstarck, EDS
Rob Fitzgerald, Northrop-Grumman

Information Assurance (IA) & Security
Bob Lentz & NSA

Information Assurance Directorate
DoD POC: Bob Lentz NII & M Redgrave
IC POC: tbd
NCOIF POC: James Eccleston, NCI;
Steve De Angelis, Enterra Solns

Wireless & Communications
Dr. Jost, OASD NII

Wireless & Comms Policy Directorate
DoD POC: Ron Jost
NCOIF POC: Pat Pollock, BAE
Systems; Jack Harris, Rockwell Collins

Architecture
NCOW RM
George Wauer, OASD NII

Arch & Interoperability Directorate
DoD POC: Jack Zavin
NCOIF POC: Sergio Nirenberg,
SAIC; Greg Wenzel, BAH

ISR
Kevin Miners, USD (I)

Undersecretary of Defense (I)
DoD POC: Kevin Meiners
COL Carpenter
NCOIF POC: John Osterholz,
BAE Systems; Kelly Brown,
EM Solutions

Working Group Ground Rules

- Non-proprietary
- Non-programmatic
- Policy Only
- Unclass or Secret only

Commercial Acquisition Practices
Ray Boyd (ESI & e-Gov)

Commercial Policies & Oversight Directorate
DoD POC: Ray Boyd
NCOIF POC: Dave McQueeney, IBM;
Tom Mayhew, Oracle

All Associations and Societies Must Address NCO

- Encourage Proactive Collaboration and Convergence of Association Programs
- Employ Combined Leverage to Accelerate NCO
- NCO Paradigm Demands a Cardinal Rule:
  - "No Stovepipes, No Vacuums, No Rice Bowls!"
- Learn From and Inform Each Other
- Help Industry Understand When to Collaborate and When to Compete
- Present Collaborative Picture to DoD

ISR Community of Interest (COI)

ISR COI Members

- Kevin Meiners - USD(I)
- MajGen Simpson - JFCOM J8
- BGen(S) Warner - JFCOM J6
- BGen Dettmer - JCS J2
- Steve Selwyn IC CIO
- Mike Pflueger - DIA CIO
- Kelly Miller - NSA/UCAO
- Mike Krieger - DOD CIO
- Mr. Decker - USMC-I
- RDML Murrett - Navy N2
- Lynn Schnurr- Army G2
- RDML Hight - Navy N71
- Mr. Dumm - AF XOII
- Ms. Snow - NGA
- CAPT Burkey - STRATCOM
- Larry Burgess - NRO
- Mr. Osterholz - NCOIF

Portfolio Management

- DoD Directive 8115.01, IT
- Portfolio Mgmt, Signed Oct 10, 2005
- IT investments shall be managed as portfolios
- Four Mission Areas
  - Warfighting
  - Business
  - DoD Portion of Intelligence
  - Enterprise Info Environment
- Domains will be Designated within Mission Areas

DODD 8320.2 - Data Sharing in a Net-Centric DOD

- Section 5.5 USD(I) Shall:
  - 5.5.1 Collaborate with ASD(NII/DoD CIO, USD(P), and the IC CIO in developing policies and procedures to protect net-Centric data while enabling data sharing across different security classifications and between DoD, the IC, and multinational partners…
  - 5.5.2 …. Provide net-Centric data sharing and effectively enable COIs, including adjudicating conflicts in metadata agreements and identifying authoritative sources

What are ISR COI Interests?

- The ability to discover data across the enterprise
  - [Visible]
- The ability to access the data
  - [Accessible]
- The ability to use/exchange the information
  - [Understandable]

ISR COI Working Groups

- Operating Concepts
- Data Strategy
- Enterprise Services
- ISR to Warfighter Utilization
- The 5th Working Group – “Industry Forum”

ISR COI Tasks

- How will the ISR enterprise be employed by Commanders, Decision Makers, Analysts?
- How do producers structure data they will post on the enterprise?
- How do users discover/access data posted on the enterprise?

NCO Industry Forum

ISR Working Group Update

ISR WG Status

- Held Initial ISR WG Meeting
  - 21 October 2005
  - AFEI Headquarters
- Agenda
  - Welcome – Dave Cheseborough / AFEI
  - Setting The Stage - Kevin Meiners / OUSD(I)
  - The Problem Set - John Osterholz / AFEI – ISR WG Industry Chair
  - Review of ISR WG Scope of Work - All
  - Going Forward/Actions - Kelly Brown

Sponsors' Key Needs

10 Jun 2005

MEMORANDUM FOR DISTRIBUTION

Subject: Intelligence Surveillance Reconnaissance (ISR) Community of Interest (COI) 20 May 2005 Meeting Minutes

1. The first meeting of the ISR COI Executive Board was held on May 20, 2005. The purpose of this meeting was to establish and organize an ISR COI. The meeting began with a solicitation of comments from the members and their expectations for the COI. The ISR COI will be based on/follow the tenets of the DoD Net-centric Data Strategy:

a. The ability to discover data across the enterprise;

b. The ability to access the data;

c. The ability to use or exchange data or information.

2. We appreciate the excellent attendance at the executive level from the Services, Agencies, Department of Defense, Department of Naval Intelligence, Defense Intelligence Agency, and National Security Agency Chief Information Offices. The attendance roster is provided as the attachment.

3. The ISR COI plans to meet quarterly. This COI will consist of four working groups: Operating Concepts, (U.S. Joint Forces Command (USJFCOM)/U.S. Strategic Command (USSTRATCOM); Data Strategy (Under Secretary of Defense for Intelligence (USD(I)); Enterprise Services (Assistant Secretary of Defense for Network, Interoperability and Integration (ASD (NII)) and ISR Production and Warfighter Utilization (USJFCOM/USSTRATCOM).

4. The next meeting will be held on September 1, 2005 at 1851 South Bell Street, Crystal City, VA in OUSD(I) conference room 7009. In preparation for the meeting, the working group leaders will organize their working groups, call meetings, and draft their Plan of Action and Milestones (POA&M). These POA&Ms will be briefed to the co-leads by the end of June 2005.

CHARLES N. SIMPSON
Major General, U.S. Air Force
Director, Requirements and Integration
U.S. Joint Forces Command (J8)

KEVIN P. MEINERS
Director, Intelligence Strategies, Assessments and Technology
Office of Under Secretary of Defense for Intelligence

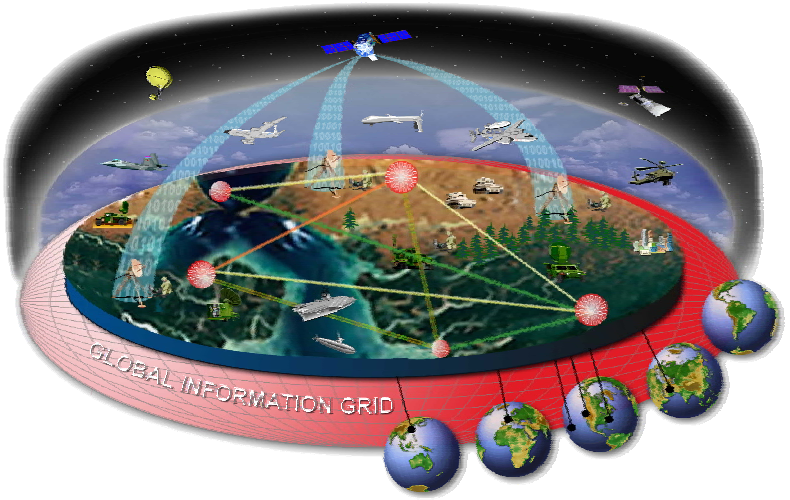
Attachment:
Attendance List, Executive Board Meeting of May 20, 2005

Distribution:
ISR COI Executive Board Members

NCOIF/ISR WG Chair is the Industry Representative

"TO BE"

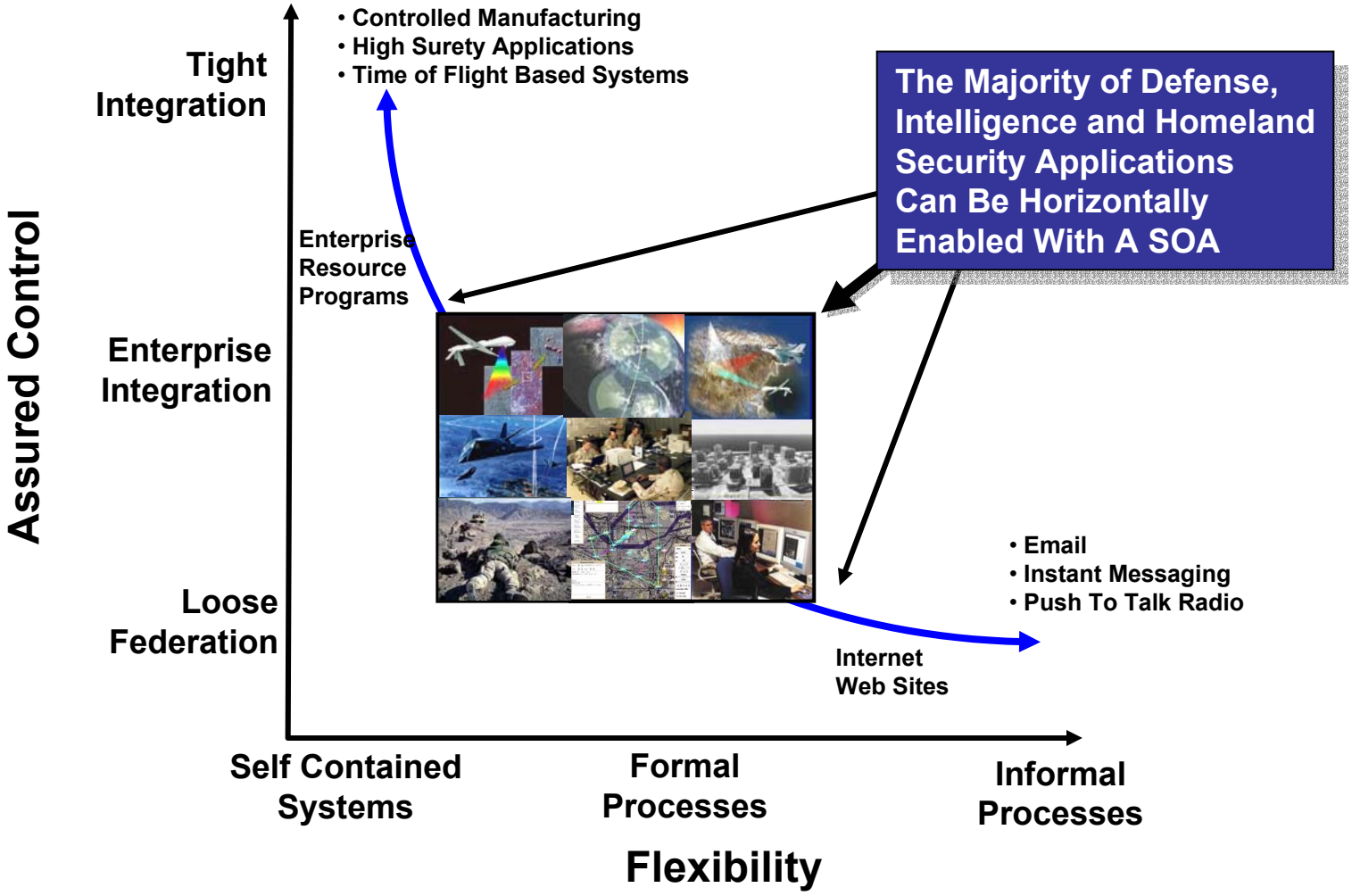
"Net-Centric"
Common
Ground
Systems



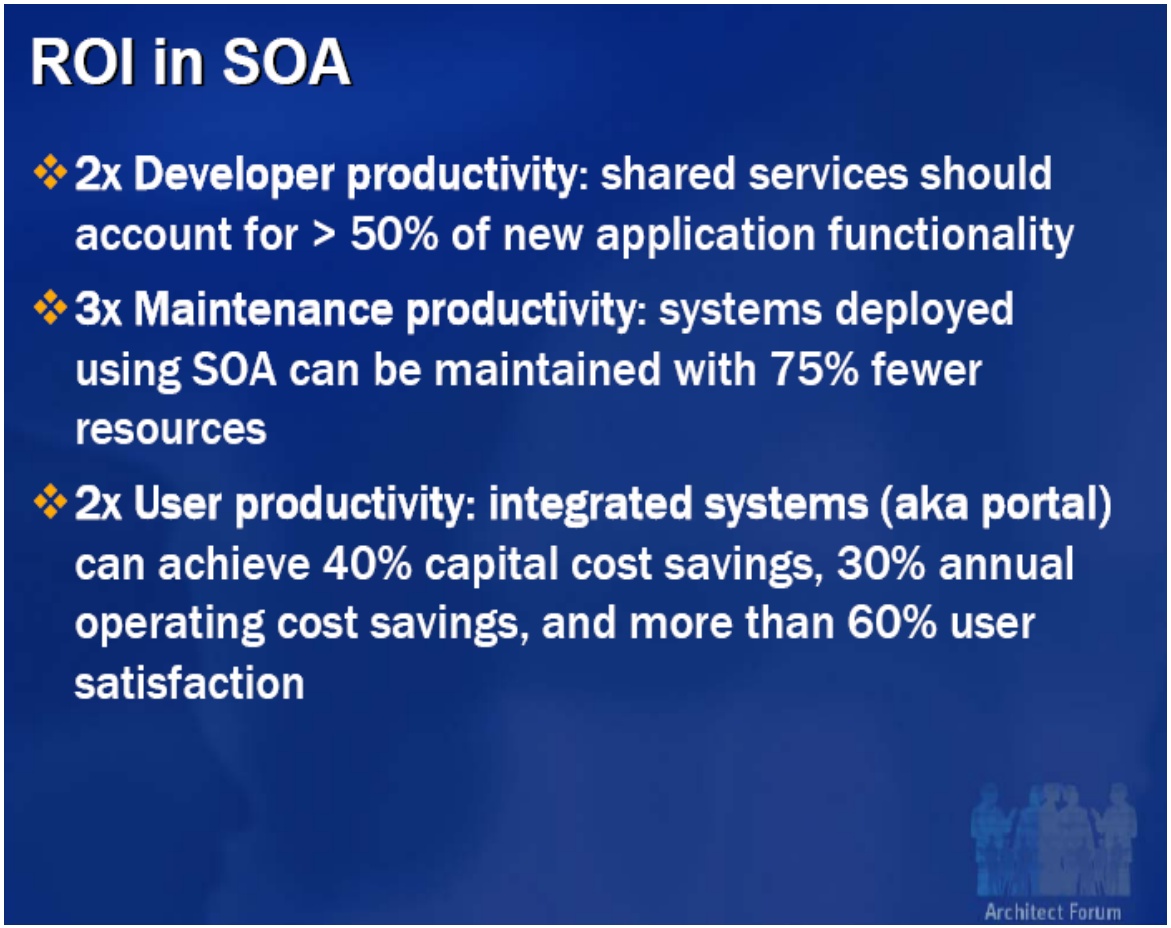
2008 - 2015

The Role Of Service Oriented Architecture

The Service Oriented Architecture's Promise For DoD



Total Cost Of Ownership Success Stories - Seductive Incentive

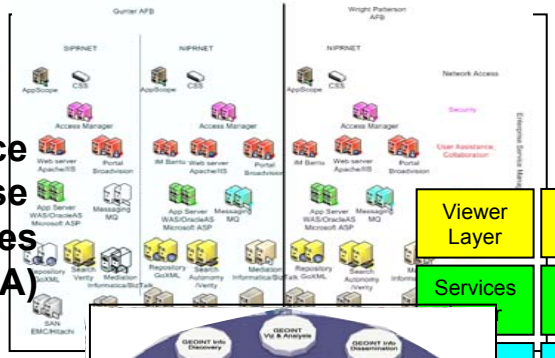


National Data Bank

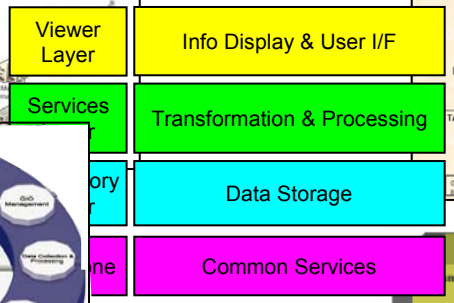
SOA Case Study:
National Data Bank
Smith Suksmith
smith.sucksmith@fns.usda.gov

Service Oriented Architectures – Everybody's Building (At Least) One!

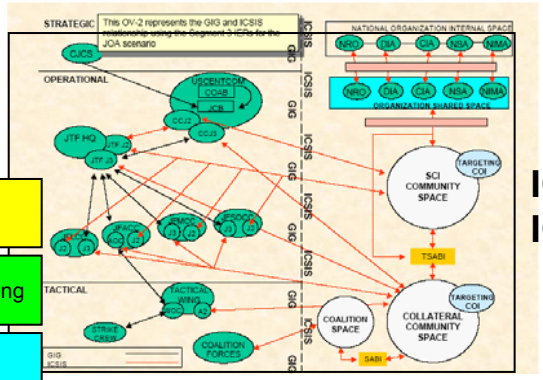
Air Force Enterprise Services (C2ERA)



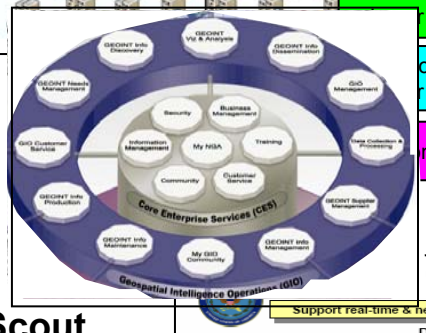
DCGS - DIB



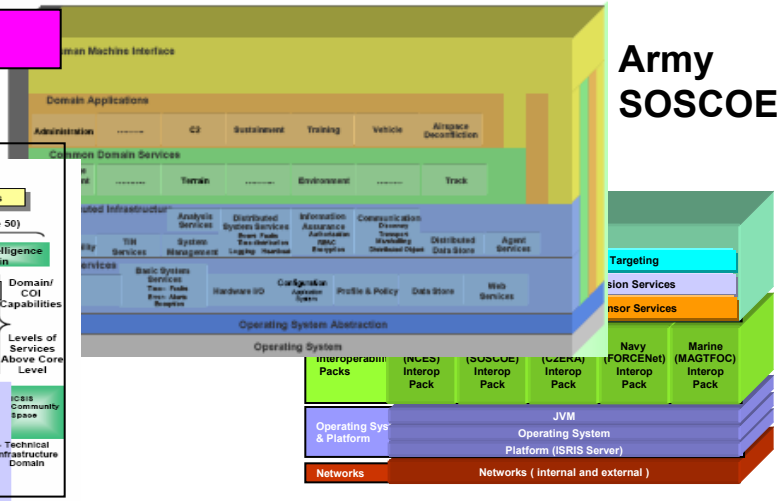
IC CIO/CIISO ICSIS



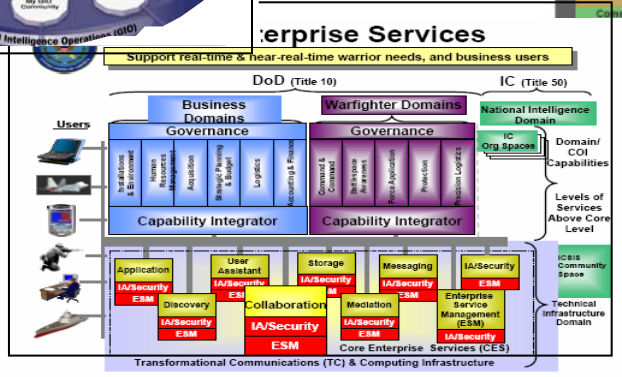
NGA GeoScout



Army SOSCOE



DISA NCES

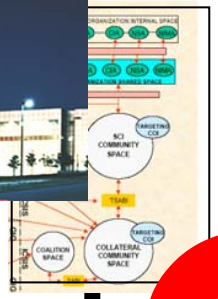


…. and more each day

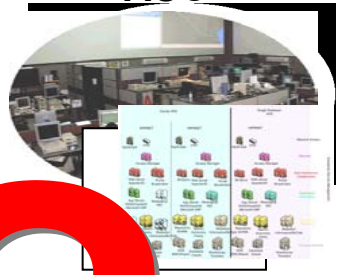
Operational Consequences Of Proliferation Can Be Severe

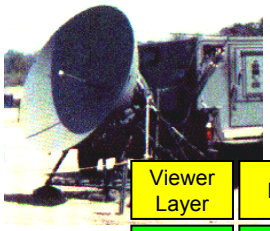
Collateral Information Space

Reachback Analysis Support



AOC

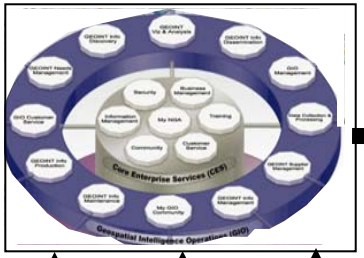




DCGS

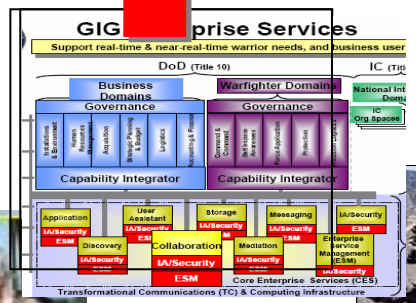
Viewer Layer	Info Display & User I/F
Services Layer	Transformation & Processing
Repository Layer	Data Storage
Backbone	Common Services

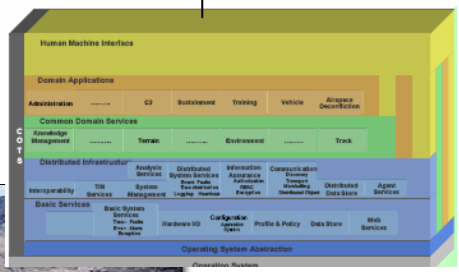
Federated Access Services

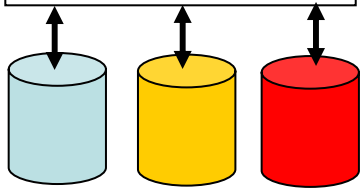


Cross-Domain In ation Sharing via SIPRNet

?







Geospatial Data Holdings

Mission: Direct Action Against A Fleeting And Deceptive Adversary

Task Force Commander

Special Mission Unit

Lack Of SOA Interoperability Will Severely Impact Cross Domain Information Sharing

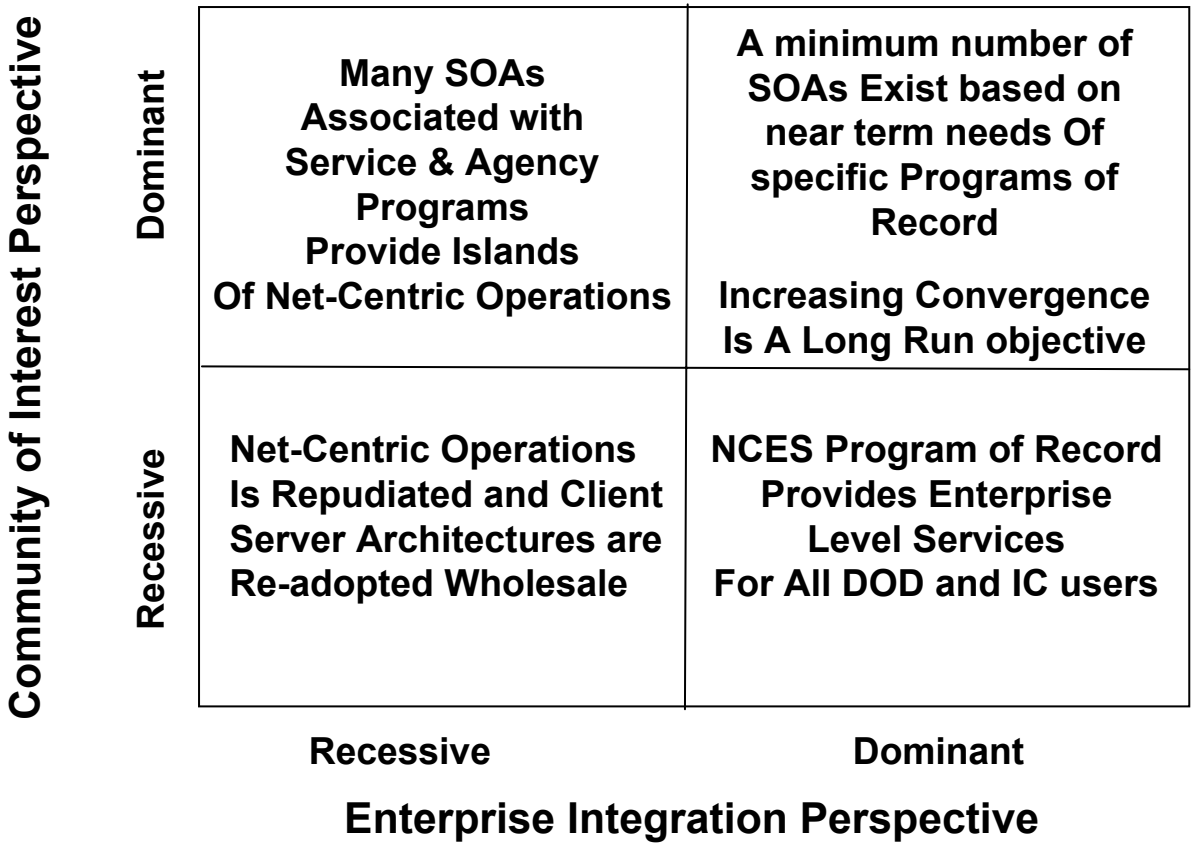
Interoperability Problems With …	Will Lead To …
• **Service Registries**	**Inability to dynamically register "new" services in the UDDI registry**
• **Orchestration Engines**	**Inability to correctly workflow services together**
• **Mediation Engines**	**Inability to correctly transform / translate various data types**
• **Discovery Engines**	**Disparate content discovery by members of a cross COI collaborative group**
• **Security**	**Disparate identity management services based on different certificate routes**

There Are A Range Of Solutions Available

- Architecture Solutions
- Data Solutions
- System API Solutions
- Policy Solutions

Successful solution will require governance of alternative futures

Alternative Futures -
For Service Oriented Architecture Implementation



Alternative Futures -
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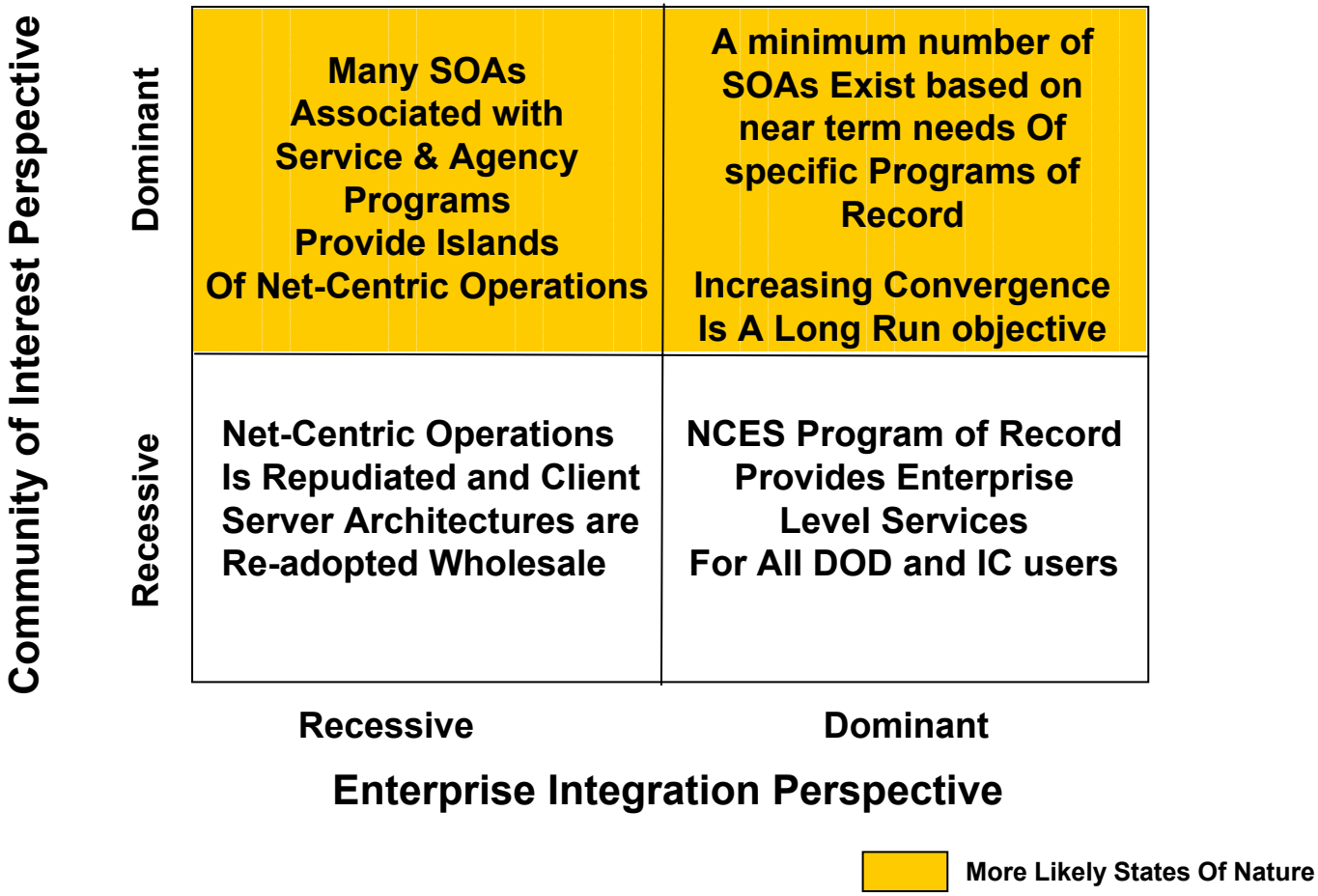
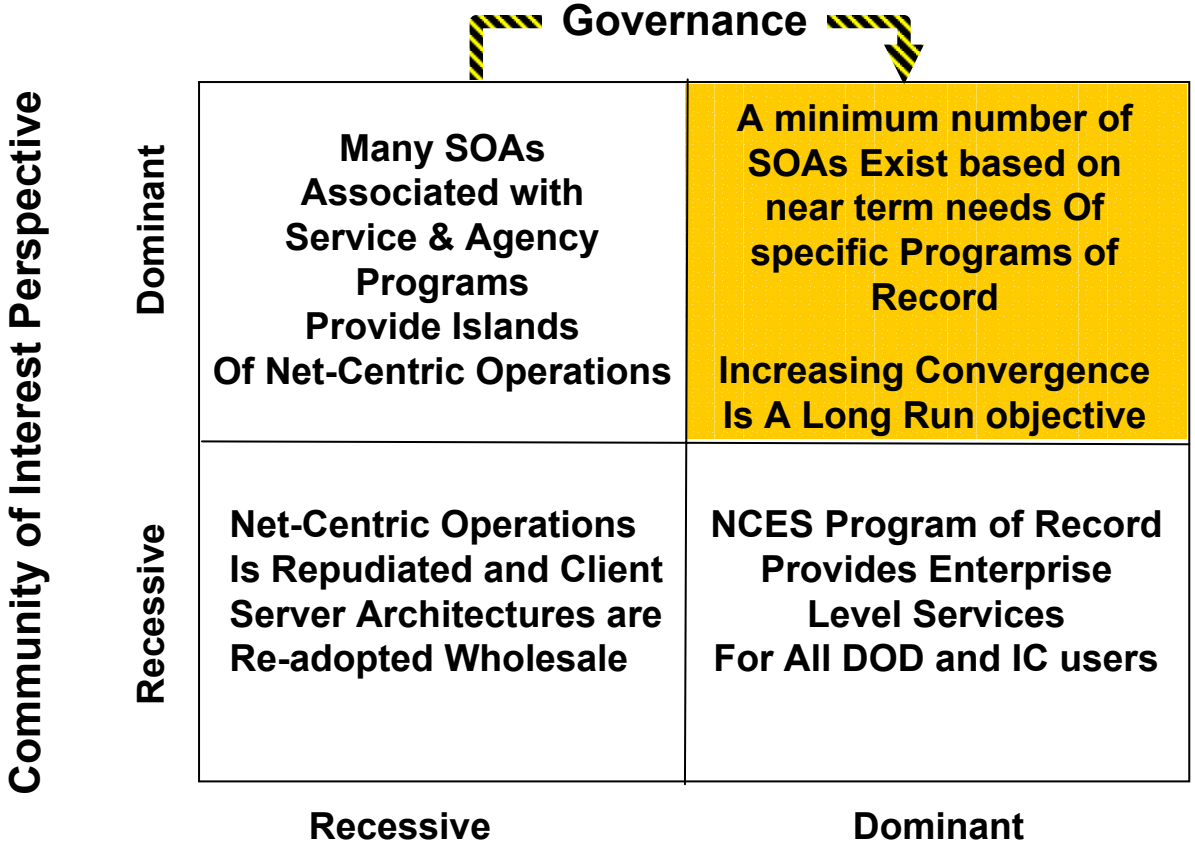


Alternative Futures - The Potential For Convergence



Governance: Sharing of services is central to the SOA approach. The ability to rapidly assemble applications or orchestrate processes is based upon the ready availability of some services that can be shared. Sharing of resources, by definition requires governance.

SOA Interoperability Will Be A Metric Of Governance

ISR Working Group Topics

- Cross - SOA Interoperability (what is it, how can it be achieved, how do we know we have it).
- Standards that support improved Horizontal Integration and assured information sharing.
- How to gain advantageous use of industry SOA solutions and best practices without impressing an unenforceable and unaffordable policy environment on existing programs.

ISR Working Group Topics

- Advancing industry's understanding of the specific information sharing requirements inherent within the ISR COI and among operationally related COIs.
- Life cycle support of net-centric capabilities – What is the business model?
- Starting with the current version of the DCGS Integration Backbone (DIB), how do we move forward into NCES?

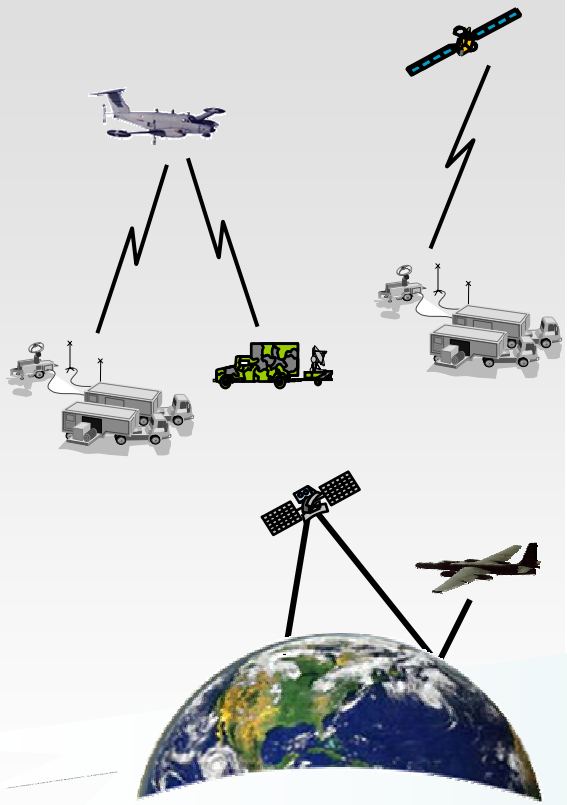
Thank you

Backup

DCGS & The "DIB"

"AS IS"

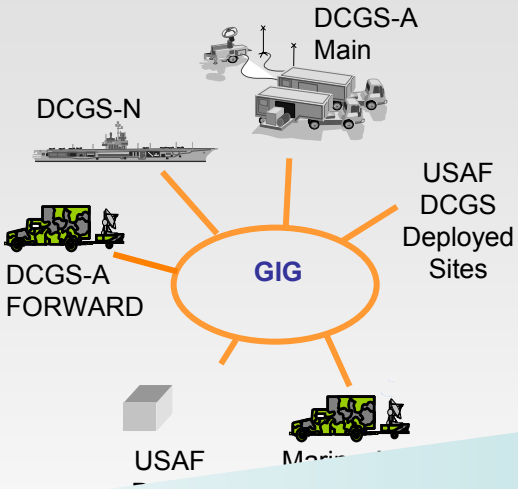
DCGS History



1990's- 2003

Transition

Distributed Common Ground/Surface Systems



2005

"TO BE"

"Net-Centric" Common Ground Systems

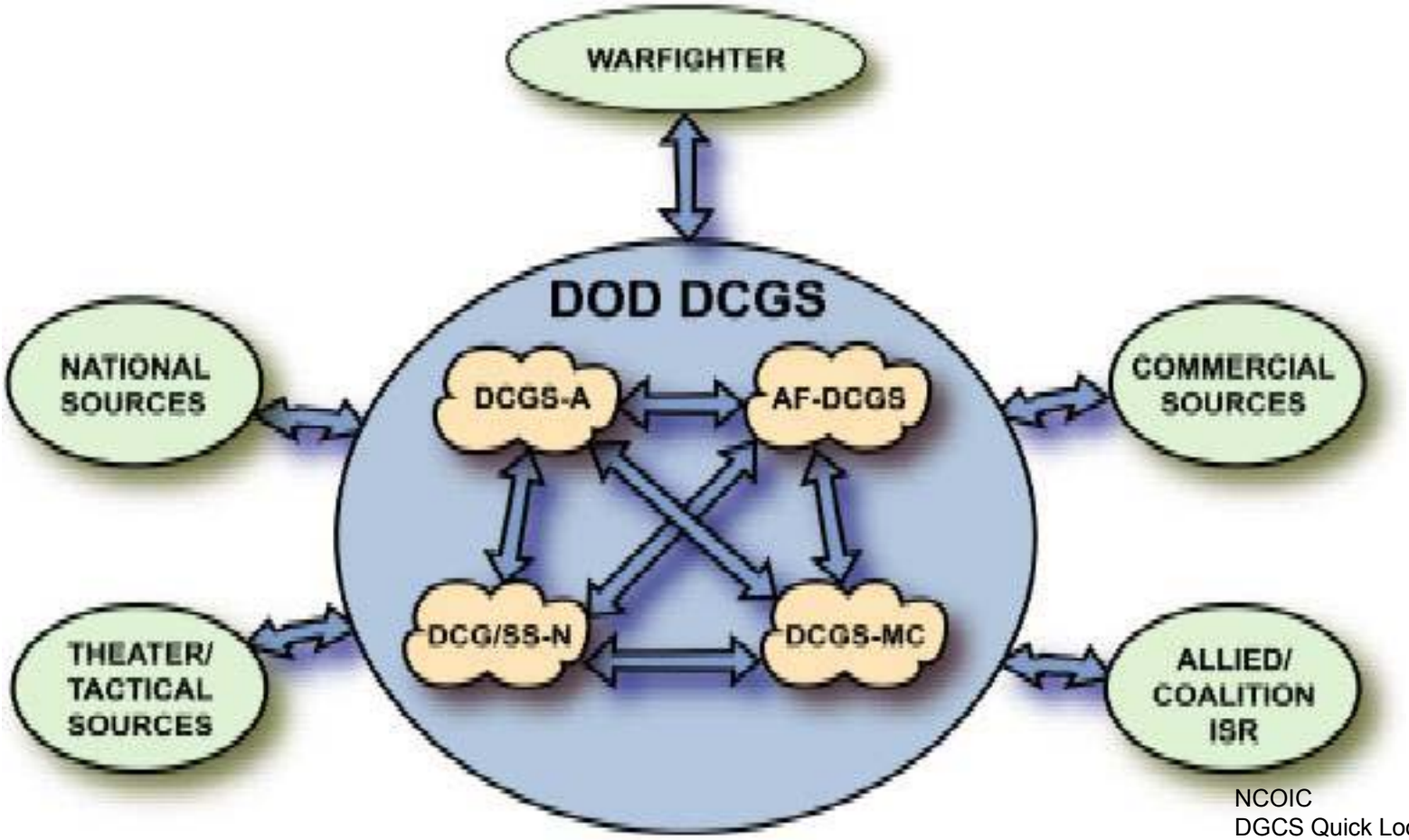
- **DIB**
- **DCGS-N**
- **DCGS-AF Blk 20**

2008 - 2015

DCGS Roadmap

DCGS elements are integrated differently within each service; The DIB currently represents the major ISR integrating mechanism for supporting Joint interoperability

DCGS & The "DIB"

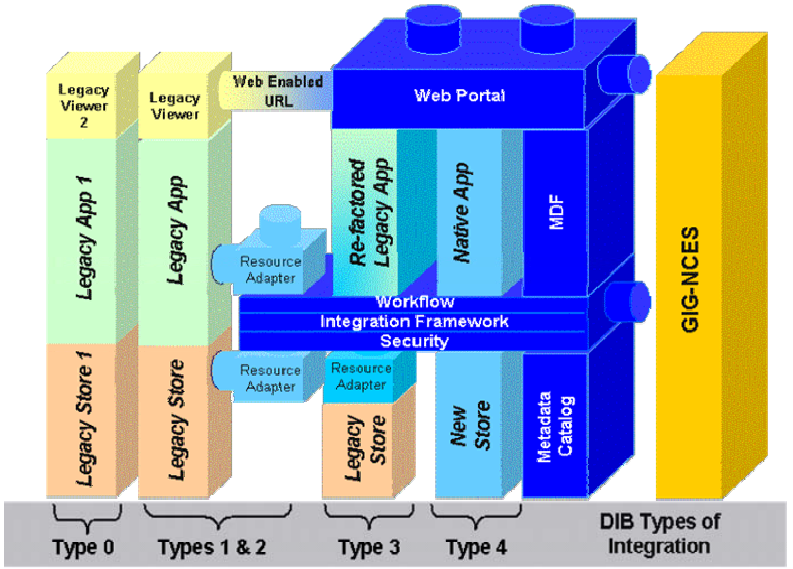


NCOIC
DGCS Quick Look
March 2005

DIB Specifics

The initial version of the DIB has been delivered.

Viewer Layer	Info Display & User I/F
Services Layer	Transformation & Processing
Repository Layer	Data Storage
Backbone	Common Services



NCOIC
DGCS Quick Look
March 2005

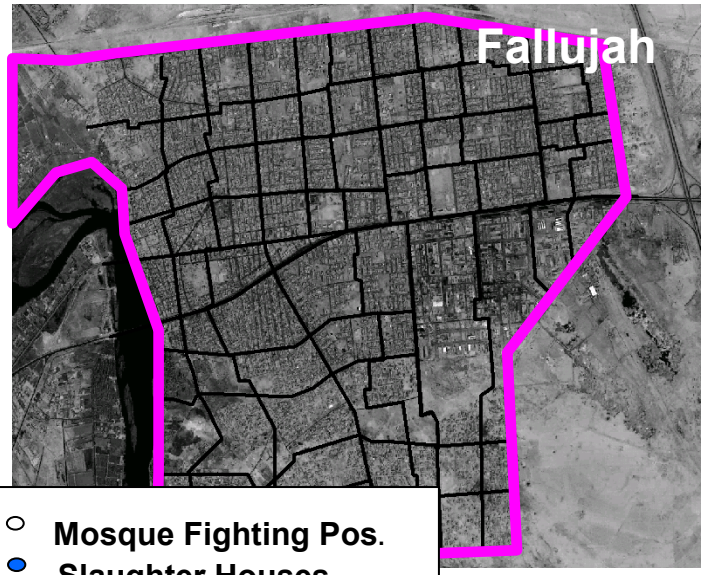
What services are missing?

What technical issues have come from integrating the DIB?

Is the DIB “sufficiently open?”

The Real World – Demanding Immediate Changes In How ISR Operations Are Conducted

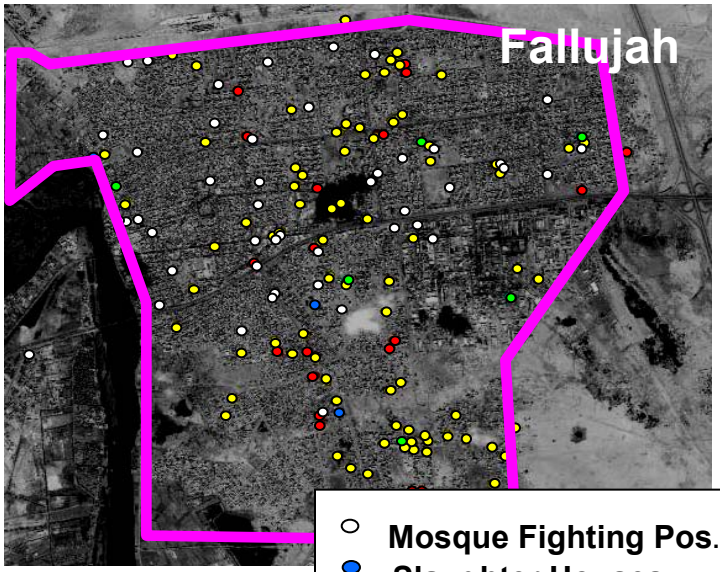
1 September 2004



- Mosque Fighting Pos.
- Slaughter Houses
- Weapons Caches
- Sniper Locations
- IED Factories

?

20 November 2004



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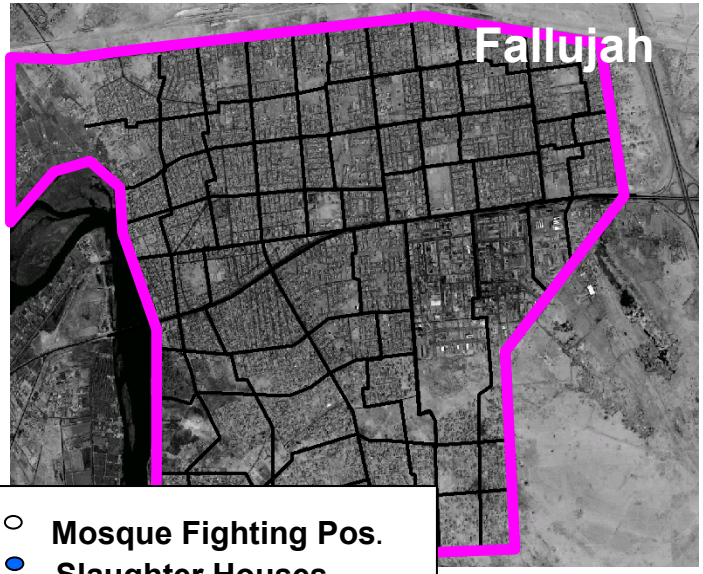

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- 50 Days
- 275 Wounded
- 38 Killed

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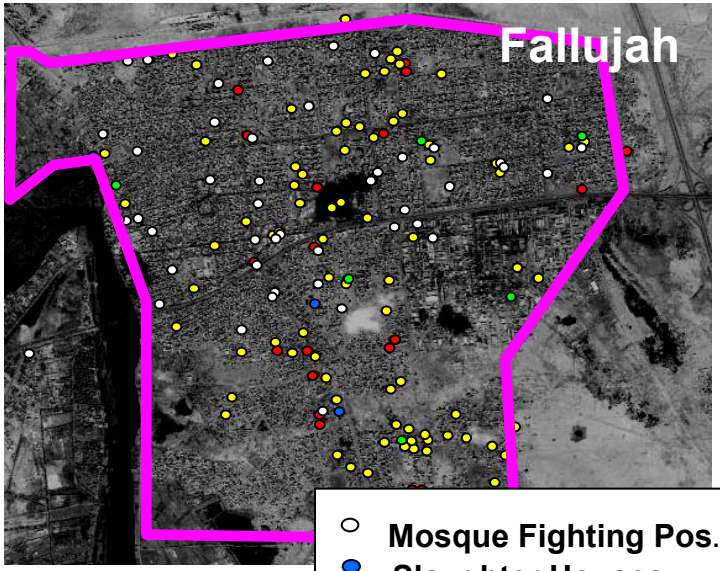

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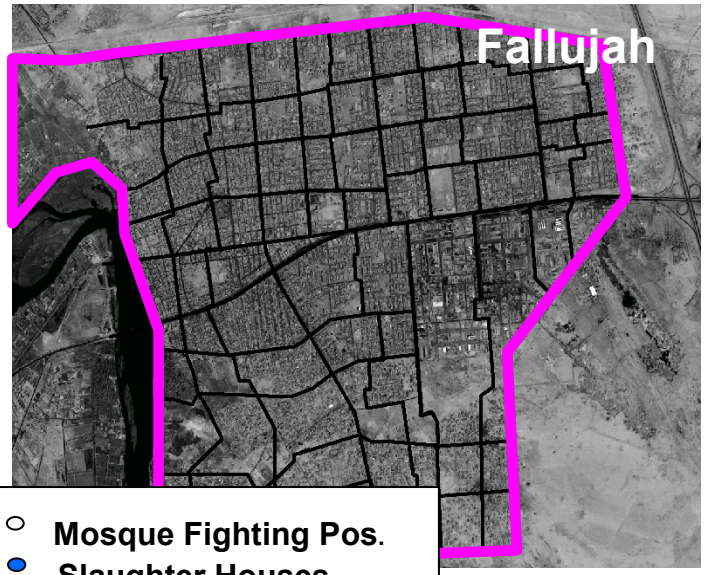

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Lack of
- Persistent Sensors
- ISR Management。
- Decision Support
- RBG Visualization

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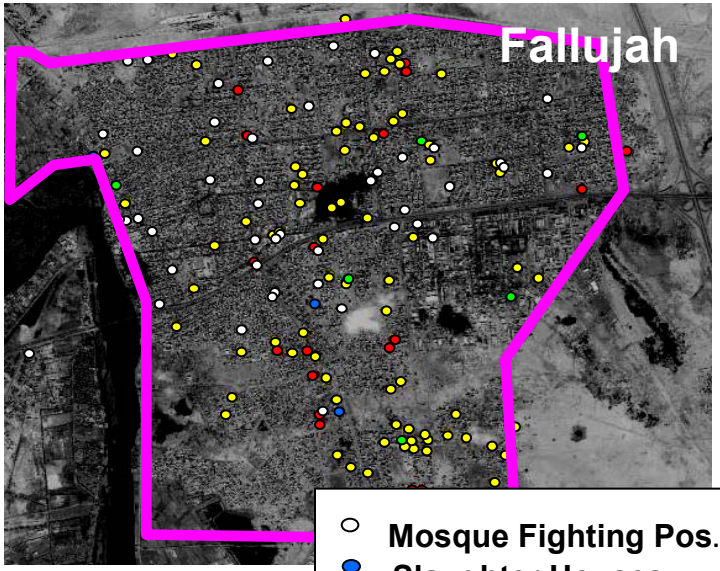

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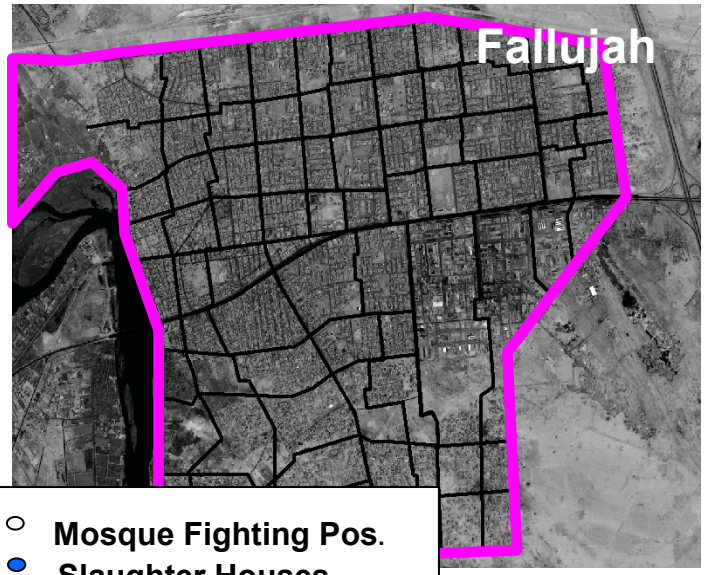

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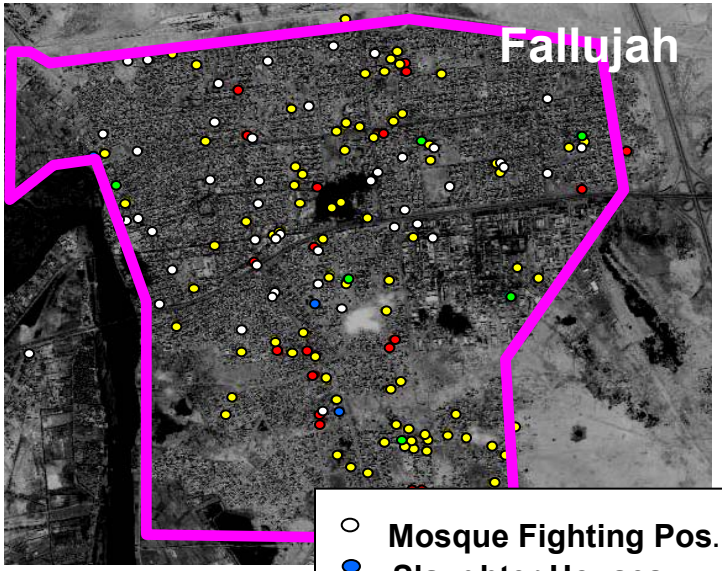

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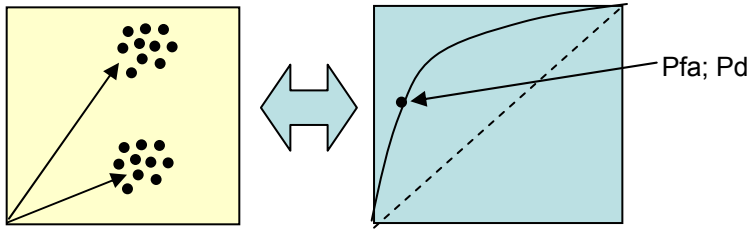
Non Traditional ISR

"Instead of sticking it out and supporting the Marines [and] soldiers in the day with the best **ISR** [intelligence, surveillance and reconnaissance] and air strike platform, they leave the area," said one Army officer. "As a result, our troops fighting in very complex and difficult terrain are left to less efficient and less agile air platforms."

A New Intelligence Paradigm Drives Horizontal Integration

Underlying Basis	Paradigm	Approach
THEN **Target as Order** (Hierarchy; *complicated* yet predictable behavior)	Observation Space / Performance Space  Attributes — ROC – Detection of the known	•***"Detect the entities – Infer relationships"*** •***Detect*** •***Classify*** •***Estimate***

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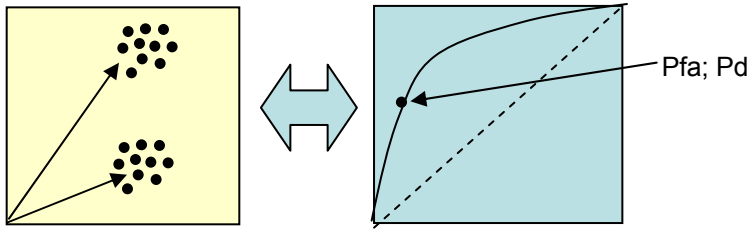
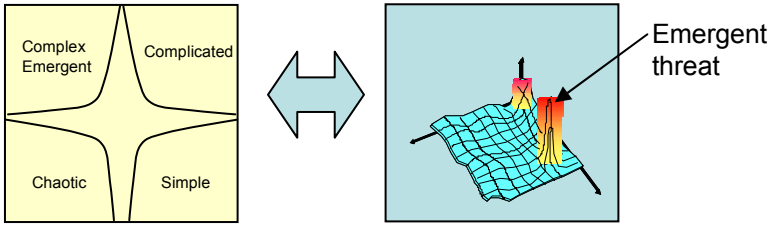
THEN **Target as Order** (Hierarchy; *complicated* yet predictable behavior)	Observation Space → Performance Space  Attributes — ROC – Detection of the known	•***"Detect the entities – Infer relationships"*** •***Detect*** •***Classify*** •***Estimate***
NOW **Target as Disorder** (Network; irreducible, *complex* emergent behavior)	Observation Space → Performance Space  Behaviors — Simulation – Anticipation of the unknown	•***"Detect the relationships – infer the entities"*** •***Model*** •***Simulate*** •***Explore***

"There is a tendency in our planning to confuse the unfamiliar with the improbable…The danger is not that we shall read the signals and indicators with too little skill; the danger is in a poverty of expectations -- a routine obsession with a few dangers that may be familiar rather than likely." *--Thomas Schelling, Forward to: Pearl Harbor: Decision and Warning (1962)*

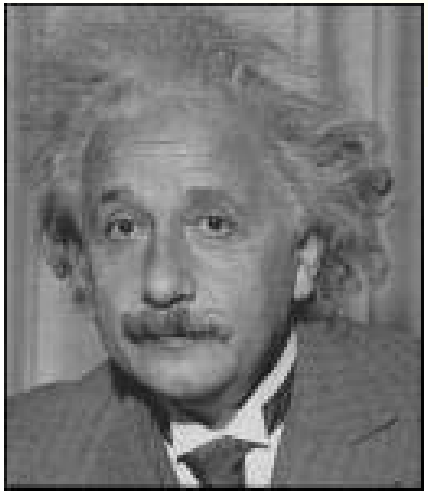
Government Executive Panel
NDIA Net-Centric Operations Conference
March 13-16, 2006

Transforming the Way the DoD Manages Data

An Army Officer recently observed,

"The Global Information Grid (GIG) exists to connect people with information"

Mike Krieger
Director, Information Management
OASD(NII)/DoD CIO
michael.krieger@osd.mil
March 14, 2006



We can't solve problems by using the same kind of thinking we used when we created them.

Albert Einstein

National Defense Strategy

- March 2005, National Defense Strategy:
  - Identifies a critical needed capability to "conduct network-centric operations."
  - Explicitly recognizes the need for fundamental change processes, policy, and culture.

Barriers to Identifying, Accessing and Understanding Data

Defining The Data Problem

End-User Consumer

"What data exists?"
"How do I access the data?"
"How do I know this data is what I need?"
"How can I tell someone what data I need?"

End-User Producer

"How do I share my data with others?"
"How do I describe my data so others can understand it?"

BARRIER BARRIER **BARRIER** BARRIER

User needs it but is **unaware** this data exists

Organization "A"

User knows this data exists but **cannot access it** because of organizational and/or technical barriers

Organization "B"

User knows data exists and can access it but may not know how to make use of it due to **lack of under-standing** of what data represents

Organization "C"

Data Strategy Approach:
Discovery Metadata

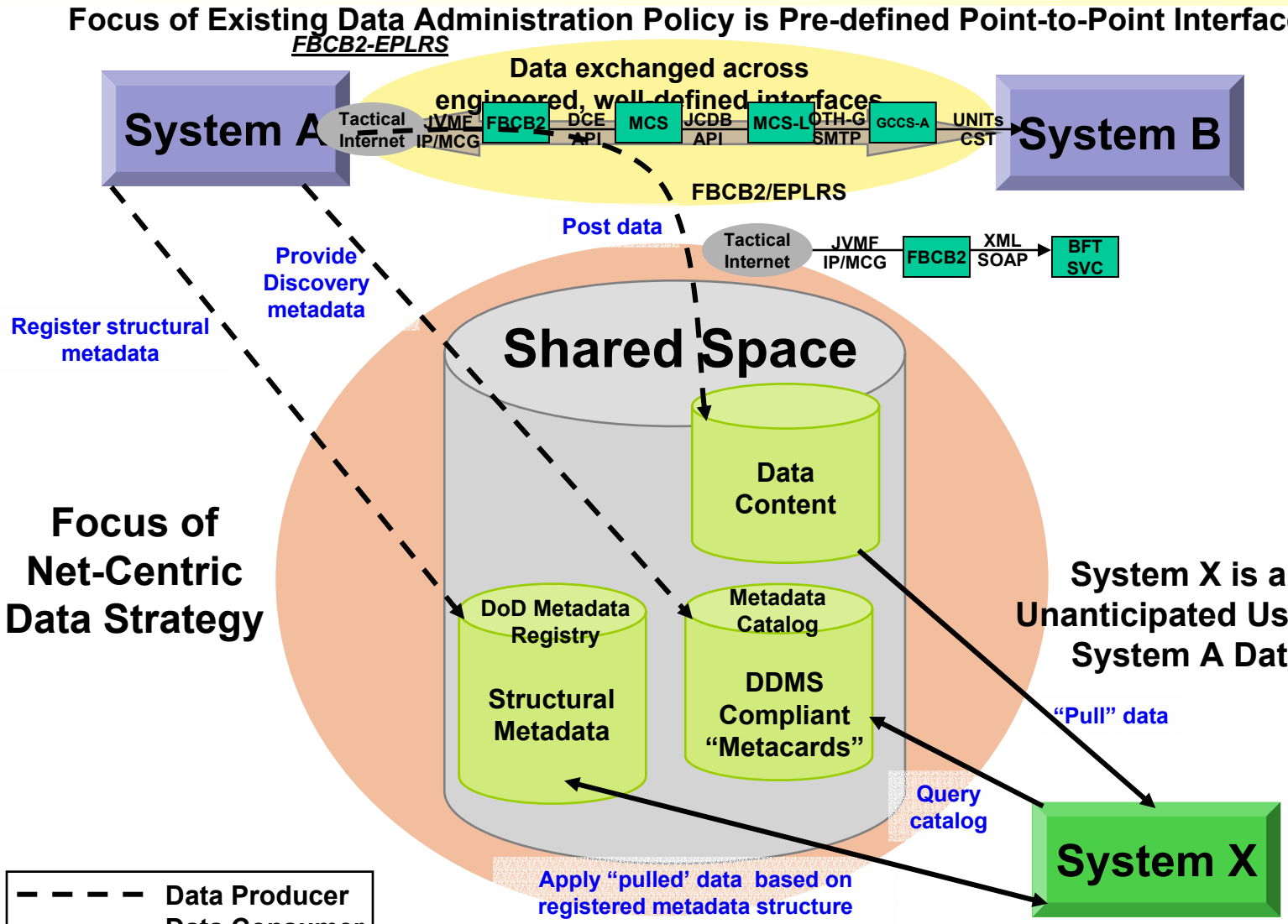
Data Strategy Approach:
Web Enabling, Web-service Enabling

Data Strategy Approach:
COIs, Metadata Registry

Data Sharing in a Net-Centric DoD

- DoDD 8320.2 (signed Dec 2, 2004) directs implementation of the Net-Centric Data Strategy
- The Net-Centric Data Strategy (signed May 9, 2003) is a key enabler of the Department's transformation
- The Strategy provides the foundation for managing the Department's data in a net-centric environment, including:
  - ✓ Ensuring data are **visible, accessible,** and **understandable** when needed and where needed to accelerate decision making
  - ✓ "**Tagging**" of all data (intelligence, non-intelligence, raw, and processed) with **metadata to enable discovery** by known and **unanticipated** users in the Enterprise
  - ✓ **Posting** of all data to **shared spaces for users to access** except when limited by security, policy, or regulations
  - ✓ Organizing around **Communities of Interest** (COIs) that are supported by Warfighting, Business, Enterprise Information Environment, and Intelligence Mission Areas and their respective Domains.

Net-Centric Data Strategy Enables Unanticipated Users



What is a COI?

- COIs are described in the DoD Net-Centric Data Strategy
- A COI is …
  - a *Community*
  - *Of* people
  - who are all *Interested* in something
  - and need to share information
- What does a COI do?
  - *Work together to resolve the issues that affect their community*
  - *Establish community standards on how information will be exchanged within the COI*
- What can't a COI do?
  - *COIs do not operate systems or provide services*
  - *COIs do not submit POMs*
  - *COIs do not direct changes to ICDs, ORDs, CDDs, or CPDs*

However, *members* of COIs ***do!***

SAMPLE

Community of Interest (COI) Steering Committee Template

Date:

POC:

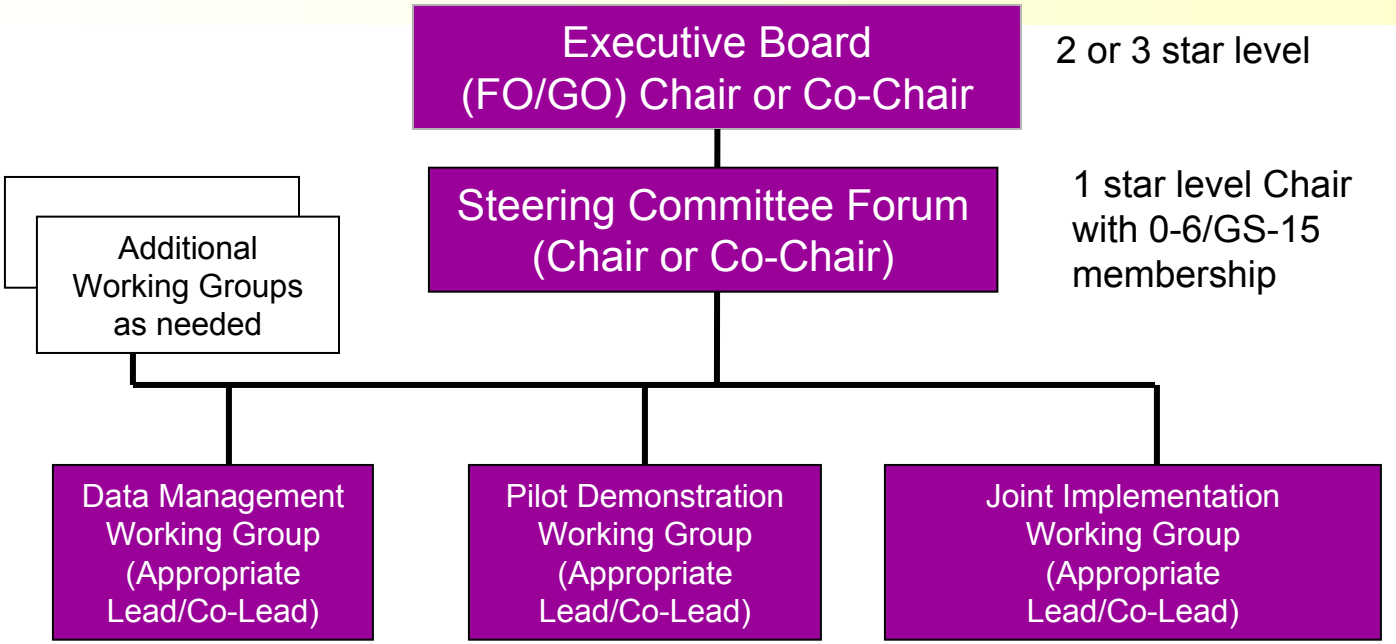
Purpose of the COI

- **One sentence that describes the information sharing problem this community is tackling.**

Definition of a COI from DOD Directive 8320.2 –

Community of Interest (COI). A collaborative group of users that must exchange information in pursuit of its shared goals, interests, missions, or business processes and therefore must have shared vocabulary for the information it exchanges.

Sample COI Organization Chart



- Develop shared vocabulary for a given problem area in accordance with DoD Net-Centric Data Strategy

- Develop repeatable process/capability to demonstrate COI products, e.g data vocabulary, DoD Enterprise service, etc
  - Leverage NCES services
  - Execute as risk reduction for next POR spiral development

- Define/implement high level COI Capability Roadmap (prioritize data & services to be made available, id program of record (POR), fund spiral if needed, stand up Pilot WG as needed)
- Synchronize COI products with JCIDS, Acquisition, PPBE and Mission Areas, (e.g. Business, Warfighting, Intel and EIE)

FOR DISCUSSION PURPOSES ONLY

Pilot Purpose

Purpose: One sentence that describes the net-centric capabilities the COI pilot will demonstrate, and designates the lead component for the pilot.

Pilot Scope

Scope:

(1) What programs of records or other sources will advertise data as a web-service IAW the agreed COI vocabulary?

(2) What value-added services will be demonstrated?

(3) What network(s) will be used to demonstrate net-centric capabilities?

(4) What joint exercise(s) will be used to demonstrate net-centric capabilities?

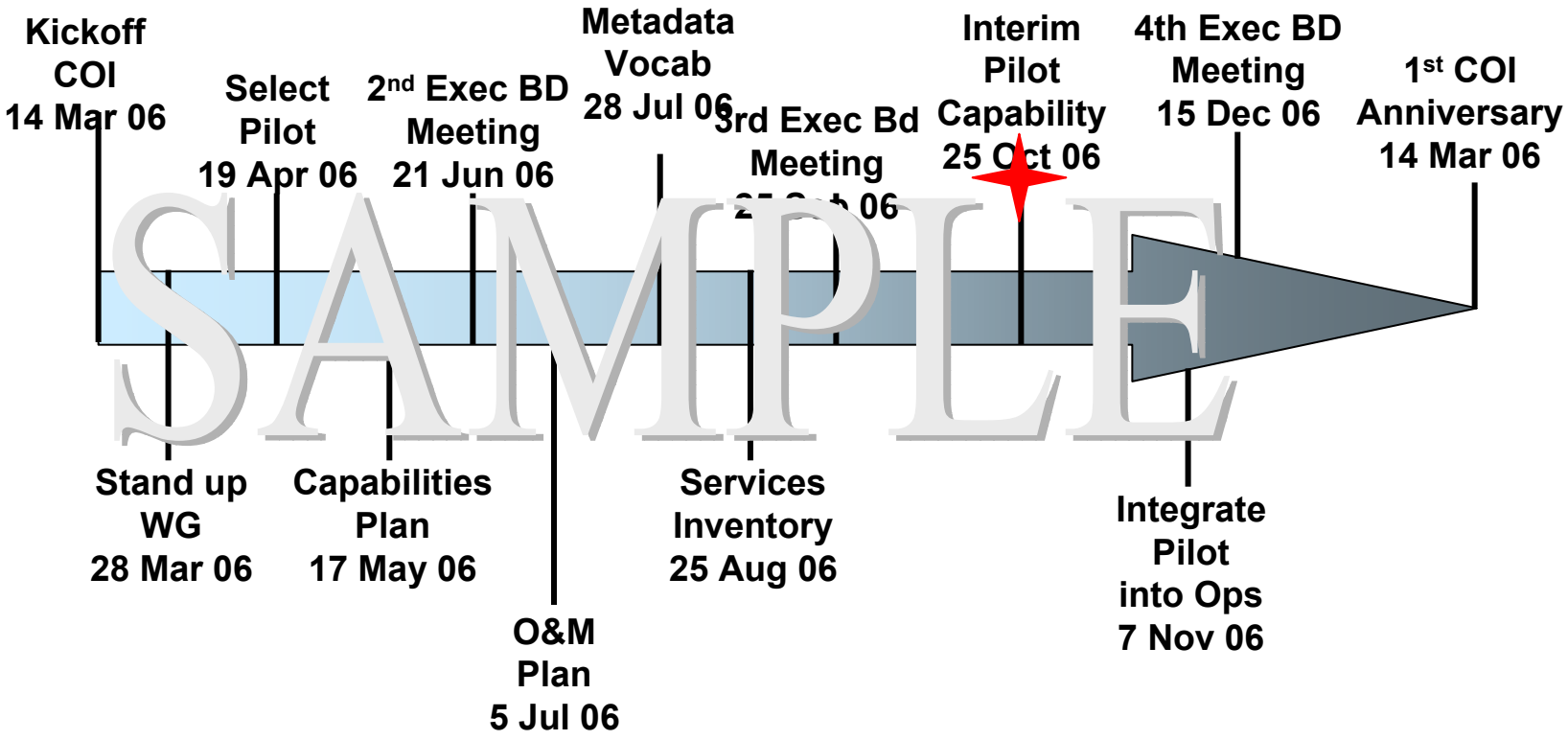
(5) What organizations are participating?

Scope of the Data Management Working Group Task to Support the Pilot

Describe the initial community vocabulary that is necessary to support the COI pilot.

COI Pilot POA&M

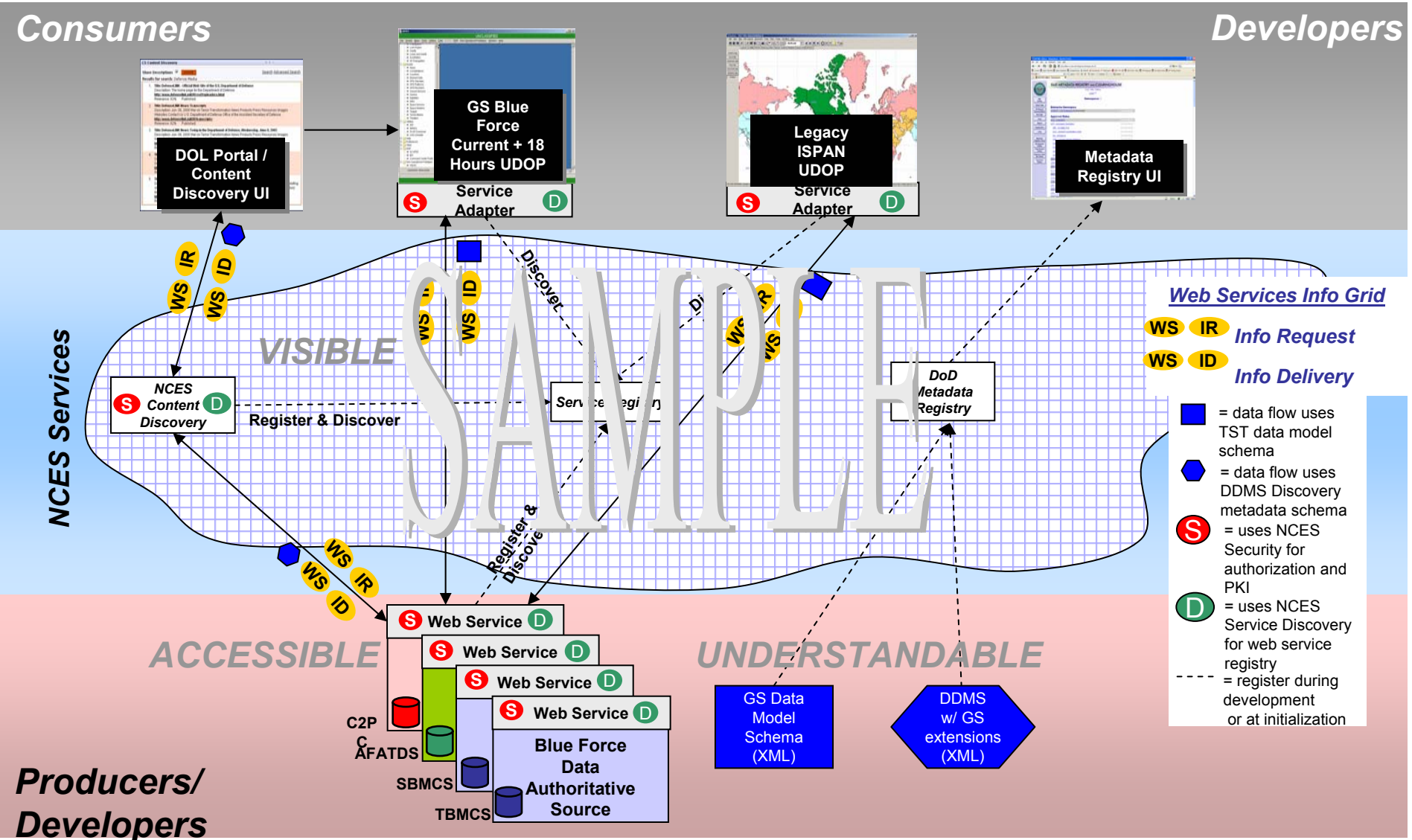
High-level Graphic with dependencies, decision points, and final demonstrated illustrated.



A Net-Cen
NII/CIO

COI Pilot Systems Architecture

GS COI Blue Force Current + 18 Hours Service UDOP (DRAFT)



COI Pilot Metrics

Metrics to assess the return on investment (ROI) (resources as well as net-centric capabilities and agility) of the pilot.

Start-point:

#1 - Changes and impact to Programs of Record (POR) involved in the COI Pilot

#2 - Initial and incremental costs of web service interfaces to advertise Program of Record (POR) data

#3 - User assessment of demonstrated net-centric capabilities

#4 – Feedback on ease of use and adoption of CES pilot services

#5 – Ease of adding additional services to pilot

#6 – Level of effort to agree on initial COI vocabulary

COI Resources

Identify resources required to conduct the pilot.

Identify resources broken out by program of record that provides the resources (as a technical risk mitigation effort), and DoD or non-DoD Component that owns the programs.

Identify resource shortfalls, impacts, and risk mitigation efforts.

Reference Links

The DoD Net-Centric Data Strategy

http://www.defenselink.mil/nii/org/cio/doc/Net-Centric-Data-Strategy-2003-05-092.pdf

Data Sharing in a Net-Centric DoD, DODD 8320.2

http://www.dtic.mil/whs/directives/corres/html/83202.htm

DoD Discovery Metadata Specification (DDMS)

http://metadata.DoD.mil/

DDMS Schema information

http://diides.ncr.disa.mil/mdreg/user/DDMS.cfm

COI Directory

https://gesportal.dod.mil/sites/coidirectory

Hot Topics in NCO Deployment Maturity

NDIA Net Centric Operations Conference
Waterside Marriott -- Norfolk, VA
March 13th, 2006

Moderator: C. Stephen Kuehl AIAA NCO PC Chairman

AIAA 75 Years
American Institute of Aeronautics and Astronautics

An Overview of AIAA

Mission

AIAA advances the state of aerospace science, engineering, and technological leadership.

Vision

AIAA is the shaping, dynamic force in aerospace – THE forum for innovation, excellence and global leadership.

- Non-profit under 501(c)(3) since 1963
- World's Largest Professional Society in Aviation, Space, & Defense Engineering/Science
- 31,000 members (5000 International) Across 7 Geographical Regions
- 66 Technical Committees Spanning Aerospace Science & Technology
- Aerospace Experts (Fellows – 706, Associate Fellows – 3562, Honorary Fellows – 79)
- 30+ Yrs Experience in Delivering Objective Congressional Testimony on Aerospace Issues & Policy Guidance
- Aerospace ISO Standards Body
- Aerospace Professional Development Course Provider (Distance Learning)
- Prestigious Aerospace Publisher – Books, Journals, & Technical Papers
- Pre-College Educational Outreach (K-12)

AIAA 75 Years
American Institute of Aeronautics and Astronautics

NCO Society Focus

NCO Liaisons

Congressional
- ✓ Congressional Visits Day
- ✓ Congressional Position Papers

DoD, NASA, NIST, DISA, FAA, FCC
- ✓ Policy Changes
- ✓ Funding
- ✓ **Technology Roadmaps**

NSF, DARPA – Research Bodies
- ✓ Policy
- ✓ Funding
- ✓ **Technology Roadmaps**

NDIA, NCOIC, AFEI, INCOSE, W2COG
- ✓ **Joint Conferences**

COTS Trades Associations
- ✓ **Standards**
- ✓ **Technology Roadmaps**

NCO PC

Chairman

Steering Committee (5)

IBSC W/Deputy Chairman 10-20 People	CBSC W/Deputy Chairman 10-20 People
IBSC Focused Liaison	CBSC Focused Liaison

Earned-Value Collaboration

AIAA Staff
- ✓ **AIAA EXECUTIVE DIRECTOR**
- ✓ **Business Development/Marketing**
- ✓ **Public Policy**
- ✓ Professional Development
- ✓ **TAC**/RSAC **Support**

AIAA Governing Body
- ✓ Board of Directors with Supporting Committees (Emerging Technologies)

AIAA TAC
- ✓ VP-TAC & PC Coordinator
- ✓ **NIS +** Seven Directorates
- ✓ 35+ **Technical Committees**
- ✓ Conference/Workshop Organizers

AIAA RSAC
- ✓ Local Sections
- ✓ US Regions
- ✓ International Regions

American Institute of Aeronautics and Astronautics

1st Tutorial Overview

- **DoD's NetCentric Data Strategy**

Dan Risacher **– OSD**

The Department of Defense Net Centric Data Strategy provides a key enabler of the Department's Transformation, by establishing a foundation for managing the Department's data in a NetCentric environment. The tutorial will describe the implementation of this strategy and how it will make information visible, accessible, and understandable.

08:30 AM -- 9:30 AM

Break 9:30AM – 9:45 AM

9:45 AM – 10:45 AM

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2nd Tutorial Overview

- **Mediate Cross Domain Information Flow: Enhanced Cross Domain Solution Decomposition**

Jared Cohen **- North Star Consulting Solutions (Enterprise IA Architecture & Systems Engineering Office)**

This tutorial provides an overall architectural understanding of the Cross Domain Space (CDS) in the GIG. It describes the current Vision of CDS with respects to Mediate Cross Domain Information Flow while describing the architectural alternatives for future Increments. This architectural approach is implementation independent and assumes some process and/or core services will be available and deployed to support this approach. The tutorial recommends research and standards activities in this area for the entire development and integration community.

10:45 AM → 12:15 PM

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3rd Tutorial Overview

- **Challenges and Recommendations in Building a Net-Centric System-of-Systems**

James Smith **– Carnegie Mellon SEI (AIAA NCO PC)**

This tutorial will present current perspectives and recommendations on critical programmatic and technical challenges confronting organizations developing, acquiring, fielding, and sustaining a heterogeneous network-centric System of Systems comprising a mixture of COTS/GOTS/other reuse and developed systems. Topics include programmatic/organizational interoperability, cost and schedule estimation, system migration, and current technology limitations, enablers, and forecasts.

1:00 PM - 1:45 PM --- Intro/purpose/overview
1:45 PM - 2:00 PM ----"Traditional" systems
2:00 PM - 2:15 PM ---- Net-Centric motivation
BREAK 2:15 PM -- 2:30 PM
2:30 PM - 2:45 PM ---- Why is Net -Centric different?
2:45 PM - 3:15 PM ---- What to do about it?
3:15 PM - 3:45 PM ---- Technology issues
BREAK 3:45 PM -- 4:00 PM
4:00 PM - 4:15 PM Unresolved issues
4:15 PM - 4:30 PM Recommendations
4:30 PM - 5:00 PM Audience Discussion

AIAA 75 Years
American Institute of Aeronautics and Astronautics

Knowledge Management in a Net-Centric Environment

Col Mark J. Lorenz
Chief, IT Insertion

HQ USSTRATCOM/J656
15 Mar 2006

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HQ USSTRATCOM/J656 Mission

Research and evaluate Knowledge Management (KM) IT enabling tools for near-term implementation.

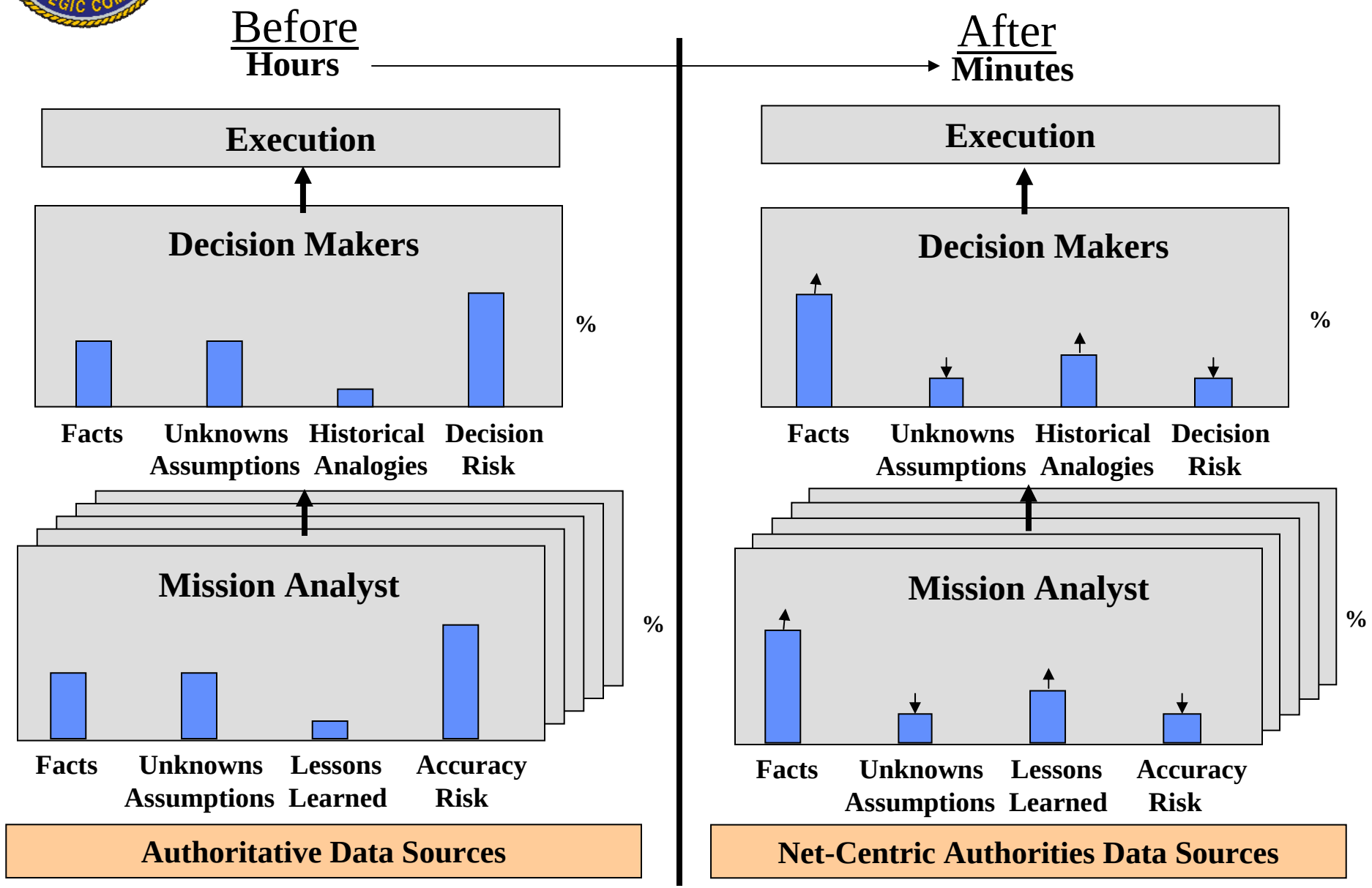
(e.g. information sharing, collaboration, search, messaging, alerting, portals)

Establish a user definable portal capability that integrates explicit & tacit knowledge to support day-to-day business and warfighter processes.

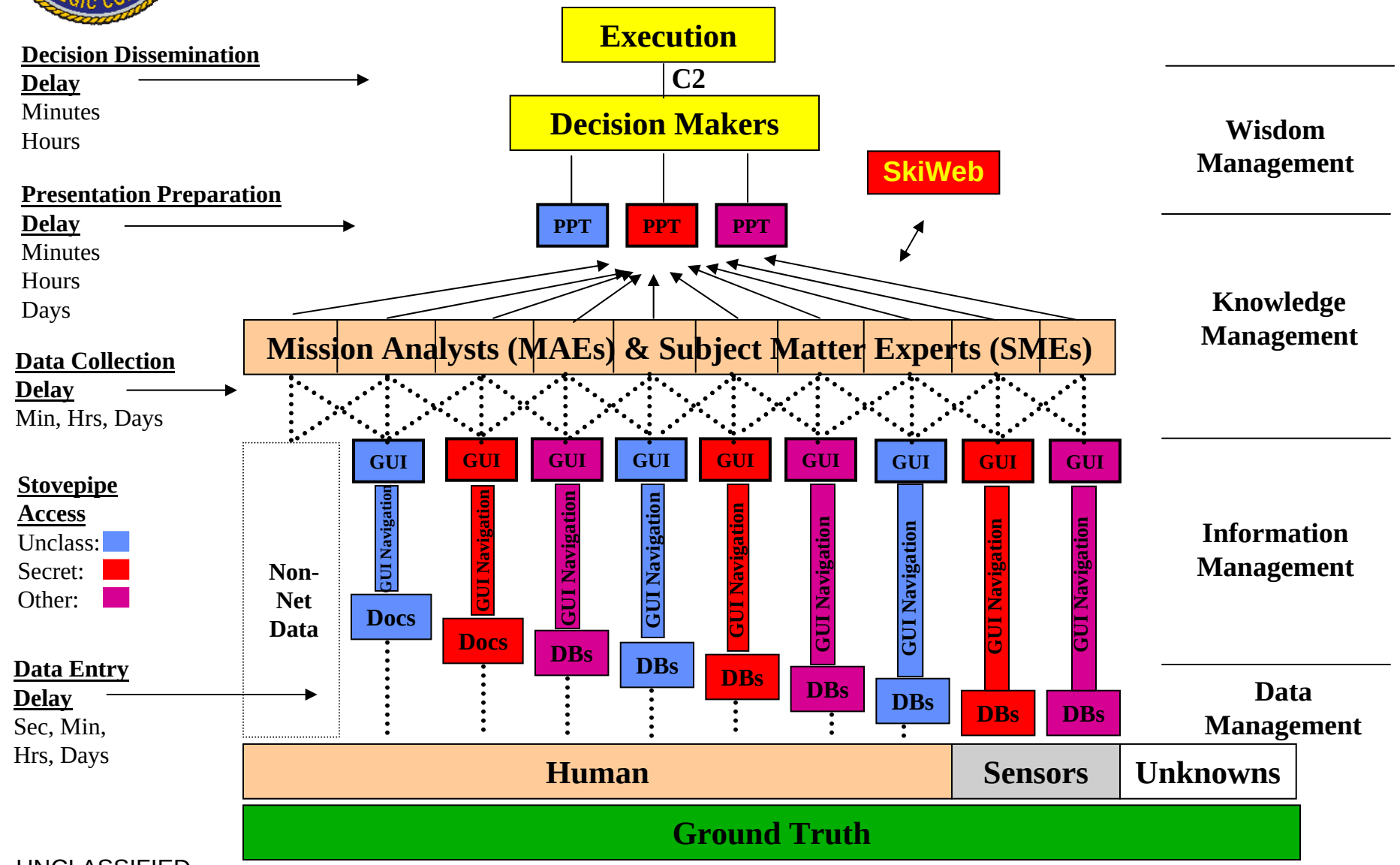
Desired Results: (KM a means to an end)

- Improve awareness of, access to, & exchange of intellectual capital
  - Improve decision timeliness, accuracy, awareness
  - Improve process timeliness, accuracy, efficiency
  - Raise intellectual capital
  - Reduce duplication work

Objective of Net-Centric KM



Current Net-Centric IT Environment



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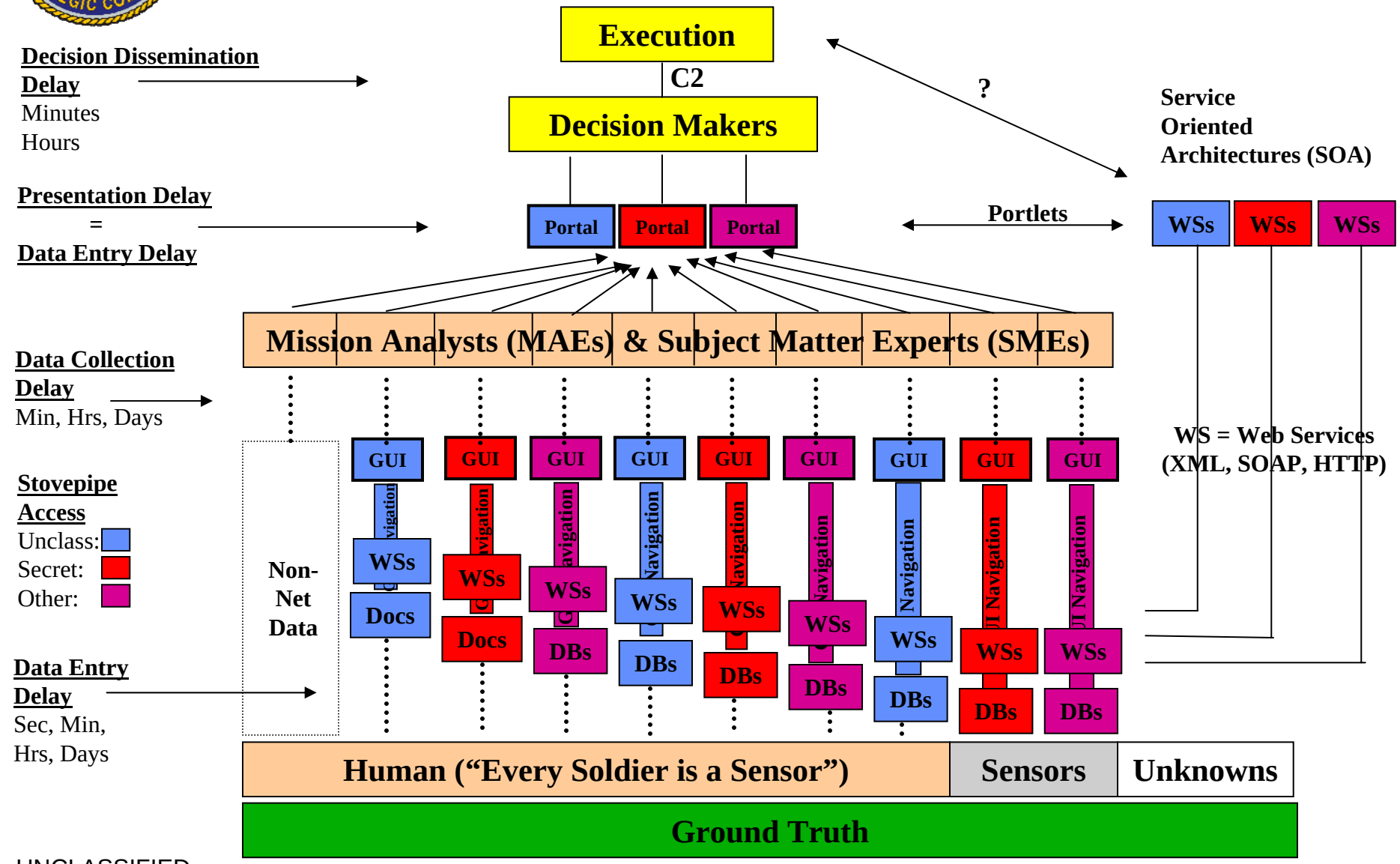
Proposed Net-Centric IT Environment



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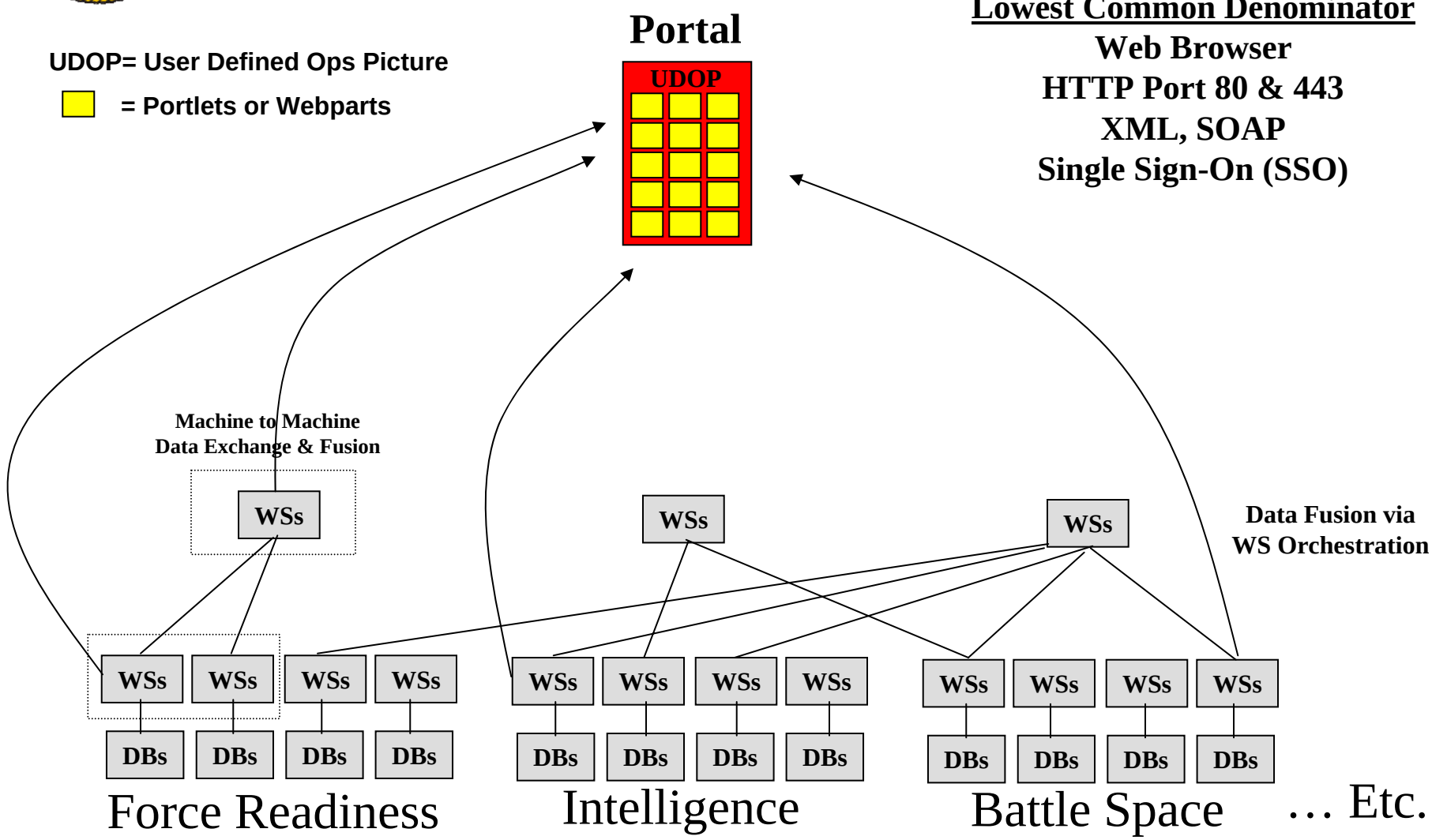
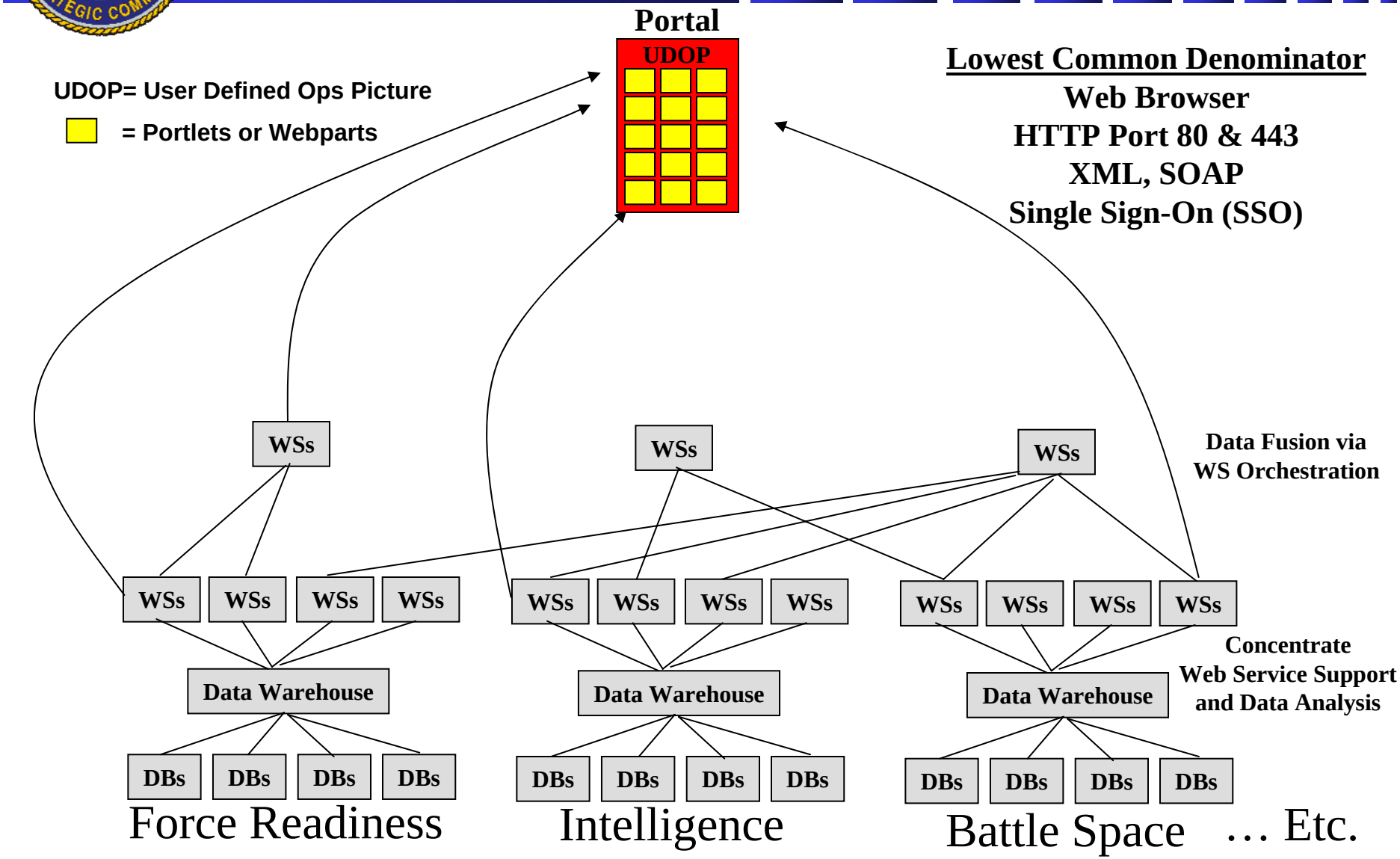
Net-Centric IT Environment



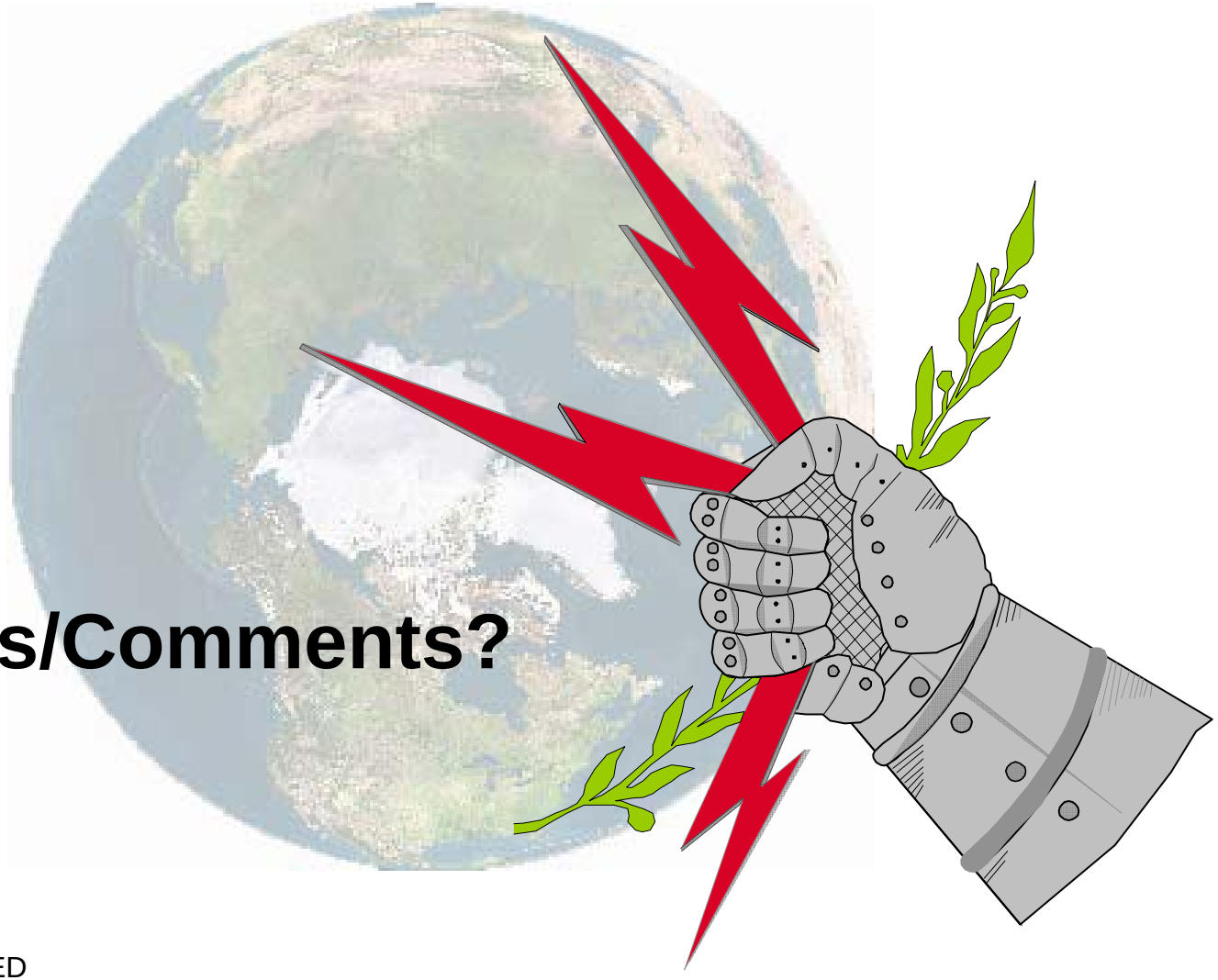
Net-Centric IT Environment



Net-Centric IT Issues

- Information Requirements and Renderings
  - CCIRs, RFIs, etc.
  - Net-centric in tactical environment
  - Net-centric in strategic MAPDER Environment
    (monitor, assess, plan, decide, execute, report)
- Access Policies
  - Authentication, Authorization
  - Enterprise Single Sign-On
- Lack of Common IT baselines
  - Ports
  - Protocols
  - Browser settings & plug-ins
- Web Service Configuration Mgt Strategy
  - Backward compatibility
  - Transition time
  - Reliability

Knowledge Management in a Net-Centric Environment



Questions/Comments?

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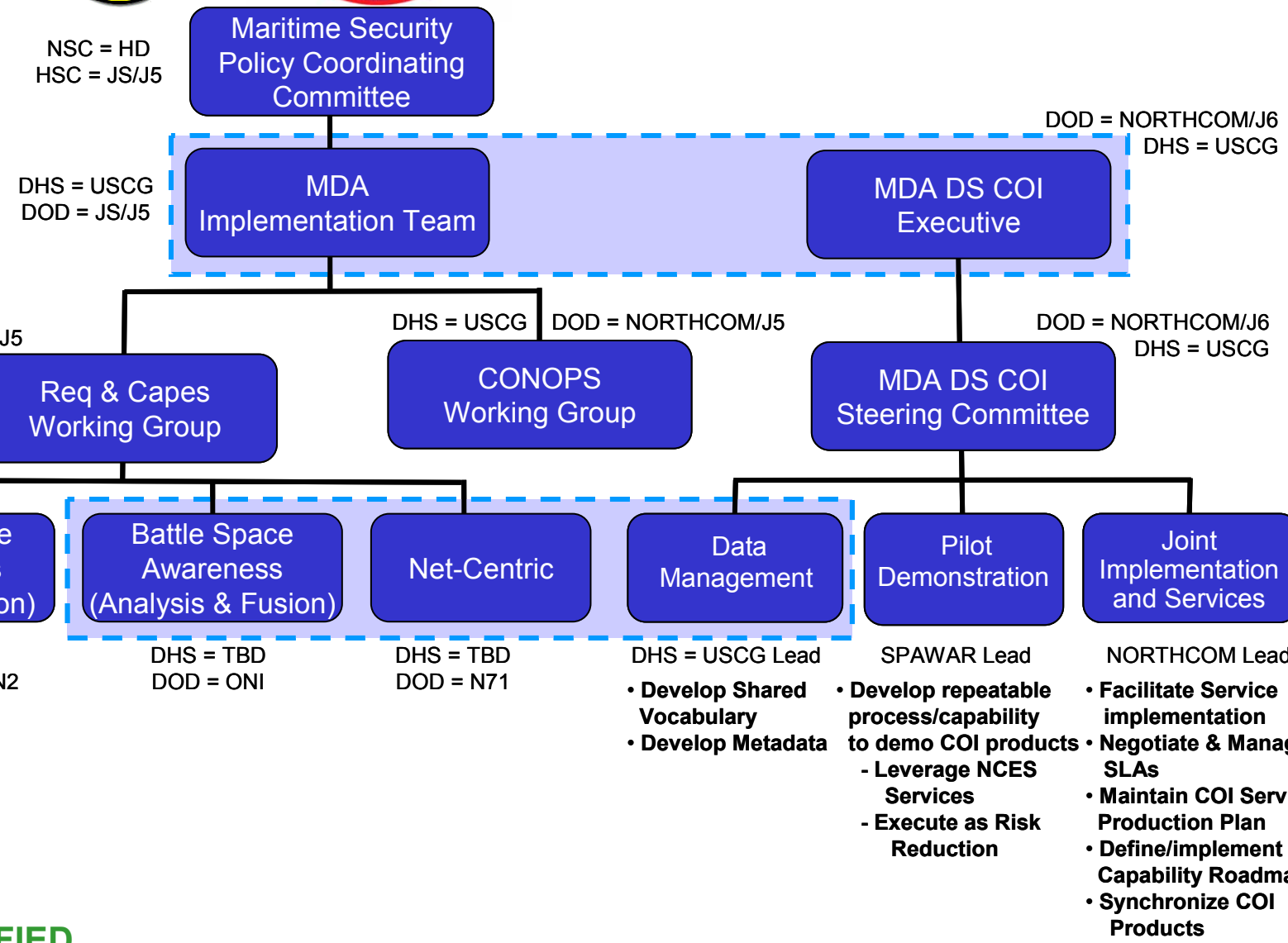
Maritime Domain Awareness Data Sharing COI

Mar 2006

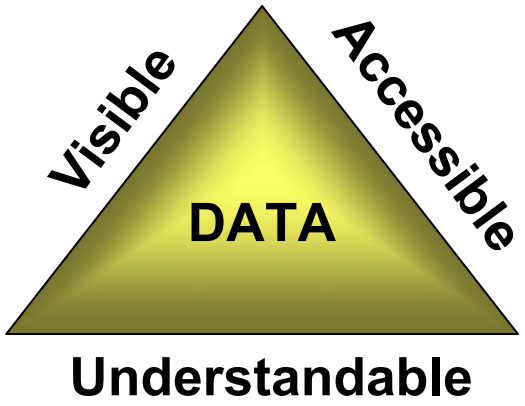
Presented by: CAPT John Macaluso
COMDT CG-66
USCG R&D Manager

MDA DS COI Governance



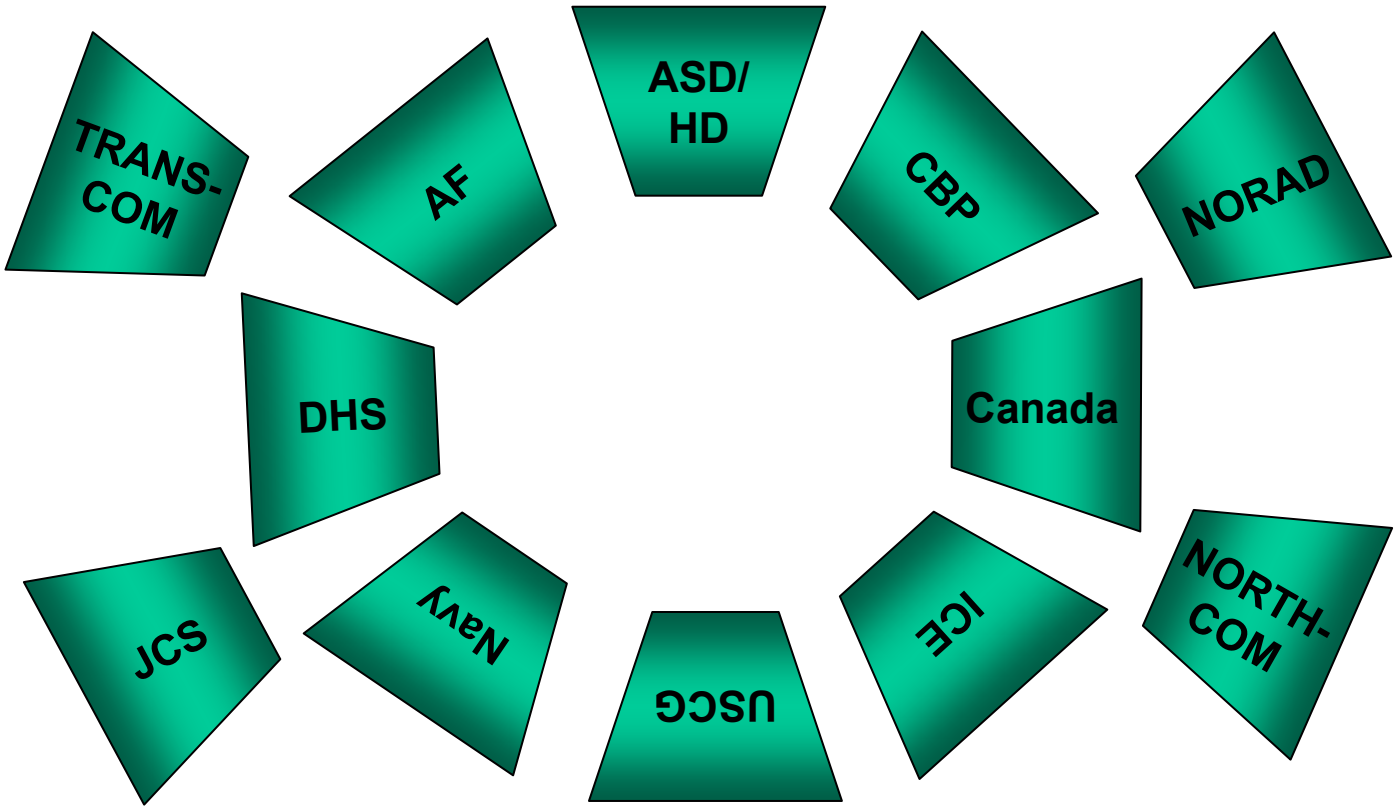
COI Defined

- **A collaborative group of users that must exchange information in pursuit of its shared goals, interests, missions, or business processes and therefore must have a shared vocabulary for the information it exchanges….DOD Directive 8320.2**



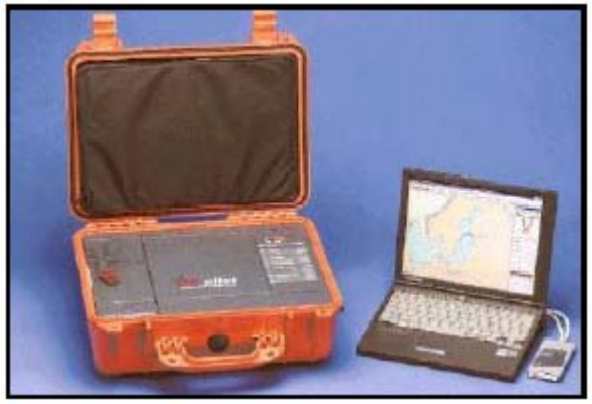
The Community

- Kick-off Meeting had strong DHS and DOD presence
- Our data producer/consumer community is many more agencies, international, and commercial



MDA DS COI- AIS Pilot

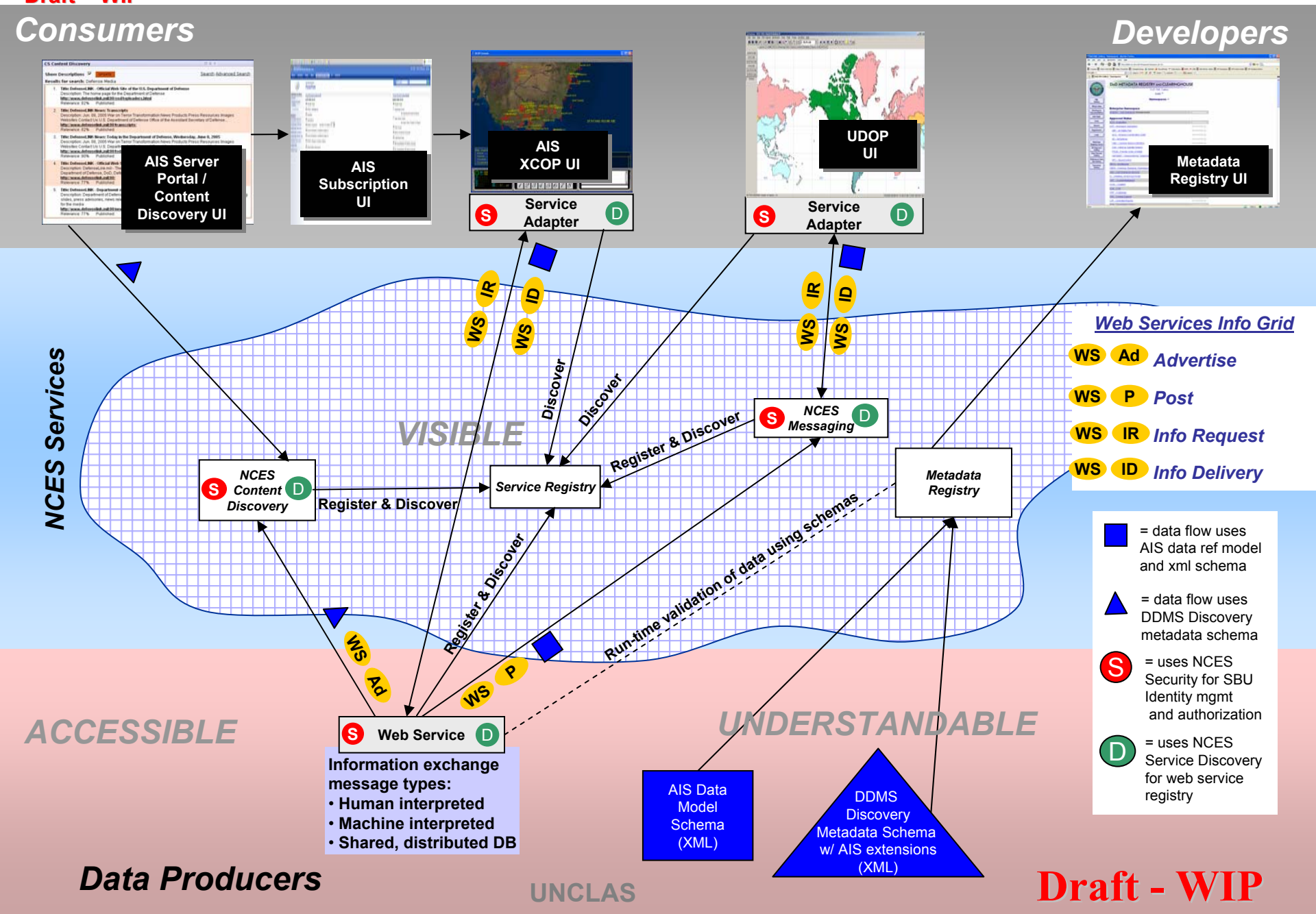
- The **Automatic Identification System** (AIS) is a shipboard broadcast transponder system operating in the Very High Frequency (VHF) maritime band that is capable of sending and receiving ship information, including Navigation (Position, Course, Speed …), Identification (Name, Call Sign, Length, Beam …), and Cargo (Draft, Type, Destination …).



Portable AIS Equipment

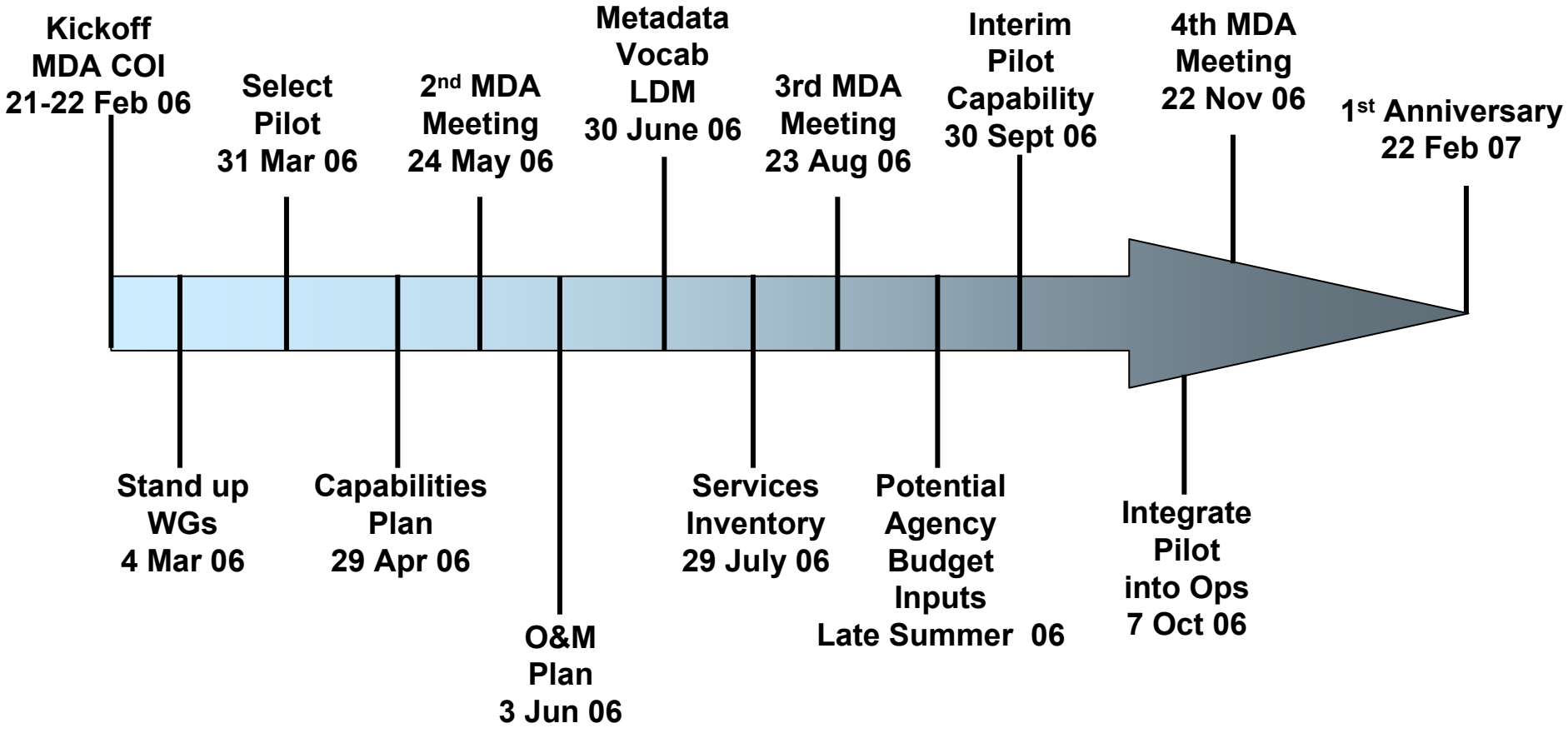
MDA DS COI Pilot Service = AIS Data RM + NCES Security/Discovery/Adapter + NCES M2M Messaging + Metadata Registry

Draft – WIP



Draft - WIP

(Draft) COI Pilot POA&M



Maritime Fusion Challenge

Current Tasking: Corresponds with MDA Essential Tasks: Find, ID, track

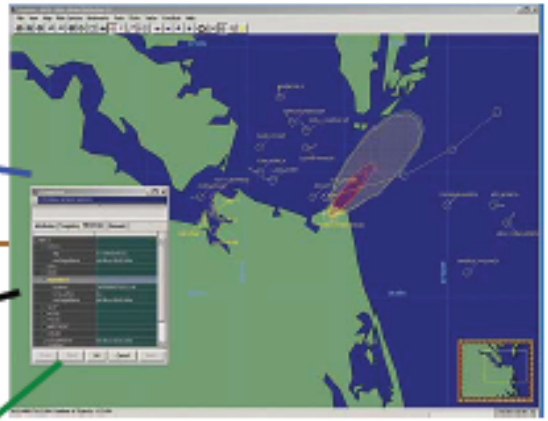
Delivery Warehouse

Receiving Warehouse

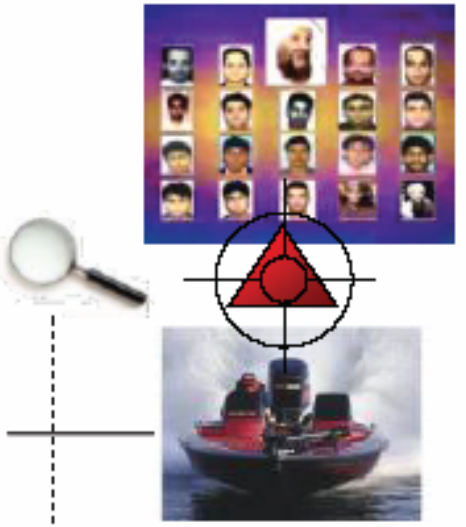
Data

- Vessels
- Cargo
- People
- Infrastructure

Information



Operationally Actionable Intelligence



Gather data from disparate sources:
- Commercial
- Law Enforcement
- Foreign Partners
- Military NTM/ISR

Develop Maritime Domain Awareness:
- Fuse data into information (COP)

Establish Maritime Domain Dominance:
- Exploit anomalies in information to identify operationally actionable intel

UNITED STATES COAST GUARD
MARITIME DOMAIN AWARENESS

UNITED STATES
NORTHERN COMMAND

Network-centric Enterprise for Global Operations

Maj Gen Roosevelt Mercer
Director, Combat and Information Operations
U.S. Strategic Command

This Briefing is UNCLASSIFIED

Vision

"Our objective is a global, persistent, 24/7 collaborative environment-comprising people, systems, and tools. Our future structure must support real time command and control at both the global and local levels as well as enable dynamic, adaptive planning and execution in which USSTRATCOM, the regional combatant commanders, and other geographically dispersed commanders can plan and execute operations together."

- General Cartwright, USSTRATCOM CDR

SASC Testimony, 16 MAR 05

Mission Statement

"Establish and provide full-spectrum global strike, coordinated space and information operations capabilities to meet both deterrent and decisive national security objectives. Provide operational space support, integrated missile defense, global C4ISR, and specialized planning expertise to the joint warfighter."

STRATCOM UCP Mission

- **USSTRATCOM – integrator and implementer of capabilities to conduct missions globally**
  - **Space Operations**
  - **Global Strike**
  - **Information Operations**
  - **Global C4 and ISR**
  - **Global Missile Defense**
  - **Countering WMD**
- **Actions – must be anticipatory, adaptive…based on a faster cycle of information exchange and decision-making**

Operations Environment

- **Continuous, radical change**
- **Many potential adversaries**
- **Asymmetric threats – increasingly global**
- **World more globally dependent**
- **Nation – must be able to plan, respond and conduct missions globally**

Information Exchange

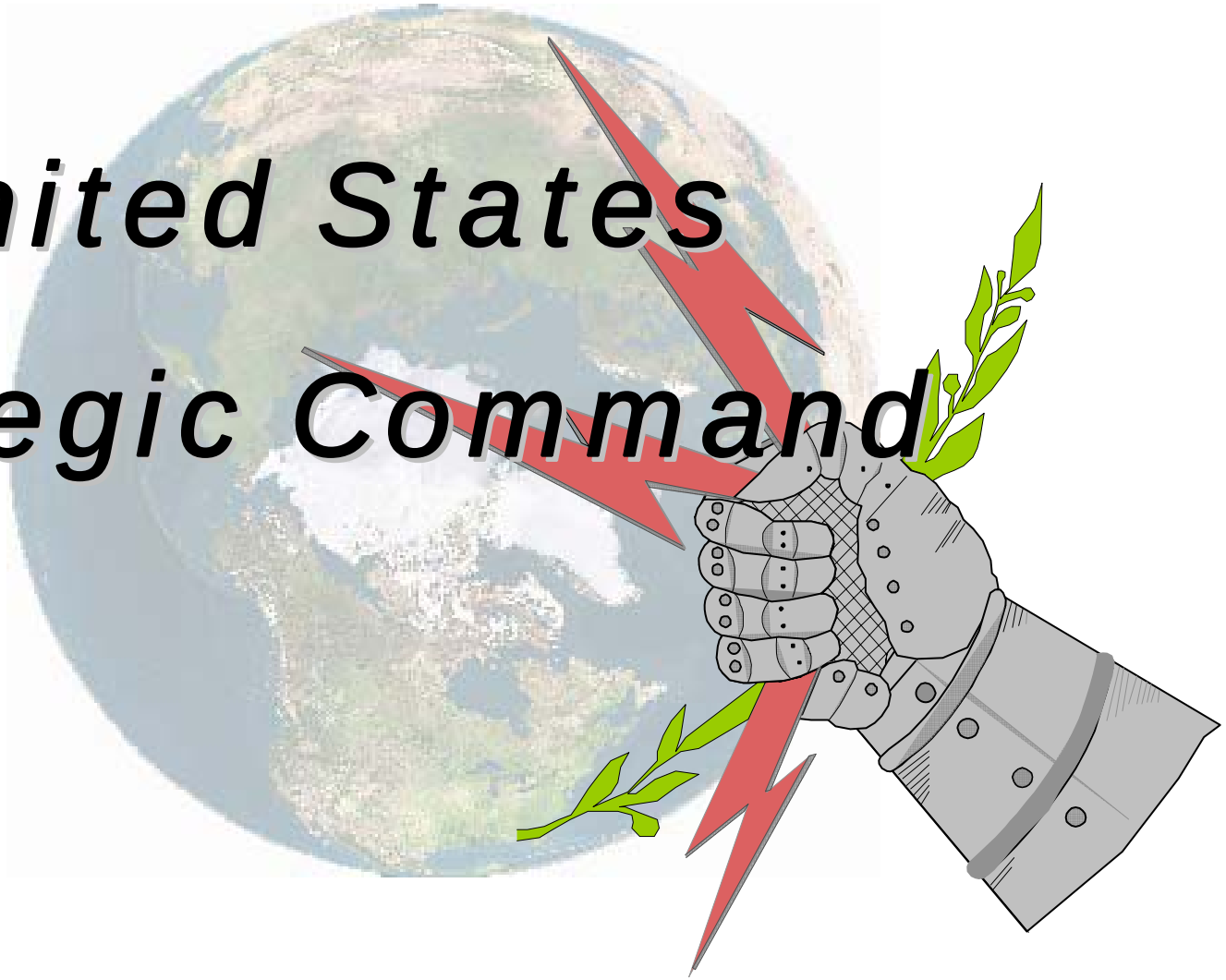
Capabilities for people, that lead to people with knowledge

- **Integrated**
- **Synchronized**
- **Collaborative**
- **Information Services that “learn” and “know content” you want**
- **Enabling common global situational updates/awareness for planning and execution**

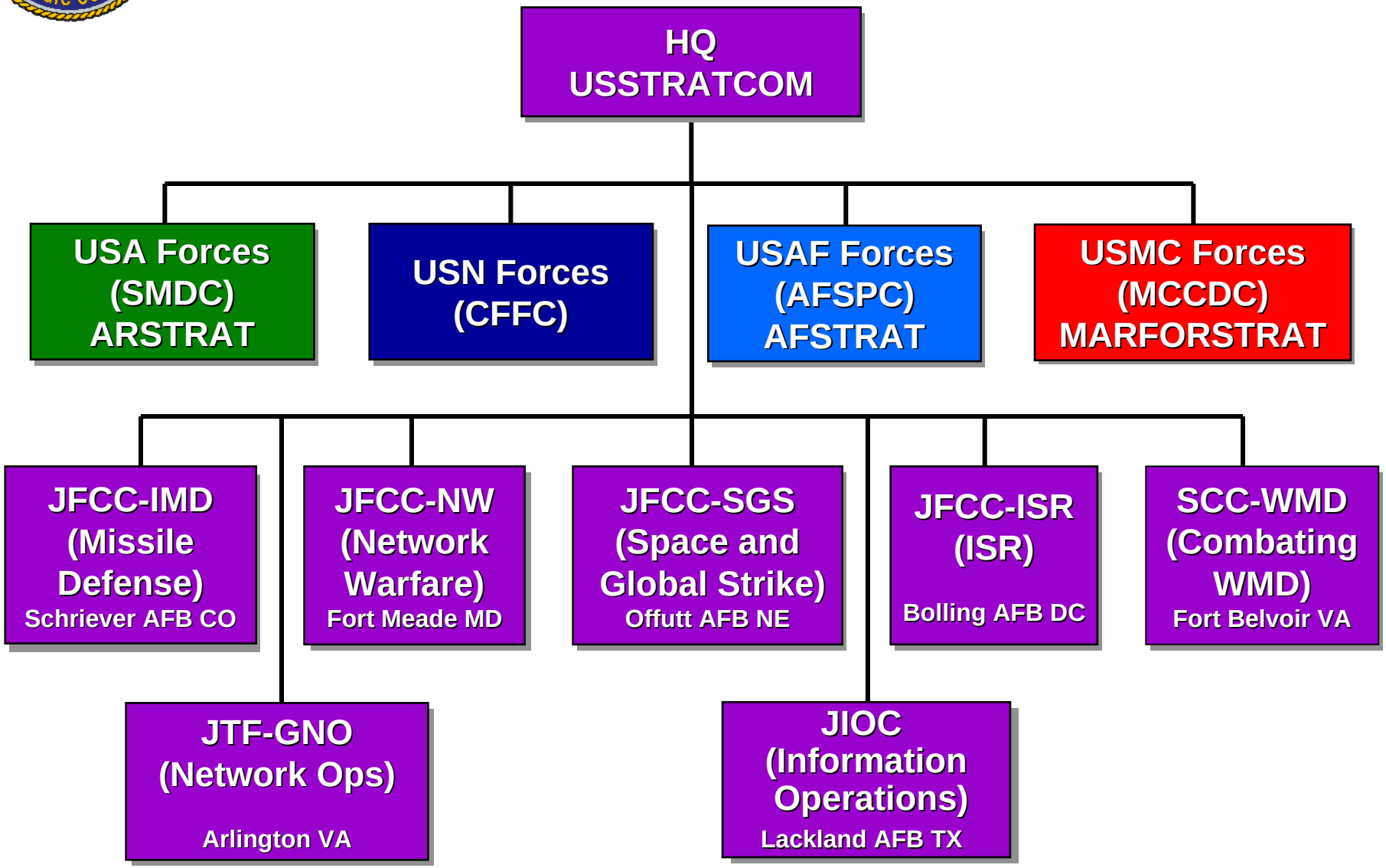
Panel Members

- **Maj Gen Roosevelt Mercer, J3A**
- **Mr David Gelenter, GS-15, J86, Deputy, NetOps/NetWar Division**
- **COL Carl Hunt, JTF-GNO/J9, Director, Technology and Analysis**
- **Col Mark Lorenz, J65, Chief, Knowledge Management**
- **CAPT Gary Sandala, JFCC-NW/J8**
- **COL Matt Allaire, JFCC-SGS, J39, Chief, Information Operations**

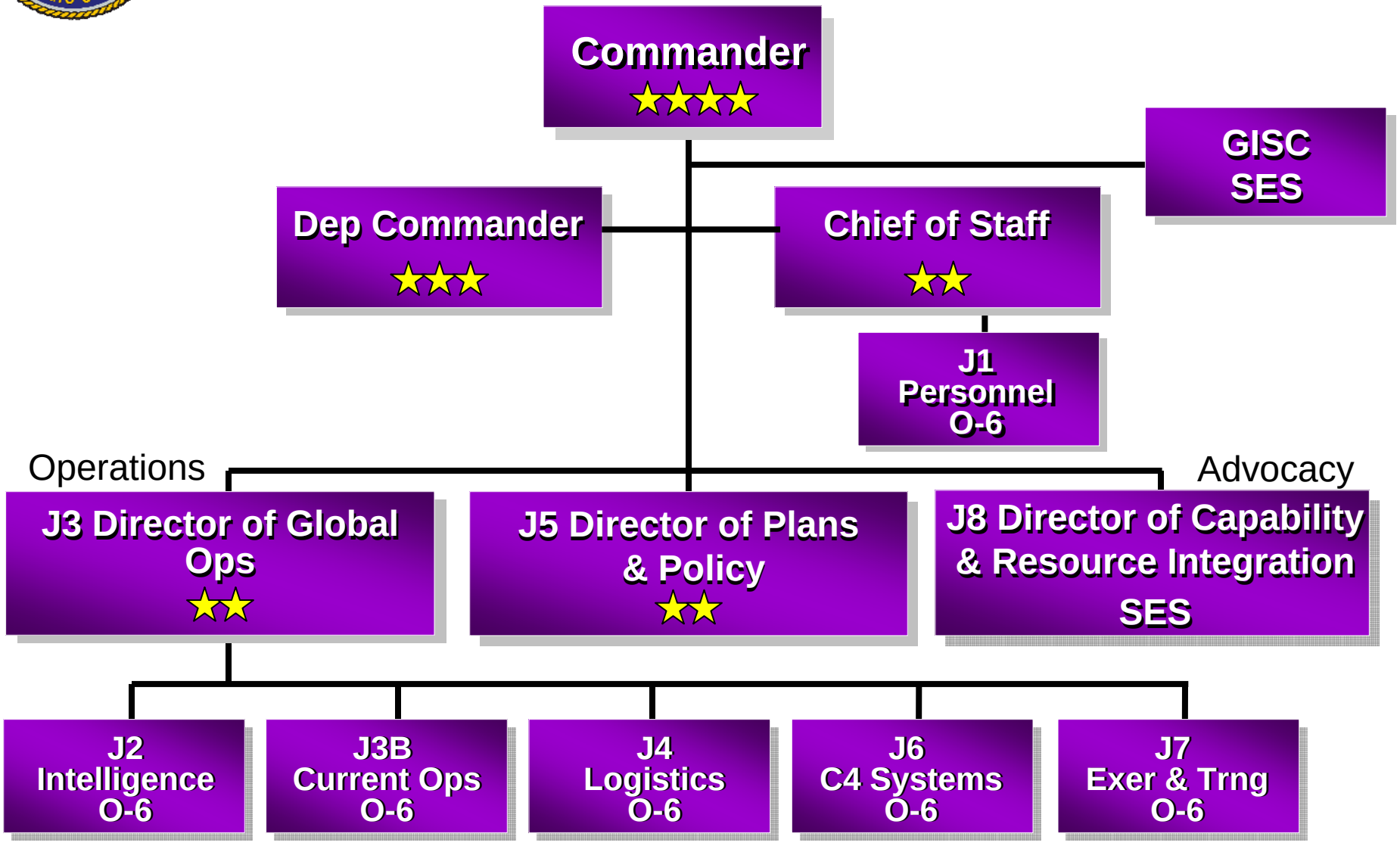
United States Strategic Command



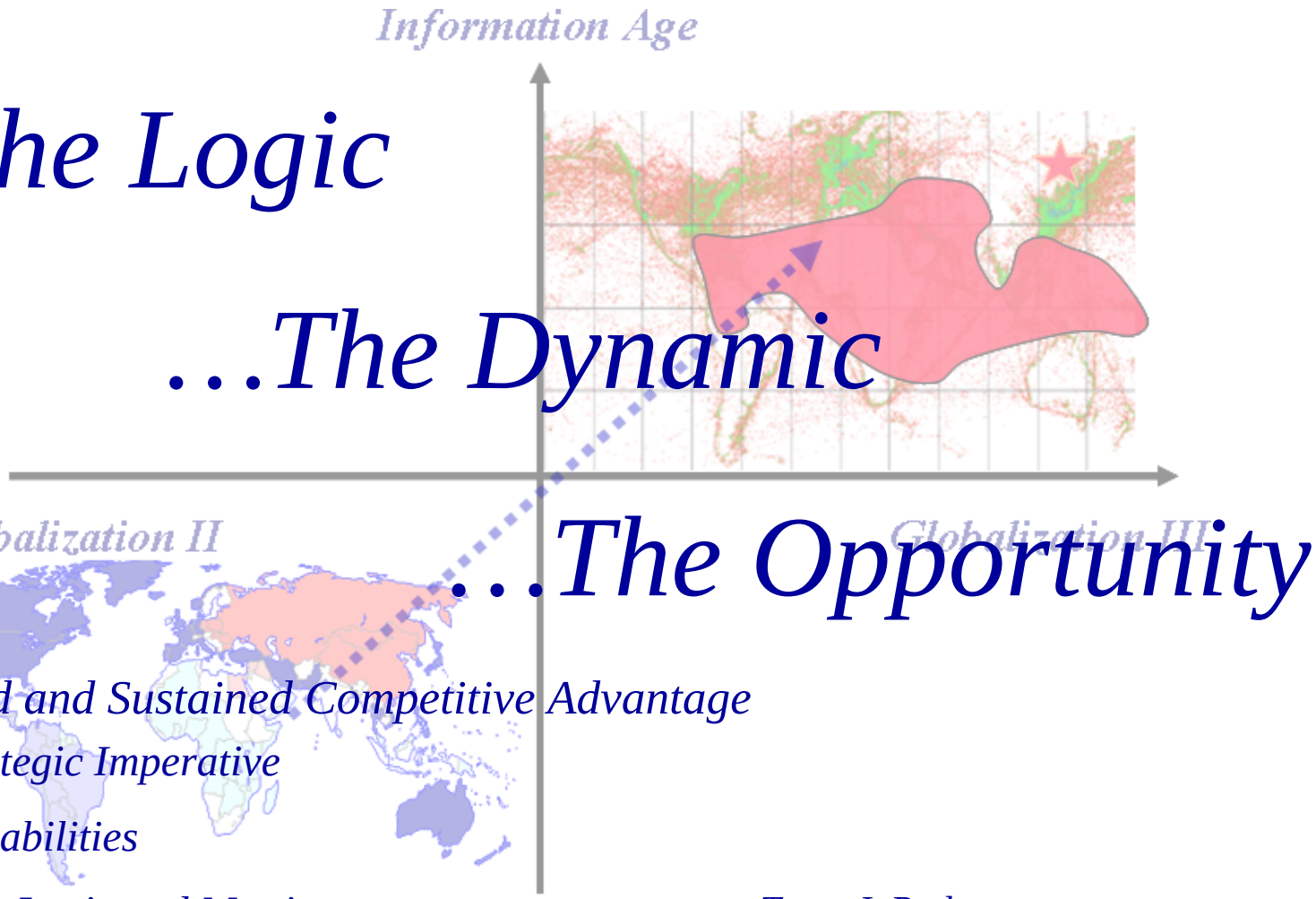
Component Structure



Headquarters Organization



Transforming National Security



…The Logic

…The Dynamic

…The Opportunity

Vision: Broad and Sustained Competitive Advantage

- *Strategic Imperative*
- *Capabilities*
- *New Logic and Metrics*
- *Opportunities*

Terry J. Pudas
Acting Director, Force Transformation
15 March, 2006

Transforming Defense

…The Concept

Elements of Transformation

☑ Continuing process
☑ Creating/anticipating the future
☑ Co-evolution of concepts, processes, organizations, and technology
☑ New competitive areas/competencies;revalued attributes
☑ Fundamental shifts in underlying principles
☑ New sources of power
☑ Culture - attitudes, values, beliefs

- *New Strategic Context*
- *Broadened Threat Context*
- *Technological Threats Facilitated by Falling Barriers to Competition*

"The ultimate competitive advantage lies in an organization's ability to learn and rapidly transform that learning into action."
Jack Welsh

Transforming Defense

…Compelling Need

- New strategic context
  - *New Theory of War based on information age principles and phenomena*
  - *New relationship between operations abroad and homeland security*
  - *New concept/sense of security in the American citizen*
- Broadened threat context
  - *State/Non-State*
  - *Symmetric/Asymmetric*
  - *Traditional/Unrestricted*
- New technological threats facilitated by the falling barriers to competitive entry
  - *Immediate accessibility to highly capable low cost IT*
  - *Opens key operational domains to competition: space, sea, cyberspace*

To the extent we do not transform, we are at risk

Transforming Defense

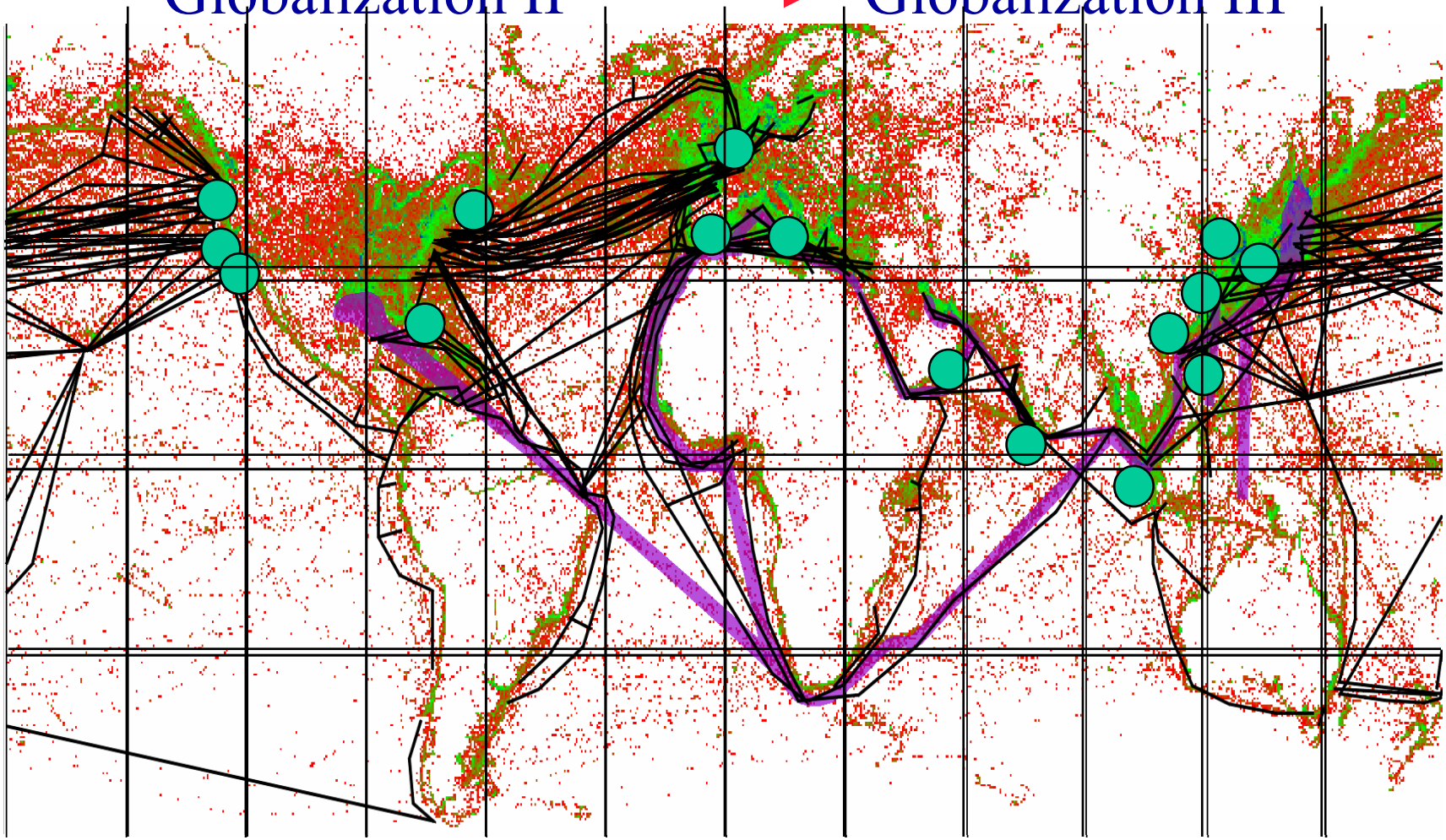
…Elements of Strategy

- Transform from Industrial Age to the Information Age
  Implement Network Centric Operations
- Ensure sustained competitive advantage
  Assure Allies
  Dissuade competitive entry
  Underwrite deterrence
  Implement countervailing strategies
- Broaden the capabilities base
  Operational, Technical, Industrial
  Create new competitive areas
  Revalue competitive attributes for the information age
  Decrease capabilities cycle time
- Leverage advantages and opportunities
  Manage the devolution of "sunset" capabilities and processes

Achieve Speed and Agility vice Optimization

Global Trends

Globalization II → Globalization III



Industrial Age → Information Age

Trends in Security Competition

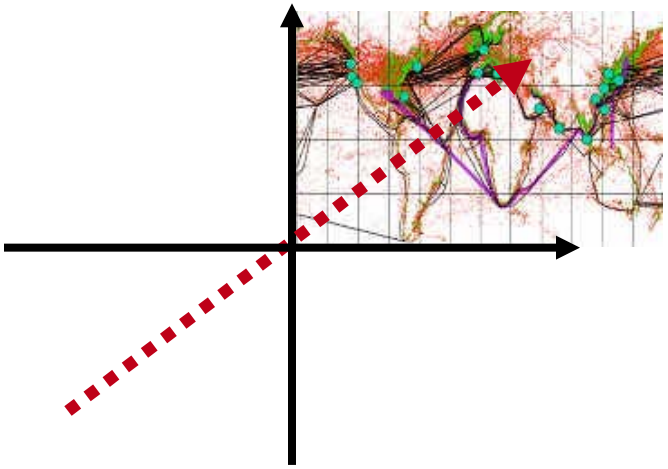
Information Age

- Short Cycle Time
- Mass Customization
- Adaptive Planning
- Interdependence

Globalization II

(1947 – 199X)

- Developed Rules
- Mature Markets
- Narrowing Customer Base
- Security = Defense



Globalization III

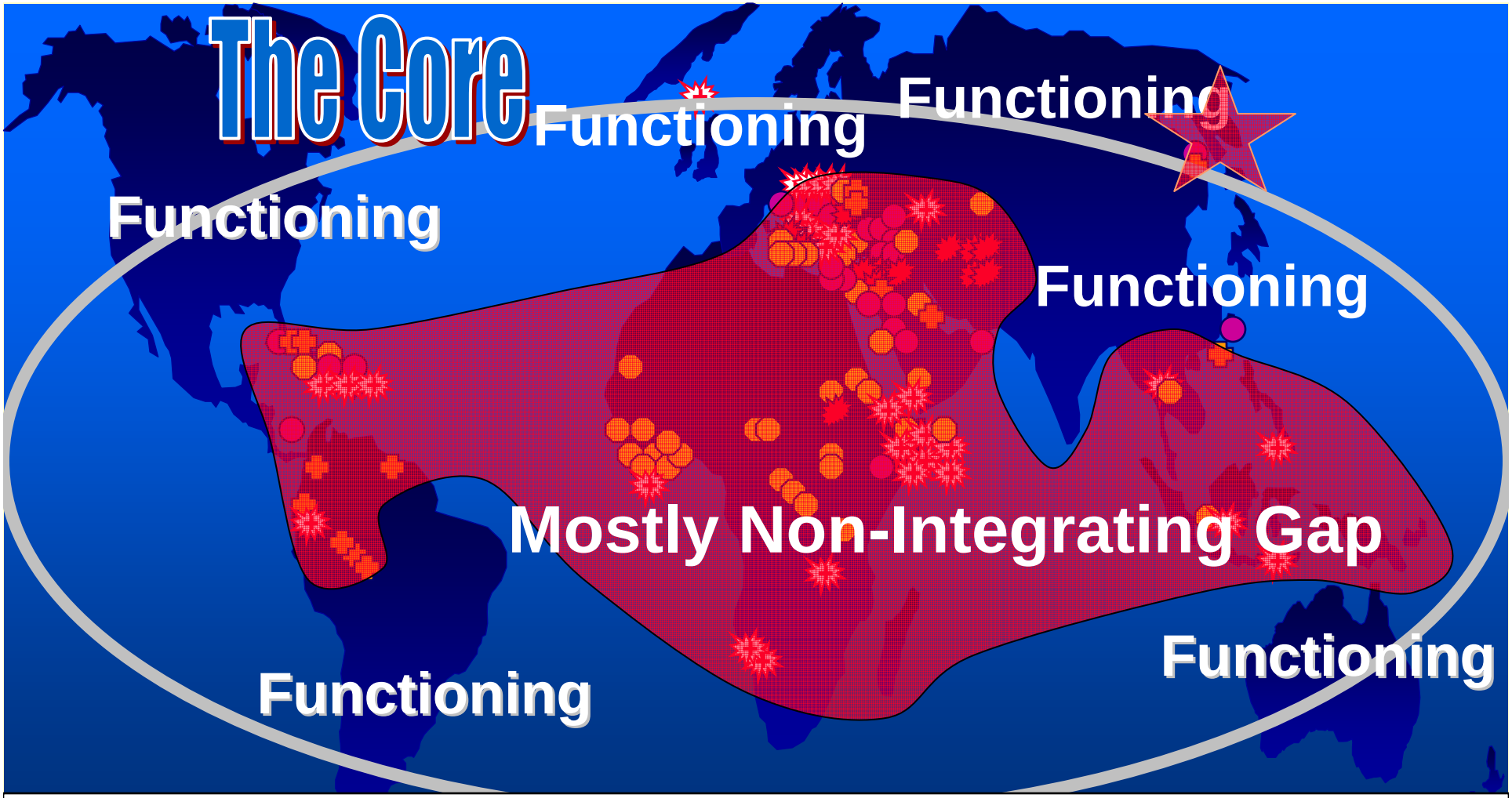
(199X – 20XX)

- Emerging Rules
- Market Opportunities
- New Customer Base Emerging
- Security = All Else + Defense

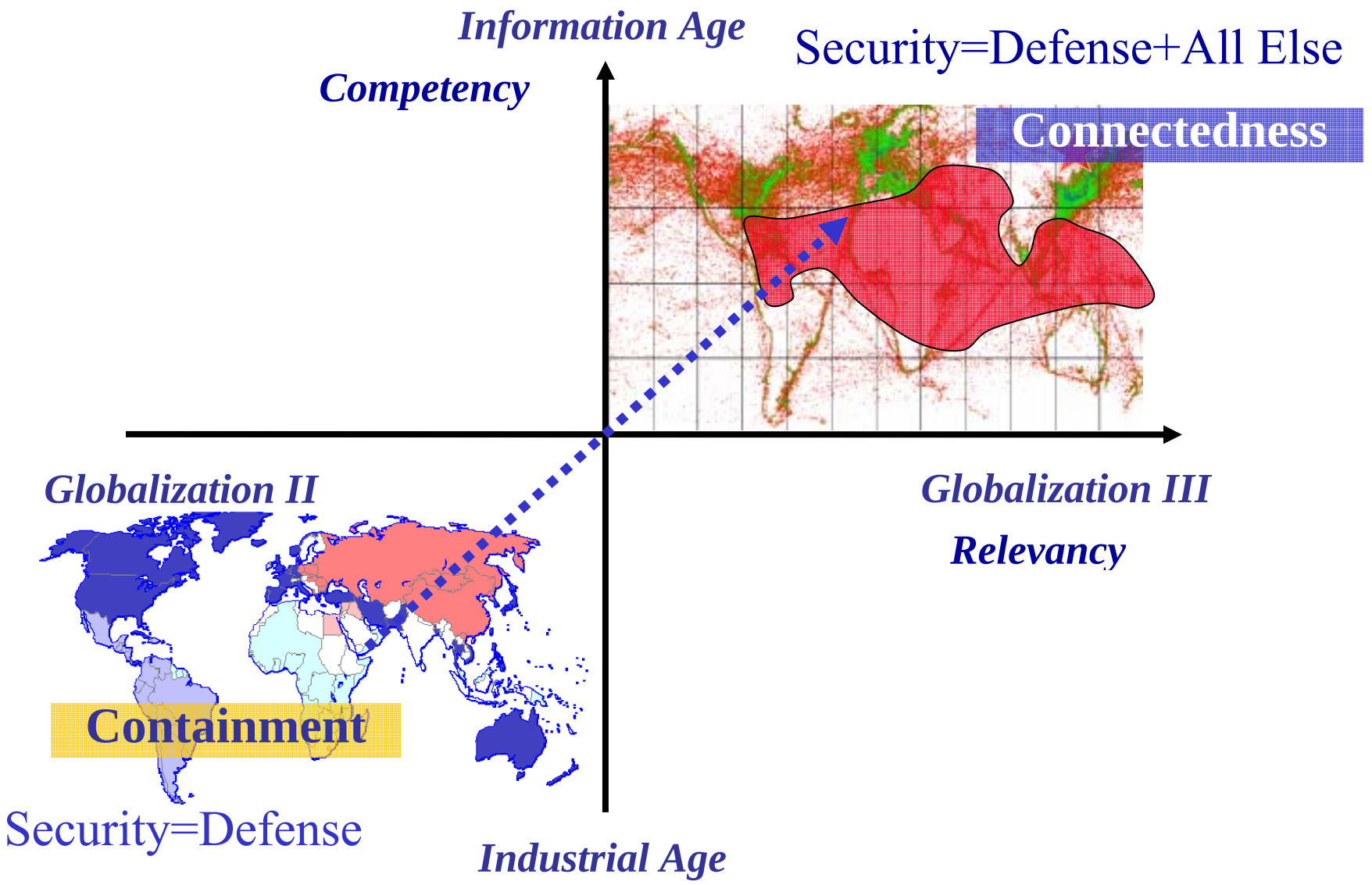
Industrial Age

- Long Cycle Time
- Mass Production
- Deliberate Planning
- Tortured Interoperability

Globalization III



Shifting Strategic Imperatives



Security Environment

… Four Challenges

Irregular

Those seeking to erode American influence and power by employing unconventional or irregular methods

Catastrophic

Those seeking to paralyze American leadership & power by employing WMD or WMD-like effects in unwarned attacks on symbolic, critical or other high-value targets

Traditional

Those seeking to challenge American power by instigating traditional military operations with legacy and advanced military capabilities

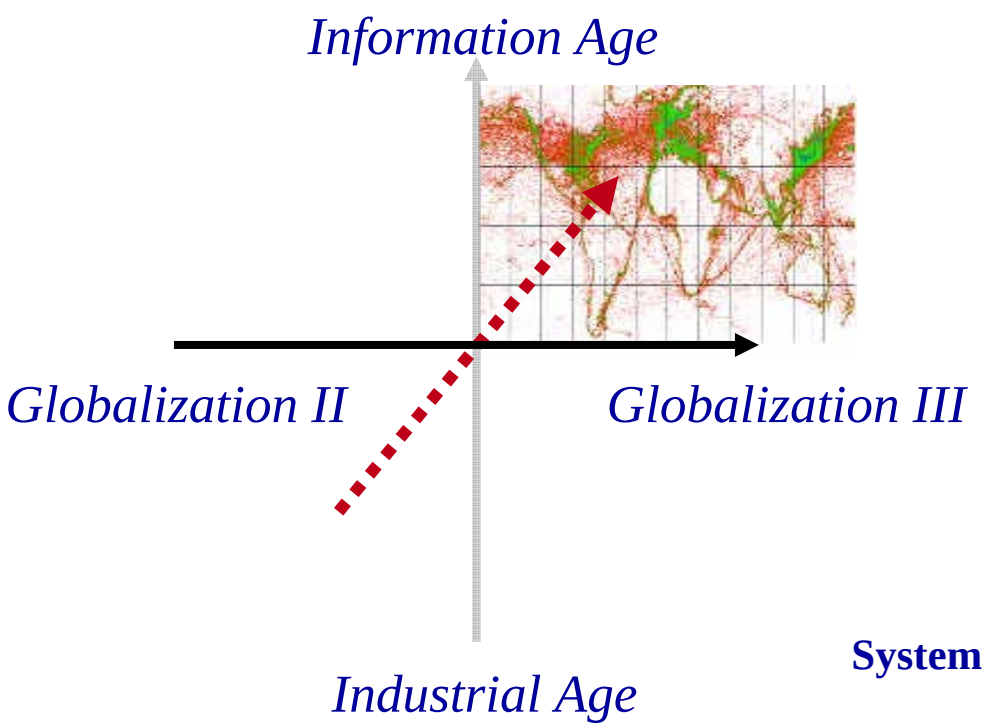
Disruptive

Those seeking to usurp American power and influence by acquiring breakthrough capabilities

No hard boundaries distinguishing one category from another

Global Trends…Threats

…*Strategic Response*



Strategic Capabilities:

- *More preventative - less punitive*
- *Achieve unambiguous warning earlier*
- *More Special Operations like characteristics*
- *Operate with speed*
- *An intel / surveillance-based force*
- *Interoperability/interdependence*
- *Coping with Systems Perturbations*

System	**----- [Great Power War?] -----**			
State	**Political Ideology**	**Hated Dictator**	**Hated Dictator w/Nukes**	**Nuclear Nationalists**
Individual	**Narco-terrorists**	**Regional Terrorists**	**International Terrorists**	**SEI***

*** Super-Empowered Individual**

Transforming Defense

…Characteristics of the Future Joint Force

This is the age of the small, the fast, and the many.

- *Small: Power and size are uncoupled*
- *Fast: A shorter response with a faster rise time more precisely placed in time and space*
- *Many: The power of the collective at lower cost over a larger area*

Rebalance for the information age

- *"Demassification" through increased information fraction*
- *Networked components vice integrated systems*

Operations based on assured access, information superiority, control of initial conditions and rates of change

- *A priori access to the domains of conflict*
- *Secure a superior information position and convert it to a competitive advantage*
- *Leverage the path dependency of conflict*

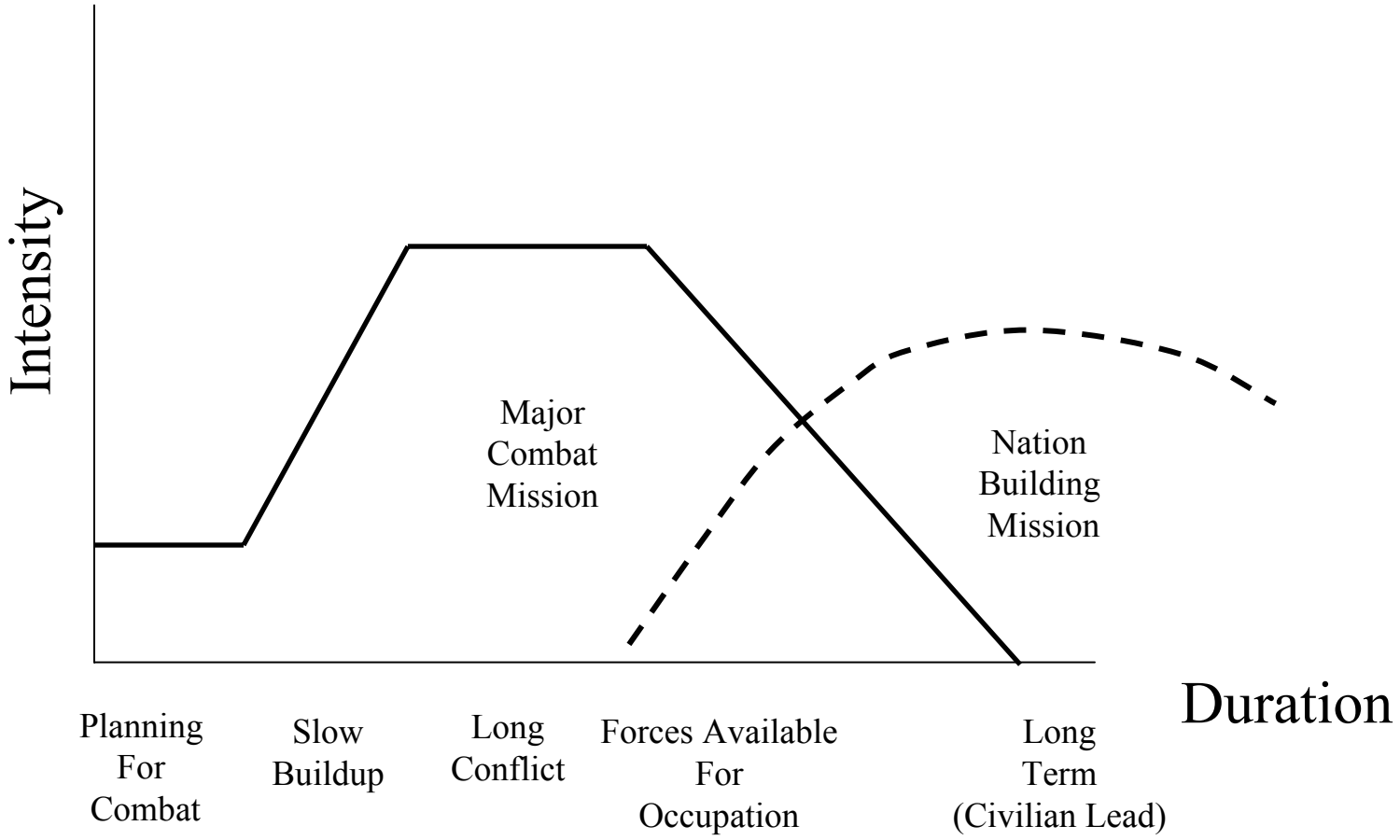
Corporate change based on co-evolution and continuous adaptive acquisition

Top Level Issues

…Culture: Attitudes, Values, Beliefs

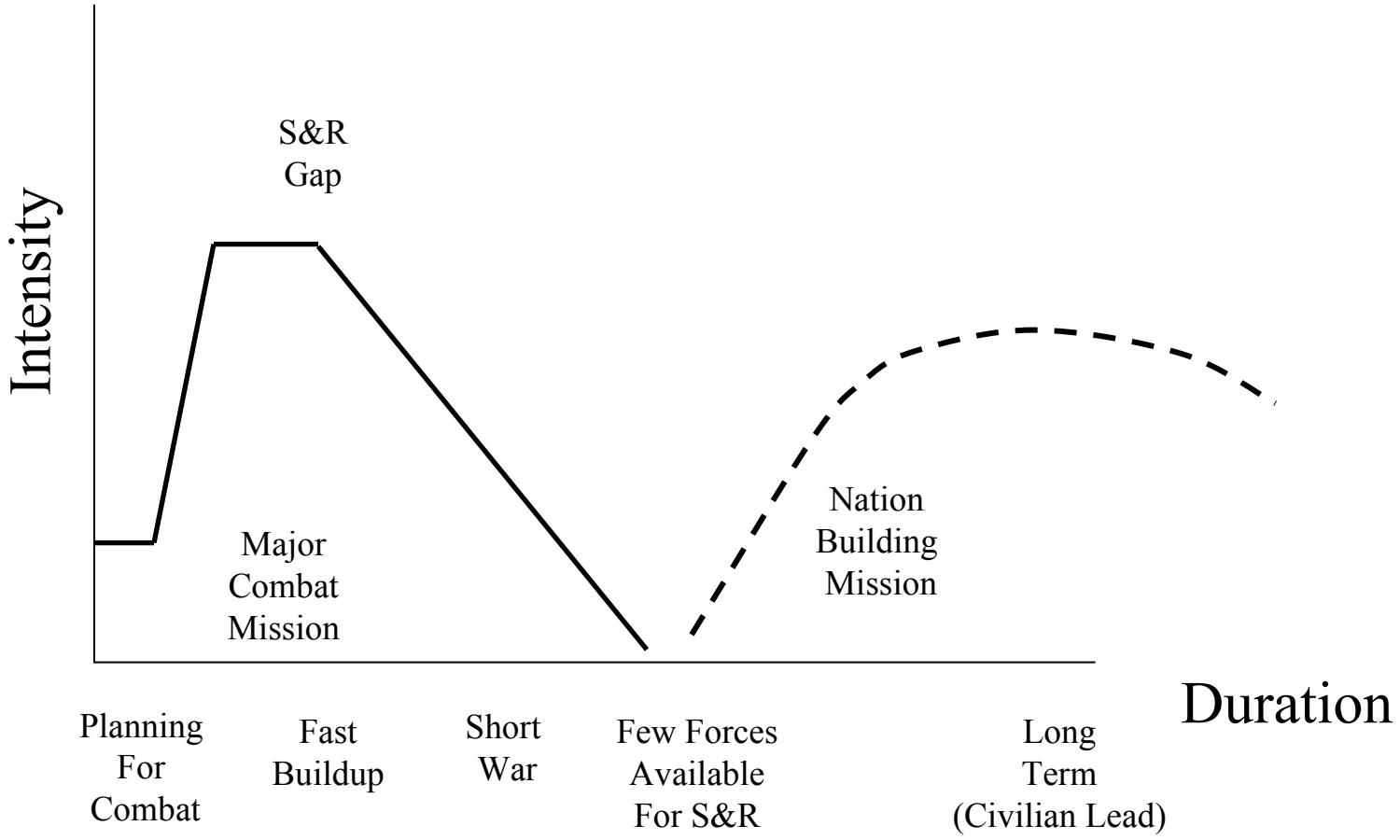
The Stabilization Mission Gap

. . . *Traditional Model*



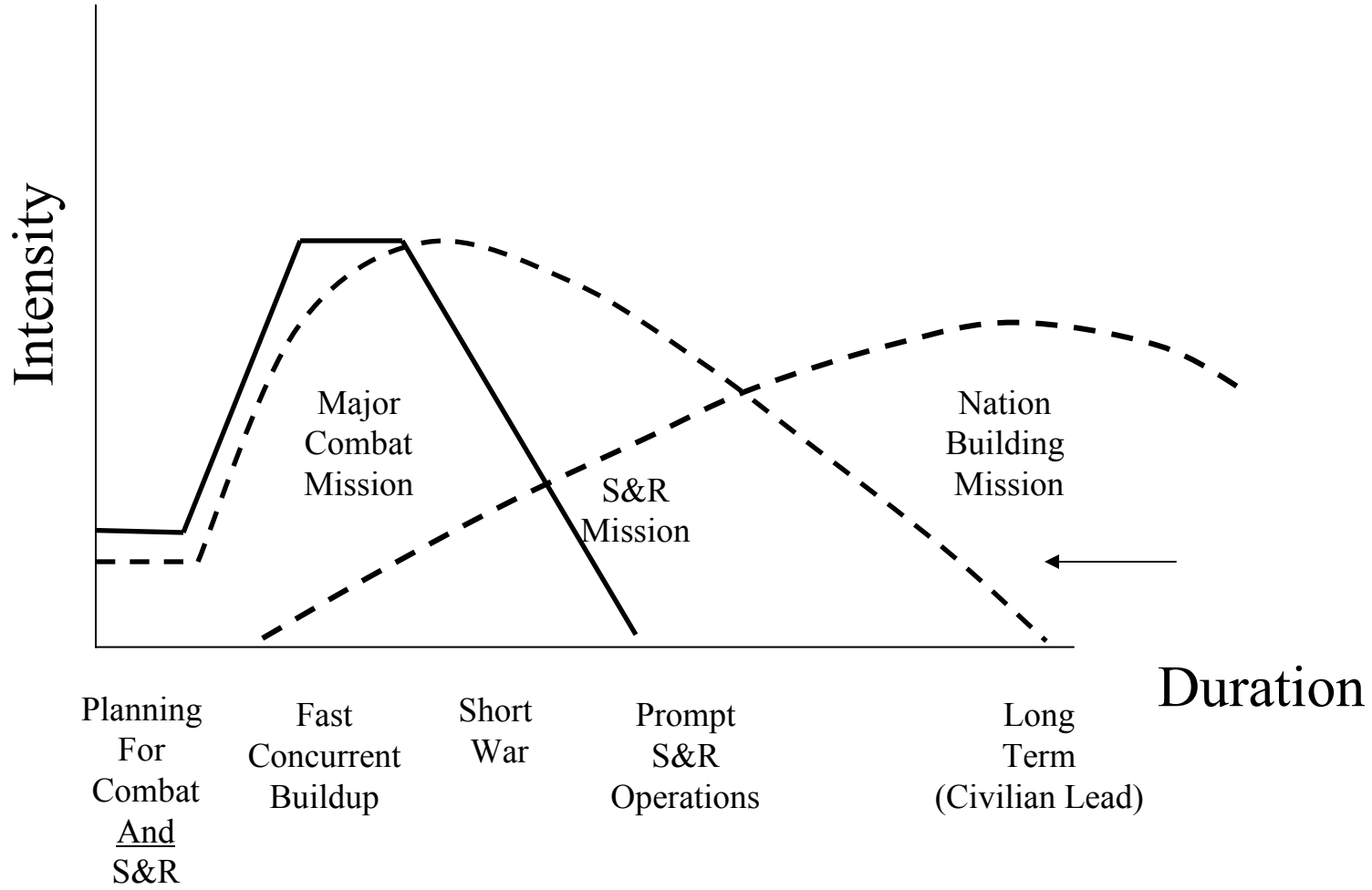
The Stabilization Mission Gap

. . .New Challenges



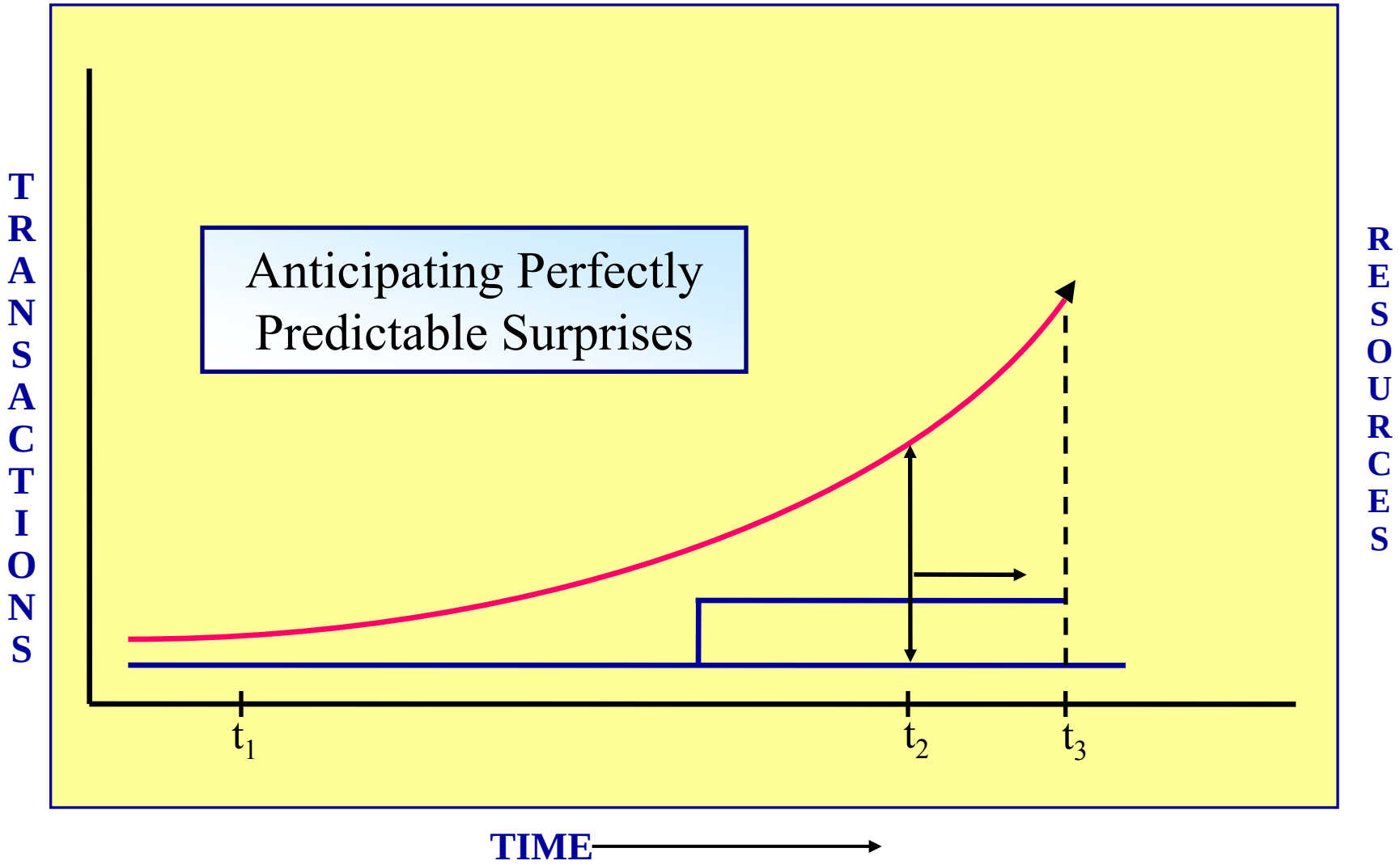
The Stabilization Mission Gap

. . . *Transformed S&R Capability*



Informing Transformation

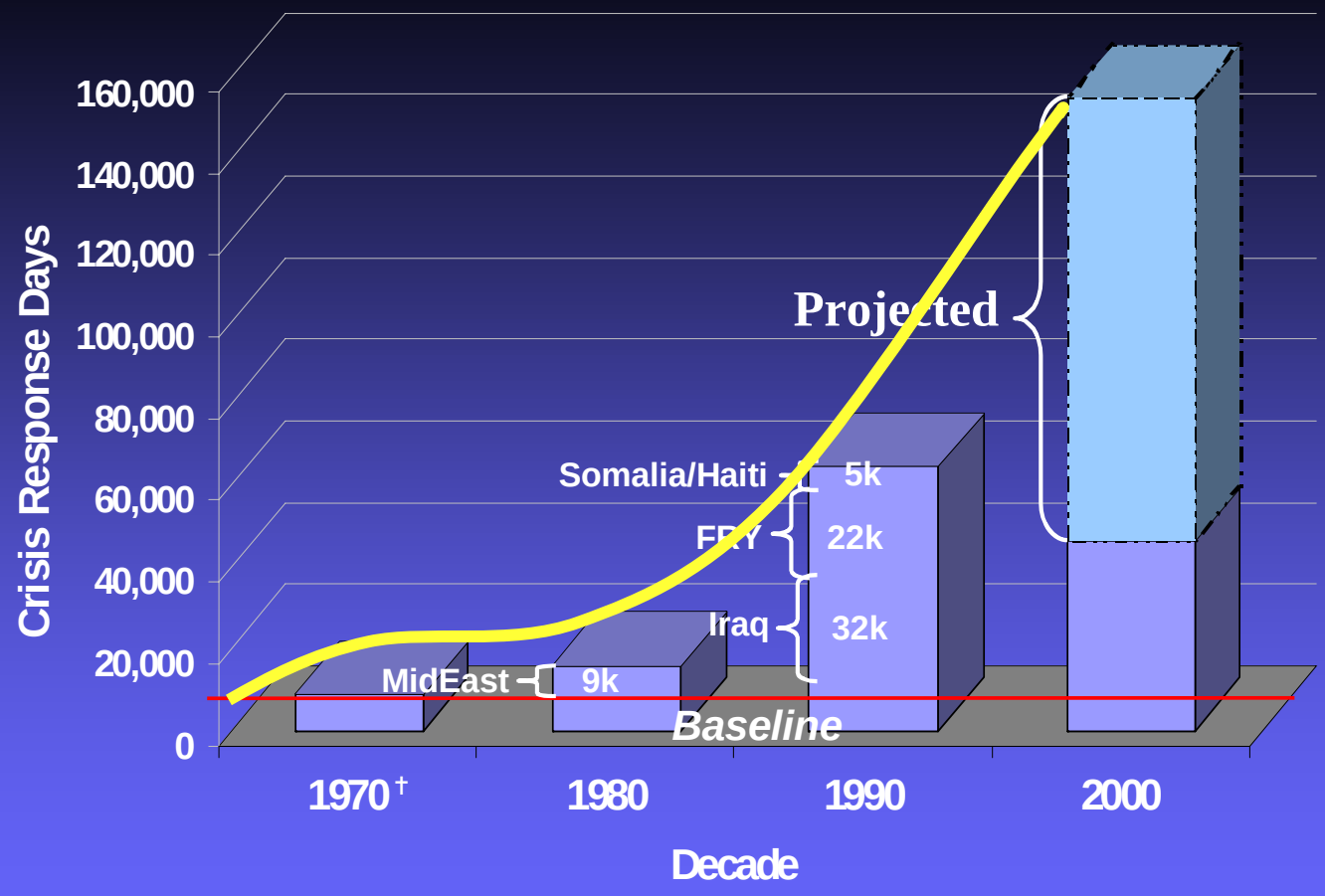
…Transactions vs. Resources



Global Trends and Implications

Policy Choices:

- *Engagement Policy*
- *Substitution of Capital for Labor*
- *Civil Component of National Security*
- *Allied / International Component*

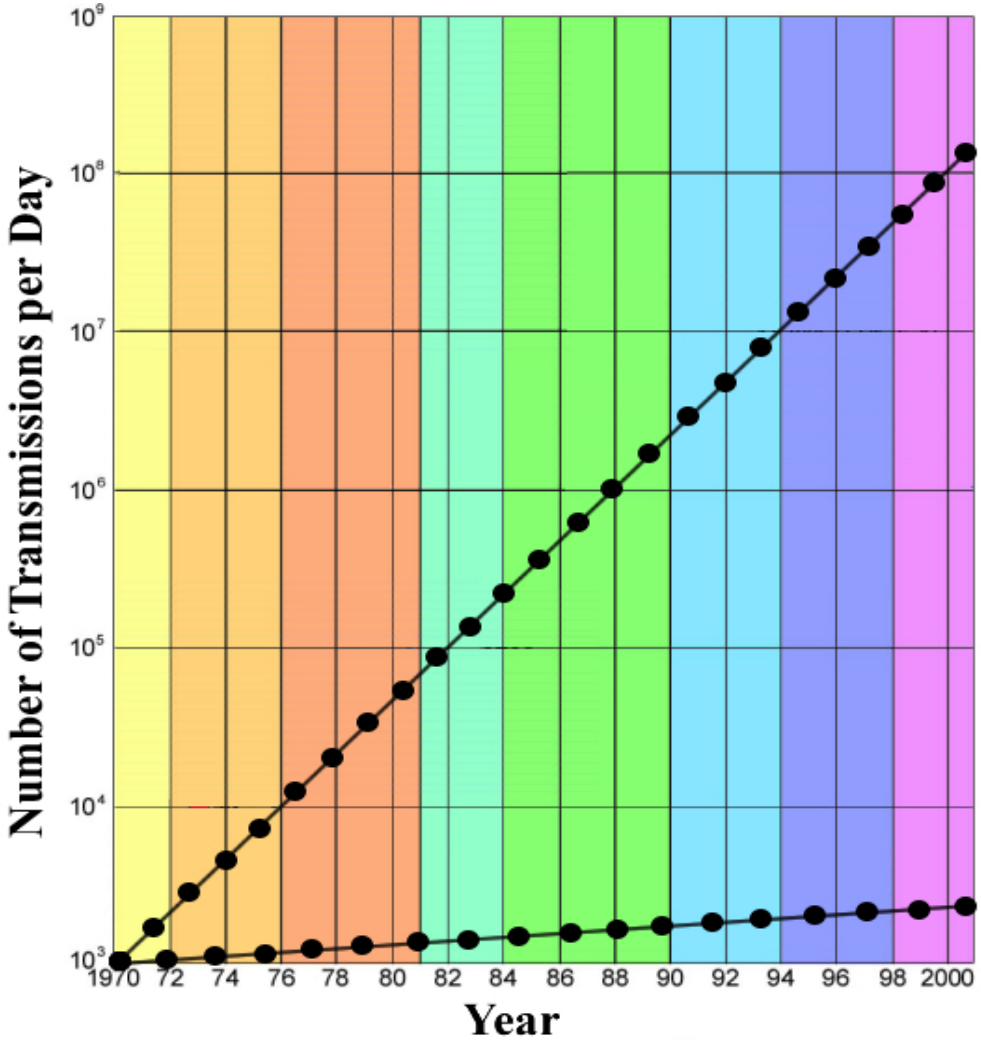


† Excludes Vietnam War

* Total number of response days for all operations by Army, Navy, Air Force and Marines

The Collection – Analysis Gap

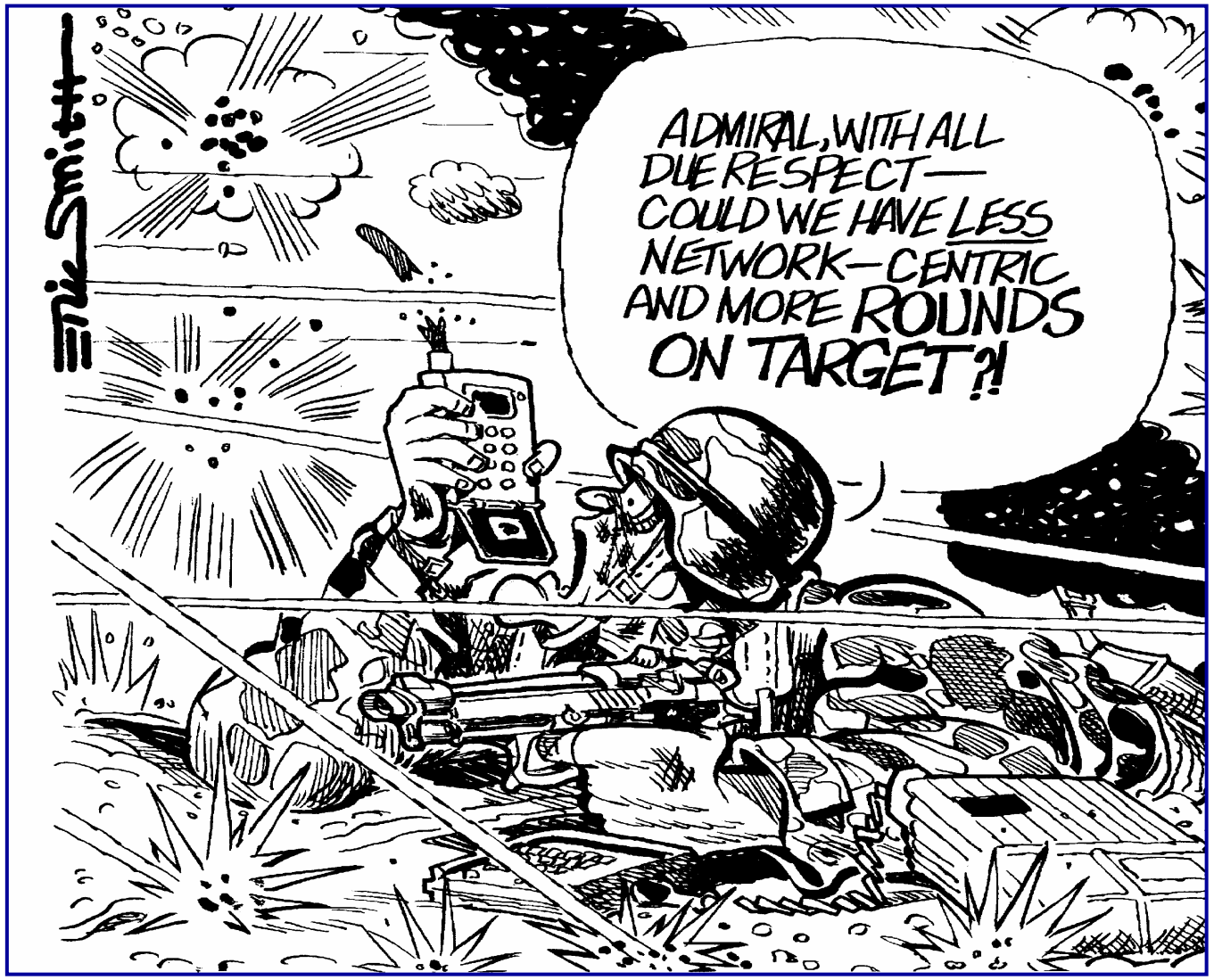
…Managing the Inevitable



Policy Choices:

- ***Automate Triage***
- ***Automate Analysis***
- ***We all become analysts***

Network Centric Warfare?



Transforming Defense

"Networked Forces

Outfight

Non-Networked Forces"

"…it allowed us to make decisions and execute those decisions faster than any opponent."

Lt. Gen. David D. McKiernan
Coalition Forces Land Component
Commander, OIF
23 April 03

Network Centric Operations

The National Defense Strategy
of
The United States of America

2005

We will conduct network-centric operations with compatible information and communications systems, usable data, and flexible operational constructs.

Capstone Concept
for
Joint Operations

August 2005

A knowledge empowered force, capable of effective information sharing across all agencies and partners, will be able to make better decisions quicker, increasing joint force effectiveness.

Military Response to Information Age

…Network Centric Warfare

Translates an Information Advantage into a decisive Warfighting Advantage

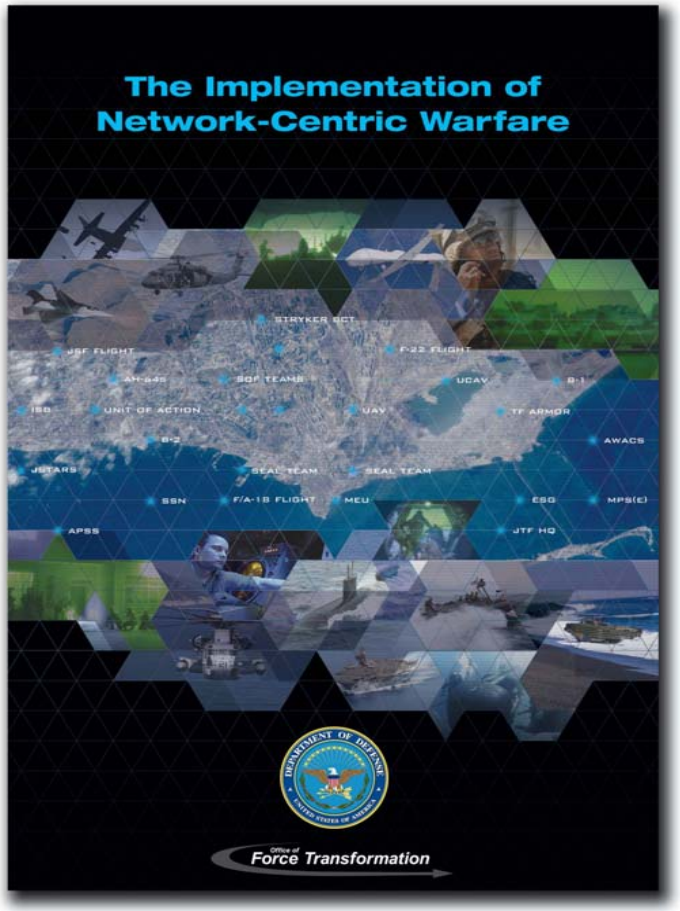
Information Advantage - enabled by the robust networking of well informed geographically dispersed forces

Characterized by:

- Information sharing
- Shared situational awareness
- Knowledge of commander's intent

Warfighting Advantage - exploits *behavioral* change and new doctrine to enable:

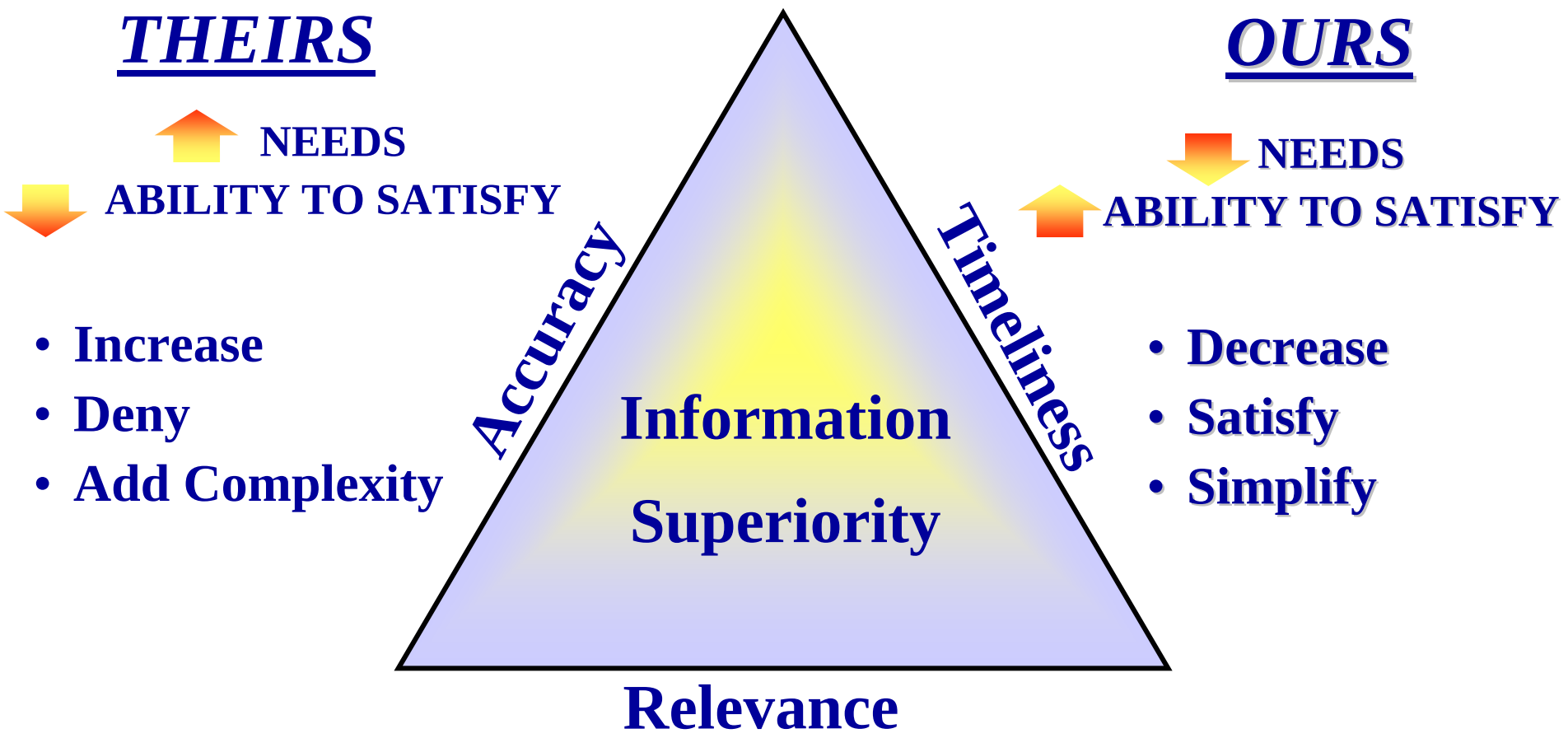
- Self-synchronization
- Speed of command
- Increased combat power



Information Sharing is a New Source of Power

Competitive Advantage

…New Sources of Power



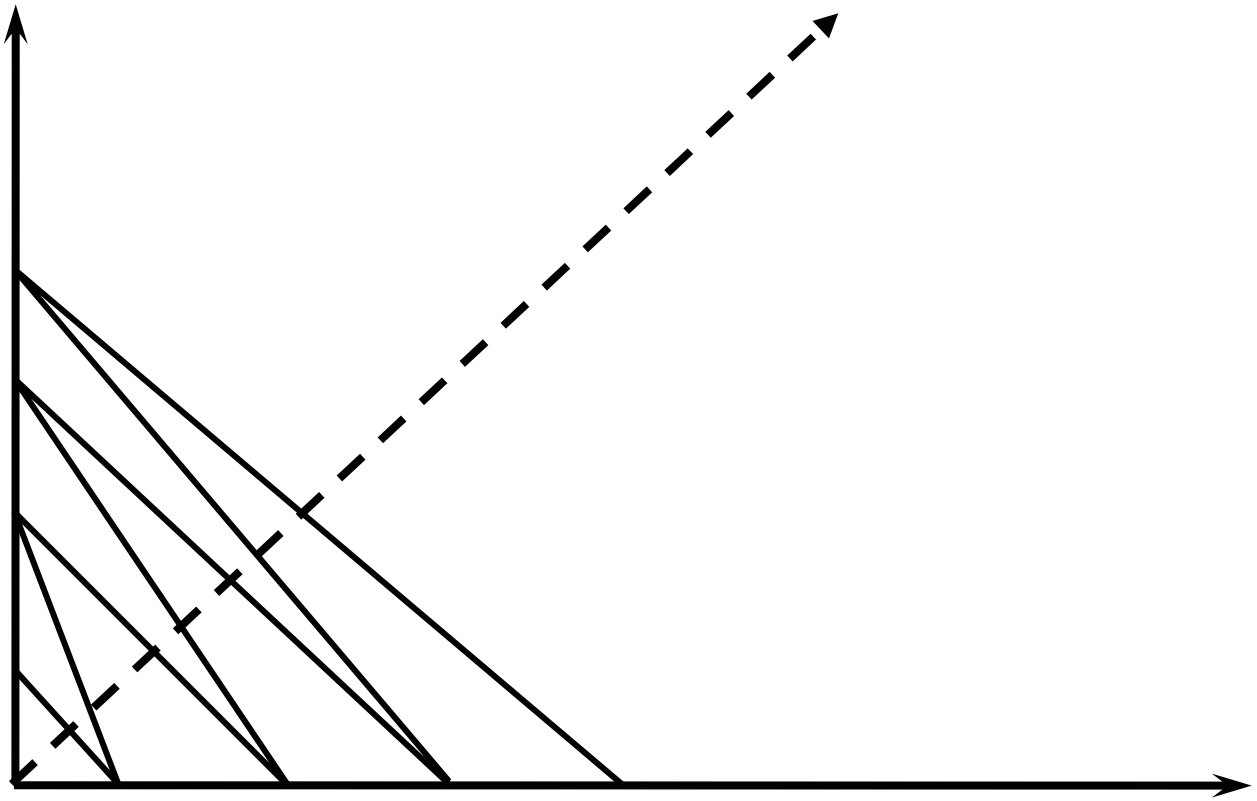
"We need a force which is designed and capable of fighting first for information superiority."

Learning Rate

Competitive Advantage

Information "Richness"

- Content
- Accuracy
- Timeliness
- Relevance



Information "Reach"

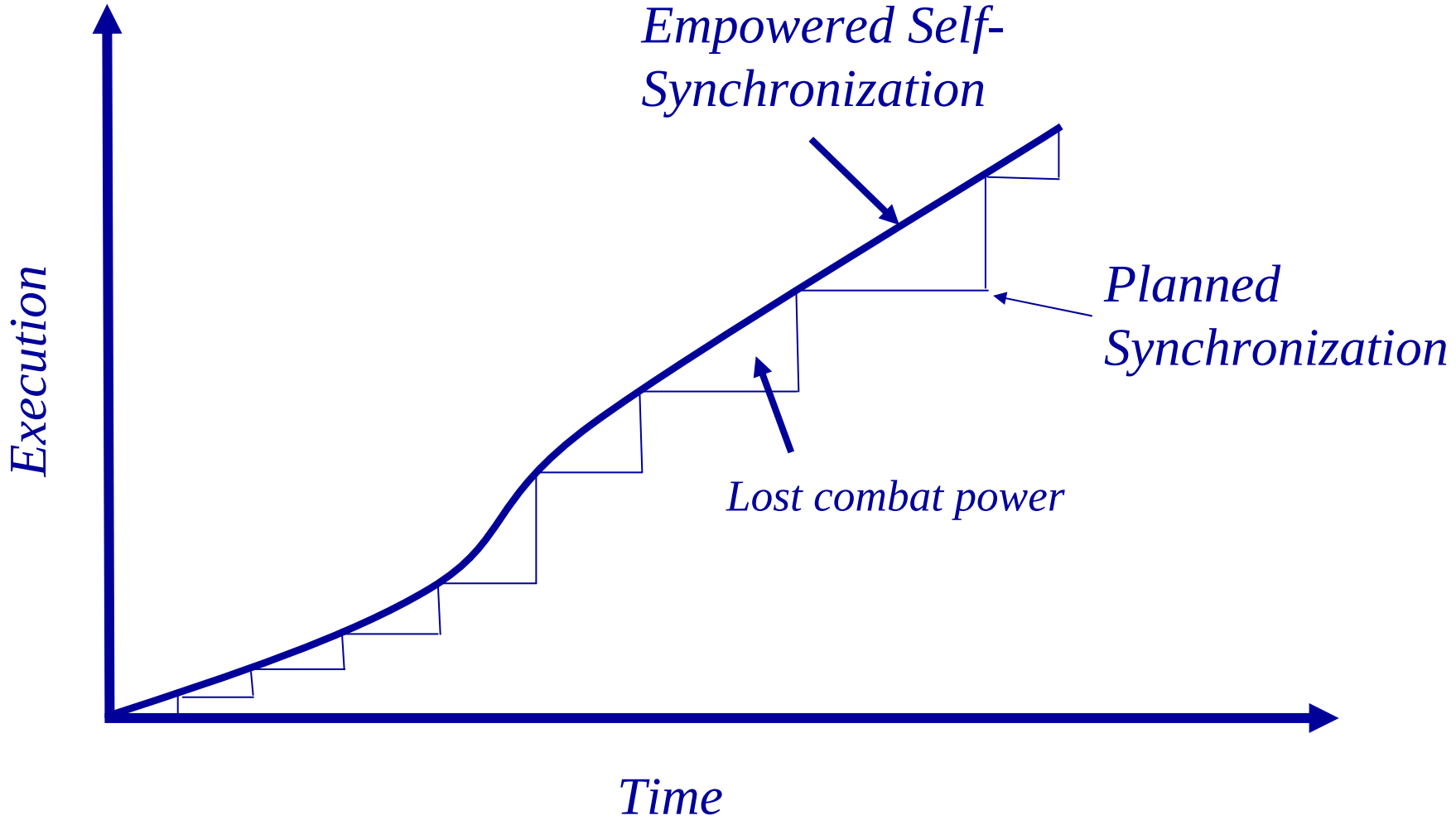
Network-Centric Warfare

PLANNING	Distributed Collaborative Fast/Adaptive
ORGANIZING	Follows information Trimmed for speed
DIRECTING	By ruleset and incentives Self-synchronization By ensuring information access
CONTROLLING	By ensuring information access Trimmed for speed

It's all about information access and speed. . .

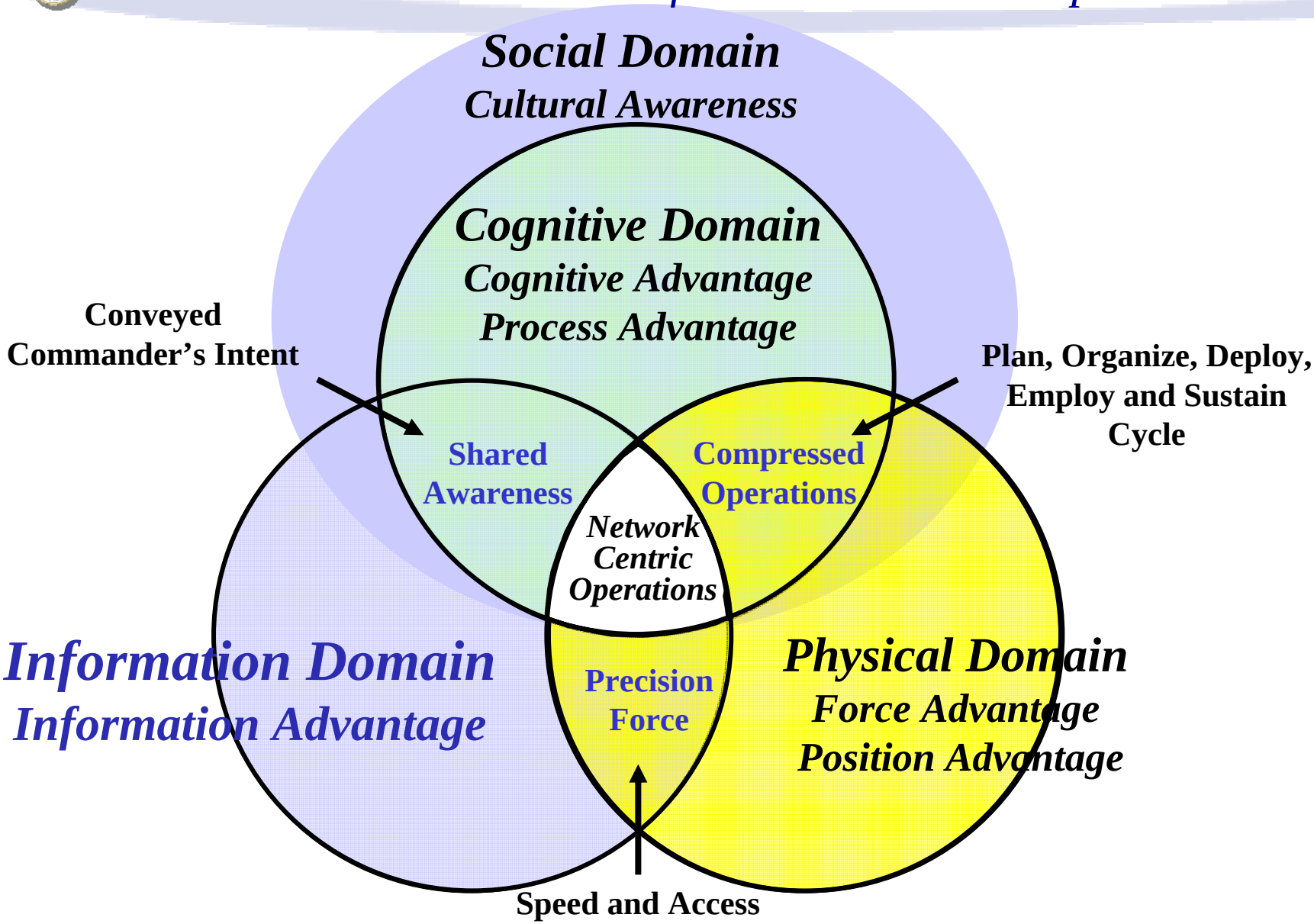
Ability to Adapt

…Learning rate



Competing in the Information-Age

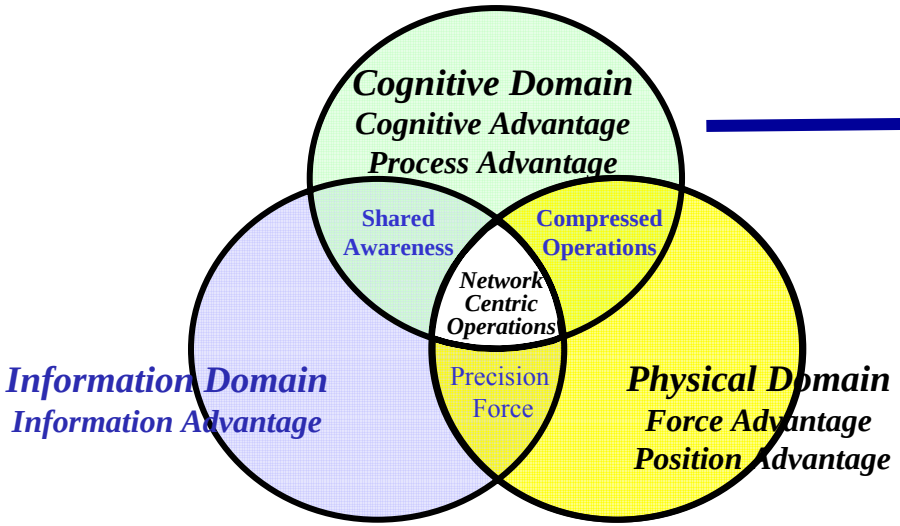
…The Power of Network-Centric Operations



Effects-Based Operations

Findings From Combat

Land	Maneuver	≈ 60%
	Attrition	≈10%
Air	Lack of Knowledge/SA	≈80%
	Surprise	≈80%
Sea	Lack of Scouting	≈80%
	Surveillance	≈80%



Network-Centric Warfare

High Rates of Change

Closely Coupled Events

Lock in/Out

Speed of Command

Self Synchronization

What's Valued

Maneuver

Sensing

Speed / Endurance

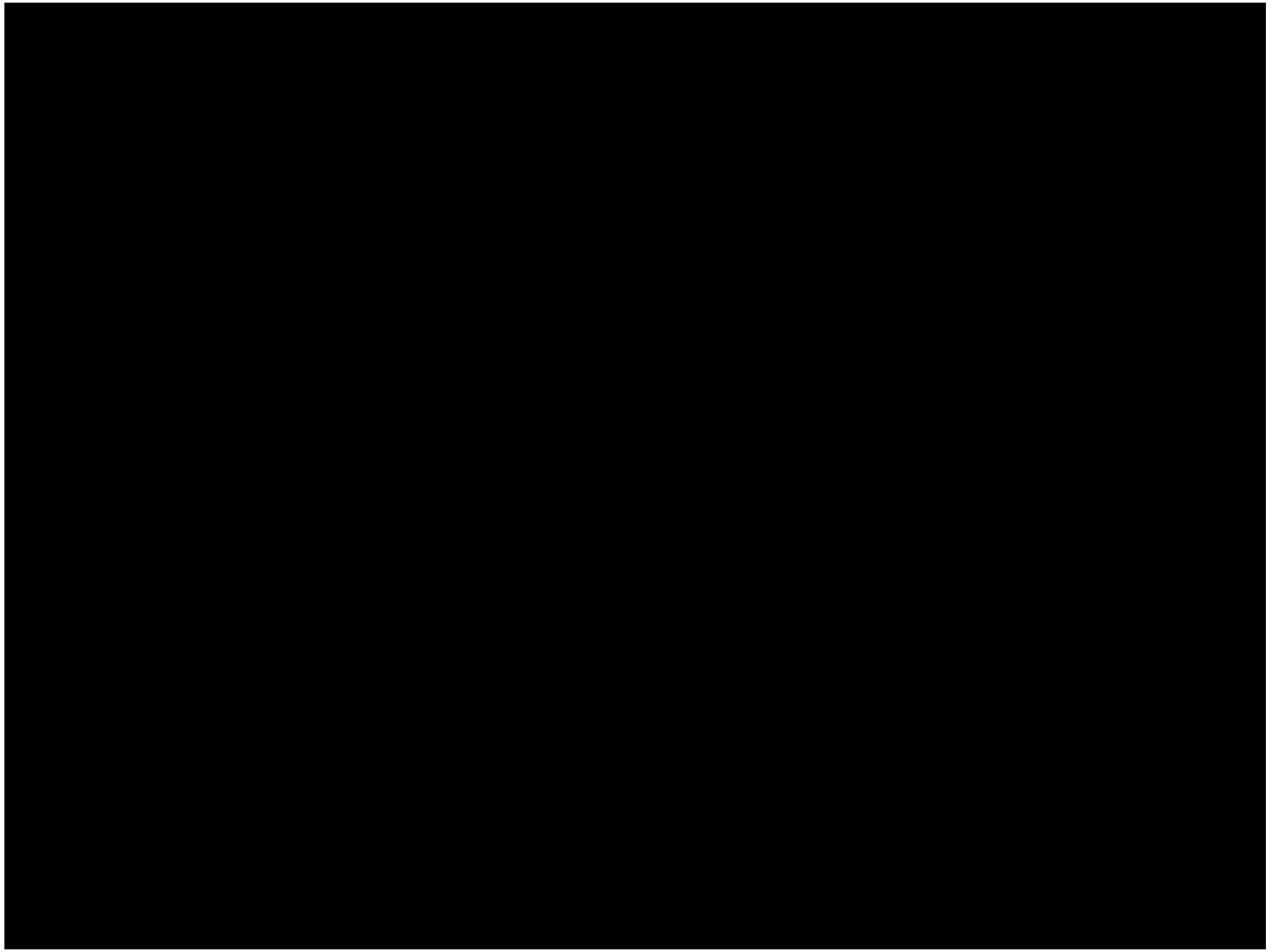
Numbers

Risk Tolerance

Networking

Shared Awareness

…The new competitive advantage



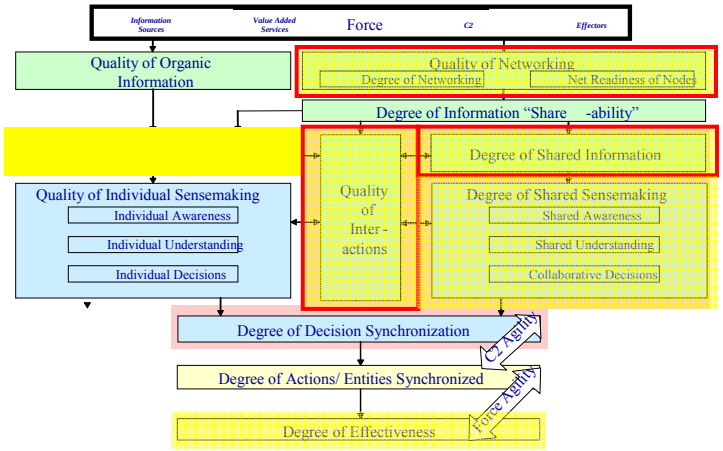
Source: New York Times Television – The Perfect War, 2004

Stryker Brigade

Scenario

- SBCT attack on Shughart-Gordon
- Certification Exercise (CERTEX) at Joint Readiness Training Center, May 2004

Area of Focus



Hypotheses

- Stryker Bde NCO capabilities provide significant information and decision superiority and increase force effectiveness and are a source of combat power

Findings

- Friendly Enemy casualty ration decreased from 10:1 to 1:1
- Increase in Individual/ shared information Quality from about 10% to ~80%
- Acceleration of speed of command from 24 to 3 hours in key engagement
- bottom line result: allowed CMD ability to control the speed of command

Western Iraq Case Study

. . .Key Findings to Date

- Western Iraq was the ***most "networked" theater of operations***, operationally and tactically, in the history of warfare.
- ***Largest conventional & coalition SOF operation*** in the history of warfare.
- ***Largest scale use of tactical data-links*** in history of warfare.
- Only area of operation in Iraq where Blue Force Tracking information on SOF + conventional ground forces was provided via data link to fixed wing combat aircraft.
- Zero Fratricide: ***Only area of operations in Iraq where air-to-ground fratricide was eliminated***

Identify Issues of Regret

… Candidates for Action Now

Warfare Elements

- ***Fire* –** non-lethals, directed energy, redirected energy
- ***Maneuver* –** seabasing, vertical battlefield, lift for operational maneuver
- ***Protection* –** urban operations, "biomedical countermeasures" cycle time
- ***C2&C* –** joint interdependency vs. interoperability
- ***ISR* –** demand-centered intelligence, tactically responsive space
- ***Logistics* –** joint demand-centered logistics

Risk Management (*creating on-ramps*)

- ***Joint concept development & experimentation* –** short cycle time / rapid iteration, concept-based / technology-enabled
- ***Joint training* –** live / virtual / constructive / distributed
- ***People* –** culture and organizations

Project "*Stiletto*"

Distributed Adaptive Operations

- Mass effects without massing forces
- Influence actions broadly
- Exploit the network
- Create high transaction rates
- Self-organize decision-making
- Generate organic intelligence
- Adapt rapidly
- Execute either distributed or concentrated operations
- Create overmatching complexity

LOA		**80'-0"**
Beam		**40'-0"**
Tunnel Width (4)		**5'-0"**
Draft (static)		**2'-4"**
Displacement		**67 MT**
Payload		**15 MT**
Fuel Load		**10 MT**
Classification		**ABS**
Main Engines	**4 x 1650HP C-30 Caterpillars**	
Surface Piercing Propellers		**4**
Speed	**Max @ full load**	**50-55 knots**
Range @ full load & max speed		**500 NM**
HP Required (total)		**6200hp**
Clear Height		**15'-0"**
Payloads		**43% of Displacement**

Project "Sheriff"

…Controlling the Engagement Timelines

The Capabilities

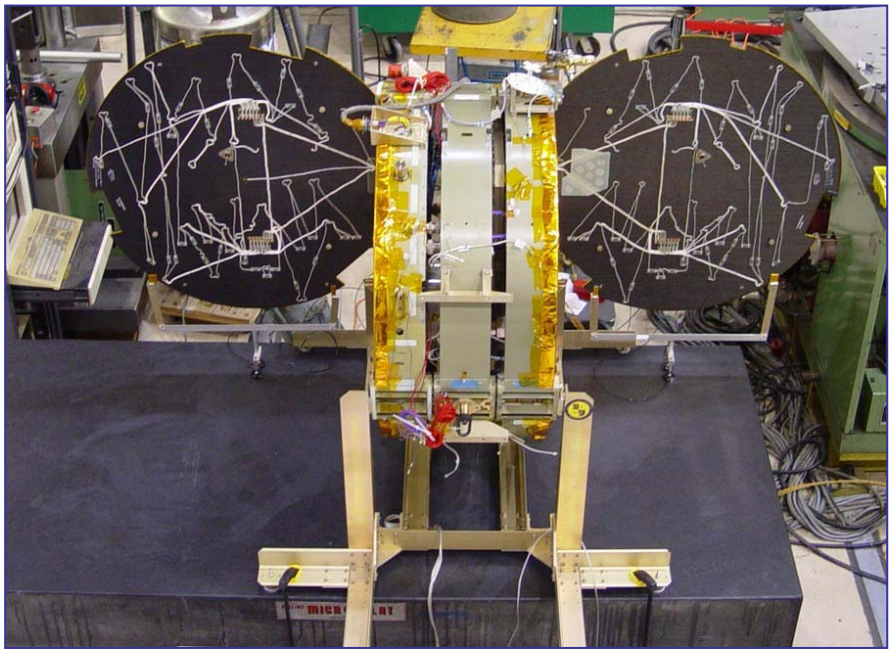
- "Speed-of-light Sensing
- Networked
- Lethal/Non-Lethal Options
- Active/Passive Options
- Kinetic/Non-Kinetic Options
- Survivability

The Technology

- Compact Active-Denial Technology
- Phraselator High-Power Direction Hailer
- Vector-Beam High-Power White/IR Spot Light
- Counter Improvised Explosive Device (IED)
- Active Protection
- Counter Sniper
- Rapid-Fire Kinetic Weapon
- Multi-Spectral Sensor Suite
- Armor Protection
- Integrated Electronic Warfare Suite
- Net-Centric Technology

Operationally Responsive Space

…TACSAT 1



A capability on orbit within the planning time constraints of a major contingency

- Responsive
  - < 2 Yr concept to on-orbit capability
- Low Cost
  - Total cost of experiment less than $15M including launch
- Experiment
  - UAV Components in Space
  - Space/Air Horizontal Integration
  - Designer Payloads
  - TCP/IP Based: SIPR Net Accessed
  - New commercial launch vehicle
- Operationally relevant capability
  - Integrated into Combatant Commanders Exercises/Experiments
  - Time / Capability Trade Off

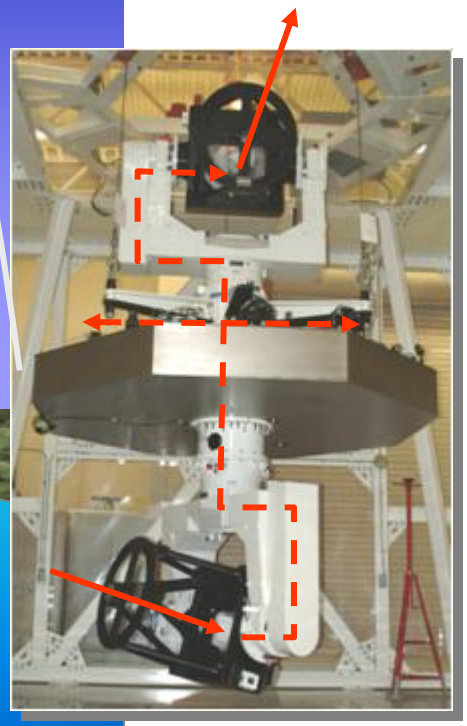
Re-Directed Energy

…Concept Description

Warfighting Advantage:

- **Decrease Engagement Timeline**
- **Reduce Collateral Damage**
- **Revalue LOS Only Lasers**
- **Increase Shots per Laser**
- **Optimize Beampath Flexibility & Engagement Options**

Laser – Relay Mirror – Air Vehicle Technology Pairing



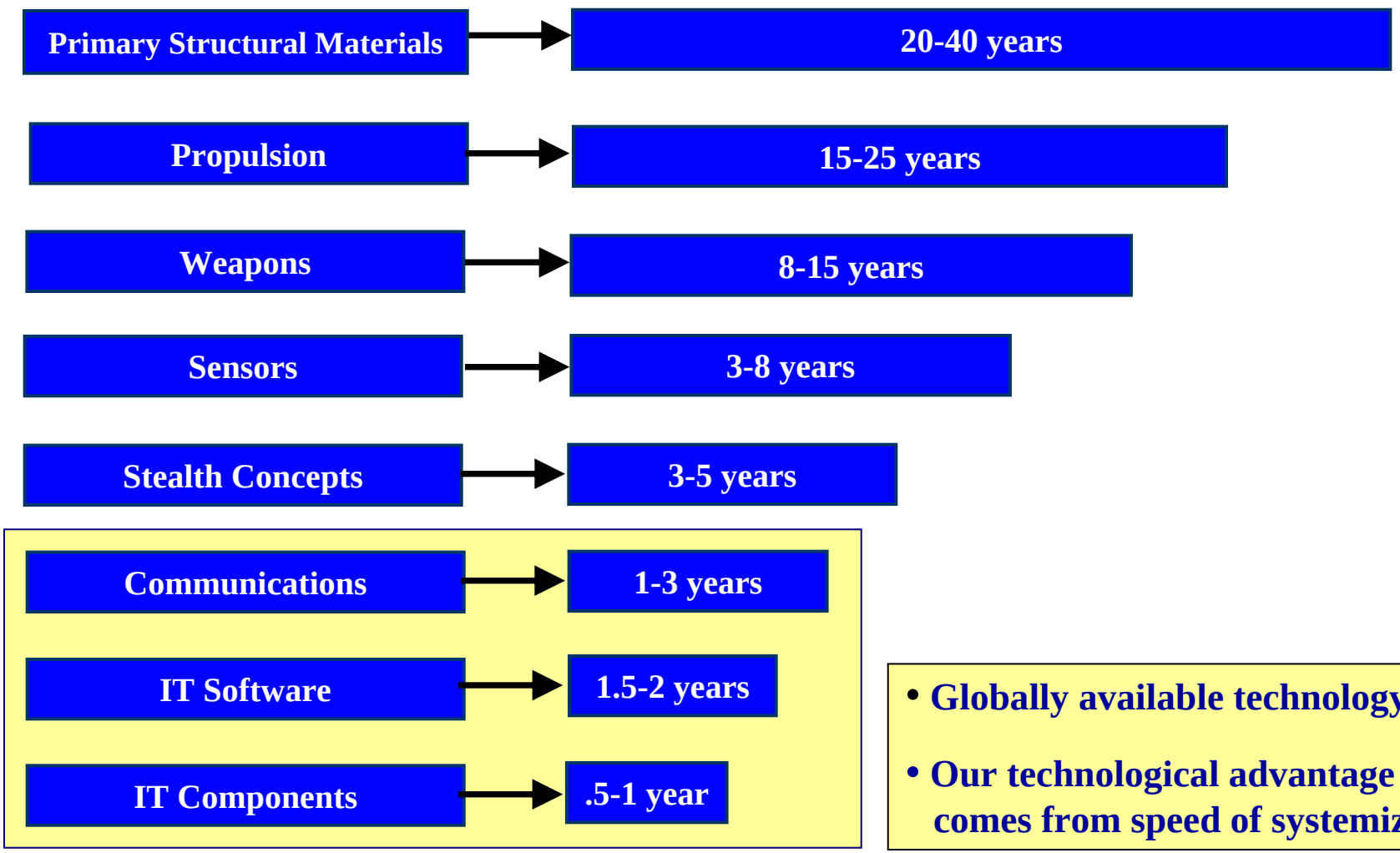
Strategic Approach to Cost

Key Elements

- *Decrease operational costs*
- *Achieve better ROI for less*
- *Broaden the capabilities base*
- *Create and preserve future options*
- *Manage divestiture*
- *Transform non-discretionary areas*
- *Impose cost to adversary*
- *Develop counter-cost imposing strategies*

New metrics create opportunities for new cost dynamics

Technology Trends and Cycles



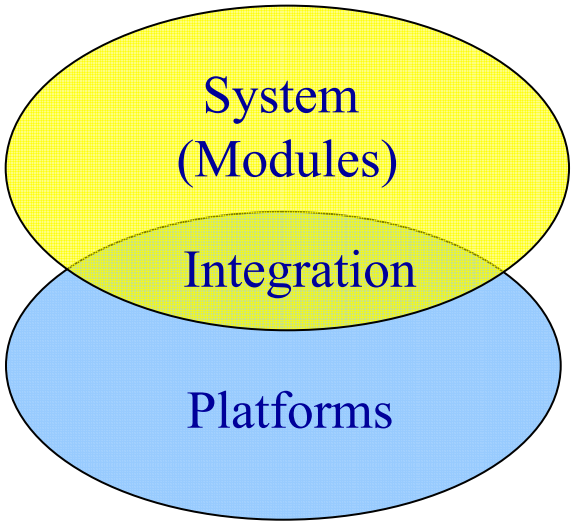
- Globally available technology
- Our technological advantage comes from speed of systemization

Alternative Architectures

…Characteristics

Focus in designing alternative architectures:

- Low unit cost
- Modularity
- Numbers
- Speed
- Networking
- Sensing
- Innovative designs
- Mass Customization



Preserve Strategic Advantage: innovation & the breadth, depth and diversity of the industrial base

Alternative Architectures

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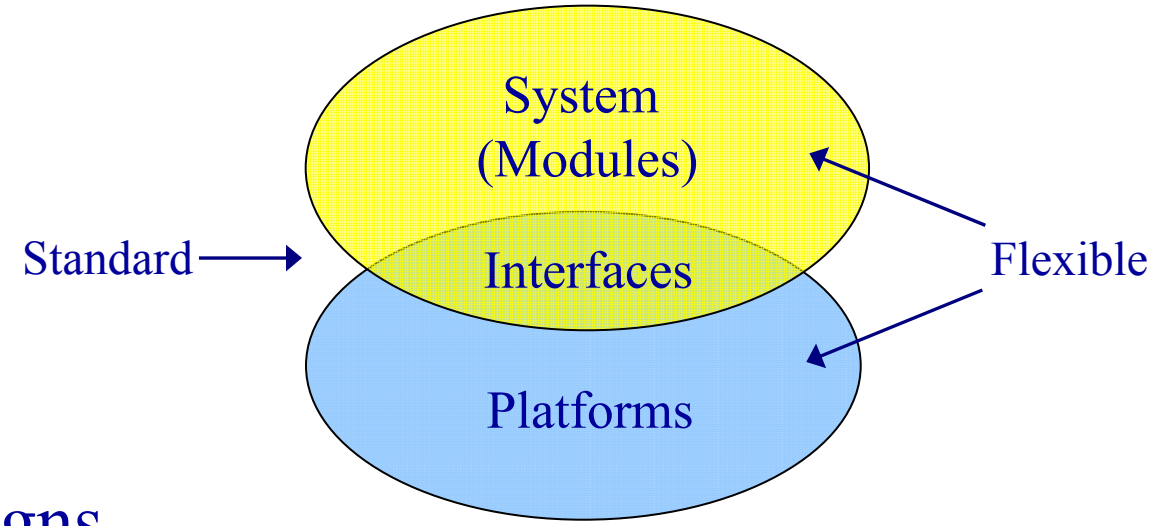

Preserve Strategic Advantage: innovation & the breadth, depth and diversity of the industrial base

New Logic and Metrics

- Achieve higher learning rates
  - *Co-evolve concepts, capabilities and processes*
  - *Continuous adaptive acquisition and experimentation*
- Employ higher transaction rates
  - *Faster cycle times*
  - *Speed of information and operational mobility*
- Create and preserve options
  - *Technology on-ramps*
  - *Broaden capabilities base*
  - *Mass customization*
- Create overmatching complexity
  - *Scalable*
  - *The small the fast and the many*

A Net-Centric DoD
NII/CIO

Transforming the Way the DoD Manages Data

Office of the DoD CIO

Net-Centric Data Strategy

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Daniel.Risacher@osd.mil
DoD CIO(IM), OASD/NII

Net-Centricity Objectives

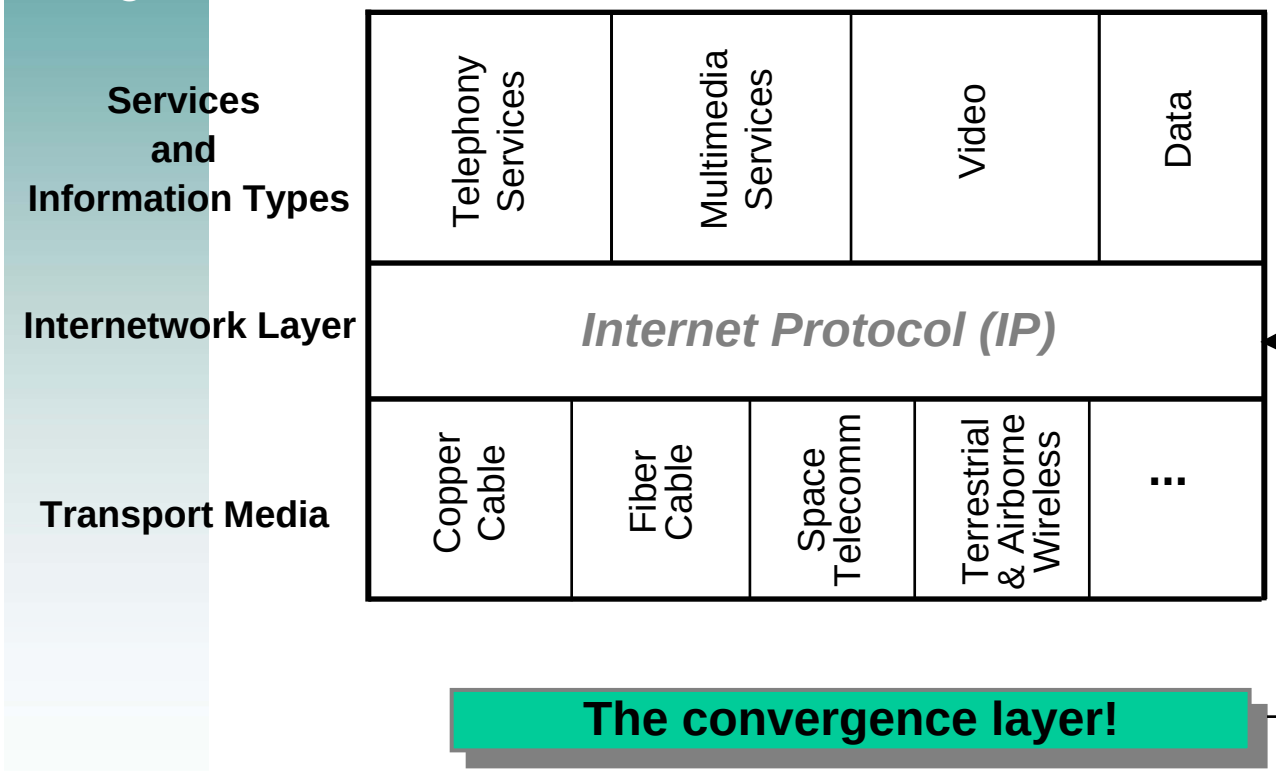
- Deliver capabilities-based service infrastructure for ubiquitous access to timely, secure, decision-quality information by edge users
- Enable information providers to post and share any information they hold
- Enable edge users to:
  - rapidly and precisely discover and pull information resources
  - dynamically form collaborative groups for problem solving
- Provide security for, and coordinated management of, netted information resources
- Supports transition towards Service-Oriented Architectures (SOAs) which, in turn, supports the shift towards ‘data interoperability’ versus ‘application interoperability’

Better information for better decisions

Net-Centric Attributes

- **IPv6** – IP, not point-to-point
- **Security** – IA enabled and encrypted communications
- **Dynamic allocation of access** – trusted access to net resources
- **Only handle information once** – data posted by authoritative sources and visible
- **Post in parallel** – data posted as it is created
- **Smart pull** – applications encourage data discovery
- **Data centric** – data separate from applications
- **Application diversity** – applications posted for use
- **Quality of service** – data timeliness, accuracy, completeness, ease of use

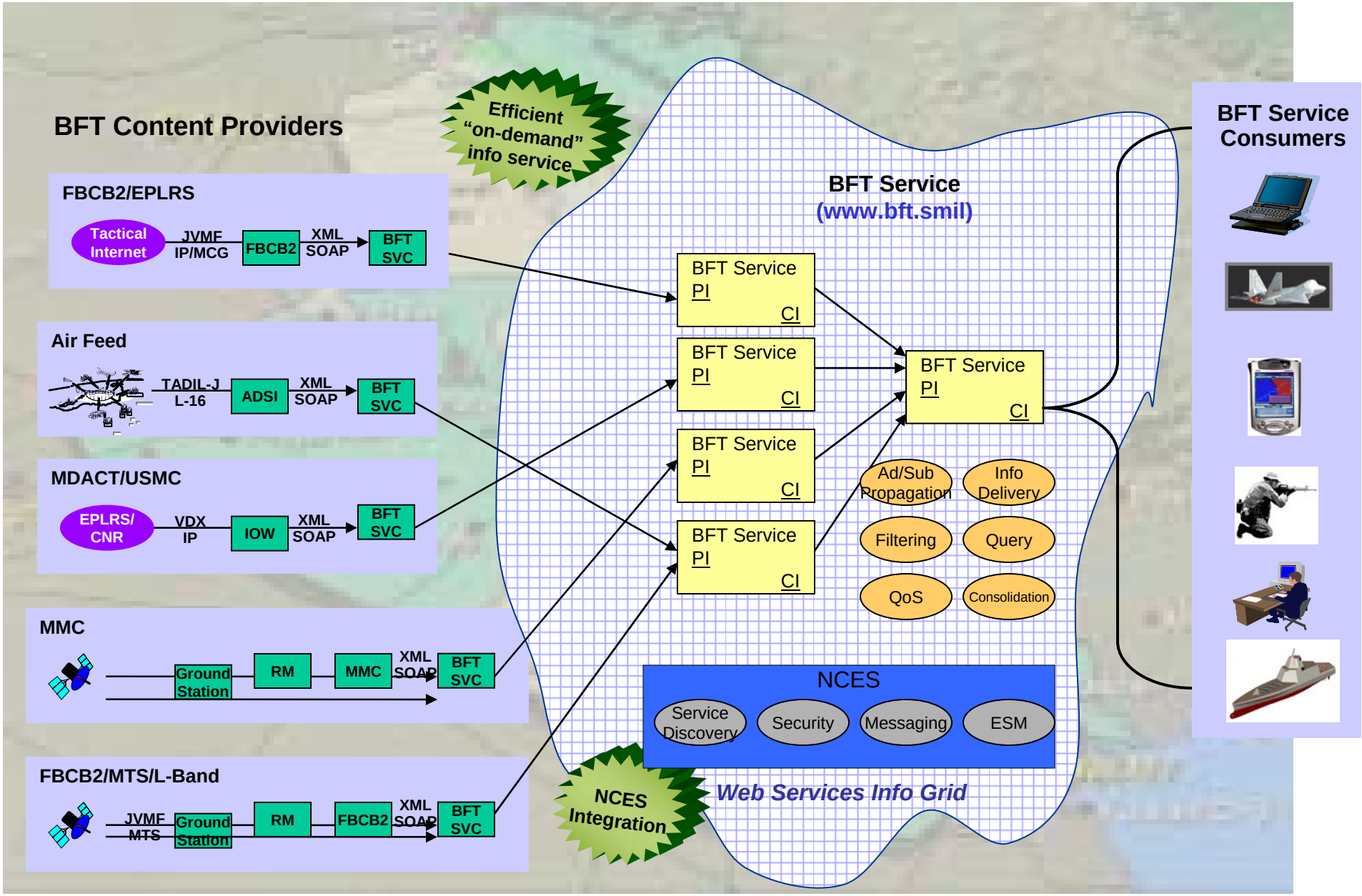
Global Information Grid: IP Based



- *World-wide* acceptance and *use*
- *Packet-switched* Internet transport
- Provides *common-user,* integrated services framework
- Provides *standardized interface* between Application and Transport Services
- Used over many network-level protocols (Ethernet, ATM, WAP…)

Blue Force Tracking (BFT) COI Service

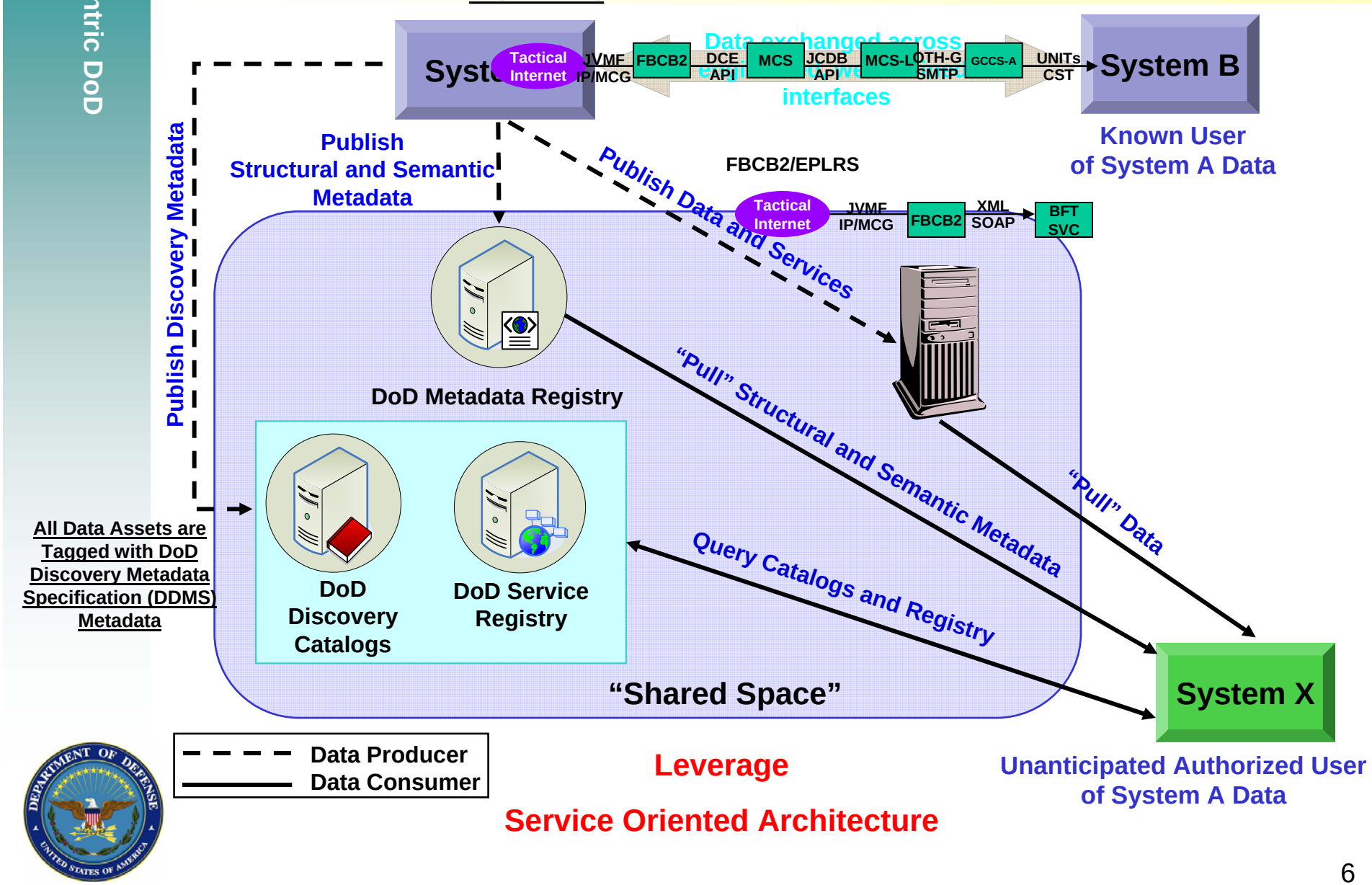
An Implementation of the DoD Net-Centric Data Strategy



A Net-Centric DoD
NII/CIO

Publishing and Subscribing of Data & Services

Supporting Both Known and Unanticipated Authorized Users



Making Data Visible

DoD Discovery Metadata Specification (DDMS)

Data Catalog
(historical)

DDMS Attributes	
Security	*
Title	*
Identifier	*
Creator	*
Publisher	
Contributor	
Date	
Rights	
Language	
Type	
Source	
Subject	*
Geospatial Coverage	
Temporal Coverage	
Virtual Coverage	
Description	
Format	

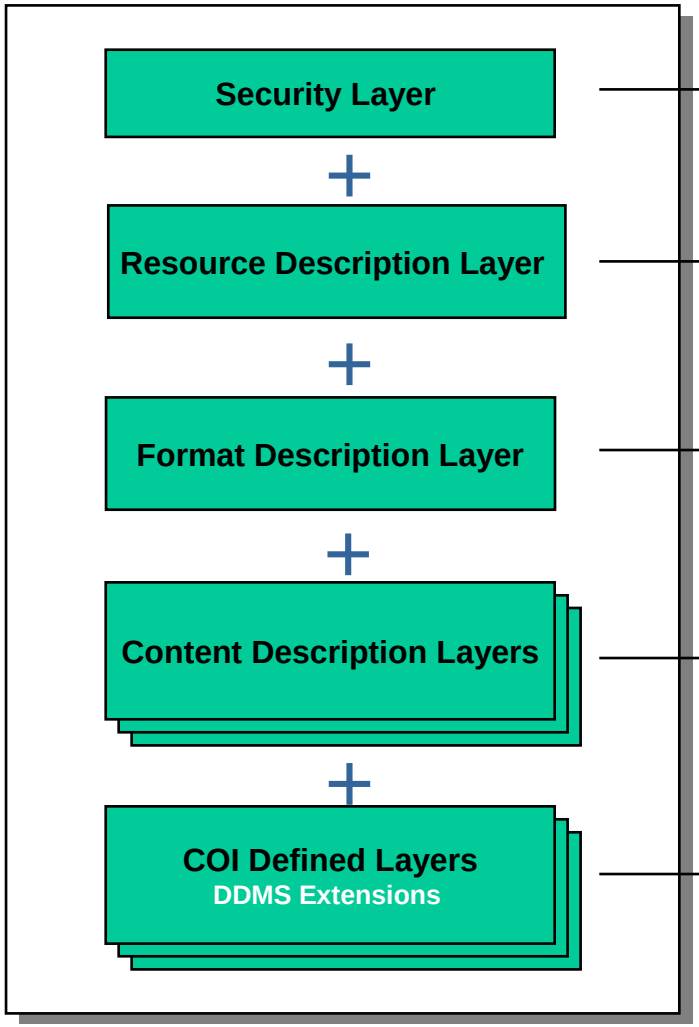
DDMS endorsed by Executive Order 13388

"Further Strengthening The Sharing Of Terrorism Information To Protect Americans"

* mandatory

DDMS: Leverages Industry Standard

DoD Discovery Metadata Specification (DDMS)



Security markings layer.

Resource maintenance and administration metadata (e.g., date created, author, publisher, title etc). Largely derived from Dublin Core.

Format-specific metadata (e.g., picture size, database record count, multimedia stream duration, file size, etc.)

Rich content descriptive metadata structure. Structured approach to provide robust method for discovery.

Community of Interest defined metadata extensions. Must be registered with DoD Metadata Registry for integration with Enterprise-wide capabilities.

BFT C2 COI – Content Provider Advertisement (DDMS)

advertmeta.xml

```
    <ddms:title>BFT COI</ddms:title>
  - <ddms:creator>
    - <ddms:Organization>
        <ddms:name>Army</ddms:name>
        <ddms:name>3ID</ddms:name>
      </ddms:Organization>
    </ddms:creator>
  - <ddms:subjectCoverage>
    - <ddms:Subject>
        <ddms:category ddms:qualifier="track" ddms:code="ground" />
        <ddms:keyword ddms:value="BFT" />
      </ddms:Subject>
    </ddms:subjectCoverage>
  - <ddms:temporalCoverage>
    - <ddms:TimePeriod>
        <ddms:start>2004-12-17T09:30:47-05:00</ddms:start>
        <ddms:end>2004-12-17T09:30:47-05:00</ddms:end>
      </ddms:TimePeriod>
    </ddms:temporalCoverage>
  - <ddms:geospatialCoverage>
    - <ddms:Place>
        <ddms:name>AOI1</ddms:name>
        <ddms:geoRef ddms:qualifier="aoi_s_lat" ddms:value="46.0" />
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        <ddms:geoRef ddms:qualifier="aoi_e_long" ddms:value="-169.0" />
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      </ddms:Place>
    </ddms:geospatialCoverage>
  - <ddms:protectedBy>
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      </ddms:Security>
    </ddms:protectedBy>
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</advertise>
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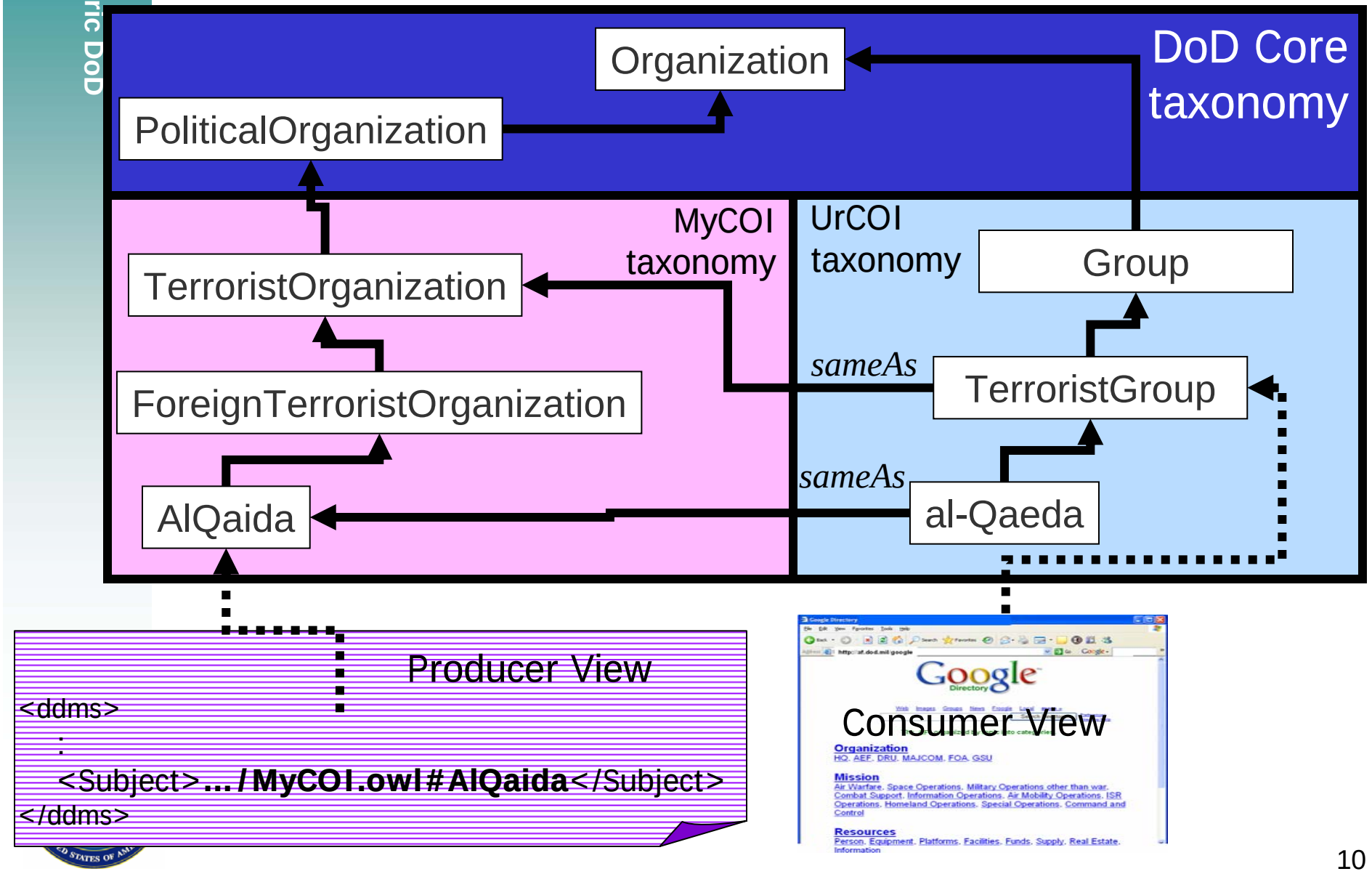
BFT Content Provider Advertisements

“ Army 3rd Infantry Division Unclassified Ground Tracks in AOI1 …”

Taxonomies to Support Discovery



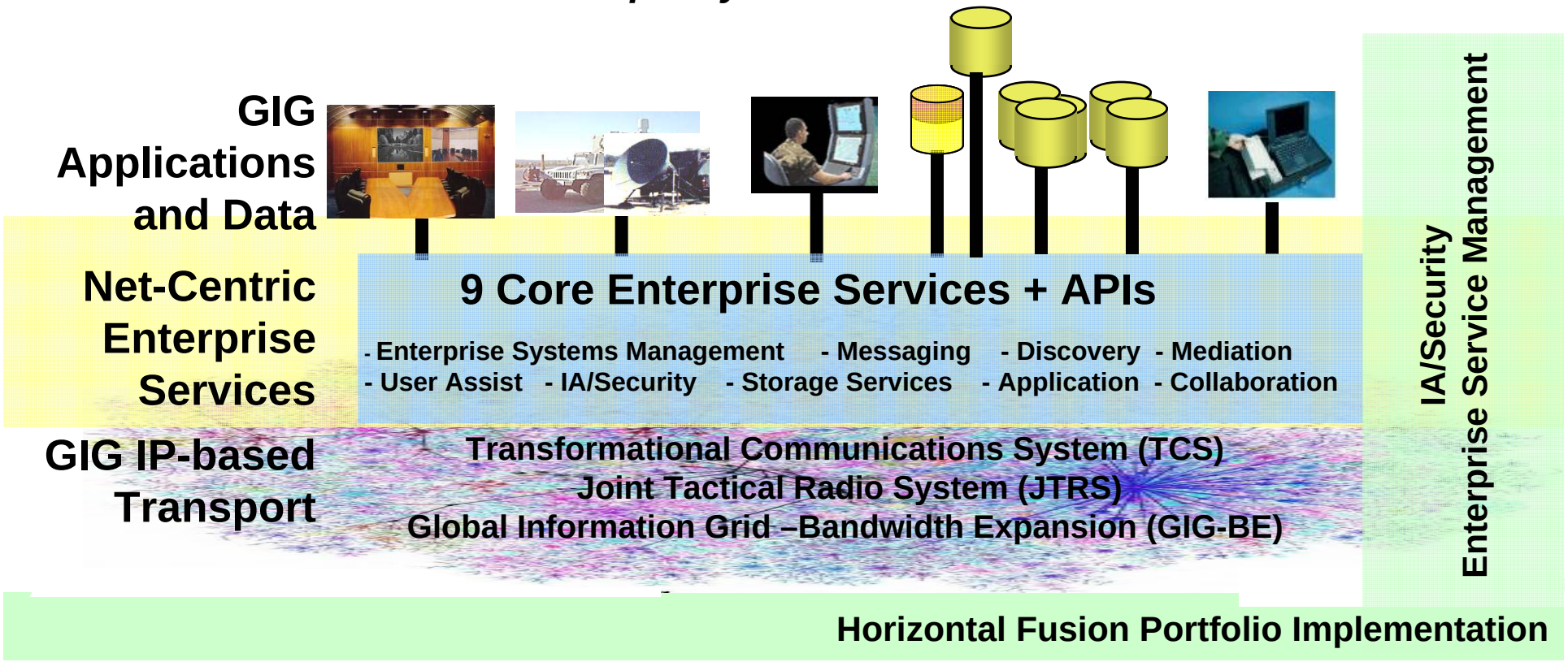
Data Sharing Responsibilities

Key Goal of DoDD 8320.2	Scope of Enterprise Role	Scope of COI Role
Make data visible	* Develop, maintain DoD Discovery Metadata Specification (DDMS) to facilitate DoD-wide search * Direct development of Enterprise search capability	* Tag data holdings with DDMS * Extend for COI specific search criteria
Make data accessible	* Maintain repository of acceptable commercial standards for web-based services * Direct development of federated service registry for web-services	* Implement access services * Register access services in federated service registry
Make data understandable	* Direct development of federated metadata registry for semantic and structural metadata	* Develop vocabularies, taxonomies for data exchange * Register these agreements in federated DoD metadata Registry

Net-Centric Enterprise Services (NCES)

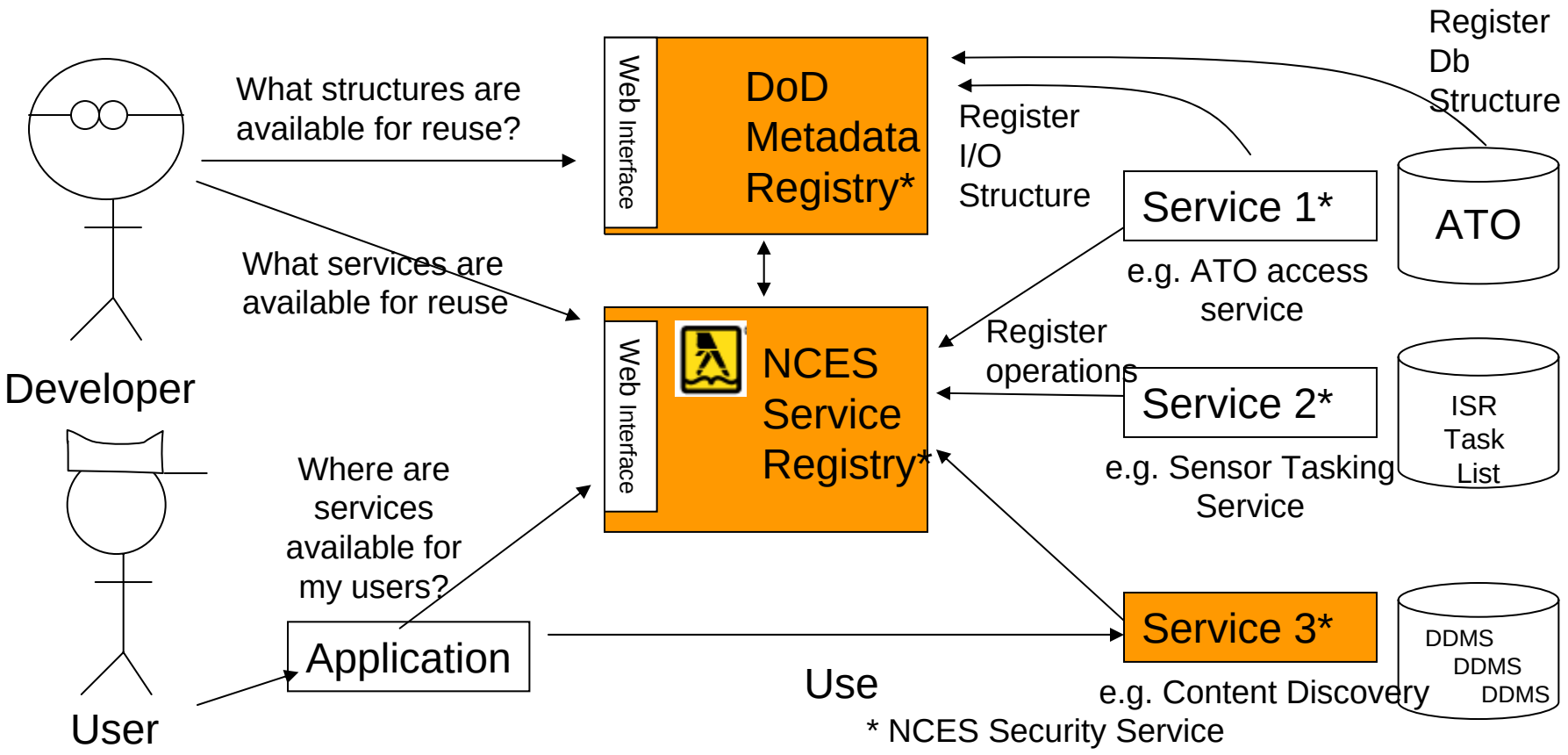
Part of the Global Information Grid

Net-Centric Enterprise Services (NCES) provide a common set of information capabilities for timely, secure, ubiquitous edge user access to decision-quality information within the GIG.



NCES Enabler:
SOA Foundation

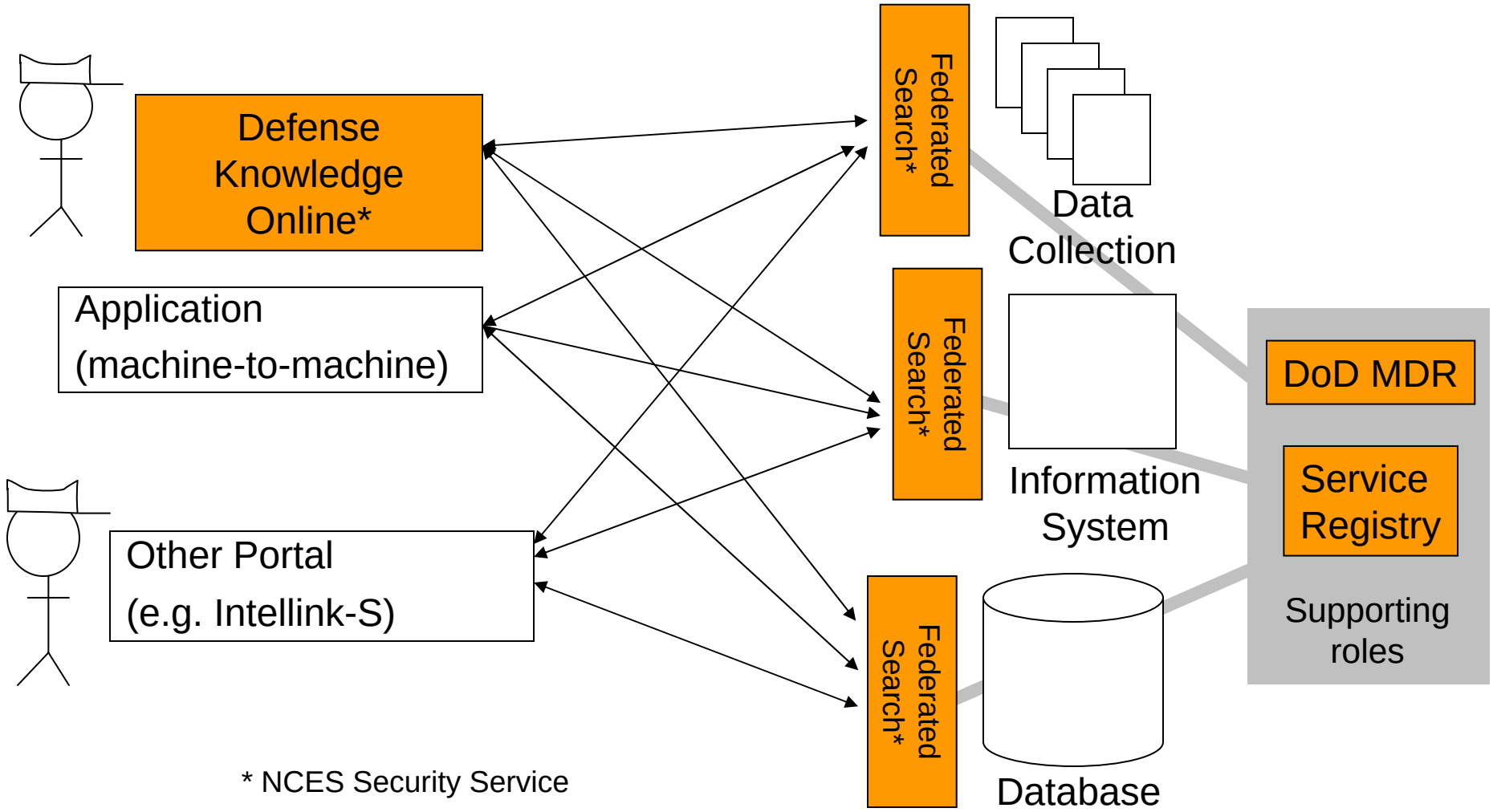
1. Register structural metadata
2. Develop & register web services
3. Develop applications



Warfighter, Intelligence, & Business User benefit *indirectly*

NCES Enabler:
Content Discovery

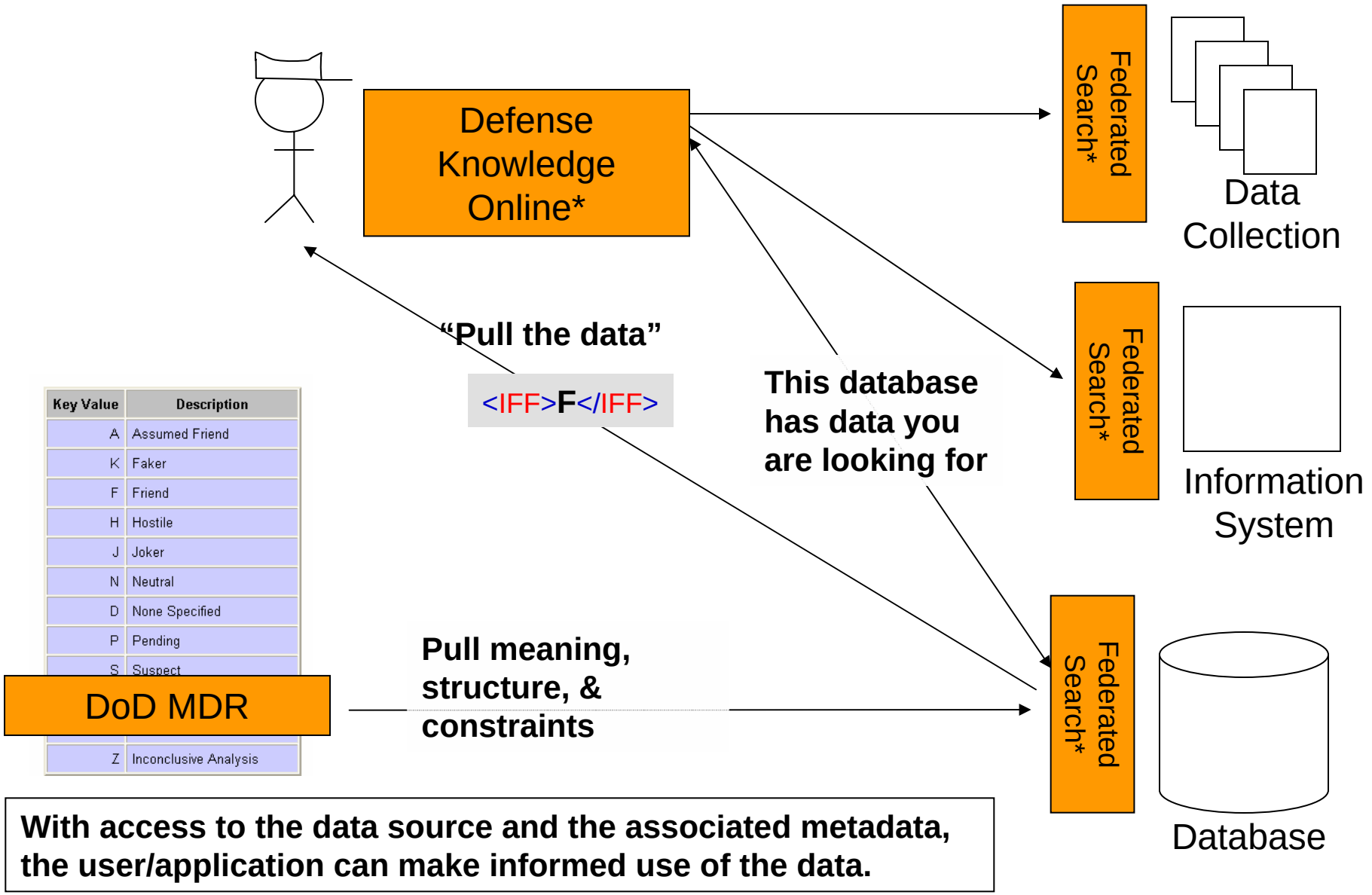
Search Web Service enables federated content searches



* NCES Security Service

Defense Knowledge Online is *one way* to use Content Discovery

Using Discovered Content



With access to the data source and the associated metadata, the user/application can make informed use of the data.

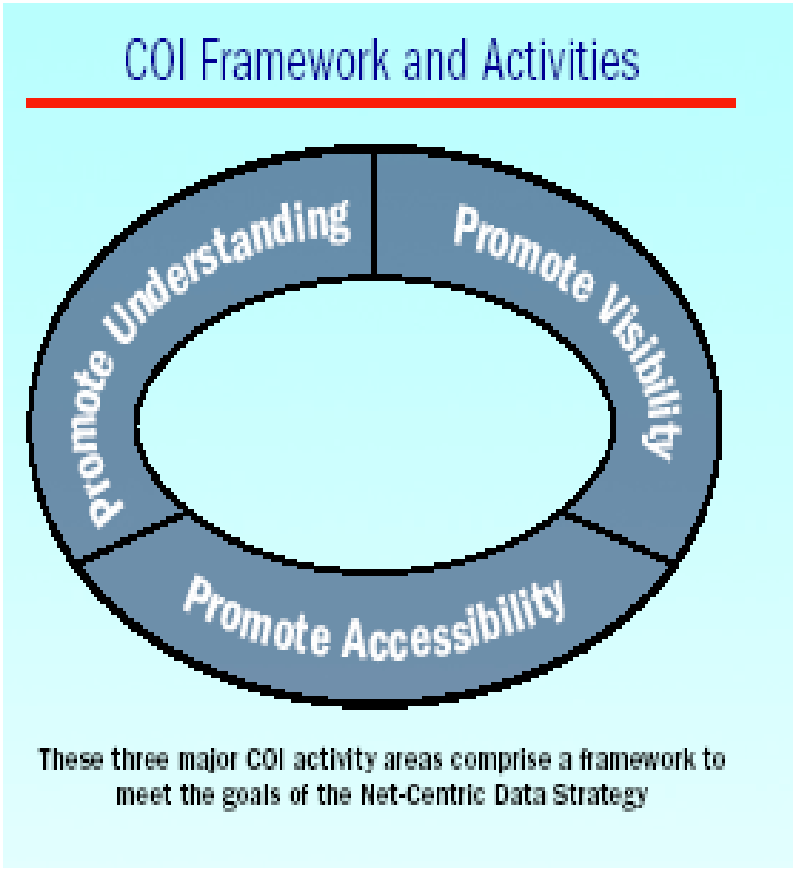
Local Chain-of-Command Implementation Decisions

- Who
  - Authors – potentially everyone
  - Publishes – *Chain of Command policy and case-by-case decisions*
  - Catalogs – publishers*: innovative techniques required
- What
  - Is Published – *Chain of Command policy and case-by-case decisions*
  - Is Cataloged – everything that's published. NII Guidance: "Visibility - Tagging and Advertising Data Assets with Discovery Metadata"
- When
  - Is it Published – *Chain of Command policy and case-by-case decisions – but at the earliest possible time after created/acquired with rapid follow up*
  - Is it Cataloged – Upon publishing
- Where
  - Is it Published – widely shared network spaces (intranet, internet)
  - Is it Cataloged – at the source
- How
  - Is it Published – limited & unlimited access; documents & services
  - Is it Cataloged
    - Documents: Automated & semi-automated tools for populating Data Catalogs
    - Services: Service Registry (basic service description) and DoD Metadata Registry (structural metadata)

*Publishers = Individuals or service operations teams

COI Overview

Deputy CIO Proposed Activities for COIs to Implement



Key Activities

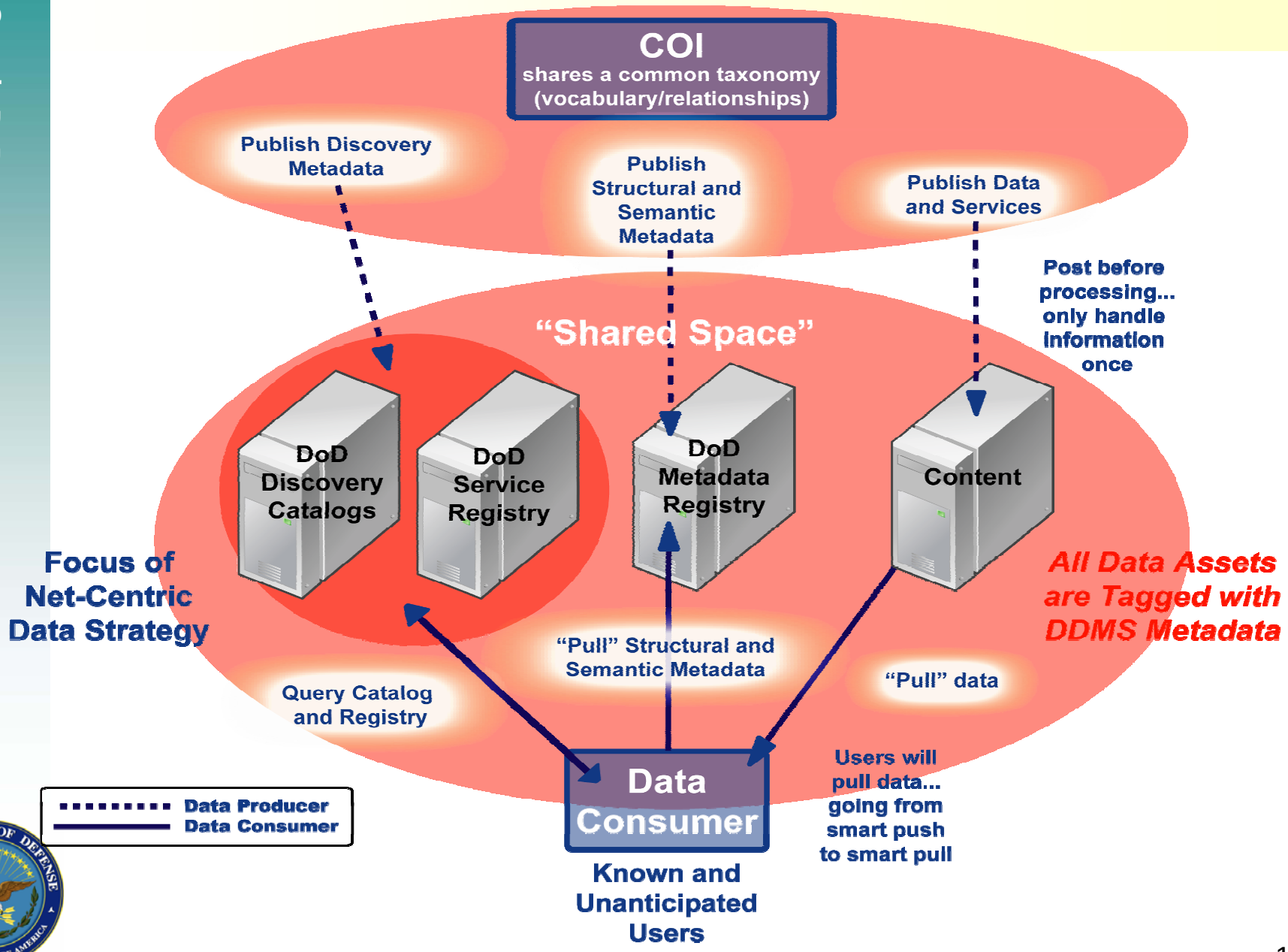
1. **Identify/establish COI**
2. **Identify membership and governance (e.g. Mission Areas, Domains) and key stakeholders (e.g. Programs, Operators)**
3. **Identify/prioritize/select key COI capabilities and data assets to expose to Enterprise**
4. **Register into DoD COI Directory (https://gesportal.dod.mil/sites/coidirectory)**
5. **Define and register COI structural metadata (e.g. taxonomy, vocabulary, data models, schema)**
6. **Define discovery metadata and process (extend the DDMS)**
7. **Tag data assets and post to searchable catalogs (e.g. Domain metadata catalog and service registry)**
8. **Register COI services (supports separation of data from applications)**
9. **Operate and sustain COI services (e.g. web services) for selected COI capabilities (leverage NCES CES)**

Technology view of what does a COI do?

- Make their data assets visible and accessible
  - Visible via service registry (WSDL), metadata registry (XSD), and data catalogs (DDMS)
  - Accessible via web services and common mime types
- Define COI-specific vocabularies and taxonomies
  - Vocabularies to improve data exchange within COI and among COIs
  - Taxonomies to improve precision discovery
- Register semantic and structural metadata to the DoD Metadata Registry (http://metadata.dod.mil)
  - XML Gallery for XML schemas, stylesheets, domain sets, samples
  - Taxonomy Gallery for discovery taxonomies (OWL syntax)

http://www.defenselink.mil/nii/org/cio/doc/COI_FAQ.doc

COIs Implementing the Data Strategy



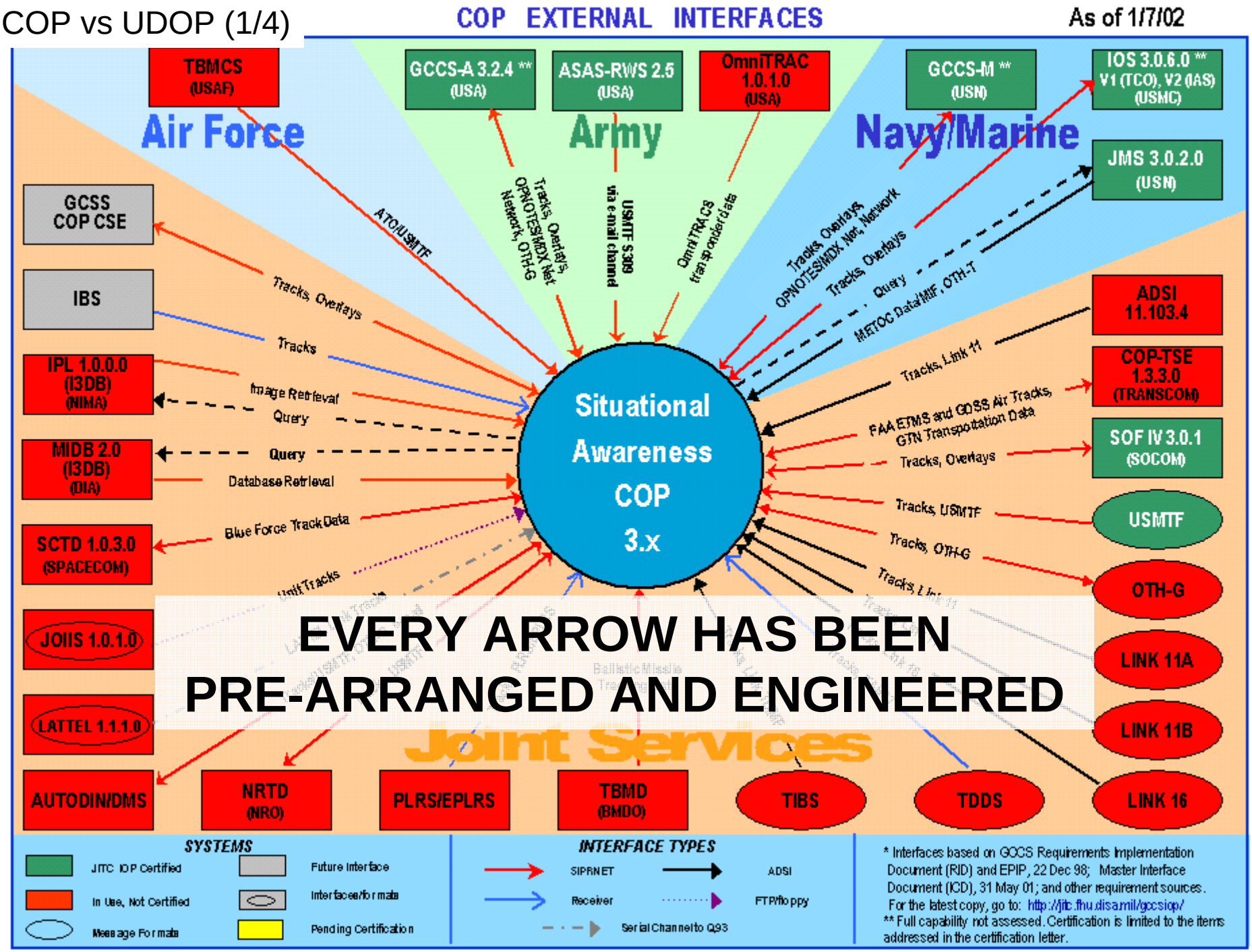
COP vs UDOP

- COP = Common Operational Picture
- UDOP = User-Defined Operational Picture

- A COP is a visual representation of a common database shared by some community
  - The information available is limited to pre-arranged data sources

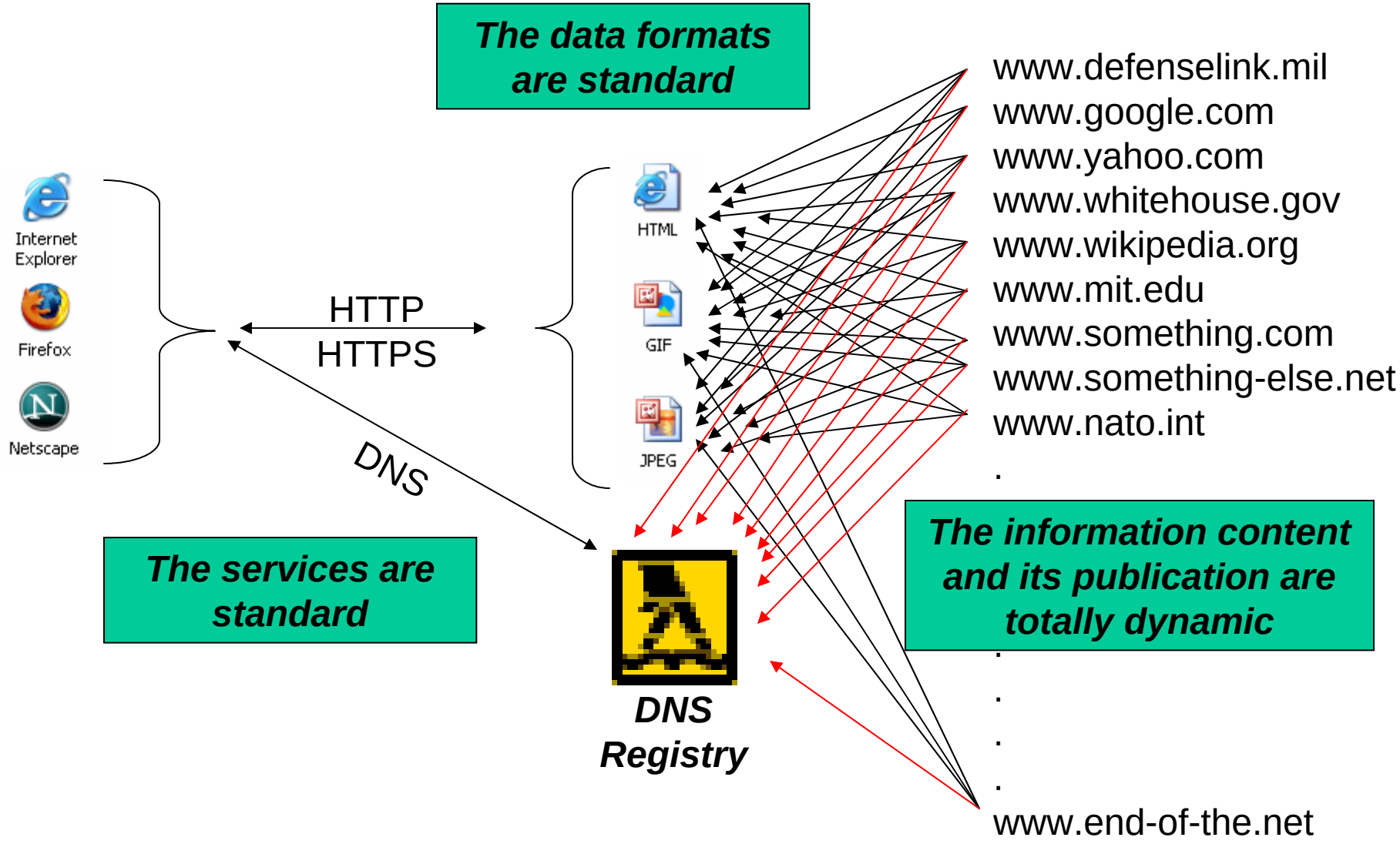
- A UDOP is a visual representation of data sources *which are available in common to the community*
  - The information available is not pre-determined

COP vs UDOP (1/4)



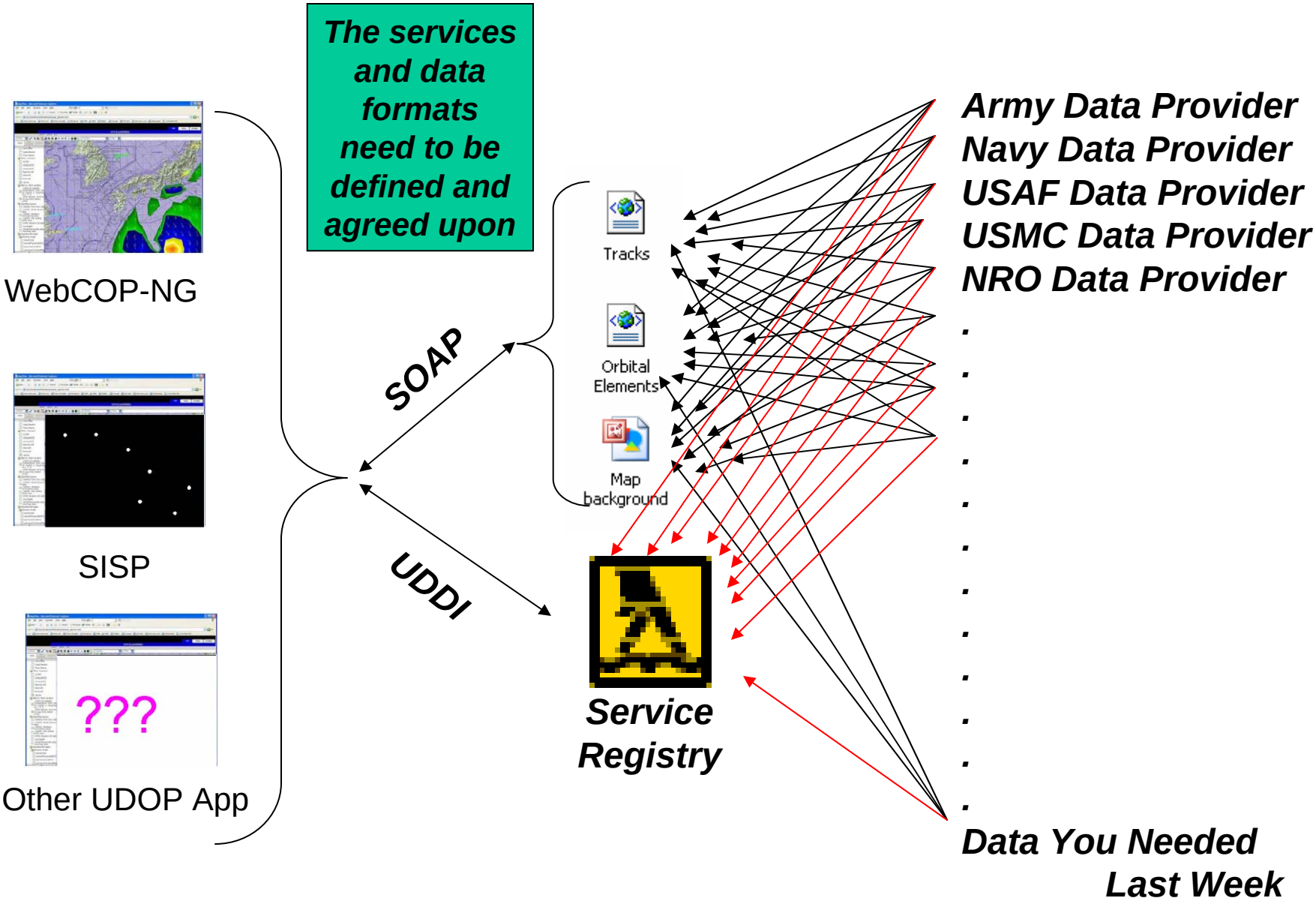
Web Browser Interfaces

a counter-example

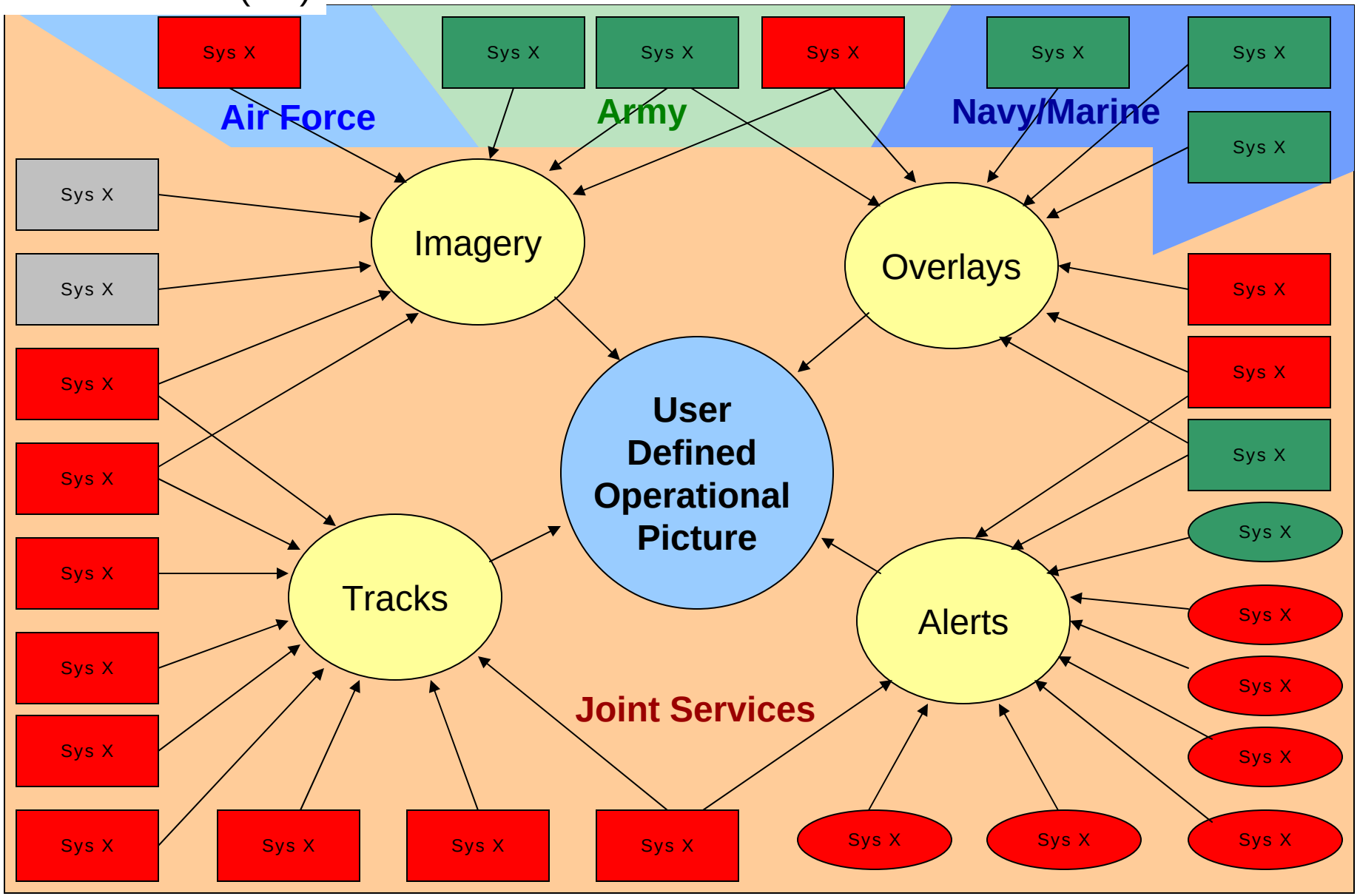


COP vs UDOP (3/4)

UDOP Interfaces



COP vs UDOP (4/4)

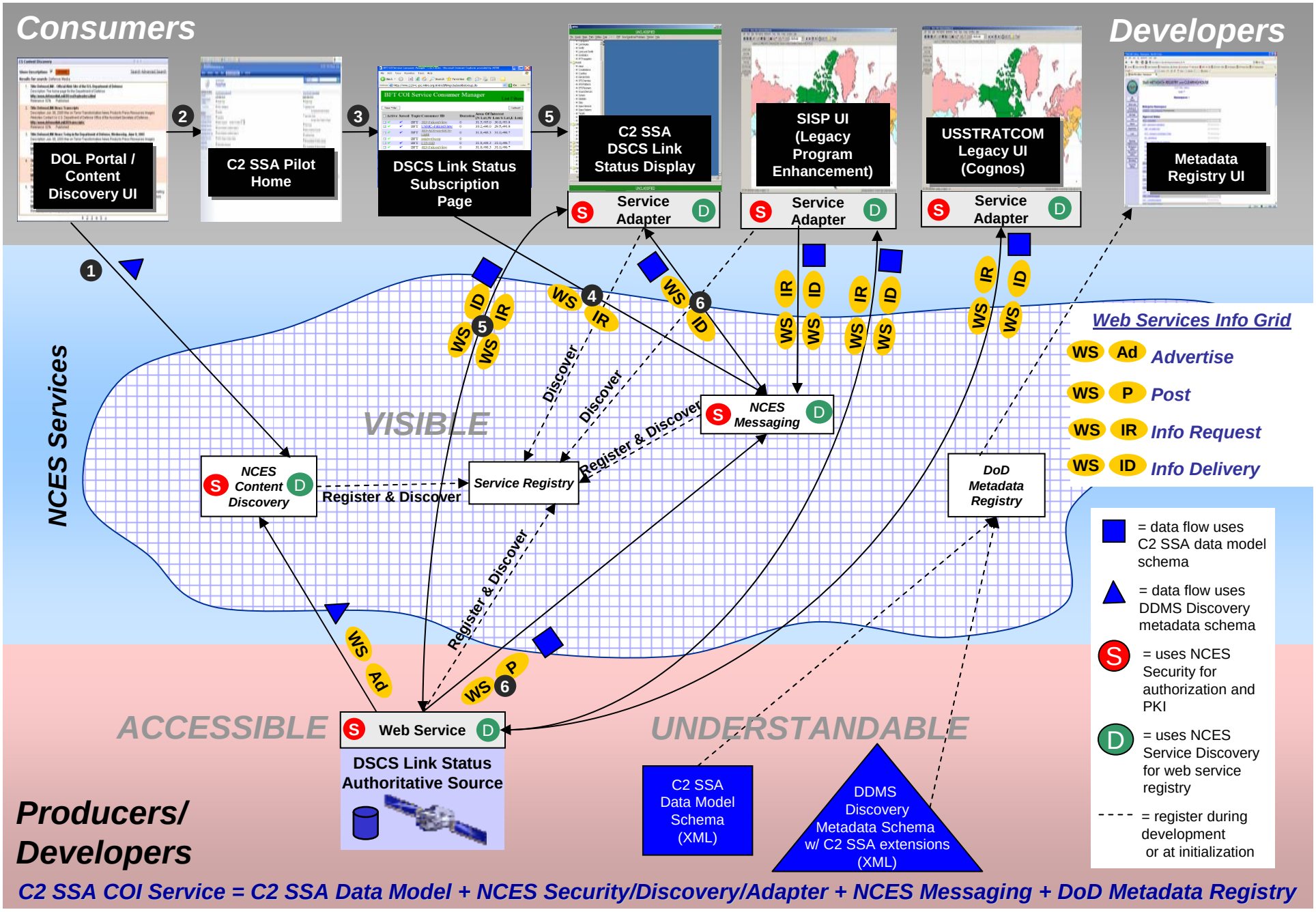


Data providers publish to the GIG in standard formats
Users select what they want on their UDOP

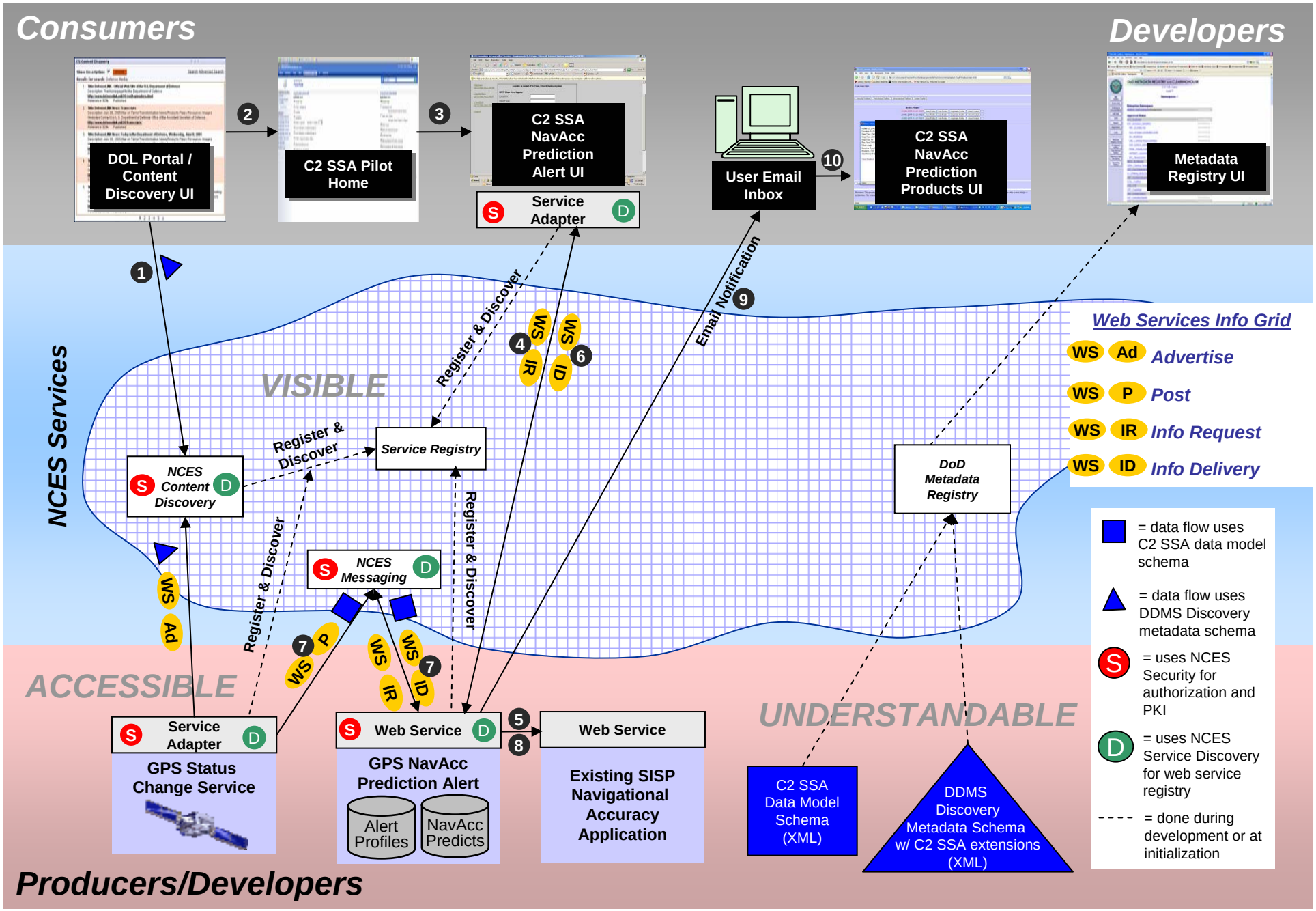
Google Earth and the Keyhole Markup Language provide an example of what a UDOP might be like

[Katrina Damage Assessment 14Sep-10am KMZ file]

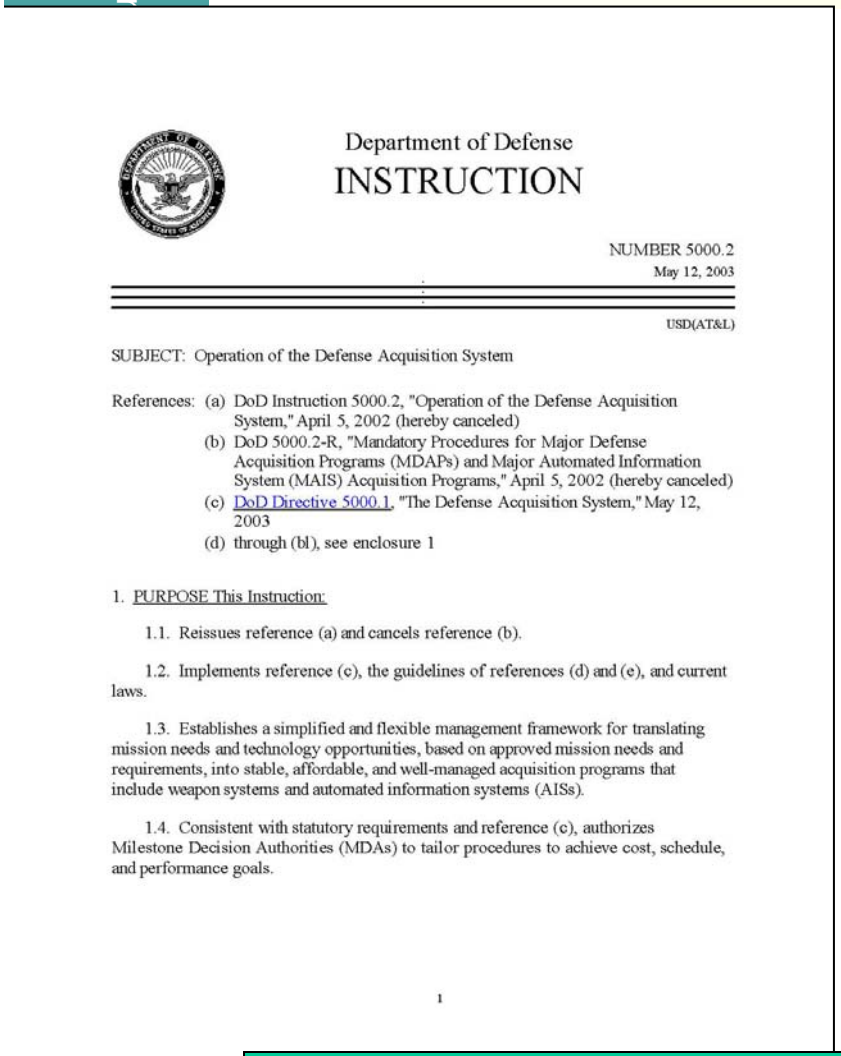
C2 SSA COI DSCS Link Status Service UDOP (as of 1 Dec 2005)



C2 SSA COI NavAcc Prediction Alert Service UDOP (as of 1 Dec 2005)



DoDI 5000.2 *requires* pilots*!*



Department of Defense
INSTRUCTION

NUMBER 5000.2
May 12, 2003

USD(AT&L)

SUBJECT: Operation of the Defense Acquisition System

References: (a) DoD Instruction 5000.2, "Operation of the Defense Acquisition System," April 5, 2002 (hereby canceled)
(b) DoD 5000.2-R, "Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs," April 5, 2002 (hereby canceled)
(c) DoD Directive 5000.1, "The Defense Acquisition System," May 12, 2003
(d) through (bl), see enclosure 1

1. PURPOSE This Instruction:

1.1. Reissues reference (a) and cancels reference (b).

1.2. Implements reference (c), the guidelines of references (d) and (e), and current laws.

1.3. Establishes a simplified and flexible management framework for translating mission needs and technology opportunities, based on approved mission needs and requirements, into stable, affordable, and well-managed acquisition programs that include weapon systems and automated information systems (AISs).

1.4. Consistent with statutory requirements and reference (c), authorizes Milestone Decision Authorities (MDAs) to tailor procedures to achieve cost, schedule, and performance goals.

1

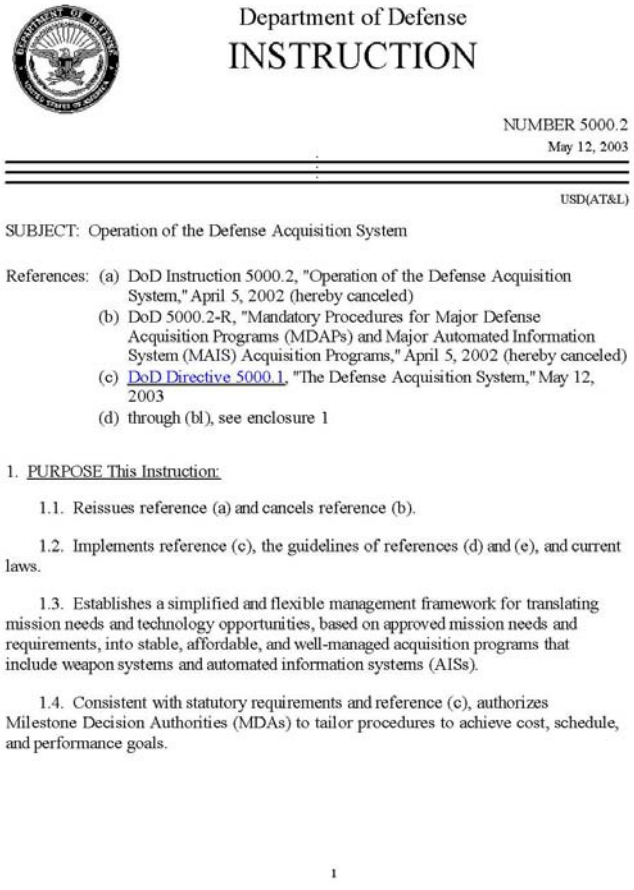
3.3.2.1. … requirements are refined through *demonstration and risk management* …requirements for future increments *depend* on feedback from users …

3.6.5. … *Multiple* technology development demonstrations may be necessary …

3.6.6. … identification and development of the technologies necessary for follow-on increments continues *in parallel with the acquisition of preceding increments*…

Post MS-B programs can (and should) spend current-year funds on pilot demonstrations *to define the next increment!*

Pilots define the CDD, not the reverse



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1

3.3.2.1. … requirements are refined through *demonstration and risk management* …requirements for future increments *depend* on feedback from users …

3.6.7. The project shall exit Technology Development when … the technology for that increment has been demonstrated … During Technology Development, the user shall prepare the Capability Development Document (CDD) …

Tech demos for the next increment happen *before* the CDD is written.
Don't let JCIDS bog you down!

Partnership for Data Interoperability

Integrity - Service - Excellence

Time-Sensitive Target Community Of Interest (TST COI)

U.S. AIR FORCE

Col John Rudolph
Air Force C2 & ISR Center/CCT

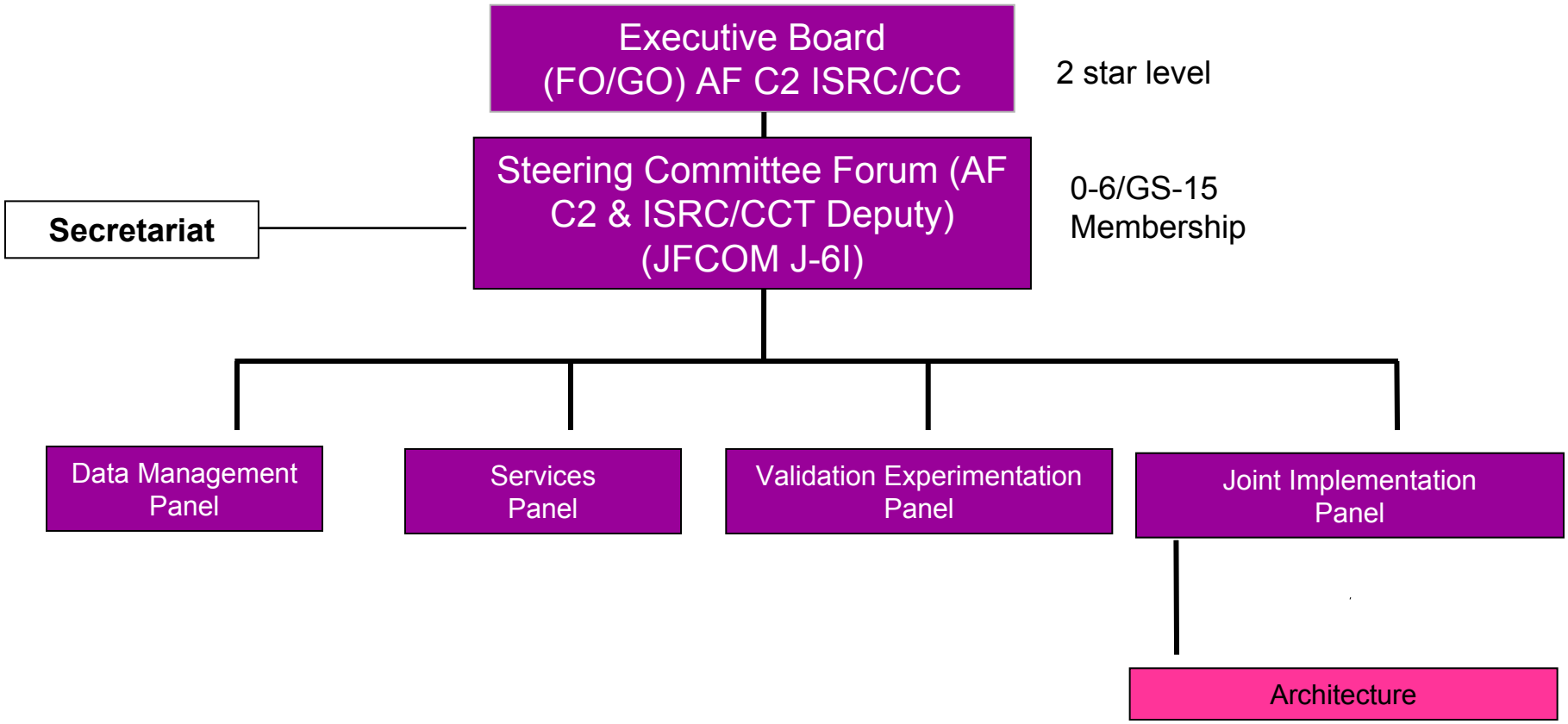
U.S. AIR FORCE

UNITED STATES JOINT FORCES COMMAND

TST COI Purpose

- To establish an Time Sensitive Target information sharing capability, employing net centric applications and services, among the cadre of TST stakeholders
- The TST COI focuses on creating a common data vocabulary supporting net centric info sharing across the entire TST kill chain of activities (Find Fix Track Target Engage Assess, (F2T2EA)) for a complete target "Audit trail"
- Supports the discovery, accessibility and understanding of TST (and targeting) data for disadvantages and unanticipated Users

TST COI Organization Chart Supported 8 Feb



TST COI Pilot Purpose

Securely provide timely dynamic planning and execution (situational awareness) for TSTs and dynamic targets to both anticipated and unanticipated users (e.g. Joint, Coalition, Inter-agency)

1. **Cross Service Weapon-Target Pairing (XSWTP)**
2. **Expose WEEMC Mission Managers (not static) showing activities TST Cells are executing to disadvantaged users**
3. **Join Target Management (JTM)**

Pilot Scope

Exposing data as a web services to provide information for better SA and TST support to a wider audience in theater to include disadvantaged users

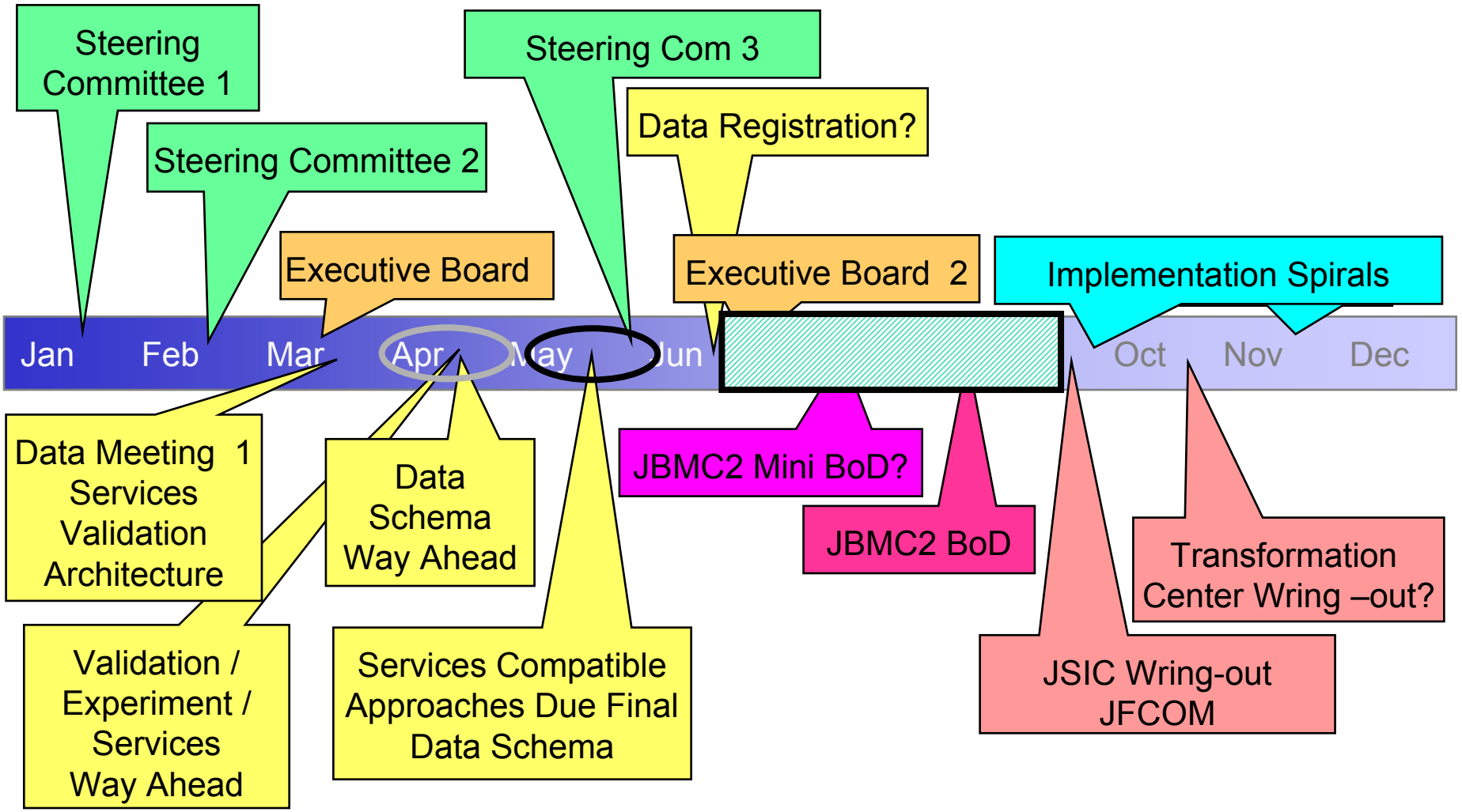
Data Sources: WEEMC/JADOCS-NC + (POR / SORs)

- **AFATDS, C2PC, NFCS, TBMCS**
- **SIPRNET Domain**
- **Participating COI member organizations:**
  - AF: ACC A2X, AFC2&ISRC (TBMCS)
  - USN: Navy NETWARCOM, SPAWAR (NFCS)
  - USA: Army G-3 (ABCS, AFATDS)
  - USMC: MARFORSYSCOM/G2 (C2PC)

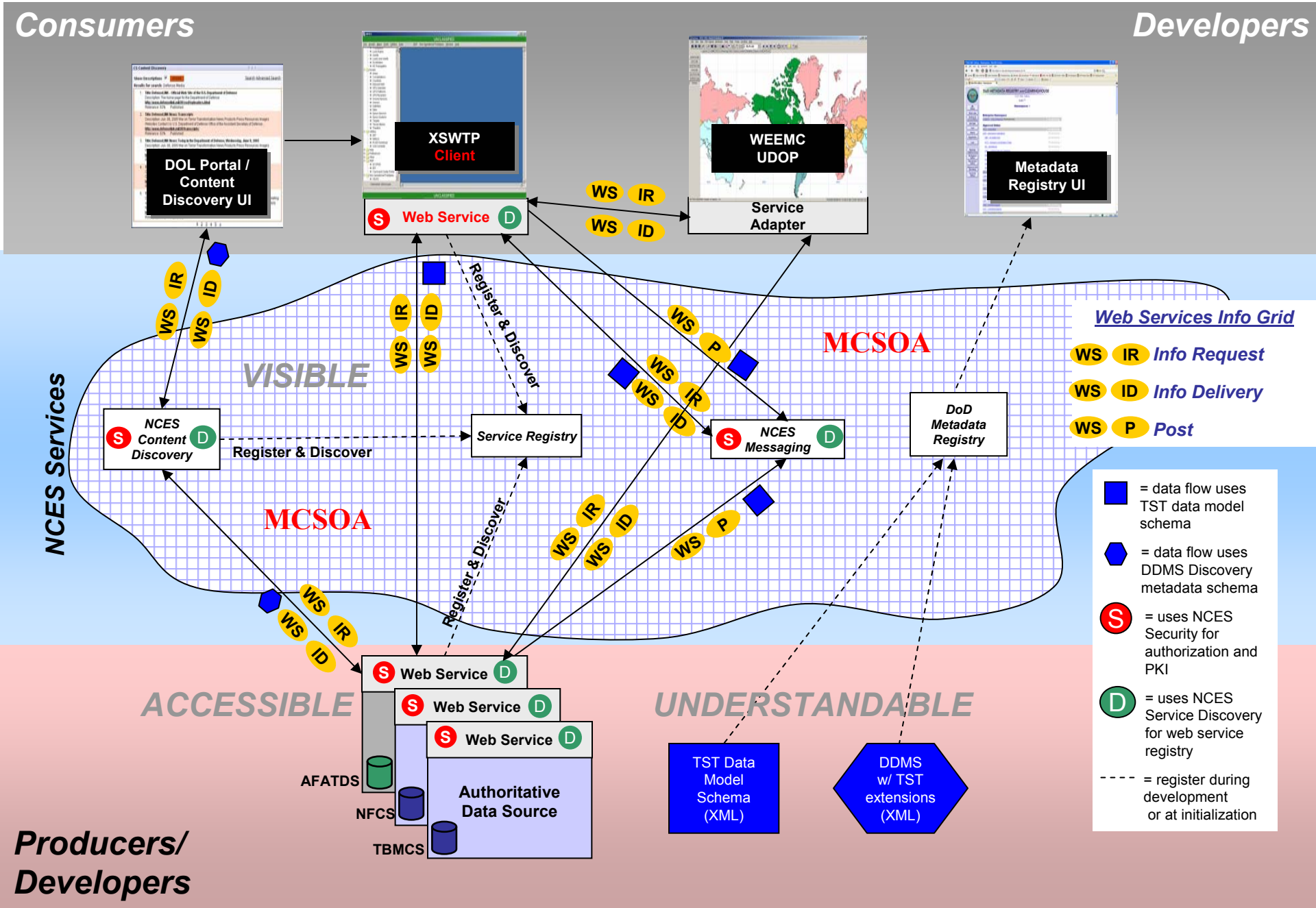
OPR: Colonel John Rudolph, AFC2ISRC/CCT

TST COI POA&M 2006

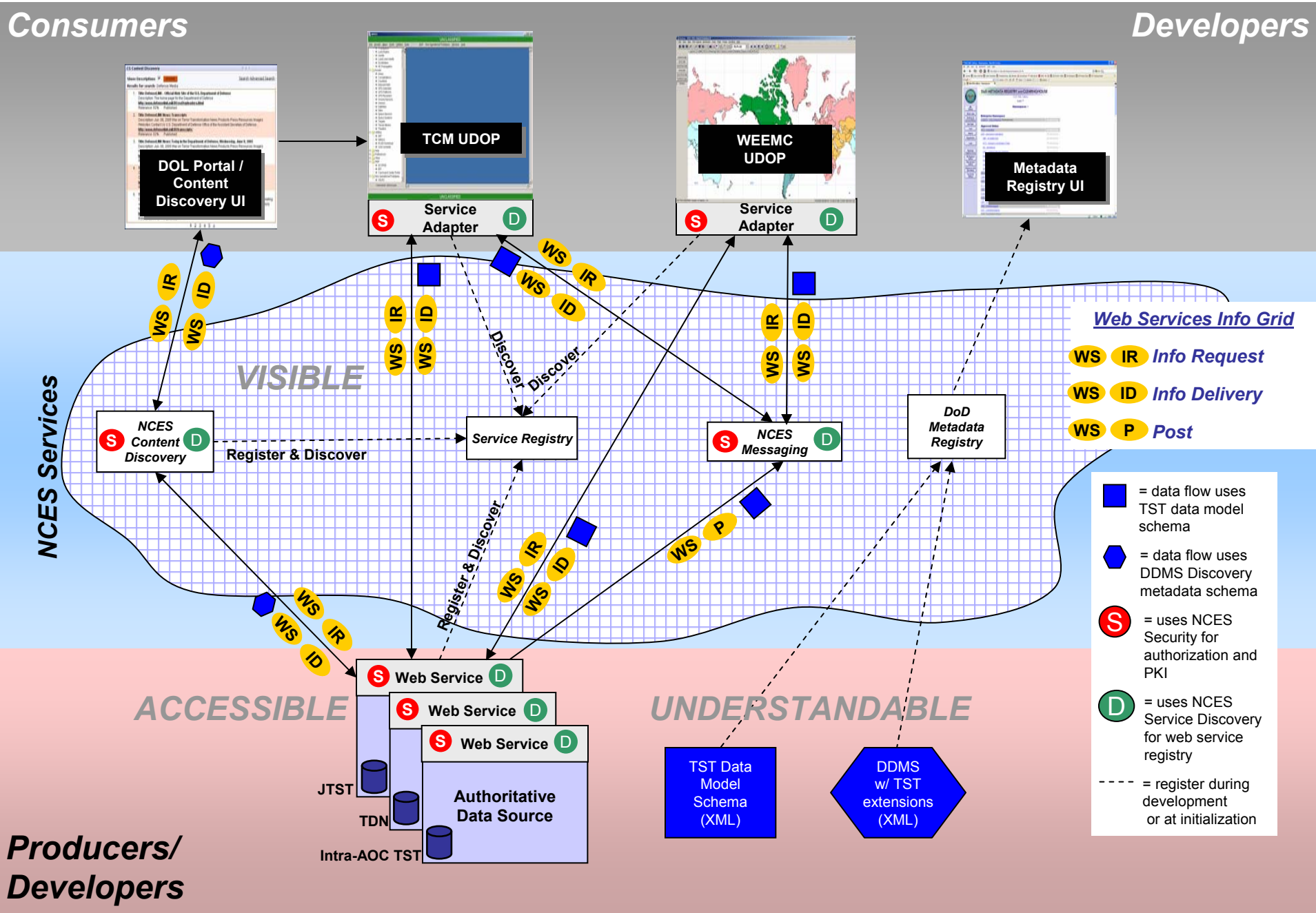
As of 23 Feb 06



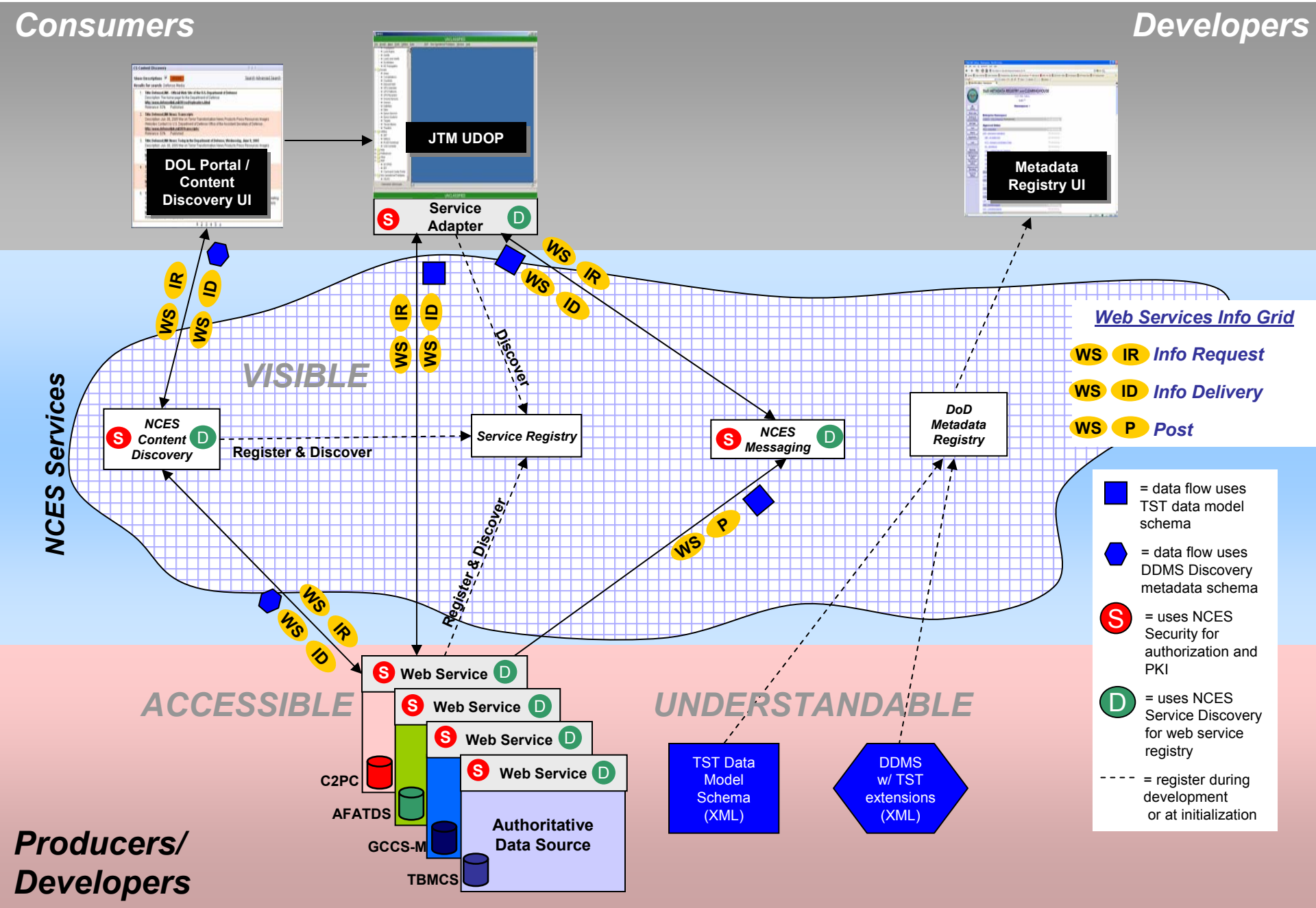
TST COI XSWTP Info Service Interoperability



TST COI WEEMC Mission Manager Availability



TST COI JTM Service Info Sharing



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TST COI Pilot Metrics

- Metric assessment underway
- Reviewing changes, impacts to PORs/SORs supporting the TST COI
  - AFATDS, TBMCS, NFCS, C2PC
- Examining initial and incremental costs of Web Svcs to support TST Execution for PORs
- Planning for User assessment of TST Net Centric capabilities during Exercises (Terminal Fury) & Labs (Transformation Center, Joint Systems Integ. Ctr.)
- Determining Level of Effort for Data, Vocabulary buy-in by Military Services.
- Review Core Enterprises System support

OPR: TST COI Secretariat (Colonel Rudolph, Mr. Park, Mr. Coleman, Dr. Beardsworth)

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COI Resources

- Resource shortfalls, impacts, and risk: Still scoping
- Risk mitigation in Exercises, Experimentation
  - Assessing costs, maturity of three spirals in parallel
  - Assessing support from SORs/PORS required

OPR: TST COI Secretariat (Colonel Rudolph, Mr. Park, Mr. Coleman, Dr. Beardsworth)

Questions ?

XSWTP Pilot Purpose

- To demonstrate availability of weapon-target pairing information to all WEEMC users and authorized unanticipated /disadvantaged users through a TST COI UDOP by making AFATDS, TBMCS, and NFCS advertise their data as a web service implementing the TST agreed-upon vocabulary.

WEEMC TCM Pilot Purpose

- To demonstrate availability of task coordination information to all WEEMC users and authorized unanticipated/disadvantaged users through a TST COI UDOP by making JTST, TDN, and Intra-AOC TST advertise their data as a web service implementing the TST agreed-upon vocabulary.

JTM Pilot Purpose

- To demonstrate availability of target list information to all WEEMC users and authorized unanticipated /disadvantaged users through a TST COI UDOP by making C2PC, AFATDS, GCCS-M, and TBMCS advertise their data as a web service implementing the TST agreed-upon vocabulary.

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Pilot Description

Data Services: Focus on disadvantaged theater TST consumers that may not have access to JADOCS/WEEMC/JADOCS-NC to enable monitoring, participation in on-going TST theater actions

OPRs: Colonel Charles Murray, Capt Harriet Campbell, AFC2ISRC/A6

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USJFCOM

Data / Vocabulary Panel

- Develop required XML Tags, Schema, Ontologies etc. to support
- Register TST Metadata in “appropriate” DoD / AF / Service repositories for immediate use
- Coordinate vocabulary development w POR, Info Services Panel
- Employ M2M* information transfer for TST activities as much as feasible
- Extend the information as on-demand information to a many-to-many operator net for TST information

* Machine to Machine

OPR: Col Charles Murray/ Capt Harriet Campbell, AFC2ISRC/A6

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Information Services Panel

- Develop the actual web / information services in conjunction with POR/SOR representatives & DISA's Core Enterprise Services.
- Coordinate hosting, web certification, registration requirements.
- Examine the TST Business Processes for additional web service spirals
- Work with panels to ensure spiral sequencing based on maturity.
- Wring out Info Services during exercises, experiments and in facilities, labs, centers.

OPR: US Army POC TBD/ESC/Tom Powis/Dr. Tim Rudolph

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USJFCOM

Validation / Demonstration Panel (formerly Pilot)

- Orchestrate spirals entry and testing into experiments, exercises, and Facilities (USAF Transformation Center, Joint Systems Integration Group)
- Monitor Data & Service Panel progress
  - Coordinate Pilot Spirals vocabulary, schema, ontologies, etc. for registration within and outside of working groups
- Coordinate with Implementation Panel for scheduling POR/SOR related events and activities
  - Software Freeze, Testing, Fielding etc.

OPR: AF Transformation Center Col Chris Moore

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Implementation Panel

- Coordinate with other TST COI Panels to effect fielding actions SOR/POR
- Coordinate with other Panels to keep an accurate POA&M of actions leading to Fielding
  - Work with Validation / Experimentation to determine optimal timing for tech. insertion
  - Work with SORs/PORs to determine “Drops” based on SOR/POR Readiness
- Act as liaison for other collateral COIs affecting targeting issues
  - (ISR, Targeting, Air & Missile Defense etc.)

OPR: USN POC, TST COI Secretariat, Mr Coleman, Mr. Park

Tutorial Summary: Challenges in Building Net-Centric System-of-Systems

Jim Smith

Carnegie Mellon Software Engineering Institute

(703) 908-8221 jds@sei.cmu.edu

Presented in conjunction with the NDIA Net-Centric Operations Conference

March 13, 2006

Carnegie Mellon
Software Engineering Institute

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Agenda for Summary

- Introduction
  - Motivation for net-centric solutions
  - What makes net-centric different?
- Systems-of-systems (SoS)
- Interoperable Acquisition
- Unresolved issues
- Recommendations

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Introduction

Motivation For Net-Centric Solutions

- **Why is net-centricity worth changing every aspect of how systems have been developed, acquired, deployed, and sustained?**
- **Simple: the traditional systems approach to fielding capability cannot cope with the realities of a dynamic, multipolar geopolitical environment and rapidly-changing technology and threats.**
  - **You can't state with confidence what operational environment a given system may be required to perform in two years down the road, much less 15-20!**

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What Makes Net-Centric Different?

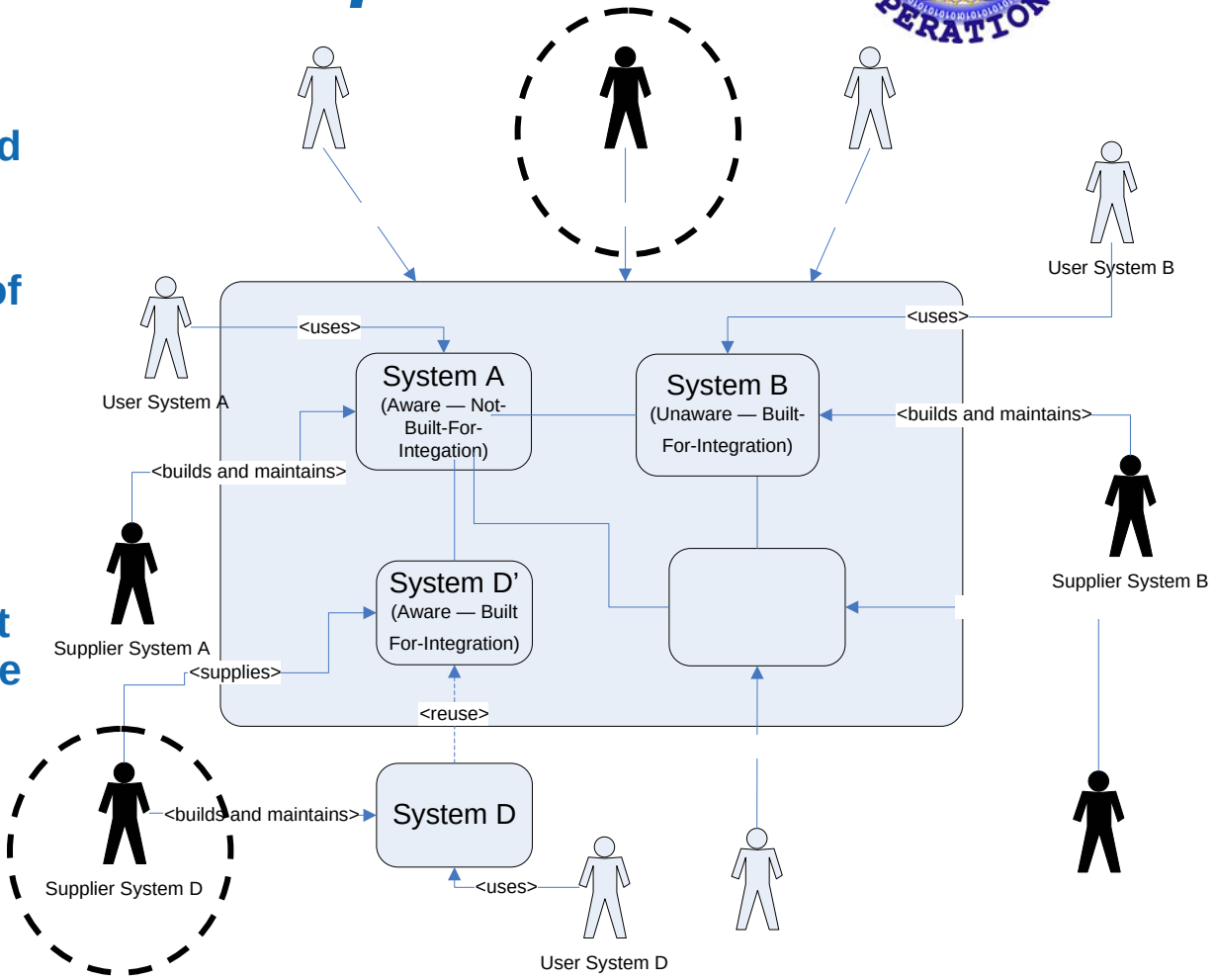
- **In short … *everything!***
  - **Emphasis shifts from platform (e.g., ship, aircraft, brigade) to capability (e.g., area interdiction, SEAD, etc.)**
  - **Capability is no longer the product of a single platform/system, but now requires the participation of multiple constituents within a system-of-systems (SoS)**
  - **Multiple capabilities involve multiple, overlapping SoS: one constituent may actively participate in multiple capabilities, with different roles**
- **Just as designing for flexibility and dynamic composability is a challenge, so is planning and managing—(almost) everything you know is wrong!**

From "Science and Technology to Support FORCEnet," Raytheon TD-06-008. Used by permission.

System-of-Systems (SoS)

System-of-Systems (SoS): Context and Role Viewpoints

- **Context 1: "orchestrated SoS"**
  Someone is attempting to orchestrate a bunch of systems (e.g., a LSI)
- **Context 2: "collaborative SoS"**
  I'm trying to be part of a topology, but don't necessarily know what it is and no one's in charge
- **Role A: "an integrator"**
- **Role B: "a constituent"**



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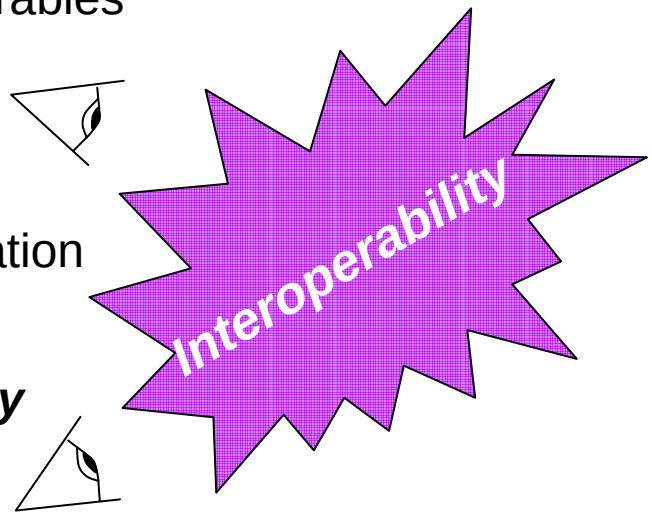
SoS Involves Multiple Perspectives

Management Perspective

- Time-phasing of deliverables
- Effects of delays
- Funding and budget
- Risk management
- Multi-supplier coordination
- etc.

Development/Assembly Perspective

- Architecture
- Systems/capabilities "mix"
- Development-based AND assembly-based construction
- Testing
- etc.



Operational Perspective

- Operational stakeholder needs
- Concept of operations
- Deployment and support
- etc.

Achieving SoS interoperability requires coordination with a diverse set of stakeholders—often across multiple organizations

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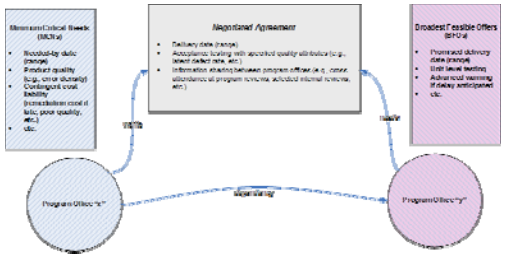
Influence Relationships

Relationships exist at multiple levels:

SoS-wide …

Near-neighbor …

and arc-level …



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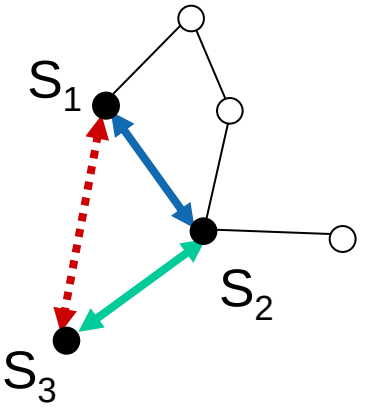
Emergent Effects

- Relationships exist where constituents influence one another
- Sequences of direct neighbor interactions often generate indirect ("transitive") effects between distant constituents
- Indirect effects often cascade
  - Detailed steps often unpredictable and difficult to envision
  - Cumulative effects can be predictable
  - These emergent effects define character and utility of resulting SoS

SoS risks may not be apparent for individual constituents or by analyzing only "near neighbor" interactions



- ***S_1 has a backwards compatibility relationship with S_2***
- ***S_3 has a schedule dependency on S_2***
- ***S_1 and S_3 are indirectly related through S_2***

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Summary of Characteristics of SoS

- Systems of systems are complex due to:
  - Independent operations and management of autonomous constituents
  - Independent evolution of constituents
  - Indirect, cascading, and emergent effects
- Traditional methods and approaches are inadequate:
  - Limited effectiveness of centralized control, hierarchical structures
  - Interdependence among acquisition, development, operations, sustainment, and evolution often ignored

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SoS Design Challenges: Critical FORCEnet Information Infrastructure Functional Capabilities[1]*

1. **Reliable wideband mobile communications**
2. **Information management**
3. **Situation awareness and understanding**
4. **Information assurance**
5. **Modeling and simulation**
6. **Dynamic composability and collaboration**
7. **Support of disadvantaged user-personnel, platform or sensor**
8. **Persistent intelligence, surveillance, and reconnaissance**

Decision Making is contained in many of the capabilities

From "Science and Technology to Support FORCEnet," Raytheon TD-06-008.
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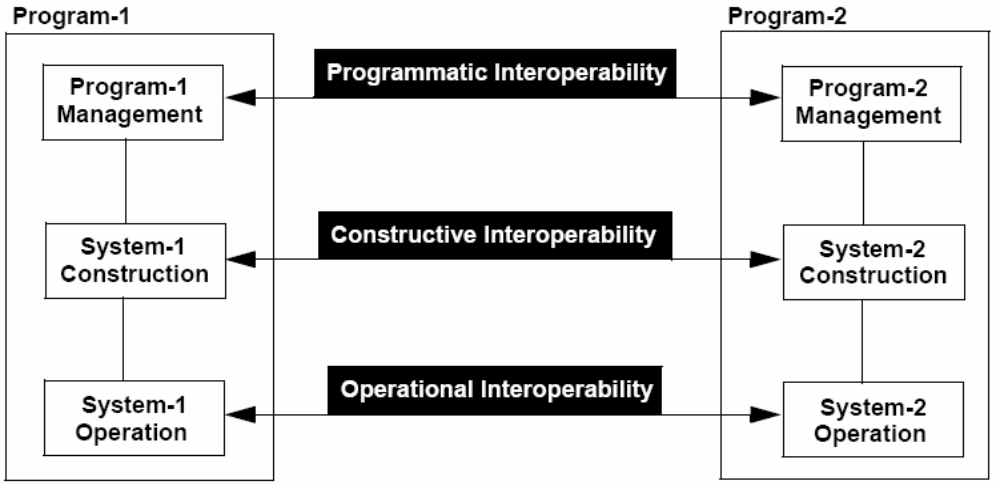
Interoperable Acquisition

Interoperable Acquisition$_1$

- **Interoperability comprises multiple dimensions*:**



- **Suitable acquisition practices are necessary to achieve interoperability**

*From *System of Systems Interoperability*, CMU/SEI-2004-TR-004

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Interoperable Acquisition$_2$

- **Key principles:**
  - **No one stakeholder group or individual can have complete SoS insight**
  - **“Central control” has limited effectiveness; distributed control is essential**
  - **SoS capabilities and properties emerge from the influence of cumulative, indirect effects of local actions and near neighbor interactions**
  - **Broader set of stakeholders, including users, must be directly involved throughout the life of a SoS**
  - **Local decisions and reward systems must be tempered by understanding of SoS purpose and goals**

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Unresolved Issues

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Unresolved Issues

- **The FORCEnet study identified gaps in eight critical technology areas. In addition, there are some software-specific technology gaps which warrant further examination:**
  - **Web services**
  - **Service-oriented architectures (SOA)**
- **The limitations of existing systems engineering and management practices fall short of the requirements for interoperable acquisition:**
  - **Cost and schedule estimating and tracking**
  - **Understanding/predicting/mitigating emergent effects (including transitive and cascading effects)**

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Unresolved Issues: Estimating and Tracking

- **Several technologies under development:**
  - **Modeling cost and schedule using COSOSIMO, COSYSMO, COCOTS, etc.**
  - **Modeling cost and schedule using SoSIP**
    - **Accounts for organizational and programmatic relationships, as well as emergent behaviors**
  - **Identifying critical points in migrating from legacy systems to service-oriented architectures**
  - **Exchange theory-based transactional cost modeling**
    - **Multivariate regression analyses based on collection of ACAT I program estimates and actuals**

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Recommendations

Recommendations$_1$

- **No easy answers, but there are some steps you can take**
- **The *only* absolute is that continuing to do what you've done in the past—for system acquisition, design/development, deployment, sustainment, and operation—is a recipe for failure**

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Recommendations$_2$

- **Adopt a net-centric "friendly" engineering/ management approach**
  - **"Central-office," hierarchical structures won't work**
    - **Need to understand influence relationships and emergence**
  - **Avoid "big bang" development approaches: use risk-driven spiral or iterative lifecycle**
    - **Also beware of the "prolonged train wreck," which is often passed-off as "spiral" or "iterative" development: it is neither**

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Recommendations$_3$

- **Cost and schedule estimating is a challenge**
  - **Recognize that SoS cost estimating is a very immature science/art: you need to begin—NOW—to understand how SoS realities impact your organization's cost and schedule estimates**
  - **Adopt work-breakdown structures and earned value measurements suitable for spiral development***

*See *Using Earned Value Management (EVM) in Spiral Development* (CMU/SEI-2005-TN-016) for a discussion.

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Recommendations$_4$

- **Design with change in mind: don't presume that the operational context that your system will actually be used in will remain the same**
  - **Don't assume that you will have reliable communications (or unlimited bandwidth, zero latency, etc.)**
  - **Don't assume that your system will be used in a well-defined, bounded environment—the internet (or NIPRnet/SIPRnet, etc.) changes everything**

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Recommendations$_5$

- **Several critical net-centric technologies are immature**
  - **Don't assume that just because you have all the requisite checks in the proper boxes in the NR-KPP checklist that your system will actually work as intended in a net-centric environment**
  - **Make the investments to keep abreast of emerging technologies (and to understand their limitations)**

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Integration of Software-Intensive Systems (ISIS) Initiative

http://www.sei.cmu.edu/isis/index.html

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Information Sharing Environment

NDIA Conference
16 March 2006

Dr. G. Clark Smith
ODNI/PM ISE
Director of Technology Group

Agenda

1. Authorities
2. What is the ISE?
3. Who is the ISE?
    a. ISE Governance
4. Why the ISE/ISC?
5. Functions of the ISE
    a. Attributes
    b. Capabilities
    c. Framework
    d. Architecture
6. ISE Accomplishments and Goals

From the President…

"The many reforms in this act have a single goal: to ensure that the people in government responsible for defending America have the best possible information to make the best possible decisions."

President George W. Bush on signing
the Intelligence Reform and Terrorist Prevention Act
17 December 2004

Authorities for the Information Sharing Environment

- E.O. 13356, Strengthening the Sharing of Terrorism Information to Protect Americans, August 2004
- The Intelligence Reform and Terrorism Prevention Act (IRTPA), December 2004
- The Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction, March 2005
- E.O. 13388, Further Strengthening the Sharing of Terrorism Information to Protect Americans, October 2005
- The Presidential Guidelines and Requirements in Support of the Information Sharing Environment, December 2005

What is the ISE?

IRTPA (December 17, 2004) calls for the creation of the ISE

to ensure terrorism information sharing, access and collaboration among users is readily available

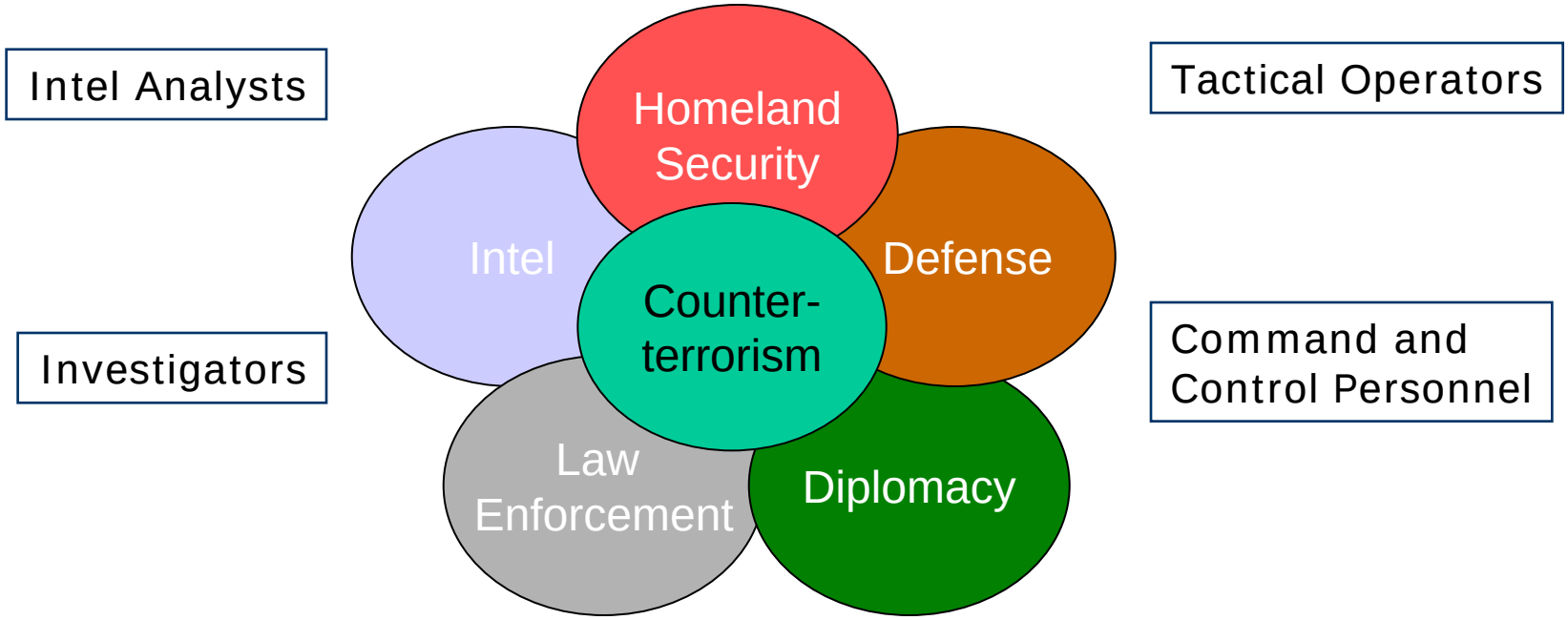
- Consistent with national security
- Consistent with information privacy and other legal rights of Americans
- Combination of policies, procedures and technologies
- Connecting resources (information, organizations, services and personnel)
- Including Federal, state, local and tribal governments, and as appropriate, the private sector and foreign allies

Further, the President has directed that

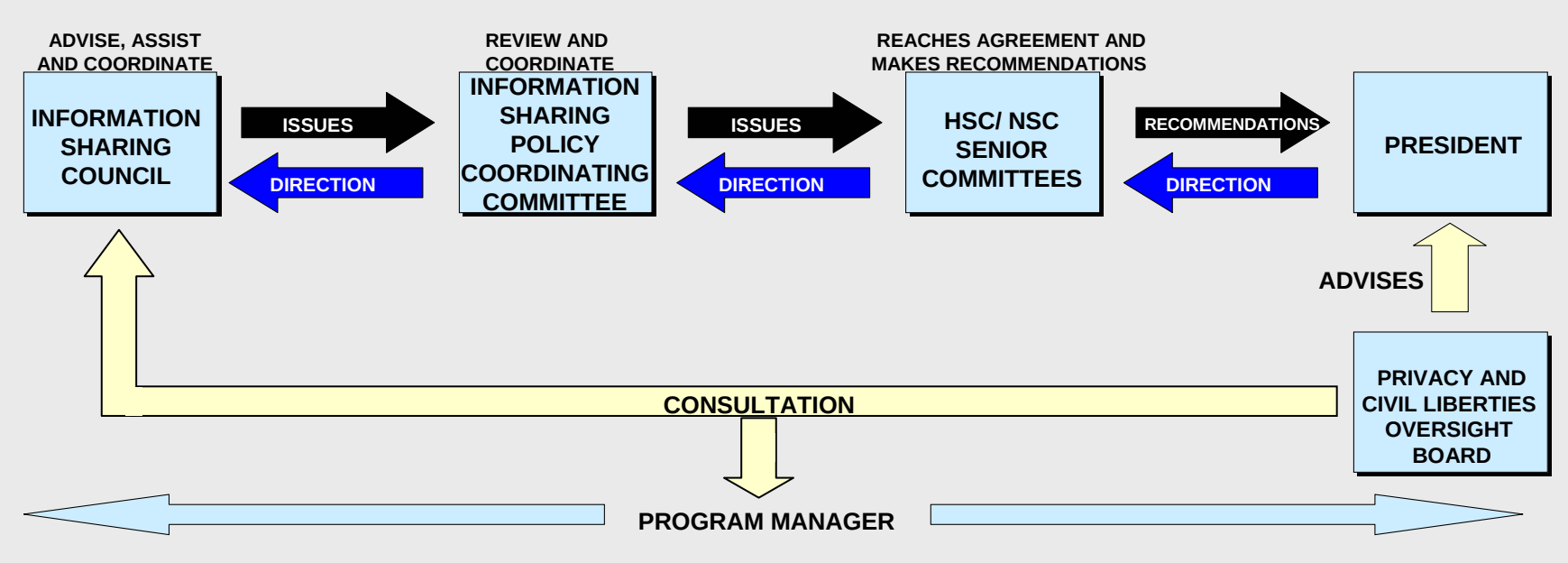
- ISE take into account the CT missions, roles and responsibilities of Executive Departments and Agencies
- State, local and tribal governments, law enforcement agencies and private sector have opportunities to participate as full partners in the ISE
- As recommended in the Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction (Commission), in its report of March 15, 2005 (Chapter 9), stated that "(t)he confused lines of authority over information sharing created by the intelligence reform act should be resolved." To that end, the Commission recommended that "(t)he overlapping authorities of the [Director of National Intelligence (DNI)] and the Program Manager should be reconciled and coordinated – a result most likely to be achieved by requiring the program manager report to the DNI."

Who is ISE?

Terrorism Information Communities of Interest



ISE Governance: Information Sharing Council (ISC)



Federal Membership:

Attorney General	DNI
CIA	OMB
FBI	NCTC
Joint Staff	State
Treasury	Defense
Commerce	Energy
Homeland Security	Transportation
Health and Human Services	

State/Local and Tribal Governments

Foreign Partners

Why ISE/ISC:? A Challenging and Complex Undertaking

- No single organization is solely in charge of or responsible for the outcome, yet each participating organization has a role and a stake
- Mission success depends on a high degree of cooperation, coordination and synchronization among a diverse set of participants
- The ISE must align with, complement and support the individual missions of the ISE participants. The nation's terrorism infrastructure neither can, nor should be, separated from existing infrastructure supporting other mission priorities
- Organizations are expected to use existing resources to meet the demands of the counterterrorism mission – which creates competition for resources
- New internal business rules must be established to create cross-organizational operational efficiencies
- New internal business rules require changing the cultures within organizations and redefining policies, processes and technical systems that currently exist within the counterterrorism operating environment

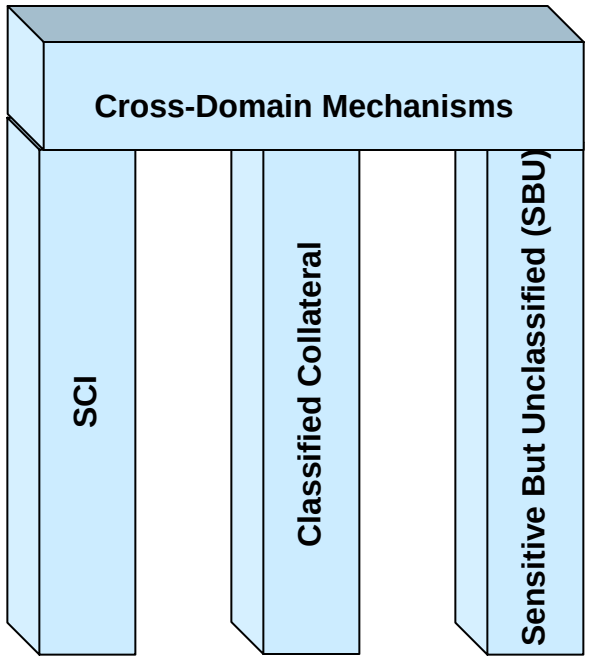
ISE Attributes as directed by IRTPA

- Connects existing systems, where appropriate, provides no single points of failure, and allows users to share information among agencies, between levels of government, and, as appropriate, with the private sector
- Ensures direct and continuous online electronic access to information
- Facilitates the availability of information in a form and manner that facilities its use in analysis, investigations and operations
- Builds upon existing systems capabilities currently in use across the Government
- Employs an information access management approach that controls access to data rather than just systems and networks, without sacrificing security
- Facilitates the sharing of information at and across all levels of security
- Provides directory services, or the functional equivalent, for locating people and information
- Incorporates protections for individuals' privacy and civil liberties
- Incorporates strong mechanisms to enhance accountability and facilitate oversight, including audits, authentication and access controls

ISE Capabilities

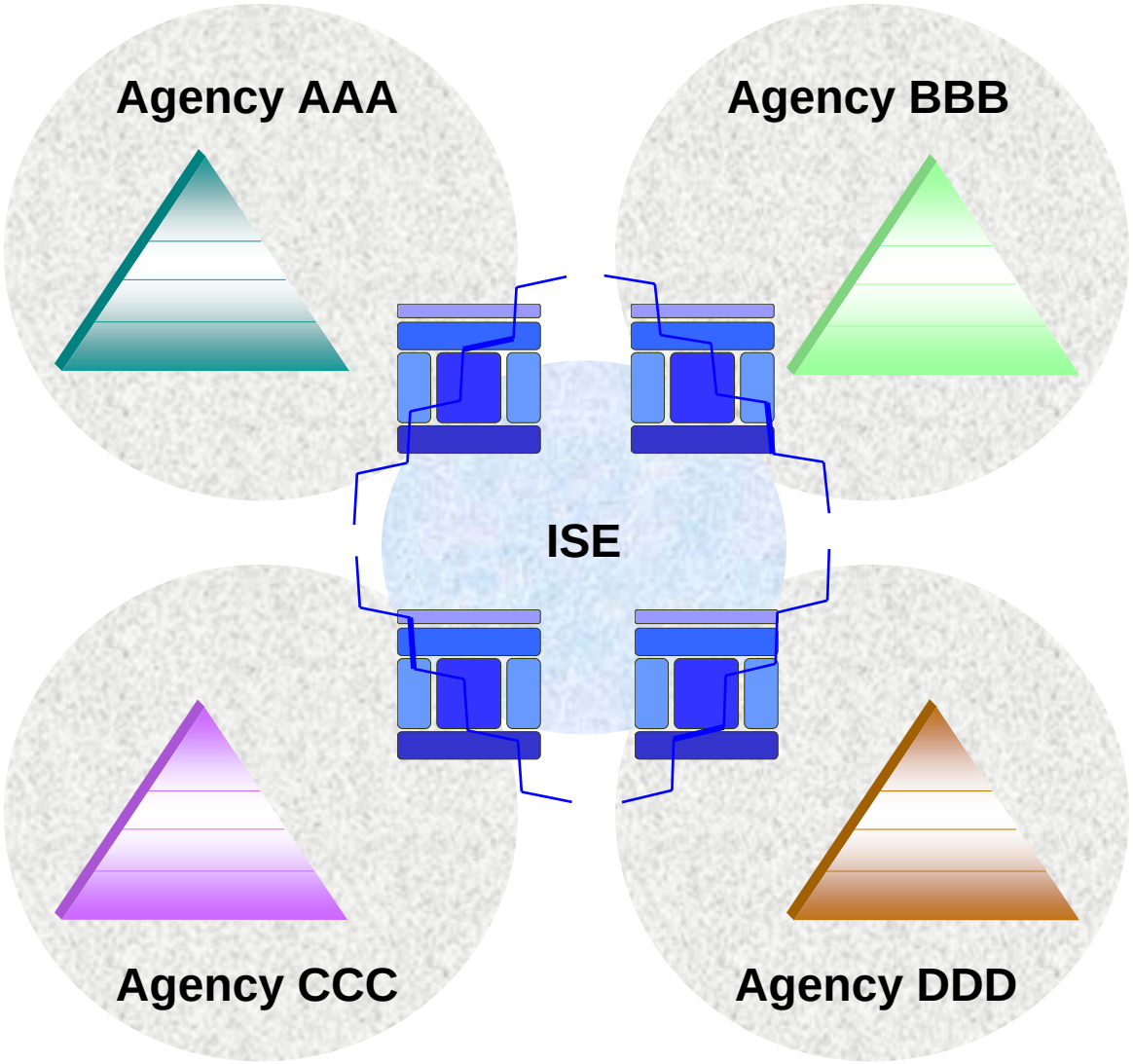
- **Easier User Access** - must simplify access for users regardless of their point of entry into the environment
- **Security and Privacy Safeguards** - must protect privacy and civil liberties while permitting access to appropriate data from the private sector
- **Information Discovery and Search** - will allow information users to discover the information they need without knowing its location or even if/where the information resides
- **Information Access** - will enable users to get the information they need whether it is pulled as a result of a search or pushed to them.
- **Knowledge Extraction** - must work with all sorts of information, from highly structured relational databases, to semi-structured materials, to unstructured textual content as well as provide tools to enable users to make sense of the information they obtain.
- **Collaboration** - will support the creation of ad-hoc collaboration groups and incorporate tools to enable multiple people to communicate on areas of mutual interest across organizational boundaries

ISE Framework



Share within:
- **Three Information Security Domains**
- **Share Across Domains**

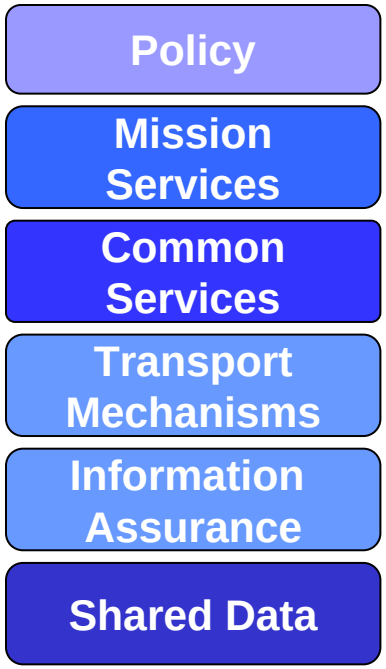
ISE Architecture Approach



To effectively & efficiently share terrorism information, each agency implements the sharing capabilities defined by the Information Sharing Environment. These capabilities connect each agency together for sharing information and to make the best possible decisions.

Information Sharing Environment Model

The ISE Architecture consists of 6 elements: One Policy and Five Reference Models



- The Policy element provides the rules for mediating interoperability among agencies
- The Mission Services element identifies how Web services will be used to share information
- The Common Services, Transport Mechanisms and Information Assurance elements provide the necessary technical standards to mediate connectivity
- The Shared Data element mediates a vocabulary for information to be shared

ISE Accomplishments to Date

- Formally established, staffed and housed the Office of the PM within the ODNI
- Established an Information Sharing Policy Coordinating Committee to address policy information sharing issues
- Submitted a PM Preliminary Report on the ISE
- Issued a Request for Information (RFI) to industry for Electronic Directory Services required by IRTPA
- Coordinated for release Executive Order 13388, identifying the PM as the Chair of the ISC
- Formally established and chaired meetings of the Information Sharing Council
- Wrote and submitted the Interim Implementation Plan for the ISE to Congress and the President
- Established a working group of Federal officials, chaired by DHS and DOJ, on Sensitive-But-Unclassified Information
- Established a working group of Federal officials, chaired by DHS and DOJ, on Terrorism Information Sharing Between and Among Federal Departments and Agencies and State, Local, and Tribal Governments, Law Enforcement, and the Private Sector
- Established a working group of Federal officials, chaired by the Department of State, on Terrorism Information Sharing with Foreign Partners
- Determined the appropriate Electronic Directory Service (EDS) strategies, concept of operations and implementation activities
- Issued a Presidential Memorandum to all Heads of Federal Departments and agencies outlining seven information sharing guidelines

ISE Two Year Goals

- Define and implement the ISE CONOPS, architecture, and standards as defined in the governing authorities
- Formulate Federal government policy to address:
  - Horizontal and vertical flow of information between federal and state, local, and tribal governments and private sector
  - Use and handling of state, local, tribal, and private sector information in ISE
- Identify and select information sharing pilot programs to be conducted and evaluated
- Deploy multi-phase EDS capability across the information sharing framework
- Report for the ISE Implementation Plan identifying:
  - ISE performance goals and measures
  - ISE training initiatives and policies
  - Specific, identifiable budget items for ISE in all federal government budgets
  - ISE Architecture and Framework deliverables