DoD Transformation

Technology Insertion *for* Joint Command and Control

Dawn Meyerriecks
Chief Technology Officer

"…possibly the single-most transforming thing in our forces will not be a weapons system, but a set of interconnections and a substantially enhanced capability because of that awareness."

-- Defense Secretary Rumsfeld

Joint C4 Capabilities… Who Uses Them?

Supported Missions/Customers

- President and Vice President
- SecDef and OSD
- Military Services
- Joint Staff
- CINCs and JTFs
- Deployed forces below JTF
- Defense Agencies
- Intelligence Community

Joint Mission Capabilities

- Trusted, Dependable, Global Network and Communications Operations
- Joint Command and Control Applications and Operations
- DoD Capstone Defensive Information Operations
- Assured Computing for Combat Support
- Combined and Joint Interoperability Activities

Global C4 capabilities supporting and connecting diverse customers, under all conditions of stress.

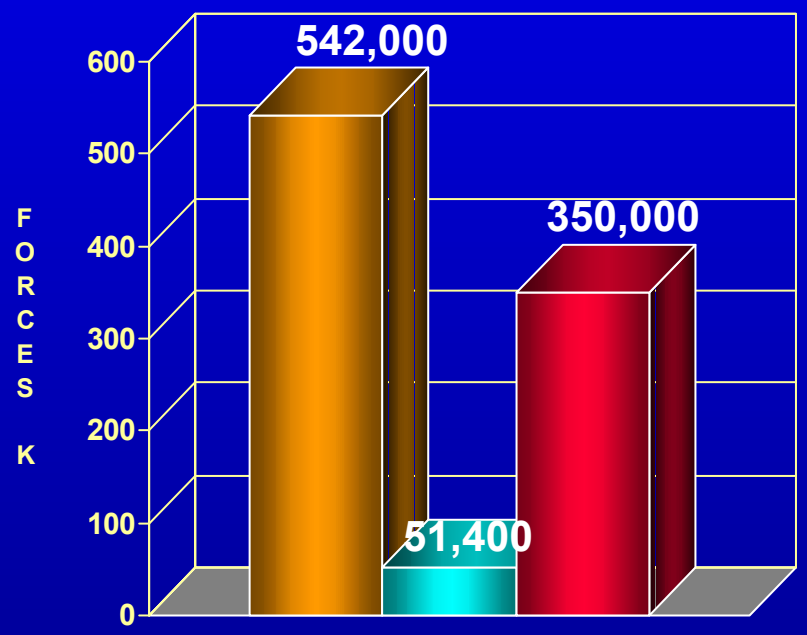
"Freedom is not synonymous with an easy life.... There are many difficult things about freedom: It does not give you safety, it creates moral dilemmas for you; it requires self-discipline; it imposes great responsibilities; but such is the nature of Man and in such consists his glory and salvation."

Margaret Thatcher

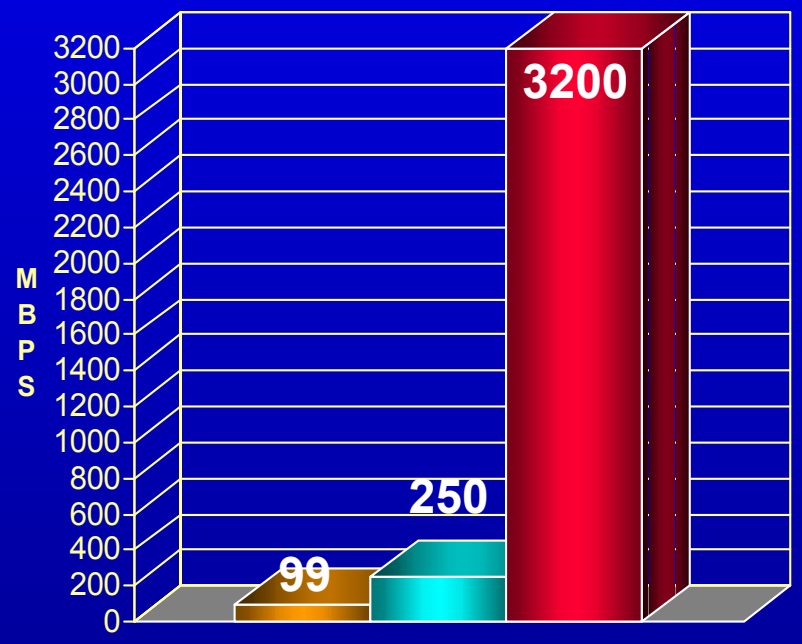
Current Operations Support

SATCOM Support

DEPLOYED FORCES



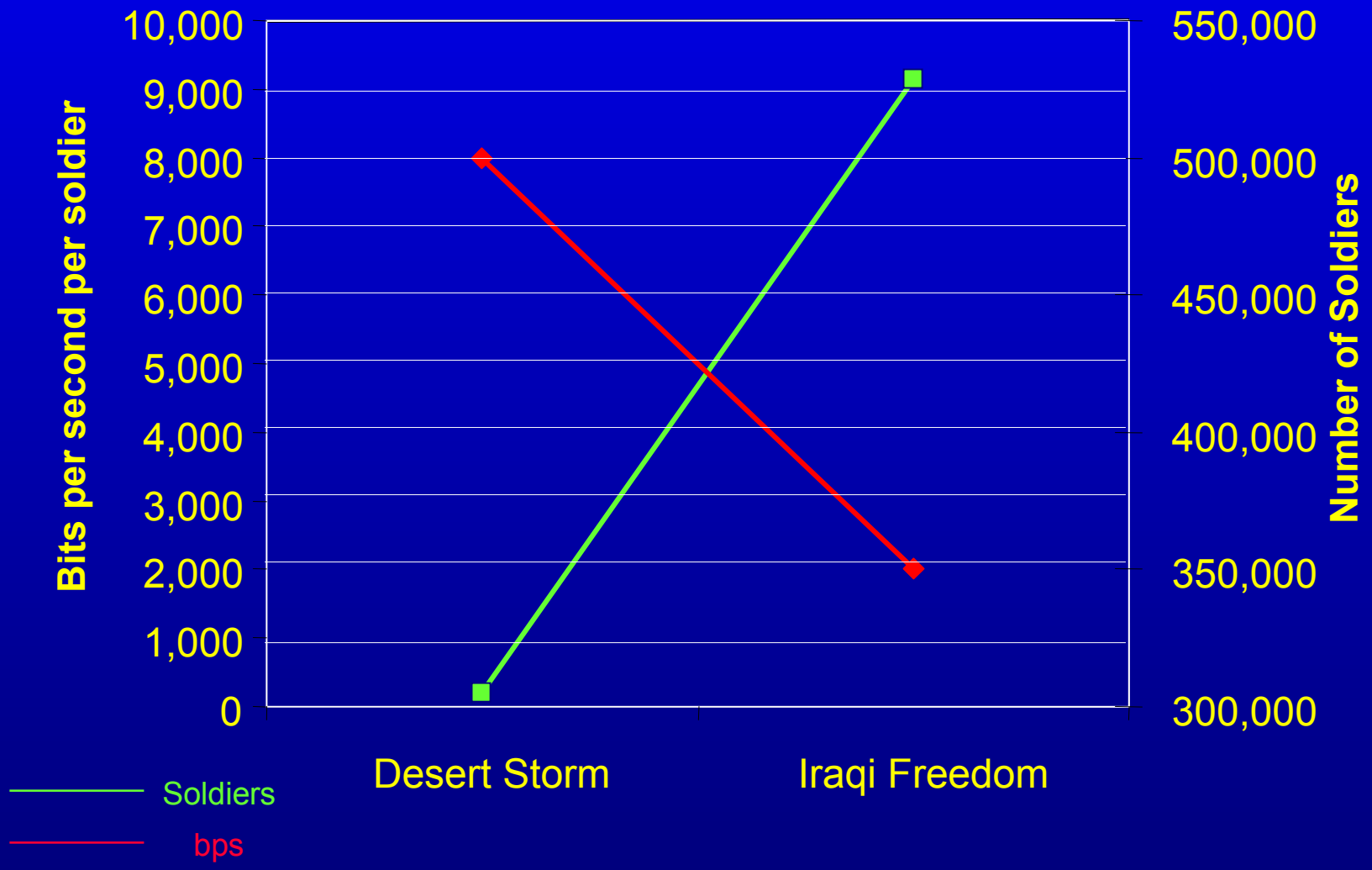
BANDWIDTH



DESERT STORM (1991) | NOBLE ANVIL (1999) | ENDURING/IRAQI FREEDOM (2003)

Current as of 01 May 03

SATCOM Bandwidth/Soldier



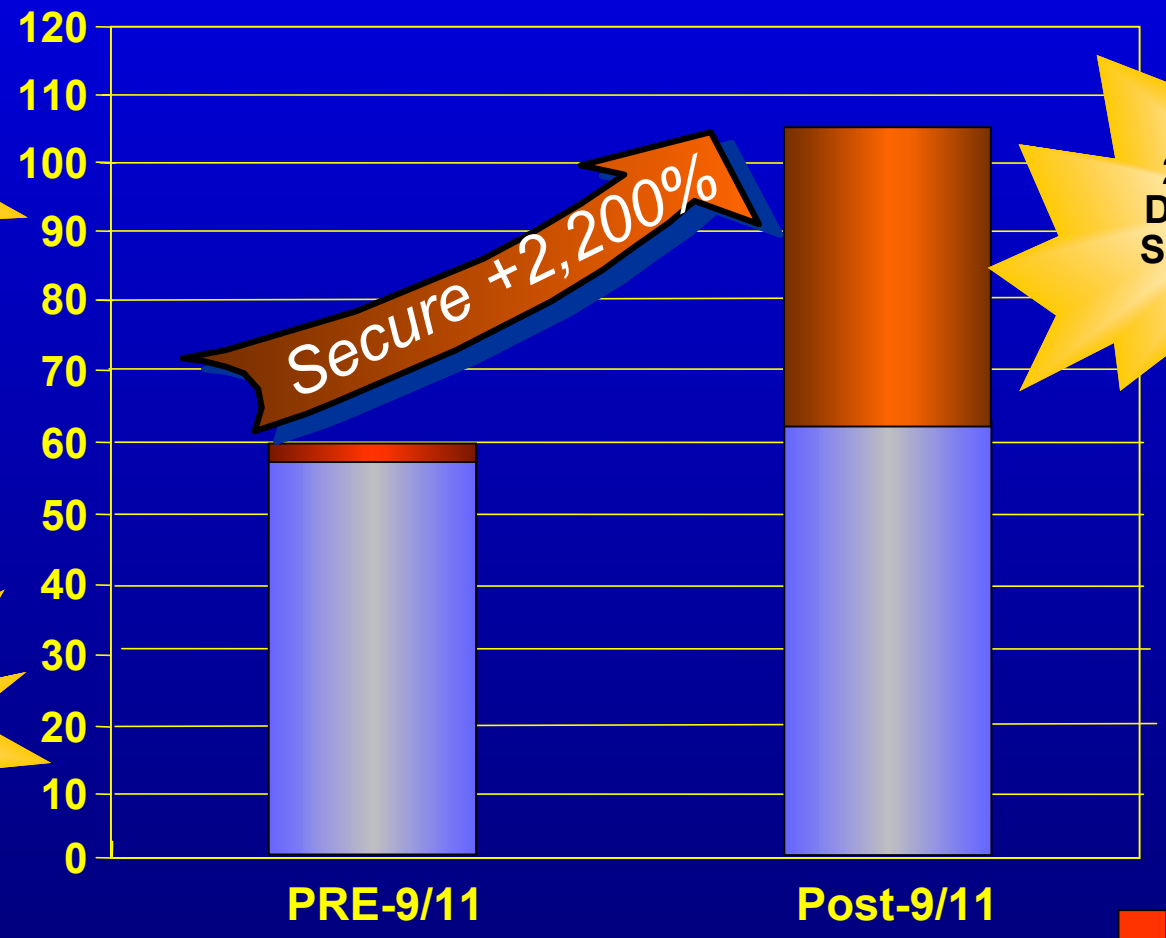
DISN Video Services

Face-to-Face Command and Control

Global Hardware Upgrades

347 New & 237 Current DVS Sites go Secure, since 9/11/01

42,125 Conferences Since 9/11

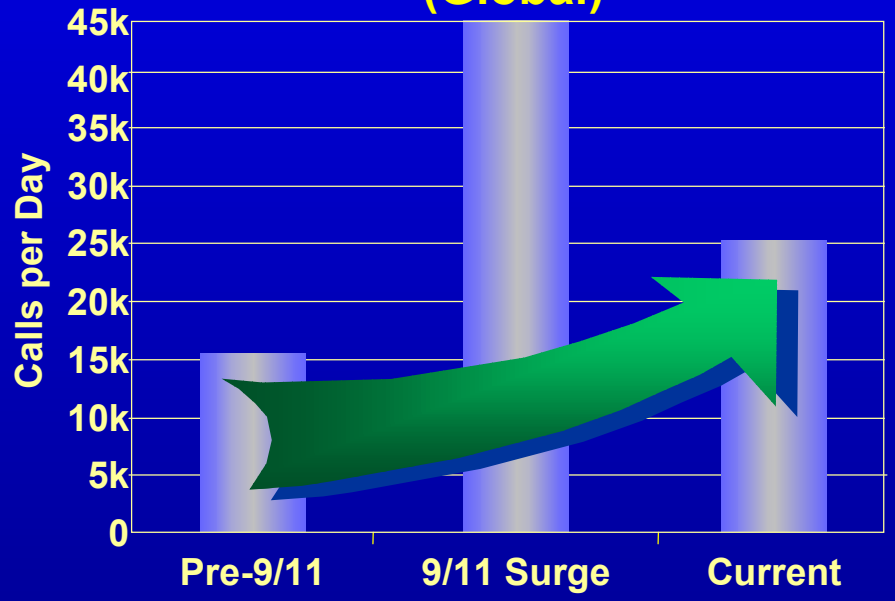


Conferences per day

Switched Network Services

DSN
(CENT AOR)

DRSN
(Global)



Increased Traffic 285%

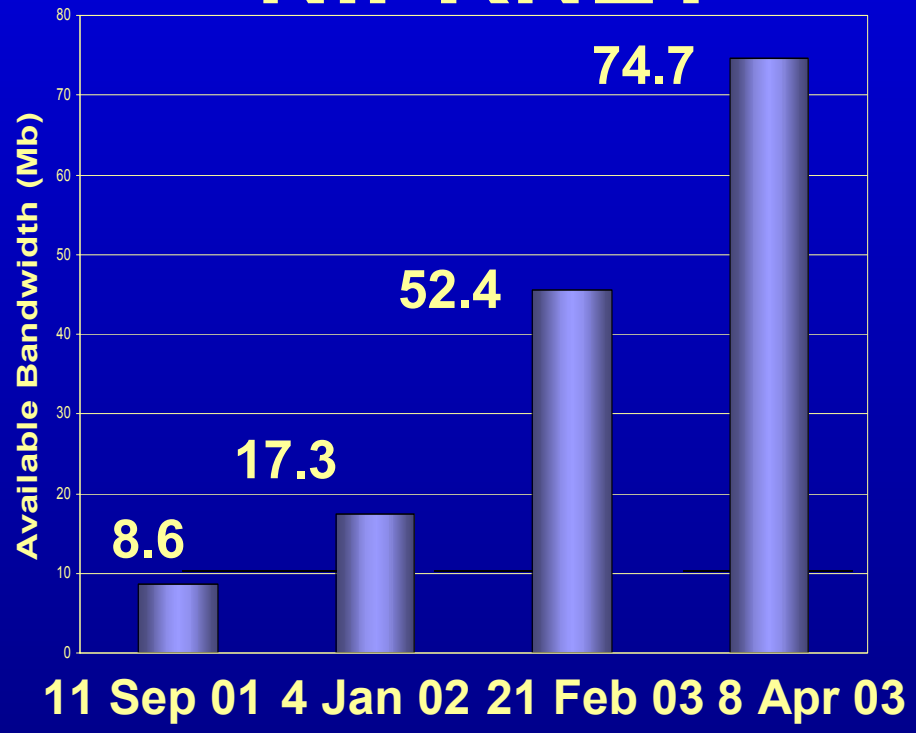
Added 1000 Trunks

300% Surge

Added 18 New Federal Agencies

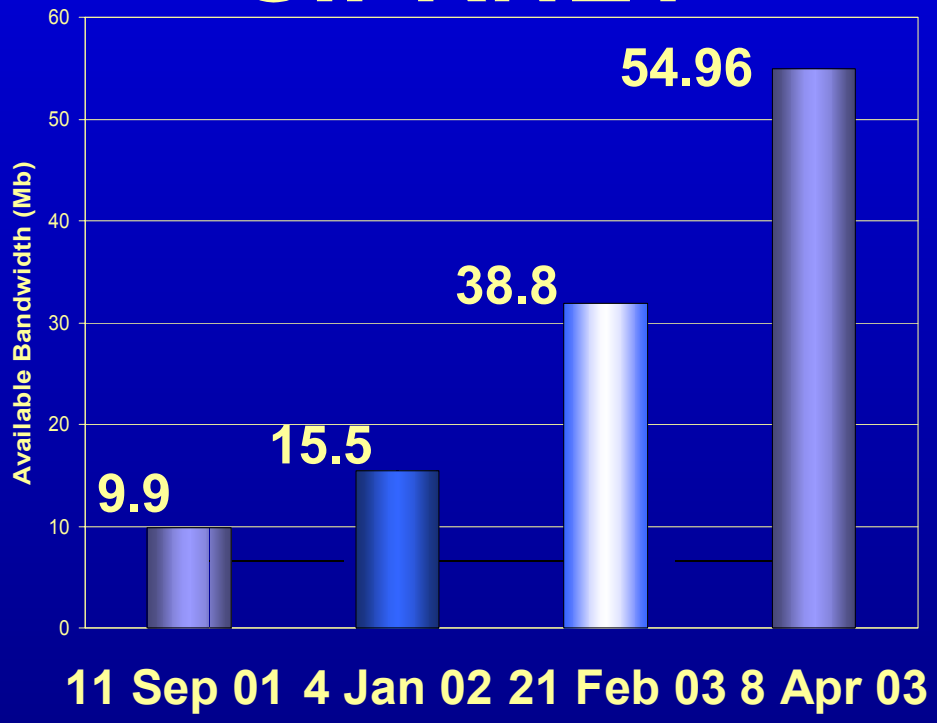
Data Services

NIPRNET



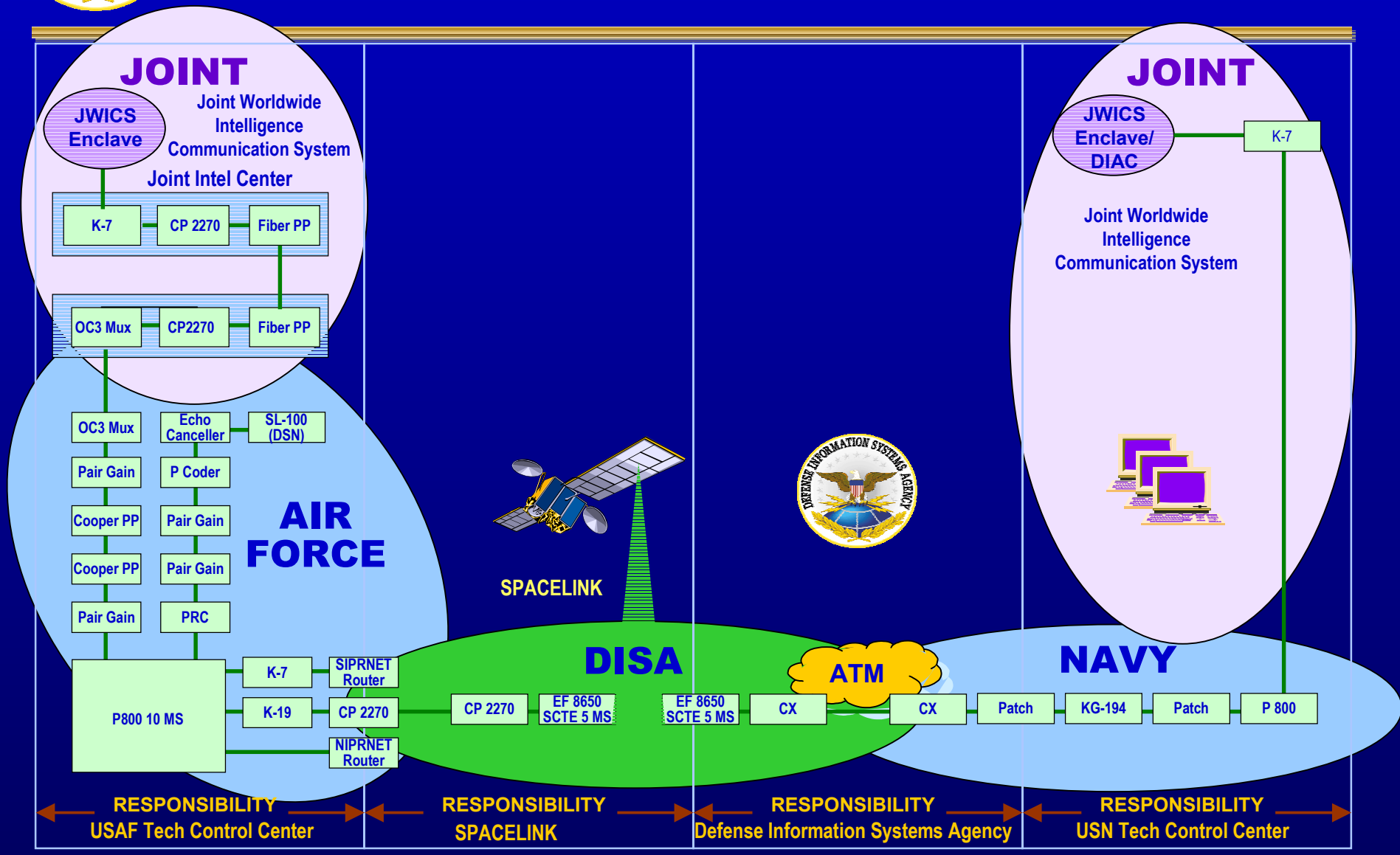
869% Increase in Bandwidth!

SIPRNET

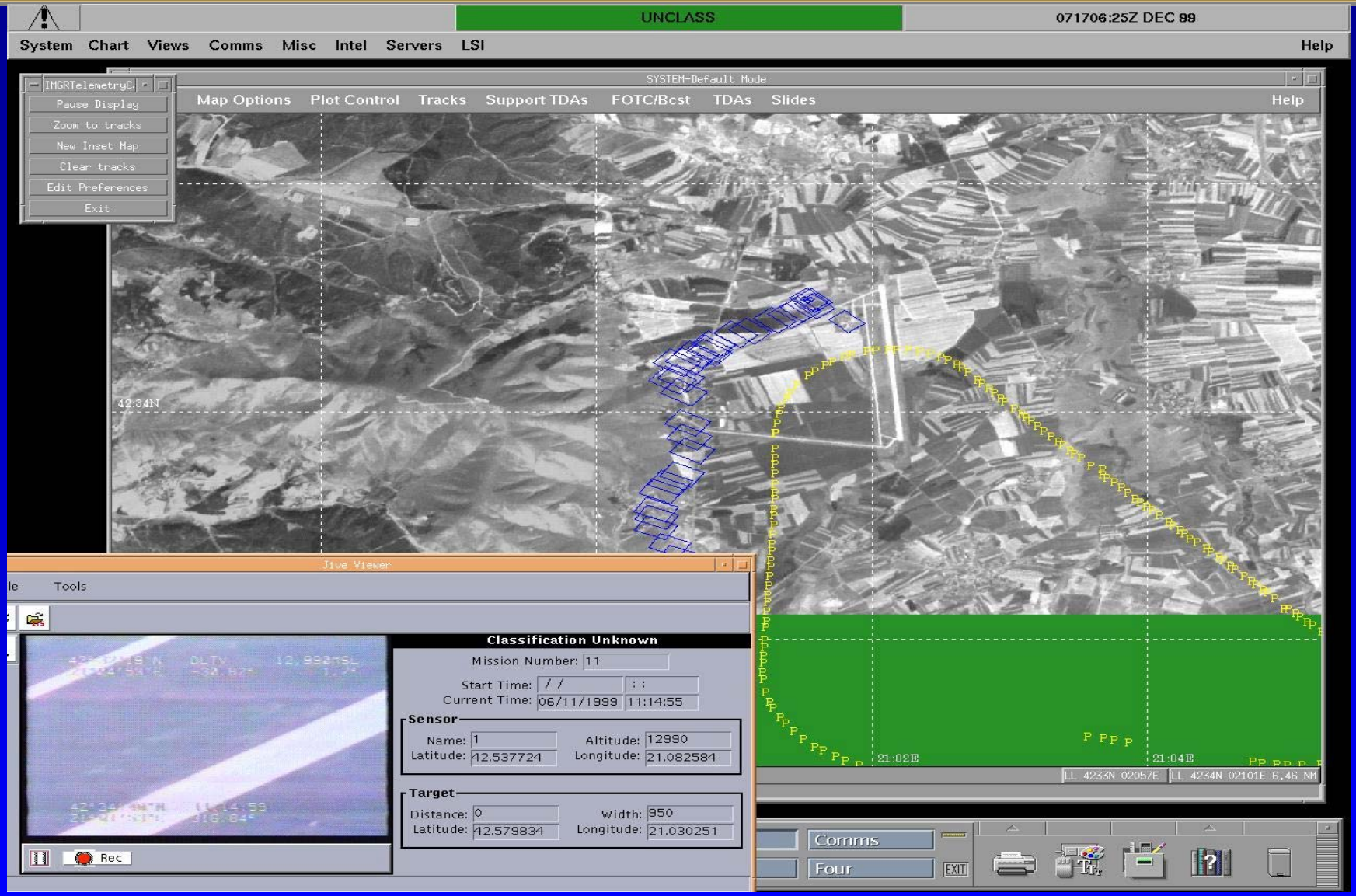


557% Increase in Bandwidth!

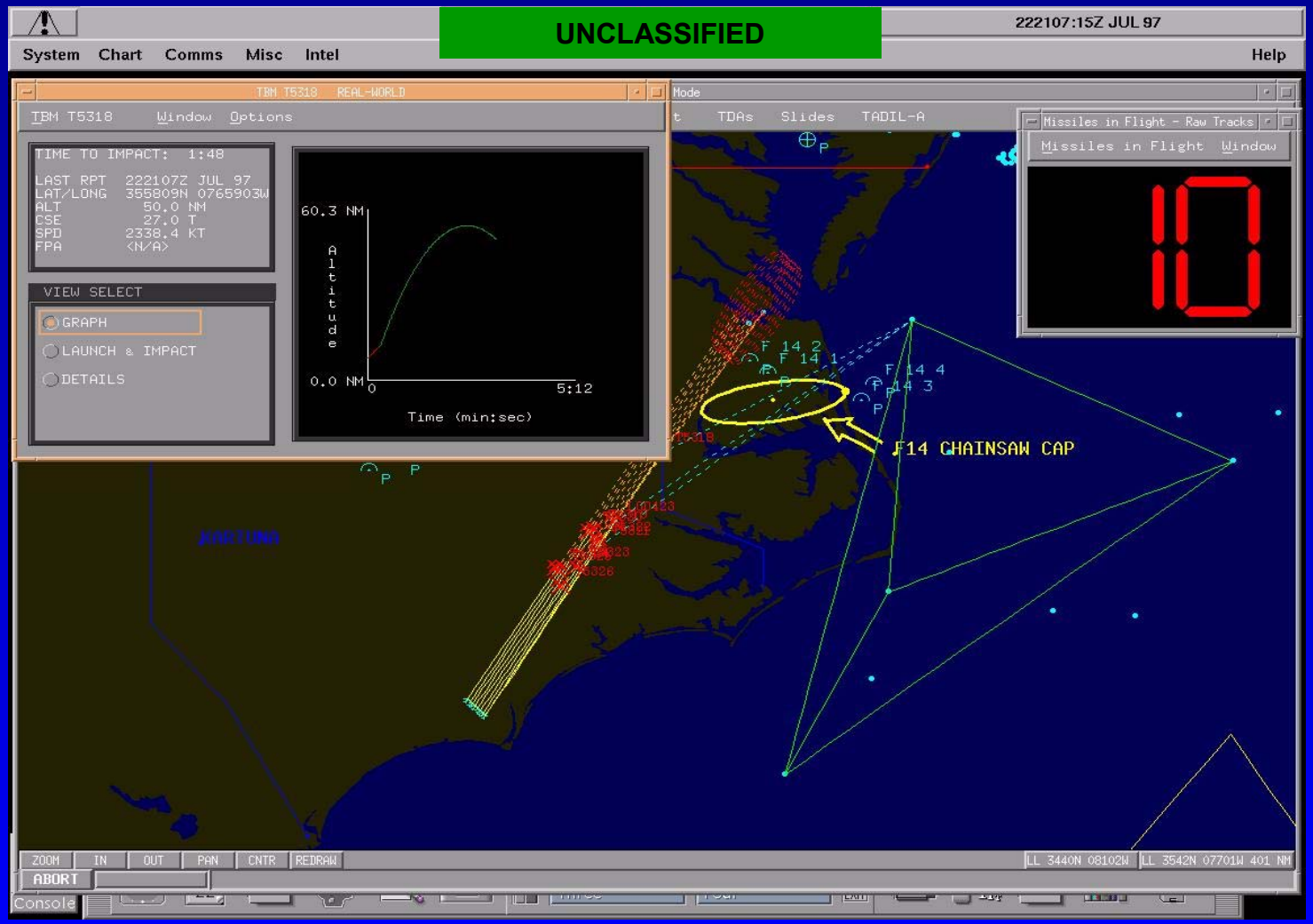
End-to-End Capability



Common Operational Picture –
Real-Time Video, Integrated Imagery



Common Operational Picture –
Theater Ballistic Missile, Integrated Intelligence



UNCLASSIFIED

172244:35Z JUL 97

System Chart Comms Misc Intel Help

SYSTEM-TBMD Mode

System Map Options Plot Control Tracks Support TDAs FOTC/Bcst TDAs Slides TADIL-A Help

Image Viewer

System Manipulation Filter

AOI
Pan
Magnify
Undo
Exit

/tmp/AAAa0014j loaded

(473, 343) 77

Overview

Cancel

(311, 701)

(IMG) SA-3 SITE-03

(IMG) SA-6 SITE 01

SA-6 SITE 01

SA-6 SITE 01

E NORFOLK, VA SA-6 SITE 0

SA-3 SITE 02

SA-2 SITE 02

xterm

jul 17

One Two Three Four EXIT

5.0 NM

UNCLASSIFIED

172136:15Z JUL 97

System Chart Comms Misc Intel Help

SYSTEM-Default Mode

System Map Options Plot Control Tracks Support TDAs FOTC/Bcst TDAs Slides TADIL-A Help

Video Player

/tmp/AAAa000u2: 320x240 Frame 65 of 999999999

TT FOB 2 HIDE

(IMG) LAUNCH1

PICKETT BRGD HQ

(IMG) PICKETT FOB1

(IMG) SLARK BRGD HQ

(IMG) LAUNCH 2

(IMG) LAUNCH1

(IMG) SLARK FOB2

(IMG) SLARK FOB3

SEERSUCKER SITE A

SEERSUCKER GRADED SITE D

(IMG) CDCM SITE A

SEERSUCKER GRADED SITE G

(IMG) LAUNCH1

SEERSUCKER GRADED SITE I

SEERSUCKER GRADED SITE H

KARTUNA

CDCM SITE E

CDCM SITE B

SEERSUCKER GRADED SITE E

CDCM SITE H

SEERSUCKER SITE B

(IMG) LAUNCH2

(IMG) MYRTLE FOB1 HIDE1

SEERSUCKER GRADED SITE F

(IMG) MYRTLE FOB 3

(IMG) LAUNCH2

(IMG) LAUNCH1

(IMG) CDCM SITE C

SEERSUCKER SITE C

(IMG) LAUNCH1

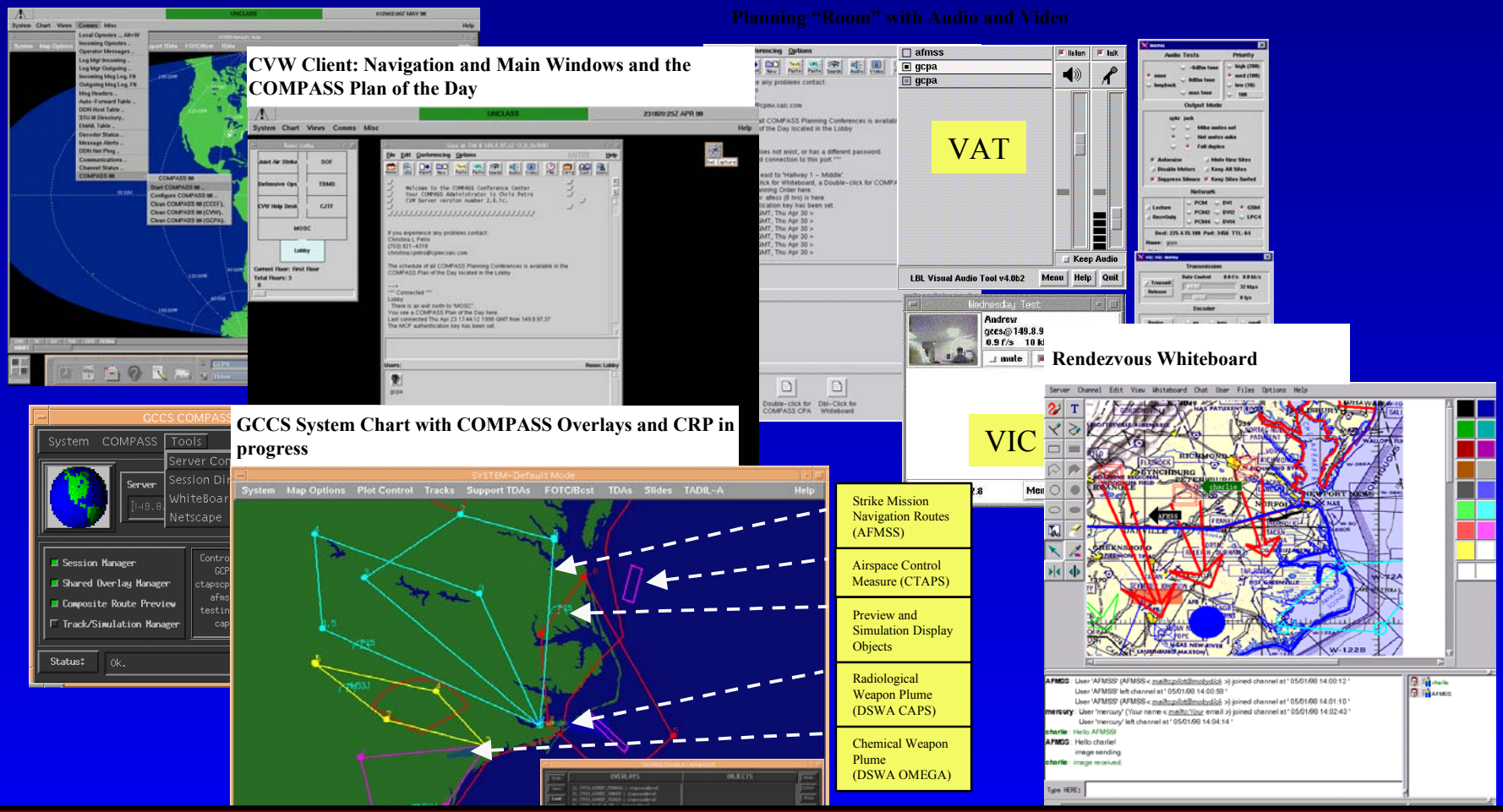
(IMG) MYRTLE BRGD HQ

ZOOM IN OUT PAN CNTR REDRAW

LL 3526N 07628W LL 3539N 07705W 372 NM

ABORT

Common Operational Picture –
Battle Damage Assessment, Sensor Availability



"GCCS is absolutely critical to CENTCOM's operations … But it is not really on my screen because it works well … it has been integrated and tested."

-- CENTCOM J6

Computer Network Defense (CND)

84% Compromises Exploit Known Problems
100-150 Large Scans/Day (<100K Hosts)
58% compromises MS Servers

Standard ACL for Internet/NIPR G/Ws
2.1 Gbps Thru 22 G/Ws

Executive Leadership

Military Telecom

124 SABI Guards

1,500 Base/Post/ Camp/Stations Worldwide

~100,000 LANs

Personal Communications Service

Presence in 65 Nations

120,000 Commercial Telecom Circuits

Joint Task Forces Worldwide

15 Step/ Teleport Sites

90 Current Missions

Fixed Locations

Deployed Forces

DoD Unclassified Data Network

DoD Classified Data Network

300 Ships

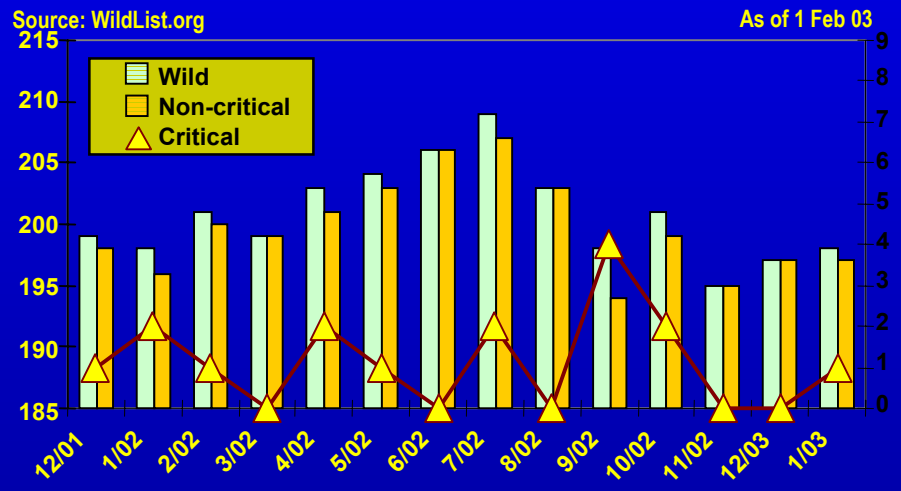
Internet 250 – 500M Users

Intelligence Networks

Each event is more distributed
– affects users and infrastructure
Each event more complicated
-- more vulnerabilities, harder to protect

CND Trends

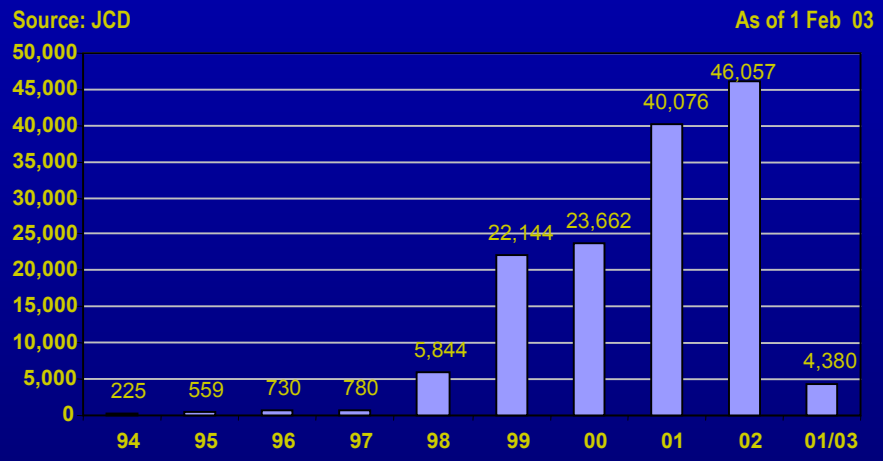
Internet Virus Growth Per Month
("Wild List," Non-critical & Critical)



- Lower overall virus numbers but . . . More complexity and danger
- Each piece of IT comes with risk

- Anticipate linear event growth, but . . . Each event is more complex and bigger
- Each event requires tactical and strategic analysis techniques

Detected "Events"
(DOD Unclassified Network "NIPRNet")



“Liberty means responsibility. That is why most men dread it.”

George Bernard Shaw

“There are no shortcuts to any place worth going.”

Publilius Syrus

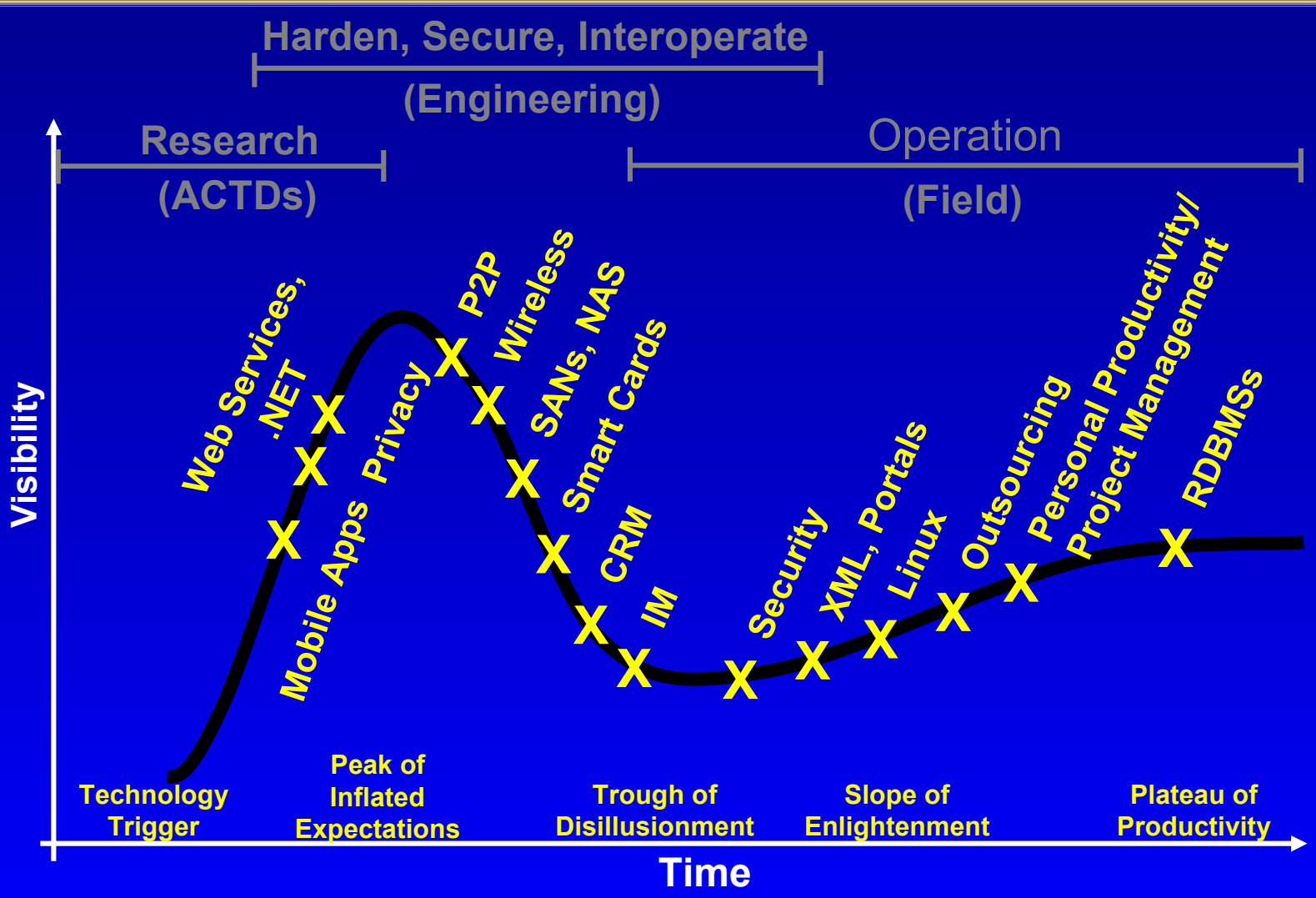
Futures

Coming Soon!

Networks with <u>Services</u> that enable Precision Search, Smart Data Pull, and Collaborative Operations –

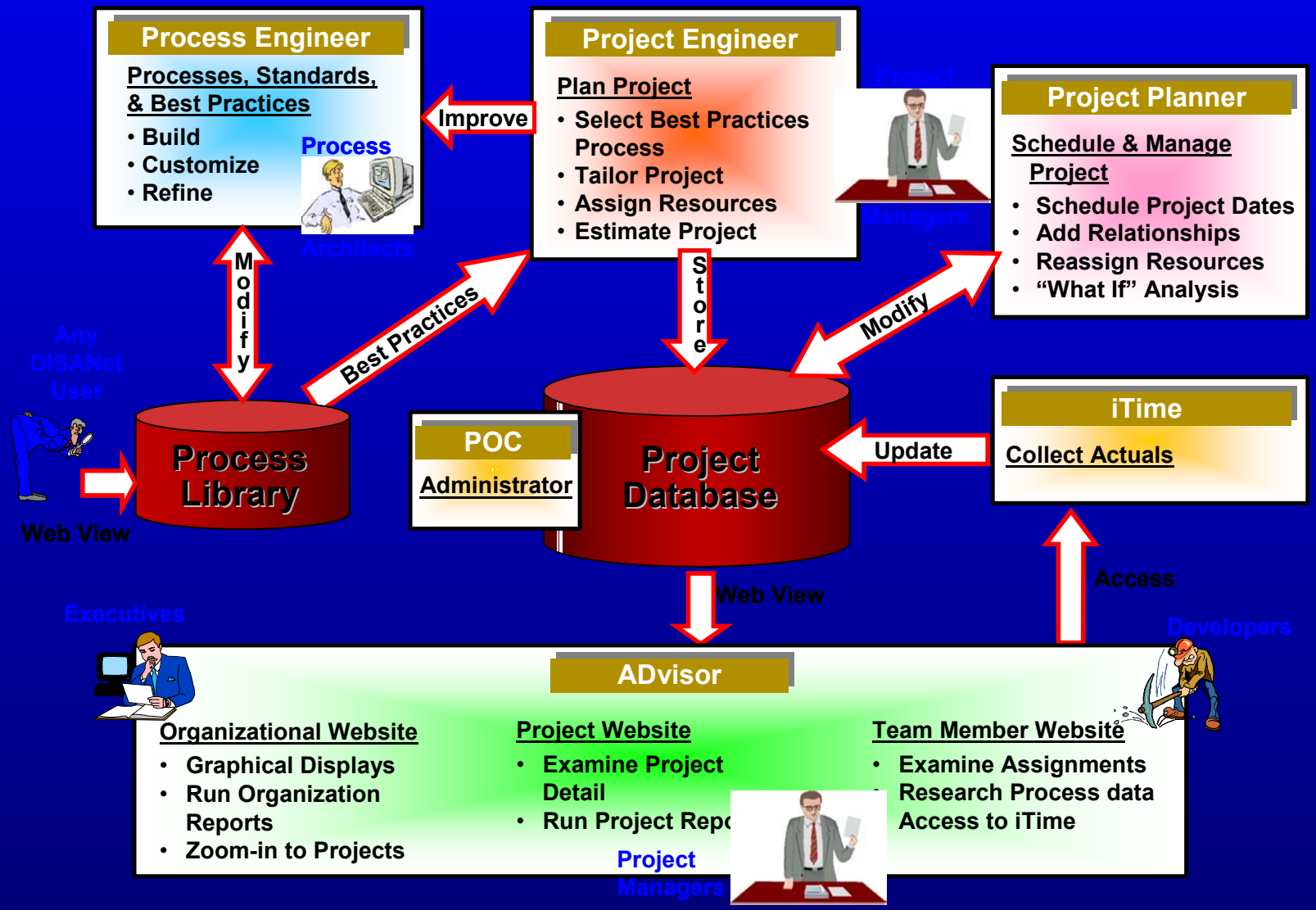
GIG-BE, TCS, Horizontal Fusion (NCES)

Technology Cycle (DoD Application)



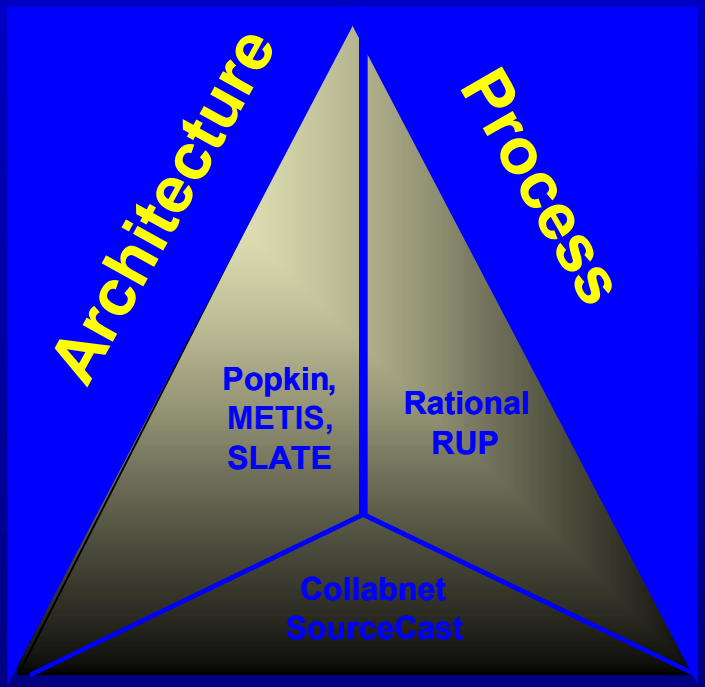
* Gartner Group

Repeatable Processes



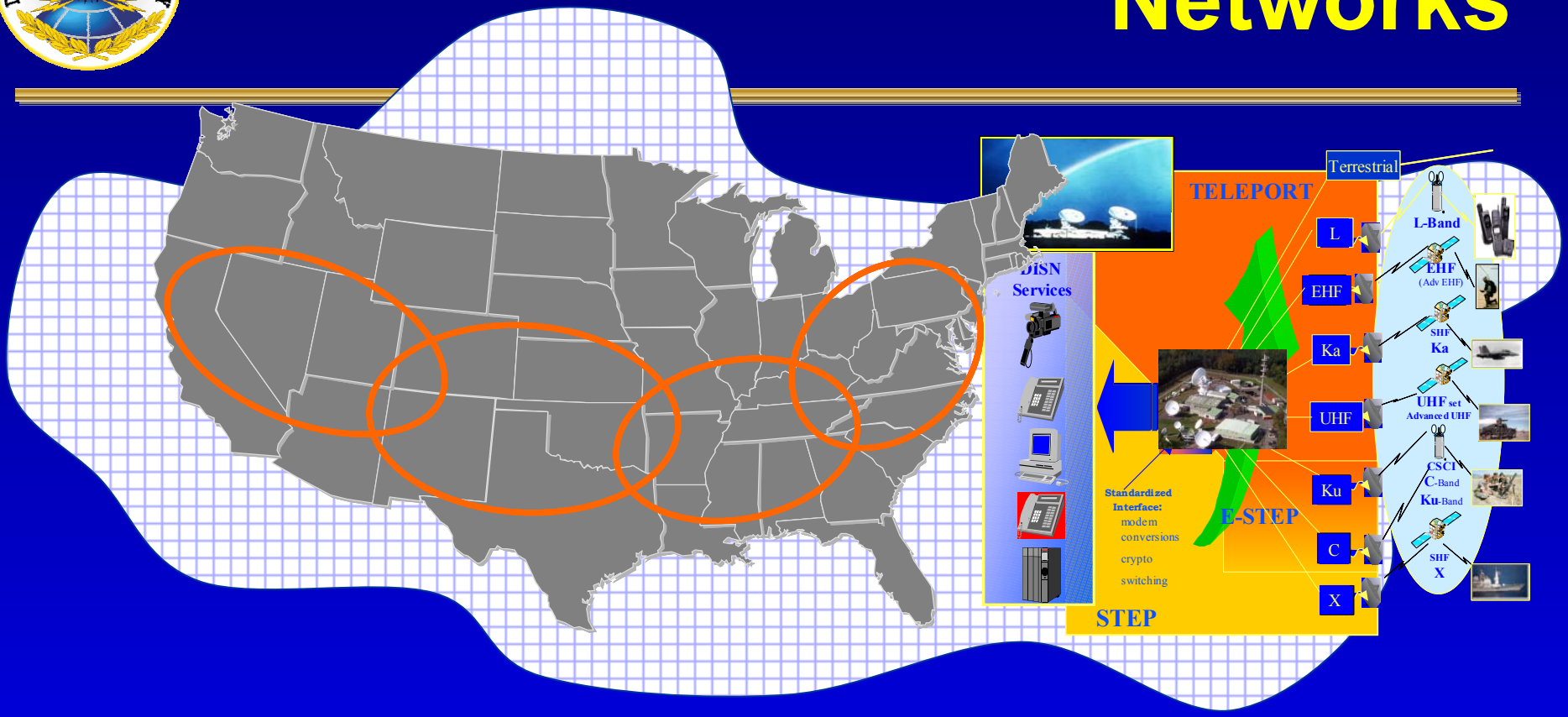
The "NEW" Development Environment

- **Community Source Process**
  - Shared Source and/or Component Libraries
- **Common Architectural Approach**
  - Shared Software Safety Approach… Security, Availability, Reliability, Risk Environment, QoS
- **Common Lifecycle Approach**
  - Shared Test Environment Replicating Real-World Scale
  - Shared Requirements Management
  - Shared Roll-Out Planning and Execution



Product

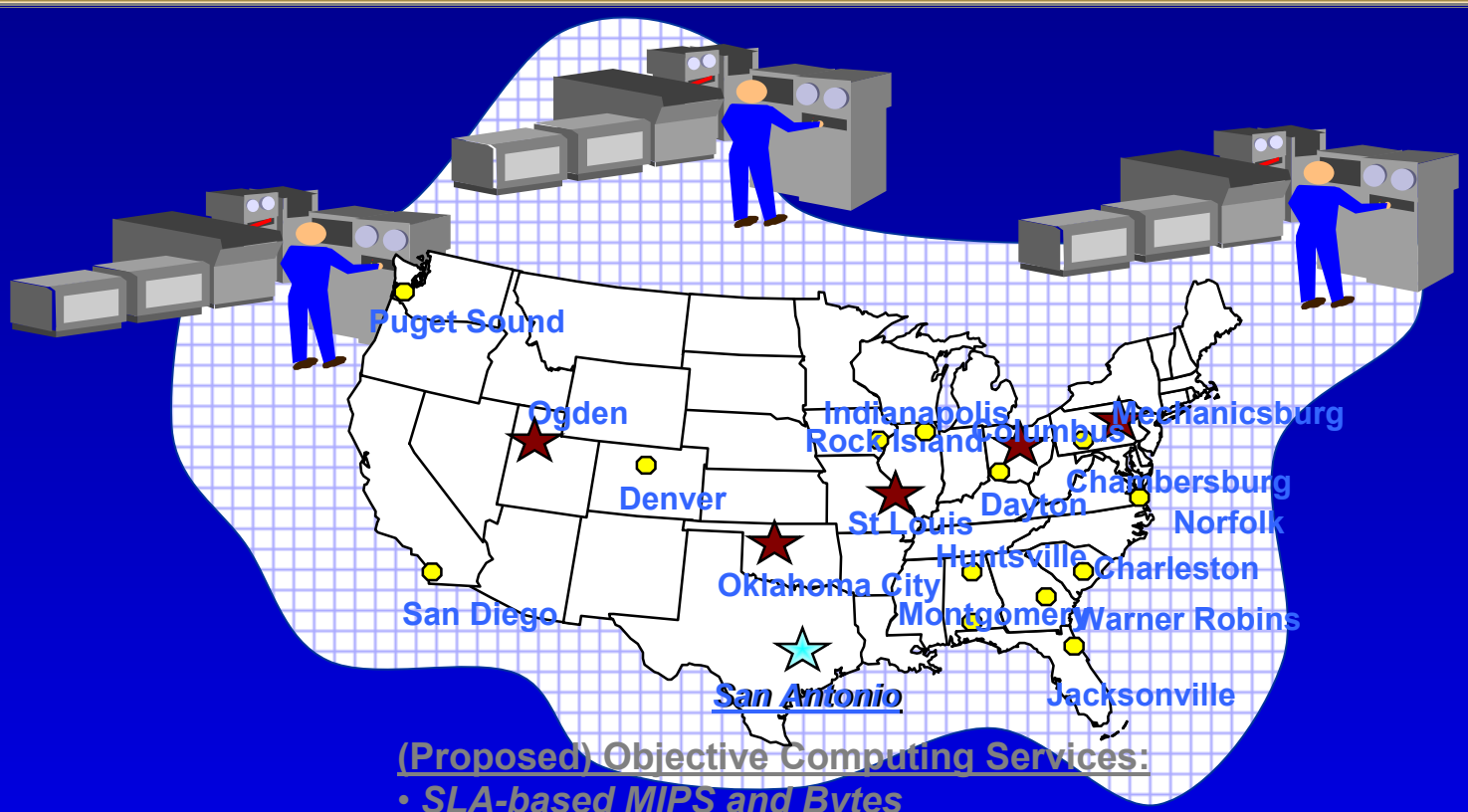
Networks



(Proposed) Objective DISN Services:

- *SLA-based Voice, Video, Data Services*
  - ***End-to-End Qos***
  - ***Dynamic Provisioning***
  - ***Cacheing, Content Delivery, MultiCast,***
  - ***"Bandwidth on Demand"***
  - ***Effective, Efficient Acquisition & Management***

Hosting



(Proposed) Objective Computing Services:

- *SLA-based MIPS and Bytes*
  - ***Capacity on Demand***
  - ***Dynamic Storage Provisioning***
  - ***Reliable Data Distribution and Replication***
  - ***Effective, Efficient Acquisition & Management***

The "NEW" Computing Environment Qualities

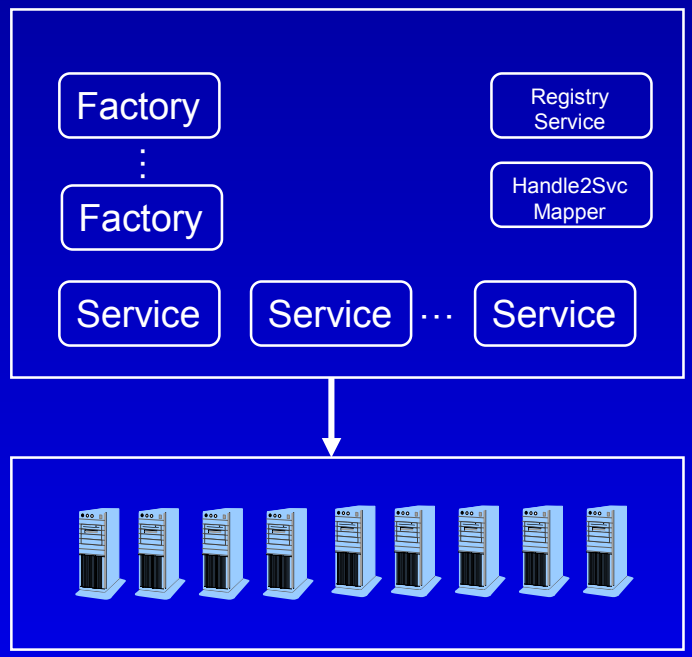
- The Open Grid Services Architecture (OGSA)…"allow applications to access and share resources across distributed, wide area networks"
  - Uniform exposed service semantics
  - Defines standard mechanisms for creating, naming, discovering transient Grid service instances
  - Provides location transparency and multiple protocol bindings for service instances
  - Support integration with underlying native platform facilities (e.g. Linux)

➢ Heterogeneous Storage, Bandwidth, Processing "On Demand"
➢ Network as a Backplane

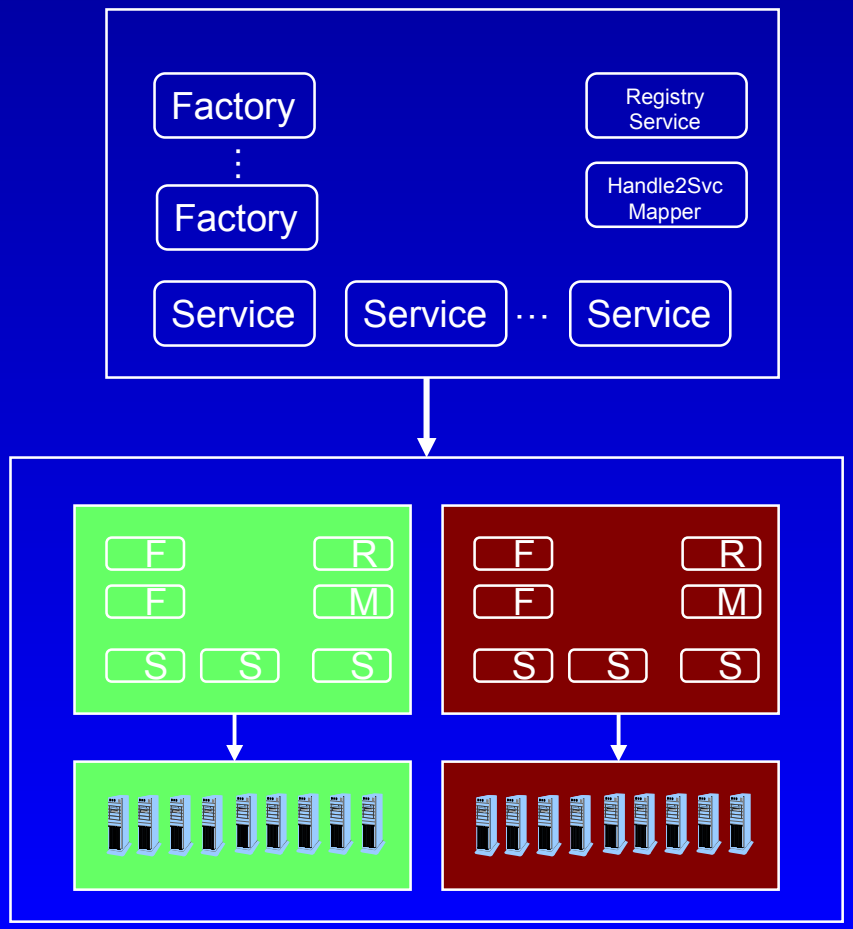
http://www.globus.org/research/papers/ogsa.pdf

Gridded Services Environment

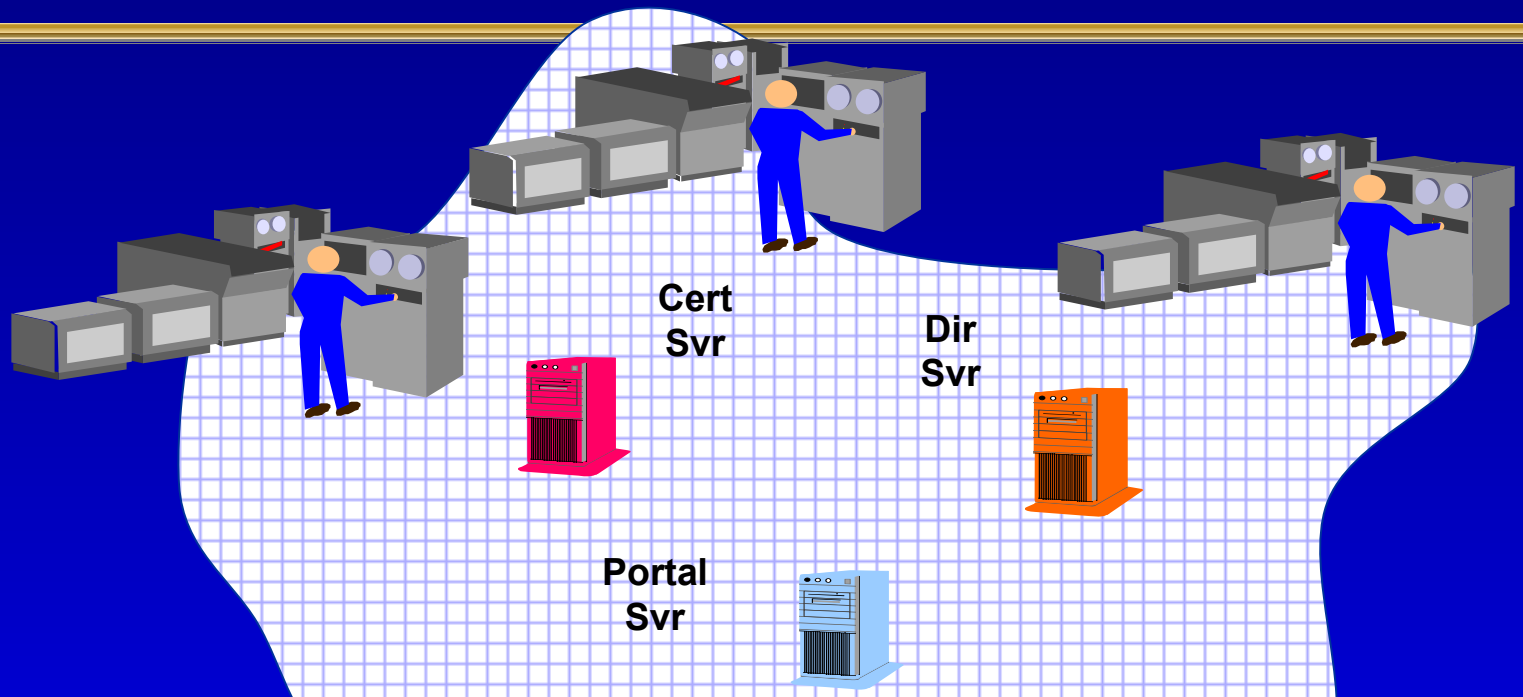
Simple Hosting Environment



Virtual Hosting Environment



Infrastructure



(Proposed) Objective Enterprise Services:

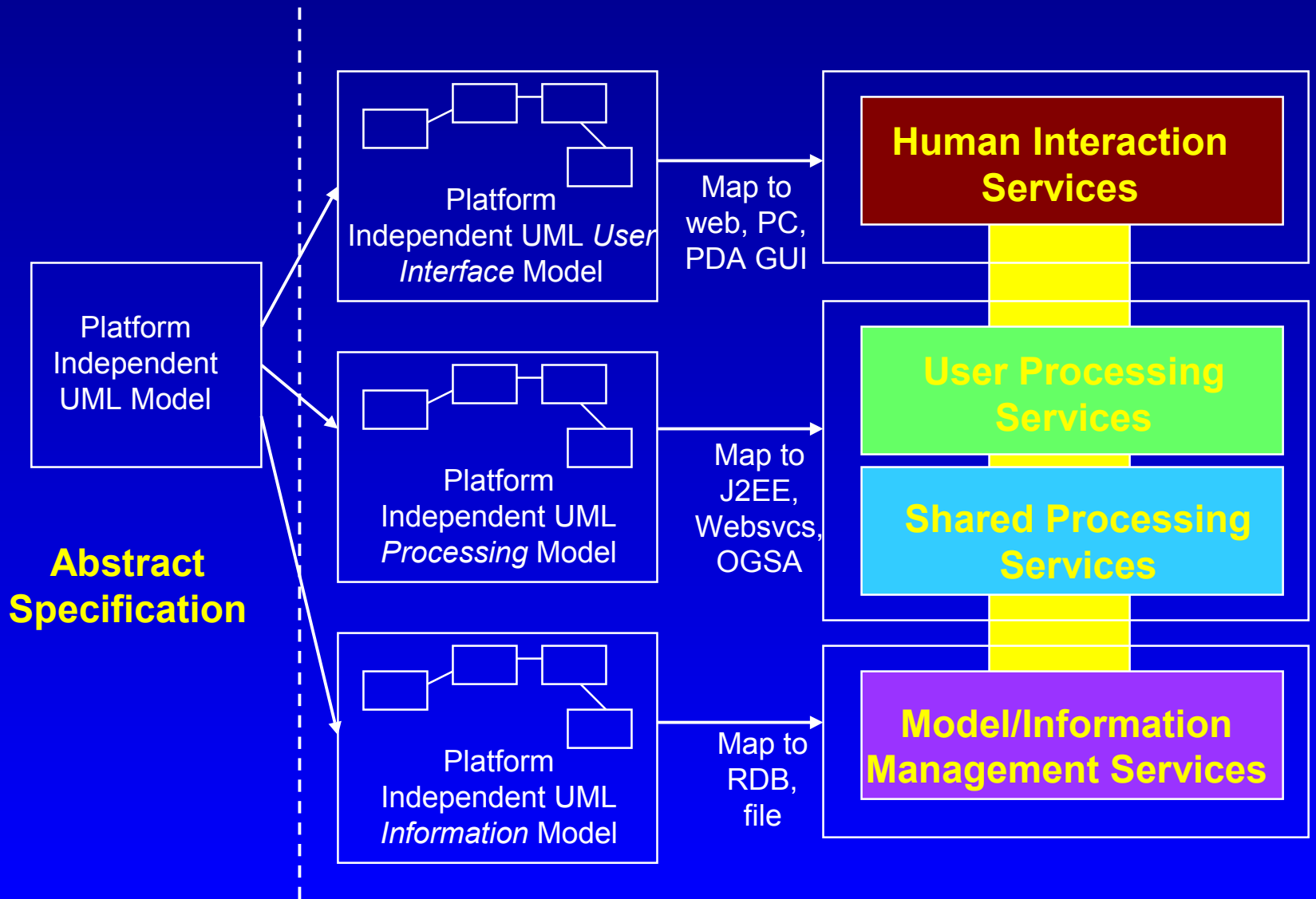
- *Building Blocks for Secure Integration of Applications and Data Sources*
  - *Identification & Authentication*
  - *Directory*
  - *Messaging & Transactions*
  - *Information Management (Discovery, Access, Dissemination)*
  - *Collaboration*
  - *Enterprise Management*

The "NEW" Infrastructure Services Model

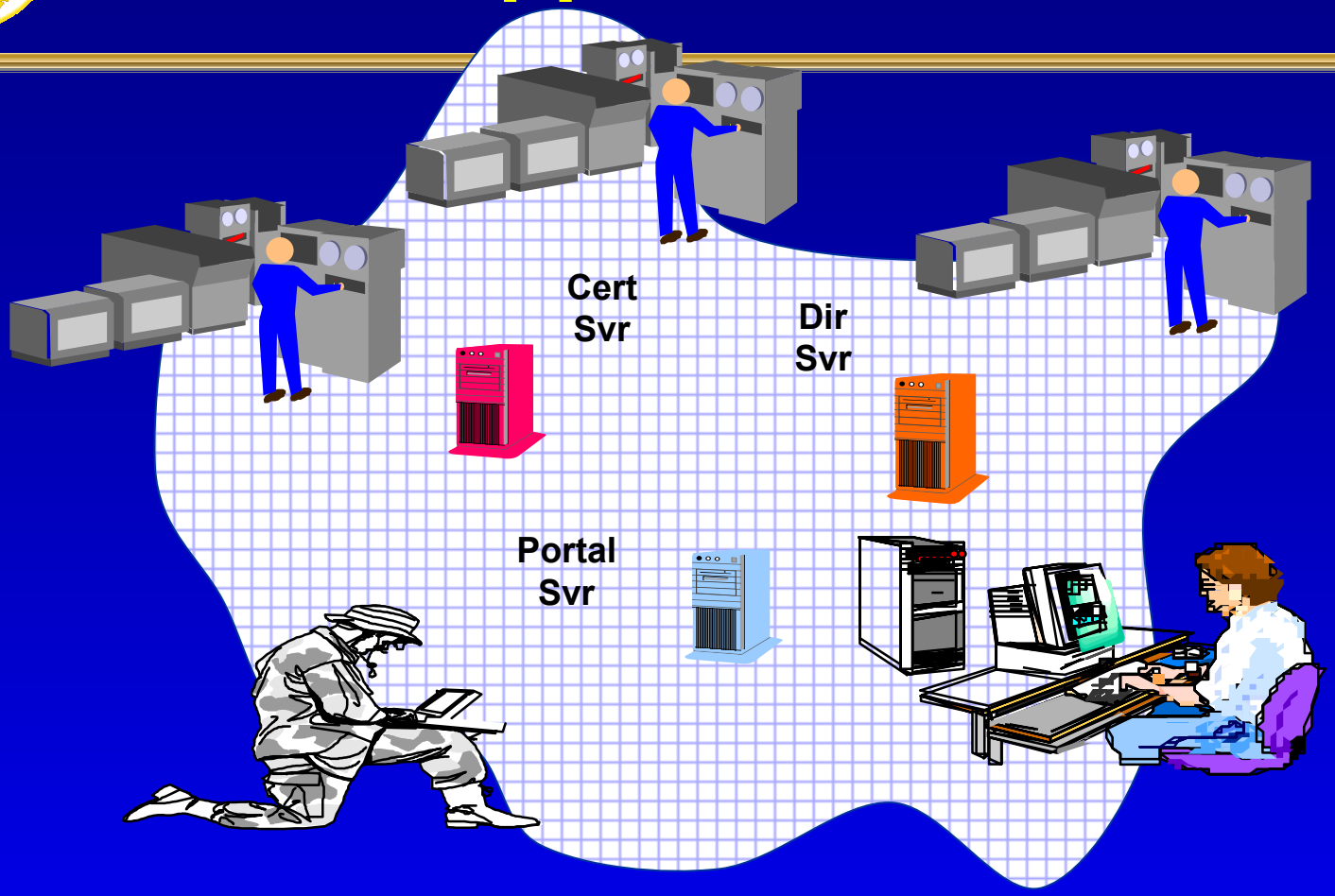
- The OpenGIS Consortium (OGC) Service Architecture…"provides a framework for developers to create software that enables users to access and process…data across a generic computing interface with an open IT environment "
  - Extensible beyond geospatial data
  - Enable interoperable data services through interface standardization
  - Support development of a service catalog through definition of service metadata
  - Separate data instances and service instances
  - Enable use of one provider's service on another provider's data
  - Define an abstract framework which can be implemented in multiple ways

http://www.opengis.org/techno/specs/99-051.pdf

Mapped Infrastructure Services



“Killer” Applications…JC2, FMMP



(Proposed) Objective Applications & Data Sources

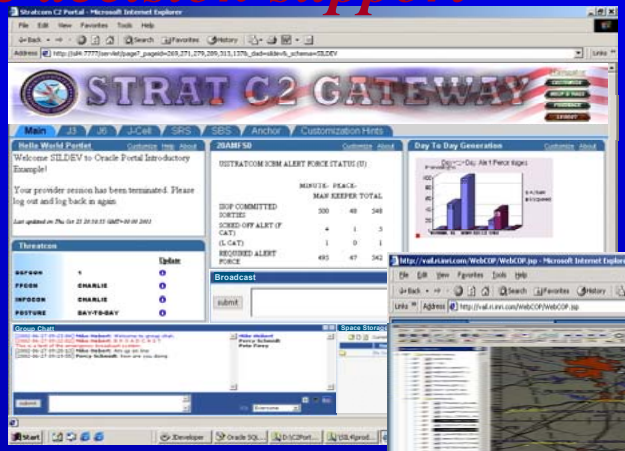
- *Community of Interest Functionality*
- *Secure, Interoperable Plug-n-Play Data Sources and Applications*

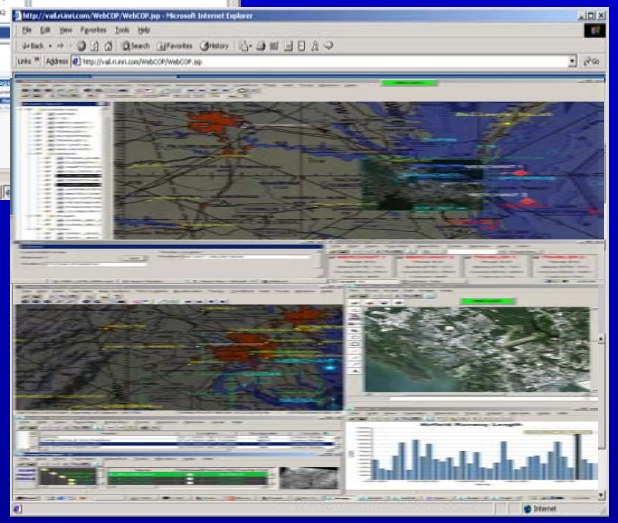
Adaptive Situation Awareness Mission Capability Package

Dynamic decision support

- *Convergence of ISR, maneuver & other info*
  - *(plans, strike, fire support, combat support, & infrastructure databases)*

  for past, present, & future total operational awareness and assessment
- *Capability to bring to war-fighters timely decision-focused displays & supporting products which are tailored to the situation, mission and decisions at hand*
- *Capability to display awareness of force C2 posture, including functional impacts of information system status and information operations*



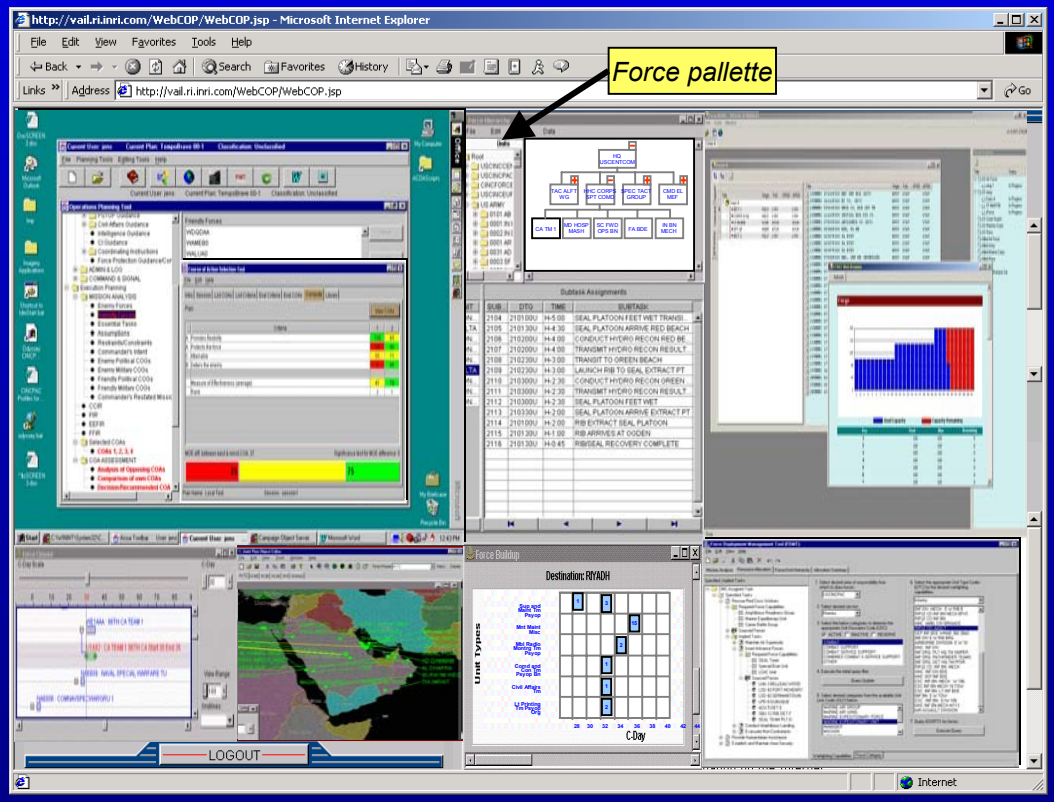


ACTDs: ABA
JBFSA
Gridlock
CINC 21
Web I3 (BADD)
ISSA, C-IA COP

Force Readiness, Deployment, & Sustainment Mission Capability Package

"Capability-based, continuous optimization of global & regional deployments"
"Minimum support base forward, Maximum flexibility"

- ***Capability to provide readiness assessments for units or for aggregations of total forces in multi-plan deliberate planning***
- ***Capability to collaborate in COA evaluation and continuous, global force projection operations from peacetime ops thru major contingencies***
- ***Capability to synchronize logistics operations with combat mission operations***



ACTDs: ACOA, CFAST, AT21, JFP, JTL, CTL

Theater Force Protection Mission Capability Package

"Move to prevent or avoid, rather than manage consequences"

- ***Capability to support threat warning, avoidance, prevention, preemption***
  - ***("the only good battle is the one never fought")***
- ***Capability to provide DOD's portion of inter-agency Crisis and Conse-quence Management if an attack occurs***
- ***Capability to coordinate Joint Rear Area FP/AT of critical bases, assets, & host nation infrastructure***

ACTDs: CRASOC2, HLS C2, ProForce, ANID

JTF / CTF Employment
Mission Capability Package

"Effects-based, minimum footprint, self-synchronized"

- ***Distributed, collaborative, information-centric decision support on employment courses of action across ops, log, & intell, including the capability to create "alternate reality" palettes for planning, assessment, & plan vs actual monitoring***

- ***Portal-based planning & information sharing support for coalition and inter-agency C2 operations***

ACTDs: CINC 21
C4EES
Global Strike

From Systems to Service-Based Capabilities

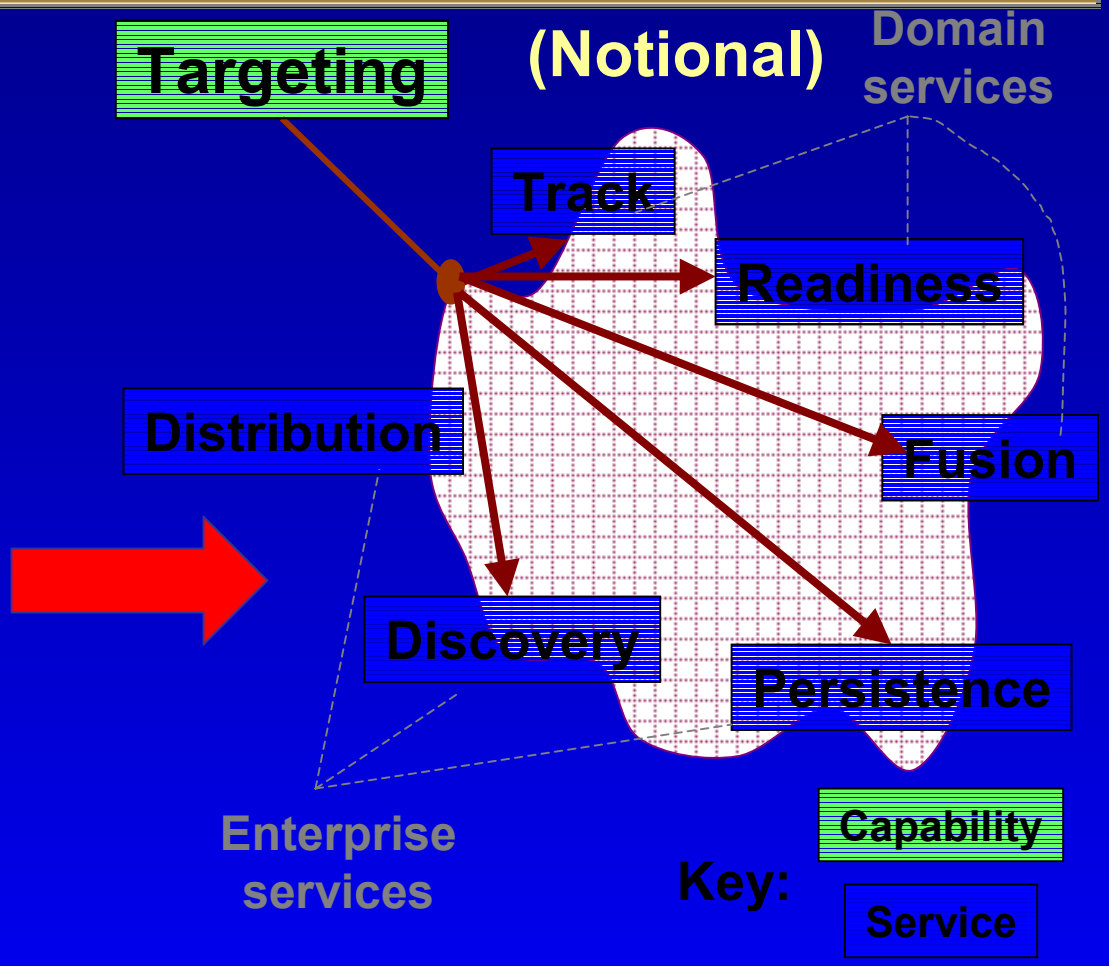
Today: Systems with Targeting Applications

GCCS

ABCS

GCCS-M

TBMCS



Capability discovers and uses common services

"With less than half of the ground forces and two-thirds of the air assets used 12 years ago in Desert Storm, we have achieved a far more difficult objective….

"In Desert Storm, it usually took up to two days for target planners to get a photo of a target, confirm its coordinates, plan the mission and deliver it to the bomber crew. Now we have near real-time imaging of targets with photos and coordinates transmitted by e-mail to aircraft already in flight.

"In Desert Storm, battalion, brigade and division commanders had to rely on maps, grease pencils and radio reports to track the movements of our forces. Today our commanders have a real-time display of our armed forces on their computer screens….

"The superior technology we now possess is perhaps the most obvious difference between the Gulf War..."

-- *Vice President Cheney speaking on* Operation Iraqi Freedom, 9 April 2003

DEFENSE INFORMATION SYSTEMS AGENCY