FORCEnet

Netting the FORCE for transformational combat capability

FORCEnet and Sea Trial

30 APR 2003 – Little Creek, VA

CAPT John Yurchak, FORCEnet Requirements
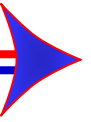John.Yurchak@netwarcom.navy.mil
757 417-6726

LCDR James Mills, FORCEnet Innovation
James.Mills@netwarcom.navy.mil
757 417-6726

FORCEnet:

The Unifying Enabler for Sea Power 21

Projecting Decisive Joint Capabilities

SEA POWER 21

You Are Here

Sea Shield

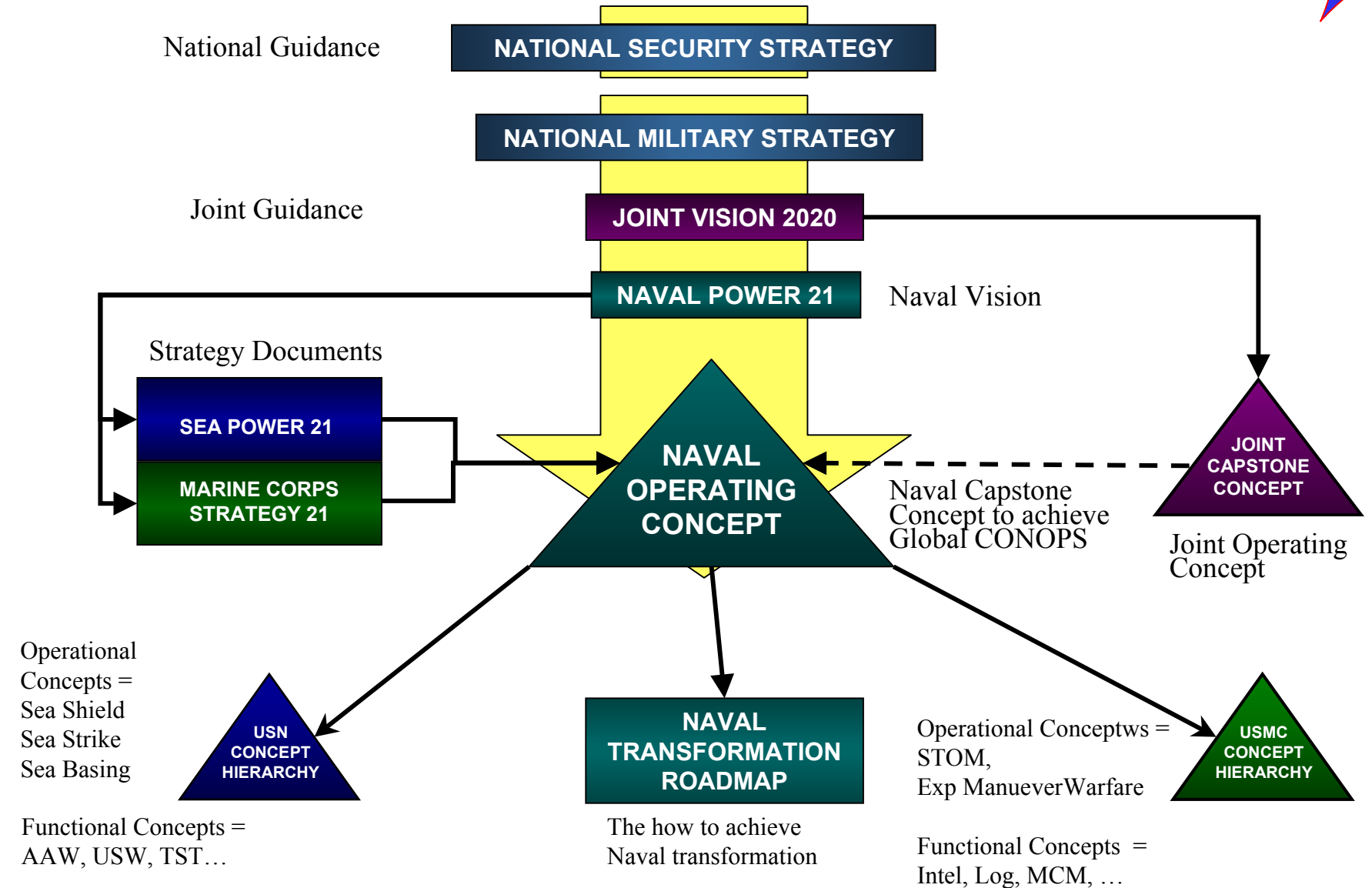Sea Trial

Sea Warrior

Sea Enterprise

ForceNet

Sea Strike

Sea Basing

- *Sea Strike* – Projecting Precise and Persistent Offensive Power
- *Sea Shield* – Projecting Global Defensive Assurance
- *Sea Basing* – Projecting Operational Independence to Joint Team

- *Sea Trial* – Process of Innovation
- *Sea Warrior* – Investing in Sailors
- *Sea Enterprise* – Resourcing tomorrow's Fleet

Based upon Global Concept of Operations

Transformation Drivers for Sea Power 21

FORCEnet

Netting the FORCE for transformational combat capability

National Guidance

NATIONAL SECURITY STRATEGY

NATIONAL MILITARY STRATEGY

Joint Guidance

JOINT VISION 2020

NAVAL POWER 21 — Naval Vision

Strategy Documents

SEA POWER 21

MARINE CORPS STRATEGY 21

NAVAL OPERATING CONCEPT

Naval Capstone Concept to achieve Global CONOPS

JOINT CAPSTONE CONCEPT

Joint Operating Concept

Operational Concepts =
Sea Shield
Sea Strike
Sea Basing

USN CONCEPT HIERARCHY

NAVAL TRANSFORMATION ROADMAP

Operational Conceptws =
STOM,
Exp ManueverWarfare

USMC CONCEPT HIERARCHY

Functional Concepts =
AAW, USW, TST…

The how to achieve
Naval transformation

Functional Concepts =
Intel, Log, MCM, …

What FORCEnet is

Foundational for Sea Power 21

  - **Operational construct**

  - **Architectural framework**

  - **All spectrums**

Builds upon earlier NCW efforts
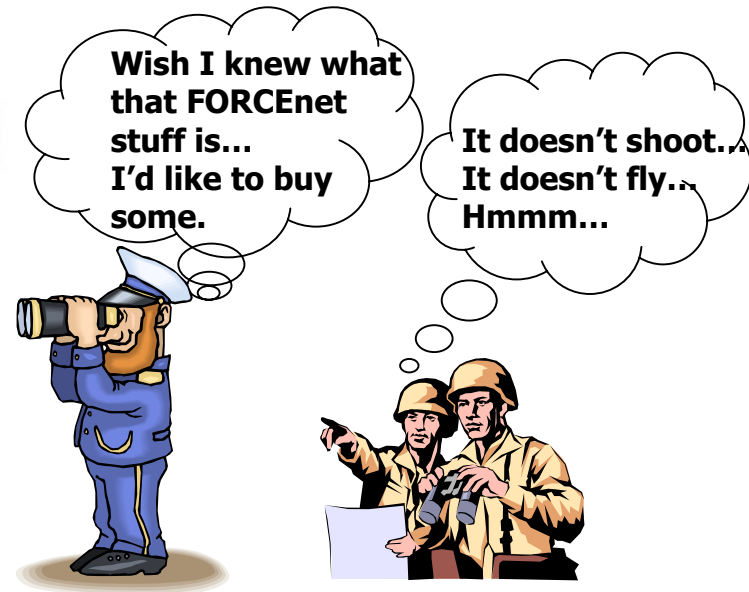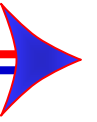 **... Copernicus, Taiwan Straits, CEC, SSG**

Inherently Joint
Capabilities-based

SEA POWER 21

Sea Shield

Sea Trial

Sea Warrior   ForceNet   **Sea Strike**

Sea Enterprise

Sea Basing

What it isn't:
  - **Just the network**
  - **System**
  - **POR**

Wish I knew what that FORCEnet stuff is... I'd like to buy some.

It doesn't shoot... It doesn't fly... Hmmm...

The "FORCE" drives the "net"...

FORCEnet – *Turning Information into Power*

Network-Centric Today

FORCEnet

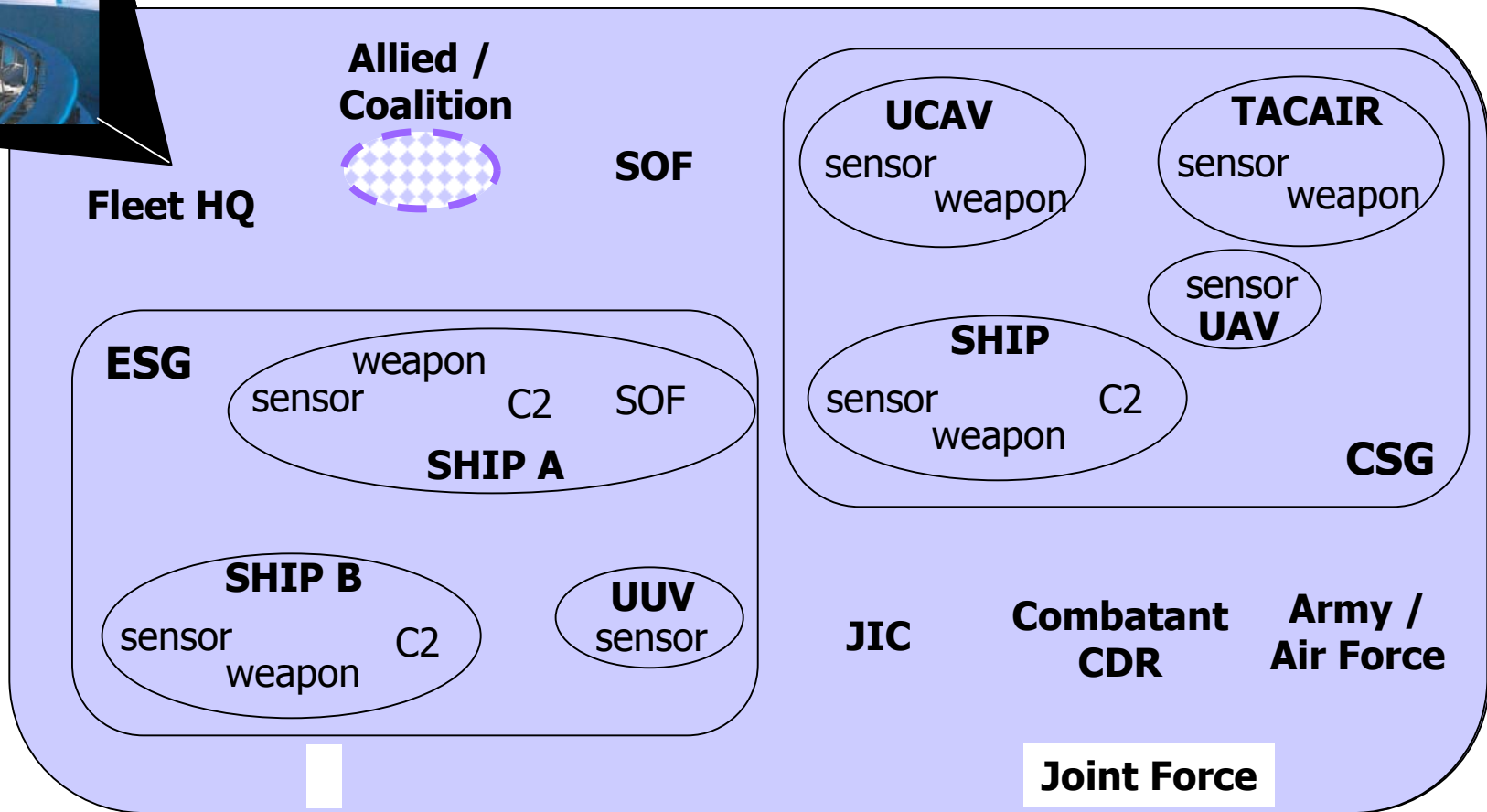*Netting the FORCE for transformational combat capability*

- **Platform/system-based approach (interfacing)**
- ***Fragile* network-centric capability**
- **Manpower intensive – configuration sensitive**
- **No ubiquitous Network-Centric capability**

JTF

UAV

JIC

Coalition

Tech Rep

BG/ARG

Tech Rep

Ship

JWICS

CENTRIX

SIPR

NIPR

NOC

Fleet HQ

Manual manipulation or intervention required

FORCEnet = Network-Centric Transformed

FORCEnet
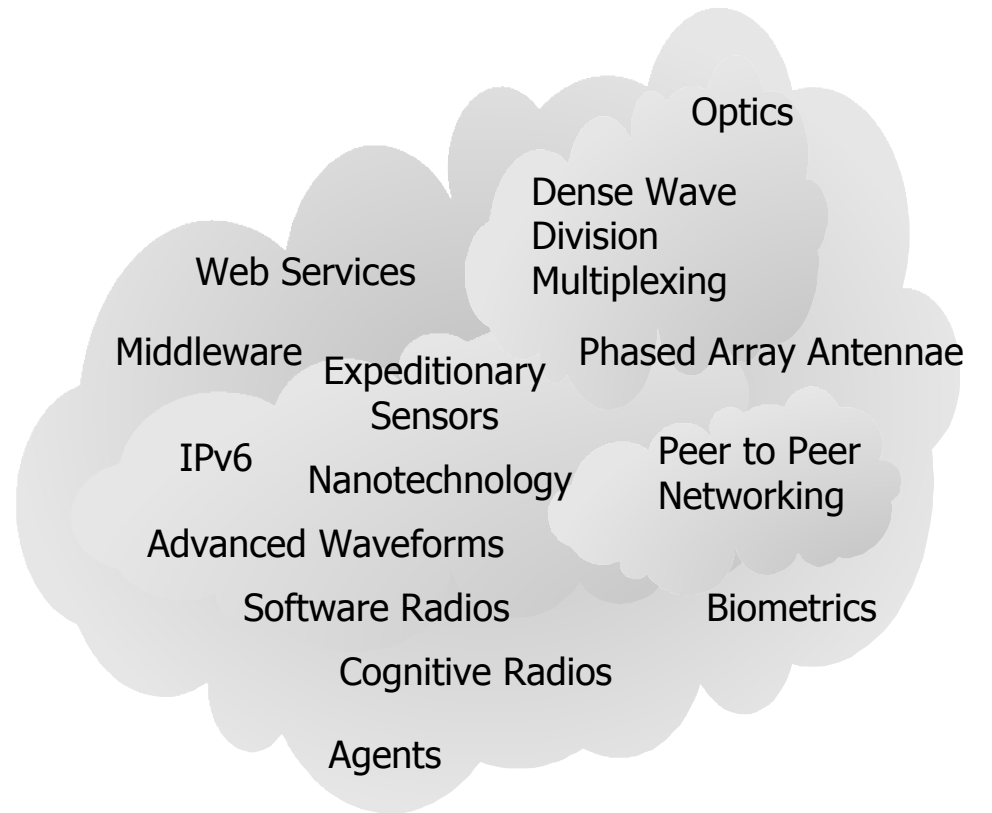
Netting the FORCE for transformational combat capability
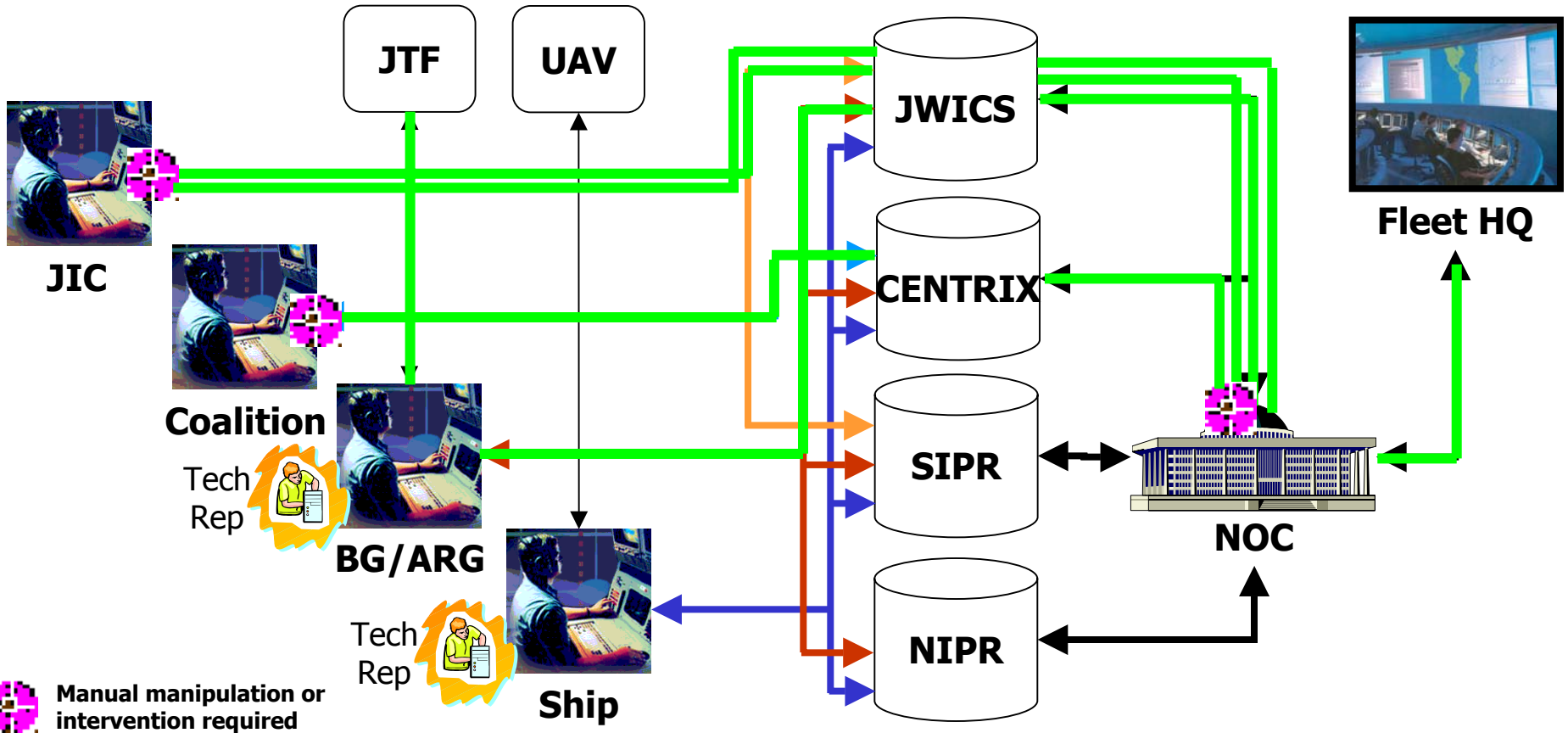
- **Robust and integrated capability**
- **Dynamic and ubiquitous Network-Centric enabler**
- **Transparent Technology - Knowledge Dominance**

Allied / Coalition

Fleet HQ

SOF

UCAV sensor weapon

TACAIR sensor weapon

sensor **UAV**

ESG
weapon sensor C2 SOF
SHIP A

SHIP sensor C2 weapon

CSG

SHIP B sensor C2 weapon

UUV sensor

JIC

Combatant CDR

Army / Air Force

Joint Force

Making It Happen

- To date, we've *interfaced* existing systems that were not designed for *integrated* information sharing capability

- FORCEnet is about *integrating* the right technologies and *aligning* acquisition to provide the right information to meet warfighter objectives

Optics

Dense Wave Division Multiplexing

Web Services

Middleware
Expeditionary Sensors

Phased Array Antennae

IPv6
Nanotechnology

Peer to Peer Networking

Advanced Waveforms

Software Radios
Biometrics

Cognitive Radios

Agents

CONOPS Lead, Technology Integration Follow

Capability must be driven by operational CONOPS

Grey Beard Warfighting Precepts

FORCEnet

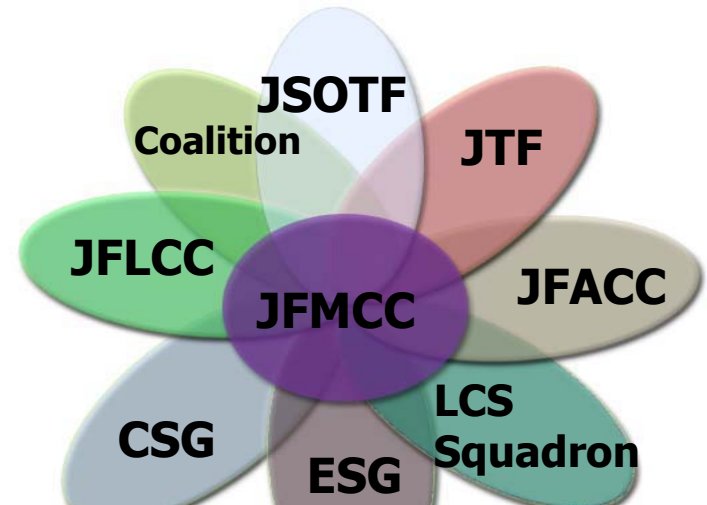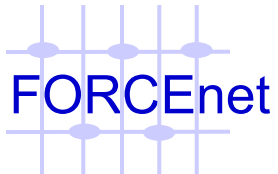*Netting the FORCE for transformational combat capability*

1. Stay Alive

2. Keep buddies alive

3. Kill the target

JSOTF

Coalition

JTF

JFLCC

JFMCC

JFACC

CSG

ESG

LCS Squadron

4. ROE – Operational to Tactical

FORCEnet: Full Spectrum Delivery

FORCEnet

Netting the FORCE for transformational combat capability

- FORCEnet must deliver across the full spectrum of naval operations

- FORCEnet must deliver to the full spectrum of naval force packages

- Sea Strike, Sea Shield, Sea Basing drive the priorities

Joint Maritime Force Packages
Centerpiece of JTF Commander's Options

- A spectrum of combat-credible force packages to respond to a broad range of requirements and missions

Scaleable Response...Tailorable Packages

ESF

	CSGs
	ESGs
CSG	SAGs
ESG	SSGNs
	← MPF(F) →

ESG		
SSGN	AFSB	SSGN	AFSB

LCS Sqdrn	CSG	ESG	Strike SAG	LCS Sqdrn	LCS Sqdrn	LCS Sqdrns	LCS Sqdrns

Axis labels: MIO · Sanctions Enforcement/No Fly Zone · Permissive NEO · Pre-emptive Strike · Covert SOF/Strike Campaign · Non-Permissive NEO · Amphibious Raid/Assault · SDTE/WD

← **Deployability** → **Expeditionary** →

17

FORCEnet – Flexible, adaptable to each mission

FORCEnet Guideposts
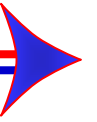
- Guidepost #1: Dynamic and Adaptable C2

- Guidepost #2: Sensor to Warrior

- Guidepost #3: On-demand, QoS Comms and Networking

- Guidepost #4: Network Capacity as Enabler Vice Constraint

- Guidepost #5: The 21st Century Warrior

- The Master Guidepost: Concept-based, integrated requirements

Pervasive Capability Seabed to Space

FORCEnet

Netting the FORCE for transformational combat capability

TCS
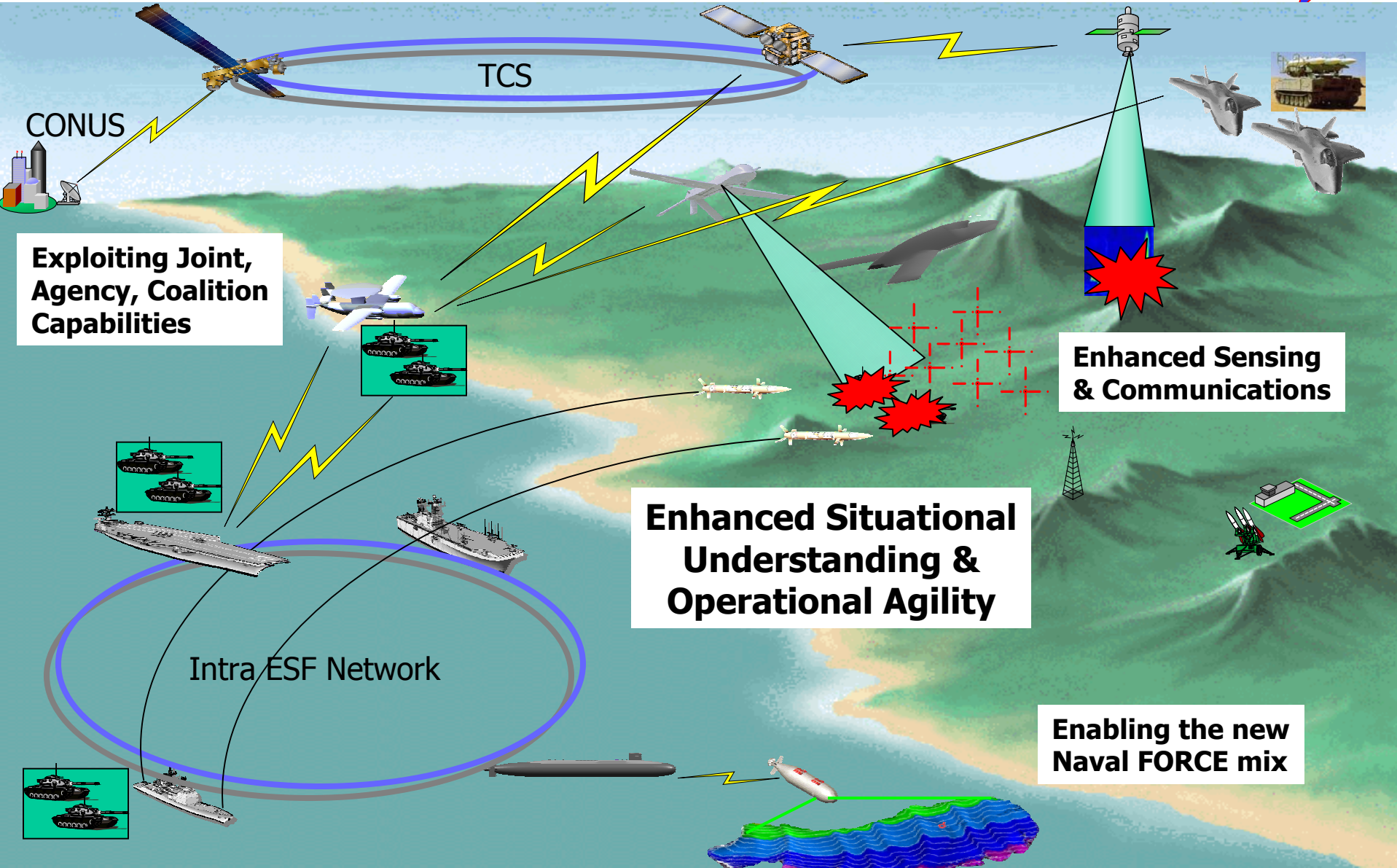
CONUS

Exploiting Joint, Agency, Coalition Capabilities

Enhanced Sensing & Communications

Enhanced Situational Understanding & Operational Agility

Intra ESF Network

Enabling the new Naval FORCE mix

net Enabling the FORCE

Netting the FORCE for transformational combat capability

Contributors to Speed of Command

$\Delta 2$ **I**nformation $\Delta 3$ **D**ecision

Coordination of Information

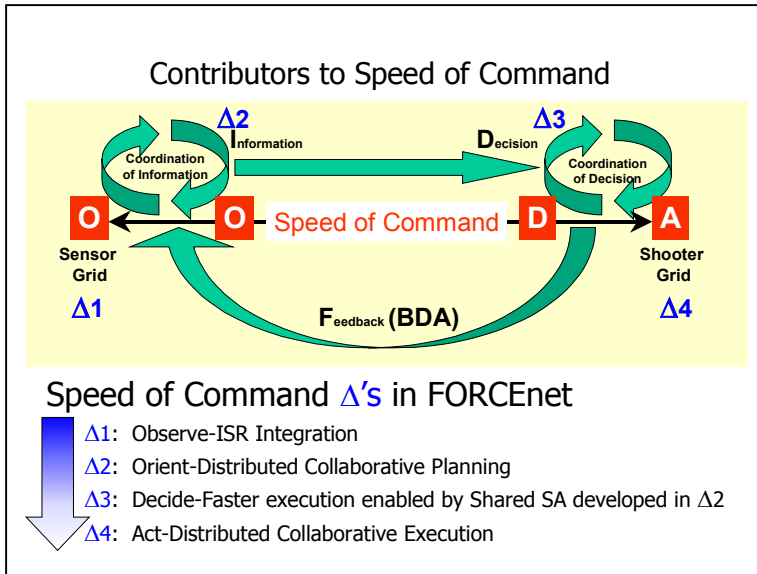Coordination of Decision

O   **O** — Speed of Command —   **D**   **A**

Sensor Grid $\Delta 1$ **F**eedback **(BDA)**   **Shooter Grid** $\Delta 4$

Speed of Command Δ's in FORCEnet

$\Delta 1$: Observe-ISR Integration
$\Delta 2$: Orient-Distributed Collaborative Planning
$\Delta 3$: Decide-Faster execution enabled by Shared SA developed in $\Delta 2$
$\Delta 4$: Act-Distributed Collaborative Execution

Challenge: Meet mission objectives with minimum forces at maximum Speed of Command (OPTEMPO)

Demands of the "Art of C2" to drive the technology…

Actionable Knowledge for the Warfighter

- Knowledge and information dominance
- Transformed situational awareness
- Accelerated speed of decision
- Knowledge-based combat operations
- Real-time enhanced collaborative planning

(From Sea Power 21: Projecting Decisive Joint Capabilities, ADM Vern Clark, October 2002, Proceedings)

Fn Requirements Approach

FORCEnet

Netting the FORCE for transformational combat capability

Strategy, Warfighter Needs, Concepts, etc.

Sea Strike   **Sea Shield**   **Sea Basing**

Reqmnts Layers

1st	**Battlespace Effects & Capabilities**	Global War On Terrorism	Under-Sea Warfare	Theater Air & Missile Defense	Time-Sensitive Targeting	Information Operations	Expeditionary Warfare	Space Control

2nd	**Enabling Effects & Capabilities**	Battlespace Awareness	Intelligence, Surveillance & Reconnaissance	Command & Control	Communications & Info Distribution	Applications

3rd	**FORCEnet Capabilities**	**Focal Point** → **Net-Centric Capabilities**

4th	**Vehicle / Media (i.e., physical)**	Network Backbone	Space	RF

5th	**Sustainment**	Computer Network Defense	Network Operations	Integrated Logistics Support	Training

Fn Requirements Approach
TST Example

FORCEnet

Netting the FORCE for transformational combat capability

Strategy, Warfighter Needs, Concepts, etc.

What the warfighter is demanding of FORCEnet

Sea Strike   **Sea Shield**   **Sea Basing**

Reqmnts Layers

| 1st | **Battlespace Effects & Capabilities** | Global War On Terrorism | Under-Sea Warfare | Theater Air & Missile Defense | Time Sensitive Targeting | Information Operations | Expeditionary Warfare | Space Control |

| 2nd | **Enabling Effects & Capabilities** | Battlespace Awareness | Intelligence, Surveillance & Reconnaissance | Command & Control | Communications & Info Distribution | Applications |

| 3rd | **FORCEnet Capabilities** |

Focal Point → **Net-Centric Capabilities**

Feedback

What characteristics FORCEnet needs to have to meet the demands

Network Backbone   Space   RF

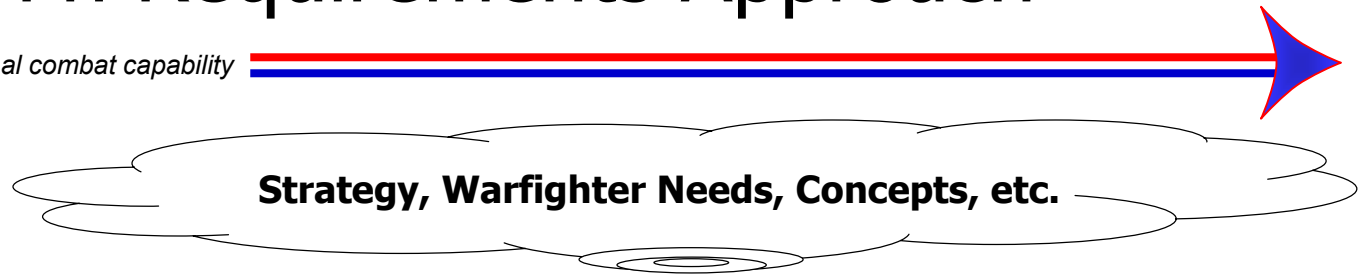| 5th | **Sustainment** | Computer Network Defense | Network Operations | Integrated Logistics Support | Training |

In order to understand the desired capabilities of the enablers …
… we need to understand the needs of the "enabled"

Fn Requirements Approach

Netting the FORCE for transformational combat capability

Strategy, Warfighter Needs, Concepts, etc.

Sea Strike **Sea Shield** **Sea Basing**

Reqmnts Layers								
1st	**Battlespace Effects & Capabilities**	Global War On Terrorism	Under-Sea Warfare	Theater Air & Missile Defense	Time-Sensitive Targeting	Information Operations	Expeditionary Warfare	Space Control
2nd	**Enabling Effects & Capabilities**		Battlespace Awareness	Intelligence, Surveillance & Reconnaissance	Command & Control	Communications & Info Distribution	Applications	
3rd	**FORCEnet Capabilities**	**Focal Point →**			**Net-Centric Capabilities**			
4th	**Vehicle / Media (i.e., physical)**		Network Backbone		Space		RF	
5th	**Sustainment**		Computer Network Defense		Network Operations	Integrated Logistics Support	Training	

In FORCEnet, this whole thing should be thought of as the combat system

Moving to the FORCEnet Domain

FORCEnet

Netting the FORCE for transformational combat capability

Legacy Capability

Transformation Filters
(Interoperability Enhancers)

Integrated Capability

JSF, UCAV, LCS…

AADC, GCCS…

Tomahawk, AEGIS…

P-3, UAV, UUV…

CEC, Link 16…

Compatible Data Elements

Diverse Communications Support

Assured /Protected Info Exchange

Network Services Compliancy

Timing/Synchronization Compliancy

…

Human System Integration

FORCEnet

Information Management
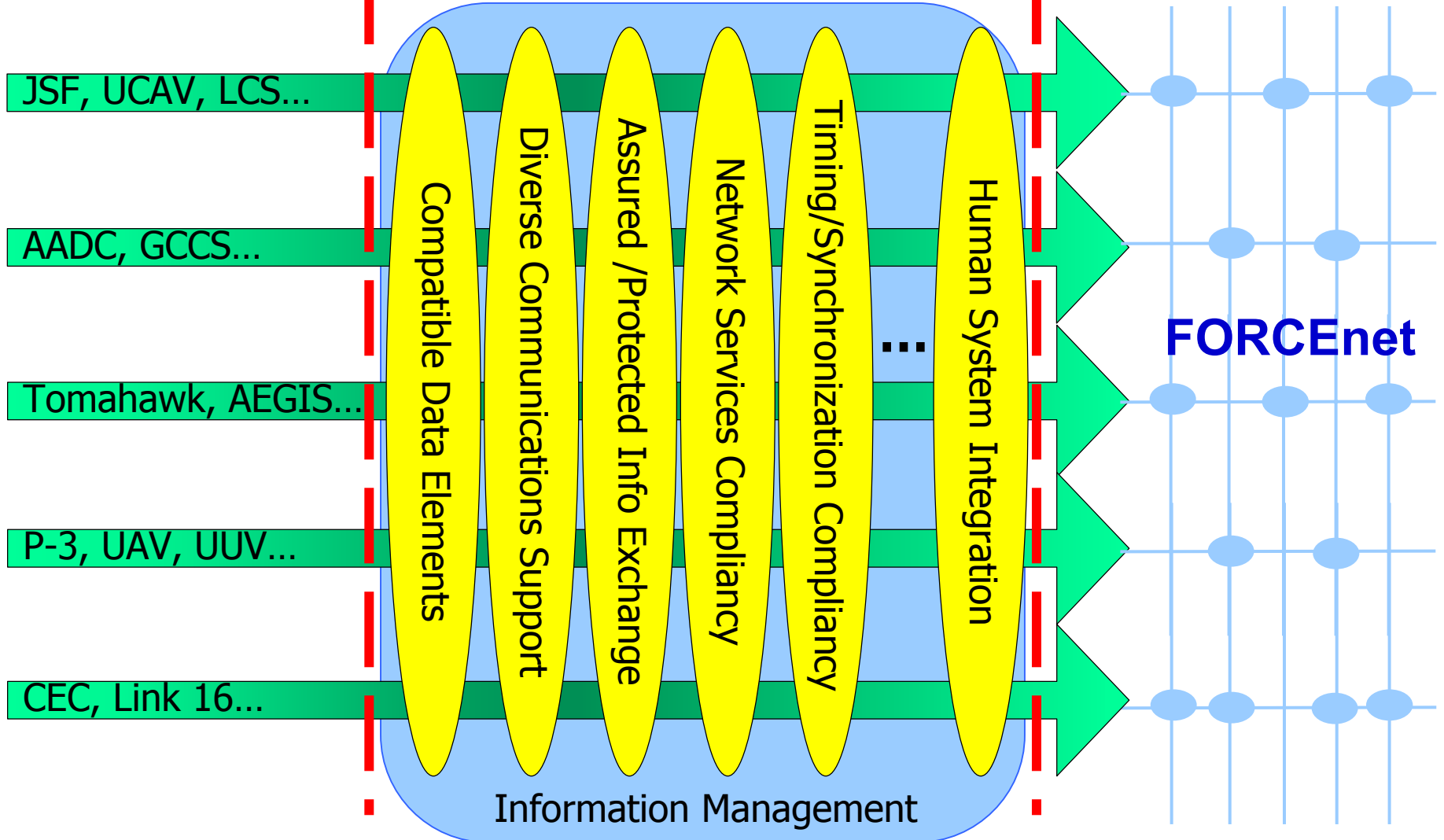
FORCEnet

Netting the FORCE for transformational combat capability

Fleet Priorities:

Focus for FORCEnet Capability Delivery

FORCEnet

Netting the FORCE for transformational combat capability

Core FORCEnet Attributes =

Joint

+ Integrated

+ Trainable

+ Survivable

=   Real Capability

Fleet Priorities for FORCEnet

FORCEnet

Netting the FORCE for transformational combat capability

- ## Focus on the "warrior"
  - Deliver operationally relevant FORCEnet capability
  - Provide enabling capabilities for Sea Strike, Sea Shield, Sea Basing

- ## Enhance sensing, connectivity, decision making
  - Assured information exchange; protected networks

- ## Expand joint, interagency, coalition interoperability

- ## Invest in intra-theater capabilities

- ## Experiment, innovate, integrate, implement
  - Driven by Sea Trial

FORCEnet – Turning Information into Power

Fleet Priorities for Sea Strike

- Improve C2 and C4ISR Interoperability
- ISR Data Links to Ships
- Naval Fires Support Tools
- IO Targeting
- Unmanned Vehicles
- Time Sensitive Targeting
- Jam Resistant Technology for GPS Weapons
- Cross-warfare Tactical Decision Aids
- Portable/Expendable Shipboard Launched Air Targets

Fleet Priorities for Sea Shield

- Assured Access
  - ASW   - MIW
  - TAMD   - SUW

- Anti-terrorism/Force Protection

- Common Operational Picture

Fleet Priorities for Sea Basing

- Force Protection
- JFMCC Concept
- Collaborative Information Environment
- Multi-National Command and Control
  - Intelligence Information Management, Analysis, and Fusion Support Tools
  - Multi-level Security
  - Standardized Coalition IT Connectivity
- Improved Forward Logistics
- Increased MCM Capabilities
- Non-Compliant MIO / Support of SOF from CRUDES Platforms

C2F/C3F Fleet IT Priorities

1. Data Throughput (AKA Bandwidth)
2. 100% Migration to IP-based C5I
3. 360 Degree Antenna
4. Multi-Level Thin Client
5. Multiple Level Security
6. Real-Time Collaboration/Next Generation KM
7. Coalition Communications
8. Multiple Platform Data Throughput Allocation
9. Embarkable/Transportable/Mobile C5I
10. Multi-TADIL Processor

"IN KEEPING WITH SEA POWER 21, IT IS NECESSARY THAT FORCENET ADDRESS FUTURE FLEET INFORMATION SYSTEM REQUIREMENTS THAT SUPPORT OPERATIONS IN A JOINT, COALITION ENVIRONMENT. THE PURPOSE OF THIS MESSAGE IS TO PROMULGATE A CONSOLIDATED "TOP TEN" INFORMATION TECHNOLOGY REQUIREMENTS LIST WHICH HAS BEEN COORDINATED WITH ALL NUMBERED FLEETS, AND REPRESENTS THE PRIORITIZED REQUIREMENTS FOR TODAY'S SEA-BORNE WAR FIGHTERS."

Ref: COMSECONDFLT 281159Z MAR 03

FORCEnet Prime Movers

- NETWARCOM
  - Chief Operating Officer; Fleet Lead for CFFC
  - FORCEnet Operational Agent/Supported Commander
- MCCDC
  - USMC Lead
- OPNAV N61 (Resource Sponsor)
- OPNAV N70/N704 (Warfare Sponsor)
- OPNAV N2 (ISR)
- SPAWAR
  - FORCEnet CHENG
- NWDC
  - Sea Trial Coordinator; FORCEnet Concepts Lead
- ONR
  - FORCEnet S&T
- PEO(C4I/Space), PEO(IWS)
  - FORCEnet Acquisition

Taking FORCEnet from concept to reality
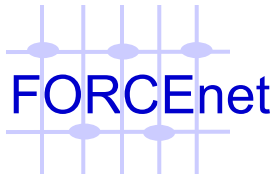
Moving Out on FORCEnet

FORCEnet

Netting the FORCE for transformational combat capability

Driven by Global CONOPS
- Attributes
- Supporting, Supported

Meeting SP21 priorities…
Interoperability, COP, TST,
IO targeting, ISR Data Links

Integrated architecture
Top-down systems engineering
In-sync with Joint
- TCA, GBE, Teleports, JTRS, SBR
JFCOM, STRATCOM

Partnering with Industry
…Standards, Best Practices

FORCEnet is hard & technical
- Standards, protocols, data
packaging, web services,
interoperability, security

SEA POWER 21

Sea Shield
Sea Trial
Sea Warrior   ForceNet   Sea Strike
Sea Enterprise
Sea Basing

✓**Delivering products**
Spirals baselined in
Sea Trial events (2003)
✓ **- Giant Shadow,**
     FORCEnet LOE 03-2
✓ **- FORCEnet Spiral 1**
   - FBE Kilo IO/CND
   - FORCEnet Spiral 2
   - FORCEnet ESG LOE/IPD

Working first on
…sensors, comms, C2, networking

Have already started to FORCEnet…there is no end state

FORCEnet Innovation:
Where Sea Trial and FORCEnet Meet

Projecting Decisive Joint Capabilities

You Are Here

SEA POWER 21

Sea Shield

Sea Trial

Sea Warrior

Sea Enterprise

ForceNet

Sea Strike

Sea Basing

- *Sea Strike* – Projecting Precise and Persistent Offensive Power
- *Sea Shield* – Projecting Global Defensive Assurance
- *Sea Basing* – Projecting Operational Independence to Joint Team

- *Sea Trial* – Process of Innovation
- *Sea Warrior* – Investing in Sailors
- *Sea Enterprise* – Resourcing tomorrow's Fleet

Based upon Global Concept of Operations

CNO Sea Trial Expectations

- I'm expecting this to formalize experimentation
- I'm expecting this to be a new way of life
- I'm expecting this to be "Fleet led"
- I'm expecting Fleet and R&D to work together
- I'm expecting the timelines to shrink (i.e. "speed to capability")

Sea Trial – Aligned for Iterative Transformation

FORCEnet

Netting the FORCE for transformational combat capability
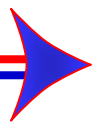
Concept Development
CFFC, Fleets, NETWARCOM, OPNAV, ONR, NWDC, MCCDC, COEs, NPS

Experimentation & Assessment
Fleets, NETWARCOM, CFFC, NWC, NWDC, MCCDC, TYCOMs, SYSCOMs, COEs, JFCOM, ONR

Implementation
CFFC, OPNAV, NETWARCOM, SYSCOMs

DoD
Joint
SSG
Fleet
CCI

S&T

Strategy/ Warfare Challenges

Concept Generation

Enabling Technologies

Basic Research

CONOPS

Concept Development

Capability Analysis

Wargaming

Input to OPNAV assessment

Liaison w/ Sea Warrior

Exp & Assess

Exp & Assess

Capability Increment

Exp & Assess

Capability Increment

Exp & Assess

POM

Doctrine

Organization

Training

Material

Leadership

Personnel

Facilities

Fast Track - Sea Enterprise

Disciplined Speed to Capability

Sea Trial Process – Fleet Led

FORCEnet

Netting the FORCE for transformational combat capability

- **Directive**
- **CD&E**
- **STIMS**
- **Assessment**

Sea Warrior
Sea Enterprise
CFFC

Proposed ST Events
CFFC/NWDC
Pillar Groups / CTs

Integrate Warfare
Area CD&E Plans
CFFC/NWDC

Req'd Capabilities
#FLTs, BGs, USMC

Prioritized
Sea Trial
Capabilities

Approve
Sea Trial
Event

Issues

NCJO

CONOPS

DOTMLPF

CFFC

Sea Trial ESG

Sea Trial Campaign Plan

Iterative Experimentation & Development

Operational Assessment
CFFC

Execute Sea Trial Experiments

Experiment Quicklook

Experiment Analysis
Sponsor

Sea Trial Pillar Groups

FORCEnet

Netting the FORCE for transformational combat capability

CFFC
Sea Trial ESG

Pillar Groups
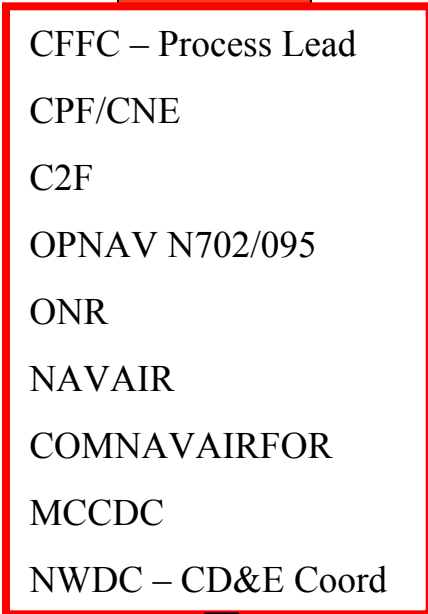
Sea Strike C2F/C5F	Sea Basing C2F/C6F	Sea Shield C3F/C7F	FORCEnet NETWARCOM
CFFC – Process Lead	CFFC – Process Lead	CFFC – Process Lead	CFFC – Process Lead
CPF/CNE	CPF/CNE	CPF/CNE	CPF/CNE
C2F	C2F	C3F	OPNAV N704/095
OPNAV N702/095	OPNAV N703/095	OPNAV N701/095	ONR
ONR	ONR	ONR	SPAWAR
NAVAIR	NAVSEA	NAVSEA	NETWARCOM
COMNAVAIRFOR	COMNAVSURFOR	COMNAVSUBFOR	MCCDC
MCCDC	MCCDC	MCCDC	NWDC – CD&E Coord
NWDC – CD&E Coord	NWDC – CD&E Coord	NWDC – CD&E Coord	
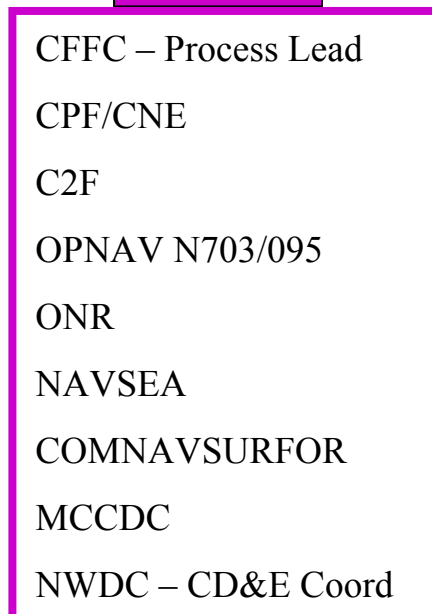
Collaborative Teams
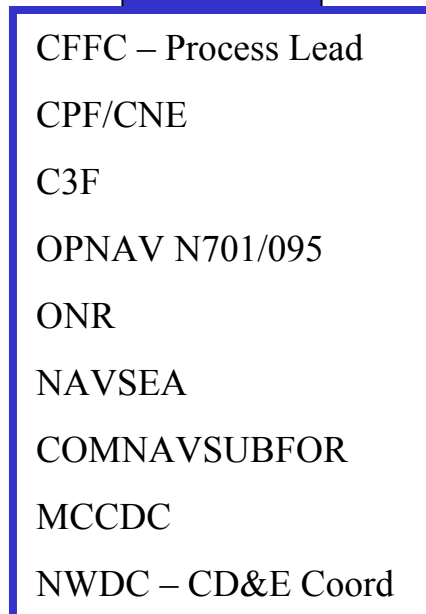
Rudder for FORCEnet Innovation

FORCEnet

Netting the FORCE for transformational combat capability

Strategic

Sea Trial ESG
- Strategic S.T. Guidance
- Priorities
- Chair: CFFC

FORCEnet Leadership
- Strategic Fn Guidance
- Priorities

Fn Innovation Focal Point

Operational

FORCEnet Pillar Group
- Shape CD&E Plan
- Adjudicate Schedule
- Prioritize Capabilities
- Support Op Agent
- Chair: NETWARCOM

NETWARCOM Innovation
- Lead for FORCEnet activity in Sea Tria
- Coordination with USMC
- Oversee Fn Innovation Continuum

FORCEnet WIDT
- Fn Concepts
- Chair: NWDC

FNCs / D&I
- Tech Concepts
- Chair: ONR

Tactical

Sea Trial Collaborative Teams
- Support Pillar Group
- Synchronize with other pillars

FORCEnet Sea Trial Working Group
- Collaborative effort to build Fn Innovation Continuum
- Chair: NETWARCOM

Individual Event Teams
- Conduct LOE, FBE, Work Shops, War Games, Pilots, Demonstrations, M&S, etc.

FORCEnet CHENG
- Execution agent supporting NETWARCOM in Fn Innovation

Innovation Continuum

FORCEnet

Netting the FORCE for transformational combat capability

	FY 2002	FY 2003	FY 2004
	M A M J J A S	O N D J F M A M J J A S O N D	J F M A M J J A S O N D

Fleet Battle Experiments (Sea Trial) — FBE J, FBE K, FBE L ...

Fleet LOEs (Sea Trial) — Giant Shadow LOE, FORCEnet Sea Trial LOE 04-1 ...

Fn LOEs — FORCEnet LOE 03-1, FORCEnet IPD, FORCEnet LOE 03-2, FORCEnet LOE 04-2

Other Field / Lab Experimentation — EEE, EEE, NPS Oceanographic, Network Modeling

Wargames (Sea Trial) — NWC Series, FORCEnet Games, Sea Trial Games

Joint Experimentation — MC02, Warfighter Seminar, WW Exp Conf, WARNET Demo, WARNET Demo (CG04)

FBE = Fleet Battle Experiment
IPD = Integrated Prototype Demonstration
EEE = Exp Pervasive Sensing Grid Enabling Experiment
LOE = Limited Objective Experiment

Draft Working Papers – Subject to Change

FY03 FORCEnet Event Priorities
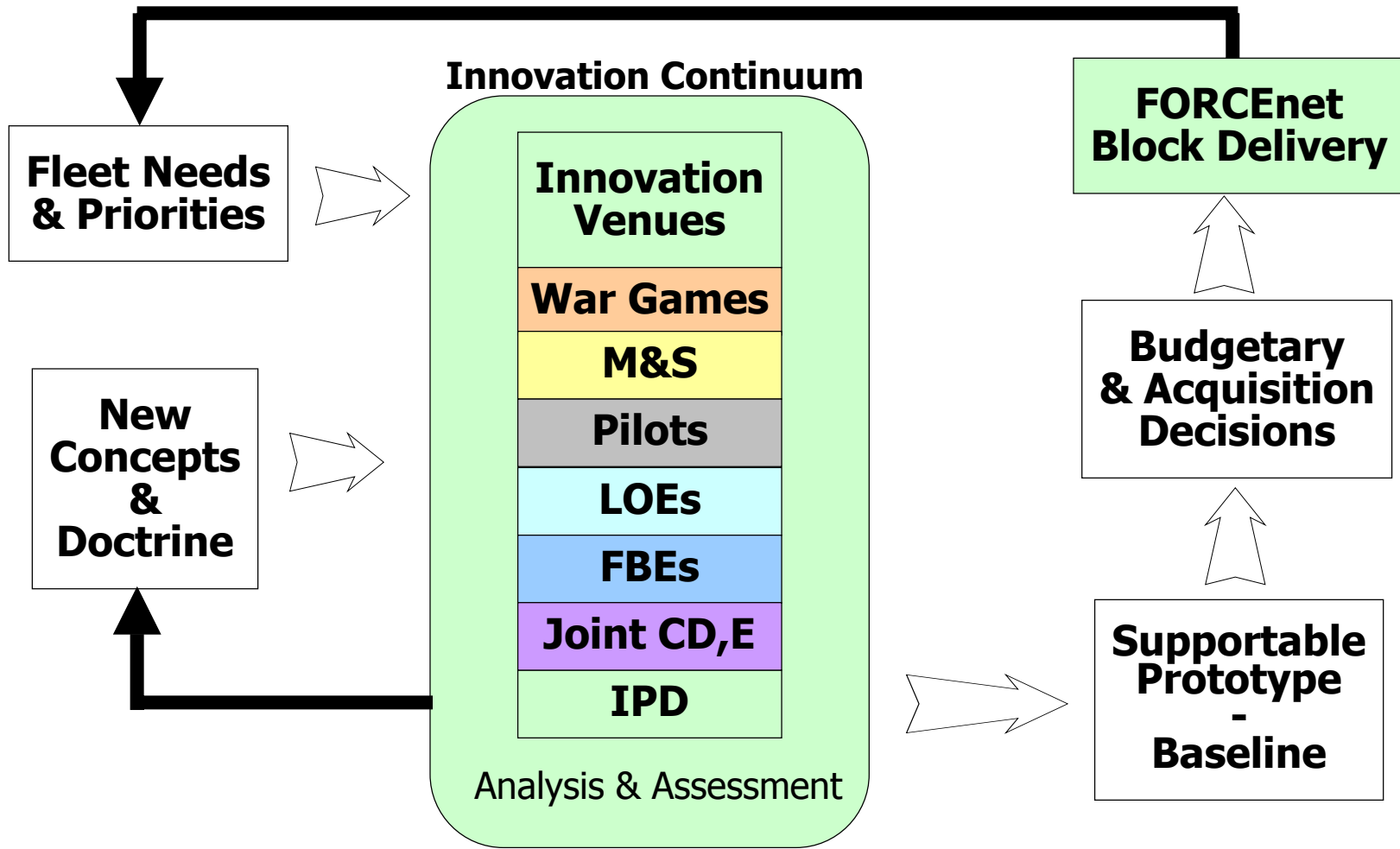
1. ESG-focused FORCEnet LOE / Integrated Prototype Demonstration 03 (IPD)
   - Planning in Progress; Execution SEP03 WESTPAC
2. Giant Shadow 03
   - Complete; Assessment in progress
3. FORCEnet Spiral 1
   - Complete; Assessment in progress
4. FBE KILO (IO/CND)
   - In Progress
5. FORCEnet Spiral 2
   - Initial planning stage

Capability Focused FORCEnet Innovation Continuum
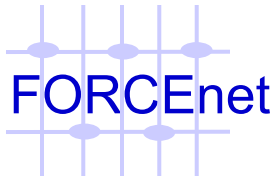
What FORCEnet is doing now...

FORCEnet

Netting the FORCE for transformational combat capability

Supporting Joint concepts & ESG

FBE K (IO/CND) (Tandem Thrust) (May 03)

FORCEnet LOE 03-1 (Lab Experiment) FORCEnet War Game (May 03/Jul 03)

FORCEnet ESG LOE / IPD 03 (PACOM C2X/ WARNET PDX) (Sep 03)

Future Innovation (Terminal Fury / Cobra Gold) (FY 04)

Supporting Split NFC Ops & JFMCC Concept

FORCEnet Spiral 1 (Multi-National Maritime Exercise) (Apr 03)

FORCEnet Spiral 2 (JTFEX 03-3) (Sep/Oct 03)

FORCEnet Spiral 3 (JTFEX 04-1) (Mar 04)

FBE L (FY 04)
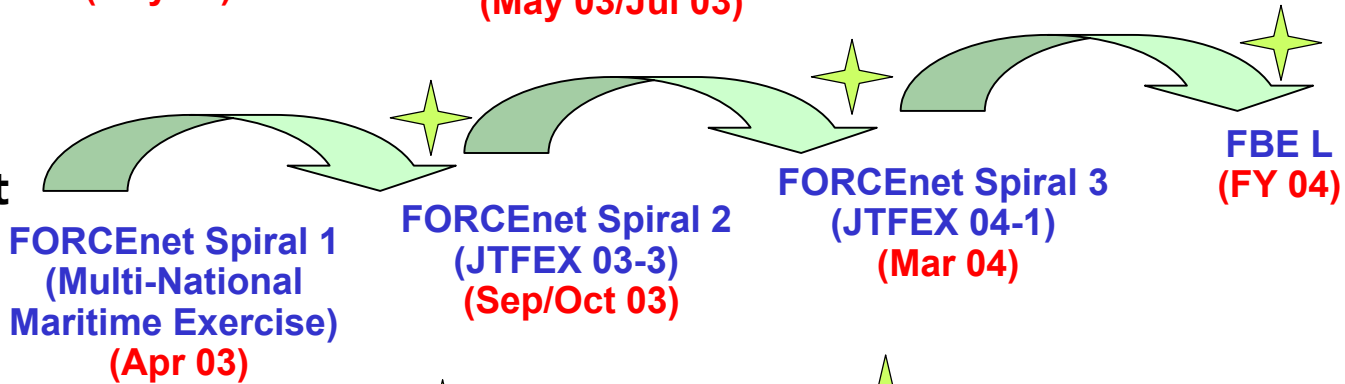
Supporting SSGN Concept

Giant Shadow 03 (Jan 03)

Giant Shadow 04 (TBD 04)

Future Innovation
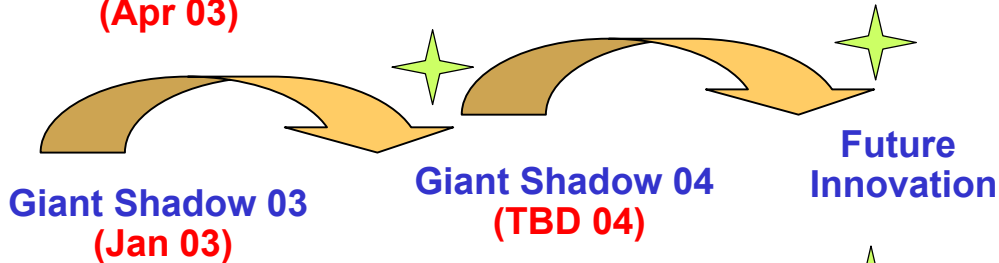
Supporting Naval / STOM Concepts

Sea Viking 04 (Oct 04)

Future Innovation
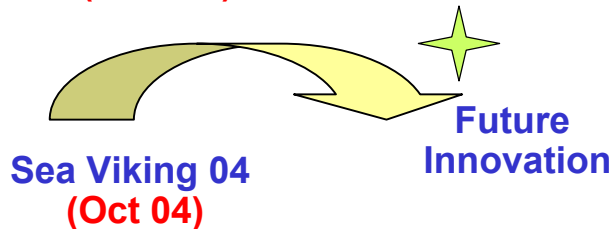
= Opportunity to influence PR05, POM06, etc

FORCEnet Sea Trial Event: FORCEnet ESG-focused LOE / FY03 IPD

FORCEnet

Netting the FORCE for transformational combat capability

EXPEDITIONARY STRIKE GROUP
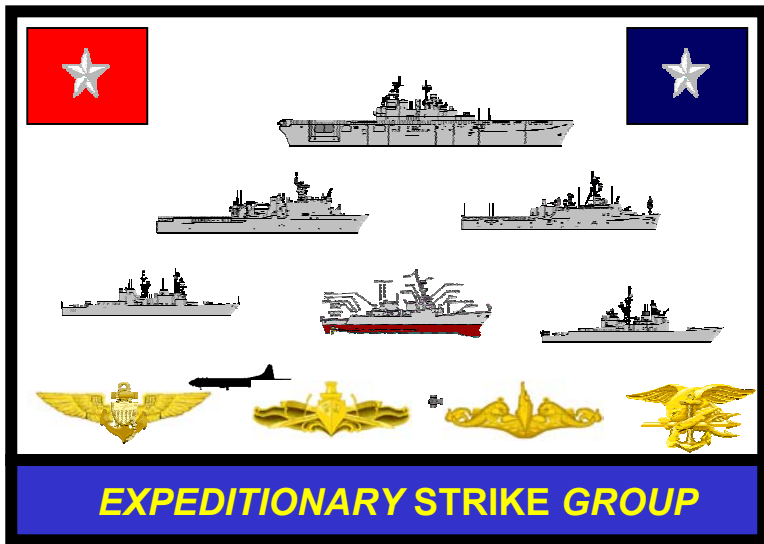
- **Venue:** WARNET PDX (OCT03 by PACOM)
- **Event Type:** Director, FORCEnet LOE
- **OCE:** CTF76
- **Operational Thread:** JTF C2X Environment
- **Objective:**
  - Determine Joint Service collaboration and information sharing benefits within an ESG given a FORCEnet Integrated Prototype
  - Determine information infrastructure to support distributed, collaborative staff operations
- **Time frame:** Fall 2003 (targeting SEP 2003)
- **Desired Outcome:**
  - Assessment of the application of an integrated Joint Fires Network with EC5G capability in Joint environment
  - Benefit of Intra-ESG Wireless Networking capability
- **Stakeholders: SPAWAR, ONR, NWDC, NAVAIR, NAVSEA**
- **Issues:** CPF/C7F/CTF76/31MEU endorsed; coordination with WARNET PDX; linkage

Areas Investigated – ESG LOE / IPD

Mission ★ People ★ Capability

4. IKA Taxonomy

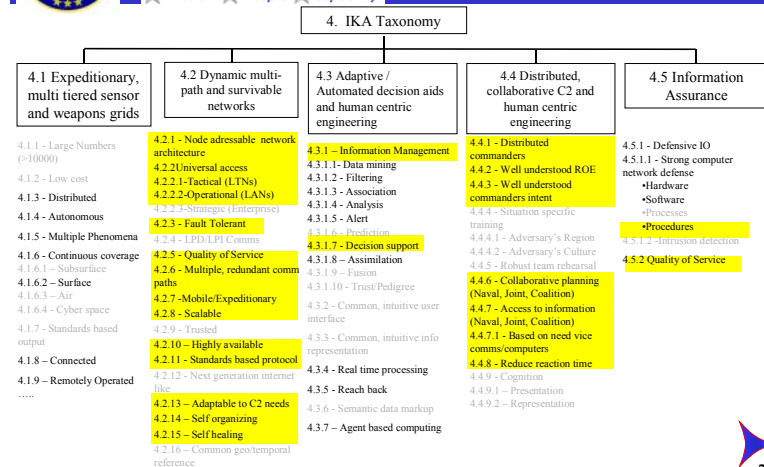| 4.1 Expeditionary, multi tiered sensor and weapons grids	4.2 Dynamic multi-path and survivable networks	4.3 Adaptive / Automated decision aids and human centric engineering	4.4 Distributed, collaborative C2 and human centric engineering	4.5 Information Assurance
4.1.1 - Large Numbers (>10000)	4.2.1 - Node adressable network architecture	4.3.1 – Information Management	4.4.1 - Distributed commanders	4.5.1 - Defensive IO
4.1.2 - Low cost	4.2.2Universal access	4.3.1.1- Data mining	4.4.2 - Well understood ROE	4.5.1.1 - Strong computer network defense
4.1.3 - Distributed	4.2.2.1-Tactical (LTNs)	4.3.1.2 - Filtering	4.4.3 - Well understood commanders intent	•Hardware
4.1.4 - Autonomous	4.2.2.3-Operational (LANs)	4.3.1.3 - Association	4.4.4 - Situation specific training	•Software
4.1.5 - Multiple Phenomena	4.2.2.3-Strategic (Enterprise)	4.3.1.4 - Analysis	4.4.4.1 - Adversary's Region	•Processes
4.1.6 - Continuous coverage	4.2.4 - LPD/LPI Comms	4.3.1.6 - Prediction	4.4.4.2 - Adversary's Culture	•Procedures
4.1.6.1 – Subsurface	4.2.5 - Quality of Service	4.3.1.7 - Decision support	4.4.5 - Robust team rehearsal	4.5.1.2 - Intrusion detection
4.1.6.2 – Surface	4.2.6 - Multiple, redundant comm paths	4.3.1.8 – Assimilation	4.4.6 - Collaborative planning (Naval, Joint, Coalition)	4.5.2 Quality of Service
4.1.6.3 – Air	4.2.7 - Mobile/Expeditionary	4.3.1.9 – Fusion	4.4.7 - Access to information (Naval, Joint, Coalition)	
4.1.6.4 – Cyber space	4.2.8 - Scalable	4.3.1.10 - Trust/Pedigree	4.4.7.1 - Based on need vice comms/computers	
4.1.7 - Standards based output	4.2.9 - Trusted	4.3.2 - Common, intuitive user interface	4.4.8 - Reduce reaction time	
4.1.8 – Connected	4.2.10 – Highly available	4.3.3 - Common, intuitive info representation	4.4.9 - Cognition	
4.1.9 - Remotely Operated …..	4.2.11 - Standards based protocol	4.3.4 - Real time processing	4.4.9.1 – Presentation	
	4.2.12 - Next generation internet like	4.3.5 - Reach back	4.4.9.2 – Representation	
	4.2.13 - Adaptable to C2 needs	4.3.6 - Semantic data markup		
	4.2.14 - Self organizing	4.3.7 - Agent based computing		
	4.2.15 - Self healing			
	4.2.16 – Common geo/temporal reference			

IPD = Fleet Value Added

FORCEnet

Netting the FORCE for transformational combat capability

Sea Strike · Sea Shield · Sea Basing

FORCEnet

Warfighting Capability

FORCEnet ESG LOE

NCIC - ESG IM/KM Management Plan

EWTGP - ESG Fires CONOPS

NWDC - CONOPS Doctrinal Impact

NWDC / SPAWAR / ONR, SYSCOM, NETWARCOM Partnership

CFFC Approved Sea Trial Event (Feb 03)

FORCEnet IPD 03

Supportable Initial Fn Capability; Linked to a Fn Continuum

OPNAV N61 Sponsored; CPF Endorsed (JAN 03)

**JTF WARNET
Deployable Prototype
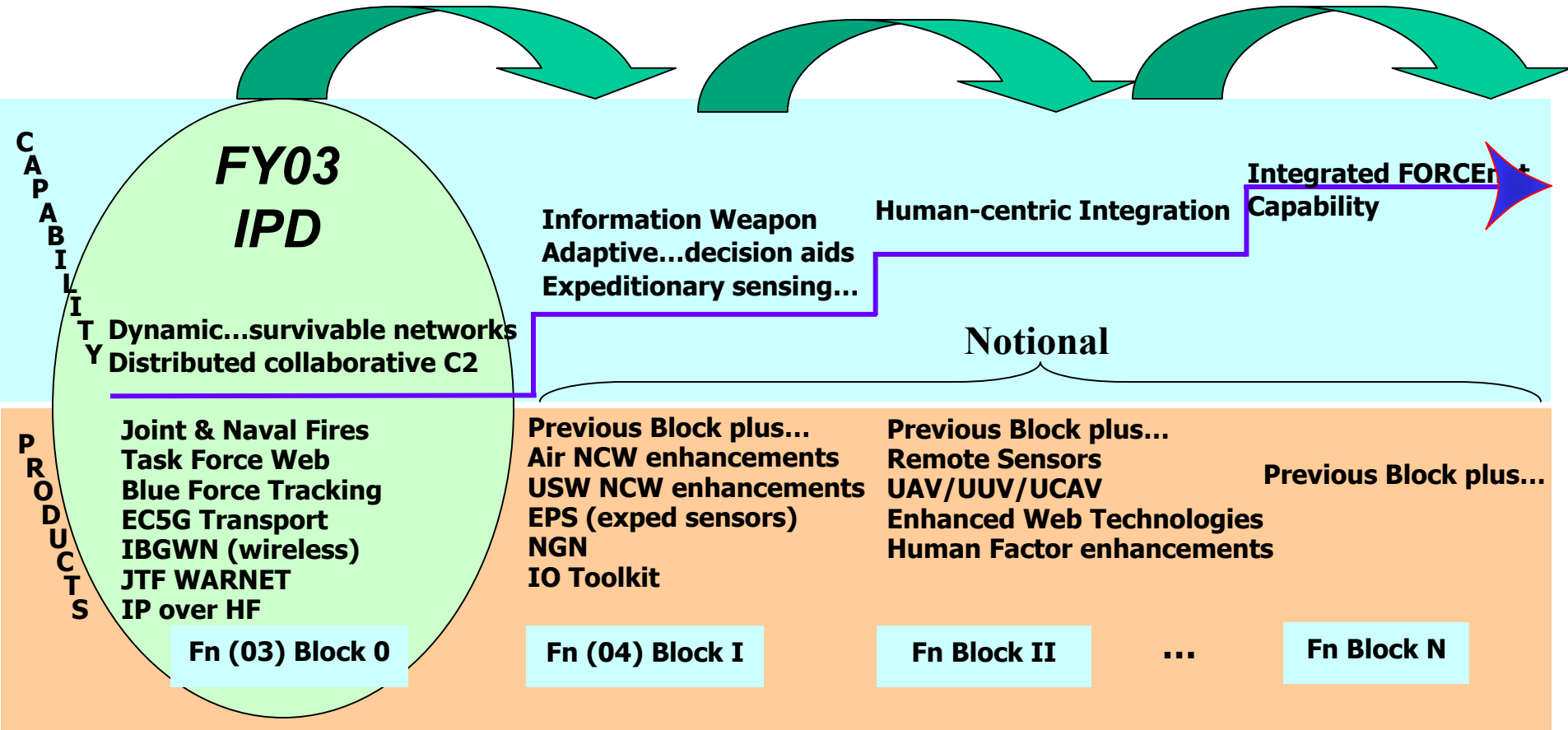Pre-Deployment Exercise SEP 02
Follow-on to ELB ACTD**

OSD Sponsored
PACOM – Directed
ONR - Tech Lead

Annual --- PACOM C2X-8 Exercise

CJTF Training Exercise

Delivering Operational Capability

Netting the FORCE for transformational combat capability

Capability Enhancements Over Time

C A P A B I L I T Y

FY03 IPD

Dynamic...survivable networks
Distributed collaborative C2

Information Weapon
Adaptive...decision aids
Expeditionary sensing...

Human-centric Integration

Integrated FORCEnet Capability

Notional

P R O D U C T S

Joint & Naval Fires
Task Force Web
Blue Force Tracking
EC5G Transport
IBGWN (wireless)
JTF WARNET
IP over HF

Previous Block plus...
Air NCW enhancements
USW NCW enhancements
EPS (exped sensors)
NGN
IO Toolkit

Previous Block plus...
Remote Sensors
UAV/UUV/UCAV
Enhanced Web Technologies
Human Factor enhancements

Previous Block plus...

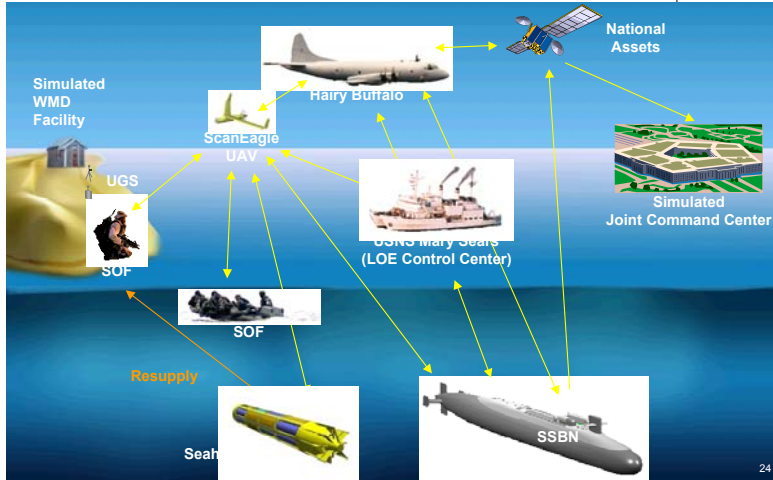| Fn (03) Block 0 | Fn (04) Block I | Fn Block II | ... | Fn Block N |

Operationally proven in war games, simulations, lab and field experiments and exercises...threaded within a continuum

FORCEnet Sea Trial Event: Giant Shadow LOE

Netting the FORCE for transformational combat capability

Giant Shadow Assets (2003)

Giant Shadow

National Assets

Simulated WMD Facility

Hairy Buffalo

ScanEagle UAV

UGS

Simulated Joint Command Center

USNS Mary Sears (LOE Control Center)

SOF

SOF

Resupply

SSBN

Seah

24

Areas Investigated – Giant Shadow

★ Mission ★ People ★ Capability

4. IKA Taxonomy

4.1 Expeditionary, multi tiered sensor and weapons grids	4.2 Dynamic multi-path and survivable networks	4.3 Adaptive / Automated decision aids and human centric engineering	4.4 Distributed, collaborative C2 and human centric engineering	4.5 Information Assurance
4.1.1 - Large Numbers (>10000)	4.2.1 - Node adressable network architecture	4.3.1 – Information Management	4.4.1 - Distributed commanders	4.5.1 - Defensive IO
4.1.2 - Low cost	4.2.2 Universal access	4.3.1.1- Data mining	4.4.2 - Well understood ROE	4.5.1.1 - Strong computer network defense
4.1.3 - Distributed	4.2.2.1- Tactical (LTNs)	4.3.1.2 - Filtering	4.4.3 - Well understood commanders intent	•Hardware
4.1.4 - Autonomous	4.2.2.2- Operational (LANs)	4.3.1.3 - Association	4.4.4 - Situation specific training	•Software
4.1.5 - Multiple Phenomena	4.2.2.3- Strategic (Enterprise)	4.3.1.4 - Analysis	4.4.4.1 - Adversary's Region	•Processes
4.1.6 - Continuous coverage	4.2.3 - Fault Tolerant	4.3.1.5 - Alert	4.4.4.2 - Adversary's Culture	•Procedures
4.1.6.1 – Subsurface	4.2.4 - LPD/LPI Comms	4.3.1.6 - Prediction	4.4.5 - Robust team rehearsal	4.5.1.2 - Intrusion detection
4.1.6.2 – Surface	4.2.5 - Quality of Service	4.3.1.7 - Decision support	4.4.6 - Collaborative planning (Naval, Joint, Coalition)	4.5.2 Quality of Service
4.1.6.3 – Air	4.2.6 - Multiple, redundant comm paths	4.3.1.8 – Assimilation	4.4.7 - Access to information (Naval, Joint, Coalition)	
4.1.6.4 - Cyber space	4.2.7 - Mobile Expeditionary	4.3.1.9 – Fusion	4.4.7.1 - Based on need vice comms/computers	
4.1.7 - Standards based output	4.2.8 - Scalable	4.3.1.10 - TrustPedigree	4.4.8 - Reduce reaction time	
	4.2.9 - Trusted	4.3.2 - Common, intuitive user interface	4.4.9 - Cognition	
4.1.8 – Connected	4.2.10 - Highly available	4.3.3 - Common, intuitive info representation	4.4.9.1 – Presentation	
4.1.9 – Remotely Operated	4.2.11 - Standards based protocol	4.3.4 - Real time processing	4.4.9.2 – Representation	
….	4.2.12 - Next generation internet like	4.3.5 - Reach back		
	4.2.13 – Adaptable to C2 needs	4.3.6 - Semantic data markup		
	4.2.14 – Self organizing	4.3.7 – Agent based computing		
	4.2.15 – Self healing			
	4.2.16 – Common geo/temporal reference			

- **Venue:** Giant Shadow LOE @ AUTEC
- **Event Type:** Fleet LOE (Dir Fn Support)
- **OCE:** SUBFOR
- **Operational Thread:**
  – Special Ops ISR support
  – Covert Strike
- **Objective:**
  – Autonomous vehicle operations from SSGN
  – Distributed C2 of ISR, targeting and strike ops
- **Time frame:** January 03; COMPLETE
- **Desired Outcome:**
  – Determine suitability of SSGN as forward C2, ISR and strike capability
  – Determine suitability of SSGN as SOF delivery and support platform
- **Stakeholders:** NAVAIR, JHU/APL, NWDC, N61F, NNWC
- **Issues:** Fn linkage with future Giant Shadow LOEs

Sea Trial: An Example

- **Giant Shadow**
  - Principally Sea Basing
  - FORCEnet aspects
- **Sea Trial brings new culture**
- **Assessment supports requirements and decision making for future capabilities**
- **Metric will be ability to influence future CONOPS, budgeting and acquisition**

Giant Shadow

Quicklook

- All Sea Trial objectives were met
  - SSGN can serve as a broad-area ISR C2 Sea Base
  - SSGN can serve as the FORCEnet provider and integrator of clandestine ISR if appropriate UAV is available
  - Improved ISR support of both varieties will greatly enhance SSGN's ability to conduct Naval Special Warfare missions.

70

Valuable Results...Follow-through Essential

- Sea Viking 04
  - Logical step to build upon FORCEnet FY03 efforts
  - Opportunity to expand upon ESG concepts
- Partnership with MCCDC
  - Deputy FORCEnet lead
  - Active member of FORCEnet Sea Trial Pillar Group
  - USMC requirements
  - LNO
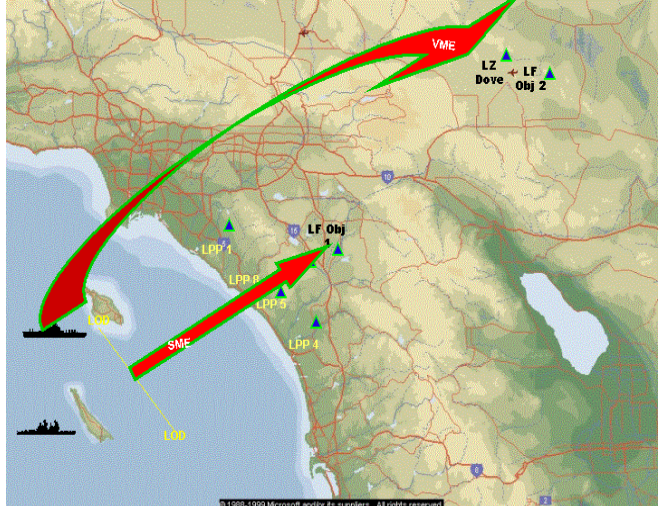
Sea Viking 04

Examine Sea Basing/STOM: foundation of Naval Transformation
Main Effort of Marine Corps Service Experimentation

Commander's Guidance

- "Operationalize" STOM
- Fix the "Digital Divide"
- Involve Marine/Navy Operating Forces (early and often)
- Provide Near-term Benefit to Operating Forces
- Focus on **tactical level**:
  - OTM/OTH C2
  - Collaborative Planning
  - Blue PLI
  - Fires
  - RSTA

Naval … the first step to Joint

Joint Capability Focus

- Joint CD&E
  - Building relationships with JFCOM, PACOM
  - Matching opportunities
- FORCEnet as a player in Joint CD&E
  - JTF WARNET
  - Pinnacle Impact
  - Joint Fires transition Initiative
  - Potential USN/USAF transformation experiment
  - DCEE

USJFCOM

Transform to What?

Deconflict Service Forces	Stitch Service Seams	Partial Integration of Service Capabilities	Full Interoperability of Service, Interagency, and Multinational Capabilities
Army Forces / Air Forces / Marine Forces / Navy Forces	Army Forces / Air Forces / Marine Forces / Navy Forces	Army Forces / Air Forces / Marine Forces / Navy Forces	Joint / Interagency / Multinational / Joint
Services Deconflicting	**Services Coordinating**	**Services Meeting Joint Vision Objectives**	**A capabilities-based joint force dominating all parts of the spectrum of conflict**

Unclassified   5

FORCEnet linkage to Joint capability approach
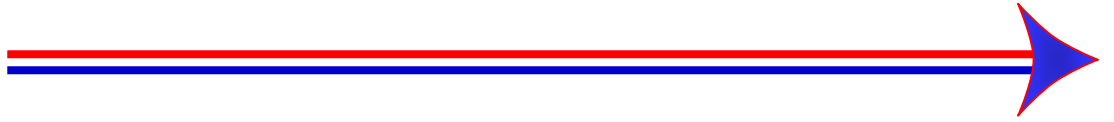
Operationalizing Knowledge Management: Building the Cognitive Part of FORCEnet

"Knowing First, Acting First"

Embedded Information Operations capability within FORCEnet brings decisive Information Advantage

LCS presents a unique opportunity to demonstrate FORCEnet as a true enabler for Sea Power 21

SEA POWER 21

Sea Shield

Sea Trial

Sea Warrior

ForceNet

Sea Strike

Sea Enterprise

Sea Basing

Knowledge management, Information visualization, Human factors, the "cognitive" part — the "FORCE" and the "Warrior"

Pervasive Knowledge, Decisive Action Imagine…

Have already started to FORCEnet…*there is no end state*

Initiatives Underway

FORCEnet

Netting the FORCE for transformational combat capability

Task Force Web

Task Force EXCEL (NKO)

Admin Sub-FAM Collaborative Tools (NMCI)

KSA FNC

DoN XML WG

SUBFOR KM

CoAp OAG

Industry Pilots

IPC KM Action Group

Collaboration Interoperability WG (DCTS)

DoN CIO KMCP

SPAWAR KWT

PACFLT KM

NETWARCOM KM

Navy-wide IM Plan
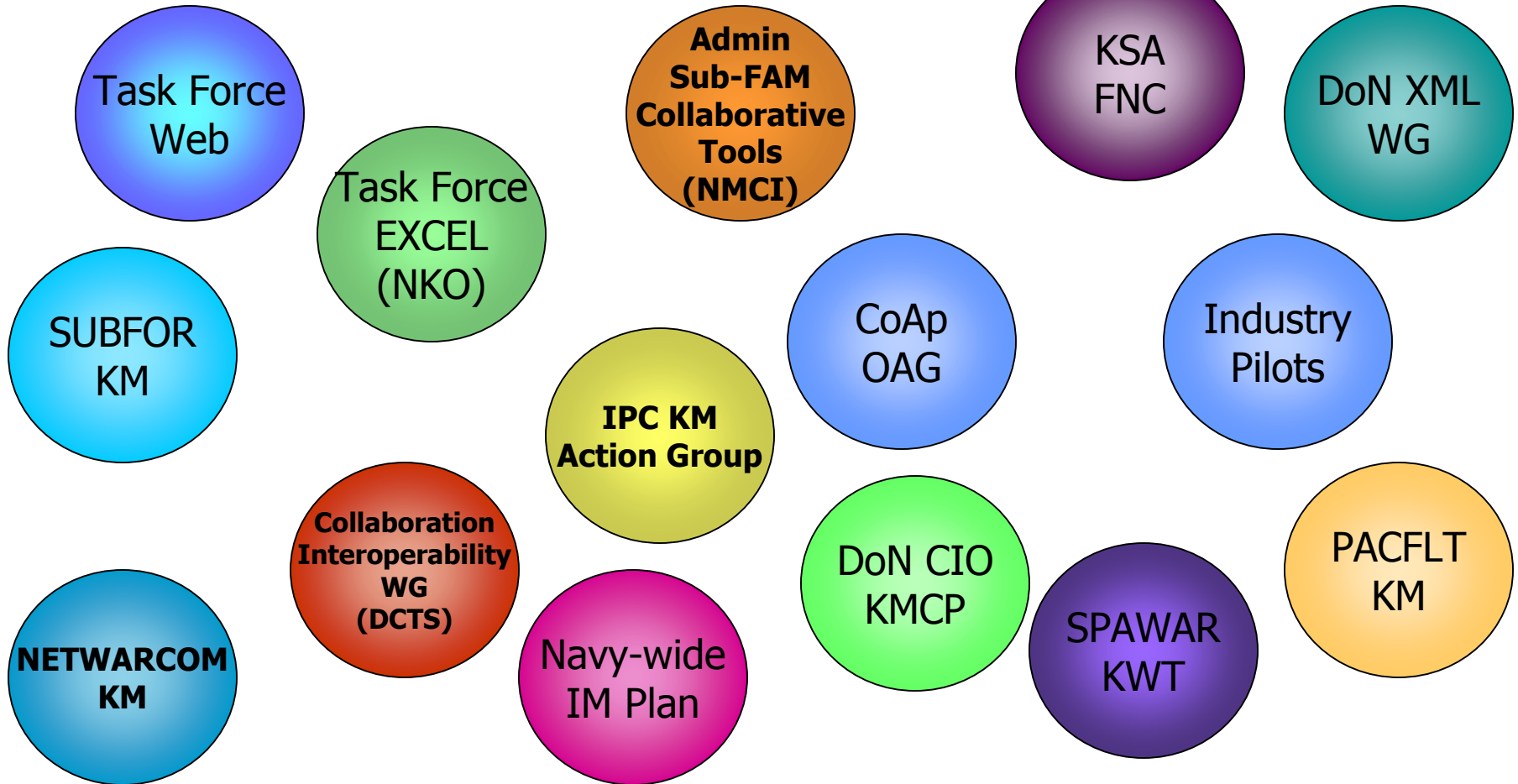
On a common course? Coordinated?

Vision Strategy & Goals

Identifies the operational purpose and applies knowledge management to meet your agency's mission.

Centers around Its Culture and Values

Organization

Provides the right knowledge and information to the right person at the right time.

Creates a knowledge-sharing culture and learning organization.

Technology

Provides appropriate technical architecture to use technology as an enabler.

Measurement & Rewards

Changes to a Knowledge Sharing culture. Cultivates the learning process to create, transfer and apply knowledge.

"Knowledge Management systematically brings together people, processes, and technology to facilitate the exchange of operationally relevant information."

The Navy will employ Knowledge Management to achieve Knowledge Dominance, resulting in:

• A warfighting force empowered with accurate, timely and relevant information

• A culture of innovation, knowledge sharing and organizational learning

• Projection of decisive warfighting capability across naval, joint and coalition domains

On Course to Knowledge-Centric

FORCEnet

Netting the FORCE for transformational combat capability

Transformation Milestones

Transformation

FORCEnet

Centric

NMCI

Y2K

NETWARCOM

Managed

IT21

Focused

Organizational Maturity

High

Organization:
- Awareness of KM and knowledge issues

Information Technology:
- Databases
- Networks

Aware

Chaotic

Organization:
- Initial KM initiatives
- People and process-focused change

Information Technology:
- Data warehousing
- Data mining
- Intranet / groupware
- Decision support

Organization:
- Culture of innovation, teamwork and sharing
- KM embedded in processes

Information Technology:
- Knowledge applications
- Repositories
- Integrated communications

Low

Existing IT:
Not KM-specific

Value-Added IT:
Specific benefits

Integrated IT:
Multiple synergies

Technology Sophistication

Summary

- FORCEnet is the enabler for Sea Power 21
- FORCEnet operations require a highly networked force supported by advances in Information Age capabilities
- FORCEnet must include the Human element – 21st Century Warrior
- FORCEnet has no end state
  - Will evolve as technologies allow
- Implementing FORCEnet requires new implementation strategies and spiral development approach

FORCEnet is the Sea Power 21 Combat System

"*FORCEnet will enable the naval service to employ a fully netted force, engage with widely distributed combat forces, and command with increased awareness and speed as an integral part of the joint team."*

- Admiral Vern Clark

We've started to FORCEnet … appreciate the reason why, get to know the language and join up!

BACKUPs

Sea Viking Objectives

Ship to Objective Movement

DISTANCES IN NAUTICAL MILES

ARG/MEU - FOB RHINO	400
FOB RHINO - KANDAHAR	95
KANDAHAR - BAND E SARDEH	180
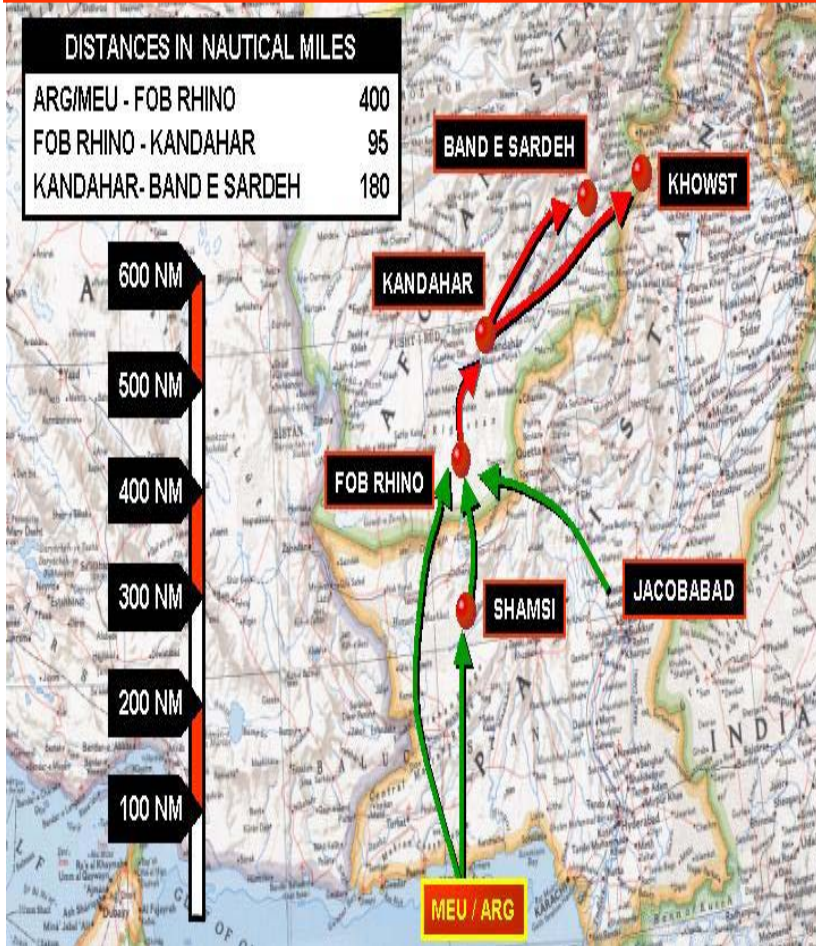
Ship to Objective Maneuver!

- **Determine how well current programs of record satisfy unique STOM requirements**

- **Develop DOTMLPF recommendations to satisfy identified STOM deficiencies:**

  - **STOM RSTA Concept**
  - **T/O, T/E, TTPs for "STOM MCSSD"**
  - **MEU CE, GCE, CSSE C2 Systems**
  - **Blue PLI**
  - **Expeditionary Fire Support System**
  - **Refinements to DRAFT STOM Doctrine**

- **Assess and as required develop POIs and SOPs to bridge the MEU/Battalion "Digital Divide"**
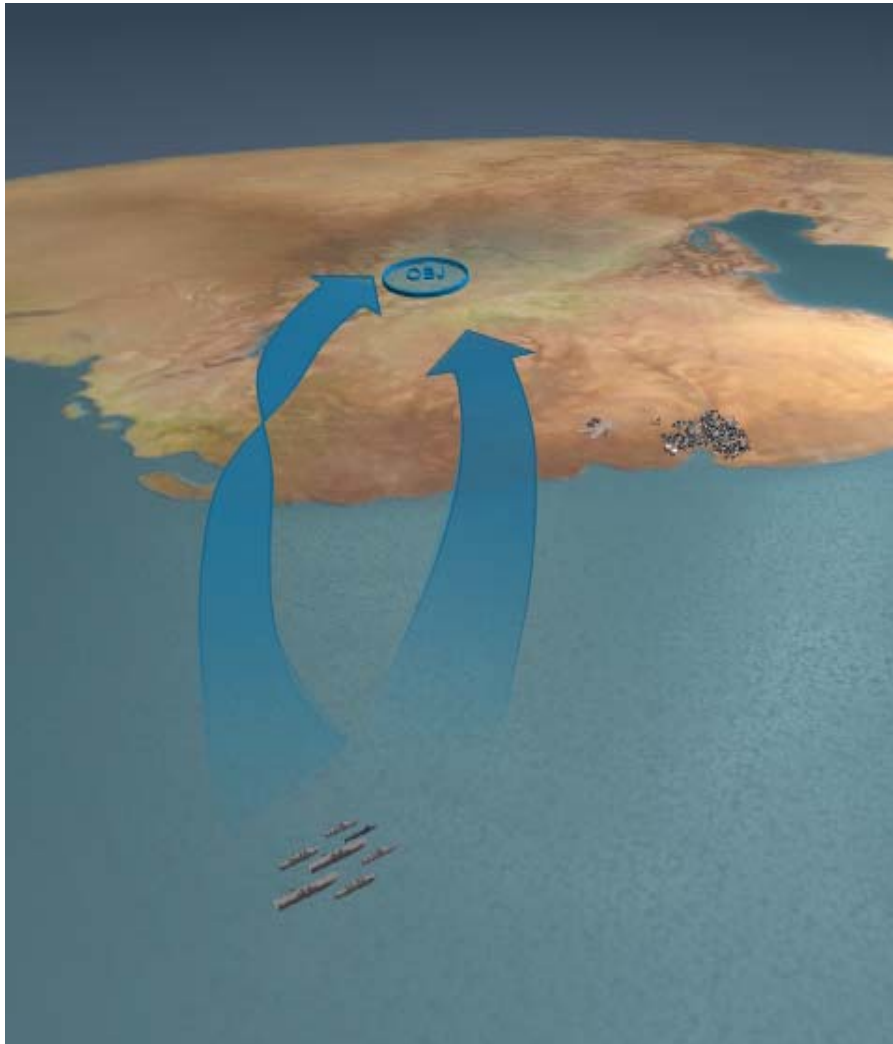
- **Develop and assess experimental doctrine and equipment to achieve enhanced capabilities for a 2005 deploying ARG/MEU:**
  - **OTM/OTH C2 to company level (mounted and dismounted)**
  - **Common database & translator that integrates C2PC, AFATDS, and MIDB**
  - **Deployable battalion COC with OTM/OTH voice/digital C2**
  - **Battalion UOC set modified for OTH C2**
  - **Aircraft modified for OTH DACT connectivity while enroute the LZ**
  - **MSSG/MCSSD C2 Suite**
  - **Enhanced Collaborative Planning capability within the ESG**
  - **Develop lightweight fire support coordination capability for the Battalion COC**

Sea Viking Objectives
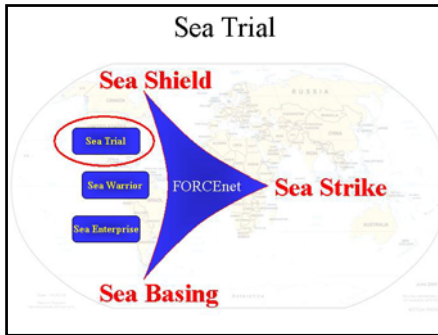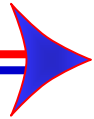
Sea Trial

SEA EAGLE
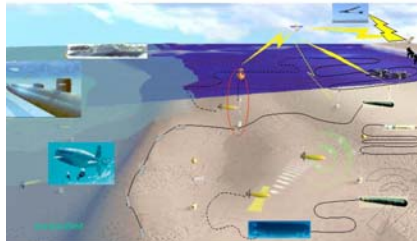
JBFSA ACTD
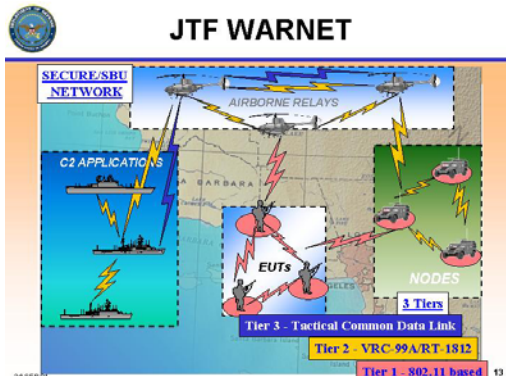
JTF WARNET

- **Provide the opportunity for experimentation**
- **Naval**
  - **Sea Trial**
  - **ONR 353 and Littoral Combat FNC**
- **Joint**
  - **Sea Eagle ACTD**
  - **Joint Blue Force Situational Awareness (JBFSA) ACTD**
  - **JTF WARNET**

FORCEnet FY03 IPD Approach

FORCEnet

Netting the FORCE for transformational combat capability

Leverage JTF WARNET Pre-Deployment Exercise (PDX)

Fleet Driven
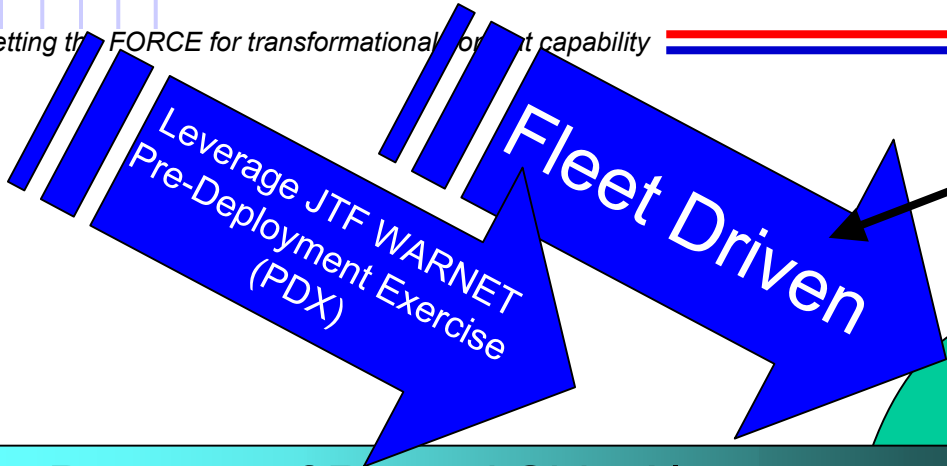
Tailored to meet CTF76/31MEU/C7F/CPF requirements

ESG focused LOE

Program of Record Ship Alts

Program of Record Temp Alts

In Theater Prototypes

New Prototypes

Integration

Fn IPD

New CONOPS

New Tech.
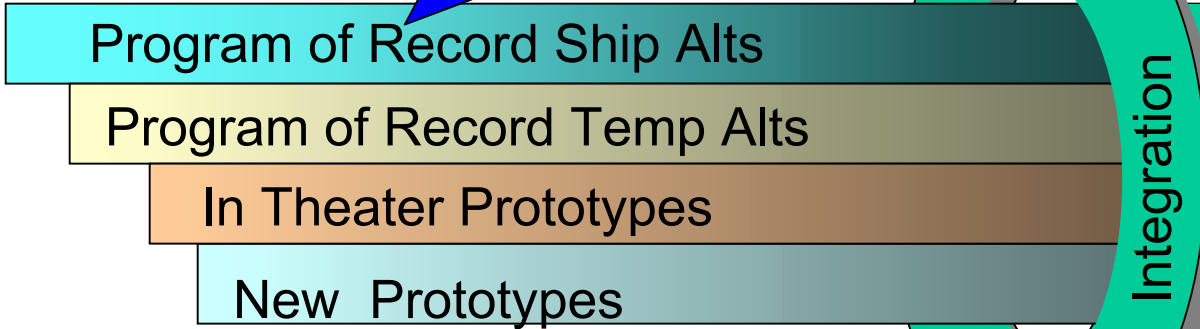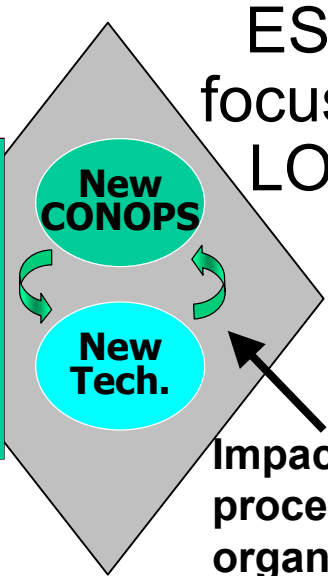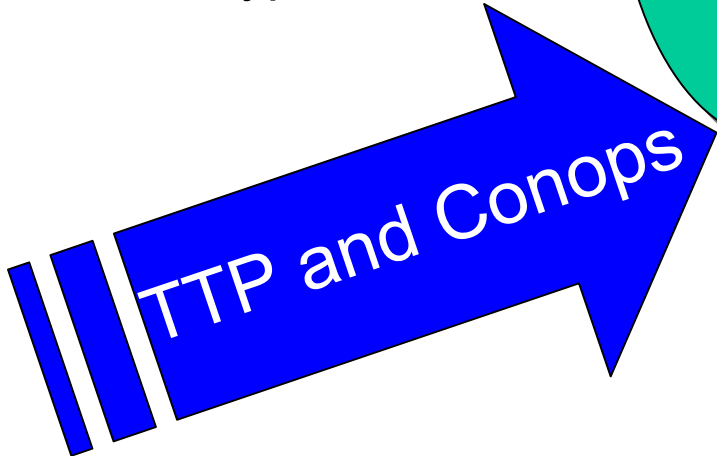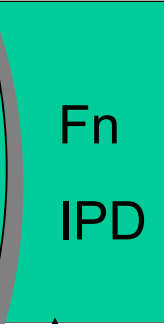
Impact on processes & organization

TTP and Conops

Results in an early delivery of FORCEnet capability with a subset of supportable leave behind capability

Disciplined Approach: IKA Taxonomy

Netting the FORCE for transformational combat capability

4. IKA

4.1 Expeditionary, multi tiered sensor and weapons grids

4.1.1 - Large Numbers (>10000)

4.1.2 - Low cost

4.1.3 - Distributed

4.1.4 - Autonomous

4.1.5 - Multiple Phenomena

4.1.6 - Continuous coverage
4.1.6.1 – Subsurface
4.1.6.2 – Surface
4.1.6.3 – Air
4.1.6.4 - Cyber space

4.1.7 - Standards based output

4.1.8 – Connected

4.1.9 – Remotely Operated …..

4.2 Dynamic multi-path and survivable networks

4.2.1 - Node adressable network architecture
4.2.2 Universal access
4.2.2.1-Tactical (LTNs)
4.2.2.2-Operational (LANs)
4.2.2.3-Strategic (Enterprise)
4.2.3 - Fault Tolerant
4.2.4 - LPD/LPI Comms
4.2.5 - Quality of Service
4.2.6 - Multiple, redundant comm paths
4.2.7 -Mobile/Expeditionary
4.2.8 - Scalable
4.2.9 - Trusted
4.2.10 – Highly available
4.2.11 - Standards based protocol
4.2.12 - Next generation internet like
4.2.13 – Adaptable to C2 needs
4.2.14 – Self organizing
4.2.15 – Self healing
4.2.16 – Common geo/temporal reference…..

4.3 Adaptive / Automated decision aids and human centric engineering

4.3.1 – Information Management
4.3.1.1- Data mining
4.3.1.2 - Filtering
4.3.1.3 - Association
4.3.1.4 - Analysis
4.3.1.5 - Alert
4.3.1.6 - Prediction
4.3.1.7 - Decision support
4.3.1.8 – Assimilation
4.3.1.9 – Fusion
4.3.1.10 - Trust/Pedigree

4.3.2 - Common, intuitive user interface

4.3.3 - Common, intuitive info representation

4.3.4 - Real time processing

4.3.5 - Reach back

4.3.6 - Semantic data markup

4.3.7 – Agent based computing….

4.4 Distributed, collaborative C2 and human centric engineering

4.4.1 - Distributed commanders
4.4.2 - Well understood ROE
4.4.3 - Well understood commanders intent
4.4.4 - Situation specific training
4.4.4.1 - Adversary's Region
4.4.4.2 - Adversary's Culture
4.4.5 - Robust team rehearsal
4.4.6 - Collaborative planning (Naval, Joint, Coalition)
4.4.7 - Access to information (Naval, Joint, Coalition)
4.4.7.1 - Based on need vice comms/computers
4.4.8 - Reduce reaction time
4.4.9 - Cognition
4.4.9.1 – Presentation
4.4.9.2 – Representation…..

4.5 Information Assurance

4.5.1 - Defensive IO
4.5.1.1 - Strong computer network defense
•Hardware
•Software
•Processes
•Procedures
4.5.1.2 -Intrusion detection

4.5.2 Quality of Service……

FORCEnet Spiral 1

Focused series of workshops, an NWC war game, culminating in a STAFFEX to address the Command & Control and Collaboration challenges with a geographically distributed staff

- **Venue:** Workshop, War Game in Newport; STAFFEX in Norfolk/Newport
- **Event Type:** FORCEnet Spiral
- **OCE:** C2F
- **Operational Thread:** Real world C2F requirement
- **Objective:** Spiral 1
  - Determine "best practices" for deploying a distributed, collaborative staff
  - Determine information infrastructure to support distributed, collaborative staff operations
- **Time frame:** Februrary 03
- **Desired Outcome:** Determine the following
  - Staff requirements at distributed locations
  - DOTMLPF updates
  - Applications requirements
  - Networking requirements (comm, client, networks)
  - Equipment implications (infrastructure, etc)
- **Stakeholders**: C2F, NAVWARCOL, NWDC, SPAWAR, N61F, NETWARCOM
- **Issues:** Ongoing

Areas Investigated – Spiral 1

★ Mission ★ People ★ Capability

4. IKA Taxonomy

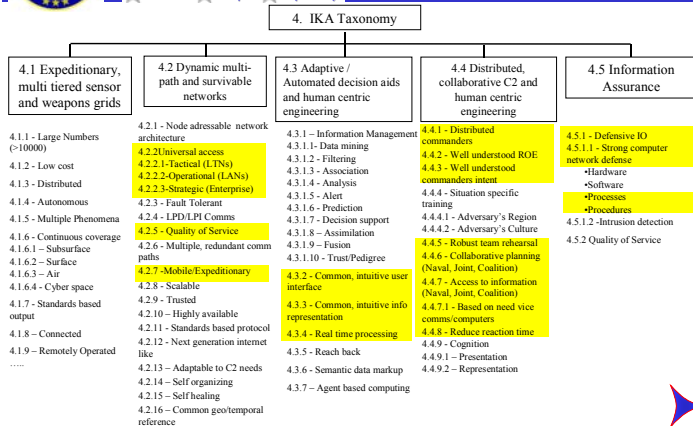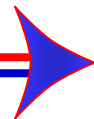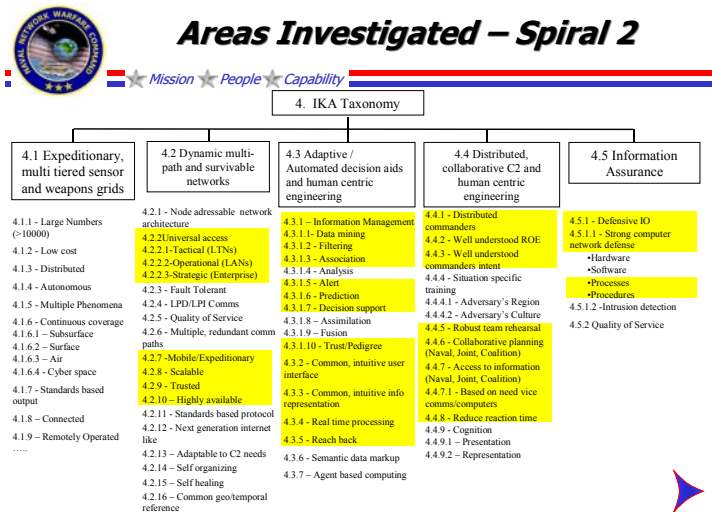| 4.1 Expeditionary, multi tiered sensor and weapons grids	4.2 Dynamic multi-path and survivable networks	4.3 Adaptive / Automated decision aids and human centric engineering	4.4 Distributed, collaborative C2 and human centric engineering	4.5 Information Assurance
4.1.1 - Large Numbers (>10000)	4.2.1 - Node adressable network architecture	4.3.1 – Information Management	4.4.1 - Distributed commanders	4.5.1 - Defensive IO
4.1.2 - Low cost	4.2.2 Universal access	4.3.1.1 - Data mining	4.4.2 - Well understood ROE	4.5.1.1 - Strong computer network defense
4.1.3 - Distributed	4.2.2.1 - Tactical (LTNs)	4.3.1.2 - Filtering	4.4.3 - Well understood commanders intent	•Hardware
4.1.4 - Autonomous	4.2.2.2 - Operational (LANs)	4.3.1.3 - Association		•Software
4.1.5 - Multiple Phenomena	4.2.2.3 - Strategic (Enterprise)	4.3.1.4 - Analysis		•Processes
4.1.6 - Continuous coverage	4.2.4 - LPD/LPI Comms	4.3.1.5 - Alert	4.4.4 - Situation specific training	•Procedures
4.1.6.1 – Subsurface	4.2.5 - Quality of Service	4.3.1.6 - Prediction	4.4.4.1 - Adversary's Region	4.5.1.2 -Intrusion detection
4.1.6.2 – Surface	4.2.6 - Multiple, redundant comm paths	4.3.1.7 - Decision support	4.4.4.2 - Adversary's Culture	4.5.2 Quality of Service
4.1.6.3 – Air		4.3.1.8 - Assimilation		
4.1.6.4 – Cyber space	4.2.7 - Mobile/Expeditionary	4.3.1.9 – Fusion	4.4.5 - Robust team rehearsal	
4.1.7 - Standards based output	4.2.8 - Scalable	4.3.1.10 - Trust/Pedigree	4.4.6 - Collaborative planning (Naval, Joint, Coalition)	
4.1.8 – Connected	4.2.9 - Trusted	4.3.2 - Common, intuitive user interface	4.4.7 - Access to information (Naval, Joint, Coalition)	
4.1.9 – Remotely Operated	4.2.10 – Highly available		4.4.7.1 - Based on need vice comms/computers	
.....	4.2.11 - Standards based protocol	4.3.3 - Common, intuitive info representation	4.4.8 - Reduce reaction time	
	4.2.12 - Next generation internet like	4.3.4 - Real time processing	4.4.9 - Cognition	
	4.2.13 – Adaptable to C2 needs	4.3.5 - Reach back	4.4.9.1 – Presentation	
	4.2.14 – Self organizing	4.3.6 - Semantic data markup	4.4.9.2 – Representation	
	4.2.15 – Self healing	4.3.7 – Agent based computing		
	4.2.16 – Common geo/temporal reference			

FORCEnet Spiral 2

Focused series of workshops, an NWC war game, culminating in an at-sea JTFEX to address the Command & Control and Collaboration challenges with a geographically distributed staff

- **Venue:** Workshop, War Game in Newport; JTFEX 03-3
- **Event Type:** FORCEnet Spiral
- **OCE:** C2F
- **Operational Thread:** C2 of Distributed JTF
- **Objective:** Spiral 1
  - Determine "best practices" for deploying a distributed, collaborative staff
  - Determine information infrastructure to support distributed, collaborative staff operations
- **Time frame:** August 03
- **Desired Outcome:** Determine the following
  - Staff requirements at distributed locations
  - DOTMLPF updates
  - Applications requirements
  - Networking requirements (comm, client, networks)
  - Equipment implications (infrastructure, etc)
- **Stakeholders**: C2F, NAVWARCOL, NWDC, SPAWAR, N61F, NETWARCOM
- **Issues:** Some resource issues

Areas Investigated – Spiral 2

★ Mission ★ People ★ Capability

4. IKA Taxonomy

4.1 Expeditionary, multi tiered sensor and weapons grids	4.2 Dynamic multi-path and survivable networks	4.3 Adaptive / Automated decision aids and human centric engineering	4.4 Distributed, collaborative C2 and human centric engineering	4.5 Information Assurance
4.1.1 - Large Numbers (>10000)	4.2.1 - Node adressable network architecture	4.3.1 – Information Management	4.4.1 - Distributed commanders	4.5.1 - Defensive IO
4.1.2 - Low cost	4.2.2Universal access	4.3.1.1- Data mining	4.4.2 - Well understood ROE	4.5.1.1 - Strong computer network defense
4.1.3 - Distributed	4.2.2.1-Tactical (LTNs)	4.3.1.2 - Filtering	4.4.3 - Well understood commanders intent	•Hardware
4.1.4 - Autonomous	4.2.2.2-Operational (LANs)	4.3.1.3 - Association	4.4.4 - Situation specific training	•Software
4.1.5 - Multiple Phenomena	4.2.2.3-Strategic (Enterprise)	4.3.1.4 - Analysis	4.4.4.1 - Adversary's Region	•Processes
4.1.6 - Continuous coverage	4.2.3 - Fault Tolerant	4.3.1.5 - Alert	4.4.4.2 - Adversary's Culture	•Procedures
4.1.6.1 – Subsurface	4.2.4 - LPD/LPI Comms	4.3.1.6 - Prediction	4.4.5 - Robust team rehearsal	4.5.1.2 -Intrusion detection
4.1.6.2 – Surface	4.2.5 - Quality of Service	4.3.1.7 - Decision support	4.4.6 - Collaborative planning (Naval, Joint, Coalition)	4.5.2 Quality of Service
4.1.6.3 – Air	4.2.6 - Multiple, redundant comm paths	4.3.1.8 – Assimilation	4.4.7 - Access to information (Naval, Joint, Coalition)	
4.1.6.4 - Cyber space		4.3.1.9 – Fusion	4.4.7.1 - Based on need vice comms/computers	
4.1.7 - Standards based output	4.2.7 - Mobile/Expeditionary	4.3.1.10 - Trust/Pedigree	4.4.8 - Reduce reaction time	
4.1.8 – Connected	4.2.8 - Scalable	4.3.2 - Common, intuitive user interface	4.4.9 - Cognition	
4.1.9 – Remotely Operated	4.2.9 - Trusted		4.4.9.1 - Presentation	
…..	4.2.10 – Highly available	4.3.3 - Common, intuitive info representation	4.4.9.2 – Representation	
	4.2.11 - Standards based protocol			
	4.2.12 - Next generation internet like	4.3.4 - Real time processing		
	4.2.13 – Adaptable to C2 needs	4.3.5 - Reach back		
	4.2.14 - Self organizing	4.3.6 - Semantic data markup		
	4.2.15 – Self healing	4.3.7 – Agent based computing		
	4.2.16 – Common geo/temporal reference			

24

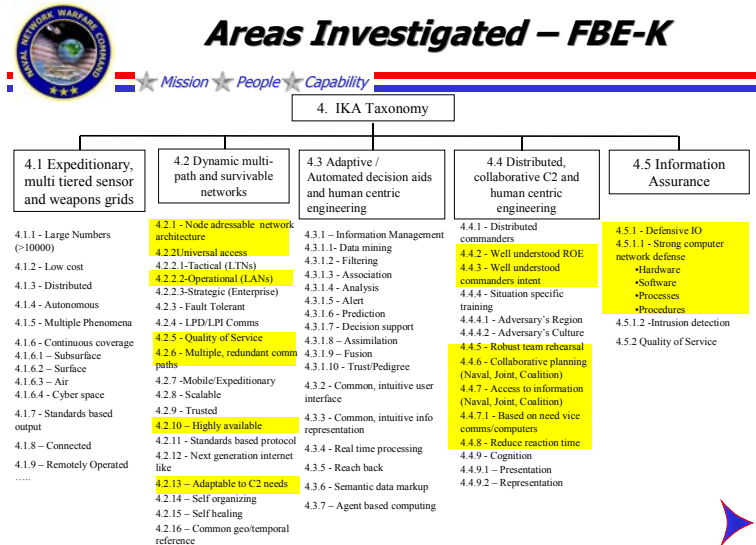# FORCEnet Sea Trial Event: FBE-K

Examining IO/CND capabilities: embedded firewalls, remote administration, CND CONOPS; Evaluating ESG organization & processes under legacy network Capability.

- **Venue:** Fleet Battle Experiment – KILO
- **Event Type:** FBE
- **OCE:** C7F
- **Operational Thread:** NEO, CSAR, Hostile visit – board, search and seizure
- **Objective:** Examine draft CONOPS and supporting networked information infrastructure to support distributed, collaborative ESG operations
- **Time frame:** April - May 2003
- **Desired Outcome:**
  - Reliable, secure and efficient access to data/information
  - Updated CONOPS for distributed ESG staff
  - Staff requirements at distributed locations
  - DOTMLPF updates
  - Applications requirements
  - IO/CND
  - Equipment implications (infrastructure, etc)
- **Stakeholders:** C7F, NWDC
- **Issues:** Linkage to other FORCEnet events

Areas Investigated – FBE-K

★ Mission ★ People ★ Capability

4. IKA Taxonomy

4.1 Expeditionary, multi tiered sensor and weapons grids	4.2 Dynamic multi-path and survivable networks	4.3 Adaptive / Automated decision aids and human centric engineering	4.4 Distributed, collaborative C2 and human centric engineering	4.5 Information Assurance
4.1.1 - Large Numbers (>10000)	4.2.1 - Node adressable network architecture	4.3.1 – Information Management	4.4.1 - Distributed commanders	4.5.1 - Defensive IO
4.1.2 - Low cost	4.2.2Universal access	4.3.1.1- Data mining	4.4.2 - Well understood ROE	4.5.1.1 - Strong computer network defense
4.1.3 - Distributed	4.2.2.1-Tactical (LTNs)	4.3.1.2 - Filtering	4.4.3 - Well understood commanders intent	•Hardware
4.1.4 - Autonomous	4.2.2.2-Operational (LANs)	4.3.1.3 - Association	4.4.4 - Situation specific training	•Software
4.1.5 - Multiple Phenomena	4.2.2.3-Strategic (Enterprise)	4.3.1.4 - Analysis	4.4.4.1 - Adversary's Region	•Processes
4.1.6 - Continuous coverage	4.2.3 - Fault Tolerant	4.3.1.5 - Alert	4.4.4.2 - Adversary's Culture	•Procedures
4.1.6.1 – Subsurface	4.2.4 - LPD/LPI Comms	4.3.1.6 - Prediction	4.4.5 - Robust team rehearsal	4.5.1.2 -Intrusion detection
4.1.6.2 – Surface	4.2.5 - Quality of Service	4.3.1.7 - Decision support	4.4.6 - Collaborative planning (Naval, Joint, Coalition)	4.5.2 Quality of Service
4.1.6.3 – Air	4.2.6 - Multiple, redundant comm paths	4.3.1.8 – Assimilation	4.4.7 - Access to information (Naval, Joint, Coalition)	
4.1.6.4 - Cyber space	4.2.7 -Mobile/Expeditionary	4.3.1.9 – Fusion	4.4.7.1 - Based on need vice comms/computers	
4.1.7 - Standards based output	4.2.8 - Scalable	4.3.1.10 - Trust/Pedigree	4.4.8 - Reduce reaction time	
4.1.8 – Connected	4.2.9 - Trusted	4.3.2 - Common, intuitive user interface	4.4.9 - Cognition	
4.1.9 – Remotely Operated …..	4.2.10 – Highly available	4.3.3 - Common, intuitive info representation	4.4.9.1 – Presentation	
	4.2.11 - Standards based protocol	4.3.4 - Real time processing	4.4.9.2 – Representation	
	4.2.12 - Next generation internet like	4.3.5 - Reach back		
	4.2.13 – Adaptable to C2 needs	4.3.6 - Semantic data markup		
	4.2.14 – Self organizing	4.3.7 – Agent based computing		
	4.2.15 – Self healing			
	4.2.16 - Common geo/temporal reference			

26

Areas Investigated – Giant Shadow

4. IKA Taxonomy

4.1 Expeditionary, multi tiered sensor and weapons grids

4.1.1 - Large Numbers (>10000)

4.1.2 - Low cost

4.1.3 - Distributed

4.1.4 - Autonomous

4.1.5 - Multiple Phenomena

4.1.6 - Continuous coverage

4.1.6.1 – Subsurface
4.1.6.2 – Surface
4.1.6.3 – Air
4.1.6.4 - Cyber space

4.1.7 - Standards based output

4.1.8 – Connected

4.1.9 – Remotely Operated
…..

4.2 Dynamic multi-path and survivable networks

4.2.1 - Node adressable network architecture
4.2.2 Universal access
4.2.2.1-Tactical (LTNs)
4.2.2.2-Operational (LANs)
4.2.2.3-Strategic (Enterprise)
4.2.3 - Fault Tolerant
4.2.4 - LPD/LPI Comms
4.2.5 - Quality of Service
4.2.6 - Multiple, redundant comm paths
4.2.7 -Mobile/Expeditionary
4.2.8 - Scalable
4.2.9 - Trusted
4.2.10 – Highly available
4.2.11 - Standards based protocol
4.2.12 - Next generation internet like
4.2.13 – Adaptable to C2 needs
4.2.14 – Self organizing
4.2.15 – Self healing
4.2.16 – Common geo/temporal reference

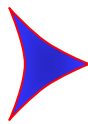### 4.3 Adaptive / Automated decision aids and human centric engineering

4.3.1 – Information Management
4.3.1.1- Data mining
4.3.1.2 - Filtering
4.3.1.3 - Association
4.3.1.4 - Analysis
4.3.1.5 - Alert
4.3.1.6 - Prediction
4.3.1.7 - Decision support
4.3.1.8 – Assimilation
4.3.1.9 – Fusion
4.3.1.10 - Trust/Pedigree

4.3.2 - Common, intuitive user interface

4.3.3 - Common, intuitive info representation

4.3.4 - Real time processing

4.3.5 - Reach back

4.3.6 - Semantic data markup

4.3.7 – Agent based computing

4.4 Distributed, collaborative C2 and human centric engineering

4.4.1 - Distributed commanders
4.4.2 - Well understood ROE
4.4.3 - Well understood commanders intent
4.4.4 - Situation specific training
4.4.4.1 - Adversary's Region
4.4.4.2 - Adversary's Culture
4.4.5 - Robust team rehearsal
4.4.6 - Collaborative planning (Naval, Joint, Coalition)
4.4.7 - Access to information (Naval, Joint, Coalition)
4.4.7.1 - Based on need vice comms/computers
4.4.8 - Reduce reaction time
4.4.9 - Cognition
4.4.9.1 – Presentation
4.4.9.2 – Representation

4.5 Information Assurance

4.5.1 - Defensive IO
4.5.1.1 - Strong computer network defense
•Hardware
•Software
•Processes
•Procedures
4.5.1.2 -Intrusion detection

4.5.2 Quality of Service

Areas Investigated – Spiral 1

4. IKA Taxonomy

| 4.1 Expeditionary, multi tiered sensor and weapons grids | 4.2 Dynamic multi-path and survivable networks | 4.3 Adaptive / Automated decision aids and human centric engineering | 4.4 Distributed, collaborative C2 and human centric engineering | 4.5 Information Assurance |

4.1 Expeditionary, multi tiered sensor and weapons grids

4.1.1 - Large Numbers (>10000)

4.1.2 - Low cost

4.1.3 - Distributed

4.1.4 - Autonomous

4.1.5 - Multiple Phenomena

4.1.6 - Continuous coverage

4.1.6.1 – Subsurface

4.1.6.2 – Surface

4.1.6.3 – Air

4.1.6.4 - Cyber space

4.1.7 - Standards based output

4.1.8 – Connected

4.1.9 – Remotely Operated …..

4.2 Dynamic multi-path and survivable networks

4.2.1 - Node adressable network architecture

4.2.2 Universal access

4.2.2.1-Tactical (LTNs)

4.2.2.2-Operational (LANs)

4.2.2.3-Strategic (Enterprise)

4.2.3 - Fault Tolerant

4.2.4 - LPD/LPI Comms

4.2.5 - Quality of Service

4.2.6 - Multiple, redundant comm paths

4.2.7 -Mobile/Expeditionary

4.2.8 - Scalable

4.2.9 - Trusted

4.2.10 – Highly available

4.2.11 - Standards based protocol

4.2.12 - Next generation internet like

4.2.13 – Adaptable to C2 needs

4.2.14 – Self organizing

4.2.15 – Self healing

4.2.16 – Common geo/temporal reference

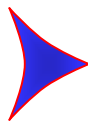**4.3 Adaptive / Automated decision aids and human centric engineering**

4.3.1 – Information Management

4.3.1.1- Data mining

4.3.1.2 - Filtering

4.3.1.3 - Association

4.3.1.4 - Analysis

4.3.1.5 - Alert

4.3.1.6 - Prediction

4.3.1.7 - Decision support

4.3.1.8 – Assimilation

4.3.1.9 – Fusion

4.3.1.10 - Trust/Pedigree

4.3.2 - Common, intuitive user interface

4.3.3 - Common, intuitive info representation

4.3.4 - Real time processing

4.3.5 - Reach back

4.3.6 - Semantic data markup

4.3.7 – Agent based computing

4.4 Distributed, collaborative C2 and human centric engineering

4.4.1 - Distributed commanders

4.4.2 - Well understood ROE

4.4.3 - Well understood commanders intent

4.4.4 - Situation specific training

4.4.4.1 - Adversary's Region

4.4.4.2 - Adversary's Culture

4.4.5 - Robust team rehearsal

4.4.6 - Collaborative planning (Naval, Joint, Coalition)

4.4.7 - Access to information (Naval, Joint, Coalition)

4.4.7.1 - Based on need vice comms/computers

4.4.8 - Reduce reaction time

4.4.9 - Cognition

4.4.9.1 – Presentation

4.4.9.2 – Representation

4.5 Information Assurance

4.5.1 - Defensive IO

4.5.1.1 - Strong computer network defense
- Hardware
- Software
- Processes
- Procedures

4.5.1.2 -Intrusion detection

4.5.2 Quality of Service

Areas Investigated – Spiral 2

4. IKA Taxonomy

4.1 Expeditionary, multi tiered sensor and weapons grids

4.1.1 - Large Numbers (>10000)

4.1.2 - Low cost

4.1.3 - Distributed

4.1.4 - Autonomous

4.1.5 - Multiple Phenomena

4.1.6 - Continuous coverage

4.1.6.1 – Subsurface

4.1.6.2 – Surface

4.1.6.3 – Air

4.1.6.4 - Cyber space

4.1.7 - Standards based output

4.1.8 – Connected

4.1.9 – Remotely Operated …..

4.2 Dynamic multi-path and survivable networks

4.2.1 - Node adressable network architecture

4.2.2 Universal access

4.2.2.1-Tactical (LTNs)

4.2.2.2-Operational (LANs)

4.2.2.3-Strategic (Enterprise)

4.2.3 - Fault Tolerant

4.2.4 - LPD/LPI Comms

4.2.5 - Quality of Service

4.2.6 - Multiple, redundant comm paths

4.2.7 -Mobile/Expeditionary

4.2.8 - Scalable

4.2.9 - Trusted

4.2.10 – Highly available

4.2.11 - Standards based protocol

4.2.12 - Next generation internet like

4.2.13 – Adaptable to C2 needs

4.2.14 – Self organizing

4.2.15 – Self healing

4.2.16 – Common geo/temporal reference

4.3 Adaptive / Automated decision aids and human centric engineering

4.3.1 – Information Management

4.3.1.1- Data mining

4.3.1.2 - Filtering

4.3.1.3 - Association

4.3.1.4 - Analysis

4.3.1.5 - Alert

4.3.1.6 - Prediction

4.3.1.7 - Decision support

4.3.1.8 – Assimilation

4.3.1.9 – Fusion

4.3.1.10 - Trust/Pedigree

4.3.2 - Common, intuitive user interface

4.3.3 - Common, intuitive info representation

4.3.4 - Real time processing

4.3.5 - Reach back

4.3.6 - Semantic data markup

4.3.7 – Agent based computing

4.4 Distributed, collaborative C2 and human centric engineering

4.4.1 - Distributed commanders

4.4.2 - Well understood ROE

4.4.3 - Well understood commanders intent

4.4.4 - Situation specific training

4.4.4.1 - Adversary's Region

4.4.4.2 - Adversary's Culture

4.4.5 - Robust team rehearsal

4.4.6 - Collaborative planning (Naval, Joint, Coalition)

4.4.7 - Access to information (Naval, Joint, Coalition)

4.4.7.1 - Based on need vice comms/computers

4.4.8 - Reduce reaction time

4.4.9 - Cognition

4.4.9.1 – Presentation

4.4.9.2 – Representation

4.5 Information Assurance

4.5.1 - Defensive IO

4.5.1.1 - Strong computer network defense

- Hardware
- Software
- Processes
- Procedures

4.5.1.2 -Intrusion detection

4.5.2 Quality of Service

Areas Investigated – FBE-K

4. IKA Taxonomy

4.1 Expeditionary, multi tiered sensor and weapons grids

4.1.1 - Large Numbers (>10000)

4.1.2 - Low cost

4.1.3 - Distributed

4.1.4 - Autonomous

4.1.5 - Multiple Phenomena

4.1.6 - Continuous coverage

4.1.6.1 – Subsurface

4.1.6.2 – Surface

4.1.6.3 – Air

4.1.6.4 - Cyber space

4.1.7 - Standards based output

4.1.8 – Connected

4.1.9 – Remotely Operated …..

4.2 Dynamic multi-path and survivable networks

4.2.1 - Node adressable network architecture

4.2.2 Universal access

4.2.2.1-Tactical (LTNs)

4.2.2.2-Operational (LANs)

4.2.2.3-Strategic (Enterprise)

4.2.3 - Fault Tolerant

4.2.4 - LPD/LPI Comms

4.2.5 - Quality of Service

4.2.6 - Multiple, redundant comm paths

4.2.7 -Mobile/Expeditionary

4.2.8 - Scalable

4.2.9 - Trusted

4.2.10 – Highly available

4.2.11 - Standards based protocol

4.2.12 - Next generation internet like

4.2.13 – Adaptable to C2 needs

4.2.14 – Self organizing

4.2.15 – Self healing

4.2.16 – Common geo/temporal reference

4.3 Adaptive / Automated decision aids and human centric engineering
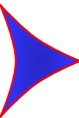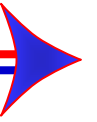
4.3.1 – Information Management

4.3.1.1- Data mining

4.3.1.2 - Filtering

4.3.1.3 - Association

4.3.1.4 - Analysis

4.3.1.5 - Alert

4.3.1.6 - Prediction

4.3.1.7 - Decision support

4.3.1.8 – Assimilation

4.3.1.9 – Fusion

4.3.1.10 - Trust/Pedigree

4.3.2 - Common, intuitive user interface

4.3.3 - Common, intuitive info representation

4.3.4 - Real time processing

4.3.5 - Reach back

4.3.6 - Semantic data markup

4.3.7 – Agent based computing

4.4 Distributed, collaborative C2 and human centric engineering

4.4.1 - Distributed commanders

4.4.2 - Well understood ROE

4.4.3 - Well understood commanders intent

4.4.4 - Situation specific training

4.4.4.1 - Adversary's Region

4.4.4.2 - Adversary's Culture

4.4.5 - Robust team rehearsal

4.4.6 - Collaborative planning (Naval, Joint, Coalition)

4.4.7 - Access to information (Naval, Joint, Coalition)

4.4.7.1 - Based on need vice comms/computers

4.4.8 - Reduce reaction time

4.4.9 - Cognition

4.4.9.1 – Presentation

4.4.9.2 – Representation

4.5 Information Assurance

4.5.1 - Defensive IO

4.5.1.1 - Strong computer network defense
• Hardware
• Software
• Processes
• Procedures

4.5.1.2 -Intrusion detection

4.5.2 Quality of Service

Areas Investigated – ESG LOE / IPD

Netting the FORCE for transformational combat capability

4. IKA Taxonomy

4.1 Expeditionary, multi tiered sensor and weapons grids

4.1.1 - Large Numbers (>10000)

4.1.2 - Low cost

4.1.3 - Distributed

4.1.4 - Autonomous

4.1.5 - Multiple Phenomena

4.1.6 - Continuous coverage

4.1.6.1 – Subsurface

4.1.6.2 – Surface

4.1.6.3 – Air

4.1.6.4 - Cyber space

4.1.7 - Standards based output

4.1.8 – Connected

4.1.9 – Remotely Operated …..

4.2 Dynamic multi-path and survivable networks

4.2.1 - Node adressable network architecture

4.2.2 Universal access

4.2.2.1 - Tactical (LTNs)

4.2.2.2 - Operational (LANs)

4.2.2.3 - Strategic (Enterprise)

4.2.3 - Fault Tolerant

4.2.4 - LPD/LPI Comms

4.2.5 - Quality of Service

4.2.6 - Multiple, redundant comm paths

4.2.7 - Mobile/Expeditionary

4.2.8 - Scalable

4.2.9 - Trusted

4.2.10 – Highly available

4.2.11 - Standards based protocol

4.2.12 - Next generation internet like

4.2.13 – Adaptable to C2 needs

4.2.14 – Self organizing

4.2.15 – Self healing

4.2.16 – Common geo/temporal reference

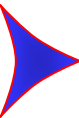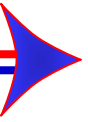### 4.3 Adaptive / Automated decision aids and human centric engineering

4.3.1 – Information Management

4.3.1.1 - Data mining

4.3.1.2 - Filtering

4.3.1.3 - Association

4.3.1.4 - Analysis

4.3.1.5 - Alert

4.3.1.6 - Prediction

4.3.1.7 - Decision support

4.3.1.8 – Assimilation

4.3.1.9 – Fusion

4.3.1.10 - Trust/Pedigree

4.3.2 - Common, intuitive user interface

4.3.3 - Common, intuitive info representation

4.3.4 - Real time processing

4.3.5 - Reach back

4.3.6 - Semantic data markup

4.3.7 – Agent based computing

4.4 Distributed, collaborative C2 and human centric engineering

4.4.1 - Distributed commanders

4.4.2 - Well understood ROE

4.4.3 - Well understood commanders intent

4.4.4 - Situation specific training

4.4.4.1 - Adversary's Region

4.4.4.2 - Adversary's Culture

4.4.5 - Robust team rehearsal

4.4.6 - Collaborative planning (Naval, Joint, Coalition)

4.4.7 - Access to information (Naval, Joint, Coalition)

4.4.7.1 - Based on need vice comms/computers

4.4.8 - Reduce reaction time

4.4.9 - Cognition
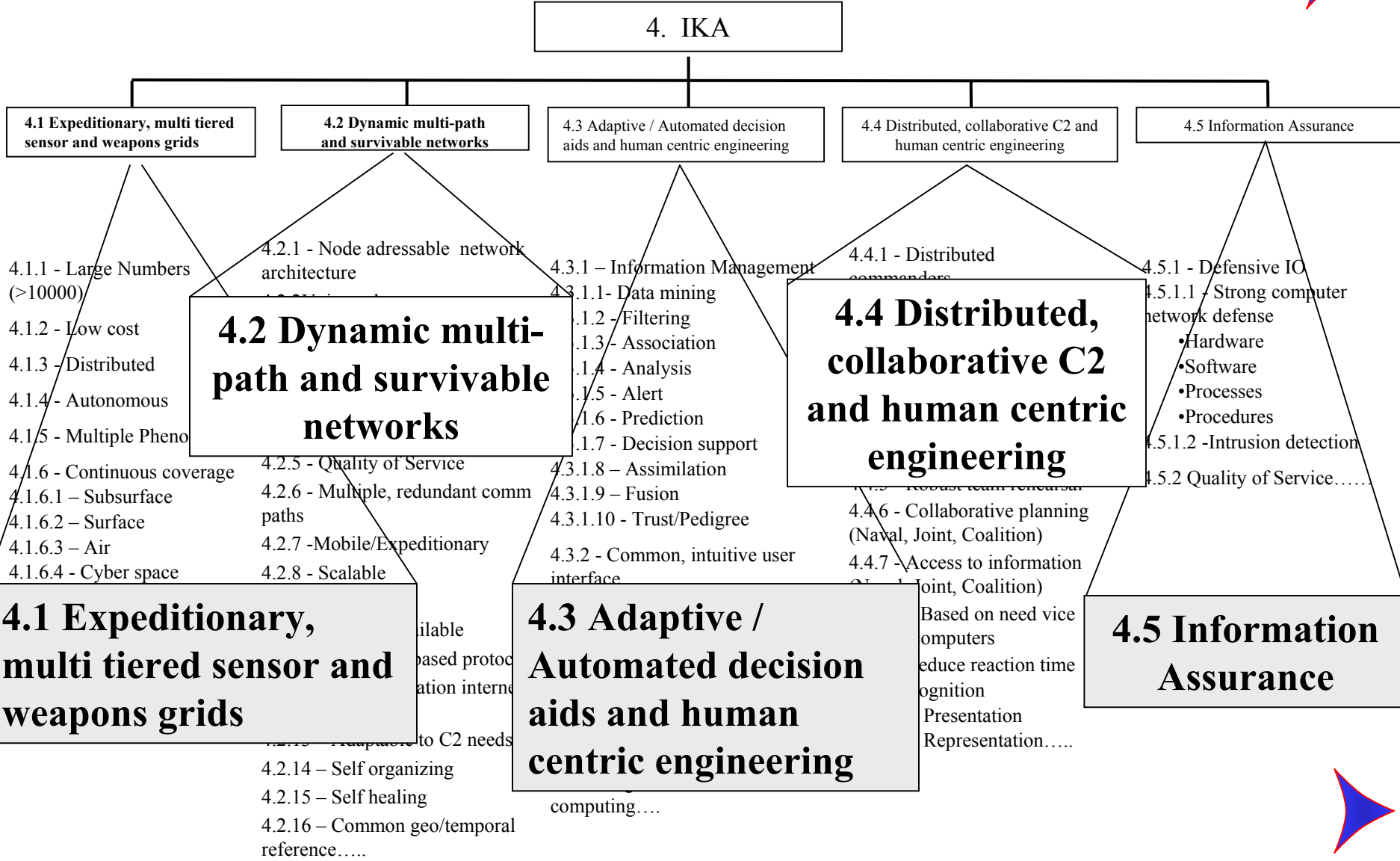
4.4.9.1 – Presentation

4.4.9.2 – Representation

4.5 Information Assurance

4.5.1 - Defensive IO

4.5.1.1 - Strong computer network defense
- Hardware
- Software
- Processes
- Procedures

4.5.1.2 - Intrusion detection

4.5.2 Quality of Service

IKA Tied to FORCEnet Capabilities

4. IKA

4.1 Expeditionary, multi tiered sensor and weapons grids

4.2 Dynamic multi-path and survivable networks

4.3 Adaptive / Automated decision aids and human centric engineering

4.4 Distributed, collaborative C2 and human centric engineering

4.5 Information Assurance

4.1.1 - Large Numbers (>10000)

4.1.2 - Low cost

4.1.3 - Distributed

4.1.4 - Autonomous

4.1.5 - Multiple Pheno

4.1.6 - Continuous coverage
4.1.6.1 – Subsurface
4.1.6.2 – Surface
4.1.6.3 – Air
4.1.6.4 - Cyber space

4.2.1 - Node adressable network architecture

4.2.5 - Quality of Service
4.2.6 - Multiple, redundant comm paths
4.2.7 -Mobile/Expeditionary
4.2.8 - Scalable

4.2.13 – Adaptable to C2 needs
4.2.14 – Self organizing
4.2.15 – Self healing
4.2.16 – Common geo/temporal reference…..

4.3.1 – Information Management
4.3.1.1- Data mining
4.3.1.2 - Filtering
4.3.1.3 - Association
4.3.1.4 - Analysis
4.3.1.5 - Alert
4.3.1.6 - Prediction
4.3.1.7 - Decision support
4.3.1.8 – Assimilation
4.3.1.9 – Fusion
4.3.1.10 - Trust/Pedigree

4.3.2 - Common, intuitive user interface

computing….

4.4.1 - Distributed commanders

4.4.5 - Robust team rehearsal
4.4.6 - Collaborative planning (Naval, Joint, Coalition)
4.4.7 - Access to information (Naval, Joint, Coalition)
Based on need vice computers
Reduce reaction time
cognition
Presentation
Representation…..

4.5.1 - Defensive IO
4.5.1.1 - Strong computer network defense
•Hardware
•Software
•Processes
•Procedures
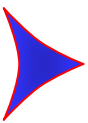4.5.1.2 -Intrusion detection

4.5.2 Quality of Service……

4.2 Dynamic multi-path and survivable networks

4.4 Distributed, collaborative C2 and human centric engineering

4.1 Expeditionary, multi tiered sensor and weapons grids

4.3 Adaptive / Automated decision aids and human centric engineering

4.5 Information Assurance

FORCEnet Capabilities Map

FORCENET

Provide expeditionary multi-tiered sensor and weapon information	Conduct distributed, collaborative command & control	Provide Dynamic, multi-path and survivable networks	Provide Adaptive / automated decision aids	Provide Human-centric integration	Provide Information Weapons

Provide expeditionary multi-tiered sensor and weapon information
- Collect, Process and Distribute Organic sensor and weapon Information
- Collect, Process and Distribute Non-organic Sensor Information

Conduct distributed, collaborative command & control
- Conduct Battle Management / C2 among Naval forces
- Conduct Battle Management / C2 with Joint forces
- Conduct Battle Management / C2 with Coalition forces
- Collect, Fuse and Disseminate Operational Intelligence
- Provide automated, timely access and exchange of data with joint and coalition forces
- Assess, characterize and disseminate environmental information
- Collaborate with civil / law enforcement agencies

Provide Dynamic, multi-path and survivable networks
- Manage information transfer among Naval forces
- Manage information transfer with national networks
- Manage information transfer with Joint forces
- Manage information transfer with coalition forces
- Protect friendly information networks

Provide Adaptive / automated decision aids
- Conduct operational and tactical Planning
- Conduct netted, prognostic logistics
- Organize, synchronize and integrate fires and maneuver to enable massed effects
- Dynamically allocate and control sensors and sensor platforms

Provide Human-centric integration
- Provide Real-time adaptable Man-machine Systems
- Provide Multi-linear Cognitive processing warriors
- Protect Friendly Information Outside the Network

Provide Information Weapons
- Deny, Degrade and Disrupt Adversary Information
- Influence Adversary Perception

- **Connect sensors, networks, weapons, decision aids and warriors from seabed to space**

- **Accelerate speed and accuracy of decisions across spectrum of command**

FORCEnet is the architecture of warriors, weapons, sensors, networks, decision aids and supporting systems integrated into a highly adaptive, human-centric, comprehensive maritime system that operates from seabed to space, from sea to land. By exploiting existing and emerging technologies, FORCEnet enables dispersed, human, decision-makers to leverage military capabilities to achieve dominance across the entire mission landscape with joint, allied and coalition partners. FORCEnet is the future implementation of Network Centric Warfare in the Naval Services.

As an adaptable, naval mission-tailorable system that delivers timely information to decision makers in any environment, FORCEnet will provide the means for an exponential increase in naval combat power. It will be built to conform to joint architectural frameworks, linking current and future sensors, command and control elements and weapons systems in a robust, secure, and scalable way. Information will be converted to actionable knowledge and disseminated to a dispersed naval combat force, enabling the rapid concentration of the full power of the Sea Strike, Sea Shield and Sea Basing concepts with far less concentration of forces.

Hon. Gordon England, SECNAV, ADM Vern Clark, CNO, GEN James Jones, CMC, *Naval Transformation Roadmap*, 26 JUL 2002

FORCEnet: Enabling 21st Century Warfare

FORCEnet is the "glue" that binds together Sea Strike, Sea Shield, and Sea Basing. It is the operational construct and architectural framework for naval warfare in the information age, integrating warriors, sensors, command and control, platforms, and weapons into a networked, distributed combat force.

FORCEnet will provide the architecture to increase substantially combat capabilities through aligned and integrated systems, functions, and missions. It will transform situational awareness, accelerate speed of decision, and allow us to greatly distribute combat power. FORCEnet will harness information for knowledge-based combat operations and increase force survivability. It will also provide real-time enhanced collaborative planning among joint and coalition partners.

Using a total system approach, FORCEnet will shape the development of integrated capabilities. These include maritime information processing and command and control components that are fully interoperable with joint systems; intelligence, surveillance, and reconnaissance fusion capabilities to support rapid targeting and maneuver; open systems architecture for broad and affordable interoperability; and safeguards to ensure networks are reliable and survivable. FORCEnet also emphasizes the human factor in the development of advanced technologies. This philosophy acknowledges that the warrior is a premier element of all operational systems.

Today, FORCEnet is moving from concept to reality. Initial efforts will focus on integrating existing networks, sensors, and command and control systems. In the years ahead, it will enable the naval service to employ a fully netted force, engage with distributed combat power, and command with increased awareness and speed as an integral part of the joint team.

ADM Vern Clark, CNO, From "Sea Power 21: Projecting Decisive Joint Capabilities", *Proceedings*, October 2002.
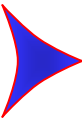
FORCEnet is...

"...*the operational construct and architectural framework for* Naval Warfare in the Information Age which integrates Warriors, Sensors, Networks, Command & Control, Platforms, and Weapons into *a networked, distributed combat force, scalable across the spectrum of conflict* from seabed to space, from sea to land."

from Strategic Studies Group XXI

FORCEnet

Netting the FORCE for transformational combat capability
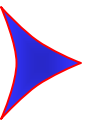
- CFFC Sea Trial Leadership Objectives
  - Provide a Framework for the Navy's Transformation Efforts
  - Integrate Concepts and Technology Development
  - Accelerate Delivery of Enhanced Warfighting Capabilities

- CFFC Sea Trial Guidance
  - Join known technologies with desired initiatives (OPNAV Level)
  - Develop fully executable BG size experiments (CFFC / NWDC)
  - Execute experiments within the constraints of a deployment (Numbered Fleets / BGs)
  - Provide Warfighter's assessment of experiment results
  - Integrate assessments and provide a consolidated list of initiatives

Source: DCINC Transformational Process brief to Sea Trial Kick-Off Conference, Sep 2002