

An Introduction to Network Centric Operations

**Presentation to
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Bottom Line Up Front

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- **Transformation**
 - A process for continuous change
- **Network Centric Warfare (NCW)**
 - An Emerging Military Response to the Information Age
 - Maturing capabilities demonstrated during OEF/OIF
- **NCW Implementation**
 - Not just about technology
 - Involves all lines of development

Key Elements of Presentation

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- *Why: Global Trends create New Strategic Context*
- *What #1: Transformation*
- *What #2: Network Centric Warfare*
 - *Tenets of NCW*
 - *Evidence of Combat Power*
- *How # 1: A Perspective on NCW Implementation*

This is your course

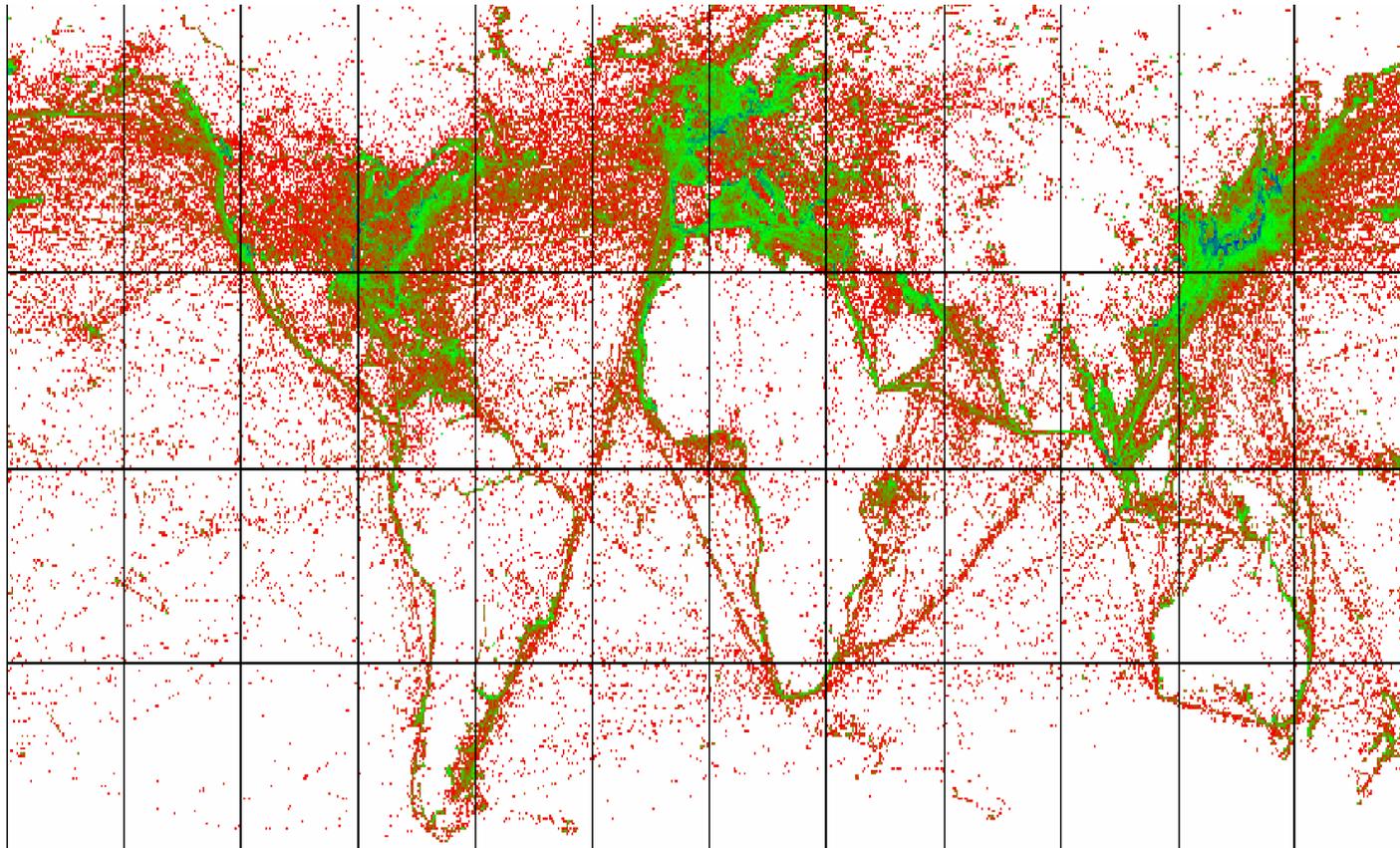
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- Facilitated Discussions
- Collaboration highly encouraged
- How can the lessons learned apply to your organization?
- What is the “story” you want to tell when you return to your office?

Global Trends

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Globalization II → **Globalization III**



Industrial Age → **Information Age**

Global Trend # 1

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Globalization II



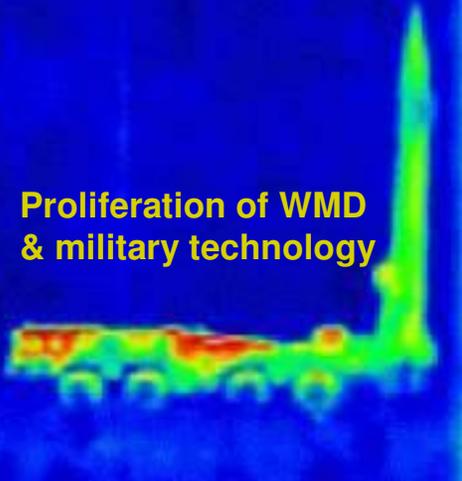
Globalization III

- **Beliefs in Conflict: Political Ideology**
- Static, bipolar “market”
- Bulk of population in 3rd World
- Limits on security “exports”
- Ordering principle = Great Power War; yet none since 1945

- **Beliefs in Conflict: Religion/culture**
- Also bifurcated, but very fluid
- 4 Billion in Core, 2 Billion in Gap
- “Unlimited” global demand for security exports
- Warfare now simultaneous across system, state and individual levels

- *New Rules*
- *New Institutions*
- *New Security Environment*
- *Disconnectedness*  *Danger*

Proliferation of WMD
& military technology



Global Trend # 2

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Industrial Age

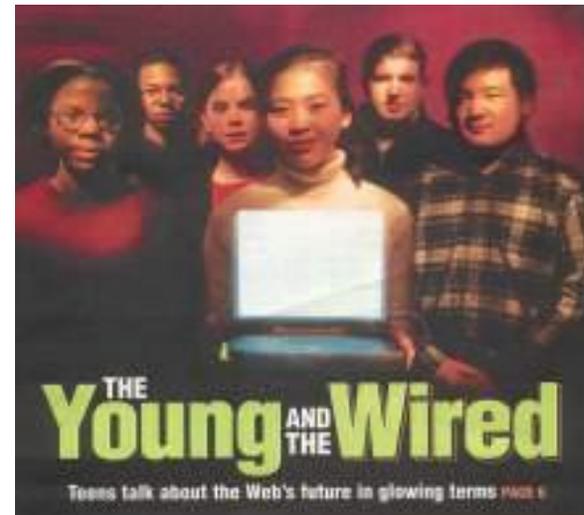
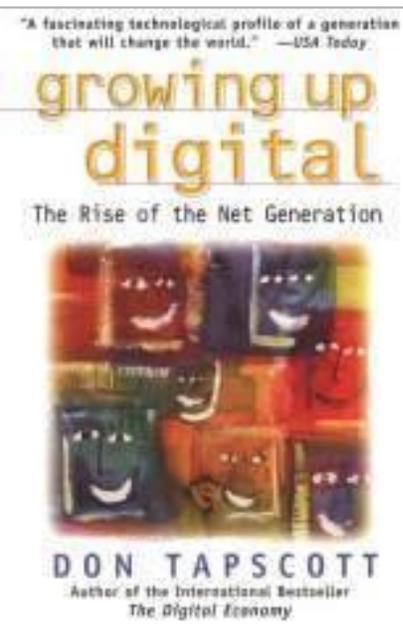
- Success = Scale + Scope
- Top Down - Centralized
- Vertical Integration
- Information Hoarding
- Local Awareness
- Arms Length Relationships
- Make and Sell
- Inwardly Focused



Information Age

- Success = Adaptability + Agility
- Empowering the “Edges”
- Virtual Integration
- Information Sharing
- Increased Transparency
- Collaboration & Synchronization
- Sense and Respond
- Externally Oriented
- Accelerated Innovation & Experimentation

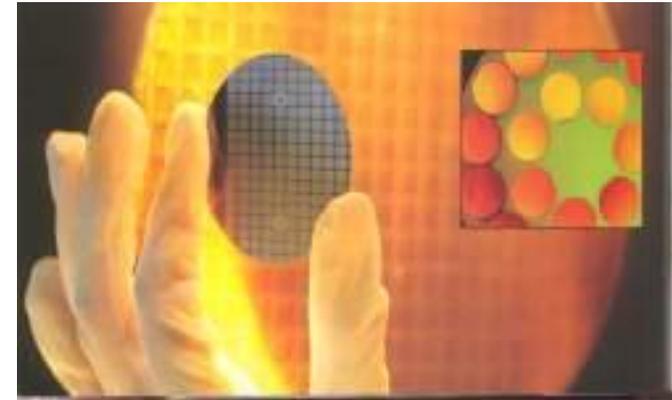
- *New Rules*
- *New Behaviors*
- *New Competencies*
- *New Relationships*



Global Trends:

...New Competitive Landscape

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Information Age

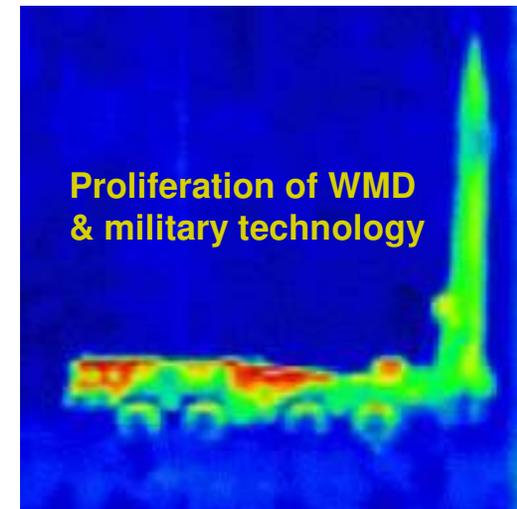
- **New Technological Context**

- Access to highly capable, low-cost IT
- Falling barriers to competitive entry -- sea, space, cyberspace

Globalization III

- **Broadened Threat Context**

- Era of uncertainty with rapidly evolving threats
- State/non-state, nodal/non-nodal
- Asymmetric / conventional
- Unrestricted – deterring the un-deterable



Global Trends:

...Create a New Strategic Context

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Information Age

- **New Strategic Context:**

- *Information Age principles & phenomena changing character of competition*
- *Era of globalization – a changed international landscape*
- *New relationship between operations abroad and homeland security*

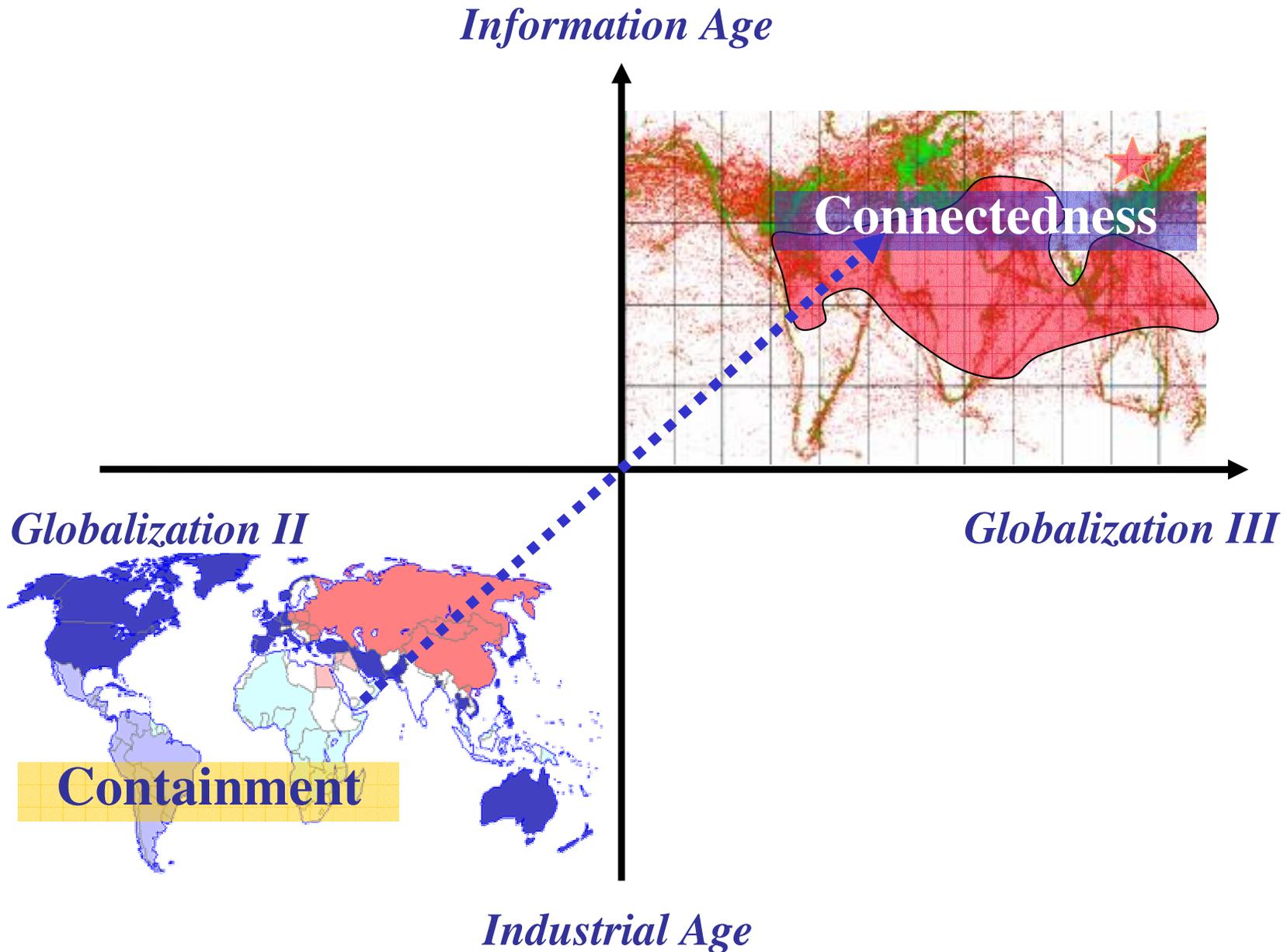
Globalization III

*To the degree we do not transform,
we are strategically a fixed-target and therefore at risk*

Transformation

...Meeting the Challenges of the New Competitive Landscape

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Transformation

...A U.S DoD Perspective

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- ⌋ **Continuing process**
- ⌋ **Creating/anticipating the future**
- ⌋ **Co-evolution of concepts, processes, organizations and technology**
- ⌋ **New competitive areas / competencies; revalued attributes**
- ⌋ **Fundamental shifts in underlying principles**
- ⌋ **New sources of power**
- ⌋ **Broadened capabilities base**

- *New technology context*
- *Broadened threat context*
- *New strategic context*

A Broad and Sustained Competitive Advantage

Transformation

...An International Perspective

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- For many military officers, it is a heart-breaking process to leave behind something that used to be important, used to make *them* important. In some cases, it implied changing their own *established world view*.
- But like it or not, *relevance* must overrule sentimentality. We have to focus on new capabilities, and to try to forget about yesterday's force structures

Minister Kristin Krohn Devold

Minister of Defense Norway at SACLANT Open Road '03

Capabilities of a Transformed Joint Force

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How The Future Joint Force Will Operate:

Although specific operations along the range of military operations may require other capabilities, the joint force will generally organize, plan, prepare, and execute using the following common core capabilities.

1. Achieve common understanding of all dimensions of the battlespace throughout the joint force
2. Make joint decisions and take actions throughout the joint force faster than the opponent
3. Adapt in scope, scale, and method as the situation requires
4. Rapidly deploy selected portions of the joint force who can immediately transition to execution, even in the absence of developed infrastructure
5. Create and sustain continuous pressure throughout the battlespace for as little or as long as it takes to accomplish strategic or operational aims
6. Disintegrate, disorient, dislocate, or destroy any opponent with a combination of lethal and non-lethal means
7. Conduct deployment and sustainment activities in support of multiple simultaneous, distributed, decentralized battles and campaigns
8. Accomplish all of the above in an interagency and multinational context

Source: Joint Operations Concepts (JOpsC)

Attributes of a Transformed Joint Force

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- **Fully Integrated:**
 - All DoD component capabilities are born joint and are able to integrate into a focused effort with a unified purpose
- **Networked:**
 - Linked and synchronized in time and purpose—allowing dispersed forces to communicate, maneuver, and share a common operating picture
- **Adaptable:**
 - Forces that are tailorable and scalable, prepared to quickly respond to any contingency
- **Expeditionary:**
 - Rapidly deployable, employable, and sustainable—regardless of anti-access, or area denial environments
- **Decision Superior:**
 - Gain and maintain information superiority to shape the situation or react to changes
- **Decentralized**
 - Uses collaborative planning and shared knowledge to empower subordinate commanders to compress decision cycles
- **Lethal**
 - Capability to destroy an adversary and/or his systems in all conditions and environments

Source: Joint Operations Concepts (JOpsC)

Information Age Transformation: Network Centric Warfare

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Translates an **Information Advantage** into a decisive **Warfighting Advantage**

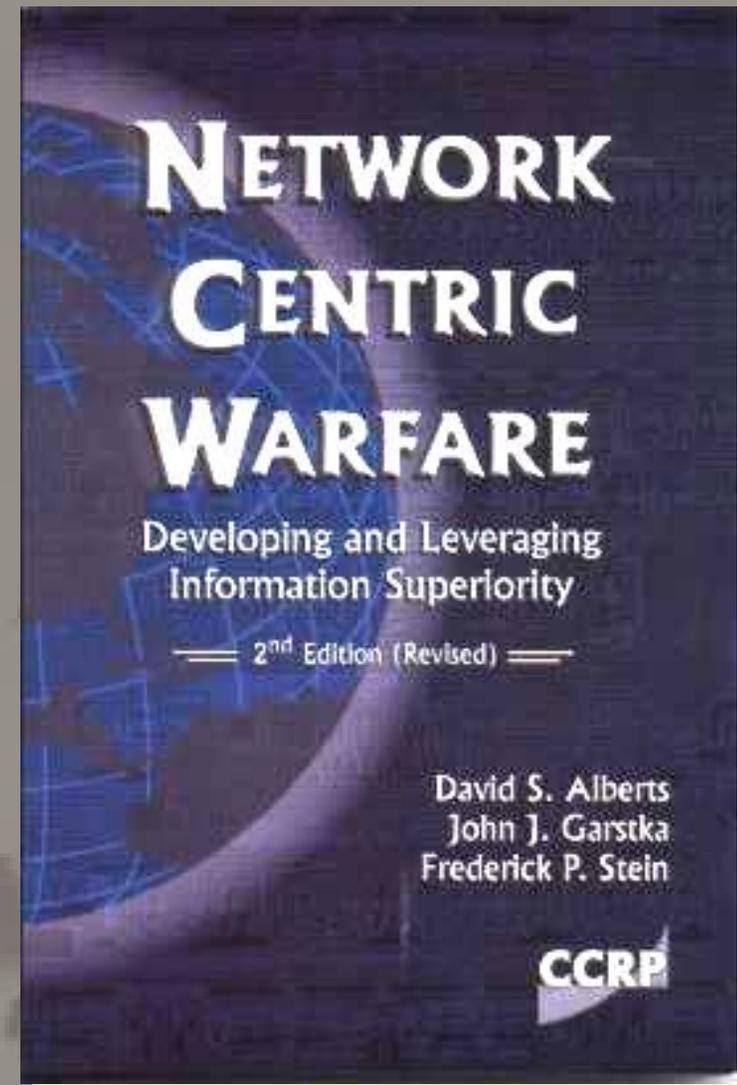
Information Advantage - enabled by the robust networking of **well informed** geographically dispersed forces

Characterized by:

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

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

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

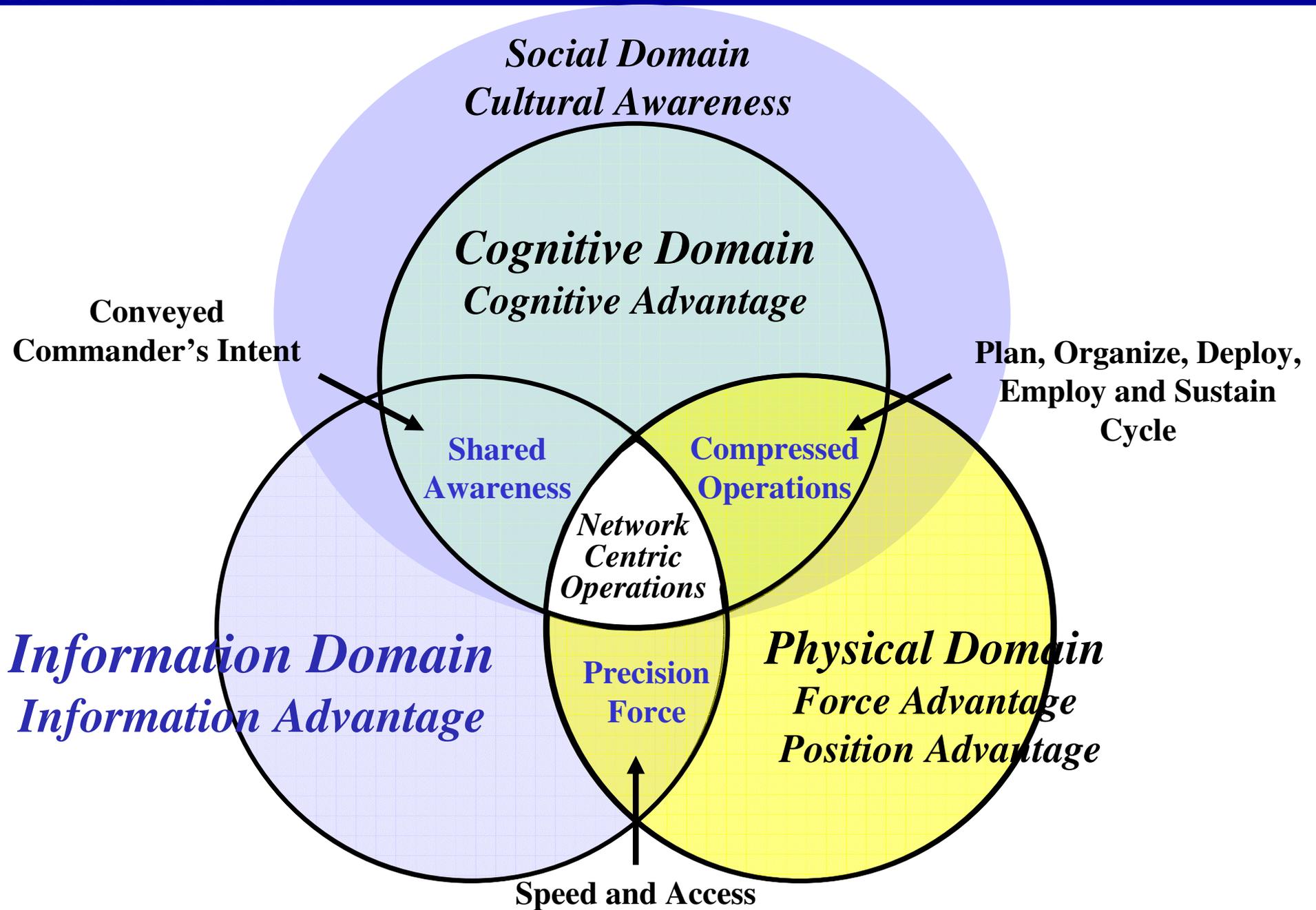


Exploits Order of Magnitude Improvement in Information Sharing

Information-Age Warfare

... Domains of conflict

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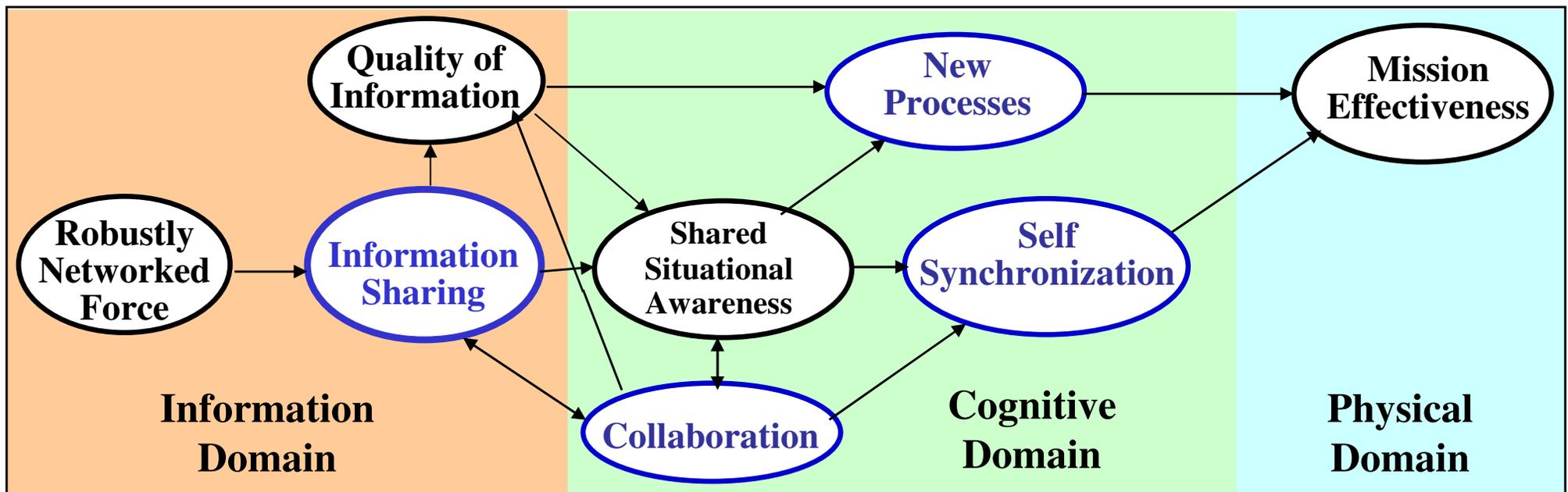


Tenets of Network-Centric Operations

...The new value chain

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- A robustly networked force improves information sharing
- Information sharing and collaboration enhances the quality of information and shared situational awareness
- Shared situational awareness enables collaboration and self synchronization, and enhances sustainability and speed of command
- These in turn dramatically increase mission effectiveness



Bottom Line

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“Networked Forces Outfight Non-Networked Forces”

“...it allowed us to make decisions and execute those decisions faster than any opponent.”

*Lt. Gen. David D. McKiernan
Combined Forces Land Component
Commander, OIF*

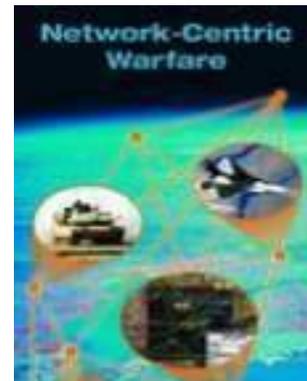
Implementing NCW

...A Perspective on Strategy

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- Get the Theory Right
- Apply the Theory Enterprise Wide
- Accelerate Networking of the Joint Force
- Accelerate Deployment of Network-Centric Systems, Concepts, and Capabilities
- Address Challenges of Allied & Coalition NCO
- Experiment with Network-Centric Concepts and Capabilities
- Develop Mature TTP for NCO
 - Service/Combined/Joint/Allied and Coalition

Focus Areas for Current OFT Initiatives

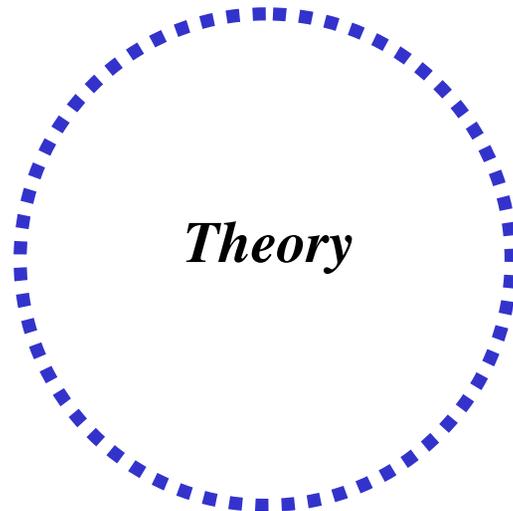
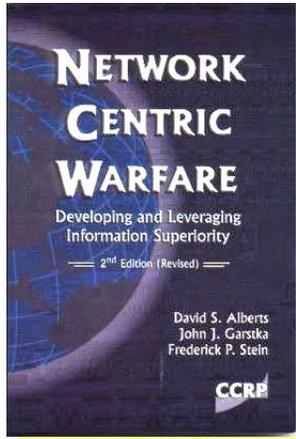


Getting the Theory Right

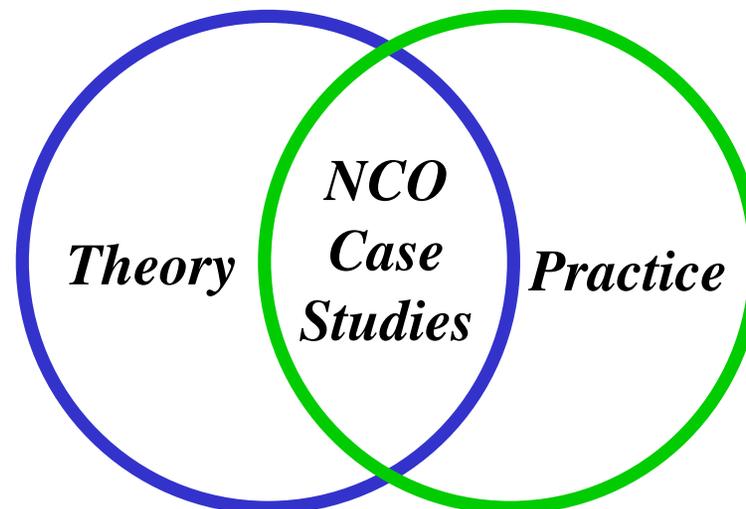
...Role of NCO Case Studies

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1999



2004



Network Centric Operations Demonstrated Across Range of Mission Capabilities

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<p style="text-align: center;">Maneuver</p> <ul style="list-style-type: none">• Ground Maneuver<ul style="list-style-type: none">- US/UK Coalition Ops (OIF)- Stryker Brigade (JRTC)	<p style="text-align: center;">Command & Control</p> <ul style="list-style-type: none">• ACE Mobile Force Land• CTF-50 (OEF)• V Corps/3ID (OIF)
<p style="text-align: center;">Protect</p> <ul style="list-style-type: none">• Air-to-Air (JTIDS Operational Special Project)	<p style="text-align: center;">Battlespace Awareness/ISR</p> <ul style="list-style-type: none">• Navy Special Warfare (OEF/OIF)• Cooperative Engagement Capability
<p style="text-align: center;">Fires</p> <ul style="list-style-type: none">• Air-to-Ground (CAS) (OEF/OIF/DCX-1)	<p style="text-align: center;">Peace Keeping & Enforcement</p> <ul style="list-style-type: none">• Task Force Fox (NATO Operation Amber Fox)

Warfighting Advantage: Evidence form High Intensity Conflict

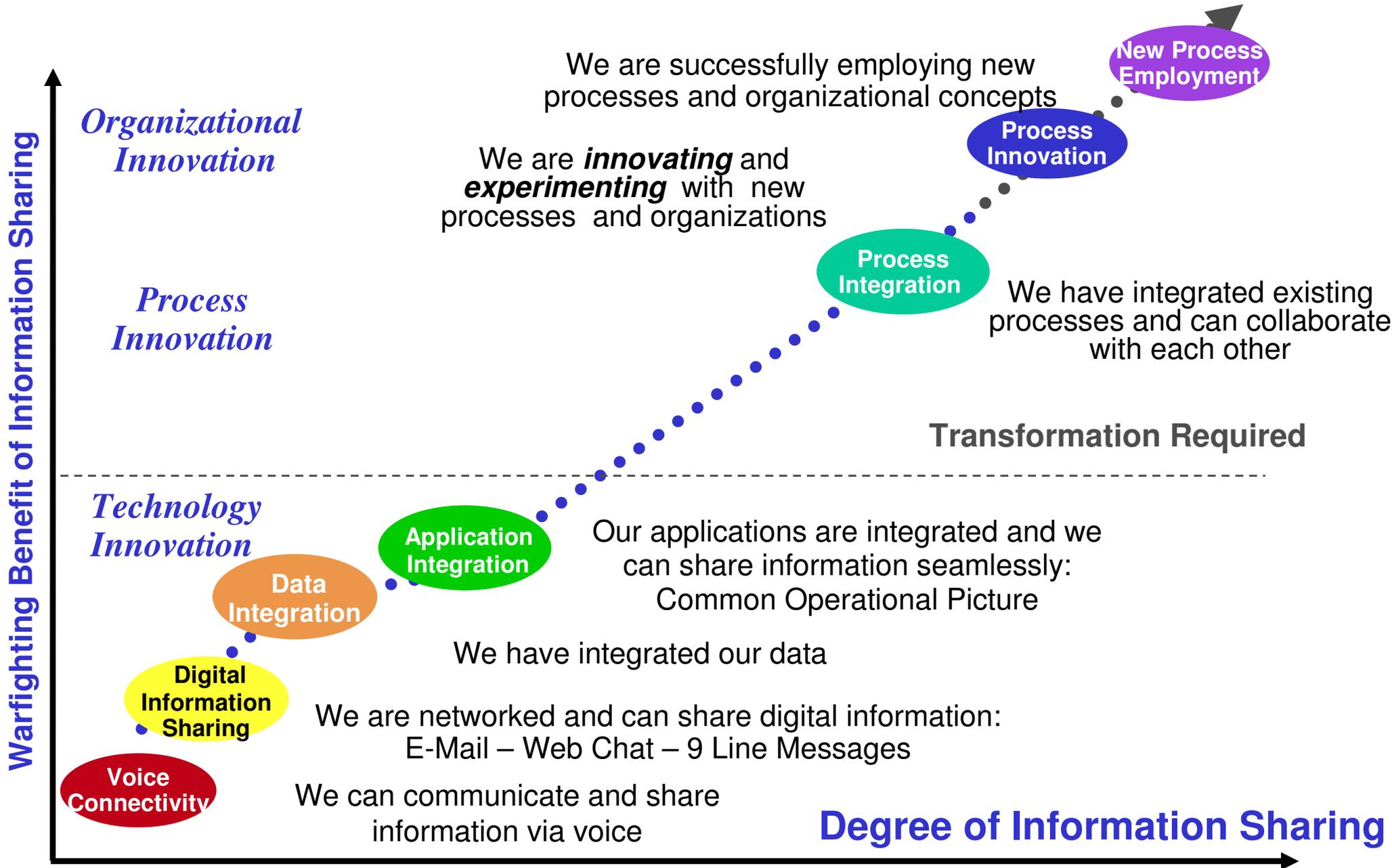
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- **Precision Engagement – Networked Air and Ground Forces**
 - Networked Air and Ground Forces decisively defeat OPFOR at night (USA Division Capstone Exercise - Phase I, Apr 2001)
 - Networked Air and Ground Forces decisively prosecute counter TBM mission (*Operation Iraqi Freedom – Western Iraq*)
- **Full Dimensional Protection - Counter Air**
 - USAF found F-15Cs, working with data links (shared awareness), increased kill ratio by over 100% -- 2.6:1 for both Day & Night Ops (JTIDS Operational Special Project - Mid 1990's)
- **Dominant Maneuver**
 - Networked coalition forces demonstrate unprecedented operational agility and speed of maneuver in defeating opposition forces (*Operation Iraqi Freedom*)
 - Networked Stryker Brigade decisively engages OPFOR at JRTC -- 10 fold reduction in loss/exchange ratio form 10/1 to 1/1 (2003-2004)

Implementing Network Enabled Capabilities

...Trajectory of Innovation and Experimentation

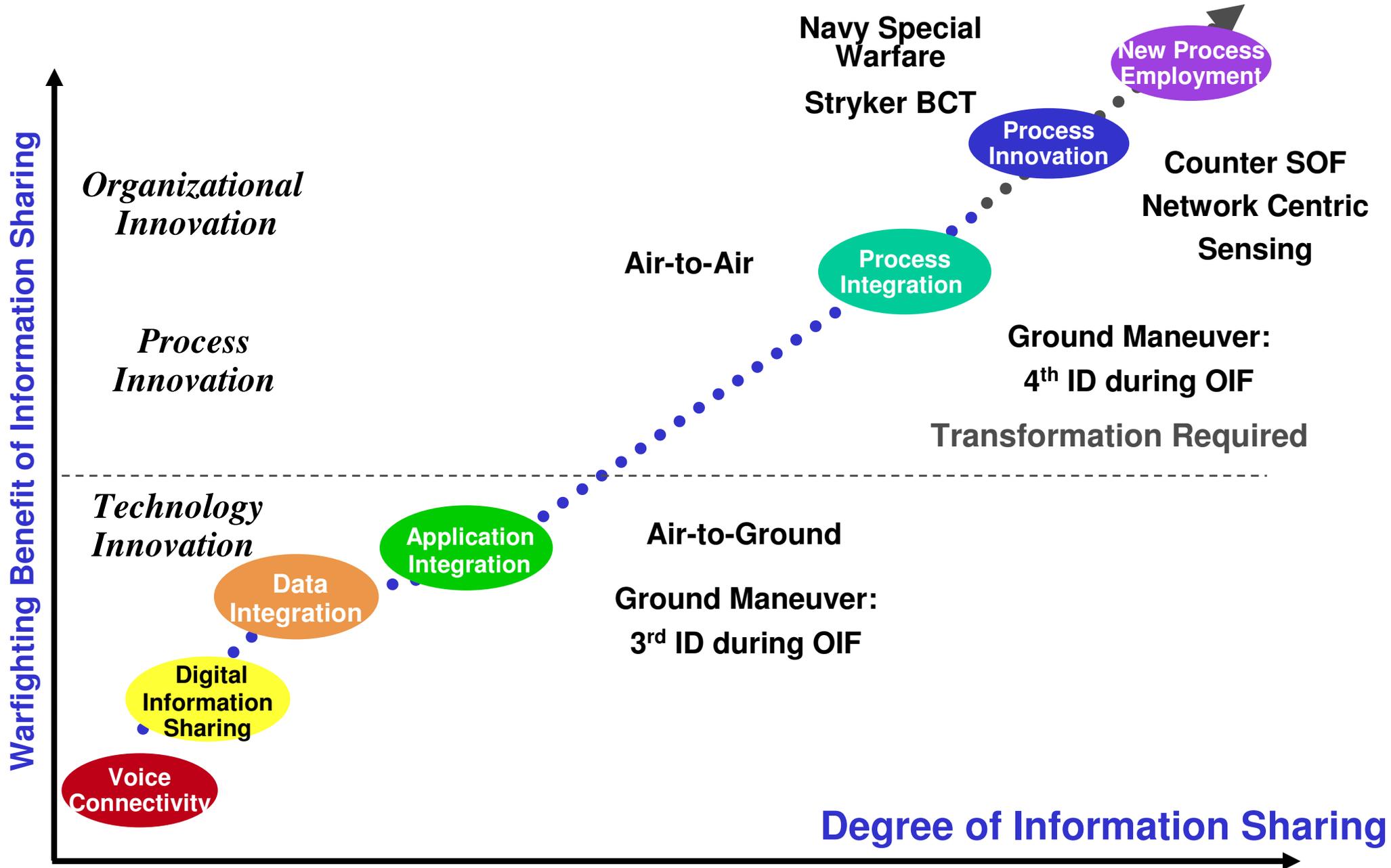
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Implementing Network Enabled Capabilities

...Trajectory of Innovation and Experimentation in U.S. DoD

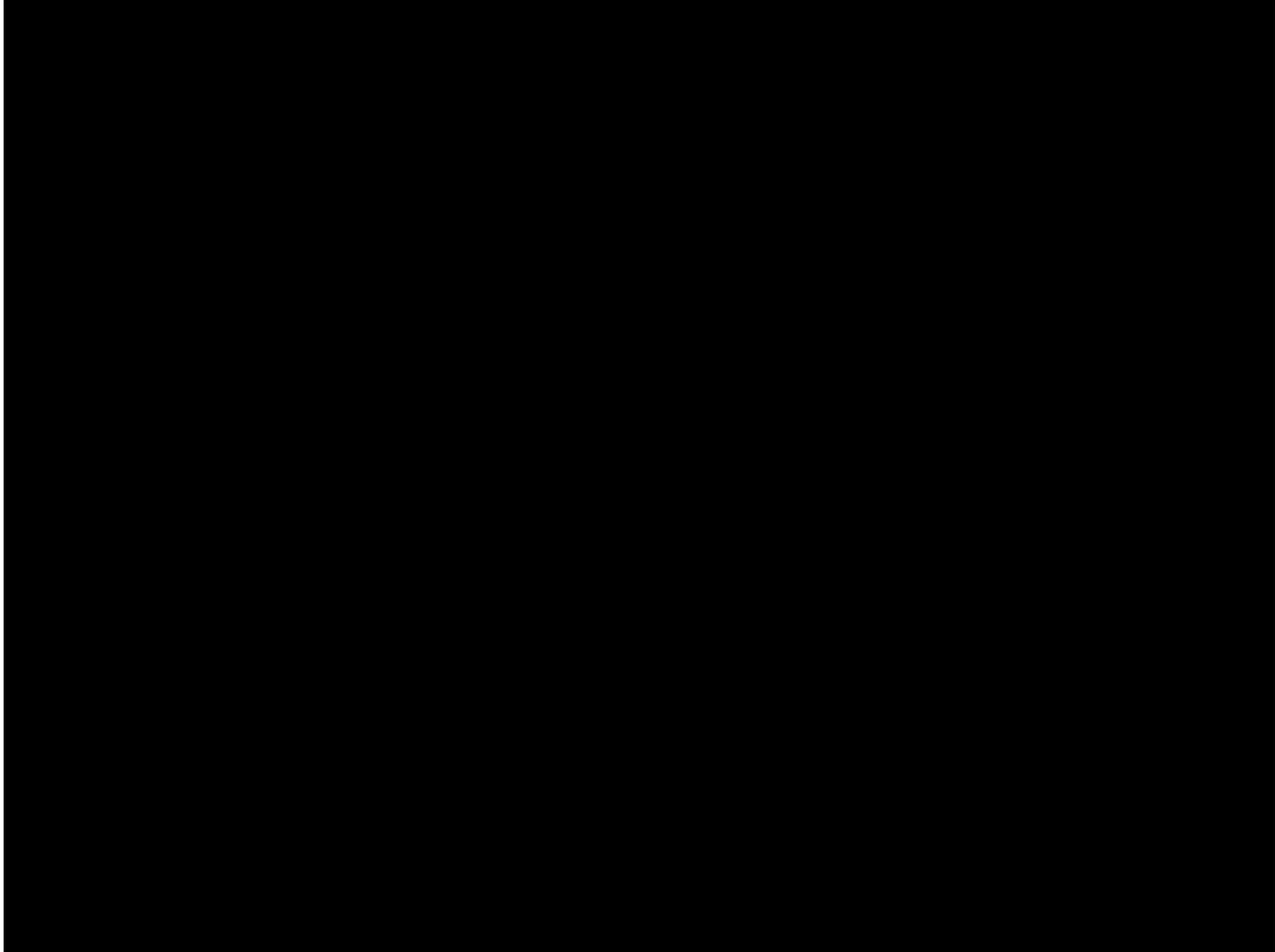
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Shared Situational Awareness

...A new competitive advantage

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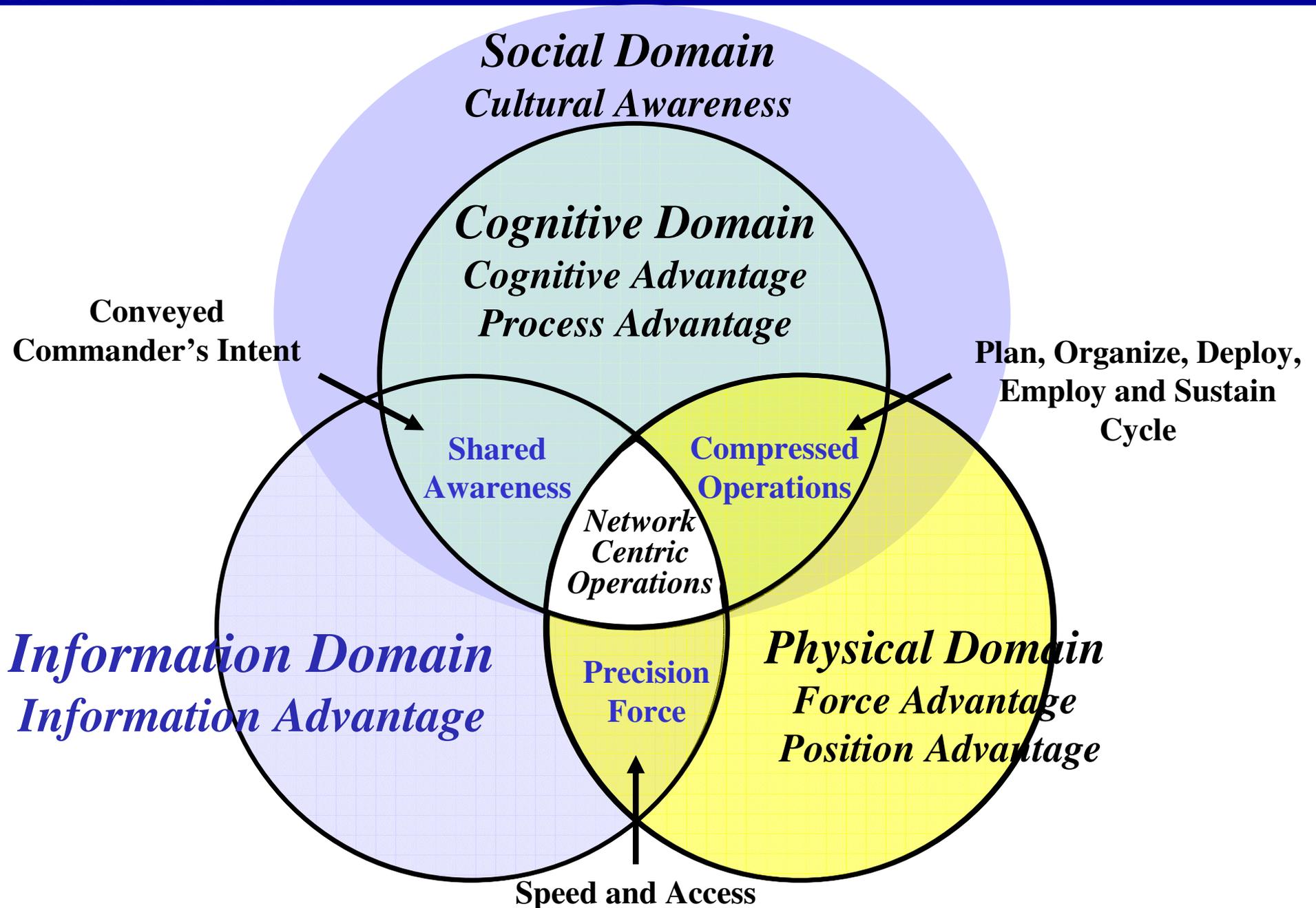


Source: New York Times Television – The Perfect War, 2004

Competing in the Information-Age

...the power of Network-Centric Operations

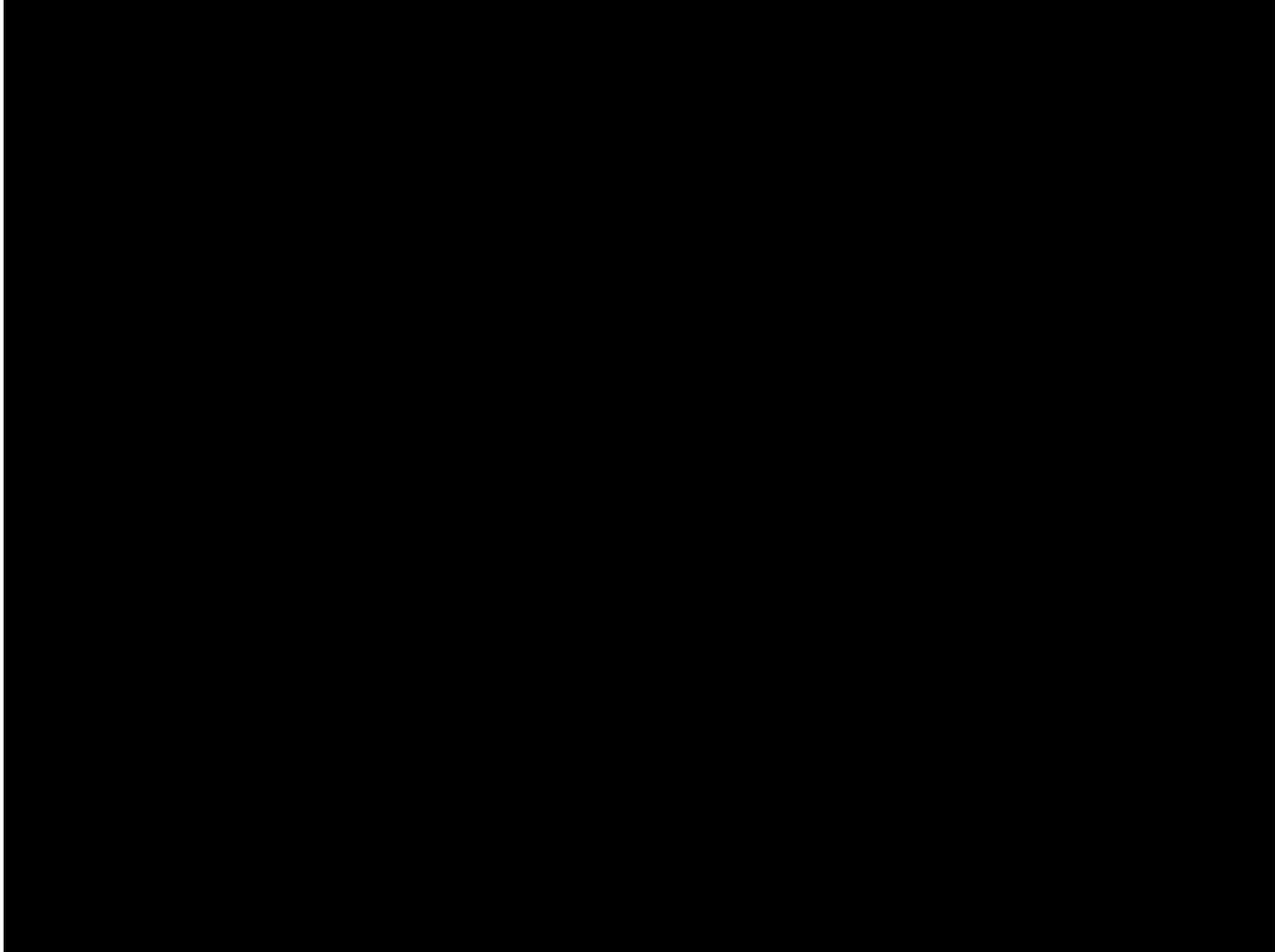
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Shared Awareness

...in the cognitive and social domains

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

NCO Conceptual Framework

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A Robustly Networked Force Enables...

*Robust
Physical and
Information
Networks*

Better Quality Networking and Information Sharing

Which can lead to ...

Improved Situation Awareness/Understanding

Enhanced Collaboration/Interactions

More Agile Command and Control

*Robust Social
Networks
(People,
Organizations
and Processes)*

Which can contribute to...

More Agile Force Elements/MCPs

Which ultimately leads to ...

Dramatically Improved Effectiveness



Physical Domain



Information Domain

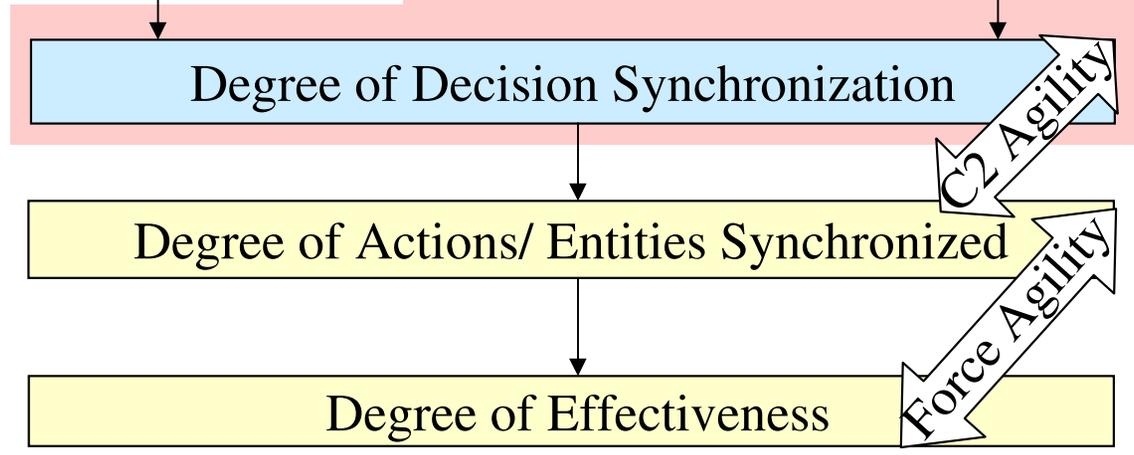
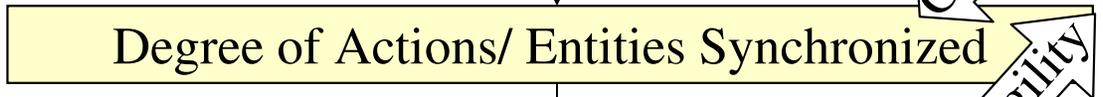
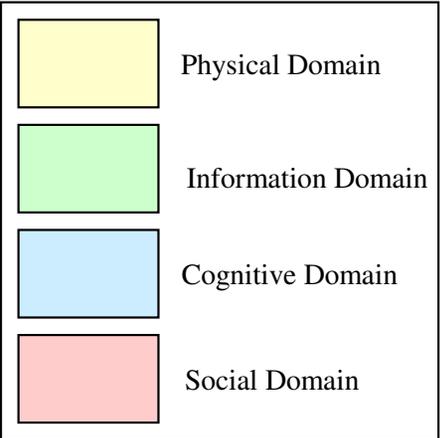
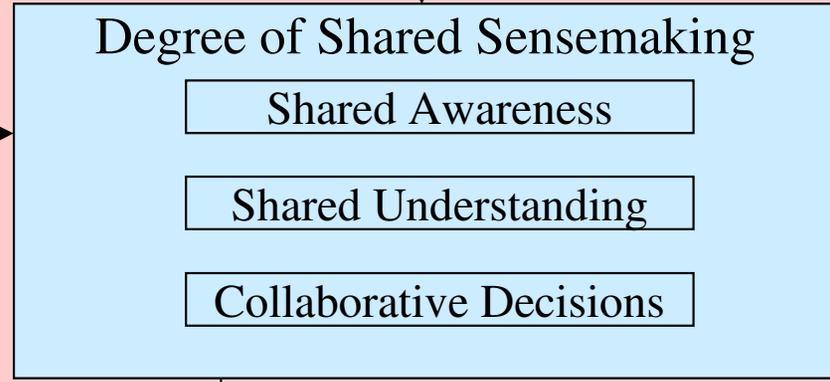
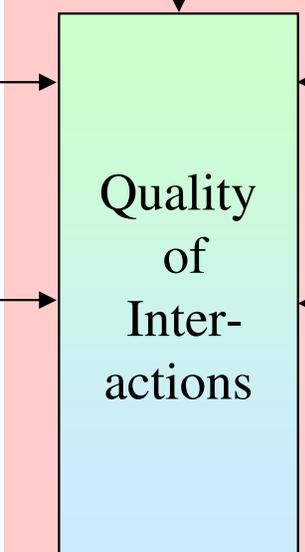
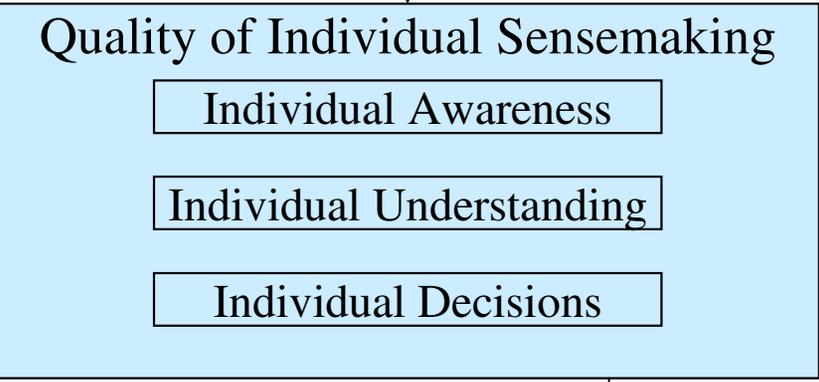
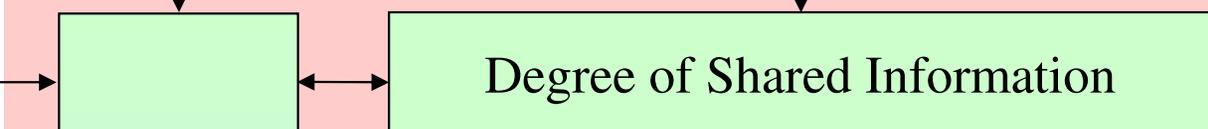
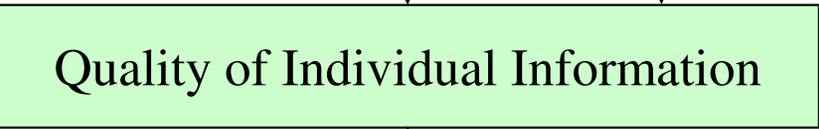
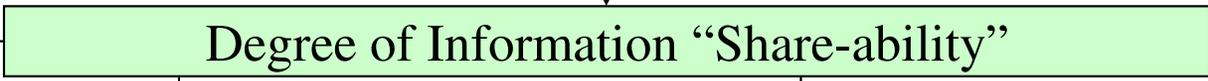
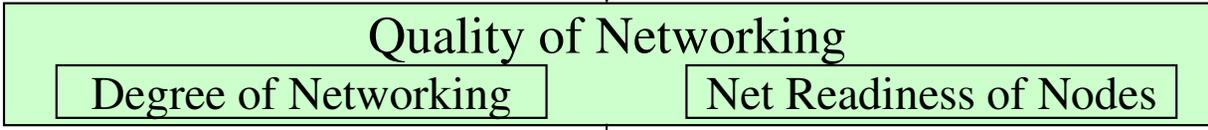
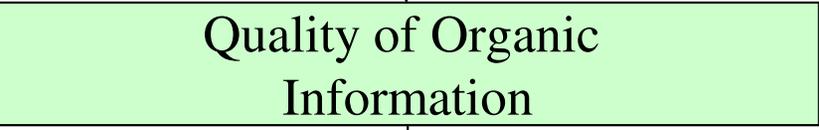


Cognitive Domain



Social Domain

NCO Conceptual Framework



Stryker Brigade

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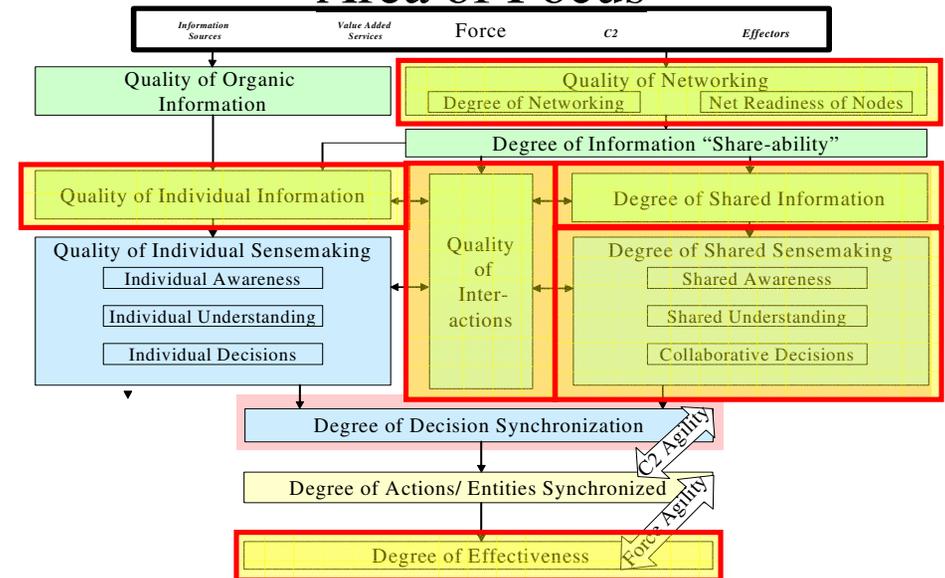
Scenario

- SBCT attack on Shughart-Gordon
- Certification Exercise (CERTEX) at Joint Readiness Training Center, May 2003

Hypotheses

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

Area of Focus



Findings

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

Stryker Brigade

Multinational Operations

Combined Task Force - 50

Area of Focus

Air to Ground Operations

Navy Special Warfare Group One (NSWG1) in OEF and OIF

Joint US/ UK Combat Operations in Operation Iraqi Freedom

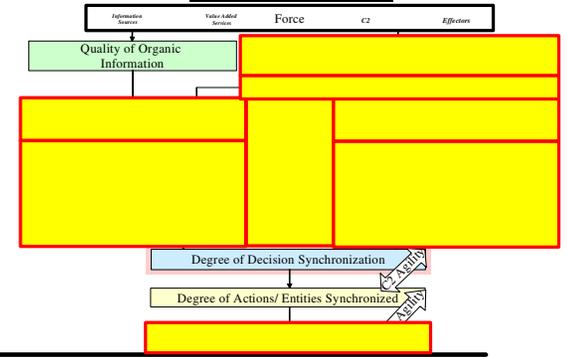
Scenario

- US/UK Combat Operations in OIF involving: CENTCOM, UKNCC, LCC, ACC, MCC, UK 1 Arm DIV (3 Bde, 7 Bde, 16 Bde), US1 MEF (15 MEU)
- Initial advance into Iraq during opening days of Operation Iraqi Freedom

Hypotheses

- During Operation TELIC/IRAQI FREEDOM, the direct accessibility to FBCB2/BFT by UK and US units provided:
 - Improved individual sense-making
 - Enhanced the quality of interactions
 - Improved shared sense-making
 - Increased mission effectiveness
- ... relative to previous operations and training without FBCB2/BFT.

Area of Focus



Findings

- FBCB2/BFT provided nearly 60% of US forces tactical SA compared to 10% in UK
- Enabled US forces to do “command on the move” unprecedented speed of maneuver
- The UK forces did not exploit the capabilities of BFT: gap in deployment, training, leadership plus optempo was not a driver
- The US forces attributed significantly higher confidence to FBCB2/BFT-provided information than their UK equivalents

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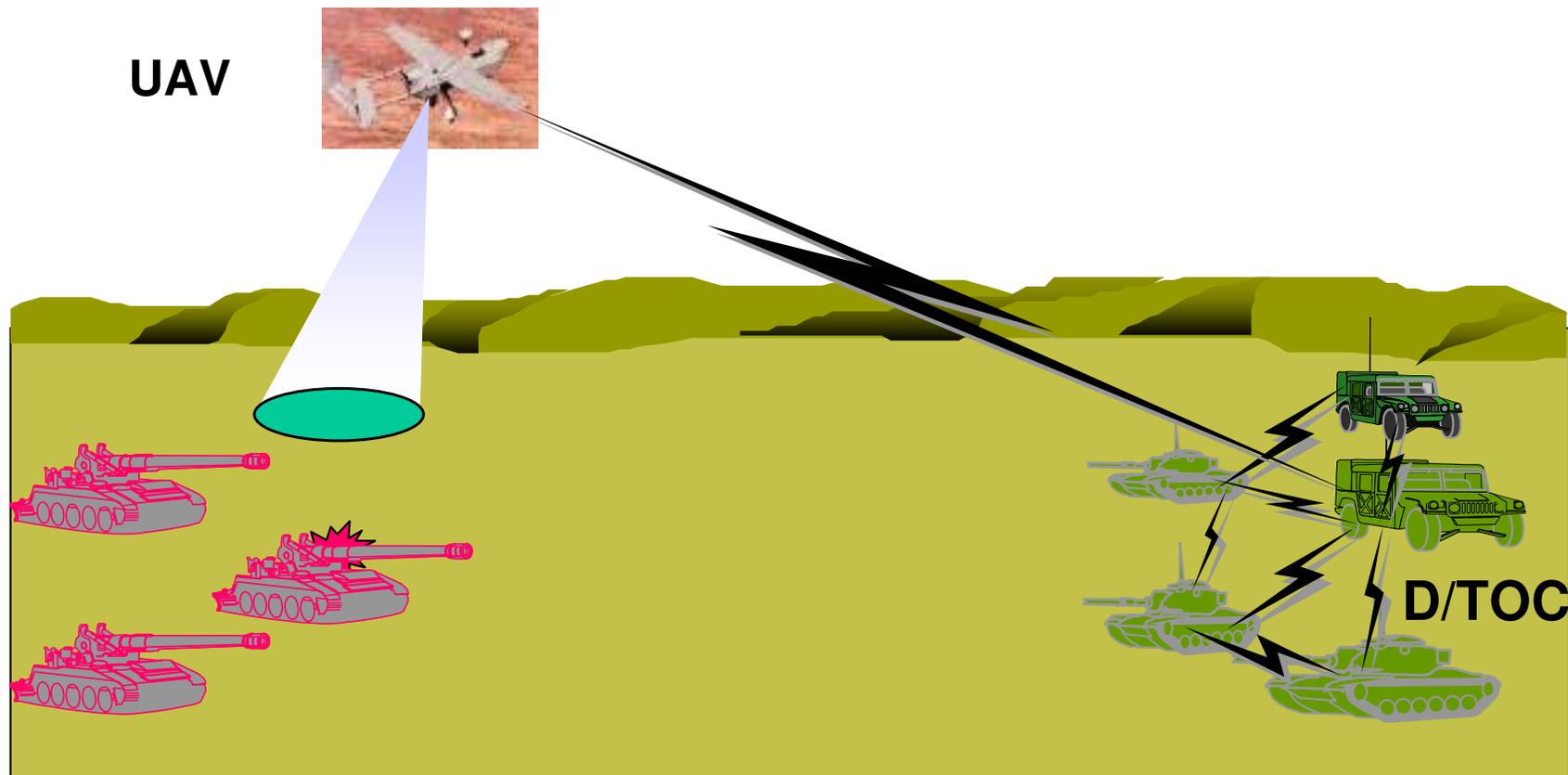
Scenario
 • NSWG1 mission s
 application of new
 A3, WEBBE, GBS
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Digital Close Air Support: Fighting First for Information Advantage

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• Tactical Situation:

- Blue Force in defensive posture
- OPFOR moving to contact under cover of darkness
- Armored column detected by JSTARS and UAV at approximately 10 mile range from Blue Force and positively identified as hostile OPFOR
- Blue Force tracking information confirms that no Blue Force ground forces are in close proximity to OPFOR
- Fire mission assigned to Close Air Support (CAS)

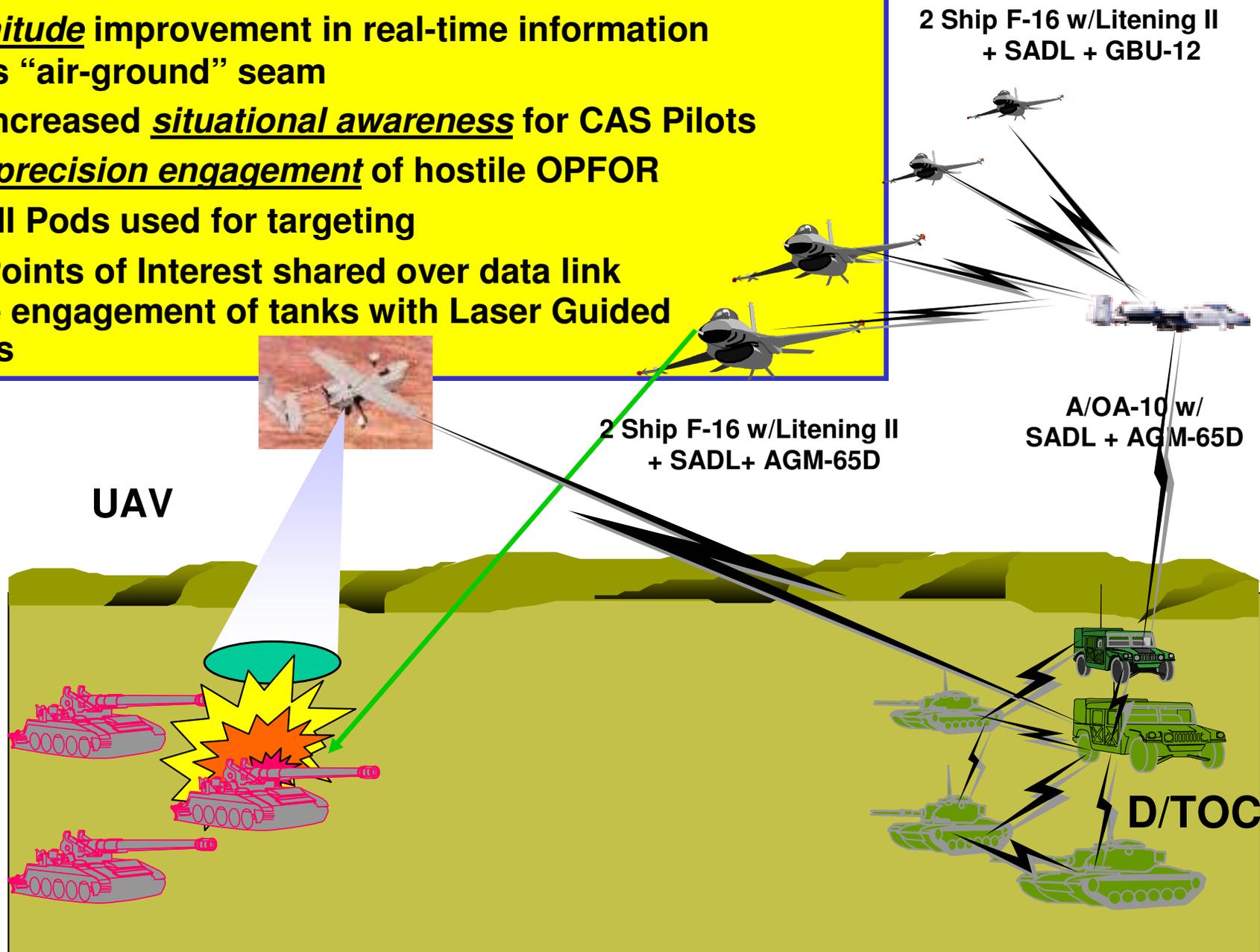


Source: US Army
Division Capstone
Exercise- Phase I
(March April 2001)

Digital Close Air Support: Network Enabled Engagement

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- Order of magnitude improvement in real-time information sharing across “air-ground” seam
- Dramatically increased situational awareness for CAS Pilots
- Collaborative precision engagement of hostile OPFOR
 - Litening II Pods used for targeting
 - Sensor Points of Interest shared over data link
 - Selective engagement of tanks with Laser Guided Munitions



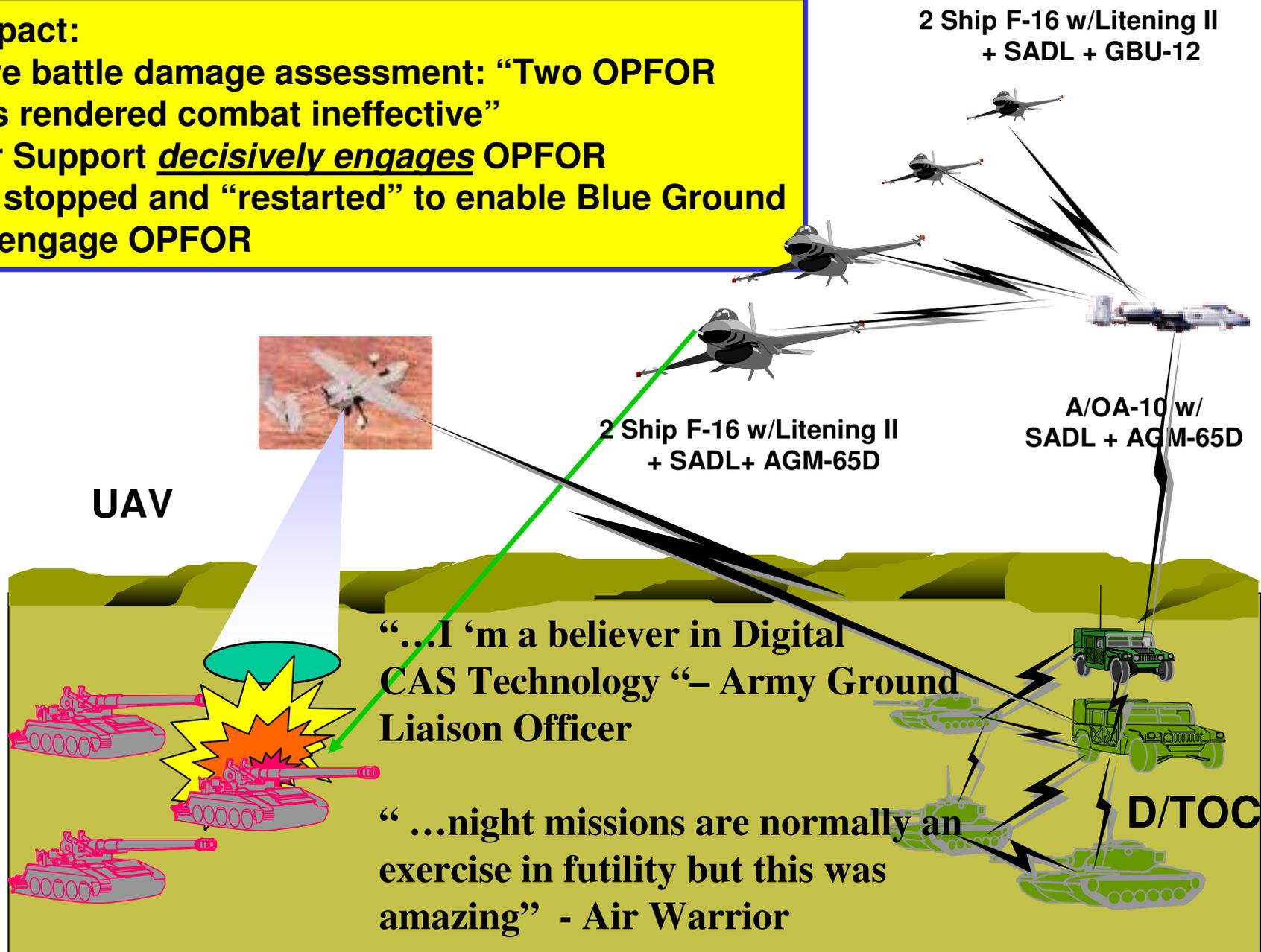
Source: US Army
Division Capstone
Exercise- Phase I
(March April 2001)

Digital Close Air Support: Decisive Defeat of OPFOR

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• Warfighting Impact:

- First wave battle damage assessment: “Two OPFOR Battalions rendered combat ineffective”
- Close Air Support *decisively engages* OPFOR
- Exercise stopped and “restarted” to enable Blue Ground Force to engage OPFOR



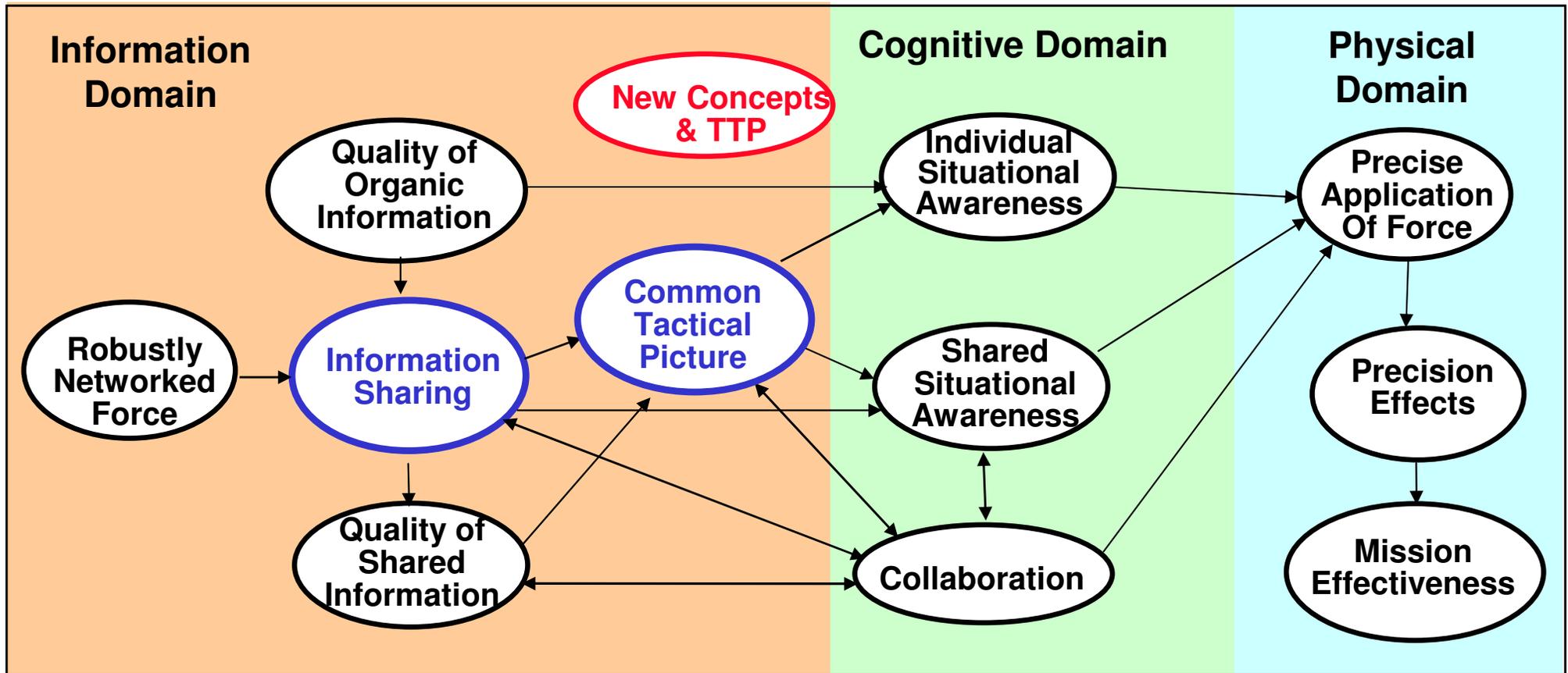
Air-to-Ground Mission: Key NCW Relationships

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Networked Force

- Air: SADL
- Ground: EPLRS

Output Measure:
Decisive Defeat
Of OPFOR



Quality of Information

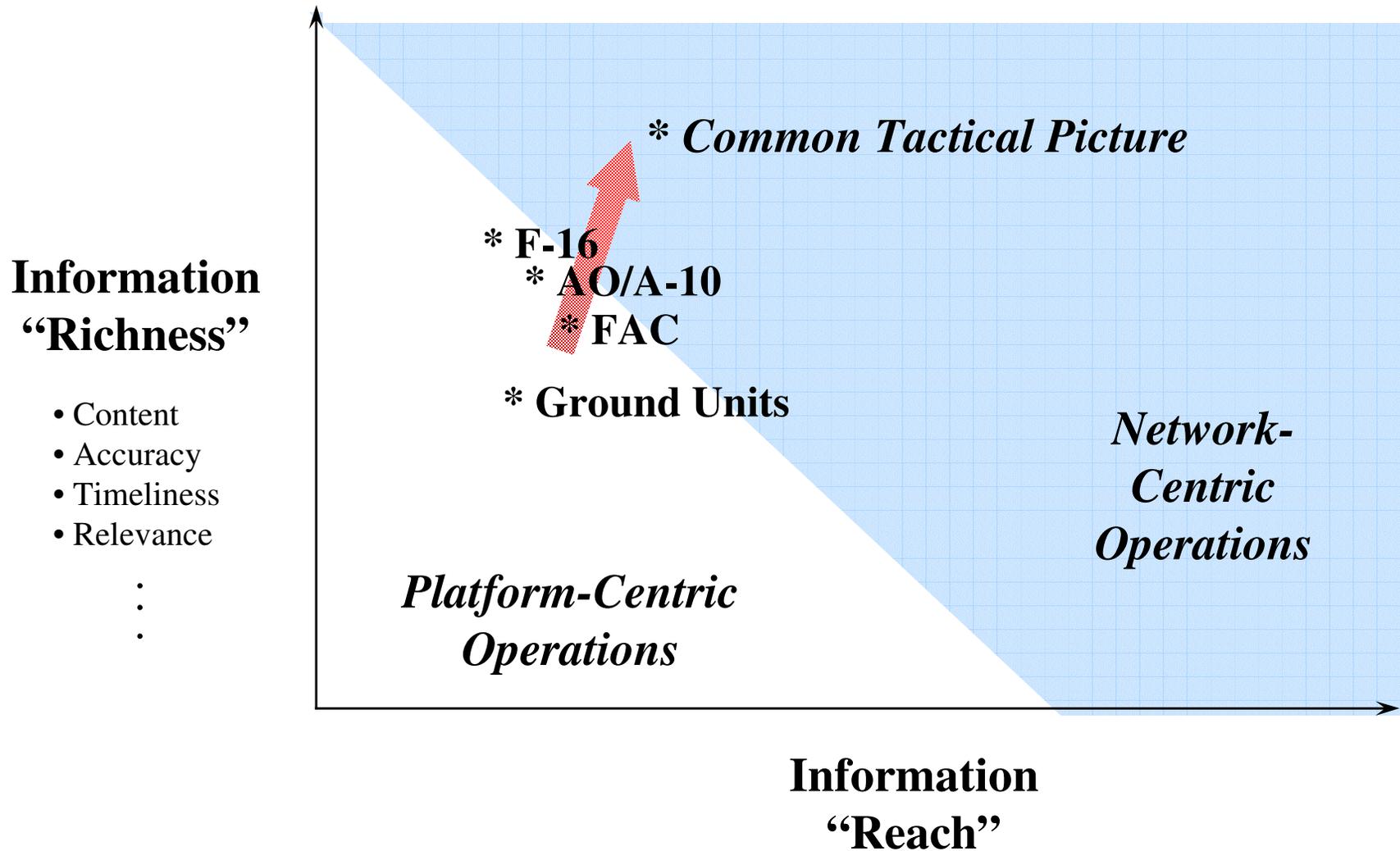
- Precision Navigation
- Litening II Pod

Information Sharing

- Blue Force Information: "Trace" of Blue Forces
- Red Force Information: "Sensor Points of Interest"

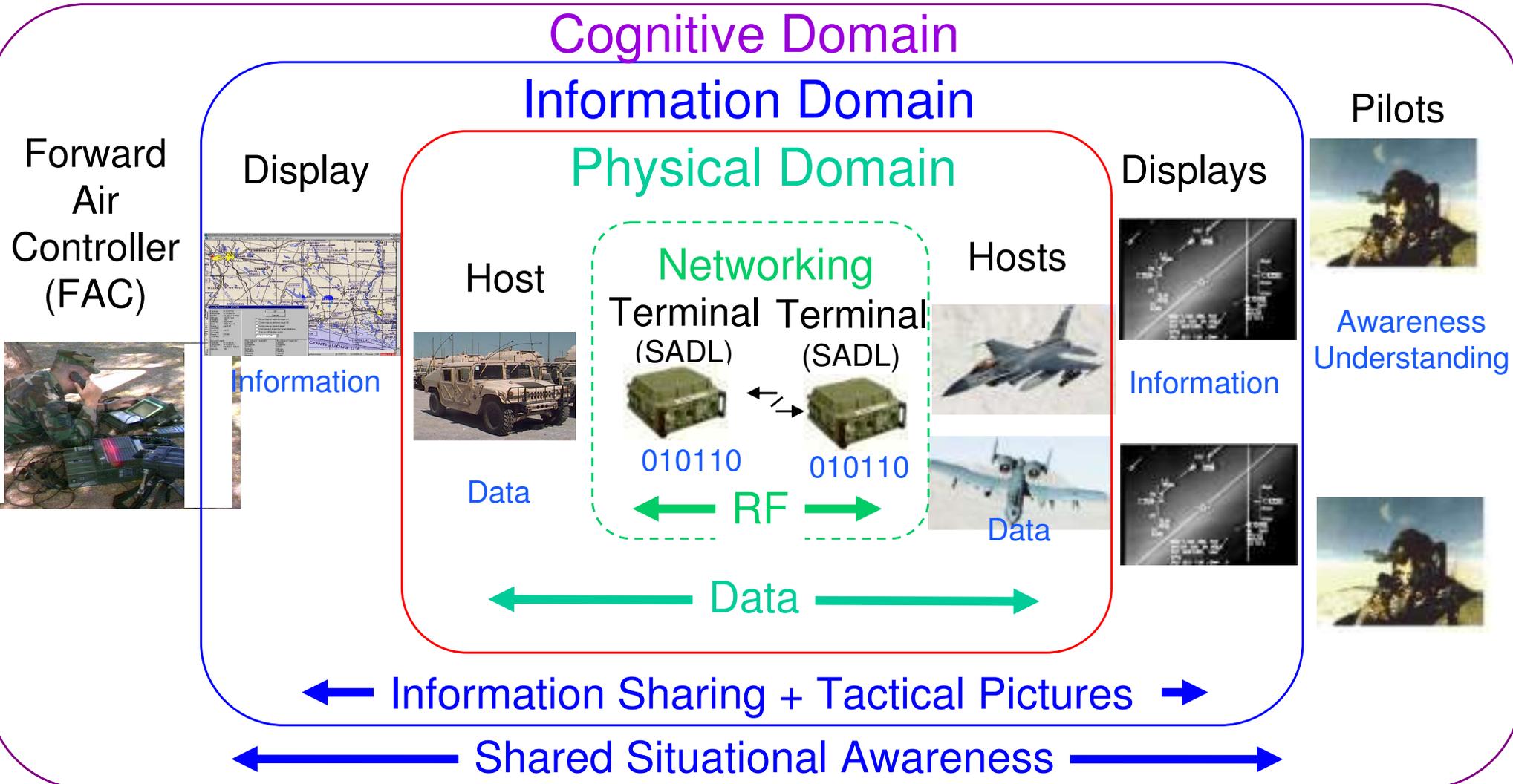
Air-to-Ground Mission: Networking of Air and Ground Forces enables Unprecedented Information Sharing

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Air-to-Ground: Key NCW Enablers

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Legend: █ Technical █ Procedural █ Operational

Air-to-Ground Mission: Information Sharing During DCX-I

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Aircraft Capabilities

<i>Video-Link</i>					
<i>SATCOM</i>					
<i>Link-16</i>					
<i>SADL</i>					
<i>Voice</i>					

Voice

*FBCB2
EPLRS*

SOF/BFT

*FBCB2/FBT
(L-Band SATCOM)*

Video-Link

Ground Force Capabilities

Air-to-Ground: Situational Awareness

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Air-to-Ground: FAC is Networked and Digitized

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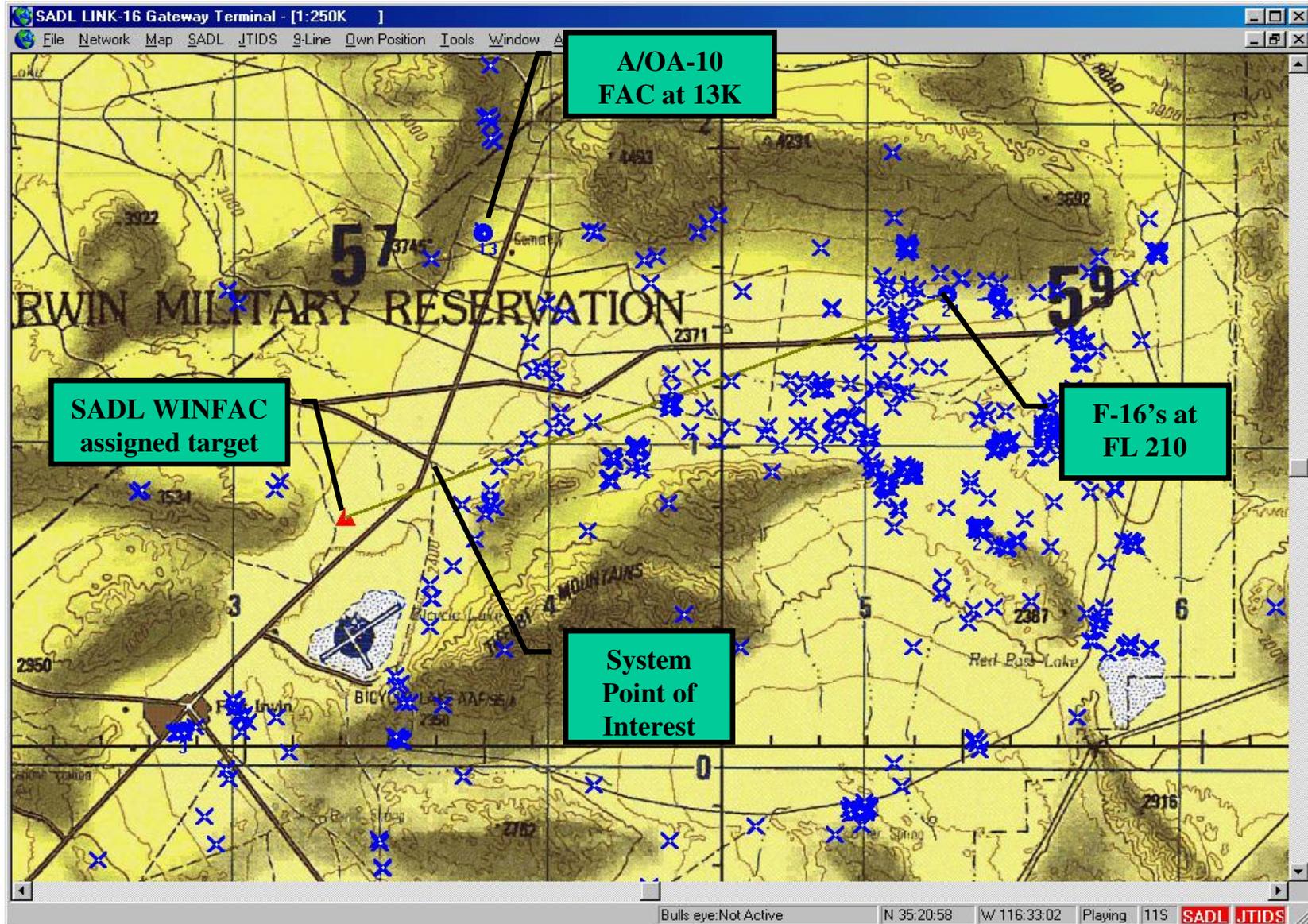
Ruggedized Laptop Creates
“Digital CAS” Tasking Messages

SADL Radio transmits “Digital CAS”
Messages To SADL-equipped Fighters

MK VII Laser
Range Finder

Air-to-Ground: “Tactical Picture” Enabled by Networking of Air and Ground Forces

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Air-to-Ground: What the Forward Air Controller Sees

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The screenshot shows a military flight simulator interface titled "SADL LINK-16 Gateway Terminal - [1:5M]". The main display is a map of Louisiana and Texas, showing various cities and airbases. A yellow area on the left represents a friendly ground target, and a blue area on the right represents friendly ground troops. A red box labeled "Fighter Data" is overlaid on the map, and a red box labeled "Fighters" is overlaid on a cluster of blue aircraft. A red box labeled "Friendly Ground Troops" is overlaid on a cluster of blue ground targets. The "Fighter Data" window is open, displaying the following information:

Friendly Aircraft 1:1 [SPAD]	
Latitude:	N 31:07:53
Longitude:	W 093:58:59
MGRS:	VQ 06274 44594
Altitude:	18225 Feet
Heading:	108°
Velocity:	452 Knots
Fuel:	9000 Pounds
Stores 1:	Aim-120
Quantity:	1
Stores 2:	Aim-9
Quantity:	1
Stores 3:	BOMB
Quantity:	0
Ground Target:	
Latitude:	N 30:45:56
Longitude:	W 093:07:12
MGRS:	VQ 88521 03639
Altitude:	100

The interface also includes a menu bar (File, Network, Map, SADL, JTIDS, 9-Line, Own Position, Tools, Window, About...), a status bar (Not Active, N 31:07:12, W 093:59:34, Paused, 14R, SADL JTIDS), and a toolbar with various icons.

Air-to-Ground: FAC to Fighter Information Sharing

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Ø This Is What the FAC Sees When He's Sending a Digital CAS Request
Ø Includes IP, Target, Threat, Egress, TOT, and Remarks

Ø What He Types Here Is Exactly

Initial Points	Targets	Threats
Select:	<input checked="" type="checkbox"/> Item 1	<input type="checkbox"/> Item 2
Latitude:	N 31:05:46	N 31:05:48
Longitude:	W 092:54:38	W 092:54:38
Altitude (ft):	300	0
Description:	None	None
Mark:	None	None
Situation:	None	None
Motion:	N	N

Standard 9 Line Text	Edited 9 Line Text	Copy Text
Target: TGT:NONE-NONE-N-NONE	MSG-1/AWQ 085 402	<input type="checkbox"/> OK
IP: IP:N-NONE-NONE	THT:SA-18S IN AREA	<input type="checkbox"/> Cancel
Threat: THT:NONE	TGT MORTARS UNK	<input type="checkbox"/>
Egress: EGR:IP-TOT:00:00-LOCL	IP:D	<input type="checkbox"/>
Remarks: 203 DEG FOR 13NM 2-NON	203 DEG FOR 13 NM 2-	<input type="checkbox"/>

Build 9 Line Brief

Egress: None IP

Time Over Target: 00:00 Locl

Remarks: 203 DEG FOR 13NM 12-NONE

Heading/Distance From IP to Target: 359 DEG FOR 10NM

Edit 9Line Text

Standard 9 Line Text Edited 9 Line Text Copy Text

Target: TGT:NONE-NONE-N-NONE MSG-1/AWQ 085 402

IP: IP:N-NONE-NONE THT:SA-18S IN AREA

Threat: THT:NONE TGT MORTARS UNK

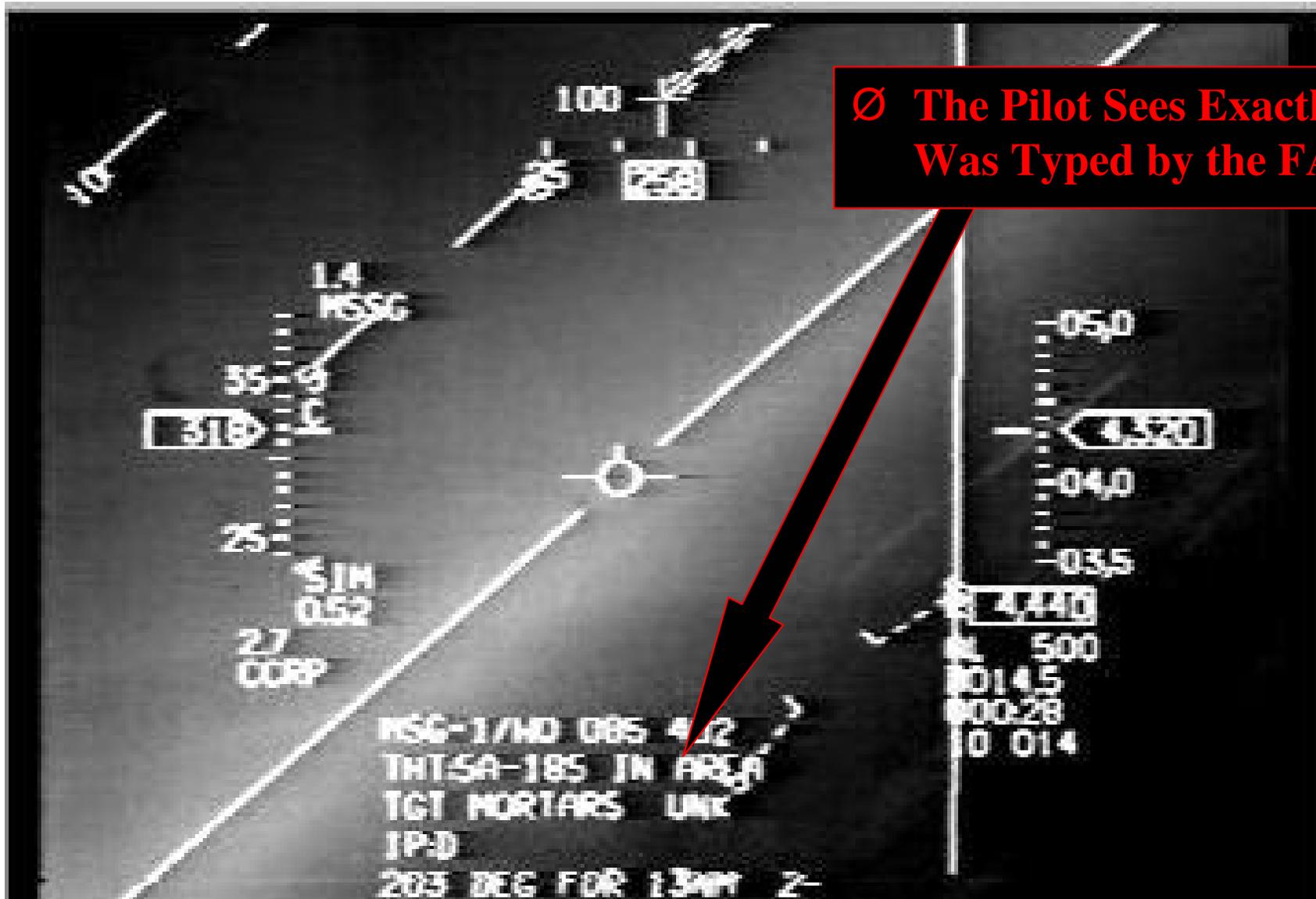
Egress: EGR:IP-TOT:00:00-LOCL IP:D

Remarks: 203 DEG FOR 13NM 2-NON 203 DEG FOR 13 NM 2-

Bulls eye:Not Active N 30:52:58 W 093:02:52 Paused 14R SADL JTIDS

Air-to-Ground: FAC to Fighter Information Sharing

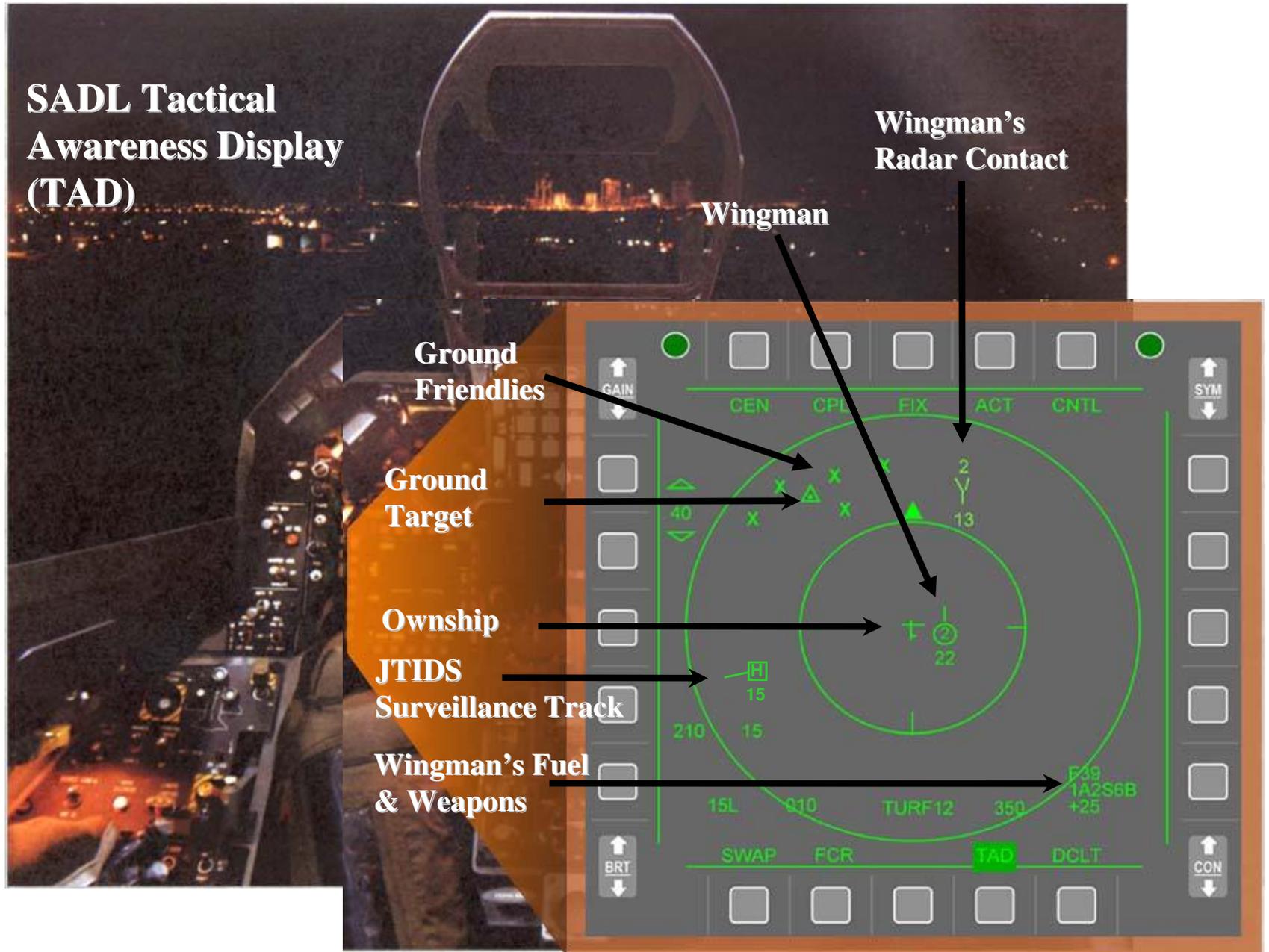
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Air-to-Ground:

What the F-16 Pilot sees in Tactical Awareness Display

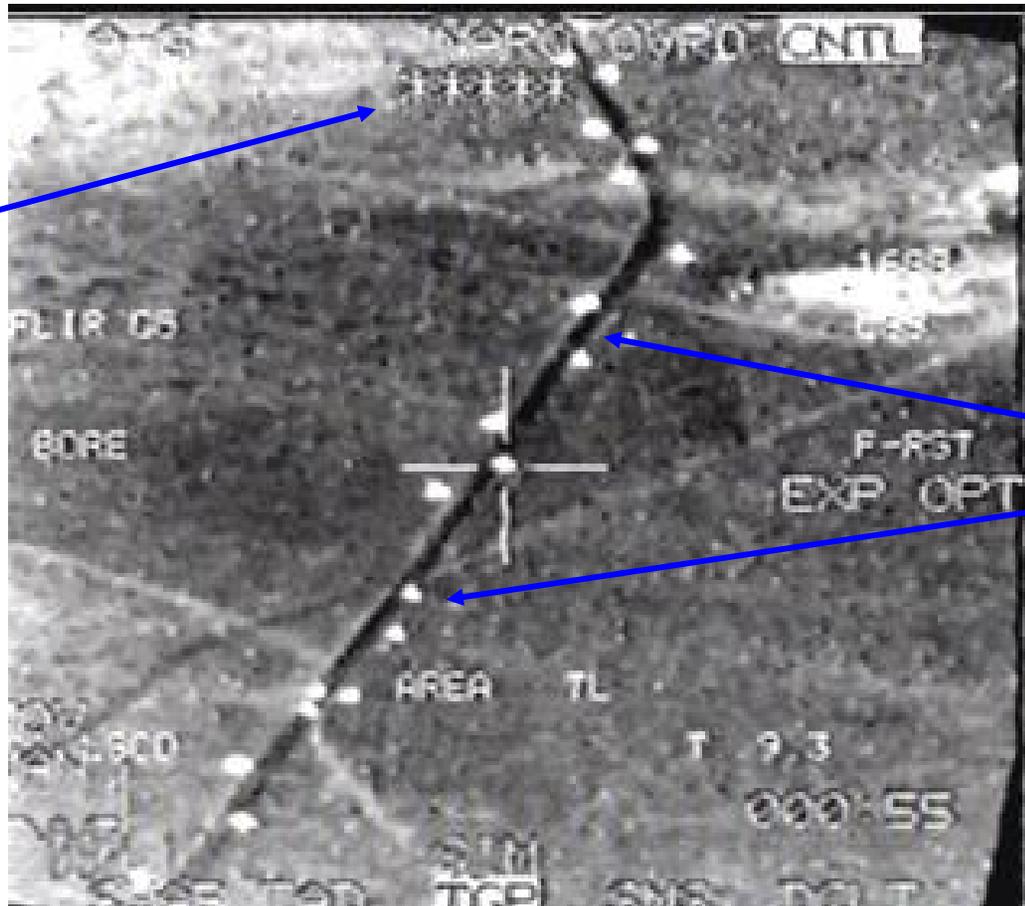
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Air-to-Ground:

What the F-16 Pilot sees with Litening II Targeting POD

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**No Friendly
Replies in FOV**

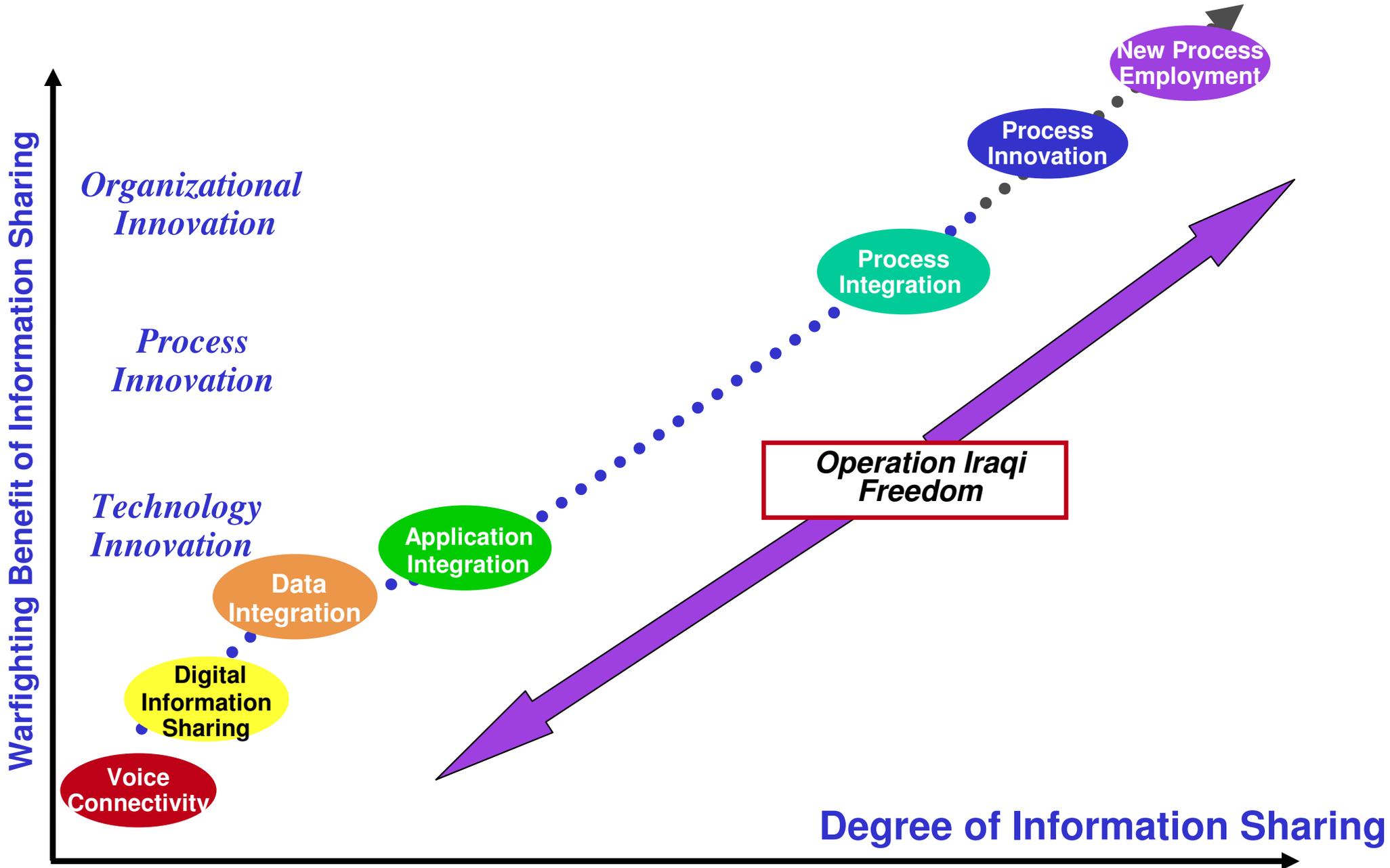
**Column parked
Along road**

DCX Phase I: 2 AM Local time

Implementing Network Enabled Capabilities

...Trajectory of Innovation and Experimentation

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Concept of Operation: Operation Iraqi Freedom (OIF)

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Three Theaters:
Southern – Center of Gravity
West – Stop scuds, monitor movements
North – Economy of Force

OIF: Southern Iraq

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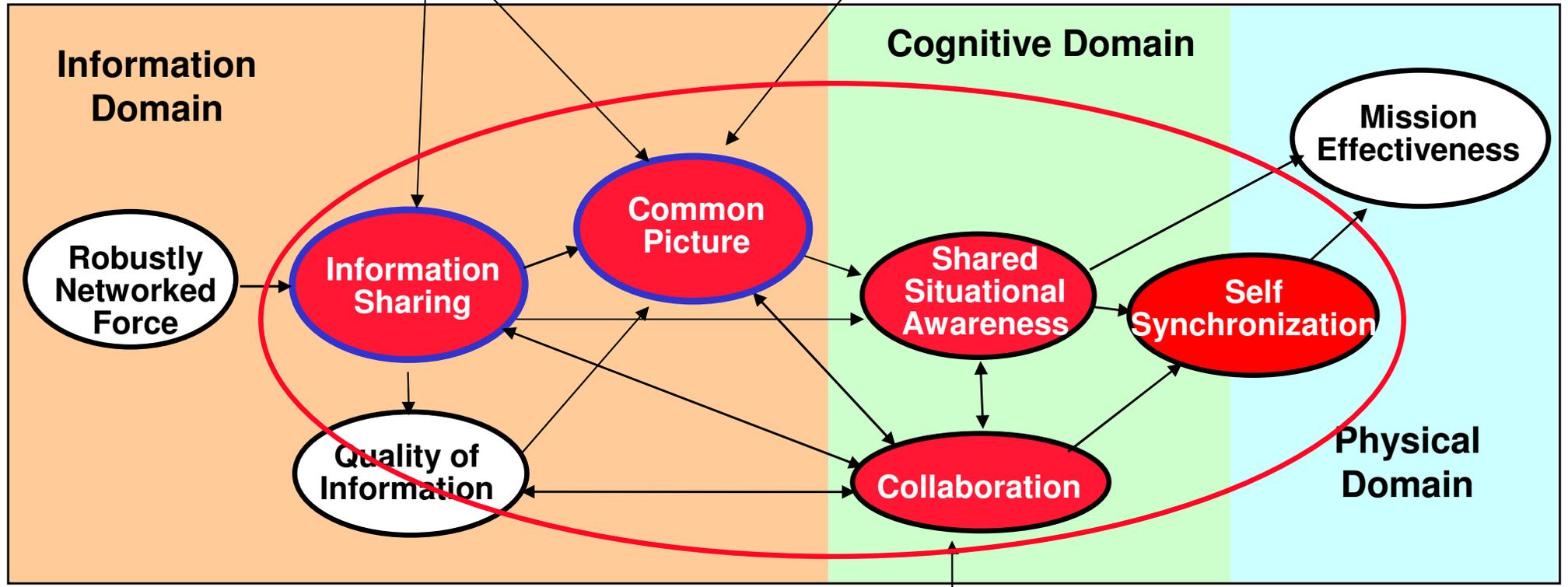
- **Controlled by V Corps / 1st MEF**
- **Traditional land battle w/heavy Joint & Coalition flavor**
 - **Very high operational tempo**
- **Networking of distributed ground force commanders via SATCOM**
- **Enhanced Relevant Common Operational Picture**
 - **Multi-echelon C2**
 - **LCC to Brigade**
 - **Enabled by Blue Force Tracking**



Ground Maneuver during Operation Iraqi Freedom: Key NCW Relationships

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FBCB2 / Blue Force Tracking Joint COP

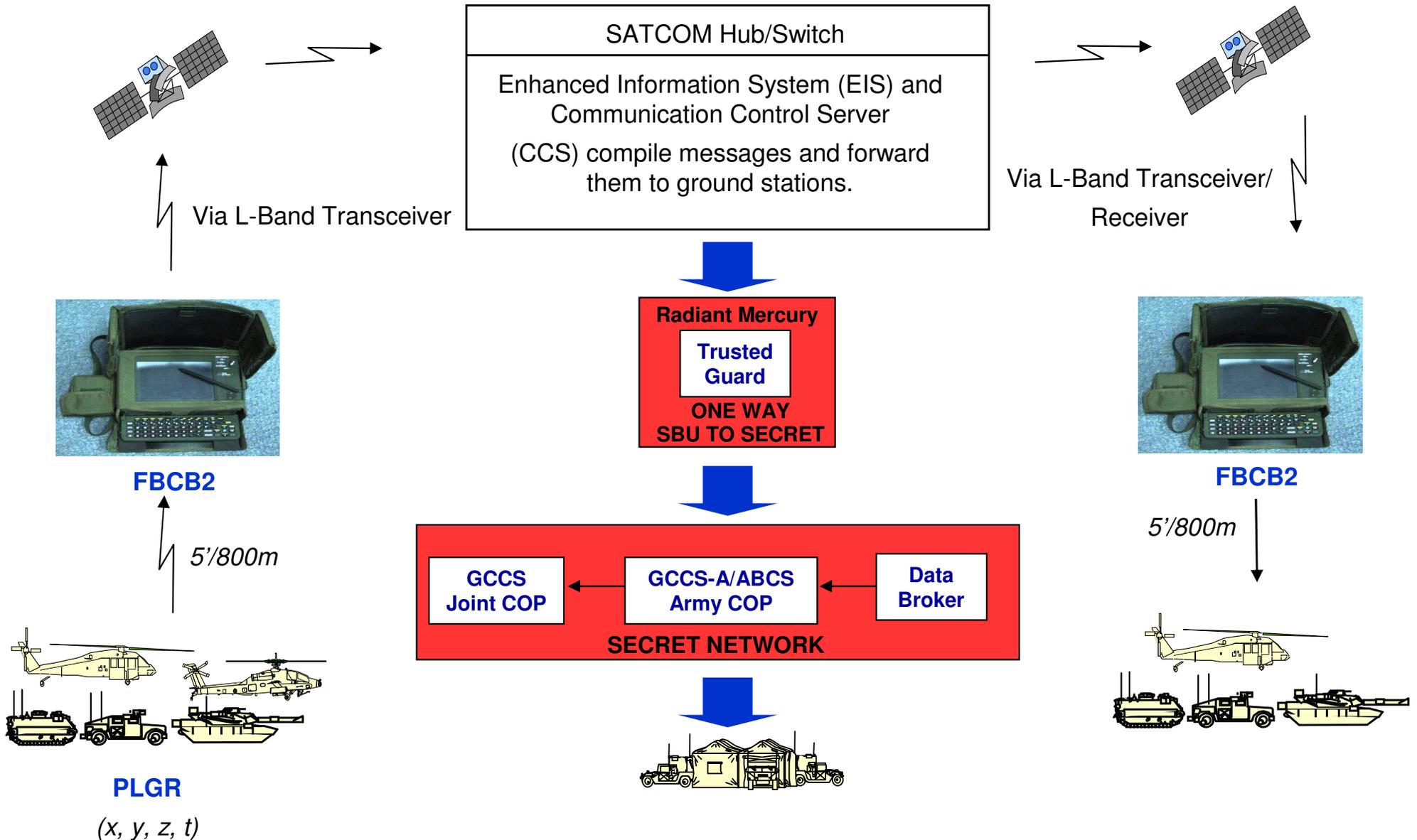


New Concepts & TTP

Defense Collaborative Tool Suite

Networking the Force: Employment of FBCB2/BFT during OIF

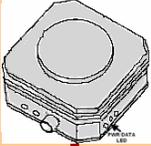
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FBCB2/BFT install on US Forces during OIF

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L-BAND
TRANSCVR
(MTS)*



PLGR



FBCB2

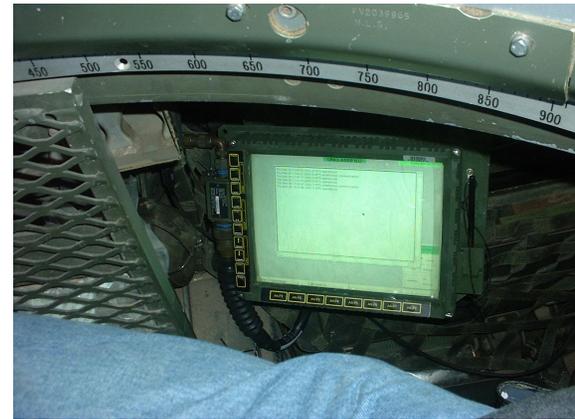


BFT Transceivers



FBCB2/BFT install on UK Forces during OIF

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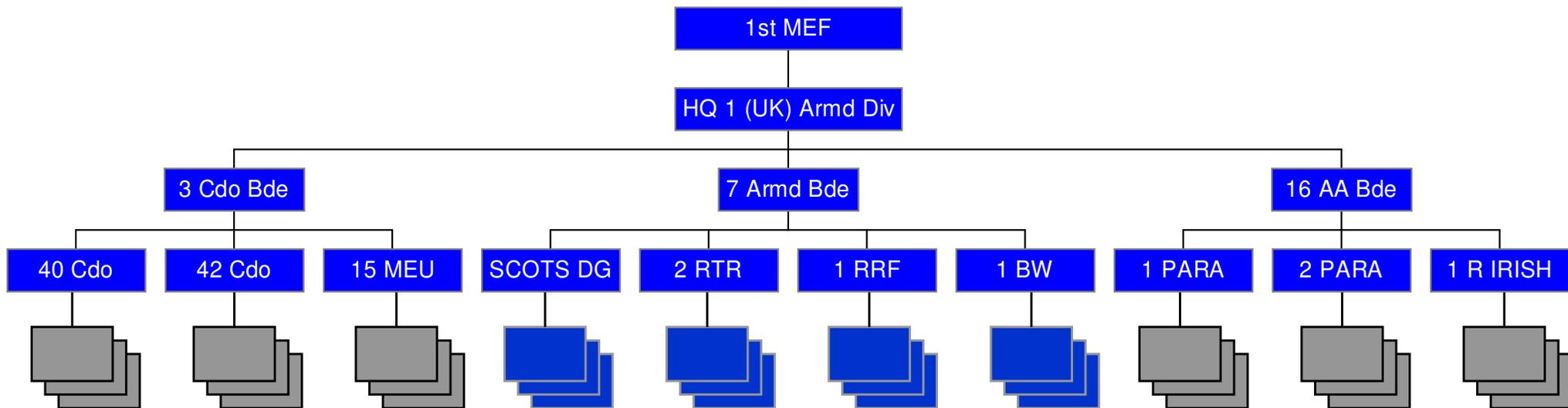
Ground Maneuver in OIF: Degree of Networking

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Pentagon	<i>SIPRNET GCCS GCSS-A</i>				
Joint Force Commander					
Coalition Force Land Component Commander					
V Corps / 1 st MEF	<i>C2PC</i>	<i>101st Airborne FBCB2/ BFT</i>	<i>3rd ID FBCB2/ BFT</i>	<i>UK 1st Armor Division FBCB2/ BFT</i>	<i>1st Marine Division C2PC + 40 + BFT</i>
Division					
Brigade					
Battalion					
Company					
Platoon					
Platform					

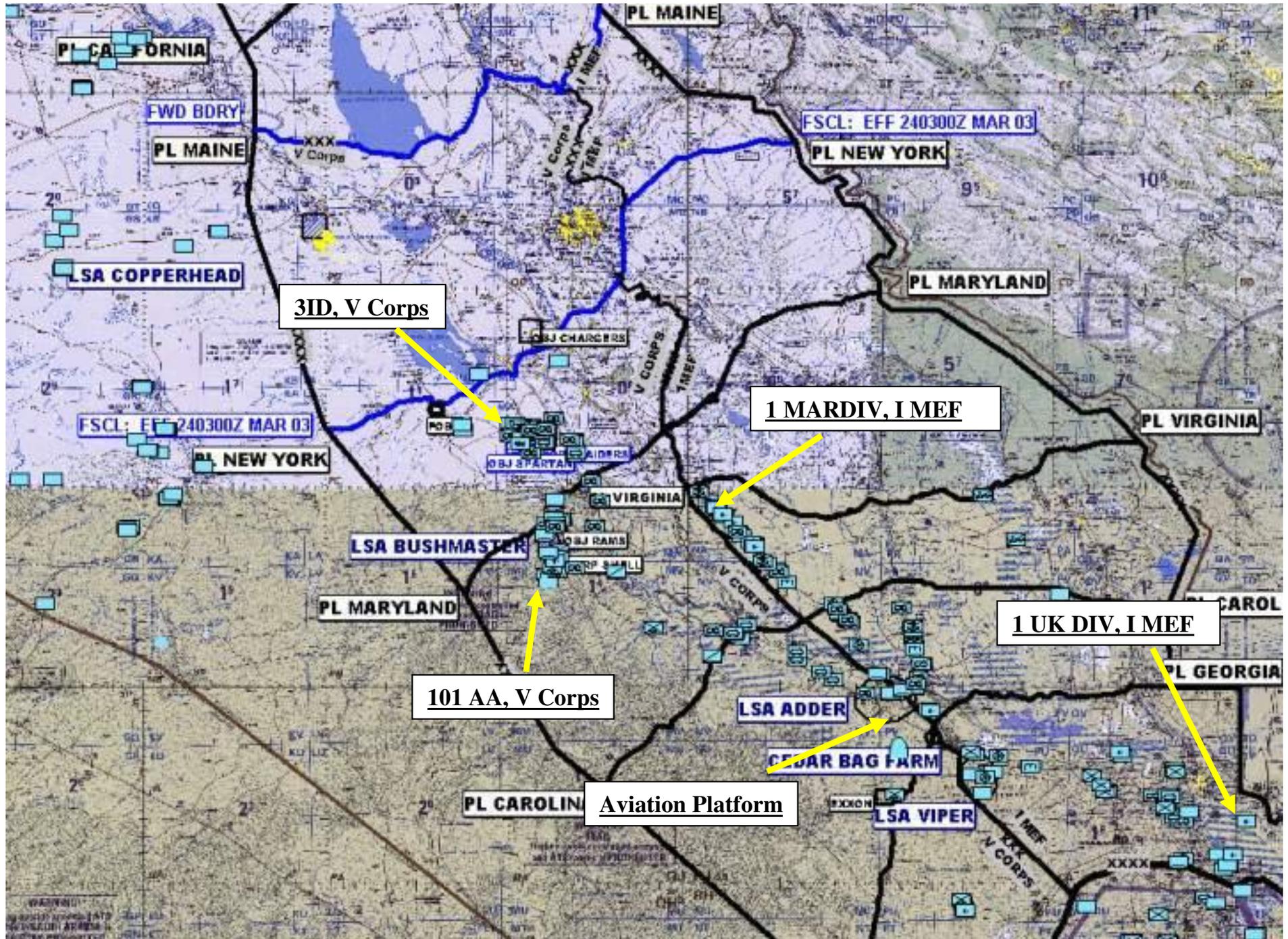
FBCB2/BFT Deployment in 1(UK) Armd Div

Office of Force Transformation



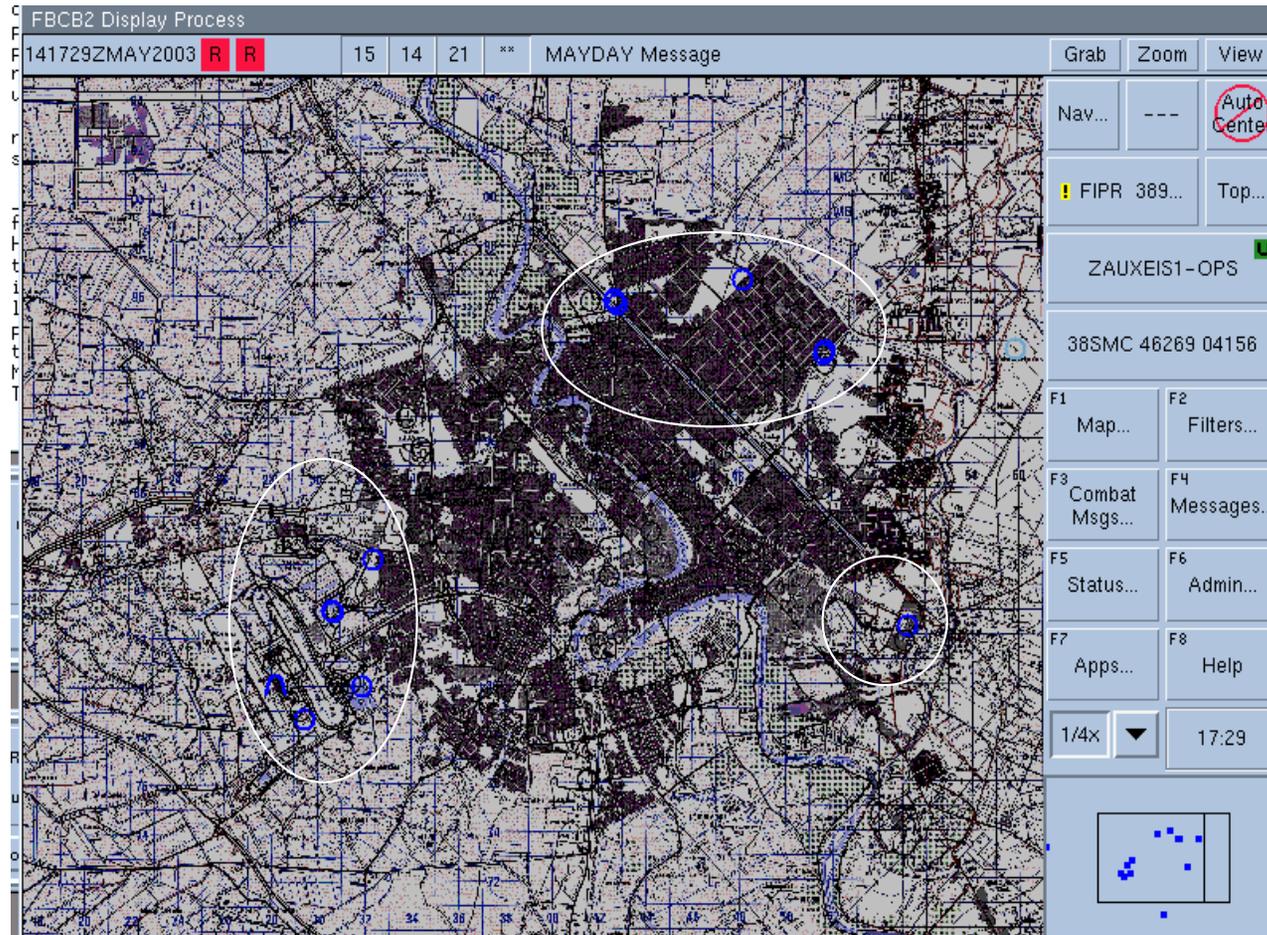
Total of 47 units of FBCB2/BFT installed in 1 (UK) Armd Div

Common Operational Picture (Blue Forces) OIF - 25 March 2003



Common Operational Picture: OIF - Baghdad

Office of Force Transformation



“When my TF seized a key highway intersection south of Baghdad, I could see the company commander icons at each blocking position and I knew we had control of the objective.”

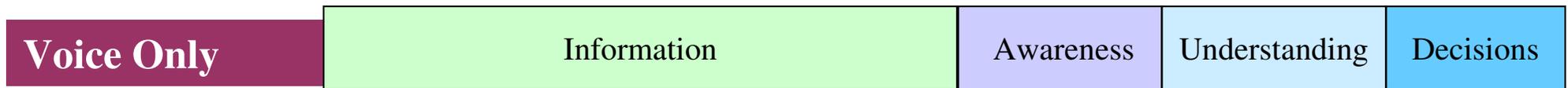
- LTC John Charlton, Cdr TF 1 15,3 ID

“Decision Superiority”

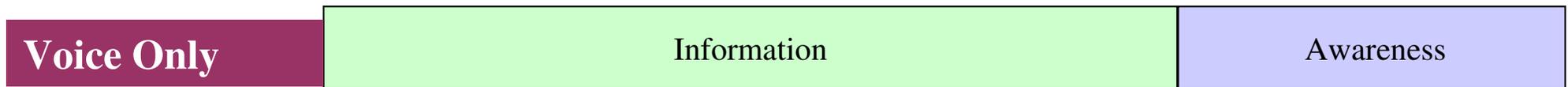
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Superior Ability to Observe – Orient - Decide - Act

Decision Maker 1



Decision Maker 2



Time

Operational Impact of NCW Capabilities (1 of 5)

Office of Force Transformation

*“The bottom line is that FBCB2/BFT presented me with **accurate information/knowledge** as a Task Force Commander, and as a result I felt as though I was making **better tactical decisions**”*

- LTC, Commander, 2/504 Parachute Infantry Regiment

“A soldier with absolutely no training on BFT could literally sit in front of it for 10 minutes, experiment, and have it figured out enough to get any information we needed off of it.”

- 326th Engineering Battalion

“FBCB2 cleared the whole command net so we could focus on maneuver”.

- CPT Tim Terese, 3 ID Main

*“The single most successful C2 system fielded for OIF was the FBCB2-BFT system...BFT gave commanders **situational understanding** that was unprecedented in any other conflict in history”*

- 3 ID Operation Iraqi Freedom AAR

Operational Impact of NCW Capabilities (2 of 5)

Office of Force Transformation



LTC Marcone – CDR 3/69 Armor (U.S. Army) - OIF

Operational Impact of NCW Capabilities (3 of 5)

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“I’m the lead company of the lead TF of the lead Brigade...There was nobody to my front.. I was able to look at my screen and see where friendly units were to my left, right, and to my rear. I was able to pass that information immediately down to my platoons so fratricide was basically eliminated”

- CPT Stewart James, Commander, A 269 AR, 3ID

“The whole squadron was in column on a highway. FBCB2/BFT displayed the locations of all blue forces. I knew the location of observed red, and was able to call for fire based on FBCB2/BFT knowledge”

- CPT, Commander, A Troop 3/7 Cavalry Regiment, 3rd Infantry Division

“Our counter battery radar picked up rounds through the Marine sector. Prior firing counter batter, the Fire Officer checked the BFT screen and ascertained that a 3ID unit (Army) had crossed over into the Marine sector and as firing at the enemy. Had it not been for BFT (FBCB2), we probably would have fired upon a friendly 3ID unit”

- LTC, USMC Division Forward Senior Watchkeeper

Operational Impact of NCW Capabilities (4 of 5)

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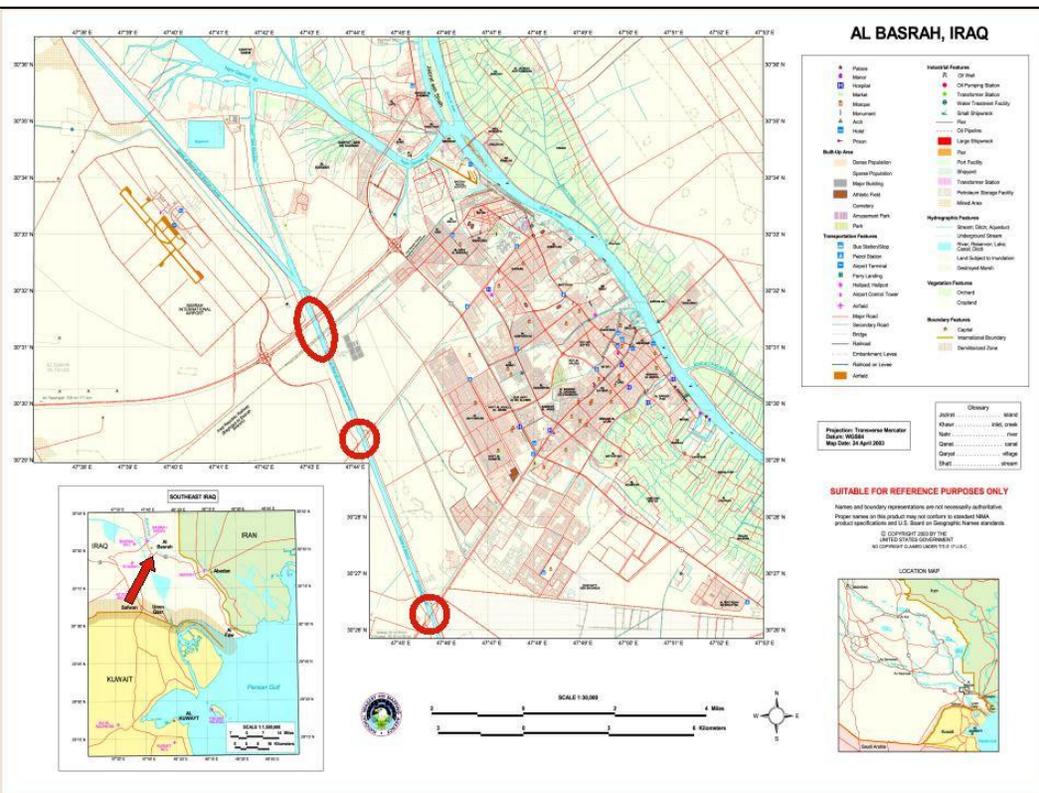
*2nd Royal Tank Regiment – 1st (UK) Armd Div, used a combination of the satellite imagery and the positioning capability of FBCB2/BFT to identify targets for urban raids. During operations in Az Zubayr and Basrah, information was provided on likely insurgent operating bases. These were, generally, houses in urban neighborhoods. Using FBCB2/BFT these locations could be pinpointed and could be reached rapidly using FBCB2/BFT for navigation. This enabled 2nd Royal Tank Regiment to achieve **surprise** and also minimized the impact of **collateral damage** through misinterpreting information.*

Case Study on US/UK Coalition Operations during Operation Iraqi Freedom

Operational Impact of NCW Capabilities (5 of 5)

Office of Force Transformation

- Coy Comd in *1st Battalion Royal Regiment of Fusiliers - 1st (UK) Armd Div* battle group exploits NCW capabilities ability to deconflict his sub-unit's movements to get to line of departure for a company group attack



- D+2 - situation was extremely complicated following the advance into SE Iraq, there was significant Coalition activity and movement
- 1 RRF BG were to advance north-east to seize 4 crossings on the Al Basrah Canal
- Company group had to manoeuvre across a significant main supply route (MSR) that was being trafficked by vehicles supporting the US advance north-west
- Using FBCB2/BFT the Coy Comd analysed the traffic movement and timed the crossing of the MSR to avoid US movement
- The affect was that he was able to generate tempo and conduct his attack 12 hours prior to other sub-unit groups who were delayed due the MSR vehicle movement

Source: NCO Case Study on US/UK Coalition Operations during Operation Iraqi Freedom

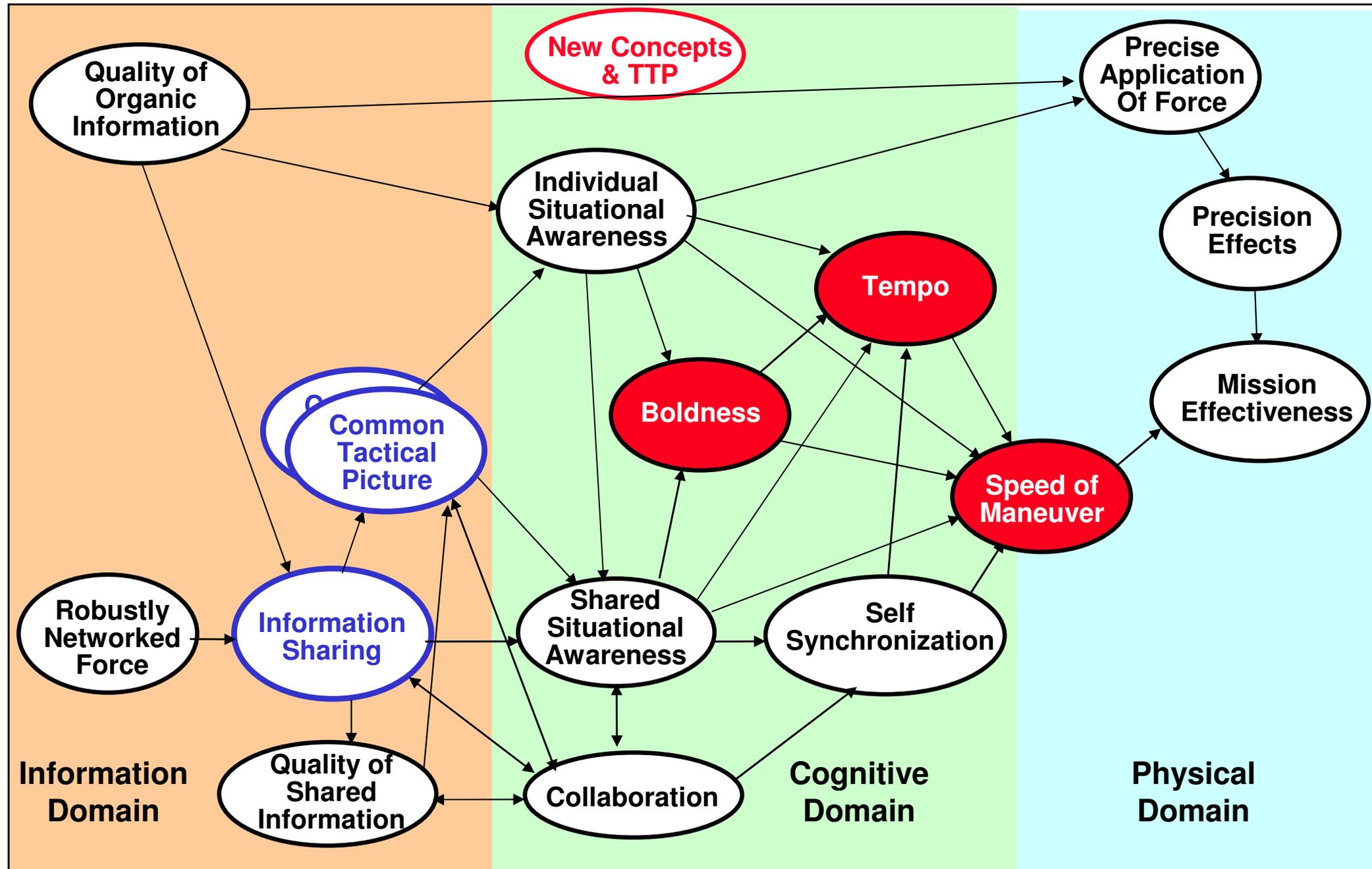
Getting the Theory Right: Command and Control of a Networked Force

Office of Force Transformation

What's Different?

- **“Common” Operational Picture**
 - Reduced “Fog” of War
- **Shared Situational Awareness (SA)**
 - Significantly increased SA for :
 - Commander
 - Subordinate Commanders
 - Individual Warfighters
 - Decreased “cognitive loading” in developing SA
- **Command Intent**
 - Increased shared situational understanding
 - Enhanced by capabilities for real-time collaboration
- **Enhanced Speed of Decision Making**
- **Increased Tactical Agility**
- **Reduced Risk**

Network Centric Warfare: Key Relationships



Implementing Network Enabled Capabilities: Lines of Development

Office of Force Transformation

Today

Future



Implementing Network Enabled Capabilities A DoD OFT Perspective on Strategy

Office of Force Transformation

- Get the Theory Right
- Apply the Theory Enterprise Wide
- Accelerate Networking of the Joint Force
- Accelerate Deployment of Network-Centric Systems, Concepts, and Capabilities
- Address Challenges of Allied & Coalition NCO
- Experiment with Network-Centric Concepts and Capabilities
- Develop Mature TTP for NCO
 - Service/Combined/Joint/Allied and Coalition



Getting the Theory Right: NCO Case Studies

Office of Force Transformation

- Completed:
 - Air-to-Air (JTIDS OSP)
 - C2 for Networked Forces: Commander Task Force-50 in OEF
- Nearing Completion:
 - Air-to-Ground (DCX-I/OEF/OIF)
 - Ground Maneuver – Stryker (JRTC Rotation)
 - Special Operations Forces (OEF/OIF)
 - Coalition NCO in OIF (UK Ground Forces)
 - Peace Keeping/Peace Support
 - NATO ACE Mobile Force Land: IRTF (Land)
 - NATO Operation Amber Fox: Task Force Fox
- Recently Initiated:
 - Ground Maneuver: V Corps and 3rd ID in OIF
 - Networked Air-Ground Ops: OIF Western Iraq
 - Application of NCO to Stability and Restoration Operations
- Exploratory Phase:
 - Application of NCO Concepts during the SARS Crisis in Asia
 - Network Based Defense: A Strategic Perspective on NCO



Security Environment

... Four Challenges

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VULNERABILITY

Irregular

Those seeking to erode American influence and power by employing unconventional or irregular methods (e.g., terrorism, insurgency, civil war and emerging concepts like “unrestricted warfare”)

Likelihood: *very high; strategy of the weak*
Vulnerability: *moderate, if not effectively checked*

Higher ↑

Catastrophic

Those seeking to paralyze American leadership & power by employing WMD or WMD-like effects in unwarned attacks on symbolic, critical or other high-value targets (e.g., 9/11, terrorist use of WMD, rogue missile attack)

Likelihood: *moderate and increasing*
Vulnerability: *unacceptable; single event could alter American way of life*

← Lower

Traditional

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

(e.g., conventional air, sea and land forces and nuclear forces of established nuclear powers)
Likelihood: *decreasing (absent preemption) due to historic capability-overmatch and expanding qualitative lead*
Vulnerability: *low, only if transformation is balanced*

Lower ↓

Disruptive

Those seeking to usurp American power and influence by acquiring breakthrough capabilities (e.g., sensors, information, biotechnology, miniaturization on the molecular level, cyber-operations, space, directed-energy and other emerging fields)

Likelihood: *Low, but time works against U.S.*
Vulnerability: *unknown; strategic surprise puts American security*

Higher →

LIKELIHOOD

No hard boundaries distinguishing one category from another

NCO Case Study: NATO Allied Command Europe Immediate Reaction Task Force (Land)

Office of Force Transformation

2000

2001

Leadership

Commander Leads by Example

Increased Situational Awareness

Personnel (Culture)

Multinational Rotations

Culture of Information Sharing

Organization (Structure & Behavior)

Multinational

Computers move around HQ

New Command Relationships

Training

Commander attends training

Short Training Course

Doctrine (Process/Tactics/Techniques/Procedures)

Information Management

Wireless Security

Merging of Ops and Planning Cell

Material (Technology)

ISIS 2.5

Wireless

Facilities

NCO Case Study: Stryker Brigade Combat Team

Office of Force Transformation

1999

2003

Leadership / Leadership Development

Agile, Confident, Adaptive Leaders

Shared Situational Awareness

Personnel (Culture)

Increased Personnel Stabilization

Culture of Information Sharing

Organization (Structure Behavior)

Organic Cavalry Squadron (RSTA) Organic Combined Arms Organic MI & HUMINT Teams

Training

Dedicated training for new Commanders SBCT Tactical Standard Operating Procedures

Doctrine (Process/Tactics/Techniques/Procedures)

Mission Type Orders

Multi-echelon Collaborative Planning

Self-Synchronization IAW CDR Intent

Material (Technology)

Stryker Vehicle

ABCS + FBCB2 + SATCOM

Facilities

Stryker BCT Mission Effectiveness

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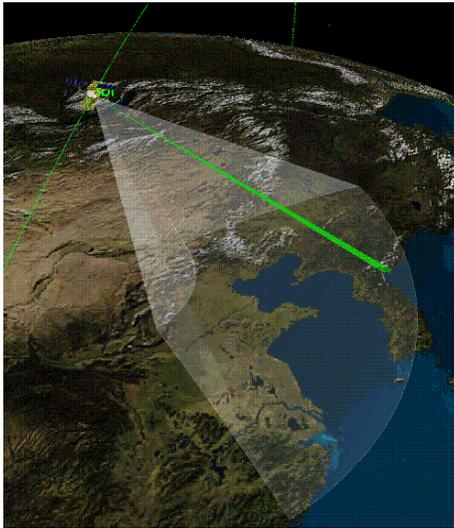
- *“The most impressive capability demonstrated by the SBCT was the ability to effect the enemy’s decision cycle through situational awareness (SA/SU) and combined with mobility and lethality. The best example was during the Shughart-Gordon urban attack operation...”*
- *“The SA/SU afforded platoon leaders and commanders by the lower tactical internet and FBCB2 gave them the ability to maneuver their forces and close with and destroy the enemy during urban operations in Shughart-Gordon.”*
- *“Observing 24 unit attacks Shughart-Gordon as a JRTC Observer Controller, I have never seen a unit clear every building and still retain combat power to defeat an enemy counterattack.”*

Source: NCO Case Study on Stryker Brigade Combat Team

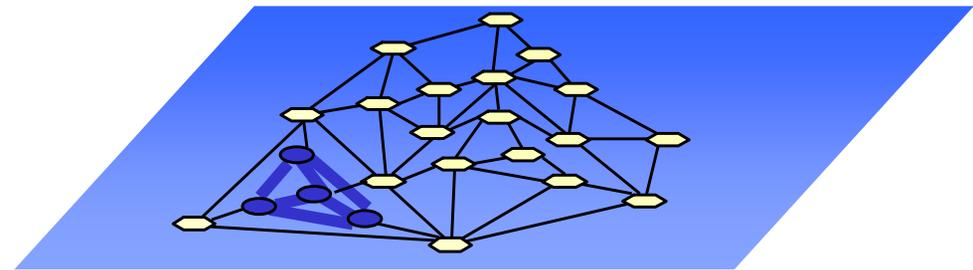
Network Centric Warfare

...Implementing Network Enabled Capabilities

Office of Force Transformation



Sensors



Networks

People

Command & Control



Effectors (Shooters)



Education for Transformation

... OFT Initiatives

Office of Force Transformation

- **Transformation Chairs Program**
 - Focused on facilitating the diffusion of emerging knowledge related to Information Age Warfare and Defense Transformation at DoD Educational Institutions
- **Transformation Research Program**
 - Focused on creating new knowledge relating to Defense Transformation by facilitating collaborative cutting edge research by the faculty of DoD Educational Institutions and their research partners
- **Transformational Leadership Certificate Program**
 - Focused on creating a coherent program of instruction on Defense Transformation – to be offered initially at NDU's School for National Security Executive Education
- **Transformation Short Course**
 - Focused on facilitating the diffusion of emerging knowledge related to Network Centric Operations within the US and to Allied and Coalition partners
 - **Innovation & Experimentation:** Focused on facilitating the diffusion of knowledge related to innovation and experimentation as a key enabler of Defense Transformation

NCW Context (The Why)

Office of Force Transformation

The world is shifting from the industrial to the information age, characterized by complex, non-linear, and inherently unpredictable challenges. In order to maintain and increase a competitive advantage in this environment, we are witnessing fundamental changes in how militaries organize, fight and interact with each other and with non-military organizations.

Network Centric Warfare, a maturing theory of Information Age Warfare, provides a foundation and framework for militaries to shape and operate in this new environment.

Militaries around the world recognize that operating in the information age calls for robustly networked forces to share information and collaborate across time and space. This entails a shift to agile, innovative and creative decision making from the top out to the “edges” of the organization. This creates a tension requiring significant innovation in technical, social, cultural and organizational processes and procedures designed for success.

NCW Short Course Vision (The What)

Office of Force Transformation

This collaborative and experienced-based course exposes participants to the maturing NCW knowledge base. This course enables participants to apply the NCW tenets and information age leadership competencies in the evolving global security environment.

At the end of the course participants will understand the NCW tenets, lexicon, concepts and context; analyze the convergence and synergies of an Information Age force; and act as change agents by recognizing, synthesizing, and evaluating innovative opportunities to apply NCW techniques and practices.

Recommended Attendance

Office of Force Transformation

Who in General

This course is designed for middle to upper level decision makers, in all career tracks across military, academic, industry, and international backgrounds. It targets civilian grades GS/GM 13-15 and military grades O-5 to O-6. It focuses on concepts, techniques, and practices, and requires some prior knowledge of Network Centric Warfare.

NCW Short Course – Learning Areas

Office of Force Transformation & Innovation, Application, Experience - Big to Small (Social, Cognitive, Information, Physical Domains)

Day 1

Arrival

- Strategic Context

Day 2

Introduction

- Theory, Lexicon, & Concepts
- Case Studies

People in the Network

- Social Domain

Network Centric
Cocktailing

Day 3

People in the Network

- Cognitive Domain

Things of the Network

- Physical & Information Domains

Evening of Innovation

Day 4

Power of the Network

- Innovation
- Change

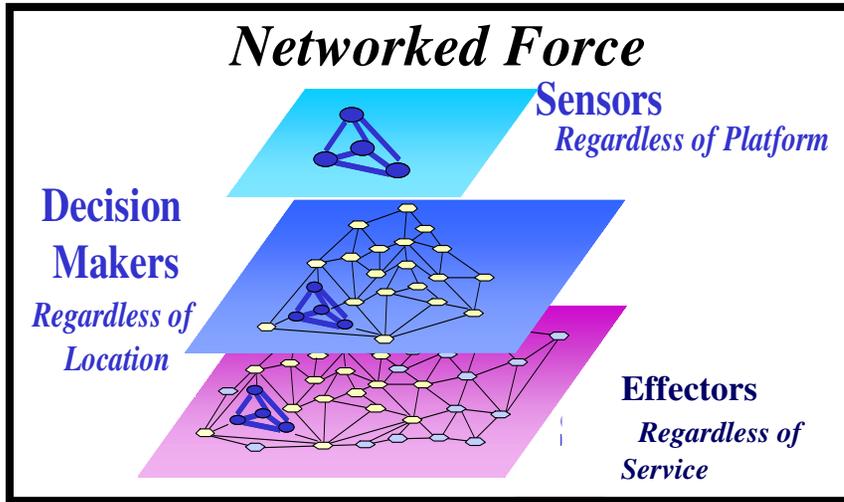
Applications of the Network

- Education Collaboration

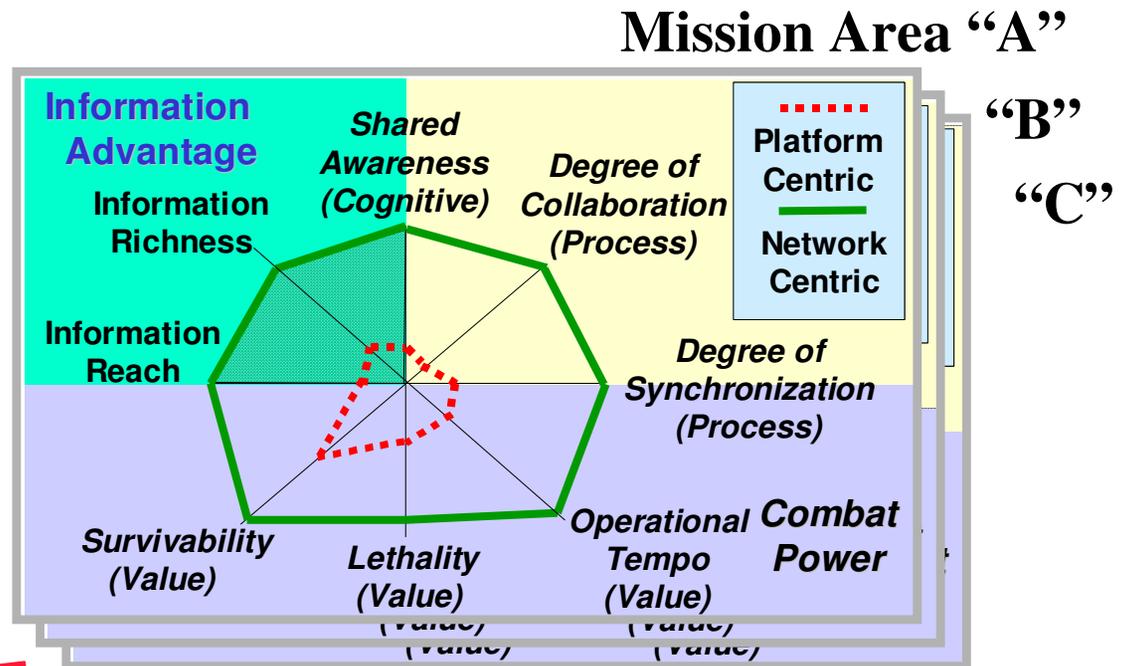
Applying the Theory Enterprise Wide: Supporting Key Force Development Decisions

Office of Force Transformation

Alternative Force Structures

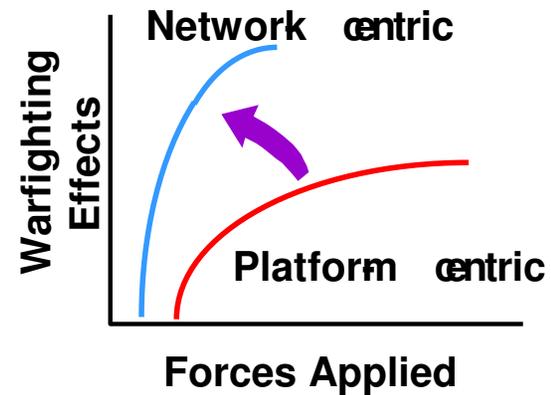


Mission Effectiveness



New Concepts & TTP

Campaign Level Effectiveness



Conclusion: Take A Ways

Office of Force Transformation

- **Network Centric Warfare: An Emerging Military Response to the Information Age**
 - *Evidence exists and is compelling*
 - *Clear linkage between Information Advantage and Warfighting Advantage*
 - *Ideas and concepts have “traction”*
- **Early NCW adopters are reaping significant gains**
 - **Armed Services: Increased Combat Power**
 - **Industry: New Business**
- **A New Mental Model is emerging to navigate the ongoing Transformation from the Industrial Age to the Information Age**

Summary

- **Transformation**
 - A process for continuous change
- **Network Centric Warfare (NCW)**
 - An Emerging Military Response to the Information Age
 - Maturing capabilities demonstrated during OEF/OIF
- **NCW Implementation**
 - Not just about technology
 - Involves all lines of development

Questions?

ERROR: invalid restore
OFFENDING COMMAND: restore

STACK:

- savelevel -
- savelevel -