An Introduction to Network Centric Operations

Presentation to
NCO Short Course
13 July 04

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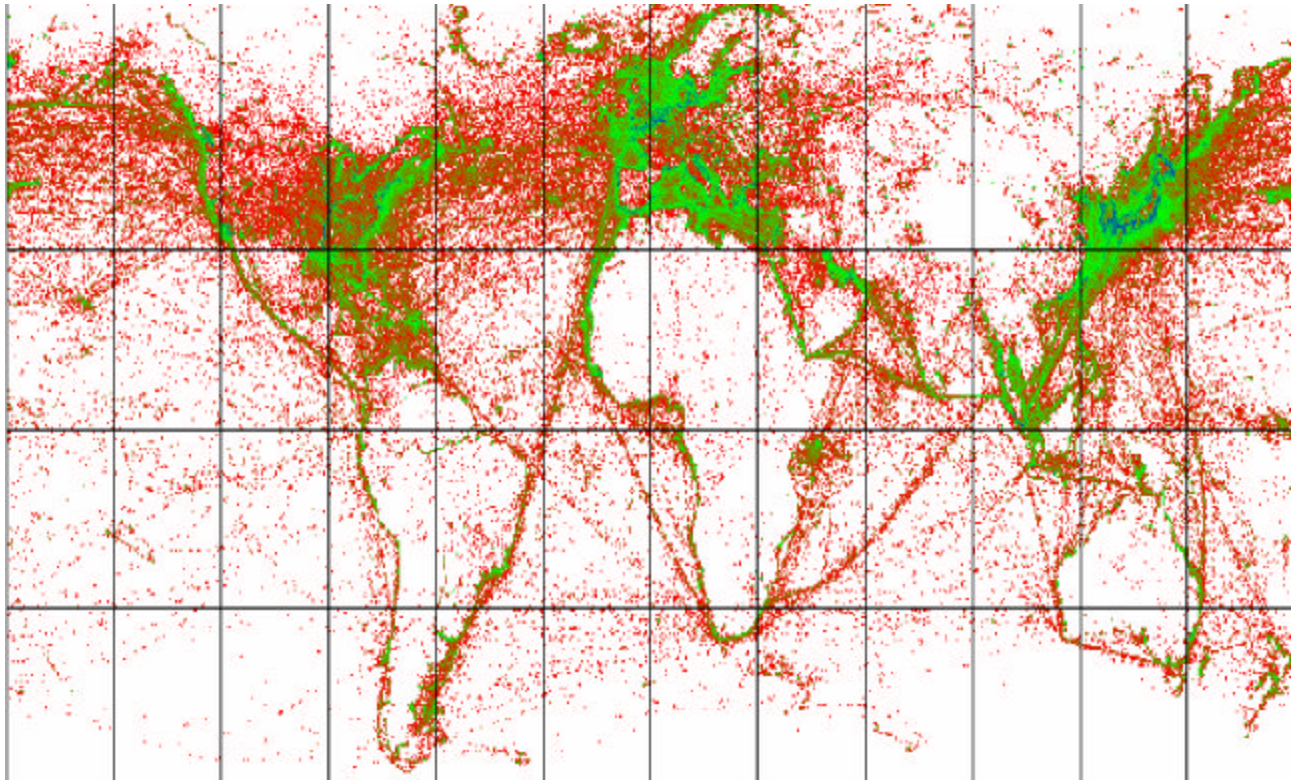
Bottom Line Up Front

- **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**

Global Trends

Globalization II → **Globalization III**



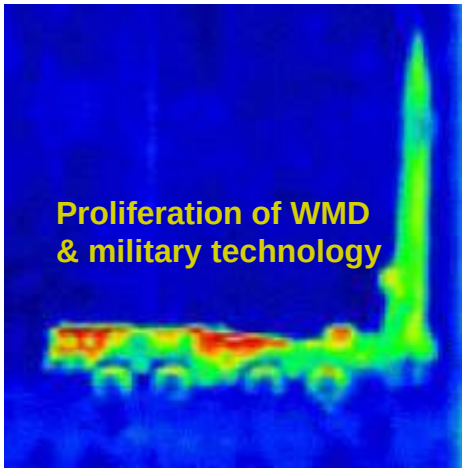
Industrial Age → **Information Age**

Global Trend # 1

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***

Global Trend # 2

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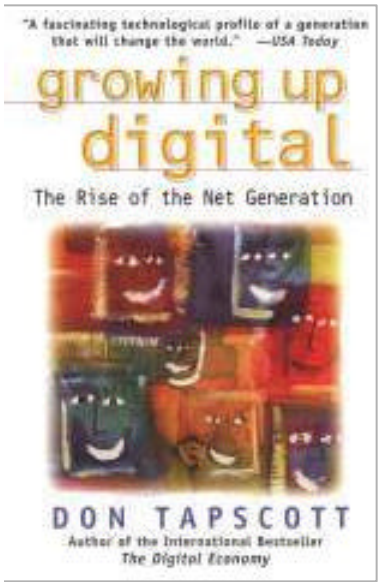
Industrial Age

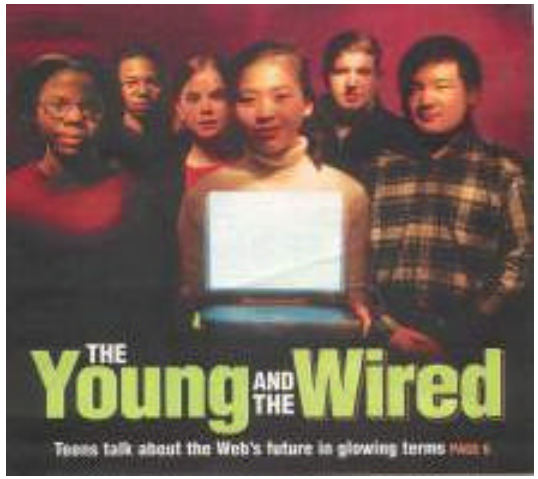
- Success = Scale + Scope
- Top Down - Centralized
- Vertical Integration
- Information Hoarding
- Local Awareness
- Arms Length Relationships
- Make and Sell
- Inwardly Focused

Information Age

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

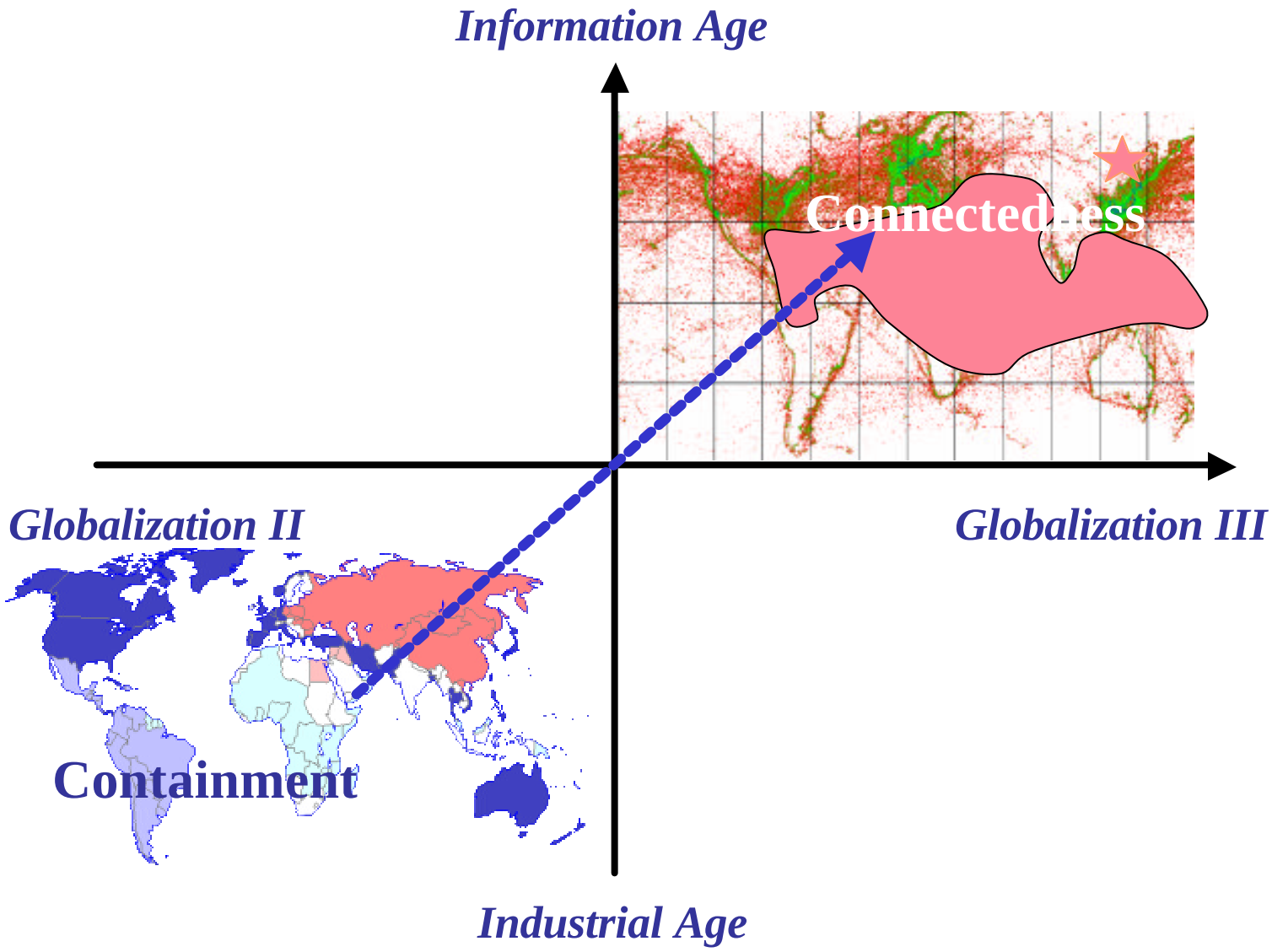


- ***New Rules***
- ***New Behaviors***
- ***New Competencies***
- ***New Relationships***



Transformation

…Meeting the Challenges of the New Competitive Landscape



Transformation

…A U.S DoD Perspective

- ☑ **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

- 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

Information Age Transformation:
Network Centric Warfare

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Translates an Information Advantage into a decisive Warfighting Advantage

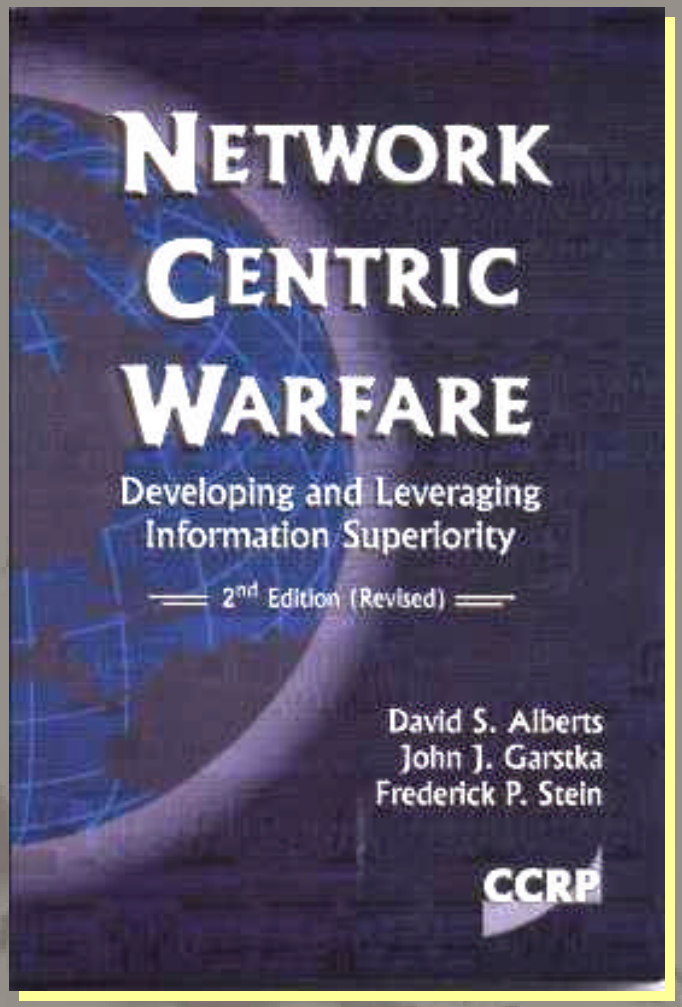
Information Advantage - enabled by the robust networking of well informed geographically dispersed forces

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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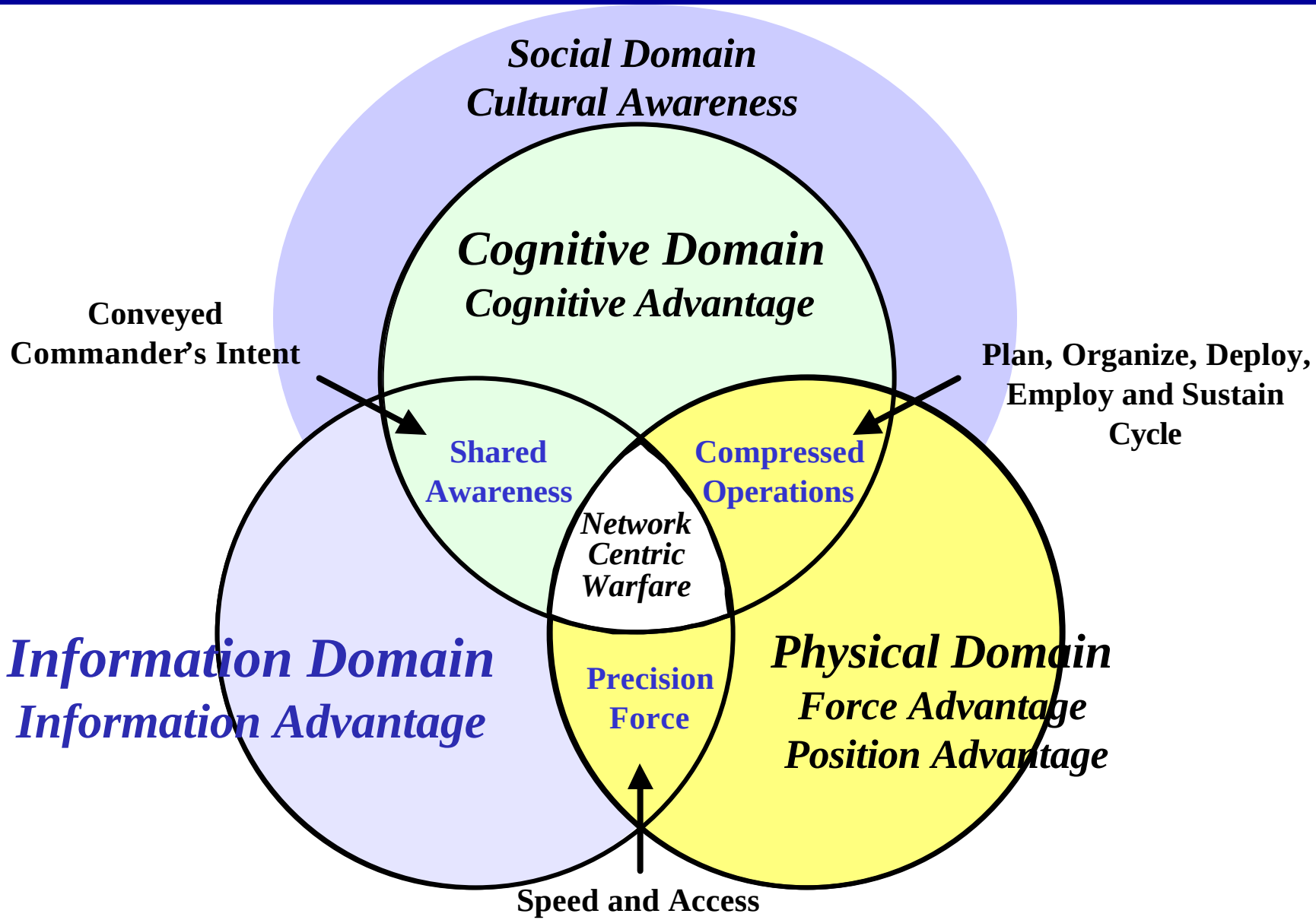
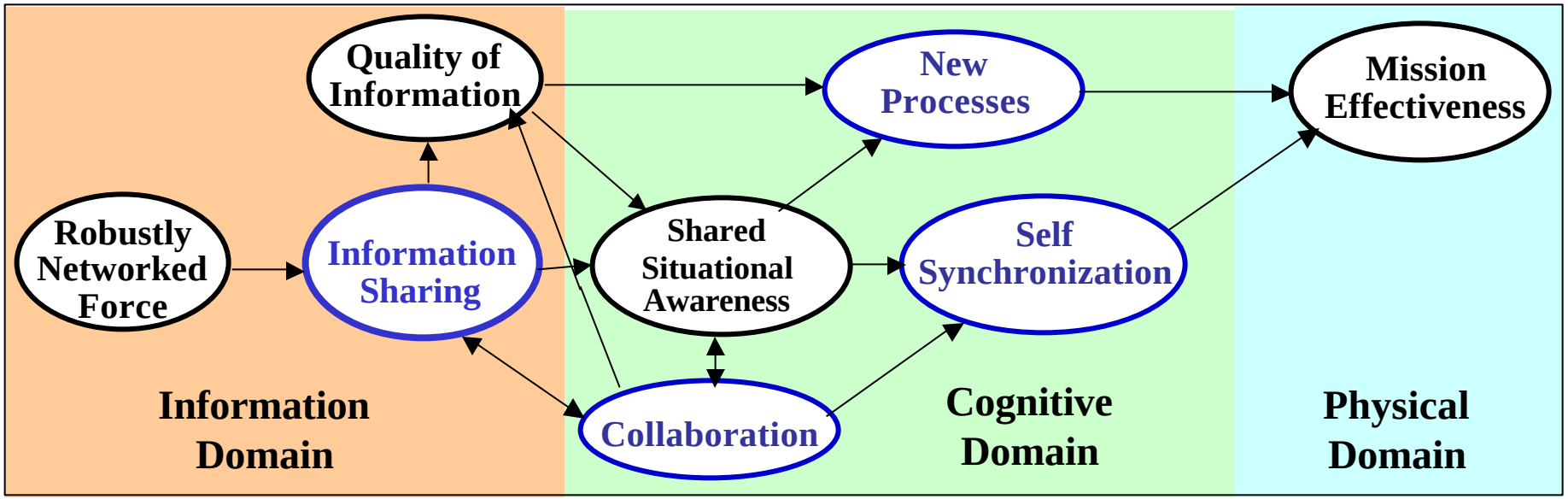


Tenets of Network-Centric Operations

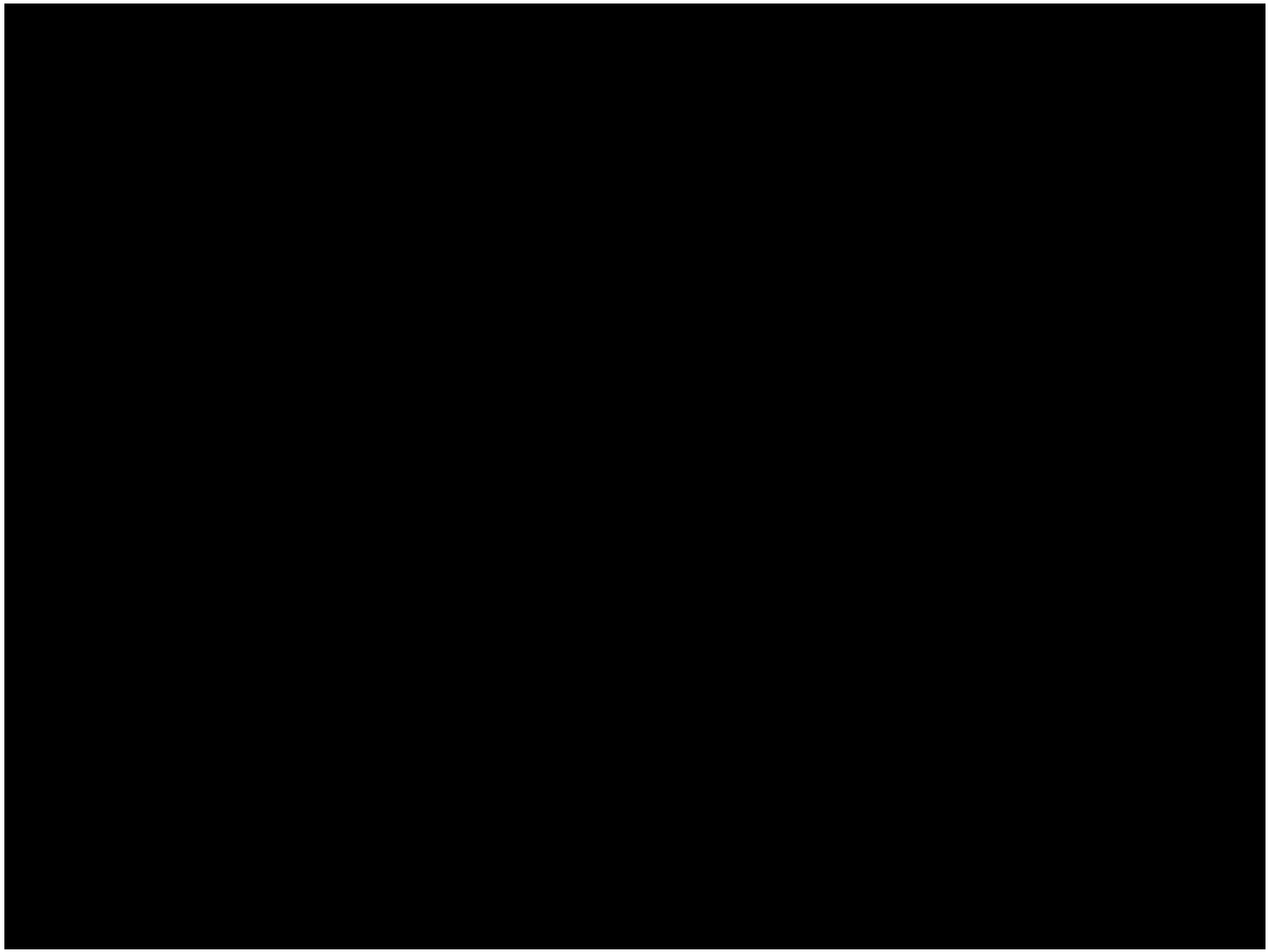
…The new value chain

- 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



Shared Situational Awareness

…A new competitive advantage



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

Bottom Line

"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

Network Centric Operations Demonstrated Across Range of Mission Capabilities

Maneuver

- Ground Maneuver
  - US/UK Coalition Ops (OIF)
  - Stryker Brigade (JRTC)

Command & Control

- ACE Mobile Force Land
- CTF-50 (OEF)
- V Corps/3ID (OIF)

Protect

- Air-to-Air (JTIDS Operational Special Project)

Battlespace Awareness/ISR

- Navy Special Warfare (OEF/OIF)
- Cooperative Engagement Capability

Fires

- Air-to-Ground (CAS) (OEF/OIF/ DCX-1)

Peace Keeping & Enforcement

- Task Force Fox (NATO Operation Amber Fox)

Warfighting Advantage: Evidence form High Intensity Conflict

- **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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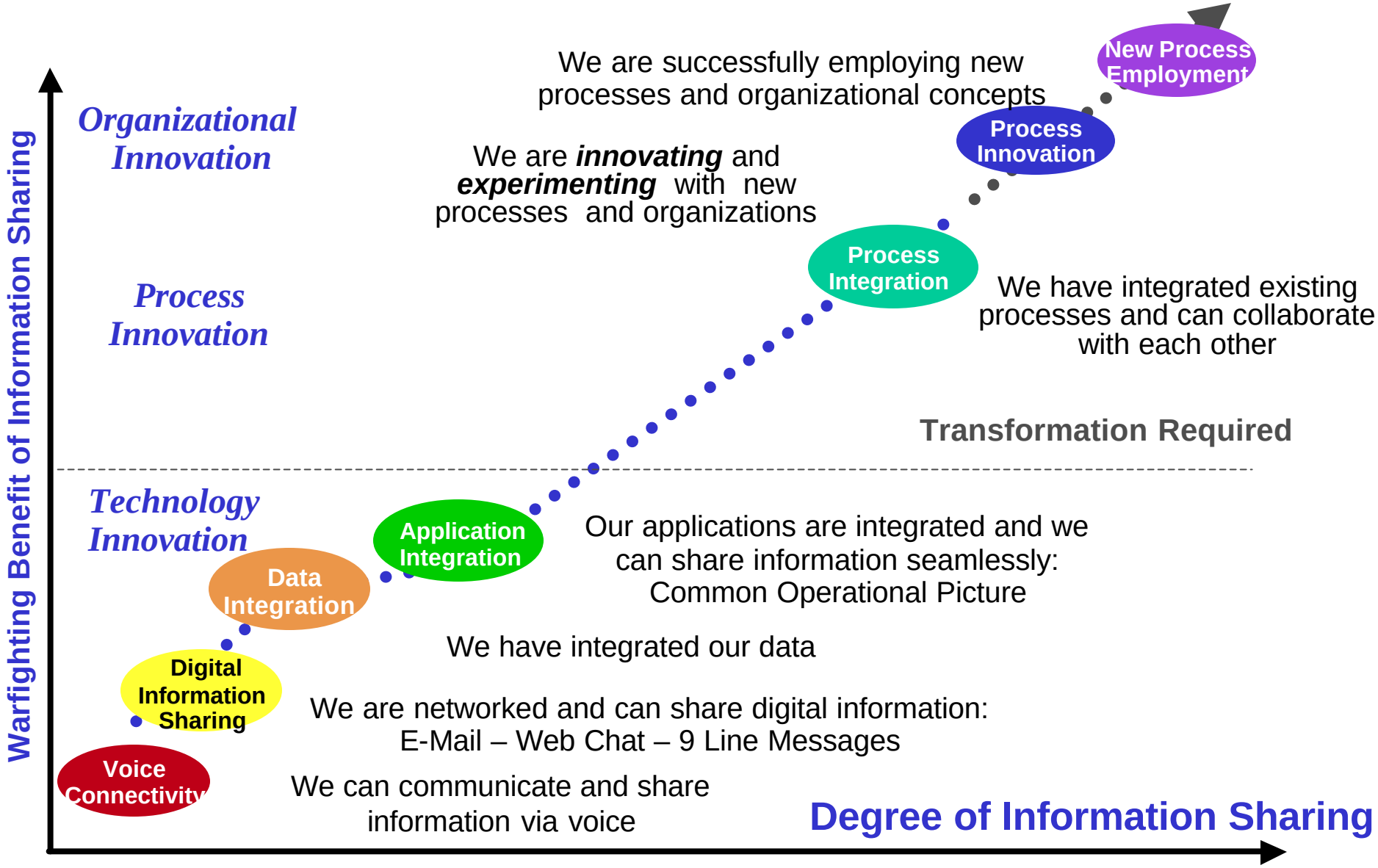

Implementing Network Enabled Capabilities

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

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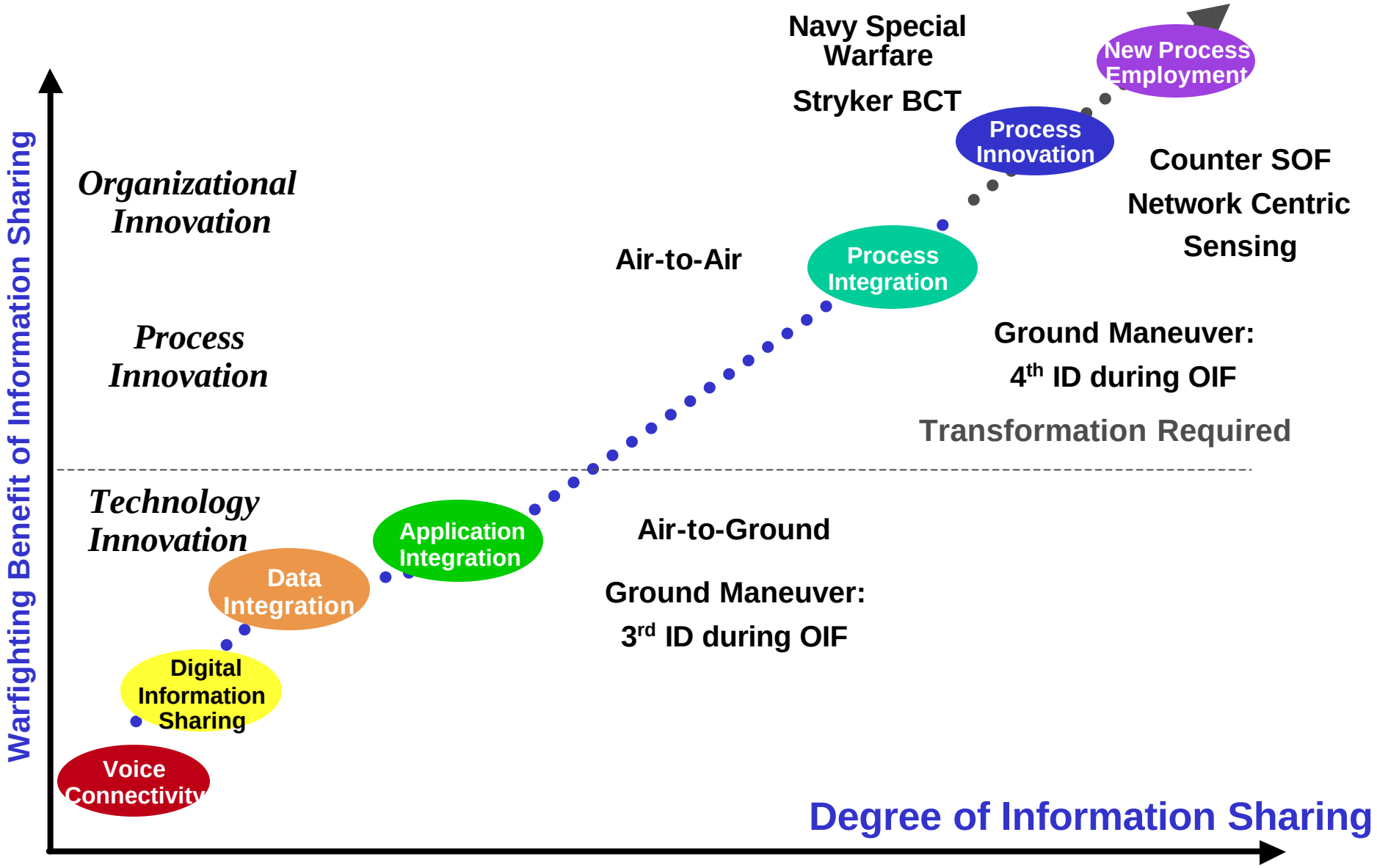

Digital Close Air Support: Fighting First for Information Advantage

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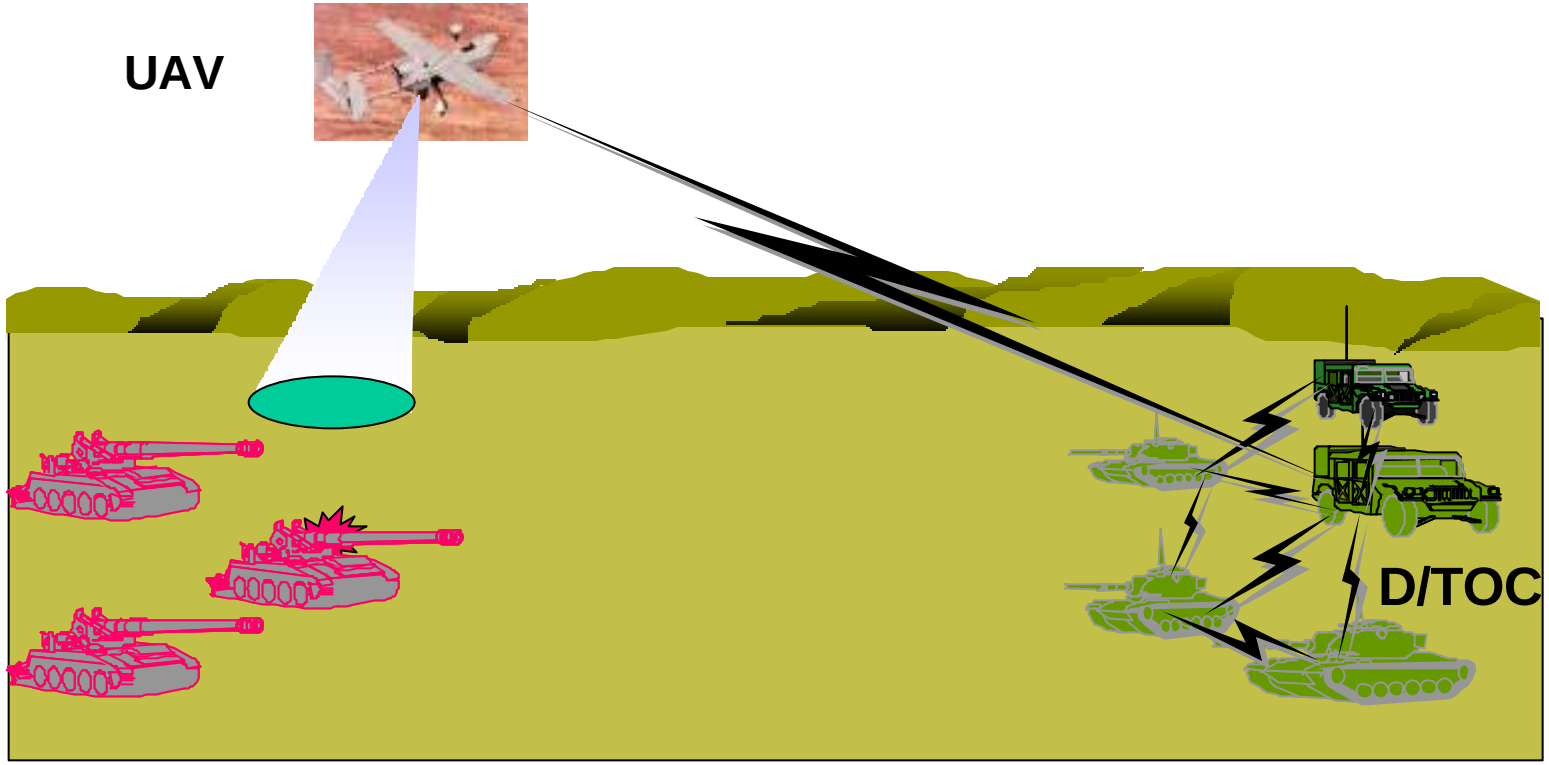
- **Tactical Situation:**
  - **Blue Force in defensive posture**
  - **OPFOR moving to contact under cover of darkness**
  - **Armored column detected by JSTARS and UAV at approximately 10 mile range from Blue Force and positively identified as hostile OPFOR**
  - **Blue Force tracking information confirms 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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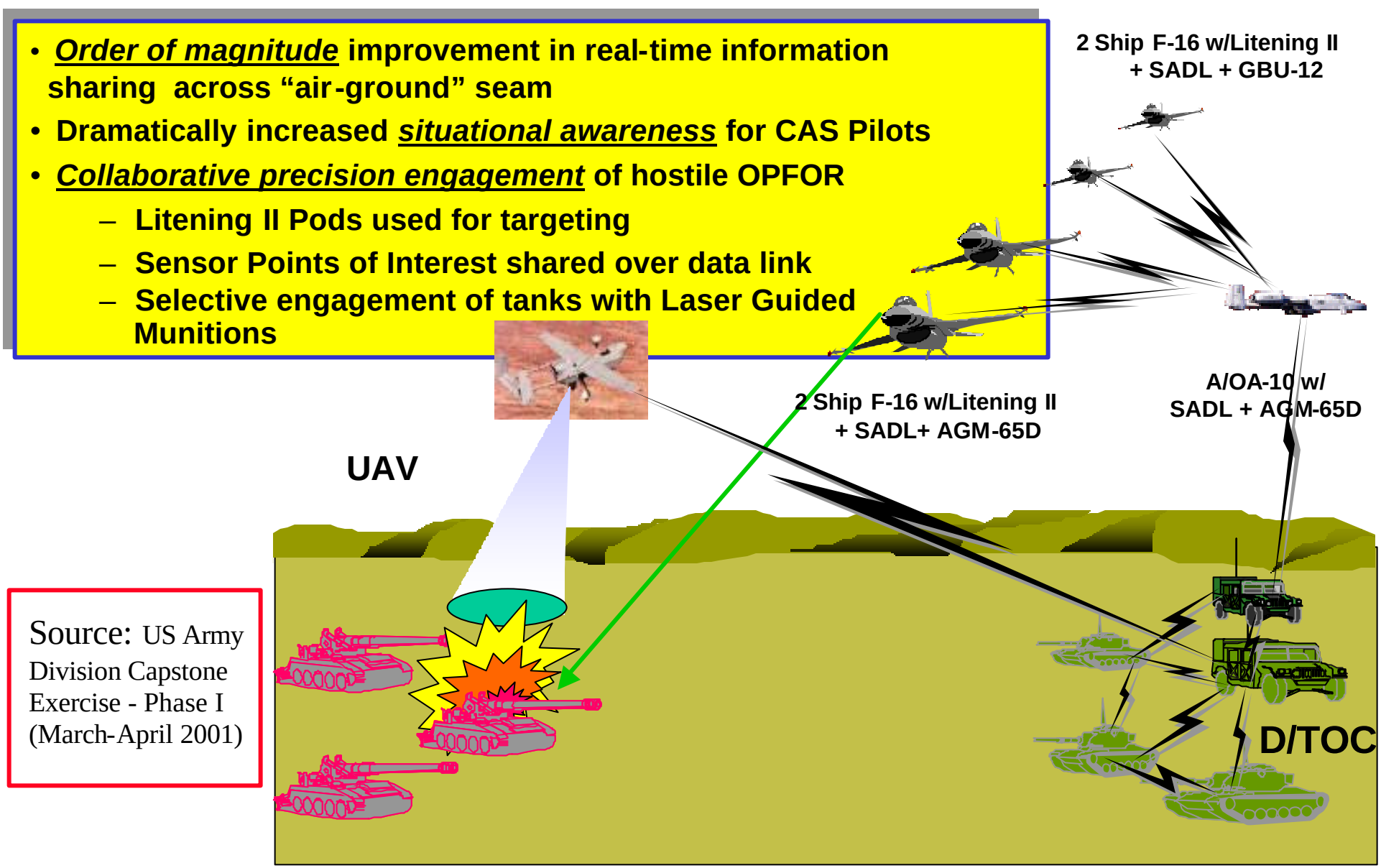
- ***Order of magnitude*** **improvement in real-time information sharing across "air-ground" seam**
- **Dramatically increased *situational awareness* for CAS Pilots**
- ***Collaborative precision engagement*** **of hostile OPFOR**
  - **Litening II Pods used for targeting**
  - **Sensor Points of Interest 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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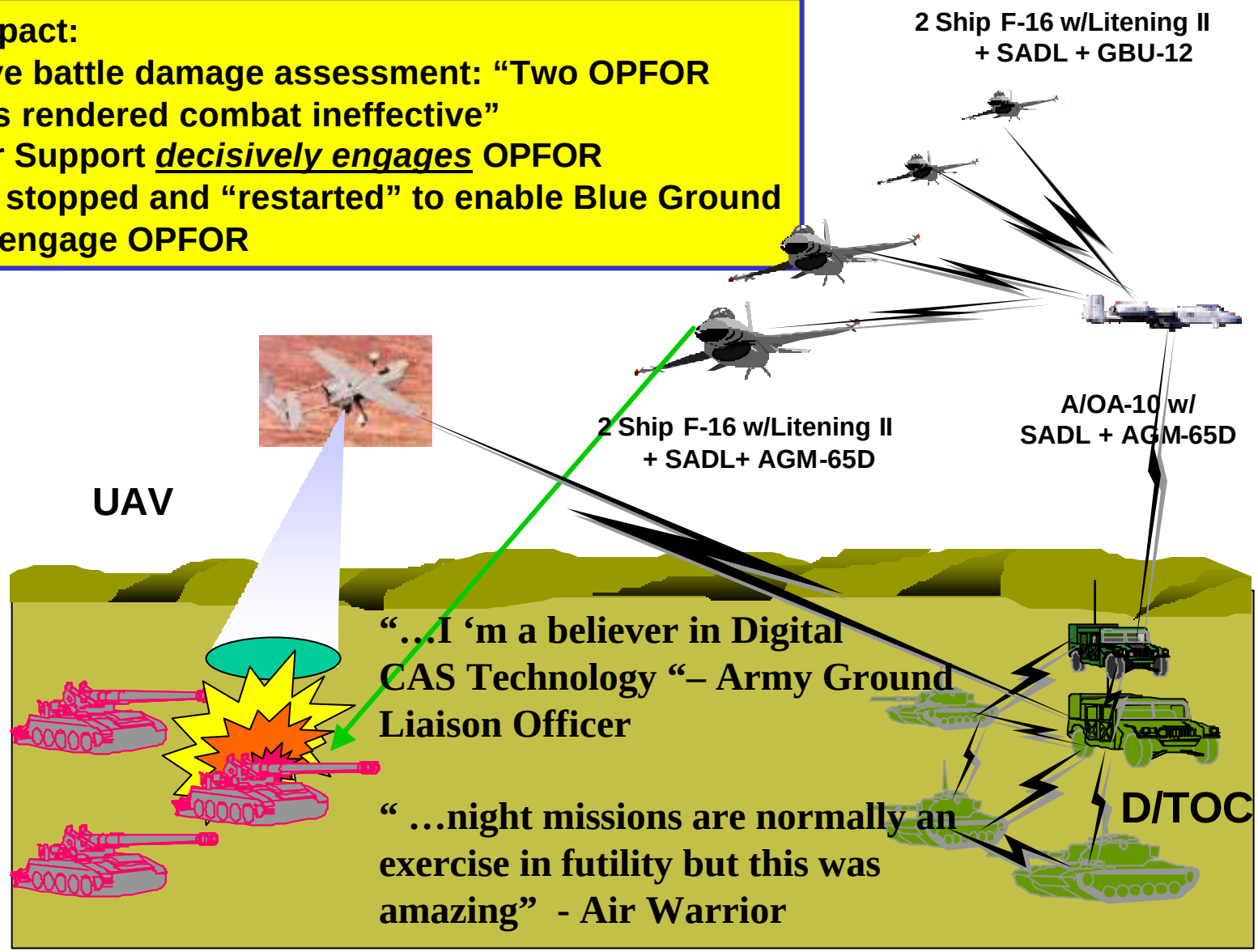
- **Warfighting Impact:**
  - **First wave battle damage assessment: "Two OPFOR Battalions rendered combat ineffective"**
  - **Close Air Support *decisively engages* OPFOR**
  - **Exercise stopped and "restarted" to enable Blue Ground Force to engage OPFOR**



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

Air-to-Ground Mission: Key NCW Relationships

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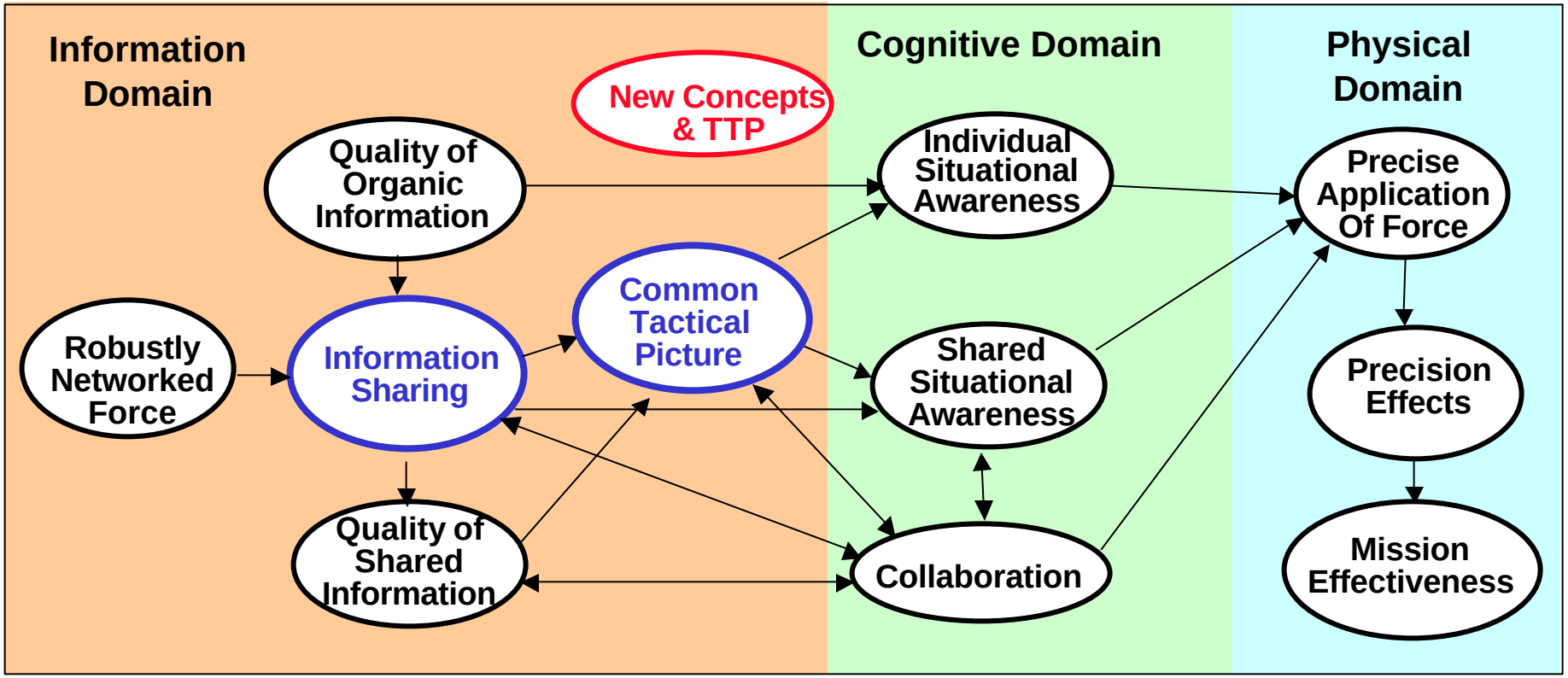
Networked Force
- *Air: SADL*
- *Ground: EPLRS*

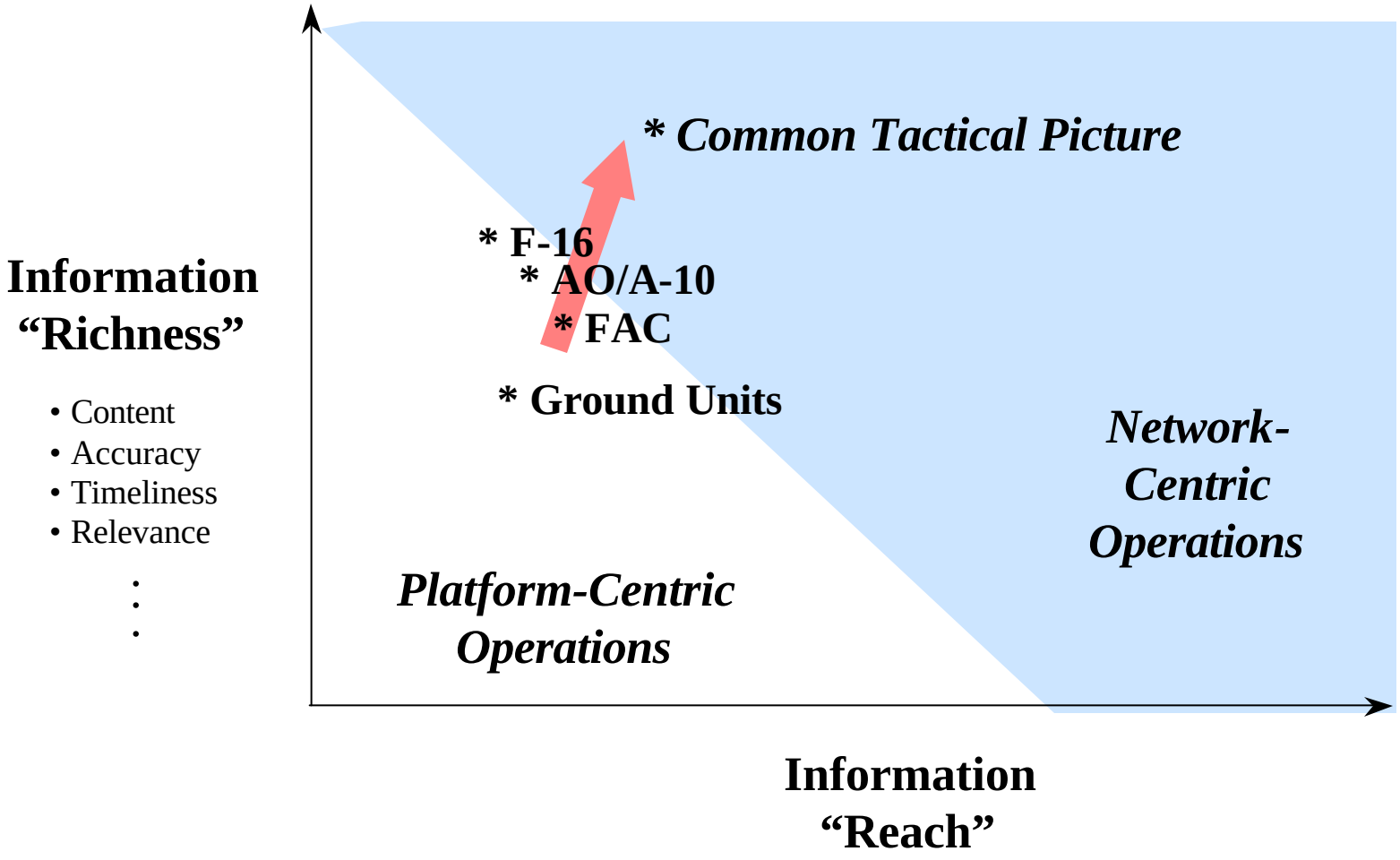
Output Measure: Decisive Defeat Of OPFOR



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



Air-to-Ground: Key NCW Enablers

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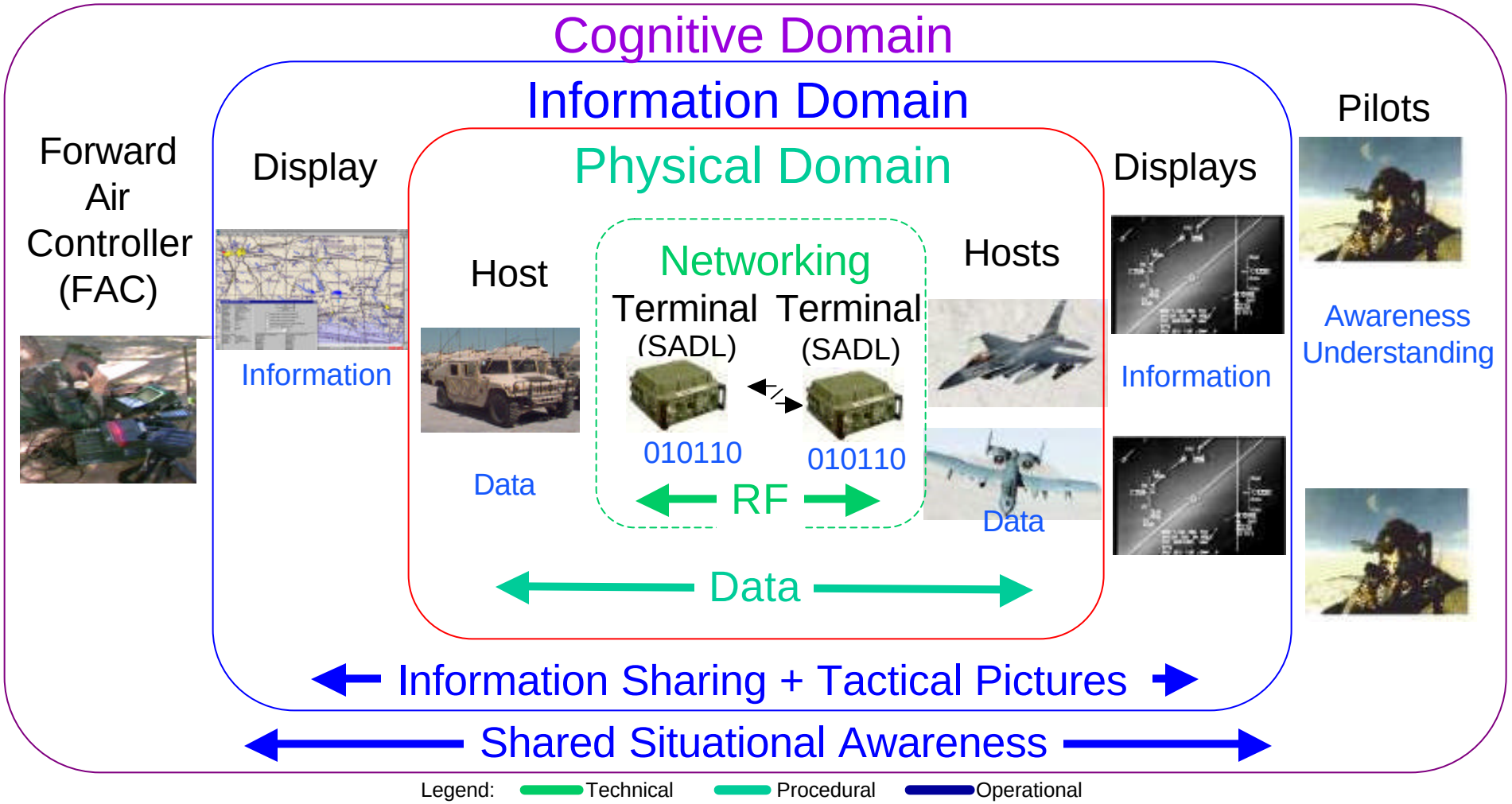
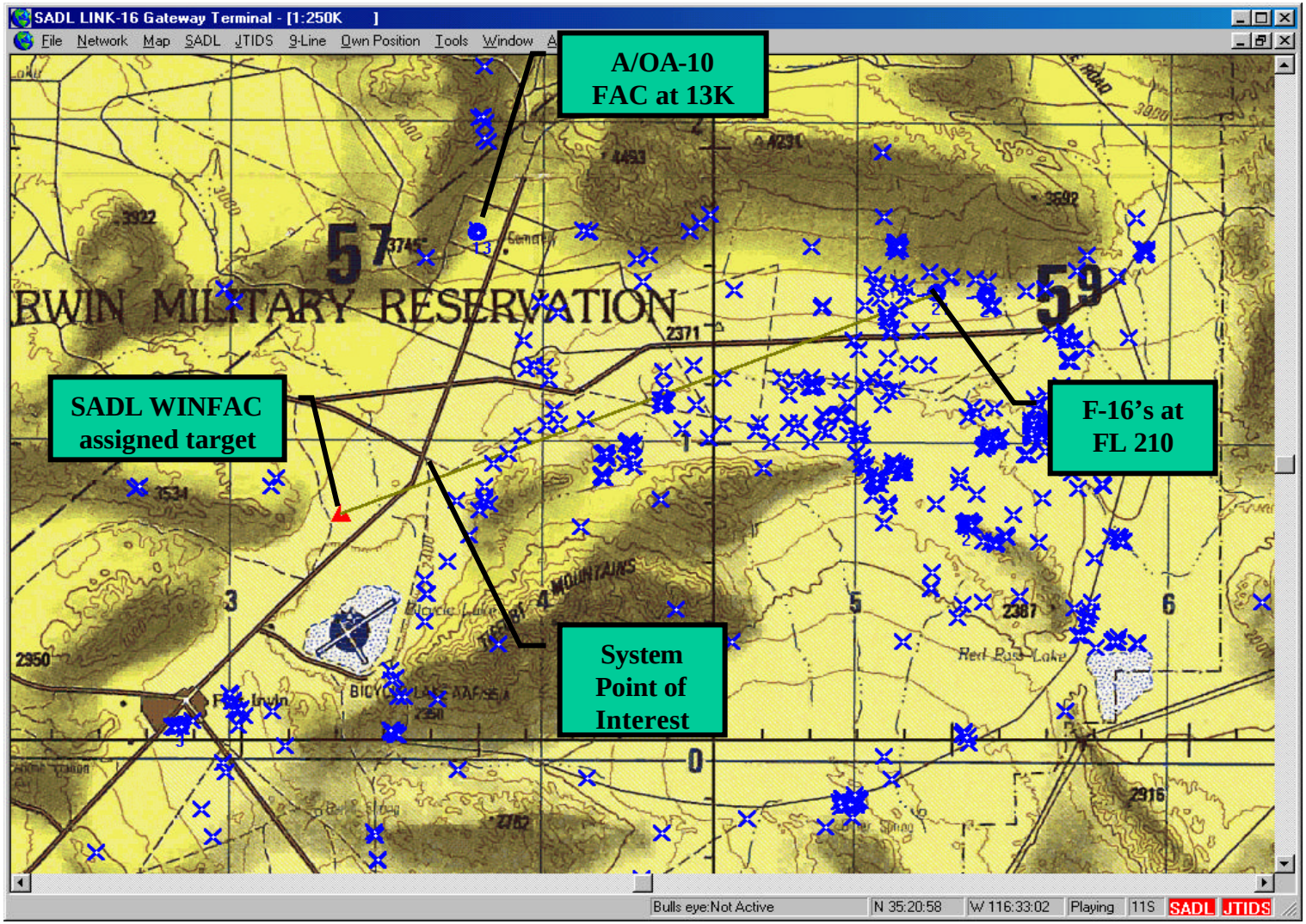
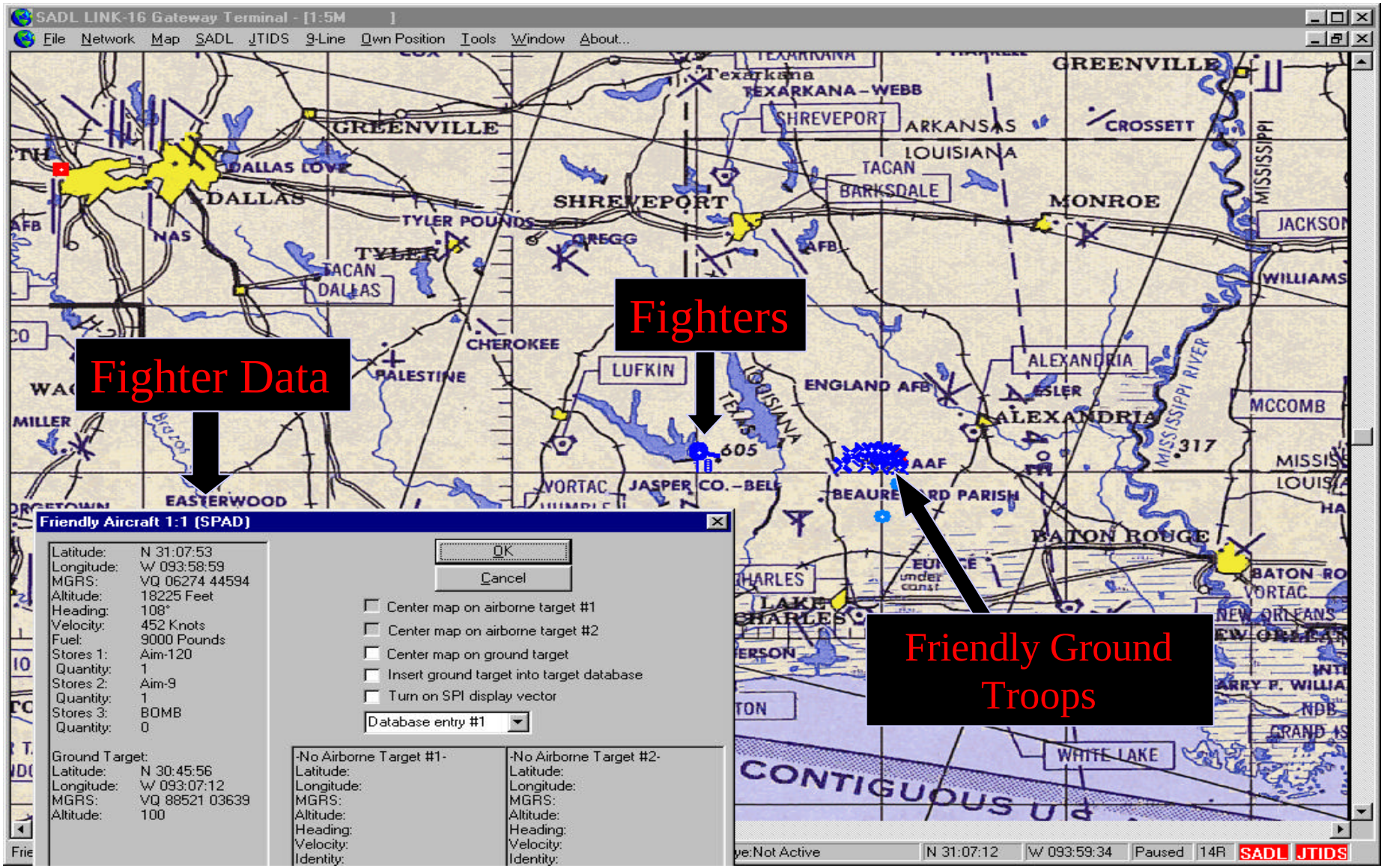


Air-to-Ground: FAC is Networked and Digitized

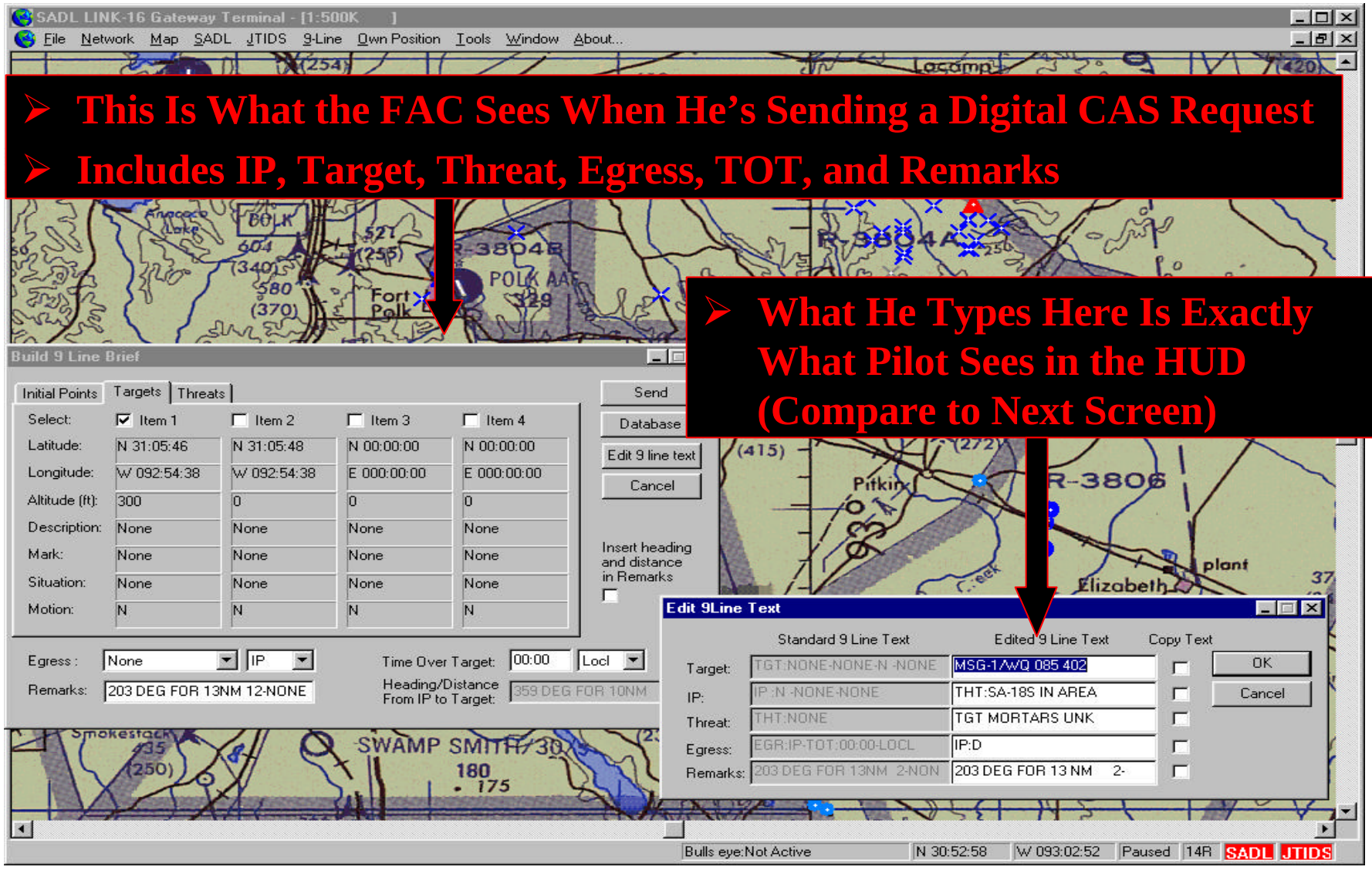
Air-to-Ground:
"Tactical Picture" Enabled by Networking of Air and Ground Forces



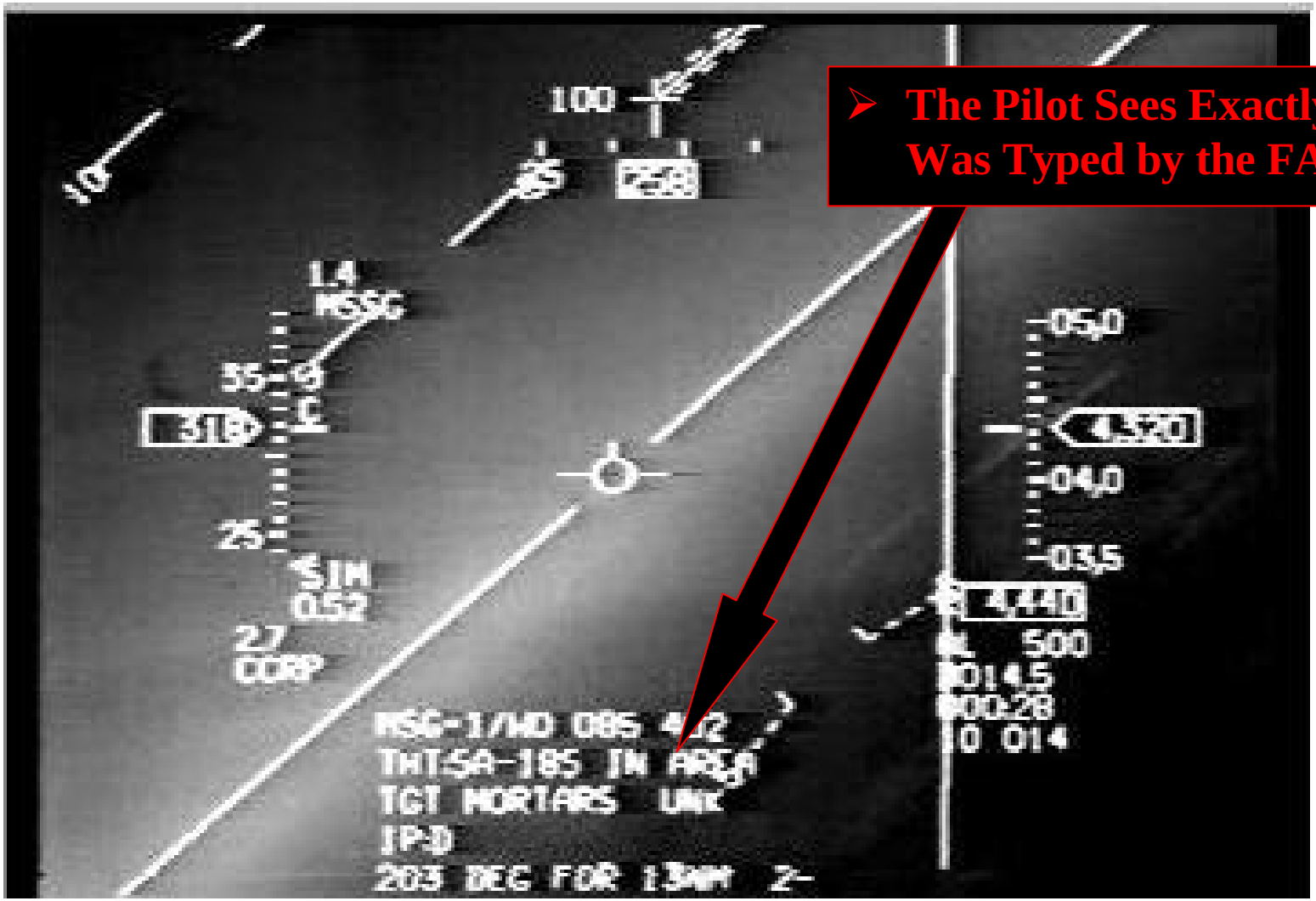
Air-to-Ground:
What the Forward Air Controller Sees



Air-to-Ground:
FAC to Fighter Information Sharing



Air-to-Ground:
FAC to Fighter Information Sharing



- **The Pilot Sees Exactly What Was Typed by the FAC**

Air-to-Ground:

What the F-16 Pilot sees in Tactical Awareness Display

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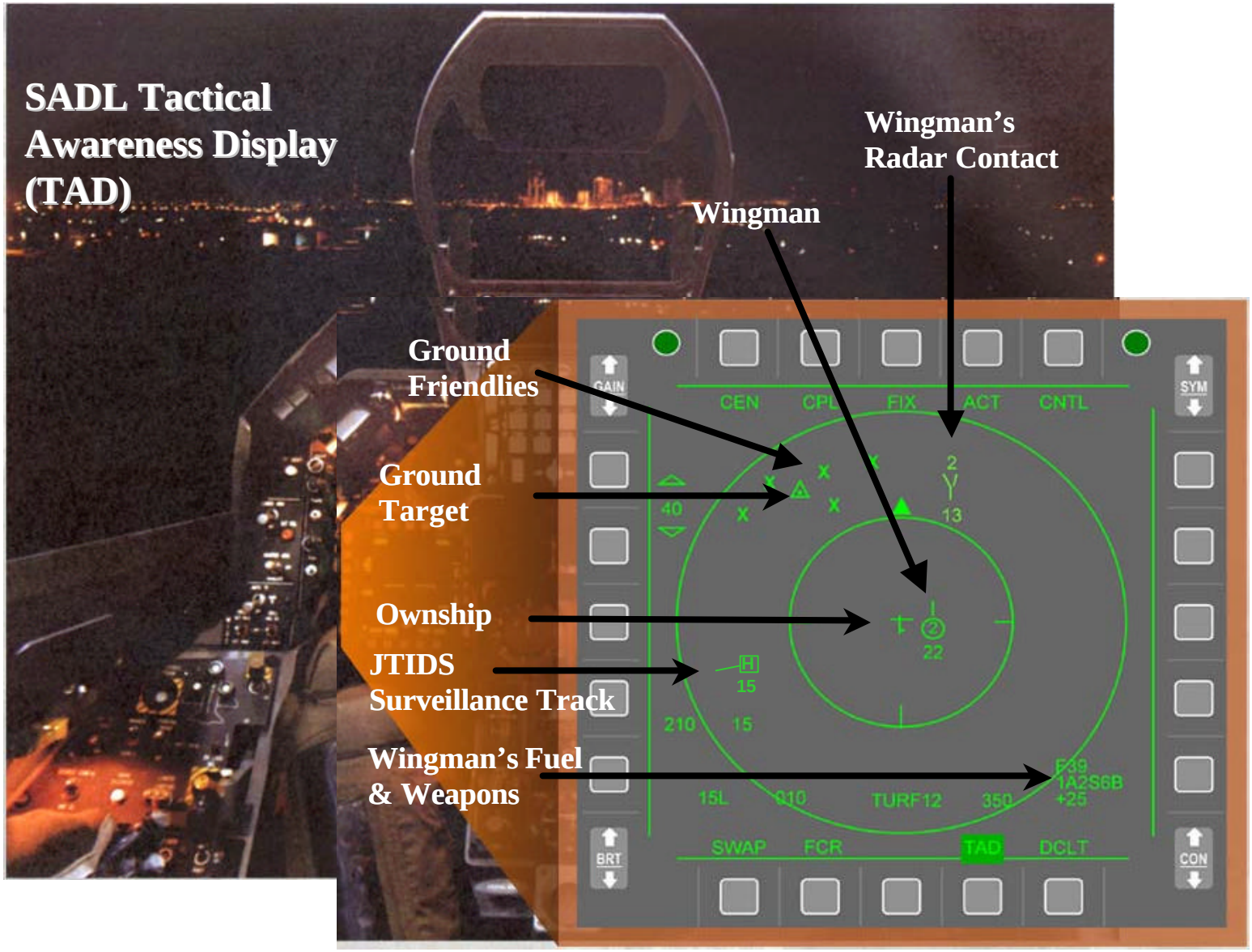
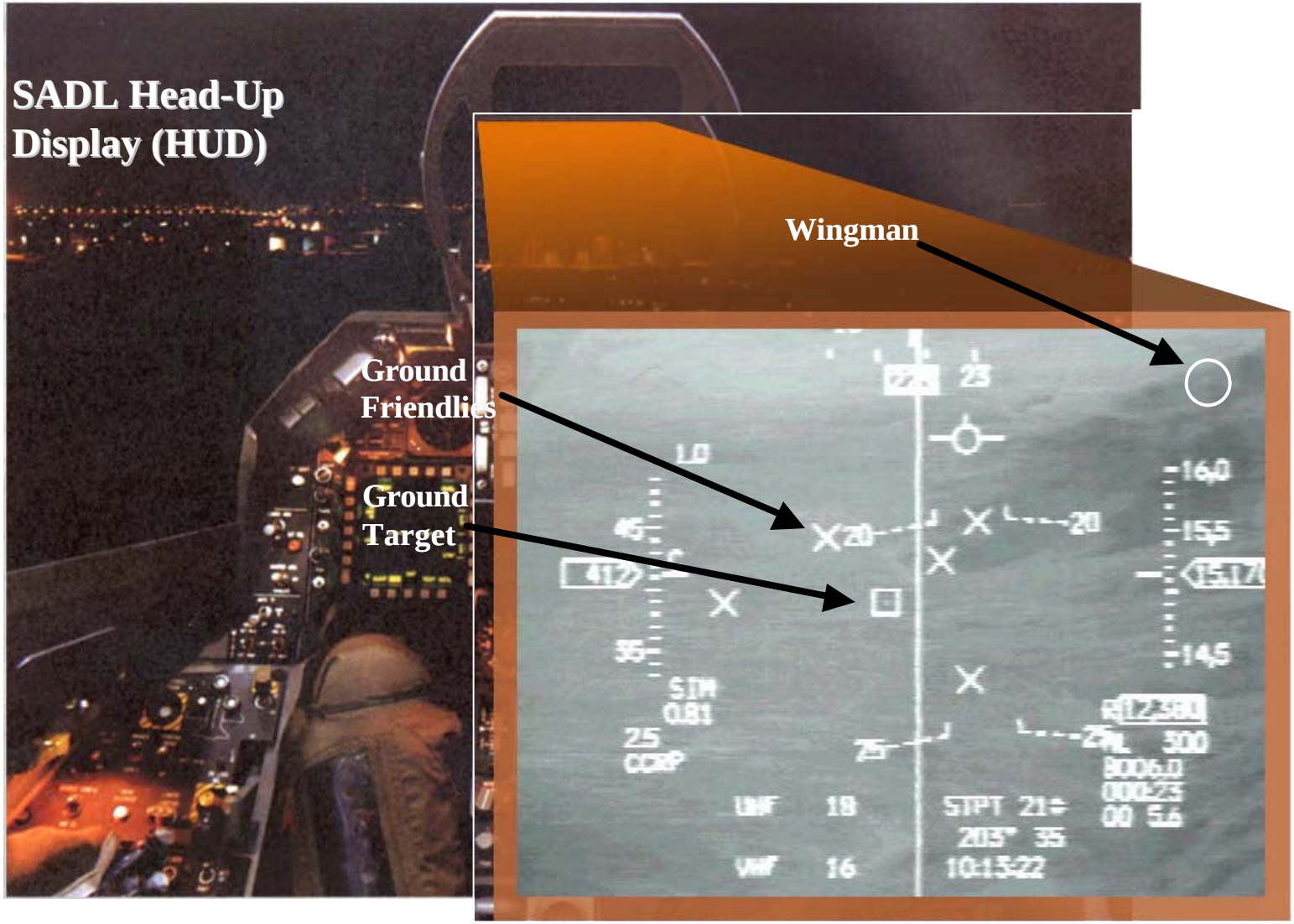


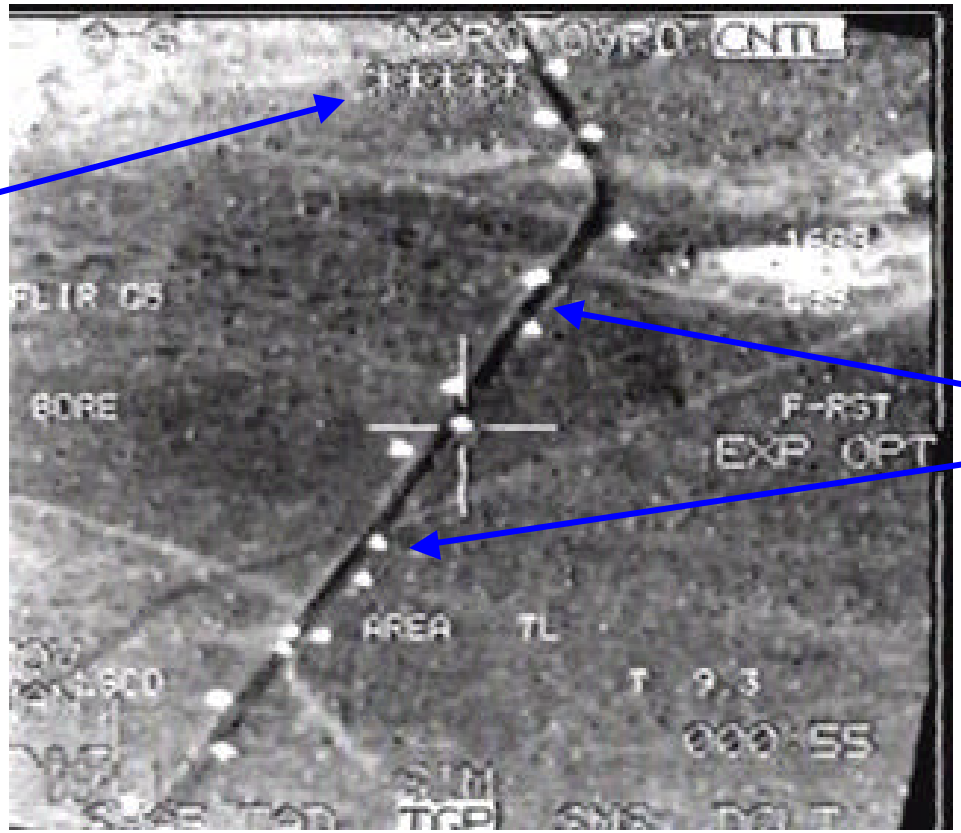
Air-to-Ground:
What the F-16 Pilot sees in Heads Up Display



Air-to-Ground:

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

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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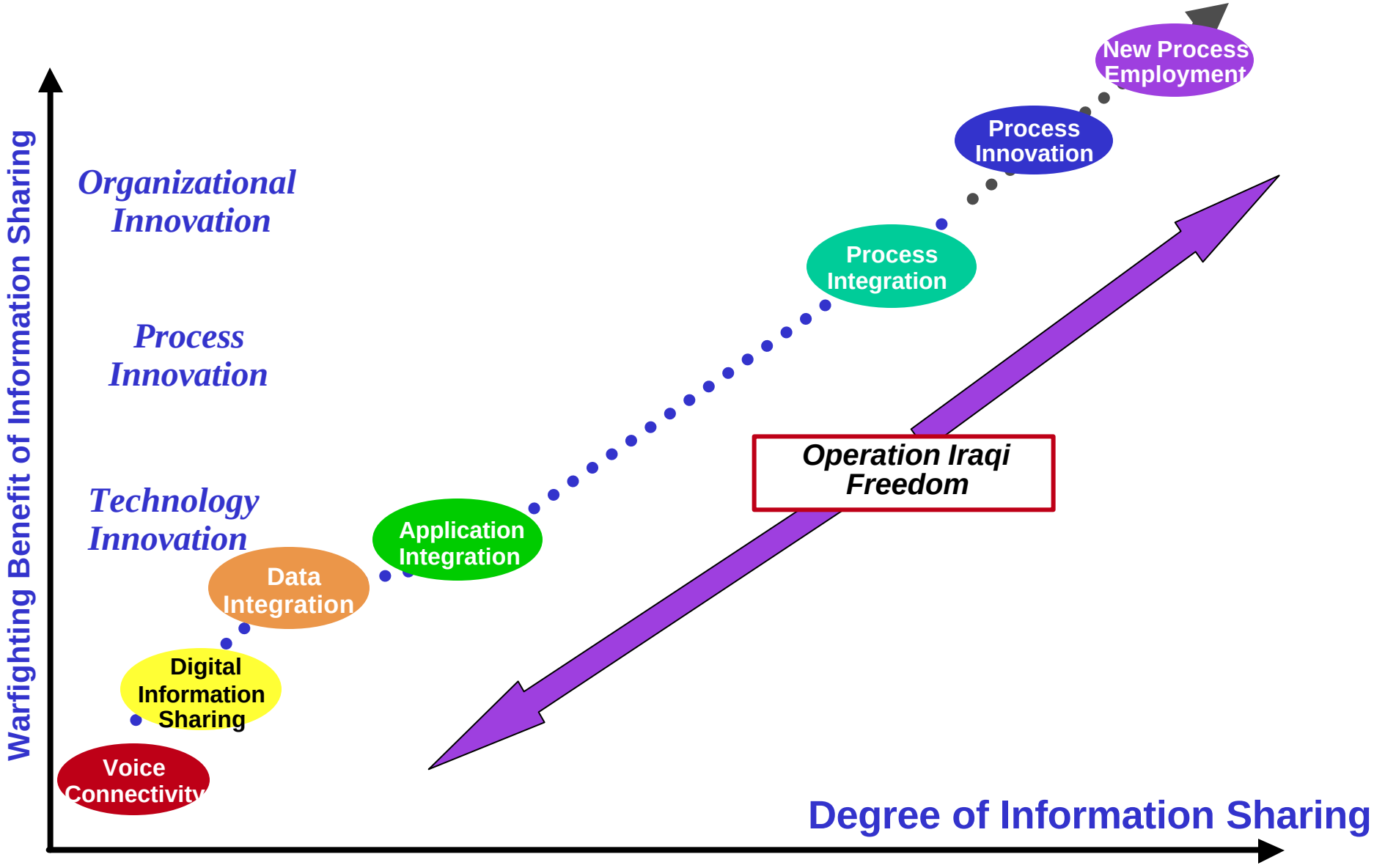
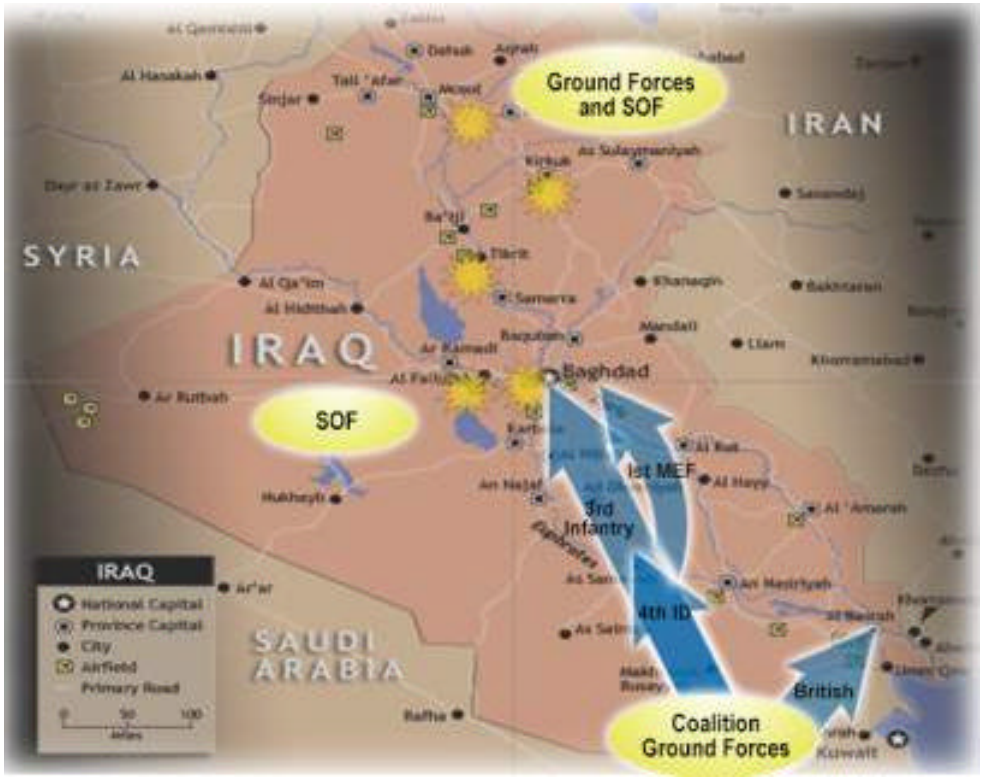


Concept of Operation: Operation Iraqi Freedom (OIF)



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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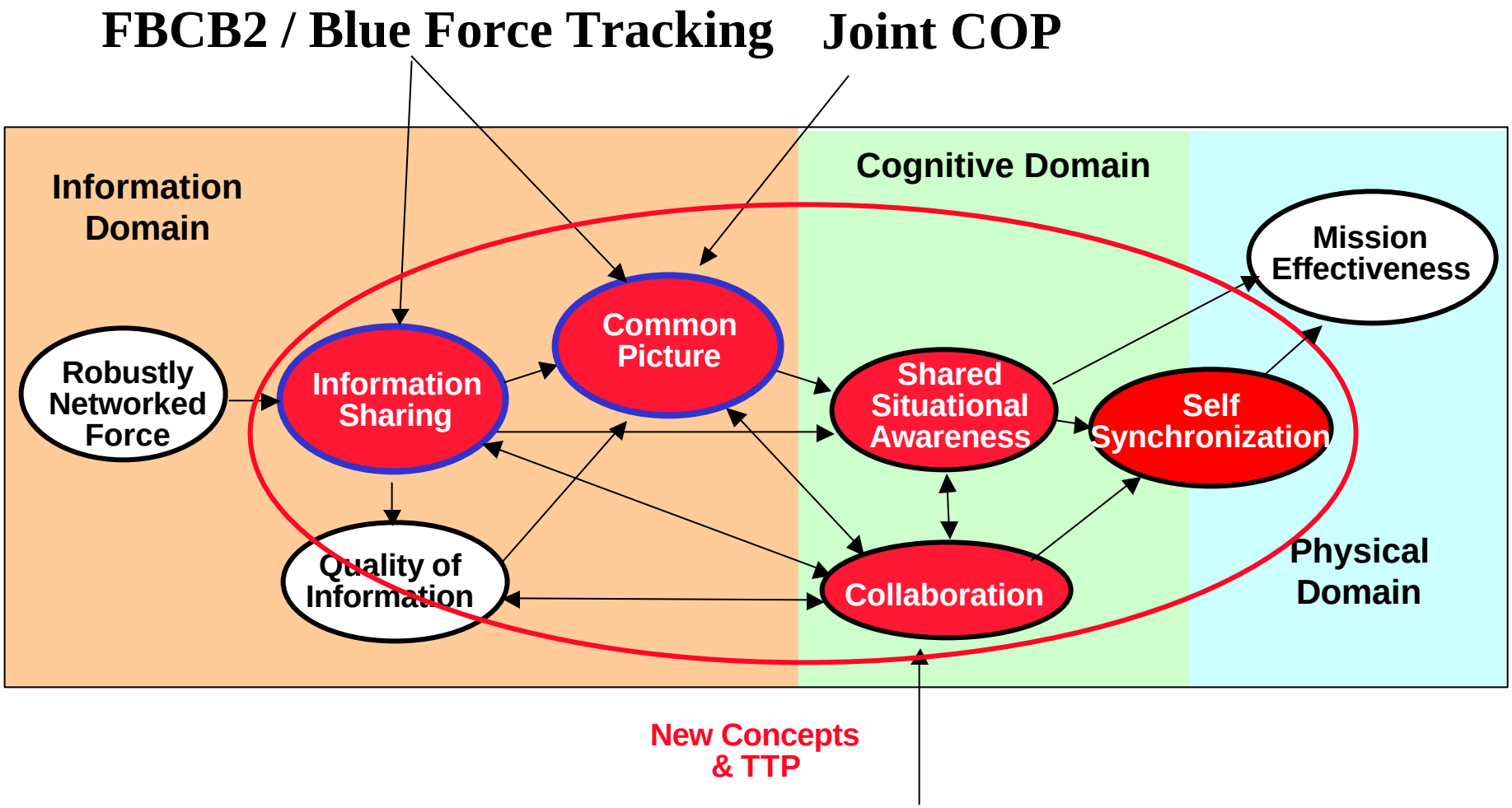

Networking the Force: Employment of FBCB2/BFT during OIF

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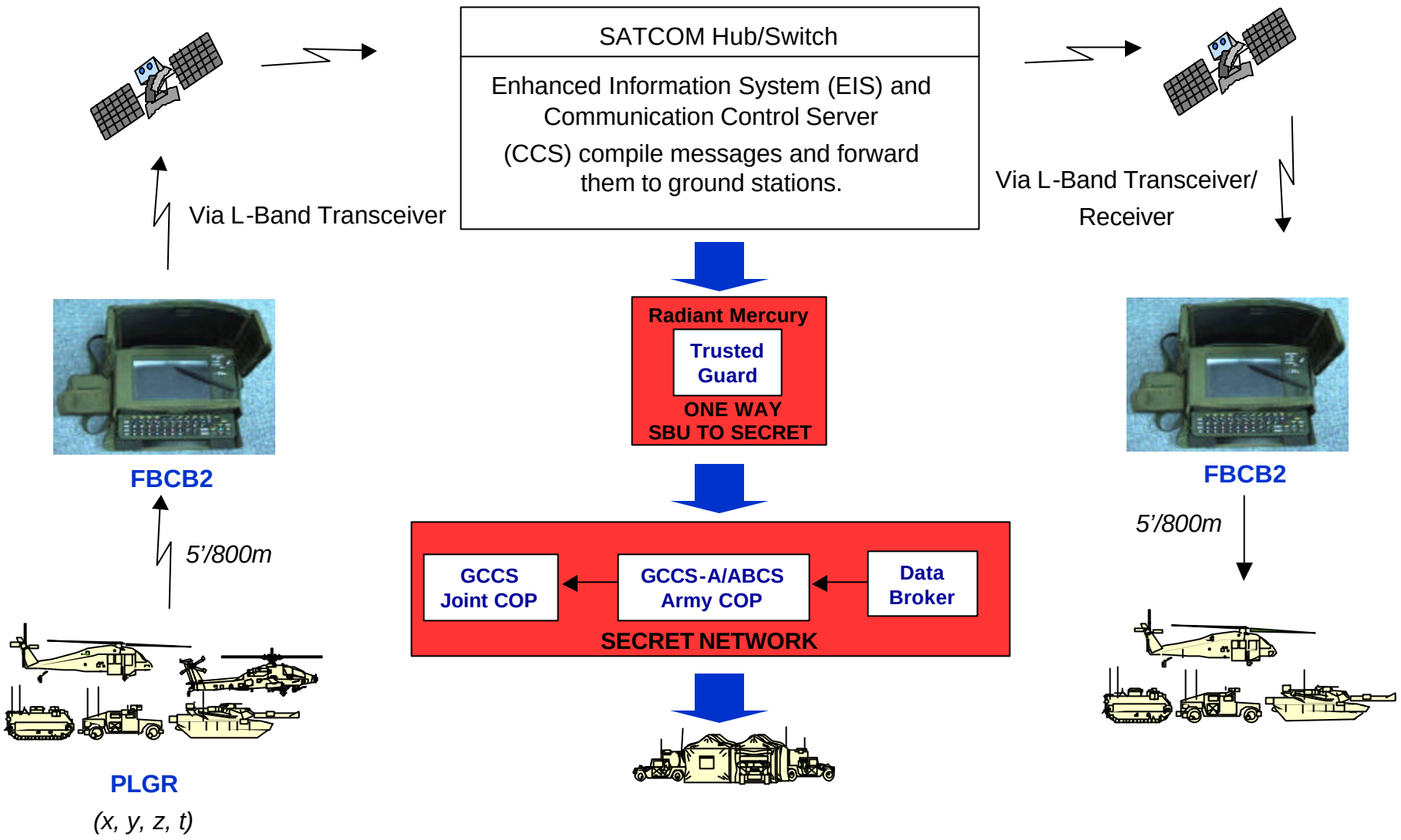

FBCB2/BFT install on US Forces during OIF

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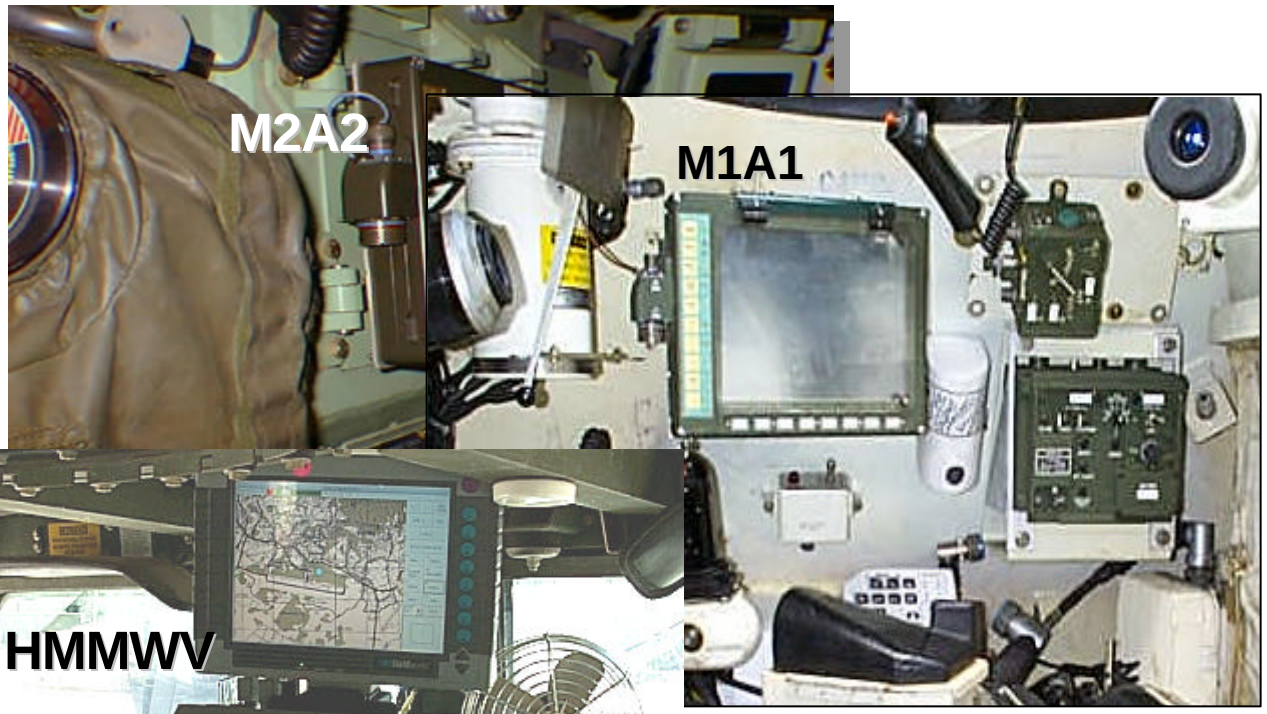
L-BAND TRANSCVR (MTS)*

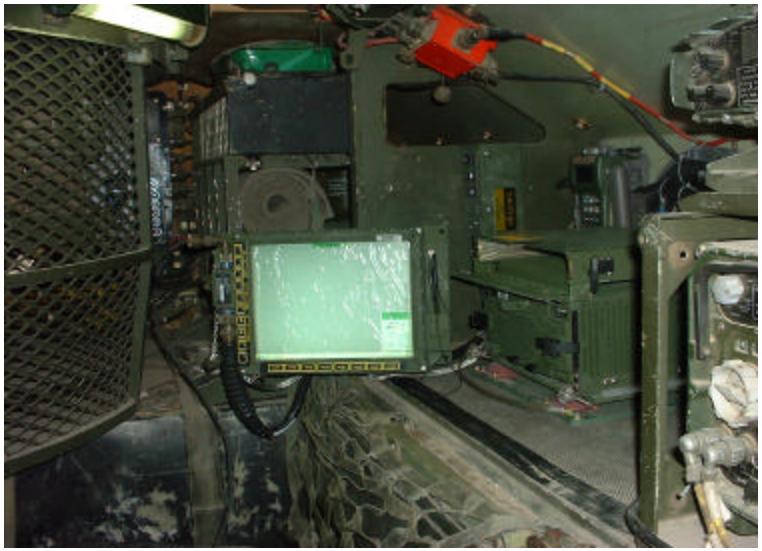
PLGR

FBCB2

BFT Transceivers



FBCB2/BFT install on UK Forces during OIF



Ground Maneuver in OIF: Degree of Networking

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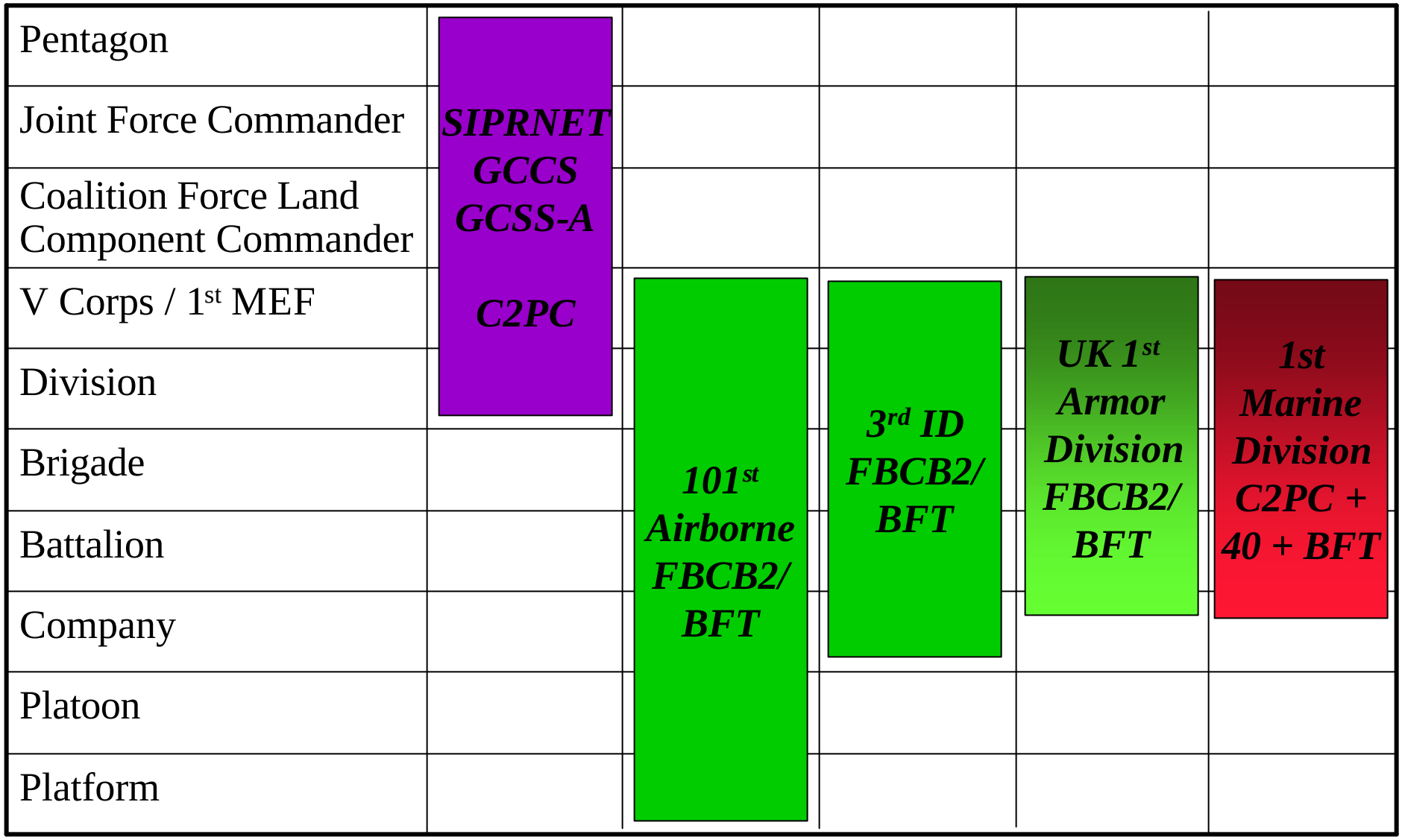

FBCB2/BFT Deployment in 1(UK) Armd Div

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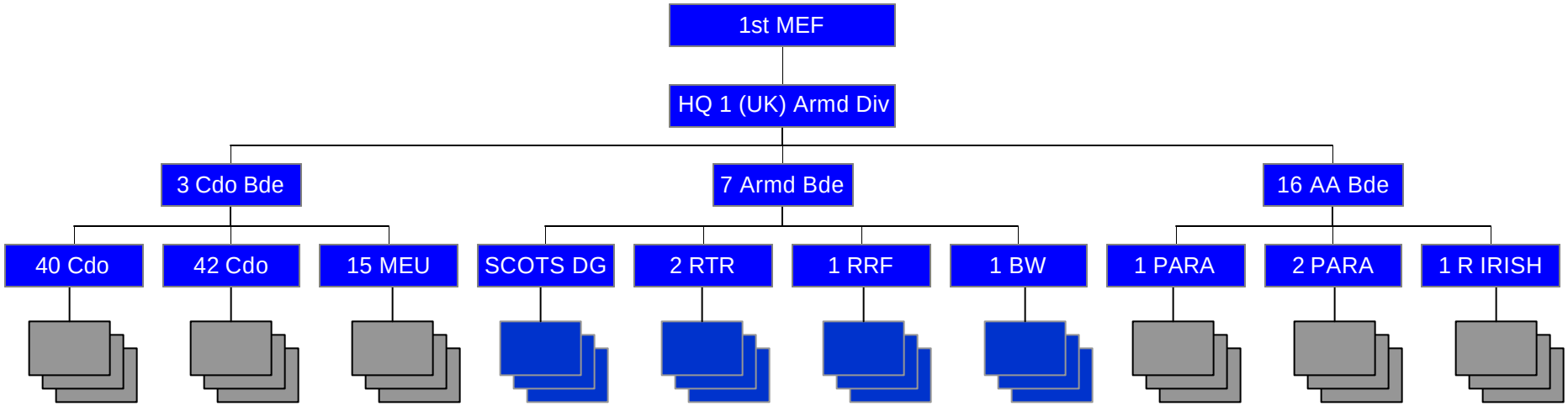
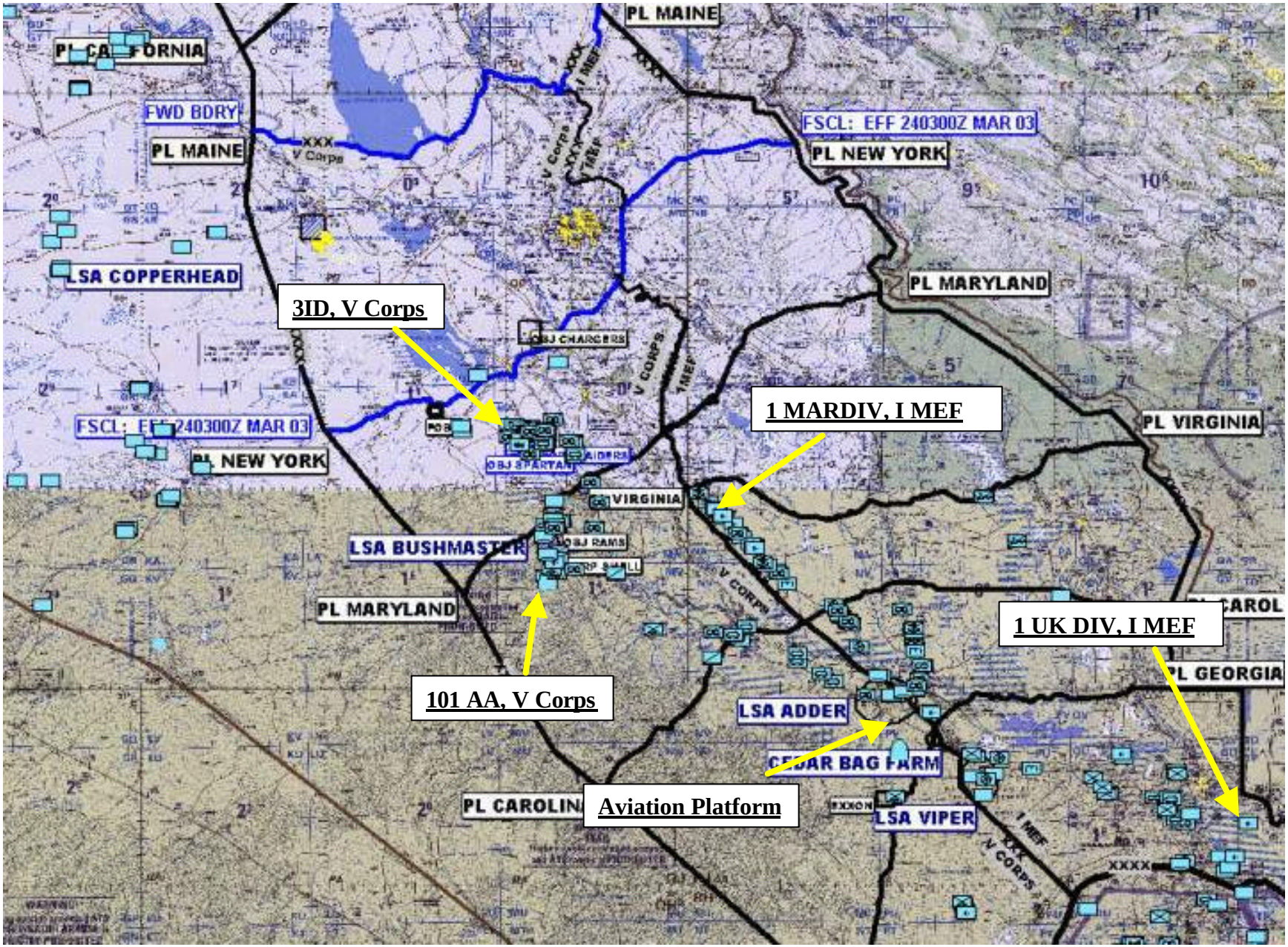
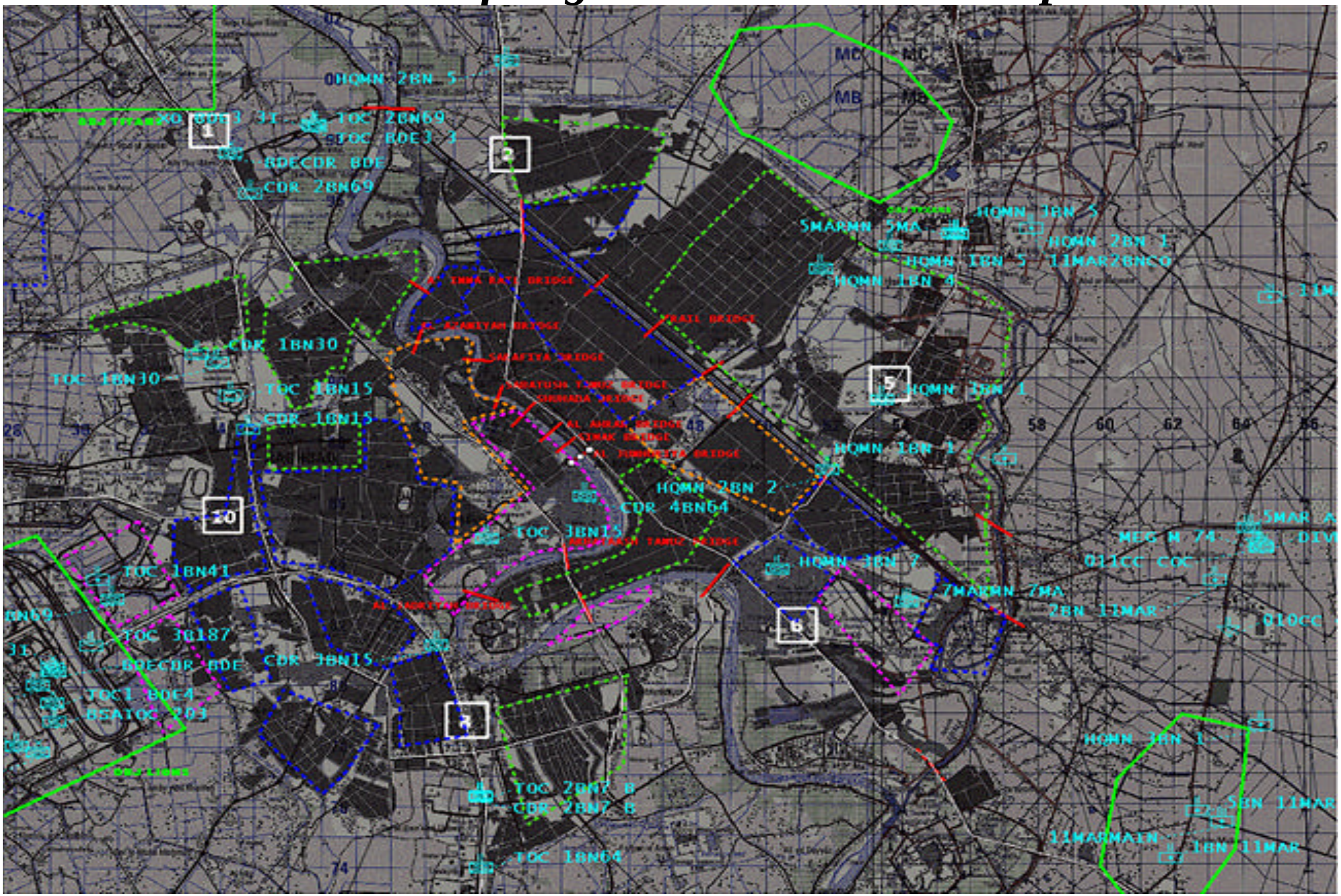


Total of 47 units of FBCB2/BFT installed in 1 (UK) Armd Div

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



Common Operational Picture
OIF - Seizure of Baghdad International Airport



Common Operational Picture: OIF - Baghdad

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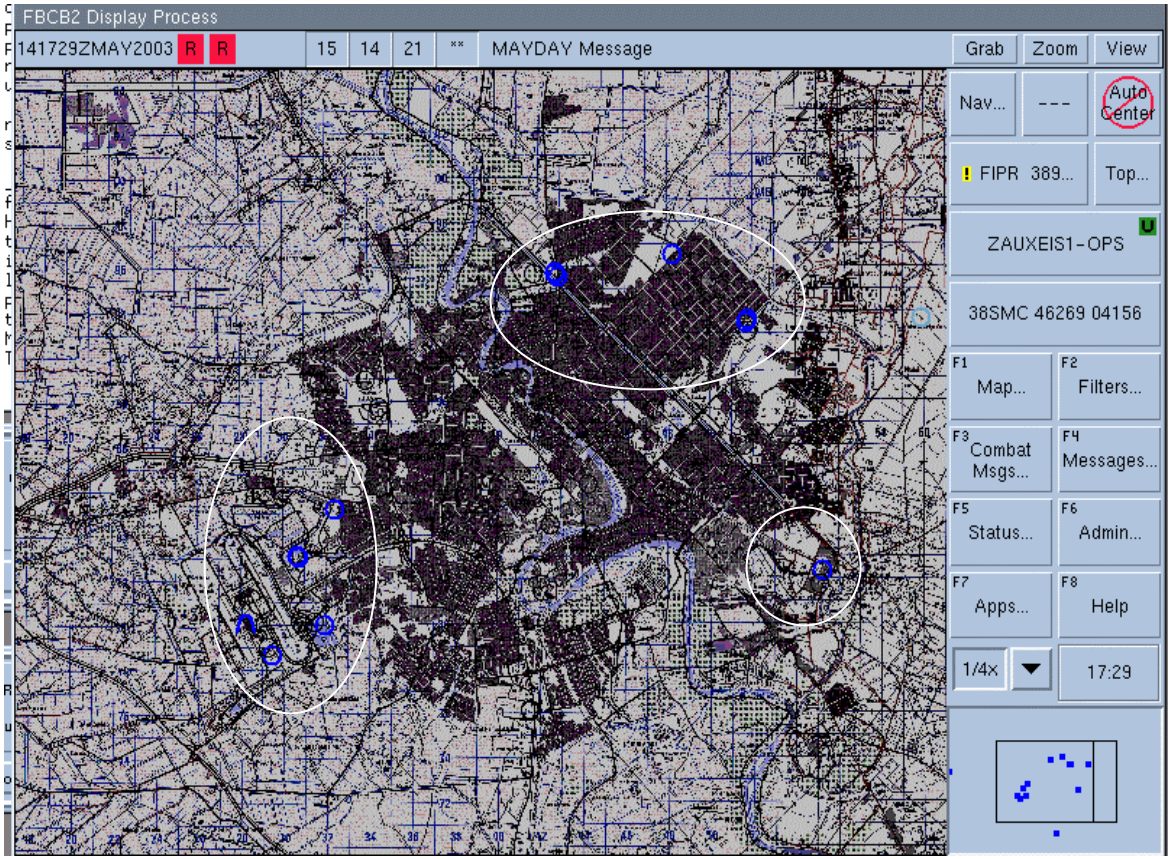

"When my TF seized a key highway intersection south of Baghdad, I could see the company commander icons at each blocking position and I knew we had control of the objective." **- LTC John Charlton, Cdr TF 1-15, 3 ID**

"Decision Superiority"

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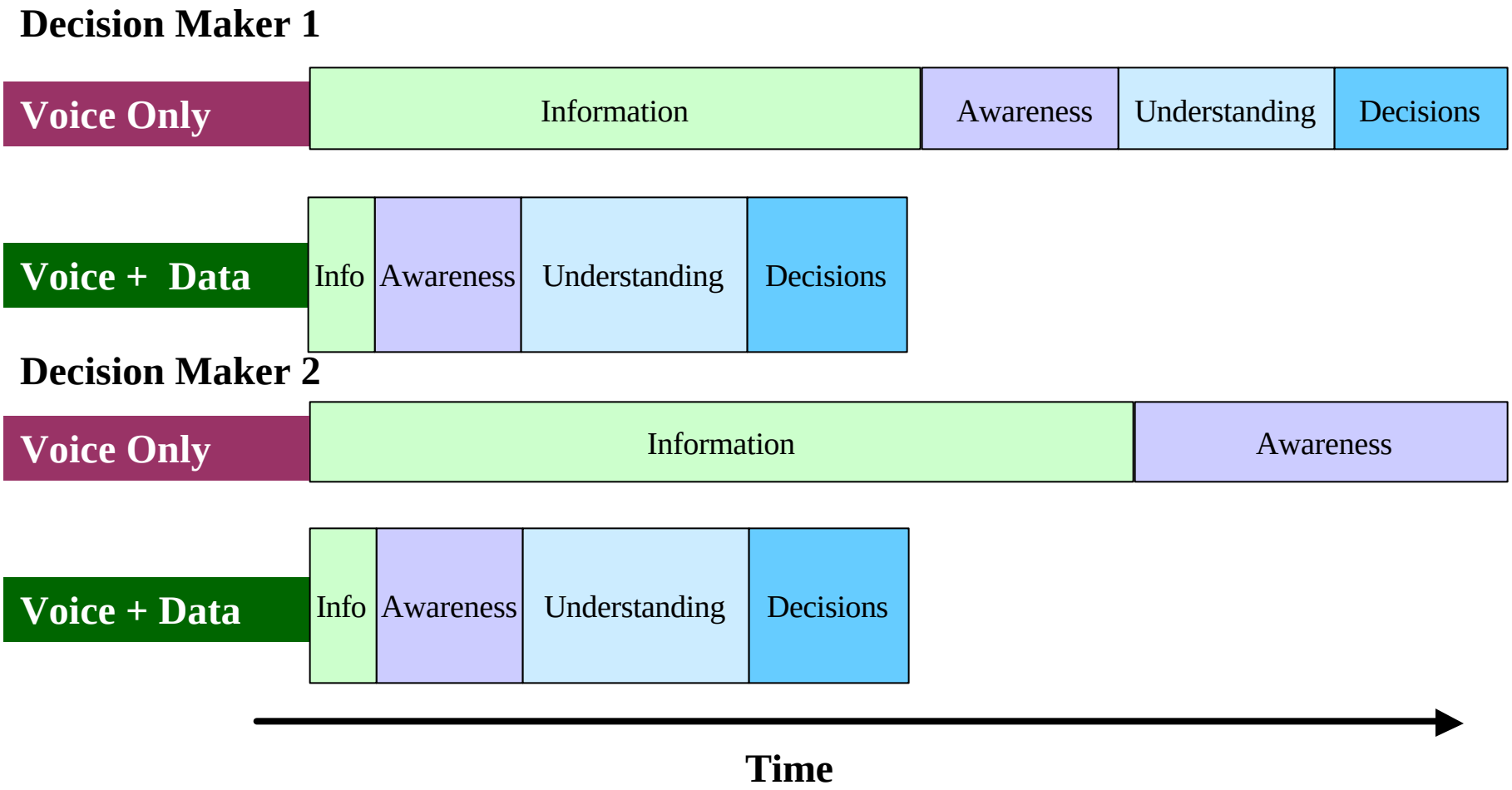
Superior Ability to Observe – Orient - Decide - Act



Operational Impact of NCW Capabilities (1 of 5)

"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)

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

Operational Impact of NCW Capabilities (3 of 5)

"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-2/69 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"

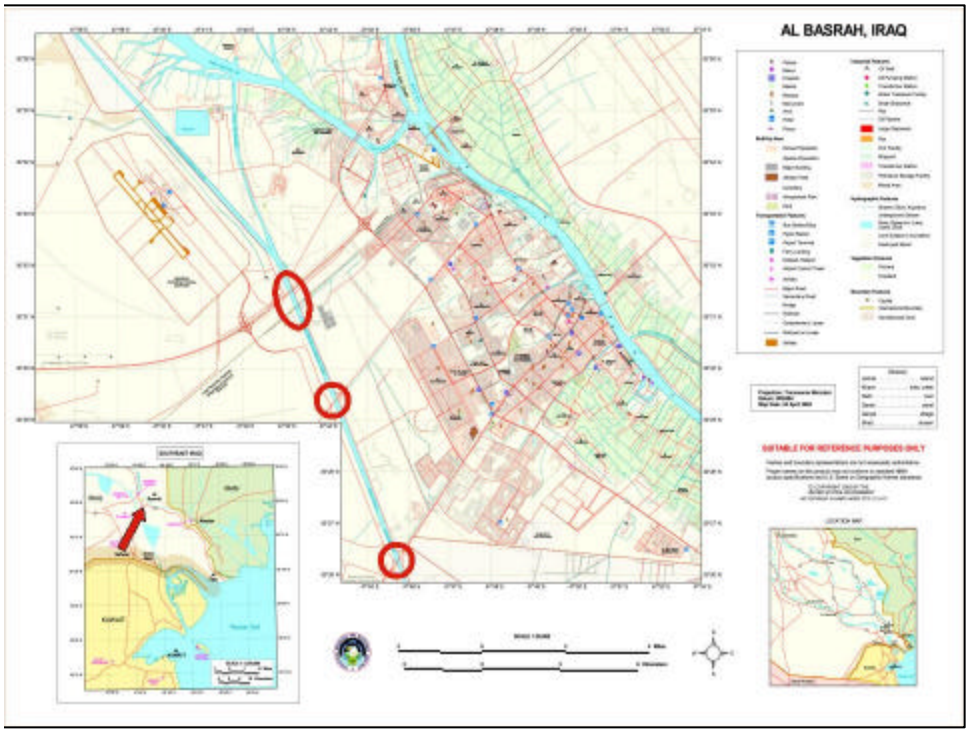
- LTC, USMC Division Forward Senior Watchkeeper

Operational Impact of NCW Capabilities (4 of 5)

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)



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

- **Coy Comd in *1st Battalion Royal Regiment of Fusiliers - 1st (UK) Armd Div* battle group exploits NCW capabilities ability to de-conflict 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**

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

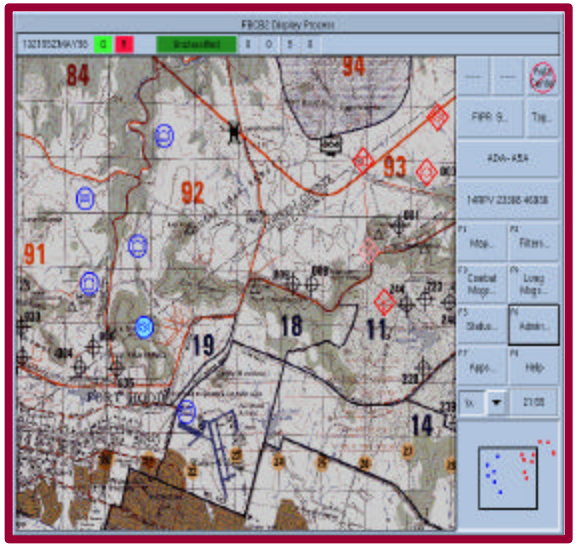
What's Different?

- **"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**

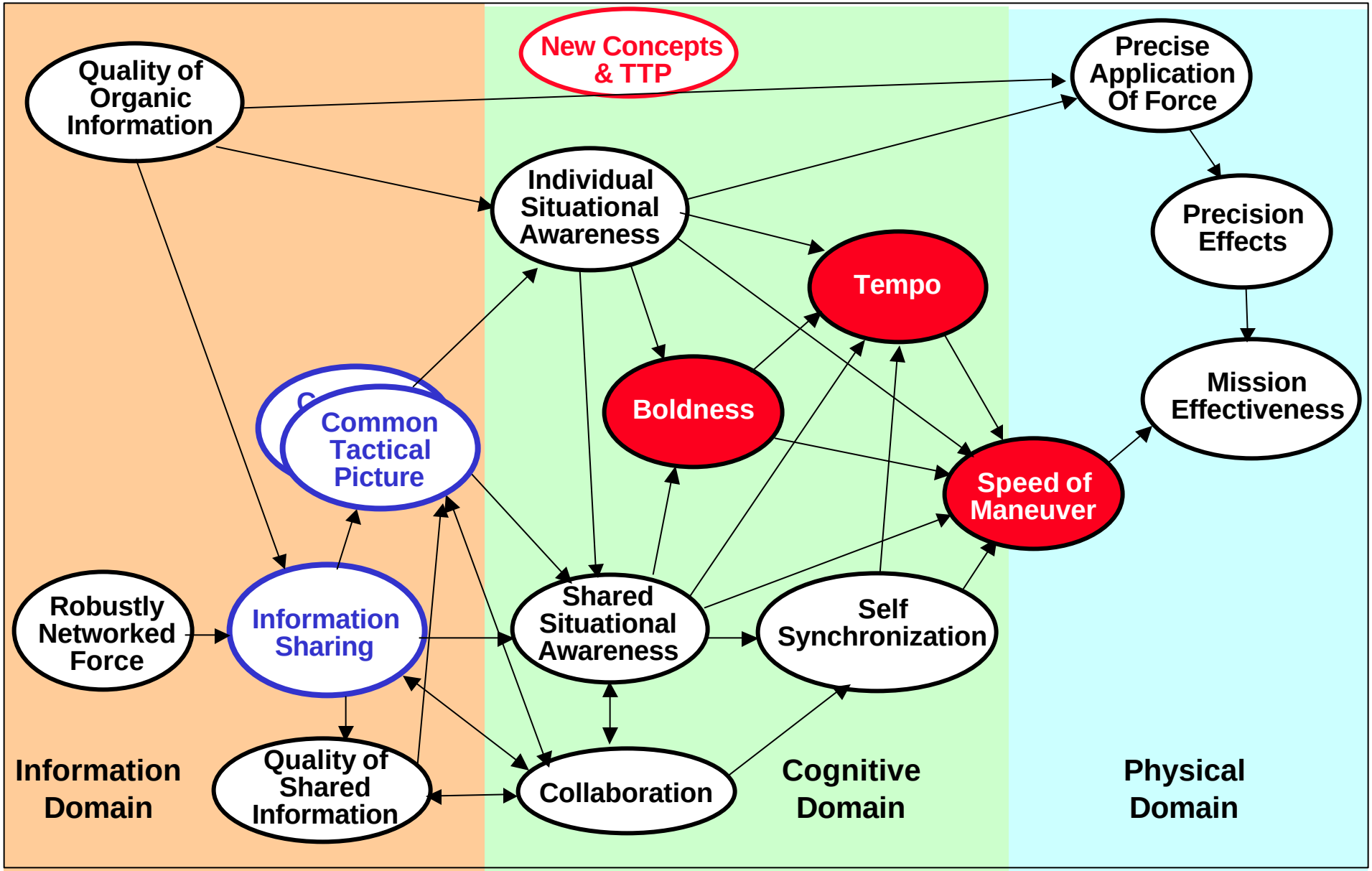
Increased Situational Awareness: Reduced Cognitive Loading

"… sitting on top of a moving turret, talking into the radio, trying to control the vehicle, getting a red flashlight, finding the map, looking at the map, figuring out where I am with the PLGR (GPS), back to the map…with FBCB2 I didn't have to do any of that to know where I was."

– CPT, 7th Cavalry Regiment

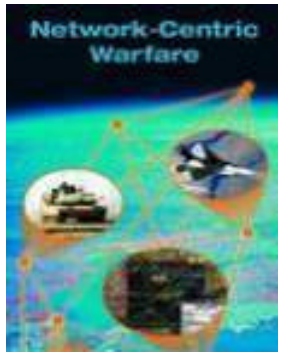


Network Centric Warfare: Key Relationships



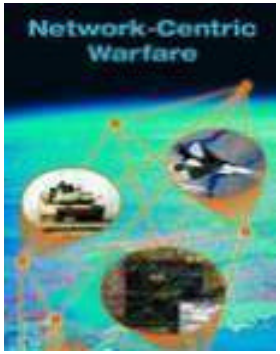
Implementing Network Enabled Capabilities
A DoD OFT Perspective on Strategy

- 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



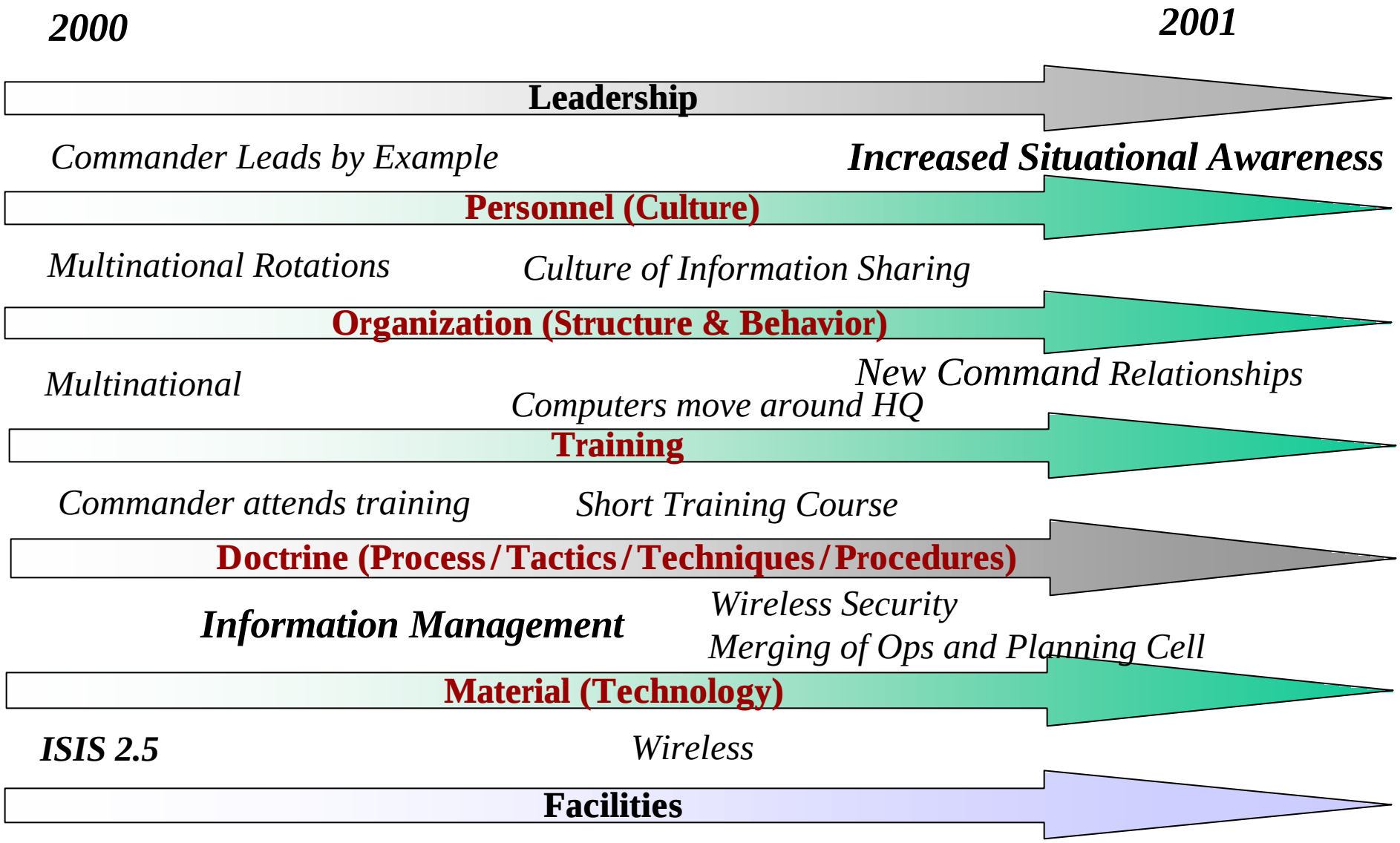
Getting the Theory Right:
NCO Case Studies

- 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



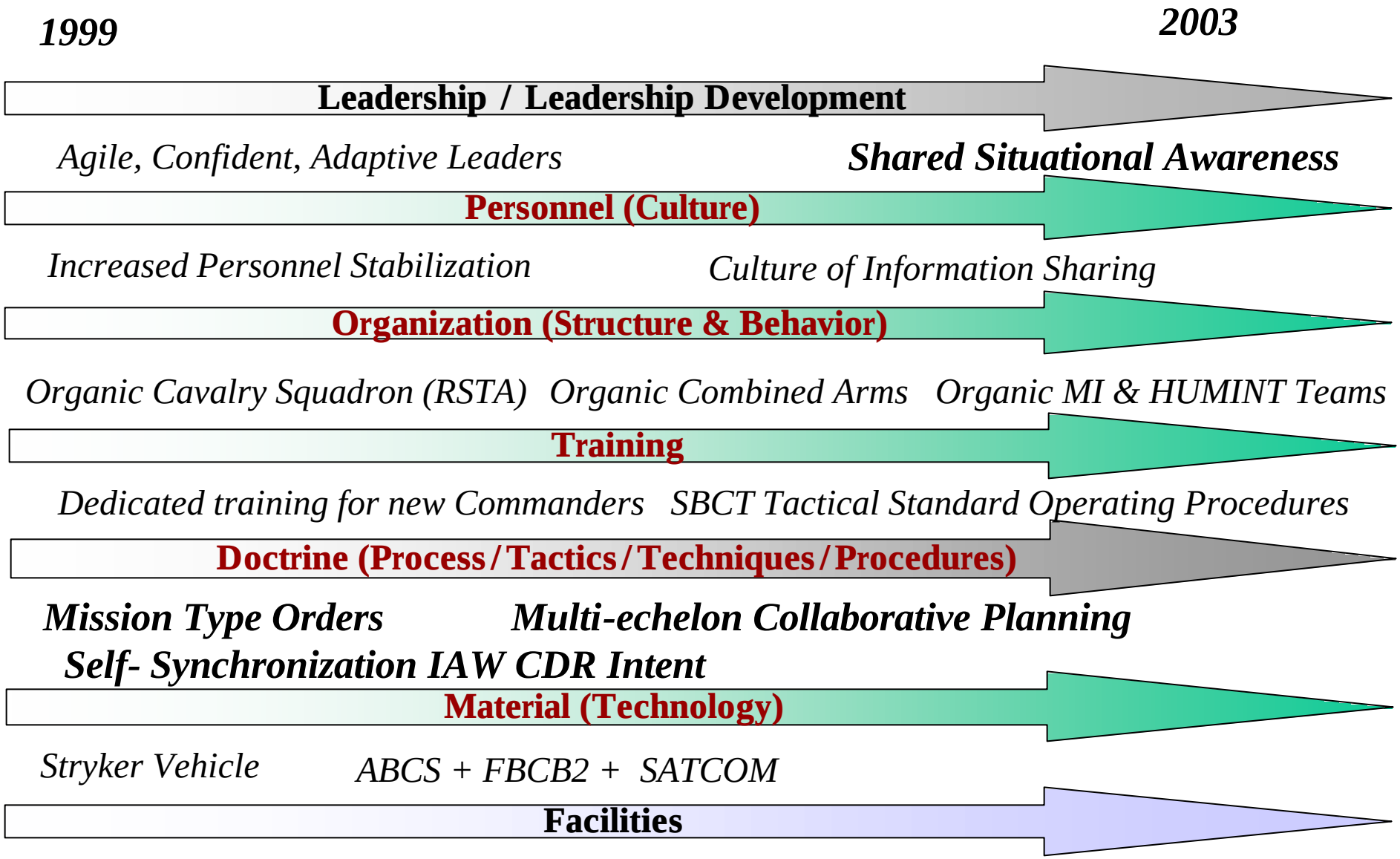
NCO Case Study: NATO Allied Command Europe Immediate Reaction Task Force (Land)

Office of Force Transformation



NCO Case Study: Stryker Brigade Combat Team

Office of Force Transformation



Stryker BCT Mission Effectiveness

- ***"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

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?