

Network Centric Warfare in Western Iraq

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Agenda



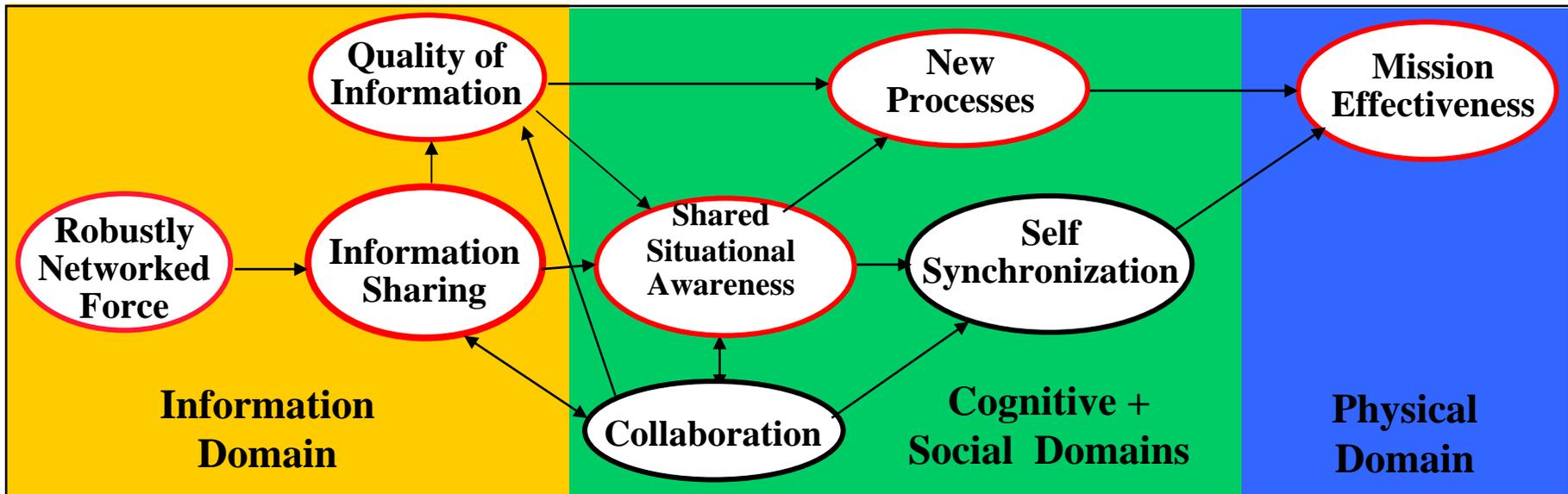
- **Background - Western Iraq Theater**
 - Missions
 - Organizations
 - Metrics
- **NCW in the Western Theater**
- **Findings**
- **Conclusions and Recommendations**
- **Summary**

Tenets of NCW... the New Value Chain



Tenets of NCW: A Hypothesis Regarding Sources of Power

- 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**



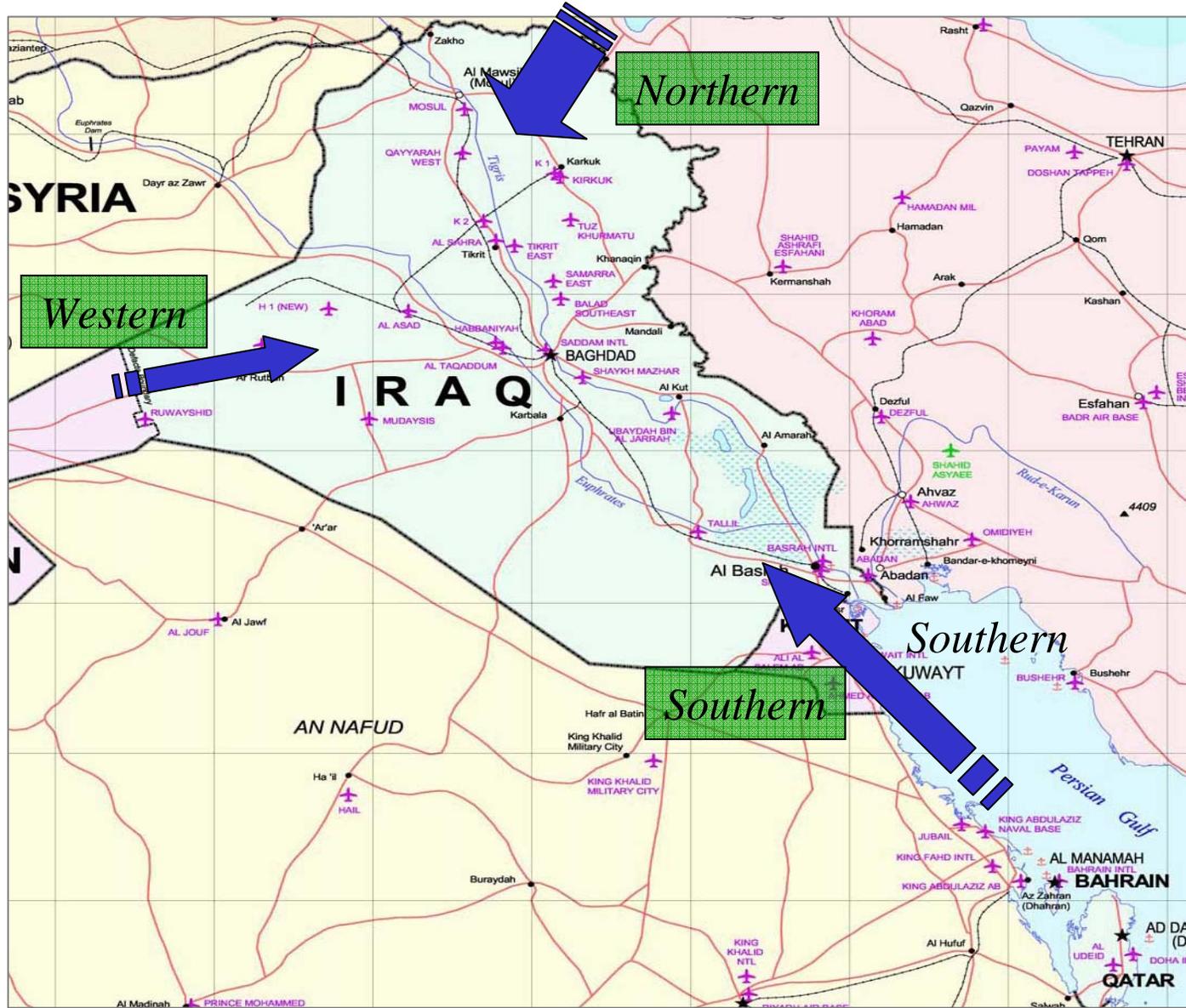
“I was already familiar with the term...network centric warfare. Sitting in the JOC [Joint Operations Center] one day and I said ‘wow this is network centric warfare.’”

– COL Robert Green, USA SOF



Linked Systems

OIF Theaters



Western Theater



Western Theater Battlefield Characterization



- Controlled by Air Component Commander (ACC)
- Special Operation / Air Force focus
- Non-contiguous --- non-linear
- Non-traditional linkages of infrastructure networks supported...
- COIs which supported...
- Non traditional missions and TTP
 - XATK
 - NTISR
- Economy of force (500 : 10,000 Iraqis)



XATK: On Call Attack

NTISR: Non-Traditional Intelligence, Surveillance and Reconnaissance

COI: Community of Interest

Western Iraq Missions



- **Primary: C-TBM in Western Iraq**
 - **Identified by National Command Authority as top strategic priority**
 - **Keep Israel out of the war**
 - **Keep the Coalition intact**
 - **Prevent Mid-East meltdown**
- **Secondary: CAS in support of SOF**
 - **410 AEW fighters + other air + SOF + ISR + CAOC TST / C2**
 - **XATK (F-16C+, A-10, GR-7) with inherent Non Traditional Intelligence Surveillance and Reconnaissance (NTISR) and TST TTP**
- **Supporting missions:**
 - **Combat Search and Rescue: HH-60s + HC-130s + PJs**
 - **Traditional ISR: PR-9s**
 - **Destruction of enemy air defenses (DEAD)**

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C-TBM: Counter Tactical Ballistic Missile

AEW: Air Expeditionary Wing

CAS: Close Air Support

CAOC: Combat Air Operations Center

TST: Time Sensitive Targeting

TTP: Tactics, Techniques and Procedures

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WHAT?

anders, 9/21/2005

Western Iraq Missions



Time Sensitive Target

“While prosecuting the highest percentage of dynamic target strikes and had absolutely zero incidents of fratricide and injury due to friendly fire.” – COL Robert Green

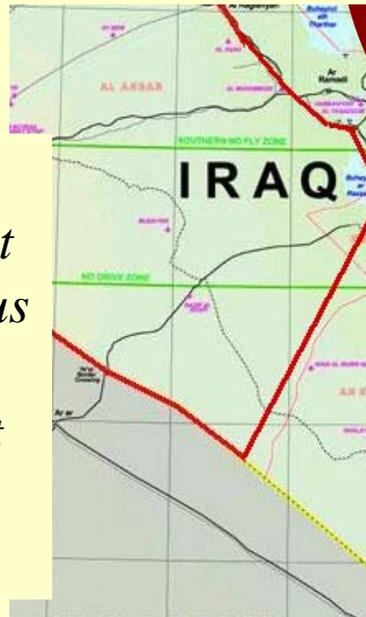
“The counter-SCUD time sensitive targeting

“50 percent of the time, the reason we knew an aircraft went down -- which is important for us with our rescue support... was because we had a guy staring at nine different chat rooms.” –

LTC White, USAF

– COL Robert Green

Counter-SCUD



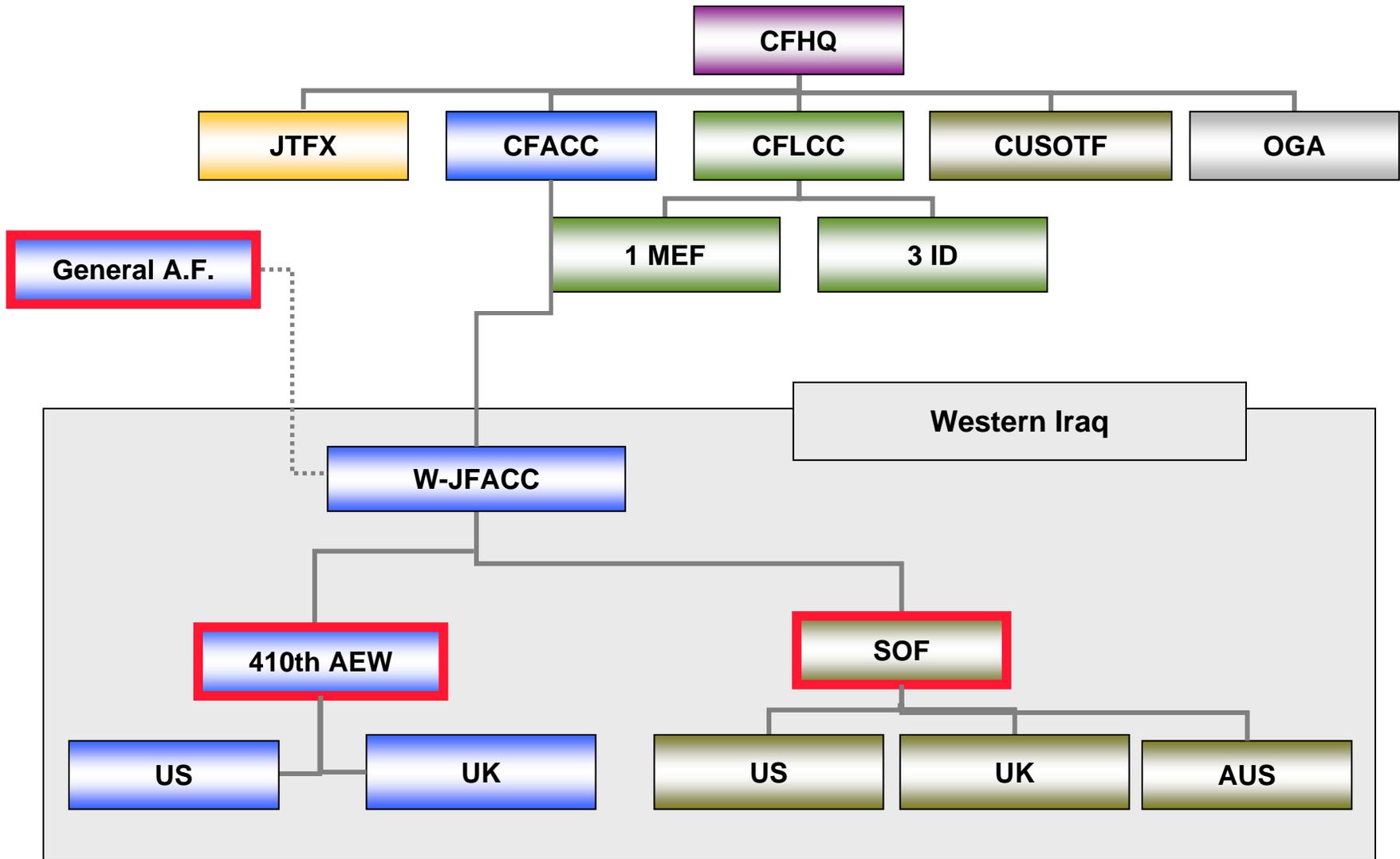
“If it was a joint force commanders' TST...all the other components as well as the headquarters had visibility.”

– LTC Backes, USAF

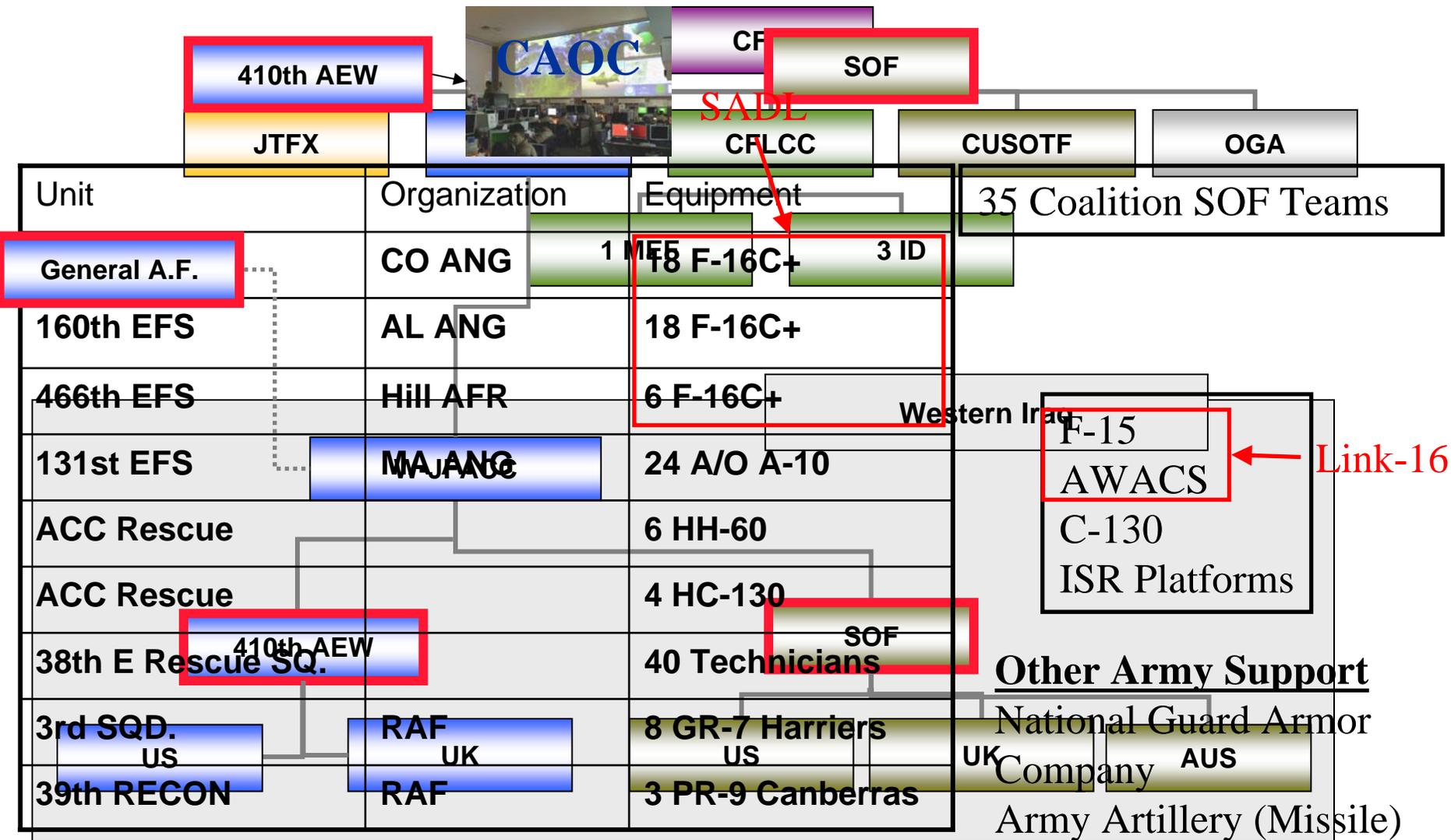
Search and Rescue



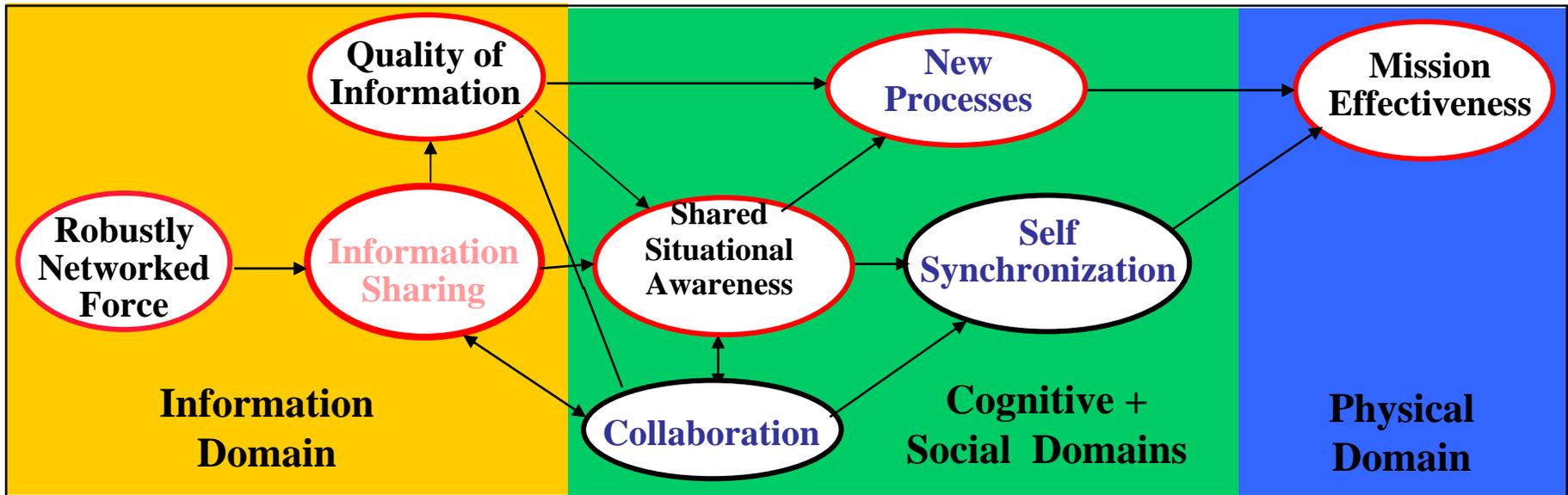
OIF Organization



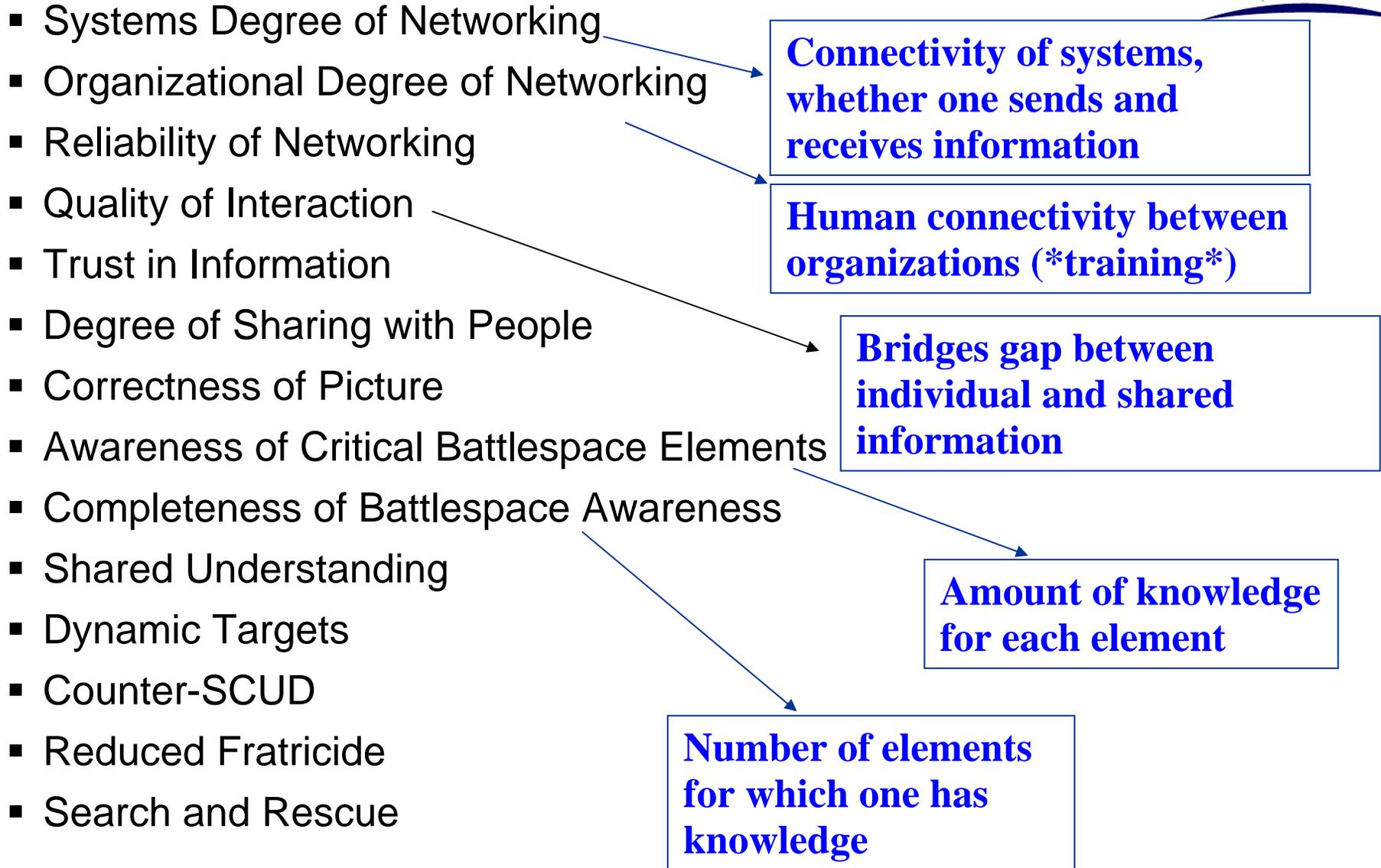
Western Theater Forces



NCW Value Chain



Metrics – Network Centric Operations

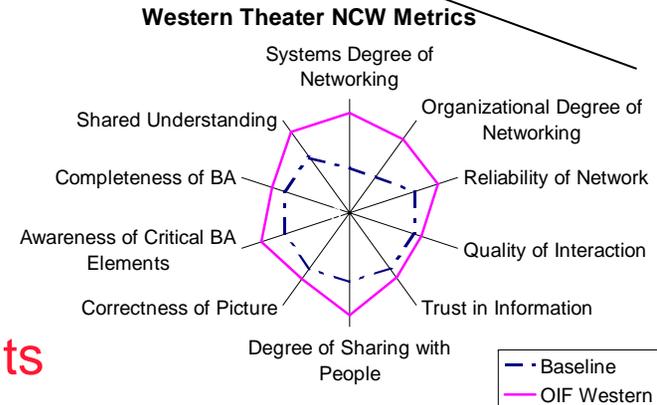


Study Metrics

- Systems Degree of Networking
- Organizational Degree of Networking
- Reliability of Networking
- Quality of Interaction
- Trust in Information
- Degree of Sharing with People
- Correctness of Picture
- Awareness of Critical Battlespace Elements
- Completeness of Battlespace Awareness
- Shared Understanding
- Dynamic Targets
- Counter-SCUD
- Reduced Fratricide
- Search and Rescue



Statistical



Statistics later...

Study Metrics



- Systems Degree of Networking
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- Correctness of Picture
- Awareness of Critical Battlespace Elements
- Completeness of Battlespace Awareness
- Shared Understanding
- **Dynamic Targets**
- **Counter-SCUD**
- **Reduced Fratricide**
- **Search and Rescue**

Average 9 min for TST

No SCUDs launched

No air-ground fratricide

Classified but successful SAR

Observed



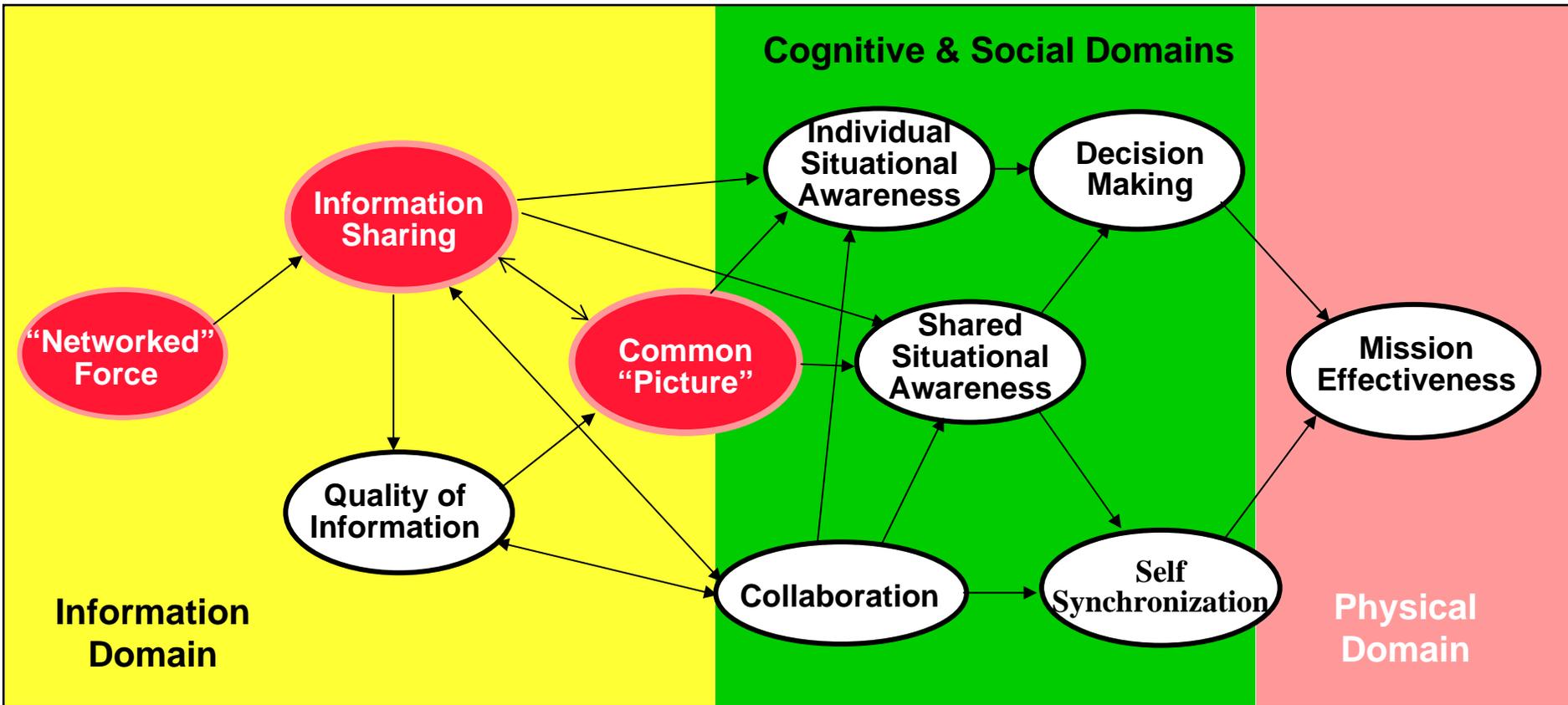
Western Iraq: Full-Spectrum Innovation

- **Technology + Technology Innovations**
 - Battle Field Universal Gateway Equipment (BUG-E):
 - Provided connectivity + data link translations
 - SADL, Link – 16, SIPRnet, TACSAT
 - TBMCS, ADOCS, mIRC, FBCB2, IMTDS
- **Process Innovations**
 - Targeting
 - Non-Traditional ISR
- **Organizational Innovations**
 - C2 Relationships
 - Intel Cells to support Non-Traditional ISR
- **Impact on Operations**
 - Decreased Engagement Timelines
 - Zero “Blue on Blue” Fratricide



Reachback

Integrated Air-Ground Operations: Key NCW Relationships





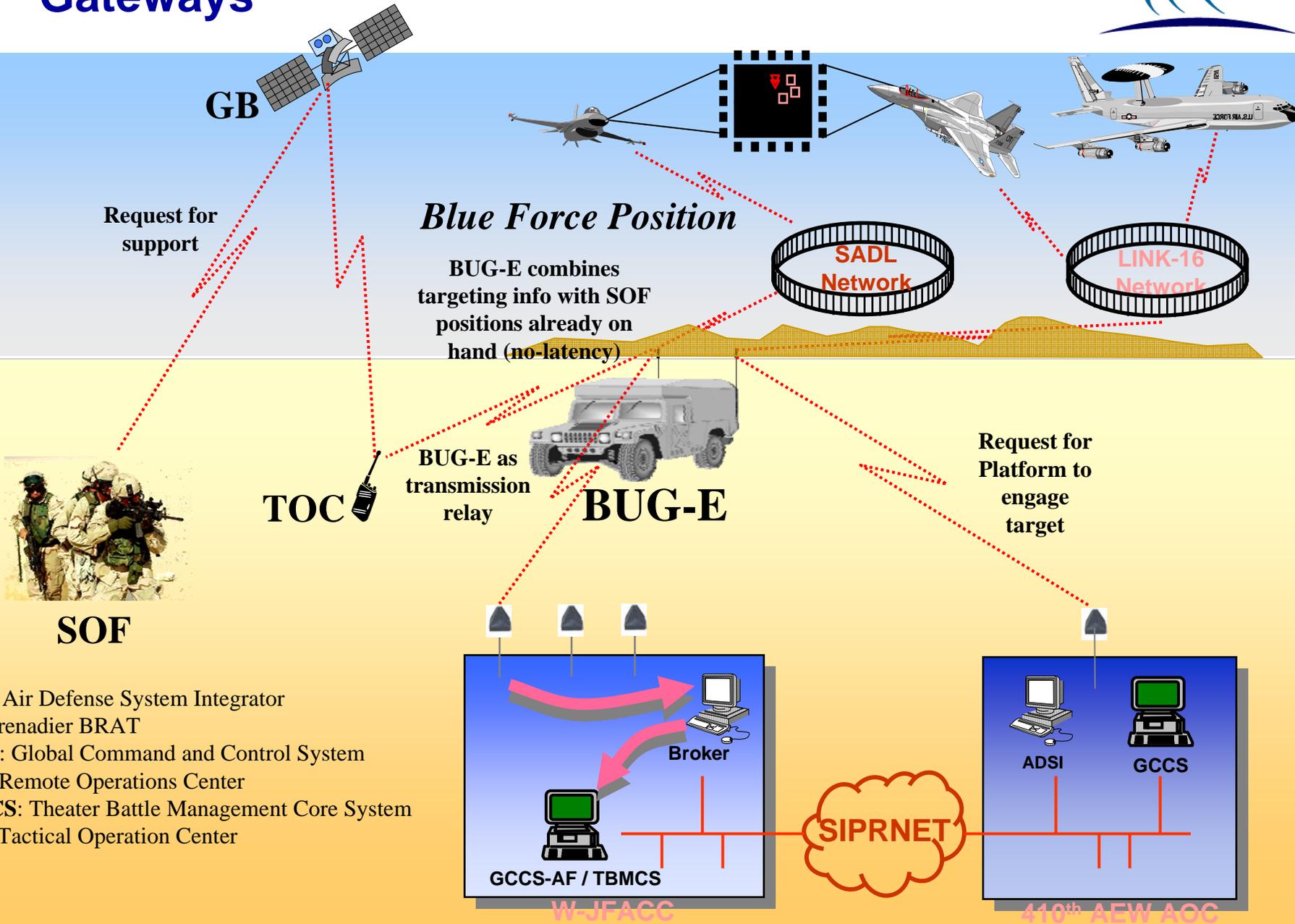
■ Existing Networks

- **Situational Awareness Data Link – SADL**
 - **Air-to-Ground**
 - **Air-to-Air**
- **Link-16 - Air-to-Air**
- **SIPRnet – Wide Area network**

■ New Gateway

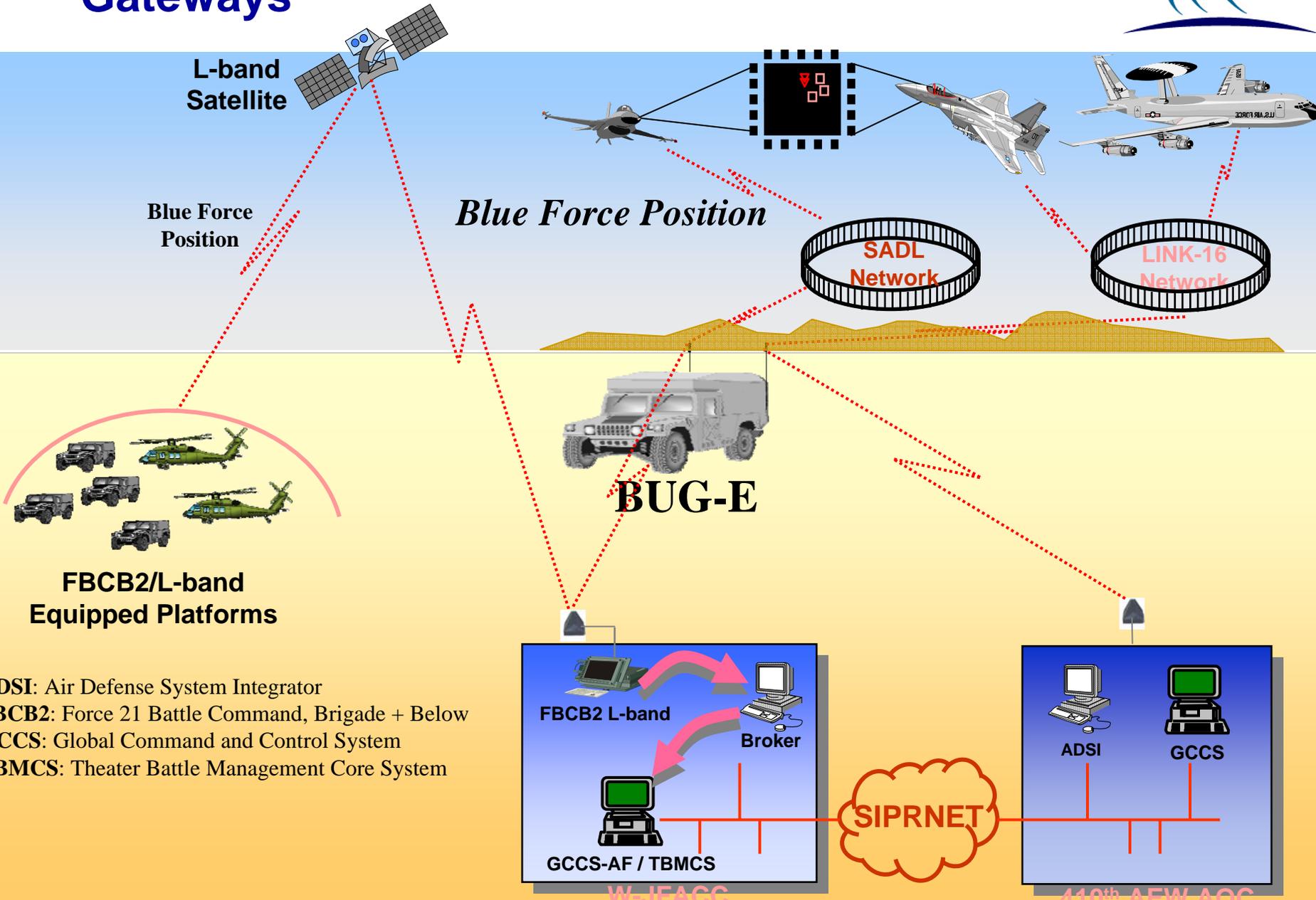
- **Battlefield Universal Gateway Equipment – BUG-E**

Networking Networks with Deployable Gateways



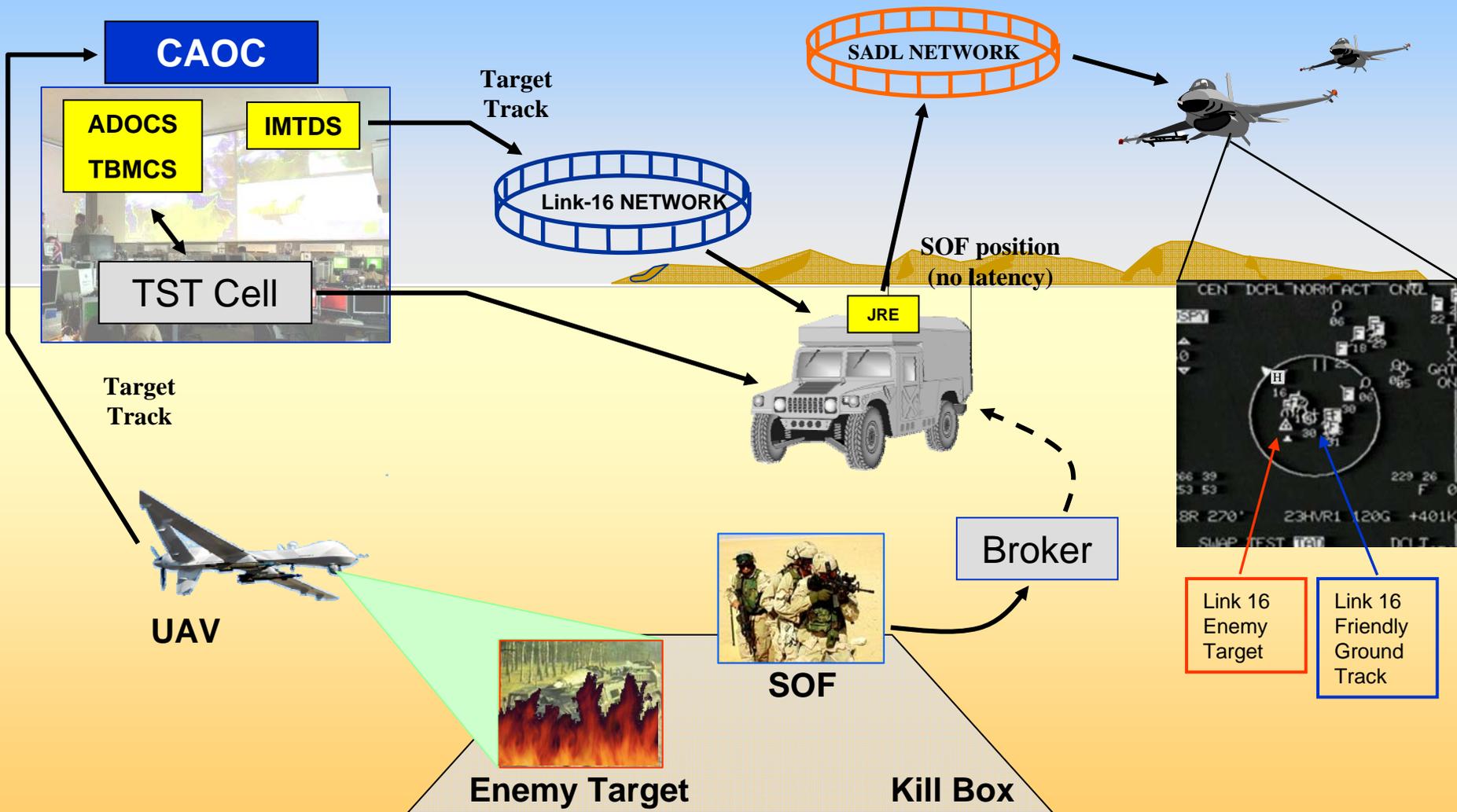
- ADSI: Air Defense System Integrator
- GB: Grenadier BRAT
- GCCS: Global Command and Control System
- ROC: Remote Operations Center
- TBMCS: Theater Battle Management Core System
- TOC: Tactical Operation Center

Networking Networks with Deployable Gateways



ADSI: Air Defense System Integrator
FBCB2: Force 21 Battle Command, Brigade + Below
GCCS: Global Command and Control System
TBMCS: Theater Battle Management Core System

Gateway Vignette



ADOCS: Air Defense Operations Center System
IMTDS: Improved Multi-link Translator and Display System
JRE: Joint Router Extension

TBMCS: Theater Battle Management Core System
TOC: Tactical Operation Center

Network Enabled Tactical Picture: Tactical Display in F-16C



“We were a totally integrated force. We had complete visibility on what SOF’s ground scheme and maneuver was gonna be. And as a result we had faster decisions, better decisions in terms of positive outcome. We had over a 100 troops in contact engagements in the west without a single loss with anybody that we trained with.”

- MAJ. John D. Caine, USAF-ANG

GFAC

UAV SPI

Link-16
Air Track

SADL Flight
Member

endly
itions

AC
Target

FAC

nk-16
and
rack

Air warfare’s most extensive sharing of SA: Networks, Gateways, Platforms -- SADL pilots see icons derived from Link-16 systems

Battlefield Universal Gateway Equipment (BUG-E)

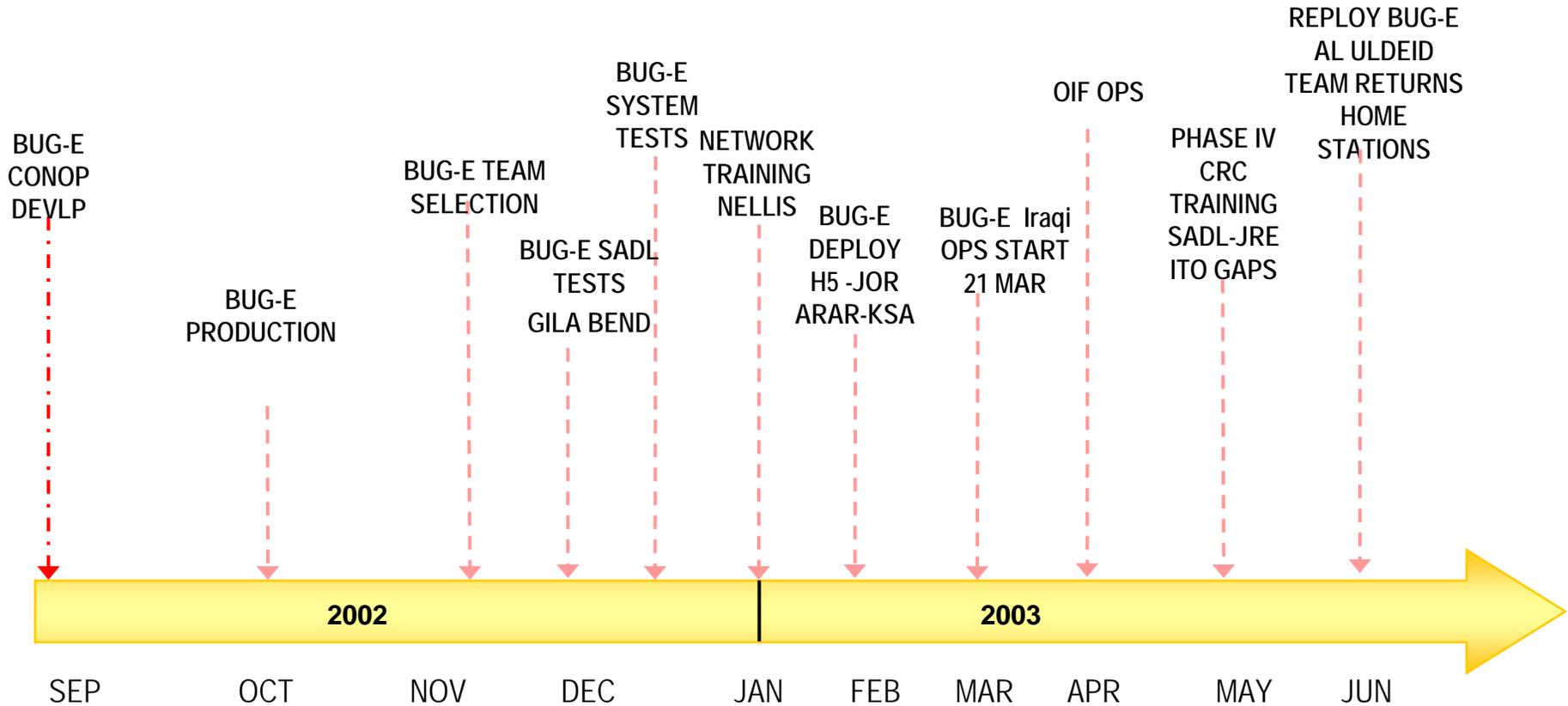


Wartime Mission of BUG-E

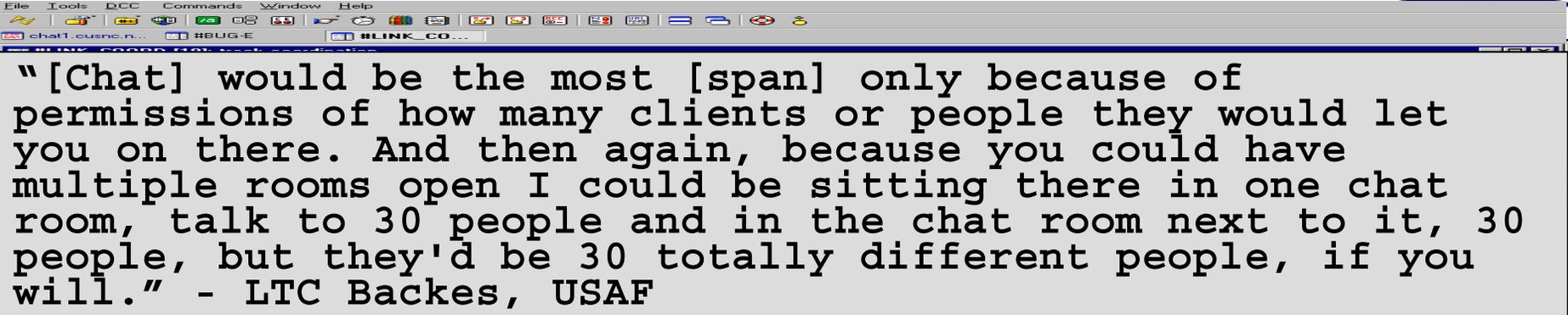


- **Supported Forward Line of Troop (FLOT)/troops in contact (TIC)**
 - Forwarded SOF locations to relevant air platforms
- **Supplied mensurated coordinates to Fighter/Bombers**
 - Utilized JRE to connect SADL, Link-16, SIPRNET
- **Extended JTIDS, SADL, Link-16 envelope forward as advance outstrips Main Operating Base ranges**
- **Provided positive friendly ID of Army highly mobile artillery rocket system (HIMARS) launchers**

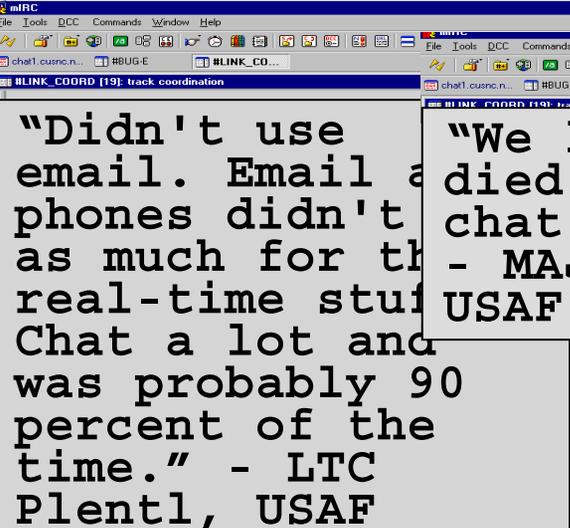
BUG-E Milestones



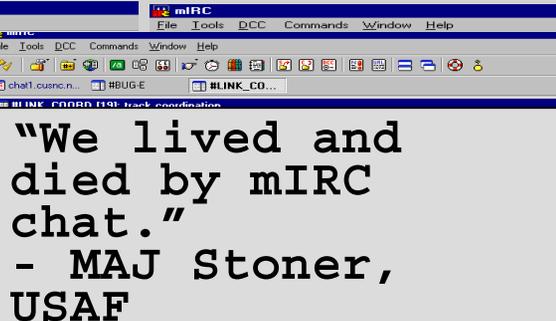
Collaborative Tools



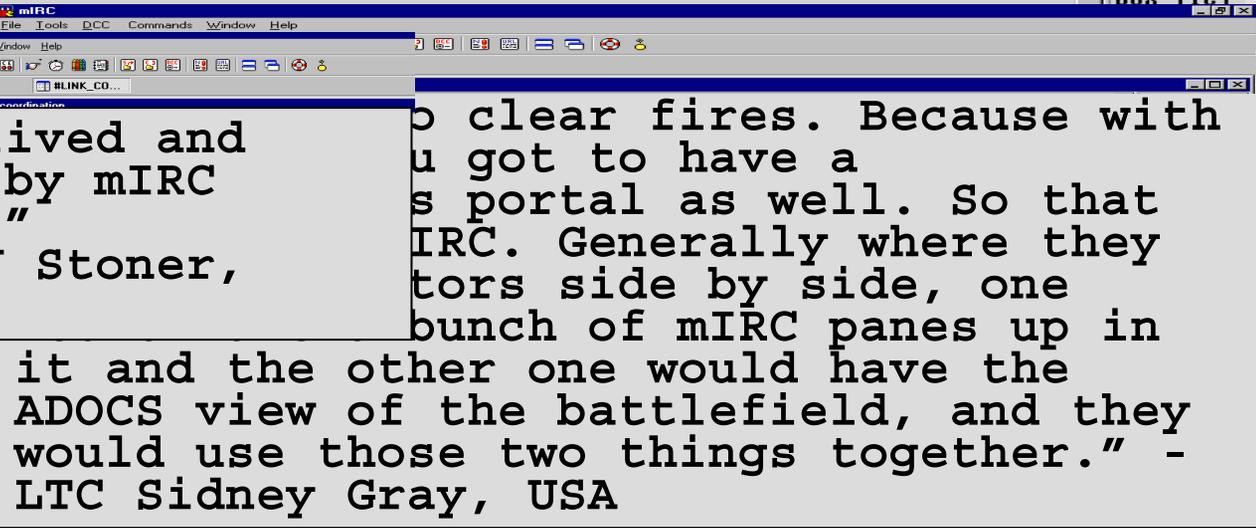
"[Chat] would be the most [span] only because of permissions of how many clients or people they would let you on there. And then again, because you could have multiple rooms open I could be sitting there in one chat room, talk to 30 people and in the chat room next to it, 30 people, but they'd be 30 totally different people, if you will." - LTC Backes, USAF



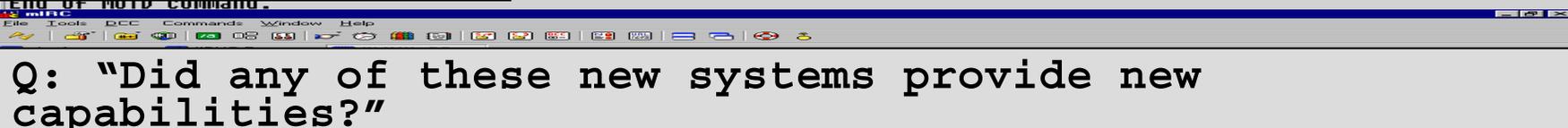
"Didn't use email. Email and phones didn't do as much for the real-time stuff. Chat a lot and was probably 90 percent of the time." - LTC Plentl, USAF



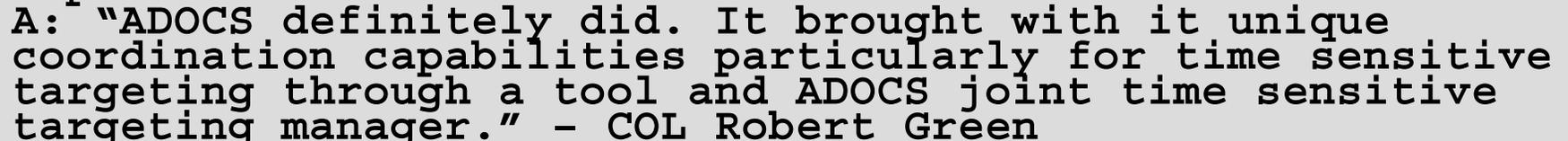
"We lived and died by mIRC chat." - MAJ Stoner, USAF



to clear fires. Because with you got to have a portal as well. So that mIRC. Generally where they sit side by side, one bunch of mIRC panes up in it and the other one would have the ADOCS view of the battlefield, and they would use those two things together." - LTC Sidney Gray, USA



Q: "Did any of these new systems provide new capabilities?"



A: "ADOCS definitely did. It brought with it unique coordination capabilities particularly for time sensitive targeting through a tool and ADOCS joint time sensitive targeting manager." - COL Robert Green



“There has been a cultural and mind shift. And we're talking about the collaboration to make the situational awareness happen. I think there's been a cultural shift driven by the technology and the organizational changes and the doctrinal changes that have made people's attitudes towards getting that information exchange to occur a high focus.”

- MAJ Stoner, USAF

“USAF and SOF types are particularly culturally aware when it comes to technology. USAF and SOF folks tend to be ‘gadget people.’ They have cars with all the trimmings. They have great home entertainment systems, etc. The USAF and SOF communities are more eager to integrate new technology and approaches into warfighting than other groups might be.”

- SOF Commander



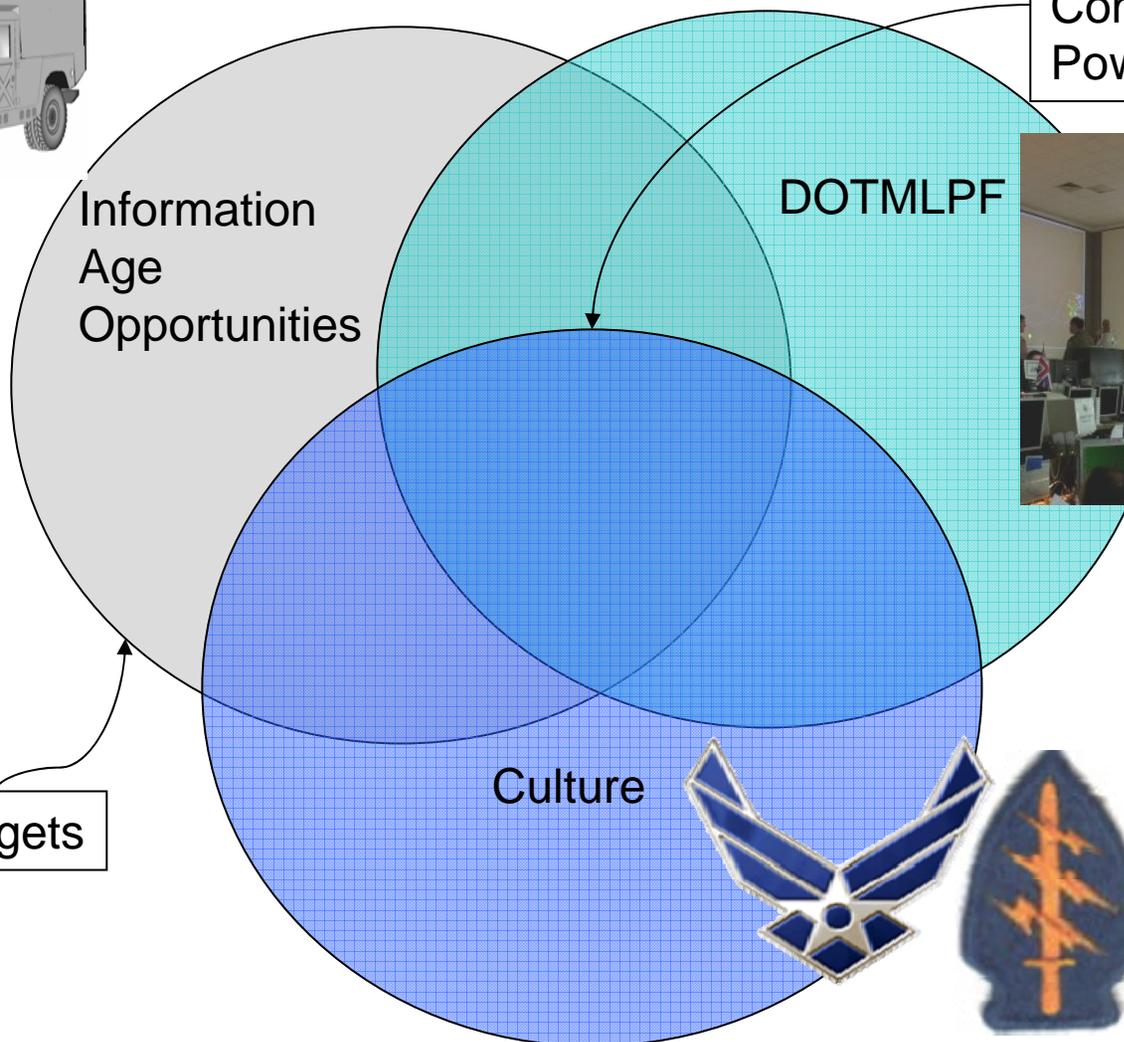
BUG-E I

NCW in the Western Theater



BUG-E

NCW
Combat
Power



Gadgets





“The effectiveness of Joint Fires Command and Control in the western desert can best be summarized by the results: In the first 27 days of combat Ops the Joint Fires element at the JSOTF did 393 successful Joint Fires deconflictions while prosecuting the highest percentage of Dynamic Target strikes in IRAQ (40%) ... and had absolutely zero incidents of fratricide and injury due to friendly fire.”

– SOF Commander



- **Western Iraq was the most “networked” theater of operations, operationally and tactically, in the history of warfare.**
- **2nd largest conventional + coalition SOF operation in the history of warfare (after OEF)**
- **Largest scale use of data-linked tactical aircraft in history of warfare**
- **Largest scale deployment of aircraft performing non-traditional ISR mission**
- **Only area of operation in Iraq where Blue Force Tracking information on SOF + conventional ground forces was provided via data link to fixed wing combat air-craft.**
- **Demonstrated capability for networking to decrease the response time for time sensitive targeting**
- **Zero Fratricide:**
 - **Only area of operations in Iraq where air-to-ground fratricide was eliminated**

Findings



- **Gateway Technologies create SA**
 - Link-16 \leftrightarrow BUG-E \rightarrow SADL
 - SIPRNET \leftrightarrow BUG-E \leftrightarrow Link-16/SADL
- **COI Technologies link SA “islands”**
 - Chat
- **Culture/training essential to exploit technology**
 - SOF and Air Force
- **TTPs are necessary to exploit networking and SA**
 - XATK
 - NTISR
 - Kill-boxes
 - ATO

MITRE Conclusions and Recommendations



- **Improve the SADL systems by expanding it to include A-10s and C-130s and permit SADL generated data to enter the Link-16 system to improve target information – develop a bidirectional data path for SADL target information to flow through gateways to Link-16 and other networks.**
- **Extend SIPRNET service to lower tactical levels to include all airfields and command posts.**
- **Allow more agility – IT - organizational and operational flexibility**
- **Identify and reduce latency between systems**
- **Evaluate and revise the lessons learned and debriefing process to capture information age lessons on battle command**
- **Integrate information age technologies useful to “Digital Natives” (i.e. chat and similar applications) that impact C2 hierarchies and TTPs.**



Questions

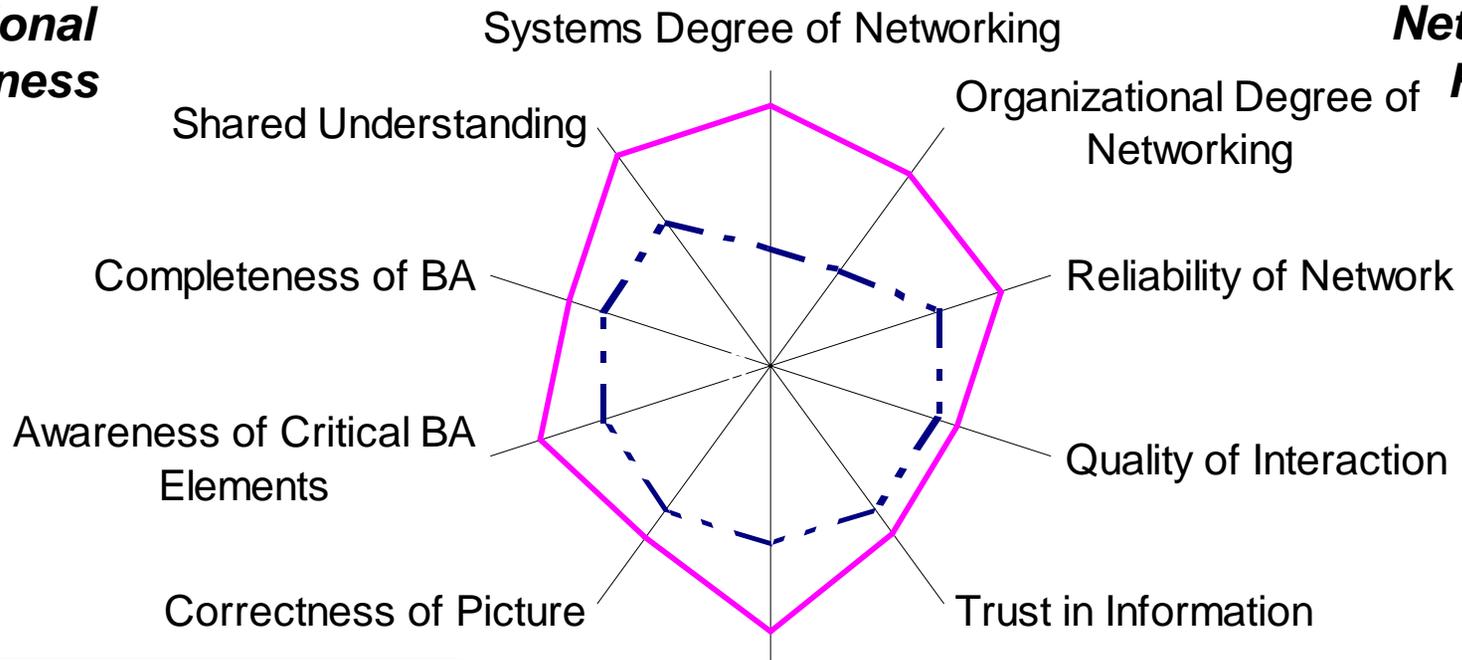
Quantitative Metrics



Western Theater NCW Metrics

**Shared
Situational
Awareness**

**Robustly
Networked
Force**



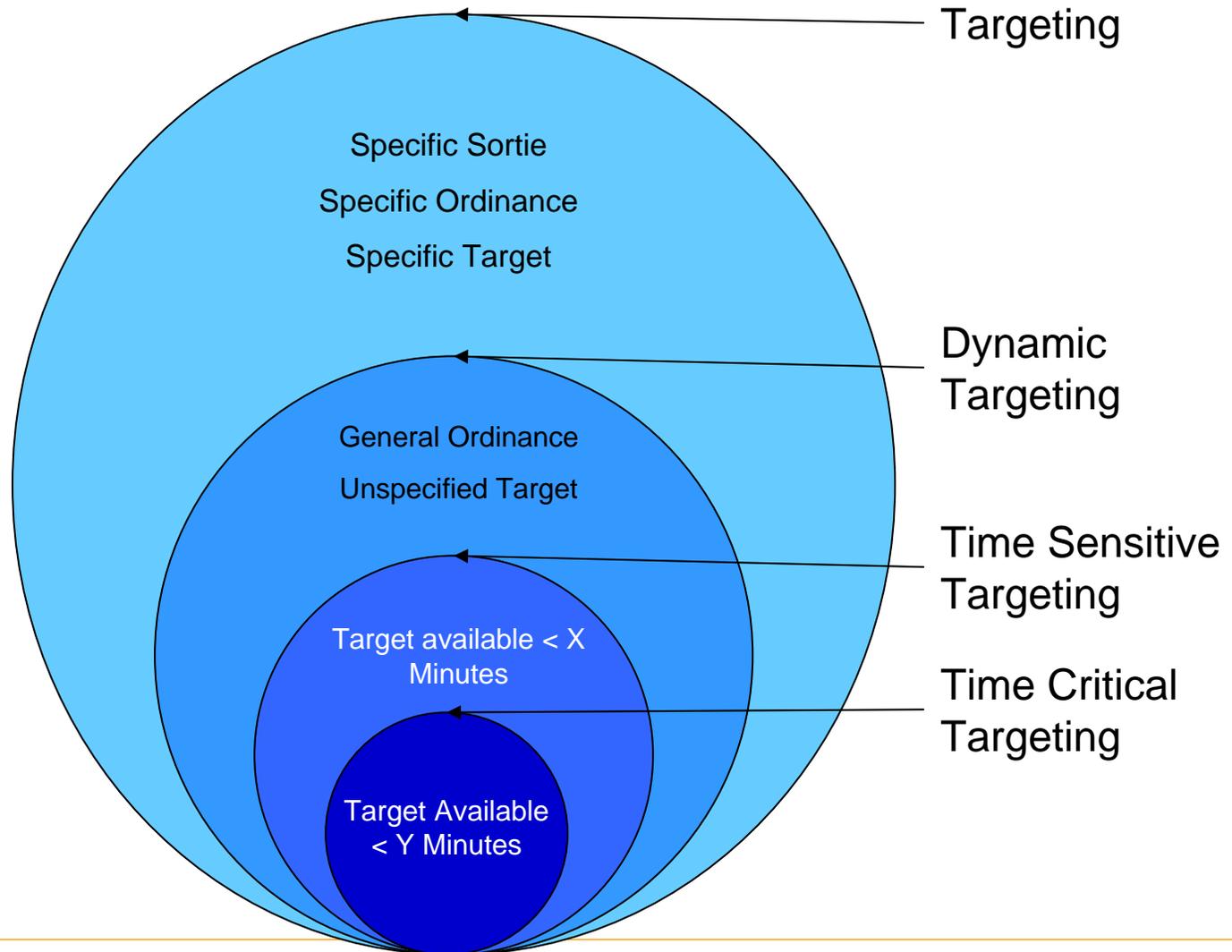
Statistically significant differences at 95% confidence using

Wilcoxon techniques

— Baseline
— OIF Western

**Information
Sharing**

Targeting Definitions



Network Infrastructure Improvements



Infrastructure	Pre-OIF	OIF	Change (%)
Commercial SATCOM Terminals	5	34	560
Avg Commercial Bandwidth (Mb)	7	10	47
Military SATCOM Terminals	20	44	120
Average Military Bandwidth (Mb)	2	3	68
Terrestrial Links	11	30	173
Avg Terrestrial Bandwidth (Mb)	2	10	44
Global Broadcasting System (Mb)	24	24	0
Total Terminals	36	107	167
Total Bandwidth (Mb)	113	783	596

Qualitative Metrics



- **Dynamic Targets**
 - 39% of targets hit were dynamic
 - 17% were time sensitive
 - TST average of 9 minutes, max of 17 minutes
- **SCUD Launches**
 - No SCUD launches in Western Theater
- **Reduced Fratricide**
 - No air-to-ground fratricide
 - Recorded incidents of NCW preventing ground-ground fratricide
- **Search and Rescue**
 - Western Theater SAR classified but successful

DOTMLPF and Culture



- **Combat Air Operations Center**
- **Targeting TTPs**
- **Air Tasking Order**

Information Age Opportunities



- **Network Infrastructure**
- **LANs (Link-16, SADL)**
- **WANs (SIPRNET, coupled LANs)**
- **BUG-E**
- **Collaborative Tools**
- **Intelligence Surveillance and Reconnaissance**