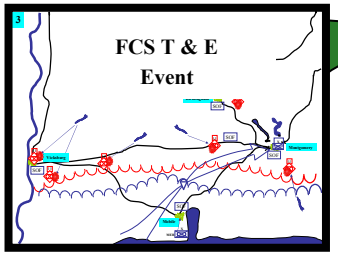
Testing In a Joint Environment: A "Missions and Means Framework" Application Case Study

Purpose

To illustrate the results of a “mission decomposition to performance measure” crosswalk involving the Joint Tactical Tasks of Joint Close Air Support / Joint Combat Identification and the functional capabilities of a Future Combat System networked sensor.

Methodology

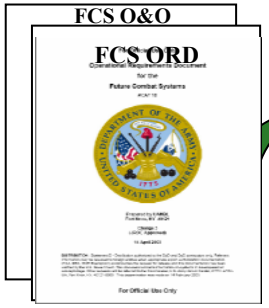


Complex Horizontal

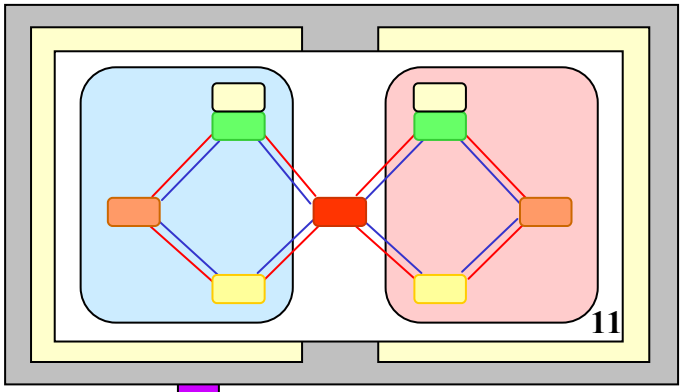
JNTC Western Range

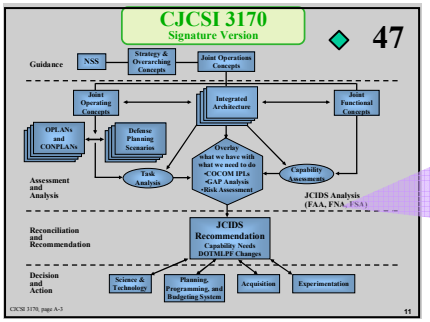
Interoperability Event

04-1



Missions and Means Framework

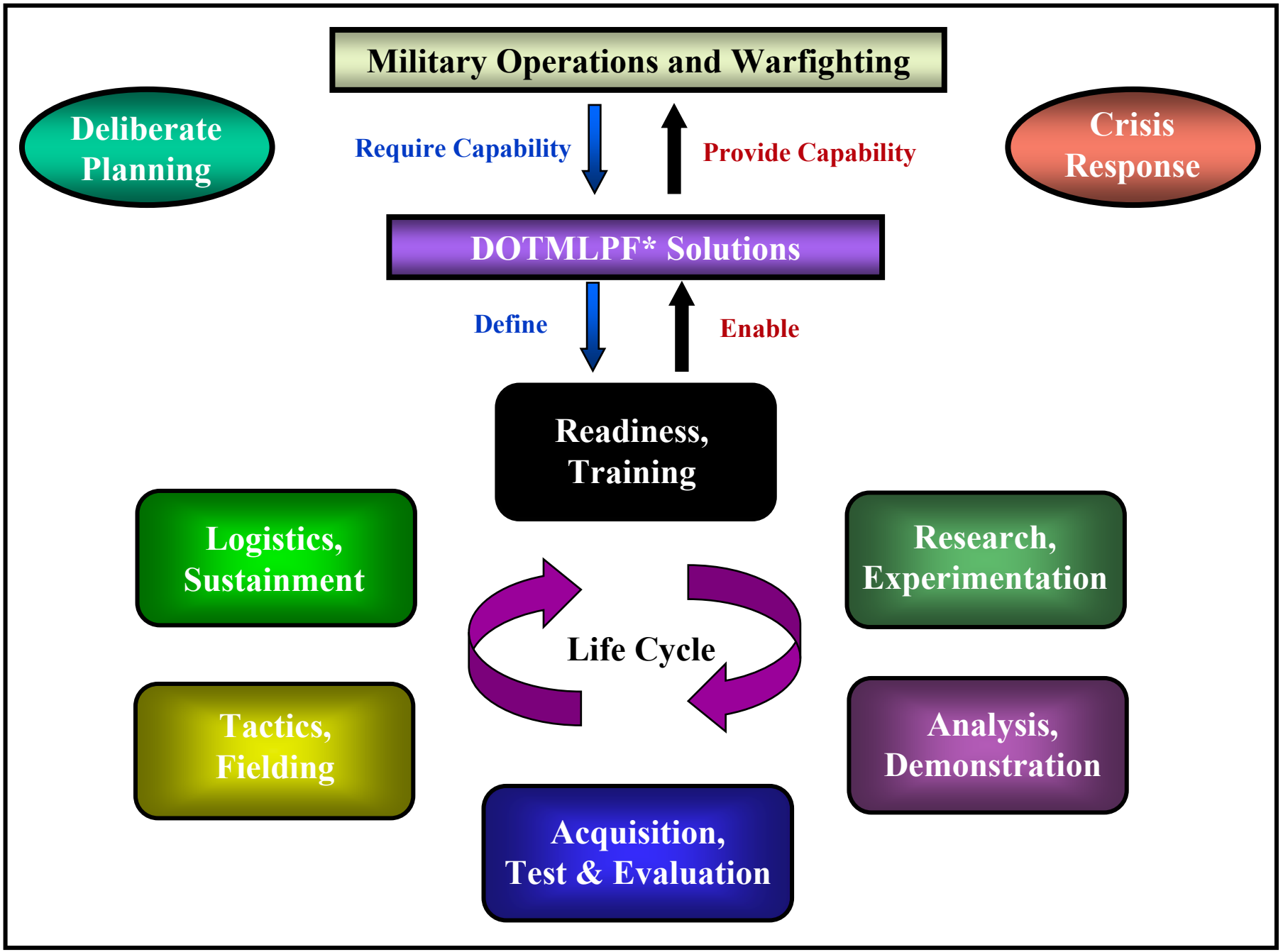




FAA

FNA 42

FSA 40

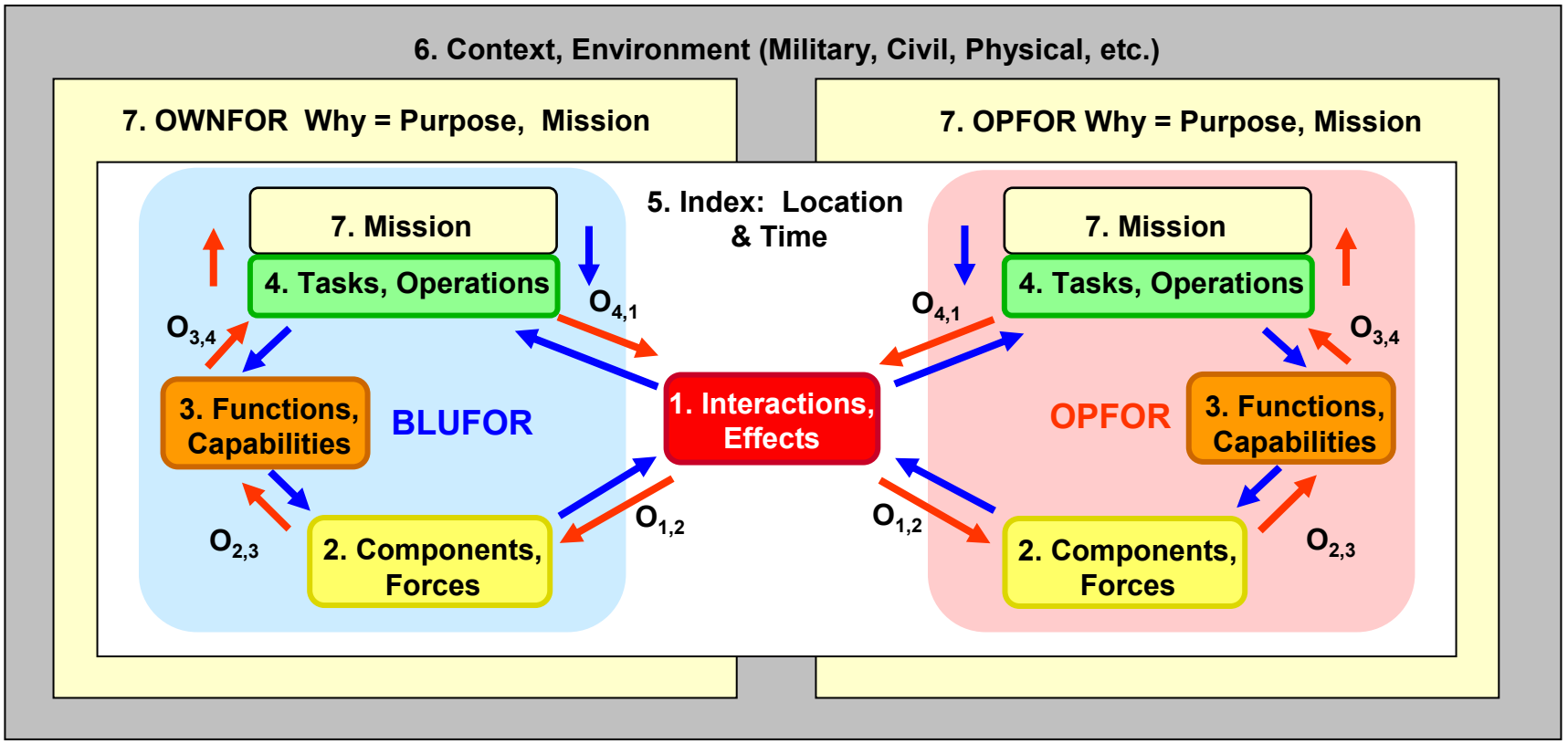


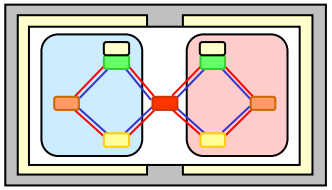
* DOTMLPF: Doctrine, Organization, Training, Materiel, Leadership, Personnel, Facilities

A Two-Sided Missions and Means Framework

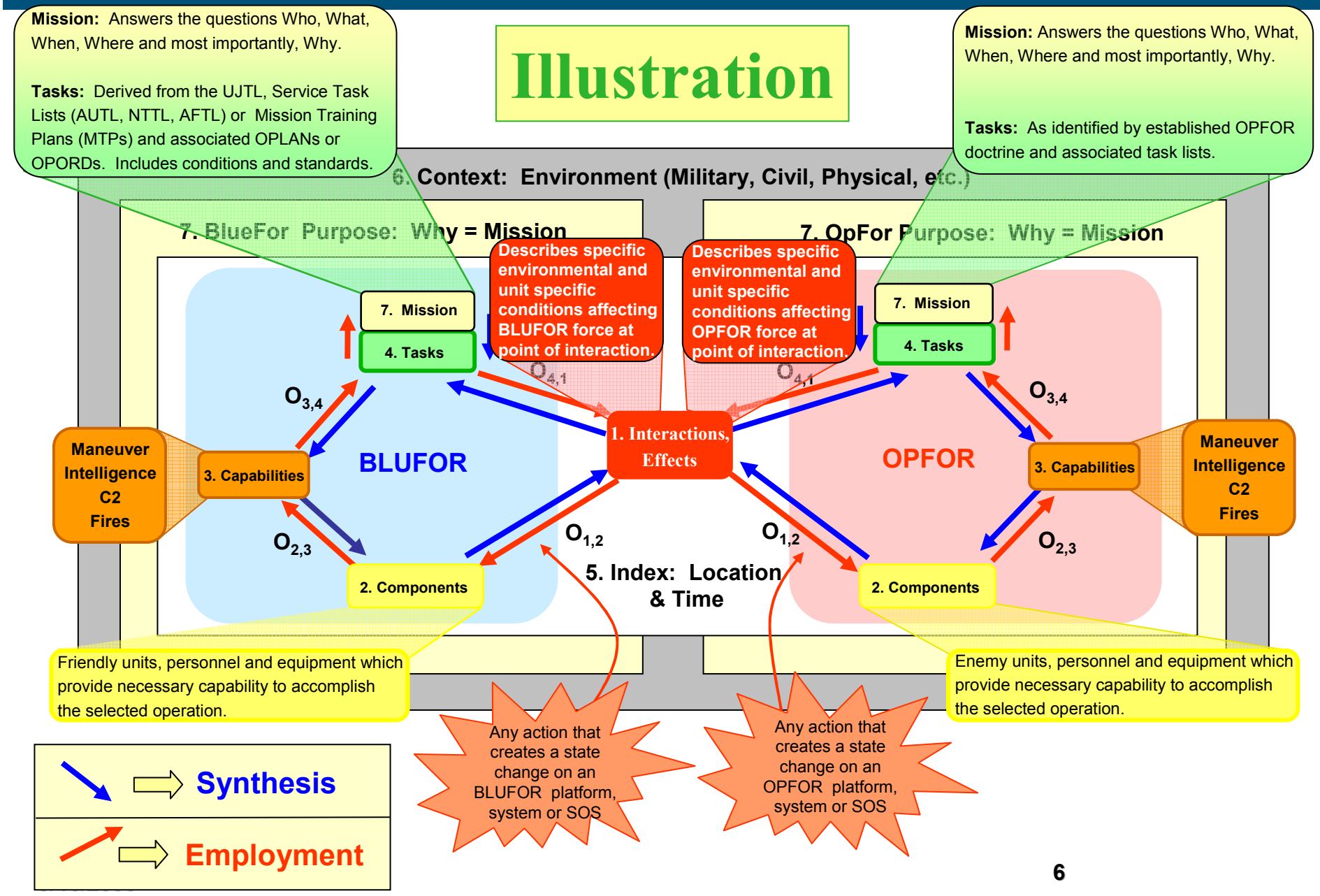
11 Fundamental Elements:

Seven Levels, Four Operators



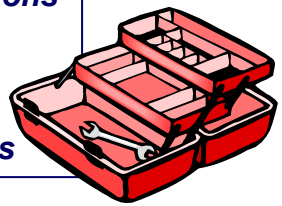


A Two-Sided Missions & Means Framework



Missions & Means Framework implementation of JCIDS (Purdy, Donlin, Flood variant)

Top-Down decomposition provides the developer with a powerful tool to design the best DOTMPF system. It stems from user validated scenarios, missions and tasks --providing the framework for evaluating and demonstrating the required systems of systems capabilities



Missions

to accomplish

comprise

Tasks

to perform

enabled by

Capabilities

provides

Answers the "So What?" Question

as supplied by

System *

* System is the integrated Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities (DOTMFPF) readiness solution

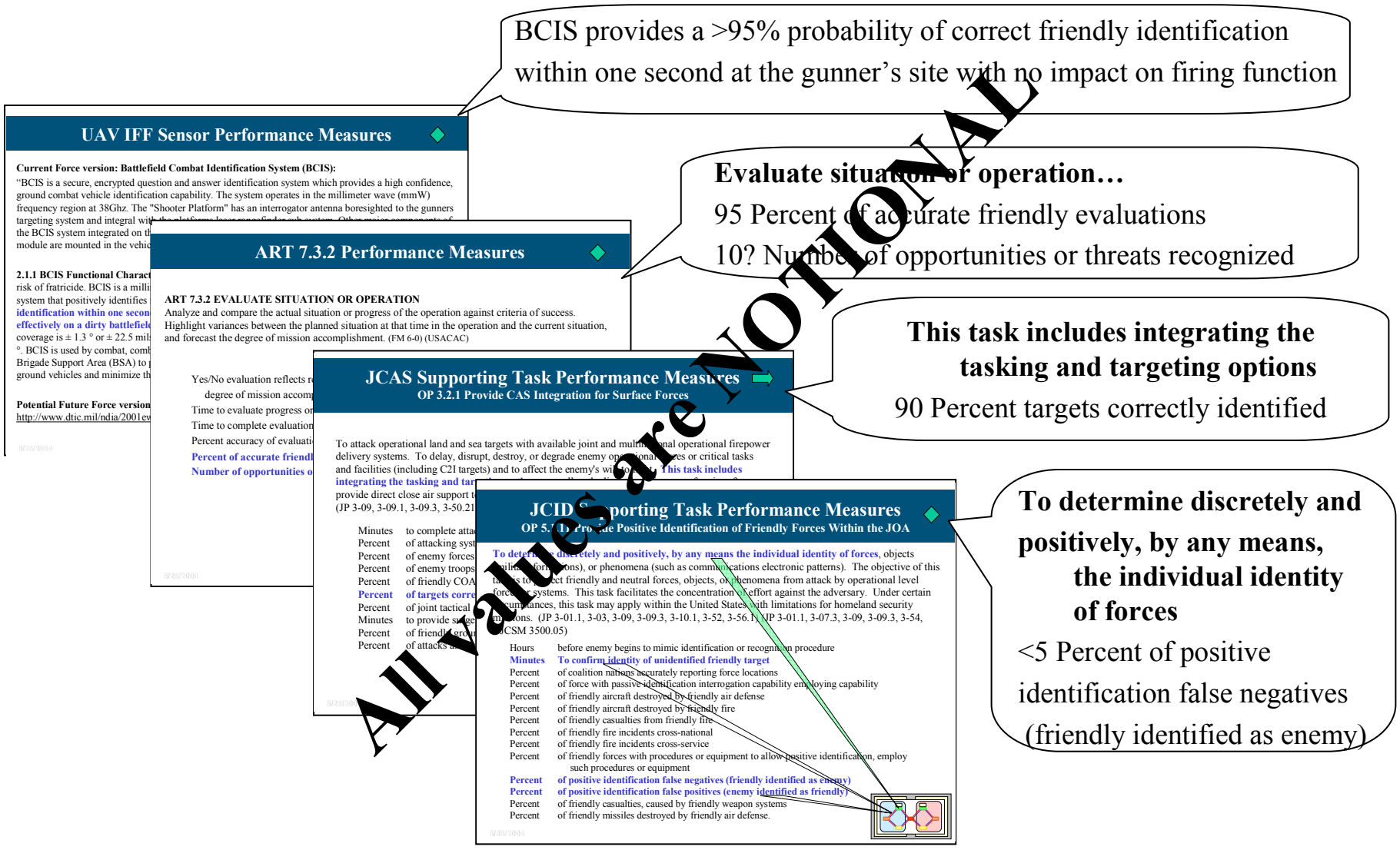
Combat Operations to Acquisition to Testing Comparison Linkage

Level 6 FCS T & E Scenario 13

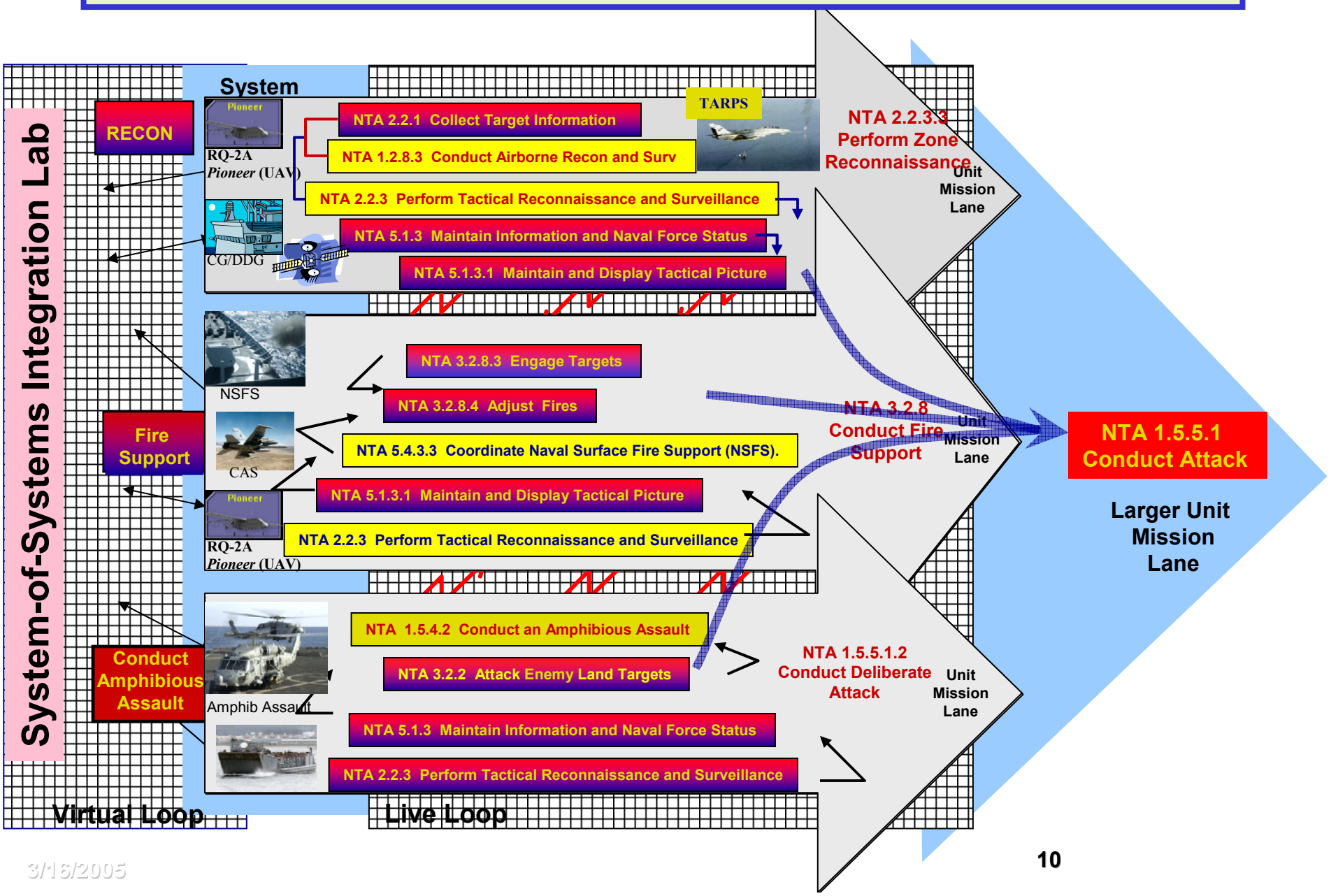
Level 5 Vignette #3

	Combat Operations		Testing in a Joint Environment		Materiel Acquisition	
L7	12 JFC/JFLCC Mission	40 $	Testing in a JE Joint T&E Mission 26	$ 44	LSI 24 Integrated Processes	36
L4	JCAS/JCID JTTs 14 UJTL OP 3.2.1, 5.1.11 Task Performnce Msr		JCAS/JCID Testing Activities JTTs 39 UJTL TA3.2.2 / TA5.2.1		IP #2 (4 tasks) ART 7.3.2, ART 7.2.1, ART 1.3.2.2, ART 1.3.1	27 38
L3	18 JCAS/JCID RC 9/34		Facilities Capabilities 42		FCS JCAS/JCID #26 and #24 Material Performnce Msr	20
L2	FCS Equipped UA		JCAS/JCID Testing Facilities		UAV Platform/ISR Package Sensors: EO/ IFF Material Attributes	21 24
L1	Interactions (Task execution L-V-C)		Interactions (Task testing L-V-C)		Interactions (Materiel stimulations)	

Study Team Performance Measure Crosswalk



Sample Navy Task Set Applied to OT Model



Observations

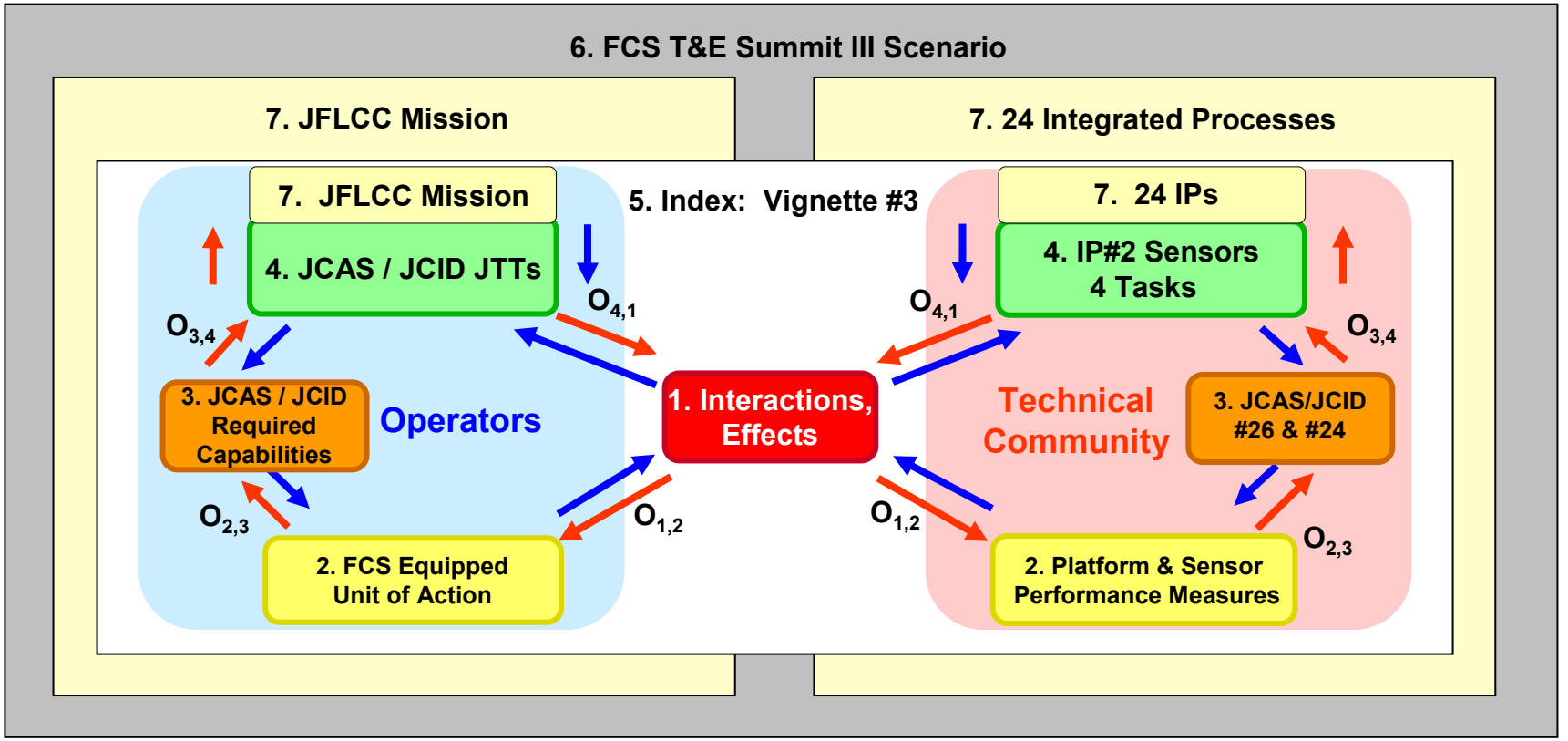
- MMF offers an integrated procedure for explicitly specifying the results of a capabilities gap analysis. Its employment helps to:
  - Organize available information pertinent to Joint Testing in Force Transformation
  - Analyze that information to identify T&E capability gaps in a Joint Environment
  - Provide inputs for a ROM cost estimate for the corrective investment.
- DOT&E appears to lack a comprehensive database of T&E range capabilities
- The Roadmap for Testing in a Joint Environment (TJE) envisions enhancements to JDEP
  - T&E will need to leverage Joint training venues for live forces to replicate the joint context
  - T&E will have to depend even more on virtual and constructive capabilities to construct the Joint environment.

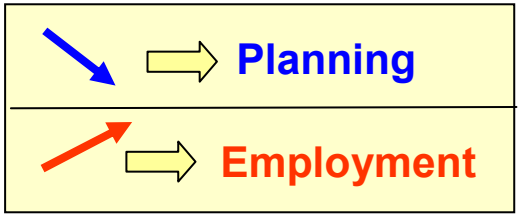
The Way Ahead

- Establish DoD requirement for MMF-like analysis of “Beacon” projects as a disciplined, repeatable procedure in support of the Joint testing community
- “Beacon” projects represent significant Joint and Service capability requirements; i.e., Littoral Combat Ship (LCS), Joint Strike Fighter (JSF), Future Combat System (FCS), JMMC2, and the E-10 (MC2A AWACS follow-on)
- Require Services and Program Managers to provide full support and cooperation to the MMF-like analysis effort
- MMF-like analysis effort will provide a “Roadmap and Way Ahead” for Services and other programs in developing truly Joint capabilities and articulate the “Joint” test and evaluation requirements for these programs and capabilities

Backup Slides

MMF Applied Methodology





FCS Test & Eval Scenario* Mission Statements

Joint Force Cdr

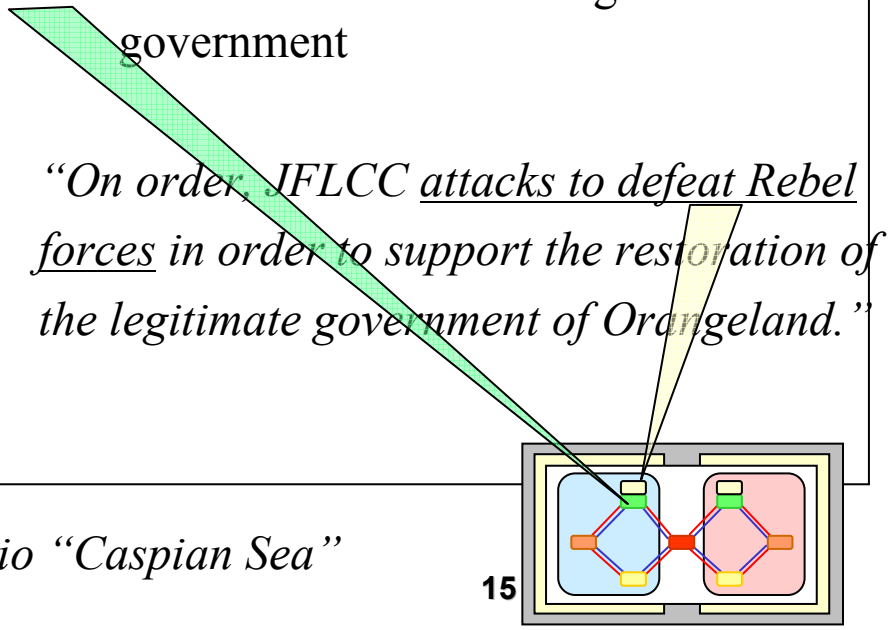
1. Achieve air superiority
2. Destroy WMD capability
3. Facilitate control of energy centers
4. Defeat resisting rebel forces

"On order, JTF conducts operations to control energy centers, defeat Rebel forces, and secure the capital region in order to restore the legitimate government of Orangeland."

Joint Force Land Component Cdr

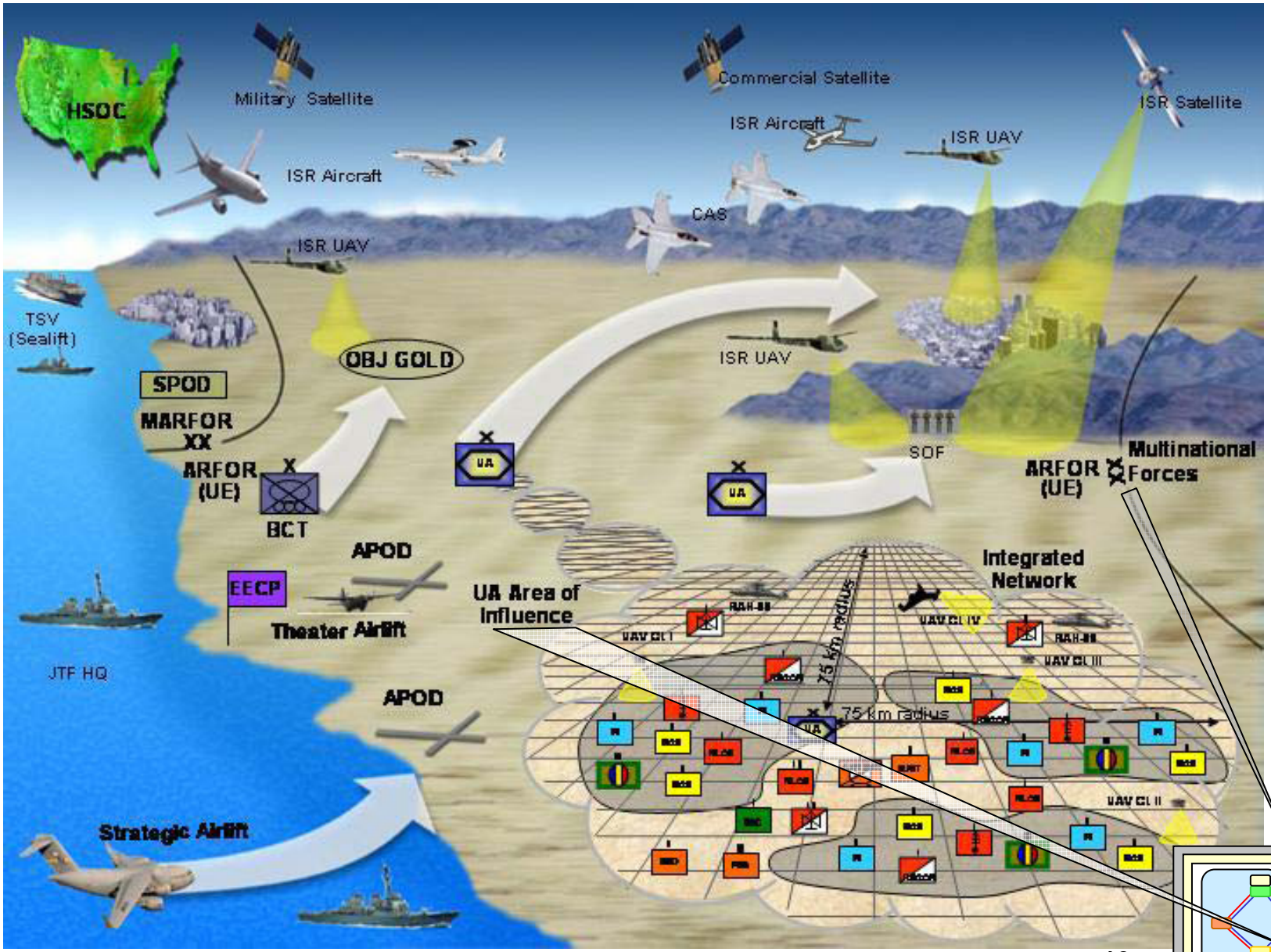
1. Defeat Rebel forces in zone
2. Secure key oil & gas pipelines and production facilities
3. Secure capital region of Orangeland
4. Destroy WMD capability
5. Facilitate restoration of legitimate government

"On order, JFLCC attacks to defeat Rebel forces in order to support the restoration of the legitimate government of Orangeland."



**Derived from DPG Illustrative Planning Scenario "Caspian Sea"*

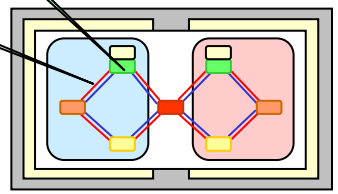
FCS JCAS/JCID Environment



JCAS Supporting Task Performance Measures
OP 3.2.1 Provide CAS Integration for Surface Forces

To attack operational land and sea targets with available joint and multinational operational firepower delivery systems. To delay, disrupt, destroy, or degrade enemy operational forces or critical tasks and facilities (including C2I targets) and to affect the enemy's will to fight. **This task includes integrating the tasking and targeting options**, as well as the liaison requirements for aircraft to provide direct close air support to surface forces. (JP 2-01.1, 3-0, 3-09, 3-09.3, 3-10, 3-10.1, 3-60) (JP 3-09, 3-09.1, 3-09.3, 3-50.21, CJCSM 3500.05)

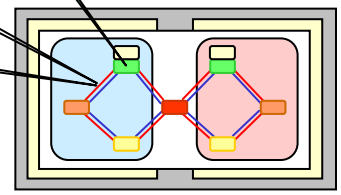
Minutes	to complete attack after target identification
Percent	of attacking systems deliver ordnance
Percent	of enemy forces destroyed, delayed, disrupted, or degraded
Percent	of enemy troops surrender
Percent	of friendly COAs altered or discarded
Percent	**of targets correctly identified**
Percent	of joint tactical air requests filled
Minutes	to provide surge CAS assets to friendly forces ISO urgent tactical situations
Percent	of friendly ground maneuver events covered by CAS on station
Percent	of attacks assessed to have greater collateral damage/effects than planned/expected.



JCID Supporting Task Performance Measures
OP 5.1.11 Provide Positive Identification of Friendly Forces Within the JOA

To determine discretely and positively, by any means the individual identity of forces, objects (military formations), or phenomena (such as communications electronic patterns). The objective of this task is to protect friendly and neutral forces, objects, or phenomena from attack by operational level forces or systems. This task facilitates the concentration of effort against the adversary. Under certain circumstances, this task may apply within the United States with limitations for homeland security missions. (JP 3-01.1, 3-03, 3-09, 3-09.3, 3-10.1, 3-52, 3-56.1) (JP 3-01.1, 3-07.3, 3-09, 3-09.3, 3-54, CJCSM 3500.05)

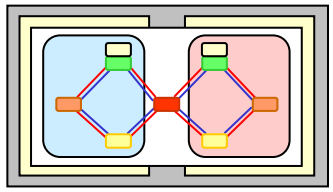
Hours	before enemy begins to mimic identification or recognition procedure
Minutes	**To confirm identity of unidentified friendly target**
Percent	of coalition nations accurately reporting force locations
Percent	of force with passive identification interrogation capability employing capability
Percent	of friendly aircraft destroyed by friendly air defense
Percent	of friendly aircraft destroyed by friendly fire
Percent	of friendly casualties from friendly fire
Percent	of friendly fire incidents cross-national
Percent	of friendly fire incidents cross-service
Percent	of friendly forces with procedures or equipment to allow positive identification, employ such procedures or equipment
Percent	**of positive identification false negatives (friendly identified as enemy)**
Percent	**of positive identification false positives (enemy identified as friendly)**
Percent	of friendly casualties, caused by friendly weapon systems
Percent	of friendly missiles destroyed by friendly air defense.



JTT Task TA 3.2.2
Conduct Close Air Support

To provide support for amphibious and/or land operations by air assets through attacking hostile targets in close proximity to friendly forces. (JP 3-09)

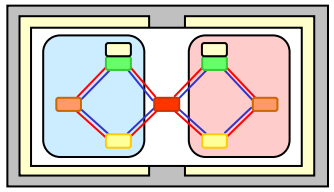
Minutes	Preplanned close air support (CAS) missions execute weapons delivery/release within ____ minutes of air tasking order (ATO)-tasked time-on-target (TOT).
Minutes	Airborne Alert or preplanned on-call CAS missions arrive at Control Point (CP) within ____ minutes of ATO-tasked time-on-station (TOS



JTT Task TA 5.2.1 Establish, Operate and Maintain Baseline Information Exchange

Establishment and implement at a tactical communications system that provides voice, data, facsimile, seamlessly and securely in an operator friendly environment.

Percent	Of the Equipment strings and system configurations are standardized as top allow communication throughout the units.
Percent	System redundancy incorporated among commanders, headquarters, and units.
Percent	Of operations delayed, disrupted, or degraded due to improper establishment and implementation of tactical communications system



Analysis of Required JCAS and JCID Capabilities

39 JCAS and JCID required capabilities

Developed by Study Team

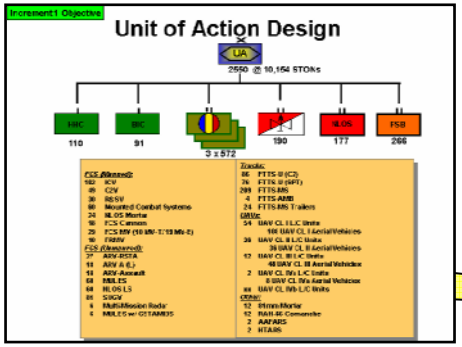
JCAS Required Capabilities

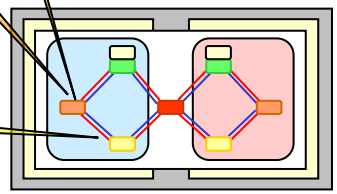
1. Enable Force Application
2. Enable Force Protection
3. Enable Logistics Support
4. Develop and Maintain Battle Space Awareness via Common Operating Picture (COP)
5. Enable development of integrated JCAS / ground maneuver plan
6. Enable Joint Close Air Support (JCAS) Command & Control (C2) needed to synchronize JCAS and ground maneuver
7. Enable rapid detection of friend, foe, non-combatants, and systems at all levels of visibility
8. Enable target location at all levels of visibility
9. Enable positive target identification at all levels of visibility
10. Enable target designation at all levels of visibility
11. Request JCAS
12. Approve JCAS
13. Enable collaborative mission planning
14. Enable taskings for Intelligence, Surveillance, Reconnaissance (ISR) platforms
15. Provide task-organized, trained, and equipped teams to facilitate the coordination of air, artillery, and naval surface fires

Source: DRC Analysis MMF Level: 4 & 3

9. (JCAS) Enable positive target identification at all levels of visibility

34. (JCID) Enable positive shooter identification of friend, foe, non-combatants and systems at all levels of visibility





FCS Architecture IPT Integrated Processes

LSI Produced Integrated Processes List

IP 1:	Battle Command	IP 14:	Conduct Cooperative Engagements
IP 2:	Sensors	IP 15:	Survivability
IP 3:	Networked Fires	IP 16:	Conduct Tactical Maneuver
IP 4:	Common Operating Picture	IP 17:	Conduct Vertical Maneuver
IP 5:	Networks	IP 18:	Robotics
IP 6:	A2C2	IP 19:	Deploy
IP 7:	Maintenance	IP 20:	Intelligence Operations
IP 8:	Resupply	IP 21:	Information Assurance
IP 9:	Perform Air and Missile Defense	IP 22:	Establish Soldier System Interface
IP 10:	Training	IP 23:	Interoperability
IP 11:	Health Protection	IP 24:	Information Management
IP 12:	Combat identification		
IP 13:	Mobility		

5/21/2004

FCS Architecture Integrated Processes #2/24 (Sensors)

ART 7.3.2: Evaluate Situation or Operation: Analyze and compare the actual situation or progress of the operation against criteria of success. Highlight variances between the planned situation at that time in the operation and the current situation, and forecast the degree of mission accomplishment. (FM 6-0) (USACAC)

ART 7.2.1: Collect Relevant Information: Continually collect relevant information about METT-TC from the information environment by any means for processing, displaying, storing, and disseminating to support conducting (planning, preparing for, executing, and assessing) current and future operations. (FM 6-0) (USACAC)

ART 1.3.2.2: Execute/Update the ISR Plan: The operations officer updates the ISR plan based on information he receives from the intelligence officer. The operations officer is the integrator and manager of the ISR effort through an integrated staff process and procedures. As PIRs are answered and new information requirements arise, the intelligence officer updates intelligence synchronization requirements and provides the new input to the operations officer who updates the ISR plan. He works closely with all staff elements to ensure the unit's organic collectors receive appropriate taskings. This ISR reflects an integrated collection strategy and employment, production and dissemination scheme that will effectively answer the commander's PIR. (FM 3-90) (USACAC)

ART 1.3.1: Perform Intelligence Synchronization: The intelligence officer, with staff participation, synchronizes the entire collection effort to include all assets the commander controls, assets of lateral units [illegible]ion units and organizations, and intelligence reach to answer the commander's PIR and IR. [illegible]AIC&FH)

ART 7.3.2 Performance Measures

ART 7.3.2 EVALUATE SITUATION OR OPERATION
Analyze and compare the actual situation or progress of the operation against criteria of success. Highlight variances between the planned situation at that time in the operation and the current situation, and forecast the degree of mission accomplishment. (FM 6-0) (USACAC)

Yes/No evaluation reflects reality of the degree of mission accomplishment and forecasts the degree of mission accomplishment.

Time to evaluate progress or situation and determine type of decision.

Time to complete evaluation of situation or progress.

Percent accuracy of evaluation of situation or progress.

Percent of accurate friendly evaluations. ***(OP 3.2.1, OP 5.1.11)***

Number of opportunities or threats recognized. ***(OP 3.2.1, OP 5.1.11)***

5/21/2004

PM-FCS CTO Functional Capabilities

52 FCS Functional Capabilities

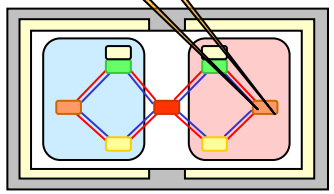
FCS Functional Capabilities

F1: Capability to destroy enemy formations via LOS, BLOS, and/or NLOS
F2: Organizationally employ fire delivery systems
F3: Scale effects to focus precisely
F4: Employ minefields
F5: Maximize lethality of dismounted operations
F6: "Avenge" kill enemy systems engaging or preparing to engage friendly systems
F7: Air defense (AD) lethality
F8: Support mission planning/mission rehearsal
F9: Enable battle command and control
F10: Enable continuous estimate of situation
F11: Enable visualization of tactical scheme
F12: Enable dissemination of tactical scheme
F13: Detect presence/identify disposition of anti-tank/personnel mines, booby traps
F14: Detect, locate other, non-mine/booby trap man-made obstacles
F15: Enable continuous situational understanding through networked force
F16: Facilitate automatic language translation
F17: Enable information exchange via adaptive, integrated communications
F18: Detect/prevent intruders/malicious software; identify points of intrusion/origin, information compromised/introduced into the network
F19: Enable Positional Navigation (POSNAV)
F20: Enable information management to fuse, monitor and disseminate information to support CCIR, combat action, decision-making and analysis
F21: Establish an adaptive learning repository to build and manage a library of friendly and enemy DTLOMS and lessons learned

5/20/2004 Source: FCS ORD, 14 April 03 MMF Level: 7 & 4 Page 16

F24: Provide combat identification to detect, locate, and identify friend, foe and noncombatants and systems

F26: Enable C2 needed to synchronize fire, maneuver and ISR



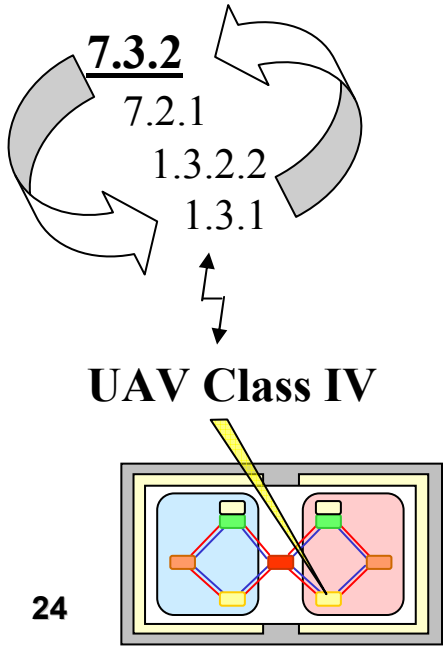
FCS ORD UAV Platform (Class IV)

Unit of Action Level

1.0 General. The Unmanned Aerial Vehicle Class IV (UAV CL IV) will be multifunction aerial systems capable of providing reconnaissance, security/early warning, long endurance persistent stare, **target acquisition and designation, wide area surveillance and have the ability to team (with Level IV Control) with air-ground forces throughout the UA.** The aerial systems will provide information from operating altitude and standoff range both day/night and adverse weather. The aerial systems should be capable of acting as a communication relay and performing emitter mapping, detect CBRN, and perform meteorological survey for the UA throughout their Area of Influence (AI). More than one type of air vehicle may be used to accomplish the roles/capabilities outlined herein.

1.1 Operational Context. UAV at the UA level must provide the following roles/capabilities:

- Provide a reconnaissance and security / early warning capability for the UA
- **Perform wide area R&S, target classification, recognition, identification….**
- Perform long endurance persistent stare across the UA AI (75 km)
- **Perform target acquisition and designation for precision fires**
- **Provide RSTA products to the UA through Jt common data links/network via FCS BCS**
- Provide information directly to C2 nodes and FCS C2 platforms
- Perform wide area search to cue other sensors
- **Conducting MUM Teaming operations with other air-ground force units**
- **Enable detection of Soldiers and vehicles (moving and stationary) through foliage**
- **Provide automatic fire adjustment calculations for indirect fire weapons and CAS**



AMSAA Systems Book UAV Platform (Class IV)

Platform Characteristics

Payload, Endurance, and Speed

Nominal Echelon: Battalion/Brigade

Type of Platform: Fixed Wing (similar to Shadow 200+)

Gross Weight: TBD

Payload Weight (including communications): TBD

Operational Altitude: 1000-6500 ft AGL

Endurance: 6 hours

Range: 40 km

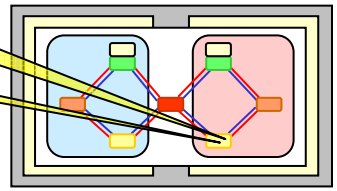
Cruise Speed: 140 kph

Maximum Speed: 200 kph

Transport: Carried 4 per HEMTT

Platform Sensor Packages

1	**UAV Meteorological** **UAV IFF** **UAV C2 Relay** **Comms Relay**
2	**UAV Meteorological** **UAV IFF** **UAV GMTI/SAR**
3	**UAV Meteorological** ***UAV IFF*** ***UAV EO (Medium)*** **UAV MWIR w/ Mine Detection and AITD** **UAV LRF/TD** **UAV Acoustic**
4	**UAV Meteorological** **UAV IFF** **CBRNE** **SIGINT Emitter Mapping**



AMSAA Systems Book UAV Class IV Technologies

UAV Electro-Optic (EO), medium: Passive EO sensor detects, classifies, identifies, and localizes targets using image/signal processing techniques; stabilized sensor; available to UAV (CL III), UAV (CL IV-a).

UAV Mid-Wave Infrared (MWIR) with Mine Detection and Aided Target Detection (AiTD): Cooled 640x480 passive sensor; detects, classifies, identifies, and localizes targets using image/signal processing techniques; stabilized sensor; includes mine detection capability with IR filter; integrated AiTD technologies; available to UAV (CL III), UAV (CL IV-a).

UAV Synthetic Aperture Radar (SAR)/Ground Moving Target Indicator (GMTI) RADAR, medium: Payload with SAR to detect stationary targets and MTI to detect moving targets (CL IV-a).

UAV CBRNE UAV Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE): Description To be provided: available to UAV (CL II), UAV (CL IV-a), UAV (CL IV-b)

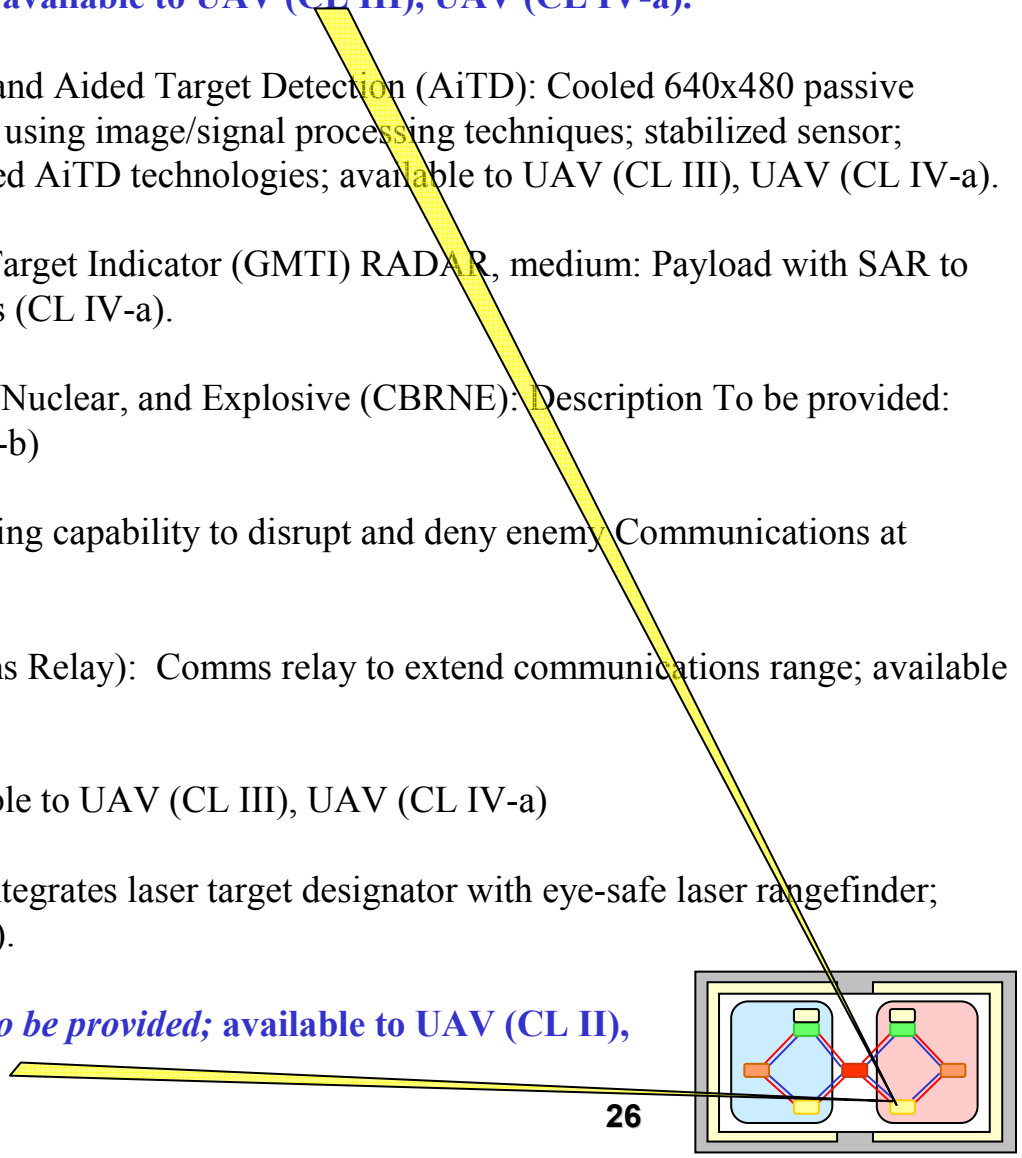
UAV Electronic Attack (EA) provides a non-lethal jamming capability to disrupt and deny enemy Communications at crucial times: available to UAV (CL IV-a/b).

UAV Comms Relay UAV Communication Relay (Comms Relay): Comms relay to extend communications range; available to UAV (CL III), UAV (CL IV-a).

UAV Meteorological, Description to be provided: available to UAV (CL III), UAV (CL IV-a)

UAV Laser Rangefinder/Target Designator (LRF/TD): Integrates laser target designator with eye-safe laser rangefinder; available to UAV (CL II), UAV (CL III), UAV (CL IV-a).

UAV Identification Friend-or-Foe (IFF): *Description to be provided;* available to UAV (CL II), UAV (CL III), UAV (CL IV-a), UAV (CL IV-b).



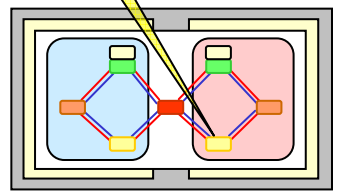
Raytheon's Electro-optical Medium Sensor Specifications and Performance Measures

Global Hawk Integrated Sensor Suite

The Global hawk Integrated Sensor Suite, developed by Raytheon, Electronic Systems, provides pairs of very-high-resolution synthetic aperture radar (SAR) and moving target indication (MTI) with electro-optical (EO) and infrared (IR) sensors offering multiple imaging capabilities. The SAR can operate simultaneously with either the EO or IR sensor, enabling wide-area search (WAS) for situational awareness and threat assessment as well a narrower focus on specific targets for prosecution or BDA.

Specifications	Performance Parameters
EO/IR Focal length: 1.75 m Aperture: 0.28 m (11 in.) Array: IR InSb: 3.7-5 um EO CCD: o,55-0.8 um Field of View Pixel, instantaneous 11.4, urad, MWIR 5.1 urad, visible Array 5.5 x 7.3 urad, MWIR 5.1 x 5.2 urad, visible **Radar** Frequency: x-based Bandwidth: 600 Mhz Peak Power: 3.5 kW Antenna field of regard: +/- 45 Deg squint, either side of aircraft	**EO/IR** WAS: 138,000 km2/24 hr NIIRS* MWIR: 5.0 Visible: 6.0 Spotlight: 1900 2x2 km spot images/24 hr NIIRS* MWIR: 5.5 Visible: 6.5 **Radar** WAS: 138,000 km2/24 hr, 10-km wide strip, at 1-m resolution out to 200 km range Spotlight: 1900 2x2 km spot images/24 hrs at 0.3-m resolution out to 200-km range GMTI: 15,000 km2/min: minimum detectable Velocity, 2.1 m/s (4 kn)

*NIIRS=National Inage Interpretability Rating Scale



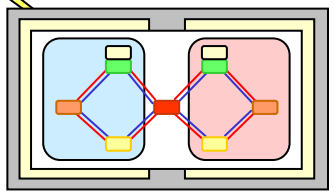
UAV IFF Sensor Performance Measures

Current Force version: Battlefield Combat Identification System (BCIS):

"BCIS is a secure, encrypted question and answer identification system which provides a high confidence, ground combat vehicle identification capability. The system operates in the millimeter wave (mmW) frequency region at 38Ghz. The "Shooter Platform" has an interrogator antenna boresighted to the gunners targeting system and integral with the platforms laser rangefinder sub system. Other major components of the BCIS system integrated on the platform are shown below. The receiver - transmitter unit and display module are mounted in the vehicle commander's area. "

2.1.1 BCIS Functional Characteristics. BCIS provides a combat identification capability to reduce the risk of fratricide. BCIS is a millimeter wave (38GHz), secure question and answer, point of engagement system that positively identifies friendly targets. **BCIS provides a > 95% probability of correct friendly identification within one second at the gunner's site with no impact on firing function. BCIS works effectively on a dirty battlefield at an operational range of 150 to 5500 meters.** Interrogator azimuth coverage is ± 1.3 ° or ± 22.5 mils. Transponder azimuth coverage is 360 ° at an elevation of -10 ° to + 45 °. BCIS is used by combat, combat support and combat service support vehicles operating forward of the Brigade Support Area (BSA) to positively identify, or be identified, by other BCIS equipped friendly ground vehicles and minimize the risk of fratricide during the conduct of land battle.

Potential Future Force version: Multilateration Combat Identification System (MCIS): http://www.dtic.mil/ndia/2001ewc/colasanti.pdf



Joint T & E Pillar

Joint T & E Mission

To ensure that the Department of Defense (DoD) has the test and evaluation (T&E) infrastructure required to develop, test, and evaluate the warfighting systems needed to prevail in increasingly complex battlefield environments R&R provides:

- Policy and oversight for facilities);
- Investment for new DoD
- Technical and resource i
- Customer-friendly suppo Director of Operational T

Source: DOT&E website

Ensure infrastructure required to develop, test, and evaluate the warfighting systems...

JCAS/JCID Testing Requirements

Tasks and performance measures associated with the conduct and employment of JCAS/JCID

DRC Analysis: JCAS Required Capability: Enable positive target identification at all levels of visibility

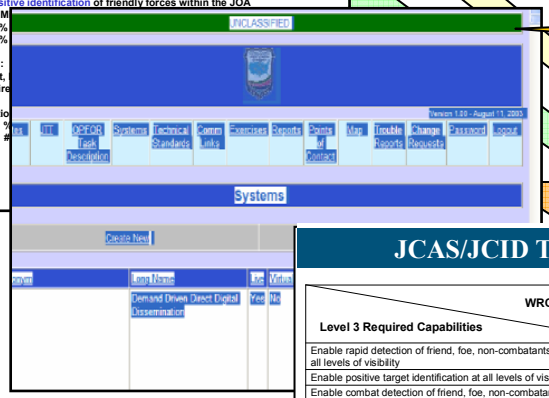
DRC Analysis: JCID Required Capability): Enable positive identification of friend, foe, non-combatants and systems at all levels of visibility

UJTL: OP Task 5.1.11 Provide positive identification of friendly forces within the JOA
Performance Measures: - M
- %
- %

FCS: FCS Functional Capabilities:
- Provide combat ID to detect,
- Enable C2 to synchronize fire

AUTL: ART 7.3.2, Evaluate Situatio
Performance Measures: - %
- #

Testing requirements for positive target and combat identification…..



JNTC Facility capabilities and systems, live, virtual and constructive

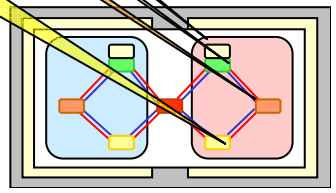
JCAS/JCID Testing Facilities

Level 3 Required Capabilities \ WRC Facilities	NTC, Ft Irwin, CA	Nellis AFB, NV	MCAG CC, 29 Palms, CA	Naval Station San Diego, CA
Enable rapid detection of friend, foe, non-combatants, and systems at all levels of visibility	8	8	8	8
Enable positive target identification at all levels of visibility	8	8	8	8
Enable combat detection of friend, foe, non-combatants and systems at all levels of visibility	8	8	8	8
Enable positive shooter identification of friend, foe, non-combatants and systems at all levels of visibility	8	8	8	1

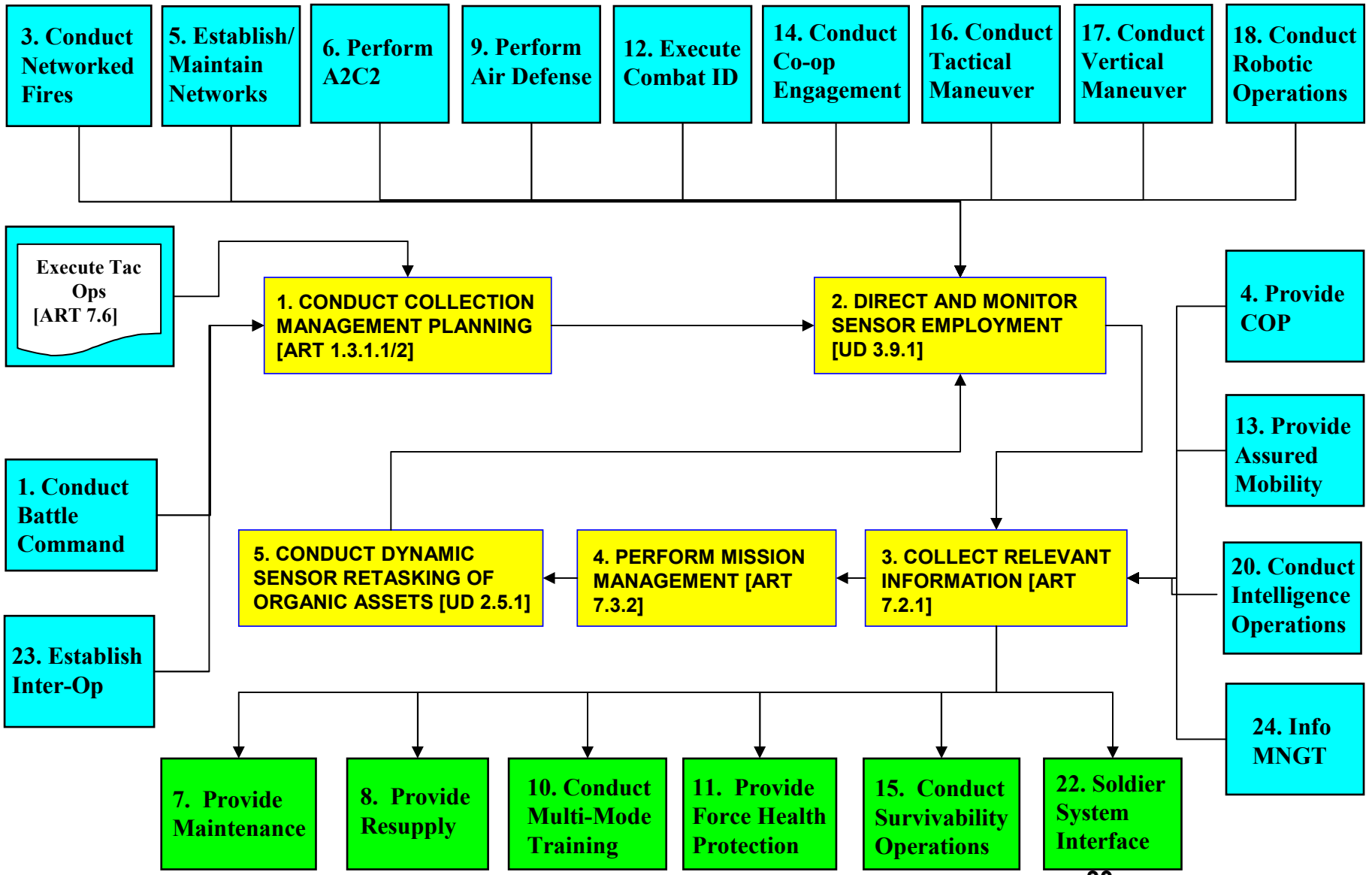
0 = Null
1 = Live
2 = Live and Virtual
3 = Live, Virtual, and Constructive
4= Live and Constructive
5 = Virtual
6= Virtual and Constructive
7 = Constructive
8 = Unknown

JNTC WRC Test Facilities

Facilities Gap Analysis

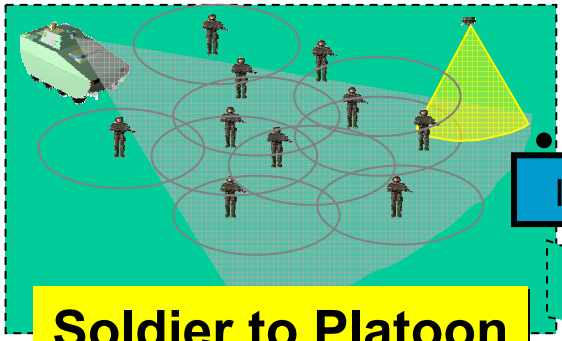


IP - 2: Establish/Maintain/Manage Sensor Networks Integrated Process Flow Diagram



IP 2: Establish/Maintain/Manage Sensor Networks OV-1

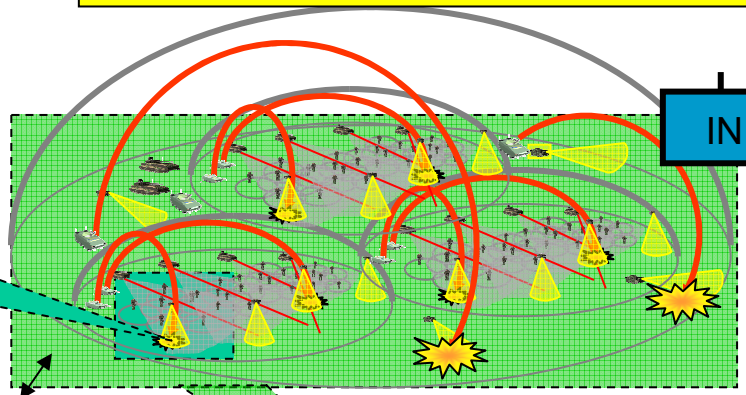
- Co Cdr can pre-set criteria for downward/ upward information flow
- Layered building blocks of information



IN

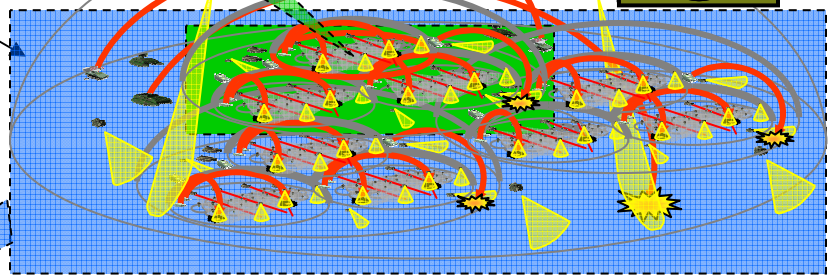
Soldier to Platoon

- Small unit sensor grid creates a sphere of SA
- Automated reporting to/from lower/higher/adjacent echelons

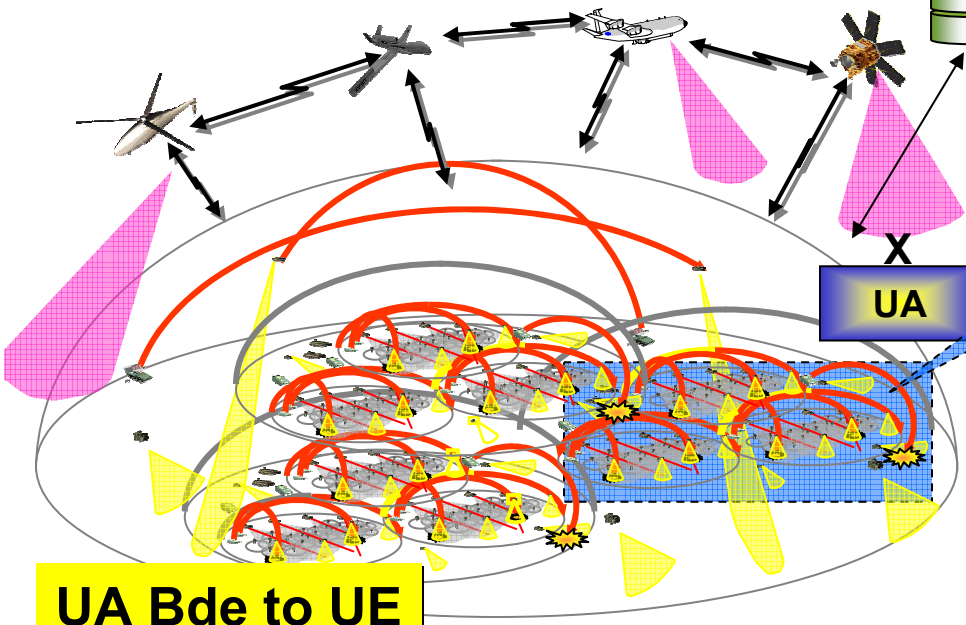


IN

NCIE



UA



UA Bde to UE

Layered Sensors at Bn & Bde

- UA Bn & Bde Cdrs set criteria for information flow
- UA/UE/JTF feeds filtered to prevent info overload
- UA linkage to UE, Joint, and National assets
- Automated fusion / Pattern Analysis process
- Layered approach supports Battle Command
- Provides information to the NCIE/COP

FCS UAV Platform (Class III)

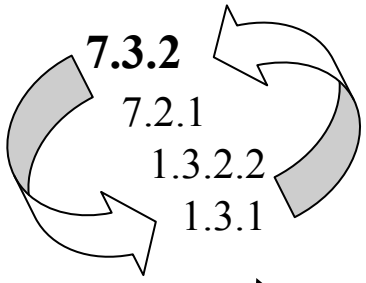
Appendix B to Section 1 to Annex E to FCS ORD (Unmanned Aerial Vehicle (CL III))

Battalion Level

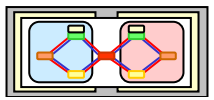
1.0 General. The UAV (CL III) is a multifunction aerial system capable of providing reconnaissance, security/early warning, **target acquisition and designation for precision fires**, throughout the battalion area of influence by remotely over watching and reporting changes in key terrain, avenues of approach and danger areas in open and rolling, restrictive, and urban areas. The aerial system will provide information from operating altitude and standoff range both day/night and adverse weather. The aerial system should be capable of communication relay, detecting mines, performing CBRN detection, and performing meteorological survey for the NLOS battalion to deliver precision fires.

1.1 Operational Context. UAV at the Battalion level must provide the following roles/capabilities:

- Provide a reconnaissance and security/early warning capability for the UA – See Day/Night
- Remotely overwatch and report changes in key terrain, avenues of approach and danger areas in open and restrictive terrain, and urban areas
- Perform **target acquisition and designation for the UA**
- Act as a communications (wide band) relay
- Detect CBRN
- Perform target area meteorological survey
- Does not require an airfield
- Support CA Battalion by performing R&S on a minimum of three routes or
- Enable NLOS targeting and fires



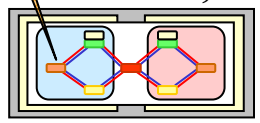
UAV Class III



MMF Level: 3

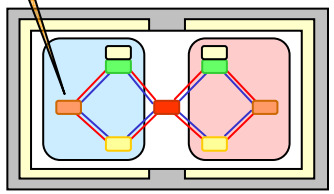
Study Team Analysis of JCAS Required Capabilities

1. Enable Force Application
2. Enable Force Protection
3. Enable Logistics Support
4. Develop and Maintain Battle Space Awareness via Common Operating Picture (COP)
5. Enable development of integrated JCAS / ground maneuver plan
6. Enable Joint Close Air Support (JCAS) Command & Control (C2) needed to synchronize JCAS and ground maneuver
7. Enable rapid detection of friend, foe, non-combatants, and systems at all levels of visibility
8. Enable target location at all levels of visibility
9. **Enable positive target identification at all levels of visibility**
10. Enable target designation at all levels of visibility
11. Request JCAS
12. Approve JCAS
13. Enable collaborative mission planning
14. Enable taskings for Intelligence, Surveillance, Reconnaissance (ISR) platforms
15. Provide task-organized, trained, and equipped teams to facilitate the coordination of air, artillery, and naval surface fires



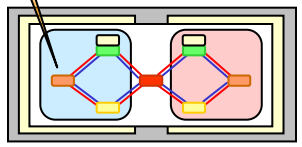
Study Team Analysis of JCAS Required Capabilities (con't)

16. Enable information exchange via interoperable communications (visual / voice / digital)
17. Enable collaborative mission rehearsal
18. Provide JCAS aircraft
19. Enable Suppression of Enemy Air Defenses (SEAD) planning & execution
20. Provide task-organized, trained, and equipped teams to facilitate the terminal control of air, artillery, and naval surface fires
21. Enable sensor to shooter linkages
22. Conduct JCAS attack
23. Scale effects to focus precisely in support of ground maneuver
24. Enable JCAS Battle Damage Assessment (BDA)



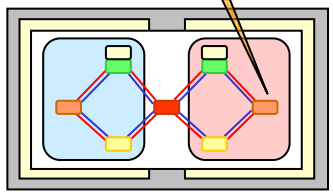
Study Team Analysis of JCID Required Capabilities

25. Conduct air Intelligence, Surveillance, and Reconnaissance (ISR)
26. Enable national and theater Signals Intelligence (SIGINT) integration
27. Develop and Maintain Battle Space Awareness via Common Operating Picture (COP)
28. Detect and report Close Air Support (CAS) targets and formations
29. Enable real-time information exchange via interoperable communications (visual / voice / digital)
30. Enable collaborative mission planning
31. Enable collaborative mission rehearsal
32. Enable combat detection of friend, foe, non-combatants and systems at all levels of visibility
33. Reduce initial target detection to positive identification time
34. **Enable positive shooter identification of friend, foe, non-combatants and systems at all levels of visibility**
35. Enable integration of Unmanned Aerial Vehicle (UAV) ISR for Positive Hostile ID
36. Enable sensor to shooter linkages
37. Conduct forward area Command and Control (C2) of aircraft
38. Enable AWACS / E2C aircraft handoff to Forward Area Controller (FAC) and Joint Terminal Attack Controller (JTAC)
39. 39. Provide Battle Damage Assessment (BDA)



FCS Functional Capabilities

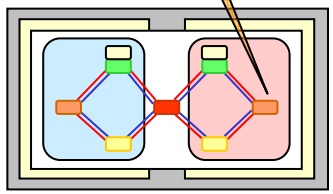
F1: Capability to destroy enemy formations via LOS, BLOS, and/or NLOS
F2: Organizationally employ fire delivery systems
F3: Scale effects to focus precisely
F4: Employ minefields
F5: Maximize lethality of dismounted operations
F6: "Avenge" kill enemy systems engaging or preparing to engage friendly systems
F7: Air defense (AD) lethality
F8: Support mission planning/mission rehearsal
F9: Enable battle command and control
F10: Enable continuous estimate of situation
F11: Enable visualization of tactical scheme
F12: Enable dissemination of tactical scheme
F13: Detect presence/identify disposition of anti-tank/personnel mines, booby traps
F14: Detect, locate other, non-mine/booby trap man-made obstacles
F15: Enable continuous situational understanding through networked force
F16: Facilitate automatic language translation
F17: Enable information exchange via adaptive, integrated communications
F18: Detect/prevent intruders/malicious software; identify points of intrusion/origin, information compromised/introduced into the network
F19: Enable Positional Navigation (POSNAV)
F20: Enable information management to fuse, monitor and disseminate information to support CCIR, combat action, decision-making and analysis
F21: Establish an adaptive learning repository to build and manage a library of friendly and enemy DTLOMS and lessons learned



Source: FCS ORD, 14 April 03

FCS Functional Capabilities (Con't)

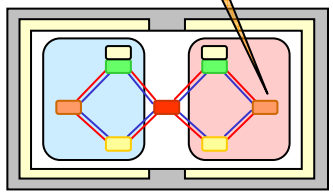
F22: Enable terrain analysis
F23: Integrate synergistic use of ISR to see the full range of operational variables
F24: Provide combat identification to detect, locate, and identify friend, foe and noncombatants and systems
F25: Determine what is most dangerous
F26: Enable C2 needed to synchronize fire, maneuver and ISR
F27: Enable sensor to shooter linkage
F28: Provide improved early warning and dissemination of threats
F29: Maneuver into and out of contact
F30: Enable decisive maneuver
F31: Enable development of situation out of contact
F32: Provide for tactical mobility
F33: Counter/neutralize/clear/mark anti-tank/personnel mines, booby traps
F34: Breach disrupting/fixing obstacles
F35: Cross gaps (i.e. streams, irrigation ditches)
F36: Enable protective countermobility and survivability support
F37: Enhance individual soldier survivability
F38: Degrade enemy detection and terminal targeting
F39: Defeat/intercept enemy threats
F40: Enable blinding the enemy
F41: Provide area suppression capability
F42: Facilitate improved soldier performance
F43: Enable medical treatment and evacuation of wounded soldiers



Source: FCS ORD, 14 April 03

FCS Functional Capabilities (Con't)

F44: Enable reduction in the maneuver sustainment footprint and demand for replenishment
F45: Enable organic Unit of Action sustainment
F46: Simplified systems maintainability to reduce maintenance and replenishment burden
F47: Water generation and replenishment
F48: Provide capability to monitor, report and submit requests to facilitate anticipatory sustainment
F49: Provide a means of transporting people and materiel
F50: Dismounted forces must be self-sustaining
F51: Provide a multi-echelon training construct
F52: Conduct air assault operations



Source: FCS ORD, 14 April 03

FCS Architecture IPT Integrated Processes List

IP 1: Battle Command

IP 2: Sensors

IP 3: Networked Fires

IP 4: Common Operating Picture

IP 5: Networks

IP 6: A2C2

IP 7: Maintenance

IP 8: Resupply

IP 9: Perform Air and Missile Defense

IP 10: Training

IP 11: Health Protection

IP 12: Combat identification

IP 13: Mobility

IP 14: Conduct Cooperative Engagements

IP 15: Survivability

IP 16: Conduct Tactical Maneuver

IP 17: Conduct Vertical Maneuver

IP 18: Robotics

IP 19: Deploy

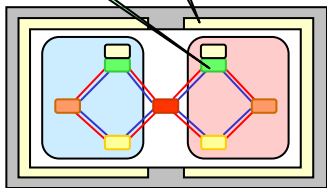
IP 20: Intelligence Operations

IP 21: Information Assurance

IP 22: Establish Soldier System Interface

IP 23: Interoperability

IP 24: Information Management



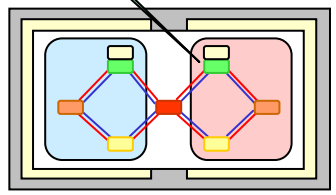
FCS Architecture
Integrated Processes #2/24 (Sensors)

ART 7.3.2: Evaluate Situation or Operation: Analyze and compare the actual situation or progress of the operation against criteria of success. Highlight variances between the planned situation at that time in the operation and the current situation, and forecast the degree of mission accomplishment. (FM 6-0) (USACAC)

ART 7.2.1: Collect Relevant Information: Continually collect relevant information about METT-TC from the information environment by any means for processing, displaying, storing, and disseminating to support conducting (planning, preparing for, executing, and assessing) current and future operations. (FM 6-0) (USACAC)

ART 1.3.2.2: Execute/Update the ISR Plan: The operations officer updates the ISR plan based on information he receives from the intelligence officer. The operations officer is the integrator and manager of the ISR effort through an integrated staff process and procedures. As PIRs are answered and new information requirements arise, the intelligence officer updates intelligence synchronization requirements and provides the new input to the operations officer who updates the ISR plan. He works closely with all staff elements to ensure the unit's organic collectors receive appropriate taskings. This ISR reflects an integrated collection strategy and employment, production and dissemination scheme that will effectively answer the commander's PIR. (FM 3-90) (USACAC)

ART 1.3.1: Perform Intelligence Synchronization: The intelligence officer, with staff participation, synchronizes the entire collection effort to include all assets the commander controls, assets of lateral units and higher echelon units and organizations, and intelligence reach to answer the commander's PIR and IR. (FM 34-1) (USAIC&FH)



ART 7.3.2 Task Performance Measures

ART 7.3.2 EVALUATE SITUATION OR OPERATION
Analyze and compare the actual situation or progress of the operation against criteria of success. Highlight variances between the planned situation at that time in the operation and the current situation, and forecast the degree of mission accomplishment. (FM 6-0) (USACAC)

Yes/No evaluation reflects reality of the degree of mission accomplishment and forecasts the degree of mission accomplishment.

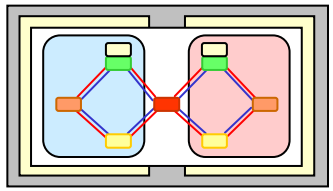
Time to evaluate progress or situation and determine type of decision.

Time to complete evaluation of situation or progress.

Percent accuracy of evaluation of situation or progress.

Percent of accurate friendly evaluations. ***(OP 3.2.1, OP 5.1.11)***

Number of opportunities or threats recognized. ***(OP 3.2.1, OP 5.1.11)***

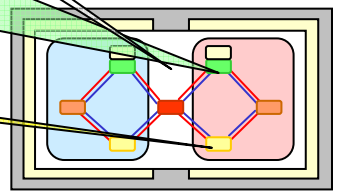


JNTC Activities

Joint or Service Exercise	Type of Event	Facilities	Level of Conflict	JTT Tasks
1st Qtr MRX	V	Virtual	SASO	TA 3.2.6; **TA 5.2.1**; TA 5.5.1
Red Flag	H	Nellis	MTW	TA 3.2.4; **TA 5.2.1**; TA 5.6; TA 6.5
1st Qtr BGIE	H	WRC	MTW	**TA 5.2.1**; TA 6.5
TF05	V	Virtual	MTW	TA 3.2 7; **TA 5.2.1**
CTC	H	WRC	MTW	**TA 3.2.2**; TA 3.2.6; TA 3.3; TA 4.2;**TA 5.2.1**
JTFEX 05-1	H	WRC	MTW	TA 3.2.4; TA 3.3; **TA 5.2.1**
2nd Qtr MRX	V	Virtual	SASO	TA 3.2.1; TA 3.2.6; TA 4.2;**TA 5.2.1**; TA 6.3
JRF (Int)	I	Nellis/AW	MTW	TA 3.2.1; **TA 3.2.2**; TA 3.2.3; TA 3.2.4; TA 3.2.7; TA 5.6
3rd Qtr BGIE	H	WRC	MTW	TA 3.2.7; **TA 5.2.1**; TA 5.6; TA 6.5
3rd Qtr MAWTS	H	29 Palms	MTW	**TA 3.2.2;; TA 5.2.1**
SF05	V	EUC	GWOT	TA 3.2.1; **TA 5.2.1**; TA 7.1
RS (Int)	I	WRC	MTW	TA 3.2.7;**TA 5.2.1**; TA 6.3; TA 6.5
4th Qtr CTC/AW	H	WRC	MTW	TA 1.1.1; T**A 3.2.2**; **TA 5.2.1**
4th Qtr CAX	H	29 Palms	MTW	TA 3.2.1;**TA 5.2.1**; TA 5.5.1; TA 6.2
Cope Thunder	H	PARC	MTW	TA 3.2.1; TA 3.2.3; **TA 5.2.1**; TA 6.2
UE FD	V	SOU	GWOT	TA 3.2.1; **TA 5.2.1**; TA 6.2

Type of Event

Vertical	**V**
Integrated	**I**
Horizontal	**H**

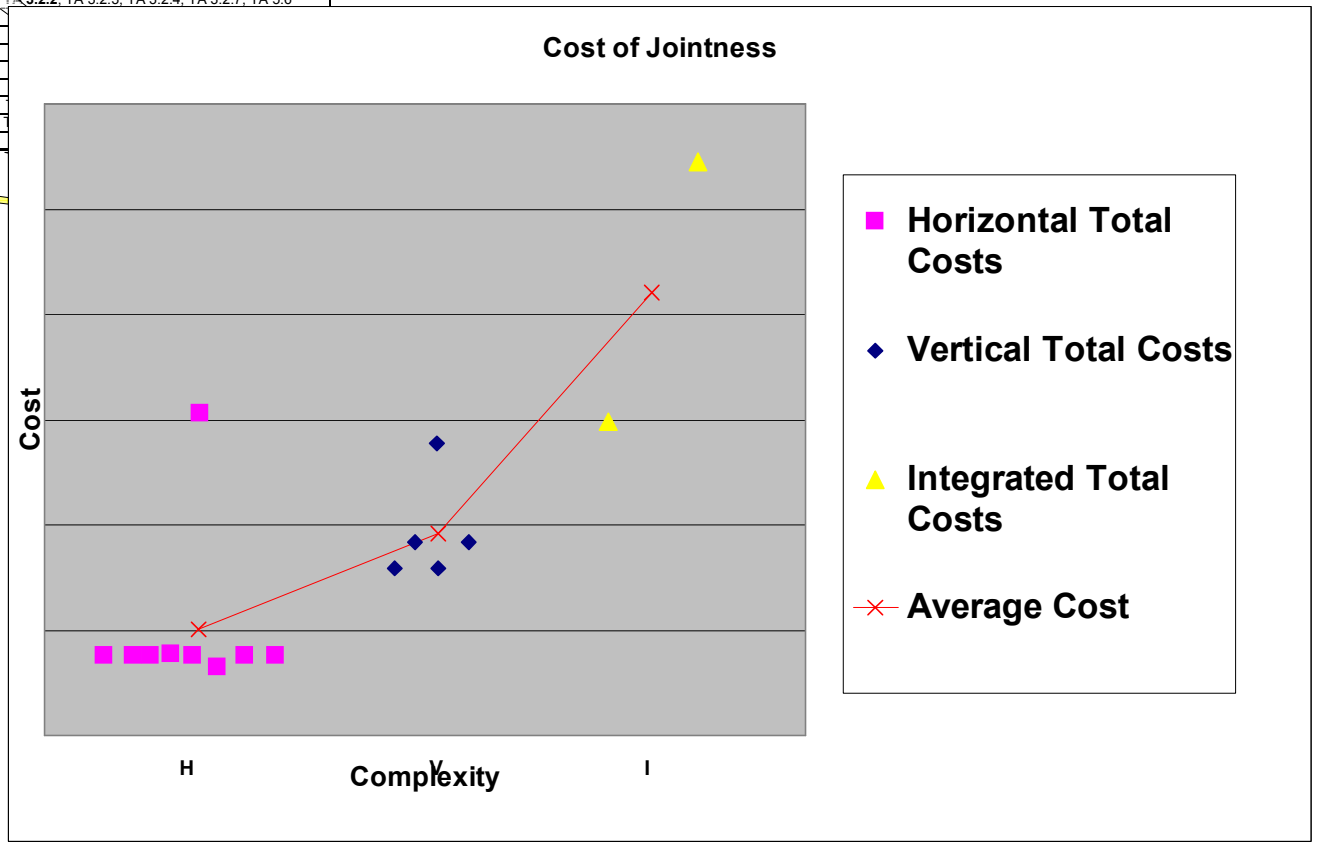


JNTC Cost Drivers

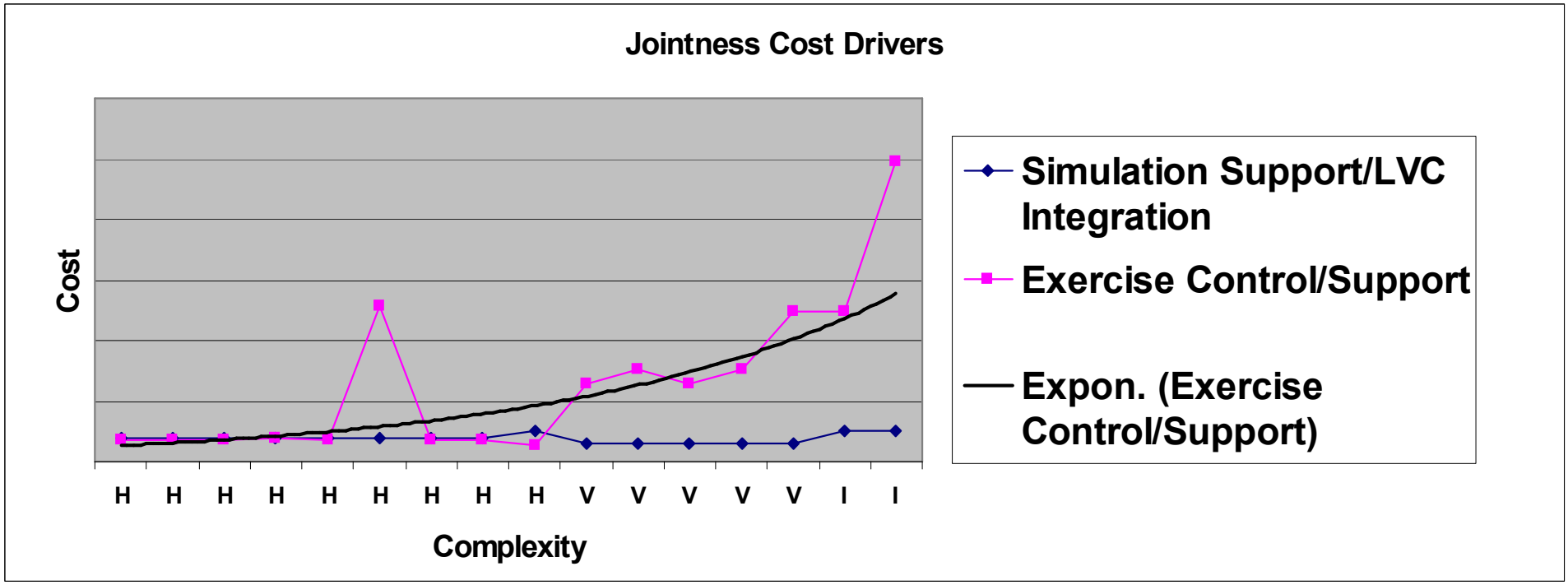
JNTC Activities

	Type of Event	Location	Venue	Tasks
1st Qtr MRX	V	Virtual	SASO	TA 3.2.6; **TA 5.2.1**; TA 5.5.1
Red Flag	H	Nellis	MTW	TA 3.2.4; **TA 5.2.1**; TA 5.6; TA 6.5
1st Qtr BGIE	H	WRC	MTW	**TA 5.2.1**; TA 6.5
TF05	V	Virtual	MTW	TA 3.2 7; **TA 5.2.1**
CTC	H	WRC	MTW	**TA 3.2.2**; TA 3.2.6; TA 3.3; TA 4.2;**TA 5.2.1**
JTFEX 05-1	H	WRC	MTW	TA 3.2.4; TA 3.3; **TA 5.2.1**
2nd Qtr MRX	V	Virtual	SASO	TA 3.2.1; TA 3.2.6; TA 4.2;**TA 5.2.1**; TA 6.3
JRF (Int)	I	Nellis/AW	MTW	TA 3.2.1; TA **3.2.2**; TA 3.2.3; TA 3.2.4; TA 3.2.7; TA 5.6
3rd Qtr BGIE	H	WRC	MTW	
3rd Qtr MAWTS	H	29 Palms	MTW	
SF05	V	EUC	GWOT	
RS (Int)	I	WRC	MTW	
4th Qtr CTC/AW	H	WRC	MTW	
4th Qtr CAX	H	29 Palms	MTW	
Cope Thunder	H	PARC	MTW	
UE FD	V	SOU	GWOT	

5/26/2004



JNTC Cost Drivers (Cont)



DRC Analysis of WRC Capabilities to JCAS/JCID

	A	B	C	D	E	F
1	WRC Facilities / Level 3 Required Capabilities	NTC, Ft Irwin, CA	Nellis AFB, NV	MCAGCC, 29 Palms, CA	Naval Station San Diego, CA	WSMR, NM
2	Enable Force Application	4	1	4	2	-1
3	Enable Force Protection	4	1	4	0	1
4	Enable Logistics Support	4	1	4	1	1
5	Develop & Maintain Battle Space Awareness via Common Operating Picture (COP)	4		4	2	
6	Enable development of integrated JCAS / ground maneuver plan	4	1	4	0	1
7	Enable Joint Close Air Support (JCAS) Command & Control (C2) needed to synchronize JCAS and ground maneuver	4	1	4	0	1
8	Enable rapid detection of friend, foe, non-combatants, and systems at all levels of visibility	-1				1
9	Enable target location at all levels of visibility	4		4		1
10	Enable positive target identification at all levels of visibility	-1				
11	Enable target designation at all levels of visibility	-1	-1		1	
12	Request JCAS	1	1	1	1	1
13	Approve JCAS	1	1	1	1	1
14	Enable JCAS collaborative mission planning	-1	-1			
15	Enable taskings for Intelligence, Surveillance, reconnaissance (ISR) platforms	1	1	1	1	1
16	Provide task-organized, trained, and equipped					
17	Enable information exchange via Interoperabl					
18	Enable collaborative mission rehearsal					
19	Provide JCAS aircraft					
20	Enable Suppression of Enemy Air Defenses (					
21	Provide task-organized, trained, and equipped					
22	Enable sensor to shooter linkages					
23	Conduct JCAS attack	4	1	4		1
24	Scale effects to focus precisely in support of ground maneuver	-1	1			
25	Enable JCAS Battle Damage Assessment (BDA)	4	1	4	0	1
26	Conduct air Intelligence, Surveillance, and Reconnaissance (ISR)	4	1			
27	Enable national and theater signals intelligence (SIGINT) integration	7	-1	-1	1	
28	Develop and maintain battle space awareness via Common Operating Picture (COP)	4	-1		2	1
29	Detect and report Close Air Support (CAS) targets and formations	4	1	4	0	1
30	Enable real-time information exchange via interoperable communications (visual / voice / digital)	-1	-1	-1		-1
31	Enable collaborative mission planning	-1	-1	-1	-1	-1
32	Enable collaborative mission rehearsal	-1	-1	-1	-1	-1
33	Enable combat detection of friend, foe, non-combatants and systems at all levels of visibility	-1	-1	-1	-1	1
34	Rapid initial "target detection to positive identification"	-1	-1	-1	-1	-1
35	Enable positive shooter identification of friend, foe, non-combatants and systems at all levels of visibility	-1	-1	-1	1	-1
36	Enable integration of Unmanned Aerial Vehicle (UAV) ISR for Positive Hostile ID (PHID)		-1	1	1	1
37	Enable sensor to shooter linkages					
38	Conduct forward area Command and Control					
39	Enable AWACS / E2C aircraft handoff to For					
40	Provide Battle Damage Assessment (BDA)					
41						
42	0 = Null					
43	1 = Live					
44	2 = Live and Virtual					
45	3 = Live, Virtual, and Constructive					
46	4= Live and Constructive					
47	5 = Virtual					
48	6= Virtual and Constructive					
49	7 = Constructive					
50	-1 = Unknown					

Enable positive target identification at all levels of visibility

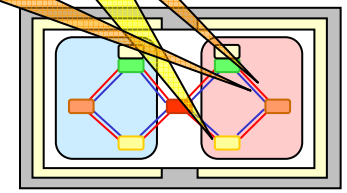
-1	-1	-1	-1	-1

Enable positive shooter identification of friend, foe, non-combatants and systems at all levels of visibility

-1	-1	-1	1	-1

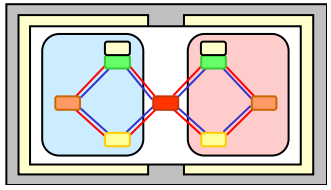
All values are NOTIONAL

0 = Null	3 = Live, Virtual, and Constructive	6 = Virtual and Constructive
1 = Live	4 = Live and Constructive	7 = Constructive
2 = Live and Virtual	5 = Virtual	-1 = Unknown

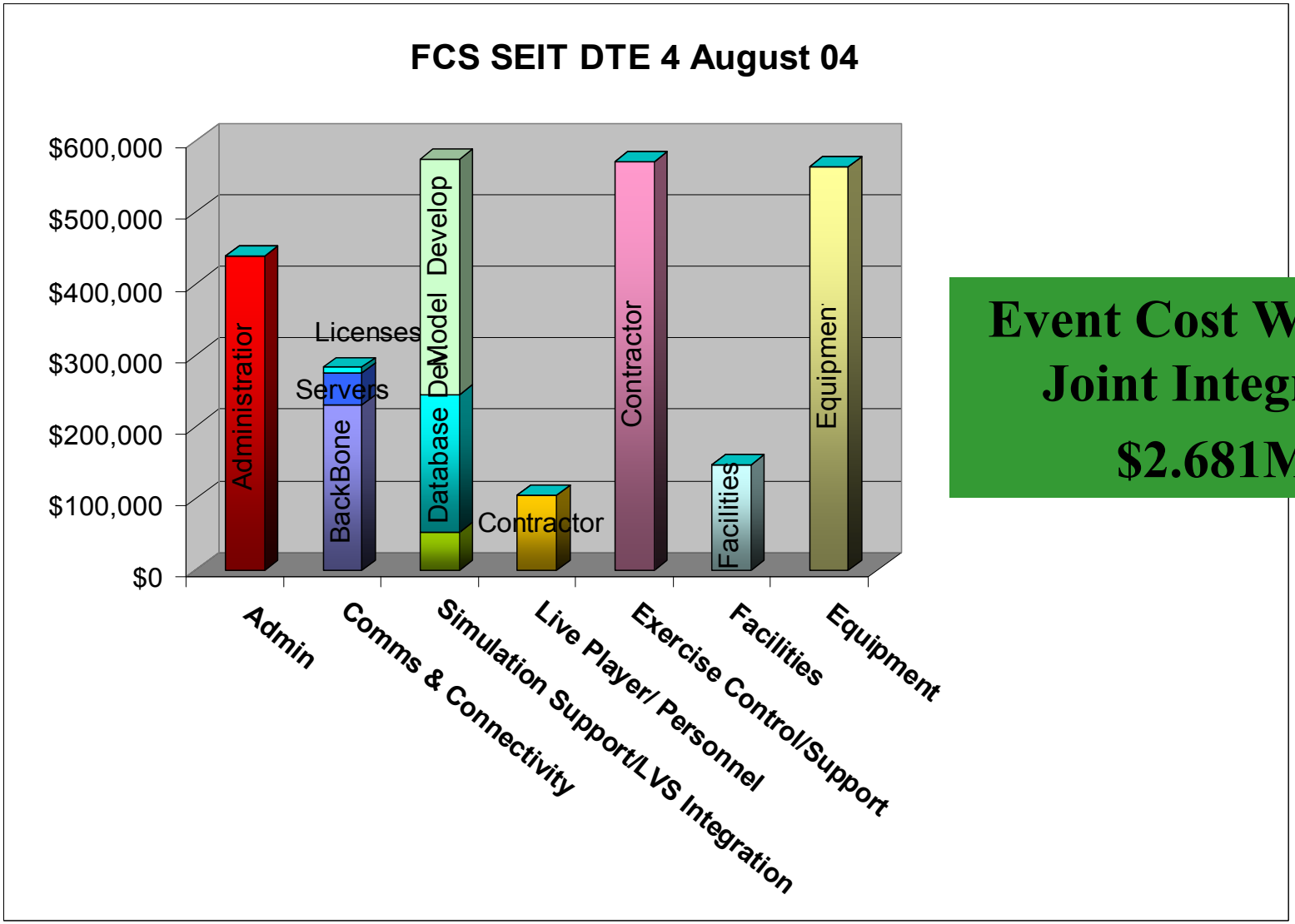


JNTC Provided WRC Facilities and Capabilities

Range / WRC Provided Capability	NTC, Ft Irwin, CA	Nellis AFB, NV	MCAGCC, 29 Palms, CA	Naval Station San Diego, CA	WSMR, NM
Aviation resources available to integrate fixed wing Close Air Support (CAS) w/ground maneuver plan	4	1	4	0	1
USAF/USMC/USN resources available to support tactical airpower control training	4	1	4	0	1
Ability to integrate doctrinally sound, well-resourced OPFOR into exercise event	4	-1	4	1	1
Maneuver / targetry instrumentation adequate for engagement feedback / AAR collection	1	-1	4	1	-1
Adequate staff of observer / controller cadre certified to service & joint standards	1	-1	1	7	1
State of the art After Action Review (AAR) data collection technical resources	4	-1	4	-1	-1
Adequate AAR development & presentation facilities	1	-1	1	-1	1
Adequate ground maneuver area suitable for integrating tactical maneuver in a joint exercise scenario	1	-1	4	0	1
Ground direct-fire / artillery range capabilities adequate to support integrated joint scenario	1	-1	1	0	1
Adequate naval maneuver area suitable for integrating tactical maneuver in a joint exercise scenario	7	0	7	1	0
Naval gunfire/ missile firing range capabilities adequate to support integrated joint scenario	0	0	7	1	1
Adequate littoral maneuver area suitable for integrating tactical maneuver in a joint exercise scenario	0	0	7	0	0
Adequate rotary wing airspace suitable for integrating tactical maneuver in a joint exercise scenario	4	1	4	0	1
Rotary wing firing range capabilities adequate to support joint exercise scenario	1	-1	1	0	1
Adequate fixed wing airspace suitable for integrating tactical maneuver in a joint exercise scenario	4	1	4	1	1
Fixed wing firing range capabilities adequate to support joint exercise scenario	1	-1	1	1	1
Technical capability to integrate strategic intel feed into joint exercise	7	-1	-1	-1	-1
Overall training environment adequate to support joint exercise maneuver expectations	4	1	4	0	1
Models & simulations integration into training environment available to realistically stimulate C^2 and ISR systems	7	-1	7	-1	-1
Technical capability to stimulate digital C^2 systems	1	-1	-1	-1	-1
Technical capability to simulate higher / joint / coalition C4ISR systems in support of joint exercise scenario	-1	-1	-1	-1	-1
engagements)	4	-1	4	-1	-1
Exercise Control SOPs / TTPs / construct adequate to joint exercise requirements	1	1	1	1	-1
Human / technical event analysis capability	4	-1	4	1	1
Aerial Port of Debarkation (APOD) capabilities	1	1	4	1	1
Sea Port of Debarkation (SPOD) capabilities	0	0	7	1	0
Rail head facilities	1	-1	-1	1	1
Technical capability to rapidly conduct JCAS Battle Damage Assessment (BDA) assessment / feedback	4	1	-1	0	1
Technical capability to observe collaborative mission ***planning***	-1	-1	-1	-1	-1
Technical capability to observe collaborative mission ***rehearsal***	-1	-1	-1	-1	-1
Technical capability to observe Enroute Mission Planning and Rehearsal System (EMPRES) capability	-1	-1	-1	-1	-1
Technical ability to integrate Joint Surveillance Target Attack System (JSTARS) [live / virtual] inputs into exercise event	4	-1	-1	-1	-1
Technical ability to integrate Unmanned Aerial Vehicle (UAV) inputs into exercise events	4	-1	-1	1	1
Technical capability to integrate computer-based exercise simulations into joint exercise	7	-1	7	-1	-1
Rotary / fixed wing aircraft support infrastructure	1	1	1	1	-1
Rotational unit equipment fleet	1	0	-1	0	0
"Link 16" integrated air and ground display feed stimulation capability	-1	-1	-1	-1	-1



ATEC Provided FCS Test Event Cost



Event Cost Without Joint Integration: $2.681M

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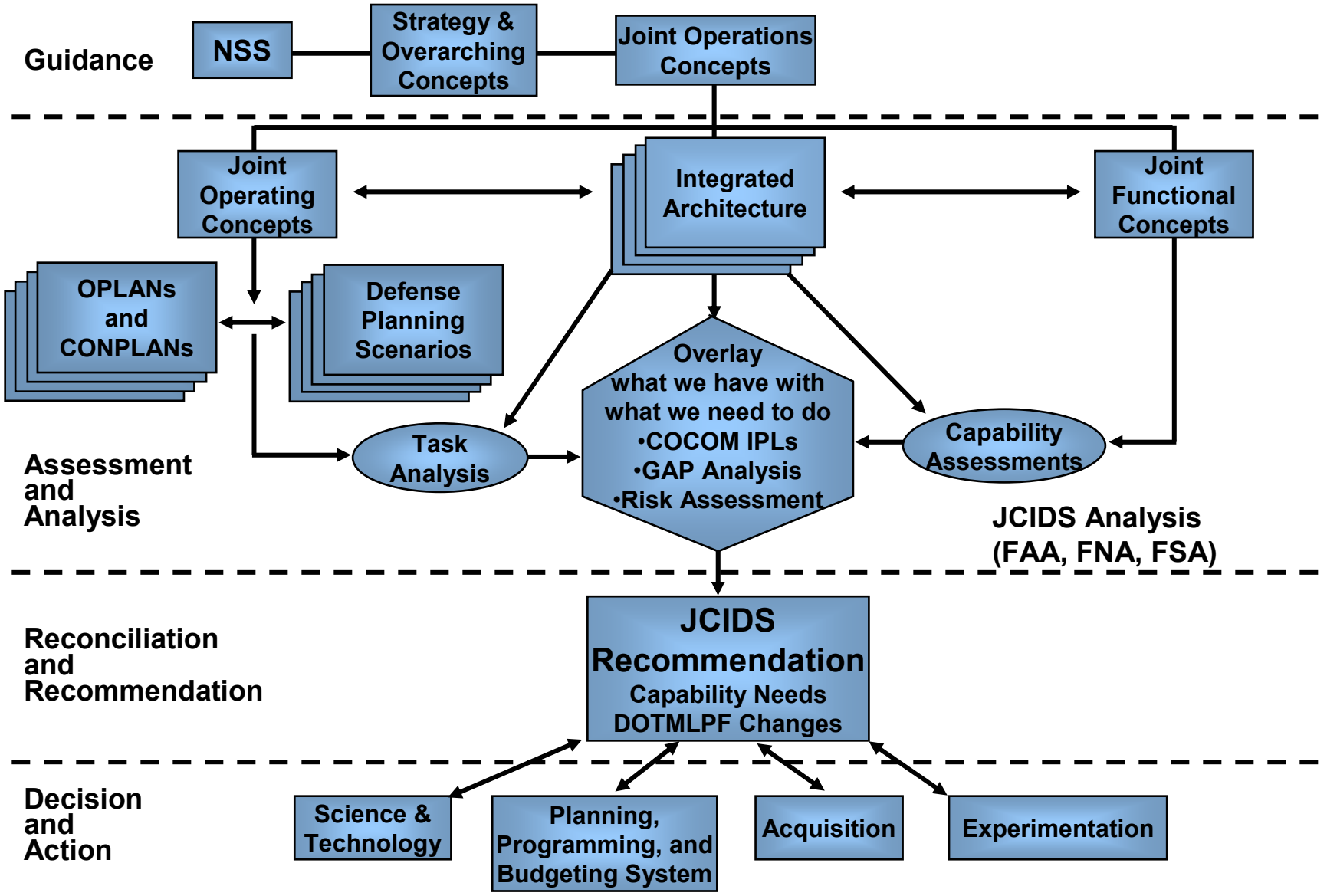
- Joint Pub 3-09.3, Joint TTPs for Close Air Support, 3 Sept 03
- Joint Pub 3-52, Doctrine for Joint Airspace Control in a Combat Zone, 22 July 03
- Joint Pub 3-56.1, Command and Control for Joint Air Operations, 14 Nov 94
- FM 7-15, The Army Universal Task List, 15 August 2003
- Future Combat Systems Organization and Operations,30 June 03
- Future Combat Systems Operational Requirements Document, 14 Apr 03
- Future Combat Systems “1-N” Task List
- Lead Systems Integrator “Integrated Processes” List
- AMSAA Systems Book, 22 May 03
- Ft. Knox T&E Summit III Scenario, 3 Jun 03
- “The Nexus of Missions and Means,” Fall, 2003

Definitions

Joint Close Air Support (JCAS): air action by fixed- and rotary-wing aircraft against hostile targets that are in close proximity to friendly forces and that require detailed integration of each air mission with the fire and movement of those forces. JP 3-09.3

Joint Combat Identification (JCID): the process of attaining an accurate characterization of
unknown detected objects to the extent that high confidence, and timely application of military options and weapon resources can occur. CID is used for force posturing, command and control, situational awareness as well as shoot, no-shoot employment decisions. TA 6.5 (UJTL), JP 3-52, JP 3-56.1

CJCSI 3170 (Signature Version)



Joint T & E Mission

To ensure that the Department of Defense (DoD) has the test and evaluation (T&E) infrastructure required to develop, test, and evaluate the warfighting systems needed to prevail in increasingly complex battlefield environments R&R provides:

- **Policy and oversight for the DoD T&E infrastructure (people, processes, and facilities);**
- **Investment for new DoD T&E infrastructure;**
- **Technical and resource information to assist DOT&E systems assessment; and**
- **Customer-friendly support services to the Services and to the Office of the Director of Operational Test and Evaluation.**

Source: http://www.dote.osd.mil/rr/vision.html

JCAS/JCID Testing Requirements

Tasks and performance measures associated with the conduct and employment of JCAS/JCID

DRC Analysis: JCAS Required Capability: Enable positive target identification at all levels of visibility

DRC Analysis: JCID Required Capability): Enable positive identification of friend, foe, non-combatants and systems at all levels of visibility

UJTL: OP Task 5.1.11 Provide positive identification of friendly forces within the JOA
Performance Measures: - Minutes to confirm identify
- % of positive ID false negatives (friendly identified as enemy)
- % of positive ID false positives (enemy identified as friendly)

FCS: FCS Functional Capabilities:
- Provide combat ID to detect, locate, and identify friend, foe, and noncombatant systems
- Enable C2 to synchronize fire, maneuver and ISR

AUTL: ART 7.3.2, Evaluate Situation or Operation:
Performance Measures: - % of accurate friendly evaluations
- # of opportunities or threats recognized

UNCLASSIFIED

Sites | JTT | OPFOR Task Description | Systems | Technical Standards | Comm Links | Exercises | Reports | Points of Contact | Map | Trouble Reports | Change Requests

Systems

Create New | Show

Acronym	Long Name	Live	Virtual	Constructive	Type	Description
5D	Demand Driven Direct Digital Dissemination	Yes	No	No	Intelligence	5D is a se disseminat give image direct acce data recei collections collected a
A2G		Yes	No	No	[Not Applicable]	
AALPS	Automated Aircraft Load Planning System	Yes	No	No	Command and Control	The Autom System (A based exp users in th planning a loads for a It ha ...
AARS	Advanced Airborne Radiac System	Yes	No	No	Surveillance and	The AARS

Study Team Analysis of JCAS/JCID Testing Facilities

Level 3 Required Capabilities \ WRC Facilities	NTC, Ft Irwin, CA	Nellis AFB, NV	MCAGCC, 29 Palms, CA	Naval Station San Diego, CA	WSMR, NM
Enable Force Application	4	1	4	2	-1
Enable Force Protection	4	1	4	0	1
Enable Logistics Support	4	1	4	1	1
Develop & Maintain Battle Space Awareness via Common Operating Picture (COP)	4	1	4	2	1
Enable development of integrated JCAS / ground maneuver plan	4	1	4	0	1
Enable Joint Close Air Support (JCAS) Command & Control (C2) needed to synchronize JCAS and ground maneuver	4	1	4	0	1
Enable rapid detection of friend, foe, non-combatants, and systems at all levels of visibility	-1	-1	-1	-1	1
Enable target location at all levels of visibility	4	-1	4	-1	1
Enable positive target identification at all levels of visibility	-1	-1	-1	-1	-1
Enable target designation at all levels of visibility	-1	-1	-1	1	-1
Request JCAS	1	1	1	1	1
Approve JCAS	1	1	1	1	1
Enable JCAS collaborative mission planning	-1	-1	-1	-1	-1
Enable taskings for Intelligence, Surveillance, reconnaissance (ISR) platforms	1	1	1	1	1
Provide task-organized, trained, and equipped teams to facilitate the coordination of air, artillery, and naval surface fires	0	0	0	0	-1
Enable information exchange via interoperable communications (visual / voice / digital)	-1	-1	-1	-1	-1
Enable collaborative mission rehearsal	-1	-1	-1	-1	-1
Provide JCAS aircraft	0	1	0	0	1
Enable Suppression of Enemy Air Defenses (SEAD) planning & execution	4	1	4	0	1
Provide task-organized, trained, and equipped teams to facilitate the terminal control of air, artillery, and naval surface fires	-1	1	-1	0	-1
Enable sensor to shooter linkages	1	1	1	1	1
Conduct JCAS attack	4	1	4	0	1
Scale effects to focus precisely in support of ground maneuver	-1	1	-1	0	-1
Enable JCAS Battle Damage Assessment (BDA)	4	1	4	0	1
Conduct air Intelligence, Surveillance, and Reconnaissance (ISR)	4	1	4	1	1
Enable national and theater signals intelligence (SIGINT) integration	7	-1	-1	1	-1
Develop and maintain battle space awareness via Common Operating Picture (COP)	4	-1	4	2	1
Detect and report Close Air Support (CAS) targets and formation	4	1	4	0	1
Enable real-time information exchange via interoperable communications (visual / voice / digital)	-1	-1	-1	-1	-1
Enable collaborative mission planning	-1	-1	-1	-1	-1
Enable collaborative mission rehearsal	-1	-1	-1	-1	-1
Enable combat detection of friend, foe, non-combatants and systems at all levels of visibility	-1	-1	-1	-1	1
Rapid initial "target detection to positive identification"	-1	-1	-1	-1	-1
Enable positive shooter identification of friend, foe, non-combatants and systems at all levels of visibility	-1	-1	-1	1	-1
Enable integration of Unmanned Aerial Vehicle (UAV) ISR for Positive Hostile ID (PHID)	1	-1	1	1	1
Enable sensor to shooter linkages	1	1	1	1	1
Conduct forward area Command and Control (C2) of aircraft	1	-1	1	-1	-1
Enable AWACS / E2C aircraft handoff to Forward Area Controller (FAC) and Joint Terminal Attack Controller (JTAC)	1	1	1	1	-1
Provide Battle Damage Assessment (BDA)	4	1	4	-1	1

All values are NOTIONAL

0 = Null
1 = Live
2 = Live and Virtual
3 = Live, Virtual, and Constructive
4= Live and Constructive
5 = Virtual
6= Virtual and Constructive
7 = Constructive
-1 = Unknown

Challenge

- Employment of
  - Precision Engagement,
  - Net-Centric Warfare, and
  - Un-Manned Combat Platforms
- To Defeat Conventional and Unconventional Warfare Opponents
  - With Time/Location Sensitive Exposure,
  - In Population Centers and Cultural Landmarks, and
  - In Complex Physical Environments
- Introduces Critical Joint, Service, and Agency Interdependences within and across Warfare Areas.

Approach

- The Missions and Means Framework evaluates alternative families of DOTMLPF solutions to these complex issues using:
  - Top-Down Decomposition to Identify Interdependencies,
  - Execution/Adjudication to Determine Capabilities/Limitations,
  - Bottom-Up Effects Traceability to Determine Mission Impact, and
  - Planning/Re-Planning to Adapt Behavior to Warfare Outcomes.

Relationship to T&E

- Top-Down Decomposition to Identify Interdependencies
  - Determines what needs to be represented, how well.
  - Prioritizes what needs to be measured, with what fidelity
- Execution/Adjudication to Determine Capabilities/Limitations
  - Provides the Operational Context for measurement and assessment.
- Bottom-Up Effects Traceability to Determine Mission Impact
  - Links cause and effect to establish “So What?”
- Planning/Re-Planning to Adapt Behavior to Warfare Outcomes.
  - Links the Art of War to the Science of Test & Evaluation by providing and Objective Structure for stating the Subjective Military Judgments.

Sample Army Task Set Applied to OT Model