

Joint Close Air Support

Issues of Interest in Concept Munitions Development

THE OVERALL
CLASSIFICATION OF THIS
BRIEFING IS:
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JCAS - An Evolving Challenge

“So when a building was mentioned as a target, everyone knew exactly which building it was, regardless of the uniform he wore ... If a Marine pilot in the stack said he did not have the right ordnance on board for a particular target, then an Air Force pilot could say he did ...”

LtGen Sattler, CG IMEF, Fallujah II, Nov 2004

“In this phase of the war, the metric for success is being there when you are needed, with the proper ordnance, with the proper training.”

Rear Adm. William Gortney, CoS 5th Flt, COIN Iraq 2006

“If it comes to a point where [ground troops] cannot withdraw, if they cannot maneuver themselves out of a situation, that’s when air, and particularly our kinetic air [power], comes in and becomes sort of our choice of last resort.”

Gen. Jack Briggs II, 455th AEW, Aug 2010



Current Fight - CAS US Attitude

“Air power contains the seeds of our own destruction if we do not use it responsibly, we can lose this fight.”

General Stan McChrystal
COMISAF
16 June 2009



Current Fight - CAS

Enemy Attitude

“We pray to Allah we have American soldiers to kill... but added these bombs from the sky we cannot fight”



Taliban Fighter

Overview

- **Doctrinal Underpinning**
- **Tactical Air Control Party**
- **Combined Fires with Maneuver**
- **Air Power Command and Control**
- **Coordination & Integration**
- **Terminal Control**
- **Digital Aided CAS**
- **CAS with UAS's**
- **Trends & Summary**

Doctrine

“ The art of war is, in the last result, the study of the enemy’s intentions and of keeping one’s freedom of action”

Xenophon, Greek historian 430-355 BC

“War is not an affair of chance. A great deal of knowledge, study, and meditation is necessary to conduct it well.”

Frederick the Great 1747

“...Rommel, you magnificent bastard, I read your book.”

LTG George S. Patton, El Guettar, 1943

“One of the serious problems in planning the fight against American doctrine, is that the Americans do not read their manuals, nor do they feel any obligation to follow their doctrine...”

“Soviet Officer’s Field book” 1978

Close Air Support

“Air action by fixed- and rotary-wing aircraft against hostile targets, which are in close proximity to friendly forces, and which require detailed integration of each air mission with the fire and movement of those forces”.

JP 3-09.3, Close Air Support



Air Interdiction

“Air operations conducted to divert, disrupt, delay, or destroy the enemy's military potential before it can be brought to bear effectively against friendly forces, or to otherwise achieve objectives. Air interdiction is conducted at such distance from friendly forces that detailed integration of each air mission with the fire and movement of friendly forces is not required”.



*JP 1-02, DOD Dictionary
of Military and
Associated Terms,
April 2010*

Terminal Guidance Operations

“Any electronic, mechanical, visual communication that provides approaching aircraft or weapons additional information regarding specific location or target.

Terminal Guidance is *not a type of control*. Those providing terminal guidance *do not have weapons release authority, or authority to direct the maneuver of the aircraft*”.



JP 1-02, DOD Dictionary of Military and Associated Terms, April 2010



Troops In Contact/Danger Close

“The JTAC should regard *friendlies within one kilometer of targets* as a troops-in-contact, “TIC” situation and advise the ground commander accordingly.

The *ground commander must accept responsibility for friendly risk* when targets are inside 0.1 % probability of incapacitation (PI) (Minimum Safe Distance), or “DANGER CLOSE”.



*Multi-Service Procedures
for the Joint Application of Firepower*

GBU-38, 125m to target building from M1A1, and TACP crouching behind turret (0.1% Pi GBU-38 185m)

Close Proximity

“... the distance within which some form of terminal attack control is required for targeting direction and fratricide prevention.”

AFDD 2-1.3, Counter-land, 1999

“Danger Close” < 0.1% PI

MK-82 LD AB	300 (meters)
MK-83 LD AB	340
MK-84 LD AB	380
GBU-38 C/AB/v4	185/230/100
155mm	200-450 ®
2.75” FFAR	140-410 ®
AGM-65	95
AGM-114 K/M/N	110/125/120
20/25/30/40/105mm	60/100/65/ 75/165

JP 3-09.3 Appendix G

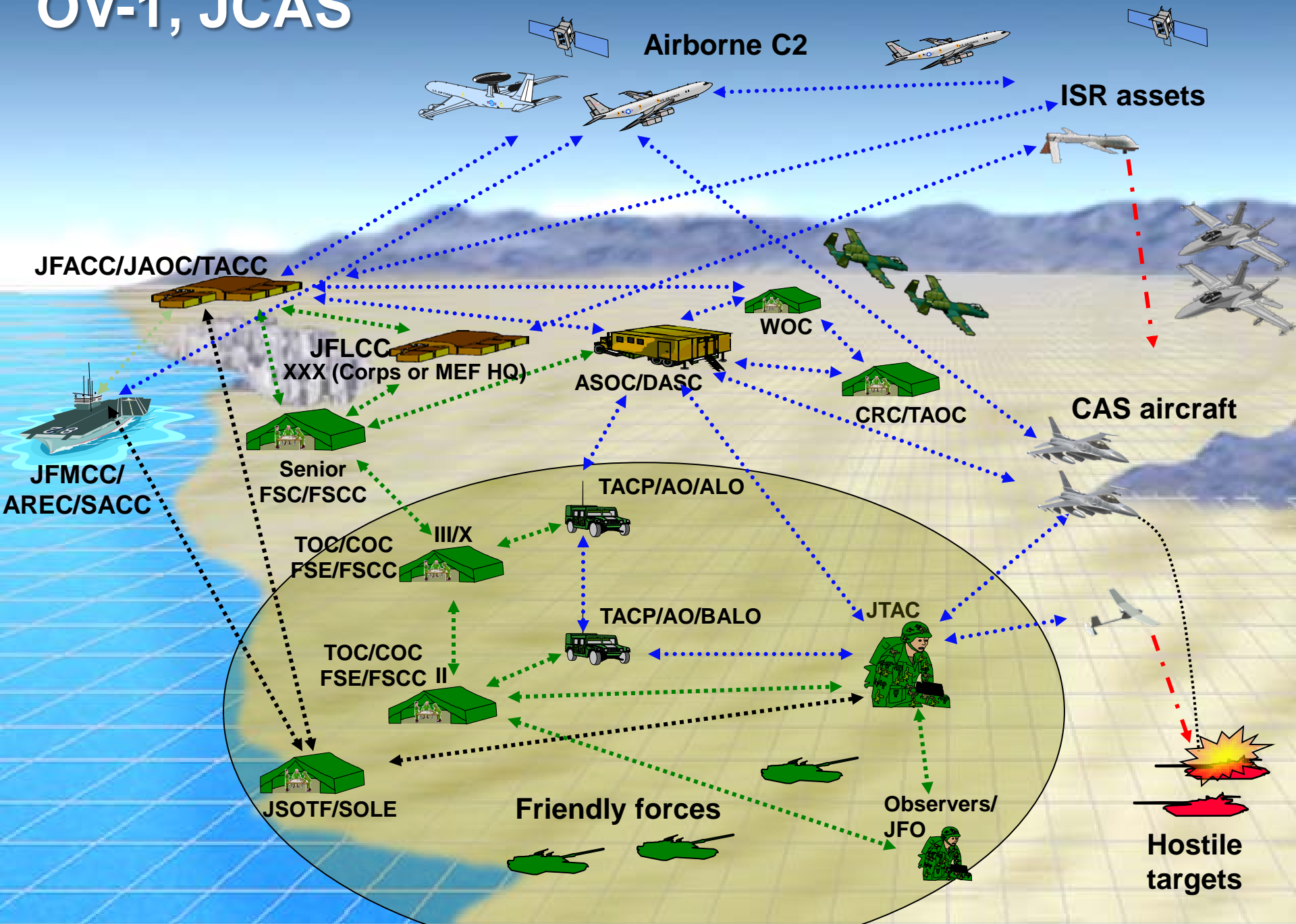
JFIRE

The amount of detailed coordination and distance from friendlies is the critical factor in CAS, TACP -to-Pilot communication, and AO/ALO-to-HHQ FSCC/FSC in TOC/COC with oversight of integration, coordination, deconfliction, and synchronization is crucial

Tactical Air Control Party



OV-1, JCAS



Air Officer/Air Liaison Officer

“The Air Officer or Air Liaison Officer (AO/ALO) is the senior Tactical Air Control Party (TACP) member attached to a ground unit who functions as the primary advisor to the ground commander on air operations. An AO/ALO is usually an aeronautically rated officer and is an expert in the capabilities and limitations of air operations. The AO/ALO plans and executes CAS in accordance with the ground commander’s guidance and intent”.

JP 3-09.3



Joint Terminal Attack Controller

“A qualified (certified) Service member who, from a forward position, directs the action of combat aircraft engaged in Close Air Support and other offensive air operations. A qualified and current Joint Terminal Attack Controller will be recognized across the Department of defense as capable and authorized to perform terminal attack control”.



JP 3-09.3

JTACs, JFOs, and any trained Forward Observers (Artillery/Mortar spotters, and Snipers/RECON) are a Force Multiplier

JTAC Battlefield Positioning

- **JTAC must be in a good position to conduct terminal control of CAS**
 - **Maintain sight of (or SA of) ground maneuver element(s) as they move during the attack**
 - **Acquire sight of CAS aircraft (or have other SA means, e.g. data-link, STRIKELINK, TACP-CASS, BAO kit)**
 - **Maintain sight of the target (or be in communication with someone who can)**



Joint Fires Observer

“A trained Service member who can request, adjust, and control surface-to-surface fires, provide targeting information in support of Type 2 and 3 CAS terminal attack controls, and perform autonomous Terminal Guidance Operations (TGO)”.

JP 3-09.3



Combined Fires and Maneuver



Integrating CAS w/Other Fires

Fire Support

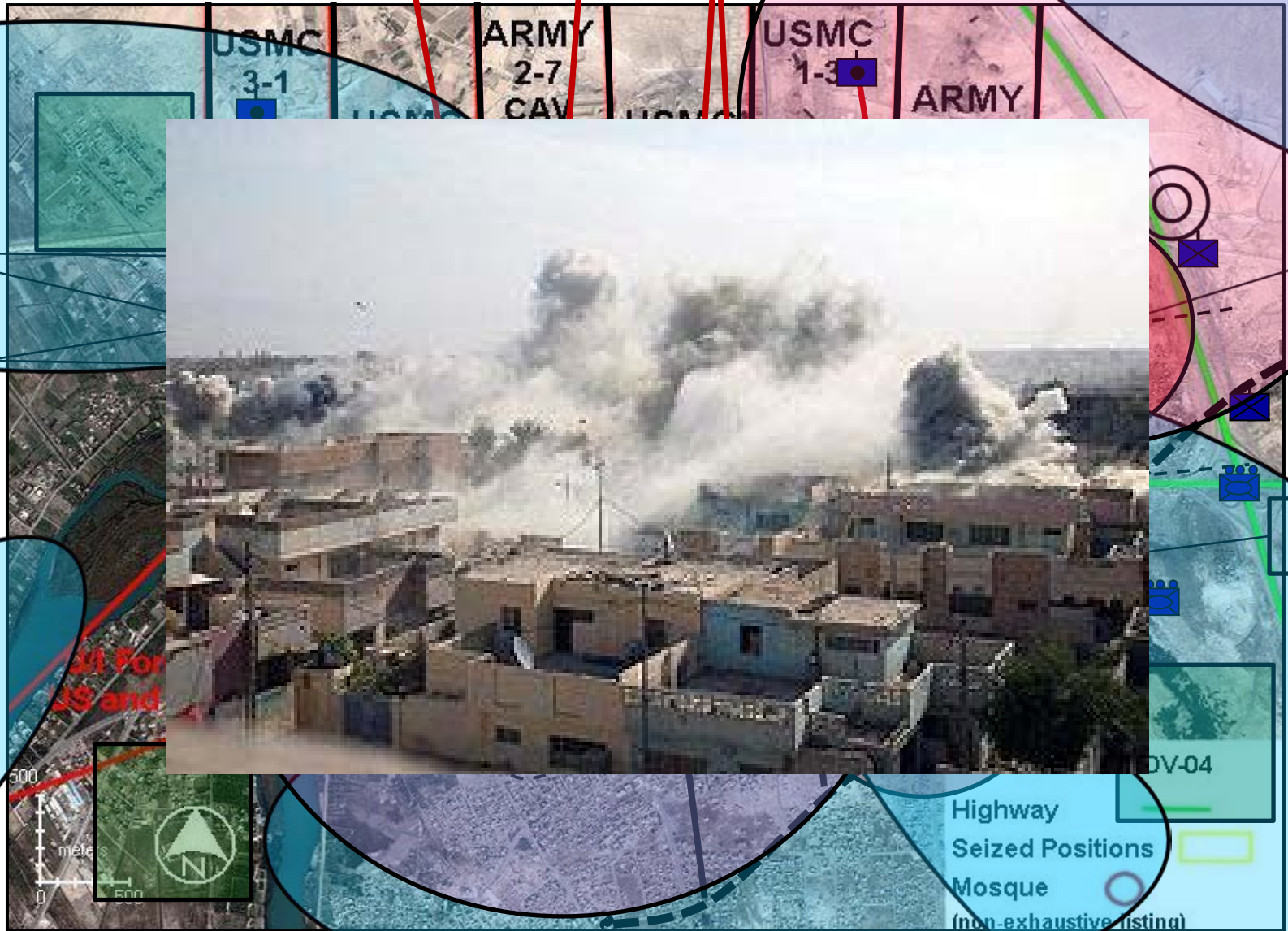
- **“Primary goal - Integrate air with supporting arms and maneuver forces to achieve the desired effect without suspending the use of any of the supporting arms or unnecessarily affecting the scheme of maneuver”.**

Combined, not sequential, attacks

- **“Secondary goal - A reasonable measure of protection to aircraft from the unintended effects of friendly surface fire”.**

*FMFM 6-8 Supporting Arms Observer,
Spotter, and Controller*

Battle of Fallujah II



Air Power Command and Control



Air-to-Ground Operations

“The **Theater Air Control System (TACS)** provides the commander, **Air Force** forces (COMAFFOR) the capability to plan and conduct joint air operations.

The **Army Air-Ground System (AAGS)** begins at the field **Army** level, and extends down through all echelons to the maneuver battalion. AAGS coordinates and integrates both Army component aviation support and air support with Army ground maneuver.

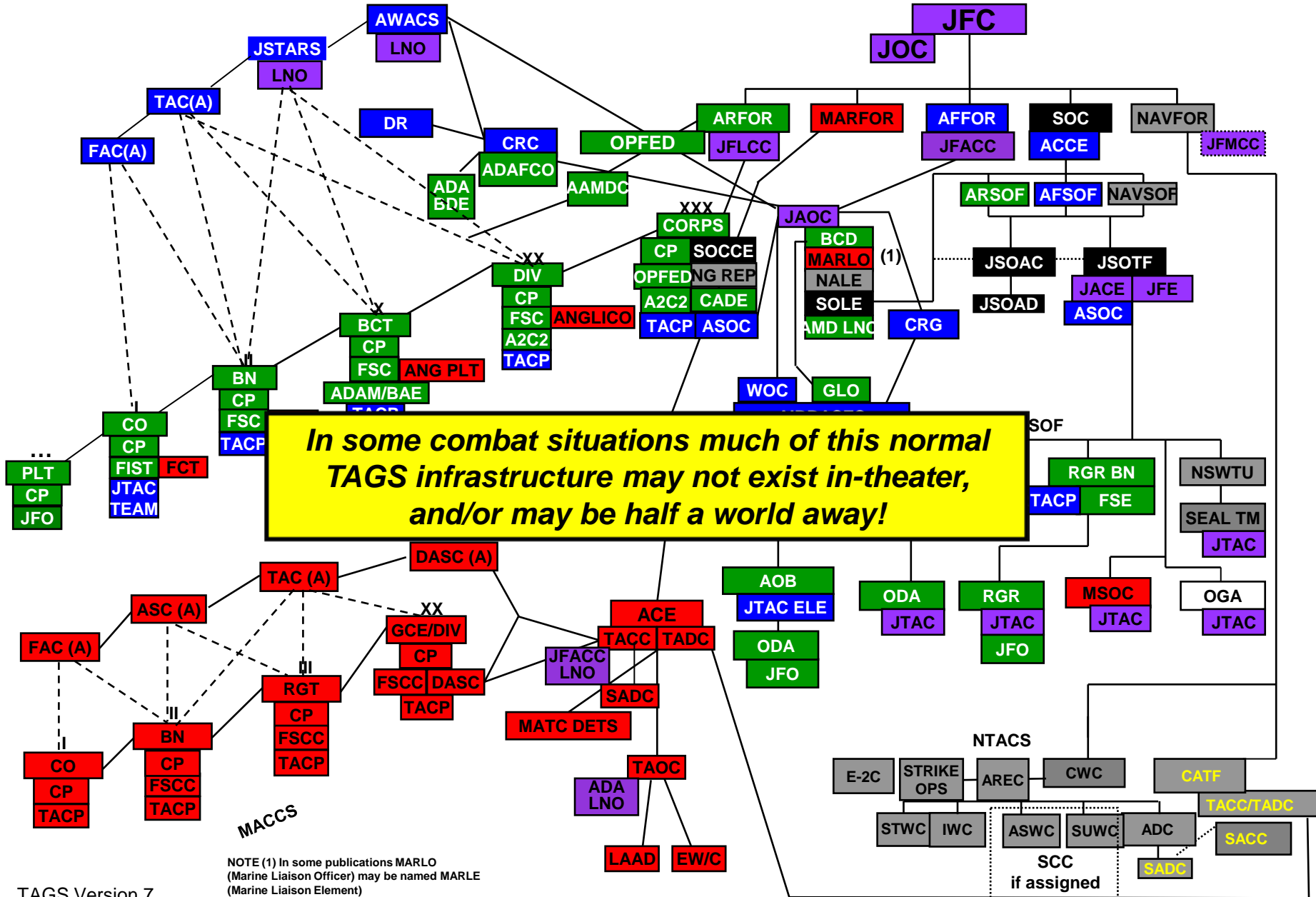
The **Navy Tactical Air Control System (NTACS)** is comprised of the United States **Navy** Tactical Air Control Center (TACC), Tactical Air Direction Center and Helicopter Direction Center.

The **Marine Air Command and Control System (MACCS)** consists of various air C2 agencies designed to provide the **Marine** Air-Ground Task Force aviation combat element commander with the ability to monitor, supervise, and influence the application of Marine air.

Theater Special Operations are normally under the control of the Joint Force Special Operations Component Commander (JFSOCC). Control of Special Operations Forces (**SOF**) air is normally exercised by a Joint Special Operations Air Component Commander (**JSOACC**)”.

JP 3-09.3, Close Air Support

Joint Theater Air Ground System



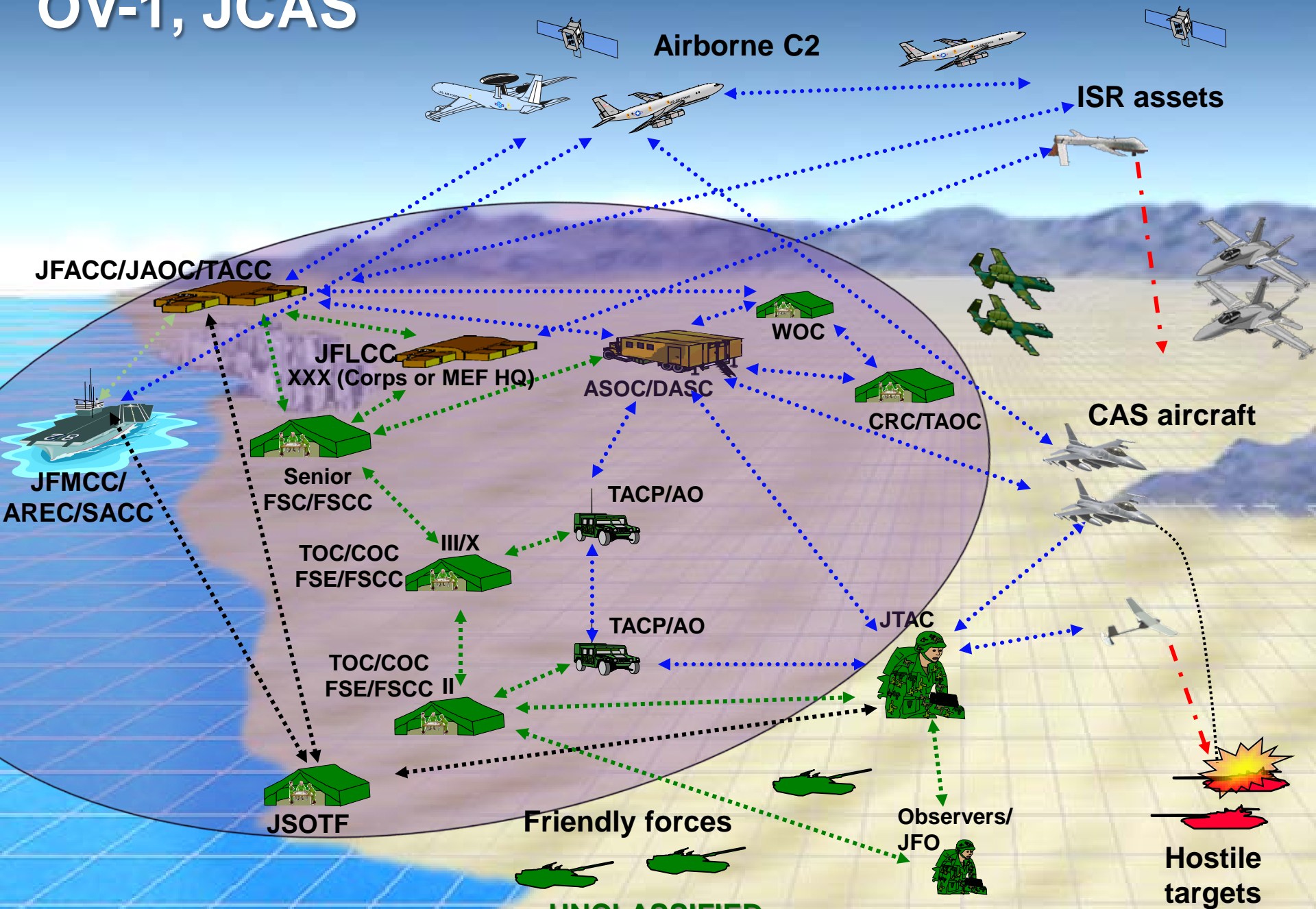
Coordination & Integration

“As used in relation to CAS, detailed integration refers to the *level of coordination required to achieve the desired effects without overly restricting* CAS attacks, surface firepower, or the ground scheme of maneuver. It is also necessary to protect aircraft from the unintended effects of friendly surface fire. The *maximum range* requiring detailed integration is typically bounded by the *range at which organic surface firepower provides the preponderance of effect on the enemy*”.

AFDD 2-1.3, Counter-land, 1999

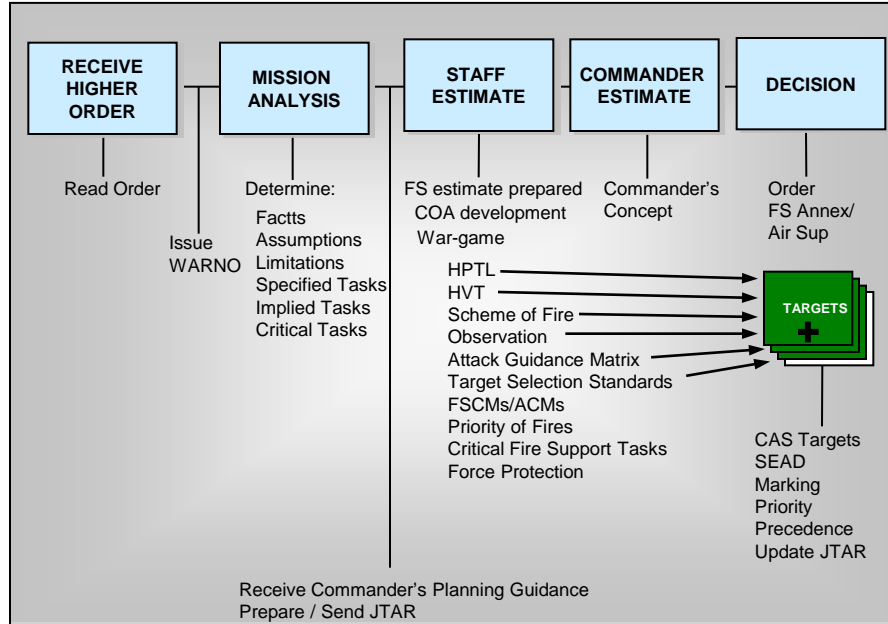
BLADE's CAS terminal control "Rule of Thumb" applies – "Plan for terminal control and attack clearance ("Cleared Hot") at lowest possible C2 level, and CAS mission approval at next C2 level up" – Current theater ROE and political considerations have impacted this rule in recent years – "don't plan to fight the last war!", "...each environment will likely be different, analyze with METT-T", "...there is never any one TTP or one weapon solution!"

OV-1, JCAS

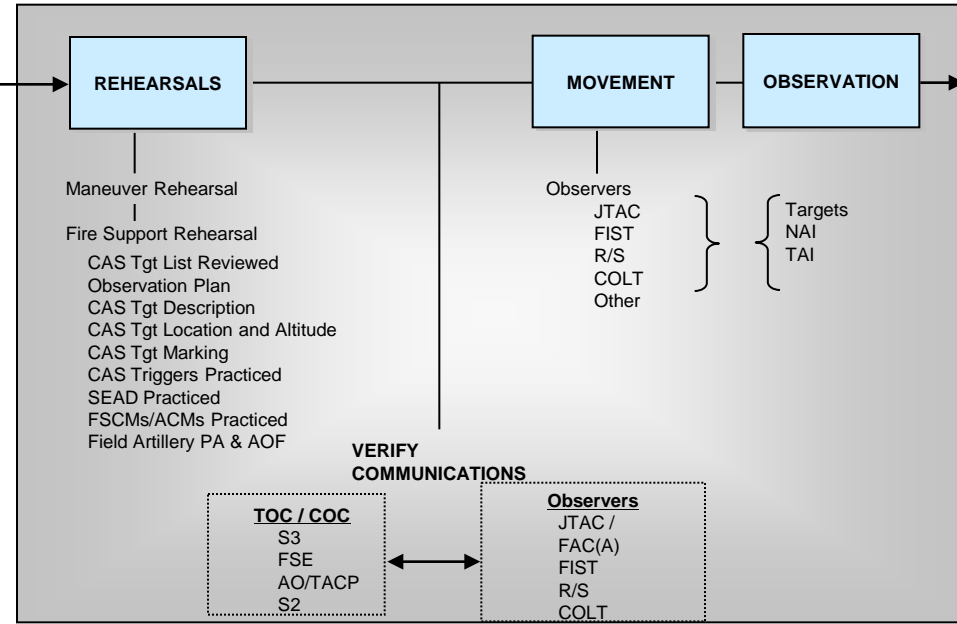


CAS Planning & Execution – Deliberate

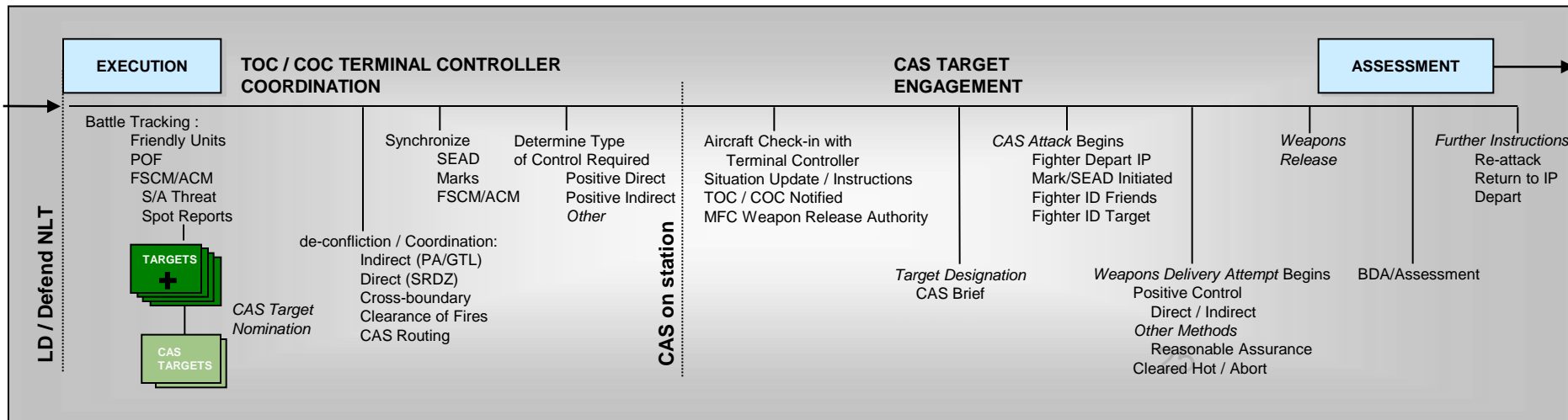
PLANNING PHASE



PREPARATION PHASE

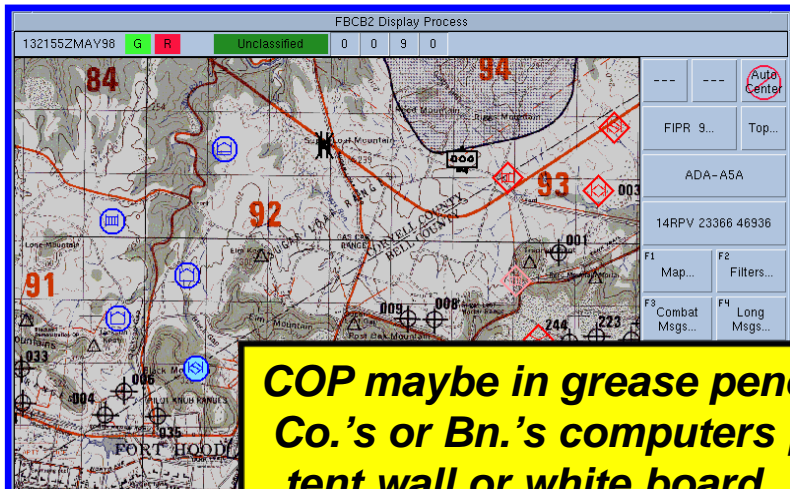


EXECUTION PHASE

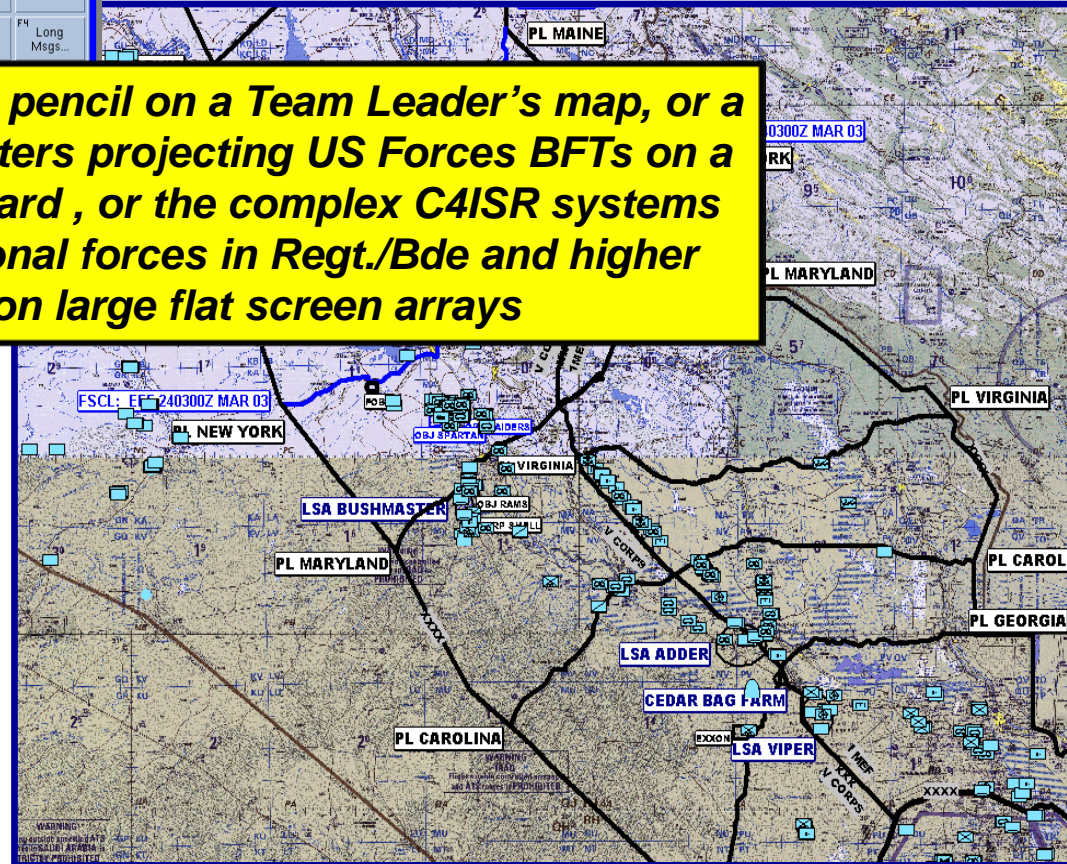
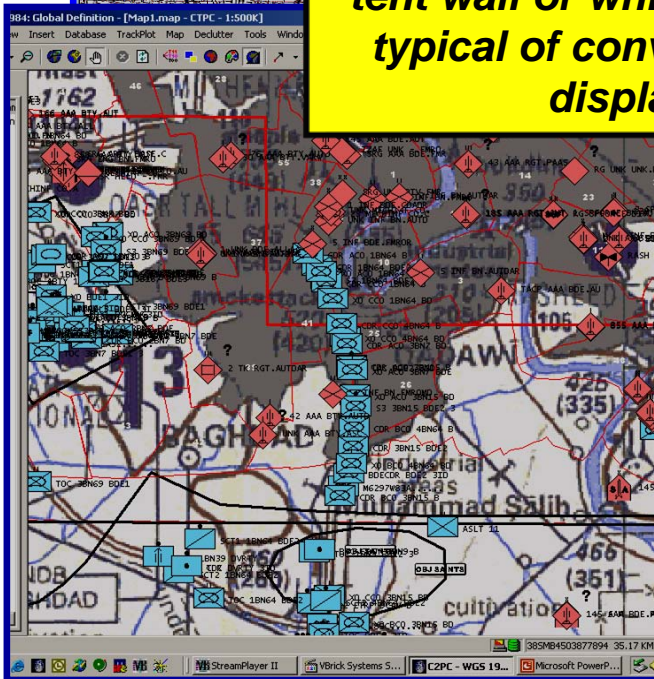


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Common Operating Picture



COP maybe in grease pencil on a Team Leader's map, or a Co.'s or Bn.'s computers projecting US Forces BFTs on a tent wall or white board , or the complex C4ISR systems typical of conventional forces in Regt./Bde and higher displayed on large flat screen arrays

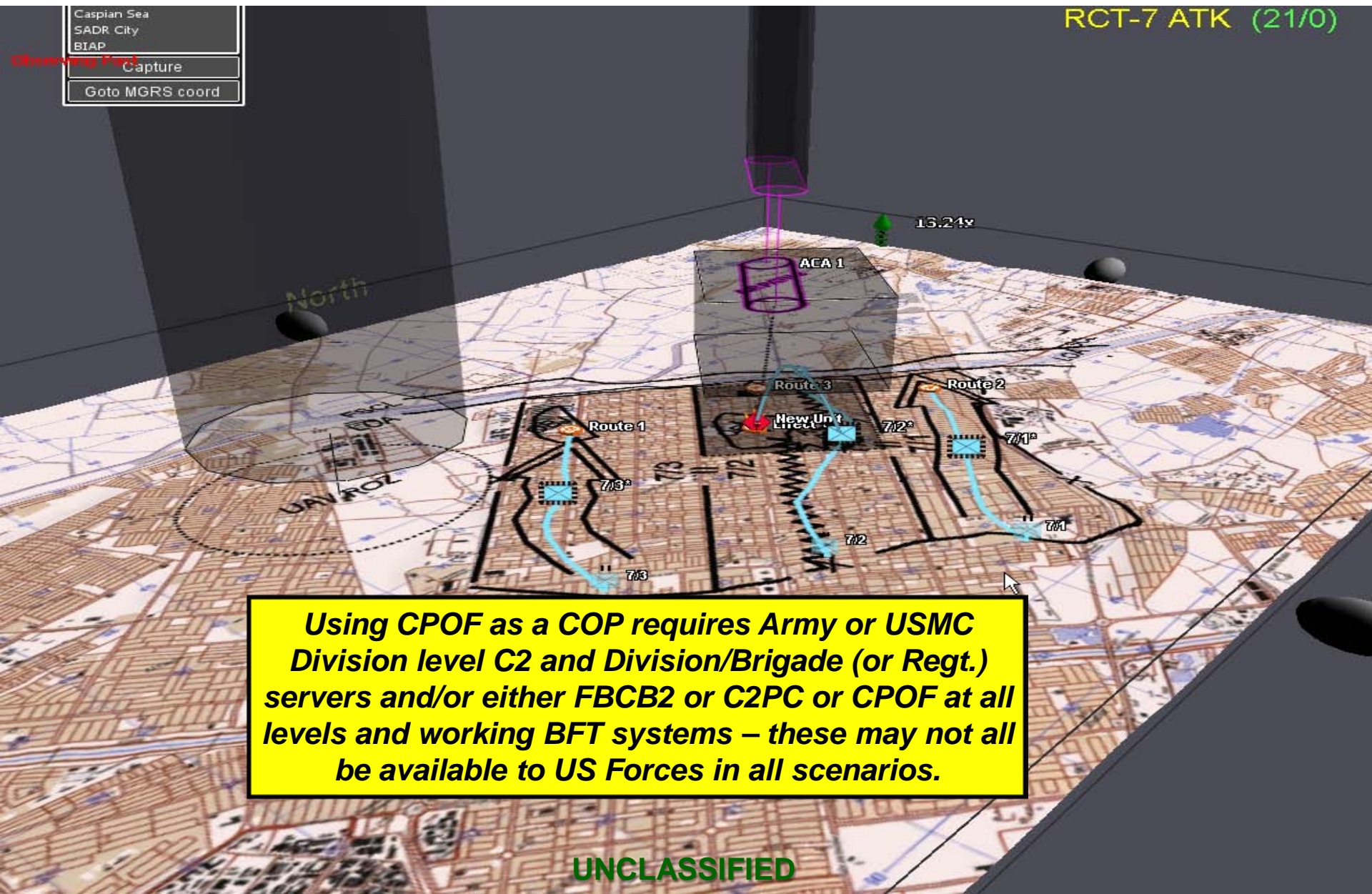


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Maneuver Graphics, FSCMs, ACMs

Caspian Sea
SADR City
BIAP
Capture
Goto MGRS coord

RCT-7 ATK (21/0)



Using CPOF as a COP requires Army or USMC Division level C2 and Division/Brigade (or Regt.) servers and/or either FFCB2 or C2PC or CPOF at all levels and working BFT systems – these may not all be available to US Forces in all scenarios.

Terminal Control



Terminal Control Types

T
Y
P
E

1

- Most restrictive;
- Provides greatest safety to friendly forces
- JTAC must visually acquire the attacking aircraft and the target
- JTAC must analyze of attack aircraft geometry/nose position to determine weapon impact point



T
Y
P
E

2

- Less restrictive; allows more flexibility to use all available systems and ordnance
- High
- Use rele
- Other assets (observer, digital CAS, ROVER) must acquire timely and accurate targeting data for success

"GPS and digital targeting systems used in Type II (CAS) may be a better mitigation of risk than Type 1."
 CAS Terminal Control guidance based on ROE change Jun 2010

ROE change



T
Y
P
E

3

- Least restrictive; allows commander to shape the battle with airpower
- Used when target threat assessment indicates that CAS attacks impose low risk of fratricide
- JTAC not required to see the target or observe the attack as long as target engagements meet the prescribed restrictions set by the JTAC/GCC
- Procedural Control: "Cleared to Engage" versus "Cleared Hot"

The types of Terminal Control



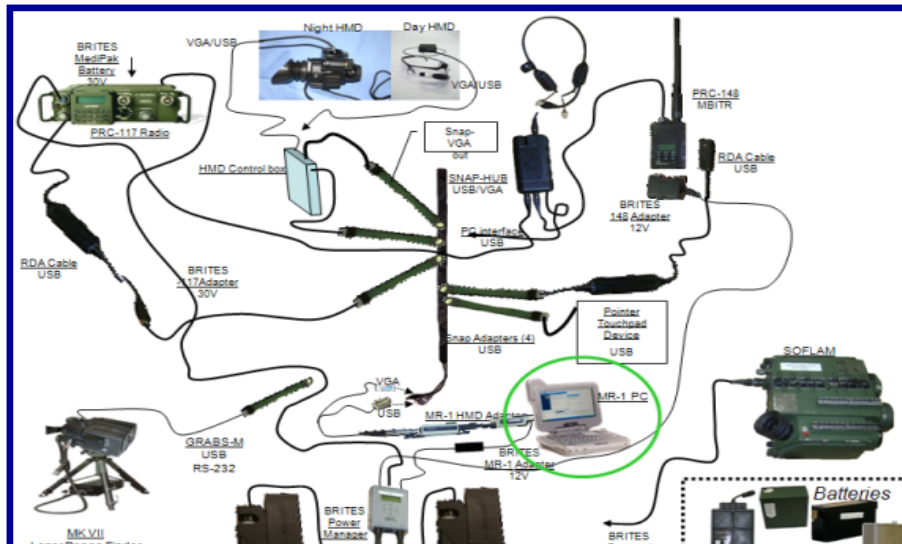
Current Field Guidance Based on ROE (Jun 2010 OEF)

- “Specific levels of risk should not be associated with each type of terminal attack control”
- “GPS and digital targeting systems used in Type II may be a better mitigation of risk than Type 1.”



Many non-MCO instances of CAS fall into this category, especially in Danger Close situations and/or attacks with ROE/CDE concerns, and/or with limited or no other Air or Artillery/Mortar missions to deconflict (SOF type raids, etc)

Digital Aided CAS (DACAS)



***“...too much stuff!”, “...too much to hook up!”, “...set-up takes too long!”,
“...weighs too much!”, “..took LRF, left rest of it at FOB”***

Comments from OEF JTACs



DACAS Systems

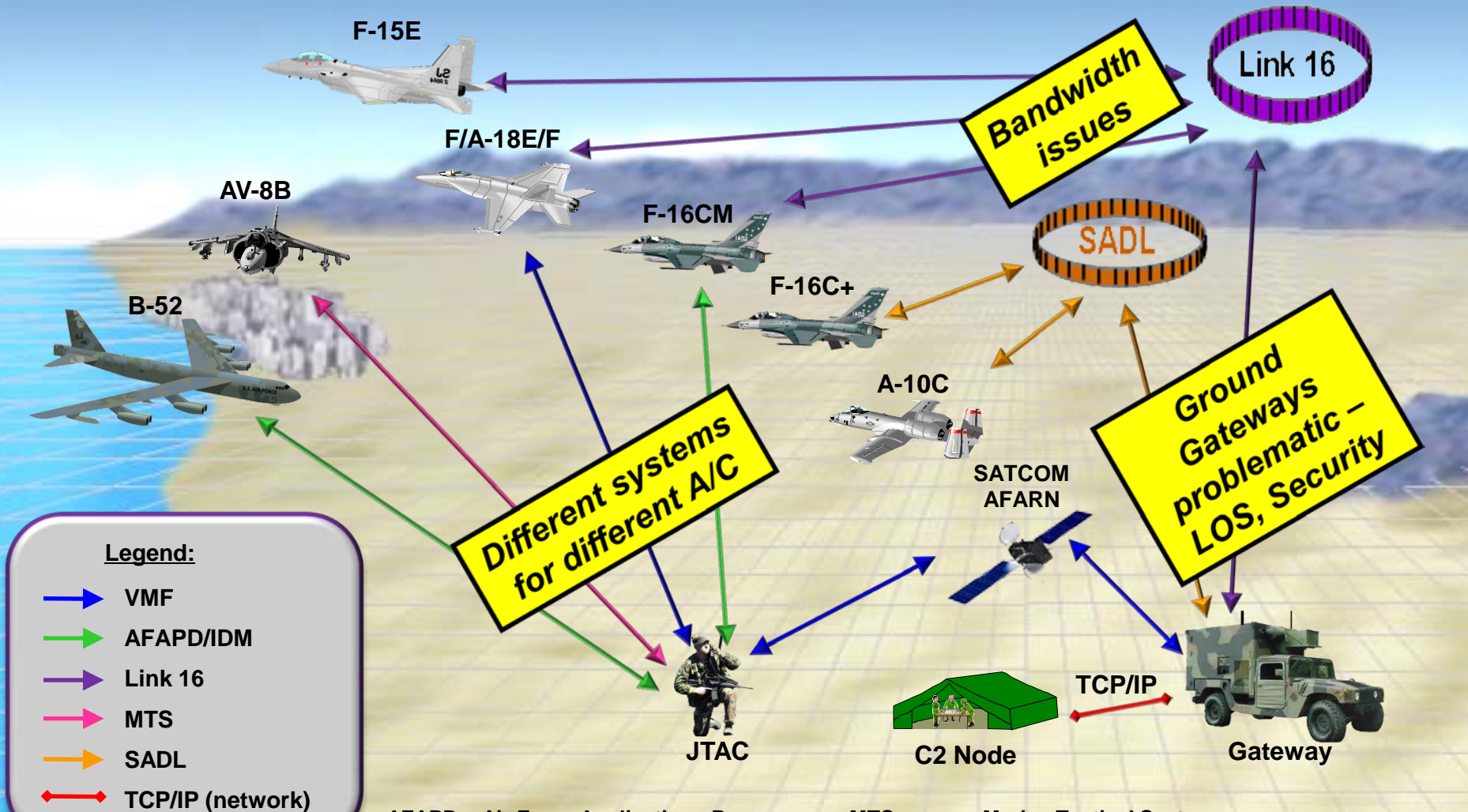
- **JTAC digital capabilities have evolved separately by Service, based on procurement to only communicate with specific aircraft**
- **LOS Modem based languages;**
 - Variable Message Format (VMF)
 - Air Force Applications Program Development (AFAPD)
 - Marine Tactical System (MTS)
- **BLOS Data Link;**
 - Link 16
 - SADL
 - Gateway Issues
- **Planned F-35 and SDB II connectivity (?)**

JTAC Digital Capabilities

- JTAC systems allow digital messaging to JCAS and other air strike mission aircraft
- Principal JTAC systems:
 - BAO Kit - Battlefield Air Operations (SOF)
 - STRIKELINK – (TLDHS) Target Location and Designation Handoff System (USMC)
 - TACP-CASS - Tactical Air Control Party Close Air Support System (USAF)
 - *Repeated recent comment from Afghanistan; “heavy expensive paperweights/doorstops – often left at FOB”*
 - ROVER III, IV, E-ROVER – **exception to above comment!**

ROVER especially useful, can receive all UAS's and ATP's imagery for CAS and Intelligence purposes

Common DACAS Protocols



AFAPD Air Force Applications Program Development
 AFARN Air Force Air Request Net
 ASOC Air Support Operations Center
 IDM Improved Data Modem

MTS Marine Tactical System
 SATCOM Satellite Communications
 TACP CASS Tactical Air Control Party CAS System
 TCP/IP Transmission Control Protocol/Internet Protocol
 VMF Variable Message Format

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CAS with UAS



CAS with UAS

“Lethal unmanned aerial vehicle (UAV) strikes represent the culminating point of a rigorous, multi-disciplined (intelligence, operations, information operations) process and cumulative understanding of a counterinsurgency (COIN) environment. For the 2nd Battalion, Princess Patricia’s Canadian Light Infantry Battle Group (2 PPCLI BG) and their brothers from the Afghan National Army (ANA) during the spring and summer of 2008, lethal UAV strikes reduced risk to friendly forces, minimized collateral damage and dislocated the enemy, reducing his freedom of action and marginalizing his strength in the eyes of the population – the key terrain.”

*Col. Luther S. Turner III, U.S. Air Force, Major Jason T. Adair, Canadian Army,
and Major Louis Hamel, Canadian Air Force*

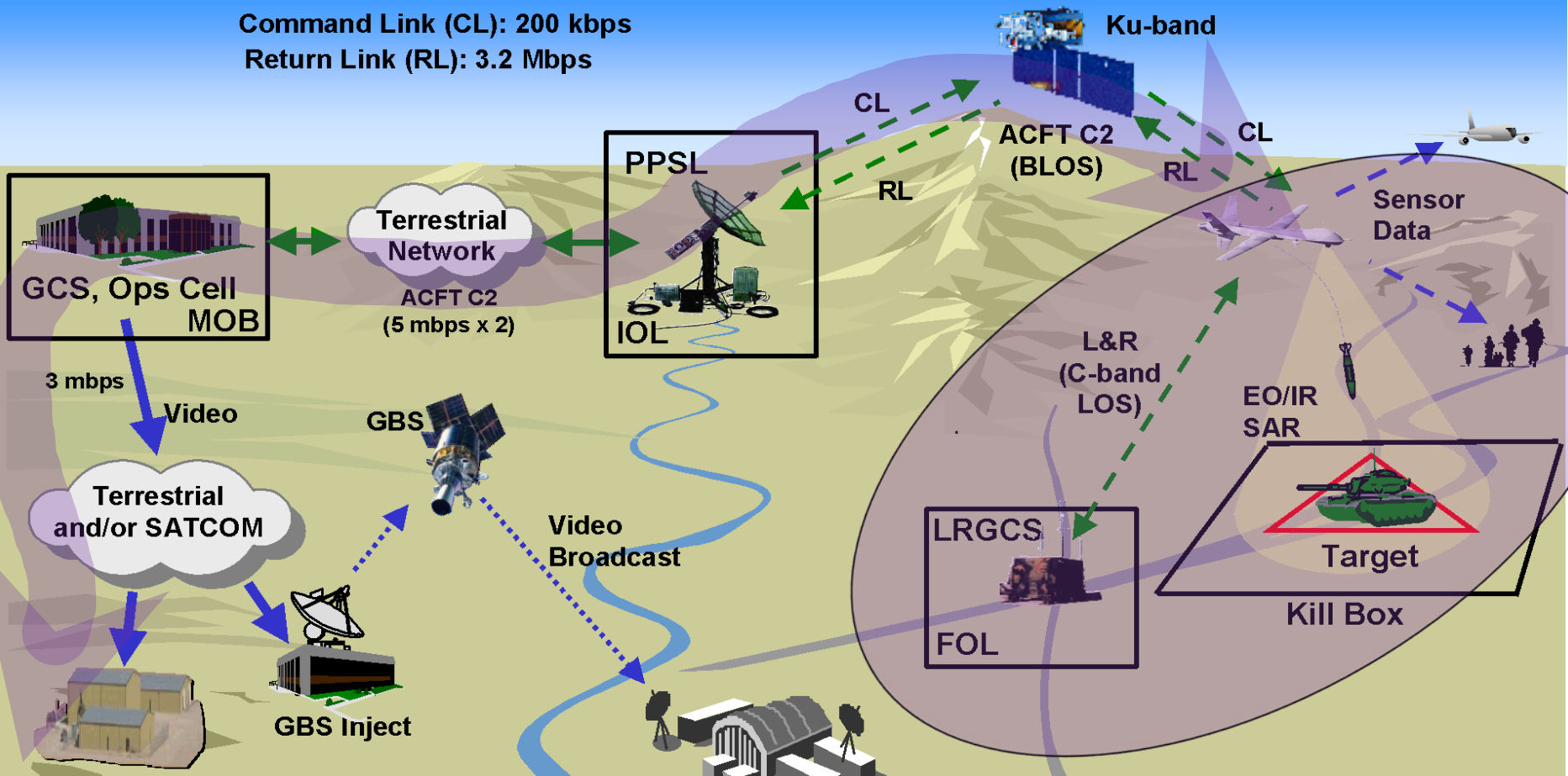
“We have already made a 100-year war-fighting leap-ahead with MQ-1 Predator, MQ-9 Reaper, and Global Hawk. Now we have loiter times in excess of 24 hours, persistent eyes on target, micro-kill with Hellfire and 500-pound JDAM [Joint Direct Attack Munition] bombs, synthetic aperture radar, and a host of ISR sensors and communications potential that have fundamentally changed the nature of warfare.”

General Barry McCaffrey, US Army (Ret.)

Persistent ISR and then CAS “On Demand” is current expectation!

CAS with UAS

Command Link (CL): 200 kbps
Return Link (RL): 3.2 Mbps



Who is piloting/controlling UAV and managing airspace deconfliction and from where?, Who has weapon launch authority? Who is targeting? – all are important questions

CAS with UAS



CAS with UAS issues

- **Datalink maintainability**
 - Connectivity to supported ground forces
- **Bandwidth issues**
 - Multiple A/C
- **Latency – BLOS GCSs and ground force input via radio relays**
- **Reflected laser energy acquisition geometry problems**
 - Ground laser - UAS Hellfire
 - UAS laser - Helicopter Hellfire
- **Ground unit SA of UAS TSPI**
 - Air space deconfliction
- **Service doctrine issues**
 - Weapon launch authority (?)
 - US Army armed UAS (?)

Overall CAS Trends

- **“One Team, One Fight”**
 - Joint integration/inter-operability
 - USA/USAF JTAC/ALO alignment policy
 - JTAC/JFO integrated training
 - Combat tour lengths
- **COIN, battlefield geometry**
 - 9-Line, A/C and JTAC getting too used to; “... From the overhead...”
 - ACMs, Minimum Altitude (handheld SAM threat or easy?)
 - Loss of institutional knowledge of harder MCO TTPs

Overall CAS Trends

○ Unmanned A/C

- GCS distant from FSCC or unit TOC/COC
- Long loiter times, Enemy awareness, SOP/SOF
- Lack of; SA, personal interaction, sense of battlespace
 - Loss of face-face, voice-voice interaction and sense of commitment/urgency

○ Distant AOC

- Lack of FSCC and ASOC/DASC interaction
- ROE/CDE (Ground unit or AOC?)

Overall CAS Trends

- **ISR + CAS, continuous and on demand**
 - **Bandwidth issues**
 - **Training replication**
 - **Dependency on UASs at cost to traditional Observation Plan**
 - **Armchair General/Saturday Morning Quarterbacking**
 - **Operational Forces awareness of HHQ watching**
 - **Perception on CAS with UAS as “CLEAN” warfare**

Overall CAS Trends

Bomber as CAS, defending B-1

“It is a great platform,” he told senators at his confirmation hearing.

“It carries a heck of a lot of bombs... and it has very good intelligence, surveillance and reconnaissance capabilities.”



It can loiter for long periods of time in a combat-air patrol, using its Sniper Advanced Targeting Pod which contains a laser designator, 3rd Gen. FLIR and digital cameras that function well both day and night to search out insurgent movements or IED emplacements. “It is almost like having another unmanned aerial vehicle in terms of full motion video and so forth,”

“So it’s not just a case of a very, very capable bomber just boring holes in the sky waiting to open the bomb-bay doors, it is also the case of a platform that’s very capable even as it is just flying around in circles.”

Gen David Petraeus 2009

JAGIC Mission Analysis

“Lessons learned from US combat operations repeatedly highlight significant difficulties integrating airspace control and fires deconfliction over and within a ground commander’s Area of Operation (AO), particularly in areas of high density operations. This problem is due to the significant increase in Unmanned Aircraft Systems (UAS), multiple supported commanders within the same AO, doctrinal disconnects, the lack of reliable communications and a common operating picture resulting in ad hoc organizations and processes. Currently there is no single C2 authority/system facilitating horizontal component integration of all air-ground operations at the lowest tactical levels. The inability to integrate all airspace users, fires, air defense and air traffic control in near-real time restricts combat effectiveness, efficiency and increases risk”.

*Joint Air Ground Integration Cell Problem Statement
Joint and Combined Integration, Fires COE, Ft. Sill, Ok.*

Summary

JCAS is complex - Future CAS weapons development needs to reduce variables that effect warfighters not add them

Most JCAS aircraft, weapons, and C2 devices are “stove-piped” Service acquisitions - current and future Forces need “plug & play Joint equipment”

Future improvements in Joint Air To Ground C2 structure will allow for fuller advantage of current and advanced munition capabilities

References

- ▶ **JP 3-09.3 Close Air Support**
- ▶ **JP 3-60 Joint targeting**
- ▶ **JP 1-02, DOD Dictionary of Military and Associated Terms**
- ▶ **AFTTP(I) 3-2.6, J-FIRE, Multi-service Procedures for the Joint Application of Firepower, ALSA**
- ▶ **FM 3-09.22, Field Artillery Tactics and Techniques**
- ▶ **FM 6-20-30, Joint Fire Support Operations**
- ▶ **AFDD 1, Air Force Basic Doctrine**
- ▶ **AFDD 2-1.3 Counter-land**
- ▶ **USAF MCM 3-1 Close Air Support**
- ▶ **MCWP 3-2CD Aviation Operations**
- ▶ **FMFM 5-70 MAGTF Aviation Planning**
- ▶ **FM 6-20-40 TTP for Fire Support, Bde. Operations**
- ▶ **Air Warrior I & II After-Action Reports**
- ▶ **MCWP 3- 16, TTP for Fire Support Coordination**
- ▶ **MCWP 3- 16.6, Supporting Arms Observer, Spotter and Controller**
- ▶ **FM 6-20-20, TTP for Fire Support at Battalion Task Force and Below**
- ▶ **USAF SAB, Operating Next-Generation Remotely Piloted Aircraft for Irregular Warfare**

Questions?

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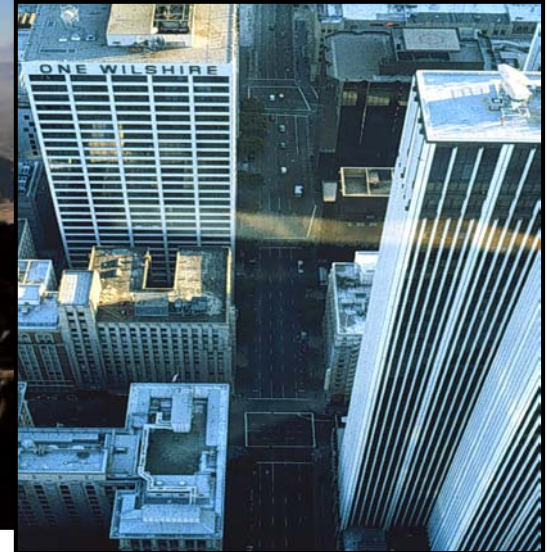
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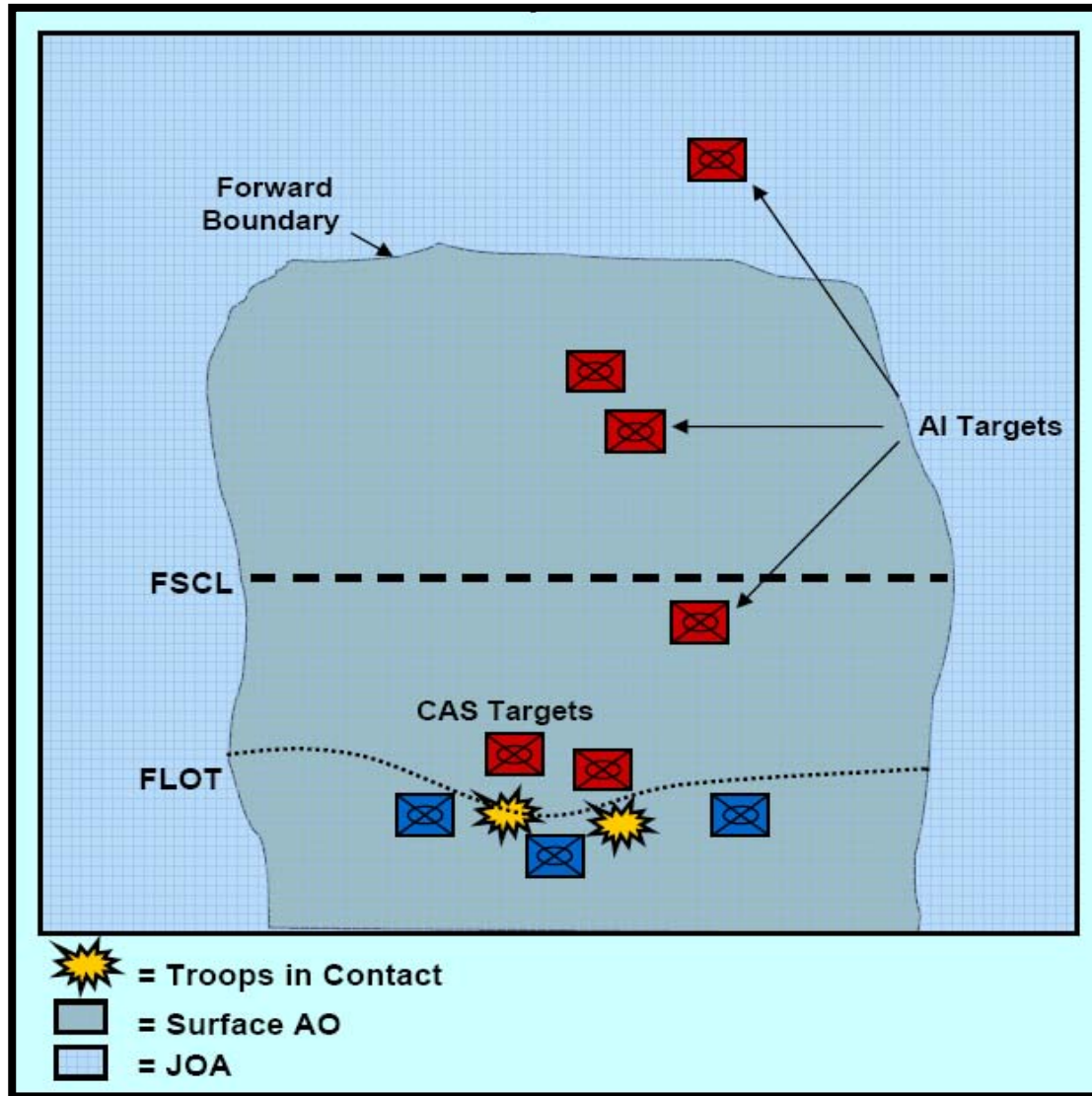
BACK UP SLIDES

METT-T



Mission, Enemy, Terrain, Troops, and Time Available

CAS/AI Target Locations





Take BP S of river, E
of rte 8

300

2600m

420feet MSL

2 BMPs at
crossroads NW
corner of town

WG25756505

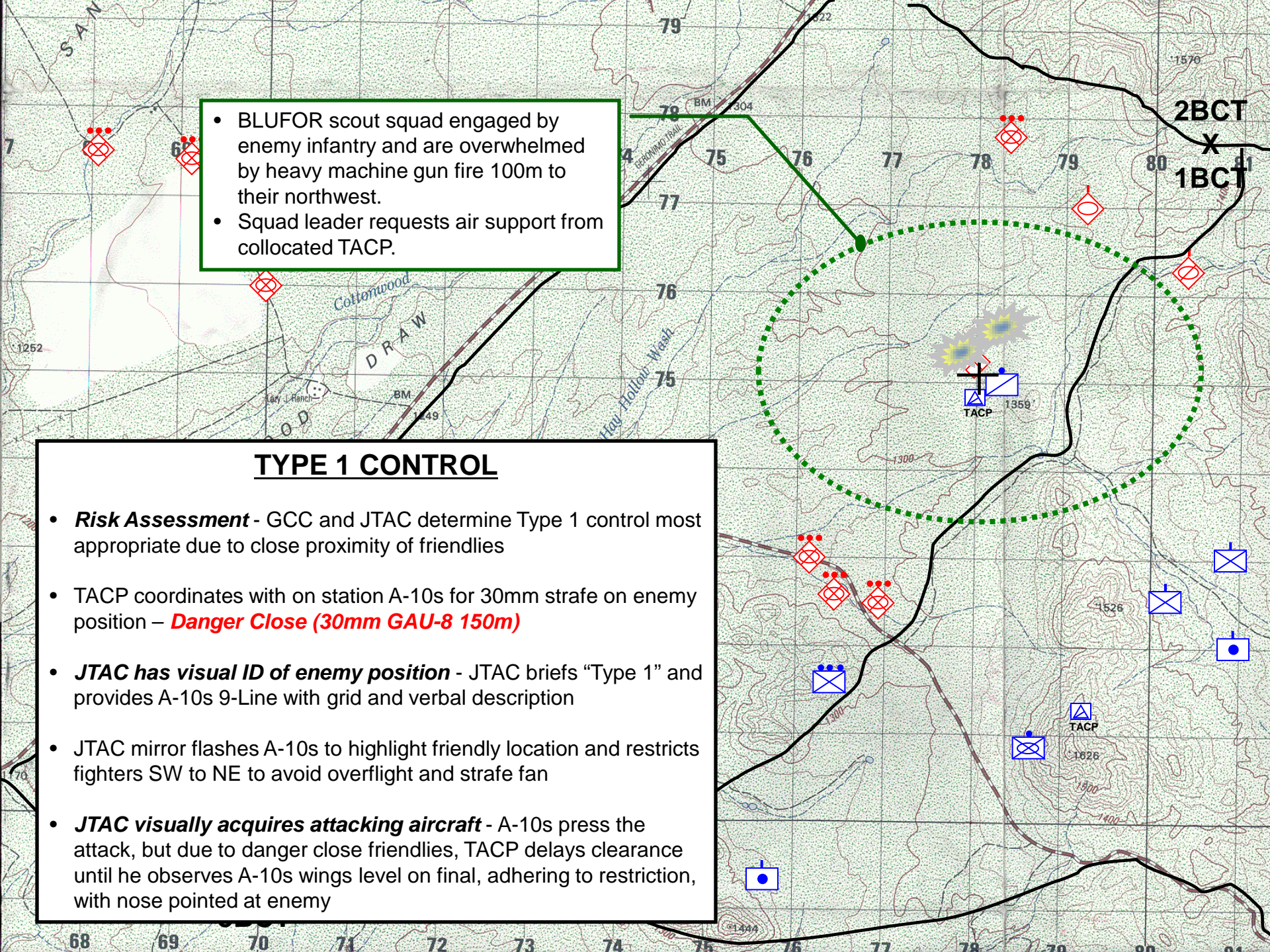
Primary Mark Laser,
Code: 1234, 2ndry
mortar WP

Friendlies E 2200, S
& SE 3000

Egress E

BMP SA-14s sup'd
w/ 81mm mortars

TOT 0705

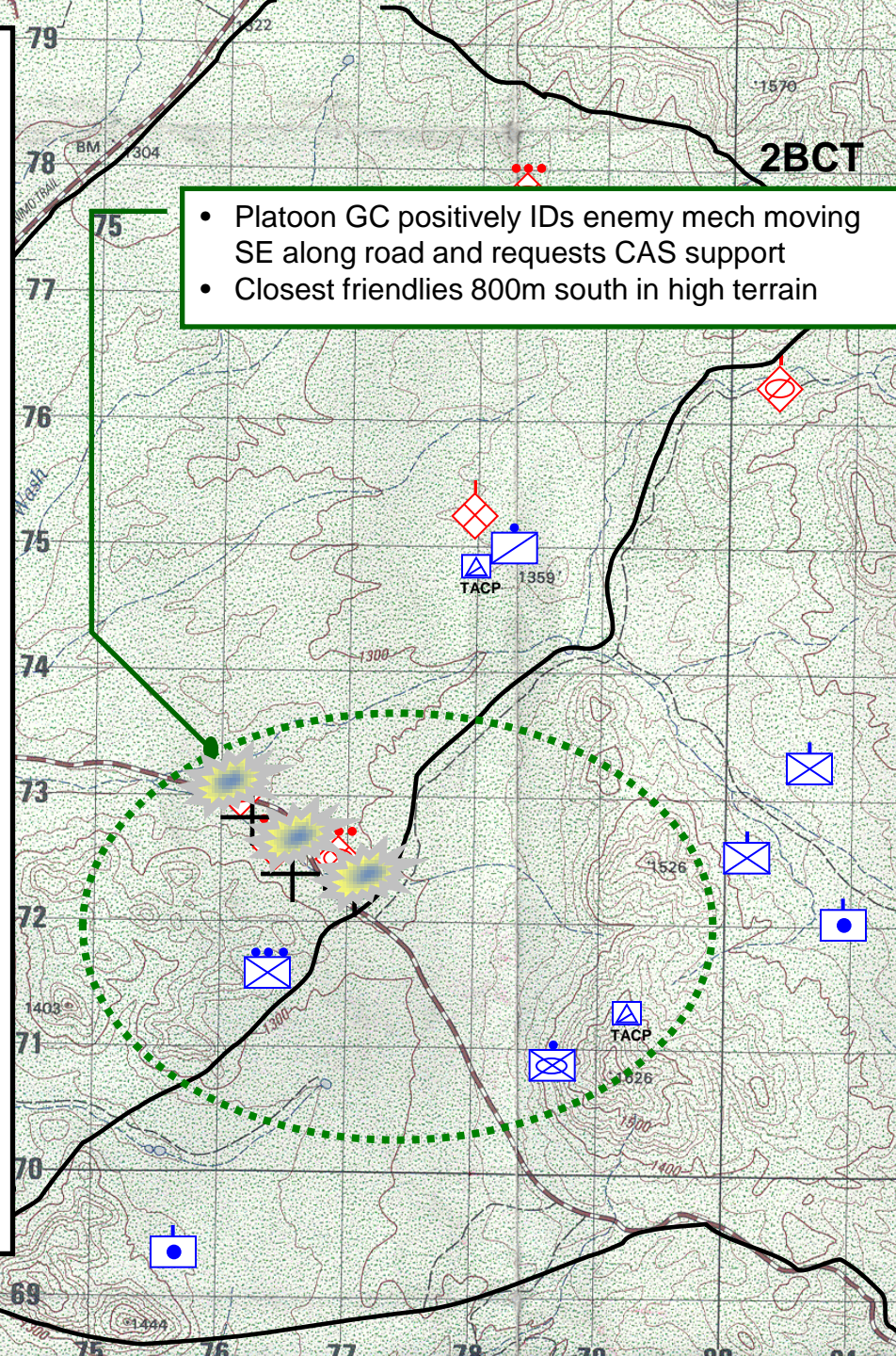
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- BLUFOR scout squad engaged by enemy infantry and are overwhelmed by heavy machine gun fire 100m to their northwest.
 - Squad leader requests air support from collocated TACP.

TYPE 1 CONTROL

- **Risk Assessment** - GCC and JTAC determine Type 1 control most appropriate due to close proximity of friendlies
- TACP coordinates with on station A-10s for 30mm strafe on enemy position – **Danger Close (30mm GAU-8 150m)**
- **JTAC has visual ID of enemy position** - JTAC briefs “Type 1” and provides A-10s 9-Line with grid and verbal description
- JTAC mirror flashes A-10s to highlight friendly location and restricts fighters SW to NE to avoid overflight and strafe fan
- **JTAC visually acquires attacking aircraft** - A-10s press the attack, but due to danger close friendlies, TACP delays clearance until he observes A-10s wings level on final, adhering to restriction, with nose pointed at enemy

TYPE 2 CONTROL

- **Risk Assessment** - GCC and JTAC determine Type 2 control appropriate since there is sufficient target area detail to ensure fighters don't target friendlies (friendlies in high ground, not moving)
NOTE: Proximity of friendlies is not the determining factor between Type 1 and Type 2 control. Requirement for Type 1 over Type 2 rests with the risk assessment and the JTACs ability to provide sufficient target detail to ensure attackers are attacking the nominated target. If the terminal controller cannot confirm target with attackers he must discontinue the attack until he can use Type 1 control
 - **JTAC has visual ID of enemy** - JTAC positioned to observe target and coordinates for two A-10s with stand-off Maverick missiles. This is not required but in this instance, it allows JTAC to provide accurate targeting data and hostile ID
 - JTAC briefs "Type 2" and provides A-10s 9-Line with detailed target information to confirm fighters are in contact with nominated target and factor friendlies minimizing risk to friendlies
 - TACP restricts fighters attack from E to W to minimize risk of weapons effects against friendlies to the South
 - Attackers are "cleared hot" after target and restrictions confirmed
- NOTE: Terminal Controller is not required to see attacking aircraft--verbal confirmation is sufficient to execute attack

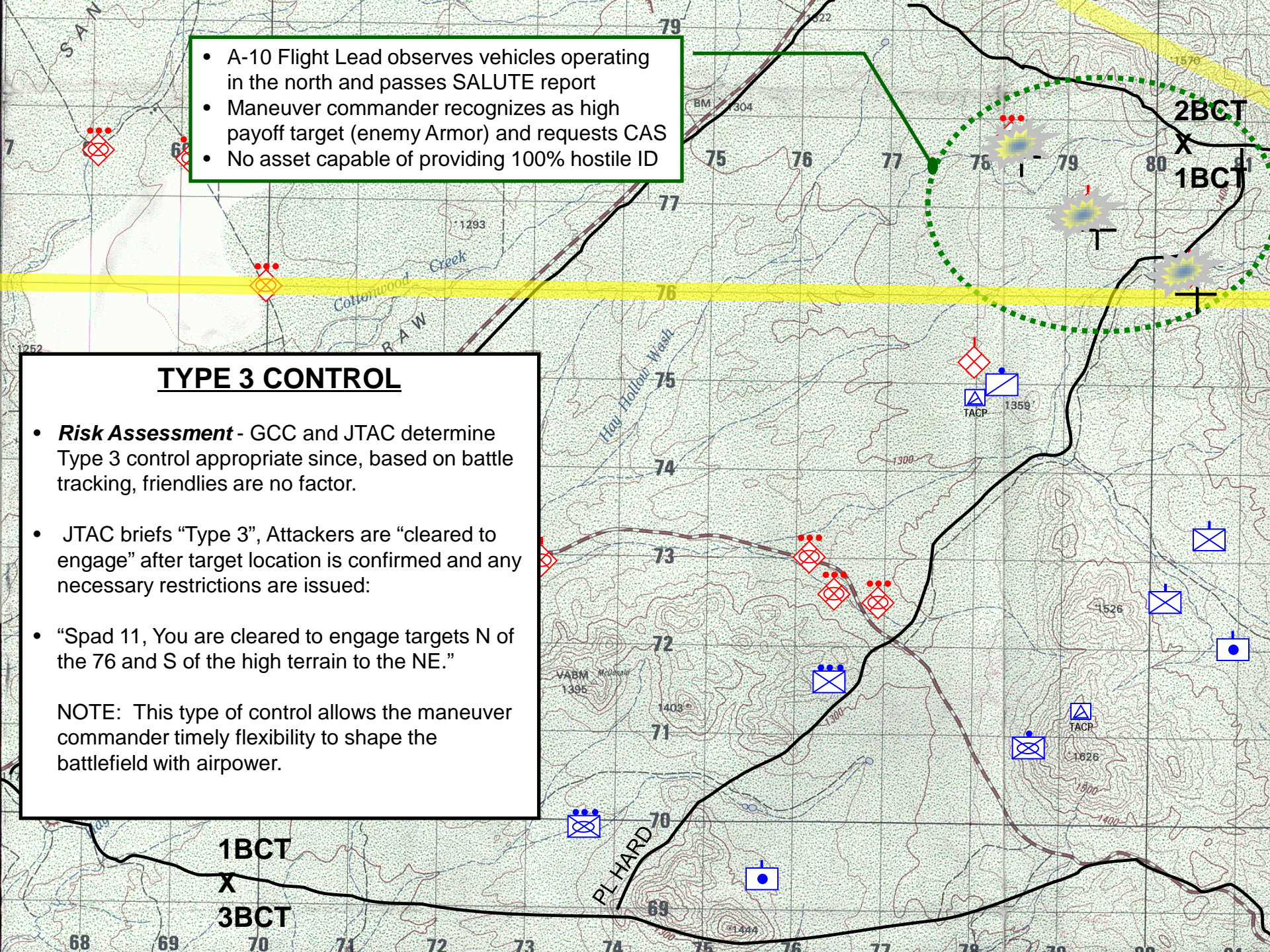


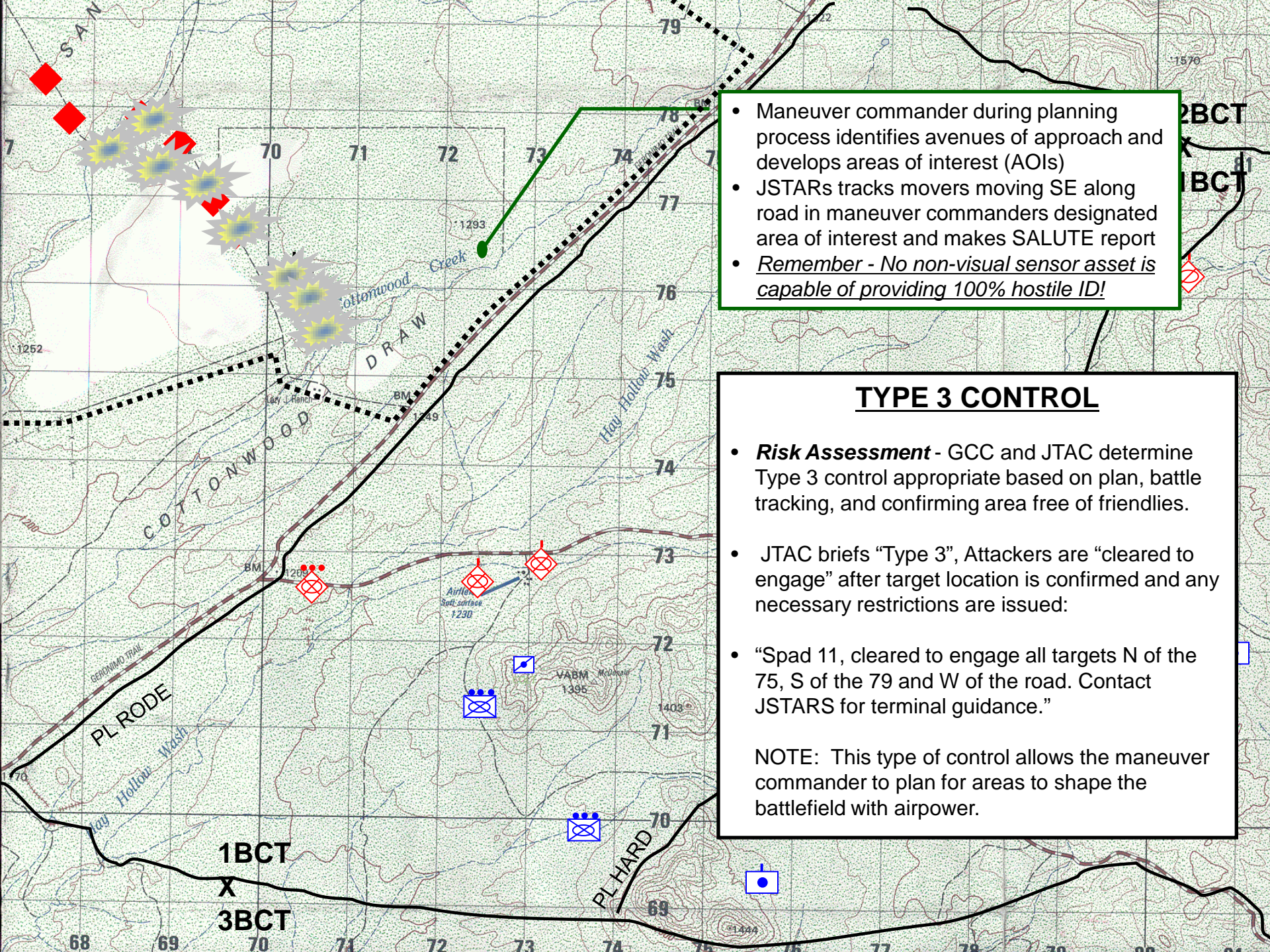
- A-10 Flight Lead observes vehicles operating in the north and passes SALUTE report
- Maneuver commander recognizes as high payoff target (enemy Armor) and requests CAS
- No asset capable of providing 100% hostile ID

TYPE 3 CONTROL

- **Risk Assessment** - GCC and JTAC determine Type 3 control appropriate since, based on battle tracking, friendlies are no factor.
- JTAC briefs "Type 3", Attackers are "cleared to engage" after target location is confirmed and any necessary restrictions are issued:
- "Spad 11, You are cleared to engage targets N of the 76 and S of the high terrain to the NE."

NOTE: This type of control allows the maneuver commander timely flexibility to shape the battlefield with airpower.



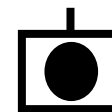


- Maneuver commander during planning process identifies avenues of approach and develops areas of interest (AOIs)
- JSTARs tracks movers moving SE along road in maneuver commanders designated area of interest and makes SALUTE report
- Remember - No non-visual sensor asset is capable of providing 100% hostile ID!

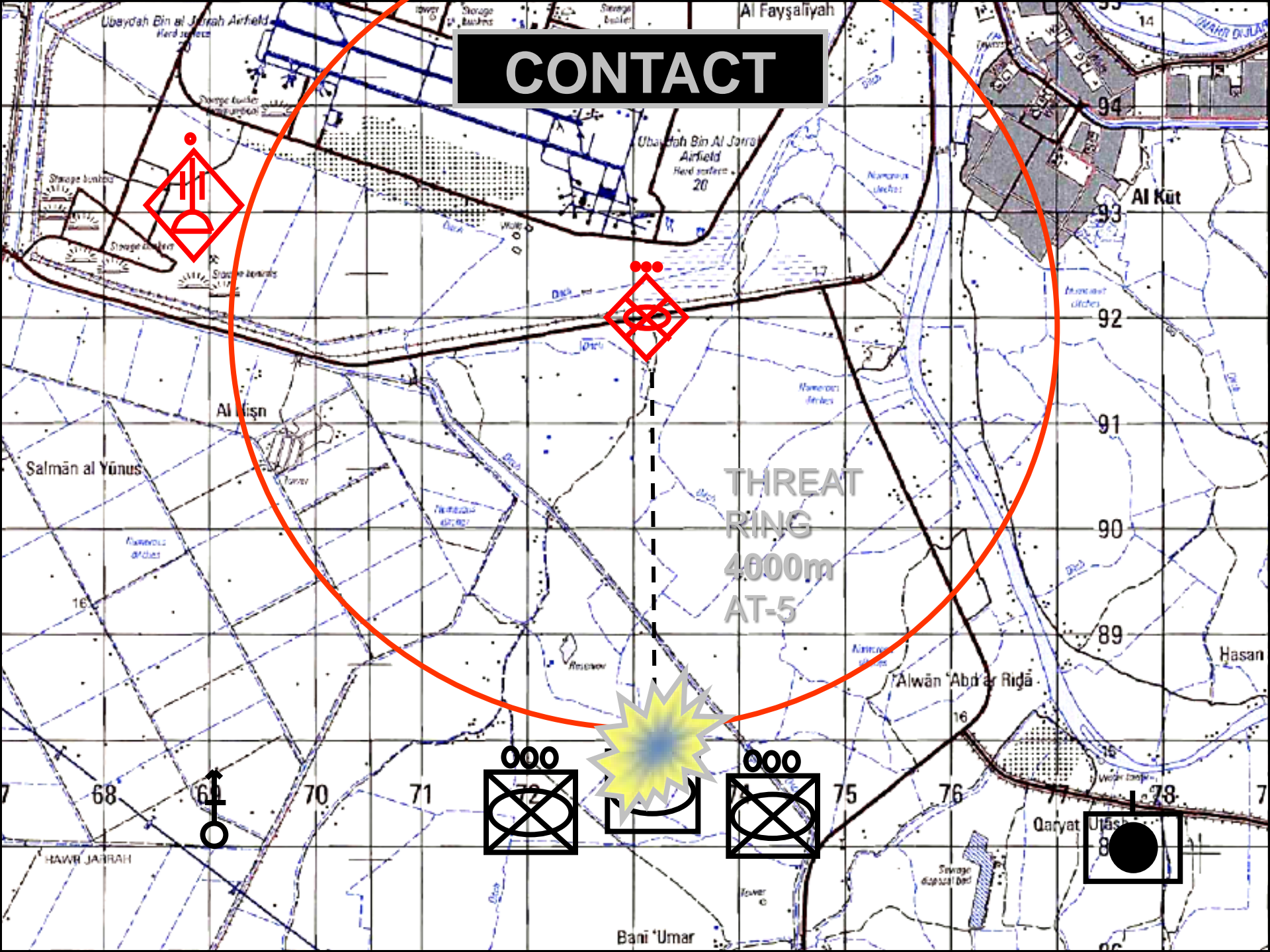
TYPE 3 CONTROL

- **Risk Assessment** - GCC and JTAC determine Type 3 control appropriate based on plan, battle tracking, and confirming area free of friendlies.
- JTAC briefs "Type 3", Attackers are "cleared to engage" after target location is confirmed and any necessary restrictions are issued:
- "Spad 11, cleared to engage all targets N of the 75, S of the 79 and W of the road. Contact JSTARs for terminal guidance."

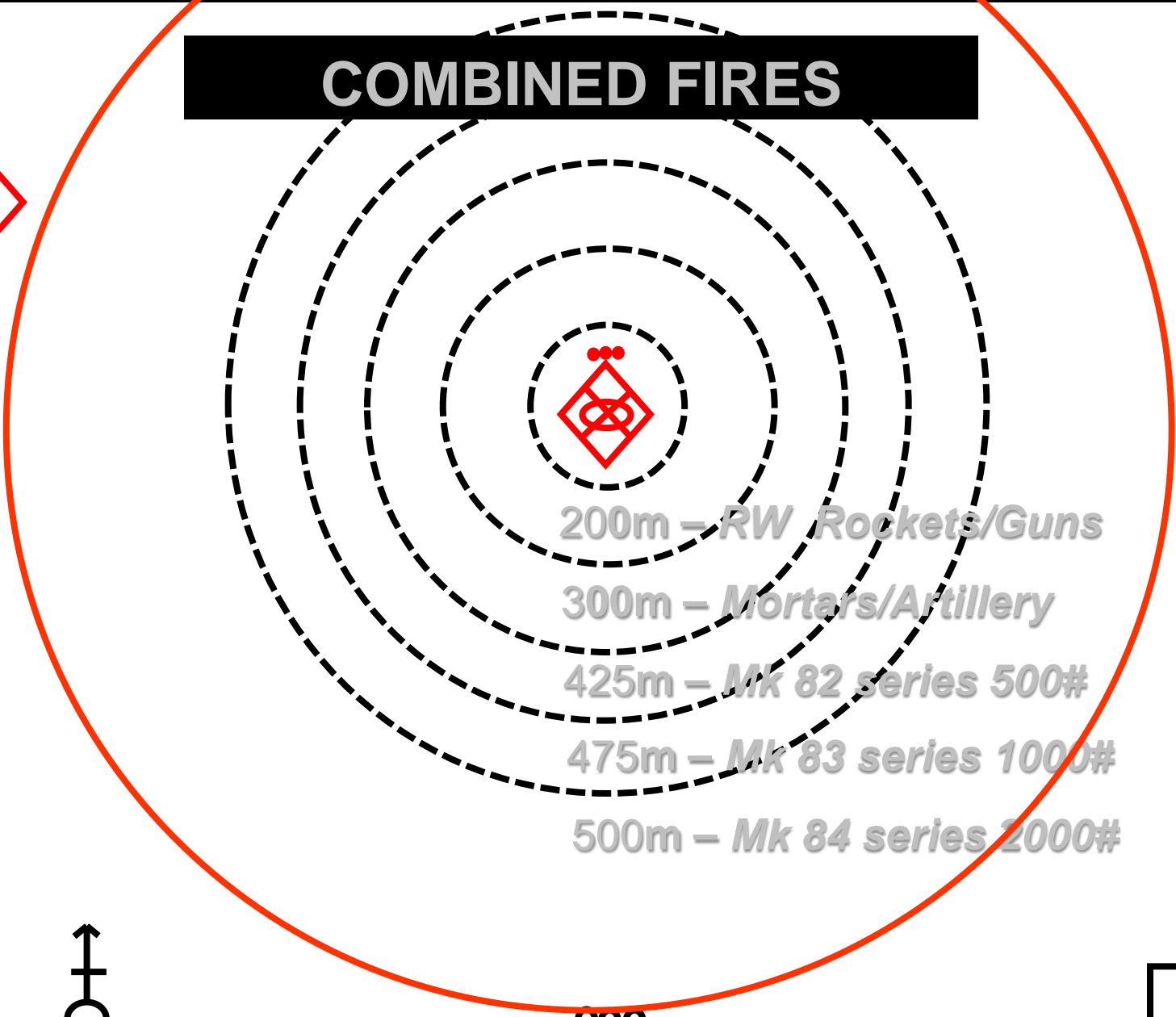
NOTE: This type of control allows the maneuver commander to plan for areas to shape the battlefield with airpower.



CONTACT



COMBINED FIRES



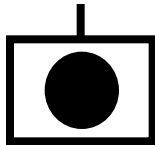
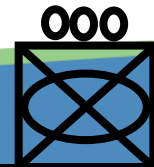
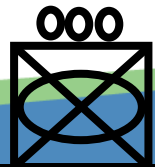
200m – RW Rockets/Guns

300m – Mortars/Artillery

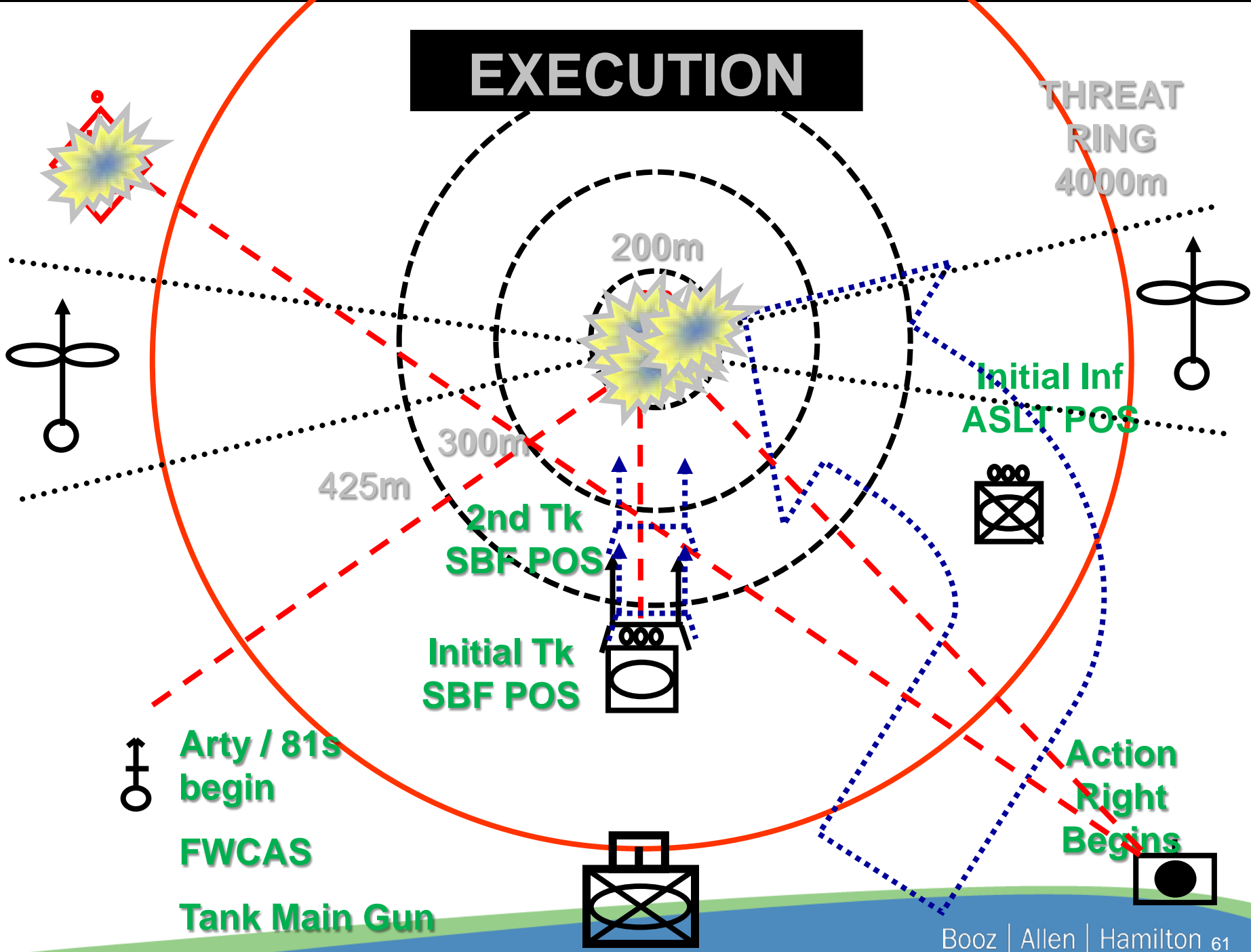
425m – Mk 82 series 500#

475m – Mk 83 series 1000#

500m – Mk 84 series 2000#

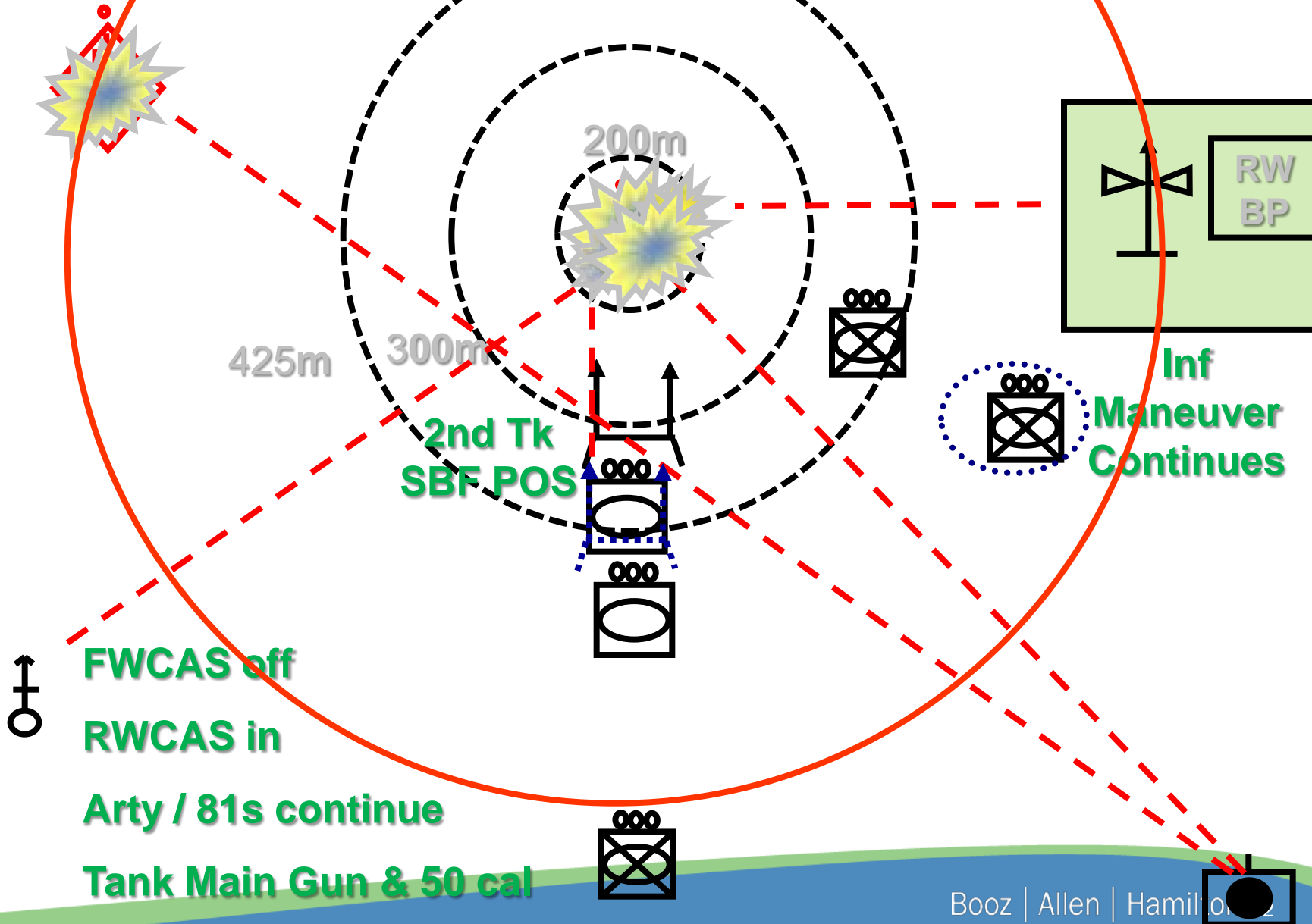


EXECUTION



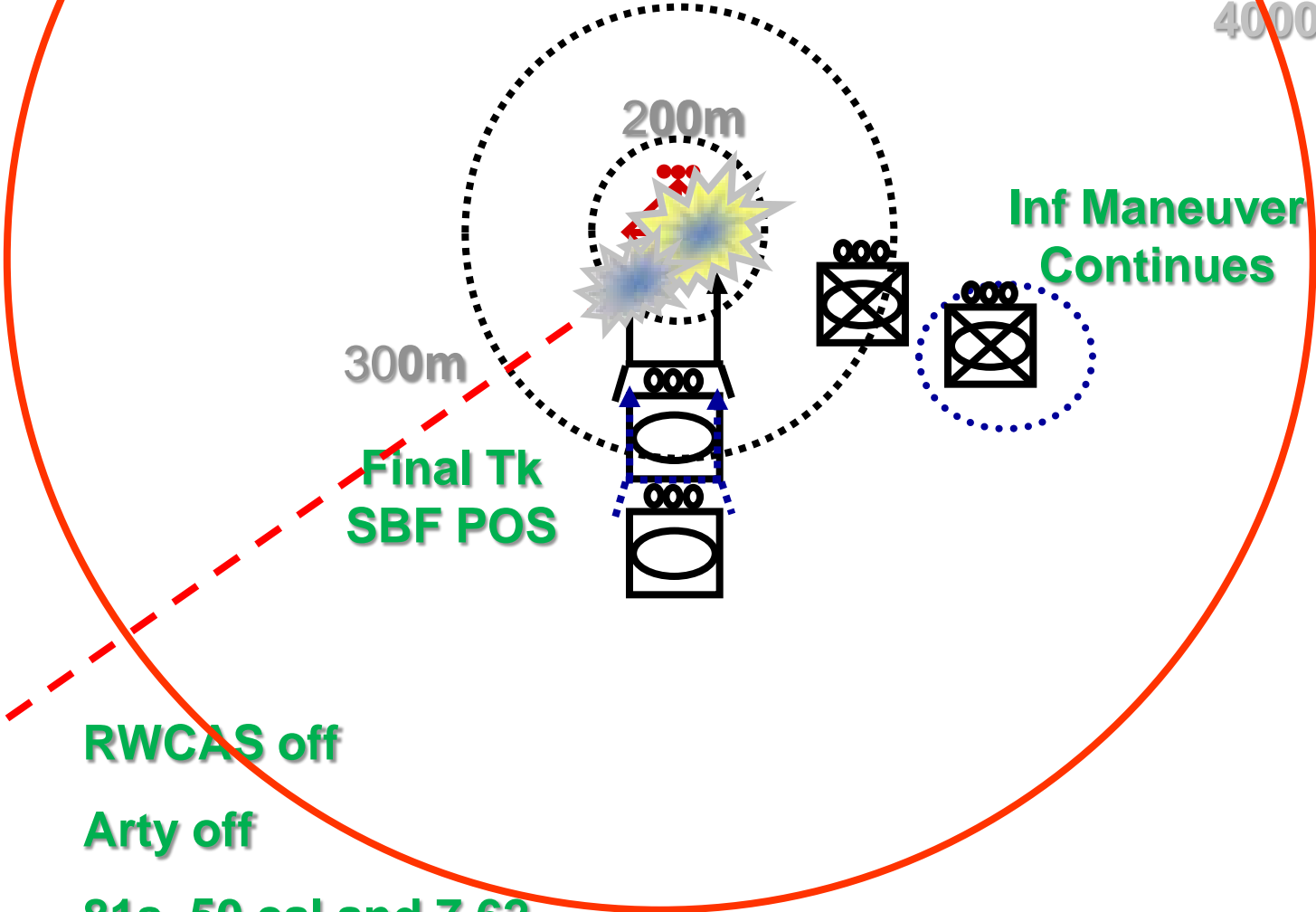
EXECUTION

THREAT RING
4000m



EXECUTION

THREAT RING 4000m



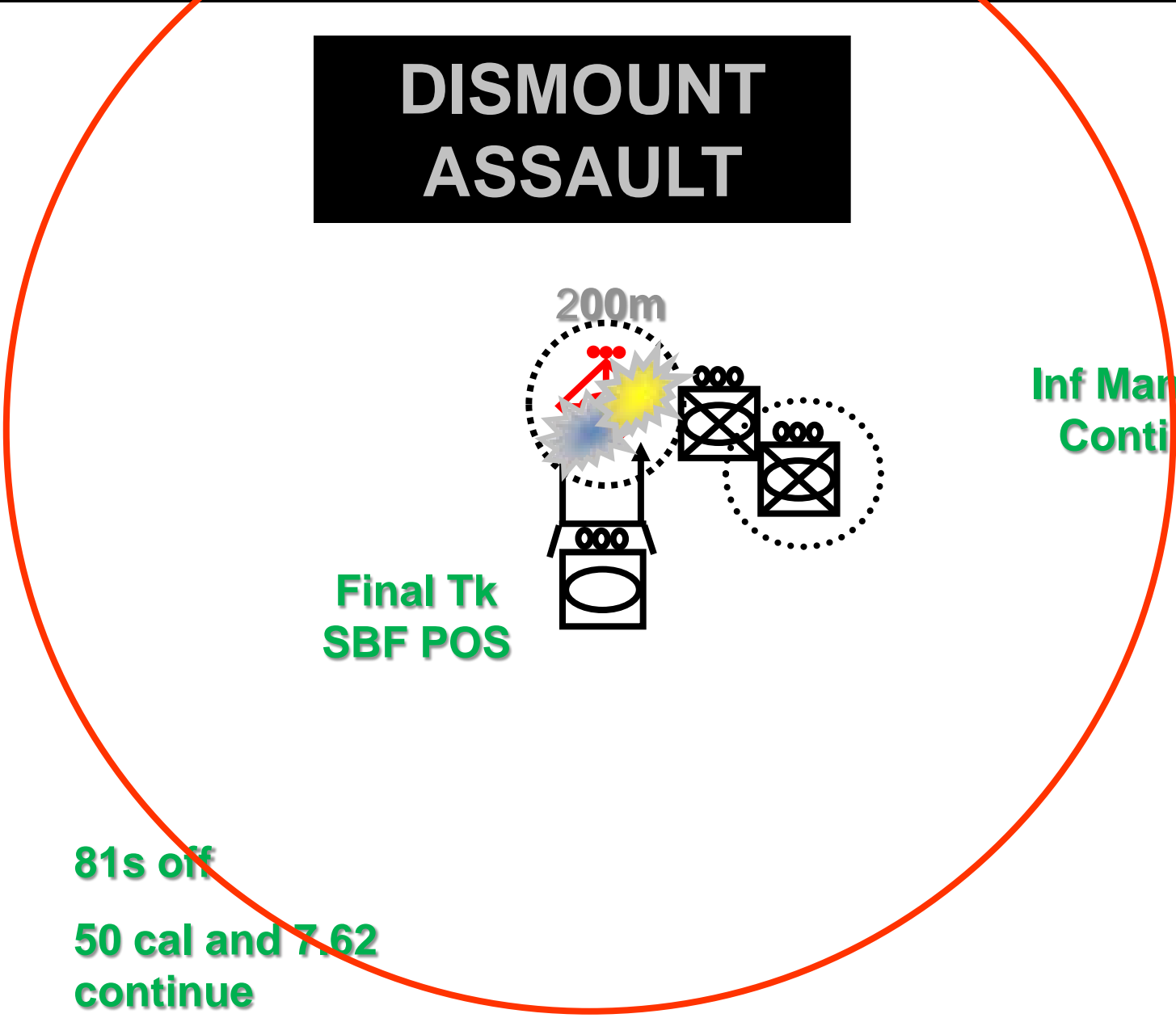
RWCAS off

Arty off

81s, 50 cal and 7.62 continue



DISMOUNT ASSAULT



81s off

50 cal and 7.62 continue

Upguns while bounding

