



Operational *Naval* Fires in Joint Maneuver Warfare

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Chief of Staff**

24 Oct 2002

www.mcwl.quantico.usmc.mil



Afghanistan Example



– Afghanistan highlights Joint expeditionary problem

- Technology permits precision targeting and long range comms
- Ground forces can target discriminately
- Maximize the lethality of fires from outside the AOA
- Want to minimize the footprint on the ground
- **Forces in contact don't care who answers the call**

– Similar Naval Expeditionary fires paradigm:

- Need it most when the least is on the ground
- Need both volume and precision
- Need to hit both planned and unplanned targets
- Unplanned targets need to be hit now!
- *Must* minimize forces ashore
- **Forces in contact will employ any “color” fires**





Afghanistan Fires



“We’d still be there looking for targets if it wasn’t for the guys on the ground.”

General James S. Jones, USMC



“Fix Fires”



- M777 Lightweight 155mm long-range system for massing, shaping, depth
- HIMARS for counterfire, MEF-level shaping
- 120mm mortar system as EFSS

The triad



LW 155mm



HIMARS



120mm rifled mortar system



History of Artillery available to the Marine Division



1970s

18 4.2 Inch Mortars



72 105mm Howitzers



18 155mm Howitzers



8 M109 155mm Howitzers



130 Tubes

Wide span of capabilities 8 8 Inch SP Howitzers



8 175mm SP Guns



Today

78 Tubes, one system

78 M198 155mm Howitzers





Conventional MEU Battery "Footprint"



155mms with prime movers



Ammo/Comm trucks



Battery CO, XO, Comm, Fire Direction, LNO



Experimentation Focus



- **Hunter Warrior – 1997**
 - Digital battlefield
 - Small units dispersed
 - ERGM naval gunfire
 - Precision TacAir
 - Sensor to Shooter with UAVs and FO/FAC

- **Technology Development**

- Handheld radios
- Tactical Handoff System (Experimental)
- Dragon Eye UAVs





Dragon Eye

Project Officer – Maj Cane



A backpackable unmanned aerial vehicle with interchangeable modular payloads, designed to provide the small unit leader an over-the-hill reconnaissance ability. Dragon Eye features fully autonomous flight operation, allowing minimal training requirements. Mission programming is conducted via a GPS registered 1:50,000 digital map projected on a Panasonic laptop computer.

Wingspan	3.75 ft
Length	3.75 ft
Max takeoff Wt	5.5 lbs
Msn Payload Wt	1.0 lbs
Link Range	5-10 km

Electronic Propulsion

Forward/Side looking color & B/W cameras
 Un-cooled IR camera in development
 Navigation via Global Positioning System

Estimated Performance:

0.75 hr endurance
 5-10km max range
 40 kt IAS

Funding:

FY01	FY02	FY03	FY04
\$1.5M	\$4.5M	\$0.75M	\$0.75M



Dragon Warrior VTOL UAV

Project Officer: Brent J. Azzarelli



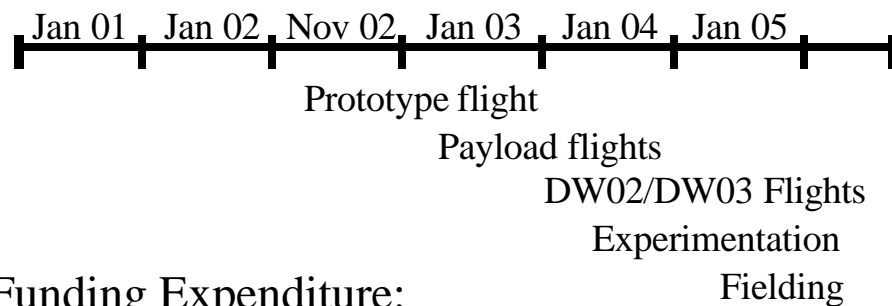
Specifications

- Shipboard compatible VTOL UAV
- Payloads: RSTA and wide-band comm relay
- Division/Regimental/MEU asset
- Fully autonomous flight capability
- 3-5 hour flight endurance
- 50 nm link range
- Transportable in a single HMMWV & Trailer

Plans & Status

- Based on the Close Range UAV requirement
- Completed flight test of 50% scale RC prototype
- Currently fabricating full scale systems at NRL
- Conducting digital flight simulations for autopilot
- Conducting wind tunnel performance/ tests
- Full scale prototype first flight Nov 02
- Payload developmental flight tests Feb 03
- MEF Experiment (Olympic Challenge) Aug 04
- Transition to NAVAIR/MCSC late FY05

Schedule



Funding Expenditure:

- FY01 \$3.4 M
- FY02 \$8.3 M
- FY03 \$10.2 M



THS(X) Artillery/Mortar

Advanced Field Artillery Tactical Data System (AFATDS)

Data Link Coordination
And Control

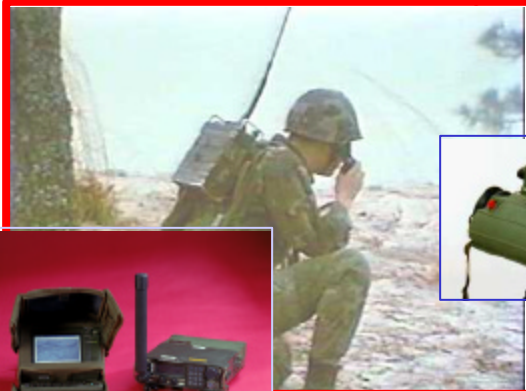


- Network of Computer Workstations that
- Process and Exchange Information
- Forward Observer to the Fire Support Elements

Forward Observer (FO)
with THS(X)

*Provides
SENSOR-TO-SHOOTER
Link to Fix Artillery Fires*

Field Artillery



MELIOS Targeting

SINGARS Radio/JVMF Data Link



Digital Maps/Imagery and GPS





THS(X) Map Graphics

The screenshot displays the THS(X) Map Graphics software interface. The title bar reads "lta_round.bsp - UCATS 01". The menu bar includes "File", "View", "Network", "Display", "Op Area", "Battlespace", "Targeting", and "Help". The toolbar contains icons for file operations, a "JOG" dropdown menu, and "GPS" and "GPR" icons. The map area shows a tactical map with a grid. Key features include:

- A large black diamond-shaped area with a white crosshair in the center.
- Blue lines forming a network around the diamond.
- Red circles containing the letters "R" and alphanumeric codes: RF3342A8, RF32A8, RF52A8, RF22A8, RF22A8, and RF02A8CS.
- Blue symbols: a triangle labeled FCS and a square labeled FSCC 2x8.
- Map labels: "MARINE CORPS AIR GROUND COMBAT CENTER TWENTYNIN", "HIBALGO MOUNTAIN", and "50".
- Coordinates: "11S NU 71528 12164" and "836 m".
- Time: "21:24:54".
- Mode: "MANUAL".



THS(X) Close Air Support



F/A-18



F-16
B-52
B-1
AH-64



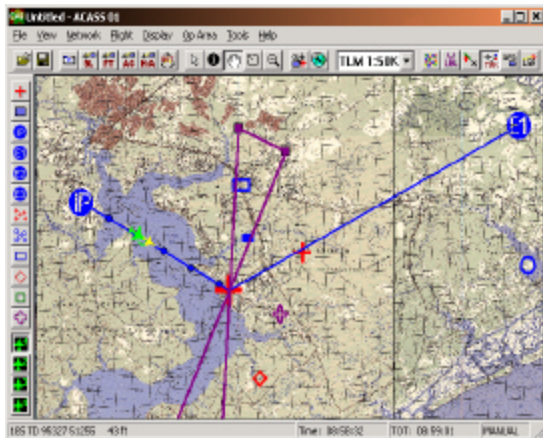
AV-8B



FAC Targeting Imagery

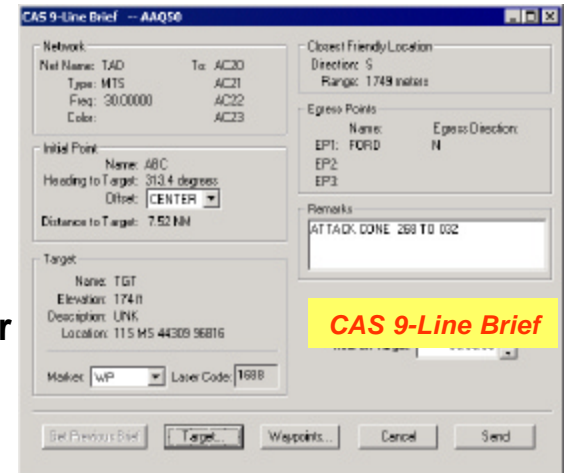


FAC Digital Map & Situational Overlays



- Off-The-Shelf Technologies:**
- Ruggedized Handheld Computer
 - PRC-148 VHF/UHF Radio
 - Laser Range Finder

FAC Digital Comm



CAS 9-Line Brief



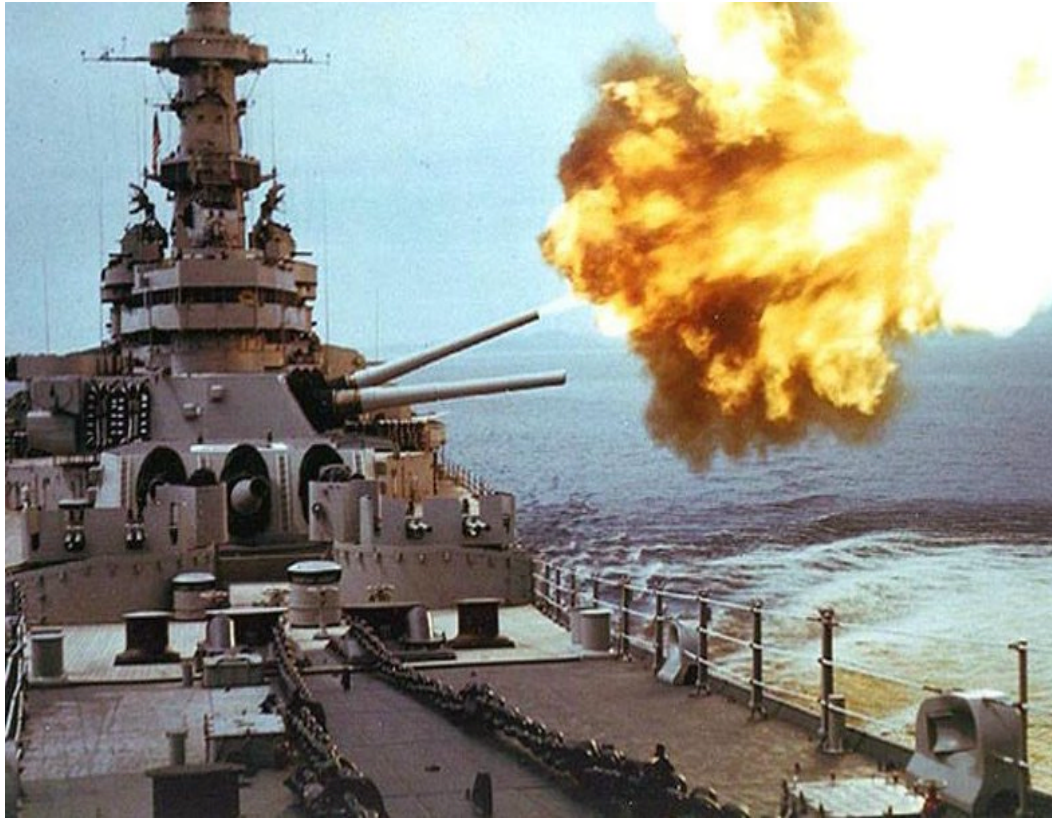
THS(X) CAS Map Display



The screenshot displays the THS(X) CAS Map Display software interface. The window title is "CAS Untitled - ACASS 01". The menu bar includes File, View, Network, Flight, Display, Op Area, Tools, and Help. The toolbar contains various icons for file operations, map navigation, and data management, including buttons for 9L, FT, AC, H/A, NET, TLM 1:50K, LBL, TRK, GPS, and LSR. The main map area shows a topographic map with several flight paths and waypoints. A blue path starts at a blue circle labeled 'IP' on the left, moves right, then down, then right again to a blue circle labeled 'E1' on the right. A purple path starts at a purple square, moves down, then right, then up, then right to a purple square. A yellow diamond is located near the center of the map. A red cross is also visible. The status bar at the bottom shows coordinates "185 TD 95327 51255", altitude "43 ft", time "Time: 08:58:32", total time "TOT: 08:59:01", and a "MANUAL" button.



THS(X) Naval Surface Fires



- **Compatible with NSFS Fire Support Coordination systems**
- **Provides rapid population of the NSFS call for fire**
- **Automatically tracks ship's gun-target line**
- **Relates GTL to friendly positions**



US Army Striker System



Technical Characteristics include:

- Point & Click Targeting
- Laser Rangefinder/Designator (G/VLLD)
- AN/TAS-4B Night Sight
- Handheld Terminal Unit (HTU) for Dismount Operations
- Pentium Lightweight Computer Unit (LCU)
- Hosts FOS Software
- Inertial Navigation System
- Based on M1025A2 HMMWV





THS(X) Mobile System



INS Gyro

MELIOS Laser
Rangefinder

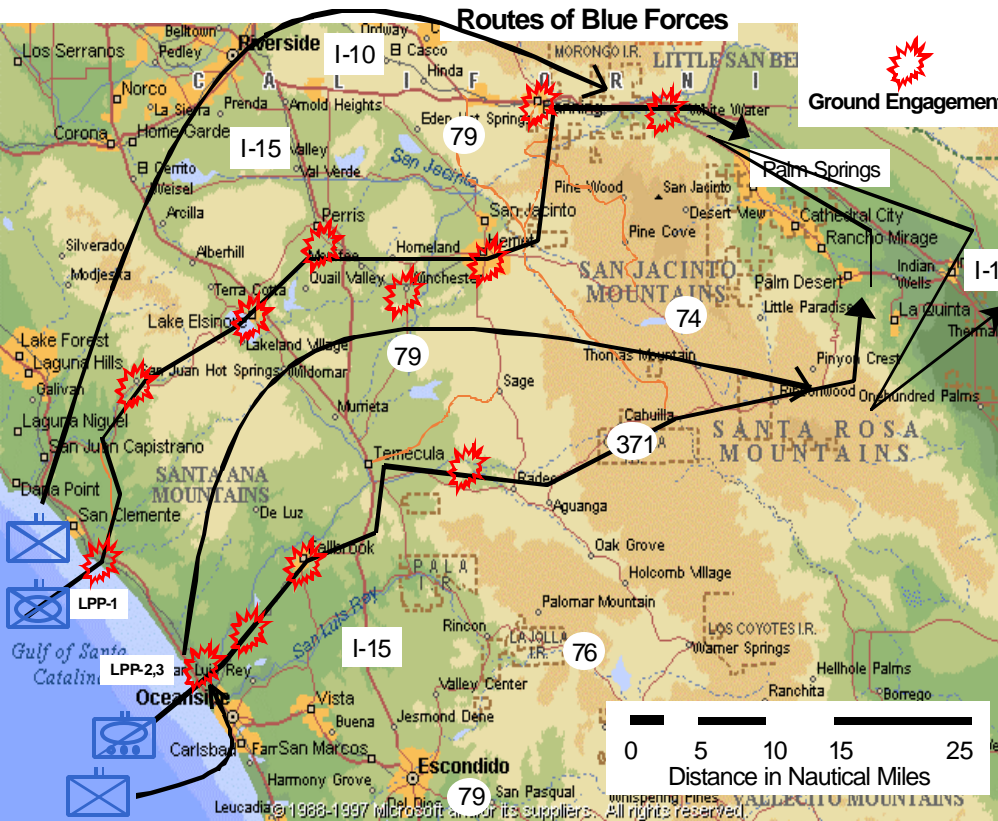
Adjustable
aiming pedestal

DACT
Computer





Wargame Results



Key Findings

- **EFSS**, **HIMARS** and **JWCS** should “fix fires.”
- Towed howitzers alone were not adequate
- Logistics footprint and limited mobility of towed howitzers (relative to STOM maneuver force) proved a substantial hindrance.
- **HIMARS** range was a critical advantage.
- **JWCS** viewed as a very expensive munition, for use only against high pay-off targets.
- Proposed Naval Surface Fire Systems (**ERGM**, **LASM**, and **NTACM**) prohibitive cost given numbers needed and magazine replenishment problems.

Systems Evaluated

- **Expeditionary Fire Support System (EFSS)**
- **Light Weight 155mm Howitzer**
- **High Mobility Artillery Rocket System (HIMARS)**
- **Joint Warfighting Counterfire System (JWCS)**
- **Extended Range Guided Munition (ERGM)**
- **Land Attack Standard Missile (LASM)**
- **Navy Theater Attack Cruise Missile (NTACM)**

**MEF-level forcible entry with MEB
as assault echelon for JTF**



Mobile Fire Support System (MFSS – “Dragon Fire”)

Project Officer: Maj. John America, Point of Contact: Forrest Lindsey



DESCRIPTION

The MFSS is a MCWL initiative to combine automation with a medium-range fire support. It is based on a French 120mm rifled mortar and is designed to fit within the MV-22 Osprey. MCWL has fired over 640 rounds through this system and it has proven to be extremely fast and precise.

SCHEDULE



Safe & Ready tests

Firing comparison tests

LAV mounting tests

C3 On the Move tests

LAV firing tests

Manufacture new gun

PLANS & STATUS

- Candidate for transition as Expeditionary Fire Support System (EFSS)
- Management of program transitioned to ONR/FNC
- Next version in initial design
- Safe & Ready and comparison tests in July
- Will participate in US Army “C3 On the Move” experiments
- LAV-Modular version nearly ready for tests

FUNDING

FY02

FY03

\$1.05M

\$1.65M (ONR-\$3.5M) (Congressional funds \$5M)



Dragon Fire MEU Battery "Footprint"



HMMWV or IFAV Prime Movers



**47 % of the "footprint"
35 % of the weight**

5-Ton Ammo Trucks



Comm/Recon



Battery CO



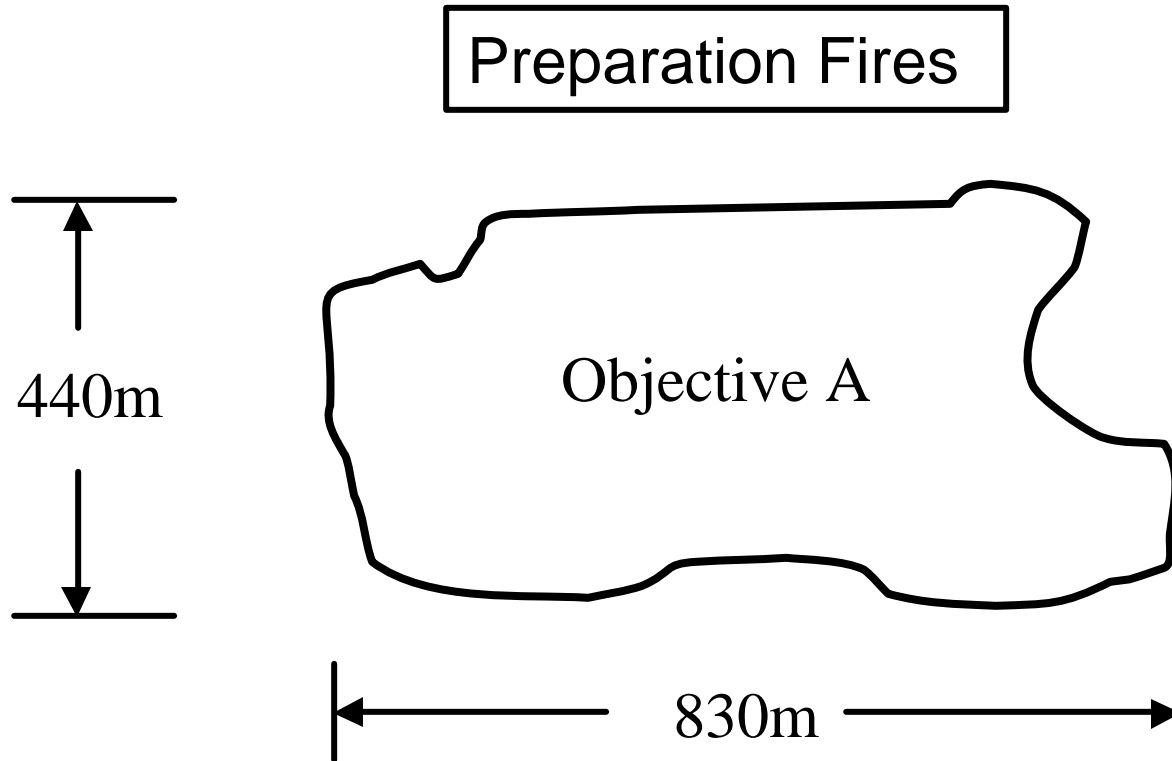
XO/Plt Cdr



LNO



Advanced Area Fires



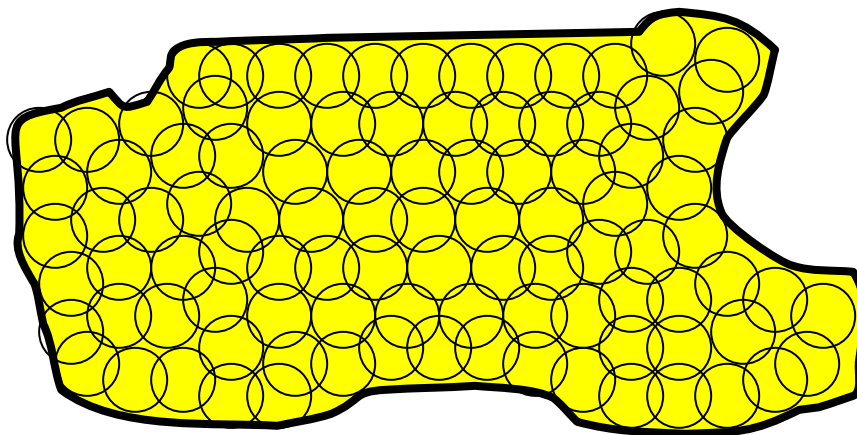
Scan the area in or trace it on the map display



Advanced Area Fires



Individual aimpoints computed, passed
From master system to firing units (98 rounds)



For one 6-gun battery, program executed in 4 minutes

For one 18-gun battalion, 1 ½ minutes

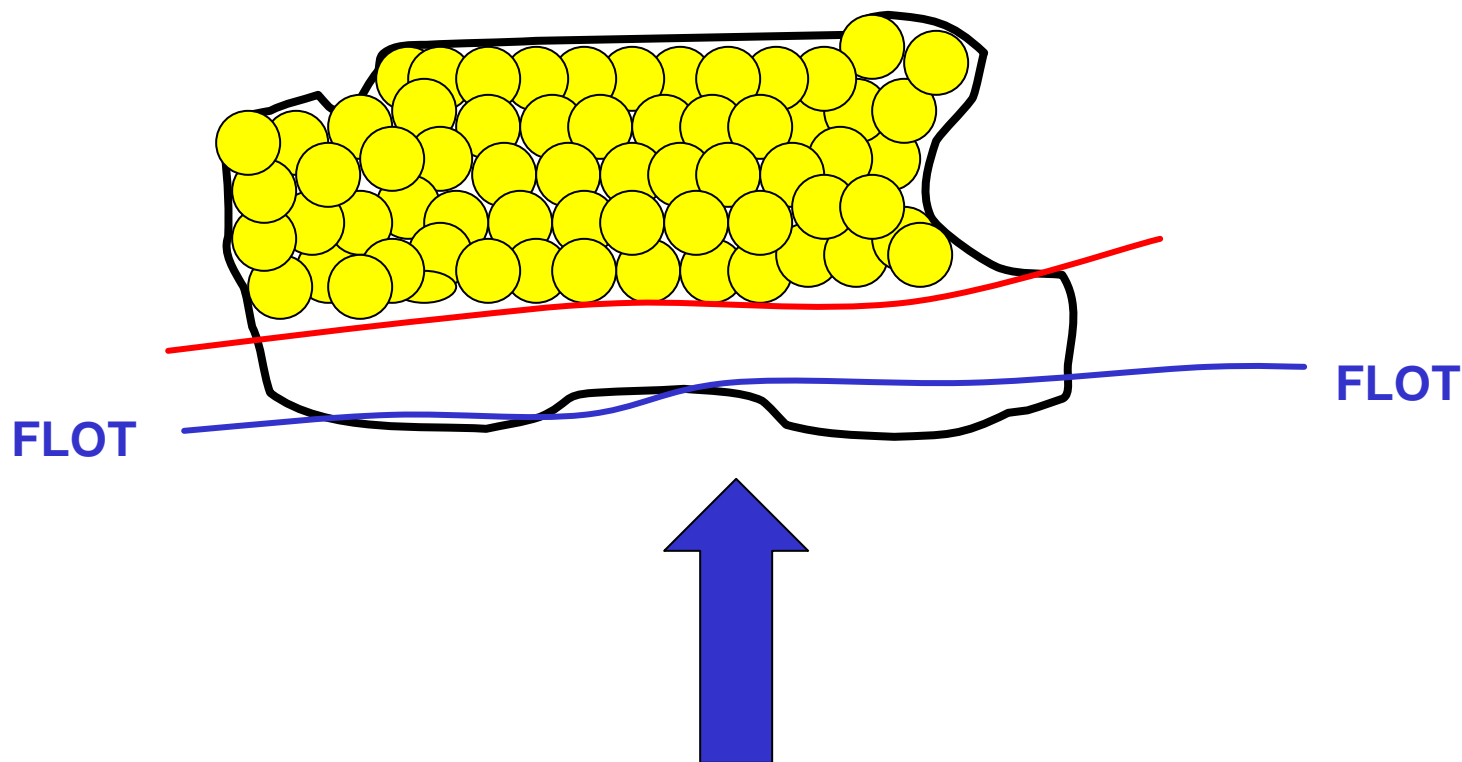
Every square meter of the ground hit by effects



Advanced Area Fires



As maneuver moves onto the objective, system precisely phases fires forward





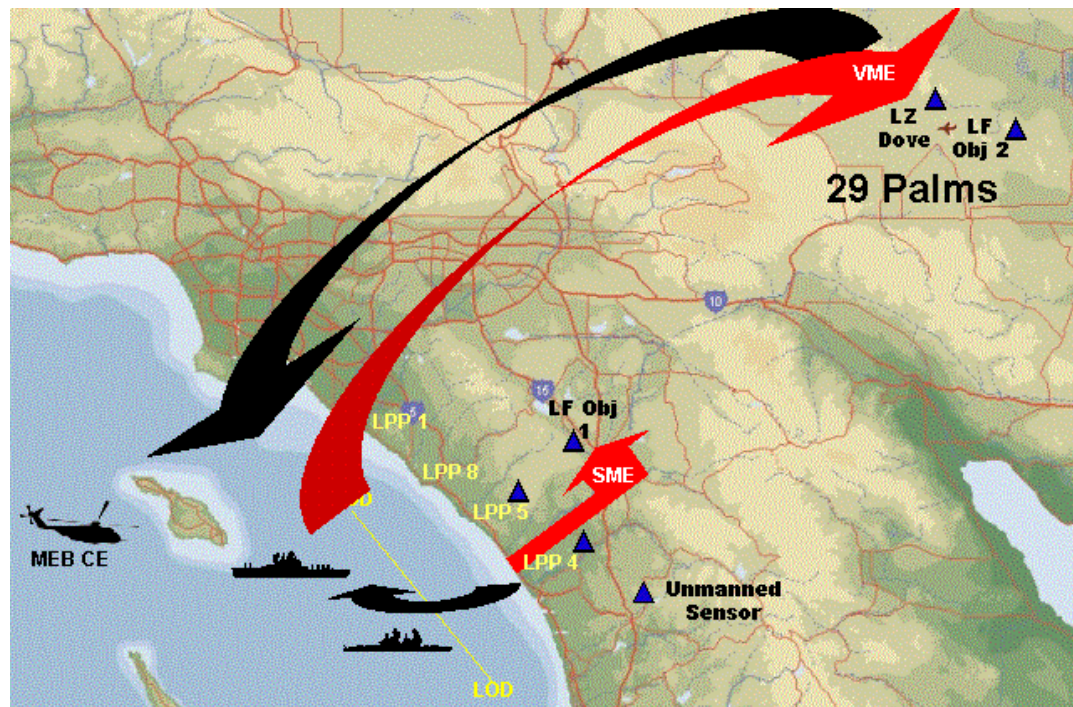
Olympic Dragon 04



Next Experiment: Ship-to-Objective Maneuver in a Joint Force

Sea-based Power Projection

- OTM/OTH Communication
- Common Tactical Picture
 - Digital Communications
 - Universal Call for Fire
- Tactical Intelligence Collection
 - UAVs and UGVs
 - Collaborative targeting
- Employment of Joint Fires
 - Precision Naval Fires
 - TacAir
 - Landing Force systems (Artillery and EFSS)



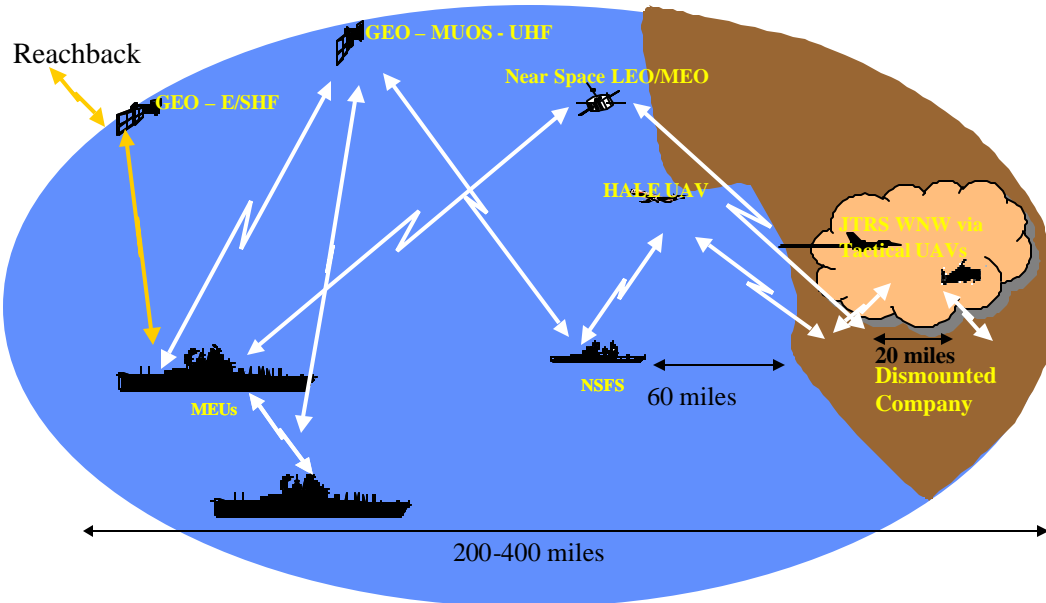
*Support the Operating Forces **and** Future Capability Development*



EMW OTH Communications



Project Officer: Lt Col Cusack RM



DESCRIPTION:

- Modified IRIDIUM to provide netted comms.
- Modified Iridium 9505 Handset with internal GPS linked to ship-borne Group Radio Controller.
- Enables experimentation in to STOM and specifically:
 - C2, RSTA, fires and sea- basing.
- Identify requirements and DOTMLPF recommendations.
- Potential for prototype capability.



OBJECTIVE:

- Universal Needs Statement CDTS ID # 01082UA
- No ground-based infrastructure, assured access with on-the-move capability to the dismounted user at the tactical level.
- Architecture a combination of tactical and high altitude UAVs and a near space (LEO/MEO) satellites.
- Space-based backbone provides worldwide capability in complex urban terrain, irrespective of weather and meets covert RSTA and RECON requirements.

FY 03:

- Sep 03 : LTA

FY 04:

- Jan 04 : System Test.
- May 04: OD 04.

TRANSITION:

- 60 secure (Type I) rugged radios for MEU deployment available within 18 months of OD 04.

FUNDING:

- FY01/02 \$0.5 M
- FY02/03 \$2.0 M
- FY03/04 \$1.0 M
- TOTAL: \$3.5M



Fires Wanted in All *Flavors*



- Seabased forces need *Joint* Fires
- Marines in contact don't care where they come from.
- Emerging Networks coupled with precision targeting and accurate weapons = *Revolution*
- *Still need weapons we drag on the ground – artillery and mortars.*
- *We're Just Beginning to capitalize on the potential!*

Afghanistan is a case study . . . Joint fires



The Ultimate Goal



**Digital Networked Fire Support
From all USMC/USN/USAF/USA
Platforms**





Questions?