IT in Support of Experimentation

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Commanding General
Marine Corps Warfighting Lab

Marine Corps Warfighting Lab (MCWL)

A Mission to Experiment…

MCWL Mission: "Conduct concept-based experimentation to develop and evaluate tactics, techniques, procedures and technologies in order to support the warfighter by enhancing current and future warfighting capabilities."

- Our primary product is *knowledge*

- Our goal is quick transition to the Deputy Commandant for Combat Development & Integration and the operating forces

- And yes, we do have a plan….

Marine Corps Warfighting Lab
Experiment Campaign Plan
(5-year window, updated every year)

C4 Challenges

Current challenges:

- Significant limitations in available SatCom nets
- “Line of sight” required for traditional SatCom
- Long-Haul voice and data comms challenging in environments with severe terrain or man-made obstacles
- Data/messaging/position location information not available at the small unit level
- Small unit radio nets impacted by terrain and obstacles
- Manual relay required to personnel outside of line of sight

Concept Evolution

Arthur Schopenhauer
1788-1860

"All truth passes through three stages. First, it is ridiculed. Second, it is violently opposed. Third, It is accepted as self-evident."

2004 - 2006

Distributed Operations
- Focus on Plt "down"

Adopted by
Training & Education Command

- **Combat Hunter**
- **Squad Fires**
- **Infantry Skills Simulation Working Group**
- **TECOM Manpower Plus-up (Increase throughput at Sqd Ldrs Crse)**
- **Tactical Small Unit Leaders Course (Formally Train Fire Team Leaders)**

Adopted by
Marine Corps Systems Command

- **"DO Gear List"**
  - $19M T/E Plus-up per Inf Bn

"I was with your son in Fallujah. He was my company commander. If we had to go back, I'd follow him with a spoon." LCpl Eric Kapitulik

Capt Doug Zembiec E/2/1
1973-2007

2007 - 2009

Enhanced Company Operations
- Focus on the Company "up, down, across"

- **LOE 1: Company-level Intell Cell (2007)**
- **LOE 2: Company-level Ops Center (2008)**
- **LOE 3.1: Dismounted Tactical Comms**
- **LOE 3.2: Dismounted Tactical Comms**
- **LOE 3.3: Unmanned Air/Ground vehicles**
  - Logistics Support to distributed forces

Now Part of Predeployment Training

- **Distributed Artillery**
  - 3X2 Arty Btry T/O & T/E
- **ECO Fires**
  - Co CO as FSC

LOE 3.2 C4 Design

- **Objectives**
  - Validate the Next Generation Command and Control (NGC2) systems' abilities to function in an austere and wooded environment in support of ECO
  - Compare the Experimental radios capabilities and limitations to existing Program of Record (POR) radios capabilities and limitations while conducting ECO
  - Identify any system, training, and TTP issues prior to and in preparation for LOE 4.0
- **Communications Equipment Lay-Down**
  - Company HQ had both POR and Experimental radios
  - Legacy Platoon: 1st Platoon issued POR radios only (PRC-148 and PRC-153)
  - Hybrid Platoon: 2nd Platoon issued both POR and Experimental radios
    - Plt HQ Element had POR and Experimental radios for inter-HQ comm and external Plt/Co comm
      - Not advertised, but the user could choose whether to use POR or Exp systems based on performance
    - Squads had POR radios
  - Experimental Platoon: 3rd Platoon issued Experimental radios only: ROA, C2A, and TW-220
- **Radio Roles**
  - PRC-148s and ROAs used for long-range voice communications
  - C2A used for long-range data communications
  - TW-220 and PRC-153s used for intra-platoon and intra-HQ element communications

LOE 3.2 C4 Equipment

Netted Iridium

- Low Earth Orbit (LEO) Iridium satellite constellation
- Traverses overhead with an on-station time of 7-9 minutes
- Traditional geo-stationary satellites require an antenna to be pointed directly at them; mountains and woods often interfere with this “take-off” or “look-up” angle
- LEO satellites overcome environmental obstacles by passing overhead, enabling communications for the user
- Netted Iridium technology allows for one-to-many broadcast communication (SVSB vs SVMB)

Distributed Tactical Communication System (DTCS) Radio Only Alpha (ROA)

- Uses Netted Iridium technology to provide On-The-Move (OTM), Over-The-Horizon (OTH), Beyond Line-Of-Sight (BLOS), push-to-talk (PTT) voice and data communications
- Capable of 2.4 Kbps netted data per channel
- Type-II certified commercial AES-256 encryption
- Broadcast Position Location Information (PLI) (different settings)
- Capable of placing traditional Iridium telephone calls

LOE 3.2 C4 Equipment

DTCS Command and Control Alpha (C2A)

- Provides all of the ROA capabilities listed above
- Provides data functions via an integrated Personal Digital Assistant (PDA). (chat, text, pre-formatted messages, etc.)
- View the Common Tactical Picture (CTP), utilizing C2CE

Trellisware CheetahNet-220 (TW-220)

- A tactical handheld radio that creates mobile, ad-hoc, multi-channel voice and data network
- Self forming/self healing, uses a meshed networking protocol
- Provides high-bandwidth/low latency data connectivity to the individual Marine with a usable 220 Kbps
- Digital voice quality; voice prompts
- Passively relays 7 voice and 1 data channel; up to 8 hops
- Transmits PLI

LOE 3.2 C4 Outcomes

• Netted IRIDIUM and MANET are teachable, viable, and are capability gap-filler for expeditionary forces in general; especially when operating within the ECO concept.

• For the devices specifically, the Marines viewed the ROA and TW-220 as ready for deployment. The C2A, with the integrated PDA and data capability, was a great concept but still requires refinement.

• Though the radios were not exercised to their full potential, the concepts were understood (example: the hybrid platoon chose to sacrifice a DTCS radio from their HQ so that their patrols could cover more area)

• The ability to send and receive data did not appear to be effective below the platoon; the squads from the experimenting unit did not want it and struggled to employ it effectively.

• Data is needed at the platoon HQ element for operational, administrative, and logistical electronic reporting.

• Devices using LEO satellites offer capabilities not present in current devices using geostationary satellites; they are also scalable down to the squad-level.

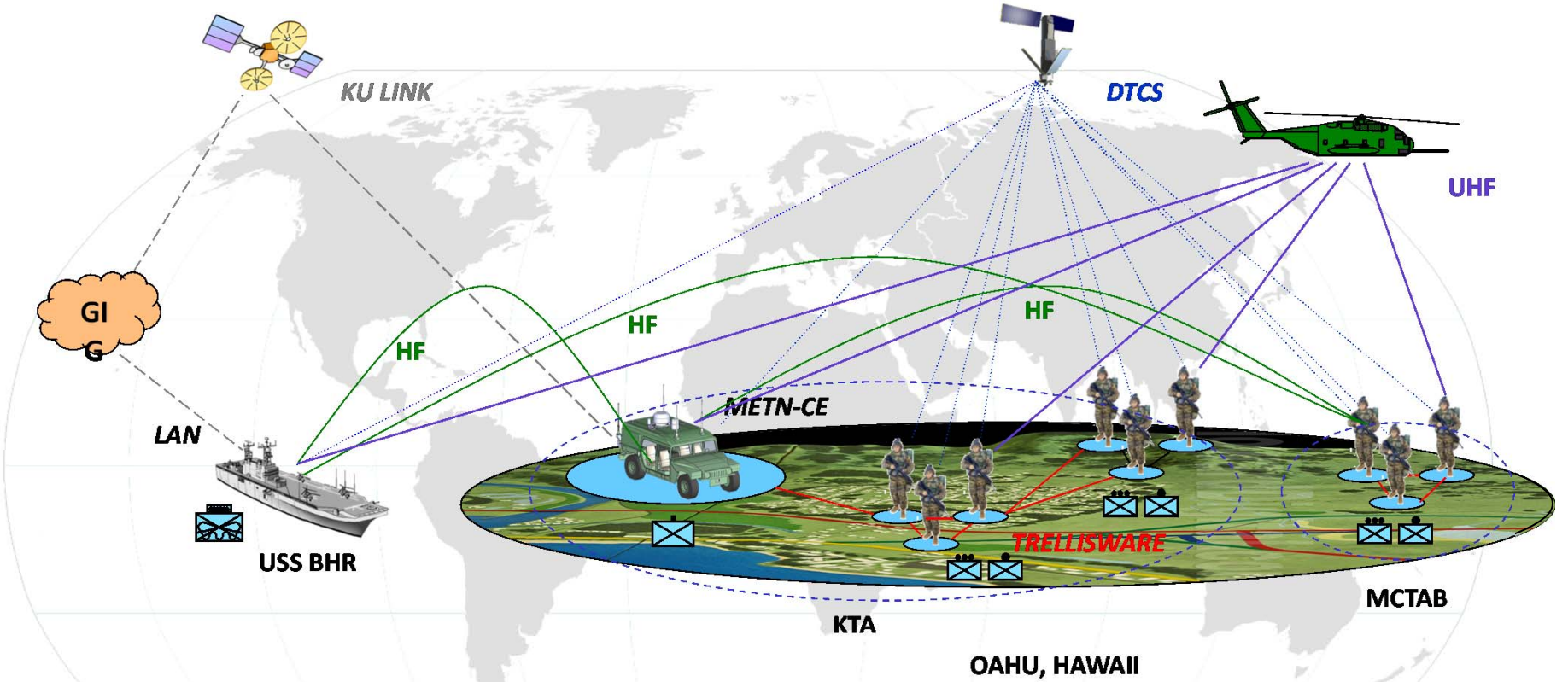
• The TW-220's ability to passive relay is highly desired at the tactical-level.

ECO LOE 4 Objectives

<u>Jul 2010</u>: Execute DO/ECO as Ship-to-Objective Maneuver envisioned, Vision & Strategy 2025 describes, and Irregular Warfare <u>demands</u>

- Identify capability gaps at all levels – especially in the areas of C2/ISR, fires, logistics – in order to shape follow-on EMO experimentation
- Assess the impact of an enhanced company/company landing team (CoLT) on immediate HHQ, MAGTF/Navy
- Employ and assess experimental Infantry Company T/O
- Assess a prototype C2 suite (CAPSET V) in STOM
- Evaluate the contribution/cost of organic Unmanned Ground Vehicles (UGV) at the tactical level
- Evaluate the utility of a logistic support element within the CoLT
- Evaluate the contribution/cost of enhanced attached and organic surface indirect fire support
- Examine fire support coordination function within the company headquarters

LOE 4 Communication Plan



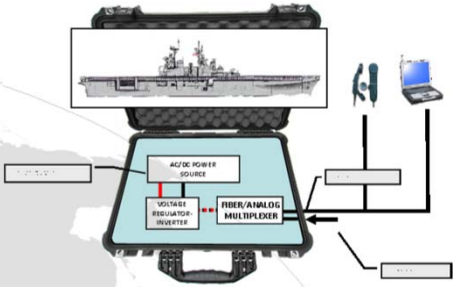
KU LINK
DTCS
TRELLISWARE
HF
UHF

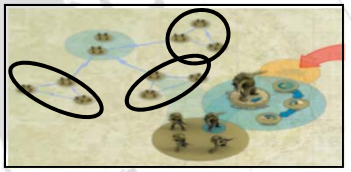
- Optimized for dismounted and distributed operations
- On the Move/Beyond Line of Sight to the squad level
- Embedded PLI

LOE 4.0 C4 Equipment

Distributed Tactical Communications System (DTCS):

- Tactical Iridium satellite-based radio (netted iridium)
- Voice and limited data
- 100-mile+ range
- Issued to Squad and above
- Conducting ship-board installation to provide voice, data, and operational picture to the SPMAGTF and Bn





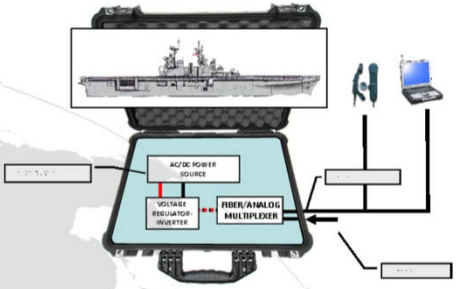
Next Generation Command and Control (NGC2):

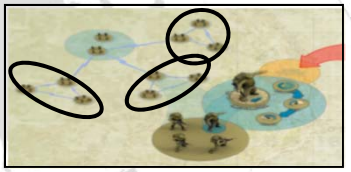
- Mesh Networked Radio (Trellisware or TW)
- Self Forming/Self Healing capability (w/voice notification)
- Each radio acts as a passive relay
- Data and digital voice capable (7 voice/1 data channel all simultaneous)
- Issued to every Marine

LOE 4.0 C4 Equipment

Mobile Tactical Network CLOC Enabler (METN-CE):

- Provides Company CP full data and voice suite to support ECO
- On-The-Move KU Band with voice (DTCS, high power TW) and software suite
- Currently configured in HMMWV (M2C2)
- Issued at Company Level





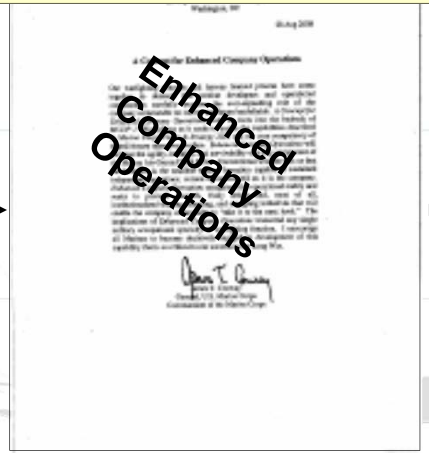
Panasonic Toughbook CFU-1:

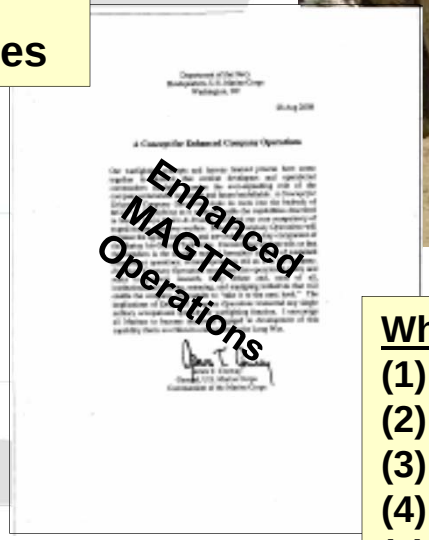
- Provides Operational and Planning tools
- Command Post of the Future (CPOF), Tactical Ground Reporting System (TIGR) and other USMC software
- Can interface with DTCS and TW; working on concurrently
- Issued at Squad, Platoon and CLOC

Why we come to work…

- We believe tactical excellence is a strategic necessity
- We understand that advanced technology is a force multiplier
- We address operational imperatives and future requirements
- We focus on achievement of Vision & Strategy 2025
- We look seriously at the future force across Doctrine, Organization, Training *and* warfighting functions
- We think we make a difference

Lab's Priorities:
(1) Concept-based experimentation
(2) Support to current operations
(3) Find/Evaluate cutting edge technologies





What Keeps us up at Night:
(1) IED threat
(2) Tactical communications
(3) Demand Reduction
(4) Moving Target Engagement
(5) Lightening the Load
(6) Distributed Logistics

Questions?