



Technology Challenges in an Uncertain World

*Commanding General, Marine Corps
Warfighting Lab*

Vice Chief of Naval Research

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Mission

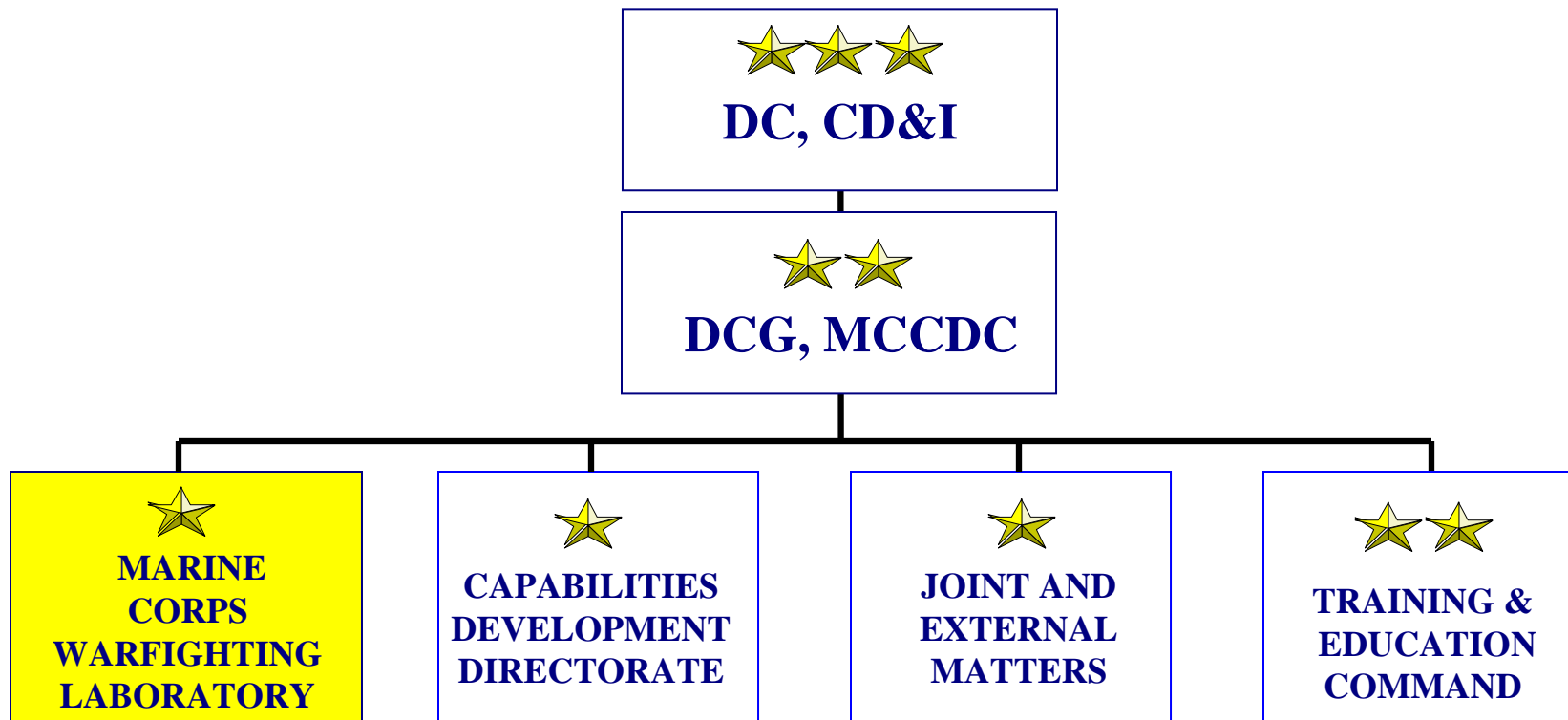


The Lab develops **concepts**, conducts *concept-based experimentation* to develop and evaluate *tactics, techniques, procedures and technologies* in order to enhance Marine Corps warfighting capabilities.





Integral Part of the Combat Development Enterprise



The Lab CG is also Vice Chief of Naval Research,
Executive Agent for S&T, and EA for Tech Support to OIF/OEF



Experimentation Continuum



The Three Worlds of Innovation and Transformation



Solving Immediate Problems



The Next Service

4-5 years



The Service After Next

10-15 years

Marine Corps Experimentation and S&T supports Naval Transformation Roadmap



Tactical Experimentation



***Current Emphasis:
Distributed Operations***



Distributed Operations (Challenges)



- Sustainment / Logistics
 - Distance / Threat / Concealment
- CASEVAC
 - Distance / Threat / Golden Hour
- Communications
 - Reliable / Global / Weight / Batteries
- Training
 - Use of Simulation



Technology Priorities Conceptually



- Make our *small units dominant*, akin to our aviation at 15K feet or our Navy on the high seas
- Consider the *Marine as a part of a system*, so we don't just concentrate on giving an individual the best gear, but gain synergy (comms, jammers, ISR, etc.) from the system
- Find and avoid minefields by their *anomalies*.
- Strengthen our ability to sensitize our troops to *cultural and language* capabilities – enable the human interface



Technology Priorities Specific Targets



- *Achieve persistent, focused ISR over the battlespace.*
- Find and predetonate improvised explosive devices.
- **Halve the weight of the basic fighting load of the infantryman**
- Incorporating common electrical power without the variety of short life batteries
- **Make infantrymen bulletproof and climatically controlled within ten years**
- A helmet with a pilot-like HUD containing optics, protection, data display & comms
- A day/night scope for infantry weapons
- Simulators that approximate the real conditions for squads are needed
- Combat identification of friendly forces and easily position location information read/transmitted in real time and displayed.
- EMP shielding and chem-bio protection
- Adaptive camouflage that conforms to the environment and light conditions.



Wasp Micro UAS



- DARPA funded Micro Air Vehicle
- Platoon Leader's "Binoculars forward"
- 4-5 Km -- 1 Hour Duration
- 35 WASP Systems over 18 months (137 Air Vehicles)
- Validation of requirement anticipated Summer 06
- Controlled insertion of technology into forward deployed units





Improved Personnel Armor



Problem remains
the accumulative
weight



Lighten the Load



- Basic Combat Load:
 - Armor
 - Ammo, food, water
 - Environmental protection
 - *Power source!*
- Every infantryman a seat?
- Exoskeleton?
- Squad equipment carrier (UGV)?





Big Dog Robotic Quadruped



- DARPA funded Robot
- Squad Leader's "Pack Mule"
- 4 MPH (10 MPH goal)
- 2 Prototypes over 18 months
- Incorporated into DO experiments
- USMC partnering with **DARPA** to set expectation of capabilities
- **Demo of mobility on Quantico's hill trail in summer 07**



Exploring concept of a Big Dog 81mm Mortar Carrier



Industry Participation



- What can industry do?
 - Respond to our requests – RFIs / BAAs
 - Respond to our needs (capability gaps) – both known and unknown
- Don't wait for us!
 - Bring your ideas to us!
 - Familiarize yourself with current and future concepts
 - We are open to your ideas, planned products, briefs, presentations.



Distributed Operations

Vehicle Armor Weight

Body Armor

QUESTIONS?

Counter IED

Persistent Surveillance

Non-lethal

Ground Simulation

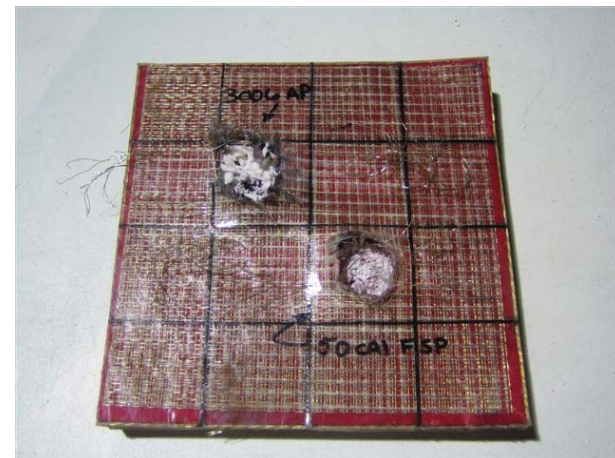
Reduce the number of radios / weight



Vehicle Composite Armor



- Greater Protection
- Lighter
- Affordable
- Adaptable





X-Files--After Action Reports



Marine Corps Warfighting Laboratory

Millennium Dragon 02 (MD 02)



Experiment After Action Report

To improve Naval expeditionary warfighting capabilities across the spectrum of conflict for current and future operating forces.

30 July – 12 August 2002

Marine Corps Warfighting Laboratory

*Project Metropolis Tactical Warrior
Experiment: Phase Two
Guam, USA*



To improve Naval expeditionary warfighting capabilities across the spectrum of conflict for current and future operating forces.

Squad Advanced Marksman (SAM) Experiment After Action Report

January 2003



XM326 120MM Mortar System



- Tested with C-RAM system at Yuma
- Just completed 192 rounds fired
- Achieved 58 second (end-to-end missions)
- Less than 15m CEP

- Follow-on to current effort
- Networked Radars
- Mobile platform
- LAV(M) w/XM 326
- AFATDS compatible
- Just completed 192 rounds
- Achieved 58 second (end-to-end missions)
- Less than 15m CEP



Counter Rocket and Mortar



Mobile C-RAM