
Command and Control (C2) Operations Research

for

Command and Control Mobility Nodes Beyond the
Tactical Edge - Unmanned Force Protection

23rd ICCRTS Program Track 5:
Highly Connected, Automated and Autonomous Forces

Concept of Operation for Unmanned Force Protection

Amphibious Landing, Hasty Breaching and Real-Time Situational Awareness.

Problem:

Delay and Stop for Missions with Dismounted Warfighters due to IED/Mines.
and

Lack of Real Time Command and Control (C2) communications Capabilities for Operations Beyond Line of Sight (BLOS) connecting CCMDs.
and

Limited Freedom-to-Maneuver on Land & in Beach Zone and long standoff distance for Force Application Detect-to-Engage and target recognition reconnaissance missions.

Solution:

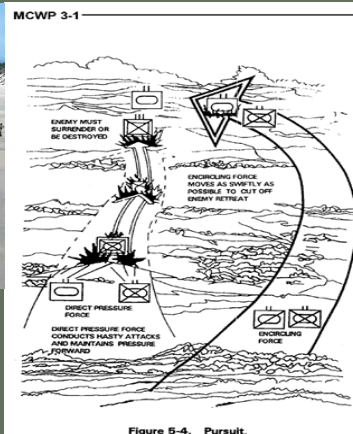
Affordable UGV/USV platforms able to maintain Operational Tempo with Breaching and Amphibious Capabilities & Real-Time Situational Awareness BLOS for Mission Success.

Benefit:

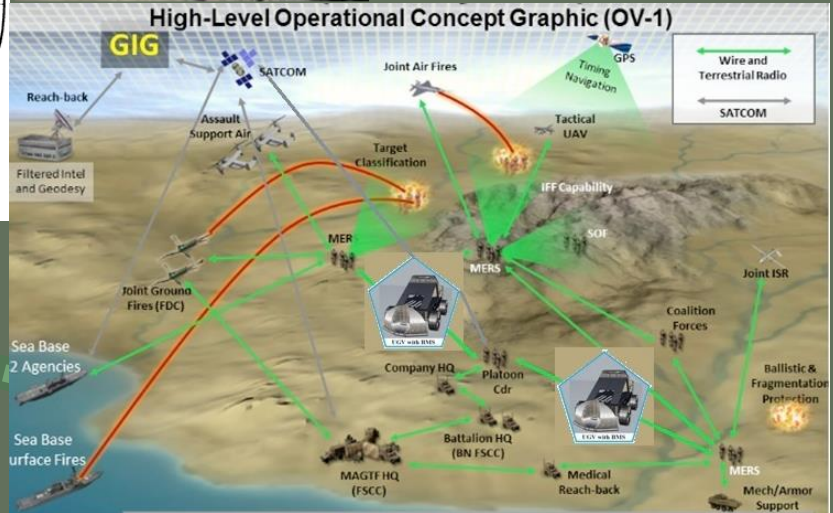
Freedom-to-Maneuver with hasty breaching system with Situational Awareness and Real-time Target recognition for C2 to complete detect-to-engage with UGV<900lbs.

Capability Development for an Unmet Requirement

Command and Control delivered from VSW to Target using Autonomous and Semi-Autonomous Platforms
Combined Arms robotic platform forms a Mobility and C2 Solution for Joint Service Operations

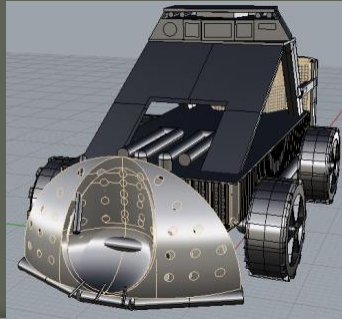


With or without LC



See www.forceprotectionrobot.com and www.unmannedforceprotection.com

Amphibious, Autonomous UGV and USV System



Proposed C2 Capability –

Joint Capability- Simultaneous Mobile Situational Awareness, Net-Centric Connectivity in Breaching Missions

Asymmetric Force Application for Dismounted Survivability:

•Use of non-traditional technologies, tactics, and weapons to provide a clear military advantage to our forces for Mobility during maneuver and engagement operations, see FM 3-90.4 & MCWP 3-17.8

Autonomous Systems:

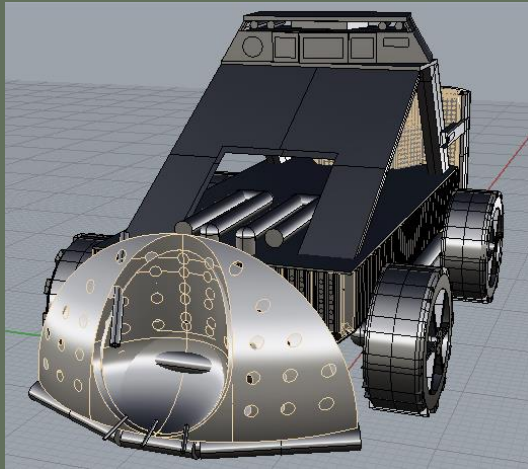
•C2 Capability that enables a particular action of a system to be automatic, semi-autonomous or within programmed boundaries, or 'self-governing' without Stop and Delay during maneuvers from VSW and inland for DTE Missions where Blue Supports Green with new Billeted Assets.

•Important for mobile unmanned systems that must maneuver in an A2/AD environment with Standoff for Survivability from IED/Mine threats with little or no human assistance or systems that aid in human cognitive tasks with real time C2.

UGV/USV with SADL & Breaching Mission Modules

Proposed Capability Solution QUAD for PMs and Directors of:

JHU/APL, IHEODTD and DARPA : 2013 – 2018



Unmanned Force Protection for Survivability Capability

The Specific Benefits [Justification]:

TTO Focus Area: Unmanned Ground Systems for MAGTF & Joint Service Force Application with order of magnitude Protection Capability.

Tactical Advantages to COCOMs and Dismounted Warfighters are for engagements from VSW for Maritime swarming to urban maneuvers.

- Solution reduces reliance on overleveraged blue capabilities & reduces adversary's A2/D2 IED/mine advantage w/ affordable multi-platforms.

- Lowers need of UAV Sorties to provide Recon Intel putting Real-Time SA at Tactical Edge BLOS at Seams for MUM-T, RAS, for USAF & COCOMs

- Application provides innovative cost calculus advantage w/ GOTS.

TTO Focus Area: Autonomous Systems: Capability Solution enables freedom-to-Maneuver with cross domain System with hasty breach Capability & Real-time Target recognition completing detect-to-engage.

Specific outcomes for MEFs and Joint Service Dismounted

- Benefits for COCOMs: Robust system to deliver C2, SA, FP and Mobility for dynamic re-tasking, M2 enabling FA Capabilities for Maneuvers & LZs

- Benefits for the Dismounted Warfighter–Force Protection=Survivability

- No UGV/USV combination delivers this Land/VSW Mobility Capability.

Key Participants

- Sponsors: NAVSEA, OPNAV, NATO
- Gov't Contributors: TARDEC
- Industry: Mark Diaz, Boston, MA
- Limited Partnership potential for Turret with Human Interface.

Key Deliverables

- Task 1: Develop Mission Module test units
- Task 2: Test Integrated AEODRS or MUMS-T Platform
- Task 3: Validate Autonomous UGV/USV w/ Mission Modules
- One unit for deployment evaluation military utility assessment
- CONOP developed between EOD & MAGTF MEB COCOMs
- Pre-certification acquisition item – UGV/USV Platforms.

<u>Funding (\$M)</u>	<u>FY18</u>	<u>FY19</u>	<u>Total</u>
DARPA	0.300	0.500	0.800
Sponsor/Service	0.300	0.400	0.700

Milestones Leading to Fielded Capability *Days After Contract Award

Contract for Test article	60 DAC *
Combined DT/OT	450 DAC *
Procurement Decision	90 DAC *
Deployment	720 DAC *

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Operational Utility of Proposed Joint C2 Capability

- **From Expeditionary 21 Capstone Concept** - The Capability Development Focus Areas for Combined Integration of Combat Power by this UGV/USV Platform are:
- Maneuver - The ability to overcome ground obstacles (explosive and non-explosive) **from the seaward approach** when they cannot be by-passed during an assault.
*Note: UGV/USV Category is for Weight less than 900 lbs but is scalable.
- Command and Control / NET Centric – Improving the ability to share situational awareness and mitigate current, significant gaps in up-to-date intelligence products sourced from commercial, coalition, interagency, and DOD systems and processes.
- Force Protection - Detecting and neutralizing explosive hazards, including mines, improvised explosive devices, unexploded ordnance, and explosive remnants of war.

Note: BDA and FA JCAs may be included for further significant Joint Capabilities.

- Joint Concept- Command and Control NET-Centric interoperability for missions.

First step is to follow existing Doctrine for SHIP-TO-SHORE MOVEMENT following NTTP 3-02.1M/MCWP 3-31.5 showing C2 Material Solution to fill STOM operational needs CG w/MoE=Achieve Situational Awareness for decision making (MCCL 5.2 & MCT 1.6.1.1, 7.1) also see JP 3-15.

The second step is for the Integrated Capability Gap Assessment to produce further Amphibious and Land Maneuver Doctrine to validate and operationalize affordable Unmanned Force Protection Capability for Joint Service C2 Use for Dismounted Mission Tempo.

Third step develops technology for Cross Domain Interoperability and Requirements for Area Denial Challenges. This enabling capability is for Joint Service, MAGTF and collaborative NATO missions for C2 SA to impact M2 and FP using VSW/Land/Airspace deployment or insertion.

The fourth step is to create new User C2 Capability for maneuvers phased ashore for tactical mobility with real time situation awareness for Tempo of LF for inland combat operations using Joint Service FLAGORDs and OPORDs.

Operational Need – Operational Gap – Operational Impact

Concept of Employment (COE), Breaching & Amphibious/BZ Utility:

- From the UJTL, the following JCAs shall be put to task;
from BEA Tier II PROBLEM-SOLUTION for each JCA
(C2 Capability Requirement)
- Integrated UGV/USV Systems deliver (M2, FP & C4) tactical advantages with insertion and when deployed with SADL Solutions with Human Interface.
- *The combined features allow for M2, FP, C2 SA, BA, FA and for on-the-ground target recognition/verification and enabling NEMW On-the-Move Networking.*
- A Robust Autonomous System and Material Solution for C2 Capabilities.

Capability Spiral – Breach  Stealth Recon/FA  FA/Engage

Outcome - Rapidly transition new capability to the warfighter.

Joint Capability for Robust Delivery of Simultaneous Mobile Situational Awareness and Net-Centric Connectivity.

The following Product Integration Plan describes benefits for Platform hardware configurations with Human Interface with DISA for C2 SA.

Note: This NOTM follows the Requirement MAGTF C2 Initial Capabilities Document (ICD).

- Having DISA involved shall bring the physical C4 hardware requirements necessary to ensure optimized Delivery of Battlespace Awareness for Force Application for CCMDs Command and Control of Operations, Missions & Tasks.
- In order to realize the benefits of Network Centric Warfare (NCW) the Situational awareness **must** be able to be physically present & traverse at the Tactical Edge for Freedom-to-Maneuver and Beyond Line of Sight. A counter A2/AD Strategy.
- This Capability relates to C2, SADL and especially the resulting dynamic retasking capability for COCOMS. The proposed G-rated chassis shall have FoS Data Links in order to optimize Net-Centric Service for DISA's Global Information Grid (GIG).

Capability Spiral – Auto-Move & Detect w/AI & C2 SA

