Ground & Sea Platforms
Community of Interest

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Ground & Sea Platforms COI Portfolio Overview

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- Dr. Airan Perez (Navy)

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# Ground & Sea Platforms COI

## Technical Challenges

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### Scope and Technical Challenges

- **Survivability**
  - Improved Blast Protection
  - Directed Energy Threat Mitigation
  - Enhanced Ballistic Protection
  - Hit and Kill Avoidance
  - Detection Avoidance (Signature Management)
  - Enhanced Cyber Defense

- **Mobility**
  - Capabilities that provide an agile, mobile, and survivable platform and force to extend the operational reach across all potential battlefield environments. The force must maintain a high operational tempo while maneuvering in space and time and minimizing the logistics burden. In addition, Lightweighting will be considered to reduce weight.

- **Unmanned Platforms**
  - Reduced Weight
  - Improved Design for Higher Speed
  - Enhanced Propulsion
  - Enhanced Energy Efficiency
  - Enhanced Platform Autonomy
  - Optimized Platforms for Unmanned Operations
  - Enable Configurable Autonomous & Unmanned Payloads
  - Enhanced Assured Trust in Unmanned Systems

- **Maintainability / Sustainability**
  - Condition Based Maintenance
  - Advanced Manufacturing for Rapid Component Replacement
  - Advanced Corrosion & Wear Resistant Systems

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### Examples

- **Autonomous Logistics & Convoy Operations**
  - Autonomous Navigation in GPS-denied, degraded visual, and complex terrain
  - Enhancing trust in Unmanned Systems

- **Enhanced Unmanned Surface Operations**
  - Unsupervised<br>Unmanned<br>Surface<br>Operations

- **Improved Chemical Agent and Corrosion Resistant Coating Techniques**
  - Condition-Based Maintenance

- **Additive Manufacturing for Replacement Parts**
  - Improved

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COI Portfolio Overview – Overall G&SP COI Investment Profile

COI Sub-Areas ($M)

- $214
- $102
- $105
- $36

Total = $457M

Component Investment

- Army 49%
- Dept. Of Navy 34%
- OSD Organizations 12%
- DARPA 4%
- USSOCOM 1%

Budget Activity

- BA 3 58%
- BA 2 42%

Source: OSD OUSD AT&L
2017: Changes and Major Accomplishments

- **Dissolution of the Modularity Taxonomy Area**
  - Difficulty establishing its S&T identity; modularity pervasive across taxonomy areas
  - Membership and funding was redistributed among the other taxonomy areas/OSD

- **Electronic Stability Control/Antilock Braking Systems transition to PEO CS/CSS (USMC/Army)**

- **Wingman JCTD (Army/USMC)**
  - Developed an effective weaponized robotic system by integrating robotic controls, target acquisition, and remote weapon system onto a HWWMV
  - Wingman JCTD had 2 live fire test events (May @ Camp Grayling and Aug @ Ft. Benning)

- **Collaborated on Armored Reconnaissance Vehicle concept development (Army/USMC)**
  - Army organized a Marine Innovation Workshop with the College of Creative Studies for Concepting and Ideation
Accomplishments:
- Navy, USMC, and Army and other Industry/Government organizations participated in the 49th Combined Light Armor Survivability Panel (CLASP).
- Navy and Army – Soldier-Ground Vehicle System Using Quadrotors (SQUAD) developed and demonstrated area searching algorithms, stowage enclosure, and optical detection of enemy UAS.

Reliance Services:
- USMC engaged and collaborating with Army on Active Protection System development (Expedited APS & MAPS)

Gaps/Risk:
- Directed Energy Weapon defeat
- Recovery of Group 1 UAS on a moving vehicle
- Signature Management and Control
Accomplishments:

• Army, Air Force, and Navy initiated and established common requirements for the ASD sponsored Ultra High Density Hybrid Energy Storage Module for Laser Weapon System and Electronic Warfare Operations (HD HESM) program

• Army and Navy supporting USMC effort to develop simulation environment for amphibious and landing craft operating in the surf zone

Reliance Services:

• Army is currently investing in high-efficiency powertrain technologies that the USMC is following and interested in leveraging

Gaps/Risk:

• Mobility in Extreme Operational Environment, in particular Arctic operations

• Army, Navy and USMC recognize range is a limiter to operational performance

• Terrain traversability and station-keeping technologies to allow operations in no-go terrain or sea states
Accomplishments:
- Multiple Army/PEO CS&CSS programs (MTRS Inc II, CRS-I) using Navy Multi-Robot Operator Control Unit (MOCU) software
- Army/Navy/Air Force ROS-G info exchange meeting with ~15 Government agencies (DoD, DoE, DoT, NASA, NIST, DARPA).
- Leveraging NASA-developed multi-agent control algorithms and mission planning

Reliance Services
- ROS-M / ROS-G enables shared software repositories & software re-use

Gaps/Risk
- Open architectures and “autonomy as an app” are critical enablers for employment of unmanned systems
- Working towards a common ground vehicle architecture as much as possible
Accomplishments:
• Navy, USMC, and Army held joint workshops for three technology focus areas
  o Advanced Manufacturing – Naval Special Warfare Carderock
  o Advanced Corrosion and Wear Resistant Systems – Logistics Management Institute HQ
  o Condition Based Maintenance - TARDEC

• USMC established a new joint program for Army/Navy/USMC platforms performing data analysis and research prognostic model frameworks

Reliance Services
• Navy/USMC leveraging Army efforts in corrosion resistance, cure times, and modeling
• Army/Navy leveraging USMC IR spectroscopy for advanced oil and fuel analysis and CBM
• Navy relying on Army/USMC for material properties and adhesion for Cold Spray repair

Gaps/Risk
• Logistics and Operational data integrity and availability
• Qualification and Validation process for additive manufacturing capabilities
Opportunities for Industry to Participate

NDIA Ground Vehicle Systems Engineering & Technology Symposium
7 – 9 August 2018
Novi, MI

TARDEC Industry Days
24-25 April 18
Warren, MI

Naval Future Force S&T Expo
2019
Washington D.C.

Michigan Defense Exposition (MDEX)
25-26 April 18
Warren, MI

Long Range Broad Agency Announcement for Navy/Marine Corps S&T
Arlington, VA

Army S&T Symposium
23 August 18
Washington D.C.

Modern Day Marine
25 – 27 September 2018
Quantico, VA