



Ground & Sea Platforms Community of Interest

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Ground & Sea Platforms COI Portfolio Overview



Steering Group Leads

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- Dr. Thomas Fu (Navy)

Deputies

- Mr. Gary Schultz (Army)
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Survivability

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- Mr. Troy Hendricks (USMC)

Unmanned Platform Integration

- Dr. Bob Brizzolara (Navy)
- Mr. Matt Deminico (Army)
- Dr. Michael Qin (USMC)

Mobility

- Mr. Dale Martin (Army)
- Mr. Don Hoffman (Navy)
- Mr. Jeff Bradel (USMC)

Maintainability/Sustainability

- Mr. Billy Short (USMC)
- Mr. Adam Brennan (Army)
- Dr. Airan Perez (Navy)

G&SP COI Taxonomy	
Taxonomy Areas	Technology Sub-Areas
Survivability	Ballistic Protection
	Hit & Kill Avoidance
	Blast Protection
	Signature Management / Directed Energy
	Lightweight Platform Structures/Materials
Unmanned Platforms	Autonomy
	Platform Enablers
	Capability Enablers
	Usage Enablers
Mobility	Fuel Economy
	Terrain Maneuverability
	Powertrain
	Seaworthiness/Stability
	M&S Capabilities
Maintainability / Sustainability	Plan and Direct Logistics Operations
	Efficient & Responsive Force Sustainment
	Logistics Demand Reduction
	Fleet Maintenance



Ground & Sea Platforms COI Technical Challenges



Scope and Technical Challenges

1.0 SURVIVABILITY

Capabilities that allow a platform and its crew to remain functional and mission capable in a hostile threat environment. This includes denying the adversary the ability to target and successfully engage a platform (susceptibility), withstanding the weapon effects of a successful attack (vulnerability), and restoring functionality after sustaining damage (recoverability).

- 1.1 Improved Blast Protection
- 1.2 Directed Energy Threat Mitigation
- 1.3 Enhanced Ballistic Protection
- 1.4 Hit and Kill Avoidance
- 1.5 Detection Avoidance (Signature Management)
- 1.6 Enhanced Cyber Defense



Cyber Defense of Vehicle Networks



Adaptive Armor



Directed Energy Defeat



Active Protection Systems

Hard-Kill APS

Soft-Kill EW

Hard & Soft Kill Options for Counter-Unmanned Aerial Systems (UAS)

2.0 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.

- 2.1 Reduced Weight
- 2.2 Improved Design for Higher Speed
- 2.3 Enhanced Propulsion
- 2.4 Enhanced Energy Efficiency



High Water Speed for Amphibious Combat Vehicles



Fuel Efficiency and Power Enhancements



Higher Power Density and Onboard Power Sources

3.0 UNMANNED PLATFORMS

Capabilities that effect operational and tactical mobility and maneuver through the use of unmanned systems. Includes unmanned ground vehicles, robots, sea vehicles, UxV swarms, etc. that work collaboratively with the Warfighter. These act as force multipliers, able to collaborate and share information while reducing operator workload by relieving the individual Warfighter of physical and cognitive burdens.

- 3.1 Enhanced Platform Autonomy
- 3.2 Optimized Platforms by/for Unmanned Operations
- 3.3 Enable Configurable Autonomous & Unmanned Payloads
- 3.4 Enhanced Assured Trust in Unmanned Systems



Autonomous Logistics & Convoy Operations



Unsupervised Unmanned Surface Operations




Autonomous Navigation in GPS denied, degraded visual, and complex terrain

Enhancing trust in Unmanned Systems

4.0 MAINTAINABILITY / SUSTAINABILITY

Capabilities that reduce the total ownership costs to maintain ground and sea vehicles and equipment. This includes increasing the operational availability of platforms while decreasing the maintenance cost and man-hours required to maintain and repair these platforms.

- 4.1 Condition Based Maintenance
- 4.2 Advanced Manufacturing for Rapid Component Replacement
- 4.3 Advanced Corrosion & Wear Resistant Systems



Condition-Based Maintenance



Improved Chemical Agent and Corrosion Resistant Coating Techniques

Additive Manufacturing for Replacement Parts

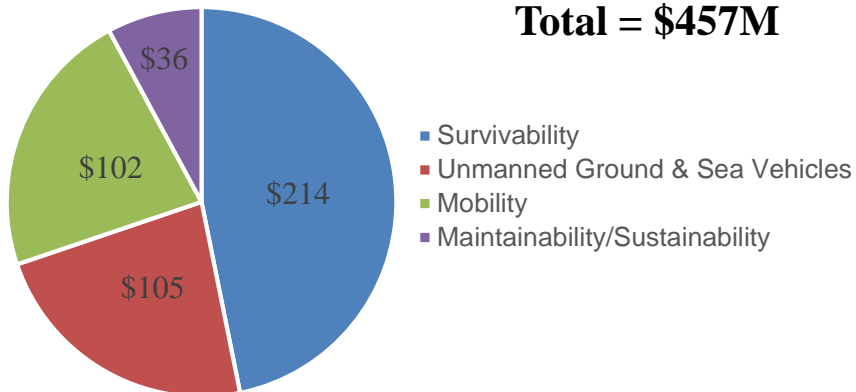


COI Portfolio Overview – Overall G&SP COI Investment Profile

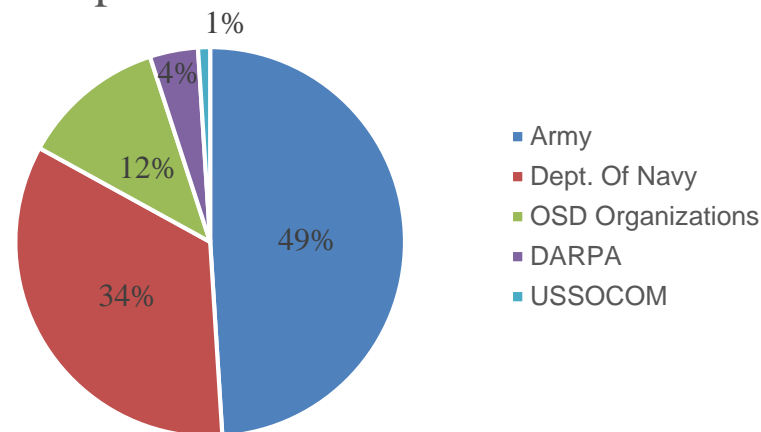


COI Sub-Areas (\$M)

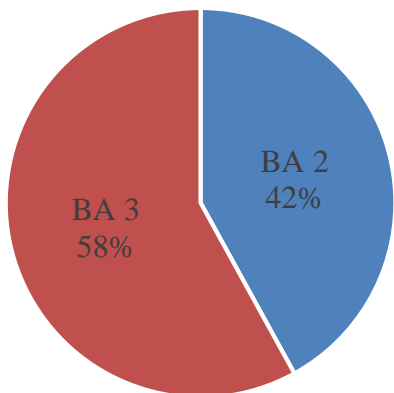
Total = \$457M



Component Investment



Budget Activity



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



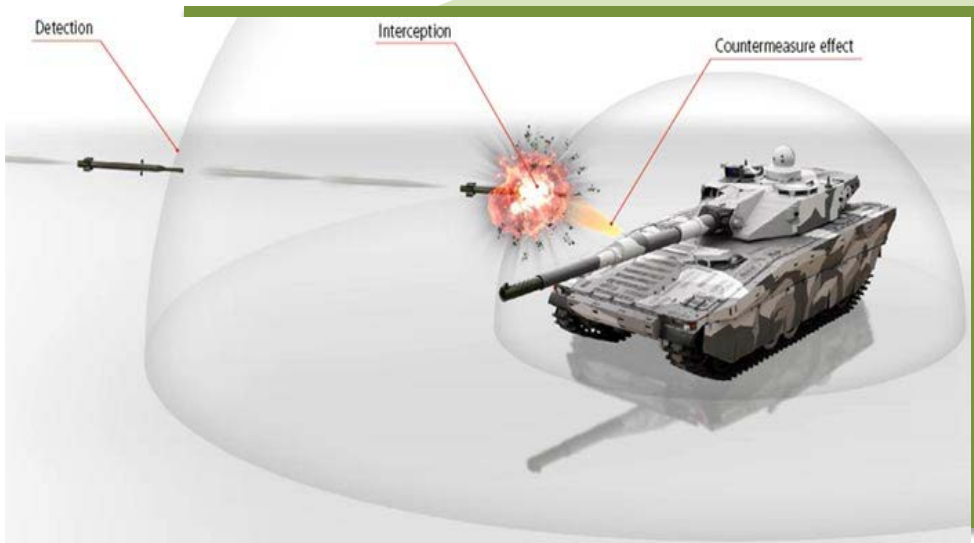
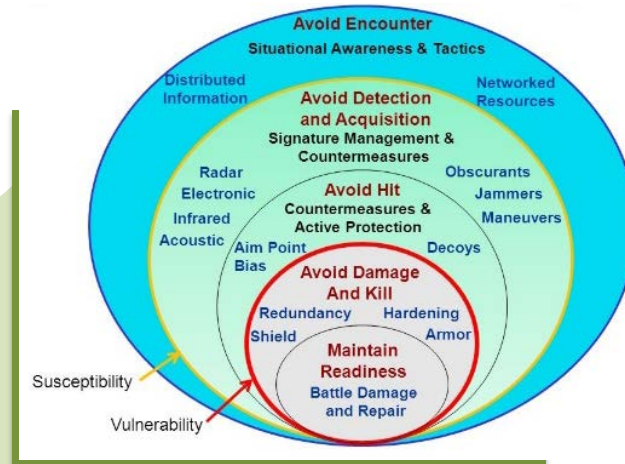
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SURVIVABILITY ACCOMPLISHMENTS & GAPS



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



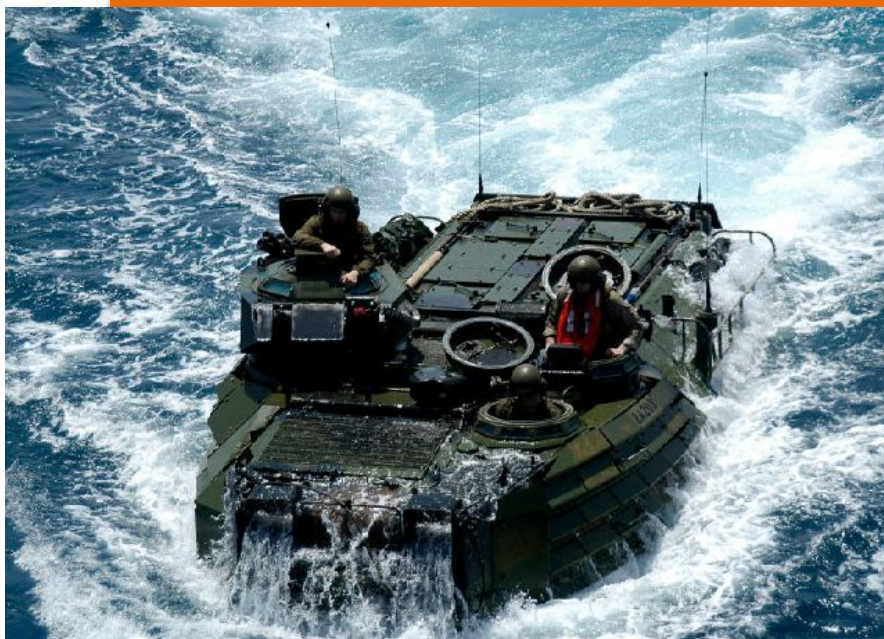
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MOBILITY ACCOMPLISHMENTS & GAPS



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



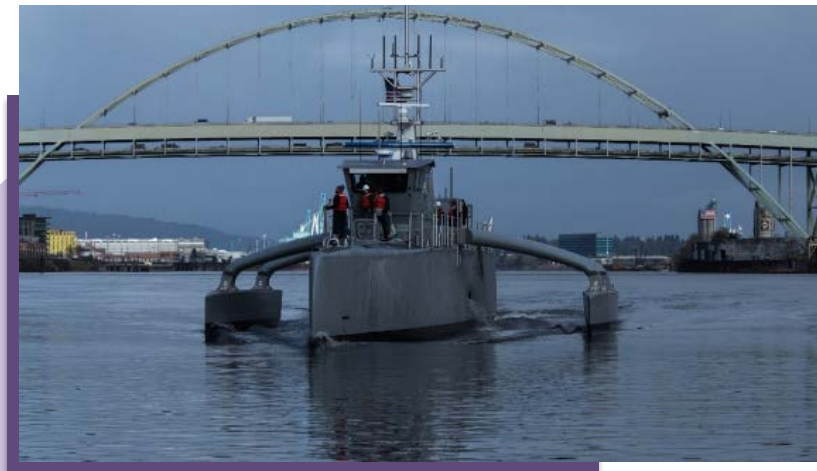
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UNMANNED PLATFORMS ACCOMPLISHMENTS & GAPS



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



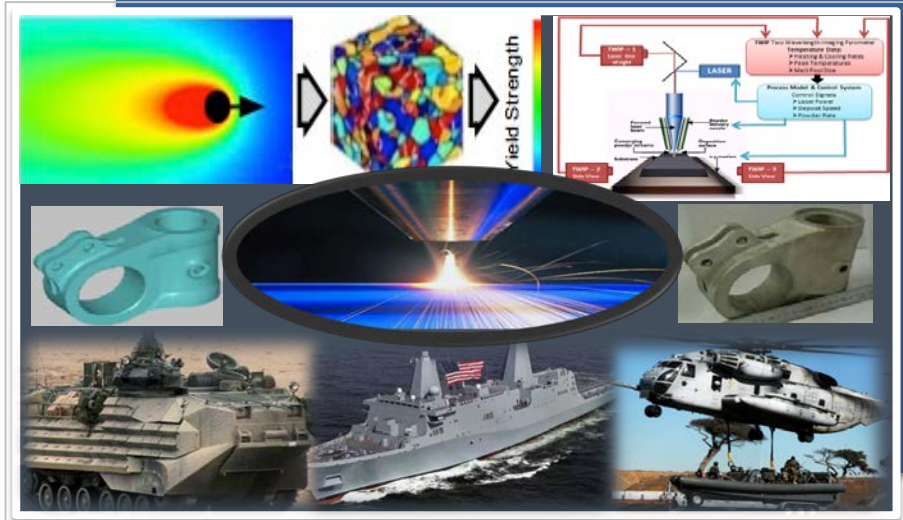
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MAINTAINABILITY/SUSTAINABILITY ACCOMPLISHMENTS & GAPS



Accomplishments:

- Navy, USMC, and Army held joint workshops for three technology focus areas
 - Advanced Manufacturing – Naval Special Warfare Carderock
 - Advanced Corrosion and Wear Resistant Systems – Logistics Management Institute HQ
 - 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



Ground Sea Platforms COI



Questions

