## Topic: N16A-T025

## SubUAS LLC

Multirotor Unmanned Air / Underwater Vehicle for Explosive Ordnance Disposal (EOD) and Mine Countermeasures (MCM)
The Naviator represents the first unmanned vehicle platform capable of operating both in air, surface and underwater and that can transition back and forth between these mediums seamlessly. SubUAS LLC, formed by the inventors of the Naviator, world experts in hybrid air/sea autonomous vehicles, is developing this technology for both commercial and military applications. The Naviator allows for rapid air/underwater deployment, and transition between underwater/air. Combined with high maneuverability and reliability of multirotor vehicles, this results in disruptive technologies that can extend operations, provide rapid response in the ocean battlespace environment and surveillance arena. Battlefield applications for this new platform include launch and recovery from air, water or ground vehicles, rapid response to investigate threats, delivering payloads, rapid deployment of explosives to eliminate mines, smart buoy sensors, ships/ports inspections, stealth missions, air/water communications system, among others.

## Technology Category Alignment:

Fixed Wing Vehicles (includes UAS)
Networks and Communications
Mobility
Unmanned Ground and Sea Vehicles

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**SYSCOM:** ONR
**Contract:** N68335-18-C-0075
Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N68335-18-C-0075

# Department of the Navy SBIR/STTR Transition Program

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Topic # N16A-T025
Multirotor Unmanned Air / Underwater Vehicle for Explosive Ordnance Disposal (EOD) and Mine Countermeasures (MCM)
SubUAS LLC

## WHO

**SYSCOM:** ONR

**Sponsoring Program:** ONR STTR for Explosive Ordnance Disposal (EOD) and Mine Countermeasures (MCM)

**Transition Target:** PMS 408

**TPOC:**
Mr. Brian Almquist
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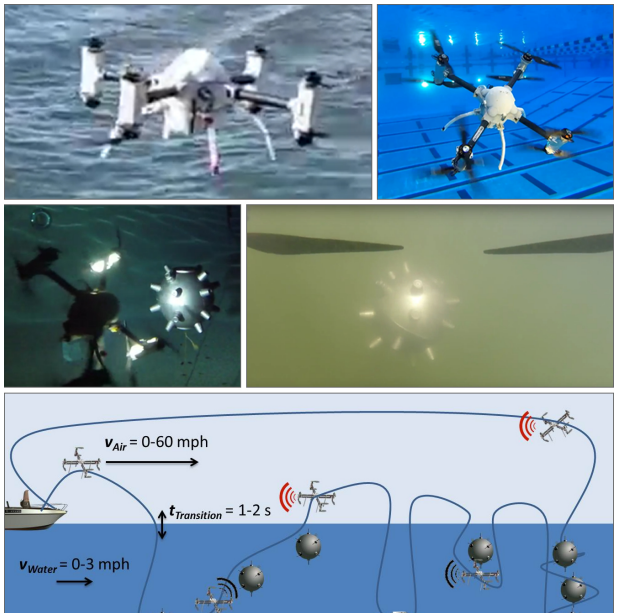
**Other transition opportunities:**
PMS-495, PMS-425, PMS-406, NAVAIR, NAVSEA,
Energy Industry
(Oil platforms/Offshore wind)
Transportation Industry
(Bridge, Ferry, and Port Inspections)

**Notes:** Idealized MCM/EOD operational scenario for a Naviator Multirotor Unmanned Aerial/ Underwater Vehicle (MUA/UV). The vehicle operates seamlessly in air/water mediums and provides rapid actionable intelligence via RF/acoustics.

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## WHAT

**Operational Need and Improvement:**
Discover and safely dispose of mines and unexploded ordinance. Improvements - Air/water/surface operational capabilities, 10x lower cost over ROVs, 10x increased speed to target, increased imaging bandwidth using RF link.

**Specifications Required:**
- transit in air to a predetermined location on the surface of the water
- enter the water, transit underwater to collect video imagery of the object
- exit the water, and transit in air to another predetermined location on the surface
- after inspection of the last underwater object transit in air back to the point of initial launch
- ability to operate at depths ranging from five (5) feet to forty (40) feet
- imagery of the object should be provided to the operator in near real-time or real-time
- tether and tether-free communication with the operator

**Technology Developed:**
SubUAS, LLC has developed a Multirotor Unmanned Air / Underwater Vehicle (MUA/UV) that can fly in air and swim underwater to inspect an underwater object. It is able to transition between air and water environments seamlessly.

**Warfighter Value:**
- Faster actionable intelligence
- Ability to safely inspect and interact with dangerous objects in remote underwater locations
- Reduction of time and number of vehicles needed through rapid deployment in air to reach water locations and transition to perform missions on the surface or underwater
- Ability to conduct combined air/water missions with reliable transition in high sea states
- Increase in mission versatility with a multi-medium vehicle capable of multiple transitions during a single operation

## WHEN

**Contract Number:** N68335-18-C-0075 **Ending on:** October 29, 2019

| Milestone | Risk Level | Measure of Success | Ending TRL | Date |
|---|---|---|---|---|
| Demonstrate Air/Water Transition | N/A | Demonstrated repeatable 1 to 2 second air/water transitions | 7 | 1st QTR FY16 |
| Demonstration of Mine Countermeasures | N/A | Demonstrated underwater mine imaging in staged, ocean operational environment | 7 | 2nd QTR FY17 |
| Demonstration of EOD/MCM Capability for Multiple Mines | Low | Demonstration of underwater mine imaging in staged operational environment for 10 targets | 7 | 2nd QTR FY19 |
| Increased Vehicle Autonomy | Low | Demonstration of the vehicle conducting autonomous mission for 10 targets | 6 | 4th QTR FY19 |
| Delivery of Functional Prototype | Low | Delivery of the vehicle prototype that is capable of lifting a 30 lb payload | 6 | 1st QTR FY20 |
| Minimum Viable Product, First Commercial Sale | Low | Successful delivery of 10+ Naviator vehicles | 8 | 1st QTR FY20 |

## HOW

**Projected Business Model:**
Started in 2016, SubUAS LLC is pursuing a bifurcated business model targeting military and commercial opportunities. R&D prototypes are developed and iteratively improved under military funding, reducing our non-recurring engineering costs (NRE) to compete in the much larger consumer drone market. SubUAS LLC has met or exceeded 10x growth targets for FY 2016, 2017, and 2018. SubUAS LLC develops, produces and sells hybrid air/water multirotor vehicles capable of conducting inspection, reconnaissance and payload delivery missions faster, with less costs.

**Company Objectives:**
SubUAS LLC has consolidated the capabilities of UV's into the first Unmanned Aerial and Underwater Vehicle: the Naviator. The Naviator represents the first unmanned vehicle platform capable of operating both in air, surface and underwater and that can transition back and forth between these mediums seamlessly. Formed by the inventors of the Naviator, world experts in air/sea autonomous vehicles, SubUAS LLC is developing this technology for both commercial and military applications, taking this technology toward further innovation and addressing the needs of our customers in a practical and efficient manner.

**Potential Commercial Applications:**
Applications for this new platform include launch and recovery from air, water or ground vehicles, rapid response to investigate targets both in air and water, payload delivery in air or water, rapid underwater deployment, smart buoy sensors, ships/ports inspections, pipeline leaks inspections, air/water communications system, splash zone inspections.

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