

Topic: N13A-T029

## Midé Technology Corporation

### Light-Weight Atmospheric Diving Suit

Midé, an expert on smart materials and their applications, has teamed with MIT to create a next generation light-weight atmospheric diving suit (ADS). Current ADS are essentially one man submarines, bulky and heavy on the ship with limited functionality at depth. The priority of this effort is to create new joints, allowing more natural human movement than current suits; maximizing maneuverability and minimizing user exertion. The team is evaluating novel materials and composites, and analyzing Lines of Non Extension (LoNE) on the human body to help optimize the placement of and functionality of the LW-ADS joints. LW-ADS will enable ADS usage in broad Navy diving mission types by providing fast insertion (from smaller ADS launch craft), no risk of decompression sickness, and improved ADS capability.

### Technology Category Alignment:

None

None

None

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**SYSCOM:** ONR

**Contract:** N00014-14-C-0291

 Corporate Brochure: [https://navystp.com/vtm/open\\_file?type=brochure&id=N00014-14-C-0291](https://navystp.com/vtm/open_file?type=brochure&id=N00014-14-C-0291)

## WHO

**SYSCOM:** ONR

**Sponsoring Program:** ONR  
Undersea Medicine

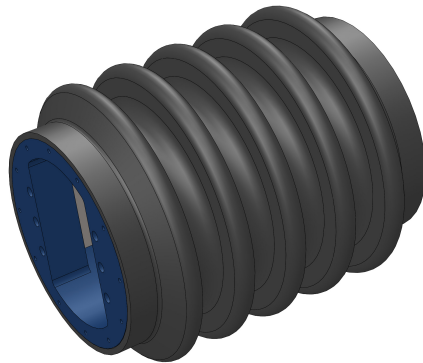
**Transition Target:** Undersea Rescue Command (URC), Submarine Rescue Diving and Recompression System (SRDRS); Explosive Ordnance and Disposal (EOD); Mobile Diving and Salvage Units (MDSUs); Naval Construction Forces (NCF), Construction Battalion (CB - "Seabees"); Naval Experimental Diving Unit (NEDU); Naval Surface Warfare (NSW); National Aeronautics and Space Administration (NASA)

**TPOC:**

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**Other transition opportunities:**  
Experimental research, oil & gas, salvage, undersea construction, research diving

**Notes:** LW-ADS Phase II Full Scale Elbow Joint CAD Model



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## WHAT

**Operational Need and Improvement:** Today's Atmospheric Diving Suits are heavy, cumbersome, rigid enclosures designed primarily to keep a diver alive at the high pressures of depth, with flexibility and maneuverability sacrificed due to the difficulty of its primary goal. The Navy is seeking a new light-weight ADS (Atmospheric Diving Suit) design to change that paradigm.

**Specifications Required:** Midé's LW-ADS (Light Weight Atmospheric Diving Suit) concept is intended for a working depth of 1000 FSW (Feet Sea Water) with FOS (Factor of Safety) 2-4, a land weight of less than 400 lbm, neutral buoyancy, walkable, and swimmable at depth. In Phase II base Midé's goal is to build and test an elbow joint prototype capable of withstanding 1000 FSW hydrostatic forces while maintaining ease of movement.

**Technology Developed:** Midé's effort is focused on creating the next generation of atmospheric diving suit, by both increasing maneuverability and reducing weight. The priority of design is a new joint for elbows and knees, which allows more natural human movement. MIT and Midé are working together to solve this problem; and believe the solution lies in creating a rigid substructure designed specifically to allow flexibility yet maintaining structural integrity under high hydrostatic loading. MIT brings complex understanding of human body LoNE (Lines of Non-Extension) to the table, which aids in understanding how to place reinforcement fibers within the membrane and endoskeleton. Current suits rely on fully rigid components linked with rotary joints, creating a very un-natural movement for the divers.

**Warfighter Value:** The next generation ADS will improve operator maneuverability and reduce fatigue, thus allowing use of the ADS in a broader range of missions. Low weight of the ADS will also enable a larger variety of launch craft; as well as faster and more flexible deployments of assets in critical need situations. In addition to these advantages the Midé ADS could offer a safer means of diver deployment than expensive and dangerous saturation diving.

## WHEN

**Contract Number:** N00014-14-C-0291 **Ending on:** January 30, 2016

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Phase II Joint Delivery (Base)	Low	Build/In-house Testing	3 for entire suit, 4 for joint alone	November 2015
Phase II Joint Testing (Base)	Med	Pass Hydrostatic Testing (1000 FSW)	4 for entire suit, 5 for joint alone	January 2016
Phase II Option I (System Design)	Low	CDR	NA	December 2016
Phase II Option II Component Delivery and Test	High	Pass Hydrostatic Testing (Unmanned)	4 for entire suit, 6 for joint alone	January 2018

## HOW

**Projected Business Model:** Midé intends to firstly consider a prime contractor role in production of joints, and possibly full suits. Secondary, would be to work with an existing prime, or development partner to integrate designs into existing/future suits. In this second case Midé will likely operate as a subcontractor and/or licensor.

**Company Objectives:** Midé intends to become the US leader in hardsuit design and production.

**Potential Commercial Applications:** Oil and gas, undersea construction and salvage could present opportunities, working with operators such as Phoenix International. There is also a market within the scientific diving community.

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