

Topic: AF083-097

## AVID LLC

### Aerodynamic Control of Micro Air Weapons

Piezoelectric morphing actuator replaces servos in existing UAS platforms. AVID provides a control system kit, which includes; the control and electronic driver boards necessary for vehicle control with the piezoelectric actuator. This technology keeps the vehicle in the fight longer, without needing to replace servos after landing. Resulting in increased reliability over servos, decreasing the life-cycle cost of the system, while providing the equal performance. AVID has successfully demonstrated equivalent performance in flight with increased reliability over servos during an Air Force Phase 2 SBIR. While Prioria's Maveric has no servo actuation on its wing due to the tube-launched nature of its mission, AVID is increasing its operational envelope by introducing this unique solution by adding control surfaces to the UAS wing and tail to support more rapid maneuvering.

### Technology Category Alignment:

None

None

None

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**SYSCOM:** NAVAIR

**Contract:** N68335-15-C-0298

 Corporate Brochure: [https://navystp.com/vtm/open\\_file?type=brochure&id=N68335-15-C-0298](https://navystp.com/vtm/open_file?type=brochure&id=N68335-15-C-0298)

# Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2016-766

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Aerodynamic Control of Micro Air Weapons

AVID, LLC

## WHO

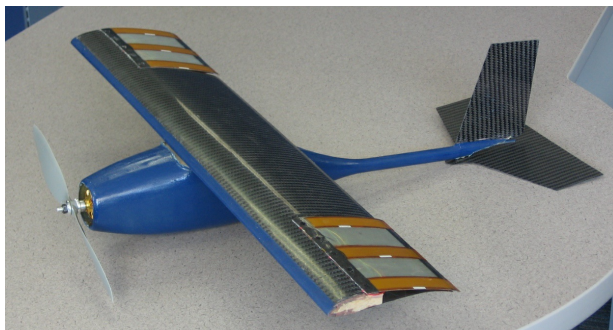
**SYSCOM:** NAVAIR

**Sponsoring Program:** PEO U&W

**Transition Target:** Marines, Army  
PEO Aviation - Unmanned Air  
Vehicles (RQ-7B Shadow),  
Department of the Interior - Aviation  
(Fixed Wing Falcon)

**TPOC:**  
(760)939-8382

**Other transition opportunities:**  
AVID is working with the TPOC to  
investigate other transition  
opportunities such as next  
generation small UAS for the Army.



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**Notes:** By adding battens to the wings and replacing tail servos; the sUAS capabilities are enhanced for greater controlled flights, increased operational range, and effectiveness.

## WHAT

**Operational Need and Improvement:** Needs include improving flight authority and small unmanned aviation asset characteristics. Enhanced maneuverability is achieved by adding flight actuation, flight control devices and removing servo motors. This allows the vehicle to perform tight right angle turns within 2-fifty foot urban canyons while intersecting at right angles.

**Specifications Required:** Key technology specifications for the AVID Control system, proven in this Phase II project, include having the same or better control authority and weight as similarly sized servos.

**Technology Developed:** AVID has developed a Morphing Control System for small UAVs. Starting as an Air Force Phase I in 2009, this technology is now being developed for Prioria's Maveric Air System, with an option for a larger vehicle. This is AVID's second Phase 2 on the morphing control system. This morphing control acts like a muscle to move the wing and tail after electricity is applied to it.

AVID's piezoelectric controller increases reliability while decreasing the life-cycle cost of UAS platforms by eliminating the need for servos, thus keeping the vehicle in the fight longer, increasing the operational envelope by placing control surfaces in places conventional servos cannot go.

**Warfighter Value:** The resulting sUAS with this technology integrated will have increased platform performance for equal cost and weight. Each vehicle's custom integration results in increased system reliability. The ultimate impact of AVID's piezoelectric morphing actuator keeps the vehicle in the fight longer, without needing to replace servos after landing. This results in increased reliability over servos, decreasing the life-cycle cost of the system while providing the equal performance.

## WHEN

**Contract Number:** N68335-15-C-0298 **Ending on:** June 30, 2017

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Small Unmanned Aircraft System First Test Flight	Low	Performs same as servo vehicle	6	September 2016
Small Unmanned Aircraft System Lab Flight Test	Low	Performs same as servo vehicle	7	June 2017
Large Unmanned Aircraft System Follow on Flight Test	Med	Proves Technology is Scalable	7	June 2017
Small Unmanned Aircraft System System Test	High	System test in the field of operations with high reliability	8	June 2018
Small Unmanned Aircraft System Operational Use	High	Used in operations with high reliability	9	December 2018

## HOW

**Projected Business Model:** AVID will develop a customized Morphing Control System for various integrators and their specific sUAS. AVID will provide each vehicle integrator a kit for a particular tail number to be integrated/sold with a Morphing Control System. Each UAS-Specific Morphing Control System Kit includes:

- AVID Control Board
- Electronic Driver Board (AMPS power Systems)
- Number of Piezoelectric specified for vehicle
- Drawings for Vehicle Integration

**Company Objectives:** AVID has already had success of Morphing Actuator boards to various universities doing research in piezoelectric controllers. As our Morphing Control System for small UAVs matures from the initial integrator, AVID will expand the kit production to other integrators interested in the technology. AVID will further develop the technology to become a leading piezoelectric controller provider which can expand to other industries.

**Potential Commercial Applications:** Organizations requiring enhanced flight control characteristics in order to achieve their objective of better tactical or situation awareness data can apply this technology to their small unmanned aircraft systems. DoD, DoT, and their Prime integrators with a need to survey large areas efficiently and effectively by air while having to control operational cost provide an additional potential application.

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