

### WHO

**SYSCOM:** NAVAIR

**Sponsoring Program:** NAVAIR

**Transition Target:** Coyote UAV

**TPOC:** (301) 342-2094

**Other Transition Opportunities:** In addition to small quadcopter drones, this technology would find widespread application for UAVs with fixed pitch propellers such as Predator, Shadow, Scan Eagle, Aerosonde, and assorted electric UAVs. If successful, this technology could increase the duration and range of the Navy Coyote-Locust UAS.

**Notes:** Rendering of potential propeller design




Image courtesy of Hydronalix, Inc.

### WHAT

**Operational Need and Improvement:** Existing blades are typically fabricated from polymers such as nylon or ABS which are lightweight, relatively strong and damage tolerant. Improvements have been made to increase the stiffness through the addition of short glass fibers along the axis of the blade. Pultrusion has also been used1 to orient glass fibers as well as the organic molecules.

**Specifications Required:** Provide a 10-12 dB average reduction in radiated noise, increase aerodynamic efficiency by 50 to 80%.

**Technology Developed:** Identified COTS propeller design and material candidates; evaluated and optimized current manufacturing techniques for ceramic and composite propeller designs

**Warfighter Value:** In addition to all small quad-copter drones this technology would find widespread application for UAVs with fixed pitch propellers such as Predator, Shadow, Scan Eagle, Aerosonde, and assorted electric UAVs. This technology could instantaneously increase the duration and range of the Navy Coyote-Locust UAS from 34 minutes to 60 minutes. If applied to small tactical fuel powered UAVs such as Scan Eagle or Shadow, improve the distance traveled on a gallon of fuel for every 100 miles to greater than 150 miles.

### WHEN

Contract Number: N68335-21-C-0728

Ending on: Sep 06, 2023

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Identify COTS propeller design and material candidates	Low	Completion of relevant documents	2	2nd QTR FY22
Evaluate and optimize current manufacturing techniques	Medium	Samples obtained & tested	3	TBD

### HOW

**Projected Business Model:** Initial transitioning and acquisition will be focused internally; Hydronalix recently won a contract award for 100 small UAS drones for NAVSEA with an option for 240 additional systems, and a final follow-on option for 1000 more. The company will also approach other UAS drone and fixed wing UAS manufacturers to promote this new propeller.

**Company Objectives:** The key capability of this technology is improved drone duration and reduced noise with no other changes other than the propeller. Current technology simply accepts lower efficiencies and higher noise generation because of the simplicity of using standard off the shelf common plastics and wood. The technology will be demonstrated through bench testing followed by actual flight testing on real platforms.

**Potential Commercial Applications:** This technology would be directly applicable to the Coyote UAV, Aerosaunde UAVs, Aeroviroment UAVs, Shadow and Boeing's Scan Eagle. The PI has long-standing relationships with key individuals in these organizations.