

# Swarm UAV Neutralization System

## Advanced Passive UAS Kill and Recovery System



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### **Passive Swarm UAS Neutralization**

HyALTA Aeronautics Inc, has developed a series of products and technologies in the area of unmanned devices. In the area of anti-UAV and anti-swarm, our HyALTA® (Hybrid Advanced Lighter Than Air) product provides a low cost and reliable passive, low collateral damage, counter-UAV capability.

The HyALTA® design (US Patent 9,623,954, additional patents pending) is a hybrid lighter-than-air (LTA) and flying wing air vehicle that delivers the VTOL capability of a quadcopter, the high transit speed of a fixed wing UAV, and the low long loiter/low energy consumption of a blimp—all in a single vehicle. HyALTA® delivers these capabilities through an elegantly simple internal structure that can reconfigure along a continuous range of positions to provide



extensive combinations of aspect ratio, chord thickness and top and bottom camber to achieve a wide range of aerodynamic and buoyant lift configurations.

Since HyALTA® can travel faster than any conventional UAV in its low drag flying wing configuration and can loiter, almost indefinitely in its lighter than air configurations, the concept is to have HyALTA® station keep until directed to dash and capture an incoming UAV in long Mylar or nylon strands dangling below (reminiscent of a Portuguese Man-of-War). Current conventional UAVs with exposed, rotating blades are vulnerable to becoming entangled. HyALTA® has no exposed spinning blades and will not become entangled in its own lines. Each HyALTA® could capture multiple UAVs. The captured UAVs are not only neutralized without risk of collateral damage but can be transported to designated areas to render safe and exploit.

This passive kill concept could be augmented with active kill techniques. Kinetic mechanisms would have much less potential negative impact on a buoyant LTA versus a vehicle dependent on aerodynamic lift. HyALTA®'s lift capability also allows the addition of sensing and communications systems to enhance intercept capabilities and potentially provide a degree of autonomy.

HyALTA Aeronautics, LLC is a small veteran owned business with concept development, program management and product development expertise. Partnerships with three major Universities (UCF, USF, CU and UVA) combines our agile development skills with the academic power and technical savvy of major University systems.

Problem Solution: HyDrone™ provides a low-cost UAV for sensor delivery with the versatility to operate in the water, land and air environments. This completely unique and patented capability allows a single autonomous vehicle to transition at speeds 4 to 5 times faster than conventional rotor craft by air but still land in a VTOL configuration. Without additional drive systems, the HyDrone™ can transition to a land vehicle to silently deploy sensors at a distance from its landing site. Alternatively, HyDrone™ can be deployed as a surface or submersible marine vehicle, transitioning to either land or air. Due to its simple design, it is rugged enough to take advantage of many deployment methods.

Differentiators:

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Other capabilities of interest inherent in the design include.

- Embedded electric motors driving a ducted fan deep within the air vehicle enable
  - Lowered acoustic and thermal signatures
  - Elimination of exposed spinning blades that endanger ground personnel
  - Deployment of entangling lines without risk to the HyALTA®
  - Operation where UAVs with exposed blades cannot (around trees, wires, etc.)
- Minimal internal structure uses materials with naturally low visual and radar signatures as well as high damage tolerance.
- As an inflated aircraft, it can land on the ground or on the surface of the water to “pause” during deployment or to recharge if equipped with solar cells.
- The flexible, light weight structure and materials can be easily disassembled and stored in small volume containers to minimize transportation and storage.