

# SWARM Delivery and Range Extension System Unmanned Vehicle Range and Communication Extension



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## UAS Range Extension and Delivery System

HyALTA Aeronautics Inc, has developed a series of products and technologies in the area of unmanned devices. In the areas of sensor deployment, surveillance, communications and reconnaissance we offer a unique capability by combining two patented technologies.

The HyALTA® design (US Patent 9,623,954 additional patents pending) is a hybrid lighter-than-air (LTA) and flying wing air vehicle that allows a single vehicle to provide the simplicity, vertical heavy lift, and extended efficient station keeping capabilities of an LTA with the high glide ratio (>40:1) and velocity (up to 200 kts.) of low coefficient of drag flying wings. HyALTA® delivers these capabilities through an elegantly simple minimalist internal structure that morphs 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.

HyALTA Aeronautics also produces the HyDrone™ UAV design as a hybrid Unmanned Vehicle that allows a single vehicle to operate in all mediums; air, water and land, using a single set of drive motors. Additionally, in the water and air modes, the UAV's drive system can be oriented to provide either VTOL or axial thrust. This transformational design is enabled by



the Hybrid Advanced Mobility Propulsion System (HyAMPS™) (US Patent 10,180,083, additional patents pending). Using a set of actuators, the HyAMPS™ can act as a ducted fan propeller in air or water or engage the ducted shroud to serve as a wheel on any surface. Actuation of the motion arms and steering system allows forward (or backward) thrust, vertical thrust and steering in any medium.

By combining the two technologies, the user has the ability to use HyALTA® to carry one or more HyDrone® to a location, using its high speed and long flight duration capabilities. Arriving at the deployment site, HyALTA® deploys one or more HyDrones into air, land or water environments. HyDrone® can complete the UAV mission for which it is configured while HyALTA® loiters for later recovery of HyDrone®s or rises to an elevation where it can loiter as a over-the-horizon or satellite communication relay or data collector. HyALTA® could act as an operation coordinator for multiple HyDrones at lower altitudes, in the water or on the ground.

**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:**

Although the concept of carrier systems to extend range are not new, the combination of a multi-mode UAV with a high speed, long duration carrier is transformational to the UAS space. HyALTA®'s lift capability also allows the addition of sensing and communications systems to provide launch/recovery and Over The Horizon communication relay capabilities and provide a high degree of autonomy.

- This concept provides the ability for the long range deployment of UAVs .
- HyALTA® has a large lift capability facilitating the addition of detection sensors, communication/surveillance capabilities and/or delivery of multiple shorter duration UAVs such as HyDrone®
- Coupling the delivery and loiter features of HyALTA® with the universal operational capabilities of HyDrone® opens any environment for exploitation or exploration.
- The long loiter capability of HyALTA provides a long duration communication relay to multiple UAVs as well as the ability to deliver them over an extended range.
- With no exposed propellers of its own and extreme ease of deployment, HyALTA® is safe for operators and can be deployed without the need for runways or capture/launch devices as it can be launched and recovered as a VTOL Blimp.
- With the combination of light weight and minimal infrastructure required for deployment, launch and recovery HyALTA® and HyDrone® are both man-portable and almost instantaneously deployable system.