Flying Water Vendor ConOps

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Our Mission Objective is to create a Flying Water Vending service capable of remotely delivering products to customers on the waterfront.

The Segment Elements are the Flight System, Operations Center, and App System. All three of these elements are team deliverables that have fully separate tasks. The Operations Center is akin to a Ground System; however, its name better describes the middle-man-behavior of this system.

The Phases of Operations include the following (in no order): Receive Order, Load Payload, Takeoff, Flight, Payload Delivery, Payment, Return to Home, Landing, Maintenance, Charging, Resupply, Mapping/Pathfinding to the Target Location, and Inventory Updates.

The System Interactions between the App System, Operations Center, and Flight System are categorized in a one-on-one fashion. The App System and Operations Center interactions consist of ordering, payment, and inventory updates. The App System and Flight System coordinate mapping/pathfinding to the target location and order tracking. The Operations Center and Flight System interact with loading the payload, maintenance, charging, and return to home coordination. One point of note is that the App System and the Operations Center work in tandem to update the inventory/app interface to determine what is still in stock. This level of automation is necessary during peak operational hours. Additionally, landing and taking off are unique to the Flight System, despite being in proximity to the Operations Center. While there are some moments of physical interaction in these two phases, the brevity of this interaction during these specific phases enables us to simplify our System Interactions and Timeline

The following is a Timeline describing the Phases of Operation pertaining to nominal operations:

- The App System sends the order and payment to the Operations Center.
- The Operations Center loads payload onto the Flight System.
- The Flight System takes off.
- The Flight System flies to target location while target location updates with respect to the App System. Concurrently, the Flight System sends order tracking updates to App System.
- The App System notifies the user, and the Flight System simultaneously checks with the App System that the payload is at the confirmed location.
- The Flight System delivers payload to the customer.
- The Operations Center sends home location to the Flight System.
- The Flight System returns home.
- The Flight System lands.
- The Operations Center performs the required maintenance, charging, and resupply on the Flight System.
- The Operations Center updates the App System on product availability and inventory status.

For Flight and Payload Delivery, the Flight System and the App System must be in constant communication. On the water, boats tend to drift, even if the motor is off. To ensure proper product delivery, the App System notifies the user to log on, so the Flight System has the most up-to-date information on the customer's location. The design of this system, through the constant location updates to the Flight System, helps to create a smooth delivery process where the customer only waits a few seconds for Payload Delivery.

Some specific quantitative performance metrics include the following:

- The Flight System must be able to hover for TBD amount of time.
- The Flight System needs to fly for TBD distance or TBD amount of time.
- The Flight System needs to fly at TBD height during flight.
- The Flight System's Payload Capacity shall be TBD pounds or TBD Volume.
- The Flight System must be able to fly in TBD wind speed.
- The Flight System needs a maximum operational speed of TBD.