

RED Delivery System

Test Plan

Introduction: The Red Delivery System is an autonomous system to allow the delivery of a small payload to a precise location. The subsystem using GPS data exchange and an LED image tracking system for precise in-air docking of two aerial vehicles. The hardware used includes a mothership which carries a raspberry pi, docking sensors, and a Pixhawk Radio.

Unit Test: Unit testing will be completed with the agile methodology, by testing repeatedly throughout the development of the entire project. After each feature and custom command is created, its functionality will be tested on the aerospace equipment.

Performance Criteria:

-----Marley -----

System Testing:

-----Miguel-----

Test Cases:

1. The mothership is able to use the GPS input to take itself and the attached drone at an altitude above that location
 - **Success:** The mothership secures location above target location – drone deploys
 - **Failure:** The system never reaches DeployedTargetPursuit state and drone never deploys
2. The drone is able to deploy and navigate to the precise target location and deliver a payload
 - **Success:** Payload is dropped off within two meters off target location
 - **Failure:** Payload is not deployed, or deployed more than two meters from the target location
3. The drone is able to retreat back to an altitude below the location that it was released from
 - **Success:** System reaches a state of PreciseDocking
 - **Failure:** System never reaches a state of PreciseDocking
4. The mothership is able to recognize that the drone is ready to dock, and the mothership can start moving in a straight direction.
 - **Success:** Mothership flies in a straight line toward location of initial takeoff.
 - **Failure:** Mothership continues to circle

5. The drone is able to use the image tracking software to fly upwards into the docking mechanism

- **Success:** Drone latches into mechanism on mothership
- **Failure:** Drone fails to latch onto mothership and circles back to docking position.

6. The system verifies docking success and turns of the drones rotors

- **Success:** Drone latches into docking mechanism and the rotors turn off
- **Failure:** Drone does not successfully dock into the mechanism and the rotors turn off or drone latches successfully and the rotors do not turn off

7. The mothership returns back to take-off location for landing

- **Success:** Mothership lands with drone successfully within two meters of take off point
- **Failure:** Mothership never lands, or the motherships lands without the drone

Test Cases are subject to change and addition