# System Design Calibration and Testing Checklist

* Performed camera calibration
* Performed IMU calibration
* Water resistant
* Sufficient data storage and battery duration for 4-hour data log
* Maintains steady temperature and operation in below freezing environment
* Test cutdown wire
* Low altitude system check (UAV @ 400 ft)

# Flight Planning Checklist

* Select Date and Launch Time
  + Date: \_\_\_\_ / \_\_\_\_ / 20\_\_\_
  + Time: \_\_\_\_:\_\_\_\_ AM
    - After sunrise: \_\_\_\_:\_\_\_\_ AM
    - At least 3 hours before sunset: \_\_\_\_:\_\_\_\_ PM
* Weather Conditions (https://www.wunderground.com/forecast/)
  + Cloud cover < 50% : \_\_\_\_\_ %
  + Rain < 30% : \_\_\_\_\_\_ %
  + Jet Stream < 100 knots: \_\_\_\_\_ (https://weatherstreet.com/models/gfs-jetstream-wind-forecast.php)
* Calculate Balloon Dynamics
  + Payload mass: \_\_\_\_\_\_\_\_ g
  + Balloon mass: \_\_\_\_\_\_\_\_ g
  + Positive lift: \_\_\_\_\_\_\_\_ g (<http://tools.highaltitudescience.com/>)
  + Required helium: \_\_\_\_\_\_\_\_ g (<http://tools.highaltitudescience.com/>)
  + Ascent Rate: \_\_\_\_\_\_\_\_\_ m/s (<http://tools.highaltitudescience.com/>)
  + Descent Rate: \_\_\_\_\_\_\_\_ m/s (https://www.highaltitudescience.com/products/0-9-m-parachute)
  + Burst Altitude: \_\_\_\_\_\_\_ m (https://predict.habhub.org/)
* Launch and Landing Location
  + Address

Street: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

City: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ State: \_\_\_\_\_\_\_\_\_

Lat: \_\_\_\_\_\_\_\_\_\_\_ Lon: \_\_\_\_\_\_\_\_\_\_ Elev: \_\_\_\_\_\_\_\_\_

* + - Outside of restricted, Class B,C,D and E aerospace (https://skyvector.com/)
  + Predict landing zone (https://predict.habhub.org/)

Lat: \_\_\_\_\_\_\_\_\_\_\_ Lon: \_\_\_\_\_\_\_\_\_\_\_ Elev: \_\_\_\_\_\_\_\_\_\_

* + - Outside of restricted, Class B,C,D and E aerospace (https://skyvector.com/)
* Flight Dynamics
  + Flight Time: \_\_\_\_ hrs, \_\_\_\_ min Landing Time: \_\_\_\_:\_\_\_\_ \_\_\_\_
  + Total Distance: \_\_\_\_\_ mi
  + Driving distance: \_\_\_\_\_\_ mi, Driving time: \_\_\_\_:\_\_\_\_

# Pre-Packing Checklist

* Payload is ready
* Balloon is prepared
* String is tied
* Vehicle gas tank is full

# Departure Checklist

* Packed the following:
  + - Balloon
    - Payload
    - Helium tank and inflator
    - Extra batteries
    - Toolbox
    - Wireless router
    - APRS receiver

# Pre-Flight Checklist

* Weather Conditions (https://www.wunderground.com/forecast/)
  + Cloud cover < 50% : \_\_\_\_\_ %
  + Rain < 30% : \_\_\_\_\_\_ %
* File NOTEM: (http://blogs.und.edu/jdosas/wp-content/uploads/sites/108/2017/12/Instructions-Filing-a-NOTAM.pdf)
* Payload Preparation
  + Identify tall obstacles: light posts, power lines, trees
  + Identify wind direction (if applicable)
  + Lay down tarp/blanket in location to maximize balloon travel distance to tall objects
  + Setup router
  + Plug-in battery
  + Connect via ssh, start ROS, verify sensors are
  + Verify Spot3 is tracking
  + Verify APRS signal is being transmitted via Direwolf
* Balloon inflation
  + Safety rope attached to payload and balloon from tank
  + Balloon inflated to provide \_\_\_\_\_\_ g lifting force and tied off
  + Take pictures of balloon inflation process
* Launch balloon
  + Disengage safety rope from balloon
  + Disengage safety rope from payload
* Record launch time \_\_\_\_:\_\_\_\_\_ \_\_\_\_\_
* Take video of launch process

# Post-Flight Checklist

* Upon Discovery of Payload
  + Take picture of payload before touching and moving it
  + Stuck in a tree?
    - Engaged cutdown system
  + Disconnect battery
  + Record landing site: Lat: \_\_\_\_\_\_\_\_\_\_\_ Lon: \_\_\_\_\_\_\_\_\_\_\_ Elev: \_\_\_\_\_\_\_\_\_\_
* Record recovery time \_\_\_\_:\_\_\_\_\_ \_\_\_\_\_