Equipment

Aircraft

- Matrice 100
  - Go Professional Hard Case
  - Propellers (x4)
  - Remote controller
  - USB to Lightning cord
  - DJI hex charger (including AC cord and RC cord)
  - Signal boosting antenna attachments
  - Extra propellers (x4)
- Mavic Pro
  - Lowepro Fastpack
  - Extra propellers (x6)
  - Hub charger

Sensors

- Zenmuse X3
- Micasense RedEdge3
  - Downwelling light sensor
  - GPS
  - Calibrated reflectance panels

Communication

- iPad
- Chromebook
  - Chargine cord
- Macbook Pro
  - Charging cord
- Garmin GPSr
- iPhone
- Walkie Talkies

Data storage

- 500GB SSD (x2)
- 64GB SD card (x2)
- 32GB SD card (x4)

Batteries

- TB48D Battery (x12)
- TB47D Battery (x1)
- Mavic Pro Batteries (x5)

Generator

- Cooler or Action Packer
- Goal Zero Yeti 1400
- Goal Zero Boulder 100 Briefcase solar panel (x4)
- Goal Zero wire bundle
  - 15' Anderson Power Pole extension cord
  - Anderson Power Pole to 4x 8mm plugs
  - 15' 8mm to 8mm extension cord (x3)
  - 30' 8mm to 8mm extension cord (x1)
- EasyAcc 20000mAh power brick
- Anker 21W solar panel

Action Items

Pre-field

1. Check weather
   a. 1800wxBrief
   b. NOAA
2. File flight plan with UCOP EHS
3. Create missions in Map Pilot
4. Save missions for offline use (including terrain tiles)

Pre-flight

1. Check propellers for damage
2. Install propellers and tighten
3. Check aircraft frame for damage
4. Check connections of all cables
5. Check security of zip ties holding camera to aircraft
6. Dust off camera lenses
7. Insert SD card to RGB camera
8. Insert SD card to multispectral camera
9. Put signal boosters onto remote controller antenna
10. Attach lanyard to antenna
11. Attach iPad to remote controller and plug it in
12. Turn on iPad
13. Close all apps except Mail and Map Pilot
14. Turn on remote controller
15. Open saved mission for current location
16. Insert charged battery into aircraft
17. Turn on battery in aircraft
18. Wait for aircraft to be detected
19. Click "upload" to upload the mission to the aircraft
20. Click "Yes" to enable terrain following feature
21. Verify that terrain following path looks reasonable (doesn't climb too high or drop too low)
22. Click green "Accept" terrain awareness
23. Click "no" for "Do not adjust return to home altitude in the case of an abandonment event"
    a. This takes up a lot of time to fly to 40m above the highest terrain in the mission, and would almost never prevent an accident given that I have total control over the aircraft's altitude as it

returns to home.

24. Use laptop to connect to rededge wireless network
    a. Network name: rededge[serial number]
    b. Network password: micasense
25. Open http://192.168.10.254/ in a web browser on the machine connected to the rededge wifi network
26. Verify there is available space on home page
27. Verify GPS has a fix on >3 satellites
28. Verify GPS time and date are correct
29. Take calibrated reflectance panel image with sun behind you (follow instructions on the panel)1. Configure autocapture mode (timer, every 2 seconds, "start")
30. Verify green status LED is blinking and that SD card space available is declining (indicating pictures are being captured)
31. Clear the launch area
32. Click "start" in Map Pilot to begin mission

During flight

1. Look up as aircraft takes off to verify green RedEdge status LED is still blinking
2. Also make sure aircraft takes off into a canopy opening
3. Turn off Terrain Awareness view in Map Pilot
4. Bring up the camera
    a. Each time the camera view blinks, an image is captured
5. Verify aircraft is rising and falling with the terrain
6. Verify the image count is increasing
7. Keep remote controller pointed towards the aircraft to ensure maximum signal transmission
    a. Use the directional indicators in Map Pilot to guide you
    b. Remote controller signal should never drop below ~90% if signal boosters are attached
    c. Remote controller signal will usually be closer to 97-100%
8. Ensure your aircraft remains in visual line of sight for you or your visual observers
9. Maintain clear lines of radio communication with your visual observers

Post-flight

1. Turn off battery
2. Remove battery from aircraft
3. Put battery in the shade
4. If mission is not yet complete:
    a. Insert new charged battery
    b. Turn battery on
    c. Click "Battery changed" in Map Pilot
    d. Wait for red triangle to appear in Map Pilot and for camera feed to come up, indicating successful connection with the aircraft
    e. Follow rest of steps as detailed in "Pre-flight"
5. Shut down remote controller
6. Shut down iPad
7. Plug iPad into power brick
8. Cool batteries
9. Charge batteries
10. Put SD card contents onto SSD
11. Delete data from SD cards

Post-field

1. Upload data from SSD to NAS
2. Sync data from NAS to cloud
3. Process new RGB photosets
4. Process new multispectral photosets
    a. Calibrated reflectance panel information
        i. _1 (red) 0.64
        ii. _2 (green) 0.64
        iii. _3 (blue) 0.64
        iv. _4 (NIR) 0.60
        v. _5 (rededge) 0.63