Smith College Spatial Analysis Lab's Drone Mission Checklist

Equipment & Documents

- In each drone & its carrying bag:
  - ☐ Charged batteries
  - ☐ Charged controller; paired with correct drone
  - ☐ Apple lightning USB cable or Android micro USB cable
  - ☐ Install SD card & place spare SD card in "Spare" container
  - ☐ Propellers (& spares/propeller guards if available)
  - ☐ Clean camera lens
- ☐ Bring extra drone
- ☐ Update firmware & software; update Apps
- ☐ SD card holder
- ☐ Charged airband radio
- ☐ Binoculars
- ☐ Launch pad
- ☐ Seasonal items: tarp (winter), sun umbrella, ice pack, insect repellent, sunblock (summer); applicable field gear
- ☐ Towel and tissue/paper towel
- ☐ Ground Control Points & GPS units (at least 1 Trimble Juno)
- ☐ Toolbox
- ☐ iPad
- ☐ Registration & license
- ☐ Checklist
- ☐ Flight Log (paper or app)
- ☐ Login to apps and bring list of app usernames & passwords
- ☐ Pen & notebook

Mission Planning

- ☐ Operations Manual: bystander handout, brief mission overview, specs
- ☐ Note any temporary flight restrictions (TFRs) & NOTAMS with AirMap or SkyVector
- ☐ Note weather conditions (1800wxbrief.com)
- ☐ Preview flight area for obstacles (e.g. power lines) or sources of magnetic/GPS interference (e.g. Power Stations)

Mapping (optional)

- ☐ DroneDeploy:
  - ☐ Plan flight (mapping mission); take screenshot on iPad or desktop
  - ☐ *For lower altitude flights/areas with outdated satellite imagery,* ***use existing maps as a baselayer*** *with an overview processed map*
  - ☐ **Make available offline** to cache each mission
  - ☐ Toggle on **Live Map** and **Obstacle Avoidance**

Field Arrival

- ☐ Check surroundings for: flight restrictions, other flying objects, bystanders, and obstacles/potential hazards

- ☐ Monitor airband radio before & during
- ☐ Establish launch location 5 meters away & upwind of crew
- ☐ Designate Pilot-in-Command, Camera Operator, and Visual Observer
- ☐ Review emergency procedures (on pg. 3)
- ☐ Regularly check weather

Pre-Flight

- Aircraft:
  - ☐ Body – inspect for any damage/defects (e.g. chipped props, cracks...etc.)
  - ☐ Camera – gimbal guard removed & stowed
  - ☐ SD card – installed
  - ☐ Install full charge battery
  - ☐ Install propellers & verified by another crew member
- Controller:
  - ☐ Position antennas at 45°
  - ☐ Flight Mode Switch (P) – rehearse abort out of automated flight
  - ☐ Check if sticks are smooth in full range motion
  - ☐ Connect via cable to iPad
  - ☐ Power on controller first
- On the iPad – DJI Go 4
  - ☐ Power on drone
  - ☐ Note and address any warnings
  - ☐ Confirm flight status – Safe to Fly, GPS & VPS
  - ☐ If indoors, verify disabling GPS/other sensors that might interfere with flight
  - ☐ Format SD card (**Camera Setting** beneath capture button → Setting → Format SD Card)
  - ☐ Start motors (both control sticks to lower-inner position)
  - ☐ Declare "Arming"
  - ☐ Take-off & hover – check for stability & control (yaw, pitch, roll, gimbal)
  - ☐ Land
  - ☐ Close DJI Go 4 app
- If Mapping - On the iPad – DroneDeploy
  - ☐ Review flight plan for any adjustments
  - ☐ Verify **Live Map** and **Obstacle Avoidance** are toggled on
  - ☐ *If applicable, fly at high altitude to acquire initial map for the next step*
  - ☐ *For lower altitude flights/areas with outdated satellite imagery,* ***use existing maps as a baselayer*** *with an overview processed map*
  - ☐ Go through take-off sequence
  - ☐ Record take-off time

Prior to Landing & Post-Flight

- ☐ Toggle camera up
- ☐ Land & record landing time
- ☐ Leave everything ON until images are done transferring (app specific)
- ☐ Power down drone, then power down controller
- ☐ Remove battery
- ☐ Inspect for any overall damage, especially after uneven landing
- ☐ Dry and clean off equipment

- ☐ Remove SD card and place in “Full” container
- ☐ Remove propellers & re-attach gimbal guard
- ☐ Place used batteries upside down in carrier
- ☐ Close apps in iPad
- ☐ Survey site for any equipment – retrieve GCPs...etc.

Debrief

- ☐ Sync flight log
- ☐ Upload images from SD card
- ☐ Log any incidents & debrief

Emergency Procedures (adapted from Air CTEMPs)

- DJI Lost Link Protocol:
    - Failsafe is initiated if control signal is interrupted/lost for greater than 3 seconds
    - If signal is lost, drone will hover in place; after 3 seconds, the craft will climb to the preset altitude AGL above the home point altitude and fly directly to the home point at this altitude and initiate an auto land
    - If the throttle is moved during the process, the drone will NOT ascend to the preset altitude
    - DJI controller doesn’t allow setting a lost link landing point
- Home Point Establishment:
    - The PIC should determine any obstacles or terrain on the flight path
    - Establish home point during take off
    - To set or check the return to home flight altitude (AGL above home point) enter **MODE → Advanced Settings → Failsafe**.
- Fly Away:
    - The DJI flight controller failsafe mode is to land immediately or return to home. The proper start up procedures are: not launched before GPS satellite acquisition and home point has been established.
    - Suspected fly-away the craft entails the craft not responding to controls, or does not appear to be following fail safe mode of land immediately or return. ATC shall be notified of the last position and altitude and heading of the craft, and of the approximate flight time remaining.
- Recovery:
    - All reasonable efforts shall be made by the flight crew to recover lost aircraft, with crew safety a priority
- Imminent Crash
    - PIC Steer the drone away from bystanders
    - Audibly announce the crash so bystanders can keep an eye on the drone
- Total Team: All crew members should communicate at all times