

MANTIS Lab Best Practices for DJI Phantom 4 Pro Field Operation

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Corpus Christi, TX
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This manual was developed by Melanie Gingras to document our best practices for Phantom 4 Pro field operation, data collection, and initial data processing.

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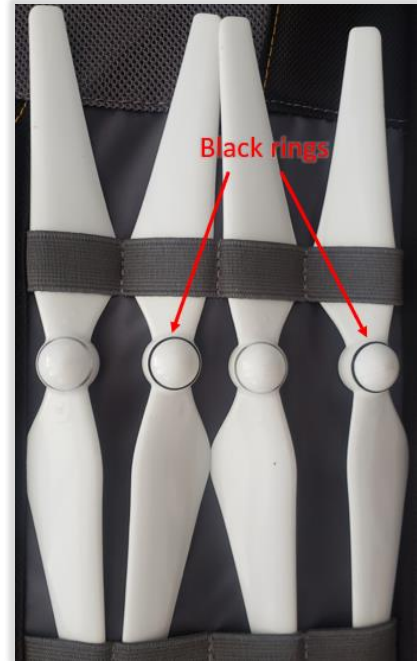
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Phantom 4 Field Workflow

Drone Assembly

1. Attach propellers to drone and make sure they click into place (propellers with the black rings go on the rotor with black dots on it and twist on in the opposite direction as the silver ringed propellers, see arrows on propellers)



Phantom 4 Field Workflow

2. Remove lens cover and make sure lens is clean



Phantom 4 Field Workflow

Connecting the Drone

3. Connect ipad/tablet to DJI controller and power on controller (tap then hold power button)



4. Power on ipad/tablet (password for ipad is "mantis")
5. If you have not yet [created your mission](#), set up a mobile hotspot with a cell phone (if not already connected connect ipad/tablet to the hotspot). You will need internet access to stream map imagery in Ground Station Pro.
6. Power on drone (tap then hold power button)

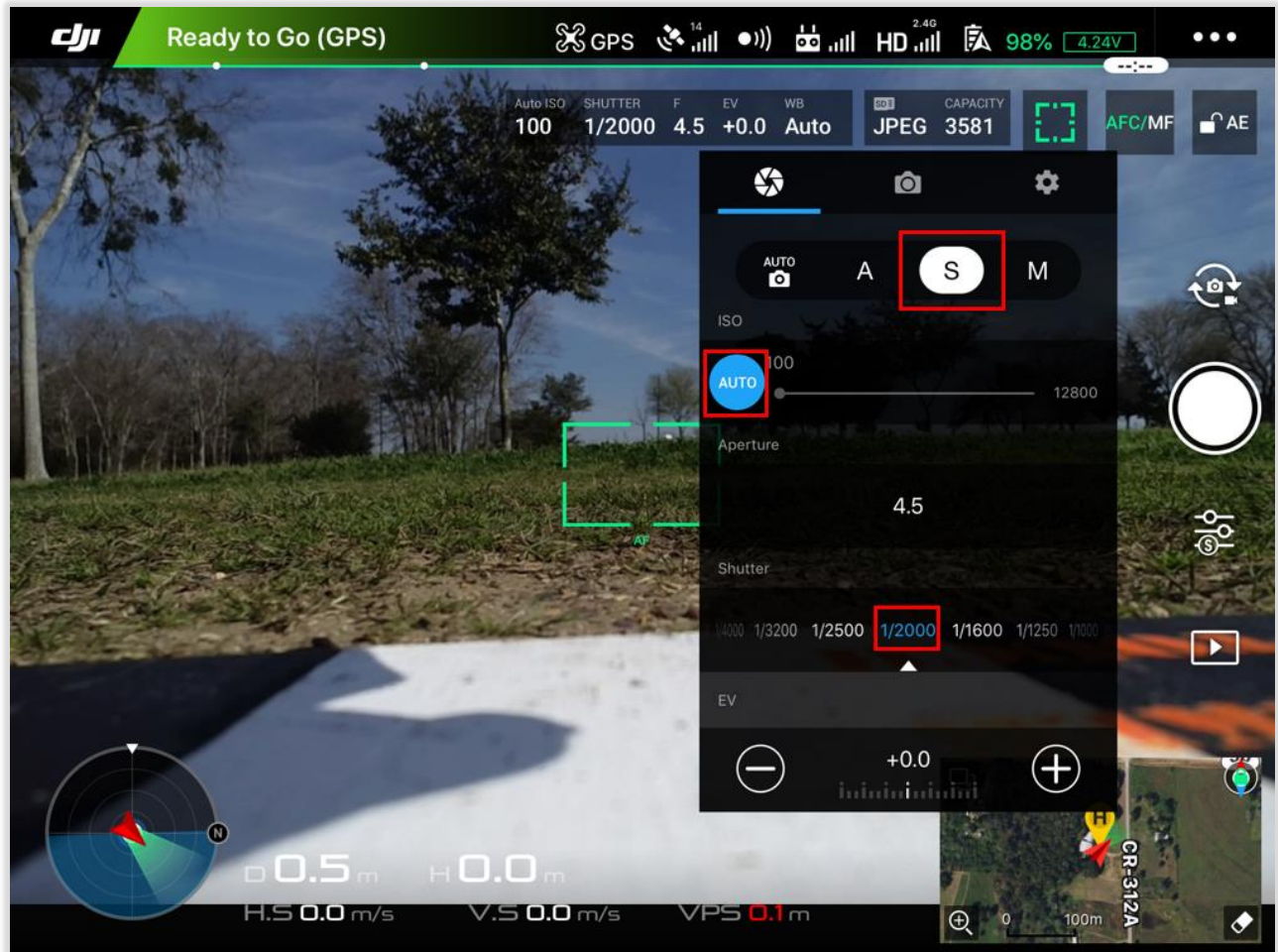
Phantom 4 Field Workflow

Camera Settings in DJI 4Pro



7. Check camera settings in DJI Pro 4:

- a. Under "s" make sure the shutter speed is set to 2000, check that the gimbal is paired with the drone by panning the camera (left wheel). The aperture updates automatically and ISO should be set to auto.



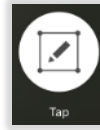
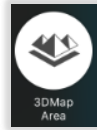
Target Placement & Creating a Mission in Ground Station Pro



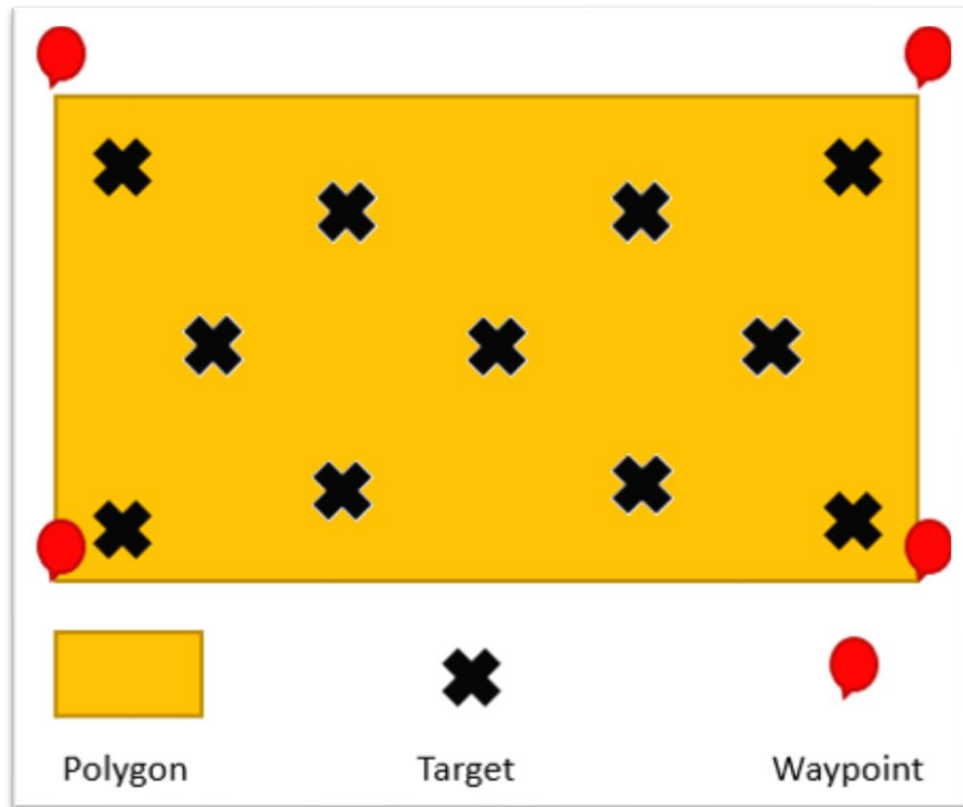
- Open Ground Station Pro and create a new mission by selecting the plus sign (in “my missions”)




in the lower left. If any part of the flight is through green or yellow restricted air space, you will need to [unlock](#) it.

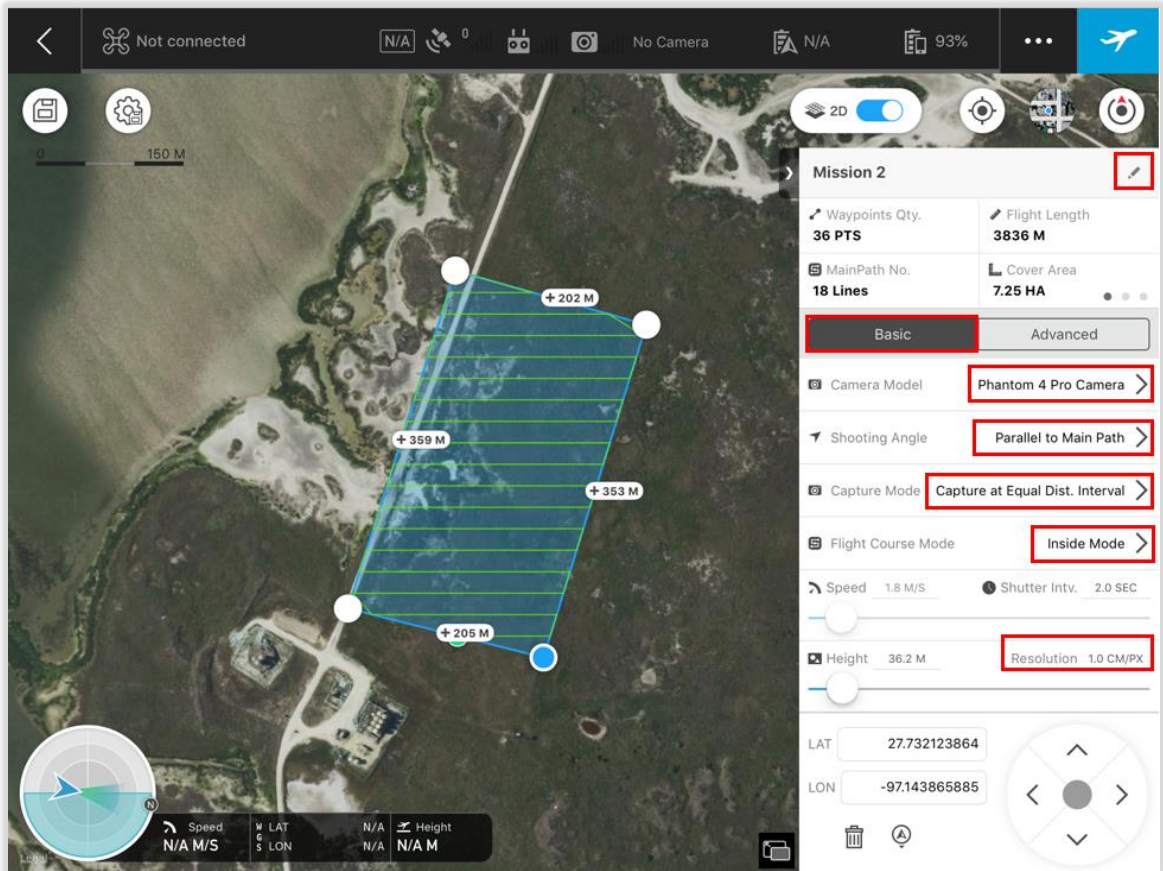


- Select “3D Map Area” and “tap”
- Outline your study area by tapping and dragging the vertices of your polygon
- Be sure all of your targets lie within the bounds of your polygon as shown below:

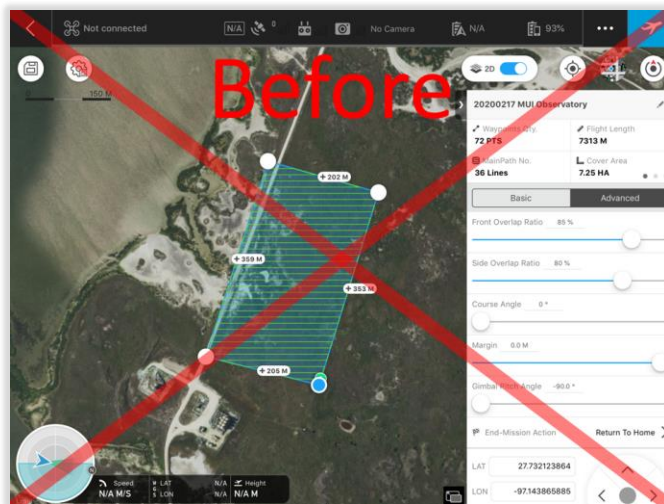


Phantom 4 Field Workflow

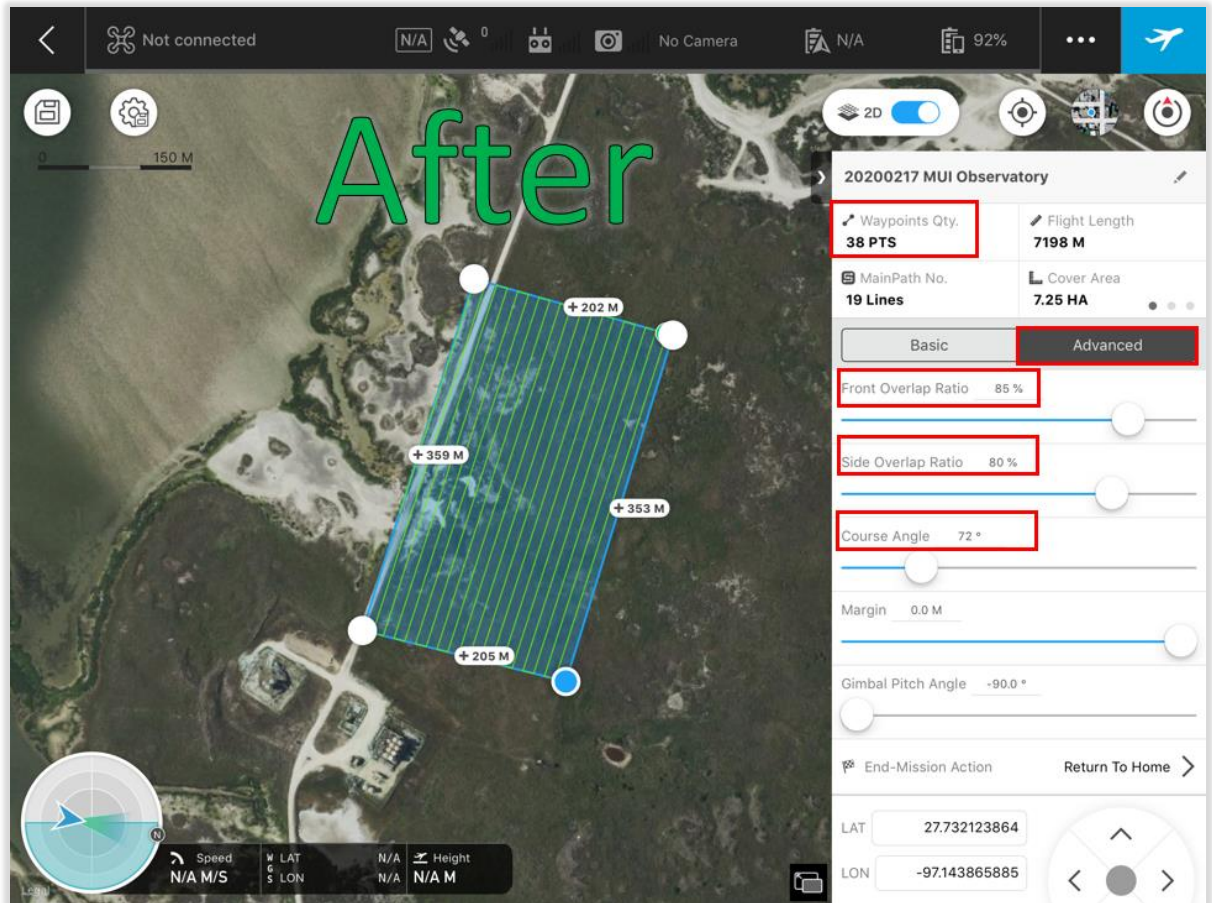
9. Give your survey a name  and adjust the basic settings to match the settings outlined in red below:



10. Adjust the advanced settings so that front overlap is ~85%, side lap is ~80%, and your course angle minimizes the number of waypoints (minimizes turns made by drone). “Before” image is before adjusting course angle and “after” image is after adjusting the course angle to minimize waypoints:



Phantom 4 Field Workflow



11. Once all of your Ground Station Pro settings are correct, you will know you can start flying when you see “Ready to Go” in green in the upper left corner of the screen in the DJI Pro 4 app:



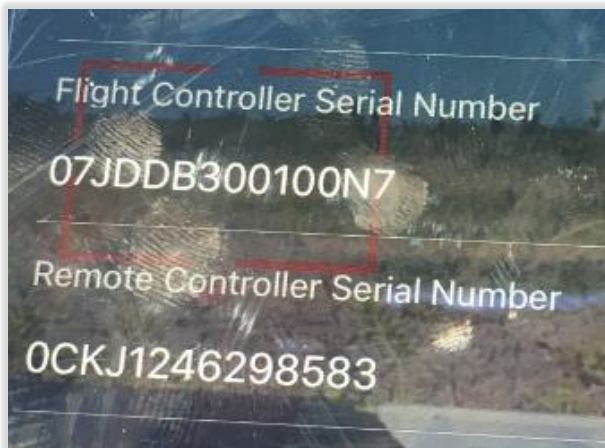
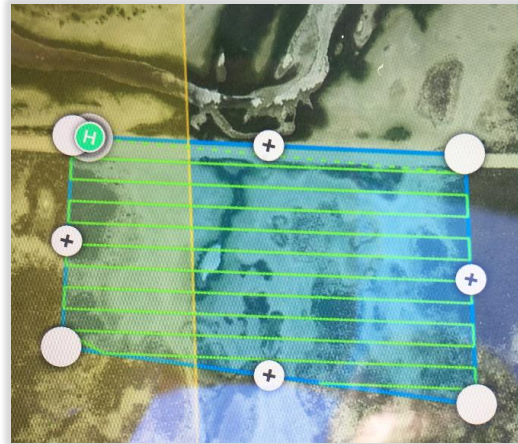
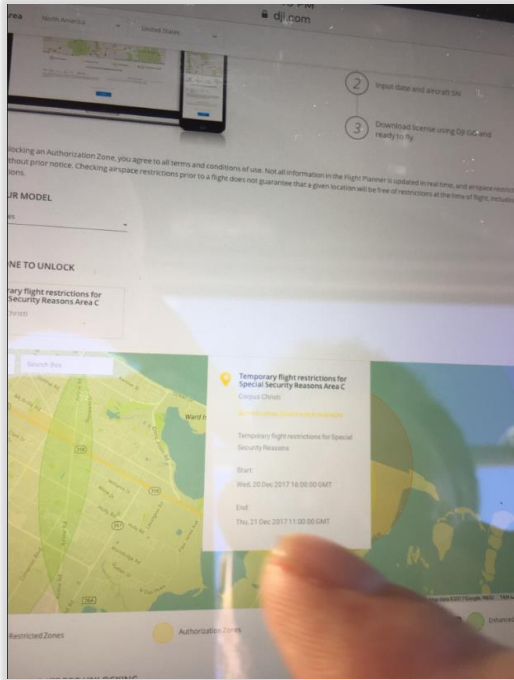
12. To begin your flight*, tap the airplane icon  in the upper right-hand corner of Ground Station Pro

*Whenever the battery hits 30%, bring the UAS home for a battery swap (it should be set to alert you at 30% but it is always good to monitor in case the setting was accidentally changed).

Phantom 4 Field Workflow

Unlocking Restricted Air Space in Ground Station Pro

13. Go to <https://www.dji.com/flysafe/self-unlock> to unlock the restricted area. You will need to create a DJI account to do this, if you do not already have one. You will be asked for the Flight Controller serial number.



Gathering GPS Data (Geodetic Control)

14. Use an RTK GPS to measure the locations of your targets. Typically, the rover pole is set to 2 meters with either a topo shoe (softer terrain—sand) or a point (harder terrain—rock/concrete) and the epoch should be set to 10 seconds.
15. Each target should be surveyed as shown below: point/topo shoe should be centered on the target and 10 seconds should elapse for each observation while the rover pole is held level and stationary.



While it is not required, it is advisable that you also collect additional ground truth points on bare earth and within vegetation to assess the interpolation of the raster later. 30-50 points is recommended.


Phantom 4 Field Workflow

Removing Image Data from the Drone

16. Remove the SD card from the drone by pushing on it with a fingernail to eject it.



17. Place it into the Micro SD card reader on your computer (if you only have an SD card reader or USB port, use an adapter)
18. Copy your images from the SD card and paste them in the appropriate Data folder on Mantis.

 > This PC > Mantis (ad.tamucc.edu) > Data > UAS