

Mission planning

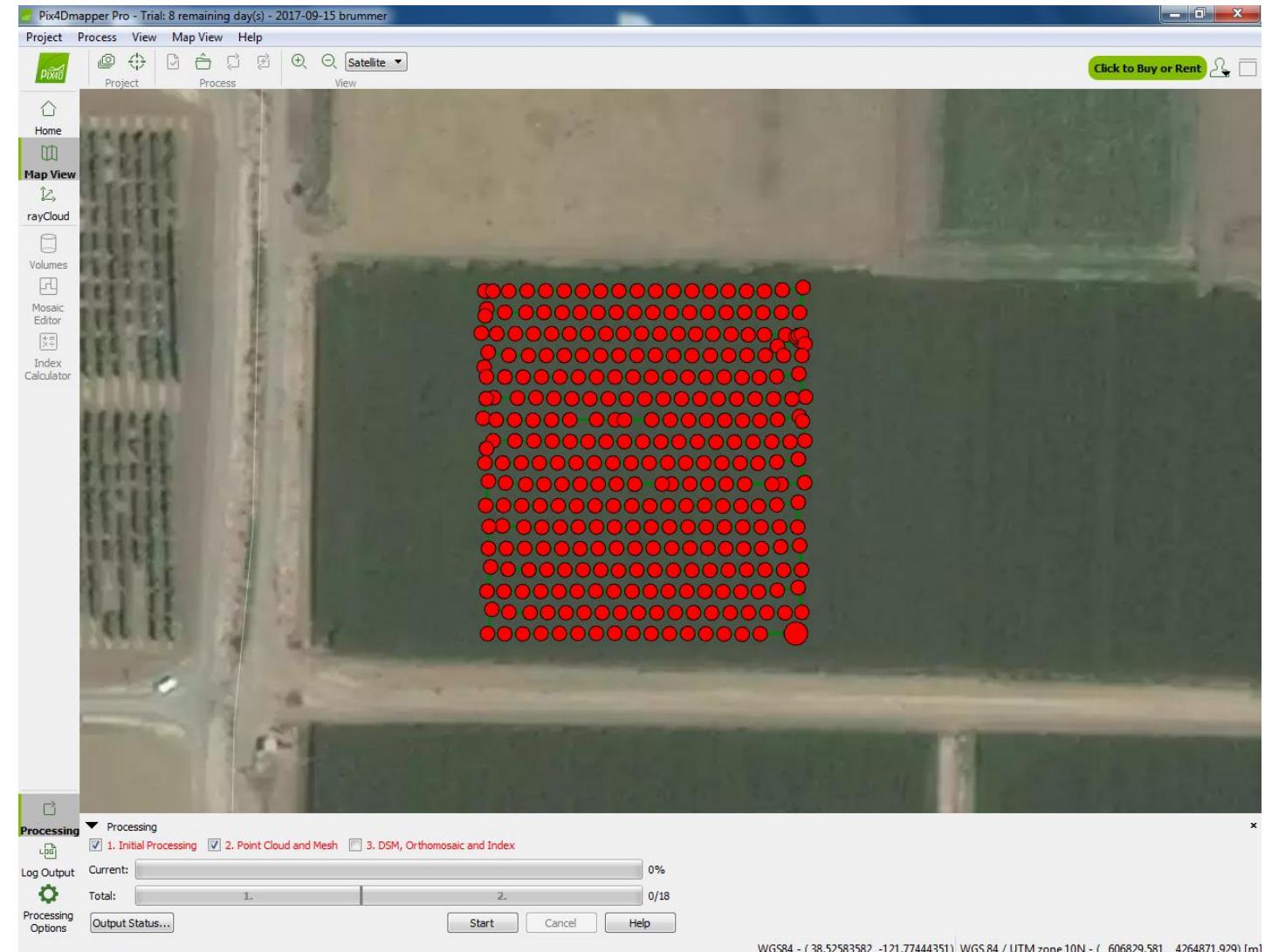
Part I: Theory and background

Part II: Example walkthrough (DJI GS Pro)



Mission planning

- Using a mission planning app is essential to get uniform/desired image spacing
- If you ever try getting imagery without a mission planning app... it will look like the pilot was 😤 😤 😤



Mission planning

- Several options are available, consider which is best for your needs



Pix4D**capture**

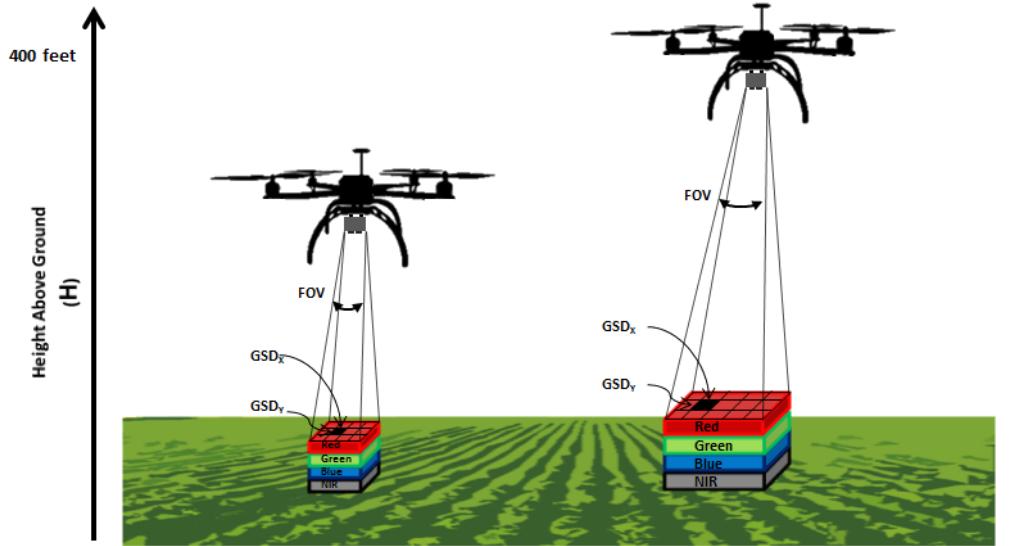


Mission planning

- Considerations before choosing an app
 - Compatibility with device, UAS, cameras
 - Mission resume, repeatability
 - Flexibility vs. ease of use
 - Probability of error
- Most are free or inexpensive... try several!
- When buying equipment, ask the sales representative about recommendations for your combination of aircraft, device, cameras, and project requirements

Mission planning

- Trade-offs
 - Higher altitude=more area/time, but lower resolution.



Altitude: 40m; Overlap: 75/85; Time: 9m 21s



Altitude: 80m; Overlap: 75/85; Time: 4m 12s

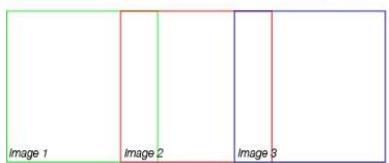
Mission planning

- Trade-offs
 - Higher overlap increases stitching quality, but reduces area/time
 - Ideal overlap depends on mapped surface

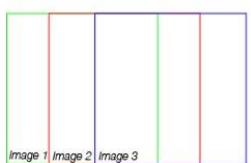
0% overlap



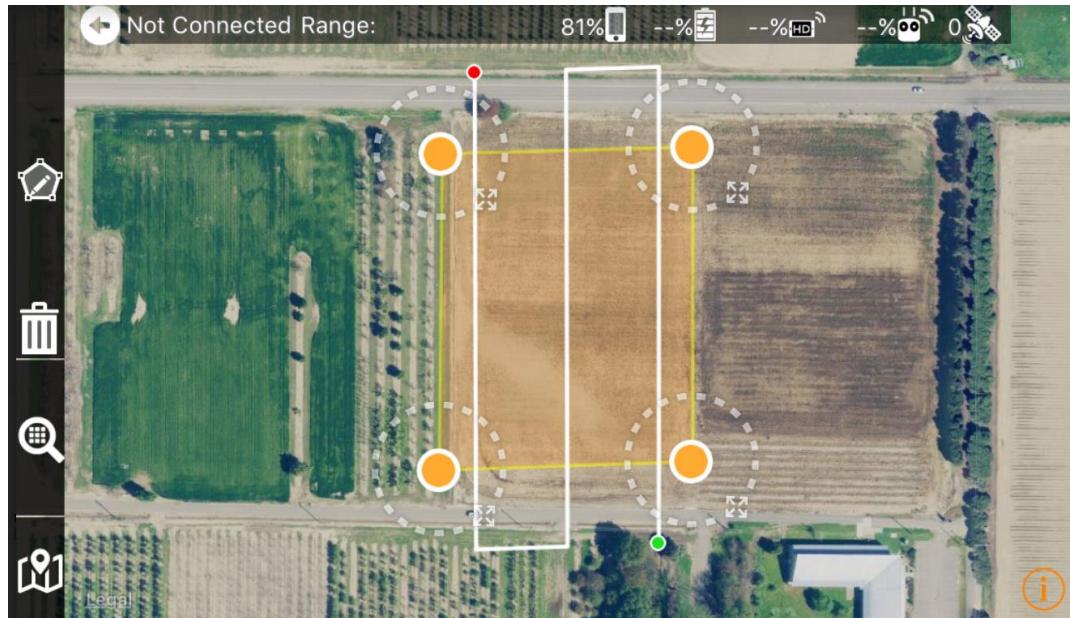
20% overlap



70% overlap



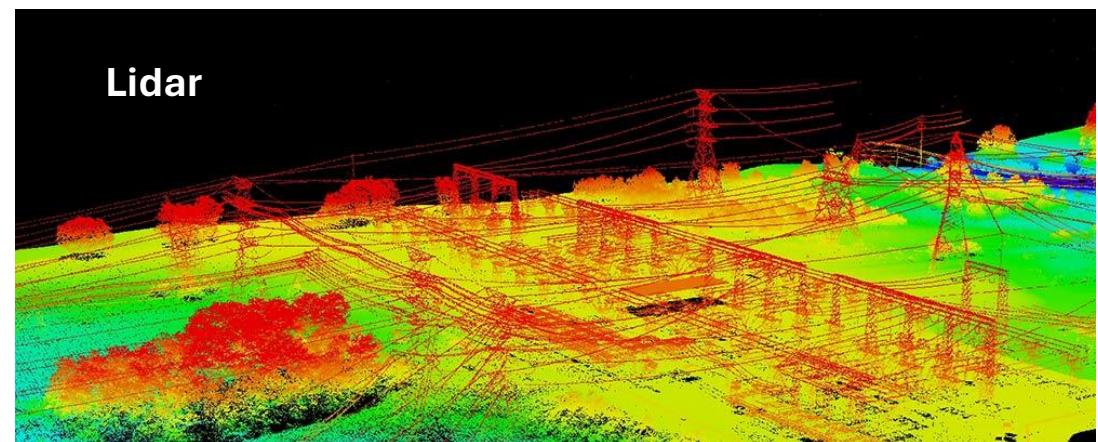
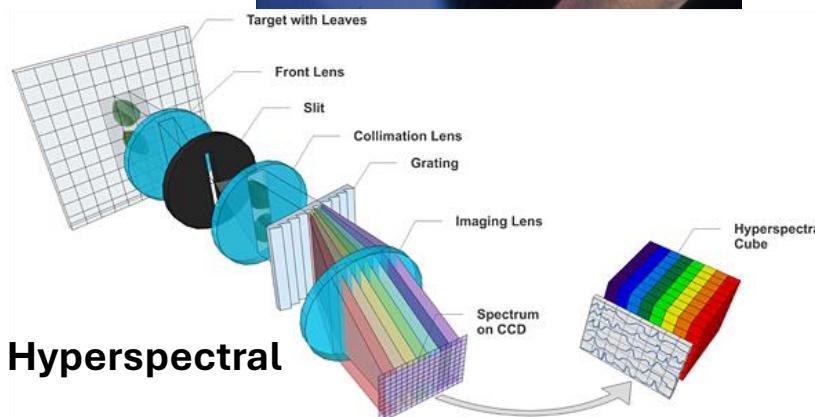
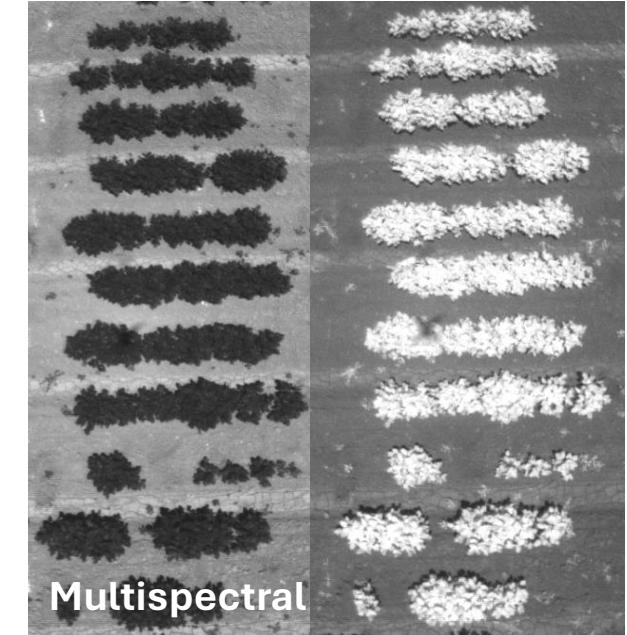
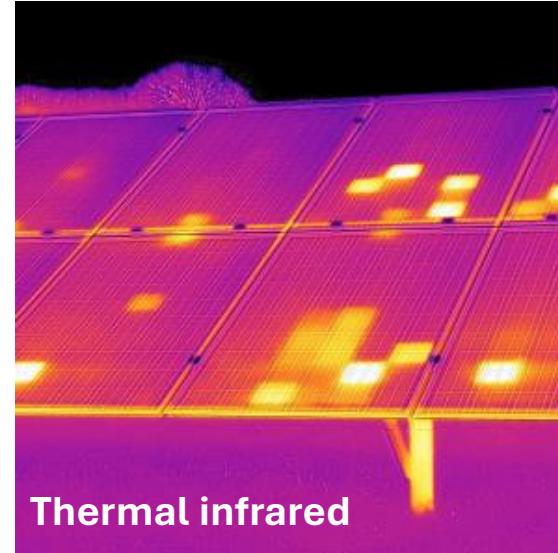
Altitude: 80m; Overlap: 75/85; Time: 4m 12s



Altitude: 80m; Overlap: 70/70; Time: 3m 11s

Choosing the right sensor

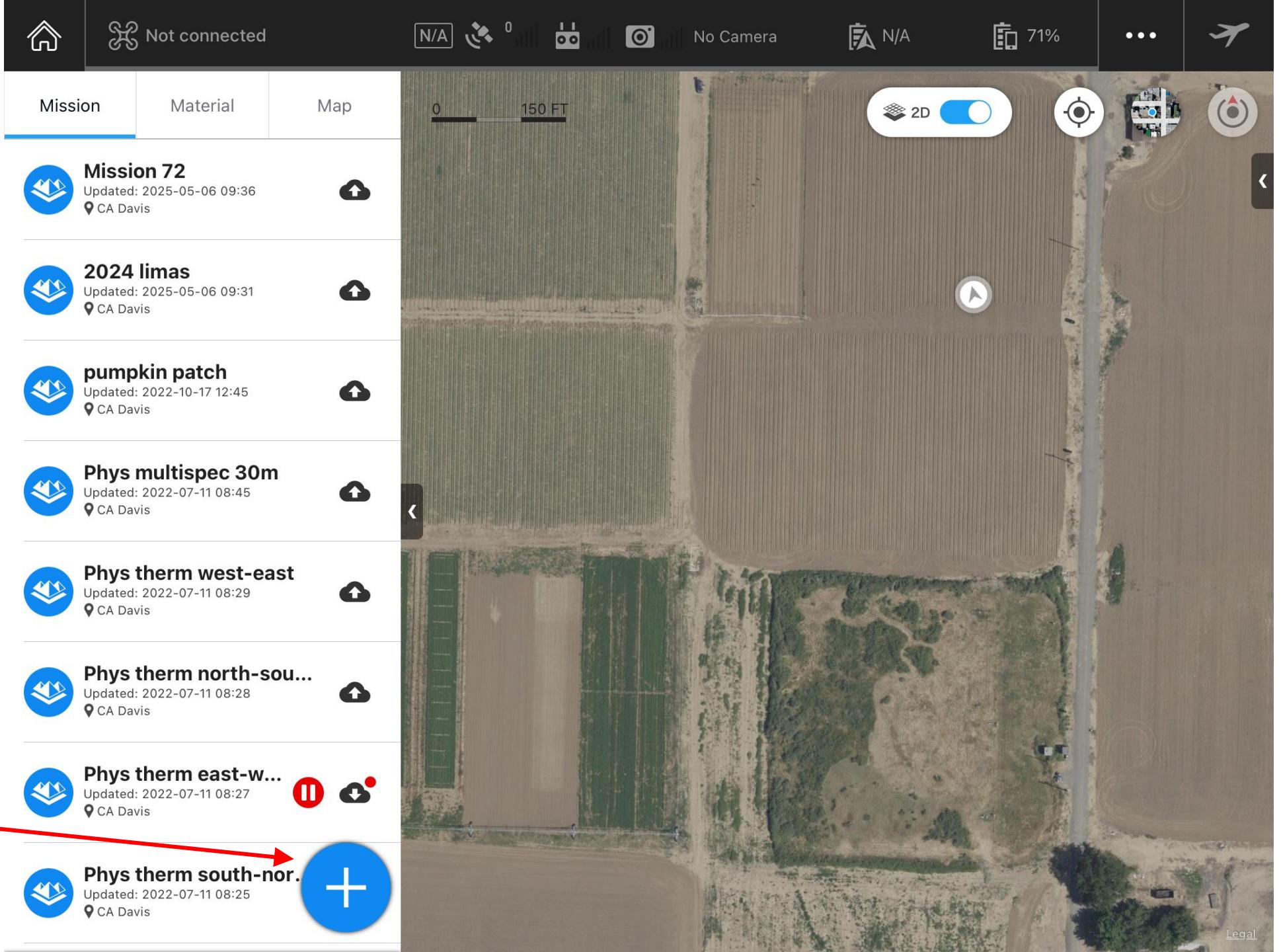
- RGB
- Thermal
- Multispectral
- Hyperspectral
- Lidar



Part II: Example walkthrough with DJI GS Pro



1. Install app from preferred store, open by clicking icon



2. Click the + symbol to create a new mission

New Mission



PhotoMap



Virtual
Fence



3DMap
Area



3DMap
POI



WayPoint
Route

3. Click “3DMap Area”



3DMap - Area



Tap



Aircraft

4. Click "Tap"





Not connected

N/A



0



No Camera



N/A



70%

...



5. Click area of
interest

Please tap on the map to make the
flight area

Speed
N/A MPHLAT
N S GN/A
LAT
N S GHeight
N/A FT



Not connected

N/A



0



No Camera



N/A



69%



6. Drag points to
desired corners



7. Pull these to
make additional
corners



8. Choose
camera, angle,
capture mode,
and altitude



Mission 73

Waypoints Qty.
26 PTS

Flight Length
6424 FT

Course Count
13 Lines

Cover Area
5.35 ACRE

Basic

Advanced

Camera Model

Zenmuse XT mm 9mm >

Shooting Angle

Parallel to Main Path >

Capture Mode

Capture at Equal Time Interval >

Flight Course Mode

Inside Mode >

Speed 16.4 MPH

Shutter Intv. 2.0 SEC

Height 197.0 FT

Resolution 11.3 CM/PX

LAT 38.538477818

LON -121.779111434



Apple Maps

Speed
N/A MPH

W LAT
G
S LON

N/A
N/A Height
N/A FT



Not connected

N/A



0



No Camera

N/A

69%

...



9. Switch to advanced

10. Adjust overlap, margin, gimbal angle, and final action

The image shows a drone flight interface with a top status bar and a main screen divided into two sections: a map view on the left and a mission planning panel on the right.

Top Status Bar:

- Not connected icon
- N/A signal strength
- No Camera icon
- N/A battery level
- 69% battery level
- Flight mode icon

Left Side (Map View):

- Aerial view of a field with a mission profile overlay.
- Profile shows 150 FT height at the start, followed by several segments of +442 FT, +520 FT, +533 FT, and +445 FT.
- Start point is marked with a green circle labeled 'S'.
- End point is marked with a blue circle.
- Bottom status bar: Speed N/A MPH, LAT N/A, LON N/A, Height N/A FT.
- Apple Maps logo.

Right Side (Mission Planning):

- Mission 73:** Flight Time est. 5 MIN 19 SEC, Photos est. 152, Batteries 1 SETS approx., Capture Interval F: 48.2 FT / S: 39.1 FT.
- Advanced Mode:** Selected (highlighted in red).
- Settings:**
 - Front Overlap Ratio: 75 %
 - Side Overlap Ratio: 84 %
 - Course Angle: 180 °
 - Margin: 0.0 FT
 - Gimbal Pitch Angle: -90.0 °
- End-Mission Action:** Hover
- Coordinates:** LAT: 38.538477818, LON: -121.779111434



Not connected

N/A



0



No Camera



N/A



69%



11. Click the flight icon, and after mission uploads, click "fly"

Mission 73

Flight Time est.	Photos est.
5 MIN 19 SEC	152
Batteries	Capture Interval
1 SETS approx.	F: 48.2 FT / S: 39.1 FT

Basic Advanced

Front Overlap Ratio 75 %

Side Overlap Ratio 84 %

Course Angle 180 °

Margin 0.0 FT

Gimbal Pitch Angle -90.0 °

End-Mission Action Hover >

LAT 38.538477818
LON -121.779111434



