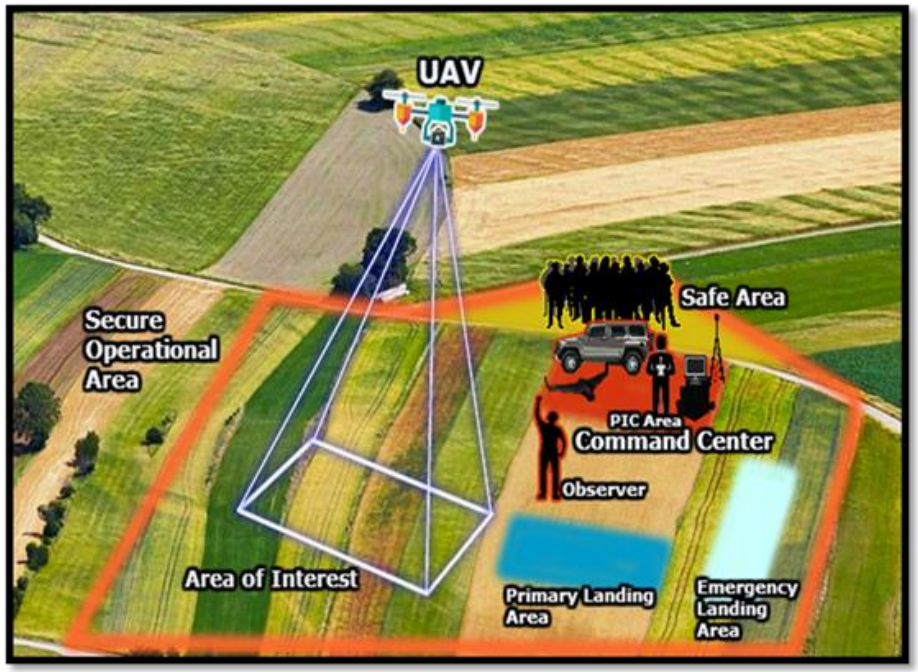
Fixed Wing
Mission Planning
Site Evaluation, Weather

Trimble UX5

Mission Planning Considerations

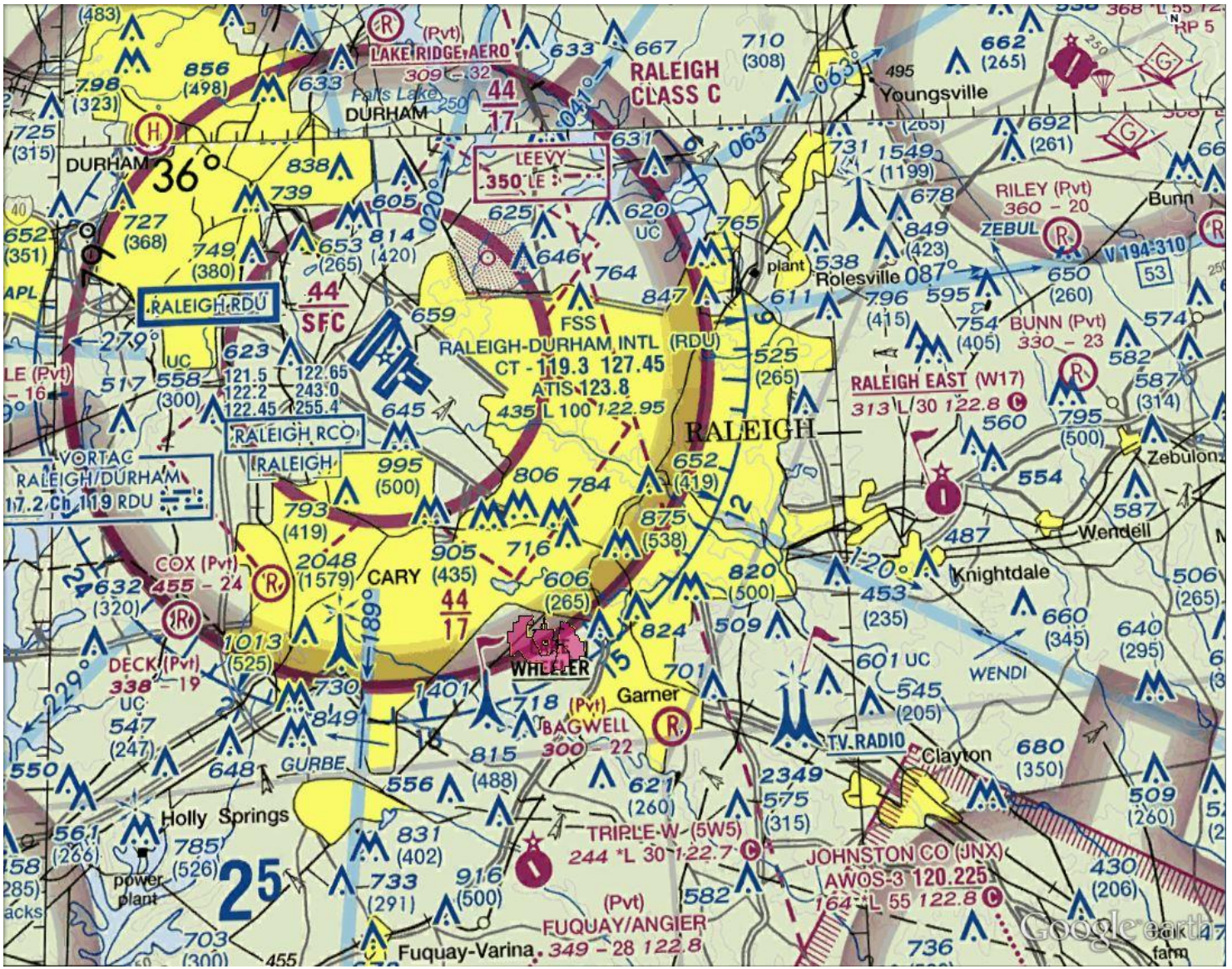
- Federal/Local Regulations
- Landowner permission
- Privacy Concerns
- UAS Limitations
- Safety
  - Airborne
  - Ground
- Weather
- Spectrum



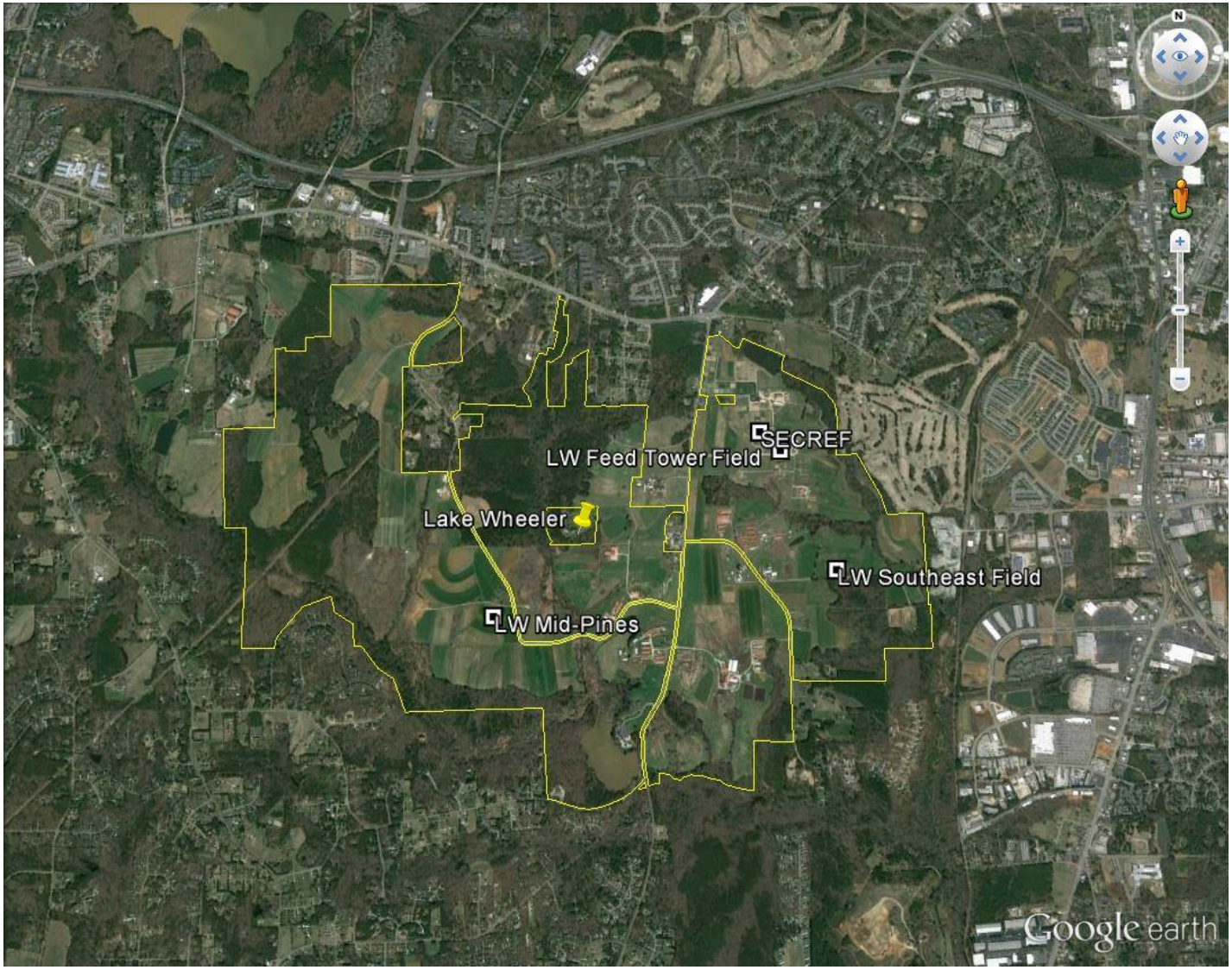
Weather for Small UAS

- Check Forecast!
- 3 miles visibility from ground station.
- Clear of clouds – Line of Sight
- Precipitation
  - Signal Strength
  - Image Quality
- Wind
  - Check UAS Operations Manual
  - Take off and Landing Options
  - Battery Life
  - Set Limits and Stick to Them!

Lake Wheeler Flight Area



Lake Wheeler Flight Area



Southeastern Field

Southeastern Field

Looking West

Looking East

Southeastern Field

Winds from the West

Factors to consider

- Take off
  - 25 m trees
  - Rolling terrain elevation trending up
- Landing
  - 30 m trees
  - Rolling terrain elevation trending up

Southeastern Field

Winds from the East

Factors to consider

- Take off
  - 30 m trees
  - Rolling terrain (elevation trending down)
- Landing
  - 25 m trees
  - Rolling terrain (elevation trending down)

Mission Area Assessment

Authorizations

- Land owner
- COA/333
- NOTAM
- NC Permit

Check surrounding for high obstacles

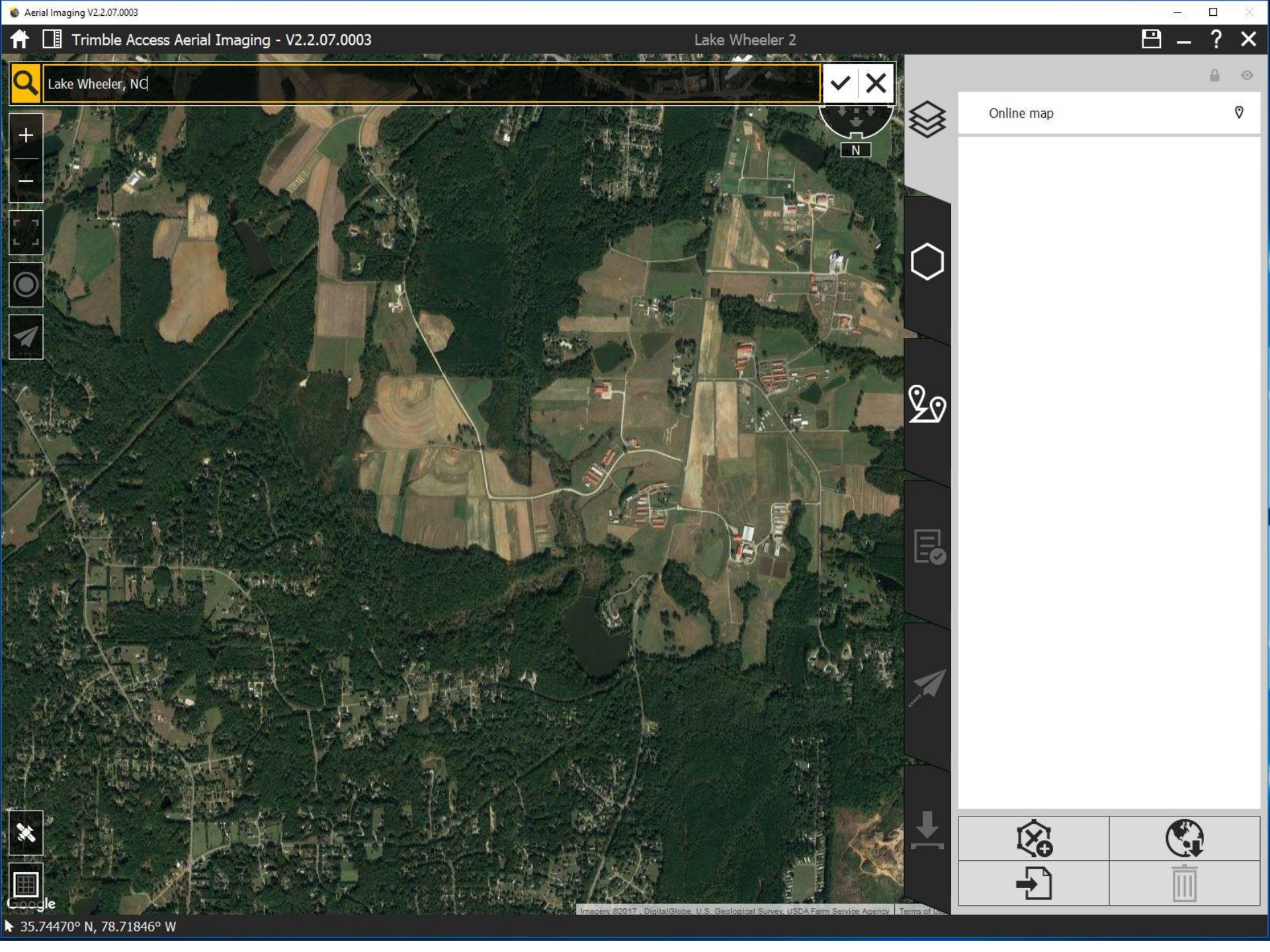
- Take off
- Mission
- Landing
- Alternate Landing Locations

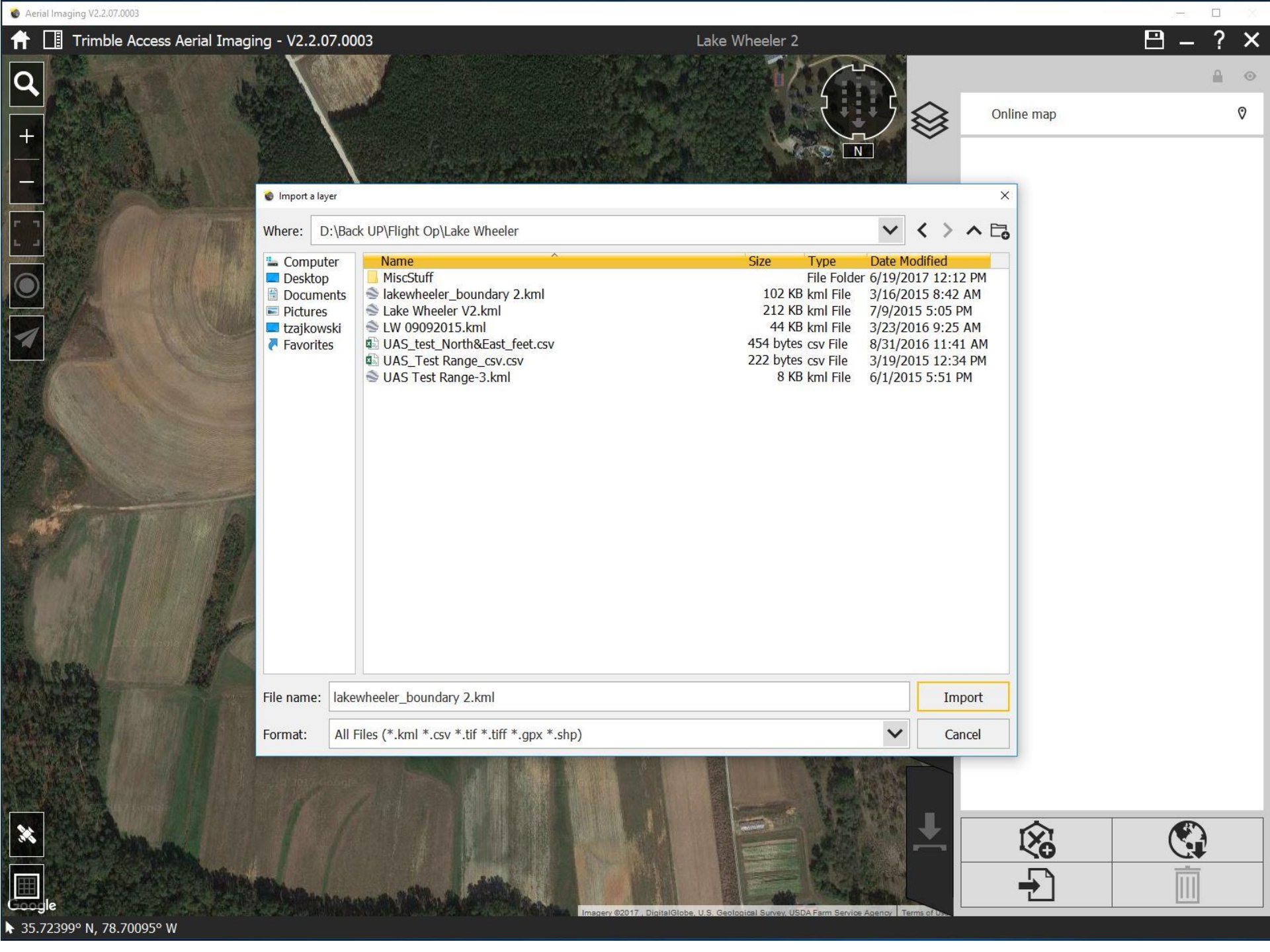
Ask the locals

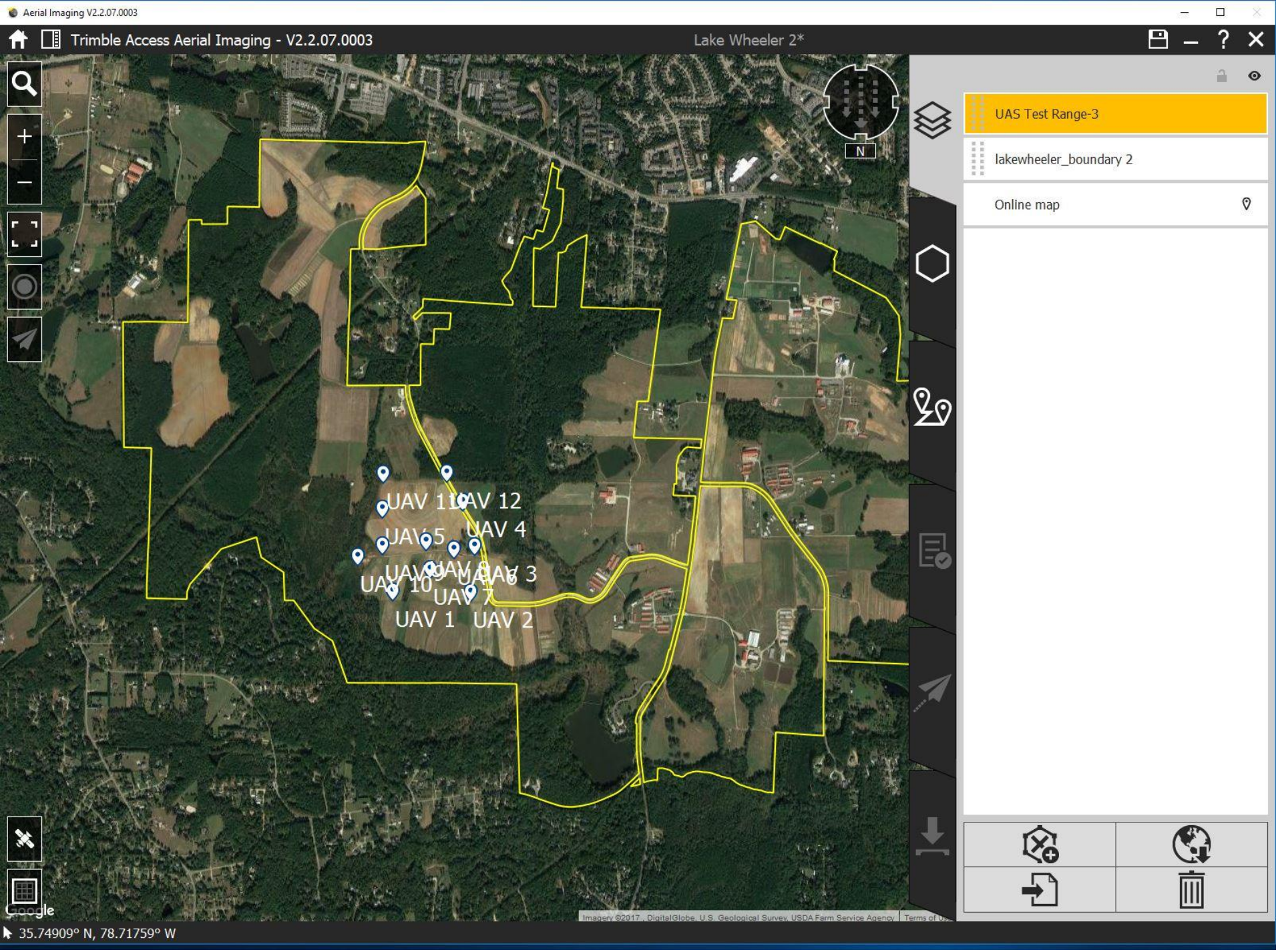
- Possible air traffic
- Ground activities

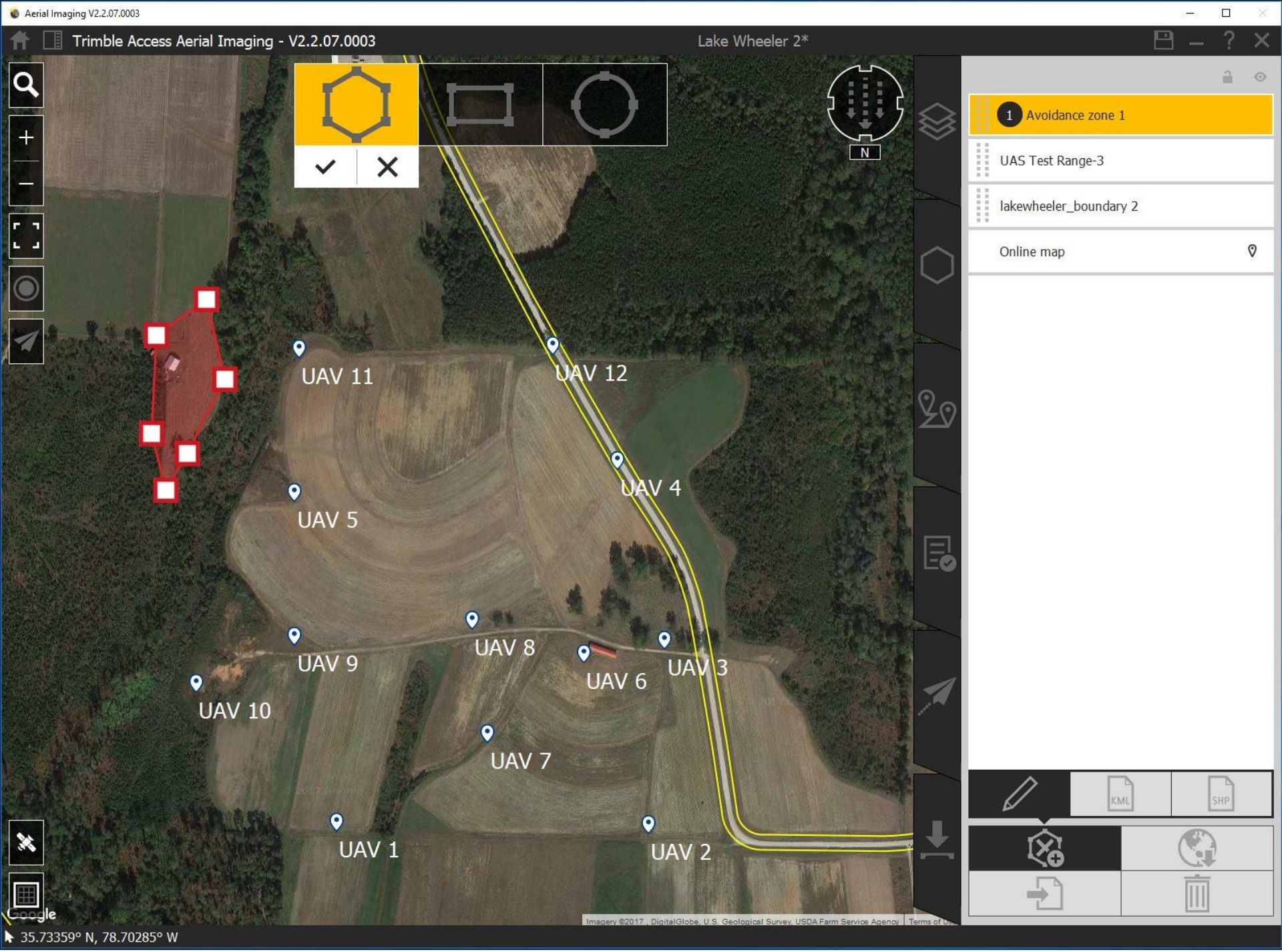
Weather

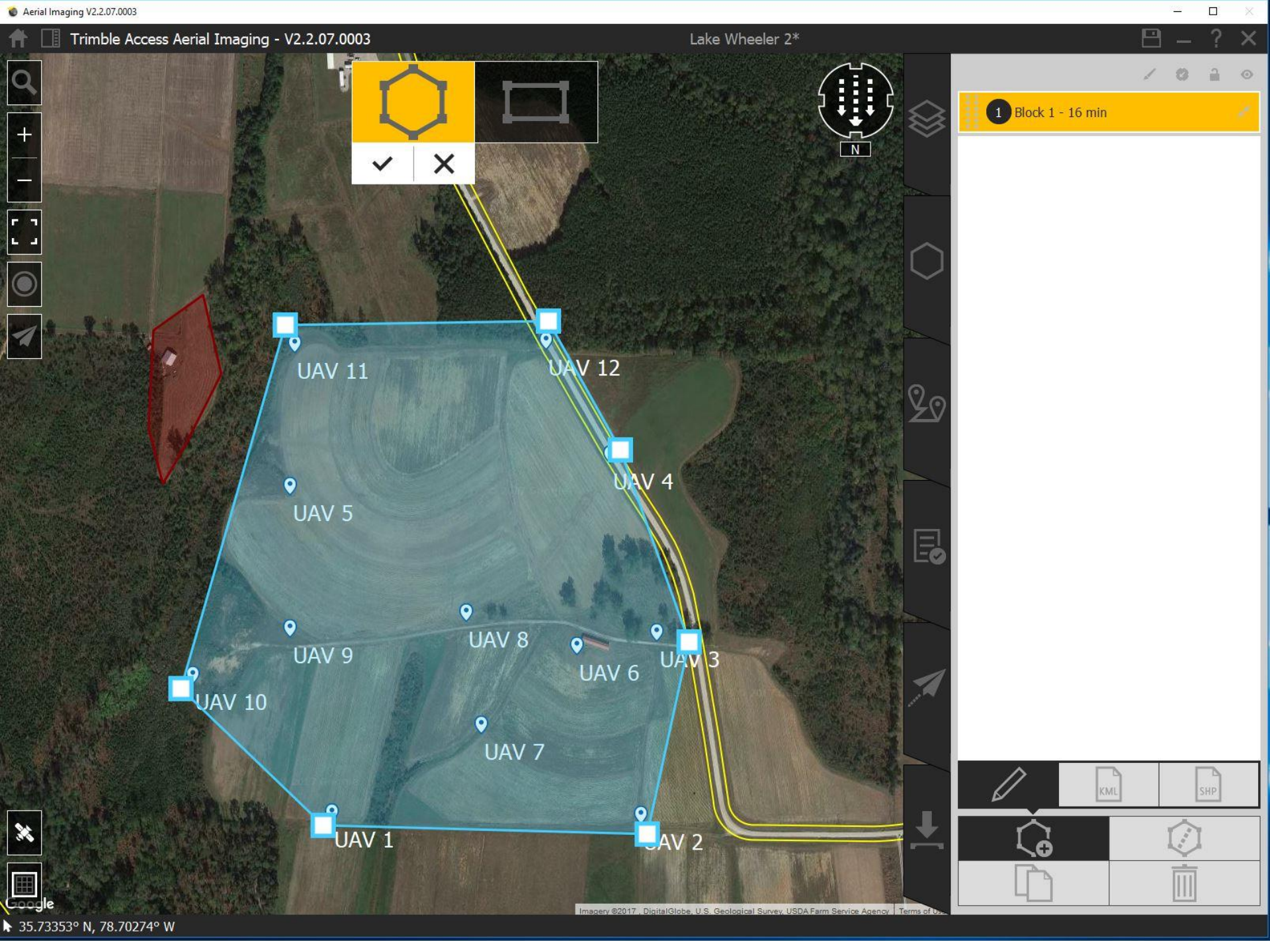
Spectrum management

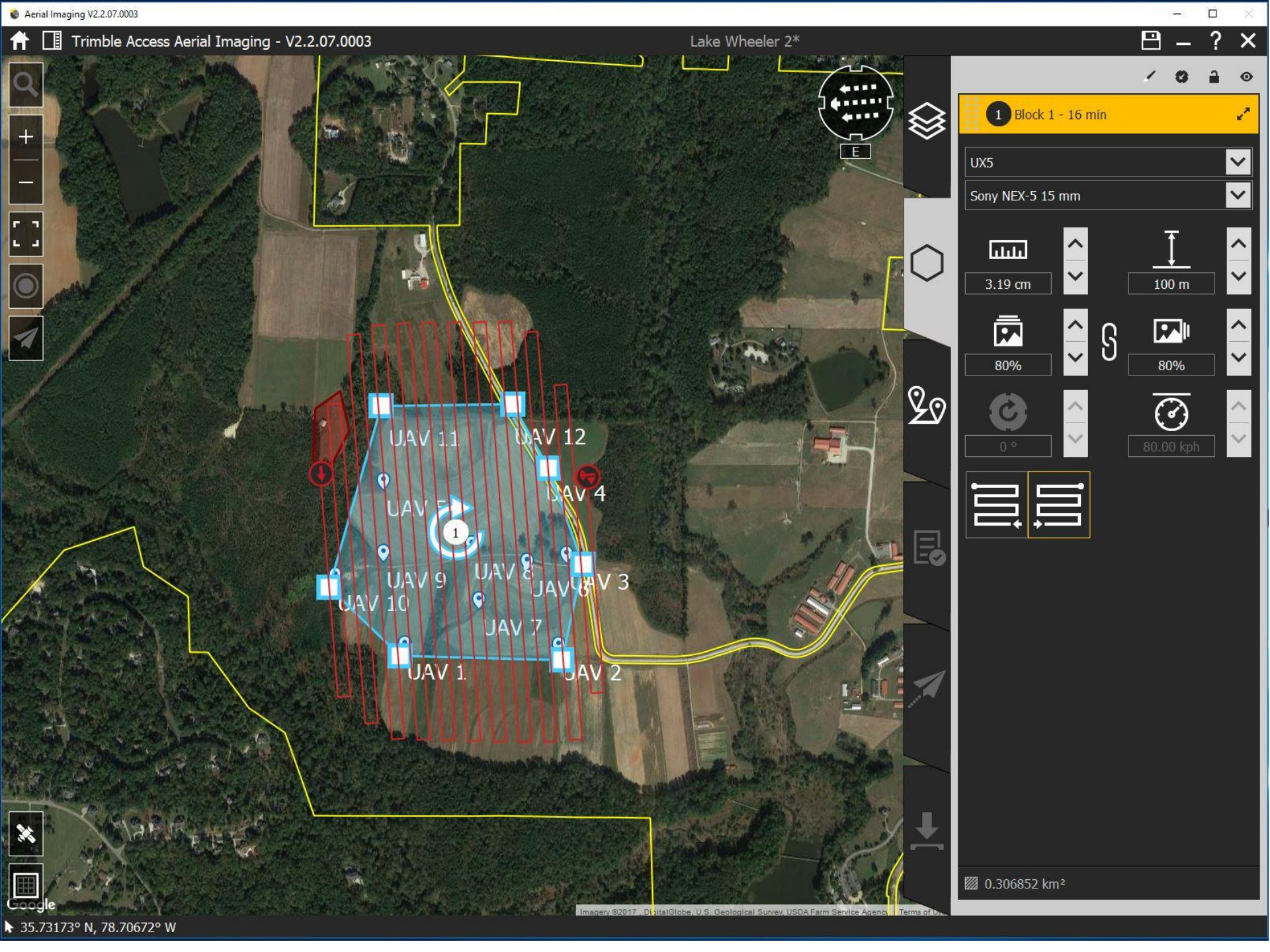

Aerial Imaging V2.2.07.0003
Trimble Access Aerial Imaging - V2.2.07.0003
Lake Wheeler 2
Lake Wheeler, NC
N
Online map
Google
Imagery ©2017 , DigitalGlobe, U.S. Geological Survey, USDA Farm Service Agency
35.74470° N, 78.71846° W

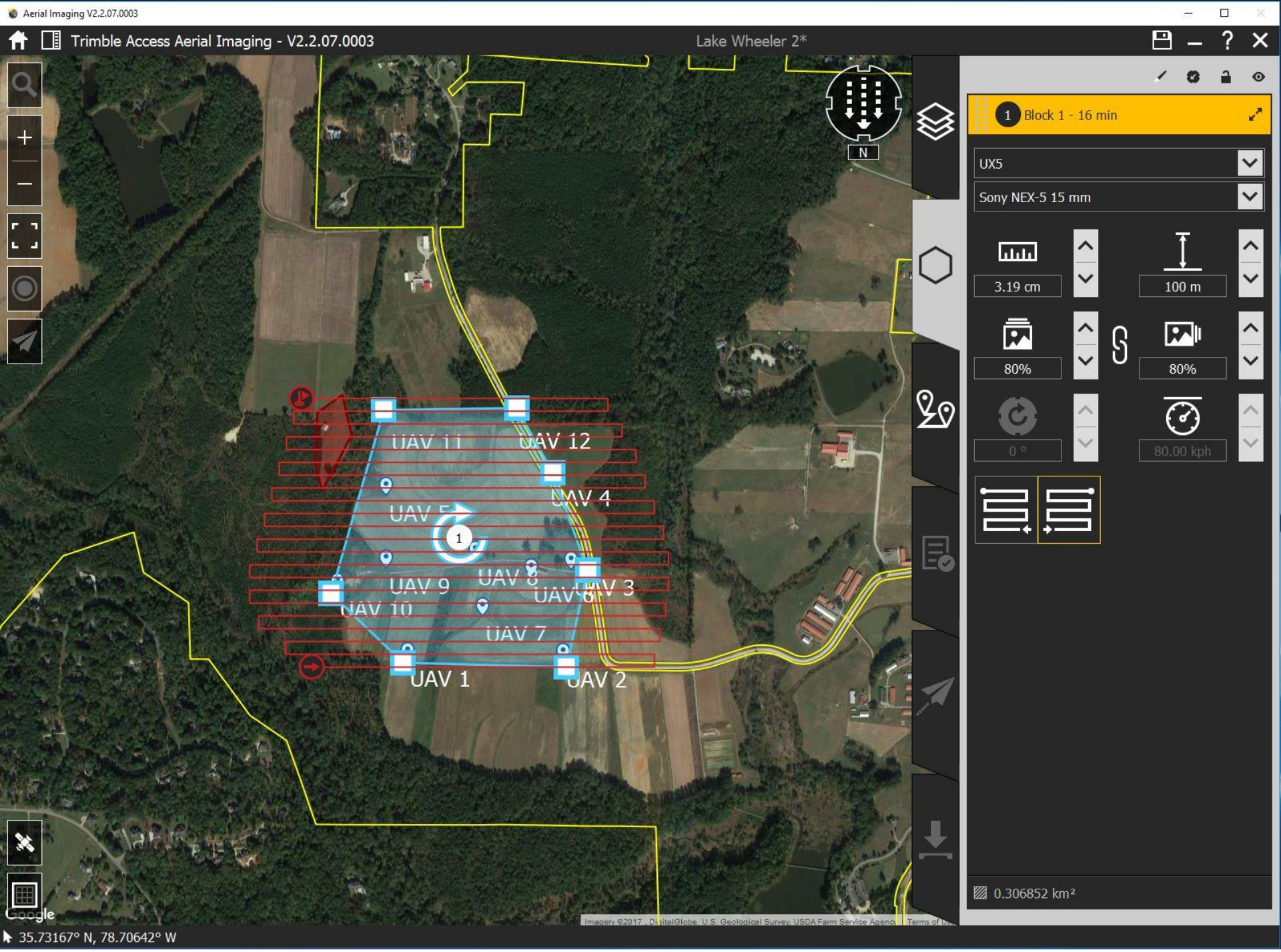

Aerial Imaging V2.2.07.0003
Trimble Access Aerial Imaging - V2.2.07.0003
Lake Wheeler 2
Online map
N
Import a layer
Where: D:\Back UP\Flight Op\Lake Wheeler
Computer
Desktop
Documents
Pictures
tzajkowski
Favorites
Name Size Type Date Modified
MiscStuff File Folder 6/19/2017 12:12 PM
lakewheeler_boundary 2.kml 102 KB kml File 3/16/2015 8:42 AM
Lake Wheeler V2.kml 212 KB kml File 7/9/2015 5:05 PM
LW 09092015.kml 44 KB kml File 3/23/2016 9:25 AM
UAS_test_North&East_feet.csv 454 bytes csv File 8/31/2016 11:41 AM
UAS_Test Range_csv.csv 222 bytes csv File 3/19/2015 12:34 PM
UAS Test Range-3.kml 8 KB kml File 6/1/2015 5:51 PM
File name: lakewheeler_boundary 2.kml
Import
Format: All Files (*.kml *.csv *.tif *.tiff *.gpx *.shp)
Cancel
Google
Imagery ©2017 , DigitalGlobe, U.S. Geological Survey, USDA Farm Service Agency
35.72399° N, 78.70095° W

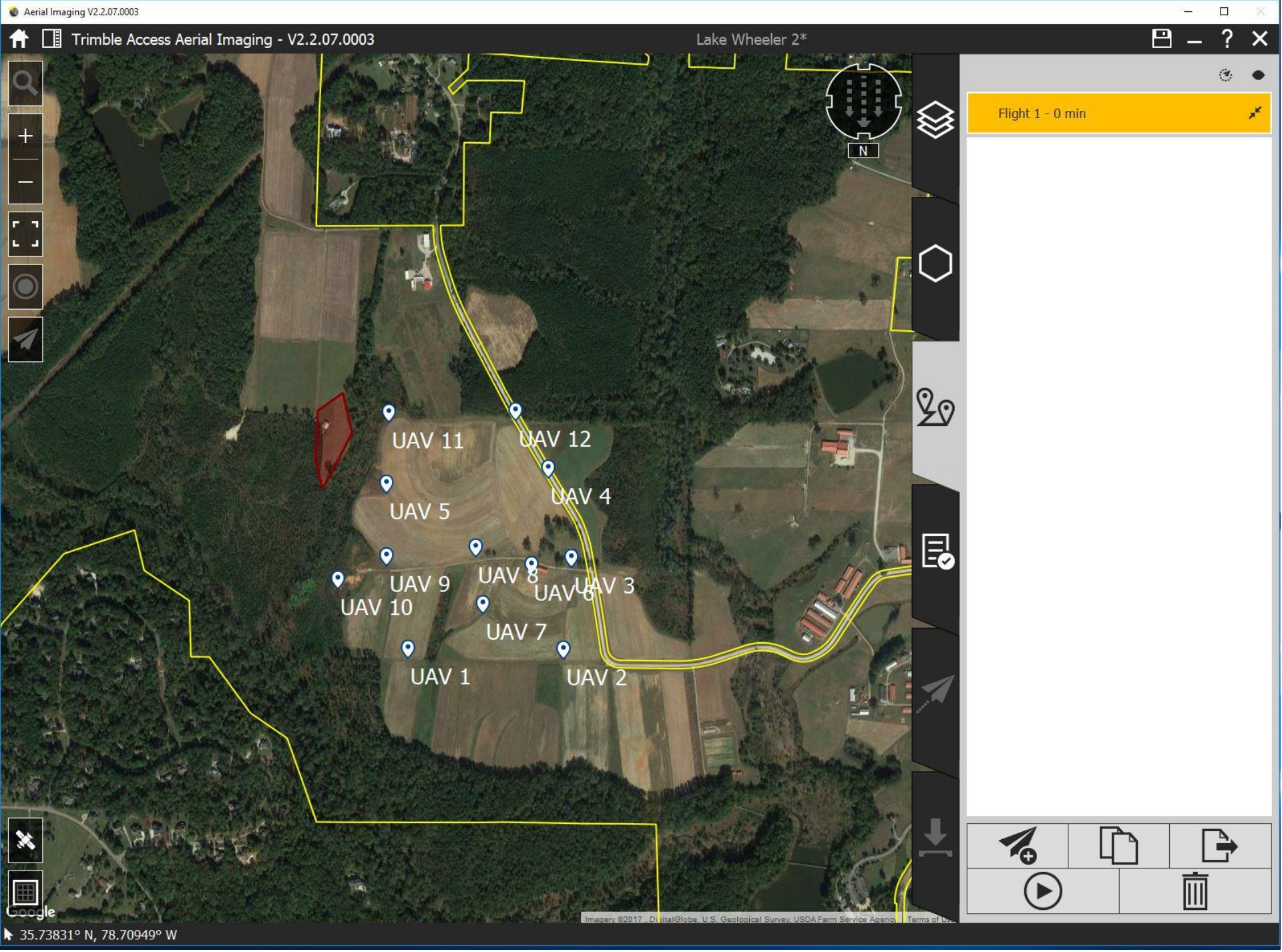

Aerial Imaging V2.2.07.0003
Trimble Access Aerial Imaging - V2.2.07.0003
Lake Wheeler 2*
N
UAS Test Range-3
lakewheeler_boundary 2
Online map
UAV 12
UAV 4
UAV 3
UAV 1
UAV 2
35.74909° N, 78.71759° W

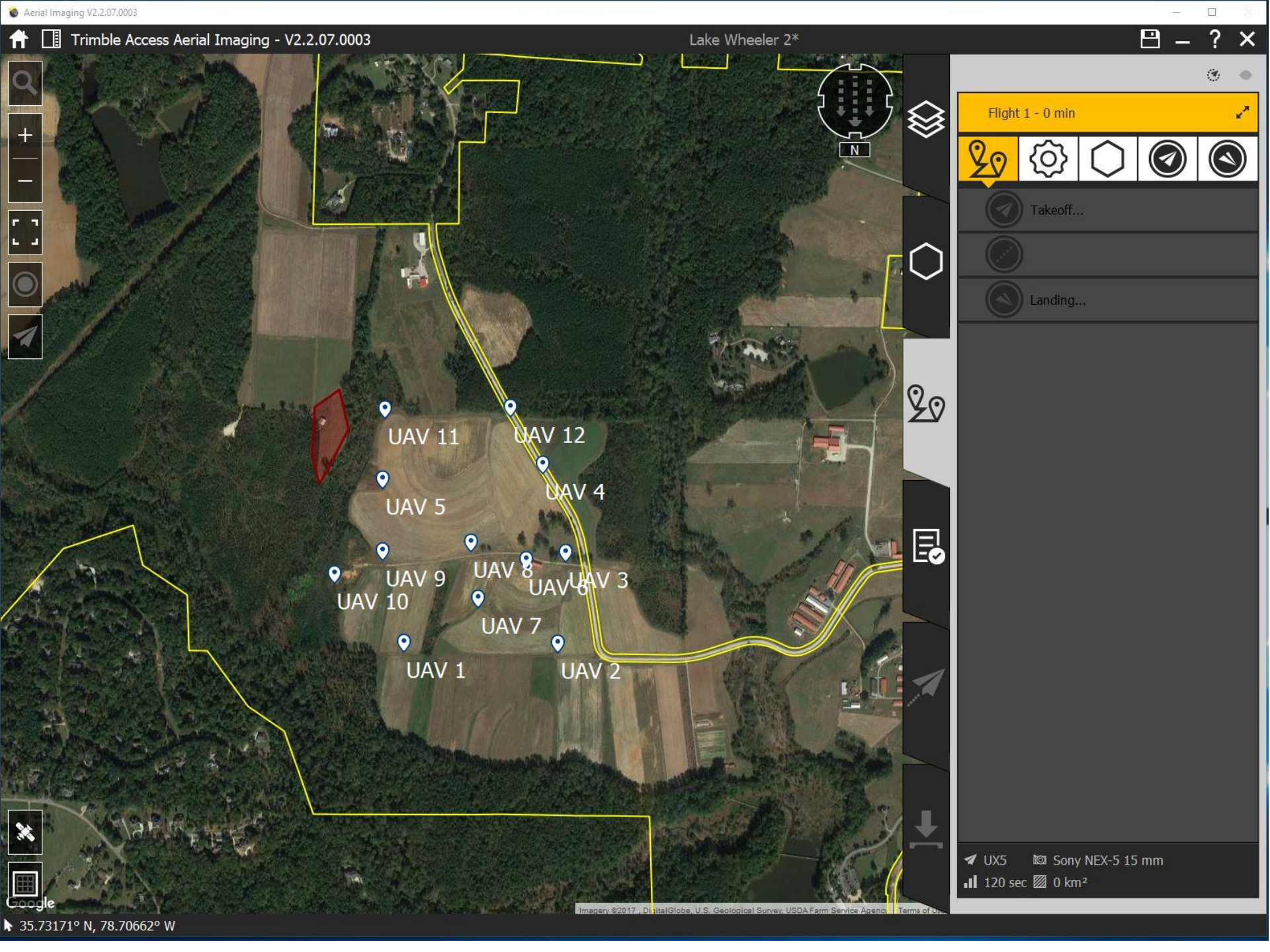

Aerial Imaging V2.2.07.0003
Trimble Access Aerial Imaging - V2.2.07.0003
Lake Wheeler 2*
N
1 Avoidance zone 1
UAS Test Range-3
lakewheeler_boundary 2
Online map
KML
SHP
UAV 11
UAV 12
UAV 4
UAV 5
UAV 9
UAV 8
UAV 6
UAV 3
UAV 10
UAV 7
UAV 1
UAV 2
Google
Imagery ©2017 , DigitalGlobe, U.S. Geological Survey, USDA Farm Service Agency
35.73359° N, 78.70285° W

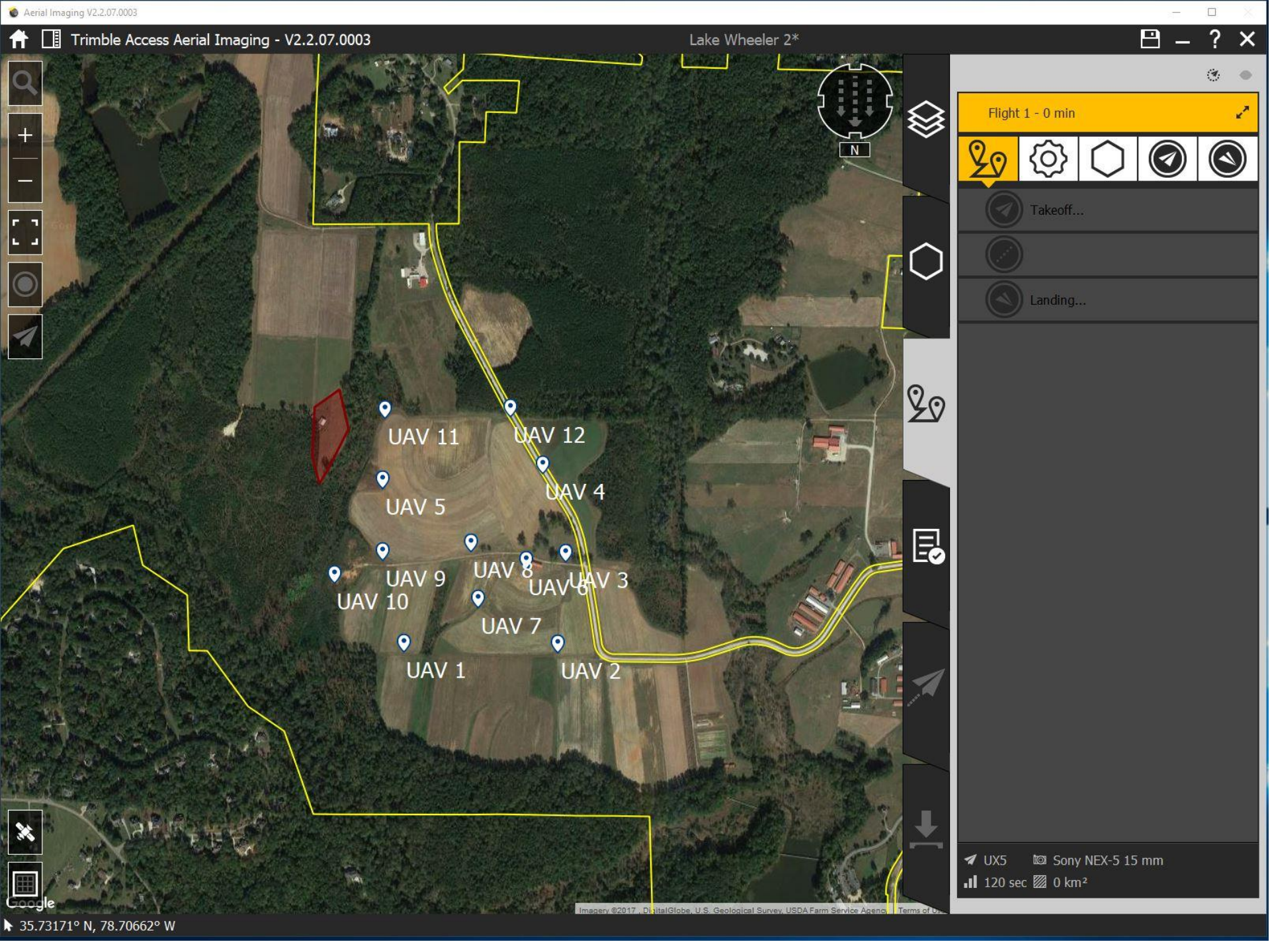

Aerial Imaging V2.2.07.0003
Trimble Access Aerial Imaging - V2.2.07.0003
Lake Wheeler 2*
N
1 Block 1 - 16 min
KML
SHP
UAV 11
UAV 12
UAV 4
UAV 5
UAV 9
UAV 8
UAV 6
UAV 3
UAV 10
UAV 7
UAV 1
UAV 2
Google
Imagery ©2017 , DigitalGlobe, U.S. Geological Survey, USDA Farm Service Agency
35.73353° N, 78.70274° W

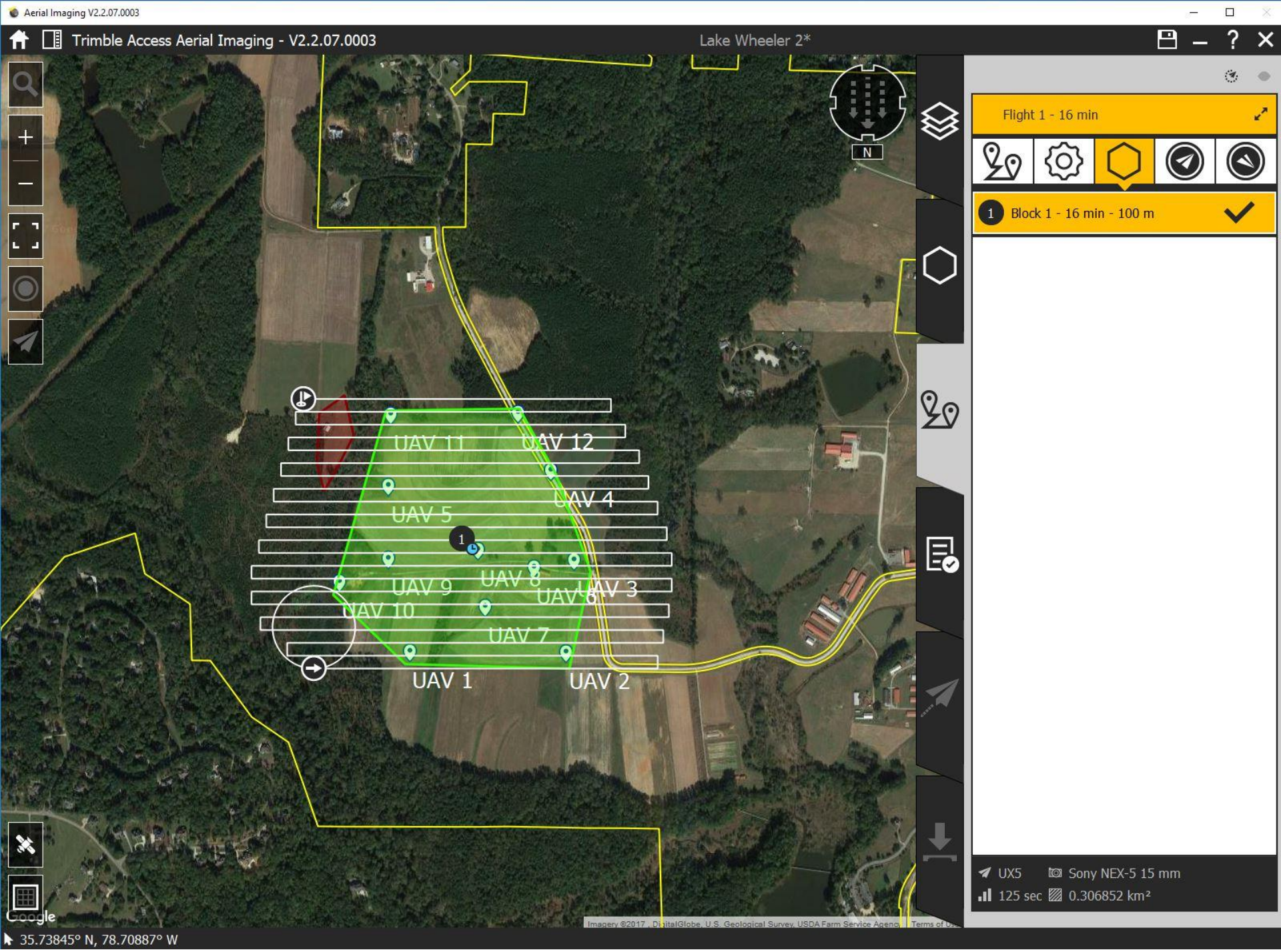

Aerial Imaging V2.2.07.0003
Trimble Access Aerial Imaging - V2.2.07.0003
Lake Wheeler 2*
E
1 Block 1 - 16 min
UX5
Sony NEX-5 15 mm
3.19 cm
100 m
80%
80%
0 °
80.00 kph
0.306852 km²
UAV 11
UAV 12
UAV 4
UAV 9
UAV 8
UAV 3
UAV 10
UAV 7
UAV 1
UAV 2
35.73173° N, 78.70672° W

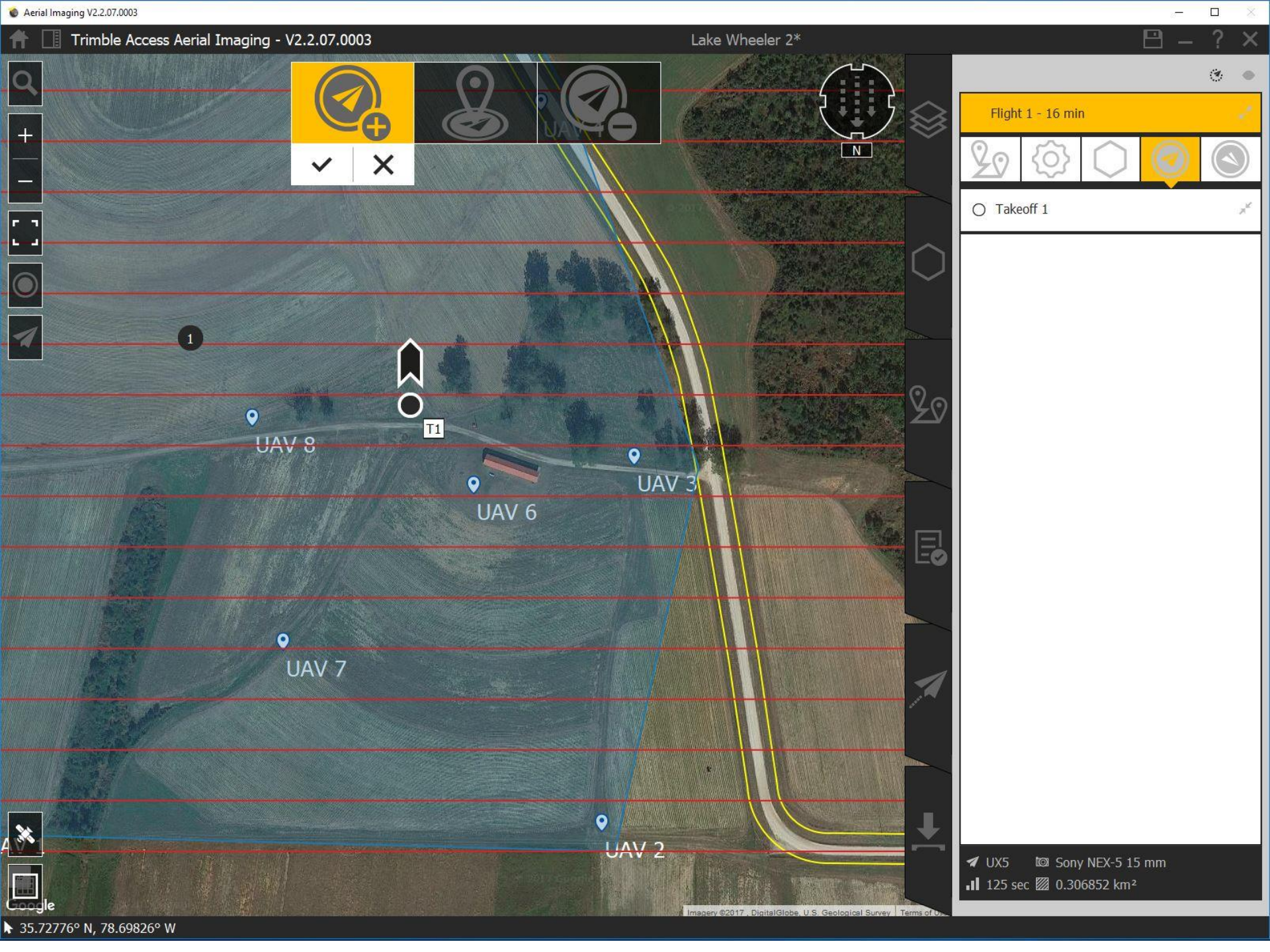

Aerial Imaging V2.2.07.0003
Trimble Access Aerial Imaging - V2.2.07.0003
Lake Wheeler 2*
N
1 Block 1 - 16 min
UX5
Sony NEX-5 15 mm
3.19 cm
100 m
80%
80%
0 °
80.00 kph
0.306852 km²
UAV 11
UAV 12
UAV 4
UAV 9
UAV 8
UAV 3
UAV 10
UAV 7
UAV 1
UAV 2
Imagery ©2017 , DigitalGlobe, U.S. Geological Survey, USDA Farm Service Agency
35.73167° N, 78.70642° W


Aerial Imaging V2.2.07.0003
Trimble Access Aerial Imaging - V2.2.07.0003
Lake Wheeler 2*
N
Flight 1 - 0 min
UAV 11
UAV 12
UAV 4
UAV 5
UAV 9
UAV 8
UAV 6
UAV 3
UAV 10
UAV 7
UAV 1
UAV 2
Google
Imagery ©2017 , DigitalGlobe, U.S. Geological Survey, USDA Farm Service Agency
Terms of Use
35.73831° N, 78.70949° W

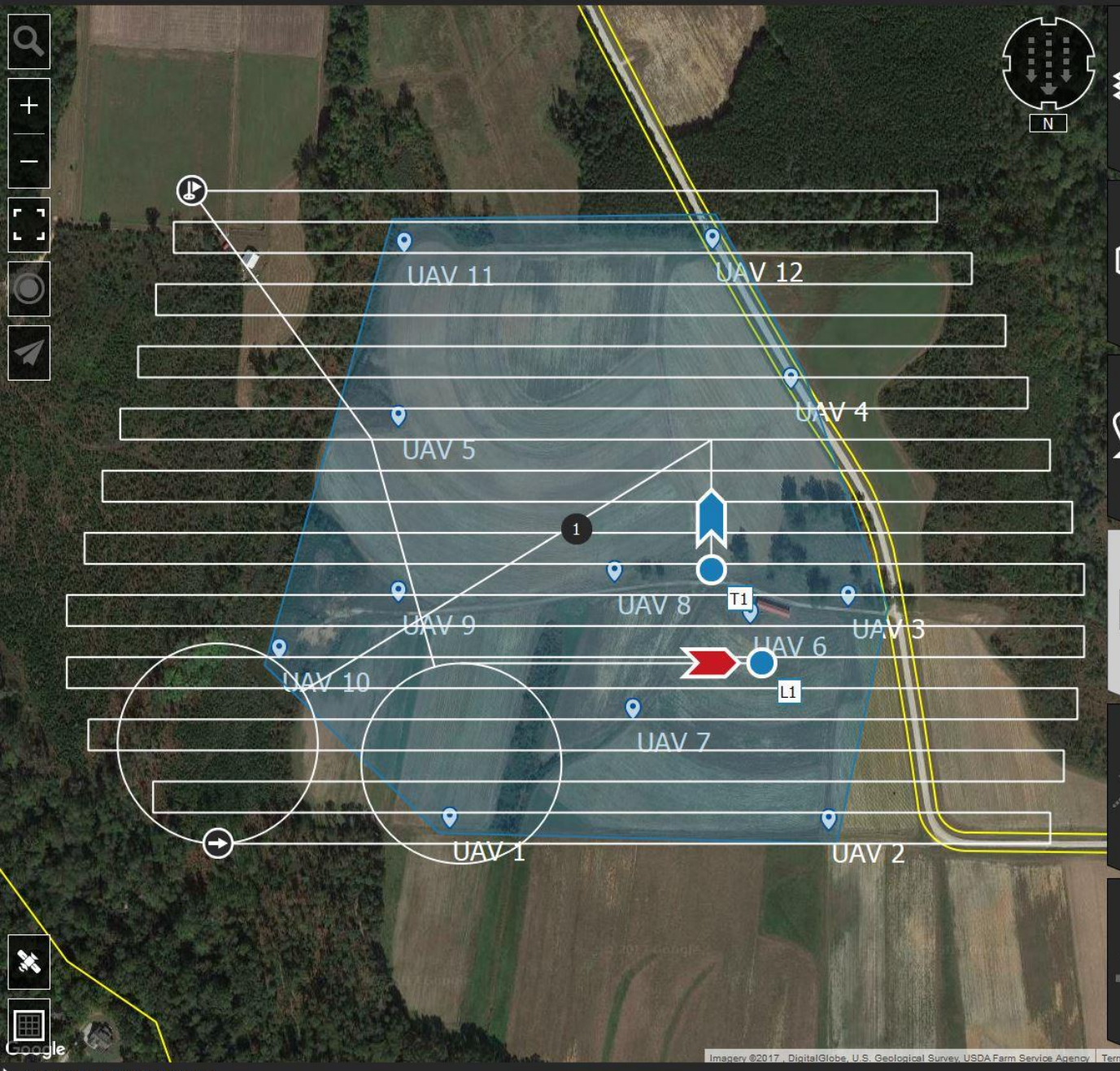

Aerial Imaging V2.2.07.0003
Trimble Access Aerial Imaging - V2.2.07.0003
Lake Wheeler 2*
N
Flight 1 - 0 min
Takeoff...
Landing...
UAV 11
UAV 12
UAV 4
UAV 5
UAV 9
UAV 8
UAV 6
UAV 3
UAV 10
UAV 7
UAV 1
UAV 2
UX5
Sony NEX-5 15 mm
120 sec
0 km²
Google
35.73171° N, 78.70662° W


Aerial Imaging V2.2.07.0003
Trimble Access Aerial Imaging - V2.2.07.0003
Lake Wheeler 2*
N
Flight 1 - 0 min
Takeoff...
Landing...
UAV 11
UAV 12
UAV 4
UAV 5
UAV 9
UAV 8
UAV 6
UAV 3
UAV 10
UAV 7
UAV 1
UAV 2
UX5
Sony NEX-5 15 mm
120 sec
0 km²
Google
35.73171° N, 78.70662° W


Aerial Imaging V2.2.07.0003
Trimble Access Aerial Imaging - V2.2.07.0003
Lake Wheeler 2*
N
Flight 1 - 16 min
1 Block 1 - 16 min - 100 m
UAV 11
UAV 12
UAV 4
UAV 5
1
UAV 9
UAV 8
UAV 6
UAV 3
UAV 10
UAV 7
UAV 1
UAV 2
UX5
Sony NEX-5 15 mm
125 sec
0.306852 km²
Google
Imagery ©2017 , DigitalGlobe, U.S. Geological Survey, USDA Farm Service Agency
35.73845° N, 78.70887° W


Aerial Imaging V2.2.07.0003
Trimble Access Aerial Imaging - V2.2.07.0003
Lake Wheeler 2*
N
Flight 1 - 16 min
Takeoff 1
UAV 8
T1
UAV 6
UAV 3
UAV 7
UAV 2
UX5
Sony NEX-5 15 mm
125 sec
0.306852 km²
Google
Imagery ©2017 , DigitalGlobe, U.S. Geological Survey
35.72776° N, 78.69826° W


Aerial Imaging V2.2.07.0003
Trimble Access Aerial Imaging - V2.2.07.0003
Lake Wheeler 2*
Flight 1 - 19 min
UAV 4
UAV 5
UAV 8
UAV 9
UAV 3
UAV 6
UAV 7
UAV 1
UAV 2
L1
N
1
Google
35.72937° N, 78.70014° W



Flight 1

- UX5
- Sony NEX-5 15 mm
- 21 min
- 530
- 125 sec

Takeoff 1

	35.72756° N
	78.69650° W
	Not fixed
	0°

Straight up

Block 1

	Right
	3.19 cm
	100 m
	80 %
	80 %
	0.31 km²
	530
	80.00 kph
	16 min

Forward down

Landing 1

	35.72672° N
	78.69594° W
	Not fixed
	90°
	2 m
	Right
	Curved


Aerial Imaging V2.2.07.0003
Trimble Access Aerial Imaging - V2.2.07.0003
Lake Wheeler 2
Flight...
85%
42:27
18:21
00:09
0
22
100%
125 sec
9
0
0 kph
S
79 kph
80 kph
79 kph
473 m
240°
100 m
100 m
N
UAV 11
UAV 12
UAV 4
UAV 5
UAV 8
UAV 9
UAV 6
UAV 3
UAV 10
UAV 7
UAV 1
UAV 2
Information
Tap Cancel to stop the simulation and return to the Flights tab.
35.72512° N, 78.69613° W
35.72592° N, 78.70102° W

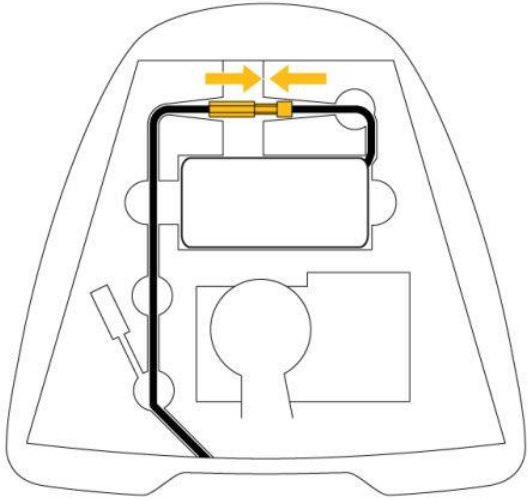
Connect the modem

- Make sure the download cable is disconnected from the modem.
- Attach the RF antenna to the modem.
- Attach the modem and antenna to the back of the tablet.
- Insert the modem cable into the USB port of the tablet.

Connect the battery

- Insert a fully charged battery into the battery compartment of the payload bay.
- Connect the main power connector on the battery to the power connector in the rover.

Note - *Make sure you are using a properly balanced battery.*



Step 3-5

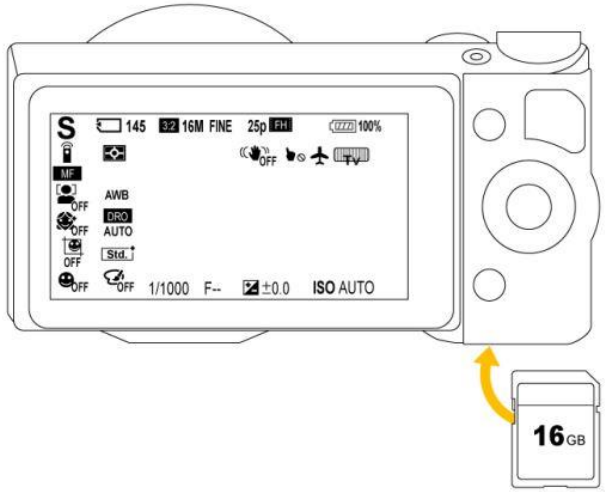
- Ground Control Station (GCS) Connects to Autopilot
- Runs Systems Checks

Flight checklist

Prepare the camera

- Insert an empty SD card.
- Turn the camera on and check if the settings are correct (click [?] below).
- Set the shutter speed. The flight requires a minimum shutter speed of 1/1250. Take the current light conditions into consideration.

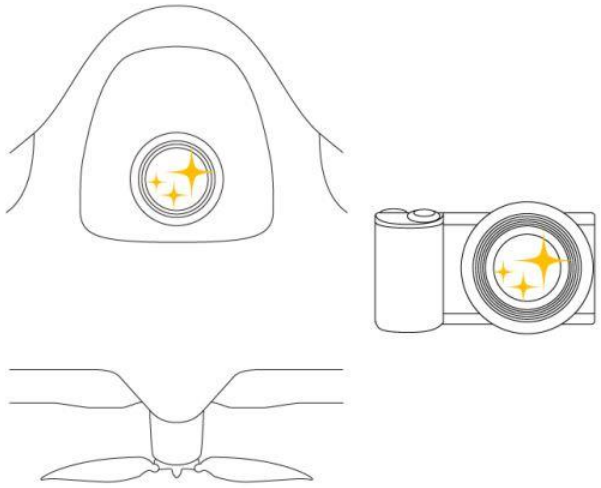
?



Clean the camera lens and filter

Using first the wet camera wipes and then the dry camera wipes, thoroughly clean the camera lens and both sides of the camera filter in the body. Make sure there are no specks of moisture or dust, as these will affect the image quality.

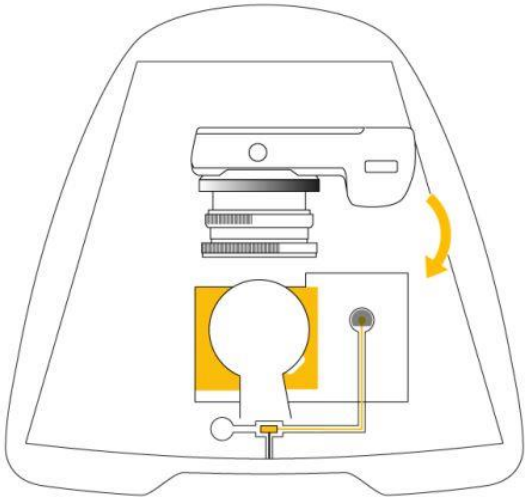
Note - *Only use wipes that are specifically intended for cleaning camera lenses.*



Insert the camera

- Insert the camera into the camera cavity of the payload bay.
- Secure the camera using the Velcro strap.

Note *- After inserting and securing the camera, check the shutter speed as the settings control might have spun and changed the setting.*

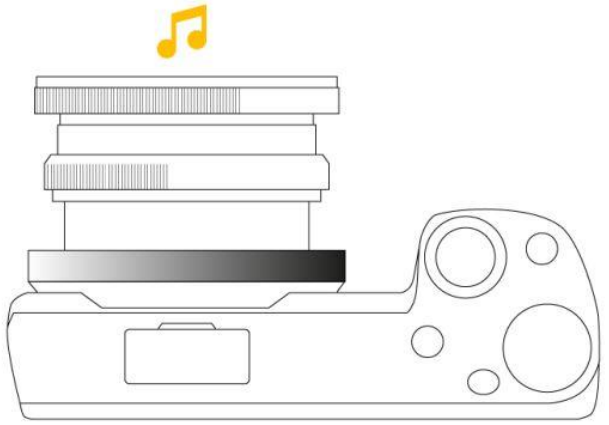


Flight checklist

Check the camera trigger

Click the button below to trigger the camera to take a picture.

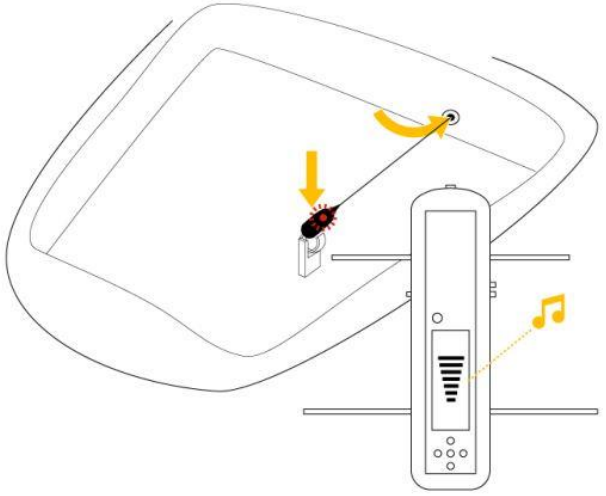
- [ ] Camera trigger is OK (sound)



Flight checklist

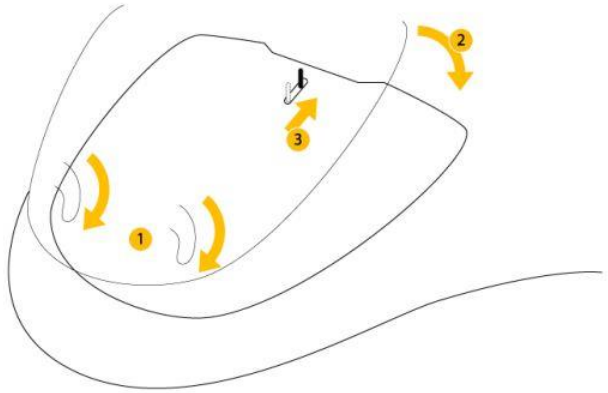
Insert the tracker (optional)

- Turn on the tracker transmitter.
- Make sure you can hear the transmitter using the tracker receiver.
- Insert the tracker transmitter into the payload bay.



Close the payload bay

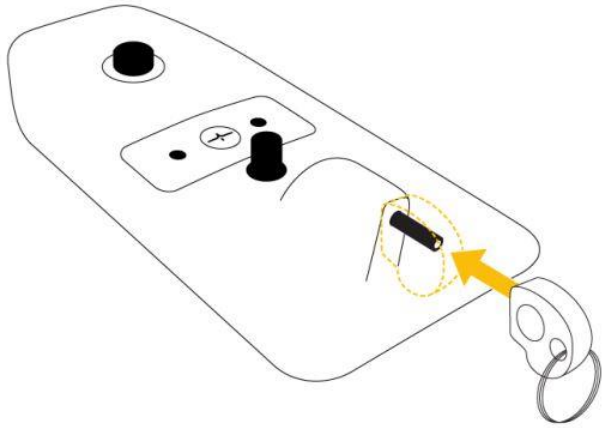
- Make sure the payload is secured with the Velcro strap.
- Attach the top cover to the payload bay and make sure it is secure.



Flight checklist

Cover the pitot tube

Put the pitot tube cover on the pitot tube.

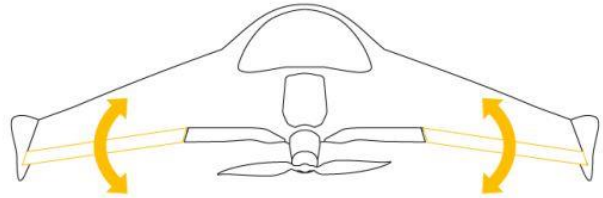


Flight checklist

Check the elevon response

- Make sure that the elevons can move freely and are not obstructed in any way.
- Tap the button below and watch the elevons on the rover. Make sure the elevons move in response to the button commands. Make sure the elevons move freely and fluently, and in unison.

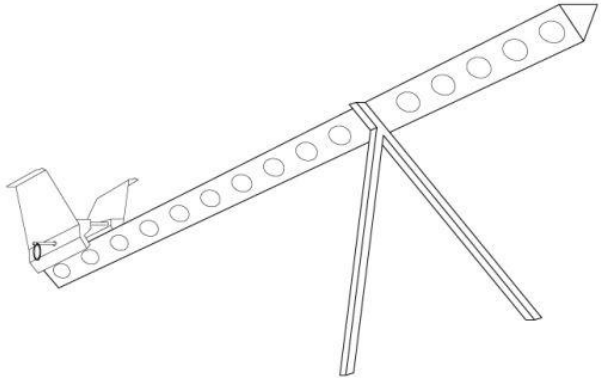
Stop elevon



Assemble the launcher

- Make sure the launcher is assembled as shown in the picture.
- Do not tighten the elastics yet.

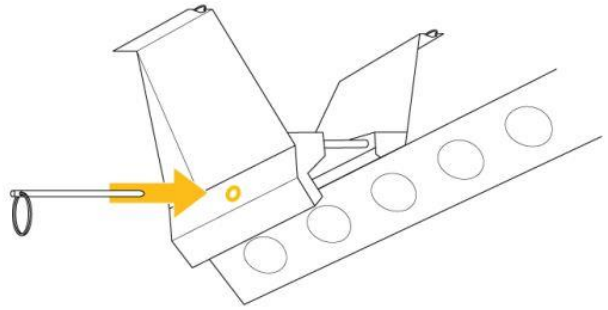
Note - *For more information on how to assemble the launcher, refer to the Trimble Launcher Quick Start Guide.*



Flight checklist

Insert the safety pin

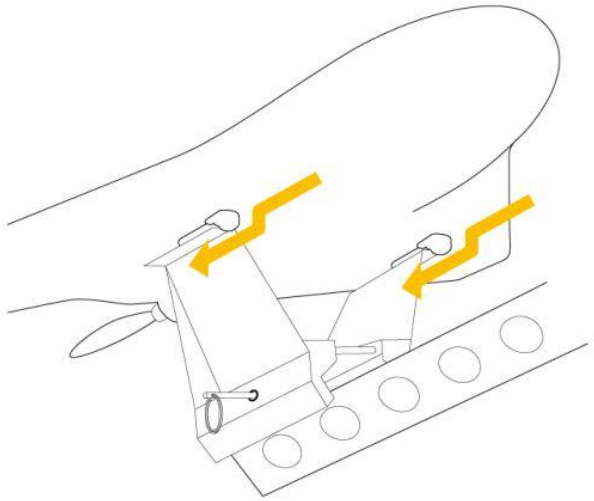
Make sure the safety pin is inserted into the launch dock.



Flight checklist

Place the rover on the launcher

Position the aircraft at the front of the launch dock and use your finger tips to guide the launcher slats on the underside of the aircraft onto the lips of the launch dock.



Step 18

- Initialize Autopilot
- Load Flight Plan

Flight checklist

Remove the pitot cover

Check the airspeed on the tablet. If the airspeed is below 20 kph, you can safely remove the pitot cover.

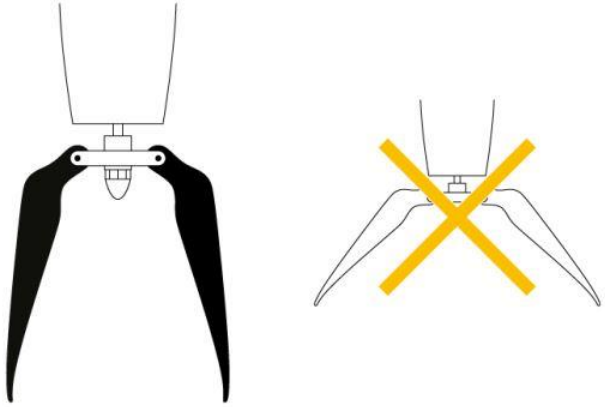
Flight checklist

Check the airspeed response

Press and hold the pitot tube for no more than 5 seconds. Make sure that the airspeed changes. The airspeed should reach at least 50 kph.

Position the propellers

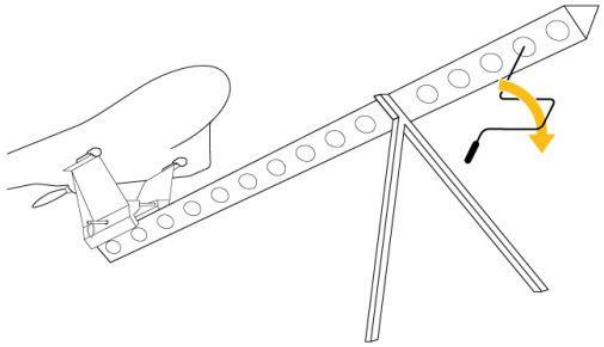
Check the position of the propellers on the aircraft and make sure they are pointing backward. If the propellers are not positioned correctly, carefully adjust them.



Flight checklist

Tighten the launcher cord elastics

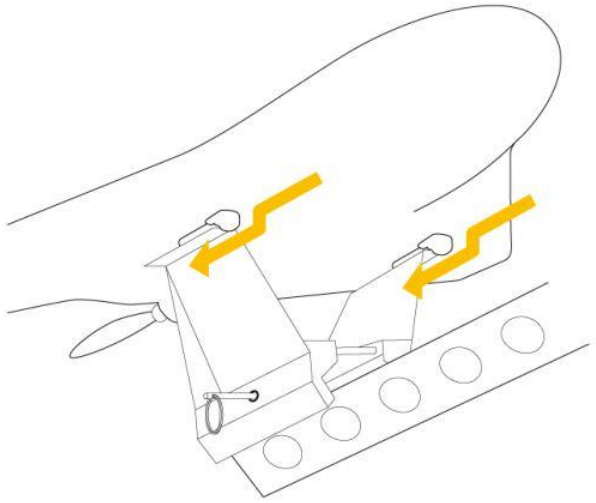
- Insert the crank onto the nut located toward the front end of the launch slide.
- Stretch the launcher cord using the crank. In normal circumstances, the node between the cord and elastic should be in the middle of the hole numbered '4' on the launcher.
- Remove the crank.



Flight checklist

Verify the rover position

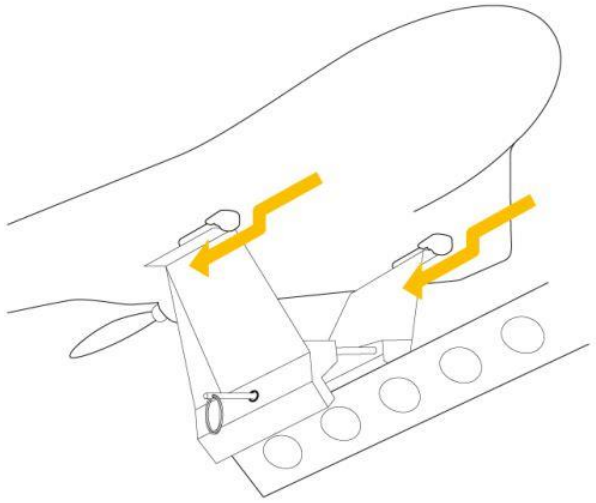
Make sure the rover is correctly positioned on the launch dock.



Flight checklist

Verify the rover position

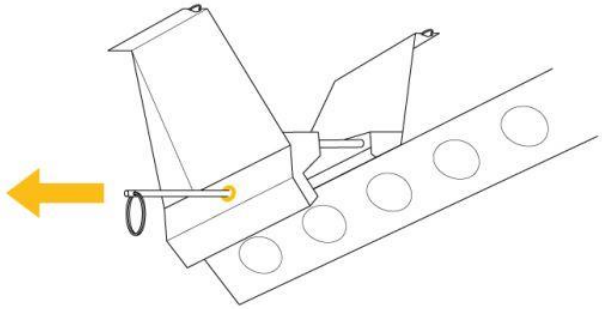
Make sure the rover is correctly positioned on the launch dock.



Flight checklist

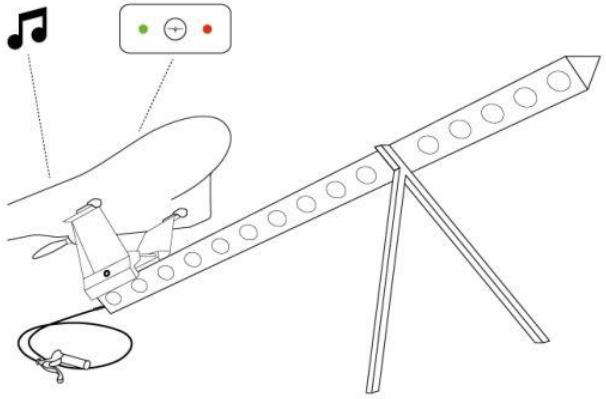
Remove the safety pin

- Make sure that the launch zone is free from obstacles.
- To remove the safety pin, position yourself behind the launcher, reach carefully under the rover and then pull out the safety pin.



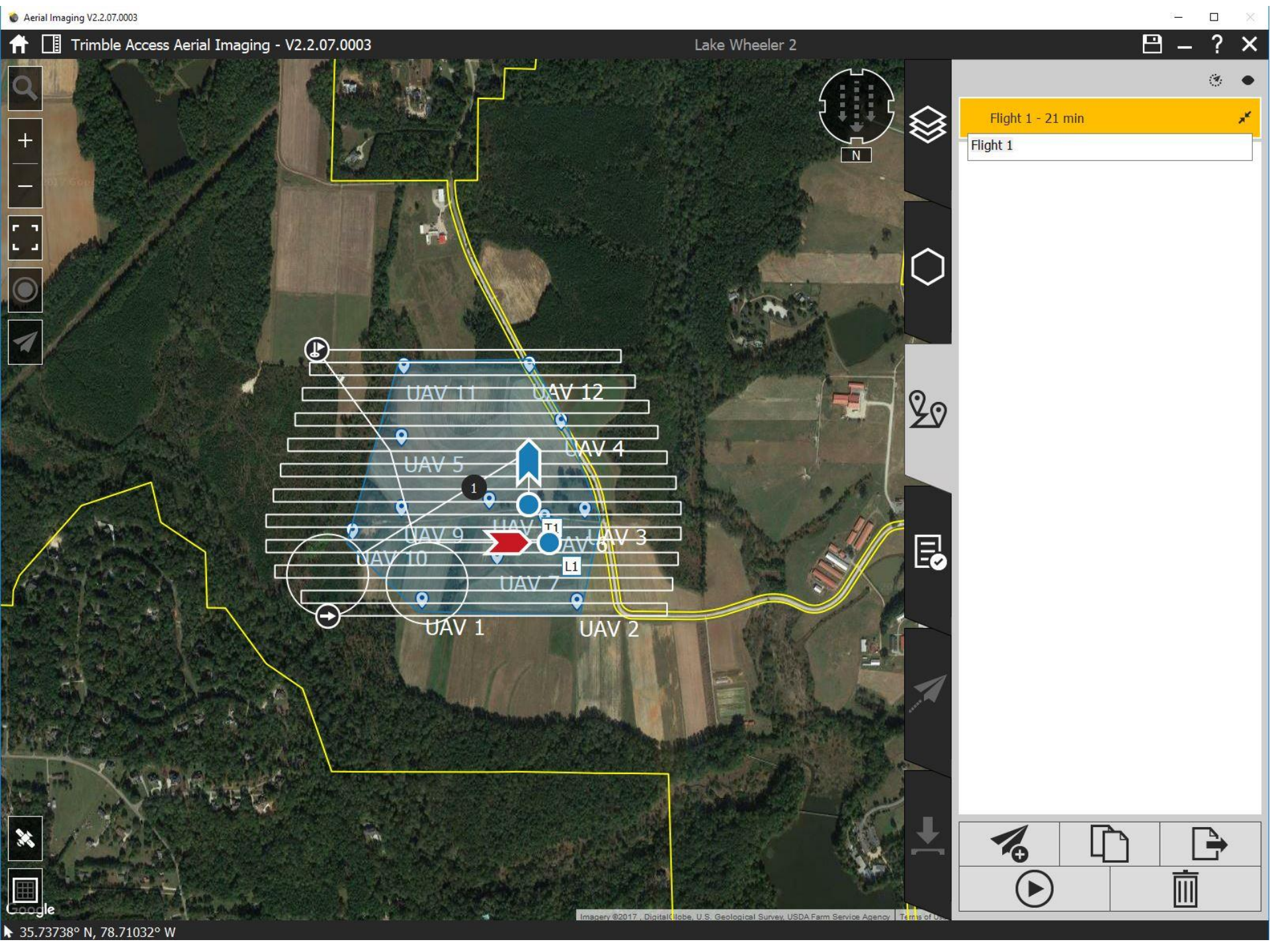
Flight checklist

Arm the system



Arm

- [ ] Drive unit is armed (sound)
- [ ] eBox is armed (steady LEDs)


Aerial Imaging V2.2.07.0003
Trimble Access Aerial Imaging - V2.2.07.0003
Lake Wheeler 2
N
Flight 1 - 21 min
Flight 1
UAV 11
UAV 12
UAV 4
UAV 5
UAV 9
UAV 10
UAV 3
UAV 7
UAV 1
UAV 2
1
T1
L1
Google
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35.73738° N, 78.71032° W