GIC

# Processing Multispectral Images with Pix4D

PIX4D pro mapper


**Sasanka Madawalagama**
Geoinformatics Center
Asian Institute of Technology
Thailand

# Data Collection

- Location – ARRI, Ayuthaya
- Crop – Rice (70 Days)
- Drone – Modified Phantom 3 Pro
- Sensors –
  - Parrot Sequoia Multispectral (G,R,RE,NIR)
  - Parrot Sequoia RGB
  - Phantom 3 Pro camera RGB


กรมการข้าว
ศูนย์วิจัยข้าวพระนครศรีอยุธยา






# Requirements

- Software
  - Pix4D Desktop – as a 15days **complete trial** or licenced
  - Additional – QGIS 2.18

- System

**Recommended**

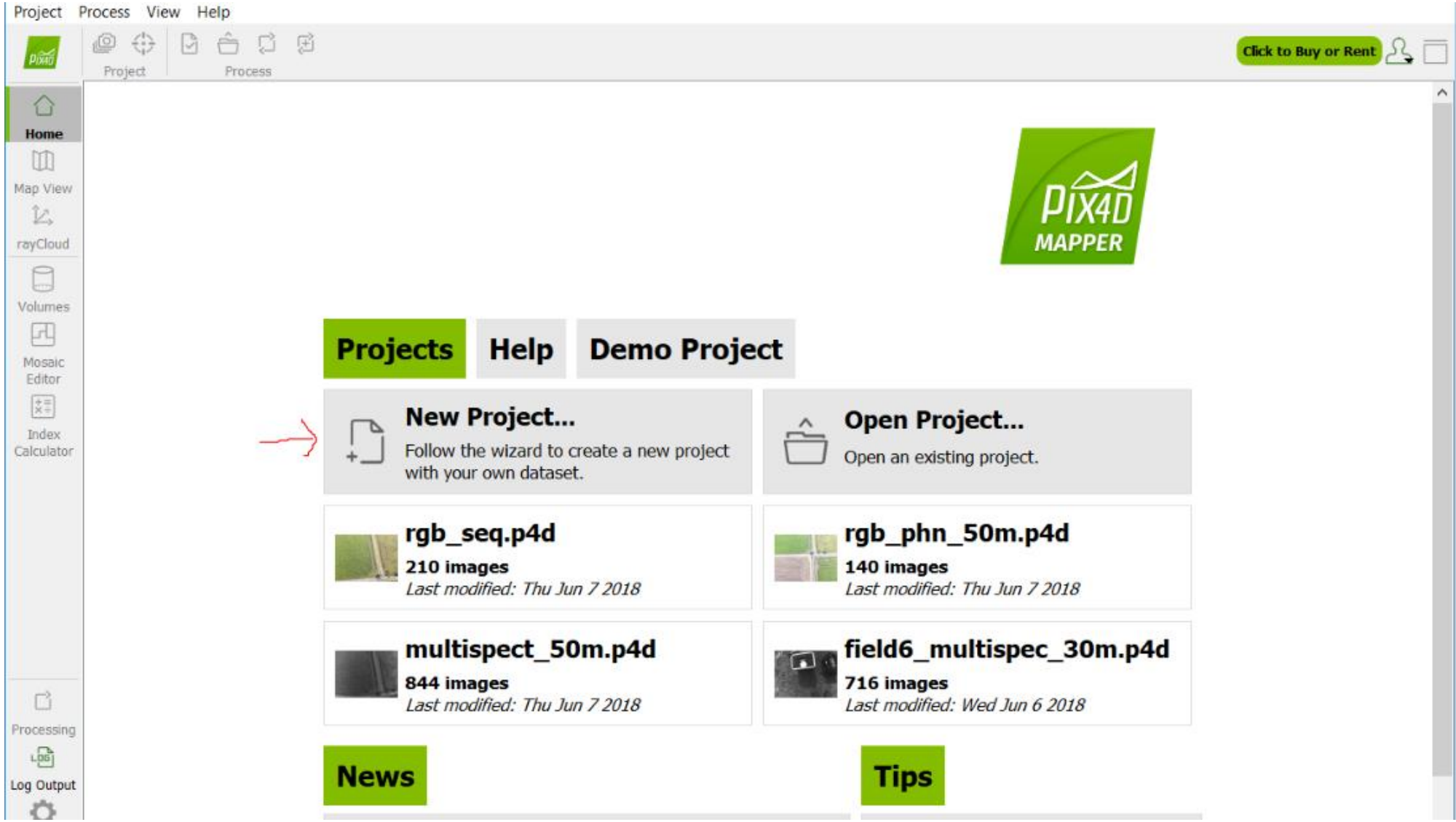
- Windows 8, 10 64 bits.
- CPU quad-core or hexa-core Intel i7/Xeon.
- GeForce GPU compatible with OpenGL 3.2 and 2 GB RAM.
- Hard disk: SSD.
- Small projects (under 100 images at 14 MP): 8 GB RAM, 15 GB SSD Free Space.
- Medium projects (between 100 and 500 images at 14 MP): 16GB RAM, 30 GB SSD Free Space.
- Large projects (over 500 images at 14 MP): 32 GB RAM, 60 GB SSD Free Space.
- Very Large projects (over 2000 images at 14 MP): 64 GB RAM, 120 GB SSD Free Space.

# First Steps

- Inspect the data
- Remove unnecessary images
- Build clear folder structure

1. Open Pix4D Desktop

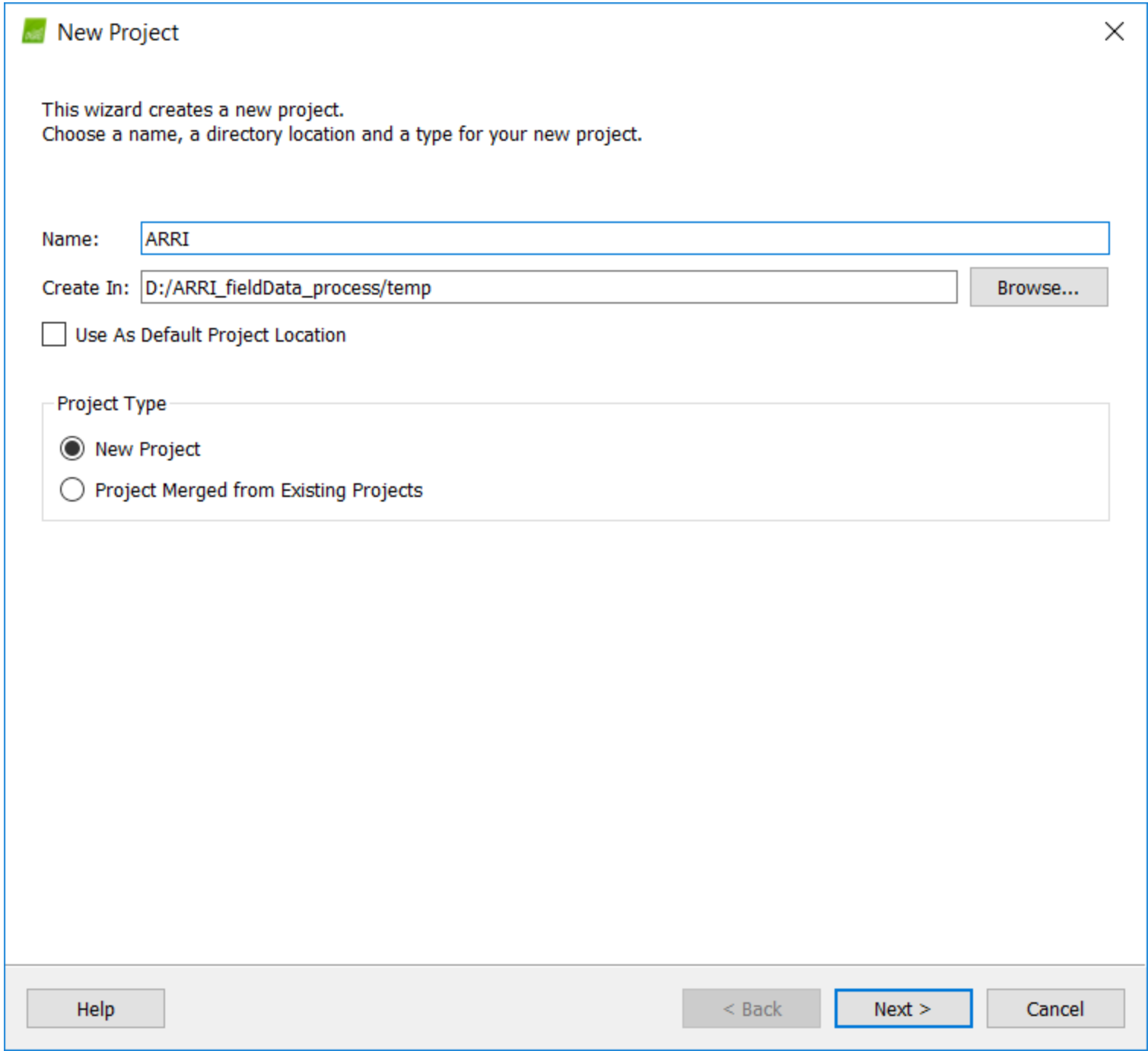
2. Open New Project



3. Name your project

Give the path where you need to save your project

Click Next

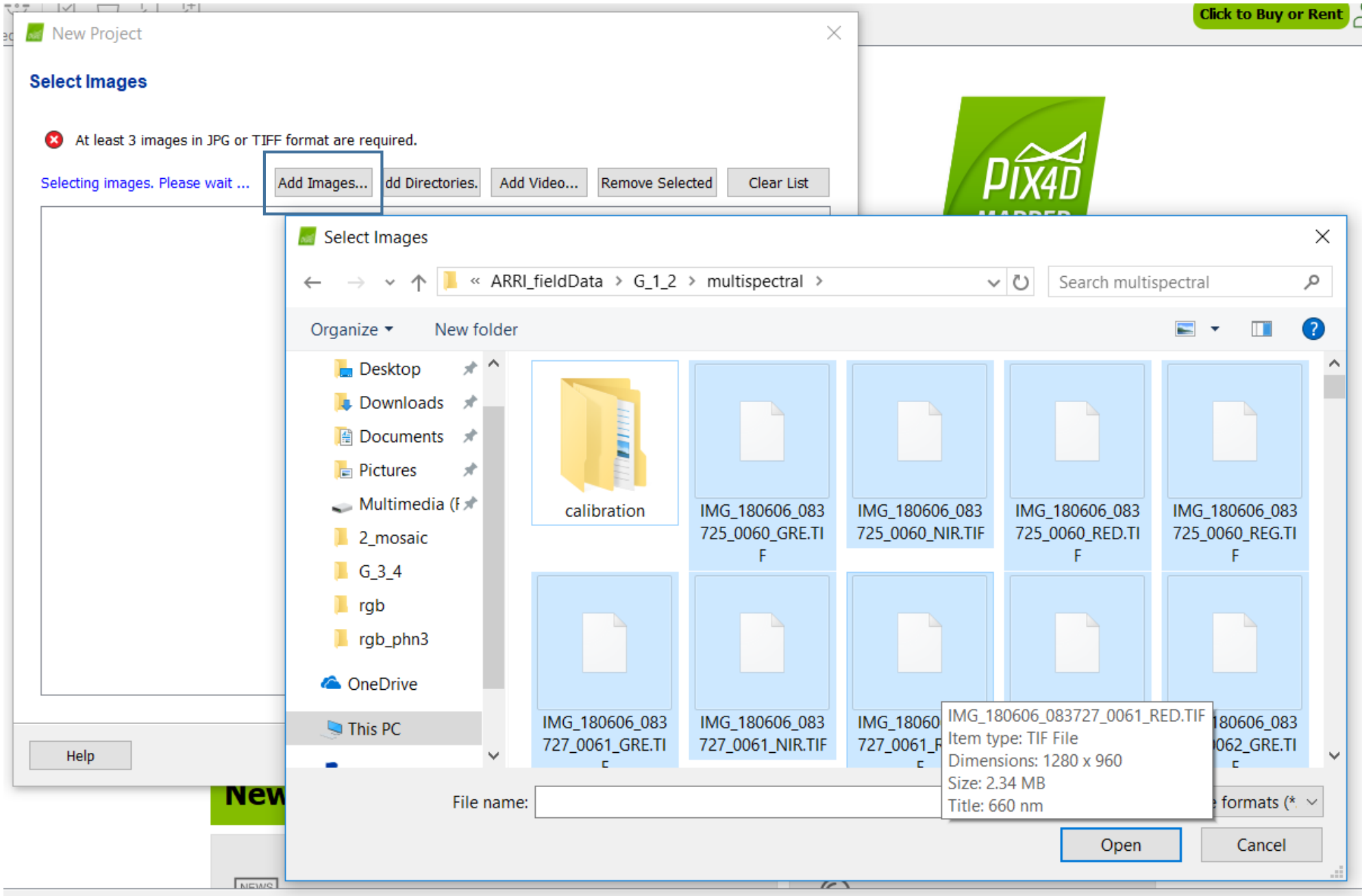


4. Click *Add Images*

Navigate to your image folder and select all multispectral images (excluding the images in calibration folder)

Click open

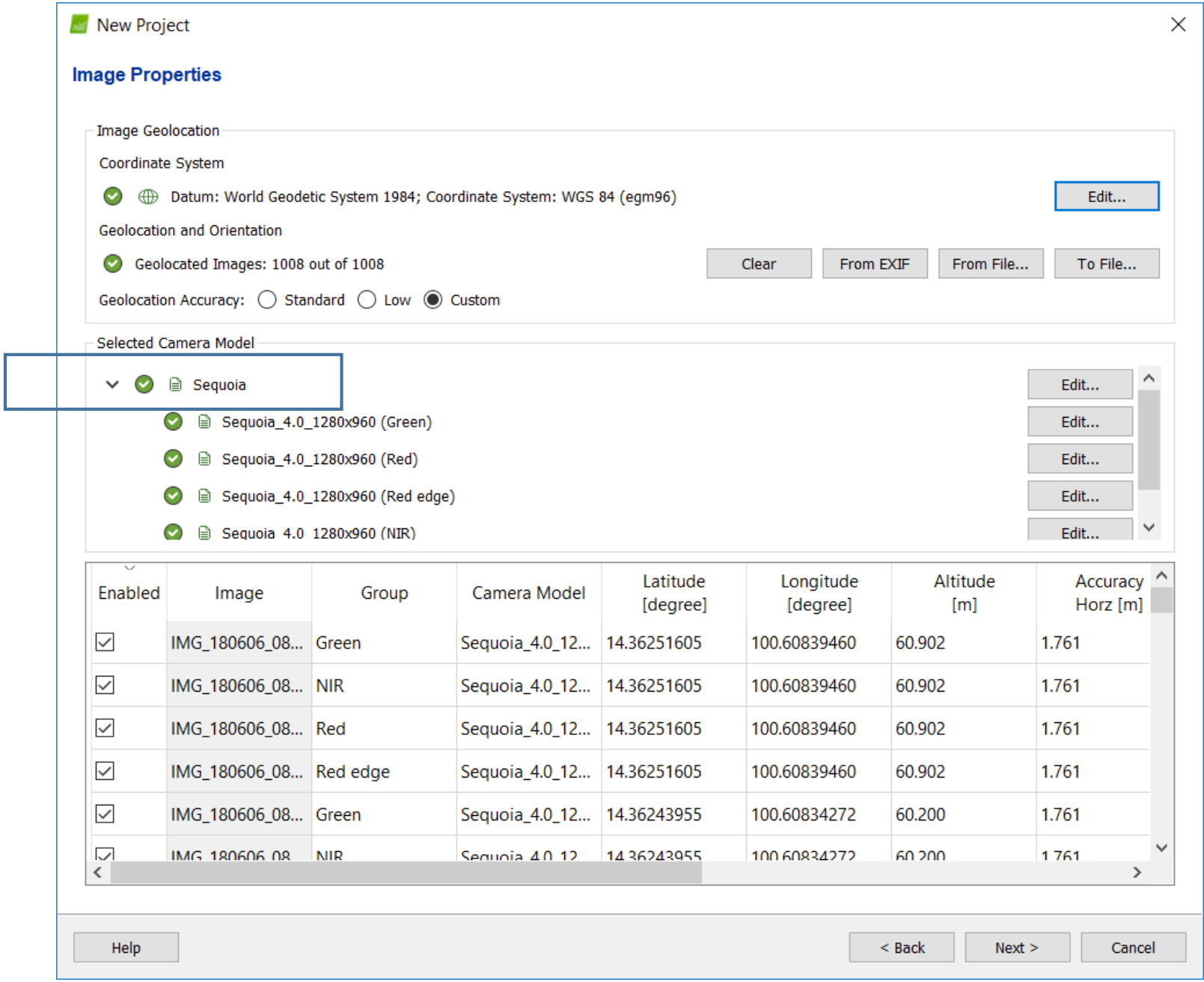
Click Next



5. In the image properties, make sure that *sequoia* is selected as the camera model.

Remark

Pix4D has a rich camera database. It can automatically select the camera model from the data read by image EXIF data.



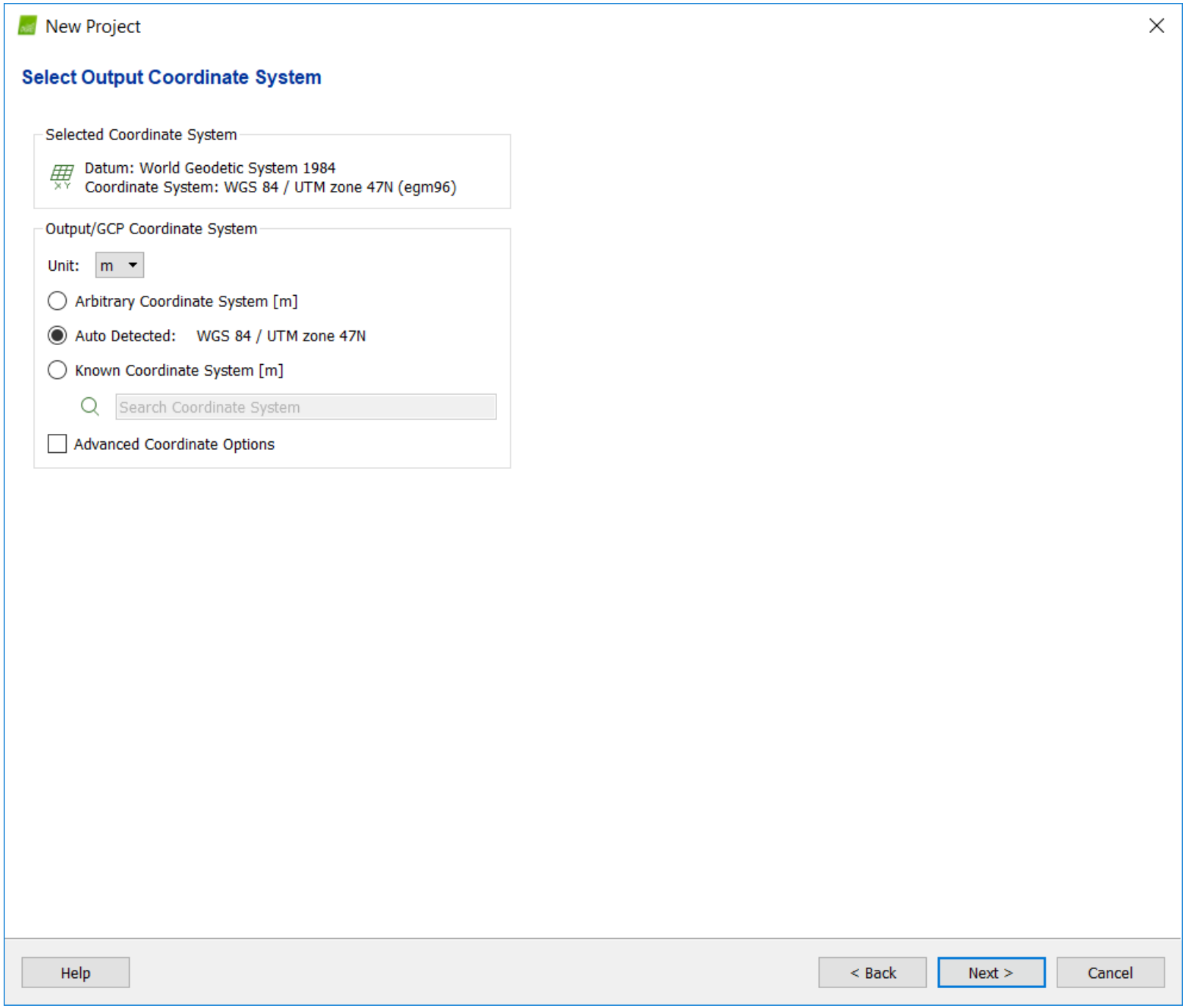
6. Input and output coordinate systems will be determined automatically.

Click Next

Remark

As the image geotags are coming form GPS, the input coordinate system is WGS84 (geographic)

For the output coordinate system it will use WGS84 UTM 47N as Thailand is in UTM zone 47



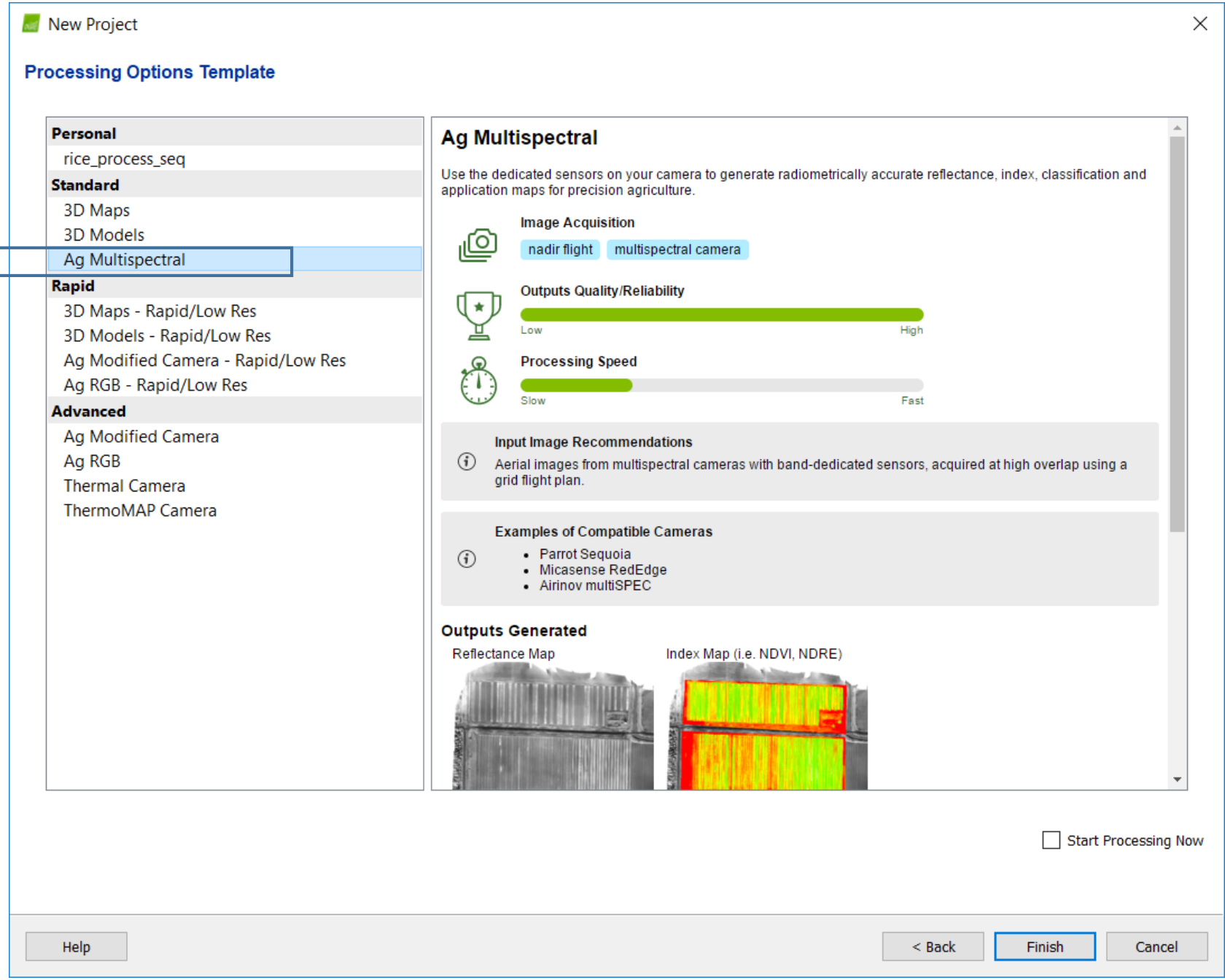
7. Under processing options select *Ag Multispectral* template.

Click Finish

Remarks

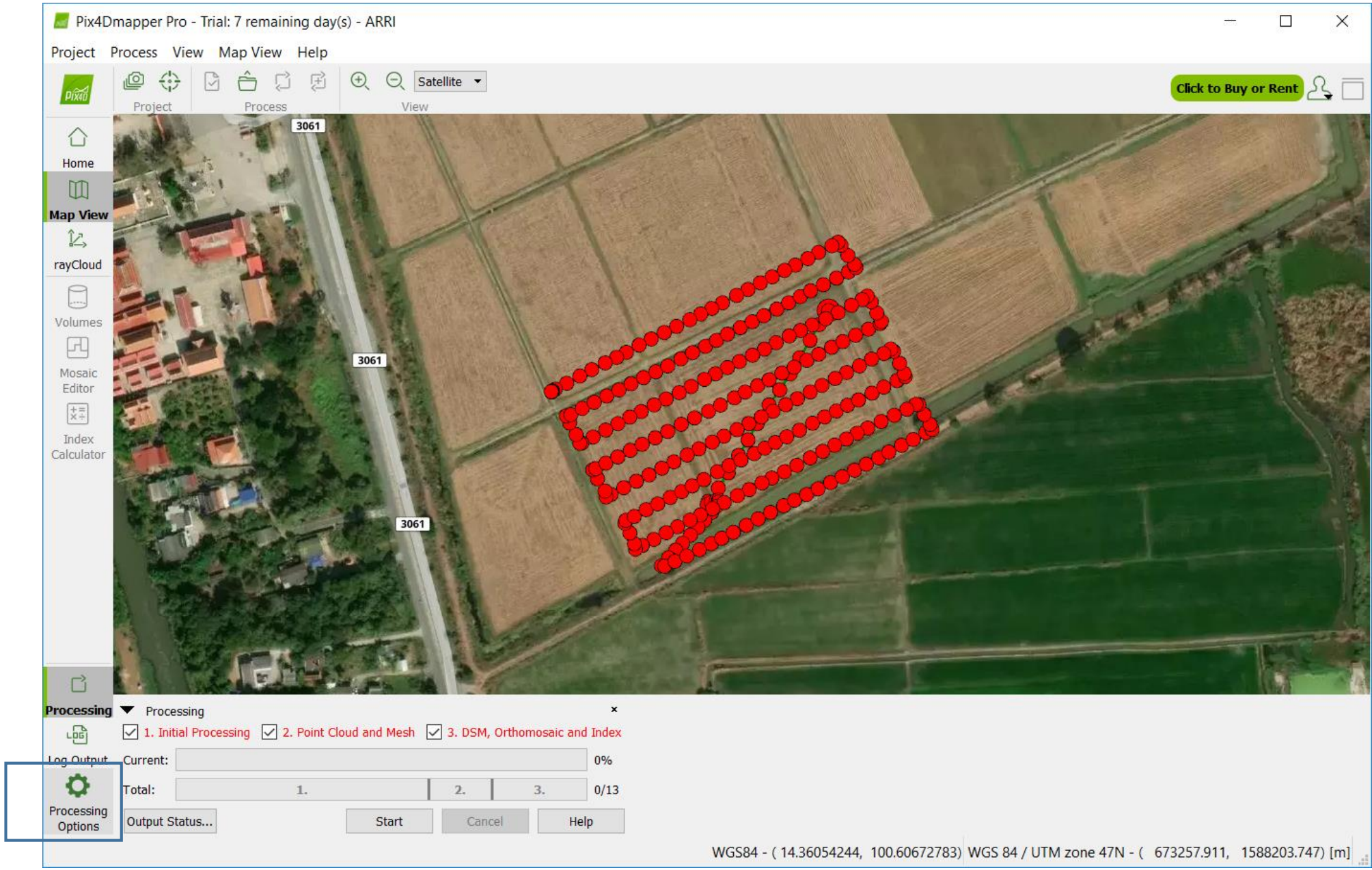
This will set the processing options for optimum values to process multispectral images. If you need higher accuracy or additional products it can be set later.

If the dataset is **RGB images**, either from phantom or sequoia, select Ag RGB

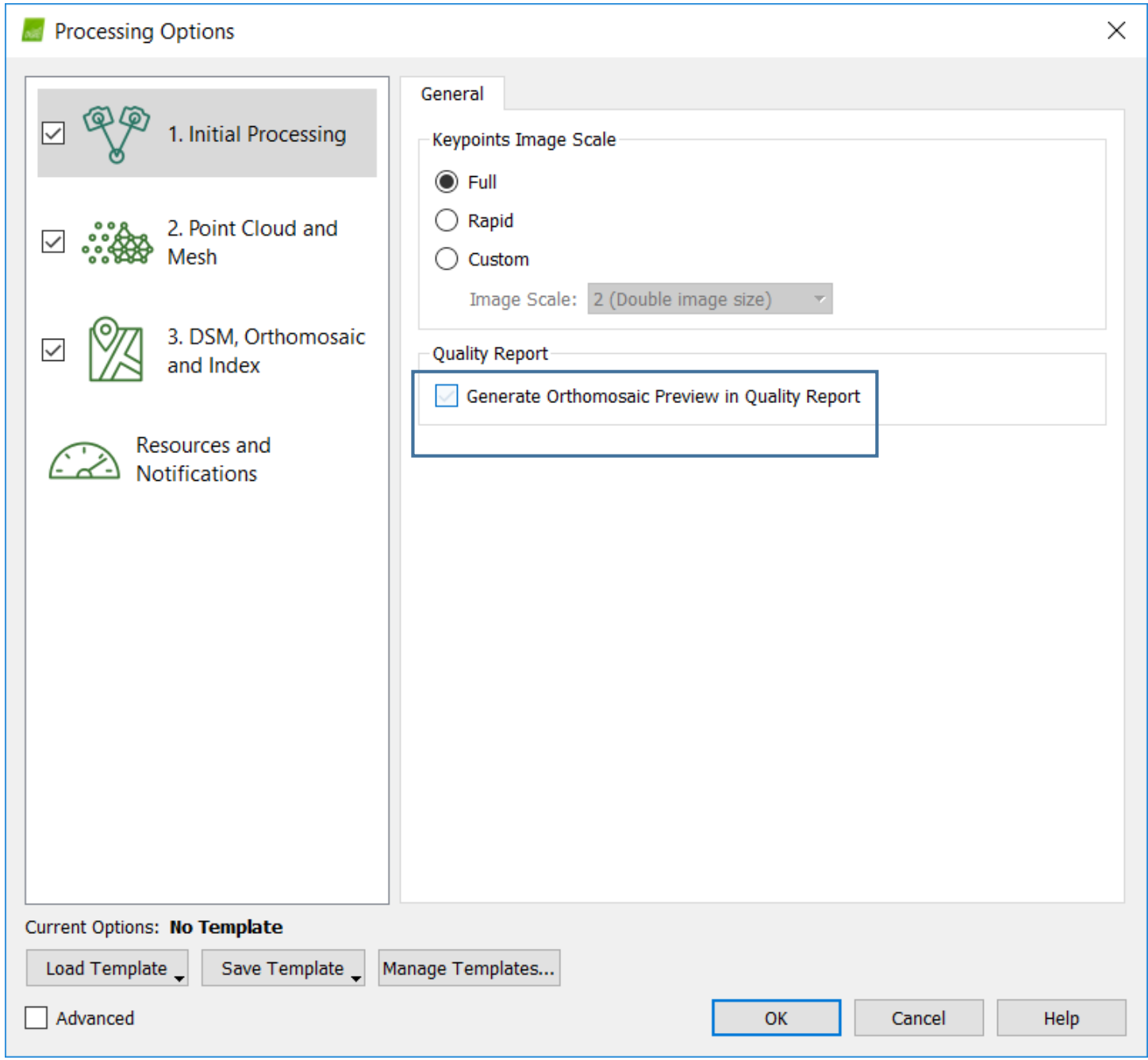


If everything goes correctly, you can see the Map View with the image locations marked in red dots.

8. Click
*Processing Options*



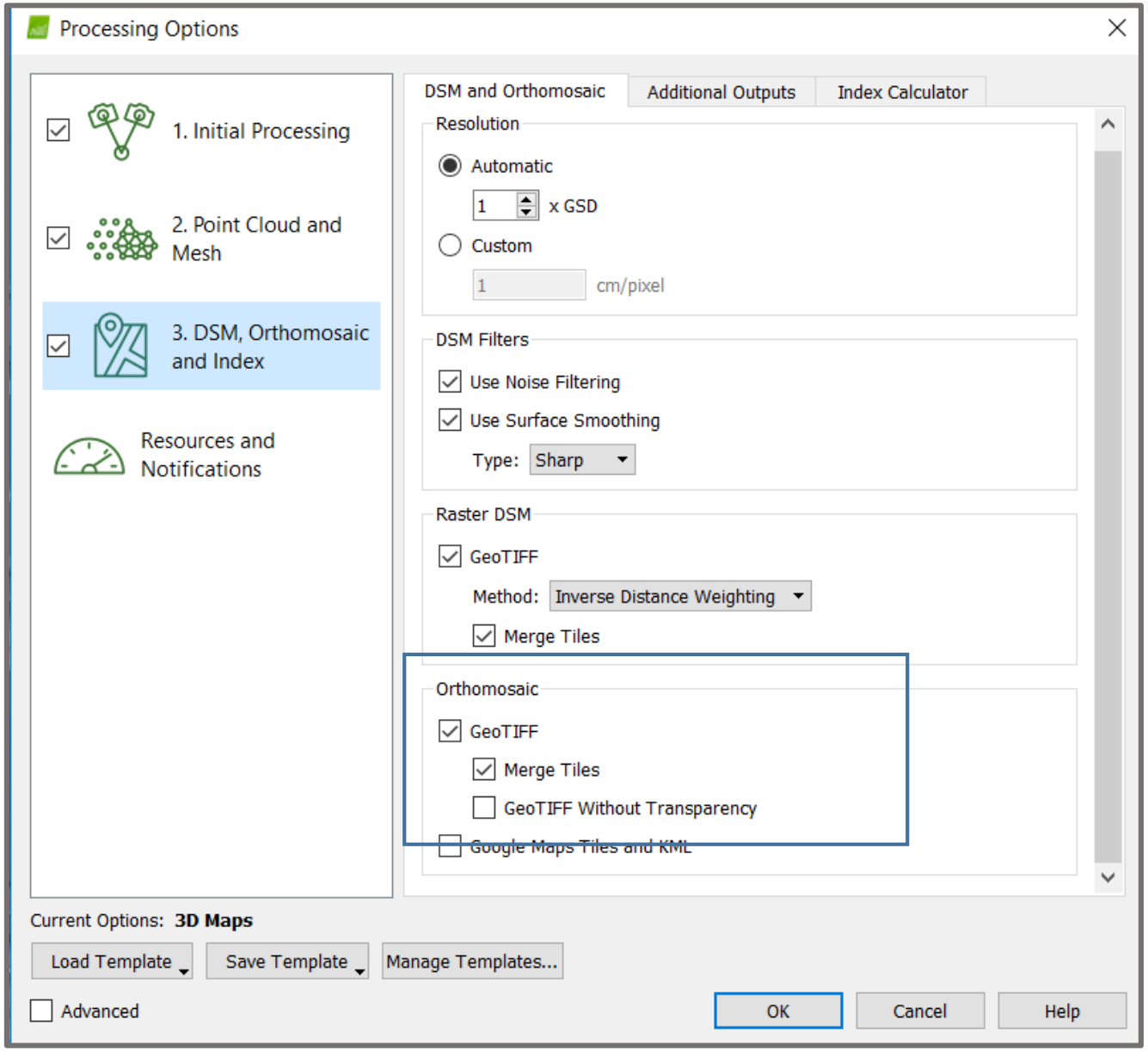
9. In *Initial Processing* tab, **uncheck** the *Generate Orthomosaic Preview* in Quality Report. This will save some time



10. From DSM and Orthomosaic:
Make GeoTIFF format and Merge Tiles are selected

Remarks

GeoTIFF is a common raster file format that can be imported into GIS and RS software

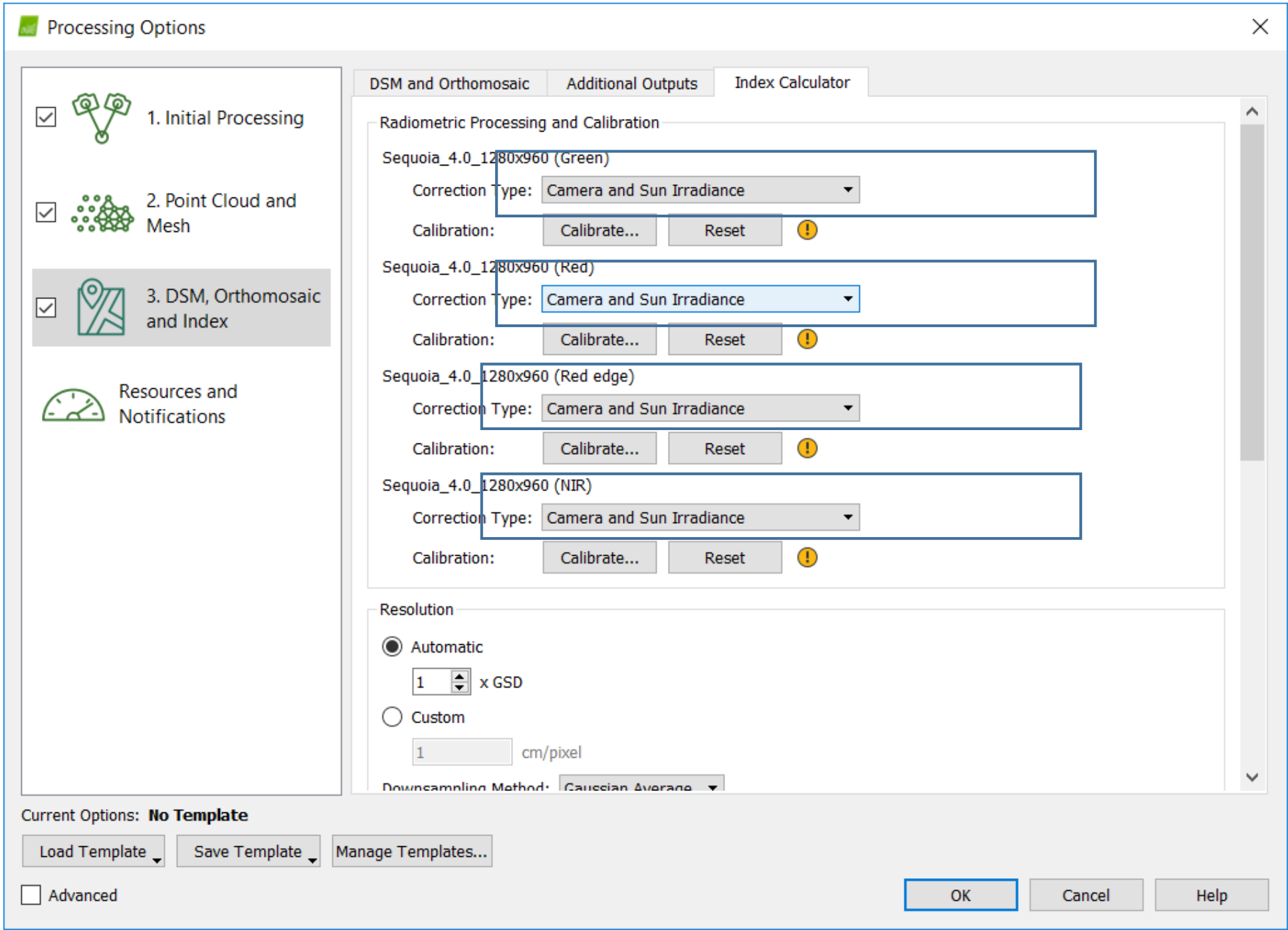


11. Go to tabs *DSM, Orthomosaic* → *Index* tab

Go to *Index Calculator*

Make sure that *Camera and Sun Irradiance* is selected as the camera type for all 4 sensors

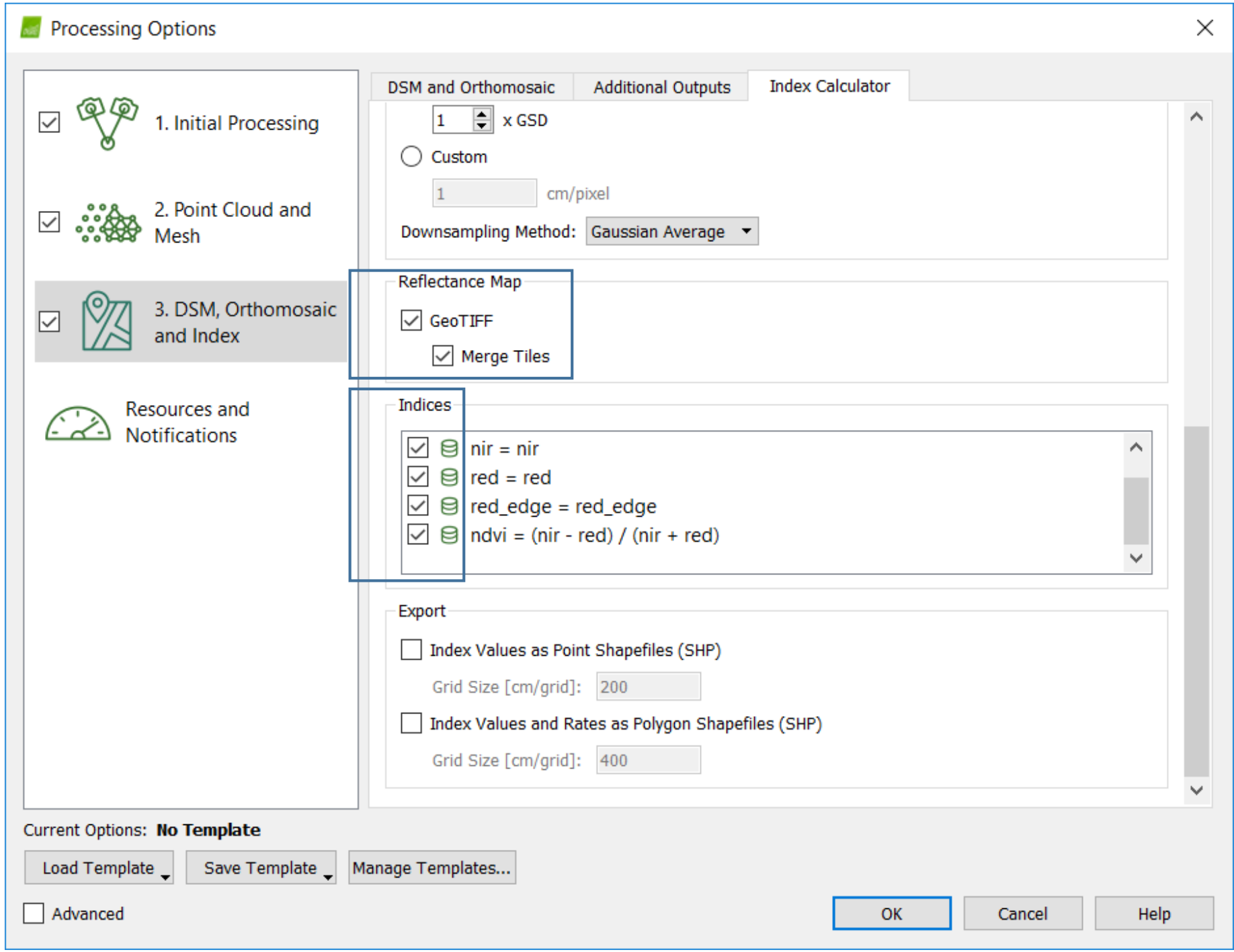
Scroll Down



Under *Reflectance Map*, Enable *GeoTIFF* and *Merge Tiles* options

Under *Indices*
Enable all the outputs

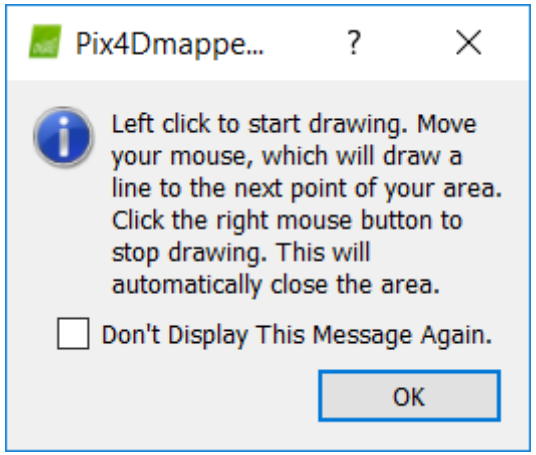
Click OK



12. In main menu go to
Map View → Processing Area → Draw

13. Draw a polygon to define processing area

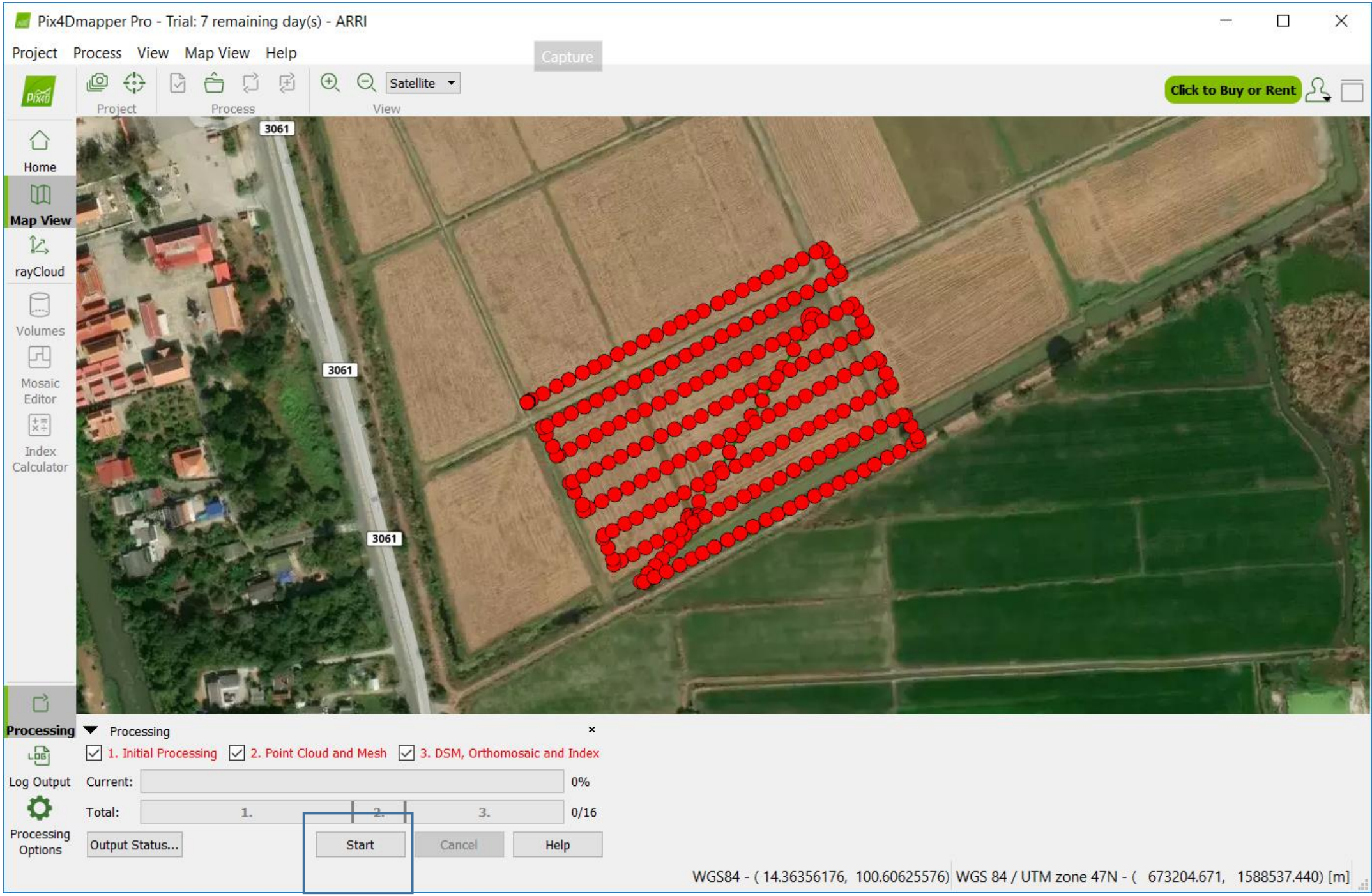
mouse Left click – Add vertex
mouse Right mouse click – Complete polygon




# 14. Start the processing

Relax, This will take time ;)

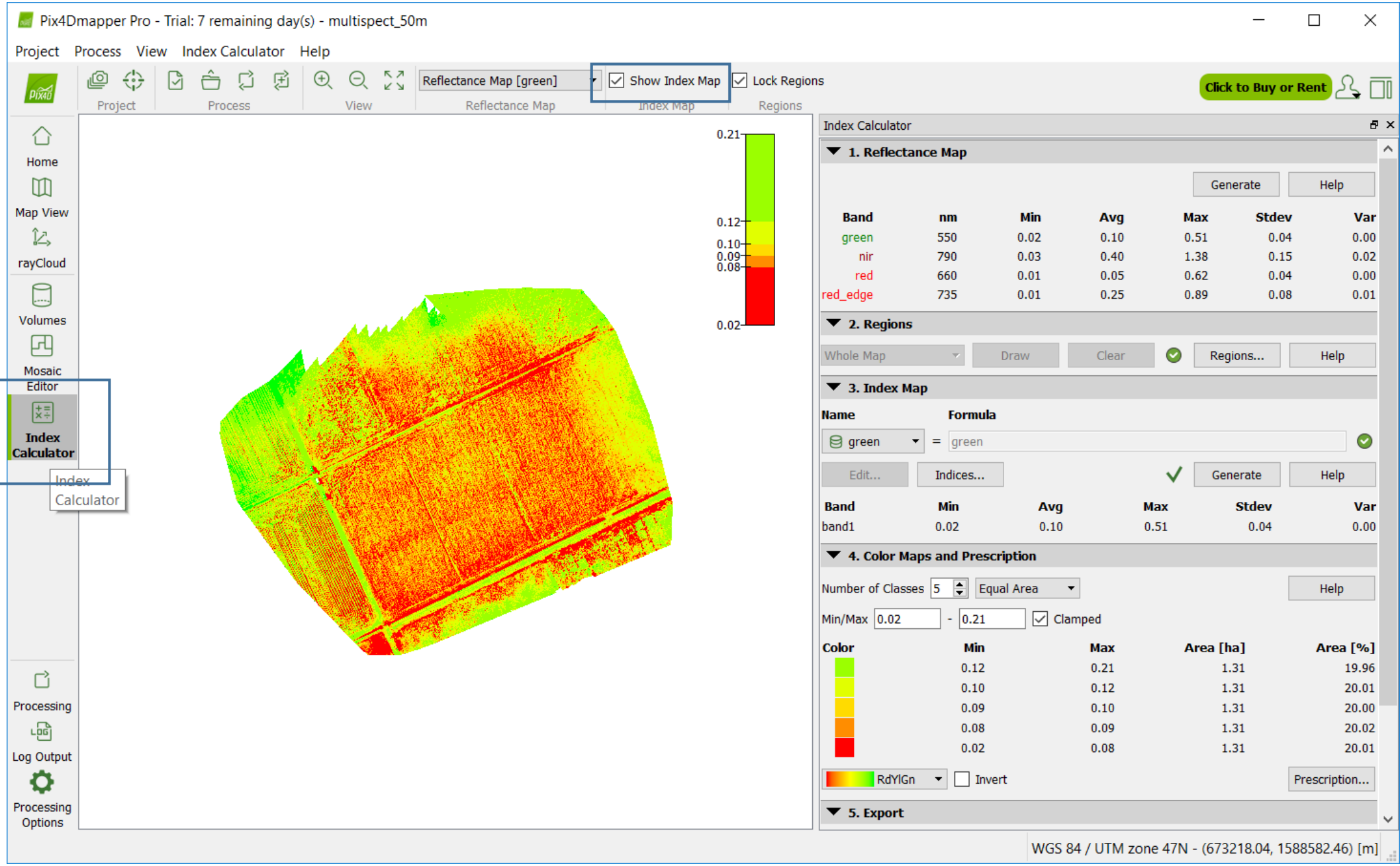
- Not Calibrated
- Calibrated
- Computing matches
- Calibrating / Optimizing



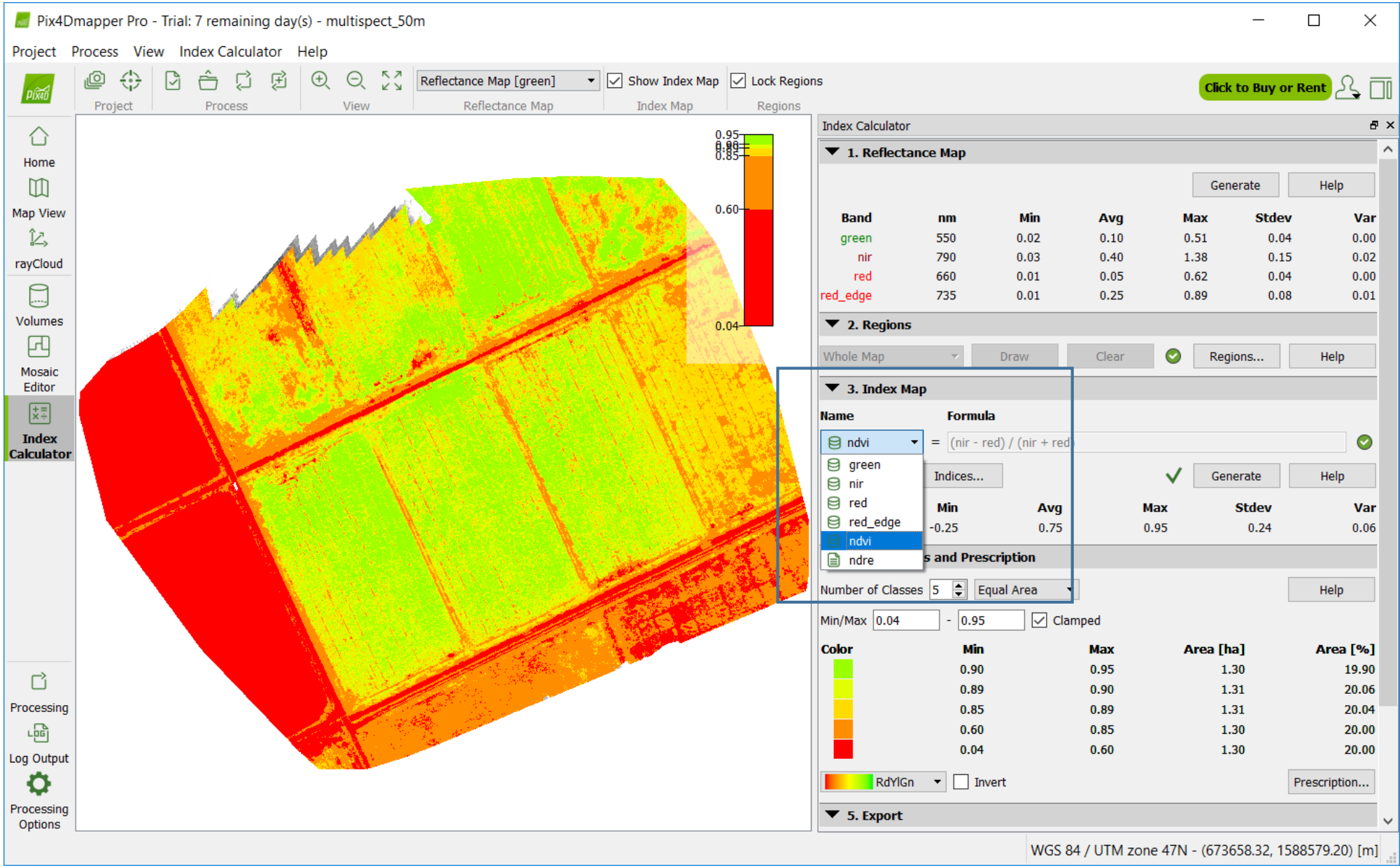
After the processing is competed, the products can be explored in index calculator

15. Go to the *index calculator*

Enable *show index map*



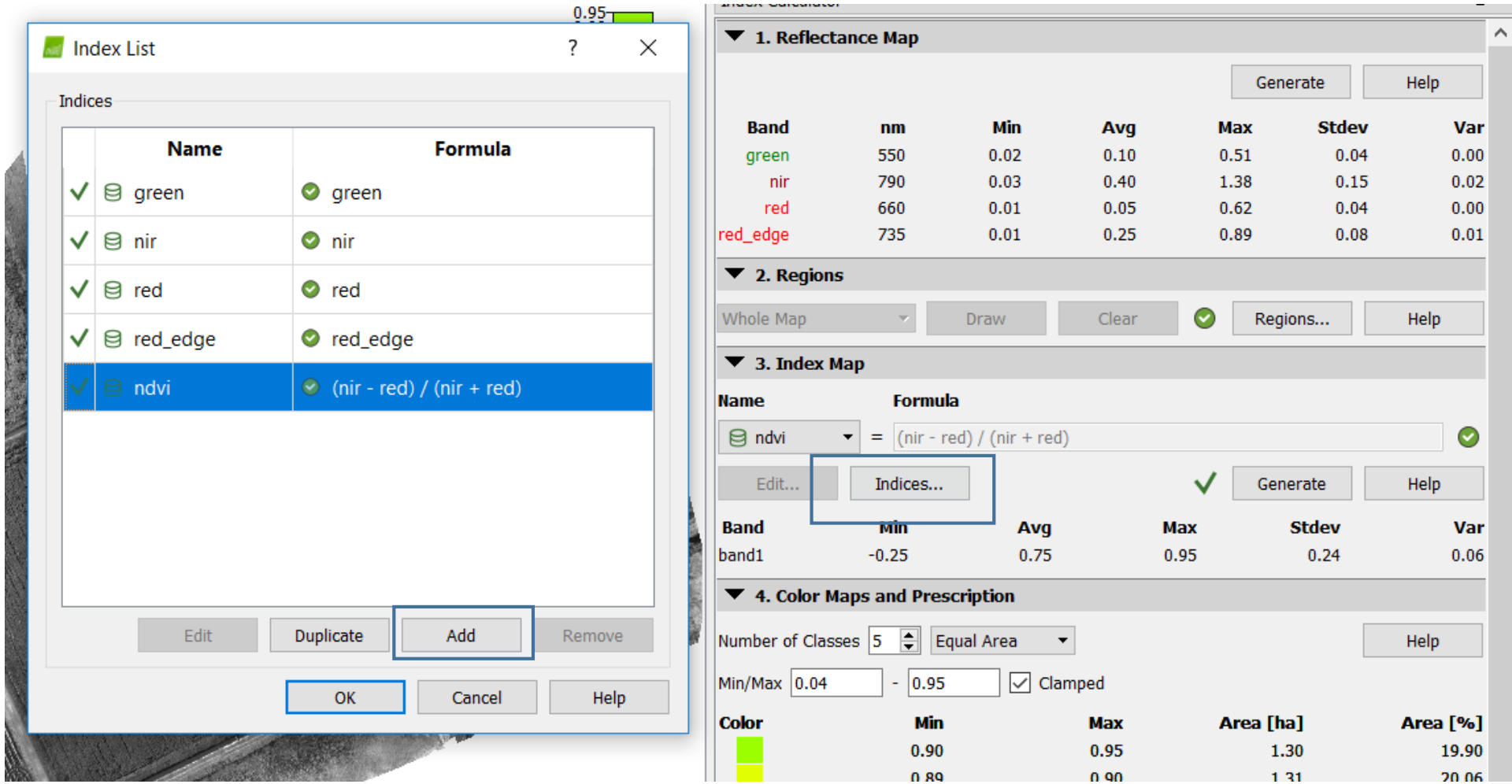
16. To load NDVI map, select *ndvi* from *Index Map* Section



17. To make a new index,

Click *Indices* from *Index Map*

Click *Add*



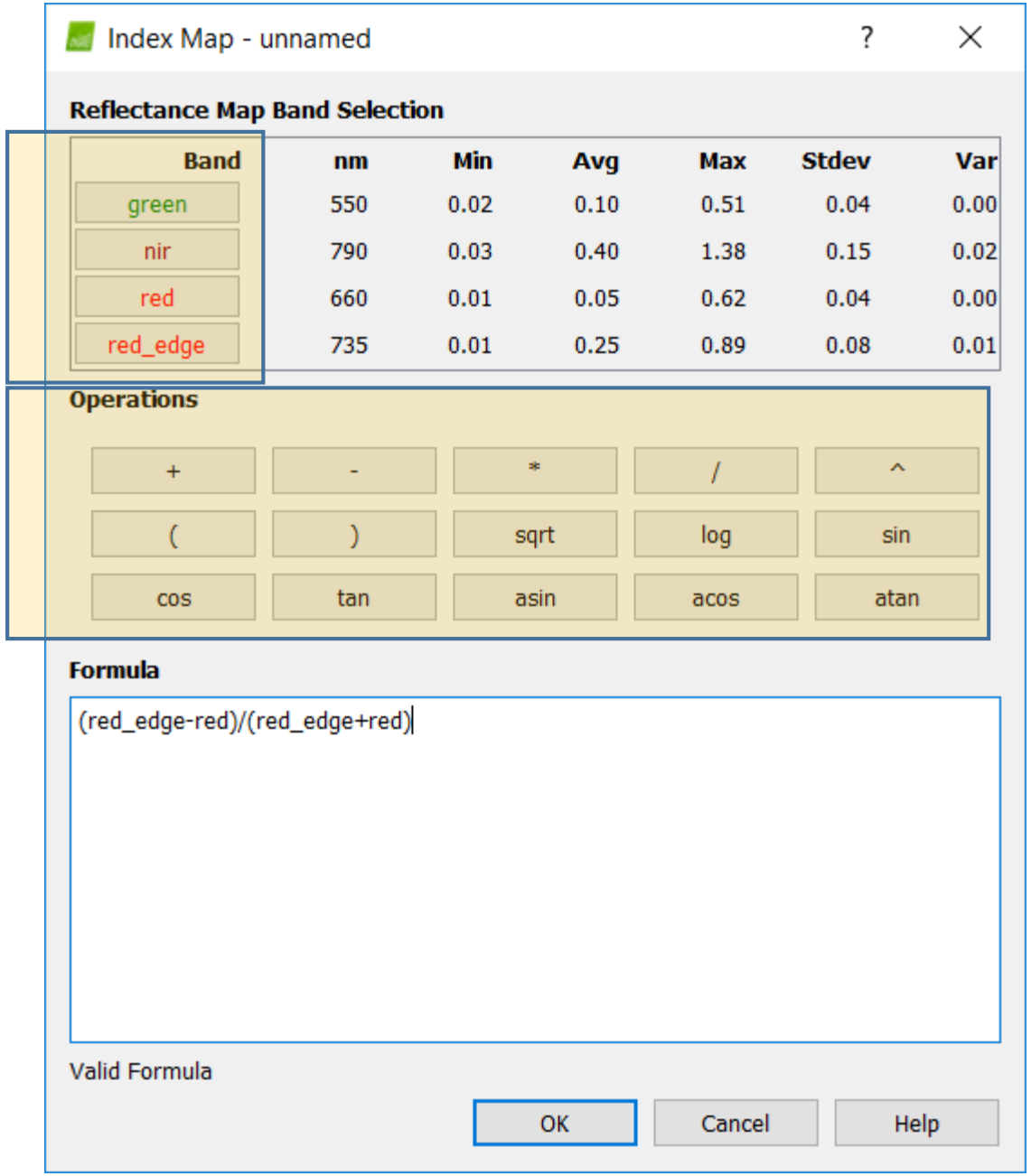
Lets Define **Normalized Difference RedEdge Index**

Write the formula as shown below.

**(red_edge-red)/(red_edge+red)**

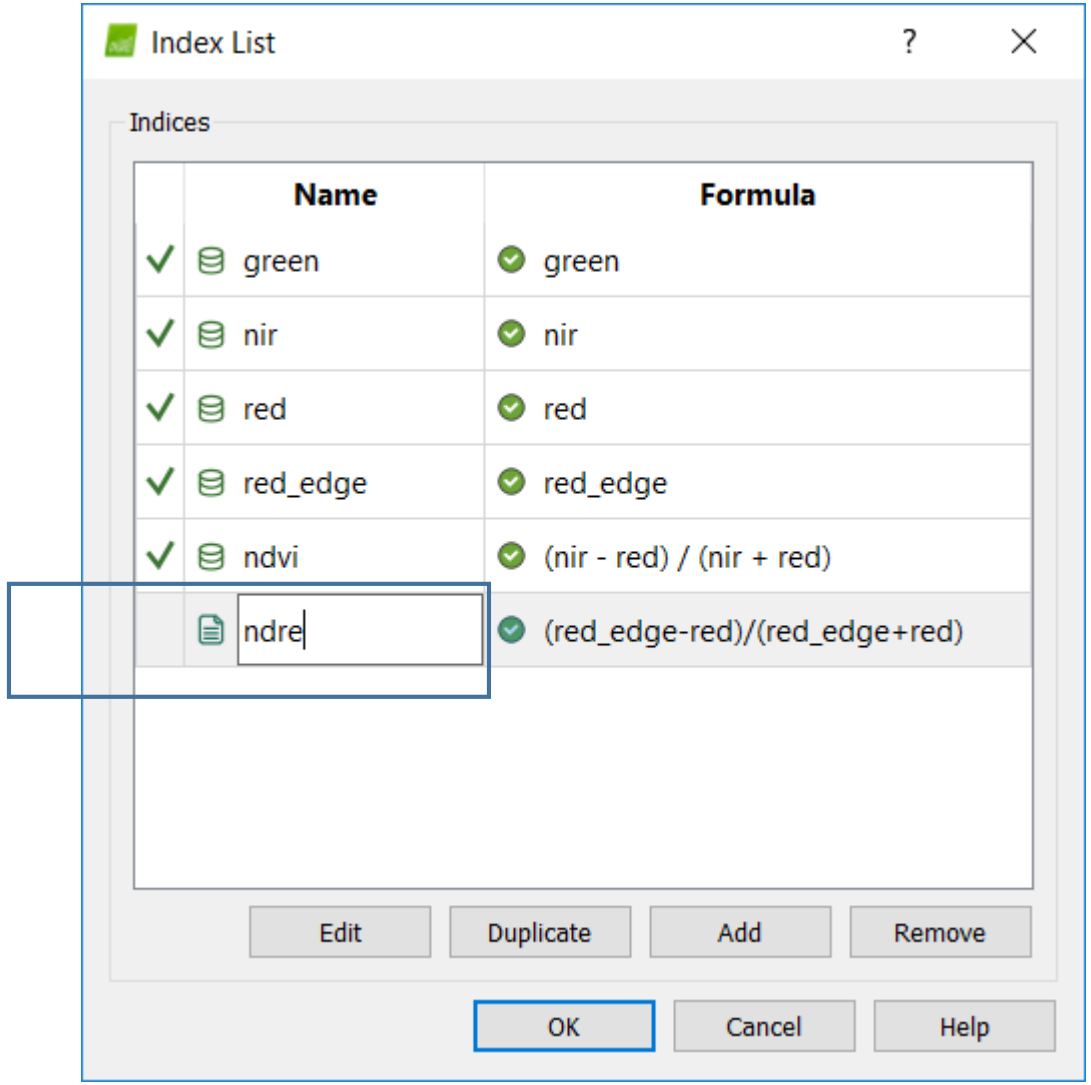
**Use ***Reflectance Map Band Selection*** and ***Operations*** to provide the inputs

Click OK

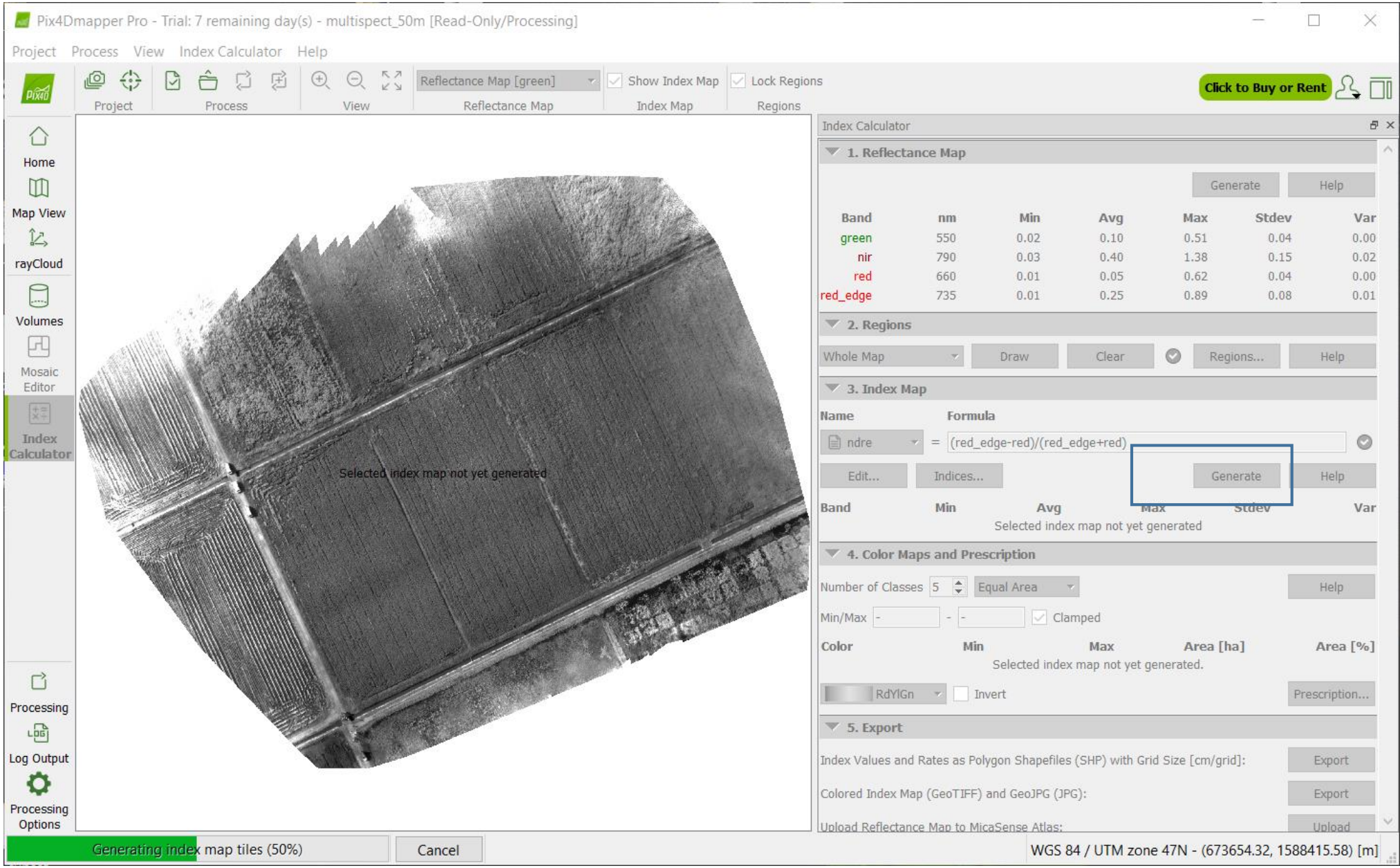


Rename the defined index as *ndre*

Click OK

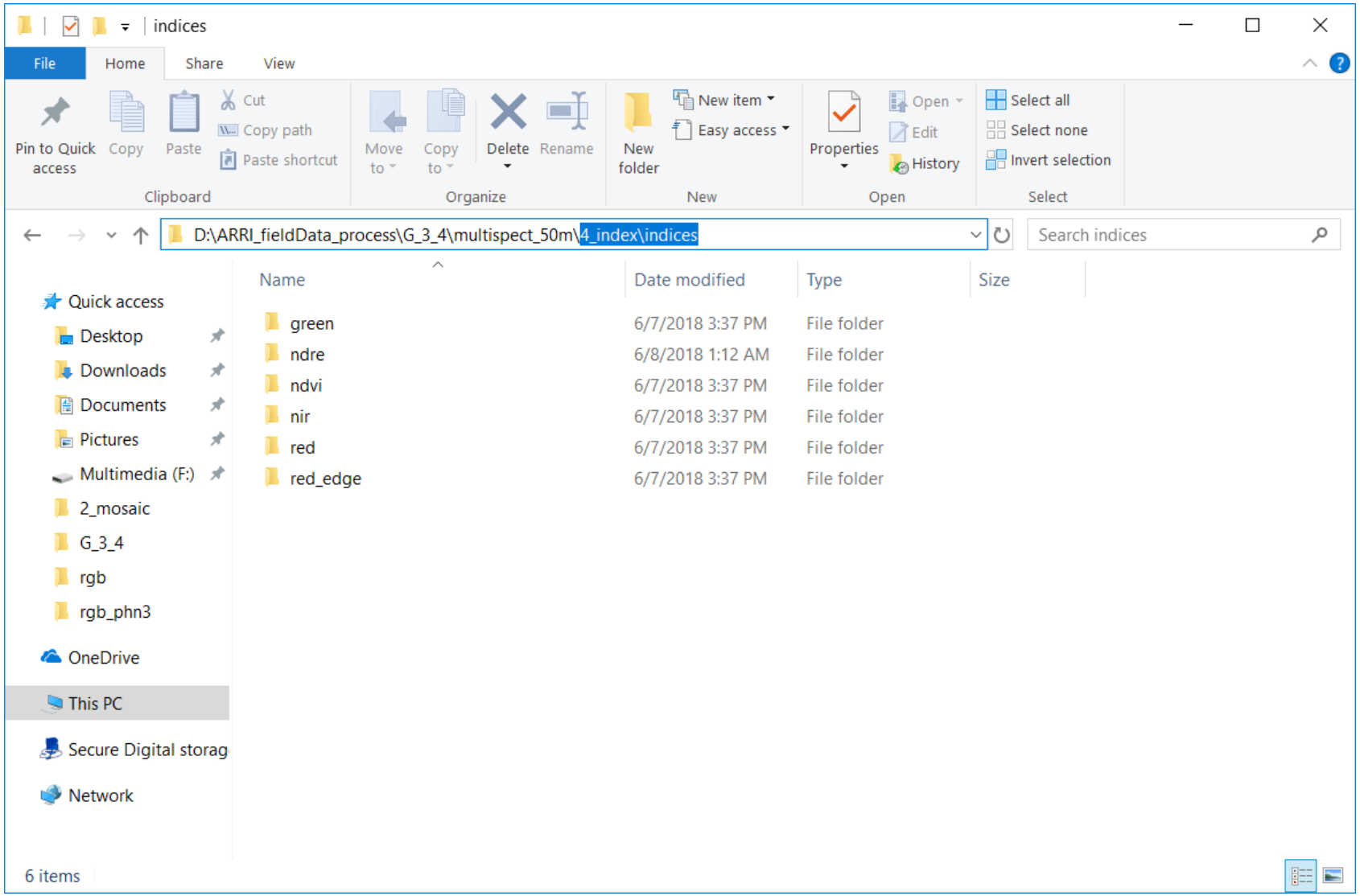


18. After Select *ndre* from index map section and click *Generate* to make the index map



All the products are saved under

*Your_project_path\your_project_name***4_index\indices**



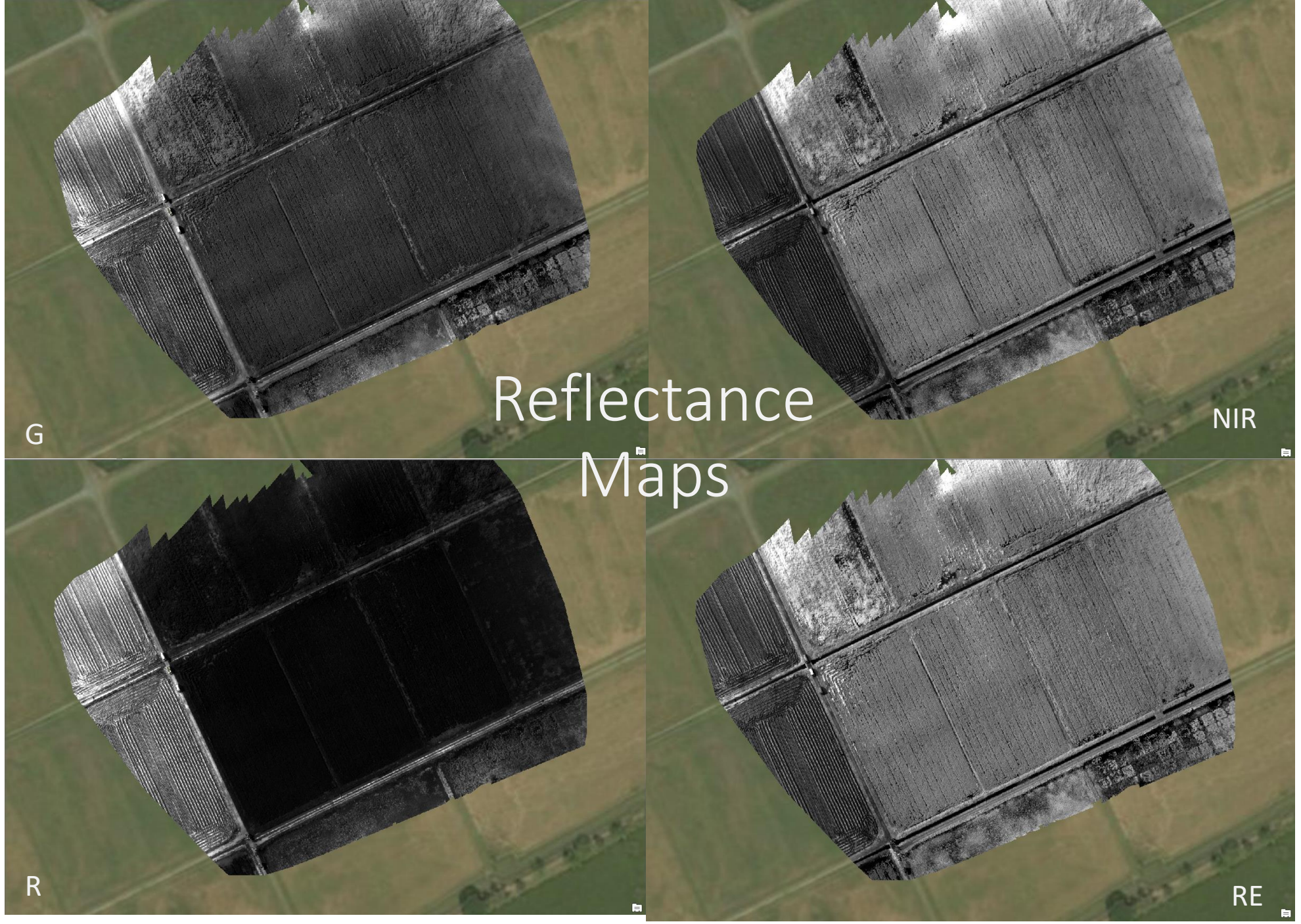
# Further Analysis

- Be familiar and use GIS software to do further analysis
  - ArcGIS – user friendly, stable, costs a lot
  - QGIS – Open source, free, community supported, lot of functions, bit complicated


RGB Orthomap


False Colour
Composite


-0.254728973 - 0.249619984
0.249619984 - 0.444698353
0.444698353 - 0.673082786
0.673082786 - 0.825339075
0.825339075 - 0.953805319
NDVI


Reflectance Maps
G
NIR
R
RE

# Useful Links

- Processing Sequoia Images using Pix4D - https://support.pix4d.com/hc/en-us/articles/209362146-How-to-process-Sequoia-imagery#label1

- Sequoia Specs - https://www.parrot.com/business-solutions-us/parrot-professional/parrot-sequoia

# end