DELAIR™

AERIAL INTELLIGENCE

DELAIR™
AERIAL INTELLIGENCE

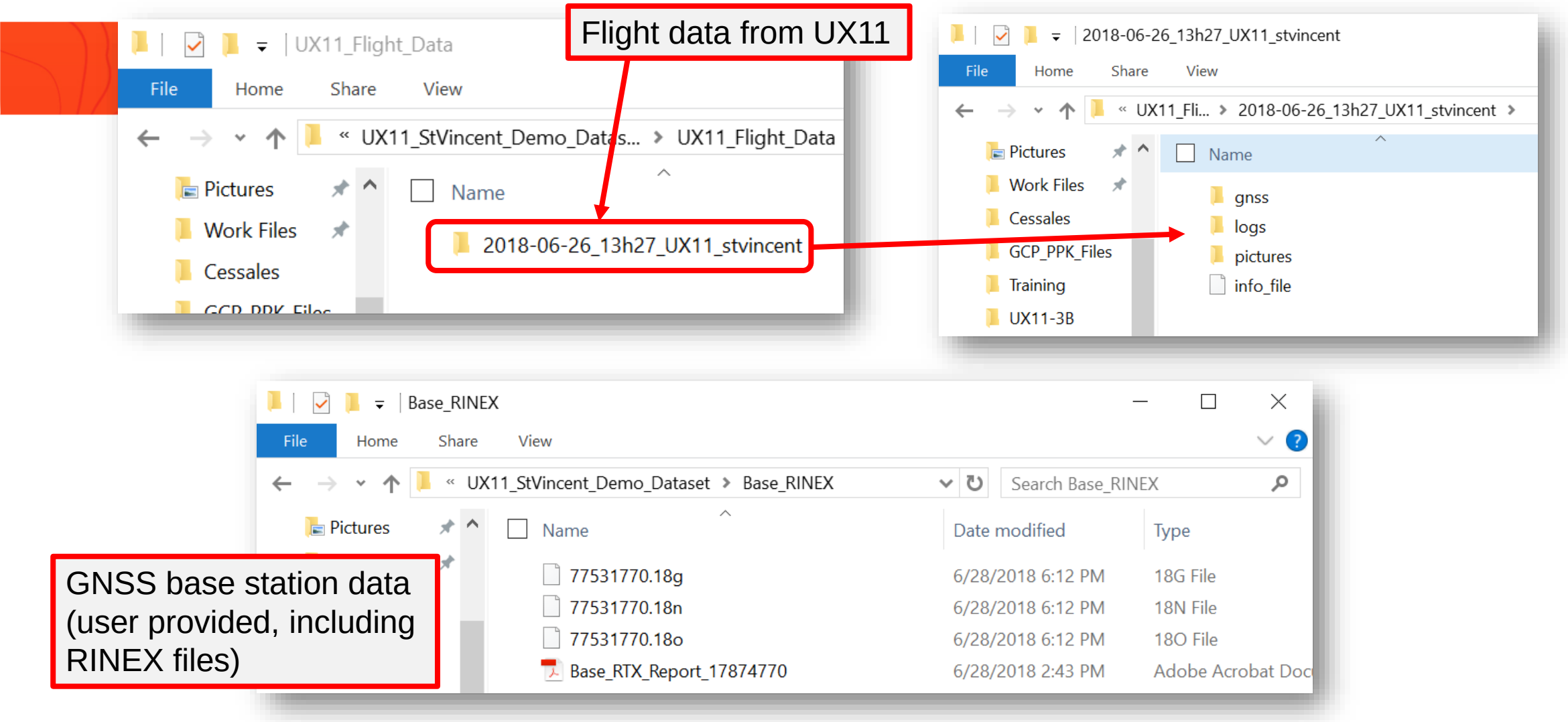
Delair After Flight Tutorial

UX11 PPK Work Flow

July 5, 2018 | Chase Fly | Geospatial Product Manager

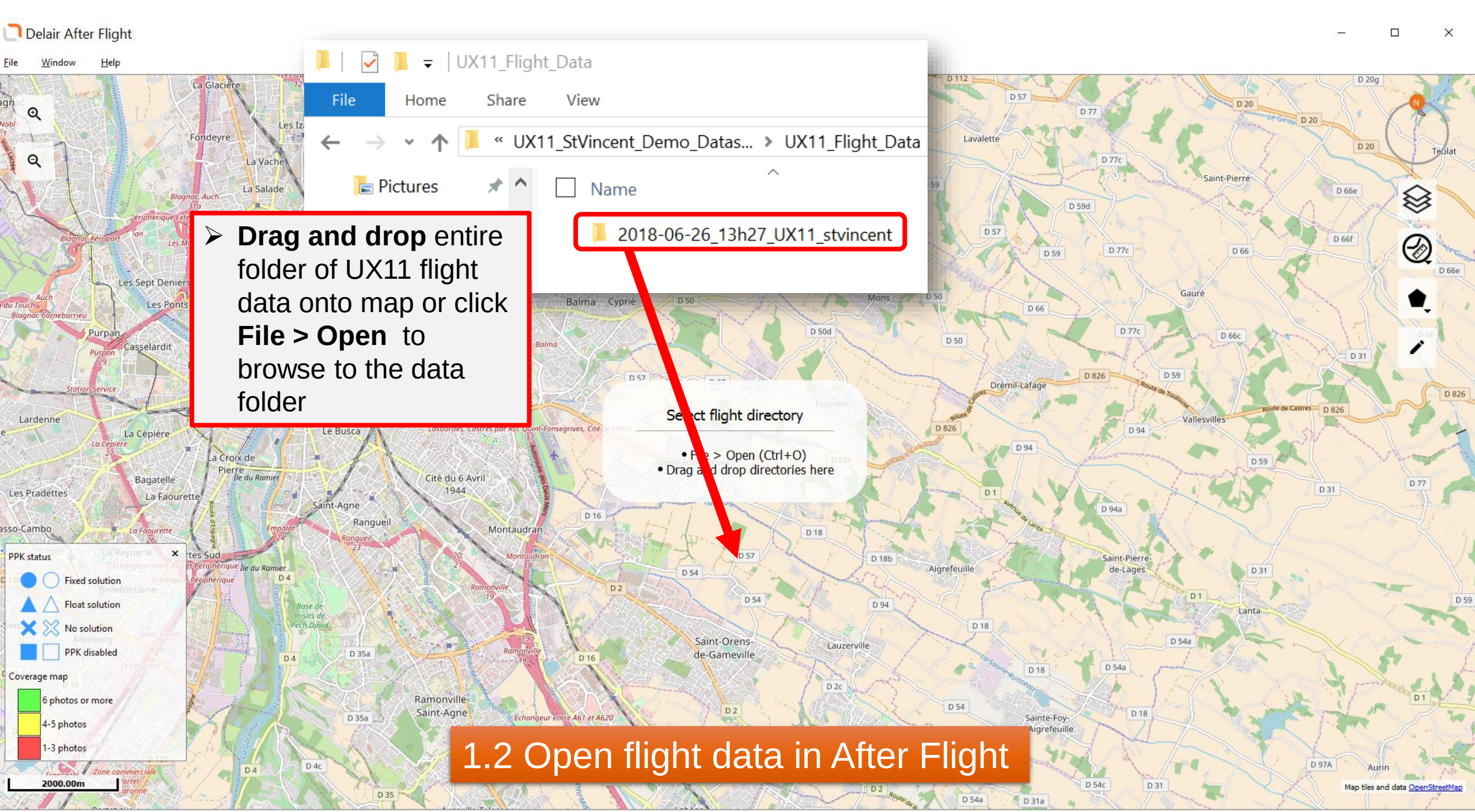
PPK Work Flow

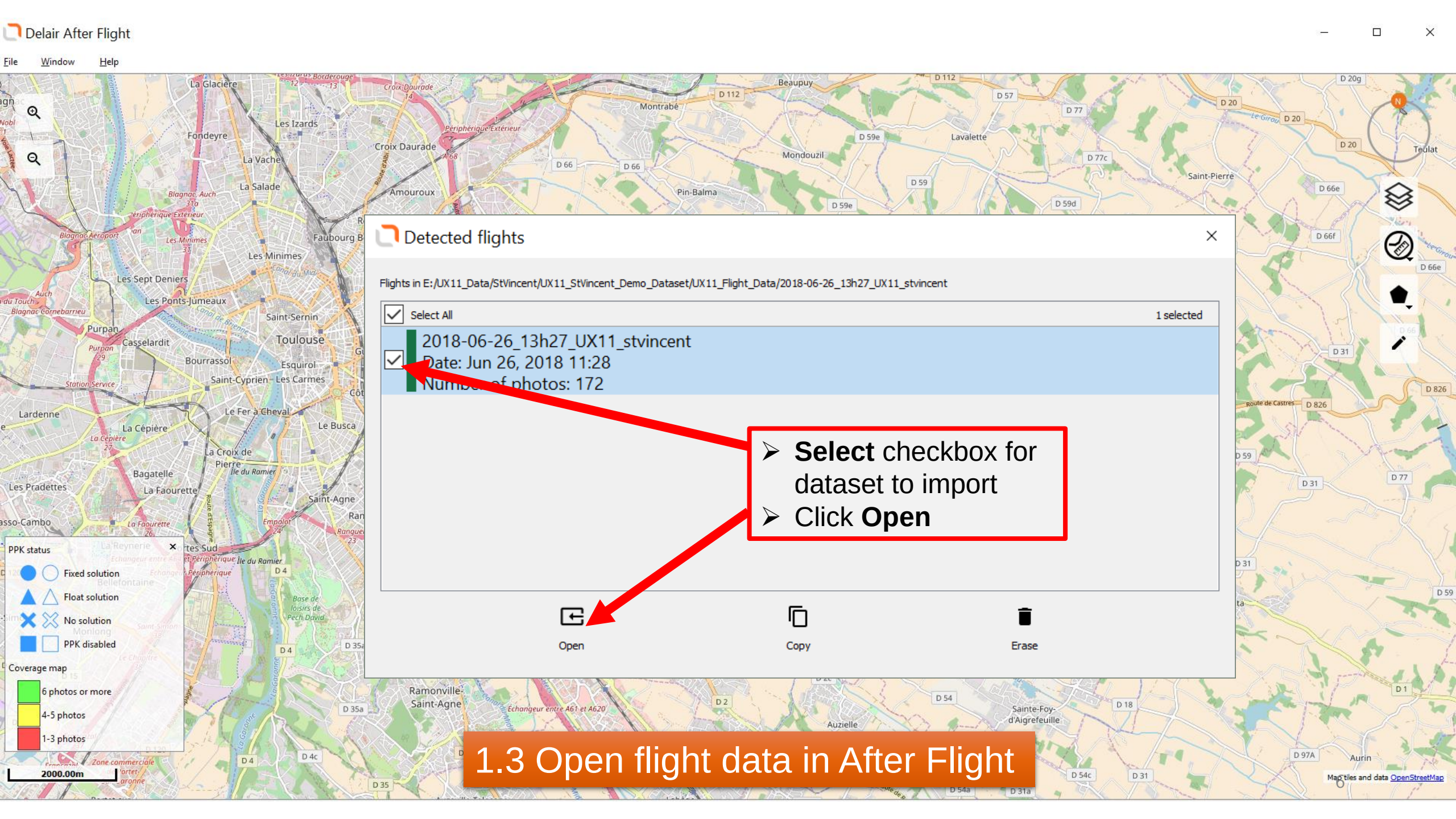
Step-by-step with screen shots using StVincent sample dataset

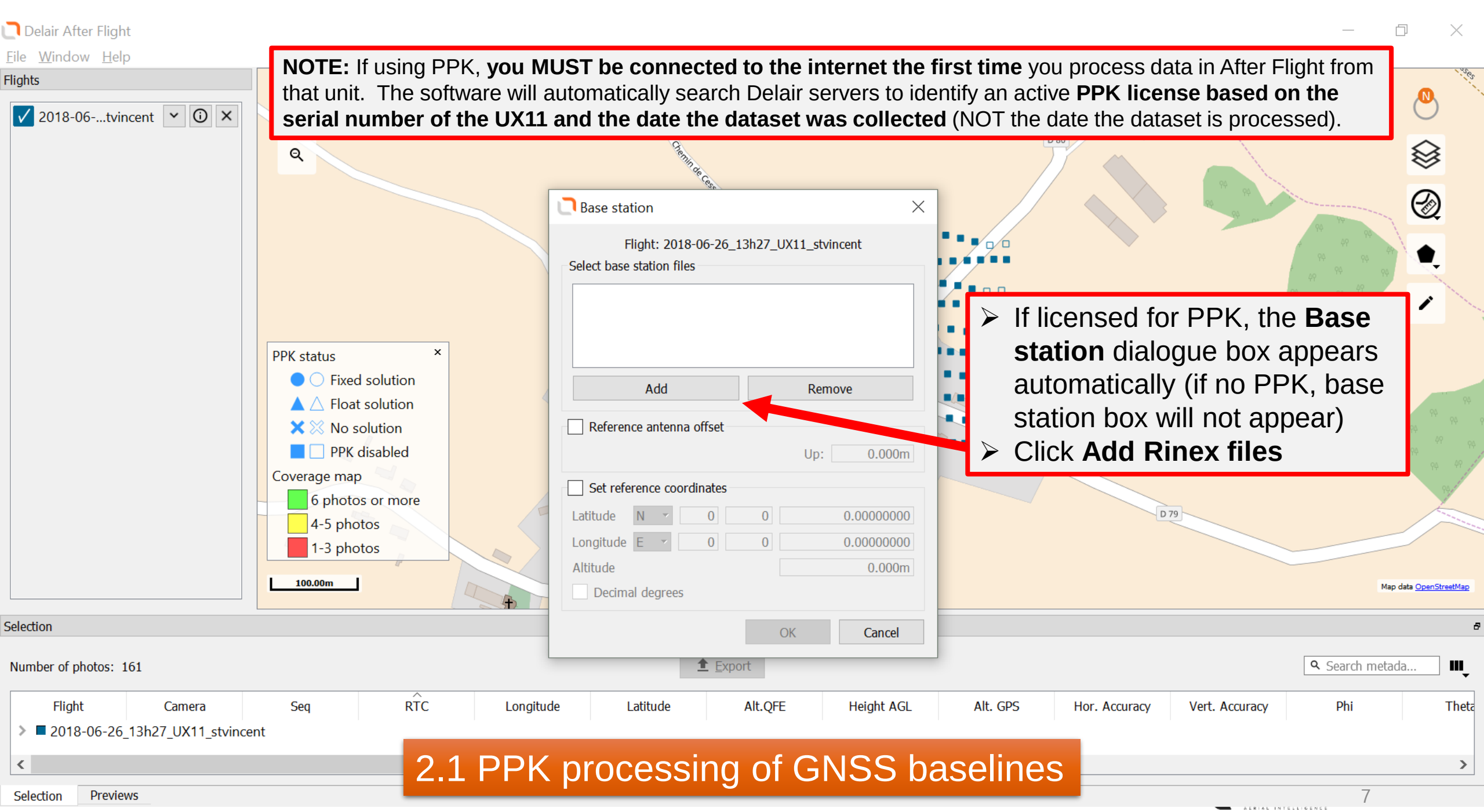


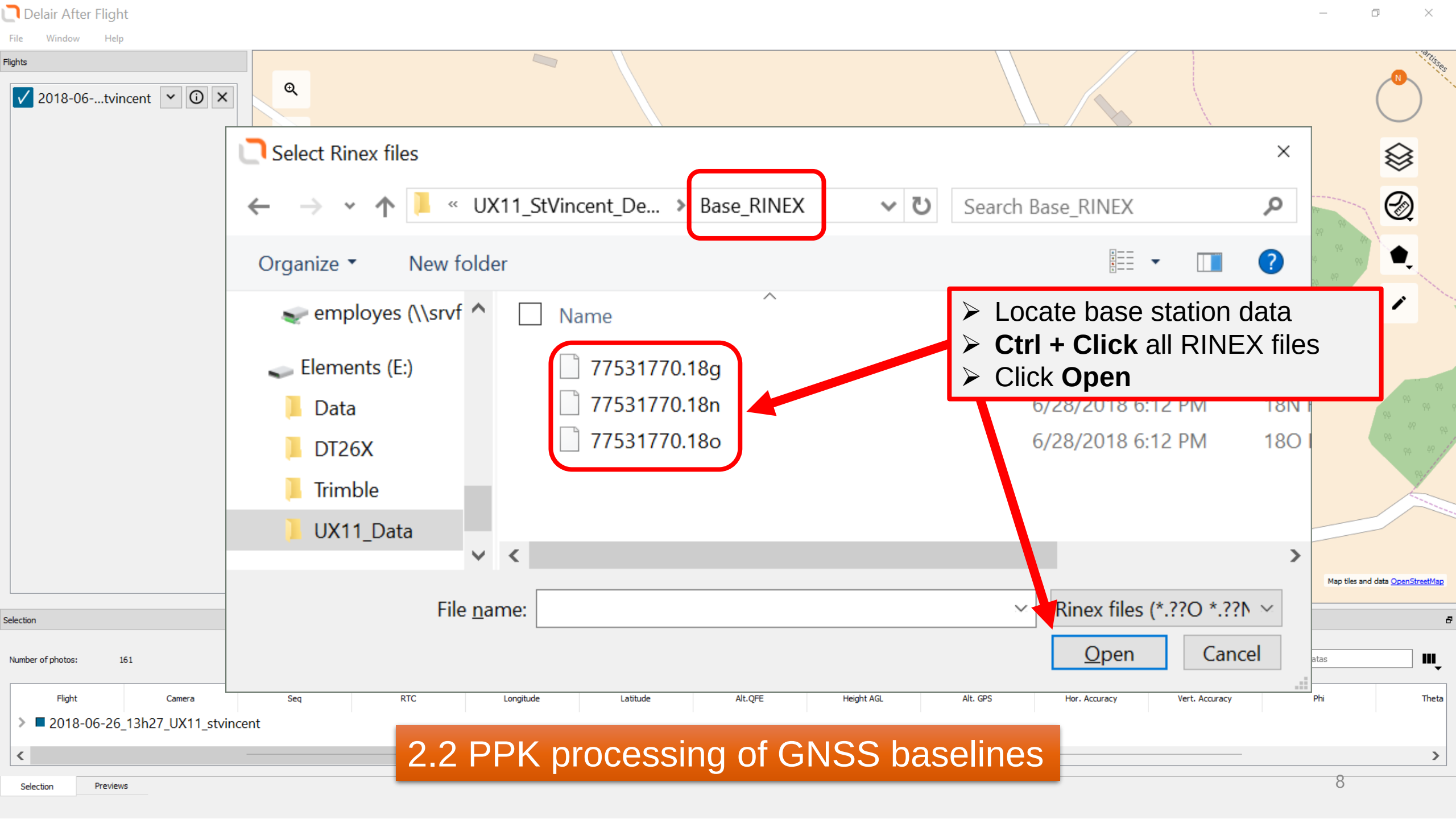
GNSS base station data (user provided, including RINEX files)

1.1 Open flight data in After Flight


Delair After Flight
File
Window
Help
UX11_Flight_Data
File
Home
Share
View
UX11_StVincent_Demo_Datas...
UX11_Flight_Data
Pictures
Name
2018-06-26_13h27_UX11_stvincent
Drag and drop entire folder of UX11 flight data onto map or click File > Open to browse to the data folder
Select flight directory
• File > Open (Ctrl+O)
• Drag and drop directories here
PPK status
Fixed solution
Float solution
No solution
PPK disabled
Coverage map
6 photos or more
4-5 photos
1-3 photos
2000.00m
Map tiles and data OpenStreetMap
1.2 Open flight data in After Flight

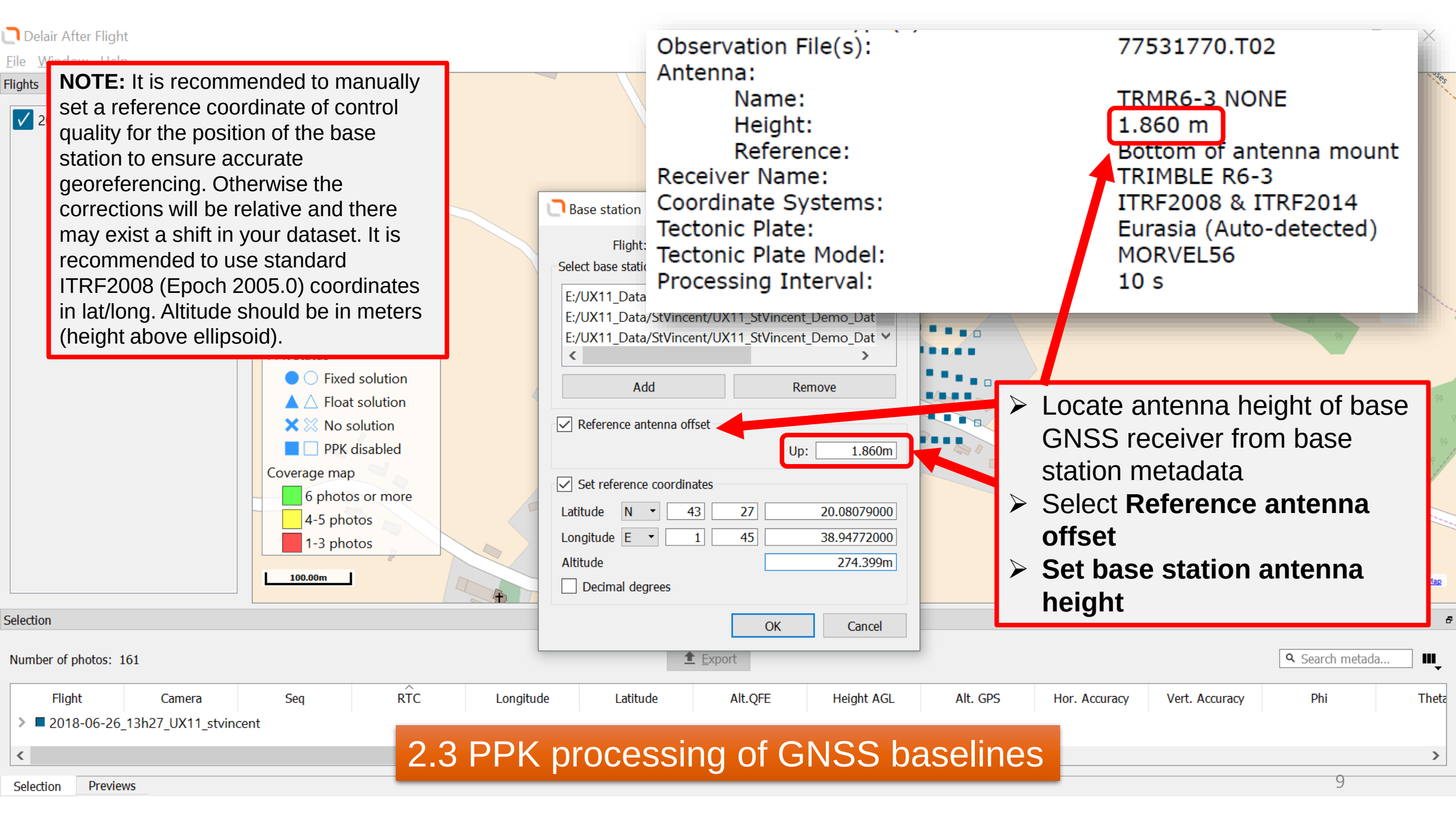

Delair After Flight
File
Window
Help
Detected flights
Flights in E:/UX11_Data/StVincent/UX11_StVincent_Demo_Dataset/UX11_Flight_Data/2018-06-26_13h27_UX11_stvincent
Select All
1 selected
2018-06-26_13h27_UX11_stvincent
Date: Jun 26, 2018 11:28
Number of photos: 172
Select checkbox for dataset to import
Click Open
Open
Copy
Erase
PPK status
Fixed solution
Float solution
No solution
PPK disabled
Coverage map
6 photos or more
4-5 photos
1-3 photos
2000.00m
1.3 Open flight data in After Flight
Map tiles and data OpenStreetMap


Delair After Flight
File Window Help
Flights
2018-06-...tvincent
NOTE: If using PPK, you MUST be connected to the internet the first time you process data in After Flight from that unit. The software will automatically search Delair servers to identify an active PPK license based on the serial number of the UX11 and the date the dataset was collected (NOT the date the dataset is processed).
Base station
Flight: 2018-06-26_13h27_UX11_stvincent
Select base station files
Add
Remove
Reference antenna offset
Up: 0.000m
Set reference coordinates
Latitude N 0 0 0.00000000
Longitude E 0 0 0.00000000
Altitude 0.000m
Decimal degrees
OK
Cancel
PPK status
Fixed solution
Float solution
No solution
PPK disabled
Coverage map
6 photos or more
4-5 photos
1-3 photos
100.00m
If licensed for PPK, the Base station dialogue box appears automatically (if no PPK, base station box will not appear)
Click Add Rinex files
Map data OpenStreetMap
Selection
Number of photos: 161
Export
Search metada...
Flight Camera Seq RTC Longitude Latitude Alt.QFE Height AGL Alt. GPS Hor. Accuracy Vert. Accuracy Phi Theta
2018-06-26_13h27_UX11_stvincent
Selection Previews
2.1 PPK processing of GNSS baselines
7



2.2 PPK processing of GNSS baselines

NOTE: It is recommended to manually set a reference coordinate of control quality for the position of the base station to ensure accurate georeferencing. Otherwise the corrections will be relative and there may exist a shift in your dataset. It is recommended to use standard ITRF2008 (Epoch 2005.0) coordinates in lat/long. Altitude should be in meters (height above ellipsoid).

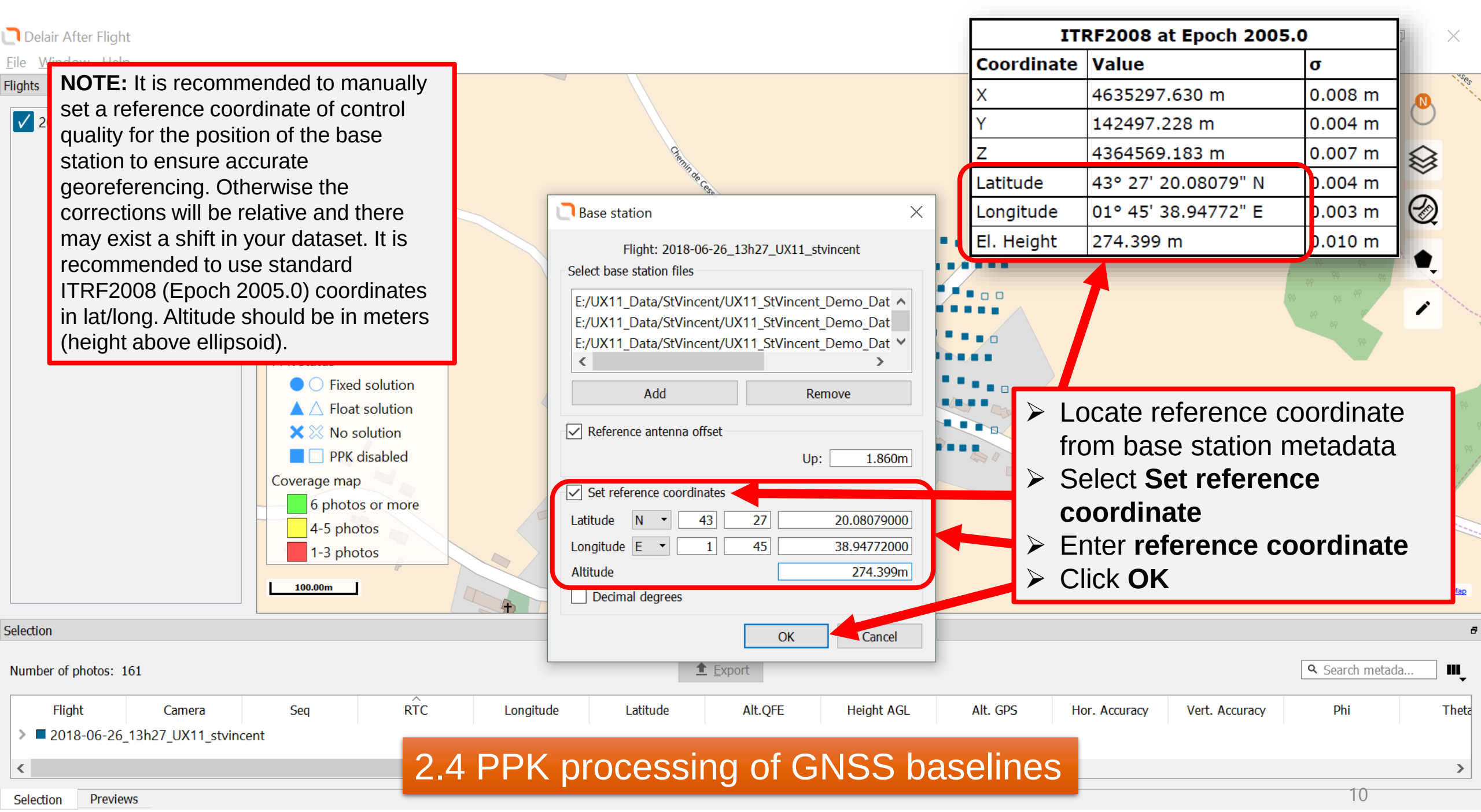


- Locate antenna height of base GNSS receiver from base station metadata
- Select **Reference antenna offset**
- **Set base station antenna height**

2.3 PPK processing of GNSS baselines

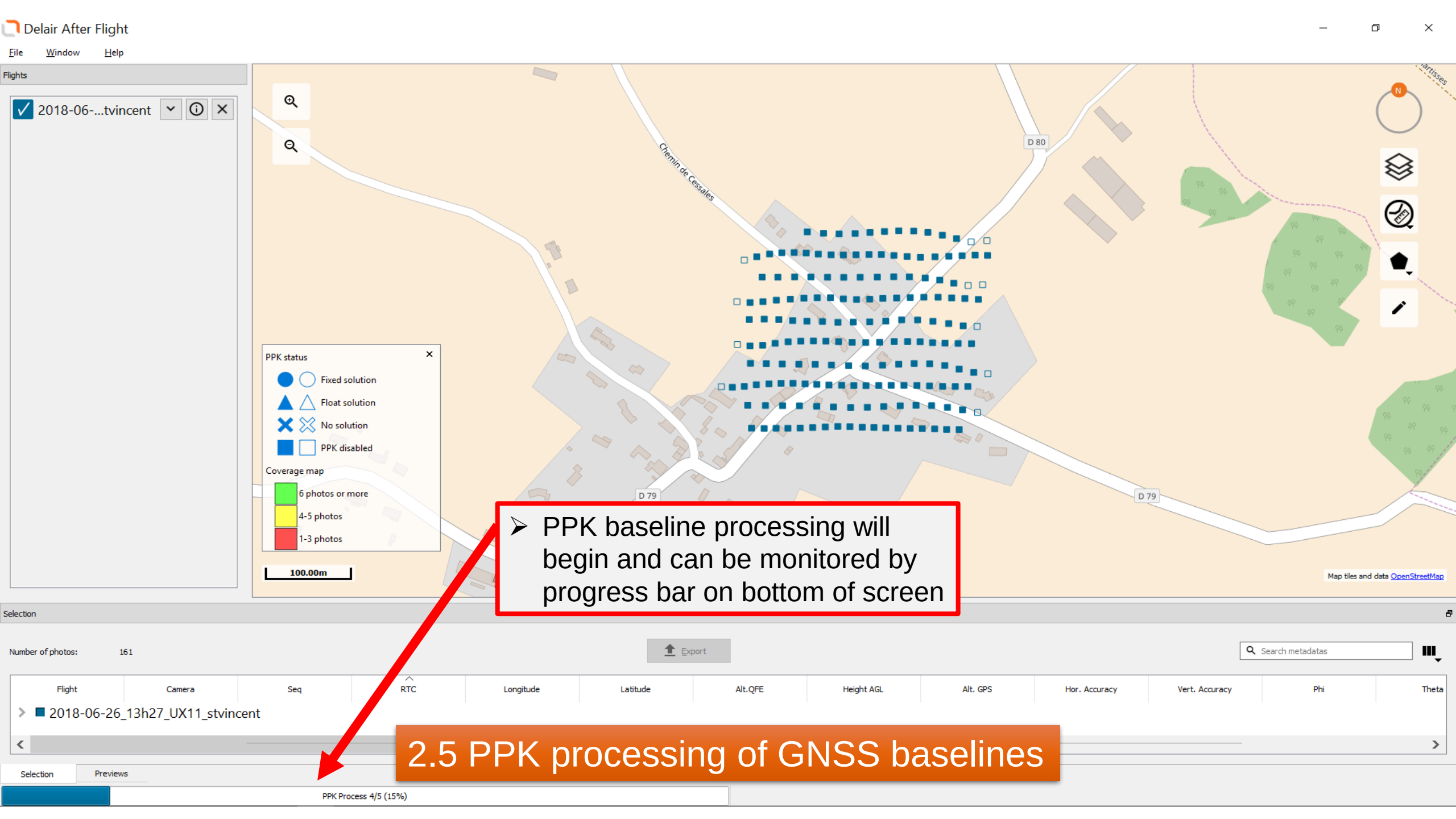
NOTE: It is recommended to manually set a reference coordinate of control quality for the position of the base station to ensure accurate georeferencing. Otherwise the corrections will be relative and there may exist a shift in your dataset. It is recommended to use standard ITRF2008 (Epoch 2005.0) coordinates in lat/long. Altitude should be in meters (height above ellipsoid).

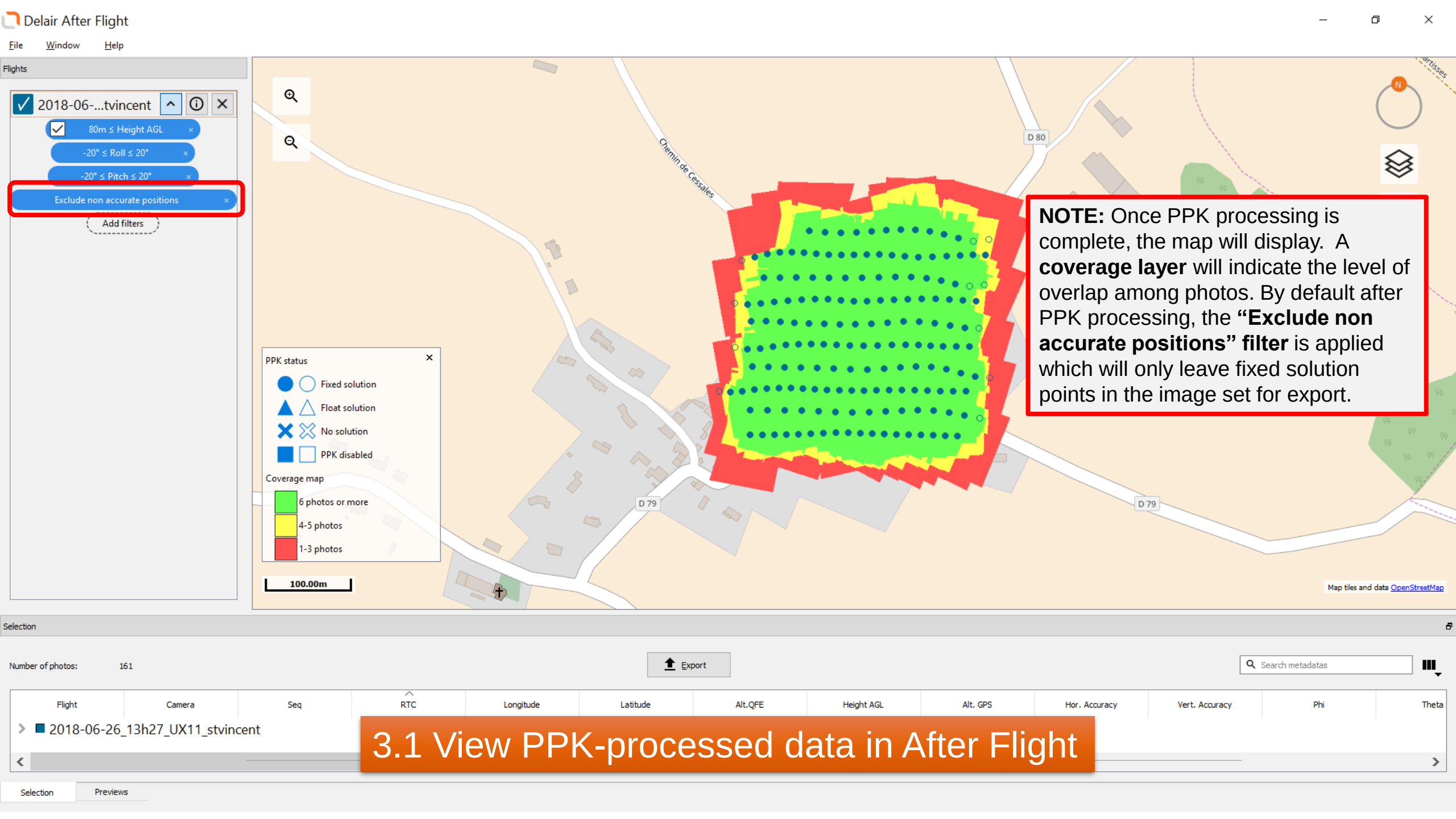
ITRF2008 at Epoch 2005.0		
Coordinate	**Value**	**σ**
X	4635297.630 m	0.008 m
Y	142497.228 m	0.004 m
Z	4364569.183 m	0.007 m
Latitude	43° 27' 20.08079" N	0.004 m
Longitude	01° 45' 38.94772" E	0.003 m
El. Height	274.399 m	0.010 m

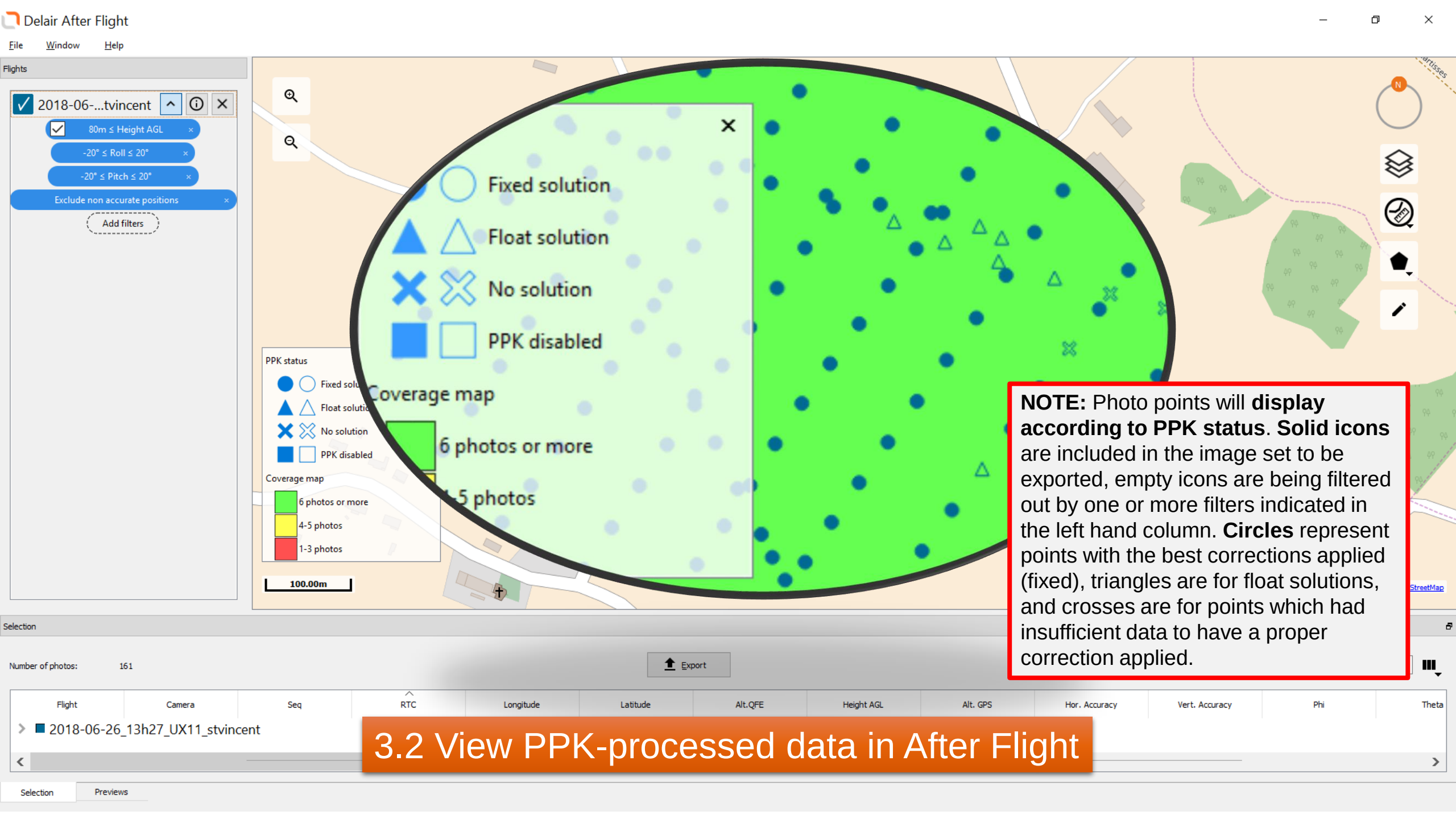


- Locate reference coordinate from base station metadata
- Select **Set reference coordinate**
- Enter **reference coordinate**
- Click **OK**

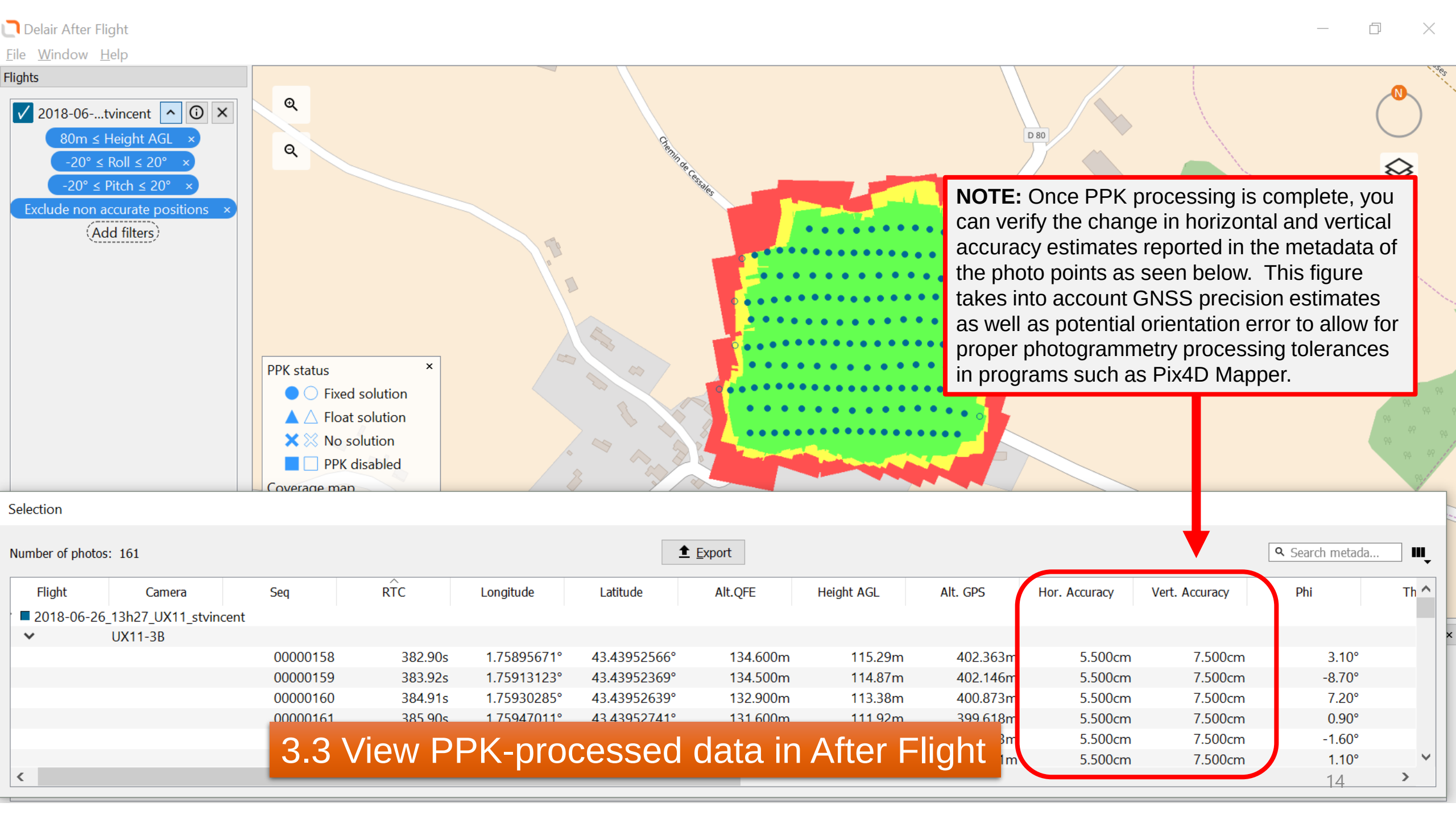
2.4 PPK processing of GNSS baselines

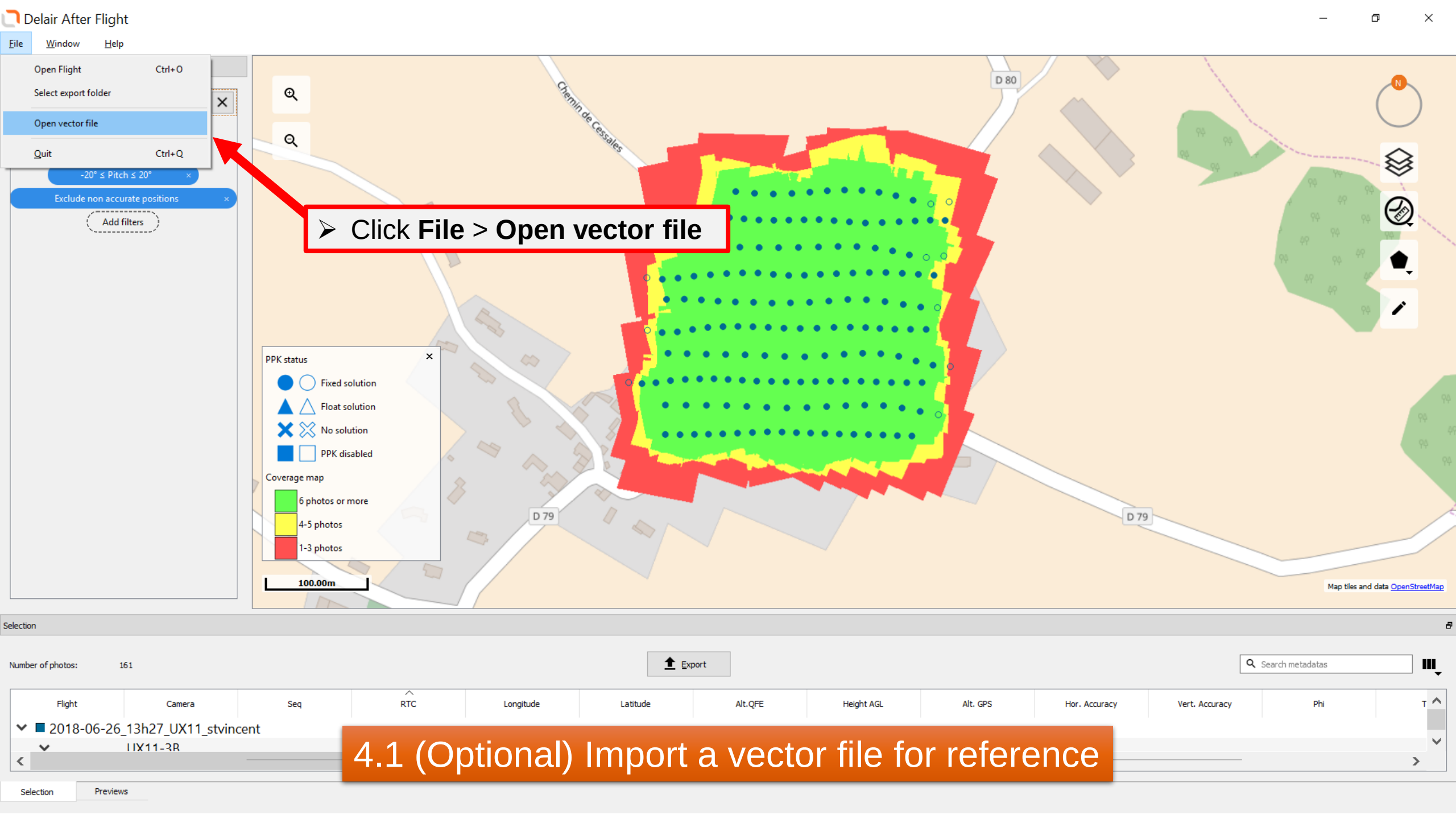

Delair After Flight
File
Window
Help
Flights
2018-06-...tvincent
Chemin de Cessales
D 80
D 79
D 79
PPK status
Fixed solution
Float solution
No solution
PPK disabled
Coverage map
6 photos or more
4-5 photos
1-3 photos
100.00m
Map tiles and data OpenStreetMap
Selection
Number of photos: 161
Export
Search metadatas
Flight
Camera
Seq
RTC
Longitude
Latitude
Alt.QFE
Height AGL
Alt. GPS
Hor. Accuracy
Vert. Accuracy
Phi
Theta
2018-06-26_13h27_UX11_stvincent
Selection
Previews
PPK Process 4/5 (15%)
➢ PPK baseline processing will begin and can be monitored by progress bar on bottom of screen
2.5 PPK processing of GNSS baselines

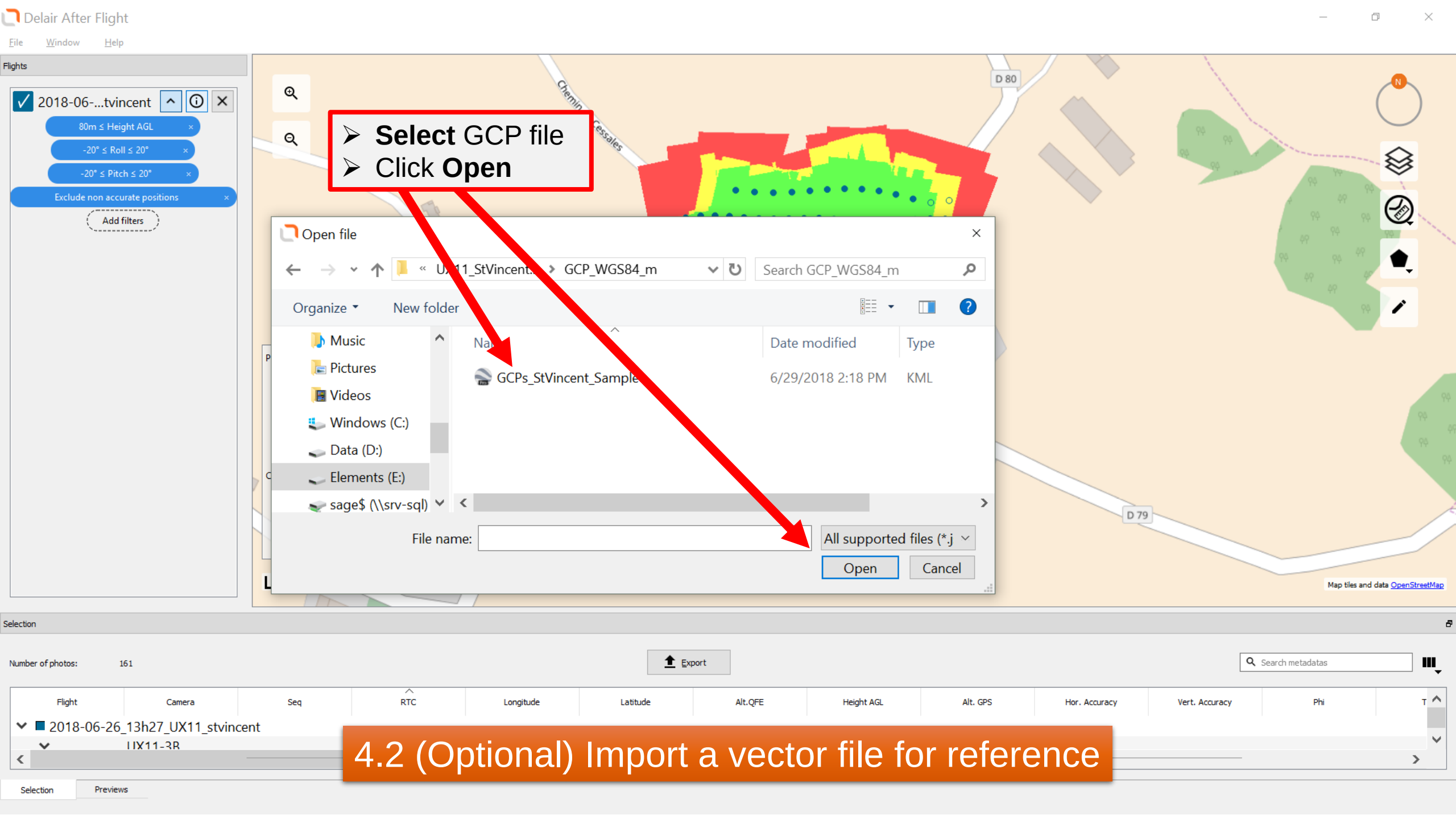

Delair After Flight
File
Window
Help
Flights
2018-06-...tvincent
80m ≤ Height AGL
-20° ≤ Roll ≤ 20°
-20° ≤ Pitch ≤ 20°
Exclude non accurate positions
Add filters
Chemin de Cessales
D 80
D 79
D 79
PPK status
Fixed solution
Float solution
No solution
PPK disabled
Coverage map
6 photos or more
4-5 photos
1-3 photos
100.00m
Map tiles and data OpenStreetMap
NOTE: Once PPK processing is complete, the map will display. A coverage layer will indicate the level of overlap among photos. By default after PPK processing, the "Exclude non accurate positions" filter is applied which will only leave fixed solution points in the image set for export.
Selection
Number of photos: 161
Export
Search metadatas
Flight
Camera
Seq
RTC
Longitude
Latitude
Alt.QFE
Height AGL
Alt. GPS
Hor. Accuracy
Vert. Accuracy
Phi
Theta
2018-06-26_13h27_UX11_stvincent
3.1 View PPK-processed data in After Flight
Selection
Previews

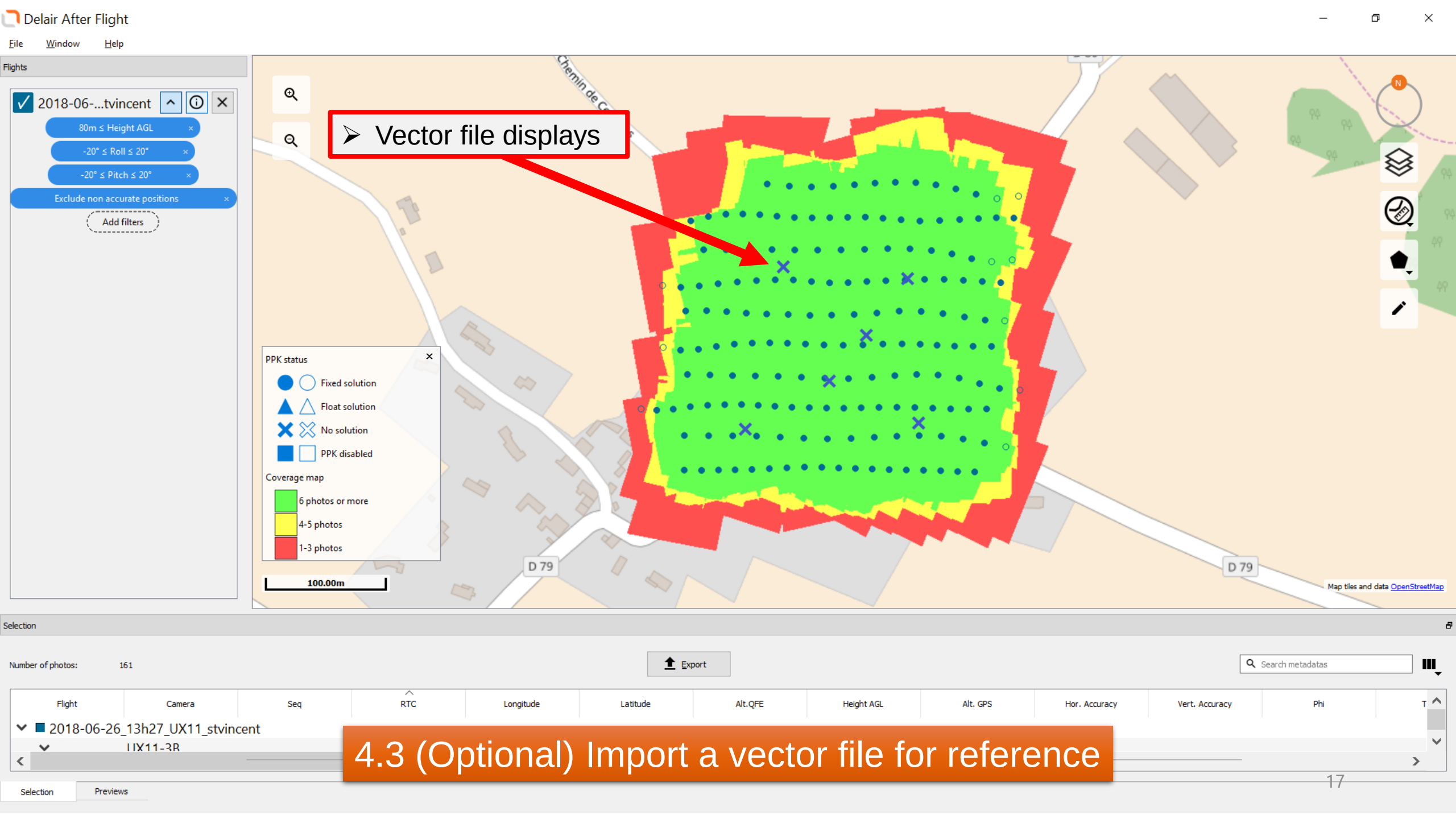


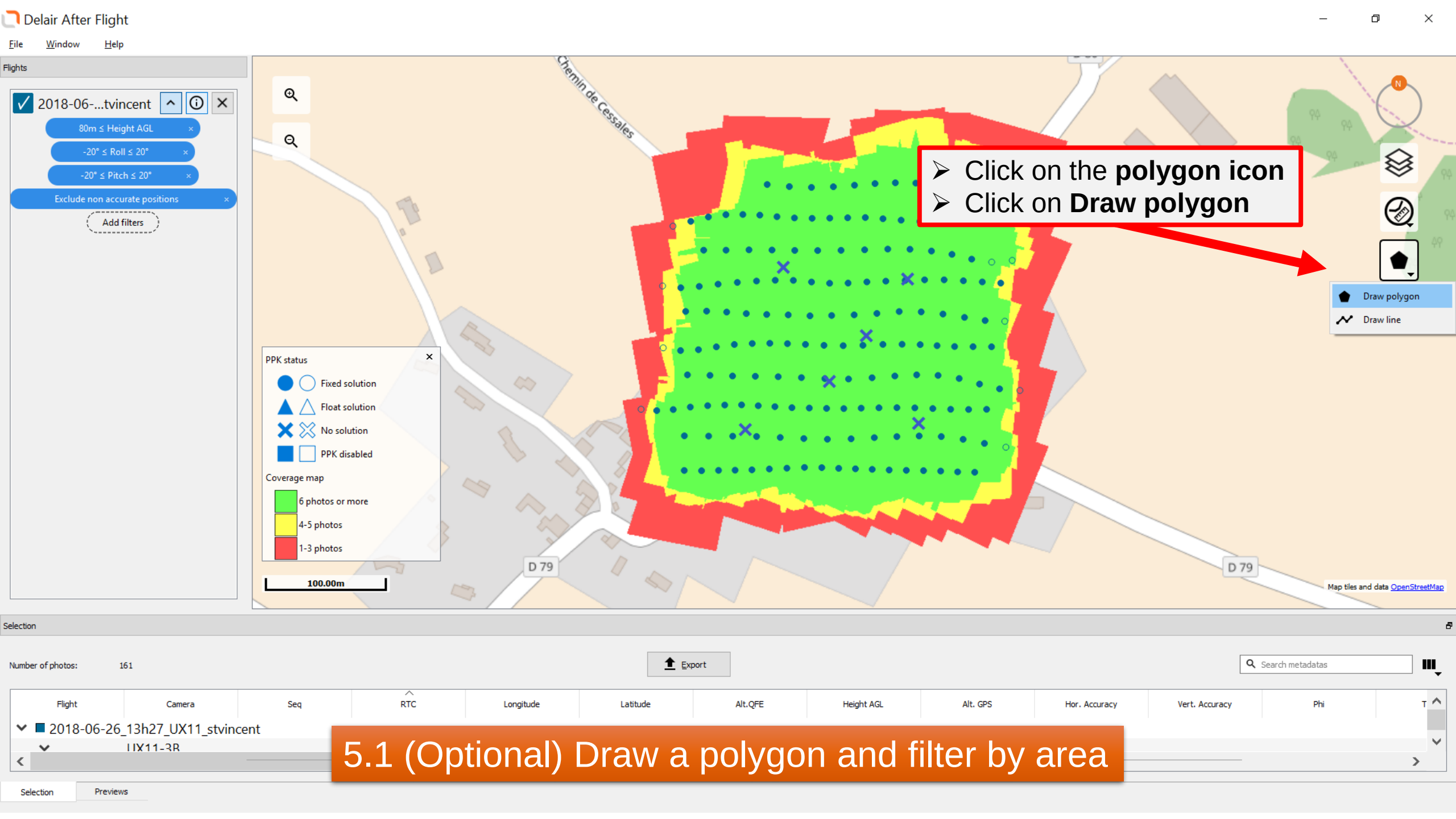
3.2 View PPK-processed data in After Flight

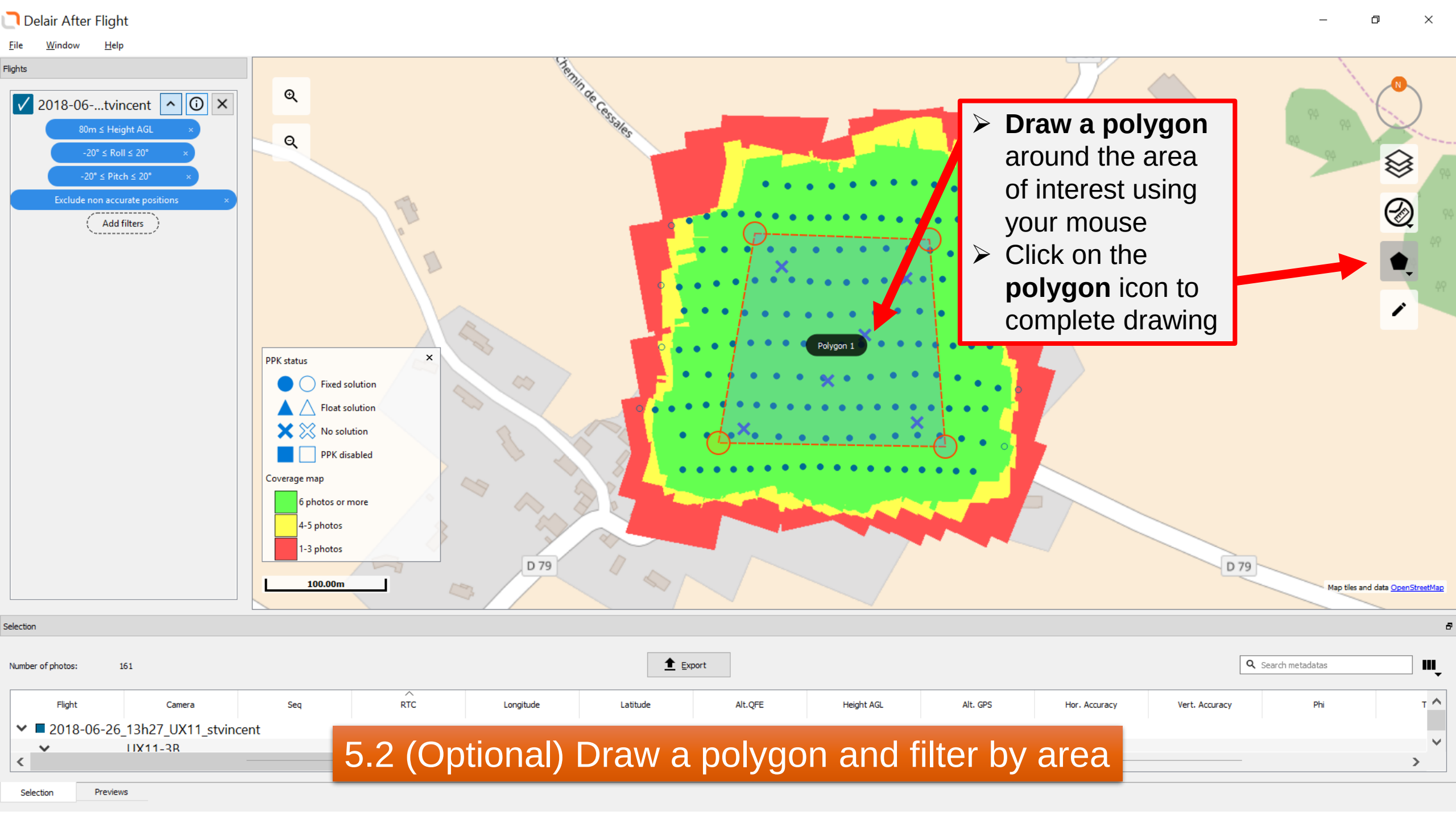

Delair After Flight
File Window Help
Flights
2018-06-...tvincent
80m ≤ Height AGL
-20° ≤ Roll ≤ 20°
-20° ≤ Pitch ≤ 20°
Exclude non accurate positions
Add filters
Chemin de Cessales
D 80
PPK status
Fixed solution
Float solution
No solution
PPK disabled
Coverage map
NOTE: Once PPK processing is complete, you can verify the change in horizontal and vertical accuracy estimates reported in the metadata of the photo points as seen below. This figure takes into account GNSS precision estimates as well as potential orientation error to allow for proper photogrammetry processing tolerances in programs such as Pix4D Mapper.
Selection
Number of photos: 161
Export
Search metada...
Flight | Camera | Seq | RTC | Longitude | Latitude | Alt.QFE | Height AGL | Alt. GPS | Hor. Accuracy | Vert. Accuracy | Phi | Th
2018-06-26_13h27_UX11_stvincent
UX11-3B
00000158 382.90s 1.75895671° 43.43952566° 134.600m 115.29m 402.363m 5.500cm 7.500cm 3.10°
00000159 383.92s 1.75913123° 43.43952369° 134.500m 114.87m 402.146m 5.500cm 7.500cm -8.70°
00000160 384.91s 1.75930285° 43.43952639° 132.900m 113.38m 400.873m 5.500cm 7.500cm 7.20°
00000161 385.90s 1.75947011° 43.43952741° 131.600m 111.92m 399.618m 5.500cm 7.500cm 0.90°
5.500cm 7.500cm -1.60°
5.500cm 7.500cm 1.10°
3.3 View PPK-processed data in After Flight
14

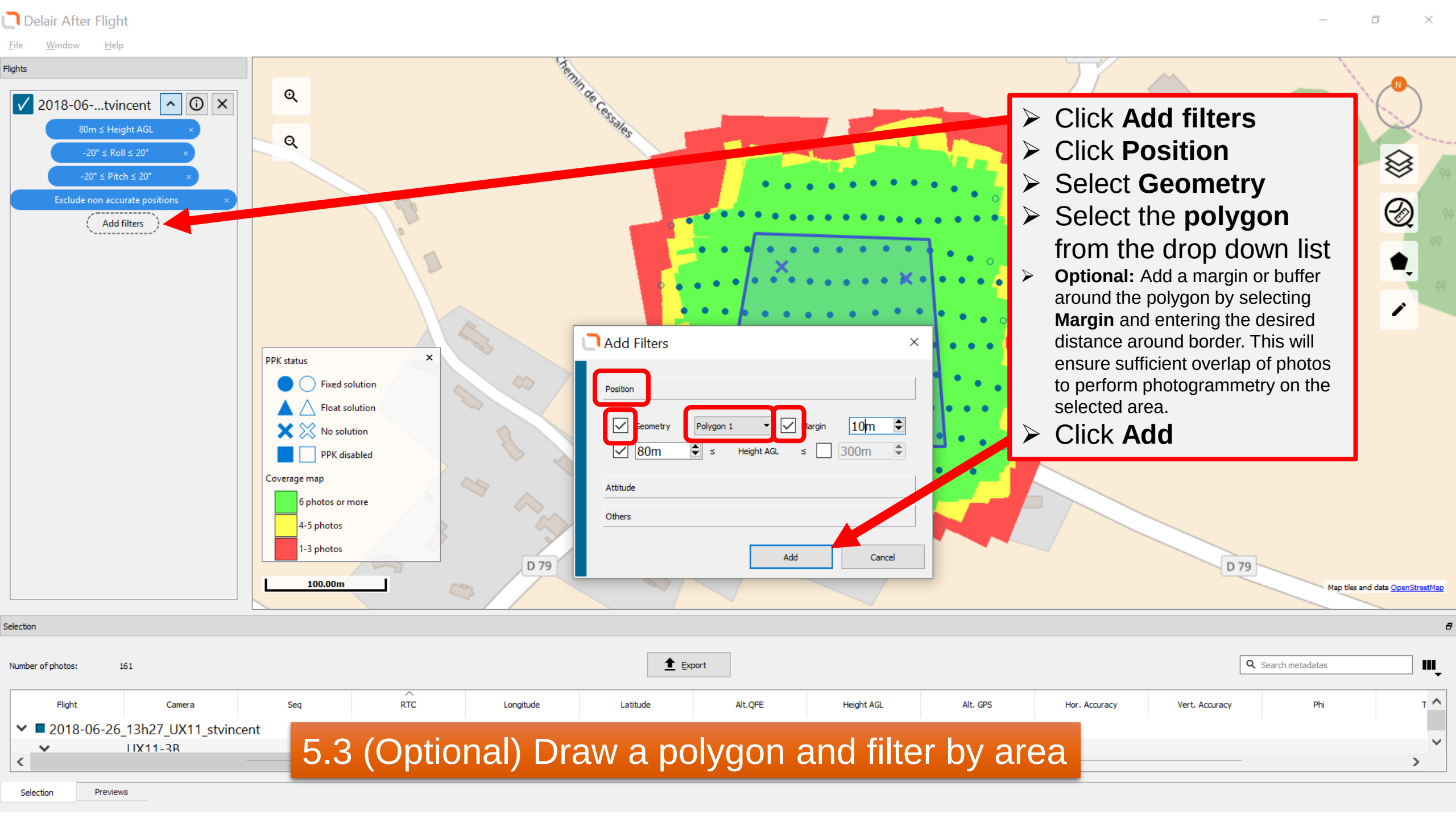

Delair After Flight
File
Window
Help
Open Flight Ctrl+O
Select export folder
Open vector file
Quit Ctrl+Q
-20° ≤ Pitch ≤ 20°
Exclude non accurate positions
Add filters
➢ Click File > Open vector file
Chemin de Cessales
D 80
D 79
D 79
PPK status
Fixed solution
Float solution
No solution
PPK disabled
Coverage map
6 photos or more
4-5 photos
1-3 photos
100.00m
Map tiles and data OpenStreetMap
Selection
Number of photos: 161
Export
Search metadatas
Flight
Camera
Seq
RTC
Longitude
Latitude
Alt.QFE
Height AGL
Alt. GPS
Hor. Accuracy
Vert. Accuracy
Phi
2018-06-26_13h27_UX11_stvincent
UX11-3B
Selection
Previews
4.1 (Optional) Import a vector file for reference

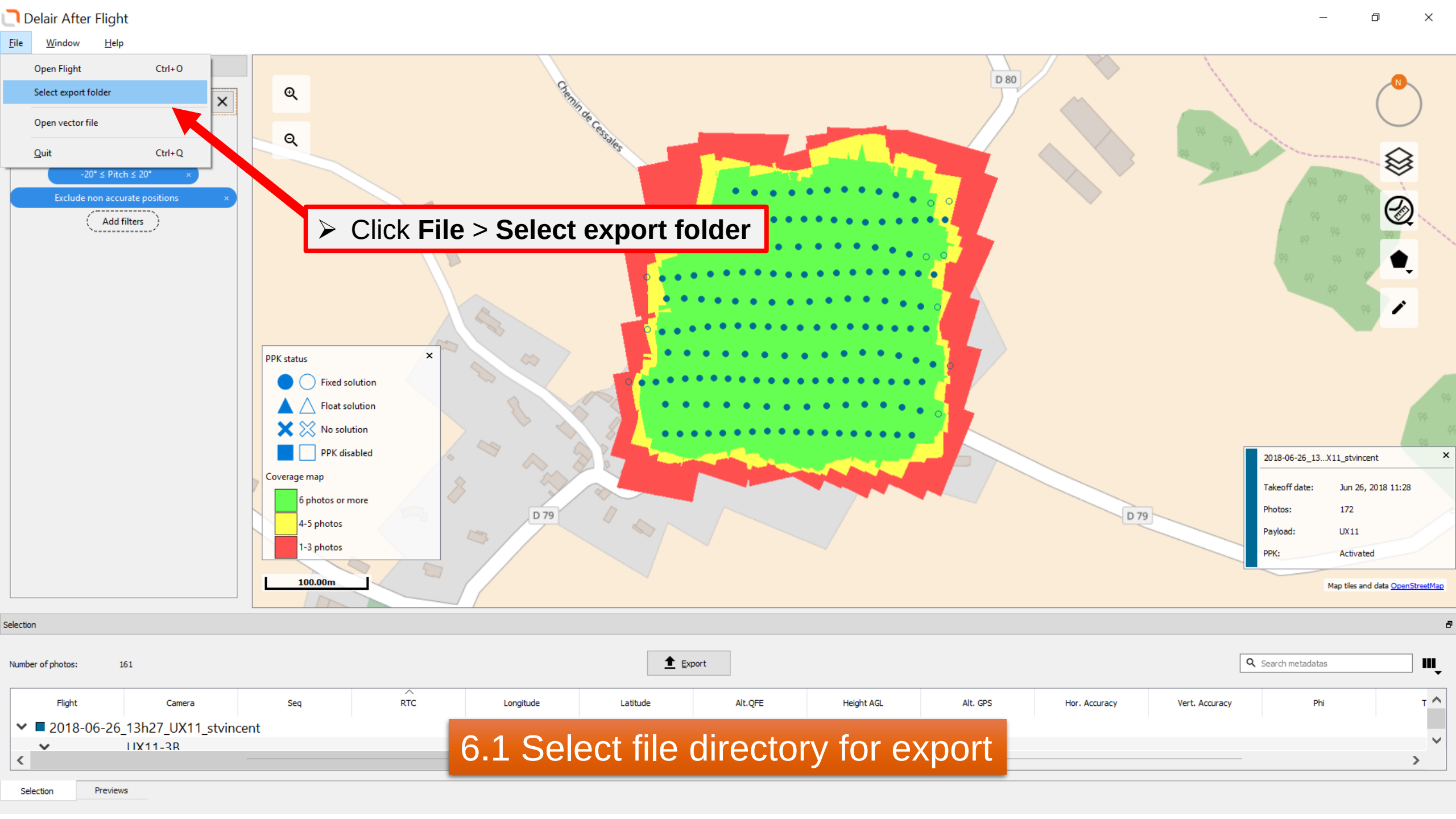

Delair After Flight
File
Window
Help
Flights
2018-06-...tvincent
80m ≤ Height AGL
-20° ≤ Roll ≤ 20°
-20° ≤ Pitch ≤ 20°
Exclude non accurate positions
Add filters
Select GCP file
Click Open
Open file
GCP_WGS84_m
Search GCP_WGS84_m
Organize
New folder
Music
Pictures
Videos
Windows (C:)
Data (D:)
Elements (E:)
sage$ (\\srv-sql)
Date modified
Type
GCPs_StVincent_Sample
6/29/2018 2:18 PM
KML
File name:
All supported files (*.j
Open
Cancel
D 80
D 79
Map tiles and data OpenStreetMap
Selection
Number of photos:
161
Export
Search metadatas
Flight
Camera
Seq
RTC
Longitude
Latitude
Alt.QFE
Height AGL
Alt. GPS
Hor. Accuracy
Vert. Accuracy
Phi
2018-06-26_13h27_UX11_stvincent
Selection
Previews
4.2 (Optional) Import a vector file for reference

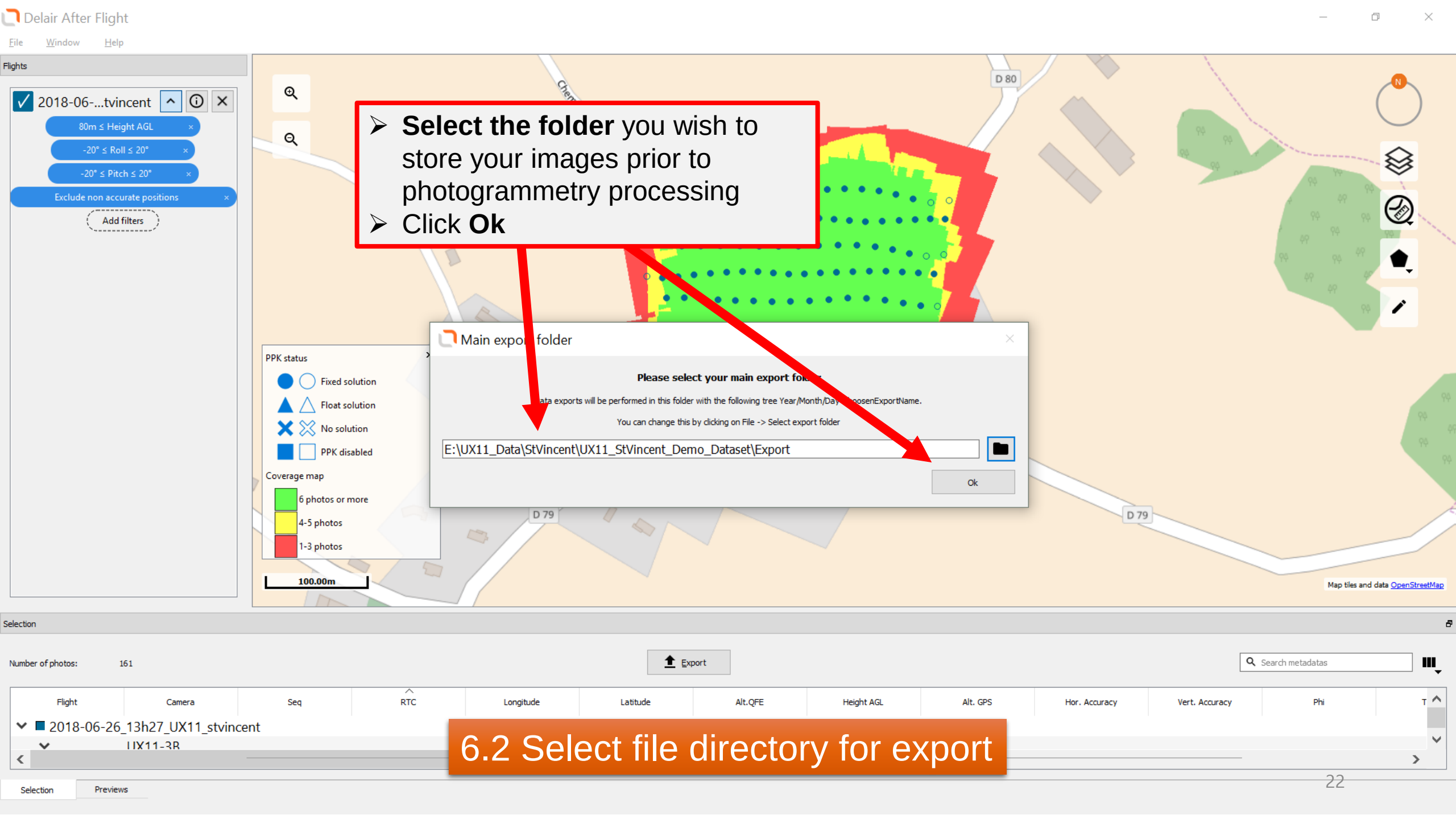

Delair After Flight
File
Window
Help
Flights
2018-06-...tvincent
80m ≤ Height AGL
-20° ≤ Roll ≤ 20°
-20° ≤ Pitch ≤ 20°
Exclude non accurate positions
Add filters
Vector file displays
PPK status
Fixed solution
Float solution
No solution
PPK disabled
Coverage map
6 photos or more
4-5 photos
1-3 photos
100.00m
D 79
D 79
Map tiles and data OpenStreetMap
Selection
Number of photos: 161
Export
Search metadatas
Flight
Camera
Seq
RTC
Longitude
Latitude
Alt.QFE
Height AGL
Alt. GPS
Hor. Accuracy
Vert. Accuracy
Phi
2018-06-26_13h27_UX11_stvincent
Selection
Previews
4.3 (Optional) Import a vector file for reference
17


Delair After Flight
File
Window
Help
Flights
2018-06-...tvincent
80m ≤ Height AGL
-20° ≤ Roll ≤ 20°
-20° ≤ Pitch ≤ 20°
Exclude non accurate positions
Add filters
Chemin de Cessales
D 79
D 79
PPK status
Fixed solution
Float solution
No solution
PPK disabled
Coverage map
6 photos or more
4-5 photos
1-3 photos
100.00m
Click on the polygon icon
Click on Draw polygon
Draw polygon
Draw line
Map tiles and data OpenStreetMap
Selection
Number of photos: 161
Export
Search metadatas
Flight
Camera
Seq
RTC
Longitude
Latitude
Alt.QFE
Height AGL
Alt. GPS
Hor. Accuracy
Vert. Accuracy
Phi
2018-06-26_13h27_UX11_stvincent
UX11-3B
Selection
Previews
5.1 (Optional) Draw a polygon and filter by area

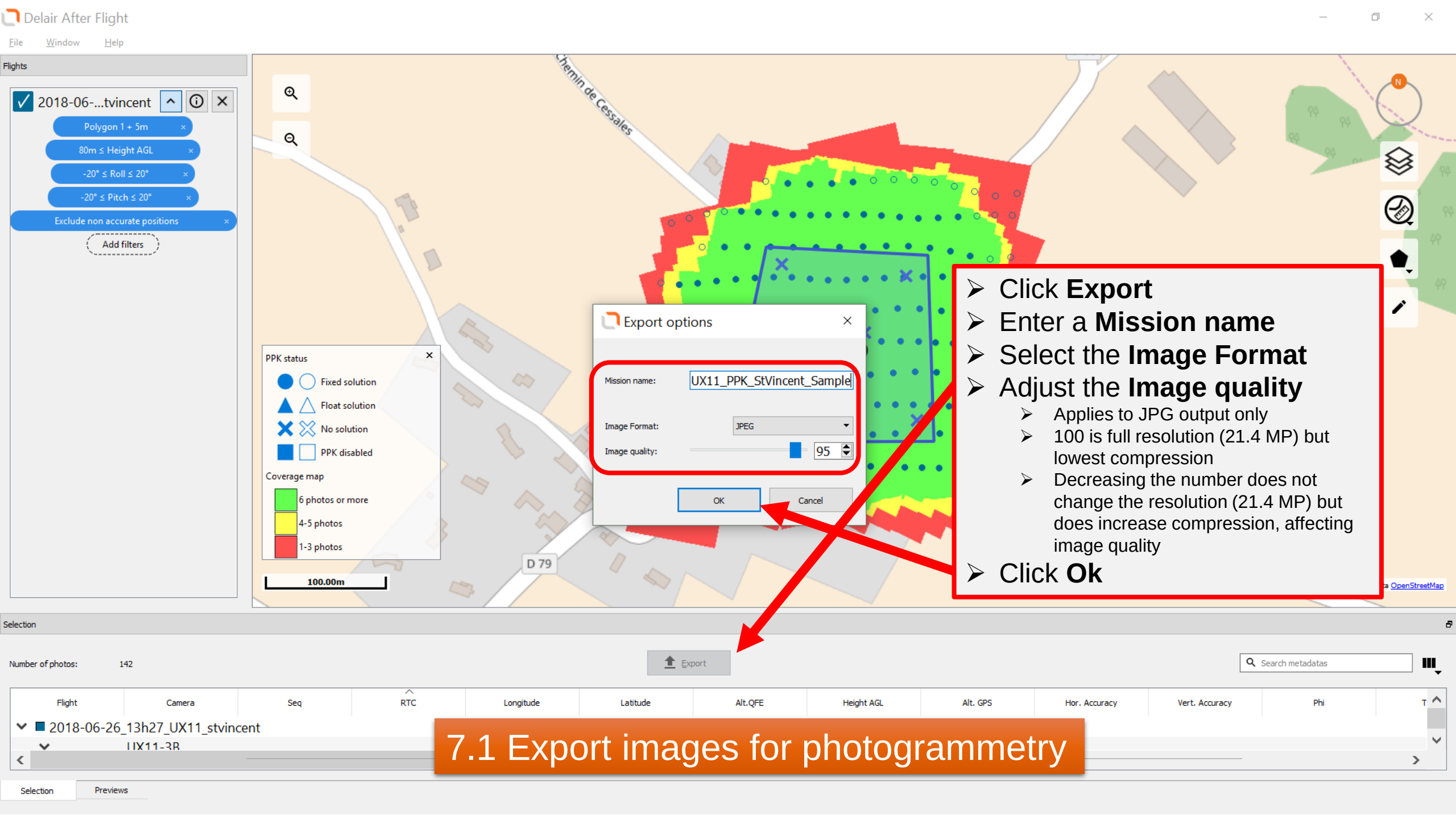

Delair After Flight
File
Window
Help
Flights
2018-06-...tvincent
80m ≤ Height AGL
-20° ≤ Roll ≤ 20°
-20° ≤ Pitch ≤ 20°
Exclude non accurate positions
Add filters
Chemin de Cessales
Draw a polygon around the area of interest using your mouse
Click on the polygon icon to complete drawing
Polygon 1
PPK status
Fixed solution
Float solution
No solution
PPK disabled
Coverage map
6 photos or more
4-5 photos
1-3 photos
100.00m
D 79
D 79
Map tiles and data OpenStreetMap
Selection
Number of photos: 161
Export
Search metadatas
Flight
Camera
Seq
RTC
Longitude
Latitude
Alt.QFE
Height AGL
Alt. GPS
Hor. Accuracy
Vert. Accuracy
Phi
2018-06-26_13h27_UX11_stvincent
Selection
Previews
5.2 (Optional) Draw a polygon and filter by area

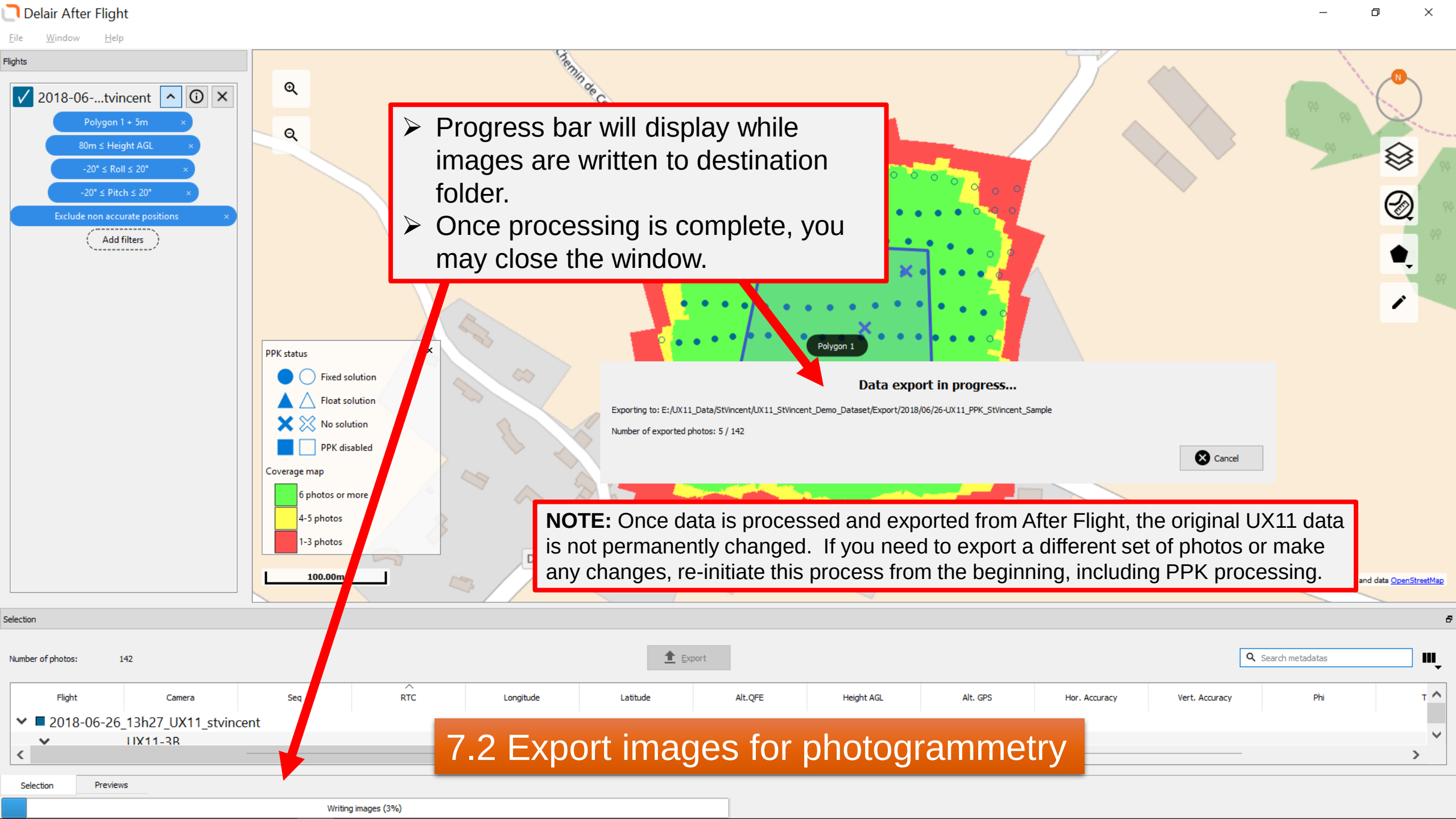

Delair After Flight
File
Window
Help
Flights
2018-06-...tvincent
80m ≤ Height AGL
-20° ≤ Roll ≤ 20°
-20° ≤ Pitch ≤ 20°
Exclude non accurate positions
Add filters
Chemin de Cessales
D 79
D 79
PPK status
Fixed solution
Float solution
No solution
PPK disabled
Coverage map
6 photos or more
4-5 photos
1-3 photos
100.00m
Add Filters
Position
Geometry
Polygon 1
Margin
10m
80m
≤
Height AGL
≤
300m
Attitude
Others
Add
Cancel
Click Add filters
Click Position
Select Geometry
Select the polygon from the drop down list
Optional: Add a margin or buffer around the polygon by selecting Margin and entering the desired distance around border. This will ensure sufficient overlap of photos to perform photogrammetry on the selected area.
Click Add
Map tiles and data OpenStreetMap
Selection
Number of photos:
161
Export
Search metadatas
Flight
Camera
Seq
RTC
Longitude
Latitude
Alt.QFE
Height AGL
Alt. GPS
Hor. Accuracy
Vert. Accuracy
Phi
2018-06-26_13h27_UX11_stvincent
UX11-3B
Selection
Previews
5.3 (Optional) Draw a polygon and filter by area

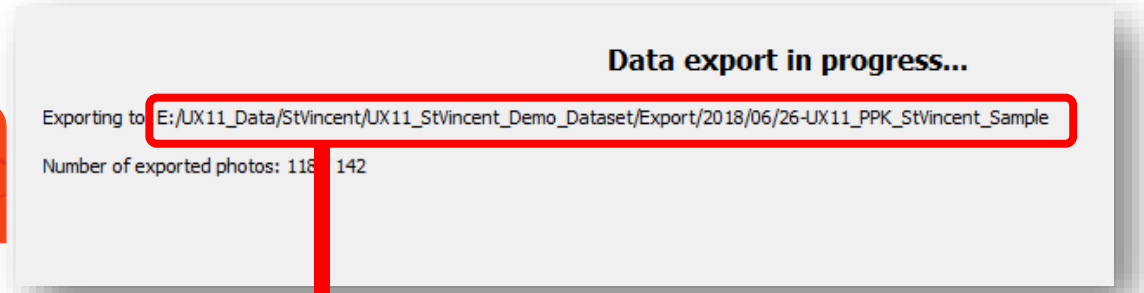

Delair After Flight
File
Window
Help
Open Flight Ctrl+O
Select export folder
Open vector file
Quit Ctrl+Q
-20° ≤ Pitch ≤ 20°
Exclude non accurate positions
Add filters
➢ Click File > Select export folder
Chemin de Cessales
D 80
D 79
D 79
PPK status
Fixed solution
Float solution
No solution
PPK disabled
Coverage map
6 photos or more
4-5 photos
1-3 photos
100.00m
2018-06-26_13...X11_stvincent
Takeoff date: Jun 26, 2018 11:28
Photos: 172
Payload: UX11
PPK: Activated
Map tiles and data OpenStreetMap
Selection
Number of photos: 161
Export
Search metadatas
Flight
Camera
Seq
RTC
Longitude
Latitude
Alt.QFE
Height AGL
Alt. GPS
Hor. Accuracy
Vert. Accuracy
Phi
2018-06-26_13h27_UX11_stvincent
6.1 Select file directory for export
Selection
Previews



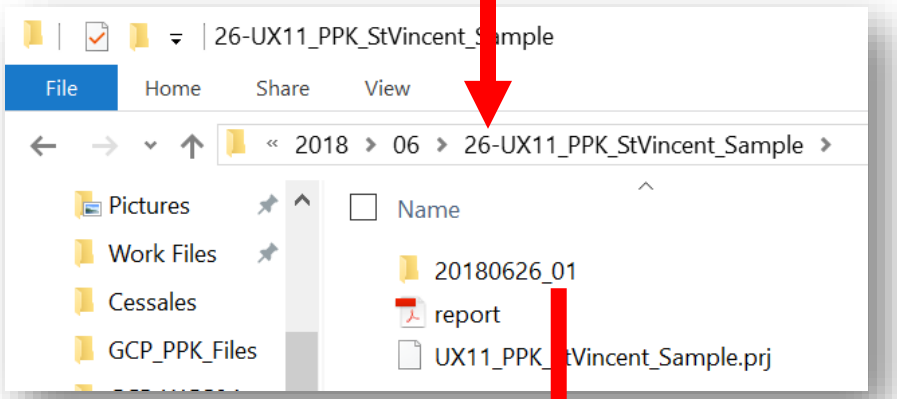
6.2 Select file directory for export

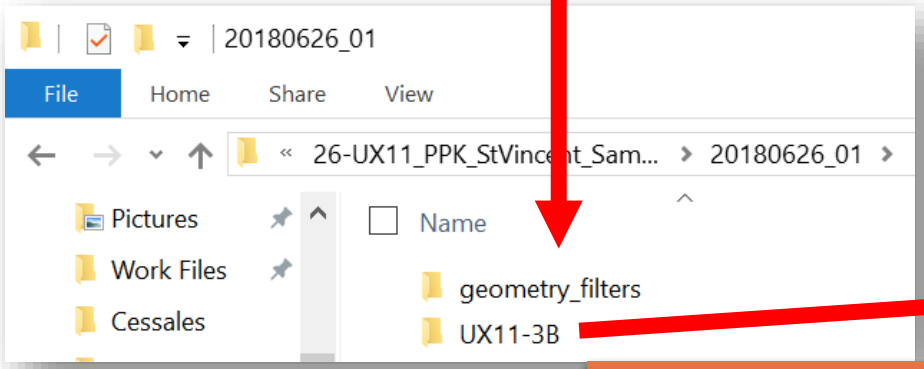

Delair After Flight
File
Window
Help
Flights
2018-06-...tvincent
Polygon 1 + 5m
80m ≤ Height AGL
-20° ≤ Roll ≤ 20°
-20° ≤ Pitch ≤ 20°
Exclude non accurate positions
Add filters
Chemin de Cessales
D 79
PPK status
Fixed solution
Float solution
No solution
PPK disabled
Coverage map
6 photos or more
4-5 photos
1-3 photos
100.00m
Export options
Mission name:
UX11_PPK_StVincent_Sample
Image Format:
JPEG
Image quality:
95
OK
Cancel
Click Export
Enter a Mission name
Select the Image Format
Adjust the Image quality
Applies to JPG output only
100 is full resolution (21.4 MP) but lowest compression
Decreasing the number does not change the resolution (21.4 MP) but does increase compression, affecting image quality
Click Ok
OpenStreetMap
Selection
Number of photos:
142
Export
Search metadatas
Flight
Camera
Seq
RTC
Longitude
Latitude
Alt.QFE
Height AGL
Alt. GPS
Hor. Accuracy
Vert. Accuracy
Phi
2018-06-26_13h27_UX11_stvincent
Selection
Previews
7.1 Export images for photogrammetry

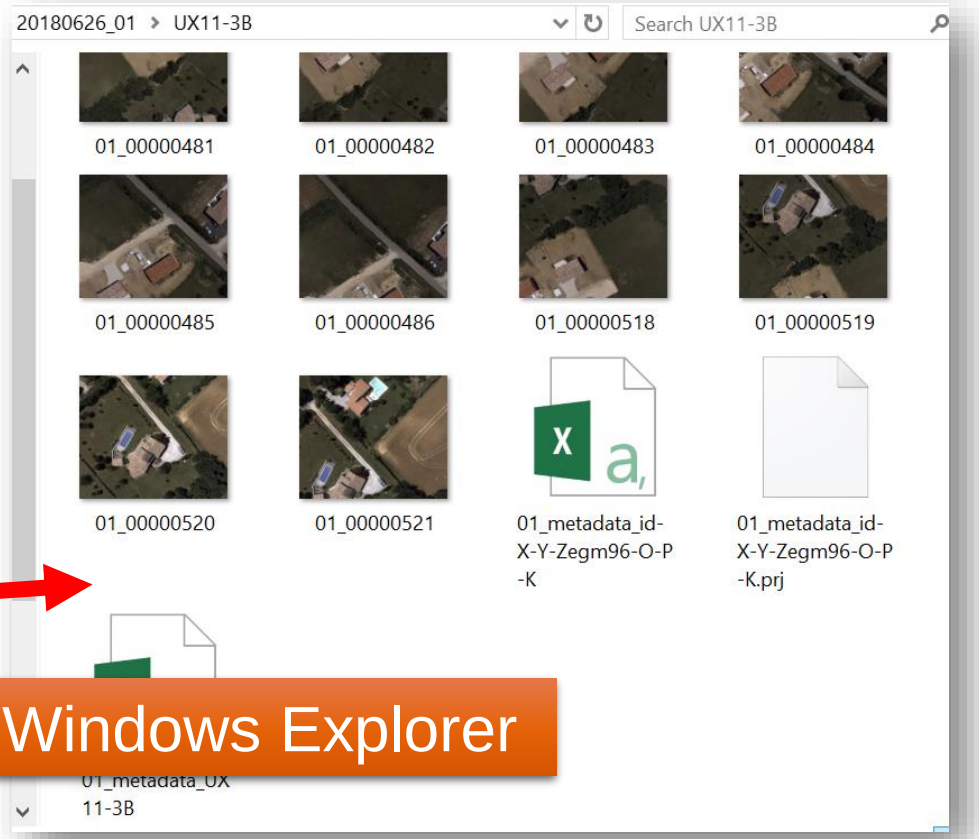

Delair After Flight
File
Window
Help
Flights
2018-06-...tvincent
Polygon 1 + 5m
80m ≤ Height AGL
-20° ≤ Roll ≤ 20°
-20° ≤ Pitch ≤ 20°
Exclude non accurate positions
Add filters
Progress bar will display while images are written to destination folder.
Once processing is complete, you may close the window.
Polygon 1
PPK status
Fixed solution
Float solution
No solution
PPK disabled
Coverage map
6 photos or more
4-5 photos
1-3 photos
100.00m
Data export in progress...
Exporting to: E:/UX11_Data/StVincent/UX11_StVincent_Demo_Dataset/Export/2018/06/26-UX11_PPK_StVincent_Sample
Number of exported photos: 5 / 142
Cancel
NOTE: Once data is processed and exported from After Flight, the original UX11 data is not permanently changed. If you need to export a different set of photos or make any changes, re-initiate this process from the beginning, including PPK processing.
and data OpenStreetMap
Selection
Number of photos: 142
Export
Search metadatas
Flight
Camera
Seq
RTC
Longitude
Latitude
Alt.QFE
Height AGL
Alt. GPS
Hor. Accuracy
Vert. Accuracy
Phi
2018-06-26_13h27_UX11_stvincent
UX11-3B
Selection
Previews
Writing images (3%)
7.2 Export images for photogrammetry



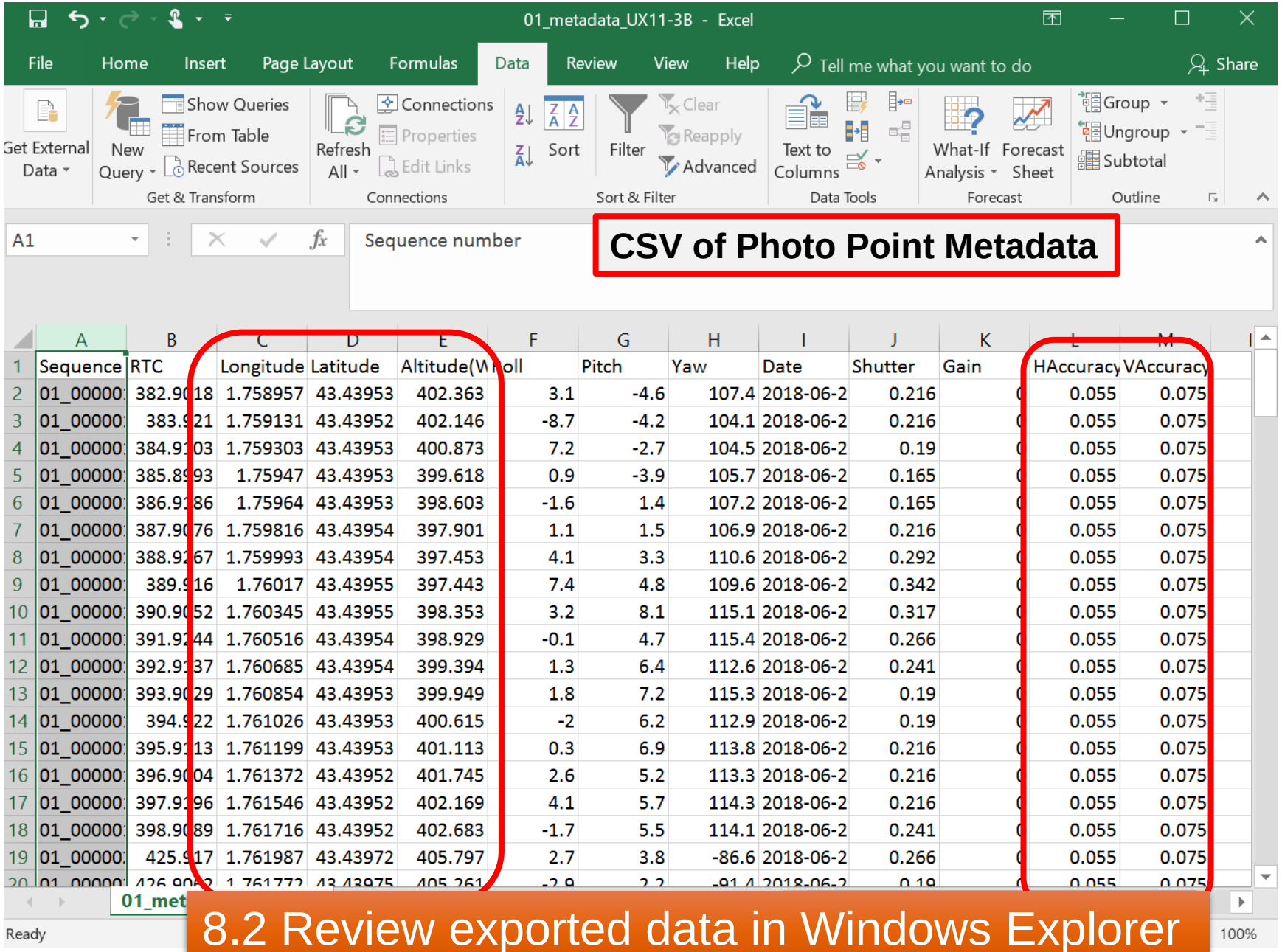
- Find the following outputs in your export folder:
  - After Flight report (PDF)
  - Inpho (Trimble) UASMaster project setup file with camera setup and photo points (WGS84, meters)
  - Folder of images
    - Geometry filters – KML file of polygon used to filter images in After Flight(if used)
    - Geotagged images (coordinates embedded in EXIF) ready for photogrammetry software
    - Inpho (Trimble) UASMaster project setup file with camera setup and photo points (UTM coordinates, WGS84 datum, meters)
    - Photo point metadata (CSV, WGS84, meters)
    - Photo point metadata (CSV, UTM coordinates, WGS84 datum, meters)







8.1 Review exported data in Windows Explorer



8.2 Review exported data in Windows Explorer

- Locate the following information on the export report:
  - Project metadata
  - Camera parameters
  - PPK processing metadata
  - Estimated accuracies of photo points

DELAIR

Export report

Date: 2018-07-06 01:08:03
Computer name: DLT-MARKETING06
Delair After Flight version: V6.0.4
Used DEM: SRTM90
Export folder: E:/UX11_Data/StVincent/UX11_StVincent_Demo_Datase
UX11_PPK_StVincent_Sample_1
Exported images / total: 142 / 172
Conversion: JPEG (Quality 100)

Flight: **2018-06-26_13h27_UX11_stvincent**
Folder: E:/UX11_Data/StVincent/UX11_StVincent_Demo_D
Sensor 1: UX11-3B
Serial number: 4103244854
Focal Length (mm): 12.0
Width / Height (px): 5048 / 4228
Pixel size (µm): 1.67
Applied filters:
Polygon 1 + 5m
80m ≤ Height AGL
-20° ≤ Roll ≤ 20°
-20° ≤ Pitch ≤ 20°
Exclude non accurate positions

Base station files:
E:/UX11_Data/StVincent/UX11_StVincent_Demo_Dataset/Base_RINEX/77531770.18g
E:/UX11_Data/StVincent/UX11_StVincent_Demo_Dataset/Base_RINEX/77531770.18n
E:/UX11_Data/StVincent/UX11_StVincent_Demo_Dataset/Base_RINEX/77531770.18o
Base station reference coordinates:
Latitude: 43° 27′ 20.08″ N
Longitude: 01° 45′ 38.95″ E
Altitude: 274m
Reference antenna up offset: 1.860m
Fixed PPK solutions percentage: 100% (142/142)
Maximum horizontal accuracy: 0.055m
Maximum vertical accuracy: 0.075m

8.3 Review exported data in Windows Explorer

DELAIR™
AERIAL INTELLIGENCE