Dr. Lomme Devriendt
Photogrammetry Production Manager

Can UAS technology compete with standard land surveying?

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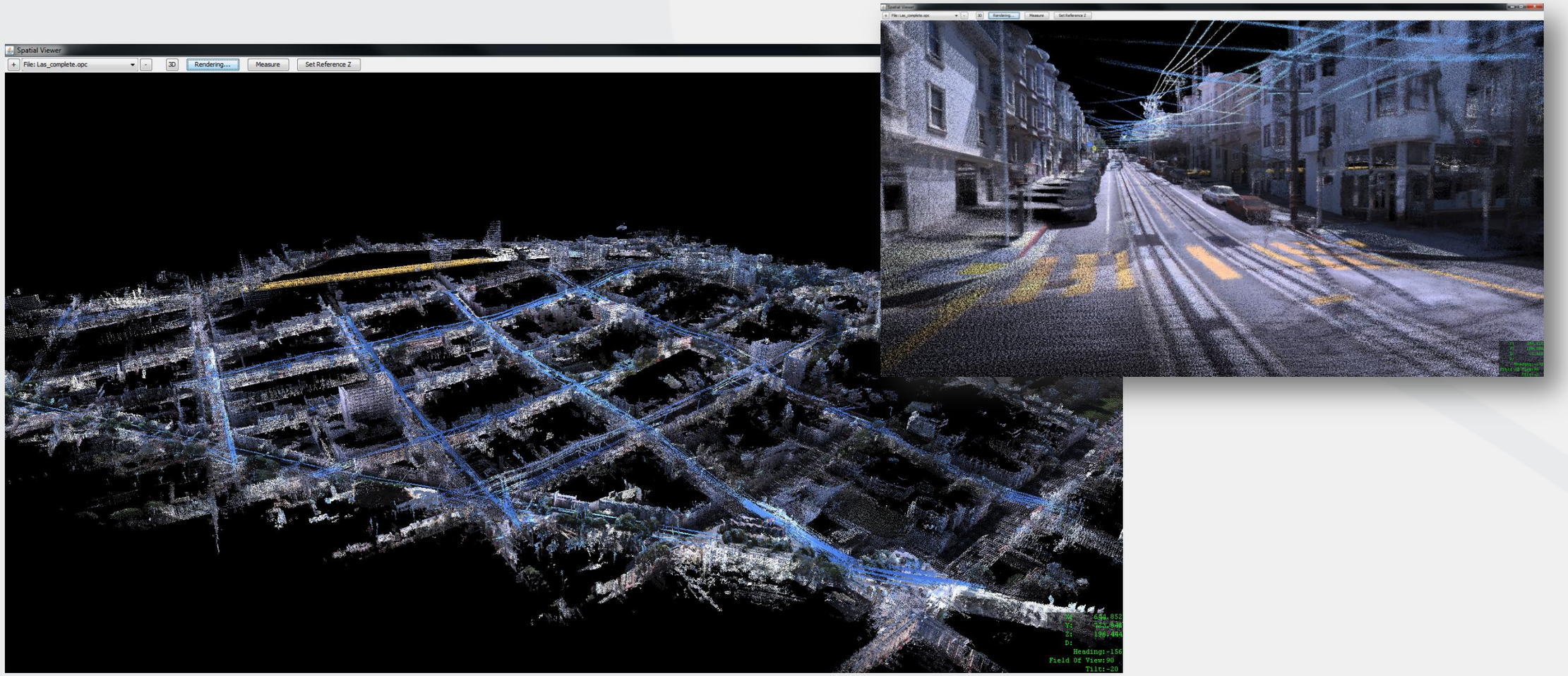
- Combining the best of both worlds: merging the **high precision** of land surveying with the **ease of geo-data capturing** of photogrammetry.



Can UAS technology compete with standard land surveying?

- (1) high immunity to weather, light and foliage conditions which limit the operational periods of image capture by high altitude photogrammetry;
- (2) supporting both 2D mapping for topographic and cadastral purposes as well as 3D modelling of buildings and other constructions; and
- (3) high ground resolution or Ground Sample Distance (GSD) and surveying precision, which are limited for high altitude photogrammetry.

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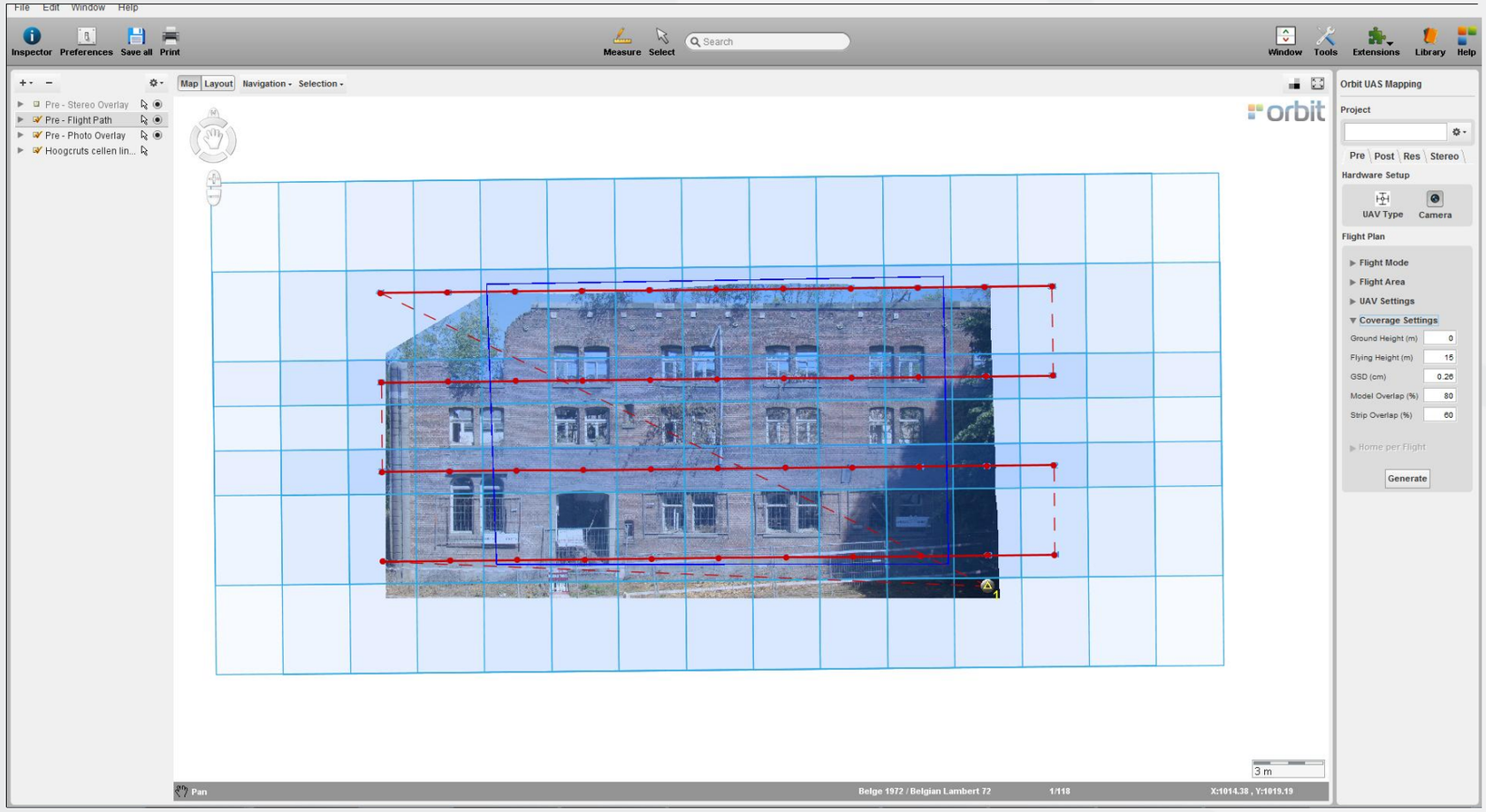

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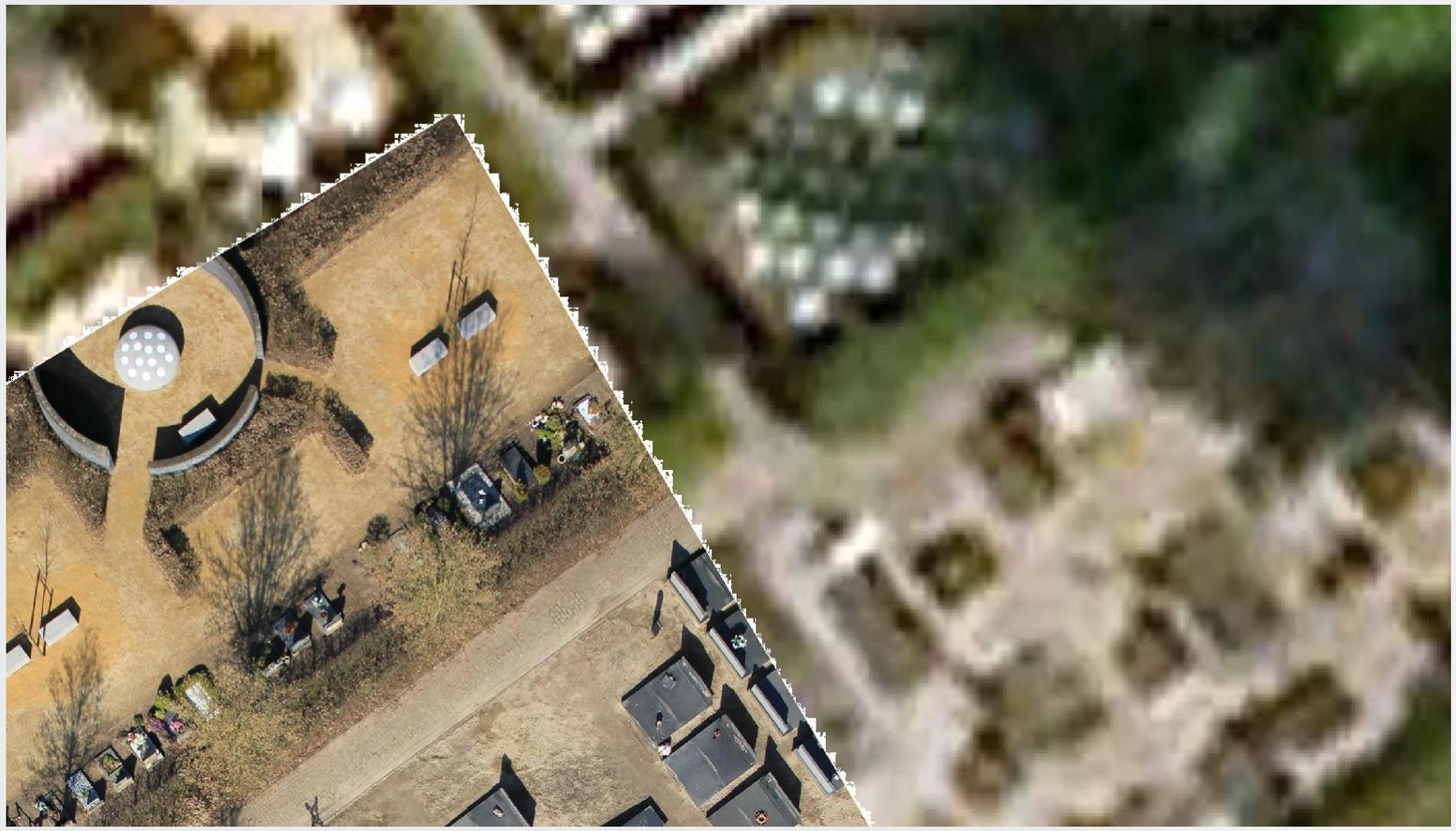
- (3) high ground resolution or Ground Sample Distance (GSD) and surveying precision, which are limited for high altitude photogrammetry.



Can UAS technology compete with standard land surveying?

- Important Note: there is a big difference between nice visualizations and land surveying quality !

- Using modern UAS mapping technology, a resolution of 1cm and accuracy of 2cm is easy to achieve at a cost that is definitely competitive when compared with traditional methods of collecting data.

- Integrating this UAS system with specialized pre- and postflight software, that feeds the preprogrammed waypoint flight in a 'photogrammetry' way and adapts the postflight process on required image and flightlog data, results in a never seen high accuracy...

orbit

Orbit UAS Mapping Software

Orbit GeoSpatial Technologies

We Innovate, We Integrate

- Orbit GT bridges the gap between Airborne and Mobile Mapping, backed by over 45 years of experience in photogrammetry, cartography, spatial database management and geospatial processing. Products in photogrammetry and mobile mapping are sold worldwide.

Facts…

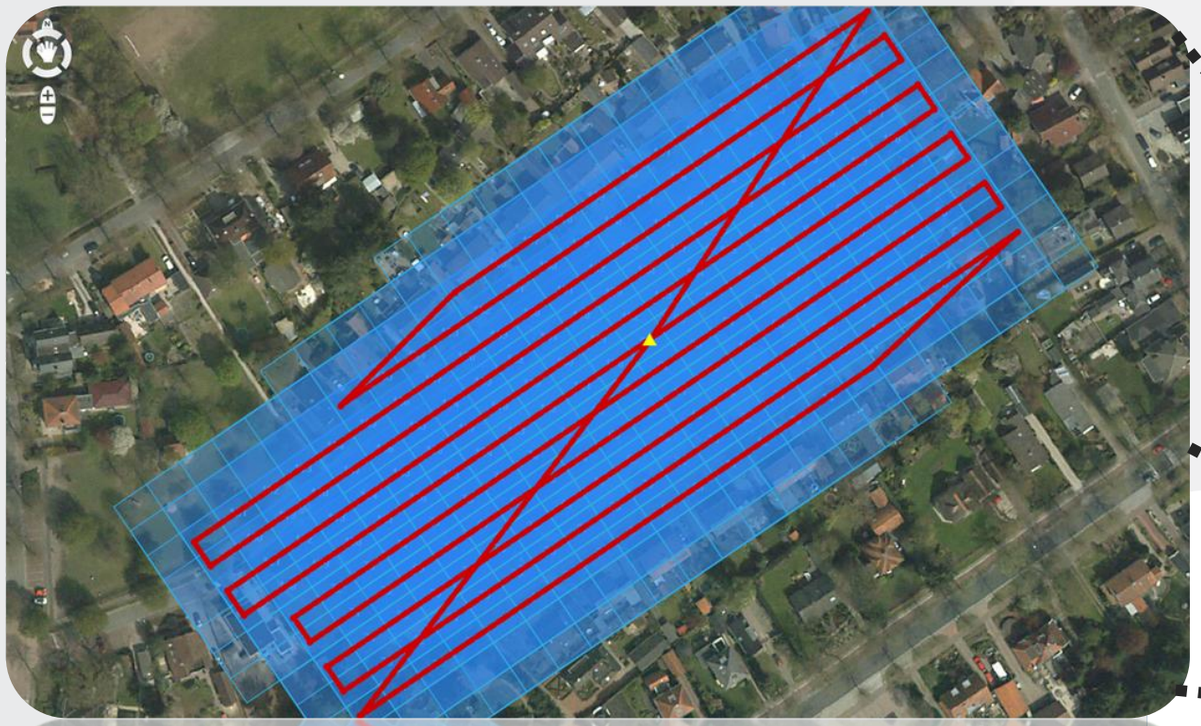
- Topcon Europe Positioning (TEP) and Orbit GeoSpatial Technologies (Orbit GT) signed an agreement through which Topcon will resell Orbit GT's mobile mapping software solutions around the globe as a part of Topcon's leading IP-S2 portfolio.

- "Orbit UAS Mapping Solution delivers a degree of accuracy that is better than the norm of surveying on the ground. These results are above the expectations of our clients" (Cadastre The Netherlands)

- "Vietnamese governments has now started making updates to the cadastral map using Orbit UAS Mapping Solution."

UAS Mapping Software

- The basis: a full stereo covered flight plan



UAS Mapping Software

- Professional software for 3D visialisation and high precision mappings...

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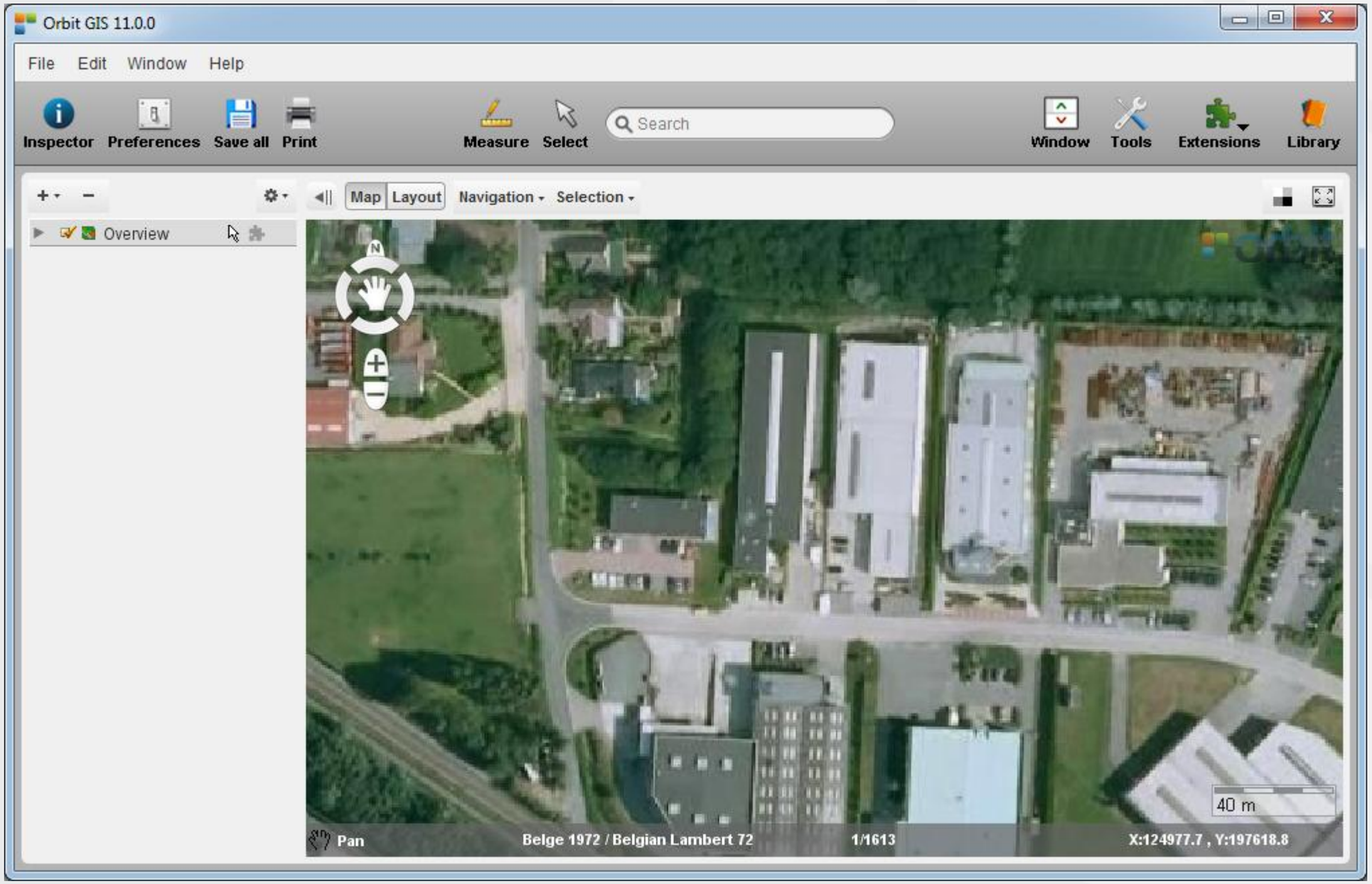
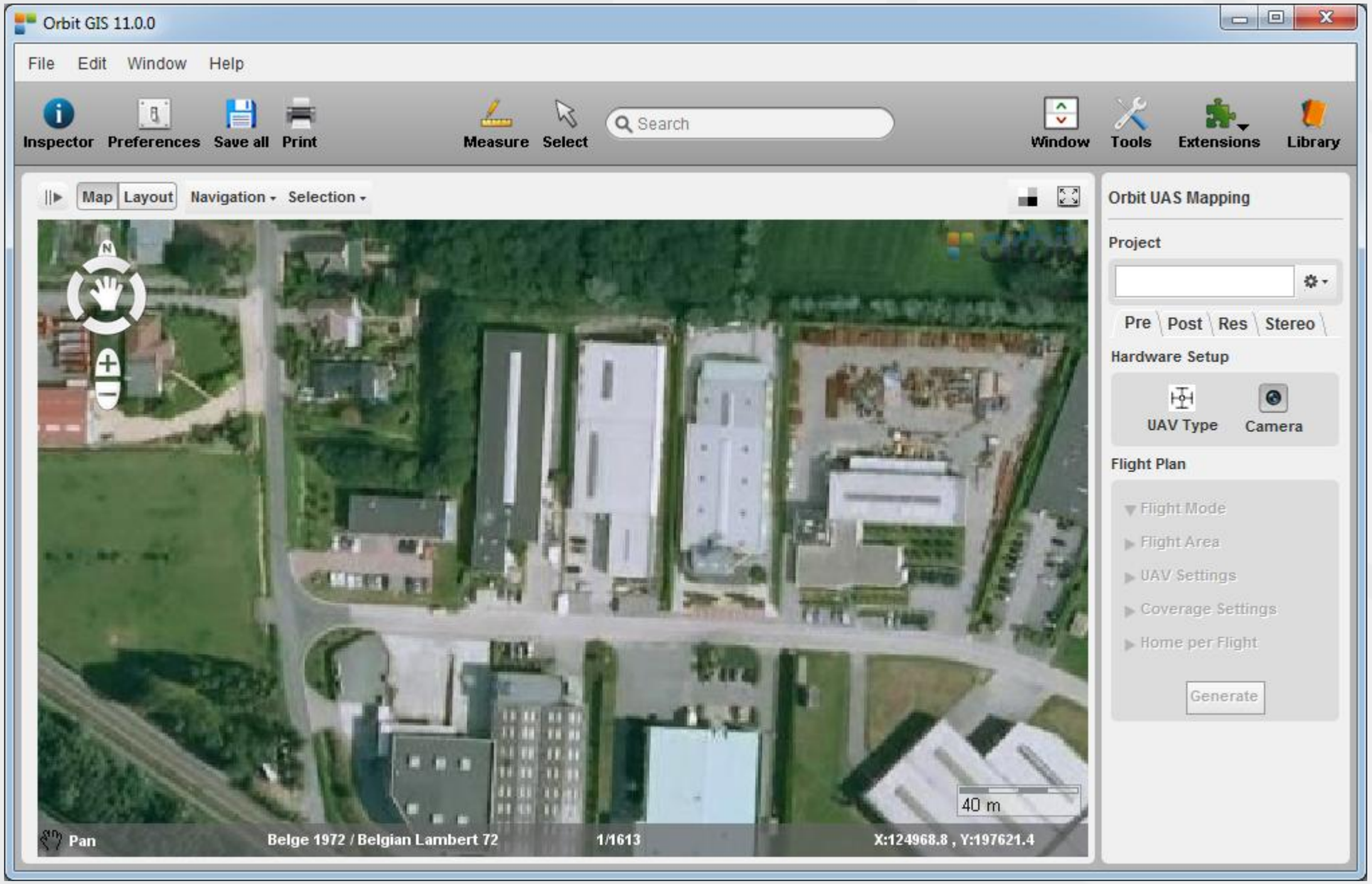
Orbit UAS Mapping Software

Planning your flight

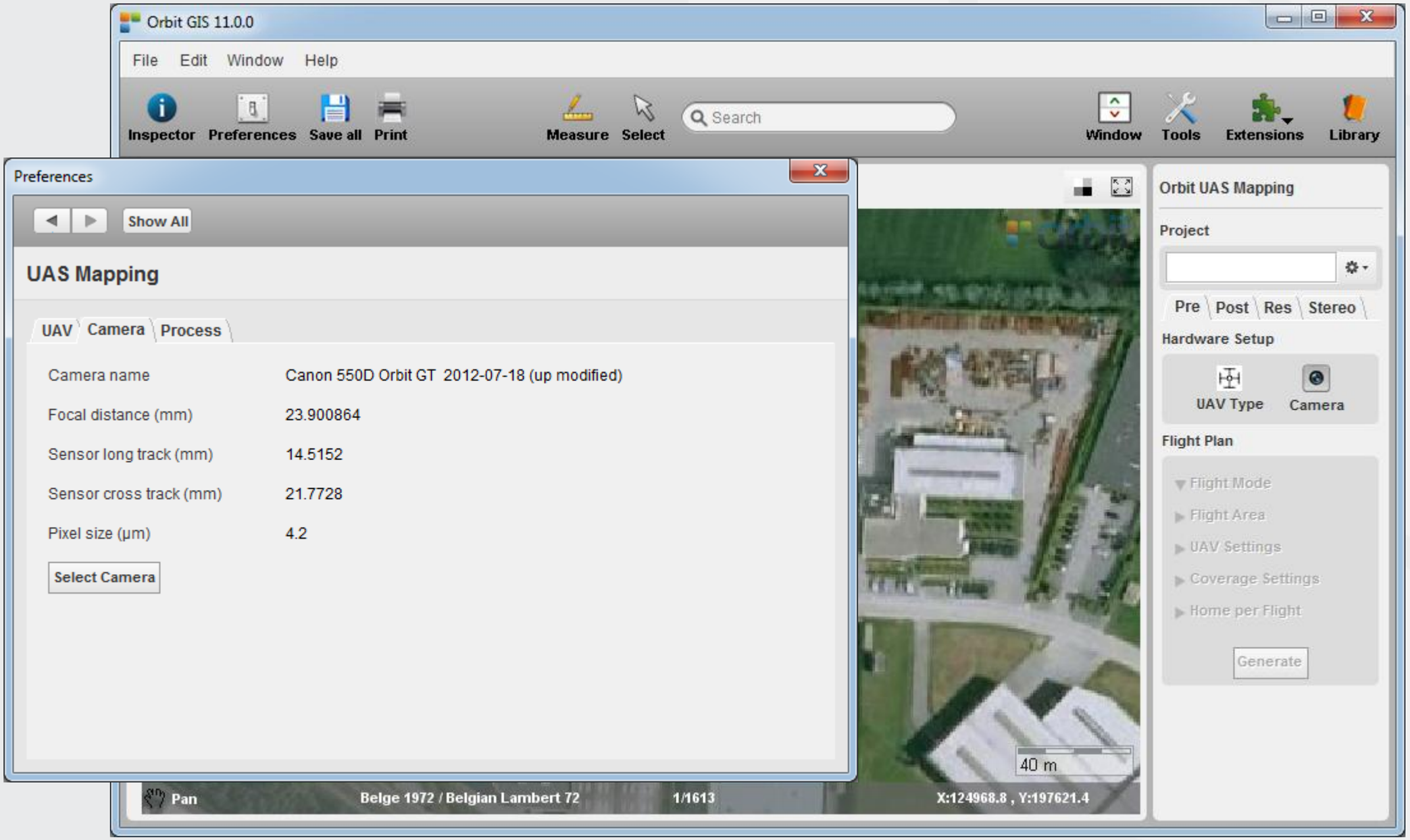
1. Import from Google, WMS, Local files, ...



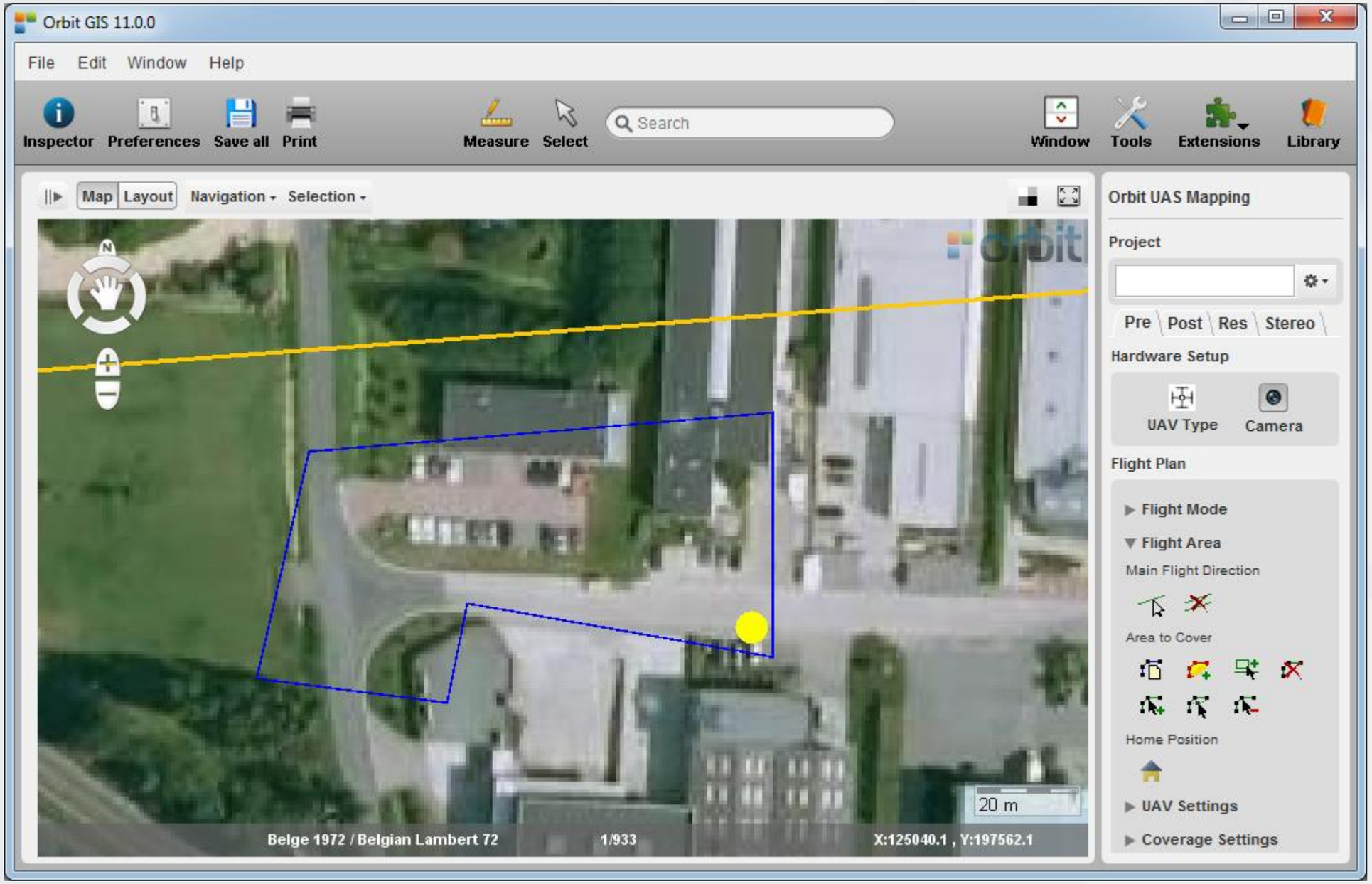
1. Import from Google, WMS, Local files, ...



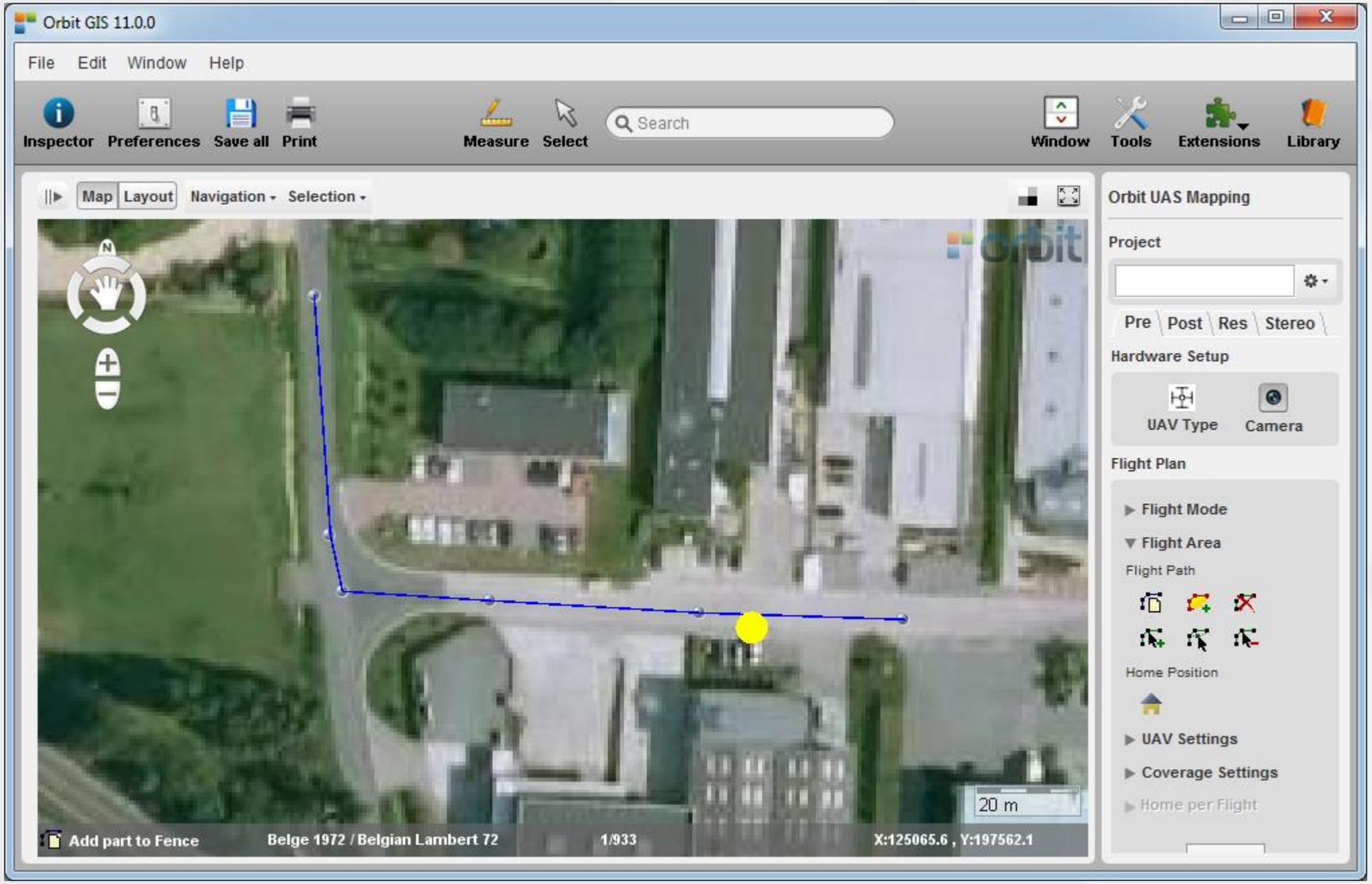
2. Choose your system & camera



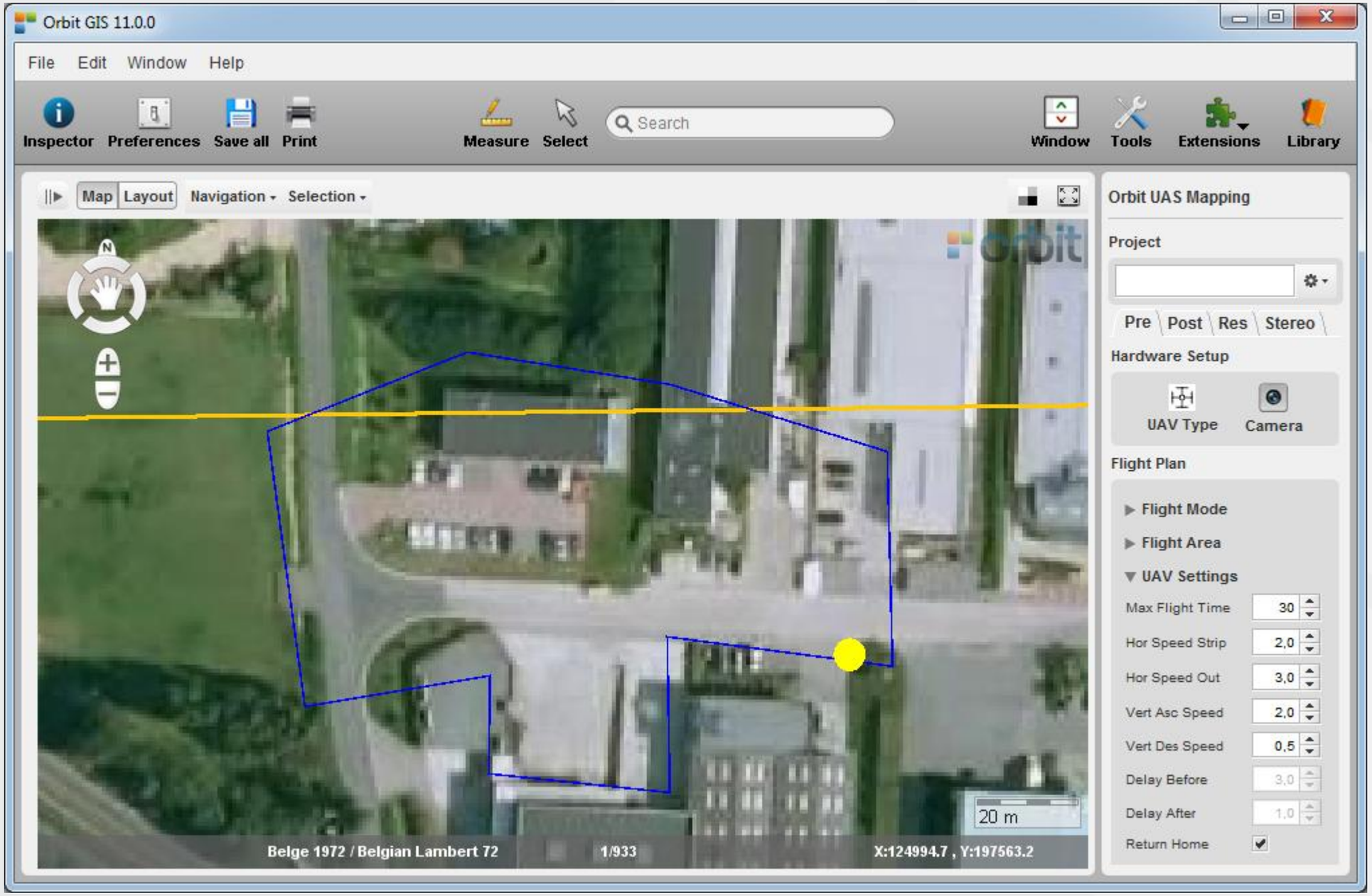
3a. Create area and flight direction for area coverage



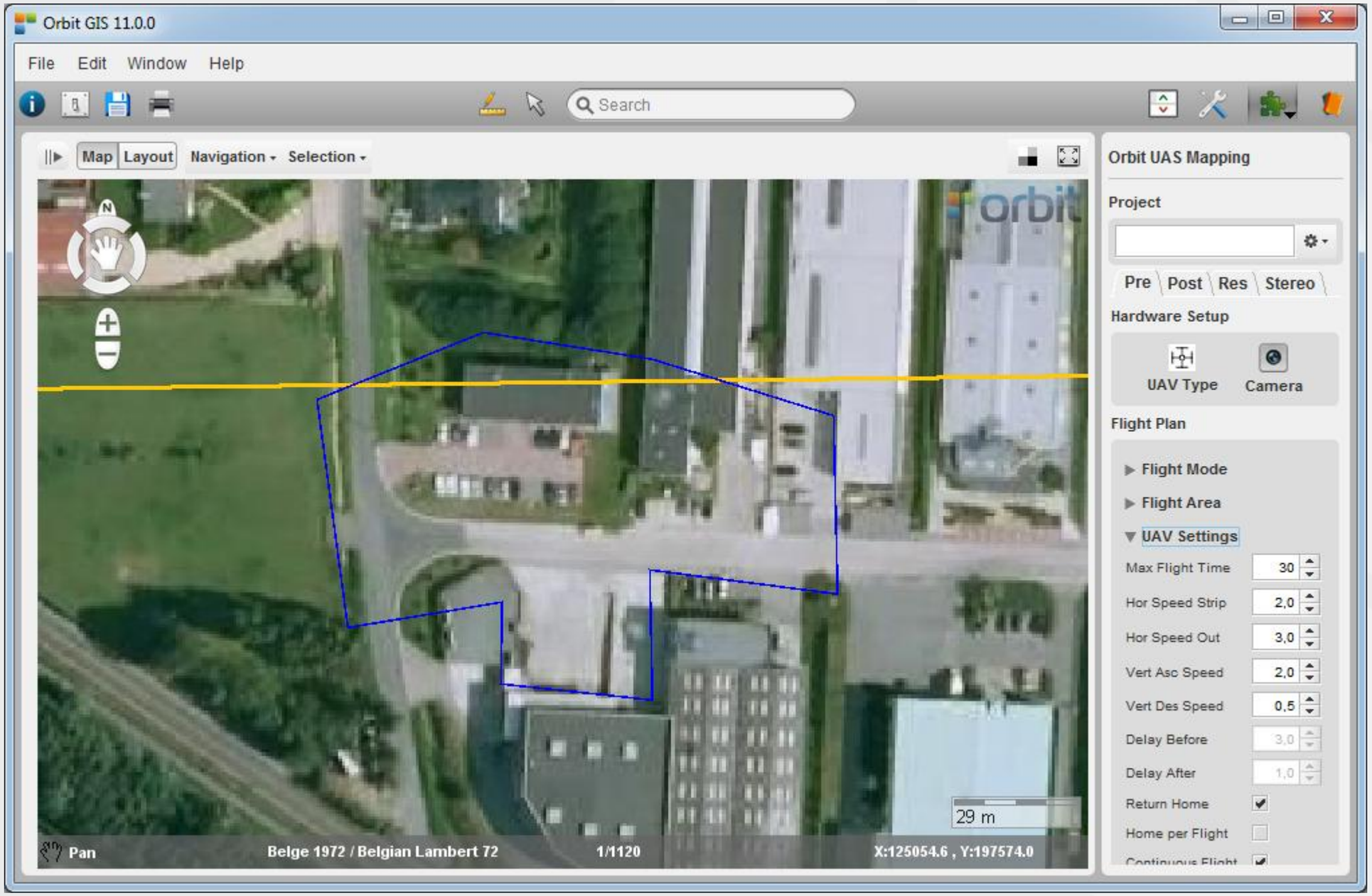
3b. Or create a line, set home for a linear flight



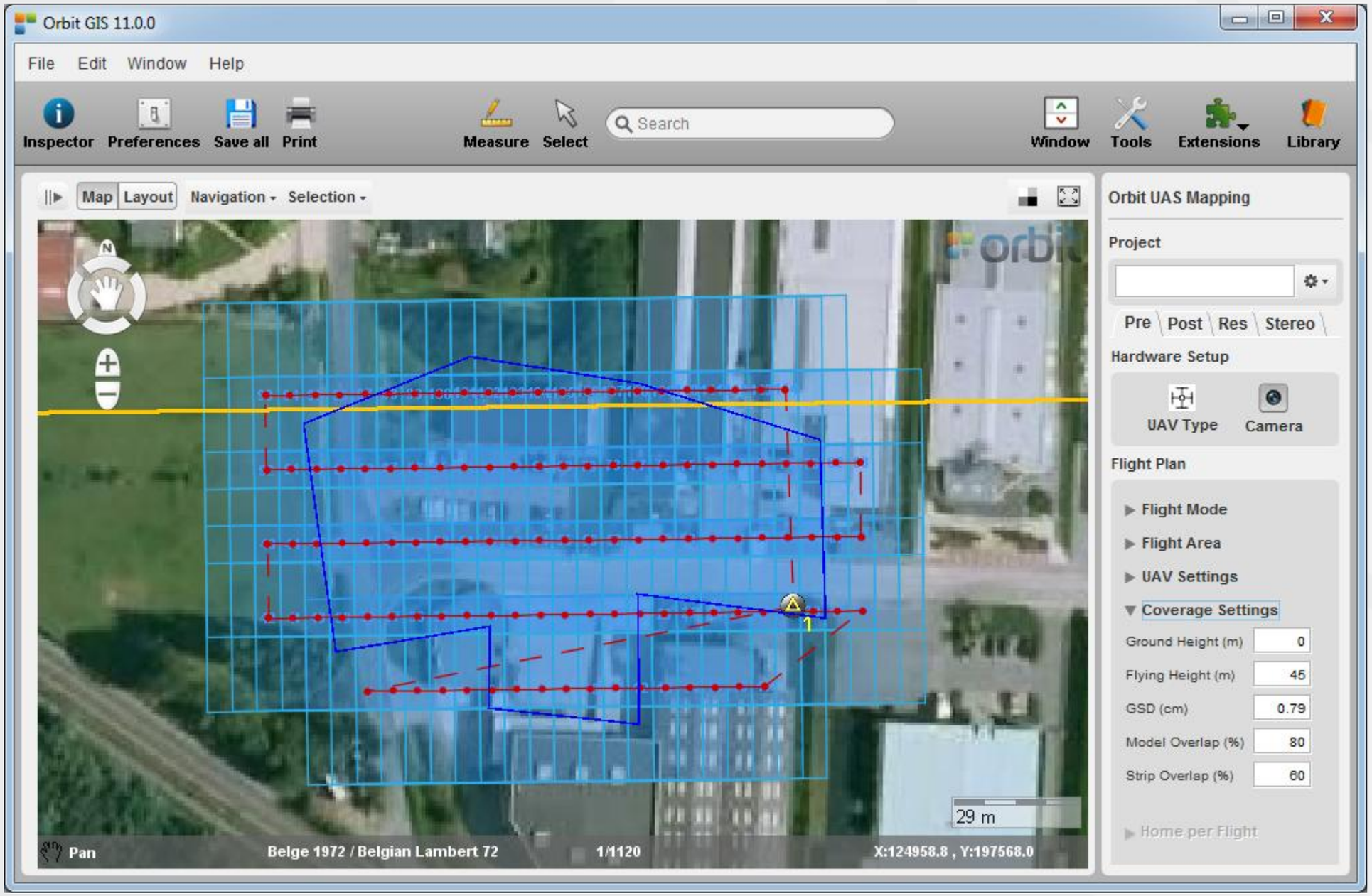
4. UAV settings: set speed, battery limits, …



5. Coverage settings: set height, overlap, …



6. Generate, save, and export to your system



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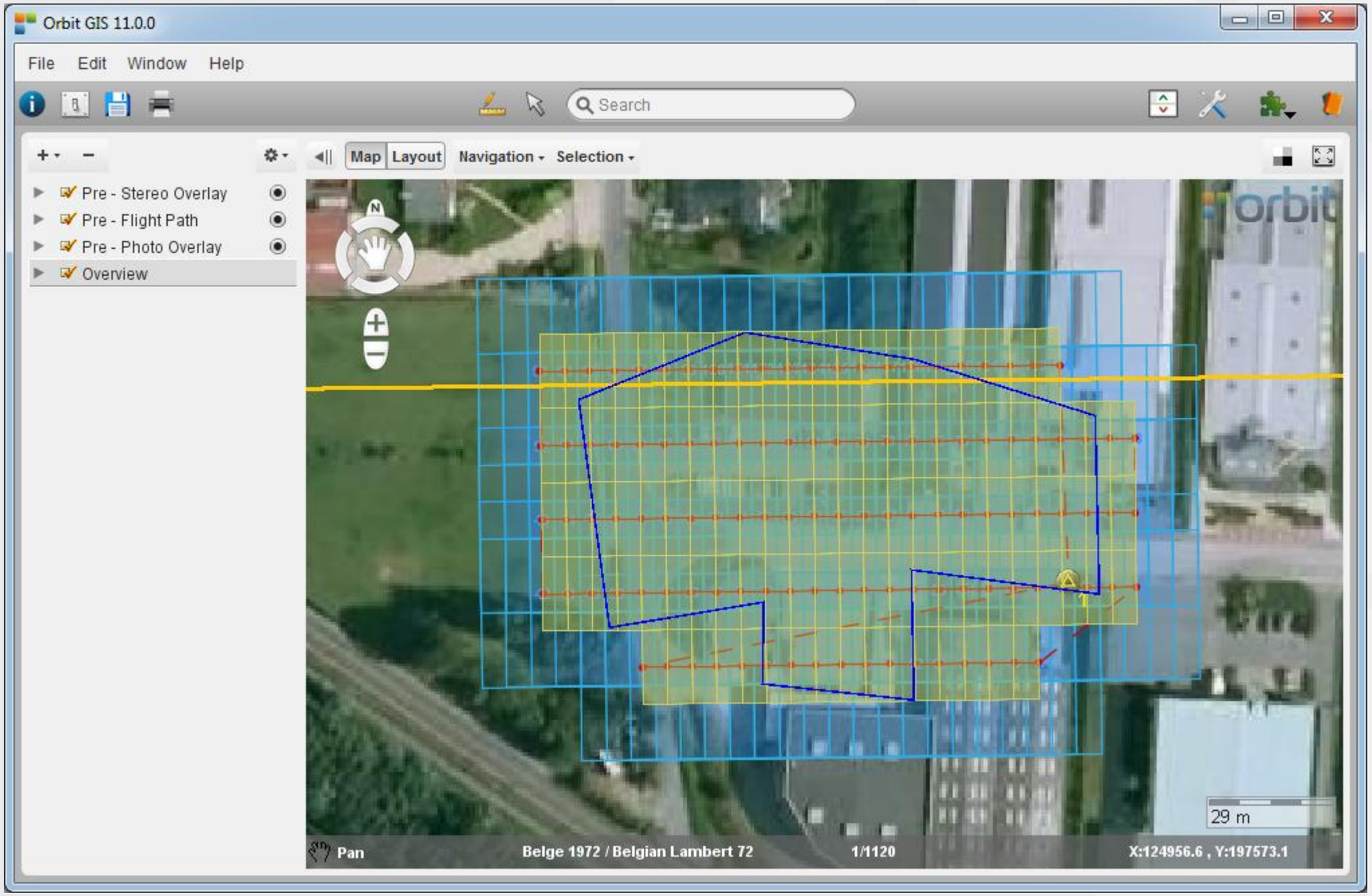

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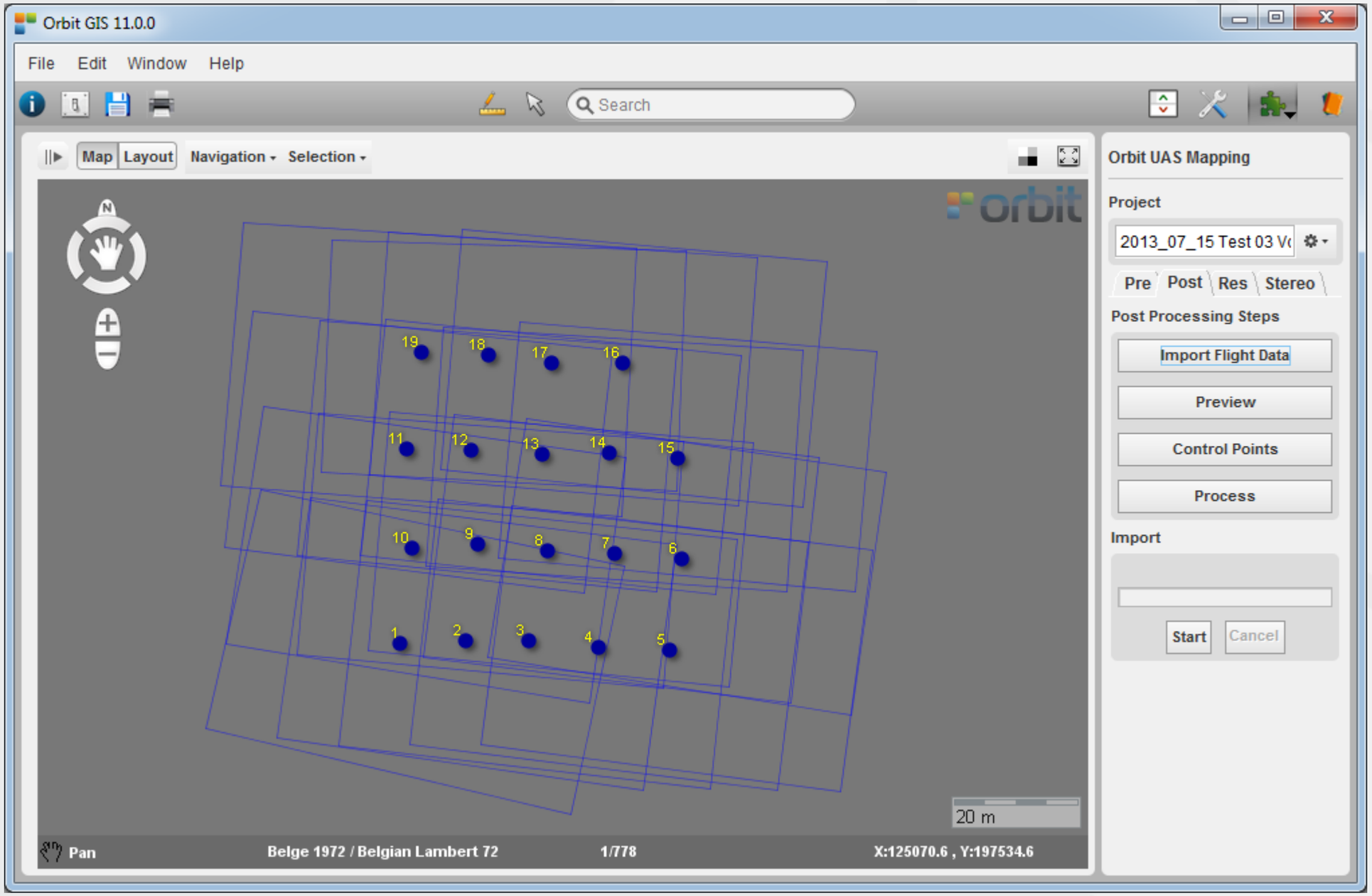
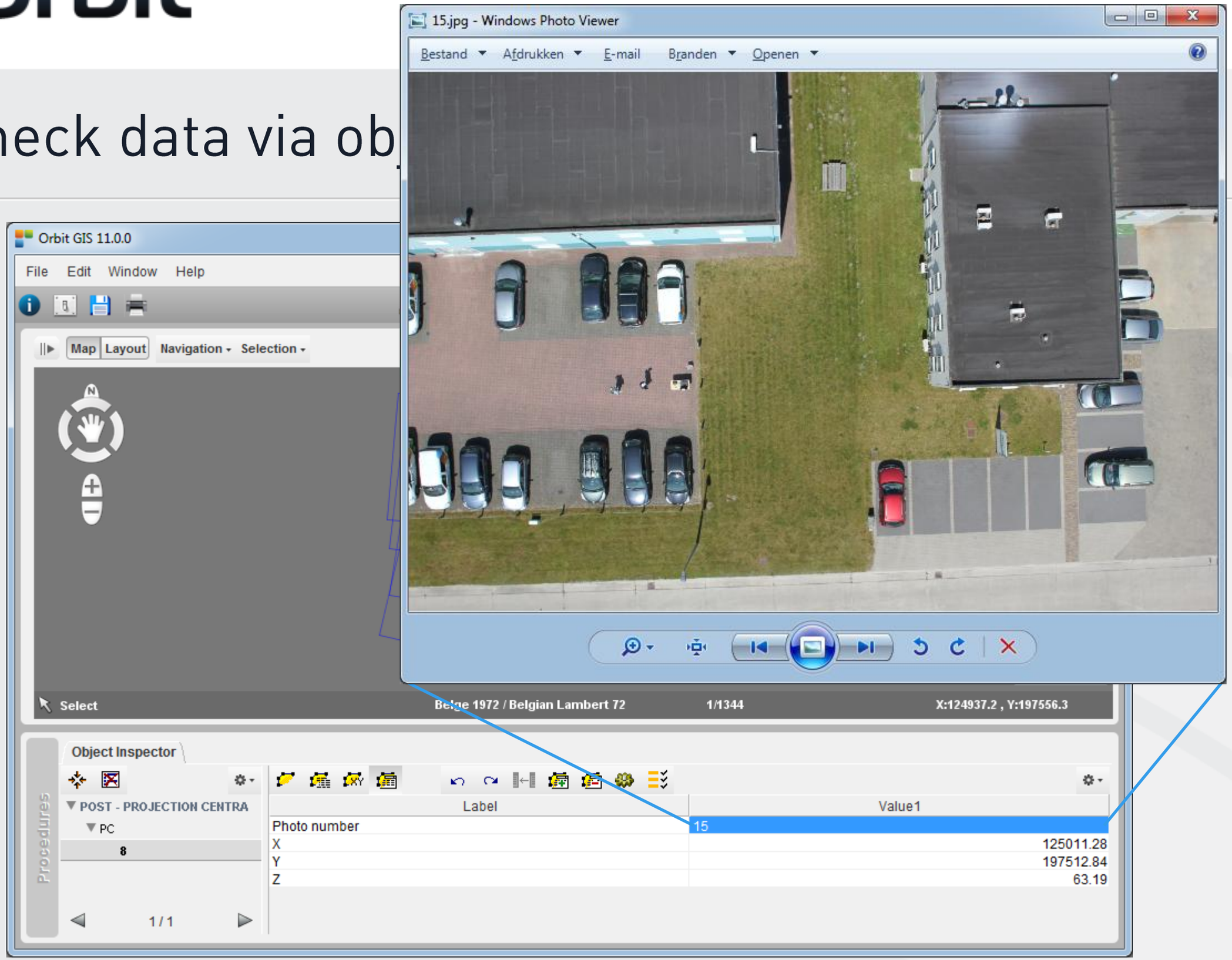
Orbit UAV Mapping Solution

Postprocessing

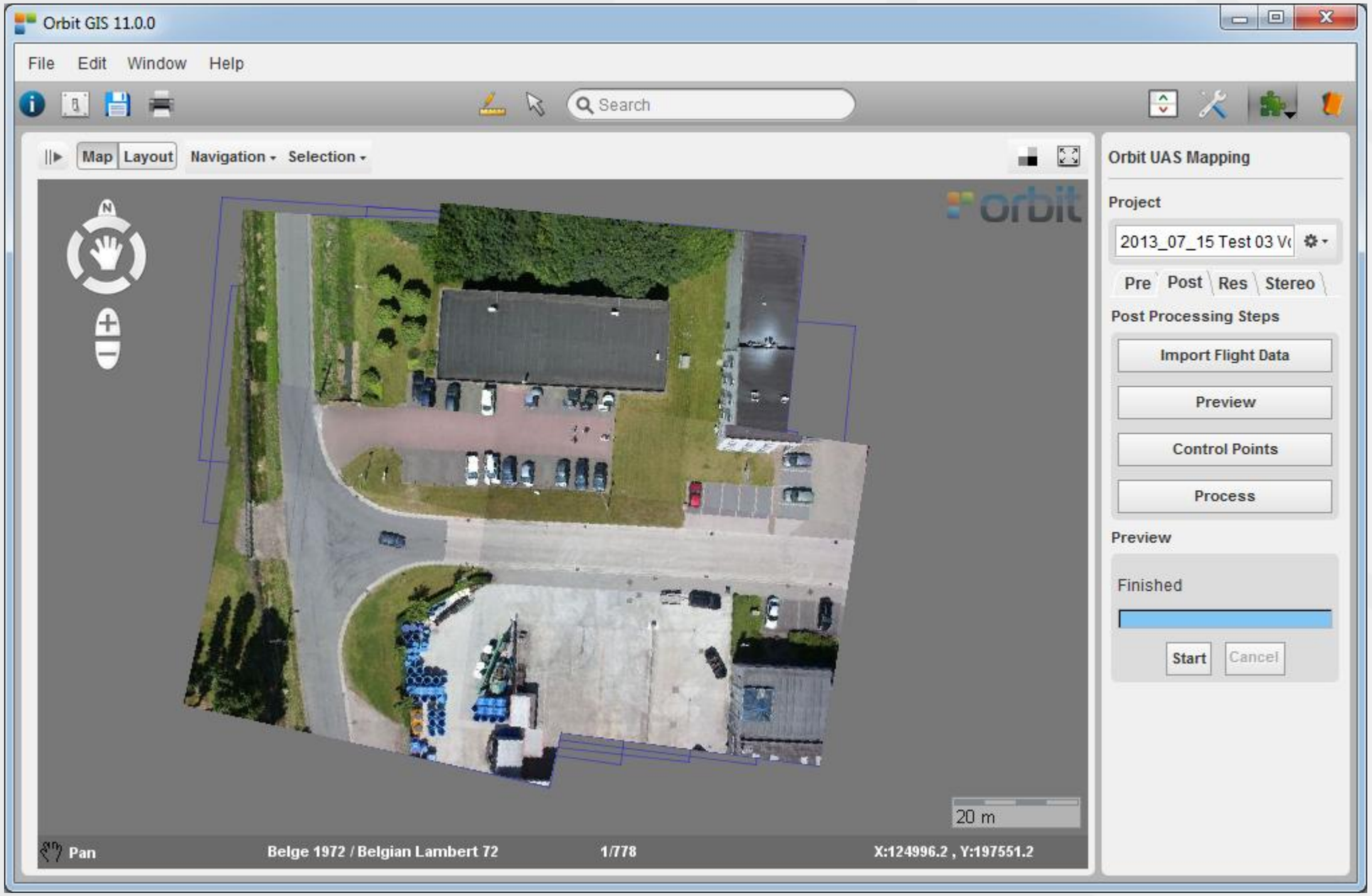
1. Import Flight Data

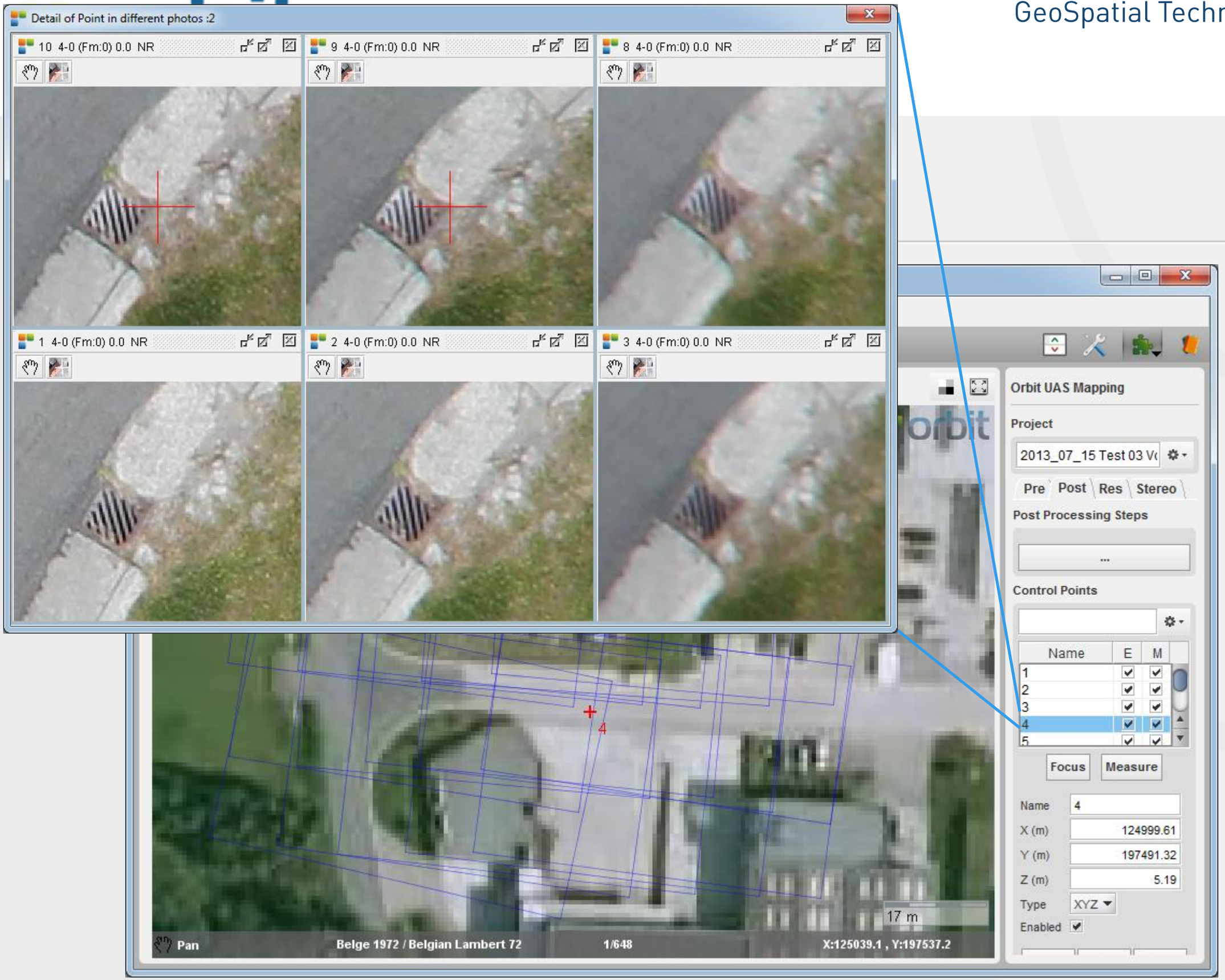


1. Check data via ob

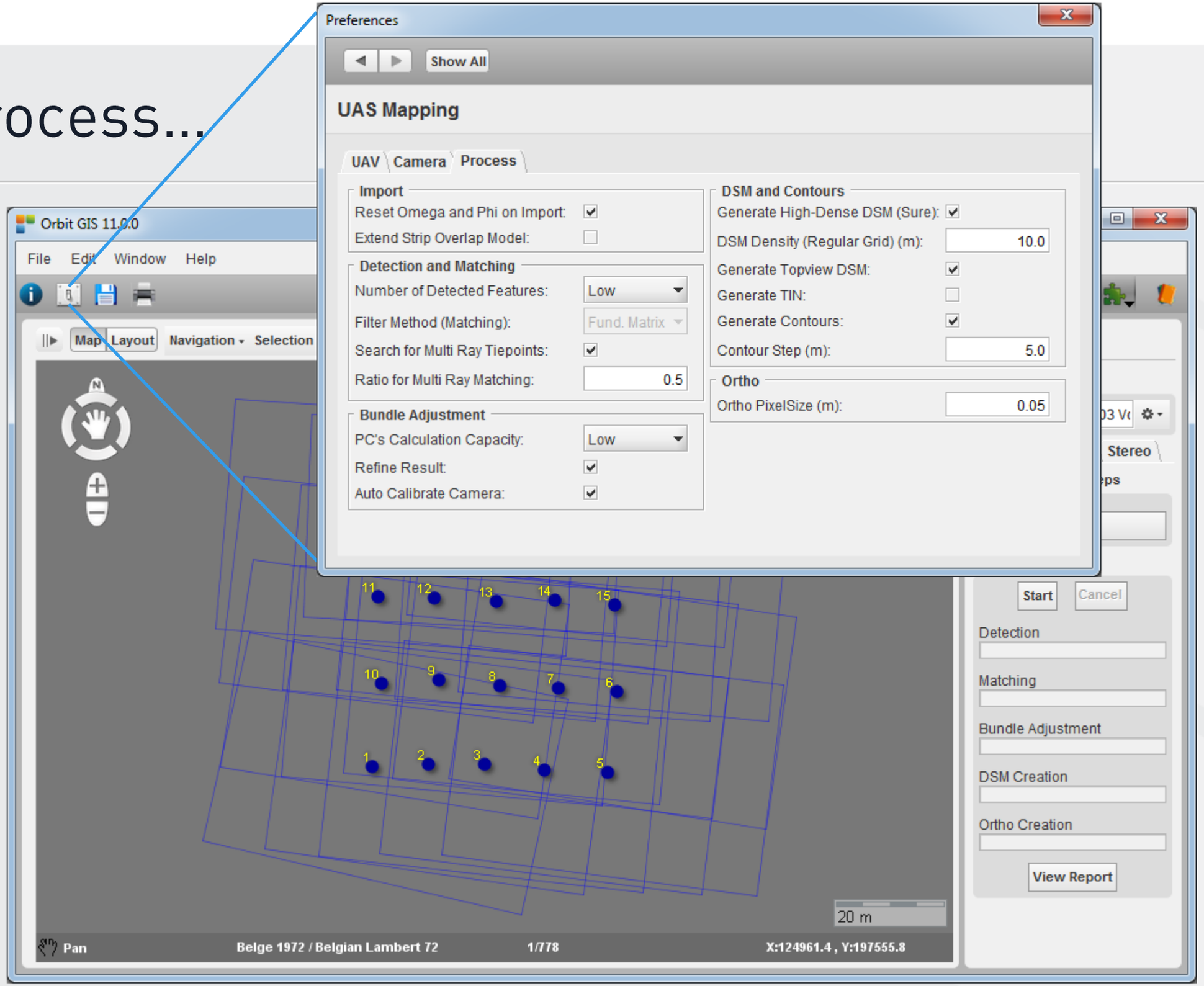


1. Check data via preview




Detail of Point in different photos :2
10 4-0 (Fm:0) 0.0 NR
9 4-0 (Fm:0) 0.0 NR
8 4-0 (Fm:0) 0.0 NR
1 4-0 (Fm:0) 0.0 NR
2 4-0 (Fm:0) 0.0 NR
3 4-0 (Fm:0) 0.0 NR
Orbit UAS Mapping
Project
2013_07_15 Test 03 V
Pre
Post
Res
Stereo
Post Processing Steps
...
Control Points
Name
E
M
1
2
3
4
5
Focus
Measure
Name 4
X (m) 124999.61
Y (m) 197491.32
Z (m) 5.19
Type XYZ
Enabled
4
17 m
Pan
Belge 1972 / Belgian Lambert 72
1/648
X:125039.1 , Y:197537.2

3. Process...


Preferences
Show All
UAS Mapping
UAV
Camera
Process
Import
Reset Omega and Phi on Import:
Extend Strip Overlap Model:
Detection and Matching
Number of Detected Features:
Low
Filter Method (Matching):
Fund. Matrix
Search for Multi Ray Tiepoints:
Ratio for Multi Ray Matching:
0.5
Bundle Adjustment
PC's Calculation Capacity:
Low
Refine Result:
Auto Calibrate Camera:
DSM and Contours
Generate High-Dense DSM (Sure):
DSM Density (Regular Grid) (m):
10.0
Generate Topview DSM:
Generate TIN:
Generate Contours:
Contour Step (m):
5.0
Ortho
Ortho PixelSize (m):
0.05
Orbit GIS 11.0.0
File
Edit
Window
Help
Map
Layout
Navigation
Selection
Stereo
Start
Cancel
Detection
Matching
Bundle Adjustment
DSM Creation
Ortho Creation
View Report
20 m
Pan
Belge 1972 / Belgian Lambert 72
1/778
X:124961.4 , Y:197555.8

3

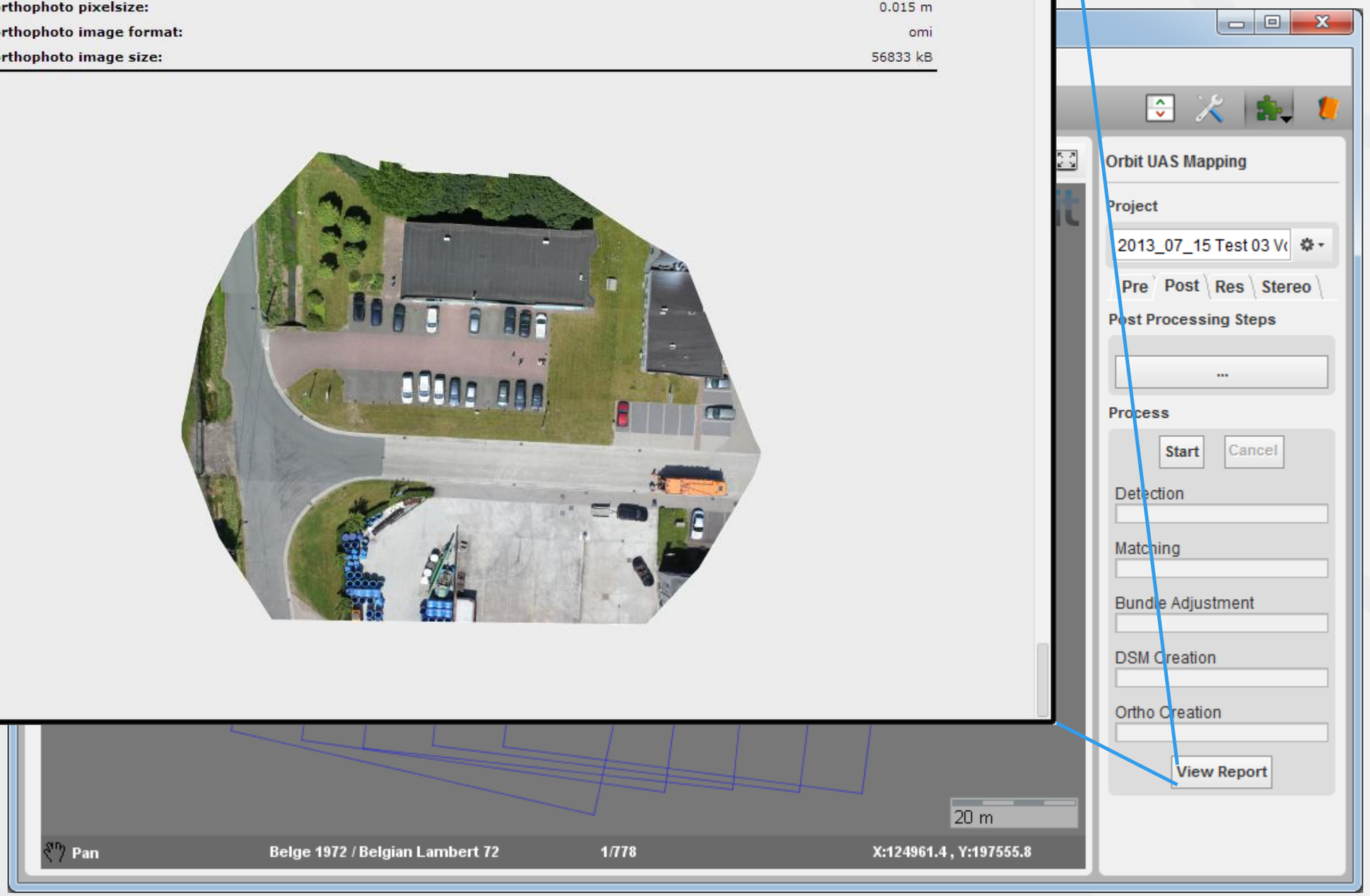
Orbit Adjustment Report:

file:///G:/Voshol/3_postflight_data/report/Report.html

4	124999.6100	197491.3200	5.1900	-0.0049	0.0054	-0.0355
5	125014.4400	197473.1200	5.2400	0.0018	0.0000	-0.0243
6	125018.8700	197490.2700	5.1800	-0.0041	-0.0070	0.0300

Results orthophoto creation

orthophoto creation:	yes
orthophoto pixelsize:	0.015 m
orthophoto image format:	omi
orthophoto image size:	56833 kB



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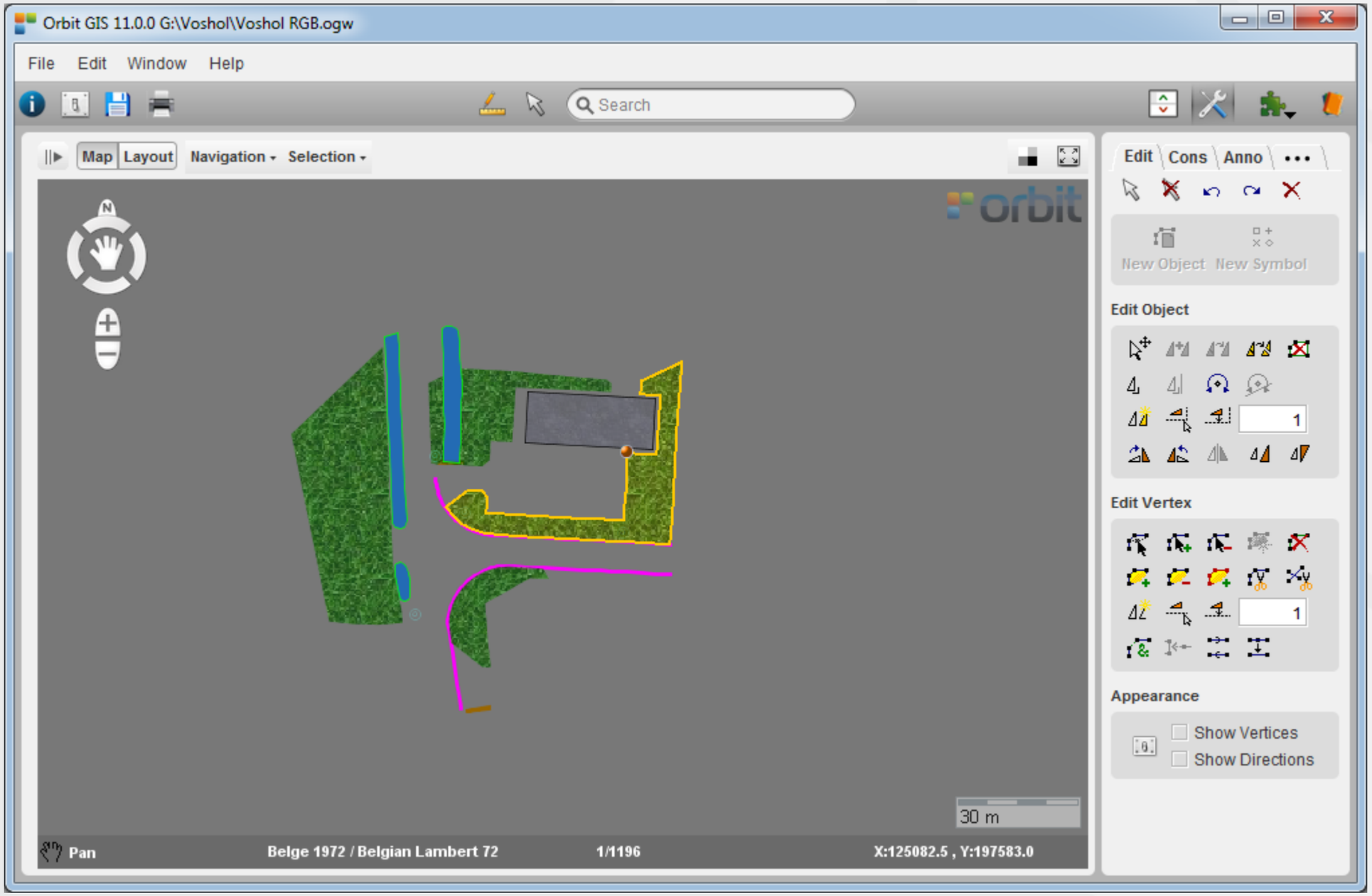
Orbit UAS Mapping Software

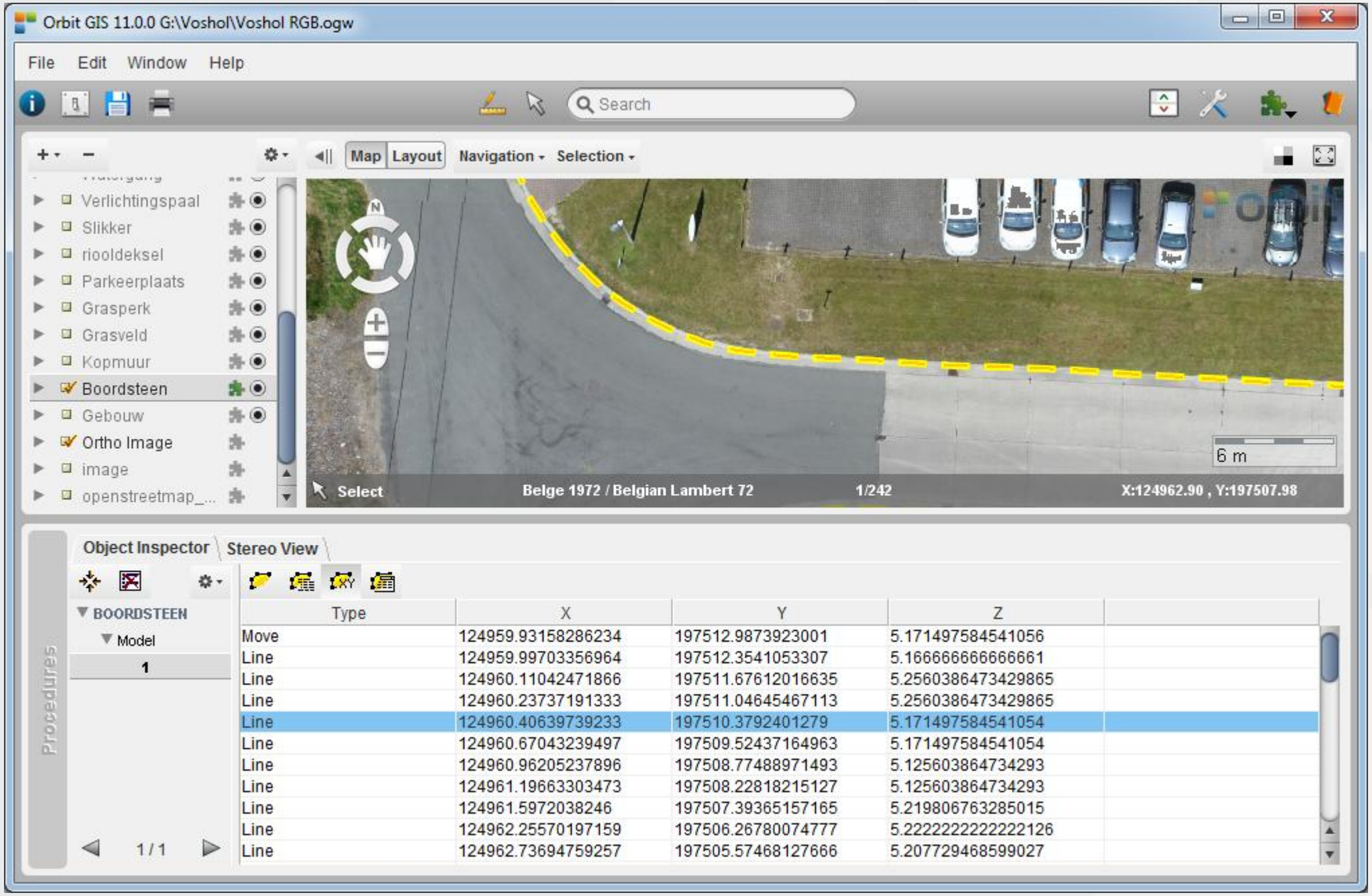
Results: integrated in GIS
Stereo Mapping Workflow

3. Process… -- orthophoto for 2D GIS mapping



3. Process... -- export: file or print

4. Process… -- stereo project for 3D GIS mapping



Type	X	Y	Z
Move	124959.93158286234	197512.9873923001	5.171497584541056
Line	124959.99703356964	197512.3541053307	5.166666666666661
Line	124960.11042471866	197511.67612016635	5.2560386473429865
Line	124960.23737191333	197511.04645467113	5.2560386473429865
Line	124960.40639739233	197510.3792401279	5.171497584541054
Line	124960.67043239497	197509.52437164963	5.171497584541054
Line	124960.96205237896	197508.77488971493	5.125603864734293
Line	124961.19663303473	197508.22818215127	5.125603864734293
Line	124961.5972038246	197507.39365157165	5.219806763285015
Line	124962.25570197159	197506.26780074777	5.2222222222222126
Line	124962.73694759257	197505.57468127666	5.207729468599027

4. Process... -- HD pointcloud for 3D GIS mapping

Orbit UAV Mapping Solution

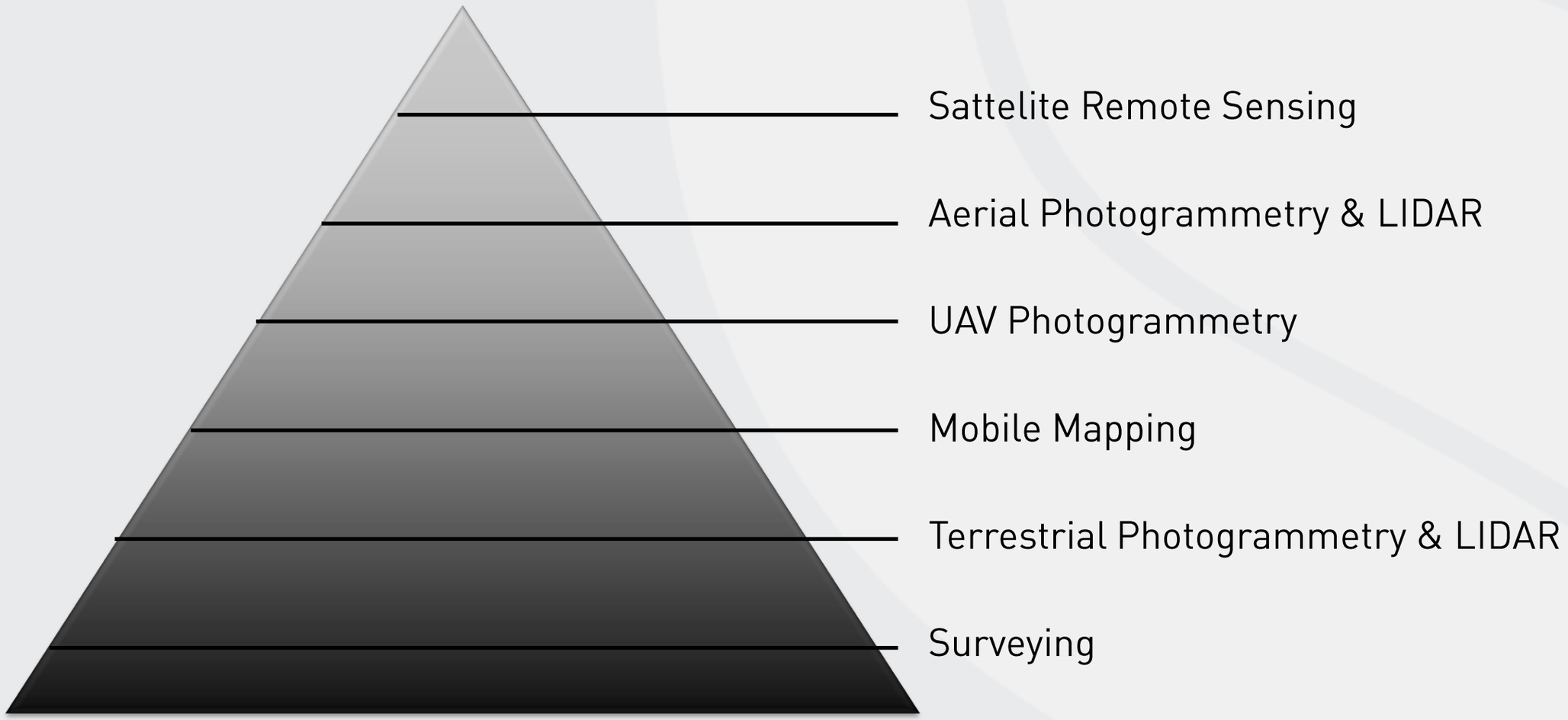
Conclusions

Conclusion: Orbit UAS Mapping Software

- Professional photogrammetric pre- and postflight software
- Full automated procedures (triangulation, dtm, volume calculation, ortho generation, ...)
- 2D and 3D GIS mapping in stereo, pointcloud, or on orthophoto
- Integrated in GIS, and other Orbit extensions to cover the whole workflow

Conclusion: Can UAS compete with land survey?

- Yes… but take into account:



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Thanks for your attention.

Contact: www.orbitgis.com

More information: www.orbitgis.com