UAV Project using Photomod 5 Lite version for topographic map creation.

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Input data description

Images

4 Digital images pixel size 0,05 m. Image size 3504X2336

Camera Canon EOS

Montage desktop

Hardware profile

Workstation:

Windows 7, 8 GB RAM, i-5-2500 CPU@ 3.30 Ghz

UAV system

UAV Penguin B:

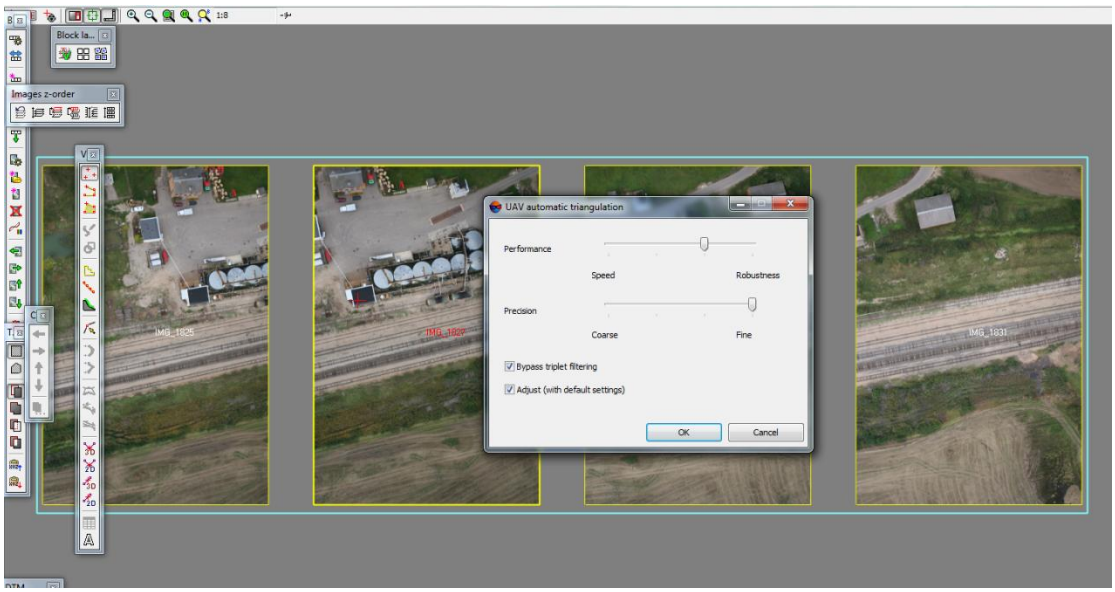
Cruise speed 80 km/h, takeoff method Catapult, Runway or car top launch

Aircraft PENGUIN

Flying altitude was 200m.

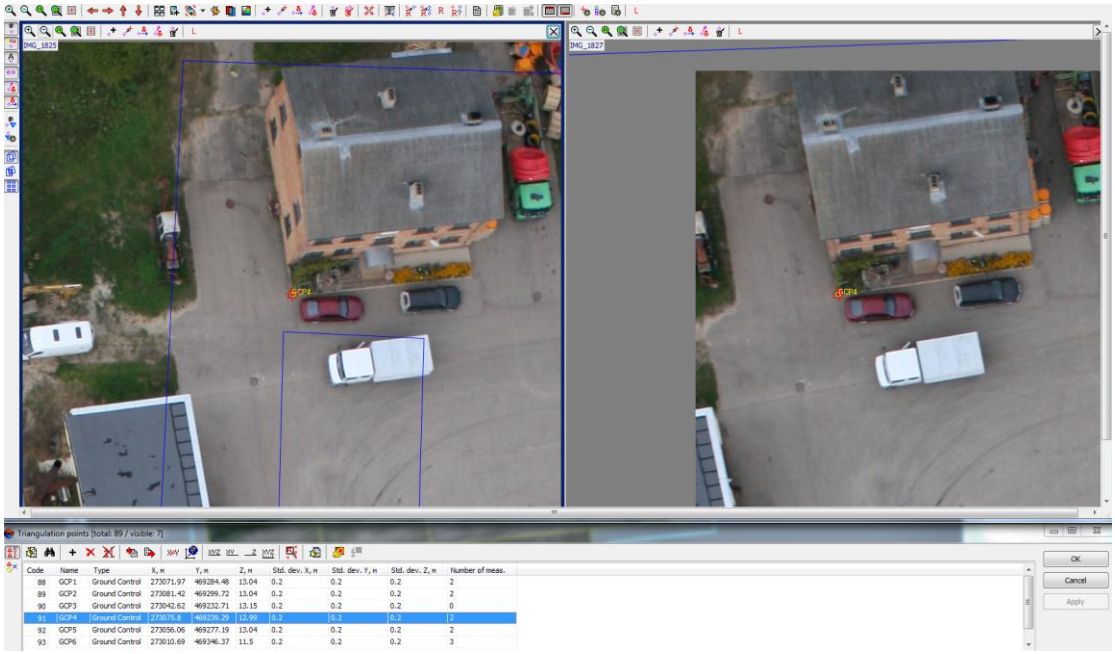
Project workflow description

All steps were done like in PHOTOMOD production chain, only first orientation was done with UAV automatic triangulation.



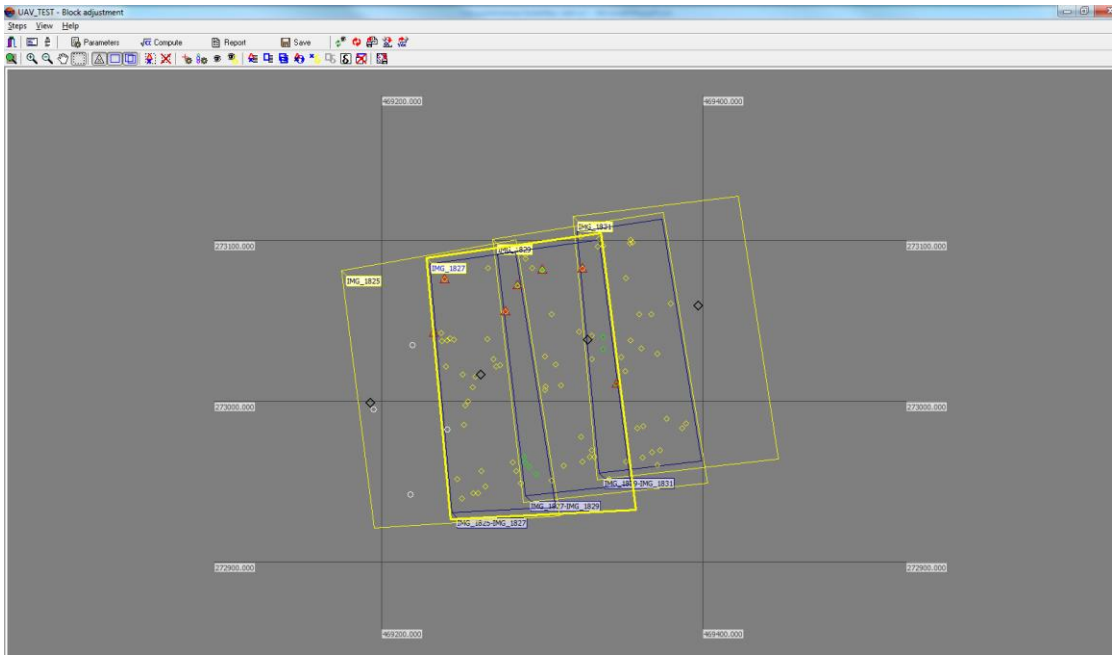
UAV automatic triangulation

After UAV automatic triangulation results where improve with Ground control points. Ground control points was objects on ground with XYZ coordinates.

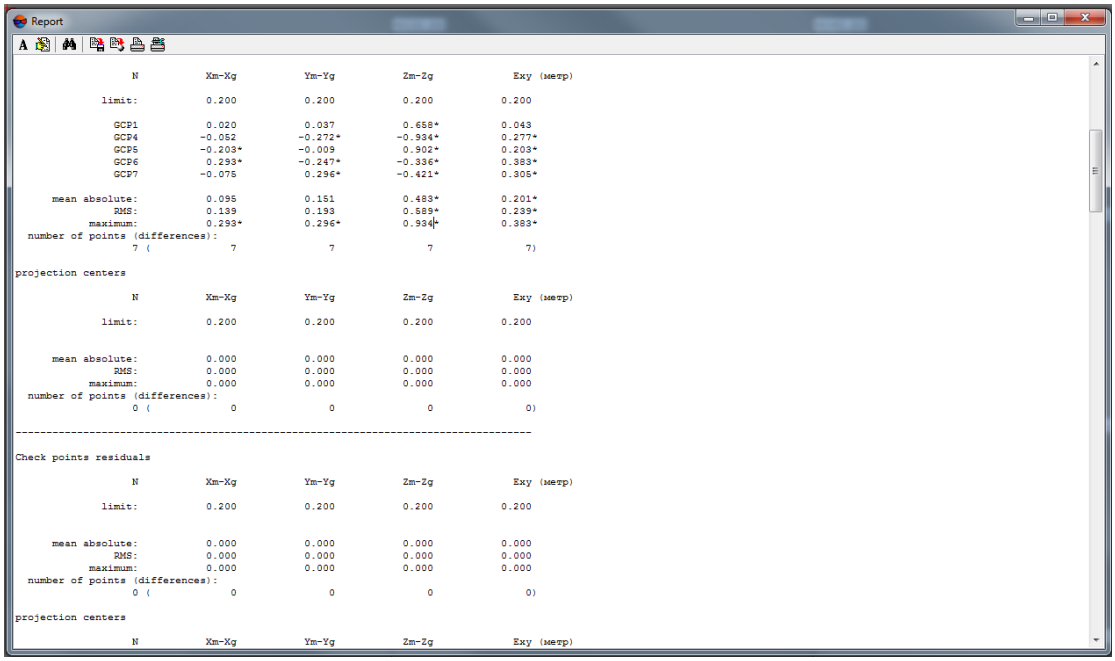


Ground control points

Aerial triangulation process was done using bundle adjustment.

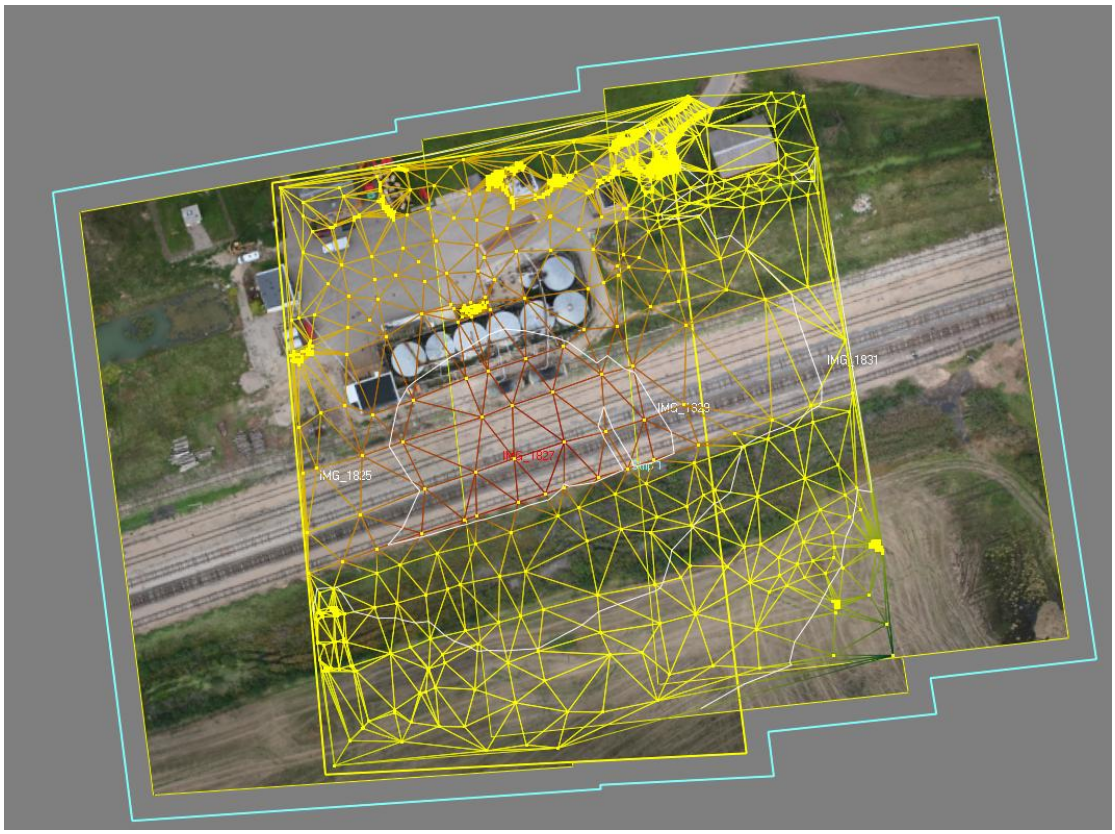


Block adjustment



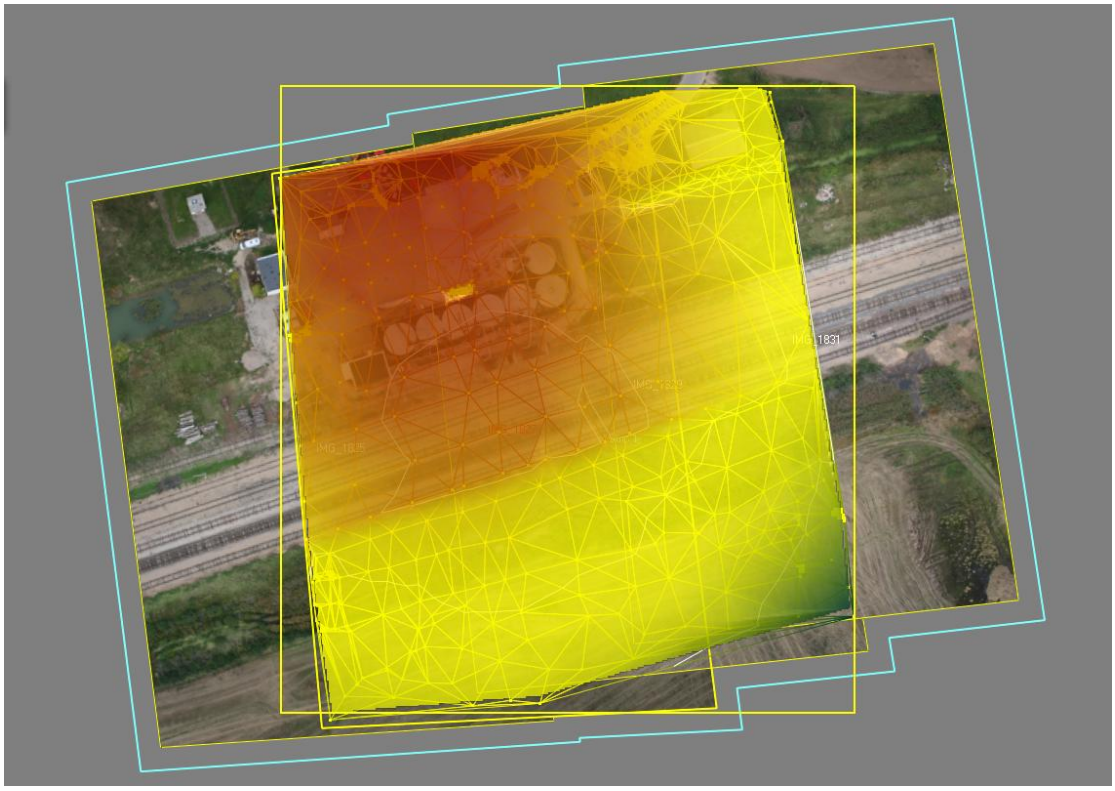
Report from solver

DTM creation was done from filtered vector data. This area was flat therefore DTM manual editing has been done in 30 minutes.



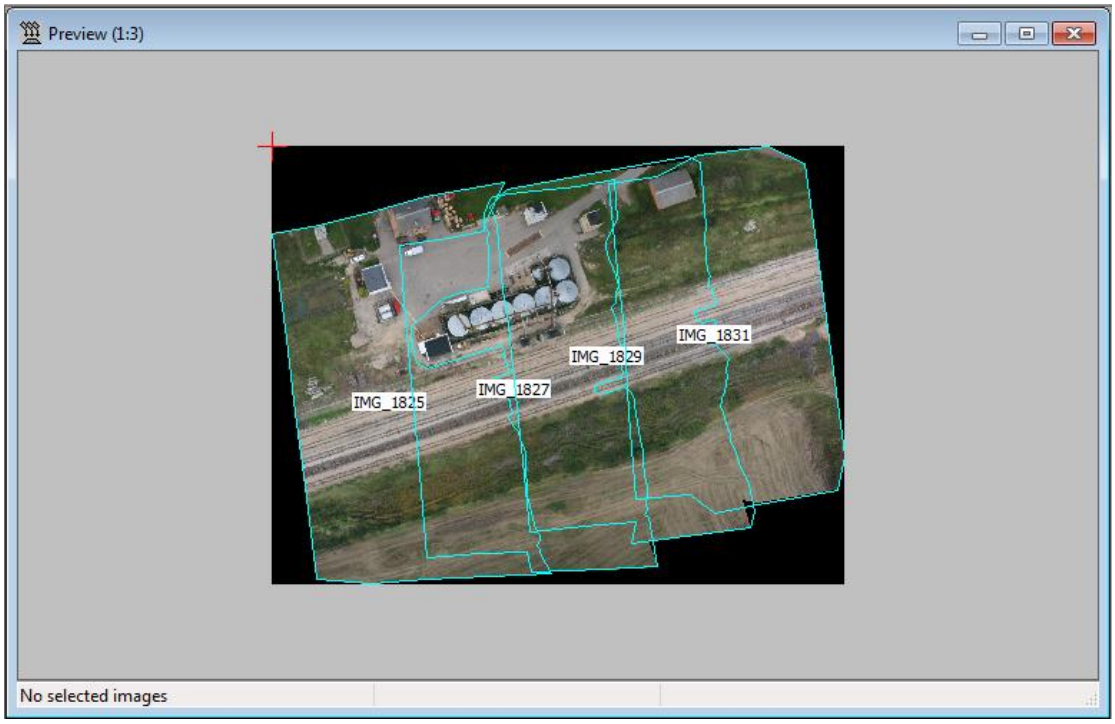
DTM editing

TIN is used for DEM creation with 1m resolution.



DEM 1m

Before orthophoto producing was necessary pre-regions editing, because seam line cross buildings. In final product orthophoto seam lines can't be seeing, because also image radiometric calibration PHOTOMOD done very well.

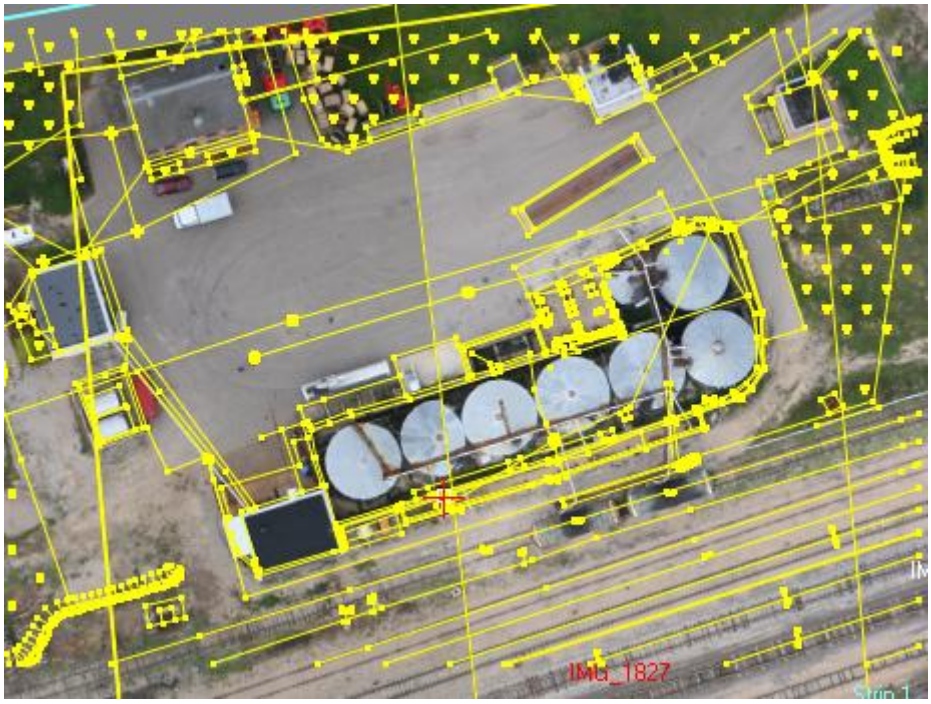


Orthophoto mosaicking

Final result orthophoto with 0,05 m resolution

One of main task from those data was stereo vectorization. For stereo vectorization is necessary code table with layers. In PHOTOMOD Lite version this code table also very easy can be change depends from new objects.

In PHOTOMOD lite version is limit for vector data, but for small areas stereo vectorization can be done.



Building stereo vectorization

Conclusion

UAV data in PHOTOMOD 5_Lite can be used for small projects. From project data we can see, that orthophoto map quality is very good with 0,05 m resolution. Accuracy results show that UAV data can be used for 4000 m^2 topographic map 1: 1000. Z coordinate have more residuals, than X, Y coordinate. This is because UAV have problem with stability.

Aerial photography and data processing can be done in one day, the most time consuming process is stereo vectorization, but this process is faster than real field work with instrument. With this technology clients receive topographic map together with orthophoto.

Also with vector data limit 500 lines is possible to create topographic maps for small areas like this area. UAV can also be useable for topographic map actualization and field work control. The main problem using UAV is flight permission. In Latvia flight permission can be given in direct vision zone. Therefore UAV operator also must be in this area. But maybe in future UAV flight permission will be improve, and UAV operators can be located in office more than 100 km from aerial photography zone.