



XXVII FIG CONGRESS

11-15 SEPTEMBER 2022
Warsaw, Poland

Volunteering
for the future –
Geospatial excellence
for a better living

Presented at the FIG Congress 2022,
11-15 September 2022 in Warsaw, Poland

Cadastral map update with modern technologies in Hungary

Máté Lehoczky

LehoGeo Engineering Ltd.

Óbuda University Alba Regia

Technical Faculty Institute of Geoinformatics

Hungarian Chamber of Engineers

Aerial Cartographic & Remote Sensing Association

Zoltán Tóth

Óbuda University Alba Regia

Technical Faculty Institute of Geoinformatics

International Society for Mine Surveying

Hungarian Chamber of Engineers

ORGANISED BY



ÖE



PLATINUM SPONSORS



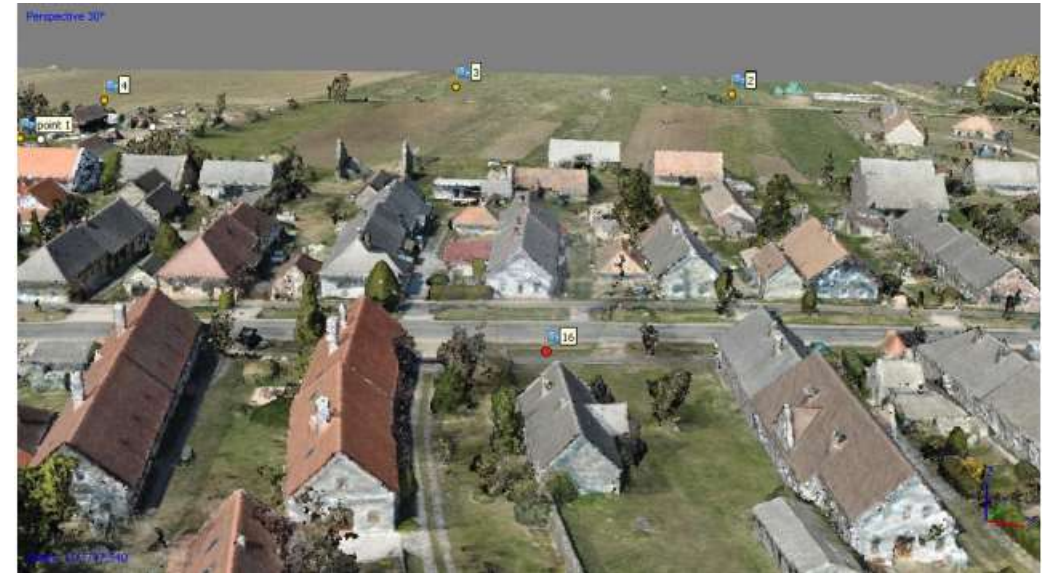
Summary

- Pilot development
- Hungarian Chamber of Engineers
- Budapest University of Technology and Economics
- Óbuda University
- Several market players
- Aim: investigate the applicability of point cloud-based survey techniques (UAV, TLS, MLS) for cadastral surveys
- Main issue: Bad/old maps in Hungary → focus on map update
- Future: point cloud-based evaluations for cadastral purposes
- Possibilities and limitations of automation.



Implementation difficulties

- Question of demarcation
- Avoiding ownership disagreements
- Replace 2D areas with 3D
- Explanation of differences and changes
- Convert point clouds/meshes to high level LOD models
- Object oriented system supported by artificial intelligence
- Connect the real estate register, professional subsystems with a 3D system



Well-known data gathering technologies- Why we need land surveyor experts?

- Easy measuring (?) - human factor is huge risk, untrained co-workers may spoils the measured accuracy
- Minimizing pipeline error can only be solved by automation improvements
- Relevance of high level know-how and experience

- Several field data collection technologies (classical geodesy, UAV-based photogrammetry, terrestrial static, and mobile scanner)
- Multiple data collection allowed for large-scale comparisons
- Self-developed application was developed to compare the different types of surveys.



Deep learning based auto recognition solutions in case of different data gathering

- The algorithm searches for the points evaluated from the different types of data
- Optimized given environment (max 0.2m)
- Finds identical points from at least one type of scan survey
- If more than one point falls within the selection set, it marks them, as well as any points from the ground survey for which it did not find a point pair. These were checked and analyzed manually afterwards
- Photogrammetry: Automated analysis is more difficult → sparser point cloud
A precise analysis of these, using multiple camera systems, and picture based object recognition
- Expected in the coming year





Conclusion

- Modern technologies have the potential (cost&time effective) to replace classical survey technologies
- High-level training and courses to maximize the reliability of manual evaluation and analysis tasks
- Development of automated recognition and identification procedures, A.I. and deep learning
- Build a new professional test field for validation and to further develop our point cloud testing algorithms to achieve even higher reliability numbers.

Chances/purposes in Hungary

- Complete nation wide resurvey
- Not just for cadastre
- Support for settlement management, construction industry, agriculture, self-driving technologies, environmental protection, etc...
- Accurate and reliable 3D skeleton, only by highly skilled surveyors
- High degree of automation and high LOD levels
- Next high level pilot in 2023





XXVII FIG CONGRESS

11-15 SEPTEMBER 2022
Warsaw, Poland

Volunteering
for the future –
Geospatial excellence
for a better living

Thanks for listening

If you have any questions, please write us to info@lehogeo.hu

Máté Lehoczky

Land surveyor and land management engineer

Specialist of digital regional development

UAS manager and data analyst

ORGANISED BY



ÖE



ÓBUDAI EGYETEM
ALBA REGIA MŰSZAKI KAR
GEOINFORMATIKAI INTÉZET

PLATINUM SPONSORS

