Technology and applications of virtual 3D models using mobile mapping and 3D games engines

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Process, what is new?

- Accurate photorealistic 3D model created with mobile mapping, semi-automatic processing, and put into 3D game engine
  - Construction of the ROAMER
  - Processing of the accurate photorealistic 3D model
  - Implementation in 3D game engine
  - Development of applications: integration of virtual and physical worlds
- Very close to what Navteq/Google/MIcorsoft can do in a large scale

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What is possible?

One man doing the whole process
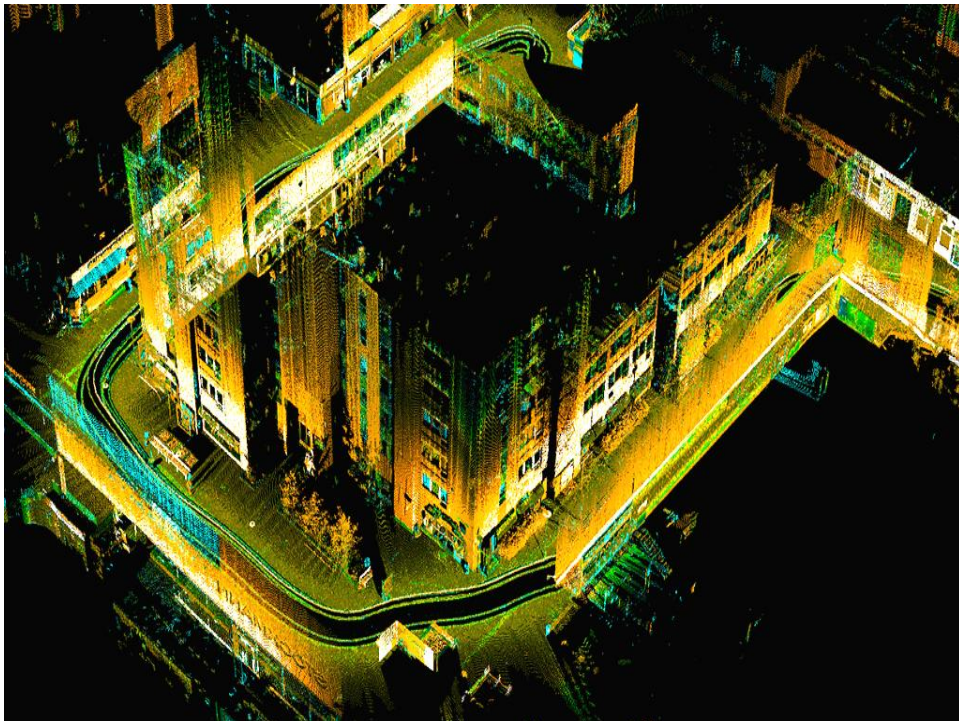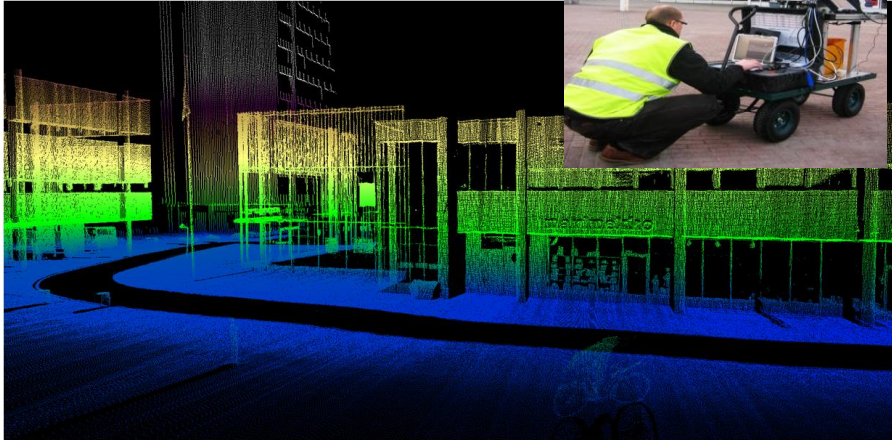

FGI ROAMER

Characteristics
- Navigation solution 100 Hz
- Bi-trigger synchronization – laser and images
- 120-976 000 points / second
- 3-61 profiles/second
- 150 m corridor widht
- Multiple scanner positions
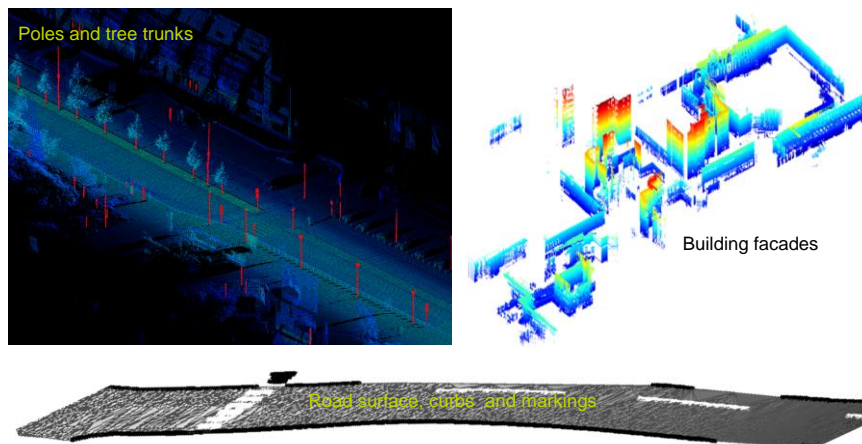- Multi-platform capability

Kukko, A., Andrei, C.-O., Salminen, V.-M., Kaartinen, H., Chen, Y., Rönnholm, P., Hyyppä, H., Hyyppä, J., Chen, R., Haggrén, H., Kosonen, I. and K. Čapek, 2007. Road environment mapping system of the Finnish Geodetic Institute - FGI ROAMER. In: *International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences* 36, Part 3/W52
Kaasalainen, S., Kaartinen, H., Kukko, A., Anttila, K. and A. Krooks, 2010. Brief Communication: Application of Mobile Laser Scanning in Snow Cover Profiling. *The Cryosphere* 5: 135–138
Alho, P., Kukko, A., Hyyppä, H., Kaartinen, H., Hyyppä, J. and A. Jaakkola, 2009. Application of boat-based laser scanning for river survey. *Earth Surface Processes and Landforms* 34: 1831-1838

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Data Acquisition

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Automatic processing of MLS data

Poles and tree trunks

Building facades

Road surface, curbs and markings

Jaakkola, A., Hyyppä, J., Hyyppä, H. and A. Kukko, 2008. Retrieval Algorithms for Road Surface Modelling Using Laser-Based Mobile Mapping. *Sensors* 2008, 8: 5238-5249
Lehtomäki, M., Jaakkola, A., Hyyppä, J., Kukko, A. and H. Kaartinen, 2010. Detection of Vertical Pole-Like Objects in a Road Environment Using Vehicle-Based Laser Scanning Data, *Remote Sens.* 2010, 2(3): 641-664
Zhu, L., Hyyppä, J., Kukko, A., Kaartinen, H. and R. Chen, 2011. Photorealistic building reconstruction from mobile laser scanning data, *Remote Sens.* 2011. 3(7) 2011: 1406-1426

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Photorealistic 3D Model

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Low data amount – Details visible

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Game Engine Interface

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