

An improved approach for automatic detection of changes in buildings

Leena Matikainen, Juha Hyypä, Eero Ahokas, Lauri Markelin, Harri Kaartinen

*Finnish Geodetic Institute, Department of Remote Sensing and Photogrammetry
P.O. Box 15, FI-02431 Masala, Finland – firstname.lastname@fgi.fi*

Automatic detection of buildings and changes in buildings from airborne laser scanner and image data for map updating has been studied. A new, improved method for change detection between an existing building map and building detection results has been developed. Corresponding building objects between the two datasets are found by analysing the overlaps of the buildings. Depending on the correspondences, change detection is carried out, and new, demolished and changed buildings are found. Detection of changed buildings is based on analysing overlap percentages or investigating the building detection results inside and outside buildings on the map by using buffers. Additional rules were developed to investigate tree cover or a digital surface model (DSM) in cases where misclassifications in the building detection stage are likely. The change detection method was evaluated by using suburban test areas covering 4.5 km². Reference results were created by applying the same method to two real building maps. Accuracy estimates for different change classes and building sizes are presented. For all buildings, the completeness and correctness were about 70%. Further tests on building detection with a classification tree based approach are also presented. The method was applied to a new dataset containing laser scanner data and an ortho image created from digital aerial images. The mean accuracy of buildings was 89% when compared with a building map, pixel by pixel. The use of the aerial imagery in addition to laser scanner data clearly improved the results. For details of the study, see [1].

References

- [1] L. Matikainen, J. Hyypä, E. Ahokas, L. Markelin, and H. Kaartinen, “An improved approach for automatic detection of changes in buildings”, Proceedings of the ISPRS Workshop ‘Laserscanning 2009’, Paris, France, 1-2 September 2009, *International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences*, in press.