

Automatic Generation of Cartographic Features for Relief Presentation Based on LIDAR DEMs

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SUMMARY

National mapping agencies in Europe are facing the challenge, where customers expect ever increasing level of detail and frequent updates of topographic maps with decreasing amount of public funding. Web-map applications have brought us the world, where few fixed scale topographic maps are just a starting point for real multiscale topographic maps having dozen of scale levels. At the same time, disruptive technologies, such as laser scanning and advanced geospatial data processing, have fundamentally changed our possibilities for doing automatic or semi-automatic topographic mapping.

In the National Land Survey of Finland (NLS), we have set the goal for increasing the level of automation in topographic mapping significantly. Among the first pilot projects in construction of the forthcoming National Topographic Database (NTDB), we have started to investigate the methods for automatic cartographic relief presentation based on LIDAR DEMs. The motivation for the work comes from the prevailing factors of demand and supply. Firstly, Finland has a new elevation system N2000, but the contours in the current Topographic database (TDB) by the NLS are still in the previously used N60 elevation system. Secondly, the complete country-wide coverage of the DEM based on airborne laser scanning will be achieved in few years, which, on one hand, will reveal the deficiencies in manual contours in the TDB, but on the other hand makes possible the use of automatic contouring methods for the whole country.

The focus of our work is on contours, which are the dominant cartographic elements in topographic maps. In addition, we have investigated methods for finding steep cliffs from the LIDAR DEM. We will present solutions for automatic extraction of index, intermediate and auxiliary contours, as well as methods for the cliff symbol placement. In conclusions, we will identify the remaining cartographic challenges, including the placement of overlapping symbols and logical conflicts

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between the contours and hydrographic features, and propose methods to overcome the issues.

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