3D-building models generated automatically from the Norwegian base map

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Automatic generation of 3D-models from the basemap

The Norwegian Mapping Standard (SOSI) specifies a new innovative way of capturing buildings from photogrammetry, which makes it possible to generate 3D-building models automatically from the original basemap data.

The SOSI-standard had its first release in 1987, and has since then been the major standard for geodata production and distribution in Norway. The SOSI-standard 1) defines how geodata and base-, planning- and cadastral maps should be created/registered, 2) which objects may be used (object catalogue), a description of how to register/construct these objects (product specifications) and 3) the syntax of the SOSI-transfer format itself.

Earlier versions of SOSI defined 3D-registration of all points and lines, but it was not focused on which points and lines that were necessary to register for a correct extraction to 3D-objects. These versions focused on the most common products which were maps only seen from above (2D) - not in perspective. In January 2007 a new version of SOSI (version 4.0) was released. This version has changed the product specifications with regards to registration of points and lines needed for automatic 3D-extraction. The important issue here is that the 3D-data should be integrated into the basemap geodatabase for both mapping and 3D purposes, giving the advantage of updating the data in only one database. The data in the geodatabase gives then an optimal skeleton for 3D-City Model extraction.

All densely populated areas in Norway are mapped using the 3D approach supported by the SOSI standard. This means more than 100 mapping projects are produced per year for the country as a whole. Also, Swedish cities have started to show an interest in adopting the thematics of the Norwegian standard.

To make it possible to automatically extract 3D-building models from the base map data, it was important to register roof lines that fully follow and describe the roof in all 3 dimensions. A total of 19 point- or linebased roof elements may be used to register building/roof information: Roof edge (Outer eave line), Ridge line, Roof cornice and Break line to mention a few.

To make it easer for software to interpret the building skeleton for automatic 3D-extraction, it was also important to introduce an attribute of Level of Details for each roof element.

Based on the type of registered roof element and the Level of Details information as an attribute, automatic 3D-extraction has proved successful.