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New National Topographic Database on the horizon

► A goal for the new National Topographic Database is set for 2018.

The National Land Survey (NLS) has had a digital topographic database (TDB) since 1992. It is following a long tradition of topographic surveying, and many of its features are based on the Basic Map created by a surveyor Mauno Kajamaa in 1947 and first completed in 1977.

The basis for the renewal of the topographic database was started by investigating the value of the TDB, a study made by the Aalto University in 2014 (see a separate article in this magazine) and a study on the new TDB system 2030 published by the Ministry of Agriculture in 2015.

A common data model agreed

The focus on the new TDB 2030 study was to make a proposal on what the TDB system should look like in 2030. The goal was to increase the use of the data and save costs. The co-ordination should still be kept within government but all other options were considered. 74 organizations in total were interviewed in this study.

The main outcomes of the interviews were that the TDB and municipalities base data should share a common data model and that it should be interoperable with other public topographic data. Updating may be shared with other organizations. Unique identifiers should be set for main features. 3D and life cycle rules are needed, while universal classification of land cover is not seen necessary. Planning information should be maintained in a separate dataset. Base information should be financed by the government and it should be possible to charge for a massive use of data for commercial use. Use conditions may vary and separate legislation should be introduced.

The full study is available from the Ministry of Agriculture.

First experiments in Tampere

In 2014 the NLS and the city of Tampere, the third largest city in Finland, agreed to start investigating how the common data model with 3D support could be achieved. During 2014 two studies were started. One of them is concentrating on the data modelling aspects and the other one on creating a 3D model using the NLS's standard point clouds from laser scanning. Figure 1 represents first data modelling results. Only data from city of Tampere was used.



Figure 1. Data Modeling Results in the City of Tampere.

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The work has started

In 2015 the NLS established a programme for creating the new National Topographic Database (NTDB). The target for this programme is set for 2018. By then we should have the first new operational system in place.

The NTDB also supports 3D and 4D, and is considered to be a basic registry linked with other basic registries. Co-operation is the key in creating the new database: updating is linked with processes where information originates and existing data is used and linked to the system.

All feature types are critically reviewed. Only the needed data should be included. This could mean for example that only basic geometry is included and all other attribute information is kept somewhere else.

The user needs of public safety authorities has a high priority in the programme. Data is open but data protection is also enforced for sensitive and personal data.

As a starting point three projects within the programme were initiated. The first project is a pilot project on buildings. We will demonstrate the whole process from data collection to data use. In this project open source solutions have a priority. The second project is defining a new data quality management process for the NTDB and the third project defining the unique IDs (see an article in this magazine).

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Levels of detail may differ

For feature level of details (LoD) we follow the CityGML classification. The basic idea on level of details is as follows:

- Class A: A city centre, features are represented in LoD2 (or better if available from plans).
- Class B: Other densely populated area or industrial area, features are represented in LoD2. Class B may also contain shore areas with recreational activities.
- Class C: Other area, features are represented in LoD1 or LoD2

The class A and B areas should have data from the municipalities and class C areas are coming from the NLS.

The National Land Survey's goal is to prevent duplication of work. If a municipality is keeping their basic geographical information up-to-date then the NTDB will have access to this data. There are possibilities where a municipality and the NLS agree to share the costs of creating a new data model with 3D for example in class B areas, or the municipality agrees that the NLS should take the responsibility for the updating. This option is probably relevant for smaller municipalities.

Technical architecture

As the project is yet in the beginning phase, we only have a draft specification for the technical architecture available. Figure 2 illustrates the basic principles. The existing NLS's TDB updating system will be continued at least until 2020. It will be used for periodical updating of the NTDB. For the municipalities two options are offered. They may utilize the NTDB directly with an editing interface or they may create an interface using they own GIS solution. The number of modules needed for the NTDB has also been identified.

The modules should be open source and available for all different players. For publishing the NTDB we will use the OSKARI platform (www.oskari.org)

A website for following the development of the NTDB will be created shortly and will be available

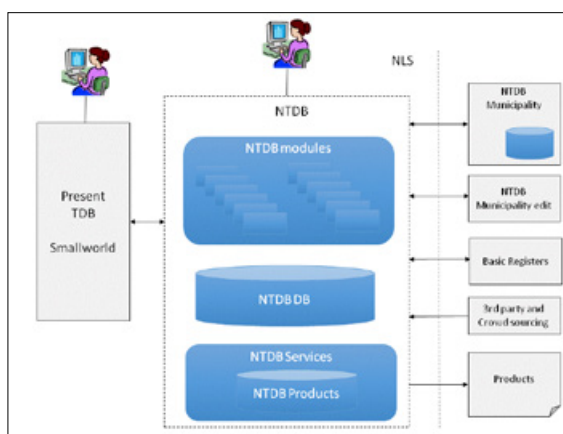


Figure 2. The basic principles of the technical architecture. The NTDB modules should be open source and available for all. Municipalities can utilize the National database in two different ways.

MODULES NEEDED FOR THE NTDB

- Plan: Management of schemas and data models
- Edit: Editing, including a 3D Edit
- Validate: Validating a schema
- CoordinateTransfer: Co-ordinate transfer
- SchemaTransfer: Schema transferring service (mainly in the first phase when using existing systems)
- Quality: Validating data quality
- Change: Change management (if persistent ID is not managed)
- GeoSync: Changes updated to and from the NTDB with changes log and persistent ID
- Publish: publishing a product
- Generalize: making a generalized product (like 1:50 000)
- UserFeedBack: management of feedback
- ProcessEngine: management of processes
- API: Application Programming Interface.

through www.paikkatietoikkuna.fi/web/en. Return on investment analysis will be conducted, and we expect to start new projects in the beginning of 2016 for the implementation of the NTDB. First results should be available in 2018.