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National Report of Finland*

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National Report
National Land Survey, Finland

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SUMMARY

Finland has a long tradition in building its national spatial data infrastructure (SDI). Today the focus of development in European countries is in the implementation of the harmonized European-wide spatial data infrastructure, INSPIRE.

National Land Survey of Finland has renewed the production line and production application of small scale databases. The new production system is based on an ESRI ArcGis application and it is developed using Visual Basic and C#. Production with the new generalization application started in 2006.

The Geographic Names Register (GNR) developed and maintained by the National Land Survey of Finland (NLS) is one of the elements included in the national and international geographic names and spatial data infrastructure. As the national geographic names repository and database the GNR serves as the reference dataset for the standardisation of Finland's geographic names, and the official names data source for different kinds of information services and applications, including the varied spatial data and map production in the NLS.

IMPLEMENTATION OF THE SPATIAL DATA INFRASTRUCTURE AND THE NATIONAL GEOPORTAL

By Antti Rainio

Finland has a long tradition in building its national spatial data infrastructure (SDI). Today the focus of development in European countries is in the implementation of the harmonized European-wide spatial data infrastructure, INSPIRE.

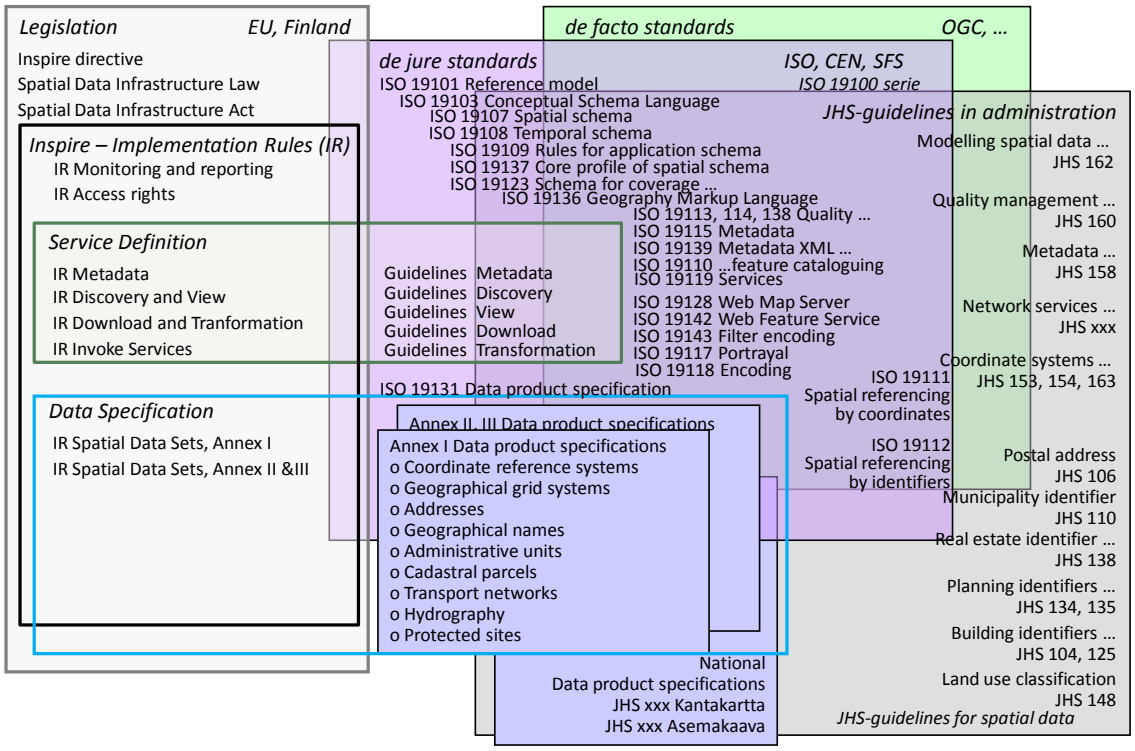
Legislation on SDI

The National Spatial Data Strategy 2005-2010 was launched in 2004 in Finland. In the EU the INSPIRE directive was accepted in 2007, and it is now ruling the implementation of SDIs in the member countries. In May 2009 the directive was executed in Finland by the law for national spatial data infrastructure. The details and timetables are included in the act for a national SDI. However, the EU Commission is still drafting the regulation as implementation rules concerning data contents and services as well as monitoring and reporting.

According to the new legislation, authorities owning spatial datasets corresponding to Inspire annex I, II or III shall describe those datasets and publish the metadata in the national discovery service maintained by the National Land Survey of Finland (NLS). Besides that, the authorities shall take care of establishing the required network services for users accessing those datasets. The usage of the services shall be monitored and reported annually.

The discovery service is open and free of charges. Otherwise the existing pricing policy will remain unchanged even if the directive increases the pressure to allow free access to view services. If payments are collected, the e-commerce services shall be available and the requirements and texts for agreements shall be published in the Internet. The privacy issues shall be tackled following the national privacy laws.

The implementation of INSPIRE directive generates not only the European SDI but forms a basis for a national SDI as well. The data specifications in the European context remain on a general level, but following the technical architecture and the best practices of the INSPIRE process a more content-rich national SDI can be created. NLS is responsible for collecting the annual reports of the usage of spatial data and for the progress of building up the infrastructure.



Working by networking

Cooperation and networking in the development of the SDI of Finland started already in the early '80s. The LIS project was followed by an advisory board working on both technical and administrative issues. The national forum for promoting the use of geographic information, the ProGIS association, started in the early '90s.

International contacts have been established at Nordic, European and global level. The international standardization organization, ISO/TC211, has been a very important forum for cooperation for several years. At the national level, localization of the standards has taken place especially in drafting teams for the administrative standards for SDI.

In accordance with the legislation, the National Advisory Board on Spatial Data is now starting to encourage and follow the development of the infrastructure. Following the spirit of the INSPIRE directive, the National Inspire Network has become a cooperation forum for the SDI implementation. Since its beginning, more than 60 organizations have taken part in the open network. The network is a place to share knowledge and experiences in modeling and specifying spatial data for multiple uses as well as building up services and formulating licenses and agreements. The idea is to support and activate partners to fulfill their duties and to take benefits of the efforts. The National Land Survey has nominated a team of experts as a secretariat for the advisory board and for the network.

The Inspire Network focuses on

- development of network services and a national geoportal
- metadata on spatial datasets and services and data specifications including harmonization
- terms of use and templates for agreements
- targets and benefits of the spatial data infrastructure

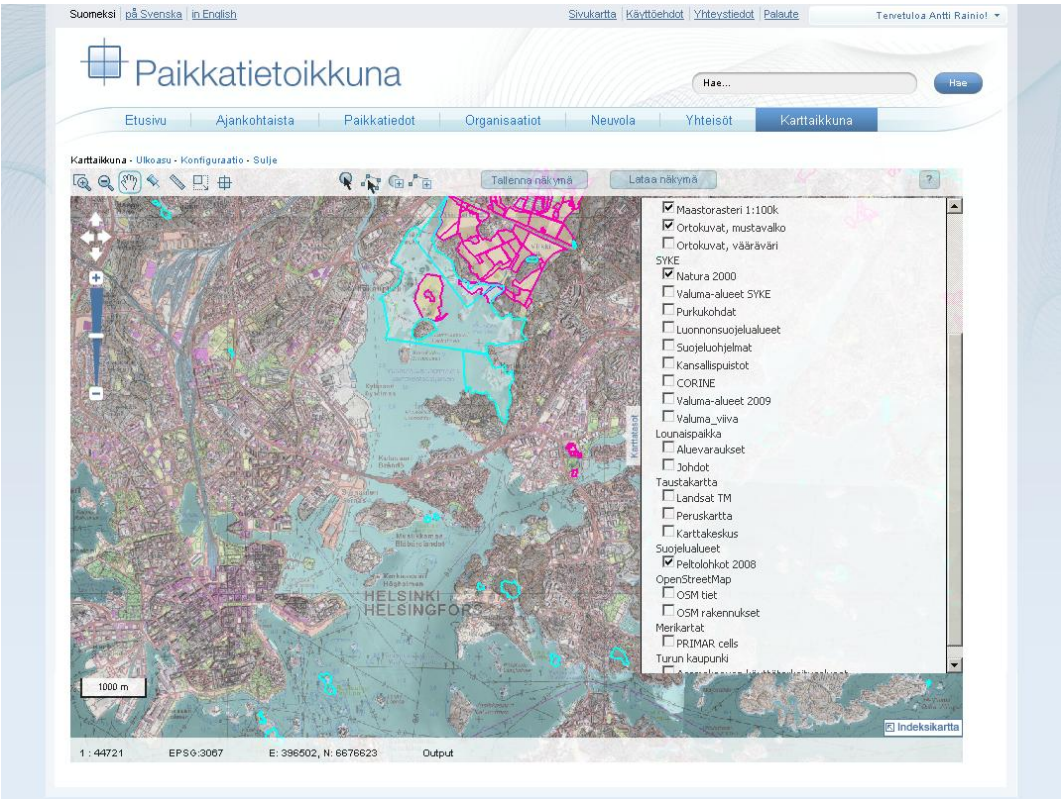
National geoportal

The role of the national geoportal is to present the contents and services of the spatial data infrastructure. The data owners are asked to publish the descriptions of their products in the portal and the users can find the datasets useful for them by reading the descriptions and by browsing map images. Overall, the information about the datasets and their contents is important in order to avoid overlapping work in data capture.

The EU commission is building up a European geoportal, while many member countries and regions are implementing their own portals. Technically the portals can be interoperable on metadata so that the European one will be able to connect to national portals and the regional metadata content can be accessed through a national one. Nowadays, more frequently, the web map services are available to allow the view service.

In Finland the goal to build up a national geoportal was written into the National Spatial Data Strategy 2005-2010. In 2007, the government repeated the goal as a part of the information society services. The new legislation requires NLS to offer web pages to support implementation and utilization of SDI.

During the last few years, inventories on the user needs have been made before the implementation of a pilot portal. Recently, a pilot for the national geoportal was launched. The service provides a lot of information about organizations and their datasets and services. In addition, the portal presents the legislation and standards which are guiding the SDI realization. Perhaps the most interesting part of the geoportal is its map window, because already 15 spatial data owners allow map browsing of more than 30 different map layers. In the pilot phase, in order to browse maps, users have to register as a user of the portal.



Actually the geoportal follows the phenomena of social media. Users can join in communities around a common task or hobby such as bird watching, scouting or fishing. The members of a community can share points of interests and routes which they can store in the portal database.

Of course, the National Inspire Network is a community by itself so it will take benefit of tools such as wikis, blogs and forums.

The geoportal pilot is a tool to collect experiences and feedback for the more advanced national geoportal. The pilot reflects the public interest to access the SDI. In the year 2010 the real discovery service defined in Inspire implementation should be integrated in the national geoportal.

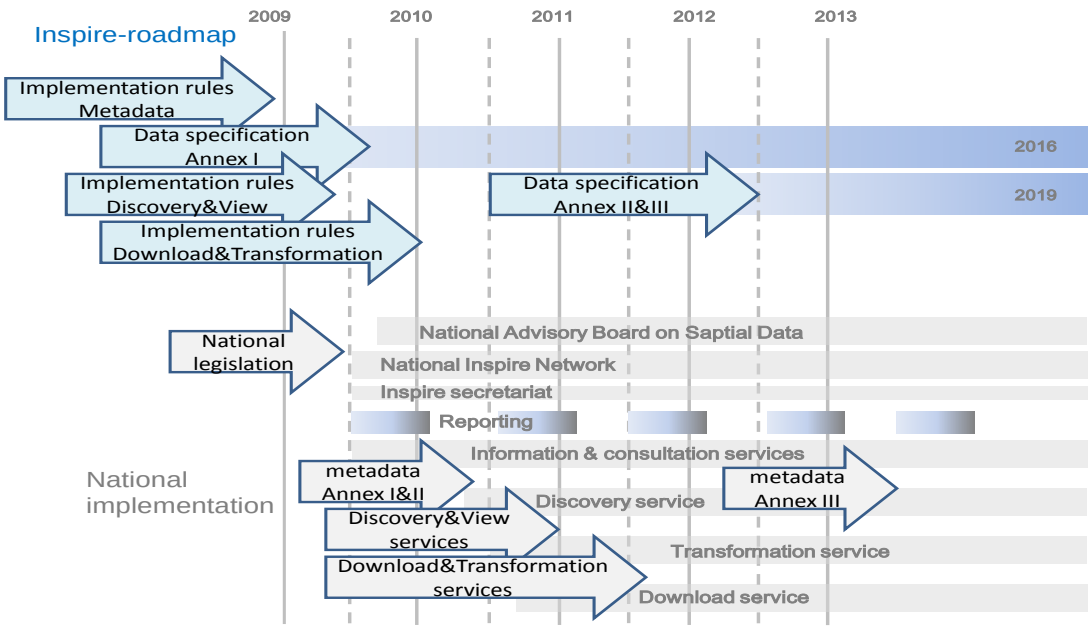
According to the new legislation, the role of the National Land Survey is to run metadata services and transformation services as well as to give guidance in the implementation of the SDI. In Finland NLS has a long tradition from the '80s in metadata and discovery services. The existing spatial data directory system will be rebuilt according to the European metadata regulation and rules and guidelines for discovery services. The evaluation of the GeoNetwork open source product is going on and new services should be available during the year 2009.

The geoportal offers already the view service but in the future the Inspire download service should be partially integrated. As a part of the national SDI in Finland, the unique Spatial Data Lending Service is in use. Originally it was implemented in 2006 by the University of Turku and its 18 data producers are providing nearly 300 datasets in the service. The lending service has today about 1000 registered users, and in the future the service should be integrated in the national geoportal. So the download service could be a part of the geoportal at least in this way.

Open Source (OS) communities are developing practical software tools for SDIs in parallel with the international standardization. Considering the Inspire technical architecture, the service interfaces are being developed for discovery, view, download, and transformation services as well as for SDI clients. Technically the geoportal is based on open source software like Liferay enterprise portal technology and OpenLayers javascript library for displaying map data. The map services are distributed, and in many cases open software products like GeoServer, MapServer and deegree are in use on the server side.

In the SDI implementation and geoportal development, co-operation at the national and international level could be very beneficial. Areas of co-operation can easily be identified within the development of SDI services as parts of the Inspire implementation. The level of co-operation can vary from sharing experiences to source code development, distribution and common use. A common policy in OS among partners is not necessary but might make co-operation easier.

Inspire roadmap is giving the frame for national activities as well. The image is showing the main tasks and the timing for launching new services.



VECTOR BASED GENERALIZATION APPLICATION IN THE PRODUCTION OF SMALL SCALE DATABASES OF THE NLS OF FINLAND

By Veijo Pätynen

Old production application out of date

Production of small scale databases (1:100k, 1:250k, 1:500k, 1:1M and 1:4,5M) of the National Land Survey of Finland was started in 1995. The production line of each database was separate from the others. Although the result was topologically incompatible, the data sets, however, were comprehensive. Validity of these databases for present-day needs has become inadequate, and also the production applications, which were based on ArcInfo and aml-scripts, have become old. International co-operation projects require the existence of high quality map databases.

Development project

The development project to produce a new production system for small scale databases was started in 2003. The new system is based on ESRI ArcGis (Windows XP) application. ESRI's ArcObjects technology provides a wide component library for developing own generalization tools. These tools are developed using Visual Basic and C# scripts and they are integrated into ESRI's standard ArcMap application. Its database format is ESRI ArcGis Geodatabase. Topological relationships between features are maintained in Geodatabase with ArcGis topology tools. The basic idea of production is to avoid interactive generalization work and use automation whenever it is possible.

Whole generalization process is done in a vector format. The process can be seen as a model-oriented generalization because it is not intended for any specific map representation. The parameters of generalization are based on the level of detail and minimum size, width or on distance between objects depending on the desired scale of data. All parameters for controlling the generalization process are pre-defined and are stored into separate control database tables. This ensures that all data is generalized in the same way and users can't use wrong parameter values by mistake. For example, there are 630 control parameter values for generalization 1:10k to 1:100k.

Source data for generalization is derived from the Topographic Database, which incorporates the most accurate positional data about Finnish topography, and in this respect is comparable to maps on scale 1:5k - 1:10k. The first phase is to produce a 1:100k map database and after that a 1:250k map database using 1:100k data. The production application contains all necessary generalization tools for selection, simplification, combination, smoothing and enhancement of points, lines and polygons. Tools for polygon aggregation, especially, are very versatile. All different classes of land cover (agricultural areas, rock areas, wetlands, etc.) can be generalized in the same process as the application controls the priority and processing rules of different area classes. For example, fusion and merge of different class of land cover polygons can be carried out automatically in one run. Generalization tools can be used for generalization of different scales after the parameters of a desired generalization step have been defined.

Start of production

Production with the new generalization application started in 2006. The production team consists currently of about 10 persons. Efficiency of the new process is remarkably better than that of the old production system. The new 1:100k map database covered two-thirds of the area of Finland in the end of 2008. Full coverage will be achieved during this year. Production of the new 1:250k map database is still in early stages but the functionality of generalization tools has already been assured.

THE GEOGRAPHIC NAMES REGISTER OF THE NATIONAL LAND SURVEY OF FINLAND
By Teemu Leskinen

The Geographic Names Register (GNR) developed and maintained by the National Land Survey of Finland (NLS) is one of the elements included in the national and international geographic names and spatial data infrastructure. The multi-lingual and multi-names circumstances in Finland as well as the multi-product and multi-scale production environment of the National Land Survey have guided the design and development of the GNR.

The Geographic Names Register comprises the Place Name Register and the Map Name Register. The Place Name Register is not based on any map scale and includes no cartographic information but contains data on the type and location of the named features and the approved spelling and the language information of the names. The Map Name Register is organised by map series and includes the cartographic representation parameters for the selected names in the Place Name Register.

The data model of the GNR is feature oriented and includes objects such as Place, representing a named feature, Place name, representing a geographic name, and Map name, representing a cartographic occurrence of a geographic name. A Place has one or more Place names that for one may have zero, one or several Map name occurrences in different cartographic products.

The GNR data is disseminated e.g. through NLS standard WFS (Web Feature Service) interfaces. The geographic names WFS products include two GML (Geography Markup Language) profile schemas for the Place Name Register, serving a little different use case purposes, and one schema for the Map Name Register. A Place Name Register WFS query can be filtered by Place and Place name identifiers, by location, by feature type or feature type group, by the spelling, by the language and language status information, by the objects' database lifespan information, and by a 'Relevance at Scale' indicator depicting the size/importance of the named feature. A Map Name Register WFS query can be filtered by the map product and by location.

Examples of fields of application for the GNR data and WFS services include:

- Standardisation; clear and consistent use of accurate geographic names in communication;
- Interoperability (id links); national and international names and spatial data infrastructures and projects (e.g. INSPIRE, EuroGeoNames, EuroRegionalMap);
- Search; finding named places and geographic names by using their attributes (location, feature type, spelling, language) as search criteria; geocoding; geoindexing, geoportals; gazetteers and gazetteer services; map browsing applications; automatic positioning and navigation;
- Visualisation; map production; geographic names as information layer in viewing services;
- Research of different kind;
- Semantic web applications; ontology;
- Cultural heritage promotion; safeguarding of the cultural heritage related to (traditional) geographic names.

The Geographic Names Register was introduced in more detail at the 9th United Nations Conference on the Standardization on Geographical Names (UNCSGN) in New York, 21-30 August 2007 (Conference room paper No. 133, *The Geographic Names Register of Finland*, http:unstats.un.org/unsd/geoinfo/9th-UNCSGN-Docs/E-CONF-98-133-Add1.pdf), and the Geographic Names Register Web Feature Service at the United Nations Group of Experts (UNGEGN) 25th Session in Nairobi, Kenya, 5-12 May 2009 (Working paper No. 27, *The National Land Survey of Finland Geographic Names Register WFS (Web Feature Service)*, http:unstats.un.org/unsd/geoinfo/25th-GEGN-Docs/WP%20papers/WP27-LandSurvey-Finland.pdf).

INITIATIVES IN THE NORDIC REGIONS
By Heli Ursin

Arctic Spatial Data Infrastructure initiative and GIT Barents
A joint project, “GIT Barents” (Geographic Information Technology within the Barents Region), started in 1994 by Finland, Norway, Sweden and Russia, was finished in April 2008 with the European Community funding. The project produced homogenous & uniform geographic information within the Barents region. In addition to that, this project also developed and implemented Internet-based technology for effective access to and distribution of geographic information within the region. Project information as well as access to the Barents Interactive Map can be found on www.gitbarents.com.

The Nordic National Mapping Agencies of Denmark, Finland, Iceland, Norway and Sweden and the National Spatial Planning of Greenland have now proposed to use the experiences and results of the Barents project in creating an Arctic SDI. The Arctic SDI should be implemented by all the circumpolar national mapping agencies, i.e. also including Russia, Canada and the USA. The National Mapping Agencies could provide reliable reference data for the region. The initial National Mapping Agencies partnership could - and should - later on be expanded to include other major contributors, users and other stakeholders.

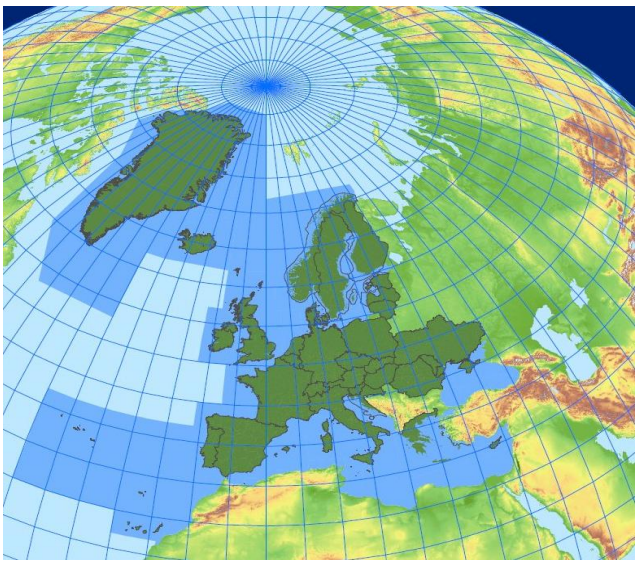
This expanded partnership would help transform the Arctic SDI into a true Geospatial Infrastructure for Sustainable Development in the polar region. The National Mapping Agencies are largely responsible for the development and management of national NSDIs (National Spatial Data Infrastructure) – in Nordic countries this responsibility is governed by the EU INSPIRE (Infrastructure for Spatial Information in Europe) Directive.

The First International Circumpolar Conference on Geospatial Sciences and Applications / IPY GeoNorth was held in Yellowknife, Canada, in August 2007. The conference presented the idea of creating Arctic Spatial Data Infrastructure (ASDI), which would make it possible to share geospatial data in support of sustainable development of Arctic communities, regions and nations. The Yellowknife Conference participants agreed that the proposed ASDI would provide a unique and effective infrastructure for the sharing of geospatial data, information, knowledge and best practices between all stakeholders in the Arctic region. The GeoNorth Conference in Fairbanks, Alaska in the in the beginning of August 2009 continues the work.

EuroGlobalMap

EuroGlobalMap (EGM) is a digital, seamless 1:1 million scale database. It is produced under the umbrella of EuroGeographics (www.eurogeographics.org), the association of the European National Mapping and Cadastral Agencies. The National Land Survey of Finland coordinates the EuroGlobalMap data production.

Currently the EuroGlobalMap covers 32 European countries. The EuroGlobalMap dataset is made up of 6 themes (administrative boundaries, hydrography, transportation networks, settlements, elevation and named location), including a total of 12 layers.
The European National Mapping and Cadastral Agencies work on several other database projects, for example, EuroRegionalMap, a database covering Europe, is being produced in scale 1:250 000.



The EuroGlobalMap (EGM) Project was started in 2000. In the background of the EuroGlobalMap is the MapBSR Project: the Digital Map of the 14 countries around the Baltic Sea. The MapBSR database was finalized in 2000. The MapBSR database will no longer be updated as an independent database, but the data has been incorporated into the EGM database. The National Land Survey of Finland was the project coordinator also for the MapBSR project.

Besides producing data for European use, the EuroGlobalMap is also the European contribution to the Global Mapping initiative (http://www.iscgm.org/cgi-bin/fswiki/wiki.cgi). The European National Mapping and Cadastral Agencies (NMCAs) have found it important to create a seamless European database - i.e. the data will be integrated at international boundaries – which is a single important improvement compared to the basic Global Map data.

Generally data in each European country is created to meet the national needs, so the resulting data infrastructure is not seamless between countries and no European-wide database has been available with seamless coverage and secured up-dating. The EuroGlobalMap database is a million scale dataset and it covers the European countries with harmonised topographical data. The EuroGlobalMap database provides the first European geographic information infrastructure that will be maintained at a source level by the National Mapping Agencies and by providing harmonized access conditions for geographic information. In the EuroGlobalMap database the national data is harmonized to meet the agreed specifications and the data is compiled into one seamless database covering whole Europe.

EuroGlobalMap is designed for business and private use. It can be used for spatial analysis, as a geographic backdrop for presentation and visualization or as a geographical interface to ground related data in Europe. Its applications will comprise, e.g. freight fleet management at the European level, environmental assessment, strategic planning in the private and in the governmental sector, strategic cross border security aspects, large scale hydrographic analyses and geographical names analyses with different languages.

The complete specifications can be found at the EuroGlobalMap website:
http://www.eurogeographics.org