



Spatial Data Infrastructures in Estonia: State of play 2010



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Report meta-information

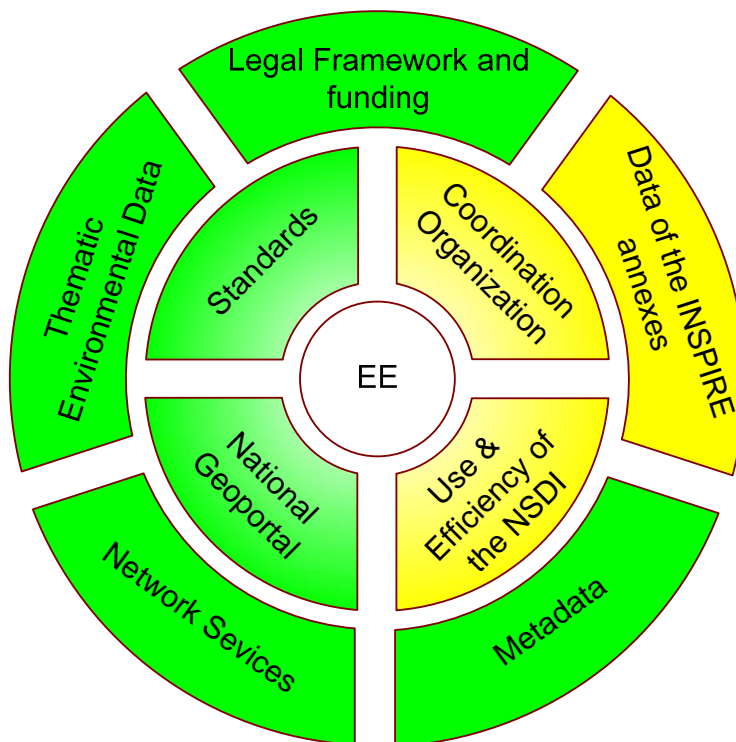
Title	Spatial Data Infrastructures in Estonia: State of play 2010
Creator	Danny Vandembroucke & Dimitrios Biliouris (SADL)
Date Issued	2010-09-01
Subject	INSPIRE State of Play
Publisher	K.U.Leuven (SADL + ICRI)
Description	This report is summarizing the review of SDI in Estonia
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Previous Contributor	Marco Fritz, Catharina Bamps, Jos Van Orshoven, Danny Vandembroucke (SADL); Peter Beusen, Katleen Janssen (ICRI), Peep Krusberg (EE)
Format	MS Word 97/2000
Audience	INSPIRE stakeholders
Identifier	rcr09EEv111.doc
Language	EN
Coverage	Autumn 2009 – Spring 2010

Version number	Date	Modified by	Comments
1.0	2002-11-29	Marco Fritz (SADL) & Peter Beusen (ICRI)	First version
2.0	2002-12-20	Jos Van Orshoven (SADL)	Completion & harmonization with 31 other country reports
3.0	2003-07-25	Catharina Bamps (SADL)	Integration and consolidation of comments by Mr Peep Krusberg, Adviser at the Estonian Land Board; Addition of Report meta-information, Executive summary, Abbreviations/acronyms
4.0	2003-08-07	Jos Van Orshoven (SADL)	Harmonisations with 31 other country reports
5.0	2004-06-10	Catharina Bamps (SADL)	Integration of information from limited review of web sites. General review, correction and update. Addition of table pointing to changes with regard to version 4
6.0	2004-06-25	Katleen Janssen (ICRI)	General review, correction and update of legal framework

7.0	2004-06-30	Jos Van Orshoven (SADL)	Consolidation
8.0	2005-06-20	Peep Krusberg	Update of the status 2005
8.1	2005-08-03	Danny Vandembroucke	Review of the 2005 update and consolidation
8.2	2005-08-04	Katleen Janssen (ICRI)	General review, corrections and update of legal framework
9.0	2006-12-22	Katleen Janssen (ICRI)	General review, corrections and update of legal framework
9.1	2006-12-28	Danny Vandembroucke	Review of the 2006 update and consolidation
10.0	2008-03-26	Katleen Janssen (ICRI)	Correction and update legal and organizational framework
10.1	2008-04-08	Danny Vandembroucke, Ludo Engelen (SADL)	Integration results survey
10.2	2008-06-20	Danny Vandembroucke (SADL)	Metadata and final changes
11.0	2010-07-20	Dimitrios Biliouris (SADL)	Review of the 2009 update
11.1	2010-07-26	Katleen Janssen (ICRI)	2009 Review of the legal framework

Change matrix 2010 versus 2007

A concise graph is added to indicate changes of the various paragraphs compared to the previous report. Two colours are used: Green and Yellow indicating major and minimum changes respectively compared with the 2007 State of Play. This graph does not reflect the country situation. Merely it represents our findings/changes per section on our preparation of the desktop analysis.



Executive summary

In Estonia, the public and private GI-actors are very active with regard to data production and the organization of GI-service facilities, an important part of which relate to web-mapping. What is not present is comprehensive standardized metadata of spatial data. Access services to metadata are very limited.

Despite this active GI-sector, no coordination initiative is in place. There is no (and there are apparently no plans to create one) national GI association in Estonia. The Estonian Association of Surveyors incorporates the main private providers of GI. An NSDI-strategy has not been formulated.

The Estonian Land Board (ELB) is the National Mapping and Cadastral Agency and can be considered as the major player on the GI-scene. ELB has been assigned as a coordinator for GI related activities in the state government sector. It produces reference and core thematic data (e.g. the Estonian National Topographic Database (ENTD)), develops distributed nation-wide information systems (the cadastral and land information systems), has developed several web mapping services (both targeted for government agencies as well as for public) and provides some metadata on the internet. In this report we have described the de facto emerging NSDI in Estonia from the perspective of ELB. ELB has indeed expressed some ambition to develop more metadata and a metadata access service.

The planned Geodesy and Cartography Act aims to avoid duplication¹ of efforts among agencies. [1]. GI-related activities had a top priority in Estonian IT Policy strategy for 2004-2006. Recently, the Estonian Government has agreed in a general Information Societies strategy until 2013 which states e.g. interoperability as a high priority, while this strategy is further refined by a detailed yearly implementation plan and in 2009-2010 an INSPIRE plan has been included as a priority action. Similarly, the INSPIRE directive was transposed by the adoption and amendment of several Acts.

The OpenGIS projects carried out by ELB between 2005 and 2006 and continue till today aims to bring the SDI infrastructure more in line with INSPIRE and e-Government principles. Infrastructure is setup with remote servers and a system for data dissemination. Various web applications - thin as well as thick clients - give the user toolsets for using the data. A catalogue service is being developed for discovery. Data themselves are accessible through WMS and WFS services. Today the ELB Geoportal contains numerous geospatial information, GIS data and spatial data infrastructure (SDI) information for the country - all available for viewing through the web map server. It also provides information about Eurogeographics projects, geology, soils and cultural information. The digital map data can be used free of charge via public web map applications or via WMS standard (supported by majority of known GIS software).

¹ Comment : we already rely on the Databases Act in this matter (the Act prohibits duplication.

Private companies are particularly involved in web mapping and related location based services.

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Abbreviations and acronyms

CIS	Cadastral Information System
CRS	Coordinate Reference System
CT	Core Thematic Data
DBMS	Database Management System
EAG	Estonian Association of Geography
EEIC	Estonian Environment Information Centre
EELIS	Estonian Nature Infosystem (Eesti Looduse Infosüsteem)
EGM	EuroGlobalMap
EIC	Environmental Information Centre
ELB	Estonian Land Board (also Maa-Amet)
EMC	Estonian Map Centre
ENTD	Estonian National Topographic Database
ERA	Estonian Road Administration
ERM	EuroRegionalMap
EU	European Union
FIR	Further Investigation Required
GI	Geographical Information
GIS	Geographical Information System
GPS	Global Positioning System
IBS	Institute of Baltic Studies
INSPIRE	INfrastructure for SPatial InfoRmation in Europe
LAN	Local area network
LIS	Land Information System
Maa-Amet	Estonian Land Board (also ELB)
MapBSR	Digital map of the Baltic Sea region
NHB	National Heritage Board
NIA	No Information Available
NLIS	National Land Information System
NMA	National Mapping Agency
NMCA's	National Mapping and Cadastral Agencies
NSDI	National Spatial Data Infrastructures
PPP	Public-Private Partnerships
PSI	Policy and legislation on access to public sector information
REF	Reference data
SABE	Seamless Administrative boundaries of Europe

SDI	Spatial Data Infrastructures
TM-Baltic	Transverse Mercator Baltic
WAN	Wide Area Network
WMS	Web Map Service
WFS	Web Feature Service
UEGN	Unified European Gravity Network

1 GENERAL INFORMATION

1.1 Method

This report is summarizing the review of SDI in Estonia, and reflects the degree to which the SDI situation in Estonia is similar to the ideas set out in the INSPIRE position papers² and the more recent INSPIRE scoping documents.

The 2002 report was based mainly on the analysis of various documents, project references and web sites readily accessible in English and Estonian. (See Section 3.2 for the full list of consulted references). Although the Estonian national mapping bodies have installed bilingual websites (EE and EN), most technical specifications were available in EE version only.

The 2004 report has been completed by integration and consolidation of comments received from representatives of the Estonian Land Board. For the update of 2005, input was received from Peep Krüsberg from the ELB which was integrated in the last version of the report. For the update of 2006 additional information on legal issues was obtained via several sources. The presentation given during the workshop “*Preparing the National INSPIRE Information Days*” (organized by JRC for the new and candidate Member States), was integrated as well.

For the 2009 update the survey questionnaire was used, along with various web sources, the national geoportal and publications. In this version obsolete information was removed, while a conclusion paragraph regarding the status of each indicator was added for each component.

1.2 The GI-, GIS- and SDI-scene in Estonia

Estonia has not developed a specific NSDI strategy. Environmental and spatial data are considered as part of the national IT policy (<http://www.riso.ee>), these are listed as one of the six main action lines for the years 2004-2006. There is a special action line for environment and spatial data: starting of environmental register; open access to environmental monitoring, fisheries and forest registers; development of land information system and especially e-services for public sector. INSPIRE is mentioned for the first time (2006). However, the Estonian Government has agreed in a general Information Societies strategy until 2013 which states e.g. interoperability as a high priority (<http://www.riso.ee/en/system/files/Estonian%20Information%20Society%20Strategy%202013.pdf>). That strategy is further refined by a detailed yearly implementation plan and in 2009-2010 an INSPIRE plan has been included as a priority action (http://www.riso.ee/et/files/IYA_2013_RAK_2009_2010_0.rtf).

The major producer of core geographic data is the Estonian Land Board (ELB, Maaamet) (Information in Estonian and English via <http://www.maaamet.ee/>), which plays a

² INSPIRE position papers, final versions: RDM, ETC, DPLI, ASF, IST, IAS (latest version 2002).

role similar to that of a traditional National Mapping Agency. ELB performs and coordinates national mapping programs, produces orthophoto-coverage's and establishes national and local geodetic networks and geodetic databases and coordinates GI activities at national level. It prepares specifications, performs quality control and organizes outsourcing of national topographic mapping works through tendering. It maintains the Land Cadastre.

The Estonian Environment Information Centre (EEIC) <http://www.keskkonnainfo.ee/> is legally mandated to collect and coordinate environmental data acquisition.

The Statistical Office of Estonia provides census analysis data and maintains classifiers for administrative units and settlements (15 counties, ca 240 municipalities. and ca 4.500 villages).

The Estonian Maritime Board is responsible for the production of nautical charts.

Other major producers of thematic GI include the Geological Survey of Estonia and the Ministry of Defence.

[\[1\]](#), [\[2\]](#)

ELB is a member of EuroGeographics (an association of European NMCA's) and is participating in many of its projects offering harmonized digital data from NMCA's covering most of Europe: SABE (Seamless Administrative boundaries of Europe, since 1999), EuroGlobalMap (EGM, 1:1 million scale, 2001) and EuroRegionalMap (ERM, 1:250000 scale, 2004).

The private sector is particularly active with respect to GI as reflected by following cases:

- The Institute of Baltic Studies (www.regio.ee) launched in 1998 one of the first web mapping applications in Estonia, the Estonian Atlas (http://atlas.ibs.ee/mis_wark_on.cgi.en) using the Estonian Road Atlas published by Regio Ltd. The data are raster maps. Search and zoom functions allow fast navigation. Navigation is also possible via name of town, village, street or object or by geographic coordinates. The use of the Atlas is free of charge for personal purposes. Use of the data and maps for profit making purpose is prohibited. The application is available in English and Estonian. The atlas is based on the Estonian Road Atlas which is produced by another private company, the Institute of Baltic Studies (IBS). These data have been digitized from paper sources (Russian military topographic maps 1:200.000) from the late 80's) and reflect the latest addition and corrections made to the database. All atlas contents belong to their authors and are subject to international and Estonian copyright law.
- The company Estonian Map Centre (Eesti Kaardikeskus, EMC, <http://www.ekk.ee>) plays a particular role. It is a state owned for-profit GI company under the Ministry of Environment (all shares belong to that

Ministry, EMC maintains the Place Name Register)³. It provides web mapping of a.o. Natura 2000 sites. Major works are: -1:50 000 Estonian digital base map production and database development; -1:10 000 Participation in the Estonian basic map 1:20 000, and the production of paper and the Estonian basic map editing and printing; -1:50 000 and 1:250 000 maps of the Estonian Defence Production and Printing; -1:500 000 Estonian Air card production and printing; -National Place Names Register.

- The most popular private GI web application is probably Delfi's (one of the biggest general purpose web portals in Estonia). The map site is set up and maintained by Regio Ltd at <http://regio.delfi.ee>. The following applications are offered via this service:
- A map of Estonia providing the opportunity for free to everybody to (1) put a marker on the map and add a comment (what is interesting there or announcement about an error), (2) browse maps;
- Mobile presentation of places of interest (more than 400 sites at the moment):
 - Regio has defined unique ID-s to selected interesting sites, these ID-s are available in their Road Atlas (paper and CD-versions), on Delfi's Mapsite or via SMS (different modes available, most interesting is by finding the caller's location using GSM locating service);
 - oral presentation of the site is read after calling to specific GSM short number supplemented with the site's ID, English version available;
- Showing user's location on map with GSM locating service;
- Locating Public Internet Points; Pharmacies, Restaurants, Hotels, Post offices.
- Locating ATM's, Banks, Recreations centres public buildings.
- Locating Gas Stations, zoos, landfill sites and many more.

The company R-Süsteemid OÜ has developed a system for management and tracking of motor transport called Sherlock. The system is implemented in one Taxi Company in Tallinn.

Despite this wealth of data and service providers, there is no (and there are apparently no plans to create a) national GI association. The Estonian Association of Surveyors incorporates the main private providers of GI.

The ELB is considered in this report as the core of a pre-SDI since it is undertaking several SDI-related projects like the web-based Cadastral Information System and the Land Information System. The ELB depends administratively from the Ministry of

³ Comment : Historical background: as cartography is a very expensive business, government established a production unit EMC, invested a lot in the technology during the first half of 90's and all cartographic production was done there. Also Estonia got lot of technological aid from other countries (Sweden, Switzerland, USA) which had to transfer to some state owned institution. Now the market has opened also to private companies and ELB, although state owned, competes with other companies for orders. Other bigger customers for ELB are Border Guard, Army, local governments and state owned (partly) utilities companies like Estonian Energy. ELB hosts some national (gazetteer) registers (are "Authorised Processor") and provide web map hosting for counties, municipalities or companies (Estonian Energy).

Environment. As such, ELB is in a good position to coordinate with environmental data producers and users.

The OpenGIS projects carried out by ELB between 2005 and 2006 and continue till today aims to bring the SDI infrastructure more in line with INSPIRE and e-Government principles. Infrastructure is setup with remote servers and a system for data dissemination. Various web applications - thin as well as thick clients - give the user toolsets for using the data. A catalogue service is being developed for discovery. Data themselves are accessible through WMS and WFS services. Today the ELB Geoportal contains numerous geospatial information, GIS data and spatial data infrastructure (SDI) information for the country - all available for viewing through the web map server. It also provides information about Eurogeographics projects, geology, soils and cultural information. The digital map data can be used free of charge via public web map applications or via WMS standard (supported by majority of known GIS software).

2 Details of the ELB as the potential nucleus for the Estonian SDI:

2.1 General Information

The Estonian Land Board is by laws responsible for the organisation, co-ordination and supervision of the activities in the fields of geodesy, cartography, geoinformatics and cadastre. <http://www.maaamet.ee/> provides information in Estonian and English.

The Cadastral Information System (CIS, operational in 2001, (<http://www.maaamet.ee>) will form together with the Estonian National Topographic Database (ENTD, under development), thematic layers (e.g. soils, geology, etc.) and relevant GIS infrastructure a basis for the National Land Information system (NLIS). This infrastructure consists of the server side technologies which allow to make spatial data available to public using open standards (WMS, WFS, etc), data exchange layer for the use of national databases X-Road () and specific plug-in on the client side for using spatial data through X-Road.

[3]

ELB has bilateral cooperation with Nation Land Survey of Finland, the Finnish Geodetic Institute, the National Survey and Cadastre of Denmark, with the MapBSR Project. It is/has been member in CERCO and EuroGeographics. ELB has been a partner in PHARE projects to set up cadastral and land information systems. The Phare project "Land Information System (LIS) Development in Estonia" was conducted from September 1997 to March 1999. In the period January 1998- June 1999, the EU Phare Land Reform Project was carried out.

The National LIS is meant to make the administration of information related to Estonian lands easier and conveniently available and usable over the Internet. The creation of a Cadastral Information System laid a foundation for LIS, which made the development of public services possible.

[\[3\]](#)

Historically the first GIS in ELB in its true sense (before that there were just some weakly connected databases) was set up during the spring of 2001. It was the Cadastral Information System (in Estonian *Maaregister*, Land Register) with the following features:

- Data Registration Application – for internal use in ELB:
 - Alphanumerical (attribute) and spatial (parcel boundaries) data registration
 - Parcel registration workflow management
 - Data management (quality control, backups, etc)
 - Applications (statistics, maps)
 - Central database with local copies and applications in local branch cadastral offices (LAN-WAN application)
- Public Services System – web application for public use, free, no user authentication is needed:
 - Cadastral information – only text based queries and answers to the Land Register (parcel ID, address, area, registration date, etc., but no owners' data – this is prohibited by Personal Data Protection Act)
 - Land Information Service (LIS) – map based, text and spatial queries and answers to the Land Register. Different map layers as static backdrops were used (1:50000 and 1:10000 raster maps, orthophotos). Additionally geodetic point's layer with attributes was included.

Since spring 2001 land registration is carried out for 100% using this new system. Also, during 2001 all existing cadastral data and map layers were entered into the Register and the LIS.

The cartographic activities in Estonia are regulated by the Regulation No 138 of 14 April 1994 of the Government of Estonian Republic "Procedure for Geodetic and Cartographic Works and Use of Geodetic and Cartographic Data".

In the field of cartography the Land Board's Department of Cartography has the following tasks:

- Production of different mapping products based on the Estonian National Topographic Database (ENTD);
- Market surveys;
- Strategic planning of map production;
- Development of guidelines and specifications;
- Outsourcing of mapping works, i.e. organisation of public procurement;
- Contract management;
- Quality control of cartographic works and produced spatial data;

- Dissemination of spatial data, both in analogue (paper) and digital forms.

In addition to organising the production of maps, the ELB is participating in the development of GI standards for the Estonian society (http://www.maaamet.ee/index.php?lang_id=2&page_id=291&menu_id=78).

2.2 Component 1: Coordination and organizational issues

The Estonian Land Board is by laws responsible for the organisation, co-ordination and supervision of the activities in the fields of geodesy, cartography, geoinformatics and cadastre. At the same time ELB acts as a contact point for the INSPIRE directive.

The ELB cooperates with many national and international institutions and organisations within the scope of related fields. Most natural cooperation is with different institutions within the Ministry of Environment. Other national bodies include e.g. the Ministry of Justice, the Ministry of Agriculture and the nationwide utilities companies like the Estonian Energy and the Estonian Telephone. Cooperation with them started in 2001. They get up-to-date maps and information on property boundaries while ELB gets information about utilities' networks as restrictions to cadastre as well as for map data production.

2.2.1 Conclusions of Component 1

The Estonian SDI approach is truly national.. SDI building blocks have reached a significant level of operationality. The Estonian Land Board cooperates with many national and international institutions and organisations within the scope of related fields.

Based on these conclusions we score the indicators as follows:

- The approach and territorial coverage of the SDI is truly national
- One or more components of the SDI have reached a significant level of operationality (4)
- The officially recognised or de facto coordinating body of the SDI is a NDP, i.e. a NMA or a comparable organisation
- The officially recognised or de facto coordinating body for the SDI is an organisation controlled by data users (No)
- An organisation of the type 'national GI-association' is involved in the coordination of the SDI (No)
- Producers and users of spatial data are participating in the SDI (No)

- Only public sector actors are participating in the SDI (Not so clear)

2.3 Component 2: Legal framework and funding

[2], [9], [24], [25] – [27]

2.3.1 Legal framework

The Government of the Republic Act lists the institutions which have executive power and defines the area of government for every ministry (e.g. for the Ministry of the Environment: the performance of tasks relating to land and databases containing spatial data, the management of the use, protection, recycling and registration of natural resources, the management of meteorological observation, nature and marine research, geological, cartographic and geodetic operations, the maintenance of the land cadastre and water cadastre, ...).

The executive agencies under each Ministry are also listed in the Act, e.g. the Land Board under the Ministry of the Environment. Every Ministry or Executive Agency has a statute which concretizes its area of activities and functions. The statute of the Ministry of the Environment can be found on its homepage (<http://www.envir.ee>) Its functions include managing the use of natural resources and environment and nature protection, land related activities, keeping state registers. The statute of the Land Board can be found on <http://www.maaamet.ee>, and includes tasks in the field of land cadastre and geodesy and cartography. The Estonian Environment Information Centre (<http://keskkonnainfo.ee>) maintains the environmental register and classifiers, maintains environmental monitoring data, the dumping site register and data of protected sites and environmental resources.

The Database Act (last amended in 2007 and incorporated in the Public Information Act) provides procedures for possession, use and disposal of state and local government databases, provides general principles of maintenance of databases belonging to the state, local governments and persons in private law, and for release and use of their data.

General national registers are maintained (listed only spatial data related) regarding (Par. 25) the population (residents) of the state, immovable property and other significant subject. General national registers are established by corresponding Acts. State registers are established by a regulation of the Government of the Republic.

The Act also defines supporting systems for the maintenance of databases:

1. The classification system;
2. The geodetic system;
3. The system of address details;
4. the system of security measures for information systems;

5. the data exchange layer of information systems.
6. the administration system of the State Information System.

Use of support systems for the maintenance of databases is mandatory upon maintenance of all state and local government databases.

The **Regulation on Geodetic System** was passed 5 Feb. 2004 and entered into force 21 Feb. 2004 (see 2.3.3) and the **Regulation on imposing of the system of address details** was passed 20 December 2007 and entered into force 1 January 2008. ELB has started to establish a central address data management system. Under the Regulation, this management system has to be functional from 1 January 2009.

The legal framework takes further shape: last amendments to the Register Acts in 2005, geodetic system (2005) and geodetic database (January 2006), and the National Topographic Database (June 2006).

The data exchange layer of information systems

The Regulation on X-Road (passed 19 Dec. 2003, entered into force 1 Jan. 2004) impose common principles for managing and operation of the internet based technical and technological environment for secure data exchange (X-Road, spelled as 'crossroad', in Estonian *X-tee*). X-Road (<http://www.ria.ee>) enables to use databases registered in the State Register of Databases through a unified interface. Through X-Road citizens are able to view their personal data, public authorities can use targeted services (juridical unified administration of matters, editing data) and legal entities have a unified portal for interaction with public authorities. Databases including spatial components and joined with X-Road are a.o. the system of address details, Constructions Register, Title Book, Register of Objects of Cultural Heritage, Land Cadastre, Land Cadastre and Municipal Lands Register of the City of Tallinn.

The INSPIRE directive was transposed by the adoption and amendment of several Acts. For an overview, see http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:72007L0002:EN:NOT#FIELD_E.

2.3.2 Public-private partnerships (PPPs)

The ELB maintains several spatial databases (geodetic network, topographic maps, special maps), but it has only very small production capabilities (aerial works, photogrammetry) and a majority of the works (building and measuring of geodetic networks, cartographic production, software development) are outsourced through public procurements. The Department of Land Cadastre of ELB registers land and maintains the Land Cadastre. All actual land surveying works are however carried out by private surveyors or companies at landowners' own expense.

2.3.3 Policy and legislation on access to and re-use of public sector information (PSI)

The Public Information Act (RT I 2000, 92, 597) was passed on 15 November 2000 and it came into force on 1 January 2001. The Act covers state and local agencies, legal persons in public law and private entities that are conducting public duties including educational, health care, social or other public services. The Act also includes significant provisions on electronic access. (<http://www.legaltext.ee/en/andmebaas/ava.asp?m=022>)

The Database Act was consolidated into the Public Information Act on 4 December 2007 and entered into force on 1 January 2008. The Act establishes the State Information System (<http://www.riik.ee/arr/>).

Cadastral data are public and everyone has right to access the data, except the data about ownership. The right to use data is free of charge for state agencies and local governments.

Directive 2003/4 on access to environmental information and Directive 2003/98 on the re-use of PSI have been implemented into Estonian law.

[1]

2.3.4 Legal protection of GI by intellectual property rights

The Copyright Act was passed 11 November 1992 (RT 1992, 49, 615; RT I 1999, 36, 469) and entered into force on 12 December 1992. The last amendments were made in 2007 (<http://www.legaltext.ee/en/andmebaas/ava.asp?m=022>).

In §4(17) of the Copyright Act it is stipulated that copyright exists in photographic works, whereas in §4(18) it is stipulated that copyright exists in cartographic works (topographic, geographic, geological, etc. maps, atlases, models).

According to §5 of the Copyright Act legislation, administrative documents (acts, decrees, regulations, statutes, instructions, directives) and court decisions, and official translations thereof, are not protected by copyright law.

Chapter VIII of the Estonian Copyright Act provides for special legal protection of databases. This chapter was inserted by the Act of 9 December 1999.

The copyright and ownership of data and publications produced by ELB's order belong to the Land Board.

2.3.5 Restricted access to GI further to the legal protection of privacy

The 1992 Estonian Constitution includes several statements on privacy. Article 22 states that "Everyone has the right to the inviolability of private and family life. State agencies, local governments, and their officials shall not interfere with the private or family life of any person, except in the cases and pursuant to procedure provided by law to protect

health, morals, public order, or the rights and freedoms of others, to combat a criminal offence, or to apprehend a criminal offender." Article 42 protects against the government-authorized collection or storage of personal data without the citizen's consent.

The Personal Data Protection Act was passed on 12 February 2003 and entered into force on 1 October 2003. It was amended in Dec. 2007 (<http://www.legaltext.ee/en/andmebaas/ava.asp?m=022>).

2.3.6 Licensing framework

Data from the Estonian Land Board can be viewed free of charge. Downloading is regulated by a Decree from the Ministry of Environment (see <https://www.riigiteataja.ee/ert/act.jsp?id=13227521>). A licence has to be signed, based on templates that can be found on the ELB website (<http://geoportaal.maaamet.ee/eng/Ordering-Data/Ordering-digital-map-datasets-p325.html>). The licence, together with an order form, has to be sent to the ELB. The data can be downloaded via ftp. Short term licences are concluded for one year and long-term licences for seven years. Four types of licence templates are available:

- Type 1: viewing, printing up to A3 for internal use
- Type 2: allowed use under type 1 + making derivative works, large scale hard copy printing, for internal use
- Type 3: allowed use under type 2 + selling derivative works without the original data
- Type 4: allowed use under type 3 + selling derivative works together with the original data (without the possibility to extract the latter).

2.3.7 Funding model for SDI and pricing policy

The ELB is financed from the state budget. There is no cost recovery. All revenues earned by ELB go back to the state budget.

Fees are charged for downloading, based on the duration of the licence, the type of licence, the specific product, the data format and the data coverage (<http://geoportaal.maaamet.ee/eng/Ordering-Data/Ordering-digital-map-datasets-p325.html>).

[3].

Different thematic projects are also financed by relevant funds.

A price list, licenses and a price calculator are available on-line on the ELB homepage for the major digital mapping products: the Estonian base map, the Estonian Basic map (raster and vector format), orthophotos and the soil map. Data is free for state institutions and cheaper for municipalities, scientific institutions etc. The price depends on the data usage licence types (how and how long one intends to use the data).

The right to use data is free of charge for state agencies and cheaper for local governments. Other users have to pay.

[\[1\]](#)

Administrative boundaries are freely downloadable (in MapInfo and DXF formats) from ELB's homepage and there are no restrictions on usage, only the source (ELB) and validity date must be mentioned. There are free public viewing capabilities for several thematic layers:

- the cadastral database and maps (Land Information Service, Cadastral Unit Data Service);
- Natura 2000 areas and nature protection;
- cultural heritage objects;
- Land use planning;
- Administrative division;
- Geology;
- Roads.

[\[3\]](#)

The use and price of digital topographic data are regulated by procedure to be approved by the Ministry of Environment (on national level).

[\[1\]](#)

2.3.8 Conclusions of Component 2

The Database Act (last amended in 2007 and incorporated in the Public Information Act) provides procedures for possession, use and disposal of state and local government databases, provides general principles of maintenance of databases belonging to the state, local governments and persons in private law, and for release and use of their data. The INSPIRE directive was transposed by the adoption and amendment of several Acts. All actual land surveying works are carried out by private surveyors or companies at landowners' own expense. Data from the Estonian Land Board can be viewed free of charge. Downloading is regulated by a Decree from the Ministry of Environment. A licence has to be signed, based on templates that can be found on the ELB website.

Based on these conclusions we score the indicators as follows:

- There is a legal instrument or framework determining the SDI-strategy or – development (In Preparation)

- There are true PPP's or other co-financing mechanisms between public and private sector bodies with respect to the development and operation of the SDI-related projects
- There is a freedom of information (FOI) act which contains specific FOI legislation for the GI-sector (In Preparation)
- GI can specifically be protected by copyright
- Privacy laws are actively being taken into account by the holders of GI (In Preparation)
- There is a framework or policy for sharing GI between public institutions
- There are simplified and standardised licences for personal use (No)
- The long-term financial security of the SDI-initiative is secured (In Preparation)
- There is a pricing framework for trading, using and/or commercialising GI (In Preparation)

2.4 Component 3: Data for themes of the INSPIRE annexes

2.4.1 Scale and resolution: European, National, Regional, Local, Other

ELB produces maps and GI at European, regional and local scale levels:

- 1:1.000.000 Estonia as part of the EuroGlobalMap;
- 1:250.000 Estonia as part of the EuroRegionalMap;
- 1:10.000 Soil map
- 1:1.000.000 Estonia as part of the Baltic Sea Region Map;
- Base map 1:50 000 under coordination of ELB
- [Geological mapping at the scale of the Estonian Base Map \(1 : 50 000\)](#) which consists of the following series:

[\[1\]](#)

- The Estonian base map 1:10 000 under coordination by ELB, is covering 100% of the country since 2003.

[\[1\], \[3\]](#)

2.4.2 Data by resolution or scale range for the INSPIRE themes

Regarding the three INSPIRE annexes addressing the 34 spatial data themes, Estonia is providing (ELB, Ministry of Internal Affairs, Estonian Map Centre) discovery and view services for most of them while a number of them can be also downloaded. ELB manages spatial component of all 13 Annex I and II data themes, excluding bathymetry (part of Elevation theme). Environmental Information Centre (EIC, also under Ministry of the Environment) manages attributes for two themes (Hydrography, Protected sites), Ministry of Economic Affairs and Communications manage attributes for one theme (Transport networks) plus partially spatial component for elevation theme (bathymetry). In March 2008, the ELB provided the data sets template filled for Estonia. The template has been completed for all the themes in annex I and II, and partially for annex III. A complete list will be presented in the updated report including the information provided by the country in 2010.

2.4.3 Geodetic reference systems and projections

The National Geodetic Network has been established by GPS according to EUREF. The geodetic datum is ETRS89.

The major projection system used is Lambert Conformal Conic Projection (Lambert-EST). The projection and other fundamental geodetic and mapping data are fixed by a regulation (February 5, 2004), the geodetic system is also by a Databases Act a support system for the maintenance of databases. All databases which include geodetic data (coordinates) must conform to that regulation started from June 1st, 2005.

The new Estonian National Geodetic Network includes 212 points and has been measured exclusively by using GPS. The initial points of the Network are nine permanent GPS stations included in the ITRF96 catalogue and the network itself is built-up as static on 1997.56 epochs. The Network is a realization of ETRS89 in Estonia and is named as EUREF-EST97.

Accuracy of the EUREF-EST97 realization was classified to EUREF B accuracy class at the 1999 EUREF Symposium, which means ± 1 cm during measuring epoch. I-order points of Misso, Mäebe, Kalana, Kurla, Olgino and Suurupi GPS-station in Estonia have been selected as an enlargement of ETRF89.

In Estonia the coordinates EUREF-EST97 and the coordinates of the World Geodetic System's (WGS84) realisation WGS84 (G8873) are considered to be identical.

The Transverse Mercator Baltic projection (TM-Baltic) has had some usage during the 90's but is now practically obsolete. TM-Baltic was created for maps covering all three Baltic states and was initially used by 1:50.000 national Base Maps as these were created at the same time in all Baltic states. In large scale maps this has never been used.

The Estonian height system is the Baltic 1977 Height System (abridged in Estonia as BK77), which is defined with the following parameters:

1. The zero-point of height system coincides with the average of Kronstadt sea level measurements in 1825-1840.
2. The epoch of the height system is not defined.
3. The average system of Earth's permanent tides is used.
4. The heights are calculated as normal heights. For the calculation of the normal gravity field Helmert's gravity formula of 1901 is used.
5. On the territory of Estonia the Baltic 1977 Height System is realized with the heights of benchmarks of the levelling network.

6. The levelling network is divided according to the accuracy of measurements, monumentation of points and hierarchical structure of the network into I, II, III and IV order networks. The points of the above networks and their heights serve as basis for other realizations of the height network in Estonia.
7. The heights of benchmarks of the levelling network are based on the adjustment of the levelling network of the former Soviet Union, the epoch is undefined.
8. The heights of levelling network points are entered into the geodetic database of the Estonian Land Board.
9. The geoid model of Estonia is EST-GEOID2003.
10. The model EST-GEOID2003 is used for calculating the EUREF-EST97 ellipsoidal heights into BK77 heights in the conformity with the accuracy requirements.
11. The data of geoid model are entered into the geodetic database of the Estonian Land Board.

http://www.maaamet.ee/index.php?lang_id=2&page_id=353&menu_id=78

2.4.4 Quality of the data

Quality control is performed by ELB. Special tools were developed for quality checks and spatial analysis of the Cadastral Information System. In particular, since 2003, a system for registration of cadastral restrictions (servitudes) is operational. It works as sub module under CIS in ELB and is meant for cross-referencing data with the managers of cadastral restrictions (power lines, gas pipes etc.). Besides software for data quality checking, data management and exchange principles and XML schemas for data exchange have been developed.

Estonia's Card Centre Ltd. is using the EVS-EN ISO 9001-2001 standard quality management system which has been certified by a quality management system.

2.4.5 Interoperability

As GIS software ESRI-products, MicroStation, MapInfo, Oracle Spatial and products from Intergraph (GeoMedia, GeoMedia Pro, GeoMedia WebInterprise) are used. Open Source software is also used, e.g. MapServer from University of Minnesota.

ELB's main registers use GeoMedia products with Oracle Spatial. Most users have MicroStation and MapInfo. ESRI products (ArcInfo, ArcView, Internet applications) are used in more specific applications. Big utilities companies use more specialized software like GE, SmallWorld and X-Power.

2.4.6 Language and culture

Metadata is provided in Estonian and partly in English. Accompanying documents are available in Estonian and partly in English. However, the ELB website which includes also the geoportal provides excellent and complete information also in English.

2.4.7 Data Content

Text explanation for attributes is available both in Estonian and English (http://www.maaamet.ee/index.php?lang_id=2&page_id=472&menu_id=78).

2.4.8 Geographical names

Standardization of Geographical names is done by the Place Names Board of Estonia on the basis of the Law on Place Names (11/12/1996). Digital geographical names database (Register) and website has been developed. The toponymic guidelines have been published on the Internet. Geographical names are in Estonian and English (http://www.maaamet.ee/index.php?lang_id=2&page_id=514&menu_id=78). Minority names have been used (in Võru and Swedish).

[\[12\]](#), [\[13\]](#)

2.4.9 Character sets

Character sets, keyboard layouts, etc are standardized, see <http://www.ciesin.ee/ITR/>.

2.4.10 Conclusions of Component 3

Already from the previous Estonia's SoP report Geodatasets existed which provide a basis for contributing to the coverage of pan-Europe for the INSPIRE-selected data themes and components while the geodetic reference system and projection systems are standardised, documented and interconvertable. The INSPIRE 2010 MR confirms the statement. 40 data sets have been reported. Quality control is performed by ELB. Special tools were developed for quality checks and spatial analysis of the Cadastral Information System. Metadata is provided in Estonian and partly in English. The ELB website which includes also the geoportal provides excellent and complete information also in English.

Based on these conclusions we score the indicators as follows:

- Geodatasets exist which provide a basis for contributing to the coverage of pan-Europe for the INSPIRE-selected data themes and components
- The geodetic reference system and projection systems are standardised, documented and interconvertable

- There is a documented data quality control procedure applied at the level of the SDI (Partially)
- Concern for interoperability goes beyond conversion between different data formats (No)
- The national language is the operational language of the SDI
- English is used as secondary language

2.5 Component 4: Metadata

2.5.1 Availability

Metadata are available for the Estonian National Topographic Database (ENTD) at scale 1:10.000. It is termed a 'reality model'. ENTD is the ELB's GIS database that contains topographic data collected during basic mapping. The reality model of ENTD complies with ISO 15046/10 standard and contains the following information: Name of feature in Estonian and English, shortened name of feature, is it a feature causing restrictions, feature code, basic map code of feature, definition of feature, guidelines helping to identify the feature, selection criteria of features to be mapped, references to additional materials, features attributes' definition, data type, measurement unit, definition of attribute value, relations to other features, name of feature relation, name of related feature, description and conditions of feature relation.

At <http://www.maaamet.ee/> under the heading maps, limited description can be obtained from the base maps 1:10.000 and 1:50.000, orthophotos and orthophotomaps, city plans and soil map.

2.5.2 Metadata catalogues availability + standard

Currently, there is no standardized metadata catalogue covering a significant part of the GI in Estonia. ELB is planning to develop such catalogue and a related metadata service.. The envisaged standard is ISO 19115 and 19119 (<http://geoportaal.maaamet.ee/est/Ruumiandmete-infrastruktuur/ISO-standardid-p104.html>).

2.5.3 Dublin core metadata standards for GI-discovery

Currently not applicable.

2.5.4 Metadata implementation

The coordinating authority for metadata implementation is the ELB. A unilingual (Estonian) standardized feature code list for use with the metadata is being developed.

2.5.5 Conclusions of Component 4

Metadata are produced for a significant fraction of geodatasets of the themes of the INSPIRE annexes. The 2010 MR reveals that for the reported datasets of INSPIRE (30 out of 40 data sets have metadata). Currently, there is no standardized metadata catalogue covering a significant part of the GI in Estonia. ELB is planning to develop such catalogue and a related metadata service. The envisaged standard is ISO 19115 and 19119. The coordinating authority for metadata implementation is the ELB.

Based on these conclusions we score the indicators as follows:

- Metadata are produced for a significant fraction of geodatasets of the themes of the INSPIRE annexes
- One or more standardised metadata catalogues are available covering more than one data producing agency (Partially)
- There is a coordinating authority for metadata implementation at the level of the SDI

2.6 Component 5: Network Services

2.6.1 On-line access service for metadata: discovery services

At <http://www.maaamet.ee/> under the heading maps, limited description can be obtained of the base maps 1:10.000 and 1:50.000, orthophotos and orthophotomaps, city plans and soil map.

A comprehensive on-line metadata service is currently not available.

2.6.2 On-line access service for data: download services

The possibility to obtain on-line access to some raster and vector cadastral is limited. The administrative and part of the statistical units can be downloaded at: <http://geoportaal.maaamet.ee/est/Andmed-ja-kaardid/Haldus-ja-asustusjaotus-p119.html>. The procedure of ordering data is described online at: <http://geoportaal.maaamet.ee/eng/Ordering-Data/Ordering-digital-map-datasets-p325.html>.

2.6.3 Inter-linkages of on-line access services for metadata and data

Currently not applicable

2.6.4 OpenSource software and access services

Universal Services (= software components for building different web applications based on Intergraph WebEnterprise) are used to develop and implement targeted Internet applications (registration of buildings in Buildings Register and data exchange with CIS).

Since the end of 2004 ELB is investigating the use of OpenGIS standards and open source GIS software technologies as next platforms for its services. The following factors have conducted to these decisions:

- OpenGIS (<http://www.opengeospatial.org>) standards are widely accepted
- There is already available very high quality Open source GIS software
- Users in Estonia have generally developed to the level so they are able to use spatial data services like OpenGIS Web Map Service (WMS) or Web Feature Service (WFS)

These factors have been considered in the Estonian Information Policy principles for 2004-2006 and in the Information Policy Action Plan for 2005 (see Ch. 2.1.1 in more detail). Currently X-GIS software and OGC standards are already in place on the Geoportal.

2.6.5 Availability of viewing services

The major milestone for ELB in 2001 was the full-scale launch of the Cadastral Information System (CIS). CIS now manages in an integrated way both textual and map data. Since the end of the year 2000, free public access to the textual part of the cadastral database covering the whole country has been provided via ELB's home pages (<http://www.maaamet.ee>). In July 2001, access to the cadastral maps for 9 counties was added to the service and the full coverage (15 counties) was achieved at the end of the same year. This public service is free for everyone and includes also almost all large scale digital spatial data available from ELB as backdrop maps, so everybody can use these pages also just as an Estonian web atlas. Basically there is a working web map server that everybody can use free of charge. Through that service, maps are made available to the public. It is possible to look at the maps and lots of other data (parcel boundaries, valuation zones, geodetic points etc.), but one can not download the digital data.

The targeted audience: internal ELB staff, surveyors, governmental sector and local governments.

The usage of this service has been gradually increased. The service experienced an average load of 30 000 hits per day during the first couple of months it was active. During the following years the average load per month has been as follows:

- 2002: 2.7 million hits/month, downloaded data volume 32 GB/month;

- 2003: 10 million hits/month, downloaded data volume 97 GB/month;
- 2004: 20.7 million hits/month, downloaded data volume 207 GB/month;
- 2005: 36 million hits/month, downloaded data volume 440 GB/month.
- 2006: 48 million hits/month, downloaded data volume 540 GB/month.
- 2007: (January - August): 101 million hits/month, downloaded data volume 1,08 TB/month.

Estonia has a national geoportal <http://geoportaal.maaamet.ee/eng/>

In there users can have access to numerous databases and services. On the Mapserver web direct links can be found to thematic web map applications, through what Estonian Land Board (ELB) mediates various spatial data managed by different owners. Users can choose between different web map applications also from "Map application" combo box located on the Settings tab.

Web Map Server

From the very beginning the LIS software (built around Oracle DBMS with Spatial extension and Intergraph Geomedia product family) has been designed in such a way that it is possible to add new data layers as well as new functionalities to it so the web service will become universal Web Map Server. The following principles were used initially:

- It should be possible to create so called targeted services with different data layers (with different look and feel) and functionality (including spatial/attribute data input/edit/delete), for the public as well as for restricted users with user authentication (for other public authorities).
- These targeted services store and use data physically in ELB's servers, the applications reside in ELB' servers and the client applications are fully web browser based. That way there is no need to acquire expensive GIS software licenses and other specific (GI) related components at the users' side.

These software components were called "Family of Universal Services" and have been developed since 2002 using Intergraph's Web Enterprise software.

WMS applications

The applications can be divided into two groups, public services and specific services with limited access. Specific services are created either for ELB's internal purposes or for other public authorities which deal with data not entirely public for different reasons (e.g. endangered species) and/or include means to input/edit/delete the data. Public services are accessible from ELB's geoportal.

At the moment (July 2010) the following services and spatial data layers are available through the WMS X-GIS. In the map window standard map tools (zoom, pan, switching on/off displayable and active layers, index map) and some manipulation tools (textual queries by coordinates (projected or lat/lon), administrative unit, cadastral unit ID or layer specific (e.g. road number if roads layer is active); distance measuring tool). Layers

or attribute data which are managed by other institutions are actually stored in the ELB's servers and are updated using specific services interactively through the web or off-line.

The Map Server via the national geoportal (<http://geoportaal.maaamet.ee/eng/Map-Server-p35.html>) provides consolidated information and datasets for:

1. [Land Information Application](#)

- cadastral map
- administrative division (down to village boundaries)
- land price and productivity zones
- geodetic network
- topomap (1:10000 Basic Map and 1:50000 Base Map)
- orthophoto

ELB is a chief and authorised processor of these layers. Topomap and orthophoto layers are included in all services.

2. [Public Immovables Sale Application](#)

Properties that are currently at auction are displayed

3. [Estonian Road Administration Application](#)

National Road Register (alphanumeric, <http://teeregister.riik.ee>) containing all public roads resides and is maintained in web environment by Estonian Road Administration (ERA). Viewing service to the Register is public to everyone, authorised users (ERA (state roads), municipalities (municipal roads) and State Forest Centre (forest roads)) are able to enter and edit the data. Data in the Register include road number, covering, intersections, bridges, bus stops, accidents, etc, all data is presented using dynamic segmentation (from the beginning of the road). Spatial part of the Register is maintained by ELB and access to it is through ELB's WMS. All data included in the Register is also viewable on the map using dynamic segmentation. Authorised users are additionally able to perform some specific spatial queries. At the moment (spring 2005) there is no direct data link between ERA and ELB, the data in the Register is exported to ELB regularly. Application allowing direct data exchange using XML is under development

1. [Restrictions Information System Application](#)

Restrictive objects and limitation zones of parcels

2. [Address data \(map\)](#)

3. [Estonian Nature Information System Application](#)

- Natura 2000 areas
- cadastral units

- protected areas
- protected objects
- cadastral units

Alphanumerical part of the Estonian Nature Infosystem (EELIS, Eesti Looduse Infosüsteem, <http://loodus.keskkonnainfo.ee/w5/>) resides and is maintained by EEIC and spatial part in ELB. Public users can use both alphanumerical and spatial databases similarly to the National Heritage Objects service. Authorised users (in EEIC or in other agencies) are able to query and see data classified by laws (living areas of endangered species, deposits of rare minerals, etc). Protected areas and objects are stored as restrictions (servitudes) in CIS in ELB. Natura 2000 layer is also managed by Environment Information Centre (EEIC).

1. [Historical Map Collection Application](#)

Topographic Maps since 1894-1915 and 1919-1934; 1935-1939; 1945-1952

2. [National Register of Monuments Application](#)

Heritage Protection Monuments, Protection Areas and Limitation Zones

3. [Mineral Deposits Application](#)

Mineral Deposits from Environmental Register

4. [Soil Map Application](#)

Soil Areas with Soil Names

5. [Geological Data Application](#)

- Bedrock map
- Map of Quaternary deposits
- Hydrogeological map
- Map of groundwater vulnerability
- Geomorphological map
- Map of mineral resources
- Map of bedrock relief
- Map of thickness of Quaternary deposits
- Map of aeromagnetic anomalies
- Map of gravity (Bouguer) anomalies

ELB is chief and authorised processor of geological data, geological mapping is carried out by Geological Survey of Estonia (also under Ministry of the Environment).

6. [Marine Areas](#)

Estonian Maritime Administration, Estonian Land Board and PRIMAR web Application

7. [Public Detailed Plans Application](#)

- county, municipality and urban land consolidation plans
- Natura 2000 areas
- Nature protection
- Cultural heritage objects

Confirmed land consolidation plans for some counties and municipalities. The services are created with cooperation with county governments and municipalities. The aim of this tool is to offer common access to land consolidation plans for officials and public without needing big investments by counties and municipalities

8. [Private Forest Centre Application](#)

Private Forest Centre and Natura 2000 support Application

9. [Hereditary Culture Application](#)

- cultural heritage objects
- cadastral units

Cultural Heritage Objects layer is managed by National Heritage Board (NHB). The textual database and its public web interface reside in NHB (<http://register.muinas.ee>) and spatial data and its public web interface in ELB. It is possible to use textual data service through NHB webpage and see search results on the map from ELB's WMS and vice versa, perform map queries in ELB homepage and see detailed textual results from NHB database. Using specific web service for NHB their authorised users are able to interactively work with the spatial data in ELB (enter/edit objects and their restriction zones, import/export spatial data, perform some spatial analyses (overlay and buffer), design and output maps, etc).

10. [Areas Sensitive to Nitrates Application](#)

Areas Sensitive to Nitrates, Sinkholes, Springs etc

11. [Administrative and Settlement Division Application](#)

The application is developed in cooperation with Statistical Office of Estonia. It is possible to view and query administrative units and their changes in different levels (county, municipality, village) and view statistical data about these (population, environmental, economics). Links to legislative acts in electronic State Gazette relevant to each administration unit are included. The application is accessible also from the homepages of Statistical Office and Ministry of Interior

2.6.6 Availability of catalogue services to regulate access

Currently not available.

2.6.7 Availability of catalogue services that perform payment operations

Currently not available.

2.6.8 Availability of catalogue services to extract and send data to a user application

The Public Web Map Service is a service that is offered by ELB for displaying spatially referenced data on the computer screen and is based on OGC WMS (*Open Geospatial Consortium Web Map Service*) standard.

Maps produced by WMS-service is in raster format and can be used by GIS software (for example *ArcGIS, MapInfo, MicroStation, AutoCAD MAP 3D* or freeware which includes WMS-client capability, some popular examples are *uDig, Gaia, Google Earth*).

The address of ELB public WMS service: <http://kaart.maaamet.ee/wms/alus?>

WMS service in geographic coordinates: <http://kaart.maaamet.ee/wms/alus-geo?>

2.6.9 SDI user applications

The Web Map Server of ELB and relevant GIS infrastructure along with the **Estonian Atlas** (http://atlas.ibs.ee/mis_wark_on.cgi.en) can be regarded as the major user application of the (future) SDI.

2.6.10 Availability of geo-processing services

Following components are publicly available from ELB :

- A presentation service (serves map window from Public Services System, so developers can include it into their Internet application map window requiring background maps)
- A registration Service (enables inclusion of users' data into the system and data editing over Internet with Spatial data editor and Universal Import service, which allows importing of file-based spatial data into LIS; DGN, SHP and MIF formats are also supported)
- An extraction service (data export, definition of area of interest, data layers and data format (DGN, SHP, XML) possible)
- Analysis Automata (spatial analysis and results' display; for finding inconsistencies in input data)
- A printing service (tools for printing of maps via Internet)

All these services use open standards (WMS, WFS, etc) since 2005. Also drivers to use spatial data through X-Roads are available.

2.6.11 Conclusions of Component 5

Although, Estonia has a national geoportal is not clear if the search is based through metadata. The 2010 MR reveals that there are 20 view services. The administrative and part of the statistical units can be downloaded at: <http://geoportaal.maaamet.ee/est/Andmed-ja-kaardid/Haldus-ja-asustusjaotus-p119.html>.

Based on these conclusions we score the indicators as follows:

- There are one or more discovery services making it possible to search for data and services through metadata (Not so clear)
- There are one or more view services available for to visualise data from the themes of the INSPIRE annexes
- There are one ore more on-line download services enabling (parts of) copies of datasets
- There are one or more transformation services enabling spatial datasets to be transformed to achieve interoperability (No information found)
- There are middleware services allowing data services to be invoked (No information found)

2.7 Component 6: Thematic environmental data

The Estonian Environment Information Centre (EEIC) was established in 1989 under the Ministry of Environment. The EEIC has a role of national coordinator for environmental information activities. It is remarkable that also the Estonian Land Board is under the same Ministry.

A number of thematic maps exist on the website of EEIC with easy to use Button/links for each field and environmental topic (<http://www.keskkonnainfo.ee/index.php?lan=EN&sid=2&tid=2>).



Figure1: Thematic Button links of EEIC website.

Moreover, the environmental registers of the above mentioned themes are available via a webmap interface where users can view the registry object by selecting a region on the map or choosing a county or a municipality and city (<http://register.keskkonnainfo.ee/envreg/main#HTTPb6ZjELFM1HbUJKBbDX3Gzaa1nJvMZ0>).

At the same time a list of monitoring environmental indicators exist for various thematic topics at: http://eelis.ic.envir.ee:88/seireveeb/envirind_avalik/index.php?l=en&t1=AVALEHT

2.7.1 Application of the legal framework and funding principles (for reference & core thematic data) to thematic environmental data

Environmental information secondary legislation has been introduced regarding the national monitoring stations and national subprograms.

[1]

At the moment environmental data is handled in separate thematic databases in EEIC. Environmental Register Act (English version available at www.legaltext.ee) regulates how all these databases will be unified. Regulations of connected databases of the Register (Estonian Nature Information System, Waste Data Management System etc.) are submitted for ratification. Data capture forms of Register are submitted for ratification.

The following services along with those mentioned in 2.7. are functional:

- Web mapping service of Estonian protected sites.
- Data exchange between Estonian Nature Information System and web mapping service of ELB.
- Data exchange between Estonian Nature Information System and web mapping service of city of Tallinn.
- Web mapping service of Estonian Environmental Monitoring facilities.

2.7.2 Conclusions of Component 6

A number of thematic maps exist on the website of EEIC with easy to use Button/links for each field and environmental topic.

Based on the information provided on the previous paragraph we score the indicator as follows:

- Thematic environmental data are covered by the described SDI-initiative or there is an independent thematic environmental SDI

2.8 Standards

On the geoportal of ELB there is an extensive reference on standard usage. Specifically ELB is using X-GIS software (Flash technology) along with OGC standards (WMS, WFS, GML, KML) as well as ISO 19115 and 19119 standards (<http://geoportaal.maaamet.ee/est/Ruumiandmete-infrastruktuur/INSPIRE-p12.html>).

2.8.1 Conclusions of Component 7

On the geoportal of ELB there is an extensive reference on standard usage. Specifically ELB is using OGC standards (WMS, WFS, GML, KML) as well as ISO 19115 and 19119 standards.

Based on these conclusions we score the indicator as follows:

- The SDI-initiative is devoting significant attention to standardisation issues

2.9 Use and efficiency of SDI

Regional cooperation takes place within the framework of the Baltic Council of Ministers, MapBSR (<http://www.mapbsr.nls.fi>) (Digital Map of the Baltic Sea Region) Project and in the field of real estate valuation.

The ELB has been a partner in several EU PHARE projects, the aims of which were to accelerate the land reform and set up cadastral- and land information systems. EU Phare project "Land Information System Development in Estonia" was conducted in September 1997- March 1999. In January 1998- June 1999, EU Phare "Land Reform Project" was carried out.

At the same time the growth of geoportals that provide public spatial information is evident. Characteristic examples are the Tallinn city geoportal (<http://kaart.tallinn.ee>); the geoportal of the Estonian major news site Delfi (<http://kaart.otsing.delfi.ee>); the geoportal of a major newspaper (<http://kaart.postimees.ee>) and of course the Agricultural Registers and Information Board which is a government organisation providing EU agricultural subsidies (https://kls.eesti.ee/pria_avalik_kaart/).

3 Annexes

3.1 List of SDI addresses / contacts for Estonia

Table: SDI contact list			
	Web address	Organisational mailing address	Over-all contact person: tel./fax/e-mail
National			
Maa-amet (Estonian Land Board)	www.maaamet.ee	Mustamäe tee 51 10602 Tallinn, Estonia	tel: +372 6650600, fax: +372 6650604 email: maaamet@maaamet.ee
Estonian Atlas	http://atlas.ibs.ee/mis_wark_on.cgi.en	Institute of Baltic Studies (IBS)	Email: atlas@ibs.ee
Statistical office of Estonia	Web: http://www.stat.ee	15 Endla Street 15174 Tallinn	Contact: Mrs Helen Tammeste Phone: + 372 6259 370 Email: helen.tammeste@stat.ee
Statistical office of Estonia Population Census Geographical Information System Section			Ms Inge Nael Head of Section Phone: +372 6259 271 email: inge.nael@stat.ee

3.2 List of references for Estonia

Table: list of references used to compile the Country Report	
Web sites:	<p>[1] http://www.maaamet.ee/doc/report2002_v03.pdf</p> <p>[2] http://www.maaamet.ee/yldinfo/aboutus.php</p> <p>[3] http://www.maaamet.ee/teenus/maainfo.php</p> <p>[4] http://www.maaamet.ee:teenus/kiirp2ring.php</p> <p>[5] http://www.maaamet.ee/doc/juhend99.zip</p> <p>[8] http://atlas.ibs.ee/mis_wark_on.cgi.en</p> <p>[9] http://www.stat.ee/files/aastaaruanne_2001.pdf</p> <p>[10] http://www.stat.ee/index.aw/section=33421</p> <p>[11] http://unstats.un.org/unsd/geoinfo/N0244282.pdf</p> <p>[12] http://www.eki.ee/knn/index2.htm</p> <p>[13] http://www.eki.ee/knn/index2.htm</p> <p>[14] http://64.49.225.236/rc_Estonia.htm</p> <p>[15] http://www.esis.ee/legislation/protection.pdf</p> <p>[16] http://www.esis.ee/legislation/copyright.pdf</p>
Other Websites	<p>- Electronic State Gazette (<i>Elektroniline Riigi Teataja</i>, eRT) http://www.riigiteataja.ee, page interface and legal texts are in Estonian. Official site of legal acts, functional since June 1, 2002 and includes all legal acts published in the (paper) State Gazette since that date. Consolidated texts available. Chief processor is State</p>

	<p>Chancellery, authorized processor is state owned IT company AS Andmevara.</p> <ul style="list-style-type: none"> - ESTLEX http://www.estlex.ee, page interface and legal texts in Estonian, limited availability of translations into Russian. Legal acts database active since 1991, run by AS Andmevara. Includes free search and view services as well as more advanced chargeable services. - Estonian Legal Language Centre (ELLC, <i>Eesti Õiguskeele Keskus</i>) http://www.legaltext.ee, page interface and legal texts in Estonian and English. ELLC is a state agency under the Ministry of Justice. Its main activities are translations of Estonian legislation into English, translation of EC legislation into Estonian and managing of a full-text database of legal translations and of a terminology database. All these resources through a web are available to the public free of charge.
Publications	<p>M. Craglia and J. F. Dallemand: Geographic Information and the Enlargement of the European Union. EUROGI-European Commission Workshop. Brussels, 16-17/11/2000. Technical Report. EUR 19824 EN http://www.ec-gis.org:8080/wecgis/docs/F22346/IMPAGINATO.PDF</p> <p>[1]</p>