Spatial Data Infrastructures in *Estonia*: State of play 2011
# Report meta-information

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This document does not represent the position of the Commission or its services. No inferences should be drawn from these documents as to the content or form of the current and future proposals to be presented by the Commission.

This document does neither represent the position of the Member States and countries under study.
Executive summary

The Estonian Infrastructure for Spatial Information is a truly national. Most of the SDI building blocks have reached a significant level of operationality. The Estonian Land Board is officially recognised as the coordinating body of the SDI, and cooperates with many national and international institutions/organisations within the scope of related fields. No association for geographical information is involved in the SDI-coordination.

The Database Act (last amended in 2007 and incorporated in the Public Information Act) provides procedures for access, 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 website of the Estonian Land Board. This all means that there is a legal framework determining the SDI-development, PPPs between public and private sector bodies exist, and a framework for sharing Geographical information between public institutions exist.

The previous SoP Country Reports of Estonia report already that Geodatasets exist which provide a basis for contributing to the coverage of pan-Europe for the INSPIRE-selected data themes and components. The INSPIRE 2011 MR confirms the statement (37 data sets have been reported). The geodetic reference system and projection systems are standardised, documented and interconvertable. Detailed documented data quality controls procedures are applied related to the Cadastral Information, topographic database, environmental register, railway traffic register and the construction work register. The concern for interoperability does partially go beyond the conversion between different data formats. Metadata is provided in Estonian and partly in English. The website of the Estonian Land Board that includes also the geoportal provides information in Estonian as well as English.

Metadata are produced for a significant fraction of geodatasets of the themes of the INSPIRE annexes. The 2011 MR reveals that for the reported datasets of INSPIRE (34 out of 37 data sets have metadata of which 23 data sets are compliant with the metadata implementing rules). There is a standardized metadata catalogue covering a significant part of the Geographical information of Estonia. The geoportal of the Estonian Land Board (http://maaamet.regio.ee/geoportal/catalog/search/search.page) includes a metadata catalogue related to the data sets of INSPIRE themes of Annex I en II. The coordinating authority for metadata implementation is the Estonian Land Board.

Estonia has no formal national geoportal. The geoportal managed by the Estonian Land Board http://geoportaal.maaamet.ee/eng/ can be considered as the main geoportal of Estonia including multiple web map applications with data from multiple sources. The Estonian Land Board has developed a discovery service for the data sets of the INSPIRE
themes of Annex I and II. The 2011 MR reveals that there are 21 viewing services, 4 download services, one transformation service and one invoking service.

A number of environment related maps and data sets exist on the website of Estonian Environment Information Centre with easy to use Button/links for each field and environmental topic. Besides the services offered by the Estonian Environment Information Centre, several other environment relevant web services exist. This all means that many thematic environmental data are covered by the Estonian SDI.

There are intentions to apply the data specifications according to the implementing rules of INSPIRE. The geoportal of the Estonian Land Board contains is descriptions on the applied standards. It is applying X-GIS software (Flash technology) along with OGC standards (WMS, WFS, GML, KML) as well as ISO 19115 and 19119 standards for metadata. Other existing web applications in the country make also frequently use of the OGC-standards.
# Table of Contents

**EXECUTIVE SUMMARY** ............................................................................................................. 4

**TABLE OF CONTENTS** ............................................................................................................................. 6

**ABBREVIATIONS AND ACRONYMS.** ..................................................................................................... 7

1 **GENERAL INFORMATION** ............................................................................................................. 9
  1.1 **METHOD** ....................................................................................................................................... 9
  1.2 **THE NSDI-SCENE IN ESTONIA** ................................................................................................. 9

2 **DETAILS OF THE ESTONIA NSDI** ................................................................................................. 11
  2.1 **INTRODUCTION** ............................................................................................................................ 11
  2.2 **COMPONENT 1: COORDINATION AND ORGANIZATIONAL ISSUES** ............................................. 12
  2.3 **COMPONENT 2: LEGAL FRAMEWORK AND FUNDING** ................................................................. 17
  2.4 **COMPONENT 3: DATA FOR THEMES OF THE INSPIRE ANNEXES** .................................................. 22
  2.5 **COMPONENT 4: METADATA** ......................................................................................................... 27
  2.6 **COMPONENT 5: NETWORK SERVICES** ........................................................................................... 28
  2.7 **COMPONENT 6: THEMATIC ENVIRONMENTAL DATA** ..................................................................... 34
  2.8 **STANDARDS** .................................................................................................................................... 36
  2.9 **USE AND EFFICIENCY OF SDI** ....................................................................................................... 36

3 **ANNEXES** ........................................................................................................................................ 39
  3.1 **LIST OF SDI ADDRESSES / CONTACTS FOR ESTONIA** ............................................................... 39
  3.2 **LIST OF REFERENCES FOR ESTONIA** .......................................................................................... 40
Abbreviations and acronyms

CIS  Cadastral Information System
DBMS  Database Management System
DXF  Drawing Exchange Format
EEIC  Estonian Environment Information Centre
EELIS  Estonian Nature Infosystem (Eesti Looduse Infosüsteem)
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
ETAK  Estonian Topographic database
EU  European Union
GI  Geographical Information
GIS  Geographical Information System
GML  Geography Markup Language
GPS  Global Positioning System
IBS  Institute of Baltic Studies
INSPIRE  INfrastructure for SPatial InfoRmation in Europe
ISO  International Organization for Standardization
KKM  Ministry of Environment
KML  Keyhole Markup Language
LAN  Local area network
LIS  Land Information System
Maa-Amet  Estonian Land Board (also ELB)
MapBSR  Digital map of the Baltic Sea region
MKA  National Heritage Board
NHB  National Heritage Board
NLIS  National Land Information System
NMA  National Mapping Agency
NMCA’s  National Mapping and Cadastral Agencies
NSDI  National Spatial Data Infrastructures
OGC  Open Geospatial Consortium
PPP  Public-Private Partnerships
PSI  Policy and legislation on access to public sector information
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<tr>
<th>Acronym</th>
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<tbody>
<tr>
<td>RIA</td>
<td>Estonian Informatics Centre</td>
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<td>RIHA</td>
<td>Administration system of the state information system</td>
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<td>RISO</td>
<td>Department of State Information Systems of the Ministry of Economic Affairs and Communications</td>
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<td>RMK</td>
<td>State Forest Management Centre</td>
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<td>SABE</td>
<td>Seamless Administrative boundaries of Europe</td>
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<td>SDI</td>
<td>Spatial Data Infrastructures</td>
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<td>TM-Baltic</td>
<td>Transverse Mercator Baltic</td>
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<td>WAN</td>
<td>Wide Area Network</td>
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<td>Web Map Service</td>
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<td>Web Feature Service</td>
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<td>WGS</td>
<td>World Geodetic System</td>
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<td>XML</td>
<td>Extensible Markup Language</td>
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1 GENERAL INFORMATION

1.1 Method

This report summarises the review of the Swiss SDI in 2011, and reflects the degree to which the SDI situation in Estonia is similar to the ideas set out in the INSPIRE position papers and in the more recent INSPIRE-implementation papers.

In comparison with the previous country report, this report has been updated to the situation of Spring 2011. In order to achieve this, literature and websites are used to describe the current situation of SDI-development and INSPIRE-implementation in Estonia.


1.2 The NSDI-scene in Estonia

1.2.1 Estonian Infrastructure for Spatial Information

Estonia has not developed a specific NSDI strategy. A separate coordinating structure has not been established in Estonia for the implementation of the NSDI; the tasks of such a structure are currently performed by the Estonian Land Board. It is planned to establish a coordinating structure which brings together all the managers of databases falling under the spatial data themes listed in the Annexes to the INSPIRE Directive. The Minister of the Environment has appointed the Estonian Land Board as the national contact point for the European Commission.

In Estonia the infrastructure for spatial information is closely linked with the state information system. The state information system consists of information systems of various information holders, some of whom also manage spatial data, and of their support systems. Many public authorities, such as the Land Board, the Department of State Information Systems of the Ministry of Economic Affairs and Communications and the Estonian Informatics Centre, significantly contribute to state infrastructure for spatial information and its coordination.

A data exchange layer called the X-Road and the administration system of the state information system (RIHA) have been introduced in Estonia. RIHA is a complete and detailed map of the state information system. Both of these systems have been well received by database maintainers and are actively used in practice.
The trends of the state information society are determined by a longer-term development plan called the Estonian Information Society Agenda 2013, which is not meant to be an implementation document for the INSPIRE Directive *per se*. However, the objectives arising from the INSPIRE Directive have been followed in the agenda. Under the agenda, a respective annual implementation plan is prepared; the plan defines specific actions for the development of the entire information society, taking into account, among other things, the operations and terms prescribed by INSPIRE.

The infrastructure for spatial information is implemented through each database manager. The main spatial data producers and their respective databases corresponding to the spatial data themes listed in the Annexes to the INSPIRE Directive are the following:

- the Land Board, as the state mapping and cadastral agency – coordinate reference systems, geographical grid systems, administrative units, addresses, cadastral parcels, elevation, land cover, orthoimagery, geology and mineral resources;
- the Estonian Environment Information Centre (reorganised on 1 April 2010), as the maintainer of environmental databases – hydrography, protected sites, environmental monitoring facilities, habitats and biotopes;
- the Road Administration, which manages everything connected with roads and transport networks – transport networks;
- the Maritime Administration, which manages navigational charts and other information related to marine navigation – transport networks; and
- the Statistical Office, as the state’s statistics agency – population distribution in space aggregated by various socio-demographic indicators.

Currently, the Land Board can be considered the biggest provider of spatial data and related services in Estonia. At present, the Land Board offers several different map applications, many of which have been developed in cooperation with other state authorities, which either link their alphanumeric data with spatial objects in the Estonian topographic database or show the data they maintain in geographic space on base maps. In addition to map applications, the Land Board has, for two years, provided free WMS base map services to the public; through such services anyone can use the various base maps of the Land Board.

An important collector of environmental data is the Estonian Environment Information Centre, which manages the environmental register and also provides, through its public service database, information to the public. The respective spatial data are used when issuing environmental permits, making plans and assessing environmental impact. Environmental impact assessments basically only rely on the data recorded in the environmental register. Several companies have become contracted clients using the spatial data of the EELIS online system of the environmental register, and they regularly receive new data.

The Land Board’s map applications and services are accessible to anyone free of charge at [http://geoportaal.maaamet.ee](http://geoportaal.maaamet.ee). The data and services of other databases are also accessible to the public free of charge, with the only restrictions on access arising from the Public Information Act.
The Public Information Act applicable in Estonia imposes an obligation on state authorities to make the data recorded in their databases available to the public (unless legal restrictions on access apply). The publication of spatial databases is somewhat different from that of other databases, since in order to make spatial databases public a respective environment is needed and services must be provided. Therefore, the main benefit of the current infrastructure is the harmonisation of data publication. By creating electronic public services a considerable amount of finances and time on customer service has been saved, which would otherwise been spent on replying to people’s inquiries, making copies of map data and other such operations. However, it must also be taken into account that the costs incurred in maintaining powerful IT systems are not minor, although interoperability and comprehensive cooperation between state authorities help to minimise them.

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.

More work on the creation of the infrastructure for spatial data in the European Union remains to be done. Pursuant to the Directive and the implementing acts of the European Commission, preparations for such work are under way. National infrastructure for spatial information is developed at the same time as adoption of Commission legislation and in accordance with the schedule established.

1.2.2 Other SDI-initiatives

The Government of Estonia has approved the Estonian Information Society Agenda 2013. This is a state agenda defining the development trends of the information society; it is not expressly intended to be an implementation document of the INSPIRE Directive. However, the objectives arising from the INSPIRE Directive have been followed in the agenda. The Estonian Information Society Agenda 2013 (in Estonian) is available at:


An annual action plan is prepared on the basis of the agenda in order to define specific operations for the development of the entire information society, taking into account, among other things, the operations and terms prescribed by INSPIRE. Activities are planned pursuant to the INSPIRE schedule also in the work agendas of the authorities concerned.

2 Details of the Estonia NSDI

2.1 Introduction

This chapter presents the component details of the NSDI of Estonia which is named the “Estonian Infrastructure for Spatial Information”. The following components of this infrastructure are described in detail: Coordination and organizational issues, Legal
framework and funding, Data for themes of the INSPIRE Annexes, Metadata, Network services, Thematic environmental data and Standards. It ends with the use and efficiency of LISI.

2.2 Component 1: Coordination and organizational issues

At present, coordination duties are performed by the Estonian Land Board. So far there has been no need for a separate coordinating structure, since the spatial data indicated in Annexes I and II to the INSPIRE Directive are mainly collected within a single jurisdiction (of the Ministry of the Environment) and cooperation between the relevant authorities has been smooth and long-standing. Transport networks is the only spatial data theme listed in Annex I which falls within the jurisdiction of another ministry (the Ministry of Economic Affairs and Communications); long-lasting cooperation was also established with the agencies of said ministry in previous periods and cooperation remains good without any additional structures. It is planned to establish a coordinating structure to bring together all of the managers of databases falling under the spatial data themes listed in the Annexes to the INSPIRE Directive.

So far, the tasks of the coordinating structure have been performed by the Land Board.

The Estonian Land Board is by laws responsible for the organisation, co-ordination and supervision of the activities in the fields of geodesy, cartography, geo-informatics and cadastre.

It produces national orthophotos and topographic maps, establishes national and local geodetic networks, manages the geodetic database, maintains the national land cadastre, and coordinates activities pertaining to geo-informatics at the national level. The Land Board coordinates the acquisition of topographic spatial data – prepares guidelines, performs quality control, maintains the Estonian topographic database (ETAK) and organises the production of topographic maps. The Land Board is subject to the jurisdiction of the Ministry of the Environment, which gives it direct contact with the producers and users of environmental data. At the same time Estonian Land Board acts as a contact point for the INSPIRE directive. The Estonian Land Board 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 the Estonian Land Board gets information about utilities’ networks as restrictions to cadastre as well as for map data production.

In Estonia the infrastructure for spatial information is closely linked with the state information system. The state information system consists of information systems of various information holders, some of whom also manage spatial data, and of their support systems. Pursuant to the Public Information Act, the following support systems of the state information system have been established; the application of these for the maintenance of state and local government databases is mandatory:
- the classifications system;
- the address data system;
- the data exchange layer of information systems (X-Road);
- the geodetic system;
- the system of security measures for information systems; and
- the administration system of the state information system.

Consequently, the infrastructure for spatial information is also largely regulated by the systems coordinating the general information policy of the state. Several public authorities significantly contribute to the national infrastructure for spatial information and its coordination:

- the Land Board, as the coordinator of activities in the field of geo-informatics;
- the Department of State Information Systems of the Ministry of Economic Affairs and Communications (RISO), as the coordinator of national information policy; and
- the Estonian Informatics Centre, as the organiser and coordinator of the development and management of the state information system etc.

The Estonian Informatics Centre, as the developer and manager of the state information system, plays the main role. The principal tasks of this authority include organising the implementation of development plans, coordinating central information systems, and instructing, managing and organising the development of both the X-Road data exchange layer and the administration system of the state information system (RIHA). RIHA is a complete and detailed map of the state information system. RIHA keeps records of the databases (information systems) and other components forming the state information system. The users, developers, managers/maintainers of information systems and citizens can find information here on state information systems, services, classifications and semantic assets. Information in RIHA is public (except for information to which access is restricted pursuant to law) and there is no need to enter RIHA in order to view this information. The chief processor of the database that entered data in RIHA is responsible for the authenticity of the data.

All public authorities are the chief and authorised processors of the data themes of Annexes I and II to the Directive. Mainly consumers constitute third parties in respect to said data themes. With regard to several data layers, the public authorities contract third parties to collect and/or process the data either fully or partially. Third parties use the data and services intensively through the existing network services provided by public authorities in order to perform their duties, but they also provide spatial data services with new functions they have added.

The tasks of the coordinating body are currently performed by the Estonian Land Board and, with regard to the general information policy of the state, by the Estonian Informatics Centre. The chief and authorised processors of the databases falling under the data themes listed in Annexes I and II to the Directives have been identified by the coordinating body. Information is exchanged and consultations (cooperation discussions, development activities etc.) are held with them. With regard to the spatial data themes
indicated in Annex III, first the databases corresponding to them must be determined; however, this cannot be fully done before the data specifications are published.

The national infrastructure for spatial information is implemented through each database manager. Major spatial data producers and their respective databases corresponding to the spatial data themes listed in the Annexes to the INSPIRE Directive are the following:

- the Land Board as the state mapping and cadastral agency – coordinate reference systems, geographical grid systems, administrative units, addresses, cadastral parcels, elevation, land cover, orthoimagery, geology and mineral resources;
- the Estonian Environment Information Centre (reorganised on 1 April 2010) as the maintainer of environmental databases – hydrography, protected sites, environmental monitoring facilities, habitats and biotopes;
- the Road Administration which manages everything connected with roads and transport networks – transport networks;
- the Maritime Administration which manages navigational charts and other information related to marine navigation – transport networks; and
- the Statistical Office as the state’s statistics agency – population distribution in space aggregated by various socio-demographic indicators.

Currently, the Land Board can be considered the biggest provider of spatial data and related services in Estonia. The Land Board made the first online map application available to the public in 2001; through this application anyone could submit queries about cadastral parcels registered in the land cadastre and view the boundaries of cadastral parcels using various topographic base maps free of charge and without any restrictions. Today, the Land Board offers several different map applications, many of which have been developed in cooperation with other state authorities, which show the data they maintain in geographic space using base maps.

It is also important to mention the Estonian Informatics Centre as a service provider, because the Centre manages the state data exchange layer (X-Road). This is a technical and organisational environment which enables the organisation of secure and provable web-based data exchange between digitally maintained (public and private) databases.

The main collector of environmental data is the Estonian Environment Information Centre, which is a state authority under the jurisdiction of the Ministry of the Environment and which was established when the former Estonian Environment Information Centre and the Centre of Forest Protection and Silviculture were reorganised. This authority collects, processes, analyses and publishes reliable and comparable environmental data, reports on the status of the Estonian environment and the factors affecting it, and maintains relevant databases. The Estonian Environment Information Centre does not actually collect data itself; instead it receives them from data producers and providers (e.g. companies, the regions of the Environmental Board and institutions responsible for the national environmental monitoring programme) who enter the data in the information systems (the Estonian nature information system, the environmental permits information system, the waste reporting information system etc.). These online systems of the environmental register ensure data acquisition by the register and are at the
same time tools which environmental supervision officials use in practice when managing the respective fields and making decisions.

The Road Administration is the chief and authorised processor of the national register of roads, which includes road data falling under the spatial data theme of transport networks indicated in Annex I to the Directive. The authorities submitting data to the register of roads are the following:

- the Road Administration, with regard to national roads;
- local governments, with regard to local and private roads; and
- the State Forest Management Centre, with regard to forest roads.

Alphanumeric data on roads are collected in the register of roads in the form of tables and they are publicly accessible. The spatial road-related data in the register of roads are received from the Land Board’s topographic database. With regard to the spatial images of roads, the Road Administration provides information on changes in the spatial images of roads as per the cooperation agreement between the Land Board and the Road Administration, and the Land Board records the changes.

The Road Administration is also the authorised processor of the state public transport register. The register records information on valid bus routes and their timetables, except for bus route permits, bus route public service contracts and public transport vehicle stopping points. Data are provided to the register by the Ministry of Economic Affairs and Communications, Road Administration, county governments, local governments and regional public transport centres (which may be authorised to perform the obligations of state or local governments related to the organisation of public transport). Data recorded in the state public transport register are available to the public through a public web application (peatus.ee). The spatial data of public transport routes is entered in the database of the public transport register. The spatial images of the bus routes were prepared using the spatial image data of the Estonian topographic database, which the Land Board made available to the Road Administration under an agreement entered into with the latter.

The private sector is particularly active with respect to issues related to spatial data infrastructures as reflected by following cases:

- The Institute of Baltic Studies (www.regio.ee) has launched 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 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. It provides web mapping services for Natura 2000 sites, and maintains the Place Name Register.
- A very popular GI web application is Delfi. It 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 (with more than 400 sites at the moment), GSM locating service; Public Points of Interest locating service (e.g. Pharmacies, Restaurants, Hotels, Post offices, ATM’s, Banks, Gas Stations, zoos).

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.

The Estonian Land Board, coordinates the development and maintenance of the corresponding infrastructure and hosts all of the necessary hardware. Development and maintenance work is generally outsourced to IT companies by way of public procurement. The Estonian Land Board also offers public authorities the opportunity to manage their spatial data through the its web-based tools (map applications). In such a case the authority uses the hardware and software created by the Land Board. Data managers are responsible for the maintenance and availability of metadata.

The Estonian Informatics Centre as the organiser and coordinator of the development and management of the state information system offers, in the form of the X-Road and RIHA, a technical and organisational environment meant for all those maintaining public sector databases and information systems. Through this environment, services can be provided and registered, databases made available and information systems described.


Since the Land Board performs the duties of the contact point, it forwards draft regulations and other documentation received from the European Commission to other managers of spatial databases in order for them to be able to comment on these. The Land Board informs the European Commission and various working groups of Estonia’s positions. It also organises the completion of questionnaires and applications and coordinates the transposition of the INSPIRE Directive into Estonian law and its implementation.

Conclusions of Component 1

The Estonian Infrastructure for Spatial Information is a truly national. Most of the SDI building blocks have reached a significant level of operationality. The Estonian Land Board is officially recognised as the coordinating body of the SDI, and cooperates with many national and international institutions and organisations within the scope of related fields. No association for geographical information is involved in the SDI-coordination.

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 (5)

• 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 (Partially)

2.3 Component 2: Legal framework and funding

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 relates 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 subjects. 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 is functional from 1 January 2009.

The Regulation on the data exchange layer of information systems (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 among others 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.

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.

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.

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

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.

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.

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. 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 (see, http://geoportaal.maaamet.ee/eng/Ordering-Data/Ordering-digital-map-datasets-p325.html).

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.
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.

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

**Conclusions of Component 2**

The Database Act (last amended in 2007 and incorporated in the Public Information Act) provides procedures for access, 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 website of the Estonian Land Board. This all means that there is a legal framework determining the SDI-development, PPPs between public and private sector bodies exist, and a framework for sharing Geographical information between public institutions exist.

Based on these conclusions we score the indicators as follows:

- There is a legal instrument or framework determining the SDI-strategy or – development
- 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 Data sets of different resolutions covering the INSPIRE and other themes

Geographical names. Suppliers: Estonian Ministry of Interior, Estonian Land Board

Administrative units at scales 1:10,000/50,000/250,000/1,000,000 (NUTS, settlements): Suppliers: Estonian Land Board, Ministry of Interior.

Address. Suppliers: Estonian Land Board, Local governments.

Cadastral parcels. Supplier: Estonian Land Board.

Transport networks at scales 1:10,000/50,000/250,000/1,000,000 (Road register, bus stops, aeronautical data, rail traffic register, navigational maps, navigation marks, ports). Suppliers: Estonian Road Administration, Estonian Land Board, Estonian Air Navigation Services, Estonian Technical Surveillance Authority, Estonian Maritime Administration.

Hydrography (water bodies). Supplier: Estonian Environment Information Centre.

Protected sites (national heritage areas, protected natural areas). Suppliers: National Heritage Board, Estonian Environment Information Centre.

Elevation. Supplier: Estonian Land Board.


Orthoimagery at scales 1:10,000 and 50,000. Supplier: Estonian Land Board.

Geology at scale 1:50,000 (geological base map). Supplier: Estonian Land Board.

Buildings. Supplier: Ministry of Economic Affairs and Communication.

Soil at scale 1:10,000. Supplier: Estonian Land Board.
Land Use at scales 1:10,000/50,000. Supplier: Estonian Land Board.

Utility and governmental services (wastewater, waste management facilities). Supplier: Estonian Environment Information Centre.

Environmental monitoring facilities. Supplier: Estonian Environment Information Centre.

Production and industrial facilities at scales 1:10,000/50,000 (extracting permit areas, pollutant release and transfer register). Suppliers: Estonian Land Board, Estonian Environment Information Centre.

Agricultural and aquaculture facilities (register of agricultural animals). Supplier: Estonian Agricultural Registers and Information Board.


Natural risk zones. Supplier: Estonian Environment Information Centre.

Atmospheric conditions. Suppliers: Estonian Environment Information Center, Estonian Meteorological and Hydrological Institute.


Habitats and biotopes (Natura 2000 areas, key biotopes). Supplier: Estonian Environment Information Center.

Mineral resources at scales 1:10,000/50,000/250,000/1,000,000. Estonian Land Board.

The Estonian Land Board produces topographic data sets at different levels; 1:10,000/50:000, 1:250:000 (as part of the EuroRegionalMap); and 1:000,000 (as part of the EuroGlobalMap).

2.4.2 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. 1-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.

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.

2.4.3 Quality of data

The quality of spatial databases and services is assured by database managers on the basis of the legislation applicable or the guidelines developed.

Quality controls are performed by Estonian Land Board regarding its data and services. Special tools are developed for quality checks of the Cadastral Information System. In particular, a system for registration of cadastral restrictions is operational. It works as a sub-module under the Cadastral Information System and is meant for cross-referencing data with the location 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 are developed.

In the Estonian topographic database, the requirements for data quality are set out in the mandatory guidelines to be followed when information is updated. Furthermore, the quality assurance procedure and the related working procedures are regulated by agreements between the topographic database maintainer (the Estonian Land Board) and the data updater.

A guideline has been made regarding the updating of data in the Estonian topographic database, and the requirements to be followed when updating data. The guideline also describes the quality standard or expected quality and presents measurable criteria for evaluating the compliance with the set quality requirements. Technical means are provided for the data updaters: software applications and database structures with predefined domains, classifications, field types, permitted values and topology rules. These means ensure that there are almost no technical errors. Content-related errors are frequently checked when data updates have to be accepted. The logic behind the entire quality assurance procedure is preventive in nature i.e. the measures taken to assure quality are created with the purpose to avoid mistakes when new data are collected.

The data registered in the environmental register and the related public services are regulated under the Environmental Register Act and the Regulation No 2 of the Ministry of Environment of 13 January 2005 dealing with the establishment of a detailed procedure for maintaining the environmental register. The structure and data model of the public service database of the environmental register are developed in such a way that number of errors is very limited. It is presumed that when data are recorded in the public service database of the environmental register, the quality has been previously checked through online systems. In addition, when importing spatial data, automatic geometric control applies.
Quality checks have also to take place regarding the maintenance of the railway traffic register and the construction work register

2.4.4 Interoperability and harmonisation of data

The databases of the National Heritage Board and the Land Board are interoperable. A link in the national register of cultural monuments directs the user to the spatial data of the monument, and it is possible to go from the Estonian Land Board’s map system back to monument data in the register of cultural monuments. Since monuments take up a certain area, it is very important that map information be included in the monument’s data. Using a cadastral register number, it is also possible to go directly to the Land Board’s map from the cultural monument database to check if there are any monuments on a certain property. The cooperation between the Land Board and the National Heritage Board has been smooth without them having concluded any cooperation agreement.

Data exchange between the Estonian nature information system and the national register of cultural monuments has been created through the X-Road. In the register of cultural monuments, a link to the Estonian nature information system has been added to monuments whose spatial data overlap with an object protected under nature conservation laws. Access is only provided to users with passwords.

The National Heritage Board provides extracts from cultural monument data by rural municipality and county. Extracts by rural municipality and county are made mainly for local government officials. Spatial data are mostly used in the preparation of comprehensive and detailed plans, as well as in environmental impact assessment. Data exchange is electronic and takes place on the basis of a mutual agreement between public authorities.

2.4.5 Language and culture

Metadata is provided in Estonian and partly in English. Accompanying documents are available in Estonian and partly in English. The website of the Estonian Land Board including the geoportal provides detailed information in Estonian as well as in English.

Standardization of Geographical names is achieved by the Place Names Board of Estonia on the basis of the Law on Place Names (11/12/1996). The relevant guidelines have been published on the Internet. (http://www.maaamet.ee/index.php?lang_id=2&page_id=514&menu_id=78). Geographical names are mainly in Estonian and English. A low number of names are in Võru and Swedish.

Conclusions of Component 3

The previous SoP Country Reports of Estonia report that Geodatasets exist which provide a basis for contributing to the coverage of pan-Europe for the INSPIRE-selected data themes and components. The INSPIRE 2011 MR confirms the statement (37 data sets have been reported). The geodetic reference system and projection systems are standardised, documented and interconvertable. Detailed documented data quality
controls procedures are applied related to the Cadastral Information, topographic database, environmental register, railway traffic register and the construction work register. The concern for interoperability does partially go beyond the conversion between different data formats. Metadata is provided in Estonian and partly in English. The website of the Estonian Land Board that includes also the geoportal provides information in Estonian as well as 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 (Yes)**

- **Concern for interoperability goes beyond conversion between different data formats (Partially)**

- **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 of metadata

Metadata is available for at least 34 spatial data sets. Most of data managed by the Estonian Land Board have metadata.

Metadata is available for spatial data sets of the following INSPIRE themes: Coordinate reference systems, geographical grid systems, Geographical names, Administrative units, Addresses, Cadastral parcels, Transport networks, Hydrography, Protected sites, Elevation, Land, Orthoimagery, Geology, Buildings, Soil, Land, Utility and governmental services, Environmental monitoring facilities, Agricultural and aquaculture facilities, Population distribution – demography, Natural risk zones, Atmospheric conditions, Meteorological geographical features, Habitats and

All the metadata of data sets referring to INSPIRE Annex I and II are compliant with the metadata implementing rules. Almost all the metadata of data sets of Annex 3 are not compliant with the metadata implementing rules (except Soil).
2.5.2 Metadata catalogues

There is a standardized metadata catalogue covering a significant part of the Geographical information of Estonia. The geoportal of the Estonian Land Board (http://maaamet.regio.ee/geoportal/catalog/search/search.page) includes a metadata catalogue related to the data sets of INSPIRE themes of Annex I and II. All of its the metadata are compliant with the implementing rules, and based on ISO 19115 and 19119.

2.5.3 Metadata implementation

Metadata is implemented at the following organisations: Estonian Land Board, Estonian Road Administration, Estonian Environment Information Centre, National Heritage Board, Ministry of Economic Affairs and Communication, Estonian Agricultural Registers and Information Board, Statistics Estonia, and Estonian Meteorological and Hydrological Institute.

The coordinating authority for metadata implementation is the Estonian Land Board. A standardized feature code list for use with the metadata is developed.

Conclusions of Component 4

Metadata are produced for a significant fraction of geodatasets of the themes of the INSPIRE annexes. The 2011 MR reveals that for the reported datasets of INSPIRE (34 out of 37 data sets have metadata of which 23 data sets are compliant with the metadata implementing rules). There is a standardized metadata catalogue covering a significant part of the Geographical information of Estonia. The geoportal of the Estonian Land Board (http://maaamet.regio.ee/geoportal/catalog/search/search.page) includes a metadata catalogue related to the data sets of INSPIRE themes of Annex I and II. The coordinating authority for metadata implementation is the Estonian Land Board.

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
- There is a coordinating authority for metadata implementation at the level of the SDI

2.6 Component 5: Network Services

2.6.1 Geoportal(s)

Estonia has no formal national geoportal. The geoportal managed by the Estonian Land Board (http://geoportaal.maaamet.ee/eng/) can be considered as the main geoportal of
Estonia which is planned to be part of the Estonian national geoportal. This geoportal provides users access to numerous databases and services. It links directly to several web map applications containing spatial data from multiple different owners (Estonian Land Board, Estonian Road Administration, Estonian Environmental Information Centre, Estonian Maritime Administration, National Heritage Board, and Statistical Office. These applications could have different data layers (with different look and feel) and functionalities, and are fully web browser based. The applications can be divided into two groups, 1) public services, and 2) services with limited access. The services with limited access are created either for internal purposes of the Estonian Land Board or for other public authorities dealing with data not entirely public for different reasons (e.g. endangered species).

The Estonian Land Board geoportal provides access to the following web applications:

1. Land Information Application containing cadastral maps, administrative units, land price and productivity zones, geodetic networks, topographic maps (1:10,000 Basic Map and 1:50000 Base Map), and orthophotos
2. Public Immovables Sale Application
3. Estonian Road Administration Application
4. Restrictions Information System Application
5. Address data (map)
6. Estonian Nature Information System Application containing Natura 2000 areas, cadastral units, protected areas
8. National Register of Monuments Application
9. Mineral Deposits Application with data from Environmental Register
10. Soil Map Application
11. Geology Application with information about bedrock (relief), Quaternary deposits (+ thickness), hydrogeology, groundwater vulnerability, geomorphology, mineral resources, aeromagnetism, and gravity.
12. Marine Areas
13. Public Detailed Plans Application containing county, municipality and urban land consolidation plans, Natura 2000 areas, Nature protection, and Cultural heritage objects
14. Private Forest Centre Application
15. Culture Heritage Application with cultural heritage objects and cadastral units
16. Areas Sensitive to Nitrates Application
17. Administrative and Settlement Division Application

The services provided by the Estonian Land Board can also be used for business purposes. The only requirements are the obligations to refer to the Land Board and the prohibition on making mass queries which could hinder the stable provision of the services. The Land Board also offers other public authorities the opportunity to use the
map applications for the purpose of spatial data management. For example, the National Heritage Board uses a map application developed especially for them in order to indicate the location of cultural monuments on the map and to draw limited management zones around them. Access to similar map applications is given to limited user groups so they can utilise the applications and produce data.

The data in the national register of cultural monuments (both text and map data) are used for various purposes; most queries are submitted to the register by notaries and owners of the monuments in order to check the existence of monuments on certain properties.

2.6.2 Network services

This topic Network services is divided into five parts: 1) Discovery services; 2) Viewing services; 3) Downloaded services; 4) Transformation services; and 5) Invoking services.

2.6.2.1 Discovery services

The Estonian Land Board has developed a discovery service for the data sets of the INSPIRE themes of Annex I and II (http://maaamet.regio.ee/geoportal/catalog/search/search.page). This discovery service is compliant with the implementing rules.

2.6.2.2 Viewing services

The viewing services offered by the Estonian Land Board (http://geoportaal.maaamet.ee/) are based on OGC WMS standard applying standard map tools (such as zoom, pan, switching on/off displayable and active layers, and index map) and some manipulation tools (such as different querying options, distance measuring). The layers or attribute data managed by other institutions are actually stored in the Estonian Land Board’s servers and updated using specific services interactively through the web or off-line. The maps produced by WMS-service are in raster format and can be used by different 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).

Several viewing services containing information related to the INSPIRE themes are integrated in the following applications and/or services:

1. Land Information Application (at http://geoportaal.maaamet.ee/est/Kaardiserver-p2.html)
6. Address Data Application (at http://maaamet.regio.ee/inspire/teenus/inspireview?teenus=Addresses&keel=ENG&request=GetCapabilities&service=WMS&version=1.3.0)
8. Protected sites (at http://maaamet.regio.ee/inspire/teenus/inspireview?teenus=ProtectedSites&keel=ENG&request=GetCapabilities&service=WMS&version=1.3.0)
10. Soil Map Application (at http://geoportaal.maaamet.ee/est/Kaardiserver-p2.html)
11. Private Forest Center Application (at http://geoportaal.maaamet.ee/est/Kaardiserver-p2.html)
16. Public Service of Environmental Registry (at http://register.keskkonnainfo.ee)
17. CORINE Land Cover Application (at http://ks.keskkonnainfo.ee/website/Corineservice/)
19. Register of Buildings Application (at https://www.ehr.ee/)
21. PRIA public service (at https://kls.eesti.ee/pria_avalik_kaart/)

These 7 of these viewing services are compliant with the INSPIRE implementing rules (Cadastral parcels, Geographical Names Application, Estonian Roads Administration Application, Address Data Application, Hydrography, Protected sites, Administrative and Settlement Division Application)

2.6.2.3 Download services

The download services existing in Estonia related to the INSPIRE themes are integrated in the following applications and/or services:

2. Public Service of Environmental Registry (at http://register.keskkonnainfo.ee)
3. Address Data Application (at http://geoportaal.maaamet.ee/est/Teenused/Kaardirakendused/Aadressiandmete-rakendus-p137.html)

None of these download services is compliant with the INSPIRE implementing rules.

The procedure of ordering data is described online at: http://geoportaal.maaamet.ee/eng/Ordering-Data/Ordering-digital-map-datasets-p325.html.

2.6.2.4 Transformation services

The only existing transformation service is the Coordinate Calculator produced by the Estonian Land Board (at http://geoportaal.maaamet.ee/est/Teenused/Geodeesia-kalkulaatorid-p142.html).

This coordinate calculator can be used on the Land Board’s geo-portal to recalculate L-EST97 basic rectangular coordinates as ETRS89 geodetic coordinates and vice versa. However, it is not clear if the calculator is available in the form of a web service. The Land Board provides the WMS map service using both the L-EST rectangular coordinate system and geographic coordinates. The original spatial data are provided using the rectangular coordinate system. Upon the provision of the WMS service, the data are transformed from the rectangular coordinate system into geographic coordinates.

2.6.2.5 Invoking services

No clear information available in the INSPIRE MR.

2.6.3 Spatial data services and other services

Other spatial data services available at the geoportal of the Estonian land Board are:

- A presentation service (serving map windows so that developers can include it into their Internet application map window)
- A registration Service (enabling the inclusion of users’ data and data editing over Internet with the spatial data editor and Universal Import service, allowing the import of file-based spatial data into different formats)
- An extraction service (making data export, definition of area of interest, data layers and data format (DGN, SHP, XML) possible)
- Automata analysis (spatial analysis and results’ display for finding inconsistencies in the input data)
- A printing service (tools for printing of maps via Internet)

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

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.

The main registers of the Estonian Land Board 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.

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
- Software of very high quality Open source GIS software is already available
- Users in Estonia are generally applying use spatial data services like OpenGIS Web Map Service (WMS) or Web Feature Service (WFS)

These factors are considered in the Estonian Information Policy principles and in the Information Policy Action Plan. X-GIS software and OGC standards are applied at the Geoportal of the Estonian Land Board.

Conclusions of Component 5

Estonia has no formal national geoportal. The geoportal managed by the Estonian Land Board http://geoportaal.maaamet.ee/eng/ can be considered as the main geoportal of Estonia including multiple web map applications with data from multiple sources. The Estonian Land Board has developed a discovery service for the data sets of the INSPIRE themes of Annex I and II. The 2011 MR reveals that there are 21 viewing services and 4 download services. One transformation service and one invoking service are reported under INSPIRE MR, but for the first it is not clear if it is a service, for the second no information could be found.

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
- 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 (Partially)

• There are middleware services allowing data services to be invoked (No information)

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 aims to collect, process, and generalise data on Estonian nature, state of environment and the factors influencing, and provides reliable environmental information for Estonia’s decision makers. It is also good to mention that the Estonian Land Board falls also under the same ministry of Environment.

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); Wildlife, Waste, Nature protection, Forestry, Water, and Air. Moreover, the environmental registers of these themes are also available via a web map interface where users can view the object by selecting a region on the map or choosing a county or a municipality/city (http://register.keskkonnainfo.ee/envreg/main#HTTPb6ZjELFM1HbUJKBbDX3Gzaa1nJvmZ0).

The Estonian Environment Information Centre is supplier of data sets of the following INSPIRE data themes: Hydrography (water bodies), Protected sites (national heritage areas, protected natural areas), Land cover (base maps, CORINE), Utility and governmental services (wastewater, waste management facilities), Environmental monitoring facilities, Production and industrial facilities (extracting permit areas, pollutant release and transfer register), Natural risk zones, Atmospheric conditions. Meteorological geographical features, and Habitats and biotopes (Natura 2000 areas, key biotopes).

The Estonian Land Board supplies environmental data sets of the following INSPIRE data themes: Elevation, Land cover (base maps, CORINE), Orthoimagery, Geology, Soil, Land Use, Production and industrial facilities, and Mineral resources.

The National Heritage Board supplies also data sets of INSPIRE data themes: Protected sites.

Estonian Agricultural Registers and Information Board supplies data sets of INSPIRE data theme: Agricultural and aquaculture facilities (register of agricultural animals).

Estonian Meteorological and Hydrological Institute supplies data sets of INSPIRE data themes: Atmospheric conditions, Meteorological geographical features.

This all means that most of the environmental data themes of INSPIRE 2 and 3 are covered by the Estonian SDU


At the moment environmental data is handled in separate thematic databases in EEIC. The Environmental Register Act regulates how all these databases are unified. Regulations of connected databases of the Register (such as the Estonian Nature Information System, Waste Data Management System etc.) are submitted for ratification. Data capture forms of Register are also submitted for ratification.

An important web map application in the domain is the Estonian Nature Information System Application (EELIS, Eesti Looduse Infosüsteem, http://loodus.keskkonnainfo.ee/w5/) containing Natura 2000 areas, cadastral units and protected areas. The alphanumerical part is provided by Environmental Information Centre and the spatial part by Estonian Land Board. Public users can use both alphanumerical and spatial databases the National Cultural Heritage service. Authorised users are able to query and view specific data (e.g. living areas of endangered species, deposits of rare minerals, etc.) The protected areas are stored as restrictions in the Cadastral Information System (CIS). The Natura 2000 areas are from Environment Information Centre. Other environment relevant web map applications are: Soil Map Application, Mineral Deposits Application, Geology, Marine Areas, and Areas Sensitive to Nitrates Application.

Besides these web map applications, other environment relevant web services exist, such as: Web mapping service of Estonian protected sites, data exchange facility to exchange data between Estonian Nature Information System and the web mapping service of Estonian Land Board, Web mapping service of Estonian Environmental Monitoring facilities, and data exchange facility between Estonian Nature Information System and the web mapping service of city of Tallinn.

**Conclusions of Component 6**

A number of thematic maps exist on the website of Estonian Environment Information Centre with easy to use Button/links for each field and environmental topic. Besides the services of the Estonian Environment Information Centre, several other environment relevant web services exist. This all means that many thematic environmental data are covered by the Estonian SDI.

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

There are intentions to apply the data specifications according to the implementing rules of INSPIRE. The geoportal of the Estonian Land Board contains descriptions on the applied standards. It is applying X-GIS software (Flash technology) along with OGC standards (WMS, WFS, GML, KML) as well as ISO 19115 and 19119 standards for metadata. Other existing web applications in the country make also frequently use of the OGC-standards.

**Conclusions of Component 7**

Estonia is dealing with the application of the data specifications according to the implementing rules of INSPIRE for the data sets related to the INSPIRE themes of the annexes. ISO 19115 and 19119 are the applied standards for metadata. The geo-portal of the Estonian Land Board applies X-GIS software (Flash technology) along with OGC standards (WMS, WFS, GML, KML). The other existing web applications are also making use of the OGC-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

According to the Report under 21(2) of INSPIRE Directive 2007/2/EC (2010) written by Estonian land Board, the best proof of the use of the Estonian Land Board’s web map applications and services are the statistics on queries made. During the winter months of 2010, an average of over 70 million queries a month were made to the Estonian Land Board’s map application servers. In the first months of 2010, an average of 2.8 million queries a month were made to the public base map WMS servers. Conclusions on the number of map application users based on the number of queries cannot be made. Since it is not necessary to identify the users of public map applications and services, it is not possible to count them; however, conclusions can be made from the fact that the Estonian Land Board’s services and map applications are used by approximately 50,000 unique IP addresses a month. These statistics show that most queries are made to the land information service through which information on cadastral parcels can be searched for and viewed. The number of queries on restrictions and address data is also high. The number of queries also largely depends on how long the map application has been available. Therefore it is completely understandable that the land information service has the highest number of users, as it is one of the oldest services.

An overview of user statistics regarding the public service database of the environmental register can be found at [http://register.keskkonnainfo.ee/stat/](http://register.keskkonnainfo.ee/stat/). On average, 2000
observations a year are entered in the nature observations database by private individuals. In 2009 the number of users of the database increased by 2.5 times.

Through the peatus.ee website, the public transport register has an average of 60,000 users per month.

The topographic data, maps and orthophotos produced by Land Board are used by almost all public authorities. Wherever there is a need to make location-related decisions, topographic spatial data are used.

Spatial data are used when issuing environmental permits, making plans and assessing environmental impact. Environmental impact assessments basically only rely on data recorded in the environmental register. Several companies have become contracted customers using the spatial data of the EELIS online system of the environmental register, and they regularly receive new information.

The database of the National Heritage Board is largely used by notaries through the e-Notar application, as well as environmentalists and those preparing plans. Through the e-Notar application, queries can be made to the X-Road enabling the notaries to verify whether the property constituting the object of a transaction is subject to any heritage-related restrictions.

The organisers of various levels of public transport (the Ministry of Economic Affairs and Communications, the Road Administration, county governments, local governments and regional public transport centres) use the spatial data of bus routes recorded in the public transport register to plan more efficient and coordinated public transport.

Many Estonian Land Board’s web map applications and spatial data services are available to everyone free of charge and can be used without any licence agreement. Some map applications are in English. All of the map applications are accessible at http://geoportaal.maaamet.ee.

The text data in the national register of cultural monuments and the Land Board’s spatial data are used by citizens who want to know whether a property is subject to heritage-related restrictions i.e. whether there are any cultural monuments on the property. Some users are people who own cultural monuments. On the one hand, a cultural monument on a property causes some restrictions to be imposed under the Heritage Conservation Act; on the other, it gives the person an opportunity to receive financial aid from the state to perform the work necessary for the preservation of the monument. The information on the location of cultural monuments is also necessary for property development. The existence and location of monuments on a property may significantly affect both the construction of new buildings and planning for the future of a building already under protection as a monument. Archaeological excavations may be carried out and there may arise a need to hire a contractor holding a professional activity licence.

Educational institutions have also started to offer web map service solutions. For example, the Department of Geography of the University of Tartu has launched a project entitled “The launch of a lab/server for educational purposes and the use thereof in
studies (http://gisweb.ut.ee/)”. The purpose of an educational lab/server is to offer geo-
informatics Master’s and Doctorate candidates and other students significantly better
study opportunities than those provided by the capacity of the current server of the
University of Tartu, to practise and develop contemporary web-based geo-information
systems and to link these with ‘new medium’ (Web2.0) applications. Furthermore, the
purpose of the server is to make the data layers and/or samples created in the Department
of Geography of the University of Tartu available as a publicly accessible web map
service. When the lab is ready, there are plans to include the use of it in practical training
on various courses.

Several geoportals are launched and used by the general public. Popular examples are the
Tallinn city geoportal (http://kaart.tallinn.ee); Delfi (http://kaart.otsing.delfi.ee); the
geoportal of a major newspaper (http://kaart.postimees.ee) and the Agricultural Registers
and Information Board which is a government organisation providing EU agricultural
subsidies (https://kls.eesti.ee/pria_avalik_kaart/).

The main barrier to the use of spatial data is the lack of know-how related to spatial data
and the lack of GIS software. This problem is most prominent in local governments.
Sometimes it is also difficult to find common ground and the interest necessary for
cooperation. So far the problems have been solved with the development of various web-
based map applications by the Land Board; this allows authorities with limited means to
view data they are interested, submit queries and manage the data.

In addition, the specific nature of the existing databases and information systems has also
constituted a barrier to data sharing. The current information systems were created to
perform certain tasks and they do not correspond to new needs. This problem can be
solved by creating new developments; however, this in turn is complicated due to the
authorities’ resources, budget and synchronisation of mutual development-related actions.
### 3 Annexes

#### 3.1 List of SDI addresses / contacts for Estonia

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<thead>
<tr>
<th>Table: SDI contact list</th>
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### 3.2 List of references for Estonia

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