Spatial Data Infrastructures in *Iceland*: State of play Spring 2005

Country report on SDI elaborated in the context of a study commissioned by the EC (EUROSTAT & DG ENV) in the framework of the INSPIRE initiative

August 2005
### Report meta-information

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<td>Margaret Hall &amp; Peter Beusen (ICRI)</td>
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Change matrix 2005 versus 2004

Paragraphs in which information is reported which deviates in a significant way from what was reported in the Spring 2004 version of this country report are listed in the below table. They are indicated in red.

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<td>Information added</td>
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<td>Updated to reflect state spring 2005</td>
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<tr>
<td>1.2</td>
<td>Detail and new information added, URL’s added, other players added</td>
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<td>2.1</td>
<td>Key issues for further development added</td>
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<td>2.4.2</td>
<td>Detail added</td>
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<tr>
<td>3.2</td>
<td>New players and websites added</td>
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Executive summary

In Iceland, several SDI-components covering the entire country are being put in place whereas a clear vision document or mandate is absent. There are a number of institutes and companies working on SDI issues, however these operate independently and thus an Icelandic SDI is not being developed in an integrated manner which would allow for the development of a comprehensive data policy and infrastructural initiative. Key players are the National Land Survey (LMI) and LISA, an organization of stakeholders in the GI-sector. Informal steering is provided by a Steering Committee composed of representatives of several ministries and the city of Reikjavik. 80% of the required funding is provided by the state. 20% comes from cost recovery through data sales and service provision.

A metadata catalogue and access service. The latter is based on the Danish model. However, the spatial reference system for the various geodatasets is variable. The quality of the major data product of LMI, the new topographic database 1:50.000, is not clear.
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### Abbreviations and acronyms

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<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>AGI</td>
<td>Association for Geographic Information</td>
</tr>
<tr>
<td>CT</td>
<td>Core Thematic Data</td>
</tr>
<tr>
<td>FIR</td>
<td>Further Investigation Required</td>
</tr>
<tr>
<td>GI</td>
<td>Geographical Information</td>
</tr>
<tr>
<td>GII</td>
<td>Geographic Information Infrastructures</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographical Information System</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>GSDI</td>
<td>Global Spatial Data Infrastructure</td>
</tr>
<tr>
<td>INSPIRE</td>
<td>INfrastructure for SPatial InfoRmation in Europe</td>
</tr>
<tr>
<td>KMS</td>
<td>Danish National Survey and Cadastre</td>
</tr>
<tr>
<td>LISA</td>
<td>Organisation of Geographical Information for all in Iceland</td>
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<tr>
<td>LMI</td>
<td>National Land Survey of Iceland</td>
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<tr>
<td>LUKR</td>
<td>Reykjavik GIS</td>
</tr>
<tr>
<td>NIA</td>
<td>No Information Available</td>
</tr>
<tr>
<td>NIMA</td>
<td>US Cartography Institute</td>
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<tr>
<td>NLS</td>
<td>National Land Survey</td>
</tr>
<tr>
<td>NSDI</td>
<td>National Spatial Data Infrastructures</td>
</tr>
<tr>
<td>PPP</td>
<td>Public-Private Partnerships</td>
</tr>
<tr>
<td>REF</td>
<td>Reference data</td>
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<tr>
<td>SDI</td>
<td>Spatial Data Infrastructures</td>
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1. GENERAL INFORMATION

1.1 Method

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

The report is based mainly on the analysis of web sites and other documents readily accessible. Some comments were received on the 2003 version from Mr./Ms. Tryggvi Már Ingvarsson, a Master student in Geoinformation Engineering an Land Management at T.U. Delft in the Netherlands, about the topographic database 1:50,000 but these were not confirmed by a published document. The update of 2005 was based on the input from Tom Barry (LISA) and integrated in the current report.

1.2 Major actors on the Icelandic NSDI-scene

There is no formal NSDI in Iceland, and in no instance was any reference found concerning the term SDI or any other related terminology, e.g. Geographic Information Infrastructures - GII. There are a number of institutes and companies working on SDI issues, however these operate independently and thus an Icelandic SDI is not being developed in an integrated manner which would allow for the development of a comprehensive data policy and infrastructural initiative. Nevertheless, it can be concluded that an operational and “de facto” NSDI situation exists at the National level

The activities and projects constituting and further developing the de facto NSDI is coordinated by the National Land Survey of Iceland (LMI) and the LÍSA Association for GIS:

- LÍSA is responsible to coordinate GIS in Iceland by promoting cooperation between institutions and enterprises. LISA was founded in 1994 and the work of the organisation is financed by membership fees. LÍSA is comparable with similar organizations found in other countries, for example the ProGIS in Finland, ULI in Sweden and AGI in the UK. LÍSA has its formal mandate set out in the “Statutes of the Organisation” (English translation available). The statute sets out the role of the association as well as membership categories and membership fees. Examples of special achievements are conferences, workgroups, special interests groups (mapping, education) and it should be noted that LISA’s workgroups have been responsible for the launched of projects such as the National Metadata Service, the National Feature Catalogue and a GI Dictionary. On LISA’s web site there are links to many new services and geo portals: (http://www.rvk.is/lisa)

- Official provider of geographic data, by law, is the National Land Survey of Iceland, LMI (http://www.lmi.is), and the Icelandic Coast Guard
The LMI is responsible for gathering, processing, archiving and disseminating geographic data and information on Iceland. It operates primarily in the fields of cartography, map publishing, land surveying, aerial photography and satellite image processing, as well as other related areas. There is currently a new law being formulated concerning the National Land Survey of Iceland. This law will cover the fields of surveying and mapmaking and also including provisions for the future development and management of The National Land Survey of Iceland. The National Land Survey of Iceland is a member of EuroGeographics and is taking part in projects covering Europe (SABE, EuroGlobalMap and EuroRegionalMap). The LMI is an institute set up under the auspices of the Ministry of Environment. The role and the operational procedures of the LMI are moving in line with the overall interest in e-Government for Iceland.

The Ministry for the Environment mentioned above has responsibility in the fields of environmental research and nature protection, land surveying and cartography, as well as physical planning. The Ministry emphasizes the importance of the availability of digital base maps, of developing a coordinated approach to geographical information systems and enforcing environmental legislation.

Besides LMI, other main providers of GI are institutes such as

- the Public Roads Administration (http://www.vegagerdin.is),
- the Icelandic Institute of Natural History (http://www.ni.is),
- the Agricultural University of Iceland (http://www.lbhi.is),
- the National Energy Authority (http://www.os.is),
- the National Museum of Iceland (http://www.thjodminjasafn.is) and
- the Icelandic Meteorological Office (http://www.vedur.is).

Private companies, Hnit hf (http://www.hnit.is) and Loftmyndir ehf (http://www.loftmyndir.is) are also involved in the production of geographical base data, both by their own business plan and at customer request.

The municipality of Reykjavík, in cooperation with the Reykjavík Energy and Iceland Telecom Ltd. has been developing and running LUKR, the Reykjavík GIS, since 1988. This system contains 15 basic themes of geographic information as well as minor themes, containing the base map, parcel boundaries and facilities of the city. For many years the citizens have been offered access to digital data over the Internet from these databases, and it is used for many purposes such as design, map making, construction projects, and information services etc. In December 1999, a product based on LUKR, called City Webview (In Icelandic: Borgarvefsja), was launched (http://www.borgarvefsja.is) on the World Wide Web, enabling users to make maps “on the fly” with the latest information from the databases, and to get recent low altitude orthophotos of the entire city.

Statistics Iceland is the national statistical institute of Iceland. The Statistics department is responsible for the collection and processing of data and providing of official statistics on the Icelandic population, the economy, national accounts, the labour market and social affairs. It is also responsible for disseminating information to the general public,
businesses, institutions and the government. Regional statistics are an important
dimension of this information service. Since the beginning of 2004 the web constitutes
the main information channel of Statistics Iceland. Statistics Iceland is responsible for all
civil registration in Iceland. The National Registry, which is an administrative department
within Statistics Iceland, is in charge of a centralised register for the Icelandic population
as a whole. Main registration items are: name, ID-number, full residence, marital status,
nationality, place of birth and registration of consensual union. Information for updating
the register is obtained according to a special law on the Icelandic National Registry, a
law on domicile and a law which obliges citizens to notify changes of address. The
National Registry issues various certificates to individuals. (http://www.statice.is)

A new system for land registration in Iceland:

A steering group of Secretary Generals from the ministries of Finance, Justice, Social
Affairs and Environmental Affairs, Statistics Iceland, the chairman of the National
Association of Local Authorities, and the Secretary of the Mayor of Reykjavik, has led
the project of coordinating the main registries for land registration in Iceland
(http://www.fmr.is). The following goals were set out for the project:

- To build a central framework for collecting real property data, and to ensure
  that each information item is only collected once into a central database.
- To ensure that this database will offer superior data accessibility and accuracy
  for prospective users, making it undesirable to keep separate real property
  databases.
- To create a new land registry database which will provide the basis for
derivative databases such as geographic information systems (GIS),
  population statistics, title and interests registry.

Access to the Land Registry Database is available to the general public on the Internet.
Members of the public can view data on a properties land and insurance evaluations
along with data on a properties size and year of construction etc.

The Information Society Task Force was established in 1997. It's main task is the
implementation of Iceland's IT-strategy: “The Icelandic government's vision of the
information society”, published in October 1996. Amongst the main objectives is that
Icelanders have easy access to the information society, governmental information and
services; to improve the competitiveness of the Icelandic economy; and to improve the
educational system. Since 1996, several other policy-publications have been introduced
and a number of committees and projects, based on the policy, have been launched.
2. Details of NLS(LMI)/LISA in Iceland

2.1 General information

Although in no place has the term SDI, NSDI or any other related term been used to describe the work of the LMI and LÍSA, most of the key features for an SDI are being met. For example:

<table>
<thead>
<tr>
<th>SDI feature / element</th>
<th>Evidenced in Iceland (LMI+LÍSA)</th>
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<tbody>
<tr>
<td>Status: strategy (or mandate) for SDI to be developed – not a one-off effort</td>
<td>No mandate or statutes expressly reference SDI. There is no SDI strategy document present in any of the Ministries or institutions serving Iceland.</td>
</tr>
<tr>
<td>Co-ordination: who will administer and organise the SDI</td>
<td>The LMI and LÍSA are well coordinated to provide SDI like services.</td>
</tr>
<tr>
<td>Scope: broad based interest and stakeholder involvement</td>
<td>Most all major institutions, ministries, municipalities as well as a number of companies have been brought into play for different aspects in the NSDI. E.g. feature catalogue, metadatabase, key base data.</td>
</tr>
<tr>
<td>Promoting: awareness, documentation, access</td>
<td>The role of both the LMI and LÍSA is to promote the use of GI/GIS and cooperation in preparing, accessing and using spatial data.</td>
</tr>
<tr>
<td>Funding: dedicated resources, a clear plan to pay for it</td>
<td>Funding is in place.</td>
</tr>
<tr>
<td>Partnerships: getting players on-board</td>
<td>Yes. As noted above.</td>
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Iceland, has at the national level an e-Government and e-commerce plan and strategy. Although relevant in a general way to SDI development, there is no specific reference to geographic or spatial data issues, unlike in Norway where the e-Government (eNorge) action plan included clear references to GI and GIS.

One clear push towards establishing an NSDI in Iceland was the introduction of the LMI new six-year mission and strategy policy, “Geographical information for the society” 2001-2006. This strategy document re-defines the LMI primary mission and future vision and coincides with a restructuring of the organization as well. The new strategy policy focuses the LMI onto developing projects that are “essential for the society as a whole”. (LMI – Annual Report 2001)

An interesting note to these changes is that the LMI has entered into specific agreements with private companies in order to achieve a number of objectives. For example:

- The new operational structure of the LMI computer system is being “content hosted in a quality-certified environment” by Hugvit Ltd.
The Map Window application on the LMI web site was developed in cooperation with Stefja Ltd.

Some burning issues concerning data policy in Iceland are:

- Developing guidelines, framework, rules and standards in the field of GI;
- Raising public awareness of GI issues;
- Developing an Educational framework.

2.2 Component 1: Legal framework and funding

2.2.1 Legal framework and organizational issues

The National Land Survey of Iceland (Landmaelingar Íslands – LMI - http://www.lmi.is) is the Icelandic Cartographic Institute under the auspices of the Ministry of Environment. It is responsible for gathering, processing, archiving and disseminating geographic data and information on Iceland. It operates primarily in the fields of cartography, map publishing, land surveying, aerial photography and satellite image processing, as well as other related areas. In 1997 a new law (Law no. 95/1997, with subsequent amendments in December 1998 and December 2000) on the LMI/NLS came into effect. The law attempts to cover the field of surveying and mapmaking, including provisions for the control of the Ministry of Environment and the purpose of the LMI as a governmental institution. In 2001 a new policy and strategy was formulated for the LMI for the period 2001-2006. The LMI can be considered as the institute coordinating and leading the development of the NSDI, working in close cooperation with LISA.

LISA (www.rvk.is/lisa) is a venue of cooperation in the field of geographical data in Iceland and is a forum for discussion and development of GIS. LISA was founded in 1994 and the work of the organisation is financed by membership fees. The primary objective of LISA is to provide a forum for a multilevel cooperation in the field of GI in Iceland, i.e. a forum for representatives of public and private parties as well as individuals, to access professional information, discuss common interests and formulate what has to be jointly achieved and by what means. Its goal is to promote cooperation between partners with geographical information systems and to encourage the joint use of databases. As examples of special achievements it can be mentioned that LISA’s workgroups have launched projects like the National Metadata Service, the National Feature Catalogue and a GI Dictionary.

A steering group of Secretary Generals from the ministries of Finance, Justice, Social Affairs and Environmental Affairs, the Statistics Iceland, the chairman of the National Association of Local Authorities, and the Secretary of the Mayor of Reykjavik, has led the project of coordinating the main registries for land registration in Iceland (www.fmr.is). The goal of the project was inter alia to build a central framework for collecting real property data, and to ensure that each information item is only collected once into a central database.
2.2.2 Public-private partnerships (PPP's)

The LMI determines on an individual basis whether a project should be handled in-house, or by a sub-contractor after advertising for bids.

As a good example of a successful collaboration, we can highlight that the municipality of Reykjavík, in cooperation with the state telecommunication company, has been developing and running LUKR, the Reykjavík GIS, since 1988.

2.2.3 Policy and legislation on access to public sector information

The Icelandic Freedom of Information Act no. 50 of 1996 applies to state and municipal administration, and to the activities of private parties insofar as they have been entrusted with official power to take decisions regarding people's rights or obligations.

A National Metadata Service in Iceland was launched in December 1999 and is freely accessible (see also 2.4).

Directive 2003/4 on access to environmental information has not been transposed yet, and the Freedom of information Act is currently under review to adapt it to Directive 2003/98 on the re-use of PSI. It is the Prime Minister’s Office who is leading the Public Sector Information (PSI) implementation: (http://eng.forsaetisraduneyti.is/).

2.2.4 Legal protection of GIS by intellectual property rights

The Copyright Act no. 73 of 29 May 1972 has been amended by Act no. 78 of 30 May 1984, Act no. 57 of 2 June 1992 and Act no. 145 of 27 December 1996. Act no. 60 of 19 May 2000 inserted article 50, which provides legal protection for databases.

Article 49 of the Copyright Act offers special legal protection to photographs.

Article 8 of law no. 95/1997 on the LMI stipulates that the State owns all rights acquired by the LMI. The institute protects the interests of the State in the areas of copyrights and utilisation rights regarding all materials that it has acquired, processed or published in connection with the surveying, mapping or photographing of Iceland. In addition, matters concerning copyrights are also contained within copyright bill, no. 73/1972, with later amendments. Article 9 stipulates that the LMI communicates information and provides access to data in its archives. Regarding original material derived from outside the institute, further distribution of such material shall be preceded by an agreement with the original source. It is permitted to grant utilisation rights for all information in the areas of surveying and mapping that is stored in the LMI’s archives, under the conditions that the source is credited and that the credibility of the information is not compromised.

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

The data protection principles of Directive 95/46/EEC have been implemented into Icelandic law by means of the Data Protection and Handling of Personal Information Act no. 77 of 2000. On 1 January 2000 this Act came into force. Its last amendment dates from 2002. In accordance with this act, access to various parts of the database may be restricted in terms of personal data.
2.2.6 Licensing framework

The Information department of the LMI handles operations in the area of disseminating information to the community, the sale of data and the handling of publishing licenses. The publishing of maps, aerial photographs and other materials is allowed upon written permission and the payment of royalty fees. Information regarding royalty fees will be published on-line.

2.2.7 Funding model and pricing policy

Funding

Article 10 of law no. 95/1997 on the LMI lists the different ways in which LMI generates capital. From this article it is clear that the Icelandic funding model is a combined model that encompasses grants and cost recovery. Approximately 20% of the budget of LMI comes from a cost recovery basis, while the rest of the funding comes directly from the state.

The LMI generates capital through (1) the sale of utilisation rights of material archived by the institute, and production that the State has copyrights to, (2) the sale of specialised services in the fields of GI, aerial photographs and remote sensing, land surveying and map-making that the institute's customers request, and (3) through service fees for handling data (e.g. photocopying).

The operations and work of LISA are primarily financed by membership fees. Some grants are attributed for workshops and travel meetings.

Pricing

Again according to article 10 of law no. 95/1997 on the LMI, the rates are determined and confirmed by the Minister, and then published in the Official Journal. Rates for the sale of specialised services and rates for handling data shall be determined in accordance with the cost of services and production in relation to particular projects, with the rate never being higher than these costs. A clear price list is available on the website of LMI.

Regarding rates in areas where the LMI plays a competitive role, the institute shall determine the rates and subsequently publish them. Competitive operations will be placed in the Administrative department as a special, well-defined unit to ensure that it is clearly separate from the Survey's other sales operations.

In 2001 the LMI’s special income from sales of maps, aerial photographs, digital data and other services totalled ISK 47.6 million while royalty fees amounted to ISK 4.4 million.

The Prime Minister’s Office is working on legislation on the pricing of PSI based on a report from the Ministry of Finance. The aim is universal access to public information, subject to a fair service charge. Public information should be defined as the property of the general public. Service charges for its dissemination may not exceed the cost of their supply, copying or other dissemination.
2.3 **Component 2: Reference data and core thematic data**

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

The following shows the distribution of digital geographic datasets available at the different scales:

- $< 1:15.000$ (40)
- $1:15.001 - 1:75.000$ (12)
- $1:75.001 - 1:200.000$ (1)
- $1:200.001 - 1:800.000$ (10)
- $> 1:800.001$ (1)

2.3.2 Reference data and core thematic data by resolution or scale range

Key digital data sets include the following:

- **IS 50V 1:50 000**

  This is the new seamless vector database covering the entire country. This database will be utilized as a reference map base as well as a GIS on its own. The database has been geo-referenced according to ISN93. The content of IS 50V includes seven layers or themes: place-names, contour lines, water, transportation, structures, administrative boundaries, land surface.

  The project costs about 230 million ISK (or about 23 million €), and is scheduled for completion at the end of 2003. The IS 50V is built on cooperation from different actors and data providers and the data will be used in a GIS operated by the various institutes, municipalities, companies.

<table>
<thead>
<tr>
<th>Name of cover</th>
<th>Data collection</th>
<th>Cooperative partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contour lines and hydrology</td>
<td>Vectorized information from DMA map films.</td>
<td>NIMA, National Energy Authority</td>
</tr>
<tr>
<td>Roads</td>
<td>GPS measurements of &quot;all&quot; roads with precision of 2 - 5 metres.</td>
<td>Public Roads Administration</td>
</tr>
<tr>
<td>Boundaries</td>
<td>Digitizing newest information on municipal borders on top of digital data.</td>
<td>Statistical Bureau of Iceland, and the Ministry for Social Affairs</td>
</tr>
</tbody>
</table>

Many digital data sets are described in the metadatabase, but the descriptions were available only in Icelandic.
### Surface features
- Digitizing data from films, analysing data from satellite images.
- Agricultural Research Institute and the Icelandic Museum of Natural History

### Place names
- Indexing and locating digitized place names from the institute's maps.
- Place-Name Institute

### Man-made structures
- Digitized from aerial photos and DMA films.
- Valuation Office of Iceland

Data in IS 50V and cooperative partners for individual covers.

- Satellite images. The LMI has an extensive archive of images and adds to the collection on a regular basis.
- Aerial photographs. The LMI maintains the archive of photographs. As of 2001 all annual aerial photographic updates are made by a subcontractor.
- Kortabrunner (*MapWells*) is the indexed catalog of all historical maps of Iceland. All maps are registered with certain key information. Part of this information is made available in lists which are made available on the Internet, searches may be conducted by text and graphics.

#### 2.3.3 Geodetic reference systems and projections

Various datasets have different projections used.

From the metadata database for Iceland (Landlysing) the following projections are available. The numbers in parenthesis are the number of datasets registered with that projection.

It is interesting to note that the IS 50V base map is referenced according to ISN93.

Direct referencing:

- Lambert (45)
- UTM (8)
- Gauss Kruger (1)
- Reykjavik 1900 (20)
- Hjörsey 1955 (19)
- ISNET 1993 (52)
- EUREF 89 (0)
- INT 1909 (5)
- GRS80 (6)
- WGS84 (31)
- Meðalsjávarhæð (46)
2.3.4 Quality of the reference data & core thematic data

Users needs are considered when building primary or reference data. For example the IS 50V data set. The LMI has concluded numerous contracts regarding the use of data from the IS 50V database. For example: the Valuation Office, National Power Company, Icelandic Institute of Natural History, National Energy Authority, Agricultural Research Institute, municipalities, Iceland Telecom, US Cartography Institute (NIMA).

The use of the database IS 50V has varied but mostly it is considered as fundamental (or base) data in a GIS to which other individual data are added.

But in general, no specific details were noted regarding the approach to quality assurance. No comments regarding the quality control process could be found. Some (informal) scepticism was recorded about the true quality of the database.

Regarding positional accuracy, Iceland is currently using a geodetic reference system surveyed with GPS in 1993. The measuring stations have been surveyed to an accuracy of 2-3 cm.

Updates: In general all updates for data are the responsibility of the data producers. In the case of the IS 50V there was an important cooperation between the different producers. As these data providers update their data sets, updates to the IS 50V will need to be considered.

There is no information found on change management.
2.3.5 Interoperability

GIS software used includes ARCINFO. But further information is required to determine the full range of GIS software in use amongst all the players.

2.3.6 Language and culture

The entire metadatabase (Landlysing) is available in Icelandic only.

Most all supporting documents are available in Icelandic. A few summary documents are provided in English.

A feature catalog service is also provided in Icelandic. The key elements and stakeholders involved in the feature catalogue are the following:

Several institutes were requested to implement sub-classifications within the feature catalog and submit them to the editorial committee. All classifications have been formulated in cooperation with numerous users. Below is a list of those who have supervised each particular classification.

http://www.lmi.is/landsurvey.nsf/htmlPages/stadlar.html

<table>
<thead>
<tr>
<th>Classes</th>
<th>Supervision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boundaries and regions</td>
<td>National Land Survey of Iceland</td>
</tr>
<tr>
<td>Transportation</td>
<td>National Land Survey of Iceland</td>
</tr>
<tr>
<td>Structure</td>
<td>Valuation Office of Iceland</td>
</tr>
<tr>
<td>Communications and utility systems</td>
<td>Reykjavík GIS, LUKR</td>
</tr>
<tr>
<td>Vegetation</td>
<td>Icelandic Institute of Natural History</td>
</tr>
<tr>
<td>Un-vegetated land surfaces</td>
<td>Icelandic Institute of Natural History</td>
</tr>
<tr>
<td>Hydrological features</td>
<td>National Energy Authority</td>
</tr>
<tr>
<td>Elevation</td>
<td>National Land Survey of Iceland</td>
</tr>
</tbody>
</table>

The feature catalogue service is based on ISO standards (which ones were not specified). The project was funded by the Office of the Prime Minister and was guided by the same steering committee as for the project “Information Society in Iceland”.

2.3.7 Data Content

No information has been found.

2.3.8 Geographical names

The LMI is responsible to index place names and to create and maintain the database. The database is intended for use by the LMI itself for map making, etc. The place names will all be location linked (i.e. georeferenced). About 50,000 names have been indexed.
2.4 **Component 3: Metadata for reference data and core thematic data**

2.4.1 **Availability**
Metadata are available for a significant part of the reference data and core thematic data. Ten institutions and municipalities participate in the National Metadata Service, with information on 40 datasets and more on the way.

2.4.2 **Metadata catalogues availability + standard**
Metadata are structured in a National Metadata Service, launched in December 1999, as a centralised Icelandic version of the Danish Metadata Catalogue of Spatial Data, published by the Danish National Survey and Cadastre (KMS), and thus the standard CEN ENV12657 is used. The Service Landlysing (http://www.lmi.is/landlysing), hosted at the National Land Survey of Iceland, is a joint development project between LISA and the National Land Survey.

2.4.3 **Dublin core metadata standards for GI-discovery**
No information has been found.

2.4.4 **Metadata implementation**
Although not specified in detail, the LMI Annual Report 2001 stated that the LMI places a high value on reviewing the information in digital base maps, with the aim to keep the information up to date.

2.5 **Component 4: Access and other services for reference data, core thematic data and their metadata**

2.5.1 **On-line access service for metadata of reference data & core thematic data**
Landlysing at http://www.lmi.is/landlysing/ is the national metadata service for Iceland. It provides free on-line access to the metadata catalogue (see 2.4.2). In 1998 permission was granted to use the KMS software to build the Internet metadata service using XML.

The aim of Landlysing is to make it easier for users and producers of geographical data sets to communicate with each other.

Landlysing is providing the only comprehensive (i.e. exploration) metadata about Iceland. By the end of 2002 the metadatabase contains more than 77 geodatasets coming from 20 contributing parties.

The metadatabase and service is co-managed by LÍSA and the LMI. The actual management and promotion is done by a three-person committee and the daily operations are carried out by the LMI. The metadatabase content is maintained by various actors including different institutes, municipalities and private companies. Participating is
voluntary and free. Each data provider is finally responsible to register their database with the LMI and to ensure that the metadata information is correct and always up-to-date.

The Landlysing is subsidized by the Ministry of Environment.

**2.5.2 On-line access service for reference data & core thematic data**

The description of the reference and core data exists, but there is no on-line access to the actual geographic data.

**2.5.3 Inter-linkages of on-line access services for metadata and reference data resp. core thematic data**

Metadata is not linked to the actual datasets. Landlysing does not provide visitors direct access to the geodatasets and geodatabases. They must be ordered directly from the data providers.

**2.5.4 Open Source software and access services**

No information has been found.

**2.5.5 Availability of web mapping service(s) and of a WebMap server interface**

The new LMI website offers a Map Windows application at [http://www.lmi.is/landsurvey.nsf/pages/kortaskjar.html](http://www.lmi.is/landsurvey.nsf/pages/kortaskjar.html). It has user friendly, interactive mapping functions. The LMI developed the Map Window application in cooperation with a private software company, Steja Ltd.

The new web site was developed in cooperation with another private company, Hugvit Ltd., which is also hosting the website.

**2.6 Component 5: Standards**

It is remarkable that the spatial referencing system seems not to be standardized over the available geodatasets.

**2.7 Component 6: Thematic environmental data**

Environmental data is also made available from Statistics Iceland, which is in the process to build up a database on the Icelandic environment covering a number of principal categories: atmosphere, freshwater supply and quality, wastes, land use, ocean and marine pollution, forests, biology, noise. It remains to be determined how these datasets are similar or different from other available environmental datasets.

The metadata situation described in 2.4.1 applies also the thematic environmental data.
2.8 Use and efficiency of SDI

The LMI Annual Report 2001 stated that the IS 50V product is considered to be a benefit to many users. Digital maps can be used as the basic spatial database for the entire country.

Benefits will cross over into many fields, such as providing the basic information set for use in guidance systems for Emergency Rescue Service, or being incorporated into the Land Record System.
3. **Annexes**

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

The following table lists the SDI contacts in Iceland:

<table>
<thead>
<tr>
<th>National Land Survey of Iceland (LMI)</th>
<th>Organisation mailing address</th>
<th>Over-all contact person: tel./fax/e-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stillholti 16-18 IS- 300 Akranes Iceland</td>
<td>Magnús Guðmundsson, Managing Director</td>
<td></td>
</tr>
<tr>
<td>Tel.: +354 430 9000 Fax: +354 430 9090 E-mail <a href="mailto:lmi@lmi.is">lmi@lmi.is</a></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LISA</th>
<th>P-box 8441, IS- 128 Reykjavik, Iceland.</th>
<th>Mrs. Thorbjörg Kr. Kjartansdóttir, Executive director</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tel.: +354 530 9110 Fax: +354 530 9101 E-mail <a href="mailto:lisa@aknet.is">lisa@aknet.is</a></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 3.2 List of references for Iceland

The following are some of the references used to compile the Country Report:

- LÍSA - an Organisation of Geographical Information for all in Iceland [http://web.rvk.is/lisa/enska.htm](http://web.rvk.is/lisa/enska.htm)
- Prime Minister’s Office [http://eng.forsaetisraduneyti.is](http://eng.forsaetisraduneyti.is)
- Icelandic Coast Guard [http://www.lhg.is](http://www.lhg.is)
- Public Roads Administration [http://www.vegagerdin.is](http://www.vegagerdin.is)
The Icelandic Institute of Natural History  |  http://www.ni.is
The Agricultural University of Iceland  |  http://www.lbhi.is
National Energy Authority  |  http://www.os.is
National Museum of Iceland  |  http://www.thjodminjasafn.is
Icelandic Meteorological Office  |  http://www.vedur.is
Statistical Institute Iceland  |  http://www.statice.is
Land Registers  |  http://www.fmr.is
Planning Agency  |  http://www.skipulag.is/pages/english/index_e.html
IceTec - Icelandic technological R&D and educational institution  |  http://www1.iti.is/domino/iti/vefsidur.nsf/index/9
City of Akranes  |  http://www.akranes.is/default.asp?sid_id=1294&tid=1
Website of City Webview  |  http://www.borgarvefsja.is
GIS company - GISLANDIA  |  http://geocities.com/gislandia/ also: http://www.hi.is/pub/gis/
GIS company – Hnit hf  |  http://www.hnit.is
GIS company – Loftmyndir ehf  |  http://www.loftmyndir.is

**Publications:**

