INSPIRE

Infrastructure for Spatial Information in Europe

Member State Report: Sweden, 2010-2012

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Contents

1   Executive summary

The EU Inspire Directive establishing an Infrastructure for Spatial Information in the European Community entered into force on 15 May 2007. Every three years, Member States are required to report to the Commission, among other things on how the infrastructure is coordinated, the relationship with third parties, quality assurance and how the various stakeholders have contributed to the coordination of the infrastructure. The report must also contain information on use of the infrastructure, what data sharing agreements have been established and on the costs and benefits of implementing the Directive. This report relates to the period 2010-2012.

The Swedish infrastructure for spatial data is implemented jointly by authorities, municipalities and other organisations in Sweden. It is based on well-developed cooperation carried out between various parties on the basis of optional agreements and arrangements. A strategic plan for the construction of the infrastructure – the National Spatial Data Strategy – has been produced together with the authorities and organisations involved and Sweden's municipalities and county councils. The plan forms a common basis for the implementation of the infrastructure and for Sweden's actions in connection with European and international cooperation within the area.

The Swedish mapping, cadastre and land registration authority, Lantmäteriet, has the role of national coordinator. This role includes ensuring that the infrastructure is coordinated with the spatial data system within the European Union and that there is a continually accessible and operational gateway to the infrastructure on the Internet. Lantmäteriet is also the authority that acts as the Commission's contact point on matters relating to the implementation of the EU Inspire Directive in Sweden. This role is assigned in the Act and Ordinance on spatial information, which also governs the Swedish implementation of the Inspire Directive.

The main measures taken to facilitate data sharing between authorities and organisations in Sweden include the Act and Ordinance on spatial information, which govern Sweden's implementation of the Inspire Directive, the spatial data portal, which is the gateway to web-based spatial data and spatial data services in Sweden and Sweden's node in the European Inspire Portal, and the cooperation model which constitutes Sweden's implementation of the Inspire data sharing requirements.

The cooperation model includes three different forms of cooperation:
- Spatial data cooperation, in which public authorities, municipalities and other organisations sign agreements to obtain access to a collection of spatial data;
- Contribution, whereby all stakeholders can publish metadata and make spatial data products accessible via the Geodata Portal;
- Optional contribution in accordance with Inspire, whereby everyone has the opportunity to publish metadata concerning spatial environmental information via the national Geodata Portal, in accordance with the requirements of the Act on spatial information.

The infrastructure has delivered the benefits envisaged and paid dividends both externally and internally. Access to increased amounts of spatial data via spatial data cooperation has familiarised certain organisations with new areas of application and is also contributing to better

and more reliable decisions. This will ultimately improve the urban development process as a whole.

In the long term, however, there is some concern about the lack of coordination between Inspire and other directives. For some time to come, it will also be necessary to have two separate pathways, one for reporting under other directives and one for meeting Inspire's data harmonisation requirements. There is also some concern that there will be a separate pathway for Inspire also at national level. As there is still relatively little use of 'pure' Inspire services, this might be used as an argument for not developing these services further.

2   Abbreviations and acronyms

INSPIRE   Infrastructure for Spatial Data in Europe
SCB   Statistics Sweden
SGI   Swedish Geotechnical Institute
SGU   Geological Survey of Sweden
SMHI   Swedish Meteorological and Hydrological Institute
SWEDAC   Swedish Board for Accreditation and Conformity Assessment
SIS/Stanli   Swedish Standards Institute

3   Introduction

Background
The EU Inspire Directive establishing an Infrastructure for Spatial Information in the European Community[1] entered into force on 15 May 2007. It aims to provide a legal framework for the 'soft' elements of an infrastructure for spatial information (spatial data) and helps to solve several problems currently associated with spatial data, for example the difficulty of obtaining access to the information, poor quality, problems in connection with data sharing between authorities, etc.

The Directive contains rules on how to achieve technical interoperability and specifies that authorities must disseminate spatial data in electronic form via network services, that they must share spatial data with other authorities and certain other bodies, and that a coordination structure must be created in every Member State. The Directive was a contributing factor in the government's decision to assign the responsibility for coordination in the spatial data sector to Lantmäteriet, the decision to establish the Geodata Advisory Board (*Geodatarådet*) (see Section 5.3 of this report) and the decision to produce a national spatial data strategy (see Section 5.1 of this report).

In accordance with the Directive, no later than 15 May 2010 Member States must send to the Commission a report including summary descriptions of:

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[1] Directive 2007/2/EC of the European Parliament and of the Council

a) how public sector providers and users of spatial data sets and services and intermediary bodies are coordinated, the relationship with third parties and the organisation of quality assurance;

b) the contribution made by public authorities or third parties to the functioning and coordination of the infrastructure for spatial information;

c) information on the use of the infrastructure for spatial information;

d) data-sharing agreements between public authorities;

e) the costs and benefits of implementing this Directive.

Every three years, and starting no later than 15 May 2013, Member States must send to the Commission a report providing updated information on the items referred to above.

This report has been updated for the period 2010-2012.

Method used for compiling this report

A large proportion of the content of this report is based on information published at www.Geodata.se and other supporting documents describing the national infrastructure for spatial information in Sweden, in particular points a, b and c above. Another important source of information was the minutes of the working group meetings between the authorities involved, which are held six times a year. A number of authorities and municipalities were also interviewed with a view to identifying observed benefits of the infrastructure. The implementation costs are based on the authorities' reporting of the appropriations utilised to the Swedish Ministry of the Environment. For point c above, information from the annual implementation reporting has also been used. The report was sent for review to people with in-depth knowledge of the various elements mentioned above (see document history above).

4   Coordination and quality assurance

4.1   Coordination

4.1.1 Member State contact point

Name and contact information

Member State Contact Point	
Name of the public authority	Lantmäteriet
Contact information:	Geodata Secretariat
Mailing address	SE-801 82 Gävle, Sweden
Telephone number	+46 771 63 63 63
Fax number	+46 26 61 32 77
E-mail address	geodatasekretariatet@lm.se
Organisation's website URL	www.lantmateriet.se, www.geodata.se
Contact person (if available)	Christina Wasström
Telephone number	+46 26 63 34 12
E-mail address	christina.wasstrom@lm.se
Contact person – substitute (if available)	Anders Rydén
Telephone number	+46 26 63 33 40
E-mail address	anders.o.ryden@lm.se

Role and responsibilities

Lantmäteriet has the role of Commission contact point on matters relating to the implementation of the EU Inspire Directive in Sweden. The role is assigned in the Act[2] and the Ordinance[3] on spatial information, which also govern the Swedish implementation of the Inspire Directive.

The role of contact point includes:
- being the contact point for the Commission in accordance with Article 19(2) of the Inspire Directive on matters relating to the Swedish infrastructure for access to and exchange of spatial data;
- responsibility for reporting to the Commission in accordance with Article 21 of the Inspire Directive with regard to how the coherent Swedish system for spatial environmental information, in other words the infrastructure for spatial information, is implemented and used;
- being Sweden's channel for communication with the Commission on matters relating to the implementation of the Inspire Directive and Sweden's representative at the EU level meetings relating to the implementation of the Inspire Directive;

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[2] SFS 2010:1767
[3] SFS 2010:1770

- coordination of and responsibility for consultations, proposals and other documents from the Commission, and coordination of the involvement of Swedish experts in the work of the European Commission to produce rules for the implementation of the Directive.

4.1.2 The coordination structure

Name and contact information

Coordinating structure supporting the Member State Contact Point	
Name of the coordination structure	Geodata Secretariat
Contact information:	Geodata Secretariat
Mailing address	SE-801 82 Gävle, Sweden
Telephone number	+46 771 63 63 63
Fax number	+46 26 61 32 77
E-mail address	geodatasekretariatet@lm.se
Organisation's website URL	www.geodata.se
Contact person (if available)	Christina Wasström
Telephone number	+46 26 63 34 12
E-mail address	christina.wasstrom@lm.se
Contact person (if available)	Anders Rydén
Telephone number	+46 26 63 33 40
E-mail address	anders.o.ryden@lm.se
Date and period of mandate	June 2006 – until further notice

Role and responsibilities

Lantmäteriet has the role of national coordinator in respect of the implementation of a national infrastructure for spatial data in Sweden. This role includes ensuring that an infrastructure for spatial data is in place, that the infrastructure is coordinated with the spatial data system within the European Union and that there is a continually accessible and operational gateway to the infrastructure on the Internet (access point). The role is assigned in the Act and the Ordinance on spatial information.

The **Geodata Secretariat** within Lantmäteriet has the task of organising, coordinating, leading and monitoring the coordination work. The coordination work includes:

- coordinating the Swedish implementation of the Inspire Directive by following developments within the sector and, via various working groups and other forums, conveying these to the relevant parties;

- ensuring that the joint authority-run Geodata Portal constituting Sweden's node within the EU system in accordance with the Inspire Directive is managed and developed;
- ensuring that the metadata catalogue, which constitutes the complete register of available spatial data and services in Sweden, is managed and developed;
- managing the technical framework which describes the requirements relating to metadata and spatial data services in the Swedish infrastructure and which is available in the Geodata Portal;
- managing the cooperation model and the agreements which determine how the organisation, management, coordination and distribution of responsibilities should be carried out, as well as the forms in which spatial data are to be provided and the conditions for their use;
- ensuring that relevant parties receive support to enable them to meet the requirements of the Inspire Directive with regard to the provision of data and services, and giving authorities, municipalities and other organisations the support they need to get involved, share in and otherwise avail themselves of the benefits of the infrastructure for spatial data and the cooperation.

In terms of organisation, the Geodata Secretariat is located within the Division Support Unit of Lantmäteriet's Land and Geographic Information Division (Figure 1). Ten people work in the Geodata Secretariat, distributed over five areas of responsibility.

The organisation model that has been established around the coordination has resulted in a 'virtual organisation', in which the management is separated from the ordinary linear management and the Geodata Secretariat coordinates Lantmäteriet's resources for implementing the coordination work.
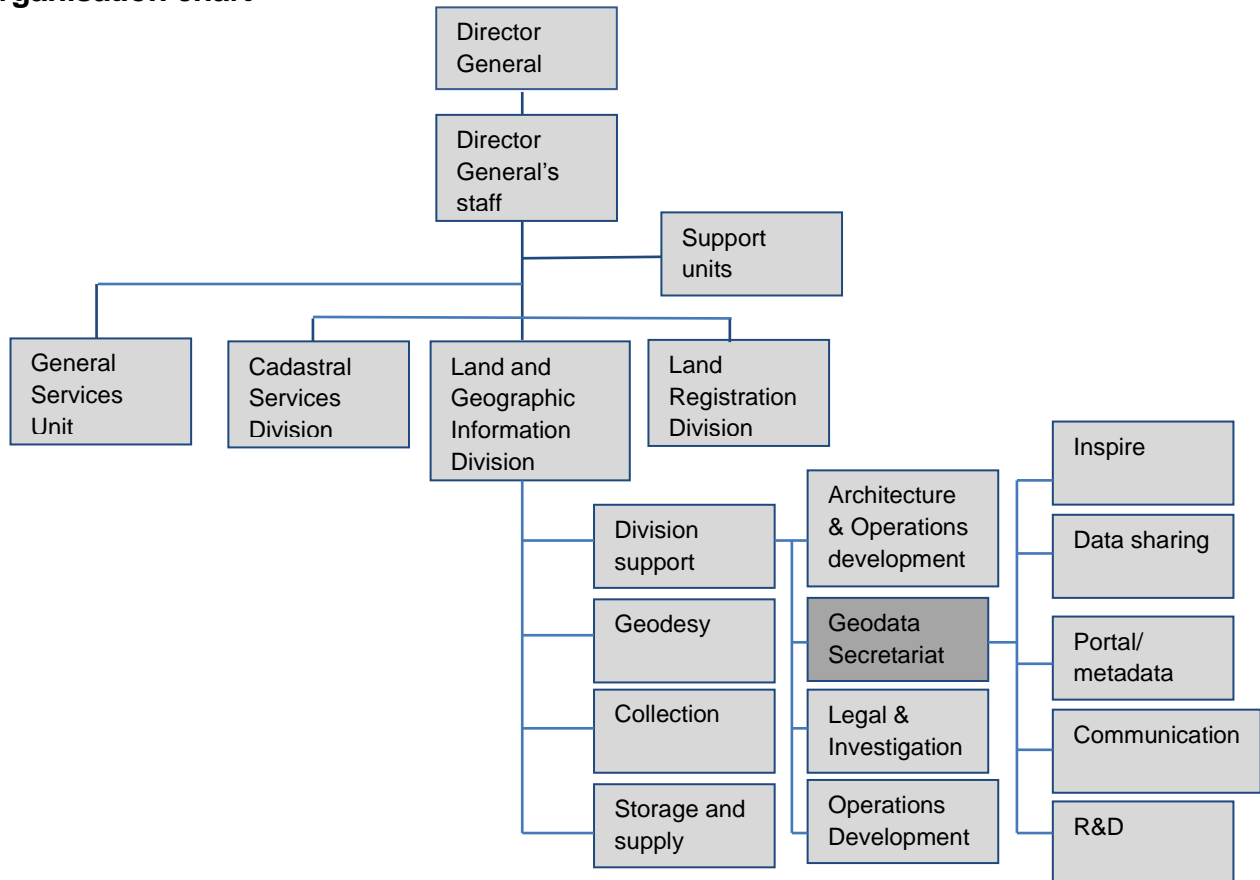
Organisation chart

Figure 1. In terms of organisation, the Geodata Secretariat is located within the Division Support Unit of Lantmäteriet's Land and Geographic Information Division

Relationship with third parties

The Geodata Advisory Board, which provides advisory services in relation to Lantmäteriet's coordination role (see also Section 5.3 of this report), and the Swedish standardisation body, the Swedish Standards Institute (**SIS/Stanli**), cooperate on matters relating to standardisation in connection with the implementation of the Swedish infrastructure for spatial data. For this purpose, there is an action programme involving activities that are based in the Geodata Advisory Board and implemented in, *inter alia*, the SIS/Stanli secretariat and technical committees.

The Geodata Secretariat works actively on behalf of research financiers and our decision-makers with a view to establishing a strategic basis for how research and development within the spatial data sector is to be enhanced in the future. An action programme has been drawn up which highlights the importance of increased cooperation between universities, institutions of higher education, industry and stakeholders in the public sector, as well as an increase in research funding within the sector. One step towards increased cooperation is the establishment of a national research and development forum.

An action programme has also been drawn up for education within the spatial data sector, focusing on Inspire-related matters. The matters concern the continuing training of professionals within various sectors who use the infrastructure or whose work involves its implementation. The action programme also deals with how matters relating to the infrastructure for spatial data can

be integrated more clearly into relevant courses at universities and institutions of higher education.

The Geodata Secretariat also has contacts with the ULI Geoforum [ULI: the Swedish Development Council for Geographic Information], in particular in the area of education and the provision of skills. The ULI Geoforum is a national association and a forum within the area of spatial data and geographic information technology and has nearly 200 members from among public authorities, municipalities, county councils, companies, institutions of higher education and other organisations.

Lantmäteriet's regional spatial data coordinators are an important resource for the Land and Geographic Information Division at regional and local level. Their task is to promote the further development and increased use of spatial information and property information within society, particularly in the municipalities. The municipalities are also represented in the Geodata Advisory Board and the Inspire working group via the Swedish Association of Local Authorities and Regions (SKL) (see also Section 5.3 of this report).

Overview of working practices and procedures

The Geodata Secretariat follows developments within the sector on an ongoing basis and draws together the requirements relating to the infrastructure in Sweden. This information is conveyed to relevant parties via various working groups and established forums (see also Section 5.3 of this report). The Geodata Secretariat also draws up guidelines and manuals to make it easier for the parties concerned to meet the requirements laid down.

Where necessary, the Geodata Secretariat implements targeted support initiatives in the form of various types of workshops, webinars and individual visits for those parties that request this. For example, several targeted workshops have been held to help with the preparation of metadata and services and with interpreting specifications. A number of webinars have also been held on the preparation of metadata. Individual visits are requested in order to provide a broader opportunity for disseminating information on the Inspire Directive and the implementation of the infrastructure for spatial data within a particular authority or organisation.

In order to show clearly that the development of a Swedish infrastructure for spatial data is a joint initiative that is run together with other stakeholders, a common logo and website have been produced (Figure 2). Via the website, both the parties involved and other stakeholders can find information on the development of the infrastructure for spatial information, and anyone who is interested can find and download information and documents relating to the infrastructure from the document archive. In addition, two open seminars are organised each year with a view to giving other users the opportunity to obtain an insight into what is happening within the spatial data cooperation and the implementation of an infrastructure for spatial data in Sweden.
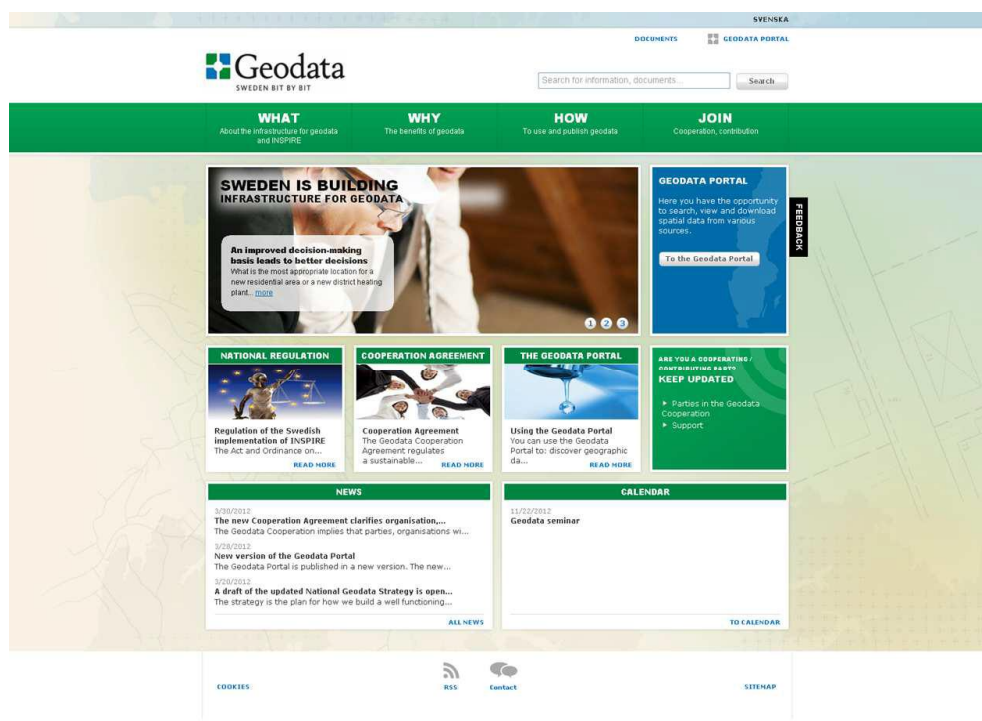
Figure 1 [*sic*]**.** Via Geodata.se (www.geodata.se) the parties involved and other stakeholders can find information on the development of the infrastructure.

In order to be able to provide continual support, particularly on matters relating to cooperation, a special support function has been established – Geodata Cooperation Support – through which parties can receive the support they need to get involved with, share in and otherwise avail themselves of the benefits of the infrastructure and the cooperation.

4.1.3 Comments on the monitoring and reporting process

The Geodata Secretariat compiles the list (the Inspire List) of the data sets that are covered by the Inspire Directive's implementing rules for interoperability and that are to be re-structured in accordance with these rules. In general, the Inspire List follows the requirements relating to the parties involved laid down in the Swedish Ordinance on spatial information. However, there is no 1:1 relationship between them, as the Swedish Ordinance provides a more general description of what is covered.

The reporting of the monitoring is carried out in three stages (Figure 3):

1. **Automatic generation of the Inspire List.** The Inspire List is generated automatically from information in the national metadata catalogue and stored in two separate Excel files, one for data sets and one for services. These are sent out to relevant parties for quality assurance and for any additional information to be added.
2. **Copying to Excel template.** Once the information in the Excel files has been through the quality assurance process and has had any additional information added the information is transferred to the Excel template that the Commission provides for the monitoring. This is done manually at the Geodata Secretariat.
3. **Uploading/reporting.** Once the information has been transferred to the template it is sent to the Commission by e-mail and also uploaded to EuroStat using the tool

developed for this purpose. The original Excel files are also made available on Geodata.se as PDF files.

[See original for figure]

Figure 2 [*sic*]**.** Reporting of the monitoring takes place in three stages: automatic generation, copying and uploading.

Metadata for data sets in Annex III are required to be published no later than 3 December 2013. There are therefore some data sets that cannot be automatically obtained from the metadata catalogue. They have to be entered manually by the respective authority. The number of requests for services cannot be generated from metadata either, but has to be generated from the log files for the respective service. A concept for the automatic generation of the number of requests has been produced and will be implemented.

In order to help the authorities to fill in the monitoring reports, a manual has been produced[4].

4.2   Quality assurance

4.2.1 Quality assurance procedures

It is assumed that the authorities will fulfil their commitments under the Inspire Directive and report any discrepancies to the Coordinator (the Geodata Secretariat). No specific procedures for ensuring that the authorities responsible for the information fulfil their commitments under the Inspire Directive have therefore been established. Activities that indirectly ensure quality in the infrastructure are summarised below:

Metadata: all metadata that is published must comply with the current standard, that is to say the national metadata profile. The national metadata profile is a specification and guideline for describing data and services in the Swedish infrastructure for spatial data in a uniform way. The metadata profile is based on ISO 19115 and satisfies both the Inspire requirements and national needs. There are various ways to publish metadata: either via an editing tool developed for this purpose, by uploading xml files using a web-based form or by metadata harvesting. All methods are approved for publication and have in-built quality controls. The metadata catalogue is used to automatically collect different types of compilations. To ensure that the compilations are correct, stringent requirements are laid down concerning the quality of the metadata.

Guidelines: guidelines to make it easier for the authorities to interpret and understand the requirements made of them by Inspire have been produced. The guidelines summarise the requirements that are laid down in various documents, they clarify these requirements and provide suggestions, where relevant, for Swedish interpretations and/or solutions for to how best to meet the requirements.

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[4] Handledning för rapportering av datamängder och tjänster 2012.pdf [Manual for reporting data sets and services 2012]

Nordic Data Sharing: a collaborative project between the Nordic countries has been initiated with the aim of evaluating how available services can be used in cross-border cooperation and what problems exist from a technical and legal point of view. The project focuses on access to data and services, interoperability between the countries' services and the usability of the services. The results produced by the project are expected to lead to recommendations for how the infrastructure between the countries can be integrated further.

Abstract Test Suite: an evaluation of Inspire's Abstract Test Suite (ATS) has been carried out[5]. The test used the ATS from the data specification Agricultural and Aquaculture Facilities. Out of a total of 30 tests in the ATS, 24 could be carried out. The remaining six could not be carried out, one of the reasons for this being the fact that file management within Inspire still does not work and that more versions of the data sets would have been needed. Of the 24 tests carried out, 16 were approved.

4.2.2 Analysis of quality assurance problems

No separate analysis of quality assurance problems has yet been produced. This is included in the work plan for the forthcoming reporting period.

4.2.3 Measures taken to improve the quality assurance

Beyond the activities mentioned above, no special measures have yet been taken to improve the quality assurance of the infrastructure and its implementation. This is included in the work plan for the forthcoming reporting period.

4.2.4 Quality certification mechanisms

A preliminary study to investigate how certification of the testing of data sets and services can be implemented has been carried out (Certification within spatial data[6]). Representatives from authorities, private stakeholders and other interested parties took part in the preliminary study.

The objective of the study was to produce a model for certification, including, among other things:

- the conditions for certification; e.g. consequences of certification with or without accreditation;
- responsibilities, roles and process for certification;
- how an organisation can be accepted as a certification body;
- rules for certification (requirements, issuing of certificates, control, etc.);
- proposals for training.

Many questions remain unanswered, however. For example, how should the certification rules be formulated? How should the requirements be laid down? If there are standards, what are they? How should the certificates be issued? How should control and review be carried out? How does a certification organisation get accepted?

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[5] INSPIRE Abstract Test Suite Evaluation, GeoTest 2013

[6] *Certifiering inom geodata – En förstudie* [Certification within spatial data – A preliminary study], 25.11.2010, Solgerd Tansilli, the GeoTest project.

As Inspire does not currently impose any specific requirements concerning certification, certification without accreditation is the model that is considered most effective in order to be able to get started with the testing of data and services as quickly as possible. In future, it will be possible to create a new accreditation area for spatial data within SWEDAC.

5   Functioning and coordination of the infrastructure

5.1   Overview of the spatial data infrastructure

The Swedish infrastructure for spatial data is established jointly by authorities, municipalities and other organisations in Sweden and is based on well-developed cooperation between different parties on the basis of optional agreements and arrangements. The Inspire Directive, which contains common rules for the exchange of, access to and use of public spatial data and services, lays the foundation for its implementation. This means that authorities and other organisations covered by Inspire must bring their data and services into line with the Directive.

The Swedish implementation of Inspire is governed by the Act and the Ordinance on spatial information. The legislation lays down clear requirements for the authorities and organisations that are specified as being responsible for spatial data in Sweden and also for Lantmäteriet in its capacity as coordinator of the infrastructure implementation. The Ordinance clarifies which authorities and organisations are responsible for information and what information this responsibility relates to.

The Act requires, among other things, that authorities and organisations responsible for information make spatial data and spatial data services available to everyone. This means that:

- the general public must be able to search, view and download spatial data via the Internet;
- authorities and organisations responsible for information must supply metadata and spatial data to one another by data sharing;
- searching and viewing with the aid of services must be free of charge.

Together with the Geodata Advisory Board, the authorities and organisations involved and the Swedish Association of Local Authorities and Regions, Lantmäteriet has produced a strategic plan for how the infrastructure is to be implemented – the National Spatial Data Strategy[7]. The strategy is a guide for all stakeholders in Sweden and constitutes a common basis for the implementation of the infrastructure and for Sweden's actions in connection with European and international cooperation within the area.

With the vision to make it **'as easy as possible for as many as possible to find and use spatial data'**, the aim of the National Spatial Data Strategy is to provide guidance for producers and users of spatial data and property-related information, and presents seven overarching objectives and strategies indicating how the relevant authorities and organisations are to work to achieve the objectives.

The vision is for the following seven objectives to be met by 2020:

- **The benefits of the infrastructure are known:** users and producers of spatial data are aware of the benefit of the infrastructure for quickly finding the right information that is

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[7] *Nationell Geodatastrategi – Sverige bygger en infrastruktur för geodata* [National Spatial Data Strategy – Sweden is building an infrastructure for spatial data], 13.9.2012, *Lantmäteriet*

usable. Knowledge of the benefits provides increased understanding and motivation to take advantage of the potential of spatial data, which will help with the continued development of the infrastructure.

- **The provision of information is governed by an appropriate regulatory framework:** the provision of information is governed by an appropriate regulatory framework with clear and simple legal provisions. The regulatory framework is adapted to modern *e*-governance. This provides the conditions to enable the efficient provision, use or other handling of spatial data from various sources. The regulatory framework is based on finding a balance between the need to protect important public interests, such as privacy, confidentiality and security, and the users' need for easy access to spatial data. The information is handled in a legally sound manner.

- **Conditions and fees for use of spatial data are simple and uniform:** we have simple and uniform conditions and fees for spatial data, which contributes to broad and extensive use. Users of spatial data can easily obtain an overview of the conditions and fees that apply. The conditions and fees for use are relevant, non-discriminatory and clearly explained. Digital licence management gives the user quick and easy access to spatial data.

- **Spatial data and services are described clearly and in a user-friendly manner:** spatial data and services are described simply, uniformly and in a user-friendly way using what is referred to as metadata. Metadata describe, among other things, the timeliness and content of the spatial data and services, where they are found and how to obtain access to them. The descriptions are found in a common register, a metadata catalogue. Metadata make it possible to search for and find spatial data and services.

- **It is possible to combine spatial data:** we can combine spatial data in order to present, reach and analyse them together. In other words, we can place spatial data on top of one another and still retain readability. We can combine data from different sources without any special reworking.

- **Services are available and meet the needs:** users and producers of spatial data communicate with one another via Internet-based services. It is possible to combine different services in order to present and read spatial data together. In other words, they can be placed on top of one another and still retain their readability. The services make it easier and more efficient to obtain access to spatial data, for example. Use of the services facilitates the process for undertakings by, for example, simplifying access to current data and minimising duplicate storage.

- **Sound skills for using, implementing and managing the infrastructure:** we have sound skills which meet our needs with regard to developing and using the various components of the infrastructure in an optimum manner, and we have secured the future supply of skills by means of established training, research and development initiatives.

Lantmäteriet, as coordinator of the implementation of the infrastructure, produces an action plan each year describing the operational objectives of the coordination, and a plan and tactics describing how we are going about achieving the seven objectives. The action plan should be seen as a guide and support for authorities and organisations responsible for information and others contributing to the infrastructure for producing an action plan for their own organisation. Figure 4 shows strategic objectives that are to be achieved in order for the overarching objective 'spatial data and services are described in a clear and user-friendly manner' to be considered met.
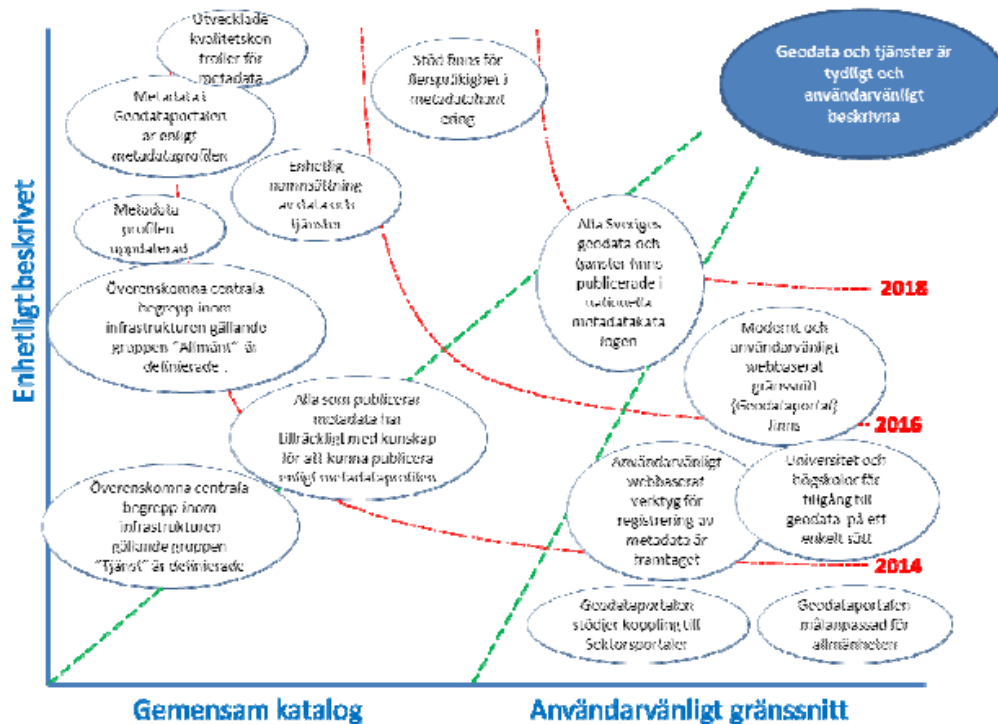
[See original for figure]

Figure 3 [*sic*]**.** The figure shows the strategic objectives that are to be achieved in order for the overarching objective for metadata to be considered met.

Key to figure:

Enhetligt beskrivet	Uniformly described
Gemensam katalog	Common catalogue
Användarvänligt gränssnitt	User-friendly interface
Utvecklade kvalitetskontroller för metadata	Developed quality controls for metadata
Metadata i Geodataportalen är enligt metadataprofilen	Metadata in the Geodata Portal comply with the metadata profile
Enhetlig namnsättning av data och tjänster	Uniform naming of data and services
Metadataprofilen uppdaterad	The metadata profile is updated
Överenskomna centrala begrepp inom infrastrukturen gällande gruppen 'Allmänt' är definierade	Agreed key terms within the infrastructure relating to the group 'General' are defined
Alla som publicerar metadata har tillräcklight med kunskap för att kunna publicera enligt metadataprofilen	Everyone publishing metadata has sufficient knowledge to be able to publish in accordance with the metadata profile
Överenskomna centrala begrepp inom	Agreed key terms within the infrastructure

infrastrukturen gällande gruppen 'Tjänst' är definierade

relating to the group 'Service' are defined

Stöd finns för flerspråkighet i metadatahantering

There is support for multilingual metadata management

Alla Sveriges geodata och tjänster finns publicerade i nationella metadatakatalogen

All of Sweden's spatial data and services are published in the national metadata catalogue

Modernt och användervänligt webbaserat gränssnitt (Geodataportal) finns

There is a modern and user-friendly, web-based interface (Geodata Portal)

Användervänligt webbaserat verktyg för registrering av metadata är framtaget

A user-friendly, web-based tool for recording metadata has been produced

Universitet och högskolor får tillgång till geodata på ett enkelt sätt

Universities and higher education institutions have easy access to spatial data

Geodataportalen stödjer koppling till sektorsportaler

The Geodata Portal supports interfacing with sector portals

Geodataportalen målanpassad för allmänheten

The Geodata Portal is in line with the objectives for the general public

Geodata och tjänster är tydligt och användervänligt beskrivna

Spatial data and services are described in a clear and user-friendly manner

5.2   Stakeholders

Figure 5 below shows the relationships between various stakeholders within the coordination structure that has been established in connection with the implementation of the Inspire Directive and the implementation of a National Infrastructure for Spatial Data in Sweden. The various stakeholders and their roles and responsibilities are described in Section 5.3 below.
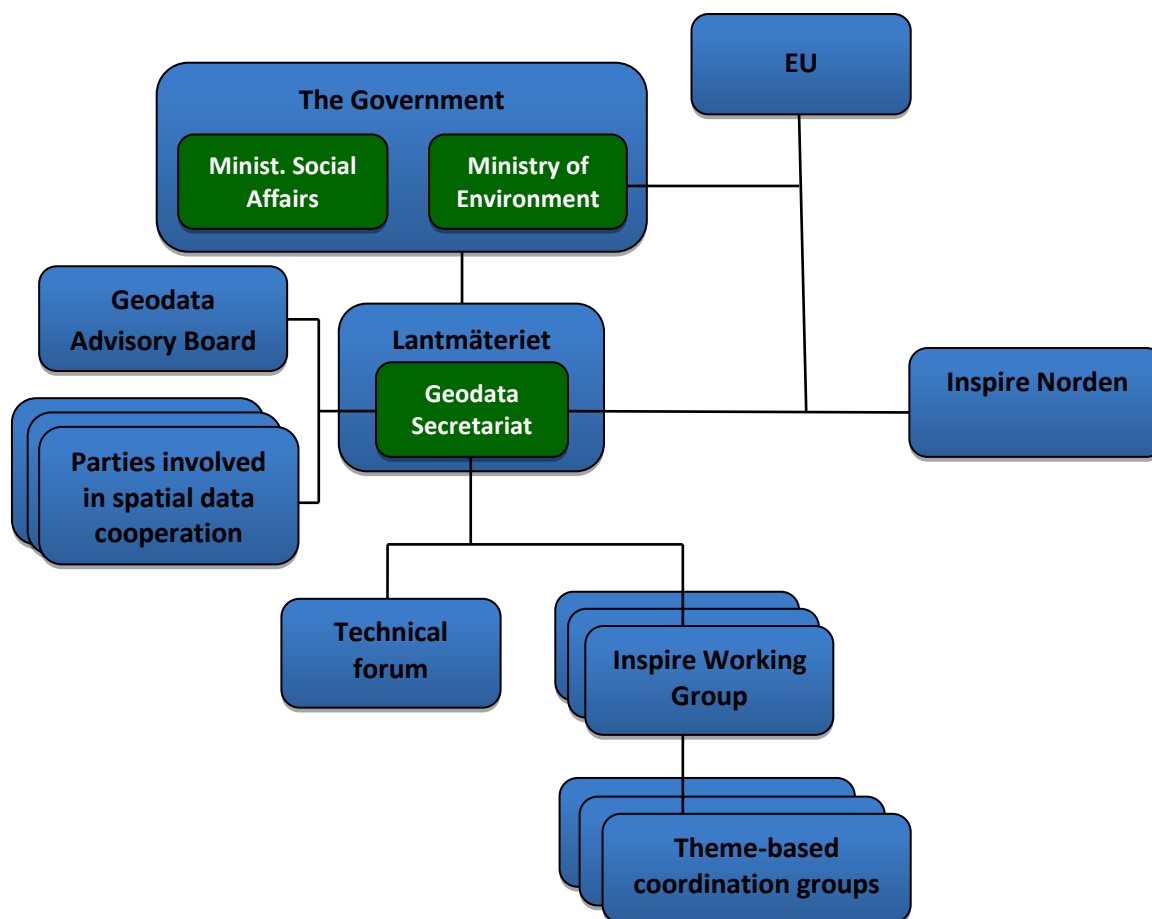
Figure 5. The figure shows the relationships within the coordination structure built around the implementation of the Inspire Directive in Sweden.

5.3   Roles and responsibilities

Together with the authorities responsible for information, **Lantmäteriet** is responsible for implementing the Inspire Directive at national level. The authorities and organisations that are responsible for information are those authorities and organisations which, under the Act and the Ordinance on spatial information, are required to make their spatial data available in accordance with the Inspire Directive. The Ordinance on spatial information clarifies which authorities and organisations are responsible for information and to which information this relates.

Lantmäteriet is responsible for coordinating the implementation and management of the infrastructure and is the driving force with regard to prioritising, initiating and leading the work. This involves, among other things, providing advice and support to the authorities and organisations responsible for information, development of the Geodata Portal, which is Sweden's node interfacing with the rest of the EU, and management of the form of cooperation – the spatial data cooperation – that has been developed and that constitutes Sweden's implementation of data sharing under the Inspire Directive. Lantmäteriet is also an authority responsible for information.

The **Geodata Secretariat** is the unit within Lantmäteriet with the task of coordinating the work and working closely with the Ministry of the Environment, which is formally responsible for the implementation of the Inspire Directive in Sweden. The Geodata Secretariat is also a contact point for communication with the European Commission on matters relating to the implementation of Inspire in Sweden.

The **Geodata Advisory Board** set up by the government supports Lantmäteriet in its coordination role. The Geodata Advisory Board comprises representatives of 13 different authorities and organisations in Sweden and provides advice on matters relating to the infrastructure for spatial data. Among other things, the Geodata Advisory Board is required to:

- contribute to the work relating to the national spatial data strategy for the overall provision of information within the spatial data sector
- deal with questions relating to matters of principle and of common national interest within the spatial data sector
- contribute to the development of the national and international infrastructure within the spatial data sector, for example by supporting the use of standards
- contribute to increasing coordination between the authorities concerned on matters relating to the development and provision of information
- contribute to the coordination of the infrastructure for the exchange of and access to spatial data

Geodata Advisory Board

- **Swedish Armed Forces**
- **Lantmäteriet**
- **Swedish Civil Contingencies Agency, MSB**
- **Swedish Environmental Protection Agency**
- **The City of Stockholm**
- **Swedish Maritime Administration**
- **Statistics Sweden, SCB**
- **Swedish Association of Local Authorities and Regions, SKL**
- **Swedish Meteorological and Hydrological Institute, SMHI**
- **Swedish Transport Administration**
- **Swedish Research Council**

The Geodata Advisory Board has set up a working group for matters relating to Inspire – the **Inspire working group**. The working group is managed by the Geodata Secretariat and comprises representatives of authorities that are responsible for information under the Act and the Ordinance on spatial information, the Ministry of the Environment and the Ministry of Social Affairs, the Swedish Association of Local Authorities and Regions and SIS/Stanli. The purpose of the working group is to support and coordinate the national implementation of Inspire. The Inspire working group meets approximately six times a year to discuss common issues, both current and long-term, and to exchange experiences and information. Where necessary,

workshops are held to be able to discuss a particular issue in more detail with a broader competence base.

Within the Inspire working group, seven **Theme-based Coordination Groups** have been established, in which several themes with similar or related content have been brought together. The purpose of these groups is to provide an opportunity for the authorities to support each other when many issues (particularly concerning specifications) have to be discussed with other authorities with responsibility within the same theme or a related theme. For each group, a convening authority has been appointed (the role as convenor is not permanent and does not entail any responsibility other than being the convenor). The coordination groups meet as and when required. For specific matters, there may be reason for the authorities concerned to take the initiative and hold their own meetings outside of the meetings of the coordination group.

For the technical interpretation of the Inspire regulatory framework there is a **Technical Forum**. The forum is managed by the Geodata Secretariat and consists of participants from a number of authorities with a great deal of experience of technical issues and in handling questions relating to the technical development and technical framework for an infrastructure for spatial data. Among other things, participants in the forum contribute their knowledge, act as referees and participate in various types of testing. Various kinds of development work can be initiated, for example to produce guidelines and/or recommendations relating to the technical infrastructure.

Inspire Norden is a Nordic network for Inspire-related issues. The network comprises the Nordic Inspire contact points and the competent ministries, together with experts in various areas. The aim is to share experience and exchange information and, where necessary, to agree on joint Nordic positions. Inspire Norden meets approximately 2-3 times a year to share experience and discuss common issues. The network also initiates and runs certain projects of joint Nordic interest.

Parties involved in the spatial data cooperation are the authorities, municipalities and other organisations that carry out public tasks and that have signed a cooperation agreement. The parties can actively influence development and management of the infrastructure for spatial data by participating in the meetings of the parties. The meetings of the parties deal with strategic issues that that jointly affect the parties. The meeting of the parties is the highest spatial data cooperation body in which operational decisions are taken.

5.4   Measures taken to facilitate sharing

In accordance with the Inspire Directive, each Member State must adopt measures for the sharing of spatial data and services between its public authorities. The measures must enable those authorities to gain access to the spatial data and spatial data services of other authorities and to use these for the purposes of public tasks that may have an impact on the environment.

A description is provided below of the main measures taken to facilitate data sharing between authorities and organisations in Sweden:

1. **Legal framework implemented** – the Act and the Ordinance on spatial information govern the Swedish implementation of the EU Inspire Directive. The Act aims to establish a coherent system for sharing digital spatial data. The infrastructure is to comprise useable spatial data for activities and measures that affect people's health or

environment. The Ordinance on spatial information specifies which authorities are responsible for information, what data they are responsible for and what their obligations are. Lantmäteriet is specified as coordinator of the Swedish infrastructure for access to and sharing of spatial data.

2. **National Spatial Data Strategy developed** – the National Spatial Data Strategy has been developed as a guide for producers and users of spatial information and property information with regard to the development and use of standards and specifications, metadata and metadata services, spatial data services for the dissemination of information, policy for access and use, research and training and the organisation and forms of cooperation.

3. **Coordination model developed** – the coordination model is the Swedish implementation of the Inspire requirements relating to data sharing. It describes how we collect, present and supply information, what technology we use, how we communicate our spatial data and what conditions apply to the use of spatial data. The coordination model includes three different forms of cooperation:

   - **Spatial data cooperation** – in which public authorities, municipalities and other organisations sign agreements in order to gain access to a collection of spatial data.
   - **Contribution** – in which all stakeholders can publish metadata and make their spatial data products accessible via the Geodata Portal.
   - **Optional contribution** in accordance with Inspire – in which, in accordance with the requirements of the Act on spatial information, everyone has the opportunity to publish metadata for spatial information via the national Geodata Portal.

4. **Geodata Portal developed** – the Geodata Portal is the gateway to web-based spatial data and spatial data services in Sweden and also constitutes Sweden's node in the European Inspire Portal. The Geodata Portal is also the interface with the Swedish Metadata Catalogue, where metadata is required to be placed to make it possible to search and view spatial data from different authorities and organisations.

5. **Technical framework developed** – the technical framework describes the requirements applying to metadata and spatial data services in the Swedish infrastructure for spatial data and available via the Geodata Portal. Among other things, the framework specifies the requirements arising from the Inspire implementing rules applying to metadata and spatial data services. The framework acts as a support and background for the technical commitments that apply in connection with participation in the spatial data cooperation or contribution to the infrastructure for spatial data.

6. **National metadata profile produced** – the national metadata profile for spatial data is a specification and guide for the uniform description of data and spatial data services. The metadata profile is adapted for data producers, users and system suppliers, among others, who wish to publish metadata in the Geodata Portal. The metadata profile must be followed in order to be able to publish in the Geodata Portal.

5.5 Cooperation

The spatial data cooperation is the arrangement describing how authorities and organisations in Sweden share data. It involves a common method of organising, constructing, managing and making available spatial data and facilitating its use. By getting involved in the spatial data cooperation, authorities and organisations gain access to a pool of spatial data from all participating parties.

An important element of the spatial data cooperation is the fact that authorities responsible for information offer their spatial data to each other for public use for a fixed annual fee, which is set in advance on the basis of a number of agreed parameters. The authorities' complete collection of spatial data is listed in a product catalogue, which specifies those spatial data that are included in the spatial data cooperation.

Municipalities, public authorities and other organisations with public tasks but which are not responsible for information under the Act and the Ordinance may also become parties. This means that they are permitted to utilise, for public use, the complete collection of spatial data provided by the authorities responsible for information for a fixed annual fee. By 1 January 2013, 116 of 290 municipalities had signed agreements enabling them to access the authorities' spatial data (Figure 6).

Lantmäteriet has also drawn up a special agreement for the education sector. This agreement provides students and researchers at universities and institutions of higher education with free access to large portions of the Lantmäteriet's spatial data. The Swedish Research Council funds user licences and distribution. The actual distribution of the spatial information is carried out via a download service that has been developed and is managed by the Swedish University of Agricultural Sciences, SLU.
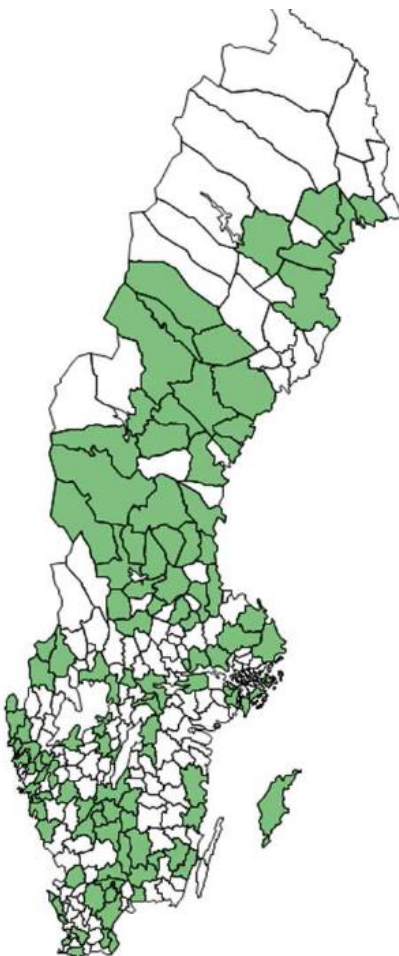

Figure 4 [*sic*]**.** By 1 January 2013 a total of 116 out of 290 municipalities had signed an agreement on access to public authorities' spatial data.

5.6   Access to services via the INSPIRE Geoportal

The Swedish Geodata Portal (Figure 7) (http://www.geodata.se/GeodataExplorer/) allows producers of spatial data to describe their information on spatial data and spatial data services and make it available via metadata published in the National Metadata Catalogue. Users get an overview of what is available and also the opportunity to assess data sets by using viewing services in the Geodata Portal's map viewer (Figure 7). The Geodata Portal is open to everyone. No agreement is required to view and search the Portal.

The components of the technical solution for the Spatial Data Catalogue are

(i)   a metadata catalogue;
(ii) a graphical user interface (GUI); and
(iii) a catalogue services for the web (CSW) interface.

The Swedish **Geodata Portal** is linked to the European spatial data portal – the Inspire Geoportal – via the CSW interface, which makes it possible for the Inspire Geoportal to correctly harvest metadata from the Swedish Metadata Catalogue.

The Geodata Portal has been developed in collaboration with the other Nordic countries.
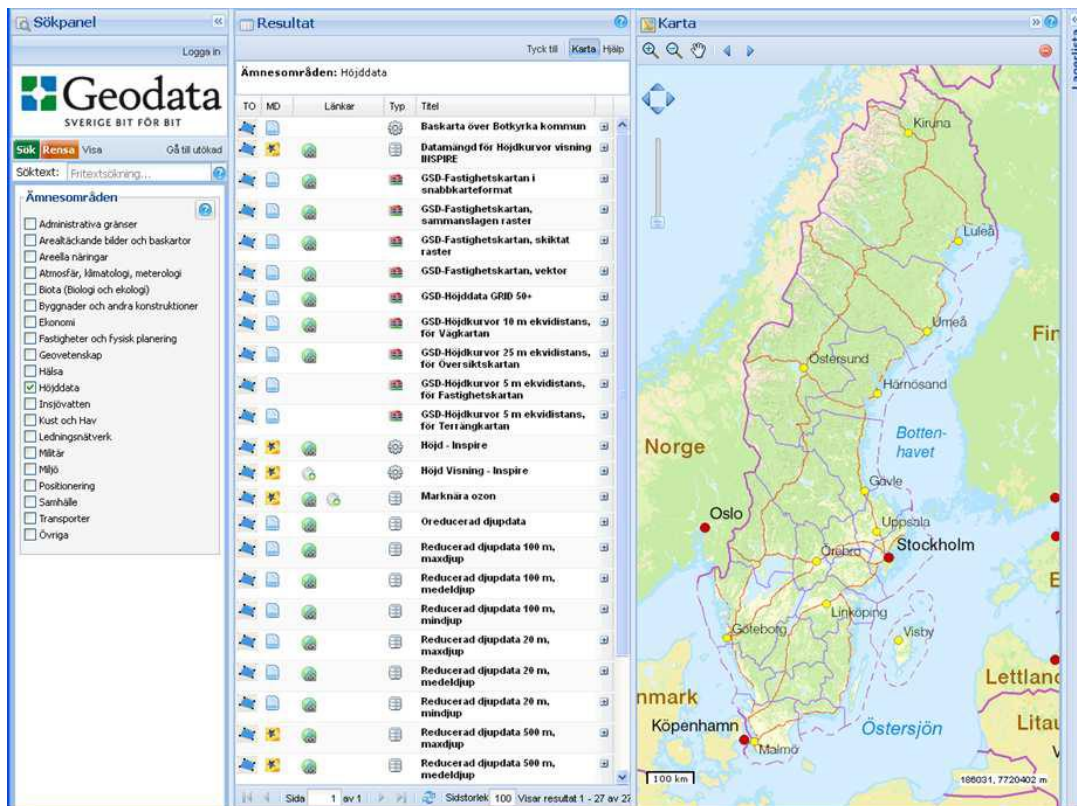

Figure 5 [*sic*]. The Swedish Geodata Portal enables producers of spatial data to describe their information on spatial data and spatial data services and make it available via metadata published in the National Metadata Catalogue.

6   Use of the infrastructure for spatial information

6.1   Use of spatial data services within the infrastructure

An indication of how the use of spatial data services has developed within the infrastructure, with particular reference to the Inspire services, is provided by the number of requests for the services reported annually to the Commission by the authorities in accordance with the monitoring and reporting implementing rule.

A summary of the number of reported requests for services for 2011 and 2012 shows that several of the authorities experienced an upward trend in the use of the services. For example, the Swedish Environmental Protection Agency reports a more than 100-fold increase in the number of requests for services since they were launched at the end of 2011.

The Geological Survey of Sweden (SGU) reports an approximate three-fold increase on average in the number of requests for services, with use of the viewing service for soil types at a scale of 1:50 000 having increased in particular (eight-fold). Lantmäteriet reports an approximately 14-fold increase in the number of requests for services.

It is worth noting that, when the reporting was carried out for 2011, the majority of services had only recently been launched and users had not yet had time to embrace these and integrate them into their existing systems. Moreover, for several of the services, in particular those provided by Lantmäteriet and the Swedish Environmental Protection Agency, the annual total was interpolated on the basis of the period they were in use, which gives a lower starting value than would probably have been the case had they been in use longer.

6.2   Use of the spatial data sets covered

During the reporting period, the focus was on producing metadata and services for those data sets that are covered by Inspire. There has therefore been no opportunity for using or testing whether Inspire data can be used/is used as input data for other directives, or for reporting for these.

It has been discussed, including at the workshop organised by the Commission on 26 March 2012, whether it will be possible in the long term for the data sets covered by Inspire to be used for the implementation of other directives and also to meet the reporting requirements imposed by these directives. The results of these discussions show that for some time to come there will remain a need for two separate pathways, one for reporting under other directives and another one to meet the data harmonisation requirements of Inspire.

One problem is that there is a lack of coordination between different specifications and other directives. For certain themes, such as Statistical Units, it is expressly stated that the specification only covers the spatial object, whereas other specifications also cover the data generated for reporting, for example for the EU Ambient Air Quality Directive and Water Framework Directive. Work on the specifications seems so far to have focused more on coordination with other data specifications than on coordination with the reporting directives.

6.3   Use of the spatial data sets by the general public

In the implementation of the Swedish infrastructure for spatial data and the implementation of Inspire the focus has been on the authorities' exchange of data and services. The Geodata Portal is, however, available to any interested parties in society wishing to search for and view data, including the Swedish Environmental Protection Agency's information on Natura 2000, Ospar, Helcom and Ramsar sites. As yet, no observations have been made with regard to how and to what extent the general public use this information.

6.4   Cross-border use

The Nordic countries developed cross-border cooperation a long time ago, and arrangements are entered into when the need arises. For example, the Nordic mapping agencies share data with one another in connection with the production of small-scale maps that extend into the other countries' territories and use common locations for roads and watercourses in large-scale mapping of border areas.

An agreement has recently been concluded between the mapping agencies in the Nordic countries concerning access to cartographic material for crisis management. The agreement gives the countries in question access to cartographic information 10 miles into the respective countries in the event of a crisis.

At a regional/global level, authorities such as the Swedish Civil Aviation Administration, the Swedish Maritime Administration, SMHI, etc. already share data with sister organisations in other countries (weather forecasts, for example) or with umbrella organisations (such as EuroControl for aviation), and there are several examples of authorities that are involved in various thematic projects (SGU and OneGeology), etc.

6.5   Use of transformation services

The general view at the present time is that harmonised data will be stored as separate layers (predefined data sets). Alternatively, extraction routines will be developed to fetch data from existing databases. In other words, the transformation will take place within the viewing and download service.

7   Data sharing arrangements

7.1   Data sharing arrangements between public authorities

In accordance with the Act and the Ordinance on spatial information, authorities responsible for information must cooperate by giving each other access to the spatial data and spatial data services that are covered by Inspire, so that the information and services can be used when any public tasks that may affect the environment are carried out. Cooperation of this kind must also take place with:

- those responsible for information under equivalent provisions in other countries within the European Union;
- European Union institutions and bodies set up by means of international agreements to which the European Community and the European Union Member States are parties; and
- authorities, municipalities and individual bodies within the European Union which, without being responsible for information, carry out public tasks that may affect the environment.

The agreements governing access to spatial data sets and data services are those drawn up in connection with the **Cooperation Model** (see also Sections 5.4 and 5.5 of this report). These are:

1. **Cooperation agreement for spatial data cooperation** – the cooperation agreement for spatial data cooperation governs the long-term cooperation within the infrastructure, based on implementing the National Spatial Data Strategy. Parties involved in this cooperation may be:
    - authorities responsible for information under the Act and Ordinance on spatial information, which are based on the EU Inspire Directive;
    - municipalities, public authorities and other organisations which carry out public tasks but are not responsible for information under the Act and Ordinance on spatial information, which are based on the EU Inspire Directive.
    - The cooperation agreement specifies how the organisation, control, coordination and division of responsibility are to be carried out, as well as the technical requirements, the forms in which spatial data are to be provided and the conditions for use of the spatial data.

    An important element in the cooperation agreement is the fact that authorities responsible for information offer their spatial data to each other for public use for a fixed annual fee, which is set in advance on the basis of a number of agreed parameters. The authorities' complete collection of spatial data is listed in a product catalogue, which describes those data that are provided within the data sharing arrangements.

    Municipalities, public authorities and other organisations with public tasks but which are not responsible for information under the Act and Ordinance on spatial data may also become parties to the spatial data cooperation. This means that, for a fixed annual fee,

they can access the complete collection of spatial data provided by the authorities responsible for information for public use.

2. **Contribution agreement** – by signing a contribution agreement, all interested parties which fulfil certain basic conditions have the right to publish metadata and make their spatial data products available via the Geodata Portal. The requirements for contribution are that:

   - metadata are to be described in accordance with a set national metadata profile;
   - if spatial data products are to be provided via services, they must satisfy a number of technical requirements;
   - spatial data are to be of public interest and be fit for purpose.

   It is possible to just describe metadata without making spatial data services accessible.

   The spatial data coordinator recommends that contributors use the same conditions for use as the parties to the cooperation agreement commit to.

3. **Optional contribution contract** – optional contribution provides the opportunity to publish metadata and provide spatial data products relating to spatial information in the Geodata Portal. Among other things, the agreement specifies the commitments and responsibilities applying to stakeholders and Lantmäteriet in its role as national spatial data coordinator. Optional contribution involves the same obligations as for authorities responsible for information and is regulated in agreements for optional contribution in accordance with Inspire and the Act and Ordinance on spatial information. Applications are examined by Lantmäteriet.

A separate framework has been developed for **licensing** of spatial data. The framework is based on Commission recommendations[8] and creates a common foundation with common definitions and conditions for different categories of use. The framework applies to:

- authorities and organisations responsible for information under Inspire;
- authorities and organisations that claim protection under the Act on copyright for literary works and works of art[9];
- authorities and organisations that have entered into spatial data cooperation.

Authorities and organisations must follow the common framework for use, the '*ramverket för nyttjande*'. It is recommended that other stakeholders participating in the infrastructure for spatial data also follow the framework, although there is no requirement for these stakeholders to do so.

When supplying spatial data, those responsible for information must use an open licence or a specific licence.

Open licence – an open licence gives general conditions for use. The open licence is to be used when:

- the organisation responsible for information claims protection under the Act on copyright for literary works and works of art;

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[8] Guidance on the 'Regulation on access to spatial data sets and services of the Member States by Community institutions and bodies under harmonised conditions'.
[9] SFS 1960:729

- no special conditions are required on account of any statutory instrument.

Specific licence – the specific licence is used when the organisation responsible for information claims copyright. The specific licence defines different categories for further use, referred to as use categories. For each category there are set conditions for the use of spatial data.

As yet, no digital licence management has been implemented. This is an objective in the Spatial Data Strategy and will be implemented at some point in the future.

7.2 Data sharing between public authorities and EU institutions and bodies

The data sets and services that are provided freely within Sweden are also provided freely to the EU institutions and bodies and to authorities in other countries. In general, the same business model applies as in Sweden. The conditions are restricted to environmental purposes. The Act and the Ordinance on spatial information enable Lantmäteriet to enter into cooperation agreements on matters relating to the cooperation of another party responsible for information if Lantmäteriet and the party responsible for information both agree.

To this end, Lantmäteriet has produced agreement templates for data sharing with the EU institutions and bodies, as well as with authorities in other countries. An authority that wishes to take advantage of this opportunity signs an authorisation agreement with Lantmäteriet, allowing the latter to sign a data sharing agreement with the party concerned within the EU or other country. Lantmäteriet then signs an agreement with the party concerned within the EU or other country wishing to obtain access to the data and services offered by the authority. The agreement also contains pricing information for the data and services, conditions for use and other information that is important for the sharing of data and services with the other party.

When a request for the data and services offered is received, Lantmäteriet informs the authority concerned, which arranges the supply of the requested data and services and sends an invoice for payment, where relevant.

7.3 Barriers to data sharing and action taken to overcome them

The regulations that currently exist for Inspire – the Act and Ordinance on spatial information – provide the fundamental conditions required for sharing spatial data sets and data services in Sweden.

8   Cost/benefit aspects

8.1   Costs resulting from implementation of the Inspire Directive

During the period 2010-2012, the government allocated SEK 50 million per year for the implementation of the Inspire Directive in Sweden, of which SEK 30-33 million per year went to Lantmäteriet in its capacity as coordinator and SEK 17-20 million per year were distributed among authorities responsible for information that had requested funds. The appropriated amount was intended to be used to finance the coordination of the implementation, to develop a national portal and to finance certain other additional costs resulting from the directive, including the development of metadata for the data sets and services covered by the directive and the development of services for the supply of the data sets. Other additional costs of the implementation were financed within the authorities' appropriate framework.

In the spending authorisations for 2012, the Swedish Ministry of the Environment asked the authorities that had been allocated funds from the appropriation to report back on how the allocated funds were used. The results for 2012 should relate to costs for the work on developing metadata and information management services – distributed over viewing, download, conversion and connection services – and for bringing existing data into line with the specifications of the Inspire Directive.

As the requirement to report back did not apply to all authorities concerned, a summary has been compiled in which the mean costs for developing a metadata record or a service have been calculated. Figure 4 [*sic*] below shows the highest and lowest cost reported and the annual average cost of developing and maintaining a metadata record/service in accordance with the Inspire Directive. The values are based on the costs of developing metadata and services reported by the authorities themselves. The very highest and very lowest values (outliers) in each category have been discarded.
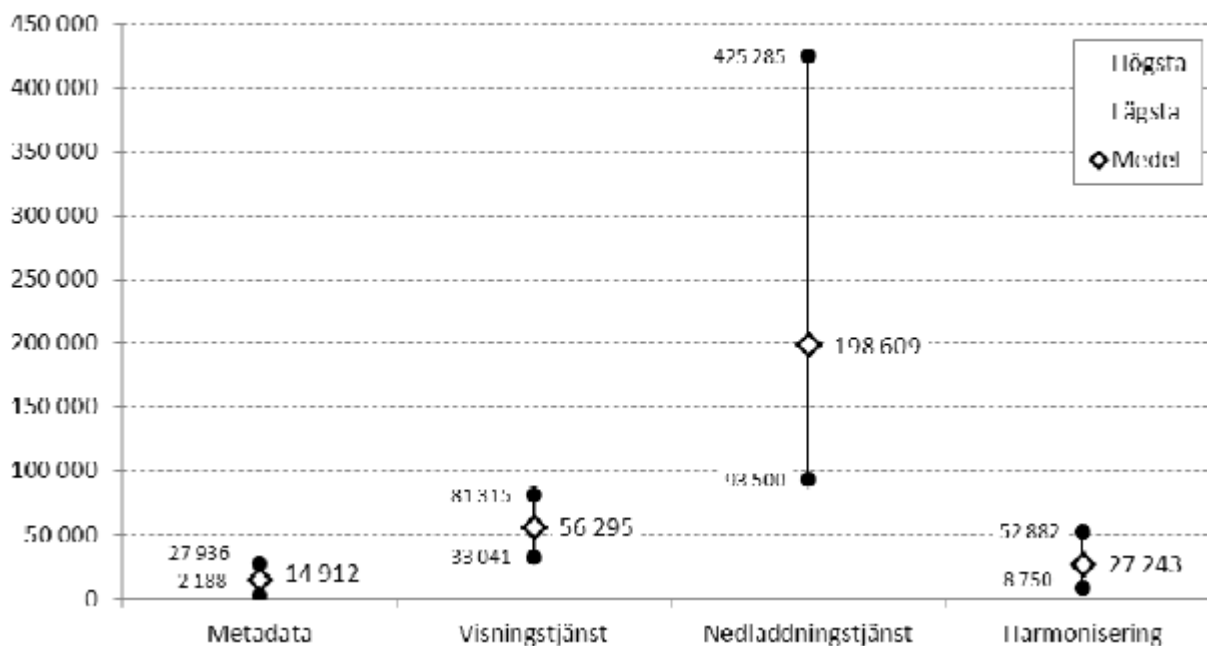
Figure 6 [*sic*]. The graph shows the average cost of developing and maintaining a metadata record/service in accordance with the Inspire Directive, based on costs reported by the authorities. The very highest and very lowest values (outliers) in each category have been discarded.

Key to figure:

Högsta	Highest
Lägsta	Lowest
Medel	Mean
Metadata	Metadata
Visningstjänst	Viewing service
Nedladdningstjänst	Download service
Harmonisering	Harmonisation

As the work to develop services is ongoing, the results of the summary are merely indicative and should be seen as a rough estimate. The statistical base is also small. The few costs reported for conversion and connection services have been excluded completely, as only a small amount of development work has been carried out for these services so far. The summarised costs for harmonisation of data should be seen as initial costs, as hardly any of the authorities have yet reported that they supply harmonised data.

Based on the calculations carried out on the basis of the reported costs, the total cost of the implementation of Inspire during 2012 has been estimated. Table 1 shows the results of this estimate, where the calculated mean cost per metadata record/service has been multiplied by the number of reported metadata records/services in the Inspire list. Table 1 also includes costs for IT infrastructure, reporting and coordination.

Table 1. The table shows the results of the estimated total cost of implementation in 2012, where the calculated mean cost per metadata record/service has been multiplied by the

number of metadata records/services reported in the annual monitoring. Costs for IT infrastructure, reporting and coordination have also been included.

	Mean cost	Number	Total
IT infrastructure	6 000 000	1	6 000 000
Metadata	15 000	259	5 189 376
Harmonisation	27 000	23	626 589
Viewing services	56 000	73	4 109 535
Download services	200 000	34	6 752 706
Reporting	500	600	300 000
Coordination	19 850 000	1	19 850 000
		Total:	41 544 000

The category **IT infrastructure** includes development and maintenance of the Swedish Geodata Portal and the national metadata profile and development of a metadata editor with accompanying documentation and training initiatives. The work is being carried out by Lantmäteriet in its capacity as coordinator. Certain authorities have also reported a need to purchase hardware and software, particularly those authorities with no previous experience of spatial information. The authorities that already manage large quantities of information have reported a need to restructure their existing systems, which in certain cases involves considerable costs. The latter are not reflected in Table 1.

The category **Metadata** includes the metadata producers' costs, both for developing metadata and for maintenance of that metadata. The initial costs can be assumed to be slightly higher, as it is necessary for producers to acquaint themselves with the national metadata profile that has been produced for this purpose and to learn to use the tools developed to publish metadata in the Geodata Portal. It is assumed that the authorities will update their metadata on an ongoing basis, but at least once a year.

The category **Harmonisation** includes the costs reported by the authorities for bringing current data sets into line with the Inspire specifications. Since only a few authorities were affected by the harmonisation requirements during the period, most authorities have merely carried out various types of preliminary studies prior to harmonising the data. For example, some authorities participated in the tests organised to determine the extent to which data following the current specifications satisfies the Inspire specifications.

The category **Viewing services** includes the costs reported by the authorities for developing viewing services. The spread of reported costs is relatively small, but, generally speaking, the higher costs are reported by larger organisations. The mean may be rather low in view of the fact that the services are to be established for 99 % availability.

The category **Download services** includes the costs reported by the authorities for developing download services. The spread of reported costs is relatively large and, as for viewing services, the higher costs are generally speaking reported by larger organisations. The costs vary a great deal depending on the solution chosen. The simple form of a predefined data set via file download is relatively easy to implement, as is file downloading via Atom stream. Direct access via WFS is more complicated and costs more to implement.

The category **Reporting** includes the costs for the time (estimated number of hours) that the authorities spend updating the Inspire list and the costs incurred by the coordinator for compiling the results. The time required by the coordinator to produce the Inspire report is also included.

The category **Coordination** includes the costs of coordinating the implementation of Inspire in Sweden, the development and management of the operational model created within the framework of the spatial data cooperation, and is responsible for the authorities' common communication channel, represented by Geodata.se, and it supports the other areas of responsibility when it comes to providing information and information material. The support provided by the Geodata Secretariat to the authorities concerned in the form of external meetings, workshops, training, development of manuals and guidelines etc. also forms a large part of the coordination. Coordination also includes costs in connection with Lantmäteriet's role as contact point with the EU on matters relating to the implementation of Inspire in Sweden.

The authorities' costs for participation in the Inspire working group and theme-based coordination groups and their own work on consultations, dissemination of information within their own organisations, etc. are not included in this total. Neither do the estimates include the authorities' and the municipalities' costs in connection with cooperation.

8.2   Benefits observed

For the purpose of identifying examples of actual benefits of the spatial data cooperation and the implementation of Inspire in Sweden, interviews were conducted with five municipalities and 10 authorities[10]. The aim of the interviews was to gather together and document any benefits experienced by authorities and municipalities involved in the spatial data cooperation. In a number of cases it was also possible to describe clear 'before' and 'after' situations, for example where working methods have changed on account of the increased use of services.

A summary of the most prominent benefits observed, divided into increased efficiency, better results and broader benefits, is provided below.

8.2.1 Increased efficiency

Of the examples that indicate an increase in efficiency, that is to say benefits that result in authorities and other organisations being able to improve the efficiency of their operations, the following can be mentioned in particular:

One agreement: the spatial data cooperation and the opportunity to sign *one* agreement and obtain access to the whole pool of spatial information from the contributing stakeholders is mentioned by both municipalities and authorities as being one of the biggest benefits of the infrastructure and the spatial data cooperation. Previously it was even necessary in certain

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[10] Compiling the benefits of the infrastructure for spatial data

cases to have one agreement for each specific product from a supplier. For every new agreement, municipalities and authorities were forced to invest time, which therefore incurred costs.

The spatial data cooperation has resulted in a much simpler and more cost-effective process for the management of agreements. In the County Administrative Boards, for example, the central IT department signs a single agreement that applies to all County Administrative Boards, which saves time and costs for all of the others. The County Administrative Boards also emphasise the advantages of not having to negotiate in respect of costs and conditions and that there is only one invoice per year that needs to be dealt with. For the municipalities, the spatial data cooperation has considerably reduced internal invoicing.

The City of Gothenburg has developed an internal financing model inspired by the spatial data cooperation business model but with its own parameters, and an internal agreement that replaces earlier agreements with the administrative departments. It has also developed its own product catalogue for data that all administrative departments can obtain access to via the agreement. The City of Gothenburg is establishing its own infrastructure at administrative level in order to disseminate data via services within the city.

Fixed annual cost: several of the interviews indicate that the fixed annual cost in the spatial data cooperation makes it easy to plan the budget for the purchase of spatial data. For example, the fixed cost for each municipality or authority means that they do not need to consider whether they can afford to purchase the spatial data they need, which has also had the advantage of making it easy to gain rapid access to spatial data for projects or for consultants carrying out tasks for the municipality.

Certain authorities, and also municipalities, previously had to request money internally, which takes time. Now access to the spatial data that is required, when it is required, is a given. For some, the whole process was previously such a large hurdle to have to overcome that projects were not carried out as desired. It is also easier to keep an eye on costs now, whereas previously there was a risk of duplicate purchases, and purchases were made many times directly from the undertaking, or alternatively via a consultant, and then it was a case of a one-off extraction and not something that could be reused internally.

More data: access to an increased amount of spatial data via the spatial data cooperation has opened the eyes of some organisations to new possibilities and areas of application. Several authorities and municipalities stress that they now also have access to new data that they had previously not been able to afford to purchase. The Swedish Geotechnical Institute and others are pleased that they can now receive correct data on the area they are interested in checking, in contrast to previously when they could obtain data on a particular test area that had no relevance to the issue at hand. They would then be unsure whether to actually order the data, as it entailed a cost and yet another agreement. Svenska Kraftnät [Swedish national grid] and the Swedish Board of Agriculture feel that they can now be more inquisitive in searching out new spatial data. Previously, they would have almost given up at the idea stage, as it was such a long and complicated process.

Better quality: the County Administrative Boards point out that the increased exposure of spatial data via the spatial data cooperation means that users will detect errors in the products and hopefully correct these, which will help to improve quality. SCB points to the increased access to spatial data as an input to improving the quality of its products, including access to orthophotos for verification. The municipality of Gävle also believes that access to updated

spatial data will help to further improve and increase the quality of their own data. One example is increasing the quality of contour lines using the *nya nationella höjdmodellen* [the new national elevation model], NNH.

Increase in efficiency: all respondents consistently believe that the spatial data cooperation has influenced and improved their internal structure in terms of the management and storage of spatial data. Many have also overhauled their internal structure and system support and have changed platforms in order to take better advantage of the benefits of the new technology. Other examples of an increase in efficiency are provided by Svenska Kraftnät, which previously had more people out in the field surveying and it also sent helicopters up to take aerial photographs and carry out laser scanning. Now, access to more data has allowed more preparatory work on its own premises with better basic data to significantly reduce the field work.

Networks: another important aspect, which several authorities in particular emphasise, is the contact network that has been created in order to be able to gain knowledge and experience from other authorities. The authorities have started to talk to other authorities more about the benefits of coordination and improving efficiency, for example. SOS Alarm [emergency services] believes that this is one of the greatest merits of the spatial data cooperation. Networking provides a great deal of information and a lot of ideas from others. Some authorities, for example the Swedish Board of Agriculture, now collect, through dialogue with other authorities, tips and ideas on combinations of spatial data and good examples using various platforms and solutions.

8.2.2 Better results

Examples indicating better results, that is to say benefits that lead to better decisions, include the following reported by authorities and municipalities:

Common view of a situation: the benefit of the more frequent updates and current data that are part of the spatial data cooperation is emphasised by all respondents. The County Administrative Boards point out that access to more data sources and the fact that all officials are working with the same basic data on which to base decisions (Figure 9) results in the decisions being more reliable and more correct. An official can easily see what is most relevant to the matter at hand, and the County Administrative Boards have started to develop support for officials so that it will be simpler for all decisions to be taken on the same basis. The County Administrative Boards also emphasise that more frequent updates mean that more up-to-date information is available and requests from users can be fulfilled more quickly.

For SOS Alarm it is vital to have up-to-date address information. From having addresses updated once a year, it is now done almost once a month (approximately 10 times a year). The more regular updates have reduced the number of discrepancies, in other words the place to which the vehicle has been sent is more likely to be correct. Previously, operators searched for addresses in 'Eniro' and 'Hitta' [search websites], which were frequently more up-to-date. Now searches are made in its own internal system, which makes the whole process easier and has driven the development of its own system in order to improve support.

[See original for figure]

Figure 7 [*sic*]. A common view of a situation in which everyone involved uses the same bases for decisions results in the decisions being more reliable and more correct.

Better feedback: access to more background information has made it possible for municipalities to disseminate information to the general public. For example, the municipality of Gävle uses orthophotos to a greater extent in many of its applications. It has noticed that it is easier for the general public to understand and interpret the orthophoto as a background and that people find their way around in a different way than with a traditional map.

Increased cooperation: in terms of a different type of cooperation, the Swedish Board of Agriculture cooperates well with Lantmäteriet. The Swedish Board of Agriculture shares the block database. If someone discovers something unclear/incorrect in some data, changes are submitted, which increases the quality of each other's data. The Swedish Board of Agriculture and Lantmäteriet have a common objective and a good system of sharing. The County Administrative Boards enter data into the Swedish Environmental Protection Agency's and the Swedish National Heritage Board's systems. They cooperate in accordance with agreements and on the basis of a good structure and working methods. Other examples include cooperation between Lantmäteriet and SMHI with regard to hydrology and between the Swedish Transport Agency and the Swedish Transport Administration with regard to the Inspire theme Transport Networks.

8.2.3 Broader benefits

The broader benefits, that is to say those that are experienced by the rest of society, include the following examples reported by authorities and municipalities:

Benefit to the general public: several different types of benefit to the general public have been observed. For example, citizens have a greater opportunity to acquire and understand information from the municipalities as a result of access to spatial data having made it easier for municipalities to develop and provide good-quality services for the dissemination of information. It is easier for the municipalities to give citizens the opportunity to influence their immediate environment and municipalities can obtain answers to questions concerning whether, for example, care facilities are being planned in a way that benefits citizens, or whether schools and day-care facilities, etc. are being built where there is a need for them, etc.

Quicker processing times is another example of a benefit to the general public. Having previously spent a great deal of time finding and processing data from various management and archive systems, it is now possible to obtain up-to-date data from one system. As a result of increased and simpler access to spatial data, the quality of the decisions taken also increases, for example in connection with various matters relating to authorisations. The fact that decisions are taken on the basis of common and up-to-date data is also beneficial to citizens from the point of view of quality.

Citizens also have a new tool for making their voices heard and to have the chance to exert some influence, for example by being able easily to report faults/deficiencies such as 'holes in the road', or proposals for the location of housing. This dialogue is currently conducted very successfully with the aid of spatial data.

Crisis management: SOS Alarm requires rapid access to water sources in the event traffic accidents, when it also needs to alert the environmental health authority. Analysis of buffer zones to calculate how far an ambulance can travel in 5, 10 and 15 minutes can then be linked to population statistics provided by Statistics Sweden to see how large a proportion of the population can be reached within any particular time interval, so that the locations of ambulances can be adjusted so that they are optimally placed based on these parameters. There is currently also a commercial service with a web-based map showing ambulances and their priority and status, which enables people to see where an ambulance is on their mobile telephone or tablet computer.

A more immediate example is provided by SOS Alarm, which previously used 'Google' and 'Hitta' [search website] to supplement its own operations system. With more up-to-date address information, the number of vehicles directed to the wrong address has decreased, which results in more lives saved. Another example is provided by the Swedish Police, which needs access to a combination of several different data sets in order to be able to carry out analyses of crime scene investigations and crime trends.

The Swedish Board of Agriculture uses information from SMHI, among others, in connection with the risk of the spread of infection and/or radiation accidents in order to be able to analyse which animal keepers will be affected and how it will affect agricultural land, etc. The spatial data cooperation provides the opportunity to increase these joint analyses.

The private sector: for consultancy firms, the spatial data cooperation and access to a broad range of spatial data products has meant that they can carry out their tasks, particularly for municipalities, more effectively, which benefits the consultant, the municipality and the general public within the municipality. Previously, it took time to obtain access to the data required for a particular investigation, in many cases at a cost that had to be borne by the customer. Now the first question that is often put to the municipality (the customer) is whether or not they are involved in the spatial data cooperation. A positive answer ensures that any necessary data will be available for producing qualitative bases for decisions and that the task will be carried out well.

9   Conclusions

The Swedish authorities and organisations responsible for information are working hard to comply with the schedule that has been set for the implementation of Inspire. Since 2010, metadata have been available to the general public for the data sets covered by Annexes I and II to the Directive and the data sets have also been available since 2011 via search and viewing services. Download services were available at the end of 2012.

Good cooperation has been developed between the authorities and organisations concerned, where there is interest in participating in the work and sharing experiences relating to the implementation. Several organisations have set up projects to investigate how Inspire can best be implemented within their own organisations and a number of initiatives relating to the data cooperation have been carried out. There has also been good support for joint meetings and workshops.

The envisaged benefits of the infrastructure have indeed been realised. The spatial data cooperation has paid dividends both internally and externally, and there are also examples of increased benefits for third parties. Access to a greater volume of spatial data via the spatial data cooperation has opened the eyes of certain organisations to new possibilities and areas of application and is also contributing to better and more reliable decisions. This will ultimately lead to an improvement in the whole urban development process. The possibility of having a common and up-to-date view of a situation has increased and been made easier.

There is a great deal of interest in services, both the use of external services and the development of an organisation's/authority's own internal services. One of the advantages of using the external services is a reduction in internal administration. The time can instead be spent, for example, developing and improving the quality of the organisation's/authority's own data, creating own services and disseminating information. Everyone wants their spatial data to be used and to benefit others. Everyone wants to share their view of reality.

From a long-term perspective, there is concern about the lack of coordination between Inspire and other directives. Discussions have been held concerning whether it will be possible in the long term for the data sets covered by Inspire to be used for the implementation of other directives and also to meet the reporting requirements imposed by them. The results of these discussions indicate that for some time to come there will be a need for two separate pathways, one relating to reporting under other directives and another for meeting the data harmonisation requirements of Inspire.

There is also a certain amount of concern about the fact that Inspire is required to be a separate pathway at national level, too, with authorities and organisations simply seeing Inspire as something that has to be done, without putting in that bit of extra effort that would make data and services more usable in a wider context. The use of 'pure' Inspire services is still relatively low and there is therefore a risk that this will be used as an argument for not developing these services further.

The government is seeking to make Sweden a forerunner in terms of operational development in the public sector with the support of IT, in other words *e*-governance. The implementation of Inspire in order to be able to use spatial data more efficiently is entirely in line with this goal. The infrastructure for spatial data creates the conditions for more efficient social governance

and new digital services, which will mean better service for citizens, undertakings and authorities.

10   Annexes

10.1 Organisations – names and contact details

- Energimyndigheten – Swedish Energy Agency, Box 310, 631 04 ESKILSTUNA, Sweden, Tel: 016-544 2000, email: registrator@energimyndigheten.se, URL: www.energimyndigheten.se
- Försäkringskassan – National Social Insurance Administration, 103 51 STOCKHOLM, Tel: 08-786 90 000, email: huvudkontoret@forsakringskassan.se, URL: www.forsakringskassan.se
- Försvarsmakten – Swedish Armed Forces, 107 85 STOCKHOLM, Tel: 08-788 75 00, email: exphkv@mil.se, URL: www.forsvarsmakten.se
- Havs- och Vattenmyndigheten – Swedish Agency for Marine and Water Management, Box 11 930, 404 39 GÖTEBORG, Tel: 010-698 60 00, email: havochvatten@havochvatten.se, URL: www.havochvatten.se
- Jordbruksverket – Swedish Board of Agriculture, 551 82 JÖNKÖPING, Sweden, Tel: 0771-223 223, email: jordbruksverket@jordbruksverket.se, URL: www.jordbruksverket.se
- Länsstyrelserna – the County Administrative Boards, URL: www.lst.se
- Lantmäteriet – the Swedish mapping, cadastre and land registration authority, 801 82 GÄVLE, Sweden, Tel: 0771-63 63 63, email: kundcenter@lm.se, URL: www.lantmateriet.se
- Luftfartsverket – Civil Aviation Authority, 60179 NORRKÖPING, Tel: 011-19 20 00, email: lfv@lfv.se, URL: www.lfv.se
- Myndigheten för samhällsskydd och beredskap – Swedish Civil Contingencies Agency, 651 81 KARLSTAD, Tel: 0771-240 240, email: registrator@msb.se, URL: www.msb.se
- Naturvårdsverket – Swedish Environmental Protection Agency, 106 48 STOCKHOLM, Sweden, Tel: 08-698 10 00, email: registrator@naturvardsverket.se, URL: www.naturvardsverket.se
- Riksantikvarieämbetet – Swedish National Heritage Board, Box 5405, 114 84 STOCKHOLM, Tel: 08-5191 8000, email: riksant@raa.se, URL: www.raa.se
- Swedish Standards Institute – Swedish Standards Institute, 118 80 STOCKHOLM, Sweden, email: info@sis.se, URL: www.sis.se
- Statistiska centralbyrån – Statistics Sweden, Box 24300, 104 51 STOCKHOLM, Tel: 08-506 940 00, email: scb@scb.se, URL: www.scb.se
- Statens geotekniska institut – Swedish Geotechnical Institute, 581 93 LINKÖPING, Tel: 013-20 18 00, email: sgi@swedgeo.se, URL: www.swedgeo.se
- Styrelsen för ackreditering och teknisk kontroll – Swedish Board for Accreditation and Conformity Assessment, Box 878, 501 15 BORÅS, Tel: 0771-99 09 00, email: registrator@swedac.se
- Sveriges geologiska undersökning – Geological Survey of Sweden, Box 670, 751 28 UPPSALA, Tel: 018-17 90 00, email: sgu@sgu.se, URL: www.sgu.se
- Sjöfartsverket – Swedish Maritime Administration, 601 78 NORRKÖPING, Tel: 011-10 19 49, email: hk@sjofartsverket.se, URL: www.sjofartsverket.se
- Sveriges Kommuner och Landsting – Swedish Association of Local Authorities and Regions, 118 82 STOCKHOLM, Tel: 08-452 70 00, email: info@skl.se, URL: www.skl.se
- Skogsstyrelsen – Swedish Forest Agency, 551 83 JÖNKÖPING, Tel: 036-35 93 00, email: skogsstyrelsen@skogsstyrelsen.se, URL: www.skogsstyrelsen.se

- Skolverket – National Agency for Education, 106 20 STOCKHOLM, Tel: 08-527 332 00, email: skolverket@skolverket.se, URL: www.skolverket.se
- Sveriges lantbruksuniversitet – Swedish University of Agricultural Sciences, Box 7070, 750 07 UPPSALA, Tel: 018-67 10 00, email: registrator@slu.se, URL: www.slu.se
- Sveriges Meteorologiska och Hydrologiska Institut – Swedish Meteorological and Hydrological Institute, 601 76 NORRKÖPING, Tel: 011-495 80 00, email: smhi@smhi.se, URL: www.smhi.se
- Stockholms stad – City of Stockholm, 105 35 STOCKHOLM, Tel: 08-508 29 000, email: kommunstyrelsen@stockholm.se, URL: www.stockholm.se
- Socialstyrelsen – National Board of Health and Welfare, 106 30 STOCKHOLM, Tel: 075-247 30 00, email: socialstyrelsen@socialstyrelsen.se, URL: www.socialstyrelsen.se
- Trafikverket – Swedish Transport Administration, 781 89 BORLÄNGE, Tel: 0771-921 921, email: trafikverket@trafikverket.se, URL: www.trafikverket.se
- Transportstyrelsen – Swedish Transport Agency, 601 73 NORRKÖPING, Tel: 0771-503 503, email: web form, URL: www.transportstyrelsen
- ULI Geoforum – ULI Geoforum, Box 415, 101 28 STOCKHOLM, Tel: 08-613 08 16, email: uli@uli.se, URL: www.uli.se

10.2 References for compiling this report

- *Certifiering inom geodata – En förstudie* [Certification within spatial data – a preliminary study], 25.11.2010, Solgerd Tanzilli, the GeoTest project
- Directive 2007/2/EC of the European Parliament and of the Council
- Guidance on the 'Regulation on access to spatial data sets and services of the Member States by Community institutions and bodies under harmonised conditions'
- Handledning för rapportering av datamängder och tjänster 2012.pdf [Manual for reporting data sets and services 2012]
- Compilation of the benefits of the infrastructure for spatial data
- INSPIRE Abstract Test Suite Evaluation, GeoTest 2013
- Minutes from the Inspire working group meetings
- *Nationell Geodatastrategi – Sverige bygger en infrastruktur för geodata* [National Spatial Data Strategy – Sweden is building an infrastructure for spatial data], 13.9.2012, Lantmäteriet
- SFS 1960:729
- SFS 2010:1767
- SFS 2010:1770
- www.Geodata.se