

## SWEDISH SDI DEVELOPMENT & IMPLEMENTATION OF INSPIRE

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### ABSTRACT

The Swedish Government and Parliament has given Lantmäteriet – the Swedish mapping, cadastre and land registration authority – a role as coordinator of the national geodata infrastructure. The responsibility comprises coordination of production, co-operation, dissemination and research as well as development. The responsibility also includes coordination of the implementation of EC directives related to geodata, such as INSPIRE. The Swedish Government has also established a Geodata Advisory Board supporting Lantmäteriet in its coordination role.

Furthermore, a National Geodata Strategy has been developed covering all strategic issues related to the handling of geodata in Sweden. Lantmäteriet is responsible to work out this strategy in close co-operation with the Geodata Advisory Board and other stakeholders.

The basic aim of the National Geodata Strategy is to build up a national infrastructure for geodata and encourage increased co-operation within the geodata sector. The strategy should provide guidelines for all involved parties in Sweden. It should be the platform for creating the infrastructure and for participation in the European and international collaboration in this field. The implementation of the EC directive INSPIRE is an important part of the strategy. A Geodata Project has been established. During a period of three years, the project will create a business model and technical infrastructure for how geodata and services will be made available for Swedish society and Europe.

### INTRODUCTION AND OBJECTIVES

The Swedish Government and Parliament has given Lantmäteriet – the Swedish mapping, cadastre and land registration authority – an outspoken role as coordinator of the national spatial data infrastructure (SDI). The responsibility comprises coordination of production, co-operation, dissemination and research and development. The responsibility also includes coordination of the implementation of EC directives related to GI, such as INSPIRE.

The EC directive INSPIRE directive came into force on 15 May 2007 and will be implemented in various stages, with full implementation required by 2019. The directive aims to create a European spatial data infrastructure. This will enable the sharing of environmental spatial information among public sector organisations and better facilitate public access to spatial information across Europe. The directive was an

initiative taken by the European Commission but the member states has been deeply involved in the whole process.

INSPIRE is based on the infrastructures for spatial information established and operated by the 27 Member States of the European Union. The Directive addresses 34 spatial data themes needed for environmental applications, with key components specified through technical implementing rules. A European Spatial Data Infrastructure will assist in policy-making across boundaries. INSPIRE is based on a number of common principles:

- Data should be collected only once and kept where it can be maintained most effectively.
- It should be possible to combine seamless spatial information from different sources across Europe and share it with many users and applications.
- It should be possible for information collected at one level/scale to be shared with all levels/scales; detailed for thorough investigations, general for strategic purposes.
- Geographic information needed for good governance at all levels should be readily and transparently available.
- Easy to find what geographic information is available, how it can be used to meet a particular need, and under which conditions it can be acquired and used.

INSPIRE is a Framework Directive, detailed technical provisions for the issues below is or will be laid down in Implementing Rules:

- Metadata
- Interoperability of spatial data sets and services
- Network services (discovery, view, download, transform, and invoke)
- Data and Service sharing (policy)
- Coordination and measures for Monitoring & Reporting

The development and implementation of INSPIRE follows a programme of work consisting of three phases. These are the Preparatory (2005-2006), the Transposition (2007-2009) and the Implementation (2009-2019) phases. The work today and the next coming years is focus on practical issues to implement the directive, e.g. implementing services and making agreements.

Each Member State has appointed a contact point who will be responsible for coordinating the implementation of the directive and to be a single contact between the Commission and the Member State. As mention above, Lantmäteriet has that role in Sweden. The Swedish government has decided to establish a high level advisory board (The Geodata Advisory Board) supporting Lantmäteriet in its coordination role. Furthermore, it has been decided to develop a national geodata strategy covering all strategic issues related to the handling of geodata in Sweden. The aim of the strategy is to give guidance to geodata producers and users regarding development and use of standards and specifications, metadata and metadata-services, services for

dissemination of information, policies for access and use, research and education as well as organisation and co-operation. Lantmäteriet is responsible to work out this strategy in close co-operation with the Geodata advisory board and other stakeholders. The strategy was presented by end of March 2007 and has then been annually updated. Thus the strategy was updated in March 2009 with a report on achieved results and description of planned activities for the coming year. There are clear links between a numbers of the areas of activity that are presented in the strategy. Those that had the strongest links have been included in a common project – the Geodata Project.

During a period of three years the project will create a general co-operation model and the technical infrastructure for how geodata and services should be made available for Swedish society and Europe. Work on the co-operation model includes organisational issues as well as contractual, pricing and financing issues. The technical and practical implementation of the EC directive INSPIRE will be done within the project. The solution will be developed together with other stakeholders who are involved in the provision of geodata

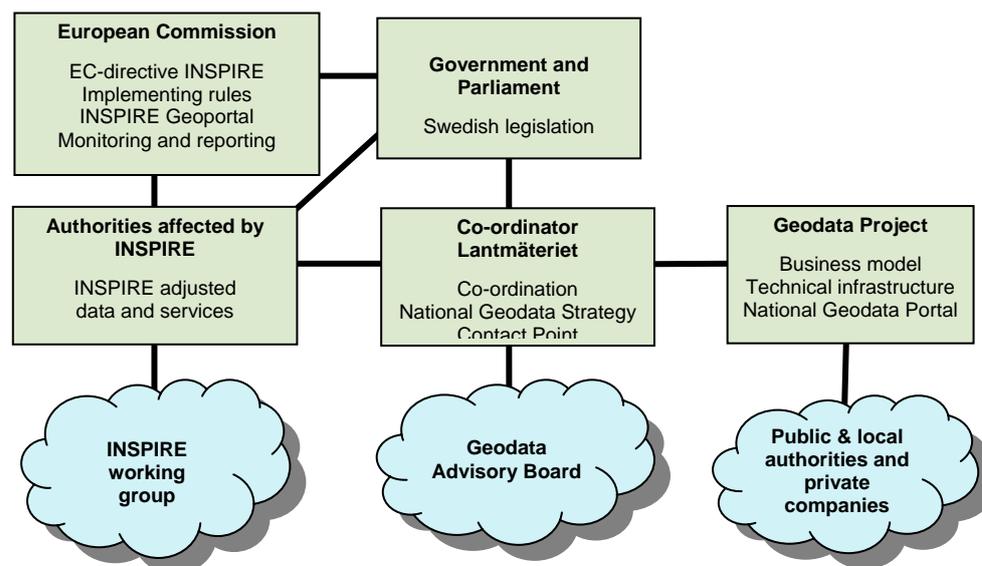


Figure 1. Overview of stakeholders, activities/roles and results

The work will have an impact on all relevant stakeholders by supporting:

- Reduction of data collection and maintenance costs.
- Improvement of data quality and consistency.
- Added value through more easy combinations of data from different sources.
- Improved access to data.
- Development of eGovernment.

In this connection it is important to stress that the implementation of the strategy not only will affect the public sector but also the private sector. The actors on the market are important and the strategy will support their activities by developing the market for value added products and services. One reason for this is that the strategy and its implementation will make the public undertakings more clear and by that help the market actors to evaluate the market potential and to invest in product and service developments.

The strategy should provide guidelines for all involved parties in Sweden. It should be the platform for creating the infrastructure and for participation in the European and international collaboration in this field. The key principles for the strategy are the following:

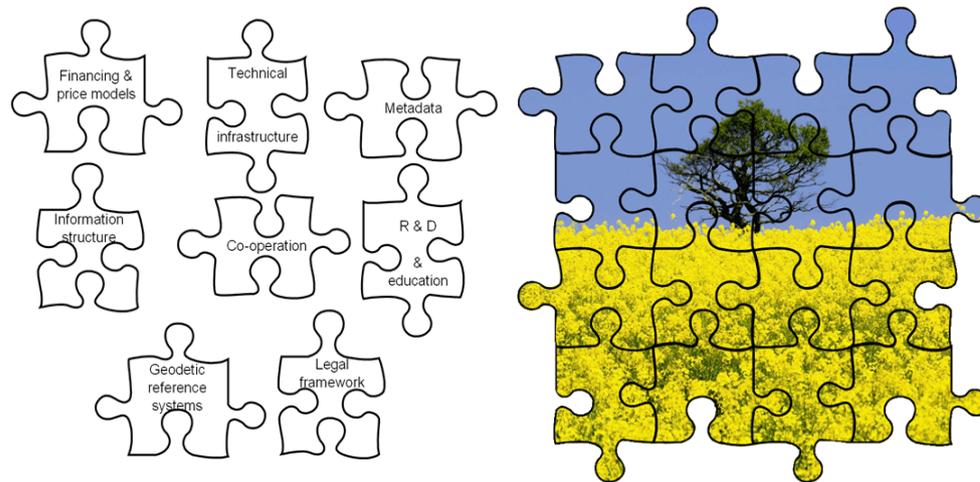
- Support the development of the private sector and create favourable preconditions for the further refinement of geodata and the creation of value-added products and services.
- Contribute to the development of Swedish e-governance and be a model for the development in other information areas and sectors. The provision of geodata should also utilise existing solutions concerning e-governance.
- The strategy is part of the implementation of the Inspire directive in Sweden.
- User demands - a user perspective which should stimulate the use of geodata on local, regional, national and global levels.
- Flexibility - rapid and easy adaptation to the new pre-conditions, new requests and technical development.
- Co-operation between different stakeholders should be so well developed and carried out in such an efficient way that costs for the use of geodata can be decreased. Networks for co-operation between central and local government and the private sector are an important basis for the infrastructure. The co-operation should be based on voluntary agreements and satisfy the needs of local, regional and national applications. The networks should stimulate the development of services that meet the requirements of individual citizens in both private and public sphere of activity.
- The implementation of the EC directive Inspire is an important part of the strategy.

The vision for the national geodata strategy, in a 10-year perspective, is that organisations that manage geodata should:

- Generate increased benefits for society through the use of geodata based on co-operation across organisational boundaries at the lowest possible price.
- Link information resources in a network and make them available via homogenous services and uniform descriptions of the information.
- Serve the public and private sectors and citizens and satisfy demands at local, regional, national, European and global levels.

## METHODOLOGY

A vision and general, strategic goals have been worked out. Based on this eight work packages have been identified:



*Figure 2. The work packages are puzzle pieces in the geodata strategy. Piece by piece they form the national infrastructure for geodata which, in itself, is a puzzle piece in the European infrastructure for a geodata (INSPIRE)*

### **Co-operation in a network as a basis for the infrastructure**

The national geodata infrastructure comprises a well-developed co-operation between the central government, local government and private sectors which is based on voluntary agreements. Future work will be oriented towards developing co-operation between independently managed organisations which, together, have responsibility for the provision of geodata at the national level. Requirements at local, regional, national and international levels will be satisfied. The platform for co-ordination of the provision of geodata will be developed within the framework of the Geodata Project based on the development of a general co-operation model. The model will describe organisation, division of responsibility and financing. The co-operation model is also an important precondition for the implementation of the EC directive INSPIRE.

### **The information structure**

The exchange of information in a national infrastructure for geodata should be based on a homogeneous, general framework with uniform descriptions of the information and services. The framework should include rules and methods for model-based concepts and descriptions of information, as well as rules and method for service-based exchange of information. As far as possible, implementation should be based on international standards and, to the extent that Swedish standards are available, they should be used.

Standardisation in the geodata sector must be co-ordinated with on-going work to formulate implementation rules for the EC directive INSPIRE. INSPIRE contains mandatory requirements in this sector of activity for public authorities and organisations. Government agencies' datasets which are covered by INSPIRE should be adapted to meet the directive's requirements or, alternatively, be made available with the help of transformation services. This means that government agencies must develop the necessary data and data exchange models.

One of the activities that was given priority in the Geodata strategy was to define and delimit geodata and services. This task included proposing which geodata and services should be included in the national infrastructure, based on available definitions and identified user needs. As part of this task a comprehensive questionnaire was prepared and circulated. An initial analysis of the results indicated that the geodata that is needed for the national infrastructure is, to a large extent, the same type of data as is prescribed for INSPIRE. Although the services that will be developed in accordance with the directive are broadly the same as those required for the national infrastructure, the investigation indicated that a number of other services should also be included.

#### **Technical infrastructure and metadata**

The aim is to create an access point – a geodata portal - for the supply of geodata and associated services. The portal will meet the requirements that apply for data services in the EC directive INSPIRE and will form the Swedish node to the INSPIRE Community Geoportal. The first version of the portal was released by end of 2008. The complete portal, with a technical solution that functions together with business models and administrative routines will be in use by 2010. In conjunction with the development of the geodata portal a proposal for a Swedish profile for the SS-ISO 19115 metadata standard has been prepared. During the year, the profile will be presented for comments prior to approval. The profile will make it possible to create homogeneous metadata in both a national and international context. To provide additional support for creating metadata a set of instructions will be written.

#### **Geodetic reference system**

A homogeneous reference system facilitates the production, processing and use of geodata; it also makes compilation of data from different sources easier. For these reasons, a rapid transition to the national geodetic reference system, SWEREF 99 and the height system, RH 2000 should take place. Activities which should be given priority to encourage the municipalities to introduce the new reference systems, in addition to the provision of information, support and follow-up assistance. So far, the transition to SWEREF 99 has taken place in approximately 100 municipalities and preparations are underway for a change to the new reference system in several more municipalities. Several public authorities, including the National Road Administration, Statistics Sweden, the National Tax Border and the county councils, will adopt SWEREF 99 as their reference system.

## **Research, development and education**

A programme for research, development and education in the geodata sector has been prepared. In the programme the focus is on describing needs in the sector relative to the areas of activity which have been given priority in the geodata strategy. The following strategic goals have been identified:

- The creation of a better national overview and co-operation.
- A clarification of where the responsibility for research in the geodata sector lies.
- Provide better co-coordinated information concerning the availability of funds for R&D which supports the geodata strategy.
- The development of better international co-operation.
- The establishment of a testing environment.
- The stimulation of development in the private sector.
- Make available the necessary competence.

## **Legal framework**

One important issue is the legal framework concerning a national spatial data infrastructure (NSDI) and INSPIRE. The first question is why we need regulations concerning these issues. One important reason is that there are many different interests in society that are affected by the NSDI and INSPIRE. The regulations are important to guarantee a commonly accepted balance between the needs to protect important interests and the user's needs of easy access to the actual information. Issues that we need to take into account are security, vulnerability, integrity and copyright. It is important to clarify the distribution between rights and duties in this field.

The current Swedish legislation on information infrastructure is build upon fundamental principles, like the over 200 years old principle of public access to official documents. This principle constitutes a right for the public to gain access to official documents whether they are in analogue or electronic form. Although this right does not mean that the public authorities have to make the documents available through network services on the Internet.

The Personal Data Act regulates when and how personal data may be processed. This law is the result of implementing the EC-directive on data protection, and is very important to take into consideration in an information infrastructure. Even though most of the INSPIRE datasets do not contain personal data, there are examples where indirect personal data can be found. For example addresses and property unit designations are considered as indirect personal data in Sweden. Processing of that information has to be in accordance with the Personal Data Act and other superior laws in this area. The laws and regulations on public management, regulate two principles concerning data-sharing. These principles mean that public authorities must co-operate with each other, and give each other access to information unless it is confidential. This applies although there is no obligation to share data through network services.

On October 31st, 2007 Lantmäteriet presented a report listing the changes to current Swedish legislation that would be necessary as a consequence of the implementation of the EC directive INSPIRE. The report concludes that the legislation does not meet the requirements of the directive and recommends that the necessary amendments should be introduced in the form of a special act on infrastructure for spatial information. Current laws consider different interests and have other purposes, for example the purpose of giving a right to the public or protecting personal data. The Ministry of Environment has prepared a proposal for changes to the Swedish legislation based on the recommendations that were made in the report. The INSPIRE directive affects some current laws and regulations in the Swedish legislation. For example the Secrecy Act that regulates when an official document shouldn't be handed out, must be amended so that it doesn't limit data-sharing according to INSPIRE. New rules must also be added, or in some cases amended, regulating grounds for limiting public access. Some specific laws that deal with electronic access to datasets which includes personal data must be modified. The new "INSPIRE act" should define general rules on the spatial data infrastructure, especially rules on public access to spatial data through network services and electronic data-sharing between public authorities.

In addition, an enquiry concerning the need for changes to rules in the legislation which regulate the management and use of geodata has been carried out. The enquiry identified a number of obstacles which can affect, amongst other activities, the use of automated applications for the exchange and use of geodata. A review of the relevant legislation is, therefore, necessary.

### **Financing and price models**

The creation of a national infrastructure for geodata will require investments. Above all, this will be the case regarding the need for financing to cover the costs of implementing the EC directive INSPIRE and for the coordination which will be required in connection with it, such as development, operation and management of the national geodata portal, adaptation of data volumes and services and the necessary investments in IT. The focus of the next stages of the work should, therefore, be on obtaining a clear picture of the investments that must be made to ensure that the implementation of the Geodata Project and the Swedish implementation of INSPIRE are not hampered by financial insecurity.

Future work with the development of price models for geodata should be concentrated, as far as possible, on removing obstacles that could have a negative effect on their efficient use, and to seek to develop homogeneous price models.

### **RESULT**

Several goals in the strategy have already been fulfilled. Below are some examples of what have been achieved so far.

The architecture of the future co-operation model was presented in June 2009, including the handling of organisational issues and the structure of different kinds of agreements being needed to implement the model.

A report that describes client and supplier needs, agreement and licence models, financing and price models and the results of cost-benefit analyses that have been carried out, was produced last year.

The Geodata Advisory Board and the Swedish Standards Institute's (SIS) signed a letter of intent concerning standardisation within the framework of a Swedish geodata strategy. Within the framework of the co-operation an action plan has been formulated.

Future Position X (FPX), the University of Gävle and Lantmäteriet have, together, established a test environment. Within the framework of this work, quality assured methods have been developed for testing specification, datasets and services.

The first version of a Geodata Portal is now in use. Services and data will successively be made available via the portal. In stages, the portal will be accessible for a larger circle of users. The portal includes WMS services and metadata published by a number of producers.

In connection with the development of the Geodata Portal a proposal for a Swedish profile for the metadata standard, SS-ISO 19115, has been decided. The Geodata Project has also developed an application which makes it possible for respective authorities to create metadata.

An action programme for research, development and education in the geodata sector has been formulated.

The government has proposed that the INSPIRE-directive should be implemented in Swedish legislation through an Act and an ordinance.

## **CONCLUSIONS**

The National Geodata Strategy gives an opportunity to present common goals to work for. It achieves a better understanding for the need of actions and investments by raising and clarifying needed efforts.

There is a strong link between the implementation of the INSPIRE-directive and the implementation of the National Geodata Strategy. A well working coordinating role is important when several actors and several activities will work together.

There is a need to demonstrate a good practical example to realise the formulated goals in the geodata strategy. It is important to be aware of that the efforts to be made, to create an infrastructure, are of long-term character and will not give full effect until 5-10 years.

The willingness and ability of the different actors to participate in the work is crucial for the time of the implementation. Times spending on communications, e.g. workshops, is important so stakeholders have a forum to present ideas and get feedback.

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