



INSPIRE

Infrastructure for Spatial Information in Europe

Member State Report: Denmark 2010-2012

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Contents

1	Executive summary	4
2	Abbreviations	5
3	Introduction	5
4	Coordination and quality assurance (Article 12)	6
4.1	Coordination (Article 12(1)).....	6
4.1.1	Member State contact point.....	6
4.1.2	The coordination structure	7
4.1.3	The working practices and procedures of the coordinating body	8
4.1.4	Comments on the monitoring and reporting process	9
4.2	Quality assurance (Article 12(2))	9
4.2.1	Quality assurance procedures	9
4.2.2	Analysis of quality assurance problems	10
4.2.3	Measures taken to improve the quality assurance.....	10
4.2.4	Quality certification mechanism.....	11
5	Functioning and coordination of the infrastructure (Article 13)	12
5.1	Overview of the spatial data infrastructure.....	12
5.2	INSPIRE stakeholders	13
5.3	Role of the various stakeholders	14
5.4	Measures taken to facilitate sharing	15
5.5	Stakeholder cooperation	15
5.6	Access to services through the INSPIRE geoportal	15
6	Use of the infrastructure for spatial information (Article 14)	17
6.1	Use of spatial data services of the infrastructure.....	17
6.2	Use of the spatial data sets by public authorities.....	18
6.3	Use of spatial data sets by the general public	18
6.4	Cross-border use of spatial data sets	19
6.5	Use of transformation services	19

7	Data sharing arrangements (Article 15)	20
7.1	Data sharing arrangements between public authorities	20
7.2	Data sharing arrangements between public authorities and Community institutions	20
7.3	Barriers to the sharing of spatial data sets and services.....	20
8.	Cost/benefit aspects (Article 16)	22
8.1	Costs resulting from implementation of the INSPIRE Directive	22
8.2	Benefits observed	24
9	Conclusion	26
Annex 1	27
Annex 2	28
Annex 3	29
Annex 4	30

1 Executive summary

The development of Denmark's spatial data infrastructure builds upon legislation, national coordination and international cooperation. The objectives are service oriented architecture, technology, data standards, agreements on sharing information and a partnership model that supports the role of both government infrastructure providers and private system integrators.

The Danish Act on Infrastructure for Spatial Information incorporates the regulations, principles and associated guidelines of the INSPIRE Directive into Danish law. With this legislation, Denmark has strengthened the framework for its spatial data infrastructure and its eGovernment strategy more generally. The Danish Geodata Agency is responsible for implementing the act.

Within the period 2010-2012, much progress has been made to extend the development and application of the national spatial data infrastructure. In the process, INSPIRE has been a key factor.

As part of the national eGovernment strategy, the Basic Data Program is of great importance to the national spatial data infrastructure. INSPIRE contributes to the Program with principles and standards that support the development of a shared public infrastructure. This infrastructure improves the efficiency of public activities and provides an everyday resource for private businesses and the general public.

The Coordination Committee on Infrastructure for Spatial Information was established in 2010 in order to facilitate and maintain an effective spatial data infrastructure - and as part of fulfilment of the Danish Act on Infrastructure for Spatial Information. The Committee consists of representatives of geodata owners, and forms a structure for a strengthened cooperation and decision-making in the field of spatial information.

The period 2010-2012 has also been characterized by technical developments that have improved the accessibility to, and quality of, spatial information. Geodata-info.dk was developed in 2010 as an open source resource in cooperation amongst the Nordic countries. It contains metadata for the data and services in the national spatial data infrastructure, including INSPIRE geodata, and thus simplifies and encourages a broader usage of spatial information. While Geodata-info.dk provides access to metadata, the Danish Geodata Agency provides access to its geodata through the Digital Map Supply. Downloads from the Digital Map Supply have more than doubled, from 368 million downloads in 2010 to 800 million in 2012.

Public authorities covered by INSPIRE have strengthened their cooperation on implementing the directive in the years 2010-2012. This cooperation is expected to continue.

Since INSPIRE is an integrated part of the national spatial data infrastructure, it is difficult to assess specific INSPIRE related costs and benefits. However, as the INSPIRE principles are integrated into the infrastructure for spatial information their value is increasing across the Danish public sector. In this sense, the benefits of the national spatial data infrastructure – and INSPIRE – are extending beyond eGovernment and into growth and innovation among companies and citizens in general.

2 Abbreviations

INSPIRE	Infrastructure for Spatial Information in Europe
SI Act	Danish Act on infrastructure for spatial information, L1331 2008
GST	Danish Geodata Agency (prior to 1 January 2013, the National Survey and Cadastre)
Coordination Committee	Coordination Committee on Infrastructure for Spatial Information
SFG	Service Community for Spatial Data (abolished 1 January 2012)
FOT	Common Public Geographical Administration Data (formerly Common Object Types)
AWS	Address Web Services
WMS	Web Map Service
WFS	Web Feature Service
WCS	Web Catalogue Service
MSDI	Maritime Spatial Data Infrastructure

3 Introduction

In Denmark, public authorities are cooperating on the development of a common public sector infrastructure for spatial information. The aim is for the infrastructure to support eGovernment with spatial information in a simple and effective way.

The Danish Act on infrastructure for spatial information (SI Act) (L1331 2008) created a legal basis for the development of the infrastructure for spatial information based on the EU INSPIRE Directive.

In addition to transposing the INSPIRE Directive, the Act is also intended to strengthen the framework for the national spatial infrastructure and the connection with eGovernment.

INSPIRE provides important standards, methods and technical specifications for the use of the spatial component in national and international eGovernment in a way that brings added value.

The Danish Minister for the Environment has authorised the Danish Geodata Agency (GST) to implement the INSPIRE Directive in Denmark. GST is therefore the national INSPIRE contact point and is responsible for monitoring the implementation of the Directive.

This report is part of the monitoring and is submitted to the Commission every three years. The report describes developments in the Danish infrastructure for spatial data during the period 2010-2012, with a particular focus on aspects relating to the implementation of INSPIRE. There is thus also a focus on GST's role as the national contact point, and part of the report is therefore concerned with examples of relevance to the Agency.

Until 31 December 2012, the Danish Geodata Agency (GST) was called the National Survey and Cadastre, but for convenience the designation GST is used throughout the report.

4 Coordination and quality assurance (Article 12)

4.1 Coordination (Article 12(1))

4.1.1 Member State contact point

Name and contact information

Member State Contact Point	
Name of the public authority	Danish Geodata Agency
Contact information:	
Mailing address	Rentemestervej 8 2400 Copenhagen NV, Denmark
Telephone number	+45 7254 5000
E-mail address	inspire@gst.dk
Organisation's website URL	www.gst.dk
Contact person (if available)	Ulla Kronborg Mazzoli
Telephone number	+45 7254 5526
E-mail address	ukm@gst.dk
Contact person – substitute (if available)	Dorthe Drauschke
Telephone number	+45 7254 5764
E-mail address	dbi@gst.dk

Role and responsibilities

Infrastructure for spatial information plays a key role in the public sector and in its interaction with the private sector and the general public. It is therefore necessary to maintain cooperation across the public sector for the development and common utilisation of the public databases and digital infrastructure. In Denmark, this is ensured by a clear distribution of roles and responsibilities.

The Danish Geodata Agency (GST) is part of the Danish Ministry of the Environment and as an authority it is responsible for infrastructure for spatial information, surveying, land and nautical mapping and cadastre and land surveyor services. The Agency works by coordinating, providing advice and performing specific tasks to ensure a coherent infrastructure for spatial information across the public sector.

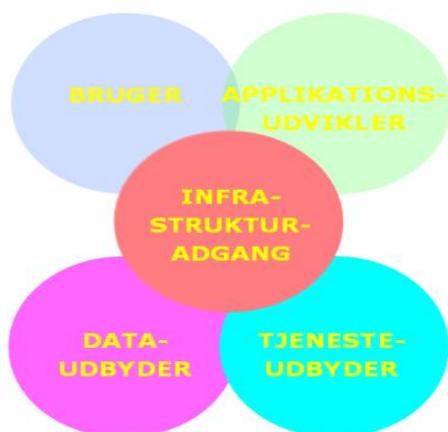
The Danish Minister for the Environment has authorised GST to implement the SI Act and thus also the INSPIRE Directive in Denmark. GST is therefore the national INSPIRE contact point and a member of the INSPIRE Committee¹.

Development of a common public sector infrastructure for spatial information involves many different stakeholders, each with different roles and areas of responsibility², such as:

- Users
- Application providers – responsible for developing solutions for users
- Data providers – responsible for ensuring that data can be displayed by service providers
- Service providers – responsible for developing and operating services
- Infrastructure access – responsible for access, support and monitoring of data and services

¹ The INSPIRE Committee has the task of assisting the Commission and delivering its opinion on the draft implementing rules for the INSPIRE Directive. The opinion is delivered in the form of a vote.

² See also Chapter 5.3



Key to graphic:

Bruger	Users
Applikationsudvikler	Application developers
Infrastrukturadgang	Infrastructure access
Dataudbyder	Data providers
Tjenesteudbyder	Service providers

Figure 1. Assignment of roles

4.1.2 The coordination structure

Name and contact information

Coordinating structure supporting the Member State Contact Point	
Name of the coordination structure	The Coordination Committee on Infrastructure for Spatial Information
Contact information:	
Mailing address	Rentemestervej 8 2400 Copenhagen NV, Denmark
Telephone number	+45 7254 5000
E-mail address	gst@gst.dk
Organisation's website URL	www.gst.dk
Contact person (if available)	Arne Simonsen
Telephone number	+45 7254 5405
E-mail address	arsim@gst.dk
Contact person (if available)	Dorthe Drauschke
Telephone number	+45 7254 5764
E-mail address	dbl@gst.dk

Role and responsibilities

The coordination structure is intended to ensure that the infrastructure for spatial information is given a central position in the public sector digitisation initiative in order to help ensure cost-effective eGovernment that provides added value. This is achieved by continuous coordination of cooperation across the public sector and cooperation with the private sector and research institutions.

The Service Community for Spatial Data (SFG), which consisted of public and private stakeholders, was established in 2002 with the aim of strengthening the existing cooperation in the field of spatial data across the public sector. The SFG was replaced on 1 January 2012 by the Coordination Committee.

The Committee was set up by the Danish Minister for the Environment pursuant to the SI Act and is made up of representatives from the organisations and authorities responsible for spatial data, which are covered by the SI Act³.

In specific terms, the joint public sector cooperation on the development of infrastructure for spatial information is conducted by many different agencies, such as FOTdanmark, which is a common public sector association of 97 municipalities and the State. FOTdanmark has established common public sector mapping across different levels of administration. This provides a number of savings for society by avoiding parallel mapping. There is also a benefit in terms of administrative efficiency in using a common spatial database⁴.

Relationship with third parties

The infrastructure for spatial information is being developed and made available to third parties via the close cooperation between GST and private developers, data producers and research institutions.

The infrastructure is based on standardised interfaces, which ensure that the information and data that public authorities make available form a commercial basis for the further development of user-oriented solutions that are accessible to the general public, such as Kortforsyningen.dk (Digital Map Supply).

Digital Map Supply

Digital Map Supply (*Kortforsyningen*) is part of the common public sector infrastructure and GST's distribution solution for maps and spatial data. GST enters into partnerships with companies that develop applications and end solutions for users⁵.

Geoforum.dk

Geoforum is the Danish forum for spatial information, with members from public authorities and private undertakings within the spatial data sector. Since 1 January 2001, Geoforum has been working to promote the benefit of spatial information to society.

4.1.3 The working practices and procedures of the coordinating body

In Denmark, the coordinating body is the Coordination Committee.

The Coordination Committee performs both statutory and contractual tasks.

Statutory tasks

The statutory tasks include drawing up recommendations for the Danish Minister for the Environment on initiatives to promote the infrastructure for spatial information. These include measures to meet the needs of users, information on current practice in connection with the use of spatial data and helping with the identification of the spatial data sets covered by the Act. The Coordination Committee is also required to assist the Danish Minister for the Environment in implementing the SI Act, and thus also the INSPIRE Directive, in Denmark.

³ See overview of members in Annex 1

⁴ More information on FOTdanmark can be found at www.fot.dk.

⁵ See list of Kortforsyningen's partners in Annex 2.

The Coordination Committee also assists the Danish Minister for the Environment in contacts with the Commission concerning INSPIRE.

Contractual tasks

In addition to its statutory tasks, the Coordination Committee also carries out contractual tasks, such as coordination of joint initiatives and managing the spatial data sector's cooperation with other fields. The Coordination Committee coordinates and implements the necessary agreements on the reuse of data, access to data and data rights as well as maintenance of the infrastructure. It is involved in creating coherence in the infrastructure for spatial information.

The Coordination Committee holds meetings four times a year, and therefore held 12 meetings during the reporting period.

4.1.4 Comments on the monitoring and reporting process

Processes and methods used in monitoring and reporting in relation to the INSPIRE Directive can be used to establish a general overview of the development of the infrastructure for spatial information in Denmark. The involvement of the Coordination Committee is therefore sought in prior to reporting to the Commission. The results of the monitoring and reporting are also used to provide a status report and overview to various stakeholders.

As the national contact point, GST has drawn up this report on the basis of information in publications produced in collaboration with partners with an interest in infrastructure for spatial information. The report is also based on information obtained from the monitoring operations during the period, with contributions from data controllers and service providers.

4.2 Quality assurance (Article 12(2))

4.2.1 Quality assurance procedures

In the infrastructure for spatial information, quality assurance is incorporated into all stages of the value chain from collection to use.



Figure 2. The value chain for spatial information

Collection

Quality assurance starts right from the collection of data with the use of recognised and agreed methods and technologies, based, among other things, on international standards. New raw data is also used to ensure quality and to make sure existing spatial data sets are up-to-date.

Handling

Quality assurance of the derived spatial data sets is carried out in several stages, which are mainly automated, and is intended to ensure completeness, accuracy and usability before the data is distributed to the users.

Distribution

Distribution of spatial information in Denmark is based on internationally recognised standards, such as WMS and WFS.

Use

In 2012, several new systems were developed within the GST to allow users to suggest corrections to the spatial data they are using. The Common Reporting Portal for Spatial Data (2012) thus enables users, via the infrastructure, to suggest corrections to several different types of GST's spatial data⁶.

4.2.2 Analysis of quality assurance problems

No significant quality assurance problems were observed during the period 2010-2012 in connection with the development of the infrastructure for spatial information. The close cooperation between the authorities in using recognised standards and agreed procedures and routines provides integral and continual quality assurance.

4.2.3 Measures taken to improve the quality assurance

In 2011, work on the common public sector digitisation strategy⁷ began, and as part of this process a number of Danish authorities were required to implement quality assurance and adapt their basic data⁸.

The basic spatial data were designated on the basis of the themes in Annex 1 to the INSPIRE Directive. This is intended to ensure synergy in the development of infrastructure for spatial information and reuse of the components that were already in place as a result of the implementation of INSPIRE. From 1 January 2013, all of this work is grouped within the common public sector Basic Data Programme⁹.

Since GST is responsible for a range of the basic spatial data, a number of data improvement projects have been initiated within the Agency, including property data, administrative units and geographical names, watercourse data and the elevation model. The projects adapt the data content and structure so that they can be used as part of a well-developed common public sector administrative base.

⁶ More information on the Joint Reporting Portal can be found at <https://indberetning.gst.dk/home.aspx>.

⁷ In 2011, the government, Local Government Denmark and the Danish Regions formulated a common public strategy for digitisation of the public sector (2011-2015). More information can be found at www.digst.dk.

⁸ Basic data are the fundamental data involved in the authorities' day-to-day proceedings. More information can be found at www.digst.dk.

⁹ The Basic Data Programme sets out a number of specific initiatives relating to public basic data which will support growth in the private sector, where basic data is a source of innovation and new jobs.

4.2.4 Quality certification mechanism

No certification mechanism has been established for the implementation of INSPIRE. GST and other authorities included in the infrastructure for spatial information base their quality assurance on general quality assurance procedures. For example, in its data production, GST uses quality assurance procedures based on ISO standards, including 19115 Metadata and 19139 Metadata – implementation specification.

5 Functioning and coordination of the infrastructure (Article 13)

5.1 Overview of the spatial data infrastructure

The infrastructure for spatial information in Denmark encompasses the following elements:

- Spatial data themes – a collection of spatial data divided into groups based on use, for example transport networks, hydrography and buildings. Spatial data themes are provided in the form of spatial data sets and spatial data services.
- Metadata – information describing spatial data sets and spatial data services, and which makes it possible to find, record and use them.
- Standards – common rules, conditions, guidelines or data characteristics and associated processes, technology and organisation.
- Common infrastructure services – a set of services on the Internet providing access to documented spatial data themes and metadata from distributed data sources. Geodatainfo.dk is one example of this sort of service.
- Cooperation between national, regional and municipal authorities, universities and research institutions, as well as private undertakings, which is intended to ensure that the infrastructure for spatial information meets the needs of users.
- Binding agreements between public operators relating to infrastructure for spatial information.

The INSPIRE Directive provides important principles, methods, standards and specifications for the national infrastructure for spatial information.

The model below shows the infrastructure for spatial information.

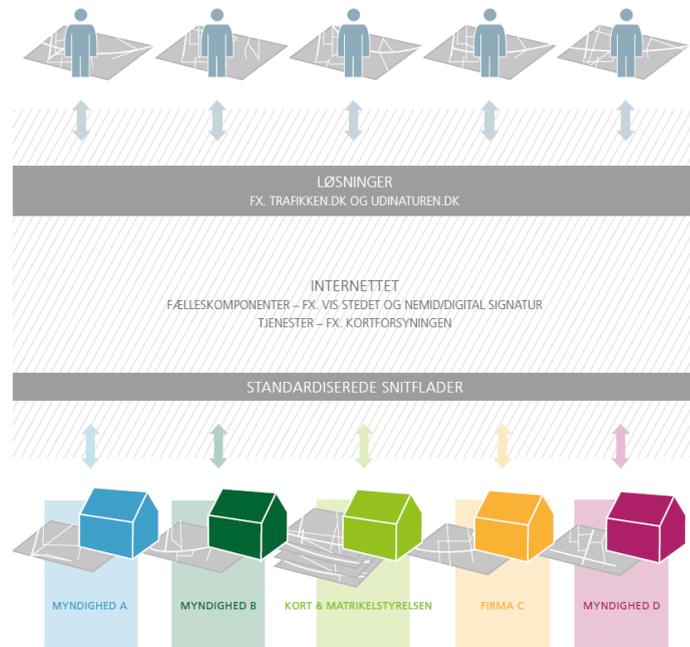


Figure 3. Model of the infrastructure for spatial information

Key to Figure:

LØSNINGER

SOLUTIONS

FX. TRAFIKKEN.DK OG UDINATUREN.DK

e.g. TRAFIKKEN.DK AND UDINATUREN.DK

INTERNETTET

THE INTERNET

FÆLLESKOMPONENTER

COMMON COMPONENTS

FX. VIS STEDET OG NEMID/DIGITAL SIGNATUR

e.g. 'VIS STEDET' ('Show Place') AND NEMID (QuickID)/DIGITAL SIGNATURE

TJENESTER

SERVICES

FX. KORTFORSYNINGEN

e.g. THE SUPPLY OF MAPS

STANDARDISEREDE SNITFLADER

STANDARDISED INTERFACES

MYNDIGHED

AUTHORITY

KORT & MATRIKELSTYRELSEN

NATIONAL SURVEY AND CADASTRE

FIRMA

COMPANY

5.2 INSPIRE stakeholders

Implementation of INSPIRE involves the cooperation of a number of public authorities across Danish government services.

The public authorities responsible for the data represent the fulcrum of the Danish implementation of INSPIRE. Identification of authorities covered by INSPIRE is based on their

role in terms of their responsibility for data. Authorities are therefore covered by the INSPIRE Directive on the basis of specific data sets. This ensures that the focus is on usability, reuse and the greatest possible added value.

The spatial data sets covered are identified in close cooperation with those holding the data on the basis of a set of principles arising from the SI Act and provided by the Coordination Committee:

1) *The spatial data set shall be available in electronic form*

Section 1 point 1 of the Act states that the spatial data set shall be available in electronic form.

2) *The spatial data set shall cover the whole country and be nationally applicable*

Section 1 point 4 of the Act states that the Act covers spatial data sets relating to the territory of Denmark.

3) *Collection of data shall be statutory*

Section 1(3) states that spatial data sets held by municipalities or regions are only covered by the Act if the collection of data is laid down in another law.

During 2010-2012, five authorities responsible for data worked on developing the infrastructure for spatial information pursuant to the INSPIRE Directive¹⁰.

Service providers are developing services that make INSPIRE data available. Service providers may be public authorities or private operators.

The Coordination Committee plays an important part in ensuring coherence and synergy between INSPIRE and the national infrastructure for spatial information.

5.3 Role of the various stakeholders

As the national contact point, GST is responsible for communication with the Commission and it is a member of the INSPIRE Committee.

GST is responsible for the implementation of the Act on infrastructure for spatial information and the INSPIRE Directive in Denmark. It facilitates cooperation between the INSPIRE stakeholders and acts as secretariat for the Coordination Committee.

The authorities responsible for data are required to ensure that their INSPIRE data sets are harmonised and made interoperable as described in the Directive. These authorities also ensure that metadata are drawn up for each data set and made available via Geodata-info.dk. Lastly, authorities responsible for data are responsible for displaying the harmonised data sets via services in accordance with the Directive's functionality requirements and operating these services in accordance with the quality requirements. Authorities responsible for data can either take on the role of service provider themselves or delegate this task to another operator.

The role of the Coordination Committee was described above in Chapter 4.1.2, The coordination structure.

¹⁰ See list of authorities subject to Annex 1 in Annex 3.

5.4 Measures taken to facilitate sharing

There are a number of general measures in the national infrastructure for spatial information that are intended to facilitate sharing between the infrastructure's various stakeholders. These measures are also used in the implementation of INSPIRE. More information on this can be found in Chapter 7 on data sharing.

5.5 Stakeholder cooperation

Cooperation between the INSPIRE stakeholders takes place to a large extent via the cooperation channels and forums that are already established in the national infrastructure for spatial information. The Coordination Committee plays an important role in creating coherence between eGovernance, including the basic data programme, implementation of INSPIRE and the other national infrastructure initiatives (e.g. FOT (see Chapter 4.1.2).

In practical terms, cooperation on the implementation of INSPIRE takes place in the related forums that GST has established and operates. These include information meetings, workshops and seminars in the INSPIRE Coordination Group, which comprises representatives of the authorities that are subject to INSPIRE. In the network of other INSPIRE stakeholders, the Geoforum plays an important role. For example, in collaboration with GST, the Geoforum has held whole-day seminars on metadata and the INSPIRE Directive.

Lastly, the annual INSPIRE conference also acts as a meeting place for national INSPIRE stakeholders, where they can share experiences and knowledge. At the conference in 2012 there were representatives from national INSPIRE authorities, Danish municipalities and universities.

An overview of the coordination measures taken during the reporting period is provided in Chapter 8.1.

5.6 Access to services through the INSPIRE geoportal

GST has developed a national geoportal, 'Geodata-info.dk', which provides access to the metadata, data and services included in the Danish infrastructure for spatial information, including INSPIRE. Geodatainfo.dk is a common component, developed in collaboration with other Nordic countries, on which all of the countries can base their search services. It is an open source development based on GeoNetwork¹¹. The Nordic countries have gained substantial advantages by pooling costs and expertise, thereby avoiding the duplication of work.

Geodata-info.dk is the gateway to the national infrastructure for spatial information and is based on the following model:

¹¹ <http://www.geonetwork-opensource.org/>



Figure 4. Publish – find – link

Facts on Geodata-info.dk

- Geodata-info.dk meets the requirements of the INSPIRE Regulation in respect of search services.
- Geodata-info.dk contains metadata for spatial data and services covered by the INSPIRE Directive and for other spatial data and services.
- Geodata-info.dk encompasses a national search service, which meets the current standards that are also recommended by the INSPIRE Directive.
- Publication and searching are carried out via standardised interfaces that can be accessed from users' own IT environments, including widely-used GIS systems.
- Geodata-info.dk is a geoportal adapted to conditions in Denmark, implementing a web application with a user interface via publishing and search services.
- Geodata-info.dk provides a map viewing service based on the common component 'Show Place'¹².

¹² <http://visstedet.kortforsyningen.dk/>
13 May 2013

6 Use of the infrastructure for spatial information (Article 14)

The infrastructure for spatial information in Denmark is construed as a series of integrated and interoperable components, which cannot easily be separated from one another when it comes to use. It is therefore difficult to examine the use of the data and services separately, as they are mutually dependent on one another in a well-functioning and efficient infrastructure for spatial information.

6.1 Use of spatial data services of the infrastructure

Spatial information only becomes valuable when it is used. In order for users easily to be able to obtain the information that they want, another distribution system is required that can handle large amounts of data and ensure that the user has easy and quick access to the most up-to-date information.

Digital Map Supply (*Kortforsyningen*) was mentioned earlier as an example of distribution services within the infrastructure. Both the public and the private sector use the services of Digital Map Supply as a natural part of their solutions. Digital Map Supply is one of services that are used most in Denmark and it is an important element in the development of a common infrastructure for spatial information. The use of Digital Map Supply and the number of enquiries has increased significantly each year since 2005 and particularly during the reporting period. As shown in the figure below, Digital Map Supply received more than 800 000 000 enquiries in 2012.

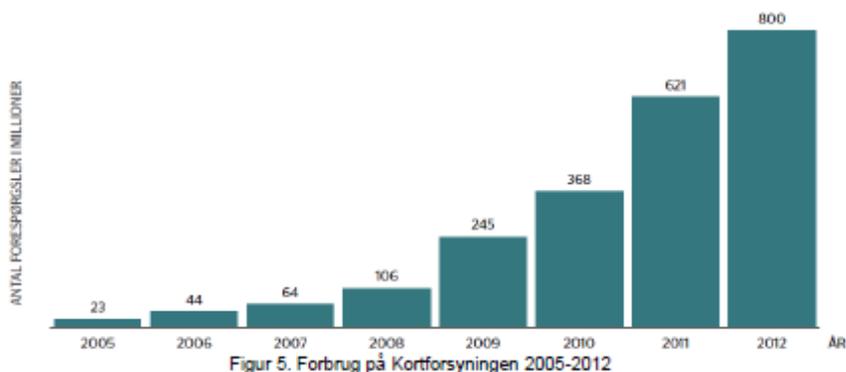


Figure 5. Use of Digital Map Supply 2005-2012

Key to figure:

Antal forespørgsler i millioner

Number of enquires, in millions

År

Year

Another example of services that handle and distribute spatial information is provided by the Danish Address Web Services (AWS). These are a collection of services aimed at reducing errors and increasing the quality of the address data of public and private IT systems by making the official, updated addresses available in a timely and relevant manner. These services enable an IT

system, in a straightforward way, to structure and validate its address information against the official address designations that are maintained each day by the municipalities. This ensures that the system's address data are correct and that they are as consistent as possible with data in other systems. By using the geographic coordinates that are attributed to the addresses it is possible to show the location on a digital map. The AWS solution was established by the Ministry of Housing, Urban and Rural Affairs in collaboration with GST. The services are freely available and there are no restrictions on further use of the data.

6.2 Use of the spatial data sets by public authorities

Spatial information is widely used in public administration as a basis for registration, administration and decision-making. A number of public-sector solutions use and display information based on common spatial data. For example, the Danish Natural Environment Portal¹³, which gives the general public access to a series of information on conservation, nature protection, planning, groundwater, soil pollution, etc.

Spatial information creates coherency across authorities and links sector-specific data in a general and effective manner. One example of this is the Danish Agrifish Agency's solution for beekeepers. Excellent pollination is a prerequisite for good crop production in Denmark, and the honey bee is the most important pollinator of cultivated crops and wild plants. Repeated outbreaks of disease among honey bees in recent years have threatened the country's arable farmers with a loss of income. The Danish Agrifish Agency has therefore set up an online register of beekeepers so that diseases can be combated more rapidly. The Central Beehive Register uses spatial information in the form of a digital background map. The overall benefit of the register¹⁴ is increased in combination with the specialist knowledge of the bee inspectors.

6.3 Use of spatial data sets by the general public

Public spatial information is used in a number of solutions for private users, for example *Borger.dk* (Life in Denmark.dk) and *Rejseplanen.dk* (Journey Planner).

Borger.dk (Life in Denmark.dk)

Life in Denmark.dk is a portal providing citizens with official digital contact with the public authorities. Via a secure gateway, citizens can obtain easy access to their own data and to geographically relevant information, for example relating to transport and the environment. It is also part of the Government Globalisation Strategy (link), the aim of which is for all written communication between citizens and the public sector to be conducted in digital format.

Rejseplanen (Journey Planner)

Journey Planner contains data from all Danish train and bus companies and most of the ferries and is based on the official address database. Journey Planner is a standalone portal, and its functionality can also be found on other websites and media. Journey Planner

¹³ The Danish National Environment Portal is the digital gateway to data on nature and the environment in Denmark.

¹⁴ More information on the register can be found at <https://cbr.pdir.dk/>

supplies over 10 million journey plans every month, making it Denmark's largest public Internet service.

6.4 Cross-border use of spatial data sets

In connection with national topographic mapping, GST cooperates on a permanent basis with the countries neighbouring Denmark in respect of edge matching cross-border data sets, preferably in relation to fixed points and reference networks.

In connection with nautical mapping, GST has an agreement with the neighbouring countries to match data with each other. This edge matching takes place in the form of standardisation and harmonisation and makes it possible for nautical charts to be used internationally.

GST participates in international civil as well as military standardisation work, and makes every effort to ensure that standardisation is carried out in agreed cooperation with its Nordic partners.

In order to obtain the full benefit of the implementation of INSPIRE across Europe it is necessary for the INSPIRE data sets to be matched between Member States. In this regard, Denmark will make use of its existing collaborations with its neighbouring countries.

6.5 Use of transformation services

The infrastructure for spatial information makes several transformation services available (WMS-, WFS- and WCS-based services).

The following services are provided:

- Coordinate transformation service;
- Format conversion service, based on an FME engine¹⁵ – aimed, in particular, at commercial GIS system formats.

¹⁵ FME is a data conversion engine that is able to handle several data formats, such as XML and various GIS formats. The engine can process data, transform geometry, convert to other coordinate systems and add attribute data.

7 Data sharing arrangements (Article 15)

7.1 Data sharing arrangements between public authorities

The agreements with the state and the municipalities¹⁶ and agreements with the regions meant that, in practice, there were only three agreements governing financing, conditions and services for the use of GST's data and services by all public, regional and municipal authorities during the 2010-2012 reporting period.

These agreements represented an important step for GST in ensuring a more uniform and efficient framework for public data sharing in the area of spatial data. The purpose of the agreements was to support the broadest possible use of spatial data within public administration.

Data sharing has simplified cooperation between the authorities and strengthened cooperation across the various levels of public authority.

7.2 Data sharing arrangements between public authorities and Community institutions

EU institutions have access to the Danish INSPIRE data sets and services. In order to facilitate any request for access, GST has drawn up guidance material on what the authorities responsible for data need to take into account when providing access to the data.

The material is supplied by the Coordination Committee, which has also decided, in spring 2013, to compile experiences with the aim of ensuring that the material is up-to-date and useable in a public authority context.

The basis for the guidance material is a process description, which is included in Annex 4.

7.3 Barriers to the sharing of spatial data sets and services

To obtain the full benefit of spatial information in eGovernment, it is important to be aware of the existence of barriers. During the 2010-2012 period, GST worked in a targeted way to reduce these barriers.

With the agreements concerning access by the state, the regions and the municipalities to GST's data and services, a large number of the access barriers relating to rights were removed within the public sector. However, there is still a need to ensure that the basis for the agreement is dynamic so that new data can be used by everyone.

Thus, there continue to be rights-related barriers in relation to use in the private domain. For many applications, the fact that spatial information cannot be freely reused by undertakings and private

¹⁶ In 2008, the government's Finance Committee approved a new model for state access to GST's spatial data. This means that spatial data can be used freely throughout central government and that public authorities will have access to the same current information. The state agreement entered into force on 1 January 2009, followed by the municipality agreement in 2010.

individuals is increasingly seen as problematic. There is a need to pay particular attention to ways of breaking down this barrier – also with regard to the possibility of promoting innovation and business development in the private domain¹⁷.

In the technical sphere, the interplay between data is a major challenge. The objective is that the use of spatial information in digital solutions should be straightforward – including for users that have not traditionally worked with spatial information. Barriers here may be that the specifications used for data and services are not uniform and standardised.

¹⁷ With free basic data in Denmark from 2013, a significant barrier to the increased use of spatial data has been removed.
13 May 2013

8. Cost/benefit aspects (Article 16)

8.1 Costs resulting from implementation of the INSPIRE Directive

Denmark does not view INSPIRE as an independent infrastructure for spatial information, but as a useful element in the ongoing development of common public sector eGovernance.

Similarly, since the implementation of INSPIRE is considered to be part of the general development of the national infrastructure for spatial information, it is not reasonably possible to draw up a separate cost/benefit analysis for the implementation of INSPIRE.

The pragmatic implementation of INSPIRE in Denmark is based on the premise that investments in spatial infrastructure will, in any event, be made over the next few years as a consequence of technological developments and the continued development of eGovernance. The aim is for the costs of implementation of INSPIRE to be subsumed within the general costs of development of the national infrastructure for spatial information, as has been the case up to now.

The examples below are not therefore intended to be viewed as isolated INSPIRE costs, but as examples of investments that were necessary anyway in the development of the common public sector infrastructure for spatial information.

Metadata

It is estimated that the amount of time spent by GST providing metadata for its INSPIRE data sets and services covered by Annex 1 is approximately 7.4 hours per data set or service. This amounts to approximately 200 hours in total. The amount of time spent is expected to fall in future, partly due to better and more user-friendly technology for metadata solutions and partly as a result of the general development of the knowledge and skills of the authorities responsible for the data.

Harmonisation of data

An example of the costs involved in harmonising data is the amount of time spent by GST on the work to bring data into line with the implementing provisions for data covered by Annex 1. The time spent per data set amounts to approximately 37 hours. The total time spent by GST during the reporting period is estimated to be approximately 300 hours.

It is expected that the general development of data modelling skills within GST in connection with Annex 1 will result in a reduction in the time spent per data set in future modelling tasks.

Network services

In a joint Nordic collaboration, GST has developed the search service Geodata-info.dk, which is based on the GeoNetwork open source software. In the joint Nordic project, DKK 400 000 was spent on the assistance of external consultants in 2010 for the implementation of the search service.

The time spent is made up as follows:

- Project-related activities: 174 hours
- Analysis/design: 278 hours
- Implementation: 547 hours
- Documentation: 100 hours

- Testing: 230 hours
- Total: 1 329 hours.

An example relating to the establishment of viewing services and the download facility is the amount of time spent by GST, which amounts to approximately 25 hours per service. The total amount of time spent by GST in establishing services is approximately 450 hours.

Monitoring and reporting

In order to automate the submission of data for the annual monitoring, thereby making the work easier for the authorities responsible for the data, GST has developed an application that draws information from metadata in Geodata-info.dk for use in the monitoring. The application facilitates the work of the authorities responsible for the data, but there will still be a need for a certain amount of quality assurance in respect of the information obtained.

The expenditure associated with the development of the application amounts to DKK 77 000. In addition, approximately 50 hours' worth of time was spent on the specification of requirements, project management and testing of the application.

GST is responsible for establishing the annual monitoring and collecting the relevant information. The amount of time spent on this can be said to be approximately 37 hours. In addition, the individual authorities must provide information for use in the monitoring. The amount of time spent per data set and service is in the order of 2 hours. This adds up to a total of 120 hours spent in Denmark.

GST is responsible for drawing up the report. This involves coordination with the authorities concerned and the Coordination Committee. In total, the amount of time spent in connection with drawing up the report is estimated to be approximately 150 hours.

Coordination and horizontal measures

The following examples are taken from GST, which in its capacity as coordinator of the implementation of INSPIRE has held a number of meetings, workshops and seminars, etc. during the reporting period.

These include:

- Meetings of the Coordination Committee (12 meetings)
- Meetings of the Danish Ministry of the Environment's internal INSPIRE working group (13 meetings)
- Meeting held for the Danish stakeholders, including the private sector
- Workshops for authorities on the theme of specifying metadata (2 workshops)
- Workshop on the provision of information for monitoring
- Workshop forming the start of the consultation with regard to data specifications for the Annex 2 and 3 spatial data themes
- Workshop focusing on the consultation with regard to data specifications for the Annex 2 and 3 spatial data themes
- Bilateral meetings with authorities in connection with the consultation in relation to Annex 2 and 3 (4 meetings)
- Workshop focusing on data sharing

- Workshop and subsequent bilateral meetings with authorities concerning data harmonisation and establishment of a download facility for Annex 1 data sets (3 meetings)
- GST took part in meetings for the exchange of experiences with Nordic INSPIRE contact points (5 meetings)
- GST took part in a Comment Resolution Workshop in Ispra in December 2011
- The Danish Ministry for the Environment took part in the reporting workshop in Ispra in March 2012
- The Danish INSPIRE authorities were represented at the INSPIRE conferences during the reporting period in question.

8.2 Benefits observed

Just as with the costs, it is not possible to isolate specific, quantifiable benefits of the INSPIRE implementation in Denmark. The close connection with the national infrastructure makes it difficult to determine whether particular benefits are due to INSPIRE or to the general development of the infrastructure.

At a cross-border level, where INSPIRE extends beyond the national infrastructure, we expect it to be possible to describe benefits that are directly attributable to INSPIRE and the interoperability across national borders developed through the implementation. However, the implementation of INSPIRE was still in its introductory stages from 2010 to 2012, and it is therefore difficult to establish specific cross-border benefits for this period.

During the 2010-2012 period, a number of secondary benefits of the INSPIRE implementation were obtained, of which Denmark would like give some examples.

The digitisation initiative in Denmark took a strategic direction in earnest in the public sector during 2010-2012, and spatial information took a prominent place on the digital agenda. The public digitisation strategies view the professional use of spatial information as a means to achieve more effective eGovernance. With a common strategic focus on coherence, uniformity and simplification, spatial information will be used increasingly in society.

The principles of the INSPIRE Directive have for many years formed the basis for the development of infrastructure for spatial information in Denmark.

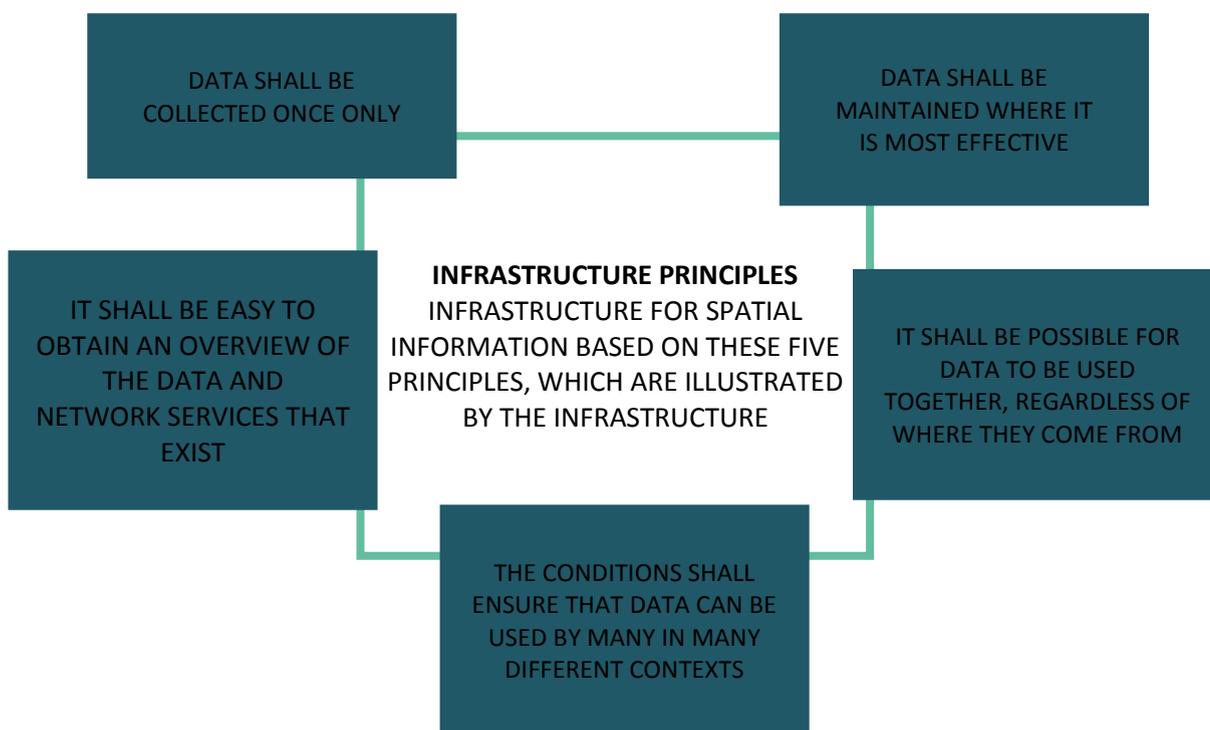


Figure 6. Infrastructure principles

These principles can be seen again and again in the public strategies, because they are not only applicable to spatial information but can also be used as a general basis for greater cooperation across public authorities when it comes to using and developing public data collections and their associated digital infrastructure.

In 2011, the Common Public Sector Digitisation Strategy (2011-2015) was published. The government, municipalities and regions intend to use this to further increase the pace of digitisation in order to revitalise the public sector. The goal of the strategy is for all public authorities to use the relevant common solutions. Spatial information and the associated infrastructure play an important part in this.

The strategy's basic data programme obtains direct inspiration from INSPIRE in respect of the principles established for basic data. In the designation of basic spatial data, Annex 1 to the INSPIRE Directive is used as a basis for ensuring consistency in the development of the national infrastructure for spatial information and eGovernance. Similarly, INSPIRE helps to ensure coherence and the possibility of sharing information across authorities. Recognised specification, including INSPIRE, are used as a basis for standardisation and modelling.

Another example of the utilisation of INSPIRE is in the work to establish a maritime spatial data infrastructure (MSDI). In 2011, a cross-ministry working group carried out a pilot project, recommending the development of a strategy for an MSDI to form the basis for future governance and planning in the maritime sector. The work on this strategy obtained inspiration from the principles and methods of INSPIRE.

9 Conclusion

The development of the Danish infrastructure for spatial information is based on a legal framework, national coordination and international cooperation. Both the fundamental principles and the specific requirements in the INSPIRE Directive contribute to the basis for this infrastructure. There has been progress in the development and use of the infrastructure during the reporting period, and INSPIRE has played an important part in this.

During the 2010-2012 period, the ongoing development of the infrastructure for spatial information encompassed both data services and the coordination structure, and access to standardised and harmonised spatial data has been improved.

As part of the public digitisation initiative, the basic data programme is very important. INSPIRE contributes to this in terms of principles, standards and methodology, which support the development of a common public sector infrastructure that ensures the efficient and harmonised use of public information across the public sector.

The public authorities covered by INSPIRE increased their cooperation during the 2010-2012 period in relation to the continued implementation of the provisions of the Directive. Since INSPIRE is implemented as an integrated part of the national infrastructure for spatial information, it is difficult to determine the costs and benefits that are specific to INSPIRE.

As the principles of INSPIRE are increasingly becoming an integral part of Danish public administration, their value is being extended across sectors. The benefits of an effective infrastructure for spatial information, including the contribution of INSPIRE, are in this regard extending out beyond public digitisation and into growth and innovation for undertakings and citizens.

Annex 1

The list below provides an overview of the authorities and organisations represented in the Coordination Committee

- Danish Regions
- Universities Denmark (*Danske Universiteter*)
- Geoforum
- Local Government Denmark (*Kommunernes Landsforening*)
- Danish Ministry of Climate, Energy and Building
- Danish Ministry of the Environment
- Ministry of Food, Agriculture and Fisheries in Denmark
- Danish Ministry of Transport
- Danish Ministry of Housing, Urban and Rural Affairs

Annex 2

The list below provides an overview of the Digital Map Supply stakeholders

- Atkins Danmark A/S
- breakoutimage as
- COWI
- Euman A/S
- Experian A/S
- Geodata Danmark
- Geograf A/S
- GeoPartner
- Grontmij A/S
- Hvenegaard & Jens Bo
- Informi GIS A/S
- Innovative Business Software A/S
- Intergraph Denmark A/S
- JO Informatik
- KMD A/S
- LE34 A/S
- LIFA A/S
- NIRAS A/S
- Orbicon
- Pitney Bowes MapInfo
- Rambøll

Annex 3

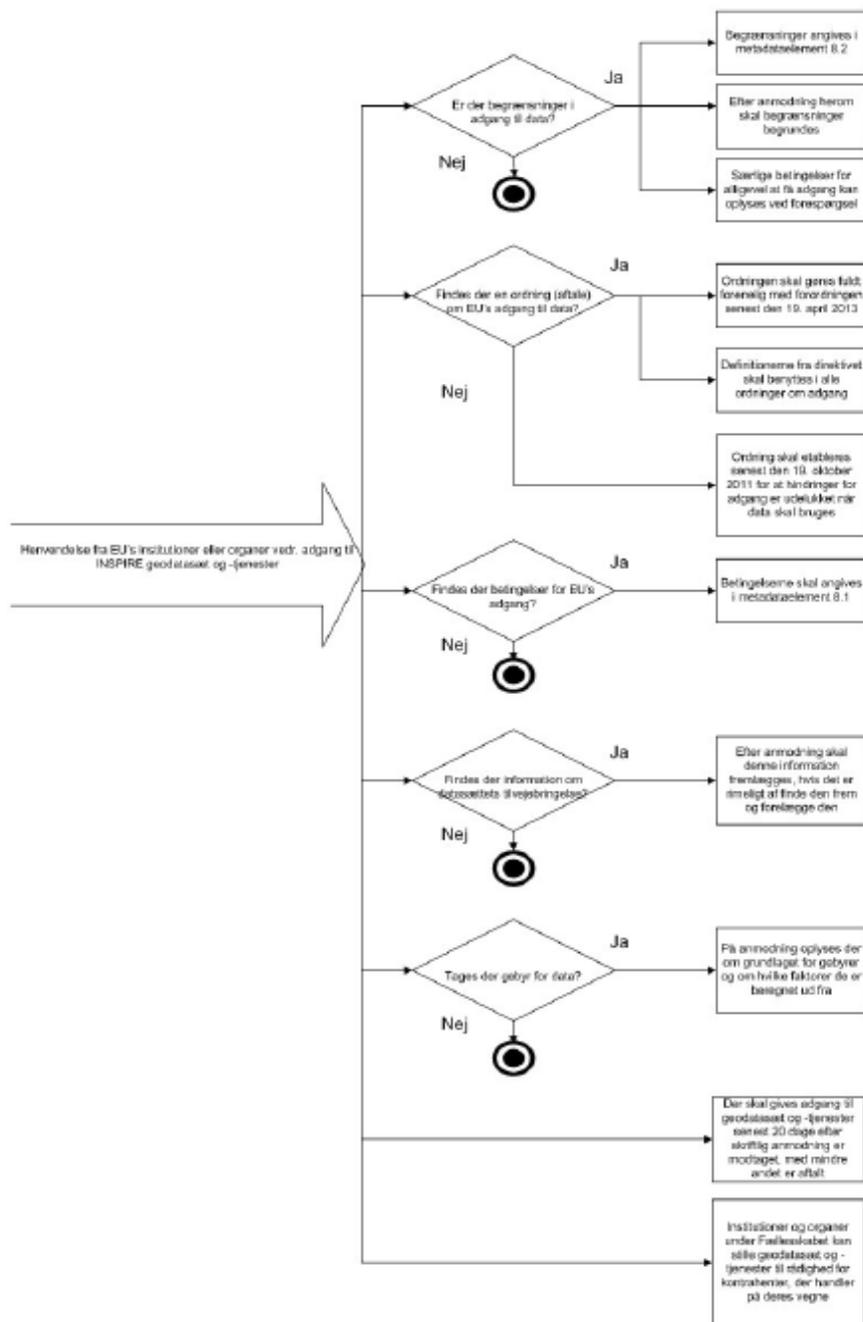
The list below provides an overview of the authorities responsible for data under INSPIRE Annex 1

- Danish Geodata Agency
- Danish Agency for Culture
- Danish Ministry of Housing, Urban and Rural Affairs
- Danish Nature Agency
- Danish Transport Agency

Annex 4

The diagram below shows the EU institutions' access to data and services.

Diagrammet herunder viser fællesskabets institutioners adgang til data og tjenester.



Key to diagram:

Henvendelse fra EUs institutioner eller organer vedr. adgang til INSPIRE geodatasæt og -tjenester	Request from EU institutions or bodies for access to INSPIRE spatial data sets and services
Ja/Nej	Yes/No

Er der begrænsninger i adgang til data?	Are there any limitations on access to data?
Begrænsninger angives i metadataelement 8.2	Limitations are indicated in metadata element 8.2
Efter anmodning herom skal begrænsninger begrundes	On request, the reasons for the limitations shall be given
Særlige betingelser for alligevel at få adgang kan oplyses ved forespørgsel	Information on any special conditions for obtaining access despite the limitations may be provided on request
Findes der en ordning (aftale) om EUs adgang til data?	Is there an arrangement (agreement) concerning the EU's access to data?
Ordningen skal gøres fuldt forenelig med forordningen senest den 19. april 2013	The arrangement shall be made fully compatible with the Regulation by no later than 19 April 2013
Definitionerne fra direktivet skal benyttes i alle ordninger om adgang	The definitions in the Directive shall be applied in all arrangements concerning access
Ordning skal etableres senest den 19. oktober 2011 for at hindringer for adgang er udelukket når data skal bruges	The arrangement shall be established no later than 19 October 2011 in order to prevent barriers to access when data is to be used
Findes der betingelser for EUs adgang?	Are there conditions applying to access by the EU?
Betingelserne skal angives i metadataelement 8.1	The conditions shall be indicated in metadata element 8.1
Findes der information om datasættets tilvejebringelse?	Is there any information on the production of the data set?
Efter anmodning skal denne information fremlægges, hvis det er rimeligt at finde den frem og forelægge den	This information shall be provided on request, if it is feasible to find and present it
Tages der gebyr for data?	Is there a fee for data?
På anmodning oplyses der om grundlaget for gebyrer og om hvilke faktorer de er beregnet ud fra	On request, information is provided concerning the basis for fees and the factors used in their calculation
Der skal gives adgang til geodatasæt og –tjenester senest 20 dage efter skriftlig anmodning er modtaget, med mindre andet er aftalt	Access shall be provided to spatial data sets and services no later than 20 days after receipt of a written request, unless otherwise agreed
Institutioner og organer under Fællesskabet kan stille geodatasæt og –tjenester til rådighed for kontrahenter, der handler på deres vegne	Community institutions and bodies may make spatial data sets and services available to contractors acting on their behalf

