

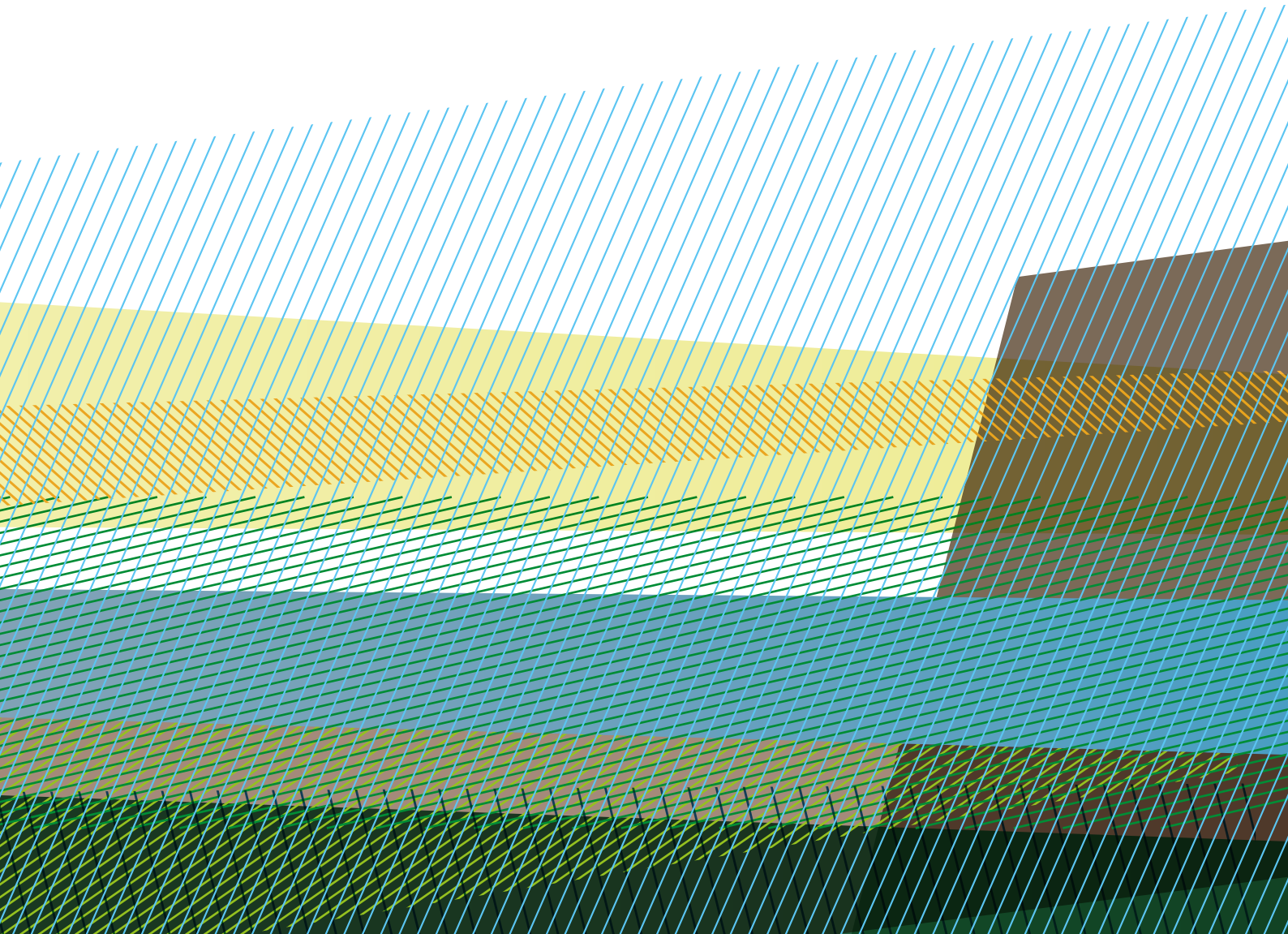


Danish Ministry of the Environment
National Survey and Cadastre

Strategic basis

The National Survey and Cadastre 2011-2015

LOCATION – A GATEWAY TO eGOVERNMENT





Title: Location - a gateway to eGovernment
Published by: The Danish Ministry of the Environment, National Survey and Cadastre
Text: The National Survey and Cadastre
Design: Bysted
Illustrations: Bysted
Print: Sangill
Year of publication: 2011
Print run: 1500

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INTRODUCTION



“In times of increased pressure on public finances, digitisation is one of the most important tools we have to modernise the public sector while carrying out administration with fewer hands. The innovative use of digital solutions can also help to increase productivity in our society. Digitisation is thus a key tool for solving the many challenges that will face Denmark over the next few years”.¹

The government is keen to take full advantage of Denmark’s internationally preeminent position in this field² by focusing on modernising the public sector through digitisation, thus creating new service opportunities for the general public and businesses and contributing to the development of society through increased productivity and new areas of growth. Therefore, the central government, Local Government Denmark (LGDK) and Danish Regions have initiated the

drawing up of an ambitious new Danish eGovernment strategy for 2011-2015.

The eGovernment strategy will provide a new framework for many areas of the National Survey and Cadastres (KMS’s) work with spatial information. At the same time, both the Ministry of the Environment and the municipalities see significant challenges in coming years in transforming administrative processes and improving data handling across administrative levels.³

Meeting these challenges will require clear agreement on central principles like; the broad use of shared data, unambiguous allocation of responsibilities among authorities and smooth access to information and internet services. Such principles are already part of the foundation for developing the national Spatial Data Infrastructure (SDI) and should also support enhanced cooperation across public authorities in more general terms.

The systematic creation of a cohesive SDI has progressed through agreements between public authorities, while the Infrastructure specified in the Spatial Information Act has provided further reinforcement in recent years. The Act gives KMS overall responsibility for filling out the framework and objectives for the national SDI in a way that will promote modernisation and development of the public sector. KMS will thus help to ensure a more cohesive, simple and efficient public sector for both citizens and businesses.

OBJECTIVE

It is KMS’s objective that spatial information becomes an everyday resource for the public sector, businesses and the general public. KMS will work to ensure that spatial information contributes to improving the efficiency of public sector activities.

¹ From the terms of reference agreed by the Government, Local Government Denmark (LGDK) and Danish Regions with regard to the Danish eGovernment Strategy for 2011-2015.

² OECD report, April 2010

³ The Danish Ministry of the Environment has approved an eGovernment strategy for 2010-2014 for the Ministry; LGDK has drafted a joint eGovernment Strategy for the municipalities.

The innovation that drives the private sector should be harnessed to develop both public and private sectors activities and to make them more efficient.

Projects linked to the provision and development of SDI-related data and services should include the participation from private businesses in the market. This will ensure that the most cost-efficient solutions are achieved in the public sector whilst drawing on the knowledge, skills and resources of the private sector for the benefit of all parties.

The use of data is the key to realising the potential value of the SDI. Here the public sector requires that the solutions and services offered by private businesses are compatible with the needs of the public sector.

A well-developed SDI that has a broad platform in both the public and private sectors will also give private businesses access to a standardised and clearly documented foundation for developing new solutions and applications. This will present expanded commercial opportunities while contributing to economic growth.

THE PRINCIPLES BEHIND THE INFRASTRUCTURE:

- Data should only be collected once.
- Data should be maintained where this can be done most effectively.
- It should be easy to get an overview of the available data and internet services.
- Data should be combinable, regardless of their source.
- There should be clear conditions of use which assure that data can be utilised by many users in many contexts.

These principles are at the heart of the INSPIRE Directive.

THE DANISH eGOVERNMENT STRATEGY

The new Danish eGovernment strategy for 2011–2015 focuses amongst other things on cross-agency cooperation on public sector's digital infrastructure and shared use of data, as well as the promotion and development of shared solutions. Environmental management and spatial information are important themes in the strategy.

KMS is responsible for coordinating the Danish Ministry of the Environment's contribution to the national eGovernment strategy.

THE NATIONAL SURVEY AND CADASTRE'S CORE TASKS



KMS is the national authority responsible for SDI, surveying, mapping, and cadastral and chartered surveyor administration. KMS's responsibilities are defined in the Act on the National Survey and Cadastre, the Infrastructure for Spatial Information Act, the Act on Subdivision and other Registrations in the Cadastre, and the Land Surveyors Act.

KMS has a legal obligation to ensure a cohesive cross-agency SDI that supports public administration and public sector activities.

KMS is a modern, IT-based public authority, which encompasses digital work processes, internationally recognised standards and large volumes of data. KMS has thus been given responsibility in the Danish Ministry of the Environment for cross-agency tasks related to the use of IT, the development of eGovernment and the coordination of data.

IT operations within the Danish Ministry of the Environment, and thus within KMS, is provided by the Agency for Governmental IT-services.

The work of KMS focuses on the following fields of responsibility:

- The SDI.
- Reference networks.
- Terrestrial mapping.
- Nautical charts.
- Historical geographic data.
- Property registration.

- eGovernment and GIS (Geographic Information Systems).
- IT operations and development.
- The Centre of Expertise for Spatial Information.

KMS creates, maintains, refines and distributes important elements of the national SDI.

KMS's ACTIVITIES

KMS focuses on meeting its users' requirements when working to fulfil its responsibilities. This includes reducing administrative processing times, supporting public sector operations and streamlining procedures through IT functionality.

KMS's work involves the development of business procedures, databanks and network services to deliver data and services that are as up-to-date and reliable as possible. This development emphasises streamlining and automation, and encompasses methods of case processing, the collection and updating of data, quality assurance, as well as automatic generalisation and visualisation.

THE AGENCY FOR GOVERNMENTAL IT-services

The Agency for Governmental IT-services is responsible for providing efficient IT support and assuring high-quality and uniform services across government agencies. Its main tasks are the operation, support, development and harmonisation of governmental IT-services.

The Agency for Governmental IT-services shall:

- create the basis for further digitisation of governmental administration.
- attract and retain IT employees by creating an attractive technological workplace with good opportunities for professional development and specialisation.
- reduce IT costs by combining multiple ministries' IT operations and achieving economies of scale through combining and standardising systems.

OBJECTIVE

KMS's objectives are:

- to ensure that the Ministry of the Environment obtains optimal IT operations.
- to help ensure that the Agency for Governmental IT-services functions well.
- to contribute towards making the Agency for Governmental IT-services a cross government initiative, which contributes to the prerequisites of the basis for realising eGovernment ambitions.

THE MINISTRY OF THE ENVIRONMENT'S eGOVERNMENT STRATEGY 2010-2014

The strategy is designed to provide a cohesive framework for the Ministry's use of eGovernment. The strategy emphasises:

- that digitisation helps to make administrative activities more efficient.
- that digitisation improves the digital services available to citizens and businesses.
- that digitisation is achieved by cooperation throughout the Ministry thereby creating solutions that can be applied broadly and in multiple contexts and across the public-sector, for example through collaboration on the new national eGovernment Strategy.
- that digital skills are strengthened while governance is made more focused and efficient.

KMS coordinates the implementation of the Ministry of the Environment's eGovernment Strategy.

THE SPATIAL DATA INFRASTRUCTURE



The national SDI plays a key role across the public sector's administrative levels and areas, and in the internal digitisation process across the Ministry of the Environment.

The principles on which the SDI's development is based are applicable beyond the field of spatial information. They can also be used as a general basis for enhanced cooperation across public authorities on developing and sharing public sector data and associated digital infrastructure.

As part of the development of the national SDI, KMS and the municipalities have developed a shared, comprehensive geographic foundation for eGovernment ("FOT" in Danish). The Ministry of the Environment with the Danish Nature and Environment Portal and PlansystemDK has made significant progress in incorporating the SDI principles in several administrative systems and contexts.

Through advances in information technology, shared services that use the internet have become more widespread. This helps to facilitate an easy and smooth use of geodata and is an important prerequisite for integrating geodata in both the public and private sectors activities (see illustration on page 25).

The Infrastructure for Spatial Information Act constitutes a legal basis for developing the SDI in accordance with the EU's INSPIRE Directive.

OBJECTIVE

KMS's objective is to support the development of eGovernment through the implementation of the INSPIRE Directive.

The Infrastructure for Spatial Information Act, the Coordination Committee on Infrastructure for Spatial Information and the Spatial Data Service Community have established a structure for cooperation and decision-making in the field of geodata.

Collaboration among the main actors in the geodata field is underpinned by their shared understanding of the importance of spatial data and recognition by individual data owners that, the benefits of basing their work on a collective infrastructure more than offset the expenses involved in building and maintaining it. KMS will support the Danish public sector in building eGovernment solutions while assuming a coordinating and governing role in the creation and application of the national SDI, with a focus on shared geodata, common components and binding agreements.

4 FOT aims to establish unified mapping of Denmark to be used throughout public administration as a part of eGovernment.

DATA SHOULD ONLY BE
COLLECTED ONCE

DATA SHOULD BE
MAINTAINED WHERE THIS
CAN BE DONE MOST
EFFECTIVELY

IT SHOULD BE EASY TO
GET AN OVERVIEW OF
THE AVAILABLE DATA
AND INTERNET SERVICES

PRINCIPLES OF INFRASTRUCTURE

Spatial Data Infrastructure builds on these five principles, which may also be illustrated using the Infrastructure Model (see page 33).

DATA SHOULD BE
COMBINABLE,
REGARDLESS OF THEIR
SOURCE

THERE SHOULD BE CLEAR
CONDITIONS WHICH ASSURE
THAT DATA CAN BE UTILISED
BY MANY USERS IN
MANY CONTEXTS

THE SPATIAL DATA INFRASTRUCTURE IS COMPRISED OF:

Geodata themes, which are collections of geodata that are sorted by application. Examples include the transport network, hydrography and buildings. These themes are available as geodata sets and services.

Metadata, which are information that describe geodata sets and services, making it possible to find, display and use them.

Shared infrastructure services, which consist of a set of internet services that allow access to documented geodata and to metadata from distributed sources of data. Geodata-info.dk is an example of this type of service.

Standards, which are common rules, conditions, guidelines or characteristics of data, as well as their associated processes, technology and organisation.

Collaboration between central, local, and regional authorities, universities and private businesses in order to ensure that the national SDI meets its users' requirements.

Binding agreements between public bodies regarding the national SDI.

Synergy should be assured between private sector geodata and services on the one hand and public sector tasks on the other. The public sector is dependent on the private sector to offer solutions and services that bring the SDI into play. At the same time, private businesses' commercial choice of technological platforms and solutions can become an independent

parameter for the development of eGovernment. Therefore a constructive, forward-looking dialogue with the private sector must be ensured with a view to creating synergies with public sector operations.

SCHEDULE FOR IMPLEMENTATION OF THE INSPIRE DIRECTIVE:

The INSPIRE Directive has three Annexes that determine the geodata sets to be covered by INSPIRE and thus by the Infrastructure for Spatial Information Act. The Annexes will be implemented in stages.

- December 2010: metadata for geodata sets and associated services under Annex I are available at geodata-info.dk.
- October 2011: national paradigm for EU access to the Danish INSPIRE geodata sets and services is in place.

- November 2011: Search and display services are operational.
- December 2012: Services for conversion and download are operational.
- December 2012 to 2019: Geodata sets under Annex I are harmonised.
- December 2013: Metadata for geodata sets and associated services under Annexes II and III are available at geodata-info.dk.
- 2015 to 2019: Geodata sets under Annex II and III are harmonised.

Cf. the INSPIRE Directive

The four areas: ■ metadata ■ data harmonisation ■ services ■ formal agreements



INFRASTRUCTURE FOR SPATIAL INFORMATION IN THE EUROPEAN COMMUNITY (INSPIRE) WAS LAUNCHED TO:

- set out the general rules aimed at creating an infrastructure for spatial information in the European Community (INSPIRE) to support Community environmental policies as well as policies and activities that may impact the environment.
- ensure that the infrastructures for spatial information which are established and operated by the Member States are compatible and can be used in Community and cross-border contexts.

INSPIRE has its background in the environmental sector but is formulated as a general basis for the use of spatial information in all sectors.

THE INFRASTRUCTURE FOR SPATIAL INFORMATION ACT

implements the regulations, principles and associated guidelines of the INSPIRE Directive into Danish law.

With the Infrastructure for Spatial Information Act, Denmark has strengthened the framework for the national SDI and its links with eGovernment.

The Act includes two significant additions to the text of the EU Directive:

- The Danish Minister for the Environment can extend the provisions of the Act to data other than those covered by the Directive.
- The Minister for the Environment can, in collaboration with other public sector stakeholders, determine which data sets should serve as the common basis for eGovernment.

2012-2019

Geodata sets under Annex I are harmonised.

DECEMBER 2013

Metadata for geodata sets and associated services under Annex II and III are available at geodata-info.dk.

2015 -2019

Geodata sets under Annex II and III are harmonised.

SHARED PUBLIC SECTOR GEODATA

Clearly defined, and jointly approved geodata are the basis for the efficient execution of public sector activities.

Spatial information is collected in various contexts and by many organisations, often based on an organisation's specific requirements related to its field of operations. Many types of spatial information however are being used beyond their original purpose by other organisations and in new contexts.

It is thus necessary to ensure that all authorities use a recognised, clearly defined and shared foundation for carrying out their respective activities.

Geodata should contribute to the efficient execution of public sector operations. This requires consensus among public agencies with regard to common standards, functionality, content and the allocation of responsibilities and obligations for the collection, maintenance, distribution and use of geodata. This requires that the individual stakeholders are committed to base their work on the shared infrastructure and to make their own data available for activities across the public sector.

Furthermore this means, that geodata must be made available for use across organisational boundaries, and that data should be collected only once, maintained where this can be done most effectively and made easily retrievable and applicable.

COMMON COMPONENTS

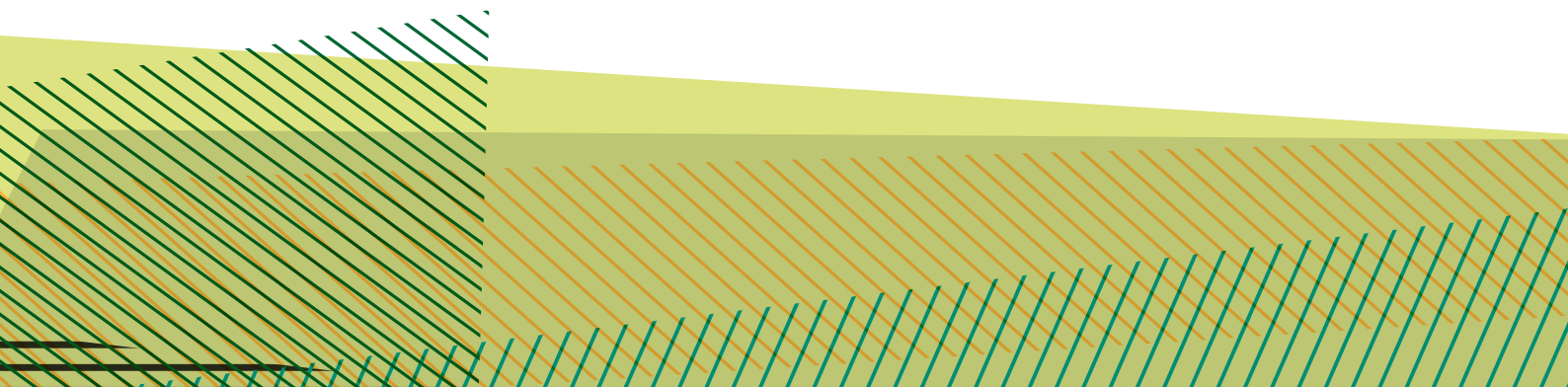
The SDI should be widely used throughout public public activities. This must be achieved through the establishment of common components and the common acceptance of conditions for their use.

Improved availability and easy access to spatial information and services are amongst the most important preconditions for a broader use of SDI in eGovernment.

It is therefore essential that functional and cohesive common components are developed to support access to geodata and functionality within eGovernment. A common component performs the work that is common for several applications, can be used in various contexts and can be incorporated in end-user solutions across multiple portals and authorities. A common component is typically not a complete end-user solution but a 'building block' that provides functionality.

Common components help authorities to reduce their development costs and create greater familiarity and cohesion across different authorities' digital solutions.

Private sector skills and resources should be utilised in the development of common components, to the advantage of both the public and private sectors.



OBJECTIVE

It is KMS's objective that the data and services for which KMS has responsibility:

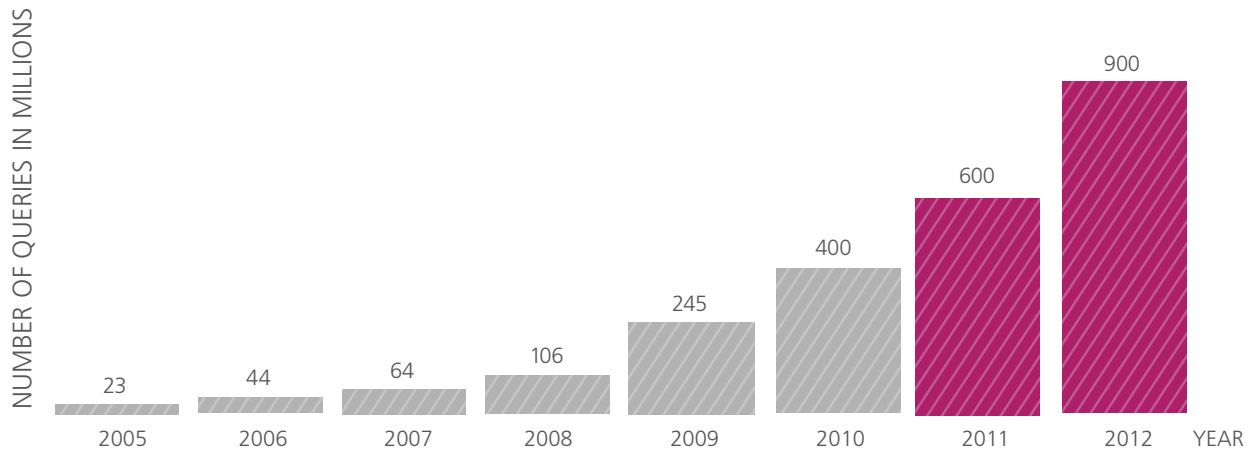
- are integrated into the shared foundation for eGovernment.
- are accessible on a 24-hour basis.
- are operated securely and efficiently.
- meet their users' requirements .

COMMON COMPONENTS

In the national eGovernment strategy, common components are an important element in the development of digital self-service solutions that are well-run and fully integrated. These help the general public to experience a familiarity and cohesion across the digital solutions provided by the authorities. The joint acquisition of common components also helps authorities to reduce their expenses. Examples of common components are the NemID/Digital Signature, NemKonto (Easy Account) and Vis Stedet (Show the location). Vis Stedet allows organisations to display geodata and maps from KMS, together with their own data on their websites. Vis Stedet is a sub-component in a series of public solutions – including VisKort (Show the map) on borger.dk (which is a single entry point to the public sector for the citizens) and Vis Planer (Show the plans).

USE OF THE DIGITAL MAP SUPPLY:

ACTUAL ■ ESTIMATED ■



THE DIGITAL MAP SUPPLY

KMS makes its spatial information available on the Internet through the Digital Map Supply, thus helping to improve access and availability of spatial information.

The Digital Map Supply reduces the technological and economic barriers and increases the accessibility of updated spatial information. The Digital Map Supply involves private partners and offers highly accessible data and functionality and associated support services.

The Digital Map Supply is used in many public applications, including shared solutions such as: borger.dk; the Danish Nature and Environment Portal; the Danish Nature Agency's local planning portal (plansystemDK.dk); the

Danish Nature Agency's interactive map on nature and outdoor activities (udinaturen.dk); the Danish Road Directorate's traffic information portal (trafikken.dk); the Danish Enterprise and Construction Authority's Public Information Server (OIS) database; the Danish Register of Underground Cable Owners (LER); and the Danish Food Industry Agency's agricultural support system. The Digital Map Supply is also used in private applications including E-Net's estate agents application and Bonnier Publications' iForm running route planner.

In 2011 the Digital Map Supply expects annual traffic to reach approximately 600 million queries.

BINDING AGREEMENTS

Realising the potential of a shared public sector SDI depends on the establishment of a structure and decision-making system that assures the necessary binding agreements between public bodies can be put into place.

An unambiguous and widely accepted SDI that can be used in eGovernment presupposes an accepted and agreed division of labour and burden sharing between public bodies and the establishment of associated conventions. Also necessary is the establishment of widely accepted models for reaching binding SDI-related agreements between public bodies.

There is also a need for, a decision-making system to facilitate agreements on the division of labour, including responsibilities and obligations, as well as financing, for example in the case of public procurements or the establishment of shared solutions. Economic frameworks and financing models should help to increase the use of shared geographic information across the public sector. They should also guarantee that the necessary data are in place and accessible under conditions that ensure their widest possible distribution and usage. This must be achieved through establishing nation-wide public sector agreements that encompass the entire SDI. Agreements on the financing of geodata and internet services must continue to develop in tandem with new public sector demands for the use of geographic information.

THE COORDINATING COMMITTEE

The Coordination Committee on Infrastructure for Spatial Information is working to facilitate and support the further development of an effective national SDI based on the activities defined in the provisions of the Infrastructure for Spatial Information Act. The Coordinating Committee consists of public authority representatives and other owners of geodata that are covered by the Infrastructure for Spatial Information Act. Individuals with special knowledge of SDI may also be appointed to the Committee.

The Coordinating Committee has both statutory and agreement-based responsibilities.

For agreement-based activities, the Coordinating Committee operates within the framework provided by the Steering Committee for Joint Government Cooperation, and serves as the domain manager for spatial information. The Coordinating Committee reports annually on its activities to the Steering Committee.

AGREEMENTS WITH THE PUBLIC SECTOR

Agreements with the central government, municipalities and regions mean that, in practice, there are only three agreements that regulate the financing, conditions and services for all use of KMS's data and services by governmental, regional and municipal authorities. A significant barrier to the increased use of spatial information has thus been considerably lowered.

OBJECTIVE

KMS' aim is that a cross-sector, shared agreement model for the SDI covering the entire public sector is developed.

INTERNATIONAL COOPERATION

The basic principles of INSPIRE must be applied in cross-border public sector work.

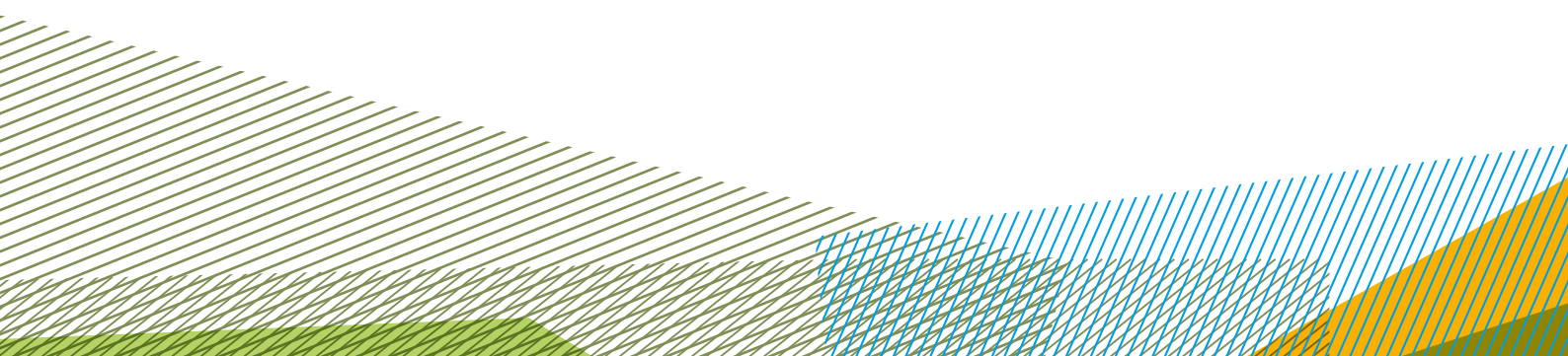
INSPIRE requires all EU countries to adapt their existing public geodata to common standards. The objective is to enable the broad use of geodata in multiple public sector fields and across EU Member States.

INSPIRE requires the creation of a shared European SDI that builds on the national infrastructures. Until INSPIRE is fully implemented in 2019, there is a risk that in order to ensure accessible geographic information, new pan-European geodata sets and internet services may be established that do not build on or further develop the national infrastructures.

Efforts should thus be made to ensure that data and services are not developed for narrow, project-oriented purposes but are established and maintained at both national and international levels from a collective perspective in accordance with the basic principles of INSPIRE.

An example is EuroGeographics, which acts as a framework for practical and political cooperation between the national mapping and cadastral institutions in Europe. One of EuroGeographics' projects that is designed to achieve a standardised basis for the exchange of geodata is ESDIN, which was launched with the purpose of implementing INSPIRE.

The aim is that EuroGeographics develops into becoming a European agency for spatial information.



The mapping and cadastral agencies in the Nordic countries cooperate on the exchange of experience and knowledge, on the establishment of common solutions and on specific projects. The Nordic countries seek to harmonise their approaches and to represent each other in international collaborative work.

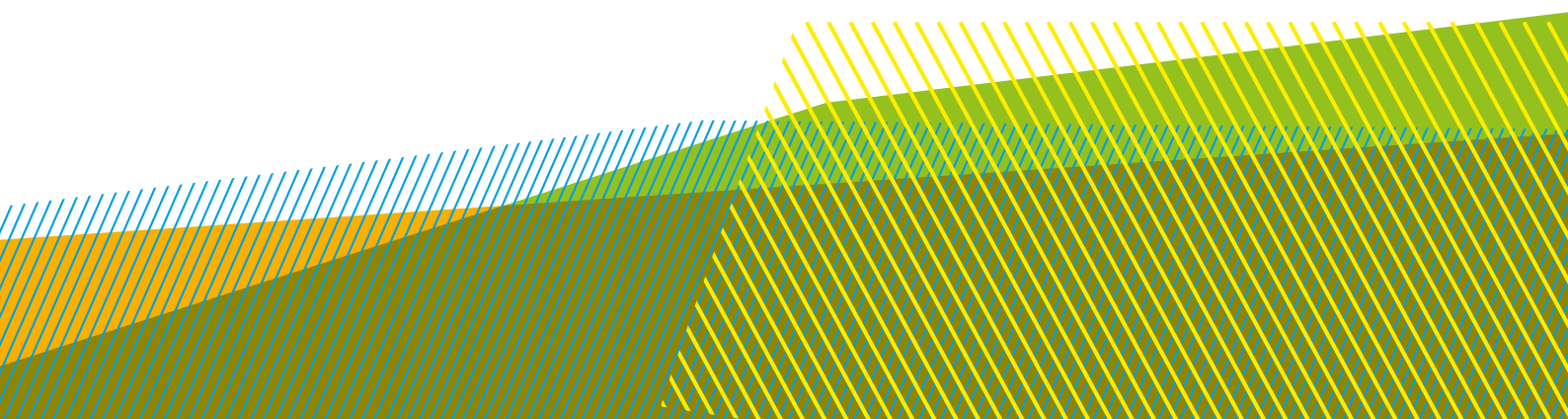
KMS' international involvement and its Nordic cooperation will ensure that KMS remains updated on current developments and has the ability to influence international cooperation and initiatives.

International standardisation is an important prerequisite for smooth access to and use of spatial information across national borders. KMS is taking part in both civil and military international standardisation activities and strives to ensure that participation is based on agreed collaboration with its Nordic partners.

KMS will in carrying out its activities use the opportunities provided by the EU multiannual framework programmes, for instance by participating in EU projects.

EUROGEOGRAPHICS

EuroGeographics is an umbrella organisation for 55 European mapping and cadastral agencies representing 44 countries. EuroGeographics' aim is to further develop the European SDI on the basis of the national infrastructures and, as one voice, to exert influence on this development at the EU level. The EuroGeographics secretariat moved from Paris to Brussels in 2010 in order to reinforce the dialogue with the EU. EuroGeographics is active in designing the basis for the European Location Framework (ELF), of which ESDIN is part, and bases its work on a Medium Term Business Plan (MTBP), which defines the framework for delivery of harmonised, cohesive pan-European data sets.



OBJECTIVE

KMS is working to ensure that the INSPIRE principles are broadly applied both in Danish public administration and internationally, including the EU, based on the fundamental principles that data should only be collected once and maintained where this can be done most effectively.

KMS is striving to ensure that these principles are followed both during the establishment of INSPIRE and in the subsequent period – for example in order to avoid duplicate registration.

ESDIN

(European Spatial Data Infrastructure with a Best Practice Network) was initiated, and is managed, by Euro-Geographics. The project has 19 partners from universities and the public and private sectors and is mainly funded by the EU. The project comprises focused standardisation of data descriptions across national boundaries and making shared geodata available in accordance with INSPIRE.

In short, the aim is to ensure that all EU Member States use the same system when working with geodata.

SPATIAL INFORMATION



There is increasing focus on the opportunities that shared solutions and data provide for the development of an efficient public sector. Various terms are used amongst the parties involved and the terminology is still under development. The national eGovernment strategy is expected to define common concepts with authoritative and binding content. Reference data is a term used in the geodata field. This term must be integrated into the terminology and framework being established in the eGovernment strategy.

A SHARED FOUNDATION FOR eGOVERNMENT

Reference data provide a well-defined common basis for the registration, linking and display of an organisation's own data with the data of others.

Reference data constitute an essential part of the national SDI and are also a prerequisite for reaping the value of the INSPIRE principles in public administration.

The effective and cohesive execution of tasks across sectors and specialist fields requires that the public sector commits itself to using the same reference data as a common basis.

Reference data can be seen as a well-defined collection of geodata sets within the SDI that form the basis for the registration, linking and display of an organisation's own data alongside the data of others. To ensure that the same reference data can be used broadly across public sector activities and administration, there need

to be several requirements of these data sets with regard to their documentation, revision history, ownership, identifiers, quality, stability and maintainance⁵.

REFERENCE DATA

are characterised by the following qualities:

- They identify the precise geographic location of other data (as the basis for registration or georeferencing).
- They enable the integration of multiple types of information, including data from various sources and specialist areas (find the location, find events at the location, determine conditions at the location).
- They improve the comprehension of information when viewed by a third party user (common perspective).

Reference data must be highly reliable and of high quality (authoritative, authentic).

⁵ The OIO (Public Information Online) Committee for Reference Data establishes the requirements for reference data.

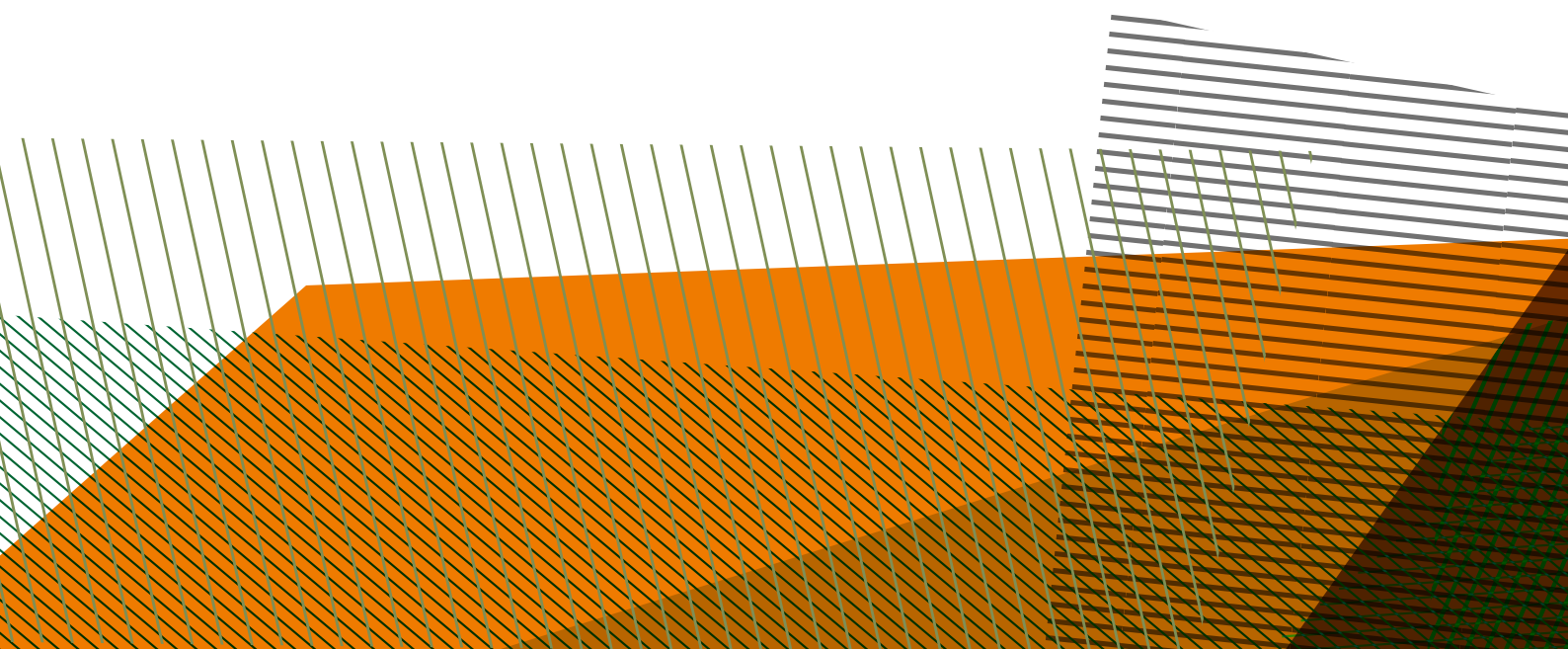
To ensure that the reference data add the intended value to public administration, there must be an official recognition of specific data sets as reference data. This must be accompanied by official concurrence on the requirements and responsibilities that follows with regard to the data's structure, quality and accessibility.

The determination of where the responsibility lies for creating and maintaining data sets that are designated as reference data is necessary to ensure the creation of the required organisation and governance of the shared foundation for eGovernment. This work will be ongoing, as the need for and requirements of reference data will continually develop.

Assurance must be given at both national and international levels that the identification of official reference data will be followed up by standardisation.

OBJECTIVE

KMS's objective is to secure recognition of specific data sets as reference data , and thus as the unambiguous foundation for eGovernment. Acceptance of common rules for these reference data must also be achieved.



THE BASIS FOR GEOREFERENCING

The same geodetic system must be used as the basis for all geographic information in public sector activities.

Unambiguous georeferencing and the smooth exchange of geodata builds upon the public sector using the same geodetic reference system when information has to be referenced precisely. This necessitates an up-to-date, accessible geodetic referencing system based on GNSS.

Similarly, geodetic referencing of height above mean water level is necessary for facility and construction projects, planning, flood management, etc. Monitoring of the mean water level is particularly relevant for climate-related activities.

GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS)

GNSS is the general term for a satellite system used to determine geographic location. GPS, Galileo and others each constitute an example of a GNSS. Galileo is Europe's future satellite system and will increase the number of GNSS satellites by 30. The overall number of GNSS satellites is expected to rise within five years from approximately 60 to approximately 130.

As modern georeferencing uses GNSS, so too is the geodetic reference related to the satellite system. Precise positioning of objects requires a differentiation between the geodetic reference associated with the satellite system and the terrestrial reference points that move a couple of centimetres each year due to continental drift.

Developments in GNSS will create a number of new applications for use in public sector activities. It is therefore important that the necessary advisory services are available.

Collaboration with private GNSS services ensures the quality and accessibility of reliable correction data for private and public use. It also ensures that high precision GNSS positioning can be linked to the geodetic reference system.

PRIVATE GNSS SERVICES

Two private nationwide GNSS services offer correction data with which GNSS users can achieve centimetre precision when using GNSS equipment. Each of the services has created a primary network of reference stations from which correction data are generated.

Both services meet KMS's requirements for accessibility and accuracy and have been approved and registered by KMS as services for high-precision surveying.

LAND AND SEA

Many administrative areas require a comprehensive groundwork for activities related to land and sea.

Terrestrial mapping is an integral part of the SDI and, through FOT, has become an important shared element of public sector administration. There is an ongoing need to develop this shared element in cooperation with other public bodies. This will be achieved through joint projects and joint procurement.

OBJECTIVE

Through FOTdanmark, KMS is working to make FOT achieve national coverage by 2012 – and thereby fulfill an already acknowledged requirement in governmental, municipal and cross-public sector activities.

FOT

FOT is the general term for the collaboration between central government and the municipalities on establishing a shared geographic foundation for eGovernment.

Work in FOT is undertaken partly through several local collaborative projects and partly by the central FOTdanmark association.

KMS's responsibility as an oceanographic authority has traditionally focused on navigation and maritime safety. Economic interests and activities in the maritime sector contribute to a growing need for a shared basis for activities in national waters. These activities include the protection of the environment and of nature, planning, rights registration and other administrative purposes.

Rights may be linked to major economic interests; identifying these rights geographically will help protect the owners of these rights. On land the georeferencing of restrictions and rights is based on the cadastral map and through the established processes for cadastral changes a cohesive registration is ensured. At sea similar possibilities should be created for the registration of restrictions and rights associated with the exploitation of raw materials, wind farms and mariculture, for example.

OBJECTIVE

KMS aims to establish a uniform geographic foundation for public administration on land and at sea, including the establishment of a marine SDI. This foundation shall be part of the general SDI with the functions that it encompasses.

It is also important, through a common objective to establish a shared, nation-wide foundation across land and sea which is based on the shared infrastructure principles.

Marine-related geodata must be an integrated part of the national SDI and build on the same principles and framework for collaboration and agreements.

There is also a requirement to create an improved foundation for activities in the coastal zone to support the increasing need for environmental regulation, climate change mitigation, emergency management and natural resource administration.

For forecasting, designing and planning activities a cohesive, quality-assured height and depth model is needed.

THE DANISH DIGITAL ELEVATION MODEL (DHM)

DHM is part of the shared geographic foundation and meets the public administration's requirements for elevation data. DHM is continually being improved in terms of its features, quality, currency and accessibility in order to meet these requirements.

PROPERTY

There is a need for a single, structured and uniform registration and georeferencing of all property.

A single, structured and uniform georeferencing of property helps to ensure that the registration process for all types of property can be based on fully digital and efficient administrative procedures.

The registration of all types of property should occur in relation to the national cadastre. As the cadastral register and cadastral map has become nationwide georeferencing is now part of the basis for public sector activities. It must be ensured that the cadastral map can be used and will be used as a basis for the georeferencing of property rights.

Unique and secure property registration requires geographical referencing so that what is owned and where it is located can be determined. Currently, the cadastral map is only used to geographically identify individual plots of land. Other types of property such as apartments, buildings on leased land and technical facilities at sea (e.g. wind turbines) are currently inconsistently geographically referenced by different authorities.

OBJECTIVE

KMS is working towards further development of the property registration system so that:

- uniform, shared administrative processes are used.
- it can better support other areas of public administration.
- all property types (objects) are identified and georeferenced on the cadastral map.

DATA COLLECTION

There is a need to use and develop new methods of data collection in order to be able to utilise new data sources and ensure the necessary currency and quality of data.

The timely updating of spatial information is a precondition for its use in many public sector activities. Continual recording of spatial changes as they are processed and registered in public administration will contribute significantly to a high currency of data.

Earth observations from space contribute new data, data sources and collection methods which can be used in public sector activities. These data can include changes in vegetation, occurrence of algae, etc. Satellite images which are part of earth observations constitute an important development area for geographic information, including ensuring a higher currency of geographic information.

KMS supports the development of new methods of data collection, such as the surveying of shallow waters with red/green lasers, with the aim of streamlining hydrographic surveying and data collection in Danish waters.

Technological developments create opportunities to involve the general public in creating spatial information. KMS will support and tap into such opportunities for crowd-sourcing and internet self-service.

OBJECTIVE

KMS aims to make the continual updating of spatial information an integral part of public administration. This will ensure that the shared foundation will continuously have a currency which is in keeping with the tasks it must support.

OBJECTIVE

KMS aims to make earth observations an integral part of maintaining the SDI and and to make earth observations used more widely in public sector activities. With satellite based registrations the currency of data can be improved, new methods of data collection can be introduced, and data collection can become more efficient.

OBJECTIVE

KMS is working to ensure that methods and procedures are developed which are based on the involvement of the general public in data collection. This can include the reporting of errors and deficiencies by the general public or the direct transfer of information to the responsible authority (crowd-sourcing).

CURRENCY AND QUALITY

Currency is a prerequisite for efficient eGovernment.

Definition of the quality for SDI must be based on the users' requirements for currency, comprehensiveness, accuracy, documentation and corresponding costs.

The quality must be defined in cooperation with the users with due respect to public sector activities and the administrative demands in relation to the foundation for eGovernment. The data quality must be ensured through efficient quality control and documentation.

OBJECTIVE

It is KMS's objective to ensure that all information has a documented quality and currency.

KMS will strive to ensure that the SDI is continually improved by introducing new updating techniques such as updating with data from earth observations.

APPLICATION



The use of spatial information is growing in both the public and private sectors. Citizens encounter spatial information via GPS-based applications and in public sector services whereas the professional use in both the public and private sectors are integrated into a large number of activities, which support more efficient planning, case administration, follow-up and communication.

This requires close collaboration between the users and designers of solutions, in order to ensure the necessary background for the adaption and development of the SDI.

OBJECTIVE

In conjunction with the national eGovernment strategy, KMS will work to help improve and simplify administration by municipal, regional and central government authorities, and to reduce case processing times by supporting a shared foundation for eGovernment across all regulating authorities. The SDI is a fundamental part of this shared foundation for eGovernment. The objective should be seen in association with the strategy to reduce bureaucracy in the public sector.

THE PUBLIC SECTOR

Joint solutions and the shared SDI must support the digitisation and development of public sector work.

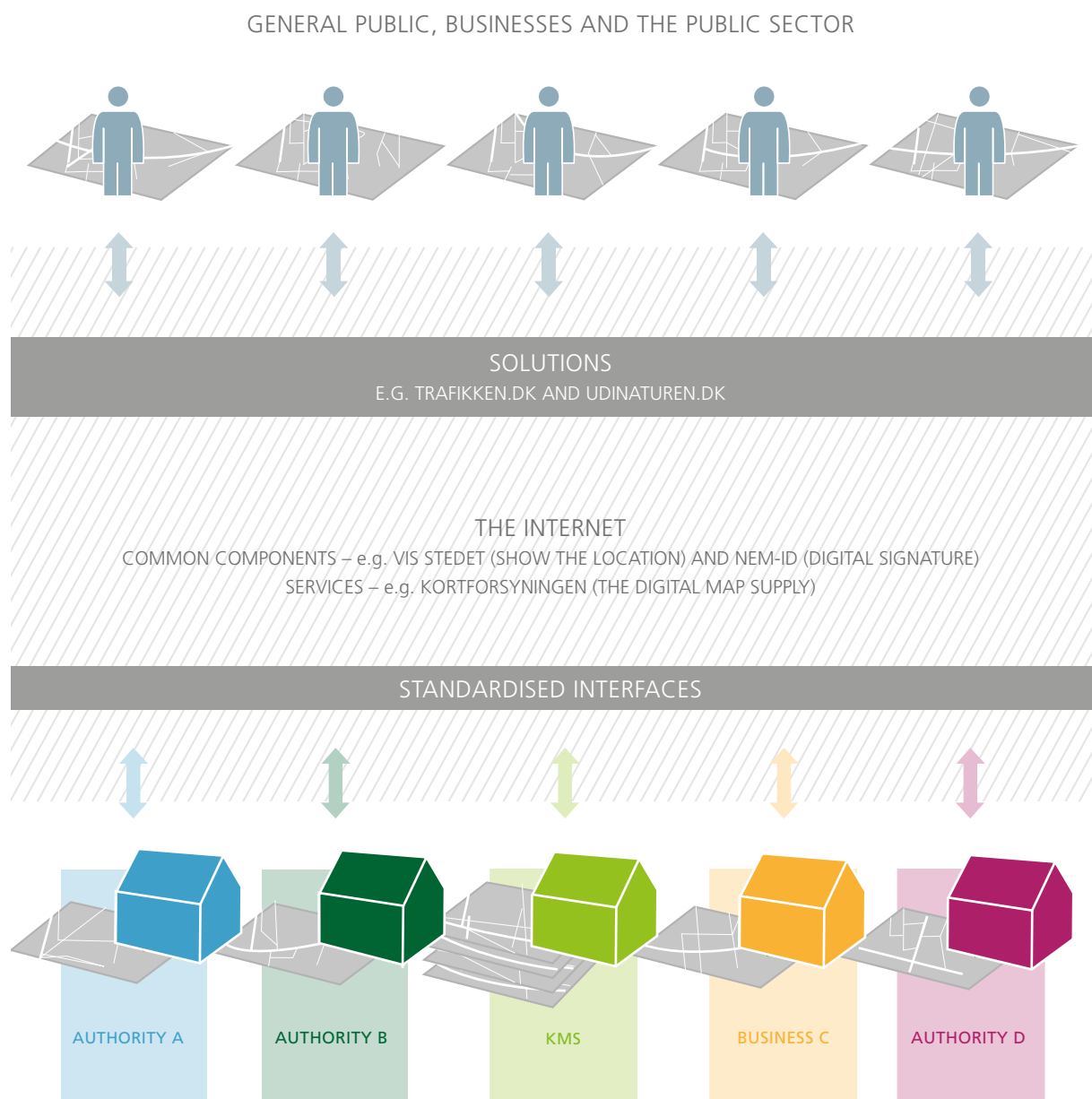
The use of spatial information has developed into playing a central role in many public sector solutions. A continued focus on untapped potential of the SDI will help to ensure that public sector activities are more cohesive, simple and efficient.

For the public sector as a whole, the use of the SDI, combined with cross-agency solutions and digital public sector activities, will contribute to overall gains in efficiency. The rewards to be gained from public digitisation efforts can first be realised when a focus on the combined processes and methods is created, and administrative processes and IT architectures are coordinated between public authorities.

KMS is coordinating the Ministry of the Environment's collaboration with the Ministry of Food, Agriculture and Fisheries on establishing the Green Mapping of Denmark, which will provide the agricultural sector with a single access point to a number of data on land management in the countryside. This will create a the springboard for an even more intensive use of geodata in the agricultural sector.

USE OF THE SDI

Technological developments will help to make the public sector more cohesive, simple and efficient.



There is also a number of additional areas in which spatial information is becoming generally widespread. One example is tax administration, where the establishment of “green” road taxes based on spatial information has been under consideration. The employment, social and health areas also have untapped potential in the use of shared spatial information.

THE GREEN MAPPING OF DENMARK

The Green mapping of Denmark will provide a better overview of land use and soil conditions and will, for instance, show the location of particularly vulnerable areas.

The Green Mapping of Denmark will be the shared and uniform basis for public administration and environmental and nature planning, both at the municipal and central government levels, while also functioning as a informational resource for the individual farmer.

“GREEN” ROAD TAXES

An intelligent tax system is based upon the user’s payment being determined by where, how long, when and in which direction a vehicle travels. This type of intelligent tax system requires the use of GNSS determination of location via satellites, in combination with spatial data (roads data). GNSS and spatial information can also provide the basis for other location-based services, such as updates on queues and accidents.

THE GENERAL PUBLIC AND BUSINESSES

Efficient public sector activity based on SDI creates value for both the general public and for businesses.

Spatial information is widely used in the day-to-day life of the general public and in business activities. A continued targeted use of the SDI will help the government to realise its goal of making the public sector more cohesive, simple and efficient for both the general public and for businesses.

The general public’s and private sector’s access to public services through the SDI must be supported, and the SDI should be made available to the general public and to the private sector. For most citizens and businesses, spatial information will make it easier to find information from across the public authorities.

The communication and understanding of public planning, administrative rulings and other public sector activities will become easier when the administrative information is presented together with a geographic basis.

Use of the same data across the public sector will create transparency and coherence in public activities and thus strengthen public sector credibility. The possibilities for the citizen to secure his or her individual rights and to participate in the public debate will be strengthened, just as interaction between the public sector and the citizen, for instance via self-service solutions, will be easier.

Use of the SDI will allow the private sector to reuse public information thus avoiding unnecessary use of resources on duplicate registration. Sharing the SDI will also facilitate reciprocal communication between the private sector and public authorities.

A well-developed SDI will give private businesses a standardised and well-documented field for developing new solutions and hereby create a basis for innovation and business development. It will also permit small and new businesses, including entrepreneurs, to contribute to development and innovation in this field.

PROTECTION OF NATURE AND THE ENVIRONMENT

Environment- and nature-related work will be enhanced and made more efficient through the systematic development of digital administrative solutions.

Nature and environment protection is fundamentally dependent on spatial information, and uses spatial information intensively, widely and in complex ways. These demands together with a need for cross-boundary geodata in environment and nature protection in the EU have led to the INSPIRE Directive and, subsequently, to the Infrastructure for Spatial Information Act. The SDI is thus inextricably linked to environment and nature protection.

OBJECTIVE

Environmental management and spatial data are areas of special focus in the national eGovernment strategy.

KMS is working to realise of the Ministry of the Environment's goal that the strategy:

- establishes models for governance and organisation of cross-agency, administrative processes.
- creates a shared foundation for eGovernment across regulating authorities.
- focuses on the opportunities for the reuse of data and for efficient data management.
- focuses on utilising spatial information to simplify administrative processes while making them more efficient and cohesive.

OBJECTIVE

KMS's objectives include:

- the establishment of shared public sector data and the establishment of cohesive, shared public sector solutions for nature and environment that adhere to the same principles as the SDI.
- the integration of the SDI in activities concerning nature and environment.
- the creation of digital administrative solutions based upon GIS that broadly support work in the area of nature and environment.

GIS APPLICATIONS FOR THE ENVIRONMENT
 support the Ministry of the Environment's internal processes, data related activities and GIS analysis and provide web-based GIS interfaces and services for the general public, businesses and authorities.

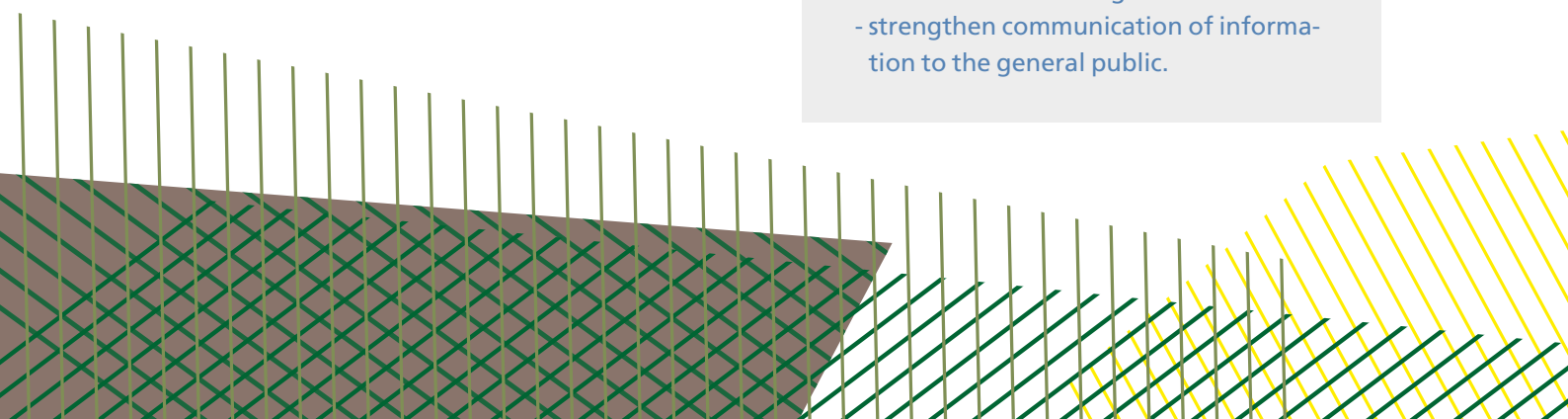
The protection of the environment and nature is undertaken across authorities and can transcend national borders as well as the boundary between land and sea. Therefore, relevant data and digital solutions must be able to function across all these boundaries, and furthermore it is vital that all authorities use the same foundation for carrying out their activities, that this foundation covers both land and sea, and that it can be integrated with spatial information from neighbouring countries.

In Denmark measures for the protection of the environment and nature are undertaken by the municipalities, the regions and the central government. It is therefore vital that activities can be based upon shared public sector data and shared digital solutions.

Information on the environment and nature must be collected and maintained using the same fundamental principles that are at the heart of the SDI.

THE DANISH NATURE AND ENVIRONMENT PORTAL
 functions as the access point for a range of public sector data and services related to nature and the environment. It must:

- support the work of the environmental authorities.
- ensure the presence of uniform, updated environmental data.
- promote the use of digital processes in environmental management.
- strengthen communication of information to the general public.



DEFENCE

Cohesion between the civil and military SDIs must be ensured.

The military's use of the SDI must be supported with geodata, network services, consultancy, training and specific solutions, and it must be ensured that the civil and military SDIs are compatible.

KMS undertakes mapping services for the Defence both nationally and internationally, and takes part in international collaboration to ensure the development of common standards.

DEFENCE

KMS has historically and currently responsibility for providing the Defence with consultancy and solutions related to maps and geodata.

KMS's work for the Defence is defined in an agreement that includes national and international cooperation and provisions in the form of, products, services, consultancy, development, project support and emergency services, as well as participation in working groups. The agreement further entails a joint and reciprocal development of skills with a view to solving future challenges.

EMERGENCY SERVICES

A comprehensive, well-run SDI is essential for civil safety and emergency services.

The SDI have an increasing importance for activities in the emergency services. It is vital for an immediate response from the emergency services, that spatial data are accessible, up-to-date and accurate at all times, and that services are user-friendly and able to cope with peak demands.

Crises must be managed across authorities and can transcend national borders and the boundary between land and sea. Emergency services must be able to perform across all these boundaries. It is thus vital that the emergency authorities all use the same foundation that covers both land and sea and that can be integrated with spatial information from neighbouring countries.

Therefore there is a requirement for a comprehensive SDI that serves as a general, integrated tool for the management of emergency situations and crises.

OBJECTIVE

It is KMS's aim that by 2012 at the latest, the Defence, Danish Emergency Management Agency, police, Danish Regions and the municipal emergency services will use the national SDI as a shared geographic foundation for handling emergency situations and crises.

THE CENTRE OF EXPERTISE FOR SPATIAL INFORMATION



It is necessary that the latest knowledge and research are utilised actively in the development of the national SDI and in the development of eGovernment. It is essential that knowledge and expertise are used actively in collaboration with all relevant national and international stakeholders.

KMS will take on the role of Centre of Expertise for Spatial Information in close collaboration with all relevant parties, including research and educational institutions.

RESEARCH AND EDUCATION

It must be ensured that knowledge and research are used actively in the development of the national SDI and in the development of eGovernment.

It must be ensured that the Danish society have the necessary skills available, and that these skills are used in the best possible way. Therefore steps should be taken through collaboration with educational institutions to ensure that relevant skills are continuously available.

These efforts should target specific activities in public sector work. These may involve new methods of data collection, generalisation, refinement or quality assurance of reference data, or methods of allocating the burdens and benefits of the national SDI.

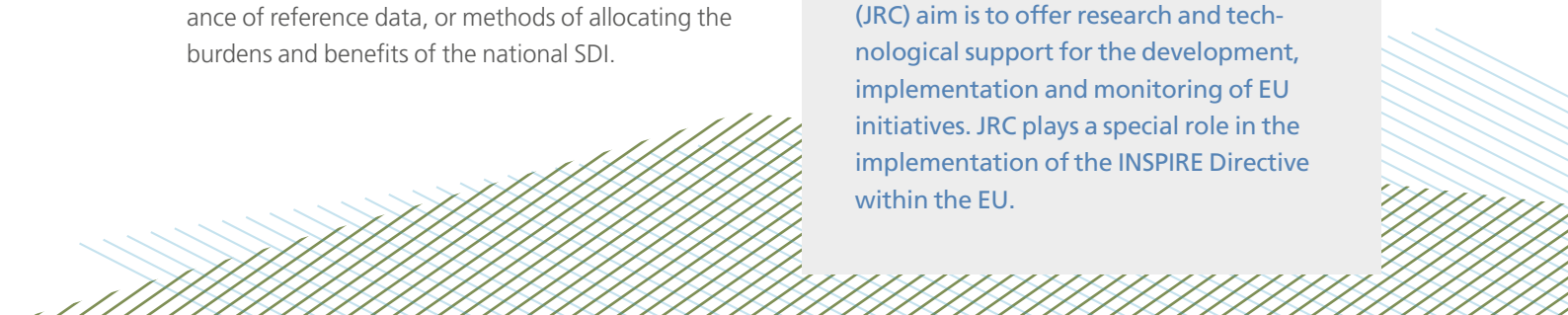
In the future, there will be a need for broad-based national and international cooperation between universities, relevant research institutions, public authorities and private businesses. This will include collaboration that builds on existing agreements as well as new collaboration that are for example established under the EU framework programmes. For instance expertise in earth observation should be strengthened, not least in the area of using satellite images.

INTERNATIONAL COOPERATION IN RESEARCH AND DEVELOPMENT

KMS follow progress in international research and development and take part in international research and development activities in the field.

EuroSDR is a pan-European network of national mapping agencies and universities whose aim is to promote applied research in the provision, management and communication of spatial information. KMS will assume the presidency of EuroSDR for the period 2012-2014.

In the EU, the Joint Research Centre's (JRC) aim is to offer research and technological support for the development, implementation and monitoring of EU initiatives. JRC plays a special role in the implementation of the INSPIRE Directive within the EU.



GOVERNMENT COMMISSIONED RESEARCH

Since the university reform and the transfer of sector-oriented research from KMS, government commissioned research has been the responsibility of the universities. Consequently, KMS's requirements for research-based knowledge and consultancy are currently met through agreements with Aarhus University and the Technical University of Denmark (DTU Space).

GREENLAND

The Greenlandic initiatives to create a modern SDI in Greenland must be supported with expertise and knowledge.

The establishment of geodata and an accompanying SDI in Greenland that covers both the land and sea is a significant task, both in terms of time and finance.

In 2009, Greenland's Home Rule Government and the Danish Government signed a collaborative agreement regarding the field of geodata. The agreement aims to promote the work of both parties and ensure the optimal functioning of their joint processes. The agreement will ensure the best possible utilisation of new and existing data on Greenland, and covers consultancy, development competence and project support.

The collaborative agreement also aims to enhance the production of nautical charts of Greenlandic waters.

OBJECTIVE

KMS aims to introduce a new system for producing nautical charts of Greenlandic waters by 2011 and concurrently develop a database solution for all the terrestrial and nautical chart data of Greenlandic territories to be used for both land and nautical mapping.

An agreement has been made with Greenland's Home Rule Government for the production of new nautical charts of the waters around southwest Greenland by 2018.

OBJECTIVE

KMS will support the work of Greenland's Home Rule Government on the geodata development activities outlined in "Geografisk Information i øjenhøjde" (Addressing Spatial Information). This will include supporting the development of an Arctic SDI portal that includes spatial data and related information for the entire Arctic region.

This effort aims to help enhance maritime safety in the region, where for example, cruise ship activity is growing. Another objective is aiming to improve the topographical maps of Greenland. The aim is amongst other things to support the establishment of a homogenous, digital spatial foundation for administration in Greenland.

Up-to-date oceanographic information will help to protect the vulnerable Arctic environment and will generally support the activities of Greenland's Home Rule Government. It will also benefit the private sector in Greenland.

THE FAROE ISLANDS

The Faroese initiatives to create a modern SDI for the Faroe Islands must be supported with expertise and knowledge.

The consolidation of an SDI for the Faroe Islands is a considerable task in terms of finance and expertise. Up-to-date spatial information will increase maritime safety and help to protect the marine environment.

OBJECTIVE

Together with the Faroese authorities, work is underway on the creation of a common strategy for further development of the basis for the topographical map of the Faroe Islands. The strategy is based on the current topographic data of the Faroe Islands and the processes and routines that have been established for topographic mapping in Denmark.

The establishment of up-to-date spatial information for land and sea will assist home rule government of the Faroe Islands, not least with regard to the protection of nature and the environment. It will also benefit the private sector in the Faroe Islands.

SUPPORT FOR DEVELOPING COUNTRIES

KMS's expertise can assist growth in developing countries.

KMS have expertise, which can be utilised in connection with Danish support to developing countries. KMS expects that this will take place in close collaboration with the private sector. Assistance can be in the form of consultancy, project screening, project participation, etc.

A particular area of expertise is the cadastral referencing and thereby the assurance of property rights. This is an important precondition for economic growth. KMS will therefore assist the Ministry of Foreign Affairs in projects relating to the procedures for cadastral referencing of property rights in developing countries.

THE INFRASTRUCTURE MODEL



THE INFRASTRUCTURE MODEL

The infrastructure model illustrates the correlation between shared public sector solutions and sector-based administration.

The infrastructure model is used in many contexts as a principle basis for cross-agency public sector cooperation and public procurement. The model has also become synonymous with the EU INSPIRE Directive and the Infrastructure for Spatial Information Act, which came into effect on May 15, 2009.

SECTOR-SPECIFIC DATA:

Geodata used exclusively within one administrative sector.

MULTI-SECTOR DATA:

Geodata used to support activities or transactions in more than one sector.

REFERENCE DATA:

Geodata and maps that can be used as a reference to ascribe precise location to other data, and which can be used in all sectors. Examples of reference data can include topographical maps, cadastral maps, municipality codes, place names, cadastral numbers, BBR (the Danish Building and Housing Register) building numbers, street names, address points, etc.

METADATA:

Information that describes geodata sets and services, and which makes it possible to find, display and use them.

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