Spatial data infrastructure and policy development in Europe and the United States

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Preface

On 16 September 2002, at the GSDI6 conference in Budapest, the GSDI working group on legal and economic aspects provided a global platform for the sharing of experiences and the discussion of the legal, economic, and organizational setting in which spatial data infrastructures develop. In the workshop current Spatial Data Infrastructure legal and policy issues in Europe and the United States were presented. The workshop was for many participants a welcome overview of different initiatives at the different European SDI levels.

The publication of this book stems from the GSDI6 workshop. In addition to the issues discussed in the workshop the book contains two country reports of SDIs that are well known for their advanced level of SDI development: the Netherlands and the United States. Reports such as these provide insights on how two different legal and economic SDI settings can still allow for and serve very similar infrastructure functions. Since GSDI6, the working group has been extended with representatives from Europe, North America, South America and Asia and the Pacific.

By bringing people together and exchanging knowledge the working group intends to positively advance the development of local, national, regional and the global spatial data infrastructure. We do hope that this book contributes to the advancement of spatial data infrastructure(s) and that it will stimulate others to share their experiences with us so that the knowledge network of the GSDI continues to expand.

Finally, we would like to acknowledge the financial support of the U.S. Federal Geographic Data Committee, and we would like to thank the contributors to this book.

Bas Kok
Bastiaan van Loenen

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Bastiaan van Loenen & Bas C. Kok

1.1 Introduction

Many national governments throughout the world are involved in developing spatial data infrastructures that will better facilitate the availability of and access to spatial data for all levels of government, the commercial sector, the non-profit sector, academia and citizens in general (Onsrud 1998). As we learn from the *Survey of national and regional spatial data infrastructure activities around the world* (Onsrud 1998), although facing similar challenges, countries are addressing those challenges differently. This is not surprising given that the development of Spatial Data Infrastructures (SDIs) in nations and regions takes place in different settings. Different cultures and people with different ideas and beliefs influence the direction in which the SDI develops. Responses to the Onsrud questionnaire show that some countries are in the process of converting analogue information into digital information (Mongolia), others have started to cooperate with other countries (Latin America), while others are trying to cooperate regionally despite conflicting national policies (Europe). Some NSDI's suffer from economic recession (Russia) while in other countries public domain information is non-existent (South Africa, Russia, South Korea). Due to spatial information being a concern of national security, some nations were unable to respond to the questionnaire.

However, the goal of the development of the infrastructures is the same: to facilitate the availability of information in such a way that the needs of the agencies, organization, citizens, commerce, and society in general are met. The problems may differ in degree but that is all (Brand 1996). Spatial data infrastructures will develop regardless of what we do or say (Brand 1998). However, development in a non-harmonized way will increase the costs to everyone and cause loss of opportunities in efficiency, effectiveness, and usefulness that would otherwise be made possible by data and experience sharing. If the issues are similar, why not share experiences? The Global Spatial Data Infrastructure (GSDI) is an excellent platform to share such experiences.

In recent years, data policy considerations have come to the forefront as increasingly important issues that need to be addressed. The GSDI network is moving towards a global spatial data knowledge network. Through the publication of this book, the GSDI Legal and Economic Working Group contributes to the global knowledge network by providing insights into the most recent and current SDI developments in Europe and the United States. The aim of the book is to provide an overview of the developments of current SDI initiatives in Europe and the United States, and to inform SDI stakeholders about these developments. In this way the working group provides a com-

munication channel and an organized understanding of a sampling of policy and legal frameworks for the development of spatial data infrastructures.

1.2 The foundation of Global Spatial Data Infrastructure

The GSDI is a global and open process for cooperation and knowledge exchange about the organisation and management of spatial data issues and related activities. The GSDI encompasses the policies, organisational remits, data, technologies, standards, delivery mechanisms, and financial and human resources necessary to ensure that those working at global and regional scales are not impeded in meeting their objectives (www.gsdi.org). GSDI promotes the sharing of information on how nations and organizations are developing their SDI's. In support of this objective, specific goals include assessing the effectiveness of existing data policies accompanying the development of information infrastructures, providing ideas about how to arrive at globally compatible solutions, and distributing background information on SDI's so that we understand better the policies or choices other nations have made in the development of their SDIs. Sharing of experiences should minimize the duplication of effort by each nation, minimize the cost of research and development, and identify critical opportunities and threats inherent in creating a global spatial data infrastructure (Rhind 1997).

During the first three years of the GSDI network development process, discussions focused on articulation of major issues (1996), the need for leadership and a place on the political agenda for addressing the policy and organizational aspects of SDIs (1997), and the need to balance the interests of developed countries with those of developing nations (1998). In 2000 in South Africa, central themes were 'engaging emerging economies' and 'sharing knowledge'. In 2001 in Colombia, activities centered on engaging expanded working groups in achieving objectives. In 2002, the GSDI conference was held in Budapest with the theme 'from global to local'. In 2004, the conference is being held in Bangalore India with an emphasis on SDI developments in support of a sustainable future. During these conferences the need for a global knowledge network has become evident. Growing the global network of people and organizations interested in advancing spatial data infrastructures is critical to the attainment of substantial and sustainable development in both the developed and developing countries of the world. Past significant learning and communication aids produced through GSDI efforts include the GSDI cookbook (Nebert 2001) and a survey on the status of spatial data infrastructures around the globe (Onsrud 1998).

1.3 GSDI Legal and Economic Working Group

In 2000, the GSDI Legal and Economic Working Group was founded. The primary purpose of the Working Group is to open communication channels and encourage dialogue regarding the legal and economic frameworks within which SDIs are being developed. The exchange of such information helps identify constraints and opportunities for cooperation among nations in sharing knowledge and pursuing GSDI concepts. One short-term objective of this working group is to invite knowledgeable individuals to prepare detailed descriptions of the legal and economic frameworks for their nations that relate to SDI developments. The legal and economic issues addressed by each report might include (a) rules and laws regarding access to government data, (b) copyright, database protection, and similar intellectual property protections, (c) liability and other legal means for ensuring the suitability of data, and (d) protections of personal information privacy. These legal issues should be addressed in the context of geospatial data, the Internet, and evolving communication technologies.

Scholarly yet practical discussions are needed of the legal and economic constraints imposed on those nations developing SDIs. Better knowledge of these constraints and differing perspectives can lead to opportunities for collaboration and sharing. Through the publication of initial sample reports, we believe the conditions for developing communication channels and understanding among nations will be facilitated. The members of the working group believe that development of a network of engaged individuals seriously addressing legal and economic issues relative to NSDIs is probably more important than the actual written responses that might be received in accomplishing the tasks outlined above.

SDI literature search engine

Literature on spatial data infrastructures and especially the legal and economic issues of SDIs exist in many places and in many formats. In order to bring together the available online literature about SDIs, the working group created a database and a search engine that allows users to search for a specific SDI issue and literature about a specific country or a specific person. In this way the working group believes that the development of communication channels among SDI stakeholders is being promoted. The search engine may be found on http://www.gsdi.org.

Workshop on legal and economic aspects

At the GSDI6 conference in Budapest, Hungary, the GSDI working group on legal and economic aspects provided a global platform for the sharing of experiences and the discussion of the legal and economic setting in which spatial data infrastructures develop. In the workshop “Spatial Data Infra-

structure Legal and Policy Issues: Providing Services and Addressing Legal Barriers in the Virtual Era – Best Practices from Europe" current SDI developments in Europe were presented. The workshop was for many participants a welcome overview of different initiatives at the different European SDI levels.

The publication of this book stems from the GSDI6 workshop. In addition to the issues discussed in the workshop the book includes two country reports of SDIs that are well known for their advanced level of SDI development. Reports such as these provide insights on how two different legal and economic SDI settings can still allow for and serve very similar infrastructure functions.

1.4 Developing the European Spatial Data Infrastructure

The spatial data infrastructures in many countries in Europe and the National Spatial Data Infrastructure (NSDI) of the United States of America are considered among the most advanced SDIs. Although they may have the same goals and overall functions, there are many differences that make them difficult to compare. These differences may be explained by the disparate cultures of the individual European countries and the United States.

In Europe, every jurisdiction is responsible typically for its own data collection and processing efforts. The efforts conform to the needs of the stakeholders in that specific jurisdiction. In this way content and quality criteria were agreed upon, the funding mechanisms created were thought to be sufficient, and if needed, other policy measures were introduced. Each country, or even each smaller jurisdiction (like the Gewesten in Belgium or the Bundesländer in Germany) did this for their specific situation. This process resulted in the current European situation of the existence of many different national standards, high quality data collected at a variety of scales, and differing data policies. Partly due to the increasing influence of information technology, awareness has grown in Europe that harmonising data collections, specifications, and policies may be beneficial.

Several developments within the European Union contributed to the increasing need for cross-boundary data within Europe, and the need for cross-border spatial data. The European Parliament continuously aims to promote the transportation and free mobility of goods and services, and the movement of people within the EU (see for example the Schengen Agreement).

Also the harmonisation of national law in many areas has resulted in harmonisation on, among many others, the protection of individuals with regard to the processing of personal data and on the free movement of such data, and the legal protection of databases. Although these Directives creat-

ed some harmonisation in national law, it is unclear whether the harmonisation de facto exists in the member states of the EU. In Chapter 4 of this book, Laarakker and Gustafsson, explain that the definition of personal data differs by country. Moreover, the stage of SDI development within Europe varies from an advanced SDI in Sweden, with high quality data and online services, to less advanced SDIs in some of the accession countries. These aspects make it difficult to have a single strategy to develop the European SDI.

The GI2000 proposal of 1995 was the first attempt to create the conditions for a European spatial data infrastructure (GI2000 1998). This proposal of the Information Society Directorate General never reached the European Commission and as recently as the end of 2001 a new proposal for a European SDI was initiated. Under the responsibility of the Environment Directorate General of the European Commission, the INfrastructure for SPatial InfoRmation in Europe (INSPIRE) was introduced. Marc Vanderhaegen and Hugo De Groof introduce in chapter 2 this initiative that should result in the European Spatial Data Infrastructure. They identify several current barriers to progress and propose means to overcome some of them. One critical barrier is the different languages that must be accommodated in the development of a European SDI.

Around the time of the start of INSPIRE, another European project started-the Geographic Information Network in Europe (GINIE). François Salgé introduces in chapter 3 this project. GINIE aims to establish and promote a European strategy for geographic information. This should result in a coherent framework for geographic information that lies at the heart of the Information Society. GINIE proposes several recommendations to harmonise policy lines within Europe. Many of the recommendations of the GINIE project are included in the INSPIRE initiative. One of the most significant findings of GINIE is the strong evidence that for the development of spatial data infrastructures political support at all levels, national, regional, and local is absolutely critical.

An example of a (sectoral) spatial data infrastructure where high administrative support exists is the European Land Information Service (EULIS). Peter Laarakker and Stefan Gustafsson introduce this pilot-project in chapter 4 as a first step towards improved access to data from the Land Registry and or Cadastres in Europe. Their pragmatic approach has resulted in a short-term project in which the aim is to link the registries of seven European countries and offer a service that allows the requestor of information in one country to access the land administration information in another. It was decided that the project should improve access to land administration data through the linkage of existing communication channels. Therefore, a goal of the project is that it not interfere with current national policy lines even though these may be in conflict. No changes are forced, only a central portal

is created. Given the use of a wide variety of terminology and differences in usage among jurisdictions, the data will be provided with sufficient metadata explaining the meaning of the information. An interesting finding of EULIS is the way the *European Directive on the protection of individuals with regard to the processing of personal data and on the free movement of such data* is implemented in the individual jurisdictions. Among the EULIS countries, the implications of this Directive for the access and use of land administration data vary greatly. This is due mostly to differences in the interpretation of the meaning of the terminology of personal data. The EULIS project resides under the E-content program of the Information Society Directorate General of the European Commission.

1.5 Legal and economic issues evolving around spatial data infrastructures

Spatial data infrastructures consist of spatial data, technology, standards, human resources, institutions, and data policies. There is increasing awareness of the critical role of institutional and policy issues on the development of SDIs. The characteristics of data and policies controlling access to and use of data are important to understand in order to realistically assess the various options for infrastructure development. In many respects, digital spatial data are like most other digital data: they are non-rival, their dissemination is inexpensive, it is difficult to exclude others from using them once they are disclosed, and their pricing is highly elastic – "double the price and people tend to do without it" (Onsrud 2002) or use substitute data. However, unlike many other types of data, the collection and maintenance of spatial data requires (highly) qualified human expertise and equipment to process, manage and use it and thus is expensive. Moreover, the creation of geographic products or services out of geographic data typically requires advanced skills. In this respect, geographic data are special (Van Loenen 2003, see also Longley 2001, 6). The technical aspects involved in the creation of a map especially require advanced expertise. For instance, geographic data are multidimensional (x,y), voluminous (large databases), represent a 3D world on a flat (2D) surface, the integration and analysis of the many varied types may be time-consuming, and the process of updating is complex (Longley 2001, 6). Further, the provision of services is necessary to make geographic data accessible and useful for citizens.

Moreover, the visual representation of the real world may vary heavily due to choices in scale and quality. A neighbourhood may be mapped on any scale between for example 1:500 and 1:100,000. Further, we can choose to collect only data concerning streets, or data concerning the entire city. Scale and quality of a dataset are important for the cost of the creation of a

dataset, and its usability: the larger the scale, the higher the cost, and the higher the quality the higher the cost.

The question that rises in such a context is how to fund the collection, processing, and dissemination of spatial data? Several optional funding models exist. Here, we provide only two models. Most other models that may be found in practice are similar to one of these or are somewhere in between.

Funding an SDI: the open access model

The open access approach assumes that government agencies, responsible for the collection and creation of government spatial data, are fully funded with public funds to accomplish their public tasks. These public tasks may vary among jurisdictions. Some jurisdictions may choose to minimise the tasks of government while others may choose for more comprehensive tasks to be accomplished by government. A minimal role for government in achieving a societal objective may result in a minimal quality or quantity requirement within government for needed data.

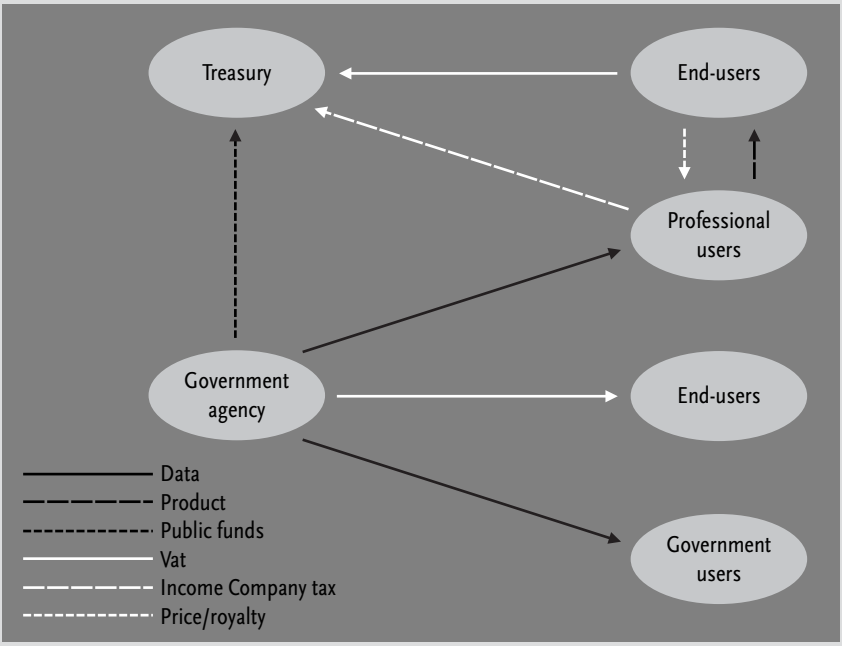
In the open access model, data within governments are accessible by those outside of government for a price not exceeding the cost of reproduction and distribution (marginal cost of dissemination) with the imposition of as few restrictions as possible. The data are available to all (non-exclusive) on a non-discriminatory basis (see also NRC 1997, 15). Accepted restrictions include data concerning national security, trade secrets, and data relating to an individual's privacy. Under open access principles, spatial data suppliers in the public domain do not compete with the commercial sector. When government adds value to their data in order to respond to a mandate or obligation of government as defined by law making bodies, they may opt to do the value adding through the efforts of their own employees but more typically they hire private commercial firms to supply the data or service for government. All public and private entities have access to the resulting data on equal terms, typically with no restrictions, at the cost of dissemination.

Although the open access model may initially have been enacted to control government, "fosters a process for adding value to raw government information resources" (Lopez 1998, 58). This spin-off effect promotes the use of the data, which results in higher quantities of (income, company, or value added) taxes going towards government (see figure 1).

At least one leading legal scholar argues that to realise the potential of geographic information systems, federal, state and local governments should promote government practices that (1) make electronic formats available, and (2) allow and promote a diversity of channels and sources of public information (Perritt 1995, 455). This is only possible if governments "resist the temptation" of selling off data to generate revenues and thus they should typically avoid asserting copyright or database rights in their public records.

At the same time, a recent initiative involving local and state government

Figure 1.1 Economic reasoning behind the open access model (after Weiss & Pluijmers, 2002)



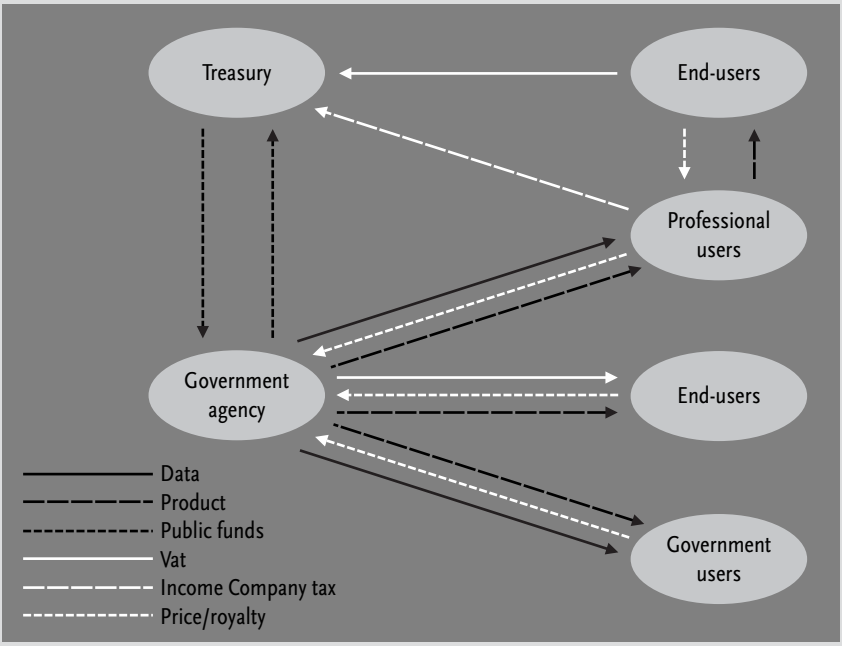
GIS practitioners in the United States reports that experiences to date indicate that few if any local jurisdictions in the United States have made money, and many have lost money, by imposing cost recovery arrangements; local government jurisdictions have failed to generate through data sales substantial revenues compared with the total costs of maintaining their GIS and geographic data operations; most local jurisdictions currently selling geographic data would prefer to give it away if there were realistic alternatives for gaining political credibility with high-level budget approvers or funding their GIS operations; and ample alternatives exist for supporting financial and other objectives than that of imposing licensing or other contract restrictions on downstream uses of governments' geographic data (see Joffee 2003).

On the other hand, the open access model is continually under discussion with its precepts changing and being challenged as technology and society change over time (see also Onsrud in chapter 7). At the current time there is concern over terrorism and thus concern over the extent that open access should be tempered through additional exceptions to the general government principle of open access. Homeland Security initiatives in the United States bear witness to this concern.

Funding an SDI: the cost recovery model

Cost recovery approaches seek profits from the sale of data to support the development and maintenance of the datasets (Lopez 1998, 43, Onsrud 1992). Data collection, maintenance, and dissemination are not fully provided by public funds and the costs must be covered through other means. The

Figure 1.2 Economic reasoning behind the one cost recovery model (after Weiss & Pluijmers, 2002)



agency is forced to generate income from the sales of data or products or through the provision of services. As a consequence, access to data may be restricted in order to cope with the financial conditions established by the amount of central government funding provided. In practice this implies a charge for the data at more than the marginal costs of dissemination and restrictions are imposed on the use of the government data through the action of copyright law and database rights. Further use restrictions are often imposed through contractual or licensing provisions. The cost recovery approach may also result in government agencies competing with private sector entities either on a level playing field basis or not. The expertise within government may be used to respond to private requests for specific spatial products.

The cost recovery model may be summarised as "[it] benefits end-users who are interested and able to acquire high-quality geographic information, directly from government" (Lopez 1998, 58). The cost recovery model may be found where high-quality data is used for the execution of the public task. The use of high-quality data within government may be the result of comprehensive public tasks, or from the demanding requirements of the government users. Further, the cost recovery model is typically found in jurisdictions where the provision of geo-information has been privatised, or where requested geo-information services are not provided for in the public tasks. One may wonder whether this model is promoting the development of an SDI.

Culture in data policy

The specialty of core spatial data may best be captured by a typical infrastructure characteristic: "very expensive to create, but may benefit many". In such a context the access policy for government spatial data is decided upon. "The proprietary model benefits end-users who are interested and able to acquire high-quality high-cost geographic information, directly from government. On the other hand, the open access approach fosters a process for adding value to raw government information resources" (Lopez 1998, 58). The policies of the United States can be characterised as adhering to the principles of the open access model whereas the policies of most European countries are to recover costs. The culture of being able to control government, and the belief that government should not engage in private sector activities, has resulted in a widespread belief in the United States that government access policies should be as open as possible. On the contrary, in Europe this culture of openness through all organisations in the public domain is not as common. Therefore thinking along the lines of an open access model seems to be more than just new laws but implies a change of culture within a country and also within a stable long-standing government organisation.

The European Parliament is likely to implement a directive that is intended to bring about a minimum set of harmonised rules concerning the reuse of public sector information. This should make for greater certainty and therefore encourage investment in creativity and innovation in content production and other sectors. Yvo Volman introduces in chapter 5 the proposal for a European Parliament and Council directive on the re-use and commercial exploitation of public sector information (PSI proposal). He stresses that substantial benefits can be expected from the extensive re-use of content resources. In this respect, the non-transparent policies in Europe that vary from country to country and from organisation to organisation are barriers that prevent this extensive re-use. The proposed directive is a first step towards transparency of the access policies that are being harmonised in limited ways throughout the European Union.

The authors of chapter 6 indicate that even in a sophisticated SDI, such as the Dutch SDI, there is a need for harmonisation of policies and an active role for Dutch government on the further implementation of the Dutch SDI. The Netherlands is often named one of the most advanced spatial data infrastructures in the world. The Dutch society is now ready to start with the SDI innovations. They organised appropriate subsidies and other administrative conditions to fulfil this high ambition. They point out that the strategy of a combination of bottom-up and top-down strategy was necessary to create the needed quality datasets that are in place. The situation for data policies that Volman describes in general terms for Europe, is explained for the Netherlands in greater detail. Like most government organisations through-

out Europe, Dutch government organisations use available intellectual property rights to handle their data in the most effective financial way, but the access policies are non-transparent and vary from one organisation to another. The increasing influence from the European Union is likely to stimulate these organisations to harmonise their policies in some ways. The PSI proposal leaves the harmonisation of the pricing principles and specific use restrictions to the individual countries and in the case of spatial data provision in the Netherlands to the individual organisation. The evaluation of the proposal after three years of its acceptance will show to what extent the proposal has resulted in harmonisation among different European countries and government organisations.

The situation concerning data policy in Europe is probably best described as non-transparent, and varying from one jurisdiction to another. In this respect, the US National Spatial Data Infrastructure is more advanced than its European counterpart. Many federal government agencies have the mandate to collect data for the whole of the United States and those agencies almost always are required to comply with the variety of federal information policies. These can best be summarised as a strong freedom of information act, no government copyright or database right, fees limited to the recouping the cost of dissemination, and no restrictions on reuse. In this respect, the policies in the United States are remarkably different from the policies in the Netherlands. Harlan Onsrud provides us in chapter 7 with the legal and economic issues of the SDI setting in the United States. He believes that it is likely that the needs of commerce and the advancement of science are better fulfilled by the open access approach of the United States than more restrictive approaches. Although there is pressure in the United States to move towards more restrictive information laws, Onsrud argues that all leading economic studies to date indicate that current open access policies should remain in place in order to take full advantage of the potentials of a Spatial Data Infrastructure.

1.6 Conclusion

In recent years data policy issues have attracted a great deal of attention. The GSDI network is moving fast towards a global spatial data knowledge network. The primary aims of such a network are to better inform each other and to share knowledge. In the area of informing each other, the GSDI Legal and Economic Working Group has already started to provide insights into the most recent and current SDI developments in Europe and the United States.

The development of spatial data infrastructures can be promoted through many different strategies. The strategy chosen should develop within the context in which an SDI exists. This national or lesser jurisdictional setting

may include the existence of high quality spatial data, a high level of awareness of the need for spatial data and an SDI, an advanced level of technological development, and sustainable funding for the further development of an SDI. On the other hand, the setting may include poor quality data, lack of awareness at decision-making levels, poorly developed technologies, and continuous uncertainty about funding mechanisms for the SDI. The typical situation will be at neither of these extremes. Each initiative must adapt to its individual circumstances.

In this book we provide an overview of the specific setting in Europe, and the United States so that others working on SDIs in another or similar setting may use this information for the benefit of their SDI.

In the future the working group aims to explore the impact of the PSI proposal in Europe, specifically whether jurisdictions are able to make their policies more transparent and to what extent one can speak of harmonisation of access policies.

Further areas of exploration might include investigation of the impact of technological developments on data policy initiatives. An example may be found in the increasing ability of governments to provide access to their data through electronic devices or the increasing ability of terrorists to access data through the Internet, and combine data from different sources in order to find a 'best' target.

The Legal and Economic Working Group includes stakeholders from almost all continents of the world and is continually expanding. By bringing people together and exchanging knowledge the working group intends to positively advance the development of local, national, regional and eventually the global spatial data infrastructure.

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2 A European SDI

A dream, or an emerging reality?

Marc Vanderhaegen & Hugo De Groof [1]

2.1 Introduction

This article is based on experience gained from the (at the time of writing) still ongoing preparation of INSPIRE by the European Commission services. INSPIRE is a major new initiative intended to trigger the creation of an INfrastructure for SPatial InfoRmation in Europe, also referred to here as a European SDI (Spatial Data Infrastructure). The preparation of this initiative is taking place in the context of the European Union decision-making process, whereby the European Commission prepares policy proposals for adoption by the Council (European Governments) and the European Parliament, often after long negotiations and many amendments.

The main input to the preparation of INSPIRE is the outcome of the work of various INSPIRE working groups, an analysis of the state of play on SDIs in Europe – a study commissioned by the European Commission that covers the EU25 and the EFTA countries, the contribution to the extended impact assessment of an INSPIRE working group, and the results of the Internet consultation and pubic hearing on the proposed INSPIRE initiative (see also http://inspire.jrc.it). Of course, this work also builds on the preparatory work and many studies that have taken place in Europe over the last decade.

It should be noted that, at the time of writing, it is not yet clear whether, or if so in what form, a proposal for INSPIRE will be adopted by the Commission. This situation, however, does not invalidate the conclusions that can be drawn from the emerging common EU vision on a European SDI and from the wealth of information on the situation with SDIs in Europe that has become available over the last two years.

2.2 The need for SDI in Europe

The GSDI Cookbook (Nebert 2001) defines SDI as the relevant base collection of technologies, policies and institutional arrangements that facilitate the availability of and access to spatial data. According to this definition, an SDI includes several components:

- geographical information and attributes, organized in distributed repositories;

1 This document presents the views of its authors only and does not represent the position of the Commission or its services. No inferences should be drawn from these documents as to the content or form of the future proposals to be presented by the Commission.

- documentation of this information (metadata);
- a means to discover, visualize, and evaluate the data (catalogues and web mapping);
- some method to provide access to the geographical information;
- a set of agreements with respect to technical (standards), organizational, and legal issues to coordinate and administer spatial information and services on a local, regional, national, or transnational scale.

An SDI is meant to help avoid fragmentation, gaps in the availability of geographic information, duplication of data collection, and problems of identifying, accessing, or using the available data. An SDI addresses both technical and non-technical issues, ranging from technical standards and protocols, organizational issues, data policy issues including data access policy, to the creation and maintenance of geographic information for a wide range of themes.

Such an SDI involves producers and users of spatial data and information systems in some form of partnership. A strategy and common approach is needed to deliver integrated spatial information services to meet the needs of users in the public, private, non-governmental and research sectors, and of individual citizens, allowing them to identify, access, and use geographic information from a wide range of sources in an interoperable way.

The establishment of an SDI is not, however, an end in itself. Policymakers increasingly recognize the growing complexity and interconnectedness of issues that affect the quality of life today; this complexity influences the way new policies are now prepared and implemented, including at the EU level. Many such policies need to be underpinned by information on spaces and places, that is to say, on geographic information to assess needs, inform policy, and evaluate impacts. Moreover, many different policies have a need for the same information. The work of an INSPIRE working group (INSPIRE 2002) is directed to provide an overview of which spatial information themes are needed by which environmental policy themes; an extract from INSPIRE 2002 is presented below.

The activities of initiatives in the Geographical Information Network in Europe (GINIE) and the European Land Information Service (EULIS) towards this goal are provided in chapter 3 and 4.

Common approaches and coordination are therefore becoming increasingly important in meeting the information needs of a wide variety of users. Coordinated action is required to identify the current gaps and deficiencies in the data collection and information supply infrastructures, to make available common solutions through research and technology development, and to develop EU to global-wide cooperation to make good these deficiencies in a cost-efficient way. The activities of initiatives like the Geographic Information Network in Europe (GINIE) and the European Land Information Service

Table 2.1 Spatial information themes needed by environmental policy themes

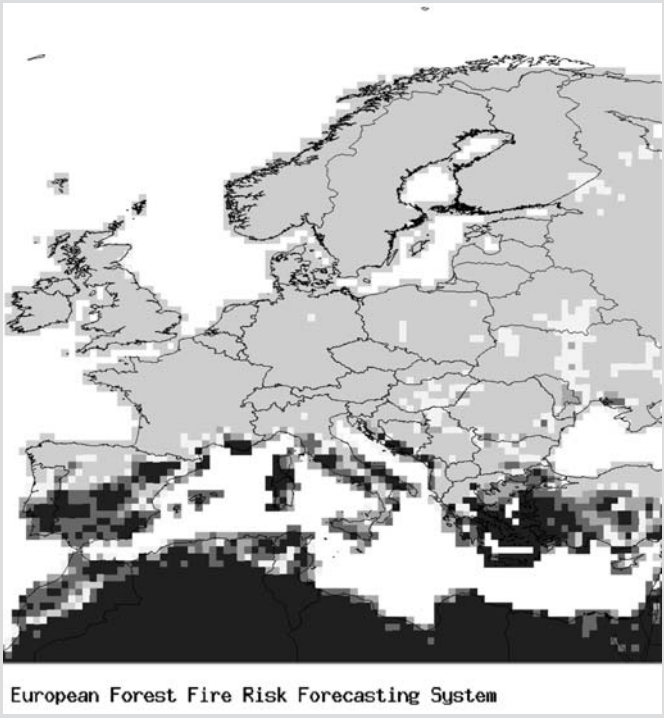
	Spatial data component				Environmental issue									
	Water – inland, sea	Air and climate change	Nature/biodiversity	Soil	Land	Waste	Noise	Health	Hazards/risks	Transport and environm.	Agriculture/forestry	Energy	Coast (land/sea)	Urban/local planning, EIA
Geographical location														
Geodetic reference system	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Geographical grids	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Monitoring sites	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Geographical names	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Administrative units														
Official administrative units	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Blocks and census districts	x							x	x	x				x
General government management units	x							x	x				x	x
Sector management & reporting units	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Elevation														
Elevation	x		x	x	x		x		x				x	x
Bathymetry	x		x				x	x					x	x
Coastline	x						x	x					x	x
Geo-physical environment														
Bedrock geology	x		x	x				x					x	x
Geo-morphology					x		x		x				x	
Soil	x		x	x	x	x	x				x		x	x
Hydrography														
Hydrography	x		x	x	x	x		x	x	x	x	x	x	x
Water catchments	x		x	x	x	x		x	x		x	x	x	x
Groundwater bodies/aquifers	x			x	x	x		x	x	x	x		x	x
Biota/biodiversity														
Biomes/Bio-ecological regions	x	x	x		x						x		x	
Vegetation	x			x	x				x				x	x
Habitats and biotopes	x		x							x	x		x	x
Species distribution	x		x								x		x	

(EULIS) towards this goal are provided in chapters three and four.

Some examples of such solutions related to the Commission Communication on natural and technological risks are presented in the figures 2.1 and 2.2 (CEC 2003).

The INSPIRE Internet consultation document shows how European and international documents that provide strategic direction for policymaking increasingly call for better information and coordination across policies. For instance, with regard to access to public information in general, the Euro-

Figure 2.1 Fire risks (29 July 2003)



Forest fire risks at EU level are currently determined using a low spatial resolution meteorological model that produces the weather forecast for the whole EU territory. The generated meteorological data are used for the fire risk models in conjunction with other datasets to provide the European forest fire risk maps. Although they are available at a higher resolution than the data currently used, country and regional meteorological data exist in a variety of formats and projections and so cannot currently be used in a European context. The standardisation of regional/national data would help improve the spatial resolution and accuracy of forest fire hazard maps, in turn producing a uniform level of information to the public and more effective fire prevention and mitigation measures. □

Source: JRC National hazards project

pean Parliament pointed out in 1999 that the EC Treaty had conferred a number of fundamental freedoms on EU citizens, but that considerable practical difficulties relating to lack of information could prevent people from exercising their rights (CEC 1999).

Access to environmental information was the particular concern of the 1998 Aarhus Convention (UN Economic Commission for Europe 1998), which was seen as a substantial step forward for both the environment and for democracy, since the Convention improves the public's rights in the making and implementation of environmental policy. The Aarhus Convention defines 'environmental information' very broadly. The definition reflects the close linkage of the environment to activities in other sectors.

Given the interconnection of issues in different sectors, in its White Paper on European Governance (CEC 2001) in 2001 the European Commission called for a coordinated approach. The White Paper proposes opening up the policymaking process so as to have more people and organizations involved in shaping and delivering EU policy. The document promotes greater openness, accountability, and responsibility for all those involved. Furthermore, since 2001, the European Sustainable Development Strategy (EU 2001) has advocated a new approach to policymaking involving better coordination of Community policies.

The World Summit on Sustainable Development (WSSD)[2] held in Johan-

2 http://www.johannesburgsummit.org/

Figure 2.2 River flooding

River flooding is often a transnational or interregional problem. Issues related to river and water management involve many institutions, all with different standards for spatial data collection and storage. This diversity creates problems in cases where integrated river basin studies need to be carried out. Simulation tools based on harmonized spatial data, such as those used for the flooding process in the Rhine valley near Bonn (simulation provided by the Surveying and Mapping Agency of North-Rhine Westphalia) can help take account of risks to people and property in a trans-boundary context. Such tools can furthermore provide orientation for the use of Community funds for flood prevention and recovery.

Source: Surveying and Mapping Agency of North-Rhine Westphalia

nesburg in 2002 provides the global context in stressing the need to develop preventive strategies to cope with environmental degradation. Such strategies require the collection and sharing of data and information, both locally and globally. The WSSD plan of implementation adopted in 2002 refers in this context to the development and wider use of earth observation technologies, global mapping, and geographic information systems.

It is, however, not only in global action plans, international conventions and European strategies that there is a call for better and more accessible geographic information. Within the EU and in the Member States, ongoing work on such issues as urban strategy, marine strategy, health and natural resources shows day after day the need for better data collection. Various efforts are being made to address the problems, including setting issues in a broader context, and taking steps to draft information requirements and streamline information dissemination. However, limiting these efforts to specific ad hoc policy themes (urban strategy, soil, water, forests, air, and so forth) or geographical areas (certain regions, for example) will not allow the complexity of local and regional ecosystems and living conditions to be taken

into account, or provide for an integrated European approach. Moreover, coordination initiatives undertaken in parallel for a number of different themes might well lead to duplication and confusion without putting any overall coordination framework in place. An information infrastructure as an overall umbrella for harmonizing spatial information and coordinating access to it for different policy areas could therefore contribute significantly to the objectives of better access to knowledge, together with better policy coordination, and hence contribute to sustainable development.

The need for such a coordination umbrella is particularly being felt in the context of the implementation of the Sixth Environment Action Programme (6th EAP) (EU 2002) that builds on a broad coordilishing a knowledge base to underpin a new approach to environmental policymaking. Readily available, good quality information is required on the state of the local and global environment. Such data are needed in order to lessen the risks associated with natural disasters, man-made hazards, and societal pressures on the environment.

This background sets out why INSPIRE, although designed from the onset as a cross-policy initiative, is emerging from environmental policy needs. Environment is one of the few policy sectors with a clear spatial dimension that is strongly interlinked with a large range of other policies sectors, such as transport, agriculture, fisheries, energy, and so forth. If key stakeholders from different policy sectors were involved from the onset in the implementation of INSPIRE, environmental information needs could provide a good basis for establishing core multipurpose data and services that could gradually be extended to other sectors as the implementation of INSPIRE proceeded.

2.3 SDIs in Europe: the state of play

The SDI State of Play study (SADL 2003) compares the situation in Europe (32 countries) against the definition of SDI provided above, concentrating mainly on multipurpose SDIs. The first striking feature this analysis reveals is that, with few exceptions, most countries are aware of the importance of SDI and are planning, or taking initiatives to develop elements, or components of SDI. Stakeholders have confirmed that the GSDI initiative, and more recently also INSPIRE, have contributed positively to raising the current level of awareness.

The next striking feature is the diversity in Europe of approaches and stages of development of initiatives taken in the context of SDI, not only between countries, but also within countries between different regions, sectors, and organizations, even though there are some common threads. One important aspect is that, in Europe, SDI initiatives are driven by the public sector with relatively little involvement of the private sector, in contrast

with what happens in Australia, Canada, and to a lesser extent the United States. In Europe, the role of the private sector is limited to the development of subcomponents and the provision of supporting services as contractors to the public sector.

The SDI State of Play study provides in a single page an overview of the situation with regard to SDI in 32 European countries against a large number of indicators relating to organizational issues, legal issues and funding, reference data and core thematic data, metadata, and access services.

This overview shows that, in certain areas, European countries score well. For instance, in many countries (but not all), geodetic reference systems and projection systems are standardized, documented, and inter-convertible; metadata are produced for certain key datasets and access to this metadata is generally free of charge. A good collection is available of geographical data that can be used as a starting point for gap filling, harmonization, and the integration of spatial data to cover the pan-European territory. This situation reflects the long tradition Europe has in cartography, fuelled by many individual policy actions, including those at the Community level, that require or support the gathering of specific geo-referenced information.

The analysis shows, however, that in other respects, the picture is less rosy. In only about half the 32 countries have SDI components reached a significant operational level. Only a few countries have a legal instrument or framework in place for the development of an SDI initiative. Even fewer have secured its long-term financial security. Not more than a handful of countries provide operational and mature access services for spatial data. The State of Play project reports that, although a significant fraction of the existing core datasets as defined in the INSPIRE Internet consultation paper are documented, that documentation has been done in many different ways. Where operational metadata catalogues exist, they maintain only a fraction of the existing metadata and provide access to an even smaller fraction through a web-based service. While the harmonization and standardization of data production within data-producing organizations may be considered common practice, that is not the case between different data producers. Only in the Netherlands is there a distributed, but nevertheless well-integrated and interoperable reference data production for the very large-scale level. Clear organizational frameworks and division of tasks among agencies are in place only in a limited number of countries such as Germany, Italy, Belgium-Flanders, and the Netherlands. Except for web-mapping, web-based services for geographic information are either weak or nonexistent. Even though CEN, ISO, and OGC provide guidelines for standardization, concrete results remain few. Data are often made available on the basis of partial to substantial cost recovery, and frequently associated with strict restrictions for use formulated in a licence agreement. Acquisition of geographic information, even between government bodies, often requires tedious procedures

and only a few datasets can be downloaded or otherwise obtained free of charge. A national SDI, with partial exceptions in Denmark, Italy, Portugal, Sweden, Slovenia, Norway, and Germany, seldom covers thematic environmental data.

In addition to these overall tendencies, the analysis of the State of Play study also shows that in a number of areas there is a marked difference between the current EU Member States and the accession countries[3]. Accession countries seem to have fewer operational SDI initiatives, fewer web-mapping services, and fewer standardized catalogues from multiple producers. Furthermore, accession countries seem to devote less attention to standardization issues, although there are exceptions. Data producers drive the SDI initiatives more frequently and users are less involved. On the positive side, accession countries seem more advanced in establishing sharing agreement policies between public bodies. It should however be noted that, for many other SDI-related issues, there appears to be no significant difference between the situation in the current EU Member States and in the accession countries.

The State of Play study clearly shows that none of the countries has in place a complete operational SDI as defined in the GSDI cookbook and none of the SDI components is fully implemented across all 32 countries, or even across the EU. Moreover, the study concludes that SDI initiatives are not coordinated across countries (and often not within countries either), so that it is difficult to combine the resulting data and services. For example, even Portugal and the Netherlands, often cited as countries with a well developed and complete national SDI, have taken a very different approach: a significant number of SDI components are neither in place, nor being planned. Hence, despite the many initiatives, widespread access and use of geographical information is still a problem in Europe.

This situation makes it difficult for users that need to combine in an efficient manner information from across administrative boundaries, from different information providers, or on different information themes, for instance in the context of the implementation of EU environmental policies. The provision of basic European geographical information datasets, supporting technology, and knowledge infrastructure has not been well coordinated across disciplines or national boundaries, making the seamless fitting together of data from many different sources difficult and expensive. The existing activities – all individually highly laudable – are fragmented and poorly coordinated at European level. Although much of the geographical information collected could potentially be useful for a wide range of purpos-

3 The following accession countries, due to join the EU in 2004, have been analysed: Cyprus, Czech Republic, Estonia, Hungary, Lithuania, Latvia, Malta, Poland, Slovak Republic, Slovenia.

es, the wider needs are rarely taken into account. In spite of the potential for the creation of a market of added-value services in geographical information, a dynamic commercial market for geographical information has as yet failed to take off in Europe[4] , in contrast with the United States.

The vision of a common market with the free movement of people, goods, and services therefore continues to be hampered by invisible barriers (information, rules, procedures, and so forth). Policymakers strive to operate in a more integrated and sustainable manner, but the information base underpinning policymaking remains patchy in coverage and variable in quality.

2.4 INSPIRE: a new EU initiative in the making

Over the last decade, numerous initiatives have been taken to organize the coordination of SDIs on a European scale, either by financing targeted projects, or by establishing SDI coordination bodies and mechanisms on a voluntary basis. Despite these efforts, the fragmentation of spatial information in Europe has increased with increasing spatial data collection, leading to the current situation of geographic information in Europe. That is one of fragmentation, gaps in availability, duplication of information collection, and problems of identifying, accessing, or using the data that is available. In addition, much of the substantial amount of quality spatial information available at local and regional level is difficult to utilize in a broader context for a variety of reasons, mainly of an institutional, organizational, and legal nature. This analysis is confirmed by the results of the INSPIRE Internet consultation, in which 97% of the respondents agreed that the following five obstacles referred to in the Internet consultation document have prevented the widespread use of geographical information:

- gaps in spatial data: spatial data is often missing or incomplete;
- lack of documentation: description of available spatial data is often incomplete;
- incompatibility of spatial datasets: spatial datasets can often not be combined with other spatial datasets;
- incompatibility of geographic information initiatives: the infrastructures to find, access, and use spatial data often only function in isolation;
- barriers to sharing and reuse: cultural, institutional, financial, and legal barriers prevent, or delay the use of existing spatial data.

4 For example, a market survey dating from March 2001 in North-Rhine Westphalia in Germany suggests that only 15% of the market potential has been realized (Micus 2001).

Current trends identified through the SDI State of Play study and feedback from stakeholders in the context of the INSPIRE Internet consultation indicate that current difficulties will continue if no overarching umbrella coordinating existing geographic information collection, distribution, and coordination activities in Europe is developed. Members of the public, governments, and companies will continue to have difficulties finding the data they need because of the lack of an organized structure in which to search for information, and because of the patchy documentation of datasets (metadata). Moreover, even when data can be found, it may be impossible to access or integrate easily, because the overarching architecture at the technological, organizational, and procedural levels is missing or applied inconsistently. Therefore, even if Europe were to make good progress in respect of increased quantity, quality, and the general availability of data relevant for policy, good governance and business, without INSPIRE these improvements would only lead to the establishment of islands of interoperability and no truly European Spatial Data Infrastructure would emerge.

Backed by a Memorandum of Understanding signed at the highest political level in the Commission (EC 2002), a number of services in the Commission have taken up the challenge of the development of a proposal for creating an overarching umbrella for the establishment of a spatial data infrastructure in Europe. Under the flag of the INSPIRE acronym, over the last two years they have been developing a proposal for a legal initiative by mobilizing existing stakeholders and experts in Europe.

The broad lines of INSPIRE are set out in a document (INSPIRE 2003a) that has served as the basis for an Internet consultation. INSPIRE aims to create a policy and legal framework for the establishment and operation of an Infrastructure for Spatial Information in Europe, for the purposes of formulating, implementing, monitoring, and evaluating Community policies at local, regional, national, and international levels and for providing information to the citizen.

The concrete elements of the Infrastructure for Spatial Information in Europe follow from the discussions with stakeholders organized through a range of working groups. The following elements are currently envisaged:

1. Coordinating structures at EU and Member State level, which organize the practical implementation of the Infrastructure for Spatial Information in Europe;
2. Metadata, which describe existing datasets held by public authorities (using agreed standards);
3. A linked electronic network, which allows anybody to query, view free of charge, access, and trade the spatial datasets held by public bodies and made available on a voluntary basis by third parties from a single point of (electronic) access through a distributed communications network (the Internet, for example);

4. A range of standards for spatial datasets and services, which takes into account existing and emerging European and international standards, and translation services between existing datasets and these standards;
5. A data policy framework and a range of sharing agreements between public bodies ensuring that information is exchanged without barriers;
6. A framework for the monitoring the implementation of the Infrastructure for Spatial Information in Europe.

The Internet consultation on INSPIRE that took place in the first half of 2003 showed that there is broad agreement among the respondents on the need for INSPIRE to address these issues.

INSPIRE would operate under the following five general principles that are referred to in the Internet consultation paper:

- data should be collected once and maintained at the level where this can be done most effectively;
- it must be possible to combine seamlessly spatial data from different sources across the EU and share data between many users and applications;
- it must be possible for spatial data collected at one level of government to be shared between all levels of government;
- spatial data needed for good governance should be available under conditions that do not restrict the extent of its use;
- it should be easy to discover which spatial data is available, to evaluate its fitness for purpose, and to know what conditions apply to its use.

At this first stage, INSPIRE would not initiate an extensive programme of new data collection in the Member States. Instead, INSPIRE is designed to optimize the scope for making use of the data that are already available, and to put in place the structures needed to determine efficiently the priorities for future spatial data collection. INSPIRE should be seen as an overarching European framework for establishing common requirements and coordination mechanisms that allow the information and SDI initiatives at national and sub-national level to work in synergy so that they contribute to the establishment of the Infrastructure for Spatial Information in Europe. In later stages, INSPIRE may work on further implementation.

INSPIRE concentrates on information needed for monitoring and improving the state of the environment, including air, water, soil, and the natural landscape. INSPIRE covers the spatial data that are relevant for the formulation, implementation, monitoring, and evaluation of Community environmental policies. The scope of INSPIRE can be defined by a list of 60-odd spatial data components grouped together in 17 themes. These themes cover both information directly related to environment policy (noise, water quality, protected sites, and so forth) and information of a cross-sectoral nature, often required by several sectors (administrative boundaries, elevation,

transport networks, land cover, and so forth). The focus of INSPIRE is thus environmental policy needs, but it is open to use and future extension by other sectors such as agriculture, transport, and energy.

The main beneficiaries of INSPIRE would be those involved in the formulation, implementation, monitoring, and evaluation of policies – at the European, national and local level – and would involve public authorities, legislators, and citizens and their organizations. Other user groups are also expected to benefit, including the private sector, universities, researchers, and the media. The proposal would therefore support the formulation and implementation of a wide range of environmental and other policies.

2.5 Expected impacts of INSPIRE

What is referred to as an 'Extended Impact Assessment' of INSPIRE is being prepared by the Commission following its commitment expressed in Communication COM (2002)276 to carry out such an assessment for its major policy proposals.

The Extended Impact Assessment identifies the economic, social, and environmental impacts of establishing a European SDI, populated with key georeferenced and environmental data. A working group set up under INSPIRE has issued its contribution to the extended impact assessment of INSPIRE in the form of a report (INSPIRE 2003b) that builds on information gathered from some fifty case studies and from the judgements received from a range of experts. The work was particularly challenging, not only because it was one of the first to be carried out under the new engagement of the Commission to carry out extended assessments of its new policy proposals, but also through the almost total lack of valid, reported quantitative information about the cost and benefits of setting up spatial data infrastructures.

Despite these challenges, the working group came to the conclusion that the implementation of INSPIRE across the EU would represent a cost-effective investment. The working group considered that there was a clear business case for implementing INSPIRE in the form of a broad framework backed by an EU framework Directive and based on the subsidiarity principle of devolved management to Member State level, where obstacles are addressed in a step-by-step manner. INSPIRE would also have significant social benefits, and would lead to more effective policies for the protection of our environment.

2.5.1 Investment requirements

The investment requirements for INSPIRE are spread over a large number of public organizations operating at national and regional level. On average,

INSPIRE would cost €12 million per year per Member State, or €130,000-180,000 per year per region of about 200,000-300,000 people, amounting to €200-300 million per annum over a period of 10 years.

INSPIRE activities are assumed in these estimates to be additional to whatever is in place at EU, national, and sub-national level, since they do not take into account the many activities in this field that are already taking place. The estimates should therefore be considered to be rather higher than what would really be needed. The added value of INSPIRE is to create the synergy necessary to connect all the separate parts of the infrastructures being created across Europe and to fill whatever gaps that remain, thus delivering fully integrated information services. The available evidence indicates that, without INSPIRE, Europe would only have isolated pockets of working infrastructures that would fail to support the knowledge base needed for good governance, sustainable development, and the innovation goals set by the Union.

2.5.2 Qualitative benefits

Three types of benefit are listed in the report on the extended impact assessment of INSPIRE. First, significant environmental benefits are described for a wide range of activities in relation to environmental policy preparation, implementation, and monitoring and in relation to participation by members of the public. Examples of such activities are the establishment of monitoring networks, environmental reporting, the establishment of management plans for specific sites or areas, the *ex ante* evaluation of environmental policies, and so forth.

The same kinds of benefit as those listed for environmental policy are expected to occur for other Community policies with a strong territorial dimension. Thus wider social benefits should result from overall improvements in the quality of policy and decision-making across Europe at local, regional, national, and international level.

Furthermore, the impact on commerce is expected to lead to the creation of new high-quality employment, as has happened in the United States.

The report also highlights the good prospects for gains by the private sector and anticipates efficiency savings for industries active in the surveying, insurance, cable laying, architecture and engineering sectors. Furthermore, it alludes to opportunities for the commercial exploitation of public sector data and information and for the development of added-value services.

2.5.3 Quantified benefits

The quantification of the benefits of introducing INSPIRE has proved a difficult challenge, because the benefits of the availability of more information

only become apparent after a certain period of time, and because they depend on many factors. The report has nevertheless identified evidence of quantitative benefits by looking at activities in the field of environmental policy for which the availability of spatial information is a decisive factor for achieving the anticipated savings. Examples of this evidence include the increased efficiency in carrying out Environmental impact assessments (EIA) and strategic environmental assessments (SEA), reducing their costs by at least €100 million per year, and the reduced duplication of spatial data collection to the extent of €25-250 million per year.

Taking the quantified elements together gives a total of €1.2 to €1.8 billion annual net benefits. These are expected to accrue gradually as the implementation of INSPIRE progresses, reaching their full effect when INSPIRE is fully implemented. Recognizing that these elements only represent a partial view of the whole picture, and that the estimates of investment requirements are on the high side, the conclusion can justifiably be drawn that the benefits outweigh the investment requirements by a considerable margin.

2.6 A European SDI in the global context

Over the last decade, international global initiatives such as GSDI and Digital Earth have been developing slowly. The political awareness of the need to develop a GSDI is growing constantly, however, as confirmed by political backing from the World Summit on Sustainable Development in Johannesburg, August 2002.

At the WSSD, the need was expressed for a comprehensive global observation system, underscoring the critical link between global observations that link space and *in situ* or surface-based observations across land, sea and air and sustainable development.

As a follow-up, the 2003 G-8 Summit in Evian, in June 2003 resulted in the G-8 Action Plan on Science and Technology for Sustainable Development (G-8 2003). The actions proposed were to:

- develop the close coordination of our respective global observation strategies for the next ten years; identify new observations to minimize data gaps;
- build on existing work to produce reliable data products on the atmosphere, land, fresh water, oceans, and ecosystems;
- improve the worldwide reporting and archiving of these data and fill observational gaps of coverage in existing systems;
- facilitate interoperability with reciprocal data sharing.

Concrete steps were then taken as a result of the high-level Earth Observation Summit, July 31, 2003 in Washington where an *ad hoc* Group on Earth Observations (GEO) was established to prepare a 10-year implementation plan for an Integrated Earth Observation System (IEOS) (see http://www.

earthobservationsummit.gov/index.html). The purpose of the system is to provide the tools needed to substantially improve our ability to identify and address critical environmental, economic and societal concerns.

The concept of an integrated Earth observation system is not new. The GEO identified some of the barriers that have precluded the development of such a system in the past: Insufficient data sharing, Inadequate observations (spatial, temporal, and/or quality limitations); Inconsistent data formats and costs.

Hence, one of the major components of IEOS is the development of a Global Spatial Data Infrastructure that covers the necessary data protocols, policy, format, standards, metadata, etc., to ensure global data are useful to all IEOS participants.

The EU contribution to IEOS is channelled through the Global Monitoring for Environment and Security (GMES, http://www.gmes.info/) initiative. This has as a 'horizontal' priority the establishment of a European SDI (INSPIRE) as the core architectural element on which the monitoring and observation system will be built.

At the stage of implementation, a European SDI should therefore evolve in close collaboration with the GEO, as a part of the 10-year implementation plan for an Integrated Earth Observation System (IEOS), and in such a way that it can be interlinked to other major regional and international initiatives, thereby contributing substantially to global sustainable development.

2.7 Conclusion

Achieving sustainable development requires striking a balance between economic, environmental, and social development. Economic activities affect the environment and hence the quality of life through sometimes complex pathways. Knowledge about the state of the environment and its pressures are dispersed among many actors; significant gaps still exist.

Without a more integrated approach and coherence between policies, decoupling ever-increasing economic activity from ever-increasing pressure on the environment will not be possible. Such an approach should also deal with the way in which information is gathered, processed, shared, and distributed.

In comparison with other regions, until recently Europe has paid relatively little attention to providing, coordinating, and linking-up information related to the state of the environment and pressures on it, because of the lack of an overall coordination initiative with sufficient political backing. Awareness is growing, however. If major new initiatives such as INSPIRE and GMES were to succeed in becoming recognized as the overarching frameworks for coordinating information collection and distribution in support of sustainable development, Europe would be in a position to deliver a major contribution to

the establishment of a global information infrastructure supporting global sustainable development, and an European SDI would be an emerging reality. Without these initiatives, the current situation is expected to evolve into islands of inter-operability and a real European Spatial Data Infrastructure would remain a dream.

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3 Geographic Information Network in Europe (GINIE)

Recommendations for action

François Salgé

3.1 Introduction

The Information Societies (IST) Technologies Programme of the European Union (IST-2000-29493), running from 1 November 2001 to the 31 October 2003, funded a project called GINIE (Geographic Information Network in Europe). Its main purpose is to develop a cohesive Geographic Information Strategy at the European level and support its implementation. Positive steps are needed to fill the current void with respect to a GI strategy at the European level. The GINIE proposal sets out a framework for a geographic information network in the European Union, the pre-accession countries and other countries around the Mediterranean basin. The partners in the GINIE project are EUROGI, OGC-Europe, the Joint Research Centre, and the University of Sheffield.

Geographic Information provides some of the core data sets that enable transparent and effective government. The establishment of a Geographic Information Network in Europe (GINIE) will create a structure for the candidate nations for EU membership to discuss their accession requirements in terms of geographic information. It aims at creating a network for the countries around the Mediterranean basin to discuss common GI issues. It aims at being the voice of Europe in the global debate, and a forum for the GI community (government and industry) to discuss GI strategy and to develop new ideas and plans.

The overall aim of the project is to establish and promote a European strategy for Geographic Information. The work packages are so organized as to implement the work necessary to achieve this aim.

With a strong government, research and industry participation within this project the objectives are attainable within the project timeframe and with the foreseen resources:

1. Develop a European Geographic Information Strategy
2. GI capacity building and awareness raising
3. Organise the EC GI & GIS workshop
4. Establish a European View on the Global Perspective Related to GI
5. Extensive dissemination of the findings and progress of the project.

As part of this process the GINIE consortium has undertaken a consultation in the first instance with the GI community across Europe, i.e. the wide set of people and organizations working in the public, private, voluntary, and research sectors who are committed to maximizing the use of GI for better governance, business, research, and informed citizenship. This is not a closed community, and it clearly needs to interact with other communities

of interest in society to achieve its objectives.

GINIE relates to INSPIRE and the proposal for the reuse and exploitation of public sector information as the project aims at developing a coherent policy framework for geographic information that lies at the heart not only of spatial data infrastructures, but also of the whole Information Society project. In turn, this framework needs to be embedded in the broader debates and initiatives related to public sector information and other key policy.

The impact of GINIE for individual European countries will be important as Geographic Information is an important asset the use of which should be maximized for the benefit of citizens, governance and commerce. To achieve this objective, the GINIE project drafted several recommendations including the proposal that licensing conditions and rights of usage should be harmonized across Europe, and they should be simple, clear, and similar for similar products, even though it may be appropriate to segment the market by type of user (Citizen, Public/local, Public/central, Private, Non-governmental and non-profit organizations) and type of usage (View only, Education and Research, Value-Adding).

3.2 Background

The development of the 'Information Society' has been one of the major policy goals of the European Union since the Maastricht Treaty in 1993 gave to the Union the responsibility of supporting the integration of trans-European networks in transport, energy, and telecommunications. The term Information Society has since come to encompass the set of policies, initiatives, and investments needed to boost economic growth and competitiveness, and support the development of a society strongly based on the creation and use of information-related knowledge, products, and services.

The European approach to the development of the information society hinges on the twin track of liberalization of the telecom sector to increase physical access to networks and services, and the liberalization of public sector information (PSI) to facilitate its reuse and create a vibrant information market and industry, provide more efficient services, and support public participation.

Geographic Information is recognized as a key component of PSI on two main grounds:

1. Geographic Information (GI) has a significant economic value. This was well illustrated by a study for the European Commission (Pira et al. 2000) which estimated the economic value of PSI in Europe at e60-70 billion per annum, of which over half was accounted for by GI (mapping, land and property, meteorological services, environmental data). In the previous year a study by OXERA (1999) indicated that whilst the turnover of the

national mapping agency in Great Britain, the Ordnance Survey, was of some £100 million, the Gross Value Added of the businesses it underpins in the country is 1000 times larger, at approximately £100 billion. The figures above differ, partly because it depends on how widely or narrowly one defines the business underpinned by GI, but they give a sense nevertheless of the undisputed contribution of GI to the economic case for increasing the reuse and exploitation of PSI.

2. Geographic Information has a significant policy value because it enables the integrated assessment of policies in different sectors (agriculture, transport, regional development, environment). The recognition of its importance at the highest political level has developed hand in hand with the increasing concerns for sustainable development, which was include in the Amsterdam Treaty in 1997 as one of the key goals of the European Union. Hence, an increasing number of environmental Directives in Europe require the collection, integration, and analysis of geographic information for impact assessment, policy monitoring, and reviewing. In 2001 the three EC Commissioners responsible for the Environment, Research, and Economic and Financial Development and EUROSTAT, signed a Memorandum of Understanding supporting the creation of an Infrastructure for Spatial Information in Europe (INSPIRE).

In recognition of the economic and societal value of GI, many countries have been developing national (or regional) spatial data infrastructures (SDI), that is frameworks of policies, institutional arrangements, technologies, data, and people that makes it possible to share and use effectively geographic information. A review of current best practice on Spatial Data Infrastructures in Europe and the United States was undertaken by the GINIE project in May 2002 (Craglia et al. 2002). The most important conclusion of that review is that political support at all levels, national, regional, and local, is absolutely crucial for the development of these important infrastructures. The reasons are that:

- Most geographic information is collected, maintained, and used by public sector organizations, which are dependent on the policies set by government in respect to organizational priorities, funding, and regulatory mechanisms.
- Geographic information is a high-value commodity as well as one, which underpins a large number of government services to the citizen. It therefore represents an area of tension between policies aimed at maximizing government revenue and those such as e-government aimed at maximizing benefits to citizens. Political support is therefore needed to resolve these conflicts.
- SDIs are not primarily about technology, but about developing a clear framework of agreements among government agencies, and between govern-

ment, the private sector, and citizens on terms through which the use of public sector information, including geographic information, can be maximized for the benefit of all. These agreements often require attention and political support at the highest levels.

- Governments therefore play an absolutely crucial role in the development of SDIs and of the Information Society because they are at the same time data producers, users, policy setters, and regulators who provide guidance to major public sector organizations.

With these considerations in mind, it is clear that developing a coherent policy framework for geographic information lies at the heart not only of spatial data infrastructures, but also of the whole Information Society project. In turn, this framework needs to be embedded in the broader debates and initiatives related to public sector information and other key policy areas such as sustainable development and the enlargement of the European Union (Craglia et al. 2001). To explore the linkages and implications for the formulation of GI policy of this broader policy environment, GINIE organized an expert meeting in May 2002 the key findings of which are summarized in this document. The meeting drew 27 experts from 10 European countries, and analyzed in particular the current experiences, main issues, and lessons to be learned from the Czech Republic, France, Italy, Lithuania, Norway, and the United Kingdom. The remainder of this document is organized into two sections reviewing the broader policy environment, and summarizing the findings and recommendations from the expert meeting respectively.

3.3 Policy context

Telecommunications policy

The EC initiatives to liberalize physical access have had some notable successes. Most national telecommunications monopolies have been privatized, greater competition has increased consumer choice and level of service, and the common standard for mobile telephony (GSM) promoted by the EC in 1994 has created a multi-billion Euro market giving Europe a competitive edge in this sector. As a result, the high penetration of mobile phones across many segments of society outstrips ownership of personal computers (PCs) in Europe, and promises an alternative way to access Internet – based information and services from the PC paradigm prevailing in the United States and Canada. Another notable success has been the establishment of a regulatory framework for electronic communications networks and services to ensure transparency, and avoid market distortions by players exploiting their dominant position. This regulatory regime agreed in April 2002 includes a Framework Directive (Directive 2002/21/EC), and Directives on Authorization

(Directive 2002/20/EC), Access (Directive 2002/19/EC), and Universal Service (Directive 2002/22/EC), in addition to the one on Personal Data Processing and Privacy enacted in 1997 (Directive 1997/66/EC) and revised in 2002 (Directive 2002/58/EC). Aside from the details of these Directives, the recognition that this aspect of economic and social life cannot be left exclusively in the hand of the market and requires a set of agreed rules, checks, and balances is of extreme importance.

Public sector information policies

Against this set of initiatives, more limited success has been achieved in increasing and regulating access to information or content. A set of Guidelines put forward by the EC in 1989 to promote access to information, transparency, and a level playing field were largely ignored, partly because of a lack of enforceable legal backing, and partly because of the immaturity of the market at that stage (CEC 1989). It took another 10 years before the debate was re-launched with the publication in early 1999 of the Green Paper *Public sector information: a key resource for Europe* (CEC 1998). This consultation paper played a major role in raising the debate across Europe on the opportunities created by the increase availability of public sector information in digital format for its reuse beyond the purposes for which it was originally collected. The paper recognized existing barriers to accessing PSI including different legal frameworks and pricing regimes, and posed pertinent questions on the extent to which such frameworks ought to be harmonized across Europe differentiating between administrative, and non-administrative data, and 'essential' versus value-added data.

After extensive consultation, the Green Paper was followed-up by a Communication (EC 2001), and a proposed Directive (CEC 2002a). The proposed Directive argues the case for actions at the European level to remove the barriers identified, and create a minimum level of harmonisation on the commercial and non-commercial reuse of PSI. The proposal does not address issues of access to data, arguing that these are best dealt with at national, regional, and local levels. Instead, it focuses on ensuring a level playing field, transparency, and non-discriminatory practices in the conditions for the reuse and exploitation of data that are already accessible. It is hoped that these generic principles that have been successfully agreed for the physical aspects of electronic access will also be agreed for the content being accessed.

e-Government

Linking public administrations through the Internet was one of the ten priority areas in the 1994 Action Plan *Europe's Way to the Information Society* (EC 1994), and was subsequently extended with the objectives of providing better services to citizens, reducing government expenditure, and boost the Euro-

pean information market in the 'government on-line priority agreed by the European Council in the *e*Europe initiative in 1999 (EC 1999). *e*Europe has been followed by two Action Plans for 2002 and 2005 (CEC 2002b) with agreements among Member States to reach set targets for the delivery of public services on line by 2005, and as a corollary, much increased access to public sector information by all citizens. The Action Plans are largely funded by national governments, with some core European Union funding.

Environmental Policy

Additional pressures for increased public access to information have developed in the environmental arena. At the international level, the 1998 Aarhus Convention on *Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matter*s, which came in force in October 2001 is important because it links the right to access information with human rights, including the right to participate in decision-making processes and seek redress. Therefore it moves away from the economic arguments about access as a way to develop the market, to more fundamental issues about democracy and social justice. At the European level, the Aarhus Convention (Aarhus 1998) requires a reappraisal of several areas of policy, including the revision of the 1990 Directive on Access to Environmental Information that was drafted in the mid 80s prior to the Internet era (CEC 1990). The revised Directive approved in 2003 updates the object of rights to include specifically environmental data held in electronic databases (Directive 2003/4/EC).

At a more general level, the increased emphasis on sustainability has lead to efforts to assess the cumulative impacts of different sectoral policies in an integrated way. This has promoted further the importance of accurate information and indicators, including geographic information. As a result, an increasing number of European Directives require the collection, maintenance, and sharing of geographic information. Examples in this regard are the Integrated Administrative and Control System to assist monitoring agricultural policies, the Communications on Integrated Coastal Zone Management (COM(2000)547 and COM(2000)545), and the Water Framework Directive (2000/60/EC). The latter is particularly significant because it specifically requires a large body of data to be collected for each river basin catchment area in Europe, and managed in a Geographic Information System suitable for integration and analysis at the European level. It is this Directive that provides the legal basis for the INSPIRE initiative.

3.4 INSPIRE

The Infrastructure for Spatial Information in Europe initiative (www.ec-gis.org/inspire) was launched at the end of 2001 with the aims of making

available relevant, harmonized and quality geographic information for the purpose of formulation, implementation, monitoring and evaluation of Community policy-making. To achieve its aim, INSPIRE has been addressing a broad set of issues including common reference data and metadata, architecture and standards, legal aspects and data policy, funding and implementation structures, and impact analysis. The objective is to arrive at an agreed European legal framework that whilst focusing first on the needs of environmental policy, will subsequently be extended to other areas of Community concern such as agriculture, regional policy, and transport.

The overarching policy principles of INSPIRE are as follows:

- data should be collected once and maintained at the level where this can be done most effectively;
- it must be possible to combine seamlessly spatial information from different sources across Europe and share it between many users and applications;
- it must be possible for information collected at one level to be shared between all the different levels, e.g. detailed for detailed investigations, general for strategic purposes;
- geographic information needed for good governance at all levels should be abundant and widely available under conditions that do not inhibit its extensive use;
- it must be easy to discover which geographic information is available, fits the needs for a particular use and under what conditions it can be acquired and used;
- geographic data must become easy to understand and interpret because it can be visualized within the appropriate context and selected in a user-friendly way.

To follow these principles poses a number of policy challenges. To this end the INSPIRE Working Group on Data Policy and Legal Issues was well represented in this GINIE expert meeting to identify areas of similarity and difference in selected European countries, and to discuss possible policy options for the proposed legal instrument implementing INSPIRE.

3.5 Implications for geographic information policy in Europe

The review of the main data policy developments taking place in Europe at the present time indicates the dynamic nature of this area of policy. This is also reflected in the experience of all the countries that were represented at the meeting. The Internet is providing enormous new opportunities to the dissemination of public sector information, the creation of new value-added

products and services, and the stimulation of the information market. The commitment taken by the European heads of states to pursue a vigorous e-government agenda is particularly significant in the extent to which it opens up new channels of communications among public sector agencies, and with citizens and the private sector. Great Britain, France and Italy have made major steps forward in the dissemination of information to the public, and the improvement of services to citizens through the Internet. Similarly, the experiences of the Czech Republic and Lithuania confirm that the Accession countries have also taken this challenge very seriously, and identified e-government and the advancement of the Information Society as a key strategic objective to modernize public administration, and facilitate entry into the European Union. A common feature to all the countries analyzed is also the extent to which they are pursuing policies of territorial decentralization, which strengthens administrations at the local level, and narrows the gap between citizens and government. These policies of decentralization also require efficient administrative procedures and open channels of communication among all the stakeholders involved, which can be facilitated by Internet-based communications.

Whilst the opportunities are many, there are also several challenges, which are particularly acute in the case of geographic information but affect other types of public sector information, including environmental information, as well. Some of these challenges are summarized below.

- At the core of such challenges lies the tension between the potential economic value of public sector information in general, and GI in particular, and its social and policy value. Therefore, the potential social and policy value that accrue from maximizing the dissemination of geographic information needs to be balanced with the competing pressures from Treasury Departments to maximize revenue for government agencies, and from other departments such as that for Trade and Industry in order to support the development of a vibrant private sector in the value-adding information businesses.
- These tensions exist not only between different government departments and agencies in central government, but also between central and local government. In this respect, the increasing process of decentralization in many countries noted above, strengthens the hand of local administrations, which are also the main collectors, users, and providers of geographic information.
- Much of the geographic information collected by local administrations is done in partnership with the private sector, thus introducing third party rights that need to be considered in formulating policies for the dissemination and use of geographic information.
- Business models based on the dissemination of information via the Internet are volatile, as shown by the burst of the Internet-bubble in the last

years. Thus many services that provided information free of charge on the basis of revenues to be raised by advertising or subscription have failed, and if they have survived have moved to a model based on direct charges.

- As the market for value added information products develops, there are an increasing number of issues arising in respect to trans-national patenting of products and processes, and fair trading. In respect to the latter, there are at least two main areas of concern: firstly, where government agencies trading on the open market unfairly compete, or are perceived by the market to do so, by cross-subsiding their products with tax-payers' money to the disadvantage of private sector competitors; secondly, where these same cross-subsidies also carry the risk in open procurements of services by other public sector bodies to make the tax payer pay more than once for the same service. Market transparency and independent regulation are therefore becoming increasingly important.

The issues identified above are affecting, to a greater or lesser extent, every country in Europe. The differences which occur are more to do with historical perspectives on what is a public service, and how it should be funded, or the funding regime of specific data providers, than with structural differences. All in all, every government at national or local level is struggling to grapple with the intellectual, institutional, organizational, and financial challenges posed by Internet based communications. The more valuable the information is, the greater the challenges.

Notwithstanding these considerations, the comparative experience of the countries analyzed indicates a degree of convergence around a few key principles. Geographic information is a key element to support good governance in Europe at all levels, and particularly in relation to the environment, e-government, and security, which are critical to citizens' quality of life. Therefore we need frameworks that ensure that geographic information is of quality fit for the purpose, and widely used. To achieve the latter two objectives the following is necessary:

- As geographic information is expensive to produce, it is necessary to favor models of production, which guarantee best value for money to meet users' needs. Innovative financial regimes must also be developed to maximize the sustainable and cost/effective production and use of geographic information for example through co-financing between public and private sector, and between local and central administrations.
- A clear policy framework needs to be developed that maximizes the use of geographic information. In this respect it may be appropriate to distinguish between key reference datasets that underpin core government, commercial, and democratic processes, or 'general interest GI' and value-added products for particular users. Each category may have different financial regimes, and conditions for access and use.

- Every service needs to be paid for. However, the balance between funding via general taxation or user fees is a matter that reflects different traditions and cultures, and the variations in quality of service provided. Whilst it is not possible, therefore, nor desirable to impose a single pricing framework across the whole of Europe, it is important that the principles of the Single Market are upheld, including non-discriminatory conditions of access and use, transparency of procedures, and fair trading. These principles in turn require an increasing harmonization of licensing procedures, and a regulatory mechanism to ensure that dominant positions are not exploited to the detriment of the market and greater access, and that it is possible to seek redress.

3.6 Recommendations

On the basis of the principles outlined above, the expert panels brought together by the GINIE project recognize that Geographic Information is an important asset the use of which should be maximized for the benefit of citizens, governance and commerce. To achieve this objective, the following recommendations are made:

- The terms and conditions to access and use geographic information should be designed to facilitate and promote maximum use by individuals and organizations, and should clearly define what one gets access to.
- The terms and conditions of use of all public sector geographic information must be publicly and freely available as part of a metadata service.
- It should be possible to view public sector information, including geographic information, for free at the point of access.
- Geographic information usage should also be maximized through incentives to promote data sharing.
- Innovative financial regimes must be developed to maximize the sustainable, and cost/effective production and use of geographic information (e.g. co-financing), compatible with the status of the data (reference data, general interest data, topic oriented data…).
- The use of licenses is appropriate to guarantee the investment and intellectual property rights of data producers, and clarify the terms and conditions of use.
- Licensing conditions and rights of usage should be harmonized across Europe, and they should be simple, clear, and similar for similar products, even though it may be appropriate to segment the market by type of user (Citizen, Public/local, Public/central, Private, Non-governmental and non-profit organizations) and type of usage (View only, Education and Research, Value-Adding).
- The harmonization of rights and licenses should start in consultation with

the main data suppliers, and users.

- The principles of non-discrimination, transparency, and fair trade should always be upheld and subject to a clear regulatory regime aiming to:
  - provide a forum to hear and redress grievances;
  - ensure that dominant undertakings do not abuse their position, and that a level playing field for commercial operators in maintained;
  - ensure that suppliers provide accurate information about their products and services;
  - recognize that the privatization of a public sector activity must consider the rights to information that have been established, and
  - provide independent and qualified advice to mediate and arbitrate between different levels of government and between the public and private sector when needed.
- In respect to liability, there is a need to:
  - define products, limitations of products, and agree on liability for information services;
  - recognize that liability depends upon ambition of service and reasonable expectations of the user, and
  - recognize that contracts and legislation are needed.

These recommendations should be considered at several levels:

- the local level, where many users and a significant part of the production of the data exist;
- the national level where the financing and the production of reference data lies; and
- the European level where there is greatest need for pan-European information for policy monitoring and evaluation and the legal framework is upheld to ensure the Single Market, and fair trade.

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4 European Land Information Service (EULIS)

Ambitions, bottlenecks and policy solutions

Peter Laarakker & Stefan Gustafsson

4.1 Introduction

Within the eContent Programme of the European Union, the national land registries and/or cadastres (LRC) of Sweden, Finland, England and Wales, Scotland, Austria, the Netherlands, Lithuania, and Norway in cooperation with Lund University (Sweden) have started a co-operation in a project called European Land Information Service (EULIS). EULIS aims to link the computerized systems of the national registries with each other.

There is an increasing interest in the real property financial market, at least among consumers, to be able to carry out international transactions more frequently. This does however require a possibility to get access to up-to-date and reliable information on land real property across national borders in an easy way. The project aims at proposing how an electronic European Land Information Service can be designed, what obstacles there might occur and how these can be overcome as well as showing the functionality of the proposed outcome through a demonstrator. In this way it will be possible to illustrate what a future end user interface might look like. Among other things, a service like this will contribute to establishing a single market for housing credits. The project will also study how a service will affect the property market, and the actors in the market.

In order to establish the foundations for a European service of this kind a number of issues have to be solved. Among these there are questions related to protection of privacy, technical solutions, standards and standardization.

4.2 Goals of EULIS

The EULIS project aims at developing a demonstrator of a future European Land Information Service. The overall objective is to provide access to information across borders via the Internet, thereby creating better conditions for professional actors in the market as well as for private citizens. This implies that a request for property ownership information in Sweden can be submitted to the Austrian land registry. The Austrian land registry directs this request via EULIS to the Swedish registry. The requested information will travel the identical way in the opposite direction. The system will be available for the professional users like notaries public, financial service suppliers (banks), and municipalities.

The EULIS project deals with questions about content of the service, standards, protection of privacy, pricing, billing, security, technical solution and exploitation. The project illustrates the positive effects of having land infor-

mation available across borders and can be seen as a measure to improve the single market for financial services, at the same time as the possibilities for private sector companies to exploit public sector information is increased.

4.2.1 Core information included in the service

The service will include two types of information. Naturally, the land information itself (for example parcel identification number, object-number, the name of the owner, the date of the last transaction of ownership) will be presented in the EULIS service. Initially this will be made in the origin language. If, in the future, information can be translated will be subject to discussion perhaps beyond this project's duration, as national concepts not always are comparable, especially from a legal point of view.

The second type of information concerns metadata for example about the meaning of the concept of ownership in Sweden if the request concerns Swedish information (De Jong and Van Loenen 2003). Where the legal framework and the information contents in the registers in the participating countries differ, efforts have been made to make the actual information understandable and explained in English. When it comes to headers in register outputs these are explained. The most common phrases are given as well. Also basic descriptions of legal concepts will be provided, as well as descriptions of routines and effects of registration at real property conveyance and mortgaging.

The register contents are described in a systematic, structured way, the same for all participating countries. This enables a possibility to use the same model for presentation of the national conditions in the EULIS service. This also makes it possible to compare different legal aspects concerning real property between the countries.

Besides explanations of register contents and transaction routines, the EULIS service will contain explanations in English of national legislation and contact information to authorities involved in the real property transactions.

4.2.2 Conditions for the proposed EULIS service

The project has identified and compared national rules for access to information, and use of information. The main purpose has been to provide the participating countries insight in the differences that exist among them with respect to the publicity issue. Therefore, the project does not aim to discuss a most ideal situation for EULIS. However, if the Consortium Members agree on a preferred model of EULIS, the findings of the project provide information on the steps to be taken, for the publicity issue, in order to come to such a preferred model. Below the principles that may be adhered to in a EULIS setting are provided.

There are in the service chain three different actors: national land data supplier (NS), EULIS service and Foreign supplier (FS). Each actor plays its own role with its own terms and conditions.

4.2.3 National rules for access to land information

All EULIS countries have legislation in place that allow citizens to enforce access to land information. Sometimes this legislation is based on a freedom of information act or a public records act, and sometimes based on a special Cadastre Act.

Users can inspect the data in the offices of the LRCs. In most countries they do not have to identify themselves or explain their further use if they want to inspect the data. Only the Registry of Scotland asks for identification, but only for feeing purposes. Online access is mostly only available to users that have subscribed to a service, and is not always available to all. Austria and Sweden do provide access to their data without the need to subscribe. However, access is only provided through object data, and in Sweden also no personal data is shown. The business models of most consortium members require to recover some of the costs by asking a fee for inspections. In the analogue world the principle of allowing anonymous access would still hold; people can pay anonymously in cash at the LRC's counter. In a digital environment, however, such an option is not (yet) available: Identification of the requester, in one-way or another, is necessary to collect the fees. Scotland requires the requester to identify himself (for feeing purposes). One country provides access to the land information through subject data (name, personal identifier), but most countries only allow access through object data (e.g., addresses, property-id). Most countries deny requests for an overview of one single natural person's real property. Only Scotland accepts such a request.

As a result of the above, requests for public inspection purposes may be confronted with the following principles:

- access to data provided through EULIS can be enforced by a request through national legislation;
- data registered in the LRCs, and accessed through EULIS can be inspected without explanation of the intended use of the data;
- identification of the requester is only allowed for feeing purposes.2.access to data provided through EULIS is only provided through object data (e.g., address of property, or property-id);
- access to data provided through EULIS is limited to a few properties;
- requests for overviews of one single natural person's property are not accepted by EULIS. Individual EULIS members may decide otherwise.

4.2.4 National rules for acquiring data from a Cadastre or Land Registry

Professional requesters for land information may use the national legislation to enforce access to this data. However, access can only be enforced if it is for public inspection purposes. For other purposes the LRCs have a certain freedom to respond to requests asking for a copy of a data set, or the complete, or a significant part of the land informationbase.

Commonalities and differences between the participating LRCs
In almost all countries a specific request needs to be made in order to obtain a copy or a subset of the database. Only Scotland and Austria do not require this. In Finland, Lithuania, and Sweden the intended use of the data has to be explained and accepted in order to obtain access to their data. The other countries do not require this. Almost all countries require the requester to identify himself prior to allow access to the data set. England/Wales and Austria do not require this.

Principles for acquiring land register and cadastre data abroad via EULIS service
The client is connected to his national LRC (NS). Via the EULIS service the client obtains data from the chosen foreign supplier's (FS) system:

- LRC data can be requested through a special request, accessible through digital means – in some countries this is the only way to request LRC data;
- FS accepts a request for the acquisition and further use of its data when the intended use fulfils FS's requirements;
- For feeing purposes, and for the decision to accept a request for acquisition and further use of FS's data, the request should be accompanied with the identification of the requester.

4.2.5 National rules for using data acquired from a Cadastre or Land Registry

The use of data acquired for other than public inspection purposes is limited to the contractual provision of the LRCs. All LRCs have means to legally restrict the further use of their data. Some can claim copyright in their data, others database rights, but most can and do claim both. The database rights are a result of the implementation of the EU Directive (EU 1996).

Commonalities and differences between the participating LRCs
Most LRCs offer their data on a take-it or leave-it basis. Lithuania, Netherlands, Norway, and Sweden also leave some contractual aspects open for negotiation. These aspects include price, format of data, and other technical

requirements. The specific use restrictions are very divers among the countries. Most do not allow users to pass on the data to other parties, and require a monetary payment. Some claim an interest in value added products developed through use of land information. Sweden, Norway, and Lithuania use liability waivers. Scotland is the only LRC that does not impose any explicit or implicit restrictions on the use of its data.

Given the wide variety of restrictions, users of the service may be confronted with the following maximum level of use restrictions:

- LRC may require that users cannot pass on the provided data to any other parties without prior consent of LRC;
- LRC may require a monetary payment;
- LRC may waive liability in the contract;
- LRC may claim an interest in any value-added products that the client develops through use of the data;
- LRC may require that its data cannot be separated from products that incorporate land information.

These restrictions are offered on a take-it or leave-it basis. Individual members may have fewer restrictions in place. All other aspects of the contract (format, update frequency, price, etc.) may be negotiated with the LRC concerned.

The FSs are responsible for their data according to their national legislation. From consumer's point of view the data must be equal reliable for foreign users as for national citizens. The service chain should not make the delivered data unreliable. If something happens due to technical or other reasons, the service should be responsible for that. Otherwise the service is not a trustable one. The claims against the data or service are given to the NS. In the service chain responsibilities are decided internally.

4.3 Use of land information and privacy restrictions[1]

The Consortium Members process a variety of data: names of property owners, property address, unique property identifier, price of property, transaction sum, mortgages, and so forth. Some of this data may be characterized as personal data. The processing of personal data is subject to legislation protecting the privacy of natural persons. At this moment, the participants are active in different jurisdictions, and different rules on privacy protection may apply. Austria, United Kingdom (including England, Wales, and Scotland), Finland, Netherlands, and Sweden are a member of the European

1 This section is based on Van Loenen, 2002a.

Union (EU). Lithuania and Norway are not a member of the EU. The EU members are supposed to have implemented the EU data protection directive (EU 1995), which entered into effect on 25 October 1998. This establishes a regulatory framework to ensure both a high level of protection for the privacy of individuals in all Member States and the free movement of personal data within the European Union (EU). The directive minimizes differences between Member States' data protection rules, setting a high level of privacy protection within the EU.

The directive also establishes rules to ensure that personal data is only transferred to countries outside the EU when its continued protection is guaranteed, so as to ensure the standards of protection introduced by the directive within the EU are not undermined. Due to the minimization of the differences between Member States, the Directive did not result in full harmonization of privacy law in Member States; it only provides a certain bandwidth within which Member States may operate (Tweede Kamer 1998, 5). Therefore, different interpretations of the explanation of, for example, the term personal data may exist among Member States, and different rules may apply to the use of personal data. In his study for the EC on implementation of data protection directive, Korff (2003, 12) identified "*mostly only minor variations in the definitions in the laws of the Member States of the terms 'personal data', 'processing', 'filing system', 'processor', 'third party', 'recipient' and 'consent' – but with some minor differences being capable of leading to divergencies in certain special cases, and with some laws adding certain matters which do clearly lead to differences*". However, he recommended "*As far as matters of ambiguity are concerned, it must be made clear whether (or when) not-fully (or not-immediately) identifiable data – such as encoded or pseudonymous data, should always be regarded as 'relating to an identifiable person', or whether this should only be the case if the person processing the data can link the data to such a person (typically, by means of a decoding 'key' or number)*" (Korff 2003, 13). It should similarly be clarified when the use of geodemographical or statistical data etc. is such as to turn these data into "personal data" (Korff 2003, 13).

The EU Directive provides several legitimate reasons to process personal data (article 7 Directive 95/46 EC):

(a) the data subject has unambiguously given his consent; or
(b) processing is necessary for the performance of a contract to which the data subject is party or in order to take steps at the request of the data subject prior to entering into a contract; or
(c) processing is necessary for compliance with a legal obligation to which the controller is subject; or
(d) processing is necessary in order to protect the vital interests of the data subject; or
(e) processing is necessary for the performance of a task carried out in the public interest or in the exercise of official authority vested in the con-

troller or in a third party to whom the data are disclosed; or

(f) processing is necessary for the purposes of the legitimate interests pursued by the controller or by the third party or parties to whom the data are disclosed, except where such interests are overridden by the interests for fundamental rights and freedoms of the data subject, which require protection under Article 1 (1).

EULIS Consortium members of EU countries can process personal data because this complies with a legal obligation (article 7c). This, however, does not imply that the processing of personal data in these organizations is exempted from the provisions of the Directive.

Data transfer to non-EU countries

The non-EU countries do not have to adhere to EU Directives. However, the Directive also applies to data transferred to non- EU-countries. The basic rule is that the data should only be transferred to a non- EU country if it will be adequately protected there (safe harbor countries). Under the Directive, if a Member State's data protection authorities considered a particular set of data is not adequately protected if transferred to a non- EU country, they can block the individual data transfer, but not all transfers of data to the country concerned. The national authorities have to inform the European Commission, which informs all other Member States. If the European Commission and all other Member States agrees that the decision is justified, it will be extended to the EU as a whole (article 25 EU Directive). The effect of the decision to qualify a third country as ensuring the protection of personal data adequately is that personal data can flow from the fifteen EU Member States and three European Economic Area (EEA) member countries (Norway, Liechtenstein and Iceland) to that third country without any further safeguard being necessary. The European Commission has so far recognized Switzerland, Hungary, the US Department of Commerce's Safe Harbor Privacy Principles, Canada, and Argentina as providing adequate protection (EU 2003). Lithuania is not (yet) recognized as ensuring an adequate level of protection within the meaning of Article 25(6) of the EU directive.

However, the Directive provides a number of derogations to article 25 that may enable the transfer of personal data to countries without adequate protection. Article 26 f rules that a transfer may take place on condition that: "the transfer is made from a register which according to laws or regulations is intended to provide information to the public and which is open to consultation either by the public in general or by any person who can demonstrate legitimate interest, to the extent that the conditions laid down in law for consultation are fulfilled in the particular case". This derogation allows for the transfer of EULIS data from EU Member States to third countries lacking adequate privacy protection, including Lithuania.

Commonalities and differences between the participating LRCs

All 'EULIS' countries have legislation in place controlling the use of personal data, and most of them are conform the EU Directive 95/46/EC. All Consortium Members can process personal data because it complies with their legal obligation, or public task. Data from all LRCs can be accessed through object data. For special user groups access through subject is allowed. In Austria, Lithuania, Netherlands, Sweden, and Scotland this applies to government entities, legal entities such as law enforcement agencies, or notaries. In the Netherlands, Scotland, England/ Wales, and Norway access through subject data is provided to anyone subscribing to the on-line service. Special groups also can obtain an overview of all the properties of a natural person. In Norway and Scotland this information is given to all subscribers of the online service.

As mentioned before, most members of the consortium interpret the definition of personal data differently. Some keep it by a general statement that in certain circumstances all data in the LRC's database can be personal data. Others are more specific and mention name and unique personal identifier. Some countries recognize the address of property, the mortgage sum, or the transaction sum as personal data. As a consequence the different interpretations of the explanation of the term personal data have resulted in different policies concerning access to land information among the Consortium Members. The EULIS project identified the following 'privacy' guidelines for their service:

1. For all requesters EULIS should allow access to its databases only through object data. EULIS does not accept requests from this group for overviews of the property of natural persons.
2. For special user groups EULIS may allow access to its databases through subject data, and /or object data. It leaves it to the individual Consortium Members to decide on the specific groups.
3. EULIS can provide a service through Internet for specific requests.
4. EULIS can show through Internet at least the following data: address, property information, and building information.

4.4 Pricing and financing

The accomplished surveys show clearly that there are distinct differences between the participating countries when it comes to cost coverage, i.e. as a result of different models for subsidy and financing. In almost every participating country the prices are set by the State; adjusting the prices is therefore difficult to achieve. This situation is expected to continue in the future and therefore the fixing of the prices for the service will still depend on the individual countries.

The charged rates in the various countries do not vary much for compara-

ble information delivery and are even more similar when the information is delivered in digital format. In the charged rates there is hardly a distinction visible between the types of customers. For specific kinds of information, the charged rates can be very diverse.

Since the project does not aim at changing or adjusting any rules or directives in price fixing, each country will continue to charge as it usually does for its current customers in accordance with existing procedures. The charged rates in each country respectively should be presented as meta-information in the future service.

The mere fact of opening up the price information and making the comparisons evident to the market and the customers may eventually give rise to a pressure on the price levels. As a result of this the conceivable pressure from the customers can be conductive to certain equalization in the future.

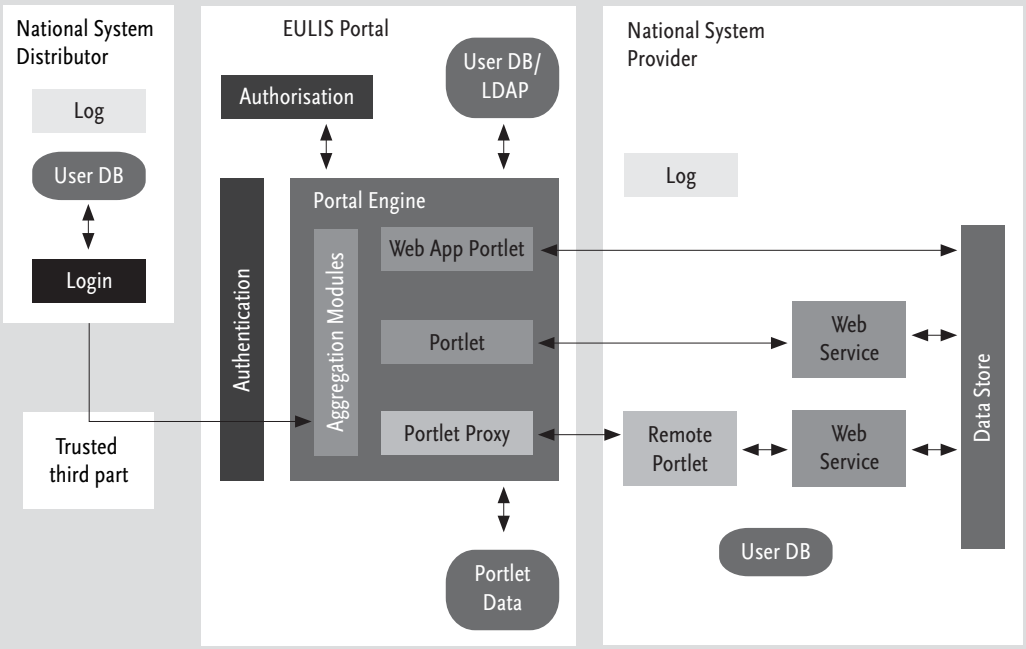
The solution regarding pricing recommended by the project is that every country adapts the prices in such a way that the costs of the EULIS portal can be paid out of the incomes from delivering information (even if there is nobody who uses the EULIS portal). In that way there is no difference in price for any user. The main reason for that is that this will guarantee price neutrality towards the national systems and promote the use of the EULIS service. This will also facilitate the contacts between the land information agencies and the customers. The benefit of this will probably far exceed the influence of the EULIS portal costs on the national system costs.

4.5 Market prospects

Today, most activities based on land information as conveyance and financing are national. If an interested party wants to invest in land in another country, the establishment of partnerships with representatives in the country concerned is needed. The EULIS service will probably not replace these routines, at least not in the beginning, but by providing easily accessible land information, contacts between partners will be facilitated. Furthermore, it will be easier for the party that meets the customer to make early assessments of possibilities in every special case. This will speed up the decision-making process in a tangible and more cost-effective way.

The establishment of a joint European service will also make it easier for national land information agencies to provide land information on the international market. The proposed solution to set up a regulation framework enabling licensed users in one country to access information from other countries and creation of security and billings routines in the EULIS service may also make it easier for the national agencies to get and maintain customers abroad. The primary interest that other countries have shown regarding the EULIS project seems to confirm this assumption.

Figure 4.1 The EULIS Portal



4.6 The EULIS prototype

To realize the ideas of EULIS the technical solution will be a portal. The portal architecture enables a slimmed EULIS system with most of the critical functionality in the national systems, and reasonable maintenance costs for a possible permanent service. It furthers offers different levels of ambition when connecting to the service. The most easy solution is to present the current HTML interface from the national service. This can later on be developed in several smaller steps, making it easier to take care of user demands as they develop. Moreover the architecture is designed to have an adaptable connection to the service for future partners. The functionality of the service can be described as in Table 4.1. The project aims to have a fully functioning demonstrator of the service ready for evaluation by January 2004.

4.7 User group, promotion and awareness

Two reference groups have been established in the project. One consists of customers representing different user categories in each participating country. The user group has been involved in the developing of the demonstrator 2003 and will be 2004. The second group consists of representatives from land information agencies in Europe. They will be continuously informed on the progress of the development work, and also may discuss a possible future permanent service, optionally including the land information of other

Table 4.1 Functionality of the service of the EULIS prototype

Step	User action	System action
1	The user logs in to a national service where he/she already is a licensed user	Authentication and authorization of the user is made in the national system. The only need for accessing the EULIS service is that the user is a licensed user in a national system taking part in the service.
2	The user chooses the EULIS service	Logon to the EULIS portal. In the portal, the national system is considered as a valid user. Information about the transaction (identification of the user) is included for invoice purposes. Access to meta data about registers, legislation and land transactions is provided by the portal.
3	The user chooses origin of information wanted	Logon to the national system concerned. The EULIS portal is a valid user in the different national systems.
4	The user collects the information requested	The national system presents the information through the portal to the user and returns information for invoice.
5	The user is invoiced by the national system	The portal has functionality to keep track of transactions so that payment goes to the right information provider.

countries. Special attention has been paid to how certain legal obstacles can be overcome. The project has been presented at several conferences, meetings and also by articles in press. A great interest for the initiative and the progress of the project work has been noticed.

4.8 Future work

In 2004, the focus will be on developing the prototype of the EULIS service to a fully functioning demonstrator. Demands and needs from presumptive customers will continuously be gathered from the existing reference group. As a preparation for a possible future service, the contacts with other land information agencies in Europe will be intensified. These contacts will also impact the development as the project intends to establish a solution that is possible to adopt and realize with a minimum of efforts for newcomers.

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5 The reuse of public sector information in the EU

Increasing the scope for cross-border exploitation

Yvo Volman

5.1 Introduction

In recent years, national governments throughout the world have started to realize the economic value of their content resources. Slowly but surely, data policies no longer focus on the dissemination of information, but also take into account its potential as basic material for added-value information products and services. Progress in this area is, however, uneven. Different solutions are adopted in the countries that are paying attention to the issue, whereas other countries are only at the very start of dealing with it. This article makes clear the importance of public sector information as a factor in the information market and outlines the recent policy developments at European level. Particular emphasis is given to geographic information, which, in view of its enormous economic value and potential, is one of the main areas of interest.

5.2 What is at stake?

The new tools of the information society have created unprecedented opportunities to combine data from different sources to make new, added-value products and services. This is for example the case for maps. All information traditionally held and represented on conventional paper maps can now be stored and handled in digital form. This development opens the way to applications that go far beyond the simple digitization of traditional maps, for example the provision of location-based services, spatial analysis for urban planning, environmental management, and transport. Whereas in the past the technical barriers presented an insurmountable hurdle to the production of these types of integrated products and services, today technology is no longer the main barrier.

So where does the public sector come in? Within the exercise of its public tasks, the public sector collects, collates, and disseminates huge quantities of information in a variety of sectors. Financial and business information is collected by a number of Ministries and public sector organizations. Company registers (required by law in many Member States) are maintained by the public sector. Legal information (in particular concerning legislation and jurisprudence) and administrative information are pre-eminent examples of public sector information. Patent offices are usually public sector bodies. Scientific, technical, cultural, and medical information is collected extensively by public research institutions and stored in public archives. Geographic information relevant to transport and tourism (maps, road traffic situations) is also available in public sector agencies. Tourist information is gathered and

published by public sector bodies at different levels of government. Part of this information can only be used for its original purpose, but much of it has the potential for reuse in the marketplace and can provide the basis for the creation of added-value services by private companies. In fact, in the information market, public sector information is an important factor. Its economic value has been estimated at €68 billion for the EU (Pira 2000).

In the study 'Commercial exploitation of Europe's public sector information' (Pira 2000), geographic information is singled out as the biggest segment of public sector information in terms of economic value (estimated at more than €35 billion). The definition of geographic information is, however, rather broad, including meteorological information in view of its spatial component. But even with a more limited definition, it is obvious that geographic information is an important resource with a considerable potential.

Combining and aggregating data from different countries will help meet the growing cross-border information needs. Cross-border services will facilitate life for travellers and will help European companies and citizens take full advantage of their rights within the internal market. The internationalization of data services is bound to grow over the next few years with the deployment of services for mobile devices (telephones, and so forth). Third generation mobile technologies will facilitate voluminous data traffic and instant access to enhanced mobile services. Geographic information may play an important part in the further development of the mobile market. Geographic information will facilitate location-based services and help travellers find their way around the world. Indeed, the cross-border nature of mobile data services may be capable of attracting a mass audience. Interest in an information service that stops at the border can be expected to be limited.

In view of the above, substantial benefits can be expected from an extensive reuse of content resources held by public sector bodies in areas such as geographic information, tourist information, meteorological information, statistics, and so forth. Not only will this reuse contribute to economic growth and job creation; it will also increase the choice and quality of service provision for citizens. However, there are barriers that make it difficult to realize the full potential of public sector information for the benefit of the European economy and European consumers. These barriers have led to the competitive disadvantages of the European content companies in comparison with their United States competitors, who reap the benefits of an open legal framework that stimulates reuse.

5.3 The American situation

In the United States, the exploitation of public sector information is facilitated by a clear and simple legal framework consisting of the following elements:

- a strong Freedom of Information Act, ensuring extensive access to government information;
- maximum fees limited to covering the costs of reproduction and dissemination;
- no government copyright: this is explicitly embedded in the US Copyright Act;
- no restrictions on exploitation and reuse.

This picture is valid at the federal level. At state level, however, the situation is less straightforward. Each state is capable of exercising copyright and charging (re-)users for the information resources; several states have already exercised this right on several occasions.

The basic idea of the American federal model is clear: the government makes broadly available all the information it collects when executing its public tasks. The content industries add value to this raw material to sell information products or services. The added value has to be good enough to persuade users to buy the products or services; otherwise, they will simply go to the government source where they can obtain the information free of charge. This framework has led to substantial economic activity based on public sector information resources. In fact, estimates indicate that the United States market based on public sector information resources may be several (possibly five) times the size of the comparable European market (Pira 2000).

5.4 Different traditions, different rules

The Member States of the European Union all have different administrative traditions, frequently dating back centuries. In line with these traditions, each country has developed its own ways of handling information flows. Consequently, the various administrations react in different ways to requests for the commercial reuse of their information resources. Even where there is a central policy, it will in any case vary widely from one country to another. Sometimes policy is left to the local and regional levels, or public sector bodies. These organizations make up the rules on a case-by-case basis; they look for a pragmatic balance between public tasks and public financing on the one hand and the commercialization of data resources on the other.

As a result, it is very difficult to make pan-European data products based on public sector information. An entrepreneur seeking to set up a service which covers all the Member States would have to contend with all the different rules and practices that prevail in all the different countries. And in some cases there may not be any clear rules or practices. Finding out what information is available for reuse and under what conditions it may be reused on a cross-border basis is difficult. A set of common rules that gave entrepre-

neurs a minimum level of legal security with respect to what they might expect in all the different countries would greatly improve this situation. Practical tools such as online licences and asset lists available online could form part of a raft of measures capable of improving the conditions for cross-border reuse.

Next to the element of uncertainty, several questions related to fair competition and a level playing field are also relevant here. Public sector information has a considerable market potential and is an important factor in the information market. Public sector bodies often have a natural monopoly over these information resources. This monopolistic position can only too easily lead to the temptation to maximise the short term revenues of certain datasets without giving due regard to the need for fair competition and the optimal use of the data for society as a whole. A public sector body could, for example, be tempted to levy high charges for access to information, or its reuse, or to grant exclusive deals. These deals may have short-term advantages, since they guarantee a stable income for a certain period, but at the same time they prevent others from obtaining the information under the same conditions. There are consequences for the possibility of establishing cross-border information products. If access to a specific dataset is 'restricted' in a certain country, making a truly pan-European product will not be possible. This barrier could be a disincentive to investors, given that pan-European products and services with geographical holes may not be among the most credible.

Furthermore, there is a risk of cross-subsidies to the commercial activities of a public sector body. Where these occur, the commercial activities are in fact sponsored, with information produced through public funding and within the public task. An example of this type of cross-subsidy is the preferential use by the commercial arm a of public sector body of a big database produced within the public task. Such use can lead to considerable market distortion. In an environment that is becoming increasingly international, this type of cross-subsidy can have serious negative effects on the European market.

But the issues at stake are not only of a legal nature. Examples of other barriers are the absence of common principles for storing and describing the information, or the lack of experience with public/private partnerships. In fact, there is at present no culture within the public sector of systematically taking into account the possibility that information resources could be reused. It will take some time before such a culture develops throughout Europe; when it does, life will be easier for potential reusers, including those from other countries.

Another highly relevant issue in this context is the language factor. The linguistic diversity within the European Union constitutes one of its riches, but at the practical level it also presents a number of challenges. Public sector bodies produce their information in the first place for a national audience

and often their information will only be available in the national language(s). This national preference has an impact on reuse, because finding one's way through the public sector information coming from another country without employing a native speaker will be difficult. In addition, the language barrier has consequences for the development of cross-border products and services. No European enterprise has immediate access to a market of 370 million customers all speaking the same language, or sharing the same consumer habits. The costs of developing a service will obviously be higher if a firm aims to make a service available to all its customers in their own language. In that respect, American firms have an advantage over their European competitors, given that the natural initial market is more homogeneous from a linguistic point of view.

These issues form additional barriers to the creation of pan-European information services based on public sector information; they also contribute to the challenging nature of the task. The measures recently taken at the European level aim to facilitate the cross-border use of public sector information and improve the opportunities to reuse this information for the benefit of the European economy and European citizens.

5.5 *e*Europe 2002: Creating an EU framework for the exploitation of public sector information

The idea of ensuring better conditions for the exploitation of public sector information and improving the relationship between private and public players in the European information market is not new. In 1989, the Commission services had already issued a set of guidelines on the exploitation issue (CEC 1989). In practice, however, these guidelines have had little impact.

A specific initiative on geographic information was taken in the mid-1990s, when the GI2000 initiative was launched. This initiative aimed to establish a policy framework for a stable, European-wide set of agreed standards, procedures, guidelines, and incentives for creating, updating, and using geographic information. The mapping agencies and market players deliberated on a draft Commission Communication of geographic information from 1996 onwards, but it was never adopted. Instead, geographic information was dealt with in the broader policy debate on public sector information.

In January 1999, the Commission published a Green Paper *Public sector information in the information society* (CEC 1999). The Commission launched a broad consultation round, with discussion meetings in practically all the Member States, presentations to other interested Institutions, and a public hearing. The Green Paper dealt with issues relating to both access and reuse concerning public sector information; numerous replies were triggered. Comments

came from government bodies, citizens' organizations, semi-public bodies, industry, and individual specialists and ordinary citizens. The geographic information community was particularly active in the discussions. The importance of the topic was widely recognized; a clear consensus evolved that action should be undertaken to take advantage of the new technologies to improve access and exploitation with regard to public sector information. In their response, the information industries sent a strong signal that they would like to see forceful action (legislation) to improve the conditions for the reuse of public sector information throughout Europe (CEC 2001a).

As a follow-up to the Green Paper, on 23 October 2001 the Commission adopted the Communication '*e*Europe 2002: Creating a EU Framework for the exploitation of public sector information' (CEC 2001b). The Communication built on the discussions centred round the Green Paper and the replies the Commission received after its publication; it sets out the EU strategy in relation to public sector information. The title of the Communication immediately indicates that actions in this area are part of the broader initiative to stimulate the information society, structured in the *e*Europe action plans. Their aim is to accelerate the development of the information society in Europe and to ensure that its potential is available to everybody. Particularly relevant in this context are the chapters in favour of European digital content and those aiming to improve the online delivery of information and transaction services by governments. Indeed, at the *e*Government Conference in Cernobbio on 7-8 July 2003, Ministers committed themselves to these objectives and invited the Commission to enhance its activities in the area of public sector information.

The 2001 Communication outlined the actions that the Commission was to undertake to improve the conditions for the reuse of public sector information throughout Europe. In addition, the Communication gave the basic orientations of the Commission on a number of key issues, such as transparency, non-discrimination, and the charging principles. The Communication paid particular attention to geographic information as a key sector within the public sector information arena.

The actions described in the Communication are of a legislative, financial, and organizational nature. They give consideration to the legal issues, but at the same time stress the importance of measures that help catalyse developments with European-wide impact, making use of existing financing programmes. The communication also underlined the need for a more extensive exchange of good practices that would enable the Member States and their public sector bodies to learn from experiences in other countries. It is important to consider the different measures together. They form a package in which the various elements reinforce each other. Project financing would lose much of its force without measures dealing in more general terms with the conditions for reuse. Furthermore, the projects can contribute significantly to

the goal of facilitating reuse by showcasing examples of successful cross-border use of public sector information.

Examples of co-funding opportunities for the geographic information area can be found in the research programme and in the *e*Content programme. Through the Information Society Technologies (IST) programme, more than 50 research projects related to geographic information have been funded, contributing to the provision of tools and innovative applications. In addition, under the IST programme, a set of support measures was launched that shares the objective of the definition of a technical and policy framework for geographic information in Europe. There are further opportunities in other Community programmes (non-research) to obtain co-funding for activities related to geographic information. An example is the *e*Content programme; several of the projects co-funded under this programme deal with geographic information.

Another recent initiative that is relevant for the geographic information sector is the INSPIRE initiative. Its first objective is to make harmonized information available for the purpose of the formulation, implementation, and monitoring of Community environmental policymaking. INSPIRE therefore concentrates on the Commission's mission in the environmental field. However, the initiative's second, long-term objective is to ensure a broader cross-sector approach to geographic information. Vanderhaegen and De Groof provide in chapter two of this book an in-depth inside in INSPIRE.

5.6 The proposal for a directive

On 5 June 2002, the Commission adopted its proposal for a directive on the reuse and exploitation of public sector documents (CEC 2002). This proposal was preceded by a public online consultation, highlighting a number of issues. These issues were related in particular to the balance between intellectual property rights and possibilities for reuse, to the scope of the initiative, and to the economic potential of public sector information. The reactions to the consultation came from reusers (industry) and from the public sector holding the data, but also from interested 'neutral experts' such as prominent academics. The comments clearly showed the need for action; industrial reusers reiterated their request for it. Some of the public sector organizations, on the other hand, expressed their concern about the possible consequences of the measures for their revenue streams.

The reactions were taken into account in the Commission's proposal for a directive. It is firmly rooted in the political orientations adopted by the Commission in the 2001 Communication. The proposal is based on article 95 of the EC Treaty, dealing with harmonization measures in the internal market. The concentration is therefore on the market aspects of the reuse of informa-

tion; the issue of access to information is left aside. This characteristic is important: the proposal does not have the character of freedom of information legislation, regulating the access rights of citizens, but deals with situations where public sector bodies influence the market by selling information, or by making information available to market players. The proposal is based on the main pillars of the internal market: fair competition and transparency.

More transparency should be reached by the obligation for all public sector bodies to publish their conditions for reuse. This obligation would allow European operators to obtain information on the datasets available for reuse in the various countries and the conditions for reuse. Transparency of the conditions would facilitate a first assessment on the feasibility of a cross-border product or service based on public sector information. The transparency requirements of the directive also deal with a clarification of the procedures that apply when a company submits a request to reuse information. Clear procedures with fixed deadlines and facilitated by the use of online licences should avoid long waiting times and create a more favourable environment for reuse.

Fair competition is in the first place enhanced by a non-discrimination principle stating that any applicable conditions for commercial reuse shall be non-discriminatory. The logical consequence of this principle is a prohibition, also spelt out in the proposal for a directive, to have exclusive agreements based on public sector information. As we have seen above, exclusive arrangements could in practice hamper the establishment of pan-European products and services and should therefore be avoided. These measures are complemented by a limitation of the opportunities to cross-subsidize the market activities of a public sector body by its publicly-funded activities. If a public sector body uses documents as input for its commercial activities, and these fall outside the scope of its public tasks, then it must be subjected to the same charges and conditions that apply to other users.

In addition, fair competition and transparency are served by the upper limit to the income generated on the basis of this information. The proposal recognizes that several public sector bodies have to finance part of their activities by selling information. The full recovery of the costs for producing, reproducing, and disseminating these documents are therefore allowed, together with a reasonable return on investment. This upper limit is high enough to guarantee the continuity of data production in cases where public sector bodies are partly self-financed (which is the case for some of the mapping agencies, for example). At the same time, the proposal is expected to lead to more transparency in the way charges are calculated and the elimination of cases where the public sector bodies make considerable profits on the basis of information resources (a database, for example) produced within the exercise of public tasks. The upper limit for charging in no way prevents a Member State from applying lower charges, or no charges at all. In an extension to the

proposal, it is even suggested that Member States should encourage public sector bodies to make documents available for reproduction and dissemination at marginal (or even no) costs.

So what benefits can reusers expect from the proposal? The directive will lead to a minimum of legal security throughout the European Union for companies that want to engage in the cross-border exploitation of public sector information and will even out the level playing field in the European information market. It creates a minimum set of rules that leaves Member States the opportunity to take measures that are more favourable to the reuse of information. If Member States wish to allow reuse at no charge and without imposing any conditions, they are perfectly free to do so. Of course, the minimum requirements in relation to transparency and non-discrimination, among other things, would also apply fully in these cases. The proposal will lead to 'first time' legislation in a number of countries that have yet to deal with the issue and will speed up developments in countries that are considering the issue, but have not yet finalized legislative proposals. The proposal should stimulate the front-runners in this area to have another look at the specific modalities of their system and improve on them where necessary.

In several respects, the proposal for a directive does not go as far as the regulations that apply in the United States. Nevertheless, in one respect the directive goes further than the American system: all levels of government are concerned, be they national, regional, or local, whereas the regulations in the United States only apply at federal level. Public sector bodies at regional and local level often hold important content resources. Much of the traffic and geographic information is collected and processed locally or at regional level. Through the directive, this information will be made more readily available for reuse.

5.7 The inter-institutional process

After its adoption by the Commission, the proposal for a directive was sent to the other institutions involved in the law-making process. The proposal has gone through the co-decision procedure, in which the Council of Ministers and the European Parliament adopt EU legislation jointly and on an equal footing. Positive opinions were given by the Committee of the Regions on 21 November 2002 (EU 2002a), and by the Economic and Social Committee, representing the interests of European civil society, on 11 December 2002 (EU 2002b). The latter indicated, however, that the Commission proposal could with benefit have been more ambitious.

The co-decision procedure may involve several readings by Parliament and by Council; this has indeed been the case for this proposal. In line with article 251 of the Treaty, describing the procedure, Parliament is first to give its opin-

ion and propose amendments to the original Commission text. The position of Parliament in first reading was prepared by the Committee on Industry, External Trade, Research and Energy that, on 28 January 2003, proposed a number of amendments going considerably beyond the Commission text, in particular in relation to the article concerning charging (EU 2003a). However, only some of these amendments were retained by the Plenary Session on 12 February 2003 (see CEC 2003).

In the meantime, Council had undertaken preparatory work, and on 27 March 2003, the Ministers for Telecommunications unanimously reached an agreement on a text that, although proposing a number of technical changes, was still relatively close to the original Commission proposal. This text was adopted formally as a common position of the Member States on 26 May 2003 (EU 2003b).

Given that Council did not take on board all the amendments proposed by Parliament, the text was sent back to Parliament for a second reading. Negotiations between Parliament and Council led to a raft of amendments that was adopted by the Plenary Meeting of Parliament on 25 September 2003. The main points of the agreement were an obligation for the Member States to ensure that practical arrangements were in place to facilitate the search for documents available for reuse, and an obligation for public sector bodies to indicate on request the basis for the calculation of their charges for reusing their data. These amendments were formally accepted by Council on 27 October 2003. This paved the way for the formal adoption of the directive within the deadline set by the Heads of State and Governments in the conclusions of the 2003 European Spring Council. From the moment of its publication in the Official Journal of the European Union, Member States will have 18 months to incorporate the directive into national law.[1]

5.8 Conclusion

Public sector information is an important component of the European information market. An extensive reuse of this information resource could benefit the European economy and the European consumers considerably. The European Commission has adopted a series of measures to deal with the barriers that at present hamper the reuse of public sector information throughout Europe. In addition to project financing and a consistent exchange of good practices, the European Commission proposed a directive that was agreed upon on 27 October 2003. These legislative and non-legislative measures

1 The directive was published in the official Journal of the European Union of 31 December 2003 (Directive 2003/98/EC, OJ L 345/90).1

should together create better conditions for the exploitation of public sector information in Europe and stimulate the cross-border use of this key information resource.

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6 National spatial data infrastructure in the Netherlands

Legal & economic issues and developments

Bastiaan van Loenen & Bas C. Kok

6.1 Introduction

The digital era has significant impact on the way we do business. Information technology enables government to disseminate data in an inexpensive way and bring services closer to citizens and businesses. Access-to-government-data policies are important for the existence and successful use of data, and for the success of the Spatial Data Infrastructure. The increasing need for spatial datasets has led to the insight that the access policies in the Netherlands vary from government agency to government agency. Therefore, access to and availability of government data is a well, and long discussed topic in the Netherlands. This, however, does not imply that at present there is one uniform, or harmonized access policy for all government data. In this respect European directives are important means for the harmonization of the data policies in the Dutch' spatial data infrastructure. This paper will provide the legal setting in which the access to government information discussion takes place in the Netherlands and will discuss the electronic government program with regard to geographic information.

6.2 Background information

The Netherlands covers 41.000 square kilometers, with a population of about 15.9 million. The Netherlands consists of 12 provinces, and 489 municipalities. The population density is 420 people per square kilometer. The Dutch GDP is roughly $283 billion. According to the IDC/ World Times Information Society Index 2000, it is one of the most developed countries in the world wide information society (seventh) (IDC 2001). Further, the Netherlands is ranked as number 5 on the Human development index of the UNDP (UNDP 2003, 245). There are 8.5 million mobile telephones (2001), and almost 10 million (2002) people use the Internet.

Recently, the Netherlands has faced two national elections within one year. In 2002, a conservative cabinet replaced the central-left cabinet. In the beginning of 2003, the current central-conservative cabinet was appointed. These changes in parliament resulted in postponement of decisions for many issues, some of which had a direct relation to the Dutch National Geographic Information Infrastructure (NGII).

6.3 NSDI building blocks

The responsibility for the collection, utilization and supply of core geographic information is, for most geographic information, in centralized government agencies. The Cadaster isresponsible for parcel data, the National Mapping Agency (Topografische Dienst) formiddle and small scale topographical data, and the CBS for statistical data. Building information and the maintenance of the population registers is a task of the municipalities. The local chambers of commerce maintain the corporate entity register. The Large Scale Base Map of the Netherlands (1:500, 1000, 2000) is a Public Private Partnership of the Cadaster, the utilities, the municipalities and the water boards. The cadastral data, the topographic data, and the large-scale base map are ubiquitous and available in digital format.

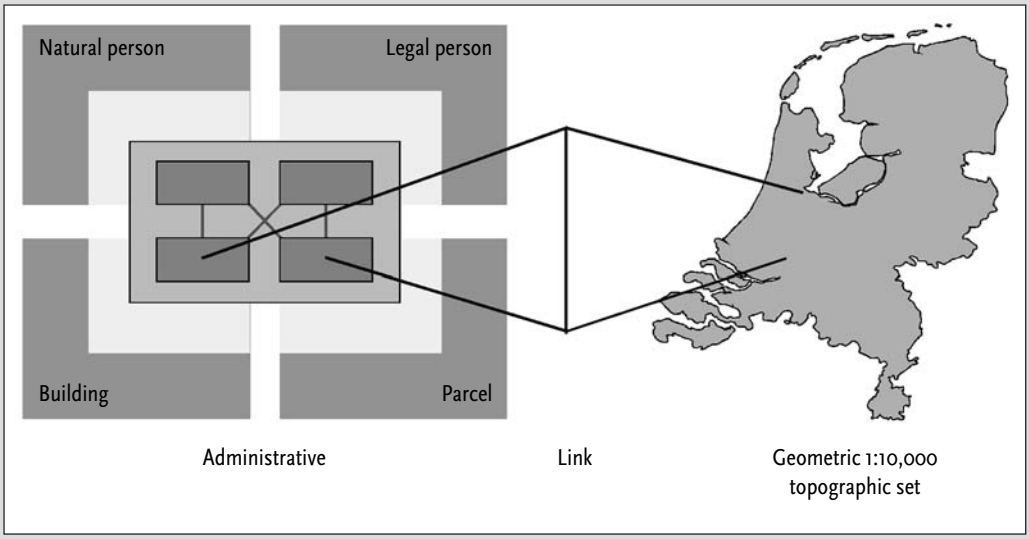
The Minister of Interior was appointed in the Decree IVR 1990 (BiZa 1990) as the principal co-ordinator of information supply with the task to co-ordinate useful developments of government information supply. The role of the Minister of Housing, Spatial Planning, and Environment (VROM), as co-ordinator for the geo-information sector, was also formally confirmed. The Minister of VROM asked the official advisory committee on land information, to 1) investigate the current and desirable organisation of the land information supply in the context of effective and efficient use of information technology, 2) to assemble the tasks of the existing organizations, data and data flows, and 3) to propose a plan of action to promote the development of the land information supply.

Ravi (1992), the now-called Netherlands Council for Geo-information, developed the national 'Structure Outline for Geo-information', which was approved by the Dutch Council of Ministers in the same year. Between 1993 and 1996 this Outline developed into the NGII. The main target of this vision was to increase the compatibility and exchange between the main core data sets (land parcels, people, companies and buildings). The NGII and e-government processes are based on this concept of core data – data that many people and organizations need to meet their organization's objectives. This core data concept is similar to the United States Federal Geographic Data Committee's Framework Data Concept. The following core administrative data sets have been realized:

- land parcels in the Cadaster (100% digital);
- natural persons in the Automated Municipal Population Records (GBA, 100% digital);
- companies in the Chambers of Commerce registers (Handelsregister, 100% digital).

The core data set for buildings has partially been developed in a tax-law for the assessment of real estate and will be further developed. Two nation wide core topographic data sets are:

Figure 6.1 Structure plan land information (1992)



Source: Ravi

- Large Scale Base Map of the Netherlands, a 1:500/1,000/2,000 base map (GBKN, 100% digital). This data set is financed by all the Dutch municipalities, the Dutch Cadaster and the joint Dutch utility companies and Dutch telecom. The production costs amount to $400 million. Additionally, the GBKN costs annually about €27 million (K+V 2001).
- Top 10-Vector data set, a 1:10.000 core database made by the National Mapping Agency (100% digital). The small-scale topographic data set will be set up in cooperation with the joint departments and will be used for decision making purposes. The main users agreed on this approach. Ravi estimated a benefit for government in avoiding double collection of data for a total amount of $23 million and $3 million keeping this data set up to date.

Some of the relationships between these core data sets have been realized, while others are subject to study. The extent to which these core datasets may be used depends on the applicability of legislation restricting or enabling the use of the data. Copyright, database legislation, and privacy legislation restrict the use of the data. Open access laws like the government information act may promote the use.

6.4 Copyright and database legislation

Copyright

Copyright in the Netherlands can be imposed when a work is original and shows the personal view of the creator of that work (*oorspronkelijkheidsvereiste*). The copyright act does not make a distinction between private parties or government; both may impose copyright on their information. The only condition is that the government has to reserve the right specifically and a

copyright sign (©) has to be placed on the work (Pluijmers 1998). Many government producers of geographic data sets impose copyright on their data. Copyright extends for the life of the author plus 70 years or 70 years for corporate created works.

Due to their factual and standardized character, geographic information often does not meet the requirements of originality required by copyright (De Jong 1998). However, common law shows that geo-information with a personal view can be protected by copyright (De Jong 1998). This is true for example for topographic maps: the generalization, use of colours and symbols may represent a personal view of how the data is represented on a map. In the Netherlands, about 80% of all public sector data sets is used by other public sector bodies. Seventy percent of the public data copyright is reserved (BDO 1998).

Database legislation

In 1999, the Dutch parliament implemented the European Directive for the Legal Protection of Databases into national legislation (Databankenwet 1999). The law protects the producer of a database, expressing that there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of the contents to prevent extraction and/or re-utilization of the whole or of a substantial part, evaluated qualitatively and/or quantitatively, of the contents of that database. The law can be described to protect 'sweat of the brow', to protect invested time, money and effort. The law grants the producer two rights. He has the right to grant permission both for downloading, printing and copying (parts of) the data set as well as for making a data set available to the public by dissemination, renting, online transmission etc. The new law offers protection for 15 years, but every time the database is updated, a new 15-year period starts. The law does not exclude government agencies from imposing this right. Government however, has to explicitly reserve the right. Most government agencies supplying spatial data claim database rights in their datasets.

6.5 Privacy

In 2001, the Dutch parliament implemented the Directive of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data into national legislation (Wbp 2001). The 'privacy' law is of great importance for the use of geo-information. The directive restricts the use of data on natural persons. Although geographic data primarily focuses on objects and not on natural persons (subjects), and even might be presented in an anonymous way, an operator can often easily relate these data to natural

persons (De Jong 1998). This is due to the use of land identifiers (De Jong 1998) (address or cadastral identification code). In most cases the law concerning privacy protection is therefore applicable to geo-information. As a guideline the Dutch parliament decided that if data is important for the way a natural person is treated in daily life, it has to be considered data on natural persons, and therefore the law applies to that data. Although the criteria might be ambiguous for some geographic data (e.g., area of a parcel), the law does apply for ownership data and data presenting the value of geo-information (e.g., taxation information). The Dutch Data Protection Agency (College Bescherming Persoonsgegevens/ Registratiekamer) has decided that data on zip-code level (6ppc) should not be considered data on natural persons.

If the law applies to a dataset, then the purpose of data collection and further use of the data have to be specified. The purpose of collection and further use should already be defined before the start of the data collection, and it should be enforced during each step of future processing until the moment the data are destroyed. This requirement may cause various difficulties for the geo-information sector, since one of the main targets of the geo-information infrastructure over the last decade has been to develop core data sets, aiming at multipurpose use and exchangeability of data (De Jong 1998). The way the law on privacy protection will influence the various sectors in society, like the geo-information sector, however, is yet unclear. In any case the law does no longer make a difference between government and private organizations. Furthermore, it no longer creates legal exemptions for certain law based data sets like the registers at the Cadaster. The new law is effective since 1 September 2001.

6.6 Access to government information

Government anticipates on the following categories of government data:

1. laws, jurisprudence, and policy decisions. These data are excluded from copyright and the database legislation (article 11 Auteurswet, article 8 Databankenwet) and may be freely accessed through www.overheid.nl;
2. information subject to the Government information act (Wet openbaarheid van bestuur);
3. other information (electronic databases) within government.

Information subject to the Government information act

The main objective of the Government information act is to promote the participation of citizens in the democratic process. The law provides for access to information that is considered crucial in the decision making process of the Administration. It concerns data related to administrative affairs, i.e. data used in the policy making process, including the preparation of policy, the

actual policy document and the data needed to execute the policy. Data concerning the national security, and the security of the Crown, among others, cannot be requested under the Government information act. The price to be paid for this type of government information is based on the marginal cost of dissemination (i.e., 10 cents per copy).

Other information within government

This category includes data that is most interesting from an economic perspective: electronic geographic datasets. The answer to "May a private citizen or business acquire an entire geographic dataset produced by a Dutch government agency?" is typically "no". Government agencies can claim copyright, or database right in their data and most of them choose to do so. Further, this data is used only partially in most administrative affairs. According to the current interpretation, the Government information act does not apply to complete databases, and therefore it is reasoned that it cannot be obtained through a Government information act request.

In 2000, the commission 'Constitutional rights in the digital era' (Franken 2000) recommended to change the goal of the Government information act from 'controlling government' into 'the public right to access government information'. Government information has become vital for citizens in daily life: citizens should have the right to access (paper or electronic) public data. Some exemptions may be made by law, for example for reasons of privacy. The parliament agreed with this new perspective "the more people use information, the higher its value for society" (TK 2000a). The constitution needs to be changed to introduce this recommendation. It is unclear whether the current parliament is willing to change the constitution, and implement the recommendations of the commission Franken.

6.7 Commercialization of government data

The memorandum *Towards accessibility of government information* by the Ministry of the Interior in 1997, really started the discussion on the commercialization of government data in the Netherlands (Kohnstamm 1997, and TK 1997b). Until then the ease of access to government data sets for the business community was hardly a point of structured discussion within the geo-information sector. The memorandum attracted increasing attention because of the explicit elaboration on the Report of the Commission Cohen 'Market and Government' (Cohen 1997, and TK 1997a). The Ministry of Economic Affairs presented this report, aiming at open markets and deregulation. The report stated that in general activities of governmental bodies oriented towards the market should be terminated. Governmental bodies should restrict themselves to their public tasks. Following this proposed policy, the Ministry of

Interior formulated its goals for better accessibility of governmental electronic data sets for the benefit of the business community. It was expected that in doing so the development of new information products as well as economic growth, would be stimulated. Other political decisions followed. The current situation for the geo-sector may be summarized as follows:

- Government agencies must execute their public task and collect data when this is necessary to fulfill this task.
- Government agencies should not perform activities that can be performed by the private sector. An exemption exists when this 'market' activity is considered to be a public task. If government agencies compete with private parties, this must be on an equal and fair basis: equal access and availability to the core datasets for all competitors, including the own organization.
- When the private sector cannot or does not want to add value to a public data set that may be of great importance for society, the responsible Minister may decide that a government agency may add value to the core dataset in order to make it better accessible.

A new law was initiated in 2001 to formalize the above (TK 2001). However, due to the new political priorities this initiative was formally cancelled in 2003 (EZ 2003). It is now foreseen this issue will be addressed in the Competition Act (mededingingswet), the Municipalities Act (Gemeentewet) and the Province Act (Provinciewet) (EZ 2003).

The EU Directive on the reuse and commercial exploitation of public sector information is expected to provide the legal framework for the commercialization of government datasets (EU 2002). This Directive does not have major implications for the current situation in the geographic information sector.

Pricing

The discussion concerning the provision of information and possible commercialization started in 1997 with the memorandum *Towards accessibility of Government information* (Kohnstamm 1997, and TK 1997b) and is ongoing. Since the mid 1980s cost recovery has been the leading principle applicable to data supply by Dutch government bodies to third parties (De Jong 1998). In the public sector a general tendency towards self-financing and thus cost-recovery is becoming evident (Berends 1998). Therefore legislation has been drawn up, for example the Land Registry Act, which states that the Cadaster must be fully (100%) cost recovering. The National mapping agency has to recover more than 40% of the costs (TK 2003c, 3). However, in 2000, the Netherlands advanced a policy line to reduce or eliminate pricing for data deemed essential for broad public use. In 2000, the Secretary of Interior presented new guidelines on the access of public sector information in the Netherlands. This memorandum *Towards Optimal Availability of Government Information* (TK

2000b) promotes the availability of government information by stating that all government information should be disseminated at a maximum of the cost of dissemination. Government information with its own pricing mechanisms, like cadastral information, is not subject to these guidelines. The policy also does not apply to data sets for which the policy line would result in financial problems for the supplier of the data, like the data sets of the National Mapping Agency and some data sets of municipalities (taxation data). In this respect, Ravi suggested to allow the geographic information sector to facilitate access to geographic data prior to a formal arrangement (law). The Minister welcomed this recommendation of self-regulation for the geo-information sector. It is unclear whether the policy line remains a priority within the new Cabinet.

The EU Directive on the reuse and commercial exploitation of public sector information will provide the legal framework which allows government to charge the cost of producing, reproducing and disseminating the data, together with a reasonable return on investment (see EU 2002).

Liability

Research by Ravi showed that practically all the government suppliers of geographic data decline to accept any form of liability, including liability for damage arising from faults in the data set, as well as damage that has been caused by wrongful use (see Berends 1998). This indemnity from liability is explicitly laid down in contracts. Statistics Netherlands accepts liability for faults in the data supplied. For cadastral data, law has regulated the liability. The Cadaster accepts liability for faults in the data supplied.

6.8 The availability of geographic data sets and their limitations in use

Berends (1998) explored the practices of the geographic information sector with respect to the availability of spatial datasets. Here, the relevant findings of that study are summarized. He found that only a minority of government organizations offers their complete spatial data sets to third parties, e.g., the Cadaster, DLO-DC and several provinces. Further, government geographic data sets are not always, by definition, available to third parties. This can be because of the policy of the administrator. A number of organizations indicated that some managers would rather reserve data sets for internal use and not make them available to third parties. In a number of cases, organizations are extremely reluctant to supply data sets. The external use of data sets can be inconvenient and threatening, 'inconvenient', for instance, regarding the work and the after-sales responsibilities that selling data sets can entail. The external use of data sets is regarded as being potentially 'threatening' if the

information is used for political decision-making or for 'checking up' on the policy of government bodies.

The same research showed that if government supplies spatial data sets to third parties, resale is forbidden in the supply contract. In general, the user is licensed to use the geographic dataset. The contract often limits the use to a certain task, a certain project or to use within an organization.

Government suppliers provided four reasons for the restrictions on resale. The first reason concerns business economics. When a supplier sells data sets and a customer provides, free of charge, or resells that data set, this limits the market for the original supplier. Further, government wants to keep control over the use of the data sets and prevent improper use of the data sets for example use of the data sets for objectives that are not in the interest of the organization.

Moreover, secrecy can limit the supply of spatial data sets. The ministry of Housing, Spatial Planning, and the Environment (Ministerie van VROM) has classified data sets containing information concerning offences against the environment. Also fiscal information in the framework of the Valuation of Real Estate Act (WOZ), is classified. In a number of cases, micro- data, in connection with the protection of privacy or company interests, is not made available. Examples of this are, company data in possession of Statistics Netherlands, data about agricultural companies registered by DLG Service for Land and Water Management, data from the Emission Registration of DGM and land exploitation data from the local authorities. However, in a number of cases, these data are accessible through a request through the Government Information Act.

Finally, the availability can be limited because the supply of data would not be in the interests of the organization in question. For example, an insight into the data concerning the acquisition of land by the local authority could lead to undesirable speculation.

Following is a list of some findings of a survey performed by the State Secretary of Interior Affairs on the nature, number, and use made of public sector data (BDO 1998):

- Approximately half of the files are used by other parties.
- 80% of that use is by other public sector bodies.
- Copyright is reserved on files provided to third parties in 70% of those cases.
- In all cases, care is taken to ensure protection of data relation to personal privacy.
- More than 70% of the files made available are provided free of charge. The remaining 30% are charged, sometimes in part and sometimes in full.
- Then files are provided, conditions for use are set in 60% of the cases. These conditions are mostly concerned with internal use and restrictions to ensure that data is used only for the aim the data set has been collected for.

Results of access policies on pricing and availability of geographic data
The overview above shows that the lack of consistent national guidelines of pricing and/or availability of government information has resulted in fragmented policies among different datasets or suppliers, varying from open access with no fee and no use restrictions to very restrictive policies.

6.9 Mechanics of access

Technically access to the data sets is being provided through the establishment of National Clearinghouse Geo-information (NCGI), an electronic metadata information desk. The clearinghouse provides a means for finding available data set, public and/or private, via the Internet. At the moment the NCGI provides only metadata, free of charge, contained in a central database. The data sets themselves are contained at the owning organization such as government agencies, or provincial and local authorities.

Organizationally spatial data are being made available through cooperation between parties within the Ravi by coming to agreements and consensus on how to make the data sets available. Its founding members, the Ravi and the Ministry of Housing, Spatial Planning and Environment, financed NCGI until 2000. Between 1997 and the year 2000 e1.5 million – not including costs for metadata and conversion – have been invested in the project.

Since 2001, the NCGI has become a non-profit organization, for which the private company Geodan was 'hired' to run the NCGI. Geodan's responsibilities are, however, without compensation.

6.10 Electronic government

In 1998, the Ministry of Interior proposed an E-Government Action Program for the nation. The program was approved by the Parliament for implementation government-wide. The geo-information sector in the Netherlands played an important role in the development of e-government. Two major e-government initiatives are Public counter 2000 and authentic registers

Public counter 2000
In 1996, the services of municipalities to citizens were characterized as fragmented. In order to provide better services to citizens, a special bureau was created by the Dutch government to initiate the integration of the public services from the perspective of the citizen, and for using the Internet as the new way of communication between the front desk and the back office. The major emphasis of Public Counter 2000 was on customer demand patterns. Examples of citizen demands include: moving to a new town, starting a busi-

ness, building a house, and finding a home for senior citizens. To do this effectively, this requires the integration of many separate government services, and the separation of front and back office.

In the pilot phase of this program, physical and virtual counters were introduced in 15 municipalities, each having one of three pilot public counters: a counter for buildings and housing, a counter for enterprises, or a health and welfare counter. The projects did not provide services of national government agencies or ministries. The lack of a consistent overall legal system was considered as a big impediment.

The geo-information sector provided the public geo information desk as a part of the Dutch e-government program. For the housing and building counter, integrated services are delivered from the Dutch Cadaster in combination with the delivery of building permits and other public provincial and municipal limitations on zoning and construction by municipalities. This counter was set up in cooperation with the Department of Housing, the Dutch Cadaster, the Municipalities, the Dutch Building Societies, Brokers and Dutch Notaries. This counter also gives an overview of the possibilities on subsidies for citizens for renting houses by the Department of Housing.

A second successful approach is the counter of businesses, which should decrease the administrative burden of businesses to meet customer needs. In 2002, almost all enterprises in the Netherlands are able to communicate electronically with tax authorities, social security, the insurance sector, and the chambers of commerce for starting a new business and to make transactions.

In 1999, the Dutch government opened a one portal-website, which offers access to all levels of departments, administrations, municipalities, provinces, agencies and other public institutions (www.overheid.nl). Electronic service delivery in the Netherlands is already manifest in the Dutch banking and insurance branch. About 75% of the annual income tax-forms were filled out electronically in 2003 (over the fiscal year 2002) and vehicle-tax-registration can also be done on-line. Also a change in the Land Registry Act is scheduled, to allow the electronic delivery of a copy of the notarial deed (a legal document) to the Cadaster.

Authentic Registers

An important part of the Action program for Electronic Government was the streamlining core data set program (TK 1998). The Streamlining core data set program recognized that although the core geographic data is important for many different operations in the Netherlands, additional measures need to be introduced to assure the quality, consistency and currency of data for several critical data sets. It was proposed to do this through the concept of Authentic Registers.

The model for Authentic Registers is simple: government guarantees the creation and maintenance of data for use by many organizations. The data is

regulated, certified as accurate and current, and the producer assumes all liability for its use by others. Every government agency is obligated to use Authentic Registers. This approach requires continuous funding commitments to finance maintenance. Each Authentic Register is assigned to a 'responsible' ministry for maintenance and improvement. This results in registers with high quality data and a guarantee on continuity and maintenance of the data.

By the end of 2002, the Streamlining program had identified the Building registration, the parcel data of the Cadaster, the 1:10,000 core topographic dataset of the National Mapping Agency, and the Address register as Authentic registers. It is likely that these datasets will acquire 'Authentic' status in 2004. The responsibility for the implementation of the geo-authentic registers is with the Minister of Housing, Spatial Planning, and Environment (TK 2003b). Partly due to the public private ownership in the Large Scale Base Map 1:1,000, it was identified as a potential Authentic Register. A decision about its status is scheduled for 2006 (TK 2003a, 3).

Space for Geo-information

A call for proposals of the Minister of Industry and Economic Development for innovative knowledge projects accomplished by consortia of public, private, and academic organizations stimulated the community to work on the tender proposal 'Space for Geo-information' (Ravi 2003). This proposal worked out the innovation of the NGII components, and is supported by and includes proposals of consortia of more than 120 public, private, academic, research and development, and international organizations, and knowledge centers. Together, the consortia provided a financial commitment of e27 million for the execution of the proposal (Kok 2003). The proposal attracted on 28 November 2003 e20 million public funding for a wide variety of projects, promoting the innovation of the NGII.

6.11 Conclusion

The European Union increasingly sets the legal framework of the Dutch Spatial Data Infrastructure. The 'Privacy' Directive, and the 'Database' Directive are already implemented. The proposed Directive on the reuse and commercial exploitation of public sector information is likely to set the legal framework for the commercial reuse of public sector information in the Netherlands, and INSPIRE may provide additional rules or guidelines for the collection, documentation and dissemination of the spatial datasets.

The Dutch Government information act, which provides the framework for access to government data is not (yet) a direct result of a European directive. However, the interpretation of the applicability of this law to spatial datasets,

has resulted in fragmented policies among different datasets, varying from open access with no fee and no restrictions in the use, to very restrictive policies. Although users of spatial data indicated that this fragmentation is a major impediment for accessing data, so far very few attempts have been made to harmonize pricing principles and restrictions in the use. Furthermore, there is still not sufficient political awareness for the need of a fully operational national clearinghouse.

The e-government initiatives provided verification that spatial data is indispensable for many government services especially, the Authentic Register program which has created awareness of the infrastructural importance of some core spatial datasets. However, it is unclear in which way public authorities will stimulate the further implementation of the Authentic Register program.

Given the developments in the European Union, and the developments in the Netherlands such as decisions on the implementation of Authentic Registers, the spatial data sector in the Netherlands has reached a situation in which the development of the current Dutch Spatial Data Infrastructure and its incorporation in a European spatial data infrastructure can be accelerated through further harmonization of policies and data collection, and documentation efforts consistent with international standards. The European initiatives (the proposed Directive on the reuse and commercial exploitation of public sector information and the INSPIRE initiative) are important means to overcome major barriers in the development of the Dutch' spatial data infrastructure.

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7 The US national spatial data infrastructure

Legal & economic issues and developments[1]

Harlan J. Onsrud

7.1 Introduction and background

United States public information principles attempt to support broad access to information in order to advance both economic and political opportunities for citizens. Four broad motives of the United States information policy are: (1) to encourage public education and enlightenment; (2) to protect intellectual property rights; (3) to assist economic development; and (4) to protect national security (Ballard et. al. 1989, 86). All of these motives are supported to varying degrees through a balance of competing yet complementary laws.

A basic policy assumption underlying most United States information laws is that the economic and social benefits of information will be maximized in society by fostering wide diversity in the creation, dissemination and use of information. For-profit businesses, not-for-profit organizations, government agencies and citizens all contribute to this diversity. The belief, borne through experience, is that diversification of sources and channels for the distribution of information establishes a social condition that allows the economy and democracy to thrive. In the United States, government records and datasets are considered to be highly valuable national assets. The diversification principle leads to the conclusion that to gain the greatest economic and social benefits from these assets, United States government information should be made available to all in an equitable and timely manner (Weiss and Backlund 1996). United States laws generally support this proposition.

7.2 Copyright, database protection, and similar intellectual property protection laws[2]

A primary objective of copyright law in the United States is to encourage expression of ideas in tangible form so that the ideas become accessible to

1 This article is a 2003 update of an article that appeared originally as Onsrud, H.J., *Access to Geographic Information in the United States, Free accessibility of geo-information in the Netherlands, the United States, and the European Community*, Proceedings, Delft, the Netherlands, Oct 2, 1998, pp. 33-41. Material in that article as well was drawn from other sources and an earlier version was presented as GIS Legal Issue Challenges, International Federation of Surveyors (FIG), Brighton England, July 22, 1998.

2 Segments of this section were drawn from Onsrud, H.J. & X.R. Lopez, *Intellectual Property Rights in Disseminating Geographic Data, Products, and Services: Conflicts and Commonalities Among European Union and United States Approaches* in: Masser, I. & F. Slagé (eds.), 1997, *European Geographic Information Infrastructure*, London (Taylor & Francis).

others and can benefit the community at large. Copyright restricts the use of creative works as an incentive for authors to bring forth knowledge, information and ideas so that others in the community may exploit the knowledge for economic or social gain. By providing limited but substantial protection to the creative author for making their work known, everyone in the community benefits.

In brief, copyright protection subsists in original works of authorship and the author of the work is the owner of the copyright upon creation of the work or expression in tangible form. Copyright protects only expression, not facts (Berne Convention 1986). Facts, algorithms, physical truths, and ideas exist for use by everyone. The expression protected must be the product of intellectual creativity and not merely labor, time, or money invested. In the United States, the protected elements of the resulting work are precisely those that reflect the intellectual creativity, and no more. Generally in the United States, copyright extends for the life of the author plus seventy years; or 95 years for published works created by corporations (Sony Bono Copyright Extension Act 1998).

Thus copyright may be had in compilations of geographic facts if there is some "authorship" in the "selection, coordination, or arrangement" of the compilation. Only a very low level of creativity – a modicum of creativity – is required (Feist Publications v. Rural Telephone Service Co. 1991). However, the protection is "thin" and extends only to the author's original and creative "selection, coordination, or arrangement."

Further, "(i)n no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery" (17 U.S.C. § 102b). "The primary objective of copyright law is not to reward authors, but to promote science and useful arts. To this end, copyright assures authors the right to their original expression, but encourages others to build freely upon the ideas and information conveyed by the work. This result is neither unfair nor unfortunate. It is the means by which copyright advances the progress of science and art" (Feist 1991).

Some works are little protected by copyright, including many spatial data sets, but may be protected by alternative laws. Contract, trademark, trade secret and misappropriation laws provide substantial protection for many data sets that lack the creativity requisite for protection under copyright. The United States does not have a database protection act similar to the acts enacted in European nations in adherence to the European Community Council Directive on Database Protection (Directive on Database Protection). Even if the United States eventually passes database protection legislation, the rights under that legislation are unlikely to be in the same legal form or be as restrictive on the rights of others as those found in Europe.

The United States expressly forbids federal agencies from imposing copyright

in the works of the agencies, thereby placing these information resources in the public domain. Due to their dominant power positions and fiscal incentives to do so, it is very likely that most government agencies would choose in their own best agency interests rather than in the interests of citizens generally if they had the ability to decide whether to impose copyright in government information. Thus the imposition of copyright in government works should be addressed by public policy makers in political law making forums. In the United States, the Copyright Act has long stated that "(c)opyright protection under this title is not available for any work of the United States Government" (17 U.S.C. § 105). The primary reason for not allowing Federal agencies to copyright public records was the fundamental belief that government copyright is the antithesis of 'open access' whereby an informed citizenry can check official abuses. However, other values also are at work, primarily that individuals ought to be able to derive benefit from public goods and that education (increased access to information) is inherently good in its own right (US Congress 1986). Thus the position of Congress has supported the development by individuals and private businesses of markets for government information and has otherwise encouraged the distribution of government information in the public interest.

Most state and local governments in the United States feel that they have the option of imposing copyright in their public records if they choose to do so. However recent legal arguments have been put forward that challenge this assumption. Legal scholars have argued that under the patents and copyright clause of the United States Constitution, Congress lacks the ability to extend copyright beyond that which is necessary to provide 'incentives' to authors to make their works available. When state or local government agencies collect information in response to a legislated obligation, it is the public need as defined by the legislative obligation that provides the incentive to gather information or create a public record. If copyright failed to exist, the information would still be collected. This being the case, copyright provides no incentive and the works may not be protected by copyright. Regardless of the validity or enforceability of this legal reasoning, some local and state agencies are pursuing the imposition of copyright in some public records. Due to their value, geographic data sets are often included when local governments in the United States make the political decision to impose copyrights and sell public data or records.

7.3 Rules and laws regarding access to government data[3]

The United States Freedom of Information Act (FOIA, USCS Title 5, § 552) and the Open Records Laws of the individual states create a balance between the right of citizens to be informed about government activities and the need to maintain confidentiality of some government records. The United States Supreme Court has stated that "(t)he basic purpose of FOIA is to ensure an informed citizenry, vital to the functioning of a democratic society, needed to check against corruption and to hold the governors accountable to the governed" (NLRB v. Robbins Tire & Co. 1978). Both the national FOIA and state Open Records Laws generally support a policy of broad disclosure by government. For instance, if a data set held by a federal agency is determined to be an agency record, the record must be disclosed to any person requesting it unless the record falls within one of nine narrowly drawn exceptions contained in the FOIA. Exceptions are construed narrowly by the courts so that disclosure is typically favored over non-disclosure. In responding to citizen requests for records, government agencies at most levels in the United States are authorized to recover the costs required to respond to the citizen requests.

May a private citizen acquire an entire geographic data set produced by a United States government agency? The answer to this question typically is "yes" and the rate charged for data sets is essentially the cost of duplication. There exists a general presumption of disclosure and the courts have held that records stored in a computer are available through the FOIA (Yeager v. DEA 1982). However, if the digital data set is protected by one of the nine exceptions to the act, it may be withheld from disclosure. For instance, exception 3 protects agency records that are specifically exempted from disclosure by statute. Thus, the Landsat Commercialization Act of 1984 allowed Landsat data sets to be sold at a much higher rate than the costs of duplication. It is worth noting that allowing an exception for Landsat data and the resulting high costs for obtaining it greatly curtailed the use of that data for an extended period of time. Unlike food and clothing, the demand for information is highly elastic so that if the price for information is perceived by individuals as being too high, they will often choose to do without rather than paying the demanded price (Weiss & Backlund 1996).

It should be noted that many federal agencies in the United States voluntarily have been placing their geographic information datasets openly on the web to make their data sets more accessible to other government agencies as well as to for-profit businesses, non-profit organizations, and citizens gener-

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3 Segments of this section were drawn from Onsrud, H.J., 1992, In Support of Open Access for Publicly Held Geographic Information, *GIS Law, Vol. 1*, No. 1, Jan/March, pp. 3-6.

ally (For example, see the clearinghouse nodes accessible through http://www.fgdc. gov). However, federal agencies also bear affirmative obligations to actively disseminate their information as defined by the provisions of OMB Circular A-130 (June 1993). They are particularly encouraged to disseminate raw content upon which value-added products may be built and to do so at the cost of dissemination, with no imposition of restrictions on the use of the data and through a diversity of channels. The core provisions of OMB Circular A-130 were incorporated into the Paperwork Reduction Act of 1995 (PRA) and that act additionally encourages the use of information technologies by agencies for providing public access, rather than relying on cumbersome FOIA processes. With the expanded use of world wide web servers by federal agencies the cost of dissemination for many government data sets has become negligible and thus these data sets are now freely available to anyone with the ability to access them over the internet.

Actions have also been taken at the federal level specifically related to spatial information and agency contributions to building the National Spatial Data Infrastructure (NSDI). The Federal Geographic Data Committee (FGDC) was established by the Office of Management and Budget (OMB) in its 1990 revision of Circular A-16, "Coordination of Surveying, Mapping, and Related Spatial Data Activities". FGDC is now composed of representatives from 16 Cabinet level and independent Federal agencies. In April 1994, President Clinton signed Executive Order 12906 that called for the establishment of a coordinated National Spatial Data Infrastructure (NSDI) as part of the evolving National Information Infrastructure (NII) and FGDC was charged with coordinating the federal government's development of the NSDI. In this executive order, FGDC was given a mandate to involve state, local and tribal governments, academia and the private sector in coordinating the development of the NSDI. The roles of various parties and their relationships in moving towards a common NSDI vision are being developed over time. Within the federal government itself, lead coordination responsibilities based on themes were assigned to specific Federal agencies by the Office of Management of Budget while FGDC working groups play a crosscutting role. GeoSpatial One-Stop (http://www.geo-one-stop.gov/) and the National Map (http://nationalmap.usgs.gov/) are examples of recent agency initiatives advancing the NSDI concept.

Similar to the federal situation, many local communities and states voluntarily have been making geographic data sets openly available on the web for general use by for-profit businesses, not-for-profit organizations, and citizens generally (e.g. for links to such data, see for example http://www.spatial.maine.edu/cadastral/main.htm or http://www.geographynetwork.com/) However, similar to the Landsat situation, some local and state governments in the United States have advocated altering state open records laws to exempt geographic information data sets from release to citizens under the provi-

sions of those laws. These local governments have perceived a possibility of paying for the creation and maintenance of improved land records systems other than through general tax revenues. Restricting access to public records is contrary to the plain letter language of most state open records laws in the United States and therefore explicit legislation is typically required to allow the restrictions. Those who seek to impose the restrictions on citizens should be required to overcome the underlying policy arguments on which such laws are based, foremost of which are that open access keeps government accountable and that open access to government information has far greater long term economic benefits for a community than does pursuing revenue generation approaches.

Those local governments selling public geographic data in a non-monopolistic fashion have failed to generate typically more than a very small percentage of the operating budget of their systems and have incurred relatively high administrative costs in supporting sales efforts. Thus, rather than copyright law, open records laws or other explicit laws constraining the actions of local governments, it is primarily economic realities and practical experiences in the context of the overall United States legal environment that have resulted in many local governments choosing to not pursue or maintain geographic data sales approaches.

7.4 Liability and other means for ensuring the suitability of data

If the vision of the NSDI in the United States is one of islands of spatial data sets growing and being supplied by many different parties, how is the accuracy and reliability of spatial data ensured?

Spatial data and spatial data products in the United States are typically suitable for the purposes for which they are intended and no more. This principle is enforced primarily through our liability laws. As a general proposition, one is not allowed to warrant a spatial data product for a purpose for which it is not suitable. If one does and the client is legally harmed by the seller's negligence or incompetence, the seller is liable for the damages suffered.

But of course, the risks of most spatial data transactions are distributed among the parties through contract language. A contract for a boundary or engineering survey for instance would make clear the responsibilities and risks incurred by the parties to the contract.

If you are a government agency making spatial data available on the web in the United States, you in essence are saying – "Here is some government data that was suitable for some government purpose but it may or may not be suitable for some purpose you have in mind. Therefore it goes without saying that the responsibility is on your shoulders to determine whether it is fit for

your use." If you are a commercial company and you place government data in a vehicle routing system without checking whether the data is suitable and reliable for this purpose, the responsibility is on the commercial company to pay any damages to users of the commercial system, not the government. For a detailed description of liability exposure issues in the United States in the use of geographic data (see Onsrud 1999).

So, in practice, the accuracy of spatial data in most instances is very responsive to the economic risks and values at stake. If you are building a multimillion dollar skyscraper in a downtown urban area, you tend to know exactly and conclusively where the boundaries are because you have invested in a very high quality survey and have gone through the process of clearing any defects in the land title. However, if you are buying a land lot in a rural area for a fishing cabin you may not have any survey work done because you may be satisfied with a rough land description and survey done back in the 1800s. The land isn't worth what a new survey would cost. Thus, as a general rule, the decision on how reliable a United States citizen wants spatial information and the extent to which they are willing to incur risk is left up to the individual citizen and his or her legal and financial advisers.

7.5 Protections for personal information privacy[4]

The legal right to privacy in the United States arose as a constitutional concept from a Harvard Law Review article written in 1890 by S. D. Warren and Louis Brandeis (Warren & Brandeis 1890). Over the years the judiciary developed and clarified the right through case law. The right "prevents governmental interference in intimate personal ... activities and freedoms of the individual to make fundamental choices involving himself, his family, and his relationship with others" (Industrial Foundation of the South v. Texas Indus. Acc. Bd. 679). Although the word 'privacy' does not appear in the United States Constitution, the United States Supreme Court over time has interpreted a right of privacy to exist for individuals under the First, Fourth, Fifth, Ninth and Fourteenth Amendments (Schwartz 1991).

From the case law, it is plainly seen that the context within which common law privacy rights were originally argued and developed in the United States was one involving conflicts among singularly identified individuals. Although such law remains valid and provides some limited protection, our culture has entered a new social and technological era in which privacy conflicts involve

4 Segments of this section were drawn from Onsrud, H.J., J. Johnson, & X. Lopez, Protecting Personal Privacy in Using Geographic Information Systems, *Photogrammetric Engineering and Remote Sensing* 60 (9): 1083-1095, 1994.

detailed data collection and identity profiling on large portions of the population.

Therefore, in addition to judge-made law, numerous legislative enactments address privacy in the United States at both the federal and state levels. The major federal privacy statute is the Privacy Act of 1974. The Privacy Act (1) allows individuals to determine what records pertaining to them are being collected, maintained, or used by federal agencies, (2) allows individuals to prevent records obtained for a particular purpose from being used or made available for another purpose without their consent, subject to twelve exceptions, (3) allows individuals to gain access to such records, make copies of them and make corrections, (4) requires agencies to ensure that any record which identifies individuals is for a necessary and lawful purpose, and (5) requires agencies to provide adequate safeguards to prevent misuse of personal information (Privacy Act of 1974 As Amended). Among additional United States federal acts addressing a range of privacy issues include the Freedom of Information Act, Fair Credit Reporting Act, Family Educational Rights and Privacy Act of 1974, Right to Financial Privacy Act of 1978, Electronic Fund Transfer Act, Privacy Protection for Rape Victims Act of 1978, Privacy Protection Act of 1980, Cable Communications Policy Act of 1984, Electronic Communications Privacy Act of 1986, Computer Matching and Privacy Protection Act of 1988, Video Privacy Protection Act of 1988, the Telephone Consumer Protection Act of 1991 and similar more recent acts. Each of these acts provides protection of personal information privacy under specific circumstances.

Many state governments in the United States have a general privacy act that mirrors the federal government's Privacy Act. These acts typically control the information that state agencies and local governments may gather on individuals. Also similar to the federal law situation, most states have numerous separate acts addressing privacy problems in specific situations.

From a review of the federal and state laws, it is readily apparent that in the United States we have tended to restrict the personal information that government may collect and we provide significant safeguards against privacy intrusions by government agencies. However, we have tended to give the commercial sector greater leeway in protecting the privacy interests of their clients and potential clients. We have also allowed private companies greater leeway in what they may do with the information they have gathered. This may reflect in the United States society a belief that individuals should be responsible for protecting their own privacy interests relative to the commercial sector rather than relying on government to do it for them, a belief that economic efficiency will be stifled by imposing greater personal privacy restrictions, a greater distrust of government power than in private commercial power, or simply an inability to overcome industry resistance to privacy legislation initiatives at state and federal levels.

With the strong privacy protection mandates being imposed by the European Union we may see much greater consistency across Europe in implementing privacy protection measures than we may see, for instance, across the individual states in the United States. Due to the ability to construct contracts that can accommodate the differences in privacy laws among nations, EU privacy legislation has not significantly impeded trade with the United States and other nations.

In review and by way of example, all spatial data sets provided openly on the web in the United States are subject to the numerous privacy statutes and the common law of privacy of the United States and the various states. The United States Federal Privacy Act applies to all collections of spatial data collected by federal agencies. In addition, the FGDC has recently endorsed a policy on access to public information and the protection of personal privacy in federal geospatial databases (http://www.fgdc.gov/fgdc/policies/privacypolicy.pdf). This policy applies to all federal geospatial databases from which personal information might be retrieved. The personal information privacy constraints imposed on the commercial sector in their use of spatial data tend to be far less restrictive although many private companies are following voluntary privacy guidelines. Imposing privacy guidelines on private companies by contracts with individuals is also possible.

7.6 Commentary and discussion

If intellectual property law is too lax, there may be inadequate incentives to produce information works. Thus, one economic goal of copyright is to protect and reward creative activity such that creators have an incentive to make their works available to others. However, if protection is too rigid, it may impede the free flow and fair use of information (Varian 1995). Thus the intellectual property regimes of most modern nations strive to provide sufficient access for citizens in order to provide the raw materials that citizens may use to create new ideas, products, services. Through such value-added activities the economic and social well being of the nation is advanced. United States law historically has supported protection of access by citizens to knowledge over protection of income streams from older innovations. This creates a tension in society to continually innovate. Thus, compared to most other nations, the current balance of copyright law in the United States favors the promotion of science and creative authorship over protection of investment.

In terms of access to government information, noted legal scholar Henry Perritt Jr. states that "the policy and legal questions on both sides of the Atlantic are remarkably similar. The principle legal questions are whether or not citizens and information resellers have a right of access to public infor-

mation and, conversely, whether or not the government can block such access by asserting copyright" (Perritt 1994, 7). United States domestic information policy at the Federal level may be summarized as: "a strong freedom of information law, no government copyright, fees limited to recouping the cost of dissemination, and no restrictions on reuse" (Weiss & Backlund 1997).

Global electronic networks have advanced to the point where we are now well along in participating in global economies. This suggests that the need to reconcile competing interests in digital geographic data will become more intense over time. Yet, each nation needs to individually resolve internally the appropriateness of proposed changes in its policies and practices in light of the culture its citizens desire to maintain.

We should be very cautious about proposing new laws and I argue that new legislation should be enacted only when our societies can't deal with changed circumstances through the marketplace, private contracting or technological responses. The law should react, not lead, in times of rapidly changing technological and social conditions. FOIA and the Copyright Act in the United States are largely technology neutral. New legislative enactments based on fear of what might happen rather than on actual conflicts will tend to complicate the law and increase the complexity of resolving future disputes. The courts are able to adapt to changing circumstances and as a general rule we should let legal principles evolve through actual experiences in dealing with new conflicts and technologies prior to advocating legislative solutions. Discussions among legal experts in the United States often raise the importance of focusing on appropriate policy choices for the United States rather than letting the desire to harmonize laws with other nations dictate our policy directions for the future. When specific conflicts arise among nations that can not be resolved by other means, certainly cautious legislative adjustments may be appropriate.

Ultimately commerce and the advancement of science need unrestricted flows of information. If this is so, the long term international consensus regarding information policy is likely to more closely resemble the United States models for open access to government information and copyright than the more restrictive models observed elsewhere (Weiss & Backlund 1997). By example, many in the United States would argue that the basic copyright standard for databases is already set forth in both GATT-TRIPS and the WIPO Copyright Treaty and this should continue as the international copyright norm (Band 2003).

I believe that giving deference in the law to new innovations and investment over old innovations and investment has had a highly desirable effect on the long term economic and social well being of the United States However, even if a group of academics could strongly document this relationship, democracies allow citizens to select government officials who may chose to ignore the advice of experts. Citizens also have the right at the ballot box to

make mistakes. Therefore, the initial critical issue in determining which policy alternatives are practically feasible in a specific jurisdiction may be to answer the question of who has the power in that jurisdiction to make decisions – whether or not those decisions are considered by experts to be rational.

If through the political process, citizens have been convinced that leaders advocating 'restrictive information practices' are appropriate, such practices are likely to be implemented. Certainly there is growing pressure in the United States to move toward more restrictive information laws. Whether the current balances in copyright law and laws controlling access to government information will continue in the United States into the near and distant future is unknown. However, political realities do not negate the responsibility of citizens, practitioners, government administrators and researchers to continually question and investigate whether specific approaches provide greater or lesser economic and social equity benefits than others. In democracies, irrational governmental policies are inevitably exposed over time with the result that the system corrects itself.

7.7 Summary

Several areas of law define or influence access to geographic information in the United States. Among these include intellectual property (e.g. copyright), freedom of information, privacy, electronic contracting and antitrust laws. In general, the form of these laws in the United States allows greater access to government information at the local, state, and national government levels and use of that information than is generally allowed in other nations. As a further generalization, United States law grants individuals greater leeway to use the work products of others without permission than is often granted by the laws of other nations. This summary article suggests that the general principle of open and unrestricted access to government information and a liberal policy concerning copyright law have been wise policy choices for the United States. The current open access approaches have been beneficial both in terms of supporting fundamental democratic values and in terms of supporting long term economic advancement for the nation.

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Stefan Gustafsson holds a MSc. in Land Surveying and has been working for the National Land Survey of Sweden since 1973. He started in 1973 as Land Surveyor, Assistant District Surveyor, responsible for the preparations for new property register, legal surveying including property formation and definition of ownership. In 1983 he became head of section at National Land Survey responsible for development of legislation, advice, education and improvement of routines and organisation concerning property formation. From 1990, he is responsible for the maintenance of Sweden's boundaries towards Finland and Norway. He further has been the responsible for the development of routines and IT support regarding the process of property formation, the project manager for the Digital Historical Maps project, developing methods for making historical maps available on the Internet. Since 2002, he is project manager for the European and Information Service (EULIS) project.

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Many national governments throughout the world are involved in developing spatial data infrastructures (SDI) to facilitate the availability of information in such a way that the needs of the agencies, organization, citizens, commerce, and society in general are met. This book covers some of the most prevalent policy issues evolving around spatial data infrastructure development. First, the book addresses a variety of European SDI projects aiming at the creation of a regional spatial data infrastructure. Secondly, insights are provided on how two different legal and economic SDI settings can still allow for and serve very similar infrastructure functions.
Through the publication of this book, the Global Spatial Data Infrastructure (GSDI) Legal and Economic Working Group provides a communication channel and an organized understanding of a sampling of policy and legal frameworks for the development of spatial data infrastructures. Stakeholders working on SDIs development in other or similar SDI settings may use this book for the benefit of their SDI.

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