



# Spatial Data Infrastructures in Europe: State of play 2006

Summary report of a study  
commissioned by the EC (EUROSTAT)  
in the framework of the INSPIRE  
initiative

(Under Framework Contract  
REGIO/G4-2002-02-Lot 2)

December 2006



**SPATIAL APPLICATIONS DIVISION  
K.U.LEUVEN RESEARCH & DEVELOPMENT**

Celestijnenlaan 200 E, BE-3001 LEUVEN  
TEL.: 32 16 32 97 32 FAX: 32 16 32 97 24  
URL: <http://www.sadl.kuleuven.be>



# REPORT META INFORMATION

---

<b>Title</b>	Spatial Data Infrastructures in Europe: State of Play Autumn 2006
<b>Creator</b>	Danny Vandembroucke (SADL)
<b>Date issued</b>	2006-10-20
<b>Subject</b>	Summary of findings of the INSPIRE State-of-Play project
<b>Publisher</b>	K.U.Leuven (SADL + ICRI)
<b>Description</b>	This report provides updated information on the state of play of Spatial Data Infrastructures in Europe, valid for Autumn 2006.
<b>Contributor</b>	Katleen Janssen (ICRI), Danny Vandembroucke (SADL)
<b>Format</b>	MS Word 2000 (doc)
<b>Audience</b>	INSPIRE Community
<b>Identifier</b>	INSPIRE-SoP-2006 v2.doc
<b>Language</b>	English
<b>Coverage</b>	Autumn 2005 – Autumn 2006

---

<b>Version number</b>	<b>Date</b>	<b>Modified by</b>	<b>Comments</b>
1.0	2006-10-10	Danny Vandembroucke	First version, based on template of summary report of 2005; chapter on methodological shift
2.0	2006-12-22	Danny Vandembroucke	First release of draft report
3.0	2007-01-03	Danny Vandembroucke	Final Draft for release to the EC
3.1	2007-01-29	Hans Dufourmont	Comments from EC inserted
3.2	2007-02-05	Danny Vandembroucke	Consolidation of comments from EC and Executive Summary added

*This document 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.*

*This document does neither represent the position of the Member States and countries under study.*

# 1. EXECUTIVE SUMMARY

The INSPIRE State of Play study initiated in 2002, takes place for the fourth consecutive year. 2006 was marked by the adoption of the INSPIRE Directive by the European Parliament and the European Council, on November 21. As for other years, the objective was to describe, analyse and assess status of the (N)SDI of 32 countries in Europe. An important difference with the former updates is the shift in methodology in order to bring the study more in line with the now adopted INSPIRE Directive. This year's update left also some room to study three countries in more detail. As was the case for the previous years, the 2006 summary report does not only describe the status in Europe, but also try to formulate some recommendation for the further implementation of the Directive.

Even if the methodology was shifted in 2006, the overall approach remained the same, i.e. to identify and describe the major (N)SDI initiatives in Europe. The aim of reviewing the methodology is to adopt the approach as much as possible to INSPIRE Directive and the ongoing work of the INSPIRE Drafting Teams, especially the one on Monitoring and Reporting. The review was done in several steps: (1) analysing the original indicators, (2) analyse feedback from stakeholders, (3) listing of all the inconsistencies, (4) comparison with the list of indicators from the INSPIRE DT M&R and (5) the elaboration of a migration path between both systems. Also the structure of the country reports has been modified to reflect the current INSPIRE developments.

As a result, the update of 2006 has seen the modification of some of the indicators and the addition of two indicators related to services (as mentioned in the INSPIRE Directive). It should be taken into account that the list of indicators as defined by the DT, September 2006, was far from finalised. This mapping exercise should be done with the final list. Nevertheless, some elements issues can already be raised:

- There are 6 existing indicators that are generic indicators that are giving an overall status rather than monitoring a specific element of the SDI. Not to be mapped.
- There are 5 indicators for which no mapping is possible. For each of them it should be discussed whether this indicator is missing in the List of Indicators of the DT M&R or not relevant at all.
- There are 4 proposed indicators of the DT M&R that does not have a corresponding indicator in the SoP. Not to be matched.
- There are 10 indicators (or groups of indicators) of the SoP that can be mapped (to a certain degree) to the DT M&R indicators assuming some stronger or weaker relationship.

The visit of the Czech republic, Spain and Sweden allow to learn some key lessons regarding the (N)SDI development at the national level:

- In all the three countries stakeholder involvement is strong. This involvement has a highly positive impact on the SDI development if it goes further than a formal involvement, i.e. when all the stakeholders act as a node of the SDI network (which is clearly the case in Spain and the Czech republic). The development of the respective SDI is in each case the result of this joint effort. In all three countries leadership is also strong.
- Particular striking is the approach in Spain where stakeholders are mobilised on a basis of equality overcoming the sometimes very complex institutional and hierarchical situation. This creates a dynamic framework in which coordinated and collaborative projects result in concrete results in a rather short timeframe.
- The way coordination is done, is differently in the three countries. In Sweden the coordination is done by the Mapping Agency (LM) supported by an advisory board in which counties and municipalities are represented. In the Czech Republic, it is the environmental agency CENIA that is taking clearly the lead and coordinates the SDI. CENIA brings together all the stakeholders with the help of two associations

(CAGI and Nemoforum). In Spain there is a specific coordinating body, the High Council which mobilises all the stakeholders from the national to the local level without having a strong and explicit hierarchical relationship.

- Cooperation amongst the stakeholders is very well developed in Spain. Each stakeholder has a specific role. The universities and private sector are strongly involved, which is also partially true for the Czech Republic. However the involvement of the private sector goes further in Spain than in the other countries.
- The regional and local involvement is well developed in Spain, and is starting to be a specific point of attention in Sweden and the Czech Republic.
- Policy support is a key issue in the three countries: sometimes at national, otherwise at regional and local level. However, it seems that political support depends on particular people and is not very stable over time.
- Free access to data is very well developed in Spain and the Czech Republic (although not everything can be downloaded freely, and sometimes time consuming procedures are still in place). In both countries reference is being made to the importance of the Aarhus Convention and the Directive on the re-use of PSI. In Sweden, a specific data exchange mechanism is in place: the local level is paid for their contribution in maintaining the data, while a charging mechanism exists for using the data.
- The focus on applications, and in particular environmental applications, is very strong in the Czech Republic. Developments are driven by this sector (and supported by other sectors), while in Spain there is a more a technical drive of the SDI development. Specific for Spain is also the project driven approach.
- Metadata are under developed everywhere, although they are not structured according to standards in Sweden. Special attention is therefore given to the Elips program and the standardisation efforts of SIS. In general, it is felt that maintaining good metadata is essential for using the infrastructure, but a big effort of which the usefulness is not always visible (low use of metadata catalogues as compared to WMS).
- The development of services is very strong in Spain and strong in the Czech Republic, a lot less in Sweden. However, in all countries, the majority of services are WMS, while WFS are only emerging and found more difficult to implement. The Czech Republic has a central portal through which most of the stakeholders use the services offered, mainly in the public sector. In Spain, the integration of services in local and regional applications, so the re-use of services is more widely spread.

The results of the assessment of the 32 countries studied show the following: it is clear that the legal status of the (N)SDI remains somewhat fuzzy. Data, metadata and services are developing quite well, especially in the 15 'old' member states. Standardisation is everywhere becoming a 'normal' issue. In general terms, attention for interoperability issues is becoming a central point of attention and seems to be more than the attention for issues for exchange format. The 32 countries have been assessed for the 32 indicators and typology has been modified accordingly.

In a separate chapter we give 7 recommendations to support further implementation of the INSPIRE Directive.

## 2. TABLE OF CONTENTS

<b>1.</b>	<b>EXECUTIVE SUMMARY</b> .....	<b>1</b>
<b>2.</b>	<b>TABLE OF CONTENTS</b> .....	<b>3</b>
<b>3.</b>	<b>ABBREVIATIONS AND ACRONYMS</b> .....	<b>4</b>
<b>4.</b>	<b>INTRODUCTION</b> .....	<b>6</b>
<b>5.</b>	<b>OBJECTIVES AND ASSUMPTIONS</b> .....	<b>8</b>
5.1	OBJECTIVES .....	8
5.2	ASSUMPTIONS .....	8
<b>6.</b>	<b>APPROACH</b> .....	<b>9</b>
6.1	ORIGINAL APPROACH OF THE STUDY .....	9
6.1.1	<i>Identification and description of (N)SDI-initiatives in 32 countries</i> .....	9
6.1.2	<i>Comparative summary of the (N)SDI</i> .....	10
6.1.3	<i>Typology of (N)SDI in 32 countries</i> .....	13
6.2	MODIFIED APPROACH FOR THE UPDATE OF 2006.....	13
6.2.1	<i>General issues on the reviewed methodology</i> .....	14
6.2.2	<i>Critical review of the original indicators</i> .....	15
6.2.3	<i>Mapping of SoP and DT indicators</i> .....	21
<b>7.</b>	<b>STATE OF PLAY OF THE SDI, AUTUMN 2006</b> .....	<b>25</b>
7.1	GENERAL OBSERVATIONS AND REMARKS .....	25
7.2	SUMMARY OF THE VISIT TO 3 COUNTRIES.....	26
7.2.1	<i>Czech Republic</i> .....	26
7.2.2	<i>Spain</i> .....	27
7.2.3	<i>Sweden</i> .....	29
7.2.4	<i>Lessons learnt from the 3 visits</i> .....	31
7.3	RESULTS OF THE ASSESSMENT OF 32 COUNTRIES .....	33
7.3.1	<i>Summary overview of state of play autumn 2006</i> .....	33
7.3.2	<i>Change table 2005-2006</i> .....	35
7.3.3	<i>Change table 2003-2006</i> .....	36
7.3.4	<i>Typology autumn 2006</i> .....	37
<b>8.</b>	<b>RECOMMENDATIONS</b> .....	<b>38</b>
<b>9.</b>	<b>ACKNOWLEDGMENTS</b> .....	<b>40</b>
<b>10.</b>	<b>REFERENCES</b> .....	<b>41</b>
<b>11.</b>	<b>ANNEXES</b> .....	<b>42</b>
11.1	REGULAR COUNTRY REPORTS .....	42
11.2	SUMMARY OVERVIEW FOR 2003, 2004 AND 2005 .....	43
11.3	TYPOLOGY FOR 2003, 2004 AND 2005 .....	46
11.4	COUNTRY CODES.....	47

### 3. ABBREVIATIONS AND ACRONYMS

The following list presents the abbreviations and acronyms commonly used in this report. Abbreviations and acronyms used in the annexed country reports are listed in those reports.

AOPK	Agency for Nature Conservation and Landscape Protection
BTA	Base Topogràfica Armonizada
CAGI	Czech Association for Geomatics
CCSS	Czech Centre for Science and Society
CDV	Transport Research Centre
CGS	Czech Geological Survey
CSO	Czech Statistical Office
EC	European Commission
EEA	European Environmental Agency
EFTA	European Free Trade Association
ESDI	European Spatial Data Infrastructure
EU	European Union
FOI	Freedom of Information
GI	Geographical Information
GII	Geographical Information Infrastructure
GIS	Geographic Information System
GMES	Global Monitoring of Environment and Sustainability
GSDI	Global Spatial Data Infrastructure
IDEE	Spanish SDI
INSPIRE	Infrastructure for Spatial Information in Europe
ISO	International Standards Organisation
JRC	Joint Research Centre of the European Commission
LM	Lantmäteriet (National Land Survey of Sweden)
LSDI	Local Spatial Data Infrastructure
MoE	Ministry of Environment
Mol	Ministry of Informatics
NA	Not Applicable
NDP	National Data Producer
NMA	National Mapping Agency
NGO	Non Governmental Organisation
NIA	No Information Available
(N)SDI	(National) Spatial Data Infrastructure
PNOA	National Plan for Aerial Orthophoto
PPP	Public-Private Partnership
PSI	Public Sector Information
QCP	Quality Control Procedure

---

RSDI	Regional Spatial Data Infrastructure
SIOSE	Land Cover and Land Use Information System of Spain
SIS	Swedish Standardisation Institute
SoP	State of Play
TEN	Trans European Network
TSDI	Thematic Spatial Data Infrastructure
WFS	Web Feature Service
WMS	Web Mapping Service

## 4. INTRODUCTION

In 2001, the European Commission initiated the INSPIRE initiative. It was based on the observation that the accessibility, interoperability and affordability of spatial data and information systems were limited. It was generally recognised that this situation prevents society to fully benefit from the potential of the technology to improve the relevancy, accuracy, impact and public control of territorial policies and related decisions at all scales and to involve citizens, businesses, non governmental and research organisations in a participatory information society.

With the INSPIRE initiative, the European Union – in collaboration with all the relevant stakeholders - intends to establish an infrastructure for spatial information in Europe that will allow the public sector users at the European, national, regional and local levels to share spatial data from a wide range of sources in an interoperable way for the execution of a variety of public tasks at conditions which do not restrain its use. Moreover, users in private, research and NGO-environments and the citizen will be offered services to discover, access and view these spatial data sources. Environmental policies, for which the spatial dimension constitutes an important component, have been chosen as the starting point to establish this spatial infrastructure.

To reach these objectives, the European Commissioners of Environment, Economic and Monetary affairs and Research agreed in 2002 about a Memorandum of Understanding, not only recognising the problem but also indicating the steps to be taken to develop such an infrastructure. One of the key elements in the MoU was the need for a legislative framework. In order to develop the INSPIRE legislation, all GI stakeholders were mobilised in relevant working groups in order to prepare the drafting process of the proposed Directive. Mid 2004, the proposal for a Directive of the European Parliament and of the Council - *Establishing an infrastructure for spatial information in the Community (INSPIRE)* - saw light. Between then and autumn 2006, several readings took place by the Parliament and the Council which resulted - after a conciliation phase during which final amendments were made - in the adoption of the Directive on November 21<sup>st</sup> 2006.

The EC, the INSPIRE expert group and all the (N)SDI stakeholders recognised from the very beginning that the building blocks for a European spatial information infrastructure consist of the operational or emerging national, regional and local SDI. However, in 2002, the Commission had only a partial view of what was going on in Europe.

Therefore, the EC launched a study, “*Status of the National Spatial Data Infrastructures in Europe, a State of Play*” covering the period mid 2002- mid 2005, to describe, monitor and analyse the activities related to the national spatial data infrastructures in 32 European countries: 25 EU Member States<sup>1</sup>, 3 Candidate Countries and 4 EFTA countries. The major activity of this study was to collect and structure all the relevant information on the status of the 5 components which form together an SDI<sup>2</sup>: legal framework and funding, reference data and core thematic data, metadata, access and other services, and standards. It was decided to study a sixth component, i.e. thematic environmental data. This study resulted in 32 country reports describing the status of the (N)SDI in 2003, 2004 and 2005, as well in summary reports assessing the overall status in Europe in those same years. In all those reports, focus was on the state of play of the general purpose SDI-efforts which were ongoing or planned at the national public sector level.

The current report is the summary of the State of Play of the same 32 (N)SDI's in Europe for 2006. As such this report presents the 2006 update of the INSPIRE State of

---

<sup>1</sup> At the time the study started, there were 15 Member States and 10 Accession Countries.

<sup>2</sup> As described in the GSDI Cookbook. The Cookbook was used as a sort of baseline for this study.

Play study initially carried out in 2002-03 and subsequently updated in 2004 and 2005. Similar to previous phases, the State of Play update 2006 was carried out by staff from SADL and ICRI, two entities within K.U.Leuven.

However, it is important to underline that the update for 2006 contains an important shift in methodology in order to bring the State of Play more in line with the INSPIRE initiative<sup>3</sup>, and especially with the ongoing work of the INSPIRE Drafting Team on Monitoring and Reporting.

The report is conceived as follows:

- The next (fifth) chapter recalls the objectives of the 2006 update of the State of Play study of which this report is a deliverable;
- The sixth chapter describes the approach ('materials and methods') for this study. The approach and methods used in the original study are recalled in a first section. The methodological shift to bring the State of Play in line with the INSPIRE initiative is described in a second section.
- The results are summarized in chapter seven. This chapter gives some general observations and summarizes the results of the visits to three (3) countries which allowed to assess their (N)SDI in more detail. It provides also – in line with previous years - an overview table of the state of play of SDI for each of the 32 countries in autumn 2006 and includes a matrix highlighting changes which occurred between 2006 and 2005, and between 2006 and 2003. Also the outcome of the typology exercise for 2006 is presented and compared with the one elaborated in previous years.
- Chapter eight gives some considerations and recommendations to take into account during the implementation process of the INSPIRE Directive once it will be published in spring 2007. It highlights also some specific points of attention related to the SoP study itself.
- In separate volumes, annexed to this report, the 32 updated country reports are presented. In addition the reports of the visits to the three countries are annexed as well.
- An executive summary, which can also be read in terms of a number of conclusions of the study, is available as the first chapter.

---

<sup>3</sup> Which did not yet exist at the time of the first study.

## 5. OBJECTIVES AND ASSUMPTIONS

### 5.1 Objectives

The overall objective of this study is to prepare the update of the State of Play study for 2006 taking into account the work done with regard to the INSPIRE legislation and in particular with the work carried out by the DT on Monitoring and Reporting.

At the beginning of the study, four sub-objectives were defined:

1. To prepare a modification of the methodological approach applied in the previous updates of the State of Play study. Practically this consists in a migration/correspondence path between the initial methodology and the one under preparation by the DT on Monitoring & Reporting. This shift will be a step-by-step approach in order to have a smooth transition between the previous assessments (2003-2005) and future monitoring and reporting activities within the framework of the INSPIRE Directive.
2. To draft the updates of the 32 country reports taking into account this methodological shift based on new information and feedback from INSPIRE stakeholders.
3. To study in more detail a maximum of 3 countries where important changes occurred over the last year (or where important changes are going on). It is hoped that this would result in a better assessment and a better country report for the three countries, and should also give important input for the recommendations.
4. To prepare a summary report giving an overview of the status of the NSDI and RSDI developments in the 32 countries, including the methodological modifications, the change matrices and analysis of (shifts of countries in) the typology, and recommendations that could be useful for further development of the European Spatial Data Infrastructure.

### 5.2 Assumptions

Throughout all activities of this study, the emphasis is on general purpose SDI-initiatives, i.e. SDI for which the promotion of the sharing and re-use of reference and core thematic data is the core activity. In all countries this type of SDI is developed mainly by public sector players, in a lot of cases in collaboration with the private sector. SDI focusing on thematic environmental data have also been considered but other types of thematic SDI have only been mentioned. Secondly, attention was focused on initiatives focusing the national scale, i.e. NSDI, rather than lower level initiatives.

However, when a national SDI is clearly lacking and regional SDI are strongly developed we also focused on either the most important, best developed or the most representative lower level SDI in that country. Especially in decentralized countries regional SDI are often pertinently present. Comparison of NSDI is done for the national level only in order to guarantee comparability. We are aware that the country reports therefore give only a partial view of the rich reality in those countries.

Only freely accessible resources and known contacts are used to describe the state of play autumn 2006.

## 6. APPROACH

This chapter describes the approach and methodology in the State of Play study. In a first section we summarize the original approach as it has been applied for the study between 2002 and 2005. The second section describes the methodological shift applied in the update of 2006. It is important to remind that the overall approach did not change in order to keep comparability.

### 6.1 Original approach of the study

The general outlook of the original approach looks at follows: identification and description of (N)SDI initiatives in 32 countries resulting in a so called country report, assessment of the (N)SDI initiatives based on the translation of this information in 30 indicators and classification of the 32 (N)SDI initiatives according to a pre-defined topology. The following sub-sections give the details of this approach.

#### 6.1.1 Identification and description of (N)SDI-initiatives in 32 countries

In 2002 a methodology was worked out to identify and describe the (N)SDI initiatives in any of the 32 European countries studied. It was decided not to work with a questionnaire or survey, but to apply a desktop study in a step-by-step way:

- From the reference characteristics of the five components of an ESDI (Legal Framework and Funding Mechanism, Geographic data - i.e. Reference and Core Thematic Data, Thematic Environmental Data -, Metadata, Access Services, Standards) as identified in the final version of the Position Papers of five of the INSPIRE working groups<sup>4</sup> we compiled late 2002 an exhaustive list of items according to which the (N)SDIs could be described. This resulted in a so-called check-list based on which the relevant elements could be extracted from the consulted information sources. After rearranging, the list was used as the template for the description of the (N)SDI in the country reports;
- The description was performed in two stages, resulting in a first and a second version of the country report. Compared to the structure of the first version, the second was extended by sections containing report meta-information, an executive summary and a section on the method used to compile the report. Section titles for which no information could be found have been dropped in the second version;
- In the first stage (September – December 2002), the country reports were compiled based on the consultation of various web sites, documents and project references readily accessible. Most resources were gathered from the internet;
- Since at that time for some countries almost no information could be found in this way, some key persons were contacted. However this could not be done for all countries in the limited time and budgetary frame. In addition, a list of information sources has been sent to all INSPIRE Working Group members in order to get

---

<sup>4</sup> The five INSPIRE working groups dealt with Architecture and Standards, Data Policy and Legal Issues, Implementation Structures and Funding, Reference Data and Metadata, Environmental Thematic User Needs). The 5 components are in fact those that are described in the GSDI Cookbook as being essential in order to speak about (an 'ideal') SDI.

feedback about its completeness. Sporadically, new data sources could be identified that way;

- 31 country reports (Switzerland and Liechtenstein were combined in 1 report) resulted from the first stage (beginning of 2003). This means that in every country at least one NSDI- or NSDI-related initiative was found. In each of them, the consulted information sources were listed in the last chapter;
- In the second stage (April-June 2003), the country reports were submitted to experts in each of the 32 countries. The experts were identified through the INSPIRE expert committee. In some countries, the report was handed over to other organizations and persons for further update. In this way, for most of the reports, corrections and updates were provided. The name and affiliation of the then contributing experts is still available in the present version reports which are annexed to this summary report (Annex 11.1 – see meta-information).
- Through the visits to nine countries performed in the scope of Activity 2 of the first contract, some extra information could be collected which, where relevant, was added to the country reports spring 2003.
- The resulting country reports were used for the update of 2004 which in turn were used to produce the update of 2005. For each of the updates, additional information was gathered through the experts from the INSPIRE expert committee, visit of relevant websites, reading of strategic and other relevant SDI documents, and through information collected during workshops and SDI related activities (e.g. EC GI&GIS workshops). In the meantime, spontaneously, several stakeholders from different countries also sent new information in the course of the years under study. For each update the previous version of the report was modified with important changes highlighted (in a change table and in the text itself).

### 6.1.2 Comparative summary of the (N)SDI

Based on these country reports, a methodology was developed to assess the status of the (N)SDI. The presented items in the reports relate to a number of organizational issues and to the five generic components of an SDI, as valid for the period studied. They can be considered as the building blocks of the SDI under study. The items or building blocks are expressed as statements or indicators (see Table 1) and the assessment of the studied SDI-initiative has been made in terms of whether it is (1) in full agreement with the statement, (2) in partial agreement, (3) not in agreement or (4) whether not sufficient information is available for assessing the level of agreement. The assessment was carried out in 2003, 2004 and 2005 and resulted in an assessment matrix for each year giving the results for all the 32 countries and 30 indicators studied.

I. Organisational issues		
Level of SDI	1	The approach and territorial coverage of the SDI is truly national
Degree of operationality	2	One or more components of the SDI have reached a significant level of operationality
Coordination	3	The officially recognised or de facto coordinating body of the SDI is a NDP, i.e. a NMA or a comparable organisation (Cadastral or Land Survey Agency, i.e. a major producer of GI)
	4	The officially recognised or de facto coordinating body for the SDI is an organisation controlled by data users
	5	An organisation of the type 'national GI-association' is involved in the coordination of

		the SDI
Participants	6	Producers and users of spatial data are participating in the SDI
	7	Only public sector actors are participating in the SDI
<b>II. Legal issues and funding</b>		
Legal framework	8	There is a legal instrument or framework determining the SDI-strategy or -development
Public-private partnerships (PPP)	9	There are true PPP's or other co-financing mechanisms between public and private sector bodies with respect to the development and operation of the SDI-related projects
Policy and legislation on access to public sector information (PSI)	10	There is a freedom of information (FOI) act which contains specific FOI legislation for the GI-sector
Legal protection of GI by intellectual property rights	11	GI can specifically be protected by copyright
Restricted access to GI further to the legal protection of privacy	12	Privacy laws are actively being taken into account by the holders of GI
Data licensing	13	There is a framework or policy for sharing GI between public institutions
	14	There are simplified and standardised licences for personal use
Funding model for the SDI and pricing policy	15	The long-term financial security of the SDI-initiative is secured
	16	There is a pricing framework for trading, using and/or commercialising GI
<b>III. Reference Data &amp; Core Thematic Data</b>		
Scale and resolution	17	Geodatasets exist which provide a basis for contributing to the coverage of pan-Europe for the INSPIRE-selected data themes and components
Geodetic reference systems and projections	18	The geodetic reference system and projection systems are standardised, documented and interconvertable
Quality of reference data & core thematic data	19	There is a documented data quality control procedure applied at the level of the SDI
Interoperability	20	Concern for interoperability goes beyond conversion between different data formats
Language and culture	21	The national language is the operational language of the SDI

	22	English is used as secondary language
IV. Metadata for reference data and core thematic data		
Availability of metadata	23	Metadata are produced for a significant fraction of geodatasets of reference data and core thematic data
Metadata catalogue availability + standard	24	One or more standardised metadata catalogues are available covering more than one data producing agency
Metadata implementation	25	There is a coordinating authority for metadata implementation at the level of the SDI
V. Access and other services for reference data, core thematic data and their metadata		
Metadata	26	There are one or more on-line access services for metadata on reference data and core thematic data
Data	27	There are one ore more on-line access services for reference data and core thematic data
Web mapping	28	There are one or more web mapping services available for reference data and core thematic data
VI. Standards		
Standards	29	The SDI-initiative is devoting significant attention to standardisation issues
VII. Thematic environmental data		
Thematic Environmental data	30	Thematic environmental data are covered by the described SDI-initiative or there is an independent thematic environmental SDI

Table 1: Selected building blocks for an SDI

With this type of rating, reality is of course strongly simplified and it is only possible through interpretation of the facts as represented in the (incomplete) country reports. E.g. the fact that a particular NSDI is evaluated as being in agreement with the three statements about the metadata component only means that substantial work has been done in relation to metadata. This implies that the practical meaning of these 'indicators' to assess progress made over time with respect to metadata production and implementation, is limited.

For every country a NSDI-initiative is assessed. Till 2004, Belgium was not assessed nationally since mainly the 3 regional initiatives had been developed at that time. The initiative at national level was in 2004 not yet consolidated. In the meantime, the national level has been very active and is therefore not only included in the country report but in the overall assessment of Belgium as well. In other countries (Germany, Spain), significant regional initiatives are also deployed. However, since the collected information on these regional initiatives does not cover the entire countries and since at the national level in those countries, relevant activities are ongoing or planned often aiming at interconnecting the regional projects, we have assessed the national level taking into account the regional developments.

In 2004 and 2005 change matrixes have been elaborated in additional tables highlighting the new or corrected information which has been collected and the progress some countries have made in developing their NSDI. Change matrixes exist for 2004-2003, 2005-2004 and 2005-2003.

### 6.1.3 Typology of (N)SDI in 32 countries

The primary goal of the typology as elaborated for the 2003 report and repeated for the 2004 and 2005 situation, was to recognize the different types of SDI for the assessment of their potential contribution for the development and implementation of a successful European SDI. In the typology, we emphasized the matters of coordination since it is obvious that coordination is the major success factor for each SDI and since coordination is tackled in different ways according to the political and administrative organization of the country. The way an SDI-initiative is coordinated is undoubtedly one of its more pertinent characteristics.

In order to make the typology also useful for monitoring purposes, the degree of 'operationality' of the SDI is taken into account. The latter is a rather subjective (overall) assessment of the level of the services the SDI is providing, which is based on the assessment of the building blocks of the SDI as described in the assessment tables. It does not mean that all characteristics of NSDI as can be derived from the INSPIRE-position papers are in place. It rather means that production of GI is coordinated to at least a certain extent and that users of GI are supported in finding and re-using GI through SDI-mechanisms.

By comparing the classification of the NSDI of 2003-2004-2005, major changes in the characteristics of the NSDI could be easily identified as shifts between classes of the typology. It was obvious however that the simple and broad nature of the typology could not lead to the detection of subtle changes.

From the more complete description of the status of SDI for 2003, it was obvious that in almost every European country (Bulgaria was an exception to this at that time), one organization of the NDP-type (NMA, Land Survey Service, Cadastral Agency) is present having the formal mandate to, a.o. maintain the national geodetic reference system, produce topographic reference data and –often- coordinate data production and dissemination with other players. As such the NDP has an implicit mandate to set up an SDI, albeit mainly from the producers' perspective. We considered this as the most basic level of SDI. User communities may or may not be active in steering committees and/or advisory boards for the NDP and NSDI. A GI-association may or may not exist, be active or not.

We distinguished countries with this type of GI-coordination from those where, of course NDP are also present, but where the NMA or another traditional data producer is not the main coordinator of the NSDI. In those countries the SDI is rather driven by a council of ministries or administrative departments, a GI-association or another type of partnership of –mainly- data users. Fundamental to this type of SDI-initiative is that the participants are willing to share each other's spatial data and those acquired from third parties and to remove the obstacles preventing this. From this perspective, participants are mainly users of GI which is acquired from the data producers. The initiative may result in a joint framework for negotiation of the SDI-participants with the data providers for optimal conditions of data characteristics, conditions or licenses for use and re-use, price, access. Such partnerships may be based on (i) a formal mandate or law, (ii) a (temporary) project agreement or (iii) voluntary contributions.

In each distinguished group, the degree of operationality as derived from the presence and accessibility of the other SDI-components was included as a further discriminating factor.

## 6.2 Modified approach for the update of 2006

The major aim of the review of the methodology developed for the INSPIRE State of Play study is to adapt it as much as possible to the INSPIRE Directive and the ongoing work within the INSPIRE Drafting Teams, especially the one on Monitoring and Reporting. In a first section we describe some general issues on the reviewed methodology and the potential consequences for the country reports. In a second section we list all inconsistencies found in the original list of indicators, and in a last section we try to elaborate a potential migration path between the original list of

indicators and the actual list of indicators as defined by the Drafting Team on Monitoring & Reporting<sup>5</sup>.

## 6.2.1 General issues on the reviewed methodology

In order to review the methodology, it was decided to have a closer look at the current assessment procedure, including the way of reporting and the assessment methods. The review was done in several steps:

- Step 1: analysis of the original indicators

The indicators used in the previous SoP releases were based on the 5 major components of an 'ideal' SDI as described in the GSDI Cookbook: data, metadata, services, standards and organisational measures. The GSDI Cookbook was used as a sort of baseline. The 30 indicators described the status of the NSDI or the 'distance-to-target': how well are the components elaborated in the respective countries as compared to the 'ideal' SDI described in the Cookbook. Some of the indicators are very broad and leave room for interpretation, others are not materialising very well (not indicating the dynamics of the SDI development). The 30 current indicators were analysed in terms of strengths and weaknesses as became obvious through the 2004 and 2005 updates.

- Step 2: analyse feedback from stakeholders

Some SDI stakeholders – mainly key INSPIRE experts – indicated some of the drawbacks of the current indicators used in the SoP. These remarks were analysed and were taken into account when reviewing the indicators.

- Step 3: listing of all inconsistencies

All strong points and drawbacks (and potential drawbacks) were listed and analysed in detail. The indicators that need enhancement were indicated, along with indicators to be withdrawn or to be added. On the basis of this list, potential enhancements were proposed to ESTAT during a Progress Meeting beginning of October 2006. This resulted in a new list of indicators. The new list contains 32 indicators instead of 30. No indicators were dropped.

- Step 4: comparison with indicators proposed by DT M&R

The result of this analysis was checked against the indicators proposed by the DT on Monitoring and Reporting, version October 2006: similarities, differences, incompatibilities, which indicators measure the same or similar characteristics, etc.

- Step 5: elaboration of a migration path

We had a closer look at those indicators that need to be 'mapped' or 'migrated'. This can be done by aggregating indicators to higher level indicators or vice versa by disaggregating some of the indicators. The link between (combined) indicators is described. Special attention has been paid to the (re-)definition of some of the terms in both lists. However, this part of the review will be further scrutinised since at the end of 2006, there was not yet a final list of indicators available from the DT M&R.

In general terms, it was decided not to review the methodology too drastically, and to keep the overall approach for reasons of comparability and continuity. In addition to this, the country reports, as elaborated between 2003 and 2005, were reviewed without making too drastic changes to the structure neither, and this for the same reason. Following elements were taken into consideration:

- There is a need to process the current country reports in view of the terminology used. While some of the terminology has been used for some historical reasons or due to the fact that things were not yet clear at that time, it should be brought in line with the terminology used within the INSPIRE Directive and related documents from the drafting teams (e.g. not speaking anymore about Reference data and Core Thematic data).

---

<sup>5</sup> Status October 2006. Review will be necessary for future updates.

- In the country reports, the chapter on standards is in general empty since this information is in most cases included in the three technical chapters (data, metadata and services). It is decided to drop this chapter and put the existing information in the respective technical chapters.
- Over the years, the section with general information on the (N)SDI has been extended for most of the countries studied. The reason is that in this section, most of the information on the organisation of the SDI found its place, as well as information on important SDI projects, examples of the use of the SDI, etc. Since organisation and coordination is one of the key elements it is proposed to re-arrange the chapters on the components of the SDI to bring them more in line with the chapters from the INSPIRE Directive: organisation and coordination; data sharing, legal issues and funding; data; metadata and network services.
- The elements related to the use and impact of the SDI should be part of the section on these matters (which was already foreseen, but in most cases not well developed).
- It has been decided to keep the chapter on the sixth component (environment) although the other chapters refer to environmental information and services as well (which results sometimes in repetition of information). The major reason to do so, is to highlight the fact that INSPIRE is related to environmental policy and therefore focus on this field rather than on other fields.

## 6.2.2 Critical review of the original indicators

### Indicators related to organisational issues

*“The approach and territorial coverage of the SDI is truly national” (I.1)*

This indicator is a kind of general indicator which says something about the territorial coverage, and indirectly about the relationships and coordination between the different levels of authority. Countries where several regions have separate RSDI, but no integrated approach will not match this indicator. The indicator does not allow to see overlaps between different initiatives, nor does it say something about the intensity or degree of maturity of the relationships. It is proposed to keep this indicator as it is.

*“One or more components of the SDI have reached a significant level of operationality” (I.2)*

This indicator is fully agreed with if one of the components as described by the GSDI cookbook is in place. So no distinction was made between an SDI with all of the components in place and those that have only one in place. In reality this indicator as it stands now does not allow to assess the status of development of the SDI. The word “significant” leaves also room for interpretation. It does not allow to know whether it is a pilot/test or long term setup. It is proposed to add a figure between 1 and 6 to indicate the number of components for which the SDI is well developed.

*“The officially recognised or de facto coordinating body of the SDI is a NDP, i.e. a NMA or a comparable organisation (Cadastral or Land Survey Agency, i.e. a major producer of GI)” (I.3)*

*“The officially recognised or de facto coordinating body for the SDI is an organisation controlled by data users” (I.4)*

*“An organisation of the type ‘national GI-association’ is involved in the coordination of the SDI” (I.5)*

The three indicators describe the way the coordination is tackled. It is the basis to make a typology of the (N)SDI. However, they do not clearly indicate whether one or more organisations, or a coordinating body/structure has/have a mandate to do so. Important questions to be answered when assessing the indicators are: *“is there a platform where on a regular basis the planning/work of the SDI is discussed with all the relevant stakeholders?”* and *“is this a permanent activity?”*. The indicators are left as they are, but should take these questions into account. An additional concern is that I.4 and I.5

are not so different after all. It might also be important to know whether there is a dedicated body/structure, rather than who is having the lead.

*“Producers and users of spatial data are participating in the SDI” (I.6)*

*“Only public sector actors are participating in the SDI” (I.7)*

Both indicators are complementary. It is proposed to leave them as they are although “participation” is not defined and can be interpreted differently. It is important to know if the users are involved and/or the private sector. The indicators give only an indirect answer on those questions.

### **Indicators related to legal issues and funding**

Although most of these indicators are less relevant for the INSPIRE Directive, it is decided to keep them since they give an indication of legal and financial considerations with regard to the development of the SDI. The major issue here will be the transposition of the INSPIRE Directive once it has been published.

*“There is a legal instrument or framework determining the SDI-strategy or – development” (I.8)*

It would be better to have an indication whether a clear strategy document exist. Except for a few cases, the legal instrument does not exist. This is normal since the transposition of the INSPIRE Directive will fill this gap. So the indicator narrows down to whether or not a strategic document exists.

*“There are true PPP’s or other co-financing mechanisms between public and private sector bodies with respect to the development and operation of the SDI-related projects” (I.9)*

At the beginning of the study it was assumed that such initiatives occurred in several countries. However, real PPP’s are rather rare. Nevertheless it is proposed to keep the indicator since it catches at least the few existing initiatives. Maybe in future assessments this could be broadened to PP collaboration at large.

*“There is a freedom of information (FOI) act which contains specific FOI legislation for the GI-sector” (I.10)*

*“GI can specifically be protected by copyright” (I.11)*

*“Privacy laws are actively being taken into account by the holders of GI” (I.12)*

These indicators give information on several legal issues which are only indirectly relevant for the development of the (N)SDI. They do not say much about accessibility to spatial data as such, but indirectly they indicate potential constraints for data sharing. For a lot of countries this information is not (clearly) available. It would be interesting to have more precise questions as starting point: e.g. is IPR used in practice to prevent access to spatial data; ibidem for security issues.

*“There is a framework or policy for sharing GI between public institutions” (I.13)*

In the future, the framework for data sharing will be the INSPIRE Directive and the corresponding national legislation after the transposition phase. What would be more useful is to know whether a coherent system of data sharing agreements is in place. The indicator was interpreted in that way before and therefore should stand as it is.

*“There are simplified and standardised licences for personal use” (I.14)*

Within the light of the INSPIRE Directive, the personal use is less relevant than use by authorities.

*“The long-term financial security of the SDI-initiative is secured” (I.15)*

This is an important indicator since it is always said that together with a good organisation and clear legislation, good funding is crucial for sustainable development of the SDI. Additional information on the level of funding, and what is to be covered with that, would be useful.

*“There is a pricing framework for trading, using and/or commercialising GI” (I.16)*

Since the answer is always Y/N, this gives not much information. Better would be to have information on the funding model being applied. The indicator is kept as it is, since the additional information is not yet available for all countries. This information could be collected in the future.

### Data

*“Geodatasets exist which provide a basis for contributing to the coverage of pan-Europe for the INSPIRE-selected data themes and components” (I.17)*

The problem with this indicator is that it is not quantified. The fact that a geodataset exists is too vague. What is important to know is the territorial coverage (eventually per scale level). In former reports, the scheme of themes was also different from the INSPIRE annexes. It is proposed to start working with a table in which for each of the themes of the three annexes the territorial coverage is given. The table will be tested in order to assess the feasibility of collecting this information (the theme level might not be the appropriate level). The table will then be used as input to assess the indicator.

*“The geodetic reference system and projection systems are standardised, documented and interconvertable” (I.18)*

It is proposed to leave this indicator although there are not many countries where different reference systems are used.

*“There is a documented data quality control procedure applied at the level of the SDI” (I.19)*

This indicator is rather vague since it is not clear for what a quality control procedure (QCP) should exist. A QCP at the level of the SDI seems a little bit ambitious. QCP for database development, service development, etc. seems more logic. It has been used in that way so far, so it is proposed to leave it as it is. In the future it could indicate whether a compliance testing mechanism exists for data, metadata and services.

*“Concern for interoperability goes beyond conversion between different data formats” (I.20)*

In practice, there was a lot of confusion about the exact meaning of the term interoperability in the countries studied. In a lot of cases it was understood as a combination of the existence of exchangeable data formats and the use of harmonised (interchangeable) datasets for the national territory (common data model, object catalogue, ...). However this is maybe too narrow. Three different categories of interoperability should be taken into account: data harmonisation within one theme/sub-theme, cross border data harmonisation and service interoperability.<sup>6</sup>

*“The national language is the operational language of the SDI” (I.21)*

*“English is used as secondary language” (I.22)*

It is proposed to leave the indicators as they are. However, we should be more precise about what a language of the SDI exactly means. In former reports most information did not relate to data issues, but rather to languages for portals, etc. However, what is crucial for the development of the SDI is the existence of multilingual thesauri. It would be interesting to collect information about the primary, secondary, ..., languages used (e.g. national language, English, local languages, etc.)

### Metadata

*“Metadata are produced for a significant fraction of geodatasets of reference data and core thematic data” (I.23)*

---

<sup>6</sup> The INSPIRE Directive speaks about data harmonisation and data/service interoperability. In addition the term consistency is used as well. Since the Directive does not clearly make the distinction between these three words (it only defines interoperability), it is expected that the Implementing Rules for data and service interoperability will do this. In general terms, interoperability is used in the broader sense for data as well as for services to indicate the possibility for the data to be combined and for the services to interact. Data harmonisation is used for the data to have a common data model, a common system of identifiers, etc. Consistency is used to describe relationship between items of information referring to the same location (e.g. the joint boundary of a road and a river) or between items of information referring to the same location at different scales.

The notion “metadata ... for a significant ...” part of the data is too vague. It is proposed to have a quantified threshold since data without metadata are difficult to use within an SDI environment. The threshold could be set at 90%. The only way to assess this is to collect information for all the relevant datasets of all the themes of the annexes of the Directive. Besides non existence of metadata for a dataset, it could be indicated if ISO or another standard is being used (e.g. coding 0, 1 and 2). A test template has been elaborated to test the feasibility to collect this information, as well as the assessment of the results.

*“One or more standardised metadata catalogues are available covering more than one data producing agency” (I.24)*

Leave it as it is.

*“There is a coordinating authority for metadata implementation at the level of the SDI” (I.25)*

Is this relevant at all? Metadata are mostly collected and published decentralised, eventually through a publication tool. If it is meant that central bodies encourage metadata publication, then this is OK. Additional information on catalogues could be gathered: individual/independent catalogues, not coordinated; several access points but coordinated; 1 access point, with a centralised approach. The indicator is left as it is, but taking into account the different approaches.

#### **Network services**

*“There are one or more on-line access services for metadata on reference data and core thematic data” (I.26)*

*“There are one or more on-line access services for reference data and core thematic data” (I.27)*

*“There are one or more web mapping services available for reference data and core thematic data” (I.28)*

To be in line with the INSPIRE Directive, it is proposed to change the order and terminology: discovery, viewing and download services. Therefore it is also necessary to add the other service types (transformation and invoking/middleware services): *“there are one or more transformation services for reference or core thematic data”* and *“there are one or more middleware services that can ‘bind’ other services”*. Instead of knowing the number of services it is important to know the amount of data that is discoverable and accessible through services.

#### **Standards**

*“The SDI-initiative is devoting significant attention to standardisation issues” (I.29)*

Leave the indicator as it is since it gives an overall appreciation on the application of standards.

#### **Thematic environmental data**

*“Thematic environmental data are covered by the described SDI-initiative or there is an independent thematic environmental SDI” (I.29)*

Leave the indicator as it is since it is interesting to have description of thematic SDI's. In most cases these are cross-border or cross regional.

In summary:

- There are two indicators added in order to have all the possible services from the Directive (discovery, view, download, transformation, middleware).
- There are two indicators for which the way of collecting information will be different in the future and tested during this update (template for data and metadata existence).
- Some indicators will be based on more precise/detailed (additional) information and additional/other questions will be answered to make the assessment.
- Most indicators will remain as they are.

The updated list of indicators looks as follows (in bold modified indicators):

I. Organisational issues		
Level of SDI	1	The approach and territorial coverage of the SDI is truly national
Degree of operationality	2	One or more components of the SDI have reached a significant level of operationality
Coordination	3	The officially recognised or de facto coordinating body of the SDI is a NDP, i.e. a NMA or a comparable organisation (Cadastral or Land Survey Agency, i.e. a major producer of GI)
	4	The officially recognised or de facto coordinating body for the SDI is an organisation controlled by data users
	5	An organisation of the type 'national GI-association' is involved in the coordination of the SDI
Participants	6	Producers and users of spatial data are participating in the SDI
	7	Only public sector actors are participating in the SDI
II. Legal issues and funding		
Legal framework	8	There is a legal instrument or framework determining the SDI-strategy or -development
Public-private partnerships (PPP)	9	There are true PPP's or other co-financing mechanisms between public and private sector bodies with respect to the development and operation of the SDI-related projects
Policy and legislation on access to public sector information (PSI)	10	There is a freedom of information (FOI) act which contains specific FOI legislation for the GI-sector
Legal protection of GI by intellectual property rights	11	GI can specifically be protected by copyright
Restricted access to GI further to the legal protection of privacy	12	Privacy laws are actively being taken into account by the holders of GI
Data licensing	13	There is a framework or policy for sharing GI between public institutions
	14	There are simplified and standardised licences for personal use
Funding model for the SDI and pricing policy	15	The long-term financial security of the SDI-initiative is secured

	16	There is a pricing framework for trading, using and/or commercialising GI
<b>III. Data for the themes of the INSPIRE annexes</b>		
Scale and resolution	17	Geodatasets exist which provide a basis for contributing to the coverage of pan-Europe for the INSPIRE-selected data themes and components
Geodetic reference systems and projections	18	The geodetic reference system and projection systems are standardised, documented and interconvertible
Quality of reference data & core thematic data	19	There is a documented data quality control procedure applied at the level of the SDI
Interoperability	20	Concern for interoperability goes beyond conversion between different data formats
Language and culture	21	The national language is the operational language of the SDI
	22	English is used as secondary language
<b>IV. Metadata for the data of the themes of the INSPIRE annexes</b>		
Availability of metadata	23	Metadata are produced for a significant fraction of geodatasets of <b>the themes of the INSPIRE annexes</b>
Metadata catalogue availability + standard	24	One or more standardised metadata catalogues are available covering more than one data producing agency
Metadata implementation	25	There is a coordinating authority for metadata implementation at the level of the SDI
<b>V. Access and other services for data and their metadata</b>		
<b>Discovery Services</b>	26	<b>There are one or more discovery services making it possible to search for data and services through metadata</b>
View Services	27	There are one or more <b>view</b> services available for <b>to visualise data from the themes of the INSPIRE annexes</b>
<b>Download Services</b>	28	There are one or more on-line <b>download</b> services <b>enabling (parts of) copies of datasets</b>
<b>Transformation Services</b>	29	<b>There are one or more transformation services enabling spatial datasets to be transformed to achieve interoperability</b>
<b>Middleware Service</b>	30	<b>There are one or more middleware services allowing data services to be invoked</b>
<b>VI. Standards</b>		
Standards	31	The SDI-initiative is devoting significant attention to standardisation issues

VII. Thematic environmental data		
Thematic Environmental data	<b>32</b>	Thematic environmental data are covered by the described SDI-initiative or there is an independent thematic environmental SDI

Table 2: Reviewed building blocks for an SDI

### 6.2.3 Mapping of SoP and DT indicators

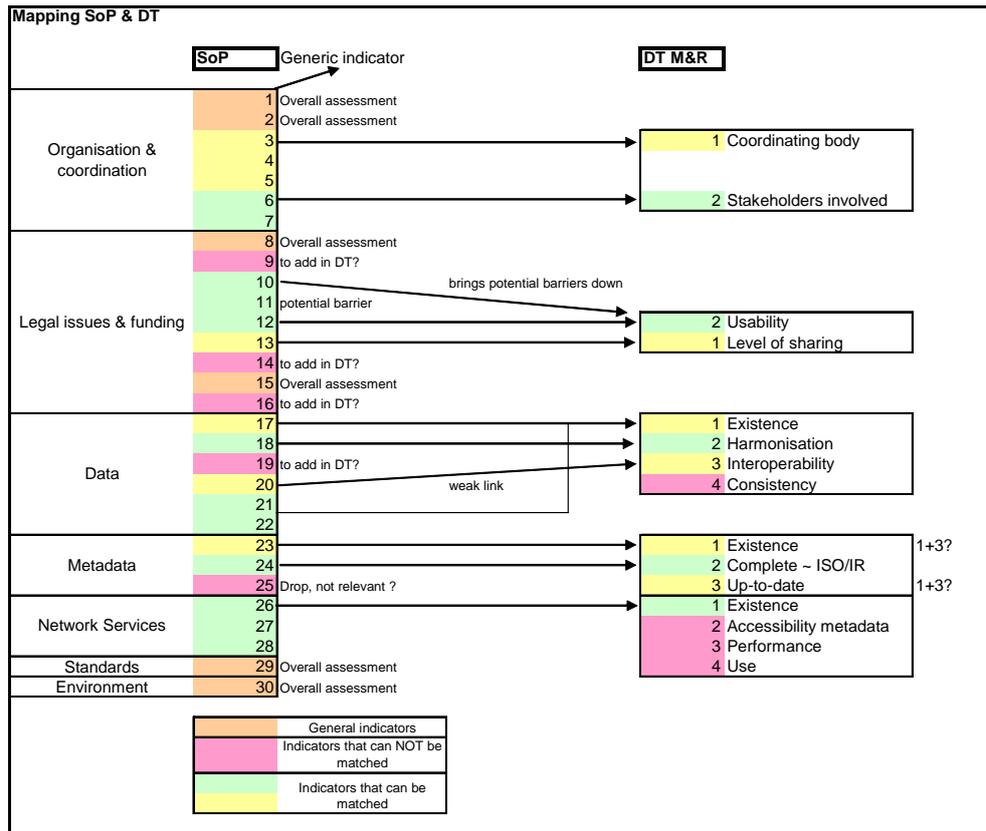
The State of Play started in 2002 and aimed at that time to have a better view on the development of the (N)SDI in 32 European countries. As explained in previous sections, the assessment of the (N)SDI was carried out against the components as described in the GSDI cookbook which acted as a kind of baseline. The INSPIRE Directive did not yet exist at that time.

In 2004 the proposal for an INSPIRE Directive saw light, and the Directive was only recently approved, in November 2006. The Directive sets out how the Member States of the EU should set up their (N)SDI to enhance data sharing amongst public authorities for environmental policy. The Directive contains chapters about the need for interoperable data and services, metadata, data sharing mechanisms, and the need to coordinate the efforts of all the relevant stakeholders in order to achieve this. The Directive also contains a chapter on the need to monitor and report on the progress being made and gives for some of the components even a time frame for doing so. Implementing rules will define which indicators should be used to monitor progress. They will also contain guidelines how to collect information to feed the indicators, and how to report the results to the Commission at fixed time intervals.

Once the Member States will have the obligation to start this monitoring and reporting process<sup>7</sup>, the SoP will – in a certain way - become obsolete. Therefore, the final aim is to replace the SoP with this new coherent monitoring and reporting mechanism as defined by the implementing rules of the INSPIRE Directive. This will be done step by step. In this update of 2006, the old approach is under review and some changes have already been made (see previous section). Secondly it is necessary to think how the results of the SoP carried out so far could be compared with future monitoring and reporting and vice versa. The reason for trying to match both approaches is to be able to assess development over time, and not to start from scratch a total new assessment process that is not comparable at all with the efforts made in the SoP.

In September 2006, SADL tried to map the 30 original indicators with the indicators which were defined at that time by the DT on M&R. The figure below shows schematically this mapping: on the left side are the thirty SoP indicators, on the right side the 13 indicators of the DT on M&R. In general, this mapping is not straightforward (for several reasons), even if there are clear links between some of them. One of the most important reasons for this is that the indicators of the SoP do not quantify, while almost all the DT indicators are quantifiable.

<sup>7</sup> The monitoring process should start once the implementing rules have been adopted. This expected to be in 2008. The first reporting is foreseen not later than 3 years after the Directive entered into force. Notice that it will be the Member States who will be responsible for monitoring and reporting on progress. At EU level, the Commission will be responsible for making an overall assessment and reporting to the European Parliament.



1. In the SoP, there are 6 indicators that are of general nature, and that therefore have no candidate indicator amongst the indicators as defined by the DT. These indicators are more like “overall assessment” indicators. They give general information on the status of the (N)SDI development. This is the type of indicator that will be used by the European Commission when aggregating the indicators used by the Member States (those that are currently being defined by the DT) to monitor the implementation of the INSPIRE Directive.

The indicators are:

- “The approach and territorial coverage of the SDI is truly national”
- “One or more components of the SDI have reached a significant level of operationality “
- “There is a legal instrument or framework determining the SDI-strategy or –development” – (this will be the transposed INSPIRE Directive)
- “The long-term financial security of the SDI-initiative is secured”
- “The SDI-initiative is devoting significant attention to standardisation issues”
- “Thematic environmental data are covered by the described SDI-initiative or there is an independent thematic environmental SDI”

2. There are 5 indicators amongst the 30 SoP indicators that can’t be matched with an indicator of the current list of the DT on M&R. These indicators are:

- “There are true PPP’s or other co-financing mechanisms between public and private sector bodies with respect to the development and operation of the SDI-related projects” – There is nothing in the INSPIRE Directive that requires PPP’s, and therefore no need to monitor this anymore.
- “There are simplified and standardised licences for personal use” – This is not a requirement in the Directive.

- *“There is a pricing framework for trading, using and/or commercialising GI”* - This is not a requirement in the Directive.<sup>8</sup>
  - *“There is a documented data quality control procedure applied at the level of the SDI”* – In the INSPIRE Directive, quality is only mentioned when speaking about harmonised data and metadata. It might be useful to define such an indicator for the INSPIRE Directive to monitor whether or not there is a certification system for data, metadata and services (we refer here also to the compliance testing idea).
  - *“There is a coordinating authority for metadata implementation at the level of the SDI”* – This is an organisational detail related to how metadata are implemented in the (N)SDI. It is not deemed useful, nor is it necessary to monitor the implementation of the Directive (see also remark previous section).
3. There are 4 indicators defined by the DT on M&R that can't be linked with any of the 30 SoP indicators. Here, no actions can be taken. These indicators are defined for specific requirements of the INSPIRE Directive. These indicators are:
- Consistency of data
  - Accessibility of metadata
  - Performance of network services
  - Use of network services
4. The remaining 19 indicators of the SoP can – in some cases after grouping or aggregation – be linked to one or more indicators as defined by the DT. The mapping is not always strong and therefore needs some 'interpretation'. These indicators are:
- Coordinating body or structure (DT)<sup>9</sup> - *“The officially recognised or de facto coordinating body of the SDI is a NDP, i.e. a major producer of GI (e.g. an NMA a Cadastral or Land Survey Agency)” (I.3); “The officially recognised or de facto coordinating body for the SDI is an organisation controlled by data users” (I.4) and “An organisation of the type ‘national GI-association’ is involved in the coordination of the SDI” (I.5)* – If none of the above is true (strongly agreeing), then there is no coordination. The other way around is also true.
  - Stakeholders involved (DT) - *“Producers and users of spatial data are participating in the SDI” (I.6); “Only public sector actors are participating in the SDI” (I.7)* – If I.6 is not true (disagree) and I.7 is true, we can say that there is weak stakeholder involvement (without being able to quantify). The opposite is also true.
  - Usability (DT) - *“There is a freedom of information (FOI) act which contains specific FOI legislation for the GI-sector” (I.10); “GI can specifically be protected by copyright” (I.11); “Privacy laws are actively being taken into account by the holders of GI” (I.12)* – The link is weak and mapping is not obvious, but copyright issues, privacy laws could be seen as potential barriers that makes access to the data more difficult. To be looked at into more detail.
  - Level of data sharing (DT) - *“There is a framework or policy for sharing GI between public institutions” (I.13)* – Not directly quantified, but the indicators can be mapped.
  - Existence of data (DT) - *“Geodatasets exist which provide a basis for contributing to the coverage of pan-Europe for the INSPIRE-selected data themes and components” (I.17)* – This indicator of the SoP was linked to the original schema of reference and thematic data, while for the INSPIRE Directive it is linked to the data of the annexes. The SoP shall step by step

<sup>8</sup> This one could eventually be matched with one of the new sub-indicators for data sharing (list drafted in December 2006).

<sup>9</sup> Note that within the DT, there is still discussion if we need indicators for the chapter on coordination.

move to the data of the annex too (most of the countries provided this information not yet). Mapping is possible.

- Harmonisation of data (DT) – *“The geodetic reference system and projection systems are standardised, documented and interconvertable” (I.18)* – Very weak link since this is only one aspect of the harmonisation. In fact in I.17, reference is also made to harmonisation (data model). Maybe use both to do the mapping.
- Interoperability of data (DT) – *“Concern for interoperability goes beyond conversion between different data formats” (I.20)* – Also here the link is very weak since it says something about the concern and nothing about practice. However the information is (partially) available in the country reports, at least for some countries.
- Existence and up-to-date metadata (DT) – *“Metadata are produced for a significant fraction of geodatasets of reference data and core thematic data” (I.23)* – Mapping is possible if the information is known at dataset level. Up till now this indicator was based on a more general assessment, rather than a detailed analysis.
- Compliance of metadata (DT) - *“One or more standardised metadata catalogues are available covering more than one data producing agency” (I.24)* – If this indicator is true (strongly agree), then we assume that we have standard metadata. But we don't know for which datasets. So the link is rather weak.
- Existence of network services (DT) - *“There are one or more on-line access services for metadata on reference data and core thematic data” (I.26); “There are one or more on-line access services for reference data and core thematic data” (I.27); “There are one or more web mapping services available for reference data and core thematic data” (I.28)* – Can be mapped directly, but not taking into account numbers. In this update, the indicators were already split up according to the 5 types as defined in the INSPIRE Directive.

In summary:

It should be taken into account that the list of indicators as defined by the DT, September 2006, was far from finalised. This mapping exercise should be done with the final list. Nevertheless, some elements issues can already be raised:

- There are 6 existing indicators that are generic indicators that are giving an overall status rather than monitoring a specific element of the SDI. Not to be mapped.
- There are 5 indicators for which no mapping is possible. For each of them it should be discussed whether this indicator is missing in the List of Indicators of the DT M&R or not relevant at all.
- There are 4 proposed indicators of the DT M&R that does not have a corresponding indicator in the SoP. Not to be matched.
- There are 10 indicators (or groups of indicators) of the SoP that can be mapped (to a certain degree) to the DT M&R indicators assuming some stronger or weaker relationship.

## 7. STATE OF PLAY OF THE SDI, AUTUMN 2006

### 7.1 General observations and remarks

The work on the State of Play, update 2006, started in June 2006. Therefore, the results as described in the country reports and in this summary report refer to the status of the (N)SDI in autumn 2006.

Information was collected in various ways. The team of K.U.Leuven attended the EC GI&GIS workshop in Innsbruck from 21 till 23 June. At this workshop, several stakeholders of national and regional SDI from 14 countries presented the status of (one of the components of) the SDI in 28 presentations. After and between sessions, we could talk with most of the representatives and stakeholders about the SoP and ask for additional input.

Beginning of July, an e-mail was sent to all the contacts of the INSPIRE expert group asking for input for the update of 2006 (documents, new initiatives, portals, presentations, updates of the previous report, ...). Twelve countries replied and sent interesting and directly usable information. Indirectly we got additional information for 7 countries of which 3 didn't send something before.

One person from SADL attended a meeting of the INSPIRE Task Force organized by IMAGI in Frankfurt on 30 August. Through this meeting, we got a very good overview of the current status of the SDI in Germany and of the ongoing discussions related to the INSPIRE process seen through the eyes of the German stakeholders.

On September 14 and 15, a workshop was organized by JRC in Ispra for the 10 new Member States and all the accessing and candidate Member States on the organization of INSPIRE Info Days. One person from K.U.Leuven attended the workshop. There were 16 presentations from 12 countries which provided valuable input for the country reports. Between the sessions we could discuss with several people and ask for additional information.

Beginning of October, we had information for 26 countries. On the basis of the material received and the input through the different other channels, it was decided together with ESTAT to select three countries for a two-days visit for an in depth assessment. There were 13 potential candidates for such a visit (countries where over the past 1,5 year SDI development was quite important organizationally and/or technically). The final selection was based on specific criteria: the possibility to learn a lot on good practices related to data sharing, the work done in the field of network services and data harmonization, ..., and additional criteria related to size and geographic position within Europe.

In October and November some of the countries were re-contacted to remind them to provide input for the SoP update. For GR, IS, LI, LU and MT, we did not receive any formal response. For all the 32 countries we had information to be integrated in the 2006 update although the quantity and quality of the information was variable.

In the following sections we summarize the findings of the three country visits and the assessment of the indicators for all the 32 countries studied (in the form of tables).

## 7.2 Summary of the visit to 3 countries

In the first three sub-sections we summarise each of the three country visits (detailed reports are available as well). In the last sub-section we list the most important lessons learnt.

### 7.2.1 Czech Republic

The country visit to the Czech Republic was held on 4-5 December 2006. It included a series of meetings with several stakeholders at the offices of CENIA which coordinates the (N)SDI and INSPIRE activities, i.e. with CENIA itself, the Agency for Nature Conservation and Landscape Protection (AOPK), the Czech Geological Survey (CGS), lawyers from the Ministry of Environment (MoE) and from the Ministry of Informatics (Mol), the Czech Association for Geomatics (CAGI) and CCSS on the second day. Also the second day, there were several visits to other stakeholders, i.e. the Czech Statistical Office (CSO), the Czech Office for Surveying, Mapping and Cadastre (CUZK), the Central Bohemia Region and the Transport Research Centre (CDV).

#### Coordination

The Czech Environmental Information Agency, CENIA, has been created in April 2005 to perform synthetic research in ecology and environmental protection and provide professional support to public administrations in the area of integrated prevention. Since beginning of 2006, CENIA is responsible for the implementation of the INSPIRE Directive. There is a strong cooperation with the EEA. The working model and types of activities are very similar. Major projects that are currently ongoing are the ETC/water of which CENIA is the leader, the set-up of a satellite receiving station, the creation of a register on emission resources, and the creation of an assessment centre. CENIA plays a coordinating and stimulating role, but also takes the lead in development of components of the infrastructure.

The CAGI and Neoforum associations/platforms are helping to bring together all the SDI stakeholders through different initiatives. CAGI is bringing together the users of the regional and local levels, the NGO's, universities and private companies. Neoforum includes also authorities. CAGI wants to focus on best practices and creation of awareness through the organisation of conferences, info days, ... It also stresses the need for education and training and organises an award for "Best geo application of the year". Neoforum started more from the idea to develop potential applications in the Real estate Market using cadastral data. Neoforum is focusing also on the organisation of seminars and events which it sometimes organises jointly with CAGI.

CENIA is currently preparing a cost/benefit study of the implementation of the SDI. The study is looking into key benefits at the strategic/general level (transparency, creation of market, possibilities eGovernment, ...), but also to benefits at the macro-economical level for which indicators will be used.

The legal departments of the MoE and Mol are responsible for the transposition of the INSPIRE Directive. The INSPIRE Directive will be an important guideline along with the two existing Directives which are key for environmental policy: the Aarhus Convention on access to environmental info and the Directive on re-use of PSI.

#### Sharing of data and services – collaboration between stakeholders

CENIA has created a central geo-portal and developed several Web Mapping Services with basic administrative, topographic and environmental data. The system is maintained in house by two people. The aim is to provide all the data/information that is required by the authorities for their day-to-day work. The services can be used through the portal but can easily be integrated in existing applications as well (for the time being through copy/pasting the correct URL). The services are free of charge.

The technical set-up has been done in such a way, that they are always operational. There are always two WMS that are balanced: if one fails, the other can take over.

The portal has been set-up in such a way that it allows interaction with the user. New information can be uploaded (e.g. on the status of the environment) after registration and login to the system. Publishing of the information is only done after quality control.

The services are used by several other departments and institutes (Geological Survey, Statistical Office, regions, ...). Some projects, like the project on geohazards from the Geological Survey are setup jointly.

#### Users and producers of data

The Czech Geological Survey (CGS) is producer of data from the annexes II and III, but is user as well. They see INSPIRE as an opportunity to be more recognised and their data to be valorised. Data are not restricted to geology, but hydrogeology, soil, energy resources and natural hazards as well. Important work is going on to harmonise the data as far as possible and make them available to the users (geoXML). CGS is working with test beds to test interoperability. One of the services to be developed will integrate knowledge rules to translate the geological maps of CZ into useable information.

The Agency for Nature Conservation and Landscape Protection is collecting also data for different themes of the annexes of INSPIRE: biotopes, Natura 2000, distribution of habitats and species, etc. The Agency is also user of the services from CENIA.

The Statistical Office (CSO) has a lot of data that can be linked to geographical information like census data, statistical data at different NUTS levels, etc. Priority will go to the development of WMS and the development of a metadata system (ISO compliant). CSO can only provide free viewing services, no download services since they do not own the geographical data. CSO will also look into the use of grids to solve the problem of data confidentiality.

Practices related to geographical data are very different from region to region. In the Region of Bohemia the existing services from CENIA are used. Only a small part of the data is from the region itself. The Regional Council owns the latter and can decide who can use them and at which conditions. There are no specific rules, for some data there are price lists, for others not. In practice the local level is not coming to the regional level to obtain data, but they go directly to the relevant national institutes.

## 7.2.2 Spain

The country visit to Spain took place on 29-30 November 2006. Presentations of- and discussions with some of the key stakeholders took place in Madrid at the National Mapping Agency: National Geographical Institute (IGN), University of Zaragoza, Cadastre, Ministry of Environment (IDEMA), GEOPISTA, regional SDI (Catalunia, Navarra) and local SDI (Pamplona, Zaragoza, Getafe) and private sector (IVER, Telefonica).

#### Coordination

There is a national coordinating body called the Consejo Superior Geográfico (National Geographical High Council) with representatives from National (9), Regional (17) and Local Authorities (2) and IGN & the Hydrographic Institute of Army. The President of the High Council is the Sub-Secretary of the Ministry of Public Works and Transports. There are two vice-Presidents: the Director General of IGN and the Director of the Hydrographic Institute of Army.

The Commission on Geomatic is an Executive Board responsible for implementing IDEE (Spanish SDI). This Board has set up a Working Group to implement IDEE with

165 individual members from more than 60 organisations. These include - besides authorities from the different levels - universities and private companies. The Working Group defines joint initiatives/projects based on a common architecture according to well known standards and profiles. Although IDEE is clearly led, **all stakeholders work on the basis of equality and partnership and see each other as equal node in the SDI network.**

When speaking about the Spanish SDI, one has to take into account the different levels of authority. IDEE is therefore a joint effort of Authorities at the National, Regional and Local levels. Following Ministries are involved: Agriculture, Foreign Affairs and Cooperation, Defence, Economy and Finance, Public Works and Transports, Education and Science, Environment, Interior, Industry - Tourism and Commerce. Several of them are data producers or have specific Institutes or Agencies dedicated for such tasks (e.g. Cadastre under Ministry of Economy and Finances, IGN under Ministry for Public Works, ...). Currently 12 out of the 17 regions are involved in the development of IDEE and are building their own regional SDI node (in May 2005 there were only 6).

Within IDEE, there is a discussion on how to measure performance and quality of the SDI. There is no idea about the types of users of IDEE. Specific services are used for specific applications or for registered users. An SDI Observatory has been set up to monitor and promote the use of SDI in October 2006. The Observatory will work with a BlogSDI, monitor SDI development in Spain, and organise workshops and seminars including for the political level.

#### Cooperation and data sharing

The basic philosophy is to create an SDI where all levels of Government share their information (INSPIRE) and open the GI for the citizen (similar to Aarhus Convention). The principle of decentralisation is being applied with local, regional and national SDI nodes. Spain even wants to go one step further and open IDEE for the private sector (re-use idea of PSI). There has been a shift in Data Policy in Spain over the past few years towards the idea that the information is free (at least discoverable, viewable and to a certain extent also downloadable), but that the services create added value and are at a certain cost. Information should be free, but with some restrictions on use (e.g. commercial). Also regions change their policy. Some regions go one step further and make almost everything for free, even for the private sector. A good example is the region of Navarra.

In addition to the technical developments, efforts are made by the Working Group to propose a common data policy, including licensing and pricing. There is agreement to jointly produce and share GI: joint switch from ED50 to ETRS89, joint effort to develop national gazetteer, close cooperation between national and regional governments (e.g. Territory Observation National Plan, SIOSE - Land Cover and LU at 1:25,000, ...). Not only data are commonly used, but also services and technical solutions are shared.

Cooperation between Public Authorities and the private sector/universities is well developed. Not only are universities and private companies developing (parts) of IDEE and the regional SDI, but they are also seen as contributors to create added value and as users of the infrastructure. This makes that there is a strong SDI development in the private sector and that big companies like Telefonica (through its daughter MapTel) are interested to make investments in this fields since it is seen as an opportunity to broaden existing markets. Despite the fact of good collaboration, private sector states that: (1) it is not always easy to get data unless a time consuming procedure (theory <-> practice) and (2) the SDI services are not stable/robust enough to form the basis for applications for the broader public (with huge amount of users).

#### Data harmonisation, metadata efforts and service development

There is a need to harmonise information between the regions: there are differences between regions at different scales, even orthophoto's are different. Therefore several initiatives have been taken: Cartociudad - official streetmap database of Spain; PNOA - National Plan for Aerial Orthophoto; SIOSE - Land Cover and Land Use Information System of Spain and the High Geographical Council worked on the BTA (Base Topogràfica Armonizada) specifications through the Cartographic Standards Commission. Also cross-border issues are tackled in some projects.

INSPIRE principles and guidelines are already being applied as much as possible. ISO 19100 standards and OGC specifications are used. The Working Group elaborated some specific recommendations (available in ES): series of WMS, a Spanish Core Metadata model (NEM v1), a Spanish Gazetteer Model (MNE v1). Other services are being developed, but to a lesser extent: e.g. WFS is more difficult to use.

In total there are 8 catalogues, 37 WMS able to visualise more than 600 geographic layers, and other services like an analysis service (WFS) for CORINE data, a DEM query service (WCS), services for downloading in GML format (1:1 million EGM, geodetic points, administrative boundaries, orthophoto's, ...), an API linked to Google Earth (WMS), a free client for PDA users, a 3D navigator, etc. The use of most of these services has already proved the usefulness of the SDI concept: e.g. the services developed by the Cadastre are used in the Ministry of Environment, by Regional Authorities, etc. As a result the work is much more efficient than before. In general terms, WMS development has reached a certain level of maturity. This is not the case for WFS which is more complex to implement: WFS is "too simple", while GML is too complex.

The use of the services is very variable: metadata services are used not that much, while basic WMS are used intensively, although this could still be better. A lot of potential users don't know about the existence of the services. At the same time, the services are not yet stable enough, something which will be specific point of attention of IGN in the coming year.

#### Specific efforts towards the local level

The local authorities are involved in several ways. One way is the setting-up of local SDI linked to the regional SDI and IDEE. Examples are IDEPamplona, IDEZar, the IDE of Gatafe, etc. Another way is through the use of services from the regional SDI and the development of specific applications like GEOPISTA which focuses on the interoperability at the local level and (1) to make control of geographic information easier for local authorities, (2) to offer better access to geographic information at lower cost and (3) to improve efficiency of municipal services (40 municipalities are involved).

The SDI of Catalonia was the first fully developed regional SDI in Spain. It now contains data from 67 organisations, 22.000 metadata registers, 12 WMS, 30 other services, 150 layers of data. IDEC is in the next stage now, integrating the municipalities in IDEC: 120 municipalities are 'spectators' and 56 are active participants (call for participation in 2005). In general, they setup a thematic/local SDI as part of IDEC. Seven universities are participating in the initiative. There is the possibility to publish data and metadata: at the end of 2006, > 30 municipalities are using edit tools to publish new layers, 60 have published their metadata.

## 7.2.3 Sweden

The country visit to Sweden was held on 27-28 November 2006, and included visits to and discussions with a number of the most important stakeholders, i.e. Lantmäteriet (the National Land Survey), the Local Authorities, the Ministry of Environment, the Association for Local Authorities, the Swedish Standards Institute, the Swedish Administrative Development Agency, and the Swedish Parliament.

#### Coordination

In 2005, Lantmäteriet (LM) was given the role of official coordinator of the Swedish SDI by a decision from Parliament.

In addition, a GI Advisory Board was set up, with members from LM, the counties, the municipalities, the Geological Survey, the Road Administration, the Meteorological and Hydrological Institute, the Maritime Administration, the Armed Forces, ULI (Swedish Development Council for Geographic Information) and the Association for Local Authorities.

The Ministry of the Environment has asked LM, in cooperation with the GI Advisory Board and other stakeholders, to prepare a first version of a national Geodata Strategy document by the end of March 2007. This strategy will cover all strategic issues related

to the handling of geo-data in Sweden, and is based on detailed investigations of user requirements. The strategy will be annually updated.

ULI is a non-profit association that has existed for 20 years, with member from central government, municipalities, regions, private sector and education. ULI's goals are to stimulate an infrastructure for GI that supports increased use of geographic information and development of value-added services; to increase cooperation between R&D, public authorities and industry; promotion of the potential that GI and GIS have in the development of the e-society; and enhancement of skills and education. ULI conducts a three-yearly survey on the use of GI and GIS in Sweden. It is currently preparing the survey of 2007.

#### Cooperation

Even though LM has only been given the role of SDI coordinator recently, it has a tradition of cooperating with other national agencies and ministries and with the local authorities. The cooperation between LM and the municipalities is traditionally based on an incentive model. The municipalities are paid for providing data, under the form of redistribution of the revenues that LM obtains by selling the data. The division of the revenues depends on the level of quality of the data that the municipalities choose to deliver and the population of the different municipalities.

The common vision for the cooperation between LM and the municipalities is laid down in a general agreement, which lays down the common vision, the principles and the financial model. Standard agreements are negotiated with the Association for Local Authorities, which are used to conclude a specific agreement with each municipality separately. In addition, an object catalogue is made and the use of standards is included in the agreements.

LM also cooperates with ministries and other national agencies. In most cases, these agreements do not take the form of a formal contract. One of the most important forms of cooperation is the National Road Database, between LM, The Road Administration and the local authorities. Other agreements include the Address Register, the Buildings Registration, the Real Property Register, and VIC Nature. In most cases, the agencies can show their data on the Internet on an LM background. However, the use that they can make of the data is limited, and LM retains copyright for the data. Transfers are usually done via ftp, with updates being sent regularly. Some customers connect directly to the reseller.

LM works with business partners from the private sector to disseminate its data, so data cannot be obtained directly from LM. 19 resellers service the citizens, the public authorities and the private sector. However, there is an increasing number of services available on the LM website. On this website, the viewing services are free, but downloading data is charged for.

The local authorities also form cooperation agreements amongst each other. They can include building common databases, selling them together and dividing the revenues. Usually the data are charged for, except in the city of Stockholm. The city planning administration found that the transaction costs for charging the data were too high.

#### Elips program

Lantmäteriet has started the Elips program for the restructuring of fundamental geo-data. It intends to develop new comprehensive processes for the creation, maintenance, exchange, storage and dissemination of spatial data. Its goal is to define requirements for storage and exchange of basic land data for the overall land information process. The work of Elips includes the establishment of common concepts and definitions between producers and users; the identification of common information needs, definition of objects and relations between objects; the establishment of system independent models for information exchange and dissemination; and the definition of a common technical interface, i.e. standardized exchange format based on GML.

The program started with an analysis of the processes and roles and the available IT-support. Currently, LM is moving to the implementation phase and is starting with the migration to Oracle Spatial Database. This will replace the internal proprietary systems and programs. The migration should be finished by the end of 2008.

#### Metadata

In the Swedish SDI, metadata exist but they are not structured according to standards yet. However, LM is working on standardization. The Elips program aims at standardizing descriptions, and a working group on metadata was installed by the GI Advisory Board in the process towards the first version of the National GI strategy. So far, the working group has looked at discovery level metadata, at the level of datasets. The object level will be addressed later on. The implementation of metadata standards will begin at the internal level of LM. Afterwards, the national level will be shaped accordingly.

The focus lies on ISO 19115. The working group has selected 22 elements to use as core metadata and will add a limited number of other elements. A Swedish translation of the ISO standards is being made by technical committee 489 of the Swedish Standards Institute.

There is no central geoportal for all GI available. There only is a possibility to query the LM website.

#### Standardisation

The Swedish Standardisation Institute (SIS) is a non-profit institution, with nine business areas and two subsidiaries. Stanli is the project of the SIS on the standardization of geographic data. Its vision is that standardization should make geographic data easy to use, easy to find and to order, and should support integration with other data and systems. Stanli's work program includes activities on international standardization, basic standards for GI (ISO 19100, national complementary standards), methodology for application standards development (based on ISO 19100), national application standards, maintenance of standards and user support, development of new projects, marketing, information and training.

Plans for the future include a new project on physical planning: standardization for the information flow in processes of planning the presentation of information on the Internet. In addition, review of GIS & GPS terminology is planned, and a contribution to the INSPIRE implementation specifications is being prepared.

## 7.2.4 Lessons learnt from the 3 visits

The aim is not to make here a comparison between the three countries we've visited, but rather to give a non-exhaustive list of lessons that pop up from what we learnt during the 3 short visits.

- In all the three countries stakeholder involvement is strong. This involvement has a highly positive impact on the SDI development if it goes further than a formal involvement, i.e. when all the stakeholders act as a node of the SDI network (which is clearly the case in Spain and the Czech republic). The development of the respective SDI is in each case the result of this joint effort. In all three countries leadership is also strong.
- Particular striking is the approach in Spain where stakeholders are mobilised on a basis of equality overcoming the sometimes very complex institutional and hierarchical situation. This creates a dynamic framework in which coordinated and collaborative projects result in concrete results in a rather short timeframe.
- The way coordination is done, is differently in the three countries. In Sweden the coordination is done by the Mapping Agency (LM) supported by an advisory board in which counties and municipalities are represented. In the Czech Republic, it is the environmental agency CENIA that is taking clearly the lead and coordinates the SDI. CENIA brings together all the stakeholders with the help of two associations (CAGI and Nemoforum). In Spain there is a specific coordinating body, the High Council which mobilises all the stakeholders from the national to the local level without having a strong and explicit hierarchical relationship.
- Cooperation amongst the stakeholders is very well developed in Spain. Each stakeholder has a specific role. The universities and private sector are strongly involved, which is also partially true for the Czech Republic. However the

involvement of the private sector goes further in Spain than in the other countries.

- The regional and local involvement is well developed in Spain, and is starting to be a specific point of attention in Sweden and the Czech Republic.
- Policy support is a key issue in the three countries: sometimes at national, otherwise at regional and local level. However, it seems that political support depends on particular people and is not very stable over time.
- Free access to data is very well developed in Spain and the Czech Republic (although not everything can be downloaded freely, and sometimes time consuming procedures are still in place). In both countries reference is being made to the importance of the Aarhus Convention and the Directive on the re-use of PSI. In Sweden, a specific data exchange mechanism is in place: the local level is paid for their contribution in maintaining the data, while a charging mechanism exists for using the data.
- The focus on applications, and in particular environmental applications, is very strong in the Czech Republic. Developments are driven by this sector (and supported by other sectors), while in Spain there is a more technical drive of the SDI development. Specific for Spain is also the project driven approach.
- Metadata are under developed everywhere, although they are not structured according to standards in Sweden. Special attention is therefore given to the Elips program and the standardisation efforts of SIS. In general, it is felt that maintaining good metadata is essential for using the infrastructure, but it is a big effort of which the usefulness is not always visible (low use of metadata catalogues as compared to WMS).
- The development of services is very strong in Spain and strong in the Czech Republic, a lot less in Sweden. However, in all countries, the majority of services are WMS, while WFS are only emerging and found more difficult to implement. The Czech Republic has a central portal through which most of the stakeholders use the services offered, mainly in the public sector. In Spain, the integration of services in local and regional applications, so the re-use of services is more widely spread.

## 7.3 Results of the assessment of 32 countries

### 7.3.1 Summary overview of state of play autumn 2006

Table 3 contains a summary of the information compiled for the (N)SDI in 32 European countries as valid for autumn 2006. Colors indicate whether the studied (N)SDI are in large, partial or no agreement with the statements about the SDI-building blocks introduced in Section 6.2 and presented in Table 1 of that Section. The summary table for spring 2003, 2004 and 2006 is presented in Annex 11.2. Table 4 and 5 are change tables. Table 4 highlights the SDI building blocks for which the assessment in 2006 is different from the one in 2005. Table 5 highlights the differences between 2006 and 2003 (the starting period of the original SoP study).

As can be seen from the table, most of the countries studied are developing a truly national SDI. In a lot of cases, this is going hand in hand with the development of regional initiatives. Furthermore, it is clear that for the legal issues there remains, even in 2006, a very fuzzy situation. Mostly because there is no clear information available, or the legal status of the SDI has not been clarified yet in the respective countries (there exists a lot of legislation, but not directly related to the NSDI). On the other hand, data, metadata and services are quite developed, especially in the 15 'old' Member States. The new Member States and candidate countries are working hard in this field too. Standardization is becoming a 'normal' issue. The new indicators, for which for the first time information was collected, are still in large 'unknown' since very limited information could be obtained through the current update.

If we look at the change matrix for 2005-2006, then one will note the 2 red boxes (in less agreement). For Austria, it was indicated before that we agreed strongly with the indicator "There are simplified and standardized licenses for personal use". On the basis of some new information this seems not (anymore) true, or is at least not so clear anymore. The red box for Spain, for the indicator "Only public sector actors are participating in the SDI" which was until 2005 still colored as 'in partial agreement' had to be changed to 'not in agreement' since the country visit and practice from the last few years demonstrated exactly the opposite. In general terms, attention for interoperability issues is becoming a central point of attention for most countries and this deemed to be more than exchange format issues.

For a significant number of statements for which in 2003, 2004 and 2005 no assessment could be made, information has been collected enabling their assessment in 2006. The degree of completeness of the information is indeed higher in 2006 than it was in 2003, 2004 and 2005.

From the change table 2005-2006 it can also be concluded that most NSDI-initiatives are rather stable while for some of them (ES, DK, LT, TR) progress seems to have been made. Notice also the specific efforts made by Romania, who succeeded to be in more agreement on 7 topics (indicators). However, this does not mean that in other countries, no progress has been made: (1) countries which already were 'in agreement' for a lot of indicators can't shift to another class anymore or/and (2) the changes could have been not significant enough to allow the shift to a higher class. The change matrix also shows that most of the changes occurred in the field of data and network services. Over the two years, similar conclusions can be drawn.







### 7.3.4 Typology autumn 2006

The classification rules set out in Section 6.2 lead, for 2003, 2004 and 2005, to the typology presented in Annex 11.3. Based on the updated information for 2006 and the country visits, Table 6 is obtained.

Like for 2003, 2004 and 2005, countries are divided over two distinct groups. In countries of the first group, a NDP (NMA or a similar type of agency like a National Land Service, Cadastral Agency, ...) is the officially mandated or de facto leading organization for the establishment of the NSDI. At a second level, the further involvement of associations or communities of data users in the coordination activities is taken into account. Involvement in this respect means that user organizations are present in bodies defining the mandate of the lead agency for the NSDI and/or advising upon the NSDI-projects. Finally the degree of operability of the SDI-initiative, i.e. whether one or more of its components are operational or whether the NSDI is rather in the planning stage, is considered.

The second group of countries have NSDI-initiative(s) led by a council of ministries or administrative departments, by a (non governmental) GI-association or other type of partnership of mainly data users. This group is further subdivided according to the presence or absence of a legal or otherwise formal mandate for the SDI-coordination. At the third level, the operability of the initiative is used as a discriminating factor.

Level I	Level II	Level III	EU-15	EU+10	CC-3	EFTA-4	Class
NDP-led	users involved	operational	DK, FI, SE, PT	HU		IS, NO	1,1,1
		partially operational	AT, GR, LU	PL			1,1,2
		not operational	BE				1,1,3
	users not involved	operational		SI, SK, LT			1,2,1
		partially operational		EE, LV, CY		LI	1,2,2
		not operational		MT	RO, BG, TR		1,2,3
not NDP-led	formal mandate	operational	BE-VL, DE	CZ		CH	2,1,1
		partially operational	IT, IE				2,1,2
		not operational					2,1,3
	no formal mandate	operational	NL, UK, BE-WA, ES				2,2,1
		partially operational	FR				2,2,2
		not operational					2,2,3

Table 6: Classification of countries according to type of NSDI

The most important changes in the table relate to the 'downgrading' of the level operability based on the 'numeric' degree of development as added in indicator 2 and indicating the number of components that have significantly been developed (IT, BE, IE). CZ is a special case since it is not a NDP that is taking the lead, but one of the environmental agencies. Most other changes are 'normal' upgrades to a more operational status. This is the case for ES, LT, EE, LV and CY.

## 8. RECOMMENDATIONS

The recommendations resulting from the update of the State of Play build upon former recommendations and on what we learned from the country visits.

1. Several countries are waiting the publication of the INSPIRE Directive and the Implementing Rules to invest in further developments of their infrastructure. Although we understand that countries are reluctant to do so, practice in several countries has shown that this is not necessary. While major new investments in datasets is a separate issue, it is clear that development of services, development of metadata (catalogues) and setting up of coordinating structures - to name just a few - could be started or continued right away. The metadata IR will be most surely in line with ongoing efforts of ISO and OGC. For the services it is felt that it is not too difficult to bring them in line with the IR whenever that might be necessary. And for coordination and collaboration, there won't be 'one single model' to be followed. Advantage of developing things now, is that stakeholders of the (N)SDI can gain experience and can show results to the policy level in an early stage.
2. The current status of development of the (N)SDI and INSPIRE as a whole has revealed the need to create awareness and to pay more attention to education/training. This is a crucial issue for further development of INSPIRE and underestimated so far. And all of these elements are important at different levels and are relevant for the whole stakeholder community: developers of (building blocks of) (N)SDI, expert GI users, the broader user community; the public authorities, academic and private sector. (N)SDI necessitates another way of using spatial data, but also another way of developing applications or information systems. Very few stakeholders are ready for this. The training centres, universities and other educational facilities are not ready for this huge task (with a few exceptions). Creation of awareness is also important to let the broader user community know that an infrastructure (or parts thereof) exists and is ready to be used.
3. Around Europe, there are several examples of good practice (there is not one 'perfect' model). It is important to collect these "stories". This is not part of the current state of play. In a first step, the different (N)SDI could be asked in which field they think help is needed and for which those examples of good practice could be a (practical) help. Along with the technical guidelines which will (should) see light with the work from the Drafting Teams, there is also a need for organisational guidelines. Another way of learning from good practices is the organisation of (bilateral) exchange of SDI experts. They could work for a certain period within another (N)SDI to learn about the way of working, the technical approaches, etc (kind of stages).
4. Several countries have good experience in collaboration with the private sector. In other countries private sector is not involved at all. It would be good to make special efforts to involve the private sector. This could be more than only as contractor for building datasets or services. For the latter, their role is of course clear. But the private sector could also be interested as a user of the infrastructure, as contributor to host building blocks of the SDI, to integrate/link own data, etc. EUROGI could look into more detail how the private sector can be involved in different countries.
5. There is a clear need from the Member States to have guidance during the transposition process. Clarifications are needed on the process itself, the timing, how transpositions should be done.
6. While in a lot of countries there exists a large number of WMS already, it seems that WFS, transformation and other services are less developed for

various reasons. Special attention should be paid to this. Regarding WFS, there are concerns about the existing profiles (too simple). This can only be tackled in the DT and in close collaboration with OGC. Regarding the transformation services it is clear that there is a specific need for services that can 'translate' existing data models into other models without the need to carry out a costly data harmonisation exercise. Examples are soil and geological data. It necessitates bringing together those specific communities with service experts.

7. For the specific SoP study, several recommendations (or 'next steps') can be made (described):
  - a. It will be necessary to collect more precise information through stable templates as part of the efforts made by the DT on M&R. This information relates to the existence of data and metadata for the data sets of the themes of the three annexes (who is responsible, territorial coverage, metadata according to standard, ...). It is proposed to keep the distinction between scale levels as this was done in previous reports (from global to local, or from small scale to large scale levels). Since this template was not yet applied for the 2006 update it is proposed to do this for the 2007 update (after a first test by one or two countries).
  - b. In the same way, it is necessary to re-assess the existence of the 5 types of services. This is not possible with the information in the current reports (with some exceptions). It is necessary to explain to the countries what 'transformation services' and 'invoking of services' mean. It might be useful to give an example for each of the 5 types of services.
  - c. Since some of the proposed indicators of the DT M&R have been added or redefined recently (December 2006), it is deemed necessary to review the mapping of the two sets of indicators in 2007.
  - d. The second indicator used in the state of play which gives an indication on the 'maturity' of the SDI should be cross-checked with the respective countries (it is giving a 'rate' of SDI development from 1 to 6/6). The way we aggregate the basic indicators into the more generic indicators should be further enhanced.
  - e. Regarding the coordination and cooperation (which are now described separately), countries should be asked for additional information on how this coordination and cooperation is done. This kind of crucial information is now often lacking or leaves room for interpretation.

## 9. ACKNOWLEDGMENTS

For the compilation of the update of the summary report on the state of play autumn 2006 of (N)SDIs in Europe and of the related country reports, the authors have been able to rely on formal and less formal inputs from various persons and organizations, whom are gratefully acknowledged:

- The EC-officials from JRC and ESTAT, the latter guiding this study;
- The organizers of the 3 two day visits to the Czech Republic, Spain and Sweden: Ms. Lenka Uhlířová and Mr. Jiri Hradec (Czech Republic), Mr. Sebastián Mas Mayoral and Mr. Antonio Rodríguez Pascual (Spain), Mrs. Ewa Rannestig and Mr. Ulf Sandgren (Sweden). And all the participants to the meetings during these visits.
- All experts who have provided correcting and completing remarks to the country reports, and have directed us towards new documents, Internet sites and other relevant material. Their names and affiliations are mentioned in the meta-information section of each report;
- Many of the participants to the EC GI&GIS workshop in Innsbruck (June 2006), the JRC workshop in Ispra for the New, Accessing and Candidate Member States (September 2006) and the INSPIRE Task Force organized by IMAGI in Frankfurt (August 2006), who during and after the meetings have provided valuable suggestions and information for completion of this and the country reports.
- Several INSPIRE stakeholders – users of GI, as well as developers of services – have also inspired and given valuable input to this study.

## 10. REFERENCES

European Commission, INSPIRE Work Programme Preparatory Phase 2005-2006, EUROSTAT, Luxembourg, 3 February 2005, updated in 2006.

European Commission, Proposal for a Directive of the European Parliament and of the Council establishing an infrastructure for spatial information in the Community (INSPIRE), {SEC(2004) 980}, EC, Brussels, 23 July 2004 and the Common Position of the European Parliament and Council.

# 11. ANNEXES

## 11.1 Regular country reports

The 32 country reports are separate documents available in printed form, as .DOC or .PDF-files. The naming convention for the digital documents is the following:

Rcr06COUNTRYCODEvX.doc or rc06rCOUNTRYCODEvX.pdf

with

- Rcr06 standing for 'regular country report 2006'
- vX standing for the version number, e.g. v4
- COUNTRY CODE as in Annex 11.5







### 11.3 Typology for 2003, 2004 and 2005

Level I	Level II	Level III	EU-15	EU+10	EFTA-4	Class	
NDP-led	users involved	operational	DK, FI, SE	HU	IS, NO	1,1,1	
		partially operational	AT,	CZ, PL		1,1,2	
		not operational	GR, LU			1,1,3	
	users not involved	operational			SI		1,2,1
		partially operational			LT	LI	1,2,2
		not operational			EE, LV, MT, SK		1,2,3
not NDP-led	formal mandate	operational	BE-VL, DE, PT		CH	2,1,1	
		partially operational	IE, IT			2,1,2	
		not operational				2,1,3	
	no formal mandate	operational	NL, UK				2,2,1
		partially operational	BE-WA				2,2,2
		not operational	ES, FR				2,2,3

Table 10: Typology of NSDI for 2003

Level I	Level II	Level III	EU-15	EU+10	CC-3	EFTA-4	Class	
NDP-led	users involved	operational	DK, FI, SE, PT	HU, CZ		IS, NO	1,1,1	
		partially operational	AT, GR, LU	PL			1,1,2	
		not operational					1,1,3	
	users not involved	operational			SI			1,2,1
		partially operational			LT, SK		LI	1,2,2
		not operational			EE, LV, MT, CY	RO, BG, TR		1,2,3
not NDP-led	formal mandate	operational	BE-VL, DE, IT, IE			CH	2,1,1	
		partially operational					2,1,2	
		not operational					2,1,3	
	no formal mandate	operational	NL, UK, BE-WA					2,2,1
		partially operational	FR					2,2,2
		not operational	ES					2,2,3

Table 11: Typology of NSDI for 2004

Level I	Level II	Level III	EU-15	EU+10	CC-3	EFTA-4	Class	
NDP-led	users involved	operational	DK, FI, SE, PT	HU, CZ		IS, NO	1,1,1	
		partially operational	AT, GR, LU, BE	PL			1,1,2	
		not operational					1,1,3	
	users not involved	operational			SI, SK			1,2,1
		partially operational			LT		LI	1,2,2
		not operational			EE, LV, MT, CY	RO, BG, TR		1,2,3
not NDP-led	formal mandate	operational	BE-VL, DE, IT, IE			CH	2,1,1	
		partially operational					2,1,2	
		not operational					2,1,3	
	no formal mandate	operational	NL, UK, BE-WA					2,2,1
		partially operational	FR, ES					2,2,2
		not operational						2,2,3

Table 12: Typology of NSDI for 2005

## 11.4 Country codes

EU-25	
AT	Austria
BE	Belgium
DE	Germany
DK	Denmark
ES	Spain
FI	Finland
FR	France
GR	Greece
IE	Ireland
IT	Italy
LU	Luxembourg
NL	The Netherlands
PT	Portugal
SE	Sweden
UK	United Kingdom
CY	Cyprus
CZ	Czech Republic
EE	Estonia
HU	Hungary
LT	Lithuania
LV	Latvia
MT	Malta
PL	Poland
SI	Slovenia
SK	Slovak Republic
Candidate Countries	
BG	Bulgaria
RO	Romania
TR	Turkey
EFTA countries	
CH	Switzerland
IS	Iceland
LI	Liechtenstein
NO	Norway
Non-European countries	
AU	Australia
CA	Canada
US	United States of America

Table 13: Acronyms for countries