



Spatial Data Infrastructures in Spain: State of play 2007

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Change matrix 2007 versus 2006

Paragraphs in which information is reported which deviates in a significant way from what was reported in the Autumn 2006 version of this country report are listed in the below table. They are indicated in red.

Paragraph	Type of change
1.1	Update section on methodology
1.3.2	Updated information on PSI
1.3.3	Update of information on IPR
2.1	Update general info on IDEE
2.2	Adding information on the reform of the High Council
2.3.1	Adding information on Royal Decree
2.3.4	Update information on funding & pricing
2.4.1	Adding table with overview data sets for INSPIRE themes (IDEE)
2.6	Information on services and table with services added
2.9	Added info on the use of the infrastructure
3.3.1	Update and adding detail on legal status IDEC
3.4.2	Adding table with overview data sets for INSPIRE themes (IDEC)
3.6	Table with services added
3.8	Added info on the use of the infrastructure
4	New section on IDE Navarra

Executive summary

The structure of public authority in Spain has three distinct levels: local, regional and national, all of which are generators and holders of public geographic information. At all these levels SDI-initiatives are being taken. The (N)SDI is being build slowly, but progressively over the last years. Institutional sensibility and co-ordination could be enhanced to strengthen development of SDI. In addition, no legal framework for the development of national or regional SDIs does exist yet. Nevertheless, besides several initiatives undertaken at regional level (e.g. Galicia, Madrid and Catalunya) an NSDI-project has started in the year 2002.

This NSDI-Initiative IDEE is taken by the Consejo Superior Geográfico and is supported by the Instituto Geográfico Nacional, Centro Nacional de Información Geográfica, several Ministries and Regional Departments. This SDI project is funded by the Ministry of Science and Technology, which aims mainly at demonstrating the technology available. Longer term funding is not guaranteed at present.

IDEE, Infraestructura de Datos Espaciales de España, coordinated by Consejo Superior Geográfico, is online since July 2004 (www.idee.es) offering the considered basic services: a Gazetteer, a Web Map Service and Metadata Catalogue. In addition IDEE offers also Web Feature Services, Web Coverage Services and Web Map Context. At national level it includes data and services from IGN, WMS and WFS services from the Cadaster Authority and ortophotos (1m) from Fondo Europeo de Garantía Agraria (FEGA) covering all Spain.

It integrates also under its umbrella 12 regional servers corresponding to regional SDI projects: IDEC (Cataluña), IDENA (Navarra), IDERioja (La Rioja), the three provinces of País Vasco (Álava, Guipúzcoa and Vizcaya), CEDERCAM in Castilla-La Mancha, SITGA (Galicia), SITCYL (Castilla y León), IDEA (Andalucía), SITMurcia (Murcia) and IDCV (Valencia). Geographic data from Cantabria are also available via WMS hosted by IGN servers.

The rest of Regions (6) are interested on launching SDI projects and it is expected to have the corresponding geoportals opened in 2007.

At present technical problems to integrate metadata are being solving, specially distributed catalogue, by means of an ad hoc expert group.

The regional initiative, the Catalan IDEC is the most advanced SDI activity in Spain. It was the first SDI in Spain to appear on the Net and it is based on a “White paper on GIS sector in Catalunya” (26/10/01).). It is funded by the Information Society Department of the Regional Ministry of Universities, Research and Information Society. Leadership and management is done by the Institute of Cartography of Catalunya (ICC). The goal of IDEC is to compile information on existing GI data and products, generate and make accessible metadata and provide several interoperable services offering its technological services platform to other interested agencies. The development of a culture of data

sharing among departments in the autonomous government was a priority for the IDEC project in 2002 and among the local governments in 2004-2005. The Geoportal IDEC offers several services, among others: a free of charge online metadata catalogue, a WMSClient or viewer which connects with a dozen of WMS from other organizations and accessing to more than 100 layers, and several geoservices will be published at the end of the year.

At local level, several SDI projects are integrated in Spanish SDI: Zaragoza, Pamplona, Getafe, and IDELocal project in Cataluña involves more than 70 municipalities. Several Ministries and organisms (Environment, Civil Works,...) are planning to join the project next year.

There is no agreed overall policy on the commercialisation of PSI, but certain practices have developed and, as a general rule, each civil service department or organisation defines its own policy. Some departments have developed complex and differentiated pricing strategies based on various categories of request and utility.

Overall, the Spanish SDI has reached a considerable degree of development. This is mainly due to a good coordination and cooperation at all levels of government and with all the stakeholders of the SDI network. 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.**

Table of Contents

CHANGE MATRIX 2007 VERSUS 2006	5
EXECUTIVE SUMMARY	6
TABLE OF CONTENTS	8
ABBREVIATIONS AND ACRONYMS.....	9
1 GENERAL INFORMATION	11
1.1 METHOD	11
1.2 OVERVIEW OF SDI-INITIATIVES AND PLAYERS IN SPAIN	11
1.3 COMMON GROUND FOR THE SELECTED SDI-INITIATIVES	15
2 DETAILS OF THE SPANISH NSDI INITIATIVE IDEE.....	19
2.1 GENERAL INFORMATION ABOUT IDEE.....	19
2.2 COMPONENT 1: COORDINATION AND ORGANISATIONAL ISSUES	20
2.3 COMPONENT 2: LEGAL FRAMEWORK AND FUNDING.....	22
2.4 COMPONENT 3: DATA FOR THEMES OF THE INSPIRE ANNEXES	24
2.5 COMPONENT 4: METADATA	32
2.6 COMPONENT 5: NETWORK SERVICES	33
2.7 STANDARDS	38
2.8 COMPONENT 6: THEMATIC ENVIRONMENTAL DATA	39
2.9 USE AND EFFICIENCY OF SDI	39
• AVERAGE TIME IN THE WEBSITE (IN MINUTES)	40
3 DETAILS OF THE REGIONAL SDI OF CATALUNYA (IDEC)	41
3.1 GENERAL INFORMATION	41
3.2 COMPONENT 1: COORDINATION AND ORGANISATIONAL ISSUES	42
3.3 COMPONENT 2: LEGAL FRAMEWORK AND FUNDING.....	43
3.4 COMPONENT 3: DATA FOR THEMES OF THE INSPIRE ANNEXES	46
3.5 COMPONENT 4: METADATA	56
3.6 COMPONENT 4: NETWORK SERVICES	58
3.7 COMPONENT 6: THEMATIC ENVIRONMENTAL DATA	68
3.8 USE AND EFFICIENCY OF THE CATALAN SDI.....	70
4 DETAILS OF THE REGIONAL SDI OF NAVARRA (SITNA)	71
4.1 COMPONENT 1: COORDINATION AND ORGANISATIONAL ISSUES	71
4.2 COMPONENT 2: LEGAL FRAMEWORK AND FUNDING.....	72
4.3 COMPONENT 3: DATA FOR THEMES OF THE INSPIRE ANNEXES	73
4.4 COMPONENT 4: NETWORK SERVICES	81
4.5 USE AND EFFICIENCY OF THE SITNA	82
5 ANNEXES	83
5.1 LIST OF SDI ADDRESSES / CONTACTS FOR SPAIN.....	83
5.2 LIST OF REFERENCES FOR SPAIN.....	84

Abbreviations and acronyms

AENOR	Asociación Española de Normalización y Certificación
AESIG	Asociación Española de Sistemas de Información Geográfica
BCN	Digital Cartographic Databases
BTA	Base Topogràfica Armonizada
CCCC	Cartographic Coordination Commission of Catalunya
CEDERCAM	Castilla-La Mancha and Unizar (Zaragoza) SDI
CNIG	Centro Nacional de Información Geográfica
CSG	Consejo Superior Geográfico (National Geographical High Board)
CT	Core Thematic Data
CWS	Catalogue Web Service
DIGA	Directorio de Informacion Geografica Accessible
FEGA	Fondo Europeo de Garantía Agraria
FIR	Further Investigatiation Required
GI	Geographical Information
GINIE	Geographic Information Network in Europe
GIS	Geographical Information System
ICC	Institute of Cartography of Catalunya
IDCV	Comunidad Valenciana SDI
IDEA	Andalucia SDI
IDEC	Infraestructura de Dades Espacials de Catalunya
IDENA	Navarra SDI
IDEE	Infraestructura de Dades Espacials de Espana
IGN	Instituto Geográfico Nacional
INSPIRE	INfrastructure for SPatial InfoRmation in Europe
INTA	Ministry of Defence
LOPD	Protección de Datos de Carácter Personal
LORTAD	Regulación del Tratamiento Automatizado de los Datos de Carácter Personal
MIGRA	Mecanismo de Intercambio de Información Geográfica Relacional formado por Agregación
MNE	Modelo de Nomenclátor de España (Spanish Gazetteer Model)
NCGI	National Center of Geographical Information
NEM	Núcleo Español de Metadatos (Spanish Core Metadata)
NOMECALLES	Nomenclator/Callejero de la Comunidad de Madrid
NSDI	National Spatial Data Infrastructures
OGC	Open Geospatial Consortium
PNOA	National Plan for Aerial Orthophoto

PPP	Public-Private Partnerships
PSI	Policy and legislation on access to public sector information
REF	Reference data
SDI	Spatial Data Infrastructures
SEIS	Sistema Español de Información de Suelos
SGE	Servicio Geográfico del Ejército
SIGCAR	La Rioja SDI
SIGCX	Sistema de Información Geográfica de Extremadura
SIGPAC	Sistema de Información Geográfica para una Política Agraria Común
SIOSE	Land Cover and Land Use Information System of Spain
SITGA	Galicia SDI, IDCV in Comunidad Valenciana
SITNA	Sistema de Información Territorial de Navarra
SIMA	Internet Map Server of the Environmental Department of the Catalonia Government
SME	Small and Medium Enterprise
TRACASA	Trabajos Catastrales, SA – the Cadastre for the Region of Navarra
WCS	Web Coverage Service
WFS	Web Feature Service
WMS	Web Map Service

1 GENERAL INFORMATION

1.1 Method

This report is summarizing the review of SDI in Spain, and reflects the degree to which the SDI situation in Spain is similar to the ideas set out in the INSPIRE position papers¹ and the more recent INSPIRE scoping documents.

The report is based on the analysis of various documents, project references and web sites readily accessible in English, Spanish and Catalan. Most resources were gathered from the Internet. The existence of a white paper for a GIS strategy in Catalunya seemed to give appropriate reason to evaluate not only the national overall strategy for Spain (with a limited documentation available) but also the regional, more advanced SDI-like project in Catalunya. The GINIE final report was very informative for describing the Catalunya initiative.

The information has been completed by integration and consolidation of comments received from a representatives of the Instituto Geográfico Nacional (2003 version) and from representatives of the Autonomous government of Catalunya and the Catalan IDEC Project.

The update of 2005 is based on the input from several Spanish experts and integrated in the last version of the report.

The update for 2006 is based on input received from Mr. Jordi Guimet (ICC) Mr. Antonio Rodríguez Pascual (IGN), on material from- and discussions during the two day visit to Madrid (29-30 November 2006), and through various other sources. **For the 2007 update, information was received from the national level (IDEE) as well as from the regional level (IDEC, SITNA). Detailed information was provided regarding data sets and services, and data sharing practices. Also, very useful information was received concerning the use of the infrastructure. The information was integrated in the report. A new section was added dedicated to the developments in Navarra. However, this section is not as complete as compared to the other sections (IDEE, IDEC) since not all the necessary information was gathered.**

1.2 Overview of SDI-initiatives and players in Spain

Public authority in Spain is organized according to three distinct levels: local, regional and national, all of which are generators and holders of public information. This structure influences the development of decentralized and relatively autonomous SDI. A legal framework for the development of regional SDIs exists in some cases (Andalucía, Cataluña, Navarra) and a new legal framework is expected at national level.

[1]

¹ INSPIRE position papers, final versions: RDM, ETC, DPLI, ASF, IST, IAS (latest version).

At the end of the year 2000 an initiative was taken to launch the development of a Spanish NSDI. This initiative is led by the Geomatics Commission of the Spanish “Consejo Superior Geográfico” (Geographical High Board), a governmental body coordinating the Spanish cartographical production. Every Ministry of the National Government and every Cartographical Agency of the 17 Regional Governments are member of this Board.

This initiative is technically based on the R&D project *"Desarrollo de servicios distribuidos de catálogo de información geográfica orientados a Internet y basados en estándares abiertos: Pasos efectivos hacia una Infraestructura Nacional de Información Geográfica"*.

The main objectives of this three-year collaborative project include the development of the technology and the implementation of a spatial data catalogue service with a national domain. The latter includes the use of the technology, the establishment of procedures, contents, sensibility, education and contacts.

The project is funded by the National Ministry of Science and Technology, which aims to demonstrate the technological possibilities. A consortium TeIDE of three universities

- (1) University of Zaragoza,
- (2) University Jaime I of Castellón,
- (3) Politechnic University of Madrid)

carries out the project and is supported by institutions at the National Government like:

- IGN,
- Centro Nacional de Información Geográfica (CNIG),
- Ministry of Environment (Confederation of River Ebro Basin),
- Ministry of Public Works and Transports,
- Ministry of Finances (Cadastral),
- Ministry of Fishing, Agriculture and Food (FEGA),
- Ministry of Defence (INTA),
- Regional Governments (Regional Ministry of Environment of Government of Galicia, Department of Public Works Government of Navarra, ICC of the Government of Catalonia),
- Local Authorities (Municipalities of Zaragoza, Pamplona, Getafe, Madrid and others) and

- Private companies.

This project is presented as SDI initiative #1 in this report.

Apart from this recent initiative, some isolated and limited efforts have been done at national level by different institutions. Those initiatives are characterised by low levels of technological support or co-ordination. Low institutional sensibility, co-ordination and technical vision can be named as the main obstacles for a government conducted development of the Spanish SDI.

[\[3\]](#)

[\[2\]](#)

On the regional level, several initiatives undertaken, e.g. in Galicia, Navarra, Madrid and Catalunya are on their way. The Catalan IDEC project is presented as SDI initiative #2.

IDEC (“Projecte per a la creació de la Infraestructura de Dades Espacials de Catalunya”) started in January 2002 and was intended to last for two years. It is not clear whether the project is finished and, if so, whether and how it is continued. The overall aim of this project is to change the culture of public administrations in terms of the way they handle and share spatial information (a rationalisation of public investments in GIS). The goal of IDEC is to compile information on existing GI data and products, generating the catalogues and the metadata which will provide the opportunity to become familiar with, localize, discover, access and recover these products. At the core of IDEC, an initial technological infrastructure (Internet portal) has been created where these elements can be published and managed. IDEC also offers a forum for those involved with spatial information to meet. In the end IDEC aspires to consolidate an organisation (i.e. a permanent institution) that will then be protected as a sustainable SDI entity.

A presentation about IDEC is available both in Spanish and in Catalan. [\[67\]](#)

In addition, a number of regional and local SDI and GIS initiatives and Geographical Databases are existing in Spain. Some of the major players involved are:

[Instituto Geográfico Nacional](#) [9]

[Centro Nacional de Información Geográfica \(CNIG\)](#) [49]

[Servicio Geográfico del Ejército \(SGE\)](#)

[Infraestructura de Datos Espaciales de Andalucía \(IDEA\)](#)

[Infraestructura de Datos Espaciales de La Rioja \(IDERioja\)](#)

[Sistema de Información Geográfica de La Rioja.](#) [7]

[Sistema de Información Geográfica de Guipúzcoa](#) [8]

[Sistema de Información Geográfica de Bizkaia](#) [10]

[Sistema de Información Territorial de las Islas Baleares](#) [13]

[Sistema de Información Geográfica de Extremadura \(SIGCX\)](#) [11]

[Cartografía del Territorio Histórico de Álava](#) [12]

[Sistema de Información Territorial de Navarra \(SITNA\)](#) [15]

[Infraestructura de Datos Espaciales de Navarra \(IDENA\)](#)

[Red de Información del Agua - Confederación Hidrográfica del Ebro](#) [17]
[Instituto Cartográfico de Cataluña](#) [28]
[Instituto Cartográfico Valenciano](#) [16]
[Sistema de Información Geográfica sobre Salud Pública - Generalitat Valenciana](#)
[Sistema de Información Geográfica para una Política Agraria Común \(SIGPAC\)](#)
[Sistema de Información Geográfica Oleícola Español](#) [18]
[SEIS.net - Sistema Español de Información de Suelos sobre Internet](#) [19]
[Atlas de Geografía de Aragón en Internet](#) [20]
[Proyecto Eurisko](#) [21]
[NOMECALLES - Nomenclator/Callejero de la Comunidad de Madrid](#) [22]

[6]

All regional public bodies that are producers of official cartography in Spain (and some international data providers) are listed on <http://www.idee.es>. Spanish local and regional and private map servers can be found on <http://www.idee.es>. On the same web site an overview of regional and national cartographic products which are distributed via Internet can be assessed.

[2]

AESIG (Asociación Española de Sistemas de Información Geográfica) is the Spanish member of Eurogi. Its goal is to promote the introduction, use and development of geographic information technologies, to act as a forum for debate and discussion between individuals, groups and organisations, users and providers of these technologies, to establish and standardise common technologies, to stimulate technological investigations and developments, to promote, represent and defend the interests of the GI-sector, and to collaborate with public and private organisations concerned with GI.

The following table presents the SDI-initiatives for Spain as identified and described in this report.

Table: Country-wide overview of SDI.					
Levels of SDI:	NUTS region name(s)	NUTS codes	Status	Spatial coverage: National	Spatial coverage: Region
National					
Consejo Superior Geográfico NSDI (IDEE)	Spain	ES	Operational	100%	
Regional					
Catalunya SDI (IDEC)	Catalunya	ES09	Operational	Ca. 15%	100%
Castilla-La Mancha SDI (CEDERCAM)	Castilla-La Mancha	ES13	Operational	Ca.	100%
La Rioja SDI (IDERioja)	La Rioja	ES26	Operational	Ca.	100%

Navarra SDI (IDENA)	Comunidad Foral de Navarra	ES31	Operational	Ca.	100%
Guipuzcoa SDI	Guipuzcoa	ES1620	Operational	Ca.	100%
Álava SDI	Álava	ES1601	Operational	Ca.	100%
Bizcaya SDI	Vizcaya	ES1648	Operational	Ca.	100%
SITGA	Galicia	ES1648	Operational		100%
SITMurcia	Murcia	ES1648	Operational		100%
IDEA	Andalucía	ES1648	Operational		100%
SITCyL	Castilla y León	ES1648	Operational		100%
IDEA	Andalucía	ES1648	Operational		100%
IDCV	Valencia	ES1648	Operational		100%
Local					
IDEZAR	Zaragoza		Operational		
IDE Pamplona	Pamplona		Operational		
IDE Local	Cataluña		Operational		
IDE Getafe	Getafe		Operational		

1.3 Common ground for the selected SDI-initiatives

1.3.1 Cooperation between the national, regional and local level, and with other stakeholders

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).

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).

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.

1.3.2 Policy and legislation on access to and reuse of public sector information (PSI)

Citizens are guaranteed by the Constitution that access to administrative documents shall be governed by law. The Law 30/1992 of 26 November 1992 (Ley de Régimen Jurídico de las Administraciones Públicas y del Procedimiento Administrativo Común) (<http://www.um.es/siu/marco/30-92.htm>) implements this principle of the Constitution. This Law has already been amended by Law 29/1998 and Law 4/1999. For access to certain types of information, a legitimate and direct interest must be proved. Concerning environmental information, Aarhus Convention and 2003/4/CE directive are both

applicable in Spain since February 2005. [Directive 2003/98/EC was transposed by the law of 16 november 2007 \(http://ec.europa.eu/information_society/policy/psi/docs/laws/spain/law2007.pdf\)](http://ec.europa.eu/information_society/policy/psi/docs/laws/spain/law2007.pdf).

1.3.3 Legal protection of GI by intellectual property rights

The Spanish Copyright Act (Law no. 22/1987) of 11 November 1987 has been amended several times throughout the years (e.g. by Law No. 43/1994 of 30 December 1994). Law no. 16/1993 implemented EU Directive 91/250/EC on the legal protection of computer programs, whereas Law no. 5/1998 of 6 March 1998 implemented EU Directive 96/9/EC on the legal protection of databases. A Spanish Copyright Code was established by Royal Legislative Decree 1/1996 of 12 April 1996.

The article 10.1.g) of the new text on Royal Legislative Decree 1/1996, 12 April 1996, sets up: “Los gráficos, mapas y diseños relativos a la topografía, la geografía y, en general, a la ciencia”. Maps, spatial data and information representation are protected by law. Article 10.1.h) sets up the same for photography and other equivalent documents.

[The Directive of 2001 on copyright in the information society was transposed by Ley 23/2006 of 7 July 2006 \(http://www.boe.es/boe/dias/2006/07/08/pdfs/A25561-25572.pdf\)](http://www.boe.es/boe/dias/2006/07/08/pdfs/A25561-25572.pdf).

1.3.4 Restricted access to GI further to the legal protection of privacy

The Spanish Data Protection Law (Ley Organica 5/1992 de 29 de Octubre de Regulación del Tratamiento Automatizado de los Datos de Carácter Personal - LORTAD) was enacted in 1992 and replaced by the Ley Orgánica 15/99 de 13 de Diciembre de Protección de Datos de Carácter Personal (LOPD) in December 1999 to implement the EU Data Protection Directive. The Law came into force in January 2000 and it is intended to guarantee and protect the public liberties and fundamental rights of natural persons, and in particular their personal and family privacy, with regard to the processing of personal data. In 2003 articles 37 and 48 of the law were superficially amended by Ley 62/2003.

A company needs to ask for the permission of the data subject to use addresses, names and other personal data in different documents and uses from which they were collected (Art. 6 Law 15/1999. Personal Data protection).

The Agencia de Protección de Datos (<https://www.agpd.es/index.php>) is charged with enforcing this Act. The agency maintains the registry and can investigate violations of the law.

Directive 2002/58 on privacy and electronic communications has been transposed by Ley 32/2003, de 3 de noviembre, General de Telecomunicaciones. This act has not further been amended.

1.3.5 Geodetic reference systems and projections

The national projections system are based on the International Spheroid of 1924. For the Canary Islands the WGS84 spheroid is used:

PROJECTION UTM

DATUM EUR_M

UNITS METERS

SPHEROID INT1924

ZONE 29

XSHIFT 0

YSHIFT 0

parameters

PROJECTION UTM

DATUM EUR_M

UNITS METERS

SPHEROID INT1924

ZONE 30

XSHIFT 0

YSHIFT 0

parameters

PROJECTION UTM

DATUM EUR_M

UNITS METERS

SPHEROID INT1924

ZONE 31

XSHIFT 0

YSHIFT 0

parameters

PROJECTION UTM (Canarias)

DATUM WGS84

UNITS METERS

SPHEROID WGS84

ZONE 28

XSHIFT 0

YSHIFT 0

parameters

[\[52\]](#)

2 Details of the Spanish NSDI initiative IDEE

2.1 General Information about IDEE

The SDI-Initiative IDEE of the “Consejo Superior Geográfico” is directly supported by “Instituto Geográfico Nacional (IGN)” and “Centro Nacional de Información Geográfica (CNIG)”, i.e. the National Centre for Geographic Information.

It was technically supported by the project "**Desarrollo de servicios distribuidos de catálogo de información geográfica orientados a Internet y basados en estándares abiertos: Pasos efectivos hacia una Infraestructura Nacional de Información Geográfica**" as a 3-year SDI project funded by Ministry of Science and Technology, which aims to demonstrate the technology available. The consortium of three universities to carry out the project has reached tentative agreements to SDI start-up work with the Instituto Geográfico Nacional and the Ministry of Environment.

[\[46\]](#)

[\[4\]](#)

The Spanish National Spatial Data Infrastructure (IDEE for Infraestructura de Datos Espaciales de España), launched in November 2002, and available in www.idee.es from June 2004. IDEE is based in INSPIRE principles and ideas, is in conformance with ISO19100 suite of standards and Open Geospatial Consortium specifications, and also fulfils the harmonization requirements established at national level by the Spanish Working Group for the IDEE. **Members of the working group include over 70 organisations and more than 200 individual members, including 7 ministries, 17 regional governments, 34 private companies and 10 universities.**

IDEE can be seen as a SDI made of other SDI, because of the structure of Spanish government decentralized in three main levels with a high level of responsibilities and self-government: the General Government; 19 Autonomous Regions and 2 Autonomous cities (Ceuta and Melilla); and more than 8,100 Municipalities. The idea is to integrate the servers, services, nodes, geoportals and resources of all SDI initiatives in Spain in a fully distributed, policentric, open, interoperable system. Each individual SDI shall have at least three minimum services: Catalogue (CWS), Gazetteer (Gaz) and Web Map Service (WMS). Every Geoportal of IDEE will be able to perform a waterfall searching in all the resources catalogues included in its area of responsibility, or in the Gazetteers of its area, and will be also able to view, overlay and analyze the results of those previous searching. In next future it will be possible to chain geospatial services in more and more complex functionalities.

A way of describing the essential ideas and philosophy of a project is based on the mention of its objectives. IDEE project shares and assume INSPIRE objectives and goals, which can be summarized as follows:

- 1) To make possible the sharing of GI among governmental agencies, in order to save investments and resources and to avoid data inconsistency.
- 2) To ease e-government, with the help of an open, distributed, interoperable and easily available GI.
- 3) To give open access to GI managed for government to all citizens and users, recognizing the right of people to read and see the geospatial data captured and maintained by their government, following the spirit of Aarhus Convention and according to Directive 2003/98 about Reusing of information managed by Government.
- 4) To open IDEE to the private sector giving to any organization the possibility of publishing their GI through IDEE Geoportal under some conditions of interoperability and metadata standardization.

The Spanish NSDI is a collective work produced by all the relevant actors in the Spanish GI sector: universities; official bodies of national, regional and local governments; private companies; users, etc. Especially important is the role played by regional initiatives in Spain, covering its area of responsibility, fostering user's communities, involving local level and developing powerful and well established SDI. It is necessary also to mention the essential contribution to IDEE of the University of Zaragoza that, under the umbrella of a Collaboration Agreement with IGN Spain, has developed most of the technology for the project.

The Instituto Geográfico Nacional (<http://www.ifgn.es>) (IGN - National Geographic Institute) belongs to the Ministry of Public Works and Transportation. Its main activities are cartography, geodesy, photogrammetry, remote sensing, GIS and national Seismic Network, Geophysics and Astronomy. The Centro Nacional de Información Geográfica (CNIG – National Centre for GI) is an autonomous body linked to the IGN. Its goal is to produce, develop and distribute geographic works and publications, including the commercialisation of the products of IGN. It is the commercialization station of cartographic products of the National Geographic Institute.

The CNIG claims to represent the National Geographic Institute and itself on some international organizations.

[\[43\]](#)

[\[44\]](#)

[\[45\]](#)

2.2 Component 1: Coordination and organisational issues

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. Recently, the Consejo Superior Geogràfico was reformed by the Royal Decree 1545/2007 (http://www.boe.es/g/es/bases_datos/doc.php?coleccion=iberlex&id=2007/20556). It is structured as follows:

- The Subsecretary of the Ministry of Public Works (Ministerio de Fomento) is the President. There are three Vicepresidents: IGN General Director, Navy Hydrographic Institute Director and Cadastre General Director.
- The General Assembly, composed by the President, Vicepresidents, 36 representatives from Ministries, 17 representatives from Regions, 6 representatives from Local governments. This Assembly will have a Consultant Committee with 15 representatives from relevant Association and other organizations related with GI.
- The Permanent Commission, to deal with urgent questions and take quick decisions, formed by representatives from each one of the categories included in the General Assembly.

The SCN is a framework to coordinate, harmonize and share geographic data and services. All the bodies integrated in the SCN will have free access to all official GI and geoservices. Therefore, it's volunteer for Regions and Local Governments to belong to that SCN, but this fact implies a lot of advantages (free access to data and services, obligation to use the cartography of members, participation in National Plans,...). The SCN is the body where all official data and services producers and relevant actors are represented with the aim of reaching consensus as a basis of recommendations, plans, agreements and actions.

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 leaded, **all stakeholders work on the basis of equality and partnership and see each other as equal node in the SDI network.**

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.

2.3 Component 2: Legal framework and funding

[5], [57] – [60]

2.3.1 Legal framework

The Royal Decree 1545/2007 establishes the National Cartographic System (*Sistema Cartográfico Nacional*), as an activity model looking at efficiency and coordination among public geographic data and services providers. This National Cartographic System (SCN) includes in principle all public data producers at the three levels of government in Spain (National, Regional and Local), but it's volunteer for each member at Regional and Local level to be integrated or not in it.

The SCN has the following tools to reach that objective:

a) **The National Reference Geographic Equipment, NRG Equipment.** It's the most basic reference geographic data and all official GI and geoservices providers at the SCN must use them as a common basis, and it's composed of:

- The official Coordinate Reference System in Spain.
- The official geographic names, structured in the Spanish Basic Geographic Gazetteer.
- The Administrative Boundaries.
- The National Inventory of Municipal References, including the precise coordinates of all Local Entities (*Entidades Locales*) defined by Ministry of Public Administration. There are 12,998.

The IGN is responsible for the production and management of this information and it will be provided without any cost and under very open conditions to all GI official producers in the SCN.

b) **The National Cartographic Plan:** The SCN will elaborate and approve a National Cartographic Plan each 4 years, taken into account the point of view of all data producers integrated in the SCN. The basic idea is to get a consensus to harmonize and coordinate GI production. This plan includes: an analysis of the official cartography at that moment; a definition of objectives and requirements to be fulfilled; a production plan for the National Administration and coordination mechanisms with the production plans of other levels (Regional, Local) of Spanish Administration; a data policy framework for all the GI produced under the plan; a financial model. An Operative Plan, more detailed, will be defined yearly.

c) The **Central Register of Cartography**, a public, official and electronic register for official cartography of Spain. IGN is the authority responsible of the management of this register. It's mandatory to register all official cartography on it. The use of Registered Official Cartography will be mandatory for bodies integrated in the SCN.

Other related laws are:

- Law of the ordination of the cartography, published on 29/05/1986
- Law 37/1988 of December of General Budgets of the State 28 for 1989. Art. 122 Creation of the National Center of Geographical Information. (OEB num 312 of December 29 1988)
- Real Ordinance 1243/1990 of October 11. It establishes the organic structure of the National Center of Geographical Information (OEB num 249 of October 17 1990)
- Resolution of December of 1999, of the National Center of Geographical Information 1, for which they notice the public prices that must govern in the distribution of data, publications and rendering of services of geographical character. (OEB num 10 of January 12 2000)

[\[47\]](#)

[\[48\]](#)

2.3.2 Public-private partnerships (PPP's)

No information available.

2.3.3 Licensing framework

No information available

2.3.4 Funding model for SDI and pricing policy

The 3-year SDI project IDEE is funded by Ministry of Science and Technology, which aims to demonstrate the technology available.

[\[2\]](#)

The CNIG, involved in the SDI project, sells its digital data generated by itself and by IGN in a non-profit oriented way. Only marginal and distribution costs are recovered. The pricing framework is fixed by public official regulation at national level.

[\[49\]](#)

Datasets produced or directly coordinated by IGN Spain are distributed without charging, in the case of non-commercial uses, except when a digital copy in a magnetic media is required. In this case only costs related to the production of the copy would be charged. For commercial users, a licence must be signed and there is to be some charge depending on the contribution of the original dataset to the final product or service, the sales figures and the benefit obtained.

NRG Equipment would be distributed with no cost (except costs directly involved in magnetic media copies production) and under a license allowing commercial and non-commercial uses.

A trend towards lower charges and less restrictions on the use of data is expected.

2.4 Component 3: Data for themes of the INSPIRE annexes

2.4.1 Data by resolution or scale range for the INSPIRE themes

The following tables give an overview of the data sets for the different themes of the INSPIRE annexes at the national level (IDEE). Only a limited number of data sets for Annex III are reported.

Data sets ANNEX I						
	Theme ²	Data set ³	Organisation responsible	Scale/resolution	Metadata (N/Y/ISO) ⁴	Can be discovered, viewed, downloaded ⁵
I-1	Coordinate Reference Systems ⁶	Geodesic network	National Geographic Institute (IGN)- Ministry of Public Works	cm	ISO	1, 2, 3
I-2	Geographical grid systems (harmonised multi-resolution grid)	Topographic Harmonized DB sheet division	National Geographic Institute (IGN)- Ministry of Public Works	1:5,000	N	1, 2, 3
I-3	Geographical names	IDEE Gazetteer	National Geographic Institute (IGN)- Ministry of Public Works	1:50,000	ISO	1,2
I-4	Administrative units (local, regional and national boundaries)	Administrative Boundaries DB	National Geographic Institute (IGN)- Ministry of Public Works	1:25,000	ISO	1, 2, 3
I-5	Addresses	Cartociudad	National	1:2,000 urban and	N	2

² See also description of the data themes in document D2.3 Definition of Annex Themes and Scope (<http://www.ec-gis.org/INSPIRE>)

³ Name the data set. Can be a database with multiple layers and thus including several themes, or a specific data set which covers part of a theme (e.g. Natura 2000), you can also have several data sets with the same information at different scales/resolutions. Please only include only the 'basic' data sets (e.g. generalised versions derived from large scale base data sets should not be included)

⁴ Indicate whether the data set has no metadata (N), metadata but not according to the ISO 19115 standard (Y), or metadata according to ISO 19115 (ISO).

⁵ Can the data set be discovered (1), viewed (2), downloaded (3) through at least one such standardised service? Indicate this using the numbers (1,2,3)

⁶ This is of course not necessarily a real data set.

		Gazetteer	Geographic Institute (IGN)- Ministry of Public Works	1:25,000 rural areas		
I-6	Cadastral parcels	Cadaster	General Directorate of Cadastre	From 1:1,000 to 1:5,000	N	1, 2
I-7	Transport networks (road, rail, air, water and links between networks)	BCN25 layer (DB 1:25,000)	National Geographic Institute (IGN)- Ministry of Public Works	1:25,000	ISO	1, 2
I-8	Hydrography (including marine areas, all water bodies, river basins, etc.)	BCN25 layer (DB 1:25,000)	National Geographic Institute (IGN)- Ministry of Public Works	1:25,000	ISO	1, 2
I-9	Protected sites (designated by national, EU or international legislation)	Natura 2000 ENP RAMSAR convention Barcelona convention MAB wetlands	Ministry of Environment	1:5000 to 1:100.000 1:5000 to 1:50.000 1:5000 to 1:50.000 1:5000 to 1:50.000 1:5.000 to 1:50.000 1:5.000 to 1:50.000	ISO	

Data sets ANNEX II						
Theme ⁷	Data set ⁸	Scale/resolution	Organisation responsible	Metadata (N/Y/ISO) ⁹	Can be discovered, viewed, downloaded ¹⁰	
II-1	Elevation (land, ice and ocean surfaces; terrestrial elevation, bathymetry, shoreline)	DTM25	1:25,000	National Geographic Institute (IGN)- Ministry of Public Works	ISO	1, 2
II-2	Land cover (physical and biological)	Corine. Land-Cover	1:100,000	National Geographic Institute (IGN)- Ministry of Public Works	ISO	1, 2
II-3	Orthoimagery (geo-referenced image data)	PNOA (Aerial Orthophoto National Plan)	50, 25 cm depending on the zone	IGN + Regions	ISO	1, 2, (3 near future)
II-4	Geology (including bedrock, aquifers and geomorphology)	MAGNA	1:50,000	Spanish Geological and Mining Institute- Ministry of Education and Science	N	2, 3

⁷ See also description of the data themes in document D2.3 Definition of Annex Themes and Scope (<http://www.ec-gis.org/INSPIRE>)

⁸ Name the data set. Can be a database with multiple layers and thus including several themes, or a specific data set which covers part of a theme (e.g. Natura 2000), you can also have several data sets with the same information at different scales/resolutions. Please only include only the 'basic' data sets (e.g. generalised versions derived from large scale base data sets should not be included)

⁹ Indicate whether the data set has no metadata (N), metadata but not according to the ISO 19115 standard (Y), or metadata according to ISO 19115 (ISO).

¹⁰ Can the data set be discovered (1), viewed (2), downloaded (3) through at least one such standardised service? Indicate this using the numbers (1,2,3)

Data sets ANNEX III						
	Theme ¹¹	Data set ¹²	Scale/resolution	Organisation responsible	Metadata (N/Y/ISO) ¹³	Can be discovered, viewed, downloaded ¹⁴
III-1	Statistical units (for dissemination or use of statistical data)	Statistical units	1:2,000	National Statistics Institute	N	2, (3 in near future)
III-2	Buildings (geographical location of buildings)	BCN25 layer (DB 1:25,000)	1:25,000	National Geographic Institute (IGN)- Ministry of Public Works	ISO	1, 2
III-3	Soil (and sub-soil characteristics)	Erosion	1:50.000	Ministry of Environment	ISO	
III-4	Land use (e.g. residential, industrial, commercial,	Planning Red Natura	1:50.000 to 1:100.000	Ministry of Environment	ISO	
III-5	Human health and safety (see full description in Annex)					
III-6	Utility and governmental services (sewage, waste management, energy, etc.)					
III-7	Environmental monitoring facilities (emissions, ecosystem parameters)					

¹¹ See also description of the data themes in document D2.3 Definition of Annex Themes and Scope (<http://www.ec-gis.org/INSPIRE>)

¹² Name the data set. Can be a database with multiple layers and thus including several themes, or a specific data set which covers part of a theme (e.g. Natura 2000), you can also have several data sets with the same information at different scales/resolutions. Please only include only the 'basic' data sets (e.g. generalised versions derived from large scale base data sets should not be included)

¹³ Indicate whether the data set has no metadata (N), metadata but not according to the ISO 19115 standard (Y), or metadata according to ISO 19115 (ISO).

¹⁴ Can the data set be discovered (1), viewed (2), downloaded (3) through at least one such standardised service? Indicate this using the numbers (1,2,3)

III-8	Production and industrial facilities (water abstraction, mining, storage sites)					
III-9	Agricultural and aquacultural facilities					
III-10	Population distribution - demography					
III-11	Area management / restrictions / regulation zones / reporting units					
III-12	Natural risk zones (e.g. atmospheric, hydrologic, seismic, volcanic, wildfire)	Forest fire	1:200.000, 1:25.000 to 1:1M	Ministry of Environment		
III-13	Atmospheric conditions			Ministry of Environment	N	
III-14	Meteorological geographical features (weather conditions, measurements)			Ministry of Environment	N	
III-15	Oceanographic geographical features (currents, salinity, wave heights, etc.)			Ministry of Environment	N	
III-16	Sea regions (physical conditions of seas and saline water bodies)			Ministry of Environment	N	
III-17	Bio-geographical regions (areas with homogeneous ecological conditions)					
III-18	Habitats and biotopes (geographical areas for specific ecological conditions)	Habitat	1:50.000	Ministry of Environment	ISO	
III-19	Species distribution	The vertebrates	Grid 10 Km	Ministry of	ISO	

	(geographical boundaries for animal and plant species)	Vascular flora		Environment		
III-20	Energy resources (hydrocarbons, hydro-power, bio-energy, solar, wind, etc.)					
III-21	Mineral resources (metal ores, industrial minerals depth/height)					

2.4.2 Geodetic reference systems and projections

See 1.3.4

2.4.3 Quality of the data

Quality description includes the sources of data used and the lineage of the data product ("genealogía")

[56]. Positional accuracy, coherence and semantic accuracy are indicators for data quality.

2.4.4 Interoperability

The UNE (national) cartographic data transfer standard MIGRA has been created by the national GI standards group (AENOR, technical committee 148) in 1996. Data descriptions are in EXPRESS which is not object oriented. MIGRA (UNE 148001 exp.) has been withdrawn in 2004 and the ISO19100 family of standards has been adopted as Spanish standards at the same time it became European standards. Translation activities has been initiated already in AENOR Technical Committee 148 "Digital Geographic Information", and a first package of 10 standards have been transferred into Spanish for adoption.

[56]

[2]

A Spanish-English glossary for interoperability terms is said to be available on-line but this could not be confirmed.

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.

2.4.5 Language and culture

Unique identifiers are used according to MIGRA standard.

2.4.6 Data Content

There are text explanations for attributes.

2.4.7 Geographical names

Geographical names are managed in Spanish (Castellano), but also in the other official languages of Spain: Catalán, Euskera, Valenciano, Gallego. Secondary names are set in the official languages of Spain. Additionally, toponyms are used in Ibicenco, Aranés, Bable.

[\[56\]](#)

2.4.8 Character sets

As character set the repertory 1,6, 100 of ISO 8859 is used, which includes all characters used in Spain.

[\[56\]](#)

2.5 Component 4: Metadata

2.5.1 Availability

One of the main objectives of the IDEE-initiative is to produce metadata. It his however not clear what the current availability is. The IGN website provides limited description of its topographic products.

2.5.2 Metadata catalogues availability + standard

No real catalogue has been found.

2.5.3 Dublin core metadata standards for GI-discovery

Not applicable.

2.5.4 Metadata implementation

There is a standardized feature code list available for use within the metadata. It is unilingual according to MIGRA standard.

[\[56\]](#)

2.6 Component 5: Network Services

The website of the IGN (<http://www.mfom.es/ign>) does not provide metadata for its digital data products. However, under the heading IDE-IGN, DIGA (Directorio de Informacion Geografica Accesible) it is mentioned that such metadata will be available soon.

The principal services offered by the current version of IDEE are:

- 1) Searching service, based on a Catalogue Web Service, offering a powerful and versatile interface to look for available geographic datasets at a particular scale, with a selected extent, for a specific date and about a topic. Regarding available reference data we have: Digital Cartographic Databases (BCN) at 1:1,000,000, 1:200,000 and 1:25,000 scales at national level; Topographic Data Bases at 1:10,000 and 1:5,000 covering most of Spanish territory at regional level; orthophoto, coverages at several resolutions of part of Spain; satellite imagery; the whole National Geodetic Network; Geographical Names in the form of National and Regional Gazetteers; DTMs; a wide variety of thematic and application data;...
- 2) Visualization service, based on a Web Map Service, allowing the visualization of any dataset identified in a search, or a generic WMS showing Spanish topographic data from 1:1,000,000 to 1:25,000 scales in a continuous way, depending on the zoom performed in each moment. Some Basic visualization commands are available as: zoom in, zoom out, pan, hide layers, distance and area measure, see coordinates,...
- 3) Geographical Names Service, based on a Gazetteer service, based on the searching and visualization of locations by their geographical name. A database of more than 350,000 names is available for that purpose.
- 4) Some other Geoprocessing Services, like a Geodetic Calculator, Map Sheet division display, Reference Systems based on Geographic Identifiers.
- 5) The possibility of chain and connect all the previous functionalities and services, combining data and services from different sources.

Over the last three years, a lot of network services have been developed at different levels of authority. At the end of 2006, there were a total of 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 felt to be more complex to implement: WFS is "too simple", while GML is too complex.

The State of the Art

- Web pages in 7 languages
- Viewer, Gazetteer client and Catalogue client in Spanish and English (2 languages)
- 9 OGC specifications implemented: WMS, CSW, WFS-MNE, WFS, WCS, WMC, SLD, WCTS, WPS
- Standards Catalogue Services on Internet
- 9 Different WFS available from different nodes
- Different WCS available from different nodes
- Remote Analysis utilities based on WPS in IGN node:
 - Statistics of different CORINE classes in a bounding-box
 - Average, maximum and minimum height in a bounding box
 - Average, maximum and minimum slope in a bounding box
 - Height profile between two points
 - Visibility map from a point
- An OGC Services directory (http://www.ideo.es/show.do?to=pideep_catalogo.EN)
- Collaboration with:
- IGP Portugal
 - <http://mapas.igeo.pt/wms/caop/continente?REQUEST=GetCapabilities&SERVICE=WMS>
- Andorra
- OTALEX (Observatorio Territorial del Alenteixo y Extremadura)
 - IGN-CNIG is a partner in the project
- SIGN2 (SDI of North Portugal and Galicia)
 - Xunta de Galicia (SITGA) is a partner of the project

Resources

- More than 200 WMS available
- Near 2000 layers available via WMS
- 7 Ministerial nodes
- 13 nodes at Regional level
- Remaining (Madrid, Illes Balears, Canary Island and Extremadura) have plans to open a Geoportal this year 2008

- More than 200 nodes at Local level
- More than 17 thematic nodes

The following table gives an overview of the available network services.

Services						
Service ¹⁵	Organisation responsible	Type of service ¹⁶	Metadata (N/Y/ISO) ¹⁷	Open for Public (Y/N)	Free/N of free ¹⁸ (Y/N)	
1	http://ovc.catastro.meh.es/Cartografia/WMS/ServidorWMS.aspx	General Directorate of Cadastre - Ministry of Economy and Finances	WMS (View)	N	Y	Y
2	http://www.ideo.es/wms/IDEE-Cuadrícula-Hojas/IDEE-Cuadrícula-Hojas	National Geographic Institute (IGN)- Ministry of Public Works	WMS (View)	N	Y	Y
3	http://www.ideo.es/wms/IDEE-Landsat/IDEE-Landsat	National Geographic Institute (IGN)- Ministry of Public Works	WMS (View)	N	Y	Y
4	http://www.ideo.es/wms/IDEE-Limite/IDEE-Limite	National Statistics Institute	WMS (View)	N	Y	Y
5	http://www.ideo.es/wms/IDEE-Base/IDEE-Base	National Geographic Institute (IGN)- Ministry of Public Works	WMS (View)	N	Y	Y
6	http://www.ideo.es/wms/IDEE-Geologico/IDEE-Geologico	Spanish Geological and Mining Institute- Ministry of Education and Science	WMS (View)	N	Y	Y
7	http://ideo.unizar.es/wms/MTN-Raster/MTN-Raster	National Geographic Institute (IGN)- Ministry of Public Works	WMS (View)	N	Y	Y
8	http://www.ideo.es/wms/IDEE-Referencia/IDEE-Referencia	National Geographic Institute (IGN)- Ministry of Public Works	WMS (View)	N	Y	Y
9	http://mapas.topografia.upm.es/cgi-bin/psge	Geographic Service of the Military - Ministry of Defense	WMS	N	Y	Y

¹⁵ List the names/IDs and where possible the link (URL) of all the discover, view, download, transformation and invoking services that are part of your infrastructure

¹⁶ Indicate the type (discover, view, download, transformation and invoking services)

¹⁷ Indicate whether the service has no metadata (N), or metadata according to ISO 19119 (ISO).

¹⁸ Whether or not the service is free for use.

			(View)			
10	http://wms.mapa.es/wms/wms.aspx http://195.235.91.59/wms/wms.aspx?REQUEST=GetCapabilities&SERVICE=WMS	Ministry of Agriculture, Fisheries and Food	WMS (View)	N	Y	Y
11	http://www.ideo.es/wms/PNOA/PNOA	National Geographic Institute (IGN)- Ministry of Public Works	WMS (View)	N	Y	Y
12	http://www.ideo.es/wms/IGN-Corine/IGN-Corine	National Geographic Institute (IGN)- Ministry of Public Works	WMS (View)	N	Y	Y
13	http://idecan.grafcan.com/ServicioWMS/FincasReg?	Property Register	WMS (View)	N	Y	Y
14	https://ovc.catastro.meh.es/Cartografia/WFS/ServidorWFS.aspx?	General Directorate of Cadastre - Ministry of Economy and Finances	WFS (Download)	N	N	N
15	http://www.ideo.es/IDEE-WFS/ogcwebservice?	National Geographic Institute (IGN)- Ministry of Public Works	WFS (Download)	N	Y	Y
16	http://www.ideo.es/wcs/IDEE-WCS-UTM28N/wcsServlet?	National Geographic Institute (IGN)- Ministry of Public Works	WCS	N	Y	Y
17	http://www.ideo.es/wcs/IDEE-WCS-UTM30N/wcsServlet?	National Geographic Institute (IGN)- Ministry of Public Works	WCS	N	Y	Y
18	http://www.ideo.es/wcs/IDEE-WCS-UTM31N/wcsServlet?	National Geographic Institute (IGN)- Ministry of Public Works	WCS	N	Y	Y
19	http://www.ideo.es/csw/servlet/cswservlet?Request=GetCapabilities&SERVICE=CSW	National Geographic Institute (IGN)- Ministry of Public Works	CSW (Discover)	N	Y	Y
20	http://ideo.unizar.es/IDEE-WCTS/ogcwebservice	National Geographic Institute (IGN)- Ministry of Public Works	WCTS (Transformation)	N	Y	Y

2.7 Standards

In general, the Spanish Standardization Committee AEN/CTN 148 has defined a Spanish Experimental Norm to guide the transfer from Spanish Geographical standards to international/European Standards "Mecanismo de Intercambio de Información Geográfica Relacional formado por Agregación" (MIGRA).

AENOR (Asociación Española de Normalización y Certificación) will adopt the CEN/ISO standards (all ISO standards mentioned in this report are explicitly listed) when translated as Spanish norms (UNE).

[\[54\]](#)

[\[6\]](#)

The National Geographical High Board (*Consejo Superior Geográfico*, CSG) of Spain, is the official body to coordinate Spanish cartographic production and activities, whose secretariat is held by IGN Spain. One of its study Commissions, the Commission for Geomatics, have actually as main task to launch a Spanish SDI (IDEE). This Commission organized in November 2002 a Working Group for IDEE, formed by experts working in SDI and Metadata projects from the point of view of data producers at the three Administration levels of government in Spain: National, Regional and Local. The main objective of this WG is to develop and maintain a National SDI in Spain following the INSPIRE philosophy and guidelines and based on OGC specifications and existing standards. The WG IDEE has held three meetings per year up to this moment, and its major standardization and harmonization efforts has produced a set of recommendations:

- A set of minimum recommended services to be implemented in every Spanish SDI: Catalogue Web Service (CWS), Gazetteer (Gaz) and Web Map Service (WMS).
- Some guidelines about SDI architecture defining the role to be played by each SDI integrated in IDEE, taking into account its responsibility extent and the idea of avoid coverage gaps.
- Development of an Open Source Metadata management application (CatMDEdit) in collaboration with University of Zaragoza. CatMDEdit is a multiplatform, multiformat, Multilanguage metadata management and editing application, with specific interfaces for ISO19115 and NEM.
- Definition, based on consensus and electronic agreement, of a Spanish Core Metadata, NEM for *Núcleo Español de Metadatos*, to be used as set of core minimum recommended metadata to be used in Spain. It's defined as a ISO19115 profile and takes into consideration Dublin Core, Water Framework Directive and INSPIRE proposal for a Directive.

- Definition, based also on consensus, of a Spanish Gazetteer Model, MNE for *Modelo de Nomenclátor de España*, to be used as a minimum core recommended conceptual model for Gazetteers in Spain. It's based on ISO19112, Alexandria Digital Library, OGC Gazetteer specification, UN recommendations and the most relevant Gazetteer projects.
- Definition, via consensus, of a set of Recommendations to implement WMS services, trying to define common criteria to name data layers, to use at least a common CRS, to make easier interoperability among existing map services.

2.8 Component 6: Thematic environmental data

The IDEE-project does not deal with thematic environmental data

2.9 Use and efficiency of SDI

The NSDI-Initiative IDEE came in 2005 in a more advanced and operational stage. The first version of the IDEE Geoportal was launched on June 2004 and in November same year a second version of Geoportal was completed, whose principle characteristics are:

- An interface in five languages (Spanish, English, Basque, Catalanian and Galician), taking into account all the official languages in Spain.
- Eleven servers connected and offering metadata, vector data, ortophotos, gazetteers, images, raster maps, documents, news,...in interoperation at national and regional level. All the Spanish Autonomous Communities have implemented regional SDIs (Cataluña, La Rioja, Navarra, País Vasco, Aragón, Valencia, Andalucía, Galicia, Castilla y La Mancha) or are developing them.
- We have the first local SDI integrated in the project in the Municipality of Zaragoza, and we expect eagerly to expand IDEE to include step by step the more than 8,000 municipalities. There is a very interesting project named GEOPISTA, under the umbrella of Science and Technology Ministry, implementing a corporative interoperable GIS for municipalities (based on OGC and ISO standards).
- A connection to General Direction of Cadastre, to search and visualize all the available cadastral cartography in Spain: the whole territory covered by 1:1,000 data in urban areas and 1:5,000 data in the country side.
- An Open Source application (CatMDEdit) for metadata capture, edition and management, developed by University of Zaragoza.
- A point open to integrate private sector data and metadata, with the only restriction of conformance to some standards (ISO19115, NEM, WMS,...).

Special attention has been devoted to the publication of a wide range of SDI related information to promote, spread and circulate this new technology: documents, papers, recommendations, events, selected links, ...

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.

The National Geoportal in figures:

- 8,100,000 individual petitions per month to Geoportal
- 18,000 visits per month
- 49,550 viewed pages per month
- Average time in the website (in minutes)
- We have visitors from 113 countries
- The top ten are: Spain, France, México, Argentina, Portugal, Colombia, USA, Brazil, Peru and Germany.

3 Details of the regional SDI of Catalunya (IDEC)

3.1 General Information

The SDI strategy in Catalunya is outlined in the “White paper on GIS sector in Catalunya” (26/10/01). It comprises an analysis of the state of art of the GIS sector in Catalunya/Spain and other European countries and strategic guidelines to boost the GIS sector.

[\[39\]](#)

Based on this strategy, the Catalan government is supporting a project called IDEC (**Projecte per a la creació de la Infraestructura de Dades Espacials de Catalunya**) to develop the regional SDI. This initiative came in response to the needs implicitly and explicitly expressed within the GI sector. The most important driving organizations are:

(1) The secretariat for Telecommunications and Information Society of the Department of Universities, Research and Information Society and

(2) The Cartographic Institute of Catalonia (ICC).

IDEC provides a platform for the formal entity management of the SDI. The objectives are to:

- Compile information and generate catalogues (also metadata) to be diffused;
- Establish agreements and consensus between the different players of the GI sector;
- Study the needs of the users for products’ and services definition;
- Promote standards;
- Widespread information;
- Consolidate a sustainable organisation which will subsequently be protected as a SDI entity;
- Create a marketplace (portal for data catalogue, products and services, descriptive metadata, list of data providers, service of added values, services for B2C or B2B operations and electronic commerce).

3.2 Component 1: Coordination and organisational issues

The ICC as coordination body is a single agency, following the SDI activities and producing data as well.

IDEC is actively supported and promoted by the Catalan Section of AESIG. It started in January 2002 and is further developing to establish a permanent, sustainable, open and participative infrastructure. Therefore, users, producers, intermediate bodies, industry and public sector are integrated (see also “yellow pages”).

The AESIG published a list of involved universities, institutions, regional and local administrations and enterprises (to mention the Catalan Government, ICC, etc.): http://www.aesig.org/monsig/monsig_i.htm.

This global and integrating solution strategy should facilitate the access and the use of GI products, with one common place for users, service providers, integrating bodies and data producers. Such an agreement between all members of the GI sector could be made within an architecture of common services, with the emphasis on the products oriented to the end-user. This project is developed in the context of standards and open architecture. This information and communication platform will present products, processes; legal aspects, marketing and support for new GI activities and will establish rules between the SDI and the participant entities in favour of the extension of the GIS market.

The way of handling and sharing spatial information by public administrations shall be changed by the IDEC project. It aims to offer a forum for those involved with spatial information, to meet.

[\[40\]](#)

[\[1\]](#)

[\[61\]](#)

The Catalog Server of metadata (data catalog) has published a list of about 70 organisations, as currently participating in the project.

The Cartographic Coordination Commission of Catalunya is the new basic body for the coordination and collaboration between the regional administrations and the local entities in the area of the cartography and related geographic information. The CCCC gives advise to the govern, and assures the participation of the local entities in the coordination processes of cartography and related geoinformation

3.3 Component 2: Legal framework and funding

3.3.1 Legal framework

The framework for the IDEC-initiative is provided by the Government White paper to SDI in Catalunya. The Institute of Cartography of Catalunya (ICC) was created by Law of the Catalan Parliament already in 11/1982 (October 8th).

[39]

IDEC is funded by the Ministry for Universities, Research and the Information Society of Catalonia and sponsored by the Department for the Information Society (in terms of funding) and the Cartographic Institute of Catalonia; which is the Agency responsible for its development.

[64]

[32]

The ICC will assume the functions of a clearinghouse for the IDEC project within the framework of the agreements between the Secretariat for Telecommunications and Information Society of the Department of Universities, Research and Information Society DURSI (<http://www.gencat.es/dursi>) and the Department of Regional Planning and Public Works DPTOP, all within the framework of the 3rd Research Plan 2001-2004 and the Strategic Plan for the Information Society (Catalonia on the network).

[25]

A recent law approved by the Catalan parliament has created the SDI and its Center of Support: Law number 16/2005 (December 27) of the Geographic Information and the Cartographic Institute of Catalonia. **This Law is accompanied by Decree 398/2006 of 24 October 2006, containing the Development Regulations of the Law.** The Cartographic Institute of Catalunya is named the competent organization within the Regional Government for Geodesy and Cartography and for the Spatial Data Infrastructure. Its competences are a.o.:

- To elaborate and to propose the Cartographic Plan and their modifications and update
- To promote the Cartographic Commission and give it support and execute its decisions when necessary
- To collaborate with other public organizations specially with local administrations to coordinate and cooperate in this field (art. 6)

The Cartographic Plan will contain the analysis of the existing and available official cartographic products and their quality and updated levels, and the basic characteristics of the organization, functions and use of the SDI of Catalunya (art. 36). The basic

characteristics, specifically those referred to organization, activities and use of the SDI will also be contained and described in the Cartographic Plan. The future development of the present law will establish the adequate procedures so that the Cartographic Commission of Catalunya can monitor the activities and solve any question related with the SDI development (art. 47).

The law also installs the Cartographic Coordination Commission of Catalunya which is responsible for the coordination and organization of the SDI. The presidency relies on the Minister of Public Works of the Regional Government (art. 31, see also component 1).

The Catalan SDI is based on the generic principles of no duplication, accessibility and sharing of geoinformation, in order to allow and assure the general use of the following information:

- a) reference data: Geodesic System, geographic names, administrative boundaries, real state, buildings and their cadastral references and postal addresses, transportation, utilities, infrastructures, hydrography, land cover, coastal zones.
- b) Thematic fundamental data: society and demography, protected areas, ecosystems, biodiversity, natural hazards, urban land, new urban planned land
- c) Other which can be considered basic for the land knowledge. (art. 44)

All geographic systems integrated in the SDI have to be interoperable. To assure the interoperability, the technological development has to accomplish the specifications which will be determined accordingly with the international standards (art. 45).

The created SDI Support Centre will act as the basic and technical organization for the promotion, exploitation and maintenance of the SDI, in order to disseminate the geoinformation and the services which are applied, and make it accessible to assure its shared use. The Support Centre will be a Unit of the Cartographic Institute, which will manage it under the orientations defined in the Cartographic Plan. (art. 46)

Article 36 of the Decree sets time limits for a “data diffusion and accessibility policy” to be in place, i.e. within one year for the ICC SDI Support Centre (by 2007), within two years for Catalan government (by 2008) and four years for local government (by 2010). The policies need not be the same or even harmonised, necessarily, according to implications in article 37 of the Decree. This states in its first paragraph that “each metadata producer entity/company may define its own policies of accessibility to geographic data and services.”

Implementation of the law is currently in progress. The CCCC plans to discuss about a common local data policy. The sustainability of IDEC (and its Support Center) is assured by the Departmental budget.

In September 2005 an agreement was signed between the e-government organization and the Cartographic Institute of Catalonia to promote and create the LOCAL SDI. A first call for participation took place at the end of the year, with a result of 60 municipalities engaged directly in the initiative while others 165 expressed their interest to be part of the

project in the next future. A new call has been published recently (July 2006), in order to increase significantly the local participation.

The Local.SDI project is seen as a tool for undertaking new projects, based on its networked information. This increases the interest of the participants, which sometimes ask about the supposed benefits for them derived from its participation. Also the participation of the private added value services companies is important, not only in the current stage, (GIS projects, metadata, WMS...) also for future projects, and they are being encouraged to give support and orientations to the local responsables.

E-government funds the tasks of:

- Creating metadata;
- Publishing data in WMS /OGC (2.000 €);
- GIS projects closely related with the project

The Center of Support offers applications based on the SDI resources platform:

- Customized Viewers (maps and street maps)
- Customization of several services (Catalog....)
- Edition tool for the creation of geo objects

These services are a way to demonstrate them the benefits of sharing data & services. At the end of 2006:

- 100 entities will be using the viewers integrated in their web pages
- 100.000 monthly access to “municipal” street maps
- 30 + will use edition tools and will publish new layers
- 30 municipalities will have their WMS (4/6 layers) connected to the IDE.LOCAL network
- 60 municipalities will have published their geodata metadata in the Catalog Service (3000 new records), and other 30 will have published their services metadata
- The first tests about geoDRM and the first impact results will be available
- An initial agreement about data policy should be considered
- Some new projects using WFS transaction technology are planned

3.3.2 Public-private partnerships (PPP's)

Currently, the IDEC project has active support of 70 partnerships, divided between the public and private sector. These partners include city councils, GI-sector companies, departments of the Generalitat and other bodies.

3.3.3 Licensing framework

The vast majority of the geographic information (small and middle scales in vector and raster formats) is available for free. There is also restricted information (large scales) which can be displayed using the map server and it can be ordered via the website of the information owner.

3.3.4 Funding model for SDI and pricing policy

The IDEC project is funded by the Ministry for Universities, Research and the Information Society of Catalonia, and sponsored by the Department for the Information Society and the Cartographic Institute of Catalonia, which is the Agency responsible for its development. In the future (2005) it will also be funded thanks to its participation in other Sectorial SDI projects, such as Local SDI, inter universities SDI, etc. In relation with the pricing policy of the Mapping Agency, the ICC, the reference data is free of charge (digital ortophotomaps 1/5.000, 1/25.000, digital vector Topographic maps 1/50.000, 1/250.000, digital raster topographic map 1/5.000).

Pricing example for products offered by ICC:

- Digital topography 1:5.000 3D in DGN/DXF export format: 0.20 €/ha
- Rasterized GeoTIFF 160 dpi resolution (as whole region) 30 €

[\[30\]](#)

3.4 Component 3: Data for themes of the INSPIRE annexes

3.4.1 Scale and resolution: European, National, Regional, Local, Other

ICC is supporting European, regional and local scale levels:

1:250 000 (topographic, status of 1999, 2001)

1:50 000 (topographic, geological, urban planning – status from 1999 on)

1:25 000 (topographic, geotechnical, nature protection sites – status: from 1997 on)

[\[31\]](#)

The main data sources of the IDEC project are Topographic Data, Orthophotos, environmental data, Land use, public equipments (points), the Cadastre and data from Urban and Land planning (terrestrial photogrammetry), all acquired at large scale (from 1:500 to 1:5 000). These data are provided by ICC, Several Departments of Catalunya Government, several municipalities, research centers, etc.

[\[1\]](#)

[\[37\]](#)

3.4.2 Data by resolution or scale range for the INSPIRE themes

The data sets for the themes of the 3 annexes of the Directive are listed in the following tables with their characteristics. Annex III themes are still incomplete.

Data sets ANNEX I						
Theme ¹⁹	Data set ²⁰	Organisation responsible	Scale/resolution	Metadata (N/Y/ISO) ²¹	Can be discovered, viewed, downloaded ²²	
I-1	Coordinate Reference Systems ²³					
I-2	Geographical grid systems (harmonised multi-resolution grid)	Fulls de l'ICC	ICC	1/5.000	ISO	1, 2
I-3	Geographical names	Toponimia	ICC	1/50.000		1, 2
I-4	Administrative units (local, regional and national boundaries)	Límits administratius	ICC	1/50.000	ISO	1, 2
I-5	Addresses	Carrerer, vialer, números de policia	ICC (Generalitat de Catalunya)	1/5.000	N	1, 2
			DIBA	1/1.000	ISO	1, 2
I-6	Cadastral parcels					
I-7	Transport networks (road, rail, air, water and links between networks)	Xarxa carreteres	ICC (Institut Cartogràfic de Catalunya)	1/5.000		1, 2, 3
				1/50.000		1, 2, 3
I-8	Hydrography (including marine areas, all water)	Xarxa hidrografia	ACA (Agència Catalana de	1/5.000		1, 2
				1/50.000		1, 2

¹⁹ See also description of the data themes in document D2.3 Definition of Annex Themes and Scope (<http://www.ec-gis.org/INSPIRE>)

²⁰ Name the data set. Can be a database with multiple layers and thus including several themes, or a specific data set which covers part of a theme (e.g. Natura 2000), you can also have several data sets with the same information at different scales/resolutions. Please only include only the 'basic' data sets (e.g. generalised versions derived from large scale base data sets should not be included)

²¹ Indicate whether the data set has no metadata (N), metadata but not according to the ISO 19115 standard (Y), or metadata according to ISO 19115 (ISO).

²² Can the data set be discovered (1), viewed (2), downloaded (3) through at least one such standardised service? Indicate this using the numbers (1,2,3)

²³ This is of course not necessarily a real data set.

	bodies, river basins, etc.)		l'Aigua)			
I-9	Protected sites (designated by national, EU or international legislation)	PEIN, Xarxa Natura 2000	DMAH (Departmaent de Medi Ambient i Habitatge - Generalitat de Catalunya)	1/50.000 (different information into WMS service)	ISO	1, 2 ,3

Data sets ANNEX II						
Theme ²⁴	Data set ²⁵	Scale/resolution	Organisation responsible	Metadata (N/Y/ISO) ²⁶	Can be discovered, viewed, downloaded ²⁷	
II-1	Elevation (land, ice and ocean surfaces; terrestrial elevation, bathymetry, shoreline)	MDT	1/250.000	ICC (Institut Cartogràfic de Catalunya)		1, 2
II-2	Land cover (physical and biological)	Cobertes del sòl	1/250.000 1/5.000	ICC CREAF		1, 2 1, 2
II-3	Orthoimagery (geo-referenced image data)	Ortoimatge	1/5.000 1/25.000	ICC (Institut Cartogràfic de Catalunya)	ISO	1, 2, 3
II-4	Geology (including bedrock, aquifers and geomorphology)	Geologia, edafologia	1/50.000 1/250.000	IGC (Institut Geològic de Catalunya)	ISO	1, 2 1,2

²⁴ See also description of the data themes in document D2.3 Definition of Annex Themes and Scope (<http://www.ec-gis.org/INSPIRE>)

²⁵ Name the data set. Can be a database with multiple layers and thus including several themes, or a specific data set which covers part of a theme (e.g. Natura 2000), you can also have several data sets with the same information at different scales/resolutions. Please only include only the 'basic' data sets (e.g. generalised versions derived from large scale base data sets should not be included)

²⁶ Indicate whether the data set has no metadata (N), metadata but not according to the ISO 19115 standard (Y), or metadata according to ISO 19115 (ISO).

²⁷ Can the data set be discovered (1), viewed (2), downloaded (3) through at least one such standardised service? Indicate this using the numbers (1,2,3)

Data sets ANNEX III						
	Theme ²⁸	Data set ²⁹	Scale/resolution	Organisation responsible	Metadata (N/Y/ISO) ³⁰	Can be discovered, viewed, downloaded ³¹
III-1	Statistical units (for dissemination or use of statistical data)	Administrative data		IDESCAT (Institut d'Estadística de Catalunya)	N	1
III-2	Buildings (geographical location of buildings)					
III-3	Soil (and sub-soil characteristics)	Geological data	1/50.000	IGC (Institut Geològic de Catalunya)	ISO	1, 2
III-4	Land use (e.g. residential, industrial, commercial,	Urban land planning	1/5.000 and/or 1/1.000	Local administration	N	1, 2
III-5	Human health and safety (see full description in Annex)					
III-6	Utility and governmental services (sewage, waste management, energy, etc.)					
III-7	Environmental monitoring facilities (emissions, ecosystem parameters)					
III-8	Production and industrial					

²⁸ See also description of the data themes in document D2.3 Definition of Annex Themes and Scope (<http://www.ec-gis.org/INSPIRE>)

²⁹ Name the data set. Can be a database with multiple layers and thus including several themes, or a specific data set which covers part of a theme (e.g. Natura 2000), you can also have several data sets with the same information at different scales/resolutions. Please only include only the 'basic' data sets (e.g. generalised versions derived from large scale base data sets should not be included)

³⁰ Indicate whether the data set has no metadata (N), metadata but not according to the ISO 19115 standard (Y), or metadata according to ISO 19115 (ISO).

³¹ Can the data set be discovered (1), viewed (2), downloaded (3) through at least one such standardised service? Indicate this using the numbers (1,2,3)

	facilities (water abstraction, mining, storage sites)					
III-9	Agricultural and aquacultural facilities	Explotacions ramaderes		DARP	ISO	1
III-10	Population distribution - demography	People district	1/5.000	Some Local administration	N	1,
III-11	Area management / restrictions / regulation zones / reporting units					
III-12	Natural risk zones (e.g. atmospheric, hydrologic, seismic, volcanic, wildfire)	Nitrats vulnerables Hydrologic (inundate area)	1	ACA		1
III-13	Atmospheric conditions					
III-14	Meteorological geographical features (weather conditions, measurements)	Meteorologia	1/250.000	Servei Meteorològic de Catalunya	ISO	1, 2
III-15	Oceanographic geographical features (currents, salinity, wave heights, etc.)					
III-16	Sea regions (physical conditions of seas and saline water bodies)					
III-17	Bio-geographical regions (areas with homogeneous ecological conditions)					
III-18	Habitats and biotopes (geographical areas for specific ecological conditions)					
III-19	Species distribution (geographical boundaries for					

	animal and plant species)					
III-20	Energy resources (hydrocarbons, hydro-power, bio-energy, solar, wind, etc.)					
III-21	Mineral resources (metal ores, industrial minerals depth/height)					

3.4.3 Geodetic reference systems and projections

In addition to the reference systems listed in Section 1.3.4, following systems are used in Catalunya and by IDEC:

For the ICC Topographic database 1:5.000, the following projection parameters are given:

ED 1950 (Hayford international, 1924; Potsdam datum (Helmert tower)

[\[24\]](#)

UTM (= conformal), Catalunya: zone 31

[\[24\]](#)

Satellite images are projected in the Lambert conic conformal system.

[\[36\]](#)

The ICC has determined the geoid of Catalonia (GeoCat) – a gravimetric geoid of overall consistent precision.

[\[32\]](#)

3.4.4 Quality of the data

Data quality assessment includes attribute checks, positional accuracy, positional precision, logical consistency and completeness of objects.

[\[24\]](#)

The accuracy of ICC topographic database 1:5 000 normally is 1 m for planimetry and 1.5 m for altimetry.

[\[24\]](#)

With regard to temporal accuracy:

For 1:250 000 topographic data, 1^o - 3^o editions are available.

[\[31\]](#)

For orthophotos, time series are available for online products (from 1963 onwards) and as aerial photographs and town photoplans (1946-1959).

[\[34\]](#)

ICC is member of the National Geographic Council (Consejo Superior Geográfico), a body which, through the Cartographic Standards Commission, draws up and publishes sets of standards for cartographic design for various series and scales valid in Spain.

[32]

3.4.5 Interoperability

A pilot project about sharing data (interoperability) in four departments of the administration was implemented (2003).

This geoportal has a map server client, which connects to different servers (Environmental Department, Cartographic Institute of Catalonia, CREAM, City councils, Cadastre, STSI, Localret...) with different architectures using requests standardized according to OGC. The STSI server provides points of public access to Internet, and the Localret server contains the main points of interest in Catalonia (libraries, city councils, hospitals, police station, fire station...).

Recently a WFS service allowing to create and to download GML files has been included in the IDEC Client (<http://www.geoportal-idec.net/gestor/mapawmse/>), and a future WCS service is also foreseen at the end of 2005.

Finally, the IDEC project makes the interoperability easier, because it gives technical support (at the other institutions) in the creation map servers standard-compliant.

[1]

Distribution format of GIS products: VisCarto25, VisCarto50, VisTopo250, Visgeotecnic, Visgeologic, Visplanejament (self developed software, operating under MS Windows).

[31]

The ICC topographic database 1:5.000 is distributed in MicroStation Design File DGN, Arc/Info Export file e00, AutoCAD Drawing Interchange File DXF.

3.4.6 Language and culture

Language problems required the development of specific software for metadata capture.

[1]

Accompanying documents are provided in Catalan, partly in Spanish and English.

The need to provide information in several languages, Catalan, Spanish and English, has been noted as a problem.

[1]

For the topographic database 1:5 000 (ES) and the 3D Topographic Cartography 1:1 000 and 1:2 000 (CAT) data dictionaries are available. UML data models of the topographic databases 1:50.000 and 1:5.000, and Public Transportation models are available in the Geoportal IDEC (Documents section).

For Orthophotos 1:5.000, 1:25.000 and 1:25.000 infrared technical specifications and preparation process documents are available (ES).

For the topographic databases 1:5.000 (EN, ES) and 1:50.000 (ES) and for the 3D Topographic Cartography 1:1.000 and 1:2.000 (CAT) technical specifications are available.

[\[24\]](#)

The White paper of the sector GIS in Catalunya, clarifying terms and concepts which are relevant of SDI is available in Spanish and Catalan.

[\[39\]](#)

3.4.7 Data Content

The ICC Topographic database 1:5.000 specifications include product specifications, data dictionary and format specifications. In addition, there are also the data models of both topographic databases.

On the other hand, the Orthophotos 1:5 000, 1:25 000 and 1:25 000 infrared color include the technical specifications and preparation process document.[\[24\]](#)

3.4.8 Geographical names

Geographical names are managed in Catalan (toponymy according to order of 20 Dec 1988 and Edict of 19 June 1995 and later modifications of the Catalan Government; coding of the roads according to the official road map of Catalunya).

[\[24\]](#)

3.5 Component 4: Metadata

3.5.1 Availability of metadata

The development of metadata and related services is central to the IDEC project. The starting point of implementation is to make available free of charge software for metadata capture, which is being distributed to any organization interested in it, and a pilot project about sharing data in four departments of the administration. The metadata tool editor is downloadable from Geoportal.

In 2002, the creation of metadata was a priority aiming at complete coverage. In 2003 a Catalog Server offered a trilingual interface to make requests on a DB containing about 15.000 metadata records (45.000, including Spanish and English versions). At the end of 2004 the CS is expected to content about 18.000 metadata.

[1]

[62]

There are also metadata on services (geo-services for access and geo-processing of geo-data) provided by different organizations – WMS, WFS, WCS, coordinate transformation, geocoding.

A total of 20.236 metadata records (16.496 also in English) from 69 organisations have been included in the Catalogue of data.

3.5.2 Metadata catalogues availability + standard

Metadata catalogues have been built. The IDEC Metadata Catalog contains 17.000 registries of datasets from 70 public organisms and private companies. Creation and importing of metadata is continued. Almost all metadata are described in Catalan, Spanish and English.

[27]

The ISO/TC 211 FDIS 19115 standard has been implemented and, there are plans to implement ISO/TC 211 DIS 19119. [24]

The software application MetaD v.2 can be freely downloaded from the geoportal, in Catalan, Spanish or English versions.

A recent agreement with OGC(E) will allow to issue, at the end of the year, a new version (v. 3), more flexible and totally “internationalised”, implementing the ISO 19139, which also will be offered free of charge by IDEC itself and by GSDD, FGDC and OGC.

[24]

3.5.3 Dublin core metadata standards for GI-discovery

Is not in use.

3.5.4 Metadata implementation

IDEC is responsible for the metadata implementation. A feature code list within the metadata is available in Catalan, Spanish and English.

IDEC provide a thesaurus with keywords. This thesaurus can be downloaded from Geoportal, and can be loaded into the metadata tool editor (MetaD) to make the metadata creation process easier and to homogenise the use of keywords.

[\[62\]](#)

Spatial searches can be performed drawing lines and polygons which intersects, contain, etc. with a metadata bounding box.

3.6 Component 4: Network Services

The geoportal of IDEC (www.geoportal-dec.cat) provides discovery, viewing and other services). Improvements have been made in 2005-2006.

The following table lists the services of IDEC. There are more than 60 (and this only for Catalonia). Services also exist for the local level (Ajuntament).

Services						
	Service ³²	Organisation responsible	Type of service ³³	Metadata (N/Y/ISO) ³⁴	Open for Public (Y/N)	Free/ Not free ³⁵ (Y/N)
1	Topographic map 1/5.000 of Catalunya (vector) url: http://galileo.icc.es/wms/servlet/icc_bt5m_v_r?REQUEST=GetCapabilities	ICC	WMS/WFS	Y	Y	Y
2	Orthoimage 1/5.000 of Catalunya url: http://galileo.icc.es/wms/servlet/icc_orto5m_r_r?Request=GetCapabilities	ICC	WMS	Y	Y	Y
3	Urban base (topography) 1/1.000 - Diputació Barcelona (vector) url: http://sitmun.diba.cat/wms/servlet/BUE1M?&REQUEST=GetCapabilities&SERVICE=WMS&VERSION=1.1.1	DIBA	WMS	Y	Y	Y
4	Street network (lines and numbers) 1/1.000 - Diputació Barcelona (vector) url: http://sitmun.diba.cat/wms/servlet/CAE1M?request=getcapabilities&service=WMS&version=1.1.1	DIBA	WMS	Y	Y	Y
5	Land cover map 1/5.000 de Catalunya (raster) url: http://www.creaf.uab.es/cgi-bin/MiraMon5_0.cgi?REQUEST=GetCapabilities	CREAF - Universitat Autònoma de Barcelona	WMS	Y	Y	Y
6	Administrative boundary (vector) url: http://galileo.icc.es/wms/servlet/icc_limadmin_v_r?REQUEST=GetCapabilities	ICC	WMS	Y	Y	Y
7	WIFI node with free access to Internet (vector) url: http://wms.guifi.net/cgi-bin/mapserv?map=/home1/fgs/www/htdocs/guifimaps/catalunya.map&REQUEST=G	GUIFI.NET	WMS	Y	Y	Y

³² List the names/IDs and where possible the link (URL) of all the discover, view, download, transformation and invoking services that are part of your infrastructure

³³ Indicate the type (discover, view, download, transformation and invoking services)

³⁴ Indicate whether the service has no metadata (N), or metadata according to ISO 19119 (ISO).

³⁵ Whether or not the service is free for use.

	etCapabilities&SERVICE=WMS&VERSION=1.1.1					
8	Tourist routes of Palau Robert (vector) url: http://delta.icc.es/cgi-bin/mapserv?map=/opt/idec/dades/probert/idelocal_probert.map&REQUEST=GetCapabilities&SERVICE=WMS&VERSION=1.1.1	Palau Robert - Generalitat de Catalunya	WMS	Y	Y	Y
9	Environment url: http://sima.gencat.net/wmsconnector/com.esri.wms.Esrimap/sima2?REQUEST=GetCapabilities&SERVICE=WMS&	DMAH	WMS	Y	Y	Y
10	Topographic map 1/50.000 of Catalunya (vector) url: http://galileo.icc.es/wfs/servlet/icc_bt50m_v_v?REQUEST=GetCapabilities	ICC	WMS/WFS	Y	Y	Y
11	Topographic map 1/250.000 of Catalunya (vector) url: http://galileo.icc.es/wms/servlet/icc_bt250m_r_r?REQUEST=GetCapabilities	ICC	WMS	Y	Y	Y
12	Landsat url: http://galileo.icc.es/wms/servlet/icc_landsat_r_r?REQUEST=GetCapabilities	ICC	WMS	Y	Y	Y
13	Orthoimatge 1/25.000 of Catalunya url: http://galileo.icc.es/wms/servlet/icc_orto25m_r_r?REQUEST=GetCapabilities	ICC	WMS	Y	Y	Y
14	Mapa Geològic 1/50.000 i 1/250.000 de Catalunya url: http://shagrat.icc.es/lizardtech/iserv/ows?REQUEST=GetCapabilities	IGC	WMS	Y	Y	Y
15	Avalanche service of Catalunya url: http://delta.icc.es/cgi-bin/mapserv?map=/opt/idec/dades/umn/allaus.map&REQUEST=GetCapabilities&SERVICE=WMS&VERSION=1.1.1	IGC	WMS	Y	Y	Y
16	Raster service of the Institut Cartogràfic de Catalunya - Geologic map of Catalunya 1:250 000 - Geologic map of Catalunya 1:50 000 - Topographic map of Catalunya 1:250 000 - Topographic map of Catalunya 1:50 000 - Orthoimage of Catalunya 1:25 000 - Orthoimage of Catalunya 1:5 000	ICC	WMS	Y	Y	Y

	- Satellite images of Catalunya 1:250 000 url: http://shagrat.icc.es/lizardtech/iserv/ows?request=getcapabilities					
17	Grids of Institut Cartogràfic de Catalunya url: http://galileo.icc.es/wms/servlet/icc_talls_v_r?REQUEST=GetCapabilities	ICC	WMS	Y	Y	Y
18	Flights of Institut Cartogràfic de Catalunya url: http://galileo.icc.es/wms/servlet/icc_vols_v_r?REQUEST=GetCapabilities	ICC	WMS	Y	Y	Y
19	Geodesic vertexes of Catalunya url: http://galileo.icc.es/wms/servlet/icc_vertex_v_r?REQUEST=GetCapabilities	ICC	WMS	Y	Y	Y
20	Hipermapa url: http://hipermapa.ptop.gencat.net/hipermapa/servidor/scripts/OGC.asp?&REQUEST=GetCapabilities&SERVICE=WMS&VERSION=1.1.1	DPROP	WMS	Y	Y	Y
21	Taxons of vegetation of Catalunya url: http://biodiver.bio.ub.es/biowms/serviceflora?REQUEST=GetCapabilities&SERVICE=WMS&VERSION=1.1.1	UAB	WMS	Y	Y	Y
22	Urban land planning	Ajuntament de Badalona	WMS	N	N	N
23	Street network, equipments	Ajuntament de Barberà del Vallès	WMS	N	N	N
24	Urban land planning, urban guide	Ajuntament de Bell-lloc d'Urgell	WMS	N	N	N
25	Street network, patrimony	Ajuntament de Bigues i Riells	WMS	N	N	N
26	Urban guide	Ajuntament de Cardedeu	WMS	N	N	N
27	Street network, plot of land	Ajuntament de	WMS	N	N	N

		Castellar del Vallès				
28	Street network, plot of land	Ajuntament de Castelló d'Empúries	WMS	N	N	N
29	Plot of land, orthoimage	Ajuntament de Cornellà de Llobregat	WMS	N	N	N
30	Urban land planning, orthoimage, Street network, equipments, cartographic contents, place name	Ajuntament del Prat de Llobregat	WMS	N	N	N
31	Urban land planning	Ajuntament de Figueres	WMS	N	N	N
32	Urban land planning	Ajuntament de Girona	WMS	N	N	N
33	Urban land planning	Ajuntament de l'Hospitalet de Llobregat	WMS	N	N	N
34	Districts, plot of land	Ajuntament de Lleida	WMS	N	N	N
35	Urban land planning	Ajuntament de la Seu d'Urgell	WMS	N	N	N
36	Urban land planning	Ajuntament de Lloret de Mar	WMS	N	N	N
37	Urban land planning,	Ajuntament de Manresa	WMS	N	N	N
38	Urban land planning, urban guide	Ajuntament de Molins de Rei	WMS	N	N	N
39	Urban guide	Ajuntament de Palafrugell	WMS	N	N	N

40	Urban land planning,	Ajuntament de Palol de Revardit	WMS	N	N	N
41	Orthoimage, plot of land	Ajuntament de Polinyà	WMS	N	N	N
42	Street network, urban guide	Ajuntament de Ripoll	WMS	N	N	N
43	Plot of land	Ajuntament de la Roca del Vallès	WMS	N	N	N
44	Urban land planning, plot of land	Ajuntament de Roses	WMS	N	N	N
45	Orthoimatge, plot of land	Ajuntament de Rubí	WMS	N	N	N
46	Urban land planning, street network, orthoimage, city map	Ajuntament de Salt	WMS	N	N	N
47	Urban land planning	Ajuntament de Sant Adrià del Besòs	WMS	N	N	N
48	Street furniture and fixtures	Ajuntament de Sant Bartomeu del Grau	WMS	N	N	N
49	Urban guide	Ajuntament de Sant Boi de Llobregat	WMS	N	N	N
50	Urban land planning	Ajuntament de Sant Feliu de Codines	WMS	N	N	N
51	Urban land planning, street network, name places, orthoimatge, plot of land	Ajuntament de Sant Joan	WMS	N	N	N

		Despí				
52	Urban land planning	Ajuntament de Sant Joan de Vilatorrada	WMS	N	N	N
53	Urban land planning	Ajuntament de Santa Coloma de Gramenet	WMS	N	N	N
54	Urban land planning, orthoimatge	Ajuntament de Santa Oliva	WMS	N	N	N
55	Urban guide, street network, points of interest, transport and mobility	Ajuntament de Terrassa	WMS	N	N	N
56	Urban land planning	Ajuntament de Tossa de Mar	WMS	N	S	S
57	Equipments, orthoimatge, name places, base maps	Ajuntament de Vilafranca del Penedès	WMS	N	N	N
58	Orthoimatge, equipments, base map	Ajuntament de Vilanova i la Geltrú	WMS	N	N	N
59	Route network, contour line, farms	Consell Comarcal del Bages	WMS	N	N	N
60	Plànol, Street network, orthoimatge	Consell Comarcal del Baix Empordà	WMS	N	N	N
61	Demography, slope, habitats, Xarxa Natura 2000, area to hunt, ECOSTRIMED, QBR (index of water quality), deposit, generator of energy, consumption and demand electrical, rubbish management, acoustic maps	Consell Comarcal del Gironès	WMS	N	N	N
62	Network of path, routes of BTT, farms	Consell Comarcal del	WMS	N	N	N

		Pla de l'Estany				
63	Topographic 1/1.000	Diputació de Lleida	WMS	N	N	N
64	Network of roads	Diputació de Tarragona	WMS	N	N	N

NOTE: all the geoservices from the municipalities (22 – 64) are, till now, available from a viewer requiring a password. A future free accessibility is envisaged in some months (currently we are debating an harmonized data policy for the diffusion).

3.6.1 On-line access service for metadata: discovery services

The creation of a metadata server was a priority in 2002.

It is be available on Internet in Catalan, English and Spanish on <http://www.geoportal-idec.net/geoportal/IDECServlet?pag=cataleg&home=s>

[1]

The IDEC presents the following metadata-related information on the IDEC project website:

- Descriptions of the ISO 19115 metadata standard and IDEC's schema;
- Manual for understanding the content of the metadata records (available in Catalan and Spanish);
- Software package for metadata capture. This tool can be downloaded from Geoportal;
- Metadata Catalog that contains all registries of metadata created by partners.

3.6.2 On-line access service for data: download services

IDEC has a Geoinformation Viewer. This software is a map server client, which connects several servers using OGC technology. It is accessible by <http://www.geoportal-idec.net/gestor/mapawmse/>.

[26]

In this map server client you can display reference and thematic data.[26] and discharge GML data from WFS services.

3.6.3 Inter-linkages of on-line access services for metadata and data

NIA

3.6.4 OpenSource software and access services

No information has been found.

3.6.5 Availability of viewing services

The Web GIS tools of ICC allow the graphical consultation of the description of the geodetic points, of the state of the projects in course and the state of production of the different cartographic series ("fitness to use").

[35]

IDEC Web Mapping Service contains geographic information (thematic and reference information) which can be consulted by municipality (WFS), by geographic area (WMS) and by toponymy (WFS).

IDEC has two maps servers clients: public-client and private-client, protected by password.

- The public-client shows topographic databases (1:5.000 and 1:50.000), orthophotos (1:5.000, 1:25.000 and 1:25.000 infrared colour) and thematic maps (Soil uses, Nitrate Vulnerable Zones, PEIN, Special Protection Natural Spaces, Public Management Forests, Waste Managers, Rivers, Reservoirs, Soil coverage, Ecology and Forest Inventory and population maps). In addition, it allows adding an external server and combining its cartography with the other layers.
- The private-client includes, in addition of public-client functions, cadastral maps, urban planning from city councils servers, etc.

These connections use the OGC technology.

Finally, IDEC has linked its map server client with its Metadata catalogue and vice versa. It allows to consult metadata from map server client and to display cartography in a result of metadata query.

[\[62\]](#)

New layers have been added in the viewer recently: geology, cadastre, climate, etc. A street map and search by postal address has been implemented.

3.6.6 Availability of catalogue services to regulate access

Such catalogue services are planned for 2005.

[\[62\]](#)

3.6.7 Availability of catalogue services that perform payment operations

Catalogue services available to perform payment operations are planned for 2005.

[\[62\]](#)

3.6.8 Availability of catalogue services to extract and send data to a user application

In preparation.

[\[62\]](#)

3.6.9 SDI user applications

A number of SDI user applications have been implemented. Now, there are two implemented initiatives that have priority: Coasts SDI and E-government.

Coast SDI has as the main objective to improve and to increase the access to the existing information for the whole users' community, so that the participation in the management of the coast could be more active and documented. Therefore, Coasts SDI allows to discover and to access to the information relative to the coast.

E-Government focuses on the portal of the Open Administration of Catalonia and has as objective to canalize and to distribute the services of the Administration to the citizens. In this framework, IDEC is contributing to create a public geoportal to facilitate the access to geoinformation to all citizens and SME.

Other thematic SDI projects are being prepared to be set up on 2005, leaded by IDEC, such as the inter universities SDI and the Local Administration SDI.

IDEC is participating in several new projects like the European project AWARE in which IDEC works on the design of geoservices for modeling Snow Water Equivalent and Run-off in Alpine zones. IDEC issued several applications to the local administrations like a customized viewer and street map, a customized catalogue server, an objects edition tool, and others. These applications allow the local administrations to customize, manage and publish the services in their own corporate web pages or portals.

3.6.10 Availability of geo-processing services

Map services have been developed in 2003. The catalogue server will initially involve hosting the metadata on a "central" catalogue for consultation (WMS) before a link is opened with other servers and the WFS is developed.

[\[1\]](#)

WFS and web pricing and ordering services are planned to be developed in 2004.

[\[1\]](#)

3.7 Component 6: Thematic environmental data

Thematic environmental data are collected and managed primarily by the Department of Environment of the Catalonia government, and widespread by an Internet Map Server (SIMA). IDEC client connects to SIMA using OGC calls, providing IDEC client access to the following geo-datasets:

- Soil use

- Nitrate Vulnerable Zones
- PEIN
- Special Protection Natural Spaces
- Public Management Forests
- Waste Managers
- Rivers, Reservoirs

From the CREAM server following layers can be displayed:

- Soils coverage
- Ecology and Forest Inventory

From the LOCALRET server access is given to:

- Points of interest (Town hall, Library, Firemen, C.A.P. Centers, Centers and Delegations, Education centers, Public hospital, Omnia Points, Police, Industrial polygon and Health)

From the STSI server, the data theme ‘Telecenters’ is accessible.

New servers will be added in next months, from several municipalities, Dept. of Agriculture, Dept. of Culture, etc.

[\[65\]](#)

Thematic environmental data held by ICC include:

- The Seismic catalogue and –Atlas of Catalunya
- The Environmental Geology of Catalunya
- The 1:25 000 geotechnical map of Barcelona
- Zones with Avalanche risk, 1:25 000 (Catalunya)

[\[63\]](#)

3.8 Use and efficiency of the Catalan SDI

For the Catalan SDI project, it is hoped that the project will provide an opportunity to develop the geoinformation market, help to diffuse public use and understanding of GI and rationalise some of the activities of the public administrations as well as to involve the private sector and academic institutions into these developments. The IDEC application will focus on diminishing transaction costs in the GI-sector, such as access to geodata and their services, alongside other sectors such as real state.

Its ultimate strategy is focused on creating sectorial but interconnected SDI (coast, inter-universities, real state, urban plans...)

[\[1\]](#)

In the course of 2007, a study was carried out on the costs and benefits of IDEC (see for a summary and the entire report <http://www.ec-gis.org/INSPIRE>).

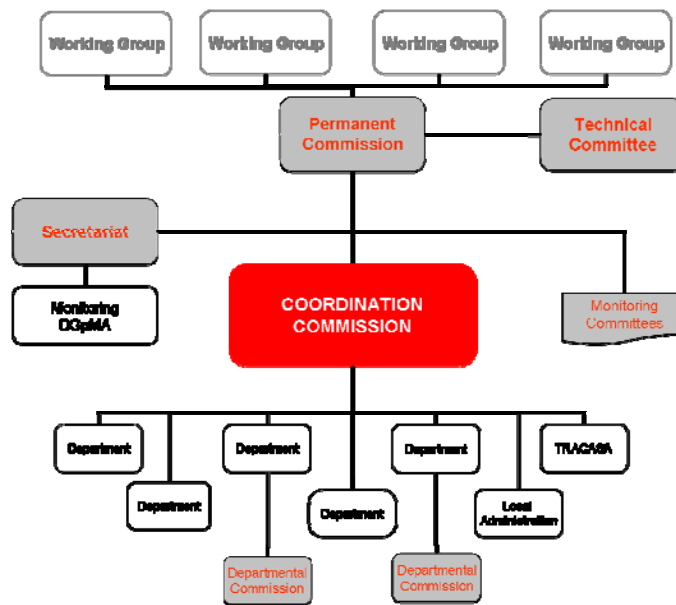
4 Details of the regional SDI of Navarra (SITNA)

This section is still under construction. Although the aim is not to describe all the regional initiatives in the countries studied, the regional SDI of Navarra is interesting for its dynamic developments: organisational and technical. Since Navarra provided specific information on their data sets, services, use of the infrastructure, we list the results in this section. We also provide the organisational elements. Issues related to data sharing are, as for the other countries, summarised in the summary report.

4.1 Component 1: Coordination and organisational issues

SITNA is a corporate project very consolidated inside the organization of the Government of Navarra. Almost all the departments participate in the project, specially those working and managing geographical information. Information regarding different themes is collected and managed (environmental, agronomic, infrastructures, services, utilities, cadastre, traditions and patrimony, etc.). An important aspect of the SITNA organizational and operating model is that each unit is responsible for maintaining in the system the layers of information under their ownership in the way they consider appropriate for dissemination.

Following Organization Model is applied:



The Coordination Commission constitutes the SITNA superior board to complete the Government's Agreements. All the Departments of the Regional Administration, a representation from Local Administrations and TRACASA, compose this Commission.

The Commission approved on the first session, the Organization and Operation Norms.

One of the rules establishes the constitution of the Permanent Commission which has the responsibility of programming, executing and reviewing SITNA development and Annual Action Plans.

The Permanent Commission delegates the Technical Committee the responsibility for monitoring, in order to control the technical aspects of the SITNA development and in particular the works entrusted to TRACASA. Likewise the Technical Committee must propose to the Permanent Committee the work program and also specific projects.

According to the Norms, several Working Groups have been constituted, demonstrating their efficiency for specific tasks.

The General Direction of Modernization and e-Administration (DGpMA) from the Government of Navarra performs a monitoring of the system in order to efficiently incorporate it in their functions and also in the Plan of Modernization, and the Plan for the Promotion for the Information Society and Knowledge.

According to their characteristics SITNA must search and support the synergies with other corporative projects. Likewise, SITNA has to pay attention to the commissions or monitoring committees coming from collaboration agreements subscribed with third parties.

There exit a specific unit in the D.G.p.M.A. that supports and promote the coordination through the Commission Secretariat. To consolidate the coordination procedures and administration

The collaboration among different Regional Government has allowed preparing the “SITNA: Strategic Plan 2007-2009” with all the requirements to achieve their objectives. The Annual Action Plans serve to manage SITNA developing objectives and projects starting from the Strategic Plan. They are evaluated by the Annual Reports.

The Permanent Committee develops the Action Plan through Projects and Working Programs approving, executing and reviewing quarterly. The annual Action Plans, the quarterly Working Programs and the Annual Reports must be shared procedures for planning and evaluation of the system development.

There is a Collaboration Agreement among the Government of Navarre and TRACASA to carry out the technological development, storage of data and support for the diffusion of the territorial information.

Several procedures are established and approved by the SITNA decision bodies in order to establish the activities to be carried out for the inclusion of a new layer of information in the SITNA warehouse or its dissemination in IDENA.

From the procedural point of view, IDENA and IDEPamplona are totally integrated in SITNA. The inclusion of new layers of information is carried out by means of the same established procedures applied for the incorporation of data to SITNA.

4.2 Component 2: Legal framework and funding

[To be completed when other information becomes available]

4.2.1 Licensing framework

Navarra follows the model that all the spatial information must be freely distributed and re-used. Therefore, until now, there is no licensing system.

The philosophy is providing the information without imputing any rates. Therefore, there is some information that can be directly downloaded from the SDI. However, there are some products subject to rates according to active law. The rates include only the cost for the medium preparation.

Examples are the Orthophoto or Topographic data of Navarra

- Orthophoto - 3 DVD - 180€(60€dvd)
- Topographic 1:5000 – 4 DVD – 240€(60€dvd)

SITNA has been analysing the possibility of charging some information in order to be partially self-financing. This has been the case for cadastre information (Annex I, Theme 6), but no decision in this sense has been made.

4.3 Component 3: Data for themes of the INSPIRE annexes

The following table lists the data sets in SITNA according to the themes of the three annexes of the INSPIRE Directive. The template includes all the Geographical Information that makes part of the SITNA warehouse. That means it contains all the available spatial information, but not necessarily published at the SDIs. The overview includes also data sets from local authorities. Almost all the themes are covered.

Data sets ANNEX I						
	Theme[1]	Data set[2]	Organisation responsible	Scale/resolution	Metadata (N/Y/ISO)[3]	Can be discovered, viewed, downloaded[4]
I-1	Coordinate Reference Systems	-	...	
I-2	Geographical grid systems (harmonised multi-resolution grid)	Cartographic grid	Government of Navarre. Department of Public Works, Transport and Communications	1/500	ISO	1.2
I-3	Geographical names	Place names/Toponymy	Government of Navarre. Department of Education.	1/5000	ISO	1.2
		Topographic cartography	Government of Navarre. Department of Public Works, Transport and Communications	1/5000	ISO	1.2
		Cartography 1:1.000	Government of Navarre. Department of Territory and Housing	1/1000	ISO	1.2
I-4	Administrative units (local, regional and national boundaries)	Administrative units	Government of Navarre. Department of Local Administration.	1/5000	ISO	1,2,3
		Historical areas: Merindades	Government of Navarre. Department of Local Administration.	1/5000	ISO	1,2,3
		Territorial units: Navarre 2000	Government of Navarre. Department of Economy and Finances.	1/5000	ISO	1.2
		Linguistical unitss	Government of Navarre. Department of Education.	1/5000	ISO	1.2
		Judicial areas	Government of Navarre. Department of Presidency, Justice and Interior.	1/5000	ISO	1.2
		Healthy areas	Government of Navarre. Department of Health.	1/5000	ISO	1.2
I-5	Addresses	Street directory	Government of Navarre. Department of Economy and Finances.	1/500	ISO	1.2
		Postal codes	Sociedad Estatal de Correos y Telégrafos, S.A. (Postal Service)	1/5000	ISO	1.2
		Street directory of Pamplona	Pamplona City Council	1/5000	ISO	1.2
		Post offices (Pamplona)	Pamplona City Council	1/5000	ISO	1,2,3
I-6	Cadastral parcels	Cadastré	Government of Navarre. Department of Economy and Finances.	1/500	ISO	1.2
		Historical cadastré	Government of Navarre. Department of Economy and Finances.	1/500	ISO	...
		SIGPAC cadastré	Government of Navarre. Department of Rural Development and Environment.	1/500	ISO	1.2
		Rural land ownership	Government of Navarre. Department of Territory and	1/500	ISO	...

		Housing				
		Concentraciones Parcelarias	Government of Navarre. Department of Rural Development and Environment.	1/500	ISO	...
I-7	Transport networks (road, rail, air, water and links between networks)	High Velocity Train Route(AVE)	Government of Navarre. Department of Public Works, Transport and Communications	1/5000	ISO	1.2
		Road networks	Government of Navarre. Department of Public Works, Transport and Communications	1/5000	ISO	1.2
		Railroad networks	Government of Navarre. Department of Public Works, Transport and Communications	1/5000	ISO	1.2
		Airport	Government of Navarre. Department of Public Works, Transport and Communications	1/5000	ISO	1.2
		Telecommunications	Government of Navarre. Department of Public Works, Transport and Communications	1/5000	ISO	1.2
		Regional urban transport network stops	Pamplona Distrit Council	1/500	ISO	1.2
		Regional urban transport network (Pamplona)	Pamplona City Council	1/5000	ISO	1,2,3
		Bicycle stations (Pamplona)	Pamplona City Council	1/5000	ISO	1,2,3
I-8	Hydrography (including marine areas, all water bodies, river basins, etc.)	Hydrographic network	Government of Navarre. Department of Rural Development and Environment	1/5000	ISO	1,2,3
		Drainage features	Government of Navarre. Department of Rural Development and Environment	1/5000	ISO	1,2,3
		Canal of Navarre	Government of Navarre. Department of Public Works, Transport and Communications	1/5000	ISO	1.2
		Irrigate areas	Riegos de Navarra, S.A.	1/5000	ISO	1.2
		Arga river park (Pamplona)	Pamplona Distrit Council	1/5000	ISO	1,2,3
I-9	Protected sites (designated by national, EU or international legislation)	Natural Protected Areas	Government of Navarre. Department of Rural Development and Environment	1/10000	ISO	1,2,3
		Zones of Special Conservation	Government of Navarre. Department of Rural Development and Environment	1/5000	ISO	1.2
		Environment education centres	Government of Navarre. Department of Rural Development and Environment	1/5000	ISO	1,2,3
		Important Comunitary Sites: LICS	Government of Navarre. Department of Rural Development and Environment	1/5000	ISO	1,2,3
		Fauna Protected Areas	Government of Navarre. Department of Rural Development and Environment	1/10000	ISO	1,2,3
		Set of Property with Cultural and Architectonic (BIC)	Government of Navarre. Department of Culture and Tourism.	1/5000	ISO	1,2,3
		Santiago's Way	Government of Navarre. Department of Rural Development	1/5000	ISO	1,2,3

			and Environment			
		Farming Routes	Government of Navarre. Department of Rural Development and Environment	1/5000	ISO	1,2,3
Data sets ANNEX II						
II-1	Elevation (land, ice and ocean surfaces; terrestrial elevation, bathymetry, shoreline)	Slope	Government of Navarre. Department of Rural Development and Environment	1/25000	ISO	1.2
		Orient	Government of Navarre. Department of Rural Development and Environment	1/25000	ISO	1.2
		Color elevation map (25 metres)	...	25 m	ISO	1.2
		B/N elevation map (7,5 metres)	...	7,5 m	ISO	1.2
II-2	Land cover (physical and biological)	Agrarian units	Government of Navarre. Department of Rural Development and Environment.	1/5000	ISO	1,2,3
		Crops and land uses	Government of Navarre. Department of Rural Development and Environment.	1/25000	ISO	1.2
		Potential Vegetation	Government of Navarre. Department of Rural Development and Environment.	1/25000	ISO	1.2
		Corine Land Cover	Government of Navarre. Department of Rural Development and Environment	1/100000	ISO	...
		Permanent crops Inventory	Government of Navarre. Department of Rural Development and Environment.	1/5000	ISO	...
		Vegetation Series	Government of Navarre. Department of Rural Development and Environment	1/50000	ISO	1,2,3
II-3	Orthoimagery (geo-referenced image data)	Orthophotograph of Navarra in colour 1:5.000 (0.4 m/pixel) 2003	Government of Navarra. Department of Public Works, Transport and Communications; Department of Rural Development and Environment; Department of Economy and Finances and Department of Territory and Housing.	0.40 m	ISO	1.2
		Orthophotograph of Navarra in colour 1:5000 (0.42 m/pixel) 98/00	Government of Navarra. Department of Public Works, Transport and Communications	0.42 m	ISO	1.2
		Orthophotograph of Navarra in colour 1:5000 (0.5 m/pixel) 2004	Government of Navarra. Department of Public Works, Transport and Communications	0.50 m	ISO	1.2
		Orthophotograph of Navarra in colour 1:5000 (0.5 m/pixel) 2005	Government of Navarra. Department of Public Works, Transport and Communications	0.50 m	ISO	1.2
		Orthophotograph of Navarra in colour 1:5000 (0.25 m/pixel) 2006	Government of Navarra. Department of Public Works, Transport and Communications	0.25 m	ISO	1.2
		Orthophotograph of the District of Pamplona in colour 1:2000 (0.16 m/pixel) 2000	Government of Navarra. Department of Territory and Housing	0.16 m	ISO	1.2
		Orthophotograph of town centres in Navarra in colour 1:1.000 (0.10 m/pixel) 99/05	Government of Navarra. Department of Territory and Housing	0.10 m	ISO	1.2

		Ortophotograph of Navarra 1:25.000 (1.87 m/pixel) 1991-1995	...	1.87 m	ISO	1.2
		Ortophotograph 1:5.000 (0.4 m/pixel) 1990	Government of Navarra	0.40	ISO	1.2
		Ortophotograph 1:5.000 (0.4 m/pixel) 1982	Government of Navarra	0.40	ISO	1.2
		Ortophotograph 1:5.000 (0.4 m/pixel) 1974	Government of Navarra	0.40	ISO	1.2
		Ortophotograph 1:5.000 (0.4 m/pixel) 1968	Government of Navarra. Department of Public Works, Transport and Communications	0.40	ISO	1.2
		Ortophotograph of Navarra 1:10.000 (1 m/pixel) 1957	Government of Navarra. Department of Rural Development and Environment	1 m	ISO	1.2
		Navarra. Flight 1929-1931. Pixel not specificate	Government of Navarre. Department of Economy and Finances.	...	ISO	1.2
		Ortophoto Navarra 1:50.000 1967	...	0.40 m	ISO	1.2
		LANDSAT-5 False colour. Several years	Government of Navarra. Department of Rural Development and Environment	25 m	ISO	1.2
		LANDSAT-5Pseudocolour. Several years	Government of Navarra. Department of Rural Development and Environment	25 m	ISO	1.2
		IRS-1C False colour. Several years	Government of Navarra. Department of Rural Development and Environment	25 m	ISO	1.2
		IRS-1C Pseudocolour. Several years	Government of Navarra. Department of Rural Development and Environment	25 m	ISO	1.2
		IRS-1D False colour. Several years	Government of Navarra. Department of Rural Development and Environment	25 m	ISO	1.2
		IRS-1D Pseudocolour. Several years	Government of Navarra. Department of Rural Development and Environment	25 m	ISO	1.2
II-4	Geology (including bedrock, aquifers and geomorphology)	Geology	Government of Navarre. Department of Public Works, Transport and Communications	1/25000	N	...
Data sets ANNEX III						
III-1	Statistical units (for dissemination or use of statistical data)	Statistical districts	Government of Navarre. Department of Economy and Finances.	1/500	ISO	1.2
III-2	Buildings (geographical location of buildings)	Buildings	Government of Navarre. Department of Economy and Finances.	1/500	ISO	1.2
III-3	Soil (and sub-soil characteristics)	Soil map	Government of Navarre. Department of Rural Development and Environment.	1/25000	ISO	...
		Pasture Valuation map	Government of Navarre. Department of Rural Development and Environment.	1/25000	N	...
		Agrological types map	Government of Navarre. Department of Rural Development and Environment.	1/25000	ISO	...

		Irrigated ability	Government of Navarre. Department of Rural Development and Environment.	1/25000	ISO	...
		Soils Erosion National Inventory	Government of Navarre. Department of Rural Development and Environment.	...	N	...
III-4	Land use (e.g. residential, industrial, commercial,	Structuring approach	Government of Navarre. Department of Territory and Housing	1/5000	ISO	...
		Structuring approach: land which cannot be developed	Government of Navarre. Department of Territory and Housing	1/5000	ISO	...
		Urbanistic rules for the region of Pamplona	Government of Navarre. Department of Territory and Housing	1/5000	ISO	...
III-5	Human health and safety (see full description in Annex)	Prison and law courts (Pamplona)	Pamplona City Council	1/5000	ISO	1,2,3
		Health buildings (Pamplona)	Pamplona City Council	1/5000	ISO	1,2,3
III-6	Utility and governmental services (sewage, waste management, energy, etc.)	Fire stations	Government of Navarre. Department of Presidency, Justice and Interior.	1/500	ISO	1.2
		Sport facilities	Government of Navarre. Department of Social Affaires, Family, Youth and Sport.	1/500	ISO	1.2
		Councils	Government of Navarre. Department of Local Administration.	1/500	ISO	1,2,3
		Supply network	Pamplona District Council	1/500	ISO	1.2
		Sanitation network	Pamplona District Council	1/500	ISO	1.2
		Containers network	Pamplona District Council	1/500	ISO	1.2
		Telecommunications	Government of Navarre. Department of Public Works, Transport and Communications	1/5000	ISO	...
		Addresses for Job Centres (Offices) and Navarra Employment Service Centres (NES)	Government of Navarre. Department of Innovation, Business and Employment	1/500	ISO	1.2
		City Council Buildings	Pamplona City Council	1/5000	ISO	1,2,3
		Socio-cultural facilities	Pamplona City Council	1/5000	ISO	1,2,3
		Leisure facilities	Pamplona City Council	1/5000	ISO	1,2,3
		Cemetery and funeral homes	Pamplona City Council	1/5000	ISO	1,2,3
		Municipal markets	Pamplona City Council	1/5000	ISO	1,2,3
		General traffic office	Pamplona City Council	1/5000	ISO	1,2,3
		Municipal toilets	Pamplona City Council	1/5000	ISO	1,2,3
		Old people's homes	Pamplona City Council	1/5000	ISO	1,2,3
		Schools	Pamplona City Council	1/5000	ISO	1,2,3
		Route of the San Fermín bull run	Pamplona City Council	1/5000	ISO	1,2,3
III-7	Environmental monitoring facilities (emissions, ecosystem	EPER Register (European Pollutant Emission Register)	Government of Navarre. Department of Rural Development and Environment	1/5000	ISO	...

	parameters)					
		Local Agenda 21	Government of Navarre. Department of Rural Development and Environment	1/5000	ISO	...
		Quality of water	Government of Navarre. Department of Rural Development and Environment	1/25000	ISO	...
		Air Quality	Government of Navarre. Department of Rural Development and Environment	1/25000	ISO	...
III-8	Production and industrial facilities (water abstraction, mining, storage sites)	Waste managers	Government of Navarre. Department of Rural Development and Environment	1/5000	ISO	...
		Purifiers	Navarra. De Infraestructuras Locales, S.A. (NILSA)	1/5000	ISO	1.2
III-9	Agricultural and aquacultural facilities	Cattle farming	Government of Navarre. Department of Rural Development and Environment.	1/5000	ISO	...
III-10	Population distribution - demography	...				
III-11	Area management / restrictions / regulation zones / reporting units	Hunting zones	Government of Navarre. Department of Rural Development and Environment	1/5000	ISO	1,2,3
		Nitrate-vulnerability zones	Government of Navarre. Department of Rural Development and Environment	1/5000	ISO	1,2,3
		Salmon and trout population areas	Government of Navarre. Department of Rural Development and Environment	1/25000	ISO	...
		Fish areas	Government of Navarre. Department of Rural Development and Environment	1/25000	ISO	...
		Contamination Aquifers Vulnerability	Government of Navarre. Department of Rural Development and Environment	1/50000	ISO	...
		Liquid Manure excluded areas	Government of Navarre. Department of Rural Development and Environment	1/5000	ISO	...
		Mining register	Government of Navarre. Department of Innovation, Business and Employment	1/5000	ISO	...
		Fallow Index	Government of Navarre. Department of Rural Development and Environment.	1/5000	ISO	...
		Mountain areas	Government of Navarre. Department of Rural Development and Environment.	1/5000	ISO	...
		Unfavoured areas	Government of Navarre. Department of Rural Development and Environment.	1/5000	ISO	...
		Production Regionalization	Government of Navarre. Department of Rural Development and Environment.	1/5000	ISO	...
		Food and Agriculture Quality-	Government of Navarre. Department of Rural Development	1/5000	ISO	...

		Guarantee of origin	and Environment.			
III-12	Natural risk zones (e.g. atmospheric, hydrologic, seismic, volcanic, wildfire)	Flood areas	Government of Navarre. Department of Rural Development and Environment	1/25000	ISO	...
III-13	Atmospheric conditions	...				
III-14	Meteorological geographical features (weather conditions, measurements)	Weather stations	Government of Navarre. Department of Rural Development and Environment.	1/5000	ISO	...
III-15	Oceanographic geographical features (currents, salinity, wave heights, etc.)	...				
III-16	Sea regions (physical conditions of seas and saline water bodies)	...				
III-17	Bio-geographical regions (areas with homogeneous ecological conditions)	Bio-geographical regions	Government of Navarre. Department of Rural Development and Environment	1/50000	ISO	1,2,3
III-18	Habitats and biotopes (geographical areas for specific ecological conditions)	Habitats and taxones	Government of Navarre. Department of Rural Development and Environment	1/50000	ISO	1.2
III-19	Species distribution (geographical boundaries for animal and plant species)	Biodiversity Data Infrastructure: animal & plants distribution	Government of Navarre. Department of Rural Development and Environment	GRID 10x10 km	N	1.2
III-20	Energy resources (hydrocarbons, hydro-power, bio-energy, solar, wind, etc.)	...				
III-21	Mineral resources (metal ores, industrial minerals depth/height)	...				

4.4 Component 4: Network Services

The following table gives the services of SITNA and their characteristics:

Services						
Service ³⁶	Organisation responsible	Type of service ³⁷	Metadata (N/Y/ISO) ³⁸	Open for Public (Y/N)	Free/Not free ³⁹ (Y/N)	
1 Searching: http://idena.navarra.es/busquedas/categorias.aspx?lang=	Government of Navarra	Discover	N	Y	Y	
2 WMS: http://idena.navarra.es/ogc/wms.aspx	Government of Navarra	View	N	Y	Y	
3 Downloading: http://idena.navarra.es/busquedas/descargas.aspx?lang=	Government of Navarra	Download	N	Y	Y	
4 Searching: http://ide.pamplona.es/busquedas/categorias.aspx?lang=	Pamplona City Council	Discover	N	Y	Y	
5 WMS: http://idepamplona.tracasa.es/ogc/wms.aspx	Pamplona City Council	View	N	Y	Y	
6 Downloading: http://ide.pamplona.es/busquedas/descargas.aspx?lang=	Pamplona City Council	Download	N	Y	Y	
7 Optimum Route: http://geopop.tracasa.es/	Pamplona City Council	Geoprocessing	N	Y	Y	

³⁶ List the names/IDs and where possible the link (URL) of all the discover, view, download, transformation and invoking services that are part of your infrastructure

³⁷ Indicate the type (discover, view, download, transformation and invoking services)

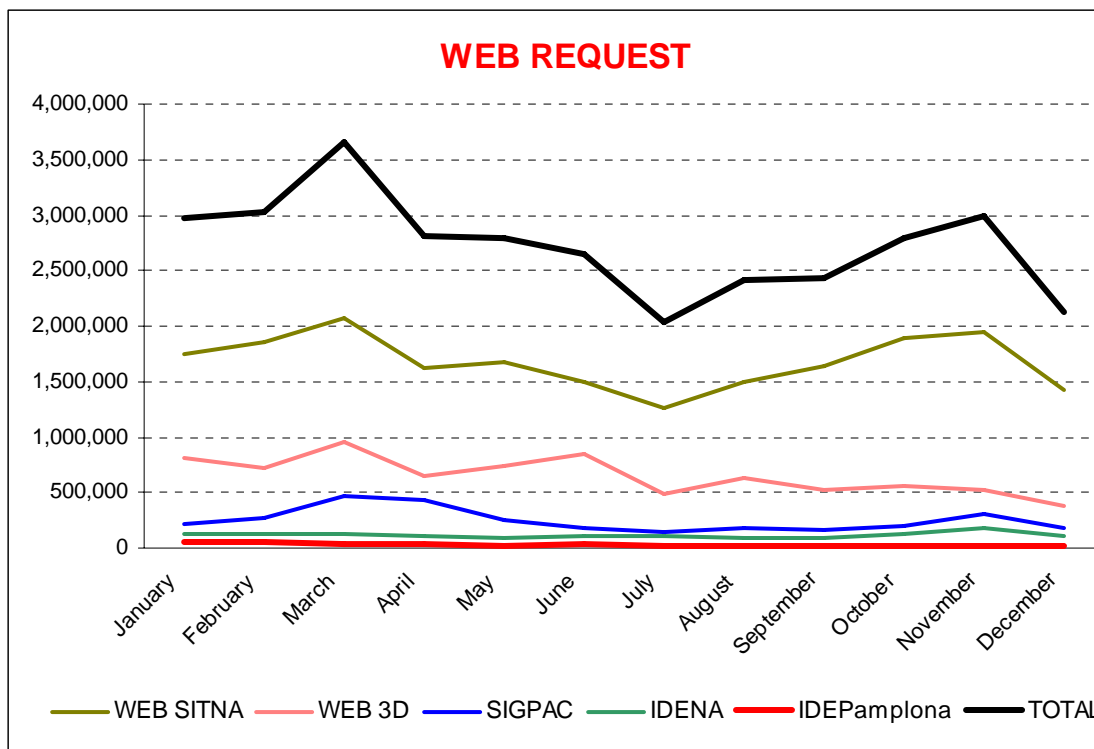
³⁸ Indicate whether the service has no metadata (N), or metadata according to ISO 19119 (ISO).

³⁹ Whether or not the service is free for use.

4.5 Use and efficiency of the SITNA

Current use of the infrastructure (2007):

STATISTICS OF REQUESTS 2007						
Month	WEB SITNA	WEB 3D	SIGPAC	IDENA	IDE Pamplona	TOTAL
January	1,753,861	815,075	216,909	134,298	50,545	2,970,688
February	1,859,162	720,761	269,344	132,399	53,696	3,035,362
March	2,066,082	950,223	461,391	133,194	40,362	3,651,252
April	1,615,931	646,467	424,508	102,172	30,136	2,819,214
May	1,670,519	742,030	254,335	98,565	25,961	2,791,410
June	1,501,478	848,395	172,296	100,880	27,673	2,650,722
July	1,257,749	493,646	146,904	111,027	26,106	2,035,432
August	1,501,241	635,111	179,287	86,911	19,389	2,421,939
September	1,643,962	516,677	162,434	98,943	15,135	2,437,151
October	1,897,677	554,103	192,812	121,693	22,639	2,788,924
November	1,952,225	520,716	314,569	171,654	24,001	2,983,165
December	1,432,170	385,013	182,623	104,113	24,631	2,128,550
TOTAL	20,152,057	7,828,217	2,977,412	1,395,849	360,274	32,713,809



Examples of the positive impact of the use of (parts of) the infrastructure: The SDI-IDENA is used in the Biodiversity Data infrastructure to support the visualization, searching and downloading of information related with Habitats and Sites.

5 Annexes

5.1 List of SDI addresses / contacts for Spain

Table: SDI contact list			
	Web address	Organisational mailing address	Over-all contact person: tel./fax/e-mail
National			
Universidad de Zaragoza Departamento de Informática e Ingeniería de Sistemas Centro Politécnico Superior		C/. María de Luna 3 E-50015. Zaragoza	Investigador responsable: Dr. Pedro R. Muro Medrano prmuro@posta.unizar.es Tfno.: [34] 976 761 950
Instituto Geografico Nacional	http://www.mfom.es/ign http://www.ign.es	General Ibanez Ibero 3 ; 28003 Madrid	Contact person: Sabastian Mas Mayoral Tel: +34-91.59.79.646 Fax: +34-91-59.79.764
Centro Nacional de Información Geográfica	http://www.cnig.es	Monte Esquinza, 41 28010 Madrid	Contact person: Pedro Vivas White Tel: +34 91 7001840 Fax: +34 91 7001864 pvivas@cnig.es
Universidad Jaume I Departamento de Informática Escuela Superior de Tecnología y Ciencias Experimentales,		Campus Riu Sec E-12080. Castellón de la Plana	Investigador responsable: Dr. Michael Gould Carlson gould@inf.uji.es Tfno.: [34] 964 72 83 17
Universidad Politécnica de		Campus SUR de la UPM	Investigador responsable: Dr. Miguel Angel Bernabé

Madrid Departamento de Ingeniería Topográfica y Cartografía		Km. 7,5 de la Autovía de Valencia E- 28031. Madrid	Poveda mab@mercator.org Tfno.: [34] 91 336 7907
Centro Nacional de Informacion Geografica	http://www.oan.es/servicios/e/CNIG.html	General Ibañez de Ibero 3 28003 Madrid	Telephone: +34 1 5541450 Fax: +34 1 5532913
AENOR Asociación Española de Normalización y Certificación	http://www.aenor.es	Departamento Comercial Calle Génova, 6 28004 Madrid	Tel. : +34 91 432 60 29/33/36 Fax. : +34 91 310 36 95
IDEC (Projecte per a la creació de la Infraestructura de Dades Espacials de Catalunya)	http://www.geoportal-idec.net	The Cartographic Institute of Catalunya: Institut Cartogràfic de Catalunya Parc de Montjuïc – 08038 Barcelona	Project director : Dr. Jordi Guimet i Pereña Tel. 93 567 15 00 – Fax 93 567 15 67

5.2 List of references for Spain

Table: List of references used to compile the Country Report	
Web sites:	http://forum.europa.eu.int/Members/jrc/jrc/eesdi/library?l=/working_groups/standards_architecture/nsdis_state_play&vm=detailed&sb=Title [2] http://redgeomatica.rediris.es/metadatos [3] http://redgeomatica.rediris.es/metadatos/colaborar.htm [4] http://redgeomatica.rediris.es/metadatos/jstic2002.pdf [5] http://redgeomatica.rediris.es/index.html [6] http://www.larioja.org/ma/sig1.htm [7] http://b5m.gipuzkoa.net/web5000/ [8]

<p>http://www.mfom.es/ign/</p> <p>[9]</p> <p>http://web.bizkaia.net/home/ca_carto.htm</p> <p>[10]</p> <p>http://imsturex.unex.es/linkarcims.htm</p> <p>[11]</p> <p>http://www.alava.net/cartografia/</p> <p>[12]</p> <p>http://www.sitibsa.com/</p> <p>[13]</p> <p>http://www.ec-gis.org/reports/policies.pdf</p> <p>[14]</p> <p>http://sitna.cfnavarra.es/</p> <p>[15]</p> <p>http://www.gva.es/icv/</p> <p>[16]</p> <p>http://oph.chebro.es/</p> <p>[17]</p> <p>http://www.mapya.es/portada/pags/indice.asp?arriba=/indices/pags/agric/agricsup.htm&izq=/indices/pags/agric/agricizq.htm&der=/agric/pags/sig/informacion.htm</p> <p>[18]</p> <p>http://leu.irnase.csic.es/mimam/seisnet.htm</p> <p>[19]</p> <p>http://fyl.unizar.es/geoatlas/inicio.htm</p> <p>[20]</p> <p>http://artieda.cps.unizar.es/eurisko/</p> <p>[21]</p> <p>http://www4.madrid.org/nomecalles/</p> <p>[22]</p> <p>http://www.icc.es/idec/ang/links.html</p> <p>[23]</p> <p>http://www.icc.es/idec/ang/doclib.html</p> <p>[24]</p> <p>http://www.icc.es/idec/ang/quequi.html</p> <p>[25]</p> <p>http://www.icc.es/idec/ang/depositories.html</p> <p>[26]</p> <p>http://www.icc.es/idec/ang/depositories.html#environ</p> <p>[27]</p> <p>http://www.icc.es/angles/presen.html</p> <p>[28]</p> <p>http://www.icc.es/projint/castella/afiliaciones.html</p> <p>[29]</p> <p>http://www.icc.es/cat99/catd/bases.html</p>
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[30]	http://www.icc.es/cat99/catd/productes.html
[31]	http://www.icc.es/pdf/priccuk.pdf
[32]	http://www.icc.es/idec/docs/e1m2mv21dpe_1.pdf
[33]	http://www.icc.es/mapsv/vols/ccvols_ang.html
[34]	http://www.icc.es/mapsv/home_ang.html
[35]	http://www.icc.es/satelit/cas/aplicas.html
[36]	http://galileo.icc.es/website/resums/resum_series.php
[37]	http://www.aesig.org/infosig/infosig_i.htm
[38]	http://www.aesig.org/monsig/docs_sig/lilibreblanc/Libre%20blanc%20SIG2001.pdf
[39]	http://www.aesig.org/monsig/docs_sig/jornada/material/EI%20PROJECTE%20IDE.pps
[40]	http://www.aesig.org/monsig/monsig_i.htm
[41]	http://www.aesig.org/monsig/docs_sig/jornada/jornadatec.htm
[42]	http://www.oan.es/servicios/e/CNIG.html
[43]	http://www.megrin.org/gddd/orgs/os_6.htm
[44]	http://www.cnig.es/jsp/english/default.jsp?pagina=creacion
[45]	http://www.cnig.es/jsp/english/default.jsp?pagina=objetivos
[46]	http://www.cnig.es/jsp/english/default.jsp?pagina=manormativo
[47]	http://www.cnig.es/jsp/english/default.jsp?pagina=ordcartog
[48]	http://www.cnig.es/jsp/productos.jsp
[49]	http://www.cnig.es/jsp/descargas.jsp?posicion=0&cantidad=20
[50]	http://www.cnig.es/descargas/CP/Ortofotomapas_25.pdf
[51]	http://data-dist.jrc.it/cgi-bin/tl1.pl?tl1.pl+projectionsys+ES

	<p>[52] http://www.anvil.eu.com/find/Glossary-spanish2.htm</p> <p>[53] http://www.aenor.es</p> <p>[54] http://www.gencat.es/dursi</p> <p>[55] http://www.map.es/csi/pg5m51.htm</p> <p>[56] http://www.map.es/csi/propiedad/</p> <p>[57] http://www.certh.gr/cordis/t_en/p/es/p_r51_en.asp-actid=1025.htm</p> <p>[58] http://www.privacyinternational.org/survey/phr2002/phr2002-part3.pdf</p> <p>[59] http://195.228.254.144/program.html</p> <p>[60] http://www.icc.es/idec/ang/idecproject.html</p> <p>[61] http://www.icc.es/idec/ang/find.html</p> <p>[62] http://www.aesig.org/monsig/docs_sig/lilibreblanc/Libro%20blanco%20SIG.pdf</p> <p>[63] http://sima.gencat.net</p> <p>[65] http://www.juntadeandalucia.es/obraspublicasytransportes/jsp/tema.jsp?ct=8</p> <p>[66] http://www.geoportal-idec.net/geoportal/IDECServlet?idioma=eng</p> <p>[67]</p>
Publications :	<p>M. Craglia, A. Annoni, R.S. Smith and P. Smits [Eds.]: Spatial Data Infrastructures: Country reports. Final version D 5.3.2(b). GINIE reports, September 2002. http://www.lmu.jrc.it/ginie/doc/SDI_final_en.pdf</p> <p>[1] GINIE - GI in the Wider Europe Complete Book, October 2003 http://www.lmu.jrc.it/ginie/doc/ginie_book.pdf</p> <p>[64]</p>