

# NATIONAL SPATIAL DATA INFRASTRUCTURE OF SPAIN: ORGANISATIONAL & LEGAL FRAMEWORK.

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## ABSTRACT.

Currently all Spanish geographical information is distributed throughout the databases from different Governmental Agencies. There are three levels of Governmental Agencies producing geographic information in Spain:

**1<sup>st</sup>) National Level: Government of Spain:** Many of its Ministries are producers of geographic information.

**2<sup>nd</sup>) Regional Level: 17 Autonomous Regions + 2 Autonomous Cities (Ceuta and Melilla):** Every of them are also producers of Geographic Information on their territories and always they have a Regional Mapping Agency or a Regional Mapping Service.

**3<sup>rd</sup>) Local Level: There are more than 8.100 Municipalities (Local Authorities).**

The National Spatial Data Infrastructure of Spain, better known by its acronym IDEE, was established for the purpose of integrating all the geographical data and services of the individual Spanish Governmental Agencies as a collaborative project based on cooperation and agreement among national, regional and local governments.

The existence of an initiative such as the IDEE, in addition to the requirements to the Public Administrations to complete the geographical information and to make it accessible, also it is fostering technological advances in the different agencies and, above all, requires these agencies to work together and to collaborate in order to harmonize of geographical data from different institutions.

This collaboration has already been clearly demonstrated in some of the foremost projects carried out by the different Administrations to produce geographical information such as:

- The **National Aerial Orthophoto Plan (PNOA)**. Spain coverage, every two years, by aerial photography, high resolution digital orthophotography and high accuracy Digital Elevation Model, performed jointly by National Government and Regional Governments.
- The **Spanish Land Use Information System (SIOSE)**. Land cover/land use database 1:25.000 scale produces in a cooperative way between the national and the regional

administrations with a minimum mapping unit of 1 ha for urban areas and 2 ha for other areas.

- The **CartoCiudad Project**. Road/street network and buildings harmonize data from the National Geographic Institute, the General Directorate of the Cadastre, the National Institute of Statistics, the Spanish Postal and Telegraph Service and the equivalent institutions in the different Regional Governments.

IDEE is managed by the **National Geographic High Council (“Consejo Superior Geográfico”)**, which acts as the collegiate body coordinating all the agencies which produce digital geographic data, including the National Government, as well as Regional and Local Governments. This is an advisory collegiate body of the Ministry of Infrastructures and Transports, which technical secretariat is held by National Geographic Institute and whose members are representatives from the three government levels of Spain. It was established by Art. 9 Law 7/86 for Cartography in Spain and its rules have been updated by the Royal Decree 1545/2007. Members of this Council are representatives from 14 Ministries, 17 representatives from every Regional Government and 6 representatives from Local Authorities

In 2002 the National Geographic High Council (NGHC) committed to its Geomatic Commission (today named as SDIs Commission) as Executive Board to define and setting up the NSDI (IDEE). The Commission on SDIs is working through a Working Group established on November 2002, and reporting and advising to the NGHC. The Working Group is developing IDEE under the INSPIRE principles and according its rules.

The NGHC's IDEE is funded by the Government. Regional SDIs, are funded by Regional Governments. There are Regional SDIs in Cataluña, Aragón, La Rioja, Navarra, Basque Country, Cantabria, Asturias, Galicia, Castilla y León, Castilla-La Mancha, Valencia, Murcia, Andalucía, Balears Islands and Extremadura. Every day more Local Authorities are developing and funding Local SDIs. The IDEE Geoportal was opened on June 2004.

Spain is co-operating to the INSPIRE Implementing Rules developing through LMOs and SDICs , and several experts working at the INSPIRE Implementing Rules Drafting Teams and the Thematics Working Groups dealing with Data Specifications.

The legal implementation of INSPIRE principles and rules in Spain have followed two different processes according the moment of the INSPIRE Directive approval:

- Previous to the Directive 2007/2/CE INSPIRE approval on March, 14th 2007:
  - National Government of Spain, from IGN's initiative, set up and agreed with every Ministry related with geographic information and with all the Autonomous Communities

(Regions) a Royal Decree setting up the National Cartographic System. This Royal Decree 1545/2007, approved on November 23rd 2007, is mandatory for the National Government bodies and the Autonomous Communities (Regions), in a voluntarily basis, can commit themselves to follow the rules set up by this Royal Decree signing an agreement with the National Geographic High Council. Just the Chapter V is setting up the NSDI (Geographic Information National Infrastructure).

- Some Autonomous Communities (Regions) have also set up Regional Laws (Catalonia, Andalusia) where the Regional SDI are defined and set up.

- After the Directive 2007/2/CE INSPIRE approval on March, 14th 2007:

- Ministry for Foreign Affairs and Co-operation has committed the Ministry of Infrastructures and Transports as responsible for Directive transposition. This Ministry jointly with Ministries of Environment, Economy and Finances, Agriculture and Public Health have prepared the Law on the Infrastructure of Geographic Information of Spain, as Inspire transposition law.

- The draft on this Law was amended by the Regional and Local Authorities and the stakeholders.

- The final draft was submitted to the Parliament for amendments in order to get the approval.

Based on SDIs data policy and GI producers business model are changing very quickly. As an example, IGN of Spain has changed its regulation for data policy and its GI business model. The new data policy has been established as open access to GI data and services with free access, free of charge, but mention of origin and ownership, for non commercial uses. Licence policy is based on use of click licences, creative commons or equivalent for geographic information downloading.

## 1. Foreword

Spanish geographic data production is mainly oriented to fulfil the management needs of good governance. However, we can divide it into three levels of geographic data producers in Spain:

- **National Level: Government of Spain:** The National Government is composed of 17 Ministries. Many of them are geographic information producers (Infrastructures and Transports (IGN-E (National Mapping Agency), CNIG-E (National Centre of Geographic Information), Economy and Finances (Cadastré, National Statistical Institute (INE-E)), Environment-Agriculture-Sea, Defence, Science and Innovation (Geological Institute of Spain (IGME), Scientific Research Council), Industry-Tourism-Commerce, Housing, etc.

- **Regional Level: 17 Autonomous Regions + 2 Autonomous Cities (Ceuta and Melilla):** Every Regional Government or Autonomous City Government is composed of Departments. Most of them are also Geographic Information producers on their territories and in many cases there is also a Regional Mapping Agency.

- **Local Level: There are more than 8100 Municipalities (Local Authorities), 43 Provinces Governments and 10 Island Governments (Balears and Canary Islands):** The biggest cities and more populated local authorities are also producing and managing GI on their territory.

## **2. The need for harmonisation.**

Today, official and private geographic data are used by public, private sectors and citizens in different applications. To manage geographic information coming from different data producers implies complex and expensive processes to transform and to load it into our own GIS system according a data model different from the original one. A simpler and less expensive way is to use interoperable web services provided by other organisation through Spatial Data Infrastructures (SDI). But in order to get the best from SDI technologies the two key words are:

- Interoperability based on standards and common specifications.
- Harmonisation based on cooperation, agreement and sharing.

When different governmental levels have the competence on geographic data the best way to reach data and services harmonisation is to cooperate among different authorities to harmonise existing geographic data or to produce jointly a new one shared and co-owned by several authorities in order to fulfil their requirements and being sure it is a unique geographic information for all them. As an example we can show you some experiences from Spain:

- The **National Plan for Aerial Orthophotography (PNOA)** is a project proposed by the National Geographic Institute to National Government Ministries orthophoto's users and to the Regional Government agencies producing orthophotos to fulfil the regional needs. The PNOA project is performing periodically the coverage of Spain by aerial photography, high resolution digital Orthophotography at 50 or 25 cm resolutions, depending on the area, every two years. It also is responsible to obtain a high precision and high resolution Digital Elevation Model, as a whole.

The coverage is obtained through collaboration, regulated by the corresponding Agreements, between the Offices and Departments of the Region Governments responsible for orthophotography production, and the Ministry of Infrastructures and Transports, though the National Geographic Institute. According common agreed specifications these Regional Government Offices are performing the works. The IGN-E carries out the general project coordination, the final quality control step and the integration of the resulting data.



*Figure 1: Natural color ortho-photo with 50cm spatial resolution*

Financing is shared among National and Regional Governments:

- 66% National Government
- 34% Regional Governments

• The **Information System of Land cover/Land use in Spain (SIOSE)**. The objective of this project is to produce a land cover/land use database in a cooperative way between the national and the regional administrations with the following characteristics: Nominal scale: 1:25.000; minimum mapping unit: 1 ha for urban areas and 2 ha for other areas; based on satellite (SPOT5) and orthophoto (PNOA) images produced; common data model object oriented (UML description), multiparameter, multilevel, extensible (for particular needs).

Funding of the project is based on:

- 66% National government:
- 34% Regional governments

• **Topographic Databases harmonisation between 1:5.000 or 1:10.000 Regional Governments databases and 1:25.000 National Topographic Database produced by**

**IGN-E.** This implies searching for common data model and procedures, data model transformation to use the previously produced databases and generalisation. Today this common harmonised production is under testing or, in some case, under production with several Spanish regions.

- **CartoCiudad database production and updating.** CartoCiudad is an official cartographic Data Base of the Spanish cities and villages and their streets and roads networks topologically structured, with spatial continuity all over Spain. This project, which has vocation of becoming the street/road “official” Database of the National Government of Spain, is the result of harmonization and integration of official digital mapping and information produced by several of the main sources of Geographical Information in de National Government of Spain: IGN-E, General Directorate of Cadastre, Statistical Office, Post Office. The CartoCiudad Database allows carrying out the following operations: direct positioning (Geocoder Service); inverse positioning (Reverse Geocoder Service); seamless urban and rural areas displaying; routing and GIS analysis.

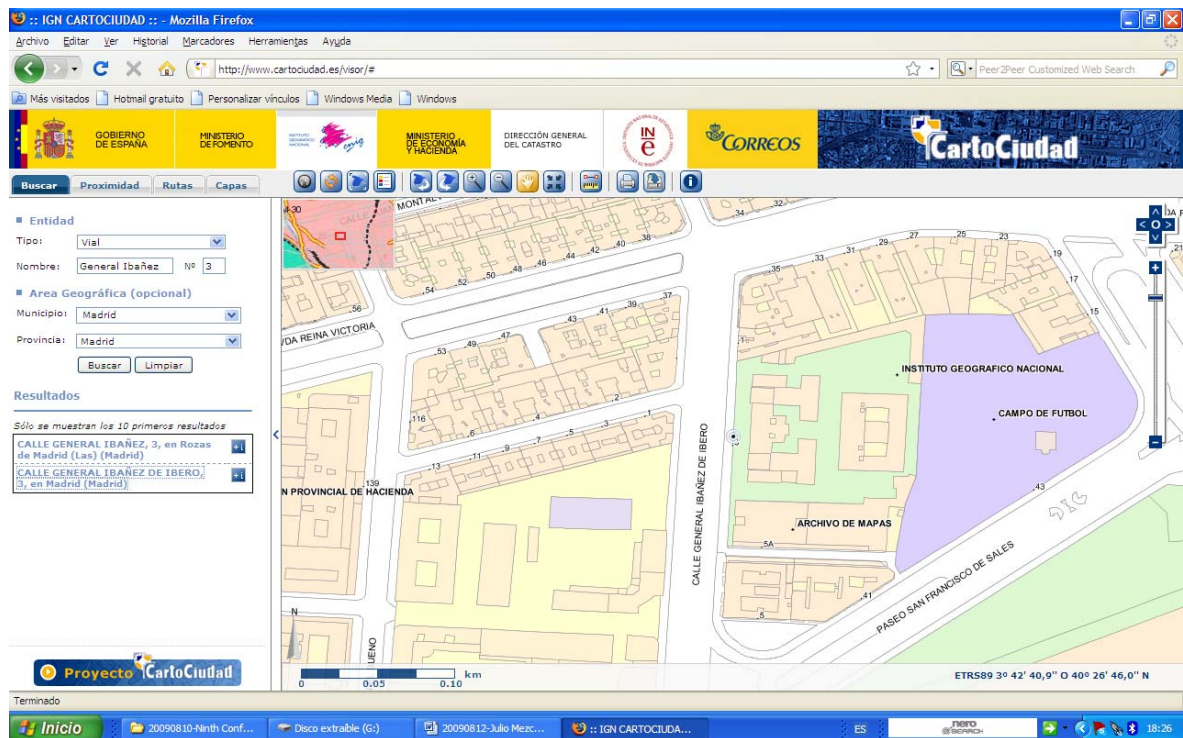


Figure 2. CartoCiudad geo-portal

### 3. The IDEE Project (National Spanish Spatial Data Infrastructure). Organisational aspects.

In Spain, the solution adopted to interoperate and harmonize GI has been the implementation of a NSDI. The Spanish NSDI ([www.idee.es](http://www.idee.es)) is a SDI composed of many SDIs. Region and Local Governments need to set up their own regional/local SDI and geoportal giving access to data and service servers at Regional Departments, Local Authorities, Public and Private companies, and Academia at their territories. At national level some Ministries, public and private companies need also to set up Internet data servers, metadata catalogues, and GI web services.

The National Geographic High Council (“Consejo Superior Geográfico”) is the governmental collegiate body appropriate as Public Authority in Spain to define and set up the NSDI (in Spanish: IDEE for Infraestructura de Datos Espaciales de España) and its national Geoportal. NGHC is an advisory collegiate body depending of the Ministry of Infrastructures and Transports, which technical secretariat is held by National Geographic Institute and whose members are representatives from the three government levels of Spain. It was established by Art. 9 Law 7/86 for Cartography in Spain and its rules were updated by the Royal Decree 1545/2007.

Members of the National Geographical High Council are:

- Representatives from Ministries: Infrastructures and Transports (IGN/CNIG), Foreign Affairs, Economy & Finances (Cadastre, National Statistical Institute), Environment, Agriculture, Interior (State Civil Defence Office), Defence, Science and Innovation, Industry, Tourism and Commerce, Justice, Education.
- 17 Representatives from every Regional Government
- 6 Representatives from Spanish Federation of Provinces and Municipalities (Local Authorities)

On April 2002 the National Geographic High Council (NGHC) committed to its Specialized Commission on SDI as Executive Board to define and setting up the NSDI (IDEE). The Specialized Commission on SDI has been working through a Working Group established on November 2002, and it is reporting and advising to the NGHC. The NSDI Working Group (IDEE WG) is open to all relevant actors actually involved in the process and having some activity in this field: data producers, software companies, universities, governmental bodies, up to more than 300 individual members. The Working Group is developing IDEE under the INSPIRE principles and according its rules. IDEE WG organizes three meetings per year and one technical workshop, from 2010 the technical workshop will evolve to a Iberian Congress on SDI (Spain, Portugal and Andorra).

#### **4. The IDEE Project funding.**

The NGHC’s IDEE is funded by the Government of Spain using the National Geographic Institute (IGN-E) budget (State General Budget). IGN-E annual expenses in implementation & maintenance IDEE Geoportal are 1.5 M€/year (2006-2008)..

At the National Government the main agencies managing GI production, such as IGN-E, Ministry of Environment, Agriculture and Sea, Ministry of Science and Innovation,

Ministry of Industry, Tourism and Commerce and Cadastre, are funding their own IDEE nodes or portals. Regional SDIs are funded by Regional Governments. That is the situation at the Regional Governments of Cataluña, Aragón, La Rioja, Navarra, Basque Country, Cantabria, Asturias, Galicia, Castilla y León, Castilla-La Mancha, Valencia, Murcia, Andalucía, Islas Baleares, Canarias and Extremadura. Every day more Local Authorities are developing and funding Local SDIs.

It must be also taken into account the harmonisation expense. Every agency assumes its data harmonisation expenses. In multilateral or bilateral projects the expenses are shared by partner agencies.

## 5. The IDEE Geoportal.



Figure 4: The IDEE Geoportal

The IDEE Geoportal was opened on 2003 December as a provisional beta version, the first version appeared on July 2004, and the second version with a new interface dated from 2005. Today it is available in 7 languages (Spanish, English, Basque, Galician, Catalan, Portuguese and French) and it implements 9 different OGC specifications (WMS, CSW, Gaz, WMC, WFS, WCS, WCTS, WPS and SLD), in a chainable and usable way.

Figures of usage and statistics of IDEE Geoportal:

- More than 85,000 visits from January to April 2009.
- More than 28,000,000 individual requests to the services in April 2009.
- Accesses from 105 countries.

## 6. IDEE Legal Framework.



Since the beginning in 2002 SDI developing in Spain was performed according the INSPIRE principles and initiative. IGN-E, Ministry of Environment and National Geographic High Council IDEE Working Group were working at the Inspire Expert Commission and at the Inspire Implementing Rules Drafting Teams through different SDICs and LMOs. But they were also applying in the Spanish SDI's implementations every decision approved or foreseen during the Inspire evolution.

The experience working inside the Inspire initiative and coordinating and running the NSDI advised to set up a first legal step using the Royal Decree 1545/2007, Nov 23rd 2007, defining the National Cartographic System (SCN), to define and set up the NSDI IDEE on its Chapter VI. Royal Decree 1545/2007.

Some Autonomous Communities (Regions) has set up Regional Laws where Regional SDI is set up (Catalonia, Andalusia).

Since the European Directive 2007/2/CE (Inspire) approval, March 14 2007, the transposition process begun in Spain. Ministry of Foreign Affairs and Co-operation assigned to the Ministry of Infrastructures and Transport (IGN-E) the responsibility on the Directive transposition. But it also assigned competence in this task to the Ministry of Environment, Agriculture and Sea, Ministry of Economy and Finances, Ministry of Industry, Tourism and Commerce and Ministry of Public Health. A Committee for Transposition composed by officers from these Ministries and chaired by an officer from the IGN-E was set up with the specific task to get the first draft ready. At the end of May 2008 the first Transposition Law draft was ready. But the approval process for this Law in Spain is complex because it must be a mandatory law for the three levels of government.

First of all the Law must agree with all the Spanish stakeholders on SDI and Geographic Information at National, Regional and Local Governments, academia, at the public and private companies. The way to reach the agreement on the Law is by means of the National Geographic High Council (NGHC). It is mandatory to get the previous approval from the NGHC before to send this Law to the Government.

On July, 11<sup>th</sup> 2008 a Transposition Law first draft was sent to the NGHC's Regions representatives. On November, 7<sup>th</sup> 2008 a new evolved Transposition Law draft was presented and sent to the members of the IDEE Working Group. Once improved with different suggestions and proposals, the Law on Spanish Geographic Information Infrastructures and Directive 2007/2/CE Transposition Law was approved by the NGHC's Permanent Commission, on March, 12<sup>th</sup> 2009. On March, 17<sup>th</sup> 2009 the approved text was sent to the General Technical Secretariat of the Ministry of Infrastructures and Transport in order to get the feedback from all the Ministries improving the text, as a previous step to be analysed and approved by the National Government at the Council of Ministers and sent to the Parliament.

## **7. New data policy.**

In Spain one of the clear consequences of the SDI implementation success has been that the most of the Geographic Information producers Public Authorities are applying a data policy based on open access to geographic information data and services. As an example the IGN-E has established on April, 8<sup>th</sup> 2008, a new data policy setting up that:

- National Reference Basic Geographic Information and Metadata are Public Sector Information accessible under conditions of: Free access, free use, free of charge, with no licensing need.
- Digital Geographic Information accessible for **non commercial uses** under conditions of: Free access, free of charge, licensing needed with mention of origin and ownership.
- Services for viewing, analysis and geoprocessing on line by Internet: free of charge.
- Downloading by Internet: free of charge; on line licensing needed.
- Downloading off line: marginal costs.
- Direct internal use at companies in company management systems is considered non commercial use. Geographic information from IGN/CNIG used as internal can be published on Internet giving added value to the original GI when the uses are non commercial.
- Digital Geographic Information will be accessible for **commercial uses** under agreement contract with CNIG. These uses not require initial fees, only commercial profits sharing. Fee established by agreement taking into account the Reference Value

## 8. Conclusions.

- National SDI of Spain (IDEE) is a collaborative project based on co-operation & agreement among the stakeholders not only at the three government levels of Spain but also academia and companies.
- IDEE has been set up according the INSPIRE principles.
- Spain has used a previously existing governmental body, the National Geographic High Council (“Consejo Superior Geográfico”) where all stakeholder from the three government levels are members, to promote, coordinate, drive and develop the NSDI of Spain.
- NGHC has established a community of actors creating services and Geoportals in parallel, according a bottom-up approach, without expecting the national legal framework in preparation to implement usable and common sense resources.
- NGHC is acting as public authority interfacing with European Commission, European Union, United Nations, ....
- IGN-E as NGHC’s technical secretariat is providing coordination and technical support to the NSDI (IDEE) and it is running its IDEE geo-portal.
- IDEE has been launched with no fixed regulations, but experience in running collaboratively the NSDI has permitted to reach a good legal framework (Royal Decree 1545/2007 and Law on the Geographic Information Infrastructures in Spain)
- IDEE and INSPIRE have driven projects for data and services harmonisation and interoperability.
- IDEE has changed data policy in Spain towards open access to geographic data and services