GOBIERNO DE ESPAÑA
MINISTERIO DE FOMENTO

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IGN Spain´s GRD Production Plan

Sebastián Mas Mayoral

❖IGN Commitment.

- Article 6 Law 7/1986, sets up:
  - "It is a National Geographic Institute commitment:

    1. National Geodetic and Levelling Networks setting up and maintenance.

    2. National Topographic Map scale 1/25.000 y 1/50.000 production and updating.
- Article 18.1.a) Law 14/2010 (LISIGE):
  - The National Government will produce nautical charts and topographic mapping 1:25.000 and 1:50.000 as national mapping series.

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❖IGN Commitment according RD 452/2012

- **Article 15 Royal Decree 452/2012, March 5th, sets up among IGN commitments:**
  - **National Geodetic, Levelling and Tidal Stations Networks planning, setting up and management.**
  - **Territory Observation National Plans for geographic and mapping applications using photogrammetric ans remote sensing systems and DEM production s.**
  - **National Cartographic Plan planning and management and National Topographic and Cartographic Data Bases production and updating to be used in National Topographic Mapping production, in Geographic Information Systems management and in any other lower scale mapping.**
  - **National Cartographic System technical and managerial support. Providing the National Geospatial Reference Equipment. Managing the Cartographic Central Register. Setting up and updating the National Geographic Names Data Base. The Administrative Boundaries Register.**
  - **Spain National Spatial Data Infrastructure coordination and technical and managerial support.**

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INSPIRE Directive and Spanish LISIGE Law commitments

- Directive 2007/2/CE, INSPIRE (*Infrastructure for Spatial Information in Europe*),
- Spanish Law 14/2010, July 5th, on geographic information infrastructures and services in Spain (LISIGE)
  - Transposes Directive INSPIRE
  - Annex I sets up as GRD the spatial data themes referred in Directive INSPIRE Annexes I & II.
  - To set up GRD Data Bases according Reglament (EU) Nº 1089/2010, on data and services interoperability IGN before 23 de noviembre de 2017.

ANEX I LISIGE. Geospatial Reference Data:

- National Geospatial Reference Equipment:
  - Geodetic Reference System (National Geodetic and Levelling Networks)
  - Coordinate reference systems
  - Geographical grid systemsSistema Oficial Coordenadas
  - National Geographic Names Data Base (Geographical names)
  - Administrative Boundaries Register (Administrative units)
  - National Municipalities Georeferences Inventory
- Authoritative Geographical Names Data Bases
- Authoritative Cadastral Parcels
- Elevation, Digital Elevation and Terrain Models
- Transport Network and Infrastructures (roads, railways, aerial transport, navigation transport, tracks, paths, trails).
- Hydrography, from the Public Hydrographical Domain
- Orthoimagery from satellite or aerial sensors
- Protected sites (Historical, Geologic, Envirnmental Protected Sites)
- Land Cover + Land Use
- Geology
- Addresses
- Population settlements

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According these commitments IGN is tasked:

- **To organize and produce some GRD included in LISIGE Annex I themas (in red color) or INSPIRE Annex I & II according the INSPIRE Implementig Rules,**
  - **Changing technical specifications, data models and production system,**
  - **Changing updating GRD processes and times in order to fullfil user needs from:**
    - **National Government**
    - **Regional and Local Governments**
    - **European Union and Commission**
    - **Academic and companies sectors**

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Digital geospatial data products produced at present by IGN

Geodetic Networks

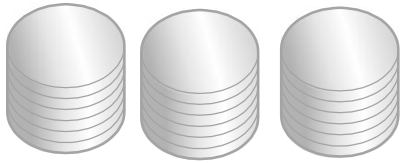
Levelling Networks

Geographical Grids

BTN25:

National Topographic Data Base 1:25.000

BTN100



NGBE

SIGLIM: Administrative Boundaries Data Base

NGMEP: Population Settlements Data Base

SIOSE: Land Cover&Land use Information System

CartoCiudad: Roads and streets Data Base

SIGNA: IGN Geographic Informa´tion System

PNOA:

Aerial orthoimagery

PNOA-LIDAR:

LIDAR Data

DEM

PNT:

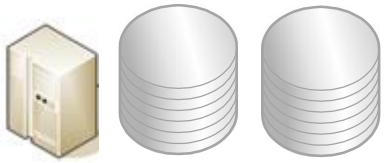
Remote Sensing

MTN25:

National Topographic Map

MTN50

What kind of GRD must be produced by IGN?



Geodetic + GNSS + Levelling Networks.

Coordinate System

Grid System

PNOA

PNOA-LIDAR

DEM

Geographic Names

Administrative Boundaries

Municipalities Location

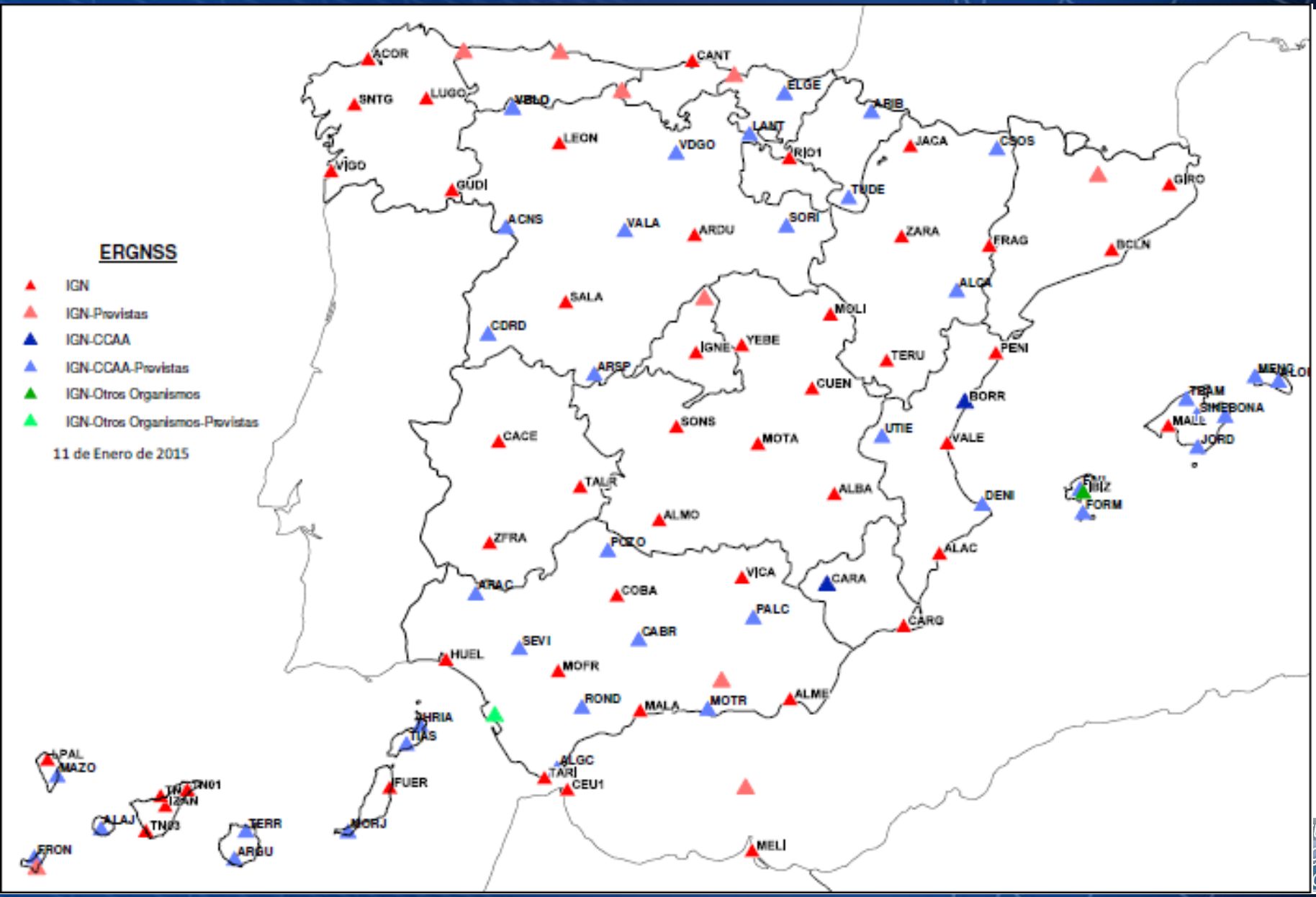
Population Settlements

Transport Networks

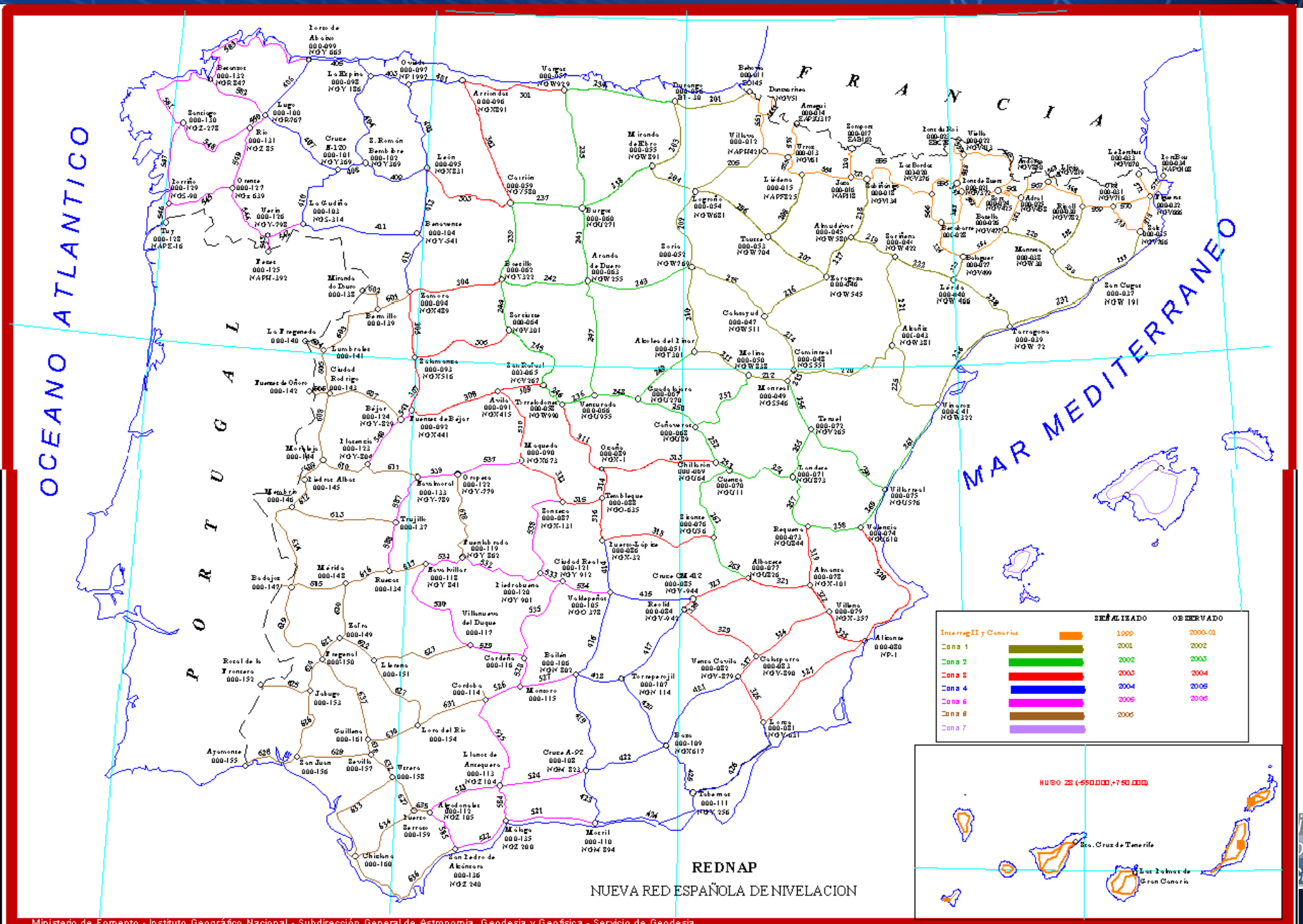
Hydrography

Land Cover + Land Use

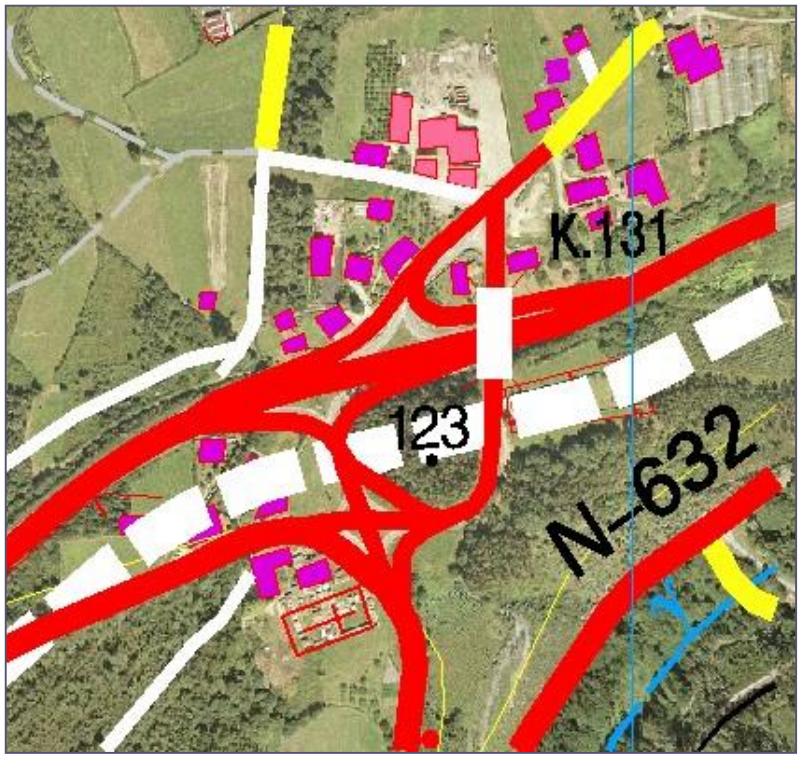
National Geodetic Network: IGN National GNSS Service



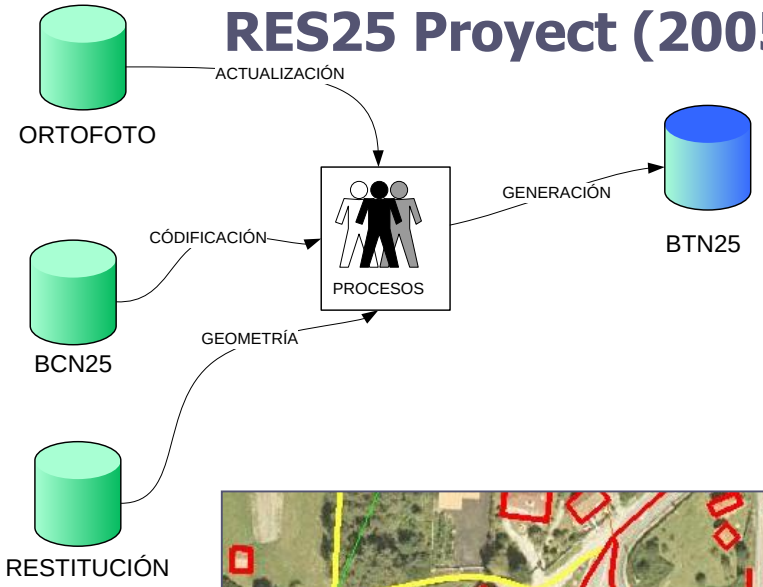
High Accuracy Levelling National Network



❖ Spain National Topographic Data Base 1:25.000 (BTN25)



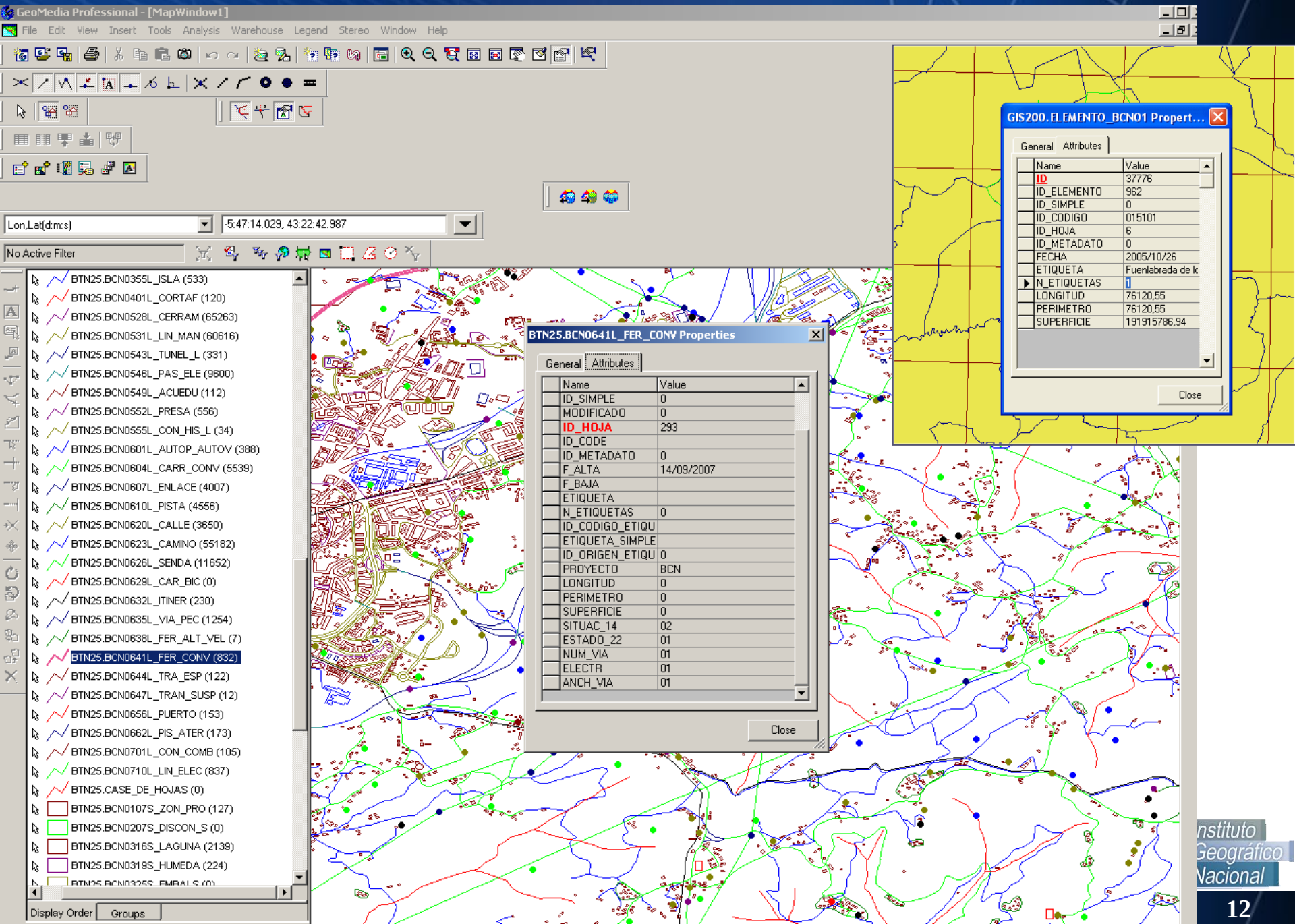
RES25 Proyect (2005-2009)



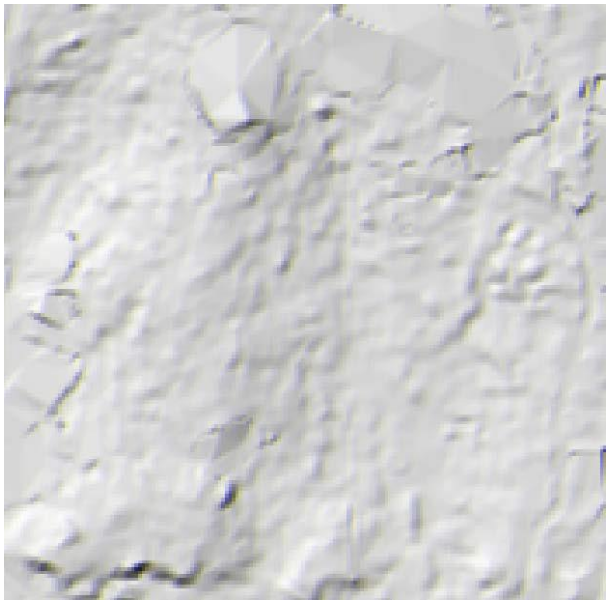
Topographic information Data Base at highest accuracy complete and continuous all over Spain.

3D Geometry
Spagueti topology

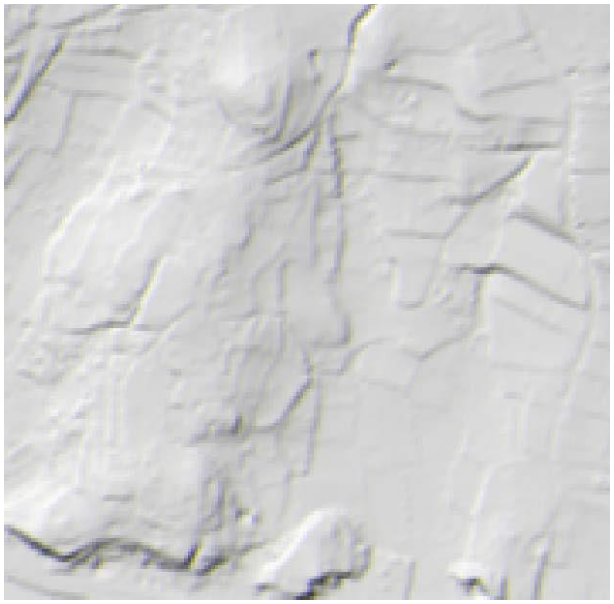
❖BTN25 : ORACLE Data Base



❖ Digital Elevation Models: DTM + DSM +Contour Lines

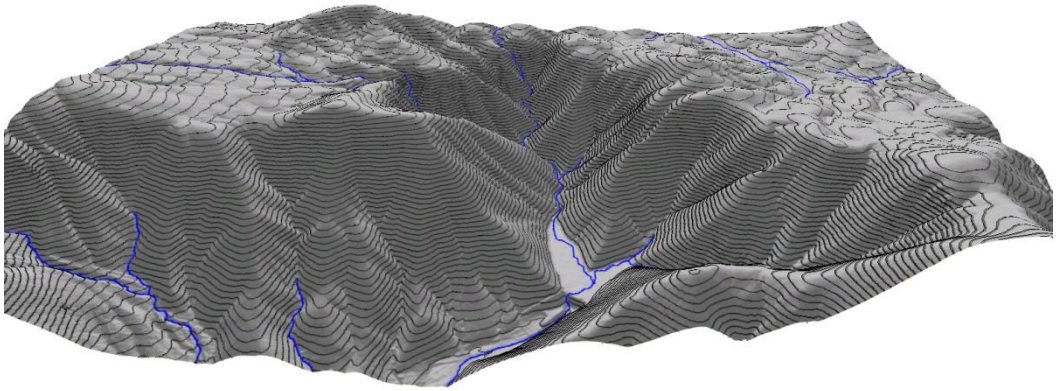


Correlation DTM 05m



LIDAR DTM 05m

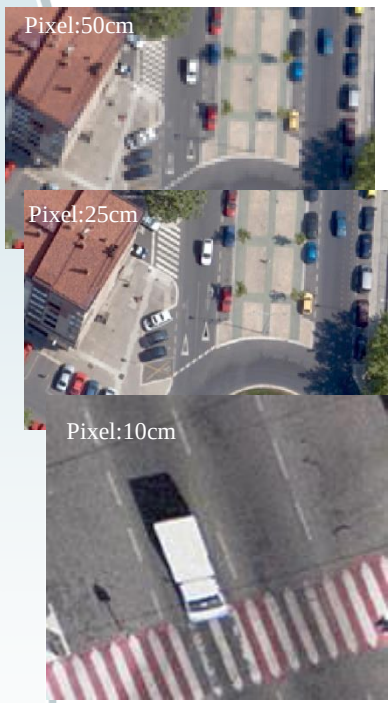
LIDAR DTM 02m

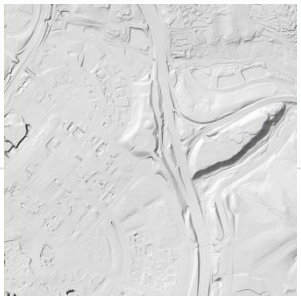


❖PNOA PRODUCTS

PNOA (Aerial Orthophotography National Plan)

- Only one photogrammetric fly to be used for every public body
- Spain whole coverage with orthophotograph (25/50cm) every 3 years.
- Very high resolution (10 cm) orthophotograph coverage on special areas (urban areas).
- Digital Elevation Model. Grid 5x5m (correlation or LiDAR)





DTM

DSM

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❖ SPAIN ORTHOPHOTO COVERAGE

2014-2016 Planning

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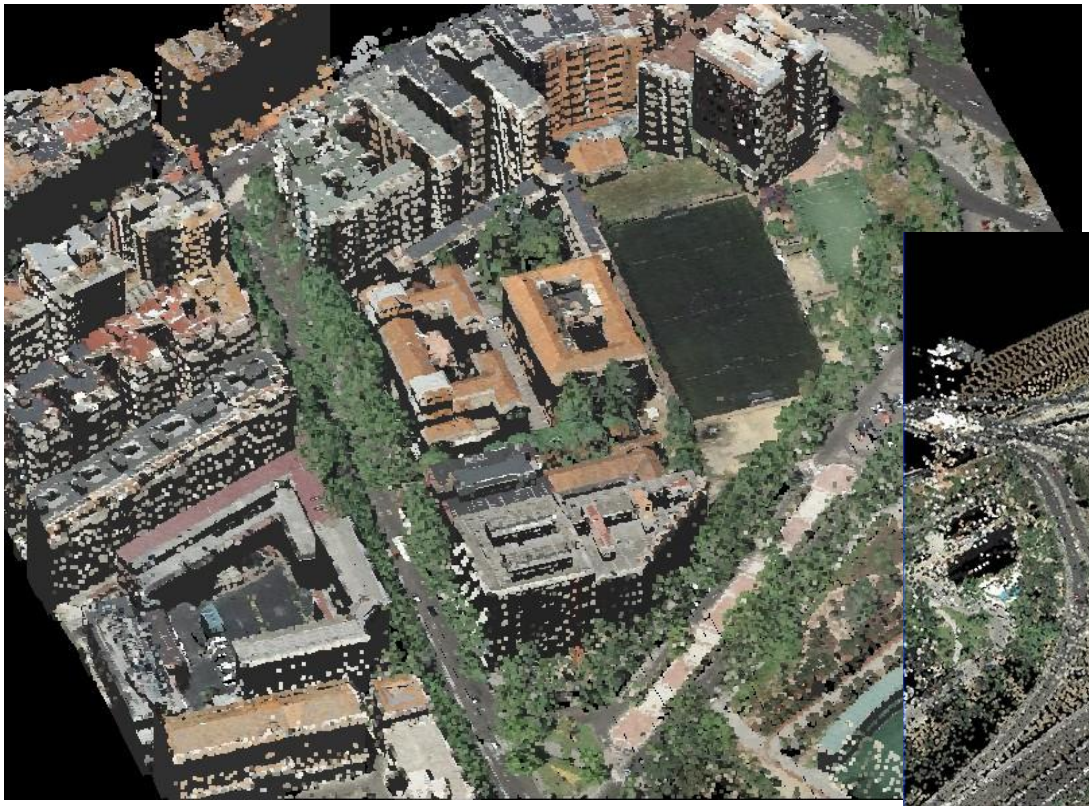
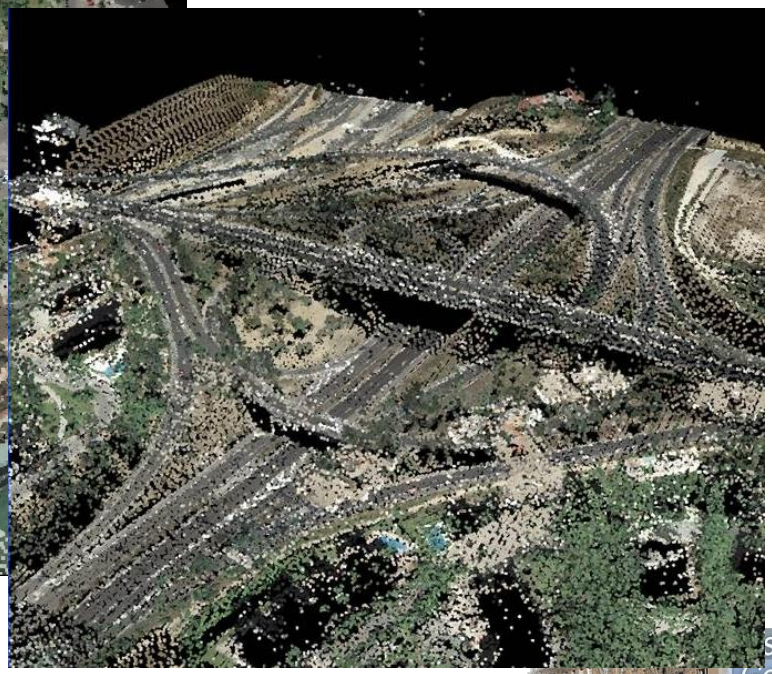
❖ LiDAR example

LiDAR data + RGB data from aerial photograph

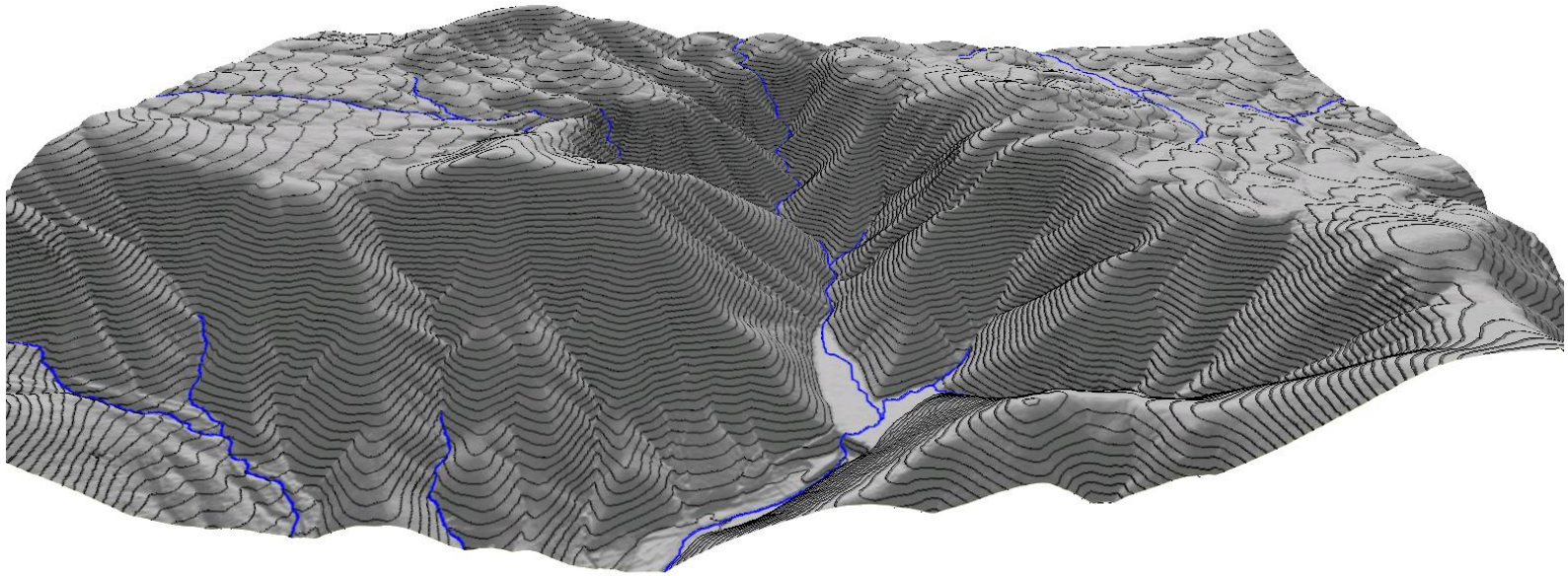


Sede Central del IGN



Nudo de Carreteras

❖Coherence among DTM and Hydrograph



Curvas de Nivel y Red Hidrográfica generadas a partir de datos LiDAR

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SIOSE = Land Cover&Land Use Data Base




The National Geographic Institute is the Spanish National Reference
entre for Land Cover&Land Use in Spain.
SIOSE = Information System for Land Cover & Land Use in Spain
OBJECTIVE: Coordination managing information on land cover & Land Use.
Integration of national and regional systems
Covering the Public Adminitrations needs (ES, EU, CCA
Collaborative and coordinate production = Less cost and
INSPIRE: SIOSE origin for COPERNICUS Land data

INSPIRE - Infrastructure for Spatial Information in Europe

opernicus

European Environment Agency

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Fotografía de Benidorm en 1956

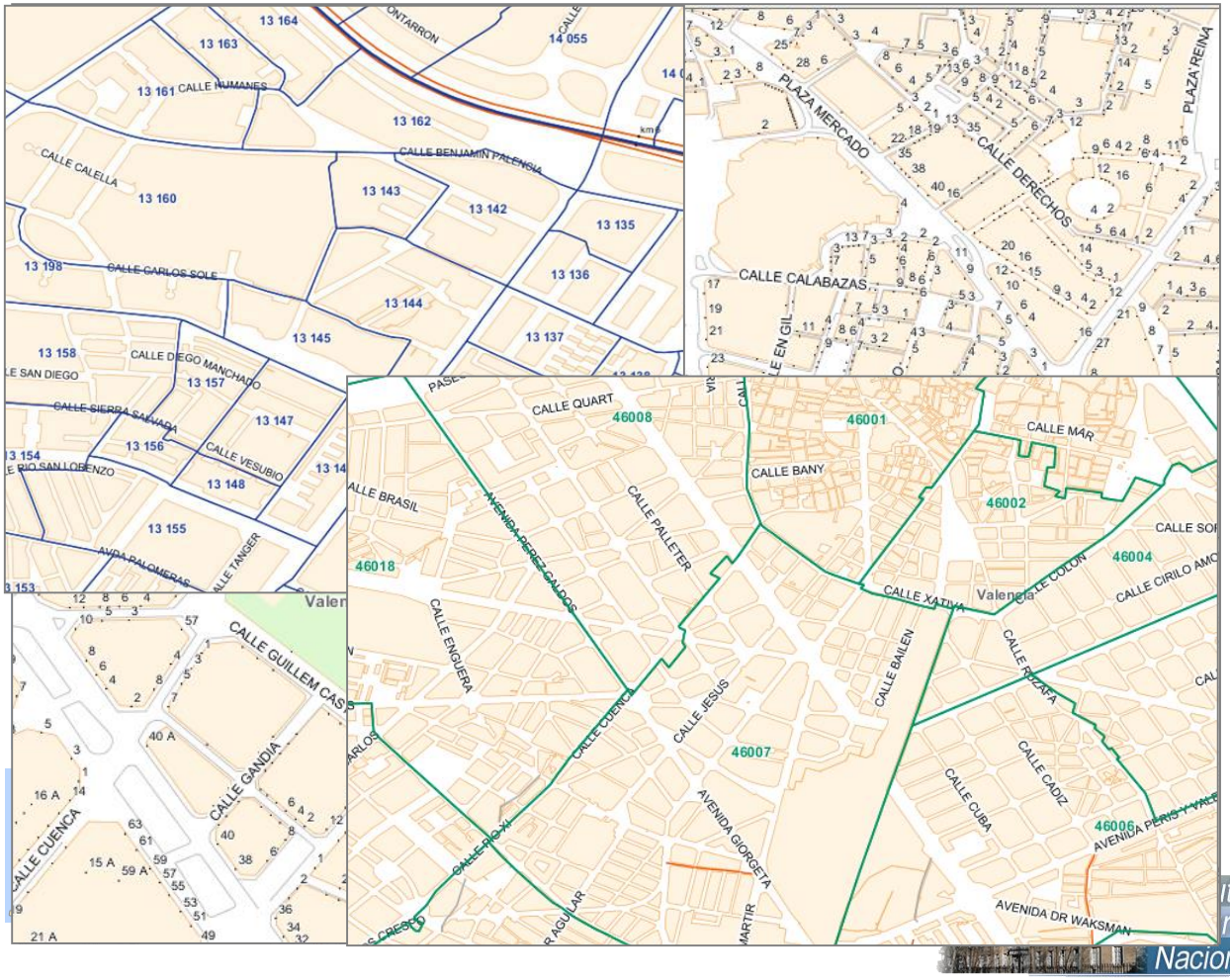
Benidorm en 2002

Construcción del Embalse de la Loteta, Zaragoza. SPOT 2005 (der.) SPOT 2011 (izq.).

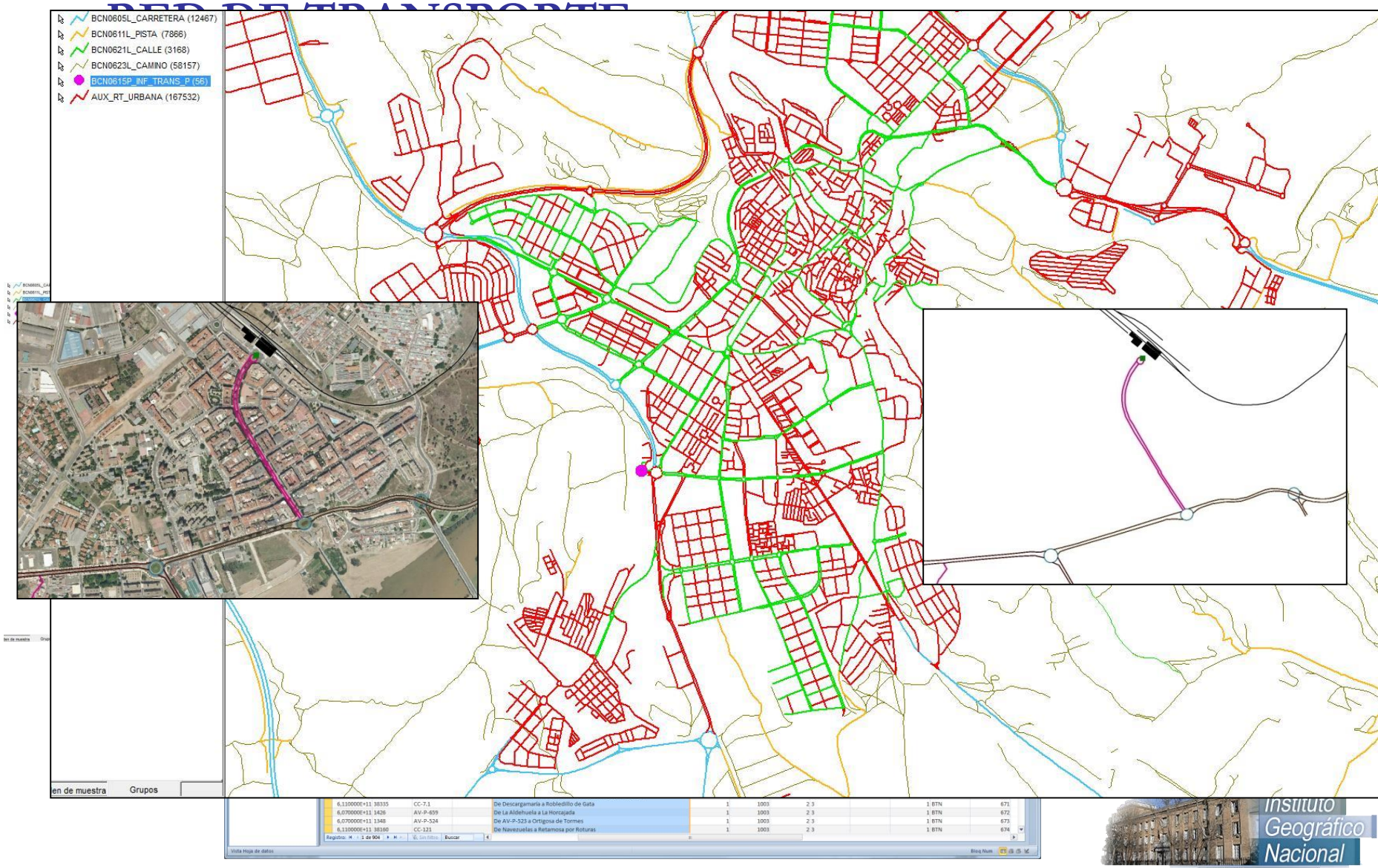
CartoCiudad Project

CartoCiudad: Road and street network authoritative data base covering Spain in a continous way (from 1:1.000 scale in urban areas to 1:25.000 in rural areas), plus census units and postal units

- Every urban area connected by continuous network all over Spain
- Addresses and km
- Geographic names
- Census units
- Postal codes
- Administrative boundaries

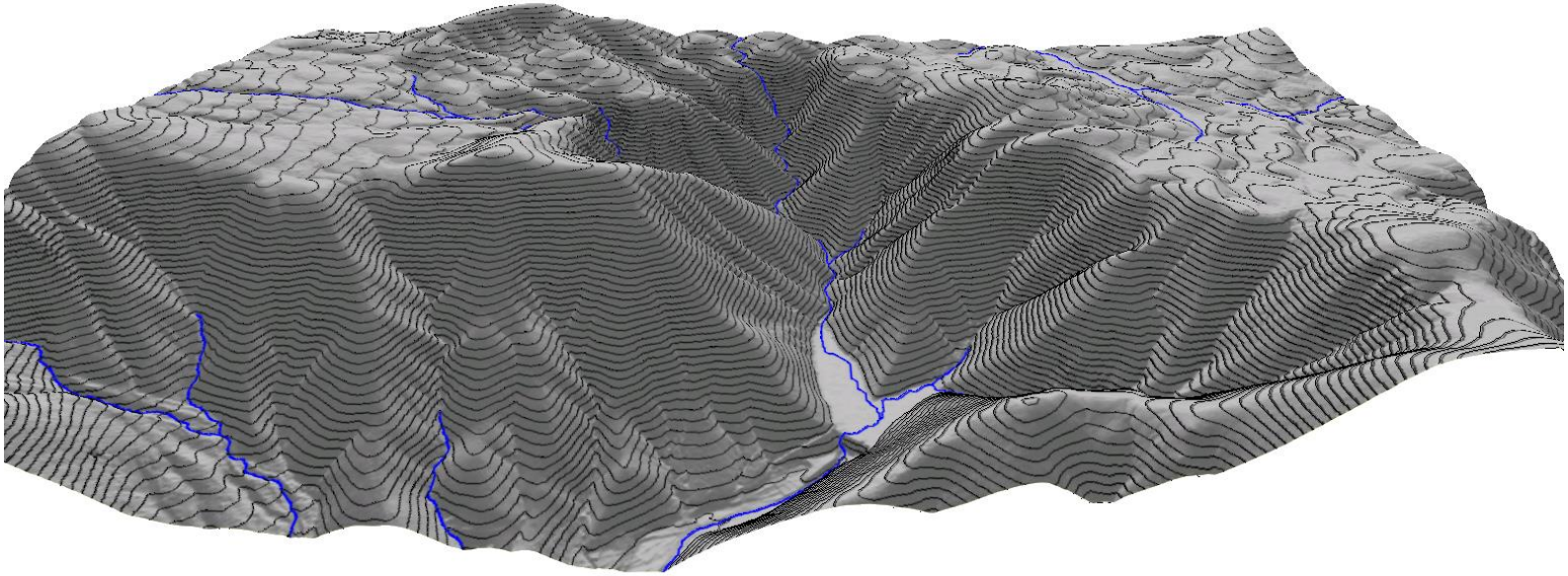


❖Transport Network Data Base.
First verion mixing BTN25 road network and CartoCiudad



Hydrography Data Base.
Harmonisation among BTN25 Hydrography and LIDAR DTM

- Setting up the hydrographic network calculated from LIDAR DTM and harmonisation between this calculated network and BTN25 hydrographic network from steroplotting Coherencia del MDT y los elementos hidrográficos



Curvas de Nivel y Red Hidrográfica generadas a partir de datos LiDAR

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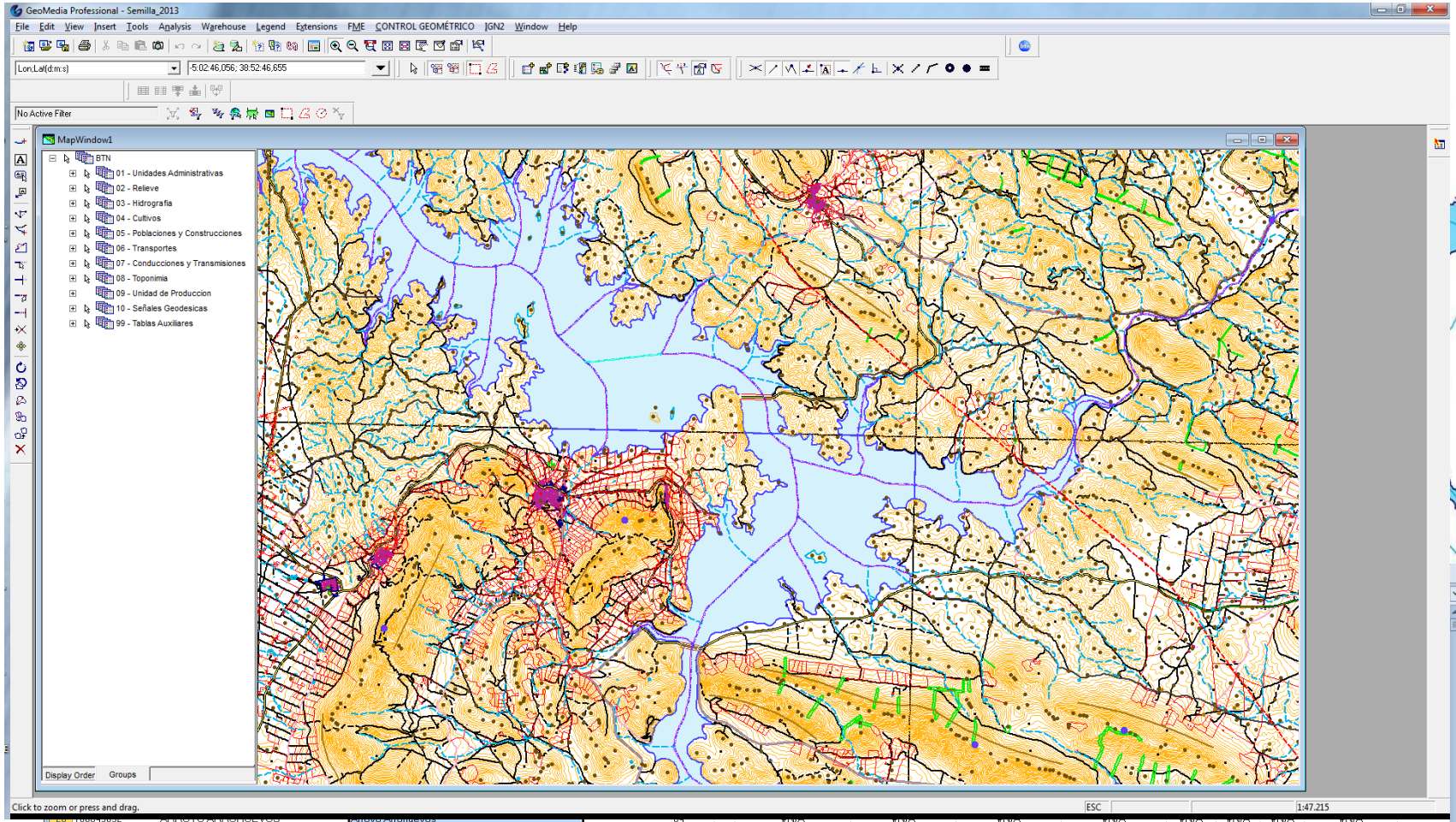
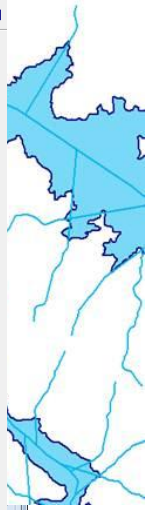
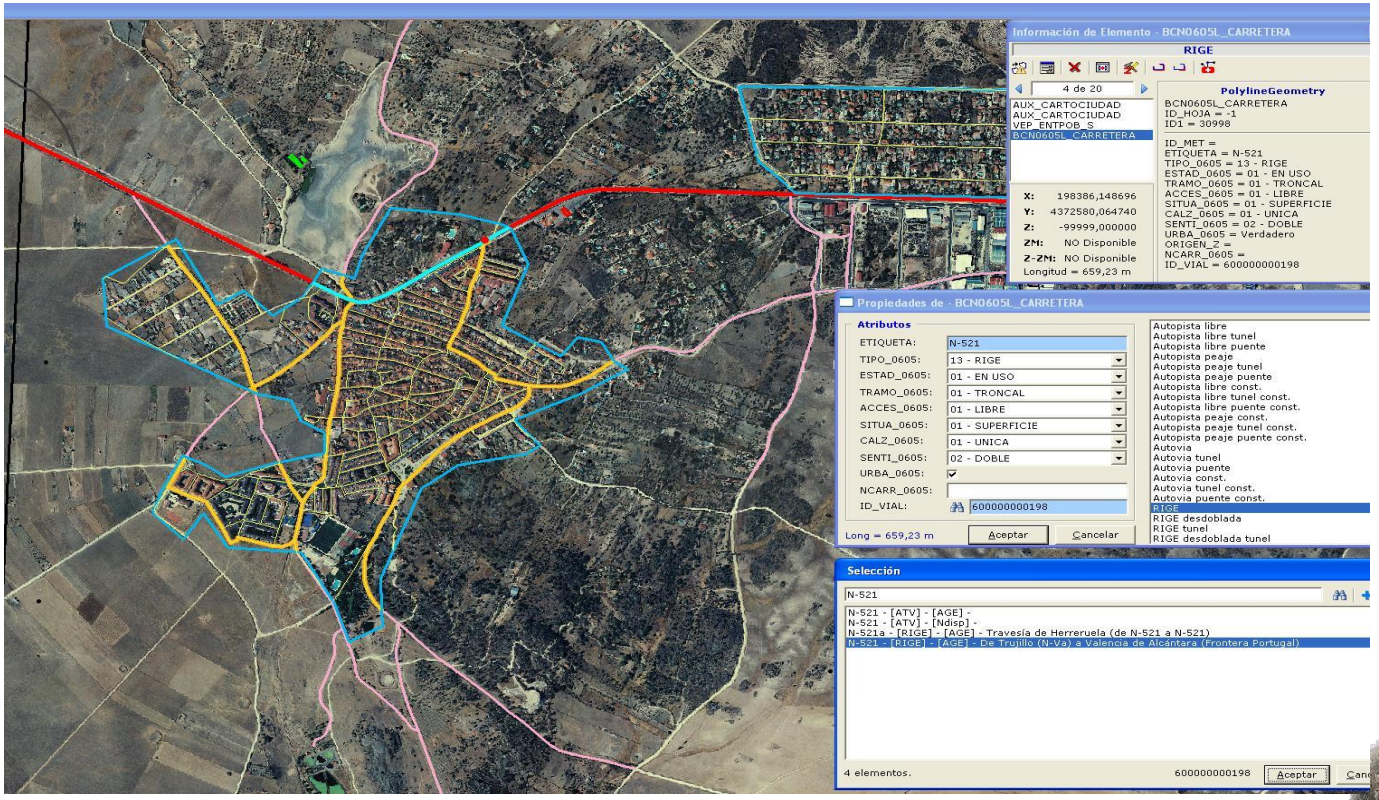
❖Hydrography Data Base



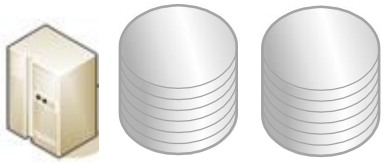


❖Population Settlements Data Base

- Setting up geometry for population settlements from 25/50 cm pixel orthophotography
- Setting up geometry for population settlements in agreement with cadastral parcels
- Setting up as population settlement every population in Statistical Office Catalogue



What kind of GRD must be produced by IGN?



Geodetic + GNSS + Levelling Networks.

Coordinate System

Grid System

PNOA

PNOA-LIDAR

DEM

Geographic Names

Administrative Boundaries

Municipalities Location

Population Settlements

Transport Networks

Hydrography

Land Cover + Land Use

How must produce GRD IGN?

- Using specifications agreed with stakeholders based on INSPIRE Implementing Rules.
- Taking into account needs mainly from National Government
- Looking for agreement and collaboration with Regional Government in order to produce just once and use by every stakeholder.
- Setting up a new production system especially oriented to get the Core GRD.

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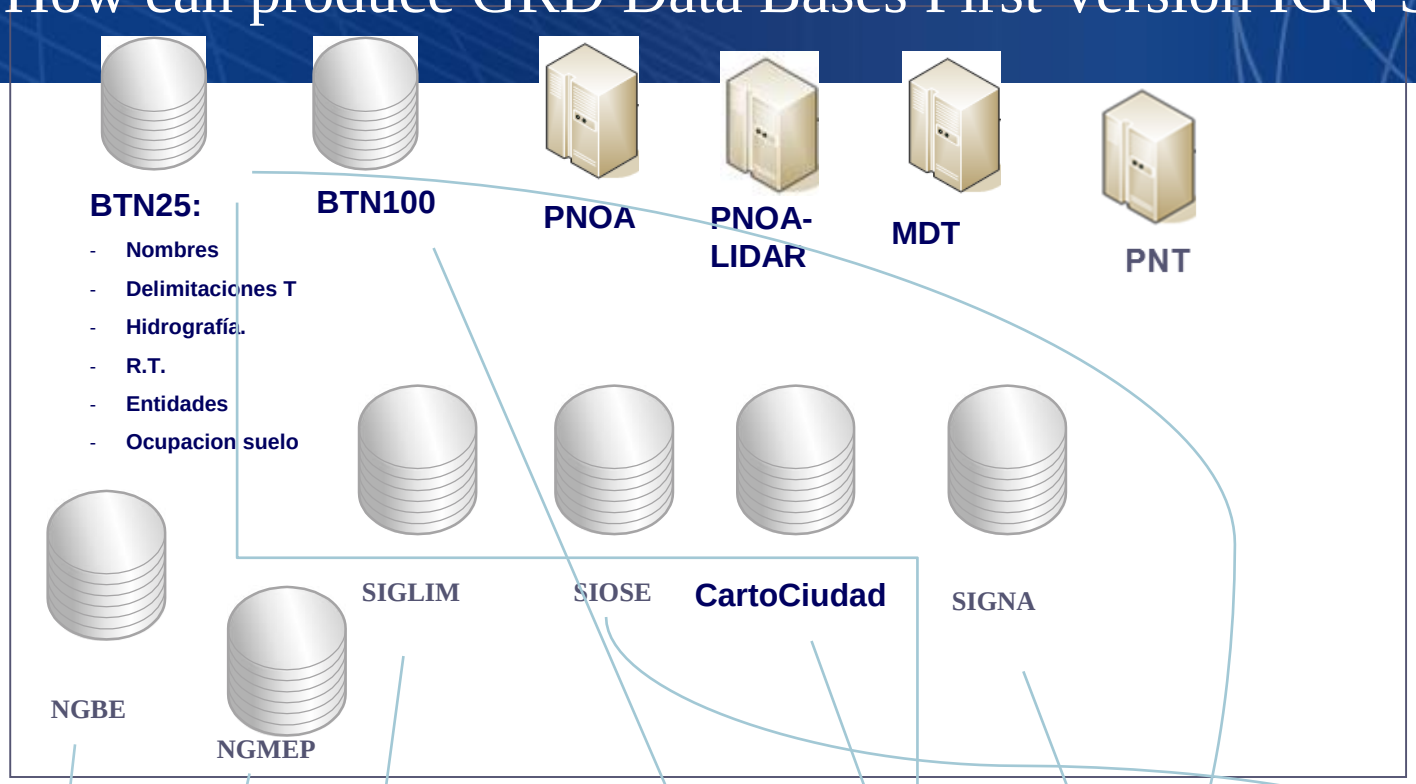
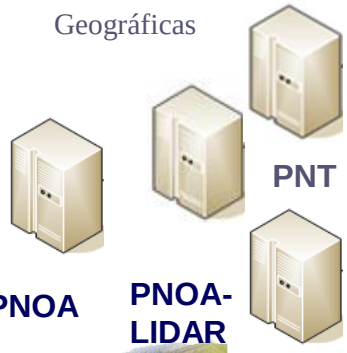
How can produce GRD Data Bases First Version IGN Sapain?



Sistema Geodésico Referencias. Redes nacionales geodésicas y de nivelacio

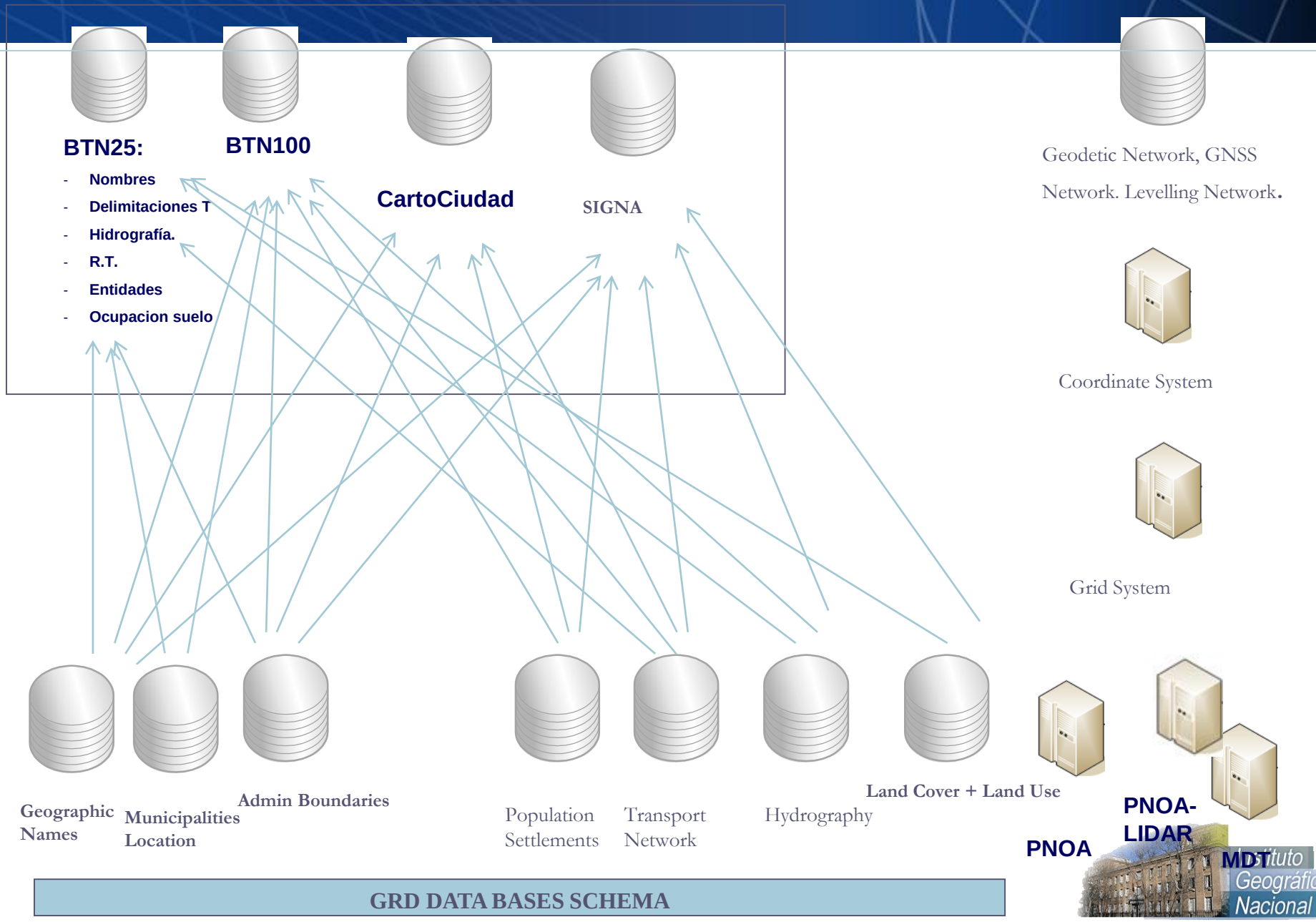
Sistema Oficial de Coordenadas

Sistema de Cuadrículas Geográficas



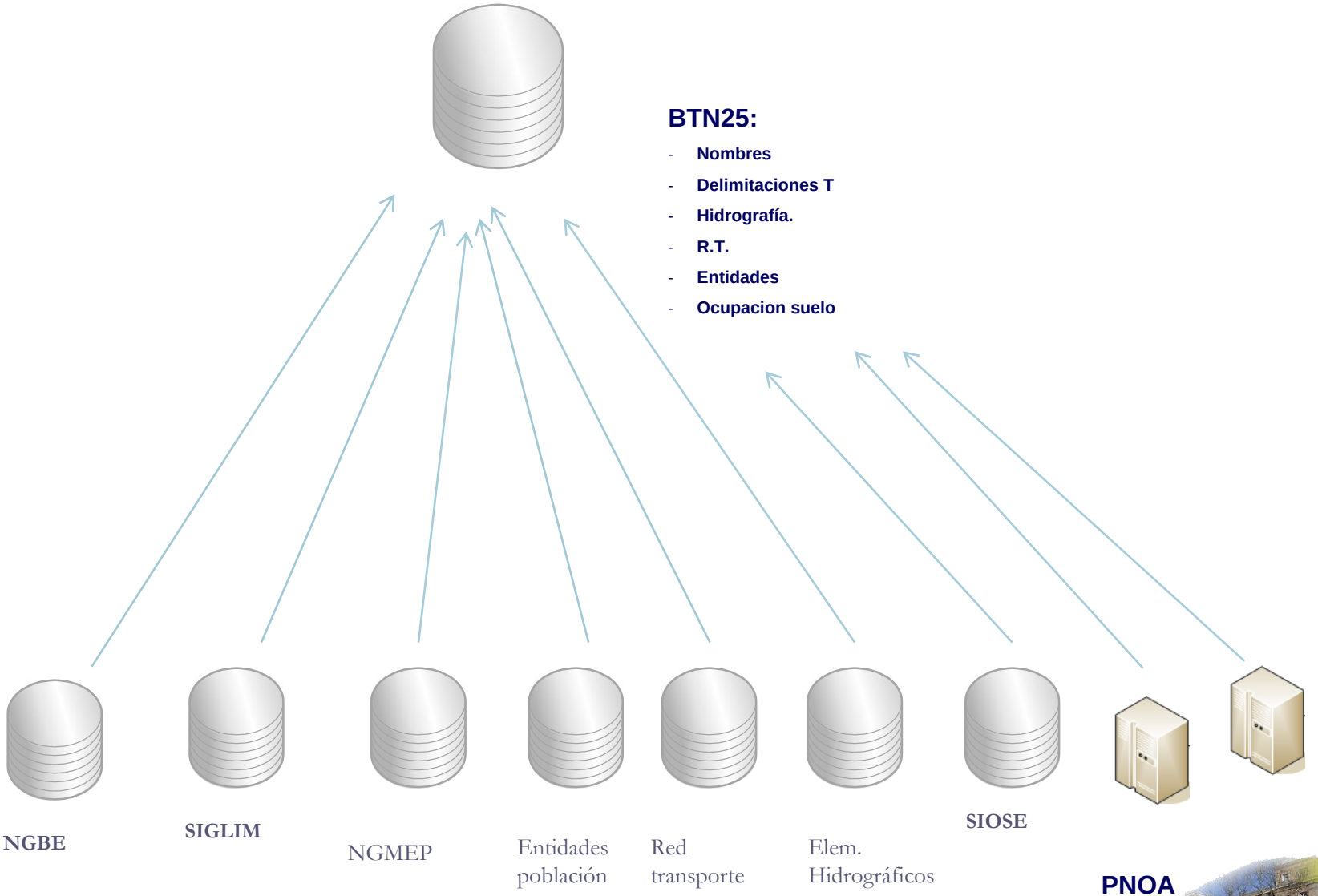
Data Bases First version from existing Digital geospatial data products

Future Digital Geospatial Data Products Updating



GRD DATA BASES SCHEMA

Using GRD Data Bases as reference for BTN25 production



NTM25/NTM50 direct production from BTN25

- Continuous viewer NTM25/NTM50 direct production from BTN25
- Light edition for NTM25/NTM50 map sheet production

❖ CONCLUSIONS

- NMCAs must produce the GRD. At least the CoreGRD. They must provide OGC web services based on GRD needed by Governmental agencies and users.
- At the same time they must produce **Digital Geospatial Data Products. Updating them from GRD Data Bases.**
- In order to produce the **GRD Data Bases** First Version we can use existing **Digital Geospatial Data Products Data Bases.** Usually Digital Geospatial Data Products data quality is good enaugh
- We need to define the GRD Data Bases updating process before first version loading.
- We also need to set up the **Digital Geospatial Data Products Data Bases** updating process from GRD Data Bases.

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Gracias por su atención

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