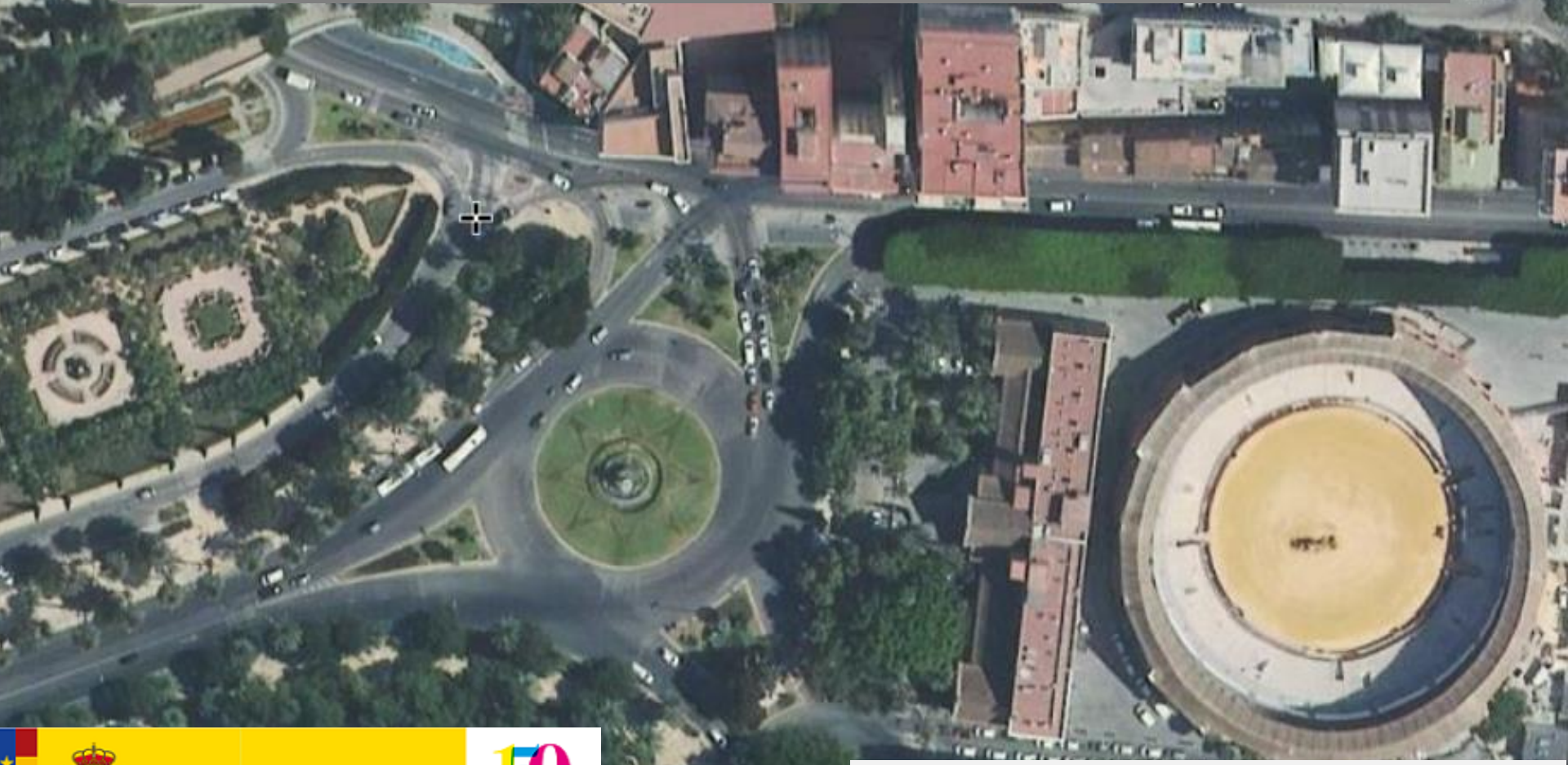


Obtaining a coverage of orthophotos and LiDAR of Spain: A success story and a nightmare



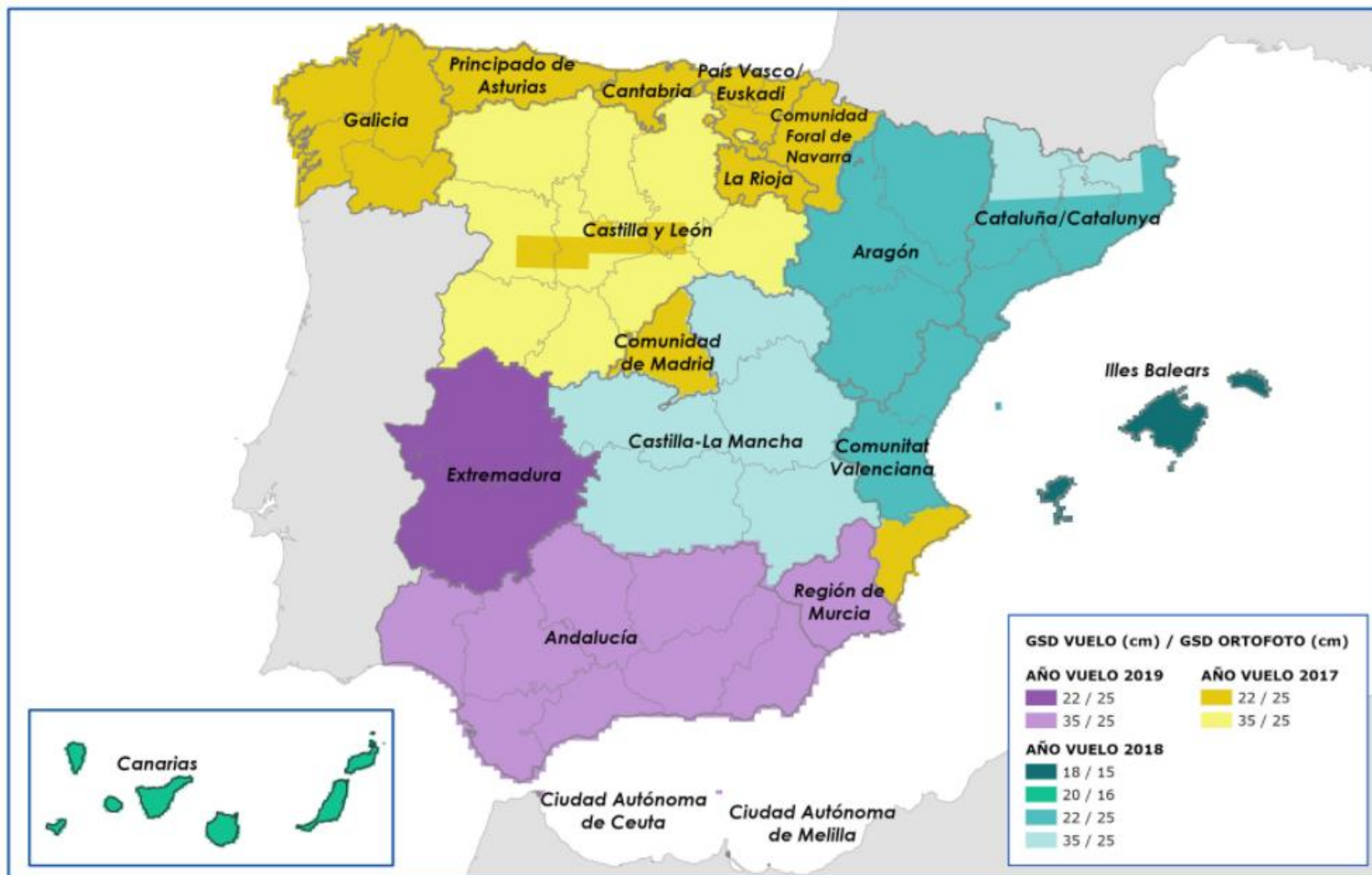
Aerial Orthophoto National Plan (PNOA)

- Goal: obtaining aerial digital orthophotos with 25-50 cm resolution, with a updating period of 2-3 years.
- Since 2004.

Technical specifications

PNOA	Flight GSD	Ortho GSD	X,Y Accuracy	Z Accuracy	Grid
PNOA50	45 cm	50	RMSE x,y <= 1,00m	RMSE z <= 2,00m	5m x 5m
PNOA25	22 cm	25	RMSE x,y <= 0,50m	RMSE z <= 1,00m	5m x 5m
PNOA10	9 cm	10	RMSE x,y <= 0,20m	RMSE z <= 0,20m (with LiDAR)	1m x 1m

Current situation



PNOA historic flights

- Goal: storing and preserving flights since 1930.
- Dates:
 - 29-30 (small part of the territory)
 - 1:10.000
 - 45-46, 56-57 and 67-68 (American flight)
 - 1:43.000 and 1:32.000 and 1:45.000
 - 73-86
 - 1:18.000
 - 80-86
 - 1:30.000
 - 89-91 (Coast)
 - 1:5.000 (colour)
 - 99-03
 - 1:40.000
 - 04- (PNOA)

Products

- **Digital photos: 8 bits, TIFF (with TFW) and ECW formats, ETRS89, 4 bands (RGB and NIR).**
- **Digital orthophotos.**
- **Mosaics of most recent orthophotos.**
- **Historic photos and orthophotos.**

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ORTHOPHOTOS AND SATELLITE IMAGERY

Application to check and compare orthophotos from different years: http://www.ign.es/web/comparador_pnoa. They cover a different area from the national territory every year (to see the areas flown per year, visit <http://pnoa.ign.es/vuelo-fotogrametrico>).



National Sentinel2 Mosaics

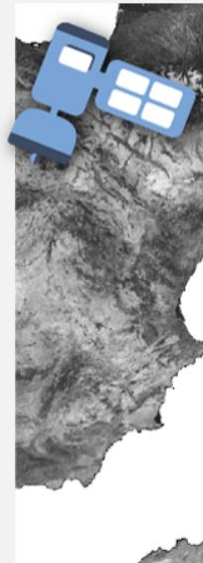
Description: Sentinel2 orthoimagery mosaics from the European program Copernicus at 10 meters pixel resolution and on a six-monthly basis.

GRS: ETRS89 for the Iberian Peninsula, Balearic Islands, Ceuta and Melilla, and WGS84 for the Canary Islands. UTM projection in the corresponding zone.

Download Units: Iberian Peninsula and Balearic Islands in two files (north and south). Canary Islands in a single file

Format: ECW

[See +](#)
[Metadata](#)
[Auxiliary Information](#)



National Historic Landsat Mosaics

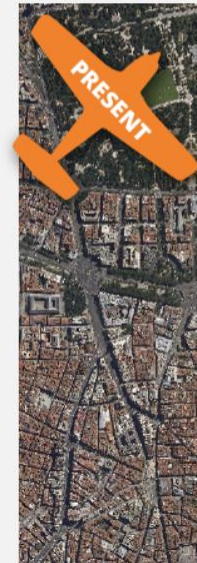
Description: Landsat 5 and 8 orthoimagery mosaics at 30 and 15 meters pixel resolution, respectively.

GRS: ETRS89 for the Iberian Peninsula, Balearic Islands, Ceuta and Melilla, and WGS84 for the Canary Islands. UTM projection in the corresponding zone.

Download Units: One mosaic for the Iberian Peninsula, Balearic Islands, Ceuta and Melilla, and another one for the Canary Islands.

Format: COG

[See +](#)
[Metadata](#)
[Auxiliary Information](#)



Most recent PNOA orthophotos

Description: Mosaic of the latest orthophotos of the National Plan for Aerial Orthophotography.

GRS: ETRS89 for the Iberian Peninsula, Balearic Islands, Ceuta and Melilla, and WGS84 for the Canary Islands. UTM projection in the corresponding zone.

Download Units: Each mosaic covers a MTN50 sheet (National Topographic Map at 1:50 000 scale).

Format: ECW

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Digital Elevation Models +

Aerial photos and images -

- ☐ National Sentinel2 Mosaics
- ☐ National Historic Landsat Mosaics
- ☒ Most recent PNOA orthophotos
- ☐ PNOA historical orthophotos
- ☐ Orthophotos SIGPAC
- ☐ Orthophotos OLISTAT
- ☐ Orthophotos Nacional
- ☐ Orthophotos Interministerial
- ☐ Orthophotos AMS (B) 1956-1957
- ☐ PNOA photograms
- ☐ Quinquenal flight 1998-2003
- ☐ Coastal flight 1989-1991
- ☐ Nacional flight 1980-1986
- ☐ Interministerial flight 1973-1986
- ☐ Ruiz de Alda flight 1929-1930 (Segura River Basin)

Old geographic documentation and cartography +

Print

Delete geometry

Layer opacity:

Scale 1 : 12354065

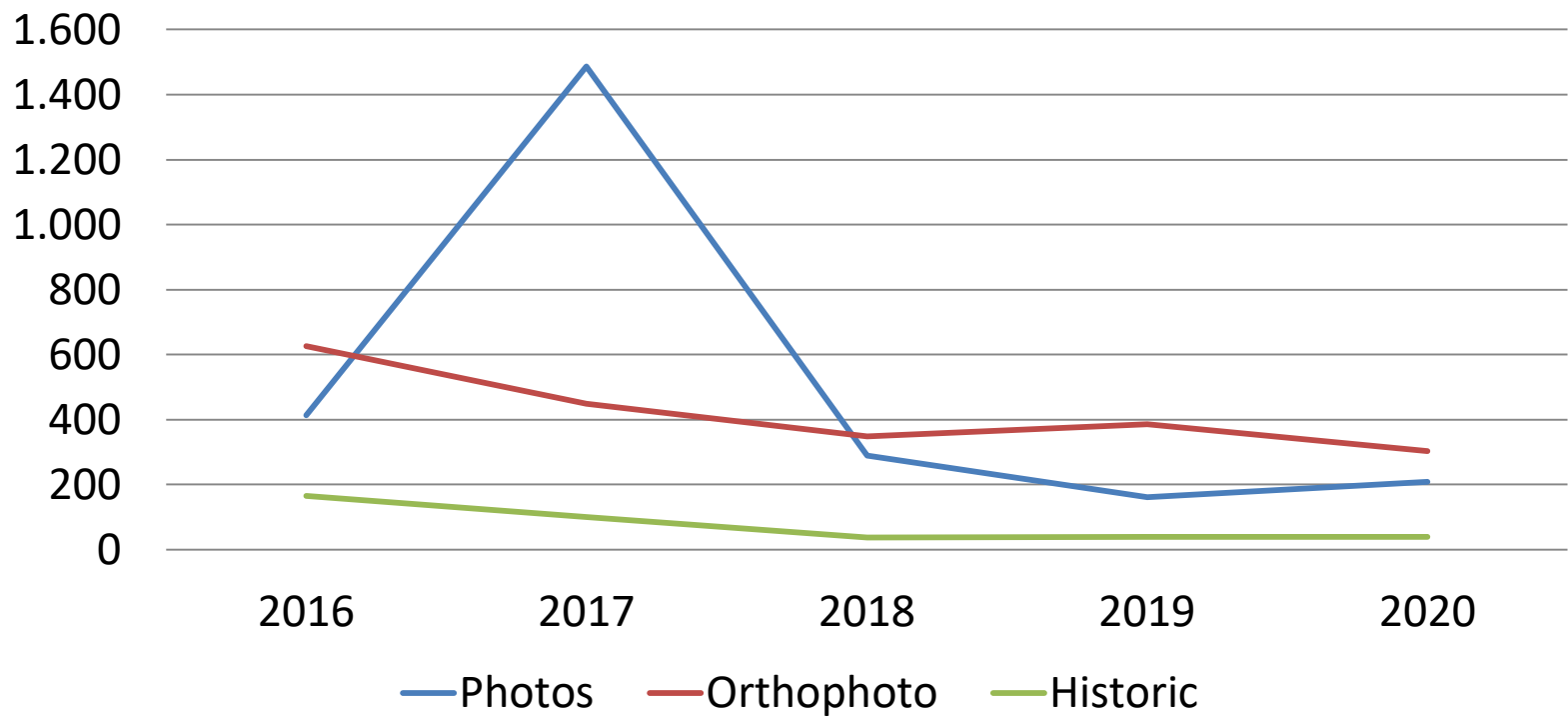
Choose products

Select layers

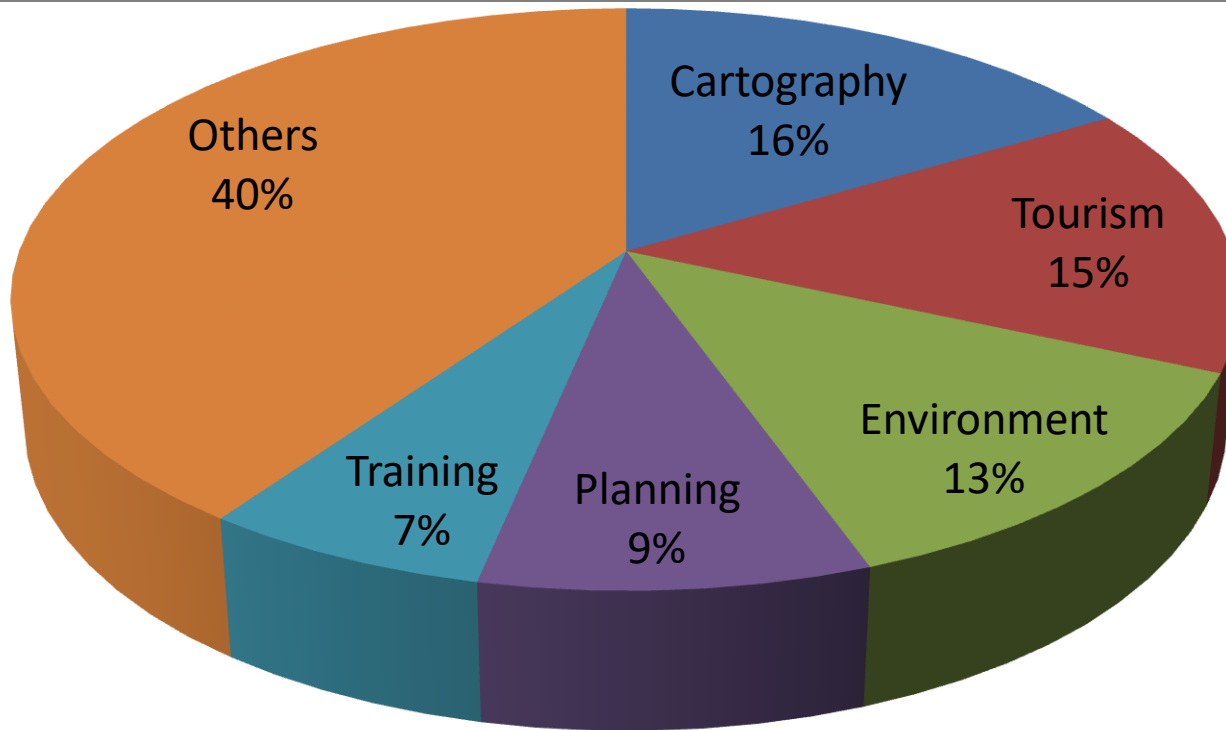


Statistics

Thousands of files downloaded

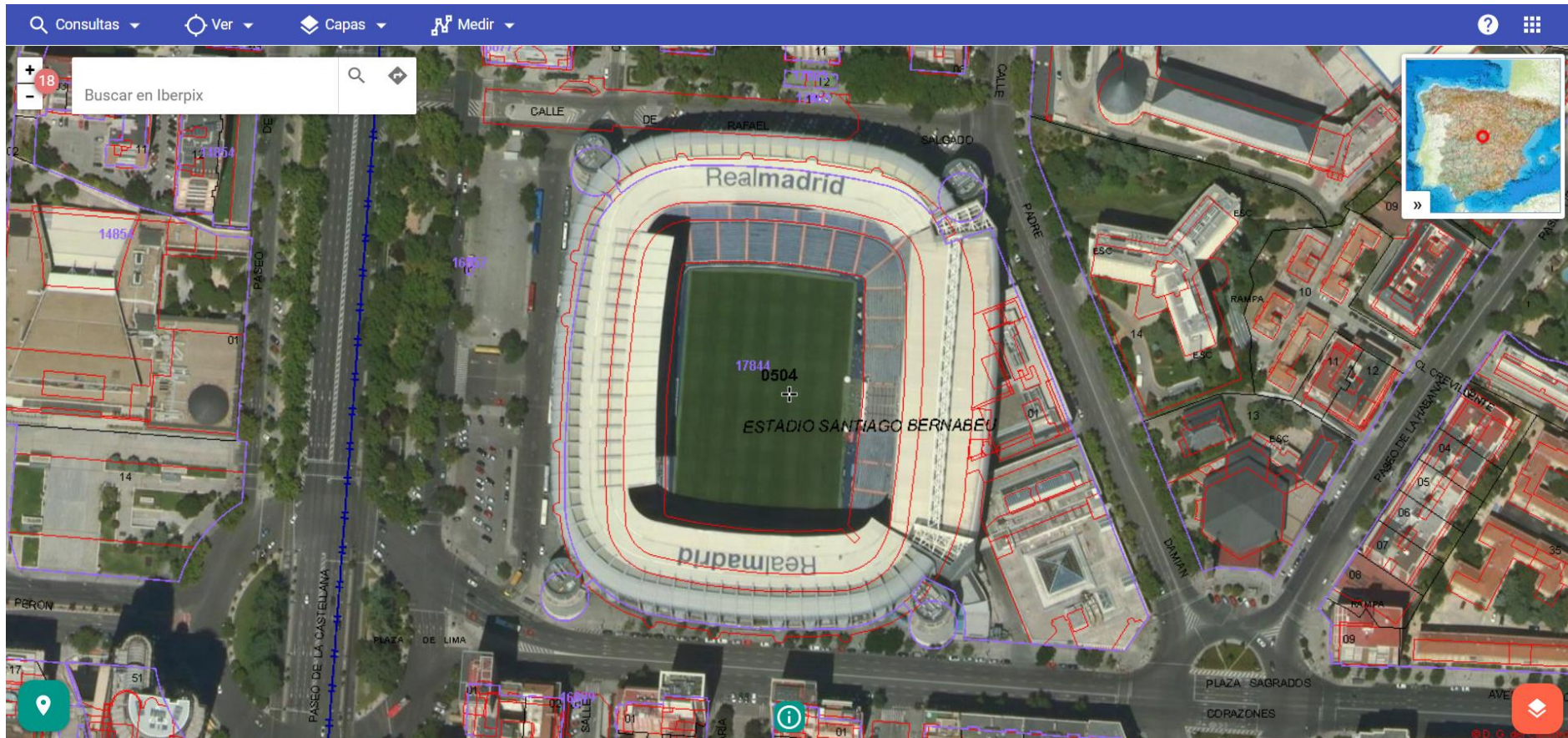


Statistics




Others: infrastructures, forests, agriculture, cadastre,...

Map Viewer



Map Viewer



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Fototeca Digital

Base cartográfica

- ☒ Mapa
- ☐ Imágenes
- ☐ Catas
- ☐ Cuadrícula MTN2
- ☐ Cuadrícula MTN5
- ☒ Vuelos fotogramétricos (posición)
- ☐ 1929- (Cuadrícula)
- ☐ 1945- Serie
- ☐ 1956- Serie
- ☐ 1973- Serie
- ☐ 1980- Serie
- ☐ 1989- Serie
- ☐ 1998- Serie
- ☐ 2004- Serie
- ☐ 2005- Serie
- ☐ 2006- Serie
- ☐ 2009 Vuelo PNOA
- ☐ 2010 Vuelo PNOA
- ☐ 2011 Vuelo PNOA
- ☐ 2012 Vuelo PNOA
- ☐ 2013 Vuelo PNOA
- ☐ 2014 Vuelo PNOA
- ☐ 2015 Vuelo PNOA

Resultado de la consulta

La consulta se realiza sobre la **capa de vuelos fotogramétricos activa** o en su defecto sobre todas ellas

Ver	Descargar	Fotogramas
<input checked="" type="radio"/>	<input checked="" type="checkbox"/>	2017 Vuelo PNOA: h50-0533-fot-16-1397
<input checked="" type="radio"/>	<input checked="" type="checkbox"/>	2017 Vuelo PNOA: h50-0533-fot-16-1396
<input checked="" type="radio"/>	<input checked="" type="checkbox"/>	2017 Vuelo PNOA: h50-0533-fot-16-1395
<input checked="" type="radio"/>	<input checked="" type="checkbox"/>	2017 Vuelo PNOA: h50-0533-fot-16-1394
<input checked="" type="radio"/>	<input checked="" type="checkbox"/>	2017 Vuelo PNOA: h50-0533-fot-16-1393
<input checked="" type="radio"/>	<input checked="" type="checkbox"/>	2017 Vuelo PNOA: h50-0533-fot-16-1392
<input checked="" type="radio"/>	<input checked="" type="checkbox"/>	2017 Vuelo PNOA: h50-0508-fot-15-1275
<input checked="" type="radio"/>	<input checked="" type="checkbox"/>	2017 Vuelo PNOA: h50-0508-fot-15-1274
<input checked="" type="radio"/>	<input checked="" type="checkbox"/>	2017 Vuelo PNOA: h50-0508-fot-15-1273

<< < 1 2 3 4 5 ... 8 > >>

Borrar selección

Borrar todo

Parar consulta

Fotogramas listados: 72

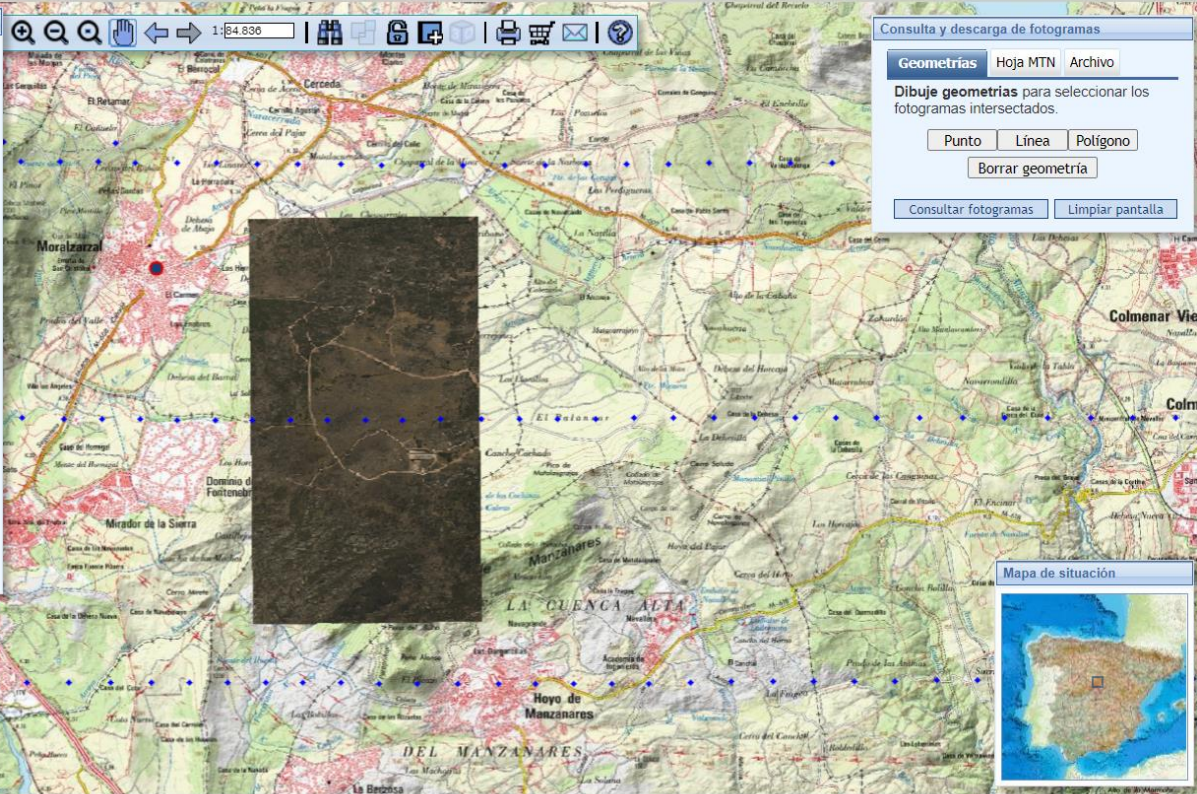
Fotogramas a descargar: 63

El vuelo AMS no permite descargas. Más información en cecaf@ea.mde.es

Obtener listado

Descargar fotogramas

1:84.830



Consulta y descarga de fotogramas

Geometrias

Hoja MTN

Archivo

Dibuje geometrias para seleccionar los fotogramas intersectados.

Punto

Línea


Polígono

Borrar geometría

Consultar fotogramas

Limpiar pantalla

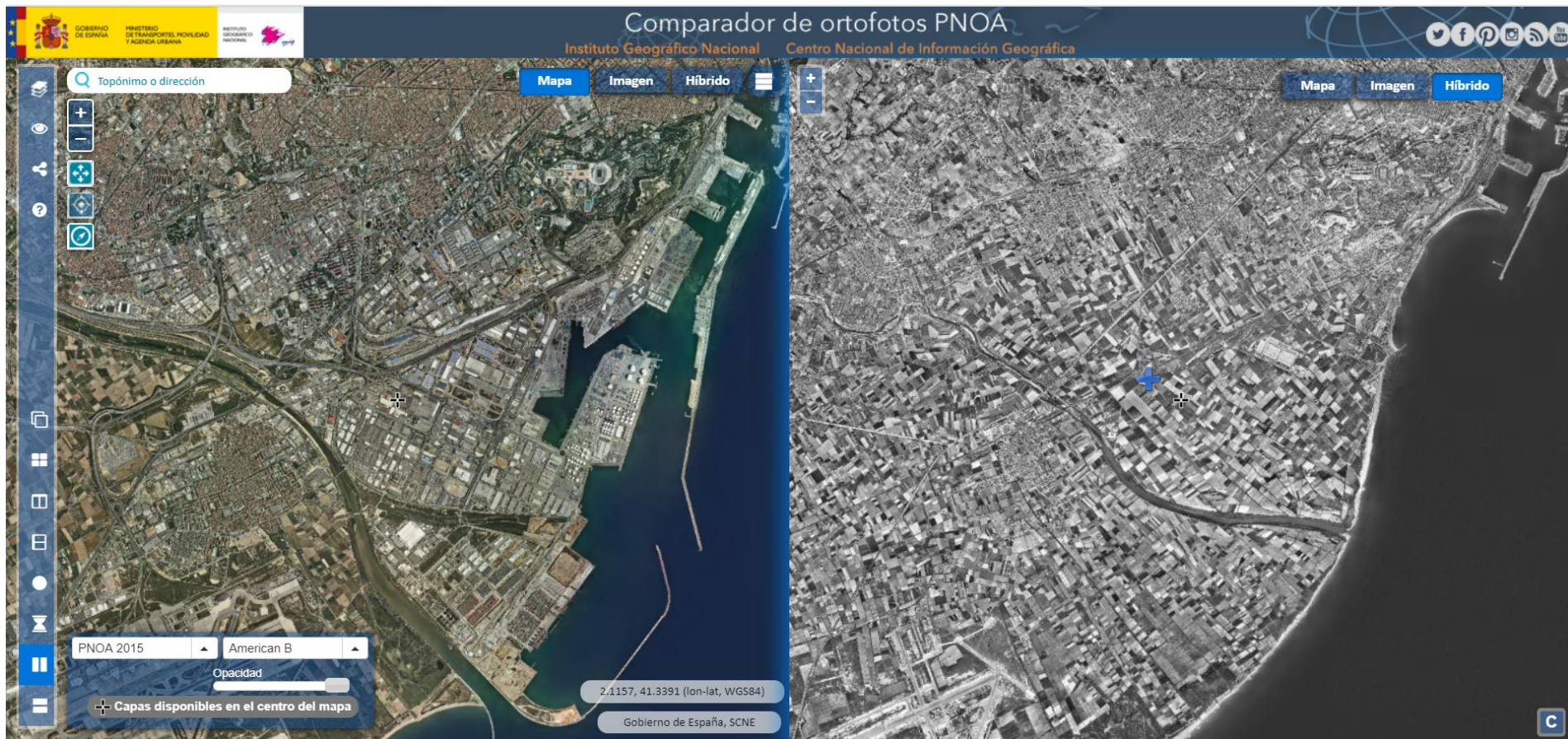
Mapa de situación



Datum: ETRS89 Proyección: UTM Huso: 30 X: 424563.01 Y: 4502093.05

Fotograma: h50_0533_fot_16-1400

Map Viewer



WMS/WMTS

Ver Medir Consultas Croquis Versión 4.4

16

Datum: ETRS89
Latitud: 39° 51' 22.85" N
Longitud: 4° 0' 51.41" W
Huso UTM: 30
Coord. X: 413.239,37
Coord. Y: 4.412.305,64
Nivel: 16

200 m

FEGA

WMS/WMTS

wikiloc

Busca rutas

o Explora

Sube rutas



Senderismo (Rutas Senderismo en España → Andalucía → Sevilla)

Sevilla(a pie de calle) 87

Añade a la lista Haz tu valoración

Comparte



Vista 4661 veces, descargada 180 veces

cerca de Sevilla, Andalucía (España)

Descarga



Autor
Ramarvid

46.932

1330

5368

He realizado esta ruta

↔ 41,13 km

↻ Sí

↗ 4.178 m

↑ 148 m

↘ 4.178 m

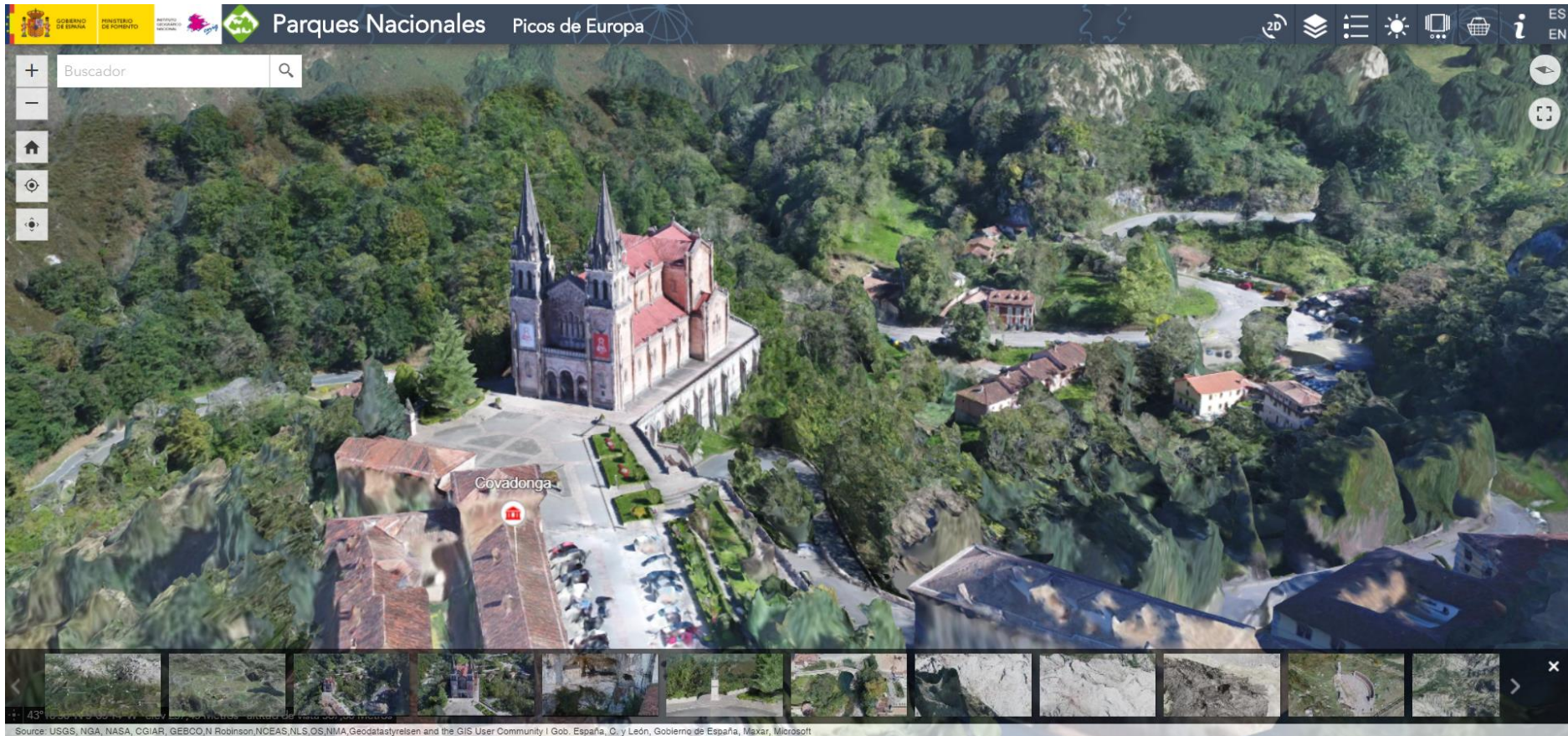
↓ -13 m

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3D Scenes



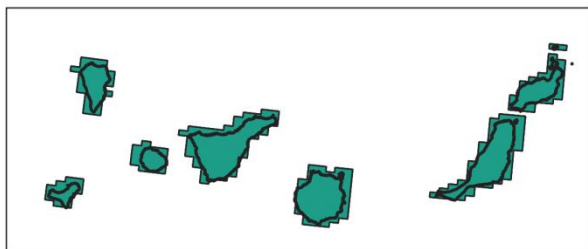
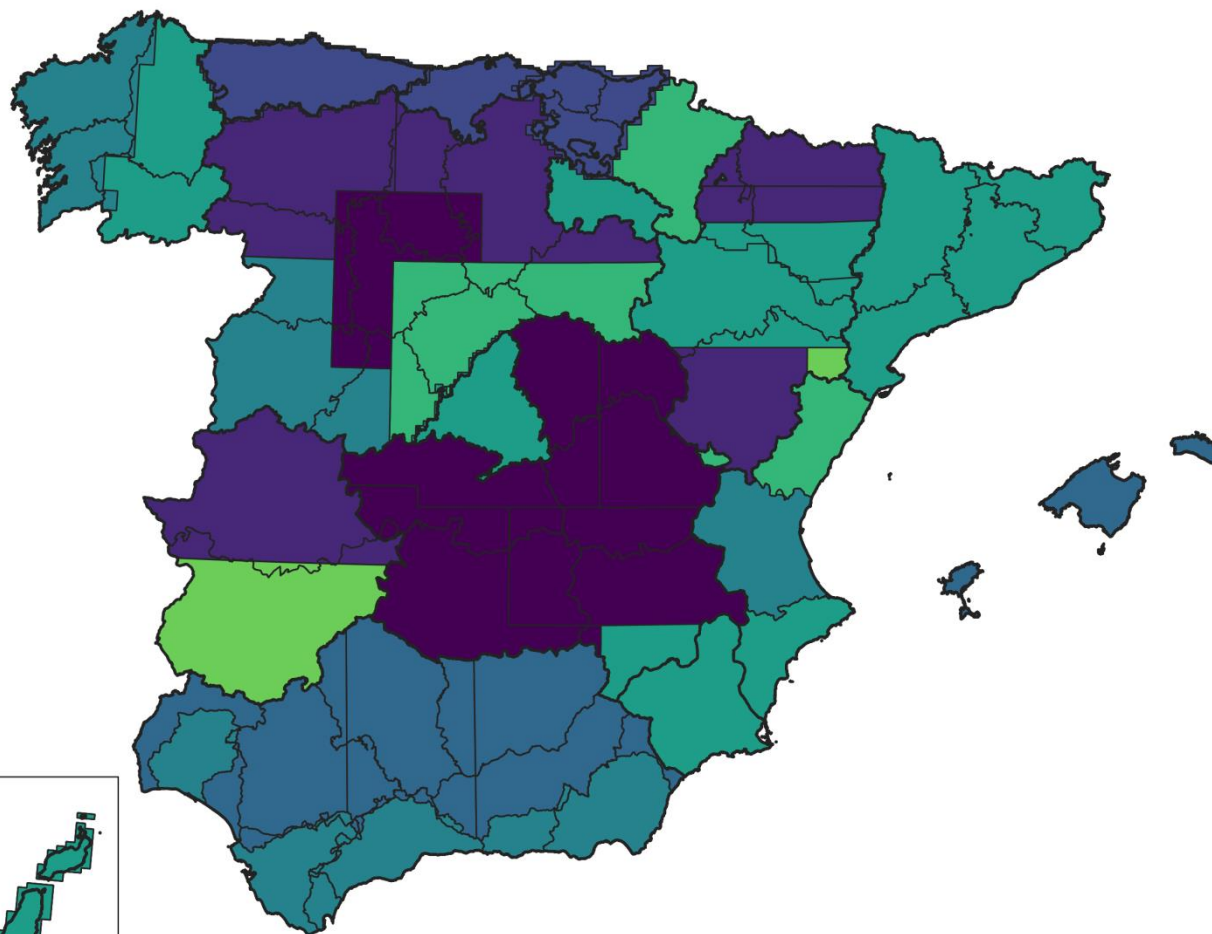
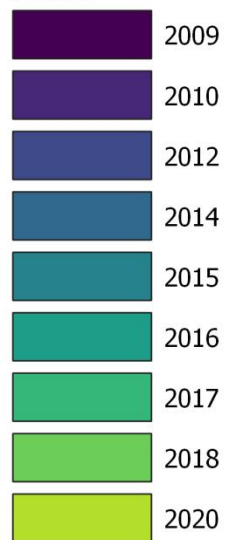
PNOA-LiDAR

- Goal: obtaining LiDAR point cloud coverage, with x, y, z coordinates, every six years.
- Coverages:
 - First: 2009-2015
 - Second: 2015-2020
- Density:
 - First coverage: 0,5 p/m²
 - Second coverage: 0,5-4 p/m²
- Accuracy: RMSE x,y <= 30 cm. RMSE z <= 20 cm.
- Distribution: 2x2km files (LAZ format).

Current situation

Leyenda

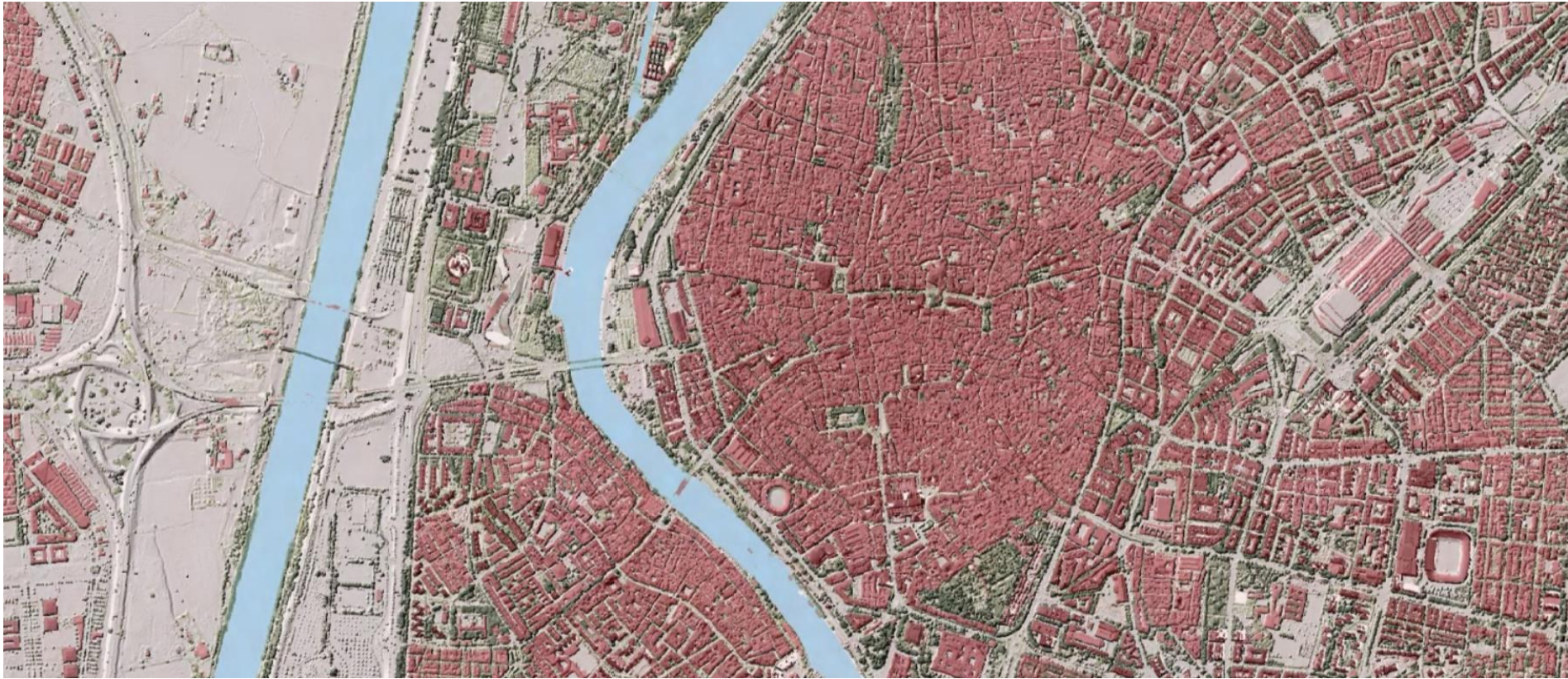
Años




Products

- **LiDAR data.**
- **Digital terrain model.**
- **Digital surface model.**
- **Slopes digital model.**
- **LiDAR map.**

Products



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Products

DIGITAL ELEVATION MODELS

Altimetric information that represents the landform of the national territory and, in the case of Lidar data, of the elements that are found on it as well. They cover a different area from the national territory every year (to see the areas flown per year, visit <http://pnoa.ign.es/estado-del-proyecto-lidar>).



LIDAR 1st Coverage (2008-2015)

Description: Digital files of the LIDAR 3D point clouds with national coverage and true color RGB-coloured or infrared IRC-coloured.

GRS: ETRS89 for the Iberian Peninsula, Balearic Islands, Ceuta and Melilla, and REGCAN95 for the Canary Islands (both systems are compatible with WGS84). UTM projection in the corresponding zone. Orthometric heights.

Download Units: 2x2 km long areas.

Format: LAZ (LAS compression file format) file.

[See +](#)
[Metadata](#)
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LIDAR 2nd Coverage (2015-Present)

Description: Digital files of the LIDAR 3D point clouds with national coverage and true color RGB-coloured or infrared IRC-coloured.

GRS: ETRS89 for the Iberian Peninsula, Balearic Islands, Ceuta and Melilla, and REGCAN95 for the Canary Islands (both systems are compatible with WGS84). UTM projection in the corresponding zone. Orthometric heights.

Download Units: 2x2 km long areas with the exception of 1x1 km long areas.

Format: LAZ (LAS compression file format) file.

[See +](#)
[Metadata](#)
[Auxiliary Information](#)



LIDAR Map 1st Coverage

Description: Shaded Digital Surface Model to which three layers have been overlayed. Two of these layers come from the rasterisation of the building and the vegetation classes of .LAS format point clouds. The other layer comes from hydrography.

GRS: WGS84, Web Mercator projection (EPSG:3857).

Download Units: MTN50 sheet

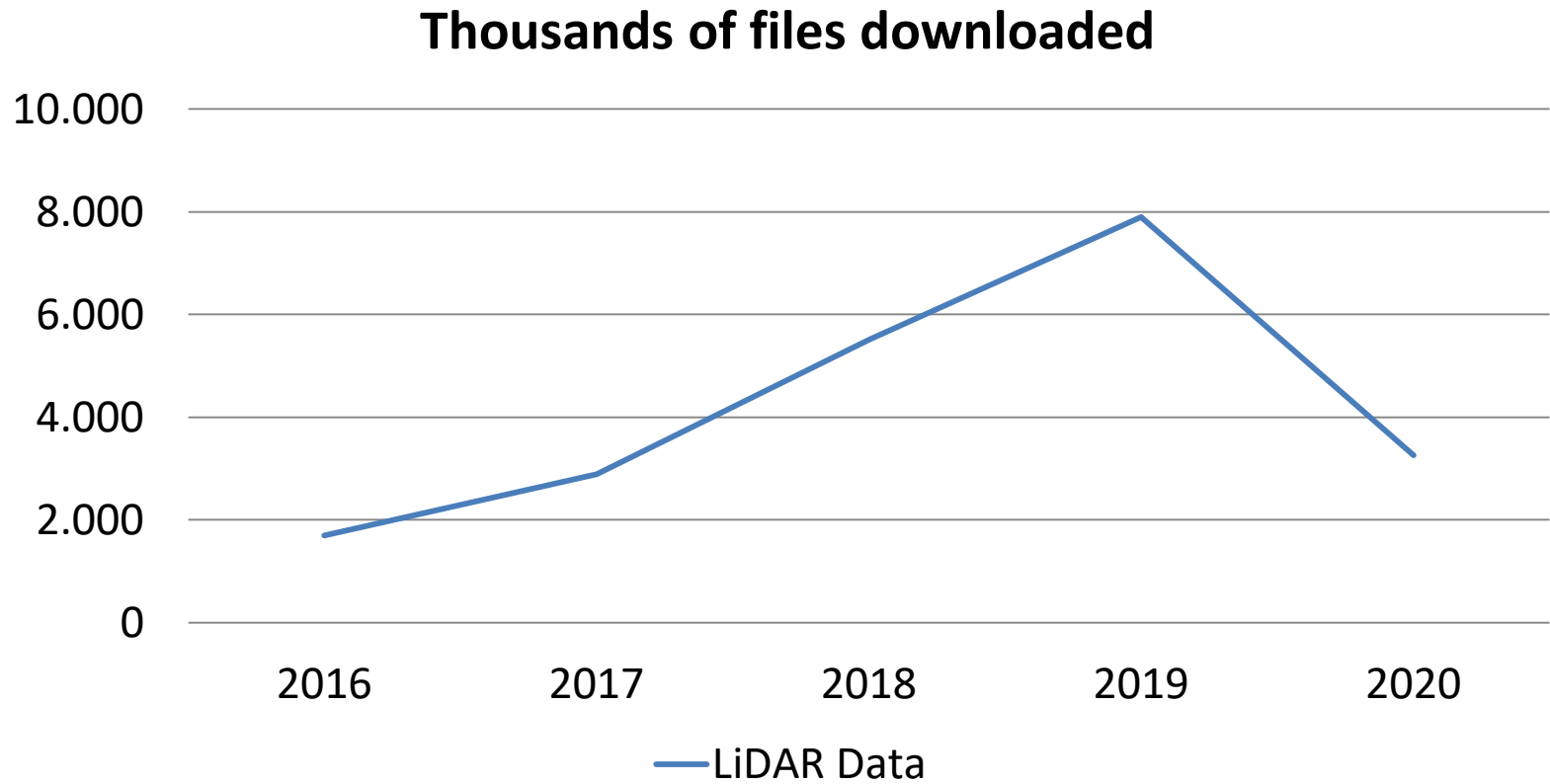
Format: ECW

[See +](#)
[Metadata](#)
[Auxiliary Information](#)

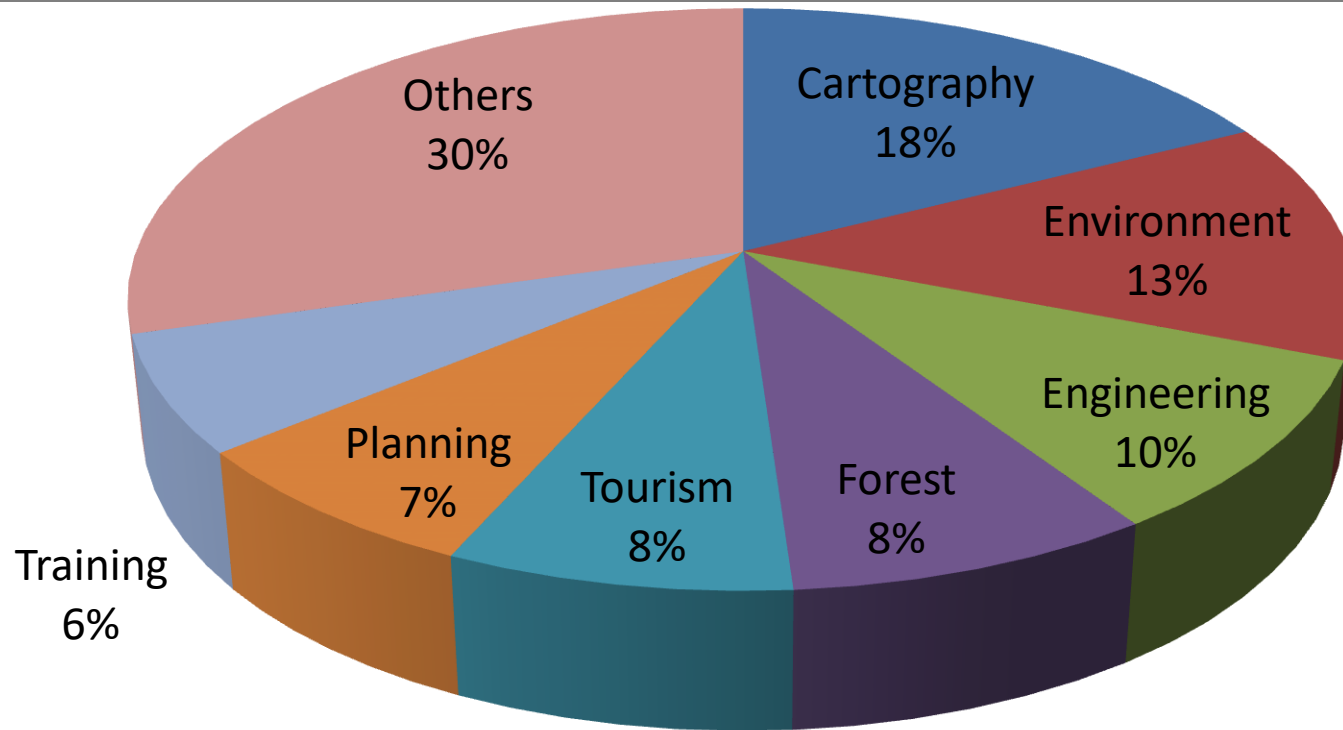


All Into a list In

Statistics



Statistics



Others: archaeology, R&D, agriculture,...

Funding

- It's a collaborative project supported by the national and regional administrations:
 - Cadastre Department
 - Spanish Agrarian Guarantee Fund
 - National Geographic Institute
 - Autonomous regions
- More than 80 agreements signed.

Conclusions

- PNOA is a key resource for many purposes.
- The outputs are open and free.
- It takes much time for bureaucratic hurdles.
- Next steps: improving periodicity and resolutions and administrative and publication processes.