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Compact guides

GISCO

Geographic information system of the Commission

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What is GISCO?

GISCO, the 'Geographic Information System of the COmmission', is a permanent service of Eurostat that fulfils the requirements of both Eurostat and the European Commission for geographic information and related services at European Union (EU), Member State and regional levels. These services are also provided to European citizens at large. GISCO's goal is to promote and stimulate the use of geographic information within the European Statistical System and the European Commission.

GISCO activities include:

- management of the geographical reference database of the European Commission;
- data processing, mainly for thematic mapping, spatial analysis and data dissemination;
- coordination and interaction with users and producers of data (European Commission, European agencies, statistical offices);
- promotion of activities to integrate geographical and thematic information, notably statistical information; and
- cooperation in initiatives such as the establishment of an Infrastructure for spatial information in the European Community (INSPIRE).

Geographic information system (GIS)

What is a GIS?

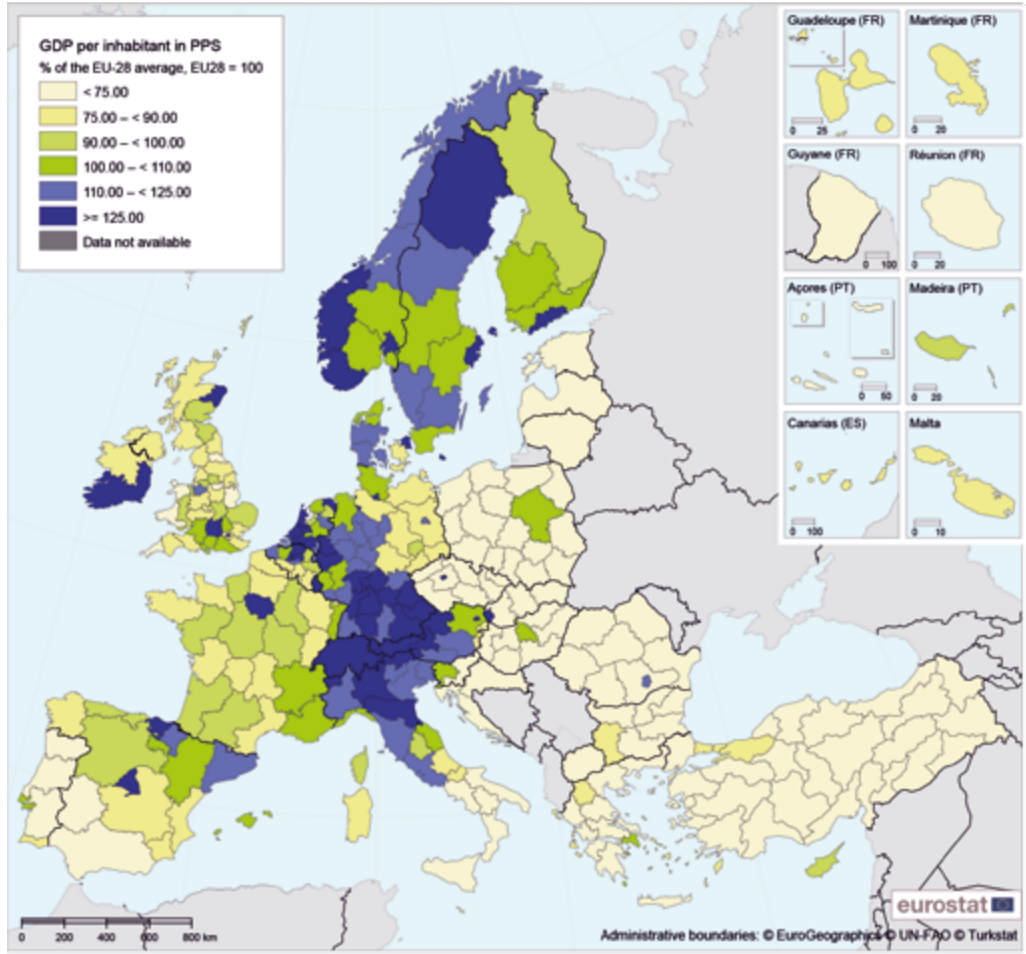
A geographic information system (GIS) is a tool for the management, analysis, presentation and dissemination of geo-referenced data.

In short, GIS can be described as a tool for 'geo-referenced data analysis and presentation'.

WHAT IS GEO-REFERENCING?

Geo-referenced means that data are associated to their geographic location. This is of course the case for topographic information (roads, rivers, administrative boundaries…) which can be easily represented on maps. Statistical data collected and disseminated by Eurostat can also be geo-referenced — in fact, European statistics are almost always associated with, at least, a country and sometimes, further down, to a region or a smaller administrative unit or even with a point such as a train station.

Map 1: Gross domestic product (GDP) per inhabitant, in purchasing power standard (PPS), by NUTS 2 regions, 2011



How can a GIS be used?

The geo-referencing of statistical data was first used to create statistical maps for Eurostat publications and, more recently, for electronic products and websites. However, the association of geographic information and statistics can generate information far beyond the simple representation of statistics on maps.

Geo-referenced data can be combined with numerical data to illustrate spatial interactions and patterns, highlighting phenomena that would be harder to perceive with just statistical tables. Moreover, the combination of computer processing power and GIS allows for a multitude of different statistical analyses to be undertaken.

GIS can also be used for a wide range of different applications, such as:

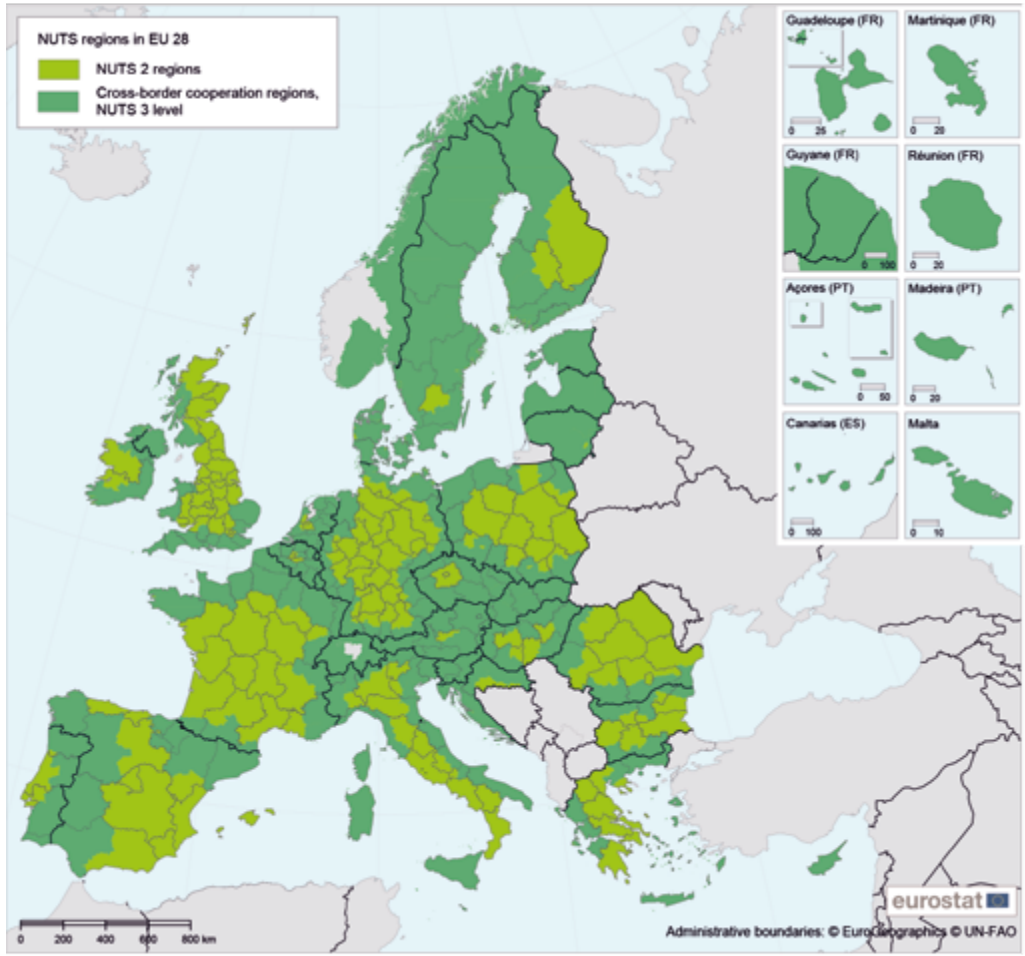
- scientific investigations;
- resource management;
- environmental impact assessment;
- urban planning;
- cartography; or
- logistics.

They can also be used by emergency planners to calculate emergency response times in the event of a natural disaster, or to assist a company looking for a new business location to take advantage of a previously under-served market.

One of the most obvious examples relates to regional policy: GIS allows regional and local administrations to follow up policy initiatives more closely. Administrations use GIS to prepare strategic decisions in relation to transport and regional planning. For example, the analysis of infra-regional statistics can be presented in the form of thematic maps. These maps allow very detailed information to be obtained for indicators such as population density, degree of urbanisation, travel patterns or availability of local infrastructures.

Other areas where GIS are of particular interest include agriculture and the environment - for instance to find wetlands that need environmental protection. Advances have been made in terms of satellite imaging and remote sensing techniques, allowing for alternative means of data collection. The combination of remote sensing techniques and existing GIS allows for more effective monitoring, as well as easier modelling of the impact of (environmental) changes at a local, national, international, and even global level.

Map 2: NUTS2 regions and NUTS3 cross-border cooperation regions, EU-28, 2011



Looking at transport and infrastructure, GIS can provide information on the means of transport at local or regional level, as well as on the availability and accessibility of transport and transport infrastructures.

How does a GIS work?

GIS contains functions such as:

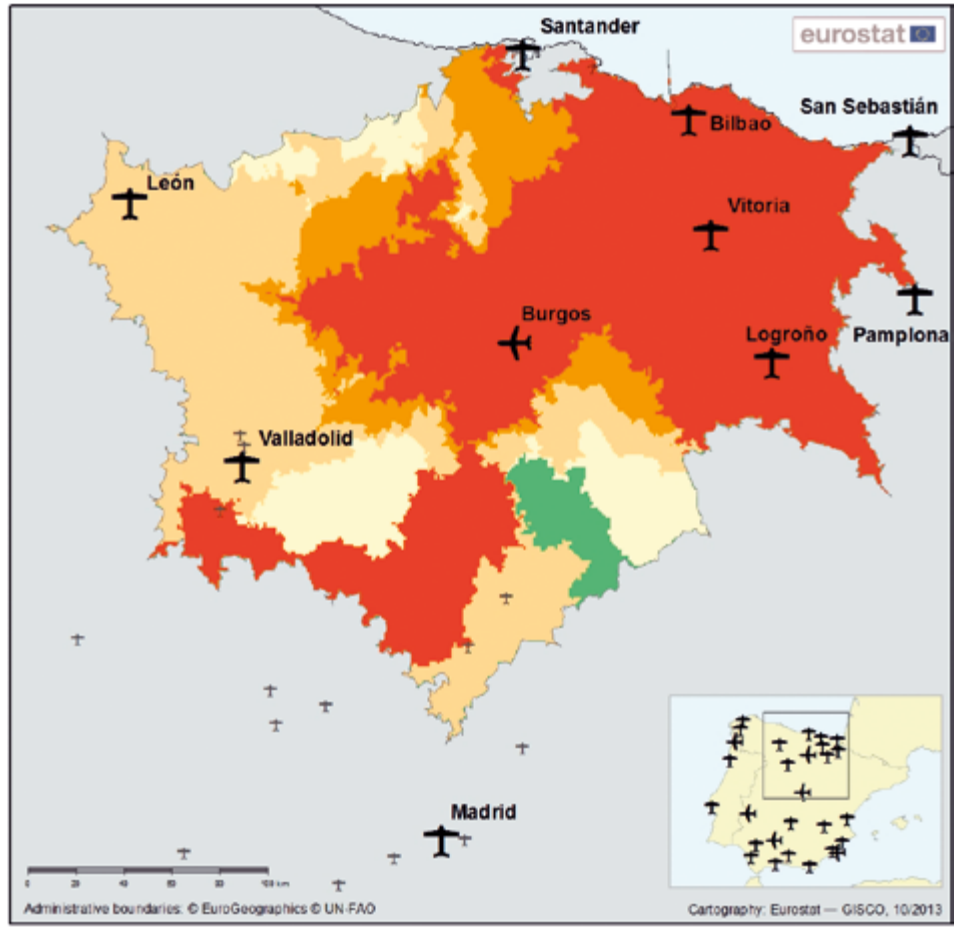
- data capturing;
- data management;
- data visualisation;
- spatial analysis;
- attribute analysis; and
- temporal analysis.

Once geospatial and thematic data have been integrated, GIS can provide answers to several types of questions such as:

- What can be found where and when did it change?
- What is the range of the impact if we perform this action?
- What is the distance between these two locations?

In Map 3 for example, several datasets (airport location, road and train networks, population density, statistical units) were analysed to determine travel times to the nearest airport (e.g. 120 ≤ minutes) and the number of reachable competitor airports within the same travel times.

Map 3: Number of airports overlapping with the audited airport Burgos, Spain (LEBG), 2006



Burgos (LEBG) overlap with airport (ICAO code)	No of residents in the overlap area per airport	Residents in overlap (%)	Distance to competitor airport (km)	Time to competitor airport (minutes)
Bilbao (LEBB)	2 987 330	73.59	150	90
León (LELN)	1 056 690	26.03	184	105
Madrid Barajas (LEMD)	148 291	3.65	237	151
Pamplona (LEPP)	2 523 380	62.16	194	124
Valladolid (LEVD)	1 220 930	30.08	140	96
Vitoria (LEVT)	3 047 830	75.08	114	70
Santander (LEXJ)	2 721 210	67.04	153	122
San Sebastián (LESO)	2 549 690	62.81	226	126
Logrono (LERJ)	2 835 972	69.86	120	85

No of residents within 2 hours from audited airport	Total no of residents in overlap with access to multiple airports	Residents in overlap with access to multiple airports (%)	Distance to rail station (km)	Distance to rail line (km)	No of tourist nights per year within 2 hours from audited airport
4 059 290	4 048 972	99.75	0.52	0.23	17 919 871

Spatial analysis

Spatial analysis is a system of techniques used to study spatial interactions and patterns by combining and processing geographic and statistical data using a computer application. It is also an approach for studying the elements of our world through mapping, discovering relationships, analysing dependencies and providing predictions based on trends.

Spatial analyses are typically used to answer part of the following questions:

- Where?

  For example: which local administrative units (LAU) regions are located within the coastal zone of the EU?

- How big, how far, what is the distribution pattern?

  For example: how far does the average resident of a LAU region have to travel to reach a hospital and how long will it take them? Which regions are most disadvantaged in terms of travel time or distance?

- How are two elements related?

  For example: does the GDP per person in a Nomenclature of territorial units for statistics (NUTS) region depend on the time it takes them to travel to an urban centre of a certain size?

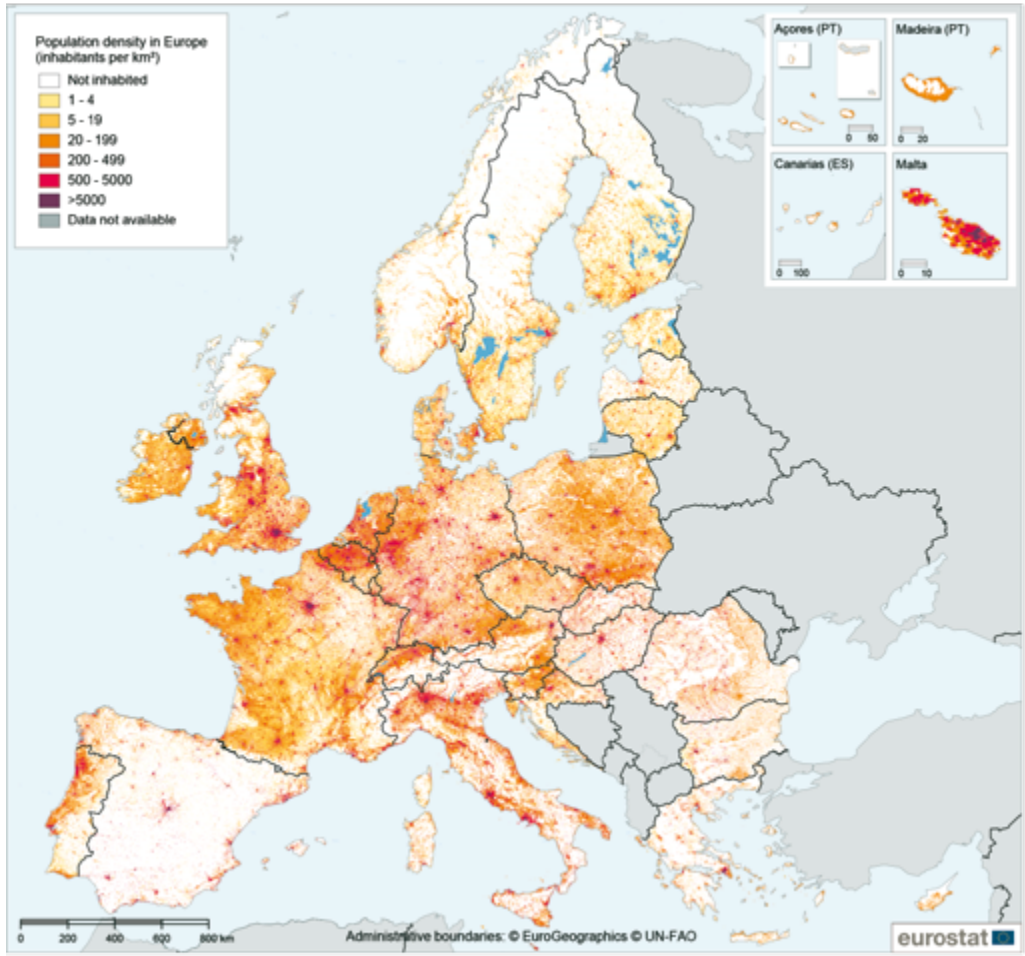
- What are the optimum locations?

  For example: where should a new hospital be built, given the road network, to provide optimum access in terms of travel time to all residents in an area?

- What are possible future outcomes?

  For example: what would be the impact of a new motorway on industries in a region, given the current distribution of industrial sites along the existing road network?

Map 4: Population densities based on inhabitants per 1 km², EU-28, 2011



The GEOSTAT initiative

The GEOSTAT initiative was launched in the beginning of 2010 by Eurostat in order to promote grid-based statistics and, more generally, the integration of statistical and geospatial information. The aim is to create information products for policy-makers that combine the 'What?', 'When?' and 'Where?', thus strengthening the information capacity of public sector information.

In practical terms, the focus of the GEOSTAT action so far has been to create a European population grid dataset of the 2011 census. The 2011 census provided population and housing data with extremely high geographical detail, often associated to an address point. This allows for the aggregation of census topics into a 1 km² grid net. The GEOSTAT 2011 grid dataset contains data on the total population at their usual residence. In the next phase, GEOSTAT will aim at laying the foundation for a spatial reference framework for statistics.

INSPIRE

The directive on 'Infrastructure for spatial information in Europe' (INSPIRE) entered into force on 15 May 2007, establishing an infrastructure for spatial data and services in Europe to support Community environmental policies, and policies or activities which may have an impact on the environment. It addresses 34 spatial themes linked by common standards and protocols. Its prime objectives are:

- data exchange;
- data sharing; and
- data reuse, for effective governance and policy-making purposes.

INSPIRE is established and operated by the EU Member States and requires full implementation by 2020. More information on INSPIRE can be found at: http://inspire.ec.europa.eu

GISCO on the Eurostat website

The GISCO pages on the Eurostat website provide information on a number of geographic information initiatives and activities related to the European Commission. They also give access to datasets from its database, maps and publications.

The Statistical Atlas presented in the centre part of the GISCO page is a collection of thematic maps from the Eurostat regional yearbook bundled together in an easy-to-use online atlas. Users can also download all maps as PDFs.

On the left-hand side of the page, the links 'Geodata', and 'Publications'' redirect users to the thematic download pages. They can download free reference datasets, access a downloadable digital elevation model of the EU territory or browse through Eurostat publications and thematically organised maps and posters.

On the right-hand side of the page, users will find links to the major initiatives in which GISCO is involved, such as:

- REGIO (Regions and cities statistics);
- LUCAS (Land cover/use statistics);
- NUTS (the statistical classification of regions in the EU); and
- INSPIRE.

The GISCO page can be accessed under the following URL: http://ec.europa.eu/eurostat/web/gisco/overview

Note: the cartography of all maps included in this publication stems from Eurostat - Gisco.

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Eurostat, the statistical office of the European Union

Eurostat's mission is to be the leading provider of high-quality statistics on Europe. Eurostat publishes official, harmonised statistics on the European Union (EU) and the euro area which offer an objective portrayal of social and economic trends. These statistics are available for EU Member States, and are sometimes broken down by region. Furthermore, some of the indicators are also published for candidate countries, EFTA countries and other non-member countries.

Eurostat collects data from national statistical institutes; the statistics are harmonised according to Europe-wide methodologies. Data are therefore genuinely comparable across the whole of the EU.

Website

Eurostat's website: http://ec.europa.eu/eurostat provides free access to EU statistics, and is also available in German and French.

Statistics Explained is a wiki-based system that presents statistical topics in an easy to understand way. Together, the articles make up an encyclopaedia of European statistics. There one can also access the online publications Eurostat yearbook, Regional yearbook and *The EU in the world*. An overview of all Eurostat online publications is available under 'Full list'.

Eurostat releases a range of publications, all of which are free of charge, on its website in PDF format; some of these are also available in German and French.

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