

MAPOVÉ ZDROJE

Prof. Dr. Milan KONEČNÝ

Dr. Radim ŠTAMPACH

Cílem předmětu je podat přehled o stávajících analogových a digitálních zdrojích, jež jsou využívány v kartografii a geoinformatice, včetně zdrojů statistických.

Tento přehled je podán ve třech horizontech, a sice ČR, Evropa (země EU a ostatní země) a Svět.

Geoinfostrategie ČR.

Rozvoj a využití Big Data.

Pozornost je věnována i integraci dat v rámci prostorových datových a informačních infrastruktur a možnostem využití dat, informací a znalostí ze stávajících prostorově orientovaných regionálních a globálních projektů.

1. Přehled a struktura zdrojů pro kartografii a geoinformatiku. Český kontext (EGON, Registry, Geoinfostrategie ČR, U.N. GGIM, DBAR).
2. Analogové zdroje v kartografii: mapové sbírky, analogová mapová a atlasová díla
3. Státní mapová díla; významná produkce map a atlasů v soukromém sektoru (autoatlasy, turistické mapy, aj.)
4. Digitální zdroje dat; data, informace a znalosti na Internetu; elektronické atlasy. Otevřené zdroje.
5. ČR a budování digitálních datových zdrojů: civilní a vojenský sektor (ZABAGED, DMR, aj.)

6. Jednotné digitální mapové dílo ČR: teoretické předpoklady, koncepce, praktické požadavky; implementace. Digitální katastr.
7. Digitální fotogrammetrie a mapová díla v ČR.
8. Evropa: digitální mapové zdroje v rámci Evropské unie (Eurogeographics, INSPIRE, COPERNICUS)
9. Tvorba, koncepce a implementace Evropské geografické informační infrastruktury

10. Statistické zdroje v ČR, EU (Eurostat aj.) a ve světě (OSN, FAO, aj.)

11. Svět: Globální mapování a Globální prostorová datová infrastruktura. GEO, GEOSS, Future World.

12. Svět: Digitální planeta Země a Geografická datová báze OSN. U.N. GGIM, DBAR spatial data.

13. Prostorová data a mapy pro redukci rizik a katastrof.

14. Data a informace v „Spatially Enabled Society“.

15. BIG DATA – Velká Data: koncepce, analýza, vizualizace

References:

www.geoinfostrategie.cz

www.digitalearth.com

www.gsdi.org

www.cuzk.org

Manual of Digital Earth. Guo Huadong, Michael F. Goodchild, Alessandro Annoni, eds. International Society for Digital Earth. Springer Open. 2020.

Open access: [Manual of Digital Earth | SpringerLink](#)

U.N. GGIM. <https://ggim.un.org/>

U.N. GGIM: Europe. <https://www.cuzk.cz/O-resortu/Mezinarodni-spoluprace/UNGGIM-Europe.aspx>

GEO and GEOSS portal.

<https://www.geoportal.org/?f:dataSource=dab>

DEFINITIONS- GI SCIENCES
TYPES AND THEMES OF GEOGRAPHIC DATA
FREE GIS DATA SOURCES

- **Geographic information science** is the scientific discipline that studies the techniques to capture, analyze, process and represent / visualize geographic information.
- **GIScience** is conceptually related to geography, cartography, geodesy, information science, computer science, but it claims the status of an independent scientific discipline. Other overlapping disciplines are: geoinformatics, geomatics and geovisualization. (Wiki)
- **GIScience** is a multidisciplinary research enterprise that addresses the nature of geographic information and the application of geospatial technologies to basic scientific questions (Goodchild, 1992).

Definitions

GIS first Textbook in Brno, 1985, Konecny Milan, Karel Rais,
Folia Geographia, 21, 26,13, p.9: (first time mentioned people)

- „GIS is a system of people, technical and organizational means that collect, transfer, store and process data to create information suitable for further use in geographic research and its practical applications.”
- Citation of book is: KONEČNÝ, M. – RAIS, K. Geografické informační systémy. Folia Geografia, roč. XXVI, Geographia 21, č. 13. Brno,1985. 196 p.

PŘÍRODOVĚDECKÁ FAKULTA UJEP V BRNĚ



FOLIA

FACULTATIS SCIENTIARUM NATURALIUM
UNIVERSITATIS PURKYNIANAE BRUNENSIS

GEOGRAPHIA

M. KONEČNÝ – K. RAIS

GEOGRAFICKÉ
INFORMAČNÍ SYSTÉMY

XXVI

1985

12

UNIVERSITA JANA EVANGELISTY PURKYNĚ V BRNĚ

“Geo-information science is the integration of different disciplines dealing with spatial information (figure 8). It was introduced as geographical information science by Goodchild (1992) meaning the science behind the systems or research about GIS and research with GIS.”

Prof. W. Kainz

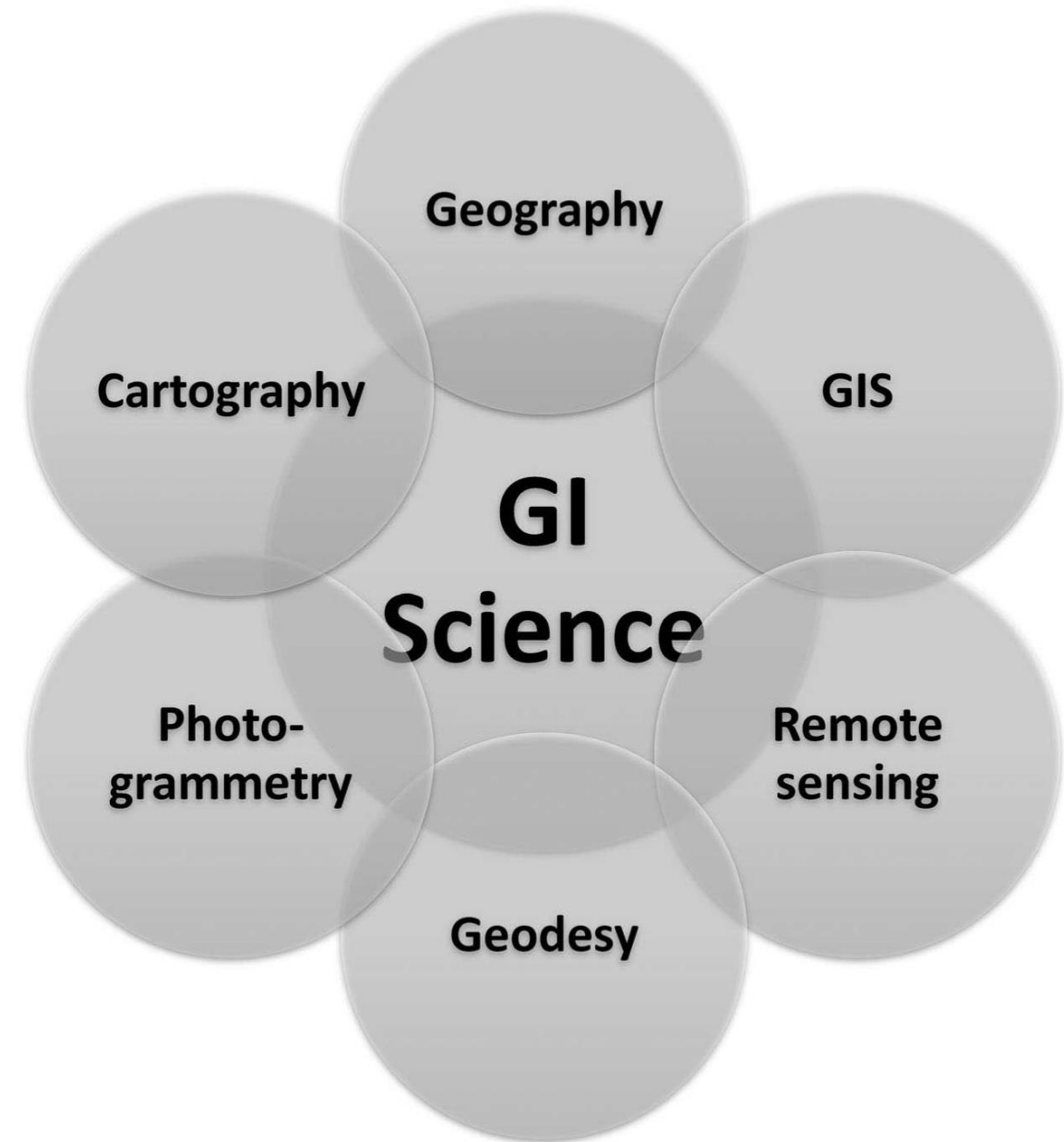


Figure 8. Spatial sciences and their overlaps.

More GI Sciences?

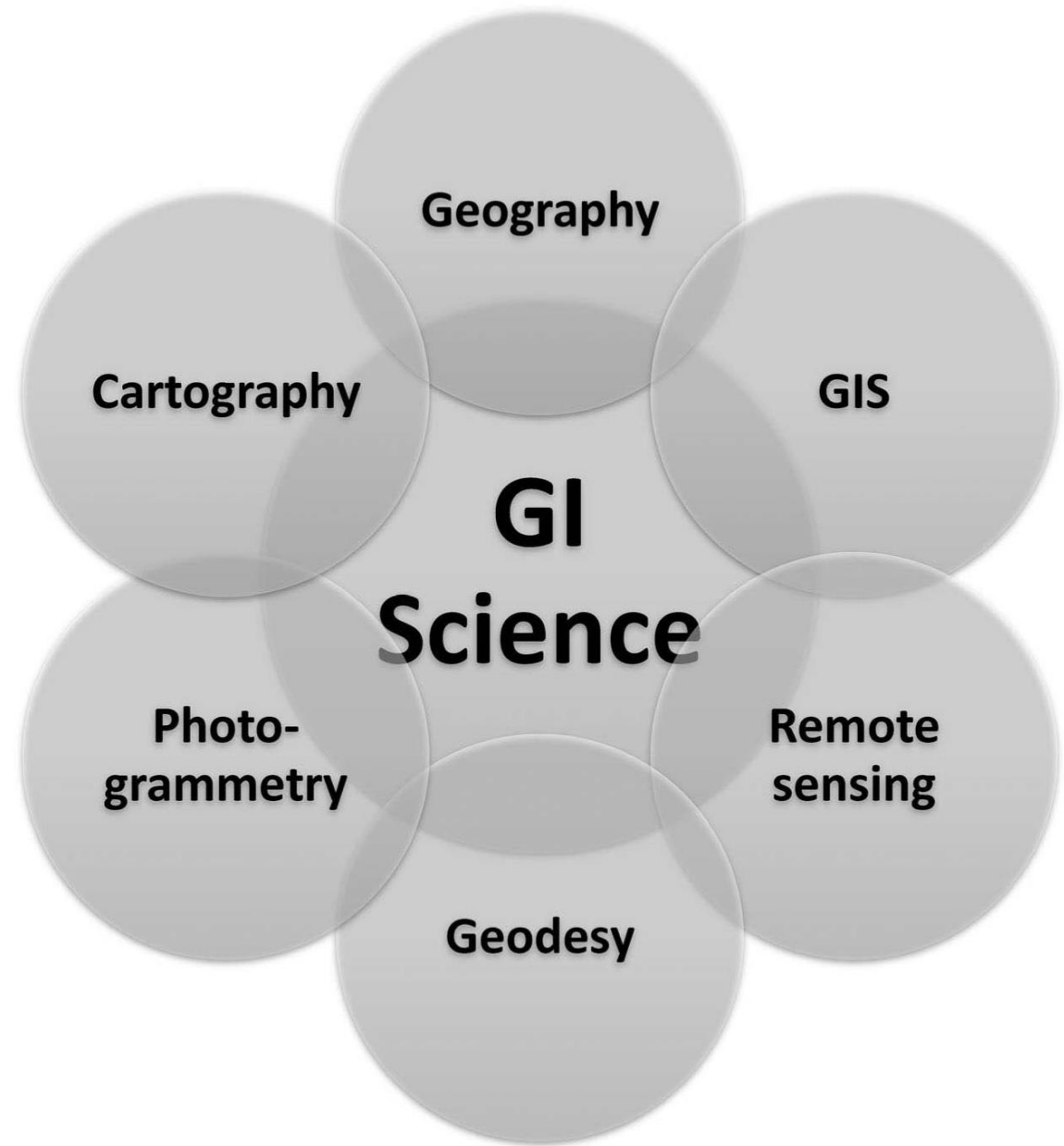


Figure 8. Spatial sciences and their overlaps.

1. GEOLOGY
2. GEOCHEMISTRY
3. GEOPHYSICS
4. ECONOMIC GEOLOGY
5. PETROLOGY
6. SEDIMENTOLOGY
7. MARINE GEOLOGY
8. OCEANOGRAPHY
9. PETROLEUM GEOLOGY
10. FIELD GEOLOGY
11. MINING GEOLOGY
12. ENGINEERING GEOLOGY
13. HYDROGEOLOGY
14. ENVIRONMENTAL GEOLOGY
15. OPTICAL MINERALOGY AND
16. EARTH SCIENCES

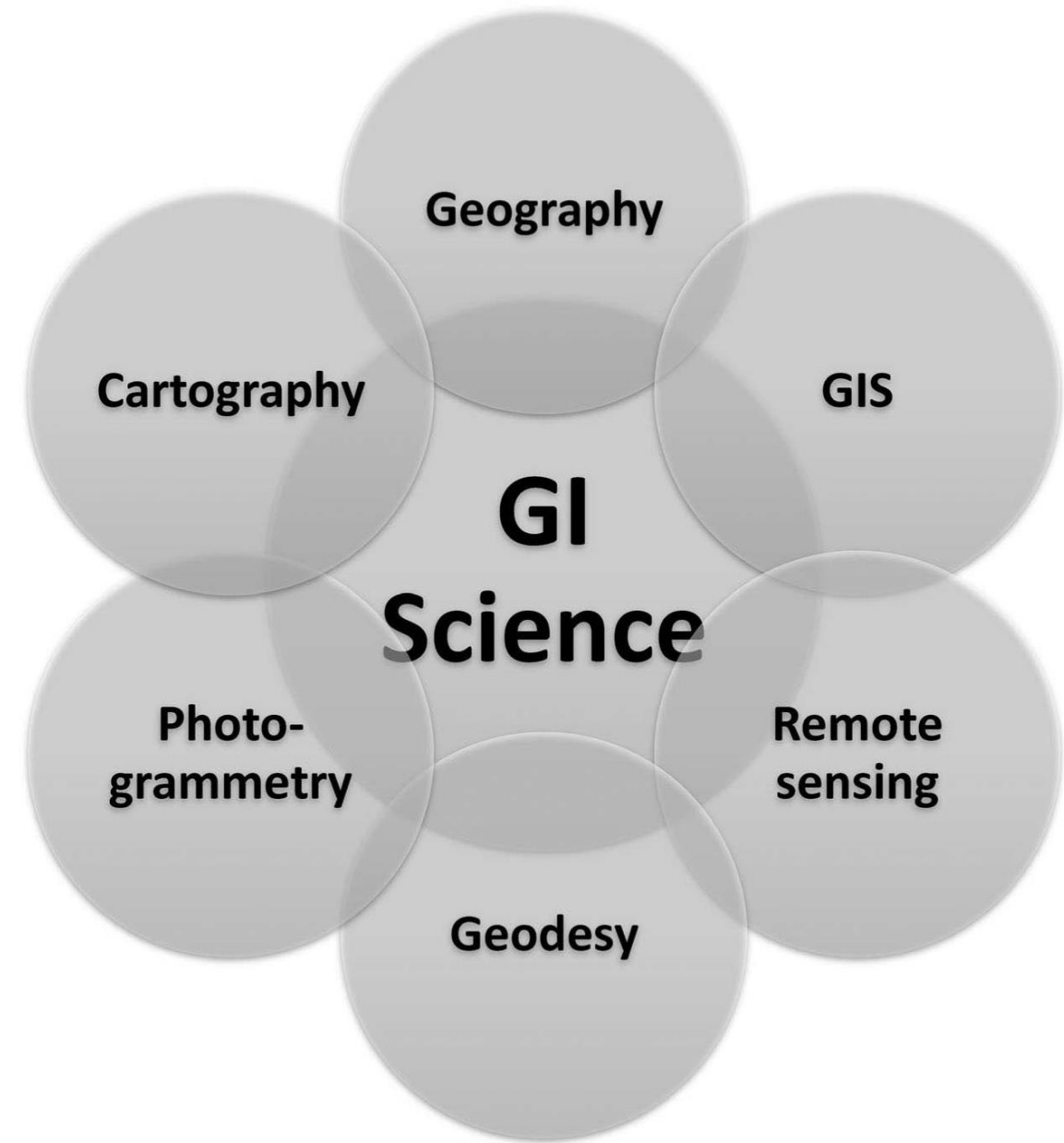


Figure 8. Spatial sciences and their overlaps.

Occupation 2000-2010 Growth (projected)

Cartographers and Photogrammetrists..	18.5%
Surveyors	08.1%
Surveying and Mapping Technicians.....	25.3%
Architectural and Civil Drafters.....	20.8%
Civil Engineering Technicians.....	11.9%
Mechanical Drafters.....	15.4%
Electrical Drafters.....	23.3%
Electrical and Electronic Engineers.....	10.8%
Mechanical Engineering Technicians.....	13.9%
Industrial Engineering Technicians.....	10.1%
Environmental Engineering Technicians.	29.1%
Geoscientists.....	18.1%

U.S. Department of Labor “Geospatial Jobs Outlook” (Department of Labor, n.d.)

Quick Facts: Geoscientists

2019 Median Pay	\$92,040 per year \$44.25 per hour
Typical Entry-Level Education	Bachelor's degree
Work Experience in a Related Occupation	None
On-the-job Training	None
Number of Jobs, 2019	31,800
Job Outlook, 2019-29	5% (Faster than average)
Employment Change, 2019-29	1,600

U.S. Bureau of Labor Statistics

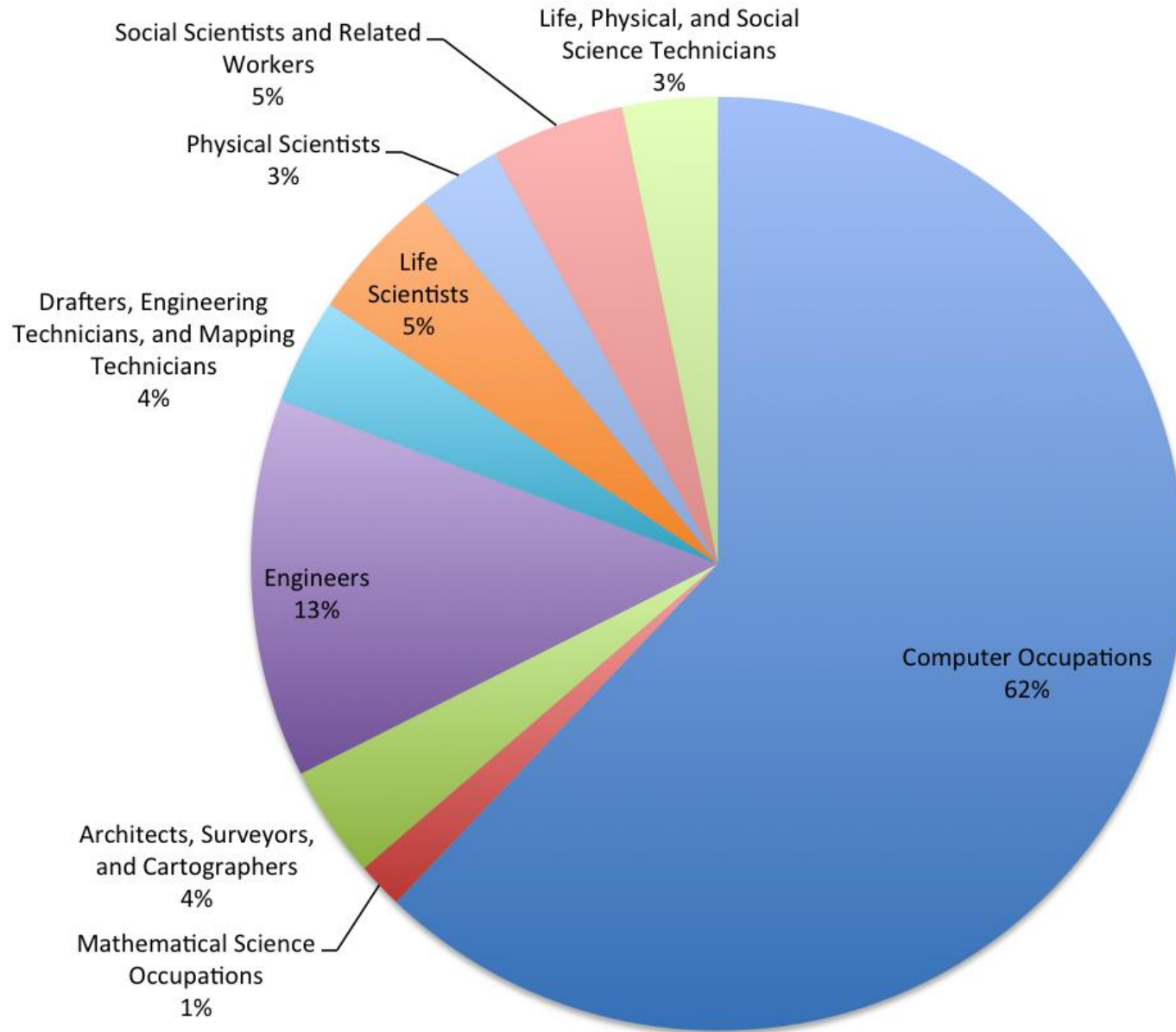
US Cartography Employment Outlook 2010-2020

According to the ArcNews Summer 2012 issue, the occupation listed as “cartographers and photogrammetrists” has a 2010 estimated employment of 14,000 in the US with a projected growth between 2010 and 2020 of 6,100, for a predicted growth rate of 20%-28%.

This growth rate is the highest reported for the 10 GIS related occupations listed in the ArcNews article, tying with “geodetic surveyors” and “surveyors”. Numerically, however, it is still a relatively small portion of GIS work, considering the categories of “geospatial information scientists and technologists” and “geographic information systems technicians” each have a 2010 estimated employment of 210,000.

ArcNews sites the US Bureau of Labor Statistics as the source.

Contribution to total growth in science and engineering occupations, 2010-2020

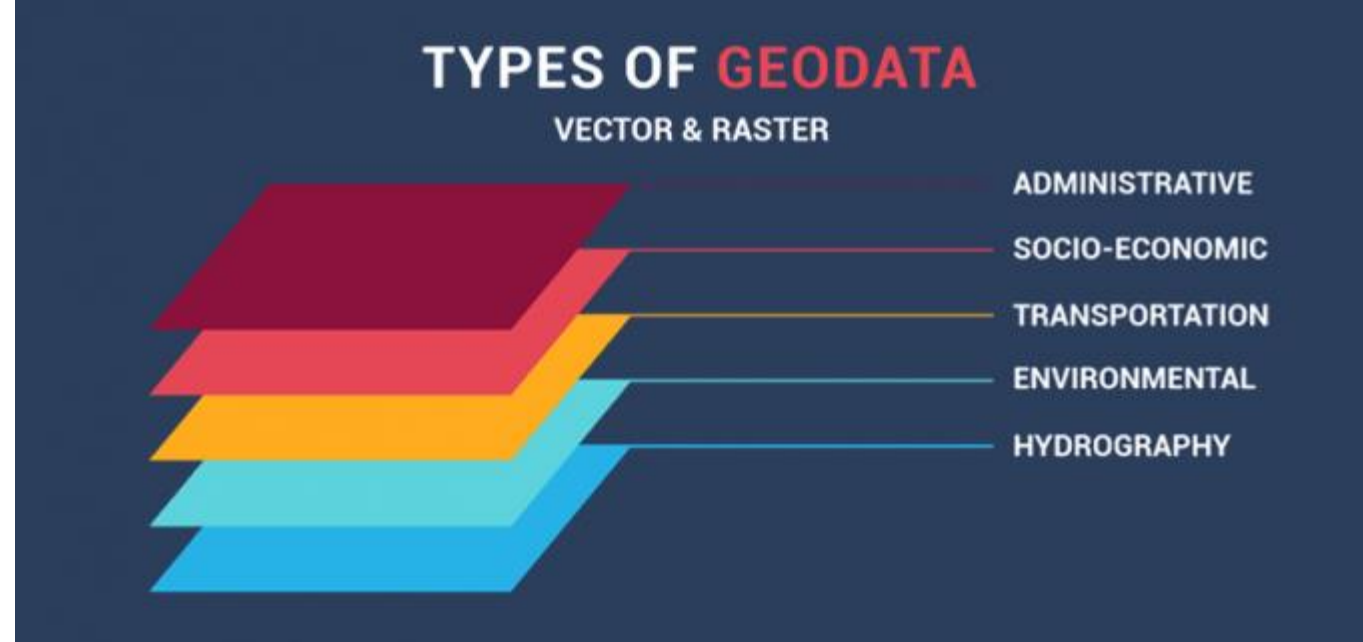


Cartography

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- Brewer, Cynthia A. [Designing Better Maps: A Guide for GIS Users 2nd Edition](#). ESRI Press, 2016.
- Brotton, Jerry. [Great Maps \(Dk Smithsonian\)](#). DK, 2014.
- Dent, B., Torguson, J., Hodler, T. [Cartography: Thematic Map Design](#). McGraw-Hill Science/Engineering/Math; 6 edition, 2008.
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- Monmonier, Mark. [How to Lie with Maps \(3rd Edition\)](#). University of Chicago Press, 2018.
- Peterson, Gretchen N. [Cartographer's Toolkit: Colors, Typography, Patterns](#). PetersonGIS Press, 2012.
- Peterson, Gretchen N. [GIS Cartography: A Guide to Effective Map Design Second Edition](#). CRC Press, 2014.
- Peterson, Gretchen N. *QGIS Map Design Second Edition*. Locate Press, 2018. [Order the PDF here](#). [Order the print book here](#) or at any other book store.
- Zineddin, Z., P. M. Garvey, R. A. Carlson, and M. T. Pietrucha. "Effects of Practice on Font Legibility," *Perception and Performance 4, Human Factors and Ergonomics Society Annual Meeting Proceedings (2007)*: 1717–1720.
- [Carto Blog](#) , a blog for the company Carto, start with posts by Mamata Akella.
- [Free and Open Source GIS Ramblings](#) Anita Graser's blog on QGIS and other software technique.
- [GeoLounge](#) is a news site that features cartography articles among others.
- [The Map Room](#) is a blog about maps, mapping, and technology by Jonathan Crowe.
- [The National Geologic Map Database](#) is maintained by the U.S. Geological Survey and contains information on mapping techniques and guidelines.
- [Petrichor Geoviz Studio](#) is a blog of sweet (donuts, etc.) cartography techniques.
- [The Soil Geographic Data Standard](#), developed by the Federal Geographic Data Committee (FGDC), describes the standards for mapping soils in the United States with specific regard to the soil data created by the National Cooperative Soil Survey.
- [The Utilities Data Content Standard](#), created by the Federal Geographic Data Committee, is a good resource for looking up the standard attributes of many utility features.
- [View from the sky](#), a blog post by Amy Lee on designing the Cali Terrain map style. See other posts in this blog for more cartography-minded discussions.

<https://www.gretchenpeterson.com/>

Geodata is location information stored in a geographic information system (GIS)



What is Geodata?

As it turns out, there's not one single type of geodata. Instead geodata exists in various forms. For example, we commonly use vector and raster to depict geodata.

Types of Geographic Data



Vector files

Vector data consists of vertices and paths. The three basic types of vector data are points, lines and polygons (areas). Each point, line and polygon has a spatial reference frame such as latitude and longitude.

First, vector points are simply XY coordinates. Secondly, vector lines connect each point or vertex with paths in a particular order. Finally, polygons join a set of vertices. But it encloses the first and last vertices creating a polygon area.



Types of Geographic Data

Raster files

Raster data is made up of pixels or grid cells. Commonly, they are square and regularly-spaced. But rasters can be rectangular as well. Rasters associate values to each pixel.

Continuous rasters have values that gradually change such as elevation or temperature. But discrete rasters set each pixel to a specific class. For example, land cover classes are represented to a set of values.



Types of Geographic Data

Geographic Database

The purpose of geographic databases is to house vectors and rasters. Databases store geographic data as a structured set of data/information.

Geographic databases are used because it's a way to put all data in a single container. Within this container, networks can be built, mosaics can be created and versioning can be done.



Types of Geographic Data

Web files

As the internet becomes the largest library in the world, geodata has adapted with its own types of storage and access. For example, GeoJSON, GeoRSS and web mapping services (WMS) were built specifically to serve and display geographic features over the internet.



Types of Geographic Data

Multi-temporal

Multi-temporal data attaches a time component to information. But multi-temporal geodata not only has a time component, but a geographic component as well.

For example, weather and climate data tracks how temperature and meteorological information changes in time in a geographical context. Other examples of multi-temporal geodata are demographic trends, land use patterns and lightning strikes.



Types of Geographic Data

Geodata Themes

Geodata can be grouped into as many themes as you want. They can be as broad or as narrow to your liking.

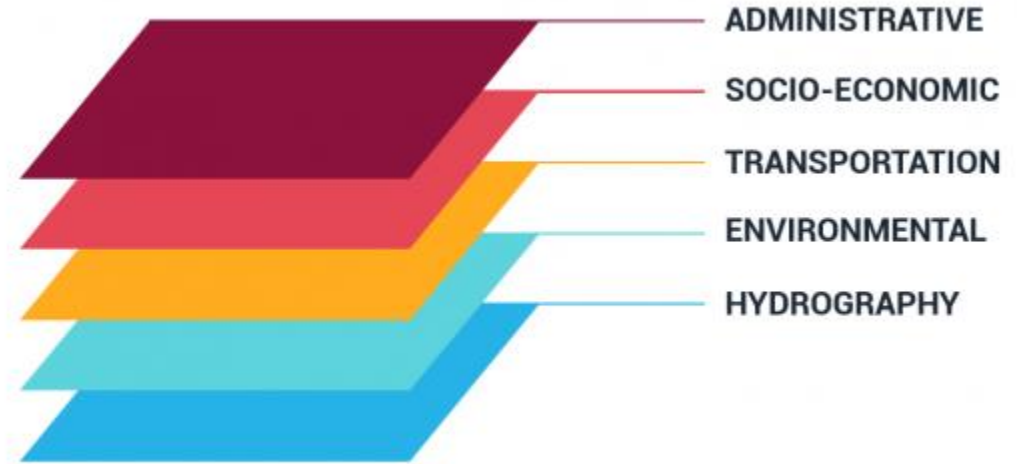
Here are examples of geographic themes:

cultural

administrative (boundaries, cities and planning)
socioeconomic data (demographics, economy and crime)
transportation (roads, railways and airport)

physical

environmental data (agriculture, soils and climate)
hydrography data (oceans, lakes and rivers)
elevation data (terrain and relief)



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12 FREE GIS DATA SOURCES: BEST GLOBAL RASTER AND VECTOR DATASETS [2020]

1. Esri Open Data Hub

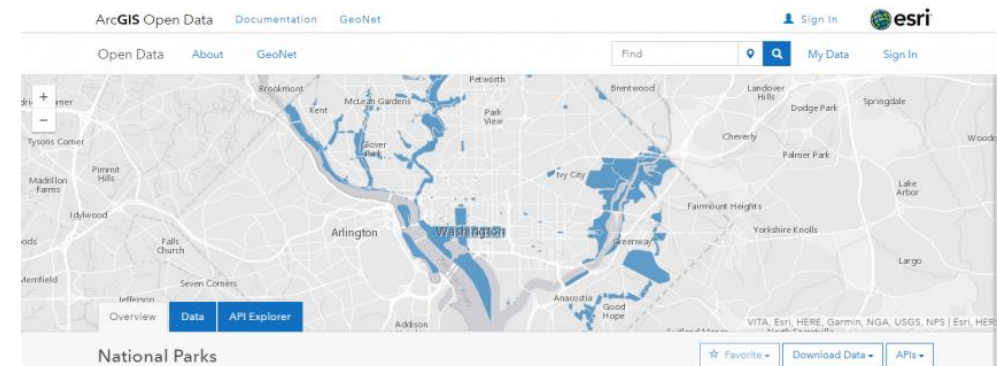
In 2020, the Esri Open Data Hub is a hidden gold mine of free GIS data. For example, it now houses over **250,000+ open data sets** from **5,000+ organizations** worldwide.

The search is convenient with a map preview of the extent and table. Alternatively, the search by topic or location and download data in multiple GIS formats are available. Ultimately, there is nothing more thorough for GIS data than the Esri Open Data Hub.



gisgeography.com/best-free-gis-data-sources-raster-vector/

<https://hub.arcgis.com/search>

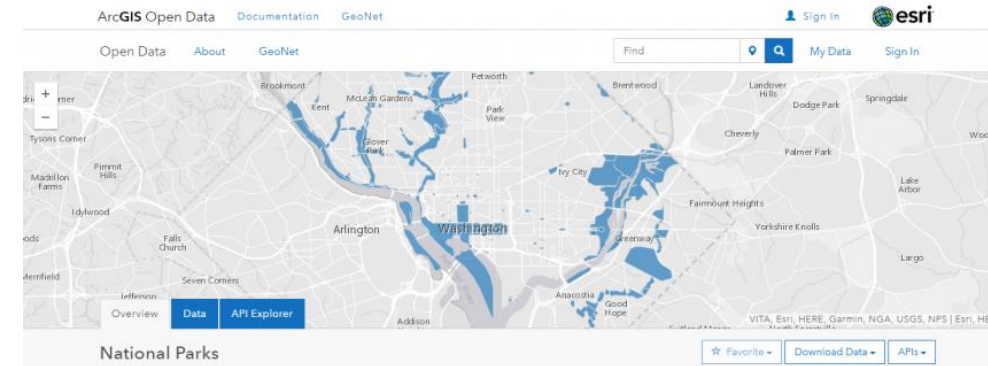


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<https://hub.arcgis.com/search>



1. Esri Open Data Hub

Advantages

- As of 2020, it has 250,000+ open data sets from over 5,000+ organizations worldwide
- Managed by the largest commercial GIS organization in the world.

Data Types

- Download formats are in spreadsheet, KML, shapefile.
- API's are OGC WMS, GeoJSON and GeoService.

12 FREE GIS DATA SOURCES: BEST GLOBAL RASTER AND VECTOR DATASETS [2020]



<http://www.naturalearthdata.com/downloads/>

2. Natural Earth Data

Natural Earth Data is number 2 on the list because it best suits the needs of cartographers. By and large, all the key cultural and physical vector GIS datasets are at a global scale conveniently to use. The raster datasets also provide beautiful hillshade relief for any map.

The best part is Natural Earth Data is in **public domain**. So this means that you have the right to use, modify and disseminate the data in any manner.

Here's more details for Natural Earth data: <https://gisgeography.com/natural-earth-data-free-gis-public/>

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<http://www.naturalearthdata.com/downloads/>

1. Natural Earth Data

Advantages

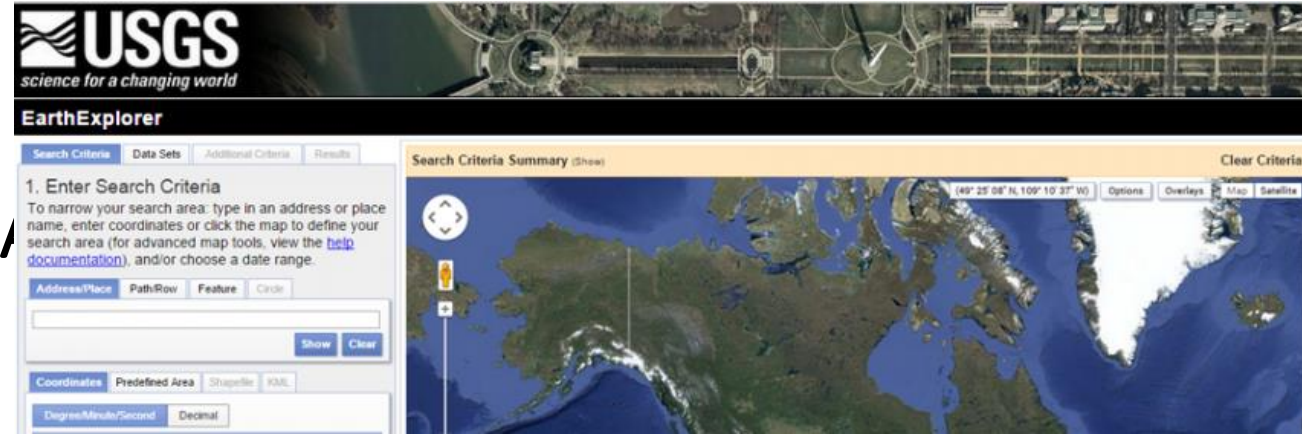
- Download global free GIS data in public domain
- Supported by the North American Cartographic Information Society (NACIS).

Data Types

- Cultural, physical and raster (basemap) data.
- Quick start kit (MXD and QGS files) with all the essential stylized layers.

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<https://earthexplorer.usgs.gov/>

3. USGS Earth Explorer

For satellite and aerial imagery, the USGS Earth Explorer is one of the largest free sources of data. The best part? It is possible to download data **outside of the United States** too.

A friendly user-interface makes accessing remote sensing data simple. In fact, it even has a bulk download application if it is needed to be downloaded more than one data sets.

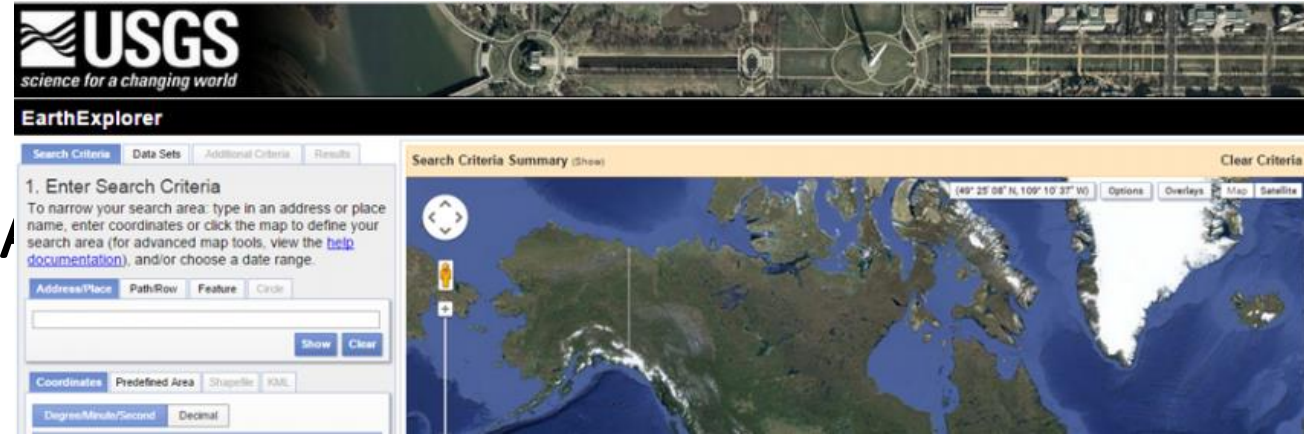
Registration is free. For other satellite data providers, here is a list of 15 free satellite imagery sources:

<https://gisgeography.com/free-satellite-imagery-data-list/>

(Sentinel-2 has 10-meter resolution in red, green, blue and near-infrared.)

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<https://earthexplorer.usgs.gov/>

3. USGS Earth Explorer

Advantages

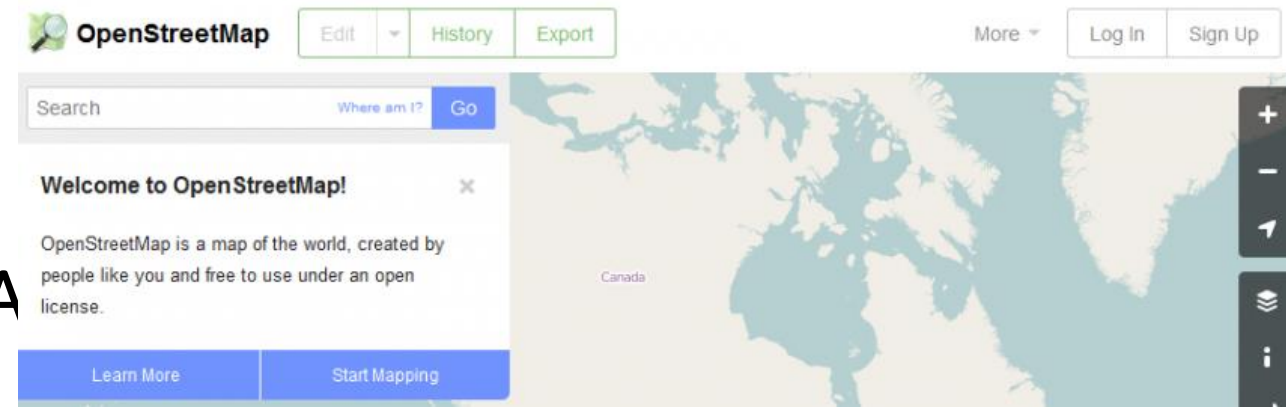
- Satellite imagery is worldwide and not just within the United States
- User interface is state-of-the-art with easy-to-use filters

Data Types

- Landsat, Sentinel-2 and land cover
- Digital Elevation Models such as NASA's ASTER and SRTM

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<https://gisgeography.com/openstreetmap-download-osm-data/>

4. OpenStreetMap (OSM)

GIS users are harnessing the power of OSM as a means to crowdsource data. The result of crowd-sourcing is highly detailed data. But it is detailed with cautious optimism.

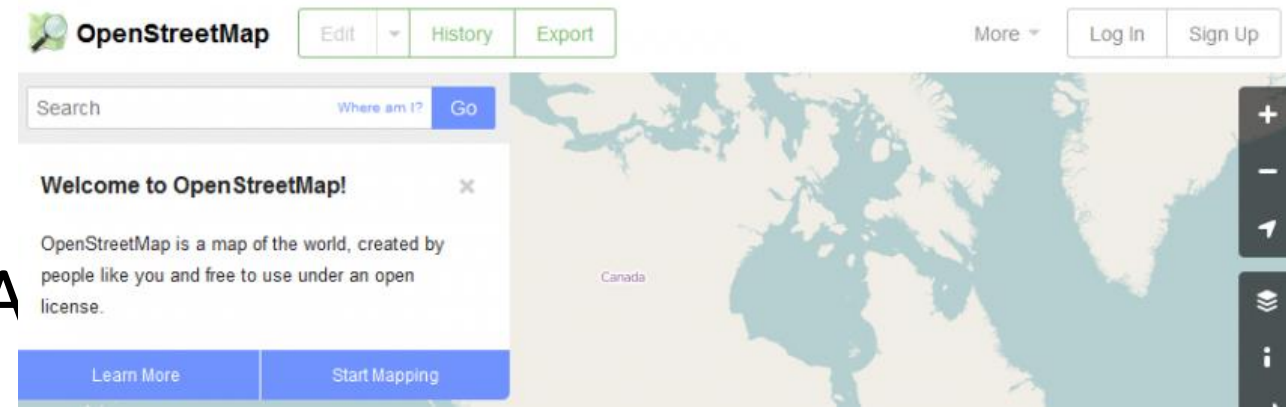
While OSM is open to the public, it's also created by the public. So this means that accuracy varies based on the creator.

For GIS analysts seeking free GIS data at a street level, OSM is exactly what they are looking for. For example, it may be the **biggest inventory of buildings** in the world.

How much data is being created every second into OpenStreetMap? There's a map for that – OSM Show Me The Way: <http://osmlab.github.io/show-me-the-way/>

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<https://gisgeography.com/openstreetmap-download-osm-data/>

4. OpenStreetMap (OSM)

Advantages

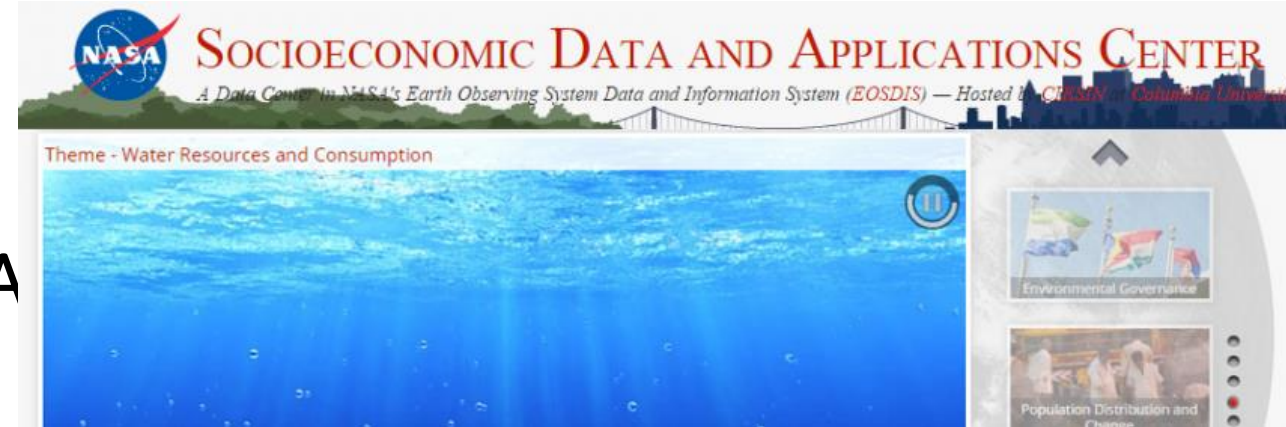
- Highly detailed free GIS data with different levels of accuracy and completeness

Data Types

- High spatial resolution cultural vector data such as buildings, roads, waterways.

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<https://sedac.ciesin.columbia.edu/>

5. NASA's Socioeconomic Data and Applications Center (SEDAC)

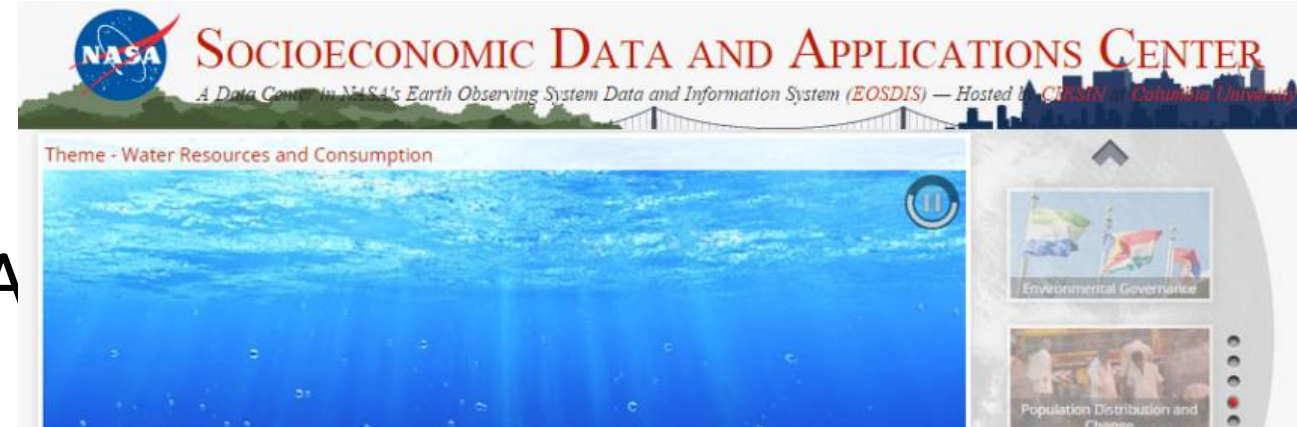
NASA's Socioeconomic Data and Applications Center (SEDAC) shows human interactions with the environment. SEDAC has a wide variety of coarse global free GIS data.

For example, their flagship data product is a **gridded population** of the world. With 800+ citations, it includes population characteristics such as age, education and density. And the global urban and local populations extents comes from night time lights

The SEDAC map viewer is good because it can be selected GIS thematic maps of the socioeconomic data. If the assemble data is needed, there's that option too.

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<https://sedac.ciesin.columbia.edu/>

5. NASA's Socioeconomic Data and Applications Center (SEDAC)

Advantages

- Flagship data is its gridded population of the world.
- Global socioeconomic data comes from 15 different themes.

Data Types

- Socioeconomic data includes a range of topics such as agriculture, climate and health.

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<https://portal.opentopography.org/datasets>

6. Open Topography

It provides a portal to high spatial resolution topographic data and tools. In particular, it houses LiDAR Data, which is a rare, precious resource nowadays.

<https://gisgeography.com/lidar-light-detection-and-ranging/>

Currently, Open Topography has collected **300 high resolution datasets**. Most are point clouds. Some are just available in raster format. Their data map shows most available data is in the United States. But data is also available in Europe, Asia and Australia too.

If you can't find LiDAR data for your area of interest, the next best thing is a global DEM.

<https://gisgeography.com/free-global-dem-data-sources/>

LIDAR (Light Detection And Ranging, také LADAR) je **metoda dálkového měření vzdálenosti na základě výpočtu doby šíření pulsu laserového paprsku odraženého od snímaného objektu**. Obvykle se využívá spektra 1064–1540 nm, pro batymetrická měření cca 530 nm.

Radar i lidar slouží k měření vzdálenosti objektů.

Zatímco radar pro tyto účely používá elektromagnetické záření, konkrétně rádiové vlny, lidar využívá laserový paprsek. Jedná o stejný princip, který používá sonar, ovšem s tím rozdílem, že sonar (SOund Navigation And Ranging) využívá pro stejný účel ultrazvukové vlny.

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<https://portal.opentopography.org/datasets>

6. Open Topography

Advantages

- Select regions in the world and search available LiDAR data.

Data Types

- LiDAR (90% in United States, Canada, Australia, Brazil, Haiti, Mexico and Puerto Rico)
- If LiDAR is unavailable, coarse global DEMs are available for download.

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<http://geodata.grid.unep.ch/>

7. UNEP Environmental Data Explorer

It is the authoritative source for UN data. For example, it holds more than **500 variables** such as freshwater, climate and health.

It is a bit difficult to explore the GIS data because the interfaces takes awhile to get used to. But clicking advanced, it can be filtered “Geospatial Data Sets”. From here, you can download free GIS data like climate, disasters and ecosystems.

UNEP is U.N. Environmental program.

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<http://geodata.grid.unep.ch/>

7. UNEP Environmental Data Explorer

Advantages

- Spatial and non-spatial data on a variety of themes.
- Display maps, graphs and tables on-the-fly.

Data Types

- Themes include population, forests, emissions, disasters and GDP (gross domestic product) for spatial and non-spatial data.

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<https://neo.sci.gsfc.nasa.gov/>

8. NASA Earth Observations (NEO)

Imagine seeing daily snapshots of climate and environmental conditions of Earth. It is like a real-time climate snapshot of the world.

NEO focuses on 5 themes with **50+ global datasets**, mostly climate-related. For example, data ranges from aerosols, chlorophyll to sea surface temperature. All are free GIS data sets that can be downloaded in JPEG, GeoTIFF and Google Earth formats.

If there is not enough data, it can be found a whole list of 7 free world climate data sources:

<https://gisgeography.com/free-world-climate-data-sources/>

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<https://neo.sci.gsfc.nasa.gov/>

8. NASA Earth Observations (NEO)

Advantages

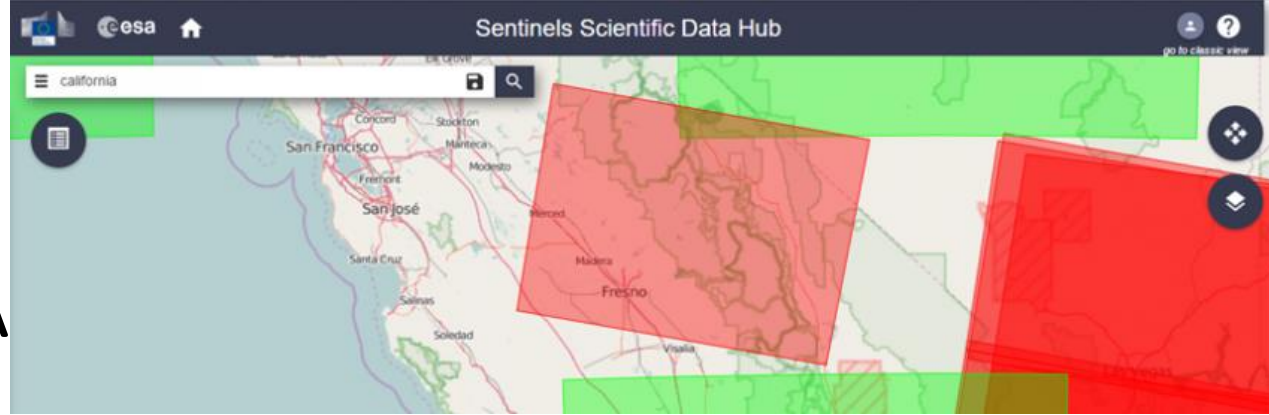
- Constant updates ensuring timely climate information of our globe.
- Accessible in a variety of GIS formats.

Data Types

- All raster grids are atmosphere, energy, land, life and ocean GIS data.

GISGEOGRAPHY.COM

12 FREE GIS DATA SOURCES: BEST GLOBAL RASTER AND VECTOR DATASETS [2020]



<https://scihub.copernicus.eu/dhus/#/home>

9. Sentinel Satellite Data

Sentinel-2 is the highest resolution satellite imagery available to the public for free. Its interface is the Copernicus Open Access Hub.

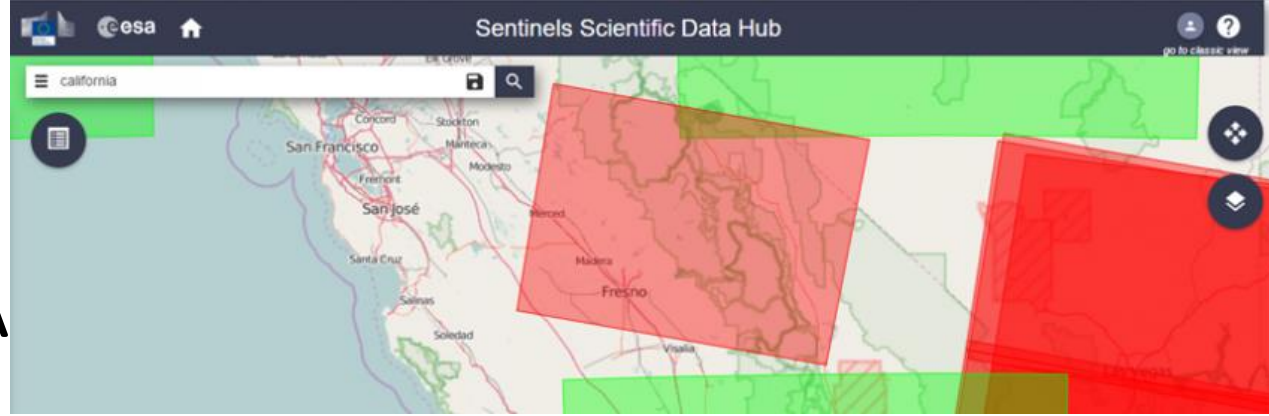
First, an account is needed after registration. Next, the area of interest can be selected by right-clicking on the map. Finally, the S2A or S2B product can be selected and downloaded.

The Copernicus Open Access Hub also stores Sentinel-1 which is [synthetic aperture radar](#).

READ MORE: How to Download Sentinel Satellite Data for Free - <https://gisgeography.com/how-to-download-sentinel-satellite-data/>

GISGEOGRAPHY.COM

12 FREE GIS DATA SOURCES: BEST GLOBAL RASTER AND VECTOR DATASETS [2020]



<https://scihub.copernicus.eu/dhus/#/home>

9. Sentinel Satellite Data

Advantages

- 10-meter resolution satellite data readily available.
- Sentinel 2 data has 13 spectral bands including red, green, blue, near-infrared

Data Types

- Raster data – 13 channels from Sentinel-2.
- Synthetic aperture radar from Sentinel-1.

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10. Terra Populus

Terra Populus (TerraPop for short) integrates census data from over 160 countries around the world. In fact, it spans up to six decades for household-level and aggregate data for more than 80 countries.

The unique thing about it is how you can explore **temporal and spatial changes**. It's not only for researches. But everyone can access changes in the human-environment system for geographic space.

TerraPop also includes your basic land cover, land use, and climate data. It's supported by the National Science Foundation and the University of Minnesota. Even now, updates keep rolling out.

Select Desired Data Output Type

Microdata Output characteristics of individual people with attached contextual variables derived from area-level and/or raster data Read more	Start Extract
Area-level Output characteristics of geographic units including aggregate population data and/or summaries from raster data Read more	Start Extract
Raster Data Output data in spatial grids potentially derived from area-level data Read more	Start Extract



<https://www.terrapop.org>

12 FREE GIS DATA SOURCES: BEST GLOBAL RASTER AND VECTOR DATASETS [2020]

10. Terra Populus

Advantages

- User-friendly interface with customized temporal data delivery.

Data Types

- Micro and environmental data describing land cover, land use, and climate.

Select Desired Data Output Type

Microdata Output
characteristics of individual people with attached contextual variables derived from area-level and/or raster data
[Read more](#) [Start Extract](#)

Area-level Output
characteristics of geographic units including aggregate population data and/or summaries from raster data
[Read more](#) [Start Extract](#)

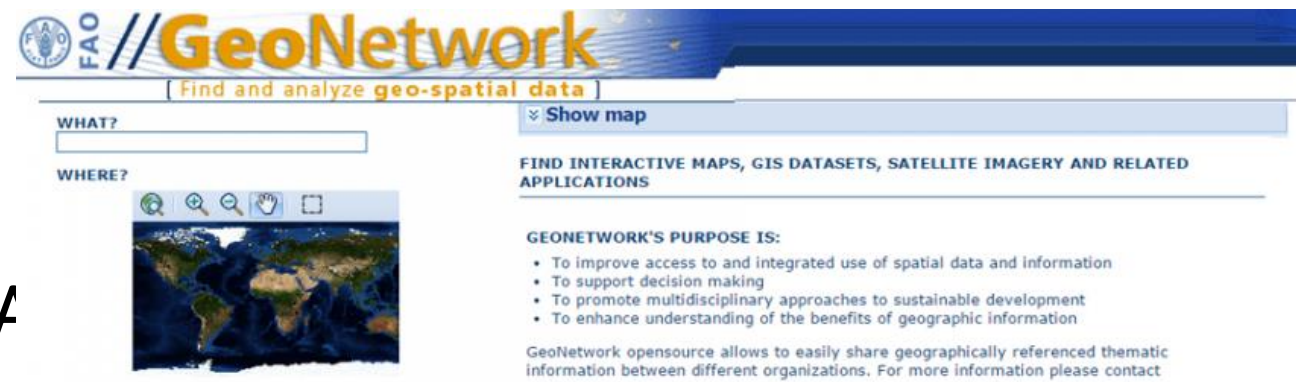
Raster Data Output
data in spatial grids potentially derived from area-level data
[Read more](#) [Start Extract](#)



<https://www.terrapop.org>

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<http://www.fao.org/geonetwork/srv/en/main.home>

11. FAO GeoNetwork

This one is the FAO GeoNetwork which is another portal of free GIS data from the United Nations.

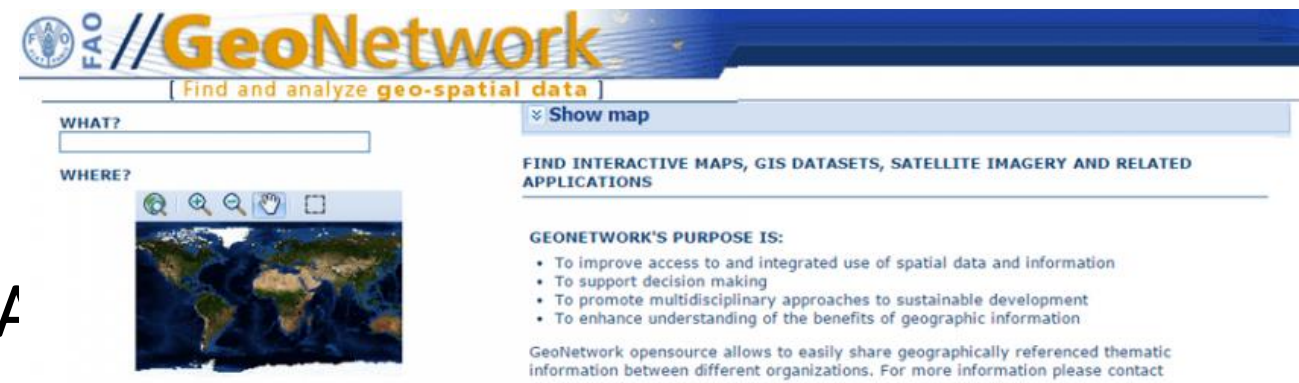
The focus of GeoNetwork is to improve **global sustainable development**. For example, global agriculture, food security and fisheries are some of its key free GIS data.

FAO produces a large number of GIS datasets for monitoring, assessment and analysis of environmental and socio-economic factors causing poverty and food insecurity.

FAO – Food and Agriculture Organization of the United Nations

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<http://www.fao.org/geonetwork/srv/en/main.home>

11. FAO GeoNetwork

Advantages

- Search wide range of categories and filter by country.

Data Types

- Agriculture, fisheries, land resource GIS data.

GISGEOGRAPHY.COM

12 FREE GIS DATA SOURCES: BEST GLOBAL RASTER AND VECTOR DATASETS [2020]



<https://globalmaps.github.io/>

12. ISCGM Global Map

Unfortunately, the International Steering Committee for Global Mapping (ISCGM) portal no longer exists. But that doesn't mean the data is gone forever. That's because ISCGM archived their data to the [Global Map Github](https://globalmaps.github.io/).

Global Map still packs some serious punch with their free GIS data. For example, global land cover and percent tree cover are the two key datasets here. But that's not all. It has cultural and natural vector datasets in here too.

Since the move, registration is no longer required. Despite the lack of updates, ISCGM free GIS data is still a source that many of us can use in our maps.

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12 FREE GIS DATA SOURCES: BEST GLOBE RASTER AND VECTOR DATASETS [2020]



<https://globalmaps.github.io/>

12. ISCGM Global Map

Advantages

- Download global land cover and tree prevent by selecting map tiles.

Data Types

- Boundaries, drainage, transportation, population centers, elevation, land cover, land use and vegetation.

GISGEOGRAPHY.COM

In a perfect world, you'd be able to find all the **free GIS data** you need in a single website. Of course, it would have to be free, downloadable from an authoritative source.

But well, you know the drill. The world's not perfect, life's not fair.

More Free GIS Data

Here are more free GIS data sources to superpower your maps:

- 15 Free Satellite Imagery Data Sources
• <https://gisgeography.com/free-satellite-imagery-data-list/>
- Free Global DEM Data Sources – Digital Elevation Models
• <https://gisgeography.com/free-global-dem-data-sources/>
- Top 6 Free LiDAR Data Sources
• <https://gisgeography.com/top-6-free-lidar-data-sources/>

BUT

U.N. GGIM is missing

(next lectures)

EU Efforts

COPERNICUS and INSPIRE



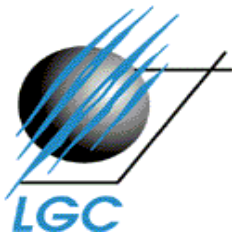
COPERNICUS (GMES) and INSPIRE: from beginning to valuable services

Milan KONECNY

Masaryk University Brno, CZ

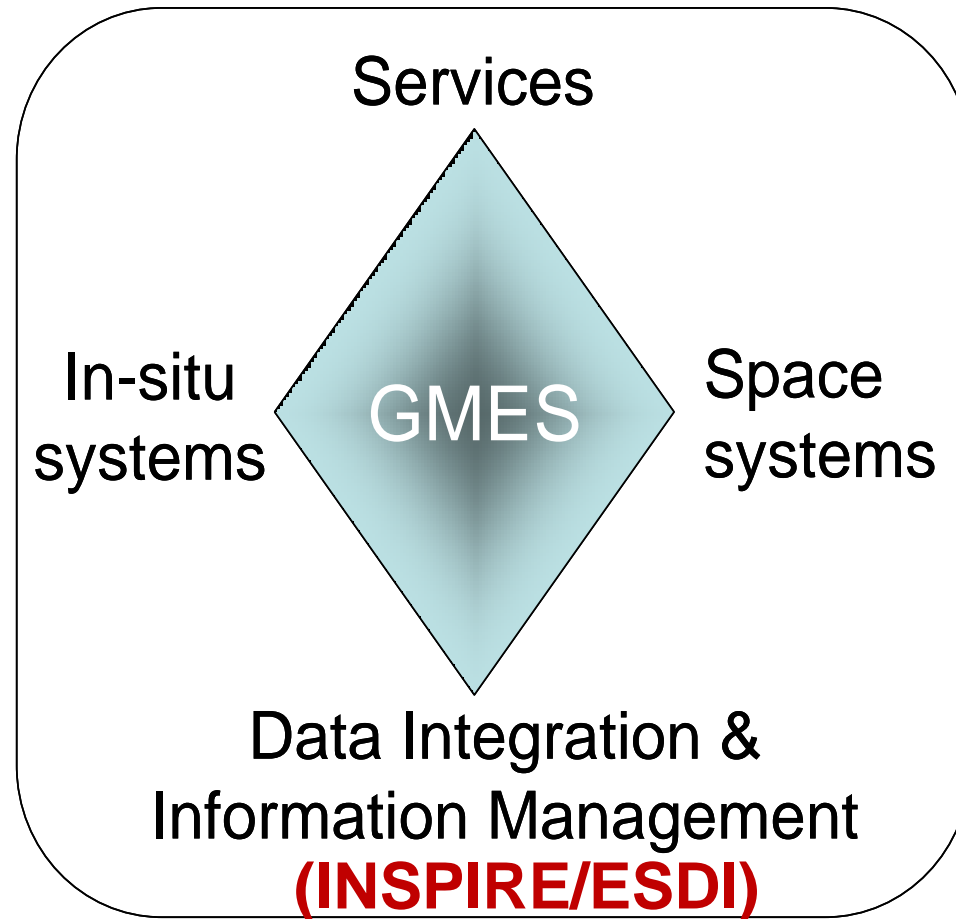
President (past) ICA, Vice-President, ISDE

konecny@geogr.muni.cz



Brno, October 8, 2020

Global Monitoring for Environment and Security





INSPIRE

Infrastructure for Spatial Information in Europe

COPERNICUS-GMES (Global Monitoring for Environment and Security) is a European initiative for the implementation of information services dealing with environment and security.

GMES is based on observation data received from Earth Observation satellites and ground based information. These data will be coordinated, analysed and prepared for end-users.

Through GMES the state of our environment and its short, medium and long-term evolution will be monitored to support policy decisions or investments.

GMES is a set of services for European citizens helping to improve their quality of life regarding environment and security.

GMES is built up gradually: it starts with a pilot phase which targets the availability of a first set of operational GMES services by 2008 followed by the development of an extended range of services which meet user requirements.

2. How did it start?

Years of research in the fields of science and technology associated with observation and understanding of the processes and phenomena of the terrestrial environment led in 1998 to the idea to launch GMES.

By a combination of measurements at terrestrial level and from space, it rapidly became clear that new operational services could be offered in fields such as **oceanography, precise mapping of land use, rapid mapping at times of emergency for the civil protection field or air quality monitoring.**

The progressive implementation of GMES is made possible by the activities and investments of European Union and ESA Member States. These and other public and private contributions are jointly supported by the European Commission (EC) and the European Space Agency (ESA).

3. To whom is it addressed?

GMES is the European solution to respond to the needs of citizens in Europe to access reliable information on the status of their environment.

GMES will mainly support decision-making by both institutional and private actors. Decisions could concern either new regulations to preserve our environment or urgent measures in case of a natural or man-made catastrophes (i.e. floods, forest fires, water pollution).

But to take decisions, it is necessary to **anticipate, intervene and control.**

WHAT SERVICES WILL BE PROVIDED?

The services provided by GMES can be classified in ***three major categories:***

Mapping, including topography or road maps but also land-use and harvest, forestry monitoring, mineral and water resources that do contribute to short and long-term management of territories and natural resources. This service generally requires exhaustive coverage of the Earth surface, archiving and periodic updating of data.

Support for emergency management in case of natural hazards and particularly civil protection institutions responsible for the security of people and property. This service concentrates on the provision of the latest possible data before intervening.

Forecasting is applied for marine zones, air quality or crop yields. This service systematically provides data on extended areas permitting the prediction of short, medium or long-term events, including their modelling and evolution.

The widespread and regular availability of technical data within GMES will allow a more efficient use of the infrastructures and human resources. It will help the creation of new models for security and risk management, as well as better management of land and resources.

COPERNICUS

is the European participation in the **worldwide** monitoring and management of our planet Earth and the European contribution to the Group on Earth Observation (GEO). The global community acts together for a synergy of all techniques of observation, detection and analysis.

GEO and GEOSS

At the World Summit on Earth Observation in Washington in July 2003, the Group on Earth Observations (GEO) was established, with the goal of addressing the information requirement for the environment on a global scale.

This work was completed in Brussels in February 2005 by the adoption of a 10 year implementation plan of an integrated Global Earth Observation System of Systems (GEOSS).

The GEOSS

is an ambitious programme of information for ecological security and durable development intended for mankind.

It principally foresees the monitoring and *understanding of nature, the extent of disasters due to human activities*, the impact of global warming, desertification, erosion and deforestation.

GMES will be the main European contribution to GEOSS.