

Annual Review 2021

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More Than Maps

An infrastructure for modern society

EuroGeographics is proud to represent Europe's National Mapping, Cadastral and Land Registration Authorities. As a unique international not-for-profit association, we work in partnership with our members to facilitate access to their trusted, authoritative information for the benefit of society.

Today, our members provide much more than traditional maps, and use their extensive technical experience to play a vital role in joining-up information from different sources using location. Whether it's geospatial or land information, their high-quality data and services underpin the infrastructures we rely on as a modern society.

In an ever-connected world, you probably use their data and services around 40 times every day – often from your phone: From step-counting health apps to travelling by public transport, emergency response, to buying and registering a home.

By working with members to integrate their data into a sustainable infrastructure for the public good, our vision is to support a society empowered by the use of official, trusted geospatial services.



VISIT OUR WEBSITE
<https://eurogeographics.org/>

Connecting you to maps, geospatial and land information for europe

#MAPSFOREUROPE

60+ **members** from the whole of geographical Europe

EUROGEOGRAPHICS ACTIVITIES

Well-established network for sharing knowledge, expertise and access to data



Sharing experiences and best practice



Representing our members interests



Fostering use and re-use of public sector geo-information

MAPS, CADASTRE, AND MORE

Our members provide data to help protect people, the planet and so much more



Environmental monitoring & management



Real-time data for pandemic response



Smarter, sustainable agriculture



Cleaner, safer, intelligent transport



Emergency responses



Aerial survey

TRUST & RELIABILITY

Our members empower society with trusted geospatial services



Trusted daily everywhere for secure ownership transactions, diligent policy elaboration and monitoring



Relied on by European institutions and UN, governments, businesses and citizens



Registered on the EU Transparency Register and bound by its code of conduct

President's Report

Connections are at the heart of EuroGeographics.

Whether sharing knowledge, expertise or access to data, our well-established and ever-growing network connects members, policymakers, and users for the benefit of people across Europe.

In the past year, we welcomed the French General Directorate Cadastral Bureau as an Associate Member, reaffirmed our partnership with the European Environment Agency (EEA) and continued to work with Eurostat to deliver members' information to the European Commission. We also marked the first step in realising the potential of members geospatial open data with the launch of the first Open Maps For Europe datasets.

By working together to deliver pan-European data, our members are demonstrating not only what can be achieved through Europe-wide cooperation, but also the benefits that result for the wider public good, specifically in support of policy decision-making at the European level.

Connecting information and action

Location is a powerful tool – it tells us where things happen but also provides the link between information and action.

Reliable geospatial data is therefore crucial for reconnecting post-pandemic, and as national sources of map, cadastral and land registration information, our members have a key role to play in Europe's resilience and recovery programme.

Trusted, transparent and interoperable public sector information based on fundamental rights and common values are key building blocks for a wide range of policies, including the EU's Digital Decade and Green Deal, intelligent transport systems, and meeting the United Nation's 2030 Agenda.

These are key issues that extend beyond national boundaries but whatever the challenge, those making difficult decisions can count on us to provide the most accurate and up to date information available.

We are a community used to constant and far-reaching change. Our agility is demonstrated not only in our ability to swiftly refocus our operations to meet user needs, but also in the way we have embraced new technologies, such as artificial intelligence, application programming interfaces (APIs), crowdsourcing and automation.

Connecting information to create data infrastructures

EuroGeographics continues to work with its members to foster recognition of the value of location data. We also help governments to commit to creating appropriate data infrastructures to propel us all to a sustainable, safer and fairer world.

The data and technology are available, what we now need is a commitment from members, government, and indeed society as a whole to fund open and interoperable data. By investing in its collection, management, coordination and intelligent use, the power of location data can be leveraged for the benefit of all.

As the official national sources of map, cadastral and land information, our members' data is fundamental to the everyday lives of people across Europe. This review contains many examples of the ways in which they are unlocking the value of official geospatial information to represent our world accurately and intuitively. I hope you find them informative and inspiring.

On a final note, I should like to thank everyone who has contributed to the Association's activities in the past year. Whether as a member organisation, a member of the Management Board or Head Office, or a stakeholder, our extensive network and passion for cooperation remains the key strength of the EuroGeographics' community.

Colin Bray

President, EuroGeographics



Secretary General & Executive Director's Report

In uncertain times, authoritative map, cadastral and land registration information provides certainty to those responsible for making critical decisions.

As a community, we strive for the common good by using our collective expertise to deliver trusted geospatial data that provides context and clarity to information about people and places. This dedication empowers society and helps decision-makers to build economic and social stability in times of major challenges. For example, geospatial data contributes to emergency responses to natural disasters, humanitarian relief, and pandemic management.

Connecting policies to serve the public good and for recovery and resilience

Interoperability, security, reliability, accessibility, and transparency are the key strengths our members bring to post-Covid recovery and resilience. As early pioneers in data interoperability, our members have wide-ranging experience in solving a wide range of challenges to create datasets and solutions beyond borders.

Our knowledge exchange network means we are uniquely placed to facilitate coordination, collaboration, and communication to help strengthen the global geospatial infrastructure.

At the 11th Session of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM), we reaffirmed our support for the UN Integrated Geospatial Information Framework (IGIF), Sustainable Development Goals (SDGs) Geospatial Roadmap, the Global Geodetic Reference Frame, and the Framework for

Effective Land Administration (FELA). Our words are matched by a commitment to take action by sharing members' knowledge with the broader geospatial community.

Connecting users with authoritative geospatial data

Demand for geospatial information will continue to grow into the next decade, and our members are committed to meeting this need and to adding even more value through the provision of high-quality data.

For example, to meet end user requirements regarding data content and quality, Copernicus Services need access to open, up-to-date, and harmonised geospatial information across Europe. Our partnership with the EEA will increase the number of official national geospatial datasets available via the Copernicus Reference Access Data (CORDA) gateway. By streamlining the licensing process, it will also facilitate their use in services such as Land Monitoring, Emergency Management and Security.

Together with our members, we provide the only interoperable pan-European datasets created using official geospatial data. These include open data released through the Open Maps for Europe interface for discovering, viewing, licensing, and downloading open datasets. The project unlocks the value of official geospatial information to support a wide range of policies including the Open Data Directive.

Some 1,000 users have accessed the datasets, which include topographic and height data, imagery, and an Open Gazetteer service. All are available under a single open data licence to ensure a level playing field for all users and will also be discoverable and available via the European Data Portal.

Open Maps for Europe is coordinated by EuroGeographics in partnership with the National Geographic Institute (NGI) Belgium and co-financed by the Connecting Europe Facility of the European Union.

Connecting the European National Mapping, Cadastral and Land Registration Authorities

More than ever, the spirit of collaboration and cooperation at the heart of EuroGeographics is what makes us stronger. Whatever the future may bring, we can count on these special relationships and connections – and society can count on us to deliver data that is fundamental to everyday life and work together to address key issues, such as climate change, migration, security, and health.

Lea Bodossian
Secretary General and Executive Director
EuroGeographics



Highlights 2021



Facilitating access to members data

In the European Commission and its agencies



Delivering Open Maps for Europe to support Open Data and Re-Use of Public Sector Information.



Providing data for policy making, monitoring and measurement.



Meeting current and future user requirements to keep official geospatial data relevant.

EuroBoundaryMap used within the European Commission through our agreement with Eurostat



55

Official administrative boundaries

39

from 39 data producers

*according to ISO country code and Kosovo

Cooperation with the European Environment Agency (EEA) through a partnership with e-GEOS

Contributing to improved provision of Copernicus In situ data:

- Increases number of official national geospatial datasets available via the Copernicus Reference Access Data gateway.
- Facilitates use in services such as Land Monitoring, Emergency Management and Security.
- Streamlines licensing process.

“To meet end user requirements regarding data content and quality, Copernicus Services need access to open, up-to-date, and harmonised geospatial information across Europe. Data produced by the members of EuroGeographics is therefore key to its success.”

Henrik Steen Andersen
Project Manager Copernicus In Situ Component, European Environment Agency



Fostering use of European geospatial data

Six pan-European datasets developed through our unique data integration process in collaboration with:

45 Data Producers

Data Production Management



National Institute of Geographic and Forest Information (IGN) France



Federal Agency for Cartography and Geodesy

Federal Agency for Cartography and Geodesy Germany (BKG)



Cadastre, Land Registry and Mapping Agency, The Netherlands (Kadaster)



2021 Data Producers Technical Meeting

Open Maps For Europe



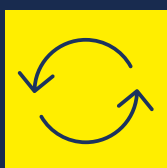
Making more data available



Removing integration costs from users



Reducing costs of data to increase its re-use



Improving re-usability of data from a technical perspective



Ensuring a level playing field for all reusers

Benefits of Open Maps For Europe for EuroGeographics members



Demonstrates role in delivering European policy

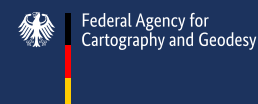


Promotes data beyond national borders



Lays foundations for future data development

Coordinated by EuroGeographics, partnered by National Geographic Institute (NGI) Belgium.



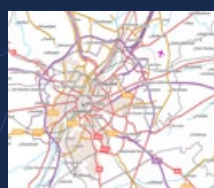
Supported by BKG Germany, General Directorate for the Cadastre Spain, NGI Belgium, IGN France and Registers of Scotland and all members who provided data for the first release.



Co-financed by the Connecting Europe Facility of the European Union



FIRST OPEN DATASETS RELEASED AT
www.mapsforeurope.org

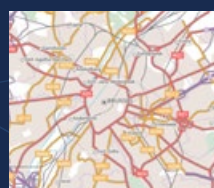


EuroRegional Map

1:250 000

Multi-theme

Open Data



EuroGlobalMap

1:1 million

Multi-theme

Open Data

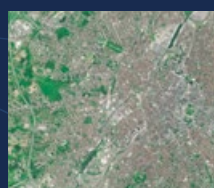


EuroDEM

1:100 000

Elevation Model

Open Data



Pan-European Imagery

Available 2022

Open Data

Provided by BKG from Copernicus Earth Observation



Open Gazetteer

Available 2022

Open Data

Authoritative multilingual names

Ensuring that members roles, capabilities and concerns are understood globally

In the United Nations by:

- > Observer organisation at the UN-GGIM Committee of Experts
- > Observer on the UN-GGIM Europe Executive Committee
- > Continue to provide and fund UN-GGIM: Europe Secretariat through a Service Level Agreement with The Netherlands Cadastre, Land Registry and Mapping Agency

11th Session of UN-GGIM Committee of Experts

Interventions highlighted members contributions and important role of members authoritative geospatial information

Offered support for:

- > Implementation of the UN Integrated Geospatial Information Framework (IGIF).
- > The Sustainable Development Goals (SDGs) Geospatial Roadmap.
- > The Global Geodetic Reference Frame.
- > The Framework for Effective Land Administration (FELA).

Welcomed:

- > Federated approach for the Centre of Excellence in Germany.
- > Vision to see geospatial and location-based information being recognised and accepted as official data for the SDGs and their global indicators.
- > Collaborative progress made by the United Nations Group of Experts on Geographical Names.

Participated in:

- > UN-GGIM: Global Geodesy Forum – ‘The Power of Where: The Value of Geodesy to Society’
- > DGI Europe 2021, the leading global geospatial intelligence conference
- > 12th session of the Working Party on Land Administration
- > Cambridge Conference in Conversation: Applying Geospatial Information to Climate Challenges
- > 8th Plenary of UN-GGIM: Europe
- > UN-GGIM: Europe – ESS – UNECE Workshop
- > FIG e-Working Week 2021
- > UN Working Group on Policy and Legal Frameworks for Geospatial Information Management as an observer organisation
- > COP26 ‘Applying Geospatial Information to Climate Challenge’ briefing paper
- > Geospatial Information for Digital Transformation organised by the Norwegian Mapping Authority.



Knowledge exchange

Supporting members capacity building and development plans



Webinars



Events



KENs

- > Record participation in knowledge exchange activities – 1,760 total participants
- > Members-only webinar series
- > Continued to deliver an active programme for members at all levels
- > Knowledge Exchange Networks on Cadastre and Land Registry, Policy, Quality, and INSPIRE
- > Permanent Committee on Cadastre in the European Union Conferences (PCC) organised by Cadastre and Land Registry Knowledge Exchange Network together with the Portuguese and Slovenian PCC Presidencies.
- > Virtual workshop on Artificial Intelligence (AI) with EuroSDR
- > INSPIRE Knowledge Exchange Network webinar series on INSPIRE themes implementation
- > Knowledge Exchange Forums on State Boundaries of Europe and Positioning
- > EuroGeographics 2021 General Assembly attracted 130 senior participants from 55 member organisations for a unique knowledge exchange opportunity

Talking Heads programme

- > For Heads of the EuroGeographics member organisations
- > High-level strategic discussions
- > Chatham House Rules

Funding

- > Dedicated workshop with information on existing EU and non-EU funding
- > Specific landscape study to present guidance on existing funding
- > Specific working group

Case Studies provided by Members



Albania

Supporting sustainable land development in Albania

"About 80% of Central and Local Government decision-making directly affects the territory and having digital topographic maps helps tremendously in the planning, development and monitoring activities of many institutions in Albania."

Lorenc Çala

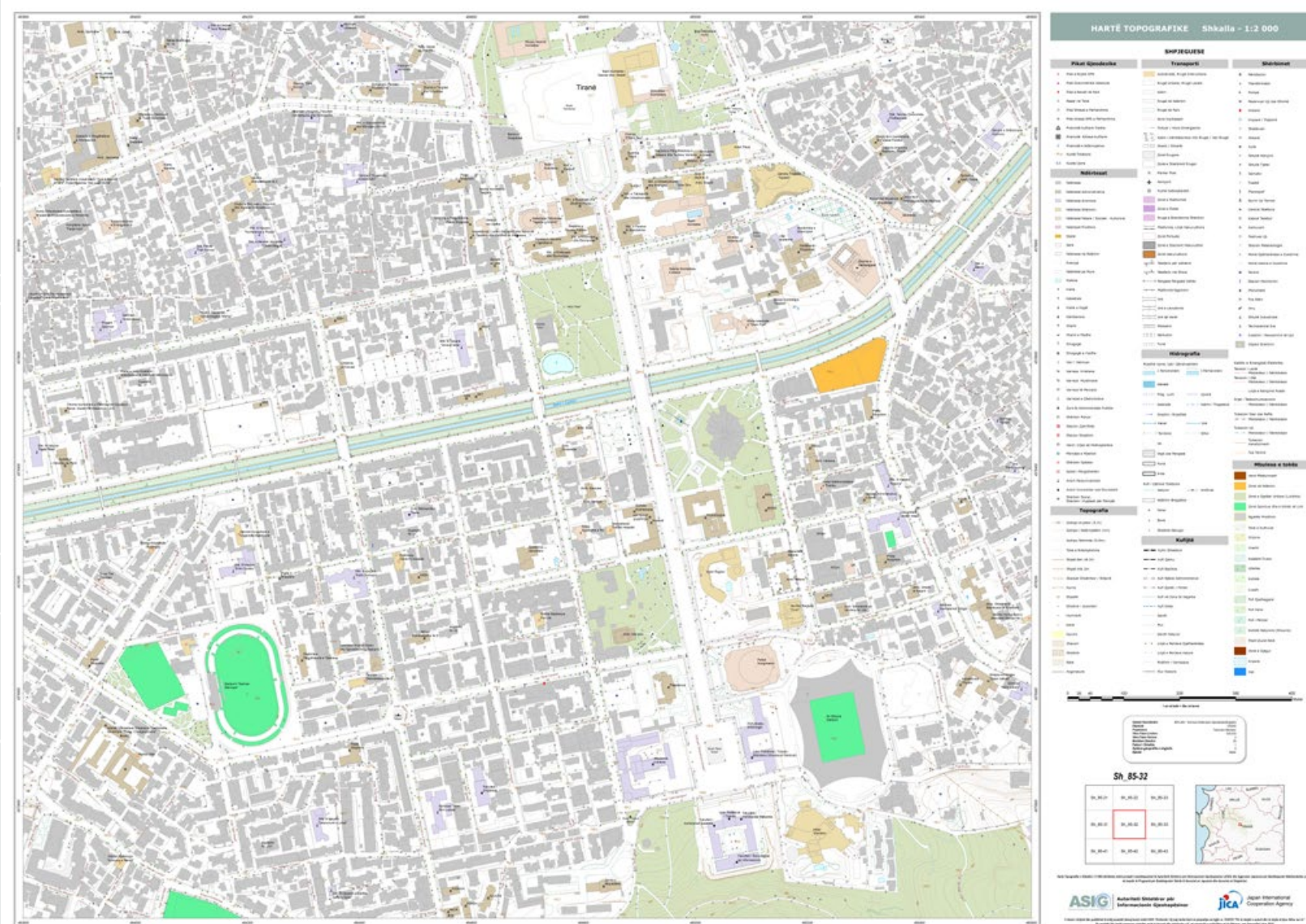
General Director, State Authority for Geospatial Information, Albania

Albania's State Authority for Geospatial Information (ASIG) has delivered a new topographic map to support sustainable land development in the Tirana-Durrës Area. Covering around about 300 km², the 1:2 000 scale digital map was part of a major project conducted with the Japan International Cooperation Agency (JICA).

The training and technology transfer has increased ASIG's capabilities for photogrammetry, accuracy and quality management, as well encouraging the use of geospatial information in the infrastructural and social development of the country.

All central and local public authorities that base their activity on geospatial information, such as ASIG, the public authorities responsible for geoinformation topics, municipalities and any other central and local institution that needs to use topographic maps, are benefitting from the data.

Following the completion of the project, Geospatial Information for Sustainable Land Development in the Tirana-Durres area in Republic of Albania, ASIG has started the preparation of the 1:2 000 scale base map into the western part of Albania.



Benefits

- Supports the development of the country's infrastructure based on the general development plan of Albania.
- Contributes to the implementation of development plans, feasibility studies, detailed projects, as well as environmental protection.
- Improves sustainable development in the context of economic growth, social infrastructure and living standards.
- Helps to understand the current situation and analyse trends for: Geographical features of the terrain, condition of infrastructure, condition of properties, general conditions along the coastal area and developments in urban areas.
- Helps in the rapid urbanisation of areas with irregular development due to demographic movement and rapid population growth in recent years in the Tirana-Durrës area.
- Promotes product use by government agencies, business companies and citizens.
- Provides analysis for gradual changes over time.
- Enables cartographic generalisation of maps, for example 1:5 000 and 1:10 000 scale, using the 1:2 000 scale topographic urban map.

Austria

Austrian geoportal uses FAIR principles to deliver open data

“We want to promote the further use and processing of our spatial data at both national and international level. After all, this results in a high benefit for the economy and society. This is why the BEV has created the necessary technical infrastructure with the portal data.bev.gv.at so that the data of the BEV can be used accordingly as open data.”

Wernher Hoffmann

President, Federal Office of Metrology and Surveying (BEV), Austria

Austria's groundbreaking new geoportal is enhancing access to data for all stakeholders by following the FAIR principles with standardised interfaces.

The geoportal at data.bev.gv.at has been developed by the Austrian Federal Office of Metrology and Surveying (BEV) to implement the legal framework on open data and re-use of public sector information.

It breaks new ground in different aspects and follows a distributed cloud strategy for the provision of BEV geospatial data. All data on the platform are published according to the Creative Commons CC-BY-4.0 licence with standardised formats and interfaces, which thoroughly support FAIR principles in a transparent way.

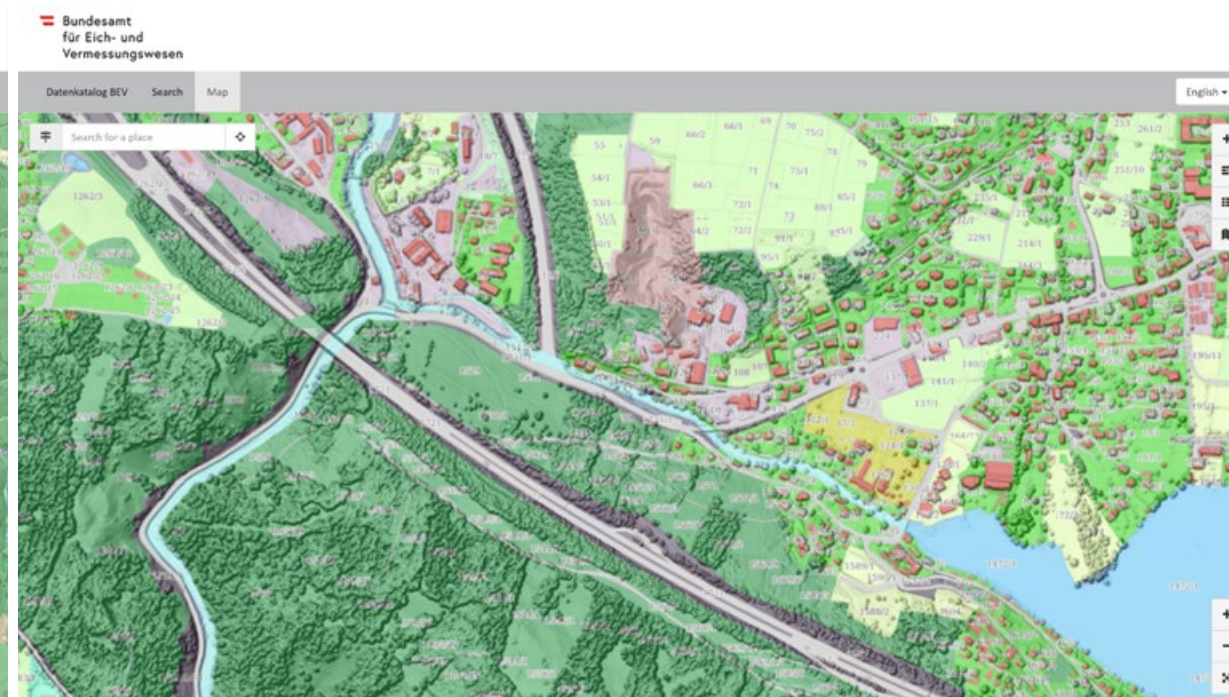
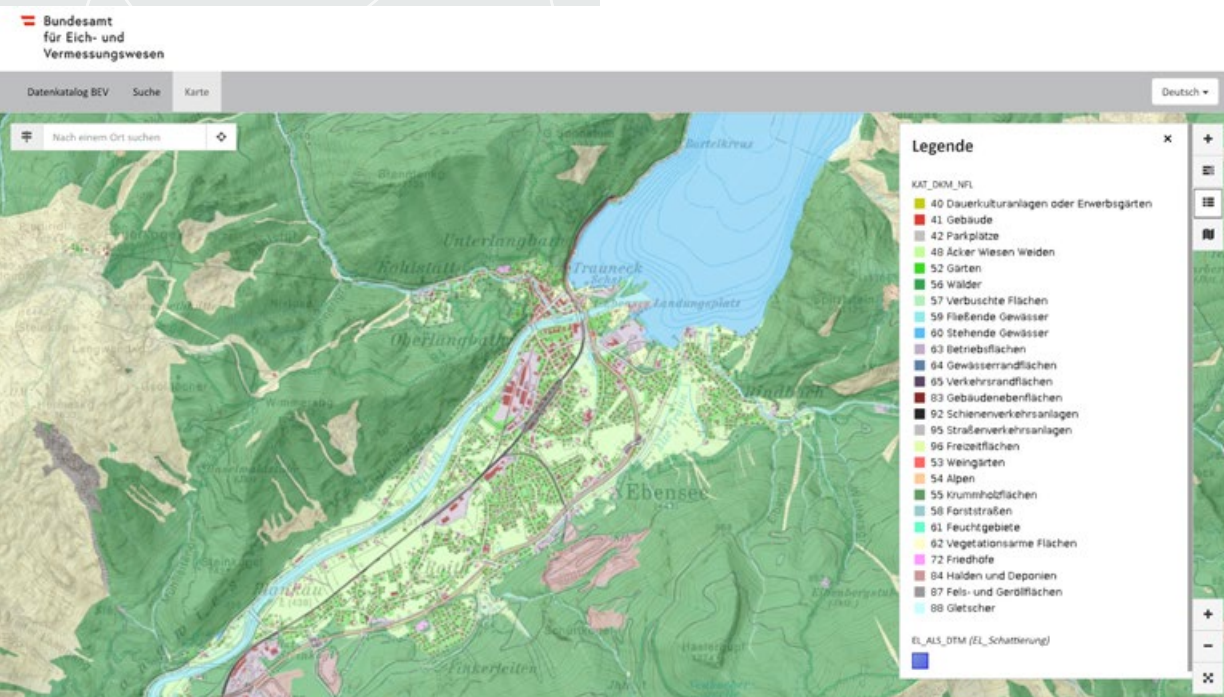
For the platform itself, the open source product Geonetwork enables a mutual interaction between the developing open source community and the requirements of BEV. For example, this resulted in an interface stabilisation of the DataCite connector for Digital Object Identifier (DOI). The DOI supports a semantic classification and correlation within the given metadata.



Visit the geoportal
data.bev.gv.at

Benefits

- Enhances security using the distributed cloud strategy and relieves the infrastructure from download peaks.
- Supports a common understanding of rights and obligations when using the data thanks to the Creative Commons CC-BY-4.0 licence which follows legal regulations.
- Increases economic efficiency by reducing duplication of effort through the mutual development of the geoportal software – common requirements are implemented once and may be adopted to varying needs of different stakeholders, which again are used by the whole community.
- Embedding of the DataCite DOI allows for a clear, transparent and sustainable addressing of datasets in an increasing data lake.



Bosnia and Herzegovina

Digital transformation of public land administration services in Federation of Bosnia and Herzegovina

“The dedicated and successful work on the establishment of digital, accurate and up to date property registers (real estate cadastre, land cadastre and land registry), address registers and sales price registers has attracted many stakeholders. By enabling continuous activities on data integration and interoperability, these significantly contribute to secured tenure rights, an efficient and transparent property market, the European Union (EU) accession and consequently to overall economic and social development and growth.”

Željko Obradović
Director, Federal
Administration
for Geodetic and Real
Property Affairs,
Bosnia and Herzegovina

Together with its partners, the Federal Administration for Geodetic and Real Property Affairs is playing a key role in delivering digital transformation in Bosnia and Herzegovina, including improving the land administration system and facilitating digital public services.

The establishment of accurate and up to date spatial data registers has attracted many stakeholders and enabled continuous activities on data integration and interoperability. Data and metadata standards, procedures, and policies are also used to promote coordination among national data.

By the end of 2021, more than 2 million land registry folios had been incorporated in the electronic land registry thanks to the systematic harmonisation of real estate data between the land registry and the cadastre. As a result of the project, funded by the World Bank, more than 57% of these folios are now based on the new cadastral survey as opposed to baseline of 30%. In addition, the digitisation of cadastral data has created the database of real estate cadastre (RECDB) which currently covers 72% of the Federation and, following the establishment of IT system used by local tax authorities and municipal staff, the Sales Price Register (SPR) data was published for public and other users with close to 65,000 individual transactions displayed publicly.

Benefits

- Provides online accessibility to all available cadastral and land registry data of the Federation.
- Establishes an up-to-date official Address database with full coverage expected by the end of 2023.
- Improves efficiency in the national land administration system through the exchange of data via web services with other governmental authorities and local government.
- Prevents duplication of data and issuing of incorrect data from unauthorised sources through the digital transformation and electronic provision of services
- Achieves integration and interoperability of data among different institutions to enable simplification of existing services and development of new modern customer-oriented services.



Croatia

Providing official geospatial data for disaster risk reduction assessment in Croatia

“Official cartography represents an indicator of statehood, while also being one of the top achievements of geodesy and cartography. The Republic of Croatia recognised this importance in realising the Croatian Topographic Map. Quality spatial data is also a basic precondition for adequate risk assessment, the development of prevention plans, and capacity building and risk response infrastructure.”

Damir Šantek

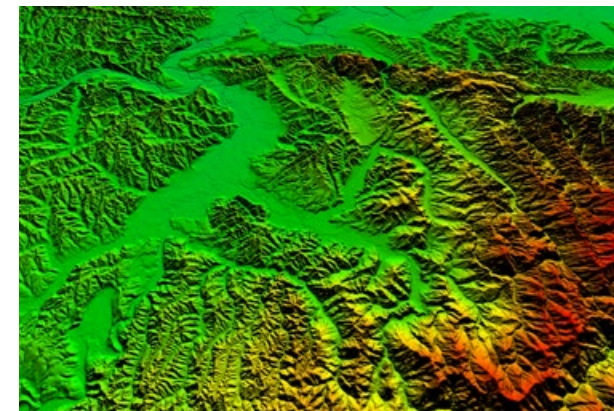
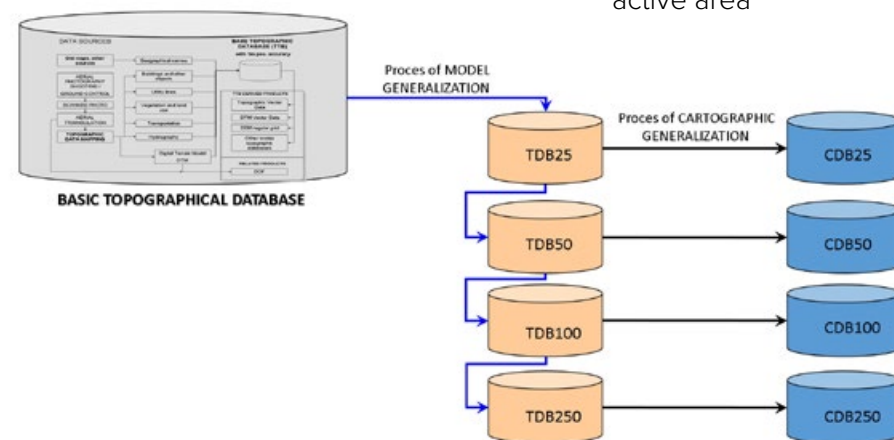
Director General,
State Geodetic Administration
of the Republic of Croatia

Following the establishment of an Official Topographic and Cartographic Information System (STOKIS), Croatia is now implementing multi-sensor aerial imaging for disaster risk reduction.

The EU-funded STOKIS project provides a basis for geoinformation systems of state authorities and public sector bodies. It was completed by entrusting the production of maps and spatial data to specialised private companies, whilst at the same time developing the technologies and digital ways of collecting topographic data. As a result, the focus has changed from standard representation to functionally linked spatial databases created from official geospatial information data.

The State Geodetic Administration, together with its partners – the Faculty of Geodesy, University of Zagreb, and the City of Zagreb – has signed the grant agreement for the ‘Multi-Sensor Aerial Imaging of the Republic of Croatia for Disaster Risk Reduction Assessment’ project.

Three main risks have been identified: floods, earthquakes, and open fires. The project will be completed by the end of 2023 and will deliver LiDAR scanning of the entire country which will also be used to produce a digital terrain model (DTM). The area of the City of Zagreb has been selected as a pilot area for developing a methodology for earthquake risk assessment due to the concentration of its population and economy and its location in an extremely seismically active area



Benefits

Official Topographic and Cartographic Information System (STOKIS)

- Provides preconditions for initiating cartographic production of official topographic maps at 1:25,000 scale (TK25), 1:50,000 scale (TK50), 1:100,000 scale (TK100) and 1:250,000 scale (TK250).
- Reduces costs at the global and local level in physical planning, waste management, crisis management, tourism promotion, threat prevention, etc.
- Eliminates errors in reporting (i.e. to the European Commission) that can occur using informal spatial information.
- Provides future users with modern and timely access to topographic and cartographic data of different resolutions through WMS and WFS services.

Multi-sensor aerial imaging for disaster risk reduction assessment project

- Delivering aerial photogrammetric imaging of the entire Republic of Croatia.
- Providing hyperspectral and thermal imaging of the corridors of the rivers Sava, Drava, Kupa and Danube.
- Developing a methodology for earthquake risk assessment in the Zagreb City pilot area that can be applied to other major cities.
- Producing a new DTM of higher accuracy, spatial resolution, and reliability than the existing model created using classical photogrammetric techniques.
- Providing high quality and accurate spatial data as the basis for preparing disaster risk analysis – primarily earthquakes and floods.
- Delivering data to all bodies and authorities in the disaster risk system via the WEB-GIS portal.

Denmark

Geodata Agency

Maintaining services and improving efficiency in Denmark despite challenges caused by Covid

“Activity in the real estate sector has been high in 2021, although society has been characterised by uncertainty and shutdowns. The employees at the Danish Geodata Agency (DGA) have not been hampered in their work during the shutdowns. They have worked just as efficiently as in other years, and by 2021 have registered more than 20,000 new properties whilst also maintaining our processing time thanks to new employees.”

Pia Dahl Højgaard
Director General,
Danish Geodata Agency (DGA)

The Danish Geodata Agency (DGA) registered more than 20,000 new properties in 2021 whilst also maintaining its processing time and improving efficiency.

Even though employees were forced to work at home due to the on-going pandemic, the Agency was able to meet demand through digitisation and by hiring more coworkers.

As a result, it has registered almost the same number of properties as in the years before the pandemic. The increased demand for housing due to a strong Danish economy and general sense of optimism is reflected in the DGA's work: When there is optimism, properties are subdivided, and when the economy stagnates, areas are transferred.

Benefits

- Continued to deliver business as usual despite challenges presented by Covid 19.
- Maintained levels of service and processing time.
- Put in place processes that enabled employees to work quickly and efficiently even from home.
- Continued to register properties in pace with demand.

Denmark

Agency for Data Supply and Efficiency (SDFE)

New portal provides data foundation for water management and climate adaptation in Denmark

“As providers of geospatial information, we support climate initiatives directly with data infrastructures and tools. In Denmark, we expect to see more flooding with excessive rain and high groundwater levels in the future. By providing better tools to assess where and how to act, the new data portal – HIPdata.dk – will support those who work professionally with water management.”

Kristian Møller

Director General, Agency for Data Supply and Efficiency (SDFE), Denmark

A new Danish portal anchored in the Agency for Data Supply and Efficiency (SDFE) is providing a data foundation for climate adaptation by enabling access to information and knowledge about water.

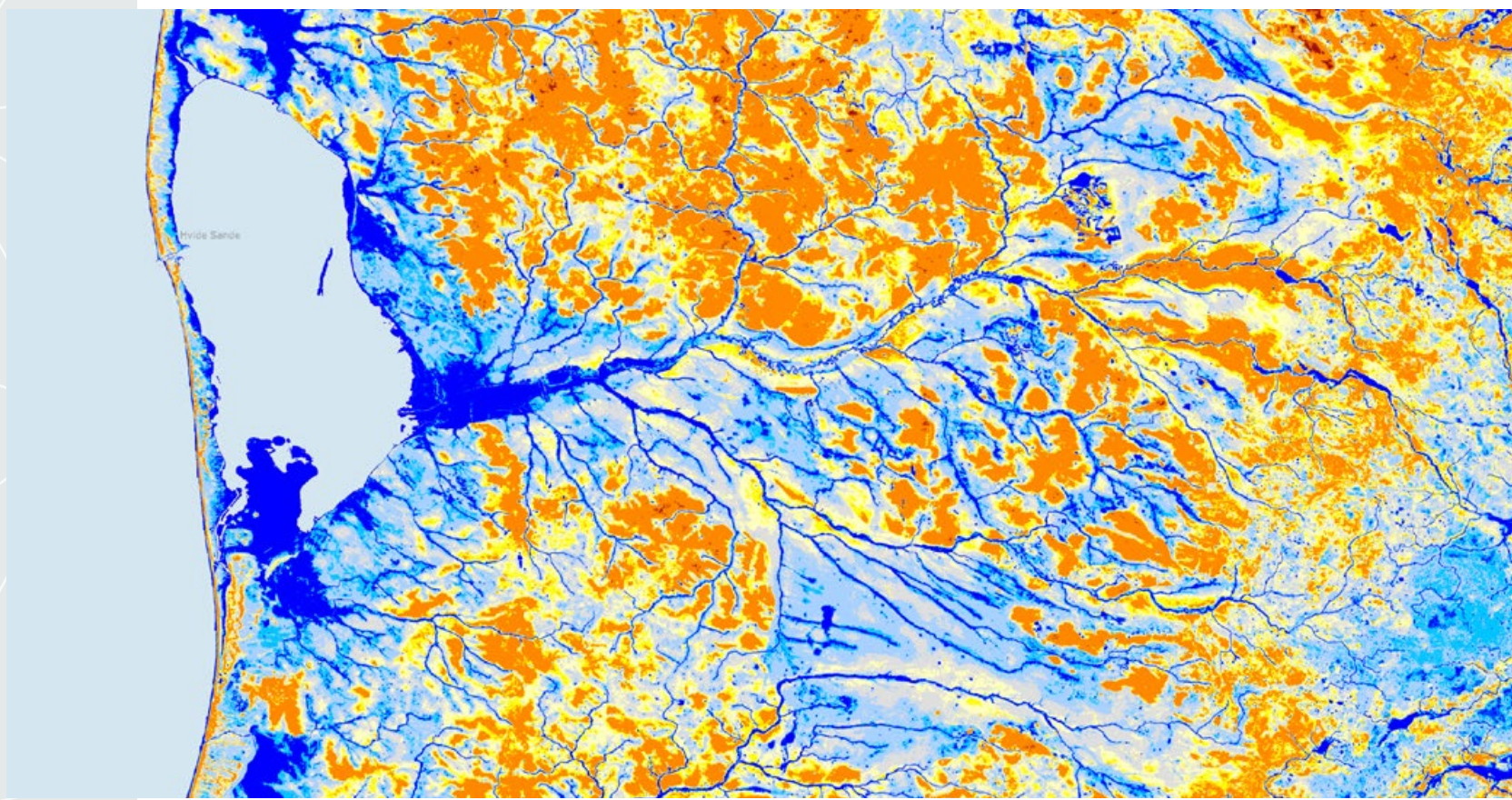
Created in a collaboration between the state, municipalities and regions under the Joint Public Digitalisation Strategy's initiative on Terrain, Climate and Water, the Hydrological Information and Prognosis System (HIP) is a common public geographical infrastructure based on open data services for the compilation and distribution of national, up to date terrain, climate and water data.

It creates coherence between existing data and model predictions of hydrological conditions to support public and private sector companies dealing with the increased water masses due to changing climatic conditions. The initiative is based on the Basic Data Program's principles for data sharing with on-going adjustments and improvements based on input from users.

The HIPdata.dk portal provides access to a large number of data and model simulations of relevance for water management, including nationwide advanced model calculations of terrestrial groundwater in a 100 metre grid. With machine learning, views have even been developed to the 10 metre grid for historical calculations. Projections have also been made up to the year 2100 and indicate where there may be challenges with high groundwater in the future.



Visit the portal
HIPdata.dk



Benefits

- Supports municipal planners, utilities and private companies with better access to near surface hydrological data.
- Provides information to manage flood risks from numerous sources (coast, torrential rain, streams and groundwater).
- Enables climate-robust risk assessment to avoid soil pollution spreading to groundwater and other sensitive water bodies. Maps showing the depth of shallow groundwater are also used to give correct permits for raw material extraction and groundwater lowering, providing knowledge on the local groundwater table.
- Provides information for infrastructure planning and protection of railways and roads against flooding, as well as for the preparation of flood/emergency maps.
- Streamlines existing production and management of water and supports the innovation of data-driven products and services.
- Ensures efficient public use of data, better accessibility and a coordinated open and common data infrastructure, enabling authorities, businesses and citizens to streamline their work with water management and coordinate efforts to mitigate and adapt to climate change.
- Supports economic growth and provides the foundation for a good decision-making for climate adaptation and infrastructure investments.

Estonia

Delivering 3D open data for Estonia

“It is essential that we keep searching for ways to model our world in the best and most intuitive way. Since we live in three-dimensional world, the possibility to see and use digital 3D models for every building in our country as open data will mark a great leap forward.”

Tambet Tiits
Director General,
Estonian Land Board

The delivery of 3D open data is bringing a new perspective to geospatial information provided by the Estonian Land Board.

In accordance with the Land Board's mission to provide open geospatial data for society, the first 3D dataset covering the whole country has been produced using LOD2 models of buildings.

3D shapes for buildings were produced fully automatically by combining aerial laser scanning point cloud and footprints from topographic database. The geometry was later refined and enriched with attributes, such as building height and type, and links to key state registries, including

the topographic database, address register, land cadastre and register of buildings, in the post-processing phase.

The use and value of the new datasets is demonstrated via a prototype 3D application. More research is planned to create a new presentation and services platform for the seamless integration of 2D and 3D data. This continuing research and development project aims to produce additional 3D datasets in the coming years to form a solid basis for creating realistic digital twins.



The app is available here
<https://3d.maaamet.ee/kaart/>

Benefits

- Available as open data to everyone.
- Enables more people to benefit from geodata by moving from traditional 2D maps to intuitive 3D apps.
- Improves public sector decision-making by providing better data.
- Delivers cost savings for using mass-produced 3D data. For example, new 3D models of buildings are already actively used in planning and construction sectors.
- Provides a solid foundation for the production of more 3D datasets which will create even more opportunities for users in the public and private sectors.



Finland

Data APIs are key to location-based knowledge in Finland

“Questions of ‘what’, ‘where’ and ‘when’ cannot be answered in different ecosystem’s digital services without the use of geospatial data, positioning, and geospatial technologies. Geospatial and positioning data are the base of location-based knowledge which feed different technologies merged into the ecosystem’s digital services. Rapid climate change and the challenge to save the diversity of nature requires changes to the geospatial knowledge infrastructure. In the future, we must answer the question “what is going to happen, when, where, how and why?””

Arvo Kokkonen
Director General,
National Land Survey of Finland

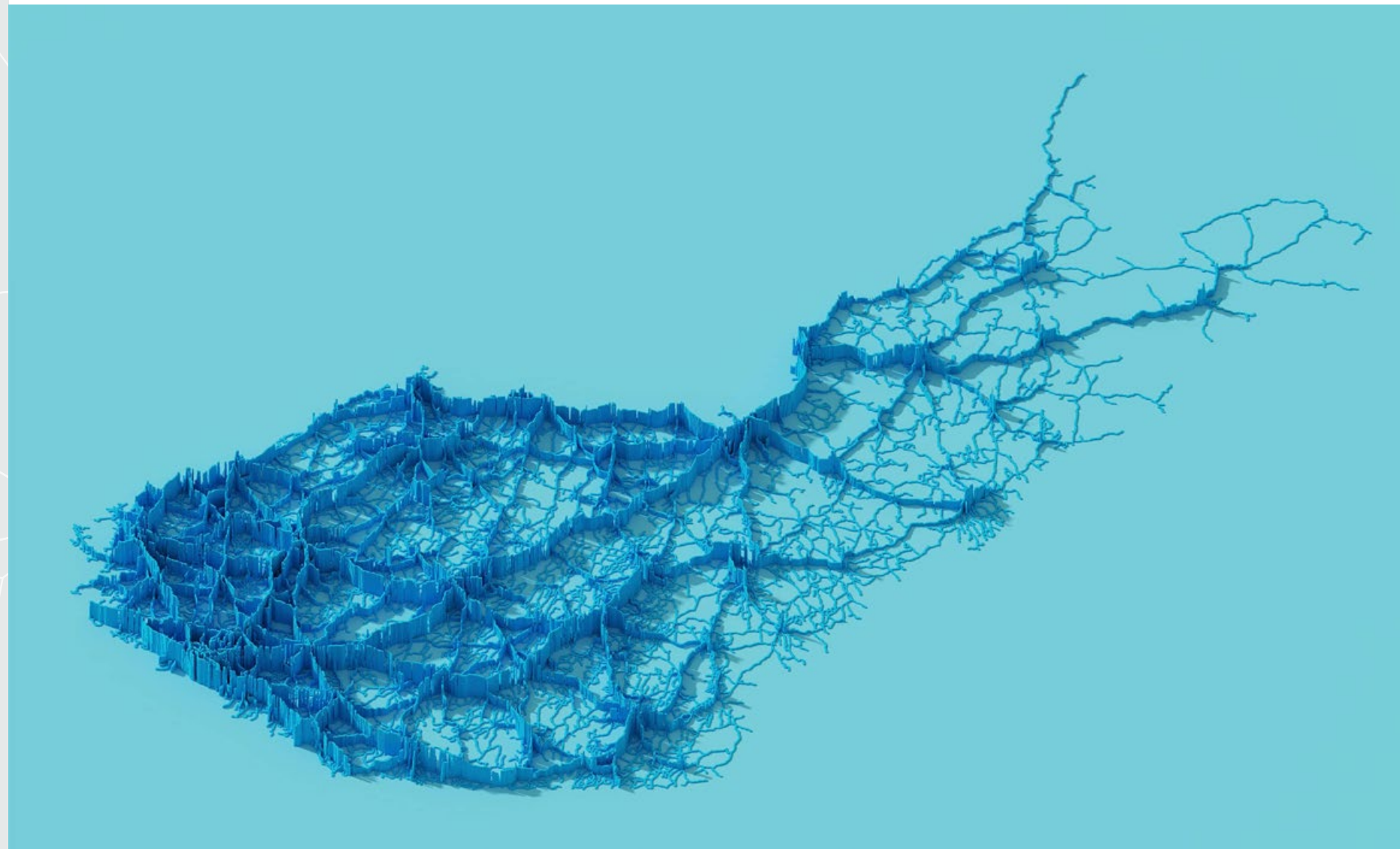
By embracing data Application Programming Interfaces (APIs), Finland is delivering fast, effective and interoperable ways for using geospatial data in different geospatial technologies and methods.

Since implementation started in 2004, the National Land Survey of Finland (NLS) has delivered 39 different Data API-services through 33 development projects. There are three categories – Public Data APIs, Companion Data APIs, and Internal Data APIs – that comprise:

- 22 Data API-services, including 123 products for geospatial data which are mostly Open Data Services.

- 17 Data API-services including 174 products for Land Register and Cadastral Data, which are chargeable except for the cadastral index map.

In 2020, the most popular Geospatial Data API, Raster Map Data API-service (WMTS), transmitted 17 billion raster map tiles (256x256 raster map tile pieces) to customer map service applications (535 raster map tiles/seconds 365/24/7/24).



Benefits

- Enables customers to directly access the most updated data in their own production applications and information services and create new customer experiences, products, services, and business models,
- Removes need for customers to store huge amounts of geospatial data into their own datastores, when data expires regularly.
- Fits perfectly into all kinds of services in mobile devices.
- Provides an effective and economic way to share geospatial data 24/7.
- Forms an important part of an organisation’s data architecture when the same Geospatial Data APIs, which are implemented for customers, are also used in the organisation’s internal production applications and information services.
- Provides solution that is supplier and technology independent
- Increases speed and efficiency, and enables interoperability, in implementing digital service chains with other ecosystem actors.
- Supports technical interoperability through OGC-standards.

Georgia

Multifunctional interactive map provides widespread access geospatial data in Georgia

“Maps.gov.ge allows citizens and professionals to use it for different purposes: To find property, address, cadastral data, title, orthophoto plans, topographic maps, Points of Interest, and other data. It facilitates easy access and promotes using geospatial data for better decision making.”

Oleg Tortladze

Chairman, National Agency of Public Registry, Georgia

Geospatial data in Georgia is now easily and widely accessible thanks to a new multifunctional interactive map released by the National Agency of Public Registry (NAPR) under the Ministry of Justice.

Available at <https://maps.gov.ge>, it provides geospatial information produced by NAPR and other authorities and is compatible with tablet and mobile devices.

The map was developed in-house by NAPR's IT team in close cooperation with the Geodesy and Geoinformation Department. The initial source was maps.napr.gov.ge, which was developed 15 years ago by NAPR, with the current portal – [www.maps.gov.ge](https://maps.gov.ge) – having been significantly improved over time in terms of speed, functionality, and content.

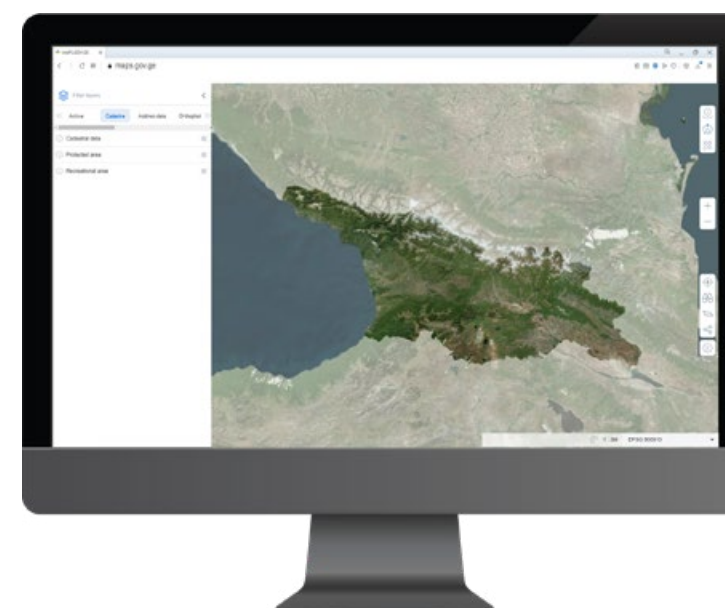
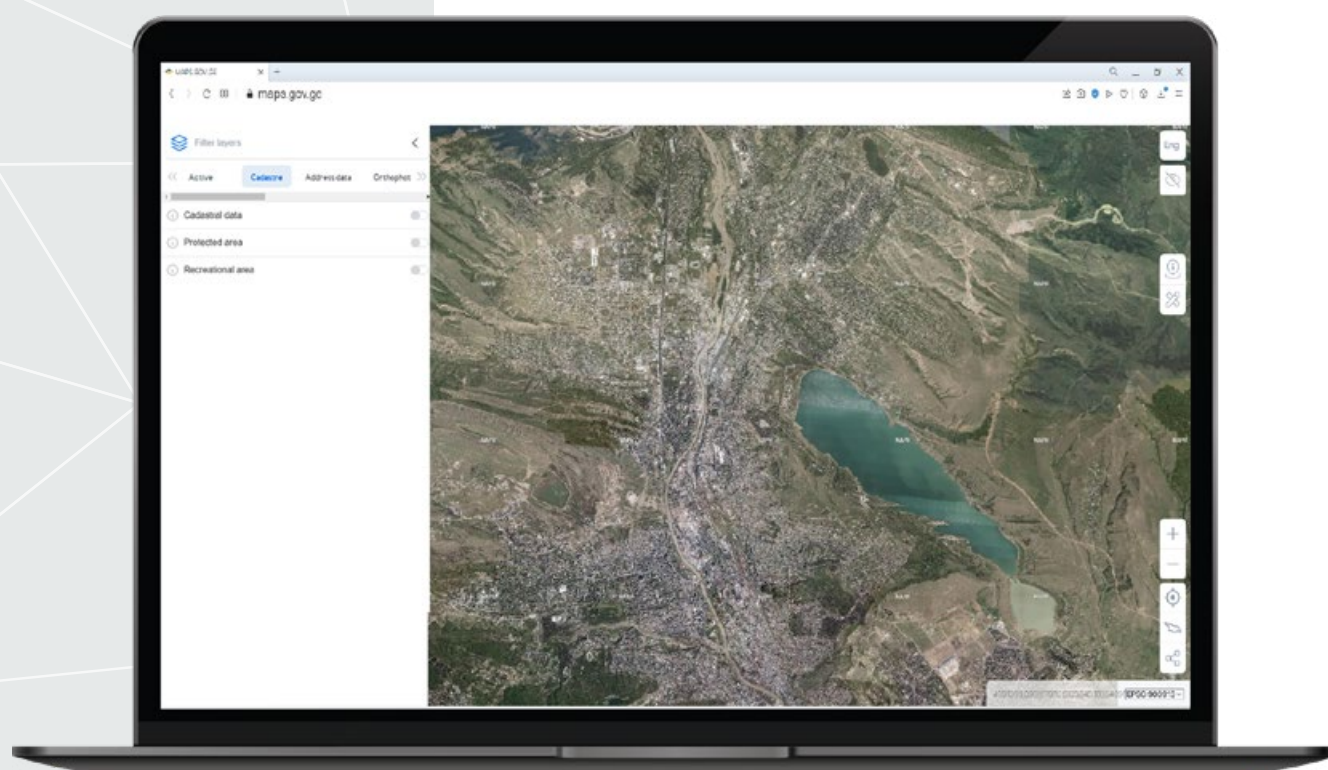
Development of the mobile application of the maps started in December 2021 with the support of the Norwegian project 'Maps for Sustainable Development in Georgia'. Refinement and enrichment of the data is ongoing with the aim of providing truly national coverage and making as much geospatial information of Georgia as possible widely available for everyone.

Currently, the map includes cadastral data, addresses, orthophotos and other core geospatial data. The next step will see the digital base maps developed within the Norwegian Project Maps for Sustainable Development in Georgia.

Currently, data is provided in Georgian, however in the near future, the map will be also fully available in English.



Visit the website
<https://maps.gov.ge>



Benefits

- Provides high-quality, authoritative data to users.
- Meets the demands of different groups, including ordinary and professional users.
- Provides easy access to authoritative geospatial data for government institutions, private sector, and citizens.
- Facilitates searches by location to find cadastral data along with immovable property title and use other geospatial data.
- Encourages development of innovation services and helps businesses and other users to better leverage existing resources and make more informed decisions.

Germany

Surveying Authorities of the Laender of the Federal Republic of Germany (AdV)

Implementation of ‘Ground Movement Cadastres’ in Germany – a significant contribution for (post) mining monitoring

“In Germany, hard coal mining was terminated in the last decade. To achieve EU and national climate goals, open-cast lignite mining will be terminated during this decade. Accompanying this process, the Surveying and Mapping Authorities monitor vertical height changes. Integrated approaches combining levelling and radar interferometry significantly improve this task.”

Jens Riecken

Chair of Working Group Spatial Reference of the Working Committee of the Surveying Authorities of the Laender of the Federal Republic of Germany (AdV)

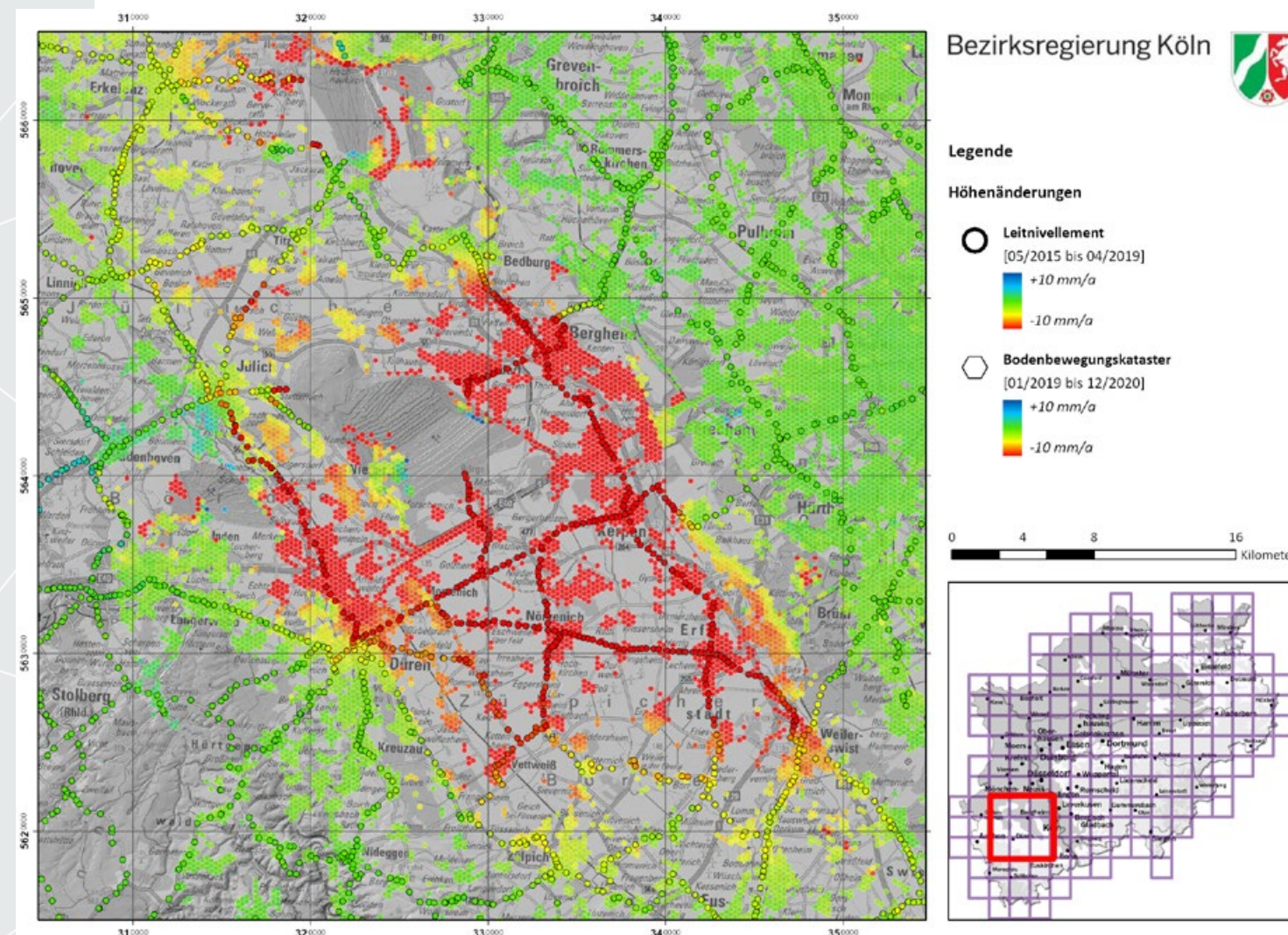
Radar data provided free-of-charge from the Copernicus programme’s Sentinel-1A and 1B satellites is key to post-mining monitoring in Germany.

This open data policy motivated several surveying and mapping authorities to use radar observation to establish ‘Ground Movement Cadastres’. This official product uses terrestrial levelling data for calibration and validation for a multi-level quality assurance process and takes into account data protection standards.

Thus, radar interferometry becomes a new observation technique in the field of geodetic reference, enabling cost-effective and precise completion of legal tasks.



Find out more at
<https://geodaesie.info/zfv/heftbeitrag/8506>



Vertical height changes in the open-cast mining area west of Cologne

Benefits

- Provides very good alignment of levelling and radar interferometry with regards to vertical ground movements and simultaneously significant data compression.
- Enables detection of new uplift areas outside the levelling lines, and confirmation of stable areas.
- Provides a complete process chain based on official reference data, reliability through multiple determinations (calibration and validation).
- Delivers an official product of the surveying and mapping administration with free access for everybody, taking into account data protection standards.
- Enables a more economical execution of legal tasks using remote sensing, high social and environmental importance and perception.

Germany

Federal Agency for Cartography and Geodesy (BKG)

Heavy rain hazard maps enable preventive measures in Germany

“Extreme weather conditions caused by global climate change have become increasingly frequent phenomena of our everyday life. In July 2021, the impact of these climatic changes manifested themselves by intense rain causing a flood disaster in the border region of Belgium and Germany. By establishing a nationwide uniform basis for heavy rain hazard maps in Germany, the Federal Agency for Cartography and Geodesy (BKG) is making an important contribution to risk management. As the first region mapped, North Rhine-Westphalia marks the beginning of the BKG project planned to be expanded to other federal states.”

Professor Paul Becker
President, Federal Agency
for Cartography and Geodesy (BKG),
Germany

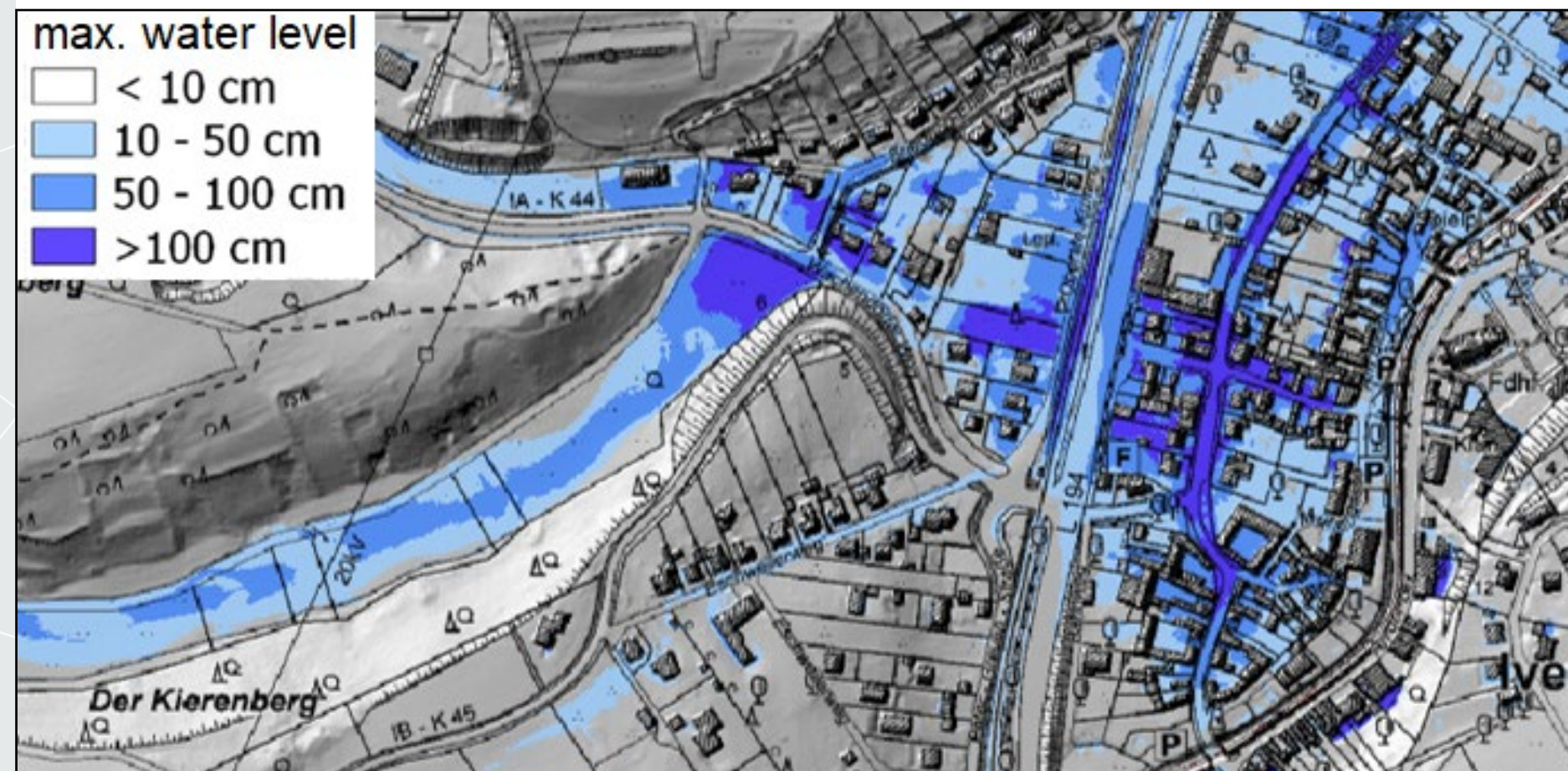
Heavy rain hazard information maps are minimising the risk of human loss and preventing damage in Germany.

The aim of the project being delivered by the Federal Agency for Cartography and Geodesy (BKG) is to create a standardised, public, freely accessible, and easy-to-use heavy rainfall hazard information map. By integrating geospatial data such as a digital terrain model, meteorological data provided by the German National Meteorological Service (DWD) and land use data, heavy rain hazard simulations are produced for two scenarios.

The first is a rare event that is not expected to take place more than once every hundred years is based on DWD regionalised long-term meteorological data, the second is an extreme scenario assuming a rainfall intensity of 90 mm/h. The map shows the hydro numerically computed water levels and flow velocities for each of scenarios.



The geodata are publicly accessible via the central platform of the German Spatial Data Infrastructure
www.geoportal.de



Benefits

- Informs the population, public decision-makers and emergency services about potential flooded areas in case of a heavy rain event.
- Provides important information for future construction projects and supports a building policy adapted to climate change.
- Enables precise planning of preventive measures by showing where infrastructure is most vulnerable using a spatial grid resolution of 1 metre.
- Establishes the first nationwide basis for heavy rain hazard maps.
- Supplies municipalities with a basis for heavy rainfall risk management and can serve as a reference dataset for municipal mapping
- Provides a freely accessible and easy-to-use heavy rainfall hazard information map on a central platform.
- Promotes cross-sectoral cooperation and exchange of expertise across public agencies.

Great Britain

Ordnance Survey enables effective urbanisation with geospatial information

“This programme will promote the value associated with accurate and relevant spatial data. The rapid delivery of a scalable and replicable national digital base map is not only relevant to cities such as Lusaka, but also has far reaching benefits at national and regional scale. The data OS has created will provide the evidence and information to support critical decisions when upgrading existing informal settlements and planning future infrastructure to promote economic prosperity.”

Andy Wilson
Africa Region Director, Ordnance Survey, Great Britain

Ordnance Survey (OS) worked with the International Growth Centre (IGC) and the Commonwealth Association of Architects (CAA) to create an automated basemap of informal settlements in Lusaka, Zambia, in response to the challenges associated with urban growth, the availability of accurate and up-to-date data for creating well-planned and managed cities, and improving infrastructure at low cost.

Using aerial imagery provided by the Zambia Survey Department in the Ministry of Lands and Natural Resources and artificial intelligence (AI), OS used its advanced automated process to generate a new base map across 420km² of Lusaka.

Using Machine Learning techniques, computers were taught what to look for, to label data and trace features such as buildings, roads and water in images using training data; this algorithm classified the various features and the technology then automatically created mapping quickly and accurately.

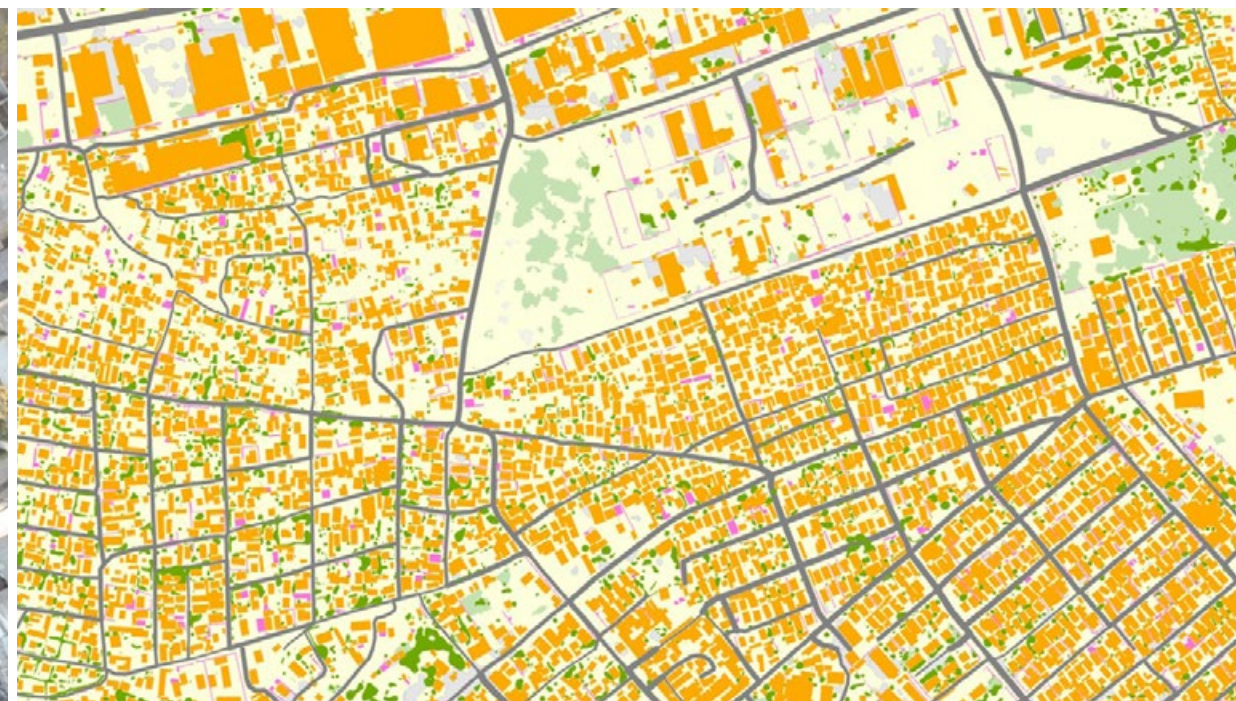
This innovative technique, using AI, is a rapid, accurate and cost-effective way to generate a detailed digital map that has a multitude of use cases, including the design and management of critical infrastructure services, land use and transport planning, land tenure, ownership and administration, and integration of future census data.



The project won the
AI Innovation of the Year award at the Digital Leaders 100 Awards

Benefits

- **Saves time and resources:** The automated process took 10% of the time it would have taken to produce the detailed basemap manually.
- **Improves quality of life for citizens by providing a robust foundation for the integration of future census data, as well as identifying informal settlements, population and density, the location of transport infrastructure surrounding the informal neighbourhoods, and access to electricity, sanitation facilities and clean water.**
- **Enables the Ministry to better target investment in critical infrastructure and services, such as roads and public spaces, in informal settlements.**
- **Assists government decision-making and planning for urban expansion, enabling predictions of informal settlement growth and their potential capacity to reduce the cost of infrastructure investment, and enable resilient and sustainable urban futures.**
- **Enables integration of further datasets to give government agencies more information and clarity to improve decision-making, for example as a foundation for street addressing for land management and taxation, and planning and managing disaster response.**
- **Provides a fast, efficient and economic way to create detailed current base mapping, enabling countries to start building an Integrated Geospatial Information Framework to support their strategic objectives and underpin geospatial business.**



Greece

Enabling direct 24/7 access to Hellenic Cadastre maps and data

“Providing access to cadastral data is one of the major goals that the Hellenic Cadastre has set to achieve. The development of a new set of services that enables citizens and professionals to access directly cadastral data on a 24/7 basis, constitutes a major step towards that direction. Such a capability not only helps citizens and professionals to satisfy their everyday needs as far as cadastral needs are concerned, but also opens-up use of cadastral data in a wide range of tasks and applications.”

Prof. Dimitrios Stathakis
President of the Board of Directors,
Hellenic Cadastre.

The Hellenic Cadastre has developed a new set of web-based services that enable professionals and individuals to get online access to cadastral data and carry out typical cadastral transactions. Such transactions involve overviewing cadastral data, ordering certificates, and carrying out land transactions. Access to data and services is available, online, on a 24/7 basis, through the Hellenic central e-government portal (<https://maps.gov.gr/> and <https://ktimatologio.gov.gr/Professionals/Account/Login>).

The services have been well-received with significant numbers of users accessing the data, which has helped alleviate congestion in the cadastral offices, particularly during the Covid-19 pandemic surge in 2021.

The services were developed almost exclusively by the Agency's IT Department and incorporated into the governmental e-portal in close cooperation with the Ministry of Digital Governance. The new services are based on the ITC infrastructure previously developed by the Hellenic Cadastre as part of a wider plan to open-up cadastral data and services to the public. They were presented to the Prime Minister by the Minister of Digital Governance in April 2021 and attracted widespread media and public attention.

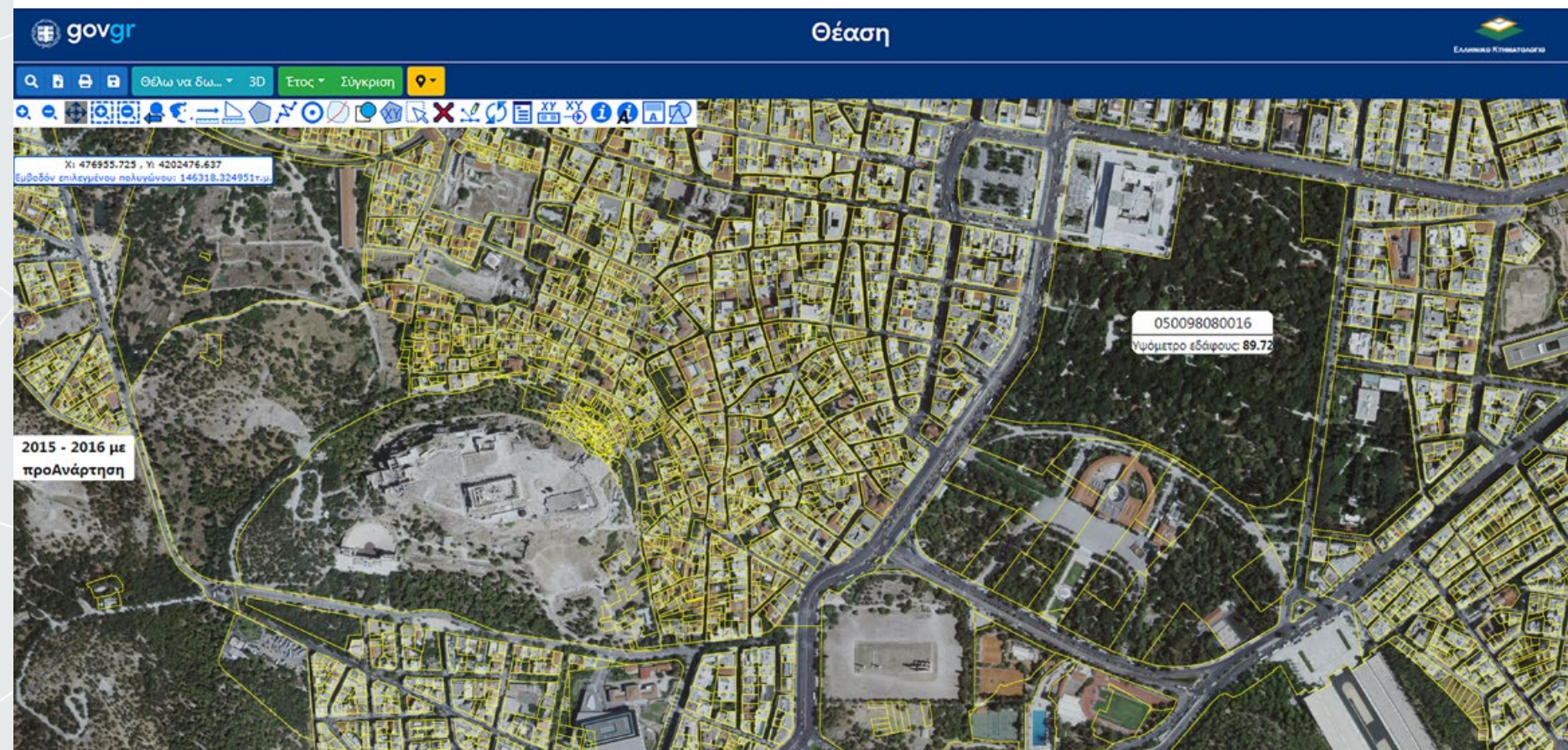


Visit the website
maps.gov.gr



Visit the website
ktimatologio.gov.gr

Preliminary cadastral map of the major archeological sites in Athens, Greece, through the open, on-line service of the Hellenic e-Government portal



Benefits

- Provides online, 24/7, direct access to cadastral data and services to all those who have a legitimate interest in the cadastral data.
- Enables easy access through a well-known focal e-governmental portal.
- Eliminates the need for individuals to visit cadastral offices.
- Avoids congestion in the cadastral offices.
- Delivers a faster service to those interested in land transactions.
- Provides a speedier resolution of cadastral registration problems.
- Improves support for planning and developmental activities.

Hungary

Supporting urban and spatial planning in Hungary with online geospatial system

“E-TÉR is the most complex online geospatial system we have developed so far!”

József Kolossa DLA

CEO of Lechner Knowledge Center

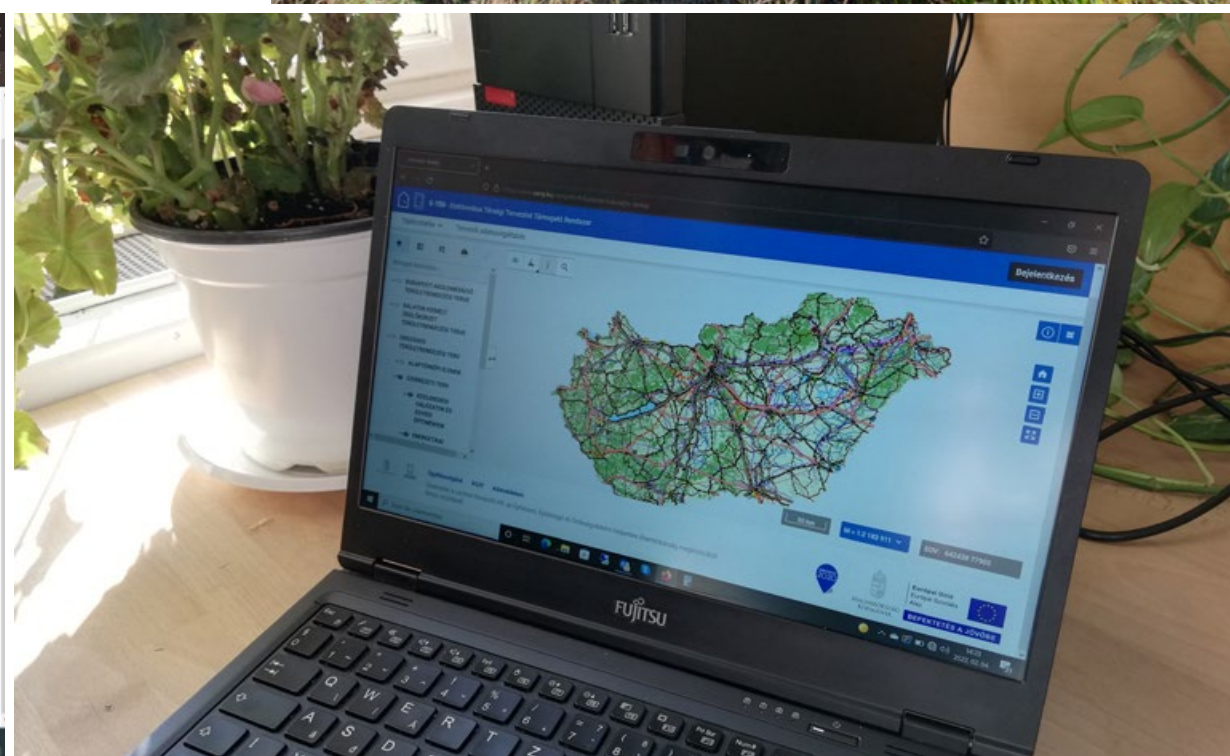
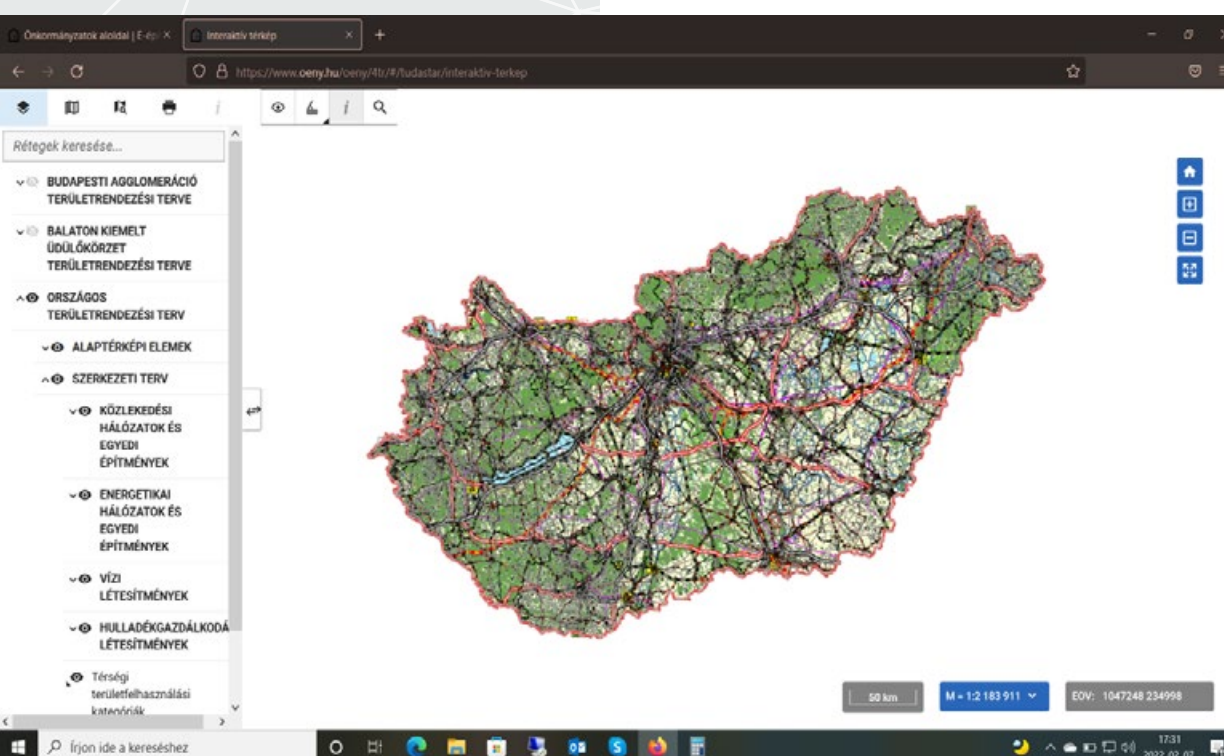
The Lechner Knowledge Center's new framework to support urban and spatial planning is the most complex online geospatial system ever to be developed in Hungary. The Electronic Spatial and Urban Planning Support System (E-TÉR) brings together the entire process of creating spatial and urban plans on a central platform. It provides complete digital support – from planning and negotiation to applicable plans.

The development of the three modules (Information, Reconciliation, Planner) of the E-TÉR web application is part of the vision for innovative renewal of the construction system. The E-TÉR system is supported by the European Union, co-financed by the European Social Fund under the auspices of the KÖFOP-1.0.0-VEKOP-15-2016-00037 project ‘Building a 3D-based data infrastructure’.



Benefits

- Enables online planning and consultation with interactive maps for towns and municipalities, regional and urban planning experts.
- Provides planners with access to geospatial and other databases as a starting point and reference point, ensuring that the entire hierarchy of national, priority regional, county, and urban plans are interlinked, and sectoral decisions are taken into account.
- Enables everyone to access maps and attachments of national and priority regional spatial plans, the module's web map interface also provides access to county spatial plans and, in the future, will also include settlement plans superimposed on these.
- Consultation on the web serves the official communication of the administrative bodies involved in the coordination of regional and urban plans in social and legal terms.
- Helps decision-makers and the public by providing easy access to territorial and municipal regulatory information, and also a clear overview of the most important requirements for land use on the map application.
- Supports creation of plans by providing vector maps of settlement and spatial plans, as well as a web interface for planning.



Ireland

Designing and delivering a high-speed broadband network for 1.1 million people in rural Ireland

“Ordnance Survey Ireland’s (OSi’s) national spatial data framework, Prime2 is underpinning almost all aspects of one of the most ambitious deployments of broadband infrastructure in the world. Undertaking a project on this scale without accurate, reliable geospatial data would be nigh on impossible.”

Colin Bray

Chief Executive Officer and Chief Survey Officer, Ordnance Survey Ireland (OSi)

Within just seven years, National Broadband Ireland (NBI) has to design and build a state-of-the-art, full-fibre network for the 1.1 million people in rural Ireland who need improved access to the Internet. The network will connect 537,596 rural properties, including over 54,000 farms and 679 schools, across every region and island in the country.

NBI needs to be able to understand not only where the properties are that need to be connected, but also where there is existing infrastructure (like poles) that can be reused and where new assets need to be located. It needs to know where land is privately owned, where surveys are taking place, where fibre-to-the-premise has been installed so far and much more besides.

NBI primarily relies on OSi’s national spatial data framework, Prime2. Used by designers on desktops and engineers in the field, it provides everyone at NBI with access to the same authoritative mapping data, including OSi’s open data on municipal district boundaries.



Pictures: ©National Broadband Ireland

Benefits

Enables a more cost-efficient network design process.

- Allows NBI’s infrastructure designers to create their initial network plans at the desktop due to the comprehensive detail in the Prime2 data.

- Saves time and improves the overall efficiency of the design phase as the accuracy of these plans means that engineers are less likely to need to make design changes when they visit sites.

Improves project planning and site safety.

- Enables NBI to more accurately identify which poles are within which municipal areas and submit planning requests to the correct local authority using Prime2 and OSi’s open source boundary data.

- Enables NBI to easily see which roads are public and recognise the road category, so that it can work with local authorities to put the most appropriate safety measures in place for employees working near busy highways.

Enables effective management of build costs.

- Provides insights to accurately ascertain how much cable it needs per section, calculate the value of assets on private property and better manage the total cost of the build phase.

Facilitates well-informed decision-making across the project.

- Enables employees in the office, working from home or in the field to easily access the geospatial information they need to make decisions.

Italy

Mapping out an interest in environmental sustainability for school pupils in Italy

“A successful path to basic school education also includes maps. Nowadays, when attention to the environment and sustainability in the use of resources is so widespread, knowledge of the territory is fundamental for a correct use of resources and, above all, for a healthy relationship between man and environment.”

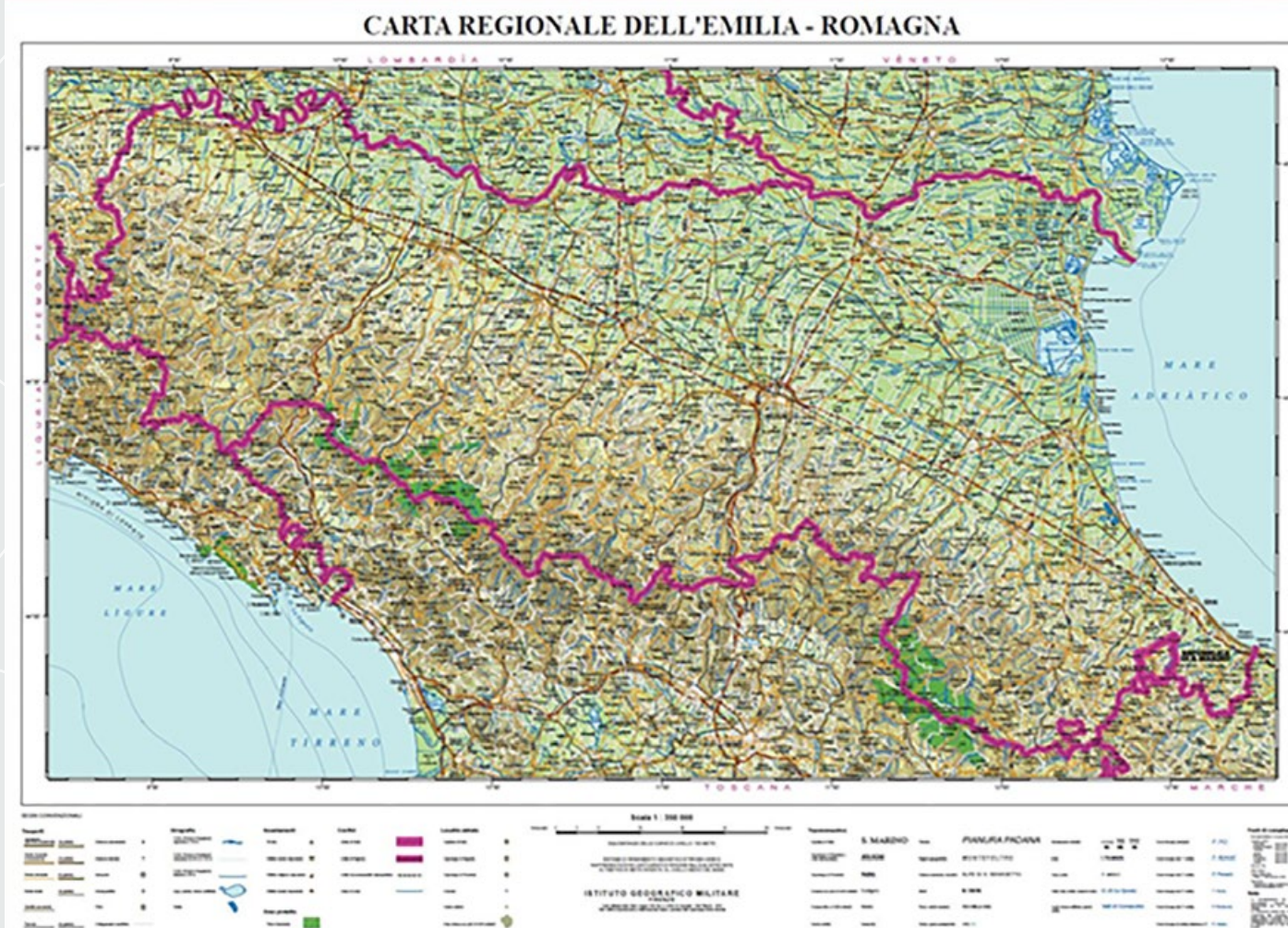
Major General Pietro Tornabene
Italian Military Geographic Institute

School pupils in Italy are benefitting from new maps that facilitate their understanding of the environment and local region.

The cartographic project led by the Italian Military Geographic Institute has created a 1:350 000 scale map for each of the twenty Italian regions. The aim is to represent the regional territory in an intuitive way. In doing so, the maps provide a valuable tool for facilitating an understanding of the environment for even the youngest school pupils.

The map shows the main, relevant natural and anthropic aspects that are useful for highlighting some general characteristics of the represented territory. These aspects can be grouped into the following topics: Altimetry, Hydrography, Borders, Transport, Inhabited areas, Settlements, Protected areas, Toponymy. Elevation is represented by hypsometric colours, contour lines and elevation points. Addition of a shading enhances the effect of the relief.

The main source of geographic data is EuroGeographics 1:250 000 scale EuroRegionalMap geographic database. Other data sources are used for the subsequent integration and control steps.



Regional map of
Emilia Romagna

Benefits

- Demonstrates the practical uses and value of geospatial data in an easy-to-understand format.
- Encourages an interest and understanding in the environment, and the place that people have within in.
- Enables in-depth knowledge of the territory that is fundamental to sustainability and the correct use of resources.
- Ultimately promotes a healthy relationship between man and environment founded on respect for the natural world.

Lithuania

Building a House – Lithuania's single information system for construction

“One of the main tasks of the Centre of Registers in providing administrative services is to move them to the electronic environment, to ensure their accessibility and, thus, to encourage the population and businesses to use electronic services. In cooperation with the State Territorial Planning and Construction Inspectorate under the Ministry of Environment, a new e-service has been developed, which implements a one-stop-shop principle instead of two stops.”

Saulius Urbanavičius
Director General, Centre
of Registers, Lithuania.

A new e-service Building a House that ensures people can receive all services electronically has been launched in Lithuania.

As a result, activities from submitting an application to inform the public about the prepared building design proposals to registering real property in the Real Property Register can now be done through the Topography, Engineering Infrastructure, Spatial Planning and Construction E-Gateway www.planuojustatau.lt.

The new e-service was created by the State Territorial Planning and Construction Inspectorate under the Ministry of Environment together with the Centre of Registers and other partners through the implementation of the project ‘Development of Advanced Electronic Services in the Field of Construction and Public Supervision of Construction’. ‘Application to register (deregister) a real property object and rights thereto or to change the Real Property Cadastre and Register data’ is one of the complex services related to the Building a House single information system for the issue of construction documents and the state supervision of construction.

The latest technologies and additional integrations developed between the information system Infostatyba as well as registers and information systems of other institutions enabled creation of the complex, customer-oriented (population and businesses) e-service.

Activities performed by the Centre of Registers together with the State Territorial Planning and Construction Inspectorate include: the creation of an interface between the Infostatyba and Centre of Registers information systems; the development of online and web services; the creation of a payment e-service created for customers using e-banking; and the ordering and receipt of an excerpt from the Real Property Register along with a VAT invoice for the work.



Visit the website
planuojustatau.lt



Benefits

- Ensures the convenience, efficiency and integrity of ordering and providing electronic services.
- Provides better services to collect and provide new data.
- Saves customers time and money because all services are available electronically and there is no need to go to the institutions.
- Enables customers to re-use uploaded documents and to access information stored in other state information systems quickly and easily using the interfaces.
- Improves the accessibility of public and administrative services in the field of construction.
- Promotes cooperation, coordination and mutual understanding between the institutions issuing construction documents and other authorities.

Northern Ireland

Enabling ownership information to be visualised more easily in Northern Ireland

"I am delighted to announce the commencement of the Land and Property Services (LPS) 3D project which will see the development of a detailed 3D buildings model dataset and 3D visualiser for Northern Ireland. This important dataset will greatly improve Land and Property Service's internal processes, including property valuation, rating and land registration. This dataset will link a range of internal datasets using geospatial identifiers and allow master data to be visualized in 3D for the first time, making visualization of ownership information in complex buildings much easier."

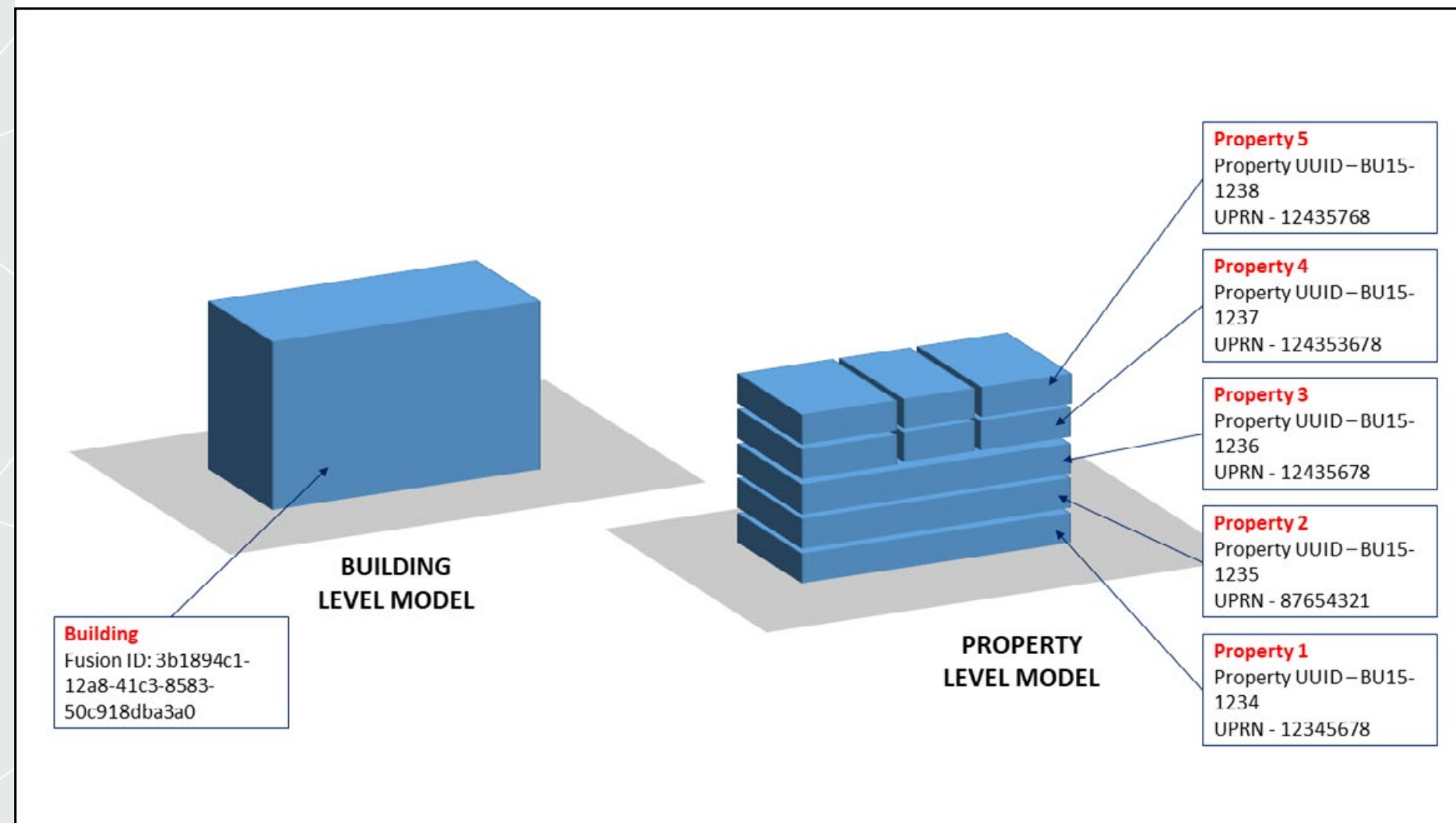
Jim Lennon
Chief Survey Officer, Ordnance Survey of Northern Ireland (OSNI)

High quality data from Ordnance Survey of Northern Ireland (OSNI) is being used to develop a 3D buildings model dataset that will enable ownership information to be visualised more easily.

OSNI high-quality data sources, such as Digital Surface Model (DSM), LiDAR, and OSNI Fusion will be used to create an automated workflow for the production 3D buildings based on the OSNI Fusion Building footprint.

The 3D Building models will be based on the City GML 3 standard and conform to LoD2, meaning that building features such as overhanging rooms, mezzanine floors and subterranean areas will be modelled.

Individual property level detail within buildings will also be modelled facilitating better representation of complex building occupation and multi-use spaces. Through use of linked data, users will be able to visualise all data pertaining to each individual property such as the address, value and ownership extent in a 3D visualiser application.



Benefits

- Saves time and costs by reducing need for site visit by valuation staff through improved use of desktop survey techniques.
- Enables a more accurate valuation as more intelligence can be retrieved about each property in a building, for example area and volumetric calculations or the properties view or orientation.
- Increases efficiency of property registration process as more effective visualisation enables caseworkers to gain an improved understanding of the parts of a building to be registered.
- Brings data together for use in a 3D environment for the first time by using linked data to collate disparate data sitting across multiple Line of Business systems.
- Allows enhanced spatial analysis, such as solar potential or property flood risk, using the 3D building models.
- Improves visualisation allowing Land and Property Service to identify areas that have poor density or buildings that are under-occupied, possibly highlighting where there is a need for public sector intervention due to market failure.
- Greatly enhances user experience as 3D becomes the norm when dealing with property data and assets.

Poland

Increasing use of open spatial data in Poland through award-winning services

“The pandemic period has shown that it is impossible to function efficiently without computerisation. From the geodesy point of view, there has been an impulse to accelerate digitisation...”

Waldemar Izdebski

Surveyor General of Poland,
Head Office of Geodesy and
Cartography (GUGiK)

More people than ever before accessed Poland's Head Office of Geodesy and Cartography (GUGiK) geoportal.gov.pl service in 2021. With nearly 10 million users, the service recorded a 25% increase in visitors from 2020 and almost twice as many downloads of open spatial data (605 TB).

GUGiK's commitment to facilitating access to official spatial data was internationally recognised by the Geospatial World Innovation Awards 2021 where it won the Spatial Data Infrastructure category for its geoportal.gov.pl. At European level, the technically innovative solutions used in geoportal.gov.pl were acknowledged by the European Commission as a 'Good Practice Candidate' for building one access point to dispersed data sources and making spatial data easily accessible via WMS.

To allow users to access a wide range of spatial data without any restrictions, a number of new services have been released via geoportal.gov.pl, and training sessions have been held to enable almost 5 000 employees from the Polish administration sector to benefit from the data.

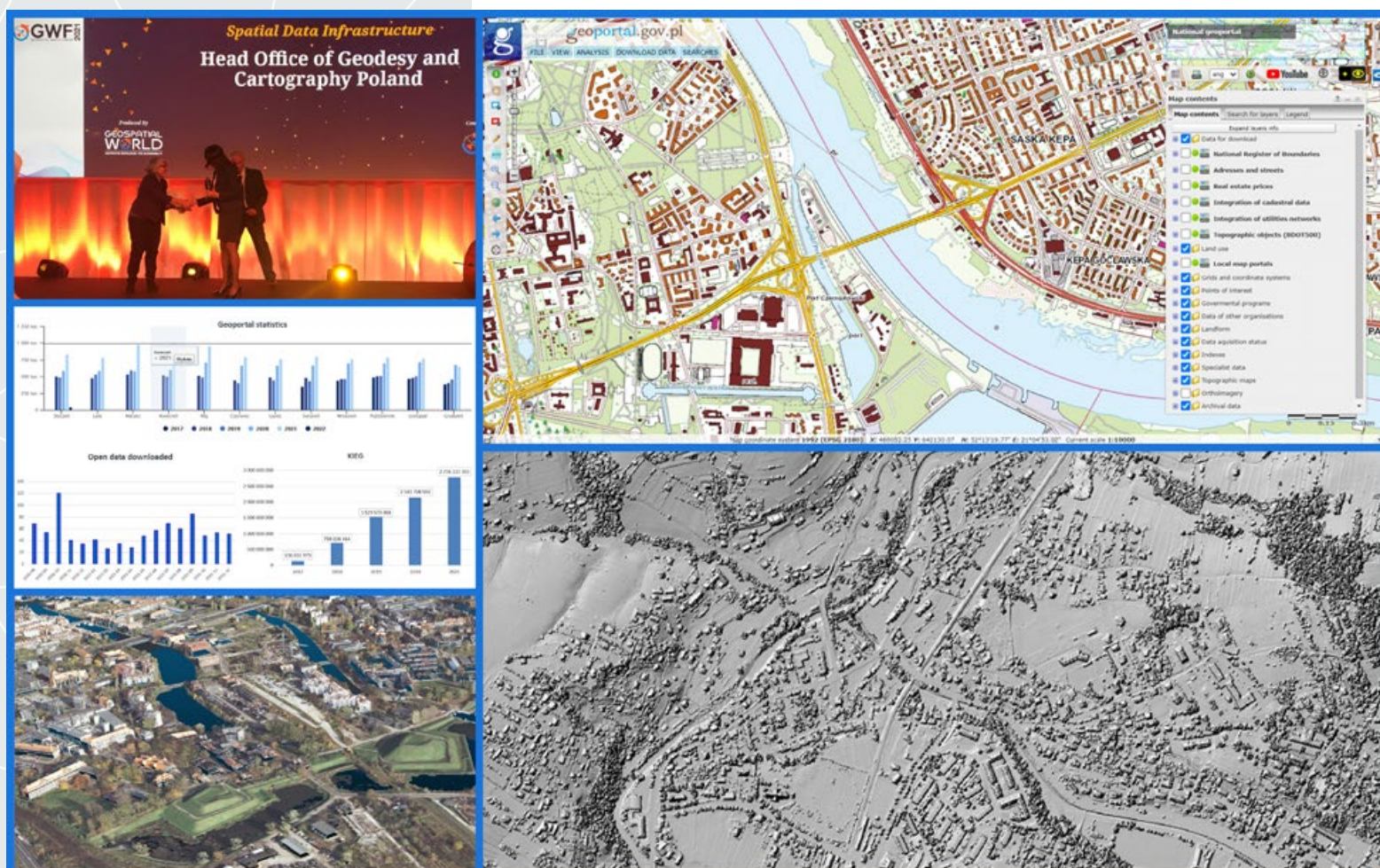
Training was also provided for more than 100 people from Moldova's public administration and private sector under the Twinning project 'Improving Spatial Data Services in the Republic of Moldova following EU standards'. The project is implemented by a consortium of Croatia, the Netherlands and Poland.

The past year has also seen a significant reduction in the volume of legal acts. Due to the amendment of the Geodetic and Cartographic Law, 14 new regulations were issued in 2021. Of the original 2,504 pages of legislation, only 567 pages remain – a reduction of almost 80%.

Visit the website
geoportal.gov.pl

Benefits

- Provides a tool in geoportal.gov.pl for analysis of topographic data (BDOT10k). Additionally, GUGiK has released a QGIS plug-in enabling visualization of Topographic Objects Database (BDOT10k) and Database of General Geographical Objects (BDOO).
- Enables all geodetic documentation to be submitted in electronic form in accordance with regulations. In 2021, nearly 1.2 million technical geodetic documents were accepted.
- Facilitates data use in many websites and services (i.a. e-budownictwo.gunb.gov.pl, e-rolnik.gov.pl) through widespread popularity of integrated network services provided by GUGiK. For example [KIEG](https://kieg.gov.pl) (National Integration of Land Records), [KIUT](https://kiut.gov.pl) (National Integration of Underground Utilities), [KIMP](https://kimp.gov.pl) (National Integration of Local Spatial Development Plans), [ULDK](https://uldk.gov.pl) (Service of Location of Cadastral parcels).
- Promotes initiatives in to create innovative projects such as [Korona Gór Polski 3d](https://korona3d.amu.edu.pl/) (kgp3d.amu.edu.pl) or [Krajowa Mapa Koron Drzew](https://mapadrzew.com) (mapadrzew.com) which were recently awarded for 'The best use of data and services provided by Head Office of Geodesy and Cartography in 2021'.



GUGiK's Highlights
of 2021

Romania

Reducing duplication of effort whilst increasingly efficiency and transparency in Romania

"We strive to turn the constraints imposed by the pandemic into an opportunity to become more efficient, and, through what we do, we want to contribute to the re-launch of the Romanian public sector through impactful, efficient and interoperable services. At the same time, I strongly believe that our experience, as European cadastral and land management authorities, will play an important role in supporting the sustainable recovery and increasing the economic and social resilience of EU Member States."

Ildikó Rákosi-Seiwarth

Director General, National Agency for Cadastre and Land Registration, Romania

Reducing the negative effects of the Covid-19 pandemic and supporting recovery was a key focus for National Agency for Cadastre and Land Registration (ANCPI), Romania in 2021.

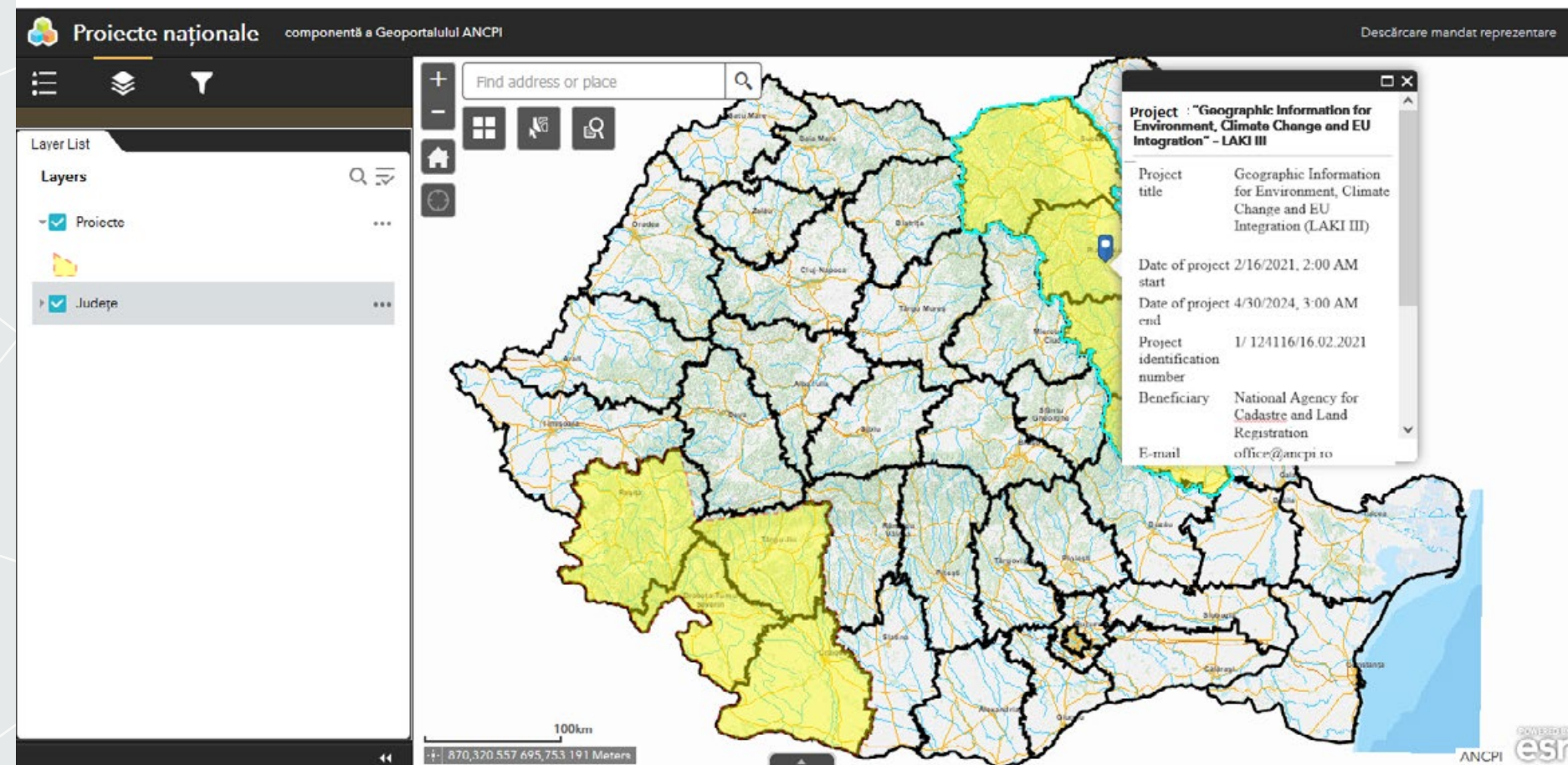
By eliminating paperwork, the Agency was able to reduce contact between employees and stakeholders whilst maintaining its levels of service and continuing to deliver new initiatives.

For example, it is minimising duplication of effort through the development of the 'National Projects' application which facilitates consultation for projects that produce geospatial data financed from public funds. This means overlaps in the collection of spatial data can be avoided.

The application will be available on the National Spatial Data Infrastructure (NSDI) portal and consists of two modules:

- The module for use by citizens for consulting the area where a project is being developed.
- The module for public authorities' use, where data producers can upload or update the geospatial information in shape format, on a TopRo5 support, like project boundaries, as well as other information of interest related to the project on the platform.

The information related to the LAKI III project 'Geographical Information for Environment, Climate Change and EU Integration' have already been uploaded.



Benefits

- Reduces, with the aim of eliminating, the duplication of geospatial data collection in publicly funded projects, as well as those with European financing.
- Ensures better access to information for the public.
- Increases the transparency of land management processes
- Ensures increased impact of social development and contributes to the increase of the quality of the public services provided by ANCPI.
- Ensures transparency in spending of public money.
- Provides a useful tool for implementing the National Resilience and Recovery Plan.

Scotland

Keeping Scotland's Land Register relevant and up to date

"Mapping underpins everything we do at RoS. Having recently completed our five-year plan, we are excited to move onto the next phase of our development. Over the past year, we have replaced our 30-year-old mapping infrastructure with a digital solution which not only supports our data ambitions but will progress the delivery of our corporate objectives. This will provide a vital foundation for our continuous improvement and create opportunities to ensure a sustainable and agile future for Scotland's land register with even greater interactivity and accessibility."

Kenny Crawford

Business Development Director,
Registers of Scotland (RoS)

Registers of Scotland (RoS) is building a modern mapping platform enabling it to work with structured data, develop new strategies to deliver information from the Land Register, adapt to improvements in geospatial and location technology and quickly answer questions such as 'Who owns Scotland'?

One of its responsibilities is to show the legal boundaries of properties on the cadastral map. Showing more than 400 years of property transactions and geospatial data, this is created from a combination of written descriptions, drawings, plans, legal presumptions, and the law of prescription (where possession of land becomes relevant) where the original intent may not always be available

To support the cadastral map, the Land Registration etc. (Scotland) Act 2012 requires a base map providing topographic information to be used for registration.

Map view showing the complexity of geospatial base map changes on derived RoS Datasets.



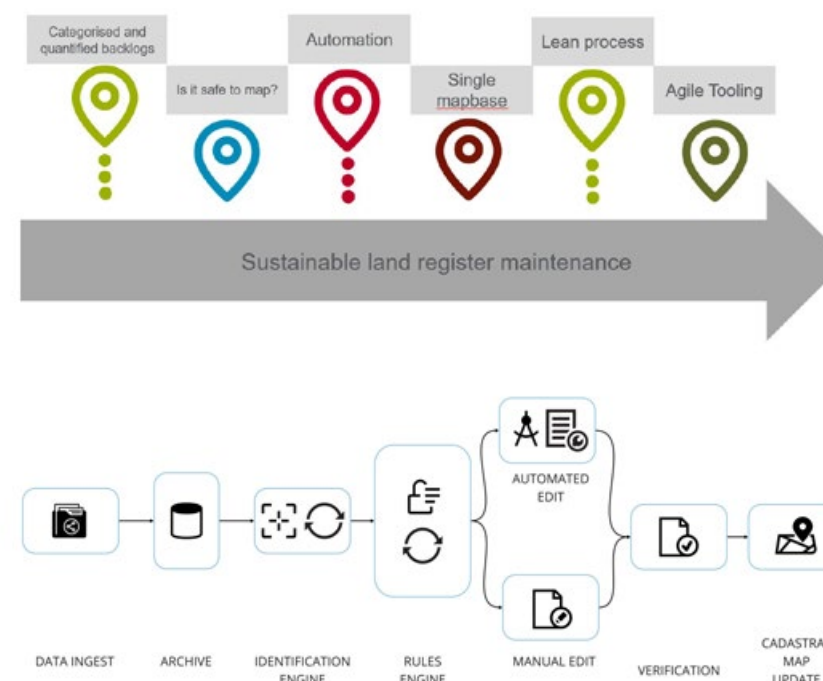
RoS uses OS MasterMap which provides contextual information (roads, buildings, walls etc) allowing users to understand legal boundaries with topographic features on the ground. As it is updated constantly and provides a near real-time view of the topographic features, this puts RoS in the unique position of providing Land Registration data that coincides with the most recent version of the map of Scotland.

RoS is also creating innovative new ways of working to meet the increased operational demand on resource. These incorporate open standards and use open-source software and are underpinned by adoption of the Land Administration Domain Model (LADM ISO19152). By developing a new Land Registration Maintenance process, it is moving away from a manual 'compare and update' process to a sustainable model supported by automated and optimised edit tools.

Benefits

- Builds sustainability into the land register – supporting the maintenance for the next 400 years.
- Delivers resiliency from base map updates and surveying improvements.
- Improves transparency and accessibility of mapping data.
- Enables prioritisation of manual workload to simplify and improve registration service journeys.
- Allows RoS to process over 10,000 changes per week from Ordnance Survey.
- Ensures better understanding of topographic change and its effects on the Land Register.
- Generates a rule-based model for handling spatial data change (quantification of risk).

Key steps towards a sustainable solution – Land Register Maintenance



Key steps to a new land register maintenance process for Scotland

An overview of the weekly process flow being implemented at Registers of Scotland

Slovakia

Providing rapid, high-resolution data for users across Slovakia

“The open provision of very accurate Airborne Laser Scanning products has triggered a wave of innovation, accelerated research and development; the possibilities for their use seem unlimited.”

Ján Mrva

President, Geodesy,
Cartography and Cadastre Authority
of the Slovak Republic (UGKK SR)

High-resolution data collected using a rapid and highly accurate measurement method is being used by a wider range of organisations across Slovakia.

The Geodesy, Cartography and Cadastre Authority is providing the Airborne Laser Scanning (ALS) data free of charge. The high quality and up to date products – Digital Elevation Model, Digital Surface Model and Classified Point Cloud – have brought many benefits to sectors which deal with environmental monitoring, emergency planning, archaeology, and climate change.



Mining activities - monitoring of cracks



Newly discovered fortified
settlement of Pajštún Castle

Benefits

- Enables the creation of geological maps for inspecting polluted areas and environmental burdens, emergency landslides and other geodynamic phenomena by the State Geological Institute.
- Enables the Mountain Rescue Service to analyse avalanche situation as well as field orientation and facilitating search work.
- Enables the observation of slope deformations, landslides, gravitational slips and monitoring of cracks and abysses due to mining activities.
- Enables hydrodynamic modelling on streams, precipitation run-off models of river basins and creating of flood risk maps for water management.
- Identifies and interprets new archaeological sites and facilitates research into the historical structures of the agricultural landscape.
- Detects greenery, enables analysis of brown bear hibernation sites in relation to the inclination of the relief, and mapping of potential mosquito hatcheries to protect nature.
- Enables municipalities to model solar, noise spread modelling, prepare zoning plans and orienteering maps.

Slovenia

Delivering the Building Land Record in Slovenia

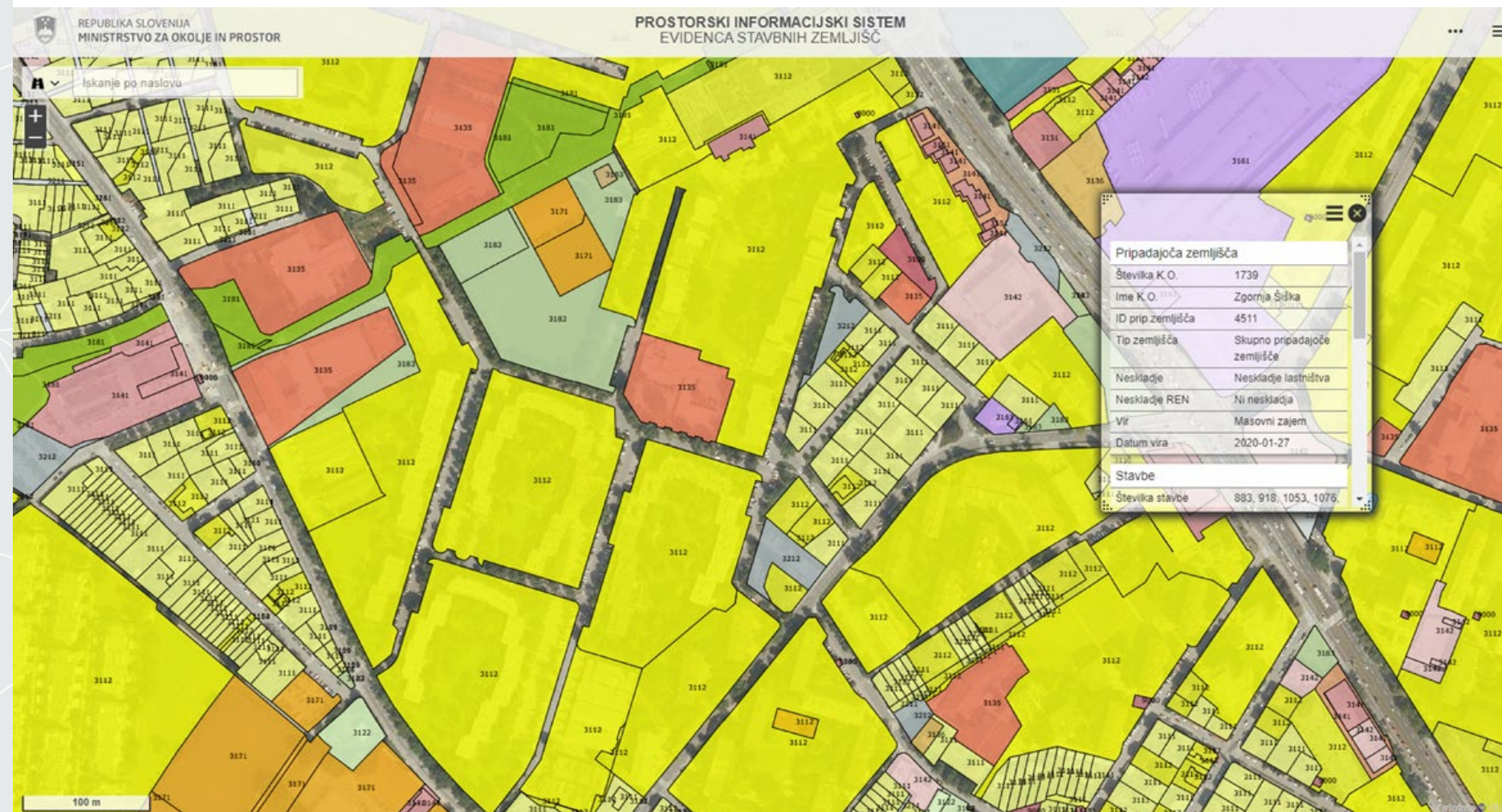
“The Surveying and Mapping Authority of the Republic of Slovenia, together with the Ministry for the Environment and Spatial Planning, carried out activities for interconnecting spatial planning data with cadastral data. The project eProstor (eSpatial), co-financed by the Republic of Slovenia and the European Union from the European Regional Development Fund, finalises the integration of graphic and descriptive data of the land, buildings and civil engineering buildings and the determination of the detailed actual land use of the populated areas.”

Tomaž Petek
Director General, Surveying and Mapping Authority of the Republic of Slovenia

Slovenia is delivering a new Building Land Record to meet the needs of spatial planning and the implementation of land policy measures. The record will provide accurate data of built-up land, undeveloped land for building and their development stages.

Effective management of building land, which represents an important capital, requires analysis of its existing condition. To achieve this, the project to acquire data for inhabited land and its actual use was completed in April 2021.

The results are freely accessible through the national spatial information system. The next stage will see this data combined with public road and railway infrastructure data to represent the built-up land. This will become the main basis for the establishment of the Building Land Record.



Benefits

- Underpins planning of the designated use of space, spatial implementation conditions or new building land for preparing municipal spatial acts.
- Ensures an appropriate land and ownership structure and implements land policy measures for remediation.
- Provides affordable land for living and working.
- Enables management of land in the public interest.
- Enables valuation of building land.
- Provides information on the development stages and other characteristics of building land for interested investors.

Spain

National Geographic Institute

Spain's customised map app puts users in control of coverage and content

“With Mapa a la Carta (<https://mapaalacarta.cnig.es/>) we combine innovation and tradition. Users can create their own topographic maps and aerial photos and download for free or purchase and receive them at home with the usual quality. This project has been possible thanks to the implementation of a workflow involving different areas of the IGN, databases, and applications.”

Lorenzo Garcia Asensio
Director General, National Geographic Institute, Spain

Mapa a la Carta (<https://mapaalacarta.cnig.es/>) enables maps or aerial photos to be configured by the area of interest, scale, title, subtitle, colour of the cover, and by loading or drawing geometries or pictures on top. By using IGN products as a base, users can design their own maps in minutes and receive a high-quality free digital product for free or purchase as a paper copy.

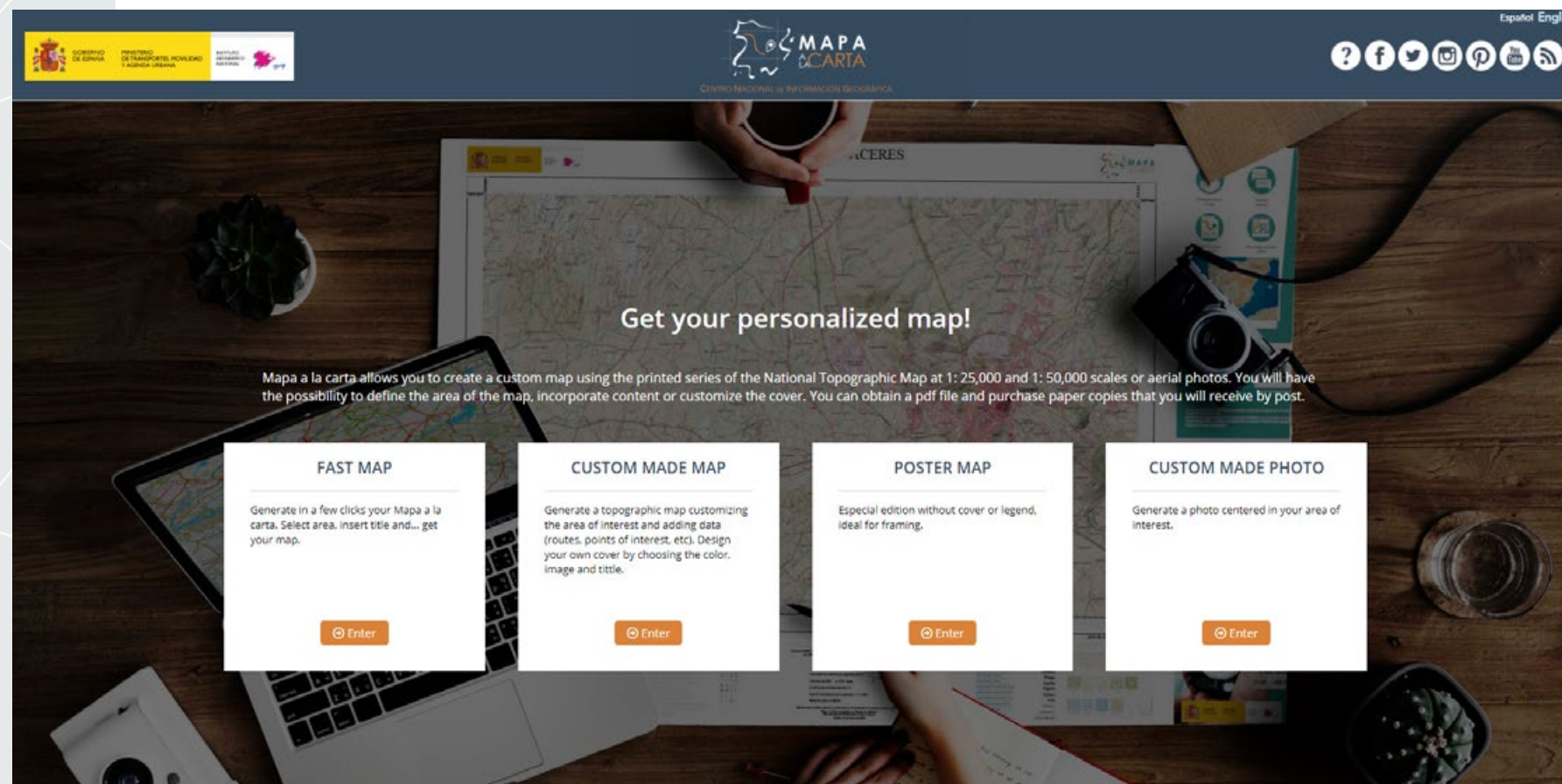
The idea was born to allow users to get a paper map centred in a certain location rather than choosing from one of 4,123 classic 1:25 000 scale sheets.

The project, developed by IGN during 2021, embraces a more flexible way of consulting geographic information using web applications and viewers, and takes advantage of the possibilities offered by new technologies.

The web application has been designed using several open source components and standard web services. The result is an easy-to-use web application for customising and receiving maps in different formats.



Visit the website
mapaalacarta.cnig.es



Benefits

- Environmentally sustainable, instead of printing hundreds of individual map sheets, it is printed on demand.
- Free download of the map or aerial photo in digital format.
- Users always have access to the latest version of the base map as the topographic database is regularly updated.
- Promotes reuse of existing geographic information and knowledge derived from the activity of public administrations.
- Provides a good option to get a customised map for specific purposes, for example organising a route, remembering a trip, promoting a business or as a gift.

Spain

General Directorate for Cadastre

Demonstrating value of cadastral information in managing natural disasters

“In addition to cartographic data, cadastral information contains other valuable data of properties such as the surfaces of each use, the state of conservation and photography, and data of the title-holders. It also provides the areas and uses of crops in agricultural parcels, which, in addition to having a greater degree of details than the Copernicus Emergencies Service, allows a better evaluation of the goods and rights affected by the natural catastrophe.”

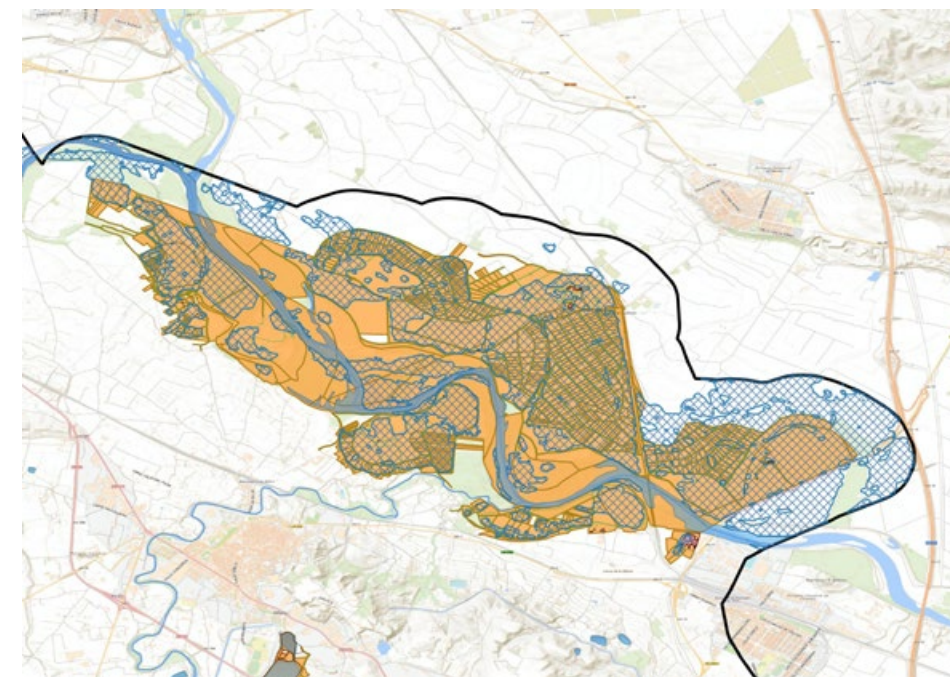
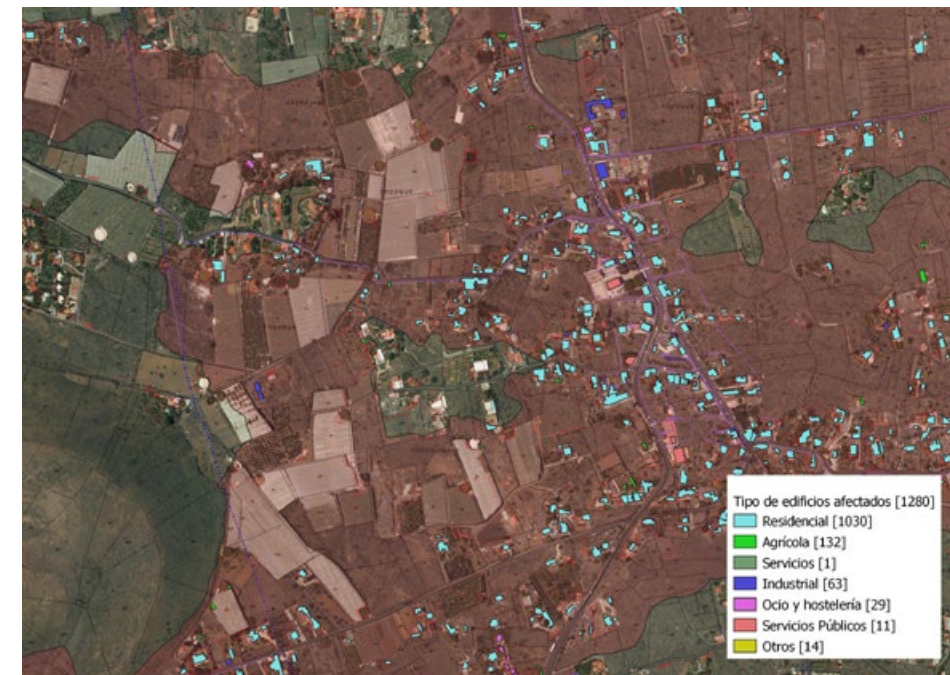
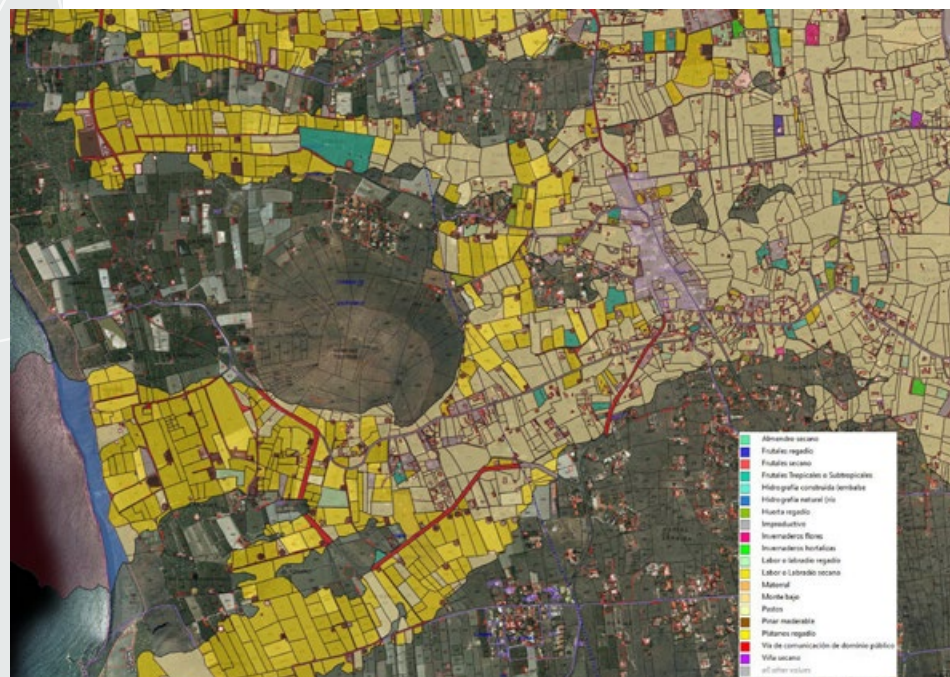
Fernando de Aragón Amunárriz
Director, General Directorate for Cadastre, Spain

Fundamental data provided by the General Directorate for Cadastre played a vital role in managing natural disasters caused by the volcanic eruption on La Palma and by rivers overflowing.

Cadastral data of the new affected areas was delivered daily and disseminated to emergency services and public administrations responsible for disaster management.

Data from the Copernicus Emergency Service was analysed and cross-checked with the cadastral database. The analysis, using QGIS tools, was carried out daily throughout the volcano eruption and advance of the lava in the case of La Palma, and during the floods.

Information was then disseminated to emergency services and public administrations responsible for disaster management. This included detailed 1:5 000 scale data of cadastral parcels, buildings and crops and information about owners, surfaces, crops and agricultural exploitations, buildings classified by uses and destinations, photography, and values of real estate.



Benefits

- Enables citizens to demonstrate the condition of their properties before they were eliminated or damaged by the natural disaster – regardless of whether they are registered in the Land Registry or not.
- Provides more information than can be obtained from the Copernicus Emergency Service as it not only visually identifies constructions and crops, but also provides many other valuable data of the affected area.
- Enables managing administrations to evaluate the damages immediately and act appropriately.
- Provides transparency in the management of natural disasters as all information is published in an accessible and user-friendly way.
- Allows both private companies and researchers to analyse and manage the territory in natural disasters, whilst ensuring only owners and public administrations can access protected data.
- Demonstrates usefulness of cadastral information that goes beyond the payment of property taxes or real estate conveyance.

Sweden

Contributing to major national infrastructure programmes in Sweden

“Sweden has now implemented a scalable national infrastructure for exchange of standardised data where digital detailed development plans and 3D buildings are the first datasets.”

Susanne Ås Sivborg
Director General,
Swedish Mapping,
Cadastral and Land Registration
Authority (Lantmäteriet)

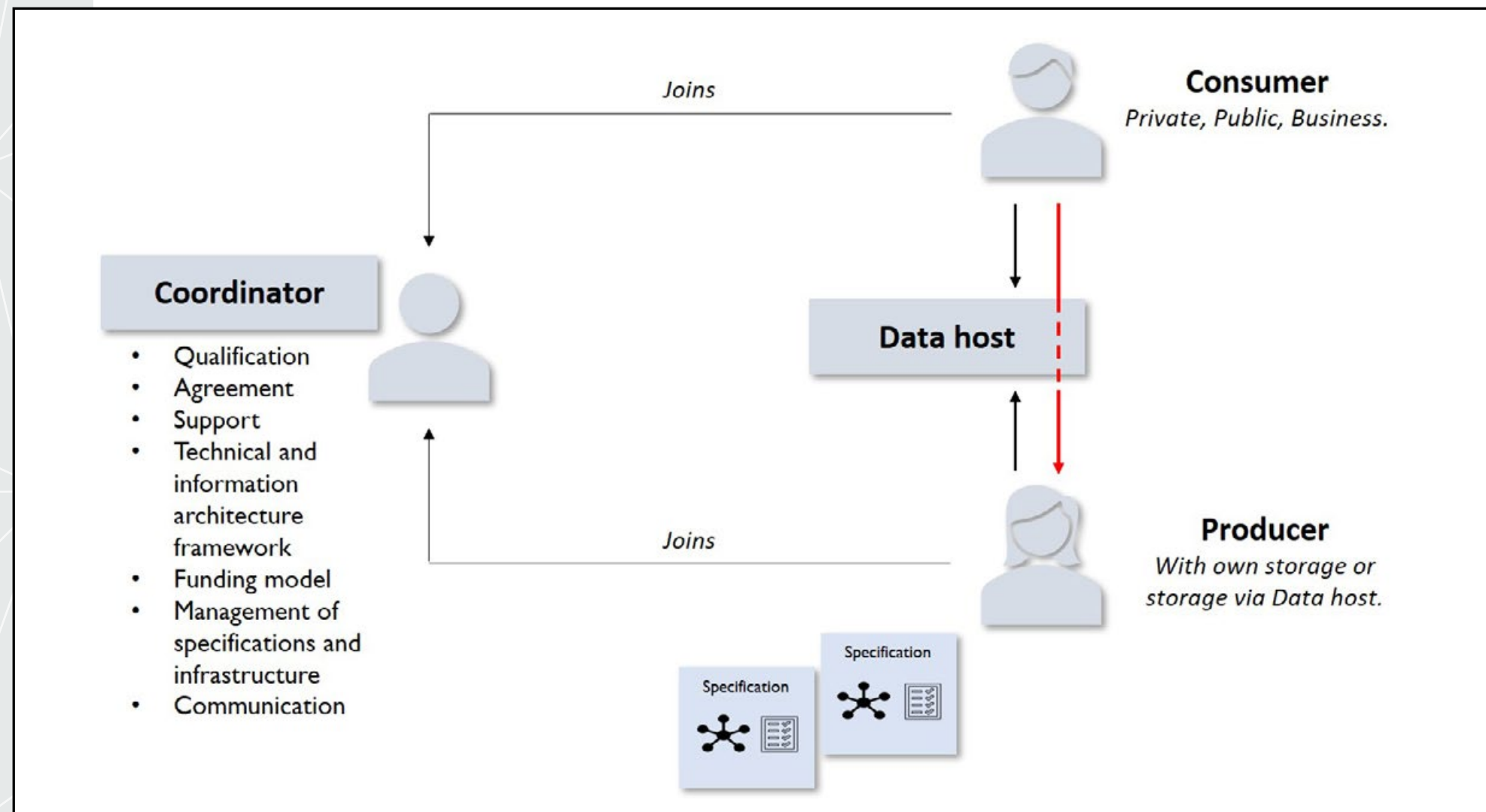
Digital detailed development plans and 3D buildings are the first datasets to be created from Sweden's scalable national infrastructure.

To enable everyone to consume the datasets via machine interface, national specifications have been set and implemented through extensive collaboration between Lantmäteriet, municipalities, other authorities and system vendors.

The entire infrastructure is built on four legal roles: producer, consumer, coordinator, and data hosting.

The infrastructure is also in line with the planned and existing building blocks and ground data framework that is held by the Swedish authority for digitisation.

Agile working has enabled Lantmäteriet to develop several test versions of both specifications and technical solutions. It has also set up an agreement model for producers and consumers. Consumers need only sign the one agreement to get access to data from multiple producers such as municipalities and authorities.



Benefits

- Increases sustainability by providing data that can be used for analysis.
- Increases legal certainty as data is nationally harmonised.
- Improves efficiency in the exchange of data.
- Reduced costs as built once and made available for all.
- Increases accessibility as published as open data.
- Identifies which land use is permitted within an area.
- Provides a basis for trying out a building permit.
- Provides a basis for statistics with the opportunity to automatically generate statistics for Statistics Sweden, the National Board of Housing, Building and Planning.

Switzerland

Award-winning swisstopo app enables easy access to national maps and federal geodata

"It is our task to provide tools so that our data is accessible to the public as simply and free of charge as possible. We do this with the swisstopo app in a contemporary, user-friendly and convincing way."

Dr. Fridolin Wicki

Director, Federal Department of Defence, Civil Protection and Sport, Federal Office of Topography swisstopo

Swiss National Maps and other federal geodata can now be easily accessed free-of-charge via mobile devices thanks to the award-winning swisstopo app.

The app, which has already recorded over one million downloads, increases awareness and useability of swisstopo data by providing quality, reliable geographical information free of charge and without the need to provide login information.

Since the go-live in summer 2020, many new contents and functions have been added and the app has already recorded over one million downloads and was named 'Master of Swiss Apps 2021'. Besides all National Maps, aerial photographs, aeronautical maps and historical maps,

the app also shows additional information relating to public transport, hiking, cycling, snow sports and aviation and includes planning, guidance or tracking functions, a panorama mode (virtual and augmented reality), search and positioning.

Developed with the external partner Ubique Innovation AG, it provides a future-proof tool for a high level of mobile usability of swisstopo's National Maps and geodata. With the corresponding Open Source Software Development Kit 'Open Swiss Maps', which was launched with the introduction of Open Government Data, it is also possible for third parties to easily integrate swisstopo data and basic functions in their own app.

Benefits

- Enables easy public access to Swiss National Maps and other federal geodata via mobile devices.
- Reliably provides consistent quality geographical information throughout Switzerland without interest, free of advertising and without the need to provide login information.
- Increases the awareness and usability of swisstopo data.
- Provides all data and functions free of charge and with unlimited use.
- Allows maps and data to be stored free of charge, without restriction and used offline. This means that the maps can be used even if mobile network coverage is poor or non-existent.
- Offers both simple operation and display of National Maps for general orientation as well as complex content and functions for use by professionals.
- The Open Source Software Development Kit 'Open Swiss Maps' creates a basis for easily integrating swisstopo maps, geodata and functions into other apps. For developers, everything is documented on GitHub. www.swisstopo.ch/sdk

OPEN SWISS MAPS SDK
Software Development Kit

swisstopo app
Precise maps for Switzerland

BEST OF SWISS APPS 2021
MASTER OF SWISS APPS

MORE INFORMATION AT
www.swisstopo.ch/app

Apple METAL iOS SDK

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Federal Office of Topography swisstopo
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Download on the App Store

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The Netherlands

Providing an insight into potential of solar energy in The Netherlands

“Our data is at the basis of sustainable goals in society. Only by working together and combining available high-quality data, can we achieve a solid base of the full picture for solar energy potential.”

Frank Tierolff

Chair Executive Board Cadastre,
Land Registry and Mapping Agency,
The Netherlands

The Netherlands Cadastre, Land Registry and Mapping Agency (Kadaster) has created a database of information related to solar potential and solar photovoltaic (PV) installations, which is very useful for policymakers to reach targets related to the Climate Agreement. The data is used gain an insight into the potential for solar energy.

Kadaster has developed a method to assess this potential using two approaches. The first combines a 3D model based on aerial photography with objects from the Key Register Addresses and Buildings. The second approach uses object detection, which is a deep learning technique used to manage the Key Register Topography. This technique automatically detects changes in the landscape, such as the appearance of solar panels on roofs.

A 3D model, based on high resolution elevation data, was used to calculate solar radiation multiple times per day and several days per year. Deep learning techniques were employed to detect existing solar panels from very high-resolution aerial images for the whole of the Netherlands. The results of both techniques provide data for all individual buildings which is combined with information about function and ownership.

This is a good example of GeoAI, where the best of both worlds are combined to use large geographic datasets and create useful policy- and monitoring information for the energy transition.



Benefits

- Generates insight into roof ownership, for example are they citizens, companies or housing associations, which is important for local governments to develop their communication and implementation strategies.
- Helps policymakers to speed up the energy transition by providing information on where and how much space is available to generate solar energy. At the same time, the data is easy to understand and visualise.
- Provides an insight on not only where the potential lies, but also categorises it by building and owner type, which is much more useful to the policymakers.
- Assists the statistics Netherlands organisation called CBS to improve the quality of their solar panel statistics, which are mostly based on register information.
- Presents a realistic insight on solar potential of building rooftops which is useful in urban planning applications.
- Enables consultancy to develop new products and services based on the solar potential and existing solar panel information.
- Enables electricity network operators to make more accurate investment plans for the electricity network using this information.

Ukraine

Providing a single digital topographic base map for Ukraine

“The main state topographic map scale 1:50 000 and access to it on NSDI pilot project geoportal will provide a single digital topographic base in Ukraine and in the future will allow to use it as a source of output data at the national, regional, and local levels. We are also convinced in the crucial role of local governments and central executive bodies in ensuring the development of geospatial data in Ukraine. The StateGeoCadaastre is making every effort to accelerate this irreversible process”.

Sergii Zavadskyi

Acting Chairman, State Service of Ukraine for Geodesy, Cartography and Cadastre

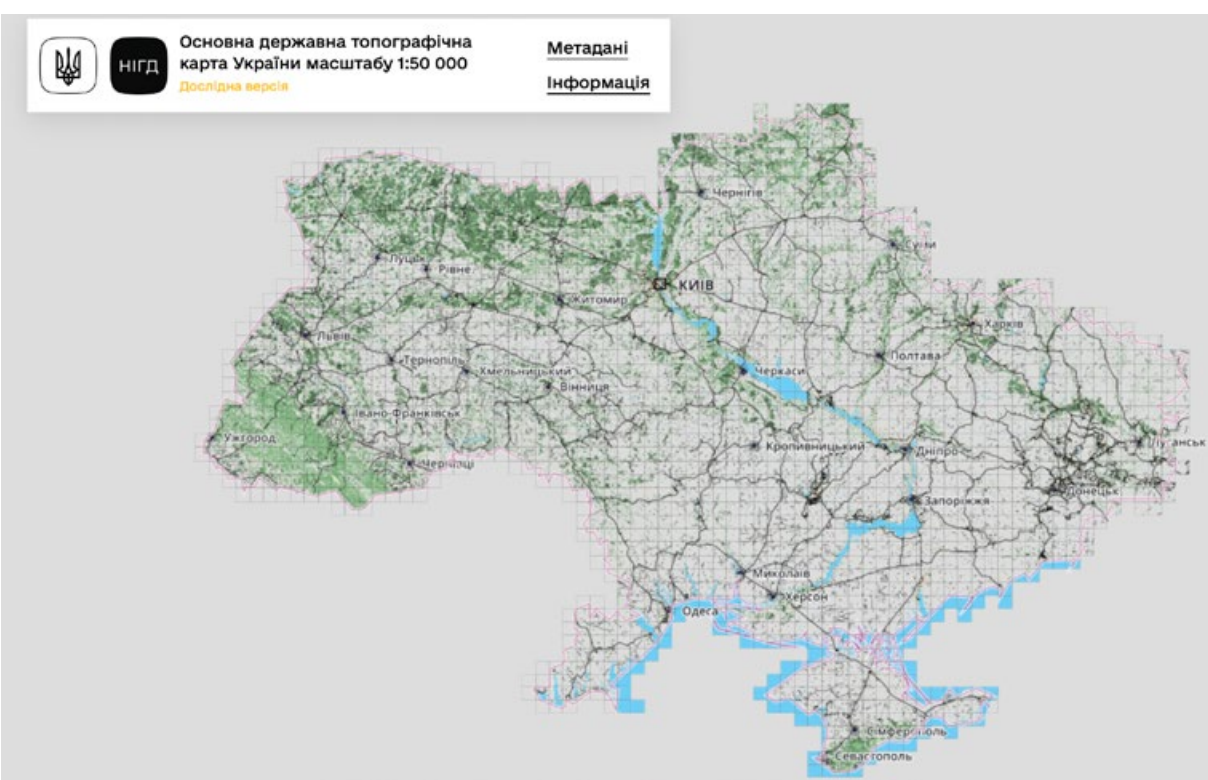
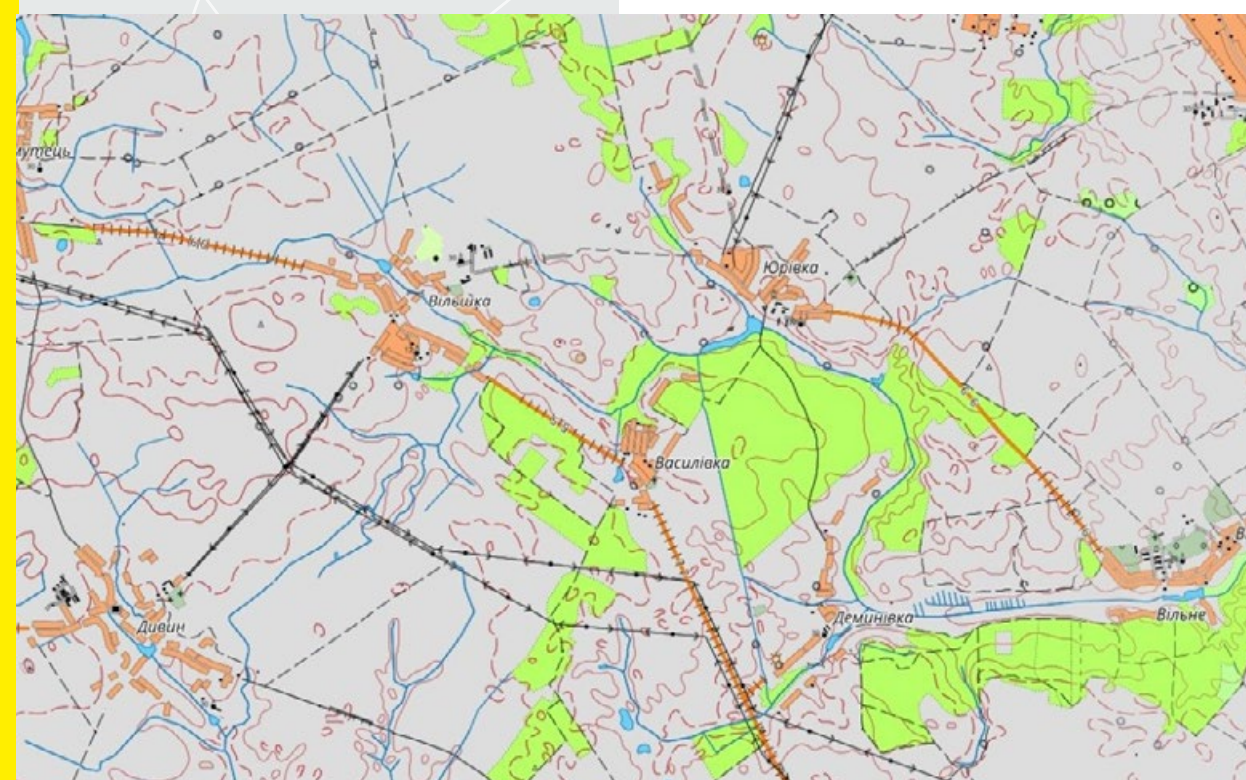
Users of geospatial information in Ukraine are benefitting from updated 1:50 000 scale digital topographic maps and a new national database for topographic data.

Delivered as part of the ‘Maps for Good Land Governance’ project in cooperation with the Norwegian Mapping Authority, the main state topographic map was developed in close cooperation between the StateGeoCadaastre, the State Enterprise ‘Research Institute of Geodesy and Cartography’, the State Enterprise ‘Ukrainian State Aerogeodesic Enterpris’, the Central Department of Military Topography and Navigation of the Armed Forces of Ukraine with the participation of other private enterprises.

The Quality Control Commission was established for adopting map sheets, with 1,288 nomenclature sheets for an area of 436,135 km² accepted. To ensure automated quality control of the updated digital maps, a ‘validate’ tool, comprising a software package and geoportal of the project monitoring and support system, were created.

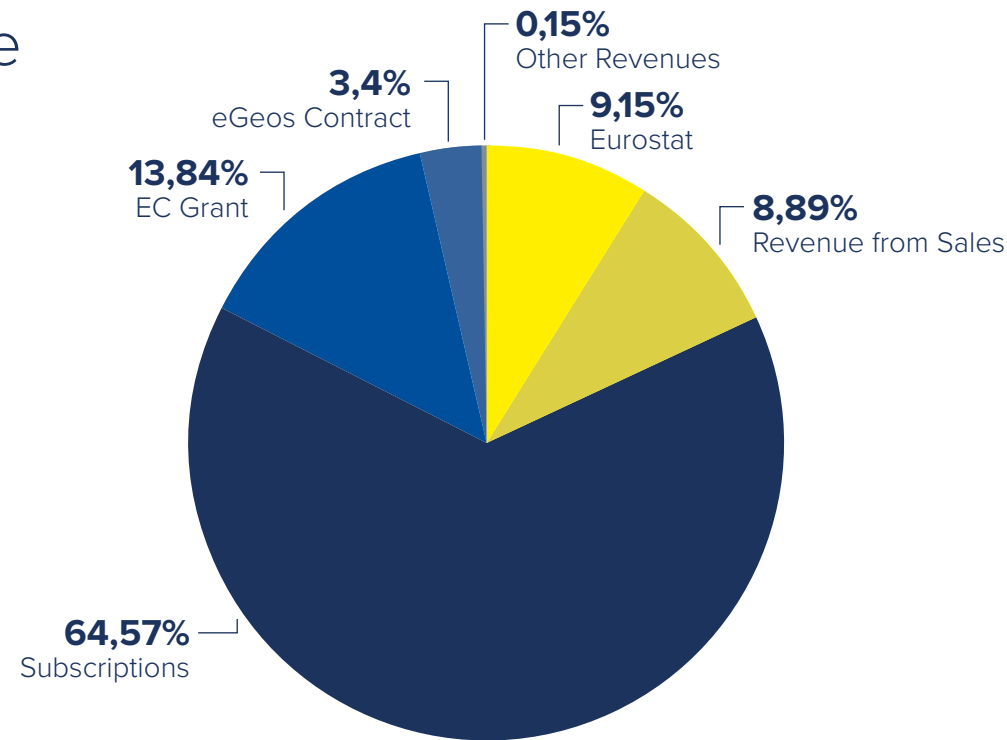
Benefits

- Provides a single cartographic basis for use by all geospatial data holders.
- Provides amalgamated territorial communities with the official source of topographic data.
- Promotes the creation of geospatial datasets and their integration into the national spatial data infrastructure (NSDI).
- Provides an accessible service for geospatial data, that is free and open to anyone.
- Provides a beneficial tool for the development and maintenance of railways, highways, networks of main and distribution gas pipelines, main oil pipelines, detection of radio frequency zones.
- Provides an information resource for the Public Cadastral Map, State Geological Map, State Geodetic Network and Catalogue of Administrative Units of Ukraine.
- Strengthens the country's defence capabilities.
- Provides an essential tool for urban planning and development documentation.

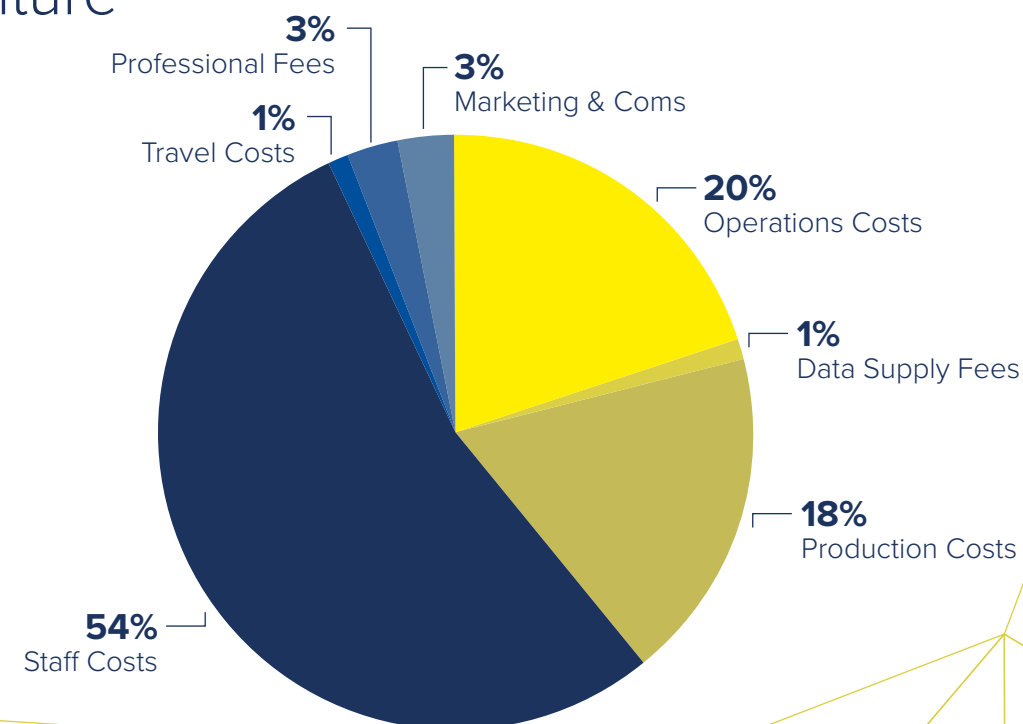


Finances

Income



Expenditure



2021 annual accounts

Income

Eurostat	128 029 €
Revenue from Sales	124 440 €
Subscriptions	903 718 €
EC Grant	193 701 €
eGeos Contract	47 550 €
OtherRevenues	2 238 €
Total Income	1 399 676€

Expenditure

Staff Costs	701 875 €
Travel Costs	6 295 €
Professional Fees	39 455 €
Marketing & Coms	36 204 €
Operations Costs	264 862 €
Data Supply Fees	12 316 €
Production Costs	231 848 €
Total Costs	1 292 854€
Final Result	106 822€

Management Board



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Colin Bray
Ordnance Survey Ireland



Treasurer
Martin Salzmann
The Netherlands' Cadastre,
Land Registry and Mapping
Agency



Kenny Crawford
Registers of Scotland



Andreas Hadjiraftis
Department of Lands
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