

Impervious areas and sealing levels

Customer Statement

"Fragmentation of land is a time bomb ...if you use satellite data over a span of ten years you can really see a difference. What we are able to see from satellite data is that the increase in soil that is sealed off by human infrastructure activities is even greater than we anticipated"

Chris Steenmans, Head of Data Access and Management Group; European Environment Agency

"To be able to evaluate the implementation of the objectives of the Austrian Strategy for Sustainable Development, suitable data have to be provided. Remote sensing data should therefore be used increasingly for the monitoring of soil sealing in the future."

(Source: Austrian Federal Environment Agency, 7th Report on the State of the Environment in Austria, 2004)

Users

The users of the service are spatial planning departments within regional governments as well as Federal Environment Agencies. In addition, the service caters to the specific information needs of European Commission Services.

User Needs / Drivers

At the EU level, the service refers to the principles formulated in the 6th Environmental Action Plan, the European Commission's "Communication on Planning and Environment - the Territorial Dimension", the 2nd Cohesion Report and the European Spatial Development Perspective.

At the national and sub-national level spatial planning directives such as national sustainability strategies and spatial planning laws are addressed.

Mitigation of climate change impact by integrated spatial planning is a key element to limit human and socio-economic loss, where e.g. land take by urban growth may lead to increased flood impact through faster run-off.



© Satellite image: Spotimage; Producer: GeoVille 2007
Transforming satellite images into geoinformation for spatial planning

Service

The impervious area and sealing level service within GSE Land offers an adequate approach to monitor urban growth and soil sealing, because it provides spatially referenced and consistent information in support of reporting obligations.

Products describe the Pressure, State and Impact of urban land-take. They consist of maps, statistics, indicators and scenarios.

Mapping and downstream products provide views of landtake trends and their impact on representative European areas on the sub-national level, such as the German 'Länder', French 'Départements' and Italian 'Regioni'.

Answers to key policy questions include:

- How much land is being taken for urban development?
- Where does the most significant land-take occur?
- How many people are affected?

Benefits

- Enriching lump statistics with geospatially explicit information
- Guaranteeing European consistency and comparability
- Facilitating the evaluation of policy options
- Improving decision making through better planning information
- Moving from observing and monitoring to policy evaluation

Outlook

GSE Land has implemented the service in regions across 9 European nations. It has served as an important reference for the first implementation step of the European GMES "Land Monitoring Core Service" via the "GMES fast track service on land monitoring - High resolution core land cover data for built-up areas, including degree of soil sealing 2006" implemented by the European Environment Agency together with the European Commission and the European Space Agency. This roll out of the service covers 38 European countries spanning from Portugal to Turkey and from Sicily to the North Cape.

Service Providers

- GeoVille Information Systems GmbH/AT (service coordinator)
- GIM nv/sa/BE
- Indra Espacio S.A./ES
- Infoterra GmbH/DE
- GISAT s.r.o./CZ

Reference Users

- Comunidad de Madrid (Direccion General de Urbanismo y Planificacion Regional) (ES)
- Vlaams Instituut voor de Zee (BE)
- Land Vorarlberg - Landesvermessungsamt Feldkirch (AT)
- Umweltbundesamt Österreich (AT)
- Österreichische Raumordnungskonferenz (AT)
- Landesamt für Bergbau, Energie und Geologie Niedersachsen (DE)
- Umweltbundesamt (DE)
- Regional Authority of Pilsen Region (CZ)



Impervious areas and sealing levels



Areas Mapped

>100,000 km2 comprising the following regions:

- Lower Saxony/DE
- Lake Constance Area/ A, CH, D, FL
- SAIL Region/BE, FR, UK, NL
- Madrid/E
- Pilsen/CZ

Product

- Mapping service: 8 classes with 0.25 ha for artificial and 1 ha for non-artificial surfaces, including sealing levels; scale of use 1:25,000
- Spatial planning indicators & population exposure maps to assess land take trends and land consumption impact

Input Data

- SPOT-5 & SPOT-4 satellite images
- Topographic maps
- Aerial photographs
- Statistical data (demographic & socio-economic data)
- Ancillary GIS data (land-use zoning, soil quality, protected areas, etc.)

Methodology

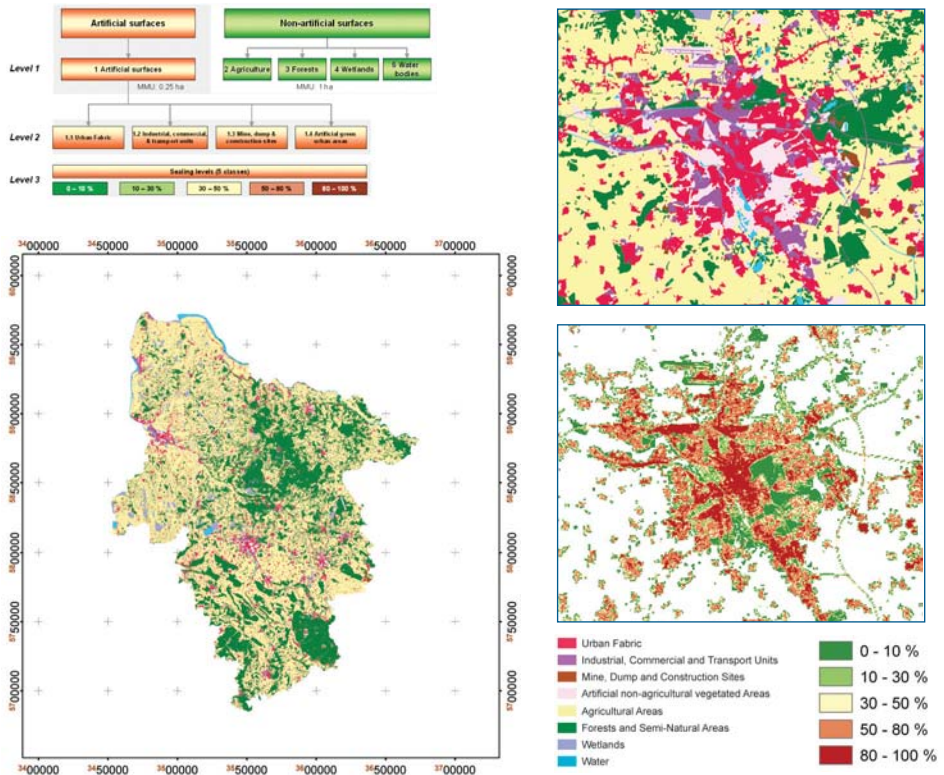
- Mapping service: Geometric & radiometric correction, segmentation, automated pre-classification, post-classification refinement, sealing level calculation, accuracy assessment
- Land Take Trends and Land Consumption Impact: Data integration, GIS-based overlay operations, statistical analyses

Type and Format of Output

GIS files (ESRI shape files and grids, alphanumeric output); analogue maps on request

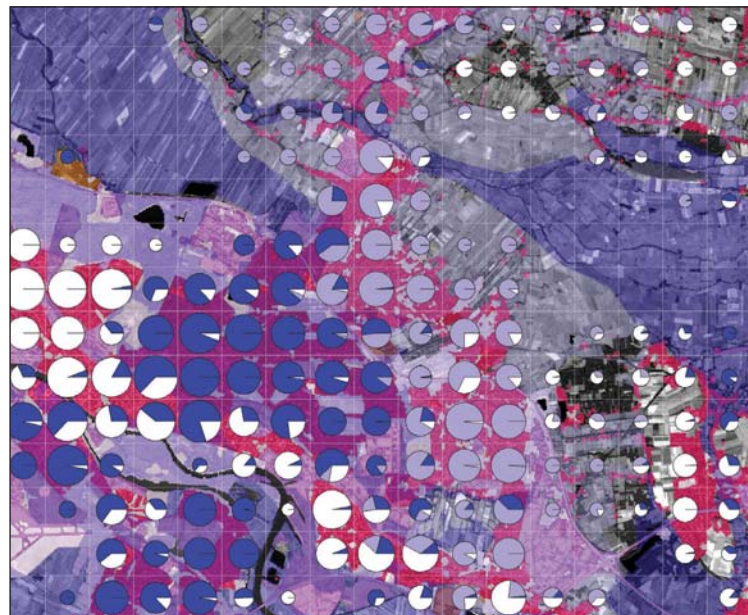
Service Portfolio & Specification Details
<http://www.gmes-gsland.info/sport/>

Land Take Mapping: Land Cover/Land Use related to land consumption and soil sealing

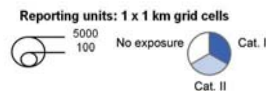


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 Mapping product example – Land-take map 1 : 25,000 for year 2005, 8 classes at 0.25 ha – artificial surfaces, 1 ha non-urban
 Inventory of artificial surfaces and sealing levels in relation to other land cover types for Weser region/Germany.

Geo-locating statistical data (e.g. population information) :



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 Example - Population exposed to flood risk in city of Bremen/Germany



High resolution land cover / land use data are used for the localisation / dis-aggregation of socio-economic statistics, usually available on the basis of administrative units. The resulting localised statistics are a key input for spatial planning and the implementation of measured to adapt for climate change, including risk management applications (e.g. economic "Flood Damage Assessment" as offered by the GSE Risk EOS "Flood Information Service" web portal, www.floodmaps.de)

Impervious Areas Service Providers



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