

## Core Mapping Service: European Land Monitoring (EUROLAND)

geoland:2

- » Support the mitigation of environmental pressures
- » Provision of a wall-to-wall, pan-European data basis for monitoring urban expansion and sprawl
- » Development and implementation of a processing chain to efficiently produce common elements and “quantitative” land cover layers contributing to a better understanding of land changes and ecological / environmental trends

### Service Objective

Sustainable development is the guiding principle of current environmental policy. Responsible authorities need accurate and timely information to meet reporting requirements linked to environmental legislation.

Environmental trends and changes are increasingly mapped and monitored by using information derived from Earth Observation. The main advantages of such data are their timeliness, their cost efficiency and the fact that all information content is harmonised across borders. Therefore the main goal of the local and continental Land Monitoring Core Service (LMCS) components is to support the mitigation of environmentally harmful human activities (“pressures”) at the aggregation level of “policy fields” such as Climate Change, Water Policy, Soil Policy, Cohesion or Common Agriculture Policy.

### Service Description

The European Land Monitoring Service (EUROLAND) addresses the local (i.e. very high spatial resolution (VHR), sample-based Urban Atlas) and the continental component (i.e. high spatial resolution (HR), wall-to-wall land cover and land cover change data) of the LMCS. More specifically the following information is provided:

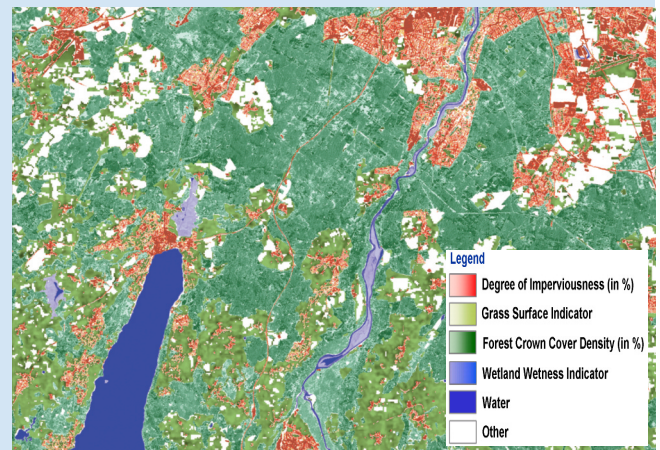
#### Local Component:

The Urban Atlas generates VHR geo-information on land use for important European urban agglomerations. Its main objective is to support the Urban Audit of DG Regional Policy. The specification of the Urban Atlas presently contains 19 thematic classes, with a Minimum Mapping Unit of 0.25 ha for urban classes and 1 ha for non-urban classes.

EUROLAND develops efficient change detection methods for the updating of coming versions of the Urban Atlas. Several cities are produced and available for viewing and download.

#### Continental Component:

EUROLAND contributes with the development and implementation of an efficient processing chain for future updates and thematic upgrades of CORINE Land Cover (CLC). This approach uses common elements (e.g. data pre-processing, calibrated indices, biophysical parameters, and change indicators) and intermediate products of general interest, such as the 5 high resolution layers (Imperviousness, Forest, Agriculture, Water, Wetlands).



*Demonstration of the 5 High HR-Layers (High Resolution Landcover Layers) for the alpine transect Munich-Verona © Euroland Team*

All layers are available in several test sites across Europe, only the HR Imperviousness Layer covers all EEA38 countries.

The continental component is complemented by statistical area frame sampling using VHR imagery. It is aimed to better understand the reasons for change across European regions and to support the validation of continental monitoring approaches in Europe and Africa.

### Users

EUROLAND addresses two different groups of users: (1) European entities such as the DGs Regional Policy, Environment and Agriculture and the European Environment Agency, and (2) Member States and European regions with the mandate to manage and report on environmental issues. The latter address for instance transboundary applications such as international water body assessment, agri-environmental monitoring or support for cohesion activities.

## Benefits

The **Urban Atlas** offers a sound basis for spatially explicit land cover/use maps and statistics allowing a regular monitoring of European urban development and planning for politicians, environmentalists and other public stakeholders in order to better manage European cities. The service is especially relevant for monitoring urban expansion and sprawl in the vicinity of cities, often the most dynamic areas with huge influence on city development itself.

The **High Resolution Layers** are developed to contribute to a better understanding of the ecological / environmental land cover elements by offering wall-to-wall quantitative layers allowing:

- Improved CLC update and attribution;
- Support of Member States to upgrade national / regional data bases with more thematic content or by more efficient mapping;
- Support the creation of European environmental indicators;
- Monitoring of changes to mitigate impacts of global warming and environmental degradation.

## Summary

Four major elements are addressed by EUROLAND:

1. Efficient production and update methods for Urban Atlas and the continental LMCS;
2. Change detection means to update and complement existing land cover / use data bases applicable for a large variety of monitoring approaches on all administrative levels;
3. Analysis of new sensors (e.g. TerraSAR-X, RapidEye, CosmoSky-Med, DMC, Sentinel-2) with regards to their applicability for European environmental monitoring;
4. Promote the integration of Earth Observation based monitoring in a range of spatial and temporal scales to better address stakeholder requirements.

These developments of geoland2 contribute already to the set-up of the GMES Initial Operations (GIO) phase by the GMES Bureau and EEA with respect to service definition and testing, cost estimation and an overall cost/benefit assessment.

	Urban Atlas	HR Layer Imperviousness	HR Layer Forest	HR Layer Grassland	HR Layer Wetlands	HR Layer Water
Information Content	Land use and land cover data with 19 classes for Larger Urban Zones with more than 100.000 inhabitants	Built-up areas including continuous degree of imperviousness ranging from 0-100%	Continuous Forest Crown Cover Density and Forest Type compositions	Grassland areas with a continuous degree of intensity	Wetland areas according to RAMSAR definition, wetness indicator	Small inland water bodies such as lakes, water reservoirs, river, streams
Type	Vector	Raster				
Minimum Mapping Unit	0.25 ha (artificial) 1 ha (non-artificial)	Pixel level, validated to 1 ha				
Update Frequency	3 years	3 - 5 years				
Specific Benefits	Development of a cost efficient update methodology of the existing Urban Atlas data	Input to State of Environment Report: Land-take trend in Europe (vs. FTS Sealing 2006); Input to various reporting & management obligations (WFD, STS, UTS, ESDP, national sustainability strategies)	International: Environment for Europe Ministerial Conference (Efe); Ministerial Conference on the Protection of Forests in Europe (MCPFE). EU level: EEA State of Environment Report, SEBI2010 indicators, support to the EU Forest Action Plan implementation. National level: support to national forest inventory and monitoring	Input to Habitats Directive CAP (cross-compliance aspects: agri/forest conversion, environmentally friendly farming, maintenance of grasslands) Global Warming impact monitoring (desertification in the South, spread of humid grassland in the North)	Provision of first pan-European data set on wetlands, Improve National digital data to RAMSAR, Birds directive, CDDA data, Habitats and NATURA 2000 sites	Input to various reporting & management obligations (WFD, Flood Directive, Climate Change, Aarhus Convention, CAP)

### For further information, please contact:

Prof. Dr. Steffen Kuntz | Task Manager EUROLAND  
P: +49 7545 8 9966  
E: steffen.kuntz@astrium.eads.net

[www.gmes-geoland.info](http://www.gmes-geoland.info) | [www.land.eu](http://www.land.eu)

