



## VISION

*Geographic Information with all its aspects should become a fully integrated component of the European knowledge-based society.*

## MISSION

*In order to ensure good governance, economic and social development, environmental protection and sustainability, and informed public participation, the mission is to maximise the availability, effective use and exploitation of GI throughout Europe.*

*This requires EUROGI to stimulate, encourage and support the development and effective use of GI and relevant technologies, and to act as channel of the voice for the European GI community, private and public sectors alike.*

## MEMBERS OF EUROGI

AESIG, Spain  
AFIGéO, France  
AGEO, Austria  
AGORIA, Belgium  
AM/FM-GIS Belux aisbl  
AM/FM GIS Italia, Italy  
CEKTRA, Slovenia  
DDGI, Germany  
DGT Portugal, Portugal  
EARSC  
Esri  
ESTGIS, Estonia  
GEODIRECTORY  
GEOFORUM Denmark, Denmark  
Geo-SEE Institute, FYRo Macedonia  
GI Norden  
HEXAGON GEOSPATIAL  
HUNAGI, Hungary  
IGIS, Croatia  
IRLOGI, Ireland  
ISPIK, Poland  
LATGIS, Latvia  
LISA, Iceland  
MallonTechnology, United Kingdom  
SOGI, Switzerland  
SPATINEO, Finland

## Map of EUROGI membership base:

"Countries in which EUROGI members are based".

Although this broadening of the membership base has taken place, the National Associations still provide the core of the organisation.

EUROGI embodies a representative sample of the European GI community and aims to be the key facilitator for Geographic Information for the purpose of good governance, economic and social development, environmental protection and sustainability, and informed public participation.



## WHAT IS EUROGI?

EUROGI is an independently funded, not-for-profit NGO operating in Europe, but which also makes contributions in a wider international context. From its earliest days EUROGI members have been *National GI Associations* (NGIAs) and official national representative organisations. The NGIAs are the NGOs in each country which draw together organisations (government departments, state agencies, local municipalities, research institutes, private companies etc.) who have an interest in GI/Spatial Data Infrastructure matters. Thus although the number of members in EUROGI has always been relatively small, through its NGIA members it has over about 6.000 organisations which are incorporated under the EUROGI umbrella.

## WHAT DOES THE FUTURE HOLD FOR EUROGI?

- ❖ 22 years of solid achievements creates a sound platform on which to move forward into the future. However no organisation can be complacent and rest on its laurels.
- ❖ Broadly some of the main future directions would include expanding and deepening membership, consolidating and building EUROGI's networks, strengthening its relationships with a number of relevant European Commission bodies, exploring and emerging future trends which will impact on the GI/SDI environment, playing a strong and cooperative role with other pan-European organisations in the broad GI/SDI field, and expanding its ability to support GI/SDI developments aimed at addressing development issues in an international context.
- ❖ Over the past, 22 years much has been achieved. However EUROGI is very much aware that much more needs to be done to ensure that GI/SDI fulfils the critical role in addressing pressing European and international challenges.
- ❖ EUROGI is a vigorous and vibrant organisation which we believe will play a significant role in the years ahead.

## POLICY POSITION PAPERS

For last 2 year EUROGI has been going through process defining some topic areas which might be important as seen from the GeolCT perspective when setting up and implementing various policies on European and national level. Its members prioritized six of these topic areas: **Internet of Things, Big Data, Linked Data, Open data, SME promotion, Sustainable Urban and Regional Development**

All of these topic areas have been discussed in working groups among the members and during two workshops with some other European organizations and Policy/Decision makers and collected together in six policy position papers.

On the following pages you can find the positions collected from all six position papers. For detailed papers please visit EUROGI website [www.eurogi.org](http://www.eurogi.org)



## BIG DATA

**#1 Dealing with Data Volume** The GeolCT community should work on improving NoSQL databases, addressing optimizations for spatial- and spatial-temporal queries, including those queries with RDF links to other data. Their deployment and federation using geospatial catalogue service standards should be promoted at the EU level.

**#2 Reducing Data Complexity and Variety** The EC should promote development of and adherence to international standard conceptual data models in the industry, academic and professional domains such as environmental management, municipal operations and the geosciences. Developers should be encouraged, when encoding point location, vector data and coverage data to implement international point location, vector and coverage data encoding standards.

**#3 Meeting Velocity** The EC should continue to support businesses as well as local and national governments in their effort to build-up computer-cloud infrastructures, where deployment of geospatial platforms on computer-cloud should be emphasized and appropriately supported.

**#4 Ensuring Privacy** The EC should sponsor research into privacy enhancing technologies and the development of standardised data masking services as one of its priorities. Good practices and well-established protocols of GeolCT should be integrated into privacy preserving standards, where privacy-by-design should be emphasized. Privacy issues related to mobility data should be considered as a priority.

**#5 Adding Value to the Data** Development of geospatial platforms and location base services should be one of the key priorities of EC policies in order to add the value to geographic information by enabling geodata-driven decision-making. To support this, a special focus should be paid to the development of tools for mapping location references (e.g. addresses) into standardised representations of location. The EC should also establish capacity-building mechanisms for enabling combined geo- and non-geo based Big Data analytics.

## INTERNET OF THINGS

**#1 Improving Data Management and Analytics** Every IoT device should be aware of its location and record time. It should be able (not forced) to report this information together with its capabilities to its superior system. The extent of reporting is entirely defined by the user, while data storage and analytics should be

performed within individual systems, thus emphasising distributed processing and data storage. Real-time stream and event processing should be adopted to complement processing of data-at-rest. Standardized geospatial platforms should be the basis of data analytics and a necessity immediately above the level of individual IoT systems in support of spatiotemporal optimizations.

**#2 Preserving Privacy** The EU should support the integration of good practices and well-established protocols of GeolCT for preserving privacy, such as decentralization of data storages and the use of location to disguise identity of users. A bottom-up approach to the implementation of IoT should be prioritised by firstly establishing autonomous systems, and then linking them through a single gateway. This gateway should be completely controlled by the user, while each subsystem should be capable of providing basic functionalities even when not connected to any global network. In support, communication protocols should be implemented in a top-down fashion.

**#3 Ensuring Security** Integration of security mechanisms should be achieved together with the integration of IoT systems in a bottom-up fashion in order to prevent or limit down-stream security risks. GeolCT and geospatial analytics should be emphasized in order to increase robustness against possible outages of systems.

**#4 Standardisation** The EU should support the development of standards from a user-centric view, which should adopt top-down communication, minimising the need for transmitting the data from subsystems to those higher in the hierarchy. Above the low-level communication standards, open Web standards should be embraced to facilitate data transfer. The location element should be represented in standard OGC format and information should be organised in terms of the requirements of the INSPIRE Directive. The EU should consider encouraging stakeholders to initiate development of international implementation standards based on the OGC Geospatial Digital Rights Management Reference Model.

## LINKED DATA

**#1 Linked Data and Open Data** In the case of open data which public sector bodies are making available they should aim to meet the Level 5 standard in the 5 Star Linked Open Data Framework, which specifies that the open data concerned is in linked data format (RDF). Guidance should be provided within different domains regarding how best to achieve level 5. The EU should encourage cross-

participation by stakeholders in the open international standards bodies engaged in aligning geospatial and linked data standards and best practices. The use of URLs and HTTP based naming of concepts and entities should be prompted, to enable unique identification. Links to openly available datasets should be included to promote usage.

**#2 Domain Linking Guidance** Within prioritised domains guidance should be provided regarding the nature and extent of linking, which would represent acceptable, good and best practice. Particular attention should be given to the location aspect within the domains. A starting point may be domains related to selected data themes set out in the INSPIRE Directive. Such guidance should take account of current and evolving ontologies in the relevant fields. The linkage and mappings should include general classes of geographical concepts, as well as the specific instances of those classes. Linkage in terms of

**#3 EU Directives and Regulations** Future EU Directives and Regulations and any significant revisions to existing Directives or Regulations should contain a provision which requires that data made publically available in terms of the Directive/Regulation be in a linked data form and uses existing relevant ontologies where they exist, in particular ontologies related to location matters. In the case of current Directives, a priority should be given to making INSPIRE data available in linked data form.

**#4 Ontologies** Ontologies dealing with location issues should be developed giving priority to such topics as place names, hydrological features, transport networks, cadastre, addresses, inside / outside positioning and location issues in relation to real time mobile situations, and Internet of Things. The development of ontologies related to the suggested topics should build on the basis of existing ontologies and should take potential user needs and requirements into account. The reuse of existing well-known ontologies should be promoted. As a priority ontology should be established regarding the data themes set out in the INSPIRE Directive.

**#5 Persistent URIs** URIs that have been assigned should be persistently maintained and resources that are assigned publicly known URIs must become part of the maintenance commitment of an organisation. In other words, once a URI has been assigned, it should not be changed later. If changing URIs is unavoidable, redirects should be maintained so that the resource remains accessible through the old URI. Public sector bodies will only start using HTTP



URLs minted by other institutions if there is a credible persistent URI policy behind them with sufficient service level guarantees, including guarantees for long-term persistence, resolvability, response times, information quality, etc.

#### OPEN DATA

**#1 Standardised Geo-referencing** Probably the single most important requirement in order to adequately incorporate the location aspect into data being released under open data initiatives is to ensure that all relevant data which is made open is georeferenced according to a widely accepted international standards.

**#2 Guiding Principles** Generally, the 10 principles from Sunlight Foundation should form the framework for specifically making geodata open. It is acknowledged that all the principles will not necessarily be met in all cases. It is suggested that with regard to each data set which would be made open, the publisher undertakes a rating using the principles set out below. On the basis of consultation, the EU could produce a standardised scoring system which could be used to rank the data which it is making open, and it could encourage national states and other bodies to adopt the system. The scores would be incorporated into the metadata which would accompany the open data.

**#3 INSPIRE** The INSPIRE requires that Member States shall adopt measures for sharing of spatial datasets and services with their public authorities. Sharing should in practice be wider so public authorities should share their INSPIRE data with the general public. As part of the INSPIRE reporting cycles Member States should be requested to report on what INSPIRE data is made publically open and to evaluate such open data in terms of the 5 Star Open Linked Data Framework.

**#4 Cross-sector access to Open Data** As location information is not specific to geospatial data but used across sectors and domains, open geographic datasets must be searchable on general data portals, thereby making geospatial information better accessible across sectors. For enhancing the discovery of geographic datasets amongst general data portals, a common metadata language for sharing the descriptions of spatial datasets must be used. Specifications such as GeoDCAT-AP can contribute towards that direction.

**#5 Open Government Partnership Action Plans** Every new Action Plan and any updates of existing Plans should make specific reference to the need to fully and adequately make public sector GI open (subject to certain limitations as set out in the INSPIRE Directive as indicated above).

Specific measures to take this forward within defined timeframes should be set out.

**#6 UN GGIM (Europe)** which has a membership and remit beyond just the EU should establish a new sub-Work Group aiming at producing a guidance document which can be used by all public authorities when drawing up their own open data policies and programmes.

**#7 Sharing Best Practice and Capacity Building** In a number of countries considerable progress has been made in opening up their public sector geodata. Policies, guidelines, manuals, impact evaluations and other documents have been produced to guide and facilitate these open data initiatives. As part of the Digital Agenda Europe initiative, the EU should facilitate a specific programme, which aims to collect and share best practices.

#### SME PROMOTION

**#1 Policies Frameworks to support GeoSMEs** National governments should be encouraged to establish policy frameworks to support the growth and development of GeoSMEs. The EU should produce a guidance document setting out a framework for national governments, which may wish to adopt suitable policies to specifically promote the GeoICT sector. Such a document could also be of significant benefit to non-EU countries in the CoE area and may also be of relevance for sub-national level entities such as regions or cities.

**#2 Expertise and Networks** Technological change, which has significant direct or indirect impacts on the environment within which GeoSMEs operate, is taking place at an ever-increasing pace. The basic problem from a GeoSME perspective is that in many cases they have resource constraints arising from the fact that by definition they are small or relatively small. EU funded projects should specifically target training and development for GeoSMEs in virtually all broadly defined domain areas (e.g. health, transport, security, environment etc.). Such capacity building should also focus on emerging business trends (e.g. the collaborative economy) and technology developments (e.g. Internet of Things, Big Data etc.). EU funded projects should also mandate use in projects of open international consensus-derived geospatial standards to maximize opportunities for participation and subsequent market success by SMEs.

**#3 EU Directives and Regulations** Tenders for the provision of infrastructure and other types of projects often make no reference to the need to provide

standards-based geodata and geoprocessing services. It is suggested that the European Commission produce a model set of tender conditions, which are specifically related to the provision of GeoICT services, possibly with variations suitable for application in various domain areas. Tenders sometimes call for successful companies to provide large-scale fully integrated systems as part of the deliverables. Consideration should be given when drawing up tender specifications to adopting a more modular approach such that there would be standards-based components, which would be more amenable to bidding by GeoSMEs.

**#4 Awareness Raising** EUROGI is of the view that the potential use of spatial data, is significantly below the potential. EUROGI considers that the widespread incorporation of geodata and services into businesses and public sector bodies, which currently do not use such data or services in an organised and focussed way, would result in significant efficiency gains and improved product offerings across Europe. Both public and private sector bodies could play a supportive role through procurement practices in domain based policies and programmes and by highlighting cases which indicate the benefits of the application of GeoICT. At a European level, EUROGI could collate them to provide a comprehensive depository, while its national association members could tailor them to local circumstances.

**#5 Global Markets** Considerable scope exists in both developing and developed countries outside of Europe for the application of GeoICT. Some of the areas where the GeoICT sector is very relevant relate to remote sensing, Spatial Data Infrastructures, GIS software, etc. International open standards are critical enablers for both European SMEs and developing nations, who seek access to global geospatial markets. Pursuing expanded international commerce in geospatial data and services should be done in collaboration with organisations such as the UN (specifically UN-GGIM) and the World Bank to ensure broad distribution of the benefits geospatial technologies can bring to developing nations. This concerted effort is critical in meeting the UN Sustainable Development Goals.

**#6 Open Data and Data Costs** GeoSMEs are often hindered in their ability to quote or engage meaningfully in projects because of the relatively high cost of certain types of geodata, in particular what is called reference data. One of the areas in which the EU has opened a major opportunity for GeoSMEs relates to the availability of Copernicus data at no data cost. Whilst it



is recognised that the production of spatial data has an associated cost, EUROGI is of the view that charging more than the marginal cost of provision of such data is not supportive of the growth and development of GeoSMEs. It is strongly recommended that the relevant decision making authorities at the national level take a 'holistic economy' perspective rather than a perspective, focusing only on the financial viability of single entity.

**#7 GeoClusters** The geospatial sector has potential for high business growth. In US the Mississippi state government has supported the establishment of a successful geospatial business cluster. This example could form a basis for national, regional or city governments in Europe to embark on the establishment of geospatial business clusters within a public-private-partnership framework. A goal could be the establishment of at least one such cluster in each European country. An initial important step would be to investigate best practice globally and to draw up guidance material for public and private sector bodies to use to move forward within their own countries. Networking between such clusters should be encouraged.

## SUSTAINABLE URBAN AND REGIONAL DEVELOPMENT

**#1 Identifying What Data is needed by Stakeholders** A fundamental starting point in any programme to promote SURD at all levels from local to regional is to understand at a fairly specific level what data the various stakeholders in urban and regional development processes would find useful. The EU in cooperation with Member States and neighbouring countries should undertake an initiative to identify the data requirements of all relevant main stakeholder groups.

**#2 Widespread Availability of Planning Related GeolCT** The widespread availability of up-to-date, accurate and understandable data is a basic requirement for promoting sustainable urban and regional development. All planning authorities should establish planning portals, which draw together relevant information related to all of the main aspects of any planning system. The experience gained by those authorities, which have established such portals should be widely communicated. Spatial data management and standards expertise should be provided to the decision makers within planning authorities so that systems are based on open standards and related best practices. This is important in order to provide a path to future uses of the data and to enable buyers to take advantage of all the resources available in the market.

**#3 Location Tagging** A key requirement for ensuring interoperability between datasets is that all relevant data is geo-tagged consistently according to accepted European and global standards.

**#4 Core Reference Spatial Datasets and Spatial Data Infrastructures** One of the most fundamental requirements from a GeolCT perspective for promoting SURD is the widespread availability of basic reference datasets. In this regard the European Location Framework initiative should be fully and actively supported, and implemented. In principle all countries within the CoE should have SDIs at both the national and sub-national levels as an important component of their 'toolset' to promote SURD. SDIs can take many forms, ranging from the INSPIRE model which may be regarded as being towards the best practice end of a continuum to ones which are considerably less comprehensive and more basic.

**#5 Smart Development** The application of ICT in promoting more efficient development processes and minimising environmental impacts associated with development have been well established. The potential of smart city and smart region internet-based platforms should be widely used. A particular emphasis should be placed on capacity building to enable less developed countries and regions within the CoE area to use such platforms. At the EU level there should be a specific focus on how new and emerging technologies could be used in an integrated way across the Union and possibly into neighbouring countries in order to promote SURD.

**#6 Big Data Analytics** Promoting SD requires planners, developers, government agents and citizens to be able to access, understand and use data from a wide variety of sources. The EU should play a proactive role in facilitating the widespread availability of big data analytical capacities amongst planning authorities at all levels from national to local, taking account of capacity constraints. The EU should also fund or at least follow current research into related data science and associated advanced standards work being done in the Open Geospatial Consortium (OGC).

**#7 Modelling Development** Promoting SURD requires planning and other authorities to go beyond just understanding current and historical development processes in their areas and to identify and evaluate potential future development scenarios. Urban land-use models provide a useful basis on which to develop other models. The EU should promote the development of dynamic spatial urban and regional models, building

on work already undertaken in various EU funded and other projects. Such land-use models should be integrated with transport and environmental impact models and where appropriate introduce 3D components.

**#8 Beyond INSPIRE** The EU's European Union Location Framework programme represents an initiative which builds on INSPIRE and the ISA programme (Interoperability Solutions for European Public Administrations) and has important possible implications for promoting improved interoperability, the single digital market, e-Government and ultimately promoting more SURD. The EULF initiative should be actively supported by governments at all levels.

**#9 Remote Sensing** Imagery from Copernicus, Unmanned Aerial Vehicles, and other remote sensing facilities offer significant opportunities to provide important inputs into urban and regional development decision-making processes. Geoscience Australia has rectified and combined almost 40 years of Landsat imagery creating a database which provides a very powerful and useful 'tool' to track land cover changes. A similar initiative should be undertaken covering all those countries in the CoE area, which may wish to participate. UAVs can provide much geodata relevant to promoting sustainable urban and regional development.

**#10 Geodata Availability Scoring Facility** The development and application across Europe of a facility rating the availability of core information, which is required to support informed infrastructure, housing and other types of investment decision-making, should take place. Such a facility would not only provide a standardised basis for evaluating performance for counties, regions or cities but could provide aspirational targets and in so doing provide a motivation for promoting better practice. A facility along the lines outlined above could also play a role in measuring progress towards the establishment of a single digital market within the context of data which relates to SURD.

**#11 3D and BIM** Building Information Modelling (BIM) has transformed the ways in which buildings, infrastructure, and utilities are planned, designed, built, and managed. The widespread application of BIM should play a significant role in supporting more cost effective building of urban areas, building the information base for the development of indoor/outdoor positioning systems and the development of 3D (and 4D) representations of urban areas. BIM solutions are largely proprietary at this point in time, but important standardisation work is being done.