



UN-GGIM: EUROPE Preparatory Phase

Working Group 1 – “Data Definition and Access Conditions”

Report

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Background of harmonised pan-European data

Authoritative geospatial data are used to support both the implementation of public policies and the development of downstream services. Moreover, geospatial data are required to be homogenous to enable the implementation of public policies in a coherent and coordinated way between Member States and at European or global level. Likewise, the services developed by the industry have to be exploited at the level of the effort required by their development, therefore they have to be deployed in several countries without requiring country specific adaptation.

At national level, Member States produce and maintain authoritative geospatial data under the responsibility of state organisations, namely National Mapping and Cadastral Agencies (NMCAs). At European Union (EU) level, the INSPIRE Directive is an important first step towards geospatial data harmonisation, because it supplies a harmonised data specification framework. This Directive has a standardising spirit in the sense that, when Member States produce data on national funding, they shall comply with the standards established by the Directive. However, this Directive does not require producing new data. The EU Directive on the re-use of public sector information (PSI) has a similar standardising spirit in the sense that it requires Member States to ensure that public data are available in conformity with the Directive's rules, but neither does it require producing new data.

As a result, the available geospatial data remain very heterogeneous between EU Member States. The same fact is acknowledged between European UN Member States.

Faced with this heterogeneity issue, some pan-European harmonised data are produced centrally at European level. Nevertheless this approach, when it is carried out with no consensus and no tight cooperation with Member States, has some serious disadvantages: The data produced in this way duplicate the data existing in Member States, thus duplicating public expense and entailing inconsistency between European data and national data; These pan-European data can be used at European level, but in certain cases they are not very used within Member States.

Therefore it seems desirable to intensify the coordination between Member States and European institutions to identify, define, produce and distribute harmonised pan-European geospatial core data.

As regards the European Union, it would be undertaking a second convergence step after the first step achieved by INSPIRE. It seems also desirable for this coordination to involve the European UN Member States that are not EU Member States, because the requirements for pan-European core data generally include data covering these States, and because these States too need pan-European core data.

In this context, the working group 1 addressed the focus points from the following questions:

- How to *identify and define* the core data?
- How to *produce* the core data?
- How to *fund* the production of core data, what *charging principles* to adopt for core data?
- How to develop *harmonised licences* for core data?



Chapter I: How to identify and define the “core Geospatial Reference Data” (cGRD)

1. Requirement Issue

Core data requirement is a most important issue at both European and global level. Requirements come from beyond purely national jurisdictions, and therefore a coordinated response from National Mapping and Cadastral Agencies to these needs is warranted to achieve national objectives within global and European policy frameworks.

Important questions are:

- What are authoritative data? What is their role? Why are they important? Why are they required by users? - Who are the users? In what areas are they needed? What use cases should be supported?
- What authoritative data (including POI) are required at European level or in global context? What quality criteria with regard to uses (to justify authoritative data)?

First answers are:

- data describing the actual state of the country & land
- data on which users have confidence
- data supporting policy making and answering to policy requirements
- data providing the hooks to which thematic and users own data can be connected
- data with temporal & historical dimension enabling to carry out comparisons and analysis
- data mastered by countries (issue of sovereignty)¹
- sustainable data (produced and maintained on a long-term period by an organisation in the framework of its official and accepted mandate)
- example: geospatial data enabling decision-making to meet regulatory or liability requirements, e.g. data guaranteeing land ownership
- data being seamless across borders (international borders or sea-land transition area)

The sustainable development and environmental question is a key element and priority of UN-GGIM globally, therefore the following requirement processes need to be taken up potentially. Key ongoing processes that have defined spatial data needs are:

- INSPIRE themes as defined can contribute to provide the requirement for environmental policies and policies directly or indirectly impacting the environment²;
- Through the in-situ component of the EU’s Earth observation programme: The GISC project³ has supplied an overview of in-situ data requirements for Copernicus services. It contains 10

¹ The availability of accurate and detailed geospatial data is an essential requirement of Member States’ autonomy, sovereignty and economic development. They should be considered and treated as a base infrastructure of each country, to be setup and maintained as other base infrastructures like road network or telecommunications network.

² INSPIRE themes, specifications and regulations strive to meet the requirements from current European Union environmental policies and policies directly or indirectly impacting the environment.

³ GMES In-situ Coordination.



to 15 requirements relevant for NMCAs geospatial data. It specified the themes, scale, accuracy and resolution of the data needed;

- At a global level GM4SD⁴, SDG⁵ and GEO⁶ can contribute to the requirement issue – setting out both needs and some processes to provide solutions;
- As regards marine data, the International Hydrographic Organisation (IHO) is carrying out a standardisation work which should be taken into account.

Requirements for core data could also be asked to representatives of thematic areas beyond environment with cross border issues e.g. transport, hydrography, transnational river basin management (Danube, Kura), and energy transition, coastal and marine issues such as integrated coastal zone management. Core data are needed sometimes on spots (which require high resolution data).

Regarding coastal and marine issues the requirement implies harmonising marine data with terrestrial data, cf. Focus Point 15⁷. Continuous marine and terrestrial data along the coastline are required to implement European or international policies related to seas and coast: risk prevention, coast protection, defence and national security.

So a **dialogue** is needed between the **people having the needs** and the **NMCAs providing the data** (and the hydrographic institutions as regards marine data) **and balancing the needs with the costs**. There is **currently no place for this dialogue** to take place. It is relevant for WG 1 to analyse this situation and possibly recommend options for how this dialogue could take place.

Such dialogue would bring progress on Focus Point 8⁸, and the results of such dialogue would be needs for cross-border and Pan-European core data bringing progress on Focus Point 9⁹.

2. Assessment of existing core data

Corine Land Cover is a good example of data needed at European level and produced by Member States by derivation from national data, using the same images and the same methodology. This example is still a very good one as regards the process and administrative structure to co-define, co-prioritise, co-finance and co-produce the dataset. However as regards the scope of what has been done until now by Corine, the data are currently not enough to meet the requirements.

⁴ Global Map for Sustainable Development.

⁵ One of the main outcomes of the Rio+20 Conference was the agreement by Member States to launch a process to develop a set of Sustainable Development Goals (SDGs).

⁶ Group on Earth Observation.

⁷ Focus Point 15: "Consider roles and requirements of information complementing the terrestrial environment (marine data) and maximise synergies between ground/marine and space based information (e.g. Copernicus, GALILEO at the EU level)."

⁸ Focus Point 8: "Analyse the respective roles of National Mapping Agencies and other Mapping Authorities, pan European associations and EU institutions, with respect to the definition of harmonised pan European datasets. Experiences from EuroGeographics, EU CORINE, GMES, LUCAS, etc."

⁹ Focus point 9: "Identification of a basic collection of authoritative reference GIS data sets."



The implementation of INSPIRE's themes¹⁰ will still demand several years¹¹. It is too early to answer if INSPIRE is enough, the EULF action¹² is considering this. The requirement investigation may show that European needs are not as big as national needs although cross border requirements may be bigger than pan-European ones and European needs may be the same as national needs on specific areas.

The contribution of INSPIRE is to provide the European frame for sharing interoperable data across domains through services, including statistical data referenced with geospatial data. INSPIRE sets standards and obliges to share and provide existing data¹³, but it does not oblige to update existing data nor to produce new data. Therefore some countries do not supply data on several INSPIRE themes, there are holes in the needed Pan-European datasets, and currently core datasets do not exist at European level. Data gaps and lacks will not be solved by INSPIRE. Even data harmonisation will not be fully solved. INSPIRE will not result in Pan-European specific and minimal core datasets, which is not in its scope.

European countries have engaged heavily into transnational cooperation both at a European level and beyond. Much of this cooperation is driven by national policy objectives, which many countries hold in common, creating accepted European, regional or global policies. Increasingly these policies require refined spatial data to be implemented as well as assessed i.e. to support decision making.

In pursuing these common goals, countries and national institutions need to be assured that counterparties are able and willing to provide authoritative data. Whilst this might be made available through global corporations on-line, who may also provide effective fora to resolve issues and even bring support to certain policy topics, the ability to go back to source and track change over time is an accepted element of UN-GGIM model which cannot be placed in a situation where it risks being hostage to incidental loss-leader services of on-line advertising business models or similar¹⁴.

Governments' strategic decisions shall rely on authoritative data they do master. Due to this there was a feeling that creating pan-European core data products based on authoritative data, such as from NMCAs with broad and unified licensing had significant merit.

¹⁰ The INSPIRE themes are relevant for policies directly or indirectly impacting the environment.

¹¹ The deadline for interoperability of newly collected Annex I spatial datasets was 23-Nov-2012, but interoperability for other Annex I spatial datasets shall be available on 23-Nov-2017. For both Annex II and III spatial datasets the deadlines are 21-Oct-2015 (newly collected datasets) and 21-Oct-2020 (other datasets).

¹² European Union Location Framework, cf. http://ec.europa.eu/isa/actions/02-interoperability-architecture/2-13action_en.htm

¹³ The obligation of sharing and supplying the data on all INSPIRE themes is since 2009, no matter if INSPIRE compliant.

¹⁴ World class companies (Google, Microsoft, and others) provide users with alternate routes for limited functions that cGRD will fulfil. The products of these companies are tied to advertising type revenue, with not known sustainability of the business case, and their quality, source and update cycle is not known.



3. Definition of core Geospatial Reference Data

It is proposed to define core Geospatial Reference Data (cGRD) through minimum topics and attributes regarding the Global and European requirements and real possibility from all Member States (MS).

3.1. Introduction

The issue is that there is currently no mandate in Europe to coordinate and solve European geospatial information issues. New mandate and new agency avenues are tricky and perhaps not realistic.

Several European or international initiatives e.g. GISC, GM4SD, GEO, INSPIRE, ELF (European Location Framework) etc. should be used as specification framework for defining cGRD at high level. INSPIRE and ELF should also be used as technical specification framework for defining cGRD in detail.

But what is the definition of cGRD? Some participants considers that this concept is restricting the discussion, while others consider that cGRD are a subset of reference authoritative data i.e. the minimum authoritative data for Member States to satisfy needs at cross-border, European and global level.

In the context where spatial data infrastructures (SDI) are developed, cross-border or pan-European datasets are often produced with a top-down or ad-hoc approach, however if each country produces interoperable data, putting them together as cross-border or pan-European is not top-down although specifications are necessary to get a pan-European product. Therefore the WG 1 agrees there is a need for authoritative data to exist and to be accessible universally in the same specification and to be consolidated in a seamless way: compared with the current situation where each country produces its own data, further steps are needed so that minimum core data are produced in all European countries and seamlessly assembled¹⁵.

Therefore the WG 1 recommends a **process leading to the existence of cGRD at European level**. This process should be based around communities of practice, which is acknowledged by participating institutions and which provides a consensus driven forum involving users as well as providers. This process will not be only focused on existing data at present, but it will aim at what is really needed, it will be based on **consensual minimum requirements for cross-border, European and global requirements**, and it will be far-sighted, even if it requires future changes and improvements in NMCAs production chains.

3.2. Process of cGRD definition taking into account user needs

The question is how to **identify what is needed by whom** i.e. how to **interface and capture results from existing processes** (such as COGI, GEO, Euro data centres, INSPIRE annexes 1 & 3, GM4SD, UNEP live, UNSDG, SOER on-line, Copernicus, PSI, European association representing GI users). In terms of **dialogue or decision making, the gaps may be procedural, or platform and organisational**. The question also needs to focus as well on access to existing capacities.

¹⁵ In compliance to the accuracy and edge-matching specifications that should be included in the pan-European product specifications.



It is proposed to proceed in two stages respectively reflecting the European users demand level and the global users demand level. The first stage would focus on reinforcing synergies in Europe, which are currently insufficient. The second stage would strive to better respond to the global level requirements. Within these two levels, the process of **cGRD** definition by taking into account user needs should address and combine several hierarchical ranks:

cGRD definition	→ GRD requirements (Global level)	→ UN-GGIM process
	→ GRD requirements (European level)	→ UN-GGIM: Europe process
	→ GRD requirements (EU level)	→ COPERNICUS, INSPIRE, PSI processes
	→ GRD requirements (Thematic level)	→ Representatives of thematic areas
	→ GRD requirements (MS level)	→ National GI coordination processes

As an example of interfacing and capturing results from existing processes, the preliminary results of the Consultation by the European Commission on Public Sector Information (PSI) guidelines was presented on 26 November 2013:

http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=4011

It included references to what people see as 'core data' (slides 9-12). Geospatial is clearly identified as being 'core data' but in this report at least there is no detail to say which elements of geospatial are seen as core. It would be interesting and useful in the context of UN-GGIM: Europe to work with the European Commission to see if a further survey might be possible to elaborate the detail.

3.3. **cGRD conditions**

The concept of **cGRD** introduced in section 3.1 could be rephrased through the following conditions:

- **cGRD** should satisfy from bottom (MS) to European and Global needs including cross-border and sea-land interface needs.
- **cGRD** should provide a skeleton for all geospatial information (GI), providing an unambiguous location for any user's information, and a geographic context to allow others to better understand the spatial phenomena.
- **cGRD** should have similar and comparable resolution for geospatial reference in all MS and made seamlessly assemblable.
- Based on these **cGRD** every MS and other public institutions could complete the entire GRD regarding to their own needs.
- **cGRD** should facilitate the harmonization and integration of the rest of GI i.e. the merging of GI from various sources.
- Same input **cGRD** is needed from all MS for inter-comparability and analysis.
- **cGRD** should help reducing GRD production costs by increasing GRD mutualization.

3.4. **cGRD production issues raised by user needs**

The concept of **cGRD** as required by current and real needs at all levels of final users (Global, European, cross border and National) implies **cGRD** should be based on existing Public authorities datasets. This is very important since it is related to authoritative data, giving the guaranty that indeed it is the data public authority rely upon.



Moreover, considering the situation in Europe and the requirement processes mentioned in sections 3.1 and 3.2, it would be necessary to guarantee the existence and maintenance i.e. the sustainability of these cGRD from MS.

To achieve sustainability according to INSPIRE, these **cGRD** should be produced only once¹⁶ and provided bottom-up by MS for all level of Public Administrations, avoiding duplication. Only in the cases where MS cannot ensure it on their own and accordingly would delegate the provision and maintenance of the **cGRD**, a subsidiary centralized (top-down) approach could be carried out by a regional (European) or global public organization, supported by external data providers or suppliers. These issues are investigated in Chapter II of this report.

Meeting user requirements also requires regional (European) and global bodies contributing to the following processes¹⁷:

- ✓ Developing a standardized data model of **cGRD** (and GRD) (e.g. INSPIRE Data Specification in the case of European Union) according to user needs.
- ✓ Setting up an update chronogram for **cGRD** according to user needs.
- ✓ Setting up a platform (i.e. a spatial data infrastructure) for integration and distribution of **cGRD**, where MS can put their **cGRD** in a decentralized way.
- ✓ Defining quality control rules for **cGRD** with regard to user needs.
- ✓ Defining final centralized verification of **cGRD**.

3.5. Relation between cGRD and other data

User requirements usually overpass what NMCA reference data can provide. An important question is therefore what cGRD are maintained by NMCA's as authoritative and reference data, what information is considered as additional, and how additional data production and maintenance will be organised.

Core data will facilitate the production and will guarantee the quality and geometrical consistency of other richer, more detailed, more thematic geospatial data, which would lean on core data.

3.6. Identification criteria of cGRD

According to the previous sections, identification criteria of **cGRD** should be:

- Reliable
- Authoritative
- Seamless
- Subject to easy integration with the rest of GRD and GI, with statistical information
- Accurate at different levels of requirement
- Interoperable (accessible by standard procedure)

¹⁶ This INSPIRE principle currently leads to different interpretations. We suggest future UN-GGIM: Europe work on data issues to define what it means.

¹⁷ Those processes are investigated in the ELF project in relation to INSPIRE.



Chapter II: “How to produce the European core data?”

1. Existing capacities (organisations, associations) and experience feedback

There is EEA’s (European Environment Agency) experience of coordinating the production and the maintenance of the *Corine Land Cover* pan-European product of the Copernicus programme (through its information and observation network EIONET). This product is interesting because it has mutualised satellite images acquisition at European level, and it has been produced and maintained in close cooperation with Member States. The production of high-resolution thematic layers within the framework of Copernicus also involves Member States however it is organised in a more centralised way than *Corine*.

The model of Eurostat is interesting too: Eurostat does not produce data, but relies on data produced by Member States, which are obliged to provide. A European Statistics Code of Practice was agreed in 2005 and the basic legal framework governing the development, production and dissemination of European Statistics by the European Statistical System (ESS) was modernised in 2009 through the adoption of Regulation (EC) No 223/2009 on European Statistics.

The reporting framework of environment directives (e.g. WFD, Habitat and Birds directives) is another model where through the SEIS initiative, harvesting national data is progressively implemented.

EuroGeographics and NMCAs have an interesting experience regarding operational coordination, production and maintenance of the harmonised pan-European products (EuroBoundaryMap, EuroRegionalMap, EuroGlobalMap and EuroDEM) as well as its distribution. Producing these products requires that NMCAs harmonise heterogeneous data content (that were nationally produced) by agreeing on:

- Core data content available for Europe;
- Common data model;
- Common quality criteria;
- Common selection and portrayal criteria, data density;
- Cross-border criteria and common state boundaries;
- Common harmonisation procedures leading to seamless datasets.

This approach is bottom-up, it started from what NMCAs could provide initially, and it harmonises data towards European users’ needs (especially Eurostat needs). It has been carried out gradually, step by step, when delivering yearly updates of the pan-European datasets and in line with NMCAs efforts and costs for reengineering.

Now the EuroGeographics pan-European datasets have reached a suitable level of data quality and harmonisation. This experience shows that regular processes of data quality control and assessment are a key condition to enable any change in matter of production for effectively achieving any harmonisation step at European level.

2. Strategic and organisational framework

The concept of a European agency for geospatial information was raised with the European Commission in 2009. The Commission reaction was that there is no mandate in the European



Treaties, no political will to extend the number of European agencies, and that EuroGeographics already exists.

However EuroGeographics is an operational entity relying on the goodwill of its members, it has no authority to require anything from European countries, in a context where, in some European countries, there are big holes in available data. EuroGeographics has practical activities and never had fundamental discussions about how to organise things at European level.

What should be produced by Member States to serve European needs should be decided by representatives from both European and national bodies with representatives of user organisations active at the European or cross border level.

UN-GGIM could be a unique opportunity to raise the question again and to persuade UN Member States to do things according to minimum requirements. At European Union level, political ownership of geospatial data is currently lacking but could be supplied by the European Commission defining a European Location Strategy stating what needs to be done, how it is to be done and how it is to be funded.

3. INSPIRE and ELF framework

INSPIRE as directive and ELF as project have different scopes and results. INSPIRE is a legal and facilitation framework based on the obligation to share spatial data sets under the scope of the INSPIRE themes, making them interoperable, documented, discoverable and downloadable by services. Although bounded for EU Member States only, many other countries are implementing or in the way to follow the same principles and technical arrangements. ELF is a project that will supply operational products and services from all European countries.

ELF is currently defining and developing an infrastructure that will facilitate the efficient creation of pan-European authoritative data and services as the successor to the current EuroGeographics pan-European products.

ELF will provide data specifications for regional and global level (related to EuroGeographics pan-European products) but also for EuroGeographic members' datasets at high (master) level of detail.

ELF will fully apply INSPIRE implementation rules, ELF "master" data specification will a subset of INSPIRE data specifications by defining a core data content on what NMCA's currently have mostly in common.

4. Issue of sustainability

Tasks and budgets may have led to choose compromise solutions instead of quality and multipurpose solutions. Appropriate calendars should be setup so that Member States satisfy the requirements and provide the core data and so that European UN Member States data are not duplicated.



5. Issue related to Copernicus

Regarding Copernicus the most important issue is currently access to data. PSI and INSPIRE Directives apply in this respect. Technical access to core data should make this easy (e.g. through the ELF platform).

However, in the near future, sustainability will be the key issue for Copernicus, European bodies and EU Member States regarding European core datasets. To be sustainable, the geospatial data required by Copernicus or the European institutions will have to be kept up-to-date; hence an important effort will be required to maintain them regularly. The issue is the same for the pan-European or cross border geospatial data required by European UN Member States.

The GISC report (Report on in-situ data requirements – Update of D2.1 – September 2013) contains requirements relevant for NMCAs geospatial data. But it does not answer to the sustainability issue, as its purpose was to answer the question “what is needed” not “how to produce”. GISC recommendations in other documents clearly identify the important role of EU Member States and re-use of existing capacities in securing sustainability.

6. Issue of sources and processes

6.1. Question of in-situ or space sensors

The sensors’ respective fields of use should be defined according to their respective advantages and drawbacks with regard to requirements.

Frequency vs. accuracy

When frequently updated data are required, space sensors will be appropriate thanks to their high revisit rhythm. On the other hand, when very accurate data are required, other methods and source data will be more appropriate.

As an example, space sensors enable to produce ortho-images with resolution lower than ortho-images stemming from aerial images, but with a better update frequency.

Homogeneity vs. consistency

Space sensors have the advantage of supplying data that are homogenous over Europe. On the other hand, they have the disadvantage of supplying data at scales that are inconsistent with large scale authoritative data maintained by European UN Member States.

6.2. Issue of collaborative data

Collaborative data might be an interesting information source to complete authoritative data. But no long-term strategies may be built on collaborative data that is not maintained nor equivalent everywhere. Nonetheless future spatial data maintenance will require the combination of collaborative processes with institutional processes.

6.3. Various production processes

Core data identification and definition issues are addressed in Chapter I, but it seems obvious that both from the experience of NMCAs (based mainly on national requirements collected during decades), and from common requirements identified in several European initiatives, programs and even legislation (ex. INSPIRE, Copernicus GISC, ELF), a subset of core themes appears to be good



candidates to become a skeleton of core data (e.g. Hydrography, DEM, Transportation, Urban Settlements, Land Cover).

Detailed content, feature size and resolution, data sources needed and update cycle of this skeleton will have to be established, but it is a fact that some of those features are actually obtainable by homogeneous and objective techniques and can be partially updated by automatic methods.

The most appropriate production process selected for each core dataset may involve automated or semi-automated procedure (through image processing and remote sensing techniques) or require much more man-power (including data editing, 2D vectorisation or 3D stereoplottling) when higher quality will be required.

Automatic or semi-automatic generalisation processes will have to be used to transform national data sets to regional and global levels, maintaining coherent topology between various levels.

7. Proposal for a technical study

We suggest a task force under the aegis of UN-GGIM: Europe – after it is established – to carry out a technical study to investigate the issue of sources and processes. This task force will require the involvement of thematic pan-European bodies that may contribute to their definition.

This study may assess for each core dataset required at the European and cross-border level, if space data would be an adequate source regarding homogeneity, frequency, accuracy, and production process. For instance, if pan-European ortho-imagery with 2.50 m resolution and with two years updating rhythm was required, space imagery would be an adequate source. Updating processes should anyhow be carefully assessed to ensure the sustainability of core datasets.

Besides, the study might determine for each required core dataset, whether mutualising pan-European space data acquisition – on the model of *Corine Land Cover* – would bring financial gains for all stakeholders, European institutions and the European UN Member States.

The study might also assess for each core dataset production process, whether, collaborative data would appropriately contribute.

Last but not least the study might determine in which cases mutualised production processes would add value, and in which cases centralised production at European level would be more efficient. It has to be taken into account that some part of data acquisition and maintenance could fall out of scope of national data production process. Another example is the data quality process: This should be in a way supervised at European level.

Though, it seems important that each European UN Member State remains responsible for producing core geospatial data over its territory, and decides whether it wishes to derive the part of the European wide core data that covers its national territory from its large scale authoritative data (whose sources depend on its own decision). Indeed the potential drawbacks of the centralised approach shall be avoided, namely duplication and inconsistency between European data and national data. It is essential from a user perspective that European data and national data are consistent. For example national IDs must be kept in the European data where applicable.

The centralised approach may have the drawback to proceed top-down i.e. the European specifications criteria may be imposed to European UN Member States and may not meet the national ones. Then the national components of the pan-European dataset - even produced at national level -



are not integrated or not recognised as authoritative datasets. In such cases, pan-European datasets are produced in duplication and in parallel to national datasets.

Setting up European specifications and data acquisition processes requires compromises between European, cross-border and national needs in a continuous dialoguing process. In this respect, the study might investigate the best practices on data acquisition of the pan-European products and the user requirement. EuroGeographic mechanisms should be investigated as well as mechanisms in other data area implemented by pan-European organisations including the private sector.

In view of the results of this study, the coordination and the distribution of core data productions could be considered.



Chapter III: How to fund core data production, what charging principles to adopt for core data?

1. The need to fund core data production

The working group agrees that further steps are needed so that minimum core data are produced in all European countries; however this raises the issue of financing the production, as producing core data may entail significant costs for European Member States. Moreover, harmonising core data at European level is currently most of the time out of scope of national remits and funding.

Funding is a key issue to be addressed, in any case funding must be available to produce and maintain the data; otherwise it will be very difficult to achieve core datasets. Without funding, there is no data: this issue has not been properly approached in open data policies.

Therefore the approach should set progressive and moderate ambition levels, and clarify the economic model applied to core data: Which core data can be free and open and therefore up-stream funded and by whom? Which core data are required to generate revenues therefore down-stream funded by the users? And what is the balance between the up-stream and the down-stream funding?

It was noted that for many NMCAs public finance does not cover 100% of their production and distribution¹⁸ costs. This is not often fully recognised at European level. The most frequent economic model is that the balance of funding is covered by users. Given this status, it seemed likely that a similar model would need to be found for core data.

We propose below to follow a multi-level approach. The first proposed level is the European Union (EU), because EU is a very structured and ruled circle, therefore it may enable particular and quicker paths for reinforced cooperation in terms of core data, which may create a first momentum for core data in Europe. The second proposed level deals with all the European UN Member States.

2. Particular paths proposed within the European Union

2.1. Using incentive financial mechanism

The working group took note of the view that EU at least has traditionally fixed problems in one of two ways:

- By setting up a European Directive obliging Member States to produce and maintain core data.
- By using an incentive financial mechanism.

It is likely that such a European Directive will not be setup and agreed on, today we are not aware of any directive that does this for geo-spatial data. However, if core data are produced only on a voluntary basis, with no incentive mechanism, it is likely that it will not work and nothing will happen.

¹⁸ Distribution over the Internet implies computer systems, bandwidth and storage space.



Therefore using an incentive financial mechanism is probably the only way to ensure that core data are produced in all EU countries. Some incentive mechanisms exist in Europe, but those most relevant for core data will have to be identified.

It is suggested that funding should come from both the Member States and the European Commission. European Commission funding back to Member States public bodies has to be justified; ELF is funded 50-50 by Member States and EU because it serves a common EU and national interest and benefit.

Corine Land Cover is another good example: it enabled to define a minimum land cover dataset; the Spanish land cover system is funded 80% at national and regional level by Spain and 20% by EU, it satisfies needs at European, national and regional level.

The development of EuroGeographics pan-European products (EBM, EGM and ERM) is also a successful example of using incentive financial mechanisms, as the development of pan-European content for these was funded via both eContent European projects and European Commission contracts over a number of years.

2.2. Free core data

If political decisions favour open data then a model for adequately sustaining its availability with the currency and quality required by users has to be put in place. Within the EU, as open data are favoured, it is suggested that some core data, namely those meeting essential requirements, should be free and open. European institutions and Member States would decide on the essential requirements and agree on the nature of the core data that shall be free¹⁹. It seems possible to determine and distinguish some themes whose free character for a certain accuracy level could be claimed and made compulsory in all Member States. As examples, if applicable, administrative unit geospatial limits, regulatory zoning maps²⁰, or more comprehensive geospatial datasets in “light” version would be compulsorily free, while “premium” versions (i.e. more accurate, more frequently updated, etc.) could have a fee.

Such a setup would allow the free of charge provision of a minimum infrastructure of core datasets in all EU Member States.

This setup may benefit from ways to finance based on using data services to finance (totally or partially) the data production and maintenance. There are new opportunities now with data reuse, data sharing, data services and co-funding.

2.3. Core data with a fee

On the other hand, beyond a certain detailed level, users - including within European institutions and within EU Member States - would be charged for core data. Given the Malthusian context of Member

¹⁹ Cf. Chapter I of this report § 3.2 “Process of core data definition taking into account user needs” mentioning COPERNICUS, INSPIRE, and PSI processes.

²⁰ Data that provide limits or information on geographical objects defined by any regulation (local, national, European or international). Such data restrict for example the use of land for private, professional or institutional purposes.



States' public finances, a part of them believe that generalizing free access to public data would inevitably lead to decreasing the volume of the produced and maintained public data, although making core data will generate indirect benefits to the society with significant order of magnitude. Indeed, producing and providing data requires high investment. In several Member States, the income from charging for public data currently represents an important contribution to the balanced budget of their production and maintenance.

The recently revised PSI Directive has validated this approach consisting in a gradation of data that are accessed by default for free (or at marginal cost) and data that are accessed for a fee in the cases where generating revenue is required to cover a substantial part of their production costs.

3. Widening to all Europe

The particular paths proposed within the EU in the previous section may create a first momentum for core data in Europe. Such momentum could then be extended to the European UN countries that are not EU members: If core data becomes a reality within the EU, their usefulness will be demonstrated to non-EU European countries, which could motivate them to produce core data.

Such extension may benefit from a favourable institutional framework for the countries connected to the EU: countries of the European Economic Area, countries members of European Environment Agency (EEA), European countries having an association agreement with the EU, and the EU accession countries.

This approach worked well for the EuroGeographics pan-European products: a momentum was first created with a subset of EU countries in the framework of eContent European projects, and then these products were extended to many more countries including non-EU ones.

However this approach reached some limits as there remain holes in EuroGeographics pan-European products (cf. chapters I and II of this report). This is where the setting up of UN-GGIM: Europe may help to increase the momentum of core data initiatives and to push such limits farther.

Core data arrangements in wider Europe could be formalised by a high level "Information Sharing Agreement", to be agreed by the European UN Member States and the supra-national entities or international organisations (e.g. EU, UN) that want to use the core data.

Such agreement would imply a series of rights and obligations for its parties: It would allow the parties to widely use the core data, or even to open the core data if applicable; It would entrust the production and the maintenance of the core data, in each UN Member State, to the appointed NMCA or other national public organisation; It would address the need to setup mechanisms providing the core data producers with the required means.



Chapter IV: How to develop harmonised licences for core data?

1. Current situation

Across Europe the situation on licensing geospatial data broadly reflects the issues outlined in Chapter III, since the licensing model should reflect to some extent the pricing and charging models.

The current situation reflects several discrepancies and different approaches:

- There is a split between those data providers who supply open licences for most or all datasets and those who operate a mixed model, where some datasets attract a royalty or transaction charge, as well as restrictions on use.
- There are circumstances where geospatial data are simply not made accessible, often on the grounds of security, privacy, inertia or concern over the cost of publishing.
- There is an inevitable diversity in details of terms and conditions, reflecting national traditions, legal frameworks and a lack of common legal terminologies.
- There is disparity around the types of licensing models, from simple, generic licences to relatively tightly-defined use licences. Issues include (but are not limited to) matters such as jurisdiction, copyright law, obligation of parties to refer to higher authorities or not (e.g. where required to charge for every last shred of data) and liability.

EuroGeographics has long experience of tackling licence harmonisation across its members, in licensing its pan-European data products. This process has proved that such a model is feasible, but also that the process can be long and tortuous. The criticality of licence harmonisation has been discussed at length in the INSPIRE Data & Service Sharing Drafting Team and reflected in the guidance to the relevant INSPIRE Regulation which promotes a modular approach.

More recently it has been highlighted in the European location Framework (ELF) project, where Work Package 9 (Sustainability) has already made progress in spotlighting issues.

Furthermore, in the Hydrographic context, licensing the Electronic Nautical Charts is another context in which licensing of core data has been tackled.

2. High level goal – something is better than nothing?

Much energy to date has been expended in trying to develop a harmonised licensing framework for licensing. Given the work already undertaken in INSPIRE, ELF and EuroGeographics and other context, it is difficult to know which way forward would be most productive. Any move by UN-GGIM: Europe should avoid duplication and the risk of confusion. However there are three areas that may offer an opportunity to reinforce work already underway and to communicate the issues.

The first is that the principles enshrined in the EU PSI Directive are promoted across UN-GGIM: Europe. There is a broad move towards governmental data being made available for re-use, even with terms and conditions rather than being locked away. This would be a powerful statement from Europe and set an exemplar for other regions.

The second would be to establish common definitions and terminology around open geospatial data licensing. This could build on the groundwork of the Open Government Partnership, Open Knowledge



Foundation, INSPIRE definitions, the ELF work and the EEA work. Again, such a structure could act as a basis for other regions seeking to build collaborative data sharing models.

The third, more ambitious, goal would be to establish some principles for simplification around the licensing of paid-for data. This is most likely to succeed if focussed initially on establishing principles for the use of core data by supra-national bodies that would support UN policy makers, disaster relief agencies and similar bodies. This goal will be a key success element of UN-GGIM: Europe. Some kind of freemium model is probably needed.

The statement in Chapter III is worth restating for this licensing; 'UN-GGIM could be a unique opportunity to raise the question again and to persuade UN Member States to do things according to minimum requirements.'

3. Connection with related initiatives

As noted earlier, there have been and still are a number of attempts to address those issues. INSPIRE comes closest to establishing core principles, but in its delivery has focussed heavily on technical issues. ELF has an explicit work package that incorporates both input and output licensing and EuroGeographics has proven success at delivering a multi-country licensing framework that still can be improved.

The unique place for UN-GGIM: Europe would be to establish overarching principles and language as described above, that would supplement existing work and also represent an 'exportable' model from Europe, which other European countries outside the EU/INSPIRE camp and other regions beyond Europe may find of benefit.

4. Next steps

We propose that the next steps are as follows

- Gain agreement from UN-GGIM: Europe that the three goals outlined in section 2 are appropriate.
- Identify members of three sub-groups to agree a draft set of principles for each goal. These sub-groups will create an initial baseline of principles, building on existing work that will be subject to vigorous internal challenge and also tested against real-world issues.
- Carry out an alignment exercise with other bodies looking at these issues e.g. ELF, INSPIRE, and others.
- Provide an overview of licencing frameworks in countries, and common or different elements.
- Circulate draft principles for discussion and review.
- Prepare a paper on principles for the UN-GGIM: Europe Plenary meeting in 2015.



Annex: Definitions

Authoritative data

These are officially recognized data that can be certified and provided by an authoritative source. In the context of public agencies, authority is the legal responsibility provided by a legislative body to conduct business for the public good.

Collaborative data

A joint effort of multiple individuals or work groups to accomplish data (like OpenStreetMap).

Copernicus

Copernicus, previously known as GMES (Global Monitoring for Environment and Security), is the European Programme for the establishment of a European capacity for Earth Observation.

Core data

A subset of reference authoritative data i.e. the minimum authoritative data for Member States to satisfy needs at cross-border, European and global level.

Data with a fee

Data that can be assessed for certain costs.

Particularly, Article 6 of the PSI Directive says that public bodies should be able to charge to supply and allow reuse of documents not exceeding certain costs and with a reasonable return on investment.

Free data (open data)

Open data is the idea that certain data should be freely available to everyone to use and republish as they wish, without restrictions from copyright, patents or other mechanisms of control.

Geospatial data

Reinterpretable representation of information with spatial characteristics in a formalised manner suitable for communication, interpretation, or processing.

Inspire

The Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE Directive) to support Community environmental policies, and policies or activities which may have an impact on the environment.

Interoperable data

Capability to transfer data among various functional units in a manner that requires the user to have little or no knowledge of the unique characteristics of those units.

License

Permission or proof of permission granted to a system participant by a competent authority to exercise a right which would otherwise be disallowed or unlawful.



PSI

PSI (acronym for Public Sector Information) can be defined as the wide range of information that public sector bodies collect, produce, reproduce and disseminate in many areas of activity while accomplishing their institutional tasks. PSI may include (among others) social, economic, geographical, cadastral, weather, tourist, and business information.

Particularly, PSI acquires a specific legal meaning within the European Union, since it has been provided with a minimum set of rules contained in the Directive 2003/98/EC of 17 November 2003 on the re-use of public sector information (often referred to as the PSI Directive, and revised in 2013).

Reference data

Data accepted as representing the universe of discourse, to be used as reference for all kind of themes.

SDI

An SDI is a coordinated series of agreements on technology standards, institutional arrangements, and policies that enable the discovery and use of geospatial information by users and for purposes other than those it was created for.