Priority Geospatial Datasets for the European Commission

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1. INTRODUCTION

Until a few years ago, the requirements of the European Commission and EU Agencies (for the rest of this paper collectively referred to as the Commission) for geospatial information were limited in terms of scope and scale. In most cases they were met by the two products delivered by EuroGeographics, EuroRegionalMap and EuroBoundaryMap. In fact the most important dataset used in the Commission has been the administrative units and statistical units of the NUTS as contained in EuroBoundaryMap. The principle use case of both data products was the creation of statistical and other maps for print.

However, in recent years, use cases and consequently demand have evolved. The number of spatial analysis has increased and is now common practice in many services of the Commission. Spatial analyses support policy making in domains such as environment, statistics, agriculture and transport and energy, or other Community data programmes such as Copernicus.

This requires the integration and processing of different types of geospatial data, with a wider scope and higher spatial quality and better resolution. As a result, the current offer from Member States as distributed via EuroGeographics is no longer sufficient to meet these additional user requirements in terms of content and spatial resolution. The Commission recognises that Member States via EuroGeographics are working on improving their offer.

In addition, the recent adoption of the UN 2030 agenda for Sustainable Development and of the related indicator framework for monitoring the Sustainable Development Goals (SDGs) also result in greater demand for various types of data, including geospatial information.

In response to these growing needs, several Directorates-General (DG) of the European Commission and European Agencies have therefore agreed that the Commission needs more and better quality geospatial data from official sources with European or at least EU coverage.

This request for geospatial information has been placed into the wider context of the Commission programme on Data, Information and Knowledge Management1 and more specifically as part of the 2018-2019 work programme under Action 5.4 – Strengthen spatial data management in the European Commission and the EU agencies (see Annex 1).

Most of the geospatial data needed for Commission policies and in scope of Action 5.4 fall under INSPIRE or other existing EU legislation. This should make synergies possible and raise the quality of the data and speed of delivery without excessive burden on Member States.

Knowing the priorities of the Commission should help Member States prioritise the implementation of INSPIRE for policies supporting Sustainable Development, and will ensure that the Member States offer meets a strong demand from the Commission.

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The Commission would therefore like to engage in a dialog with Member States on putting its requirements in the focus of the on-going or future implementation of EU legislation including INSPIRE.

The request is related to the initiative of DG Environment for priority data sets for environmental reporting and monitoring\(^2\) but should support a wider range of policies and applications.

2. **Goal, scope and structure of the paper**

The goal of this paper is to provide a consolidated and consistent overview of Commission user needs and set out cross-cutting and domain specific requirements of the European Commission for EU wide geospatial information and data products from Member States in support to Sustainable Development and other EU policies.

The MIG is invited to comment on the concept of priority datasets for SDG monitoring and EU policies, and the usefulness of the UN-GGIM: Europe Core Data specifications to achieve the necessary harmonisation.

The MIG is also invited to comment on the presented work plan and time table.

2.1. **Approach**

The paper defines essential technical and non-technical requirements of the Commission for pan-European wide geospatial information for a number of INSPIRE data themes. Technical requirements are requirements defining the quality properties of the actual data. Non-technical requirements are requirements for the delivery and use of the data, e.g. the license conditions.

The paper is a joint effort of the Commission services concerned with delivering geospatial data to the Commission, processing geospatial information or implementing policies towards sustainable development using geospatial information. This includes the DGs responsible for the implementation of policies on Agriculture, Transport, the Digital Single Market, , blue economy, climate change and environment, energy and natural resources, forestry, health, disaster management, tourism, urban planning and supported by the DGs that are responsible for creating and delivering geospatial information, such as Eurostat, GROW and the Joint Research Centre.

Thanks to the consolidation of requirements under Action 5.4 Member States get the full range of requirements from one single source instead of varying or conflicting requirements from the different services of the Commission.

Should the MIG decide to support Action 5.4, more policy areas and their domain specific requirements could be added in a second step.

The focus is on official data that Member States normally should provide to the Commission under several European legal obligations, including the *INSPIRE, Public Sector Information* and *Intelligent Transport Systems* Directives. Also statistical legislation on the creation of EU statistics increasingly requires Member States and the European Statistical System to process and use geospatial information from the INSPIRE scope.

\(^2\)
The paper covers the following spatial data themes and related data sets:

Buildings (BU), Cadastral Parcels (CP), Addresses (AD), Administrative units (AU), Statistical Units (SU), Transport Networks (TN) and Land Parcel Information System (LPIS).

In addition the Commission also has a strong demand for Postal Codes (PC) to support geocoding, recognising that Postal Codes are not covered by INSPIRE if owned by private companies.

It is worth noting that UN-GGIM: Europe undertakes similar work to define the specifications for in total 14 INSPIRE data themes, most of which are also in the list of the above priority data themes of the Commission. The Commission therefore decided to align its requirements with the existing and forthcoming UN-GGIM: Europe Core Data specifications. Should this initiative be successful Member States and the Commission could decide to expand the first set of priority data with the remaining UN-GGIM: Europe data themes at a later stage.

It is not the scope of this paper to assess the on-going activities of National Mapping Authorities and EuroGeographics under the European Location Services (ELS) project. The deliverables of this project may represent a valuable offer to meet Commission requirements but it is too early for the Commission to assess the quality of the ELS offer.

2.2. Structure of the paper

The paper starts by outlining by means of example key EU policy areas in need for more and better quality geospatial information and the related geospatial data needs.

Next, existing EU legislation is presented introduced that require the provision of geospatial information to the public and the Commission and hence represents additional opportunities to raise synergies with the implementation of INSPIRE.

This part is followed by a description of the UN-GGIM: Europe process to develop core data. For each of the Core Data themes identified as priority a synopsis of the specification is provided as developed by UN-GGIM: Europe is provided.

Then, current issues regarding the implementation of INSPIRE are described including an overview per priority dataset as regards the availability under INSPIRE.

The last part of the paper presents in an overview the cross-cutting requirements of the Commission for geospatial information from Member States and finishes with a short list of potential actions by the Commission and Member States to improve the availability of EU wide data including a draft roadmap.

A list of annexes provides more background on the different chapters of this paper.

3. SELECTED EU POLICY AREAS AND THEIR SPECIFIC GEOSpatial DATA REQUIREMENTS

3.1. European Statistical System (ESS) – 223/2009/EC

The European Statistical System (ESS) aims at better integrating statistical and geospatial information and promoting the production of official geospatial statistics. The goal is to increase the relevance of statistics for users by increasing the spatial resolution of
The use of geospatial information for statistics has a long tradition in many National Statistical Institutes (NSIs) but is often restricted to specific statistical products such as the Census or map making. What is often missing is a consistent and sustainable approach to geo-enabling statistics.

According to the ESS GEOSTAT projects geocoding of unit records in a database environment has been identified as the key element for geo-enabling statistics and make it fit for data integration.

All statistical use cases such as spatial analysis, mapping and data aggregation can then be easily implemented and the full integration of geospatial information management in statistical production from the design of the product and the production process to the dissemination of the information is achieved.

According to GEOSTAT, geospatial information required for statistics can be grouped into three main categories:

- Tier 1) Geospatial information for geocoding, representing and disseminating statistics, i.e. for providing the spatial context for statistics (e.g. AD, SU, postal codes)

- Tier 2) Geospatial information for the above applications and for producing geospatial statistics (e.g. BU, TN, CP, and postal codes)

- Tier 3) Geospatial information to create statistics, e.g. on land use. Input geospatial data: LC, OI, EL. These data are essential input for producing statistics.

Most of the above data are used during statistical production and are not disseminated as geospatial statistics. As such they represent auxiliary data that are necessary to generate the final statistical product. The most obvious example are census statistics that require the location of individuals and households, e.g. by geocoding them to addresses. However the final statistics are disseminated on statistical geographies such as LAU2, statistical grids or the NUTS.

The case of statistics is therefore special in the sense that the Commission and Eurostat do not require these data to calculate EU statistics. Rather they express these requirements on behalf of National Statistical Institutes in Member States to ensure the comparability of EU statistics between Member States and in particular the quality of the EU SDG indicators it is essential that all NSIs have access to geospatial information with defined and harmonised quality.

3.2. Integrated Administration and Control System (IACS) - 1306/2016/EU

The Integrated Administration and Control System (IACS) is set up and operated by the Member States on the basis of Article 67, 68 and 70 of Regulation (EU) No 1306/2013 and it allows for establishing and controlling of eligibility for the aid or support under the common agricultural policy. IACS comprises a) "a computerised database" recording for each beneficiary of the support, the data obtained from aid applications and payment claims (c.f. Article 69(1)); b) the "identification system for agricultural parcels", or the LPIS; c) a system for the identification and registration of payment entitlements; d) aid
applications and payment claims; (e) an integrated control system; (f) a single system to record the identity of each beneficiary of the support referred to in Article 67(2) who submits an aid application or a payment claim (‘system for the identification of beneficiaries’).

According to Article 70(1), the LPIS is a geographically enabled system allowing for identification of agricultural parcels, being an integral part of the IACS. It is "established on the basis of maps, land registry documents or other cartographic references. Use shall be made of computerised geographical information system (GIS) techniques, including aerial or spatial ortho-imagery. It is thus primarily spatial data. LPIS operates at reference parcel level, containing a unit of land representing agricultural area (Article 5 of Commission Delegated Regulation (EU) No 640/2014). LPIS data as a subset of IACS provides necessary basic information for pre-establishing yearly farmer's declarations, currently channelled through a Geospatial Aid Application (GSAA), which provides additional potentially useful spatial data in the environment and climate context.

A wide interoperability and modularity are to be ensured to have the possibility to add other electronic on-farm and e-governance applications, including satellite-based services. Currently, DG AGRI in coordination with CLIMA, ENV, GROW and with a technical support from JRC is setting out a process for the IACS spatial data sharing (of the non-personal data) under INSPIRE. The work is performed in collaboration with the Member States in the framework of the committees and workshops.

Once the process has been established and implemented in the INSPIRE Directive compliant way, these data may be used by other tools such as a Farm Sustainability Tool a novelty element of the future CAP proposal, currently under a feasibility study. This tool is envisaged as the core of a digital decision support tool for farm management that would integrate information from various sources, allowing for a two-way data exchange between the farmer and the public authorities, possibly extending its use to further environmental commitments. The aim is to enhance both the economic and the environmental performance of the individual farm, while simplifying and optimising the farmers’ agronomic and administrative tasks.

IACS data sharing process will certainly enrich interoperability amongst multiple data sources for the policy monitoring and evaluation.

4. **OVERVIEW OF EU LEGISLATION DEALING WITH GEOSPATIAL INFORMATION**

In addition to INSPIRE, a number of existing and forthcoming EU wide legislation exist that will oblige Member States to provide geospatial information to the public and the Commission. The implementation of these legal acts in Member States should help the provision of EU wide data to the Commission. The following section provides an overview of the most relevant pieces of legislation.

4.1. **Infrastructure for Spatial Information in the European Community (INSPIRE) - 2007/2/EC**

Under the terms of INSPIRE Directive (Article 17), each Member State shall adopt measures for the sharing of and enabling access to spatial data sets and services between its public authorities for the purposes of public tasks impacting the environment. It requires that such measures preclude any restrictions likely to create practical obstacles, occurring at the point of use, e.g. sharing of spatial data sets and services. The arrangements for sharing of spatial data sets and services shall be open to public
The Commission adopted the ‘data package’ on the 25 April 2018 as a set of measures to improve the availability and re-usability of data, in particular publicly held or publicly funded data, including government data and publicly funded research results, and to foster data sharing in business-to-business (B2B) and business-to-government (B2G) settings. The availability of data is essential so that companies and the public sector, including the EU Institutions themselves, can leverage on the potential of data-driven innovation or develop solutions supporting their mandate.

Key elements of the package propose on the PSI the enhanced access to and re-use of real-time data notably with the help of Application Programming Interfaces (APIs); lowering charges for the re-use of public sector information by limiting exceptions to the default upper limit of marginal cost of dissemination and by specifying certain high-value data sets which should be made available for free (It is proposed that a delegated act defines these high-value datasets, which may very likely include geospatial information); allowing for the re-use of new types of data, including data held by public undertakings in the transport and utilities sector and data resulting from publicly funded research; and minimising the risk of excessive first-mover advantage in regard to certain data, which could benefit large companies and thereby limit the number of potential re-users of the data in question.

Access and preservation of scientific information should be updated with updating and reinforcing the overall policy with the development of guidelines on opening up research data and the creation of incentive schemes for researchers sharing data and ensuring coherence with the European Open Science Cloud. Guidance on private sector data sharing will be provided to companies that wish to make data available to other companies or to public authorities.

The framework for the deployment of Intelligent Transport Systems (ITS) in the field of road transport and for interfaces with other modes of transport (“ITS Directive”) aims to establish interoperable and seamless ITS services while leaving Member States the freedom to decide which systems to invest in. Under this Directive, the European Commission has to adopt (i.e. functional, technical, organisational or services) provisions to address the compatibility, interoperability and continuity of ITS solutions across the EU.

Spatial data is relevant for two of the priority areas of the ITS Directive:

- the optimal use of road, traffic and travel data, which is relevant for the provision of EU-wide multimodal travel information services (MMTIS, priority action a) covered by delegated regulation (2017/1926);

- the provision of EU-wide real–time traffic information services (RTTI, priority action b), covered by delegated regulation (2015/962).
The MMTIS Delegated Regulation 2017/1926 "Accessibility, exchange and reuse of static travel and traffic data" requires that Transport authorities, transport operators, infrastructure managers or transport on demand service providers shall provide among other topics the following data by 1 December 2023: Address identifiers, Topographic places, Points of interest, Identified access nodes, Geometry/map layout structure of access modes, intermodal interchanges and connection times, Network topology and routes/lines (topology), Stop facilities access nodes, Road network, Cycle network, Pedestrian network.

The Regulation requires to "... use for spatial network the requirements defined in Article 7 of INSPIRE Directive". It is currently under discussion whether also other INSPIRE data themes, e.g. Addressed and Geographical Names, could be used as possible data sources. The Regulation also requires that "national access points shall provide discovery services to users, for example services allowing for the search of the requested data using the content of the corresponding metadata and displaying such contents". Other aspects, like conditions for access and use, are currently not explicitly addressed.

The RTTI Delegated Regulation 2015/962 requires each Member State to set up a national access point (NAP), intended as a "single point of access for users to the road and traffic data, including data updates, provided by the road authorities, road operators and service providers and concerning the territory of a given Member State". The NAPs shall provide discovery services and appropriate metadata. The Regulation requires that relevant data (static road data, dynamic road status data and traffic data) be accessible in standardised and machine-readable formats and that data providers regularly update the data and correct errors in a timely manner.

There is no provision on conditions for access in the legal act. France decided e.g. on an open and reuse licence.

4.4. Development of TENtec, the European Commission's information system to coordinate and support the Trans-European Transport Network (TEN-T) policy – 2013/1315/EU & 2017/849/EU

TENtec has two main actions which are a) the collation of technical, geographical and financial data to be used to inform policy-making and political decision-making processes related to TEN-T and its associated funding programme, the Connecting Europe Facility (CEF) and b) the provision of technical support to the Innovation and Networks Executive Agency (INEA) and its grant management functions. This incorporates supporting the necessary workflows for issuing grant agreements after completion of the selection cycle for new projects, including proposal submission and reception, and the required web interfaces.

In addition to its primary dual function, TENtec also enables the European Commission to easily compile information and create timely reports and maps. This benefits all parties involved in TEN-T project implementation processes, providing greater transparency, data quality and a systematic up-to-date overview of the budget execution and technical implementation for each TEN-T/CEF project.

Another important function of TENtec is its capacity to act as a bridge to the ministries of Member States and other key stakeholders (DG REGIO, DG ENV, EIB and

4 http://www.bison-fute.gouv.fr/licence-de-reutilisation,10620,langen.html
neighbouring countries), including support for transport modelling of future policy and budgetary scenarios, briefings, the mapping of TEN-T/CEF co-funded projects and other layers such as alternative fuels and secure and safe parking.

The 2013 regulation established the two-layer concept for TEN-T with a core network to be implemented by 2030 connecting all major nodes in Europe (i.e. ports, airports, major urban nodes) with each other and linking Europe to the other world regions. The second layer is provided by the comprehensive network to be completed by 2050. Both networks constitute multi-modal networks and the multi-modal terminals providing the interchanges between modes are regarded as important elements of TEN-T.

Spatial data on roads, railways, inland waterways, airports, ports and rail-road terminals provide full support to the policy-making process, leading to the European Commission’s TEN-T Regulation and the CEF. It covers. Data is collected and continuously updated in close collaboration with Member States through the Open Method of Coordination (OMC). Official maps are published in the EU legislation as on the TENtec public portal as download and interactive maps. TENtec will also be one of the data source for the network for the TRIMODE project (Transport Integrated Model for Europe).

In addition, the CEF proposed budget for the period 2021-2027 identifies a new field of efforts for TENtec: military mobility. Subject to the definition of military requirements, dual use of the TEN-T transport network for civilian and military purposes should be envisaged. This new important topic is currently subject of consultations with the competent actors (Member States, European Commission, European Union External Action Service, European Defence Agency and NATO).

5. UN-GGIM: Europe and the concept of core data

UN-GGIM: Europe is one of the regional entities of the global UN-GGIM initiative and was officially established on 1st October 2014.

"The aim of UN-GGIM: Europe work is to ensure that the national mapping and cadastral authorities and national statistical institutes in the European UN Member States, the European Institutions and associated bodies work together to contribute to the more effective management and availability of geospatial information in Europe, and its integration with other information, based on user needs and requirements."

To achieve its objectives UN-GGIM: Europe has prepared a work plan that among other issues addresses the needs from users of geospatial information for data interoperability and harmonisation. The Executive Committee therefore decided to establish the working group on Core Data (Working Group A) with the goal to define a set of core data themes for Europe that should be harmonised between countries and that are particularly relevant for monitoring and achieving the Sustainable Development Goals.

UN-GGIM: Europe Core Data themes are identical with INSPIRE data themes and build on the INSPIRE data specifications. The working group has selected the following 14

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5 http://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/


INSPIRE themes as core data: GN, AD, AU, CP, TN, HY, EL, LC, OI, SU, BU, AM, US (Basic government services). The main use case for defining this subset of INSPIRE was the monitoring and achieving of the Sustainable Development Goals (SDG) of UN 2030 agenda for sustainable development. As monitoring the SDGs through indicators is primarily a statistical activity, many if not all of the 14 Core Data themes are also highly relevant for the production of statistics and statistical indicators.

The concept of core data goes beyond the requirements of INSPIRE and aims at harmonising the quality of geospatial information in terms of scale, semantics, mandatory attributes, and temporal coherence. Also a business model for the creation and maintenance of core data needs to be developed that guarantees that core data are created, maintained and delivered without unnecessary barriers for access and use.

The technical specifications of the 14 core data themes are becoming progressively available and all specifications should be completed by the end of 2018. However, the work on the business model for providing these data is on hold and needs to be resumed by the UN-GGIM: Europe Executive Committee.

A decision needs to be taken on how to endorse the data specifications and the business model for core data internationally and within each Member State. Member States need to make a plan for actually making data available in the form of UN-GGIM: Europe Core Data once the technical specifications have been approved. As a result of this uncertainty, currently neither Member States nor EuroGeographics provide UN-GGIM: Europe Core Data.

The Commission and EU agencies have reviewed the UN-GGIM: Europe Core data specifications as they become available to make sure they meet Commission requirements. As a result the UN-GGIM: Europe specifications mention existing or potential applications of these data for EU policies and EU legislation.

If all Member States would implement INSPIRE according to these requirements it would be fairly straightforward to produce the necessary EU wide geospatial data sets for policy support.

### 5.1. Core Reference data specifications: Cadastral parcels (CP)

**Definition:** Areas defined by cadastral registers or equivalent. [INSPIRE Directive 2007/2/EC]

**Description:** Cadastral parcels should partition the national territory. A cadastral parcel should be considered as a single area of Earth surface (land and/or water), under homogeneous real property rights and unique ownership, real property rights and ownership being defined by national law.

**Requirements:** Core data should include feature type Cadastral Parcel with a unique and persistent identifier should have the following attributes: a) geometry (as surface or as multi-surface); b) - national cadastral reference.

**Spatial Dimension:** Core data for theme ‘Cadastral Parcels’ should be available on whole territory at the scale larger than 1: 5000 (for remote areas 1: 10000). Cadastral parcels should have in general an absolute accuracy of 1 metre or better in urban areas and of 2.5 metres or better in rural areas. In case of new surveys absolute accuracy better than 50 cm should be achieved. There should be no topological gaps or topological overlaps between cadastral parcels. Topological consistency with theme AU and SU
should be enforced. The depth (e.g. 3D) for registration of rights, responsibilities and restrictions should be added.

**Temporal Dimension:** Obsolete parcels should be retained in the data and their current status indicated using the INSPIRE mechanism of life-cycle attributes and versioning. No temporal gaps should exist. Temporal consistency between the cadastral parcel in the spatial data set (cadastral map) and the cadastral parcel in the land registry (if any) or in reality should exist. The update frequency for theme Cadastral Parcels should be one year or better.

**Use Cases:** protect state lands, reduce land disputes, facilitate land reform, Agriculture, land management, taxation

**Use Case Keywords:** Disaster Management, Real Estate Market, Taxation, LPIS (Agriculture), Land consolidation, Infrastructure Management, Spatial Planning, Protection of Soil and Water, Statistics,

**Policy Fields/Legal Acts:** SDG, JUST, AGRI, Statistics

Further reference: UN-GGIM: Europe Working Group A on Core Data Core spatial data theme ‘Cadastral parcels’–Recommendations for content –Draft version 1.1

5.1. **Core Reference Data Theme: Addresses (AD)**

**Definition:** Location of properties based on address identifiers, usually by road name, house number, postal code [INSPIRE Directive 2007/2/EC].

**Description:** The basic unit of addressing is a building; a permanent construction, intended or used for the shelter of people, having at least one entrance from publicly-accessible space.

**Requirements:** Core data should comprise of the feature type Address with at least the following attributes: one two-dimensional geographic position, one locator (e.g. number or name) if available, and such other address components as are in current use. A unique and persistent identifier is required. The geographic position should be enhanced by specifying the type of geography (e.g. building, entrance, parcel, postal delivery point, postal descriptor). Wherever possible, building or entrance should be used. Complex cases (e.g. Shopping malls, restricted areas, multi-unit areas) should be addressed as well if possible.

**Spatial Dimension:** Address data should cover the full geographic extent of the territory at the scale larger than 1: 5 000 (including isolated buildings and buildings in remote areas) with respect to completeness. Coordinates should be within 5 metres of the true position of the building centroid or entrance

**Temporal Dimension:** Obsolete addresses should be retained in the data and their current status indicated using the INSPIRE mechanism of life-cycle attributes and versioning. Pre-allocated or provisional addresses, where available, should be managed in the same way. The update frequency for theme Addresses should be one year or better.

**Use Cases:** Address data underpin government administration at all levels. Addresses support the provision of services and also enable effective communication with citizens: informing them of policies applying to them, notifying them of events or incidents affecting them and supporting the carrying out of social surveys.
Use Case Keywords: Manage emergency rescue, locate where people are, make accessibility studies, manage incidents; locate economic activities in ecosystem accounting, geocoding e.g. of EU project locations.

Policy Fields/Legal Acts: SDG, ENV industrial facilities, REGIO (major) projects, Statistics

Further reference: UN-GGIM: Europe Working Group A on Core Data - Core spatial data theme ‘Address’ - Recommendations for content – Draft version 1.0

5.2. Core Reference Data Theme: Buildings (BU)

Definition: Geographical location of buildings [INSPIRE Directive 2007/2/EC]

Description: Constructions above and/or underground, intended or used for the shelter of humans, animals, things, the production of economic goods or the delivery of services that refer to any structure permanently constructed or erected on its site [from INSPIRE Data Specifications on Buildings].

Requirements: Enclosed constructions should comprise of the feature type Building with following attributes: Geometry (as surface or multi-surface), unique and persistent identifier, Height above ground, Number of floors above ground, Current use, Nature for noticeable buildings (e.g. church, castle, greenhouse, stadium), Date of construction, Number of dwellings. Any other construction should include the feature type OtherConstruction with following attributes: Geometry, Unique and persistent identifier, Nature, Height above ground (at least for elevated constructions especially for air-traffic control). Future geometries should be stored at least in CityGML LOD2 and current geometries upgraded. Physical description of buildings including underground floors and energy characteristics together with linkage mechanisms to AD and PC should be provided.

Spatial Dimension: Constructions data should cover the full geographic extent of the territory at the scale larger than 1: 5000-10.000. Buildings and constructions are to be captured with respect to completeness except very small constructions. Absolute horizontal accuracy should be better than 2 meters

Temporal Dimension: Current, valid constructions are considered as core data. The update frequency for theme Buildings should be one year or better. Obsolete constructions should be retained in the data and their current status indicated using the INSPIRE mechanism of life-cycle attributes and versioning.

Use Cases: Buildings are 3D topographic objects and, as such, may influence the propagation of physical phenomena. These data are required for serving citizens (e.g. school, hospital), assessments for air and noise pollution or risk assessments to various kinds of risks (earthquake, fire, flood etc.), monitoring of land consumption, population concentration and access to services.

Use Case Keywords: Find relevant place for new antennas, railways, roads, solar panels; manage emergency rescue, locate where people are, statistics, SDG, spatial planning.

Policy Fields/Legal Acts: SDG, REGIO, ENER, Statistics

5.3. Core Reference Data Theme: Administrative Units (AU)

**Definition:** Units of administration, dividing areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance, separated by administrative boundaries [INSPIRE Directive – 2007].

**Description:** In core data the basic unit of administrative units may concern Land Administrative Units and Maritime Units. Land Administrative Units are covering mostly land surface, while Maritime Units are covering territorial waters.

**Requirements:** Core data for the Land Administrative Units should comprise of the feature type AdministrativeUnit with following attributes: geometry (as surface or multi-surface), unique and persistent identifier, national code, national level (e.g. for hierarchical order) and national level name, geographical name(s) with the name itself, i.e. its spelling and with information on its language, status and (if relevant) source, residence of authority, temporal attributes (in the data set). Core data for the Maritime Administrative units should include feature types MaritimeUnit with the following attributes: geometry (as surface or multi-surface), unique and persistent identifier, type, name (if any). In addition, it should include the Baseline defined by an identifier and by the list of its Base Map Segments with their geometry and type. Linkage with information system managing the responsibilities and the responsible parties of each administrative level need to be ensured. Boundaries of Administrative Units need to be legally and technically agreed on common international boundaries for land and maritime boundaries. The same applies for internal boundaries of administrative units. Official names need to be provided.

**Spatial Dimension:** Administrative Units data should cover the full geographic extent of the territory at the scale larger than 1: 10 000. Regarding Administrative Units overlapping or not with sea, administrative unit data should reflect the national administrative reality; however it should be feasible to make a distinction between land and sea (up to exclusive economic zones). There should be no topological gaps or topological overlaps between administrative units. Topological consistency with TN, SU, and CP should be enforced.

**Temporal Dimension:** The update frequency for theme AU should be one year or better. Obsolete administrative units should be retained in the data and their current status indicated using the INSPIRE mechanism of life-cycle attributes and versioning. Pre-allocated or provisional units, where available, should be managed in the same way. Regulations and spatial data should be consistent.

**Use Cases:** The theme Administrative Units is widely required by most SDGs, as it defines the areas of responsibility of governments, at different levels, from national to local. In addition, administrative units are also necessary for many other applications, such as mapping or use as statistical units.

**Use Case Keywords:** Manage emergency rescue, waste management plans, protect water ecosystems, find responsible party for policy implementation and administration, forest management, subsidies for farmers, forecast agricultural production, spatial planning, monitoring of regional and urban policy implementation using territorial typologies based on administrative units, maritime spatial planning, integrated coastal management

**Policy Fields/Legal Acts:** SDG, REGIO, Statistics
5.4. Core Reference Data Theme: Statistical Units (SU)

Definition: Statistical units are the spatial features used for dissemination of statistics. They encompass any geographical aggregation of statistical information.

Description: The statistical information considered in the scope of this document is a quantitative representation of any fact or phenomenon, according with a documented collection of data, broken down by qualitative or quantitative standard classification, and made by an official or authoritative source or institution.

Requirements: The geographic representation of Statistical Units may vary. Polygons (e.g. NUTS, Enumeration Districts, Urban zones) and Grid cells are the most used ones; however points and line could also be used. Core data for the Grid statistical units content should include the pan-European INSPIRE standard LAEA square grid of at least 1000 meters side with the feature types attributes of Geometry, resolution and a Unique and persistent identifier. Vector statistical units should include the following attributes: Geometry (as surface or as multi-surface), Unique and persistent identifier, Level of the unit, ISO Country code, Geographical name, Version Id, Reference Period Begin, Reference Period End.

Spatial Dimension: Standard and Grid data should cover the full geographic extent of the territory at the scale of 1: 10 000. Statistical delineations (e.g. urban zones, great urban areas and functional urban areas) do not need to cover the full geographic extent, however are advised to do so. There should be no topological gaps or topological overlaps between statistical units (except documented cases). Topological consistency with AU, TN, and CP should be enforced.

Temporal Dimension: Current, valid features are considered as core data. Obsolete statistical unites should be retained in the data and their current status indicated using the INSPIRE mechanism of life-cycle attributes and versioning. Pre-allocated or provisional statistical units, where available, should be managed in the same way. Statistical Units should have a harmonised reference date, ideally 31/12/ of any given year. It is an obligation for geospatial authorities or other authorities responsible for the definition of statistical units to provide them at the latest 3 months after this reference date to the public.

Use Cases: Statistical information is a key part of administrative decisions of governments from Local to National and international institutions, using them to analyse problems, taking the decisions, monitoring action’s plan and supervise results by all societal and political instances. Therefore is highly relevant for e.g. settlement, urban planning, analysing poverty, simulation of different scenarios due to hypothetical conditions or changes. Statistical Units provide the key data to understand nearly any phenomenon at every stages of knowledge approach: historical overview, analytical search, tracking evolution and forecasting future trends

Use Case Keywords: Locate where people are, socio-economic studies, accessibility studies, city management, assess human pressure on ecosystem, assess number of people in area of interest (risk, pollution, public service), reporting for legal acts.

Policy Fields/Legal Acts: SDG, REGIO, Statistics

5.5. **Core Reference Data Theme: Postal Codes (PC)**

**Definition:** Location of properties based on a series of letters or digits or both for the purpose of sorting mail.

**Description:** While postal codes are assigned to geographic areas, special codes are assigned to specific addresses.

**Requirements:** Core data should comprise of the feature type post code with at least the following attributes: one two-dimensional geographic position, one locator (e.g. number or name) if available, and such other components as are in current use. A unique and persistent identifier is required. The geographic position should be enhanced by specifying the type of geography (e.g. building, road section, organization).

**Spatial Dimension:** Postal codes data should cover the full geographic extent of the territory at the scale larger than 1: 5 000 (including isolated buildings and buildings in remote areas) with respect to completeness. Coordinates should be within 5 metres of the true position.

**Temporal Dimension:** Obsolete postal codes should be retained in the data and their current status indicated using the INSPIRE mechanism of life-cycle attributes and versioning. Pre-allocated or provisional codes, where available, should be managed in the same way.

**Use Cases:** Postal Codes underpins government administration at all levels, and good administration is a prerequisite for the achievement of the SDGs. It supports the provision of services and also enables effective communication with citizens: informing them of policies applying to them, notifying them of events or incidents affecting them and supporting the carrying out of social surveys.

**Use Case Keywords:** Geocoding of statistical surveys, manage emergency rescue, locate where people are, accessibility studies

**Policy Fields/Legal Acts:** SDG, Statistics

Further reference: not available

5.6. **Core Reference Data: Land parcels LPIS**

**Definition:** The LPIS is a geographically enabled system allowing for identification of agricultural parcels. It should fulfill two explicit functions: the unambiguous localisation of all declared agricultural parcels by farmer and inspectors and the quantification of all eligible area for crosschecks during the administrative controls by the paying agency.

An LPIS is operated at a **reference parcel** level. A reference parcel shall contain a unit of land representing agricultural area, the latter meaning any area taken up by arable land, permanent grassland and permanent pasture, or permanent crops. A reference parcel is defined in such a way as to ensure that the reference parcel is measurable, enables the unique and unambiguous localisation of each **agricultural parcel** annually declared and as a principle, is stable in time. An **agricultural parcel**, defined as a continuous area of land, declared by one farmer, which does not cover more than one single crop group as defined by the Member State.
Requirements: The Land Parcel Identification system (LPIS), established following the LPIS Core model\textsuperscript{8,9} shall hold: a stable identification of reference parcels (RP) using a Unique and persistent identifier, the maximum eligible area per reference parcel (MEA) (i.e. the basis for eligibility for any scheme), a list of stable ecological focus areas = EFA-layer\textsuperscript{10} and other area-related information relevant for eligibility: e.g. areas with natural/specific constraints, Natura 2000 areas, WFD, etc.

Spatial Dimension: Core data for theme Land Parcel Identification System\textsuperscript{'} should be available at the scale larger than 1: 5 000 with an positional accuracy of 1.25m or better. In some countries a direct link to the Core Reference Theme Cadastral Parcels could be established with a direct link to the Unique and persistent identifier.

Temporal Dimension: The update frequency for theme LPIS should be one year. Obsolete units should be retained in the data and their current status indicated using the INSPIRE mechanism of life-cycle attributes and versioning. Pre-allocated or provisional units, where available, should be managed in the same way. Regulations and spatial data should be consistent.

Use Cases: aid applications, geographical indications for wine, climate change policy, cross-compliance policy evaluations,

Policy Fields: AGRI, ENV, CLIMA, NEAR, GROW

Further reference: see References in Footnote.

5.1. Core Reference Data Theme: Transport Networks (TN)


Description: The transport networks should comprise an integrated transport network, and related features, that are seamless within each national border as well as at European level, i.e. connected at national borders. Transportation data includes topographic features related to transport by road, rail, water, and air; features form networks where appropriate; multi-modal nodes between different networks are established and enable navigation services.

Requirements: Core data for the Transport Networks should comprise of the Common transport elements application schema with specific subthemes for Road, Rail, Cable,
Water and Air. It should contain at minimum the attributes from the OMC Glossary\footnote{https://ec.europa.eu/transport/sites/transport/files/tentec_omc_glossary.pdf}:

All associated spatial objects in the Transport Networks theme should use object referencing to an existing set of transport links rather than duplicate the geometry. Linear referencing should be adopted to support the location of changes in condition or other phenomena along a link or link sequence where there is no requirement to disturb the link and node structure. In Transport Networks data, Transport Nodes should be present wherever Transport Links connect or end.

**Spatial Dimension:** Transport Networks should cover the full geographic extent of the territory at source resolution (Physical topographic) with at least a scale larger than 1: 10 000. Lower order resolutions should be derived from the highest order representation of the transport network. The datasets should be inherent topological correct. Topological consistency with AD, BU, SU, AU, LU should be enforced.

**Temporal Dimension:** The update frequency for theme TN should be one year or better. Obsolete transport networks features should be retained in the data and their current status indicated using the INSPIRE mechanism of life-cycle attributes and versioning. Pre-allocated or provisional units, where available, should be managed in the same way. Regulations and spatial data should be consistent.

**Use Cases:** The theme Transport Networks is widely required by most policies and SDGs, as it defines the movement of persons and goods, at different levels, from European to national to local. It is used for transport policies (e.g. TEN-T, road safety, air transport, connectivity, multimodality, military mobility) regional policies and statistics.

**Use Case Keywords:** Manage emergency rescue, capacity planning, maritime spatial planning, Incident management, traffic management, pollution management (light, noise, soil, water), environmental impact assessments, utility management, infrastructure management, accessibility studies, transport modelling, road safety, connectivity, multimodality

**Policy Fields/Legal Acts:** SDG, REGIO, Statistics, MOVE, ENER

Further reference: UN-GGIM: Europe Working Group A on Core Data not yet available. INSPIRE data specifications

**6. Current data offer under INSPIRE**

**6.1. Availability**

The above requirements highlight the great demand for more and better quality data in the Commission to support a number of key EU policies. The ultimate goal is to have harmonised national datasets from Member States that can be combined into consistent EU wide data sets without or limited further processing. These data should be provided based on performant and stable services in line with the INSPIRE requirements.

In fact the data most urgently needed by the Commission fall under Annex I of INSPIRE (AD, TN, CP, AU, HY). The data currently available from Member States under INSPIRE do not fully meet this demand although the Commission recognises that some Member States have invested heavily and provide all requested INSPIRE services in good quality (see Figure XX).
For six priority datasets: Addresses, Buildings, Cadastral parcels, Transport networks, Administrative units, and Statistical units Member states data have been analysed in the INSPIRE geo-portal\textsuperscript{12} (Status 28.05.2018. The first column shows all datasets (local, regional, national) registered at the Geoportal for the specific theme with the current number of metadata records and downloadable number of datasets; while the second column shows only the national datasets\textsuperscript{13}.

The maps clearly illustrate the huge implementation gap between the number of metadata records and the number of download services to actually obtain these data. Also the maps clearly show that several Member States are lagging behind in the implementation of certain INSPIRE themes.

For completeness the status of availability of datasets i.e. INSPIRE Monitoring & Reporting 2016) declared by MS within the yearly monitoring exercise is also provided. Deadlines for Addresses, Cadastral parcels, Transport networks and Administrative units already passed in 2017, while Buildings and Statistical unit’s datasets must be provided by 2020.

\begin{table}[h]
\centering
\begin{tabular}{|l|l|}
\hline
\textbf{All Datasets} & \textbf{National Datasets} \\
\hline
\end{tabular}
\end{table}

12 http://inspire-geoportal.ec.europa.eu/thematicviewer/

13 http://inspire-geoportal.ec.europa.eu/thematicviewer/AppliedMethodology.action
Figure 1: Availability of essential core data

All maps are taken and can be seen from the INSPIRE Geoportal Thematic Viewer application http://inspire-geoportal.ec.europa.eu/thematicviewer/INSPIREThemes.action

6.2. Technical and non-technical harmonisation

In terms of technical harmonisation, a study by EEA shows that the above mentioned core reference data are not yet available from the INSPIRE geoportal with harmonised physical data models and functioning services. Similar results have been observed by Eurostat.
In non-technical terms, varying data access and use conditions remain a huge issue for EU wide harmonised data from official Member States data.

There is a growing trend to ‘open data’ is evident on the European scale. This is fully in line with the principles of INSPIRE and its main requirement to make data accessible.

However there is still a diversity of license conditions between countries and in some cases even among national public authorities. In addition, organisations have adopted different technical means to restrict access to data services, impacting on the ease and time taken to download data when needed from several sources.

Some Member States provide INSPIRE services as open data but others are lacking completely any initiative in this direction, creating a varied licensing environment when data needs to be combined and harmonised for a range of possible applications.

This diversity ranging from fully open according to Creative Commons to very specific national licenses with hefty license fees is hampering the development of consistent and harmonised EU wide data products from national data.

Moreover custodian agencies in Member States restrict the number of features that can be obtained from an INSPIRE download service.

To overcome this lack of harmonisation as regards technical and non-technical requirements Commission services or EU agencies have started using other, non-official data as a work around\textsuperscript{14}.

\textbf{7. HOW CAN MEMBER STATES CONTRIBUTE TO MEETING THE COMMISSION REQUIREMENTS?}

The final vision of all stakeholders should be the creation and availability of semantically and spatially harmonised and interoperable pan-European datasets based on existing open services/data available from Member States.

However the availability and quality of data available from INSPIRE and as a result the possibility to create EU wide geospatial data products is hampered by the following shortcomings:

(1) Quality: scale, thematic coverage, temporal coherence;

(2) Access and use conditions: fees and rights to re-disseminate;

(3) Reactivity: speed at which new data requirements from EU services can be met;

(4) Harmonisation: differences in the implementation and interpretation of INSPIRE make the compilation of pan-EU products difficult without further harmonisation work;

(5) Availability of download services.

As a result the Commission can only satisfy its requirements by supplementing and enhancing official Member States data with data from Community-sourced programmes

\textsuperscript{14} See on-going discussion on the use of HY and TN for the CLC+ hard-bone.
such as Copernicus or where appropriate crowd sourced information such as OpenStreetMap.

Yet, the use of official Member States data together with official EU data such as Copernicus data remains a strong requirement of the Commission.

It is therefore the goal of Action 5.4 to increase the use of official Member States data from INSPIRE.

Member States are therefore encouraged to implement the requirements of UN-GGIM: Europe Core Data. Efforts should concentrate on harmonising the quality of the data with regard to:

1. Temporal coherence;
2. Scale;
3. Scope (attributes);
4. Open Access;
5. Delivery.

The exact requirements per theme are set out in the UN-GGIM: Europe core data specifications.

What is missing in the UN-GGIM: Europe specifications but is an essential condition for the Commission and EU agencies is to be able to use Member States' data under a harmonised data license for all national data, ideally in the form of an open data licence such as open CC0 and CC-BY\textsuperscript{15}.

In addition Member States should make efforts where applicable to provide stable and performing services for the delivery of their data in line with the INSPIRE quality of service requirements.

The goal is that the Commission can integrate national data into pan-EU datasets consuming national INSPIRE services without the need to harmonise the data in terms of spatial and attributes quality.

As an alternative, Member States could mandate EuroGeographics, industry or other stakeholders to provide those harmonised data and services on their behalf.

8. **TIMELINE**

Member States are encouraged to focus the implementation of INSPIRE on meeting the above requirements and make their data available to the European Citizens and the Commission in line with these requirements:

**For Member states or their representatives such as EuroGeographics**

\textsuperscript{15} [https://creativecommons.org/share-your-work/licensing-types-examples/](https://creativecommons.org/share-your-work/licensing-types-examples/)
Short term: make data available per core data theme as is through INSPIRE Geoportal/Services (Metadata, View and Download services) to achieve full European coverage as fast as possible (End of 2018 – Legal Deadline was by 2014).

Medium term: make data available per theme according to INSPIRE Data Specifications through INSPIRE Geoportal/Services (Metadata, View and Download services) at full European coverage (End of 2019 – Legal Deadline was by Nov 2017 except BU).

Long term: make data available enhanced according to the UN-GGIM: Europe core specifications (End of 2021).

During this transition period, and only if necessary, the Commission would continue compiling data from Member States and possibly other sources into EU-wide geospatial data products. This may happen due to a lack of harmonisation or a lack of data from one or several Member States.

At the European Commission level

Short term: The Commission provides an INSPIRE thematic viewer for the core reference datasets to support monitoring and access (End of 2018).

Medium term: The Commission monitors the progress of INSPIRE implementation for the core reference data by compiling pan European data sets towards the relevant INSPIRE Data Specifications in collaboration with Member States or other relevant stakeholders (annually as of 2018).

Long term: As of 2019 the Commission will monitor the progress of delivery of pan European data sets according to the UNGGIM: Europe core data specifications. In addition, in close cooperation with Member States the Commission will start producing pan-European datasets meeting the UN-GGIM: Europe core data specifications. One mandatory condition will be that Member States data are available under an open data licence. Data not available under such a licence will be replaced with alternative data having such a license.
9. **ANNEX 1 - ACTION 5.4: STRENGTHEN SPATIAL DATA MANAGEMENT IN THE EUROPEAN COMMISSION AND THE EU AGENCIES**

**Title**

Strengthen spatial data management in the European Commission and the EU agencies (through coordinated thematic priorities building on the progress made in the implementation of the INSPIRE[1]Directive and under the umbrella of COGI[2]).

**Pillar(s)**

1) Improving information retrieval and delivery and 3) Maximising use of data for better policy-making

Building on the outcome of the inter-service workshop in October 2017[3] and as outcome of action 1.7 in the 2017 work programme, a number of activities will take place under this continued action which aim at strengthening spatial data management can be beneficial for all Commission services and EU agencies handling or using spatial data.

The action will be divided in two phases. Phase 1 (2018) will identify thematic priority areas or specific EU priority reference data sets of relevance for several DGs and agencies (building on the environment example), in order to concentrate efforts and resources on where most added value can be generated for EU policy making.

Moreover, in collaboration with action 1.3 (which is addressing standards, metadata and search), the action will investigate relevant aspects related to spatial data management, including the possible evolution of and synergies between existing or planned geoportals.

In phase 2 (which can already start in later 2018), the facilitation of "read or link across" between the various domains (e.g. through glossaries of spatial objects, mappings between vocabularies, registries or specific common identifiers…) will be explored and implemented. Also, once the future Multiannual Financial Framework is becoming clearer, a discussion will be triggered on how investments in national data and information management in a more coordinated way can improve data availability and quality for EU policy making.

As cross-cutting and ongoing activities, the improvement of awareness raising, training and capacity building within the Commission and in working together with Member States in a more coordinated way across domains will be developed.

**Description**

**Owner**

JRC, Eurostat, and ENV

**Stakeholders**

CNECT, DIGIT, GROW, OP, REGIO and the EEA as well as all other interested DGs and EU agencies through Inter-Service Group on Geographic Information (COGI)

End of 2018: present results of phase 1 including 1) a concept and details of thematic priorities and data sets for the Commission services and 2) a strategy for awareness raising, training and capacity building.

**Deliverables**

End of 2019: present results of phase 2 including concept and implementation of "read across" and further implementation of 2018 deliverables in particular the access to thematic spatial data.
Timetable

The action was initiated in June 2017 and will run until December 2019.

The deliverables and milestones are mentioned above.

Documentation

All information is available through a dedicated WIKI: https://webgate.ec.europa.eu/fpfis/wikis/x/uROGCw

Maturity level

The action is underpinned by the activities of the JRC in the context of the INSPIRE Directive and the work of Eurostat in the context of its role for COGI. In addition, ongoing and future ISA2 project can assist in the delivery process.

Strategic Objectives

SO2: Establish corporate governance over information

SO3: Ensure system interoperability

SO8: Exploit the potential of (big) data

SO9: Put in place the tools and infrastructure for data analytics


10. ANNEX 2—EXTENDED OVERVIEW OF RELEVANT EU LEGISLATION

10.1. INSPIRE Directive


The first important milestone was in December 2013, when Member States were obliged to provide their data as-is. This step established metadata and exposed data through network services. Consequently, by December 2017, datasets that fall under the scope of
Annex I are expected to be in place and interoperable. Similarly, by the end of 2020, data for Annex II and III should also be conforming to the Directive’s requirements.

Alongside national geoportals, the pan-European INSPIRE geoportal (http://inspire-geoportal.ec.europa.eu/) serves as a central access point to data and services from organisations in the EU Member States and EFTA countries. It enables not only cross-border data discovery, visualisation and use, but also metadata, data and service validation. Recently on the top of INSPIRE geoportal the Thematic Viewer was developed (http://inspire-geoportal.ec.europa.eu/thematicviewer). It currently has two applications:

- The Priority datasets application displays the results of a thematic and spatial coverage filtering, which aims at identifying the priority datasets for eReporting
- INSPIRE Data themes application aims at displaying datasets which metadata has been checked on INSPIRE Resource linkages aspects.

Available guidance documents give examples of data and service sharing (https://inspire.ec.europa.eu/data-and-service-sharing/62). They include non-mandatory sample agreements which can be modified and adopted by public authorities. The proposed approach follows a general understanding to obtain a higher level of harmonisation, with positive implications on national and European levels. However, a number of organisational and legal challenges remain. There is still a diversity of license conditions between countries and in some cases even among national public authorities. In addition, organisations have adopted different technical means to restrict access to data services, impacting on the ease and time taken to download data when needed from several sources. At the same time the increasing convergence to ‘open data’ is an evident trend on the European scale. The evolution of this movement is fully in line with the principles of INSPIRE and its main requirement to make data accessible. Some Member States provide INSPIRE services as open data but others are lacking completely any initiative in this direction, creating a varied licensing environment when data needs to be combined and harmonised for a range of possible applications.

Many datasets and services are already available and more are becoming available on a daily basis. Although the data may not be fully harmonised to INSPIRE’s requirements (e.g. data is still "as is"), the available datasets can be found and viewed. There are some good examples of nationwide coverage in particular INSPIRE themes but there are also many cases where full country-wide datasets are missing due to several issues: they do not have metadata (search), links to data are missing (impacting on 'discovery'), datasets/services are configured differently, not completely filled according to requirements or they do not have sufficient performance (known as 'bind') and, as noted above, there can be technical and data policy restrictions that leave datasets and services somewhat hidden from their potential use.

INSPIRE principles, data and services and semantic interoperability tools and data model 'assets' are widely applicable and reusable for geospatial data-sharing relevant to EC policy. Within the context of the ISA and ISA² Programmes, the JRC has been exploring the 'reuse' of INSPIRE in the environment and other policy domains, including transportation and energy efficiency. Such work, such as currently being provided through the ELISE Action, can already provide resources, approaches and starting-points for the reuse of INSPIRE in other sectors.
10.2. ITS Directive

Intelligent Transport Systems (ITS) apply information and communication technologies to transport. Computers, electronics, satellites and sensors are playing an increasingly important role in our transport systems. The main innovation is the integration of existing technologies to create new services. ITS as such are instruments that can be used for different purposes under different conditions. ITS can be applied in every transport mode (road, rail, air, water) and services can be used by both passenger and freight transport.

Directive 2010/40/EU, adopted in July 2010, on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport ("ITS Directive") aims to establish interoperable and seamless ITS services while leaving Member States the freedom to decide which systems to invest in.

Under this Directive, the European Commission has adopted (i.e. functional, technical, organisational or services provisions) to address the compatibility, interoperability and continuity of ITS solutions across the EU.

The Directive includes 4 priority actions areas:

- Priority area I: Optimal use of road, traffic and travel data;
- Priority area II: Continuity of traffic and freight management ITS services;
- Priority area III: ITS road safety and security applications;
- Priority area IV: Linking the vehicle with the transport infrastructure.

Regarding the links between the INSPIRE and ITS Directives, the latter provides that, “in order to guarantee a coordinated approach, the Commission should ensure coherence between the activities of the committee established by the ITS Directive and (among others) those of the Committee established by the INSPIRE Directive”. INSPIRE can support one of the priority areas set by the ITS Directive, namely the “optimal use of road, traffic and travel data”[1], which is relevant for several priority actions, among which are the provision of EU-wide multimodal travel information services (priority action a) and the provision of EU-wide real-time traffic information services (RTTI, priority action b), respectively covered by the two delegated regulations (1926/2017) and (962/2015).

10.2.1. Priority Action a) on the provision of EU-wide Multimodal Travel Information Services

Regulation 1926/2017 for the provision of EU-wide Multimodal Travel Information Services (MMTIS) provides the necessary requirements to make EU-wide multimodal travel information services accurate and available across borders. It establishes the specifications necessary to ensure the accessibility, exchange and update of standardised travel and traffic data and distributed journey planning for the provision of multimodal travel information services in the European Union.

Article 4 of the Delegated Regulation requires that “Transport authorities, transport operators, infrastructure managers or transport on demand service providers shall provide the static travel and traffic data and historic traffic data of the different transport modes, by using for the spatial network the requirements defined in Article 7 of Directive 2007/2/EU”. Beyond the “spatial network” also other data categories listed in the Annex of the Regulation fall under the scope of the INSPIRE Directive and in particular of its
Annex I, e.g. address identifiers, points of interest, topographic places, etc.). The INSPIRE roadmap requires EU Member States to make available and harmonised according to INSPIRE, all download and view services and the Geodata that fall under INSPIRE Annex I by 23 November 2017.

On the other hand, the ITS Directive requires Member States to set up National Access Points (NAP) to provide access to a wide range of standardised static, and if they choose dynamic, travel and traffic data across all transport modes from public and private actors. Annex I of the delegated regulation defines the list of data categories to be provided at the NAP (if they already exist in the MS). The various datasets in the NAP will use a variety of data standards, including INSPIRE and prevailing modal specific standards (NeTEx/Transmodel for public transport, TAP-TSI EDIFACT for rail, IATA for aviation and DATEX for road). Such National Access Points must have the most important static datasets, such as timetables, persons with reduced mobility accessibility information, location of stations/stops etc. by 1st December 2019 at the latest for the TEN-T comprehensive network and by 1st December 2023 for the full transport network.

In parallel, EC will support the early implementation of the Delegated Regulation along the TEN-T network through a CEF Programme Support Action MOVE/B4-2017-350. 17 individual MS projects will start in January 2018 and run for a period of 12-48 months. Most proposals concern stakeholder coordination, NAP expansion and development and NeTEx conversion. None of the proposals is taking into account the use of INSPIRE data, even if there is a specific requirements in the ITS delegated regulation and the MS are already due to provide data according to INSPIRE. DG MOVE will organise a number of coordination activities to steer the implementation in a consistent and harmonised way and facilitate the exchange of best practices amongst MS.

10.2.2. Priority Action b) on the provision of EU-wide Real Time Traffic Information Services

Delegated Regulation 2015/962 establishes the specifications necessary in order to ensure the accessibility, exchange, re-use and update of road and traffic data by road authorities, road operators and service providers for the provision of EU-wide real-time traffic information services.

It shall apply to the comprehensive trans-European road network, as well as motorways not included in this network, and priority zones identified by national authorities where they consider this to be relevant.

The legal text makes explicit reference to INSPIRE, stating that “the specifications set out in this Regulation should be compatible with the specifications established by Directive 2007/2/EC and its implementing acts, in particular Regulation 1089/2010 [7]. The extension of the application of these specifications to all static road data types might also promote further harmonisation in this field”.

The Commission Staff Working Document (SWD) accompanying the above mentioned delegated regulation [2], when considering benefits states that: “The optimisation of the business exchanges between partners and the reduction in duplications of data lead to an increase in dissemination, better re-use and finally time and cost-saving for everyone”. This is seen as a conclusion of the experience gained through the implementation of the INSPIRE Directive, which has also opened up access to spatial data via interoperable network services, available to the business and other communities.
Also, the SWD points out that “as mostly used by road operators, DATEX II[2] would be an appropriate European standard for data sharing, acknowledging that for static road data the INSPIRE Directive and its implementing acts should be considered”. For static road data in particular, Member States and other stakeholders are encouraged to use the data categories and network infrastructure that are being developed to meet the requirements of the INSPIRE Directive and its implementing Regulations.

Following the ITS SWD, in April 2015[3] the Commission issued a request to three European Standardisation Organisations (ESOs: CEN, CENELEC and ETSI),” to draft new European standards and European standardisation deliverables in support of the implementation of Article 8 of Directive 2010/40/EU for multimodal information, traffic management and urban logistics in the urban ITS domain”.

This request itself includes the INSPIRE Directive in the background documents. Also, the ESOs were requested to take into account existing initiatives and standards, including geo-standards (page 8, sec.1.2.2). The Decision was adopted in February 2016[4], where it is considered that the [INSPIRE] “digital network graph can be enhanced to be used as a common location referencing system for reliable ITS services. This enhancement should take into account pre-existing standards, in particular Geographic Data File (GDF)”.

Related to this regulation, within the European Union Location Framework Action, JRC has developed in 2015/16 the EULF Transportation Pilot, establishing an up-to-date flow of road safety data between road authorities and private sector map providers in Norway and Sweden, and provided guidance on linear referencing and exchange standards (the TN-ITS protocol), supporting the aims of the Intelligent Transport Systems Directive and drawing on INSPIRE. Partners included ELF project (Norwegian and Swedish Mapping Agencies), Norwegian and Swedish Road Authorities, ERTICO, TomTom and Nokia/HERE. The introductory video and the final report describing the findings can be downloaded at this website: https://joinup.ec.europa.eu/community/eulf/og_page/eulf-transportation-pilot

The work of the pilot during the 2015/2016 paved the way for a related CEF project proposal, aiming at extending the implementation of the TN-ITS service in five countries (Flanders (Belgium), United Kingdom, Ireland, Finland, France), for the provision of updates of ITS spatial road data.

In the ISA² geospatial Action ELISE (European Location Interoperability Solutions for e-Government) the Work Programme 2017-2020 provides for further pilot activities in the Intelligent Transport Systems field, in particular regarding accurate and authoritative digital maps for multi-modal travel and traffic information and as a backbone service for connected cars in the short term and automated driving in the long term.

There is a Programme Support action under the CEF transport programme for a extending the concept of the transportation pilot to at least additional 12 countries in EU.

[1] For an overview of the other areas of applications, please refer to the JRC report: http://publications.jrc.ec.europa.eu/repository/handle/JRC68401

[2] DATEX is a standard developed for information exchange between traffic management centres, traffic information centres and service providers. The second generation DATEX II specification opens up the standard to all actors in the traffic and travel information sector. See www.datex2.eu