

**AGREEMENT BETWEEN
THE EUROPEAN UNION,
REPRESENTED BY THE EUROPEAN
COMMISSION,
AND
THE EUROPEAN ENVIRONMENT AGENCY
ON
THE IMPLEMENTATION OF THE
COPERNICUS
LAND MONITORING SERVICE AND THE
IN SITU COMPONENT**

Annex I

DESCRIPTION OF TASKS



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ANNEX I - Delegated tasks for the Service ("the Action")**Description of the delegated tasks**

The tasks delegated under this agreement relate to the coordination of the technical implementation of the pan-European continental component, the local component of the Copernicus Land monitoring service, the cross-cutting activities for coordination of the in situ component of the Copernicus programme as well as development and support activities. The global land component is directly managed by the Commission - DG JRC.

A. The European Land Monitoring Service**Introduction**

The European Land Monitoring Service will provide users in the field of environment and other terrestrial applications with high quality information based on space data combined with other sources of in situ data. It addresses the data and information needs of a wide range of policies such as environment, agriculture, regional planning, transport, energy as well as climate change, at European level.

The European Land monitoring service should focus on the priorities defined by consultation amongst key users: the European Commission (DG ENV, DG REGIO, DG JRC, DG AGRI, DG ENER, DG CLIMA, DG DEVCO ...), the Copernicus User Forum, the EIONET National Focal Points (NFPs), and the National Reference Centres (NRCs).

Satellite input data

The satellite data necessary for product development will be provided by the European Space Agency (ESA) in the context of the Copernicus satellite image Data Ware House (DWH). Liaison and dialogue with ESA is essential and should be organized to ensure the efficient delivery of the necessary and relevant satellite data. EEA will provide and update the European land monitoring service requirements for satellite imagery that will feed in this dialogue, and will support the EC in its negotiations with ESA on the content and functionalities of the DWH.

Timely availability of space data, correctly fulfilling the technical image characteristics as required by the European land monitoring service is a prerequisite for successful implementation of the Copernicus services.

In situ input data

Copernicus land services need both satellite images and in situ data as input sources in order to establish reliable information services. Calibration and validation activities make use of the in situ data. Most in situ data are managed and made accessible at national level. However, there are as well European in situ datasets that are considered important for Copernicus land. The LUCAS database is one such longstanding European database coordinated by DG ESTAT, which is used for verification and validation of several information services in the Copernicus land portfolio, hence justifying an appropriate level of synchronisation between both.

In this context, EEA will continue to liaise with DG ESTAT so as to ensure optimal

synchronisation and complementarity in view of optimal combination of both LUCAS and Copernicus land services for underpinning Community policies on land. This includes as well support to the EC expert group on land cover / land use data, and the preparation of an EC communication on land as a resource.

The European Land service will ensure the procurement of the In Situ data necessary for the production of its pan-European and local land products. When the In Situ data are of several services interest, the European Land service will liaise with the Cross-Cutting component to ensure the access to these In Situ data.

The European land monitoring service components

For the period 2014-2020, two specific components (pan-European and local) are proposed for the European part of the service along the logic of a continuation of the information time series started in the GMES Initial Operations phase (GIO) 2011-2013.

I. Pan-European Land component:

In the Pan-European component, it is envisaged to have a portfolio of services, ranging from image mosaics, over land cover and land cover change mapping to mapping of complementary thematic land cover characteristics.

A first set of tasks of the pan-European component will address the post-processing of space data, and the production of Pan-European mosaics of ortho-rectified images, and intermediate products such as biophysical variables.

Following a successful set up of a precursor High Resolution Layer on imperviousness, i.e. the level of sealing of the earth's surface, in 2006 and 2009, a first full series of the HRLs was deployed for the reference year 2012. The HRLs provide detailed information on thematic land cover characteristics at 20 m resolution and validated a 1 ha grid cells. As such they provide complementary information other land cover / land use nomenclatures, such as CORINE Land Cover (CLC).

Next to imperviousness, for which a time series and change information could be started in 2012, the 4 other level 1 themes from the CLC nomenclature were set up as well. For forests, a HRL on tree cover density and a HRL with forest types were deployed. In the agricultural domain a grassland HRL was produced and furthermore an HRL indicating multi-annual presence of surface water and wet land, as well as a HRL on small water bodies were produced.

A second set of tasks will focus on updating and improving the High Resolution Layers (HRLs). HRLs will be updated in a 3-yearly cycle. The first update should thus be with the reference year 2015, the second update being in 2018. In 2015, all 5 HRLs from 2012 will be updated, but particular focus will be put on the grassland HRL, and to the extent feasible with Earth Observation, it will address aspects of intensity of agricultural practices on grasslands.

As a third set of tasks, CORINE Land Cover (CLC) time series will be further updates. CLC, the long standing time series started back in the nineties, remains a flagship product of the land monitoring service, and will be updated in a 6 yearly cycle. This includes the production of land cover and land use change information. CLC datasets will be updated in 2018. Synchronisation with HRLs is such that the latter also provide intermediate information to the CLC datasets.



Furthermore the pan-European component will start a re-engineering process, thus exploring the potential for providing incremental yearly but partial coverage updates of information layers.

II. The Local Land component:

The main objective of the local land component is to provide more detailed land cover and land use information complementary to the pan-European component on specific areas of interest, so called “hotspots”.

The component should continue to cover and to focus on the mapping and change analysis of larger urban areas following the Urban Atlas exercises of 2006 and 2012 (with now a 5 yearly update cycle). Next Urban Atlas exercise is thus proposed for 2017. Over these 2 series of datasets, the number of Functional Urban Areas (FUA)¹ has been extended from an initial threshold of cities having more than 100.000 inhabitants, to a threshold of approximately 50.000 inhabitants. Given the increasing importance of the environment in urban areas, an extension from EU28 to EEA39 will be performed as well.

The local land component will focus as well on the mapping and monitoring on a regular basis of environmental sensitive areas, updating the Riparian Zones work of 2012 in 2018. The Riparian Zones service is providing crucial information for the monitoring and assessment of ecosystem functioning and biodiversity monitoring, as defined by the MAES initiative (Mapping and Assessment of Ecosystems and their Services). Land change products will also be provided in this context. Furthermore similar work will be done to monitor changes in Natura2000 areas and potential surrounding threats from a land use perspective, from 2015 onwards, with a first full implementation in 2016.

Service Evolution

The period 2014-2020 will allow the evolution of the service along the following lines: the improvement of the specifications of the existing GIO products, complements to the GIO products, and the start-up of new land monitoring information products.

Evolution of the service should consider the future availability of Sentinel data. Product update cycle, as well as product delivery time, may be reviewed and improved based on the performance of the Sentinel data acquisition system and processing chains. The possibility of a continuous product update mechanism should be envisaged on a mid-term vision, probably from 2016 onwards, modifying thus the pre-defined update cycle approach.

The service evolution should allow, if necessary, to better answer to user requirements, to take into account the requirements of new users or to adjust the products to the evolution of the requirements of the existing users.

Additional and complementing HRL land cover-use mapping products may also be foreseen to answer to specific policy needs, including the requirements for “greening” EU policies. As an example, the integration of green linear elements will be envisaged in the HRLs from 2015 onwards.

Introducing the third dimension in the information products is request in order to better integrate with socio-demographic information. It is also considered a logical extension to the Urban Atlas data ... The land service will consider the use of Sentinel-1 radar data, amongst

¹ Functional Urban Areas (FUA) are formerly known as Larger Urban Zones (LUZ).

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other to improve information on height for the earth's surface modelling. Surface model information could contribute as well to the improvement of other land services, for instance for the production of HRLs on imperviousness or forests, or to improve datasets on surface water bodies. It may allow including new services in the portfolio related to identifying areas prone to topographic accidents such as land slides, subsidence etc...

Service evolution should explore geographical extension of the mapping activity: mapping of new environmental sensitive areas should be considered, i.e. coastal zones, and/or specific areas at risk (such as the alpine domain, desertification and drought prone regions) and/or European Neighbourhood.

The new activities may also include, without being exhaustive: snow and ice monitoring, the development of products designed for Arctic areas, the support to the raw material domain, the support to the monitoring of the biofuel directive, the assessment of inland surface water quantity and quality, the support to surveillance and environmental inspection, the identification and monitoring of areas prone to geo-hazard risks, etc.

Stakeholder consultation

Beside the continuity and the improvement of the GMES Initial Operation products, the evolution of the service with complements or new activities should be based on the existence of mature products, results of pre-operational research projects, and on clearly identified user needs. This should be defined in agreement with DG ENTR through a transparent user consultation process, using objective criteria and according to both European Community and national user requirements. Prioritization will be necessary and constraint by budget availability. Technical specifications of new elements will be defined following this prioritisation exercise.

Service and Product Assessment

The activities will also include independent statistical validation of the services and products provided, meeting international quality assurance standards. External expertise may be employed to support this process.

Data and Product archiving and dissemination

Products and data of the European land monitoring service shall be archived; this archive will be maintained during the whole implementation period. Products will be disseminated through the Copernicus Land portal (land.copernicus.eu). Other dissemination platforms could be proposed with specific functionalities but a strict coordination is needed to ensure the respect of data integrity.

The maintenance of the Copernicus Land portal is part of the task of the service. This maintenance will include the integration and the link with the Global Land products in coordination with the Global Land service operators and the Global Land technical coordinator DG JRC.

In setting up "land.copernicus.eu" the Agency shall coordinate with the Commission in order to ensure the interoperability with the "copernicus.eu" overall federation of dissemination services (e.g. discovery, view, registration). The Commission will work in collaboration with the Agency and other Copernicus Service delegated entities to define the technical specifications for the federation of dissemination services. As long as the definition of the technical specifications of the federation of services, thereby respecting open standards, is not

provided to the Agency, it is requested to use standardised interfaces for the dissemination services (such as W3C, OGC and INSPIRE specifications). The overall aim shall be to offer to Copernicus Users a common experience while accessing Copernicus data and information.

Liaison with Participating Countries

In the development of the activities, the contributions and expertise of the participating countries will be maximised in compliance with the subsidiarity principle and in a cost efficiency manner using, when possible, a decentralised implementation approach. The work of the Eionet Action Group on Land monitoring in Europe (EAGLE) working group enabling the transformation and integration of national land databases to a coherent European land monitoring concept and the results of the FP7 HELM project on best practices in LC/LU mapping will be taken into account in the production process of the two main components of the Service, thus fostering a bottom-up approach whenever appropriate and technically and timely feasible.

User liaison

A liaison with the users at European and international level when necessary has to be ensured, through regular consultations with the Copernicus User Forum, relevant networks (e.g. EIONET) or through the organisation of ad hoc meetings and workshops. This liaison will allow the collection of the user needs and requirements, as well as raising awareness for the potential user uptake of the products.

Communication Plan

In the first year of the Copernicus operational service implementation phase, a revision of the GIO communication and dissemination plan will be drafted. The plan will identify communication activities to be implemented along with the service, including an assessment of target audiences and communication channels and means. A revision of the communication plan is scheduled with every major 3-yearly cycle of the implementation of pan-European products.

Further, outreach activities on service level will be carried out specifically to the related scientific and professional communities.

Product Timeliness

Specific attention will be paid on improving the timeliness of the product delivery, namely reducing the timing between data acquisition and final product delivery, aiming at reducing the production time to 1 year between the moment of image availability at the end of each acquisition season and the information service availability.

Implementation process

EEA will coordinate the implementation of the delegated tasks. This will include both the administrative management of the implementation through involvement with and outsourcing to external operators, both public authorities in the MS and private sector entities. The instruments used for this coordination include consultation of the market through calls for tender and subsequent establishment of framework or service contracts, as well as the establishment of grant agreements with countries.

The coordination of the land service includes as well a technical component. This technical

coordination aims at the minimum “in house” expertise required to ensure coherence and consistency within the land services portfolio, comparability within time series, monitoring the quality of the services, appropriate technical interaction with the stakeholders, etc... For the technical coordination EEA will be assisted by the European Topic Centre where appropriate.

In support to DG ENTR, EEA will also ensure the dialogue with the other Copernicus Services.

Furthermore, and as the pan-European and local components of the land service as well as the cross-cutting in situ coordination are delegated to the EEA, the agency will ensure the liaison between these 2 major parts.

B. Cross-cutting activities for coordination of the in situ component of the Copernicus Programme

In situ data as defined by Copernicus comprise all non-space-borne data with a geographic dimension. It includes 'observation data from ground-, sea- or air-borne sensors as well as reference and ancillary data licensed or provided for use in Copernicus'. The provision of in situ data will draw on different data sources, including mainly and preferably member states' (MS) data sources, and to the extent that it is necessary, other third party in situ data sources. Access to the MS in situ data will be organized on the basis that participating countries will systematically provide access according to INSPIRE principles and on a free basis.

The Regulation of the European Parliament and of the Council establishing the Copernicus Programme and repealing Regulation (EU) No. 911/2010 outlines the Copernicus in situ component as one of the three pillars of the programme. According to the Article 7 of the regulation, the in situ component shall include a coordinated access to in situ data, as needed by the operational Copernicus services for Emergency management, Land monitoring, Marine environment monitoring, Atmosphere monitoring, Security and Climate change.

The specifications and access for day to day operational management and ingestion of the in situ data and service tailored pre-processing will be provided by the services themselves, unless when multiple services would require the same tailored pre-processing, which would trigger a need for coordination..

For reasons of efficiency, harmonisation and ease of access, the overall in situ data coordination by the European Environment Agency will be provided when interaction with one data provider/network should be established and maintained for service of the Copernicus programme, or when data is part of an existing EU reporting dataflow and re-use for Copernicus services can be facilitated. The EEA will base its work amongst other on the experience within the FP7 GISC (GMES In situ Coordination) project.

There are four primary tasks of the EEA in the frame of the cross-cutting in situ data coordination:

1. Establishing and maintaining an overview of the state of play of in situ data for Copernicus services, based on 3 elements:
 - Overview of the in situ data requirements for Copernicus service production;
 - A database comprising an overview of already available and used in situ data including their accessibility and web-service performance as indicated by the Copernicus service operators;
 - Crossing demand and offer for in situ, in order to identify gaps, priorities and the potential for improvement of in situ data access,

2. Operational provision of cross-cutting in situ data including access to reference data for Copernicus services through:
 - The establishment of an in situ data node for Copernicus services at EEA, collecting, transforming, completing and providing access to full coverage, as harmonised as feasible in situ data through a single point of access, using INSPIRE compliant web services;
 - The node will as well address improved access to selected national reference datasets;
 - Completion of gaps, and integration in a full coverage service with parts of European products;
 - Facilitating access to in situ via Eionet (e.g. NRT air quality data);
3. Managing partnerships with data providers to improve access and use conditions of in situ data for Copernicus services;
 - The coordination of access agreements on national and regional in situ data for inclusion in the above node, in cooperation with data custodians;
 - Maintaining and extending partnerships with in situ data providers at European and global level when considered appropriate as an alternative for accessing national and regional data sources;
4. Supporting the European Commission and Copernicus Service providers/entrusted entities when seeking for solutions for providing in situ data needed.

EEA shall organize the following activities (tasks):

1. Establish and maintain an overview of the state of play of in situ data for Copernicus services

This task consists of three elements, firstly addressing the demand side for in situ data, secondly maintaining the offer side on in situ data and thirdly the crossing of demand and offer in order to identify priorities of action.

The list of requirements for in situ data for Copernicus services shall build upon the existing inventory made during the GISC project. Service operators will be requested to provide input in order for EEA to extend and maintain a comprehensive overview of requirements for all of the Copernicus services. It has to be remarked that the requirements for in situ for the Copernicus services are limited to the production and maintenance phase of the services, hence prohibiting uncontrolled proliferation of these data to the end users.

The meta-database provides a detailed overview of all the available and already accessible in situ data for use by Copernicus services and shall build upon information available from INSPIRE meta-databases, both at European level as well as at national level. The meta-information should be complemented with specific fields beyond the minimum INSPIRE metadata specifications in order to allow for correct assessment of fitness for purpose, including information that Copernicus service operators provide on the compliance and performance of web-services through which these in situ data are made available.

The EEA shall cross the list of requirements with the metadata on available and accessible in situ data in order to derive a state of play on in situ data for Copernicus services. The state of play needs to be such that priorities for coordination actions and providing gap filling solutions in the domain of cross-cutting in situ can be identified, based on criteria including:

- Level of criticality of any data theme for one or more Copernicus services;
- Feasibility of improvement of a distributed access to a data theme from a perspective of completeness of coverage, technicality of the data model, accuracy, timeliness, required resources as well as access and use conditions or restrictions;

- Potential interference with on-going initiatives in the framework of INSPIRE;
- Cost-effectiveness as compared to pan-European data sources.

To the extent feasibility, and conform the Copernicus regulation, access to national and/or regional data sources is the preferred option, however within the boundary condition of not jeopardising the operational and timely implementation of the Copernicus services.

2. Operational provision of in situ data including access to reference data for Copernicus services

According to the INSPIRE principles, the long term objective and ideal access to geo-referenced in situ data should become operational according to a fully distributed architecture, thus ensuring up-to-dateness of the information via access at their point of collection, management and maintenance. The INSPIRE implementation is a work in progress, whereas in situ data needs for Copernicus services urge for short term solutions.

In order to facilitate the access to in situ data for the Copernicus services, EEA will configure and implement a technical solution via an intermediate node so as to ensure for the Copernicus services a single point of access. The concept shall be such that this node deals with all aspects needed to ease the use of in situ data by handling upfront use conditions and restrictions, harmonising data models to the extent feasible, and completing the pan-European coverage by gap-filling from other data sources. At the same time, this intermediate node shall offer services at a high level of technical performance and availability.

Services offered shall be compliant with mainstream specification frameworks, such as INSPIRE, OGC, W3C etc...

This task includes the conceptual design and deployment of a data node for Copernicus services at EEA, harvesting in situ data from both national and/or regional data sources, as well as pan-European data sources for gap filling. The proposed concept fits a 2-track approach in which decentralised data access to the national and regional in situ data is combined with centralised approach when and if necessary.

Through its Eionet network, EEA will facilitate and ensure access to specific environmental data themes that are crucial to the Copernicus services. In this context, particular interest will be given to the category of Near Real Time data, such as air quality data, which are instrumental to the Atmosphere service.

3. Managing partnerships with data providers to improve access and use conditions of in situ data for Copernicus services

In situ data are collected to a large extent at national and regional levels, and to some extent at international level. The main challenge in improving the access to in situ data is in the arrangements that can be reached with data providers. Statistical data have a longstanding tradition of sharing data between national and European levels of governance via the European Statistical System (ESS). EEA and Eionet have as well a 20 year experience of free sharing of environmental data, following Community Environmental policies and their reporting modalities. The free and open sharing of geospatial data lacks behind, despite the importance of the spatial dimension, and the added value it brings when combined with statistical and environmental monitoring information. This has been a key driver to establish the INSPIRE directive. However, the full implementation of INSPIRE is a work in progress, and in attendance of this, short term solutions have to be found for the Copernicus services, entailing an important coordination task on service cross-cutting in situ data access. This task comprises 3 parts:

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- The coordination with national and regional data custodians in order to ensure sustainable access agreements to in situ data they are managing, and for inclusion in the above mentioned node; data custodians are mostly public authorities that have been mandated with thematic in situ data collection, management, maintenance and distribution;
- Geospatial reference data are a special category of in situ data, which are essential to operational Copernicus services in the sense that they provide a geographic framework to which many other in situ data are referenced and maintained. Most of the reference data needed for Copernicus services can be linked to INSPIRE spatial data themes from Annex I and II, and require coordination with National Mapping and Cadastral Agencies;
- For data themes not having an appropriate solution under the above points a alternative pan-European and global data-sources will be explored, either through existing umbrella organisations and/or via commercial data custodians. This includes securing the existing agreements with organisations such as EuroGeographics, EuroGeoSurveys, EuroGOOS, EUMETNET, or extending cooperation arrangements to global level if needed (WMO,...). EEA will strive to improve licensing aiming at both harmonised conditions as foreseen in the INSPIRE directive, art. 17§8, as well as the full, open and free data and information policy of the Copernicus programme. Open and free data policy, in accordance with the GEO (Group on Earth Observations) principles, will be promoted.

A register of stakeholders, coordination arrangements and partnerships will be set-up and continuously maintained.

4. Support to the EC and Copernicus services on in situ data issues

EEA will support the European Commission and services in structuring the in situ component in Copernicus, including support related to in situ data in the framework of GEO/GEOSS. When needed, EEA will coordinate involvement of stakeholders in different cross-cutting actions, organize discussion and meetings, organize events for the visibility of Copernicus in situ component to attract potential in situ data providers etc. EEA will also collaborate with Copernicus services in seeking for solutions for providing in situ data needed.

