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D.2.2.1.c Report on requirements from GEOSS, INSPIRE, GMES, SEIS and related initiatives and projects

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These are Dublin Core metadata elements. See for more details and examples http://www.dublincore.org/

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ACRONYMS AND ABBREVIATIONS

Abbreviation	Name
ADC	Archtecture and Data Committee
AIP-2	Architecture Implementation Pilot, Phase 2
AOC	Advanced Operating Capacity
BPEL	Business Process Execution Language
CAP	Common Agricultural
CEN	European Committee for Standardization
CRS	Coordinate Reference System
CSR	Component and Services Registry
CS-W	Catalog Service
CT	Consolidation Team
DEM	Digital Elevation Models
DOPA	Digital Observatory of Protected Areas
DoW	Description of Work
DS DS	Data Specifications Drafting Team
EbRIM	electronic business Registry Information Model
ENM	Ecological Niche Model
EO	Earth Observation
EO-DAIL	Earth Observation Data Access & Integration Layer Implementation
EUOSME	European Open Source Metadata Editor
ERCS	Emergency Response Core Services
ESA	European Space Agency
ESDI	European Spatial Data Infrastructure
EU	European Union
FP7	Seventh Framework Programme
FTS	Fast Track Service
GAS	GMES Atmosphere Service

GCI	GEOSS Common Infrastructure
GEMS	Global and regional Earth-system (Atmosphere) Monitoring using Satellite and in-situ data (GEMS)
GEO	Group on Earth Observations
GeoRM	Geo Rights Management
GeoRSS	Geospatially-enabled RSS and Atom feeds
GEOSS	Global Earth Observation System of Systems
GIGAS	GEOSS, INSPIRE and GMES an Action in Support
GMES	Global Monitoring for Environment and Security
GSCB	Ground Segment Coordination Body
HMA	Heterogeneous Mission Accessibility
IG	Implementation Group
INSPIRE	Infrastructure for Spatial Information in Europe
IOC	Initial Operating Capacity
IPCC	Intergovernmental Panel on Climate Change
IR	Implementing Rules
ISO	International Organization for Standardization
JRC	Joint Research Centre
LMCS	Land Monitoring Core Service
MACC	Monitoring Atmospheric Composition and Climate
MCS	Marine Core Service
MS	Member State
NDVI	Normalize Difference Vegetative Index
NGO	Non-Governmental Organization
NSDI	National Spatial Data Infrastructure
O&M	Observation and Measurement
OGC	Open Geospatial Consortium
OSOR	Open Source Observatory & Repository
OWS	OGC Web Services
PROMOTE	PROtocol MOniToring for the GMES Service Element

QC	Quality Control
SA	Support Action
SAFER	Services and Applications For Emergency Response
SBA	Societal Benefit Area
SEIS	Shared Environmental Information System
SensorML	Sensor Markup Language
SIF	Standards and Interoperability Forum
SIR	Standards and Interoperability Registry
SOS	Sensor Observation Service
UML	Unified Modeling Language
UN	United Nations
UNEP	United Nations Environment Programme
W3C	World Wide Web Consortium
WCMC	World Conservation Monitoring Centre
WCS	Web Coverage Service
WCS-T	Web Coverage Service, Transactional
WCTS	Web Coordinate Transformation Service
WFS	Web Feature Service
WFS-T	Web Feature Service, Transactional
WMS	Web Map Service
WPS	Web Processing Service
WP	Work Package
XML	eXtensible Markup Language

1 INTRODUCTION

EuroGEOSS demonstrates the added value to the scientific community and society of making existing geographic systems and applications interoperable and used within the GEOSS and INSPIRE frameworks. The project built an Initial Operating Capacity (IOC) for a European Environment Earth Observation System in the three strategic areas of Drought, Forestry and Biodiversity.

The concept of inter-disciplinary interoperability requires research in advanced modelling from multi-scale heterogeneous data sources, expressing models as workflows of geo- processing components reusable by other communities, and ability to use natural language to interface with the models.

1.1 Purpose and scope

In order to enhance the EuroGEOSS IOC for multidisciplinary interoperability a review of requirements from the main international projects and initiatives addressing such issue is to be done. The goal of this document is to update the analysis in the first version of this document (EuroGEOSS D2.2.1b, 2011).

The collected requirements will contribute to provide specifications, guidelines and prototypical implications in order to support the implementation of the EuroGEOSS Advanced Operating Capacity (AOC) and the infrastructures in each of the thematic areas of EuroGEOSS.

2 THE GLOBAL EARTH OBSERVATION SYSTEM OF SYSTEMS (GEOSS)

2.1 Introduction

In the previous versions of this document (EuroGEOSS D2.2.1b, 2011) we provided an overview of GEOSS: GEOSS Societal Benefit Areas, GEOSS Architecture, GCI (GEOSS Common Infrastructure), and GEOSS Architecture Implementation Pilot (AIP), outcomes of the SIF (Standards and Interoperability Forum) interoperability assessment, outcomes of the GEO Ministerial meeting 2010 (Beijing), and activities of the GEOSS Sprint to Plenary in 2011.

In the next sections we will update the main requirements stemming from GEOSS, considering the outcomes of the last GEO Ministerial meeting – held in November 2011 in Istanbul.

2.2 The Brokering Approach in GEOSS

During the last GEO Ministerial meeting in Istanbul (November 2011), it was demonstrated an enhanced GEOSS Common Infrastructure (GCI). Figure 1 depicts the enhanced GCI which was demonstrated in Istanbul.

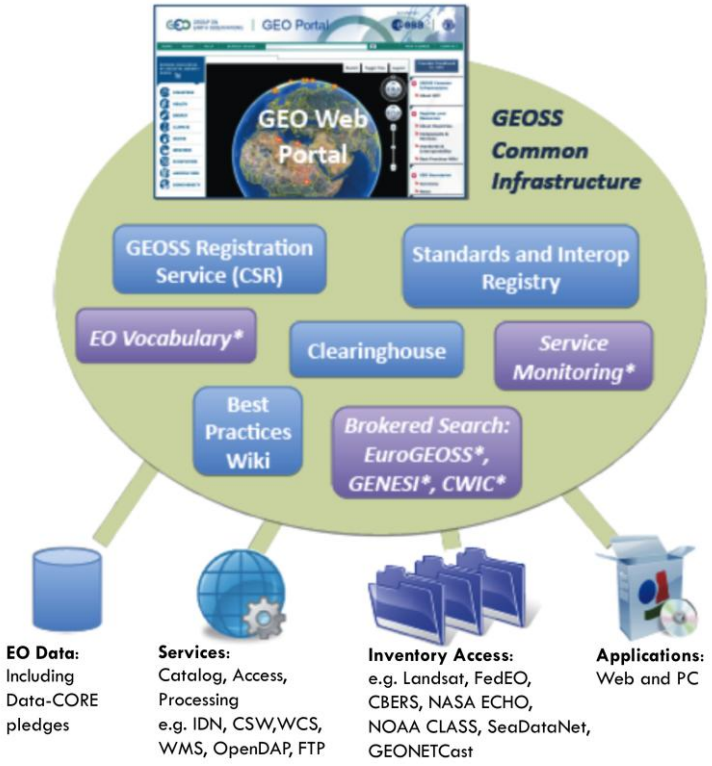

Figure 1 - Enhanced GCI presented at the GEO-VIII Plenary

Today more than 28 million data products are discoverable via the GCI. This rapid growth is due to the introduction of the EuroGEOSS brokerage software, which allows the GCI to talk to external catalogues containing an enormous number of resources. The user sends a request to the GCI which is then transmitted through the broker to these catalogues. Because different catalogues use different keywords (e.g. rainfall vs. precipitation), a controlled vocabulary – the GEOSS Earth observation vocabulary – has been established by combining existing and well-established dictionaries and glossaries. [GEO News, Issue #17[1]]

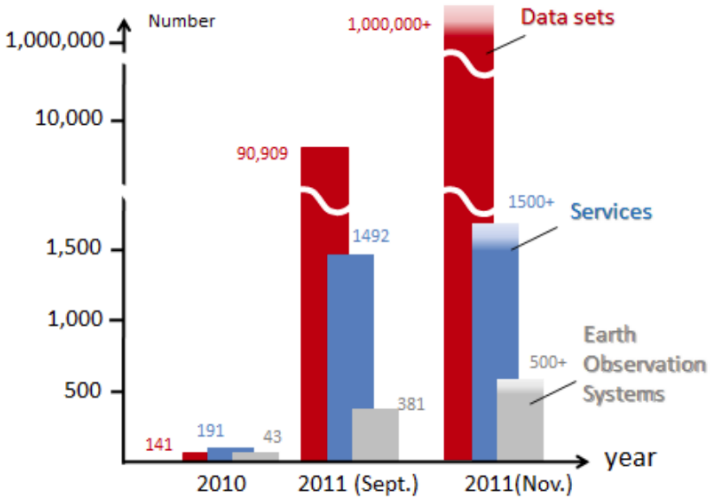

Figure 2 - Growth of Accessible Resources in the GCI (GEO, 2011)

Brokered-based solutions are thus becoming central requirements for multidisciplinary interoperability components in the GCI.

2.3 Ranking of Resources

The above section highlighted the importance of the brokering approach to increase the number of available resources in the GCI. This raises the new challenge of returning to users the *most appropriate* resources first among the available ones. In fact, traditional filters which are usually applied during the discovery phase (keyword, spatial and temporal filters) become insufficient when dealing with millions of entries; that is, a search result set might however contain thousands of records.

This means that after executing the user's query, the system (i.e. the GCI in the case of GEOSS) should be able to **rank** the matched records according to some metrics. Moreover, the heterogeneity and complexity of GEOSS makes it necessary to use different metrics according to different use cases. In fact, GEOSS aims to cover a broad range of possible user types – from decision makers to pure scientists. Thus, it is likely that different user types need different ranking metrics according to their specific use cases.

Possible metrics for the ranking algorithm are:

1. Online Accessible Resources first;

[1] http://www.earthobservations.org/art_017_004.shtml

2. Free and Open (i.e. GEOSS Data Core) Accessible Resources First;
3. Resources with Complete set of Metadata First;
4. High-quality Data First.

2.4 Data Quality

The last item of the above-cited possible metrics for the ranking algorithm deals with data quality. Again, the complexity and heterogeneity of GEOSS environment makes it very challenging to address this issue. The GeoViQUA FP7 project, presented at the last GEO Plenary in Istanbul, is working to address this; in particular the project is:

- extending the present standards for data-quality description;
- profiling the CSW interface in order to run quality-based queries.

Requirements stemming from this project should be taken into account.

3 INFRASTRUCTURE FOR SPATIAL INFORMATION IN THE EUROPEAN COMMUNITY (INSPIRE)

This section reports on the status of the INSPIRE directive requirements. There are no updates regarding the INSPIRE implementing rules and guidelines since the publication of the previous deliverable (EuroGEOSS D2.2.1b, 2011). Nevertheless, It is worth to mention the development and deployment of the INSPIRE geoportal which has been recently published by the Joint Research Center.

3.1 Introduction

The **European INSPIRE Directive** (EC 2007/2) establishes the legal framework for setting up and operating a European Spatial Data Infrastructure (ESDI) based on the infrastructures for spatial information (SDIs) of the Member States (MSs) of the European Union.

Specifically, the purpose of the INSPIRE Directive is *to "lay down general rules aimed at the establishment of the Infrastructure for Spatial Information in the European Community (hereinafter referred to as Inspire), for the purposes of Community environmental policies and policies or activities which may have an impact on the environment. Inspire shall build upon infrastructures for spatial information established and operated by the Member States (Article 1)".*

Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) was published in the official Journal on the 25th April 2007. The INSPIRE Directive entered into force on the 15th May 2007[2].

To ensure that the spatial data infrastructures of the Member States are compatible and usable in the Community and transboundary context, the Directive requires that common ***Implementing Rules*** (IR) were adopted in a number of specific areas: metadata, data specifications, network

[2] http://inspire.jrc.ec.europa.eu/

services, data and service sharing, and monitoring and reporting. These IRs are adopted as Commission Decisions or Regulations, and are binding in their entirety. The Commission is assisted in the process of adopting such rules by a regulatory committee composed of representatives of the Member States and chaired by a representative of the Commission (this is known as the Comitology procedure)**Erreur ! Signet non défini.**.

Technical Guidelines are also provided by the INSPIRE directive. They are informative guidance documents to help set up systems compliant to the *INSPIRE Directive,* the according *Implementing Rules*, and to existing international standards and specifications.

In (EuroGEOSS D2.2.1, 2009) and (EuroGEOSS D2.2.1b, 2011) we provided a list of requirements defined by the *Implementing Rules* on metadata, data specifications, network services, data and service sharing and monitoring and reporting.

Since (EuroGEOSS D2.2.1b, 2011) no updates were published regarding the INSPIRE Technical Guidelines and Implementing Rules.

In the following we will update on the recent (November 2011) publication of the INSPIRE Geoportal on the web which can be useful to the EuroGEOSS project partners to discover and view published INSPIRE resources.

3.2 The INSPIRE Geoportal

With the recent deadline of November 2011 for Member States to provide discovery and view[3] services according to the INSPIRE Regulation on Network Services, JRC published a first release of the INSPIRE Geoportal. This release allows the users to access spatial and environmental data from many different sources across Europe in one single search. The information available through the Geoportal is linked to geographical areas, and can often be displayed in map format. The metadata is available in multiple languages. This allows users to find out the data or service they require exists and whether the information they have found is suitable for their requirements and is available for use.

INSPIRE is based on the infrastructures for information established and operated by the 27 Member States of the European Union, Fifteen EU countries have already provided more than 200.000 searchable records linked to the geo-portal.

Figure 3 shows the INSPIRE Geoportal first release Geoportal which includes three components:

- The European Open Source Metadata Editor (EUOSME)
- INSPIRE Metadata Validator Service
- Discovery/Viewer Web Service

[3] http://inspire-geoportal.ec.europa.eu/

Figure 3 – The INSPIRE GeoPortal

The European Open Source Metadata Editor (EUOSME) (EuroGEOSS D2.2.3, 2010), (EuroGEOSS D2.2.3b, 2010) is a web application developed by EuroGEOSS and then adopted by the INSPIRE geo portal. It is written in Java and based on Google Web Toolkit (GWT) libraries. Its main purpose is to help create metadata compliant with the INSPIRE Directive (2007/2/EC) and the INSPIRE Metadata Regulation (1205/2008). More specifically, this implementation allows to describe a spatial data set, a spatial data set series or a spatial data service compliant with the standards ISO 19115:2003 (corrigendum 2003/Cor.1:2006) and ISO 19119:2005. It is therefore an implementation of the INSPIRE Metadata Technical Guidelines based on these two ISO standards, and published on the INSPIRE web site. This editor builds on the experience acquired in the development of the INSPIRE Metadata Implementing Rules, and includes the INSPIRE Metadata Validator Service available from the INSPIRE EU Geo-portal (http://www.inspire-geoportal.eu/).

The Discovery/Viewer service publishes one single web interface to discover and view INSPIRE Member States resources. Figure 4 presents the web interface which was design to let the user reach the functionalities from a single page. The web page offers to the user a traditional map view on the left and a simple, but sophisticated, search menu on the right.
The INSPIRE Geoportal discovery functionality is performed by the INSPIRE Geoportal search engine. The engine maintains an index of all the metadata documents made available by Member States through their INSPIRE discovery services. The indexing activity makes it possible to execute searches that are almost instantaneous as opposed to the time required by a real-time federated search across all services. Functionalities include the possibility to discover resources in each language of the European Union and to view resources directly on the map displayed by the geoportal.
The user can also take a look at the dataset metadata and ask for an immediate translation into another language (e.g. English).

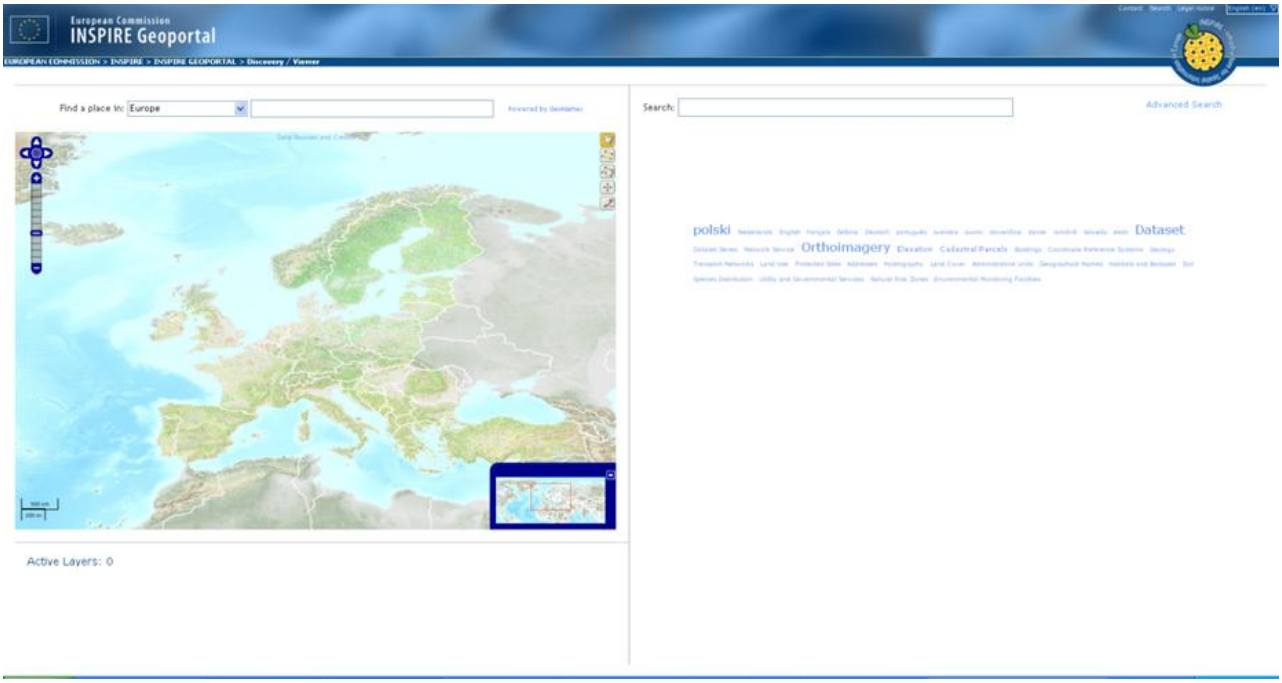

Figure 4 – The INSPIRE GeoPortal Discovery Service

The search functionality can be performed by the Member States to review the compliance level of each resource with respect to the INSPIRE Implementing Rules and Technical Guidelines.

Figure 5Erreur ! Source du renvoi introuvable. presents the picture gallery which shows a snapshot of all the layers that were found in Member State Services. By clicking on the image thumbnail the related metadata page opens. In this way, the Geoportal establishes the connection between the layer and the dataset, thanks to the successful implementation of the INSPIRE Technical Guidelines for Metadata, Discovery Services and View Services.

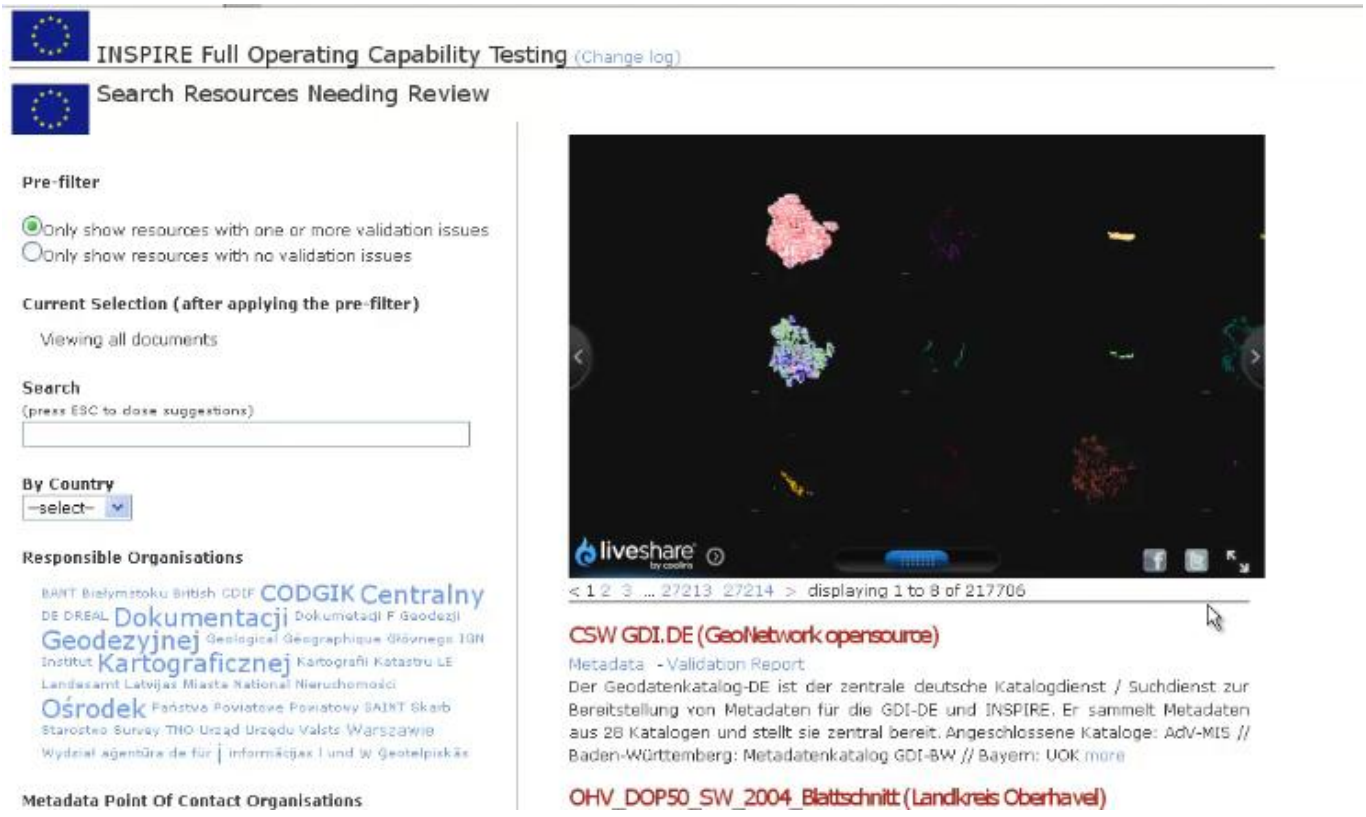

Fig 5: The INSPIRE GeoPortal Thumbnail gallery

4 THE GLOBAL MONITORING FOR ENVIRONMENTAL AND SECURITY (GMES)

4.1 Introduction

The Global Monitoring for Environmental and Security (GMES) is the European programme implementing an Earth observation service system that fed with satellites and other sensors information will monitor our environment and support the security of every citizen.

Technically GMES consists in a set of systems that first; collects data from multiple sources (earth observation satellites and in situ sensors such as ground stations, airborne and sea-borne sensors and second provides users with tools to processes these data to generate reliable and up-to-date information. This information will be provided throughout services dedicated to monitoring and forecasting the state of the Earth's subsystems.

Systems for six thematic areas are developed: marine, land, atmosphere, emergency, security and climate change. GMES services are all designed to meet common information requirements and have global dimension. The major users of GMES: policymakers and public authorities, will use the information to prepare environmental legislation and policies with a particular focus on monitor and assess climate change effects.

This chapter updates the GMES requirements, previously illustrated in (EuroGEOSS D2.2.1b, 2011). Updates regard:

- The "GMES components" (section 4.3 of (EuroGEOSS D2.2.1b, 2011)): GMES compliance to the INSPIRE directive;

- The “Land Monitor Services” (section 4.4.1 of (EuroGEOSS D2.2.1b, 2011)): pan–European Land Cover Monitoring service and Global Land component objective;
- The “Emergency Management” (section 4.4.4 of (EuroGEOSS D2.2.1b, 2011)): Emergency Management Service (EMS) description.

4.2 General GMES Requirements

(see (EuroGEOSS D2.2.1b, 2011))

4.3 GMES Components

The GMES initiative has been structured in three main components: 1) the space component, (satellites and associated ground segment), 2) in-situ measurements (ground-based and airborne data gathering networks), and 3) services to process and provide users with harmonized and standardized information according to common requirements.

The European Space Agency (ESA) is responsible for the space infrastructure and data provision. It was conceived in 1998 and since 2001 research projects develop pilots to implement the system. Since 2008 services have started to take shape and they should become pre-operational from 2011 onwards.

Crucial to the success of the GMES service component is the compliance with the requirements of the INSPIRE directive2, related Implementing Rules and associated technical guidelines. All foreseen GMES activities shall therefore ensure compliance with, and actively contribute to the development of, the relevant INSPIRE Implementing Rules and associated technical guidelines.

Within the EuroGEOSS scope, GMES service components are the most relevant component in order to gather requirements as inputs for the analysis and designs of the information systems and services to develop during the project. Therefore next sections focus on the description of current GMES services and in particular we will point out the main requirements of these services to adopt them as requirements to fulfill by EuroGEOSS systems and services. Finally we will present the general remarks, conclusions and main requirements to be addressed by EuroGEOSS.

4.4 GMES Services description and requirements

(see (EuroGEOSS D2.2.1b, 2011))

4.4.1 Land Monitoring Services

The GMES Land Monitoring Service (LMS) provides accurate and cross-border harmonised geo-information at global to local scales. It has a wide range of applications for land use / land cover change, soil sealing, water quality and availability, spatial planning, forest monitoring and global food security.

Pan-European Land Cover monitoring service

The service will also be of high relevance to Civil Protection and Humanitarian Aid work within the fields of Prevention, Preparedness and Disaster Risk Reduction, which is often also related to land use (e.g. building/no building etc.). It addresses a wide range of policies such as environment, agriculture, regional, development, transport, energy as well as climate change at EU level and European commitments to International Conventions. The Land monitoring service will focus on the priorities defined by the Land Monitoring Service Implementation Group and the results of consultation of user communities.

The Land Service also builds on precursor activities (Geoland and Geoland2 which will continue to carry-out additional development of the service until the end of 2012), ESA GSE projects, Corine Land Cover, Land Fast Track precursor project), on preparatory action (Reference Data Access project) and existing operational activities at European level and national level. The details of these priorities and their relevance to users will be validated by the Commission with the advice of the GMES User Forum. The development of this service should ensure compliance with, and actively contribute to the development of, the relevant INSPIRE Implementing Rules and associated technical guidelines, in particular the relevant themes of Annex I.

Next, we outline the main requirements for the development of the LMS to be considered in the context of EuroGEOSS:

- Discovery capabilities to share common data and services among the users community, by implementing catalogue and archive facilities.
- Data access capabilities: This involves a proper metadata documentation of each dataset according to international standards putting the EC in a position to provide, from a centralised data portal, continued access to all datasets acquired under GMES.
- Data and Services should be deployed in a appropriate spatial data infrastructure for data integration and dissemination.
- Service coordination: In a distributed architecture which is expected to deliver operational services, an effective coordination mechanism is an absolute prerequisite for success.
- Interoperability: interoperable service components need to define interfaces, capable of ensuring interoperability. Internationally agreed standards (e.g. ISO, CEN) and open specifications (e.g. W3C, OGC) expressed in widely accepted languages (e.g. XML, UML) provide a framework for interface definitions. INSPIRE implementing rules (IR) are taken into account.
- Data harmonization: Ortho-imagery and land-cover/ land-use are part of the themes listed in the annexes of the INSPIRE Directive.
- Multidisciplinarity: Cover a wide variety of thematic content.
- Different geographical scales: From Global to Local.
- Different time scales, varying from near real time, to days or even several years.

Evaluation of these requirements was carried out within the project *Geoland* funded under the 6th Framework Programme of the European Commission. The pre-operational Land Monitoring Services are currently provided through the FP7 project *Geoland2*[4].

Based on land cover, land use or bio-physical information derived from Earth Observation satellite data, Geoland2 services provide decision-makers with relevant information on the changing conditions of natural resources. Geoland2 addresses two different service levels: Core Mapping Services (CMS) and Core Information Services (CIS) which aim at demonstrating the added-value of the CMS in various fields, thus fostering multidisciplinary interoperability. These services are deployed in a Spatial Data Infrastructure (SDI) to disseminate products and services to users. For this INSPIRE is considered as the baseline, to ensure an easy integration of the SDI into the context of the European Spatial Data Infrastructure. The main actors are the Geoland2 service providers and users who consume Geoland2 services. [LCMS portfolio]

Users can link to these services from their applications. In addition the user can also use the services via the SDI expert portal, which supports a rich set of functions for human interactions to:

[4] http://www.gmes.info/pages-principales/projects/land-projects/geoland2/

- **Discover** available dataset series, datasets and services: a catalogue service allows the user to view and query related meta-data. Also users can navigate directly to the distributed services to discover, view or download data from the links provided in the descriptions of the Service Portfolio.

- **View and download** available datasets: an online data access client allows the user to view data from WMS layers or download data from WCS and WFS services.

- **Order** available datasets: an ordering client allows the user to order data available from the catalogues, possibly customised towards the users needs.

Global Land Component

The objective of the Global Land component (activities initiated in 2012) of the Land Service is primarily to support EU policies at international level and the European commitments under international treaties and conventions, such as the three Rio conventions on Climate Change, Desertification and Biodiversity. The Global Land component will also be a major contribution to the Global Earth Observation System of Systems (GEOSS); in particular, to the implementation of the task SB-02 “Global Land Cover” of the GEO (Group on Earth Observation) 2012-15 Work Plan and other related ones.

The Global Land component of the Land service will focus on the delivery of bio-geophysical terrestrial parameters which are mature and of high priority for ensuring the immediate continuity of the activities serving the identified policies. The parameters have been selected through consultation with stakeholders. It builds on the results of FP 7 projects as GEOLAND2 (BioPar service), and other FP7 “GMES and Africa” related projects, on the EUMETSAT LANDSAF developments, on the JRC policy support activities and the GMES User Forum.

The first activity launched in 2012 cover the Agriculture sector, the support to the food aid and international cooperation policies, with the production of a set of biophysical parameters relevant for crop monitoring, crop production forecast, carbon budget, biodiversity and climate change monitoring 9 at worldwide level as well as additional biophysical parameters relevant for environmental monitoring purposes in Africa. These parameters will also be available for use in other applications.

4.4.2 Marine Environmental Monitoring Services

(see (EuroGEOSS D2.2.1b, 2011))

4.4.3 Atmospheric Monitoring Services

(see (EuroGEOSS D2.2.1b, 2011))

4.4.4 Emergency management

The objective of the GMES Emergency Management Service (EMS) is to support users in the field of crisis management, in particular Civil Protection, Humanitarian Aid and External Action communities by providing them with information based on space data combined with other sources of data. It addresses both natural disasters (floods, forest fires, earthquakes, tsunamis, volcanoes, landslides, storms, ..) and man-made disasters (industrial, nuclear accidents, terrorism attack etc.), inside and outside the EU.

Next, we outline the main requirements for the development of the EMS to be considered in the context of EuroGEOSS:

- Quality of Service to preserve data usefulness for all time.
- Discovery capacities: Data and services must be catalogued in a way which will facilitate their use. This is the purpose of correctly defining data format as well as maintaining metadata.
- Data and service accessibility: Deployed in a distributed environment so that a user can easily merge them with other relevant datasets.
- Data harmonization: a common vocabulary to record metadata, as well as, standards for spatial data and information, may be achieved through INSPIRE implementing rules.
- Different geographic scales: from local to global efficiently in case of emergency management;
- Interoperability and information sharing between all services involved in an emergency/crisis through the standardization of available components, which takes INSPIRE duly into account;
- Multidisciplinarity: service architecture provides core services and downstream services which derived core services for particular themes. Specific thematic products, depending on the type of event (floods, volcanoes, etc.) can bring additional specialised information. EMS will rely on information provided by advanced technical and operational capabilities making full use of space earth observation and supporting their integration with other sources of data and information.

The EMS will focus on the priorities defined by the Emergency Response Core Service Implementation Group and guidance from the GMES User Forum. It will be based on:

- the consultation of user communities building on precursor activities funded by ESA (TERRAFIRMA, RESPOND and RISKEOS), and by the EU (SAFER, PREVIEW)
- the preparatory action (LINK-ER project), and
- existing operational activities at European and national level.

The first priority defined by the users is to ensure the continuity of the operational mechanism for delivering emergency mapping products during the emergency response phase, i.e.

– (i) emergency response maps produced in rush mode to show the impact, assess the damage and follow the evolution of the disaster in the hours and days after the crisis, and
– (ii) geographic reference maps made available in rush mode providing basic topographic maps on areas affected by the disaster, in particular on infrastructure and the key natural resources.

The second priority is to support the other phases of the crisis management cycle, in particular the prevention, preparedness and recovery phases, inside or outside EU, by providing pre-disaster or post-disaster mapping products, including refugee / IDP (Internally Displaced Person) maps under a non-rush mode. Taking into account the users' needs, higher priority will be given to the emergency products produced in rush mode.

4.4.5 Security

(see (EuroGEOSS D2.2.1b, 2011))

4.4.6 Climate change

(see (EuroGEOSS D2.2.1b, 2011))

4.5 Conclusions on GMES Services requirements

(see (EuroGEOSS D2.2.1b, 2011))

5 SEIS (SHARED ENVIRONMENTAL INFORMATION SYSTEM)

There are no updates to report since the previous version of this deliverable. Discussion is still on-going within the European Commission on the scope and ambitions of the SEIS Implementation Plan.

6 CONCLUSIONS

The main updates of requirements in this third version of the document are summarized in Table 1.

Table 1 - Main Updates of Requirements

	Brief Description	Initiative
Brokering	Brokered-based solutions for multidisciplinary interoperability	GEOSS
Ranking	Ranking resources, possibly according to different metrics	GEOSS
Data Quality	Use of data quality for discovery and ranking functionality	GEOSS
Implementation of INSPIRE Data Models	Monitor the implementation of the INSPIRE Directive in the definition of formal data models	INSPIRE

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