Deliverable 0.3

Report on Interoperability

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Executive Summary

This Deliverable is the GEOEssential Deliverable D0.3 “Report on Interoperability”. It reports about interoperability analysis and tests on GEOSS Platform, Copernicus DIAS, ESA TEPs and Other Strands that are particularly relevant at global and European level.

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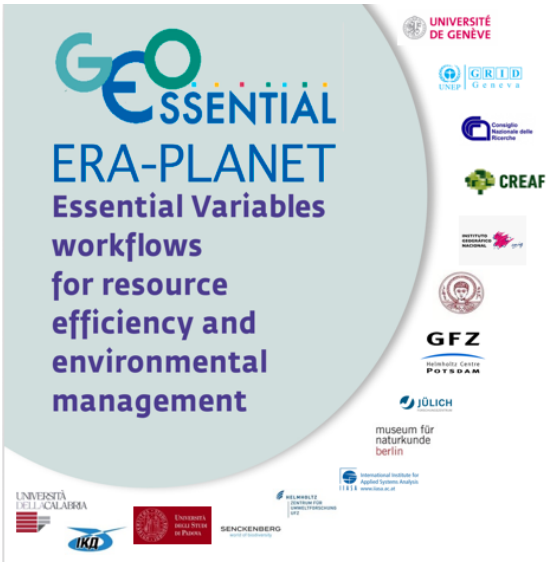

1 Introduction

This Deliverable is the GEOEssential Deliverable D0.3 “Report on Interoperability”. It reports about interoperability analysis and tests on GEOSS Platform, Copernicus DIAS, and ESA TEPs that are particularly relevant at global and European level.

2 Report on interoperability

2.1 GEOSS Common Infrastructure

A central part of GEO’s Mission is to build the Global Earth Observation System of Systems (GEOSS). GEOSS is a set of coordinated, independent Earth observation, information and processing systems that interact and provide access to diverse information for a broad range of users in both public and private sectors. GEOSS links these systems to strengthen the monitoring of the state of the Earth. It facilitates the sharing of environmental data and information collected from the large array of observing systems contributed by countries and organizations within GEO. Further, GEOSS ensures that these data are accessible, of identified quality and provenance, and interoperable to support the development of tools and the delivery of information services. Thus, GEOSS increases our understanding of Earth processes and enhances predictive capabilities that underpin sound decision-making: it provides access to data, information and knowledge to a wide variety of users. This ‘system of systems’, through its GEOSS Platform (former GCI), proactively links together existing and planned observing systems around the world and support the need for the development of new systems where gaps currently exist. It will promote common technical standards so that data from the thousands of different instruments can be combined into coherent data sets. The GEO Discovery and Access Broker (GEO DAB) is the primary mechanism by which all data and information is discovered and accessed. The GEO DAB implements the necessary mediation and harmonization services through Application Program Interfaces (APIs). These APIs allow data providers to share resources without having to make major changes to their technology or standards [1].
CNR-IIA designs, develops, maintains and operates the GEO DAB and the GEOSS API. The GEO DAB is also one of the Key Enabling Technology (KET) in ERA-PLANET for the development of the ERA-PLANET Knowledge Platform therefore no issue was encountered during the interoperability analysis and tests. Figure 1 shows how the interoperability between the ERA-PLANET Knowledge Platform and the GEOSS Platform can be achieved through API interaction, according to the ERA-PLANET KP system architecture.

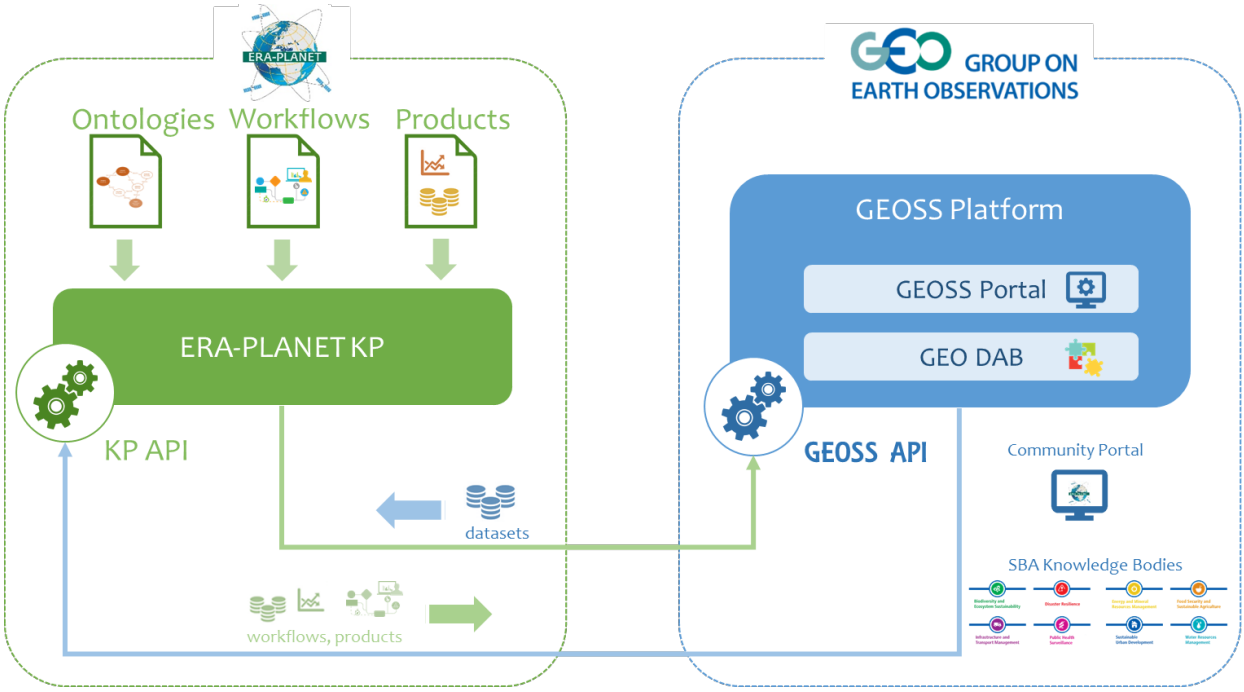

Figure 1 Design of the proposed integration between the ERA-PLANET Knowledge Platform and the GEOSS Platform [from SMURBS D6.1]

2.2 ESA TEP

ESA has started in 2014 the EO Exploitation Platforms (EPs) initiative, a set of R&D activities that in the first phase (up to 2017) aims to create an ecosystem of interconnected Thematic Exploitation Platforms (TEPs) on European footing, addressing:

- Coastal,
- Forestry,
- Hydrology,
- Geohazards,
- Polar,
- Urban themes; and
- Food Security (under definition),

In short, an EO exploitation platform is a collaborative, virtual work environment providing access to EO data and the tools, processors, and Information and Communication Technology resources required to work with them, through one coherent interface. The fundamental principle of the EP operations concept is to move the user to the data and tools. Users access a platform work environment providing the data, tools, and resources required, as opposed to downloading, replicating, and exploiting data 'at home' [2].
The H2020 EDGE (European Direction in GEOSS Common Infrastructure Enhancements; 2017-2020) project led by ESA, with CNR-IIA as subcontractor, is analyzing the interoperability with ESA TEPs in the GEOSS Platform context. CNR-IIA plans to leverage the outcomes of this EDGE activity for interoperability test in ERA-PLANET. Therefore interoperability analysis and test for ERA-PLANET have been postponed. In particular, it is important to understand how ESA plans to harmonize TEPs and Copernicus DIAS initiatives.

Figure 2 The seven ESA Thematic Exploitation Platforms (TEPs)

2.3 Copernicus DIAS

The European Commission (EC) has launched an initiative to develop Copernicus Data and Information Access Services (DIAS) that facilitate access to Copernicus data and information from the Copernicus services. By providing data and information access alongside processing resources, tools and other relevant data, this initiative is expected to boost user uptake, stimulate innovation and the creation of new business models based on Earth Observation data and information. In response to the requirements laid down by the EC and approved by Participating Countries, ESA has launched a call for services to establish the DIAS with the aim to deploy operational access platforms in early 2018. In parallel, EUMETSAT are building up a DIAS in a stepwise approach and aim at first functionalities to be available in the same timeframe [3].

The European Commission launched the 4+1 Copernicus DIAS (Consortium led by SERCO with OVH as cloud provider; Consortium led by CREOTECH INSTRUMENTS with CLOUDFERRO as cloud provider; Consortium led by ATOS INTEGRATION with T-SYSTEM INTERNATIONAL as cloud provider; Consortium led by AIRBUS DEFENCE AND SPACE with ORANGE as cloud provider; EUMETSAT) on 20th June 2018. They offer the DIAS initial services addressing the provision of access to Copernicus data and information (so called back-office services) [4].

Due to the short time since the release of the 4+1 DIAS instances, it still was not possible to conduct full interoperability tests. However, a preliminary analysis of the DIAS support to data sharing specifications suggests that no major issue will be encountered (as for Requirement DIAS-1-15: *The DIAS catalogue(s) and its (their) contents shall be interoperable with the catalogues offered by the Copernicus distribution services and adhere to common standards that ensure interoperability with other communities and infrastructures (e.g. the European Data Portal, INSPIRE infrastructures, and GEOSS)* [5]).

Copernicus DIAS are currently offering cloud services for computation and storage. Recently, some interoperability tests have been started in the context of the EuroGEOSS Sprint-to-Ministerial initiative aiming at running VLAB instances for EODESM (ECOPOTENTIAL showcase) and for the UN SDG 15.3.1 calculation (ERA-PLANET GEOESSENTIAL showcase) on Copernicus DIAS Infrastructure-as-a-Service, with ONDA and CREODIAS consortia. The test are under development at the time of writing (March 2019). Final results will be available around May 2019.

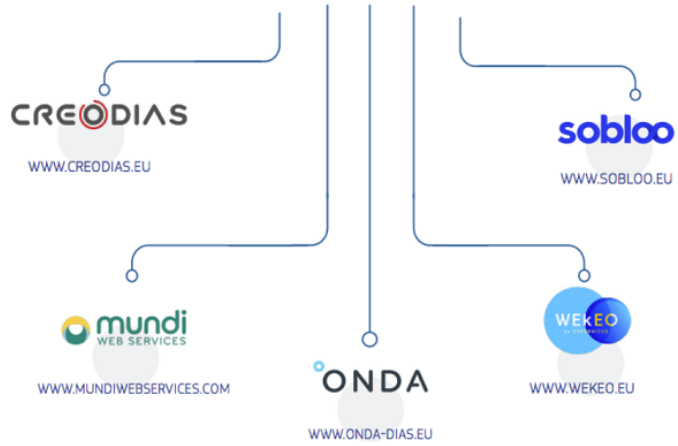

Figure 3 The 4+1 DIAS Consortia developing Copernicus DIAS

2.4 Other ERA-PLANET Strands

GEOEssential is one of the four strands for ERA-PLANET Transnational Projects. The other three strands have similar activities to design and develop platform for data, information and knowledge generation and sharing. Although the requirements differ, synergy between the efforts in Transnational Projects is useful and even necessary, for avoiding duplication of efforts, optimizing mobilization of resources and last but not least, a better and harmonized contribution of ERA-PLANET to international inititatives – GEO/GEOSS in primis.

Taking into account the preliminary design of platforms in the Transnational Projects, a common design principle is the adoption of a loosely-coupled architecture allowing interoperability with the external environment - see ERA-PLANET DP6 “ERA-PLANET Knowledge Platform exposes a set of (high-level) APIs for interaction with the external environment”. Therefore, in general it is possible to conceive an interaction between the different Transnational Project platforms. Moreover, the different platforms share a second design principle concerning the extension of the platform itself through internal APIs – see ERA-PLANET DP4 “ERA-PLANET Knowledge Platform is made of software components interacting through (low-level) APIs”. Therefore, it is possible to conceive the four platforms as specialization through extension of a single ERA-PLANET Platform.

Since there will be a single ERA-PLANET Knowledge Platform with dedicated views to the four Strands, no interoperability issue between the four strand platforms exists.

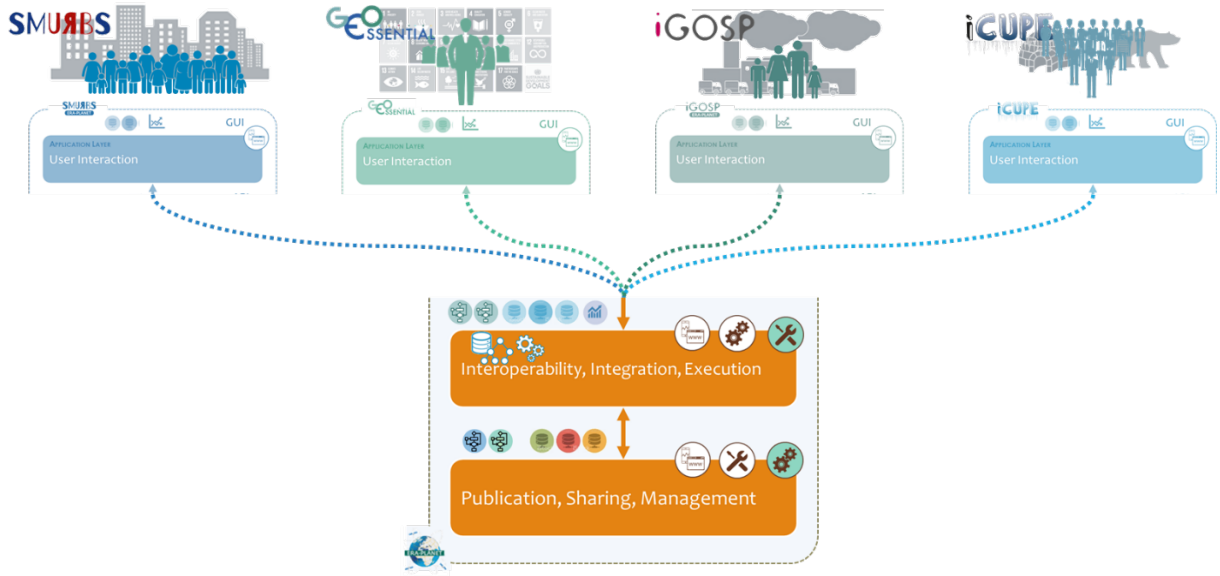

Figure 4 The Strand infrastructure as personalization of the ERA-PLANET Knowledge Platform [from SMURBS D6.1]

3 Summary

The following table summarizes the status of interoperability analysis and tests for GEOSS Platform, ESA TEPs, Copernicus DIAS and Other Strands:

Platform	Status
GEOSS Platform	No issue
ESA TEPs	Postponed. Information from ESA about coordination among TEPs and DIAS initiatives is necessary
Copernicus DIAS	Hosting of VLAB instances on Copernicus DIAS infrastructures under test in ECOPOTENTIAL and ERA-PLANET projects
Other Strands	No issue