# D1.6 - Annual progress reports (a)

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|---|---|
| Work Package | WP1, Project Management & Technical Coordination |
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| Version | 1.0 |

**Dissemination Level**

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|---|---|
| X | PU: Public |
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# Versioning and contribution history

| Version | Date | Author | Notes |
|---|---|---|---|
| 0.1 | 03/05/2023 | Sarantis Paskalis (NKUA) | TOC and V0.1 |
| | 25/5/2023 | George Domalis (NVCR), Thomas Azrak (EBOS), Rob Carillo (TRUST-IT) | T3.1 progress report, WP2, WP6 |
| | 31/05/2023 | Vasileios Baousis (ECMWF), Monia Santini (CMCC) | WP3, WP5 |
| 1.0 | 31/05/2023 | Sarantis Paskalis (NKUA) | Final version |

# Terminology

| Terminology/Acronym | Description |
|---|---|
| Dx.y | Deliverable number y, belonging to WP number x |
| DoA | Description of Action |
| EAB | Ethics Advisory Board |
| EC | European Commission |
| EO | Earth Observation |
| EU | European Union |
| GA | Grant Agreement to the project |
| GDPR | General Data Protection Regulation |
| MoM | Minutes of Meeting |
| PC | Project Coordinator |
| PMB | Project Management Board |
| REA | Research Executive Agency |
| SSL | Self-Supervised Models |
| TM | Technical Manager |
| TRL | Technology Readiness Level |
| WP | Work Package |
| WPL | Work Package Leader |


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# Table of Contents



# List of Figures



# List of Tables

# Executive Summary

The first annual progress report summarizes the project's progress during its first year. It contains per WP analysis of the work done, deliverables submitted, milestones reached, and a total and per partner indication of resource allocated.



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# 1 Introduction

The reporting period (01/06/2022-31/05/2023) refers to M1-M12 months of the project. During this period, all WPs except WP4 were in progress:

- WP1 Project Management & Technical Coordination (M1-M12)
- WP2 Requirements Elicitation and Conceptual Framework Specification (M1-M12)
- WP3 Data Orchestration & Machine Learning (M1-M12)
- WP4 EO4EU Data Marketplace Ecosystem (M1-M12)
- WP5 EO Data Uptake Demonstration (has not started yet)
- WP6 Communication, Dissemination & Exploitation (M1-M12)

During the first 12 months of the progress, the foundations for the project's success have been laid out. The project management manual has been published as D1.1, the internal communication infrastructure has been agreed upon and setup, the requirements specifications have been solidified, an early design has been completed, and the project has made its presence visible both in the digital and the real world. The progress is discussed in more detail at the section for each WP.

# 2 Summary of the project results achieved

## 2.1 WP1 Project Management & Technical Coordination

WP1 has produced the D1.1 Project Management Manual in M3, which describes the means of managing the project, including internal communications, document storage, code repositories, workflows, etc. More specifically, WP1 is divided into 4 Tasks:

T1.1 Project Management (NKUA)
D1.1 Project Management Manual has been produced in M3 and followed ever since. NKUA has provided

- document storage (sharepoint folders)
- email exchange (mailing lists)
- code and workflow infrastructure (gitlab)
- instant messaging (slack)

Moreover, regular online meetings take place every 2 or 4 weeks per WP. If needed more specialized coordination meetings take place (e.g T2.3 in WP2, coordination meeting between WP2 and WP5).
The physical meetings (see Table 7) organized had a hybrid approach to allow for maximum attendance.
Internal reporting has been setup, and is being carried out every two months. The internal reporting consists both of work performed and resources consumed.

T1.2 Technical & Scientific Coordination (ECMWF)
Technical coordination is being carried out throughout the project through participation in WP and Task meetings, email and instant messages. Specifically, the project's initial use-cases and their requirements have been collected and a first version of the architectural design is being produced.
The technical infrastructure for storing/processing and delivering the services has been setup, and is currently being fine-tuned and configured for the project's use.
Individual components have been developed and are currently being integrated into the project's platform. To this end, the coordination meeting in Reading, UK (see Table 7) helps in identifying problems and establishing the roadmap to a functional project platform.


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T1.2 has produced D1.2 Data Management Plan (a), which identifies the data types that will be used, collected and/or generated, and frames the overall guidelines regarding data collected and generated throughout the project implementation.

T1.3 Risk management & Quality Assurance (ENG)
T1.3 has been active and produced D1.2 Risk management plan. The scope of the Risk Management plan is to describe the managerial dashboards set up for the execution of EO4EU so that the project could produce the expected results with best quality and ensure smooth communication between project partners.
The Deliverable main contributions are:

- Quality Plan: all procedures and agreements regarding Quality Control. It contains a quality control procedure for all deliverables described in this section in order to ensure the quality management of the project, as well as a Quality Dashboard to monitor the progress of each Task in every WP.
- Risk Management & Mitigation Plan: summarizes the procedures related to risk management and mitigation procedures.

T 1.4 Legal Compliance and Ethical Assurance (NKUA)
Task T1.4 has developed deliverable D1.10 Legal and Ethical issues and Guidelines (a), which states the legal and ethical framework into which EO4EU operates. It contains references to regulations and procedures followed, the Trustworthy AI self-assessment, and the detailed list of the Ethics Advisory Board of the project, consisting of one representative per project partner.

### *2.1.1 Deliverables*

The following deliverable have been submitted as results from WP1:

**Table 1 – WP1 Deliverables**

| Deliverable Number | Name | Abstract | Submitted on |
|---|---|---|---|
| D1.1 | Project Management Manual | This Project Management Manual is intended to support partners in the effective and efficient administration, procedural and financial management of the project. It focuses on project implementation procedures, structures and coordination and sets out key responsibilities for EU engagement and interaction. It is intended to support the achievement of project objectives, the effective management of partner progress and the timely delivery of project results. This Project Management Manual sets out:<br>● The procedures and standards to be used in the EO4EU project;<br>● The key roles and responsibilities;<br>● How the project will be carried out, measured, monitored, accounted for and safeguarded during the project | 31 Aug 2022 |
| D1.2 | Risk Management Plan | This document is the second deliverable of EO4EU (D1.2) and it contains the Risk Management plan. It has been elaborated by WP1 and reviewed by the consortium.<br>Overall, the scope of the Risk Management plan is to describe the managerial dashboards set up for the execution of EO4EU so that the project could produce the expected results with best quality and ensure smooth communication between project partners.<br>It is organised into the following sections: | 30 Nov 2022 |


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|---|---|---|---|
| | | • Introduction: includes the aim of this report, the list of reference documents and the deliverable structure description.<br>• Project overview: a short description of the project. Purpose, goals and technologies are briefly described in this section, along with brief architecture description.<br>• Quality Plan: all procedures and agreements. Moreover, a shared with all project partners are described in this section in order to ensure the quality management of the project.<br>• Risk Management & Mitigation Plan: summarises the procedures related to risk management and mitigation procedures.<br>• Annexes: an annex appended at the end of this document is related to the Quality Review report. | |
| D1.3 | Data Management Plan (a) | This deliverable presents the initial data management action plan (DMP) and provides the general outline of the project policy for data management. The EO4EU DMP identifies the data types that will be used, collected and/or generated, and frames the overall guidelines regarding data collected and generated throughout the project implementation.<br>The DMP will describe the format and support the data management life cycle of all the data collected and generated following the FAIR (Findable, Accessible, Interoperable, Reusable) Data Principles, as defined in the "Guidelines to the Rules on Open Access to Scientific Publications [1] and Open Access to Research Data in Horizon 2020 [2]" and in the "Guidelines on FAIR Data Management in Horizon 2020 [3]".<br>This document will present the methodology and standards to be followed, in cases where data will be shared and/or made open, and how it will be curated and stored.<br>The strategy for the data management identifies and classifies respectively the data generated and collected, along with their metadata to be used. Also, this document reports on the exploitation and availability of the aforementioned data/metadata, the required ethical and legal compliance issues, and the responsibilities in the implementation of the DMP.<br>The DMP is a living document that will be updated when important changes to the project occur, due to the inclusion of new data sets, changes in consortium policies or any other external factors. At least two (2) updated versions are expected during the project lifetime; one in month 18 and the final one in month 36.<br>The next version of the EO4EU DMP will emphasize on the definition of procedures to be implemented by the project to efficiently manage its research data in terms of storage and backup (backup provision, recovery procedure), selection and preservation (which data will be retained/shared/ preserved, length of time that data have to be preserved and preservation preparation time). | 30 Nov 2022 |
| D1.6 | Annual Progress Report (a) | This deliverable | 31 May 2023 |



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| | | | |
|---|---|---|---|
| D1.10 | Legal and Ethical issues and Guidelines (a) | | 31 May 2023 |

### 2.1.2 Milestones

**Table 2 – WP1 Milestones**

| Milestone Number | Name | Means of verification | Achieved on |
|---|---|---|---|
| M1 | Kickoff Meeting | Kickoff meeting took place in Athens on 29-30 June 2022 | 29-30 Jun 2022 |
| M2 | Definition of Management Structure and Steering Committee | Management structure and Steering Committee is documented in deliverable D1.1, submitted on 31 Aug 2022 | 31 Aug 2022 |

## 2.2 WP2 Requirements Elicitation and Conceptual Framework Specification

WP2 “Requirements Elicitation and Conceptual Framework Specification” is divided into 3 tasks 1.T2.1 “Multidisciplinary landscape analysis & best of breed technologies” which aims to analyze each of the research areas upon which the project bases its innovation strategy and to develop a gap analysis for the selected use cases and technologies. SISTEMA, who has successfully led this task from initiation until closure has gone through many brainstorming sessions and discussions with all partners within the consortium for a better understanding of user requirements which was the fundamental tool to define the research areas of the project. Therefore, 5 research areas were defined and each broken down into many sub-areas:

1. Data Accessibility & Exploitability
    1. Data Accessibility
    2. Data Licensing
    3. Direct Exploitability (processing close to data)
2. Processing Capabilities and Scale-Up
    1. Computational Resource Needs
    2. Specific Computational Needs (HPC, GPUs, ...)
3. Algorithm Capabilities
    1. Traditional (waterfall) Analysis
    2. ML/AI-Based Approaches
4. Data Presentation / Communication / Delivery
    1. Traditional vs. Interactive Data Presentation Tools
5. Intellectual Properties Management Tools

1. Open-Source Software Management
2. Infrastructure Security
3. Data Protection: secure results transmission/delivery for publicly available results, how to avoid copying/cloning/reselling.

Task 2.1 started since month 1 of the project, June 2022, and lasted until the delivery of the deliverable D2.1 “Research and Innovation Landscape analysis report” which took place in month 9, February 2023.

2. Task 2.2 “Multi Stakeholders Requirement Analysis and Business Process Modeling” aims at extracting, collecting, and analyzing user requirements and operational procedures as well as providing a baseline for business processes using business process modeling and notation (BPMN) flowchart. ECMWF is leading this task to gather external user requirements and collaborating with T2.1 and T5.1, which cover the project’s use cases, to provide a full picture of external and internal user requirements.
Multiple sub-tasks were identified in T2.2:

- End-user survey creation, review and finalization
- Public communication channels identification
- Survey publication
- End-user identification
- First stage requirements collection and analysis
- First stage BPMN
- Facilitate end-user access to the platform for testing
- Second stage end user feedback collection, requirements refinement and analysis
- Final version of BPMN

The end-user survey was created with the aim of collecting external user needs. It was published and disseminated with the help of WP5 and WP6 partners via LinkedIn, the project’s website, and email communications. The created survey covered the following aspects:

- Data requirements
- Storage and access
- Data search, indexing and catalogs
- Hardware processing capabilities
- Other processing capabilities
- Algorithms
- Interfacing services
- Authentication and authorization

To engage a large base of audience and increase the number of responses received to this survey, an early access program was offered to those who participated in this survey. This will allow them to test the features and capabilities of the EO4EU platform and provide their feedback, which will be used to refine the final version of the requirements.
The deadline to respond to the online survey was on the 15$^{th}$ April 2023. Following this deadline, the external user requirements were collected and consolidated in one document. Moreover, a first draft of the BPMN flowcharts was developed covering the end user interaction with the platform in different scenarios. These flowcharts will be updated throughout the life cycle of the project.


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Currently, ECMWF is working with NKUA (T2.3), SISTEMA (T2.1) and CMCC (T5.1) to consolidate all user requirements (internal and external) to easily assign the responsible technical partner and track the satisfaction of these requirements.
T2.2 started since month 1 of the project, June 2022, and will last until month 24, May 2024. The first deliverable of this task, D2.2 "EO4EU End-user Requirements Analysis and Business Process Flows" is due in month 18 of the project. Deliverable D2.3 "EO4EU End-user Requirements Analysis & Business process flows (b-final)" will mark the end of this task.
3. Task 2.3 "Technical Specifications, interoperability Requirements and Scalability analysis" aims to gather all the technical and interoperability requirements, and an extensive review and analysis on the system requirements of each individual module and their interdependencies.
Technical requirements generated will be the base to develop the solution blueprint and the operational architecture of the EO4EU solution.
Activities under the T2.3 are running in parallel, for all the technical components of the solution. NKUA, the task leader for T2.3, is working on the data interoperability and data source integration, based on the Deliverable D2.1 outcome generated within T2.1. this activity aims to aggregate data sources, define data inbound/outbound services, research of the possible data formats.
As for the solution modules, all partners are engaged in generating the below

1. Technical requirements
2. Class diagram
3. Sequence diagram
4. Communication diagram

For each of the below modules

1. Knowledge graph
2. System and services
3. Machine learning
4. Graphical user interface, comprised of User management module, API, visual data analytics and visual workflow editor
5. Data storage

Almost all the module above reached around 70% of the final technical requirements, class and sequence diagrams for the first phase, which shall end by end of May 2023. Next phase shall start at 1st of June and will last until the end of May 2024

### 2.2.1 Deliverables

**Table 3 – WP2 Deliverables**

| Deliverable Number | Name | Abstract | Submitted on |
|---|---|---|---|
| D2.1 | Research and Innovation Landscape analysis report | A vast amount of Earth Observation data is produced daily and made available through online services and repositories. Contemporary and historical data can be retrieved and used to power existing applications, foster innovation, and improve EU citizens' lives. However, an undersized audience follows this activity, leaving huge volumes of valuable information unexploited.<br>The EO4EU project aims to provide innovative tools, methodologies and approaches that would assist a wide spectrum of users, from domain experts and professionals to simple citizens to benefit from accessing EO data. It strives to deliver dynamic data mapping and labelling based on AI | 28 Feb 2023 |


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|---|---|---|---|
| | | augmented modules, adding Fairness to the data and introducing an ecosystem for holistic management of EO data. EO4EU envisages to bridge the gap among domain experts and end users, while aims to bring in the foreground technological advances to address the market straightness towards a wider usage of EO data.<br>The project will support the wider exploitation of EO data by delivering: (i) Machine Learning (ML) methodologies for Semantic Annotation of existing and growing data sources, (ii) semantically enhanced knowledge graphs that will enable structuring of content around diverse topic areas and building step by step journeys from different sources into a unified approach, (iii) data fusion techniques to extend the scalability of existing distributed systems, (iv) Augmented and Virtual Reality for interactive user experience, and (v) advanced data analytics visualizations for improved learning and evidence-based interpretations of environmental observations. Its operational and technical capacity will be demonstrated within seven distinct pilots that cover different thematic areas, such as personalized health care, sea route planning, ocean monitoring, food security, food ecosystems, soil erosion, environmental pest, and crisis management. These thematic areas will engage a wide spectrum of involved stakeholders, from EO providers, policy makers and actors, researchers and academics to citizen scientists and the general public to join efforts and provide their multidisciplinary expertise to support the Commission's strategic goals towards further exploitation of EO data.<br>The current document summarises a detailed work performed to identify the main driving lines on which the platform implementation work shall be organised around. Starting from the use cases to be implemented within the project, requirements in terms of data, processing tools, algorithms, results presentation and IPR have been collected and assessed. A detailed analysis on the gaps with respect to the state of the art has been performed and the results, per research area, have been aggregated based on the level of criticality.<br>The outcome showed that main criticalities remain on the access to relevant data and data sources, removing barriers to some datasets that prevent the development of services on them, and on the possibility to deploy a variety of computational resources close to the data. Besides traditional CPU-based processing technologies, GPU and HPC applications still remain not fully exploited and need some push also on the facilitation of the exploitation of these tools. The adoption of ML and AI tools is not yet widely diffused because these tools are not yet well known by the service developers than for technological gaps, thus there is a need of pushing awareness and knowledge of their functionalities and capabilities within the community. | |

## 2.2.2 Milestones

**Table 4 – WP2 Milestones**



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| Milestone Number | Name | Means of verification | Achieved on |
|---|---|---|---|
| M3 | Data Resources Identification | All research areas where EO4EU aims to base its innovation strategy defined within the D2.1, in addition to the analysis done for the state of the art of each of the research area, in which the current available technology is described along with the gap and needs from each of the use cases. Deliverable D2.1 submittal on 28-February 2023<br>Furthermore, all the module of the solution defined and work started to gather and discuss all the technical requirements along with the interoperability and integration of all the modules | M9 of the project (28-Feb-2023) |

## 2.3 WP3 Data Orchestration & Machine Learning

WP3 is composed of four tasks focusing on the design and implementation of the core EO4EU components, based on the requirements gathered from WP2 and WP5. WP3 task activities are coordinated with the other work packages to continuously verify alignment to user requirements. The overall WP3 objectives are: a. Formulate the high-level design and implementation principles that will enable the EO4EU ecosystem to access the underlying infrastructure provided by multiple data pools as a common pool of resources, b. Deploy a semantic-enhanced knowledge graph that augments the FAIRness of EO data knowledge and support a sophisticated representation of data entities and their dynamic; c. Develop a novel Function-as-a-service (Faas) mechanism for accomplishing interoperability at heterogeneous data and APIs d. Design and implement a generic ML pipeline which will use the available input data sources of EO data to process and serve downstream tasks; e. Develop ML models to reduce the volume of the data that will be transferred; f. Deploy Customer Facing Services that will offer advance Graphical user Interfaces in all stages of the data lifecycle. The four tasks of the WP3 are the following and their respective activities and plans are analyzed in the following paragraphs: a. Knowledge Graph and Semantic Annotation for Data Mapping, b. Systems and Services Orchestration", c. ML-based processing, d. Customers Facing Services.

Within the context of T3.1 "Knowledge Graph and Semantic Annotation for Data Mapping", NVCR kicked off the design and development activities on M1. A series of closed, ongoing and upcoming activities led to the design of the v1 prototype and are currently motivating the work towards delivering the KG integrated component in M18.

**Completed activities:**

1. Initial planning and preparation of the solution
2. Review and state of the art analysis of the knowledge graph and semantic annotation related applications and technologies applied in EO data resources
3. Review of the data resources in terms of:
    a. Identification of EO data providers and services
        i. CAMS (ECMWF) https://atmosphere.copernicus.eu/
        ii. C3S (ECMWF) https://climate.copernicus.eu/
        iii. CEMS (ECMWF participation) https://emergency.copernicus.eu/
        iv. Marine https://marine.copernicus.eu/
        v. Land https://land.copernicus.eu/
        vi. Security https://www.copernicus.eu/en/copernicus-services/security
        vii. INSPIRE: https://inspire-geoportal.ec.europa.eu/
        viii. Galileo:
            [1] GALILEO OPEN SERVICE (OS)


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[2] GALILEO SEARCH AND RESCUE (SAR)
[3] GALILEO PUBLIC REGULATED SERVICE (PRS)
[4] GALILEO COMMERCIAL SERVICE (CS)
[5] GALILEO'S CONTRIBUTION TO INTEGRITY-MONITORING SERVICES

b. Definition of managing and accessing datasets for the abovementioned sources
c. Requests of the data model by the data owners/ providers CDS and ADS
d. Review and experimentation with the service providers' API structure
e. Availability of APIs for datasets required by the use case partners
f. Accessibility of the service

4. Investigative KG prototypes with ADS, CDS datasets, a. Prototyping with custom data structures ,b. Prototyping with Neo4J graph database
5. Investigation/ experimentation with the services providing an API and specifically, CDS, ADS and ADAM
6. Continuous collaboration and communication with MEEO, towards defining the datasets to be used and the datasets which will be served in ADAM, including the provisioning of the semantics and the metadata for each dataset.
7. Preparation and successful demonstration of an early first integrated prototype for exploratory purposes in the plenary meeting in Bologna, hosted by Cineca

**Identified on-going and up-coming steps of task 3.1:**

1. Custom parsers will be developed for the services which are not providing access to the datasets and their description through an API
2. Extraction of data and variable descriptions, from the services providing such a capacity
3. Design and implementation of the APIs that will enable access and querying the KG
4. Definition of the communication requirements with the rest eo4eu components
5. Deployment of the service

Further to the initial EO Data providers review, all the datasets and their respective data owners/providers identified in the context of T2.1 were reviewed in-depth towards the understanding and definition of the way of serving users with datasets semantically similar to their queries i.e. ADS,CDS,ADAM,ISTAT,DANAOS,ODBL,NOAA,COPERNICUS SPACE,CMCC, ISRIC, LAND, EUMETSAT and NASA

Since ADS and CDS are capturing and serving almost 50% of the datasets identified in T2.1, it is worth mentioning that stores data in a standardized format. The datasets provided by these services can be accessed through a dedicated search tool. While ADS and CDS do not provide direct access to data allows users to generate the API requests towards accessing/downloading the datasets needed.

EO4EU knowledge graph (KG) v1 prototype covers the lack of semantic search across multiple data sources. The KG focuses on extracting the textual description of the datasets from the abovementioned services aiming to serve datasets that matches semantically the queries of the users, in three basic functionalities through a dedicated use story:

Step 1: The user makes a search about a query ("soil erosion"), the KG will result in the most similar datasets in terms of their descriptions. It is worth mentioning that results will not be listed per provider.

Step 2: The user (either a physical user or an engine) chooses one of the resulted datasets, sends a second request to KG and as a response the KG returns the dataset breakdown into products, features, options.


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Step 3: She/He selects the items he/she is interested in and sends a third and final request to our system, and as a response, the code necessary to download the options selected in step 2 is returned with the appropriate API call.

Based on the responses of the three above steps, the KG is reconstructing the API text that corresponds to the specific set of datasets that meets user's need, for instance,

*It is worth mentioning that various services lack the capacity to provide access to data through APIs. Therefore, a second prototype for accessing such datasets is being under design and prototyping, towards extracting/parsing textual descriptions, serving semantically similar datasets, but having the ability to provide the user with a direct download link instead.

Task 3.2 delivers the design and implementation of the system and the service orchestration both on infrastructure and application backend level. EO4EU utilizes multiple cloud backends, like the ADA Cloud[1] from CINECA and WEkEO[2] from ECMWF/EUMETSAT( utilizing the ECMWF Data Processing Infrastructure DPI) . Both clouds are based on OpenStack infrastructure technology, which ensures interoperability between the two clouds.ADA Cloud environment provides direct access to the CINECA HPC resources, where demanding processing can be executed (like machine learning workloads), a basic requirement for the EO4EU platform.
EO4EU Cloud Infrastructure deployment follows modern design choices;

- Distributed by-nature
- Infrastructure agnostic
- Event-driven
- Highly Available
- Scalable
- Redundant
- Automated to the maximum extend.

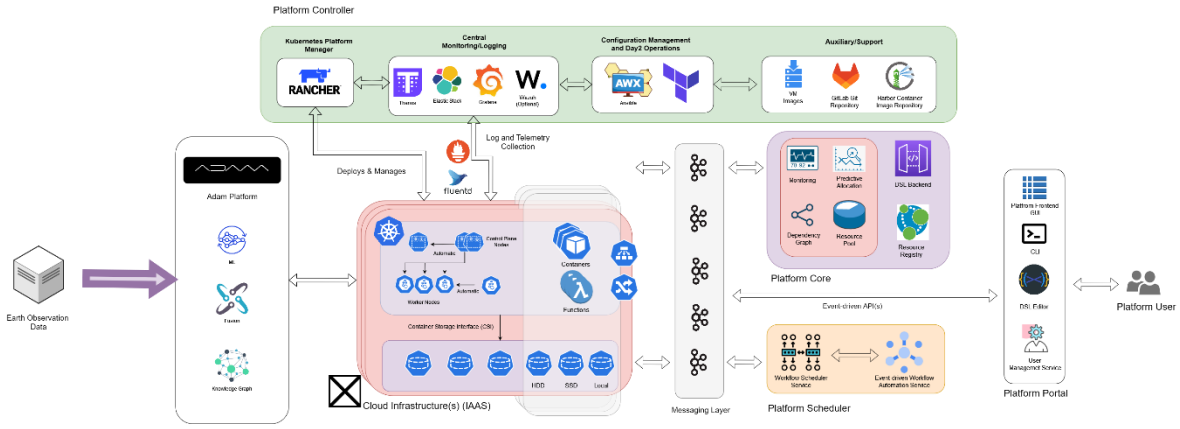


**Figure 1: EO4EU High level architecture**

Figure 1 depicts the main components of the eo4eu platform, currently being deployed in ADA and WEkEO clouds. Openstack resources on both clouds are utilized based on demand, via using

[1] https://wiki.u-gov.it/confluence/display/SCAIUS/UG3.6%3A+ADA+Cloud+UserGuide
[2] https://www.wekeo.eu/


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Kubernetes Cloud Controller Manager (CCM). CCM is structured using the plugin mechanism of Kubernetes, allowing different cloud providers to integrate their platforms with Kubernetes. Interoperability between clusters is ensured with the Rancher Cluster Manager[3]. Rancher adds significant value on top of Kubernetes. Rancher is a complete management platform for Kubernetes, that allows running Kubernetes anywhere.

EO4EU platform adopts Infrastructure as Code (IaC) and GitOps best practices to ensure interoperability, consistency and standardization in a multi-cloud environment. Several auxiliary support components have been deployed to support this approach and integrated to ensure, Increased deployment speed and frequency, Improved Reliability, stability, and redundancy ,c consistency and standardization, configuration management and Improved compliance and auditing over the multi-cloud infrastructure. Figure 2 presents the auxiliary systems whereas **Error! Reference source not found.** depicts the adopted deployment methodology of the platform.

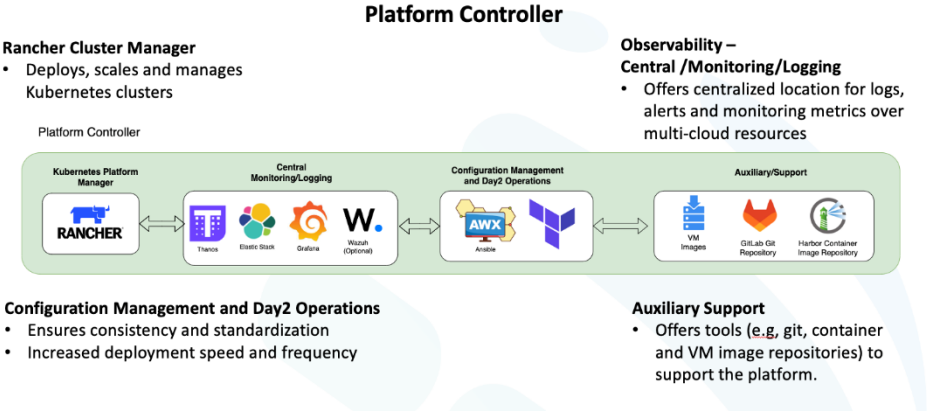


**Figure 2: Auxiliary services and components**

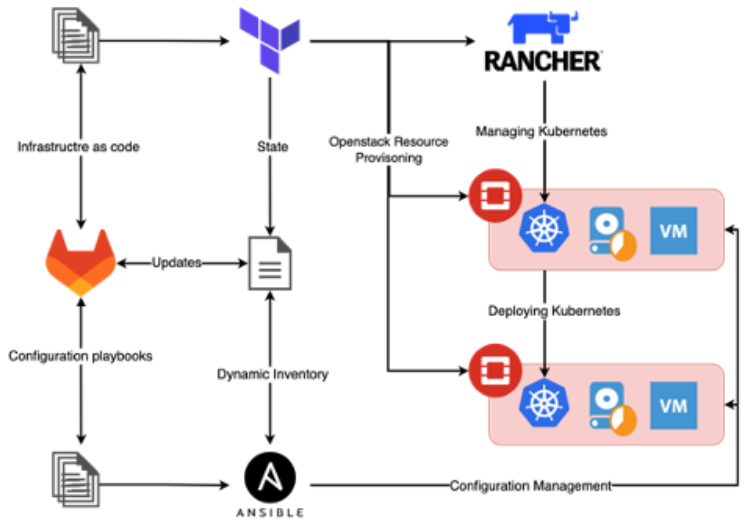


**Figure 3 eo4eu infrastructure deployment with IaC**

Observability over the multi-cloud infrastructure allows us to continuously monitor and visualize the status of the eo4eu infrastructure and services. Health and performance metrics, logs and distributed traces, are continuously collected and processed to help in the overall eo4eu platform status update and in incident and anomaly detection. A combination of platforms and tools are being deployed to

[3] https://ranchermanager.docs.rancher.com/v2.5/pages-for-subheaders/manage-clusters



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support this functionality and are further analyzed in the following paragraphs. CINECA and ECMWF developed a multi-cluster monitoring solution by leveraging on Prometheus, Thanos[4], and Grafana tools[5]. The system allows to observe both cluster components as well as EO4EU services deployed in different clusters from a single Grafana control plane. All the metrics are stored in an object storage solution to enable long-term metrics analysis. The system is also capable of generating and visualizing alerts coming from the different clusters.

**Provision service**: The provisioning service is a component that aims to act as the initiator of an eo4eu workflow designed by a user. This component inputs data (in yaml format) from the DSL component and translates the requirements received into cluster deployments and configuration data. The cluster deployments are created to initiate each individual component (Fusion, FaaS, ML, etc.) and a communications sequence is established between them for relaying their processing results if any. The configuration data is used to configure the required storage for each component. Additionally, messages are exchanged from the provision service to the deployed components for configuration reasons. The provisioning service outputs files containing the deployment specifications of the components contained in the circulated workflow and files containing all the needed configuration for storage and communication purposes inside the workflow.(Figure 4)

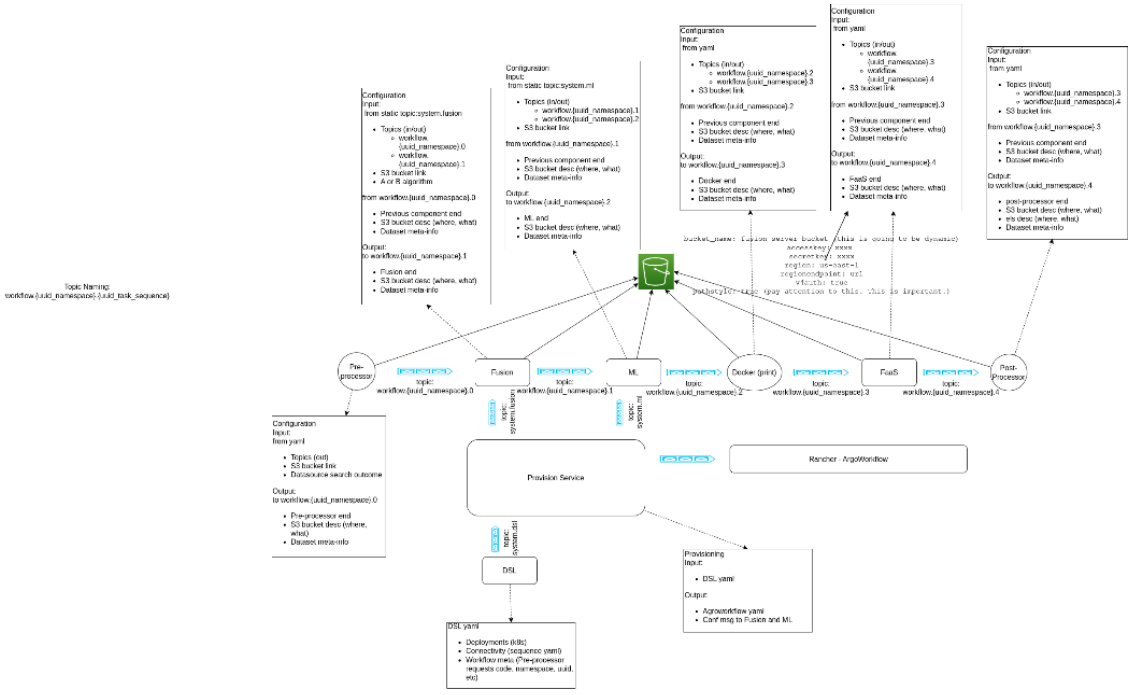


**Figure 4 Provision service high level description**

**Inbound service**: A dynamically instantiated pre-processor component will deliver data from the datasources to the workflow. Each user specific workflow, deployed from the provision-service, will have a pre-processing service component that will establish connection with the data sources (until now ADAM, CDS, ADS) and will be able to download in the workflow storage the needed data. Acting as a black box, pre-processor will not be visible to the user and will be executed obscurely.

[4] https://thanos.io/
[5] https://grafana.com/



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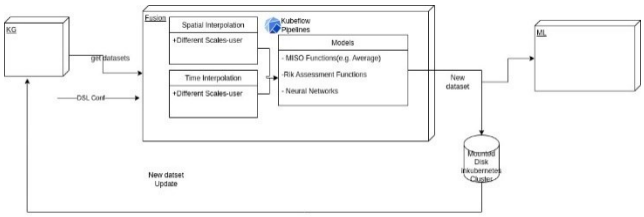


**Figure 5 High level architecture of fusion engine**

**Fusion engine (Kakia**): Fusion engine was designed and developed in order to support multiple pipelines requested by users in different types of data and use cases. Fusion engine designed to support the preprocessing of a vast volume of EO data and then to proceed to consolidate this information spatiotemporally (Figure 5). The functionalities depend on the possible requests from the end users like the computation of Normalized Difference Vegetation Index (NDVI), the automatic crop counting in field etc. The fusion engine integrates with the downstream tasks to have access to data and then can forward this refined information to the Machine Learning components. Fusion engine creates different chain of functions as is described in the DSL script.

**DSL engine.** Tied closely to the Workflow Editor is a DSL (Domain Specific Language) developed specifically for the needs of the Workflow Editor. This language represents the graphs, metadata and other information created by the Workflow Editor's graphical UI for the description of a system workflow, allowing for the ease of understanding and debugging of a submitted workflow by the user. The language is named DGL (Definable Graph Language). The DGL is also responsible for the validation of a created workflow, according to a set of rules and conditions. When a user submits a workflow from the Editor interface, the entered data is converted to DGL defined text, gets checked for validation errors and if error free the data is compiled and sent to the other components through the EO4EU's message bus.

Within task T3.3 we have analyzed, developed, trained and deployed models targeting the twofold purpose of the task: (i) Self-Supervised Learning (SSL) models for the facilitation of annotation efficiency of downstream tasks, and (ii) Models of Learned Compression. Regarding the first direction, that of SSL models, we relied on the renowned SimCLR architecture to build our models. These models are trained using a vast amount of unlabeled data. What guides their training is the contrastive loss, which allows similar images to be mapped closer to each other in the latent space, while differently looking images are mapped further away. We must clarify at this point that, following the Machine Learning jargon based on which these models are commonly exemplified, we refer to 'images', while under the umbrella of this term all data provided in a grid of two or more dimensions, can produce a (hyper)volume that can be processed by the models.

As afore mentioned**, Self-Supervised Learning models** like SimCLR get trained using unlabeled data. The purpose of these models is to provide their encoder as a feature extractor, which transforms the input data in this new latent space, aiming to facilitate downstream tasks to achieve label-efficiency. This means that the only way of demonstrating the efficiency of such SSL models, is by selecting a downstream supervised task and evaluating the performance of a supervised model addressing this task in two ways: with and without the use of the feature extractor provided by the SSL model.

To be able to have a clear evaluation of the SSL models, we selected a renewed EO benchmarking dataset, which could accommodate both model training: M1 that is the SSL model, and M2 that is a classification task. The benchmarking dataset that has been selected was that of BigEarthNet-s2. It contains 590,326 non-overlapping image patches of atmospherically corrected by the Sentinel-2 images, acquired between June 2017 and May 2018 over the 10 countries of Europe. In addition, each


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image patch was annotated by the multiple land-cover classes (i.e., multi-labels) that were provided from the CORINE Land Cover database of the year 2018 (CLC 2018).

To consume this data for our model's training and evaluation we had initially developed the data loaders that could provide batches of this data. Therefore, these Sentinel 2 data of the BigEarthNet dataset were used to train both the SimCLR model (M1) as well as the baseline classifiers M2. As a baseline classifier we selected the same encoder architecture as the one used in the SimCLR model, which was followed by a classification head, with both the encoder and the classification head having a random initialization of all weights. This constitutes a suitable baseline for a consistent comparison with the classifier that utilizes the SimCLR model. This is done by plugging the classification head to the trained encoder, as it results from SimCLR model (M1) training.

We are currently in the process of executing the comparative evaluation, utilizing the setting described above. After the complete evaluation of this setting, we intend to proceed to further tuning and optimization in the selected benchmarking downstream task, to demonstrate further improvements that are possible, beyond the initial evaluation.

Having evaluated our model, and demonstrated a downstream task where this could be utilized, the immediate next steps are to utilize the different data sources relevant to our project, as suggested by our partners, and training more models that can be used by downstream tasks. We will follow an equivalent pipeline as the one described above, to consume data (that may also be the outcome of the fusion component provided by T3.2), train the SLL model that can be made available to operate as the feature extractor which the downstream tasks will be enabled to use to achieve label efficiency. To facilitate the operationalization of serving these outcomes to the users of downstream tasks, the T3.3 task leader has proposed and solidified, in collaboration among partners, Tasks and WPs, the way these models will serve their products to users, through an inference server. In this way, the Use Case owners that wanted to design an efficient supervised model for their task relying on certain input data sources but were blocked by the barrier that is the requirement of large volumes of labelled data, will be facilitated to do so in a labelled efficient way.

The second direction of this task is the design and implementation of models of **learned compression**. A method that has seen widespread adoption in the domain of neural adoption is the vector-quantized variational auto-encoder method, or VQ-VAE. In essence, the latter learns a codebook of vector embeddings, and each vector in the latent space is mapped to its closest code in the learned dictionary of codes before being fed to the decoder. Importantly, even though neural networks can provide a convenient alternative to complex components in a compression pipeline, they still need to be trained. As an auto-encoder by nature, the VQ-VAE technique trains its model with a reconstruction loss. The method has recently been improved to work on with even larger models and volumes of data.
In T3.3, we exploit these recent advancements to develop the learned compression models, leveraging the ambulance of EO data. The big volume of available EO data and the fact that each data modality concerns a thematic content constitute great indicators that invite for applying the latest methods of learned compression on these data distributions. Our motivation has been to leverage the abundance of available data and the most recent advancements of the field of learned compression to offer compression capabilities for the EO data, that exceed the state of the art, and that can greatly facilitate application developers to obtain, transfer and store relevant data.
Similarly, to the SSL models, we have opted to develop our codebase and to design our initial evaluation of the models using the same public benchmarking dataset. We are currently executing the training and evaluation of these models, which will demonstrate their capabilities. The next step would be to use the other suggested data sources to train encoder decoder pairs that can optimally compress and decompress the data modality on which they were trained on, leveraging the particularities of the data distribution of each data source.


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Lastly, we now start the process of documenting the developed models and their use. This documentation will accompany these models, to facilitate their use as well as their potential further reusability and extensibility. We intend to complete the training of these models for all relevant data sources, making them available throughout the EO4EU, and accompanying them with their respective documentation towards the completion of D3.4 “ML methods, models, and documentation” in M18.

**Task 3.4 “Customers Facing Services” - Lead by EBOS**

The following work-tasks have been developed and tested, but with future additions and further development is required, such as:

A successful development and deployment of the EO4EU Platform Software System as Front-Page – Home-Page, Fig.3.4.1, of the (inside the Dashboard) has been completed. The current Front-Page of the EO4EU Platform can provide and enable 3D Mapping and Interaction operations such as a Zoom In and Out, Rotation, Selection, and other transformations (more will be added).


Fig.3.4.1 EO4EU Platform – Front-Page - Snapshot

1. Analyzing the User‘s and System’s Components Specs and Requirements for the T3.4 Customer Facing Services.
2. Defining the Technological Objectives and Advancements.
3. Designing and Developing Unified Modeling Language (UML) System Architecture & Components – Abstract Block Diagram of the User Interface.
4. Designing and Developing UML System Architecture & Components – Analytical Block Diagram of the User Interface.
5. Designing and Developing the EO4EU Platform - Dashboard and Front-Page (Home-Page).
6. Designing and Developing the Dashboard – Data Analytics Visualization.
6. Designing and Developing Application Programming Interface - API with the basic functions.
7.Designing and Developing the User Management Model - UMM with the User Interface Data and the Key-cloak.
8. Designing and Developing the Command Line Interface – CLI with the basic functionalities.

Testing and Deployment of the above System’s Components have been run on EBOS local network servers, as they are ready for full deployment on external Clusters with the collaboration of the Consortium’s partners. Further advancements, additions of new functionalities based on partners’ needs regarding the needs of the EO4EU Platform System but also based on the User’s requirements will be developed through the life-circle of the project. Software improvements and optimizations will also be investigated and utilized to bring the User Interface Software in a more user-friendly


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environment, simple in the use of it, but also bring more advancements and innovations in terms of the functionalities, interactions, and service operations.

**The DSL Editor**, accessible through the eo4eu frontend**,** also known as the Workflow Editor, is a powerful and user-friendly tool that empowers users to effortlessly create, customize, and manage their workflows. By logging into the platform, users gain access to a comprehensive set of features that streamline the workflow creation process. Leveraging the intuitive drag and drop functionality, users can add a wide range of components to the canvas area, sourced from the datastore, ensuring they have ample options to suit their needs.

Within the DSL Editor, users have the flexibility to arrange and position components according to their preferences. The toolbar enables easy movement of components, allowing for optimized workflow designs. Additionally, users can interact with each component, defining their properties and configuring them to meet their specific requirements. Establishing connections between components is seamless, enabling smooth data flow and interaction within the workflow. Once the workflow is created, users can finalize and dispatch it for execution. To provide a responsive and user-friendly experience, the DSL Editor utilizes modern web technologies such as React and the React Flow library. These technologies contribute to a smooth and efficient workflow creation journey, empowering users to design and deploy customized workflows that precisely align with their specific requirements.

## 2.4 WP4 EO4EU Data Marketplace Ecosystem

Work in WP4 is planned to commence in month M13.

## 2.5 WP5 EO Data Uptake Demonstration

WP5 is related to the Use Cases to conduct to demonstrate a set of possible sectors and applications for which the platform can be exploited by more or less ICT expert users to facilitate their day-to-day activities or decision-making processes. In particular the EO4EU proposed systems has to be evaluated in terms of usability and effectiveness under real conditions, through demonstrators with real installations/usage of the system, so to certify that the prototype meets the defined specifications and it is ready to be deployed in the real world.

The WP5 was conducted by organizing around monthly meetings, with more frequent meetings in case of specific clarification or feedback needed, also to better align and coordinate with other WPs, in particular WP2. In particular, at the beginning a clarification of the type of users of the platform (external users, project partners, stakeholders) each WP should address was needed. Role in terms of Tasks and Use Case leaders/contributors were also clarified, as well as an action plan per task to organize the main sub-steps to follow until M18. Two among three WP tasks started at the beginning of the projects and are briefly summarized below.

**Task 5.1**

Strongly interacting with Tasks 2.1 and 2.2, this task aimed at clarifying requirements from a Use Case point of view. Use Case are better defined and technical implementation guidelines formulated. All the proposed UCs have been analyzed in detail to identify needs in terms of:

data management (spatial and temporal domains, data sources, data format, data transfer rate, disk size, input, intermediate and/or temporary and output data), SW components (esp. AI in terms of scope, configuration, pipeline) and computational infrastructure (virtual resources, scalability requirements, resource occupation for development purposes and for the operational phase of the service).

The same Table used in WP2 for the landscape analysis and collect requirements from project partners (Use Case participants) in terms of Input data, data preparation, data processing and results delivery was used as source of information, leading to the delivery of D5.1, a first version of Pilot

Implementation methodology and release of evaluation guidelines. The Task will last until M18 after the Use Cases are launched.

**Task 5.2**
This Task started with the project to define pilot plan with the timeline and the detailed execution timeline of each pilot, based on the findings of 5.1. A comprehensive demonstration plan will facilitate the smooth planning, deployment and assessment of all UCs.
In this Task, a list of main (champions) and then secondary users was compiled, starting from the ones expressing their interest in the proposal phase. To explore their availability to contribute in the specific Use Case, an ice-breaking questionnaire was formulated and circulated, with 21 respondents, to identify their common practices in terms of data exploitation, time horizons considered, devices exploited and visualization/analysis needs of possible Use Case results. Results were summarized and are under analysis. This task will last until the end of the project to continue updating and improving the delivered products thanks to users' feedback.

### *2.5.1 Deliverables*

**Table 5 – WP5 Deliverables**

| Deliverable Number | Name | Abstract | Submitted on |
|---|---|---|---|
| D5.1 | Pilot Implementation methodology and release of evaluation guidelines (a) | A vast amount of Earth Observation data is produced daily and made available through online services and repositories. Contemporary and historical data can be retrieved and used to power existing applications, foster innovation, and improve EU citizens' lives. However, the audience for this information is relatively small, resulting in vast amounts of valuable data remaining unexplored.<br><br>The EO4EU project aims to provide innovative tools, methodologies, and approaches that can assist a broad range of users, from domain experts and professionals to ordinary citizens, in benefiting from accessing EO data. It aims to deliver dynamic data mapping and labelling AI-augmented modules that add fairness to the data and introduce an ecosystem for the holistic management of EO data. EO4EU envisions bridging the gap between domain experts and end-users while bringing technological advances to the forefront to address the market's demand for wider usage of EO data.<br><br>The project will support the wider exploitation of EO data by delivering: (i) Machine Learning (ML) methodologies for Semantic Annotation of existing and growing data sources, (ii) semantically enhanced knowledge graphs that will enable structuring of content around diverse topic areas and building step by step journeys from different sources into a unified approach, (iii) data fusion techniques to extend the | 31 May 2023 |


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| | | scalability of existing distributed systems, (iv) Augmented and Virtual Reality for interactive user experience, and (v) advanced data analytics visualizations for improved learning and evidence-based interpretations of environmental observations. Its operational and technical capacity will be demonstrated within seven distinct pilots that cover different thematic areas, such as personalized health care, sea route planning, ocean monitoring, food security, food ecosystems, soil erosion, environmental pest, and crisis management. These thematic areas will engage a wide spectrum of involved stakeholders, from EO providers, policy makers and actors, researchers and academics to citizen scientists and the general public to join efforts and provide their multidisciplinary expertise to support the Commission's strategic goals towards further exploitation of EO data.<br><br>In this document, each of the seven use cases is analysed in detail to identify their data management needs, software component needs, and computational needs. Additionally, a summary of the deployment plan for each use case is presented, to consolidate it at a later stage against the data and processing infrastructure provider for technical alignment. These two chapters, namely the deployment plan and technical alignment, will be briefly described in this document, with more details to be provided in version B at a later stage. | |

## 2.6 WP6 Communication, Dissemination & Exploitation

As this WP deals with the project's communication, dissemination and exploitation activities, it focused on activating activities as early as M1 and building upon early achievements. Given the nature of the work of the WP, its tasks also frequently collaborated not only with tasks within the same WP but also with other WPs in the project given its "horizontal" nature of communicating results from the rest of the project.

**Summary**

The work carried out in the first year can be summarised with the following:

- Preliminary mapping and definition of the project's key results and their attributes to support in dissemination planning and future exploitation plans and opportunities for standardisation (T6.1, T6.3, T6.4 and T6.5).
- The delivery and implementation of the Dissemination, Exploitation, and Communication Plan and Strategy (D6.1) including its action plans that are organised through "campaigns" and horizontal activities, in particular the Community Building and Awareness Campaign (T6.1, T6.2, T6.4, and T6.5).

- The set-up and maintenance of the project communication channels comprising: (1) the project website, (2) social media accounts including Twitter, LinkedIn, Instagram, and YouTube, (3) the newsletter (T6.1, T6.2, and T6.5).
- Outreach and engagement of external stakeholders at events with the aim of generating interest and building contacts in the run-up to the release of the EO4EU platform. (T6.1 and T6.5).

**Progress towards objectives**

As the activities of the WP are highly interconnected between tasks, this report will be structured based on our progress towards the WP6 objectives as defined in the work plan with mention of task contributions.

**Building an engaged community**

In building an engaged EO community, from the outset, WP6 has worked towards generating interest and building its community. This was carried out through the following:

- **Newsletter subscription**: Along with the launch of the website in M1, the project already started gathering newsletter subscribers through a web form online with the main messaging being offering them future opportunities to use or benefit from the EO4EU Platform and the project (T6.2, andT6.1). These subscribers are welcomed as "EO4EU Community Members" and are invited to webinars, early access opportunities and to participate to surveys. This will be an important means of generating early usage of the EO4EU platform.
- **Dedicated campaign**: The first dedicated campaign run by WP6 is the "Community Building and Awareness" campaign running from M1 – M12 which aims to deliver visibility in at least 4 third-party events, at least 400 followers across the project's social media and 100 attendees and on-demand viewers for its webinars. Its main target was to gather at least 200 contacts in the EO4EU Community Database (newsletter subscribers). 6-month early results were reported in D6.1. To-date, the relevant campaign goals contributing to community engagement have been achieved or surpassed as of the 3rd week of May (through T6.1, T6.2, T6.5):
    - 197 contacts in database
    - 604 total followers on social media
    - 7 third party events with visibility
    - 11 external channels/media outlets that took up the press release
- **Interactions through two webinars**: These were organised featuring speakers from other WPs (T6.5, T6.2, T6.1)
    - Introducing EO4EU: Making Earth Observation data more accessible through next generation tools: https://www.eo4eu.eu/events/introducing-eo4eu
    - Unveiling the Opportunities of EO Data Exploitation: EO4EU Use Cases: https://www.eo4eu.eu/events/unveiling-opportunities-eo-data-exploitation-eo4eu-use-cases
- **Creating an offering for early access**: As part of our support to other WPs, one of the activities we undertook was to promote WP2's end-user survey. WP6 crafted the offering whereby participants to the survey could be shortlisted and invited to obtain early access for use of the EO4EU Platform (T6.1).
- **Outreach through third-party events**: See dedicated section below.

**Communication and Dissemination**

The workplan foresaw daily communication activities to communicate the benefits of the platform to the interested parties in the public and private sector.

- **Horizontal activities**: The communication and dissemination plan has specifically set regular and continuous activities to be carried out throughout the project lifetime. The target was to ensure continued growth of the number of unique website visitors, weekly Twitter posts, bi-weekly LinkedIn posts, monthly Instagram posts, up to 2,400 total social media followers, 3500 total video views, synergies with at least 5 entities, 8 publications in journals and 12 publications in conferences. 6-month early results were reported in D6.1. Although the target is meant to be reached at the end of the project, the following have thus far been achieved (through T6.1, T6.2, T6.5):
    - 1074 unique website visitors[6]
    - Regular communication averaging more than double the required monthly Twitter and LinkedIn posts (Instagram lagging due to problems in sourcing content)
    - 609 total social media followers
    - 1 journal publication
    - 1 conference publication
    - 617 total video views
    - Synergies established with three entities:
        - SAFERS project – communication synergy
        - EC-NEXTLAND project – communication synergy
        - Open Earth Monitor project – technical and communication synergy
    - So far, dissemination or advancing standards are to be explored after technical advancements in the project have been made. Nonetheless, an application for an external standardisation expert has been made to the Horizon Standardisation Booster to help guide the project in its standardisation activities.
- **Dedicated campaign**: As mentioned in the previous section on building a community, the first dedicated campaign run by WP6 is the "Community Building and Awareness" campaign, which aside from its community building elements, also required the delivery of a communications kit including a video (targeting 400 views), and a flyer, presentation, poster and rollup banner to be used at events (see dedicated section below). These have all been delivered, including 491 views of the general video (T6.1).

In general, while the interim dissemination and communication activities are largely on-track, the foreseen offering of early access to the EO4EU platform from 2024 onwards and the advancement on the technical development of the platform is expected to generate more interest and contribute to the achievement of the KPIs or targets that are lagging. To-date, interest has been generated even without the tangible offering yet of the EO4EU platform nor early access and has largely been achieved through communicating potential benefits and high-level features.

**Events**

[6] This only tracks visitors that have accepted website cookies. Therefore, this forms only a subset of the real value.



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WP6 is meant to organise webinars, policy luncheons, workshops and impact events, and coordinate outreach in third-party events. Towards this, members of WP6 (T6.5 and T6.1) provided visibility to EO4EU in the following events:

- Nordic Bioaerosol Meeting, 10-11 November 2022, Stockholm, Sweden
- IX International Conference on Forest Fire Research & 17th International Wildland Fire Safety Summit, 11-18 November 2022, Coimbra, Portugal
- EOSC Symposium, 11-17 November 2022, Prague, Czechia
- Latvian Society of Allergists “3rd Molecular Allergology School", 12 January 2022, Riga, Latvia
- EuroGEO Workshop 2022, 7-9 December 2022, Athens, Greece
- AGU Fall Meeting, 12-16 December 2022, Chicago, USA
- EGU General Assembly 2023, 23-28 April 2023, Vienna, Austria

Aside from third-party events, two webinars were organised which not only allowed us to introduce the project and our use cases, but also allowed us to gather contacts (T6.5, T6.1, T6.2). Most of the registrants expressly requested to be informed of the project updates and offerings. The webinars, especially the live broadcast allowed interested stakeholders external to the project to interact with the experts and understand the benefits that EO4EU may offer them in the future. These webinars are continued to be made available in a “gated” format to allow the project to continue to gather contacts from interested stakeholders – a tactic which contributes to growing the community.

**Exploitation**

WP6 aims to maximise the internal and joint exploitation of the EO4EU tools and solutions among the partners and expand the adoption of the EO4EU System to end users. This means the creation of appropriate business models, ensuring global community interaction, and economic viability and sustainability of the EO4EU system.

Towards this WP6 worked in the first 6 months to define the preliminary set of Key Exploitable Results of the project including titles, a short description and expected availability (T6.4, T6.3 and T6.1). These KERs have been identified in D6.1 - Assets and Value Proposition and fed into the development of the communication and dissemination campaigns in the report, which is now currently being implemented and will feed into the exploitation and business model development.

Following the identification of these preliminary KERs, the next 6 months onwards towards the end of the project will be to further refine and streamline them and define result managers, intellectual property rights, further dissemination plans, further elaboration of the joint and internal exploitation plans. This will be achieved through internal workshops organised by T6.4, with the first one already being organised within the reporting period.

### *2.6.1 Deliverables*

**Table 6 – WP6 Deliverables**

| Deliverable Number | Name | Abstract | Submitted on |
|---|---|---|---|
| D6.1 | Dissemination and Communication Plan & | The EO4EU project aims at expanding access to a wider audience and improving the usability of data generated by EO service providers. To achieve this goal, the platform will leverage machine learning, cloud services, and pre-exascale high-performance computing (see 4 Assets and Value | 30 Nov 2022 |



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| | Continuous monitoring (a) | Proposition). An essential step will be the communications and dissemination strategy aimed at guaranteeing a significant uptake of the developed solution.<br>The overarching dissemination and communication goal is to ensure the maximum uptake and adoption of the project's results. Two communications and dissemination objectives to enable this are (1) to increase the relevance of the project's value proposition and (2) improve the user journey toward conversion. The latter will consider three stages of the user journey, namely the awareness, considerations, and decision stages. This will allow to consistently target the audience in the communications and dissemination activities, thereby providing them a smooth transition from getting acquainted with the EO4EU platform to becoming users (see 2 Dissemination and Communication Objectives.<br>The communications and dissemination activities will target each of the identified stakeholder groups which include EO data providers, private sector, researchers and academia, policy makers, citizens and general public (see 3 Stakeholder Analysis). To ensure sufficient result exploitation, the applied methodology will include the generation of relevant content for each stakeholder group and their engagement as community members. Some of the tools that will be used include newsletters, social media schedulers, event tools, webinar videoconferencing tools, and event platforms.<br>An approval procedure for materials considered of high importance by WP6 will be set up (see 4.2 Approval Structure). Additionally, the results of the communications activities will be continuously monitored by such tracking tools as Google Analytics and the Drupal content management tracker, among others (see 4.3 Monitoring).<br>The communications and dissemination strategy will be multi-channel and consist of horizontal activities, as well as a set of targeted campaigns (see 6 Communication and Dissemination Plan). The channels for horizontal activities will include the support of the website with an overview of the EO4EU functionalities and social media and content repositories. As part of the content production, the plan envisions the creation of a product brochure, a set of use case flyers, and a policy brief. Additionally, a video documentary series, a quarterly newsletter, press releases, and third-party coverage will ensure a multi-media approach to dissemination. Concurrently, EO4EU will organize at least eight webinars, which will include both technical and non-technical webinars, as well as a set of workshops.<br>It is planned to implement four communications campaigns (see 5.3 Campaigns). The Community Building and Awareness campaign will aim at building the EO4EU Community Database. The EO Innovation Award campaign will promote the EO4EU platform to a wider audience. Next, the Technical Outputs Dissemination campaign will aim at directly promoting the project's specific outputs to their target audiences. Finally, the EO4EU Platform Promotion campaign will demonstrate the features and use cases, | |



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| | | thereby leading to further engagement and transition from “visitor” to “user”. This plan has already been piloted and some early results were already seen (see 7 Early results and next steps). | |

# 3 Project Meetings

Each WP has setup their own regular online meetings. Depending on the workload, the meeting frequency is either monthly (WP1, WP5, WP6) or biweekly (WP2, WP3). In some cases, regular meetings have also been setup for individual tasks (T2.3, weekly).

Moreover, face-to-face meetings have also been conducted to facilitate in-person collaboration and work acceleration.

**Table 7 – Project Meetings**

| Title | Place, Date | Main Conclusions |
|---|---|---|
| Kickoff Meeting | Athens, GR, 29-30 June 2022 | Presentation of the consortium<br>Management preparation of the first year of the project<br>Discussions about the technical perspectives of the project |
| 2nd Plenary Meeting | Bologna, IT, 13-15 February 2023 | Presentation of the ongoing work at each WP. Workshops for several key technical aspects. |
| Technical Meeting | Reading, UK, 29-30 May 2023 | |

# 4 Use of Resources

In this section the consumed resources up to M10 are reported, since the figures for the last 2 months of the year will be collected after M12.



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**Table 8 – EO4EU Use of Resources for the first 10 months**

| Party | WP1 | WP2 | WP3 | WP4 | WP5 | WP6 | Total |
|---|---|---|---|---|---|---|---|
| NKUA | 13.2 | 9.8 | 28.9 | 0.0 | 9.8 | 7.6 | **69.3** |
| ECMWF | 1.5 | 1.0 | 2.5 | 0.0 | 0.0 | 0.0 | **5.0** |
| NVCR | 0.1 | 2.8 | 13.9 | 0.0 | 0.0 | 0.0 | **16.8** |
| CINECA | 1.1 | 9.1 | 9.7 | 0.3 | 0.0 | 0.0 | **20.3** |
| VU | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** |
| LU | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 0.0 | **2.5** |
| FMI | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** |
| CMCC | 0.3 | 0.2 | 1.1 | 0.1 | 3.9 | 0.0 | **5.6** |
| SIS | 0.3 | 6.5 | 4.5 | 0.0 | 5.5 | 1.5 | **18.4** |
| DANAOS | 0.0 | 2.1 | 0.0 | 0.0 | 0.0 | 0.0 | **2.1** |
| KEMEA | 0.7 | 5.2 | 0.0 | 0.0 | 2.3 | 1.0 | **9.1** |
| EBOS | 1.6 | 9.3 | 3.9 | 0.0 | 0.5 | 0.5 | **15.7** |
| TRUST-IT | 1.2 | 0.0 | 0.0 | 0.0 | 0.3 | 7.2 | **5.9** |
| COMMPLA | 0.1 | 0.0 | 0.0 | 0.0 | 0.3 | 5.5 | **5.9** |
| ENG | 1.4 | 4.2 | 9.1 | 0.0 | 1.5 | 0.6 | **16.8** |
| IES | 0.7 | 0.7 | 0.4 | 0.0 | 1.4 | 0.6 | **3.7** |
| MEEO | 0.3 | 2.9 | 5.6 | 0.0 | 0.9 | 1.9 | **11.6** |
| IVI | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.6 | **1.6** |
| HESSO | 0.0 | 0.4 | 7.6 | 0.0 | 0.4 | 0.0 | **8.4** |
| **Total** | **22.5** | **54.1** | **87.0** | **0.4** | **29.3** | **28.0** | **218.6** |

The Coordinator NKUA has committed more resources in the project in the first 10 months, because it was essential that the management, communication and technical infrastructure needed to be established, configured and adjusted in order for the project to start moving forward.

# 5 Conclusions

The first EO4EU annual report provides a comprehensive overview of the progress and findings of our research project, indicating that everything has proceeded according to plan. Throughout this phase, the project consortium has diligently pursued the objectives outlined in the Grant Agreement, successfully executing the planned methodologies and reaching the first milestones. As we move forward, we anticipate building upon these achievements and advancing towards our ultimate innovation goals.