

D7.3 – Progress Report 1

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HISTORY OF CHANGES

Date	Version	Author	Change Description
04.07.2023	0.1	Luisa Bettli	Initial version with ToC
31.08.2023	1.0	CENTAUR Consortium Board and Steering Committee	First version of the document



1 INTRODUCTION

1.1 SCOPE OF THE DOCUMENT

The main objective of the D7.3 – Progress report 1 is to provide an overview of the activities performed and results produced from M1 to M9, as well as deliverables and milestones achieved and planned in CENTAUR project.

Particularly, an overview of the status of the activities performed, currently ongoing and next steps are provided with reference to each work package (related tasks), as well as results achieved.

1.2 DEFINITIONS, ABBREVIATIONS AND ACRONYMS

Abbreviation/acronym	Definition
AB	Advisory Board
Aoi	Area of Interest
CCR	Casse Centrale de Réassurance
CB	Consortium Board
CEMS RM	Copernicus Emergency Management Service Rapid Mapping
CEMS RRM	Copernicus Emergency Management Service Risk & recovery Mapping
DRC	Danish Refugees Council
DDR	Demo Design Review
DTM	Digital Terrain Model
EEAS	EU Situation Room
EC	European Commission
ECMWF	European Centre for Medium-Range Weather Forecasts
EFAS	European Flood Awareness System
EO	Earth Observation
ESS	Exploitation Strategy Seminar
EU	European Union
FR	Final Review
GFFO	Germain Federal Foreign Office
HE	Horizon Europe
HRB	Horizon Results Booster

ICDPR	International Commission for the Protection of the Danube River International Commission for the Water Quality and Water Management
IPR	Intellectual Property Rights
IR	Interim Review
JRC	Joint Research Centre
KERs	Key Exploitable Results
KOM	Kick-Off Meeting
KPI	Key Performance Indicators
LULC	LandUse/LandCover
ML	Machine Learning
NDA	Non-Disclosure Agreement
NLP	Natural Language Processing
OSINT	Open-Source INTelligence
PC	Project Coordinator
PDR	Preliminary Design Review
PDRE	Preliminary Demo Results Evaluation
REDIAM	Red de Información Ambiental de Andalucía Environmental information
SAR	Synthetic Aperture Radar
SatCen	European Union Satellite Centre
SC	Steering Committee
SEA	Copernicus Service in Support to EU External Access
SMEs	Small and Medium-sized Enterprises
STP	SpaceTec Partners
UF	Urban Flood
UN	United Nations
UNEP	United Nations Environment Programme
UNHCR	United Nations High Commissioner for Refugees
URR	User Requirements Review
(V)HR	(Very) High Resolution
VITO	Vlaamse Instelling Voor Technologisch Onderzoek
WFS	Water & Food Security

WP	Work Packages
WPL	Work Package Leader
TL	Task Leader

1.3 APPLICABLE AND REFERENCE DOCUMENTS

ID	Document name
[RD01]	CENTAUR - 101082720 – Grant Agreement
[RD02]	HORIZON-CL4-2021-SPACE-01 - Strategic Autonomy in Developing, Deploying and Using Global Space-based Infrastructures, Services, Application and Data 2021, available at https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl4-2021-space-01-12
[RD03]	D1.1 - Report on Urban Flood and Water & Food security indicators
[RD04]	D2.1 - Catalogue of CENTAUR data and related specifications
[RD05]	D2.2 - Urban flood and Water & Food Insecurity Design
[RD06]	D3.1 - Platform design and development
[RD07]	D5.2 - Plan for the dissemination and exploitation including communication activities
[RD08]	D6.1 - Communication strategy and action plan
[RD09]	D7.1 - Project management plan v1
[RD10]	D7.5 - IPR and innovation plan
[RD11]	D7.7 - Data management plan
[RD12]	Centaur Consortium Agreement – Version 1 – 21 st June 2023

2 PROJECT ACTIVITIES STATUS - UP TO M9

In the following chapter 3, an overview of the status of the ongoing activities is reported for each Work Package (WP) and related Tasks. Particularly, for each WP the following contents are provided:

1. Overview of WP objectives.
2. WP time planning (tasks duration and deliverables).
3. Tasks description and CENTAUR team in charge of specific actions.
4. Deliverables description, due date and, type, dissemination level and lead beneficiary.
5. Milestones related to each WP.
6. Status of the activities and results achieved.
7. Next steps foreseen.

As according to the project time-planning, the activities related to WP4 will start in M10, in the present progress report, points above are reported only from 1 to 5.

2.1 WP1 – ANALYSIS OF REQUIREMENTS AND USE CASES DEFINITION

The objective of WP1 is to provide user requirements and indications and to lay the groundwork for subsequent activities in CENTAUR. In particular, WP1 has the following objectives:

- Assess how the current Copernicus SEA and EMS services model Urban Flood risks and Water & Food Insecurity.
- Identify gaps in current response tools and determine ways to overcome them and enable appropriate responses to complex emergencies and crisis.
- Provide a preliminary inventory of basic indicators to be considered in the project, which will be completed during execution of WP2.
- Select and define a representative number of use cases.
- Design the complete conceptual model linking climate hazards, socioeconomic impacts, and possible implications for human security, including a complete list of variables and composite crisis indexes that will drive research activities throughout the project.

WP1 will last 12 months, distributing the start/end dates of the different tasks as in the timeline below (Figure 1).

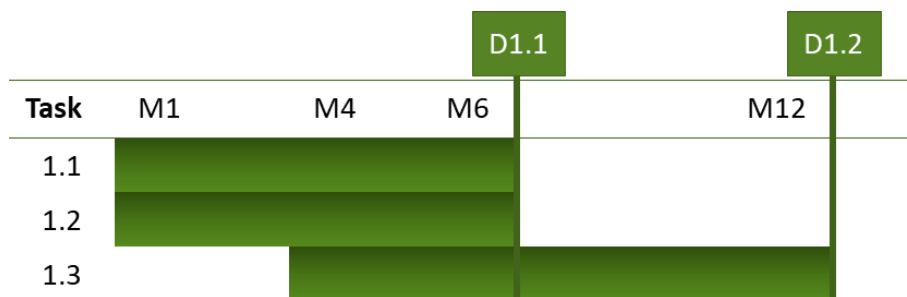


Figure 1: WP1 timeline of the activities and related deliverables

Tasks and responsibilities within WP1 have been organized as reported in Table 1.

Table 1: Tasks (or subtasks) related to WP1

Task or subtask	Responsible partners
Work Package leader	SAT
Task 1.1 - Review of EMS operations for Urban Flood detection and monitoring, gap analysis and definition of indicators	EG (task leader)
New EO data availability.	ECM, EG, UNI, CLS and ITH
Topographic data availability.	ITH, UNI, CLS
Demographic and socio-economic indicators.	UNI, ADE
Current weather forecast systems.	ECM
Innovative urban flood indicators.	EG and UNI
Task 1.2 - Review of SEA operations for Water & Food Insecurity	SAT (task leader)
Review of the current service portfolio and past production.	SAT
Proposals for new Copernicus SEA products and services in the water & food insecurity domain.	SAT and EG
Biophysical parameters and agriculture monitoring data sources and indicators.	VIT, UNI
Water indicators.	VIT, UNI
Meteorological variables and forecasts.	EG, ECM
Fine-scale population distribution and exposure to security risks.	DLR
Demographic & socio-economic stress, vulnerability.	ADE, GMV, DLR, UNI and SAT
Task 1.3 - Cross-cutting analysis, Use Cases and Crisis Indexes definition	UNI (task leader)
Define the Use Cases according to EMS & SEA needs	UNI, SAT, EG, TRA, ADE and CLS
Design an advanced composite crisis index	ADE, UNI and CLS

Two deliverables are in scope of WP1, among which the D1.1 delivered in M6 (Table 2).

Table 2: Deliverables in scope of WP1

Deliverable Number	D1.1	Lead Beneficiary	SAT
Deliverable Name	Report on Urban Flood and Water & Food security indicators		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	6	Work Package No	WP1
Description			
To report possible improvements and proposed evolutions at Copernicus SEA level, by describing all existing data sources and indicators to be harvested, processed and integrated in the CENTAUR platform and identifying new indicators that should be generated within CENTAUR			
Deliverable Number	D1.2	Lead Beneficiary	UNISTRA
Deliverable Name	Report on CENTAUR Use Cases and Indexes definition		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	12	Work Package No	WP1
Description			
This deliverable shall contain:			
<ul style="list-style-type: none"> - a cross cutting analysis - definition of the Use Cases according to EMS & SEA needs 			
design an advanced composite crisis indexes that will take advantage from the experience of already existing services.			

There are 5 milestones related to WP1 (Table 3).

Table 3: Milestones related to WP1

Milestone #	Milestone Name	Means of Verification	Status	Due date
1	KOM - Kick off	Contract Signed	Completed	M1
2	URR – User Requirement Review	D1.1	Completed	M6
4	DDR - Demo Design Review	D1.2	Planned	M15
5	IR - Interim Review	Review with EC Officer and Reviewers	Planned	M18
9	FR - Final Review	-	Planned	M36

2.1.1 Task 1.1 - Review of EMS operations for Urban Flood detection and monitoring, gap analysis, definition of indicators

In the frame of Task 1.1 a complete analysis of Copernicus EMS operations in relation to Urban Flood impacts, gap analysis and definition of indicators was performed. An initial in-depth analysis on urban flood context, including:

- Copernicus EMS triggering activations.
- Drivers of urban flood in the context of climate change.
- An assessment of the use cases in scope of CENTAUR project, over which demonstrate its capabilities (i.e. France, Spain, Italy, Germany and Mozambique). Particularly, an analysis of the urban flood events occurred over specific areas of interest, within the countries above have been performed.

An end-user driven gap analysis between the current Copernicus EMS operational services and the desired service provision through CENTAUR was performed to tackle the Climate Security impacts with reference to the urban flood thematic area.

As reported in Task 1.2, a User Requirements Analysis was performed also with regards to the urban flood domain. Particularly, several Use Cases and operational tools focused on urban flooding were presented to the users to analyse their needs and interests related to this topic. The analysis revealed that present **flood models do not have the sufficient accuracy** and that the **geographical scope was not appropriate (normally global data)** to be used for their activities. Based on the user's experience, the users described several limitations and needs on the existing flood models:

- Need for real time data about flood extent during flood events.
- In many urban areas, standard methods of SAR-based flood mapping are not technically feasible, because SAR is not sensitive to flooding (or any other type of change) of the ground surface in these areas.
- Flood models are not user-friendly for non-technical decision makers.
- The accuracy of flood models decreases in areas with dam presence and is not sufficient in urban and forested areas.

A detailed review on the state of the art was produced on main existing radars and optical sensors used for flood mapping, particularly within the Copernicus EMS context. Moreover, an overview of new EO data constellations, new topographic data availability, socio-economic and traditional media, as well as enhanced weather forecast system was produced including on existing limitation in commonly used data. T1.1 further included a brief review of previous assessments of socioeconomic vulnerability to (urban) floods and of economic impact of floods, identifying key factors of vulnerability and discussing corresponding data sources.

As the basis to identify and define composite risk index in the urban flood thematic area, 14 innovative indicators were identified and described distributed in 2 groups: i) urban flood; ii) demographic and socio-economic urban flood related. Each indicator was preliminarily drafted in dedicated ID-card, where a brief description, gaps addressed, input and output data, and high-level workflow were reported. The same structured approach was adopted by the water and food insecurity related indicators identified in T1.2.

A comprehensive assessment of results obtained from the review analysis of EMS operations for urban flood detection and monitoring was reported in Deliverable D1.1 - Report on Urban Flood and Water&Food security indicators ([RD03]).

2.1.2 Task 1.2 - Review of SEA operations for Water & Food Insecurity impacts, gap analysis and definition of indicators

In the frame of Task 1.2 a complete analysis of Copernicus SEA operations in relation with Water & Food Insecurity impacts, gap analysis and definition of indicators was performed. The task started with an in-depth analysis on the water and food insecurity context, including:

- Main implications, impacts and pathways between climate change and security.
- Challenges to mitigate climate security threats.

- Main ongoing institutional initiatives inside and outside the EU.
- A study of the three Areas of Interest considered for running and demonstrating the CENTAUR capabilities (Mali, Somalia, and Mozambique). It included considerations on the climate change impacts on the areas, water and food security issues and political instability and violent events over the last years.

It was followed by an end-user driven gap analysis between current Copernicus SEA operational Service Model and the desired service provision to respond to Climate Security impacts (particularly, the water & food insecurity).

On one side a User Requirement Analysis was performed synthesizing the views of the users on urban floods and water & food insecurity related to climate change. This way the CENTAUR project expects to ensure that the final solution(s) meet(s) the specific needs of the users and provides value to them. The results of the analysis shall serve as the foundation guiding the design and development of the system, including aspects such the delivery format, frequency of analysis and relevant background data to be used. A questionnaire with 70 questions was distributed among the Advisory Board members, obtaining a total of 14 responses that were subsequently analysed. The existing operational experience of the consortium partners, the open discussion carried out with the users (in a dedicated User Requirement Review meeting) and the outcomes from the user questionnaires were combined to draft the final (functional and non-functional) requirements for the CENTAUR project.

On the other side a review of the current SEA service portfolio and past production focused on: i) reactive intelligence products that may be enriched by applying a new transversal approach that considers the climate change and its effects on the environment and population; ii) the SEA systems and platforms devoted to produce intelligence in a proactive way. The exercise included proposals for new Copernicus SEA products and services in the water & food insecurity domain.

In the end, a complete state of the art review of the data needs covering potentialities and limitations of the following long-term open data sources and indicators, in terms of spatial and temporal resolution, coverage, quality, suitability and accessibility were performed.

As a first step in the definition of the composite risk index on the water and food insecurity domain 25 innovative indicators were identified and described distributed in 5 groups: i) biophysical parameters and agriculture monitoring data sources and indicators; ii) water indicators; iii) meteorological variables and forecasts; iv) fine-scale population distribution and exposure to security risks and resources shortage and v) demographic and socio-economic stress and vulnerability. For each of them a preliminary production workflow was drafted.

All results are part of Deliverable D1.1 - Report on Urban Flood and Water&Food security indicators ([RD03])

2.1.3 Task 1.3 - Cross-cutting analysis, Use Cases and Crisis Indexes definition

Three main activities still have to be completed within Task 1.3 performed: a cross-cutting analysis of Tasks 1.1 and 1.2 outputs, the final definition of Use Cases, and the design of advanced composite crisis indexes.

Use Cases definition, design and preparation activities are performed by working groups per Use Case, with interactions with the Advisory Board and other potential users. The table below gives an overview of the progress of these activities (Table 4).

Table 4: Activities in Task 1.3: status and results of use cases definition

Activity	Status	Results
Definition of urban flood (UF) and water & food security (WFS) use cases inside / outside Europe including a multidisciplinary case, according to EMS and SEA needs, based on stakeholders' experiences and ensuring the involvement of local/regional authorities	Closed	Selection and adjustment of UF and WFS Use Cases in agreement with the Advisory Board members during the User Requirement Review Meeting (URR):

		<ul style="list-style-type: none"> • 4 UF use cases selected for cold and hot demonstrators, including 1 multidisciplinary. • 1 UF use case selected for cold demonstrator. • 3 WFS use cases selected for cold and hot demonstrators, including 1 multidisciplinary. • 2 optional use cases (Sudan, Morocco) to be processed on voluntary basis.
Selection of available Earth Observation and ancillary data for cold cases	Ongoing	<ul style="list-style-type: none"> • Collection of archive EO (satellite / aerial) data, Digital Terrain Model (DTM), EO based flood masks • Definition of the EO data acquisition plan for 2024, request submissions to be done • Collection of weather, hydrologic, topographic and LandUse / LandCover (LULC) data, as well as social media markers. • WFS use case inputs are being collected for cold cases Mali, Mozambique, Somalia.
Selection of standard and novel Earth Observation and ancillary data for hot cases	Ongoing	<ul style="list-style-type: none"> • Definition of the EO data acquisition plan for 2024, request submission to be done • To be done for 2025
Definition of indicators and indexes to be tested on each Use Case	Ongoing	<ul style="list-style-type: none"> • UF indicators and indexes specified. • UF socio-economic indicators specified. • WFS indicators confirmed and indexes under finalization. • WFS socio-economic indicators confirmed and indexes under finalization.

The **design of advanced composite crisis indexes** is performed by Urban Flood and Water & Food Security working groups, taking advantage from the experience of already existing services. It includes a combined analysis of the state of the art, gaps and proposals for indicators 1.1 and 1.2, considering user needs, to define the precise axes of development of the project. The compilation of a main repository of stakeholder’s best practices or needs/expectations that can be used as inputs and drivers with users indicating priorities in the short, medium and long term and with both high specification / high technology and lower specification / low technological options is also done. The conceptual cause-effect model connecting security risks to climatic shocks change and extreme weather events will be developed. The model will serve as basis for a conflict prediction tool sensitive to climate change effects and will include the final selection of indicators, and datasets to be gathered, processed and generated on a continuous basis.

In order to adapt the theoretical model to the different Use Cases selected, an analysis in terms of period of observation, aggregation level, data availability and applicable indicators has been performed.

The table 5 below gives an overview of the progress of the activity.

Table 5: Activities in Task 1.3: status and results of crisis indexes definition

Activity	Status	Results
Analysis of the state of the art and cross-cutting analysis	Ongoing	Comparative analysis of T1.1 and T1.2 with strengths and weaknesses
Definition of development priorities	Planned	Define the user requirements / development priorities in the short/medium/long terms
Definition of new crisis UF indexes	Ongoing	<ul style="list-style-type: none"> • UF and UF-SE indexes identified. • Methodological approach description in progress. • Conceptual model diagram in progress
Definition of new crisis WFS indexes	Ongoing	<ul style="list-style-type: none"> • Conceptual model diagram in progress
Definition of new crisis UF indexes	Ongoing	<ul style="list-style-type: none"> • UF and UF-SE indexes identified. • Methodological approach description in progress Conceptual model diagram in progress

And last but not least, a **cross-cutting analysis** specifically based on the multidisciplinary use case and the comparative analysis of T1.1 and T1.2 has still to be performed. Complementarity of UF and WFS indicators and indexes will be highlighted.

2.1.4 Next steps

In the coming months, the following steps are planned to conclude the analysis of requirements and use case definition in WP1. Specifically, Task 1.3 - Cross-cutting analysis, Use Cases and Crisis Indexes definition is projected to continue until M12. Input data selection: The initial compilation of essential indicators for project consideration will be complemented and consolidated. Ensuring seamless coordination with WP2 – Thematic Product Engineering is of paramount importance during this process.

Case study refinement and preparation: The case studies will be reviewed and, if needed, modified based on insights from partners’ experience. A comprehensive testing will be performed on all case studies to determine their practical applicability using real-world data. It is especially important to focus on both data integration, to enhance the integration of relevant data into the different case studies, and scalability, considering their potential applicability beyond the immediate project scope. Additionally, an active engagement of the project stakeholders in the process will be ensured.

Conceptual model design: A comprehensive conceptual model will be developed to serve as a roadmap to understand the complex relationships of the different variables involved. This could involve the creation of visual diagrams or flowcharts to effectively illustrate these dynamics. The aim is to provide a clear framework that captures the interrelationships and dependencies within the advanced composite indexes.

Advanced composite index definition: Building upon the work completed in previous steps, the advanced composite indexes will be crafted to encapsulate the multidimensional relationships between climate hazards, socioeconomic impacts, and human security implications.

It is crucial to highlight that all the gathered information will be consolidated in Deliverable 1.2 - Report on CENTAUR Use Cases and Indexes definition. This report encompasses the comprehensive cross-cutting analysis, the formulation of use cases aligned with EMS & SEA requirements, and the design of the advanced composite crisis indexes.

2.2 WP2 – THEMATIC PRODUCT ENGINEERING

Following the assessment of user requirements in WP1, this work package puts in place workflows for collecting necessary data for the development of risk indicators and crisis indexes, as well as for their implementation. The final output of this package shall consist in several service pipelines that will combine earth observation meteorological and hydrological data; open intelligence data from traditional and social media, socioeconomic and political indicators; other types of geospatial data, using geospatial and temporal information as common homogenising feature to merge these data into synthetic indexes.

Particularly, WP2 is organized in the following tasks with related objectives:

- in Tasks 2.1, 2.2 and 2.3 will be harvested and pre-processed data collected from several repositories.
- In Tasks 2.4, 2.5 and 2.6 pre-processed data will be used to design and implement the service pipelines for the generation of complex Urban Flood, Food/Water Insecurity, and socio-political-economic indicators, properly combining and integrating dataset for supporting monitoring services, crisis conditions, and impact assessment.
- in Task 2.7 indicators generated above will be combined to produce enhanced integrated crisis indexes and prediction models improving information content related to crises deriving from Urban Flood and Food/Water Insecurity.

WP2 will last 25 months, distributing the start/end dates of the different tasks as in the timeline below (Figure 2).

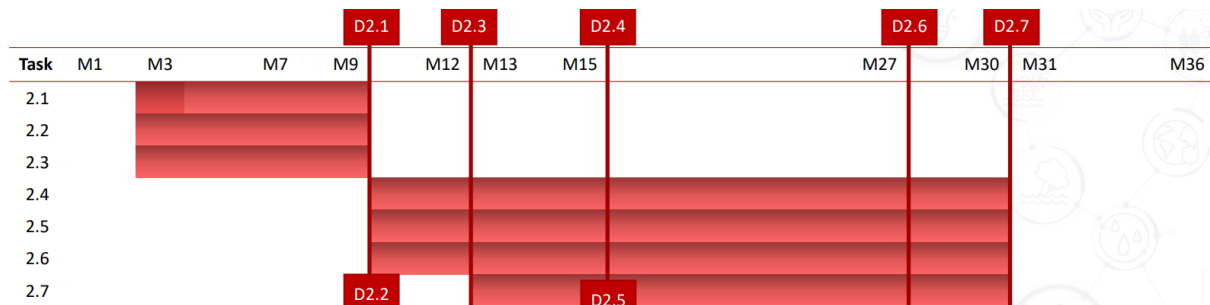


Figure 2: WP2 timeline of the activities and related deliverables

Tasks and responsibilities within WP2 have been organized as reported in Table 6.

Table 6: Tasks (or subtasks) related to WP2

Task or subtask	Responsible partners
Work Package leader	SAT
Task 2.1 - Geospatial data harvesting and customization	GMV (task leader)
Catalogue setup and connection to any external repository	GMV
Collection of geospatial datasets	EG
Make use of different database to collect info about vegetation and health	VIT
Harvest and process high resolution data for elevation information	ITH
Task 2.2 - Open and socio-economic data mining and customization	HEN (task leader)
Harvest and enrich open data for use cases	HEN

Harvest and catalogue official census data and population statistics	DLR
Contribute to the development of novel image processing techniques	CHE
Task 2.3 - Meteorological data access and modelling	ECM (task leader)
Develop ML to improve prediction of HR precipitation in urban areas	ECM
Task 2.4 - Social, economic & political indicators - design and implementation	AD (task leader)
Collecting and combining socioeconomic/political data	AD
Derive indicators for interoperability with other data types in CENTAUR	HEN
Census and population statistics harmonization	DLR
Crisis, political instability, and social fragility related new indicators	SAT
Task 2.5 - Urban Flood indicators - design and implementation	EG (task leader)
Focus on DL techniques to optimize flood detection in urban environments	UNI
Focus on urban area flood modelling to enhance flood extent mapping	EG, ECM
Check the “fit for purpose” of the (new) urban floods indicators	CLS, TRA
Task 2.6 - Urban Flood indicators - design and implementation	VIT (task leader)
Design and implementation of new indicators and increase of resolution of existing ones	VIT
Ensuring innovation/complementarity with existing food security frameworks	UNI
Design and implement new indicators related to population movement	EG
Support for the meteo-related data as an ancillary data	ECM
Supporting for generation of information on the exploitation of natural resources	GMV
Task 2.7 - Integrated multi criteria analysis and synthetic indexes design and implementation	CHE (task leader)
Design and test a data processing chain for both Copernicus SEA and EMS, integrating all available information into synthetic indexes	CHE
Supporting crises indexes integration and generation	EG, VIT
Supporting socio, economics and political indicators for integrated crises indexes generation	ADE

Seven deliverables are in scope of WP2, among which D2.1 and D2.2 are expected for this delivery in M9 (Table 7).

Table 7: Deliverables in scope of WP2

Deliverable Number	D2.1	Lead Beneficiary	EG
Deliverable Name	Catalogue of CENTAUR data and related specifications		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	9	Work Package No	WP2

Description			
For each data domain (geo-spatial, open source and meteorological), a list of relevant datasets and their specification, access point and constraints.			
Deliverable Number	D2.2	Lead Beneficiary	EG
Deliverable Name	Urban Flood and Water & Food Insecurity design		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	9	Work Package No	WP2
Description			
To design a flood detection indicator for urban areas; to design new indicators and increase of resolution of existing ones.			
Deliverable Number	D2.3	Lead Beneficiary	EG
Deliverable Name	Urban Flood and Water & Food Insecurity service pipelines v1 (baseline set up)		
Type	DEM — Demonstrator, pilot, prototype	Dissemination Level	PU - Public
Due Date (month)	12	Work Package No	WP2
Description			
To implement the service pipelines for the generation of complex Urban Flood, Food/Water Insecurity and socio-political-economic indicators, properly combining and integrating dataset for supporting monitoring services, crisis situation and impact assessment - baseline set up			
Deliverable Number	D2.4	Lead Beneficiary	EG
Deliverable Name	Urban Flood and Water & Food Insecurity service pipelines v2 (tuning and adaptation)		
Type	DEM — Demonstrator, pilot, prototype	Dissemination Level	PU - Public
Due Date (month)	15	Work Package No	WP2
Description			
To implement the service pipelines for the generation of complex Urban Flood, Food/Water Insecurity and sociopolitical-economic indicators, properly combining and integrating dataset for supporting monitoring services, crisis situation and impact assessment - tuning and adaption			
Deliverable Number	D2.5	Lead Beneficiary	CHE
Deliverable Name	CENTAUR multi-criteria indexes design		
Type	R — Document, report	Dissemination Level	SEN - Sensitive
Due Date (month)	15	Work Package No	WP2
Description			
To design a data processing chain for both the Copernicus SEA Service and Copernicus Emergency Service, that integrates all available information into synthetic indexes			

Deliverable Number	D2.6	Lead Beneficiary	CHE
Deliverable Name	CENTAUR multi-criteria analysis and indexes generation pipelines v1 (using indicators from the baseline)		
Type	DEM — Demonstrator, pilot, prototype	Dissemination Level	SEN - Sensitive
Due Date (month)	27	Work Package No	WP2
Description			
To test a data processing chain for both the Copernicus SEA Service and Copernicus Emergency Service, that integrates all available information into synthetic indexes - baseline			
Deliverable Number	D2.7	Lead Beneficiary	CHE
Deliverable Name	CENTAUR multi-criteria analysis and indexes generation pipelines v2 (final setting)		
Type	DEM — Demonstrator, pilot, prototype	Dissemination Level	SEN - Sensitive
Due Date (month)	31	Work Package No	WP2
Description			
To test a data processing chain for both the Copernicus SEA Service and Copernicus Emergency Service, that integrates all available information into synthetic indexes - final setting			

There are seven milestones related to WP2 as listed in Table 8.

Table 8: Milestones related to WP2

Milestone #	Milestone Name	Means Verification	of Status	Due date
1	KOM - Kick off	Contract Signed	Completed	M1
3	PDR – Preliminary Design Review	D2.1, D2.2,	Completed (a session with the end-users will be planned end Sept/Oct according to their availability)	M9
4	DDR - Demo Design Review	D2.3, D2.4, D2.5	Planned	M15
5	IR - Interim Review	Review with EC Officer and Reviewers	Planned	M18
7	PDRE – Preliminary Demo Results Evaluation	D2.6	Planned	M27
8	FDR - Final Demo Review	D2.7	Planned	M32
9	FR – Final Review	-	Planned	M36

2.2.1 Task 2.1 - Geospatial data harvesting and adaptation

Under task 2.1, and in collaboration with partners from task 2.2 and 2.3, the outcome of this task is **Deliverable 2.1. Catalogue of CENTAUR data and related specifications**. This document includes the list of datasets that will be used as inputs to generate the CENTAUR innovate indicators, as well as the list of innovate indicators themselves that will be provided through the CENTAUR platform for both project domain: urban flood and water and food security. This have been done for all Earth observations and forecasts of meteorological and hydrological data; open intelligence data from traditional and social media, socio-economic and political data; other types of geospatial data. The collection of the data information from the three tasks - T2.1, T2.2, and T2.3 - have been centralized using a common excel file where the partners responsible to collect, provide or develop the needed data have been requested to include the required information for each dataset. Each row of the tables represents an individual dataset that is either data input to generate the innovate indicators or the innovate indicators themselves:

- The **input** can be available data generated by an external data provider (e.g., Copernicus, ESA, etc.) that are collected and made available for the project by a CENTAUR partner. Input can be a product developed and provided by a CENTAUR partner. These datasets will be stored on the CENTAUR platform to be used for any component developed within this project, for further detail on the component see D3.1 Platform design and development.
- The **innovative indicators** are quantitative metrics that provide a signal or sign of the presence, state, or rate of change of a situation or condition. The input data described above is employed in a process of analysis and interpretation and is used to provide insight into specific phenomena or trends. The indicators will be developed for both target CENTAUR domains: Urban Flood (UF) and Water and Food Security (WFS) and were previously introduced in D1.1 ([RD03]). In D2.2 ([RD05]) they will be further described, providing detailed information about the data workflow and the methodology to generate these indicators. The innovative indicators themselves will be stored in a catalogue for end-users' consultation. add further on this, according to the platform functionalities itself.

The catalogue document includes significant number of specifications for each dataset have been collected and provided in the catalogue:

- **CENTAUR context fields:** Dataset name, Description, ID-X, CENTAUR Team/Product Owner, CENTAUR Use Case / AOI, Main applications, Tags, Other restrictions.
- **Technical specifications:** Dataset name, Raw input data, Sensor, Data-sources & Provider, Spatial coverage and resolution, Temporal extent, Update frequency, Format, Publication, Version, Language(s), Modality, + Licence, and Copyright.

The development of the data catalogue as part of WP2 has been carried out in parallel to Task 3.1 which consolidates the design of the CENTAUR platform integrating all WP2 services. The design of the platform includes the description of the service processing chains from the input to the final products (innovate indicators) which are both described in the data catalogue included deliverable 3.1.

Deliverable 2.1. Catalogue of CENTAUR data and related specifications have been submitted by 31/08/2023.

2.2.2 Task 2.2 - Open and socio-economic data mining and adaptation

The objective of task 2.2 is the harvesting and provision of data and meta-data corresponding to the requirements of the use-cases from a set of open sources (traditional and social media, census, and population statistics). Contents will be processed and enriched by a series of technologies (e.g. Natural Language Processing - NLP) and harmonized such, that the results are compatible with geospatial layers.

The provision of data involves the setting up of adequate sources in terms of geographic Area of Interest (AOI), language and domain-coverage. Furthermore, concerning the use of HENSOLDT's Open-Source Intelligence

(OSINT) system for data collection and enrichment, it concerns the setting up of a multi-lingual set of concepts which for the basis for (later) indicator creation.

Concerning both, cold and hot cases the availability (volume) of data has been investigated and summarized (but not finalized yet). The 3 partners of T2.2, HEN DLR and CHE provide complementary data and technologies. All partners have contributed to deliverables D2.1 ([RD04]) and D2.2 ([RD05]) and through these to milestones M9 and M12.

Currently, the setting up of data provision/collection activities is being finalized. Initial work has been carried out on the design and detailed definition of indicators (which will be derived from these data).

The next steps will include the finalization of data collection/provision activities and the design and development of an initial set of indicators. This initial set will be extended to a larger set of indicators in iterations.

Work begun and carried out in T2.2 will transition into T2.4, the design and implementation of socio-economic indicators in September 2023.

2.2.3 Task 2.3 - Meteorological data access and modelling

ECMWF is currently developing two key data sets and the delivery of meteorological forecasts within the CENTAUR project.

The first data set targets extreme precipitation in urban areas via a machine-learning based prediction of return periods. To this end, a series of observation-based precipitation data sets have been employed and return periods for the CENTAUR use cases in Europe have been evaluated. As a result, precipitation from the E-OBS data base has proven most accurate and is currently used to develop the machine-learning based model. Therefore, a catalogue of return periods of extreme precipitation is being created and enables the translation of return periods to precipitation rates. In the coming months, ECMWF will apply the herein developed model using 3-day forecasts to provide timely predictions of extreme precipitation events in urban areas. These forecasts will then serve as triggers and inputs for the flood inundation model by e-GEOS. Additional data sets for the use cases in Africa will be exploited.

The second data set developed by ECMWF targets the occurrence and severity of meteorological droughts. To advance on the state of the art, a probabilistic monitoring system is currently being developed. This monitoring system will estimate the likelihood of an ongoing drought and its severity, i.e., it will determine if a drought is moderate, severe, or extreme and how long this drought has been going on. Therefore, the cold cases defined within CENTAUR have been evaluated and the reliability of the monitoring system has been evaluated with an impact-based, observational data set (EM-DAT). In the coming months, a suite of forecasts — ranging from the days to 6 months ahead — will be employed and the probability of moderate, severe, or extreme precipitation deficits will be evaluated. These forecasts will further be analysed with respect to the monitoring status and yield probabilities of drought aggravation or recovery. The focus of the latter will be the hot cases defined within CENTAUR.

Finally, ECMWF is in contact with all partners from CENTAUR and actively engaging in the provision of meteorological data sets. Particularly, a range of forecasts for the development of water- and food-security based indicators is currently being selected and will soon be provided to the relevant partners, e.g., for Task 2.6 to VITO.

2.2.4 Next steps

In the coming months, the following next steps are planned, as Task 2.4 – Social, economic & political indicators (design and implementation), Task 2.5 – Urban Flood indicators (design and implementation) and Task 2.6 – Water & Food security indicators (design and implementation) will start in parallel from M10 and later on (in M13) Task 2.7 – Integrated multi-criteria analysis and synthetic indexes design and implementation will initiate.

1. **Input data preparation:** All input data required for the computation of innovative indicators will be harvested and pre-processed, starting with those countries identified as the CENTAUR cold cases. Within



these countries, specific time ranges will be selected which are most relevant in terms of drought condition monitoring to steer further development of WFS indicators (next point).

2. **Workflow Consolidation and Development:** Workflows for all innovative indicators will be further developed and consolidated.
3. **Pipeline Development:** Pipelines will be created to integrate various indicators from different thematic areas (urban Flood, Water & Food Insecurity and Socio-economic), to generate composite indices.
4. **Development of Early Response Tools and Decision Support Systems:** Tools will be developed to visualize and analyze data and indicators through an intuitive dashboard. Customized predictive models will enable "what-if" analysis, and alerts will be generated based on specific rules, such as predefined indicator thresholds or anomalies.

Particularly, within Task 2.4 partners have been involved in Task 2.1 and 2.2 in preparation of T2.4, which will start in September 2023. ADE has been meeting with all partners contributing input data and/or innovative indicators towards measuring relevant socio-economic indicators for both the Urban Flood and Water & Food Security components of CENTAUR. These data cover measures of socioeconomic vulnerability to the effects of droughts and floods, as well as measures of their (potential) economic impact and security implications. Contributing partners include EG, UNI, CLS, TRA, DLR, HEN, GMV, CHE, and SAT, covering T2.4 and ensuring a connection with both T2.5 and T2.6. Over the coming months, the partners will collect/generate necessary input data, specify appropriate metrics for innovative indicators (for indicators derived from social/traditional media), and develop corresponding algorithms for data collection and indicator computation.

2.3 WP3 – SERVICE DEPLOYMENT

The objective of Service deployment work package (WP3) is to have the necessary tools to visualise/analyse the products generated in the services (the output of Thematic Product Engineering work package WP2). The platform will be designed to be scalable and agnostic to the IT resource tier.

The WP is split into several task to achieve the deployment of the services:

- Task 3.1 is related to design and the set-up of the platform where the different services will be integrated.
- Task 3.2 oversees the integration of the components related to Urban flood domain.
- Task 3.3 oversees the integration of the components related to Livelihood and food security.
- Task 3.4 is related to establishing the testing environment and developing the pipelines for automatization testing and guaranteeing the quality of the output. Each developer will create the test cases that will be run by a different team.

The WP will last 33 months, starting from M4 and activities are distributing as per the timeline below (Figure 3).

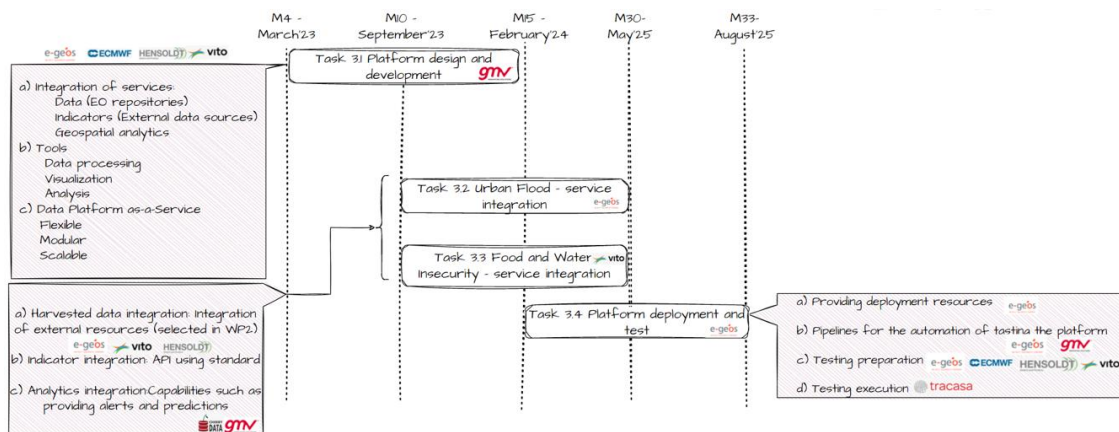


Figure 3: WP3 timeline of the activities and related deliverables

Tasks and responsibilities within WP3 have been organized as reported in Table 9.

Table 9: Tasks (or subtasks) related to WP3

Task or subtask	Responsible partners
Work Package leader	GMV
Task 3.1 - Platform design and development	GMV (task leader)
Analyses and integrated different services and systems in AgERA5 domain	ECM
Analyzed and integrated different services and systems in Copernicus land domain	VIT
analyses and integrated different services and systems in social data domain	HEN
Task 3.2 - Urban Flood – service integration	EG (task leader)
Harvested data integration	EG, VITO, HEN
Indicator integration	EG, VITO, HEN
Analytics integration	GMV, CHE
Task 3.3 - Livelihood and food security– service integration	VIT (task leader)
Harvested data integration	EG, VITO, HEN
Indicator integration	EG, VITO, HEN
Analytics integration	GMV, CHE
Task 3.4 - Platform deployment and test	EG (task leader)
Definition of test cases	EG, VITO, HEN, ECM
Execution of the test cases as an external tester of the platform	TRA

Six deliverables are in scope of WP3, among which D3.1 is expected for this delivery in M9 (Table 10).

Table 10: Deliverables in scope of WP3

Deliverable Number	D3.1	Lead Beneficiary	GMV
Deliverable Name	Platform Design Document (all the theoretical background related to service design and implementation) v1		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	9	Work Package No	WP3
Description			
To consolidates the design of the platform that allows the integration WP2 services - I version.			
Deliverable Number	D3.2	Lead Beneficiary	GMV
Deliverable Name	Platform Design Document (all the theoretical background related to service design and implementation) v2		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	15	Work Package No	WP2

Description			
Consolidates the design of the platform that allows the integration WP2 services - II version.			
Deliverable Number	D3.3	Lead Beneficiary	GMV
Deliverable Name	CENTAUR integrated platform including Urban Flood and Water & Food Indexes v1 (baseline)		
Type	DEM — Demonstrator, pilot, prototype	Dissemination Level	PU - Public
Due Date (month)	15	Work Package No	WP3
Description			
Service integration on multiple iteration leded. The three main iterations will follow the development of WP2:			
<ul style="list-style-type: none"> • Harvested data integration. • Indicator integration. • Analytics integration Baseline. 			
Deliverable Number	D3.4	Lead Beneficiary	GMV
Deliverable Name	CENTAUR integrated platform including Urban Flood and Water&Food Indexes v2 (final setting)		
Type	DEM — Demonstrator, pilot, prototype	Dissemination Level	PU - Public
Due Date (month)	32	Work Package No	WP3
Description			
Service integration on multiple iteration leded. The three main iterations will follow the development of WP2:			
<ul style="list-style-type: none"> • Harvested data integration. • Indicator integration. • Analytics integration final settings. 			
Deliverable Number	D3.5	Lead Beneficiary	GMV
Deliverable Name	CENTAUR integrated platform test document v1 (baseline)		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	15	Work Package No	WP3
Description			
To provide deployment resources and organize the testing of the platform services. In particular, pipelines for the automation of tasting, even in a prototype development Baseline.			
Deliverable Number	D3.6	Lead Beneficiary	GMV
Deliverable Name	CENTAUR integrated platform test document v2 (final setting)		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	32	Work Package No	WP3

Description

To provide deployment resources and organize the testing of the platform services. In particular, pipelines for the automation of tasting, even in a prototype development. Final settings.

There are three milestones related to WP3 (Table 11)

Table 11: Milestones related to WP3

Milestone Number	Milestone Name	Means of Verification	Status	Due date
3	PDR – Preliminary Design Review	D3.1	Completed (a session with the end-users will be planned end Sept/Oct according to their availability)	M9
4	DDR - Demo Design Review	D3.2, D3.3, D3.5	Planned	M15
8	FDR - Final Demo Review	D3.4, D3.6	Planned	M32

2.3.1 Task 3.1 - Platform Design

Each task is assigned to the responsible partner. Here I kindly ask you to provide a view of the activities closed, ongoing planned, and related results. Under this task, the platform design has been defined with the input from WP1 (user requirements) and WP2 (description of the services).

- Analysing the user requirements, the platform design has been started. The platform design consists of 2 phases: The preliminary version includes an overview of the platform, the general principles and the generic components that are included. This release has been delivered in the PDR milestone.
- The final version that will include the components and interfaces needed to allocate the services that are designed and implemented in WP2, scheduled in the DDR milestone.

2.3.2 Next steps

In the coming months, as the design and implementation of the services in WP2 will be consolidated and Task 3.2 – Urban Flood (service integration) and Task 3.3 – Water & Food security (service integration), there will be main activities listed below to be performed.

- Define in a more detailed version of the design platform: components, description of the interfaces between them and external sources, updating the D3.1 deliverable ([RD06]).
- Integration environment
 - Setting up the integration environment, cloud subscription is included.
- Service integration: harvesting, indicator, and analytics integration.
- Testing environment
 - Setting up the test environment, establishing and deploying the tools needed.
 - Test cases definition.

It will consist of an incremental process where each release from WP2 will be incorporated into the platform. The key point of the progress will be the interaction with WP2 and the scheduling of WP2 deliverables.

2.4 WP4 – CLIMATE CHANGE CRISIS AND NATURAL DISASTER DEMONSTRATION

The present WP4 has the objective of aimed at testing the CENTAUR platform in pre-operational context and demonstrating its added value to current Copernicus EMS and SEA operations. Particularly, WP4 has the following objectives:

- Organizing demonstrations in running CENTAUR’s system over use cases selected, on the basis of users’ needs and data availability.
- Executing the demonstration exercises by supervising the proper platform and service runtime performance. The cold and hot uses cases for the two main thematic lines (Urban Flood and Water & Food security) are run for the scenario configuration that has been agreed with the user community.
- Analysing the demonstrator outcomes from a user perspective to ascertain user and stakeholder feedbacks, on the the fit-to-purpose of platform user experience, continuous monitoring/indicators and products for both Urban Flood and Water & Food security.

WP4 will cover the entire duration of the project, following the start and end dates of the different tasks as per the following timeline (Figure 4).

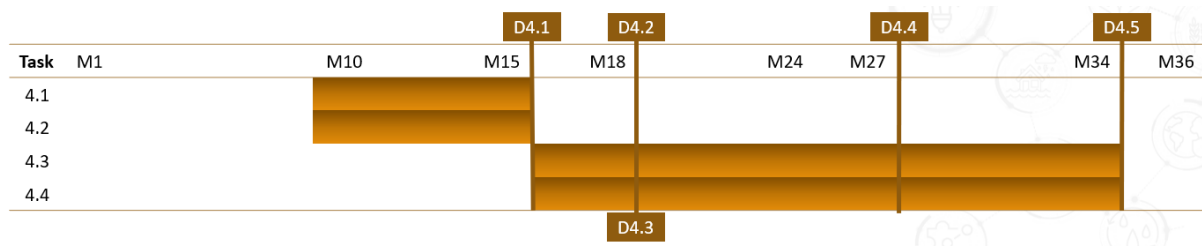


Figure 4: WP4 timeline of the activities and related deliverables

Tasks and responsibilities within WP4 have been organized in (Table 12).

Table 12: Tasks (or subtasks) related to WP4

Task or subtask	Responsible partners
Work Package leader	UNISTRA
Task 4.1 - Demo design, performance identification and validation criteria/EMS Urban Flood	UNI (task leader)
Establish validation criteria for the platform and thematic results	TRA
Run cases (first cold and then hot) for Water & Food Security demonstrators	TRA, AD, SAT
Run cases (first cold and then hot) for Urban Flood demonstrators	TRA, UNI, EG, CLS
Task 4.2 - Demo design, performance identification and validation criteria/SEA Water & Food security	AD (task leader)
Apply demonstrator assessment (Task 4.4) and implement recommendations	ALL
Task 4.3 - Demonstrator execution	GMV (task leader)
Exploitation activities performed during and after the project duration	EG, VIT

Task 4.4 - Demonstrator assessment	GMV (task leader)
Analyse the demonstrator outcomes from a user perspective (Urban Flood)	EG, UNI
Analyse the demonstrator outcomes from a user perspective (Water & Food Security)	SAT, AD, VIT
Analyse the platform from a Service Provider (SP) viewpoint through KPIs and thematic results	EG, UNI, SAT, AD, VIT

Five deliverables are in scope of WP4 (Table 13).

Table 13: Deliverables in scope of WP4

Deliverable Number	D4.1	Lead Beneficiary	UNISTRA
Deliverable Name	CENTAUR demonstration plan v1 (cold case)		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	15	Work Package No	WP4
Description			
For the Cold Cases, includes areas of interest, datasets available, timeframe and any other demo detail, including users interaction and validation criteria.			
Deliverable Number	D4.2	Lead Beneficiary	UNISTRA
Deliverable Name	CENTAUR demonstration plan v1 (hot case)		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	18	Work Package No	WP4
Description			
For the Hot Cases, includes areas of interest, datasets available, timeframe and any other demo detail, including users' interaction and validation criteria. This report also includes criteria to interact with the Crisis Observatory to early capture possible alternative or additional areas of interest.			
Deliverable Number	D4.3	Lead Beneficiary	UNISTRA
Deliverable Name	CENTAUR demonstration operational report and validation result - cold cases		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	18	Work Package No	WP4
Description			
Report on the execution of the demonstration exercises by supervising the proper platform and service run-time performance. To provide analytical reports based on the crisis and natural disaster demonstrators to analyze the demonstrator outcomes from a user perspective regular reporting will be performed on improvement actions to be implemented in the short and medium term on the demonstrators Cold case.			
Deliverable Number	D4.4	Lead Beneficiary	UNISTRA
Deliverable Name	CENTAUR demonstration operational report and validation result v1 - hot cases (intermediate)		

Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	27	Work Package No	WP4
Description			
Report on the execution of the demonstration exercises by supervising the proper platform and service runtime performance. To provide analytical reports based on the crisis and natural disaster demonstrators to analyse the demonstrator outcomes from a user perspective regular reporting will be performed on improvement actions to be implemented in the short and medium term on the demonstrators' (Hot case – intermediate).			
Deliverable Number	D4.5	Lead Beneficiary	UNISTRA
Deliverable Name	CENTAUR demonstration operational report and validation result v2 - hot cases (final)		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	34	Work Package No	WP4
Description			
Report on the execution of the demonstration exercises by supervising the proper platform and service runtime performance. To provide analytical reports based on the crisis and natural disaster demonstrators to analyse the demonstrator outcomes from a user perspective regular reporting will be performed on improvement actions to be implemented in the short and medium term on the demonstrators' (Hot case – final).			

There are five milestones related to WP4, as listed below (Table 14).

Table 14: Milestones related to WP4

Milestone Number	Milestone Name	Means Verification	of Status	Due date
1	KOM - Kick off	Contract Signed	Completed	M1
4	DDR – Demo Design Review	D4.1	Planned	M15
5	IR - Interim Review	D4.2, D4.3	Planned	M18
7	PDRE – Preliminary Demo Results Evaluation	D4.4	Planned	M27
9	FR – Final Review	D4.5	Planned	M36

2.5 WP5 – ANALYSIS OF THE INTEGRATION IN THE OPERATIONAL SETUP OF COPERNICUS EMS AND SEA, IMPACT AND FURTHER EXPLOITATION

The present WP5 has the objective of preparing a plan to move from a prototypal phase to an initial operational phase of CENTAUR into the Copernicus EMS and SEA Security operational service, based on lessons learnt from the demonstration phase. Particularly, WP5 has the following objectives:

- Performing an interoperability analysis and roadmap for the integration of the most relevant products and services developed in CENATUR, into the Copernicus EMS and SEA service.
- Determine what can be integrated into the Copernicus EMS (RM & RRM) and SEA portfolios.
- Identifying the Key Exploitable Results (KERs) by all partners of CENTAUR by addressing existing gaps and market needs for emergency and security services.

WP5 will cover the entire duration of the project, following the start and end dates of the different tasks as per the following timeline (Figure 5).

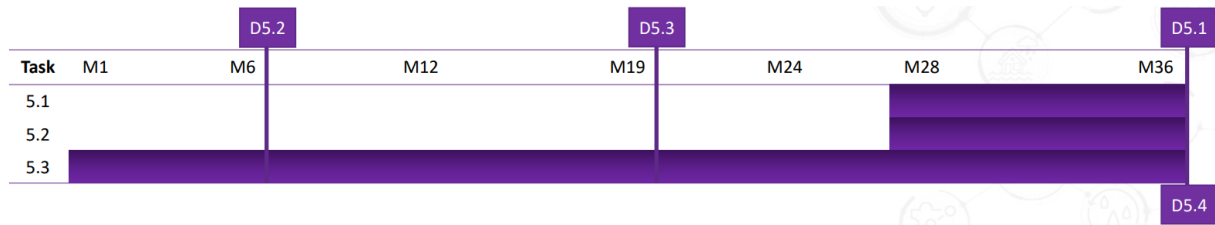


Figure 5: WP5 timeline of the activities and related deliverables

Tasks and responsibilities within WP5 have been organized as reported in Table 15.

Table 15: Tasks (or subtasks) related to WP5

Task or subtask	Responsible partners
Work Package leader	EG
Task 5.1 - EMS interoperability analysis and roadmap for integration	UNI (task leader)
Determine CENTAUR relevant product integration into Copernicus EMS RM & RRM	EG/UNI
Analyse new developments/tools integration into EMS services	EG/ECM
Task 5.2 - SEA interoperability analysis and roadmap for integration	SAT (task leader)
Determine CENTAUR relevant product integration into Copernicus SEA	SAT/EG
Analyse the integration baseline of the platform with the SAT systems	GMV
Plan preparation for products/services integration with the Copernicus SEA service	EG/SAT/GMV
Task 5.3 - Impact, exploitation, and business model	EG (task leader)
Exploitation activities performed during and after the project duration	All

Four deliverables are in scope of WP5 (Table 16).

Table 16: Deliverables in scope of WP5

Deliverable Number	D5.1	Lead Beneficiary	EG
Deliverable Name	CENTAUR interoperability and impact analysis report, including roadmap for the integration in the EMS and SEA		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	34	Work Package No	WP5
Description			
To assess and select from the CENTAUR catalogue of products and services the most relevant ones for the Copernicus EMS and SEA service. To determine what can be integrated into Copernicus EMS RM, RRM or both or if it can be used to enlarge the service portfolio and integrated to enrich current services to analyse how to integrate these new developments / methods / tools into the EMS services to prepare a plan to integrate the selected products and services with the Copernicus SEA service.			
Deliverable Number	D5.2	Lead Beneficiary	EG
Deliverable Name	Plan for the dissemination and exploitation including communication activities v1		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	6	Work Package No	WP5
Description			
To plan exploitation activities performed during and after the project duration. The analysis of project results will lead to the identification of key exploitable project results. The exploitation plan will take into account different types of industrial partners (Industry, SMEs, new start-ups) as well as other type of stakeholders that are needed in the business ecosystem. Initial version.			
Deliverable Number	D5.3	Lead Beneficiary	EG
Deliverable Name	Plan for the dissemination and exploitation including communication activities v2 (interim)		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	18	Work Package No	WP5
Description			
to plan exploitation activities performed during and after the project duration. The analysis of project results will lead to the identification of key exploitable project results. The exploitation plan will take into account different types of industrial partners (Industry, SMEs, new start-ups) as well as other type of stakeholders that are needed in the business ecosystem. Interim version.			
Deliverable Number	D5.4	Lead Beneficiary	EG
Deliverable Name	Plan for the dissemination and exploitation including communication activities v3 (final)		
Type	DEM - Demonstrator, pilot, prototype	Dissemination Level	PU - Public

Due Date (month)	18	Work Package No	WP5
Description			
To plan exploitation activities performed during and after the project duration. The analysis of project results will lead to the identification of key exploitable project results. The exploitation plan will take into account different types of industrial partners (Industry, SMEs, new start-ups) as well as other type of stakeholders that are needed in the business ecosystem. Final version			

There are four milestones related to WP5 as listed below (Table 17).

Table 17: Milestones related to WP5

Milestone Number	Milestone Name	Means of Verification	Status	Due date
1	KOM - Kick off	Contract Signed	Completed	M1
2	URR – User Requirement Review	D5.2	Completed	M6
5	IR - Interim Review	D5.3	Planned	M18
9	FR – Final Review	D5.1, D5.4	Planned	M36

2.5.1 Task 5.3 – Impact exploitation and business model (including beyond Copernicus)

In the framework of Task 5.3, which started since the beginning of the project, the following actions were performed up to M9:

- very preliminary identification of results that may be exploited (KERs) after project finalization. Therefore, the two KERs identified will be explored considering the progress of the technical activities in the following and upcoming months.
- actions required and partners responsible for the actions in the point above were identified.
- description of the market analysis relevant for the exploitable results of CENTAUR, including a market segmentation, market dynamics and a competitive analysis on the technology and products relevant for the work conducted in CENTAUR.
- communication and dissemination strategy identification and definition.
- reference to the market analysis that is currently ongoing and complemented throughout the project. A market segmentation was performed in the initial stage and will be refined with the progress of the technical activities’ framework. A competitive analysis with reference to the initial KERs identified was conducted, with the perspective of better tailoring and orienting it as soon as more KERs are under definition/development.
- results from the points reported in the above were described and tacked in the deliverable D5.2 - Plan for the dissemination and exploitation including communication activities v1, which was requested at the very initial stage of the project (i.e. by M6).

Furthermore, the EC Horizon Results Booster (HRB) service was activated on the 22nd March 2023 requesting support for the assessment on the identification and description of the Key Exploitable Results of CENTAUR. Several activities related to the HRB service were performed: meetings with the EC consultant dedicated to the presentation of the service to CENTAUR consortium, the analysis and assessment of CENTAUR KERs and the final Exploitation Strategy Seminar (ESS) workshop (3rd and 21st April 2023, 12th May and 22nd May) gathering of information and providing the requested reports and coordinating bilateral meetings with the consortium partners

for deciding the best exploitation strategy for each KER. The service and the virtual Exploitation Strategy Seminar (ESS) provided CENTAUR project participants the opportunity to work on: 1) the identification/grouping of key exploitable results; 2) the first definition of the related use mode; 3) the identification and mapping of risks related to the exploitation; 4) follow-up actions.

2.5.2 Next steps

For this WP as already described with the milestones in Table 17 the publication of two further updated versions of the document "D5.2_Plan_for_the_dissemination_and_exploitation_including_communication_activities_v1" ([RD07]) is foreseen:

- D5.3 Plan for the dissemination and exploitation including communication activities v2 (interim),
- D5.4 Plan for the dissemination and exploitation including communication activities v3 (final).

For the subsequent versions of the document all parts will be updated in version 2 (v2) and finalized in version 3 (v3).

After the initial one of version v1, starting from the next version (v2) a detailed **Market Analysis** will be provided. In particular, the content of the chapters "Identification of the target markets", "Competitive analysis" and "Potential market share", will be developed.

Based on the Market Analysis, Market Segmentation and the identification of the Target Markets, a more specific **User Segmentation** will be carried out and described in detail in v2 and v3.

The **KERs** identified in the initial stage of the project, in the intermediate version (v2) will be updated and new identified KERs will be presented. These KERs may evolve during the validation and demonstration phase, and IPR issues will be adequately addressed once they are clearly defined and tested. All results will be described in the final version (v3) of the document.

In the Final version (v3), recommended **Market Strategies** for successful commercialization of these products and services will be included.

A **Business Model** and final **Business Plan** will be clearly detailed in the final document (v3).

The results of an **Interoperability analysis** and a **Roadmap for the integration** of the most relevant products and services developed into the Copernicus EMS and SEA service, expected to be available in a more consolidated state only starting from the third year of the project, will be described in the final version (v3).

2.6 WP6 – COMMUNICATION, DISSEMINATION AND OUTREACH

The focus of Work Package 6 is on communication, dissemination, and outreach and it is led by SpaceTec Partners (STP). The primary goal is to engage with important stakeholder groups, share project outcomes and work towards shared programmatic goals. The team aims to use various communication and dissemination tools efficiently to achieve maximum outreach and success. As this is a research project, STP also seeks to inform the scientific community about the progress in remote sensing and machine learning. Therefore, our work ensures that project outcomes are well-communicated, disseminated, and evaluated to achieve maximum programmatic impact.

In the first nine months of the project, several significant milestones have already been reached. The Communication Strategy and Action Plan D6.1 deliverable ([RD08]) was completed earlier in the year (M6). This deliverable includes a comprehensive communication strategy which will serve as a blueprint to guide all communication activities throughout the project. This will ensure consistency and coherence in our messaging. To expand the project's online presence and foster meaningful engagement, the project website has successfully been launched and the official CENTAUR accounts on Twitter and LinkedIn have been created. While the website will serve as a centralised platform to access project information, these social media accounts will be essential tools for communicating the project's updates and building a community around it.

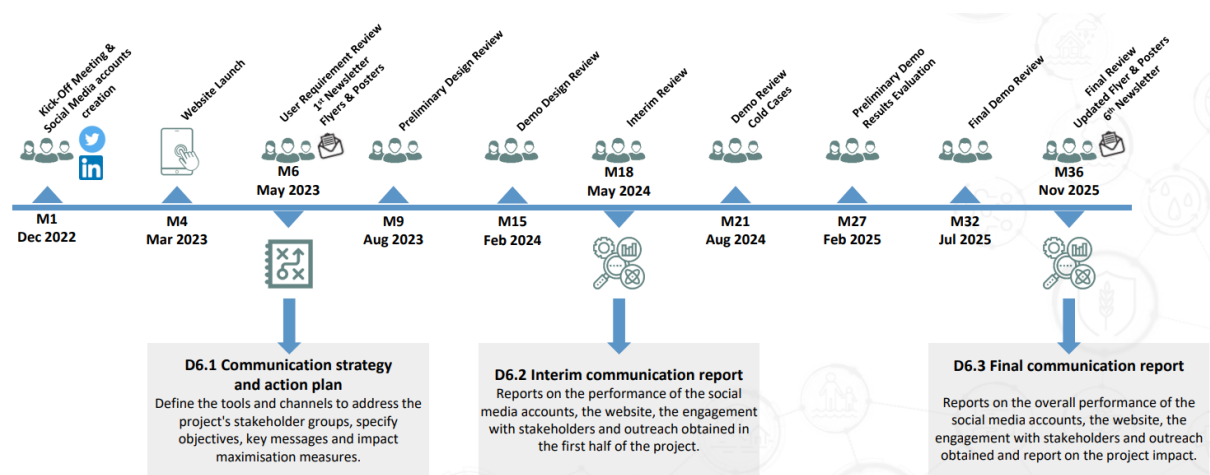


Figure 6: Milestones and deliverable foreseen in WP6

Likewise, other communication activities have been effectively implemented to reach the project's target audience. These include:

- CENTAUR Newsletter: The first project newsletter has been published, providing stakeholders with updates on project progress.
- Flyer: An informative project flyer has been designed and circulated to raise awareness and interest among stakeholders. The flyer serves as a concise and visually appealing tool to introduce the project's objectives.

STP hold the primary responsibility for the communication, dissemination, and outreach of the CENTAUR Horizon Europe (HE) project. To implement the communication strategy and ensure effective dissemination of project information to relevant stakeholders, STP is in contact with all partners from the consortium. In addition, STP manages the website and the CENTAUR social media platforms, engaging the audience with updates, news, and project highlights. Throughout the course of the project, other consortium partners will play a key role in raising the visibility of CENTAUR. They will actively contribute by sharing relevant information when necessary for content

creation, by participating in relevant events to represent the project, and by working on dissemination activities following project's milestones.

2.6.1 Task 6.1 - Stakeholder Engagement

The aim of Task 6.1 is to build and sustain relationships with stakeholder communities. A preliminary review was conducted to identify six key stakeholder groups crucial to the success of the project:

- European Commission Agencies.
- Copernicus-related Institutions and Entrusted Entities.
- Copernicus EMS and SEA Users.
- Research Centres, Research Networks, or Associations.
- International Working Groups Focused on Disaster Risk Reduction and Management.
- Industry, Small and Medium Size Enterprises (SMEs), and Downstream Sector.

To facilitate effective engagement, a comprehensive online database has been established to collect accurate information about the target audiences. Collaboratively developed with contributions from all project partners, this database is a valuable resource for raising the project's visibility among key audiences.

Social Media

Engaging stakeholders through social media platforms is crucial to our outreach efforts. To this end, we conduct regular social media posting, animation, and research, maintaining daily engagement on CENTAUR's official social media accounts. By employing a targeted tagging strategy, STP aims to connect with relevant stakeholders, keeping them informed about the project's progress and activities.

Participation in Events

Events are regularly monitored and identified for the CENTAUR consortium to participate in. Participation in these events is a strategic opportunity to establishing and consolidating relationships with interested agencies and stakeholders. The team seeks to create meaningful interactions and collaboration opportunities through CENTAUR's presence at these gatherings.

The creation of the stakeholder database, daily social media engagement, and participation in relevant events continue to foster relationships and ensure active stakeholder involvement.

2.6.2 Task 6.2 - Communication and Dissemination, including social media animation

Task 6.2 focuses on promoting, communicating, and raising awareness about the CENTAUR Horizon Europe project and its activities. The successful development of the Communication Strategy ([RD08]) provides a comprehensive plan to guide all communication efforts throughout the project, defining key stakeholders, messages, and objectives.

Currently, the project is in the awareness-raising phase, aiming to introduce CENTAUR's objectives, activities, and expected outcomes to the target audience. Various communication channels, including the project website, social media, newsletters, and press releases, are used to generate interest, attract stakeholders, and build anticipation and expectations around the project.

CENTAUR Website

The design, development, and launch of the CENTAUR website have been completed. The website serves as a central hub for project information, providing easy access to deliverables, events, project updates, use cases, and other essential details. The website undergoes regular monitoring for updates to ensure it remains a top-performing resource for stakeholders.

Visual Identity

The visual identity of the CENTAUR Horizon Europe project has been developed, including the creation of the logo, social media backgrounds, project templates (newsletter and press release), and flyers.

The first version of the project flyer has been developed and distributed to potentially interested stakeholders through the consortium, providing high-level information about the project.

Social Media Communication

CENTAUR has established its presence on social media platforms such as Twitter, and LinkedIn. Daily social media animation is carried out to actively engage with relevant accounts through likes, retweets, and reposts. This approach aims to increase the project's visibility, expand its network, and build a follower base. The use of the #CENTAUR hashtag in posts ensures easy interaction with users interested in our content. The @CENTAUR_EU Twitter account currently has 103 followers, while the LinkedIn account has gathered 123 followers.

Project Newsletter

The first newsletter was successfully sent out this month (M9) to registered recipients in full compliance with GDPR. The newsletter featured recent updates on the project, including the launch of the website, the flyer published, and the report on urban floods and water and food insecurity indicators. CENTAUR's Newsletter is a regular means of informing the target audience about project progress, achievements, and upcoming activities.

2.6.3 Next steps

Over the next six months, several steps will be taken further to advance the CENTAUR project's communication and outreach efforts.

STP will keep producing engaging social media posts for the Twitter and LinkedIn accounts to continue raising the CENTAUR project's profile and expanding its following. These posts will highlight project updates, achievements, key topics such as urban floods, food security, water security and climate security, ensuring our stakeholders and target audience remain informed and engaged.

We will actively research and identify relevant events and opportunities to participate in and present the CENTAUR project. These engagements will increase the project's visibility, attract potential collaborators, and foster support from key stakeholders.

As outlined in the communication strategy, STP aims to produce and disseminate a CENTAUR factsheet. This document will be a valuable resource for stakeholders and interested parties to understand the project's key aspects, objectives, achievements, and to showcase its significance and impact.

In addition, STP will release the second CENTAUR newsletter at the end of 2023. Leading up to this, the focus will be on increasing mailing list registrations to reach a wider audience and keep it regularly updated on the project's progress, outcomes, and upcoming events.

User workshops will represent a significant milestone in the project's timeline, providing an opportunity to present the results and objectives achieved during the project's course. In the next six months, we will begin preparations for these workshops, ensuring they are organised efficiently and promoted thoroughly to attract maximum participation.

2.7 WP7 – PROJECT MANAGEMENT

The WP7 objective is the overall management of the project according to the Contract, EC directives and Consortium decisions. The WP activities include the consortium management, the establishment and coordination of a Consortium Board, the interface towards EC, the monitoring and control of the project progress, the administrative and financial management, the technical management of the project, the management, and the conduction of the Steering Committee and of the Advisory Board.

The daily project coordination covered and will cover the following tasks:

- Overall management and coordination of CENTAUR consortium.
- Interaction with the consortium, as well as with the Commission and reference Advisory Board members, including the communication and the organization of periodic project meetings and conference calls for various bodies and provision of meeting minutes.
- Provision and implementation of guidelines on project management, quality assurance, data management, reporting and periodic monitoring activities.
- Overseeing CENTAUR project delivery process, including the deliverables preparation, organisation and monitoring of the reviewing to verify the consistency of the reports submission to the European Commission (EC).

Legal and financial management have covered the following tasks:

- Monitoring of expenditure of project resources.
- Management of budgets, coordination of financial reporting and distribution of payments to partners (assigned to the financial officer within CENTAUR).
- Communication between consortium partners and the EU on project and funding-related questions.

As part of the activities carried out in WP7, the following meetings were organised at the consortium level, as well as including the Advisory Board members whether relevant:

1. Kick off meeting (14th, 15th December 2022, at e-GEOS premise and virtual teleconference).
2. User Requirement Review Meeting (08th June 2023 – in virtual teleconference).
3. Participating in every WP progress meeting and directly follow-up on technical matters, monitoring the progress and the status of specific activities
4. Organizing and chairing WP2 Progress Meeting on a weekly basis (agenda, minutes, etc).

WP7 will last the entire duration of the project, distributing the start and end dates of the different tasks as per the following timeline (Figure 7).

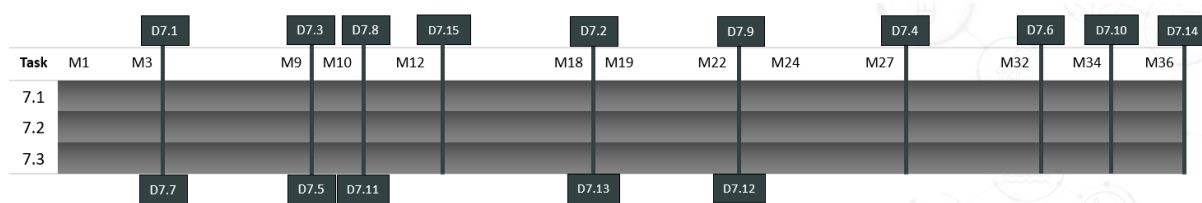


Figure 7: WP7 timeline of the activities and related deliverables

Tasks and responsibilities within WP7 have been organized as reported in Table 18.

Table 18: Tasks (or subtasks) related to WP7

Task or subtask	Responsible partners
Work Package leader	EG
Task 7.1 - Consortium coordination	EG (task leader)
All coordination activities to ensure the correct execution of the project to its organization, objectives and project master plan	EG
Task 7.2 - Technical coordination	EG (task leader)
All technical coordination activities to ensure the correct execution of the overall technical coordination and technical content of the project	EG
Task 7.3 - Steering and Advisory	EG (task leader)
Appoint the Steering and Advisory members. Ensure the execution of the Steering Committee and the coordination of the Advisory Board works.	EG

Fourteen deliverables are in scope of WP7 (Table 19).

Table 19: Deliverables in scope of WP7

Deliverable Number	D7.1	Lead Beneficiary	EG
Deliverable Name	Project Mgmt Plan v1		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	3	Work Package No	WP7
Description			
Includes necessary project management processes It will be maintained during the whole project life cycle. Initial version.			
Deliverable Number	D7.2	Lead Beneficiary	EG
Deliverable Name	Project Mgmt Plan v2		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	18	Work Package No	WP7
Description			
Includes necessary project management processes. It will be maintained during the whole project life cycle. Final version.			
Deliverable Number	D7.3	Lead Beneficiary	EG
Deliverable Name	Progress Report 1		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	9	Work Package No	WP7

Description			
Means for verification of achieved milestone, includes measured results for the relevant period and final measured results to be used for communication Interim.			
Deliverable Number	D7.4	Lead Beneficiary	EG
Deliverable Name	Progress Report 2		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	27	Work Package No	WP7
Description			
Means for verification of achieved milestone, includes measured results for the relevant period and final measured results to be used for communication Final.			
Deliverable Number	D7.5	Lead Beneficiary	EG
Deliverable Name	IPR and Innovation Plan v1		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	9	Work Package No	WP7
Description			
Timeline, guidelines and report template to manage the innovation throughout the project, addressing also the IPR and Exploitation. The plan will identify the project milestones where the innovative products will be delivered up to the final consolidated product portfolio, which access rule and IPR will be defined for the exploitation phase. Initial version			
Deliverable Number	D7.6	Lead Beneficiary	EG
Deliverable Name	IPR and Innovation Plan v2		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	32	Work Package No	WP7
Description			
Timeline, guidelines and report template to manage the innovation throughout the project, addressing also the IPR and Exploitation. The plan will identify the project milestones where the innovative products will be delivered up to the final consolidated product portfolio, which access rule and IPR will be defined for the exploitation phase. Final version.			
Deliverable Number	D7.7	Lead Beneficiary	EG
Deliverable Name	Data Management Plan		
Type	DMP — Data Management Plan	Dissemination Level	PU - Public
Due Date (month)	3	Work Package No	WP7
Description			
Includes all information required in the guidelines on data management in HEU describing how the research data collected or generated will be handled. It will be maintained during the whole project life cycle.			

Deliverable Number	D7.8	Lead Beneficiary	EG
Deliverable Name	DWH use for 2023		
Type	DMP — Data Management Plan	Dissemination Level	PU - Public
Due Date (month)	10	Work Package No	WP7
Description			
Use of satellite EO data from ESA DWH in 2023.			
Deliverable Number	D7.9	Lead Beneficiary	EG
Deliverable Name	DWH use for 2024		
Type	DMP — Data Management Plan	Dissemination Level	PU - Public
Due Date (month)	22	Work Package No	WP7
Description			
Use of satellite EO data from ESA DWH in 2024.			
Deliverable Number	D7.10	Lead Beneficiary	EG
Deliverable Name	DWH use for 2025		
Type	DMP — Data Management Plan	Dissemination Level	PU - Public
Due Date (month)	24	Work Package No	WP7
Description			
Use of satellite EO data from ESA DWH in 2025.			
Deliverable Number	D7.11	Lead Beneficiary	EG
Deliverable Name	DWH request for 2024		
Type	DMP — Data Management Plan	Dissemination Level	PU - Public
Due Date (month)	10	Work Package No	WP7
Description			
Request of satellite EO data from ESA DWH in 2024.			
Deliverable Number	D7.12	Lead Beneficiary	EG
Deliverable Name	DWH request for 2025		
Type	DMP — Data Management Plan	Dissemination Level	PU - Public
Due Date (month)	22	Work Package No	WP7
Description			

Request of satellite EO data from ESA DWH in 2025.			
Deliverable Number	D7.13	Lead Beneficiary	EG
Deliverable Name	Report on Steering and Advisory activities v1		
Type	DMP — Data Management Plan	Dissemination Level	PU - Public
Due Date (month)	18	Work Package No	WP7
Description			
Includes a summary of the activities of the Steering Teams and the outcomes collected from the Advisory Board (guidelines, white papers, feedbacks) in the first project period.			
Deliverable Number	D7.14	Lead Beneficiary	EG
Deliverable Name	Report on Steering and Advisory activities v2		
Type	DMP — Data Management Plan	Dissemination Level	PU - Public
Due Date (month)	36	Work Package No	WP7
Description			
Includes a summary of the activities of the Steering Teams and the outcomes collected from the Advisory Board (guidelines, white papers, feedbacks) in the second project period.			

There are four milestones related to WP7 as listed below (Table 20).

Table 20: Milestones related to WP7

Milestone Number	Milestone Name	Means Verification	of Status	Due date
1	KOM - Kick off	Contract Signed	Completed	M1
2	URR – User Requirement Review	D7.1, D7.7	Completed	M6
3	PDR – Preliminary Design Review	D7.3, D7.5	Completed (a session with the end-users will be planned end Sept/Oct according to their availability)	M9
4	DDR – Demo Design Review	D7.8, D7.11	Planned	M15
5	IR - Interim Review	D7.2, D7.13 Review with EC Officer and Reviewers	Planned	M18
7	PDRE – Preliminary Demo Results Evaluation	D7.4	Planned	M27

8	FDR – Final Demo Review	D7.6	Planned	M32
9	FR – Final Review	D7.14	Planned	M36

2.7.1 Task 7.1 - Consortium Coordination

The activities performed in Task 7.1 are listed below:

- Ensuring the correct execution of CENTAUR project, according to the organization setup, the objectives fixed and the project master plan.
- Acting as an interface between CENTAUR Consortium and the Commission.
- Coordinating, consolidating, and harmonizing of the Consortium organization structure through the following actions:
 - Establishing a Consortium Board (CB) the formal decision-making body, constituted by the coordinator and one representative per partner.
 - Establishing a Steering Committee (SC) made up by subject matter domain expert, it steers the project implementation, reviews project strategy, and advises the Coordinator and the Consortium Board in analysing and approving project scope, results, as well as give advice on IPR and Ethical issues.
 - Deploying processes and interfaces for Project management with Technical Manager, the Communication Manager and the WP leaders.
- Monitoring CENTAUR project resources availability, so that each work-package can be executed properly and successfully, from the perspective of time planning, activities scheduling, budget allocation and technical objectives.
- Evaluation of project progress and performance, identification of inconsistency and implementation of corrective activities/actions.
- Reporting every progress and results achieved at CENTAUR project level.
- Performing any review of each deliverable and progress report to verify the consistency of the actions performed in each task, before the final submission to the Commission.
- Ensuring the timeliness of all the deliverables, their dissemination at the CENTAUR Consortium level, and at the Commission level, through an effective management process.
- Organizing and chairing progress meetings on a periodic basis and duly planned, whether specific issues need to be followed and promptly addressed.
- Disseminating agenda, minutes, etc both at the Consortium level and Advisory Board level, when involved in specific interactions/meetings.
- Ensuring the set up and maintenance of the Consortium Agreement (CA) ([RD12]).
- Ensuring the overall legal, ethical, financial, and administrative management.
- Managing the Consortium budget and the Community financial contribution regarding its allocation between partners and activities, in accordance with the Contract with the Commission and the decisions taken by the consortium (with the Financial Officer existing within CENTAUR).
- Monitoring partners' duties compliance with respect to the GA ([RD01]) and the CA ([RD12]).
- Advise partners on contractual status and implications.
- Ensure the coordination of the Advisory Board works, including the proper analysis and monitoring of ethical issues associated to the Project.

The PC is in charge in uploading the deliverables on the EC portal, according to the deadline for the submission. Here below those already delivered on the EC portal:

- D1.1 - Report on Urban Flood and Water & Food security indicators >> M6 ([RD03])
- D2.1 - Catalogue of CENTAUR data and related specifications >> M9 ([RD04])
- D2.2 - Urban Flood and Water & Food Insecurity design >> M9 ([RD05])

- D3.1 - Platform Design Document (all the theoretical background related to service design and implementation) v1 >> M9 ([RD06])
- D5.2 - Plan for the dissemination and exploitation including communication activities v1 >> M6 ([RD07])
- D6.1 - Communication strategy and action plan >> M6 ([RD08])
- D7.1 - Project Management Plan v1 >> M3 ([RD09])
- D7.3 - Progress Report 1 >> M9 (the present document)
- D7.5 - IPR and Innovation Plan v1 >> M9 ([RD10])
- D7.7 - Data Management Plan >> M3 ([RD11][RD10])

2.7.2 Task 7.2 - Technical Coordination

The activities performed in Task 7.2 are listed below:

- Ensuring the overall technical coordination of CENTAUR project.
- Providing guidelines to CENTAUR partners so that the activities could be executed in agreement with the GA, as well as the performance and progress could be monitored.
- Maintaining the project management plan in coordination with the PC with reference to each WP (related tasks and efforts), partners' roles and responsibilities to direct project activities.
- Ensuring the harmonisation of the activities carried out in the different WPs by establishing an efficient inputs/outputs exchange during the whole project lifecycle and by ensuring the alignment and the harmonisation of the different WPs Work Plans with the project master plan.
- In collaboration with the WP Leaders (WPL), proposing and harmonising the technical contents for results and related technical matters dissemination.
- Preparing a strategy for research and data management, including a guided data management assessment.
- Identifying events which could affect the achievement of the project objectives and plan mitigation actions.

2.7.3 Task 7.3 - Steering and Advisory

The activities performed in Task 7.3 are listed below:

- Assessing the risks at CENTAUR project level and applying mitigation actions whether encountered.
- Monitoring the overall technical progress and advising the project activities in line with users' demand.
- Appointing the Steering and Advisory members.
- Ensuring the execution of the Steering Committee (SC) and the coordination of the Advisory Board activities and interactions at project level.
- Performing a proper analysis and monitoring of the ethical issues associated to the Project.

2.7.4 Next steps

Activities reported in the Tasks in Ch. 2.7.1, Ch. 2.7.2 and Ch. 2.7.3 will be performed throughout the entire lifecycle of the project.



3 STEERING COMMITTEE ACTIVITIES

3.1 ADVISORY BOARD COMPOSITION

Within CENTAUR project, the Advisory Board (AB) identified was initially composed by 15 members, identified among United Nations (UN) agencies, Non-Governmental Organization (NGO), Civil Protections, Copernicus EMS and SEA end-users, who have already signed a Lol during the technical offer preparation phase.

According to the new model of the CA ([RD12]), each member of the AB should sign a Non-Disclosure Agreement (NDA) for confidentiality of data used. Some issues in collecting signatures were faced from the UN users' side. Therefore, the involvement of all the UN end-users remained on-hold for, in order to configure a potential solution. It was proposed to consider a smaller group of users that will be involved in dedicated users' workshops as kind of "demonstrator users only" to whom public deliverables will be shared too. These dedicated users' workshops will be scheduled aside to AB sessions already planned with the Advisory Board members. Up to the end of M9, this remains a point of discussion with the EC officer.

In the meanwhile, new opportunities for the involvement of relevant users were encountered as the two here below:

- United Nations Children's Fund (UNICEF), the Climate Change Innovation Portfolio Office.
- World Food Program (WFP), the Mozambique WFP division.

Two distinguished roles were identified to be covered by the AB members, according to their confirmation, with the duties reported below:

- Demonstrators: enabling verification and validation of new datasets and combinations to improve/create products and a novel broad spectrum of indicators; testing; addressing priorities; providing feedback.
- Advisors: providing dataset and requirements; building use cases; testing; providing feedback.

Furthermore, a specific CENTAUR thematic area was associated to each AB member as reported in Table 21 and Table 22.

Table 21: CENTAUR Advisory Board members and related role/thematic area of involvement

CENTAUR Advisory Board Members	Role in CENTAUR		Thematic Area	
	Advisor	Demonstrator	Urban Flood	Water & Food Security
Italian Civil Protection - Regional Department (IT)	✓		✓	
Helpcode - NGO active in the education and training for children. Emergency and Security management (IT)		✓	✓	✓
Danish Refugee Council - Division of Evidence, Knowledge & Learning (D)		✓		✓
German Foreign Office - Data Science Division (DE)	✓			✓
Rediam - Red de Información Ambiental de Andalucía Environmental information (ES)		✓	✓	
Caisse centrale de réassurance (CCR) - Public Insurance Company (FR)	✓		✓	
United Nations Environment Programme (UNEP) - Climate Change and Security Programme >> On Hold	✓			✓
United Nations High Commissioner for Refugees (UNHCR) - Special Advisor for Climate Action >> On hold	✓	✓		✓

Table 22: CENTAUR Advisory Board members and related role/thematic area of involvement

CENTAUR Advisory Board Members	Role in CENTAUR		Thematic area	
	Advisor	Demonstrator	Urban Flood	Water & Food Security
International Commission for the Protection of the Danube River International Commission for the (ICPDR) - Water Quality and Water Management (International)		✓	✓	
United Nations Support Office in Somalia (UNSOS)	✓	✓		✓
EU Situation Room (EEAS)		✓		✓
Geospatial Information Section (UN) >> On hold.		✓	✓	✓
JRC - Disaster Risk Management Unit Copernicus EMS service operations (EC)	✓	✓	✓	
Directorate General of Civil Protection and Emergencies, Ministero dell'Interno, Governo Spagnolo		✓	✓	
Wav-e		✓	✓	✓

3.2 ENGAGEMENT PLAN AND INTERACTIONS

A user engagement plan was shared with the AB members, so that they could be aware in advance of a potential involvement frequency throughout the project (Figure 8, Figure 9, Figure 10). The exact date will be shared according to their availability. It is foreseen to schedule a Preliminary Design Review (PDR) dedicated meeting with the AB (end Sept/Oct according to their availability), with the main objective of sharing the preliminary design of the innovative indicators identified and the preliminary platform functionalities according to the requirements collection.

N.	Users engagement meetings	Topic/Description	Attendance	AB members involvement through CENTAUR (Y1)																		
				Dec-22	M1	M2	M3	M4	M5	M6	Jun-23	M7	M8	M9	M10	Oct-23	M11	M12				
1	User Requirement Review - URR	Users' requirements finalization and refinement.	Remotely																			
2	Preliminary Design Review - PDR	Progress meeting: preliminary design and content overview provided to the users.	Remotely																			
3	Demo Design Review - DDR	Cold cases implementation review: areas of interest, datasets available, timeframe and any other demo detail, users interaction and validation criteria.	Remotely																			
4	Workshop 1	Cold cases demonstration: testing, validation, users' feedback for improvements.	Remotely																			
5	Demo Review Cold Cases - DRCC	Enhanced Cold cases demonstration: implementing feedback from Workshop 1.	Remotely																			
6	Preliminary Demo Results Evaluation - PDRE	Hot cases demonstration: testing, validation, users' feedback for improvements.	Remotely																			
7	Final Demo Review - FDR	Enhanced Hot cases demonstration: implementing feedback from PDRE.	Remotely																			
8	Workshop 2	Final demonstration: overall testing and key findings from users' experience (after some time left to the users for testing the service).	In presence																			
CENTAUR Milestone																						
Workshop Session																						

Figure 8: AB engagement plan – Year 1

N.	Users engagement meetings	Topic/Description	Attendance	AB members involvement through CENTAUR (Y2)																		
				M13	M14	Feb-24	M15	M16	M17	M18	Jun-24	M19	M20	M21	Sep-24	M22	M23	M24				
1	User Requirement Review - URR	Users' requirements finalization and refinement.	Remotely																			
2	Preliminary Design Review - PDR	Progress meeting: preliminary design and content overview provided to the users.	Remotely																			
3	Demo Design Review - DDR	Cold cases implementation review: areas of interest, datasets available, timeframe and any other demo detail, users interaction and validation criteria.	Remotely																			
4	Workshop 1	Cold cases demonstration: testing, validation, users' feedback for improvements.	Remotely																			
5	Demo Review Cold Cases - DRCC	Enhanced Cold cases demonstration: implementing feedback from Workshop 1.	Remotely																			
6	Preliminary Demo Results Evaluation - PDRE	Hot cases demonstration: testing, validation, users' feedback for improvements.	Remotely																			
7	Final Demo Review - FDR	Enhanced Hot cases demonstration: implementing feedback from PDRE.	Remotely																			
8	Workshop 2	Final demonstration: overall testing and key findings from users' experience (after some time left to the users for testing the service).	In presence																			
CENTAUR Milestone																						
Workshop Session																						

Figure 9: AB engagement plan – Year 2



N.	Users engagement meetings	Topic/Description	Attendance	AB members involvement through CENTAUR (Y3)													
				M25	M26	M27	M28	M29	M30	M31	M32	M33	M34	M35	M36		
1	User Requirement Review - URR	Users' requirements finalization and refinement.	Remotely														
2	Preliminary Design Review - PDR	Progress meeting: preliminary design and content overview provided to the users.	Remotely														
3	Demo Design Review - DDR	Cold cases implementation review: areas of interest, datasets available, timeframe and any other demo detail, users interaction and validation criteria.	Remotely														
4	Workshop 1	Cold cases demonstration: testing, validation, users' feedback for improvements.	Remotely														
5	Demo Review Cold Cases - DRCC	Enhanced Cold cases demonstration: implementing feedback from Workshop 1.	Remotely														
6	Preliminary Demo Results Evaluation - PDRE	Hot cases demonstration: testing, validation, users' feedback for improvements.	Remotely														
7	Final Demo Review - FDR	Enhanced Hot cases demonstration: implementing feedback from PDRE.	Remotely														
8	Workshop 2	Final demonstration: overall testing and key findings from users' experience (after some time left to the users for testing the service).	In presence														
CENTAUR Milestone																	
Workshop Session																	

Figure 10: AB engagement plan – Year 3

On the basis of the evidence gathered from the user questionnaires shared with the end-users in the context of WP1 and CENTAUR requirements collected accordingly ([RD03]), the users were classified in two groups, considering the interest they express in the Copernicus EMS and SEA services (Table 23):

- Users/Potential Users of the Copernicus Emergency Service (Urban Flood).
- Users/Potential Users of the Copernicus SEA Service (Water and Food security).

Table 23: AB members and their interest into Copernicus Services

Advisory Board members	COPERNICUS SERVICE INTEREST
European External Action Service - EEAS (Situation Room)	Copernicus SEA Authorized User
European Commission (EC) Joint Research Centre (Unit E1- Disaster Risk Management)	Copernicus Emergency Authorized User
CCR (Department R&D Cat & Agriculture)	Copernicus Emergency Potential Future User Copernicus SEA Potential Future User
UN Environment Programme (Disasters and Conflicts Division)	Copernicus Emergency Potential Future User Copernicus SEA Potential Future User
German Federal Foreign Office (S05 crisis early warning)	Copernicus Emergency Potential Future User Copernicus SEA Potential Future User
WAV-e (IoT)	Copernicus Emergency Potential Future User Copernicus SEA Potential Future User
International Commission for the Protection of the Danube River (ICPDR)	Copernicus Emergency Potential Future User
Environment and Water Agency (REDIAM)	Copernicus Emergency Potential Future User
General Directorate of Civil Protection (Natural Hazards area)	Copernicus Emergency Authorized User
Helpcode (NGO)	Copernicus Emergency Potential Future User Copernicus SEA Potential Future User
EC Joint Research Centre (E1)	Copernicus Emergency Authorized User Copernicus SEA Potential Future User

Advisory Board members	COPERNICUS SERVICE INTEREST
Danish Refugee Council (Evidence, Knowledge and Learning Division)	Copernicus Emergency Potential Future User Copernicus SEA Potential Future User

In Table 24 it is provided a list of interactions performed and ongoing from the SC with the AB members.

Table 24: AB interactions performed and ongoing

AB member	Interactions
EEAS	The ongoing high-level dialogues between EEAS and SatCen present great potential in the context of climate security. These exchanges play a pivotal role in deepening the understanding of the complex dynamics between climate change and its implications for security. The insights drawn from these interactions have the potential to significantly contribute to the development of the CENTAUR project. What is even more noteworthy is the commitment to sustaining these interactions in the coming months, facilitating an ongoing exchange of ideas and expertise.
UNSOS	Further bilateral meetings are planned to continue informing UNSOS - United Nations Support Office in Somalia about the CENTAUR project's progress and showcasing its current status. These meetings will aim to collect and gather valuable feedback from participants.
Italian Civil Protection	The Italian Civil Protection at the regional and local levels has been informed about the CENTAUR project, its objectives, expected outcomes, thematic areas focusing on Urban Floods, and the milestones achieved so far, as well as those that lie ahead. Ithaca, as the reference partner and participant in the Italian Use Case of the project, has informed Civil Protection about the potential contributions they could bring to the project. This includes facilitating access to the local data, providing feedback on the outputs, and sharing insights on how the extracted information can be integrated into local and regional alert systems for improved communication with citizens. Regarding their official presence in the project as an Advisory Board member, the NDA signing procedure is currently ongoing and has not been finalized yet.
CCR ICPDR	<p>The Caisse Centrale de Réassurance (CCR) was first contacted by CLS during the tendering phase to discuss their involvement in CENTAUR's advisory board and their interest for a CENTAUR Use Case in France. As a major actor of the public-sector reinsurance, CCR provides cedants in France with coverage against natural catastrophes.</p> <p>The main interactions with the CCR to this day include:</p> <ul style="list-style-type: none"> - Sharing information about the CENTAUR project (documentation, objectives, products, calendar), with a focus on the urban flood theme. - Sharing of administrative information and documents regarding the CCR's involvement in CENTAUR advisory board. - Discussion about the French Use case location and event, and the added-value brought by both CCR and CENTAUR, including the possibility for CCR to perform an evaluation of CENTAUR results by comparison with their own data and model. - Participation of CCR to the User Requirements Review Meeting, and contribution to the user requirement questionnaire. <p>The International Commission for the protection of the Danube River (ICPDR) was also contacted by CLS during the proposal to discuss their interest in joining CENTAUR</p>

AB member	Interactions
	<p>advisory board as experts of the Urban Flood component. To date, the interactions with ICPDR are the following:</p> <ul style="list-style-type: none"> - Sharing information about the CENTAUR project (documentation, objectives, products, calendar), with a focus on the urban flood theme, as well as sharing of administrative documents to formalize ICPDR's involvement in CENTAUR. - Discussion about a potential use case in the Danube river basin based on passed CEMS activations, unfortunately the most relevant events were too old to be selected for the project. - Contribution of the ICPDR Flood protection Expert Group to the user requirements questionnaire on the Urban flood component. - ICPDR participation to the User Requirements Review Meeting.
GFFO DRC	<p>ADE organised 2 bilateral meetings with members of the Advisory Board (Danish Refugee Council and the German Foreign Office's stabilisation unit), presenting the project in more depth and facilitating an exchange on needs and research priorities between project partners and stakeholders.</p>
WAV-e Helpcode JRC	<p>e-GEOS organised three bilateral meetings with WAV-e, Helpcode and JRC with the objectives of introducing the project, sharing some introductory materials, gathering their needs and knowledge of Copernicus services. These three users were involved in the URR meeting and will be involved in the further project meetings and workshops ad per the users' engagement plan already shared.</p>
REDIAM Directorate General of Civil Protection and Emergencies, Ministry of the Interior (Ministerio del Interior, MIR) of Spain	<p>TRACASA Global has organised two bilateral meetings with the Spanish Directorate General of Civil Protection and Emergencies and the Environmental Information Network of Andalusia (Red de Información Ambiental de Andalucía, REDIAM) to understand their knowledge and use of current COPERNICUS products, present CENAU to them and gather their needs and requirements related to this project. To strengthen the relationship, the communication, dissemination and outreach material created in WP6 has been shared with the Spanish members of the AB. TRACASA Global, as leader partner of the Ebro Basin Use case, has asked the Spanish Directorate General of Civil Protection and Emergencies its collaboration to access to the data acquired in the Zaragoza area by Ebro Hydrographic Confederation (Confederación Hidrografica del Ebro, CHE) during the flood event occurred in April 2018.</p>
GIS (UN)	<p>The end-user will be involved in a second phase of the project due to the availability.</p>
UNEP UNHCR UNICEF WFP	<p>UN end-users, as mentioned in the above, are currently on hold due to the issue faced with the NDA signature. However, an initial interaction was performed sharing introductory CENTAUR material and understanding their interest in collaborating into the project, as well as the role and thematic area covered. UNEP provided feedback to the users' requirements questionnaire.</p>

3.3 IPR AND ETHICAL ISSUES ADVICES

In the deliverable D7.3 – IPR and innovation plan – v1 ([RD11]), the innovation management plan is presented with the objective of providing CENTAUR actual tools to allow the strategic management of the overall activities and transforming the initial concept idea of the product into a concrete, real and appealing innovative product. In this process, the market needs and user needs represent the drivers to tackle the main scope of the innovative evolution of Copernicus Emergency and Security Services and the time-evolving constraints, i.e technologies and market opportunities.

The innovation plan is strictly connected with the Internal Property Right (IPR), which provide the management tools the possibility to implement innovation, as well as to outreach the extra-project application domain.

No ethical issues advices occurred to be reported here.



4 CONCLUSIONS

The activities in the project are proceeding smoothly and in line with the time planning, even though an initial assessment phase occurred at the very beginning of the project.

CENTAUR team is working hard to reach the final objective and to meet the requirements from the end-users, whose requirements represent the guide for the project activities design and implementation and their involvement in the project provide the team the added value especially in the future demonstration phase.





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