

D7.5 – IPR an Innovation Plan v1

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HISTORY OF CHANGES

Date	Version	Author	Change Description
01.07.2023	0.1	Cecilia Sciarretta (EG)	Initial version with a ToC
31.08.2023	1.0	Cecilia Sciarretta (EG)	First version of the document



1 EXECUTIVE SUMMARY

The present document represents the deliverable D7.5 -IPR and Innovation Management Plan v1 (IMP) of CENTAUR project and is issued under the Work Package WP7 -Project Management.

The CENTAUR goal is to implement several service elements, including innovative indicators relevant to the urban flood issues and to the water & food insecurity, the relevant service pipelines enabling their retrieval/computation from a specific selection of heterogeneous data (satellite, in-situ) and SW components to perform multi-criteria analysis to derive crisis indexes, also integrating context information from social, political and economic frame of the specific geographic area of occurrence. These SW components represent a platform suite that could be, when fully engineered, included in the operational pipelines of the Copernicus Emergency and Security Services.

CENTAUR contributes in the increase of the situational awareness over critical regions, in particular those where the CSS/SEA is active, where specific natural and anthropic emergencies outcomes could turn in security issues for the overall social, political and economic status of the area.

Copernicus Entrusted Entities are the first beneficiaries of this service suite, but parts of the suite could be of interest also for other stakeholders, General public and other audiences.

The ultimate benefit of the project is to make the Copernicus services evolve, enriching the portfolio of the “Emergency Service” and “Support to EU External Action” with a new set of validated products and services.

Hence, the CENTAUR project answers to the innovation challenge in different ways, by the exploitation of innovative technologies (artificial intelligence) to fuse heterogeneous data, evolve and refine the physical models and enabling a direct connection of the Copernicus SEA Service to the Copernicus EMS, with the monitoring of crisis triggers from natural hazards and critical meteorological conditions, integrating these new enablers into the existing services.

The Innovation Management permeates the project for its entire duration and acts as a whole with the overall Project Management: the Project Reviews are the correct place where to discuss and plan actions to raise the awareness of the innovation within the project team, to encourage disclosure of intellectual results, to decide the proper protection level for the generated intellectual property, following the activities development timeline.

This Innovation and IPR Management Plan enlarge the information provided in the Grant Agreement [RD01] and [RD02], and refers to matters treated in the Consortium Agreement [RD03].



2 INTRODUCTION

2.1 SCOPE OF THE DOCUMENT

e-GEOS is the leader of the CENTAUR - COPERNICUS ENHANCED TOOLS FOR ANTICIPATIVE RESPONSE TO CLIMATE CHANGE IN THE EMERGENCY AND SECURITY DOMAIN project Consortium.

The Innovation Management Plan intends to provide the project with actual tools to allow the strategic management of the overall activities, in order to transform the starting concept idea of the product into a complete, real and appealing innovative product, taking into account the drivers of the process (market needs, user needs), 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 Management is intimately connected with the IPR Management and Exploitation Management, which provide the management tools allowing not only to implement innovation but also to robustly and safely outreach the extra-project application domain.

A direct connection with the Communication and Dissemination Management will be kept during the project life, to assure that the innovative results developed are properly disseminated, according to the agreed level of result accessibility.

The Project Coordinator (PC) will lead and supervise the whole process, to assure its success. The IMP will be updated in case of necessity. The present document is divided into the following sections:

- Section 3: Describing the main characteristics of the Innovation Management within the CENTAUR project
- Section 4: Describing the related IPR Management
- Section 5: Presenting the Innovation management tools and plan

2.2 DEFINITIONS, ABBREVIATIONS AND ACRONYMS

ID	Document name
AI	Artificial Intelligence
CA	Consortium Agreement
CB	Consortium Board
CEMS	Copernicus Emergency Service
CSS/SEA	Copernicus Service in Support to EU External Action
CP	Control Point
DDR	Demo Design Review
EC	European Commission
EO	Earth Observation
EU	European Union
FDR	Final Demo Review

FR	Final Review
GA	Grant Agreement
HE	EU Research and Innovation funding programme 2021-2027.
IR	Interim Review
KPI	Key Performance Index
IM	Innovation Manager
IMP	Innovation and IPR Management Plan
IPR	Intellectual Property Rights
JOA	Joint Operating Agreement
LIDAR	Light Detection and Ranging
ML	Machine Learning
NDVI	Normalized Difference Vegetation Index
PC	Project Coordinator
PDR	Preliminary Design Review
SC	Steering Committee
SW	Software
SatCen	European Union Satellite Centre
TRL	Technology Readiness Level
VIS/NIR	Ultraviolet/Visible/Near Infrared
WP	Work Package

2.3 APPLICABLE AND REFERENCE DOCUMENTS

ID	Document name
[RD01]	CENTAUR (101082720) – Grant Agreement – Annex 1 – Description of Action (Part A)
[RD02]	CENTAUR (101082720) - Grant Agreement – Annex 1 – Description of Action (Part B)
[RD03]	CENTAUR Consortium Agreement
[RD04]	CALL HORIZON-CL4-2021-SPACE-01, Topic HORIZON-CL4-2021-SPACE-01-43 – Research activities in support of the evolution of the Copernicus services, available at https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl4-2021-space-01-43 link.
[RD05]	CENTAUR (101082720) – D7.1 Project Management Plan
[RD06]	Copernicus Service in Support to EU External Action: https://sea.security.copernicus.eu/
[RD07]	Copernicus Emergency Service https://emergency.copernicus.eu/



[RD08]	European Commission, European Innovation Council and SMEs Executive Agency, Your guide to intellectual property management in Horizon Europe, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2826/409260
[RD09]	DESCA – Model Consortium Agreement for Horizon Europe, version 1, December 2021



3 INNOVATION MANAGEMENT IN CENTAUR PROJECT

3.1 OVERALL STRUCTURE OF CENTAUR

The CENTAUR project Work Plan has been organized through the following seven Work Packages, on a 36-month period, carrying on the core activities according to an “Analysis-Development-Demonstration-Transfer” process.

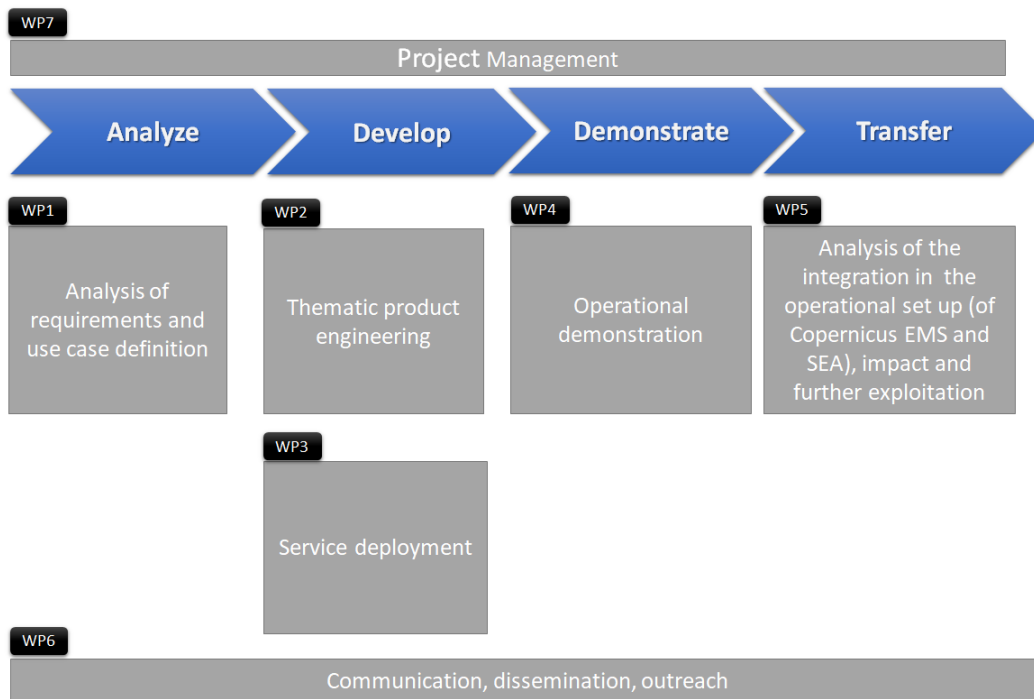


Figure 1 – CENTAUR WBS and logical flow

WP1 - Analysis of requirements and use cases definition (led by SatCen), with the objective to interact with the End-User communities, identifying and assessing use cases relevant in operational scenarios and driving the research activities performed by the upcoming WPs.

WP2 - Thematic product engineering: definition, design and development (led by e-GEOS), of indicators (Social, economic & political, Urban Flood, Water&Food security) and of integrated multi-criteria analysis with relevant crisis indices, through the evaluation of available Copernicus products, Meteorological products, multisource. geospatial data.

WP3 Service deployment (led by GMV), with the objective of designing and developing the platform to provide the services, also leveraging on and exploiting already available processing chains.

WP4 Climate change crisis and natural disaster demonstrators (led by UNISTRA), with the objective of designing, executing and validating the demonstrators, for Urban Flood, in the EMS environment and for Water&Food security in the SEA environment.

WP5 Analysis of the integration in the operational set up of Copernicus EMS and SEA, impact and further exploitation (led by e-GEOS), with the objective of technically integrating, and preparing a plan for the transition from a prototypal level to an initial operational level in the Copernicus Services.

WP6 Communication, dissemination, outreach (led by SpaceTec Partners), with the objective to keep the public informed about the activities and the outcomes of the project. The aim is to make sure that the stakeholders in emergency and security are informed of project's progress and results. Furthermore, since this is a high-level research project it also aims to inform the scientific community of the advances in remote sensing, data modelling and machine learning/AI fields.

WP7 Project Management (led by e- GEOS) to assure the proper consortium and technical coordination, as well as to manage the project's steering bodies.

3.2 CENTAUR: INNOVATION PROVIDER IN COPERNICUS EMS AND SEA

CENTAUR seeks to generate several outcomes for the Copernicus Services to improve situational awareness, foresight, and early response capabilities related to urban floods and water & food Insecurity, including the evaluation of their potential impact on exposed and vulnerable populations and assets.

To generate these outputs, CENTAUR adopts a layered approach to derive more and more complex information.

First level – Data

Maximizing the exploitation of available data carrying geoinformation:

- geospatial data, including satellite EO, ground sensors data, geoinformation Reference layers, Light Detection and Ranging (LIDAR) measurements, etc.
- meteorological data, related models, forecasting/nowcasting methods.
- open data from a variety of sources or unconventional “sensors” such as media of various types, documents, social outlets.
- simple indexes, such as an NDVI.
- statistical/census information, as measurements such as the population values for a given year.

Second level - Indicators

Defining, evolving, refining, enriching Indicators, consisting of thematic information coming from time series of data and simple indexes, obtained according to the models applicable to the phenomena observed or using of advanced processing methods in the domain of big data analysis and artificial intelligence such as Machine Learning (ML).

CENTAUR indicators will describe and characterize urban floods, water and food insecurity and social, political and economic factors. Indicators may well describe a phenomenon alone or used to trigger another one.

Third level – Crisis indexes

Defining innovative Crisis Indexes, from the integration/correlation of urban flood and water & food indicators with Social, Economic and Political indicators, to detect a crisis event and/or its impact. Such indicators intend to provide quantitative assessment of statistical risk of occurrence of an event, obtained by simple combination of indicators or applying more innovative AI automatic classification algorithms.

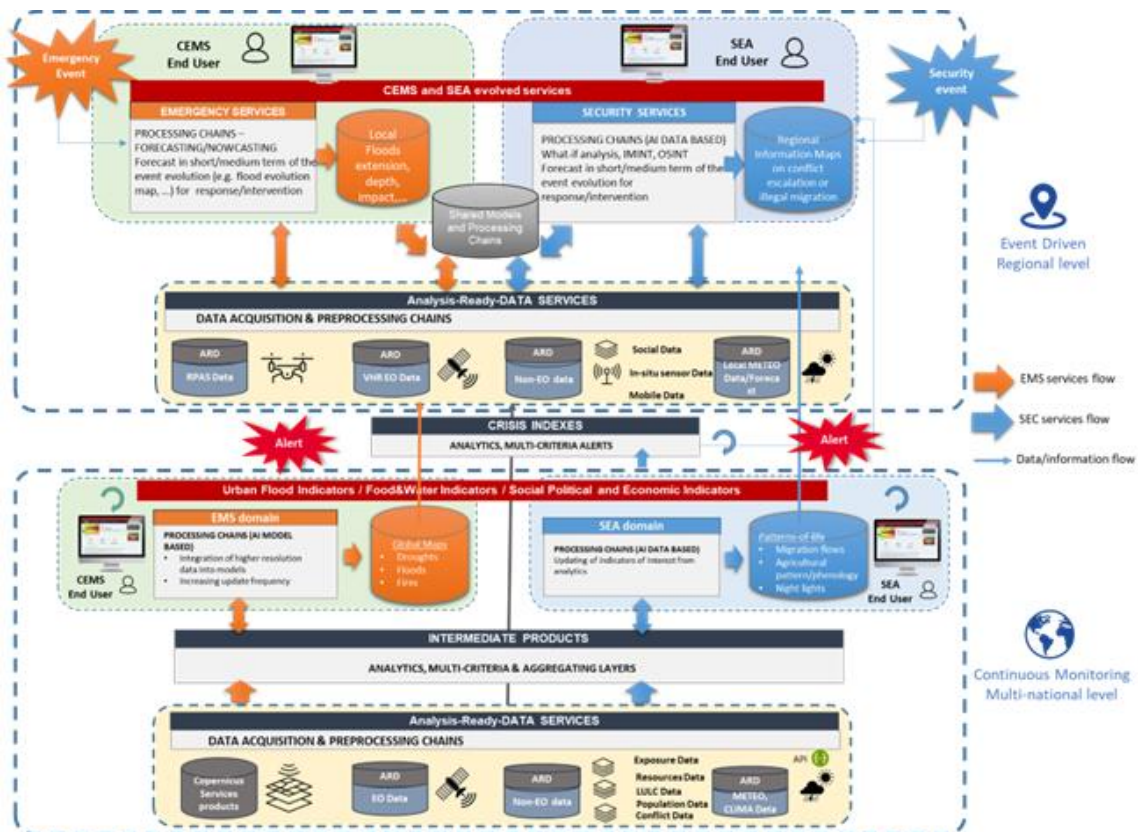


Figure 2 – CENTAUR Data & Product Hierarchy

The CENTAUR goal is to prototype service elements and related components, to enrich the functions available in the CEMS and CSS/SEA services, combining enhanced modeling, automatic early warning, monitoring systems for alarm triggering and operational intelligence.

3.2.1 CENTAUR Innovation content

According to the EC definition, "the Innovation Management is the overall management of all activities related to understanding needs, with the objective of successfully identifying new ideas, and managing them, in order to develop new products and services which satisfy these needs".

CENTAUR channels innovation potential in the Copernicus EMS and SEA evolution into five main directions:

- The review of consolidated and definition of **innovative indicators** for natural and anthropic phenomena related to the Urban Flood and Food & Water Insecurity issues, which take benefit of the availability of long term and wide coverage time series of raw and preprocessed multisource data, including also simple indexes from basic processing (e.g. NDVI from multispectral VIS/NIR data).
- The challenging, innovative definition and implementation of **crisis indexes**, through the correlation and AI-based processing of environmental and anthropic monitoring indicators, physical models (e.g. Meteorological) and social, economic, political information/indicators, providing alerts and triggers for an enhanced situational awareness in specific areas of SEA interest.
- The development of SW tools, as specific **prototype pipelines for the Urban Flood and Water&Food insecurity**, apt to be engineered and integrated in the operational workflows of the Copernicus EMS and SEA, if deemed interesting by the Entrusted Entities.

- The development of a **prototype SW platform** able to integrate the previous elements and providing intelligence products.

The innovative potential of the project, beside the Copernicus EMS and SEA services, may provide benefits to:

1. The **technology providers** of the project, supported in evolving their own technology solutions in the physical data modelling (meteorological indicators for nowcasting/predictions, EO-based indicators...), multisource data Artificial Intelligence (AI) domain, SW tool development.
2. The **GEOINT community**, which will benefit of methodologies and technology solutions developed in the project for the specific contexts (hazard related to Urban Flood and Water&Food Insecurity), adaptable to other domains.
3. The **research scientific community** studying climatological and meteorological themes.
4. The **international community** interested in overall sustainability themes (environment, society, economy).

3.2.2 CENTAUR Innovation management

The innovation management takes care of the newborn idea, on which the project is based, up to its full growth into a new product, throughout the whole life of the project. The following Picture represents, within the CENTAUR project, the key areas to be addressed by the Innovation Management, considering:

- **Strategic Drivers**
- **Technology Management**
- **Product Management**

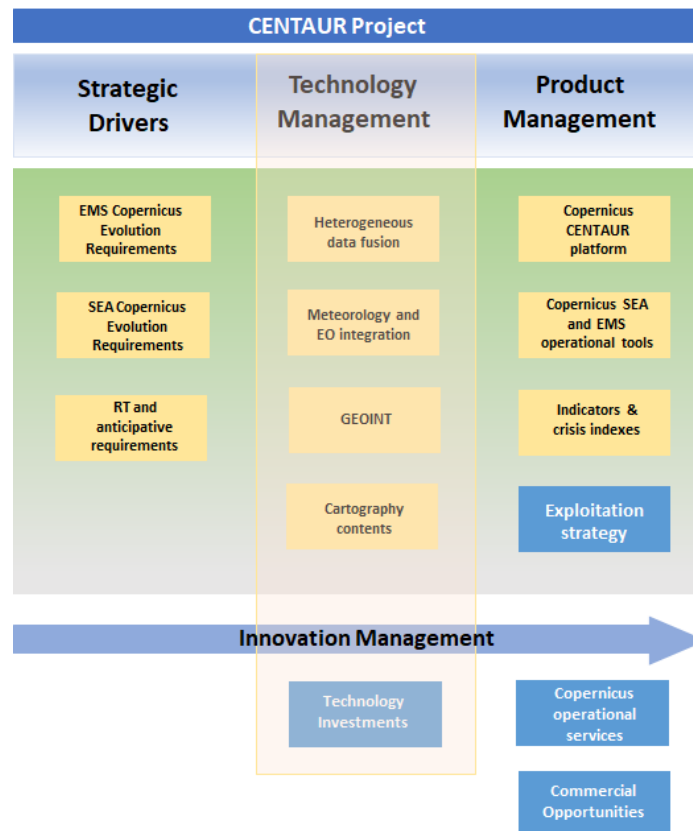


Figure 3 – CENTAUR Innovation Management

Strategic drivers

The CENTAUR Project reviews in WP1 and related deliverables, the user needs and requirements for the evolution of the two Copernicus services, EMS and SEA, as well as the relations between the two services, in particular how some emergency information, related to event related to natural hazards (e.g. floods, water scarcity, fires, etc.) may influence, combined with other socio-political markers, the stability and the security of areas outside Europe potentially generating impacts on the European security itself. A main strategic driver is the enhancement of an anticipative and “early warning” capability of the Copernicus services, which is more and more critical to be effective in both the emergency and security contexts. This driver is declined in the project in the design and implementation of innovative service components, in which either new, more reliable predictive models are developed, as well as more efficient SW tools and innovative processing methods, AI-based, lowering the information production latency.

Technology Management

The main fields of technology management in the project are related to i) the integration of Meteorological information and EO data, to ii) the methods for the fusion of many types of heterogeneous data, to iii) the advance in the GEOINT domain and to iv) the innovation and enhancement in the content layers of EO-based cartographic products, key factors in the Copernicus services.

A detailed list of all the technical components to be developed/evolved in the project is provided in the next section, to be used to monitor during the project life cycle the development towards the expected enhanced TRL.

Product Management

The **CENTAUR Platform** is an integrated technological prototype product based on separate SW modules, algorithms, etc., in which the components represent a Product Portfolio where each Intellectual Property has to be elicited and protected for each developing partner, taking into consideration in particular the cases of joint developments. Nevertheless, it is important to ensure that the proposed evolution of the Copernicus Service could be deployed by the Entrusted Entity and that no IPR issues restrict this: it will be treated in the following paragraph. Beyond the platform “as a whole”, the specific different **SW pipelines for the Flood and Water&Food Insecurity**, including new components and content, will be developed during the project. These two main products can be intended also separately and their use in the Copernicus services as well as in different context will be analyzed. The information contents in the developed platform and components is related to new and revised thematic indicators and their intelligent combination in crisis indexes, by correlating multi-source information. The result products are valuable in the Copernicus services context, as well as in other application domain.

3.2.3 CENTAUR Innovation classes

Following the assumption above, we can identify several main classes of developments where innovation can be traced and measured:

- **Indicators**
- **Crisis indexes**
- **Urban Flood pipeline**
- **Water & Food Insecurity pipeline**
- **CENTAUR Platform**

In the following, the elements of each class that will be developed and monitored during the project are listed, together with the initial and expected TRL; the monitoring of the achievements and status of the elements during the CENTAUR life cycle is part of the process to correctly manage the related IPR issues, with the aim of clearly identify, in particular after the project implementation, in the exploitation phase, the ownership and access of/to the project results.

TECHNOLOGY READINESS LEVEL (TRL)

RESEARCH	9	ACTUAL SYSTEM PROVEN IN OPERATIONAL ENVIRONMENT
	8	SYSTEM COMPLETE AND QUALIFIED
	7	SYSTEM PROTOTYPE DEMONSTRATION IN OPERATIONAL ENVIRONMENT
DEVELOPMENT	6	TECHNOLOGY DEMONSTRATED IN RELEVANT ENVIRONMENT
	5	TECHNOLOGY VALIDATED IN RELEVANT ENVIRONMENT
	4	TECHNOLOGY VALIDATED IN LAB
	3	EXPERIMENTAL PROOF OF CONCEPT
	2	TECHNOLOGY CONCEPT FORMULATED
	1	BASIC PRINCIPLES OBSERVED

Figure 4 – TRL table

INDICATORS	OWNER	Indicator name	TRL IN	TRL OUT
UF-ID-1	ECMWF	Static map of precipitation associated to return period	3	7
UF-ID-2	ECMWF	Forecast of return period	2	7
UF-ID-3	ECMWF, e-GEOS	High-Resolution urban flood risk maps for various return periods	3	7
UF-ID-4	SERTIT	Inferred InSAR urban flood extent	3	7
UF-ID-5	SERTIT, e-GEOS	Urban flooding map based on geomorphological and InSAR approach for an enhanced damage assessment	3	7
UF-ID-6	Hensoldt, e-GEOS	Social/Traditional media indicators for Urban Flooding Maps	3	7
UF-ID-7	e-GEOS	Hazard web sources indicator	6	7
UF-ID-8	Adelphi	<i>Robustness and quality of the built environment</i>	<i>Not pursuing for the time being</i>	
UF-ID-9	Adelphi, SERTIT, TRACASA,CLS,Hensoldt,DLR	Assets and financial resources	1	7
UF-ID-10	Adelphi, SERTIT, TRACASA,CLS,Hensoldt	Public services and government support	1	7
UF-ID-11	Adelphi	<i>Social networks and community support</i>	<i>Not pursuing for the time being</i>	
UF-ID-12	Adelphi	<i>Timely access to information</i>	<i>Not pursuing for the time being</i>	
UF-ID-13	Adelphi, SERTIT, TRACASA,CLS,Hensoldt,DLR	Ability to evacuate	1	7
UF-ID-14	Adelphi, e-GEOS, Hensoldt	Economic impact of floods	1	7
WFS-ID-1	ECMWF	Meteorological drought indicator (Monitoring)	4	7
WFS-ID-2	ECMWF	Meteorological drought indicator (Forecast)	2	7
WFS-ID-3	ECMWF	Meteorological drought indicator (danger levels)	1	7
WFS-ID-4	UNISTRA/VITO	Agricultural drought monitoring (near real-time)	2	7
WFS-ID-5	VITO/UNISTRA	Agricultural drought forecast	1	7

INDICATORS	OWNER	Indicator name	TRL IN	TRL OUT
WFS-ID-6	VITO/UNISTRA	Agricultural drought risk zone map	1	7
WFS-ID-7	e-GEOS	IDP Camps status indicator	3	7
WFS-ID-8	DLR	Populations at risk of food insecurity	1	7
WFS-ID-9	DLR	Populations at risk of water insecurity	1	7
WFS-ID-10	DLR	Number of people living in conflict-affected areas	1	7
WFS-ID-11	Adelphi, Hensoldt	Food security	2-7	7
WFS-ID-12	Adelphi, Hensoldt	Economic security	1	7
WFS-ID-13	Adelphi, Hensoldt	Displaced persons	2-7	7
WFS-ID-14	Adelphi, Hensoldt	Violent conflict	2-7	7
WFS-ID-15	Adelphi, Hensoldt	Radicalisation and polarisation	1	7
WFS-ID-16	Adelphi	<i>Disruptions in food supply chains</i>	<i>Not pursuing for the time being</i>	
WFS-ID-17	Adelphi, Hensoldt	Humanitarian aid	2-7	7
WFS-ID-18	Adelphi, Hensoldt, GMV	Resource capture	1	7
WFS-ID-19	Adelphi, Hensoldt	Climate sensitivity of agri-food systems	1	7
WFS-ID-20	Adelphi	<i>Obstacles to mobility</i>	<i>Not pursuing for the time being</i>	
WFS-ID-21	Adelphi, Hensoldt, GMV	Public services and infrastructures	1	7
WFS-ID-22	Adelphi	<i>Obstacles to mobility</i>	<i>Not pursuing for the time being</i>	
WFS-ID-23	Adelphi, Hensoldt	State-citizen relations	1	7
WFS-ID-24	Adelphi, Hensoldt	Dispute resolution mechanisms	1	7
WFS-ID-25	Adelphi, Hensoldt	Social cohesion and trust	1	7

CRISIS INDICES	CherryData, e-GEOS, VITO, ADELPHI		TRL IN	TRL OUT
Early warning forecast index	CherryData, e-GEOS, VITO, ADELPHI, ECMWF	Integration of ID-1, -2, -3	2	6
Flood hazard index	CherryData, e-GEOS, VITO, ADELPHI, ECMWF	Integration of ID-3, -4, -5, -6 and -7	2	6
Flood hazard index	CherryData, e-GEOS, VITO, ADELPHI, ECMWF	Integration in ID-7 of ID-9, -10, -13 and -14	2	6
Early warning forecast index	ECMWF, e-GEOS	Alert threshold definition	1	7
Flood hazard index	ECMWF, Sertit, e-GEOS	Alert threshold definition	1	7

URBAN FLOOD + SOCIO-ECONOMIC PIPELINE COMPONENT	e-GEOS, All involved in Urban Flood Developments	Local node functionalities description	TRL IN	TRL OUT
Weather Local Node	ECMWF	i) Historical catalogue of return periods associated with extreme precipitation (UF-ID-1) ii) Forecast precipitation maps for different return period scenarios generation (UF-ID-2)	2-4	7
Speedy Flood local node	e-GEOS (contributes: ECMWF, Hensoldt, UNISTRA/SERTIT)	i) Precipitation map ingestion (UF-ID-3) ii) FLORIA flooding mask ingestion (UF-ID-4) iii) Input data harmonization and integration (UF-ID-7) iv) Social/traditional media ingestion (UF-ID-5, UF-ID-6) v) Speedy Flood model integration vi) Damage cost calculation for building and transportation network (UF-ID-14)	2	7
FLORIA local node	SERTIT (contributes: e-GEOS, Adelphi)	FLORIA flood mask generation (UF-ID-4, UF-ID-5, UF-ID-6) Damage assessment tool flood depth-based (UF-ID-5, UF-ID-14)	2-4	7
Social/Traditional media local node	Hensoldt (contributes: e-GEOS, SERTIT)	Social/Traditional media downloading and filtering (UF-ID-5, UF-ID-6) Social/Traditional media mapping based on flood mask (UF-ID-5, UF-ID-6)	2	6

WATER&FOOD + SOCIO-ECONOMIC PIPELINE	VITO, GMV, Hensoldt, Adelphi, DLR	Local node functionalities description	TRL IN	TRL OUT
Weather Local Node	ECMWF	Historical catalogue of observed meteorological drought events (WFS-ID-1) Evaluation of seamless probabilistic forecasts for meteorological drought occurrence (WFS-ID-2) Evaluation of meteorological drought warning levels (WFS-ID-3) Provision of seamless forecasts for agricultural drought model (WFS-ID-5)	2	7
Drought Local Node	VITO	Harvesting and pre-processing of all required input datasets for computation of agricultural drought indicators for a country of interest. Assessment of current agricultural drought conditions in near-real time (WFS-ID-4). Combination of current agricultural drought conditions with meteorological forecasts to generate long term forecasts of agricultural drought (WFS-ID-5). Combination of WFS-ID-4 and WFS-ID-5 to generate agricultural drought risk zone maps.	1	7
Population Local Node	DLR	i) Assessment of available census population data for the generation of gridded population datasets. ii) Harvesting and pre-processing of all required population input datasets for security and risk assessment of water and food security. iii) Evaluation of different methodological methods for the generation of multi-temporal population grids based on population and settlement growth. iv) Combination of water availability conditions with population data to generate estimates of population at risks of water insecurity (WFS-ID-9) v) Combination of derived population datasets with WFS-ID-11 and WFS-ID-12 to generate estimates of populations at risk of food insecurity and violent crime. (WFS-ID-8, WFS-10)	1	7
Displacements Local Node	e-GEOS	The local node will be responsible to: i) respond to the user request ordering the images on the area of interest through the CENTAUR platform. ii) preprocess the data and run the algorithm for the automatic change detection. iii) generate the refugee camp extent map.	2	7
Social/traditional media	Hensoldt (contributes: e-GEOS, SERTIT, CherryData)	Social/Traditional media downloading and filtering (WFS-ID-15, WFS-ID-18, WFS-ID-21, WFS-ID-23, WFS-ID-24, WFS-ID-25)	2	6

CENTAUR PLATFORM (platform technical component here)	GMV	Technological component functionalities description	TRL IN	TRL OUT
Access manager	GMV	Verifying the user identity. All groups and users will be managed by an administrator.	6	7
Notifier	GMV	Component in charge of the management of notifications.	3	7
Data requester	GMV	Launches a user request to specific service (allocated in a local node).	3	7
Data loader	GMV	Converts the data ingested in the platform, if needed.	3	7
Service catalogue	GMV	Includes the relevant information about Water & Food security and Urban Flood domains.	3	7
Viewer	GMV	Presents the dataset generated by the platform to the end-user and allows to request new information.	3	7
Received data manager	GMV	Receives the products generated on-demand by the local nodes.	3	7

4 IPR MANAGEMENT IN CENTAUR

4.1 INTELLECTUAL PROPERTY RIGHTS

The Innovation and Exploitation Manager is responsible to manage the knowledge produced during the project lifecycle and to assess the opportunity for applying for patents or declaring copyrights (Table 1).

The IP management in the project lifecycle is based on 4 pillars:

1. Management of the IP used in the project; that includes appropriate access and usage for key IP and the monitoring of use of 3rd party components before and after the project.
2. Capturing and managing IP generated by the project; that includes implementation of an IP management strategy, stimulating the disclosure, securing agreements for foreground IP.
3. Assessing the IP and the opportunities, aiming to patentability and collaborations, evaluating the innovation potential and the market opportunity.
4. Protecting the IP, reviewing the need for formal protection and proposing appropriate securing means (patents, copyright, trademarks, etc.).

Table 1: Definitions

Definitions	
Background	Tangible or intangible input (data, knowhow, information) which is held by the project partners prior to their accession to the agreement. Includes IP as copyright, patents/ patent applications (filed prior to access to agreement).
Results	All results which are generated under the project – whether or not protectable. Such results may include copyrights, design or patent rights, trademarks or others, and belong to the partners who have generated them.
Access rights	User rights (incl. licenses) to results or background of project partners.
Exploitation	Utilization (direct/indirect) of results in research activities, which are not part of the project, as well as utilization for further development, creation and commercialization of a product or process.
Dissemination	Means through which research results are presented to the public. Official publications (e.g. patent applications) are not considered as dissemination.

As reported in [RD08], new elements concerns IP strategy for projects, within the terms of Article 39 of the Horizon Europe legislation. In particular, the HE projects are required to provide:

Mandatory Results Ownership List (ROL)

Beneficiaries must provide information on the owner(s) of the results (results ownership list) in the reporting. This includes whether the ownership is single or joint, the name of the owner(s), the country of establishment of the owner(s) and whether the results will be exploited by the owner(s). Failure to do so will block both the submission of the final periodic report and the final payment.

This requirement shall be implemented in the CENTAUR project.

CENTAUR project follows the IPR prescriptions as per applicable GA and CA. The CENTAUR CA has been composed following the DESCA template and adapting its articles to the project.

4.2 RESULTS TYPOLOGY FROM CENTAUR

The main critical aspects relevant to IPR pertain to ownership tracing/ruling and Result/background access. Besides the existing background IP, the foreground IP coming from the results of the project, is the key aspect of the project and relates strategically to the Innovation Management, as indicated in the previous section (Table 2).

Table 2: Results typology

Subject Matter	Patent	Utility Model	Industrial Design	Copyright	Trade Mark	Confidential Information
Invention	X	X				X
Software	X ⁵			X		X
Scientific article				X		
Design of a product			X	X	X	
Name of a product, service/project					X	
Know-How						X
Website			X	X	X	

According to the Horizon Europe Rules for Participation and GA, the results of the project belong to the participant generating them (CA 8.1). This rule is applied in the CENTAUR CA. Given the collaborative nature of the project, some results can be jointly developed by several participants. Hence, situations of joint ownership might arise. In the case of CENTAUR developments, rules to facilitate the formalization of these potentially critical issue have been agreed in the CA.

Ownership of Results (8.1)

Results are owned by the Party that generates them.

Joint ownership (8.2)

As per Article 16.4 and the linked section “Ownership of Results” of the Annex 5 of the Grant Agreement, two or more Parties own results jointly if:

- a) they have jointly generated them; and
- b) it is not possible to:
 - i. establish the respective contribution of each Party; or
 - ii. separate them for the purpose of applying for, obtaining, or maintaining their protection.

The joint owners will strive to, within a 6 (six) months period as from the date of the generation of jointly owned Results and before any industrial or commercial Exploitation, enter into a written separate joint ownership agreement to set the terms and conditions of the allocation of ownership, all protection measures and on the division of related costs and/or the conditions to Exploit.

Unless otherwise agreed:

- each of the joint owners shall be entitled to use their jointly owned Results for non-commercial research and teaching activities on a royalty-free basis, and without requiring the prior consent of the other joint owner(s).
- each of the joint owners shall be entitled to otherwise Exploit by themselves or through their Technology Trans Office, the jointly owned Results and to grant non-exclusive licenses to third parties (without any

right to sub-license) if the other joint owners are given: (a) at least forty-five (45) calendar days advance notice; and (b) fair and reasonable compensation.

The joint owners shall agree on all protection measures and the division of related cost in advance.

Transfer of Results (8.3)

8.3.1 Each Party may transfer ownership of its own Results, including its share in jointly owned Results, following the procedures of the Grant Agreement Article 16.4 and its Annex 5, Section Transfer and licensing of results, sub-section "Transfer of ownership".

8.3.2 Each Party may identify specific third parties it intends to transfer the ownership of its Results to in Attachment (3) of this Consortium Agreement. The other Parties hereby waive their right to prior notice and their right to object to such a transfer to listed third parties according to the Grant Agreement Article 16.4 and its Annex 5, Section Transfer of licensing of results, sub-section "Transfer of ownership", 3rd paragraph.

8.3.3 The transferring Party shall, however, at the time of the transfer, inform the other Parties of such transfer and shall ensure that the rights of the other Parties under the Consortium Agreement and the Grant Agreement will not be affected by such transfer. Any addition to Attachment (3) after signature of this Consortium Agreement requires a decision of the Consortium Board.

8.3.4 The Parties recognise that in the framework of a merger or an acquisition of an important part of its assets, it may be impossible under applicable EU and national laws on mergers and acquisitions for a Party to give at least forty-five (45) calendar days prior notice for the transfer as foreseen in the Grant Agreement.

8.3.5 The obligations above apply only for as long as other Parties still have - or still may request - Access Rights to the Results.

A specific article has been included in the CA, in the 8.3 section, to clarify the access to the results/background for the EU institutions, given the direct role of SATCEN in the project.

8.3.6. As per ANNEX 5 of GA, the granting authority, EU institutions, bodies, offices or agencies shall obtain from the beneficiaries of the grant, on a royalty free basis, access to the results for developing, implementing and monitoring EU policies or programmes. Such access rights do not extend to beneficiaries' background. The beneficiaries shall grant them access to the background needed for exploiting the results, under commercially fair and reasonable conditions. Such access rights are limited to non-commercial and non-competitive use.



4.3 ACCESS RIGHTS IN CENTAUR

To allow the performance of the own work of a Party under the Project, Access Rights to Results and Background needed are ruled in the CA, following in turn the prescription of the GA ([RD01], [RD02]) and the recent IP guide for HE projects [RD08], whose main prescriptions follows the schema as per Table 3 below.

Table 3: Access Rights to Results and Background main description from the IP guide for HE projects

Purpose	Access to Background	Access to Results
Implementation of the project	Royalty-free, unless otherwise agreed by participants before their accession to the GA	Royalty-free
Exploitation of project results	Subject to agreement, access rights shall be granted under fair and reasonable conditions (which can be royalty-free)	

The research work is detailed in the project work packages and is developed in accordance with the timing and milestones established. The joint work in the project implies that project partners may need to give access rights to their background IP and results, in order for other partners to carry out their work in the project implementation phase and/or exploit their results.

With regard to project Background, to be used in the project implementation, the guiding principle is a “royalty-free” criterion, full-access basis for the project implementation, and “fair and reasonable conditions” for the exploitation. As the project implementation (Design and Development) phase goes by, in its different WPs with different timelines, details could be added to the CA (IPR Annex). The access rights have been ruled in Sect. 9 of the CA as follows, for sections 9.1 – 9.4:

Background included (9.1)

9.1.1 In Attachment 1, the Parties have identified and agreed on the Background for the Project and have also, where relevant, informed each other that Access to specific Background is subject to legal restrictions or limits. Anything not identified in Attachment 1 shall not be the object of Access Right obligations regarding Background.

9.1.2 Any Party may add additional Background to Attachment 1 during the Project provided they give written notice to the other Parties. However, approval of the Consortium Board is needed should a Party wish to modify or withdraw its Background in Attachment 1.

General Principles (9.2)

9.2.1 Each Party shall implement its tasks in accordance with the Consortium Plan and shall bear sole responsibility for ensuring that its acts within the Project do not knowingly infringe third party property rights.

9.2.2 Any Access Rights granted exclude any rights to sublicense unless expressly stated otherwise.

9.2.3 Access Rights shall be free of any administrative transfer costs.

9.2.4 Access Rights are granted on a non-exclusive basis.

9.2.5 Results and Background shall be used only for the purposes for which Access Rights to it have been granted.

9.2.6 All requests for Access Rights shall be made in writing. The granting of Access Rights may be made conditional on the acceptance of specific conditions aimed at ensuring that these rights will be used only for the intended purpose and that appropriate confidentiality obligations are in place.

9.2.7 The requesting Party must show that the Access Rights are Needed.

[Access Rights for implementation \(9.3\)](#)

Access Rights to Results and Background Needed for the performance of the own work of a Party under the Project shall be granted on a royalty-free basis, unless otherwise agreed for Background in Attachment 1.

[Access Rights for Exploitation \(9.4\)](#)

9.4.1 Access Rights to Results - Access Rights to Results if Needed for Exploitation of a Party's own Results shall be granted on Fair and Reasonable conditions. Access rights to Results for internal research and for teaching activities shall be granted on a royalty-free basis.

9.4.2 Access Rights to Background if Needed for Exploitation of a Party's own Results, including for research on behalf of a third party, shall be granted on Fair and Reasonable conditions.

9.4.3 A request for Access Rights may be made up to twelve (12) months after the end of the Project or, in the case of Section 9.7.2.1.2, after the termination of the requesting Party's participation in the Project.

4.4 POST-PROJECT CONSTRAINTS

After the conclusion of the project, the IPR provisions will remain in force, such as the obligations regarding confidentiality, exploitation and dissemination. Consequently, the post-contract phase will be properly managed discussing the obligations indicated by EC and updating the CA.



5 CENTAUR TOOL AND PLAN FOR INNOVATION MANAGEMENT

5.1 INNOVATION CONTROL POINTS

The "control points", CP, of the CENTAUR Innovation Management, including also IPR Management, take place at the same time of the planned project Progress/Review Meetings of the technical WPs (WP3, WP4, WP6), in order to have these activities fully integrated within the project and to allow their steering role.

After the consolidation of the design phase, the pace of these meetings allows a frequent monitoring of the Innovation activities and allows a proper set up of actions and a reasonable short time control for recovery actions if needed and/or to exploit R&D (or in general application) opportunities.

The dependency with the GANTT of the project, characterizes each CP with a specific innovation objective, indicated in the Table below and detailed in the following (Table 4).

Table 4: Innovation Control Points

Control Point	Milestone number	Milestone title	Deliverable	Date	Innovation topic to be addressed
CP1	MS3	PDR – Preliminary Design Review	D2.2 D3.1 D7.5	M9	Innovation Management methodology and plan sharing. Platform Design and component breakdown: all the theoretical background related to service design and implementation
CP2	MS4	DDR - Demo Design Review	D2.4 D3.3	M15	Analysis of technical deliverables tech specs: <ul style="list-style-type: none"> • Urban Flood and Water&Food Insecurity service pipelines • CENTAUR integrated platform (baseline)
CP3	MS5	IR - Interim Review	All tech. deliverables at date	M18	<ul style="list-style-type: none"> • Initial ROL • Draft of JOA
CP4	MS8	FDR - Final Demo Review	D2.7 D3.4 D7.6	M32	Analysis of technical deliverables tech specs: <ul style="list-style-type: none"> • CENTAUR multi-criteria analysis and indexes generation pipelines • CENTAUR integrated platform (final)

Control Point	Milestone number	Milestone title	Deliverable	Date	Innovation topic to be addressed
CP5	MS9	FR - Final Review	All final tech. deliverables	M36	<ul style="list-style-type: none"> • IP Portfolio • Final ROL • JOA

CP1: At **MS3**, the Methodology to manage the innovation will be shared. Timeline, guidelines and report template will be presented and discussed, addressing also the IPR management according to the CA. As the innovation, indeed, should be a goal of the project, each partner should be motivated in identifying the objects of its activities which are characterized by innovative aspects both to be disclosed and to be 'protected', e.g. by means of IPR process activation.

CP2: At **MS4**, as platform design started, the Platform Technological component breakdown will be available and its preliminary view in terms of innovation planned achievement will be feasible. The urban flood and water&food pipelines are available at date, being part of the platform, with development leader and contributors assigned. This are the constituting bricks of the ROL and JOA, to be derived as next step. Consolidation of the technology baseline assumed for the project will be integrated with eventual input from technology scouting, in principle also external to the project.

CP3: at **MS5**, which is Interim Review; the Platform development is ahead and assessing the actual SW module implementation and related effort, at least for those completed development is feasible. A draft JOA and initial ROL will be shared, as well as a revision of the CA relevant to BIPR if needed. Technology innovation coming from the development activities will be presented, also identifying algorithms, SW developed that may be proposed for the activation of an IPR process.

Consolidation of the technology baseline assumed for the project will be integrated with eventual input from technology scouting, in principle also external to the project.

CP4: at **MS8**, the platform development and integration is completed, including also the component relevant to the crisis indices. Hence, not only the single components, but also the platform as a unique, validated product is available.

Consolidation of the technology baseline assumed for the project will be integrated with eventual input from technology scouting, in principle also external to the project.

Assessment of the maturity level of the innovation will be discussed, evaluated and reported.

CP5: In the Final Review, **MS9**, the IP Portfolio from the project activities will be presented, as well as the final ROL and JOA to be activated if needed.

The consolidated Product Policy for the CENTAUR platform and components will be presented, in coordination with the Exploitation activities.

5.2 REPORTING ACTIVITIES

The Periodic Reports, will contain dedicated sections to the innovation contents discussed in the relevant CP, as described in the previous section.

The Final Report will include a section on the IP Portfolio, generated during the project, and the CENTAUR Platform Product Specifications.

5.3 RESPONSIBILITY

The responsible for the process defined in the previous sections is the Project Coordinator (PC).



ANNEX 1 - CONSORTIUM AGREEMENT - BACKGROUND IPR

According to the Grant Agreement (Article 16.1) Background is defined as “data, know-how or information (...) that is needed to implement the Action or exploit the results”. Because of this need, Access Rights have to be granted in principle, but Parties must identify and agree amongst them on the Background for the Project. This is the purpose of this attachment.

PARTY 1 – e-GEOS S.p.a.

As to **e-GEOS S.p.A.**, it is agreed between the Parties that, to the best of their knowledge the following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific restrictions and/or conditions for implementation (Article 16.4 Grant Agreement and its Annex 5, Section “Access rights to results and background”, sub-section “Access rights to background and results for implementing the Action”)	Specific restrictions and/or conditions for Exploitation (Article 16.4 Grant Agreement and its Annex 5, Section “Access rights to results and background”, sub-section “Access rights for exploiting the results”)
<p>BRAINT</p> <p>e-GEOS platform for the support to IMINT using EO data. It includes algorithms for EO data exploitation like: workflow management, RFI-driven satellite data planning and optimization, EO data processing, EO data information extraction and IMINT report generation.</p>	<p>Free use during implementation for EC and all the members of the team</p>	<p>As per 8.3.6</p>
<p>SEonSE</p> <p>e-GEOS platform for providing multi-sensor Maritime Situational Awareness from multiple information sources: EO satellites, AIS, VMS, LRIT, vessels databases, SIGINT data and user-data. SEonSE includes algorithms for ship and oil spill detection, measurements of wind and wave fields, anomaly detection in vessel tracks, as well as extraction of maritime patterns of life and can be used for MARINT report generation.</p>	<p>Free use during implementation for EC and all the members of the team</p>	<p>As per 8.3.6</p>
<p>EMAGE/MITICO</p> <p>EMAGE is the e-GEOS SW for processing EO data. It is a suite to process SAR and Optical data with highly optimized algorithms. It</p>	<p>Free use during implementation for EC and all the members of the team</p>	<p>As per 8.3.6</p>

includes the MITICO interferometric chain able to generate SAR Coherence and Amplitude products and Change Detection / Activity maps.		
Speedy Flood Tool	Free use during implementation phase and during the CENTAUR project.	Usable for exploitation
Flood Hazard algorithm (ESA-Fragility)	Free use during implementation for EC and all the members of the team	Usable for exploitation
<p>CENTAUR core platform including:</p> <ul style="list-style-type: none"> • Customized Dashboard based on GeoNode <p>Scheduler that manages the execution of processing and the configuration of data for OGC presentation</p>	Free use during implementation for EC and all the members of the team	As per 8.3.6

This represents the status at the time of signature of this Consortium Agreement.

PARTY 3 - EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS – ECMWF

As to ECMWF, it is agreed between the Parties that, to the best of their knowledge, the following Background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific restrictions and/or conditions for implementation (Article 16.4 Grant Agreement and its Annex 5, Section “Access rights to results and background”, sub-section “Access rights to background and results for implementing the Action”)	Specific restrictions and/or conditions for Exploitation (Article 16.4 Grant Agreement and its Annex 5, Section “Access rights to results and background”, sub-section “Access rights for exploiting the results”)
ECMWF Integrated Forecast System (IFS)	Conditions as per the applicable ECMWF license. Use only for the purposes and the duration of the CENTAUR project. Use for any exploitation prohibited.	Use for exploitation prohibited

This represents the status at the time of signature of this Consortium Agreement

PARTY 11 - ITHACA

As to **ITHACA**, it is agreed between the Parties that, to the best of their knowledge the following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific restrictions and/or conditions for implementation (Article 16.4 Grant Agreement and its Annex 5, Section “Access rights to results and background”, sub-section “Access rights to background and results for implementing the Action”)	Specific restrictions and/or conditions for Exploitation (Article 16.4 Grant Agreement and its Annex 5, Section “Access rights to results and background”, sub-section “Access rights for exploiting the results”)
<p>Politecnico di Torino holds the proprietary rights to the LIDAR data and very high-resolution aerial data acquired with photogrammetric cameras over Turin, Italy, to generate the city's digital elevation and 3D model. These data (both raw, in metadata, and in further elaborated formats) will be used by ITHACA exclusively for the scope of the CENTAUR, with an ad-hoc bilateral agreement to be stipulated between Politecnico di Torino and ITHACA. The entire data package cannot be shared with the partners involved without designated consent from Politecnico di Torino and ITHACA.</p>	<p>To be defined at a later stage based on the bilateral agreement between Politecnico di Torino and ITHACA.</p>	<p>To be defined at a later stage based on the bilateral agreement between Politecnico di Torino and ITHACA.</p>

This represents the status at the time of signature of this Consortium Agreement



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