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## EXCELSIOR Project

H2020-WIDESPREAD-2018-2020   Grant Agreement No 857510	
Project full title:	<b>ERATOSTHENES: Excellence Research Centre for Earth Surveillance and Space-Based Monitoring of the Environment</b>
Project acronym:	<b>EXCELSIOR</b>
Work Package:	<b>WP8 ECoE Digital Innovation Hub in EMMENA</b>
Deliverable:	<b>D8.5 Report on ECoE Networking &amp; Knowledge Hub</b>
Version:	<b>Final D8.5</b>
Dissemination level:	<b>Public</b>

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	<p><b>H2020-WIDESPREAD-2018-2020/ H2020-WIDESPREAD-2018-01</b>  <b>Grant Agreement No 857510</b>          This project is funded by the <b>EUROPEAN COMMISSION</b> in the Framework Programme for Research and Innovation (2014-2020).</p>	
<p>Call / Topic:</p>	<p><b>H2020-WIDESPREAD-2018-01 /</b>  <b>WIDESPREAD-01-2018-2019</b>  <b>Teaming Phase 2</b></p>	
<p>Project full title:</p>	<p><b>ERATOSTHENES: Excellence Research Centre for Earth Surveillance and Space-Based Monitoring of the Environment</b></p>	
<p>Project acronym:</p>	<p><b>EXCELSIOR</b></p>	
<p>Work Package (WP): Task (T):</p>	<p><b>WP8 ECoE Digital Innovation Hub in EMMENA</b>  <b>T8.3 ECoE Networking &amp; Knowledge Hub</b></p>	
<p>Deliverable (D):</p>	<p><b>D8.5 Report on ECoE Networking &amp; Knowledge Hub</b></p>	
<p>Due date of deliverable:</p>	<p><b>31 May 2022</b>  <b>(Month 32 of the project)</b></p>	<p><b>Version: Final D8.5</b></p>
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<p>Start date of project:</p>	<p><b>1 October 2019</b></p>	<p>Duration: <b>84 months</b></p>
<p>Dissemination Level:</p>	<p><b>Public</b></p>	



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<b>APPROVED</b>	All partners			30/05/2022

### Work Package 8: ECoE Digital Innovation Hub in EMMENA

#### Deliverable D8.5: Report on ECoE Networking & Knowledge Hub

Sections to be protected	Description	Owner	Access Rights	
			Period	Type*
-			-	PD

\*PD: Public dissemination CA: Confidentiality Agreement required for disclosure



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## **EXECUTIVE SUMMARY**

This document, entitled “D8.5 Report on ECoE Networking & Knowledge Hub”, provides a short description of the platforms content. The design and development of the platforms is scheduled to be implemented after Month 18. This deliverable presents the main motivation and ideas behind the functionality of the platforms. A full description of the platforms’ content in its final form will be available in D8.6 – Report on ECoE Networking & Knowledge Hub (update 1). The main scope of the platforms is to foster the cross-fertilisation of ideas and uptake of ECoE’s research and innovation output and facilitate ECoE cross-departmental and external access to state-of-the-art IP.



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## Abbreviations and Acronyms

AI	Artificial Intelligence
BEYOND	Building a Center of Excellence for EO based Monitoring of Natural Disasters
CDM	Crop Damage Management
CEG	Department of Civil Engineering and Geomatics
CUT	Cyprus University of Technology
DEC	Department of Electronic Communications
DEC-MTCW	Department of Electronic Communications- Ministry of Transport, Communications and Works
DIH	Digital Innovation Hub
DLR	German Aerospace Centre
ECoE	ERATOSTHENES Centre of Excellence
EO	Earth Observation
EMMENA	East Mediterranean/Middle East/North Africa
ESA	European Space Agency
FOSS	Cyprus Research Centre for Sustainable Energy
GEO	Group on Earth Observation
GEO-CRADLE	Coordinating and integrating state-of-the-art Earth Observation Activities in the regions of North Africa, Middle East, and Balkans and Developing Links with GEO related initiatives towards GEOSS
NOA	National Observatory of Athens
TROPOS	Leibniz Institute for Tropospheric Research
UAV	Unmanned Aerial Vehicle
WP	Working Package



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## 1. INTRODUCTION

The Report on Regional Exploitation platform is included in the WP8 “**ECoE Digital Innovation Hub in EMMENA**”, whose major objective is to outline ECoE’s functional areas of state-of-the-art infrastructure and Research Excellence Clusters with external stakeholders needs in a forward-looking, extrovert approach in order to establish a Digital Innovation Hub in EMMENA.

This specific report puts emphasis on **Task 8.3 ECoE Networking & Knowledge Hub**, which:

- fosters the cross-fertilisation of ideas and uptake of ECoE’s research and innovation output by building a networking platform to foster EMMENA and DIH stakeholder registration and interaction in an organised way and
- sets the ECoE Knowledge Hub to facilitate ECoE cross-departmental and external access to state-of-the-art IP.

This report is the first technical specification of the ECoE Networking & Knowledge Hub and follows the following structure:

- **Chapter 2** presents the Networking Platform, its content and added value, mentions the stakeholders’ profile and analyses some key functional specifications, e.g. Core website design and digital tools
- **Chapter 3** outlines the Knowledge Hub, its content, added value and some key features, mentions the service requirements and capabilities as well as describes key issues such as security
- **Chapter 4** concludes to the most important competitive advantage of the ECoE Networking & Knowledge Hub, as well as key restrictions and limitations.



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## 2. ECOE NETWORKING PLATFORM

The aim of task 8.3 is to foster the cross-fertilisation of ideas and uptake of ECoE's research and innovation output by building a networking platform to foster EMMENA and DIH stakeholder registration and interaction in an organised way.

ECoE Network is an open access platform developed using a free and open-source content management system. The core of this network is the ECoE, the Strategic Partners and their affiliate networks, but the ambition is to build concrete links with other EO and non-EO players in EMMENA through user engagement activities.

### 2.1 Content

The EXCELSIOR makes available, in the EMMENA region, a Networking Platform, which:

- incorporates a rich inventory of regional capacities
- publishes comprehensive profiles of stakeholders
- provides a first assessment of countries EO maturity
- facilitates potential partnerships between various stakeholders

The informational content available on the platform will be accessible to unregistered users. A registration process will also be included. This will follow the standard registration process, which includes steps such as completing a Registration Form, validation of user registration by an administrator and user notification by email.

Upon registering to the platform, logged-in users will have access to several functionalities, including:

- profile creation
- blog capabilities
- forum participation
- event creation

Particularly with regards to the Profile creation functionality, the profiles of all stakeholders will be validated and uploaded on the Networking Platform, in a fully functional mode, following open access principles. The profiles include exclusive and specific information collected via the Registration Form. After their registration, the stakeholders can login at any time and edit their profiles.

The Registration Form will collect relevant information, including the following:

- Full name
- Title
- Position
- Email
- Phone
- Organisation name
- Thematic area of interest
- Country



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## 2.2 Added-value

The added value offered by the Networking Platform includes and is not limited to:

- It provides a networking space that fosters the communication and the development of functional research and business relationships among partners and between project partners, interested stakeholders and policy-makers.
- It constitutes a focal crowdsourcing point that facilitates the aggregation and generation of collective intelligence on observing, understanding, protecting, monitoring, and predicting environmental parameters in land, water and air.
- It promotes the communication of scientific research and discoveries using open standards, to the benefit of the economy, environmental sustainability and society as a whole.
- By offering open content:
  - It facilitates the communication of the collective intelligence generated to the wider community, thus promoting its proliferation and the improved understanding of the relationships among Earth processes
  - It enables the development of innovative entrepreneurial initiatives that concern, among others, technological solutions including satellite observation, and geospatial tools such as navigation and positioning systems.
  - It sets the stage for the incorporation of generated scientific knowledge in policy-making towards the achievement of environmental and social sustainability goals.

## 2.3 Filtering / searching mechanisms

The Networking Platform provides three different mechanisms for filtering/ search:

- i. Map search: 3 filters to search the database & displays results on the map
- ii. Keywords search: search by one or more keywords (for quick search)
- iii. Advanced search page: 10 filters combined with a “search by keywords” option. Indicative filters are listed at section 2.6, “Functional specifications”, below.

The networking platform integrates social media and blog capabilities, allowing for a lively-type interaction and it allows registered users to follow influencers and to initiate and participate in discussion threads. The gateway to and from the ECoE Networking Platform will be provided through the ECoE portal, using a specialised networking platform widget.

## 2.4 Stakeholder Profile

The Stakeholder Profile indicatively will include the following sections:

- Organisation Name
- Type of organisation (e.g. SME, research institute, public body)
- Contact Details of two contact persons
- Activity Focus (e.g. IT, EO)
- Capacities



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- National and International Activities (e.g. projects, associations)
- Engagement in EXCELSIOR (e.g. partner, MoU signed)
- Location/Country
- Space-borne capacities
- Ground-based/In-situ monitoring networks/facilities
- Modelling and computing processing capacities
- The source of data used
- Data exploitation for the provision of value-adding services and products
- Other Information the Stakeholder would like to provide

Statistics will be drawn when most of the information is on the Portal.

## **2.5 Functional specifications**

### **Core website design**

The ECoE Networking Platform website will be designed using state-of-the-art technology and all required functionalities to fully accommodate the requirements stemming from its purpose.

An indicative design of the landing page of the Networking Platform is provided below.



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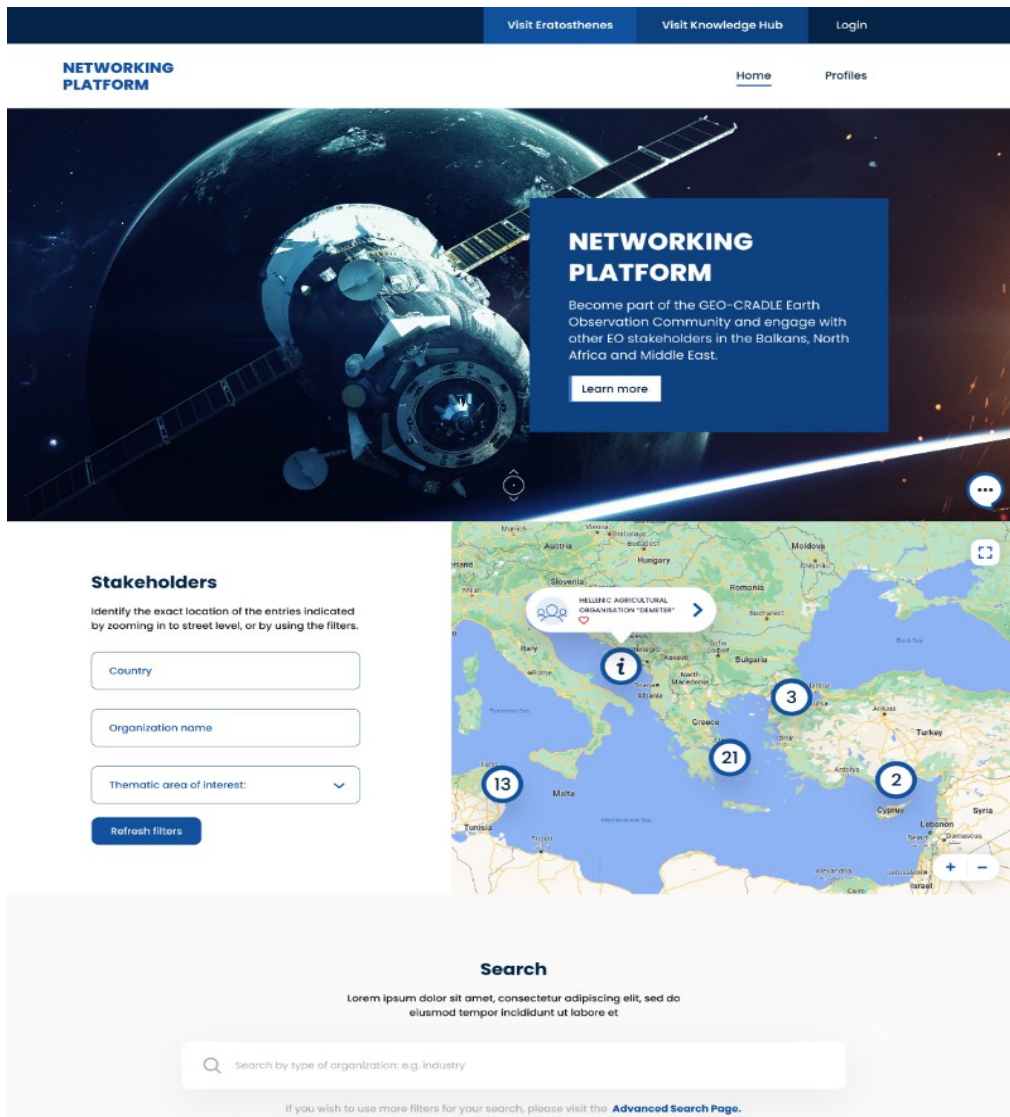


Figure 1: Networking platform-Landing page



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<b>31</b> <small>COUNTRIES</small>	<b>206</b> <small>STAKEHOLDERS</small>	<b>785</b> <small>PROFILE VIEWS</small>
---------------------------------------	---	--

### Recent Stakeholders

List of recently active stakeholders in GEO - CRADLE database.  
Check what is going on.

<

Climate change

HELLENIC AGRICULTURAL ORGANISATION "DEMETER"

♡
See more →

Climate change

HELLENIC AGRICULTURAL ORGANISATION "DEMETER"

♡
See more →

Climate change

HELLENIC AGRICULTURAL ORGANISATION "DEMETER"

♡
See more →

>

See all the stakeholders

### Database Services

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**Join our network**

Create your profile in our platform and join our network!

Login

**Be an active member**

Become an active member of the platform and interact with other stakeholders, by submitting a comment

Submit a comment

**Stakeholders Browsing**

Discover stakeholders of interest by location, thematic area and view their profile and data!

Discover

Figure 2: Networking platform-Landing page



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Figure 3: Networking platform-Landing page



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### Events

Lorem ipsum lorem ipsum lorem ipsum

**20 Apr**

Lorem ipsum dolor sit amet, consectetur

🕒 18:30 a.m

📍 Remote

by stakeholder name [See more →](#)

**20 Apr**

Lorem ipsum dolor sit amet, consectetur

🕒 18:30 a.m

📍 Remote

by stakeholder name [See more →](#)

**20 Apr**

Lorem ipsum dolor sit amet, consectetur

🕒 18:30 a.m

📍 Remote

by stakeholder name [See more →](#)

[See all events](#)

### Be a part of the platform

Become an active member of the platform and interact with other stakeholders

[Submit a comment](#)

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.

🕒 14/10/2021

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🕒 14/10/2021

[Answer >](#)

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🕒 14/10/2021

[Answer >](#)

[see all submissions →](#)

Subscribe to our newsletter  [Submit](#)

**Consortium**

**Affiliated Entities**

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**NETWORKING PLATFORM**

Platform

[User manual](#)

Get in touch

[info@excelsior2020.eu](mailto:info@excelsior2020.eu)

[www.excelsior2020.eu](http://www.excelsior2020.eu)

[f](#) [t](#) [i](#) [l](#) [y](#) [p](#)

Figure 4: Networking platform-Landing page



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As illustrated by the above indicative landing page design, a non-exhaustive list of the services provided includes the following:

- Links that directly connect the two platforms developed within the project
- Member login functionality
- Member profile functionality (available only to registered stakeholders)
- Project information page
- On-map presentation of project partners and stakeholders (only registered stakeholders presented)
- Multiple project partners and stakeholders inventory search options, browsing and filters
- Overview of involved and recently active stakeholders
- Highlight of recent partners and stakeholders registered
- Forum functionality (available only to registered stakeholders)
- Thematic areas overview
- Social media news harvesting (based on relevant hashtags or harvested from registered stakeholders)
- Overview of relevant events (event submission available only to registered stakeholders)
- Newsletter functionality
- The functionality to mark stakeholders, events, etc. as “favorites”, in order to collect relevant information at one’s user profile (available only to registered stakeholders)

### **User login and profile**

The top section of the front page will provide quick links to the Data Hub of the platform, the options to Register and Login to the platform, as well as links to the “Profiles” section and to the User Manual. By clicking on the “Register” menu-item on the top header menu, users will be directed to the Registration page. On the Registration page, users will be asked to fill in some basic info, such as the username and email they wish to use for their account. After submission, they will be informed by email with instructions in order to create their profile. In addition, by clicking on the top header menu-item, users will be able to edit, delete or view the status of their profile. A system administrator should check their submission and publish it.

### **Google-based geospatial mapping**

The use of Google-based geospatial mapping provides an interactive overview of the location of partners and stakeholders. Starting from a regional level, this interactive overview will allow users to zoom in to street level, to identify the exact location of the entries indicated.

### **Search functionalities**

Multiple filters and search functionalities will be available at the Search section of the ECoE Networking Platform website front page. Besides the “Quick search” bar, this section also contains a link to the Advanced Search Page, where users can apply search filters to refine their search.



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An indicative list of such filters is the following:

- Name /Title
- Thematic Areas
- Role in the value chain
- Region
- Organization type

### Digital tools

The functionality of the ECoE Networking Platform website will be enhanced through the incorporation of a selection of digital tools designed to facilitate the maximisation of its usefulness. These include:

- **The Social Media Harvesting Tool.** The tool harvests related news and updates from social channels, providing users with related information. It offers the functionality to explore updates and news posted on the social media harvested.

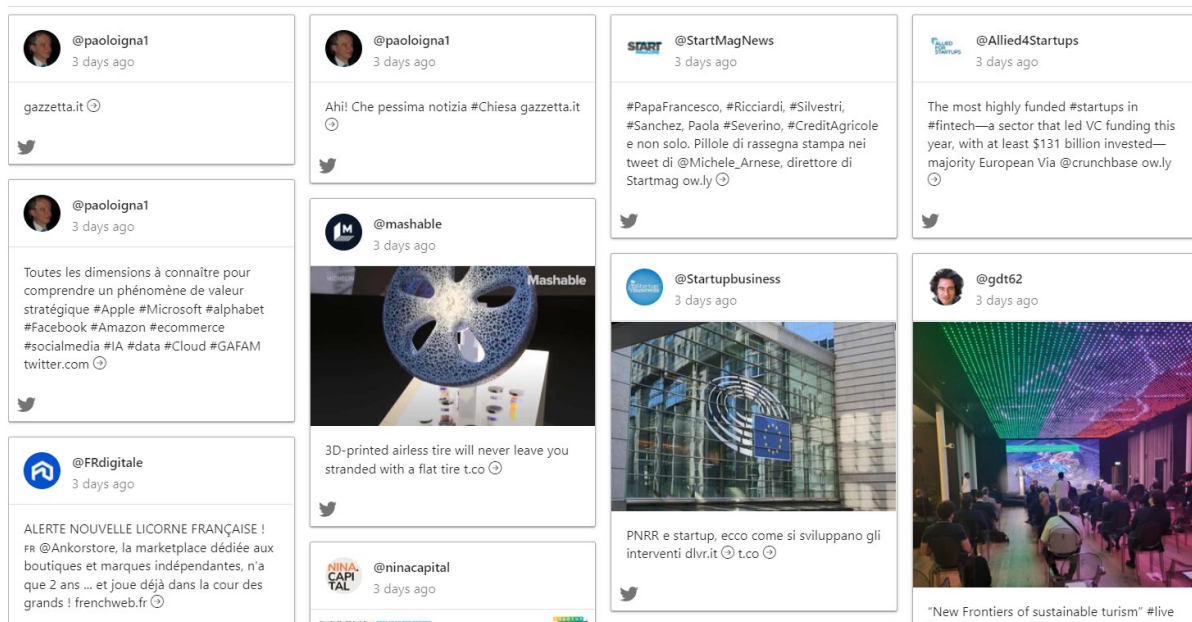


Figure 5: Example of Knowledge Base Tool

- **The Intelligent Assistant** is an Artificial Intelligence application (virtual assistant - chatbot) that provides users with information about the project.



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### 3. ECOE KNOWLEDGE HUB

In addition to the Networking Platform, the ECoE Knowledge Hub will also be created, with the aim to facilitate ECoE cross-departmental and external access to state-of-the-art IP.

The ECoE Knowledge Hub will include among others:

- i. a pool of open-source EO tools, algorithms, models, etc., for the EMMENA thematic sectors addressed (description, applicability, methods to access, licensing information, etc.);
- ii. catalogues of descriptive metadata for various regional datasets from in-situ monitoring networks, even outside ECoE's responsibility;
- iii. information on relevant past and ongoing research and innovation projects from local to global level,
- iv. a portfolio of best practice examples for the different ECoE EO applications, with an outlook for operationalisation and commercialisation and
- v. training material to boost uptake of Copernicus and ECoE services to meet operational needs in EMMENA.

#### 3.1 Content

The goal of the ECoE knowledge hub is to be used by a broad network of partners, collaborators and stakeholders within different areas of research. It is developed to optimize research outcomes by facilitating the exchange of information among the actors, creating critical mass and avoiding duplications. Hence, the ECoE Knowledge Hub will significantly reduce the costs of developing and replicating similar systems, remove traditional organisational and geographical boundaries and remove infrastructure and hosting costs for the associated organisations. It will also enable integration with ECoE's systems and any cloud-based systems by using Knowledge Hub's API and social login options.

Consequently, the ECoE Knowledge Hub will be an instrument for the alignment of the national research initiatives, aiming at fostering and increasing European, EMMENA and international cooperation, collaboration and communication among researchers and research institutions. The strategic objective is to create a coordinated network bringing together the partners, stakeholders and other associated organisations to join forces in order to increase the visibility and impact of the ECoE.

#### 3.2 Added-value

In a wider perspective, the added-value of the Knowledge Hub instrument and its expected impacts can be summarized as follows:

- Improve upon scientific and technological excellence
- Facilitate the integration and transfer of knowledge
- Establish a critical mass in a given thematic area via networking of researchers with complementary expertise, capacity building and knowledge transfer
- Make common research efforts and provide long term sustainability for ECoE, allowing for more significant results



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- Facilitate data access and data sharing
- Facilitate proactive studies, sharing standardized and innovative measures in specific disciplines
- Enable long lasting and large base research, tools and methods to capitalize results
- Enhance communication and visibility at European, EMMENA and international level
- Deliver knowledge for policy making, anticipate scientific and technological needs and provide efficient scientific support for strategic and political decision-making in the specific field.

A key element of success for the ECoE research groups is to meet the "excellence" and "capacity building" criteria. It is essential that research groups will represent the very best expertise in the thematic area in question ("excellence") and have full research support by the EXCELSIOR partners to enter in each thematic field, in order to develop skills and participate in local, EMMENA, European and international cooperation ("capacity building").

In this context, the hub will allow researchers to join forces, to collaborate and to share expertise, results and data, infrastructures and develop research capacity. The network of researcher groups, once selected, is entitled to develop a joint research plan and to carry out joint integrating and multilateral activities between partners, collaborators and stakeholders. An initial task for the Knowledge Hub members can be to integrate a programme of activities, such as educational, training, research and integrating activities.

### **3.3 Functional specifications**

#### **Core website design**

The ECoE Knowledge Hub website will be designed using state-of-the-art technology and all required functionalities to fully accommodate the requirements stemming from its purpose.

An indicative design of the landing page of the Knowledge Hub website is provided below.



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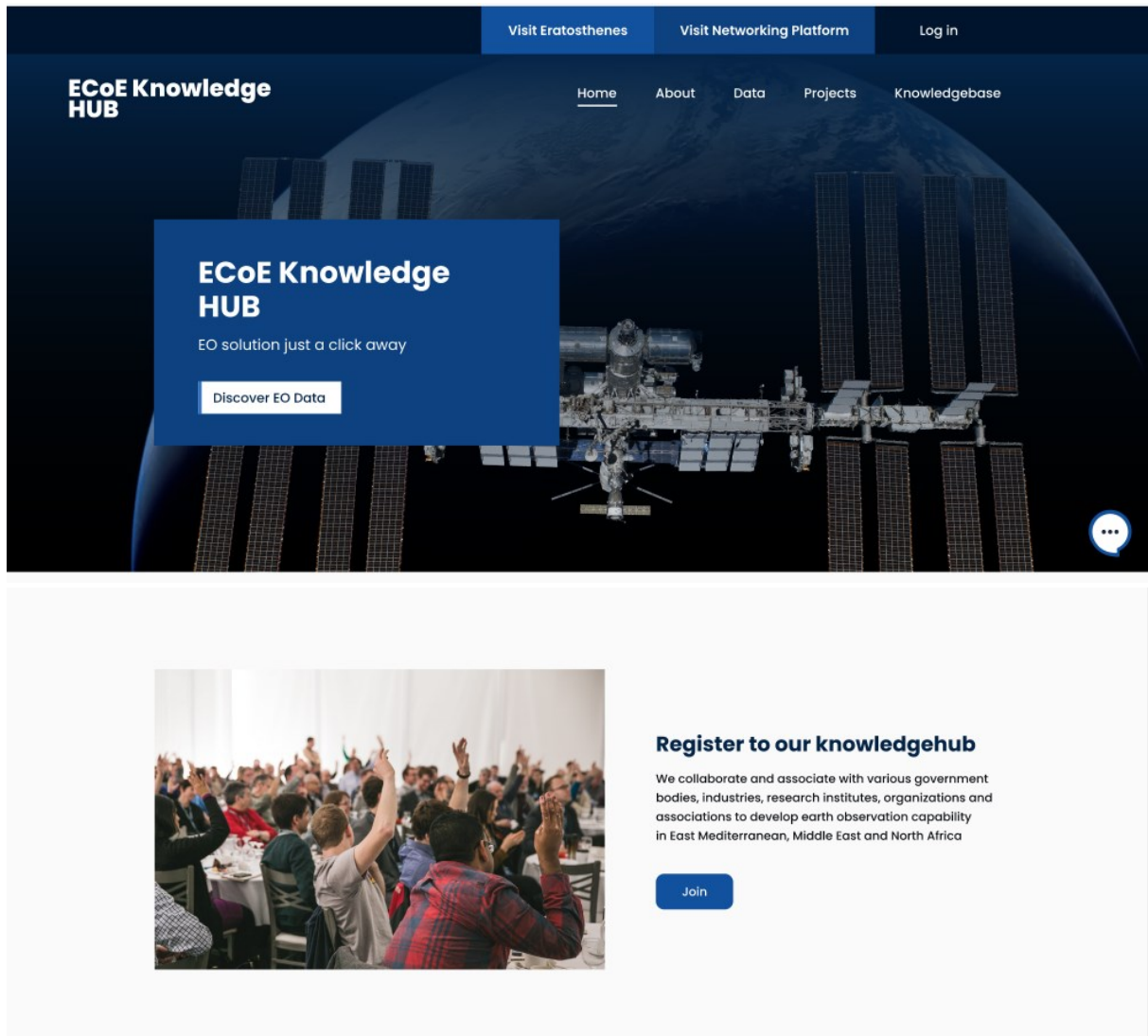


Figure 6: Knowledge Hub-Landing page



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## Projects

Glimpse of various EO projects happening



Sustainable Forest Management

### Cross-sector dialogue for Wildfire Risk Management

Improving understanding of the impact of human activity on land use, and how it relates to climate change, with the ultimate aim of reducing global carbon levels by sharing the insights and models developed with other countries

9 May 2022 | by User from Organization

Tag 1 Tag 2 Tag 3



Sustainable Forest Management

### Cross-sector dialogue for Wildfire Risk Management

Improving understanding of the impact of human activity on land use

9 May 2022 | by User from Organization

Tag 1 Tag 2 Tag 3



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## Knowledgebase

Get quick access to case studies, tutorials, skills and expertise that are required to build EO capability



### Tools

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore

See more →



### Library

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See more →



### Training material

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See more →

Figure 7: Knowledge Hub-Landing page



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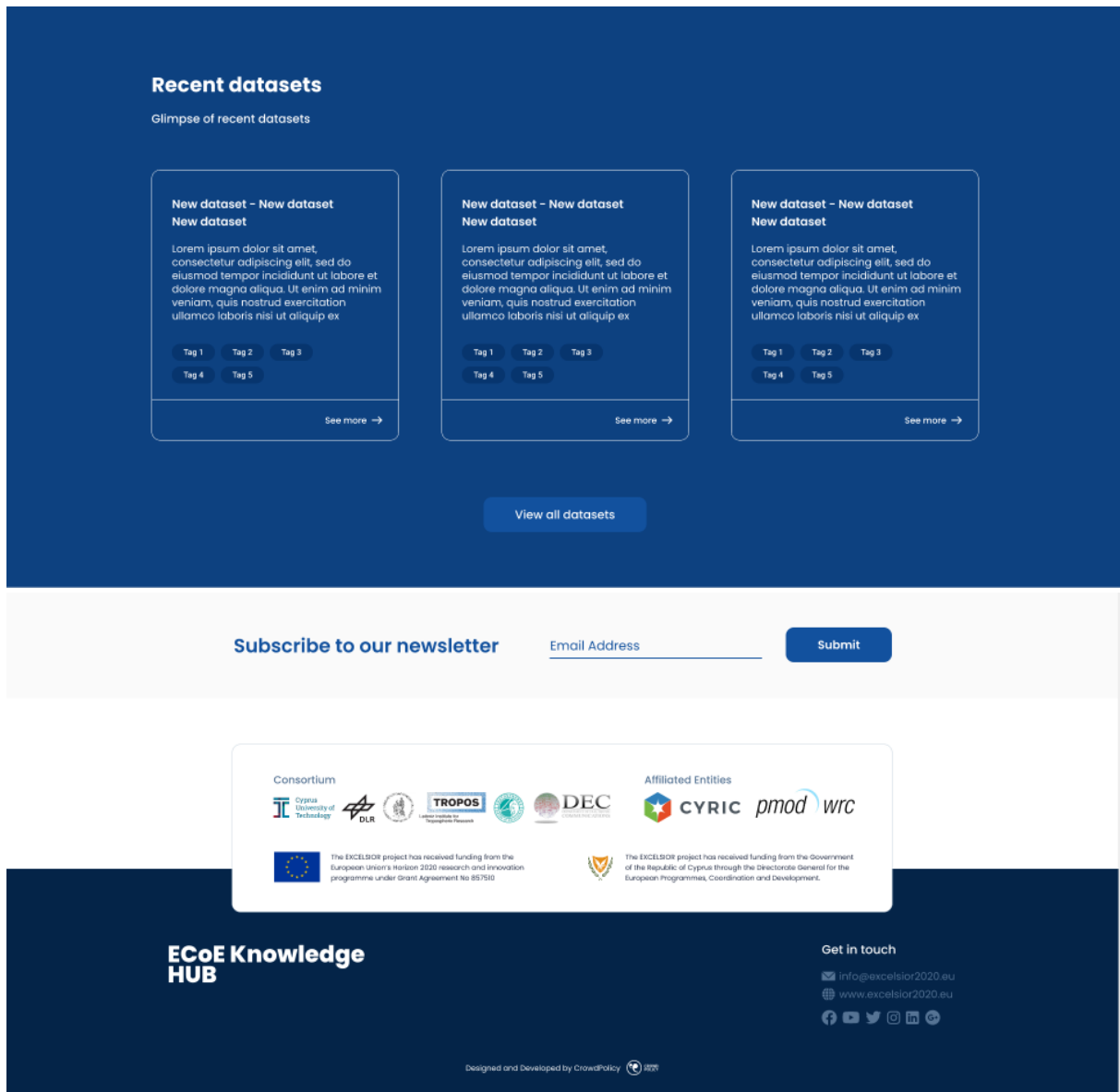


Figure 8: Knowledge Hub-Landing page

As illustrated by the above indicative landing page design, a non-exhaustive list of the services provided includes the following:

- Links that directly connect the two platforms developed within the project
- Member login functionality
- Project information section and subpage
- EO resources section, leading to subpages allocated to relevant Tools and Library items



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- New datasets section providing information on new datasets additions. It includes a link to the dataset management subsystem (CKAN), for browsing or searching the entire data catalogue available.
- A Projects section, leading to the Projects catalogue and to Project subpages, through multiple search, browsing and filtering options
- A Knowledge Base section, leading to subpages listing Case Studies, Courses and Tutorials, through multiple search, browsing and filtering options
- Newsletter functionality

### 3.4 Features

To facilitate and standardize access to data, the implementation of the project will investigate the opportunities available to aggregate curated data from the cloud-based platforms of the Copernicus Data and Information Access Services (DIAS), in order to provide centralised access to Copernicus data, information and processing tools. These platforms include Creodias, Sobloo, Mundi, Onda and Wekeo. The aggregation will be feasible in case open access APIs are available to harvest free of cost by the standardized harvesting standards and processes (e.g. DCAT, INSPIRE, REST APIs) that will be supported by the system.

The capabilities provided by the five DIAS online platforms can be beneficial to ECoE's Knowledge Hub and allow users to access and download Copernicus data and information. Each of the five competitive platforms also provides access to additional commercial satellite or non-space data sets as well as premium offers in terms of support or priority. The optimal approach to utilize and integrate these platforms into the ECoE Knowledge Hub will be discussed and decided among project partners.

**Cloud processing platforms** using AI can provide the following advanced capabilities: efficiency in computation time and memory occupation, costs of computer power on-site, automations, robustness, scalability and many others. It will be explored whether information mined from all Big Earth Data sources and processed by such platforms can be made available through the Knowledge Hub using the APIs provided. A variety of infrastructures for processing Earth Observation data has been developed and some of them are presented below indicatively:

- From private funds, e.g.
  - Google Earth engine, a web-based platform with a dedicated Python-API, (global coverage)
  - Amazon web services, a cloud platform with direct access to each band of Landsat products (global coverage)
- From the public sector, e.g.
  - Copernicus Open Access Hub (global coverage)
  - EUMETSAT Data Center (global coverage)
  - PANGEA (global coverage)
  - ESA thematic and mission exploration platforms (TEPs)
  - National space programs such as PEPS in France.



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- Swiss Data Cube (covering Switzerland)
- Digital Earth Australia (covering Australia)
- CODE-DE (global coverage)
- Earth Explorer from USGS (global coverage)
- List of open access & open data portals
  - <https://data.europa.eu/>
  - <https://data.gov.gr/>
  - <https://www.data.gov.cy/>
  - <https://data.worldbank.org/>
  - <https://open.unep.org/>
  - [Geo-Cradle Data hub](#)
  - <https://data.world/datasets/environment>
  - <https://geodata.gov.gr/en/>
  - <https://www.eea.europa.eu/data-and-maps>

If and to the extent required, the ability to harvest data using automated processes (APIs) from any of the above-mentioned sources will be assessed on a case-by-case basis, as specified by project partners, and depending on whether this service is provided by the source, and also on whether the above-mentioned cloud-based platforms provide the infrastructure and API end-points required. When the above services are provided on a commercial basis, then the possible allocation of the fees required will have to be decided by project partners.

Many systems provide only **discovery services for databases**, e.g. GDI-DE, CEOS, IDN, and some have catalogues of data products, with on-demand online ordering and delivery like DIMS and EOSDIS. The availability of free and large-volume open data are available as simple download FTP servers such as MODIS with the development of open geo-spatial consortium (OGC), with standardized discovery services for linking product catalogue metadata to direct download services.

The ECoE Knowledge Hub will technically support standardized harvesting processes (e.g. DCAT, inspire, REST APIs) that will allow for the aggregation of data or other relevant information of interest to and from the above-mentioned portals and platforms. The aggregation will be feasible concerning and to the extent that the information of interest is available through open access APIs. The aggregation of information that is available through APIs on a commercial basis will require the payment of the access fees demanded. This issue will be decided among project partners.

### 3.5 Licence outline

The use of publicly available information on the ECoE Knowledge Hub is proposed to be authorised under the Creative Commons Attribution 4.0 International (CC BY v. 4.0) licence that is developed by the [Creative Commons organization](#). The CC BY v. 4.0 licence is well-established among open data portals and it is used by, among others, the [European Open Data portal](#). CC BY allows users to copy, modify and distribute data in any format for any purpose, including commercial use. Users are only



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required to report and indicate if they have made any changes. More on the content of this license in the outline that follows.

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CREATIVE COMMONS ATTRIBUTION 4.0 LICENCE (CC BY)

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- The Licensor hereby grants a worldwide, royalty-free, non-sublicensable, non-exclusive, irrevocable licence to the public, to reproduce, share, produce Adapted Material with the Data. The Licensor shall not forbid the public from making technical modifications necessary to exercise the Licenced Rights.

**2. No downstream restrictions**

- The public may not impose any additional or different terms or conditions on, or apply any Effective Technological Measures to, the Data if doing so restricts exercise of the Licenced Rights by any recipient of the Data.

**3. No endorsement**

- Nothing in this licence may imply that the use of the Data by the public is connected with, or sponsored, endorsed, or granted official status by the Licensor.

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- Moral rights are not licenced under this licence, however, to the extent possible, the Licensor agrees not to assert any such rights held by the Licensor to the limited extent necessary to allow the public to exercise the Licenced Rights.
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**6. Disclaimer of Warranties and Limitation of Liability**

- The Licensor offers the Data as-is and as-available, and makes no representations or warranties, such as of merchantability, fitness for a particular purpose, accuracy, or the presence or absence of errors.
- In no event will the Licensor be liable for any costs, expenses, or damages arising out of this licence or use of the Data, except for gross negligence or wilful misconduct.



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### 3.6 Service Requirements

The ECoE Knowledge Hub will be a ***pool of open-source*** EO tools, algorithms, models and data for EMMENA thematic sectors. The platform will provide the functionality to make datasets available to end-users as files and through APIs. Similarly, it will be technically possible for the hub to harvest information from commercial sources, provided that these sources provide APIs that conform with established standards (DCAT, INSPIRE, etc.), and also provided that the project partners will decide for the allocation of the required access fees, on a case-by-case basis.

As the most important part of the Knowledge Hub, ***catalogues of descriptive metadata*** for various regional datasets will be included from in-situ monitoring networks, provided that these monitoring networks technically allow for automated metadata harvesting service. In case this service is provided on a commercial basis, then the possible allocation of the fees required will have to be decided by project partners.

Indicatively, the list of sources of interest to be examined includes:

- [Geo-Cradle Data hub](#)
- [Copernicus portal](#)
- [GEOSS](#)
- [European Data official portal](#)
- [Next geos](#)
- [Inspire portals](#)

If and to the extent required, the ability to harvest data using automated processes (APIs) from any of the above-mentioned sources will be assessed on a case-by-case basis, depending on whether this service is provided by the source. When this service is provided on a commercial basis, then the possible allocation of the fees required will have to be decided by project partners.

Furthermore, the following will also be investigated:

- The use of the recently developed EU data retrieval tools such as DIAS, EarthServer, EO Browser and also OpenDatacube.
- The access to databases available at big Earth Data-providing systems through a “federated search engine”.

Relevantly, it will be ensured that the proposed system will provide Analysis Ready Data using distributed info from highly scalable systems

Furthermore, the Knowledge Hub comprises information on **relevant past and ongoing research and innovation projects** from local to global level. A database will be included and updated occasionally with relevant links to key projects and platforms. These key projects will represent each domain of application for Earth Observation. Key projects to be linked are depicted at Table 1. For every project, basic information will be included such as abstract, Coordinator, Domain of expertise and webpage.



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Table 1: Key projects linked with ECoE Knowledge Hub

DOMAIN	PROJECTS
Fires	Firelogue, FirEUrisk, SILVANUS, Fire-RES, DRYADS, FIRE-IN, LessonsonFire, FIRE-IN
Agriculture	ENVISION, e-shape, Callisto, FOREST, SWSOIP, CROSS, CROSS 2, ...
Atmosphere	AIRSPACE, PM3, WebAir 2, LIDAR, BACCHUS, SIROCCO
Water	SAT-COAST, HYDRAULICS, WATERLEAKS, SEO-DWARF
Land	CASCADiS, EDAFOS
Disaster Risk Reduction	SATFLOOD, Decatastrophize, BEACHTECH
Cultural Heritage	IKAROS, RISKa, CLIMA, INCEPTION, PROTHEGO, ATHENA, Digital unblocking of holy islands, RESEARCH
Geo-informatics	MEDNET, THAL-CHOR, THAL-CHOR 2
Resilient Society	STEELCOR, ANAGENNISI, SMART GEMS, SAFER, PvroSION, ARinfuse
Education	CopHub.AC, SOFIA, FPA-FPCUP (WP2018)

In addition to the above-mentioned projects, a portfolio of **best practice examples** will be created. This portfolio will include ECoE EO applications, with an outlook for operationalization and commercialisation. Best practices will focus on specific sectors, e.g.:

- ESA Earth Observation Best Practice for Agro-Insurance
- [EARSC Portal](#)
- <https://lessonsonfire.eu/en/library>
- [MEDNET](#)
- [CASCADiS](#)

Last but not least, **training material** will be included to boost uptake of Copernicus and ECoE services to meet operational needs in EMMENA. Indicative sources include:

- [EO science for society](#)
- [EO4GEO](#)
- [RUS COPERNICUS](#)
- [ARSET NASA](#)

### 3.6 The software

The ECoE Knowledge Hub may provide a full range service for:

- Discovery services for data sets and data products
- View service with on-map or on-chart data visualizations, if appropriate, depending on the nature of data
- Direct download service
- Processing environment with online data access (CKAN)
- User management services

Moreover:



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- To fully exploit a continuous data stream of information, the ECoE knowledge hub will be consist of the necessary subsystems and Infrastructure, such as: portal, user management subsystem, harvester and archive subsystem, search, view and access functionalities, processing environment (CKAN), value added products (datasets, tools, etc), monitoring and reporting services (system error logging).
- The ECoE knowledge hub platform will be developed using state of the art Project management, Product assurance and System engineering approaches.
- Contact form-based Help desk functionality will be available for users to contact the system administrator regarding platform operations

The design of the Knowledge Hub is built on Wordpress and CKAN. Both allow semantic annotation of its content. ECoE Knowledge Hub expands on the knowledge and expertise gained from the development of GEO-CRADLE Regional Data Hub, adding functionalities and content.

### **3.7 Capabilities of the platform**

#### **Capabilities of the Technical Solution (CKAN)**

The proposed data management and presentation tool is CKAN, the leading community-driven, free and open-source open data platform that gives organizations and individuals a high degree of freedom to publish and consume structured information (<https://ckan.org/>)

CKAN is the leading data management system that enables the publishing of open data using open-source tools. CKAN integrates open data catalogue features into an existing CMS. It enables the sharing of data in dynamic ways and datasets are treated as content that can unlock rich workflows, providing a high-quality experience of a data management system.

An overview of the general capabilities of the proposed application of CKAN is described below. The proposed application will be extended to support the project objectives.

#### **General capabilities**

The proposed application of CKAN is an open-source data platform containing a complete suite of data and content management with categorization and visualization features that help organizations present public data in easily understandable formats. It provides capabilities for loading analytics, publishing, a variety of data types such as spreadsheets, text files and maps.

#### **I. Data publishers and Benefits**

The proposed application of CKAN brings together the following features about Data Publishers:

- Meets DCAT specifications
- Provides metadata management capabilities, including automatic creation of data.json files
- Complete data and content management system
- Full capabilities of visualization and mapping tools
- Secure data management (roles, groups, permissions)



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- Multi-level access for public and internal audiences
- Easily customizable look of the website with logo and colours
- Search with many possibilities
- Publish data in computer-readable format using basic open data standards, including JSON, XML, RDF, DCAT
- Addition of individual datasets via API or other applications
- Link files within each data set
- Store data either directly on CKAN or on external websites
- Automated collection, transfer or import of large-scale data.

## II. Data users - Benefits

The proposed application brings together the following features about Data Users. Researchers, journalists, entrepreneurs and developers can use CKAN in a number of ways:

- Easy download of any data source in multiple formats
- Pre-display data sheets as tables, charts or maps
- Extensive keyword search for all data
- Real-time access APIs for web and mobile application development
- Rating, comment and feedback on data sources
- Easy data sharing with other users

## III. Organizations

In the proposed application, the Organization is a wrapper that contains information, sorted into datasets. One Organization provides answers to key questions, such as: "Who provides the data" and "Under what circumstances?"

## IV. Datasets

The proposed application allows authorized users to create datasets that act as collections of data sources.

## V. Resources

A source is an uploaded or externally-referenced file or API within a data set. Sources can be either an uploaded file or a URL to a file offline or the endpoint of an API that can be used to retrieve data from an external service. By default, the proposed application allows you to upload any type of file. PDF, MS Word documents, HTML and image files are treated as data sources.

## VI. Data store

Many of the data sources added to CKAN contain structured data. The proposed application can export and store this information in data sources that can be accessed through an API. CKAN makes data easy to search, sort and visualize.

The file types that can be parsed include:



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- .xml
- .csv
- GeoJSON

## VII. User roles and authentication

The proposed application provides a complete graphical user interface for creating and managing user accounts, user roles, and workflows.

At the application level, user roles are:

- Super admin
- User

## VIII. User roles

At the organization level, user roles are:

- Member: can only view available datasets
- Editor: the above, plus can create (edit/ delete) a new dataset (private or published) to the organization
- Admin: the above, plus can add (or remove) users to the organization, to delete the organization, etc.

## IX. Registration

There are three registration methods available.

- A. From the User Menu. The user navigates to the Registration menu and registers by filling in the registration form. The administrator then activates the user, giving him a role and access to the rest of his Profile settings.
- B. Upon registering, a two-step verification process follows, consisting of email verification and approval by the administrator.
- C. The administrator can add a user from the administration menu. The administrator can change the role of a user.

## X. User Login

The user logs into the application using the dedicated login form as long as he is a registered user.

## XI. Add dataset

Datasets can be added by the system administrator and also by the administrator and the editor of each organization.



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Datasets are imported from the Dataset menu. Users can follow the indicated steps to complete the process. It is important that by using the Organization content visibility option the user can make the data set visible only to the members of the Organization he belongs to.

## **XII. Resource Import**

Sources in CKAN are files and APIs. A source is imported when the Dataset is created or after it has been created.

## **XIII. Add Organization**

All users can enter an Organization. Admin and editor users can manage their Organization.

## **XV. API support**

### **A. Metadata**

The CKAN platform supports Api for "Metadata" datasets in both Json and Rdf presentation formats.

### **B. Data**

The CKAN platform supports Api for datasets in both Json and Rdf presentation formats.

### **C. Organic groups**

The admin menu provides access to the setting needed to enable the change appearance feature.

## **Further technical and operational specifications**

This section specifies the capabilities of the platform and defines the state-of-the-art. The table below provides some of the initial actions that are needed in order to define the configuration of the platform.

Overall, high availability cloud-based infrastructure will be provisioned to host the platform. The cloud infrastructure will provide the necessary resources for all platform's subsystems ensuring high availability and strong system security. The platform will be supported by the following distinct and interoperable subsystems:

- User-friendly UI Interfaces - Information Architecture
  - Visualization of datasets (for example: grids, graphs and maps)
  - Dashboards presenting data sets metadata which conform to relevant standards (DCAT, INSPIRE, etc.) and contain additional fields such as keywords, thematic, per project partner, etc., as deemed desirable by project partners
  - Support datasets search and download
- Registration subsystem
  - Users registration and authentication to access the platform
- Template engine that supports the flexible creation of portfolios, reports and data modelling
  - Ability to model datasets based on the business needs of companies



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- Automated tools in visualizing data in reports or maps if appropriate, depending on the nature of data
- Templates for statistical reporting and geomapping
- Central storage and processing subsystem for complex and simple data structures
  - Support partitions for each customer data
  - Automated data import of complex or simple data structures from open datasets (i.e., csv, json), repositories, data hubs, open crowdsourcing data platforms, open datasets of academic papers such as Open Educational Resources (OER) including Lessons, Best practices, Academic papers. Focus will be given to specialized portals compatible with relevant applicable standards (INSPIRE, DCAT, DCAN, etc.). Further compatibility requirements will be investigated.
- Interoperability subsystem for the automatic disclosure of data sets to and from third party systems
  - Export of imported datasets following standard formats, i.e. csv, xml, json, over well-defined REST APIs and through the UI
  - Support dataset search and updates over APIs thus enabling users (partners and stakeholders) to remain easily updated with the latest data available

### **Horizontal specifications**

- The system will operate as an internet application so that it can be accessed via the Internet and via desktops and will be compatible with cloud computing infrastructure.
- Open-source technologies and open-source software will be used so that there are no software licensing costs and the platform can be expanded in the future independently of the developer and its maintainer. Strict security standards will be observed as the data that will be stored will be very sensitive and their safe storage and management will be ensured
- Interface based on Internet technologies: All functions will be offered via the web, while the interface will be developed using the latest capabilities of interface technologies, based on the instructions of the WCAG standard. Access is possible through more than one of the most widely used Internet browsers (Mozilla Firefox, Opera, Apple Safari, Edge, etc.), without the need for additional application installation (excluding mobile applications).
- Implementation of applications with open-source open CMS for content and information management. The technology that will be used will be a modern web-based content management tool (CMS - Content Management System) with a modular architecture, which will have the ability to be supported by a large community of users. In addition, it will support a large number of combinations of computer system architecture, operating system (cross platform) and database management system.
- Support of the English and Greek languages. The system will be able to support additional languages



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### **3.8 Security**

The security and storage of data is based on the integrity and authorized access mechanisms provided by the established and widely used CKAN and Wordpress software on which the ECoE Knowledge Hub will be based.

### **3.9 Training material**

The ECoE knowledge hub will be supplied with e-learning material in the form of user manuals. The material will be comprehensive and easy to understand for the non-expert user. It will cover the functionalities of the hub in full.



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## 4. CONCLUSIONS

ECoE aims to create a sustainable network to enable the engagement of regional stakeholders across the complete EO value chain (scientists, policy makers etc.), and to act as an interface to EO initiatives in the EMMENA region. To do this, the EXCELSIOR consortium is committed to implementing an inclusive Networking Platform and a Knowledge Hub described in this Deliverable. These two platforms will be a centralised information pot for all existing EO information. It will include information in a user-friendly environment and many more features that will be assessed for their usefulness during the next period.

In essence, the Networking platform and the Knowledge Hub aim to support and to connect the following the following three complementary dimensions:

- **Research:** to perform excellent joint research in order to respond to questions arising from the ECoE's Strategic Research Agenda;
- **Networking:** through the Networking Platform, to build a progressive long-lasting network in order to increase and facilitate transnational cooperation and coordination between excellent researchers, researchers' groups and research organisations;
- **Capacity building:** to prove the opportunity to develop research capacity, to join learning and training activities (e.g. mobility) and to share research infrastructures.

This deliverable presents the first decisions and choices made to arrive at a description of the ECoE Networking and Knowledge platforms at architecture level. This architecture is based on a list of needs which the ECoE intends to demonstrate using the platforms. All the specifications will be discussed in detail between the consortium partners to make sure that the end product will be user friendly with a high impact in the community. The upcoming deliverable (D8.6) will provide a more mature version of the two platforms.