# Horizon 2020

# Call: H2020-SC5-2016-2017
(Greening the Economy)

# Topic: SC5-20-2016

# Type of action: RIA
(Research and Innovation action)

# Proposal number: 730260

# Proposal acronym: EuroGEOSS-Hub

Deadline Id: H2020-SC5-2016-OneStageB
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*How to fill in the forms*

The administrative forms must be filled in for each proposal using the templates available in the submission system. Some data fields in the administrative forms are pre-filled based on the previous steps in the submission wizard.

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub**

# 1 - General information

| | |
|---|---|
| Topic | SC5-20-2016 |
| Call Identifier | H2020-SC5-2016-2017 |
| Type of Action | RIA |
| Deadline Id | H2020-SC5-2016-OneStageB |

| | |
|---|---|
| Acronym | EuroGEOSS-Hub |
| Proposal title* | EuroGEOSS-Hub: the European approach to Data Hub for GEOSS |

*Note that for technical reasons, the following characters are not accepted in the Proposal Title and will be removed: < > " &*

| | | | |
|---|---|---|---|
| Duration in months | *48* | | |
| Fixed keyword 1 | *Earth Observation / Services and applications* | Add | |
| Fixed keyword 2 | *Cloud computing* | Add | Remove |
| Fixed keyword 3 | *Earth observations from space/remote sensing* | Add | Remove |
| Free keywords | *Sustainable Development Goals, Brokering technology, Big Data, Data Hub* | | |

## *Abstract*

*The EuroGEOSS-Hub is an innovative web-based platform overcoming the fragmentation of the European landscape of public and private Earth Observation (EO) data infrastructures. The Hub facilitates access and processing of multiple EO data and information streams, particularly from in-situ networks, and complements the Copernicus dissemination platforms developed by the EC and Member States. Thus, it maximizes the synergy between European space and non-space data to advance European science, policy, and growth of European business. The EuroGEOSS-Hub focuses initially on four challenges: Forest wildfire modelling, Extreme Weather-Global Floods, Sea Level Rise and Coastal Impact, and the EU monitoring of Sustainable Development Goals. These challenges are addressed in thematic applications integrated in three cross-domain research activities: (i) interoperability across Big Data platforms (Cloud and HPC platforms), (ii) the integration of space and in-situ EO data streams from Copernicus, INSPIRE, and the private sector, and (iii) the measurement of the benefits for policy, scientific and business communities. Each will be integrated into the EuroGEOSS-Hub platform to test both the platform design and the implementation of the product processing chains. The project will also develop a business model for long-term sustainability taking into account technical, economic, and legal aspects, and foster exploitation of EO beyond traditional sectors. Embedded in the European legal framework including data protection, IPR, and consumer protection, the EuroGEOSS-Hub aims to be the platform of choice for EO among public administrations and the private sector to develop innovative applications for the benefit of Europe. The EuroGEOSS-Hub has a strong international dimension with global partners, including China, the US, and Australia, to address shared issues on the interoperability and governance of GEOSS, and the achievement of the Sustainable Development Goals.*

Remaining characters 17

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub**

Has this proposal (or a very similar one) been submitted in the past 2 years in response to a call for proposals under the 7th Framework Programme, Horizon 2020 or any other EU programme(s)? ○ Yes ◉ No

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub**

## Declarations

| | |
|---|---|
| 1) The coordinator declares to have the explicit consent of all applicants on their participation and on the content of this proposal. | ☒ |
| 2) The information contained in this proposal is correct and complete. | ☒ |
| 3) This proposal complies with ethical principles (including the highest standards of research integrity — as set out, for instance, in the European Code of Conduct for Research Integrity — and including, in particular, avoiding fabrication, falsification, plagiarism or other research misconduct). | ☒ |

4) The coordinator confirms:

| | |
|---|---|
| - to have carried out the self-check of the financial capacity of the organisation on http://ec.europa.eu/research/participants/portal/desktop/en/organisations/lfv.html or to be covered by a financial viability check in an EU project for the last closed financial year. Where the result was "weak" or "insufficient", the coordinator confirms being aware of the measures that may be imposed in accordance with the H2020 Grants Manual (Chapter on Financial capacity check); or | ○ |
| - is exempt from the financial capacity check being a public body including international organisations, higher or secondary education establishment or a legal entity, whose viability is guaranteed by a Member State or associated country, as defined in the H2020 Grants Manual (Chapter on Financial capacity check); or | ◉ |
| - as sole participant in the proposal is exempt from the financial capacity check. | ○ |

5) The coordinator hereby declares that each applicant has confirmed:

| | |
|---|---|
| - they are fully eligible in accordance with the criteria set out in the specific call for proposals; and | ☒ |
| - they have the financial and operational capacity to carry out the proposed action. | ☒ |

The coordinator is only responsible for the correctness of the information relating to his/her own organisation. Each applicant remains responsible for the correctness of the information related to him/her and declared above. Where the proposal to be retained for EU funding, the coordinator and each beneficiary applicant will be required to present a formal declaration in this respect.

According to Article 131 of the Financial Regulation of 25 October 2012 on the financial rules applicable to the general budget of the Union (Official Journal L 298 of 26.10.2012, p. 1) and Article 145 of its Rules of Application (Official Journal L 362, 31.12.2012, p.1) applicants found guilty of misrepresentation may be subject to administrative and financial penalties under certain conditions.

**Personal data protection**

Your reply to the grant application will involve the recording and processing of personal data (such as your name, address and CV), which will be processed pursuant to Regulation (EC) No 45/2001 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data. Unless indicated otherwise, your replies to the questions in this form and any personal data requested are required to assess your grant application in accordance with the specifications of the call for proposals and will be processed solely for that purpose. Details concerning the processing of your personal data are available on the privacy statement. Applicants may lodge a complaint about the processing of their personal data with the European Data Protection Supervisor at any time.

Your personal data may be registered in the Early Warning System (EWS) only or both in the EWS and Central Exclusion Database (CED) by the Accounting Officer of the Commission, should you be in one of the situations mentioned in:
-the Commission Decision 2008/969 of 16.12.2008 on the Early Warning System (for more information see the Privacy Statement), or
-the Commission Regulation 2008/1302 of 17.12.2008 on the Central Exclusion Database (for more information see the Privacy Statement) .

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub**

# List of participants

| # | Participant Legal Name | Country |
|---|---|---|
| 1 | BUREAU DE RECHERCHES GEOLOGIQUES ET MINIERES | France |
| 2 | JRC -JOINT RESEARCH CENTRE- EUROPEAN COMMISSION | Belgium |
| 3 | CONSIGLIO NAZIONALE DELLE RICERCHE | Italy |
| 4 | UNIVERSITAT AUTONOMA DE BARCELONA | Spain |
| 5 | COLLECTE LOCALISATION SATELLITES SA | France |
| 6 | CENTRO DE INVESTIGACION ECOLOGICA YAPLICACIONES FORESTALES | Spain |
| 7 | EUROPEAN ASSOCIATION OF REMOTE SENSING COMPANIES | Belgium |
| 8 | UNIVERSITE DE GENEVE | Switzerland |
| 9 | UNIVERSITY OF GLASGOW | United Kingdom |
| 10 | CLOUDSIGMA AG | Switzerland |
| 11 | EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS | United Kingdom |
| 12 | ATOS ORIGIN INTEGRATION SAS | France |
| 13 | BARCELONA SUPERCOMPUTING CENTER - CENTRO NACIONAL DE SUPERCOMPUTACION | Spain |
| 14 | 52°North Initiative for Geospatial Open Source Software GmbH | Germany |
| 15 | Institute of Remote Sensing and Digital Earth,CAS | China (People's Republic of) |
| 16 | Global Reporting Initiative | Netherlands |
| 17 | THE UNIVERSITY OF READING | United Kingdom |
| 18 | CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE | France |
| 19 | UNIVERSITY OF NEW SOUTH WALES | Australia |
| 20 | DHI | Denmark |
| 21 | NATURAL ENVIRONMENT RESEARCH COUNCIL | United Kingdom |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub**

| # | Participant Legal Name | Country |
|---|---|---|
| 22 | AGENZIA REGIONALE PER LA PREVENZIONE, L'AMBIENTE E L'ENERGIA DELL'EMILIA-ROMAGNA | Italy |
| 23 | Stichting EGI | Netherlands |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **BRGM**

# 2 - Administrative data of participating organisations

| ***PIC*** | ***Legal name*** |
|---|---|
| *999993662* | *BUREAU DE RECHERCHES GEOLOGIQUES ET MINIERES* |

*Short name: BRGM*

*Address of the organisation*

Street Quai Andre Citroen - Tour Mirabeau 39-43

Town PARIS

Postcode 75739

Country France

Webpage www.brgm.fr

*Legal Status of your organisation*

**Research and Innovation legal statuses**

Public body ..... yes
Non-profit ..... yes
International organisation ..... unknown
International organisation of European interest ..... unknown
Secondary or Higher education establishment ..... no
Research organisation ..... no
Legal person ..... yes

**Enterprise Data**

SME self-declared status ..... 2011 - no
SME self-assessment ..... unknown
SME validation sme ..... 2011 - no

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: 721 - Research and experimental development on natural sciences and engineering

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **BRGM**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: Direction of Information Systems ☐ not applicable

☐ Same as organisation address

Street: 3 Avenue Claude-Guillemin

Town: ORLEANS Cedex 2

Postcode: 45060

Country: France

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **BRGM**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr. Sex: (•) Male ( ) Female

First name **François** Last name **ROBIDA**

E-Mail **f.robida@brgm.fr**

Position in org.: Deputy Head Direction of Information Systems

Department: Direction of Information Systems ☐ Same as organisation

☐ Same as organisation address

Street: 3 Avenue Claude-Guillemin

Town: ORLEANS Cedex 2 Post code: 45060

Country: France

Website: www.brgm.fr

Phone 1: +33 2 38643132 Phone 2: +xxx xxxxxxxxx Fax: +33 2 38643840

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Frédérique | MOJON LUMIER | f.mojonlumier@brgm.fr | +33238643124 |
| Francis | BERTRAND | f.bertrand@brgm.fr | +33238643670 |
| Amélie | VAGNER | a.vagner@brgm.fr | +33238643322 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **JRC**

| ***PIC*** | ***Legal name*** |
|---|---|
| *999992304* | *JRC -JOINT RESEARCH CENTRE- EUROPEAN COMMISSION* |

## *Short name: JRC*

### *Address of the organisation*

Street Rue de la Loi 200

Town BRUSSELS

Postcode 1049

Country Belgium

Webpage http://www.jrc.ec.europa.eu

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... yes
Non-profit ..... yes
International organisation ..... no
International organisation of European interest ..... no
Secondary or Higher education establishment ..... no
Research organisation ..... yes

Legal person ..... yes

### Enterprise Data

SME self-declared status ..... 2007 - no
SME self-assessment ..... unknown
SME validation sme ..... 2007 - no

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: -

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **JRC**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: EC DG Joint Research Centre Digital Earth and Reference Data Unit ☐ not applicable

☐ Same as organisation address

Street: TP262, Via E Fermi

Town: ISPRA

Postcode: 21027

Country: Italy

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **JRC**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: (•) Male ( ) Female

First name: **Massimo** Last name: **CRAGLIA**

E-Mail: **massimo.craglia@jrc.ec.europa.eu**

Position in org.: Senior Scientist

Department: Digital Earth& Reference Data Unit, Institute for Environnement&S ☐ Same as organisation

☐ Same as organisation address

Street: T¨P262, Via E.Fermi

Town: ISPRA Post code: 21027

Country: Italy

Website: www.ec.europa.eu/jrc

Phone 1: +39 0332786269 Phone 2: +xxx xxxxxxxxx Fax: +39 0332786325

## *Other contact persons*

| *First Name* | *Last Name* | *E-mail* | *Phone* |
|---|---|---|---|
| Irene | Apolloner | irene.apolloner@ec.europa.eu | +39 (0332) 78 5080 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **CNR**

| ***PIC*** | ***Legal name*** |
|---|---|
| *999979500* | *CONSIGLIO NAZIONALE DELLE RICERCHE* |

*Short name: CNR*

*Address of the organisation*

Street PIAZZALE ALDO MORO 7

Town ROMA

Postcode 00185

Country Italy

Webpage www.cnr.it

*Legal Status of your organisation*

**Research and Innovation legal statuses**

Public body ..... yes
Non-profit ..... yes
International organisation ..... no
International organisation of European interest ..... no
Secondary or Higher education establishment ..... no
Research organisation ..... yes
Legal person ..... yes

**Enterprise Data**

SME self-declared status ..... 2015 - no
SME self-assessment ..... unknown
SME validation sme ..... 2007 - no

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: 721 - Research and experimental development on natural sciences and engineering

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **CNR**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: Istituto sull'Inquinamento Atmosferico - UOS Firenze ☐ not applicable

☐ Same as organisation address

Street: Via Madonna del Piano 10

Town: Sesto Fiorentino

Postcode: 50019

Country: Italy

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **CNR**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: (•) Male ( ) Female

First name: **Stefano** Last name: **NATIVI**

E-Mail: **stefano.nativi@cnr.it**

Position in org.: Head of the CNR-IIA - UOS Firenze

Department: Istituto sull'Inquinamento Atmosferico - UOS Firenze ☐ Same as organisation

☐ Same as organisation address

Street: Via Madonna del Piano 10

Town: Sesto Fiorentino Post code: 50019

Country: Italy

Website: http://www.uos-firenze.essi-lab.eu/

Phone 1: +390555226590 Phone 2: +393406428427 Fax: *+xxx xxxxxxxxx*

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Paolo | MAZZETTI | paolo.mazzetti@cnr.it | +390555226591 |
| Mariella | LIBERTI | maria.liberti@cnr.it | +390555226592 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **UAB**

| ***PIC*** | ***Legal name*** |
|---|---|
| *999986484* | *UNIVERSITAT AUTONOMA DE BARCELONA* |

## *Short name: UAB*

### *Address of the organisation*

Street CAMPUS DE LA UAB BELLATERRA

Town CERDANYOLA BARCELONA

Postcode 08193

Country Spain

Webpage http://www.uab.es

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... yes

Non-profit ..... yes

International organisation ..... no

International organisation of European interest ..... no

Secondary or Higher education establishment ..... yes

Research organisation ..... yes

Legal person ..... yes

### Enterprise Data

SME self-declared status ..... 2007 - no

SME self-assessment ..... unknown

SME validation sme ..... 2007 - no

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: 853 - Higher education

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **UAB**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: Computer Architecture and Operating Systems Department ☐ not applicable

☐ Same as organisation address

Street: Carrer de les Sitges s/n - Block Q

Town: Cerdanyola del Vallès (Barcelona)

Postcode: 08193

Country: Spain

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **UAB**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: ○ Male ◉ Female

First name: **Ana** Last name: **CORTES FITE**

E-Mail: **ana.cortes@uab.cat**

Position in org.: Associate Professor

Department: Computer Architecture and Operating Systems Department ☐ Same as organisation

☐ Same as organisation address

Street: Carrer de les Sitges s/n - Block Q

Town: Cerdanyola del Vallès (Barcelona) Post code: 08193

Country: Spain

Website: http://grupsderecerca.uab.cat/hpca4se/en

Phone 1: +34935812607 Phone 2: +34935811990 Fax: +34935812478

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Tomas | Margalef | tomas.margalef@uab.cat | +935813537 |
| Alejandra | Campos | alejandra.campos@uab.cat | +935814964 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **CLS**

| ***PIC*** | ***Legal name*** |
|---|---|
| *998142126* | *COLLECTE LOCALISATION SATELLITES SA* |

## *Short name: CLS*

### *Address of the organisation*

Street RUE HERMES 8

Town RAMONVILLE ST AGNE

Postcode 31520

Country France

Webpage www.cls.fr

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... no

Non-profit ..... no

International organisation ..... no

International organisation of European interest ..... no

Secondary or Higher education establishment ..... no

Research organisation ..... no

Legal person ..... yes

### Enterprise Data

SME self-declared status ..... 2007 - no

SME self-assessment ..... unknown

SME validation sme ..... 2007 - no

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: 93 - Sports activities and amusement and recreation activities

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **CLS**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: DOS/SERVICE PRODUCT DISSEMINATION ☐ not applicable

☐ Same as organisation address

Street: 11 RUE HERMES PARC TECH DU CANAL

Town: RAMONVILLE SAINT AGNE

Postcode: 31520

Country: France

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **CLS**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mrs

Sex: ○ Male ◉ Female

First name: **Sophie**

Last name: **BESNARD**

E-Mail: **sbesnard@cls.fr**

Position in org.: HEAD OF PRODUCT DISSEMINATION DEPARTMENT

Department: DOS/SERVICE PRODUCT DISSEMINATION DEPARTMENT ☐ Same as organisation

☒ Same as organisation address

Street: RUE HERMES 8

Town: RAMONVILLE ST AGNE Post code: 31520

Country: France

Website: www.cls.fr

Phone 1: +33 561 394 656 Phone 2: +33 615 699 432 Fax: +33 561 393 782

## *Other contact persons*

| *First Name* | *Last Name* | *E-mail* | *Phone* |
|---|---|---|---|
| Sylvie | d'Alessio | sdalessio@cls.fr | +33561394833 |
| Estelle | Obligis | eobligis@cls.fr | +33561393761 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **CREAF**

| ***PIC*** | ***Legal name*** |
|---|---|
| *998880005* | *CENTRO DE INVESTIGACION ECOLOGICA YAPLICACIONES FORESTALES* |

## *Short name: CREAF*

### *Address of the organisation*

Street UNIVERSITAT AUTONOMA DE BARCELONA

Town BELLATERRA

Postcode 08193

Country Spain

Webpage http://www.creaf.uab.es/

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... yes

Non-profit ..... yes

International organisation ..... no

International organisation of European interest ..... no

Secondary or Higher education establishment ..... no

Research organisation ..... yes

Legal person ..... yes

### Enterprise Data

SME self-declared status ..... 2007 - yes

SME self-assessment ..... unknown

SME validation sme ..... 2007 - no

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: 721 - Research and experimental development on natural sciences and engineering

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **CREAF**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: CREAF - Ecology ☐ not applicable

☒ Same as organisation address

Street: UNIVERSITAT AUTONOMA DE BARCELONA EDIFIC

Town: BELLATERRA

Postcode: 08193

Country: Spain

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **CREAF**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: (•) Male ( ) Female

First name: **Joan** Last name: **Maso**

E-Mail: **joan.maso@uab.es**

Position in org.: Senior researcher

Department: CREAF - Grumets ☐ Same as organisation

☒ Same as organisation address

Street: UNIVERSITAT AUTONOMA DE BARCELONA EDIFICI C

Town: BELLATERRA Post code: 08193

Country: Spain

Website: www.creaf.es

Phone 1: +34935811771 Phone 2: +34935811312 Fax: +34935814151

## *Other contact persons*

| *First Name* | *Last Name* | *E-mail* | *Phone* |
|---|---|---|---|
| Cristina | Garcia | c.garcia@creaf.uab.es | +34935868007 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **EARSC**

| ***PIC*** | ***Legal name*** |
|---|---|
| *952204478* | *EUROPEAN ASSOCIATION OF REMOTE SENSING COMPANIES* |

## *Short name: EARSC*

### *Address of the organisation*

Street RUE BERANGER 26

Town BRUXELLES

Postcode 1190

Country Belgium

Webpage www.earsc.org

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... no

Non-profit ..... yes

International organisation ..... no

International organisation of European interest ..... no

Secondary or Higher education establishment ..... no

Research organisation ..... no

Legal person ..... yes

### Enterprise Data

SME self-declared status..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: 941 - Activities of business, employers and professional membership organizations

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **EARSC**

## *Department(s) carrying out the proposed work*

**No departement involved**

Department name ☒ not applicable

☐ Same as organisation address

Street *Please enter street name and number.*

Town

Postcode

Country

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **EARSC**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr.

Sex: (•) Male ( ) Female

First name: **Geoff**

Last name: **Sawyer**

E-Mail: **geoff.sawyer@earsc.org**

Position in org.: Secretary General

Department: EUROPEAN ASSOCIATION OF REMOTE SENSING COMPANIES ☒ Same as organisation

☒ Same as organisation address

Street: RUE BERANGER 26

Town: BRUXELLES

Post code: 1190

Country: Belgium

Website: www.earsc.org

Phone 1: 0032476737564

Phone 2: +xxx xxxxxxxxx

Fax: +xxx xxxxxxxxx

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Monica | Miguel-Lago | secretariat@earsc.org | 0034639584684 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **UNIGE**

| ***PIC*** | ***Legal name*** |
|---|---|
| *999974650* | *UNIVERSITE DE GENEVE* |

## *Short name: UNIGE*

### *Address of the organisation*

Street RUE DU GENERAL DUFOUR 24

Town GENEVE

Postcode 1211

Country Switzerland

Webpage www.unige.ch

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... yes

Non-profit ..... yes

International organisation ..... no

International organisation of European interest ..... no

Secondary or Higher education establishment ..... yes

Research organisation ..... yes

Legal person ..... yes

### Enterprise Data

SME self-declared status ..... 2007 - no

SME self-assessment ..... unknown

SME validation sme ..... 2007 - no

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: - - Not applicable

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: ISE/enviroSPACE ☐ not applicable

☐ Same as organisation address

Street: 66 Bd Carl-Vogt

Town: Geneva

Postcode: 1205

Country: Switzerland

**Department 2**

Department name: ISE/GRID ☐ not applicable

☐ Same as organisation address

Street: 66 Bd Carl-Vogt

Town: Geneva

Postcode: 1205

Country: Switzerland

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **UNIGE**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Prof. Sex: (•) Male ( ) Female

First name: **Anthony** Last name: **Lehmann**

E-Mail: **anthony.lehmann@unige.ch**

Position in org.: Associate Professor

Department: enviroSPACE ☐ Same as organisation

☐ Same as organisation address

Street: 66 Bd. Carl-Vogt

Town: Geneva Post code: 1205

Country: Switzerland

Website: www.unige.ch/envirosapce

Phone 1: +41223790021 Phone 2: +41763917765 Fax: +xxx xxxxxxxxx

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Nicolas | Ray | nicolas.ray@unige.ch | +41223790784 |
| Grégory | Giuliani | gregory.giuliani@unepgrid.ch | +41223790709 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **UBDC**

| ***PIC*** | ***Legal name*** |
|---|---|
| *999974165* | *UNIVERSITY OF GLASGOW* |

## *Short name: UBDC*

### *Address of the organisation*

Street UNIVERSITY AVENUE

Town GLASGOW

Postcode G12 8QQ

Country United Kingdom

Webpage www.gla.ac.uk

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... yes

Non-profit ..... yes

International organisation ..... unknown

International organisation of European interest ..... unknown

Secondary or Higher education establishment ..... yes

Research organisation ..... yes

Legal person ..... yes

### Enterprise Data

SME self-declared status ..... unknown

SME self-assessment ..... unknown

SME validation sme ..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: 853 - Higher education

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **UBDC**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: Urban Big Data Centre ☐ not applicable

☐ Same as organisation address

Street: 7 Lilybank Gardens

Town: Glasgow

Postcode: G12 8RZ

Country: United Kingdom

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **UBDC**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr. Sex: (•) Male ( ) Female

First name: **Keith** Last name: **Dingwall**

E-Mail: **keith.dingwall@glasgow.ac.uk**

Position in org.: Senior Business Manager

Department: Urban Big Data Centre ☐ Same as organisation

☐ Same as organisation address

Street: 7 Lilybank Gardens

Town: Glasgow Post code: G12 8RZ

Country: United Kingdom

Website: http://ubdc.ac.uk/

Phone 1: +44 141 3304752 Phone 2: +4407931247595 Fax: +xxx xxxxxxxxx

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Joe | Galloway | rso-ecas@glasgow.ac.uk | +441413303884 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **CloudSigma**

| ***PIC*** | ***Legal name*** |
|---|---|
| *969018264* | *CLOUDSIGMA AG* |

## *Short name: CloudSigma*

### *Address of the organisation*

Street SAGEREISTRASSE 29

Town GLATTBRUGG

Postcode 8152

Country Switzerland

Webpage www.cloudsigma.com

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... no

Non-profit ..... no

International organisation ..... no

International organisation of European interest ..... no

Secondary or Higher education establishment ..... no

Research organisation ..... no

Legal person ..... yes

### Enterprise Data

SME self-declared status ..... 2010 - yes

SME self-assessment ..... unknown

SME validation sme ..... 2010 - yes

**Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.**

NACE Code: 72 - Scientific research and development

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **CloudSigma**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: Research ☐ not applicable

☒ Same as organisation address

Street: SAGEREISTRASSE 29

Town: GLATTBRUGG

Postcode: 8152

Country: Switzerland

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **CloudSigma**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr. Sex: (•) Male ( ) Female

First name: **Robert** Last name: **Jenkins**

E-Mail: **robert@cloudsigma.com**

Position in org.: CEO

Department: CLOUDSIGMA AG ☒ Same as organisation

☒ Same as organisation address

Street: SAGEREISTRASSE 29

Town: GLATTBRUGG Post code: 8152

Country: Switzerland

Website: www.cloudsigma.com

Phone 1: +359 87 901 4134 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Vanya | Nikova | vanya.nikova@cloudsigma.com | +359 877 035 187 |
| Peter | Gray | peter.gray@cloudsigma.com | +359 879 014 134 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **ECMWF**

| ***PIC*** | ***Legal name*** |
|---|---|
| *999916741* | *EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS* |

## *Short name: ECMWF*

### *Address of the organisation*

Street SHINFIELD PARK

Town READING

Postcode RG2 9AX

Country United Kingdom

Webpage www.ecmwf.int

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... yes

Non-profit ..... yes

International organisation ..... yes

International organisation of European interest ..... yes

Secondary or Higher education establishment ..... no

Research organisation ..... yes

Legal person ..... yes

### Enterprise Data

SME self-declared status..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: - - Not applicable

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **ECMWF**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: Forecast Department ☐ not applicable

☒ Same as organisation address

Street: SHINFIELD PARK

Town: READING

Postcode: RG2 9AX

Country: United Kingdom

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **ECMWF**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: (•) Male ( ) Female

First name: **Fredrik** Last name: **Wetterhall**

E-Mail: **fredrik.wetterhall@ecmwf.int**

Position in org.: Scientist

Department: Forecast Department ☐ Same as organisation

☒ Same as organisation address

Street: SHINFIELD PARK

Town: READING Post code: RG2 9AX

Country: United Kingdom

Website: www.ecmwf.int

Phone 1: +44 118 9499 628 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

## *Other contact persons*

| *First Name* | *Last Name* | *E-mail* | *Phone* |
|---|---|---|---|
| Daniel | Thiemert | daniel.thiemert@ecmwf.int | +44 118 9499 024 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **ATOS**

| ***PIC*** | ***Legal name*** |
|---|---|
| *996484008* | *ATOS ORIGIN INTEGRATION SAS* |

## *Short name: ATOS*

### *Address of the organisation*

Street AVENUE D ALSACE 18

Town PARIS LA DEFENSE CEDEX

Postcode 92926

Country France

Webpage www.atos.net

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... no

Legal person ..... yes

Non-profit ..... unknown

International organisation ..... unknown

International organisation of European interest ..... unknown

Secondary or Higher education establishment ..... no

Research organisation ..... unknown

### Enterprise Data

SME self-declared status..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: 93 - Sports activities and amusement and recreation activities

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **ATOS**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: ATOS INTEGRATION FRANCE ☐ not applicable

☐ Same as organisation address

Street: 80 quai Voltaire

Town: Bezons Cedex

Postcode: 95870

Country: France

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **ATOS**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr. Sex: (•) Male ( ) Female

First name **Gabriel** Last name **KEPEKLIAN**

E-Mail **gabriel.kepeklian@atos.net**

Position in org.: R&D Director

Department: ATOS Integration France ☐ Same as organisation

☐ Same as organisation address

Street: 80 quai Voltaire

Town: Bezons Cedex Post code: 95870

Country: France

Website: ww.atos.net

Phone 1: +33 (0)1.73.26.21.74 Phone 2: +33 (0)6.22.74.65.06 Fax: *+xxx xxxxxxxxx*

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Tarek | HABIB | tarek.habib@atos.net | +33 788 638 145 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **BSC**

| ***PIC*** | ***Legal name*** |
|---|---|
| *999655520* | *BARCELONA SUPERCOMPUTING CENTER - CENTRO NACIONAL DE SUPERCOMPUTACION* |

## *Short name: BSC*

*Address of the organisation*

Street Calle Jordi Girona 31

Town BARCELONA

Postcode 08034

Country Spain

Webpage www.bsc.es

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... yes
Non-profit ..... yes
International organisation ..... no
International organisation of European interest ..... no
Secondary or Higher education establishment ..... no
Research organisation ..... yes
Legal person ..... yes

### Enterprise Data

SME self-declared status ..... 2011 - no
SME self-assessment ..... unknown
SME validation sme ..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: 72 - Scientific research and development

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: Computer Science ☐ not applicable

☐ Same as organisation address

Street: Calle Jordi Girona 29

Town: BARCELONA

Postcode: 08034

Country: Spain

**Department 2**

Department name: Earth Science ☐ not applicable

☐ Same as organisation address

Street: Calle Jordi Girona 29

Town: Barcelona

Postcode: 08034

Country: Spain

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **BSC**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: ○ Male ◉ Female

First name: **Rosa M.** Last name: **Badia**

E-Mail: **rosa.m.badia@bsc.es**

Position in org.: GROUP MANAGER

Department: WORKFLOWS AND DISTRIBUTED COMPUTING ☐ Same as organisation

☐ Same as organisation address

Street: Calle Jordi Girona, 29

Town: Barcelona Post code: 08034

Country: Spain

Website: www.bsc.es

Phone 1: +34 934134075 Phone 2: +xxx xxxxxxxxx Fax: +34 93 413 77 21

## *Other contact persons*

| *First Name* | *Last Name* | *E-mail* | *Phone* |
|---|---|---|---|
| Kim | Serradell | kim.serradell@bsc.es | +34934134051 |
| Albert | Soret | albert.soret@bsc.es | +34934134076 |
| Marina | Azor | marina.azor@bsc.es | +34934134082 |
| Isabel | Martinez | isabel.martinez@bsc.es | +34934137570 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **52North**

| ***PIC*** | ***Legal name*** |
|---|---|
| *997237407* | *52°North Initiative for Geospatial Open Source Software GmbH* |

## *Short name: 52North*

### *Address of the organisation*

Street Martin-Luther-King-Weg 24

Town Münster

Postcode 48155

Country Germany

Webpage http://www.52north.org

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... no

Non-profit ..... yes

International organisation ..... no

International organisation of European interest ..... no

Secondary or Higher education establishment ..... no

Research organisation ..... no

Legal person ..... yes

### Enterprise Data

SME self-declared status ..... 2008 - yes

SME self-assessment ..... unknown

SME validation sme ..... 2008 - yes

**Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.**

NACE Code: 721 - Research and experimental development on natural sciences and engineering

| *Proposal ID* **730260** | *Acronym* **EuroGEOSS-Hub** | *Short name* **52North** |
|---|---|---|

## *Department(s) carrying out the proposed work*

**No departement involved**

Department name ☒ not applicable

☐ Same as organisation address

Street *Please enter street name and number.*

Town

Postcode

Country

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **52North**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: (•) Male ( ) Female

First name: **Simon** Last name: **Jirka**

E-Mail: **jirka@52north.org**

Position in org.: Project Manager

Department: 52°North Initiative for Geospatial Open Source Software GmbH ☒ Same as organisation

☒ Same as organisation address

Street: Martin-Luther-King-Weg 24

Town: Münster Post code: 48155

Country: Germany

Website: http://52north.org/

Phone 1: +49-251-396371-31 Phone 2: +xxx xxxxxxxxx Fax: +49-251-396371-11

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Christoph | Stasch | c.stasch@52north.org | +49-251-396371-32 |
| Cornelia | Müller | c.mueller@52north.org | +49-251-396371-0 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **RADI**

| ***PIC*** | ***Legal name*** |
|---|---|
| *921756372* | *Institute of Remote Sensing and Digital Earth,CAS* |

## *Short name: RADI*

### *Address of the organisation*

Street No 9, Dengzhuangnan Road

Town Beijing

Postcode 100094

Country China (People's Republic of)

Webpage www.radi.ac.cn

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... unknown

Non-profit ..... unknown

International organisation ..... unknown

International organisation of European interest ..... unknown

Secondary or Higher education establishment ..... unknown

Research organisation ..... unknown

Legal person ..... yes

### Enterprise Data

SME self-declared status..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: M - Professional, scientific and technical activities

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **RADI**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: satellite data technology division ☐ not applicable

☒ Same as organisation address

Street: No 9, Dengzhuangnan Road

Town: Beijing

Postcode: 100094

Country: China (People's Republic of)

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **RADI**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Prof.

Sex: (•) Male ( ) Female

First name: **Li**

Last name: **Guoqing**

E-Mail: **ligq@radi.ac.cn**

Position in org.: Head of Satellite Data Technology Division

Department: Satellite Data Technology Division

[ ] Same as organisation

[x] Same as organisation address

Street: No 9, Dengzhuangnan Road

Town: Beijing

Post code: 100094

Country: China (People's Republic of)

Website: http://english.radi.cas.cn/

Phone 1: 0086+10+82178062

Phone 2: *+xxx xxxxxxxxx*

Fax: *+xxx xxxxxxxxx*

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **GRI**

| ***PIC*** | ***Legal name*** |
|---|---|
| *926573101* | *Global Reporting Initiative* |

## *Short name: GRI*

### *Address of the organisation*

Street Barbara Strozzilaan 336

Town Amsterdam

Postcode 1083 HN

Country Netherlands

Webpage www.globalreporting.org

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... no

Non-profit ..... yes

International organisation ..... no

International organisation of European interest ..... no

Secondary or Higher education establishment ..... no

Research organisation ..... no

Legal person ..... yes

### Enterprise Data

SME self-declared status ..... 2015 - no

SME self-assessment ..... unknown

SME validation sme ..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: -

| *Proposal ID* **730260** | *Acronym* **EuroGEOSS-Hub** | *Short name* **GRI** |
|---|---|---|

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: Institutional Funding and Program Partnerships ☐ not applicable

☒ Same as organisation address

Street: Barbara Strozzilaan 336

Town: Amsterdam

Postcode: 1083 HN

Country: Netherlands

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **GRI**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Ms

Sex: ○ Male ◉ Female

First name: **Berte**

Last name: **Arts**

E-Mail: **arts@globalreporting.org**

Position in org.: Senior Coordinator

Department: Institutional Funding and Program Partnerships

☐ Same as organisation

☒ Same as organisation address

Street: Barbara Strozzilaan 336

Town: Amsterdam

Post code: 1083 HN

Country: Netherlands

Website: www.globalreporting.org

Phone 1: +31(0) 20 531 0034

Phone 2: +31(0) 20 531 00 00

Fax: *+xxx xxxxxxxxx*

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Kenneth | van Toll | toll@globalreporting.org | +31 (0) 20 531 00 90 |
| Tia | Alahuhta | alahuhta@globalreporting.org | +31 (0) 20 531 00 82 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **UREAD**

| ***PIC*** | ***Legal name*** |
|---|---|
| *999984156* | *THE UNIVERSITY OF READING* |

## *Short name: UREAD*

### *Address of the organisation*

Street WHITEKNIGHTS CAMPUS WHITEKNIGHTS H

Town READING

Postcode RG6 6AH

Country United Kingdom

Webpage http://www.rdg.ac.uk

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... yes

Non-profit ..... yes

International organisation ..... no

International organisation of European interest ..... no

Secondary or Higher education establishment ..... yes

Research organisation ..... yes

Legal person ..... yes

### Enterprise Data

SME self-declared status ..... 2011 - no

SME self-assessment ..... unknown

SME validation sme ..... 2011 - no

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: - - Not applicable

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **UREAD**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: Department of Geography and Environmental Science ☐ not applicable

☐ Same as organisation address

Street: Russell Building, Whiteknights

Town: Reading

Postcode: RG6 6DW

Country: United Kingdom

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **UREAD**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Prof. Sex: ○ Male ◉ Female

First name: **Hannah Cloke** Last name: **Cloke**

E-Mail: **h.l.cloke@reading.ac.uk**

Position in org.: Professor of Hydrology

Department: Department of Geography and Environmental Science ☐ Same as organisation

☐ Same as organisation address

Street: Russell Building, Whiteknights

Town: READING Post code: RG6 6DW

Country: United Kingdom

Website: http://www.reading.ac.uk/h-l-cloke.aspx

Phone 1: +44(0)118 378 697 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Mischa | Phillips | m.phillips@reading.ac.uk | +44(0)118 378 4494 |
| EU-Unit | Reading | eu-unit@reading.ac.uk | |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **CNRS**

| ***PIC*** | ***Legal name*** |
|---|---|
| *999997930* | *CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE* |

## *Short name: CNRS*

### *Address of the organisation*

Street Rue Michel -Ange 3

Town PARIS

Postcode 75794

Country France

Webpage www.cnrs.fr

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... yes

Non-profit ..... yes

International organisation ..... no

International organisation of European interest ..... no

Secondary or Higher education establishment ..... no

Research organisation ..... yes

Legal person ..... yes

### Enterprise Data

SME self-declared status ..... 2013 - no

SME self-assessment ..... unknown

SME validation sme ..... 2013 - no

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: 721 - Research and experimental development on natural sciences and engineering

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **CNRS**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: LEGOS - UMR5566 ☐ not applicable

☐ Same as organisation address

Street: 14 av Edouard Belin

Town: Toulouse

Postcode: 31400

Country: France

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **CNRS**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: (•) Male ( ) Female

First name: **Benoit Meyssignac** Last name: **Meyssignac**

E-Mail: **benoit.meyssignac@legos.obs-mip.fr**

Position in org.: Researcher

Department: LEGOS - UMR5566 [ ] Same as organisation

[ ] Same as organisation address

Street: 14 av Edouard Belin

Town: Toulouse Post code: 31400

Country: France

Website: www.legos.obs-mip.fr

Phone 1: +33561334719 Phone 2: *+xxx xxxxxxxxx* Fax: +33561253205

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Christophe Giraud | Giraud | fp7@dr14.cnrs.fr | +33561336080 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **UNSW**

| ***PIC*** | ***Legal name*** |
|---|---|
| *998090910* | *UNIVERSITY OF NEW SOUTH WALES* |

## *Short name: UNSW*

### *Address of the organisation*

Street ANZAC PARADE

Town SYDNEY

Postcode 2052

Country Australia

Webpage http://www.unsw.edu.au

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... yes

Non-profit ..... yes

International organisation ..... no

International organisation of European interest ..... no

Secondary or Higher education establishment ..... yes

Research organisation ..... yes

Legal person ..... yes

### Enterprise Data

SME self-declared status ..... 2012 - no

SME self-assessment ..... unknown

SME validation sme ..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: 853 - Higher education

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **UNSW**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: CITY FUTURES RESEARCH CENTER ☐ not applicable

☒ Same as organisation address

Street: ANZAC PARADE

Town: SYDNEY

Postcode: 2052

Country: Australia

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **UNSW**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Prof. Sex: (•) Male ( ) Female

First name: **Chris Pettit** Last name: **Pettit**

E-Mail: **c.pettit@unsw.edu.au**

Position in org.: ASSOCIATE DIRECTOR

Department: CITY FUTURES RESEARCH CENTER ☐ Same as organisation

☒ Same as organisation address

Street: ANZAC PARADE

Town: SYDNEY Post code: 2052

Country: Australia

Website:

Phone 1: +61 2 9385 4826 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Bill | Randolph | b.randolph@unsw.edu.au | +61 2 9385 5117 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **DHI**

| ***PIC*** | ***Legal name*** |
|---|---|
| *998595116* | *DHI* |

## *Short name: DHI*

### *Address of the organisation*

Street AGERN ALLE 5

Town HOERSHOLM

Postcode 2970

Country Denmark

Webpage www.dhigroup.com

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... no

Non-profit ..... yes

International organisation ..... no

International organisation of European interest ..... no

Secondary or Higher education establishment ..... no

Research organisation ..... yes

Legal person ..... yes

### Enterprise Data

SME self-declared status ..... 2012 - no

SME self-assessment ..... unknown

SME validation sme ..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: 721 - Research and experimental development on natural sciences and engineering

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **DHI**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: DHI ☐ not applicable

☐ Same as organisation address

Street: Agern Allé 5

Town: Hørsholm

Postcode: 2970

Country: Denmark

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **DHI**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Ms

Sex: ○ Male ◉ Female

First name: **Maija** Last name: **Bertule**

E-Mail: **mabe@dhigroup.com**

Position in org.: Programme Advisor

Department: UNEP-DHI ☐ Same as organisation

☒ Same as organisation address

Street: AGERN ALLE 5

Town: HOERSHOLM Post code: 2970

Country: Denmark

Website: www.unepdhi.org

Phone 1: +4545169175 Phone 2: *+xxx xxxxxxxxx* Fax: *+xxx xxxxxxxxx*

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Peter | Koefoed Bjørnsen | pkb@dhigroup.com | +4545169200 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **NERC**

| ***PIC*** | ***Legal name*** |
|---|---|
| *999989200* | *NATURAL ENVIRONMENT RESEARCH COUNCIL* |

## *Short name: NERC*

### *Address of the organisation*

Street Polaris House, North Star Avenue

Town SWINDON WILTSHIRE

Postcode SN2 1EU

Country United Kingdom

Webpage http://www.nerc.ac.uk

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... yes

Non-profit ..... yes

International organisation ..... no

International organisation of European interest ..... no

Secondary or Higher education establishment ..... no

Research organisation ..... yes

Legal person ..... yes

### Enterprise Data

SME self-declared status ..... 2015 - no

SME self-assessment ..... 2015 - no

SME validation sme ..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: 721 - Research and experimental development on natural sciences and engineering

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: British Geological Survey ☐ not applicable

☐ Same as organisation address

Street: Environmental Science Centre

Town: Nicker Hill, Keyworth, Nottingham

Postcode: NG12 5GG

Country: United Kingdom

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **NERC**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr. Sex: (•) Male ( ) Female

First name: **James** Last name: **Passmore**

E-Mail: **jpass@bgs.ac.uk**

Position in org.: GIS and web design specialist

Department: British Geological Survey [ ] Same as organisation

[ ] Same as organisation address

Street: Environmental Science Centre, Nicker Hill, Keyworth

Town: Nottingham Post code: NG12 5GG

Country: United Kingdom

Website: www.bgs.ac.uk

Phone 1: +44(0)115 9363125 Phone 2: +441159363100 Fax: +441159363200

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Jenny | Forster | jforster@bgs.ac.uk | +44(0)115 9363083 |
| Patrick D. | Bell | pdbe@bgs.ac.uk | +44(0)1159363075 |
| Vicky | Hards | vlh@bgs.ac.uk | +44(0)1159363336 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **ARPAE**

| ***PIC*** | ***Legal name*** |
|---|---|
| *999454633* | *AGENZIA REGIONALE PER LA PREVENZIONE, L'AMBIENTE E L'ENERGIA DELL'EMILIA-ROMAGN* |

## *Short name: ARPAE*

### *Address of the organisation*

Street VIA PO 5

Town BOLOGNA

Postcode 40139

Country Italy

Webpage www.arpa.emr.it

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... yes

Non-profit ..... yes

International organisation ..... unknown

International organisation of European interest ..... unknown

Secondary or Higher education establishment ..... no

Research organisation ..... yes

Legal person ..... yes

### Enterprise Data

SME self-declared status ..... 2007 - no

SME self-assessment ..... unknown

SME validation sme ..... 2007 - no

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: O - Public administration and defence

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **ARPAE**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: Servizio IdroMeteoClima ☐ not applicable

☐ Same as organisation address

Street: Viale Silvani, 6

Town: Bologna

Postcode: 40122

Country: Italy

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **ARPAE**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: (•) Male ( ) Female

First name: **Silvano** Last name: **Pecora**

E-Mail: **specora@arpa.emr.it**

Position in org.: Responsible of the Hydrological Area

Department: Servizio Idro-meteo-Clima [ ] Same as organisation

[ ] Same as organisation address

Street: Via Garibaldi, 75

Town: Parma Post code: 43121

Country: Italy

Website:

Phone 1: 00390521274378 Phone 2: 00393357712864 Fax: 00390516497511

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Cinzia | Alessandrini | calessandrini@arpa.emr.it | 00390521274351 |
| Barbara | Ramponi | bramponi@arpa.emr.it | 00390516497504 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **EGI.eu**

| ***PIC*** | ***Legal name*** |
|---|---|
| *989221715* | *Stichting EGI* |

## *Short name: EGI.eu*

### *Address of the organisation*

Street SCIENCE PARK 140

Town AMSTERDAM

Postcode 1098 XG

Country Netherlands

Webpage www.egi.eu

## *Legal Status of your organisation*

### Research and Innovation legal statuses

Public body ..... no

Non-profit ..... yes

International organisation ..... no

International organisation of European interest ..... no

Secondary or Higher education establishment ..... no

Research organisation ..... no

Legal person ..... yes

### Enterprise Data

SME self-declared status ..... 2012 - no

SME self-assessment ..... unknown

SME validation sme ..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

NACE Code: 72 - Scientific research and development

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **EGI.eu**

## *Department(s) carrying out the proposed work*

**Department 1**

Department name: EGI ☐ not applicable

☒ Same as organisation address

Street: SCIENCE PARK 140

Town: AMSTERDAM

Postcode: 1098 XG

Country: Netherlands

## *Dependencies with other proposal participants*

| ***Character of dependence*** | ***Participant*** | |
|---|---|---|

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub** *Short name* **EGI.eu**

## *Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr.

Sex: (•) Male ( ) Female

First name: **Sergio** Last name: **Andreozzi**

E-Mail: **sergio.andreozzi@egi.eu**

Position in org.: Strategy and Policy Manager

Department: Strategy and Policy ☐ Same as organisation

☒ Same as organisation address

Street: SCIENCE PARK 140

Town: AMSTERDAM Post code: 1098 XG

Country: Netherlands

Website: www.egi.eu

Phone 1: +31630372823 Phone 2: +31208932007 Fax: *+xxx xxxxxxxxx*

## *Other contact persons*

| ***First Name*** | ***Last Name*** | ***E-mail*** | ***Phone*** |
|---|---|---|---|
| Celine | Bitoune | celine.bitoune@egi.eu | +31630372990 |
| Yannick | Legré | yannick.legre@egi.eu | +31630372534 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub**

# 3 - Budget for the proposal

| No | Participant | Country | (A) Direct personnel costs/€ | (B) Other direct costs/€ | (C) Direct costs of sub-contracting/€ | (D) Direct costs of providing financial support to third parties/€ | (E) Costs of inkind contributions not used on the beneficiary's premises/€ | (F) Indirect Costs / € (=0.25(A+B-E)) | (G) Special unit costs covering direct & indirect costs / € | (H) Total estimated eligible costs / € (=A+B+C+D+F+G) | (I) Reimburse-ment rate (%) | (J) Max.EU Contribution / € (=H*I) | (K) Requested EU Contribution/ € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Brgm | FR | 1141650 | 90000 | 15000 | 0 | 0 | 307912,50 | 0 | 1554562,50 | 100 | 1554562,50 | 1554562,50 |
| 2 | Jrc | BE | 681693 | 135000 | 0 | 0 | 0 | 204173,25 | 0 | 1020866,25 | 100 | 1020866,25 | 1020866,25 |
| 3 | Cnr | IT | 604800 | 118000 | 0 | 0 | 0 | 180700,00 | 0 | 903500,00 | 100 | 903500,00 | 903500,00 |
| 4 | Uab | ES | 296031 | 56500 | 0 | 0 | 0 | 88132,75 | 0 | 440663,75 | 100 | 440663,75 | 440663,75 |
| 5 | Cls | FR | 416980 | 31578 | 63149 | 0 | 0 | 112139,50 | 0 | 623846,50 | 100 | 623846,50 | 623846,50 |
| 6 | Creaf | ES | 179400 | 28050 | 0 | 0 | 0 | 51862,50 | 0 | 259312,50 | 100 | 259312,50 | 259312,50 |
| 7 | Earsc | BE | 280400 | 40000 | 0 | 0 | 0 | 80100,00 | 0 | 400500,00 | 100 | 400500,00 | 400500,00 |
| 8 | Unige | CH | 628243 | 24500 | 0 | 0 | 0 | 163185,75 | 0 | 815928,75 | 100 | 815928,75 | 0,00 |
| 9 | Ubdc | UK | 151622 | 26200 | 0 | 0 | 0 | 44455,50 | 0 | 222277,50 | 100 | 222277,50 | 222277,50 |
| 10 | Cloudsigma | CH | 252000 | 38221 | 0 | 0 | 0 | 72555,25 | 0 | 362776,25 | 100 | 362776,25 | 0,00 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | Ecmwf | UK | 630823 | 31320 | 0 | 0 | 0 | 165535,75 | 0 | 827678,75 | 100 | 827678,75 | 827678,75 |
| 12 | Atos | FR | 644984 | 100200 | 30000 | 0 | 0 | 186296,00 | 0 | 961480,00 | 100 | 961480,00 | 961480,00 |
| 13 | Bsc | ES | 250100 | 25000 | 0 | 0 | 0 | 68775,00 | 0 | 343875,00 | 100 | 343875,00 | 343875,00 |
| 14 | 52north | DE | 276000 | 23100 | 0 | 0 | 0 | 74775,00 | 0 | 373875,00 | 100 | 373875,00 | 373875,00 |
| 15 | Radi | CN | 94000 | 0 | 0 | 0 | 0 | 23500,00 | 0 | 117500,00 | 100 | 117500,00 | 0,00 |
| 16 | Gri | NL | 17920 | 13750 | 0 | 0 | 0 | 7917,50 | 0 | 39587,50 | 100 | 39587,50 | 39587,50 |
| 17 | Uread | UK | 312170 | 39600 | 0 | 0 | 0 | 87942,50 | 0 | 439712,50 | 100 | 439712,50 | 439712,50 |
| 18 | Cnrs | FR | 221419 | 25000 | 0 | 0 | 0 | 61604,75 | 0 | 308023,75 | 100 | 308023,75 | 308023,75 |
| 19 | Unsw | AU | 137160 | 0 | 0 | 0 | 0 | 34290,00 | 0 | 171450,00 | 100 | 171450,00 | 0,00 |
| 20 | Dhi | DK | 105741 | 18270 | 9000 | 0 | 0 | 31002,75 | 0 | 164013,75 | 100 | 164013,75 | 164013,75 |
| 21 | Nerc | UK | 239564 | 31400 | 0 | 0 | 0 | 67741,00 | 0 | 338705,00 | 100 | 338705,00 | 338705,00 |
| 22 | Arpae | IT | 117000 | 20700 | 0 | 0 | 0 | 34425,00 | 0 | 172125,00 | 100 | 172125,00 | 172125,00 |
| 23 | Egi.eu | NL | 258400 | 45200 | 0 | 0 | 0 | 75900,00 | 0 | 379500,00 | 100 | 379500,00 | 379500,00 |
| | Total | | 7938100 | 961589 | 117149 | 0 | 0 | 2224922,25 | 0 | 11241760,25 | | 11241760,25 | 9774105,25 |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub**

# 4 - Ethics issues table

| 1. HUMAN EMBRYOS/FOETUSES | | Page |
|---|---|---|
| Does your research involve Human Embryonic Stem Cells (hESCs)? | ○ Yes ◉ No | |
| Does your research involve the use of human embryos? | ○ Yes ◉ No | |
| Does your research involve the use of human foetal tissues / cells? | ○ Yes ◉ No | |
| **2. HUMANS** | | **Page** |
| Does your research involve human participants? | ○ Yes ◉ No | |
| Does your research involve physical interventions on the study participants? | ○ Yes ◉ No | |
| **3. HUMAN CELLS / TISSUES** | | **Page** |
| Does your research involve human cells or tissues (other than from Human Embryos/ Foetuses, i.e. section 1)? | ○ Yes ◉ No | |
| **4. PERSONAL DATA** | | **Page** |
| Does your research involve personal data collection and/or processing? | ○ Yes ◉ No | |
| Does your research involve further processing of previously collected personal data (secondary use)? | ○ Yes ◉ No | |
| **5. ANIMALS** | | **Page** |
| Does your research involve animals? | ○ Yes ◉ No | |
| **6. THIRD COUNTRIES** | | **Page** |
| In case non-EU countries are involved, do the research related activities undertaken in these countries raise potential ethics issues? | ○ Yes ◉ No | |
| Do you plan to use local resources (e.g. animal and/or human tissue samples, genetic material, live animals, human remains, materials of historical value, endangered fauna or flora samples, etc.)? | ○ Yes ◉ No | |
| Do you plan to import any material - including personal data - from non-EU countries into the EU?<br><br>*For data imports, please fill in also section 4.*<br>*For imports concerning human cells or tissues, fill in also section 3.* | ○ Yes ◉ No | |
| Do you plan to export any material - including personal data - from the EU to non-EU countries?<br>*For data exports, please fill in also section 4.*<br>*For exports concerning human cells or tissues, fill in also section 3.* | ○ Yes ◉ No | |

*Proposal ID* **730260** *Acronym* **EuroGEOSS-Hub**

| | | |
|---|---|---|
| If your research involves low and/or lower middle income countries, are benefits-sharing actions planned? | ◯ Yes ◉ No | |
| Could the situation in the country put the individuals taking part in the research at risk? | ◯ Yes ◉ No | |
| 7. ENVIRONMENT & HEALTH and SAFETY | | Page |
| Does your research involve the use of elements that may cause harm to the environment, to animals or plants?<br>*For research involving animal experiments, please fill in also section 5.* | ◯ Yes ◉ No | |
| Does your research deal with endangered fauna and/or flora and/or protected areas? | ◯ Yes ◉ No | |
| Does your research involve the use of elements that may cause harm to humans, including research staff?<br>*For research involving human participants, please fill in also section 2.* | ◯ Yes ◉ No | |
| 8. DUAL USE | | Page |
| Does your research have the potential for military applications? | ◯ Yes ◉ No | |
| 9. MISUSE | | Page |
| Does your research have the potential for malevolent/criminal/terrorist abuse? | ◯ Yes ◉ No | |
| 10. OTHER ETHICS ISSUES | | Page |
| Are there any other ethics issues that should be taken into consideration? Please specify | ◯ Yes ◉ No | |

I confirm that I have taken into account all ethics issues described above and that, if any ethics issues apply, I will complete the ethics self-assessment and attach the required documents. ☒

How to Complete your Ethics Self-Assessment

# 5 - Call specific questions

## *Open Research Data Pilot in Horizon 2020*

If selected, all applicants will participate in the Pilot on Open Research Data in Horizon 2020[1] , which aims to improve and maximise access to and re-use of research data generated by actions. Participating in the Pilot does not necessarily mean opening up all research data. Actions participating in the Pilot will be invited to formulate a Data Management Plan in which they will determine and explain which of the research data they generate will be made open.

Applicants have the possibility to opt out of this Pilot and must indicate a reason for this choice.

Participation in this Pilot does not constitute part of the evaluation process. Proposals will not be evaluated favourably because they are part of the Pilot and will not be penalised for opting out of the Pilot.

| We wish to opt out of the Pilot on Open Research Data in Horizon 2020. | ○ Yes | ◉ No |
|---|---|---|

[1] *According to article 43.2 of Regulation (EU) No 1290/2013 of the European Parliament and of the Council, of 11 December 2013, laying down the rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)" and repealing Regulation (EC) No 1906/2006.*

## *Data management activities*

The use of a Data Management Plan (DMP) is required for projects participating in the Open Research Data Pilot in Horizon 2020, in the form of a deliverable in the first 6 months of the project.

All other projects may deliver a DMP on a voluntary basis, if relevant for their research.

| Are data management activities relevant for your proposed project? | ◉ Yes | ○ No |
|---|---|---|

| | |
|---|---|
| A Data Management Plan will be delivered<br>(Please note: Projects participating in the Open Research Data Pilot **must** include a Data Management Plan as a deliverable in the first 6 months of the project). | ☒ |
| Data Management is part of a Work Package. | ☐ |
| Data Management will be integrated in another way. | ☒ |

Please indicate how data management will be addressed in your project:

EuroGEOSS-Hub will collect and generate data and information through its Platform services and User Applications. Overall data management is at the heart of EuroGEOSS-Hub activities, and hence is addressed throughout all technical Work Packages.

Remaining characters 54

**H2020 –SC5-20-2016 European data hub of the GEOSS information system**

# EuroGEOSS-Hub Proposal


***Coordinator Contact details:***
***BRGM–*** *Information Systems Division - BP 36009 - 3 avenue Claude-Guillemin -45060 Orléans Cedex 2 (France)*
***Project Director: F. ROBIDA*** *(f.robida@brgm.fr)*


**TABLE OF CONTENT**

**List of Participants**

| Participant N° | Short Name | Participant Organisation Name | Country |
|---|---|---|---|
| 1 | BRGM | BUREAU DE RECHERCHES GEOLOGIQUES ET MINIERES | France |
| 2 | JRC | JRC - JOINT RESEARCH CENTRE- EUROPEAN COMMISSION | Belgium |
| 3 | CNR | CONSIGLIO NAZIONALE DELLE RICERCHE | Italy |
| 4 | UAB | UNIVERSITAT AUTONOMA DE BARCELONA | Spain |
| 5 | CLS | COLLECTE LOCALISATION SATELLITES SA | France |
| 6 | CREAF | CENTRO DE INVESTIGACION ECOLOGICA Y APLICACIONES FORESTALES | Spain |
| 7 | EARSC | EUROPEAN ASSOCIATION OF REMOTE SENSING COMPANIES | Belgium |
| 8 | UNIGE | UNIVERSITE DE GENEVE | Switzerland |
| 9 | UBDC | UNIVERSITY OF GLASGOW - Urban Big Data Center | United Kingdom |
| 10 | CloudSigma | CLOUDSIGMA AG | Switzerland |
| 11 | ECMWF | EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS | United Kingdom |
| 12 | ATOS | ATOS ORIGIN INTEGRATION SAS | France |
| 13 | BSC | BARCELONA SUPERCOMPUTING CENTER – CENTRO NACIONAL DE SUPERCOMPUTACION | Spain |
| 14 | 52North | 52°North Initiative For Geospatial Open Source Software GmbH | Germany |
| 15 | RADI | INSTITUTE OF REMOTE SENSING AND DIGITAL EARTH,CAS | China (People's Republic of) |
| 16 | GRI | GLOBAL REPORTING INITIATIVE | Netherlands |
| 17 | UREAD | THE UNIVERSTY OF READING | United Kingdom |
| 18 | CNRS | CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE | France |
| 19 | UNSW | UNIVERSITY OF NEW SOUTH WALES | Australia |
| 20 | DHI | DHI | Denmark |
| 21 | NERC | NATURAL ENVIRONMENT RESEARCH COUNCIL | United Kingdom |
| 22 | ARPAE | AGENZIA REGIONALE PER LA PREVENZIONE, L'AMBIENTE ET L'ENERGIA DELL' EMILIA ROMAGNA | Italy |
| 23 | EGI.eu | Stiching EGI | Netherlands |

# 1. Excellence

## 1.1 Objectives

**Europe has been a major contributor to the development of a Global Earth Observation System of System (GEOSS)** during the last 10 years. As we move into the second decade of GEOSS implementation (2016-25), **Europe can play a leading role in the field of global EO**: the coming on stream of data from the Copernicus programme gives Europe an unprecedented capacity for high-quality EO to address the major scientific and policy challenges of our time. At the same time, the implementation of the INSPIRE Directive and of several open data initiatives in the EU offer a unique opportunity to integrate better data from space and in-situ, strengthen the information base for science and policy, and embed the use of EO in the institutional programmes of public administrations.

This proposal will harness these unique opportunities and will develop a European GEOSS Data hub (the EuroGEOSS-Hub) that increases and demonstrates the benefits for Europe of the European investment in EO and interoperable data infrastructures. It will also contribute to the evolution of the GEOSS Common Infrastructure

(GCI) to make it more user-centred as recommended by the GEOSS Infrastructure Implementation Board in 2015. This Board recognized the significant progress made in developing an interoperable System of System thanks to the brokering technology introduced in 2011, but acknowledged that in the process too much emphasis has been given to data discovery and access from all GEOSS domains and disciplines without taking into account specific user needs. To close the resulting gap between data and technology providers and data users, **it recommended evolving the GEOSS Common Infrastructure (GCI) to become more user-driven,** and to do so by working very closely with the user communities represented by the GEO initiatives and flagships identified in the GEO Strategic Plan. It also recommended **to focus more on data processing and use**, rather than just discovery and access, and giving incentives to the organizations that participate in GEO **by providing measures** of the increased access and use of the data they contributed, feedback from users, and comparisons with other data providers in the same domain. These recommendations will guide the development of the EuroGEOSS-Hub as described in Section 1.2.

The effects of the prolonged financial crisis affecting Europe since 2009 have given **political priority to sustainable growth and the creation of new jobs**. Public investment, including that in R&D, needs to be harnessed to support the creation of innovation, growth and jobs in the private sector. For this reason, the European Commission (EC) is developing a strategy to maximize the dissemination and use of Copernicus data and services, and will provide dedicated funding in 2017-18 for a dissemination platform complementing those being developed by several Member States, and European organizations such as ESA and EUMETSAT.

With this in mind, the EuroGEOSS-Hub will not duplicate the EC investment on Copernicus data dissemination but complement it by advancing its GEO brokering technology so that it can bridge across existing e-infrastructures and processing platforms, and by focusing on the integration and use of space and in-situ data where Europe has uniquely rich assets yet to be fully exploited. More specifically, the project aims at:

i) **Establishing an interoperable and scalable IT platform based on an advanced GEO brokering framework** to harness existing European investments in high performance computing, cloud computing, including the emerging European Cloud initiative, Big Data, and e-infrastructures.

ii) **Integrating space and in-situ EO data streams from multiple sources** such as Copernicus, INSPIRE, open data initiatives, and the private sector, so that they are ready for re-use and delivered through the project's platform to researchers, public administrations, and Small and Medium Enterprises (SMEs) to develop new applications and products, and generate innovation and growth,

iii) **Measuring and communicating the benefits of this integrated approach to accessing and using data and services** to policy, science, and the business sector because there can be no sustainable growth without a well-framed evaluation of the benefits derived from the investment made.

iv) **Advancing scientific research and develop information services** in each of the thematic areas identified by the project: forest wildfire modelling, extreme weather and global flooding, sea level rise and coastal zone impacts, monitoring of the Sustainable Development Goals to support the GEO Strategic Plan and the global community.

v) **Supporting the development of the Digital Single Market through a vibrant EO and spatial information market place in Europe** addressing the needs of business, research and public administrations, and acting as a connecting hub with existing e-infrastructures in Europe.

vi) **Strengthening the regional dimension of GEO with a strong European node** well connected and interoperable with other nodes at the global level, to make data from GEOSS easily accessible by scientists and industry in Europe and, in turn, European products from science and industrial sources available to GEO stakeholders world-wide.

## 1.2 Relation to the work programme

The project call asks for proposals to be fully interoperable with the GEO Discovery and Access Broker (DAB): no other consortium can achieve this better than the EuroGEOSS-Hub as it includes those responsible for its original design in the FP7 EuroGEOSS Project (2009-12), and have been maintaining and developing ever since. The conceptual innovation of the DAB was the recognition that to develop a system of systems, in such global and diverse community such as GEO, it is essential to support each community standards, best practices, and traditions. Hence, it introduced the concept of brokering, a mediating middleware taking on the task of interfacing the different standard protocols without asking each community to change their own. The

effectiveness of the GEO DAB was demonstrated in 2011 and was adopted by the GEO Plenary in that year. Over the last five years, it was evolved with new functionalities and runs on a cloud-based operational platform to ensure scalability. With the EuroGEOSS-Hub, the development will address the key challenge of the interoperability of clouds and High Performance Computing (HPC) infrastructures to provide a seamless access and processing environment to users. In doing so the project will contribute directly to the Foundational Tasks of the GEO Work Programme addressing operations and development of the GCI and shift the focus of GCI from discovery and access to processing and use.

To achieve its objectives, the project has identified an initial set of applications of European and global significance that contribute to the GEO Strategic Plan: they address global forest fire modelling, extreme weather and floods at a global level, climate change and its effects on coastal areas, and indicators measuring progress towards the UN Sustainable Development Goals (SDGs). These represent applications at different levels of maturity in GEOSS, which can be used to test effectively the capabilities of the EuroGEOSS-Hub. As the projects develops, more application areas will be added through collaboration with selected GEO initiatives, flagships, and community activities which are the three key implementing mechanisms of the GEO Strategic Plan. In the area of weather forecasting, forest fires and flood alert the partners of the project are those already running the related **Copernicus Services**, so the project will build on these services and extend their global reach. By taking advantage of the more detailed and integrated information resources available in Europe it will be possible to develop models and measuring frameworks able to supplement information deficiencies in other parts of the world.

Whilst Europe is rich, and set to become richer still, in high quality spatial information and EO, it is fragile when it comes to the exploitation of this wealth in new products and services, and ultimately jobs. This fragility comes from two main factors: a European Digital Single Market that is not yet fully developed and is still operating largely within the national boundaries of the 28 Member States, and an ICT business sector, including that of EO and geoprocessing, that is very fragmented. According to Eurostat (2013) there were some 870,000 ICT firms in Europe in 2010 of which 99% employed less than 10 people (micro-SMEs). These firms have strengths in their flexibility and ability to innovate, but difficulty in investing due to their small size and lack of venture capital in Europe. To compete in a globalized world, **European information-based SMEs need easy access to data, infrastructures, and skills** so that they can develop their innovation potential to the full. For this reason, the EC has been pursuing its policy of Open Data and, recognizing the potential of Copernicus as a source of innovation, has also adopted a policy of full and open access to its data. In parallel, it has invested in structuring actions to develop a European Research Area, networking research centres and disciplinary infrastructures, and is now addressing remaining legal and market obstacles to the development of a Digital Single Market.

In this rapidly evolving landscape a key challenge is to leverage these many initiatives, and connect the different infrastructures and capacities to boot-strap the development of a vibrant European geo-ICT and EO-based sector. The coming on **stream of Copernicus and INSPIRE data,** sensor networks enabled by the emerging **Internet of Things,** and data streams from the public via **citizen observatories and citizen science activities** supported by social media offer an unprecedented opportunity. The **EuroGEOSS-Hub aims to be the point of junction of these many initiatives to forge a competitive European market place for EO and spatial information**. Section 3.3 describes the consortium as a whole, but the following are examples of the potential of the project to act as catalyst of key European initiatives:

- **Alignment with Copernicus**: EuroGEOSS–Hub partners and associates (like the European Environment Agency-EEA and the European Space Agency-ESA that do not participate in H2020 projects) are responsible for the Copernicus Emergency, and Global Land services (European Commission Joint Research Centre - JRC), European Land (EEA), Atmospheric service and Climate Change (European Centre for Medium-range Weather Forecasts - ECMWF), as well as the Copernicus in-situ coordination (EEA). Collecte Localisation Satellites (CLS) is a key partner in the Copernicus Marine service being in charge of its dissemination platform. Finally, the EEA and ESA will be part of the Advisory Board of the project having already expressed the willingness to establish a MoU with EuroGEOSS-Hub, if funded.
- **Alignment with Copernicus**: EuroGEOSS–Hub partners and associates are responsible for the Copernicus Emergency, and Global Land services (JRC), European Land (European Environment Agency, EEA, member

of the Advisory Board of the project), Atmospheric service and Climate Change (ECMWF), as well as the Copernicus in-situ coordination (EEA). CLS is a key partner in the Copernicus Marine Service being in charge of the dissemination platform of the service. Finally, ESA will be part of the Advisory Board of the project having already expressed the willingness to establish a MoU with EuroGEOSS-Hub, if funded. The JRC works closely with DG GROW to design the dissemination platform from Copernicus and related EO in Europe, and therefore ensures alignment with the EuroGEOSS-Hub.

- **Alignment with INSPIRE**: The JRC is the technical coordinator of INSPIRE, while the EEA coordinates implementation among the environmental protection agencies.
- **Alignment with GEO**: the CNR is responsible for operations and development of the GEO Discovery and Access Broker (DAB), is a key participant in the GEOSS Foundational Tasks on the operations (GD-02) and development (GD-07) of the GEOSS Common Infrastructure and co-chairs the GEOSS Knowledge Base (GD-09). The EEA, JRC, and CNR are members of the GEO Programme Board overseeing the implementation of the GEO work programme.
- **Alignment with European and international e-infrastructures initiatives**: EGI.eu is partner of the Consortium. Members of the consortium are also partners in the European consortium for High Performance computing (PRACE), Helix Nebula, the Big Data Public Private Partnership, the Belmont Forum, the Research Data Alliance (RDA), ESFRI, EPOS, and EUDAT. As to the **ESFRI projects and the European observatory systems** more generally, the partner of the Consortium **NERC** will coordinate the platform development with the **EPOS** (European Plate Observing System) ESFRI project, being the paradigm to be followed for the other relevant ESFRI in the future. Besides, CNR will play an analogous coordination role with the **GMOS** (Global Mercury Observation System) project and the **ERA-Planet** (European Research Area Network on EO).
- **Alignment with industrial initiatives** to develop dedicated marketplaces targeting different markets and using different business models within the umbrella of EARSC and the Marketplace Alliance which the industry plans to establish –including the Copernicus World Alliance (CWA).

Whilst the EuroGEOSS-Hub aims at delivering benefits for Europe from EO, it cannot do so by merely looking inwards. On the contrary, the project has a strong outward set of partnerships, first and foremost because it aims to act as a regional node of a global GEOSS information system, second because there is much to be mutually learned from sharing experience and knowledge at the global level and creating the bases for further partnerships and market growth with European SMEs, and finally because of the global nature of the challenges the initiative focuses on. For this reason, the EuroGEOSS-Hub has partnered with the Institute of Remote Sensing and Digital Earth (RADI) of the Chinese Academy of Science that is leading activities in the framework of **ChinaGEOSS**, and has established collaborative arrangements with **US-GEO** and the **Japanese DIAS (Data Integration and Analysis System)** with which the partners of the project have worked for many years in the framework of the GEOSS Infrastructure Implementation Board. Collaboration with the **Australia's Urban Research Information Network** has been also established as a result of joint work with the project's partners in the context of the Research Data Alliance (RDA), an international initiative led by EU, US, and Australia to facilitate the sharing of research data at the global level. To note that all these international collaborations and partnerships are based on own resources showing the commitment to work with this project.

As Europe is one of the major contributors to development aid in Africa, a particular regard will be given to develop interoperability arrangements with **AfriGEOSS** and provide support to stakeholders in that continent. **GEO-Cradle**, a recently launched capacity building action involving the Balkans, the Middle East and North Africa will also provide an excellent vehicle for shared activities with the EuroGEOSS-Hub.

| Specific topic/challenge of the Work Programme | EuroGEOSS-Hub related/responding main actions |
|---|---|
| **To provide sustained operation, continuity and interoperability of the GEOSS information system** | **EuroGEOSS-Hub builds on and evolves the DAB** (cornerstone of GEOSS). No other consortium can achieve this better than EuroGEOSS-Hub as it includes those responsible for its development and operations (CNR). **EuroGEOSS-Hub will give feedback to GEOSS data providers** with a data dashboard. EuroGEOSS-Hub partners are leaders of GEO Foundational Tasks on GCI operations (GD-02) and GEOSS evolution (GD-07). |
| **To strengthen the access to EO at regional level to harvest, consolidate and exploit those data at global level** | **EuroGEOSS-Hub complements the Copernicus dissemination platform** (funded by DG GROW) by **focusing on the integration of space and non-space data**, in particular data from the public sector (INSPIRE, open data initiatives), the private sector, and citizen observatories. It establishes **interoperability arrangements with other regional nodes** (Americas, China, Australia, Africa) |
| **To overcome the fragmentation of the European landscape of existing public and private EO data infrastructures** | EuroGEOSS-Hub enables **public and private data to be easily accessed via a single platform**. Its contribution to the European Marketplace envisaged by EARSC helps overcoming fragmentation in the commercial sector. It allows small service providers to access a global market. It develops **ties between the Copernicus access platforms, GEOSS and INSPIRE**. |
| **To maximize public and private EO data infrastructures combined exploitation in the light of the evolving demand and supply of EO in Europe** | EuroGEOSS-Hub results will help develop multiple marketplaces all with different business models. It will **construct a rich environment where companies and researchers can collaborate** to meet public or commercial needs. It will help optimize the infrastructure development envisaged by the EC (DG GROW, DG Connect and DG RTD) and by companies towards a market goal. As such, it will **contribute to the exploitation of Copernicus and stimulate new jobs and economic growth** in Europe. |
| **To take into account the global trend towards more open data policies, the availability of new big data technologies and the requirements for the development of the European digital economy** | EuroGEOSS-Hub partners are working closely with the EC Publications Office **to develop the Open Data portal and connect it with INSPIRE** so that relevant spatial and non-spatial information can be made easily accessible and reusable. Big Data technologies are a key issue being addressed in the project through research on interoperability of Big Data platforms and the analytics of integrated multi-source data streams. Support to the Digital Single Market is central to the activities of the project that has a strong involvement of the private sector. EuroGEOSS-Hub will **showcase the GEOSS Data Sharing and Management Principles implementation**. |
| **To maximize and leverage on past Community investments to support the GCI and in particular the Broker technology, which is at the cornerstone of the GEOSS.** | EuroGEOSS-Hub consortium is **built around the team that developed the GEO DAB in the FP7 EuroGEOSS project** (2009-12) and has been maintaining and developing ever since. This project will **evolve and advance the DAB further by addressing the interoperability of Big Data technologies** (cloud, HPC, grid) to provide a seamless access and processing environment to the users. |
| **To provide users with a unique access point (gateway) to diverse European range of EO data and services and non-EO ones** | Through the evolved GEO DAB deployed by the project, it is possible to **provide a single access point to the brokered facilities** including the GCI, the Copernicus dissemination platform funded by GROW, the INSPIRE geoportal, research e-Infrastructures, and the Open Data Portal |
| **To be fully interoperable with: GCI and the DAB, GEOSS data hubs developed in other regions of the world, and with Environmental infrastructures associated with major EU programmes, legislations and** | EuroGEOSS-Hub is built around the GEO DAB ensuring full interoperability with the GCI, the Copernicus dissemination platform funded by GROW, and the INSPIRE geoportal that is managed by the JRC who is partner in the project. The **processing layer of EuroGEOSS-Hub platform includes a combination of European cloud and HPC service providers**, as well as partners of the Big Data Public-Private-Partnership to ensure full alignment with European initiatives in this field. |

| | |
|---|---|
| **initiatives** | |
| **To be built in close cooperation with other national and European initiatives, in particular with Copernicus** | JRC as in-house science service of the EC works closely with DG GROW to develop a Copernicus dissemination platform able to maximize opportunities of access and use across Europe. **EuroGEOSS-Hub does not duplicate but complements the Copernicus platform that is funded by GROW** thus maximizing the return on European investment. |
| **To pay special attention to user-friendliness for multiple user profiles while ensuring system adaptability, scalability and robustness** | System adaptability and flexibility are assured by **implementing a Brokering-based architecture**. **Scalability and robustness are provided by building the platform on a Virtual Cloud infrastructure**. The EuroGEOSS-Hub marketplace layer supports multiple user profiles needs. The developed (multi-thematic) User-centric Applications assess and showcase the platform effectiveness. |
| **To contribute to the Community Strategy and Implementation plan of the Belmont Forum** | With its **focus on multi-disciplinary interoperability**, EuroGEOSS-Hub **addresses fully the need expressed in 2015 by the steering Committee of the Belmont Forum** e-Infrastructures and Data Management Collaborative Research Action (CRA) to demonstrate the benefits of harmonizing data and HPC/Big Data Analytics infrastructures to promote interdisciplinary and transdisciplinary research and data usage. |
| **To support an open ecosystem of services and business opportunities** | EuroGEOSS-Hub puts **major emphasis on developing such open ecosystem to benefit European SMEs**, by: (a) providing easy access and use to interoperable data and processing facilities, (b) developing a market place that maximizes the opportunities for supply and demand to meet and develop new products and services, (c) fully complying with European legislation to protect the interest of European citizen and business, (d) developing an ecosystem of User-centric applications (e.g. SDGs monitoring) |
| **To address a governance model driven by the public sector with possible contributions from private entities. To sustain and retain the brokering (DAB) ownership in the evolution of this IT technology** | EuroGEOSS-Hub **will develop a "Business models" study (D7.5) and a consequent "Sustainability Plan" (D7.6)** for a long-term sustainability of the Platform and its services, including their governance. A starting model for brokering platforms governance is the RDA report generated by the "Brokering Governance" WG (chaired by CNR) suggesting a Public-Private approach. Public (BSC, EGI.eu) and Private (ATOS, CloudSigma) existing storage and computing infrastructures will sustain the EuroGEOSS-Hub IT Platform. |

## 1.3 Concept and methodology

### 1.3.1 Concepts

EuroGEOSS-Hub builds on the following principal ideas –see Figure 1:

(a) **To develop a user-focused GCI, fostering the engagement of the thematic communities,** by implementing an innovative IT Platform addressing the requirements of the four multi-thematic user applications showcased the project, and developing a repeatable methodology to connect to other applications in the future.

(b) **To harness the richness of space, in-situ, and research data in Europe.** In the context of the GEOSS regional nodes, Europe is in a unique position for in-situ and space data provision and integration; this asset must be valorised by implementing a platform that is able to act as a broker (intermediary) between the European ecosystem of data infrastructures and GEOSS. In particular, the EuroGEOSS-Hub must be able to broker: Copernicus Core Services, INSPIRE, relevant ESFRI projects, EEA platforms, etc. and the future European initiatives and programmes (e.g. the Copernicus Dissemination platforms, the ERA-NET in EO: ERA-PLANET, ESA's Thematic Exploitation Platforms), etc.

(c) **To provide a marketplace for EO downstream services and products and stimulate the European business sector**. The European EO and in-situ data assets can be further leveraged by developing the necessary applications and tools to expose coordinated views (gateways) to the potential users –e.g. marketplaces and

unified views for downstream services. The EuroGEOSS-Hub will play the role of gateway for both data access and processing as well as for the online marketplaces dealing with EO services –see Figure 2.

(d) **To support the effectiveness and efficiency of the European data infrastructures contributing to GEOSS by providing a data dashboard** communicating: i) use metrics; ii) data and metadata quality reports; iii) comparative summary statistics; iv) information on data use for generating SDGs indicators or other informational products; v) possible gaps in data needs (e.g. to support the SDGs indicators) and suggestions (e.g. link to workflows) to address them; vi) data relation with the GEOS Flagships.

(e) **To evolve the DAB (GCI cornerstone) reinforcing the European leadership in the GCI**. As long as GEOSS aims at deploying a System of existing diverse Systems there will always be the need for an interconnecting/mediating and harmonizing middleware (so-called "brokering") framework or equivalent. So far, this is where Europe has its lead with GEOSS (i.e. the DAB development and operation). This middleware is therefore a key component of any system-of-systems' infrastructure and Europe should continue to steer its development and operation and reinforce its leading position. The EuroGEOSS-Hub has this aim at its core.

(f) **To advance GEOSS/GCI brokering capabilities by introducing a new brokering layer for harnessing data storage and processing infrastructures –i.e. the European Big Data capacities ecosystem**. In the near future, the DAB will evolve to support the GCI mission to generate and manage information and knowledge from the data made available through GEOSS. This implies to optimize data and processing for Big Data Analytics. Several European initiatives and (federated) infrastructures exists and the EuroGEOSS-Hub will leverage them by introducing a new brokering layer (i.e. Virtual Cloud services) achieving the same flexibility and openness the DAB successfully applied to the data content mediation and harmonization –see also Figure 1.

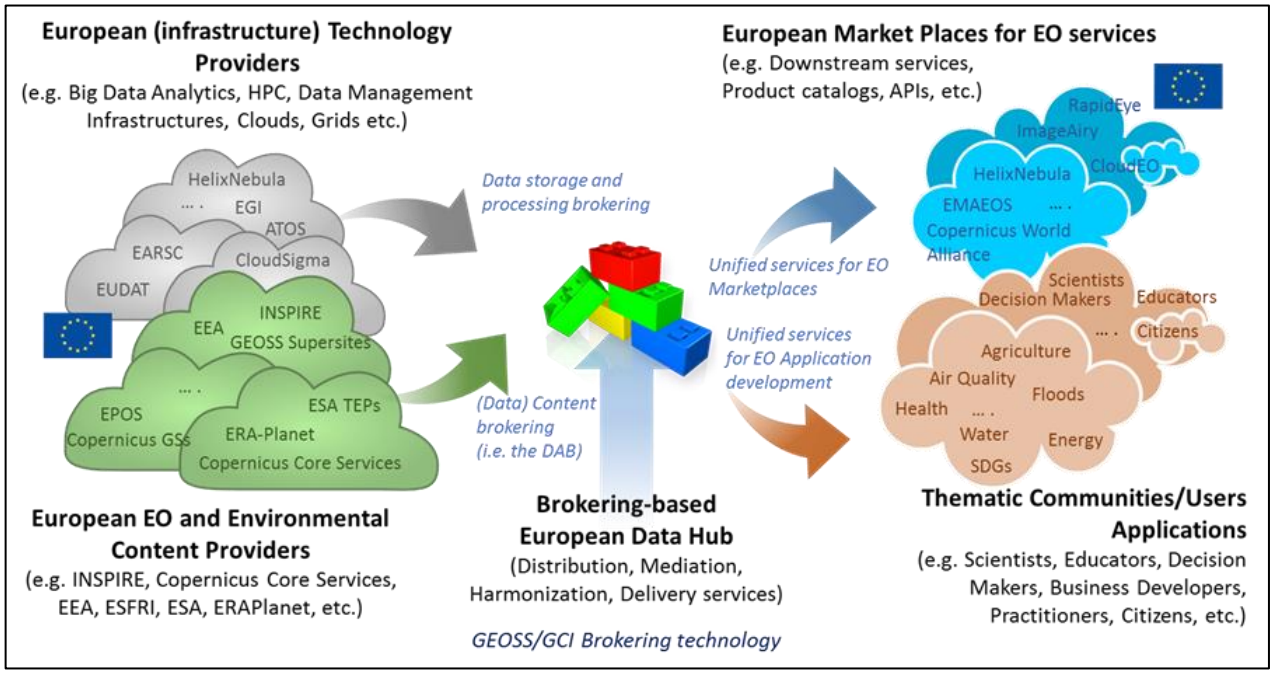



Figure 1. The EuroGEOSS-Hub Brokering approach in the European landscape

***GEOSS Brokering concept, history and evolution***

For disciplinary and domain applications, systems interoperability largely deals with the adoption of agreed technologies, standards, specifications and interfaces (protocols) characterizing that discipline. However, multi-organizational and multi-disciplinary application initiatives make more complex demands on the type of systems and arrangements needed to support cross-domain activities. Thus, interoperability among diverse disciplinary and domain systems must be pursued adopting more flexible and sustainable approaches. **The Brokering approach, successfully demonstrated by GEOSS, implements such a flexibility by providing a set of mediation and harmonization services for data services discovery and access**. This allows GEOSS to interact at the present time with more than 150 data infrastructures from 5 continents, covering all the EO disciplines and some non-EO

datasets as well. As a result, **GEOSS plays the role of hub connecting the global EO resource suppliers and the (intermediate and final) consumers** –in line with the Web 2.0 paradigm.

Brokering is important to support any data-hub sustainability and ability to evolve (i.e. adaptability, flexibility and scalability). On the basis of the GEOSS experience, **the brokering approach is also needed to harness the European landscape of EO data and technology provisions** (see Figure 2) **and support the multiplicity of potential users and business applications** to be addressed in Europe and globally (see Figure 1).

### *Brokering history*


**The FP7 EuroGEOSS project (2009-12) introduced first the brokering approach as the European way to GEOSS** (see http://www.eurogeoss.eu). EuroGEOSS applied the DAB technology (developed by CNR with the support of JRC and BRGM) to three Communities of Practice: Weather monitoring, Ocean ecosystems, and Water management. Other EC-funded projects connected the DAB development with other User Communities (e.g. GEOWOW, MEDINA, EarthServer, UncertWeb, MED-SUV) and the GEO DAB was officially adopted by the GEO Plenary in 2011 as the cornerstone of the GCI development. CNR is in charge of the DAB operations for the GCI, and leads the EuroGEOSS-Hub WP2, which evolves the DAB technology to address the new GCI and GEOSS requirements.

### *Brokering international research activities*

In the last few years, many other European programs and international initiative have adopted the brokering/mediation approach to address complex interoperability challenges. It is noteworthy to mention: (a) the **EarthCube program**, funded by the US NSF, which recognized a Brokering framework (re-using the DAB) as one of its technological building blocks (see BCube project http://earthcube.org/group/bcube); (b) FP7 and H2020 projects **EU BON, GMOS, COOPEUS, ConnectinGEO, ECOPOTENTIAL, and SeaDataNet II** that utilize the DAB key technology to implement their data systems interoperability; (c) the **Japanese DIAS** (Data Integration and Analysis System) making use of the DAB technology to federate its national data providers (see http://agora.ex.nii.ac.jp/~kitamoto/research/earth/dias/index.html.en); (d) **US NSIDC ACADIS Gateway** that profiled the DAB technology to implement the US Arctic Data Repository (https://www.aoncadis.org/home.html): (e) ICSU WDS is implementing a brokering/mediation based approach for its distributed data system.

**The RDA (Research Data Alliance)** has a Brokering Interest Group (IG) (https://rd-alliance.org/group/brokering-ig.html) while the ICSU World Data Systems has recently proposed a new Working Group on "Brokering Framework". Also the **Belmont Forum e-Infrastructure and Data Management Collaborative Research Action** (CRA) recognized the importance of combining the many data and processing e-infrastructures and capacities by adopting mediation and brokering solutions (see http://www.bfe-inf.org/)

### *GEOSS and brokering technology evolution*

The GEO Strategic Plan has identified as set of **Foundational Tasks to evolve GEOSS and the GCI and meet current and emerging needs, such as**:

- Extending the user audience to decision-makers and the general public;
- Focusing on the accessibility and usability of Earth observation resources to improve our scientific understanding of the Earth processes, and enhance our predictive capabilities that underpin sound decision-making;
- Engaging partners and user communities in evolving the current infrastructure through collaborative tools for co-creation of products and services;
- Evolving the current System of Systems component-based architecture with an open systems platform that is flexible, sustainable and reliable.

The direct contribution of EuroGEOSS-Hub to these developments tasks is assured by the project partners who play a central role in the **Foundational Tasks of the GEO work programme** dealing with GCI operations (GD-02) and Knowledge base development (GD-09) (CNR), co-chair the working group on GCI development and evolution (JRC), and participate in the GEO Programme Board (CNR, JRC, EEA).

The **EuroGEOSS-Hub advances significantly the current brokering technology (DAB)** by introducing:

(a) the **discoverability and accessibility to new resource content types** (i.e. heterogeneous models, workflows, semantic artefacts) **supporting the creation of a knowledge base**.

(b) the **brokering of distributed and heterogeneous data storage and computing capacity infrastructures**: e.g. Clouds, HPC infrastructures, Grid infrastructures.

#### Maturity level

**The EuroGEOSS-Hub platform builds on a set of key enabling technologies, which are mature and have been already demonstrated in relevant environments**, they include: the CNR DAB framework, the JRC MIDAS (Modelling Inventory and Data Access System) and IPChem[1] (Information Platform for Chemical Monitoring data) frameworks, the EGI.eu Cloud federation platform OpenStack and OneData, the BSC COMPSs/PyCOMPSs programming framework, ATOS SparkinData platform, Sci-Hub and PEPS platforms, CloudFlare, and other commercial solutions –see WP2 tasks description. In terms of technology readiness levels (TRL), they are all from level TRL 6 (technology demonstrated in industrially relevant environment) to TRL 8 (system complete and qualified).

**The resulting EuroGEOSS-Hub platform will be validated in two relevant environments: GEOSS and the European EO services environment** –including Copernicus.

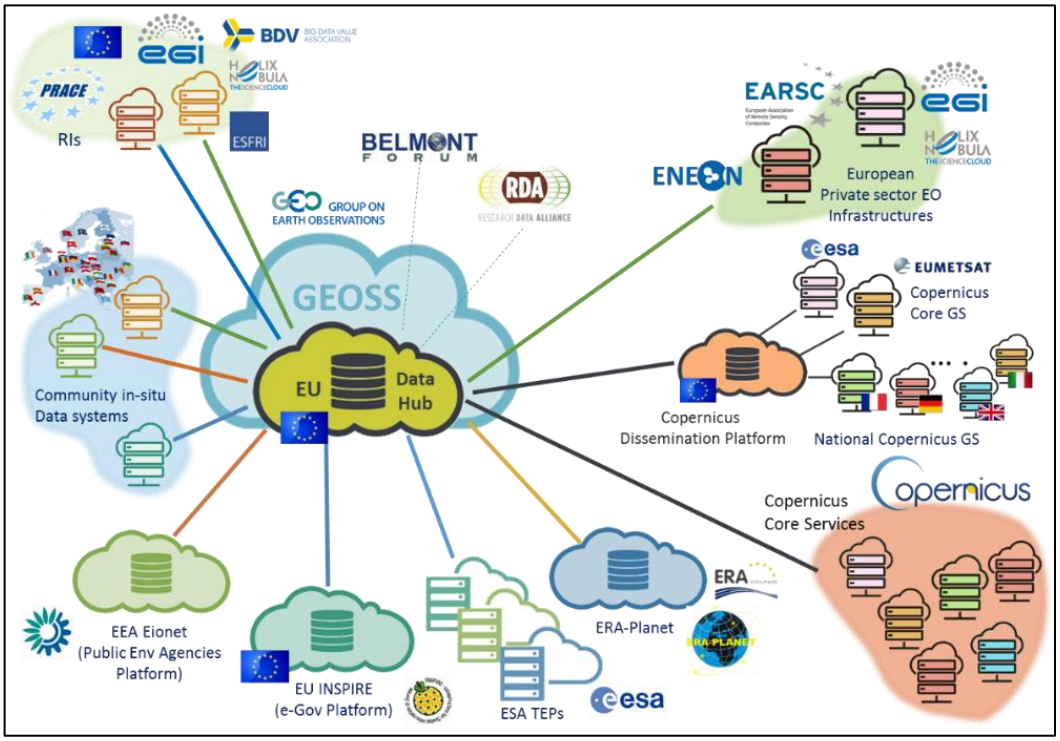



Figure 2. The European ecosystem for Data and Technology provision in the EO sector

### 1.3.2 Methodology

#### *Overall methodology*

In keeping with the **three Strategic Objectives defined by GEO for 2016- 2025**, EuroGEOSS-Hub will implement the following overall methodology (see Figure 3):

- **Advocate:** EuroGEOSS-Hub will develop four significant User-driven Applications to demonstrate the substantial value of Earth observation to achieve national, regional, and global sustainability goals, in

[1] https://ipchem.jrc.ec.europa.eu/RDSIdiscovery/ipchem/index.html

particular for a more resilient society, an improved sustainable economic growth, and a healthy environment. The Applications will increase the understanding and use of Earth observations available in support of decision and policy-making as far as important societal challenges for Europe.

- **Engage:** EuroGEOSS-Hub will leverage the European ecosystem of environmental infrastructures and Big Data provisions associated with major EU programmes, legislation, and initiatives, via coordination and interoperability actions. It will coordinate with the other GEOSS regional data hubs developed in China, US, Japan, Africa, and Australia. This will foster strategic partnerships to address global and regional challenges.
- **Deliver:** EuroGEOSS-Hub will develop an innovative brokering IT platform to combine the DAB/GCI approach with the uptake of the new Big Data technologies. This will leverage European public sector investment to foster a European marketplace for EO services and create new economic opportunities. The EuroGEOSS-Hub platform will allow to generate information and knowledge by integrating, processing and using EO and socio-economic data to support science policy and business goals. It will also establish an "operational help-desk service" to build capacity and expand the market to non-traditional players. The EuroGEOSS-Hub User-centric Applications must be considered as part of the IT platform development contributing with requirements, artefacts, assessments and showcasing.

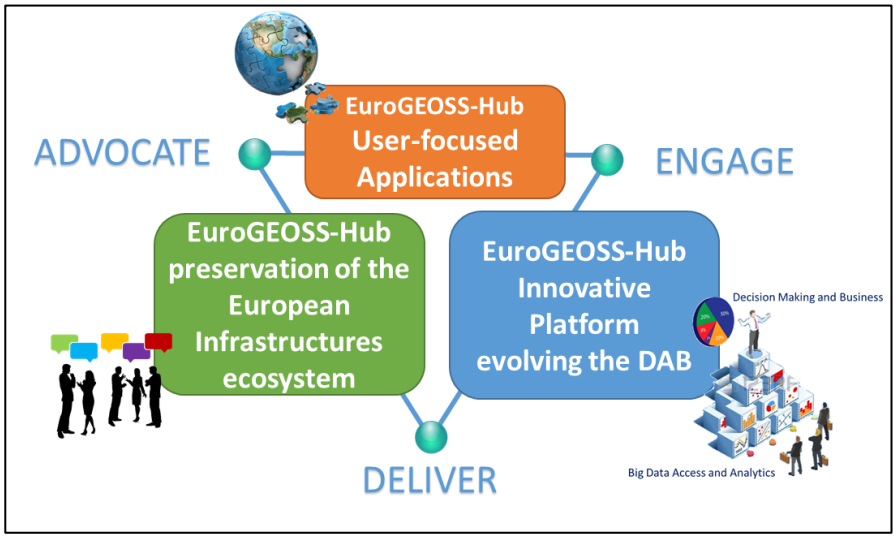



Figure 3. EuroGEOSS-Hub overall methodology to reinforce the European contribution to the three Strategic Objectives defined by GEO

***Implementation Methodology***

The EuroGEOSS-Hub implementation methodology consists of the following main R&D activities:

- **To develop four strategic User Applications and coordinating the integration between the Copernicus dissemination platforms and the European in-situ data infrastructures** (see WPs 3-6). Built on the top of the EuroGEOSS-Hub platform and services (see WP2), these Applications will increase the European capacity to address GEOSS societal challenges of prime importance to the EU such as achieving the post-2015 SDGs and implementing adaptation and mitigation strategies to climate change. The Applications will integrate the EO products and services provided by the Copernicus Core Service platforms (Partners involved are: CLS, ECMWF, JRC, and the EEA) and the European in situ data infrastructures (i.e. INSPIRE, EEA, ERA-Planet, EPOS, GMOS, etc.). WP7 collects feedbacks and experiences from the four Applications and Users Communities (beyond the Applications themselves) to assess the benefits of accessing and using the EuroGEOSS-Hub for a range of stakeholders in the policy, scientific and business communities.
- **To implement an Innovative Brokering Platform as unique Gateway for User applications** (see WP2). EuroGEOSS-Hub will integrate the complex European EO provisioning ecosystem, integrating the in-situ data supplying platforms (e.g. INSPIRE, EEA data systems, ERA-Planet, ESFRI on EO like EPOS, etc.) and the space-born data suppliers (i.e. the Copernicus Core services, the European private EO platforms, ESA TEPs, and in the future the Copernicus Dissemination platform funded by DG GROW). EuroGEOSS-Hub will leverage the

different European Big Data infrastructures, including: HPC infrastructures, EGI/Helix Nebula, European private clouds.

- **To develop a European Marketplace for EO downstream services and products.** The EuroGEOSS-Hub platform will support the creation of a European Marketplace for EO products and services. They stem from the data infrastructures brokered by EuroGEOSS-Hub, the User Applications developed by EuroGEOSS-Hub, and the third party marketplaces that EuroGEOSS-Hub will broker (see WPs 2-8). This applies the approach of the MAEOS (Marketplace Alliance for Earth Observation Services) initiative managed by EARSC (partner of the Consortium). EuroGEOSS-Hub is a key contributing project to help establish and improve MAEOS. It will enable companies to offer new products and services, capitalize on the public investments in environmental and EO programmes and unleash a new wave of innovative geospatial products addressing many markets. It will provide a single entry point for customers world-wide looking to find geospatial solutions to meet their needs.
- **To provide a EuroGEOSS-Hub data dashboard to add value for the GEOSS European Stakeholders and the EO application developers.** The dashboard will provide: i) use metrics on data and metadata quality; ii) comparative summary statistics; iii) information on data use for generating SDGs indicators or other informational products; iv) possible gaps in data provision (e.g. to develop the SDGs indicators) and suggestions (e.g. workflows) to address them; iv) data relation with the GEOSS Flagships.
- **To evolve the DAB/GCI Broker technology providing Big Data analytics capacities and contributing to the GEOSS Knowledge Base** (see WP2). The EuroGEOSS-Hub advances the GEO DAB to: (a) improve data accessibility, (b) implement data processing and (c) support discoverability and accessibility of models, workflow and processing capacities –creating a EuroGEOSS-Hub knowledge system. DAB technology will be integrated with innovative and already demonstrated European technologies for infrastructures and EO resources mediation and harmonization, including: EGI OpenStack, OneData, COMPSs/PyCOMPSs, MIDAS, IP-Chem, INSPIRE transformation services, GI-Cat/GI-axe, etc. (see WP2).
- **To coordinate with other GEOSS Regional Nodes and relevant European Research Infrastructures** –see WP8 and Task 2.5. EuroGEOSS-Hub will develop a set of interoperability arrangements, at the political and technological levels, necessary to ensure that the EuroGEOSS-Hub is well connected to existing (and emerging) European e-infrastructures (e.g. EGI.eu, EPOS, EUDAT, ESA TEPs, ERA-Planet projects, GEOSS Flagships infrastructures, etc.) and initiatives like the Big Data Value Chain Public Private Partnership, and the European Cloud. EuroGEOSS-Hub will establish interoperability agreements with other regional nodes emerging at the global level such as: ChinaGEOSS, US-GEO, AfriGEOSS, the Japanese DIAS, and the Australian Urban Research Information Network. This synergetic action strengthens the European role and contribution in GEOSS and to its evolution –see GEOSS Foundational tasks GD-02, GD-06, GD-07 and GD-09.

***EuroGEOSS-Hub innovative IT Platform development***

Adopting a service-oriented approach and applying the separation of concerns pattern, the EuroGEOSS-Hub innovative IT Platform consists of **three loosely-coupled brokering service layers** dealing with the diverse European provisioning sectors covered by the project, from the bottom up: (a) data storage & computational infrastructures provision, (b) EO/environmental data systems provision and (c) EO downstream services market provision. The three EuroGEOSS-Hub platform layers are called, respectively: **Infrastructures/Clouds Brokering layer**, **Content Brokering layer** and **Marketplace Brokering layer for EO services and products** –see Figure 4. They interact via well-defined and open APIs (Application Programming Interfaces), i.e. the "**Virtual Cloud APIs**" and the "**Discovery, Access, Processing and Visualization APIs**", exposing the services provided by the layers –see Task 2.2 and Figure 4. **This solution allows the EuroGEOSS-Hub platform to be infrastructure-agnostic preserving the European distributed data provision ecosystem and harnessing the European Big Data capacities.**

Specific distribution, mediation and harmonization (i.e. brokering) services are implemented for each of the three layers (see Tasks 2.6, 2.7, 2.8 and Figure 4). Specific actions (Tasks 2.3 and 2.4) deal with the overall Platform Quality (including data Producer and Data Consumer aspects as well as Quality-of-Service) and Security and Privacy challenges. The **GEOSS Data Sharing and Management Principles will be at the core of the EuroGEOSS-Hub platform and will be implemented by all the four thematic Applications** (WP3-6). As the JRC co-chairs the

GEOSS Data Management Principles WG, the experience of the EuroGEOSS-Hub will be a test bed for organisations at the global level.

**An AGILE iterative software development approach** (e.g. Rational Unified Process: RUP) **will be adopted** for the Platform design, development and revision: three major releases are planned for the **Initial**, **Advanced** and **Final EuroGEOSS-Hub capacity (M18, M32, M44).** Finally, an action (Task 2.5) is devoted to **implement the technological aspects of interoperability agreements**, managed by WP8, **to coordinate with and outreach to the other GEOSS Regional Nodes and the European Research Infrastructures**.

***Marketplace Brokering layer for EO services and products***

This layer implements the EuroGEOSS-Hub user interaction services for **discovering, accessing, and using the EO services, and products** available on and via the Platform (see Task 2.6). The include: a **"Marketplace"**, a **"Unified Front-end"** (for data discovery and access), a set of well-used third-party **"Toolboxes"** (e.g. R, Matlab, IDL, etc.), a **data Dashboards**, and a **"Products Catalogue"**.

**The online Marketplace site provides information on EO downstream products and services**, transactions are processed by the EuroGEOSS-Hub platform operator. The Marketplace can broker the services and information provided by other Marketplaces –Web 2.0 philosophy.

The **Unified Front-end** is the web portal directly accessed by the user allowing discoverability and access to the EuroGEOSS-Hub data and processing resources**.**

The **Data Dashboard** supports the effectiveness and efficiency of the brokered European data infrastructures, providing relevant use information, statistics, quality metrics and possible suggestions on connection with other relevant components, e.g. workflows, SDG monitoring applications.

The Marketplace Brokering layer **implements the functionality to support different user profiles (templates)** with scope for further granularity, enabling the filtering and provisioning of services based on user-specified parameters (e.g. price/performance, advanced filtering, etc.) –see task 2.6. **User's requests to discover, access, process and visualize data are passed forward to the underpinning Content Brokering Layer**, which returns a harmonized view of the content managed by the EuroGEOSS-Hub Platform.

***Content Brokering layer***

The Content Brokering layer **manages the requests arriving from the Marketplace Brokering layer tools as well as from the external systems** accessing the APIs exposed by this layer (i.e. the "Discovery, Access, Processing and Visualization APIs"). **This is the main interoperability interface to contribute to GEOSS and the GCI**.

This layer implements **advanced distribution, mediation and harmonization (brokering) functionalities to handle requests for discovery, access, combine, and process multiple Earth observation content**, regardless of their location/source, model/structure and encoding/format (see Task 2.7). It returns back the matching content in a harmonized and consistent way. To accomplish such a demanding task, the Content Brokering:

- **Binds to the content services (e.g. data discovery and access services) published by the European environmental and EO systems** (e.g. Copernicus core services, INSPIRE Portal, EEA systems, EPOS services, ERA-Planet common services, etc.), harmonizing their content.
- **Submits data access and processing execution requests**, regardless where data and processing capacities are, **to the underpinning Infrastructure/Cloud Brokering layer**, which implements a Virtual Cloud infrastructure.

The Content Brokering layer contains the following main components (see Task 2.7): (a) the **"Requests Manager"** to manage received requests; (b) **"DAB 2.0 (Advanced Discovery and Access Broker based on the DAB)"** to discover, evaluate and access EO and non-EO resource content, including: data, processing modules, models,

ontologies, workflows. In addition, this component implement metadata augmentation using linked-data elements and users tags and feedbacks accessed from the Knowledge Base; (c) **"Processing Broker"** to implement the mediation services and adapt heterogeneous processing services offered by different interfaces, (d) **"Knowledge Base"** to create, manage and expose a set of knowledge bodies (i.e. best practices, ontologies, user feedbacks and annotations, information on advanced products characteristics and generation, etc.) to enhance data and processing modules access and utilization –utilized by the DAB 2.0 and by the Infrastructure/Cloud Brokering layer optimization.

***Infrastructure/Cloud Brokering layer and services***

The Infrastructure/Cloud Brokering layer implements a high-level Virtual Cloud interface by brokering a set of private and public Clouds and data storage/computational Infrastructures, which underpin the EuroGEOSS-Hub platform capabilities, namely: the **ATOS Cloud infrastructure**, the **CloudSigma Cloud infrastructure**, the **Barcelona Supercomputer Centre High Performance Computing infrastructure**, and the **EGI Federated Cloud**. Being infrastructure agnostic, the implemented Virtual Cloud interface allows other infrastructures to join and support the EuroGEOSS-Hub platform; for example, several EARSC members have already expressed their interest in joining the platform, in the next future.

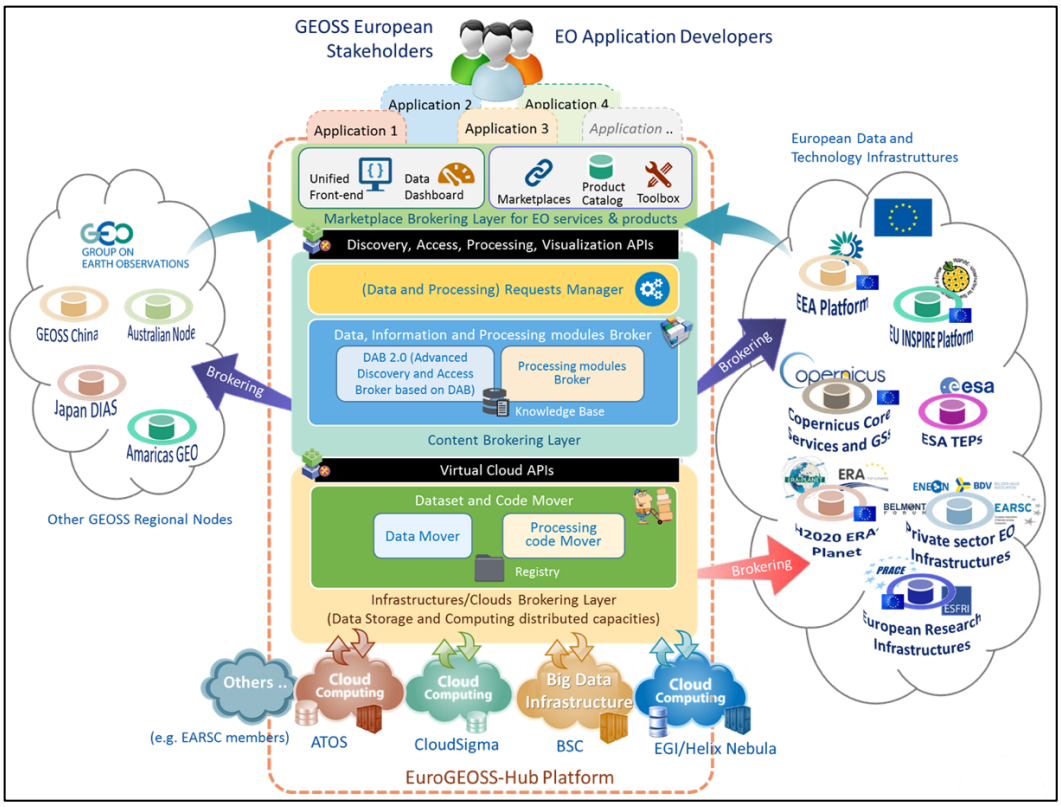



Figure 4. The EuroGEOSS-Hub innovative Platform schema

The **Infrastructure/Cloud Brokering layer is also in charge of brokering the infrastructure services** (i.e. data storage and computing capacities) empowering the environmental and EO systems brokered by the EuroGEOSS-Hub platform, such as: Copernicus Core Service platform, INSPIRE Portal, EEA services, EPOS infrastructure, ERA-Planet common services, ESA TEPs, etc.

The Infrastructure/Cloud Brokering services are utilized by the **Content Brokering layer**, which submits data access and processing requests, regardless where data and processing capacities are. Addressing these requests, the Infrastructure/Cloud Brokering layer is in charge of (see Task 2.8): (a) managing and moving distributed data (the **"Data Mover"** component) and moving and executing processing codes on heterogeneous computing platforms (the **"Processing Code Mover"** component); (b) managing a **registry** of infrastructures and their capabilities to help the two moving components; (c) implementing a **Cloud Workload optimization**: i.e. to implement the services to optimize data versus code moving.

***EuroGEOSS-Hub User-centric Applications***

Four significant User-centric Applications will be developed by EuroGEOSS-Hub to engage partners and user communities in: (a) contributing to the Platform development by providing: requirements, software modules and knowledge, and assessing the platform services; (b) making use of the services offered by the Platform to address strategic scientific and policy objectives; (c) starting the development of a market place for EO services; (c) evolving the current DAB framework and the GCI adopting a user-focused approach. All four address both European and global concerns showing the major contribution of the EuroGEOSS-Hub to the GEO Strategic Plan and the agendas of international organisations. The Applications addresss the followingt:

**Forest Fires Application** (WP3): Currently the European Forest Fire Information System (EFFIS) operated by the JRC and part of the Copernicus Emergency Service supports the protection of forest against fires in the EU countries and provides the European Commission services on wildfires in Europe. This WP will take advantage of the existing moderate resolution data and (e.g. Sentinel-2, Landsat, MODIS, VIIRS, …) and new data obtained from COPERNICUS sources (e.g. Sentinel-3) to provide new services at European and even Global scale with more accurate and reliable information. The new data obtained from such systems, including a large array of multispectral information, will allow to carry out quasi-real-time forest fire monitoring that will be crucial in the prevention, fight and mitigation of such hazards. The application will use the data included in the EuroGEOSS-Hub to develop services to estimate wildfire danger, detect on-going active fires and to monitor forest fire evolution to assess wildfire damages, and to observe the post-fire vegetation regeneration. All this services will contribute Global Wildfire Information System (GWIS), already in the GEO Work Program 2012-2025, which will allow to determine the forest fire regimes at global scale. The San Diego Super Computing Centre will participate in this work with its own funding.

**Extreme Weather-Global Floods Application** (WP4): aims to facilitate the availability of different flood data sources on a European and Global level and to incorporate these data into existing forecasting system to create impact-based warnings that will further the use of forecasting systems beyond their current reach. The forecasts will build upon existing operational systems such as the European Flood Awareness System (EFAS), part of the Copernicus emergency service, and the Global system GloFAS as well as national and regional systems. It will make detailed hydrological-hydraulic modelling available in a seamless integration from the large scale modelling (EFAS) to the basin scale, producing integrated predictions that are consistent across all temporal scales by using the same set of models across both prediction ranges. As a consequence, uncertainty can be better quantified and more reliably defined across the whole prediction range, and bias correction and post-processing are also more consistent. The work will focus on two European test basins, Loire and Rhine and assess upscaling the methodologies to Europe.

**Coastal Zones and Sea Level Change Application** (WP5): aims at developing regional services for the assessment of sea-level rise and alteration of the water cycle representing major threat for the risks of erosion, flooding and water resources. Compared to WP4, this WP addresses the questions of prevention and adaptation, rather than preparedness and crisis management. Therefore, existing and potential users concerned by WP5 are governments, regional and local authorities in the field of land use planning and development, as well as private and public operators of critical long-life infrastructures (e.g. nuclear power plants). While the question of current and future sea-level rise is addressed at global to regional scales, its impact is best demonstrated by choosing specific regional to local sites. The project will focus demonstrate the services in:

- French Polynesia, which is a hotspot for the detection of early signs of climate change impacts to shorelines, as it includes about 80 of the 420 atolls in the world. These coasts are currently poorly monitored, and the use of space data and adapted algorithms is expected to significantly improve our understanding regarding the process taking place in this region.
- French coasts, where risks of marine flooding during storms is expected to increase with sea-level rise.
- Congo and Loire river watersheds are two contrasting environment in terms of data availability, size and potential users which allow to test the scalability of the services.

**European SDGs Monitoring Application** (WP6): aims at building a common scientific, computational and policy framework (see Figure 5) to support the pathway from Observation data, Essential Variables, to High-level indicators in order to improve the coherence between the different UN Sustainable Development Goals (SDGs) indicators and to optimize their monitoring. It will specifically work on the SDG 6 on Clean water and sanitation,

SDG 7 on Sustainable energy, SDG 11 on Sustainable cities, SDG 12 on Sustainable consumption and production, SDG 13 on Climate action, and SDG 15 on Life on Earth. An interactive Dashboard to present the indicators calculated the project will also be developed in WP6.

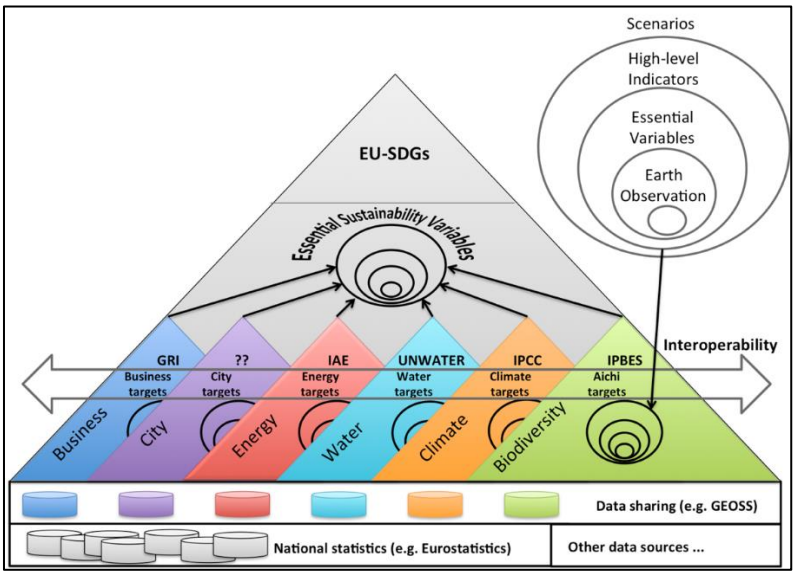



Figure 5: EU-SDGs data and indicator framework

***Coordination and Integration between the EuroGEOSS-Hub Applications and the IT Platform***

A strong coordination between the work of the thematic communities leading the four User Applications and the data and the technology providers developing the EuroGEOSS-Hub IT Platform is crucial so that the scientific work is documented, and can be reproduced in other areas efficiently and effectively. To ensure such coordination, the project will consider for each Application four phases: Model, Design, Implement, and Publish which provide inputs to the EuroGEOSS-Hub IT Platform and, in turn, can receive useful services to accomplish their targets. Referring to Figure 6, these are the main interactions:

- **Model phase**: first a Feasibility and Business model, then a Functional Model are developed, providing a set of requirements for the IT Platform (e.g. Data and algorithms requirements). On the other side, the IT Platform can provide a list of already available products and services to the Feasibility and Business model.
- **Design phase**: one or more scientific and service workflows are specified, generating possible requests to: (a) extend the Content Brokering Layer capabilities –e.g. adding new mediations modules; (b) access new data storage and computing capacities virtualized by the Infrastructures/Clouds Brokering Layer. In turn, the IT Platform can provide useful information to identify the useful services to implement an effective workflow.
- **Implement phase**: one or more scientific and service workflows are created and revised building on the capabilities provided by the EuroGEOSS-Hub Market Level and Content Brokering Layers via their APIs – the Content Brokering services provide a transparent access to the brokered Infrastructures/Clouds, too. In turn, the User Application can assess the APIs and the platform capabilities effectiveness.
- **Publish phase**: the Application products as well as the workflow(s) are published on the EuroGEOSS-Hub Market level Brokering Layer. Some knowledge bodies developed by the Application (e.g. the workflow model, processing algorithms, etc.) can be included in the EuroGEOSS-Hub knowledge base. On the other side, the Application can receive feedbacks from the EuroGEOSS-Hub Users who accessed the Application products.

This coordination approach is implemented (see Figure 6) in the project by including a specific task for each of the User Application WPs (Tasks 3.4, 4.7, 5.5, 6.9) to contribute inputs to the IT Platform (i.e. WP2). On the other side, four WP2 tasks have a specific activity to take care of the requirements stemming from the User Applications development (requirements for the overall platform requirements and at each interoperability

layers: Tasks 2.1, 2.6, 2.7, 2.9) and, in turn, they provide back guidelines and best practices to use the Platform services and capabilities. Finally, Task 7.1 assesses the developments that the project has generated in the thematic and cross-thematic areas, informing all the WP2 tasks.

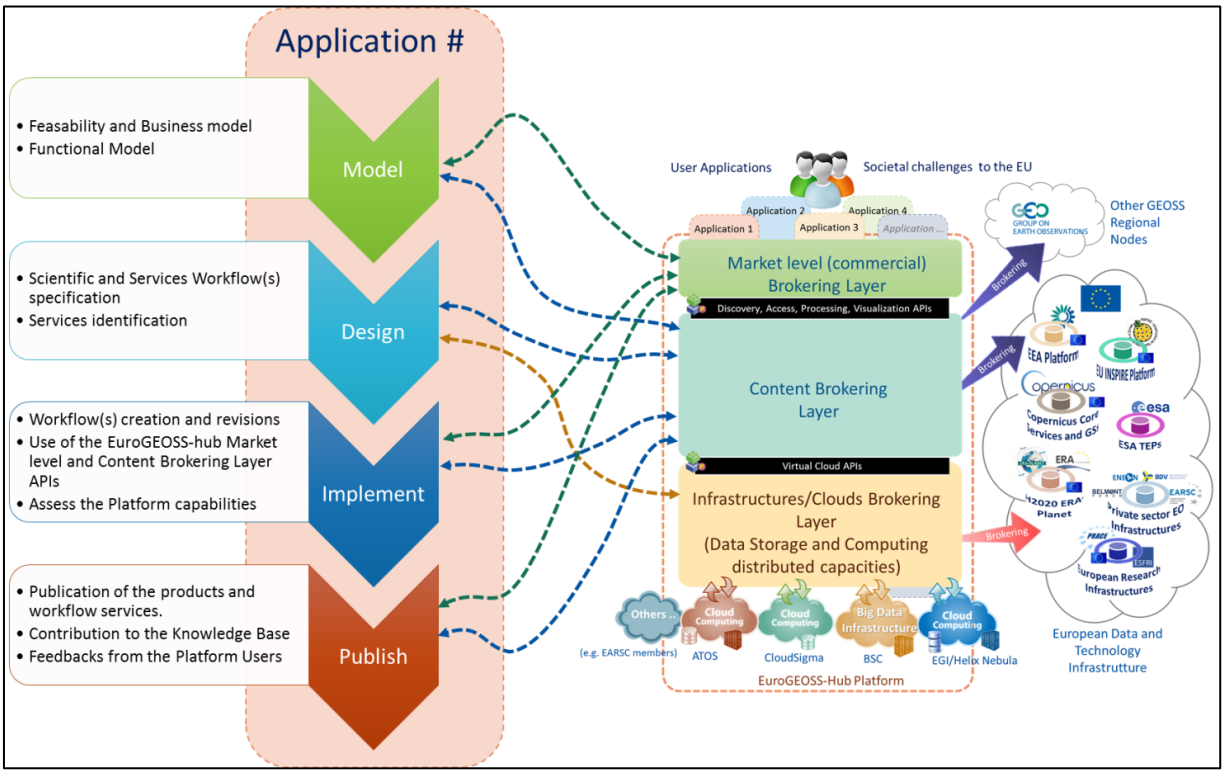



Figure 6. Coordination actions between User Application (design and development) and the EuroGEOSS-Hub Platform

***Evaluation and sustainability***

An important component of the project relates to the assessment of benefits, evaluation, and revision cycles. This is the equivalent of an AGILE methodology applied to the desired socio-economic and policy outcomes of the project. To this end, a dedicated WP (WP7) assesses the benefits of accessing and using the EuroGEOSS-Hub for a range of stakeholders in the policy, scientific and business communities. Moving from the inner core outwards, the WP will measure the benefits for the participants and users of the User-centric Applications, for the larger scientific community, and for European businesses, particularly SMEs. Broader benefits derived by the global GEO community will also be addressed. WP7 will develop a macro business model (D7.5) that can be the basis for the long-term sustainability of the Hub, taking into account technical, economic, and legal aspects (D7.6). The WP is based on complementary profiles from the partners, coming from public and private areas (both commercial and no-profit), covering EO/IT/research sectors.

- **JRC**, and **CNR** represent public benefits not directly measurable in terms of business but in terms of research or public good; they also represent how the public sector can also co-fund and co benefit from a public private partnership model (to be defined).
- **BRGM** represents a public industrial and commercial institution applying a policy for close working relationships with public authorities and enterprises, in order to support sustainable and responsible management of all below-ground environments and their resources.
- **EARSC** represents a wide network of companies engaged in activities linked to EO services from satellite operations, data supply, IT and software components and value-added GI services. EARSC brings the commercial perspective to the exploitation and sustainability of the EuroGEOSS-Hub linked to business.
- **ATOS** represents the interest and business models possible from the IT point of view around big data models.
- **CLS** due to its shareholders profile, has experience of multiple business models: non profit public delegation of service with strong governance, free public service under contract and co-ownership, commercial EO

services, commercial added value services in the maritime sector. It can also represent the market behaviour around the world, acting in 60 countries around the world.

- **CloudSigma** operates as somewhat of a disruptor in the Infrastructure-as-a-Service market, taking a user-centric approach to deliver flexibility and scalability that meets the diverse demands from technology start-ups to the most complex compute workloads of big science and financial services. This market positioning offers insight into the commercial considerations particular to the SME.
- **EGI.eu** (i.e. the EGI Foundation) is a significant example of initiative to coordinate and develop an e-infrastructure that provides long-term distributed compute and storage resources for performing research and innovation activities across Europe. EGI.eu is a not-for-profit foundation established under Dutch law with participants from national e-infrastructure representatives (NGIs), European Intergovernmental Research Organisations (EIROs) and European Research Infrastructure Consortiums (ERICs). EGI.eu has also a business engagement program to innovate together with SMEs and industry"

By taking a multi-faceted perspective, it is possible to consider all the economic, legal, and policy-related aspects that need to shape the long-term sustainability of the Hub.
Please note that gender analysis is not applicable in this RIA project/topic.

### 1.4 Ambition

The EuroGEOSS-Hub aims to be a **step-change** in the use of EO in Europe with innovative solutions on four levels:

1) **Synergy of European efforts**: this is a key challenge as the number of relevant initiates is high including the Copernicus dissemination platform that will be funded in 2017-18 in parallel to the development of the EuroGEOSS-Hub, the launch of a European Cloud initiative, several initiatives in the framework of the Digital Single Market including the Free Flow of Data Initiative, the activities of the Big Data Public Private Partnership, the revision of the INSPIRE directive and so on. Others will follow from 2017 onwards, and will interact with related activities at national and international level, and technological evolution. To keep on top of all these initiatives and try and make them work together rather than in complete independence requires a position at the heart of the decision-making process. The Joint Research Centre as in-house science service of the European Commission plays this role, and will work together with the relevant Directorates in the Commission (GROW, RTD, CNECT, DIGIT) to ensure coordination among these many activities and initiatives. Moreover, as technical coordinator of INSPIRE and lead of the Open Data policy in the EC, it can support also operationally the necessary data flows in synergy with the EuroGEOSS-Hub platform. Coordination between the development and evolution of the Copernicus dissemination platform is crucial. We need to make sure there is no duplication of investment with that put in place by DG GROW, nor divergent architectural choices that might undermine interoperability across platforms. For this reason, JRC works closely with DG GROW to ensure coordination of effort, and acts as its technical advisor for the choice of interoperability solutions. EARSC provides a private sector perspective to the co-ordination between the various efforts and has stated its intent to help organize a Marketplace Alliance to help in this respect. Moreover, the EuroGEOSS-Hub is designed from the outset to play a complementary role to the Copernicus platform by focusing on the integration of data from in-situ and sensor networks with space-based data.

2) **Technological innovation**: the project advances the state of the art most particularly in the area of cross-platform interoperability. Over the last few years, cloud computing has come to the fore as the new development often replacing previous choices such as HPC and Cloud computing. Its flexibility and scalability have also resulted in innovative solutions such as Software-as –a-Platform, Infrastructure-as-a-Platform, Processing as-a-Platform etc. There are high expectations that by moving data close to the processing, clouds will address the problems created by Big Data. In practice however we risk creating new silos as different providers offer different solutions and try to capture the market by reducing interoperability across (commercial) clouds. Hence the innovation of this proposal is the advancement in brokering technology to address cross-platform (cloud, HPC) interoperability. This will allow to port data, processing, and code across platforms in a seamless way hiding the complexity of specifications from the users, and thus opening the door to a much wider non-specialist community of users.

3) **GEO leadership**: The development of a regional dimension to GEO has been raised several times in recent GEO plenaries and work plan symposia as a way to deliver more demonstrable benefits to the GEO members

and narrow the gap between science/policy and civil society/business community. The EuroGEOSS-Hub offers a real opportunity to set a blueprint for other regional hubs to follow/adapt. By leveraging the wealth of European in-situ data from public administrations, voluntary efforts including the general public, and the private sector it can demonstrate the added value of integration with EO data, and Copernicus in particular. The measurement of benefits designed in the proposal will also be of global interest because it will set a methodological route for others to follow to obtain comparable data, and support the long term sustainability of GEOSS. In addition to these regional contributions, the proposal will also input directly into the GCI evolution, which is already anchored to the GEO DAB (developed and managed by the CNR). The drive to make the GCI more use focused and delivering processing and information instead of just data is exactly in line with the outcomes of the EuroGEOSS-Hub.

4) **Innovation and Growth:** The GEO plenary in 2014 gave a mandate to the continuation of GEO for the next decade but also made recommendations to open GEO to engagement with the private sector. The form of this engagement will be made is subject to discussion in the GEO community as the structure of the private sector, particularly in the ICT/EO domain, varies considerably across different parts of the world, and there are different sensibilities about the potential impact of private (commercial) sector on local markets. As indicated in Section 1.1 the European market is characterized by micro-firms, with strong innovation potential but difficulty to compete with global large players. In an open data world, protectionist barriers are not an option. At the same time, it is essential that the European legal framework addressing data protection, privacy, consumer protection, and fair competition is adhered to. This framework, which is also in evolution in the context of the Digital Single Market, frames the development of EuroGEOSS-Hub and can be leveraged to nurture the growth of European companies. It is not a barrier to international competition but it is a boundary condition that can represent additional costs to non-Europeans. By demonstrating how to leverage these boundary conditions and foster innovation and growth in Europe, the project will be a major contributor to the development of the Digital Single Market.

# 2. Impact

## 2.1 Expected impacts

***Work programme Expected Impacts***

EuroGEOSS-Hub will contribute to all the expected impacts mentioned in the work programme, under the relevant topic. Table 2 details the project contributions and the associated key performance indicators.

*Table 2. EuroGEOSS-Hub contributions to the work programme expected impacts*

| Expected Impact | Project Contributions | Key Indicators/Targets |
|---|---|---|
| **Improved user-friendly discovery, access and exploitation of EO data and information in Europe** | To discover and access EO data and information, EuroGEOSS-Hub platform makes use of the **brokering approach and technology** (DAB), successfully adopted by GEOSS. It will be evolved to improve user friendliness by:<br>• enhancing EO data discoverability;<br>• significantly advancing access and processing, by using the present **Big Data** infrastructure services for data storage and computation –keeping the platform infrastructure agnostic;<br>• implementing knowledge bodies and workflows discoverabiity and access, to improve data usability and exploitation | Statistics on User accesses and feedbacks, using metrics commonly adopted for web market places. |
| **Strengthened European regional approach to GEOSS** | EuroGEOSS-Hub platform implements the GEOSS European node (unique gateway) by brokering the significant European EO and environmental data infrastructures, including Copernicus Core Services, INSPIRE, EEA data systems, GEOSS European Supersites, | • Number of metadata managed by the brokering services of EuroGEOSS-Hub<br>• Number of European |

| | | |
|---|---|---|
| | ESA TEPs, EPOS, GMOS, ERA-Planet infrastructures, EGI, HelixNebula, etc. | "dataset" used/computed compared to the Global ones others.<br>Four targets are defined: year 2, year 3, year 4, after project lifetime. |
| **Broader uptake of GEOSS and Copernicus data, information and services** | • EuroGEOSS-Hub platform allows its users to access and process the Copernicus data/products using its **Big Data** capabilities.<br>• EuroGEOSS-Hub platform develops a Marketplace for **EO services and products** including the products and services provided by the public and private Copernicus dissemination platforms and the Copernicus Core Services –see MAEOS initiative of the partner EARSC.<br>• EuroGEOSS-Hub platform brokers the ESA TEP products and services, both directly and via the ERA-Planet project services –CNR coordinates this ERAnet.EuroGEOSS-Hub User-centric Applications generates advanced products and information making use of the Copernicus data, brokered by the Platform. | Statistics on:<br>(a) number of requests sent to the EuroGEOSS-Hub platform, detailed by utilized data and services.<br>(b) number of Big Data Analitics requests, detailed by utilized data and services<br>(c) number of users who accessed the EuroGEOSS-Hub, detailed by user categories and country; |
| **Increased EO-driven innovation and business opportunities for European SMEs and companies** | EuroGEOSS-Hub access to GEOSS data and its channel to GEO stakeholders helps develop business in SME's and larger companies throughout the EO services sector as well as helping developments in the IT sector.<br><br>EuroGEOSS-Hub platform develops a Marketplace for **EO services and products** including the products and services provided by the four User-centric Applications and the services offered by third-party marketplaces that can be proxied by the platform. | Number of SMEs and private companies that has used GEOSS resources via the EuroeGEOSS-Hub, every quarter or semester, and estimate:<br>(a) increment of EO services business outside of Europe.<br>(b) increment of structuring of the sector (i.e. groups of companies). |
| **Wider commercial exploitation of EO data and products beyond sectors that are not traditionally engaged in EO** | EuroGEOSS-Hub products and services using Copernicus and GEOSS data will drive innovation and business in all markets. Effort is going into the market development in all commercial sectors.<br><br>The EuroGEOSS-Hub platform provides **EO data and products** to the Big Data Analitics sector. | Count the Users and the number of requests sent to the Marketplace services and to the BigData Analytics services of EuroGEOSS-Hub. |
| **Increased European capacity to address GEOSS societal challenges of prime importance to the EU such as achieving the post-2015 SDGs or implementing adaptation and mitigation** | • EuroGEOSS-Hub develops a specific User-focused Application on "**European SDGs Monitoring**". This aims at building a common scientific, computational and policy framework to support the pathway from EO data to high-level indicators and improve the coherence between the different UN SDGs indicators optimizing their monitoring. It specifically works on **SDG 6** on Clean water and sanitation, **SDG 7** on Sustainable energy, **SDG 11** on Sustainable cities, **SDG 12** on Sustainable consumption and production, **SDG 13** on Climate action, **SDG 15** on Life on Earth.<br>• The other three EuroGEOSS-Hub User-centric | Number of Users of and requests to the SDGs monitoring application of EuroGEOSS-Hub (see WP6 and in particular the **SDGs Dashboard** –D6.8)<br><br>Number of Users of and requests to the products and services of the EuroGEOSS-Hub User Applications. |

| | | |
|---|---|---|
| **strategies to climate change** | Applications deal with natural risks: forest fires, weather extreme events and floods, and sea-level rise | |

***Other relevant Impacts***

EuroGEOSS-Hub is a key contributing project to help **establish and improve the Marketplace Alliance for Earth Observation Services (MAEOS) initiative of EARSC** (partner of the Consortium). This will significantly **contribute to the creation of a European Marketplace for EO Services**, enabling companies to offer new products and services building upon those coming from Copernicus and in situ sources. It will allow the European industry to capitalize on the public investments in environmental and EO programmes and, by linking with other data sets, can unleash a new wave of innovative geospatial products addressing many markets. It will provide a single entry point for customers world-wide looking to find geospatial solutions to meet their needs.

In MAEOS (like a physical marketplace) transaction costs should be reduced to a minimum so enabling low-cost business to develop. It will **allow a fragmented industry to build on the strengths of its diversity whilst not being limited by national boundaries**. The basic guiding principle should be to enable information as a service (INFOaaS). The platforms and infrastructure to support this should not be monolithic and must enable the large number of individuals and small businesses to innovate and bring new products and services to the market. Competition should be assured at every level. Some platform elements could be picked up and used by different marketplace operators. EuroGEOSS-Hub will contribute towards this goal.

Other principles would need to be addressed include the protection of IPR, the rules concerning exploitation of open data, security of information and privacy, financing and supporting new business models. This would offer a new model not available elsewhere and which could be an attractive place to do both science and business. **A Marketplace Alliance will be created to oversee the operation of the Marketplace(s) and represent the interests of all the stakeholders**. The Alliance would not do business directly but would act on behalf of all users of, or suppliers to, the one or more Marketplaces by negotiating terms, assembling market information and promoting the platform as a place to find services. The Alliance could also represent the downstream industry on regulatory matters and for the standardization of products and services.

***Framework conditions and Barriers***

EuroGEOSS-Hub users are not only application end-users (like decision makers), but also application producers and stakeholders –private and public intermediate users. Considering the huge European EO ecosystem along the whole value chain, the EuroGEOSS-Hub platform must **go beyond the traditional barriers characterizing end-users and stakeholders as well as public and private sectors**, ensuring its necessary sustainability. Finally, the EuroGEOSS-Hub platform has to **overcome the traditional separation between EO data access and high processing capacity technologies, remaining infrastructure agnostic** to ensure flexibility, scalability and evolvability.

The interest in EuroGEOSS-Hub will be various, from both public and private sectors, **this complexity must be fully considered and addressed**. Stakeholders can include:

<u>Research and Academia</u>

- A PhD student who needs a lot of computing performance to test the algorithm she/he developed.
- A Lab that wants to publish its innovative products along with the associated algorithms and its scientific publications.

<u>Commercial and no-profit organizations</u>

- A SME that wants to use the data available on the EuroGEOSS-Hub portal for its proper private market.
- A small company that wants to use the EuroGEOSS-Hub as a marketplace to expose its products and services and increment their visibility.
- A SME that wants to use the EuroGEOSS-Hub services and products to develop an end-user application – e.g. to monitor a SDG for a given region/country/city.
- An operational data producer who wants to distribute his/her data though the EuroGEOSS-Hub and follow end user statistics and feedbacks on his/her products.

- A cloud company providing access to cloud storage/computing services to expand the EuroGEOSS-Hub capacities.

Public sector organisations, regional and interregional governments

- A public manager aiming to access a SDG dashboard and get more information on the sustainability issues affecting a specific area.
- A public agency looking for a specific EO products or services, free from charge.

Communities, programmes and existing platforms

- The manager of a European infrastructure being brokered by the EuroGEOSS-Hub and contributing to GEOSS, who wants to get valuable feedbacks on the use of its products and hints on possible improvements.
- A stakeholder of an existing dissemination platforms (including a service desk), such as AVISO (> 8000 users), CMEMS (> 5500 users), Argos (>6500 users), which wants to be brokered by EuroGEOSS-Hub (at the marketplace and data content levels) to wider commercial exploitation of their products beyond their usual sectors and get useful feedbacks.
- Interoperability managers and developers of other GEOSS Regional nodes and relevant European research Communities/infrastructures, who wants to establish an interoperability agreement with EuroGEOSS-Hub.

**EO data and products sector is highly dynamic**, due to constant progression of space and in-situ data collection technologies, information extraction techniques, and forecasting modelling evolution. **IT infrastructures are characterized by a tremendous innovation and standardization rate as well** –see for example Cloud technology, Big Data Analytics, Internet of Things, etc. Hence, it is of paramount importance to conceive and implement the IT Platform of EuroGEOSS-Hub being characterized by the following features:

- Flexibility –in terms of existing systems interoperability and standards implementation;
- Scalability –in terms of capabilities and portability;
- Evolvability –in terms of user and stakeholders needs addressing;
- Technology Agnostic –in terms of data storage and computing infrastructures;
- Openness –in terms of standard interfaces, APIs, and software.

## 2.2 Measures to maximise impact

A Dissemination, Exploitation and Communication Plan will be first prepared at month 4 and kept updated for the entire duration of the project.

***Dissemination***

Dissemination and Communication activities are of high importance both during the project duration, to create visibility and raise awareness within the stakeholder communities, as well as after the project, to utilize the project results, find ways to further continue and advance the related research and pave the way for future exploitation of the EuroGEOSS-Hub platform, its marketplace and the developed Applications. These activities will **communicate and demonstrate the EuroGEOSS-Hub added value to the EO community as well as within key social and economic sectors of the Society**. They will capture the attention of stakeholders within the EO Community, as well as actors within the key social and economic sectors addressed by EuroGEOSS-Hub.

Through a well-planned and frequently updated **Social Media presence** on widely accepted platforms (e.g. Twitter, Facebook, and LinkedIn) EuroGEOSS-Hub will engage members of the general public, and continuously draw attention to EuroGEOSS-Hub activities and objectives, including **at least one press conference/release at the start and end of the project**. A set of key performance indicators are defined to assess and quantify the EuroGEOSS-Hub Dissemination and Communication activities –see Table 3.

The EuroGEOSS-Hub consortium perceives these activities as **an investment, not only during the life cycle of the project but also moving forward to make an impact on the EO downstream service sector in Europe** (for example helping to monitor the SDGs for EU). Communication and dissemination actions will be specified in the "EuroGEOSS-Hub Dissemination, Exploitation and Communication plan" deliverable (**D8.1**), which will be developed in the beginning of the project (by month 4) and will be regularly revised.

Dissemination and Communication activities will **target a wide range of stakeholders**, starting from the EO community and interested parties, such as: policy-makers, public sector organisations, regional and interregional governments, EO application developers –either public or private, European and international relevant Communities and programmes. Dissemination and communication activities will also be targeted to relevant actors in the key social and economic sectors addressed by the EuroGEOSS-Hub Applications, including: Natural Disasters, Coastal Zone, and SDGs monitoring. The dissemination and communication strategy consists of three main phases:

- **Awareness-oriented phase**: the aim of this phase is to create visibility and raise awareness amongst relevant stakeholders referred to above during the project duration. It consists mainly of dissemination and communication activities, i.e. distribution of project information (e.g. Social Media presence), designing dissemination material, organizing and participating at project-related/relevant events (e.g. GEO and Copernicus side events, workshops), press releases, creating a project logo and project website, etc.

- **Results-oriented phase:** during this phase, which covers the periods from the initial main milestones of the project to after its conclusion, the principal goal is sharing technology and knowledge developed within the project, as well as receiving feedbacks and inputs. This phase has a strong focus on disseminating the project results, in particular the innovative IT Platform, and the User-centric Applications. Activities within this phase include: demonstrations, organization of side-events, participation at related conferences and workshops, Social Media presence, publication of papers in relevant journals and active involvement with the EO community and related stakeholders –including European and international organisations and policymakers with ties to the key social and economic sectors related to EO services. In particular, two stakeholder Communities will be addressed: GEOSS and Copernicus.

- **Exploitation-oriented phase:** this phase focuses on identifying the exploitable results of EuroGEOSS-Hub, particularly those related to the EO application and data dissemination sectors. A critical activity during this phase will be working towards the exploitation and utilization of results beyond the project duration. This phase will commence early in the project, but related activities will be intensified towards the conclusion of the project, when the consortium will have a clear view of the technological advancements and innovative approaches for EO resulting from the project, and a clear insight of the feedbacks provided by the Users of the EuroGEOSS-Hub Platform and Applications developed. A main focus of this phase will be carrying out the EuroGEOSS-Hub Platform and Applications assessment, which will also lead to the identification of additional targeted scientific and economics actors in the EO data and services sector, in order to provide them with relevant results of the project, as well as make recommendations to relevant European and International programmes (i.e. GEOSS and Copernicus), and organisations active in the EO data and services sharing areas (e.g. Belmont Forum, RDA, ISDE, etc.). Any advanced data management or IPR issues will be tackled during this phase.

The foreseen dissemination and communication activities performed during the three phases identified above can be subdivided into the following key activities:

- **Website and Social Media***:* This activity will develop the EuroGEOSS-Hub web-site and maintain it during the project life and beyond. The EuroGEOSS-Hub website will publish all results to a wide audience. Social media networks such as Twitter and LinkedIn, as well as industry and EO focused blogs will be utilised to reach more users through additional channels and subsequently raise awareness and foster participation.

- **Organisation of dissemination events at official venues***:* EuroGEOSS-Hub specific dissemination and communication events will be organised, as well as facilitating attendance by consortium members at EO community and stakeholder events, such as those publicised via the *Copernicus and GEOSS portals*, and any relevant wider dissemination events, symposiums and seminars, including:
  - *GEO Plenaries (one at each year of the project duration);*
  - *GEO European Projects Workshop (GEPW) (one at each year of the project duration);*
  - *GEO Work Plan Symposium (one at each year of the project duration);*

- *Copernicus events (e.g. the Copernicus Marine Environment Monitoring Service, C3S Workshops, Big Data from Space Workshops, GEOSS Flagship workshops, etc.);*
- *Belmont Forum steering Committee meetings;*
- *Research Data Alliance (RDA) plenaries;*
- *INSPIRE annual Conference (one at each year of the project duration);*
- International Society for Digital Earth *(ISDE) conferences;*
- *MAEOS and related industry events;*
- *BDVA (Big Data Value Association) events;*
- *European Space Solutions (bi-annual);*
- *ESA Living Planet (tri-annual);*
- *Events dedicated to SDGs implementation (e.g. UN Sustainable Development Solutions Network events) and user sectors (e.g., energy, agriculture, etc.)*
- *Geospatial World Forums;*
- *European Geosciences Union General Assembly;*
- *American Geophysics Union general meetings;*
- *International Symposium on Remote Sensing of Environment (IRSE);*
- *IEEE IGARSS (International Geoscience and Remote Sensing Symposium).*

EuroGEOSS-Hub materials (brochures, newsletters, leaflets, movies, etc.) will be designed and focused for each event. Two movies will be developed for the GEO Plenaries held in the 2nd and 4th year of the project.

The list of events will be updated once the project has commenced and dates have been published by relevant event organizers so that Consortium members may consistently attend these events to publicize the activities and results of EuroGEOSS-Hub during the life of the project.

- **Raising awareness among EO Communities via self-organized dissemination events**: This activity will amalgamate the knowledge and results generated by the project and will be disseminated to relevant stakeholders and interested partners within the EO community, in Europe and in GEOSS using alternative venues (see task 8.6). Regular and periodical self-organized dissemination events and seminars will be held reaching all major stakeholders to present the findings of EuroGEOSS-Hub. Partners of the Consortium will target regional governments, scientists, public sector organisations, private companies and relevant stakeholders in the different GEO Societal Benefit Areas (SBAs), and SMEs. Best Practices material and Webinars will be generated and distributed. TED Talks/Conferences will be organized.

- **Scientific publications***:* The dissemination and communication channels will include selected journals, scientific or targeted publications. The partners will prepare a number of scientific publications and promotional material for external professionals and researchers. Indicative journals include, for example:
  - *International Journal of Applied Earth Observation and Geoinformation;*
  - *Environmental Modelling & Software;*
  - *IEEE JSTARS (Journal of Selected Topics in Applied Earth Observations and Remote Sensing);*
  - *South-Eastern European Journal of Earth Observation and Geomatics;*
  - *ISPRS Journal of Photogrammetry and Remote Sensing*

WPs 1-7 are expected to publish at least two significant publications each, for the entire duration of the project; hence, about 15 manuscripts are considered from the Consortium on peer-reviewed journals and magazines.

- **Information material (brochures, newsletters):** The project will produce four series of dissemination and communication material (beginning of the project, after the two intermediate main milestones M–PM18 and PM32- at the end of the project), for raising the awareness of the deliverables and results to the relevant target groups. A newsletter will include updates on key findings and extends the reach to an even larger number of stakeholders including members of the European EO community, GEOSS, scientific research organisations, industry, public sector organisations and relevant government departments in Europe. Brochures and infographics will be produced and distributed, but will also have digital forms such as easy to

distribute infographics and blog posts. Produced movies will be available on the Website and a dedicated Youtube channel will be crated.

- **Training Materia**l: EuroGEOSS-Hub will develop and provide access to training material, including webinars and tutorials, to show how the EuroGEOSS-Hub platform, its Marketplace and the developed User focused Applications can be used and adapted to different needs. The project Website and dedicated social media channels will be used to disseminate the training material.

- **A (virtual) liaison office** will be set up by the project team to raise awareness and improve co-operation with other initiatives and programmes (see task 8.3, 8.4, and 8.5). This will provide an identity where other parties can address questions concerning the EuroGEOSS-hub and how to interact with it. The Liaison office will certainly address all stakeholders which have an interest to co-operate with or to benefit from the EuroGEOSS-Hub so providing a harmonised and constant interface where someone outside the project will be able to address questions. It will overcome uncertainty about who to address so that rather than being a question of knowing someone who participates to the EuroGEOSS-Hub and then being passed on to whoever can address a question it can provide a more responsive point of contact. The Liaison Office will also provide a focus for organising and coordinating the communication activities which will be undertaken by the whole team.

**For each designed dissemination and communication activity, the following information will be determined**:

- Activity goal and purpose;
- Expected results;
- Target group;
- Key message(s);
- Communication channels and dissemination tools;
- Timing;
- Responsibilities;
- Costs and budget.

**The initial target groups** for the "Dissemination and exploitation of results" activities include:

- GEO Committees, Boards, WGs and Task members (i.e. GEO ExComm; GEOSS Program Board, GEO High-level WG, GEO Secretariat, GEOSS Flagships, Initiatives, and Foundational Tasks, etc.);
- GEOSS Regional Nodes not directly connected to EuroGEOSS-Hub;
- EARSC members and in particular the MAEOS stakeholders;
- Copernicus World Alliance (CWA) members;
- Copernicus User Communities, Core Services and Ground Segments;
- ESA Thematic Exploitation Platforms;
- BDVA (Big Data Value Association) Members;
- Relevant European research infrastructures and other relevant programs supported by DG-RTD, DG-GROW, and DG-CONNECT;
- EGI.eu and HelixNebula members and stakeholders;
- RDA relevant WGs;
- The Belmont Forum e-Infrastructure and Data Management CRA, steering Committee and WGs;
- ENEON and other relevant networks (e.g. EnVRI-plus, EPOS, etc.);
- ERA-Planet and the other relevant ERAnet (e.g. CIRCLE-2, FACCEJPI, Ocean Energy ERAnet, etc.);
- International initiatives dealing with EO Data Science (e.g. ICSU Future Earth initiative; UN initiatives and programs, etc.);
- Relevant Scientific Communities (e.g. AGU, EGU, ISDE, IGARSS)

To communicate and disseminate the project results, an important role will be also played by the **EuroGEOSS-Hub Advisory Board**, which is composed of: The European Space Agency (ESA ESRIN), the Environmental European Agency (EEA), the Federal Geographic Data Committee (FGDC, US), the San Diego Supercomputer Center (SDSC, US), the GEO Secretariat, AfriGEOSS, DSI (Japan) Climate Centre of the Red Cross/Red Crescent and

the Open Geospatial Consortium (OGC) have agreed to be member of the Advisory Board, which will be complemented by representatives from EC DG RTD, GROW and CNECT. This Advisory Board is described further in section 3.2.

***Communication activities: channels and tools***

**JRC** will provide access to the **INSPIRE Forum, which has 82 discussion Groups for more than 4000 members**. In addition, JRC will provide the link to the **Copernicus Land Monitoring and Emergency Management and Security services Communities**.

EuroGEOSS-Hub project and its results will be featured in **EARSC** communications both towards members and towards the wider EO Community. EARSC will **promote the capabilities towards the Oil & Gas community with which we have good links as well as other commercial sectors with which we are in the process of developing community relationships e.g. Energy, Agriculture etc. MAEOS will have a role for global promotion of the European capabilities** and will develop further the communication strategy once it is operational. EARSC is also developing links with other companies around the world in order to enable partnerships between European EO service providers. EARSC is a partner to **GEO-Cradle**, which focuses on the Balkans, Mid-East and N Africa and is working with the African Association of Remote Sensing Companies to generate an inventory of companies existing throughout the African continent.

**EGI.eu** will use its channels to communicate and disseminate the EuroGEOSS-Hub results: **EGI-Engage project aims to accelerate the implementation of the Open Science Commons** by expanding the capabilities of a European backbone of federated services for compute, storage, data, communication, knowledge and expertise, complementing community-specific capabilities. Moreover, EGI-eu will **communicate the project results in Helix-Nebula Community**.

**ECMWF** will use its **media centre and learning channels** to communicate and disseminate the EuroGEOSS-Hub results. Noticeably, **the Copernicus Climate Change and Atmosphere Monitoring Service Communities** will be addressed.

**ATOS** will use its communication channels to disseminate the projects activities and results, including its **Newsroom facilities:** Atos news, Press Releases, dedicated Events, Media Resources, RSS, social networks.

**CLS** will also use its communication and outreach channels and in particular will target **the Copernicus Marine Monitoring Service Community**: existing dissemination platforms (included service desk), as AVISO (> 8000 users), CMEMS (> 5500 users), Argos (>6500 users), which wants to be accessed by EuroGEOSS-Hub.

**GRI** will communicate the project results to its Stakeholders using channels such as the **GRI Global Conferences and its reporting activities**.

**BRGM** will use its **"News and Media", RSS Feed, and BRGM on Youtube** to communicate the project results. EuroGEOSS-Hub results will be featured in **BDV (Big Data Value) association** by ATOS. NERC will use its **BGS communications dashboard** to disseminate the project results targeting in particular the EPOS Community.

**CNR** will provide access to its **discussion Groups including a Foresight Group on significant innovative solutions and Forum on Open Data.** CNR will also provide access to the projects of the **EO ERAnet: ERA-Planet**. **CREAF** will provide access link with **ENEON (network of Earth observation networks) Community**.

**BSC** has a **communication department** in charge of institutional and project communication and dissemination of the results through different channels (press, social media, conferences, workshops, etc.). BSC will use large international events on HPC such as SC (more than 10,000 participants) and ISC (more than 3000 participants) conferences, to provide high visibility to the project. **The MareNostrum visitor's center**, open to visits for the general public for general outreach, will communicate and disseminate the project through flyers, postcards, posters, etc. **Training and Knowledge and Technology transfer** will be also used by BSC.

**JRC and CNR** will communicate the EuroGEOSS-Hub results in **the many GEOSS Tasks**, which they co-chair or are member of. The University of Geneva will use its communication channels with **Non Governmental Organisations**. RADI and the other connected Regional nodes will use their communication channels to feature the project results **worldwide**.

More generally, **Table 3 describes the project communication channels and their Key Performance Indicators**.

*Table 3 Key Performance Indicators for the EuroGEOSS-Hub Dissemination and Communication activities*

| Communication Channel | EuroGEOSS-Hub Approach | Key Performance Indicators (quantified indicators and target performance) |
|---|---|---|
| **EuroGEOSS-Hub website** | Key element of the project dissemination and communication strategy, for both internal and external purposes | Common web metrics with Google analytics, containing unique page visits, views and responses. |
| **Social media platform presence and interaction** | Presence on widely accepted platforms (e.g. Twitter, Facebook, LinkedIn,) to reach out and engage members of the general public, draw attention to EuroGEOSS-Hub activities, generate discussion of EuroGEOSS-Hub activities and collect feedback. Organize TED Talks (see www.ted.com) | Reviewed by social media monitoring tools in biannual reports for all platforms on common social media metrics such as reach, activity, likes and followers. |
| **Marketing and community events** | Direct mailings (website subscription) will be used sharing newsletters about key progress. Events for end user and application developer communities will be attended and organized by all stakeholders. | EuroGEOSS-Hub will have subscribers from EO organisations, public organisations and bodies, private sector stakeholders in EO technology and services, scientists, data scientists and users from Europe and globally. |
| **Information and training material** | We will distribute offline and online brochures, posters, leaflets, infographics, and training material (including webinars and tutorials). | At the start, after each main milestone and end of the project this will be key for the communication campaign efforts. Training multimedia material will be always available on the project web site. |
| **Scientific publications** | We will hold conference presentations and submit (journal) papers. | Number of manuscripts/presentations: <12 = poor; 12-18 = good; >18 = excellent |
| **Workshops, special events, and clustering activities** | Workshops, special and side-events for EO community and stakeholders (also combined with gathering events) will be organised throughout Europe and internationally. The project will be able to leverage events organised by GEO, INSPIRE, the EEA, ESA and other contributing organisations | The EuroGEOSS-Hub network contacts and engagement will increase during the project up to several hundreds of contacts. |

***Exploitation***

The results of the project will offer several exploitation possibilities, which fit into the evolving European strategy being developed between the European Commission and other European institutional stakeholders, industry and researchers. This is aimed at leveraging the public investment, which has been made in Europe (Copernicus programme, INSPIRE, Open data, e-infrastructures, etc.) to enable industry and scientists to create growth and jobs in Europe. The main lines of exploitation will be:

**Science:**

- Better access to and use of global data –including analytics services;
- Increased participation in global research programmes linked to GEO societal benefit areas;
- Improved links between scientists and industry with direct (funding) and indirect (R&D excellence) benefits.

**Commercial:**

Benefits on the commercial (industrial) side will extend right through the value chain from suppliers of data, infrastructure services (IaaS), platform software components and services and EO services. All will benefit from easier to access a European and global market as well as the data and services on which their research and products are based. This includes data coming from non-European sources through GEOSS.

The European industry has declared its intention to establish a European Marketplace Alliance for EO Services (**MAEOS**). It will oversee and support many "marketplaces" or brokerages offering access to EO products and services. It will include and support a variety of business models including groups of companies offering specialised services based on market sector or geographical region and including bespoke/consultancy type products as well as on-line e-services. It will be inclusive and open to any company wishing to participate.

In general, the project can benefit industry in 5 different ways:

1. The research conducted during the project can be applied to commercial Marketplaces. The software components, the architecture and the interaction with the infrastructure layers can help others set up brokerage services for the products and services.
2. Data from GEOSS can be made more easily accessible for companies to use and on which to build products and services –i.e. **the EuroGEOSS-Hub Marketplace**.
3. The EuroGEOSS-Hub broker services can be introduced under MAEOS and provide direct links for users, companies and researchers i.e. the EuroGEOSS-Hub becomes a marketplace alongside others.
4. Promote services to GEOSS stakeholders. The EuroGEOSS-Hub can provide the capability for European companies to offer their services to global customers under the GEO umbrella.
5. The EuroGEOSS-Hub User-centric Applications provide possible processing techniques or chains which can be adopted by companies offering services.

Further, results from the EuroGEOSS-Hub project can benefit this work to establish European digital marketplaces in three ways:

1. Techniques and knowledge from the project will be used to improve commercial marketplaces. Through the MAEOS, marketplace operators will be able to (online) access key knowledge or software components which can be introduced by the commercial players into their marketplaces.
2. The EuroGEOSS-Hub project will provide a testbed for software components that can be used to build one or more commercial marketplaces. In this instance, successful software packages that have been proven through the EuroGEOSS-Hub project can be developed further by the commercial marketplace operators to develop new products and services. The EU Public License offers a model for this to happen.
3. The resulting EuroGEOSS-Hub IT platform can become a Marketplace in its own right which is tailored to the GEO community allowing commercial and scientific players to access GEOSS data and importantly provide their products and services into the GEOSS international community. It will become a showcase for European research and technology and a key channel to the international market.

From the perspective of the different commercial players involved, we noted above that players throughout the value-chain can benefit:

1. **Data suppliers**. Companies offering commercial data will be able to supply this through the marketplace, which will be constructed. The project will enable supply to the GEO community where it is recognised that free and open public data should co-exist with that sourced from commercial suppliers. An important element of the EuroGEOSS-Hub will be to implement the legal interoperability frameworks developed in GEOSS and CODATA.
2. **EO Services suppliers**. Any supplier of geospatial services will be able to use the EuroGEOSS-Hup Marketplace to sell services. They can either provide their own brokerage or join with others to offer either

complementary or even competitive services. For example, a group of companies may wish to specialise in products for a specific commercial sector i.e. agriculture, oil & gas, insurance etc. Similarly, companies may wish to offer global intelligence services with each specialising in a geographic region. Some of the offers will be based on consultancy or bespoke products. These companies will benefit through easier access to data and value-added products on which they build their offer.

3. **Broker Service Providers**. Providers of broker services are building their offers on specific software components. These components are supplied by specialist companies that combine specialist algorithms with knowledge of data. Companies offering data from different sources can compete either using different or the same broker. Visualisation tools or access to processing capability can become a differentiation factor or one that is available to all. Competition should ensure that the best tools become available to a wider user base.
4. **IT infrastructure Providers**. The infrastructure required to host and process data on the principle of user to data should again be accessed on a competitive basis. One or more brokers of infrastructure services (see the project Virtual Cloud) will bridge between the offer of cloud services, communications bandwidth and/or processing capacity and the geospatial service brokers. These IT players will gain revenue from the EO services markets but their business models will be based on many other client segments as well. In this respect, the EuroGEOSS-Hub marketplace will contribute to raise the importance of the EO sector for these players.

**Commercial actors in each of these market segments will benefit from the EuroGEOSS-Hub project.**

***Business Plan and Sustainability Plan***

Sustainability and exploitation of the results will depend on a sound business plan. This will be developed under the project (**D7.5**) and will address all the aforementioned aspects focusing on the potential contribution in each part. It will look at the **revenue flows**, the **ability to support a number of marketplace operators** and how to **ensure competition at all levels with no dependency on large monolithic players**. Analysis techniques will be used to consider the market forces and **to help position the European sector against its international competition**. The ability to leverage this using the GEO community will be an important consideration.

The Plan will **consider a partnership between the public players delivering the GEO (and Copernicus) programme and its infrastructure and the various players from all market segments** with an interest in the EO services marketplaces. This can take the form of a PPP (Public-Private-Partnership) between the industry and the institutional stakeholders led by the EC. The examples and lessons learned from the **Big Data Value PPP will be an important input of the EuroGEOSS-Hub business plan**. **The business community will be consulted through EARSC** to both promote the results from the project but also as the basis for an analysis of their needs from the EuroGEOSS-Hub. The **MAEOS will greatly help in this respect by providing a business focus on the project**.

The business plan will take into account all the possible exploitation paths identified above. It will start by developing **a picture of the competitive landscape in which the EuroGEOSS-Hub will be situated (D7.4)**. Based on the stakeholder consultation, it will **present the possible means in which revenue can be generated based on the EuroGEOSS-Hub project results**. It will **examine differing business models for exploiting those results** and the ways in which revenues can be generated and it will **make recommendations on steps to be taken to develop a sustainable business model around the project**. The business model will be **reviewed and agreed by business leaders** leading to a view on the implementation including a plan setting out the subsequent steps and measures to be taken.

Given the rapidly changing environment, it is proposed to make **a first business model** (possibly in skeleton form) **available at M18** of the project, which can then be used to adapt or guide subsequent actions with **an update at M30** and **a final business plan** to be developed near the end of the project when the results are fully known **at M42**. The introduced **business model is the cornerstone of the project long-term Sustainability Plan** (**D7.6**) taking into account technical, economic, and legal aspects, and foster exploitation of EO beyond traditional sectors.

### *User uptake and logistics support*

EuroGEOSS-Hub **platform offers a services portfolio, according to user categories and range of expectations**. Each category and service has to be characterized in terms of delivery and level of commitment (Service Level Agreement: SLA). It will be necessary **to identify users and the link between them**. In addition, **accompanying measures will be necessary to assess the usability of the platform**.

Platform services organization will help to administrate and manage the whole EuroGEOSS-Hub Community. A steering committee for the platform services organization, with a strong service management team, shall be dedicated to that. As part of the platform operations, the **logistics support (hotline support, FAQ, documentation, training) will be designed and planned, in the longer-term sustainability roadmap** (see **D8.6**). The project Business and Sustainability Plans will adopt the approach, showed in Figure 7, for users uptake to support the adoption of EuroGEOSS-Hub services and products by user communities.

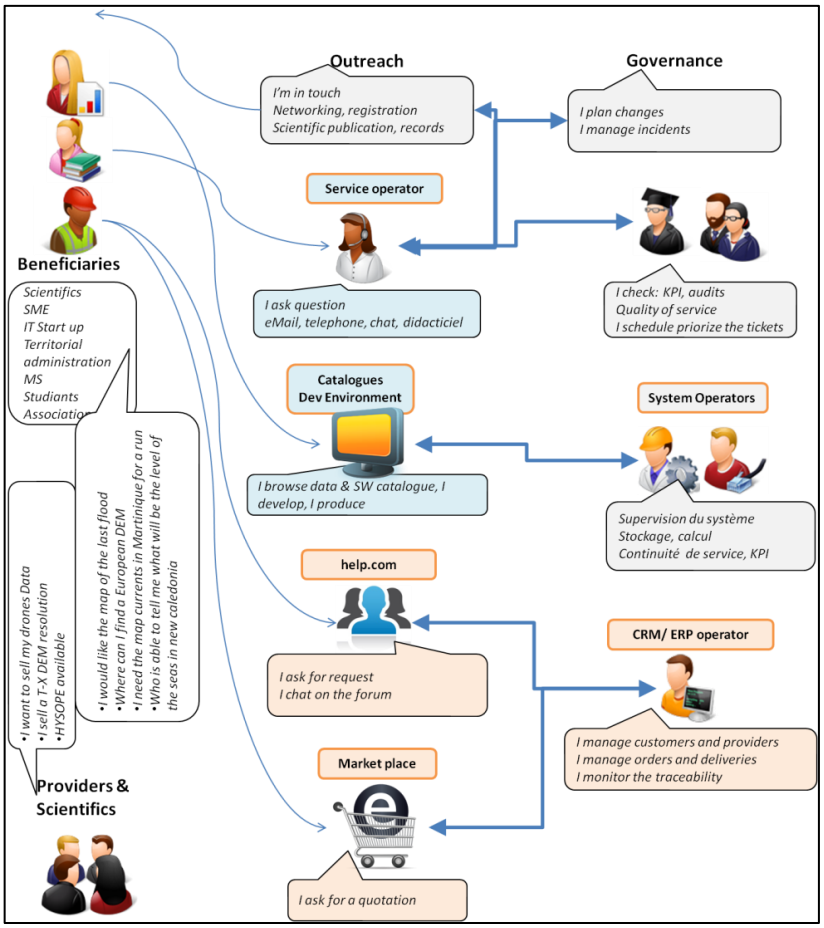



Figure 7. EuroGEOSS-Hub user-uptake methodology and necessary activities/tools

### Data Management Plan (for the Open Research data)

EuroGEOSS-Hub will collect and generate data and information through its Platform services and User-centric Applications. To enable access and re-use in a transparent and powerful way, EuroGEOSS-Hub will define a Data Management Plan **in agreement with the H2020 guidelines on Data Management** and applying the **GEOSS Data Sharing and Data Management Principles** as well as the **Copernicus Core Services QA/QC**.
**A first version of the EuroGEOSS-Hub Data Management Plan (DMP) will be delivered by month 6** (**D8.2**), and it will be kept updated during all the project duration (M20 and M38). The DMP will cover the following subjects:

- **What standards** will be used for data discoverability, accessibility and (re-)use;
- **How these data will be exploited and/or shared/made accessible** for verification and reuse;
- **How these data will be curated and preserved**, even after the project duration.

The DMP will include (at least) 5 information strands regarding data managed by the project:

1. **Data set reference and name**:
   a. Identifier for the data set to be produced.
2. **Data set description** (Description of the data that will be generated or collected):
   a. Origin (in case it is collected);
   b. Nature and scale;
   c. To whom it could be useful;
   d. Whether it underpins a scientific publication;
   e. Information on the existence (or not) of similar data;
   f. Possibilities for integration and reuse.
3. **Standards and metadata**:
   a. Reference to existing suitable standards of the discipline;
   b. If these do not exist, an outline on how and what metadata will be created;
4. **Data sharing** (Description of how data will be shared):
   a. Access procedures;
   b. Embargo periods (if any);
   c. Outlines of technical mechanisms for dissemination and necessary software;
   d. Other tools for enabling re-use;
   e. Definition of whether access will be widely open or restricted to specific groups;
   f. Identification of the repository where data will be stored, if already existing and identified, indicating in particular the type of repository (institutional, standard repository for the discipline, etc.);
   g. In case the dataset cannot be shared: the reasons for this should be mentioned (e.g. Ethical, rules of personal data, intellectual property, commercial, privacy-related, security-related).
5. **Archiving and preservation** (including storage and backup):
   a. Description of the procedures that will be put in place for long-term preservation;
   b. Indication of how long the data should be preserved, its approximated end volume, the associated costs and how these are planned to be covered.

EuroGEOSS-Hub will **rely on the existing Public and Private data storage and computational infrastructures contributing to its Platform to assure accessibility, preservation and curacy**, i.e. **ATOS** cloud, **CloudSigma** infrastructure, **BSC** HPC infrastructure, and **EGI.eu** cloud federation. Other private and public infrastructures (e.g. EARSC members cloud infrastructures) will also be able to interoperate with the platform and manage/mirror data.

To allow harmonization and integration, **the EUROGEOSS-Hub platform will support the standards commonly used by the EO Community, including:** OGC and ISO TC211 standards, W3C standards, NASA and NOAA standards, INSPIRE standards, ESA standards, UNIDATA/UCAR/NCAR specification, RDA and Belmont Forum recommended specifications.

***Knowledge Management and Protection***

To maximize EuroGEOSS-Hub impact, **all software developed through this project will be made available via a "CC-BY" type of license with public APIs** –where appropriate coordinated with European and International Working Groups– and deposited in an **Open Software Repository** such as Github.

**All milestones, deliverables and other reports from this project will be made publically available** once they have passed the project's internal review process. This will be done using the project's Website.

**All papers resulting from the work of this project will be made available using** GREEN **and** GOLD **Open Access**, following the best strategy to maximize the publication impact and the targeted audience.

The **Consortium Agreement** (to be prepared if the proposal is approved) **will include details of how the IPR of the Partners/Consortium will be handled**, in conjunction with the legal services of the partners involved and applying the Horizon 2020 IP Management principles as well the GEOSS Data Sharing and Management principles**.**

# 3. Implementation

## 3.1 Work plan — Work packages, deliverables

EuroGEOSS-Hub is planned for a four-year period starting January 2017 until the end of 2020. The project is articulated around four thematic user-centric applications (**WPs 3, 4, 5** and **6**) underpinned by a strong technological platform (**WP2**) addressing the key issue of the interoperability of Big Data processing, and an assessment and sustainability core activity (**WP7**) –see Figure 8. The External relations, Dissemination and Outreach (**WP8**) ensures that the EuroGEOSS-Hub is well connected with the necessary interoperability arrangements with relevant European e-infrastructures (Copernicus, INSPIRE, Open data portals, research e-infrastructures, etc.) and global ones (GEOSS regional nodes, and international initiatives) and implements the dissemination, exploitation and communications plan that is essential for the project success. Project management (**WP1**) activities include the preparation and updates of progress reports and the deliverables quality control.

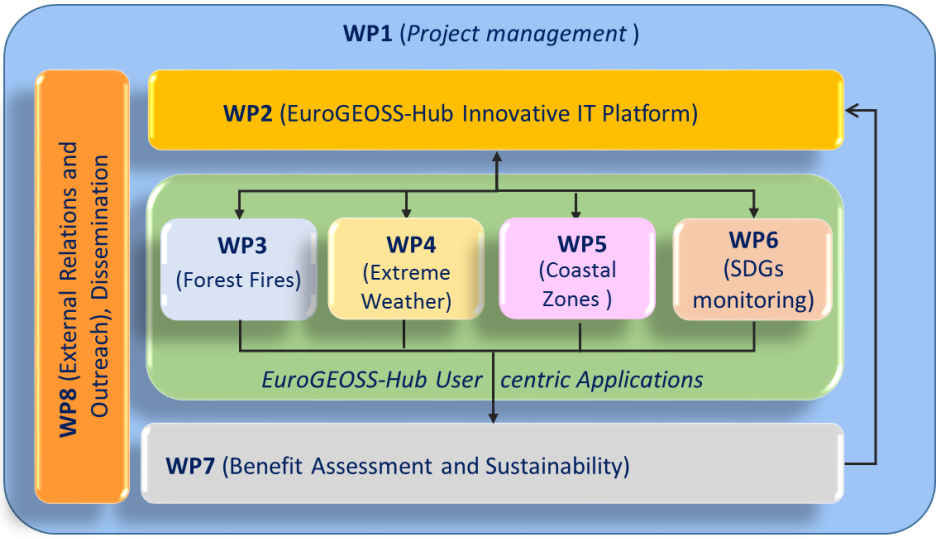



Fig 8: EuroGEOSS-Hub components and overall structure

### *Coordination of the EuroGEOSS-Hub Platform development*

There are many activities to design and develop the innovative EuroGEOSS-Hub IT Platform requiring many different areas if expertise. At the same time, it is crucial to have a coordinated and effective control on the platform design and implementation, considering the evolution of both GEOSS/GCI requirements and the EO European infrastructures landscape. To ensure this coordinated approach, the project has been structured with a single WP dealing with the platform development, consisting of three sub-WPs (see Figure 8):

- (***WP2a***) "Platform Requirements and Architecture", coordinated by CNR, deals with the whole platform conceptualization, design, and interoperability with the other Regional Nodes and European research infrastructures. This includes the specification of the security, privacy and quality aspects of the platform.
- (***WP2b***) "Marketplace and Brokers development", coordinated by ATOS, deals with the user interaction and content brokering services implementation. This includes the DAB evolution (enhancement and advancement): DAB 2.0.
- (***WP2c***) "Virtual Cloud development". coordinated by EGI.eu, deals with the implementation of the services to broker the existing cloud/infrastructures services (data storage and computing capacity) needed to enable Big Data analytics for the platform. This implements a virtual cloud building on the infrastructures provided by: EGI, ATOS, BSC, CloudSigma, other SMEs members of EARSC.

### *Coordination and Integration between the EuroGEOSS-Hub Applications and the IT Platform*

A strong coordination between WP2 and the four User-centric Applications WPs (WP3,4,5 and 6) is implemented by following the approach depicted in Figure 6. A specific task is implemented by each of the User Application

WPs **(Tasks 3.4, 4.7, 5.5, 6.9)** to contribute inputs to the IT Platform (i.e. WP2) and leverage the platform services. On the other side, four tasks in WP2 have a specific activity to take care of the requirements stemming from the User Applications **Tasks 2.1, 2.6 2.7, 2.9** which, in turn, generate guidelines and best practices to use the Platform services and capabilities. Finally, **Task 7.1** will provide a multidisciplinary assessment informing all the WP2 tasks.

**The User-centric Applications (WPs 3 ,4 ,5, 6)** will develop a set of products and services (e.g. thematic dictionaries and ontology, dashboards, processing modules and services, workflow and tools.) that will contribute to the platform resources and to its marketplace content. Therefore, it is important to consider these **WPs 3, 4, 5, 6 as user-focused actions contributing to the development of the EuroGEOSS-Hub innovative platform**.

**WP6**: European SDGs monitoring Application is larger (about 80% more effort) than the other user-centric applications (i.e. WP 3, 4, 5) because it addresses six goals significant for the EU. It is noteworthy that the WP6 leader partner (UNIGE) will contribute in-kind resources covering about the 35% of the total effort.

The **EuroGEOSS-Hub DMP** (Data Management Plan) is delivered by WP8 (External Relation, Dissemination and Outreach) and not by WP1 (Management and Scientific Coordination) because of the nature and scope of this plan in the project, aiming to reach out to the GEOSS and Copernicus communities and contribute to the platform sustainability and exploitation.

## GANTT

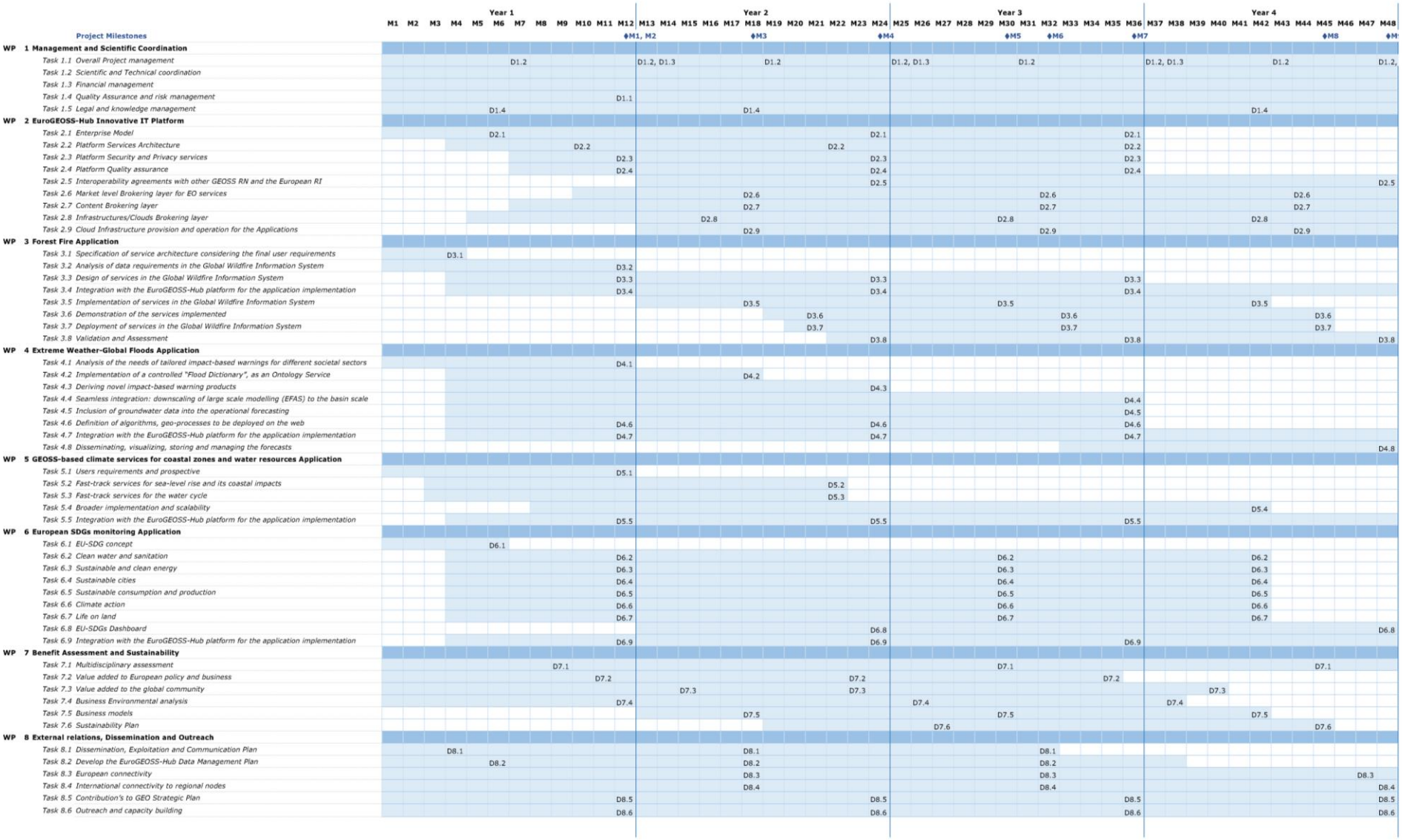


**Table 3.1.a: Work Package Description**

| **Work package number** | **1** | | **Lead beneficiary** | | **01-BRGM** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Work package title** | **Management and Scientific Coordination** | | | | | | | | | | | |
| **Participant number** | **1** | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| **Participant short name** | **BRGM** | JRC | CNR | UAB | CLS | CREAF | EARSC | UNIGE | UBDC | CloudSigma | ECMWF | ATOS | BSC |
| **Person-months per participant** | **36** | 3,8 | 6 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

| **Participant number** | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Participant short name** | 52North | RADI | GRI | UREAD | CNRS | UNSW | DHI | NERC | ARPAE | EGI.eu |
| **Person-months per participant** | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| **Start Month** | **1** | | | **End month** | | **48** | | | | |

**Objectives**
WP1 will provide the overall management of the project, the scientific coordination and take charge of grant, financial and legal issues.

**Description of work**
**Task 1.1 Overall Project management (BRGM)**
The main contractor and coordinator of EuroGEOSS-Hub, BRGM will be responsible for coordination and administration by:

- Contracting (contract negotiation, Description of Work (DoW) preparation, consortium agreement preparation)
- Monitoring compliance by the consortium members with their obligations;
- Reporting (WP activity and progress reports on half-yearly basis),
- Project Deliverables management (collection, integration and submission),
- Periodic reports management (collection, compilation and submission)
- Liaising with the European Commission
- Supporting of the Executive Group (Core team, WPL)
- Supporting the Advisory Group
- Providing a platform to ensure the smooth and streamlined information flow within the consortium
- Organising the consortium meetings (internal to the project and review meetings)

The Main management partners are the Project Coordinator (BRGM), the Scientific coordinator (JRC), the Technical coordinator (CNR) and the Quality and risk (BRGM).

**Task 1.2 Scientific and Technical coordination (JRC-CNR)**
In EuroGEOSS-Hub the scientific and Technical coordination is assigned to JRC for the Scientific component and CNR for the technical one. In particular, CNR will be responsible for the overall information system architecture, and the interoperability arrangements between the information platform and the thematic work

packages as well as interoperability with external regional nodes and the GEOSS Global Common Infrastructure. JRC will be responsible for the scientific coordination, and in particular:

- To ensure the coordination and the added value of the project to the scientific and policy objectives of the thematic work packages.
- To assess the scientific quality of the deliverables.
- To ensure coordination with global initiatives such as the GEO Strategic Plan, and the activities of the Research Data Alliance, and with European ones such as the implementation of the INSPIRE Directive, the development of the Copernicus dissemination platforms, and relevant European initiatives in the field of Big Data and Cloud computing.
- To co-chair the Technical and Scientific Committee with CNR, prepare agenda, minutes and follow up.
- To develop a validation plan.

**Task 1.3 Financial management (BRGM)**
The financial management is based on the monitoring of the effort spent by the partners in the various activities, with the aim of verifying the adherence of the work profile to the initial planning and to formulate updated forecasts for the successive periods. This task includes: collecting and submitting partner cost statements, monitoring project expenses, obtaining audit certificates on financial statements whenever they are needed and transferring funds to the partners after each payment by the EC according to the terms of the consortium agreement and financial schedule.

**Task 1.4 Quality Assurance and risk management (BRGM)**
This task includes activities for preparing, maintaining and implementing the quality and risk management plan. The quality management plan will include procedures for project outcomes (documents, software) issues and change control, reporting and communication, corrective actions, tracking of action items and conflict resolution. Moreover, a specific part of the plan will describe risk assessment and control procedures. Risk assessment will take place at any time of the project and will aim at early identification of risks. Risk control will contribute to monitor identified risks and take all necessary actions to reduce their effects. At the core of the risk management will be a risk table, listing and classifying risks according to their probability, severity and impact on the project. This table, prepared at the beginning of project and updated with adequate periodicity.

**Task 1.5 Legal and knowledge management (BRGM)**
This task includes negotiation and monitoring of the consortium agreement and the Intellectual Property Rights of partners.

**Deliverables** (brief description and month of delivery)
**D1.1: Quality and Risk Contingency Plan**, Report, (BRGM), (M12).
**D1.2: Internal Report**, (BRGM), Report, (M7, M13, M19, M25, M31, M37, M43, M48).
**D1.3: Annual management Report delivered to EC**, (BRGM), Report, (M13, M25, M37, M48)
**D1.4: Report on IPR and Consortium Agreement monitoring**, (BRGM), Report, (M6, M18, 42)

| **Work package number** | **2** | | | **Lead beneficiary** | | **03-CNR** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Work package title** | **EuroGEOSS-Hub Innovative IT Platform** | | | | | | | | | | | | |
| **Participant number** | 1 | 2 | **3** | 4 | 5 | 6 | 7 | 10 | 11 | 12 | 13 | 15 | 21 | 23 |
| **Participant short name** | BRGM | JRC | **CNR** | UAB | CLS | CREAF | EARSC | CloudSigma | ECMWF | ATOS | BSC | RADI | NERC | EGI.eu |
| **Person-months per participant** | 24 | 7 | **60** | 6 | 36 | 30 | 10 | 34 | 6 | 36 | 36 | 10 | 32 | 30 |
| **Start Month** | **1** | | | | **End month** | | | | **48** | | | | | |

**Objectives**

To design and develop the innovative web-based IT platform (three design and building cycles are considered) that implements the EuroGEOSS-Hub, providing **a unique access point (gateway) to diverse European EO and non-EO data, services, and information streams,** and connecting to the global resources in GEOSS. The platform consists of three loosely-coupled interoperability brokering layers to assure a highly flexible, evolvable and scalable framework (see Figure 4). It **evolves (enhance and advance) the DAB framework**, preserving past EU research investments. The platform implements high-level capabilities to:

- **Discover, access, combine and process** multiple (EO and non-EO) data and information streams, connecting the relevant and heterogeneous research and operational EO and environmental infrastructures, across disciplines and communities;
- Deliver a set of **mediation, harmonization, managing and optimization capabilities** enabling processing modules and data moving across heterogeneous Big Data Infrastructures (e.g. Clouds, HPC systems, etc.), minimizing the total workload and costs;
- Implement a **Marketplace for EO downstream services and products**, supporting multiple user profiles and user customization, ensuring system adaptability and robustness;
- Implements a **Data Dashboard for the GEOSS European Stakeholders** and application Developers;
- Define and implement a **flexible privacy and security framework**;
- Define and support a high quality level for delivering products and services by applying the relevant **GEOSS Data Management Principles**
- **Enable the implementation of a set of User Applications** (see WPs 3-6) and iteratively update the Platform functionalities on the basis of their feedbacks.

An AGILE iterative software development approach (Rational Unified Process) is adopted: three major releases are planned for the **Initial**, **Advanced** and **Final EuroGEOSS-Hub capacity (M18, M32, M44)**

**Description of work**

The WP consists of three sub-WPs including 9 Tasks comprising several main distinct actions.

*Sub-WP2a: Platform Requirements and Architecture (CNR)*

***Task 2.1. Enterprise Model*** (**CLS**, EARSC, ATOS, JRC, CNR, EGI.eu, BRGM, CREAF, NERC)

To detail the purpose, scope and policies for the system describing the business requirements and how to meet them. It recognizes the European EO domain and EU strategy context for the service and the platform definitions including aspects like the associated operational concepts, the approach for connecting public and private data and services infrastructures, the service governance and system monitoring, the user needs, user profiles, IPRs, access conditions, data policy, service accounting, etc. Preliminary actions in the Task include: a) collection of user needs; b) identification of constraints (e.g. “negotiate and plan” data exchange and possible SLA with the data owners for the EuroGEOSS-Hub Applications implementation); c) definition of an up to date European view of the global interoperability scenario through interviews with people playing a key role in relevant activities on European Services (such as Copernicus) or European initiatives (like ENEON, Belmont

Forum, BDV, MAEOS, CWA, EGI) or projects (like the EO ERAnet: ERA-Planet). The Task will deliver the enterprise view of the EuroGEOSS-Hub architecture including: service concept, service methodology (based on best practices like: ITIL, ECSS, FitSM and ISO2000), strategy of cooperation and interoperability with relevant initiatives and programs.

***Task 2.2. Platform Services Architecture*** (**CNR**, BSC, CLS, ATOS, EARSC, BRGM, EGI.eu, CREAF, CloudSigma) To specify the two APIs connecting the three functional interoperability brokering layers (see Figure 4). Main activities: (2.2.1) *Discovery, Access, Processing, Visualization APIs*: specification of the APIs exposed by the "Content Brokering Layer" used by the "Market-level Brokering Layer" components. The goal is to adopt as much as possible consolidated implementations of standards. (2.2.2) *Virtual Cloud APIs*: specification of the APIs exposed by the "Infrastructures/Clouds Brokering Layer" used by the "Content Brokering Layer" components. The goal is to adopt as much as possible consolidated implementations of standards.

***Task 2.3. Platform Security and Privacy services*** (**CloudSigma**, ATOS, CLS, CNR, EGI.eu, EARSC, NERC) To design and develop the Platform management and security services. Main activities: (2.3.1) *Privacy and Security*: services to assure Authentication and Authorization, considering User profiles and data access constraints and privacy requirements. It allows to tag each object with specific groups –based on Shibboleth implementing both OAuth2 and SAML authentications, it will be integrated with CloudSigma ACL engine. (2.3.2) *Accounting and Monitoring*: services to assure the platform monitoring and logging, including the information needed for accounting and billing: a platform agnostic monitoring service to facilitate scaling and load balancing (i.e. Monitoring-as-a-Service and Accounting and Billing-as-a-Service).

**Task 2.4.** ***Platform Quality assurance*** (**CREAF**, CLS, EARSC, BRGM, ATOS, CloudSigma, CNR) To define and specify the Platform quality aspects, both producer and consumer-focused. Linked to the DMP (D8.2), it will implement the GEOSS Quality Management Principles for the platform. Main activities: (2.4.1) *Quality vocabulary*: to provide a vocabulary and encodings specification for data quality matrices, re-using existing and well-used specifications for EO (see UncertML and QualityML) and providing a guidance to implement that in the Platform. (2.4.2) *QA/QC, fit-for-purpose* and *User feedback* specifications to specify the models and protocols to be implemented by the three interoperability Brokering Layers to assure (see QA4EU and the recommendations on GEOSS Documentation and Data Quality principles). (2.4.3) Platform QoS: to specify the platform Service Level Agreements (SLAs) and the platform products quality certification.

***Task 2.5. Interoperability agreements with other GEOSS Regional Nodes and Interoperability experiments with European research infrastructures such as EPOS*** (**CNR**, JRC, BRGM, CLS, ECMWF, NERC, EGI.eu, RADI, CREAF) To develop and test interoperability with other Regional nodes that contribute to GEOSS (i.e. ChinaGEOSS, the Japanese DIAS, US-GEO, the Australian Urban Research Information Network, AfriGEOSS) and the significant European research infrastructures (e.g. EPOS, the European Supersites, EUDAT, ENVRIplus, the European WMO nodes, EGI). JRC will provide the link with WP8, for the governance aspects of the interoperability agreements. NERC will provide the formal link to EPOS.

*Sub-WP2b: Marketplace and Brokers development (ATOS)*

***Task 2.6. Marketplace Brokering layer of EO services and products*** (**ATOS,** EARSC, CLS, CloudSigma, BRGM, CNR, CREAF, UNIGE, JRC, UAB) To design and develop the EuroGEOSS-Hub user interaction services for discovering, accessing and using the EO products and services information, provided by Platform. This layer implements the relevant security and quality specifications as defined by Tasks 2.3 and 2.4. Main activities: *(2.6.1) Unified Front-end and data Dashboard*: design and development of the interaction services for supporting multiple users, including: i) a flexible portal for data and process modules discovery and access; ii) a data dashboard providing data use statistics, quality reports and impact on SDGs and on other information generation. Task 6.8 of WP6 will contribute with the EU-SDGs dashboard. *(2.6.2) Marketplace, Products Catalog and Toolbox*: design and development of the EuroGEOSS-Hub Marketplace for the products and services generated by (or brokered by) the Platform and noticeably by the EuroGEOSS-Hub user Applications; the marketplace includes third party services, a products catalog, and a toolbox (based on the SparkinData platform: www.sparkindata.com). *(2.6.3) User-profile optimization*: to design and develop functionality enabling different user profiles (templates) with scope for further granularity, enabling the filtering and

provisioning of services based on user-specified parameters (e.g. price/performance, advanced filtering, QoS, etc.), assessing commercial solutions such as RightScale and open source solutions such as Scalr. *(2.6.4). Demonstration of the service concepts and Application showcase*: set up of the service desk procedures and operations to support users for management aspects (account creation, answering questions on the data and services), feedbacks collection and uptake consolidation (KPI reports, users statistics). The Applications will be also used as showcases of the EuroGEOSS-Hub services and presented as applicative booklet and to illustrate the offered portfolio.

***Task 2.7. Content Brokering layer*** (**CNR**, ATOS, BRGM, JRC, CREAF, BSC, EARSC, EGI.eu, NERC, CloudSigma)
To design and develop advanced brokering functionalities to handle requests for discovery, access, combine, and process heterogeneous Earth observation data and information streams. This layer implements the relevant security and quality specifications as defined by Tasks 2.3 and 2.4. Main activities: *(2.7.1) Requests Manager*: to implement the (data and processing) requests managing functionalities that interpret requests and build and execute the needed workflows by invoking the underlying advanced data and processing brokering services (based on the Akka framework and operating on the SparkinData platform). *(2.7.2) DAB 2.0:* advanced services to harmonize heterogeneous metadata and data models and adapt the diverse protocol interfaces that characterize EO and non-EO data services. It evolves the present DAB capabilities, introducing: resources metadata augmentation (linked-data elements, users tags and user feedbacks), discovery and access of new content (models, ontologies, workflows, etc.), enhanced access (using the data moving capabilities offered by the *Infrastructures/Clouds Brokering layer*) and data integration and transformation based on the knowledge base content (schema transformation based on data semantic representation, CRS projections, resolution transformation, data encoding mapping). This would also try to assess conditions and terms of use of the resources it makes available. *(2.7.3) Processing Broker* to implement the mediation services and adapt heterogeneous processing services offered by different interfaces (based on the service orchestration solution, implemented using Geoserver and the Swagger open source modules, developed to interconnect the SparkinData, Sci-Hub and PEPS platforms using standardized interfaces). *(2.7.4) Knowledge Base* (**CNR/JRC**, BRGM, ATOS): to create, manage and expose a set of knowledge bodies (best practices, ontologies, user feedbacks and annotations, workflows, etc.) to enhance data and processing modules access and utilization. Examples are: JRC MIDAS (Model Inventory for Impact Assessment), JRC IPChem (Information Platform for Chemical Monitoring) and the subtask 2.7.5 outcomes. This task will contribute to the new "GEOSS Knowledge Base" new task –GEOSS GD-09, co-chaired by the CNR. *(2.7.5) Remotely-sensed and in-situ data integration*: to implement automatic mapping for integration of heterogeneous data acquired from remotely sensed and in-situ observation and measurements (e.g. by using the INSPIRE data specification models and transformation services). *(2.7.6) Content provision and operation for the user focused Applications*: to deploy and configure the content brokering services required by the user Applications making use of the capabilities implemented by the EuroGEOSS-Hub.

*Sub-WP2c: Virtual Cloud development (EGI.eu)*

***Task 2.8. Infrastructures/Clouds Brokering layer*** (**BSC**, EGI.eu, CloudSigma, ATOS, EARSC, CNR, NERC):
To design and develop a data storage and computing Virtual Cloud by brokering the heterogeneous infrastructures (i.e. Cloud, HPC, Grids) underpinning the EuroGEOSS-Hub platform. The Virtual Cloud is also used to broker external infrastructures providing data storage and processing capabilities, where required. This brokering layer implements the relevant security and quality specifications as defined by Tasks 2.3 and 2.4. Main activities: *(2.8.1) Data Mover*: services to move and manage distributed data content, based on solution like: backfilling, peer-to-peer sharing and distributed file systems. They provide advanced data handling capabilities to the Processing Code Mover component. Existing object storage solutions will be adopted to distribute the data in the computational infrastructure through advanced persistency mechanisms. *(2.8.2) Processing Code Mover*: services to move and execute a given code on heterogeneous computing platforms building on the BSC COMPSs/PyCOMPSs programming framework and the ATOS Docker container based solution. These computational services optimize the execution of applications benefitting from the underlying hardware and software system and transparently interacting with the Data services –e.g. automatically parallelizing the execution. *(2.8.3) Cloud Workload optimization*: services to optimize data versus code moving, considering a set of parameters (e.g. data transfer velocity, computing and storage cost,

current workload, etc.), knowing data allocation, and taking into account Users preferences and profiles. This will leverage best practices from mobility prediction and CDN content distribution patterns, ensuring data is placed as close as possible to the cloud offering the closest match compute required by a given user-profile. An in-depth assessment will be made of existing solutions such as Hadoop, Seph and Swift as well of the potential for using commercial solutions such as CloudFlare.

***Task 2.9 Cloud Infrastructure provision and operation for the Application*** (**EGI.eu**, ATOS, CloudSigma, BSC, CLS, EARSC): to deploy and configure the cloud and HPC services required by the Applications implemented by EuroGEOSS-Hub. This guarantees a suitable production quality infrastructure for supporting the Application execution (e.g. system monitoring and maintenance and user support).

**Deliverables** (brief description and month of delivery)
***D2.1****: EuroGEOSS-Hub Platform Enterprise Model specification* (M6, M24, M36) –Report (CLS): specification of the Platform enterprise view, including: operational scenarios, European public and private infrastructure roles, services governance and monitoring, user needs and profiles, and IPR. Three versions are planned.
***D2.2****: EuroGEOSS-Hub Platform Service Architecture specification* (M10, M22, M36) – Report (CNR): specification of the system architecture describing the three functional layers, the macro-components, and the interfaces between the layers and to the external world. Three versions are planned.
***D2.3****: EuroGEOSS-Hub Platform Platform Security and Privacy services specification* (M12, M24, M36) –Report (CloudSigma): specifications of Security and Privacy services implemented by the Platform. Three versions are planned.
***D2.4****: EuroGEOSS-Hub Platform Platform Quality specification and assessment* (M12, M24, M36) –Report (CREAF) specifications of Quality principles and services implemented by the Platform. Three versions are planned.
***D2.5*** *Report on the interoperability of EuroGEOSS-Hub Platform with other infrastructures* (M24, M48) – Specification of the Brokering agreements done by the Platform with external infrastructures (JRC/CNR). Two versions are planned.
***D2.6****: EuroGEOSS-Hub Platform Marketplace Brokering services* (M18, M32, M44) - Other (Software/Services) (ATOS): set of user interaction services implementing the marketplace, the unified front-end and the data dashboard. Three major releases are planned for the Initial, Advanced and Final EuroGEOSS-Hub capacity.
***D2.7****: EuroGEOSS-Hub Platform Data, Information and Processing Brokering services* (M18, M32, M44) – Other (Software/Services) (CNR): set of services implementing the Content Brokering. Three major releases are planned for the Initial, Advanced and Final EuroGEOSS-Hub capacity.
***D2.8****: EuroGEOSS-Hub Platform Infrastructures/Clouds Brokering services* (M16, M30, M42) – Other (Software/Services) (BSC): set of services implementing the Virtual Cloud. Three major releases are planned for the Initial, Advanced and Final EuroGEOSS-Hub capacity.
**D2.9**: *Cloud Infrastructure provision and operation (M18, M32, M44)* –Other (Software/Serices) (EGI.eu), deployment and configuration of the cloud and HPC services required by the EuroGEOSS-Hub Applications.

| **Work package number** | **3** | **Lead beneficiary** | | **04-UAB** |
|---|---|---|---|---|
| **Work package title** | **Use Case Forest FireForest Fire Applications** | | | |
| **Participant number** | 2 | 3 | **4** | 6 | 12 |
| **Participant short name** | JRC | CNR | **UAB** | CREAF | ATOS |
| **Person-months per participant** | 18 | 10 | **60** | 4 | 4 |
| **Start Month** | **1** | **End month** | | **48** | |

**Objectives**

The main objective of this work package consists in the development of a near real time assessment of burnt areas and fire impact at global scale. To this purpose, a methodology to automatic retrieve forest fire perimeters from MODIS/VIIRS's and later on Sentinel-3 hotspots will be defined. This methodology will serve two main purposes: on the one hand, it will enable the Global Wildfire Information System with a system to provide near-real time mapping of burnt areas that could be used to monitor active fires at the global scale and, on the other hand, it will be used as part of a potential forest fire spread prediction module to deliver forecasted fire behaviour in case of critical fire events. Additionally, the proposed methodology will contribute to improving the data stored in Global Wildfire Information System by completing the existing fire perimeter series of each past fire with intermediate fire perimeters tagged with time and data. The information provided by this application will support the analysis of wildfire regimes and wildfire impacts at global scale. The San Diego Supercomputer Centre (SDSC) will participate in this work with its own funding. The specific objectives of this WP are:

- Development of a general-purpose method that uses hot-spots from MODIS/VIIRS (and Sentinel 3, when available) for delimiting fire perimeters.
- Analysis and testing of the algorithm at a global scale in different test sites such as Europe and USA.
- Deployment of the near real-time burnt area assessment using services provided by WP2 to gather required data from the EuroGEOSS-Hub.
- Deploy/adapt the methodology for different end user purposes (monitor critical fire events, assess changes in fire regimes in different parts of the globe, and monitor wildfire impacts at the global scale).

**Description of work**

**Task 3.1 Specification of service architecture in relation to the EuroGEOSS-Hub and considering the final user requirements.** (**JRC**, UAB, SDSC, CNR)

This task analyses the general look and defines the services to be tested and included in the Global Wildfire information System. It identifies the main topics to be covered and the potential users of different services.

**Task 3.2 Analysis of data requirements in the Global Wildfire Information System** (**JRC**, UAB, SDSC)

This task makes a detailed analysis of the data required to implement the services defined in Task 3.1. This study include all the required aspects for an efficient implementation of the services, such as data specifications, spatial and time resolution, projection, accuracy, precision, and so on.

**Task 3.3 Design of services in the Global Wildfire Information System** (**UAB**, JRC, SDSC)

Once the services have been defined, this task will design them, considering the data required and the potential output generated to the end-users. These services will be designed with a global view of the system, but tackling different issues separately, and sequentially.

**Task 3.4 Integration with the EuroGEOSS-Hub Platform for the Application implementation** (**UAB**, JRC, SDSC, CNR, BRGM)

This task will provide the necessary requirement inputs to WP2 (according to the methodology depicted in Figure 6) for the EuroGEOSS-Hub Platform development. On the other hand, this task will provide information and guidelines on the Platform services and APIs to be used for the Scenario implementation. Three specification cycles are foreseen, in agreement with the Platform development cycles. A first and preliminary specification of datasets and processing/algorithm modules were already provided to WP2.

**Task 3.5 Implementation of services in the Global Wildfire Information System** (**UAB**, JRC, SDSC)

This task will cover the implementation of the different services, from accessing the data in the EuroGEOSS Hub, its analysis and processing and its presentation to different user profiles. The services will be implemented using the services and the tools defined in the project (WP2) and considering output for different devices. The services will be implemented taking into account the real time requirements what would imply the use of HPC resources.

**Task 3.6 Demonstration of the services implemented (UAB,** JRC, SDSC)
This task will show the usability of the services provided by the WP2 in the context of the wildfire scenario. This will be the starting point of a continuous feedback cycle between the Application and WP2 in order to adjust the Platform services and APIs provided by the EuroGEOSS-Hub to meet the needs of generic Applications.

**Task 3.7 Deployment of services in the Global Wildfire Information System** (**JRC**, UAB, SDSC)
This task deploys the services developed in this WP in the Global Wildfire Information System to constitute an operational near-real time system.

**Task 3.8 Validation and Assessment** (**JRC**, UAB, SDSC)
This task consists in the validation of the proposed services in the Global Wildfire Information System in specific test sites. The use of the Global system in particular test sites will allow to prove the right functioning and usefulness of the different services, before making them operational at global scale.

**Deliverables** (brief description and month of delivery)
***D.3.1*** *Application Requirements and service architecture (M4)* - Report, (JRC), specification of services required in the Global Wildfire Information System, based on the Users requirements.
***D.3.2*** *Data Requirements (M12)* - Report, (JRC), documentation of data models and workflows required by the application.
***D.3.3*** *Application Design (M12, M24, M36)* – Report, three versions, (UAB), design specification for the Services in the Global Wildfire Information System.
***D 3.4*** *Application requirements specification for EuroGEOSS-Hub Platform (M12, M24, M36)* – Report, three versions, (CNR), specification of the Forest Fire application requirements to the EuroGEOSS-Hub Platform, the capabilities offered by the Platforms to the specific application and the assessments.
***D.3.5*** *Application Implementation (M18, M30, M42)* – Three versions, Other (Software), (UAB), Implementation of designed services in the Global Wildfire Information System.
***D.3.6*** *Application Demonstration (M21, M33, M45)* - Other (Software), (UAB), Demonstration of Services using the EuroGEOSS-Hub Platform.
***D.3.7*** *Services Deployment in the Global Wildfire Information System (M21, M33, M45)* – three phases, (JRC), Other (Software), deployment of the services in the Global Wildfire Information System becoming an operational near-real time system.
***D 3.8*** *Results validation and assessment (M24, M36, M48)* –three versions, Report, (JRC), validation of the proposed services in the Global Wildfire Information System in specific test sites.

| **Work package number** | **4** | | **Lead beneficiary** | | **11-ECMWF** | | | |
|---|---|---|---|---|---|---|---|---|
| **Work package title** | **Extreme Weather-European Floods Applications** | | | | | | | |
| **Participant number** | 1 | 2 | 3 | **11** | 12 | 14 | 17 | 22 |
| **Participant short name** | BRGM | JRC | CNR | **ECMWF** | ATOS | 52North | UREAD | ARPAE |
| **Person-months per participant** | 18 | 18 | 10 | **24** | 4 | 24 | 36 | 24 |
| **Start Month** | **1** | | **End month** | | **48** | | | |

**Objectives**

The recent decade's development of global numerical weather prediction (NWP) and earth system models (ESM) have improved the usefulness of relevant weather parameters for use in a wide range of applications in operational flood protection. The main objective of this work package is to strengthen the availability of

different data sources on a European and Global level, according to OCG/WMO standards and to incorporate these data into existing forecasting systems to create impact-based warnings that will further the use of forecasting systems beyond their current reach. The forecasts will build upon existing operational systems such as the European Flood Awareness System (EFAS) and the Global system (GloFAS) as well as national and regional systems. Specific objectives are:

- To improve the European availability of hydrological data in GEOSS, such as satellite and in-situ observations, focusing on socio-economic data that can be used to derive the flood impact in combination with the provided flood hazard information. In particular, European National Hydrological Services will be supported in standardized exchange of data and information in the context of the WMO Hydrological Observing System (WHOS) as part of the WMO Integrated Global Observing System (WIGOS), which supports the collaboration and engagement with GEOSS as a cross-cutting WMO priority. Also the latest INSPIRE enhancements to improve the support of observation data will be considered for this purpose.
- To improve and apply standardized data models, formats and service interfaces developed by OGC and WMO, specifically the 'Water suite of standards' developed in the context of OGC/WMO Hydrology Domain Working Group (HDWG), including WaterML 2.0 and the SOS 2.0 Hydrology Profile. This will include enhancements for handling ensemble forecast outputs which will extend results of previous project such as GEOWOW
- To develop a controlled "Flood Ontology Service", facilitating the discovery and interpretation of hydrological data, products and forecasts to support decision makers.
- To implement a seamless integration of EFAS and GloFAS with the EuroGEOSS-Hub with the aim of creating a fully integrated approach. This will facilitate the development of flood impact forecast products by combining data from different sources and scales.
- To develop new ways to disseminate the flood impact forecasts as produced by systems like the EFAS and GloFAS using and potentially extending OGC/WMO compliant services
- To develop an alternative data catalogue for storing and managing large amounts of hierarchical data respecting Climate and Forecast Convention (e.g. NetCDF CF) and server application designed for efficient management and data retrieval respecting OGC/WMO standards.

To reach ambitious objectives, the work package needs a large range of expertise from end-users, research institutions on the needs of forecasters (UREAD), Hydrological Services supporting civil protection actions (ARPAE), usage and improvement of data model/formats and service interfaces standards compliant with the guidelines of the OGC/WMO HDWG and INSPIRE (ARPAE, 52North, BRGM), connection with all the National Hydrological Services belonging to the WMO Region Association VI – Europe - concerning hydrologic data sharing (ARPAE), operational forecasting centres at global, European and basin scale (ECMWF, ARPAE), Copernicus EMS (JRC), groundwater level information and surface/ground water connexion (BRGM) and data manipulation (52North). This constellation ensures that the products developed are relevant for the forecasters, that they are built on the latest probabilistic forecasting techniques and uses the best available data retrieval and processing technologies.

**Description of work**

**Task 4.1. Analysis of the needs of tailored impact-based warnings for different societal sectors**. **(UREAD,** JRC, ECMWF). This task will analyse the user requirements of impact-based warnings of extreme floods. The work will be performed through user-oriented workshops and tailored questionnaires. The analysis will use the case studies, workshops and questionnaires as well as the EFAS and GloFAS user communities to interact with the different user groups. It will also list the potential sectors that would benefit from the new products and where this could stimulate downstreams markets and services.

**Task 4.2. Implementation of a controlled "Flood Dictionary", as an Ontology Service**. **(ARPAE,** CNR, UREAD, BRGM**).** Once defined this Flood ontology and its mappings with pre-existing data formats (OGC/WMO, INSPIRE) will contribute to EuroGEOSS-Hub knowledge base. Its encoding in RDF to be accessed in SPARQL

**Task 4.3. Deriving novel impact-based warning products. (UREAD,** 52North, JRC, ECMWF, ARPAE, BRGM**)** These warning products will be achieved by pulling relevant background information from existing databases through the EuroGEOSS-Hub, such as dynamic socio-economic data, sensitive building and infrastructure data, satellite data, in-situ data flows to develop socio-economic impact maps of flood risk. This task will use both the EFAS and GloFAS systems and will go beyond the current threshold-based forecasting (e.g. including technologies such as event pattern detection/complex event processing).

**Task 4.4. Seamless integration: downscaling of large scale modelling to the basin scale. (ECMWF,** JRC, ARPAE, UREAD). This task will use detailed hydrological-hydraulic models together with the data and products to assess the impact of extremes on the local scale. This task will build on task 4.3 and integrate the novel products for EFAS on a small-scale test basin in the Loire and Rhine river basins. The case study Loire basin will be shared with WP5 and Task 4.5. The capability to upscale the methodology to Europe will be evaluated. The test basin for GloFAS will be decided together with the stakeholders (Red Cross/Red Crescent).

**Task 4.5 Inclusion of groundwater data into the operational forecasting**. **(BRGM,** ECMWF, JRC**)**. This task will use detailed hydrological-hydraulic models together with the data and products to assess the impact of extremes on the local scale. This task will build on task 4.3 and integrate the novel products for EFAS on a small-scale test basin in the first stage in the Loire and Rhine river basins. The case study Loire basin will be shared with WP5 and Task 4.4. In the second stage the capability to upscale the methodology to European scale will be assessed.

**Task 4.6. Definition of algorithms, geo-processes to be deployed on the web (52North,** JRC, ECMWF, BRGM**).** This task will use the OGC WPS 2.0/SOS 2.0 and OGC/WMO HDWG 'Water suite of standards' to derive flood impact forecasts for EFAS and GloFAS and local models. This work will rely on and improve concepts developed in the OGC/WMO HDWG as well as in the context of the European INSPIRE directive. The software baseline for this work will be open source implementations of the relevant OGC standards such as the 52°North SOS and WPS packages. Expected enhancements to be developed in this task comprise an improved approach on how to handle ensemble data with the different standards, the definition and enhancement of profiles increasing the interoperability of the standards, and best practice recommendations that will result from the work on this task

**Task 4.7: Integration with the EuroGEOSS-Hub Platform for the Application implementation (CNR,** ECMWF, JRC, ARPAE, 52North**).** This task will provide the necessary requirement inputs to WP2 (according to the methodology depicted in Figure 6) for the EuroGEOSS-Hub Platform development. It will also provide information and guidelines on the Platform services, APIs, algorithms, to be used into the EuroGEOSS-Hub platform for the Scenario implementation. Three specification cycles are foreseen, in agreement with the Platform development cycles. A first and preliminary specification of datasets and processing/algorithm modules was already provided to WP2 (see Tasks 2.1 and 2.4). Furthermore, this task will support the application development in Task 7 by using the functionality of the EuroGEOSS-Hub Platform.

**Task 4.8. Disseminating, visualizing, storing and managing the forecasts** (**ECMWF**, all partners)**.** This task will use OGC/WMO/INSPIRE compliant services (considering also new standards such as the OGC Pub/Sub specification) to disseminate, visualise, store and manage the forecasts

**Deliverables** (brief description and month of delivery)

**D4.1.** *Report on the analysis of the needs of impact based warnings* **(UREAD), (M12)** Description of the the needs of end-users and the potential market uptake of new products.

**D4.2.** *Controlled flood dictionary – Ontology service, Other (Software),* **(ARPAE) (M18)**, specification of a controlled vocabulary for flood events and water management and its encoding in RDF to be accessed in SPARQL.

**D4.3.** *Prototype of the novel impact-based warning products, Other (Software)***, (UREAD) (M24),** software prototype demonstrating the new impact-based warning system.

**D4.4.** *Downscaling of large scale modelling (EFAS) to the basin scale, Report,* **(ECMWF) (M36),** Report on proof-of-concept of implementation of the new impact-based forecasts at basin scale in a seamless approach, supported by standardization and interoperability.

**D4.5** *Report on inclusion of groundwater data into the operational forecasting, Report***, (BRGM),** (**M36**), Report on the proof-of-concept of implementation of the new impact-based forecasts on the flood forecast and longer-scale monthly and seasonal integration.

**D4.6.** *Algorithms and geo-processes standard artifacts, Other (Software),* **(52North) (M12, M24, M36),** prototype of advanced OGC WPS 2.0/SOS 2.0/WaterML 2.0 profiles and implementations to derive flood impact forecasts for EFAS/GloFAS, including documentation of developed profiled of the use standards

**D4.7.** *Application requirements specification for EuroGEOSS-Hub Platform, Report,* **(CNR), (M12, M24, M36),** specification of the Extreme Weather-European Floods application requirements to the EuroGEOSS-Hub Platform, the capabilities offered by the Platforms to the specific applications, and the assessments.

**D4.8.** *Showcase of novel ways of forecast dissemination, Other (Software)***, (ECMWF), (M48)**, Final showcase of the visualisation, management and storage of the user-centric applications available through the EuroGEOSS-Hub platform.

| **Work package number** | **5** | **Lead beneficiary** | | **01-BRGM** | | |
|---|---|---|---|---|---|---|
| **Work package title** | **GEOSS-based climate services for coastal zones and water resources Application** | | | | | |
| **Participant number** | **1** | 3 | 5 | 12 | 14 | 18 |
| **Participant short name** | **BRGM** | CNR | CLS | ATOS | 52North | CNRS |
| **Person-months per participant** | **33** | 10 | 22 | 9 | 20 | 24 |
| **Start Month** | **1** | **End month** | | **48** | | |

**Objectives:**

With growing human pressures on coastal zones worldwide and in Europe, their sustainable development is coming into increased scrutiny. In this context, **sea-level rise** and the alteration of the **water cycle** represent major threats for the risks of **erosion**, **flooding** and **water resources**. With this in mind, the objectives of this WP are to address the following questions:

- How does sea-level rise globally and regionally? Can we improve future sea-level projections by better constraining models with observations?
- Can we quantify more systematically how local vertical ground motions modify relative sea-level changes in coastal areas?
- How will sea-level rise affect shoreline erosion and coastal flooding during storms?
- Can we better understand the water cycle and its alteration by climate change?
- To meet these challenges, access to an infrastructure such as the EuroGEOSS-Hub platform is essential.

An increasing amount of in-situ, aerial and space data is becoming available to meet these challenges (e.g., altimetry, gravimetry, GPS, Synthetic Aperture Radar, multispectral data). However, despite the existence of many initiatives and platforms to meet this challenge (e.g., EPOS-GNSS TC, AVISO, Climate Change Initiative), their use remains fragmented. In addition, critical needs such as future sea-level rise projections remain poorly addressed, because existing models remain insufficiently validated against observations. The EuroGEOSS-Hub offers a unique opportunity to provide an adapted infrastructure and IT capacity to scientists

working in this scientific field, which is essential for adapting our economies and development practices to climate change. As users of WP5 are concerned with long-term trends and adaptation, **products** will not require near-real time capabilities, but they will need to be updated regularly (on a monthly to yearly basis) in order to enable the detection of early impacts of climate change. While the question of current and future sea-level rise is addressed at global to regional scales, other applications require choosing specific regional to local sites to demonstrate the capabilities of the service:

- French Polynesia, which is a hotspot for the detection of early signs of climate change impacts to shorelines, as it includes about 80 of the 420 atolls in the world. These coasts are currently poorly monitored, and the use of space data and adapted algorithms is expected to significantly improve our understanding regarding the process taking place in this region.
- French coasts, where risks of marine flooding during storms is expected to increase importantly with sea-level rise.
- Congo and Loire river watersheds are two contrasting environment in terms of data availability, size and potential users.

The activities of this WP are closely connected to major international initiatives such as the ISSI Working group on "Contemporary regional and global sea level rise: assessment of climate models against observations", and the World Climate Research Programme on Sea-level rise and its coastal impacts.

**Description of work**

**Task 5.1: Users requirements and prospective** (**CLS**; BRGM, 52North)

This task aims at gaining insight into the present and future economic environment of the sector of coastal zones, water and climate change. First, it will review existing services and determine how their data can be referenced in the EuroGEOSS-Hub. Second, it will collect requirements of users concerned with water, coastal zones and adaptation to climate change. Third, it will analyse the key sectors impacted (energy, transport…). Finally, it will analyse under which conditions a market of climate services based on the EuroGEOSS-Hub capabilities could grow, in terms of data availability as well as economic and regulatory context (e.g. European water, flooding and marine water directives and national regulations).

**Task 5.2: Fast-track services for sea-level rise and its coastal impacts** (**BRGM**, CNRS/LEGOS, CLS, ATOS, CNR)

First, this task will integrate algorithms and data flows that will enable the EuroGEOSS-Hub to process and display sea-level rise and vertical ground motions observations (CLS, ATOS, CNR). This implies developing new algorithms and interconnections with existing Hubs to allow the interferometric processing of synthetic aperture radar data (ERS, Envisat, Sentinel 1). These datasets will be used by BRGM to monitor potential early impacts of sea-level rise on atolls. For that purpose, BRGM will develop new shoreline change detection algorithms and use the EuroGEOSS-Hub capabilities to run them over the atolls of French Polynesia. Then, using the EuroGEOSS-Hub capacities, CNRS/LEGOS will assess a suite of climate models sea level estimates corrected for land motion with solid-earth deformation models against observations of sea level. The objective is to identify the climate model sea level estimates in agreement with observations and provide refined global and regional sea-level rise projections with their uncertainties on this basis. To demonstrate the utility of such datasets, BRGM will use the capabilities of the EuroGEOSS-Hub to combine high-resolution topographic data and coastal subsidence observations with mean and extreme sea-levels and flooding models to better represent how future sea-level rise will affect these extreme events.

**Task 5.3: Fast-track services for the water cycle** (**CLS**)

Using the capabilities of the EuroGEOSS, this task will improve our understanding of the water cycle in the Congo and Loire river watersheds. The challenge here is to develop and validate algorithms that enable to assess ground and surface water changes over small watersheds such as the Loire river, which is highly monitored and where important usages of water exist (nuclear plants, agriculture, biodiversity). On the other hand, the Congo watershed Application is essential to demonstrate how such applications can be useful for

poorly monitored regions. The Loire river test case will benefit from groundwater data collected by in-situ networks and connected to the EuroGEOSS-Hub within WP4.

**Task 5.4: Broader implementation and scalability** (**52North**, CLS, BRGM)

This task examines the long terms issues related to the development of the service. It will first examine what has been learnt from the fast-tracks, and how services can be built on them, sustained and run into operations. This includes service design definition, operational concepts, governance and economics models and infrastructures (system of systems concept). The task will also examine how the proposed services can be combined with other sources of data in order to meet user requirements and benefit populations at risk and public policies (see WP7).

**Task 5.5: Integration with the EuroGEOSS-Hub Platform for the Application implementation** (**CNR**, CLS, BRGM)

This task implements the integration of the new products (including algorithms) into the EuroGEOSS-Hub platform (see Figure 6). It guarantees and manages the intellectual property rights of data belonging to each user/company. Finally, it analyses the benefits offered by the EuroGEOSS-Hub to perform these new services, assessment of the service offered.

**Deliverables**

***D 5.1*** *Users requirements and prospective (M12)* - Report, (CLS), review report of the sectorial analysis of user requirements, the market status and potential: actors, potential wider exploitations.

**D 5.2** *Fast-track services for sea-level (M22)* - Other (Software), (BRGM), Pilot demonstrator on the application to sea-level rise and coastal impacts

**D 5.3** *Fast-track services for the water cycle (M22)* - Other (Software), (CLS), Pilot demonstrator and reports on the application to quantifying the water cycle over key watersheds.

**D 5.4** *Broader implementation and scalability* (M42) - Report, (52North), the report deals with the development of services application in real geographical test cases, their capabilities to meet user needs in combination with other sources of information

**D 5.5** *Application requirements specification for EuroGEOSS-Hub Platform (M12, M24, M36)* - Report, (CNR), specification of the coastal zones and water resources application requirements to the EuroGEOSS-Hub Platform, the capabilities offered by the Platforms to the specific applications, and the assessments.

| **Work package number** | **06** | | | **Lead beneficiary** | | | **08-UNIGE** | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Work package title** | | | | **European SDGs monitoring Application** | | | | | | |
| **Participant number** | 2 | 3 | **8** | 9 | 11 | 12 | 13 | 16 | 19 | 20 |
| **Participant short name** | JRC | CNR | **UNIGE** | UBDC | ECM WF | ATOS | BSC | GRI | UNSW | DHI |
| **Person-months per participant** | 36 | 21 | **77** | 27,9 | 16 | 8 | 20 | 12 | 3 | 6 |
| **Start Month** | **1** | | | **End month** | | | **48** | | | |

**Objectives**

The UN 2030 Agenda and the Sustainable Development Goals (SDGs) and associated targets represent the new framework for global sustainability leading to integrated sustainability policies at various scales. The Inter-agency Expert Group on SDG Indicators (IAEG-SDGS) has received the mandate to provide a first set of indicators for consideration by the United Nations Statistical Commission in March 2016. Our capacity to mobilise the available data to assess and monitor the progress towards these goals is central to the success of

the entire process. The GEO Initiative (GI-18): Earth Observations in Service of the 2030 Agenda for Sustainable Development, a primary objective of which is to integrate Earth observations and geospatial information into national development and monitoring frameworks for the SDGs and associated indicators in collaboration with the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM). A crucial element of achieving this objective is to deepen the dialogue between the Earth observation/geospatial information community and the official statistics community at the global and national level. At the European scale, the SDG framework needs to coincide as much as possible with existing environmental policies in order to create synergies and momentum.

This WP will build a common scientific, computational and policy framework (figure 5) that will address the following questions:

- What is the benefit of the EuroGEOSS data hub for assessing and monitoring the SDGs at global, European and national scales?
- How can the EuroGEOSS hub improve the access and processing of data for the reporting and monitoring of selected SDGs:
    - Water targets in relationship with the Water Framework Directive?
    - Energy targets and their alignment with the EU Energy Strategy for 2030?
    - Cities targets in relationship with the European vision on sustainable cities?
    - Progress towards a circular economy and private sector improvements on sustainability and lead to more sustainable business?
    - Climate targets in relationship with the EU Adaptation Strategy?
    - Biodiversity targets in relationship with the EU Strategy for 2020?
- Is it useful and possible to generalize the pathway from Observation data, Essential Variables, to High-level indicators in order to improve the coherence between the different SDGs indicators and to optimize their monitoring?

**Description of work**

**Task 6.1: EU-SDG concept (JRC, CNR, UNIGE)**

This task aims at exploring data inputs and indicator development solutions for the EU framework for reporting and monitoring SDGs that will be developed by the relevant institutions (EC, ENECE, UNEP, EEA) at the European and national scales. In connection with the relevant initiatives (IAEG-SDGs, UN-GGIM and GEO-Initiative 18), cross analyses (**using ontologies**) of SDG targets, high-level indicators, essential variables, available European data and European policy needs will be first undertaken. We will explore the use of internationally agreed methodologies for generating SDGs indicators at the European scale.

**Task 6.2: Clean water and sanitation (SDG 6)(DHI, UNIGE)**

The 'water goal' (i.e. SDG6) is set out to ensure availability and sustainable management of water and sanitation for all. The goal includes six targets covering the entire water cycle, including the management of water, wastewater and ecosystem resources. Following the UN Global Expanded Monitoring Initiative (GEMI) Task Team on Earth observations (EOTT) similar activities for the implementation of the EU Water Framework directive this task will review and explore what Earth observations have to offer in terms of data, products, indicators and services which can be applied to assess and monitor the 6 targets under SDG6 - in a European context and beyond. The task will look at the key water variables from a dual perspective i.e. looking at those variables that relate to climate and macroscale hydrology, as well as those water variables that are essential for applications and operations involving water resources management (cf. The GEOSS Water Strategy: From Observations to Decisions). In addition and since water is at the very core of sustainable development this task also recognises the need to pay particular attention to the linkages with the other SDGs.

**Task 6.3: Sustainable and clean energy (SDG 7)(JRC, ATOS)**

One of the targets of SDG7 calls for doubling the global rate of improvement in energy efficiency by 2030. In particular, buildings are responsible for over 40% of the primary energy consumption in Europe, and there is the need to improve buildings-related energy efficiency through innovative solutions. The overall aim of the

work package is to investigate the potential benefits of integrating space earth observation data with in-situ data to support energy efficiency policies at local level. In particular, it is expected that space data can contribute to better understand energy uses and losses in the built environment in urban areas and help devising more effective integrated energy planning, encompassing the decarbonisation of the energy supply, balanced energy uses and the optimal use of urban infrastructure The work package will liaise with existing initiatives and policies at the European level (e.g. Energy Union Package, Energy Performance of Buildings and Energy Efficiency Directives, Covenant of Mayors,) and will also investigate the best way of linking the EuroGEOSS-Hub and the European Energy Efficiency Platform (E3P) Data Hub.

**Task 6.4: Sustainable cities (SDG 11)(UBDC, BSC, UNSW)**

SDG11 deals with making cities inclusive, safe, resilient and sustainable. The task will involve developing sociotechnical approaches to increase the capacity of cities to monitor social and economic aspects of quality of life, while alleviating risks to the environment, land and other resources. We will focus on modelling and monitoring capacity for environmentally sustainable, socially inclusive and healthy access to jobs, healthcare, education and a selected number of other basic services and urban opportunities, in keeping with the SDG11 targets. Building on an ongoing program (Spatial Urban Data System) funded as a part of UK's Urban Big Data Centre, as well as other European programs, the focus will be to: (1) assess indicators, data needs, standards and interoperability issues that arise; (2) demonstrate, using the case of a few cities, how trade-offs can be made between uncertainty and precision in measuring at different scales (e.g, small-area estimates for analysing spatial disparities within cities, as well as aggregated indicators that allow for cross-city or European scale comparisons); and (3) determine processes by which cities and local governments can adopt and embed such monitoring mechanisms into urban governance, and institutional innovations in government, private entrepreneurship and public participation needed to support uptake and embedding. The outcome of this task contributes to the activities of the Urban Indicators Working Group of the Research Data Alliance. For this reason, they include contribution from the University of New South Wales (Australia) that coordinates the Australian Urban Research Information Network.

**Task 6.5: Sustainable consumption and production (SDG 12)(GRI, UNIGE)**

**- Subtask 6.5.1:** We will explore the link between Earth Observation data made available through GEOSS and the private sector sustainability activities and strategies, in particular for the identification of risks and reporting. Currently only a very limited amount of earth observations are used commonly, through a series of tools for businesses such as Aqueduct (World Resources Institute) or the Water Risk Filter (WWF). An important opportunity lies in the use of GEOSS to improve the information made available to businesses (directly or through tools) in order to contextualize their internal information system and indicators (e.g. land use, water use and pollution, resources consumption, etc.). This information is critical to support businesses in their decision-making to become more sustainable (linked in particular to SDGs 12.2, 12.6, 12.7 and 12.8). The task will identify in particular strategies to strengthen the link between GEOSS information system and businesses decision making tools and eventually reporting. The task will highlight in particular the links that can be done with existing initiatives and tools in the private sector and specific stakeholders, to ensure an easy adoption of new information systems. The task will focus as well on the potential to support, with the GEOSS system, extra-financial reporting initiatives (CDP, Dow Jones Sustainability Index, etc) and the GRI reporting standard widely used for businesses CSR reports.

**- Subtask 6.5.2:** In order to being able to monitor SDG#12.6, which calls for advancing sustainability reporting worldwide, GRI has created the "SDG 12.6 Live Tracker", a tool incorporated in the GRI Sustainability Disclosure Database which monitors sustainability reporting policies and data for every country in the world. For the current project, GRI's tasks will be to: (1) Identifying relevant sustainability reports to be added to the GRI Sustainability Disclosure Database; (2) Registering reports (about 4000 a year) in the GRI sustainability Disclosure Database, including a number of data points for each report; (3) Analysis of the data to provide more insights in if and how the SDGs are addressed in the sustainability reports. Since the SDG 12.6 Live Tracker is active since 1 January 2016, GRI can provide analysis on high level trends of SDG disclosures by companies from 2017 onwards, disaggregated by year, country or region, sector, size of company, type of organization and other characteristics. This will provide better insights on if and how companies are disclosing information on the SDGs in their sustainability reports, as well as which goals they are focusing on.

**Task 6.6: Climate action (SDG 13) (ECMWF, UNIGE, BSC)**

SDG 13 deals with actions to combat the impacts of global climate change, for example changing weather patterns, rising sea level, and more extreme weather events. This task will address the SDG 13 target of raising awareness on climate change mitigation, adaptation, impact reduction and early warning. It will i) identify the monitoring and modelling capacity of the 50 GCOS Essential Climate Variables (ECVs) and ii) identify high-level indicators needed to support EU's Climate Adaptation Strategy on local, regional, national level and iii) identify any existing gaps and assess how the GEOSS data hub can bridge those gaps. The work in this task will be done in close cooperation with the Copernicus Climate Change Service (C3S) to select and refine the services with special focus on extreme weather impacts.

**Task 6.7: Life on land (SDG 15) (UNIGE, JRC)**

SDG15 concerns terrestrial Biodiversity and Ecosystem with 12 targets focusing on freshwater, forest, desert, mountain and natural ecosystems, as well as protected, invasive and commercial species. Following the efforts of the GEO-BON and EU-BON, as well as the GLOBIS-B project, this task will explore how these targets can be assessed and monitor with adequate indicators at the European scale based on Essential Biodiversity Variables. This task will be also attentive at connecting with the 20 Aichi targets defined by the Convention on Biological Diversity (CBD). The aim will also to be able to better define the different sources of information and indicators to be used at various scales, from the national, European to global scales and to demonstrate how these indicators can be assessed through the EuroGEOSS Hub.

**Task 6.8: EU-SDGs Dashboard (UNIGE, CNR)**

This last task will develop an online dashboard (DB) on EU-SDGs presenting the different indicators calculated in the project as dynamic maps and graphs, and comparing them with the SDGs at global and sub national scales. The DB will be built on best practice with different end users profiles (public, schools, media, scientists, policy makers) by presenting flexible selections of data sources, essential variables, high-level indicators, international agreements, and European policies, as well as the links between them. The DB will be open-source and based on novel geospatial solutions for business innovations and public participation, where all the data and graphs presented in the DB will be easily shared on other platforms as web services. The sustainability of the platform will be insured by UNIGE after the end of the project with the aim of possibly extending it as a GEO DB on SDGs (liaison with the GEO Secretariat will be ensured to that end). The DB will contribute to the EuroGEOSS-Hub Platform data dashboard developed by Task 2.6.

**Task 6.9: Application requirements specification for EuroGEOSS-Hub Platform (CNR, JRC, UNIGE):**

This task will provide the necessary requirement inputs to WP2 (according to the methodology depicted in Figure 6) for the EuroGEOSS-Hub Platform development. On the other hand, this task will provide information and guidelines on the Platform services and APIs to be used for the Scenario implementation. Three specification cycles are foreseen, in agreement with the Platform development cycles.

**Deliverables**

**D6.1** *EU-SDGs concept paper (M6)* - Report, (UNIGE), EU-SDG cross analyses (using ontologies) of SDG targets, high-level indicators, essential variables, available European data and European policy needs.
**D6.2** *Scientific report and indicators on SDG 6 on Clean water and sanitation (M12, M30, M42)* - Report (DHI), review on what EOs have to offer in terms of data, products, indicators and services which can be applied to assess and monitor the 6 targets under SDG6.
**D6.3** *Scientific report and indicators on SDG 7 on Sustainable energy (M12, M30, M42)* - Report (JRC), benefits of space EO data with in-situ data to support energy efficiency policies at local level.
**D6.4** *Scientific report and indicators on SDG 11 on Sustainable cities (M12, M30, M42)* - Report (UBDC), assess indicators, data and standards needs, uncertainty role in measuring at different scales, and institutional innovations and entrepreneurship needed to support uptake and embedding.
**D6.5** *Scientific report and indicators on SDG 12 on Sustainable consumption and production (M12, M30, M42)* - Report (GRI), links between GEOSS information system and businesses decision making tools and reporting

and analysis on SDG disclosures by companies from 2017 onwards.
**D6.6** *Scientific report and indicators on SDG 13 on Climate action (M12, M30, M42)* – Report (ECMWF), monitoring and modeling capacity of the 50 GCOS Essential Climate Variables, high-level indicators needed to support EU's Climate Adaptation Strategy, and existing gaps analysis.
**D6.7** *Scientific report and indicators on SDG 15 on Life on Earth (M12, M30, M42)* – Report (UNIGE), assessment and monitoring on SDG 15 with adequate indicators at the European scale based on Essential Biodiversity Variables.
**D6.8** *Scientific report and indicators on EU-SDGs dashboard (M24, M48)* - Other (Software) (UNIGE), EU-SDGs presenting the different indicators calculated in the project as dynamic maps and graphs, and comparing them with the SDGs at global and sub national scales.
**D6.9** *Application requirements specification for EuroGEOSS-Hub Platform (M12, M24, M36)* - Report (CNR), Report specification of the SDGs monitoring application requirements to the EuroGEOSS-Hub Platform, the capabilities offered by the Platforms to the specific application, and the assessments.

| **Work package number** | **7** | **Lead beneficiary** | | | **02-JRC** |
|---|---|---|---|---|---|
| **Work package title** | **Benefit assessment and sustainability** | | | | |
| **Participant number** | 1 | **2** | 3 | 7 | 10 | 12 |
| **Participant short name** | BRGM | **JRC** | CNR | EARSC | CloudSigma | ATOS |
| **Person-months per participant** | 6 | **12** | 10 | 12 | 6 | 6 |
| **Start Month** | **1** | **End month** | | **48** | | |

**Objectives**
This WP assesses the benefits of accessing and using the EuroGEOSS-Hub for a range of stakeholders in the policy, scientific and business communities. Moving from the inner core outwards, the WP will measure the benefits for the participants and users of the EuroGEOSS-Hub Applications, for the larger scientific community, and for European businesses, particularly SMEs. Broader benefits derived by the global GEO community will also be addressed. The WP will develop a macro business model that can be the basis for the long-term sustainability of the Hub, taking into account technical, economic, and legal aspects. This includes the aim to objective to sustain and retain the brokering (DAB) ownership in the evolution of this IT technology.

**Description of work**

**Task 7.1: Multidisciplinary assessment (JRC, CLS, CloudSigma)**
This task applies a user-centric socio-technical design methodology to assess the developments that the project has generated in the thematic and cross-thematic areas (increased interoperability of technology, data, services, new information products, etc.). The methodology involves a series of interviews, questionnaires, and participant observation, where possible, across the multidisciplinary users of the project to identify the changes in the workflows, process and outcomes generated by the project. This assessment will be supported by the analysis of KPI and users' feedback collected by the service desk along the project with the User centric Applications, with also a broader community contacted initially in Task 2.1 and users connected to the Hub during the project. This task will inform tasks across WP2 as well as WPs 3-6, providing the multidisciplinary assessments as a high-level basis for better-informed design as well as optimizations based on user profiling. More specifically, using the aforementioned methodologies and processes we can extract from selected user-groups their high-level requirements of a federated infrastructure and feedback results across each task within WP2. This will ensure WP2 activities stay focused on delivering relevant

functionality in accordance with the requirements of the various user-profiles. Finally, this task develops the conditions and terms of use under which the EuroGEOSS-Hub Applications will be available; guidelines are provided, in line with GEOSS Data Sharing Principles and Copernicus Regulation.

**Task 7.2: Value added to European policy and business (EARSC)**
This task focuses on the contribution of the EuroGEOSS Hub to the Digital Single Market, and specifically to providing the basis upon which European SMEs can develop new products and services, and extend the value chains through to intermediate and final users. It will be based on surveys and focus groups organised by EARSC and related business associations in the ICT and geo-ICT sectors. EARSC intends to establish a Marketplace Alliance for EO Services (MAEOS), which will help overcome the fragmentation of the European companies. The MAEOS will oversee the setting up of a marketplace operated on the principle of competition at every level; EO services, platform services and infrastructure services. The results from the EuroGEOSS-Hub project will feed into its marketplace (which develops the MAEOS vision) and enable companies to improve the services, which can be offered by the marketplace. The relationship between the MAEOS and the EuroGEOSS-Hub will be analysed as part of this work-package and the results used as one input into the sustainability plan. Each of the User focused Applications will be assessed with members of EARSC and the possible commercial exploitation considered. Possible company contribution towards User Applications will also be assessed. The results will form part of the overall evaluation of the value added to European policy and business.

**Task 7.3 Value added to the global community (JRC, CloudSigma)**
This task assesses the contributions of the EuroGEOSS Hub to the implementation of the GEO Strategic Plan 2016-15 with respect to the GEOSS common infrastructure, the thematic areas addressed by the EuroGEOSS-Hub Applications, and the international collaborations and partnerships developed by the project. This task will be based on surveys and interviews in the GEO community and key stakeholders of the project.

**Task 7.4: Business Environmental analysis (ATOS, EARSC, CLS, CloudSigma, JRC)**
This task will build on the assessments carried out in the Tasks 7.1-7.3 and analyse them in the context of the evolving technological, policy, and business environment. It will do so through a PESTEL analysis (Political, Economic, Sociological, Technological, Ecological, Legal) - this model allows the identification of the influence (positive or negative) that macro-environmental factors can have on the development of the Hub - and a Porter five forces analysis will shed light on the forces that affect the opportunities for competitive advantages, anticipate changes that are could pose risk for long term sustainability. This will result in a broad market assessment relating not only to the commercial space occupied by the EuroGEOSS-Hub Platform as a whole, but at each layer of the stack (EO services, platform services and cloud/infrastructure services). An incremental approach will ensure tracking of the market as it evolves. Specifically, the various parts of the value chain will be addressed considering their competitive environment. Each layer of the hub will be addressed; users/marketplace, the content layer and the cloud/processing content layer. Each layer will be addressing a wider market than GEOSS users and the sustainability will depend on their success in addressing other paying customers. A competitive assessment will inform T7.5 by presenting the potential impact of competing platforms and services. Legal issues with respect to the exploitation of results and watch-activity on the evolving policy and legal landscape likely to affect the development and sustainability of the Hub will also be performed in this task and feed into T7.6.

**Task 7.5: Business models (EARSC, CLS, ATOS, CloudSigma, CNR, EGI.eu, BSC)**
Following the results obtained in Task 7.4, this task aims to assess business scenarios according to different User Applications developed in the project and other possible usages of the EuroGEOSS-Hub. The business models will consider the use of each layer. The usage processes (such as assimilation, appropriation and adaptation) of a potential user panel will be studied to analyse the impacts of the proposed scenarios. This task needs the concourse of all the partners. The partnership within the project prefigures future ones. Using the Osterwalder analysis, this task will propose and argue conceivable business models. The MAEOS to be established by EARSC will embrace many different business models ranging from consultancy bespoke products through to fully on-line services. Each of these will benefit from improved access to data, content

and platform resources coming from the EuroGEOSS-Hub. These will be assessed to define possibilities for a sustainable result. A panel of users including business, public sector and academic will be established to review the results of the business model analysis and to recommend solutions.

**Task 7.6: Sustainability Plan (JRC, CLS, EARSC, CloudSigma, CNR, EGI.eu, BSC)**
Based on the outcomes of the previous tasks in this WP, this task develops the plan for the long-term sustainability of the EuroGEOSS-Hub. This task includes a risk and sensitivity analysis taking into account the evolving socio-technological landscape and boundaries conditions. We also tackle ways of neutralising potential conflict relating to the complex negotiations involved in forming mutually sustainable commercial partnerships and the business decisions made between partners within large consortia. In addition, this addresses the identification of a EuroGEOSS-Hub governance model, including the aim to sustain and retain the brokering (DAB) ownership in the evolution of this IT technology. RDA "Brokering Governance" WG recommendations will be considered for a private-public approach.

**Deliverables**

***D 7.1*** *Multidisciplinary assessment v1- baseline, v2 and v3 (M9, M30, M45)* - Report (JRC), assessment of the developments generated by the project in the thematic and cross-thematic areas and its more general perspectives.

***D 7.2*** *Value added to European policy and business v1. v2. and v.3 (M11, M23, M35)* - Report (EARSC), assessment of the project contributions to the Digital Single Market, providing European SMEs with the basis to develop new products and services, and extend the value chains through to intermediate and final users.

***D 7.3*** *Value added to the global community v 1, v2 (M15, M23, M40)* - Report (JRC), assessment of the project contributions to the implementation of GEO Strategic Plan 2016-15 (i.e. GCI, thematic areas, international collaborations and partnerships).

***D 7.4*** *Business Environmental analysis v1, v2, v3 (M12, M26, M38)* - Report (ATOS), broad market assessment, considering each layer of the platform stack (EO services, platform services and cloud/infrastructure services).

***D 7.5*** *Business Plan v1, v2, v3 (M18, M30, M42)* - Report (EARSC), EuroGEOSS-Hub Business model(s) to sustain the Platform services and applications beyond the project duration.

***D 7.6*** *Sustainability Plan v1 and v2 (Month 27, 45)* - Report (JRC), EuroGEOSS-Hub Sustainability Plan, building on the business models introduced by D7.5, including a platform governance model and the sustainability and retainment of the brokering (DAB) ownership in the evolution of this technology.

| **Work package number** | **8** | | **Lead beneficiary** | | | | | | **01-BRGM** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Work package title** | | **External Relation, Dissemination and Outreach** | | | | | | | | | |
| **Participant number** | **1** | 2 | 3 | 4 | 5 | 6 | 7 | 12 | 13 | 19 | 23 |
| **Participant short name** | **BRGM** | JRC | CNR | UAB | CLS | CREAF | EARSC | ATOS | BSC | UNSW | EGI.eu |
| **Person-months per participant** | **12** | 6 | 17 | 6 | 4 | 10 | 6 | 5 | 3 | 3 | 2 |
| **Start Month** | **1** | | **End month** | | | | | **48** | | | |

**Objectives**

1. To develop the EuroGEOSS-Hub dissemination, exploitation and communication plan, implement it and review it regularly.
2. Develop the EuroGEOSS-Hub Data Management Plan
3. To develop the interoperability arrangements (including legal aspects) necessary to ensure that the EuroGEOSS-HUB is well connected to existing European e-infrastructures such as EPOS, EGI, EUDAT, etc., and initiatives like the Big Data Value Chain PPP, and the European Cloud.
4. To develop the interoperability arrangements necessary to ensure that the EuroGEOSS-HUB is well connected to other regional nodes emerging at the global level such as ChinaGEOSS, US-GEO, AfriGEOSS, the Japanese DIAS, and the Australian Urban Research Information Network.
5. To contribute to the relevant tasks of the GEO Strategic Plan and work programmes in particular those related to the development and evolution of the GEOSS Common Infrastructure, and implementation of the GEOSS Data Management Principles (GD-07), and the implementation of the GEOSS Data Sharing Principles and Guidelines (GD-01).
6. To develop outreach actions for European public administrations, the scientific community, and the private sector, with a particular focus on SMEs.

**Description of work**

**Task 8.1: Dissemination, Exploitation and Communication Plan** (**EARSC**, BRGM, ATOS, 52North, EGI.eu, JRC, CLS, ECMWF): this activity develops the dissemination, exploitation and communication plan for the project, implements it and reviews it regularly.

**Task 8.2: Develop the EuroGEOSS-Hub Data Management Plan** in line with the GEOSS Data Management Principles and Guidelines, and review it regularly (**BRGM**, ATOS, 52North, EGI.eu, JRC, CLS, ECMWF, CNR)

**Task 8.3: European connectivity** this is an important activity to ensure synergy between the activities and the development path of the project and important related initiatives at both European (e.g. Copernicus, INSPIRE, Open Data, Digital Single Market, etc.) and national levels. European –infrastructures will be regularly contacted to ensure that interoperability arrangements are put in place and are fit for purpose (**JRC**, CNR, EGI.eu, NERC, CLS, ECMWF, BSC).

**Task 8.4: International connectivity to regional nodes** This is an activity largely devoted to connecting to other regional GEOSS hubs as they are emerging in the Americas, Asia and Oceania, Africa, etc. and to related international activities such as those of the Research Data Alliance, ICSU, and the World Data Centers to ensure that interoperability arrangements and synergy take place. (**CNR-JRC**, UNIGE)

**Task 8.5 Contribution's to GEO Strategic Plan** the outcomes of the project will provide input to the GCI foundational tasks on GCI operations, development and evolution, and knowledgebase and to the activities of the GEO initiatives and flagships relevant to the four user applications of the project. **(JRC**, CNR, UNIGE)

**Task 8.6: Outreach and capacity building** this activity supports the development of the skills and competences necessary to connect to the EuroGEOSS-Hub and make effective use of the resources it makes available. It includes both technical competences and organizational/legal ones necessary to build capacity in the host organisations and ensure sustainability of approaches. This task will have a both European and international dimensions leveraging the global partners participating in the project. (**CREAF**, JRC, CNR, BRGM, EARSC, RADI, UNIGE, EGI.eu, BSC)

**Deliverables** (brief description and month of delivery)

***D8.1*** *EuroGEOSS-Hub Dissemination, Exploitation and Communication Plan (M4, M18, M32)* –three versions, Report (BRGM).

***D8.2*** *EuroGEOSS-Hub Data Management Plan (DMP) (M6, M20, M38)* – Three versions, Report (BRGM).

***D8.3*** *European Interoperability Agreements (M18, M32, M47)* – Three versions, Report (JRC), Description of the Interoperability arrangements developed in Europe,

***D8.4*** *Global Interoperability Agreements (M19, M33, M48)* – Three versions, Report (CNR) , Description of the Interoperability arrangements developed with non-EU countries,

***D8.5*** *Contributions to GEO Strategic Plan (M12, M24, M36, M48)* – Four versions, Report (JRC), description of the project contributions to the achievement of the GEO Strategic Plan.

***D8.6*** *Outreach activities (M12, M24, M36, M48)* – Four versions, Report, (CREAF), description of the project outreach activities, worldwide.

**Table 3.1b: List of work packages**

| Work package No | Work Package Title | Lead Participant No | Lead Participant Short Name | Person-Months | Start Month | End month |
|---|---|---|---|---|---|---|
| 1 | Management and Scientific Coordination | 01 | BRGM | 85,80 | 1 | 48 |
| 2 | EuroGEOSS-Hub Innovative IT Platform | 03 | CNR | 357 | 1 | 48 |
| 3 | Use Case Forest Fire | 04 | UAB | 96 | 1 | 48 |
| 4 | Use Case Extreme Weather-Global Floods | 11 | ECMWF | 158 | 1 | 48 |
| 5 | GEOSS-based climate services for coastal zones and water resources | 01 | BRGM | 118 | 3 | 42 |
| 6 | European SDGs monitoring | 08 | UNIGE | 226,9 | 1 | 48 |
| 7 | Benefit Assessment and Sustainability | 02 | JRC | 52 | 1 | 48 |
| 8 | External Relations and Outreach | 01 | BRGM | 74 | 1 | 48 |
| | | | Total months | 1167,7 | | |

**Table 3.1c: List of Deliverables**

| Deliverable (number) | Deliverable name | Work package number | Short name of lead participant | Type | Dissemination level | Delivery date (in months) |
|---|---|---|---|---|---|---|
| D1.1 | Quality and Risk Contingency Plan | 1 | BRGM | R | CO | M12 |
| D1.2 | Internal Report | 1 | BRGM | R | CO | M7-M13-M19-M25-M31-M37-M43-M48 |
| D1.3 | Annual Management Report delivered to EC | 1 | BRGM | R | PU | M13-M25-M37-M48 |
| D1.4 | Report on IPR and Consortium Agreement monitoring | 1 | BRGM | R | CO | M6 - M18 - M42 |
| D2.1 | EuroGEOSS-Hub Platform Enterprise Model specification | 2 | CLS | R | PU | M6 - M24 - M36 |
| D2.2 | EuroGEOSS-Hub Platform Service Architecture specification | 2 | CNR | R | PU | M10- M22- M36 |
| D2.3 | EuroGEOSS-Hub Platform Platform Security and Privacy services specification | 2 | CloudSigma | R | PU | M12- M24- M36 |
| D2.4 | EuroGEOSS-Hub Platform Platform Quality specification and assessment | 2 | CREAF | R | PU | M12- M24- M36 |
| D2.5 | Report on the interoperability of | 2 | JRC/CNR | R | PU | M24- M48 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | EuroGEOSS-Hub Platform with other infrastructures | | | | | |
| D2.6 | EuroGEOSS-Hub Platform Marketplace Brokering services | 2 | ATOS | OTHER (Software) | PU | M18- M32- M44- |
| D2.7 | EuroGEOSS-Hub Platform Data, Information and Processing Brokering services | 2 | CNR | OTHER (Software) | PU | M18- M32- M44 |
| D2.8 | EuroGEOSS-Hub Platform Infrastructures/Clouds Brokering services | 2 | BSC | OTHER (Software) | PU | M16-M30-M42 |
| D2.9 | Cloud Infrastructure provision and operation | 2 | EGI.eu | OTHER (Software) | PU | M18-M32-M44 |
| D.3.1 | Application Requirements and service architecture | 3 | JRC | R | PU | M4 |
| D.3.2 | Data Requirements | 3 | JRC | R | PU | M12 |
| D.3.3 | Application Design –three versions | 3 | UAB | R | PU | M12-M24-M36 |
| D.3.4 | Application requirements specification for EuroGEOSS-Hub Platform –three versions | 3 | CNR | R | PU | M12-M24-M36 |
| D.3.5 | Application Implementation – three versions | 3 | UAB | OTHER (Software) | PU | M18- M30- M42 |
| D.3.6 | Application Demonstration | 3 | UAB | OTHER (Software) | PU | M21- M33- M45 |
| D 3.7 | Services Deployment in the Global Wildfire Information System –three phases | 3 | JRC | OTHER (Software) | PU | M21- M33- M45 |
| D 3.8 | Results validation and assessment –three versions | 3 | JRC | R | PU | M24-M36-M48 |
| D4.1 | Report on the analysis of the needs of impact based warnings | 4 | UREAD | R | PU | M12 |
| D4.2 | Controlled flood dictionary – Ontology service | 4 | ARPAE | OTHER (Software) | PU | M18 |
| D4.3 | Prototype of the novel impact-based warning products | 4 | UREAD | OTHER (Software) | PU | M24 |
| D4.4 | Downscaling of large scale modelling (EFAS) to the basin scale | 4 | BRGM | R | PU | M36 |
| D4.5 | Report on inclusion of groundwater data into the operational forecasting | 4 | ECMWF | R | PU | M36 |
| D4.6 | Algorithms and geo-processes standard artefacts | 4 | 52North | OTHER (Software) | PU | M12, M24, M36 |
| D4.7 | Application requirements specification for EuroGEOSS-Hub Platform | 4 | CNR | R | PU | M12-M24-M36 |
| D4.8 | Showcase of novel ways of forecast dissemination | 4 | ECMWF | OTHER (Software) | PU | M48 |
| D 5.1 | Users requirements and prospective | 5 | CLS | R | PU | M12 |
| D 5.2 | Fast-track services for sea-level | 5 | BRGM | OTHER (Software) | PU | M22 |

| | | | | | | |
|---|---|---|---|---|---|---|
| D 5.3 | Fast-track services for the water cycle | 5 | CLS | OTHER (Software) | PU | M22 |
| D 5.4 | Broader implementation and scalability | 5 | 52North | R | PU | M42 |
| D 5.5 | Application requirements specification for EuroGEOSS-Hub Platform | 5 | CNR | R | PU | M12- M24- M36- |
| D6.1 | EU-SDGs concept paper | 6 | UNIGE | R | PU | M6 |
| D6.2 | Scientific report and indicators on SDG 6 on Clean water and sanitation | 6 | DHI | R | PU | M12-M30-M42 |
| D6.3 | Scientific report and indicators on SDG 7 on Sustainable energy | 6 | JRC | R | PU | M12-M30-M42 |
| D6.4 | Scientific report and indicators on SDG 11 on Sustainable cities | 6 | UBDC | R | PU | M12-M30-M42 |
| D6.5 | Scientific report and indicators on SDG 12 on Sustainable consumption and production | 6 | GRI | R | PU | M12-M30-M42 |
| D6.6 | Scientific report and indicators on SDG 13 on Climate action | 6 | ECMWF | R | PU | M12-M30-M42 |
| D6.7 | Scientific report and indicators on SDG 15 on Life on Earth | 6 | UNIGE | R | PU | M12-M30-M42 |
| D6.8 | Scientific report and indicators on EU-SDGs dashboard | 6 | UNIGE | OTHER (Software) | PU | M24-M48 |
| D6.9 | Application requirements specification for EuroGEOSS-Hub Platform | 6 | CNR | R | PU | M12-M24-M36 |
| D7.1 | Multidisciplinary assessment v1-baseline, v2 and v3 | 7 | JRC | R | PU | M9-M30-M46 |
| D7.2 | Value added to European policy and business v1. v2. and v.3 | 7 | EARSC | R | PU | M11-M23-M35 |
| D7.3 | Value added to the global community v 1, v2 | 7 | JRC | R | PU | M15-M23-M40 |
| D7.4 | Business Environmental analysis v1, v2, v3 | 7 | ATOS | R | PU | M12-M26-M38 |
| D7.5 | Business Plan v1, v2, v3 | 7 | EARSC | R | PU | M18-M30-M42 |
| D7.6 | Sustainability Plan v1 and v2 | 7 | JRC | R | PU | M27-M45 |
| D 8.1 | EuroGEOSS-Hub Dissemination, Exploitation and Communication Plan –three versions | 8 | BRGM | R | PU | M4-M18-M32 |
| D 8.2 | EuroGEOSS-Hub Data Management Plan (DMP) –three versions | 8 | BRGM | R | PU | M6-M18-M32 |
| D 8.3 | European Interoperability Agreements –three versions | 8 | JRC | R | PU | M18-M32-M47 |
| D 8.4 | Global Interoperability Agreements –three versions | 8 | CNR | R | PU | M18- M32- M48 |
| D 8.5 | Contributions to GEO Strategic Plan –four versions | 8 | JRC | R | PU | M12- M24- M36- M48 |
| D8.6 | Outreach activities –four versions | 8 | CREAF | R | PU | M12- M24- M36- M48 |

## 3.2 Management structure, milestones and procedures

### 3.2.1 EuroGEOSS-Hub management structure

The EuroGEOSS-Hub project will rely on clear responsibilities, professional planning, communication and progress monitoring throughout the project lifetime. As coordinator, BRGM will manage the project in several dimensions which are progress monitoring, participant contribution quality control deadline and accurate financial management. With is wide experience in large project coordination, BRGM will in addition maintain contacts with the European Commission, the General Assembly and the Executive Board to ensure an efficient running of the project.

Considering the total of 23 partners involved in the project made of 8 work packages over a period of 4 years, the project requires a strong and clear management structure (Figure 9 and Table 4) and an efficient decision-making mechanism, jointly with structured processes of monitoring and when requested project revision. An Executive Board will be enabled and composed of the work packages leaders, individually experienced in these responsibilities.

All of these rules, procedures and management structure will be detailed in a Consortium Agreement (CA) based on the DESCA 2020 model with minor modifications and signed by the consortium members. The major items are described below.

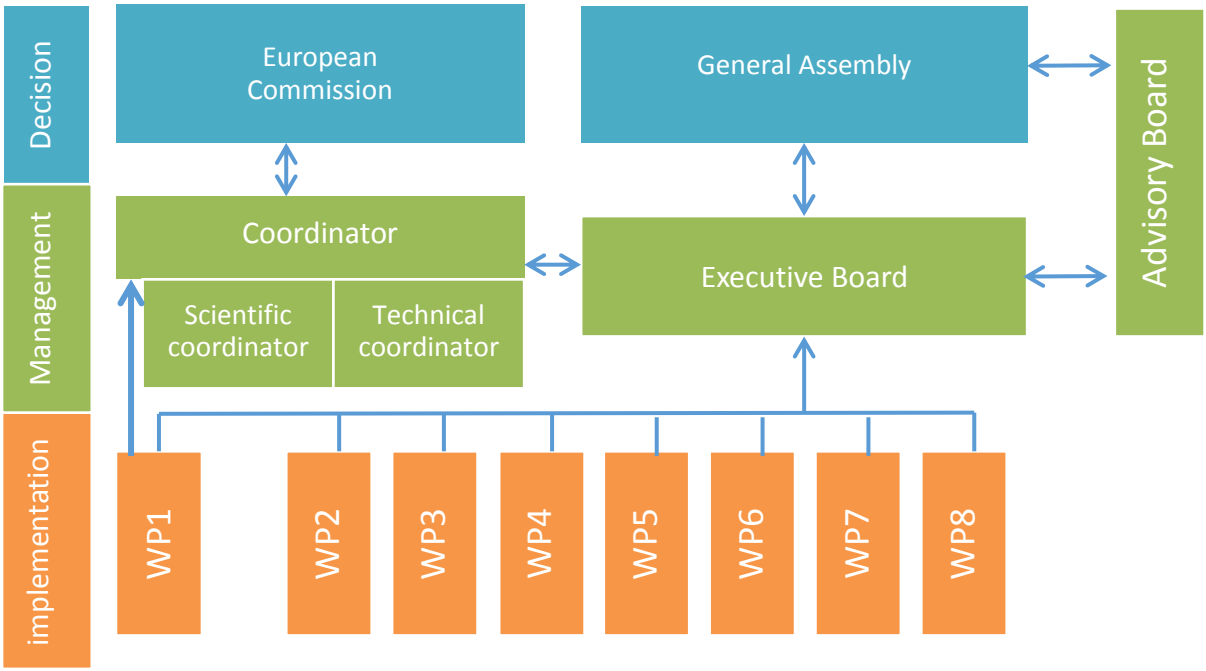



Figure 9 – Management structure of the project

| Management body | Member | Responsibility | Reports to |
|---|---|---|---|
| Coordinator | BRGM | Project management in all dimensions | EC |
| Scientific Coordinator | JRC | Scientific management | Coordinator |
| Technical Coordinator | CNR | Technical management | Coordinator |
| Work Packages | Whole consortium | Project Tasks execution | WP Leader |
| Executive Board | Coordinator, Work packages leaders | Technical coordination | Coordinator |
| General Assembly | One representative per member | Major decision on workplan and project | Coordinator |
| Advisory Board | External experts and community representatives | Advice on exploitation, developments, benefits | Executive Board |

Table 4 – Management bodies

***Coordinator (BRGM)****:* The Coordinator of EuroGEOSS-Hub will be Partner 1, BRGM, which has as long experience in coordinating projects like EuroGEOSS-Hub such as the EuroGEOSS (FP7) project.
In particular, the Coordinator shall be responsible for:

- monitoring compliance by the consortium members with their obligations;
- collecting, reviewing together with the scientific and technical coordinators to verify consistency and submitting reports and other financial, certifications deliverables and requested documents;
- managing the financial contribution and fulfilling the financial tasks described in the CA;
- keeping updated and available the address list of Members and other contact persons;
- providing, upon request, the Parties with official copies or originals of documents which are in the sole possession of the Coordinator when such copies or originals are necessary for the Parties to present claims.

***Scientific Coordinator (JRC)***: The Scientific Coordinator will work closely with the Project Manager (BRGM), the Technical Coordinator (CNR) and WP Leaders, and report to the former. EC-JRC has appointed Dr. Max Craglia to take this position. Max has over 25 years experience in international scientific project management starting with the European Science Foundation's GISDATA programme (1993-97) that involved over 300 researchers from 20 countries. He has since coordinated the MADAME, GENIE, EuroGEOSS, and GEOWOW European projects, and is a member of the INSPIRE Coordination Team. Max co-chairs the GEO Working Group for the development and evolution of the GEOSS Common Infrastructure (GCI) and is alternate EC representative on the GEO Programme Board. In the winter of 2015-16, Max coordinated the advice of an independent panel of experts to DG GROW on a dissemination strategy and platform for Copernicus and EO in Europe. Through the continued collaboration between JRC and DG GROW, Max will ensure the synergy between the platform and the EuroGEOSS-Hub.
Max will be responsible for overseeing the scientific development of the project. This includes the management of dependencies and synergies between various tasks, coordination of scientific work, review of scientific reports and deliverables. The Scientific Coordinator duties include:

- Ensuring cross-fertilization across scientific tasks, and synergy with related international developments;
- Monitoring of the progress of scientific research carried out in EuroGEOSS-Hub;
- Monitoring the preparation of the project's Data Management Plans in line with the GEOSS Data Management and Data Sharing Principles;
- Liaising between EuroGEOSS-Hub and related projects, networks of excellence, standardisation bodies and in general with adjacent research communities including INSPIRE, Copernicus, and GEO;
- Acting as impartial arbiter in case of disputes in the project between scientific and industrial objectives;
- Facilitating the synergy between the project and the relevant European initiatives led by the European Commission such as Digital Single Market, INSPIRE, Copernicus, Free Flow of Data, Open data;
- Supporting the decision making mechanism, proposing changes regarding research approach to implementation or proposing adjustments to the work plan to ensure the overall success of the project.

***Technical Coordinator (CNR)*:** The Technical Coordinator will work closely with the Project Manager (BRGM), the Scientific Coordinator (JRC) and WP Leaders, and report to the former. CNR has appointed Dr. Stefano Nativi to take this position. Stefano has over 20 year experience in the technical management of international projects, including FP7 EuroGEOSS, MED-SUV, and GEOWOW, H2020 ECOPOTENTIAL, ESA Prodtrees, HMA-T2, NSF BCube, etc. He coordinates the development and operation of the GEO DAB component of GCI. He is co-chair of the GEO Task GD-09 (GEOSS Knowledge Base) and of the sub-task GD-07.1 (GEOSS evolution and architecture). He is member of the Member of the Science and Technical Advisory Committee (STAC) of the Copernicus Marine Environment Monitoring Service (CMEMS). He is member of the Steering Committee of the Belmont Forum –Data Management and e-Infrastructure CRA. The Technical Coordinator duties include:

- Coordinating the Platform development with the GEOSS DAB technology evolution and the future GEOSS architecture;
- Facilitating the design of a commonly agreed Platform architecture;
- Facilitating the resolution of possible conflicts due to integration of different technologies for the implementation of the innovative Platform;
- Facilitating the discussion about the maturity and capabilities of the interoperability solutions to be adopted to integrate the three Platform layers;
- Ensuring cross-fertilization across technical tasks, and synergy with related international developments;
- Monitoring of the progress of technical research and multi-disciplinary interoperability carried out in EuroGEOSS-Hub, particularly the integration and cross-fertilization of the thematic pilots and the technology platform;
- Ensuring the project is advancing the state of the art and contributing to the overall global interoperability efforts;
- Supporting the decision making mechanism, proposing changes regarding research approach to implementation or proposing adjustments to the work plan to ensure the overall success of the project.

***Work Packages:*** Each WP will be led by a WP leader, which will responsible for day-to-day management and technical coordination of their respective WPs. This includes:

- managing and reaching the respective deliverables and milestones of the WP;
- ensuring work quality and time schedule;
- ensuring communication both inside and outside their respective WPs, including dissemination of the results generated within their WP;
- solving problems.

Communication within WPs participants will primarily be upheld by web-based tools (Skype, Webex etc.), teleconferences, email. Major problems shall be reported to and discussed in the Executive Board, where all WP Leaders have a seat.

***Executive Board:*** The Executive Board is made of the WP leaders and chaired by the Coordinator, unless otherwise decided by a 2/3 majority of the Executive Board members. The Executive Board shall be responsible for:

- Monitoring of the project progress, quality and output based on regular reports from WP leaders,
- Ensuring smooth exchange of information between different WP's;
- Adapting the planning where necessary and appropriate;
- Approving periodic and final reports to the EU;
- Approving the Dissemination Plan.

In that sense, the Executive Board shall support the Coordinator in preparing meetings with the Funding Authority and in preparing related data and deliverables. The Executive Board shall also, when by a General Assembly decision tasks have been deleted, advice the General Assembly on ways tasks and budget have been rearranged. Such rearrangement shall take into consideration the legitimate commitments taken prior to the decisions, which cannot be cancelled. In terms of communications, the Executive Board shall decide the content and timing of external communication releases and joint publications by the consortium or proposed by the Funding Authority.

***General Assembly**:* One representative of each Consortium members shall have a seat in the General Assembly and will be duly authorized to deliberate, negotiate and decide on all matters listed below. General Assembly

meeting shall be chaired by the Coordinator, unless decided otherwise by the General Assembly. The Parties agree to abide by all decisions of the General Assembly. This does not prevent the Parties to submit a dispute to resolution in accordance with the provisions of settlement of disputes in the Consortium Agreement.
The General Assembly shall consider any proposals made by the Executive Board and be free to act on its own initiative to formulate proposals and take decisions in accordance with the procedures set out in the Consortium Agreement.

The following decisions shall be taken by the General Assembly:
- Proposals for changes to Annex I of the EC-Grant Agreement to be agreed by the European Commission;
- Changes to the Consortium Agreement;
- Decisions related to Intellectual Property;
- Proposal to the European Commission for a change of the Coordinator, for suspension of all or part of the Project or for termination of the Project and the Consortium Agreement;
- Identification of a breach by a Party of its obligations under this Consortium Agreement or the Grant Agreement;
- Declaration of a Party to be a Defaulting Party; remedies to be performed by such a Party as well as termination of a Defaulting Party's participation in the Consortium;
- Withdrawal of a Party from or entry of a new Party to the Consortium and approval of the settlement on the conditions of the withdrawal/accession of such a new Party.

***Advisory Board:*** The Advisory Board will be set up shortly after project start. The management and contact to the Advisory Board will be an integral part of WP1. In general terms, the Advisory Board will advise the consortium on:
- disseminating of EuroGEOSS-Hub findings beyond the consortium;
- maximizing EuroGEOSS-Hub exploitation benefits;
- external developments relevant to achieving progress towards the impacts of the call.

Members of the Advisory Board will be invited to the Kick-off meeting and Final Event as well as to the annual Consortium Meetings.

The European Space Agency (**ESA**) Copernicus Ground Segment Development Division, the Environmental European Agency (**EEA**), the Federal Geographic Data Committee (**FGDC**, US), the San Diego Supercomputer Center (**SDSC**, US), the **GEO Secretariat**, **AfriGEOSS**, **DSI** (Japan) and the **Open Geospatial Consortium** (OGC), and the **Climate Centre of the Red Cross/Red Crescent** have agreed to be members of the Advisory Board, which will be complemented by representatives from **EC DG RTD**, **GROW** and **CONNECT**.

### 3.2.2 Preparation and frequency of meetings

The chair of a management body shall convene meetings of that management body. The frequency of meetings is given in the table below.

| Management body | Ordinary meeting | Extraordinary meeting |
|---|---|---|
| Executive Board | Monthly by teleconference,<br>Half year face-to-face | At any time upon request of 2/3 of its members |
| General Assembly | Annually face-to-face | At any time upon request of 2/3 of its members |
| Advisory Board | Annually and back to back with the General Assembly | |

The rules related to meetings will be detailed in the Consortium Agreement, but these main rules shall apply;
- All invited partners can suggest amendments to the meeting agenda;
- Decisions can be made by voting and will follow the majority. In case of equality, the vote of the Coordinator will decide the result. No members can veto decisions;
- The meeting minutes are of the responsibility of the meeting organizer.

### 3.2.4 Management of project progress, quality control and internal communication

The progress of the project will be monitored by regular reporting and meetings of the Executive Board. The monitoring of the project at different levels is outlined below:

- The Coordinator will use milestones to ensure that important dependencies in timing of the project execution are not compromised. The table below lists milestones that have been identified for the project as a whole;
- The Executive Board will monitor progress of the project, identify major bottlenecks and solutions. Required adaptations to the project plan will be made, with the aim to ensure the delivery of the project results as agreed with the European Commission. Major adaptations shall be reported to the General Assembly. Progress reports will also form the basis for the annual reports prepared by the Executive Board;
- The WP Leaders will monitor progress of participants of their WP on a monthly basis. Appropriate measures will be taken by the WP Leaders in case of problem reported by participants. Major problems will be discussed in teleconference meetings with the Coordinator;
- When required teleconference meetings between teams of different WP's will be organized by the responsible WP Leaders.

### 3.2.5 Conflict resolution

In case of conflict, the WP leaders will have first responsibility to find an amicable solution to a conflict, if appropriate in consultation with the Coordinator. In case the conflict cannot be resolved, the WP leader will put the issue forward to the Executive Board. If the Executive Board is unable to find an amicable solution, the issue will be voted on by the Executive Board members. In case this happens, the issue and its outcome will be reported to the Project Officer. Further details will be laid down in the Consortium Agreement.

### 3.2.6 Dissemination management

Dissemination, exploitation and communication actions will be defined by the Dissemination, Exploitation and Communication Plan prepared in Task 8.1 and led by EARSC in WP8.

In parallel of outreach and capacity building activities in European and international dimensions, the project will develop synergy at national and European level in relation with initiatives such as Copernicus, INSPIRE, Open Data, Digital Single Market. Connection is planned to be made at international level as well, in the Americas, Asia and Oceania, Africa, etc. Still at the global scale, the project will contribute to the GEO Strategic Plan in providing input to GEOSS Common Infrastructure.

**Table 3.2a: List of milestones**

| Milestone number | Milestone name | Related work package(s) | Estimated date | Means of verification |
|---|---|---|---|---|
| MS1 | Initial User-centric Application Analysis and Design | 3, 4, 5, 6 | M12 | D3.1, D3.2, D3.3 ver. 1, D4.1, D5.1, D6.1, D6.2 ver.1, D6.3 ver.1, D6.4 ver.1, D6.5 ver.1, D6.6 ver.1, D6.7 ver.1 |
| MS2 | Initial User Application requirements and Platform analysis and design | 2, 3, 4, 5, 6 | M12 | D3.4 ver. 1, D4.7 ver.1, D5.5 ver.1, D6.9 ver.1, D2.1 ver.1, D2.2 ver.1, D2.3 ver.1, D2.4 ver.1 |
| MS3 | Initial Platform capacity development and the associated DMP and Dissemination, Exploitation and Communication Plan | 2, 8 | M18 | D2.6 ver.1, D2.7 ver. 1, D.28 ver.1, D2.9 ver 1, D8.1 ver.2, D8.2 ver. 2, D8.3 ver.1, D8.4 ver.1 |
| MS4 | Initial User-centric Applications development and showcase | 3, 4, 5, 6 | M24 | D3.5, D4.2, D4.3, D5.2, D5.3, D6.8 ver.1 |

| | | | | |
|---|---|---|---|---|
| MS5 | Multidisciplinary assessment baseline and initial Business Plan and Sustainability Plan | 7 | M30 | D7.1 ver.1, D7.5 ver.1, D7.6 ver.1 |
| MS6 | Advanced Platform capacity and the associated DMP and Dissemination, Exploitation and Communication Plan | 2, 3, 4, 5, 6, 8 | M32 | D2.5 ver.1, D2.6 ver.2, D2.7 ver. 2, D.28 ver.2, D2.9 ver 2, D3.4 ver. 2, D4.7 ver.2, D5.5 ver.2, D6.9 ver.2, D8.1 ver.3, D8.2 ver. 3, D8.3 ver.2, D8.4 ver.2 |
| MS7 | Final User Application requirements and Platform analysis and design | 2, 3, 4, 5, 6 | M36 | D3.4 ver. 3, D4.7 ver.3, D5.5 ver.3, D6.9 ver.3, D2.1 ver.3, D2.2 ver.3, D2.3 ver.3, D2.4 ver.3 |
| MS8 | Final Platform capacity and the associated Multidisciplinary assessment, Business Plan and Sustainability Plan | 2, 7 | M45 | D2.6 ver.3, D2.7 ver. 3, D.28 ver.3, D2.9 ver 3., D7.1 ver.3, D7.5 ver.3, D7.6 ver.2 |
| MS9 | Final User-centric Applications showcase and end of the project | 1, 2, 3, 4, 5, 6, 7, 8 | M48 | D2,5 ver. 2, D3.6, D4.8, D5.4, D6.8 ver.2, D8.3 ver. 3, D8.4 ver. 3, D8.5 ver.4, D8.6 ver.4 |

**Table 3.2b: Critical risks for implementation**

| Description of risk (indicate level of likelihood: Low/Medium/High) | Work package(s) involved | Proposed risk-mitigation measures |
|---|---|---|
| Large number of partners leading to inadequate communication, insufficient participation and/or integration (low) | All | Clear description of responsibilities in working plans, Regular Consortium meetings and monthly conference calls of the Executive Board |
| Failure to deliver project objectives (low) | All | On-going evaluation and monitoring will reinforce direction and focus, as will regular contact with |
| Loss of key project personnel or project direction (low) | All | Consortium Members with major roles are substantial and have deep expertise and shared responsibilities within WP provide stability in staffing. |
| Under-estimation of staff effort (low) | All | The project team manages personnel resources and oversees programs of work. The project team will address any issues early in the project. |
| Deliverables not delivered on time and domino effect can occur due to interdependency (medium) | All | Day-to-day communication between coordinator and WP leaders and further between WP leaders and tasks performers. |
| Lack of agreement on IPR or | All | Proactive WP7 will reduce this risk, the |

| | | |
|---|---|---|
| business issues (medium) | | project will be making progress in these domains. A Consortium Agreement must be signed and WP1 delivers periodically "Report on IPR and Consortium Agreement monitoring" (D1.4). |
| Lack of communication in the Consortium (low) | All | Planned meetings, the share of results and information on the project website, the monitoring of management of coordinator. |
| Lack of synergy between the User-centric Application development and the IT Platform development (medium) | WPs 2, 3, 4, 5, 6 | Specific tasks and related Deliverable to address this risk are present in all the involved WPs, i.e. Tasks 3.4, 4.7, 5.5, 6.9, 2.1, 2.6, 2.7, 2.9. |
| Insufficient assessment and generalization of the interdisciplinary aspects addressed by the User-centric Applications and the Platform (medium) | All | WP7 has a dedicated task (7.1) delivering three versions of the report: "Multidisciplinary assessment". WP8 has a dedicated task (8.5) delivering four versions of the report: "Contributions to GEO Strategic Plan" |
| Unclear impact of the project on the European digital single market (medium) | All | WP7 has a dedicated task (7.2) delivering three versions of the report "Value added to European policy and business", EARSC is in charge of this activity implementing its vision to create a European Alliance for EO Services (see MAEOS) |
| Insufficient coordination with Copernicus and other relevant European research infrastructures and GEOSS strategic goals (medium) | All | Members of the Consortium are responsible of the Copernicus Core Services management. The JRC works closely with DG GROW to design the dissemination platform from Copernicus and related EO in Europe. ESA ESRIN (Copernicus Ground Segment Development Division) is part of the Advisory Board and a MoU will be finalized to coordinate actions in the framework of Copernicus and GEOSS. |
| Lack on interoperability among the ICT infrastructure and the EO/environmental data system provisions (medium) | WP2, 3, 4. 5, 6 | WP2 is the only WP dealing with EuroGEOSS-Hub platform development, to better control and coordinate the interoperability implementation among the existing ICT infrastructure and the EO/environmental data system provisions. |

### 3.3 Consortium as a whole

The consortium of the EuroGEOSS-Hub includes leading European research institutions, academia and private sector companies. It has also a strong international dimension as indicated by the key indicators below:

- The consortium includes **23 partners from 11 countries**: **8 European countries** and **Switzerland**, plus **China** [the Institute for Remote Sensing and Digital Earth (RADI) of the Chinese Academy of Science] and

**Australia** [the University of New South Wales (UNSW) that leads the Australian Urban Research Information Network].

- The **US also participates in the project as a member of the Advisory Board** with the Federal Geographic Data Committee (**FGDC**) and the San Diego Supercomputing Centre (**SDSC**). FGDC co-chairs, with the European Commission JRC (Joint Research Centre), the GEO Working Group leading the development and evolution of the GEOSS Common Infrastructure (GCI), while the SDSC participates directly in the research activity of the project in relation to the development of the global wild fire information system (WP3).
- There are **five international organisations participating in the consortium** (the Centre for Water and Environment of UNEP (**UNEP-DHI**), the Global Resource Initiative (**GRI**), the European Centre for Medium-range Weather Forecast (**ECMWF**), the European Commission (**Joint Research Centre-JRC**) and **EGI.eu**, a not-for-profit foundation, that coordinates a federation of over 350 resource centres created managing the infrastructure on behalf of its participants: **National Grid Initiatives** (NGIs) and **European Intergovernmental Research Organisations** (EIROs).
- **ESA (European Space Agency) Copernicus Ground Segment Development Division participates as a member of the Advisory Board**. ESA and EuroGEOSS-Hub will sign a Memorandum-of-Understanding (MoU) to better coordinate their activities in the GEOSS and Copernicus dissemination areas.
- The **private sector (including commercial and no-profit) is represented by 8 partners** including **ATOS**, the largest Europe-based IT company with 93,000 employees in 72 countries, **CLS** a subsidiary of CNES and IFREMER and the European Association of Remote Sensing Companies (**EARSC**) that represents almost **80-SMEs** in the field of Earth Observation. These SMEs **are associated to the project through EARSC** as linked third parties and will contribute to the project's objectives.
- **Four partners** (University of Geneva, CloudSigma, RADI, and UNSW) contribute to the project with their own resources or resources from their governments, for more than 1.1 million, representing 11% of the total requested budget for the project.

The consortium is led by the French Geological Survey (**BRGM**) **as overall Project Coordinator**, supported by the **JRC as Scientific Coordinator**, and the **National Research Council of Italy (CNR) as Technical Coordinator**. These partners were also the leaders of the EuroGEOSS FP7 project (2009-12) that **developed the GEOSS Discovery and Access Broker (DAB)**, now at the heart of the GCI. This call also aims to advance such technology and retain its property in Europe.

EuroGEOSS outcomes dramatically evolved the GCI and GEOSS shaping its success on EO data discoverability, in the last 5 years; **EuroGEOSS-Hub could have the same evolutionary impact on the GCI and GEOSS as to accessibility and processing for the next 5 years**.

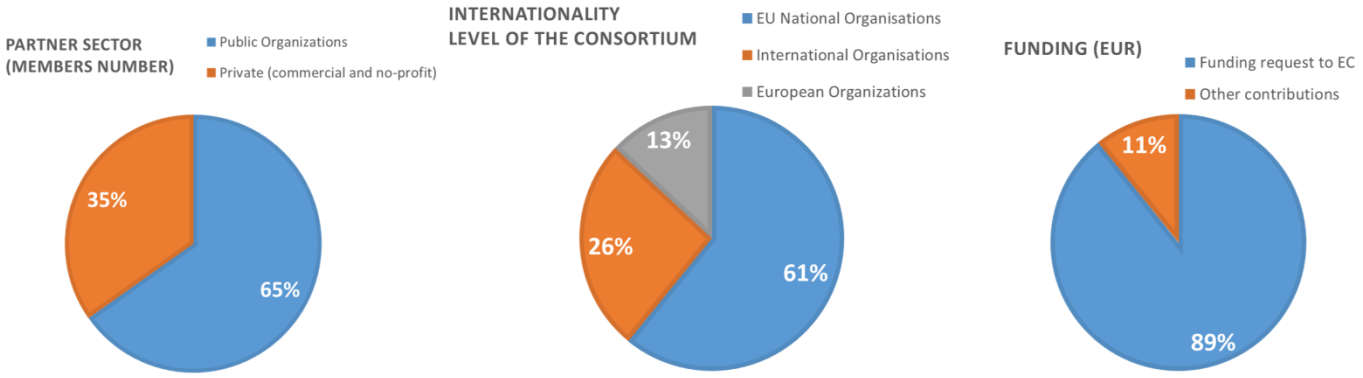
The technological partners of the project have strong capacities on **cloud computing** (**EGI.eu**, **ATOS**, **CloudSigma**) and High-Performance Computing-**HPC** (Barcelona Super Computing Centre: **BSC**, also member of **PRACE** the European e-infrastructure on HPC) as well as contribution in kind from the **SDSC** for forest fire modelling. The **EGI** federation brings together more than 350 data centres worldwide and the largest community **cloud federation in Europe with 21 cloud providers in 12 European countries**.

As indicated in Section 1.2 the project is well integrated in all the major international initiatives of relevance to the call, such as Copernicus, INSPIRE, GEO, European and international e-infrastructures initiatives and industrial initiatives.

As indicated, **the project consortium is designed to complement, and not duplicate, the Copernicus dissemination platform that will be funded by DG GROW**. It is therefore well embedded to the **Copernicus services**, **INSPIRE**, **GEO**, and the **downstream applications development by the private sector**. The link to the space data providers is assured at policy level by the link JRC-DG GROW, and at the operational/scientific level by the coordination with ESA through a MoU to be finalised if the proposal is funded.

The strong technological base and interoperability of platforms agenda of the project will play a major role to inform the **European Cloud initiative** and the **Big Data activities led by DG CONNECT** as well as the **Big Data task force led by Eurostat** (of which JRC is member) and the foreseen development of a Big Data processing capacity for the European Commission.

The **Advisory Board** of the project (see Section 3.2.1) plays an important role not only **to ensure synergy with global initiatives and other global nodes of GEO**, but also as an **important forum of dialogue and coordination between the many initiatives at the European and national levels** such as those related to Copernicus, INSPIRE, and the Digital Single Market.




### 3.4 Resources to be committed

**Table 3.4a: Summary of staff effort Table**

| | WP1 | WP2 | WP3 | WP4 | WP5 | WP6 | WP7 | WP8 | Total |
|---|---|---|---|---|---|---|---|---|---|
| **01-BRGM** | **36,00** | 24,00 | | 18,00 | **33,00** | | 6,00 | **12,00** | **129,0** |
| **02-JRC** | 3,80 | 7,00 | 18,00 | 18,00 | | 36,00 | **12,00** | 6,00 | **100,8** |
| **03-CNR** | 6,00 | **60,00** | 10,00 | 10,00 | 10,00 | 21,00 | 10,00 | 17,00 | **144,0** |
| **04-UAB** | 2,00 | 6,00 | **60,00** | | | | | 6,00 | **74,0** |
| **05-CLS** | 2,00 | 36,00 | | | 22,00 | | | 4,00 | **64,0** |
| **06-CREAF** | 2,00 | 30,00 | 4,00 | | | | | 10,00 | **46,0** |
| **07-EARSC** | 2,00 | 10,00 | | | | | 12,00 | 6,00 | **30,0** |
| **08-UNIGE** | 2,00 | | | | | **77,00** | | | **79,0** |
| **09-UBDC** | 2,00 | | | | | 27,90 | | | **29,9** |
| **10-CloudSigma** | 2,00 | 34,00 | | | | | 6,00 | | **42,0** |
| **11-ECMWF** | 2,00 | 6,00 | | **24,00** | | 16,00 | | | **48,0** |
| **12-ATOS** | 2,00 | 36,00 | 4,00 | 4,00 | 9,00 | 8,00 | 6,00 | 5,00 | **74,0** |
| **13-BSC** | 2,00 | 36,00 | | | | 20,00 | | 3,00 | **61,0** |
| **14-52North** | 2,00 | | | 24,00 | 20,00 | | | | **46,0** |
| **15-RADI** | 2,00 | 10,00 | | | | | | | **12,0** |
| **16-GRI** | 2,00 | | | | | 12,00 | | | **14,0** |
| **17-UREAD** | 2,00 | | | 36,00 | | | | | **38,0** |
| **18-CNRS** | 2,00 | | | | 24,00 | | | | **26,0** |
| **19-UNSW** | 2,00 | | | | | 3,00 | | 3,00 | **8,0** |
| **20- DHI** | 2,00 | | | | | 6,00 | | | **8,0** |
| **21-NERC** | 2,00 | 32,00 | | | | | | | **34,0** |
| **22-ARPAE** | 2,00 | | | 24,00 | | | | | **26,0** |
| **23-EGI.eu** | 2,00 | 30,00 | | | | | | 2,00 | **34,0** |
| **Total** | **85,80** | **357,00** | **96,00** | **158,00** | **118,00** | **226,90** | **52,00** | **74,00** | **1 167,7** |

**Table 3.4b: 'Other direct cost' items (travel, equipment, other goods and services)**

| Partner | Cost (€) | Justification |
|---|---|---|
| **02-JRC** | | |
| Travel | 93 500 | Travels (45 units) to Consortium and WP meetings of staff from 4 Units contributing to the project |
| Equipment | | |
| Other goods and services | 41 500 | Workshops and fee-paid experts (40 units) for specific advice, audit costs |
| **Total** | 135 000 | |
| **03-CNR** | | |
| Travel | 48 000 | Travels to annual GEO Plenary (4), European GEO events (8), project meetings (8)as WP Leader and other project relevant events (5). |
| Equipment | 5 000 | Laptop and workstation |
| Other goods and services | 65 000 | Hosting the EuroGEOSS-Hub on a cloud infrastructure providing the necessary capabilities of elastic scalability, storage, logging and monitoring (20 units). Preparation of the audit certificates. |
| **Total** | **118 000** | |
| **04-UAB** | | |
| Travel | 40 000 | Travel to Consortium meetings (12), WP 3 meetings (12) and other project relevant conference (12). |
| Equipment | | |
| Other goods and services | 16 500 | Audits, Open Access publications (7) and WP related workshops costs |
| **Total** | **56 500** | |
| **06-CREAF** | | |
| Travel | 26 150 | Travels to project meetings (10), GEOSS events and workshops (7), Interoperability experiments, OGC TC and ISO TC meetings (5) |
| Equipment | | |
| Other goods and services | 1 900 | Audits, Open Access publications (2) |
| **Total** | **28 050** | |
| **09-UBDC** | | |
| Travel | 14 000 | Travels to consortium meeting (14) and to attend one related conference (1) |
| Equipment | 11 200 | Rack mounted high performance server with a GPU supporting virtual machines for data visualization, image processing, GIS for processing and analysis EO satellite sensor data. |
| Other goods and services | 1 000 | consumables |
| **Total** | **26 200** | |
| **10-CloudSigma** | | |
| Travel | 10 800 | Travels to consortium meeting (12 units) |
| Equipment | | |
| Other goods and services | 27 421 | 3 year subscription for a Virtual Machine (100Ghz CPU, 100GB RAM, 2500GB SSD) |
| **Total** | **26 200** | |
| **12-ATOS** | | |
| Travel | 31 200 | Travel to Consortium and several work packages meetings (6 per year) |
| Equipment | 65 000 | Allocating cloud infrastructure and high performance computation capacities for the project platform during years 1 to 4 |
| Other goods and | 4 000 | audit |

| | | |
|---|---|---|
| services | | |
| **Total** | **100 200** | |
| **16-GRI** | | |
| Travel | 6 250 | Travel to Consortium and work packages meetings |
| Equipment | 7 500 | Laptops and workstation |
| Other goods and services | | |
| **Total** | **13 750** | |
| **20-DHI** | | |
| Travel | 13 270 | Travel to Consortium and work packages meetings (12) |
| Equipment | | |
| Other goods and services | 5 000 | Reporting and IT extended services |
| **Total** | **18 270** | |
| **22-ARPAE** | | |
| Travel | 20 700 | Travels to project meetings (12, Consortium, WP and final) |
| Equipment | | |
| Other goods and services | | |
| **Total** | **20 700** | |
| **Partner** | **Cost (€)** | **Justification** |
| **02-JRC** | | |
| Travel | 93 500 | Travels (45 units) to Consortium and WP meetings of staff from 4 Units contributing to the project |
| Other goods and services | 41 500 | Workshops and fee-paid experts (40 units) for specific advice, audit costs |
| **Total** | **135 000** | |
| **03-CNR** | | |
| Travel | 48 000 | Travels to annual GEO Plenary (4), European GEO events (8), project meetings (8)as WP Leader and other project relevant events (5). |
| Equipment | 5 000 | Laptop and workstation |
| Other goods and services | 65 000 | Hosting the EuroGEOSS-Hub on a cloud infrastructure providing the necessary capabilities of elastic scalability, storage, logging and monitoring (20 units). Preparation of the audit certificates. |
| **Total** | **118 000** | |
| **04-UAB** | | |
| Travel | 40 000 | Travel to Consortium meetings (12), WP 3 meetings (12) and other project relevant conference (12). |
| Other goods and services | 16 500 | Audits, Open Access publications (7) and WP related workshops costs |
| **Total** | **56 500** | |
| **06-CREAF** | | |
| Travel | 26 150 | Travels to project meetings (10), GEOSS events and workshops (7), Interoperability experiments, OGC TC and ISO TC meetings (5) |
| Other goods and services | 1 900 | Audits, Open Access publications (2) |
| **Total** | **28 050** | |
| **09-UBDC** | | |
| Travel | 14 000 | Travels to consortium meeting (14) and to attend one related conference (1) |

| | | |
|---|---|---|
| Equipment | 11 200 | Rack mounted high performance server with a GPU supporting virtual machines for data visualization, image processing, GIS for processing and analysis EO satellite sensor data. |
| Other goods and services | 1 000 | consumables |
| **Total** | **26 200** | |
| **10-CloudSigma** | | |
| Travel | 10 800 | Travels to consortium meeting (12 units) |
| Other goods and services | 27 421 | 3 year subscription for a Virtual Machine (100Ghz CPU, 100GB RAM, 2500GB SSD) |
| **Total** | **26 200** | |
| **12-ATOS** | | |
| Travel | 31 200 | Travel to Consortium and several work packages meetings (6 per year) |
| Equipment | 65 000 | Allocating cloud infrastructure and high performance computation capacities for the project platform during years 1 to 4 |
| Other goods and services | 4 000 | audit |
| **Total** | **100 200** | |
| **16-GRI** | | |
| Travel | 6 250 | Travel to Consortium and work packages meetings |
| Equipment | 7 500 | Laptops and workstation |
| **Total** | **13 750** | |
| **20-DHI** | | |
| Travel | 13 270 | Travel to Consortium and work packages meetings (12) |
| Other goods and services | 5 000 | Reporting and IT extended services |
| **Total** | **18 270** | |
| **22-ARPAE** | | |
| Travel | 20 700 | Travels to project meetings (12, Consortium, WP and final) |
| **Total** | **20 700** | |
| **Partner** | **Cost (€)** | **Justification** |

**H2020 –SC5-20-2016 European data hub of the GEOSS information system**


**List of Participants**

| Participant N° | Short Name | Participant Organisation Name | Country |
|---|---|---|---|
| 1 | BRGM | BUREAU DE RECHERCHES GEOLOGIQUES ET MINIERES | France |
| 2 | JRC | JRC - JOINT RESEARCH CENTRE- EUROPEAN COMMISSION | Belgium |
| 3 | CNR | CONSIGLIO NAZIONALE DELLE RICERCHE | Italy |
| 4 | UAB | UNIVERSITAT AUTONOMA DE BARCELONA | Spain |
| 5 | CLS | COLLECTE LOCALISATION SATELLITES SA | France |
| 6 | CREAF | CENTRO DE INVESTIGACION ECOLOGICA Y APLICACIONES FORESTALES | Spain |
| 7 | EARSC | EUROPEAN ASSOCIATION OF REMOTE SENSING COMPANIES | Belgium |
| 8 | UNIGE | UNIVERSITE DE GENEVE | Switzerland |
| 9 | UBDC | UNIVERSITY OF GLASGOW - Urban Big Data Center | United Kingdom |
| 10 | CloudSigma | CLOUDSIGMA AG | Switzerland |
| 11 | ECMWF | EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS | United Kingdom |
| 12 | ATOS | ATOS ORIGIN INTEGRATION SAS | France |
| 13 | BSC | BARCELONA SUPERCOMPUTING CENTER – CENTRO NACIONAL DE SUPERCOMPUTACION | Spain |
| 14 | 52North | 52°NORTH INITIATIVE FOR GEOSPATIAL OPEN SOURCE SOFTWARE GMBH | Germany |
| 15 | RADI | INSTITUTE OF REMOTE SENSING AND DIGITAL EARTH,CAS | China (People's Republic of) |
| 16 | GRI | GLOBAL REPORTING INITIATIVE | Netherlands |
| 17 | UREAD | THE UNIVERSTY OF READING | United Kingdom |
| 18 | CNRS | CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE | France |
| 19 | UNSW | UNIVERSITY OF NEW SOUTH WALES | Australia |
| 20 | DHI | DHI | Denmark |
| 21 | NERC | NATURAL ENVIRONMENT RESEARCH COUNCIL | United Kingdom |
| 22 | ARPAE | AGENZIA REGIONALE PER LA PREVENZIONE, L'AMBIENTE ET L'ENERGIA DELL' EMILIA ROMAGNA | Italy |
| 23 | EGI.eu | Stiching EGI | Netherlands |

**Coordinator Contact details :**

**BRGM**– Information Systems Division - BP 36009 - 3 avenue Claude-Guillemin -45060 Orléans Cedex 2 (France)
Project Director : F. ROBIDA (f.robida@brgm.fr)

# 4. Section 4: Members of the consortium

## 4.1 01-BRGM

**Description of Organisation**

**The Bureau de Recherches Géologiques et Minières (BRGM)** is the French Geological Survey and France's leading public institution for Earth Science applications applied in the management of surface/subsurface resources and geoscience information exchange. BRGM is an interdisciplinary institution that delivers policy development support to public authorities and carries out research activities to bring innovative technologies and practical responses to major challenges such as climate change, new energy needs, and land degradation. BRGM is a major player in the collection and delivery of georeferenced data and has been a pioneering organisation in conceptual work on interoperability as a principle of distributed information systems.
BRGM ensures the quality of the undergoing research projects being ISO 9001:2008 and ISO 14001:2004 certified for all of its activities. It manages projects on commercial basis for international funding agencies like European Commission or World Bank. BRGM has an international expertise in information systems, being part of drafting teams of the INSPIRE directive and now its maintenance. Under Inspire, BRGM is in charge of the French Inspire catalogue (French Government's Geoportail) and codelist repository. Voting Member of the OpenGeospatialConsortium (OGC), it is involved in several OGC working groups such as the GeoSciML SWG and Hydrology Domain Working group standardising a suite of international standards for the geology and water communities.
BRGM is also actively involved in the International Union of Geological Sciences (IUGS) Commission for the Management and Application of Geoscience Application (CGI) setting up international standards such as GeoSciML, EarthResourceML. BRGM has a strong expertise and experience in EU and national-funded collaborative projects. For the OneGeology Consortium (118 countries) BRGM is in charge of the portal development and operation.
BRGM implements research programmes and decision-support tools designed to anticipate and prevent surface and subsurface risks. BRGM is closely involved in furthering knowledge on coastal risks and their management in the context of climate change. It is also involved in monitoring coastline change, through the Coastline Observatories in mainland and overseas France.
On the same status of the French National Meteorological Service and the Central Service of Hydrometeorology and Support to Flood Forecasting, the BRGM contributes to the achievement of the national hydrological situation report (monthly evolution of water resource) on behalf of the French ministry of Environment and Sustainable Development. The BRGM is the groundwater flooding reference organization for the Risk Prevention Directorate attached to the Ministry of Environment. Several studies have been achieved on climate change impacts on water resources and its repercussions for flooding and drought.
The BRGM currently works on forecasting groundwater levels by improving national piezometric data network. The objective is to deploy interoperable communication tools/standards and integrate data from other networks (meteorology, river flow) to characterize in almost real-time groundwater quantitative state.

In EuroGEOSS-Hub, BRGM will be coordinator of the project as well as WP 05 leader -demonstrating how the GEOSS Hub and associated capabilities can support coastal adaptation to climate change - and WP08 leader - ensuring External Relation, Dissemination of project results and Outreach.

**Profiles of staff members:**

***François Robida*** (M), deputy Director of Information Systems and Technologies division, BRGM. Mining engineer and geostatistician, 35 years of experience in computer science applications to earth sciences. Member of the Board of Directors of OGC (Open Geospatial Consortium), Chair of the EuroGeoSurveys Spatial Information Expert Group, Chair of the IUGS/CGI Council.
***Sylvain Grellet*** (M), project leader in Information Systems. Scientific program coordinator of the BRGM program "Enterprise Architecture and geoscientific information management". He facilitated the "Environmental Monitoring Facilities" Inspire data theme and was member of the Observations & Measurements and Sensor

Web Enablement team in Inspire; he is now involved in various Inspire maintenance related activities. Former WISE Technical Group member, now co-chair of OGC hydrology Domain Working Group, he contributed to various international water data transfer standards.

***Agnès Tellez Arenas*** (F), PhD in Computer Science, project leader in Information Systems and Technology since 1999. Workpackage leader: in OneGeology-Europe for the geoportal and the services developments; in the Pangeo FP7 project for the implementation of the portal and services. She is also involved in the GeoSciML group of the IUGS/CGI and co-chair of the OneGeology Technical Implementation Group.

***Olivier Pouvesle,*** (M) Enterprise Architecture specialist, since 2008 he is responsible of projects' architecture, integration and deployment within BRGM IT infrastructure for both BRGM and partners' projects. Involved in European projects such as InGeoClouds where he defined and coordinated the deployment of the cloud infrastructure.

***Gonéri Le Cozannet*** (M) Researcher engineer at BRGM since 2006, presently responsible for the Climate Change and Vulnerability scientific programme. His research focuses on coastal flooding, shoreline changes, climate change and sea-level rise impacts and satellite remote sensing applications. He contributed to several French national assessments of climate change impacts on coastal zones published in 2009, 2013 and 2015. He has been an active member of several working groups such as the Geohazards and Coastal Zones Communities of Practice of GEO, and the World Climate Research Programme (WCRP) Grand Challenge on Sea-level rise and Coastal Impacts. Over the last years, his research is increasingly benefiting from advanced space and in-situ data processing (e.g. Satelite Aperture Radar Interferometry to monitor vertical ground motions in coastal zones) as well as high-performance computers (e.g. Global Sensitivity Analysis of Coastal Impacts models).

***Hélène Bessière*** *(F),* PhD in hydrology, specialised in hydrosystem modelling. She is involved in different projects linking together atmosphere, surface and subsurface compartments (flood or low-flow forecasting, river and groundwater interaction etc.). She has already implemented a variational data assimilation method in a hydrological model for flash flood. She also works with geographical information system and remote sensing data.

**A list of up to 5 relevant publications, and/or products, ;**


1. Inspire: S. Grellet, F. Daffner and al. "Data Specification on Environmental monitoring Facilities - Technical Guidelines"; Schleidt and al. (including S.Grellet): "Draft Guidelines for the use of Observations & Measurements and Sensor Web enablement-related standards in INSPIRE Annex II and III data specification development".
2. OGC: Peter Taylor and al. (incl. S.Grellet): "OGC 10-126r4 - OGC® WaterML 2.0: Part 1 - Timeseries"; Boyan Brodaric and al. (incl. S.Grellet): OGC®GroundWaterML 2.0.
3. **Le Cozannet, G.**, Garcin, M., Yates, M., Idier, D., & Meyssignac, B. (2014). Approaches to evaluate the recent impacts of sea-level rise on shoreline changes. *Earth-Science Reviews*, *138*, 47-60.
4. **Le Cozannet**, G., Rohmer, J., Cazenave, A., Idier, D., van De Wal, R., De Winter, R., ... & Oliveros, C. (2015). Evaluating uncertainties of future marine flooding occurrence as sea-level rises. *Environmental Modelling & Software*, *73*, 44-56.
5. **H. Bessière, 2008.** A variational data assimilation method for distributed hydrological flash flood modelling. PhD Thesis. Institut Nationale Polytechnique de Toulouse. France


**A list of up to 5 relevant previous projects or activities,**

1. **EUROGEOSS** – FP7 – BRGM project coordinator -showed the added value to the scientific community and society of making existing systems and applications interoperable and used within the GEOSS and INSPIRE frameworks. Project coordinator, BRGM contributed to building an initial operating capacity for a European Environment Earth Observation System in the strategic areas of Drought, Forestry and Biodiversity.
2. **ENERGIC OD** – CIP - addresses lack of agreement on interoperability standards deploying a set of Virtual Hubs (VH) using the brokering approach (developed in EuroGEOSS) to facilitate 10 multidisciplinary applications based on the full exploitation of (open) GI, hence stimulating innovation and business activities. BRGM is developing and hosting the French VH and a mobile application to enhance knowledge on the coastline, allowing crowd-sourcing and exposing open (INSPIRE compliant) data. (www.energic-od.eu)
3. **SparkinData** a project funded by the French Governent (Direction Générale des Entreprises, "Investments for the Future" program), 2015-2018. SparkInData has the ambition of building a sustainable ecosystem

around geolocated data. SparkInData is currently addressing various markets (ie. Agriculture, environment, local authorities, utilities, defense and risk management), the objective of SparkInData is to build a state of the art Big Data marketplace deployed on a cloud infrastructure. The platform currently uses Copernicus data, supplied by the PEPS platform developed by the French Space Agency. Within SparkinData, BRGM is developing data processing for geohazards. (www.sparkindata.com)

4. **EPOS** a long-term plan for the integration of national and transnational Research Infrastructures for solid Earth science in Europe to provide seamless access to data, services and facilities. Currently, in EPOS implementation project (H2020), BRGM is leading WP15, developing geological information and modeling services. It is acting as the connection body between the EPOS and EGS, the Association of European Geological Surveys (http://www.epos-eu.org).
5. **InGeoClouds**: FP7 project that ported an Inspire compliant data publication platform to the cloud (www.ingeoclouds.eu).

**A description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work;**

On its own IT infrastructure, BRGM is hosting:

1. OneGeology portal, Minerals4EU diffusion system-EUMKDP and several international projects central nodes, providing storage and quality of service.
2. French Inspire compliancy: BRGM hosts the French Inspire catalogue and code List repository.
3. Support to the French Ministry of Environment: BRGM ICT Division also hosts numerous platforms, decision support system for the French MoE especially for the Water and Risk department.

***"No third parties involved"***

### 4.2 02-JRC

**Commission of the European Communities, Joint Research Centre-**

**Description of Organisation**

The Joint Research Centre is one of the Directorates General of the European Commission. Its mission is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies. As the in-house science service of the European Commission, the JRC functions as a reference centre of science and technology for the Union. The JRC participates in this proposal through four Units in two of its institutes: The Institute for Environment and Sustainability (IES) and the Institute for Energy and Transport (IE).

The **Digital Earth and Reference Data Unit** is the lead Unit of reference for this project. The Unit co-ordinates the scientific and technical development of INSPIRE (the Infrastructure for Spatial Information in Europe), and supports its implementation within the Commission and the Member States. The Unit represents the European Commission on the GEO programme Board, co-chairs the GEOSS Common Infrastructure Development Working Group (GD-07), and the Data Management Principles Task Force. It also Co-chairs the Legal Interoperability Working Group of the Research Data Alliance. The Unit works closely with DG GROW in defining a dissemination platform for Copernicus data and services able to maximize access and use from academia, the private sector and public administrations across Europe. It is therefore well placed to act as a bridge between the activities of GEO and those of the Member States, particularly in relation to environmental policy and the implementation of the INSPIRE directive and Copernicus.

**Climate Risk Management Unit** has the mission is to improve the observation, evaluation, anticipation and communication of the impacts of current weather extremes and future climate change and evaluates the effectiveness of policies and measures that reduce their risks towards sustainable development. The Unit operates the European Flood Awareness System (EFAS).

**The Forest and Climate Unit** supports European policy with respect to the sustainable use of forest resources, forest resource monitoring, the analysis of climate footprint of anthropogenic impacts n forests, forest ecosystem services, and forest biomass. It also operated the European Forest Fires Information Service (EFFIS).

**The Renewables and Energy Efficiency Unit** provides scientific and technical support to the Commission services (DG TREN, DG ENV) for the design, the implementation and the monitoring of the EU energy efficiency policies and programs. The Unit is linked to several international and national organisations (such as, CEN, ISO, IEC and IEA), research labs and universities operating in the field of energy efficiency.

**Main tasks in the project:** Scientific Coordinator and major contributions to WP 2 3, 4, 6 and 8. Lead of WP 7.

**Relevant previous experience:**

EC-JRC is the overall technical coordinator of the Infrastructure for Spatial Information in Europe (INSPIRE). As such it is responsible of leading the development of implementing rules and technical guidelines for metadata, the interoperability of spatial datasets and services, and the INSPIRE network services (discovery, view, download, transform and invoke), and the interoperability with the Copernicus programme in collaboration with DG GROW. The competitive research activities of EC-JRC include participation and leadership in FP7 GEOWOW (GEOSS Interoperability for Weather, Ocean, and Water), EuroGEOSS (a European approach to GEOSS). EC-JRC contributes to the international standardisation efforts through the development of the INSPIRE technical specifications and its contributions to the work of CEN TC287, ISO TC211 and OGC.

**Profiles of staff members:**

**Massimo Craglia** is a member of the INSPIRE Coordination Team, with responsibility in the field of metadata, and has been technical coordinator of the EuroGEOSS and GEOWOW FP7 Integrated Projects. He co-chairs the GEO Foundational Task GD-07 on GCI Development, and is the alternate JRC member of the GEO Programme Board. Prior to joining the JRC in 2005, Massimo was a Senior Lecturer at the University of Sheffield, and participated in several European projects in the field of Geographic Information.

**Jesús San-Miguel-Ayanz**, is the leader of the European Forest Fire Information System (EFFIS) and the European Forest Information and Communication Platform (EFICP) as integral components of the European Forest Data Centre. He holds a Forest Engineering degree from the Polytechnic Univ. of Madrid and a MSc and PhD degrees on Remote Sensing and GIS (1989 and 1993, respectively) from the University of California-Berkeley.

**Peter Salamon** has a Master of Science in Applied Environmental Geosciences from the University of Tuebingen, Germany, and a PhD in Hydraulic and Environmental Engineering from the Polytechnic University of Valencia, Spain. At the JRC he has been working on providing scientific policy support in the fields of flood and disaster risk management, civil protection and climate change adaptation. He is currently project leader of the European and Global Flood Awareness Systems (EFAS and GloFAS).

**Apollonia Miola** leads the JRC research project "Building a Knowledge base for the Sustainable Development Goals". She is an economist and before joining the EU Commission she was a senior researcher and lecturer of Applied environmental economics (MSc in Economics and Management of the Environment) at the "Luigi Bocconi" University of Milan. She is the author of many reports and peer reviewed papers in the field of climate change and sustainable development.

**Isabella Maschio** Is scientific project officer in the Renewables and Energy Efficiency unit of the Joint Research Centre. She is coordinating research projects on the use of geolocation data for energy policies, energy in smart and sustainable cities and the development of the European Energy Efficiency Platform (E3P).

**Hans Bloem** is a member of the Renewables and Energy Efficiency Unit of the Institute for Energy and Transport and member of several EU research networks. His expertise is in the area of: Energy performance assessment of buildings; outdoor testing and dynamic analysis techniques, Renewable energies for the built environment in particular, solar energy, Standards for energy performance calculation and measurement.

**Catherine Doldirina** is a lawyer specialized in Internet law and coordinates legal advice in the Unit in relation to INSPIRE, Copernicus, and GEO. She co-chairs the Legal Interoperability Working Group of the research Data Alliance and participate in the GEOSS Data Sharing Working Group.

Selected Publications:

Nativi S., Mazzetti P, Craglia M. and Pirrone N. 2014. The GEOSS solution for enabling data interoperability and integrative research. *Environmental Science and Pollution Research*, 21(6) 4177-4192. http://link.springer.com/article/10.1007%2Fs11356-013-2264-y

Nativi S., Craglia M., and J. Pearlman. 2013. Earth Science Infrastructures Interoperability: The Brokering Approach. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 6(3), 1118-1129. http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6506981

Alfieri, L., Salamon, P., Pappenberger, F., Wetterhall, F., & Thielen, J. (2012). Operational early warning systems for water-related hazards in Europe. *Environmental Science and Policy, 21*, 35-49. doi:10.1016/j.envsci.2012.01.008

***"No third parties involved"***

### 4.3 03-CNR

**Description of Organisation**

The **National Research Council of Italy** (CNR) is the largest public research organization of Italy. Its duty is to carry out, promote, spread, transfer and improve research activities in the main sectors of knowledge growth and of its applications for the scientific, technological, economic and social development. **The Head of the CNR Earth System Science Department (Enrico Brugnoli) represents Italy in the new GEOSS Program Board**. CNR is distributed all over Italy through a network of institutes. The **Institute of Atmospheric Pollution Research** (CNR-IIA) undertakes research and innovation activities in several thematic areas dealing with Earth System Science and Earth Observation, including the development of systems and technologies for Earth and Space data sharing and interoperability. CNR-IIA has been and is deeply involved in GEO activities, its **Director Nicola Pirrone represents Italy in GEO**, as alternate Principal. **CNR-IIA is one of the GCI Providers developing and operating the GEO DAB**. The CNR-IIA senior researcher Stefano Nativi and Paolo Mazzetti has been representing Italy as co-chair or member of the GEO S&T Committee, GEO IIB, GEO IDIB and GEO SBA. In the past 10 years, **CNR-IIA has been involved, often as coordinator, in about 10 projects funded by the EU to contribute to the GEOSS development**, in particular EruGEOSS and GEOWOW being responsible for the multidisciplinary interoperability platform development.

In EuroGEOSS-Hub project, CNR-IIA mainly participates with its Division of Florence, whose research activity focuses on the application of Information and Data Science to manage, harmonize, and share Earth and Space Science resources (i.e. data, knowledge, services, and infrastructures. The Division of Florence of CNR-IIA has been playing a key role in the design, implementation, and operation of the multidisciplinary GEOSS Common Infrastructure (GCI) and in particular it develops, manages and operates the GEO DAB. It is also involved in relevant international initiatives and programs, such as: NSF Earth Cube, Research Data Alliance (RDA), Belmont Forum e-Infrastructure and Data Management CRA, Science Europe, AGU and EGU.

In the EuroGEOSS-Hub project, CNR-IIA will lead WP2 «EuroGEOSS-Hub Innovative IT Platform» and provide important contributions to the User Application WPs (3-7) and WP9.

As designer and developer of the GEO DAB, CNR-IIA assures maximising and leveraging on past Community investments to support the GEOSS Common Infrastructure, in particular the broker technology. The presence of CNR-IIA in the project would also help retain ownership in the evolution of this IT technology. The CNR-IIA expertise in EO and environmental data interoperability and integration with Big Data technologies assures the development of an innovative web-based IT platform to provide users with a unique access point (gateway) to the diverse European range of Earth observation data.

**Profiles of staff members:**

**Stefano Nativi (M)** Head of the Florence Division of CNR-IIA, he is the scientific coordinator of the theme “Open Data and Interoperability” for the Earth System Science Department of the CNR. He is in charge of the DAB provision to the GCI. He is co-chair of the GEOSS Foundational Task GD-09 “Knowledge Base” and of the subtask GD-07.01 “GEOSS Architecture evolution”. He has served as member of the GEO Infrastructure Implementation Board (IIB) and as co-chair of the GEOSS Science & Technology Committee. He is member of the Expert Panel of the Copernicus Data Dissemination and Big Data Strategy and is member of the Scientific and Technical Advisory Committee (STAC) of the Copernicus Marine Environment Monitoring Service. He is also member of the Steering Committee of the Belmont Forum e-Infrastructure and Data Management CRA and of the INSPIRE Metadata Core Drafting Team. He recently joined the NSF Earth Cube Architecture WG and chairs the RDA (Research Data Alliance) "Brokering Governance" WG and Brokering Interest Group. He has coordinated FP7 and CIP European projects and has been co-PI of U.S.A. NSF and ESA projects.

**Nicola Pirrone (M)** is Director of the CNR-IIA (Institute of Atmospheric Pollution Research, www.iia.cnr.it) and Adjunct Professor at the University of Michigan. He has coordinated over 50 research projects funded by major European and international (i.e., USEPA, World Bank, UNEP) agencies, including those funded by the European Commission (i.e. MAMCS, AME, MERCYMS, GMOS). During the last 20 years he had an active role as expert

member / chair / head of Italian delegations in European, International and National programs and task forces related to different aspects of Earth Observation, Environmental Research, Environmental Policy development and Evaluation of research strategies in EU and abroad. He is currently the Lead of the GEO Task HE-02 on "Tracking Pollutants" and the Lead of the UNEP F&T Partnership.

**Paolo Mazzetti (M)** is researcher at CNR-IIA. He taught "Telematics" at the University of Florence at Prato for the degree in Information Engineering for seven years. He has more than fifteen years of experience in design and development of infrastructures and services for geo-spatial data sharing in the context of national, European (FP7, CIP, H2020) and global initiatives. He was member of the GEO Institutions Development Implementation Board (IDIB). He participates in the E-Infrastructures and Data Management Collaborative Research Action. He is the Italian national representative in the arctic data committees: IASC Data Standing Committee (IDSC) and the SAON Committee on Data and Information Services (CDIS).

**Mariella Liberti (F)** after earning a master degree in History at the University of Calabria, she held a permanent position as technical staff member at the Institute on Membrane Technology (ITM-CNR), where she was appointed Responsible for International Relations and Communications Office. She was in charge of coordination of the international activities promoting the Institute to world and internal audiences. She participated in several national and international projects for management and dissemination activities. She also dealt with the management and technical organization of Conferences and Project Meetings. At CNR-IIA she is currently in charge of the day-to-day management of the ENERGIC-OD Project.

**Mattia Santoro (M)** is researcher at CNR-IIA. His research focuses mainly on cyber (e)-infrastructures for multi-disciplinary interoperability, with particular interest for semantic discovery and environmental models interoperability. He participated to several national, European (FP7, H2020) and global projects and initiatives for the development of multi-disciplinary interoperability infrastructure. He was member of several GEOSS Architecture Implementation Pilots (AIP). He is part of the GCI Providers group, where he is responsible for the GEO DAB operational environment.

**A list of up to 5 relevant publications, and/or products, ;**

- *Nativi, S; Mazzetti, P; Santoro, M; Papeschi, F; Craglia, M; Ochiai, O; "**Big Data challenges in building the Global Earth Observation System of Systems**", Environmental Modelling & Software, Vol. 68, 2015; pp. 01-26, Jun 2015.*
- *Nativi, S.; Craglia, M.; Pearlman, J., "**Earth Science Infrastructures Interoperability: The Brokering Approach**", Selected Topics in Applied Earth Observations and Remote Sensing, IEEE Journal of , vol.6, no.3, pp.1118,1129, June 2013.*
- *Pier Bargellini, S Cheli, YL Desmos, Bruno Greco, V Guidetti, PG Marchetti, Carmen Comparetto, Stefano Nativi, G Sawjer, 2013, "**Big Data from Space: Event Report**", ESA report, available at:* http://www.congrexprojects.com/docs/default-source/13c10_docs/here.pdf?sfvrsn=0
- *S Nativi, P Mazzetti, GN Geller, 2012, "**Environmental model access and interoperability: The GEO Model Web initiative"**, Environmental Modelling & Software, Volume 39, January 2013, Pages 214-228.*
- *L. Vaccari, M. Craglia, C. Fugazza, S. Nativi, and M. Santoro, "**Integrative Research: The EuroGEOSS Experience**", IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, vol. 5, no. 6, pp. 1603–1611, Dec. 2012.*
-

**A list of up to 5 relevant previous projects or activities,** .

- *FP7 **EUROGEOSS** (European approach to GEOSS; GA n. 226487; www.eurogeoss.eu; leader of the WP "Multidisciplinary Infrastrcucture Interoperability".*
- *FP7 **GEOWOW** (GEOSS interoperability for Weather, Ocean and Water; GA n. 282915; www.geowow.eu ; leader of the WP "Multidisciplinary Infrastrcucture Interoperability".*
- *FP7 **EARTHSERVER** (European Scalable Earth Science Service Environment ; GA n. 283610; www.earthserver.eu; Activity and WP leader.*

- *H2020* ***ERA-Planet*** *(The European Network for Observing our Changing Planet); GA n, 689443; www.iia.cnr.it/eraplanet/; Coordinator*
- *CIP-PSP* ***ENERGIC-OD*** *(European NEtwork for Redistributing Geospatial Information to user Communities - Open Data; GA n. 620400; http://www.energic-od.eu ); Coordinator.*
-

**A description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work;**

- **GEO DAB infrastructure**: a cloud-based infrastructure serving GEOSS to discover, access, and use more than 200 million multidisciplinary datasets provided by more than 150 heterogeneous Infrastructures. It consists of: 32 large virtual machines, 12 load balance services, 4 autoscaling groups, 1 Hadoop cluster, a monitoring service and a dynamic routing service.

***"No third parties involved"***

### 4.4 04- Universitat Autònoma de Barcelona (UAB)

**Description of Organisation**

The **Universitat Autònoma de Barcelona** (UAB) **is one of the major public universities of Spain**. Currently, the University offers 81 undergraduate courses, covering a wide range of fields such as humanities and arts, social sciences, health sciences, technology and physical sciences. Furthermore, the UAB offers 143 Master's degrees, as well as 8 Erasmus Mundus Master's degrees. The University has over 44,000 students, almost 3,600 researchers and teaching staff, and it hosts more than 8,000 foreign students.
The UAB is the best university in Spain according to the Times Higher Education World University Rankings 2015-2016, and is in 146th position worldwide. QS top 50 under 50 Ranking (QS 50u50 2014) , which includes universities founded less than 50 years ago, the UAB ranks 10th in the world ranking, 2nd at European level, and is the first-ranked Spanish university. In 2009, the UAB was awarded with the label of Campus of International Excellence (only 5 Spanish universities received that recognition).

The University is a breeding ground for quality researchers and a centre for the dissemination of knowledge and technologies, and it plays a leading role in scientific research. Its main areas of investigation include Biotechnology and Biomedicine, Animal Health, Food Technology and Safety, Environmental Sciences and Technology, Nanotechnology, Microelectronics, Material Science and Engineering, Computer Vision, Artificial Intelligence, Experimental Sciences, Social Sciences, and research in Humanities. This wide range of disciplines integrated into a single area help to promote multi-disciplinarity in research.
Regarding the UAB's research activity, the following data stands out: 3,102 articles published (2013 Thompson Reuters WOK); 427 research agreements; 78 research national projects (2013); 62 patents claimed (2013) and 62 spin-off companies (2012). The UAB was beneficiary in 168 projects of the 7FP, acting as the coordinator for 22 of them and received more than 44 million Euros of funding. UAB hosted 9 excellent projects funded by the European Research Council (ERC Starting, Consolidator, Advanced and PoC Grants). Regarding the Marie Curie Action, UAB was the first Spanish university in number of projects and hosted 49 Marie Curie fellows. Finally, the UAB also participates in more than 114 European research projects outside the 7FP (DG EAC projects, LIFE, CORES, ESF, NATO etc).
UAB is already beneficiary of 25 projects funded under H2020.

The High Performance Computing Applications for Science and Engineering (HPCA4SE – http://grupsderecerca.uab.cat/hpca4se/) research group has been investigating on the application of High Performance Computing to different fields of science and engineering for more than 20 years. Environmental modelling and simulation has been one of the interest areas of the group, and forest fire propagation simulation and climate modelling the main applications of the group in this area.

In the context of this proposal, UAB is the WP leader of WP3 and jointly with JRC will investigate the use of the EuroGEOSS data hub to the Forest Fire use case and will develop the services required for this pilot. These services will be based on the results of WP2 and, for that reason, UAB will also participate in tasks 3.3 and 4.6 of WP2. Finally, UAB will participate in the WP1, which is in charge of the management and coordination taks and in WP8 which is devoted to Benefit Assessment and Sustainability.

**Profiles of staff members:**
**Ana Cortés** [F] is associate professor of the Computer Architecture and Operating Systems Department at the UAB. Her expertise concerns high performance computing and environmental applications development focusing in parallel programming optimization. She also has a large experience on applying dynamic data-driven strategies to calibrate environmental systems such as weather forecast models and forest fire spread forecast models and she has organized several workshops on this topic. She participated in European project Forest Fire Spread Prevention and Mitigation (SPREAD EVG1-CT-2001-00043). She is the author of more than 20 papers in referred journals on parallel computing and computational science and she is involved in the programme committee of

several HPC conferences.

**Tomàs Margalef** [M] is full professor at the Computer Architecture and Operating Systems Dept. of the UAB where is leading the HPCA4SE research group. His expertise concerns high performance computing, environmental applications development, and performance analysis and tuning. He has a wide experience in participation in European projects such as FOREMMS (IST-1999-11228), SPREAD (EVG1-CT-2001-00043) and AUTOTUNE (FP-7288038-AUTOTUNE). He is involved in many conferences on High Performance Computing.

**Relevant publications**

- Gemma Sanjuan, Carles Brun, **Tomàs Margalef, Ana Cortés**. *Determining Map Partitioning to Minimize Windfield Uncertainty in Forest Fire Propagation Prediction*, Journal of Computational Science (in press), 2016, DOI: 10.1016/j.jocs.2016.01.006
- Tomàs Artés, Andrés Cencerrado, **Ana Cortés, Tomàs Margalef**, *Real-time Genetic Espatial Optimization to Improve Forest Fire Spread Forecasting in High Performance Computing Environments,* International Journal of Geographical Inforamtion Science, 30, 594-611, 2016. DOI: 10.1018/13658816.2015.1085052.
- Tomàs Artés, Andrés Cencerrador, **Ana Cortés, Tomàs Margalef**, *Enhancing Computational Efficiency on Forest Fire Forecasting by Time-Aware Genetic Algorithms*, Journal of Supercomputing, 71, 1869-1881, 2015. DOI: 10.1007/s11227-014-1365-9.
- Carlos Brun, **Tomàs Margalef**, **Ana Cortés**, Anna Sikora. *Enhancing multi-model forest fire spread prediction by exploiting multi-core parallelism,* Journal of Supercomputing, 70, 721-732, 2014. DOI: 10.1007/s11227-014-1168-z.
- Andrés Cencerrado, **Ana Cortés**, **Tomàs Margalef**. *Response time assessment in forest fire spread simulation: An integrated methodology for efficient exploitation of available prediction time.* Environmental Modelling and Software, 54, 153-164. 2014. DOI:10.1016/j.envsoft.2014.01.008.

**Relevant previous project**

- **Project 1: Ministerio de Economía y Competitividad (Spain), "Computational thinking and performance engineering for life sciences and environmental applications" (TIN2014-53234-C2-1-R),** IP: Ana Cortés and Tomàs Margalef. This Project is oriented to apply HPC to environmental and life science applications.
- **Project 2: Ministerio de Ciencia e Innovación (Spain), "Ejecución eficiente de aplicaciones Multidisciplinares: Nuevos Desafíos en la Era Multi/Many core" (TIN2011-28689-C02-01)**, IP:Tomàs Margalef. This Project is oriented to redesign the scientific multidisciplinary challenges o better exploit multi/many core systems.
- **Project 3: Ministerio Ciencia e Innovación (Spain), "Consolider Supercomputacion y e-Ciencia (Syec)" (CSD 2007-0050).** This project has been coordinated by Barcelona Supercomputing Centre and its main objective is to design a roadmap to enhance Science through supercomputation with the aim of achieving a more efficient use future supercomputers.
- **Project 4: EU FP7 Project "Automatic Online Tuning" (FP7-288038-AUTOTUNE).** The main objective of this project is to develop an automatic online performance analysis tool (Periscope) including energy efficiency tuning for parallel programming that will increase multi-core programming efficiency by orders of magnitude.
- **Project 5: European Comission "Forest Fire Spread Prevention and Mitigation" (SPREAD EVG1-CT-2001-00043)**. This project was a large European project with 27 partners that tackled forest fire hazards from different perspectives (prevention, mitigation, management, post-fire recovery).

**Relevant infrastructure to the proposed work**

The HPCA4SE group has the following infrastructure:

- Two nodes each one with 4 AMD Opteron 6376 processors (16 cores) and 128GB (DDR3) memory. Each system is composed of 64 cores.
- One server with 2 Intel Xeon processors E5-2650 with 8 cores and 256GB (DDR3) memory, which also includes one Nvidia K20c Kepler and one Nvidia Tesla M2090.
- One server with one Intel Xeon processor E5-2430 with 6 cores and 32GB (DDR3) memory.
- One server with 4 Intel(R) Xeon(R) processors E5-4620 with 8 cores and 128GB (DDR3) memory (total

number of cores 32).

- One server with a Intel Xeon processor E5-2630 with 6 cores and 64GB (DDR3) memory, which includes one Intel® Xeon Phi™ Coprocessor 5110P and a Nvidia GTX Titan.

***"No third parties involved"***

### 4.5 05 – Collecte Localisation Satellites (CLS)

**Description of Organisation**

**Collecte Localisation Satellites (CLS)** is a French Société Anonyme created in 1986 and an international group of 600 staff distributed between the HQ and the almost 20 offices and subsidiaries around the world. CLS is a subsidiary of the French Space Agency CNES.
CLS' core activities are focused on satellite-based services for governmental and commercial operators. CLS is the operator of the ARGOS system. A large part of CLS activities is related to the maritime domain: Sustainable management of marine resources (incl. control of fisheries), Environmental monitoring (oceanography, wildlife tracking), Maritime security.
The EURO GEOSS hub project will be performed within the Space Oceanography Division of CLS, recognized as a major actor in space altimetry (from data processing to applications). Within this division, a large number of metoceanhydro dissemination platforms are designed, developed and operated by CLS. Thus AVISO+, Copernicus Marine Environment Monitoring Service, Copernicus Global Land Service, INDESO are ones of the major references of CLS.

**Profiles of staff members:**

**Sophie BESNARD (F)** Since 2014 Team Manager for the Product Dissemination Department in the CLS Space Oceanography Division, in charge of the CMEMS CIS and 3 of the 24 Dissemination Units, AVISO+ and Copernicus Global Land Service for the product dissemination activities and the service desk. Dissemination platform for CLS private markert are also operated.CLS Engineer System manager for INDESO (2012-2014). Pilot of the project management process for CLS (ISO 9001certification). ENSTA Engineer (Paris 15ème)

**Estelle OBLIGIS(F)** Deputy Director of the Space Oceanographye Divisionreceived the Ph.D. degree in physical methods in remote sensing from the Université of Paris 7, Paris, France, 1996. She joined Collecte Localisation Satellites, Ramonville Saint-Agne, France, in 1998, for activities related to microwave radiometry for Envisat, SMOS, AltiKa and Jason missions, with a focus on calibration/validation, retrieval algorithms, and long-term survey of the radiometers. She is now Deputy Director of the Space Oceanogrpahy Division at CLS and she is still implied in different projects at CLS related to ground segment, with a focus on the Copernicus program.

**Bruno COULON (M)** Technical Director at CLS, he joined CLS in 1998 as project manager. During his careers at CLS, he managed several projects to deliver systems mainly dedicated to EO payload processing, satellite data collection system, maritime security and safety. In parallel he was in charge of the Product and SW development department in the technical division. Prior joining CLS, Bruno worked at Eumetsat, MATRA (now called Airbus Defense en Space) and the French Atomic Agency. Bruno holds a PhD in Physics (University of Grenoble; F) and a MBA (Open University; UK)

**Franck MERCIER (M)** Geophysicist (1994) and Ph.D. in Hydrology from Space (2001). He has 15 years of experience in the exploitation and valorisation of satellite radar altimetry data for purposes other than the open ocean: continental hydrology (lakes, rivers, wetlands), coastal ocean zones, emerged lands, sea ice, ice sheets and icebergs detection. He holds a specific expertise in the analysis of radar altimeter echoes over heterogeneous surfaces for the retrieval of accurate surface heights. He was responsible at CLS of the CASH Project and Project Leader of PISTACH (Innovative Prototype of Treatment System for Coastal Altimetry and Hydrology).

**A list of up to 5 relevant publications, and/or products, ;**

**CMEMS CIS service** (http://marine.copernicus.eu/) CLS is leading, since 2009, the MyOcean Central Information System (CIS) in charge of all interfaces with users: users management, web communication, web-access to services, management and use of all (WP CIS). The service desk manages the help desk but also all the service transition and changes management.

**ESA CCI products** (http://www.esa-sealevel-cci.org/). CLS is leading, since 2010, the Sea Level Essentiel climate Variable (ECV) project of the Climate Change Initiative (CCI) from ESA. CLS 's main responsabilities are: project management including users management, outreach and communication, responsibility of the Sea Level ECV production as well as the management of the algorithm development team (R&D activity).

**AVISO+ Service** (http://www.aviso.altimetry.fr/en/home.html) Archiving, Validation and Interpretation of Satellite Oceanographic data has been set up in 1992 to process, archive and distribute data from the NASA/CNES ocean altimetry satellite Topex/Poseidon (T/P). Today Aviso+ is the webportal reference to access to the altimetry data.

**CASH Project** The core of this project, funded by the French Ministry of Research, consisted in a global re-processing of the Topex/Poseidon measurements (1992-2005) that was dedicated to the constitution of an hydrology-oriented altimetric data set.

**PISTACH Project** Innovative Prototype of Treatment System for Coastal Altimetry and Hydrology, in collaboration with CNES, CNRS, IRD and IRSTEA. Funded by CNES as part of Jason-2 project to improve satellite radar altimetry products over coastal areas and continental waters, PISTACH mainly consisted in the development of new state-of-the-art dedicated processing algorithms.

**A list of up to 5 relevant previous projects or activities,** .

**CMEMS & MyOcean** CLS has been strongly involved in the definition of the current MyOcean objectives, methods and organization to answer Marine Copernicus Service (MCS today CMEMS) and taking into account, especially, EU policy and Institutional context. CLS was the second partner of the MyOcean consortium during 6 years acting as the technical director of the project.

CLS is leader of MCS Engineering tasks since 2009. It consists in defining and maintaining the SW and HW architecture of all the production units, developing the gateways for automatic ordering, cataloguing and dissemination of data across the MCS including the production of all KPIS for service evaluation. CLS has been in charge to define all applicable standards, interfaces and processes for the MCS with all production units and repositories.

**ARGOS** CLS is the designated agent of CNES to operate the ARGOS system ground segment and to promote the use of it. Those Argos basic services are provided at cost to the users under the oversight of the Argos Operation Committee (CNES, NOAA, EUMETSAT).

**INDESO** CLS is in charge of the implementation and operation of an infrastructure for operational oceanographic system in Indonesia including models, ocean forecasts, fish stock forecast, optical and radar imagery.The complete project is called INDESO for *Infrastructure Development of Space Oceanography*. INDESO addresses the needs of the Balitbang KP for a complete new oceanographic centre in Perancak, Bali, from the building to the computer systems, the satellite antenna, and the transfer of expertise to the Indonesian experts. The main goals of the INDESO project is to preserve the long term sustainability of fisheries and ecosystems in Indonesia,

**EO4WILDFIFE** EO4wildlife main objective is to gather and convince thousands of biologists, ecologists, scientists and ornithologists around the world to use more and better European Sentinel Copernicus Earth Observation data. To reach this objective a service platform and its toolbox will be designed and developed, offering high level services that can largely be used by all of them whatever their research field, skills and objectives. The front end will be easy-to-use and will offer dedicated services that would stimulate their interest for Sentinel Earth Observation data.

**A description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work;**

***CLS Facilities :*** CLS is a 24/7 worldwide operations centre. For 30 years now, CLS has been successfully operating complex applications in its datacentres. At the moment the company is handling 50 applications and 250 services. Some of these, such as the ARGOS, LRIT, NOVACOM and IRIDIUM applications, require continuous, round-the-clock operation. Other applications more scientific are operated for spatial agencies on hours worked basis. CLS is staffed 24/7/365 by certified operators, systems & network administrators and application engineers. To ensure that CLS Data Center site has the highest levels of security, redundancy, reliability and infrastructure necessary to host all these applications, it is important to make sure that the site has experienced personnel.

***"No third parties involved"***

### 4.6 06 – The Centre for Ecological Research and Forestry Applications (CREAF)

**Description of Organisation**

The Centre for Ecological Research and Forestry Applications (CREAF) (www.creaf.cat) is a public research institution created in 1987 and located near Barcelona. CREAF's main objective is to generate knowledge and create new methodological tools in the fields of environmental sciences and ecology. CREAF's activities include research on the function and diversity of natural ecosystems and their response to disturbances; environmental problems that may severely affect the function of ecosystems, such as changes in soil use or atmosphere and climate changes; and the development of conceptual and methodological tools to assist in decision-making and facilitate sustainable management. The research carried out by CREAF can be grouped into 4 main areas: Biodiversity, Functional Ecology and Global Change, Forest Ecology and Wildfires, and Environmental and Territorial Analysis and GIS. In the last area, the Grumets group is conducting research in big data, web mapping, remote sensing time series, and geospatial standards and is maintaining the RS & GIS MiraMon software.
Its profile matches the tasks in the proposal for their experience in bid data processing, data quality, geospatial standards, user feedback and map visualization tools for assessing and monitoring regional and global processes affecting natural systems. This includes the set up of long term research monitoring (LTRM) networks for monitoring changes in natural systems; the application of remote sensing methods on land use and cover mapping; and, knowledge extraction, and desktop and web base big data tools (www.miramon.cat). CREAF and the European Commission co-organized the GEOSS European Project Workshop 7 in Barcelona. CREAF is part of the consortium for an ERA-Planet in the H2020 SC5 2015

**Profiles of staff members:**

**Dr Joan Masó**. PhD in Geography, MSc in Physics, and a MSc in Electronic Engineering all in the UAB. Since 1995 he is a researcher at CREAF and GIS developer. Teacher in a RS and GIS master in the UAB. Creator of Remote Sensing imagery visualization and download web data portals. Expert in JPEG2000 format. Involvement with professional/scientific bodies: He is an active member of the TC of the Open Geospatial Consortium (OGC) since 2003 (editor OGC 07-057r7 WMTS, OGC 13-082r2 simple profile, OGC 12-108 GMLCOV for JPEG2000 and 08-085r2 GMLJP2 v2 standards), in OGC Testbeds, and chair of the Iberian and Latin American Forum and member of the OAB for 1 year. Editor of ISO19165 Data and Metadata preservation standard candidate. He has coordinated the GeoViQua FP7 project (Visualization of quality information in GEOSS) and is coordinating H2020 ConnectinGEO and H2020 WaterInnEU and participated in H2020 ECOPotential and the H2020 ERAPlanet. Earth and Space Science Informatics division president in the European Geosciences Union. Member of the GEO Program Board, GEO Standards and Interoperability Forum, and GD-06 in-situ coordination GEO Tasks. GEO Spain users forum Chair.

**Ivette Serral**. BSc in Environmental Sciences and MSc in GIS for the UAB, with more than ten years of experience in GIS and imagery research and European and national related projects management. At CREAF she is related to geospatial data standards projects, to MiraMon GIS software applications and development.

**Núria Julià** is BSc in Biology for the UAB, BSc in Computer Sciences for the UPC and MSc in Remote Sensing and GIS for the UAB. Since 2003 she is a GIS developer and researcher at CREAF. She is member of the Grumets research group).The main objective of its research is the geospatial data standards, web services and the collaborative portals. She is related to geospatial data standards projects such FP7 GeoViQua. She is an editor of OGC 07-057r7 Web Map Tile Service Developer of the MiraMon GIS&RS and the OGC Web Map Service, Web Map Tile Service, Web Feature Service and Web Coverage Service server and client. She has experience in C, JAVA, HTML and JavaScript. She has a large experience and knowledge in several types of databases and geo-databases. Developer of the CaMM MiraMon: a metadata catalogue and search engine based. Key role on the project: ConnectinGEO Observations Inventory design and analysis.

**A list of up to 5 relevant publications, and/or products, ;**

- Blower J.D., Masó J., Díaz D., Roberts C.J., Griffiths G.H., Lewis J.P., Yang X. and Pons X (2015)

Communicating Thematic Data Quality with Web Map Services, ISPRS International Journal of Geo-Informatics 4(4) pp1965-1981DOI: 10.3390/ijgi4041965
- Yang X , Blower J D, Bastin L, Lush V, Zabala A, Masó J, Cornford D, Daz P, Lumsden J (2013) An Integrated View of Data Quality in Earth Observation. Philosophical Transactions of the Royal Society A 371: 20120072. DOI: 10.1098/rsta.2012.0072.
- Masó J, Pons X, Zabala A (2011) Tuning the second-generation SDI: theoretical aspects and real use cases. International Journal of Geographical Information Science. DOI: 10.1080/13658816.2011.620570
- Zabala A, A. Riverola, I. Serral, P. Daz, V. Lush, J. Masó, X. Pons, T. Habermann (2013) Rubric-Q: Adding Quality-related Elements to the GEOSS Clearinghouse Datasets. IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing 6 (3): 1676-1687. DOI: 10.1109/JSTARS.2013.2259580
- Masó J, Pomakis K, Juli N (2010) OpenGIS Web Map Tile Service Implementation Standard, v. 1.0.0 Open Geospatial Consortium Inc. Document reference number 07-057r7, http://www.opengeospatial.org/standards/wmts.

**A list of up to 5 relevant previous projects or activities,** .

Coordinating an Observation Network of Networks EnCompassing saTellite and IN-situ to fill the Gaps in European Observations (ConnectinGEO), European Commission, H2020-SC5-2014-641538. Centre for Ecological Research and Forestry Applications (CREAF), Consiglio Nazionale Delle Ricerche (CNR), Tiwah Ug (Haftungsbeschraenkt), 52°North Initiative For Geospatial Open Source Software Gmbh (52N), Internationales Institut Fuer Angewandte Systemanalyse (IIASA), Centro Euro-Mediterraneo Sui Cambiamenti Climatici Scarl (CMCC), Science And Technology B.V. (S&T Corp), Agencia Estatal Consejo Superior De Investigaciones Cientificas (CSIC), Institut d'Aeronomie Spatiale De Belgique (BIRA-IASB), Association Pour La Recherche Et Le Developpement Des Methodes Et Processus Industriels (Armines), Norsk Institutt For Luftforskning (NILU), The University Of Exeter (UNIEXE), IEEE France Section, Institut Mines-Telecom (IMT), European Association of Remote Sensing Companies (EARSC). 999 995 EUR

Applying European market leadership to river basin networks and spreading of innovation on water ICT models, tools and data (WaterInnEU), European Commission, H2020-SC5-2014- 641821. Centre for Ecological Research and Forestry Applications (CREAF), Technische Universiteit Delft (Tu Delft), 52°North Initiative For Geospatial Open Source Software Gmbh (52°North), Randbee Srl, Adelphi Research Ggmbh (Adelphi), Antea Belgium (Antea Group), Global Water Partnership Central And Eastern Europe (GWP Central And Eastern Europe), Orion Innovations (Uk) Ltd. 914991 EUR

Improving future ecosystem benefits through Earth Observations. A Remote sensing and in-situ data ecosystems services quantification for selectected protected areas (ECOPotential), European Commission, H2020-SC5-2014-641762, Consiglio Nazionale delle Ricerche, Participants: Consiglio Nazionale delle Ricerche (IT), and 46 more partenrs including CREAF (ES) and UAB (ES), 15 993 931 EUR

QUAlity aware VIsualisation for the Global Earth Observation system of systems (GeoViQua), European Comission. 7th Framework. Coordinator: CREAF Participants: CREAF (Spain), UAB (Spain), 52° North GmbH (Germany), Fraunhofer IGD (Germany), CNR – IIA (Italy), Aston University (UK), University of Reading (UK), CEA - LSCE (France), ESA (France), S[&]t Corporation (The Netherlands), OGCE FP7-ENV-2010-1 265178 3 266 804.00 EUR

Environmental knowledge discovery of human sensed data (GroundTruth 2.0), European Commission, H2020-SC5-2014-689744-2. Coordination Stichting IHE Delft (NL), Participants Hydrologic Research Bv (NL), Stichting Akvo (NL) Tygron Serious Gaming Bv (NL) Vlaamse Instelling Voor Technologisch Onderzoek N.V. (BE), Starlab Barcelona SL (ES), Altran Innovacion SL (ES), Centro De Investigacion Ecologica Y Aplicaciones Forestales (ES), Stockholms Universitet (SE), Gavagai Ab (SE), Conservation Education And Research Trust (UK), Trans-African Hydro-Meteorological Observatory (KE), Upande Limited (KE), World Wide Fund For Nature Zambia Country Office (ZM)

**A description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work;**

High-capacity repository and processing server clusters to store and distribute the data generated, highspeed Internet connection (CREAF is connected to RedIRIS, the academic and research Spanish network that provides advanced communication facilities), printers, colour A0 plotter, A0 scanner, etc.
MiraMon Geographical Information System software for imagery publication and distributed processing.
All necessary equipment for the coordination task: teleconference facilities, wiki collaborative site, website, and meeting and training rooms.

***"No third parties involved"***

### 4.7 07 – European Association of Remote Sensing Companies (EARSC)

**Description of Organisation**

EARSC, the European Association of Remote Sensing **Companies** is a **membership**-based, not for profit European **organization** which coordinates and promotes activities of European companies engaged in delivering EO geo-information services. EARSC's key goal is to help promote the industry and to help develop the market for EO services. EARSC is representing the European providers of geo-information services in its broadest sense creating a network between industry, decision makers and users and covering the full EO value chain from data acquisition through processing, fusion, analysis to final geo-information products & services.

EARSC currently has around 80 members and the network contains all the leading European suppliers of EO data and value-added products as well as many small and micro-enterprises. Formed in 1989, EARSC provides its members with information on current and prospective European programs, legislative actions as well as the news on the market for EO services, maintains facts about the industry (industry survey 2013 and 2015), offers help for companies wishing to become ISO certified and promotes the industry to potential customer communities (ie the oil and gas sector) and to public stakeholders.

We undertake studies into the market and the impact of EO geo-information services. As well as the Comprehensive industry survey published every 2 years, we have conducted a study into the benefits of making Copernicus Sentinel data available on a free and open basis; "GMES and Data: Geese and Golden Eggs" can be downloaded from our web-site and there are links to the video presentation of the results. More recently we have published 2 reports on the economic value of EO data the first looking at Winter Navigation in the Baltic and the second on Forest Management in Sweden.

Very recently, we published a position paper on “Creating a Marketplace for EO Services” in which we state that industry will come together to create a Marketplace Alliance which will oversee many different marketplaces. One role will be to provide knowledge of the software components which can be used by companies to put together a new marketplace or to improve what they can offer. The EuroGEOSS-hub will provide research results with a direct impact to help companies develop marketplaces aimed at different business models. The architecture and understanding generated under the EuroGEOSS-hub project can feed directly into the commercial marketplaces. The project will also enable industry to access data coming from GEOSS as well as offering their products to the GEO stakeholders in more than 100 countries. EARSC is currently applying to become a participating partner to GEO.

For this project, EARSC will draw upon its members as linked 3$^{rd}$ parties to undertake specific tasks. The requirements of commercial marketplaces will be defined and components offered by companies ie processing algorithms, visualization packages, complementary products, brokering software etc. will be introduced into the hub. In this respect, EARSC offers access to the skills and knowledge of nearly 80 companies which can contribute on a request from the team. Some possible contributions are listed in Section 4.2.

**Profiles of staff members:**

**Geoff Sawyer, (M) -**EARSC Secretary General, Senior management positions in the space industry as well as numerous representative positions in the UK and Europe including 3 years as the chairman of EARSC (from 1991 to 1995) and as a member of several EU consultative bodies such as Spassec (for space and security) and the SecAG (Security Advisory Group). 3 years working experience for the European Commission, responsible for supporting space policy and in particular the creation of the GMES initiative. Very well known to many in the space and earth observation sectors and brings this deep wealth of experience and knowledge to support the

ambitions of the geo-information industry that EARSC represents.

**Mónica Miguel-Lago,(F)** EARSC Executive Secretary, Oceanographer, proven ability and experience of conducting International Programmes, working in Earth Observation closely with different stakeholders from most highly regarded technological related firms and institutions, as research centres, ESA, EU, or UN departments. Her background as a scientist coupled with her personal know-how on outreach projects or organizational events has equipped her with a multitude of skills for a professional development at European Framework and specially on promoting awareness on the capabilities and limitations of Earth Observation.

**Ariane Dubost,(F)**, EARSC Projects Officer. Projects officer based in Brussels.Background in communications within the space sector having previously worked in ESA communications department and in Beijing at the International Space Science Institute.
**Emmanuel Mondon, (M) -** EARSC Consultant. Technical consultant on EO systems and services

**A list of up to 5 relevant publications, and/or products, ;**

- Creating a European Marketplace for EO Services. EARSC Position paper published February 2016.
- Copernicus Economic Value Case 1: Winter Navigation in the Baltic. Published September 2015
- GMES and Data: Geese and Golden Eggs. The case for free and open Sentinel data. Published September 2013.
- Industry Survey 2015. The State and Health of the EO Services Industry. Published September 2015
- EARSC 2014 Annual Report: Published June 2015.

**A list of up to 5 relevant previous projects or activities,** .

- eoPages: www.eopages.eu. A brokerage site to promote the activities of the European industry and provide means for clients to find suppliers.
- EO4OG Portal www.eo4og.eu Dedicated portal for the oil&gas sector with a full analysis of the needs of the sector together with EO products which can meet those needs.
- EARSC Portal www.earsc-portal.eu Comprehensive guide to EO applications and information relevant to the sector.
- Eomag: quarterly information bulletin distributed to over 3000 stakeholders around the world.
- GEO. Participation to H2020 projects ConnectinGEO, ENEON and GEO-CRADLE aimed at developing networks of European partners and promoting European capabilities to GEO stakeholders.

***EARSC has linked third parties, see section 4.2 for descriptions***

### 4.8 08 - Université de Genève – (UNIGE)

**Description of Organisation**

**The University of Geneva** (www.unige.ch/envirospace) was founded in 1559 and is a world-class university, made up of 9 faculties and one of the 20 members of the League of European Research Universities. **The Institute for Environmental Sciences (ISE)** is an inter-faculty entity of the University of Geneva created formally in March 2009. The Institute's main objectives are to undertake research and teaching activities in the numerous inter-connected domains of the environment, such as climate, water, biodiversity, health, energy, urban ecology and environmental governance. Within ISE, **the enviroSPACE laboratory of Prof. Anthony Lehmann (Spatial Predictions and Analyses in Complex Environments)** aims at promoting interdisciplinary research based on spatially explicit information and indicators on the present and future state of the environment. Thanks to an Institutional partnership between University of Geneva, the Swiss Federal Office for the Environment (FOEN) and **the United Nations Environment Program (UNEP)/Global Resource Information Database (GRID-Geneva)**, a close collaboration exists between enviroSPACE and GRID-Geneva. Both teams are sharing infrastructure resources, staff, and are participating in common projects.

**Profiles of staff members:**

***The project will essentially be implemented by:***

- **Prof. Anthony Lehmann (M)** has a PhD in Ecology, and was coordinator of the FP7 enviroGRDS project. He will lead WP7 and participate in different tasks.
- **Dr Nicolas Ray (M)** has a PhD in Biology and was manager of the enviroGRIDS and coordinator of the EOPOWER FP7 projects. He will work on different tasks of WP7 and create the liaison with the UNEP/GRID team.
- **Dr Grégory Giuliani (M)** is a geologist with a PhD in Spatial Data Infrastructure for the Environment. He is leading the Capacity building task of GEO. He will work on different tasks of WP7.
- **Dr Pierre Lacroix (M)** has a background in Earth Sciences and a PhD in Environmental Sciences. He has more than 12 years of experience in GIS and Spatial Database management. will work on the different tasks of WP7.
- **Martin Lacayo (M)** is a PhD candidate at UNIGE with a strong capacity on geosptial programming. He will work on task 7.7 to develop the EU-SDGs dashboard.

***Key expertise***

The UNIGE/GRID team is specialized in performing spatially-explicit modeling, by handling and analyzing spatial and statistical data on environmental and natural resource issues through Geographic Information Systems (GIS) and remotely-sensed imagery. The team also specialized in downscaling and upscaling of environmental data and indicators, and in developing geocomputation workflows with distributed computing infrastructures linked to spatial data infrastructures, using international (meta)data standards (e.g., ISO, OGC) and initiatives (e.g., GEOSS, INSPIRE). Capacity building on Spatial Data Infrastructures (SDI) and GEOSS-related issues is also a key asset of the team. Thematic domains of expertise include:

- Species distribution modeling: statistical models and GIS
- Natural habitat mapping: Remote sensing, GIS, statistics and expert knowledge
- Ecosystem services: spatially-explicit assessment of ES
- Hydrological modeling: process based models of hydrology
- Climatic scenarios: downscaling of regional climatic models
- Land use change modeling: spatially explicit models of land use change

**A list of up to 5 relevant publications, and/or products, ;**


- Lehmann A., Giuliani G., Mancuso E., Abbaspour K.C., Sozen S., Gorgan D., Beel A., Ray N., Filling the gap between Earth observation and policy making in the Black Sea catchment with enviroGRIDS. ***Environmental Science and Policy, 2014, in press.***

- Lehmann A., Giuliani G., Ray N., Rahman K., Abbaspour K.C., Nativi S., Craglia M., Cripe D., Quevauviller P., Beniston M., Reviewing innovative Earth Observation solutions for filling science-policy gaps in hydrology. *Submitted to* ***Journal of Hydrology.***
- Special issues from the enviroGRIDS project for:
  - International Journal of Advanced Computer Science and Applications (IJACSA)
  - Environmental Science and Policy (ESP)
- Giuliani, G., Lacroix, P. M. A., Guigoz, Y., Bigagli, L., Ray, N., & Lehmann, A. (2014). Bringing GEOSS services into practice (workshop, training material and book). Available at: http://www.geossintopractice.org

**A list of up to 5 relevant previous projects or activities,** .

1) **Coordination by A. Lehmann of the EC-FP7 enviroGRIDS project** (www.envirogrids.net), 30 partners, from April 2009 to March 2013. It aims at building capacities for a Black Sea Catchment Observation and Assessment System supporting Sustainable Development, to develop a grid-enabled Spatial Data Infrastructure, and to build capacities around GEOSS and INSPIRE.

2) **Work package leader by A. Lehmann in the EC-FP7 ACQWA project** (www.acqwa.ch) on the impacts of climate change in mountainous regions.

3) Coordination by N. Ray of the EU/FP7 EOPOWER project (http://www.eopower.eu), 13 partners from June 2013 to May 2015. The purpose of the EOPOWER project is to create conditions for sustainable economic development through the increased use of Earth observation products and services for environmental applications

4) Partner in EU/FP7 IASON (http://iason-fp7.eu), 14 partners from June 2013 to May 2015. The project has the ultimate goal to establish a permanent and sustainable Network of Earth Observation scientific and non-scientific institutions, stakeholders and private sector enterprises belonging in the EU and third countries located in two significant areas: The Mediterranean and the Black Sea regions.

5). **Partner in EC-FP7 PEGASO** (www.pegasoproject.eu) project on Integrated Coastal Zone Management of the Black Sea and the Mediterranean Sea.

**A description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work;**

***Significant infrastructures***

SDI infrastructures

- GeoServer and GeoNetwork
- ArcGIS server
- UNEP GRID data broker: http://broker.grid.unep.ch:8080/gi-cat/gi-portal/
- Privileged access to UNEP-Live platform (as contributors to its development and member of UNEP)

Distributed computing infrastructures:

- Access to the UNIGE Baobab cluster (944 cores) for scientific geoprocessing.

***"No third parties involved"***

### 4.9 09 – University of Glasgow-Urban Big Data Center (UBDC)

**Description of Organisation**

Founded in 1451, the University of Glasgow (UGLA) is the fourth oldest university in the UK and is a member of the elite Russell Group of leading UK research universities , having produced seven Nobel laureates and includes among its alumni, some of the world's most renowned innovators, from scientist Lord Kelvin, economist Adam Smith, to the pioneer of television John Logie Baird. It is ranked 62nd in the world (QS World University Rankings 2015) and 12th in the UK. The UK Economic and Social Research Council funded Urban Big Data Centre (UBDC) through a highly competitive funding process. Unique consortium of 7 leading universities led by Glasgow, UBDC provides a research-led national data service which supports data owners, policymakers, researchers and citizens in extracting useful information from multiple urban-related datasets and novel solutions for analytics and knowledge discovery. It enables stakeholders from academia, business and government to harness the potential of big data and focuses primarily on the methods and technologies to manage, link and analyse large amounts of heterogeneous and complex urban data.

**Profiles of staff members:**

- **Prof. Piyushimita (Vonu) Thakuriah** (F) is the Director and PI of the Urban Big Data Centre, Ch2M/Halcrow Chair of Transport, and Professor of Urban Studies and the Schoold of Engineering in UGLA. Her research is on smart, socially-just and sustainable transport systems and the emerging area of Big Data and Urban Informatics. Prior to her current appointment, she was Professor and Director of the Urban Transportation Center in the University of Illinois at Chicago, USA. To date, she has authored over 170 pieces of scientific work and has been involved in over $70 million of grant funds (PI of over $24 million), with funding from leading scientific sponsors in the UK, US and Europe. Prof. Thakuriah has consulted with multiple governments around the world on projects of national and international significance and has played an internationally leading role in the area of Urban Informatics.
- **Dr Jinhyun Hong** (M) is a Lecturer in Transportation Planning at the University of Glasgow and is a co-investigator of the UBDC. He has a PhD in Urban Design and Planning and has been involved in a number of research projects related to travel behaviour, transportation emissions, active travel and sustainable urban form.
- **Dr Jing Yao** (F) is a Lecturer in Urban Big Data and Quantitative Methods at the University of Glasgow and a co-investigator of the UBDC. She has a PhD in Geography and a MSc in Industrial Engineering. She has multi-disciplinary research experience in GIS, spatial data analysis and modeling, as well as their applications in public health, land use, housing, and urban and regional planning for over 10 years.
- **Rod Walpole** (M) is a Scientific Computing Officer in UBDC at the University of Glasgow. He has a background in GIS and remote sensing data analysis and application development with over 20 years commercial experience in the design and development of geospatial systems for clients including the European Space Agency, the UK Environment Agency, and Defra.

**Key expertise**

- Big Data and Urban Informatics
- Quantitative models and simulation on transport, public health and the environment
- Creating composite indicators for sustainable cities
- Geospatial technology solutions and other information management solutions

**A list of up to 5 relevant publications, and/or products, ;**

**Hong, J.** (2017) Non-linear influences of the built environment on transportation emissions: focusing on densities. Journal of Transport and Land Use, (doi:10.5198/jtlu.2015.815)

**Hong, J.**, and Chen, C. (2014) The role of the built environment on perceived safety from crime and walking: examining direct and indirect impacts. Transportation, 41(6), pp. 1171-1185.

**Hong, J.**, Shen, Q., and Zhang, L. (2014) How do built-environment factors affect travel behavior? A spatial

analysis at different geographic scales. Transportation, 41(3), pp. 419-440.

**Hong, J.,** and Goodchild, A. (2014) Land use policies and transport emissions: Modeling the impact of trip speed, vehicle characteristics and residential location. Transportation Research Part D: Transport and the Environment, 26, pp. 47-51.

**Hong, J.,** and Shen, Q. (2013) Residential density and transportation emissions: examining the connection by addressing spatial autocorrelation and self-selection. Transportation Research Part D: Transport and the Environment, 22, pp. 75-79.

**Thakuriah, P**., N. Tilahun and M. Zellner (forthcoming 2016). Big Data and Urban Informatics: Innovations and Challenges to Urban Planning and Knowledge Discovery. In *Seeing Cities through Big Data: Research, Methods and Applications in Urban Informatics*, to be published by Springer, New York. Also in Proc. of NSF-sponsored Workshop on Big Data and Urban Informatics, pp. 4-32.

**Thakuriah**, P. and G. Geers (2013). Transportation and Information: Trends in Technology and Policy. Springer, New York.

Cottrill, C. D., and P. **Thakuriah** (2015) Location privacy preferences: a survey-based analysis of consumer awareness, trade-off and decision-making. In Transportation Research Part C: Emerging Technologies, 56, pp. 132-148.

**Thakuriah**, P. and N. Tilahun (2013). Incorporating Weather Information into Real-Time Speed Estimates: Comparison of Alternative Models. In Journal of Transportation Engineering, Vol. 139, No. 4, pp. 379-389.

**Thakuriah**, P., P. Metaxatos, J. Lin and E. Jansen (2012). Factors Affecting Propensity to Use Bicycle and Pedestrian Facilities in Suburban Locations. In Transportation Research - Part D: Transport and Environment, Vol. 17, pp. 341-348.

Fotheringham, A.S., Crespo, R., and **Yao, J**. (2015) Exploring, modelling and predicting spatiotemporal variations in house prices. Annals of Regional Science, 54(2), pp. 417-436.

Fotheringham, A. S., Crespo, R., and **Yao, J**. (2015) Geographical and temporal weighted regression (GTWR). Geographical Analysis, (doi:10.1111/gean.12071)

**Yao, J.**, and Fotheringham, A. S. (2015) Local spatiotemporal modeling of house prices: a mixed model approach. Professional Geographer, (doi:10.1080/00330124.2015.1033671)

**Yao, J.**, and Murray, A. T. (2014) Locational effectiveness of clinics providing sexual and reproductive health services to women in rural Mozambique. International Regional Science Review, 37(2), pp. 172-193.

**Yao, J.**, Murray, A. T., and Agadjanian, V. (2013) A geographical perspective on access to sexual and reproductive health care for women in rural Africa. Social Science and Medicine, 96, 60 - 68.

**A list of up to 5 relevant previous projects or activities,** .

- Prof. Thakuriah is the Director and Principal Investigator on the UK Economic and Social Research Council funded Urban Big Data Centre
- Prof. Thakuriah is a co-investigator on the UK ESRC funded Scottish Administrative Data Research Centre based in University of Edinburgh.
- Prof. Thakuriah is principal investigator on the Marie-Curie Career Integration Grant “Social Transport with Urban Big Data”.

**A description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work;**

- Geoserver
- ArcGIS Server
- CKAN Open Data Portal
- UBDC Cluster (272 cores - 600TB)

***"No third parties involved"***

### 4.10 10 – CloudSigma

**Description of Organisation**

CloudSigma is a pure-cloud Infrastructure-as-a-Service (IaaS) provider that offers highly available, flexible, enterprise-class cloud servers and cloud hosting solutions. CloudSigma is operational in both Europe and the US, with plans to expand into Latin America and Asia selecting the highest-quality facilities to support its innovative infrastructure.

CloudSigma is one of the most customizable cloud providers on the market. Customers are able to provision CPU, RAM, Storage and bandwidth independently to eliminate the limitation of fixed sizes and reduce waste. Each resource is billed separately and transparently as either subscription or as pay-as-you-go 5-minute billing segments enabling customers to accurately track how much their cloud servers are costing. Any operating system and software can be installed with complete administrator/root control. All cloud servers and drives are persistent and controlled with the same methodology as physical dedicated server equivalents. VLANs and IP addresses are also controlled using standard behaviour.

CloudSigma demonstrates commitment to a federated cloud approach for the emerging EO industry through the Helix Nebula initiative, the ESA Information-as-a-Service Stimulus project, its support for ESA use-cases like the SSEP, and various other European projects. Our involvement in the EuroGEOSS-Hub project has the potential to expose further business opportunities and develop valuable partnerships.

The objectives outlined in this proposal are in-sync with CloudSigma's current development roadmap and existing activities within the EO space. We view this proposal in light of the wider aims of building a strong economy around earth observation in Europe. We intend on liaising throughout the project timeframe with companies we already collaborate with, with a view to exposing the EuroGEOSS-Hub to a wider audience.

**Profiles of staff members:**

**Peter Gray, Male**

Peter is a Project Manager working predominantly on internal research activities as well as external collaborative projects within the FP7/H2020 Framework Programmes. He studied Computer Graphic Design at the National College of Design and Technology in New Zealand, graduating in 1999. He has 10 years experience managing large scale digitization projects in the museums and archives sector. He has worked with a number of national museums and archival organisations.

**Alex Georgiev, Male, BSc**

Alex is a Project Manager and Technical Writer at CloudSigma. He is a BSc Computer Science graduate from Brunel University. Alex has exposure to a broad range of disciplines in computing including networking, database design and deployment, web and Java development and cloud architecture. Since joining CloudSigma he has attained thorough expertise in the operation and development of data centre and cloud stack infrastructure.

**Miguel Trujillo, Male. BSc**

Miguel is a Senior Developer at CloudSigma. Miguel is one of the primary developers on the CloudSigma Cloud Stack, responsible for development of the orchestration and cloud management infrastructure. Miguel is an expert Python developer, and is an active contributor within the Open Source community. Previous to CloudSigma, Miguel has over ten years commercial experience responsible for the development of large scale projects in the areas of Finance, Banking and Academia. Miguel has a BA in Computer Software Engineering from the University of Guadalajara, Mexico.

**A list of up to 5 relevant publications, and/or products, ;**


- M. Kuhnert, C. Wietfeld, O. Paterour, A. Georgiev, K. Petersen, M. Büscher, J. Pottebaum, "Next Generation, Secure Cloud-based Pan-European Information System for Enhanced Disaster Awareness," Proc. of the ISCRAM Kristiansand, May 24-27 2015.

- Full range of cloud server hosting and Big Data Archives manipulation.
- R. Jenkins, “The Science Cloud Cometh,” HPC-wire magazine, 2013.
- R. Jenkins, “Cloud: The Next Industrial Revolution,” All Things Digital magazine, 2013.
- R. Jenkins, “Can European Firms Legally Use U.S. Clouds To Store Data?,” Forbes magazine, 2013.

**A list of up to 5 relevant previous projects or activities,** .

**Helix Nebula - The Science Cloud (FP7 - INFRA-2012-3.3)**
CloudSigma is one of 4 original supply-side organisations to provide cloud infrastructure as part of federated cloud able to meet the ever increasing demand from big science organisations such as ESA, EMBL and CERN.

**CloudSME (FP7-2013-NMP-ICT-FOF)**
CloudSigma is contributing to the development of a cloud-based, one-stop-shop solution, providing a scalable cloud platform on which to implement simulations for manufacturing and engineering SMEs. CloudSigma provides infrastructure and integrates with the brokerage platform.

**ESA INFOaaS Stimulus Project**
CloudSigma is the coordinator and main IaaS provider, working with project partners on the development of a Data-as-a-Service framework for the exploitation of ESA EO satellite data facilitated by the Fluid Ops platform, installed on CloudSigma and interfaced to the ESA VA4 data set. Third party applications interface with the platform to provide end-users with Information-as-a-Service.

**SEO-DWARF (H2020-MSCA-RISE-2015)**
CloudSigma provides cloud expertise in the form of staff exchanges to collaborate in the design of a system for content-based search of EO images on an application specific basis using the marine application domain and data from Sentinels 1,2,3, ENVISAT.

**A description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work;**

CloudSigma offers cloud infrastructrure (test-lab and production cloud). CloudSigma Research houses a test laboratory at the Technical Center TVS, a co-location service in Sofia, Bulgaria. The test lab consists of a small pre-production compute set-up consisting of a cluster of 16 and 24 core machines, each with 128GB RAM. Each is used to test developments, prior to them being deployed to a production environment. The cluster includes a storage cluster also. CloudSigma's production cloud in Zurich, Switzerland is also offered for use during the project. Two locations are available:

- Equinix (ZH4) - The primary home of our Swiss cloud. ZH4 IBX is a purpose built highly specified data center in a prime location in the heart of Zurich with excellent communication links. This is a key state of the art IBX center in a key metropolitan area in Europe.
- Equinix (ZH5) - This is our second site in Zürich used for high availability. Our ZH5 infrastructure is connected by dual 10Gbps dark fiber (independently routed) and sits in a separate insurance zone from ZH4 making it a powerful disaster recovery or high availability set-up for our customers. ZH5 IBX is a brand new purpose built data center with latest generation systems.

***"No third parties involved"***

### 4.11 11 – European Centre for Medium-Range Weather Forecasts - (ECMWF)

**Description of Organisation**

ECMWF is an international organisation supported by 34 European and Mediterranean statesECMWF's principal objectives are the preparation, on a regular basis, of medium-range and long-range weather deterministic and ensemble forecasts for distribution to the meteorological services of the Member States, the development of scientific and technical research directed to the improvement of these forecasts, and the collection and storage of appropriate meteorological data. ECMWF's computer facility includes supercomputers, archiving systems and networks.

***Profile relating to the project***

A key goal of ECMWF's strategy is to develop new global, medium-range weather forecasting products, with particular emphasis on early warnings of severe weather; ECMWF has already developed a number of new such products for its Member States, such as Extreme Forecast Index (EFI) which delivers early warnings of extreme weather variables, such as rain, wind temperature etc. ECMWf also provides reforecasts for the ensemble products, which can be used to bias-correct the forecasts. ECMWF is also the operational center for the European (EFAS) and executes forecasts and hosts the EFAS-Information System platform. EFAS is financed by Copernicus providing medium range flood warnings in Europe in support of the European Community. ECMWF is also part of the pre-operational test of the European Forest Fire Information System (EFFIS). In previous projects ECMWF has developed warning products for extreme winds, and the forecasts from ECMWf are also used in operational storm surge warning systems.

ECMWF provides the results from operational forecast activities to Member States and Co-operating States, the members of the WMO and the public. ECMWF products include current forecasts, climate reanalyses and specific datasets. These are available via the web, point-to-point dissemination, data servers and broadcasting. All ECMWF's operational forecasts aim to assess the most likely forecast and also the degree of confidence one can have in that forecast. To do this the Centre carries out an ensemble of predictions which individually are full descriptions of the evolution of the weather, but collectively they assess the likelihood or probability of a range of possible future weather.

***Main tasks in the project***

ECMWF will in this project take the lead in showcasing the use of the data and tools in the EUROGEOSS-HUB as well as being one of supplier of data for the hub. ECMWF will deliver raw forecast products for all parts of the forecast chain, develop the existing products as well as the new identified and contribute to the best practice of disseminating the forecast to the end-users. ECMWFs position as the world's leading centre for global medium-range weather forecasts as well as its vast experience in product generation and user support makes will ensure that the products that are delivered are of the highest quality.

**Profiles of staff members:**

**Fredrik Wetterhall, male, PhD.,** is a researcher in the Ensemble Prediction Section at ECMWF. He has large experience in hydrological modelling, hydro-meteorological weather forecasting, precipitation interpolation and downscaling and hydrological impact studies. He has worked on the FP7 projects DEWFORA, KULTURisk and GLOWASIS and is currently leading the research on the European flood Awareness System (EFAS) at ECMWF. This works includes hydrological model development, verification, post-processing and interaction with the EFAS user community through bimonthly bulletins. He has written over 30 peer-reviewed publications in international journals. Currently, he is co-editor of Theoretical and Applied Climatology and co-chair of the Hydrological Ensemble Prediction Experiment (HEPEX, www.hepex.org).

**Prof Florian Pappenberger**, **male, PhD**: is a principal scientist at ECMWF responsible for a team working in the area of applications of Numerical Weather Predictions including fire, droughts, malaria, energy and floods. He leads the computational centre of the European Flood Awareness System. He is a Guest Professor at Hohai University (Nanjing, China) and University of Bristol (Bristol, United Kingdom). His expertise is documented in over 110 publications in international peer reviewed journals and book chapters. His awards include the Arne Richter Award for Outstanding Young Scientists from the European Geosciences Union and the Outstanding

Editor Award of the Hydrology and Earth System Sciences Journal. He is part of the EFAS team which received the IES Excellence Award for 'Support to EU Policy' (a European Commission award).

**A list of up to 5 relevant publications, and/or products, ;**

**Wetterhall, F.,** Pappenberger, F.**,** Alfieri, L., Cloke, H. L., Thielen-del Pozo, J., Balabanova, S., Daňhelka, J., Vogelbacher, A., Salamon, P., Carrasco, et al..: HESS Opinions "Forecaster priorities for improving probabilistic flood forecasts", Hydrol. Earth Syst. Sci., 17, 4389-4399, doi:10.5194/hess-17-4389-2013, 2013

**Pappenberger**, F., Stephens, E., Thielen, J., Salamon, P., Demeritt, D., van Andel, S. J., **Wetterhall, F.** and Alfieri, L., Visualizing probabilistic flood forecast information: expert preferences and perceptions of best practice in uncertainty communication. Hydrol. Process., 27: 132–146. doi: 10.1002/hyp.9253, 2013

**Pappenberger**, F., Jendritzky, G., Staiger, H., Dutra, E., Di Giuseppe, F., Richardson, D.S.,Cloke, H.L., Global forecasting of thermal health hazards: the skill of probabilistic predictions of the Universal Thermal Climate Index (UTCI), International Journal of Biometeorology 05/2014; DOI:10.1007/s00484-014-0843-3, 2014

**Pappenberger**, F., Cloke, H. L., Parker, D. J., **Wetterhall**, F., Richardson, D. S., Thielen, J., The monetary benefit of early flood warnings in Europe, Environmental Science & Policy, 51, 278-291, doi:10.1016/j.envsci.2015.04.016, 2015

B Revilla-Romero, FA Hirpa, JT Pozo, P Salamon, R Brakenridge, F **Pappenberger** and T de Groeve, On the Use of Global Flood Forecasts and Satellite-Derived Inundation Maps for Flood Monitoring in Data-Sparse Regions, Remote Sensing 7 (11), 15702-15728, 2015

**A list of up to 5 relevant previous projects or activities,** .

1. **GEOWOW** – The GEOSS Interoperability for Weather, Ocean and Water is a project co-funded under the European Community's Seventh Framework Programme FP7/2007-2013. GEOWOW's challenge is to improve Earth Observation data discovery, accessibility and exploitability, and to evolve the Global Earth Observation System of Systems (GEOSS) for the benefit of all Societal Benefit Areas (SBAs) with particular focus on Weather, Ocean Ecosystems and Water.
2. **EFAS & GloFAS** - The European Flood Awareness System (EFAS), developed to produce European overviews on ongoing and forecasted floods, contributes to better protection of the European Citizen, the environment, property and cultural heritage in support to the EU Mechanism for Civil Protection. Since 2012 EFAS is an operational service under the umbrella of the Copernicus emergency management service and run by Member States organisations. The Global Flood Awareness System (GloFAS), jointly developed by the European Commission and the European Centre for Medium-Range Weather Forecasts (ECMWF), couples state-of-the art weather forecasts with a hydrological model and with its continental scale set-up it provides downstream countries with information on upstream river conditions as well as continental and global overviews. GloFAS produces daily flood forecasts in a pre-operational manner since June 2011.
3. **IMPREX** - IMproving PRedictions and management of hydrological EXtremes is funded under DG Research H2020 programm (2015-2019) and is designed to support the reduction of Europe's vulnerability to extreme hydrological events through improved understanding of the intensity and frequency of future disrupting features that may be very different from today's reality.
4. **Earth2Observe** - Global Earth Observation for Integrated Water Resource Assessment is a collaborative project funded under the DG Research FP7 programme (2014-2017). The overall objective is to contribute to the assessment of global water resources through the use of new Earth Observation datasets and techniques. The project will integrate available earth observations, in-situ datasets and models, to construct a consistent global water resources reanalysis dataset of sufficient length (at least 30 years). The resulting datasets will be made available through an open Water Cycle Integrator data portal: the European contribution to the GEOSS/WCI approach. The datasets will be downscaled for application in case-studies at regional and local levels, and optimized based on identified European and local needs supporting water management and decision making
4. **EarthServer2** -The Horizon 2020-funded EarthServer2 project aims to establish scalable web-based analysis and processing services for multi-dimensional geo-referenced Earth Science data. Big Earth Science data

often need extensive processing in order to retrieve meaningful and communicable information for users and decision-makers. The challenge is to extract the right information from petabytes (PB) of raw data. Ideally, data processing and analysis should be performed on server-side and only kilobytes of refined information are downloaded.

***"No third parties involved"***

### 4.12 12 –ATOS -

**Description of Organisation**

Atos SE (Societas Europaea) is a leader in digital services with 93,000 employees in 72 countries, which delivers hi-tech transactional services, consulting and technology services, systems integration and managed services. It had 2014 pro forma annual revenue of €10 billion being the largest Europe based IT Company. The Group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and is listed on the Euronext Paris market. Atos Research & Innovation (ARI) is the research, development and innovation hub of Atos SE and it is a key reference for the whole Atos group, delivering technology innovation to our customers. With presence in Spain and in Turkey, ARI is organized around technology laboratories. Atos operates under the brands Atos, Atos Consulting, Atos Worldgrid, Bull, Canopy, and Worldline.
Atos Intégration France is a French company of Atos SE. Atos has a strong portfolio of Systems Integration offerings to provide increased added value for clients to drive their growth and profitability. Its enhanced global delivery model adds quality, scalability, predictability and flexibility at a competitive price point, and benefits from a strong global presence. Atos continues to adapt its existing portfolio to cater for the increasing demand for SAP-based solutions and industry-specific Business Intelligence, Analytics and Smart Mobility solutions. The Atos Global Delivery Platform is based on industry best practices for the governance, management and delivery of the project base business or application management services.

**Profiles of staff members:**
**Mr. Gabriel Képéklian** (male) is the Research and Development leader at Atos Intégration France. He was a partner on the Datalift ANR project (all-in-one semantic platform for the interconnexion of datasets, from the heterogeneous data to the linked data), and currently on FUI projects : Waves (semantic platform for the interconnexion of datastreams, including reasoning and filtering capabilities) and Nasima (software and hardware platform for the introduction of tools that exploit augmented / mixed reality on industrial sites, an Industry 4.0 project). He also teaches « Semantic web » at Ecole Centrale de Paris. He is member of Business Groups of the W3C and of standardization committees (OGC, CEN, AFNOR).

**Mr. Tarek Habib** (male, PhD) is a program management expert. He has a PhD in satellite image processing, and he lead a number of Earth Observation projects for the account of the European Space Agency and the French Space Agency. Among these projects he directed:

- The SparkinData project: the Big Data marketplace for the creation of value from geolocated data (eg Copernicus satellite imagery, in-situ data, and so on)
- The next generation for Earth Observation (ngEO): the user services component responsible for the distribution of all the Sentinel data (1, 2 and 3) to the European identified users
- The coordinated quality control (CQC): the component of the ESA's Coordinated Data Access system responsible for the traceability, quality control and quality investigation for all Earth Observation data handled by ESA.

**A list of up to 5 relevant publications, and/or products, ;**

1. Gabriel Kepeklian, Laurent Bihanic, Raphaël Troncy, *Datalift: a platform for integrating big and linked data*, Proc. of the 2014 conference on Big Data from Space (BiDS'14) European Space Agency-ESRIN Frascati, 2014, pp. 370-373
2. Gabriel Képéklian, Olivier Curé, Laurent Bihanic, *From the Web of Documents to the Linked Data*, due to appear in Volume 205 of the Lecture Notes in Business Information Processing series, Springer Verlag, 2015
3. Ghislain Atemezing, Fabien Gandon, Gabriel Képéklian, and al. *When Publishing Linked Data is More than Just Using a Tool*, ODW13, London, 2013
4. François Scharffe, Raphaël Troncy, Gabriel Képéklian, *Enabling linked data publication with the Datalift platform*, in: Proc. AAAI workshop on semantic cities, Toronto (ONT CA), 2012
5. Chadi Jaber, Tarek Habib, *SparkInData: Earth Observation application marketplace hosted in the cloud.* conference on Big Data from Space (BiDS'16) European Space Agency-Tenerife, 2016

**A list of up to 5 relevant previous projects or activities,** .

- **SparkinData**, a project funded by the French Governent (Direction Générale des Entreprises, "Investments for the Future" program), 2015-2018: Atos was chosen to lead a consortium of 11 partners to build the SparkInData platform. SparkInData has the ambition of building a sustainable ecosystem around geolocated data.. SparkInData is currently addressing various markets (ie. Agriculture, environment, local authorities, utilities, defense and risk management), the objective of SparkInData is to build a state of the art Big Data marketplace deployed on a cloud infrastructure. The platform currently uses Copernicus data, supplied by the PEPS platform developed by the French Space Agency. www.sparkindata.com
- **Oceanography data platform**, Atos & Mercator Ocean, 2013-2014: Atos has put in place in collaboration with Mercator Ocean a platform for the collection and processing of oceanographic data. The goal of this platform is to set up a hybrid cloud based solution for data analysis. An oceanographic data processing platform prototype has been implemented. It is based on HADOOP ecosystem and has been deployed on the European scientific cloud Helix Nebula
- **INFOaaS – Information as a Service**, ESA/ESRIN, 2014-2015: Atos is currently leading the INFOaaS project in collaboration with IREA-CNR. The objective of this project is to host on Helix Nebula IaaS a ground deformation long-term monitoring service based on the Small Baseline Subset (SBAS) Differential Synthetic Aperture Radar Interferometry (DInSAR) which is a microwave remote sensing technique enabling to estimate deformations within centimetre to millimetre accuracy. This service is basd on ERS and Envisat dataset.
- **Datalift**, an ANR (Agence Nationale de la Recherche) project: design and prototype of an all-in-one semantic platform for the interconnexion of datasets; from the heterogeneous data to the linked data.
- **Waves**, a FUI (Fonds Unique Interministériel) project: design and prototype of a platform for the interconnexion of datastreams, including reasoning and filtering capabilities
- **Nasima**, a FUI project: design and prototype of a software and hardware platform for the introduction of tools that exploit augmented / mixed reality on industrial sites, an Industry 4.0 project

**A description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work;**

Atos operates together with Fujitsu Spain, as the infrastructure provider partner, the high-specification supercomputer Teide-HPC (High Performance Computing) ordered by the Institute for Technology and Renewable Energy (ITER) -an organisation that reports to the Inter-island Council of Tenerife-, as part of the INNPLANTA program leaded by the Ministry of Economy and Competitiveness. The Teide-HPC is the second most powerful supercomputer installed in Spain, with 2200 processors, 17,600 cores and a peak Rmax performance of 350 TeraFlops. The Teide-HPC is located at the D-ALiX Data Centre, the neutral point of access for western Africa and the Canary Islands situated in Granadilla de Abona (Tenerife). The access to part of this infrastructure will be studied and offered occasionally, on-request and by agreement.

***"No third parties involved""***

### 4.13 13 – Barcelona Supercomputing Center – Centro Nacional de Supercomputación (BSC-CNS)

**Description of Organisation**

The Barcelona Supercomputing Center (BSC) was established in 2005 and is the Spanish national supercomputing facility and a hosting member of the PRACE distributed supercomputing infrastructure. The Center houses MareNostrum, one of the most powerful supercomputers in Europe. The mission of BSC is to research, develop and manage information technologies in order to facilitate scientific progress. BSC combines HPC service provision, and R&D into both computer and computational science (life, earth and engineering sciences) under one roof and currently has over 400 staff from 41 countries. BSC has collaborated with industry since its creation, and participates in various bilateral joint research centers with companies such as IBM, Microsoft, Intel, NVIDIA and Spanish oil company Repsol. The centre has been extremely active in the EC Framework Programmes and has participated in seventy-nine projects funded by it. BSC is a founding member of HiPEAC, the ETP4HPC and other international fora.

**Profiles of staff members:**

**Dra. Rosa M. Badia (female)** holds a PhD on Computer Science (1994) from the Technical University of Catalonia (UPC). She is a Scientific Researcher from the Consejo Superior de Investigaciones Científicas (CSIC) and team leader of the Workflows and Distributed Computing research group at the Barcelona Supercomputing Center (BSC). She was involved in teaching and research activities at the UPC from 1989 to 2008, where she was an Associated Professor since year 1997. From 1999 to 2005 she was involved in research and development activities at the European Center of Parallelism of Barcelona (CEPBA). Her current research interest focuses in programming models for complex platforms (from multicore, GPUs to Grid/Cloud). The group lead by Dr. Badia has been developing StarSs programming model for more than 10 years, with a high success in adoption by application developers. Currently the group focuses its efforts in two instances of StarSs: OmpSs for heterogeneous platforms and PyCOMPSs/COMPSs for distributed computing including Cloud. Dr Badia has published more than 150 papers in international conferences and journals in the topics of her research. She has participated in several European projects, for example BEinGRID, Brein, CoreGRID, OGF-Europe, SIENA, TEXT and VENUS-C, and currently she is participating in the project Severo Ochoa (at Spanish level), EuroServer, ASCETIC, The Human Brain Project, EU-Brazil CloudConnect, MUG, BioExcel and NEXTGenIO and it is a member of HiPEAC2 NoE.

**Dr. Daniele Lezzi** (male) received the B.Sc. degree in computer engineering in 2002 and the Ph.D. in Information Technology Engineering in 2007 from the University of Salento, Italy. From 2002 to 2006 he has been team member of the Center for Advanced Computing Technologies division of the National Nanotechnology Laboratory of the University of Salento and has been also lecturing on computer science fundamentals. From 2006 to June 2008 he was a researcher in the Euro-Mediterranean Centre for Climate Changes (Italy) involved in the design of the computational infrastructure and worked as consultant of the SPACI (Southern Partnership for Advanced Computing Infrastructure) consortium, Italy. Since 2008 he is researcher in the Computer Sciences department of Barcelona Supercomputing Center. His research interest covers High Performance, Distributed, Grid and Cloud Computing and programming models. In particular this research addresses the design of programming frameworks for the porting and execution of scientific applications on distributed computing infrastructures like Grid and Clouds with special emphasis on interoperability. He participated in several EC funded projects like GridLab, CoreGRID, BEinGRID, OGF-Europe, SIENA, VENUS-C, IS-ENES, OPTIMIS and EU-Brazil OpenBio, and he is currently involved in the EU-Brazil Cloud Connect project. He is also contributing to the EGI Federated Cloud Task Force whose goal is to deliver a blueprint that, targeting at both resource providers and user communities, defines how federated virtualized environments can be implemented.

**Dra. M. Teresa Pay (female)**: PhD in Environmental Engineering (2011) from the Technical University (UPC) of Catalonia with the Degree of European Doctor and the Special Doctoral Award. As a Marie Curie fellow (2013-2016), she worked as a postdoc in air quality modelling at École Polytechnique (France) and now is a researcher at the Earth Sciences Department at the Barcelona Supercomputing Center and associate professor at the University of Barcelona.

**Msc. Kim Serradell Maronda**, (male). Is Bachelor (2005) in Computer Sciences for the Facultat d'Informàtica de Barcelona (FIB-UPC) and for the Grande école publique d'ingénieurs en informatique, mathématiques appliquées et télécommunications de Grenoble (ENSIMAG). Currently, he is the co-manager of the Computational Earth Science (CES) group at the Earth Sciences department in the Barcelona Supercomputing Center (BSC). The CES group is a multidisciplinary team of 15 members with different IT profiles that interacts closely with all the other

groups of the Earth Sciences Dept.

**Prof. F.J. Doblas-Reyes** (male) is an ICREA research professor at the BSC-CNS. He is the head of the Earth Sciences Department, a lead author of the last IPCC Assessment Report (AR5), member of several WMO and international committees for HPC, climate modelling and climate services research, and author of more than 100 peer-reviewed contributions.

**A list of up to 5 relevant publications, and/or products, ;**

**Publication**:

1. Pay MT, Piot M, Jorba O, Basart S, Gassó S, Jiménez-Guerrero P, Gonçalves M, Dabdub D, Baldasano JM, 2010. A full year evaluation of the CALIOPE-EU air quality system in Europe for 2004: a model study. Atmos Environ, 44, 3322-3342.
2. Soret, A., Guevara, M., Baldasano, J.M., 2014. The potential impacts of electric vehicles on air quality in the urban areas of Barcelona and Madrid (Spain). Atmospheric Environment, 99, 51–63
3. Valverde, V., M.T. Pay and J.M. Baldasano, 2015. Ozone attributed to Madrid and Barcelona on-road transport emissions: characterization of plume dynamics over the Iberian Peninsula. Scienc. Tot. Environ., 543, 670-682
4. Enric Tejedor, Yolanda Becerra, Guillem Alomar, Anna Queralt, Rosa M Badia, Jordi Torres, Toni Cortes, and Jesús Labarta. PyCOMPSs: Parallel computational workflows in Python, International Journal of High Performance Computing Applications, first published on August 19, 2015 as doi:10.1177/1094342015594678
5. Francesc Lordan, Enric Tejedor, Jorge Ejarque, Roger Rafanell, Javier Álvarez, Fabrizio Marozzo, Daniele Lezzi, Raúl Sirvent, Domenico Talia, Rosa M. Badia: ServiceSs: An Interoperable Programming Framework for the Cloud. J. Grid Comput. 12(1): 67-91 (2014)

**Services***:*

1. CALIOPE air quality forecast system. It provides an open, operational, detailed 48-h air quality prediction aimed at air pollution managers and any interested citizen in the quality of the air we breathe through the webpage www.bsc.es/caliope and the MyGEOSS mobile application (CALIOPE-EU)

**A list of up to 5 relevant previous projects or activities,** .

1. **Project title**: Seasonal-to-decadal climate Prediction f or the improvement of European Climate Services. Funding agency: EUFP7./Budget: 11,785,694.40€ funding: 8,224,862€
2. **Project Title**: Development of the air quality forecast system for Spain (CALIdad del aire OPerativo para España) CALIOPE / Funding agency: Spanish Environmental Ministry / Budget: 1.189.258Eur
3. **Project Title**: Copernicus Atmosphere Monitoring Service (CAMS). Global and regional validation (CAMS 84) / Funding agency: EU / Budget: 2.825.000 Eur
4. EU-Brazil Cloud infrastructure Connecting Federated Resources for Scientific Advancement (EUBrazilCC, http://www.eubrazilcloudconnect.eu/). EUBrazil Cloud Connect aim is to create an intercontinental federated eInfrastructure for scientific usage. This e-Infrastructure will join resources from different frameworks, like private clouds, supercomputing and opportunistic desktop resources to offer the community high level scientific gateways and programming models.
5. Human Brain Project (https://www.humanbrainproject.eu) a FET Flagship that will makefundamental contributions to neuroscience, to medicine and to future computing technology.

***BSC has linked third parties, see section 4.2 for descriptions***

## 4.14 14 – 52°NORTH INITIATIVE FOR GEOSPATIAL OPEN SOURCE SOFTWARE GMBH (52NORTH), GERMANY

**Description of Organisation**

The 52°North GmbH has been founded in 2006 as a German company limited by shares ("Gesellschaft mit beschränkter Haftung - GmbH"). Shareholders with the indicated shares are the University of Münster (Münster, Germany) - 26%, the University of Twente (Twente, The Netherlands) - 26%, Environmental Systems Research Institute Inc. - Esri (Redlands, California, USA) - 24%, and con terra GmbH (Münster, Germany) - 24%. 52°North acts as a non-profit organization based on its shareholders agreement. Shareholders receive neither profit shares nor other payments from company funds. 52°North coordinates activities of partners from research, industry, and public administration. Its mission is to foster the development of new concepts and technologies in Geoinformatics, in particular Sensor Web, Web-based Geoprocessing, Earth Observation, and Metadata. The company has a long and outstanding record in the Geo-IT domain and is significantly contributing to the development of international standards. For example, 52°North is involved in the OGC and in the advancement of the INSPIRE directive. A pro-active innovation strategy is a central element of 52°North's activities. This becomes manifest in European and national research projects as well as the company's involvement in OGC Testbeds. This is complemented by consulting and software development projects helping customers to integrate up-to date technological developments into their operational infrastructures. 52°North focuses on the development of open source software to promote the use of its developments and to motivate external developers to contribute to the advancement of 52°North software. 52°North Sensor Web implementations are used by many parties in domains such as oceanography, hydrology and environmental monitoring. Whenever possible, all software developed by 52°North is put under an open source license.

**Profiles of staff members:**

**Dr. Simon Jirka**, male, works as community leader, senior consultant and project manager for the Sensor Web group of the Open Source initiative 52°North. His activities are focused on spatial data infrastructures, especially on Sensor Web architectures as well as sensor discovery mechanisms. Besides his contribution to several European projects such as GEOWOW, NeXOS, FixO3, ConnectinGEO, and ODIP II he is also involved in the Sensor Web Enablement initiative as well as further activities of the Open Geospatial Consortium (OGC). In addition, he regularly leads professional services projects in the fields of consulting and software development.

**Dr. Christoph Stasch**, male, works as senior consultant at 52°North where he is involved in the Sensor Web and Geoprocessing communities. He has also served as Co-Chair and editor of the OGC SOS 2.0 standard. He has been involved in several projects (e.g. WaterInnEU and OGC Testbeds) relying on OGC SWE and WPS technology and will be able to bring first-hand experience into the development of concepts, architecture specifications and software.

**Matthes Rieke**, male, is a software engineer and consultant at 52°North. Previously he worked as research associate at the Institute for Geoinformatics (University Münster). He is code manager of several 52°North software components and is actively involved in several research and development activities (including OGC Testbed activities and the H2020 project ConnectinGEO).

**A list of up to 5 relevant publications, and/or products, ;**

1. Bröring, Arne, Johannes Echterhoff, Simon Jirka, Ingo Simonis, Thomas Everding, Christoph Stasch, Steve Liang and Rob Lemmens (2011). "New Generation Sensor Web Enablement." MDPI Sensors 11(3): 2652-2699.
2. Andres, Volker, Simon Jirka, Michael Utech (2014). OGC Best Practice: OGC Sensor Observation Service 2.0 Hydrology Profile (OGC 14-004r1). Wayland, MA, USA, Open Geospatial Consortium Inc.
3. Jirka, Simon, Alexander Kotsev, Michael Lutz, Mattes Rieke, Robin Smith and Paul Smits (2014). Using the OGC SOS as INSPIRE Download Service for Observation Data. INSPIRE Conference 2014, Aalborg, Denmark.

4. Jirka, Simon, Daniel Mihai Toma, Joaquin del Rio, Eric Delory (2014). A Sensor Web architecture for sharing oceanographic sensor data. Sensor Systems for a Changing Ocean (SSCO) 2014 at the Sea Tech Week 2014, Brest, France, IEEE.
5. 52°North Sensor Web Suite (http://52north.org/communities/sensorweb/): Open source software products comprising implementations of the OGC Sensor Observation Service standard (version 1.0.0 and 2.0) as well as corresponding client applications and discovery tools.

**A list of up to 5 relevant previous projects or activities,** .

1. GEOWOW (GEOSS interoperability for Weather, Ocean and Water): In GEOWOW 52°North has worked together with partners such as the Global Runoff Data Centre, the European Space Agency, and KISTERS AG to improve the GEOSS Common Infrastructure for facilitating data sharing on a global level (focus area for 52°North: hydrological and meteorological data).
2. NeXOS (Next generation, Cost-effective, Compact, Multifunctional Web Enabled Ocean Sensor Systems Empowering Marine, Maritime and Fisheries Management): Within NeXOS 52°North focuses on the development of an interoperable marine Sensor Web architecture for oceanographic data covering the whole path from the sensor to application.
3. FixO3 (Fixed point Open Ocean Observatory): The FixO3 network seeks to integrate European open ocean fixed point observatories and to improve access to these key installations for the broader community. In the context of this project, 52°North contributes mainly its Sensor Web background and expertise on interoperable approaches for data modeling and sharing.
4. BRIDGES (Bringing together Research and Industry for the Development of Glider Environmental Services): Within this project 52°North contributes by developing an interoperable Sensor Web architecture that facilitates the operation of gliders collecting oceanological observation data.
5. ODIP 2 (Ocean Data Interoperability Platform, Phase 2): This coordination and support action aims at facilitating the sharing of ocean data across scientific domains and international boundaries. The contribution of 52°North in this projects addresses the aspects related to Sensor Web technology and the related OGC Sensor Web Enablement standards.

**A description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work;**

52°North does not plan to provide an infrastructure or technical equipment. However, 52°North will offer its open source Sensor Web implementation for use by the project partners. Furthermore, the 52°North demo servers will be available for the demonstration of Sensor Web-related project results.

***"No third parties involved"***

### 4.15 15 – The Institute of Remote Sensing and Digital Earth (RADI)

**Description of Organisation**

**RADI** is a comprehensive research institute under the Chinese Academy of Sciences (CAS). RADI explores leading technologies in Earth observation, geospatial information science and mechanisms for acquiring and distributing remote sensing information. It aims to construct and operate spaceborne, airborne and ground-based Earth observation systems that can provide resource-environmental spatial information at the regional and global level, forming a Digital Earth science platform. RADI has a highly qualified workforce, including 700 researchers or engineers with an average age of 37. Of these, 96 are research professors, 173 are associate professors, and 44% have doctoral degrees. RADI is home to many cutting-edge research resources, including the State Key Laboratory of Remote Sensing Science, the Center for Applied Technologies of Earth Observation, the National Engineering Center for Geoinformatics, and the CAS Laboratory of Digital Earth Science. With over 3.3 million images of satellite data archived since 1986, it is regarded as one of the largest Earth observation satellite data archive in the World. With two Citation S/II high-altitude remote sensing aircraft, the Airborne Remote Sensing Center can conduct all-weather flight operations with different remote sensors ranging from aviation cameras, scanners, and imaging spectrometers to imaging radar.

**Profiles of staff members:**

**Dr. Guoqing Li** is a male professor of the Institute of Remote Sensing and Digital Earth (RADI) at Chinese Academy of Sciences (CAS). He got his PhD from CAS at 2004 and then he had got his experience in European Space Agency and Purdue University as visiting professor. His favorite research areas related to high performance remote sensing image processing technology, satellite data ground system, and spatial data grid. He is now mostly focused on new generation spatial data infrastructure ,nature disaster data management and infrastructure as well as big data applications. More than 80 of his papers have been peer-reviewed and published. Dr. Li is leading the development of China-GEOSS and heavily involved in GEO activities. He has served as member of WDS Scientific Committee in the term of 2012-2015 and 2015-2018, and has been the coordinator of ICSU/CODATA Linked Open Data for Global Disaster Risk Research (LODGD) Task Group science 2012.

**A list of up to 5 relevant publications, and/or products, ;**

- Quan Zou, Guoqing Li, Wenyang Yu, A Resource Package"-Oriented Approach for Remote Sensing Analysis Modeling Dust Storm Monitoring Model as Example, International Journal of Software Engineering and Knowledge Engineering, Vol. 24, No. 5 (2014) 731–757, DOI: 10.1142/S0218194014500284
- Guoqing Li, Hao Zhang, Jibo Xie, Dataset of Multi-satellite Synchronous Collaborative Observation in Zhangye District at 2013，Acta Geographica Sinica 2014，Vol69，p306-312
- Liping Liu, Guoqing Li, Jibo Xie. Design & implementation of distributed spatial computing node based on WPS. Proceedings of the 35th International Symposium on Remote Sensing of Environment (ISRSE35). 2013.
- Zeng, Y.; Li, G.; Guo, L.; Huang, H. An On-Demand Approach to Build Reusable, Fast-Responding Spatial Data Services, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing,Volume 5, Issue 6, 2012. Pp 1665 - 1677
- Yue Gao, Guoqing Li，Lixia Guo，Design and Implementation of A deep web architecture, ICECC 2012, 2012,2(6), 3200- 3204

**A list of up to 5 relevant previous projects or activities,** .

- China GEOSS Data Sharing Platform, 2012-2014, funded by MOST
- China Remote Sensing Network and Application, 2012-2015, funded by MOST
- Spatial data on-demand grid for distributed heterogeneous , 2010-2013, funded by MOST
- Intelligent service research of multi-source spatial data based on ontology technology, 2010-2013, funded by MOST

**A description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work;**

- RADI operates two national key S&T infrastructures: the China Remote Sensing Satellite Ground Station and the Airborne Remote Sensing Aircraft. The China Remote Sensing Satellite Ground Station, a member of the international Earth observation ground station network, boasts one of the world's highest capacities for receiving, processing, and distributing satellite data.

***"No third parties involved"***

### 4.16 16 – Global Reporting Initiative (GRI)

**Description of Organisation**

The **Global Reporting Initiative (GRI)** (www.globalreporting.org) is an international independent organization that helps businesses, governments and other organizations understand and communicate the impact of business on critical sustainability issues such as climate change, human rights, corruption and many others. GRI has pioneered sustainability reporting since the late 1990s, transforming it from a niche practice to one now adopted by a growing majority of organizations. GRI's Sustainability Reporting Standards are foundational to this success. With thousands of reporters in over 90 countries, GRI provides the **world's most widely used standards on sustainability reporting and disclosure**, including reporting on the Sustainable Development Goals (SDGs). When it comes to reporting on the SDGs, GRI offers the **SDG Compass**, a tool which helps companies understand and align strategies as well as measure and manage their contributions to the SDGs. GRI also offers a **SDG mapping service**, which confirms that the SDGs are correctly mapped against the GRI disclosures.

**Key expertise relevant to the project**

GRI captures sustainability reports issued by companies in its **Sustainability Disclosure Database**. These sustainability reports enable businesses, governments, civil society and citizens to make better decisions based on how to report their sustainability impact. This extensive repository of sustainability reports provides users with access to all types of sustainability reports, whether GRI-based or otherwise, as well as relevant information related to the reporting organizations. In the database GRI is amongst others **tracking the SDG target 12.6.1**.

**Profiles of staff members:**

GRI's subtask for this project (6.5) will be implemented by
Antoaneta Stefanova (F), She has a Master's degree in Law and Economics and 5 years of experience in collecting and analyzing data from GRIs Sustainability Disclosures database. For this particular project she will collect and analyse companies' sustainability reports for reference to the SDGs.

**A list of up to 5 relevant publications, and/or products, ;**

GRI has the following products and services relevant to the call content:

- UN Sustainable Development Goal Target 12.6 – Live tracker http://database.globalreporting.org/SDG-12-6/Global-Tracker
- SDG Mapping Service: https://www.globalreporting.org/services/alignment/Pages/SDG-Mapping-Service.aspx
- SDG Compass (in collaboration with UNGC, WBCSD): http://sdgcompass.org/
- GRI Sustainable Development Strategy 2016-2020 (publication) - : https://www.globalreporting.org/resourcelibrary/GRI%20Sustainable%20Development%20Strategy%202016-2020.pdf

**A list of up to 5 relevant previous projects or activities,** .

- *Business Transparency for Sustainable Development program*. GRI implements this program with support of the Swedish International Development Agency (Sida). One of the key objectives of this program is the implementation of the Sustainable Development Strategy (see also publication).
- *Accelerating climate investment ghrough better data and reporting.* This project is supported by the GIZ and the key focus is on Climate Risk, Data and Decision Making for Businesses and Government.
- *Measure What Matters project*: GRI is partner in the Green Economy Coalition (GRI, A4S, International Institute for Environment and Development, Stockholm Environment Institute and Stakeholder Forum for a Sustainable Future). The goal of the project is to greater alignment between corporate, national and global sustainbality data frameworks.

**A description of any significant infrastructure and/or any major items of technical equipment, relevant to the**

**proposed work;**

- GRI Sustainability Disclosure Database

***"No third parties involved"***

### 4.17 18 – UNIVERSITY OF READING (UREAD)

**Description of Organisation**

The **University of Reading** was established in 1892 and received its Royal Charter in 1926. It is a public research university based in Reading in the United Kingdom. The University of Reading is ranked in the top 1% of universities in the world (QS University World Ranksings 2015/2016) and enjoys a world-class reputation for teaching, research and links to business. The University has won the Queen's Anniversary prize four times, which recognises outstanding work and impact of higher education institutions.
The University of Reading's Department of Meteorology is Europe's largest with a world-leading reputation in research focusing on the fundamental science of weather, climate and earth observation. In the most recent Research Excellence Framework results (REF 2014), 86% of our research was graded as world leading or internationally excellent. The Department hosts a number of staff from the UK Met Office (MetOffice@Reading), the National Centre for Atmospheric Science (NCAS) and the National Centre for Earth Observation (NCEO). The Department of Geography and Environmental Science provides a world-leading centre for hydrological research, delivering world class scientific knowledge and understanding across the breadth of Hydrological science, policy and societal impacts. The Department of Meteorology and the Department of Geography and Environmental Science run several major pioneering research programmes which currently include understanding the communication of probabilistic forecasts, improvements to global flood forecasting systems, understanding flooding from intense rainfall,improving seasonal drought forecasting and next generation land surface process modelling. The University has a strong collaborative relationship with the European Centre for Medium Range Weather Forecasts (ECMWF) and the Copernicus Emergency Management Serivce, working particularly closely with the the European Flood Awareness System (EFAS) and Global Flood Awareness System (GloFAS) teams at ECMWF and the European Commission Joint Research Centre.

**Profiles of staff members:**

**Hannah Cloke** (Female) is full Professor and Director of Hydrology at the University of Reading with expertise in land surface hydrology, probabilistic flood forecasting, river catchment processes, climate impact on water resources and uncertainty analysis. She is an attached hydrology research consultant to EFAS and ECMWF and currently leads a large consortium project 'SINATRA' researching flooding from intense rainfall, working with many stakeholder partners including the UK Met Office, the Environment Agency, the Flood Forecasting to improve flood forecasting and warning. She is also working on improvements to the Global Flood Awareness System and land surface model parameterisation for flood forecasting.

**Elizabeth Stephens** (Female) is an Early Career Fellow working on the Global Flood Awareness System (GloFAS), developing novel statistical techniques to provide a thorough diagnostic evaluation of current forecasting system advantages and limitations at the spatial and temporal scales that are relevant to decision makers. The ultimate goals of this project are to help humanitarian agencies to utilise forecasts and to enable forecast system development to be prioritised by what produces the largest gains in decision-making ability.

**Rebecca Emerton** (Female) is a junior researcher in hydrometeorology and land surface processes working on reforecasting and predictability of flooding. She has worked on problems related to assessing and evaluating hydrological predictions from land surface systems and is widely experienced in knowledge exchange and presenting work to differing communities.

**A list of up to 5 relevant publications, and/or products, ;**


- *2016 Continental and Global Scale Flood Forecasting Systems Emerton RE, Stephens EM, Pappenberger F, Pagano TC, Weerts AH, Wood AW, Salamon P, Brown JD, Hjerdt N, Donnelly C, Baugh C, Cloke HL WIREs Water. In press.*
- *2015 Precipitation and floodiness. Stephens, E., Day, J. J., Pappenberger, F. and Cloke, H. Geophysical Research Letters, 42 (23). pp. 10316-10323. doi: 10.1002/2015GL066779*

- *2015 Improved seasonal prediction of the hot summer of 2003 over Europe through better representation of uncertainty in the land surface. Macleod D. A. Cloke H. L. Pappenberger, F., Weisheimer A. Quarterly Journal of the Royal Meteorological Society.doi:10.1002/qj.2631*
- *2015 Imbalanced land-surface water budgets in a numerical weather prediction system. Kauffeldt, A., Halldin, S., Pappenberger, F., Wetterhall, F., Xu, C.-Y. and Cloke, H. L. Geophysical Research Letters. ISSN 0094-8276 doi: 10.1002/2015GL064230*

  *2015 ERA-Interim/Land: a global land surface reanalysis data set. Balsamo, G. , Albergel, C., Beljaars, A., Boussetta, S., Brun, E., Cloke, H., Dee, D., Dutra, E., Muñoz-Sabater, J., Pappenberger, F., de Rosnay, P., Stockdale, T. and Vitart, F. Hydrology and Earth System Sciences, 19 (1). pp. 389-407. doi: 10.5194/hess-19-389-2015*

**A list of up to 5 relevant previous projects or activities,** .

- *ANYWHERE: EnhANcing emergencY management and response to extreme WeatHER and climate Events. (UREAD – co-investigator) Horizon 2020 2016-2019 This large consortium project led by CRAHI consists of developing a platform of products and services to support decision making and management of the response operations during weather-induced emergencies.*
- *IMPREX: IMproving PRedictions and management of hydrological Extremes (UREAD – co-investigator) Horizon 2020 2015-2018 In this large consortium project led by KNMI is progressing forecasting capability of hydrological extremes and their impacts at synoptic to seasonal time scales. Particular emphasis is on the provision of realistic, robust and relevant information on extreme hydrological impacts at climate time scales to governments, business and citizens in Europe.*
- *IMPETUS: Improving Predictions of Drought for User Decision-Making (UREAD – project lead) Natural Environment Research Council (UK) 2014-2018 IMPETUS is a large consortium project aiming to improve the forecasting of UK drought on monthly to decadal timescales, which will lead to the development of improved decision-making processes. IMPETUS is improving meteorological, hydrological and water demand forecasts and how they are combined to produce drought forecasts working with stakeholders.*
- *SINATRA Susceptibility of Catchments to Intense Rainfall and Flooding (UREAD – project lead) Natural Environment Research Council (UK) 2013-2018 SINATRA is a large consortium project improving the understanding and characterisation of the processes determining the probability, incidence and magnitude of flooding from intense rainfall; developing new modelling architectures, parameterisations and data assimilation routines and improving the understanding and prediction of impacts.*
- *Assessing Ensemble Flood Forecasts at the Key Spatial and Temporal Scales (UREAD – project lead) Leverhulme research foundation2013-2016 Early Career Fellowship working with the Global Flood Awareness System and Humanitarian Agencies to understand predictiability and utility of the forecasts.*

***"No third parties involved"***

### 4.18 18 – Centre National de la Recherche Scientifique - Laboratoire d'Etude en Géophysique et Océanographie Spatiale (CNRS)

**Description of Organisation**

The Laboratoire d'Etude en Géophysique et Océanographie Spatiale (LEGOS) is a joint research unit set up by CNRS, UPS (University Paul Sabatier), IRD and CNES and is devoted to earth system science, coastal oceanography, tropical dynamics, marine biogeochemistry, spatial hydrology and oceanography , and cryospheric dynamics. Research groups investigating these themes pursue a multi-disciplinary approach, using in-situ observations, satellite measurements, modelling and data assimilation. LEGOS engages in these activities as part of the Observatoire Midi-Pyrénées and the University of Toulouse, in close collaboration with locally based businesses such as CLS and NOVELTIS, the national research organisations CNRS and IRD, and European and international programs.

Concerning sea level science, LEGOS is internationally recognized for studying contemporary sea level rise and understanding its causes. Since now about 20 years, research of the sea level team is mostly devoted to climate research with two main topics: contemporary sea level variations and their causes, and the continental water cycle. The sea level team moved to these topics because of the new availability of high precision altimetry (with the launch of Topex/Poseidon in 1993 and following missions) and the recognition that space techniques can also be used to study land hydrology. The team became involved in the precise determination of the mean sea level from satellite altimetry at regional and global scale. The team worked at explaining the global mean sea level rise and associated thermal expansion and land ice contributions (using in situ hydrograhic data for the steric sea level component and space-based observations for land ice), trying to close the sea level budget. The team also studied the causes of the interannual variability of the global mean sea level, in particular the link with ENSO events. In parallel, the team studied the causes of the regional variability in sea level trends, developed 2-dimensional past sea level reconstructions to derive spatial trend patterns prior to the altimetry era (since about 1950) and determine the dominant modes of variability of these spatial patterns (found to be mainly driven by ENSO, PDO, NAO, etc). In a recent study, the team addressed the detection/attribution problem, i.e., tried to detect the anthropogenic signal in the observed spatial sea level patterns (comparing satellite altimetry data, past sea level reconstructions and outputs of coupled climate models with and without anthropogenic forcing). A growing part of the team's research on sea level now concerns the regional variability and the local impacts of sea level rise (considering the sum of the global mean rise plus regional variability plus vertical crustal motions) in different regions, in particular the low-lying Pacific islands (but other regions are also studied). Since the early 2010s, the team became also involved sea level projections with climate models at both global and regional scales. The approach is to assess climate model estimates against sea level observations to refine projections of future sea level. The team is currently leading an Internation Space science Institute team to address this problem.
Sea level, climate change as well as the global water cycle are currently the main research focus of the LEGOS sea level team. The LEGOS proposing team has published more than 60 articles on "Sea Level" in peer-reviewed journals since year 2000.

**Profiles of staff members:**

**Benoit Meyssignac, male, Msc, PhD.,** specialised in the analysis of the water-energy cycle in the climate system. He has experience in analysing climate model's output and assessing climate model simulations against observations of the water-energy cycle through space geodesy and altimetry. He has particularly focused his work in analysing the sea level variations at climatic time scales in both climate models and space observations. he is involved in French and European research projects focusing on the sea level budget closure, the estimate of the Earth energy budget, the impact of sea level rise, the assessment of climate models against observations. He is part of the steering committee of the WCRP grand challenge "regional sea level change and coastal impacts"

**A list of up to 5 relevant publications, and/or products, ;**

*1)* Melet A. and Meyssignac B., (2015) Explaining the spread in global mean thermosteric sea level rise in CMIP5 climate models. Journal of Climate, 28, 9918–9940. doi: http://dx.doi.org/10.1175/JCLI-D-15-0200.1
*2)* Le Cozannet G., Garcin M., Yates M., Idier D., Meyssignac B., (2014) Approaches to evaluate the recent impacts of sea-level rise on shoreline changes, Earth-Science Reviews, 138, 47-60. doi: 10.1016/j.earscirev.2014.08.005
*3)* Meyssignac B., Llovel W., Cazenave A., Salas-Melia D., Becker M. (2012) Tropical Pacific spatial trend patterns in observed sea level: internal variability and/or anthropogenic signature? Climate of the Past. 8:787-802. doi:10.5194/cp-8-787-2012
*4)* Meyssignac B., Becker M., Llovel W., Cazenave A. (2012) An assessment of two-dimensional past sea level reconstructions over 1950-2009 based on tide gauge data and different input sea level grids. Survey in Geophysics, 33, 5:945-972. doi:10.1007/s10712-011-9171-x.
*5)* Meyssignac B. and Cazenave A. (2012). Sea level: a review of present-day and recent-past changes and variability. Journal of Geodynamics, 58:96-109. doi:10.1016/j.jog.2012.03.005.

**A list of up to 5 relevant previous projects or activities,** .

1) PI of the international team « Contemporary Regional & Global Sea Level Rise: Assessment of Satellite, in-situ Observations and Climate Models » of the International Space Science Institute: http://www.issibern.ch/teams/climatemodels/
2) CoI of the « Sea Level Climate Change Initiative » project of ESA : http://www.esa-sealevel-cci.org/
3) CoI of the « Earth Radiative Budget » project of the International Space Science Institute
4) CoI of the "Coastal Environmental Changes: Impact of sea LEvel rise" project of the Agence Nationale de la Recherche: http://www.anr-cecile.fr/
5) Member of the steering team of the WCRP/CLIVAR grand challenge "Regional sea level change and coastal impacts" : http://www.wcrp-climate.org/grand-challenges/gc-sea-level

***"No third parties involved"***

### 4.19 19 – University of New South Wales (UNSW)

**Description of Organisation**

The City Futures Research Centres, University of New South Wales (UNSW) has a focus on data driven research to support better planning and policy-making. City Futures Research Centre, UNSW has been in existence for more than 10 years and has programs on (i) City Analytics, (ii) City Change, (iii) City Housing, (iv) City Shaping and (v) City Wellbeing. Professor Pettit is the leader of the City Analytics Program. The City Analytics Program will contribute specifically to Task 7.3. Sustainable Cities, through expertise in city indicators. The City Analytics program has developed the City Indicator Data Openness Measure (CI-DOM). This measure will be applied all the indicators developed in this work package. Also through the Australian Research Council funded project "Urban Analytics Data Infrastructure" The City Analytics Program will provide access to nationwide urban data collections across Australia including data on housing to develop and test city indicator harmonization across Continents. The City Analytics Program will also contribute to the formulation of an urban data dictionary.

The City Futures Research Centre, through Professor Pettit will also contribute to WP 9 in activities associated with international partnership, dissemination and outreach. Prof Pettit co-chairs the Research Data Alliance Interest Group on Quality of Urban Life Indicator along so with Dr Massimo Craglia and Prof Piyushimita Thakuriah. This will provide an important vehicle for international partnerships and dissemination of project outcomes. Prof Pettit has also been involved in coordinating the development of a number of city wide indicator products across Australia, as part of the Australian Urban Research Infrastructure Network (AURIN) e-infrastructure project. He will bring this expertise in helping to formulate and harmonize indicators products internationally.

**Profiles of staff members:**

**Professor Christopher Pettit, Male, BRTP, PgDipGIS, MRTP, PhD**, specialised in the convergence of the fields of spatial planning and GIS and he has published more than 120 peer reviewed papers in this area. For the last 20 years he has been undertaking research and development in the use of GIS and mapping technologies for creating what if? land-use change scenarios at the land parcel level across municipalities and cities. In relation to this research he was Chief Investigator on the AURIN open source What if? project and is the Chief investigator for a CRC-Spatial Information project which is endeavouring to better understand and overcome the bottlenecks in adoption of planning support systems in practice. He is also currently undertaking research into spatial measures of liveability and their adoption by policy and decision makers. He is also a co-Chief Investigator on the NHMRC Centre of Research Excellence in Healthy, Liveable and Equitable Communities and co-CI on the NHMRC Australian Prevention Partnership Centre project: Reconnecting urban planning with health: The development and validation of national liveability indicators associated with chronic disease risk factors and health outcomes.

**A list of up to 5 relevant publications, and/or products, ;**

Pettit, C.J. Barton, J, Goldie, X, Sinnott, R. Stimson, R, Kvan, T. (2015) The Australian Urban Intelligence Network supporting Smart Cities, in Geertman S, Stillwell J, Ferreira J and Goodspeed J (eds) Planning Support Systems and Smart Cities, Lecture Notes in Geoinformation and Cartography, pp 243 – Springer, pp 243-259.

Sinnott, R.O. C. Bayliss, A. Bromage, G. Galang, G. Grazioli, P. Greenwood, G. Macauley, D. Mannix, L. Morandini, M. Nino-Ruiz, Pettit, C.J. M. Tomko, M. Sarwar, R. Stimson, W. Voorsluys, I. Widjaj. (2014) The Australia Urban Research Gateway, Concurrency and Computation: Practice and Experience, DOI: 10.1002/cpe.3282.

Fox, M. and Pettit, C. (2015) On the Completeness of Open City Data for Measuring City Indicators, IEEE First International Smart Cities Conference (ISC2), Guadalajara, Mexico, 25-28 October 2015.

Hunter, J., Azeezullah, I., Ward N., Shyy, T-K, Beer, C., Girvan, S., Nairn, A., Branson, M., Stimson, R., Dentrinos, J., Galang, G., Wallace, S. Pettit, C.J. (2015) "Enabling SDMX-based Retrieval and Spatio-statistical Analysis of National Census and Related Datasets", 11th IEEE International Conference on eScience 2015, Munich, Germany Aug 31-Sept 4, 2015.

Li, S., Dragicevic, S., Castro, F. A., Sester, M., Winter, S., Coltekin, A. Pettit, CJ. Jiang, B. Haworth, J. Stein, A., Cheng, T.. Geospatial big data handling theory and methods: A review and research challenges. ISPRS Journal of Photogrammetry and Remote Sensing. doi:http://dx.doi.org/10.1016/j.isprsjprs.2015.10.012

**A list of up to 5 relevant previous projects or activities,** .

| | |
|---|---|
| 2016/2017 | Urban Analytics Data Infrastructure, (ARC, $805,000) Role; Chief Investigator |
| 2016/2017 | Rapid Analytics Interactive Scenario Explorer RAISE (CRC-Spatial Information, $390,000), Role Chief Investigator |
| 2014/2017 | What cost-effective built environment interventions would create healthy, liveable and equitable communities in Australia, and what would facilitate these being translated into policy and practice? (NHMRC, 1061404, $1,865,000), Role: Chief Investigator. |
| 2014/2015 | Reconnecting urban planning with health: The development and validation of national liveability indicators associated with chronic disease risk factors and health outcomes (NHMRC, 9100001, $620,000), Role: Chief Investigator. |
| 2014/2016 | Understanding Barriers, Bottlenecks and Opportunities for Adoption of Spatial Information Tools in Land use Planning in Australia and New Zealand: A Visual Analytics Usability Approach. (CRC-Spatial Information, $108,000) Role: Chief Investigator. |

**A description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work;**

Access to the $24 million Australian Urban Research Infrastructure Network (AURIN), which comprises over 2,000 datasets and 100 spatial-statistical tools.

***"No third parties involved"***

### 4.20 20 – UNEP-DHI Partnership - Centre on Water and Environment (UNEP-DHI)

**Description of Organisation**

The UNEP-DHI Partnership - Centre on Water and Environment is a United Nations Environment Programme centre of expertise, and is dedicated to improving the management of freshwater resources from the local to the global level. It was established in 2001 and is hosted by DHI Group headquarters in Denmark. D**HI is an independent, international consulting and research-based not-for-profit foundation of more than 1000 employees, with offices in 30+ countries, and with more than 50 years of experience in water resources management, particularly specializing in water resources modelling tools. As a collaborating centre between UNEP and DHI, the centre is able to draw upon and combine the vast range of knowledge and skills of both organizations.**

**UNEP-DHI, through its role in within the UN-Water, has been extensively involved in the work relating to the formulation of the goal, targets and indicators for the global SDG Goal 6 on Water and Sanitation – as a lead on Target 6.5 (IWRM Implementation) and in a contributing role for targets 6.4. and 6.6. (water use efficiency/sustainable withdrawals and water ecosystems respectively). In addition, UNEP-DHI is actively involved in the design of the** Global Expanded Monitoring Initiative (GEMI) for **Integrated Monitoring of Water and Sanitation Related SDG Targets globally, operating under the UN-Water umbrella. Supported by the** Swiss Agency for Development and Cooperation (SDC), this initiative will assess indicators and monitoring options for each target under SDG 6, will refine relevant indicators and design a coherent mechanism, working in direct support of agreed global monitoring and reporting systems for all of the SDGs. UNEP-DHI has been particularly involved in indiator assessment and monitoring mechanism design for targets relating to sustainable withdrawals, water use efficiency, water ecosystems and IWRM.

UNEP-DHI has thus extensive knowledge of the targets and indicators relating to the monitoring and reporting on the global SDG for water. In addition, the centre is able to draw on the expertize of DHI-GRAS. DHI GRAS is specialised in earth observation, satellite image processing and Geographic Information Systems. Since 2000, more than 150 projects in more than 50 countries worldwide have been completed. DHI GRAS has a strong background in remote sensing for hydrology, water quality, environmental assessment and land cover mapping.

**Profiles of staff members:**

**Dr. Christian Tottrup**, male, Msc, PhD, specialized in Earth Observation (EO) for water and natural resources management and with practical experience from project management, consultancy and research on a global scale. In recent years he has been focusing on the development of open source software tools for EO based monitoring, assessing and inventorying of water resources. Dr. Tottrup is the acting project manager on GlobWetland Africa - a large EO application project funded by the European Space Agency to facilitate the exploitation of satellite observations for the conservation, wise-use and effective management of wetlands. Dr. Tottrup is also currently involved in the formulation of the draft monitoring methodology for SDG indicator 6-6-1.

**Dr. Peter Koefoed Bjornsen**, male, M.Sc., Ph.D., specialized in aquatic ecology, environmental monitoring and assessment, and integrated water resources management. More than 25 years of experience from research, research management and international development cooperation. As Director for the UNEP-DHI Partnership Centre on Water and Environment, Dr. Bjornsen has through UNEP and UN-Water been actively involved in providing technical support to the formulation of the Sustainable Development Goal 6 on Water and in developing indicators and monitoring and reporting mechanisms for the new targets under SDG-6.

**Dr. Silvia Huber**, female, Msc, PhD., specialized in utilization of Earth Observation (EO) for monitoring environmental parameters and status/change detection. Dr. Huber has previously worked with environmental changes in the Sahel on the subject of long-term satellite time series, performing trend analyses and looking at teleconnections. In recent years, she has been engaged with a wide range of topics including water quality monitoring, land cover change and trend analysis, land cover mapping, erosion potential mapping or drought monitoring. She has profound skills in EO data processing, geostatistical data analysis, geospatial mapping as well

as validation procedures. She is involved in Danish and European research projects focusing on integrating EO data into monitoring programs, e.g. for WFD reporting. Dr. Huber manages several languages including English, German (mother tongue), French and Italian.

**Gareth James Lloyd.** Male, MSc., Senior Programme Advisor at UNEP-DHI Partnership. Advising on issues related to governance, policy, planning, stakeholder involvement, operation, regulation and information management in the water sector, and specifically IWRM. He has been expensively invololved in the consultation process for global goal on water over several years, and is currently supporting the preparation and execution of a project proposal for the global monitoring and reporting mechanism on the SDG 6 under GEMI.

**Maija Bertule**. Female, MSc., Programme Advisor at UNEP-DHI Partnership. Specializing in indicator driven assessments of water resources. Contributed to the consultation process and indicator analysis in preparation of the UN-Water Recommendation for the global SDG for Water, and preliminary indicator analyzis under GEMI. Assistant project manager of the GEF Transboundary Waters Assessment Programme River Basins Component – indicator based assessment of 286 transboundary rivers. Currently involved in design of an online tool and platform to support indicator based management processes in basins.

**A list of up to 5 relevant publications, and/or products, ;**

- A Post-2015 Global Goal for Water: Synthesis of Key Findings and Recommendations from UN-Water (results of the consultation processs with UNEP-DHI's contribution): http://www.unwater.org/publications/publications-detail/en/c/216087/
- Guzinski R, Kass S, Huber S, Bauer-Gottwein P, Jensen IH, Naeimi V, Doubkova M, Walli A, Tottrup C. (2014): Enabling the Use of Earth Observation Data for Integrated Water Resource Management in Africa with the Water Observation and Information System. Remote Sensing, 6(8):7819-7839.
- GEMI – Integrated Monitoring of Water and Sanitation Related SDG Targets: Phase 1 Development of a monitoring process and baseline (project proposal document).

**A list of up to 5 relevant previous projects or activities,** .

- TIGER-NET (2012 – 2015). ESA financed project aiming to support of the African Earth Observation Capacity for Water Resource Monitoring in close collaboration with African water authorities and experts. DHI GRAS was in charge of design and development of an open-source Water Observation and Information System (WOIS) for monitoring, assessing and inventorying water resources in a cost-effective manner
- TIGER-BRIDGE (2015 – 2017). ESA funded project with the aim to further strengthen the EO capacity and knowledge within the African water resource community. A continuation of TIGER NET efforts.
- GlobWetland Africa (2015 – 2018). ESA funded project in partnership with the African Team of the Ramsar convention on wetlands. The project is initiated to facilitate the exploitation of satellite observations for the conservation, wise-use and effective management of wetlands in Africa and to provide African stakeholders with the necessary Earth Observation (EO) methods and tools to better fulfil their commitments and obligations towards the Ramsar Convention on Wetlands.
- Analysis and consultation process for the UN-Water Recommendations for the targets and indicators of Global Goal for Water
- GEMI - the Global Expanded Monitoring Initiative: Phase 1 Development of a monitoring process and baseline of Integrated Monitoring of Water and Sanitation Related SDG Targets on a global level
- Support to AMCOW on the Establishment of a Monitoring and Reporting System for the Water Sector in Africa

**A description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work;**

- *DHI MIKE Software*

***DHI has linked third parties, see section 4.2 for descriptions***

## 4.21 21 – NATURAL ENVIRONMENT RESEARCH COUNCIL (NERC)

**Description of Organisation**

The British Geological Survey (BGS) is part of the Natural Environment Research Council (NERC), the UK's largest funder of independent environmental science, training and innovation, delivered through universities and research centres. BGS is Britain's national geological survey and has been in existence since 1835. BGS works for both the public and private sectors and employs around 690 staff, 465 of which are scientists. BGS are the United Kingdom's premier centre for earth science information and expertise and is its principal supplier of national capability in geoscience. It is the UK's premier provider of objective and authoritative geoscientific data, information and knowledge for wealth creation, sustainable use of natural resources, reducing risk and living with the impacts of environmental change.
BGS is the designated NERC National Geosciences Data Centre (NGDC) and is the national UK repository for geosciences data (www.geosciencedatacentre.com) derived from UK industry, international scientific collaboration and academic research. The data centre is responsible for maintaining environmental data and making them available to all users, not just NERC researchers but others from science, commerce, government and education as well as the general public. It is essential that data generated through NERC supported activities are properly managed to ensure their long-term availability. These data holdings provide a resource for new research, investigating key environmental challenges such as climate change, supporting Government policy in areas like managing water quality, supporting infrastructure development and commercial enterprise. NERC supports open access to publicly-funded research and ensures that the ideas and knowledge derived from our research, survey and monitoring activities are made available as widely, rapidly and effectively as practicable.

**Profiles of staff members:**

**Mr James Passmore (male)** is a GIS and web application developer with over 20 years experience, specialising in OGC web standards with additional research interests in geoinformatics and linked data and the semantic web. James is currently working with the INSPIRE Maintenance and Implementation Group to extend the INSPIRE download service technical guidance to include WCS. He is the author of a series of OneGeology cookbooks explaining how to create compliant OGC WMS services for INSPIRE and OneGeology. James has played a lead development role in a number of EU funded research infrastructure projects including EPOS, Pangeo, EarthServer, OneGeology and SubCoast.

**Mr Martin Nayembil (male)** is the BGS data architect with nearly 20 years' experience in the application of database technology to the geosciences including Spatial and XML relational database technologies as well as NoSQL databases. Martin has knowledge of a wide range of commercial and open source database solutions and specific expertise in developing and maintaining a Data Architecture, defining and implementing standards and best practice for database design. Martin is currently playing a major role in defining the technical architecture for EPOS.

**Mr Jonathan Lowndes (male)** is a project manager and lead developer at the BGS. He has over 14 years' experience in the development of web and database applications. For the past 8 years he has also managed commercial projects for the management and delivery of data to industry and the public, including UKDEAL for the hydrocarbons industry and CO2 STORED for the carbon capture industry. He has experience in web services, including OGC services and the implementation of INSPIRE directives , being responsible for the delivery and management of the EMODnet Geology portal.

**Mr Patrick Bell (male)** is Information Systems Team Leader at the BGS. Patrick is a web systems and GIS specialist with over twenty years of experience. Specialising in spatial technologies and infrastructures and developing information systems that provide access to geoscience information via multiple channels including web browsers, mobile apps and social media, Patrick has been responsible for delivering award winning systems such as OpenGeoscience (www.bgs.ac.uk/opengeoscience), UK Soil Observatory (www.ukso.org) and the iGeology mobile app (www.bgs.ac.uk/igeology).

**Ms Rachel Heaven (female)** is a geologist and informatics specialist with over 20 years experience. Rachel specialises in geographic metadata standards, database design and development, linked open data and thesaurus and ontology development. She also has expertise in spatial database and web mapping and Android smartphone app development. From 2003 to 2012, Rachel was a member of the CGI-IUGS Multi Lingual Thesaurus Working Group. Since 2012, Rachel has been a member of the CGI-IUGS Geoscience Terminology Working Group. Rachel is a member of the W3C spatial data on the web working group.

**A list of up to 5 relevant publications, and/or products, ;**

BGS deliver OpenGeoscience (www.bgs.ac.uk/opengeoscience) an online portal to free data which received 20 million hits on its day of release.
BGS run CO2STORED (www.co2stored.co.uk) providing access to world-leading overview data for over 500 potential CO2 storage sites around offshore UK.
BGS are members of the ESSP partnership (http://www.bgs.ac.uk/essp/) combining our data, information and expertise, to create a commercial API marketplace for environmental data services.
BGS has much involvement with UK, EU and global initiatives aimed at increasing the availability of environmental spatial data. BGS staff sit on a number of technical and data specification teams for INSPIRE and the DEFRA led UK Location programme.
BGS provide iGeology (www.bgs.ac.uk/iGeology) a mobile app for iOS and Android that delivers interactive access to BGS digital geology mapping which has received over 250,000 downloads.

**A list of up to 5 relevant previous projects or activities,** .

**EPOS** (http://www.epos-eu.org/) a long-term plan for the integration of national and transnational Research Infrastructures for solid Earth science in Europe to provide seamless access to data, services and facilities.
**OneGeology project** (http://www.onegeology.org) that has built a geoscience data and information platform through the provision and utilisation of standardised web services by geological surveys and institutues across the globe.
**PanGeo** (http://www.pangeoproject.eu/) providing free access to geohazard information for many of the largest cities in Europe, mapping geohazards that could potentially affect up to 13% of the EU population. PanGeo is supporting 'Copernicus', a European program designed to support EU environmental policy.
**European Geological Data Infrastructure EGDI** (http://www.egdi-scope.eu/) working towards European societal challenges, trying to achieve increased coordination and more sustainable accessibility of geological information at EU-level.
**Minerals4EU** (http://www.minerals4eu.eu/) designed to meet the recommendations of the Raw Materials Initiative and is developing an EU Mineral intelligence network structure delivering a web portal, a European Minerals Yearbook and foresight studies.

**A description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work;**

The BGS Keyworth Computer Room is a purpose-built facility commissioned in September 2010 providing 1760U of rackmount server space plus additional 362U for communications and networking equipment. The Computer Room was awarded the BREEAM 'Excellent' rating for building design and construction (the first such award for a data centre in the UK), and has been awarded an "A" Rating for Energy Performance.

***"No third parties involved"***

### 4.22 22 – Regional Agency for Prevention, Environment and Energy of Emilia-Romagna (ARPAE)

**Description of Organisation**

ARPA-SIMC is the regional Hydro-Meteo-Climate Service belonging to the Regional Agency for Prevention, Environment and Energy of Emilia-Romagna (ARPAE) in Northern Italy. Its tasks include meteorological and hydrological real-time monitoring and forecasting over the Region. Forecasting activities cover nowcasting products, by means of radar and conventional real-time observations, and short and medium range probabilistic weather and hydrological predictions. The hydrological division is responsible for the development and implementation of operational flood forecasting and water management products based on hydrological models used in combination with numerical ensemble weather and long-range forecasts. The products of the climate group include local climate monitoring and its description, and the production of local climate predictions, including scenario projections and multi-model seasonal calibrated predictions. The expertise and the products of the climate group and the hydrological division have been developed within the framework of National and European projects (e.g. STARDEX, DEMETER, CLIMAGRI, SEDEMED I and II, ENSEMBLES, WEATHER, WATECORE, COASTANCE, ENHANCE, CIRCE and the COST action VALUE).

ARPAE, in particular the Hydrology Area, took part in AIP-6 project, coordinated by OGC, to develop and promote the use of WaterML2 standard format; besides the same Area implemented the Italian Hydrological Information System (HIS) in collaboration with ISPRA (Italian Institute for Environmental Protection and Research) in the framework of GEOSS and WMO data exchange policy. ARPAE represents Italy in international organizations, such as WMO and OGC working groups, thanks to some experts belonging to the Agency.

**Profiles of staff members:**

**Dr. Eng. PECORA Silvano (M)** is a civil engineer, specialized in hydrology and hydraulics, with a PhD in Hydrological Engineering. He is Head of Hydrology at ARPA-SIMC, coordinating hydrological monitoring and modeling in the whole Po river basin, Italy. He has a long experience in flood forecasting and water resources management using numerical and stochastic models. He is leading the development of the Italian Hydrologic Information System, which provides a service oriented architecture for publishing, cataloging, discovering and accessing hydrological data in Italy. He is National Representative in WMO Commission of Hydrology, co-leader of the WMO\OGC Hydrology Domain Working Group, co-task team leader of the Task Team on Water Scarcity and Drought in the Working Group of Climate and Hydrology of the WMO RA VI (Europe), WMO CHy representative at CBS IPET-MDRD (Inter-Programme Expert Team on Metadata and Data Representation Development). He is actively participating in the development of WHOS, the WMO Hydrological Observing System, as the mechanism whereby WMO CHy would provide the most comprehensive hydrological component in fulfillment of the WIGOS objective of “an integrated, comprehensive, and coordinated system which is comprised of the present WMO global observing systems.” In the context of WMO CHy, he is supporting hydrological data exchange according to OGC and WMO standards in a large number of applications in the world.

**Eng. BORDINI Fabio (M)** graduated in Electronic Engineering at the University of Perugia. After experiences in the private and business sector, he worked as system, database, server manager and developer for the Regional Health Office of Emilia Romagna. He has been working at ARPAE since 2009 as system administrator, software and hardware developer and assistant. He has an expertise in European and International environmental data sharing and management, brokering data, metadata services and catalogs; besides he developed national and international infrastructures of open data based on WMO-OGC standards, including the Italian Hydrological Information System (HIS Italy).

**Dr. ALESSANDRINI Cinzia (F)** graduated in Environmental Sciences in the University of Parma. She has an expertise in European and International projects proposals preparedness and management concerning floods, droughts and data management. Her tasks include hydrological monitoring, flood and drought forecasting and reporting. Recently she coordinated the Italian hystorical water data collection to implement the Italian Hydrological Information System (HIS Italy) among 20 different Administrative Regions, in collaboration with ISPRA (Italian Institute for Environmental Protection and Research).

**Dr. TONELLI Fabrizio (M)** gained his PhD in Hydrological Engineering at the University of Padova. His tasks in ARPAE include hydrological monitoring and numerical hydrological modelling of the Po river basin. Moreover, he is in charge of the Po river Flood Early Warning System maintenance. He took part in the Italian hystorical data preparedness to create a common data format to upload them in the Italian Hydrological Information System (HIS Italy).

**Additional Staff**: Dr. Mauro Del Longo (M), Eng. Alberto Agnetti (M), Eng. Giuseppe Ricciardi (M), Dr. Franca Tugnoli (F), Dr. Monica Branchi (F), Eng. Enrica Zenoni (F).

**A list of up to 5 relevant publications, and/or products, ;**

1. Pecora S., Open Data in idrologia. XXXIV Congresso nazionale di Idraulica IDRA14, Bari, 2014.
2. S. Pecora, F. Bordini: Contribution to the HIS architecture of ISPRA (Italian High Institute for Environmental Research and Protection) 2013.
3. Alessandrini C., Bordini F., Pecora S., Tonelli F.: Standard per la condivisione dei dati idrologici. Giornate dell'Idrologia – Italian Hydrological Society, Perugia, 6-8 October 2015.
4. Pappemberger F., Stephens L., Van Andel S. J., Verkade J. S., Ramos M. H., Alfieri L., Brown J. D., Zappa M., Ricciardi G., Wood A., Pagano T., Marty R., Collischonn W., Le Lay M., Brochero D., Cranston M., and Meissner D.: HEPEX – Operational HEPS systems around the globe, available at: http://hepex.irstea.fr/ operational-heps-systems-around-the-globe/, 2013.
5. Casicci L., Montani A., Pecora S., Tonelli F. and Vergnani M. Pre-operational use of a meteorological and hydrological/hydraulic ensemble approach on the Po River. Proceedings of The European Geosciences Union General Assembly, Vienna, Austria 03 – 08 April 2011.

**A list of up to 5 relevant previous projects or activities,** .

1. AIP-6 GEOSS water services for data and maps.
2. AIP-7 GEOSS discovery and access to global water data, maps and services.
3. Participation to activities belonging to WMO Commission for Hydrology in standardized water data sharing and in the OGC/WMO Hydrological Domain Working Group.
4. Coordination of Operational Hydrology Committee in Italy for collection and dissemination of hydrological observations.
5. Demonstrations of standardized water data dissemination in South and Central America, SAVA river basin, North and Southern Africa, Arctic Region, New Zealand and China.

**A description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work;**

1. HIS Italy: the Italian hydrologic monitoring is a federated network composed by 19 Administrative Regions and 2 Autonomous Provinces, together with ISPRA, the governmental technical body established by the Italian Ministry of Environment. The portal provides access to the hydrological observations in Italy, commonly published as Hydrological Yearbooks. In particular, it provides additional operational capability, for in situ water observations, as a national registry of water data services catalogued using the standards and procedures of the Open Geospatial Consortium and the World Meteorological Organization.

***"No third parties involved"***

### 4.23 23 – EGI.eu

**Description of Organisation**

Stichting EGI (abbreviated EGI.eu) is a not-for-profit foundation established under the Dutch law to coordinate EGI. EGI is an international collaboration that federates the digital capabilities, resources and expertise of national and international research communities in Europe and worldwide. The main goal is to empower researchers from all disciplines to collaborate and to carry out data- and compute-intensive science and innovation. EGI offering includes a federated IaaS cloud to run compute- or data-intensive tasks and host online services in virtual machines or docker containers on IT resources accessible via a uniform interface; high-throughput data analysis to run compute-intensive tasks for producing and analysing large datasets and store/retrieve research data efficiently across multiple service providers; federated operations to manage service access and operations from heterogeneous distributed infrastructures and integrate resources from multiple independent providers with technologies, processes and expertise offered by EGI; consultancy for user-driven innovation to assess research computing needs and provide tailored solutions for advanced computing. Over the last decade, EGI has built a federation of long-term distributed compute and storage infrastructures that has delivered unprecedented data analysis capabilities to more than 40,000 researchers from many disciplines (e.g., Medical and Health Sciences, Natural Sciences, Engineering and Technology, Agricultural Sciences, and Art and Humanities). The EGI federation brings together more than 350 data centres worldwide and also includes the largest community cloud federation in Europe with 21 cloud providers across 12 European countries offering IaaS cloud and storage services, and more than 750,000 Virtual Machines run since January 2014.

**Role of EGI.eu in the project**

EGI.eu will contribute to WP2 in order to support the design and development of the EuroGEOSS-HUB innovative IT platform bringing the expertise in designing and operating distributed infrastructures. In particular, EGI.eu will bring the expertise in IT service management, interoperability of heterogenous infrastructure and also in supporting the integration of the platform with the EGI federated cloud in order to ensure the publicly funded cloud providers can support the GEOSS applications in the area of research and innovation. This will give more strenght to a European ecosystem composed of both publicly funded and commercial providers that can serve the full chain from research to innovation and commercialisation of applications in the domain of this project.

**Profiles of staff members:**

**Dr. Sergio Andreozzi (M)** is the Strategy and Policy Manager at EGI.eu supporting the strategic planning and execution of EGI.eu and the EGI federation. He coordinates the development of processes for managing the EGI service and solution portfolios as well as for managing innovation. He has been involved in grid and distributed computing since 2002 contributing to technical activities, standardisation, development of business models, interoperability, policy analysis, sustainability, IT service management among others. Sergio holds a PhD in Computer Science from the Univ. of Bologna and a MSc in Computer Science Engineering from the Univ. of Pisa.

**Sy Holsinger (M)** is a Senior Strategy and Policy Officer at EGI.eu with a focus on strategic planning and execution, business model development, and federated service management. He has 10 years experience in several EU-funded projects related to the development and implementation of e-Infrastructures for research and innovation as well commercial exploitation. Sy studied Business Communications and Management focusing on project and financial management, business development, marketing and communication messaging.

**Peter Solagna (M)** works as Senior Operations Manager at EGI.eu. He has particular expertise in the field of distributed and federated infrastructures, and has been successfully coordinating two activities in the EGI-InSPIRE project, among which Technology provisioning (which includes the activities for the deployment of a Federated Cloud infrastructure) and the Operations of the production infrastructure. Before EGI.eu and EGI-InSPIRE, Peter worked for INFN in the context of EGEE-III projects, and for other big international collaborations involving distributed operations. Peter holds a MSc in Computer Engineering from the University of Padova.

**Matthew Viljoen (M)** has been delivering computing and data services to scientific research communities since 2003 after working in a number of software development companies. More recently Matthew was responsible for running the data archive for WLCG Tier 1 at STFC in the UK. Matthew also developed the data access and storage services for the DIAMOND national synchrotron facility of the UK. Since joining EGI in 2015, Matthew is involved in the EGI-Engage and INDIGO-DataCloud projects. Matthew holds a BSc Honors degree in Mathematics and Physics from Oxford Brookes University.

**A list of up to 5 relevant publications, and/or products, ;**

1. Federating Infrastructure as a Service Cloud Computing Systems to Creates a Uniform E-Infrastructure for Research, Wallom, D.C.H.; Turilli, M., Drescher, M.; Scardaci, D. & Newhouse, S., IEEE 11th International Conference on e-Science 2015, DOI: 10.1109/eScience.2015.51
2. European Open Science Cloud for Research, Dr.Kimmo Koski, Kristiina Hormia-Poutanen, Prof. Mike Chatzopoulos, Yannick Legré, Bob Day, Oct 2015, https://zenodo.org/record/32915
3. Resources and Services of the EGEE Production Infrastructure; Ferrari, T.; Gaido, L.; Journal of Grid Computing, June 2011, Volume 9, Issue 2, pp 119-133, DOI: 10.1007/s10723-011-9184-1, June 2011.
4. EGI: an Open e-Infrastructure Ecosystem for the Digital European Research Area, Sergio Andreozzi, Sy Holsinger, Damir Marinovic, Steven Newhouse, Proceedings of eChallenges e-2012 Conference, Lisbon, Portugal, ISBN: 978-1-905824-35-91
5. EGI: Implementing service management in a large scale e-Infrastructure, Sy Holsinger, Sergio Andreozzi, Proceedings of the IEEE Network Operations and Management Symposium (NOMS) Conference, 2014, Krakow, Poland, DOI: 10.1109/NOMS.2014.6838371

**A list of up to 5 relevant previous projects or activities,** .

1. EGI-Engage - Engaging the Research Community towards an Open Science Commons (www.egi.eu/about/egi-engage), is an €8M H2020 project that started in March 2015, co-funded by the European Commission for 30 months, as a collaborative effort involving more than 70 institutions in over 30 countries. EGI-Engage aims to accelerate the implementation of the Open Science Commons by expanding the capabilities of a European backbone of federated services for compute, storage, data, communication, knowledge and expertise, complementing community-specific capabilities. EGI.eu is the coordinating partner.
2. TEISS - Thales Esa InfoaaS Stimulus is a European Space Agency (ESA) stimulus project (Jan-Jul 2016) to demonstrate that cloud resources can be accessed through the Helix Nebula Marketplace (HNX) for applications analysing/visualising data coming from ESA. EGI.eu is supporting developers at a commercial partner to define an integration solution, providing technical support with an EGI cloud provider, and testing both for the technical integration and in the application porting of two use cases. Activities also comprise the definition of business models for continuing beyond the proof of concept pilot phase.
3. Indigo DataCloud - INtegrating Distributed data Infrastructures for Global ExplOitation (www.indigo-datacloud.eu) is an H2020 project aims at developing a data/computing platform targeted at scientific communities, deployable on multiple hardware, and provisioned over hybrid (private or public) e-Infrastructures. The project will allow application development and execution on Cloud- and Grid--based e-Infrastructures, as well as on HPC clusters. An essential part of DataCloud will be to extend existing PaaS solutions, allowing public and private e-Infrastructures to integrate their existing services.
4. ENVRIplus - Environmental Research Infrastructures providing shared solutions for Science and Society (http://www.envriplus.eu) is a Horizon 2020 project (May 2015-April 2019b) bringing together Environmental and Earth System Research Infrastructures, projects and networks together with technical specialist partners to create a more coherent, interdisciplinary and interoperable cluster of Environmental Research Infrastructures across Europe. EGI.eu is working within the project on data integration, harmonisation and publication facilities, dissemination and training, sustainability plans and liaison with external stakeholders outside of ESFRI environmental research infrastructures.
5. HNSciCloud - Bridging Cloud Computing Innovation & Open Science (http://www.helix-nebula.eu/about-hnscicloud) European pre-commercial procurement (PCP) project co-funded by the European Commission Horizon 2020 Work Programme, which kicked-off in January 2016. Driven by the Pre-Commercial Procurement (PCP) commitment of leading research organisations from across Europe, HNSciCloud creates a competitive marketplace of innovative cloud services serving scientific users from a wide range of domains.

**A description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work;**

EGI.eu will facilitate access to affiliated cloud service providers to test deployment of the applications in an heterogeneous infrastructure; it will also offer access and expertise to the advanced technology being used to federated compute, storage and data.

***"No third parties involved"***

***Consideration of Gender Aspects***

The European Commission has already an instrument to deal with discrimination based on gender in the form of Article 141 (ex Article 119) of the EC Treaty and has adopted a whole series of measures to implement this article in practice. In previous years, the importance of the principle referred to equal economic treatment and wages was included in EC legislation under Article 119 of the EC Treaty. In subsequent years, this principle was extended to the case law of the European Court of Justice. Today, equal opportunities and equal treatment between men and women has been guaranteed by taking actions covering: the application of the principle of equal pay; the creation of equal conditions for men and women with respect to access to employment, vocational training and retirement; equal treatment of men and women in the area of the "de-jure" or "de-facto" social security systems, the reversal of the burden of proof in cases of discrimination; and positive discrimination to promote the underrepresented gender. Over the years, the European Parliament has supported and called for measures to improve the position of women. This work continues through the activities of the Women's Committee. In more detail, a number of specific European and UN Policies have been adopted to promote gender.

The gender issues will be addressed within the EuroGEOSS-Hub consortium with two approaches:

The companies and institutions which already have a gender policy established commit to contribute with communication on their gender policy to the EuroGEOSS-Hub outreach activity so that opportunities (training, employment) can be better known within the specific community.

Within WPs, priority will be given to ensure that the final team will have an adequate presence of women with the right position and competencies. Moreover, the partners commit to action so that the representation of the project towards externals will be well balanced between men and women to act as successful ante type to young women.

From a general point of view, the women representation in the project will roughly remain unchanged or will only marginally increase because key persons are tasked in general for the full duration of the project. The EuroGEOSS-Hub consortium is acutely aware of these issues and a detailed action plan will be developed and implemented, based on JRC example. JRC takes a proactive stance with regard to promoting equal opportunities and, in particular, gender equality in its working environment. The JRC-wide network on "Women and Science", was set up in 2000, continued to monitor gender equality in the organisation. As a result of the activities of this initiative, gender parity has continued to improve with in the organisation.

### 4.2. Third parties involved in the project (including use of third party resources)

#### 01- BRGM

| | |
|---|---|
| Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted) | Y |
| *BRGM will subcontract communications materials such as graphical chart, base communication tools (leaflets, posters, …)* | |
| Does the participant envisage that part of its work is performed by linked third parties | N |
| Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement) | N |

#### 05- CLS

| | |
|---|---|
| Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted) | Y |
| *CLS will subcontract IT generic tasks on code industrialization and cross-platform enablement* | |
| Does the participant envisage that part of its work is performed by linked third parties | N |
| Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement) | N |

#### 07- EARSC LINKED THIRD PARTIES

| | |
|---|---|
| Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted) | N |
| Does the participant envisage that part of its work is performed by linked third parties[1] | Y |
| *EARSC has nearly 80 members, largely companies coming from within the EU. All members sign a letter of attestation agreeing to the EARSC statutes on condition of becoming a member. Each is therefore considered as a Linked 3rd Party ie having a legal connection with EARSC that extends beyond the scope of H2020 projects.*<br>*Most of these companies have skills and expertise which will be of value to the EuroGEOSS-hub project. As linked 3rd parties we intend to involve members as it is required. A full list and short summary of each member and the particular skill which may be used is given below.* | |
| Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement) | N |

[1] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

**ACRI-ST:** An independent French SME, space agencies' partner, serving EO data users, allying scientific research and project management of complex environmental systems.

**Airbus Defence and Space:** Franco-German large company with UK and Spain sites offering IT systems and software, data supply from satellite operations and value-added services.

**AnsuR Technologies**: A Norwegian company which integrates space and satellite applications with satellite communications, navigations and earth observations.

**Assimila:** UK consultancy company with strong links with the research community which help to identify future technologies that will meet our customer's needs and support its implementation.

**Blac**kbr**idge:** A Planetlabs company based in Germany working on satellite operations, ground station, data center and geocloud solutions, satellite imagery distribution and value added products.

**BMT Group:** UK Business group leading engineering, science and technology consultancy, operating mainly in the maritime industries. Offices in Europe, Asia and the America.

**Brockmann Consult:** German value added company instrumental in the design and execution of scientific projects which have been incorporated into ESA environmental satellite missions.

**C-S Systèmes d'information:** French company deploying command and control information systems, implementing open, interoperable and upgradable solutions, aligned with operational needs.

**CGG: NPA Satellite Mapping:** UKworld-leading supplier with core expertise in the supply and processing of satellite imagery, offshore exploration, geological mapping and InSAR surveying.

**CGI**: UK IT company specialist in 24×7 operational end-to-end EO ground system solutions, and in developing applications and services to exploit EO data. Skilled in system architecture.

**CloudEO:** German company which brings data, software and processing power together within a private cloud environment at a certified hoster.

**CLS:** Subsidiary of CNES, IFREMER and the investment company ARDIAN. It provides operational services for environmental monitoring, sustainable management of marine resources and security.

**Deimos Imaging:** Private Spanish company subsidiary of UrtheCast Corp. Owns and operates the DEIMOS-1 and DEIMOS-2 satellites with a 24/7 commercial services**.**

**Deimos Space:** Spanish Elecnor's technological arm. It specialises in the design, engineering, systems integration in the aerospace, satellite systems, remote sensing and telecommunications sectors.

**DHI-GRAS:** Danish company specialised in earth observation, satellite image processing and GIS. They are specialist in environmental assessment, water resources and marine monitoring.

**e-geos:** A Finmeccanica/Thales company from Italy. It offers data acquisition and pre-processing to application of COSMO-SkyMed solutions for key vertical markets.

**Earth-i:** UK SME which supplies very high resolution satellite images from the new DMC3 / TripleSat Constellation, consisting of 3 identical British multispectral optical satellites.

**European Space Imaging:** Company based in Germany. Supplier of global very high-resolution (VHR) satellite imagery (WorldView-3 satellite) and derived services to customers in EMEA & CIS countries.

**Eurosense:** Belgium company specialist in aerial photogrammetry, orthophotography, cartography, GIS. Broad coverage in Western and Central Europe.

**Flyby:** Italian SME which works with scientific community, improve theoretical models and transform them into applications and commercial products. Large experience on solar energy.

**FDC:** Independent french research consultancy specialised in the field of Space applications (navigation, positioning, earth observation, communications, …).

**Fugro GEOS:** UK company supplier of metocean services for offshore and coastal engineering applications.

**GAF AG:** an e-Geos/Telespazio company based in Germany. Reliable supplier of data, products and services in the fields of geo-information, satellite remote sensing, spatial IT and consulting.

**Geocento**: UK SME offering broker services to find EO data with a focus on the Oil & gas sector.

**Geomatrix:** Lithuanian SME. Focus on development of automated work-flows for processing of large amounts of satellite imagery and geo-spatial information; LIDAR, DTM or GIS datasets.

**Geosystems Polska:** Polish remote sensing/photogrammetry and LIS/GIS consultancy and laboratory involved in various types of geographic data processing, spatial analysis and geovisualisation.

**Geoville:** Austrian SME with broad international customer base. It is dedicated to providing a wide range of value added services for remotely sensed data and GIS applications.

**GIM:** Belgium SME which develops innovative techniques for processing spatial data, designs new applications for geodata. Combined expertise in GIS geomarketing, geo ICT, geodata and EO

**Gisat:** Czech SME with focus on operational application of satellite mapping to monitor various aspects of environment and development of dedicated web based platforms.

**Globesar:** Norwegian EO SME. It holds exclusive commercial rights of the SBAS-GSAR software that enables to provide customers with surface displacement maps using SAR data.

**GMV:** Spanish company working in areas of satellite control centres, remote sensing and data processing, flight dynamics, mission analysis, planning and navigation systems and applications.

**Hermess:** Dutch SME specialised in processing radar, optical and acoustics measurements, numerical modelling, assimilation of measurements in models for marine environmental information

**Hisdesat:** Spanish government satellite services operator acting primarily in the areas of defence, security, intelligence and foreign affairs. Will be operating PAZ (SAR) and INGENIO (Optical)

**IABG:** German company which utilizes HR satellite data to extract topographies, conduct stereo photogrammetric surveys and generate terrain models, create orthophotos and image classification.

**Innova:** Italian SME highly specialized in Synthetic Aperture Radar technology, Infomobility systems, High Performance Computing, GRID and Geographical Information Systems.

**ISDEFE:** Spanish state-owned company which offers consulting and engineering services

**Kongsberg Spacetec:** Norwegian company focus on delivery of meteorological turnkey ground stations and value added applications, environmental and surveillance.

**KSAT:** Commercial Norwegian enterprise providing services based on data from polar orbiting satellites. Operates 4 ground stations; Tromsø, Svalbard, Grimstad, (South Norway) and Antarctica.

**Metria:** Swedish company which offers services in the field of geographical IT. Large experience on GIS techniques for environmental and forestry applications as well as security-related aspects.

**NEO:** Dutch SME applies satellite imagery in management of infrastructure and environment, as well as in agriculture and forestry. NEO works across the globe.

**Noveltis:** French private company which performs scientific engineering studies and implements customised end-user solutions in the fields of Space, the Environment and Sustainable Development.

**Ocean Space Consult:** Dutch SME provider of market research, strategy development and consulting services to the energy, coastal engineering and maritime companies.

**Pixalytics:** Independent UK consultancy SME specialising in EO. Combines cutting edge scientific knowledge with satellite and airborne data.

**Planetek Italia:** Italian SME providing solutions to exploit the value of geospatial data (acquisition, storage, management up to analysis and sharing). Expertise on SDI an geo-location based solutions

**PlanetObserver:** French SME offering web-mapping, 3D visualization, simulation solutions, moving map apps, cartographic mapping, DEM´s and audio-visual production

**Reach-U:** Estonian SME working on mapping, geospatial data, geographical information systems (GIS) and mobile positioning. Key player on location-based services (LBS).

**Rhea:** Belgian company providing consultancy in IT services. Skilled in system architecture and the provision of Cloud services.

**RSICS:** Bulgarian SME offering software services and design, development, implementation and integration of web based projects, software applications and Geographic Information Systems (GIS).

**SCISYS:** German company focus on media broadcasting, space, earth observation, security and defence. Porfolio comprises: ground segments, related infrastructure or meteorological products.

**Serco:** UK Service company offering operational and engineering support to a large number of space markets.

**Space4environment:** SME based in Luxemburg with focus on thematic assessments in support of European environmental policies (Biodiversity Strategy, Land resources efficiency, Urban strategy)

**Spacemetric:** Swedish SME providing image management solutions for satellite and airborne sensors that improve data access and streamline the process from image acquisition to application.

**SpaceTecPartners:** Belgium based consultancy on subjects as Space Systems and Satellite Navigation, Communications, EO and Geo-information activities as well as Integrated Applications.

**Stevenson Astrosat:** UK SME specialized on multiple space based systems and its data combination with licensed technology and scientific models. Key products: thermal-carbon reporting, emergency.

**TAKT:** Bulgarian SME active in the field of development of remote sensing sensors, systems & platforms, data processing &management, distribution &application of end user products & services.

**Telerivamento Europa:** Italian SME leader on satellite radar Interferometry (InSAR) applications (SqueeSAR™) within a range of sectors including oil and gas, transportation and mining.

**TerraNIS:** French SME and world operator and distributor of Pixagri® et Oenoview® services, respectively in the agriculture and the wine-making sectors.

**Terrasigna:** Romanian SME with experience on data processing and EO monitoring solutions, thematic exploitation platforms, data mining & big data, ground based radar & educational software.

**Thales:** French company leader for satellite systems, manufacturing and infrastructures. European supplier of satellite-based solutions for Defense and Security.

**Visioterra:** French company developing applications for the Earth Explorer missions. Running software platform called VtWeb enabling to easily access EO/meteo/climate/ biogeophysical data.

### 12- ATOS

| | |
|---|---|
| Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted) | Y |
| *ATOS will subcontract consultancy on the cloud brokering modules design* | |
| Does the participant envisage that part of its work is performed by linked third parties | N |
| Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement) | N |

### 13- BSC

| | |
|---|---|
| Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted) | N |
| *ATOS will subcontract consultancy on the cloud brokering modules design* | |
| Does the participant envisage that part of its work is performed by linked third parties | N |

| Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement) | Y |
|---|---|

*If yes, please describe the third party and their contributions*

*Some of the work carried out at the Barcelona Supercomputing Center–Centro Nacional de Supercomputación will be contributed free of charge by BSC Third Parties (Article 12 Grant Agreement): Spanish Council for Scientific Research (CSIC) and Universitat Politècnica de Catalunya (UPC).*

*The BSC is a consortium that is composed of the following member institutions: the Universitat Politècnica de Catalunya and the Spanish and the Catalan governments. Both UPC and the Spanish government (through CSIC) contribute in kind by making human resources available to work on projects. The relationship between BSC and CSIC and UPC (respectively) is defined in an agreement with each institution that was established prior to the start of this project.*

- *Consejo Superior de Investigaciones Científicas (CSIC)*

*Some CSIC researchers carry out their work at universities and research centers based in Spain, institutions with which CSIC actively collaborates. This collaboration takes place within the framework of long-term agreements, ensuring that CSIC researchers are fully integrated into teams and research projects. CSIC has signed collaboration agreements with several entities, including the BSC.*

*The relationship between BSC and CSIC is defined in an agreement established prior to the start of this project, and thus, not limited to it. BSC is free to use these resources provided by CSIC at will, they are therefore assimilated as "own resources" and will be charged to the project without being considered as a receipt. The cost will be declared by the beneficiary and it will be recorded in the accounts of the third party. These accounts will be available for auditing if required.*

*Dra. Rosa Maria Badia is a CSIC researcher of the Instituto de Investigación en Inteligencia Artificial (IIIA) affiliated with the BSC. She carries out her research in association with the Barcelona Supercomputing Center - Centro Nacional de Computación on the BSC premises.*

- *Universitat Politècnica de Catalunya (UPC)*

*The High Performance Computing research group of the Computer Architecture Department at the Universitat Politècnica de Catalunya (UPC) is the leading research group in Europe in topics related to high performance processor architectures, runtime support for parallel programming models, performance tuning applications for supercomputing and Cloud Computing.*

*The High Performance Computing research group at the UPC shares many key resources with the BSC, including several key personnel that will be dedicated to this project. There is a signed Collaboration Agreement between the UPC and the BSC establishing the framework of the relationship between these two entities. According to this agreement, several professors of the UPC are made available to the BSC to work on projects.*

- *ICREA (Institució Catalana de Recerca i Estudis Avançats) will provide resources (professor/researcher) free of charge to the BSC as a third party (Article 12 Grant Agreement). ICREA is a foundation supported by the Catalan Government and guided by a Board of Trustees which aims to recruit top scientists for the Catalan R&D system: scientists capable of leading new research groups, strengthening existing groups, and setting up new lines of research.*

*Following the rules of ICREA, although the salary costs of Dr. Francisco Doblas-Reyes are paid by ICREA, he is assigned to physically work at Barcelona Supercomputing Center (Earth Science Department). The terms and conditions of this cooperation between ICREA and Barcelona Supercomputing Center are reflected in a bilateral agreement between the two parties.*

*The beneficiary, BSC, is free to use these resources at will. They are therefore assimilated as "own resources" of the beneficiary, and will be charged to the project without being considered as a receipt. The cost will be declared by the beneficiary and it will be recorded in the accounts of the third party. These accounts will be available for auditing if required.*

**18- CNRS**

| | |
|---|---|
| Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted) | N |
| Does the participant envisage that part of its work is performed by linked third parties | Y |
| *Dut to its statuts, post-doctoral students must be hired by CNRS.* | |
| Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement) | N |

**20- DHI**

| | |
|---|---|
| Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted) | Y |
| *DHI will subcontract consultant support on SDG6 global monitoring system compatibility analysis* | |
| Does the participant envisage that part of its work is performed by linked third parties | Y |
| Collaboration with DHI-GRAS, which is closely linked to the work of UNEP-DHI and DHI, specializing in Earth Observations for Water Resources management and analysis. DHI-GRAS is owned by DHI, with ongoing links to the research direction and priorities of DHI and established agreements for cooperation of various projects.<br>DHI GRAS is specialised in earth observation, satellite image processing and Geographic Information Systems -GIS. Since 2000, more than 150 projects in more than 50 countries worldwide have been completed. DHI GRAS has a strong background in remote sensing for hydrology, water quality, environmental assessment and land cover mapping. Projects often run in interdisciplinary project settings requiring close collaboration with ecologists, hydrologists, coastal experts, engineers, often from other departments of DHI. | |
| Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement) | N |

# 5. Section 5: Ethics and Security

## 5.1 Ethics

This project has not entered any ethics issues in the ethical issue table.

## 5.2 Security

Please indicate if your project will involve:

Activities or results raising security issues: **NO**

EU-classified information' as background or results: **NO**


# Appendix 1 - Glossary

| Term | Description |
|---|---|
| **AB** | Advisory Board |
| **AGU** | American Geophysical Union |
| **BDV** | Big Data Value |
| **BDVA** | Big Data Value Association |
| **CA** | Consortium Agreement |
| **CAS** | Climate Adaptation Strategy |
| **CBD** | the Convention on Biological Diversity |
| **CMEMS** | Copernicus Marine Environment Monitoring Service |
| **CRA** | Collaborative Research Action |
| **CWA** | Copernicus World Alliance |
| **D*x*** | Deliverable number *x* |
| **DB** | Dashboard |
| **DIAS** | Data Integration and Analysis System |
| **DMP** | Data Management Plan |
| **EC** | European Commission |
| **ECVs** | Essential Climate Variables |
| **EEA** | Environmental European Agency |
| **EFAS** | European Flood Awareness system |
| **EFFIS** | European Forest Fire Information System |
| **EGI** | European Grid Infrastructure |
| **EGU** | European Geosciences Union |
| **EIROs** | European Intergovernmental Research Organisations |
| **ENEON** | European Network of Earth Observation Networks |
| **EO** | Earth Observations |
| **EOTT** | Task Team on Earth observations |
| **EPA** | United States Environmental Protection Agency |
| **EPOS** | European Plate Observing System project |
| **ESA** | The European Space Agency |
| **ESA TEPs** | ESA EO Thematic Exploitation Platforms |

| | |
|---|---|
| **ESFRI** | European Strategy Forum on Research Infrastructures |
| **EU** | European Union |
| **EUMETSAT** | European Organisation for the Exploitation of Meteorological Satellites |
| **FGDC, US** | Federal Geographic Data Committee |
| **GCI** | GEOSS Common Infrastructure |
| **GD** | GEO Discovery |
| **GEMI** | the UN Global Expanded Monitoring Initiative |
| **GEO** | Group on Earth Observation |
| **GEO DAB** | GEO Discovery and Access Broker |
| **GEOSS** | Global Earth Observation System of System |
| **GEOSS SBAs** | GEOSS Social Benefits Areas |
| **GEPW** | GEO European Projects Workshop |
| **GloFAS** | Global Flood Awareness system |
| **GMOS** | Global Mercury Observation System project |
| **GWIS** | Global Wildfire Information System |
| **IAEG-SDGS** | Inter-agency Expert Group on SDG Indicators |
| **IEEE IGARSS** | International Geoscience and Remote Sensing Symposium |
| **INFOaaS** | information as a service |
| **IPChem** | Information Platform for Chemical Monitoring data |
| **IPR** | Intellectual Property Rights |
| **IRSE** | International Symposium on Remote Sensing of Environment |
| **ISDE** | International Society for Digital Earth |
| **KO** | Kick-off |
| **M** | (Project) Month |
| **MAEOS** | Marketplace Alliance for Earth Observation Services |
| **MIDAS** | Modelling Inventory and Data Access System |
| **MS** | Milestone |
| **NGIs** | National Grid Initiatives |
| **OGC** | Open Geospatial Consortium |
| **PC** | Project Coordinator |
| **PESTEL analysis** | Political, Economic, Sociological, Technological, Ecological, Legal analysis |
| **PM** | Project Month |
| **PRACE** | The European e-infrastructure on HPC |
| **PPP** | Public-Private-Partnership |
| **RDA** | Research Data Alliance |
| **RDA** | Research Data Alliance |
| **SLA** | Service Level Agreement |
| **SBA** | Societal Benefit Area |
| **SDGs** | Sustainable Development Goals |
| **SDSC** | San Diego Supercomputer Centre, USA |
| **STAC** | Advisory Committee |
| **TCB** | Technical Advisory Committee |
| **TEPs** | Thematic Exploitation Platforms |

| | |
|---|---|
| **TRL** | Technology Readiness Levels |
| **UN-GGIM** | United Nations Committee of Experts on Global Geospatial Information Management UN-GGIM |
| **US** | United States |
| **WHOS** | WMO Hydrological Observing System WHOS as part of the |
| **WIGOS** | WMO Integrated Global Observing System WIGOS |
| **WMO** | World Meteorological Organization |
| **WP** | Work Package |

# Appendix 2 – Support Letter

esrin

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Frascati, 2 March 2016

**Subject:** **Supporting H2020 Proposal Project EuroGEOSS Hub - a proposal to be submitted under the Call for proposals H2020 2016-2017 SC5-20-2016**

Dear Project Coordinator,

Following your request, I wish to confirm our general interest and support to the EuroGEOSS-HubProject Proposal, assuming that it is approved for funding and implementation in the framework of the European Commission H2020, topic SC5-20-2016.

In particular, within the frame of the overall coordination of GEOSS activities with DG/RTD, we wish to confirm our availability to establish a close technical collaboration with any winning proposal thus ensuring maximum synergies among the initiatives conducted in the frame of the GEO Common Infrastructure evolution.

The detailed implementation of such technical cooperation, could envisage establishment of joint actions, participation to of the EuroGEOSS-Hub project Steering Committee, and further measures to be elaborated during the course of the project between our respective entities.

Pier Bargellini

Head of the Copernicus Space Component Mission Management and Ground Segment Development Division


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