



Survey on the Total Employment in Europe in the EO Services Sector

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European Association of Remote Sensing Companies,
Brussels, March 2021

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Date of Delivery:	March 2021
Version:	1
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Version	Date	Comment
1 st Issue	March 2021	

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Funded by ESA – ESA Contract Number: 4000128631.

The views expressed herein can in no way be taken to reflect the official opinion of the European Space Agency..

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1. Introduction

Each year, EARSC publishes a report looking at the companies in the EO services sector including the number of employees working within the sector. This represents only a part of the total employment as there is a strong resource in public sector agencies. Hence, we were challenged to put a figure to the total employment in all categories of employer both public and private, commercial and academic.

Thus, the **EARSC EO sector employment survey** is the first report providing an estimate of **the total number of Earth Observation (EO) employees throughout Europe**, including both the public and private sector. Building upon two previous EARSC surveys¹, this study provides a more detailed picture of the employment in the Earth Observation field.

The key objectives of this research are:

- To identify public and private entities employing Earth observation staff at the European level
- To indicate areas of activity where further data and analysis is necessary
- To give a more holistic picture about employment for Earth observation

Given the complexity and the broad scope of this study, we wish to highlight the fact **that the numbers given are estimations** based on our methodology. By publishing this report and continuing consultation with key experts, we plan to improve the estimations and the accuracy of the total number of employees. The annexes give detail of the organisations and number of employees for each category we have considered.

¹ The EARSC 2020 State and Health of the Earth observation services industry, giving an overview of the European EO sector and the EARSC 2016 Public Services Bodies Report, providing a comprehensive and accurate picture of the PSBs in Europe that use Earth observation data and services.

2. Methodology

2.1 Scope and Definition of Terms

The survey aims to evaluate the total number of employees in Europe working directly or indirectly with EO data in both the public and commercial sector. The EARSC State and Health of the Earth Observation services industry² provides a figure for the employment in the sector. It does not include the public sector or other commercial sectors.

The scope of this study has been to assemble existing data from the previous EARSC surveys and also gather primary data.

Before entering into the detail of the methodology, it is important to give definitions in order to understand the scope of this research.

EO employee: our definition is all persons whose work relies on EO data or services. Any person working for an organisation or a unit within an organisation which is using EO data, and hence whose job is dependent on the EO data will be included. Hence, a secretary working for a company which is selling services will be included as an EO employee. In many organisations, EO data is only a part of the data being used. In this case we try to take a percentage of the use and apply this to the total employees. For example, a unit dealing with GI data in a local authority which has 10 employees, we would consider that 10% of the collective work relies on EO data and hence 1 employee or Full Time equivalent (FTE) will count towards the survey.

Earth Observation (EO): we are choosing to address people working with data coming from satellites. The more general term of Remote Sensing can be taken to include all observation / measurement platforms such as aircraft and drones, but in our analysis we are only considering satellite-based data.

Public sector bodies (PSBs)³: “the state, regional or local authorities, bodies governed by public law and associations formed by one or several such authorities or one or several such bodies governed by public law”⁴.

Commercial bodies: bodies governed by private law, having an industrial or commercial character.

EARSC Market taxonomy: EARSC has developed two taxonomies, divided into thematic domains and market segments⁵. The two approaches are complementary because they provide two different ways of looking at EO services. The taxonomy includes a generic and comprehensive definition of available products and how these form the basis for the delivery of the EO services.

² Read the entire EARSC 2020 Industry Survey in our website: <https://earsc.org/publications/>

³ We will use the acronym PSBs for Public Sector Bodies in the following developments.

⁴ <https://www.igi-global.com/dictionary/exploitation-public-sector-information-europe/24089>

⁵ Read the entire report: Copernicus Academy Hub for Knowledge, Innovation and Outreach, Assessment of Copernicus Uptake (Update of the user-oriented taxonomy), June 2020.

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In the context of this study, we used the market taxonomy in order to identify the other industrial sectors in which EO employees could play a significant role.

2.2 List of countries targeted in the study:

We included in our list of countries the members of the European Union and ESA member states (Table 2-1). In total, we included 30 countries.

EU members	ESA members	List of countries included in the survey
Austria	Austria	Austria
Belgium	Belgium	Belgium
Bulgaria		Bulgaria
Croatia		Croatia
Republic of Cyprus		Republic of Cyprus
Czech Republic	Czech Republic	Czech Republic
Denmark	Denmark	Denmark
Estonia	Estonia	Estonia
Finland	Finland	Finland
France	France	France
Germany	Germany	Germany
Greece	Greece	Greece
Hungary	Hungary	Hungary
Ireland	Ireland	Ireland
Italy	Italy	Italy
Latvia		Latvia
Lithuania		Lithuania
Luxembourg	Luxembourg	Luxembourg
Malta		Malta
Netherlands	Netherlands	Netherlands
	Norway	Norway
Poland	Poland	Poland
Portugal	Portugal	Portugal

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Romania	Romania	Romania
Slovakia		Slovakia
Slovenia		Slovenia
Spain	Spain	Spain
Sweden	Sweden	Sweden
	Switzerland	Switzerland
	UK	UK

Table 2-1: List of countries covered by the survey

2.3 Data collection

As this survey aims to estimate the number of EO employees in both the public and private sector, we approached these two categories differently.

First, we broke down the category of “public sector” in different subcategories as follows:

- a. Public Sector Bodies (National level)
- b. Public Sector Bodies (European level)
- c. Clusters
- d. Academia
- e. Military⁶

For the private sector, we identified two subcategories:

- f. EO services sector
- g. Other industrial sectors

The following developments will explain in detail how we gathered data for each of these categories, the public sector first and then the private sector.

2.3.1 Public Sector

a) **Public Sector Bodies (National level)**

We used the data collected during the EARSC Public Service Bodies Survey conducted in 2016. Many public bodies have a responsibility to supply their governments with the appropriate information for policy decision-making. Given the considerable number of persons engaged in this activity throughout Europe, this survey wanted to understand the scale and scope of this role. With a combined picture of

⁶ We integrated « military » in a subcategory but we did not address it in this survey.

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the private and the public sector service providers, we can develop a better understanding of the importance of the public sector and the impact Copernicus is having in Europe and how future policies may be implemented.

This survey had three main objectives:

- Assess the use of EO/Copernicus amongst EU Public Sector Bodies
- Develop a better understanding of the impact of Copernicus amongst PSBs
- Complement the industry survey by covering the full public/private landscape

In carrying out this survey, EARSC has first built a database with approximately 400 public organisations across Europe. Then a dedicated questionnaire was disseminated through an online tool⁷ and individual targeted emails to a total of 378 public bodies which are engaged in the delivery of services based on Earth Observation data and information to their governments.

Out of those 378 PSBs contacted, 119 responded (from 30 countries) and 108 provided a figure of total employment and/or EO employees. More precisely, 105 gave a figure for the total employment and 104 gave a figure for the number of EO employees.

After collecting the data (name of the PSB, country, total employment and EO employment figures), we have created 11 categories to classify the PSBs:

- 1) Environment
- 2) Agriculture
- 3) Forestry
- 4) Technology
- 5) Hydrology
- 6) Geological
- 7) Mapping
- 8) Meteorology
- 9) Cultural heritage
- 10) Marine
- 11) Civil protection

Within each category, we also differentiated the PSBs at a national and regional level.

b) Public Sector Bodies (European level)

We also identified PSBs at the European level with potential EO staff, assuming the number of EO employees for each one⁸ (Table 2-2).

⁷ www.surveymonkey.com

⁸ See in Table 3-1 (p16) for the estimation of EO employees.

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List of European Public Sector Bodies
ESA- European Space Agency
JRC- Joint Research Center
EUMETSAT- The European Organisation for the Exploitation of Meteorological Satellites
SatCen- European Union Satellite Centre
EMSA- European Maritime Safety Agency
EEA- European Environment Agency
ECMWF- European Centre for Medium-Range Weather Forecasts
GSA- European Global Navigation Satellite Systems Agency
FRONTEX- European Border and Coast Guard Agency

Table 2-2: European Public sector bodies

c) **Clusters:**

The 2020 European Panorama of Clusters and Industrial Change Report⁹ identified 2950 clusters across Europe. The report also states that these industrial clusters account for almost one in four European jobs (61.8 million jobs, or 23,4% of total employment), playing a significant role in the competitiveness of the European economy.

In the context of this survey, we wanted to point out the European clusters in which Earth Observation staff could be employed. We used the European Cluster Collaboration Platform¹⁰ to identify a list of European clusters involved in Earth Observation activities.

We identified 203 clusters throughout Europe in the following sectors: environment, energy, agriculture, infrastructure, technology and space, digital industries¹¹.

d) **Academia:**

⁹ The European Observatory for Clusters and Industrial Change, 2020 Edition of the European Panorama of Clusters and Industrial Change, Performance of strong clusters across 51 sectors and the role of firm size in driving specialisation, Publications Office of Luxembourg, 2020, 93 pages, available online: https://www.clustercollaboration.eu/sites/default/files/news_attachment/european_panorama_2020.pdf.

¹⁰ <https://www.clustercollaboration.eu/cluster-list>

¹¹ See Annex N (p.52)

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We identified universities with laboratories, departments or institutes linked to EO activities¹². We used two main sources to gather a list of universities with departments or laboratories:

- The European Association of Remote Sensing Laboratories' (EARSeL) website¹³
- The network of Copernicus Academy¹⁴

For some countries¹⁵, we also did desktop research using national databases to add universities and laboratories¹⁶.

- The institutes:

We wish to highlight in the following paragraph the question related to the institutes. We integrated institutes (please see the list in table 2-3) in the academia category as well as in the Public Sector Bodies (public sector). We are not completely satisfied with this approach and we are wondering if the institutes should form a separate category. We encourage you to give us your feedback regarding this question.

Country	Institute
Austria	Federal Office and Research Institute for Agriculture
Austria	Institut für Vermessung, Fernerkundung und Landinformation
Austria	Institute for Information and Communication Technologies
Belgium	Institut Géographique National - Nationaal Geografisch Instituut
Belgium	Instituut voor Natuur- en Bosonderzoek
Belgium	Royal Meteorological institute of Belgium
Belgium	Institut bruxellois de gestion de l'environnement
Bulgaria	Institute of Oceanology
Croatia	Croatian Forest Research Institute

¹² See the lists in Annex L (p.42) and Annex M (p.44).

¹³ <https://earsel.org/>

¹⁴ https://www.copernicus.eu/sites/default/files/Network_of_Copernicus_Academies-List_of_Members_03Sept2018.pdf

https://www.copernicus.eu/sites/default/files/Network_of_Copernicus_AcademiesList_of_Members_03Sept2018.pdf

¹⁵ France, Poland, Germany, Italy, UK and Spain.

¹⁶ For example, for France, we used the following database:

<https://appliweb.dgri.education.fr/rnsr/ChoixCriteres.jsp?PUBLIC=OK> (Source: Ministère de l'enseignement supérieur, de la recherche et de l'innovation)

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Cyprus	Agricultural Research Institute
Czech Republic	Hydrometeorological institute
Czech Republic	Forestry and Game Management Research Institute
Czech Republic	Prague Institute of Planning and Development
Czech Republic	Institute of Botany of the Czech Academy of Sciences
Denmark	Danish Meteorological Institute
Denmark	National Space Institute, DTU
Estonia	Institute of Baltic Studies
Estonia	Institute of Forestry and Rural Engineering
Estonia	Marine systems institute
Finland	Finnish Meteorological Institute
Finland	Finnish environment institute
Finland	Finnish Geospatial Research Institute
Finland	Finnish Geodetic Institute
Finland	Finnish Game and Fisheries Research institute
Finland	Forest Research Institute (Metla)
France	Ifremer (Institut français de recherche pour l'exploitation de la mer)
France	IAURIF (Institut d'aménagement et urbanisme de la Région de Paris)
France	INSTITUT EUROPEEN DE LA FORÊT CULTIVÉE - EFIATLANTIC
France	INRA Institut National de la Recherche Agronomique
France	IUEM Institut Universitaire Européen de la Mer
Germany	Institute for Radar Technologies
Germany	Inst. for Photog. & Eng. Surveys
Germany	Federal Institute for Geosciences and Natural Resources (BGR)
Germany	Federal Institute of Hydrology

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Germany	Bavarian State Research Center for Agriculture, Institute for Crop Science and Plant Breeding
Germany	Bavarian State institute for forestry
Germany	Rhenish Institute for Environmental Research
Germany	Institute of Photogrammetry and Geoinformation (IPI)
Germany	Institute for Cartography
Germany	Institute for Geoinformatics and Remote Sensing
Germany	Institute of Geography and Geology
Greece	Informatics & Telematics Institute
Greece	Institute for soil science and agricultural chemistry
Greece	Institute Of Geology and Mineral Exploration
Greece	Forest Institute
Greece	Institute for Mediterranean Forest Ecosystems and Forest Products Technology
Greece	Institute for Mediterranean Studies
Greece	Information Technologies Institute
Greece	Mediterranean Agronomic institute of Chania
Hungary	Geological and Geophysical Institute
Hungary	Institute for Soil Science and Agricultural Chemistry
Ireland	Marine Institute
Italy	Istituto di Metodologie per l'Analisi Ambientale (IMAA)
Italy	Italian National institute for environmental protection and research
Latvia	State Forestry Research Institute
Latvia	Institute of Geodesy and Geoinformatics
Lithuania	Marine Research Institute
Luxemburg	Luxembourg Institute of Science and Technology
Netherlands	KNMI Royal Netherlands Meteorological Institute (Koninklijk Nederlands Meteorologisch Instituut)

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Netherlands	SRON (Institute for Space Research)
Netherlands	Royal Netherlands Institute for Sea Research
Norway	Norwegian Meteorological Institute
Norway	Northern research Institute
Norway	Norwegian Forest and Landscape Institute
Norway	Norwegian institute of Bioeconomy Research (NIBIO)
Norway	Norwegian institute for air research
Poland	Polish Geological Institute
Poland	National Marine Research Institute (NMFRI)
Poland	Institute of Geodesy & Cartography (IGIK)
Poland	Nature Conservation Institute Polish Academy of Sciences
Poland	Institute of Geography and Spatial Management
Poland	Institute of Meteorology and Water Management
Portugal	INSTITUTO GEOGRAFICO PORTUGUES
Portugal	Instituto da Conservação da Natureza e das Florestas
Portugal	Portuguese Sea and Atmosphere Institute
Portugal	Institute of Earth Sciences
Romania	Geological Institute
Romania	National Institute of Hydrology and Water Management
Romania	National Research and Development institute Delta
Slovakia	State Geological Institute of Dionyz Stur
Slovakia	Slovak Hydrometeorological Institute
Slovenia	Geodetic Institute of Slovenia
Slovenia	Slovenian Forestry Institute
Spain	Institut de Ciències del Mar (ICM-CSIC)
Spain	National Geographic Institute of Spain

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Spain	INSTITUTE CARTOGRÀFIC I GEOLOGIC DE CATALUNYA
Spain	Instituto Geologico y minero de Espana
Sweden	Swedish Meteorological and Hydrological Institute
Switzerland	Swiss Federal Institute for Forest, Snow and Landscape Research
Switzerland	Swiss Federal Research institute WSL
The Netherlands	UU / IMAU (Institute for marine and atmospheric research Utrecht)
The Netherlands	Royal Netherlands institute for Sea Research
The Netherlands	Institute for Space Research (SRON)
United Kingdom	Nottingham Geospatial institute

Table 2-3 – List of institutes included in the report

e) Military

The military employ a significant number of analysts working with EO, satellite imagery. For this iteration of the report, we have not tried to estimate how many persons this represents.

2.3.2 Private sector

a) EO services sector:

EARSC published in May 2020 the EARSC State and Health of the Earth observation services industry. Our survey allows us to follow the evolution of the sector by measuring the number of EO employees, alongside other relevant indicators, such as the annual revenue or the annual growth. In the context of this survey, a sample of 50 EO companies were asked about the number of EO employees. According to our report, the number of employees in the EO sector for 2019 is 9786.

b) Other industrial sectors:

Apart from the Earth Observation sector itself, there are other industrial sectors with EO employees. We wanted to identify sectors which are potentially employers of EO expertise at the European level.

To do so, we first used the EARSC Market taxonomy (see Table 2-3) in order to know these sectors.

MARKET	SECTORS
Managed living resources	Agriculture

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	Fisheries
	Forestry
Energy and mineral resources	Renewable energy
	Oil and gas
	Raw materials
Infrastructure and transport	Construction
	Utilities and supplies
	Communications and connectivity
	Transport and logistics
	Marine and maritime
	Travel and tourism
Financial and digital services	Insurance and real estate
	Retail and geo-marketing
	News and media
	ICT, Knowledge and digital interfaces
Urban development	Smart cities
	Local and regional planning
Defence and security	Emergency and social protection
	Security, defence and military
	Humanitarian operations
Environmental, climate and health	Environmental ecosystems and pollution
	Health care
	Meteo and climate
Citizens and society	Consumer solutions
	Leisure
	Education and training

Table 2-4- EARSC Market taxonomy

Based upon the EARSC taxonomy, we then selected those sectors, which we consider are the most significant in terms of number of EO employees. You can see below the list of these sectors and their importance for the EO sector (Table 2-5).

Industrial sector	Importance for the EO sector
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<i>Oil and Gas</i>	<i>Remote-sensing data are highly useful for the oil and gas industry¹⁷. Remote sensing has proven to be an effective instrument for downstream and upstream oil and gas operations through evaluation of infrastructure for well-site planning and for exploration through large-scale regional reconnaissance.</i>
<i>Agriculture and Fisheries</i>	<i>Remote sensing technologies have many useful applications for the agriculture¹⁸, like crop production forecasting, assessment of crop damage and crop progress, crop identification, identification of planting and harvesting dates, identification of pests and disease infestation, soil moisture estimation, irrigation monitoring and management, land cover and land degradation mapping...</i>
<i>Technology and Geospatial Information</i>	<i>Geospatial information technology consists of an emerging field including Geographic Information System (GIS), Remote Sensing (RS) and Global Positioning System (GPS). It enables to acquire data that is referenced to the earth and use it for analysis, modeling, simulations and visualization.</i>
<i>Insurance</i>	<i>With the amplification of natural disasters around the world, the worsening of their human, material and economic impact, and the increase in claims on insured property, insurance players must constantly respond to new challenges. Assets insured against natural disasters are concentrated in densely populated areas with highly developed infrastructure, often in coastal regions prone to flooding, marine submersion and hurricane risks or in areas with high seismic activity. It is in these sectors that the penetration of the insurance market is the highest and the most expensive insurance benefits are paid. In the event of a disaster, the insurance industry needs to quickly assess the cost of the event. Prior to this, it is necessary to know the risk exposure and the stakes of the territories. To do this, they need to have up-to-date information. Earth observation technologies are a valuable aid to improve and accelerate the evaluation of the impact of a catastrophic event after its occurrence, but also to assess risks by refining their models.</i>
<i>Marine and Maritime</i>	<i>Remote sensing plays a crucial role in the supervision of extended maritime areas¹⁹. In particular, multisensor multisource imagery is collected daily through satellite platforms moving on earth-centered orbits. This massive amount of data, including optical images and radar maps, can be exploited</i>

¹⁷ The EARSC Sentinel Benefit Case “Global Oil industry activity monitoring” also demonstrates the different benefits of remote sensing data (Sentinel-1’s InSAR) in the sector. Read the case: https://earsc.org/sebs/wp-content/uploads/2020/02/Sebs-flyer_oil_200203.pdf

¹⁸ For concrete examples, read our Sentinel Benefit Cases about “Growing potatoes in Belgium” and “Farm management support in Poland”: https://earsc.org/sebs/wp-content/uploads/2019/08/Sebs-flyers-Belgium_potatoes4_190726.pdf/https://earsc.org/sebs/wp-content/uploads/2019/10/Sebs-flyers-Polish2_190930.pdf

¹⁹ For example see our Sentinel Benefit Case about “Navigation through sea-ice off Greenland”: https://earsc.org/sebs/wp-content/uploads/2019/04/greenland_flyer-190329.pdf

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	<i>for relevant purposes, such as the implementation of maritime surveillance tasks. Satellite missions also serve the purpose of remotely measuring meaningful properties of the water(e.g., salinity, turbidity, pollutants concentration), enabling chemophysical surveys of maritime areas of interest</i>
<i>Non-governmental organisations</i>	<i>NGOs play an important role in the humanitarian and environmental fields. Space technology, especially remote sensing data, has proven to be a key tool for assisting population during crisis or wars²⁰.</i>
<i>Forestry</i>	<i>From simple images of the earth's surface, which break free from artificial boundaries created by man, remote sensing provides a homogeneous and detailed vision of the areas overflow. Moreover, the stable and regular orbit of the satellites allows a revisit over a given point: a possibility used to follow the evolution of a region over several months or even years. Satellite remote sensing has proven to be a reliable and effective tool in forestry surveillance, management and monitoring, complementary to other traditionally used methods. The remote sensing technology has become a decisive instrument for foresters enabling them to have a clearer view and better knowledge of the forests²¹.</i>
<i>Engineering companies</i>	<i>Engineering companies need transversal skills and the discipline of civil engineering in particular, may require remote sensing skills for different applications like: "assessments of key infrastructure changes and construction developments; continuous mapping and monitoring of critical infrastructures across multi-site projects; continuous monitoring to detect encroachment events, including intentional damage to infrastructure or a threat to staff safety; engineering development, planning, monitoring and controlling of infrastructure solutions at all levels of scale and complexity to optimize the processes and results; demand and suitability analysis; assess the environmental impact of human activities (detect land movement, subsidence, heave, and monitor land-use statistics); intelligence on the location, extent, magnitude and evolution of deformation."²²</i>
<i>Renewable energy</i>	<i>Energy and our changing Earth call for new solutions at a time when energy, environmental and social issues are crucial. Remote sensing technologies play an important role in the energy sector. For example, microwave sensors on some satellites can be used to map the abundance of snow during the winter. This information is relevant when choosing the location of a new hydroelectric dam; even wind power needs data from space because it is possible to map the winds according to their intensity.</i>

²⁰ For example see:

http://www.esa.int/Enabling_Support/Preparing_for_the_Future/Space_for_Earth/How_an_Italian_NGO_uses_space_to_help_people_in_need

²¹ Read our case on "Forestry management in Sweden": https://earsc.org/sebs/wp-content/uploads/2019/08/SeBS_sweden_flyer_190725.pdf

²² Assessment of Copernicus uptake, CopHub AC, 2020, p. 52.

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Table 2-5- List of the other industrial sectors selected and their significance for the EO sector

3. Data analysis and Results

Having collected the data, we followed different steps to estimate the number of EO employees per category which differs according to the nature of the category. The rationale and results for each are shown in the sections below.

3.1 Public Sector

3.1.1 Public Sector Bodies (National level)

We used two different projections: based on the data collected during the PSBs survey in 2016 (each Public Sector Body surveyed gave us the total employment and the EO employment figures), we calculated the median²³ for each category as identified in table 2.3.1. This figure was then used to project for the organisations for which we had no data. The average number of EO employees for the PSBs which we did know for each category was used for those for which we did not have any employment figure.

It is important to add that the PSBs surveyed for each category were not representative of all the EU and ESA countries²⁴. This is the reason why we also used the average figure of EO employees for the countries that were not represented (per category).

National Public sector bodies	Responses from the EARSC 2016 Survey ²⁵	Projection	Number of EO employees
Environment	401	594	995
Geological	33	115	148
Cultural Heritage	20	30	50
Technology	627	1720	2347
Marine	460	1248	1708
Meteorology	1456	1314	2770
Mapping	450	836	1286

²³ It means that for each category, we excluded the highest and the lowest number of EO employees given by the PSBs in order to calculate an average figure. We could then apply this figure for other PSBs within the same category.

²⁴ See Table 2-1 on page 6 and 7 to see the list of countries targeted in this study.

²⁵ The figures in this column correspond to the total of Earth Observation employees given by the PSBs surveyed.

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Forestry	0	111	111
Hydrology	34	120	154
Civil protection	220	125	345
Agriculture	17	56	73
TOTAL EMPLOYMENT			9987

Table 3-1: Public Sector body employment by category

3.1.2 Public Sector Bodies (European level)

For the European PSBs, we estimated the number of EO employees based on our knowledge of these organisations.

European PSBs	EO employees
ESA	50
JRC	100
EUMETSAT	30
SatCen	30
EMSA- European Maritime Safety Agency	5
EEA- European Environment Agency	10
ECMWF	20
GSA	0
FRONTEX	0
TOTAL	245

Table 3-2: European Public Sector Bodies and number of Employees

3.1.3 Academia

After listing the different universities including potential EO staff and researchers, we decided to isolate the universities with laboratories or departments focused on Earth Observation and remote sensing activities. We assumed that each university and department focused in remote sensing had an average of 10 EO staff/researchers (we excluded Croatia because of the size of the country). For the other universities, we assumed that each one had an average of 3 EO Staff/researchers. As shown in the table 3-3, 28 countries are represented in our list. We decided to use our estimation of the number of EO staff/researchers for the 2 countries missing (Hungary and Slovakia). This means that we estimated that for these two countries, each of them had one remote sensing laboratory or research

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center with an average of 10 EO staff and one laboratory other than remote sensing with an average of 3 EO staff. The table 3-4 summarizes our analysis for this category and the table 3-3 shows the total number of laboratories per country with the number of remote sensing and other laboratories²⁶.

Country	Total number of labs/dpts	Number of Remote sensing labs/dpts	Number of other labs/dpts
AUSTRIA	5	1	4
BELGIUM	6	1	5
BULGARIA	1	0	1
CROATIA	2	0	2
CYPRUS	2	2	0
CZECH REPUBLIC	5	2	3
DENMARK	2	0	2
ESTONIA	1	0	1
FINLAND	4	0	4
FRANCE	13	1	12
GERMANY	26	14	12
GREECE	10	3	7
IRELAND	1	0	1
ITALY	9	3	6
LATVIA	1	0	1
LITHUANIA	2	0	2
LUXEMBOURG	4	0	4
MALTA	1	0	1
NETHERLANDS	5	3	2
NORWAY	6	1	5
POLAND	12	5	7
PORTUGAL	2	0	2

²⁶ The detailed list of universities and laboratories are in Annex L (p. 47) and Annex M (p.40).

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ROMANIA	1	0	1
SLOVENIA	1	0	1
SPAIN	13	2	11
SWEDEN	4	1	3
SWITZERLAND	5	2	3
UNITED KINGDOM	16	7	9
TOTAL	160	48	112

Table 3-3- Table with the number of universities and laboratories per country

Categories	Number of labs/depts	Average number of EO staff/researchers	EO Staff and researchers
Remote sensing labs/depts	48	10	480
Other labs/depts	112	3	336
Total number of universities	160		
Projection (Hungary and Slovakia)	4	$(10+ 3) \times 2^{27}$	26
Total number of EO staff/researchers			842

Table 3-4- Table summarizing the number of remote sensing laboratories and departments and the other laboratories and departments targeted in our research with our estimation of the number of EO staff and researchers.

3.1.4 Clusters

As detailed in the table below, we used the ranges of employment²⁸ given by the European Cluster Collaboration Platform²⁹ and estimated an average number of EO employees different for each range.

²⁷ We estimated that for the two countries missing in our list, each of them had one remote sensing laboratory or research center with an average of 10 EO staff and one laboratory other than remote sensing with an average of 3 EO staff.

²⁸ The figures of employment given by the European Cluster Collaboration Platform include “the staff in the management team of the cluster organisation”.

²⁹ The European Cluster Collaboration Platform uses different ranges for the employment in the clusters: between 1 and 10 employees, between 11 and 50, and more than 30 employees.

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Ranges - Employment	Total number of clusters per range	Estimation of the average number of EO employees	Total
1-10	175	1	175
11-50	22	2	44
>30	6	3	18
	203		237

Table 3-5. Ranges of employment for clusters and calculation.

3.2 Private sector

3.2.1 EO services sector

As explained in previous developments, we used the results of the latest version of our EARSC Industry Survey (2020). Our analysis gives an overview of the employment in the Earth Observation services sector since 2006. For the year 2019, we estimated that the number of employees in the European Earth Observation services sector is 9876, which represents a growth rate of 17% over the last 12 months.

The total employment in the sector broken down by company class (micro companies, small, medium, large and departments) shows a good evolution (see figure 3-5-1) with a significant increase over the last year. We explained this increase for two major reasons: first, the number of micro companies has risen significantly and many of those are growing. We found out that around 50% of the increase in employment numbers is driven by these micro companies; then, a new type of companies, IT players, is entering the sector and is offering infrastructure-as-a-service. Our survey showed that around 300 persons are employed in this category.

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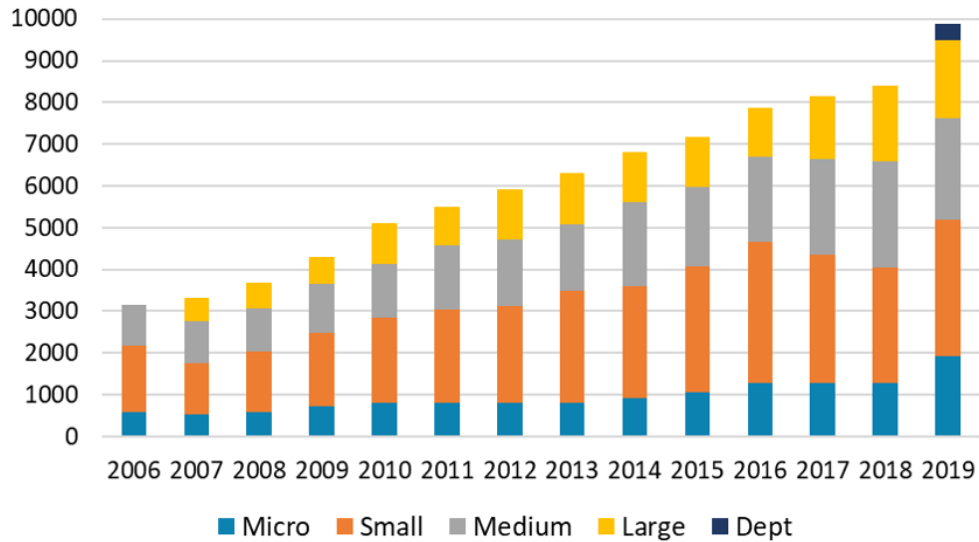


Figure 3-5-1. Evolution of EO employees by company class

3.2.2 Other industrial sectors

After selecting these sectors based on their significance for the EO sector, we broke them down in different categories:

INDUSTRIAL SECTOR	CATEGORIES
Oil and gas	exploration
	transportation
	storage
	processing of oil and gas
	refining
	services industry
Agriculture and fisheries	Fisheries production
	Agricultural production (farmers+ support)
	manufacture of food products
	Transport of agricultural products

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Technology and GI	EU's ICT Sector
	Science, technology and innovation
Insurance	Life insurance
	Health insurance
	Property and casualty insurance
Marine and maritime	Shipbuilding
	Seaports and related services
	Recreational boating
	Maritime transport, shipping
	Maritime services
	Navy
	Coastal tourism
	Maritime supply industries
NGO's³⁰	Humanitarian
	Environmental
Forestry	Wood-based industries
Engineering companies	Civil Engineering
	Environmental Engineering
	Marine Engineering
	Mining Engineering
Renewable energy	Wind power
	Hydropower
	Biomass
	Solar energy

Table 3-6- Table illustrating the different industrial sectors selected in our survey and the subcategories

After classifying these bodies into 9 categories with sub-categories, we then looked for sources providing figures and trends in employment for each category.

Based on these data, we then estimated a proportion of potential EO employees. It is important to specify that we adopted a different approach for each of these categories according to our knowledge of the sector, their considered presence and maturity in using EO services, how much they in-source or out-source these activities. In many of the sectors we have estimated first the amount which the companies are using geospatial information and hence the likely intensity of employment of GI professionals. We consider that a large number of GI people will be familiar with and using EO services but only as a part of their work. Accordingly, we have estimated that an effective 10% of the GI staff

³⁰ Find in Annex O and P (p.63 and 64) the list of Humanitarian and Environmental Non-Governmental Organisations identified for this survey.

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will be EO services. In other words, a staff of 100 GI persons would be equivalent to 10 FTE³¹'s for the purposes of our analysis. We adapted this rationale and considered for some sectors that an effective of 1% of the GI staff would be EO services instead of 10%.

The intensity of GI employees and the percentage used to calculate FTE's are shown in the Table.

Industrial sector	Categories	Total european employment	Calculation	Estimation of the EO employees
Oil and gas	oil and gas extraction	81000 ³²	50 EO specialists plus 1% of total in GI and 10% EO FTE	131
	transportation			0
	storage			0
	processing of oil and gas			0
	refining			0
	Energy services industry			
Agriculture and fisheries	fisheries production	179600 ³³		50
	agricultural production (farmers + support)	EU's regular agricultural labour : 20.5 million people in 2016 with 17% FTE (340 000 farmers) ³⁴	1% is in GI and 10% EO FTE	340
	manufacture of food products	4,3 million ³⁵		100
	transport of agricultural products			

³¹ Full-time Equivalent.

³² European Commission, DG Fisheries and Maritime affairs, Report on Employment trends in all sectors related to the sea or using sea resources, July 2006, p. 15.

³³ Eurostat, Report "Employment in the EU fisheries industry and fisheries production", 2017, p.3

³⁴ https://ec.europa.eu/eurostat/statistics-explained/index.php/Farmers_and_the_agricultural_labour_force_-_statistics#:~:text=As%20the%20number%20of%20farms,2005%20to%204.4%20%25%20in%202016.

³⁵ Source: Eurostat, 2016

<https://ec.europa.eu/eurostat/fr/web/products-eurostat-news/-/EDN-20191015-1?inheritRedirect=true>

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Technology and GI	EU's ICT Sector	5,4 million ³⁶		300
	science, technology and innovation	2,5 million ³⁷ (R & D)		100
Insurance	life insurance			0
	non-life insurance	570555 ³⁸	1/1000	57
Marine and maritime	shipbuilding	175000 ³⁹		0
	seaports and related services	284000 ⁴⁰		0
	recreational boating	253000 ⁴¹		0
	maritime transport, shipping	303 000 ⁴²	1% is in GI and 10% EO FTE	300
	maritime services	88000 ⁴³	1% is in GI and 10% EO FTE	88
	coastal tourism			0
	maritime supply industries	257000 ⁴⁴		0
NGO's⁴⁵	humanitarian	See the list of 10 NGOs in annex	Average of 2 to 3 EO employees	25
	environmental	See the list of 10 NGOs in annex	Average of 2 to 3 EO employees	25

³⁶ Source (2017):

https://ec.europa.eu/eurostat/statistics-explained/index.php/ICT_sector_-_value_added,_employment_and_R%26D#Employment

³⁷ Source (2010): Eurostat, "Science, Technology and innovation in Europe", 2012 Edition, p.40

³⁸ <https://www.statista.com/statistics/443237/leading-non-life-insurance-companies-ranked-employee-numbers-europe/>

³⁹ <https://maritimetechnology.nl/media/Mapping-the-European-maritime-cluster.pdf>, p.6

⁴⁰ <https://maritimetechnology.nl/media/Mapping-the-European-maritime-cluster.pdf>, p.6

⁴¹ <https://maritimetechnology.nl/media/Mapping-the-European-maritime-cluster.pdf>, p.6

⁴² Eurostat, Report on maritime affairs, Exhaustive analysis of employment trends in all sectors related to sea or using sea resources, p.6

⁴³ <https://maritimetechnology.nl/media/Mapping-the-European-maritime-cluster.pdf>, p.6

⁴⁴ <https://maritimetechnology.nl/media/Mapping-the-European-maritime-cluster.pdf>, p.6

⁴⁵ Find in Annex the list of Humanitarian and Environmental Non-Governmental Organisations identified for this survey.

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Forestry	wood-based industries ⁴⁶	3,3 million		
Engineering companies	Total civil Engineering	1,68 million ⁴⁷	1% is in GI and 1% EO FTE	170
	environmental eng.			
	marine eng.			
	mining eng.			
Renewable energy	Total (Renewable energy)	1,268 million ⁴⁸	1% is in GI and 1% EO FTE	127
	hydropower	76200	0.1% is in GI and 10% EO FTE	7
	biomass	306000 ⁴⁹	0.1% is in GI and 10% EO FTE	30
	wind power	314000 ⁵⁰	0.1% is in GI and 10% EO FTE	31
	solar energy	81000 ⁵¹	0.11% is in GI and 10% EO FTE	8
TOTAL				2642

Table 3-7- Results based on our estimation of Earth observation employees for the different industrial sectors

For the oil&gas sector, which is increasingly becoming an energy sector, a number of the larger companies do employ EO specialists to provide expertise using satellite data. A recent trend has been to look at methane emissions. Employment in these internal service departments waxes and wanes with the price of oil and the performance of the sector. Nevertheless, most of the majors employ a small number of EO specialists and we include 50 such employees in addition to the more general GI experts with a knowledge of the use of satellite data.

⁴⁶ Eurostat, "Agriculture, Forestry and Fisheries statistics", 2019 edition, p.13

⁴⁷ <https://www.statista.com/statistics/763254/total-employed-persons-in-civil-engineering-industry-eu/>

⁴⁸ PWC Copernicus Market Report, 2019, p. 104.

⁴⁹ « The State of Renewable energies in Europe », Edition 2015, 15th EurObserv'ER Report, Barometer prepared by Observ'ER (FR) in the frame of the "EurObserv'ER 2013-2016" project with the following consortia members: Renac (DE), Institute for Renewable Energy (IEO/EC BREC, PL), Jožef Stefan Institute (SI), ECN (NL), Frankfurt School of Finance & Management (DE), p. 126.

⁵⁰ Ibid.

⁵¹ « Solar PV Jobs and Value added in Europe », Solar Power Europe, EY, November 2017, p.9.

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Another trend which we have encountered is that of experts from other domains recognising that satellite data can help them in their job. This is a general trend and one we are needing to adapt to within the core EO services sectors as companies with more specific interests pick up and use satellite imagery. We can talk about farm support or insurance as typical areas of interest. This is also happening inside some companies and specifically in the energy sector, data scientists or AI experts, who use any source of data to solve a problem, are also using EO. We make no adjustment to sector employment numbers to reflect this change but put a note to ourselves to address this in any future studies.

4. Summary of Results

Compiling the totals for each of the categories leads to the table and the charts below. The total number of EO employees estimated to be working in the sector is 24002 or 24000 in rounded numbers. Of these, 11484 or 48 % are working in the public sector whilst 12518 or 52 % are working in the private sector.

Categories	Total number of Earth Observation employees
PUBLIC SECTOR	
Public sector bodies (National level)	9987
Public Sector Bodies (European level)	245
Clusters	410
Academia	842
Military	(no data)
PRIVATE SECTOR	
EO services sector ⁵²	9876
Other industrial sectors	2642
TOTAL ESTIMATED NUMBER OF EO EMPLOYEES (public and private sector)	24002

Table 4-1: Estimated total number of EO service employees in Europe

The total has been calculated using a mix of interviews, surveys and specialist knowledge. Many of the figures have been calculated through estimates based on metrics. This is a first calculation and we hope that others reading this may challenge some of the results and enable us to improve the accuracy of the results.

We still have some gaps and certainly some errors in the figures we are using. We shall plan to update this survey as more information becomes available. If you have data which may help us improve our analysis, we should love to hear from you!

⁵² This figure comes from the EARSC 2020 Industry Survey.

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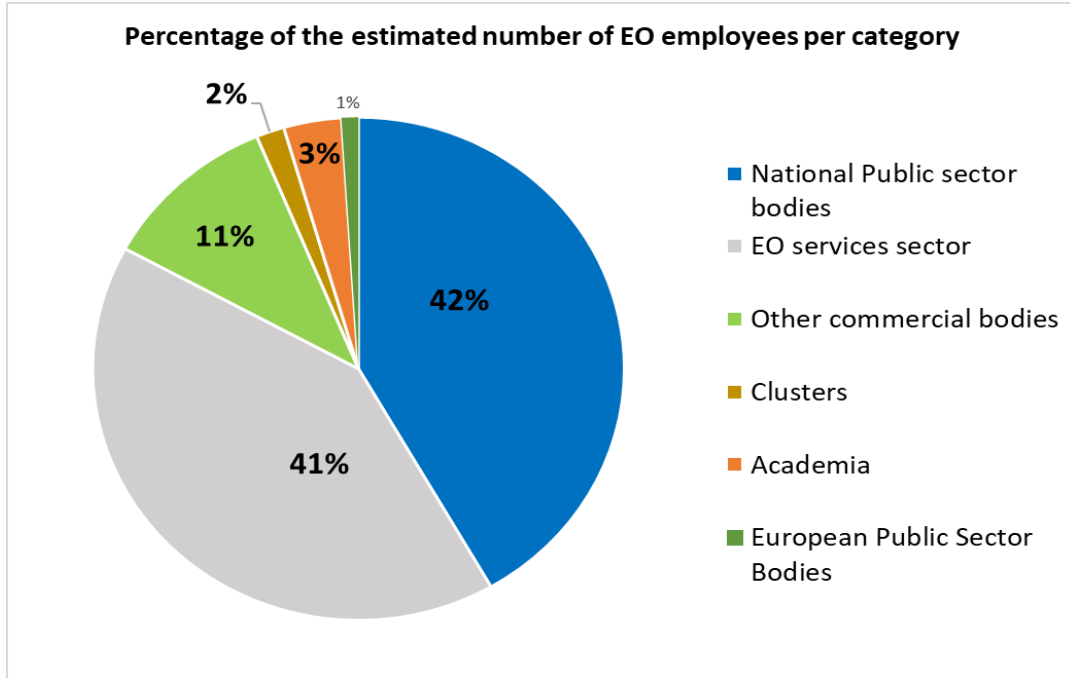


Figure 4-1: Percentage of the estimated number of European Earth Observation employees per category

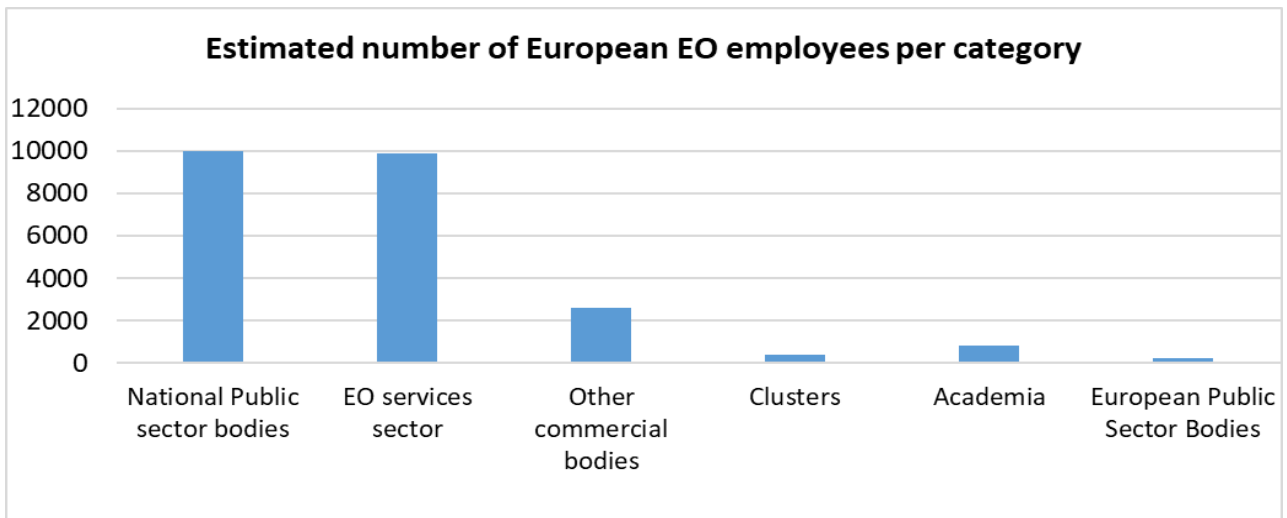


Figure 4-2: Estimated number of European Earth Observation employees per category

Annexes

Annex A - List of Public Sector Bodies for the category Geology

COUNTRY	NATIONAL PSB
Austria	Geological Survey of Austria (GBA)
Belgium	Service géologique de Belgique/Belgische Geologische Dienst
Croatia	Croatian Geological Survey
Cyprus	Geological Survey Department – Ministry of Agriculture, Natural Resources & Environment
Czech Rep.	Geological Survey
Denmark	Geological Survey of Denmark and Greenland - GEUS
Estonia	Geological Survey of Estonia
Finland	The Geological Survey of Finland (GTK)
France	Bureau de recherches géologiques et minières
Germany	Geologisches Landesamt Hamburg
Hungary	Geological and Geophysical Institute
Ireland	Geological Survey of Ireland
Italy	Geological Seismic and Soil Survey of Emilia Romagna
Lithuania	Lithuanian geological survey
Luxemburg	Service Géologique du Luxembourg
Norway	Geological Survey of Norway
Poland	Polish Geological Institute
Portugal	LNEG- mineral resources and geophysics

Survey on the Total Employment in Europe in the EO Services Sector

Romania	Geological Institute
Slovakia	State Geological Institute of Dionyz Stur
Slovenia	Geodetic Institute of Slovenia
Slovenia	Geological Survey of Slovenia
Spain	Instituto Geológico y Minero de España
Sweden	Geological Survey of Sweden, SGU
UK	BGS British Geological Survey

Annex B- List of Public Sector Bodies for the category Cultural Heritage

COUNTRY	NATIONAL PSB
Cyprus	Department of Antiquities – Ministry of Communications and Works
Czech Rep.	Department of the archaeology of landscape and archaeobiology
Finland	Finnish Museum of Natural History
France	Musée d'histoire naturelle
Ireland	NPWS Dept Arts, Heritage and Gaeltacht
Lithuania	Department of Cultural Heritage
Norway	Directorate for Cultural Heritage
UK	Remote Sensing Team, Historic England
UK	EH English Heritage

Annex C- List of National Public Sector Bodies for the category Meteorology

COUNTRY	NATIONAL PSB
Austria	ZAMG - Zentralanstalt für Meteorologie und Geodynamik
Belgium	IRM/KMI - Section Ozone and UV
Croatia	Meteorological and Hydrological Service
Cyprus	Department of Meteorology – Ministry of Agriculture, Natural Resources & Environment
Czech Rep.	Hydrometeorological institute
Denmark	Danish Meteorological Institute
Finland	Finnish Meteorological Institute
France	Météo-France/ CNRM
Germany	Germany's National Meteorological Service
Hungary	Hungarian Meteorological Service
Latvia	Latvian Environment, Geology and Meteorology Centre
Netherlands	KNMI Royal Netherlands Meteorological Institute (Koninklijk Nederlands Meteorologisch Instituut)
Norway	Norwegian Metrology Service
Norway	Norwegian Meteorological Institute
Poland	Institute of Meteorology and Water Management
Romania	National Meteorological Administration
Spain	AEMET (State Meteorological Agency)
Sweden	Swedish Meteorological and Hydrological Institute
Switzerland	MeteoSwiss
UK	UKMO UK Meteorological Office

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COUNTRY	REGIONAL PSB
Belgium	Agence wallonne de l'Air et du Climat
Italy	Servizio Idro-Meteo-Clima (Arpa Emilia-Romagna)

Annex D - List of National Public Sector Bodies for the category Technology

COUNTRY	NATIONAL PSB
Denmark	National Space Institute, DTU
Denmark	Danish Geodata Agency
Finland	VTT Technical Research Centre of Finland
France	Centre National Recherche Scientifique CNRS
France	CEA (commissariat à l'énergie atomique et aux énergies alternatives)
France	Societe Francaise de Photogrammetrie et de Teledetection
Germany	Julius Kühn-Institut, Institut for Strategies and Technology Assessment
Germany	German Aerospace Center - German Remote Sensing Data Center
Germany	Deutsches Zentrum fuer Luft und Raumfahrt EV (DLR) German Aerospace Center
Germany	Institute for Radar Technologies
Greece	Centre for Reseach and Technology Hellas, Information Technologies Institute
Greece	Informatics & Telematics Institute
Ireland	Irish Centre for High-End Computing
Italy	Consiglio Nazionale delle Ricerche

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Luxemburg	Luxembourg Institute of Science and Technology
Netherlands	ECN Energy research Centre of the Netherlands (Energieonderzoek Centrum Nederland)
Netherlands	SRON (Institute for Space Research)
Netherlands	NLR National Aerospace Laboratory (Nationaal Lucht- en Ruimtevaartlaboratorium)
Netherlands	TNO (Netherlands Organisation for Applied Scientific Research)
Norway	Northern research Institute
Norway	Norwegian Space Centre
Norway	Research Council of Norway
Norway	Norwegian Institute of Bioeconomy Research (NIBIO)
Poland	Remote Sensing and Gis Laboratory
Poland	Earth Observation Group
Poland	Space Research Centre of Polish Academy of Sciences
Portugal	Centro de Investigacao em Ciencias Geo-Espaciais
Romania	Romanian Space Agency (ROSA)
Romania	National Research and Development Institute Delta
Slovenia	Space-SI
Switzerland	Swiss Federal Research Institute WSL
UK	National Centre for Earth Observation
UK	Science and Technology Facilities Council
UK	Centre of Aerospace Research of the Earth
UK	National Centre for EO
Ukraine	Centre of Aerospace Research of the Earth
COUNTRY	REGIONAL PSB

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Belgium	Centre Spatial de Liege (université de Liège)
Belgium	VITO
France	Laboratoire Commun de Télédétection CEMAGREF-ENGREF (LCT)
France	CERFACS (Centre européen de recherche et calcul scientifique)

Annex E- List of National and Regional Public Sector Bodies for the category Marine

COUNTRY	NATIONAL PSB
Belgium	Management Unit of the North Sea Mathematical Models
Belgium	Agentschap voor Maritieme Dienstverlening en Kust
Bulgaria	Institute of Oceanology
Croatia	Paying Agency for Agriculture, Fisheries and Rural Development
Cyprus	Department of Fisheries & Marine Research – Ministry of Agriculture, Natural Resources & Environment
Cyprus	Department of Merchant Shipping – Ministry of Communications and Works
Denmark	Danish AgriFish Agency, Center of Controls
Estonia	Marine Systems Institute at Tallinn University of Technology
Estonia	TUT Marine Systems Institute (Tallin University of Technology)
France	Mercator Ocean
France	Ifremer (Institut français de recherche pour l'exploitation de la mer)
Germany	Federal Maritime and Hydrographic Agency
Germany	Federal Bureau of Maritime Casualty Investigation

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Germany	Federal Waterways and Shipping Agency Northern Region Office
Greece	Hellenic Bureau for Marine Casualties Investigation (HBMCI)
Ireland	Marine Institute
Ireland	Coastal & Marine Research Centre
Italy	Marine Casualty Investigation Body
Luxemburg	Administration de la Gestion de l'Eau
Netherlands	Nederlandse Maritime Police
Netherlands	Royal Netherlands Institute for Sea Research
Netherlands	Water Board De Stichtse Rijnlanden
Netherlands	North Sea Foundation (Stichting De Noordzee)
Netherlands	NWP Netherlands Water Partnership
Netherlands	UU / IMAU (Institute for marine and atmospheric research Utrecht)
Norway	Norwegian Maritime Authority
Norway	Directorate of Fisheries/Institute of Marine Research
Norway	Norwegian Coastal Administration
Norway	Norwegian Water Resources and Energy Directorate
Poland	National Marine Research Institute (NMFRI)
Spain	Institut de Ciències del Mar (ICM-CSIC)
Spain	European Fisheries Control Agency
Sweden	Swedish Agency for Marine and Water management
Sweden	Aquabiota Water research
UK	MMO Marine Management Office

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UK	CEFAS Centre for Environment, Fisheries and Aquaculture Science
COUNTRY	REGIONAL PSB
Estonia	Institute of Baltic Studies
France	Villefranche Oceanographic Laboratory
Portugal	EMSA (European Maritime Safety Agency)
Portugal	EurOcean

Annex F - List of National and Regional Public Sector Bodies for the category Mapping

COUNTRY	NATIONAL PSB
Austria	BEV (Bundesamt für Eich- und Vermessungswesen)
Belgium	Royal Museum for Central Africa / Natural Hazards and Cartography service
Belgium	Institut Géographique National - Nationaal Geografisch Instituut
Bulgaria	Geodesy faculty
Czech Republic	Ministry of Regional Development, Department of Spatial Planning
Czech Republic	Prague Institute of Planning and Development, Spatial Information Section
Czech Republic	Ministry of Regional Development, Department of Spatial Planning
Denmark	Agency for Spatial and Environmental Planning
Denmark	Danish Geodata Agency
Estonia	Estonian Land Board
Estonia	Geological Survey of Estonia

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Estonia	TTU Geodeesia oppetool
Finland	Finnish Geospatial Research Institute
Finland	Finnish Geodetic Institute
France	IGN
France	IAURIF (Institut d'aménagement et urbanisme de la Région de Paris)
Germany	State Bureau of Surveying and Geoinformation Schleswig-Holstein
Germany	Federal Institute for Geosciences and Natural Resources, Remote Sensing
Germany	Federal Agency for Cartography and Geodesy
Germany	Inst. for Photog. & Eng. Surveys
Greece	Institute Of Geology and Mineral Exploration
Greece	National Cadastre and Mapping Agency
Ireland	PROPERTY REGISTRATION AUTHORITY IRELAND
Italy	Catasto
Italy	Geographical Information System and Cartography, Veneto Region
Latvia	LR VALSTS ZEMES DIENESTS
Malta	Continental Shelf Departement
Netherlands	Kadaster
Norway	Norwegian Mapping Authority
Poland	Institute of Geodesy & Cartography (IGIK)
Portugal	CEG-Institute of Geography and Territorial Planning Portugal
Portugal	INSTITUTO GEOGRAFICO PORTUGUES
Portugal	DGT (DG territorio)

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Slovenia	Surveying and mapping authority of the Rep of Slovenia
Spain	Spanish Directorate General for cadastre
Spain	National Geographic Institute of Spain
Sweden	Swedish Cartographic Society
Switzerland	Office fédéral de topographie
UK	Fera - Remote Sensing/GIS Team
Ukraine	International Association "Ukrainian Land and Resource Management Center"
COUNTRY	REGIONAL PSB
Belgium	AGIV Flanders Geographical Information Agency (FGIA)
France	IAURIF (Institut d'aménagement et urbanisme de la Région de Paris)
Italy	Geographical Information System and Cartography, Veneto Region
Spain	INSTITUTE CARTOGRÀFIC I GEOLOGIC DE CATALUNYA

Annex G - List of National and Regional Public Sector Bodies for the category Forestry

COUNTRY	NATIONAL PSB
Austria	Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape
Belgium	Direction Générale Agriculture, Ressources Naturelles et l'Environnement
Croatia	Croatian Forest Research Institute
Cyprus	Department of Forests (also has Remote Sensing Center) – Ministry of Agriculture, Natural Resources & Environment
Czech Rep.	Forestry and Game Management Research Institute
Estonia	Institute of Forestry and Rural Engineering
Finland	Forest Research Institute (Metla)
Germany	Federal Institute for Geosciences and Natural Resources (BGR)
Germany	Department of Forest Science
Greece	Department of Forestry and Management of the Environment and Natural Resources
Greece	Forest Institute
Greece	Institute for Mediterranean Forest Ecosystems and Forest Products Technology
Ireland	Forest Service, Department of Agriculture, Food and the Marine
Italy	Corpo forestale dello stato
Latvia	State Forestry Research Institute
Luxemburg	Administration de la Nature et des Forêts
Norway	Norwegian Forest and Landscape Institute
Slovenia	Slovenian Forestry Institute

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Spain	Laboratorio de Teledeteccion, Centro de Investigacion Forestal (CIFOR)
Spain	Centre for Ecological Research and Forestry Applications (CREAF)
Sweden	Swedish Forest Agency
Switzerland	Swiss Federal Institute for Forest, Snow and Landscape Research
UK	FC Forestry Commission
COUNTRY	REGIONAL PSB
Belgium	Agentschap voor Natuur en Bos
Belgium	Departement Leefmilieu, Natuur en Energie (administration flamande de l'environnement)
France	Institut européen de la forêt cultivée - EFIATLANTIC
Germany	Bavarian State Institute for Forestry
Spain	Forest Sciences Center of Catalonia

Annex H - List of National Public Sector Bodies for the category Hydrology

COUNTRY	NATIONAL PSB
Germany	Federal Institute of Hydrology
Netherlands	Hydrographic Service of the Royal Netherlands Navy (Dienst der Hydrografie)
Romania	National Institute of Hydrology and Water Management
Slovakia	Slovak Hydrometeorological Institute
Spain	MINHO RIVER BASIN DISTRICT MANAGEMENT AUTHORITY
UK	CEH (Centre for Ecology and Hydrology)
UK	UNKO Hydrographic office

Annex I - List of National and regional Public Sector Bodies for the category Civil Protection

COUNTRY	NATIONAL PSB
Belgium	Home affairs - GD Crisis center
Croatia	National Protection and Rescue Directorate (NPRD)
Cyprus	Cyprus Civil Defence Force – Ministry of the Interior
Cyprus	Cyprus Joint Rescue Coordination Center – Ministry of Defence
Cyprus	Fire Service Headquarters – Cyprus Fire Service
Denmark	Danish Maritime Accident Investigation Board
Denmark	Danish Defence Logistics and Acquisition Organization
Finland	National platform for mitigating the damage of natural disasters
France	Association française pour la prévention des catastrophes naturelles
France	European-Mediterranean Seismological Center
Germany	Federal Office of Civil Protection and Disaster Assistance
Greece	General Secret. For civil protection/emergency planning and response direct.
Hungary	National Directorate General for Disaster Management
Italy	Italian Dpt of Civil protection
Netherlands	National Platform for Disaster Risk Reduction
Norway	National Security Authority
Norway	Norwegian Directorate for Civil Protection
Portugal	Autoridade Nacional de Protecção Civil

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Slovenia	Administration for Civil Protection and Disaster Relief
Spain	Dirección General de protección Civil y Emergencias
Sweden	Swedish Civil Contingencies Agency
Sweden	Swedish Civil Contingencies Agency (MSB)
Switzerland	National Platform for Natural Hazards
COUNTRY	REGIONAL PSB
Italy	General Directorate of Civil Protection- Sardinia Government

Annex J - List of National and regional Public Sector Bodies for the category Agriculture

COUNTRY	NATIONAL PSB
Austria	Federal Office and Research Institute for Agriculture
Croatia	Paying Agency for Agriculture, Fisheries and Rural Development
Cyprus	Agricultural Research Institute – Ministry of Agriculture, Natural Resources & Environment
Estonia	Estonian Agricultural Registers and Information Board
Finland	MTT Agrifood Research Finland
Finland	RKTL (Finnish Game and Fisheries Research Institute)
France	INRA Institut National de la Recherche Agronomique
Germany	Julius Kuehn-Institut
Greece	Mediterranean Agronomic Institute of Chania
Hungary	Institute for Soil Science and Agricultural Chemistry, Centre for Agricultural Research, Hungarian Academy of Sciences

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Hungary	Institute for Soil Science and Agricultural Chemistry
Ireland	Teagasc (The Agriculture and Food Development Authority)
Luxemburg	Administration des Services Techniques de l'Agriculture - Département Agriculture et Environnement
Portugal	DGADR (Direção-Geral de Agricultura e Desenvolvimento Rural)
Spain	Ministerio de Agricultura, Alimentación y Medio Ambiente
COUNTRY	REGIONAL PSB
Germany	Bavarian State Research Center for Agriculture, Instiute for Crop Science and Plant Breeding
Germany	Bavarian State Research Center for Agriculture

Annex K- List of National and regional Public Sector Bodies for the category Environment

COUNTRY	NATIONAL PSB
Austria	UBA (Environment Agency Austria)
Belgium	Brussels Instituut voor Milieubeheer Institut Bruxellois de Gestion de l'Environnement
Belgium	Federal Department of the Environment
Croatia	Croatian Environment Agency
Croatia	Ministry of Environmental Protection
Cyprus	Department of Environment – Ministry of Agriculture, Natural Resources & Environment
Cyprus	Department of Lands and Surveys – Ministry of the Interior
Czech Republic	Institute of Botany of the Czech Academy of Sciences
Czech Republic	CENIA, Czech Environmental Information Agency
Czech Republic	Agency for Nature Conservation and Landscape Protection (AOPK)
Denmark	Ministry of the Environment
Denmark	Department of Geosciences and Natural Resource Management, University of Copenhagen
Denmark	Department of Environmental, Social and Spatial Change, Roskilde University
Denmark	Ecoinformatics & Biodiversity, Aarhus University
Denmark	Aarhus Universitet -- Danmarks Miljøundersøgelser -- Aarhus University -- National Environmental
Estonia	Estonian Environment Agency
Finland	Finnish Environment Institute

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France	European Topic Centre on Biological Diversity (Leading organisation = French National Museum of natural History)
France	Cerema/DterSO
France	Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME)
France	Ministère de l'Écologie, du Développement Durable et de l'Énergie
France	Centre de Documentation de Recherche et d'Expérimentations sur les pollutions accidentelles des eaux
France	OCLAESP (lutte contre atteintes à l'environnement)
France	Office français de la biodiversité
Germany	Federal environmental agency
Greece	Goulandris Natural History Museum / Greek Biotope Wetland Centre (EKBY)
Greece	Greek Biotope/Wetland Centre (EKBY)
Greece	Ministry for the Environment, Energy and Climate Change
Hungary	Institute for soil science
Ireland	Environmental Protection Agency of Ireland
Ireland	Environmental Protection Agency (EPA)
Ireland	Northern Ireland Env Agency
Italy	ISPRA (Italian National Institute for Environmental Protection and Research)
Italy	Istituto di Metodologie per l'Analisi Ambientale (IMAA)
Latvia	Latvian Environment, Geology and Meteorology Centre (LEGMC)
Luxembourg	Département de l'Environnement
Malta	Malta Environment and Planning Authority
Netherlands	Wetlands International

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Netherlands	Netherlands Environmental Assessment Agency
Norway	Norwegian Institute for Air Research
Norway	Norwegian Environment Agency
Norway	Climate and Pollution Agency
Norway	NIBIO Survey and statistics division
Poland	EcoForecast Foundation
Poland	Department of Monitoring and Environmental Information
Poland	EcoForecast Foundation
Poland	Nature Conservation Institute Polish Academy of Sciences
Portugal	Agência Portuguesa do Ambiente, I.P
Portugal	Portuguese Environment Agency
Portugal	Instituto da Conservação da Natureza e das Florestas
Portugal	Portuguese Sea and Atmosphere Institute
Romania	Ministry of Environment and Forestry
Slovakia	Slovak Environment Agency
Spain	Oficina Española de Cambio climático
Spain	Puertos del Estado - Area de Medio Físico
Sweden	Swedish Environmental Protection Agency
Switzerland	Federal Office for the Environment
Switzerland	Federal Office for the Environment (FOEN)
UK	Scottish Environment Protection Agency

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UK	EA-Environment Agency
UK	JNCC Joint Nature Conservancy Council
UK	SEPA Scottish Environmental Protection Agency
UK	NRW Natural Resources Wales
UK	SNH Scottish Natural Heritage
UK	Department for Environment, Food and Rural Affairs (DEFRA)
UK	Centre for Environment, Fisheries and Aquaculture Science
UK	Joint Nature Conservation Committee
UK	BAS British Antarctic Survey
COUNTRY	REGIONAL PSB
Belgium	Departement Leefmilieu, Natuur en Energie (administration flamande de l'environnement)
Belgium	Cellule de l'Etat de l'environnement Wallon
Belgium	Agentschap voor Geografische Informatie Vlaanderen (AGIV)
Belgium	Agentschap voor Natuur en Bos ANB
Belgium	Instituut voor Natuur- en Bosonderzoek
Belgium	Intergewestelijke Cel voor het Leefmilieu/Cellule Interrégionale de l'Environnement
France	Atmo Auvergne (qualité de l'air)
France	ARITT CENTRE (agence régionale innovation)
France	Alpine Network of Protected Areas
Germany	North Rhine Westphalian State Agency for Nature, Environment and Consumer Protection
Germany	North Rhine-Westphalia State Office for nature environment and consumer protection

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Germany	Thuringian Regional Office for the Environment and Geology
Germany	Rhenish Institute for Environmental Research
Greece	Interbalkan Environment Center
Greece	Laboratory of Geophysical - Satellite Remote Sensing & Archaeo-environment, Institute for Mediterranean Studies
Italy	ARPA (Agenzia Regionale per la Protezione dell' Ambiente) Lombardia
Italy	Centro Euro-Mediterraneo sui Cambiamenti Climatici

Annex L - List of universities with remote sensing/earth observation laboratories, departments or research centres

Laboratory/ Department	University	Country
Remote Sensing and Topographic LiDAR Research Group	University of Innsbruck	AUSTRIA
Remote Sensing Laboratories at the Department of Geography	State University of Gent	BELGIUM
Laboratory of Remote Sensing and Geo-Environment at the Department of Civil Engineering and Geomatics	Cyprus University of Technology	CYPRUS
Cyprus Remote Sensing Society	Eratosthenes Research Centre, Faculty of Engineering and Technology of the Cyprus University of Technology (CUT)	CYPRUS
Department of Remote Sensing	Global Change Research Institute (CzechGlobe)	CZECH REPUBLIC
Remote Sensing Laboratory, Faculty of Civil Engineering	Czech Technical University	CZECH REPUBLIC
LETG LITTORAL, ENVIRONNEMENT, TELEDETECTION, GEOMATIQUE	Université d'Angers	FRANCE
Department 1 Section 1.4 Remote Sensing	Helmholtz Centre Potsdam GFZ German Research Centre for Geosciences	GERMANY

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Signal Processing in EO - TUM Department of Aerospace and Geodesy	Technische Universität München	GERMANY
Remote Sensing Working Group at the Institute of Geosciences	Martin-Luther-University Halle	GERMANY
Physical Geography and Remote sensing	Ludwig Maximilians Universitaet	GERMANY
Institute for Geoinformatics and Remote Sensing	University of Osnabrück	GERMANY
Institute of Geography and Geology - Department of Remote Sensing	Julius-Maximilians-University Würzburg	GERMANY
Remote Sensing Research Group at Geographische Institute	University of Bonn	GERMANY
Chair for Earth Observation	Friedrich-Schiller University	GERMANY
Research Group for Earth Observation (rgeo) at the Department of Geography	University of Education & University Heidelberg	GERMANY
Geomatics/Remote Sensing Group at the Department of Geography	Ruhr-University Bochum	GERMANY
Earth Observation Laboratory	Hochschule Rhein-Waal	GERMANY
Cartography, GIS & Remote Sensing Section	University of Göttingen	GERMANY
Center for Remote Sensing or Land Surfaces (ZFL)	University of Bonn	GERMANY
Chair of Remote Sensing Technology TUM Department of Civil, Geo and Environmental Engineering	Technische Universität München	GERMANY
Remote Sensing Laboratory at the Department of Surveying	National Technical University of Athens	GREECE
Laboratory of Forest Management a Remote Sensing at the Faculty of Forestry & Natural Environment	Aristotle University of Thessaloniki	GREECE
Lab of Aerial Forestry Imagery and Remote Sensing	Democritus University of Thrace (DUTH)	GREECE
Remote sensing laboratory	University of Trento	ITALY
Telecommunications and Remote Sensing Lab	University of Pavia	ITALY
Laboratory of Earth Observation	University of Rome "Tor Vergata"	ITALY
Laboratory of Geo-Information Science and Remote Sensing	Wageningen University & Research	NETHERLANDS

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Faculty of Geo-Information Science and Earth Observation (ITC) at the Department of Earth Systems Science	University of Twente	NETHERLANDS
Department of Geoscience and Remote Sensing	Delft University	NETHERLANDS
Earth observation Laboratory	University of Tromso	NORWAY
Spatial Information and Remote Sensing Centre	Institute of Geodesy & Cartography (IGIK)	POLAND
Department of Geoinformatics, Cartography and Remote Sensing at the Faculty of Geography and Regional Studies	University of Warsaw	POLAND
Institute of Geography and Spatial Management at the Department of GIS, Cartography and Remote Sensing	Jagiellonian University	POLAND
Department of Photogrammetry & Remote Sensing	Warmia & Mazury University	POLAND
Earth Observation Group at the Space Research Centre	Polish Academy of Sciences	POLAND
Faculty of GIS	Military university of Technology	POLAND
Forest Remote Sensing and territorial planning Laboratory	Universidad Politecnica de Madrid	SPAIN
Laboratory of Earth Observation	University of Valencia	SPAIN
Section of Forest Remote Sensing at the Department of Forest Resource Management	Swedish University of Agricultural Sciences	SWEDEN
Remote Sensing Laboratories at the Department of Geography	University of Zürich	SWITZERLAND
Remote Sensing Research Group at the Department of Physical Geography	University of Bern	SWITZERLAND
Remote Sensing Group	Manchester Metropolitan University	UNITED KINGDOM
The Remote Sensing Detectors Group	University College London	UNITED KINGDOM
Remote sensing Group	University of Southampton	UNITED KINGDOM
Earth Observation and Ecosystem dynamics- Department of Geography and Earth sciences	University of Aberystwyth	UNITED KINGDOM

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School of geosciences- The Edinburgh Earth Observatory	University of Edinburgh	UNITED KINGDOM
School of Geography and Environmental sciences	University of Ulster	UNITED KINGDOM
Department of Geography- Remote sensing unit	University of Manchester	UNITED KINGDOM

Annex M – List of universities with laboratories, departments or research centres (other than remote sensing)

Laboratory/ Department	University	Country
Institut für Vermessung, Fernerkundung und Landinformation	Universität für Bodenkultur	AUSTRIA
Dept of Water, Atmosphere and Environment, Institute of Meteorology and climatology	BOKU University of Natural Resources and Life Sciences	AUSTRIA
Institute for Information and Communication Technologies	Joanneum Research	AUSTRIA
Department of Geoinformatics, GIS	University of Salzburg	AUSTRIA
Department of Earth and Environmental Sciences	Faculty of Bioscience Engineering	BELGIUM
Cartography and GIS Research Group at the Department of Geography	Vrije Universiteit Brussel	BELGIUM
GEMME – Georesources & Geo-Imaging Laboratory	Université de Liège	BELGIUM
Department of Environmental Sciences and Land Use Planning - Geomatics	Université Catholique de Louvain	BELGIUM
Department of Biosystems	Faculty of Bioscience Engineering	BELGIUM
Department of Meteorology and Geophysics	Sofia University "St. Kliment Ohridski"	BULGARIA
Department of Geology and Geological Engineering	Faculty of Mining, Geology and Petroleum Engineering, Croatian Academy of Sciences and Arts	CROATIA
Faculty of Geodesy	University of Zagreb	CROATIA
Czech University of Life Sciences	Czech University of Life Sciences	CZECH REPUBLIC

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Department of Applied Geoinformatics and Cartography	Charles University	CZECH REPUBLIC
Faculty of science, applied geoinformatics	Masaryk University	CZECH REPUBLIC
Department of Mathematical Modelling	Technical University of Denmark	DENMARK
Department of Geoscience	University of Aarhus	DENMARK
Tartu Observatory	University of Tartu	ESTONIA
UTU Geospatial Labs	University of Turku	FINLAND
School of Electrical Engineering at the Department of Radio Science and Engineering	Aalto University	FINLAND
GeoInformatics Research Group at the Department of Geosciences and Geography	University of Helsinki	FINLAND
Faculty of Science and Engineering, Dept of Geography and Geology	University of Turku	FINLAND
Laboratoire de Planétologie et Géodynamique de Nantes (LPGN)	Université de Nantes	FRANCE
AgroParis Tech	Institut des Sciences et Industries du Vivant et de l'Environnement	FRANCE
Laboratoire Icube, Faculté de géographie	Université de Strasbourg	FRANCE
International Space University	ISU, Strasbourg	FRANCE
Géosciences Montpellier	Université de Montpellier, Université des Antilles	FRANCE
OSUNA Observatoire des Sciences de l'Univers Nantes Atlantique	Université de Nantes	FRANCE
Département de Géographie	Université de Bretagne occidentale (Brest)	FRANCE
Département des Sciences de l'Environnement	Université de Bordeaux	FRANCE
Géosciences Océan	Université de Brest	FRANCE
IUEM Institut Universitaire Européen de la Mer	Université de Brest	FRANCE
Département Biologie et Géosciences	Université Paul Sabatier	FRANCE

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Centre Observation, Impacts, Energy	Mines ParisTech	FRANCE
Department of Geoinformation Processing for Environmental Planning	Technical University Berlin	GERMANY
Institute of Geography and Geoecology	Karlsruhe Institute of Technology	GERMANY
Department of Physical Geography	University of Cologne	GERMANY
Department of Geography/Geosciences - FB VI	University of Trier	GERMANY
Laboratory of Geomatics at the Department of Geography	Humboldt University Berlin	GERMANY
Institute of Photogrammetry and GeoInformation (IPI)	Leibniz University Hannover	GERMANY
Department of Geography	Ludwig-Maximilians-Universität München	GERMANY
Limnologische Station	Technische Universität München	GERMANY
Institute of Photogrammetry and GeoInformation (IPI)	Leibniz University Hannover	GERMANY
Department of Geomatics	University of Applied Sciences Stuttgart	GERMANY
Institute for Cartography	Technical University Dresden	GERMANY
Research Centre SPACE	University of the Germany Army	GERMANY
Sector of Applied Geology and Geophysics at the Department of Geology	University of Patras	GREECE
Geography Dept	Harokopio University	GREECE
Information Technologies Institute	Centre for Research and Technology	GREECE
Civil, Surveying & Geoinformatics Department	Serres Technological Education Institution	GREECE
Laboratory of Computer Science Applications in Spatial Planning	University of Thessaly	GREECE
Department of Marine Sciences	University of the Aegean	GREECE
Laboratory of Climatology and Atmospheric Environment	University of Athens	GREECE
Geography Department	Maynooth University	IRELAND

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Geodesy and Geomatics Division	University of Roma "La Sapienza"	ITALY
Laboratorio di Oceanologia Sperimentale ed Ecologia Marina at the Dipartimento di Scienze Ecologiche e Biologiche	Università degli Studi della Tuscia	ITALY
Department of Civil Engineering	Università degli Studi di Salerno	ITALY
Centre of Studies and Activities for Space CISAS "G Colombo"	University of Padova	ITALY
Aerospace Research Centre of Sapienza	University La Sapienza	ITALY
Department of Civil, Chemical, Environmental and Materials Engineering (DICAM)	University of Bologna	ITALY
Institute of Geodesy and Geoinformatics	University of Latvia	LATVIA
Marine Research Institute	Klaipeda University	LITHUANIA
Department of Geography	Vilnius Gediminas Technical University	LITHUANIA
Departement Géographie et Aménagement du territoire	Université du Luxembourg	LUXEMBOURG
Geophysics Laboratory	Université du Luxembourg	LUXEMBOURG
Research unit in Engineering science	Université du Luxembourg	LUXEMBOURG
Interdisciplinary Centre for Security, Reliability and Trust	Université du Luxembourg	LUXEMBOURG
Dept Environmental Management and Planning	University of Malta	MALTA
Department of Astronomy	Leiden University	NETHERLANDS
Department of Physical Geography at the Faculty of Geosciences	Utrecht University	NETHERLANDS
Department of Environmental Sciences and Natural Resource Management	The Norwegian University of Life Sciences	NORWAY
Department of Earth Science, Birkeland Centre for Space Science	University of Bergen	NORWAY
Department of Geography	Norwegian University of Science and Technology	NORWAY
Centre for Space Systems and sensors	University of Oslo	NORWAY

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Department of Geology	The Arctic University of Norway	NORWAY
Faculty of Mining Surveying and Environmental Engineering	AGH University of Science and Technology in Krakow	POLAND
Faculty of Geography	University of Łódź	POLAND
Independant Department of Geomatics and spatial Management	Warsaw university of Life sciences	POLAND
Faculty of Geography	University of Szczecin	POLAND
Department of Forest management, Department of Meteorology, Institute for Melioration, Environmental Management, and Geodesy	University of Life sciences, Poznan	POLAND
Laboratory of Geomatics at the Institute of Forest Resource Management	University of Agriculture in Krakow	POLAND
Department of Physics, Institute of Earth Sciences, School of Science and Technology	University of Evora	PORTUGAL
Department of Biology	University of the Azores	PORTUGAL
Faculty of Materials Science and Engineering	Transilvania University of Brasov	ROMANIA
Centre of Excellence for Space Sciences and Technologies	SPACE-SI	SLOVENIA
Agrifood Campus of International excellence	Universities of Almería, Cádiz, Córdoba, Huelva y Jaén.	SPAIN
European Topic Centre	University of Malaga	SPAIN
Department of Geology and Geochemistry	Universidad Autonoma de Madrid	SPAIN
Photogrammetric and Topometric Systems Research Group,	University of Jaen	SPAIN
Department of Geography and Land Management	Universidad de Zaragoza	SPAIN
SIGTE	University of Girona	SPAIN
Department of Computer Science and Engineering	University of Cadiz	SPAIN
CEANI division of the institute SIANI	Universidad de Las Palmas de Gran Canaria,	SPAIN

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Department of Geography	Universidad de Alcala	SPAIN
Department of Physical Geography	University of Seville	SPAIN
Dpto. Ingeniería Gráfica y Geomática	Universidad de Cordoba	SPAIN
Division of Geoinformatics at the Department of Urban Planning and Environment	KTH Royal Institute of Technology	SWEDEN
Department of Earth and Space Sciences	Chalmers University of Technology	SWEDEN
Department of Physical Geography and Ecosystem Science	Lund University	SWEDEN
Department of Earth and Environmental Sciences	ETH - Swiss Federal Institute of Technology in Zurich	SWITZERLAND
Faculté des géosciences et de l'environnement	Université de Lausanne	SWITZERLAND
Institute of Environmental Sciences	Université de Genève	SWITZERLAND
Centre for Polar Observation and Modelling	University of Leeds	UNITED KINGDOM
Centre for the Observation and Modelling of Earthquakes, Volcanoes and Tectonics	University of Leeds	UNITED KINGDOM
Nottingham Geospatial institute	University of Nottingham	UNITED KINGDOM
Department of Geography	University of Leicester	UNITED KINGDOM
Meteorology Department	University of Reading	UNITED KINGDOM
School of Ocean Sciences	University of Bangor	UNITED KINGDOM
Department of Electronic & Electrical Engineering	University of Bath	UNITED KINGDOM
Department of Geography	University of Sheffield	UNITED KINGDOM
Visual and Spatial Technology Centre	University of Birmingham	UNITED KINGDOM

Annex N - List of European clusters with the number of employees (ranges)⁵³

CLUSTER	COUNTRY	CATEGORY
CleanTech Cluster	Austria	Environment
Ecoplus	Austria	Environment
GreenTech Cluster Styria	Austria	Environment
CAP Construction	Belgium	Infrastructure
Cluster Eco Construction	Belgium	Infrastructure
ecobuild.brussels	Belgium	Infrastructure
Flander.bio	Belgium	Agriculture
Flanders' Food	Belgium	Food security, Health
Flanders' Maritime Cluster	Belgium	Marine
Flux50 vzw	Belgium	Energy
GreenWin	Belgium	Environment, Infrastructure
GREENWIN Belgian Innovation Cluster	Belgium	Environment, Energy
IBN Offshore Energy	Belgium	Energy
Pôle Meca Tech	Belgium	Digital Industries
Smart Digital Farming	Belgium	Agriculture
Smart Hub Flemish Brabant Cleantech	Belgium	Environment
TWEED (Technology of Wallonia Energy, Environment and sustainable Development)	Belgium	Energy, Environment

⁵³ Source : <https://www.clustercollaboration.eu/cluster-list>

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Wagralim	Belgium	Agriculture
Black Sea Energy Cluster	Bulgaria	Energy
Cleantech Bulgaria	Bulgaria	Environment
Electric Vehicles industrial cluster	Bulgaria	Digital Industries, Evt
Green Synergy Cluster	Bulgaria	Environment
ICT Cluster	Bulgaria	Technology
Cluster Aero-Space Technologies, Research and Applications (CASTRA)	Bulgaria	Space
Marine Cluster Bulgaria	Bulgaria	Marine
Cluster Inteligtne Energija	Croatia	Energy
Croatian Competitiveness Cluster of food-processing sector	Croatia	Agriculture
Croatian Competitiveness Cluster for Electro Energetic and Production Machinery and Technology Sector	Croatia	Energy
Green Cluster	Cyprus	Environment
Smart Cities Mediterranean Cluster	Cyprus	Infrastructure
Crea hydro&energy	Czech Republic	Environment
Czech Hemp Cluster	Czech Republic	Agriculture, Biopharmaceuticals
Czech Pellets Cluster	Czech Republic	Environment, forestry
Czech Stone Cluster	Czech Republic	Environment
Nanoprogress	Czech Republic	Technology, sustainable energy
National Energy Cluster	Czech Republic	Environment, energy

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CLEAN	Denmark	Energy
Energy Innovation Cluster	Denmark	Energy
House of Energy	Denmark	Technology
INBIOM	Denmark	Agriculture, Energy
Innovation Network Femern Belt	Denmark	Infrastructure
Estonian Recycling Competence Center/Green Economy Cluster	Estonia	Environment
Arctic Smart Rural Community	Finland	Agriculture, Blue growth industries
Merinova Technology Centre	Finland	Environment, industry
Water Ecosystem	Finland	Marine, Environment
Advancity	France	Smart cities
Aerospace Cluster Auvergne- Rhône Alpes	France	Space, Digital industries
Aerospace Valley	France	Space, Technology
Agri Sud-Ouest Innovation	France	Agriculture
ASTech Paris région	France	Space, Technology
Atlansun	France	Environment, Energy
Axelera	France	Environment
Capenergies	France	Energy, Blue growth industries
CD2E	France	Environment
Cereales Vallee	France	Agriculture

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DERBI	France	Energy, Renewable sources
Dream Cluster	France	Environment, Digital industries
Ea eco-entreprises	France	Environment, Digital industries
Hydreos	France	Environment, renewable energy
IAR - The French Bioeconomy Cluster	France	Agriculture, Energy
Inno'vin	France	Agriculture, Innovation
Interbio Nouvelle-Aquitaine	France	Agriculture, Technology
Nutrition Health Longevity	France	Agriculture, Biotechnology
Pôle Aqua-Valley	France	Environment, Water
Pole Avenia - contacted (?)	France	Energy, Blue growth industries
Pole Europeen de la Ceramique	France	Creative industries, Mobility Technologies
Pôle Mer Bretagne Atlantique	France	Environment, Marine
Pôle Mer Méditerranée	France	Aquaculture, Blue renewable energy
Qualimediterranee	France	Agriculture
Rhinespace	France	Energy, smart cities
S2e2 Smart Electricity Cluster	France	Energy, digital industries
TEAM2	France	Environment

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Temergie	France	Environment, Blue growth industries
Tenerrdis	France	Energy, Renewable sources
Terralia - Food, Wellness, Natural Products	France	Environment, Agriculture
Vallee de l'energie	France	Energy, digital industries
Valorial	France	Agriculture
Vegepolys Valley	France	Agriculture, Environment
Vitagora	France	Agriculture
Biomastec	Germany	Agriculture, Environment
Cluster Energy Technology Berlin- Brandenburg	Germany	Energy
Cluster Leistungselektronik	Germany	Energy, digital industries
Ecoliance Rheinland	Germany	Environment
Energy Saxony	Germany	Energy, digital industries
GeoEnergy Celle	Germany	Environment, energy
Innovations und Effizienzcluster	Germany	Environment, green technologies
Maritime Cluster Norddeutschland e.V.	Germany	Marine
Netzwerk	Germany	Environment, Energy
OLEC	Germany	Environment, Digital industries
Thurigian Renewable Energies Network	Germany	Energy, mobility technologies

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Umweltcluster Bayern	Germany	Environment
Blue Energy Cluster:	Greece	Marine, Environment
CHORUS	Greece	Environment, Energy
Alliance Informatics and Innovation Cluster	Hungary	Digital industries, smart cities
ArchEnerg Cluster	Hungary	Environment, Energy
Cluster of Applied Earth Sciences	Hungary	Environment, renewable sources
Green Current Renewable Energetis and Innovation Cluster	Hungary	Environment, renewable sources
KEXPORT Environmental Cluster	Hungary	Environment
GeoScience Ireland	Ireland	Environment, Energy
Irish Bioeconomy Fundation	Ireland	Agriculture, agro chemicals
Shannon Development	Ireland	Aerospace vehicles, digital industries
Blue Energy Cluster	Italy	Marine
ASTER - Energy and environment platform	Italy	Environment, Blue growth industries
CAT.AL, High Technology Agrifood Lombardy Cluster (Parco Tecnologico Padano)	Italy	Agriculture, Biotechnology
Clever	Italy	Environment, sustainable energy
Clust-ER Agroalimentare Emilia-Romagna	Italy	Agriculture
Cluster Lucano di Bioeconomia	Italy	Agriculture

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Consorzio Ecodomus	Italy	Environment, sustainable energy
Distretto Agroalimentare Regionale	Italy	Agriculture
Lazio Connect	Italy	Aerospace vehicles, digital industries
Lombardy Energy Cleantech Cluster	Italy	Energy
Parco Agroalimentare FVG - Agrifood and Bioeconomy	Italy	Agriculture, Food
Polo Agrifood	Italy	Agriculture, Food
TeRN	Italy	Environment, Space exploration
Tuscany Technology Cluster for Energy and Green Economy	Italy	Energy, digital industries
Cleantech Latvia	Latvia	Energy, digital industries
Cleantech Lithuania	Lithuania	Environment, resources
Lithuanian Photovoltaic Technology Cluster	Lithuania	Energy, Renewable sources
SMARTTA Smart Technology Cluster	Lithuania	Energy, digital industries
Jurinis klasteris/Maritime cluster	Lithuania	Marine, Blue growth industries
Lithuanian ICT Cluster	Lithuania	Digital industries
Lithuanian Space Association (LSA)	Lithuania	Space
Smart Food Cluster	Lithuania	Digital industries, food
Artificial Intelligence Technology Cluster	Lithuania	Digital industries

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Malta Marittima Agency	Malta	Marine, Blue growth industries
WaterCampus Leeuwarden	Netherlands	Environment, renewable sources
Biobased Delta	Netherlands	Agriculture, Environment
Greenport West-Holland	Netherlands	Agriculture, Environment
Promotie Group Tuinbouw Emmen	Netherlands	Agriculture
AgriFood Capital	Netherlands	Digital industries, food
Food ValleyNL	Netherlands	Digital industries, food
High Tech NL	Netherlands	Digital industries, information technology
Stichting Water Alliance	Netherlands	Environment, renewable sources
Arctic Cluster Team	Norway	Digital industries
GCE NODE	Norway	Marine, Blue growth industries
NCE Aquatech Cluster	Norway	Blue growth industries, aquaculture
NCE Maritime CleanTech	Norway	Marine, Energy supply system
NCE Seafood	Norway	Blue growth industries, aquaculture
Oslo Renewable Energy and Environment Cluster	Norway	Environment, Blue growth industries
Tretorget AS	Norway	Environment, forestry

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AgroBioAlliance	Poland	Agriculture, Environment
Centre for Energy Technologies Cluster	Poland	Digital industries, Energy
Instytut Maszyn Przepływowych - Baltic Eco-Energy Cluster	Poland	Environment, renewable sources
SEaNergia Baltic Cluster	Poland	Marine, Environment, Blue growth industries
Silesian Water Cluster	Poland	Environment, water
South Poland Cleantech Cluster	Poland	Digital industries, Energy
Mazovia Cluster ICT	Poland	Space
Sustainable Infrastructure Cluster	Poland	Environment, renewable sources
Aebb	Portugal	Agriculture, Forestry
Animaforum	Portugal	Agriculture, Blue growth industries
EnergyIN - the Competitiveness and Technology Cluster for Energy	Portugal	Environment, energy
InnovCluster	Portugal	Agriculture, Environment
AGROFOOD REGIONAL INOVATIVE CLUSTER	Romania	Agriculture
AGROPRO Oltenia Cluster	Romania	Agriculture, Blue growth industries
AgroTransilvania Cluster	Romania	Agriculture
BIODANUBIUS	Romania	Agriculture, Environment
Cluster For promoting Nearly Zero Energy Buildings	Romania	Environment, Infrastructure

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Eco innovation cluster for sustainable environment	Romania	Energy, Blue growth industries
Green Energy Innovative Biomass Cluster	Romania	Agriculture, Environment
ICT Regional Cluster	Romania	Information technology
IND-AGRO-POL	Romania	Agriculture
Innovation and Technology Cluster	Romania	Digital industries
Start Inovare	Romania	Digital industries, Environment
Transylvania Energy Cluster	Romania	Digital industries, Environment
Cluster for ecological culture and ecological energy Ecopanonia	Serbia	Digital industries, energy
Bioeconomy Cluster	Slovakia	Agriculture
Slovensky plastikarsky klaster	Slovakia	Environment
AE-ROBO-NET	Slovenia	Agriculture, digital industries
Poly4Eml hosted by Anteja ECG d.o.o.	Slovenia	Agriculture, Forestry
Teces	Slovenia	Energy, Environment
Aclima - Basque Environment Cluster	Spain	Environment
AEI Aertic	Spain	Agriculture, digital industries
Amec Urbis	Spain	Environment
Asociación Cluster Agroalimentario de Navarra	Spain	Agriculture
Basque Energy Cluster	Spain	Energy, Blue growth industries

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BioPlat	Spain	Energy, Environment
Catalan Water Partnership (CWP)	Spain	Marine, Environment
Cluster Bioteconologic i biodemic	Spain	Agriculture, Biopharmaceuticals
Cluster D'energia eficient de Catalunya	Spain	Environment, energy
Cluster Food+i	Spain	Agriculture, Health
Cluster of Renewable Energy and Energetic Solutions of Castilla and León	Spain	Energy
Cluster Smart Cities de la región de Murcia	Spain	Environment, Digital industries
EnerCluster	Spain	Digital industries, Wind energy
Extremadura Energy Cluster	Spain	Agriculture, energy
FEMAC	Spain	Agriculture, environment
Innovi - Catalan Wine Cluster	Spain	Agriculture, wine
Madrid aerospace Cluster	Spain	Aerospace vehicles, digital industries
Secpho - collaborate to innovate	Spain	Agriculture
ZINNAE	Spain	Environment, sustainable agriculture
Dalarna Science Park	Sweden	Creative industries, energy
NetPort Energy Cluster	Sweden	Environment, energy
Offshoreväst	Sweden	Marine, Blue growth industries

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Sustainable Business Hub	Sweden	Environment, renewable sources
Aberdeen Renewable Energy Group	United Kingdom	Blue growth industries
BioVale Limited	United Kingdom	Agriculture, energy
Cambridge Cleantech	United Kingdom	Energy, Environment
Greentech South	United Kingdom	Environment
Highlands and Islands Enterprise	United Kingdom	Environment, wind energy
Marine South East	United Kingdom	Marine, aquaculture
Oxfordshire Greentech	United Kingdom	Environment
Scottish Enterprise	United Kingdom	Energy, blue renewable energy
Team Humber Marine Alliance	United Kingdom	Marine
Water Cluster	United Kingdom	Environment, hydrology

Annex O - List of Humanitarian Non-governmental organisations and the location of their headquarters

Non-governmental organisation	Headquarters
Aid Convoy	UK
CHS Alliance	Switzerland
Core Humanitarian Standard on Quality and Accountability	Denmark
@fire International Disaster Response Germany	Germany
Hellenic Rescue Team	Greece
Proactiva Open Arms	Spain
SOS Méditerranée	France

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Médecins sans Frontières	Switzerland
International Committee of the Red Cross	Switzerland
EuroMed Rights	Denmark

Annex P- List of Environmental Non-governmental organisations and the location of their headquarters

Non-governmental organisation	Headquarters
European Environmental Bureau	Belgium
Friends of the Earth Europe	Belgium
Greenpeace International	The Netherlands
T & E - Transport and Environment	Belgium
WWF International	Switzerland
France Nature Environnement	France
EcoCity	Greece
OrganizationEarth	Greece
Woodland Trust	UK
Green Alliance	UK