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ECoLaSS

Evolution of Copernicus Land Services based on Sentinel data

D16.1

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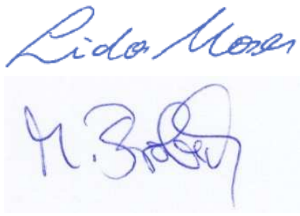
Author(s):	Linda Moser (GAF) Markus Probeck (GAF) Xavier Blaes (UCL) Christophe Sannier (SIRS) Heinz Gallaun (JR)	28.09.2017	
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AD01	Horizon 2020 Work Programme 2016 – 2017, 5 iii. Leadership in Enabling and Industrial Technologies – Space. Call: EO-3-2016: Evolution of Copernicus services. Issued: 13.10.2015
AD02	Guidance Document: Research Needs Of Copernicus Operational Services. Final Version issued: 30.10.2015
AD03	Proposal: Evolution of Copernicus Land Services based on Sentinel data. Proposal acronym: ECoLaSS, Proposal number: 730008. Submitted: 03.03.2016

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EXECUTIVE SUMMARY

The Horizon 2020 (H2020) project, "Evolution of Copernicus Land Services based on Sentinel data" (ECoLaSS) addresses the H2020 Work Programme 5 iii. Leadership in Enabling and Industrial technologies - Space, specifically the Topic EO-3-2016: Evolution of Copernicus services. ECoLaSS is conducted from 2017–2019 and aims at developing and prototypically demonstrating selected innovative products and methods for future next-generation operational Copernicus Land Monitoring Service (CLMS) products of the pan-European and Global Components. This will contribute to demonstrating operational readiness of the finally selected products, and shall allow the key CLMS stakeholders (i.e. mainly the Entrusted European Entities (EEE) for the CLMS, i.e. EEA and JRC) to take informed decisions on potential procurement of the next generation of Copernicus Land services from 2020 onwards. To achieve this goal, ECoLaSS makes full use of dense time series of Sentinel-2 and Sentinel-3 optical data as well as Sentinel-1 Synthetic Aperture Radar (SAR) data. Rapidly evolving scientific as well as user requirements will be analysed in support of a future pan-European roll-out of new/improved CLMS products, and the transfer to global applications.

This Deliverable D2.1: "D51.1a - Stakeholder Consultation Report" is the first Deliverable of Work Package (WP) 16: "WP 51 – Stakeholder Consultation, which aims to ensure the proper involvement of main stakeholders and decision makers in this assessment process through regular consultations with the main stakeholders such as EEA, JRC and EC, in which the proofs-of-concepts/prototypes of Task 4 will be discussed in order to determine priorities for continuation of work in the next project phase(s) and seek the stakeholders' view/approval of suggested operational candidates.

This Deliverable D51.1 has also a close link to WP 21 "Assessment of Service Evolution Requirements" with its main Deliverable "D21.1a – Service Evolution Requirements Report", in the frame of which user and stakeholder interviews have been carried out, and the functional and technical evolution requirements of existing and upcoming services for the Copernicus Land Monitoring Service (CLMS) beyond 2020, both of the Continental and Global LMCS Component, are collected and documented. In practice, gathering stakeholder requirements in the frame of WP 21 and consulting with stakeholders on the planned service developments in WP 51, often go hand in hand, specifically at this early stage of the project. Whereas the present Deliverable documents the stakeholder consultation process and what has been done in that respect, the related thematic recognitions are documented in the Deliverable D21.1a – Service Evolution Requirements Report, and are therefore not repeated in the present report.

For a Horizon2020 project like ECoLaSS, with clearly defined tasks and resources, it would be generally not possible to individually interact with the entirety of potential stakeholders on a single basis. Therefore, the ECoLaSS team has taken on the approach of consulting in as many cases as possible with federating entities of relevant stakeholder segments (see e.g. section 3.2.4), or proxies of relevant bigger groups of stakeholders (see e.g. section 3.2.3). These allow to comprehensively address, or interact with, a large group of stakeholders in an efficient manner.

Summarising the project's achievements in stakeholder consultation in the first half of the first Reporting Phase (M1-9), substantial and fruitful interactions have been taking place with all major relevant European and many national stakeholders, as well as with a multitude of further stakeholder groups. This was facilitated by the consortium partner's collective unique positioning in the Copernicus and land monitoring community, as well as by the sophisticated stakeholder consultation concept, building on a dual strategy of targeted stakeholder meetings and using basically every opportunity for back-to-back meetings. Therefore, the consortium considers the WP 51 to be fully on track as planned.

Some improvement potential is recognised in view of the intensity of the exchange with JRC, although this has been a key focus throughout the first nine months of the project. A further intensification of efforts will be put in this in the next project phase. The close and fruitful contacts with EEA will be continued. Some further potentially relevant entities are planned to be addressed as well (such as further EC DGs).

In view of the collected information, the project team gained many valuable insights with respect to future CLMS product developments and the perception, use and further needs of the various stakeholders with respect to the CLMS products.

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Abbreviations

AD	Applicable Document
AFIGEO	Association Française pour l'Information Géographique) French Association for Geographical Information)
AG	Aktiengesellschaft (stock company)
AGM	Annual General Meeting
AT	Austria
BE	Belgium
BELSPO	Belgian Science Policy Office
BKG	Bundesamt für Kartographie und Geodäsie (German Federal Agency for Cartography and Geodesy)
BMVI	Bundesministerium für Verkehr und digitale Infrastruktur (German Federal Ministry of Transport and Digital Infrastructure)
CAP	Common Agricultural Policy
CCI	Climate Change Initiative
CCI+	Climate Change Initiative + (follow-up)
CGDD	Comissariat Général au Développement Durable (French General Office for Sustainable Development)
CGS	Collaborative Ground Segment
CLC	CORINE Land Cover
CLC+	CORINE Land Cover plus (with improved specifications)
CLMS	Copernicus Land Monitoring Service
CNIG	Conseil National de l'Information Géographique (French National Council for Geographic Information)
CO	Confidential
CODE-DE	Copernicus Data and Exploitation Platform – Deutschland
DAFM	Irish Department of Agriculture, Food and the Marine
DE	Deutschland (Germany)
DG/s	Directorate-General/s
DG AGRI	Directorate-General for Agriculture and Rural Development
DG CLIMA	Directorate-General for Climate Action
DG DEVCO	Directorate-General for International Cooperation and Development
DG ENV	Directorate-General for Environment
DG GROW	Directorate General for Internal Market, Industry, Entrepreneurship and SMEs
DG MOVE	Directorate General for Mobility and Transport
DG REGIO	Directorate General for Regional Policy
DFD	Deutsches Fernerkundungsdatenzentrum
DLR	Deutsches Zentrum für Luft- und Raumfahrt (German Aerospace Center)
DRI	Direction de la Recherche et de l 'Innovation (French Innovation and Research Directorate)
EAA	Environmental Agency Austria (Umweltbundesamt Österreich)
EARSC	European Association of Remote Sensing Companies
EARSeL	European Association of Remote Sensing Laboratories
EC	European Commission
ECoLaSS	Evolution of Copernicus Land Services based on Sentinel data (H2020 project)
ECV	Essential Climate Variable

EEA	European Environment Agency
EEA-39	The 33 member countries of the EEA (i.e., the EU-28 member states together with Iceland, Liechtenstein, Norway, Switzerland and Turkey), plus 6 cooperating West Balkan countries (i.e., Albania, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Montenegro, Serbia as well as Kosovo)
EEEs	European Entrusted Entities
EIONET	European Environment Information and Observation Network
ELI	Earth and Life Institute
EO	Earth Observation
ESA	European Space Agency
ESRIN	European Space Research Institute
EU	European Union
FISE	Forest Information System for Europe
FOR	Forest (HRL)
FR	France
GAF	GAF AG (a service provider)
GEO	Group on Earth Observations
GEOSS	Global Earth Observation System of Systems
GmbH	Gesellschaft mit beschränkter Haftung (limited liability company)
GRA	Grassland
H2020	Horizon 2020 (the 8th Framework Programme for Research and Technological Development of the EC)
HR	High Resolution
HRL/s	High Resolution Layer/s
IACS	Integrated Agricultural Control System
IGN	Institut National de l'Information Géographique et Forestière (National Institute of Geographic and Forest Information)
IMP	Imperviousness (HRL)
INSPIRE	INfrastructure for SPatial InfoRmation in Europe
INTERGEO	Tradefair for geo-information professionals
IPCC	Intergovernmental Panel on Climate Change
ISRSE	International Symposium on Remote Sensing of Environment
IUFRO	Interconnecting Forests, Science and People
JR	Joanneum Research GmbH (a service provider)
JRC	Joint Research Centre of the EC
KO	Kick-Off
LC	Land Cover
LC/LU	Land Cover/Land Use
LU	Land Use
MARS	Monitoring Agricultural ResourceS
MR	Medium Resolution
MS/s	Member State/s
MULTIPLY	MULTIscale SENTINEL land surface information retrieval Platform
N2000	Natura 2000
NFP	National Focal Point
NRC	National Reference Centre
PU	Public (Dissemination Level)

REA	Research Executive Agency (of the EC)
SAR	Synthetic Aperture Radar
SAS	Société par actions simplifiée
SEIS	European Shared Environmental Information System
SENSAGRI	Sentinels Synergy for Agriculture
SIG	Special Interest Group
SIRS	Systèmes d'Information à Référence Spatiale SAS (a service provider)
SME	Small and Medium Enterprise
SOeS	Service de l'Observation et des Statistiques (French Observation and Statistical Service)
UBA	Umweltbundesamt Deutschland (German Environment Agency)
UCL	Université Catholique de Louvain (Catholic university of Leuven), Belgium
UNCCD	United Nations Convention to Combat Desertification
URL	Uniform Resource Locator
VITO	Flemish Research Institute
WP	Work Package
WRI	World Resources Institute

1 Introduction

The Horizon 2020 (H2020) project, "Evolution of Copernicus Land Services based on Sentinel data" (ECoLaSS) addresses the H2020 Work Programme 5 iii. Leadership in Enabling and Industrial technologies - Space, specifically the Topic EO-3-2016: Evolution of Copernicus services. ECoLaSS is conducted from 2017–2019 and aims at developing and prototypically demonstrating selected innovative products and methods for future next-generation operational Copernicus Land Monitoring Service (CLMS) products of the pan-European and Global Components. This will contribute to demonstrating operational readiness of the finally selected products, and shall allow the key CLMS stakeholders (i.e. mainly the Entrusted European Entities (EEE) for the CLMS, i.e. EEA and JRC) to take informed decisions on potential procurement of the next generation of Copernicus Land services from 2020 onwards.

ECoLaSS makes full use of dense time series of Sentinel-2 and Sentinel-3 optical satellite data as well as Sentinel-1 Synthetic Aperture Radar (SAR) data. Rapidly evolving scientific as well as user requirements will be analysed in support of a future pan-European roll-out of new/improved Copernicus Land Monitoring Service products, and the transfer to global applications.

The Deliverable D2.1: "D51.1a - Stakeholder Consultation Report" is the first Deliverable of Work Package (WP) 16: "WP 51 – Stakeholder Consultation", as part of Task 5: "Operationalisation Framework", in which the future conditions under which the new/improved Copernicus Land products will (or will not) qualify as operational Copernicus Land service candidates (i.e. the so-called operationalisation framework) will be investigated. WP 51 Stakeholder Consultation specifically aims to ensure the proper involvement of main stakeholders and decision makers in this assessment process through regular consultations with the main stakeholders such as EEA, JRC, EIONET, and EC, in which the proofs-of-concepts/prototypes of Task 4 will be discussed in order to determine priorities for continuation of work in the next project phase(s) and seek the stakeholders' view/approval of suggested operational candidates.

This Deliverable D51.1 has a close link to WP 21 "Assessment of Service Evolution Requirements" with its main Deliverable "D21.1a – Service Evolution Requirements Report", where user and stakeholder interviews have been carried out, and the functional and technical evolution requirements of existing and upcoming services for the Copernicus Land Monitoring Service (CLMS) beyond 2020, both of the Continental and Global CLMS Component, are collected and consolidated. In practice, gathering stakeholder requirements in the frame of WP 21 and consulting with stakeholders on the planned service developments in WP 51, often go hand in hand, specifically at this early stage of the project where the WP 21 aspects are predominant.

The subsequent benchmarking and selection process of the most mature operational CLMS new service candidates will be undertaken by WP 52 Candidates for Operational Roll-out, considering various aspects such as operational feasibility, technical maturity, cost/benefit ratio, timeliness, etc., before WP 53 Integration Plan into Copernicus Service Architecture will suggest strategies how to best integrate the selected new/improved products into the existing Copernicus Land service environment, ensuring consistency and complementarity with the other Copernicus Land suite of products.

The ECoLaSS project follows a two-phased approach of two times 18 months duration. The stakeholder consultation process, i.e. the interactions and collection of feedback and recommendations, is documented in the present Deliverable D51.1 Stakeholder Consultation Report, which shall be regularly updated and delivered in four issues. The present version is the first issue of the Stakeholder Consultation Report, compiled at an early stage in the middle of the first 18-month project cycle. It will, amongst others, constitute a major input to WP 52 "Candidates for Operational Roll-out" and WP 53 "Integration Plan into Copernicus Service Infrastructure", where – next to the technical and operational maturity – the voiced priorities of the stakeholders will be key decision criteria.

Particularly for the second project phase, upfront the consultations in the frame of WP 51, the relevant most recent results and outputs of both Task 3 (i.e. developed methods and related documentation, methods compendia, etc.) and of Task 4 (i.e. proof-of-concept/prototype data sets of new and improved products, including derived/estimated accuracy figures) and/or related dissemination material (organised

and provided by WP 61) will be compiled and provided by the consortium to the addressed stakeholders, in order to realistically reflect the actual status of development, with all relevant advantages and limitations discovered by then.

For a Horizon2020 project like ECoLaSS, with clearly defined tasks and resources, it would be generally not possible to individually interact with the entirety of potential stakeholders on a single basis. Therefore, the ECoLaSS team has taken on the approach of consulting in as many cases as possible with federating entities of relevant stakeholder segments (see e.g. section 3.2.4), or proxies of relevant bigger groups of stakeholders (see e.g. section 3.2.3). These allow to comprehensively address, or interact with, a large group of stakeholders in an efficient manner.

The Deliverable provides both a description and a rationale of which stakeholder (groups) are addressed by ECoLaSS (chapter 2), and provides detailed documentation of the work undertaken and first recognitions gained from these consultations (chapter 3). It provides a conceptual description of the project's consultation concept (section 3.1) as well as comprehensive summaries of the outcomes from dedicated consultation activities with the CLMS main stakeholders EEA and JRC, with the EC DGs, with key national stakeholders, with federating stakeholder groups, and with other parallel projects of relevance for ECoLaSS (section 3.2). The results of further stakeholder consultations in the frame of other workshops and events (section 3.3) as well as the activities related to disseminating information on a broader basis to relevant stakeholders by means of dissemination actions (section 3.4) are additionally described. A first summary of findings and conclusions is given in chapter 4.

2 Stakeholders

Various European, national and other stakeholders, the latter ranging from federal stakeholder entities to other projects with relevance for Copernicus Land, have been and will further be addressed in the ECoLaSS stakeholder consultation process. The following stakeholder entities and groups have been identified as generally (or potentially) relevant and are therefore, and will be further addressed by ECoLaSS:

- **EEA**, being the EEE for the continental and local Copernicus Land components and the in-situ component (several thematic units);
- **EC DG JRC**, being the EEE for the global Copernicus Land component, and being involved in conceptional studies towards a future pan-European agricultural service;
- **EC – DG GROW,** being responsible both for the overall programmatic coordination of Copernicus and for the management of this H2020 project (via REA);
- **EC – thematic DGs such as ENV, AGRI, CLIMA, REGIO, MOVE, DEVCO,** being responsible for the coordination of specific environmental, infrastructure and policy issues in Europe (and partially beyond);
- **Copernicus Committee and User Forum**, being composed of EU member states' representatives, assisting the EC on user requirements, policy definitions, implementation measures and coordination of the Copernicus programme with its public-sector users;
- **EIONET**, being an EEA-39 wide network of NFPs and NRCs which is coordinated by EEA, supporting collection and organisation of data as well as development and dissemination of information concerning Europe's environment.
- **National Stakeholders** with a relevant Copernicus mandate or acting as coordinating user for Copernicus implementation in key Member States such as Germany or France.

In section 2.1 the various European stakeholders will be described more in detail, section 2.2 outlines national stakeholders from key Member States and section 2.3 focusses on all other stakeholders and groups of stakeholders.

2.1 European-level Stakeholders

For ECoLaSS, the most crucial stakeholders of are the two Entrusted European Entities (EEE) responsible for CLMS implementation, i.e. the European Environment Agency (EEA) and the Joint Research Centre (JRC), the latter being a European Commission (EC) Directorate-General (DG). Further EC DGs are however also relevant and are therefore described as well in this section.

EUROPEAN ENVIRONMENT AGENCY (EEA)

The European Commission entrusted the European Environment Agency (EEA) with coordinating the implementation of the Copernicus Land Monitoring Service's continental (pan-European) and local components, as well as with the service cross-cutting in situ component coordination. The main contact persons in charge of the CLMS at EEA are Mr Tobias Langanke and Mr Hans Dufourmont; a long-term relation exists between both and several ECoLaSS project partners, through various previous/parallel Copernicus Land project implementations.

The EEA is a European Union (EU) public body seated in Copenhagen, Denmark. It supports the EU in the development and implementation of environmental policies by providing relevant, reliable, targeted and timely information on the state of the environment and future prospects, as well as independent scientific knowledge and technical support. Currently, the EEA has 33 member countries (i.e. the 28 Member States of the European Union, Iceland, Liechtenstein, Norway, Switzerland and Turkey) and 6 cooperating countries (https://www.eea.europa.eu/). The EEA is the hub of the European Environment Information and Observation Network (EIONET) (see section 2.3). The EEA and EIONET contribute to the European Shared Environmental Information System (SEIS), a distributed, integrated, web-enabled information system based on a network of public information providers sharing environmental data and information. It builds on existing e-infrastructure, systems and services in the Member States and EU institutions.

EC DG JOINT RESEARCH CENTRE (JRC)

The EC's Joint Research Centre (JRC), specifically the "Knowledge for sustainable development & Food security" Unit as part of the "Knowledge Management Directorate" is, amongst other activities, in charge of coordinating the implementation of the Copernicus Land Global Component. The main contact person for the CLMS Global Component is Mr Michael Cherlet, and for a future pan-European Agricultural service Mr Guido Lemoine as well as Mr Olivier Léo (retired) as well as Felix Rembold for the topic of global crop forecasting.

The JRC acts as the European Commission's science and knowledge service. The mission of the JRC is "to support EU policies with independent evidence throughout the whole policy cycle. Its work has a direct impact on the lives of citizens by contributing with its research outcomes to a healthy and safe environment, secure energy supplies, sustainable mobility and consumer health and safety" (https://ec.europa.eu/jrc/en/about/jrc-in-brief). In addition, the JRC is "Comprised of strategy and coordination, knowledge production, knowledge management and support directorates, and is spread across six sites in five different countries within the EU" (https://ec.europa.eu/jrc/en/about/organisation).

As for Monitoring Agricultural ResourceS (MARS), "the JRC develops methods, tools and systems for use within agricultural monitoring activities applied to Europe, sub-Saharan Africa and other areas of the world. Crop yield forecasting is undertaken to provide monthly bulletins forecasting crop yields to support the EU's Common Agriculture Policy (CAP). Providing early warning of crop shortages or failure provides rapid information for EU development aid activities to support food insecure countries, as part of the JRC work on global food security. Within the CAP, techniques and guidance are continually being refined for the standardized measurement of field areas, identification of crop types, geo-location of landscape features and assessment of environmental impacts. Such techniques for agricultural monitoring are a key part of the Integrated Agricultural Control System (IACS) which is at the core of CAP implementation in Europe: JRC provides methods and technical guidance in support of this implementation." (https://ec.europa.eu/jrc/en/mars).

EC DG Environment (DG ENV)

The Directorate-General for Environment (DG ENV) acts as European key stakeholder and user of Copernicus Land Products. DG ENV is the European Commission department responsible for EU policy on the environment. It aims to protect, preserve and improve the environment for present and future generations, proposing and implementing policies that ensure a high level of environmental protection and preserve the quality of life of EU citizens. It also makes sure that Member States apply EU environmental law correctly and represents the European Union in environmental matters at international meetings" (http://ec.europa.eu/dgs/environment/index_en.htm).

The DG ENV contact points are: (i) Mr Frank Vassen, from Unit D3 – Nature conservation; Directorate „Natural Capital", who was, amongst other things, involved in the CLMS local component's Natura2000 product definition, and (ii) Mr Peter Löffler from Unit D1 – Land Use & Management, Directorate D „Natural Capital", responsible for all Forest topics in Unit D1 and for the Forest Information System for Europe (FISE). DG ENV is interested in future developments of the pan-European CLMS, with specific focus on the HRL GRA (Unit D3) and HRL FOR (Unit D1). The Coordinator GAF has had several telecons and meetings with DG ENV already (see section 3.2.2).

EC DG Internal Market, Industry, Entrepreneurship and SMEs (DG GROW)

The Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW) is responsible for delivering the EU's space policy via the two large-scale programmes Copernicus (European Earth observation satellite system) as well as Galileo (European global navigation satellite system). Moreover, DG GROW's is responsible for research actions to spur technological innovation and economic growth on the field, such as this Horizon2020 (H2020) project ECoLaSS. The main contact person for Copernicus at DG GROW is Mr Michel Massart, and the ECoLaSS Project Officer is Mr Massimo Ciscato.

Moreover, DG GROW's responsibilities contain: "completing the Internal Market for goods and services; helping turn the EU into a smart, sustainable, and inclusive economy by implementing the industrial and sectorial policies of the flagship Europe 2020 initiative; fostering entrepreneurship and growth by reducing the administrative burden on small businesses; facilitating access to funding for small and medium-sized enterprises (SMEs); and supporting access to global markets for EU companies. All of these actions are encapsulated in the Small Business Act; generating policy on the protection and enforcement of industrial property rights, coordinating the EU position and negotiations in the international intellectual property rights (IPR) system, and assisting innovators on how to effectively use IP rights" (https://ec.europa.eu/growth/about-us_en). DG GROW is based in Brussels and has approximately 1,400 staff members.

EC DG for Climate Action (DG CLIMA)

The Directorate-General for Climate Change has the mandate to participate in international negotiations on climate, help the European Union to deal with the consequences of climate change and support meeting its climate targets. It also develops and implements the EU Emissions Trading System. Specifically the Unit C3 "Land Use and Finance for Innovation" deals with the implications of land use and land use change on carbon emissions, following the six broad IPCC categories of land use, i.e. forest land, cropland, grassland, wetlands, settlements, and other land. Main focus is on Europe, as this is DG CLIMA's reporting responsibility towards the international climate conventions. GAF has been establishing a first contact with DG CLIMA's C3 Unit; main point of contact is Mr Rene Colditz.

Further EC DG's

Consultation with further EC DG's may be undertaken in the next phases of the project, in case they are relevant for assessing their respective Copernicus Land Service evolution needs and/or gathering their feedback on ECoLaSS developments. Particularly DG AGRI and DG DEVCO are considered potentially relevant.

2.2 National Stakeholders

The following national stakeholders – being relevant decision makers and national coordinating entities on Copernicus matters in key Member States (MS), e.g. Germany and France – were selected in the process of the user requirements analysis as part of WP 21 as proxies for the bigger EEA39 national stakeholder community. This list is non-exhaustive and open, and may be further extended by relevant further entities in the course of the ECoLaSS project.

GERMAN FEDERAL AGENCY FOR CARTOGRAPHY AND GEODESY (BKG)

The mandate of the German Federal Agency for Cartography and Geodesy ("Bundesamt für Kartographie und Geodäsie" – BKG) is to provide geo-information and geo-services and advice to German Federal Ministries and agencies. Specifically the Unit GI 7 – "Entwicklung und Fernerkundung" is in charge of informing on Copernicus Land Service activities. In particular, Mr. Hovenbitzer acts as German national thematic coordinator ("Fachkoordinator") for Copernicus Land Services. Furthermore, since February 2017, BKG has been assigned the role of a Copernicus Relay. As needed, the BKG may also accompany the German delegate (i.e. DLR) to the Copernicus User Forum. BKG itself performs various ongoing projects using Copernicus satellite data. The BKG point of contact for ECoLaSS is Mr Ralph Gehrke.

GERMAN ENVIRONMENT AGENCY (UBA), GERMANY

The German Environment Agency ("Umweltbundesamt" = UBA) acts as Deputy thematic coordinator ("Fachkoordinator") for the Copernicus Land Service in Germany. This position is currently held by Dr. Thomas Schultz-Krutisch. UBA was recently also nominated as member of the Copernicus Relay network. Further activities in Copernicus comprise: (i) UBA is the EIONET National Focal Point (NFP) for Land Cover and (ii) the EIONET National Reference Centre (NRC) for air quality and land cover, responsible for CORINE Land Cover (CLC) updates and contact point for EEA (in terms of CLMS pan-European and local component). The UBA point of contact for ECoLaSS is Mr. Christian Schweitzer.

DEUTSCHES ZENTRUM FÜR LUFT- UND RAUMFAHRT (DLR) RAUMFAHRTMANAGEMENT

The German Aerospace Center (DLR) Raumfahrtmanagement (Space Administration) is entrusted by the German Federal Ministry of Transport and Digital Infrastructure (BMVI) with the implementation of Copernicus in Germany. Its has supported the setup of the German Copernicus Strategy which has recently been approved by the German government. The DLR Space administration has established interfaces between the European Copernicus programme and German national users through dedicated thematic coordinators („Fachkoordinatoren") for the six thematic Copernicus services. E.g. Copernicus Land is represented by UBA and BKG. Another task of DLR is to represent Germany in the Copernicus User Forum and the Copernicus Committee together with the thematic Copernicus coordinators. Furthermore, DLR organizes the German National Copernicus Forums every 1.5 years. The German information website on „Copernicus in Deutschland" (Copernicus in Germany) is run by DLR as well. The implementation of the German Copernicus National Ground Segment CODE-DE is also procured by DLR. Additionally, DLR procures various funding programmes for Copernicus implementation to German public entities and industry. The DLR Space Administration's main point of contact for ECoLaSS is Mr. Michael Bock.

ENVIRONMENT AGENCY AUSTRIA (EAA)

The Environment Agency Austria – EAA (Umweltbundesamt – UBA) is the Austrian EIONET National Reference Centre (NRC) for Land Cover. The person of contact is Mr Andreas Littkopf, from the Soil and Land Management Department.

The Agency leads the European Topic Centre on Urban Land and forest Systems and is directly supporting the Copernicus team at the European Environment Agency (EEA). Long-term cooperation with EEA is expected also to continue beyond 2020 e.g. in the frame of (future) European Topic Centres. The EAA advocates Copernicus services being used for national applications and further developments related to land and biodiversity monitoring.

GENERAL OFFICE FOR SUSTAINABLE DEVELOPMENT (CGDD) OF THE FRENCH ENVIRONMENT, ENERGY AND SEA MINISTRY

The General Office for Sustainable Development (CGDD) of the French Environment, Energy and Sea Ministry - Commissariat Général du Développement Durable du Ministère de l'Environnement, de l'Énergie et de la Mer represents the French position to the Copernicus User Forum and steering group and is in charge of liaising with French stakeholders. Its main role is to provide feedback from French institutional needs. Persons of contact are: Mr Vincent Pircher from CGDD/ Direction de la Recherche et de l 'Innovation (DRI) who is also the French representative at Copernicus User Forum; Mr Benoit David from CGDD/DRI who is in charge of the Satellite National Plan; and Ms Frédérique Janvier who is the French EIONET NRC representative on Land Cover.

CGDD/SOeS is the French EIONET NRC and oversees the implementation of CLC for France as well as other Copernicus land products. It also develops statistical indicators based on Copernicus and other geospatial products for the French government. Regarding future activities, CGDD/DRI will provide input to future requirements from French institutions as part of the Copernicus steering group and user forum whilst SOeS will provide more technical input/feedback as part of the EIONET NRC meetings/activities and will address the national expression of need for environmental statistics, and the needs of other end users.

NATIONAL COUNCIL FOR GEOGRAPHIC INFORMATION (CNIG)/ FRENCH MAPPING AGENCY (IGN) AND FRENCH ASSOCIATION FOR GEOGRAPHICAL INFORMATION (AFIGEO)

The National Council for Geographic Information (CNIG)/ French Mapping Agency (IGN) and French Association for Geographical Information (AFIGEO) are two organisations focusing on the development of Geographical Information in France. Main ECoLaSS person of contact is Mr Pascal Lory, who is in charge of the user interface for Copernicus Land services.

A workshop was recently organised involving French institutions and service providers, making use of Copernicus data, to present their solutions. This information was gathered at an information day organised by the French CNIG/IGN and AFIGEO on 30 March 2017 to foster exchanges between the Copernicus programme and the needs of end-users. Producers of in situ data (i.e. mainly IGN) also presented their vision regarding the complementarity between Copernicus and national infrastructure. The main activities towards these users are: Promote the Copernicus services offer, improve the relationship between these services and users' expectations, identification of opportunities for private sector, support the users to position themselves in the added value chain, coordination of geographic information actors in France, recommendations to the Copernicus point of contact for France, recommendations at European level (EC, ESA, EEA, etc.), notably concerning favourable development conditions for service companies.

2.3 Other Stakeholders

This section gives an overview of further stakeholders which are considered relevant for ECoLaSS. Some of these have not yet been systematically addressed in the current phase of the project, however consultations are foreseen, the rationale for which is given in the following.

EIONET

The European Environment Information and Observation Network (EIONET) is a partnership network under the coordination of the European Environment Agency (EEA), consisting of the EEA itself, currently six European Topic Centres (ETCs) and a network of around 1000 experts from 39 countries in over 350 national environment agencies and other bodies dealing with environment information. These are the National Focal Points (NFPs) and the National Reference Centres (NRCs). The EEA and EIONET contribute to the European Shared Environmental Information System (SEIS) (see section 2.1).

EARSEL

EARSeL is a scientific network of European remote sensing institutes, coming from both academia and the commercial/industrial sector. The main scientific efforts of EARSeL are concentrated in Special Interest

Groups (SIGs), which form the foundation of the activities of EARSeL. They aim to encourage co-operation and foster innovative applications of remote sensing at highest scientific and state-of-the-art level. The SIGs are commonly considered very valuable to the scientific community as a means to understand and evaluate the major remote sensing related issues to be tackled in the future by the scientific community. SIGs can as well be instrumental in the design and the definition of future space missions. The SIGs organise workshops and specialist meetings, the reports and proceedings of which are published. The conclusions and specific recommendations are presented to the sponsoring agencies and other relevant institutions. Currently established SIGs of interest for ECoLaSS are the SIGs on Temporal Analysis of Image Data, Forestry, and Coastal Zones.

Some of the project partners of ECoLaSS are also members of EARSeL and are therefore well aware of the scientific state of the art in remote sensing based land monitoring applications. The contacts will be used, and SIG workshops may be attended as required, to further benefit from this awareness of the state-of-the-art for the benefits of the ECoLaSS developments.

EARSC

The European Association of Remote Sensing Companies (EARSC) is a European non-profit organisation promoting the use of Earth Observation (EO) technologies and fostering the development of the European EO geo-information services industry. It is recognised as the representative of the European remote sensing value-adding industry. Its members are private-sector companies established in Europe, which offer earth observation related products, services and consultancy. EARSC provides its members with various sources of EO related information as well as business intelligence about the sector. The association aims to increase awareness on EO among stakeholders and potential customer groups, reinforce the use of EO products and services, identify new business opportunities and establish new markets, and network with other relevant players in the sector.

Amongst others, EARSC regularly organises or co-organises well-attended thematic workshops (typically in Brussels) and Copernicus-related events, bringing together relevant actors, stakeholders and political decision makers on various EO related aspects. Having a permanent secretariat office in Brussels and excellent connections to top decision makers at EC, EARSC is uniquely placed to facilitate dialogue between policy and industry, as well as to bring together relevant actors of Copernicus in an unprecedented fashion. This has already enabled valuable information exchange on stakeholder needs and industrial capabilities in the recent past, specifically on Copernicus.

As one of the elected EARSC Directors, the ECoLaSS Project Coordinator Markus Probeck is the main point of contact with EARSC, ensuring that the ECoLaSS team will stay well informed about all political framework conditions and requirement changes in view of Copernicus future operations and implementation plans.

COPERNICUS COMMITTEE AND COPERNICUS USER FORUM

Both through EARSC and the national delegates of the project partners' countries of establishment (DE, FR, BE, AT), there are connections to the delegates of the Copernicus Committee and the Copernicus User Forum, which are key consulting and decision making bodies for the future of the whole Copernicus programme. Likewise, there are well-established connections to national Copernicus user fora, such as the German 'Nationales Forum für Fernerkundung und Copernicus', which are conducted in regular 1 - 1.5 year intervals. Both are deemed to facilitate the stakeholder consultation process undertaken by WP 51.

CLMS RELATED OPERATIONAL IMPLEMENTATION AND R&D PROJECTS

Various ongoing operational implementation projects as well as parallel research and development projects with a clear relation to the CLMS (such as under the Horizon2020 programme) are considered additional relevant stakeholders to ECoLaSS. These are, on the one hand, the currently ongoing Copernicus Land High Resolution Layer (HRL) 2015 production projects of the HRL Imperviousness (IMP), HRL Forest (FOR) and HRL Grassland (GRA); and on the other hand related H2020 projects addressing future developments in the Copernicus Land context: e.g. Sensagri and Multiply.

3 Stakeholder Interaction Process

This Chapter features explanations on various stakeholder interaction activities involving all stakeholders described in Chapter 2. Section 3.1 details activities carried out for the stakeholder consultation process, section 3.2 describes the purpose and results of meetings and teleconferences, section 3.3 elaborates on conferences and workshops where targeted stakeholder consultation or networking were carried out, and section 3.4 focusses on the dissemination material prepared to facilitate the interaction with stakeholders and communicate the contents and progress of the ECoLaSS project.

3.1 Consultation Process

In order to collect stakeholder requirements, which aims at confirming, adjusting or potentially newly initiating the products and services that are envisaged for development and demonstration as part of ECoLaSS, a stakeholder consultation process with key representatives of EEEs and the most relevant stakeholders and groups of stakeholders is considered of utmost importance to:

- regularly inform relevant Copernicus Land stakeholders and decision makers on the status of ongoing research and development activities in the project;
- gather their feedback on the project's technical developments, thematic evaluations, service/product maturity assessments and the suggested candidate products for later operational implementation;
- receive advise on current/evolving priorities and/or emerging adaptation needs for the continuation of work in the next project phase(s);
- support the EC and other stakeholders in a sufficiently timely manner such as to allow leading informed discussions on the future implementation of Copernicus Land products.

Starting early in the project, i.e. at T_0+7, a dedicated stakeholder consultation process has been put in place by WP 51, building on WP 21 results and initiated Task 3 developments. The stakeholder consultation process is a recurring activity which will constitute also a major focus of the second project phase, when more mature results of the methodological developments and prototypes will become available.

The WP 51 is led by GAF who is taking care of organising the consultation process with EC DGs, EEA, federating stakeholder organisations and German national stakeholders. Specifically with EEA, GAF can build on the good and long-time relation and contacts established especially with EEA in the course of several recent Copernicus Land operational projects, amongst them the Copernicus Land HRL 2015 production. UCL with the assistance of SIRS is in charge of organising the consultation process for the global Copernicus Land developments, i.e. primarily with JRC and other EC DGs.

Consultation is arranged preferably back-to-back with other events where participation is foreseen (section 3.3), or by organising dedicated telecons or physical meetings on ECoLaSS matters (section 3.2).

Presentations at the Copernicus User Forum and the EIONET group which are currently envisaged could further be addressed by dedicated presentations and discussion sessions, upon invitation. EEA and EC could help facilitate such invitations. Related good personal contacts and experience exists in the consortium; e.g. GAF has been regularly participating and presenting to previous EIONET meetings.

3.2 Consultation Telecons and Meetings

Meetings and teleconferences have been conducted with key representatives of the main European stakeholders (section 3.2.1) as well as with DGs of the EC (section 3.2.2), representatives of national users and stakeholders that implement or coordinate Copernicus activities (section 3.2.3), federating stakeholder entities (section 3.2.4), and other projects with relevance to CLMS and in connection to stakeholders (section 3.2.5).

3.2.1 Consultation with EEA and JRC

Various dedicated meetings and telecons on ECoLaSS matters as well as interactions during workshops and symposia with the EEEs EEA and JRC took place within the first couple of months of the ECoLaSS project runtime, as follows:

MEETINGS WITH EEA AND JRC:

Participation at the ECoLaSS Kick-Off Meeting:

- Tobias Langanke, the EEA key representative for the pan-European CLMS implementation, participated in the KO Meeting and held the presentation: "Update and feedback from pan-European Copernicus land monitoring service", formulating the current status of CLMS products, future plans and the desired role of ECoLaSS.
- JRC had been invited to the Kick-Off, but couldn't participate; related Global Land requirements were however discussed with JRC directly before and after the KO Meeting.

Meetings with EEA back-to-back with other events:

- Several short interactions with EEA representatives, including exchanges on ECoLaSS related or relevant issues, took place back-to-back to other meetings and conferences, e.g. at the WorldCover 2017 conference in Frascati, where dedicated conversations during the poster session at the ECoLaSS poster took place.

Meetings with JRC dedicated to a future pan-European Agricultural service

- On February 2017 a meeting took place with the Food Security team at JRC (Olivier Léo, Guido Lemoine) in Ispra regarding the upcoming pan-European CLMS Agricultural service, with presence of the consortium partners UCL and SIRS. An interview protocol was filled and reviewed as part of the user and stakeholder analysis on service evolution requirements in WP 21.
- UCL, SIRS and GAF are currently planning a follow-up meeting at the JRC in Ispra with regard to the future pan-European Agricultural service specifications.

Meetings with JRC back-to-back with other events:

- At the ISRSE conference from in May 2017 in Tshwane, South Africa, a meeting with JRC (Michael Cherlet), main representative of the CLMS Global Component implementation, was conducted by SIRS. An interview questionnaire was filled, in the light of the user and stakeholder analysis on service evolution requirements, as part of WP21.

TELECONS WITH EEA AND JRC:

- A teleconference between EEA (Tobias Langanke) and GAF and SIRS was set up in May 2017, in the light of the user & stakeholder interview on service evolution requirements, as part of WP21, followed by discussions and refinements of the information received from EEA.
- A teleconference with JRC (Michael Cherlet) was conducted by GAF in June 2017, in order to explain the background, objectives and ongoing activities of the ECoLaSS project. The purpose was to foster closer interaction of the JRC with ECoLaSS. JRC communicated strong interest in the ECoLaSS project and intentions for closer collaboration starting from October 2017 onwards.
- A teleconference with Philippe Loudjani of the JRC, Directorate D - Sustainable Resources, Food Security D5 Unit, MARS CAP Land group took place in September 2017, with the aim to communicate (i) the objectives of ECoLaSS with focus on a future pan-European agricultural service, and (ii) the interest to participation at the 23rd MARS Conference, in Gormanston, Ireland, on 28 and 29 November 2017. Interest from the side of JRC was shown and ECoLaSS was invited to give a short oral presentation and in addition, advertise the project by participating with a poster in the poster session.
- A teleconference with EEA (Hans Dufourmont, being responsible for the Copernicus Land programme at EEA) was conducted in September 2017, where EEA proposed the participation of

ECoLaSS as oral presentation at the upcoming CCI+/LCLU workshop, tentatively on 16 November 2017 in Brussels, which is planned to be attended by the ECoLaSS project coordinator, Markus Probeck (GAF).

- Furthermore, a joint telecon between both, EEA and JRC, the consortium coordinator and further partners is currently planned for after the M9 Interim Review, targeting an enhanced stakeholder engagement of the EEEs in ECoLaSS. This is also considered a good opportunity to further foster the coordination between the CLMS pan-European and global components.

3.2.2 Consultation of EC DGs

The EC Directorates-General on Enterprise, Industry, Entrepreneurship and SMEs (DG GROW) and Environment (DG ENV) are considered the main EC DGs of relevance for ECoLaSS and have therefore been primarily addressed in the first phase of the project. Consultations with further DGs are planned (see section 2.1).

MEETING WITH DG GROW REPRESENTATIVES BACK-TO-BACK WITH OTHER EVENTS:

A meeting of GAF with DG GROW (Mr Michel Massart) where GAF shortly presented the ECoLaSS contents and objectives to DG GROW took place back-to-back with the WorldCover conference in March 2017 at ESA/ESRIN in Frascati. The ECoLaSS poster was shown during the poster sessions.

TELECONS WITH DG ENV:

DG ENV participated in the user requirements analysis as part of the WP 21 activities. Separate telecons took place with two key DG ENV units: D3 Nature Protection (Mr Frank Vassen) and D1 Land Use & Management (Mr Peter Löffler) (see section 2.1).

PHYSICAL MEETING WITH DG ENV, BRUSSELS – 05 JULY 2017

A further physical meeting was conducted with DG ENV Unit D1 (Mr Peter Löffler, Policy Officer Forest Protection) as a follow-up of the previous user requirements analysis. Mr Löffler is the responsible for coordinating all Forest topics in DG ENV. The ECoLaSS project coordinator Markus Probeck met with him bilaterally on 5 July 2017 in Brussels in order to:

i. further exchange information on latest developments in the CLMS, and specifically to further inform DG ENV which free & open Copernicus data are already produced and freely available via the CLMS (specifically by the pan-European and local Land components);
ii. discuss further developments in view of the upcoming migration of the Forest Information System Europe (FISE) from JRC to EEA.

A high interest was identified by DG ENV specifically in the HR Forest Layer and the upcoming (improved) HR Grassland 2015, which may serve already some of the current DG ENV reporting needs, and seem to have potential also for further applications and value-adding. The future evolution of these two HRLs are of particular interest to DG ENV; therefore, further consultations are foreseen to be continued in that sense.

FURTHER INTERACTION WITH DG GROW:

Policy Survey of DG GROW:

An exchange of information with DG GROW (Ms Virginia Puzzolo) in the framework of the survey on "Project Contribution to EU Policies" was carried out in June 2017. The goal was to analyse whether and how the ECoLaSS project is contributing or will contribute to the implementation of EU policies. Information gathered within the policy questions of the user analysis interviews in WP 21 partially served as input to the survey.

MEETING WITH DG CLIMA:

A first short contact took place between the ECoLaSS project coordinator and Mr Rene Colditz from DG CLIMA's C3 Unit "Land Use and Finance for Innovation" end-September 2017 back-to-back with another meeting at DG GROW. It seems that the DG CLIMA Unit C3 is well aware of the Copernicus Land Monitoring Service products currently offered, but does currently not yet have much information about the intended further development of the CLMS and has not yet used them for their reporting obligations. A physical meeting has been envisioned for October 2017 to assess current contribution potential of the CLMS and explore DG CLIMA's requirements towards a future CLMS.

3.2.3 Consultation of National Stakeholders

TELECONS AND MEETINGS WITH GERMAN NATIONAL STAKEHOLDERS

- BKG (Ralph Gehrke) participated in the ECoLaSS KO meeting and presented BKG's current use of CLMS products and requirements towards a future CLMS. BKG also participated in the user requirements analysis as part of WP 21. GAF conducted a telecon and a follow-up revision of the interview protocol with BKG. GAF plans to remain in contact with BKG on ECoLaSS matters in the future.
- UBA (Christian Schweitzer) participated in the user requirements analysis as part of WP 21. GAF conducted a telecon and a follow-up revision of the interview protocol with UBA. GAF plans to remain in contact with UBA on ECoLaSS matters in the future.
- DLR Raumfahrtagentur (Mr Michael Bock) participated in the user requirements analysis as part of WP 21. GAF conducted a telecon and a follow-up revision of the interview protocol with DLR Raumfahrtagentur. GAF plans to remain in contact with DLR Raumfahrtagentur on ECoLaSS matters in the future.

TELECONS AND MEETINGS WITH FRENCH NATIONAL STAKEHOLDERS

- Several meetings took place with representatives of the French Ministry of Environment (main contact: Mr Serge Flamenbaum, Mr Lefevre-Fonollosa) back-to-back with (i) the French National Workshop on the Evolution of Copernicus Services; (ii) a French national workshop for Copernicus evolution needs related to vegetation applications organised by the French Space Agency together with relevant ministries, which aimed to collect requirements from science and industry. The consultations particularly focused on user requirements for Copernicus Evolution related to vegetation applications. Further specific thematic workshops are planned on this topic.
- SIRS participated to the AFIGEO Copernicus information French national workshop which is a French national event with different stakeholders (National Council for Geographic Information (CNIG), French Mapping Agency (IGN) and French Association for Geographical Information (AFIGEO). In the frame of this, side-meetings took place with the French stakeholders (e.g. Mr Pascal Lory) on their user requirements towards Copernicus services and use of Copernicus products in downstream services. This dialogue is intended to be continued alongside the next IINSPIRE conference in Strasbourg.

TELECONS AND MEETINGS WITH AUSTRIAN NATIONAL STAKEHOLDERS

- A meeting was conducted between Joanneum and the Environmental Agency Austria (EAA)'s Soil and Land Management Unit (ECoLaSS point of contact: Mr Andreas Littkopf) in the frame od the user requirements assessment process of WP 21, assessing the EAA's needs in view of future CLMS services.

3.2.4 Consultation of Federating Stakeholder Entities

For a Horizon2020 like ECoLaSS, with clearly defined tasks and resources, it is generally not possible to individually interact with too many stakeholders on a single basis. Therefore, the ECoLaSS team has taken on the approach of consulting with federating entities of relevant stakeholder segments. These allow to comprehensively address, or interact with, a group of stakeholders in an efficient manner. In that sense, the following federating stakeholder entities have been / are being addressed:

EARSC ANNUAL GENERAL MEETINGS

Besides regularly organising various earth-observation and Copernicus related events and workshops, EARSC also conducts dedicated information exchange and discussion workshops between industry and decision makers in the frame of its Annual General Meeting (AGM), which typically take place for two days in June/July in Brussels each year. For example in 2015, this was the first occasion ever to publically bring together the Entrusted European Entities (EEEs) of the six thematic Copernicus Services in one public forum, and discuss the future evolution and potential industrial role of Copernicus services in detail. In 2017, the AGM took place on 4/5 July in Brussels. The workshops associated to the AGM dealt with the industrial involvement in GEO and GEOSS, as well as with an internationalisation strategy. Specifically the latter has been of interest to ECoLaSS as it was dealing with exploring opportunities to export European knowledge and service capacities to other parts of the world, e.g. in terms of roll-out of established operational products such as the various Copernicus Land services. The related workshop was conducted with strong support of ESA and featured, amongst others, information on upcoming opportunities to Japan. The EARSC AGMs are regularly attended by the ECoLaSS project coordinator in his role as EARSC Director; thus a proper information exchange is ensured.

EIONET

A participation of ECoLaSS to one of the upcoming EIONET meetings had been discussed between the ECoLaSS team and EEA. It has been generally considered very useful by both, in order to inform Member States of the open user requirements collection and stakeholder consultation process. Actually, a participation had already been agreed for the next EIONET NRC Land Cover meeting in Copenhagen on 09/10 October 2017, however has been cancelled by EEA due to potential confidentiality and conflict-of-interest issues in relation to CLC+. However, it is planned to have an ECoLaSS participation at a later stage, when also more project outcomes will already be available.

3.2.5 Other relevant Projects

H2020 LAND "SISTER" PROJECTS

A telecon between the Project Coordinators of three parallel H2020 "sister" projects in the Land domain had been held in April 2017, facilitated by REA. This comprised:

- **Sensagri:** Project Coordinator Mr Antonio Ruiz Verdú, deputised by Mr José Moreno (University of Valencia);
- **Multiply:** represented by its Project Coordinator Mr Peter von Bodegom (Univ. Leiden);
- **ECoLaSS:** represented by the Project Coordinator Markus Probeck and the Scientific Coordinator Linda Moser (GAF).

The goal of the telecon was to introduce the projects' objectives and discuss potential areas of synergies, amongst others, the interaction with stakeholders.

ECoLaSS and Sensagri identified the following common areas of interest: (i) crop type/classification; (ii) potentially LAI (ECoLaSS aims for a service providing multiple indices, potentially also from biophysical parameters, to be decided further); (iii) experimental prototypes from Sensagri (e.g., irrigation areas, tilling) might also be of interest for future HRLs (e.g., grassland, water/wetness);

ECoLaSS and Multiply were found to be rather complementary projects with different approaches and methods but no direct duplication of work. A further information exchange was agreed on the processing power/mirror site needs for Sentinel products.

The three projects identified areas of potential future synergies and collaboration:

- sharing information or documents on end-user or stakeholder requirements, bridging the gap to be close to Copernicus stakeholders while individually keeping the main responsibilities for the respective end-user (e.g. for a potential future agricultural Copernicus Land Service)
- exchange test site locations, information on Sentinel data access / processing infrastructure
- exchange information in future teleconferences, e.g. coordinate in advance in case of attendance to relevant workshops on the topic.

CLMS CONTINENTAL COMPONENT OPERATIONAL IMPLEMENTATION PROJECTS

Additionally, the operational implementation projects of the Copernicus Land High Resolution Layers (HRLs) 2015, which are currently in production/in an advanced production phase, are considered direct important stakeholders to the ECoLaSS project. The newly produced HR layers 2015 serve as basis for the ECoLaSS methodological developments, e.g. for change detection (WP 34). The following HRL projects/products and respective project coordinators are considered the most relevant HRL stakeholders:

- HRL IMP, coordinated by GeoVille. The coordination is established mainly via Christophe Sannier (SIRS) in the frame of SIRS's involvement as a main mapping partner and via Linda Moser (GAF) in the frame of GAF's responsibility for product validation.
- HRL FOR, coordinated by GAF. A very close and direct coordination is ensured through the HRL FO project coordinator, Mr David Herrmann (GAF), who directly supports the development work in ECoLaSS.
- HRL GRA, coordinated by GAF. Likewise, a very close coordination is ensured through the HRL GRA project coordinator, Ms Regine Richter (GAF), who also directly supports the development work in ECoLaSS.

3.3 Workshops and Events

In cases where this is feasible, consultation with stakeholders for ECoLaSS is arranged back-to-back with other events where participation of the consortium partners is foreseen, e.g. at international Earth Observation conferences and workshops (section 3.3.1), Copernicus-related events (section 3.3.2), and other events and workshops with relation to stakeholder interaction for Copernicus Land developments (section 3.3.3).

The following three sections will detail the objectives of attending the respective event, briefly explain the contents of the event, focus on the stakeholders that ECoLaSS consortium partners interacted with, and summarise the outcomes of the stakeholder interactions.

3.3.1 International Earth Observation Conferences

WORLDCOVER 2017:

The WorldCover 2017 conference in ESA/ESRIN from 14 to 16 March 2017 was hosted by the European Space Agency together with GEO, FAO and the EU. The whole Land Monitoring community met for three days in order to present their work and deduct, e.g., multi-user requirements (climate modellers, geographers, scientists, environmentalists, commercial participants) for high and low resolution land cover mapping – from country to continental and global scale. For the programme and more information please see: http://worldcover2017.esa.int/index.php. Being a topical key conference in 2017 it was attended by all five consortium partners GAF, SIRS, JR, UCL and DLR, which also presented their work and results from other ongoing projects on the Land topic and Copernicus. The poster contribution of ECoLaSS was shown

in two poster sessions; the abstract and poster can be downloaded from the ECoLaSS website: https://www.ecolass.eu/news-events-1.

Interactions with various European stakeholders (e.g. EC and EEA), scientists from research institutes, commercial partners, project coordinators and the European Space Agency took place. The community showed strong interest in the ECoLaSS project, and, in relation to that, the new HRL 2015 products which were presented as well by GAF. Several discussions on the topics of Validation, use of SAR in Copernicus, time series applications in Copernicus, future CLMS services etc. took place.

The most important stakeholders which the consortium interacted with, or which showed interest in ECoLaSS were:

- EEA – Mr Tobias Langanke: Since the consortium has been in contact previously, it will continue to update him about ECoLaSS development and invite him to future review meetings as stakeholder.
- JRC – Mr Jean-Francois Pekel: The purpose of the interaction was to explain the contents of ECoLaSS and to discuss the new 30m global water layer in contrast to the HRL Water and Wetness. Knowing J.F. Pekel already since a longer time, ECoLaSS plans to remain in contact with him, in framework on a future HR water layer as part of the Copernicus land global component.
- EC DG GROW – Mr Michel Massart: The objectives of the interaction was a short ~10 minutes overview of the ECoLaSS project objectives and contents. Since the consortium has been in contact previously it will continue to update M. Massart about ECoLaSS development and invite him to future review meetings as stakeholder.
- ESA – several of ESA's leading technical officers and staff were introduced to the project ECoLaSS: Ms Bianca Hörsch, Ms Susanne Mecklenburg, Mr Steven Briggs, Mr Olivier Arino, Mr Michael Rast, Mr Marc Paganini, Mr Michael Berger, Mr Marcus Engdahl, and Mr Zoltan Bartalis. Some ESA project officers showed great interest in future developments as proposed by ECoLaSS. Particularly Susanne Mecklenburg, the Sentinel-3 mission manager, is very interested to be updated about future developments regarding synergies of Sentinel-2 and -3. Since all ECoLaSS consortium members have good contacts to ESA, ECoLaSS will stay in contact and provide updates on the project.
- UNCCD secretariat, Bonn – Ms Sara Minelli: The interaction was an interesting discussion on land degradation from remote sensing, a topic in relation but not directly tackled by ECoLaSS.
- World Resource Institute (WRI) – Ms Michaela J. Weisse: The objectives of the interaction was to present ECoLaSS and the new HRL Forest to Ms. Weisse, who presented on operational land cover systems: lessons learned from the Global Forest Watch.
- H2020 Project Sensagri – Mr David A. Nafría (Agricultural Technological Institute of Castilla and Leon, Spain) was visited during the poster session, where he presented a first poster of the H2020 project Sensagri, which was awarded a Grant in the same call as ECoLaSS on the same topic of Copernicus Land Service Evolution. While ECoLaSS tackles various layers, Sensagri concentrates on a future agricultural layer. Contacts with Sensagri were further continued by arranging a telecon between the project coordinators of both projects (see section 3.2.5).
- Copernicus Land High Resolution Layers 2015 – Ms Linda Moser (GAF): A presentation on the HRL 2015 status and developments was held by the ECoLaSS scientific coordinator from GAF, which – besides the consortium partner SIRS which is as well consortium partner in the HRL production – is anyway in contact with the project coordinators of all five currently produced HRLs, and synergies are exploited in the ECoLaSS project.
- Copernicus Land Global component – Mr Marcel Buchholz (VITO) presented a side-product of the current CLMS global component on a 100m scale on dynamic land cover. The interaction consisted in a short presentation on ECoLaSS and an exchange of state of the art methodological ideas on time series analysis. Further contacts with M. Buchholz followed.
- Several further research institutes, universities and companies – that cannot all be named in the framework of this report – presented projects of relevance for ECoLaSS or future LCLU mapping and land monitoring in general.

ISRSE

The 37th International Symposium on Remote Sensing of Environment (ISRSE) took place in Tshwane, South Africa 8 to 12 May 2017. The theme was "Earth Observation for Development and Adaptation to a Changing World", see more information at: http://isrse37.org/. The conference was attended by SIRS in order to identify relevant initiatives from the conference and collect a synthesis of user requirements for Copernicus Evolution related to Global applications. Likewise, it was used for organising specific meetings with the EEE representatives for CLMS Global, i.e. JRC. Specifically, a consultation took place with Mr Michael Cherlet, being responsible for the CLMS Global component in JRC. This exchange was followed up by a later telephone conference and a dedicated meeting (see section 3.2.1).

MULTITEMP

The Belgian Science Policy Office (BELSPO) and VITO Remote Sensing hosted the MultiTemp 2017 conference in Bruges, Belgium from 27-29 June 2017. The MultiTemp is a bi-annual scientific conference with the primary objective to advance the knowledge on using EO time series to address a wide range of applications. See more information at: https://multitemp2017.vito.be/. It was attended by SIRS, UCL and GAF staff, and proved very useful for networking and identification of suitable methods for CLMS Evolution in view of massive Sentinel-1, Sentinel-2 and Sentinel-3 time series processing.

IUFRO 125TH ANNIVERSARY CONGRESS

This congress, held in September 2017, was attended by SIRS and had the focus on "Interconnecting Forests, Science and People" and it particularly relevant for improvements of the HRL forest. See more information at: http://iufro2017.com/.

THE 23RD MARS CONFERENCE

The MARS conference is organised by JRC, in collaboration with the Directorate-General for Agriculture and Rural Development (DG AGRI) and the Irish Department of Agriculture, Food and the Marine (DAFM), and will take place from 28 to 29 November 2017 in Ireland. The conference will provide a platform to present and discuss Member States' experiences and general observations regarding the Integrated Administration and Control System (IACS), including developments in shared management. ECoLaSS plans to participate with the consortium members UCL, GAF and SIRS, and to present the EColaSS concept and first outcomes. It is envisaged to be a great platform for interacting with stakeholders from the agricultural domain and assess and discuss the requirements and specifications of a future CLMS agricultural service. See more information at: https://ec.europa.eu/jrc/en/event/conference/23rd-mars-conference.

3.3.2 Copernicus-related Events (National & European)

COASTAL MONITORING WORKSHOP, BRUSSELS – 29 JUNE 2017

On 29 June 2017, a Copernicus workshop on Coastal Monitoring had been conducted in Brussels, co-organised by the Copernicus Land Monitoring Service (CLMS) and the Copernicus Marine Environment Monitoring Service (CMEMS). It aimed at analysing mid-term (2018-2020) and long-term (post-2021) priorities for the potential evolution of the CLMS and the CMEMS in coastal areas, addressing user needs in view of coastal zone management and monitoring. The workshop addressed the following main topics:

- Overview of user needs and challenges (Session I);
- Current Copernicus offer in terms of data and service information (Session II);
- Draft proposal for the evolution of CLMS and CMEMS in response to the user needs (Session III).

The coastal zone monitoring topic had been considered of potential relevance for ECoLaSS in terms of either future CLMS continental component services or in view of the developments towards a future CLC+.

Relevant recognitions form the workshop comprise:

- The needs for coastal zone monitoring are very heterogeneous; many stakeholders are involved.

- It seems that the CLMS and the CMEMS may, for the time being, continue to work individually to fine-tune their respective current products to coastal needs.
- Specifically the CLMS plans to add a coastal zone product to the Local LMCS component group (of which a considerable part would be already covered by Urban Atlas, Riparian Zones and Natura2000 products)
- Elevation issues (in terms of a more precise DEM for coastal applications) need to be addressed
- Open questions seem to exist in terms of service boundary definition, e.g. European vs. national and land vs. marine services.

The presentations are available online at http://workshop.copernicus.eu/coastal/.

CCI+ Information Day, Frascati – 6 July 2017

The European Space Agency (ESA) had organised an Information Day on the upcoming next phase of the ESA Climate Change Initiative (CCI+) on 6 July 2017 in Frascati, informing potential bidders and stakeholders on future procurement plans under the CCI programme element over the period 2017-2020. Eligible participation to the bids is limited to the 18 ESA Member States having subscribed to the programme. Amongst others, the countries of origin of all five ECoLaSS project partners are eligible.

For the ECoLaSS project, the CCI+ Information Day was specifically relevant in terms of the intended tender for the **ECV Land Cover**, which was published end-August 2017. High-resolution maps of land cover and its changes (10-30m spatial resolution) are considered relevant for enabling proper climate modelling, mitigation and adaptation activities, as they are partially determined by regional climate and may thus indicate climate change.

The upcoming CCI+ ECV Land Cover specifically aims to address:

- Understanding land cover classification variability across spatio-temporal scales (specifically between medium and high-resolution);
- Understanding how the Land Cover ECV products at moderate resolution relate to the map products needed for mitigation and adaptation at local scales including forest monitoring and reporting activities in the frame of the REDD+ mechanism;
- Timeframe to be considered: 1992-2015.

These development activities aim at bridging the current product scale gap between the medium- and high-resolution domains. Such convergence is increasingly addressed by the Global component of the CLMS, toward the high-resolution Continental CLMS component, which is specifically relevant for the further evolution of the HR Layers prodcts. Potentially, ECoLaSS partners may be involved in bids for the CCI+ Land Cover (to be confirmed), which could ensure a direct connection and exchange of experiences. Anyway, a coordination of development activities with the later CCI+ project should be established on project level.

CLC+ Workshop, Brussels – 16 Nov. 2017

The EEA is currently discussing future CCI+ specifications within EIONET. A respective internal EIONET NRC Land Cover meeting will take place in Copenhagen on 09/10 October 2017, where ECoLaSS participation will however not be admissible. However, the EC (supported by the Copernicus Support Office) is organising a public workshop on CLC+ in Brussels on 16 November 2017, where it is expected that the future plans for CLC+ will be made public in more detail. The ECoLaSS team plans to be represented there in order to assess the further development needs and implications for the work in ECoLaSS.

3.3.3 Other Events and Workshops with relevance to ECoLaSS

INTERGEO (TRADE-FAIR FOR GEO-INFORMATION PROFESSIONALS), BERLIN– 26-28 SEPT. 2017

The INTERGEO is the worldwide leading trade-fair for geo-information technology, geodesy and land management. It provides an excellent opportunity to get informed of the latest technical developments and technologies in the dynamic geo-IT environment. In 2016, more than 17,000 geo-information professionals from > 500 companies, state and international authorities and regional administrations of 37 countries have been counted. Copernicus has been one of the key topics addressed both, by a dedicated EC Copernicus/Galileo booth, and by the parallel INTERGEO congress.

Particularly, the ECoLaSS project coordinator Markus Probeck, had been designated as the CLMS thematic expert for the Copernicus booth by EC in the frame of another project activity. This opportunity has been used not only to inform the community of the latest state-of-play of Copernicus and the CLMS, but also to create awareness of the ongoing investigations on the further CLMS evolution in the frame of ECoLaSS, and get in contact with further potential stakeholders from public entities and industry (see Figure 1).

Figure 1: Copernicus / Galileo booth at the INTERGEO 2017 (© M. Probeck, GAF)

3.4 Dissemination Material for Stakeholders

The project webpage www.ecolass.eu has been set up in March 2017 and the URL was widely distributed to stakeholders since then (see Figure 2). The recently initiated Twitter account @ECoLaSS2020 will be distributed as well at all future interactions.

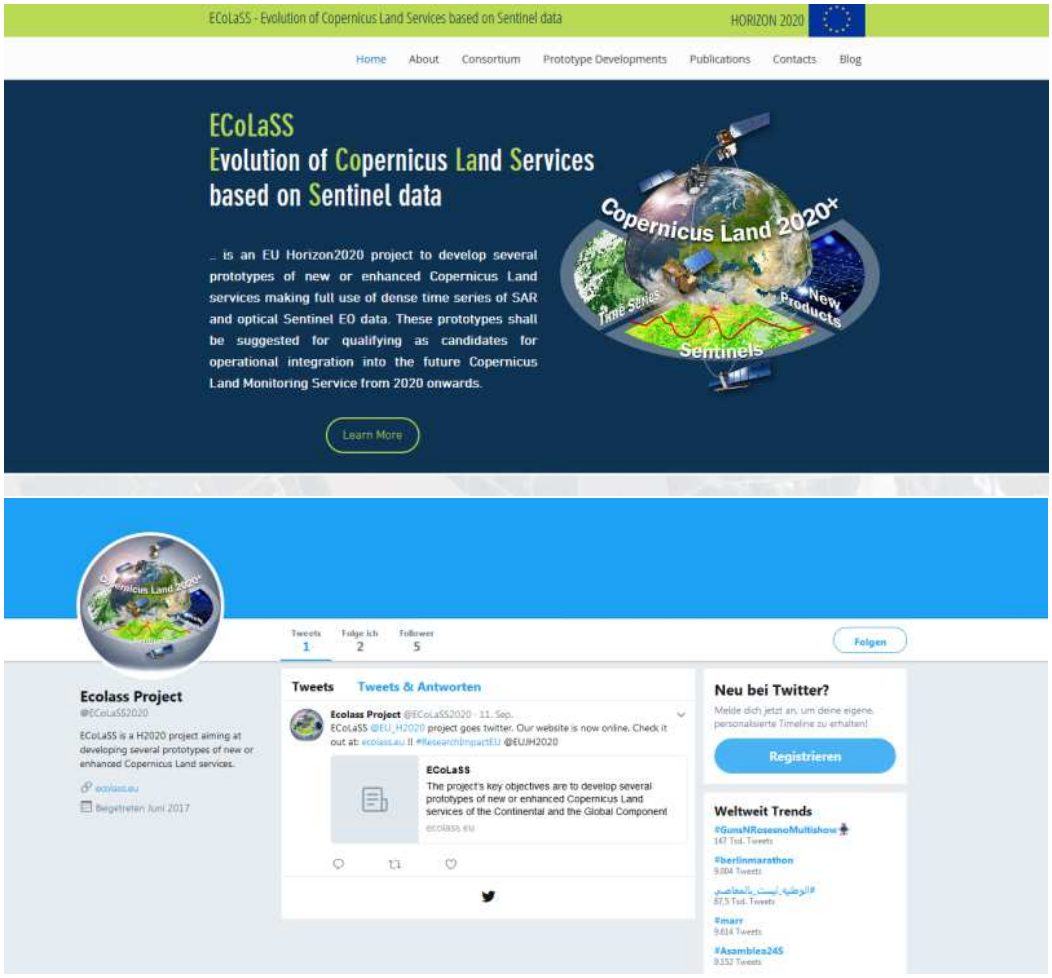

Figure 2: ECoLaSS project website (www.ecolass.eu) and Twitter account @ECoLaSS2020

In preparation for telecons with EEA and JRC, the first ECoLaSS project overview poster, originally presented at the WorldCover Conference 2017 (see section 3.3.1), was also distributed in advance, describing the ECoLaSS objectives, project overview and test sites. A flyer version of the Poster (see Figure 3) is handed out at conferences and fairs, such as the recent INTERGEO tradefair in September 2017 (see section 3.3.3 and Figure 4).

Figure 3: ECoLaSS Dissemination Material distributed to stakeholders: first ECoLaSS Flyer/Poster

Figure 4: ECoLaSS flyer disseminated by Copernicus Support Office together with Copernicus brochures and CLMS & other thematic Copernicus service fact sheets at Copernicus/Galileo booth, INTERGEO 2017 (© M. Probeck, GAF)

Of high importance for communicating with the stakeholder community is the distribution of the Deliverable D21.1 – Service Evolution Requirements Report to all stakeholders participating to the user requirements assessments in the frame of WP 21. Stakeholders univocally appreciated to receive the final report and are in general very interested to stay in touch with ECoLaSS on future developments.

4 Conclusions & Outlook

Summarising the project's achievements in stakeholder consultation in the first half of the first Reporting Phase (M1-9), substantial and fruitful interactions have been taking place with all major relevant European and many national stakeholders, as well as with a multitude of further stakeholder groups. This was facilitated by the consortium partner's collective unique positioning in the Copernicus and land monitoring community, as well as by a sophisticated stakeholder consultation concept, building on a dual strategy of targeted stakeholder meetings and using basically every opportunity for back-to-back meetings. Therefore, the consortium considers the WP 51 to be fully on track as planned.

Some improvement potential is recognised in view of the intensity of the exchange with JRC, although this has been a key focus throughout the first nine months of the project. A further intensification of efforts will be put in this in the next project phase. The close and fruitful contacts with EEA will be continued. Some further potentially relevant entities are planned to be addressed as well (such as further EC DGs).

In view of the collected information, the project team gained many valuable insights with respect to future CLMS product developments and the perception, use and further needs of the various stakeholders with respect to the CLMS products. Whereas this Deliverable documents the stakeholder consultation process and what has been done in that respect, the related thematic recognitions are documented in the Deliverable D21.1a – Service Evolution Requirements Report, and are therefore not repeated in the present report.