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EXCELSIOR Project

H2020-WIDESPREAD-2018-2020 | Grant Agreement No 857510	
Project full title:	**ERATOSTHENES: Excellence Research Centre for Earth Surveillance and Space-Based Monitoring of the Environment**
Project acronym:	**EXCELSIOR**
Work Package:	**WP6 Knowledge Transfer and Capacity Building**
Deliverable:	**D6.1 Workplan for transfer of knowledge and experience**

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 	**H2020-WIDESPREAD-2018-2020/ H2020-WIDESPREAD-2018-01** **Grant Agreement No 857510** This project is funded by the **EUROPEAN COMMISSION** in the Framework Programme for Research and Innovation (2014-2020).
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Project acronym:	**EXCELSIOR**
Work Package (WP): Task (T):	**WP6 Knowledge Transfer and Capacity Building** **T6.1**
Deliverable (D):	**D6.1 Workplan for transfer of knowledge and experience**
Due date of deliverable:	**30 November 2019** **(Month 02 of the project)** — **Version: 01.0**
Author(s):	CUT: **Kyriacos THEMISTOCLEOUS, Rodanthi-Elisavet MAMOURI** DLR: **Michael EINEDER, Gunter SCHREIER** NOA: **Haris KONTOES, Ioannis PAPOUTSIS** TROPOS: **Johannes BÜHL**
Contributor(s):	CUT**: Kyriacos NEOCLEOUS, Diofantos HADJIMITSIS** DLR: **Egbert SCHWARZ, Sven JACOBSEN, Thomas KRAUSS, Sarah ASAM** NOA: **Themos HEREKAKIS, Anestis TRYPITSIDIS** TROPOS: **Patric SEIFERT, Albert ANSMANN** DEC-MTCW: **Georgios KOMODROMOS, Stelios TZIORTZIS and Nikos KOUVELIS**
Start date of project:	**1 October 2019** — Duration: **84 months**

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Document Sign-off

Nature	Name	Role	Partner	Date
DRAFT	Haris KONTOES	WP6 Leader	NOA	14/11/2019
REVIEWED	Silas Mechaelides Kyriacos Neocleous	Quality Assurance	CUT	18/11/2019
REVIEWED	Diofantos HADJIMITSIS	Project Coordinator	CUT	19/11/2019
APPROVED	All partners	WP Participants	-	20/11/2019

Work Package 6: Knowledge Transfer and Capacity Building

Deliverable D6.1: Workplan for transfer of knowledge and experience

Sections to be protected	Description	Owner	Access Rights	
			Period	Type*
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*PD: Public dissemination CA: Confidentiality Agreement required for disclosure

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EXECUTIVE SUMMARY

This document represents the 'Workplan for transfer of knowledge and experience' (deliverable D.6.1) for the EXCELSIOR project. It focuses on the scope and activities of WP6 "Knowledge Transfer and Capacity Building", whose main objective is to coordinate and manage the secondments and workshops that will take place during the entire EXCELSIOR project in order to facilitate knowledge transfer and capacity building with partnering and supporting organisations. The document will provide a workplan of how knowledge transfer and capacity building will take place between the Consortium partners via workshops, seminars and secondments. This plan relies heavily on the extensive work done at the preparation of the project in defining the seminars, workshops and secondments that will take place between the consortium partners. Deliverable D6.1 is closely tied to WP5 'ECoE Resources and Infrastructure', especially T5.4, Installation, training and technical support. As well, the personnel mobility scheme is critical for task T6.2 Secondments and T6.3 Technical Skills Development. This report provides a guideline regarding how knowledge transfer and capacity building take place. This document will change during every reporting period, to reflect any changes, modification, etc. that are necessary for the optimal functioning of the EXCELSIOR project in order to increase our understanding of what is needed to conduct capacity building for the specific sectors of the ECoE. Therefore, the specific secondments and workshops listed in this report are not final and are indicative.

This plan focuses on how knowledge and experience will be transferred mainly, but not exclusively, between the Strategic partners of the EXCELSIOR project. Other experts in EO and remote sensing can provide training and workshops to the ECoE through the EXCELSIOR project. It is vital to develop a methodology in order to monitor a yearly mobility scheme workplan for sustainable know-how transfer for each aspect of the thematic sectors addressed by ECoE, with detailed guidelines regarding training and workshops and update this accordingly every reporting period. The workplan will be updated and adjusted following the WP3 yearly analysis on the strategy and targets for research and innovation. A capacity building strategy and secondment methodology needs to be defined for the EXCELSIOR project. The capacity building strategy has two pillars: (a) a backbone programme for systematic long-term capacity building and knowledge transfer of ECoE staff from the expert partners, with a fixed duration and targets, aiming at both research and innovation upscaling; and (b) ad-hoc visits programme for training on specific skills that may become necessary during the course of the project.

The present document constitutes the first version of the 'Workplan for transfer of knowledge and experience' in the framework of the EXCELSIOR project, dedicated to Task D6.1 'Personnel Mobility Scheme' under work package WP6 'Knowledge Transfer and Capacity Building'. D6.1 is delivered at Month 2 and focuses on the training guidelines of the project. Thus, this document will be updated during the first, second, third, fourth and fifth reporting period of the project.

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Abbreviations and Acronyms

CUT	Cyprus University of Technology
DEC-MTCW	Department of Electronic Communications- Ministry of Transport, Communications and Works
DLR	German Aerospace Center
ECoE	ERATOSTHENES Centre of Excellence
EMMENA	Eastern Mediterranean, Middle East and North Africa
EO	Earth Observation
ERC	Eratosthenes Research Centre
EU	European Union
HRS	Human Resources Strategy
KPI	Key Performance Indicator
KSA	Knowledge, Skills and Abilities
IPR	Intellectual Property Rights
LMS	Learning Management System
NOA	National Observatory of Athens
TROPOS	Leibniz Institute for Tropospheric Research
WBS	Work Breakdown Structures
WP	Working Package

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1. INTRODUCTION

The 'Workplan for transfer of knowledge and experience' falls under the scope and activities of WP6 "Knowledge Transfer and Capacity Building", whose main objective is to coordinate and manage the short- and long- term training and workshops that will take place during the entire EXCELSIOR project in order to facilitate knowledge transfer and capacity building with partnering and supporting organisations. This report will be adjusted every reporting period to reflect any changes, modification, etc. that are necessary for the optimal functioning of the EXCELSIOR project

The EXCELSIOR project is instrumental in upgrading the Eratosthenes Research Centre (ERC) into the Eratosthenes Centre of Excellence (ECoE), thereby creating a world-class centre of excellence in Earth Observation that will implement a course of actions to progressively generate enough revenues to be capable of achieving full economic sustainability in terms of staff, assets and operations. Among the activities for the upscaling process will be capacity building mechanisms in the form of recruitment of research and professional personnel, acquisition of state-of-the-art research equipment, transfer of scientific and technological know-how from advanced project Partners and other external entities.

This plan relies heavily on the extensive work done at the preparation of the project in defining the seminars, workshops, trainings and secondments that will take place from the consortium partners. The aim of the ECoE is to reach a maturity level of excellence. This will be done through the Consortium partners, who will provide their knowledge to bring the ECoE to excellence.

Taking all this into account, this report follows the structure presented below:

Chapter 1 consists of an introduction to Deliverable D6.1, "Workplan for transfer of knowledge and experience"

Chapter 2 defines knowledge transfer and capacity building activities, including secondments. A detailed explanation of the secondment policy is included.

Chapter 3 focuses on the management of knowledge transfer.

Chapter 4 focuses on the trainings that will be conducted regarding knowledge transfer and capacity building activities.

Chapter 5 provides the conclusion of the report.

Annex 1 includes a draft schedule for workshops, training, training topics and expected outcomes of each workshop

2. Knowledge transfer and Capacity building

Knowledge transfer consists of the range of activities which aim to capture and transmit knowledge (either explicit, such as in patents, or tacit such as know-how), skills and competence from those who generate them to those who will transform them into economic outcomes. It includes both commercial and non-commercial activities such as research collaborations, consultancy, licensing, spin-off creation, researcher mobility and publication.

Capacity Building refers to any efforts to increase the ability of individuals and institutions to undertake high-quality research and to engage with the wider community of stakeholders. There are ten steps for good capacity building, which will be presented throughout this report:

1. Identify with partners what knowledge and skills will be needed to undertake high quality research.

2. Ensure that all partners/team members understand the implications for Capacity Building.

3. Undertake a Training Needs/Gap Analysis and Organisational Assessment of the consortium partners and key stakeholders to identify capacity building requirements.

4. Develop a Capacity Building 'plan of action' which is realistic in terms of inputs, time frame, methodology and cost. Ensure that it is focused on research excellence.

5. Undertake Risk and Sensitivity Analysis of the Capacity Building plan to ensure it is robust, flexible and not excessively optimistic

6. Identify experts with the necessary expertise to deliver the Capacity Building programme from within, or if necessary, outside the consortium

7. Identify staff of the future ECoE to be trained and upgraded in skills and ensure that these staff members have the correct education and pre-knowledge as well as a sustainable perspective to deploy their skills at the ECoE.

8. Identify the capacity building activities over the life of the project with the Consortium Partners.

9. Identify networking and opportunities to support capacity building with other stakeholders

10. Initiate the Capacity Building Plan

11. Monitor and report on progress regularly.

2.1 Secondments

Secondments are considered a route to knowledge and technology transfer. Effective knowledge transfer constitutes a key mechanism of the European Research Area and ensures that publicly funded research exerts an effective impact on EU competitiveness. A secondment, viewed most generally as an exchange of personnel from one organisation to another, is a powerful support mechanism for effective knowledge and technology transfer. Staff exchange is most valuable in enabling the transfer of implicit knowledge between research collaborators by focusing on an agreed agenda, domain or problem. In secondments, the organisation who is sending the individual to be trained is considered the donor organisation, the organisation who is hosting the individual is considered the recipient organisation and the individual who is being trained is considered the secondee.

The objective of a secondment is to develop employees in roles that they could not access within their current team. The temporary movement or 'loan' of an employee to another organisation is increasingly recognised as valuable for both employee and organisational development. There should be a clear reason for the secondment, with specific outcomes identified, resulting in benefits for all. A secondment

may be split into several stays (by the same staff member, from the same sending organisation and to the same host organisation), provided that the sum of the duration of all splits is at least. There are several advantages for secondees, which include gaining new skills, develop existing skills in a new context. new skills and new perspectives of seeing a different way of working. The most important aspect of a secondment is that the secondee will return with the skills and experience that are useful to the organisation. Secondments will take place through placement or visit with the Consortium partners and other organisations who are specialized in specific areas of Earth observations. Secondments in the frame of EXCELSIOR would also not change any labour employment scheme either with the donor or recipient organisation. It is important to note that secondments do not preclude visits at the recipient site by management and additional staff from the donor organisation for any meeting necessary for the EXCELSIOR project.

The secondments that will take place within WP6 are briefly described in Chapter 4. Such activities will take place once the ECoE established as a legal entity, at the end of Month 24. Following, the Consortium partners will evaluate the specialized type of capacity building and knowledge transfer that will be conducted and the time frame when it will be accomplished. Once this is established, specialized personnel will be sent for trainings. If suitable personnel are not available, Human Resources will engage in the procedure of recruiting qualified staff that meet the requirements necessary for the capacity building and knowledge transfer training that will take place.

2.2 Workshop for knowledge transfer

The EXCELSIOR project will transform the current ERC into the ECoE. The ECoE is expected to grow over the next 7 years into a fully self-sustainable Centre of Excellence. During Phase 2 of the EXCELSIOR project, CUT's ERC will receive EU funding as well as complimentary financial commitments to upgrade the existing ERC into the ECoE, thereby creating a state-of-the-art Centre of Excellence through knowledge transfer and capacity building. The knowledge transfer and capacity building will be undertaken between the ERC and the EXCELSIOR Consortium Partners, as well as through collaborations with other agencies and organisations in research projects, EO applications, incubators, etc.

The transformation and upscaling process of the ERC into the ECoE will require capacity building mechanisms in the form of (a) recruitment of research and professional personnel, (b) acquisition of state-of-the-art research equipment, (c) transfer of scientific and technological know-how from advanced project partners and other external entities, (d) holding consultation meetings with stakeholders from the Eastern Mediterranean, Middle East and North Africa (EMMENA) region and (e) setting-up a Digital Innovation Hub to foster ECoE, National, EMMENA and European innovation uptake in EO. Figure 1 provides a simplified view of the overall EXCELSIOR methodology. In the right of Figure 1, are the high level objectives to reach by the end of the project, which include the ability to produce excellent research, the capacity to convert this research into innovation products and services and how to sustain a network of stakeholders nationally, in EMMENA and the European Union (EU) region and address their needs. These three pillars are what will make ECoE sustainable beyond the lifetime of the EXCELSIOR project and maximise its footprint and impact in the region.

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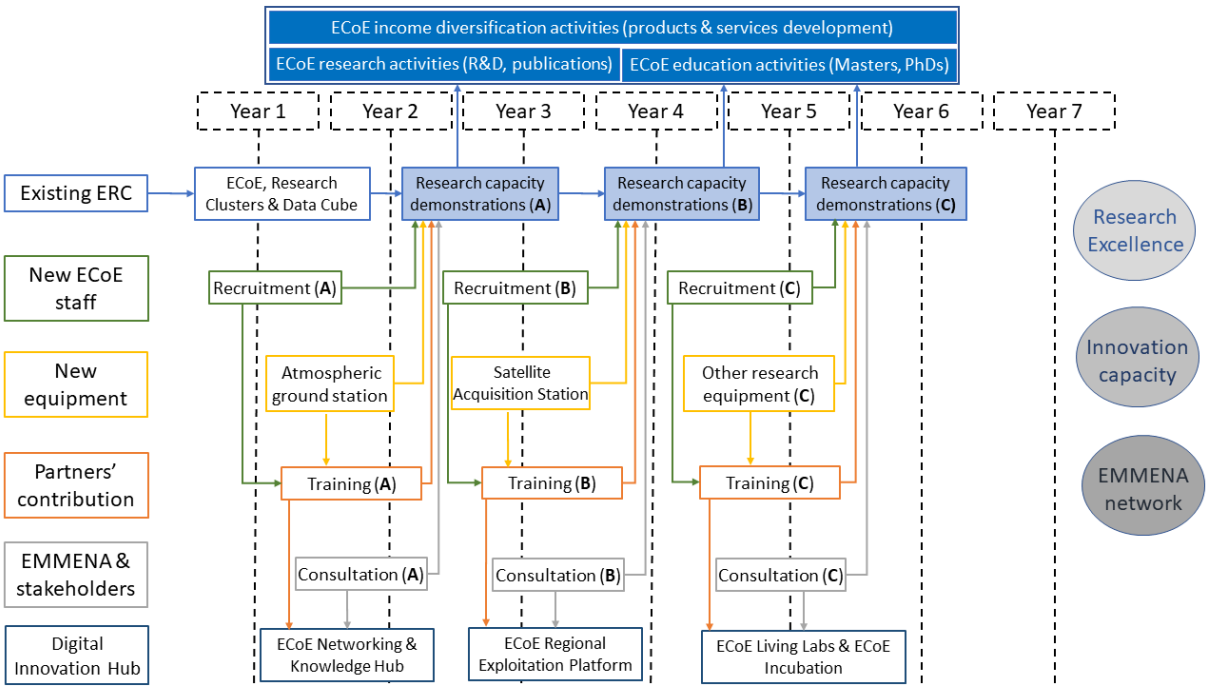

Figure 1: EXCELSIOR project methodology for transforming ERC into ECoE

Once the ECoE is established, and the basic organization chart is in place, the ECoE research area will be structured into Thematic Research Clusters. The capacity building activities will evolve through three cycles, shown as A, B and C in Figure 1. In each iteration or cycle, new staff will be recruited, advanced research equipment will be procured in order to support research activities and training will be scheduled. The Consortium Partners will provide scientific expertise and innovation practices to the ECoE in order to address the needs resulting from the national and the EMMENA region stakeholders. Each cycle may conclude into a set of capacity building projects, enabling existing and new staff to demonstrate the capacity building capabilities. The projects will be defined by a limited timeframe, concrete objectives, and tangible results from sharing science and technical skills. These capabilities will help to achieve sustainability of the ECoE in the three thematic clusters in the long term. The above workplan will provide guidelines for the strategic growth roadmap of ECoE and will initiate a new recruitment, equipment acquisition, training, consultation and capacity demonstration cycle.

Demonstration projects will be used to address the needs of the stakeholders by receiving the capacity building from the Consortium partners and demonstrate how the stakeholders' needs can be fulfilled through the applications developed by the ECoE. These demonstration projects enables researchers to translate their research into impact that directly benefits the target market as well as providing state-of-the-art secure and interoperable services and resources that will enable the emergence of genuine open Science, enhancing data skills and boosting data intensive research in Cyprus and the EMMENA region. In addition, the demonstration projects will include a series of workshops and training events for stakeholders. The demonstration projects encourage case studies and practical application within the Centre of Excellence, which encourages innovation through the ECoE.

2.3 Capacity Building

The capacity building activities provide a comprehensive approach to transfer knowledge and expertise from the Consortium partners of the EXCELSIOR project to the ECoE staff. The objective of this plan is to address both technical and functional turnover and knowledge transfer. The plan includes the resources, staffing, training, methods, milestones and tasks required to accomplish the knowledge transfer. The plan should also include procedures to verify and transfer to the ECoE all technical skills, software, data, documentation maintenance and operation functions associated with the ECoE infrastructure training. The ability to address knowledge transfer throughout the life of a project has proven to be a critical success factor. The foundation of the knowledge transfer plan is that EXCELSIOR's advanced and strategic partners understand the challenges involved in knowledge transfer and capacity building between organisations, such as the skills necessary in development and execution of trainings and early identification and mitigation of risks. By working individually with the ECoE staff and Consortium partners, each of whom are experts in a specific different thematic research sector of the ECoE, will be a key component in the EXCELSIOR knowledge transfer goals and expectations.

The EXCELSIOR team proposes to facilitate knowledge transfer through a coordinated set of tasks aligned with multiple communication methods across all involved institutions and teams. This strategy will allow the proper planning, delivery, documentation, and validation of all knowledge transfer activities throughout the project. In the context of EXCELSIOR, knowledge transfer is the practical problem of transferring both explicit and implicit knowledge from the Consortium Partners and partnering organisations to the ECoE staff. Such knowledge transfer and capacity building will provide critical implementation experience for the ECoE to be competitive in the specific research sectors and be able to provide applications and services to national, EMMENA, European and International markets. The EXCELSIOR team will work directly with the ECoE staff to ensure they have a thorough understanding of each of these guiding principles and how they can leverage them to achieve positive impact on the success of the project. Knowledge transfer contributes to a culture of learning and adapting, setting the stage for a sustainable organisational capability that can handle changes and adapt to changes that may occur.

2.4 Methodology

As soon as the ECoE is established, the EXCELSIOR consortium will identify and assess the knowledge transfer needs of the Centre of Excellence. This procedure will result from what has been established in the Grant Agreement and from the preparation of the business plan in phase 1 in order to evaluate the priorities of the Centre of Excellence and define the needs of the capacity building of the Centre. This can also be done with the consultation of stakeholders and Consortium partners. As soon as the needs are identified, the training methods will be agreed upon and implemented. The schedule of the training will be decided based on the resources and time availability of the ECoE and the Consortium partners.

In order to meet the needs of the knowledge transfer, an agenda will be prepared regarding the topics of the training, the duration of the training and the training site. After the training occurs, the results and impact of the knowledge transfer will be assessed and evaluated by applying the new capacity building into short-term projects, applications, scientific publications, conference involvement, etc. The success of the implementation of the success of the knowledge transfer and the capacity building will be assessed through the Key Performance Indicators (KPIs) of the Centre of Excellence. The following diagram (Figure 2) shows the methodology by identifying what is the need, who will conduct the training, how will the training be implemented, assess the results of the training and define the success by identifying if the original need was met through KPIs.

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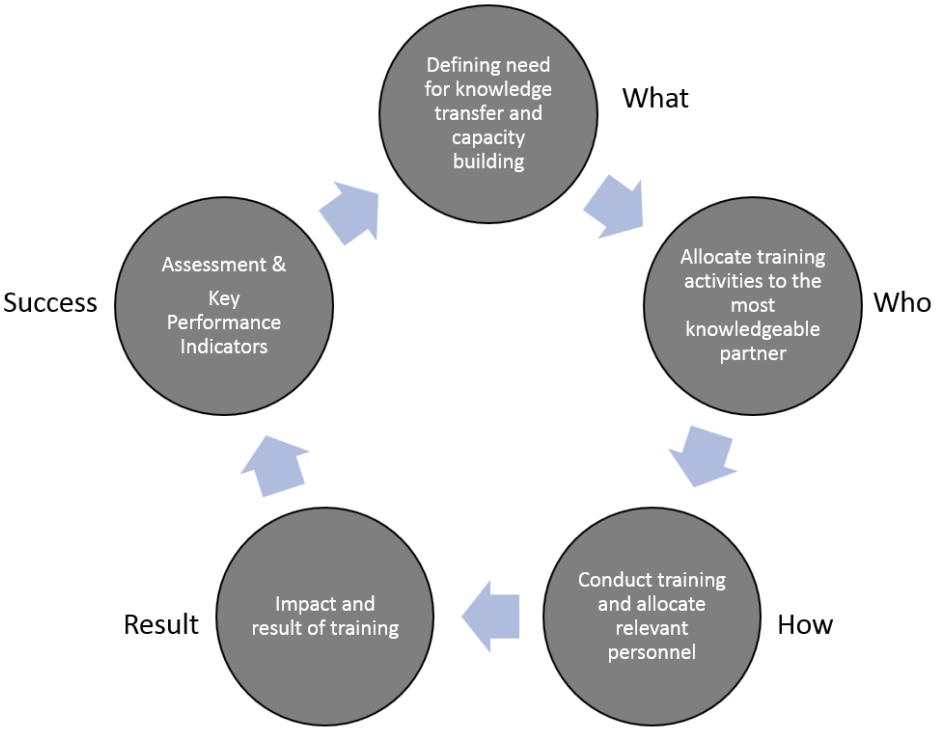

Figure 2: Methodology of knowledge transfer

2.5 Knowledge Transfer Methods

Knowledge transfer during the EXCELSIOR implementation will be based on the following two methods.

1. **Exploration-oriented knowledge transfer**, involving ECoE staff in the actual implementation process.
2. **Instruction-oriented**, involving ECoE staff only as participants in the knowledge transfer process.

The exploration knowledge transfer method includes the ECoE staff training through the EXCELSIOR Consortium, which will prepare the staff to gain specific skills through in-situ training. All necessary manuals and guidelines will be provided for the trainees. The trainees will include the ECoE staff, young researchers such as PhD students and post doc students, as well as end users Through active instruction, the students will be immersed in all aspects of the project. During EXCELSIOR implementation, most of the training will be based on the exploration-oriented method, as this is more cost effective for the ECoE.

In the instruction-oriented knowledge transfer method, the trainings are conducted by the Consortium partners and external experts. Knowledge transfer to the ECoE staff will take place during a series of seminars, workshops, short- and long- term workshops. In the instruction-oriented knowledge transfer method, there is minimal involvement of the ECoE staff during the implementation process. The knowledge transfer techniques are passive, with the ECoE staff not participating in the implementation and begin working with the system/equipment/infrastructure only when it is ready to be used.

There are multiple tools available to support knowledge transfer. The methods chosen will depend on answers to the following questions:

1. Why do you need to transfer the knowledge?

2. What is the receiver's level of knowledge/expertise?

3. Will the knowledge be applied in the same or a different environment?

4. What type of knowledge to be transferred?

A brief example of the methods that will be utilized to support knowledge transfer during the EXCELSIOR project is presented in Table 1.

Table 1: Methods for knowledge transfer

KNOWLEDGE TRANSFER METHODS	DESCRIPTION	WHEN TO USE	BENEFITS
Seminars	An instructor transferring knowledge to a group of people in a classroom setting.	When there is a need to train multiple participants at the same time with the same information.	• Ability to address multiple participants at one time in a structured environment. • Transmission of consistent information allowing employees to come away with the same skills/knowledge. • Participants may benefit through other attendees' experiences or expertise.
In-situ trainings	The steps to create a product, service or produce an outcome. It defines exactly what a scientific approach is, who is responsible, and to what standard a process should be completed.	New employee and key personnel training. As an aid to performing complex procedures.	• In depth knowledge of the specific field • Requires that the process be understood completely • Pinpoints unnecessary steps in a procedure • Eliminates the need to remember complex procedures with many steps
Resource Center	Online resource center where trainees can find information and/or post questions. Questions will be answered by an expert	• When specific information is necessary from one of the partners • Where a database of information can be easily accessible	• Knowledge base will be created based on the questions that have been submitted. • Will assist new staff in accessing information in one central location
Tutorials	Self-directed, asynchronous online class allowing students to learn at their own pace and adapt to their schedule.	When there is a need to train multiple participants with the same information.	• Address large audiences • Transmission of consistent information • Training may be conducted in a self-paced environment • Travel is not required for student or trainer
Meetings	Two or more people meet for the purpose of discussing a predetermined topic, often in a formal setting.	When there is a need to get information out to an audience which is either used to decide or generate feedback and discussion.	• A large amount of information can be made available to a large audience in a short time frame • Opportunity for interactivity among the participants • Opportunity to make decisions and form a consensus among participants

Webinar	Live class transmitted over the web using video conferencing software.	Used to deliver consistent information to large or geographically dispersed audience who need the same knowledge or skill	• Deliver information to a large, geographically dispersed audience • No expense in terms of time or travel • Can be made interactive with a Q&A session
Wikis	A website that facilitates the fast creation, sharing, and transfer of collaborative knowledge content in a highly accessible and visible manner.	• For documents, processes, etc. that need to be stored in a central repository and updated frequently. • For topics and concepts that are expected to evolve and expand over time.	• Encourage knowledge sharing • Search capabilities makes information easy to find • It is easy to update collaborative information
Documentation	Documenting job processes and placing them in a central repository.	When there is a standard process or procedure that will be used again and again.	• Maintains knowledge and learning • Standardized reference ensures quality and repeatability • Easy access

2.7 Success Metrics

Capacity is best measured through an approach encompassing several methods rather than by a single indicator. Through identifying and applying a similar measurement approach, it is expected that more data can be generated to enable better monitoring, evaluation, and learning around organizational capacity development across sectors and organization types. The most effective way to measure the effectiveness of the knowledge transfer process is to measure the changes in the skill competency of the staff members. **Skill competency** will be measured through skill-based surveys, evaluations, and after-action reviews. These tools will provide an assessment by the recipient on the quality of the knowledge transferred from the source. The surveys will focus on qualitative metrics such as the comprehensiveness and usefulness of the training. In addition, impact should also be included in the metrices. The impact of each training regarding knowledge transfer and capacity building needs to be measured. As knowledge transfer and capacity building are qualitatively measured, their impact may not be evident initially since capacity building takes time. Even where goals are realistic, there may be a delay between the time that a capacity-building intervention happens and the time when the organization internalizes that intervention and learns to perform effectively at a higher level.

The following five recommendations are suggested in order to create matrices that assess capacity building.

1. Since capacity is expressed through performance, capacity development measurement must be centered on organizational performance. It should monitor performance change as the appropriate metric for validating whether capacity has changed in ways that are significant.
2. Performance measurement must be defined holistically, encompassing both the organization's performance in achieving targeted results and the organization's performance in learning, adapting, and sustaining itself over time. Performance should be measured by achieving both targeted results and in learning, adapting, and sustaining itself over time.

3. The measurement of organizational performance must be complemented by measures of the wider local system that co-produces the development results of interest. Therefore, performance measurement depends on observing how the organization functions within that wider system.
4. The effect of organizational performance change on local system change will fit a contribution paradigm. Credible contribution of organizational performance change to local system change will fit a contribution paradigm. Confidence in increased effectiveness is established in the contribution of performance improvement to system change with multiple methods to connect organizational performance and systems change, and through gathering different perspectives on change.
5. The measurement approach should incorporate at least one method of perceiving unpredicted changes in performance and of validating the pathway of predicted changes. This often requires deductive approaches that trace processes after change has happened.

2.8 Training material

The EXCELSIOR Consortium partners will transfer the approved training materials, including training curriculum, exercises, individual training records, and training statistics, to the ECoE according to the format determined by the EXCELSIOR project. A Learning Management System (LMS) and repository will be created during the project to manage the ongoing training of ECoE infrastructure users. In addition, the EXCELSIOR Consortium partners will transfer data files, software, software documentation, process flows, and operational information needed for the operation and maintenance of the equipment to the ECoE staff. Work-in-process (changes, updates, additions, or deletions of materials in part or whole) during the project period will be incorporated in the knowledge transfer process. The EXCELSIOR Team will be responsible for implementing the work-in-process until the completion of the project. Any background and IPR issues with the related documentation, software and other materials is addressed in the EXCELSIOR Consortium Agreement.

There are several tasks that will be used as a basis to support development of the knowledge transfer plan. These tasks include (a) verify software and hardware, data and documentation, (b) transfer of software and hardware data and documentation, (c) identify essential knowledge to be transferred (d) identify who has the knowledge, (e) identify who the knowledge should be transferred to, (f) select knowledge transfer tools, (g) establish knowledge transfer checkpoints, (h) define success metrics for knowledge transfer (i) perform knowledge transfer activities, (j) monitor, assess and report on knowledge transfer activities and (k) deliver training material. As more information becomes available, the tasks will be updated to reflect the ECoE's requirements.

3. Management of Transfer of Knowledge Plan

The selection of staff and the management of the transfer of knowledge plan will be made according to Transfer of Knowledge Plan and the defined criteria according to the internal ECoE rules as well as WP3 ECoE Strategic growth strategy, WP4 Human Resources Plan and WP5 ECoE Resources an Infrastructures. The trainings plan will follow specific criteria such as:

•Technical aspects: instrument performance (maintenance, calibration, quality assurance), operator training, etc.;

• Scientific excellence: originality, quality, state of the art, technical aspects (instrument performance and high quality), relevance, impact, etc.;

• Market-driven aspects: relation to business and innovation, private sector participation, technical development, innovative solutions, socio-economic impact, etc.;

• Aspects related to the staff profile and/or background, including new staff, early career researchers, full time and part time staff.

3.1 Human Resources and Staffing

The Human Resource Strategy (HRS) of the EXCELSIOR project, and later the ECoE, will be developed to represent the ethos and values of the organisation and facilitate recruitment processes in the most efficient and sustainable manner. The EXCELSIOR project is focused on conducting excellent multidisciplinary EO research, towards a better understanding, monitoring and sustainable exploitation and protection of the physical, built and human environment. Employment opportunities will be open to all scientists and personnel based on the specified job requirement. When new skills are identified for a project, the ECoE will assess and fulfill the specific skills through training or by acquiring staff with the new skill. As the implementation progresses, certain skills may no longer be needed, and staffing will be adjusted accordingly. Staffing levels will be reviewed in an annual base through Task 4.4: Annual Personnel Review and Development Scheme to determine if more actions are needed.

Staffing level is one of the performance metrics monitored on the project mainly addressed by the Human Resources strategy WP 4. The Human Resource Plan (WP4) will detail the positions and numbers of persons assigned to the knowledge transfer effort. The analysis of knowledge, skills, and abilities and the staffing levels will be used to identify qualified staff to fill the positions. If the prerequisite skills are not available in the ECoE, Human Resources, in collaboration with the Research Team Leaders, will assist the Program Manager and the Board of Directors to identify new position considering to the recruitment scheme of the ECoE.

In addition, the HRS will ensure that all ECoE members and prospective members are treated solely on the basis of their merits, abilities and potential without receiving any unjustified discrimination or biased treatment on grounds such as gender, age, disability, marital status, pregnancy or maternity, race, religion or belief, sex, sexual orientation, socio-economic status or any other irrelevant distinction.

3.2 Performer Skills Assessment

During each training phase, the EXCELSIOR project will identify the knowledge, skills, and abilities (KSA) necessary to accomplish knowledge transfer and capacity building. This will be done in order to better identify the best candidate(s) to attend workshops or secondments. These KSAs will span the domains of project management, organisational change management, knowledge transfer, and training development. This information will be captured in the Strategic Growth Roadmap (WP3). This iterative process is defined as the Work Breakdown Structure (WBS) and it is developed throughout the lifetime of the EXCELSIOR project. The specific KSAs for the project will be based on the WBS positions and an assessment will be performed to adjust the positions and titles to best represent the roles on the project.

The product of this skills assessment will be used to determine the numbers and level of staffing for each position and sector of the ECoE.

3.3 ECoE Thematics

In line with the EXCELSIOR Vision, the **horizontal axis** consists of three Thematic Clusters for **sustained excellence** in research of the ECoE, namely: Environment and Climate, Resilient Society and Big Earth Data Analytics.

In particular, the following domains will be addressed within each Thematic Cluster:

• **Environment and Climate**

- *Climate Change Monitoring*, by establishing an active remote sensing supersite in Cyprus monitoring climate, and environment including water resources, agriculture, land use as well as aerosols, clouds, dust and pollution in the EMMENA region using the relevant expertise from TROPOS. *(Calibration/validation supersite – GBS)*

• **Resilient Society**

- *Disaster Risk Reduction*, by transferring relevant expertise from NOA's BEYOND Centre of Excellence for EO-based monitoring of natural disasters.
- *Access to Energy*, by combining EO data, with physical modelling and machine learning to focus on energy nowcasting, projections, and short-term forecasting, using the relevant expertise from NOA. *(EMMENA Solar Energy Observatory)*
- *Water resource management*, resulting from climate change variables, including droughts, water shortages, water quality, freshwater aquifers and land desertification, using the relevant expertise from DLR.

• **Big Earth Data Analytics**

- *Data management and analytics*, for researching explorative algorithms to improve information retrieval from petabytes of remotely sensed data, using the relevant expertise from NOA and DLR *(Big Earth Data Analytics)*

The trainings on the three thematic research clusters, namely the Environment & Climate, the Resilient Society and the Big Earth Data Analytics clusters, will be implemented in terms of the operations, research collaborations, tools to facilitate research, agreeing internal structures and allocating staff responsibilities, etc. The trainings will include:

1. **Management activities**, such as assignment of roles and responsibilities in the research groups, setting individual scientific goals and group KPIs, establishing a systematic collaboration scheme with the Strategic Partners, harmonizing processes for internal and external teamwork, ensuring vertical organisation of the group's activities from access to equipment data to research and innovation uptake, etc.

2. **Technical activities,** such as customization and calibration of the ECoE infrastructure to meet the research group's scientific needs, technical work required to prepare the participation to European and/or global infrastructure networks (e.g., for the atmospheric equipment and receiving antenna foreseen), defining the IT interfaces for the seamless access to EO data from the research equipment, set-up of scientific models and other core tools as research enablers, defining laboratory standards guidelines and best practices, etc.

3.4 Training by Consortium Partners

DLR, as a result of its organisational and wide technical expertise, will be a key partner for knowledge exchange and capacity building in the fields of land, water and maritime security, in the form of joint development research projects and staff exchanges. DLR's experience will also be instrumental in the

design, implementation and operation of Earth Observations and Geo-Information infrastructures of the ECoE, specifically for establishing a direct satellite data acquisition facility.

NOA will systematically provide support, processing chains, models, products and services to the ECoE to foster the development of value chains tailored to the downstream needs of the ECoE stakeholders and will provide expertise for big data EO management and dissemination. NOA will also support the linking of the ECoE with International initiatives, such as Copernicus, GEO, ESA, CEOS and the GEO-CRADLE network.

TROPOS will be the key partner for the establishment of a Ground-Based remote sensing Station (GBS) supersite for aerosol and cloud monitoring, Atmospheric Science and Climate Change Research in the ECoE, by providing its unique expertise in this field and its links to European networks, resulting in Cyprus becoming an important participant in the European Network of active remote sensing of the atmosphere.

4. Trainings

In order to enable capacity building and knowledge transfer, there will be several workshops, trainings, site visits and secondments between the members of the Consortium, as described in Table 2, suggested by the Partners as an indicative knowledge transfer needs. These knowledge transfer activities will be reviewed and reassessed following the establishment of the ECoE. The trainings on new infrastructure will take place through visits between the Consortium Partners. Trainings can take place in terms of an introduction and preparation for the specific thematic, technical aspect of the thematic and the operational aspect of the thematic. Some of the areas of knowledge transfer and capacity building can be divided through the partners; e.g. DLR will work with the ECoE regarding the establishment of an antenna, NOA will train the ECoE regarding hydrocarbons and TROPOS will work with the ECoE regarding the calibration and validation of the atmospheric supersite.

For example, the personnel mobility schemes for TROPOS will include trainings that include extended exercises and training on complex data analysis and handling of the respective software tools, with focus on an extended complex multi-platform data analysis (e.g. available data from previous closure studies, A-LIFE campaign or participation to new ones (e.g. D-TECT)), from the observational overview to detailed case studies. This activity includes strong and close co-operation with the scientific community and respective training to perform excellent research for the preparation of publications.

For DLR, the personnel mobility scheme will focus on short term staff exchange on training for Data Information Management System (DIMS) which includes Training on running the state-of-the-art DIMS components like Processing System Management (PSM) and Operating Tool (OT) based on operational ground segment components (e.g. Sentninel-1, Training on EO data handling, implementation of data interfaces e.g. direct downlink or Copernicus Data Hub, following the rules for open data policy). Training will also be conducted on how to use of the data analysis, monitoring and alarm functionalities, configuration and setup and the generation of planning information. In order to enable capacity building and knowledge transfer, there will be several workshops, trainings, site visits and secondments between the members of the Consortium, as described in Table 2. These trainings are indicative and will change during the course of the EXCELSIOR project. The number of persons and/or visits is subject to change, depending on the secondment or training. The schedule and location of the trainings will be decided by the Consortium partners according to the project needs. All changes will be reported accordingly. The trainings will be included in the Period Report for every 15-month period.

Table 2 Trainings, workshops, site visits and secondments (indicative activities)

DLR
DLR training in **Germany**
Training A • Short term staff exchange on training for Data Information Management System (DIMS) which includes Training on running state-of-the-art DIMS components like Processing System Management (PSM) and Operating Tool (OT) based on operational ground segment components e.g. Sentninel-1; Training on EO data handling, implementation of data interfaces e.g. direct downlink or Copernicus Data Hub, following the rules for open data policy); Training on basics how to use of the data analysis framework which includes e.g. Level 1 (L1b) Sentinel-1 Instrument Processing Facility (IPF) as well as monitoring and alarm functionalities; Training on configuration and setup, e.g. definition of AOI and subscription rules and generation of planning information e.g. ground station schedule based on the requested AOI (Neustrelitz) • Short-term staff exchange for teaching of basics for maritime information extraction from SAR and hands-on software training course at DLR Maritime Safety and Security Lab (Bremen)

Training B

- Training on Data Information Management System (DIMS) which includes 1) Training on running state-of-the-art DIMS components like Processing System Management (PSM) and Operating Tool (OT) based on operational ground segment components, 2) Training on EO data handling, implementation of data interfaces, 3) Training on basics how to use of the data analysis framework and 4) Training on configuration and setup, e.g. definition of AOI and subscription rules and generation of planning information. (Neustrelitz)
- Introduce ECoE operations staff in basic antenna and reception system operations and maintenance procedures. (Neustrelitz)
- Training on antenna and data reception operations (Neustrelitz)
- Training in processing of optical and hyperspectral sensor data and products at DLR (Oberpfaffenhofen).
- Training on DLR's SAR-AIS Integrated Toolbox (SAINT) software used to derive Level 2 (L2) maritime information products, such as ship detection, wind speed, and sea state, fully automatically and in near real-time. This training includes operation and configuration of SAINT and ancillary software, settings for operational processing to cover different types of sensors and products, as well as validation of the generated L2 products. (Bremen)

Training C

- Individual on-the-job training and supervision with the goal of writing a joint research paper under the first authorship of the ECoE staff. Training and capacity building topic will be the Research Capacity Demonstrators between on "Agriculture and sustainable land and water management in coastal regions of the eastern Mediterranean". (Oberpfaffenhofen).
- Supervision and skill development of the PhD students in the early stage of their research (EO time series methods, Copernicus multispectral/SAR sensors) (Oberpfaffenhofen).
- Training and skill development in late stage of their PhD phase (enhanced data science approaches, geospatial analysis, processing and interpretation of EO time series) (Oberpfaffenhofen).

DLR training in **Limassol**

Training A

- Introduction and NSG specific technical overview of antenna system, reception and automation system including antenna HF components, baseband systems, and telemetry processing and storage systems. The task concludes preparation of design overview documentation.

Training B

- Support ECoE in preparation for the antenna installation and manufacturer antenna acceptance tests. This task includes training material like checklists and best practices.
- Introduce ECoE operations staff in basic antenna and reception system operations and maintenance procedures.
- Basic training on optical data processing based on processing chains such as DLR's CATENA. These include automatic processing of Sentinel data and Copernicus contributing missions very high resolution optical data for ortho-rectification, co-registration and also, in case of (multi-) stereo data, DSM- and DTM-generation for general purposes or specially for vulnerability analysis, monitoring or modelling of Cultural Heritage sites.
- Training on the optical data processing and analysis chain CATENA. DLR contributes with short term staff exchange for familiarisation to optical data processing and products at ECoE premises.
- Basic training in SAR and InSAR (Interferometric SAR). This includes fundamental theory underlying (In)SAR technology as well as an overview of the satellites and sensors operating through to typical applications of the technology and cutting-edge topics.

Training C

• Definition of a joint project topic and refinement of research questions and methodological approaches • Skills development of the PhD students with respect to scientific paper writing and visualisation

TROPOS
TROPOS training in **Leipzig, Germany**
Training A • ECoE staff will be involved in the integration of instruments and the setup of the GBS at Leipzig. • Training on running the GBS instrumentation, and on calibration, quality-assurance and continuous observation procedures during the first measurement test phase of GBS at Leipzig. • Lectures at TROPOS on usage of the data analysis software package provide by TROPOS to produce quicklook plots, required to do routine, daily checks of the status of the entire GBS instrumentation. • Packing and shipping of fully operational GBS station **Training B** • Training on the built up, implementation and data processing of PollyXT Raman lidar. Training on data analysis methods and how to use the software tools provided by TROPOS for aerosol profiling. • Training on the Setup of Cloudnet software for GBS **Training C** • ECoE staff will collaborate with of TROPOS in Cloudnet data processing and usage. • Teaching of GBS scientists in manual and automated Raman lidar evaluation .
TROPOS training in **Limassol**
Training A • Setup of GBS at Limassol and establishment of the internet infrastructure to run and control the full station from ECoE. In-depth training of the ECoE researchers to operate the station. • First intensive measurement campaign on the ECoE's premises with GBS. [Research Capacity Demonstrators]. Transfer of knowledge regarding the exploitation of the GBS long-term observations of aerosols, clouds, and meteorological quantities in a statistical sense and the integration and comparison of the statistical results with respective ones for the other ACTRIS RS stations to monitor atmospheric and climate conditions over Europe. **Training B** • Research Capacity Demonstrators. Analysis of the advanced GBS data sets with focus on aerosol characterisation and profiling of cloud properties and cloud evolution processes (lifecycle). This can be regarded as an in-depth observation-based pilot study on climate research in the EMMENA. **Training C** • Workshop on Satellite lidar and radar observations from space focusing on the exploitation and interpretation of the aerosol/cloud products • Workshop on application of advanced ground-based lidar methodologies for the development of higher-level products from satellite observation • Research Capacity Demonstrators: extended exercises, and training on complex data analysis and handling of the respective software tools, with focus on an extended complex multi-platform data analysis (e.g. available data from previous closure studies, A-LIFE campaign or participation to new ones e.g. D-TECT), from the observational overview to detailed case studies. This activity includes strong and close co-operation with the scientific community and respective training to perform excellent research for the preparation of publications.

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NOA
NOA training in **Athens**
Training A • Training on BEYOND Centre of Excellence activities, processing practices and lessons learnt, for EO-based monitoring of natural disasters. • Solar radiation in situ measurements assimilation in the SENSE system. Theoretical and practical aspects. • Training on processing of magnetometer data, modelling, theory and lessons learnt, for mineral exploration research and applications. **Training B** • Training, theory and applications for floods monitoring, including early warning and impact assessment. • Training, theory and applications on Persistent Scatter Interferometry methods for geo-hazards monitoring, including earthquakes, landslides, volcanic activity, construction activity, etc. • Training on the processing chains for the exploitation of magnetometer data **Training C** • Solar radiation measurements, data processing and assimilation into SENSE • Set-up, customisation and operation of a magnetometer network in Cyprus.
NOA training in **Limassol**
Training A • Machine learning techniques for smart farming, food security and monitoring of the implementation of the European Common Agricultural Policy **Training B** • Installation and customisation of the SENSE system for solar energy nowcasting and forecasting as well as provision of training for the system use including theoretical and practical aspects on solar radiation calculations. • Short term staff exchange on supporting ECoE in preparation of Sen2Agri system installation for the deployment of a large-scale crop type mapping of the region. This task includes training material, example testing of the tool. • Fire monitoring and management state-of-the-art, including satellite data processing, theory, algorithms, database post-processing, data fusion, hands-on co-development. • Modelling risk and estimating hazard, exposure, susceptibility, vulnerability, techniques for damage assessment using optical, SAR and fused datasets and EO-based early warning systems for detection and alerting. **Training C** • Workshop on data assimilation and data fusion techniques, combining real-time EO data with in-situ information for disaster risk reduction applications. • Exploitation of multiple sensor observations (space-based optical and radar, in-situ, meteo etc.) and the synergistic use and fusion of such datasets for the extraction of added value information in regard to agriculture monitoring and specifically for the purposes of food security, agriculture subsidy control and smart farming. • Set up and operation of the ECoE network of in-situ sensors for agriculture, establishment of the internet infrastructure to access the data from ECoE, with the assistance of NEUROPUBLIC LLC (the committed service provider for the network), and in-depth training of the ECoE to access and fully exploit the data of the stations. • Installation of the solar radiation network. Training workshop on daily maintenance, data storage and data post processing for solar radiation measurements.

5 Conclusions

The Workplan for transfer of knowledge and experience presented in this document provides a guideline of how knowledge transfer and capacity building can be achieved via mutual secondments through the ECoE with all Consortium members. The main objective of the document is to define the methodology for the knowledge transfer and capacity building and provide an indicative plan of the workshops and trainings that will take place during the EXCELSIOR project. The workplan for the knowledge and experience will be determined by all Project partners according to the needs of the ECoE and the EXCELSIOR project and will be evaluated based on the resources of the ECoE.

The Workplan presented in this report included the tentative workshops, trainings and secondments between the Consortium members. All activities are indicative and are subject to change according to the needs of the ECoE and the EXCELSIOR project. The updated schedule of the training activities will be reported at the end of each reporting period.

END OF DOCUMENT

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ANNEX I:

Training activities suggested by the Advanced partners. The final set of activities will be selected and approved by the EXCELSIOR Consortium and ECoE. The schedule, duration and number of persons will also be determined according to the needs and staff availability for the ECoE's capacity building.

Training Schedule: TROPOS

In order to enable capacity building and knowledge transfer, there will be several workshops, trainings, site visits and secondments which have been suggested by the members of the Consortium. The tentative training list for TROPOS is described in Table 3.

Table 3: Training Schedule for TROPOS

RECOMMENDED ACTIVITIES FOR TRAINING PHASE A

ACTIVITY 1

Type: Training

Thematic: Build-up, Test and Shipping of GBS

Location: Leipzig

- Short description of the training
  - The ECoE personnel responsible for operating the GBS for the ECoE will be present during the integration of individual remote-sensing instruments and computer infrastructure into the GBS
  - The ECoE personnel will participate in test measurements at Leipzig
- Objectives
  - Integration of instruments into the two laboratory containers of the GBS
  - Installation and wiring of computer infrastructure
  - Making the GBS ready for shipping at the end of the integration phase
- Expected outcomes
  - Deep understanding of the structure and functioning of the GBS as a system for performing remote-sensing measurements of the atmosphere
  - Enabling ECoE personnel to move the GBS in a safe and efficient way

ACTIVITY 2

Type: Training

Thematic: Setup of the GBS at Limassol

Location: Limassol

- Short description of the training
  - The GBS will be set up at Limassol and ECoE personnel will be enabled to use it for the purpose of atmospheric research
- Objectives
  - Teaching how to correctly setup the station
  - Connect to local electricity and server infrastructure of the ECoE
  - Connect to data processing chains of ACTRIS (Cloudnet and PollyNET)
  - Usage of the data for generating scientific products
- Expected outcomes
  - ECoE personnel is enabled to deploy and operate the GBS and use its full scientific capacity for atmospheric research

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ACTIVITY 3

Type: 1st Research Capacity Demonstration of the ECoE

Thematic: Remote-sensing measurements of the atmosphere

Location: Limassol

- Short description of the training
  - Remote-sensing measurement campaign with the GBS conducted by ECoE and guided by TROPOS
- Objectives
  - Operate the GBS under conditions of a measurement campaign
  - Regular maintenance of microwave radiometer and PollyXT laser
  - Interpretation of aerosol observations with PollyXT lidar
  - Interpretation of cloud observations with Cloudnet
  - Presentation and discussion of measurement results on a regular basis in conjunction with other measurement systems participating in the 1st Research Capacity Demonstration of the ECoE
  - Apply different coordinated scan procedures of Doppler lidar and Cloud Radar
- Expected outcomes
  - ECoE personnel is enabled to operate the GBS and interpret and present its scientific products on a continuous basis

Trainings scheduled:

- ECoE staff will visit TROPOS and will be involved in the integration of instruments and the setup of the GBS at Leipzig.
- Lectures at TROPOS on usage of the data analysis software package provide by TROPOS to produce quicklook plots, required to do routine (day by day) checks of the status of the entire GBS instrumentation.
- Packing and shipping of fully operational GBS station
- Setup of GBS at Limassol and establishment of the internet infrastructure to run and control the full station from ECoE. In-depth training of the ECoE researchers to operate the station.
- First intensive measurement campaign on the ECoE's premises with GBS. [Research Capacity Demonstrators]. Transfer of knowledge regarding the exploitation of the GBS long-term observations of aerosols, clouds, and meteorological quantities in a statistical sense and the integration and comparison of the statistical results with respective ones for the other ACTRIS RS stations to monitor atmospheric and climate conditions over Europe.
- Staff exchange of ECoE on training running the GBS instrumentation, and on calibration, quality-assurance and continuous observation procedures during the first measurement test phase of GBS at Leipzig.
- Longer term staff exchange of ECoE researchers involved to the GBS to learn, built up, implementation and data processing of PollyXT Raman lidar. Training on data analysis methods and how to use the software tools provided by TROPOS for aerosol profiling.
- Longer term staff exchange of ECoE researchers for training on the Setup of Cloudnet software for GBS.
- Expert visits on upcoming topics linked with the demonstration research topics (t.b.d. in the Task 6.1) Analysis of the advanced GBS data sets for comprehensive aerosol characterizations in the range of interest (RoI) with focus on profiling of cloud properties and cloud evolution processes (lifecycle). This can be regarded as an in-depth observation-based pilot study on climate research in the EMMENA

- ECoE staff will collaborate with of TROPOS in Cloudnet data processing and usage.
- Teaching of GBS scientists in manual and automated Raman lidar evaluation
- Workshop on Satellite lidar and radar observations from space focusing on the exploitation and interpretation of the aerosol/cloud products
- Workshop on application of advanced ground-based lidar methodologies for the development of higher-level products from satellite observation
- Expert visits on upcoming topics as indicated in Task 6.1. Proposed demonstration Research: extended exercises, and training on complex data analysis and handling of the respective software tools, with focus on an extended complex multi-platform data analysis (e.g. available data from previous closure studies, A-LIFE campaign or participation to new ones (e.g. D-TECT), from the observational overview to detailed case studies. This activity includes strong and close co-operation with the scientific community and respective training to perform excellent research for the preparation of publications

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Training schedule: DLR

In order to enable capacity building and knowledge transfer, there will be several workshops, trainings, site visits and secondments between the members of the Consortium, as described in Table 4.

Table 4: Training Schedule for DLR

-Short term staff exchange on training for Data Information Management System (DIMS) which includes training on:

1. Running state-of-the-art DIMS components like Processing System Management (PSM) and Operating Tool (OT) based on operational ground segment components e.g. Sentninel-1,
2. EO data handling, implementation of data interfaces e.g. direct downlink or Copernicus Data Hub, following the rules for open data policy)
3. Basics on how to use of the data analysis framework which includes e.g. Level 1 (L1b) Sentinel-1 Instrument Processing Facility (IPF), as well as monitoring and alarm functionalities
4. Configuration and setup, e.g. definition of AOI and subscription rules and generation of planning information e.g. ground station schedule based on the requested AOI.
5. General overview will be start with Presentations, partly based on hands
6. System training will be prepared e.g., for the system developed for Sentinel-1

Logistics: Training and introduction on site DLR Neustrelitz, Hosting in Neustrelitz hotel at DLR rates, Lunch at DLR cantina

-Short-term staff exchange for teaching of basics for maritime information extraction from SAR and hands-on software training course at DLR Maritime Safety and Security Lab (Bremen, Germany) in Fundamentals of methods and algorithms used to derive maritime information such as sea state, ocean surface wind, ship detection and classification, ice and oil detection and classification, sea ice drift, etc. This Background is needed to understand and adjust the user-configurable parameters in DLR's SAR-AIS Integrated Toolbox (SAINT) software. In addition, hand-on training will be provided with the SAINT software including operation and configuration of SAINT and ancillary software, settings for operational processing to cover different types of sensors and products, as well as validation of the generated L2 maritime information products

Logistics: Training and introduction on site DLR Bremen, Hosting in Bremen hotel at DLR rates

Lunch at Bremen University Mensa

-Introduction and NSG specific technical overview of antenna system, reception and automation system including antenna HF components, baseband systems, and telemetry processing and storage systems. The task concludes preparation of design overview documentation. Topics regarding the induction on ground station infrastructure and the related infrastructure and main components include:

- ✓ Antenna system introduction
- ✓ Main components of the reception chain
- ✓ Front End System FEP
- ✓ Monitoring Control
  - Station Planning
  - Station Control
  - Monitoring & Alarm

Training is prepared and performed by DLR staff. The presentations will be partly based on hands-on experience with DLR antenna systems and assisting on operational service execution
Logistics: Training and introduction on site DLR NZ. Hosting in NZ hotel at DLR rates. Lunch at DLR cantina

-Training workshop in technical specification of antenna parameters and characteristics, as well as introduction in the basic requirements for antenna equipment and reception system operations. This includes technical support for the evaluation of antenna offers from manufactures. *The task includes preparation of example documentation and training documents with respect to NSG specific system components.* Continuation on intensive technical introduction by DLR staff. Focus on specification and layout of antenna system. Preparation for specification and support to antenna procurement. On site in Neustrelitz and on site in Limassol
Logistics: Training and introduction on site DLR NZ. Hosting in NZ hotel at DLR rates. Lunch at DLR cantina. In Limassol. Training at ECoE facilities. Hotel for DLR staff.

-Training on Data Information Management System (DIMS) which includes 1) Training on running state-of-the-art DIMS components like Processing System Management (PSM) and Operating Tool (OT) based on operational ground segment components, 2) Training on EO data handling, implementation of data interfaces, 3) Training on basics how to use of the data analysis framework and 4) Training on configuration and setup, e.g. definition of AOI and subscription rules and generation of planning information. (Neustrelitz)

-Introduce ECoE operations staff in basic antenna and reception system operations and maintenance procedures. (Neustrelitz)

-Training on antenna and data reception operations (Neustrelitz)

-Training in processing of optical and hyperspectral sensor data and products at DLR (Oberpfaffenhofen).

-Training on DLR's SAR-AIS Integrated Toolbox (SAINT) software used to derive Level 2 (L2) maritime information products, such as ship detection, wind speed, and sea state, fully automatically and in near real-time. This training includes operation and configuration of SAINT and ancillary software, settings for operational processing to cover different types of sensors and products, as well as validation of the generated L2 products. (Bremen)

-Two short term staff exchange between Limassol and Neustrelitz to introduce ECoE operations staff in basic antenna and reception system operations and maintenance procedures.

-Longer term staff exchange of ECoE staff at DLR for antenna and data reception operations training

-Short term staff exchange of ECoE staff on training in processing of optical and hyperspectral sensor data and products at DLR in Oberpfaffenhofen.

-Short-term staff exchange for software training course at DLR Maritime Safety and Security Lab (Bremen, Germany): Training on DLR's SAR-AIS Integrated Toolbox (SAINT) software used to derive Level 2 (L2) maritime information products, such as ship detection, wind speed, and sea state, fully automatically and in near real-time. This training includes operation and configuration of SAINT and ancillary software, settings for operational processing to cover different types of sensors and products, as well as validation of the generated L2 products.

-Longer term staff exchange of ECoE staff at DLR for individual on-the-job training and supervision with the goal of writing a joint research paper under the first authorship of the CUT PhD students. Training and capacity building topic will be the Research Capacity Demonstrators between on "Agriculture and sustainable land and water management in coastal regions of the eastern Mediterranean".

-Short-term visit for definition of a joint project topic and refinement of research questions and methodological approaches

-Short-term visit for supervision and skill development of the PhD students in the early stage of their research (EO time series methods, Copernicus multispectral/SAR sensors)
-Training and skill development in late stage of their PhD phase (enhanced data science approaches, geospatial analysis, processing and interpretation of EO time series) (Oberpfaffenhofen).

-Short term staff exchange on supporting the ECoE in preparation of an antenna installation and manufacturer antenna acceptance tests. This task includes training material like checklists and best practices. The training is also based on acceptance tests as has been held in Neustrelitz.

-Basic training on optical data processing to ECoE based e.g. on the DLR processing chain CATENA. These include automatic processing of Sentinel data and Copernicus contributing missions very high-resolution optical data for orthorectification, co-registration and also – in case of (multi-) stereo data – DSM- and DTM-generation for general purposes or specially for vulnerability analysis, monitoring or modeling of Cultural Heritage sites.

-Short term staff exchange on training of the optical data processing and analysis chain CATENA. DLR contributes with short term staff exchange for familiarization to optical data processing and products at ECoE premises

-Basic training in SAR and InSAR (Interferometric SAR) carried out by DLR on-site at ECoE premises. This includes fundamental theory underlying (In)SAR technology as well as an overview of the satellites and sensors operating through to typical applications of the technology and cutting-edge topics. These trainings will include some practical examples, i.e. on-hand training, to enforce the concepts.

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Training schedule: NOA

In order to enable capacity building and knowledge transfer, there will be several workshops, trainings, site visits and secondments between the members of the Consortium, as described in Table 5.

Table 5: Training Schedule for NOA

-Training on BEYOND Centre of Excellence activities, processing practices and lessons learnt, for EO-based monitoring of natural disasters. This training workshop will provide an overview of our activities, our operations plan and best practices, covering the entire value chain, from infrastructure to processing, to operational applications and sustainability plans.

1. Operations of Satellite Ground Segment
2. Operations of Copernicus Hubs for the European Space Agency
3. Satellite data processing approaches (distributed processing, data manipulation, organization and storage, algorithms, etc.)
4. Flagship value chains and applications for disaster management: FireHub, FloodHub and GeoHub
5. Introduction on hazard, vulnerability and risk assessment models
6. Sustainability of infrastructure and applications

General overview will be start with Presentations, partly based on hands.
Logistics: Training and introduction on site NOA Athens

-Machine learning techniques for smart farming, food security and monitoring of the implementation of the European Common Agricultural Policy**.** Training on BEYOND Center of Excellence activities, processing practices, in house machine learning algorithms and lessons learnt for EO based and AI enabled monitoring of the agricultural land.

1. Lectures:
    a. Basics of pattern recognition and artificial intelligence on Earth Observation data
    b. Basics on Earth Observation techniques for agricultural applications, focusing on Common Agricultural Policy and Food Security.
2. Hands-on exercises
    a. Automated searching and downloading of pertinent Copernicus data
    b. Preprocessing of Sentinel-1 and Sentinel-2 data
    c. Clustering techniques for crop identification
    d. Supervised classification techniques for crop classification

Regression techniques for phenology extraction and yield estimation
Logistics: Training in ECoE's Limassol premises, hotel accommodation for 1 person

-Solar radiation in situ measurements assimilation in the SENSE system. Theoretical and practical aspects.

1. Solar radiation theory and measurement basics
2. Earth observation measurements on atmospheric composition
3. Radiative transfer modeling
4. The SENSE system
5. Solar radiation / energy related applications

General overview will be start with Presentations, the SENSE system infrastructure at NOA will be presented.

Logistics: Training and introduction on site NOA Athens
-Training on processing of magnetometer data, modelling, theory and lessons learnt, for mineral exploration research and applications. This training workshop will provide an overview of our activities, our operations plan and best practices, covering the entire value chain, from infrastructure to processing, to operational applications and sustainability plans.
1. Operations of the HellENIc GeoMagnetic Array (ENIGMA)
2. Magnetometer data processing approaches (processing, data analysis, storage, algorithms, etc.)
3. Introduction on mineral exploration research and applications
4. Sustainability of infrastructure and applications

General overview will be start with Presentations, partly based on hands. Attendees are expected to provide their own laptops
Logistics: Training and introduction on site NOA Athens

-Installation and customisation of the SENSE system for solar energy nowcasting and forecasting as well as provision of training for the system use including theoretical and practical aspects on solar radiation calculations.
1. Real time acquisition of EO data on atmospheric composition
2. Software workshop on the use of radiative transfer modeling
3. Sense system demonstration and installation at Cyprus premises
4. Sustainability of infrastructure and applications
5. Presentation of related applications

Presentations and practical activities
Logistics: Training and introduction at Cyprus

-Short term staff exchange on supporting ECoE in preparation of Sen2Agri system installation for the deployment of a large-scale crop type mapping of the region. This task includes training material, example testing of the tool.
1. Support in installing and setting up the Sen2Agri system
2. Hands-on training on how to use the Sen2Agri system

Logistics: -Installation on ECoE's server infrastructure, Training in ECoE's Limassol premises, hotel accommodation for 1 person

-Fire monitoring and management state-of-the-art, including satellite data processing, theory, algorithms, database post-processing, data fusion, hands-on co-development. Modelling risk and estimating hazard, exposure, susceptibility, vulnerability, techniques for damage assessment using optical, SAR and fused datasets and EO-based early warning systems for detection and alerting. Training, theory and applications for floods monitoring, including early warning and impact assessment.

-Training, theory and applications on Persistent Scatter Interferometry methods for geo-hazards monitoring, including earthquakes, landslides, volcanic activity, construction activity, etc. Hands-on sessions in:
1. Synthetic Aperture Radar basics
2. Fundamentals of differential interferometry
3. Persistent Scatterer Interferometry
4. Overview of applications

-Training on the processing chains for the exploitation of magnetometer data
1. Introduction to ground-based magnetometer data processing chains
2. Acquisition and Real-Time data
3. Data pre-processing, processing and analysis
4. Magnetometer data exploitation approaches
The workshop includes training material, and training data sets. Attendees are expected to provide their own laptops. Training and introduction on site NOA Athens

-Workshop on data assimilation and data fusion techniques, combining real-time EO data with in-situ information for disaster risk reduction applications.

-Exploitation of multiple sensor observations (space-based optical and radar, in-situ, meteo etc.) and the synergistic use and fusion of such datasets for the extraction of added value information in regard to agriculture monitoring and specifically for the purposes of food security, agriculture subsidy control and smart farming. Lectures and hands-on exercises
Logistics: Accommodation for 1 person, Training at ECoE's premises

-Set up and operation of the ECoE network of in-situ sensors for agriculture, establishment of the internet infrastructure to access the data from ECoE, with the assistance of NEUROPUBLIC LLC (the committed service provider for the network), and in-depth training of the ECoE to access and fully exploit the data of the stations. Set-up the network of in-situ sensors for agriculture. Train staff on how to access the sensor data, how to calibrate, how to use in multi-sensor data modeling for smart farming. Installation of the solar radiation network. Training workshop on daily maintenance, data storage and data post processing for solar radiation measurements. Installation of the Solar network. Instruments calibration. Software workshop. Quality control quality assurance and technical procedures
Logistics: Training and introduction at Cyprus

-Solar radiation measurements, data processing and assimilation into SENSE. Post processing algorithms. Assimilation of outputs into SENSE model
Logistics: Training and introduction at Athens

-Training on the set-up, customisation and operation of a magnetometer network in Cyprus.
1. Introduction to instrumentation (sensors, electronics)
2. Location of a ground-based magnetometer
3. Set-up, customization, operation and testing of a ground-based magnetometer
4. Deploying of a ground-based magnetometer network (data acquisition, telemetry)
5. Time resolution and formats (IAGA2000, IAGA2002)
6. Data management and dissemination
7. Set-up a web-based data server
8. Maintenance and upgrades of a ground-based magnetometer network
Logistics: Training and introduction on site NOA Athens

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