ICOS ERIC

Work Plan 2018

24 October 2017

ICOS/GA05/2a

Contents

1. Foreword by the Director General

For technical reasons, the work plans for 2018 ICOS ERIC and for the ICOS RI have been split since the statutes and financial rules foresee different procedures to adopt them. Nevertheless, this foreword is written for both work plans since content-wise they are closely connected.

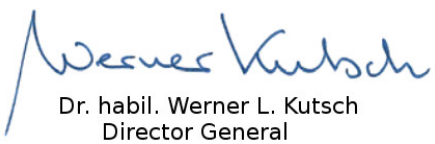
The year 2018 will be a remarkable one for ICOS: with the labelling of the first 8 ICOS stations the by the 5th General Assembly the Research Infrastructure will become fully operational and first data will flow under the ICOS license to our scientific and societal users. It has been a long journey and I want to thank everybody who has contributed in making it happen. All parts of the ICOS community have been constantly engaged in building this Research Infrastructure with highest motivation and good spirit.

Further stations will come quickly during the year 2018. The approval of the stations will be a permanent agenda point of the next General Assembly meetings. The labelling process is a crucial building block of ICOS since it confirms the compliance of each single station to the high standards that ICOS has developed. Those standards are unique and put ICOS in the position of a world-leading data provider for greenhouse gases. The engagement of the Central Facilities, the Carbon Portal and the Head Office in many international networks and activities confirms that ICOS has become a role model for many cooperating networks and research infrastructures.

Yet we do not want to rest on our success, but want to consolidate the achieved and to develop ICOS further. Consolidation means to compile a management plan that will integrate the constitutional documents and contracts, internal rules, and process descriptions that have been developed already into one consistent document. During the construction phase, ICOS has followed a strategy with elements of agile development to provide these documents step by step. Now it is time to integrate them and also fill the gaps that might appear during this integration.

Furthermore, we recognise the need to crystallise our vision on the next 10 years, to define better what ICOS wants to achieve and how, and what kind of organisation it will be in 10 years. The Paris Agreement requires broad knowledge on greenhouse gases on global, regional and even local scale. The challenge may be to develop ICOS further from a data to a service provider. In order to develop our vision on a well-informed base, we have started to analyse the user community and the impact of ICOS.

The ICOS Science Conference at Prague in September 2018 will be an outstanding opportunity to integrate the science around the ICOS data and the societal impact that can be achieved with the generated knowledge. It will also be one of the communication highlights for the next year. The ICOS photo campaign will be summarized in an exhibition shown for the first time during the conference. Many of the pictures we have seen so far (and also the movies introducing the stations) have shown the beauty and the vulnerability of our planet. Sometimes it is important to go back to this very basic motivation of our work: in addition to scientific curiosity, it's the preservation of our planet.



Dr. habil. Werner L. Kutsch
Director General

2. ICOS ERIC

1.1 ICOS Head Office (HO)

The ICOS ERIC Head Office supports the central aims of ICOS ERIC to coordinate, develop, monitor and integrate the activities of ICOS RI by facilitating the work of the Director General, the RI Committee, the General Assembly, Central Facilities and National Networks. The Head Office supports the coordination of the infrastructure at the European level and coordinates and facilitates the future network development and extension in cooperation with the ICOS Central Facilities and the MSAs.

Head Office tasks include

i. Support for the operations and development of the RI;
ii. Management of external cooperation;
iii. Management of ICOS ERIC participation in externally funded projects;
iv. Outreach and communication;
v. Strategic developments and
vi. Administrative and financial management of ICOS ERIC and ICOS RI.

2.1.1 Support for the operations and development of the RI Coordination

Head Office works together with the Central Facilities to coordinate the overall activities and develop the ICOS RI. In 2017 ICOS RI entered to full operational mode. This is reflected in the work plan 2018 where in some areas the focus will be shifted from construction to steady operations and development. The transition to the operational mode is reflected to the tasks of the Central Facilities. During 2018 the list of tasks, i.e. the Annex 2 in the Central Facility agreements will be revisited.

Head Office continues to support the Central Facilities in finalising the first wave of the labelling of the official ICOS stations, all together almost 130 stations, and signing the contracts with the labelled ICOS stations. The activities and deliverables of the Central facilities will be followed and progress or possible problems and bottlenecks are discussed in the annual meetings with the Central Facilities as well as WebEx meetings as required.

Supporting the ICOS National Networks

ICOS ERIC will support the National Networks during the final steps of the labelling process in close discussion with the national focal points. The protocols to standardize the ecosystem network which have been developed during the past years by the ICOS scientific community will be finalized and published during 2018. ICOS ERIC is supporting this effort through a short-term contract for an editor. Furthermore, ICOS ERIC steers and coordinates the scientific and technical development of the station networks. In 2018 this work is strongly supported by the H2020 project RINGO. Within the project framework ICOS data services will be expanded by making part of pre-ICOS data available after quality control, and the future data needs are addressed by technical developments with pioneering instrument installations.

RINGO - Readiness of ICOS for Necessities of integrated Global Observations

ICOS ERIC is coordinating an EU Horizon 2020 project RINGO which aims to further develop and foster sustainability of the ICOS RI and the ICOS ERIC. Readiness of ICOS RI is further developed via scientific, technical and managerial progress and by deepening the integration into global observation and data integration systems. The project includes developing of the KPIs for measuring the success of the ICOS RI.

ICOS Research Infrastructure Committee and Monitoring Station Assemblies

ICOS Research Infrastructure Committee (RI Committee) is formed by representatives from the Head Office, Carbon Portal, Central facilities and Monitoring Station Assemblies and convened by the Director General. RI Committee will have two three days face-to-face meetings to facilitate in-depth development of strategic issues, and development of ICOS RI operations. The day-to-day operational issues will be discussed in monthly tele-conferences. Remote meetings between the Head Office and Central Facilities will be arranged to solve any emerging problems and to improve overall communications.

Atmosphere, Ecosystem and Ocean Monitoring Station Assemblies (MSAs), formed by station PIs of the ICOS National Networks work closely together with the ICOS Central Facilities on station labelling, data processing, quality assurance and operation procedures. In 2018 each MSA will have 1-2 face-to-face meetings, as required. The meetings are supported by ICOS ERIC. MSAs are represented in the ICOS RI Committee by the Chair and Vice-Chair to relay and communicate the views and recommendations to be discussed. ICOS ERIC supports the travel of the MSA Chairs and Vice-Chairs to the RI Committee meetings. The MSA meetings are important occasions to share information and the HO participates in all meetings.

In 2017 one of the focus areas of the ICOS Head Office was the community building within ICOS RI, of which one example was the joint meeting between National Focal Points and the RI Com in December 2017. ICOS RI has started now its full operational mode changing slowly the tasks from construction to operations and development within the RI. Thus, it is important to maintain the so far strong engagement of the National Networks and scientific community in ICOS activities, and this continues to be one of the focus areas in 2018. Two dedicated focal point meetings will be arranged, one in connection with the ICOS Science Conference.

2.1.2 Management of external cooperation

ICOS is a part of a complex research infrastructure landscape in Europe and globally. In 2017 the General Assembly approved the internal rules on cooperation. In 2018 these guidelines will be taken into action and a set of framework agreements will be negotiated.

Collaboration with other European Environmental Research Infrastructures (ESFRI)

In several analyses about the European Infrastructure Landscape conducted in the framework of the ESFRI Roadmap 2016 and the ENVRIplus project have shown that the niches of the single RIs have not always been described very exactly resulting in risky overlaps between RIs on one hand as well as potentials arising e.g. from co-location on the other. During the year 2018 bi- and multilateral communication with other RIs (namely ACTRIS, IAGOS; EMSO, EUROARGO, AnaEE, Lifewatch; DANUBIUS and eLTER RI) will develop a clearer picture of

the landscape, the core competences of each RI and possible cross-RI services. In ENVRIplus a format for this has been developed. The communication will be coordinated by the DG with involvement of the CFs and Focal Points. Parts of the RINGO project support the activities.

ENVRIplus

ICOS ERIC is the new coordinating institution in the ENVRIplus H2020 project. The project is the current manifestation of the ENVRI community of environmental Research Infrastructure cluster in Europe, and is coordinating the joint development and cross pollination of technical, cultural and policy development in Europe. ICOS ERIC is positioned in a foremost role as the coordinator, particularly visible in the dissemination, common coordination (inc. Board of environmental Research Infrastructures (BEERi)) and landscape mapping operations. In addition, ICOS is a strong partner in the technical developments associated with remote field stations, and especially in the data oriented activities ICOS Carbon Portal plays a significant role.

International collaboration for global GHG Observations (UNFCCC, WMO, GEO)

ICOS is increasingly recognized as European *in-situ* pillar for a global greenhouse gas observation system. This will consist of a whole value chain from observations to services that support decision making in the Paris Agreement framework. Thus, ICOS participates actively in global initiatives such as the development of the Integrated Global Greenhouse Gases Information System (IG^3IS) of the WMO and the GEO Carbon and Greenhouse Gases Initiative (GEO-C). Furthermore, ICOS is recognized by the Subsidiary Body for Scientific and Technical Advice (SBSTA) of the UNFCCC. ICOS is participating organization in GEO and has applied for an observer status at UNFCCC in autumn 2017.

ICOS ERIC has taken the lead of the project GEO Carbon and Greenhouse Gas initiative, which was accepted in the three years' work plan of GEO 2016. In 2018, the operations will be ramped up by establishing committed networks of scientists for different parts of the project and achieving external funding. ICOS ERIC will host the GEO-C secretariat and contributing to the senior-level steering and advisory group. Besides coordinating the smooth cooperation between different bodies of the Initiative, some resource-allocation is envisaged to promoting visibility and to collaboration by organising side-events and meetings. These actions are aligned

GEO-C – GEO Carbon and Greenhouse Gas Initiative

ICOS ERIC is coordinating the GEO-C Initiative within the framework of GEO. It is a joint effort of the participating organisations to reach a coordinated system of domain overarching observations of carbon and greenhouse gases. The objective is to monitor and evaluate changes in the carbon and other cycles, and GHG emissions as they relate to human activities and global change, and to provide decision makers with timely and reliable policy-relevant information. Aim is to establish a common platform to plan joint strategies and implement joint activities.

with RINGO WP 5. ICOS ERIC will be actively participating in a proposal answering the EuroGEOSS call within the H2020 program (deadline March 2018).

IG^{3}IS -Integrated Global Greenhouse Gas Information System

WMO GAW IG^{3}IS is envisioned as an observationally based information system for determining trends and distributions of GHGs in the atmosphere and the ways in which they are consistent or not with efforts to reduce greenhouse gas emissions. This is being done already on a global scale through existing networks, but currently provides only a modicum of useful information at the spatial scale of nations and regions managing emissions and offsets. The IG^{3}IS effort is aimed at improving the granularity of observations and analyses, in order to support the planning and management of Intended Nationally Determined Contribution (INDC) mitigation efforts by nations. IG^{3}IS is not designed to check compliance with regulations, but rather to provide information on policy- and management-relevant scales and ensure that the information provided is consistent with a global network of high quality observations and models. IG^{3}IS focuses on four objectives: i) support of national GHG emission inventories; ii) Detection and quantification of fugitive methane emissions; iii) Estimation and attribution of megacities emissions and iv) Providing carbon situational awareness.

International collaboration in domain-wise global networks (FLUXNET, SOCAt, GAW)

ICOS has already achieved a deep connection to domain-wise global data integration efforts. The ecosystem flux data are well connected to FLUXNET, ocean data in SOCAt and GLODAP and atmospheric data in the GAW program by WMO. ICOS Central Facilities have been asked to play an even more prominent role in those global networks that have very often started as voluntary efforts by a small group of scientists and should now be further developed in cooperation with other regional infrastructures. The negotiations on this cooperation will be started by the end of 2017 and conducted throughout the year 2018. Director General and Head Office have a leading and coordinating role here and will include the Central Facilities whenever necessary.

All international cooperation efforts will be done in close harmonisation with the development of an integrated ICOS strategy (see 1.1.4), and will supported by the results from the RISCAPE project.

RISCAPE – European Research Infrastructures in the International Landscape

The EU Horizon 2020 project RISCAPE is a landscape analysis of the most prominent research infrastructures in the world. It covers a wide range of disciplines, from biomedical sciences to social sciences, to astronomy, as well as e-infrastructures. ICOS ERIC is leading the investigation on environmental infrastructures. The work in RISCAPE will provide ICOS with an informed view on the major research infrastructures worldwide, allowing for a better understanding of their assets and possible complementarities. This will be beneficial to ICOS' development and international cooperation activities by highlighting the most relevant infrastructures to cooperate with.

2.1.3 Management of ICOS ERIC participation in externally funded projects

Participation in external projects is considered as an important resource for developing ICOS to be a cutting-edge infrastructure. ICOS ERIC follows the ICOS internal guidelines for the participation of ICOS RI and ICOS ERIC in externally funded projects, and considers carefully its role and contribution case by case promoting the participation of the whole ICOS community.

The project participation of ICOS ERIC is always built to support the key objectives and activities of ICOS ERIC, defined in the statutes. The project portfolio lists all the ongoing projects where ICOS is a coordinator or a partner (Table 1).

Table 1. Project Portfolio overview of the ICOS ERIC H2020 projects.

Cost Center	Project Acronym	Financing Rules	EC project code	Total EC Grant (Project)	Max Grant Amount ICOS ERIC
103	ENVRI Plus	H2020 /RIA		14 683 534 €	1 240 882 €
104	RINGO	H2020/ CSA	730944	5 000 000 €	642 324 €
105	RISCAPE	H2020 /CSA	730974	1 999 867 €	199 983 €
106	SEACRIFOG	H2020 /CSA	730995	1 999 89 €	366 015 €
108	EOSC	H2020/RIA	739563	9 953 067 €	97 375 €
109	DANUBIUS PP	H2020/CSA	739562	3 997 592 €	43 725 €
t.b.d.	VERIFY	H2020/RIA	776810	9 998 963 €	175 000 €

Coordination of RINGO and ENVRIplus

Two H2020 projects are coordinated at the ICOS ERIC, thus especially important projects bringing special requirements for Head Office organization and project management. RINGO is managed at the Operational unit, by the Scientific Integration and Liaison Officer and a Junior Officer. ENVRIplus coordination was transferred from the University of Helsinki to ICOS ERIC in 2016, and the project director and project manager were transferred into ICOS Head Office in the end of 2016 until the end of the project in 2019.

Financial management of H2020 projects

Administrative Unit is tasked with the Financial Management of the projects where ICOS ERIC is Coordinator, Beneficiary or Linked 3rd Party (Table 1). Those tasks include managing project payments and cost claims, allocating costs to project cost centers, monitoring accumulation and eligibility project costs, ensuring internal managerial accounting principles are in place, documented and followed as per Grant Agreements. In addition to the direct tasks to Unit, the

accounting company providing overall financial services to HO does additional project accounting work and auditors will perform ICOS ERIC H2020 audits. Processes and rules for the Financial, Human Resources (time-tracking) and Administrative Compliance of the ICOS ERIC will be built and implemented. The requirements of Horizon2020 funding granted to ICOS ERIC as legal entity force the financial and administrative management processes to be compliant. In 2018 the projects will come to their first Reporting Periods (which forms a significant body of work for financial unit in the form of preparing and compiling financial reports as per Commission requirements. Most significant task will be the RINGO project, that ICOS ERIC coordinates. Additionally, capacity for the financial management of H2020 projects needs to be built to ensure the continuity and transfer of knowledge evenly across the organization. Process Competence at all levels needs to be implemented parallel to the actual reporting work. Overall review of existing Head Offices time-tracking, travel management and financial reporting IT-tools has to be conducted with the support of the Azets Oy (Accounting Company) to evaluate whether they meet the EC reporting requirements or is automation level to be increased. A change or upgrade to Financial and HR IT-tools may be required in order to report and track project funding, produce required and compliant audit trails. Currently there are no additional financial audits for H2020 projects foreseen for 2018.

2.1.4 Communications & Outreach

The overall communications strategy concerning the role of the Communications Unit in ICOS is still under development. It seems, though, that this role will be to provide guidance and support for all ICOS activities (core and projects) and all parts of the ICOS RI (ERIC, Central Facilities, National Networks). The Unit will produce common tools and solutions, and foster cooperation, harmonization and the exchange of best practices.

The impact analysis due in Q1 will provide key performance indicators and an analysis of ICOS' users. Its publication will also be the occasion of a specific, coordinated, and differentiated action towards all target groups.

Providing up-to-date information to relevant target groups

To the general public

A clear and timely information is the key to raise the interest of the general public for ICOS' activities. The website is the main channel of dissemination, with the support of social media. It will be updated and reinvigorated. The experience launched in 2017 with Instagram and the #ICOScapes campaign is promising and will be developed. Monitoring and analysis of ICOS' visibility will be reinforced in order to get better insight on the areas that need improvement.

Though digital communication is the preferred media, paper documents (brochures, leaflets…) are not useless. The science brochure issued in 2017 is a good example, and the need for other paper communication materials will be examined. Regular update and analytics of digital communication channels is performed.

To the ICOS community

Being a distributed RI is a challenge in terms of internal communications. The network of Communications focus points in all parts of the RI will be mobilized on a regular basis, especially for the organization of events that involve ICOS as a whole (presence in international exhibitions, production of communication material…). The exchange of good practices and the design of common tools will also be one of the major role of the ICOS network.

At the same time, an active participation in the newly formed ERIC Forum will ensure ICOS actions are nurtured by the best practices exchanged with similar organizations. The Head of Communications' membership in a European or international association is advisable. The aim is to create common tools and products and benchmark good practices outside ICOS.

To ICOS' stakeholders

ICOS' existence and activities rely on a number of decision-makers, funders and supporters, not all of them being represented in the General Assembly. A special effort will be made to produce information that is relevant for them.

Increasing visibility and impact of ICOS activities

Participation in scientific conferences

ICOS is a research organization and its close link to the international scientific community is crucial. The aim is to ensure that scientists will use ICOS data and products in their research, and/or contribute with their own research to the production of these data and products.

ICOS' achievements, services and perspectives will be presented at the main European and international conferences like AGU, EGU… A strategic reflection on the choice of which event to invest in and the necessity of diversifying ICOS' presence (to conferences in Africa, Asia, Russia, South-America…) will be undertaken. As far as possible, the organization of side-events should be favoured as they can bring more visibility (place in the official program) and often prove to be less expensive (decent catering vs. costly stand). ICOS as an organisation will participate one to two major scientific events.

Participation in international events

ICOS has the ambition to play a leading role on the global scene of climate change actors. It is therefore essential that its visibility in e.g. COPs is adequate. The role of the Communications Unit, apart from the practicalities of ICOS' presence, is to ensure that this presence and the content of ICOS' message is disseminated to targeted stakeholders. The likely acceptation of ICOS as Participating Organization into the UNFCCC will be widely communicated, according to a specific communication plan. The role of GEO – and of ICOS in GEO – will probably increase in the future and it will be necessary to ensure ICOS' visibility there too.

Organization of ICOS events

Apart from its participation in events organized by others, ICOS will develop its own "Focus events" to reach out to new target groups, in Finland or elsewhere: media, youth, city representatives… A reflection on the most relevant target groups and modalities will be carried out, together with the Communications strategy under preparation. The general public will be targeted through events like the #ICOScapes exhibition.

The 2018 Science Conference

The biannual Science Conference will be held in Prague in September 2018. This major event will be the opportunity not only to reach the scientific community, but also to show the diversity of ICOS' activities. A message on ICOS' strategic goals will be delivered on the occasion.

2.1.5 Strategic developments

Developing the long-term strategy for ICOS RI

ICOS will accomplish its implementation during the next two years and become fully operational by the end of the first 5 years funding period. Further improvement of the already achieved importance of ICOS within the global landscape as described in Chapter 1.1.3 will require a clear and commonly agreed strategy for the mid- to long-term development of ICOS. This will be based on several studies already started in 2017 related to the ICOS identity, visibility and impact. In the beginning 2018 these studies will be completed and integrated into a strategic plan.

An impact analysis (IA) of ICOS RI has been started in 2017 within the framework of the RINGO project. This work will be concluded in early 2018, and the results will be taken into practice during 2018. The IA will develop a framework for key performance indicators and apply them as a baseline study about today's status of ICOS at the dawning of the operational phase. A part of the impact analysis will be a thorough investigation into the different types of users of ICOS data (and other related data products). The aim of this investigation is to produce an ICOS user strategy document that recognizes the different user groups, types of data that is used and how the data is accessible. The work will be closely connected to the timelines of the impact analysis. The main work is outsourced to a consultancy company, complemented with a significant contribution from the Head Office.

An ICOS Identity Study will give us important information on the perceived idea of ICOS among the main groups that are involved in ICOS activities on varied levels (ICOS Central Facilities (including CALs), Monitoring Station Assemblages and National Networks). The purpose of this study is to clarify the needs and expectations that the different groups have from ICOS as an infrastructure: scientific (personal and domain-wise), managerial and on a societal discourse level. It focuses on the development of the idea of ICOS in time: past, present and future. The study will be based on qualitative methodology and it executes theories for example related to the Sense of Place, place-making (place dependence, place attachment and place identity), attitude and identity. The timelines will follow those of the impact analysis, with the aim of having first results in late spring 2018. The study will be performed with in-house expertise.

In addition, further results of the H2020 projects ICOS ERIC is participating (RINGO, VERIFY, RISCAPE, SEACRIFOG, ENVRIplus) will sharpen the future strategy of ICOS.

VERIFY - Observation-based system for monitoring and verification of greenhouse gases

VERIFY aims to deliver a portfolio of synthesis products on GHG fluxes (measurements, models, integration methods, and uncertainties) to the Global Carbon Project, IPCC (including the Task Force on Inventories), UNFCCC negotiators and inventory compilers, and the Future Earth Programme. ICOS is participating with the option to carry the underlying database and data-management to future operations.

SEACRIFOG – Supporting EU-African Cooperation on Research Infrastructures for Food Security and Greenhouse Gas Observations

ICOS ERIC is a major partner of the EU Horizon 2020 SEACRIFOG project. SEACRIFOG focuses on the design of an adaptive concept for a pan-African observational system on radiative forcing (GHG and aerosols), with a special emphasis on land-use, land-use change and climate-smart agriculture. It also incorporates prospective emission trajectories (transport, energy, industry…). SEACRIFOG brings together data providers (research organizations, infrastructures, statistical offices, private sector…), users of this data (scientific organizations, climate modelers, CORDEX-type downscaling communities, bodies in charge of GHG inventory reporting, NGOs…), and possible funders of the proposed options. Through the project, ICOS will widen its network of partner infrastructures on the African continent.

Engaging new countries and development of Pan-European network

As a cutting-edge research infrastructure ICOS needs to keep up with the technical and scientific developments, and develop the ICOS Station Networks both scientifically and geographically. Expanding to new countries and filling the observational gaps in existing Member countries is one of the focus areas in this field. ICOS advocates the benefits of being part of ICOS in different forums. Especially, HO offers support to the countries and intergovernmental organisations interested in ICOS and taking concrete steps to become a Member or Observer. The H2020 RINGO project facilitates these activities.

Work toward increasing the European coverage of ICOS will be continued also by supporting the development of the technical and administrative capabilities of candidate ICOS countries. Involvement of relevant non-ICOS country scientists is deepened by joint meetings and workshops, as per RINGO WP 2. Also, support is planned for participants from these countries to 3rd ICOS Science Conference 2018.

2.1.6 Administrative and financial management of ICOS ERIC and ICOS RI

Back Office processes

The following administrative areas supervised at the Head Office:

Continuous task of acting as General Secretariat for the General Assembly, Chair and Vice-Chair, support to financial committee and Financial Committee Chair, Support to Ethical Advisory Board (EAB) and support to Member and Observer delegates.

Leading Human Resource Management of the Head Office and the Carbon Portal director including Employment legal compliance.

Implementing Financial Management of the ICOS ERIC Head Office including the processes of Accounts Payables, Accounts Receivables and Invoice workflows.

Planning and coordinating Financial Management of the ICOS RI as specified in the Internal Financial Rules (Budgeting, Reporting, 5-year planning).

Supporting to procurement process is also part of the tasks as well as management and supervision of service providers and office infrastructure including IT.

Other main administrative activities for 2018

Specific administrative tasks for 2018 will be submitting the new FIRI application to the Academy of Finland for the host premium contribution of Finland towards the ICOS ERIC, and development of the next 5 -year financial plan for ICOS RI, which is closely linked with the ICOS RI strategy and goals for the next funding period. Further, the common document management system will be improved.

1.2. ICOS Carbon Portal (CP)

ICOS Carbon Portal offers access to research data, as well as easily accessible and understandable science and education products. All measurement data available in the Carbon Portal is quality controlled through the ICOS Thematic Centers, divided into Ecosystem, Atmospheric and Ocean Thematic Centers and a Central Analytical laboratory. Dedicated researchers all over the world will contribute to the elaborated products catalogue.

Carbon Portal tasks include:

i. Data service development
ii. ICOS ERIC IT infrastructure support
iii. Data management and elaborated products
iv. Training and user support
v. General Management

1.2.1 Data service development

The most essential services for data ingestion and providing data to the users have been established in the course of 2017. These services have been designed to fully support the ICOS requirements of the CC4BY open data license, usage tracking and attribution. The basic functionalities of the portal will be extended in 2018 with more customized functions based on user demands. We expect that first official ICOS Data starts end of 2017 so reporting statistics of up- and downloads will be continuously reported by interactive webpages. This will be on the basis of per contributor, domain and station. Further emphasis of developments will be on the tightly linked elaborated products and virtual research environments (task 3).

Until now the CP Services have been designed for, but did not actually rely yet on the EUDAT (CDI) services because of lack of certain functionalities in the CDI software stack that ICOS would rely upon. In the meantime, all services have been developed as in-house development using direct PID’s and DOIs minting using the Handle and the IDF minting system and direct iRODS storage at the PDC datacenter (Stockholm Technical University), combined with storage at the fsicos server’s RAID system (with a duplicate backup system). As soon as the CDI software stack fulfils the requirements and stability needs of ICOS we will implement the use of these services for the basic functionalities. At this moment we expect this to occur mid-2018.

Next to the first priority of supporting the central facilities, we will have a special emphasis on development of products for the elaborated products of user communities like those of the RINGO, EUROCOM, VERIFY and TRANSCOM projects.

EUDAT2020

EUDAT2020's vision is to enable European researchers and practitioners from any research discipline to preserve, find, access, and process data in a trusted environment, as part of a Collaborative Data Infrastructure (CDI) conceived as a network of collaborating, cooperating centres, combining the richness of numerous community-specific data repositories with the permanence and persistence of some of Europe's largest scientific data centres. One of the main ambitions of EUDAT2020 is to bridge the gap between research infrastructures and e-Infrastructures through an active engagement strategy, using the communities that are in the consortium as EUDAT beacons and integrating others through innovative partnerships.

During its three-year funded life, EUDAT2020 will evolve the CDI into a healthy and vibrant data-infrastructure for Europe, and position EUDAT as a sustainable infrastructure within which the future, changing requirements of a wide range of research communities are addressed. EUDAT2020 ends in March 2018.

1.2.2 ICOS ERIC IT infrastructure support

The Carbon Portal hosts the ICOS main website and the data portal services. CP also hosts the OTC and several ICOS national websites. We are ready to host other ICOS related web sites as well. At the same time CP continues to run and manage the ICOS Document Management System (DMS). CP also will continue to manage the icos-ri email, email lists and discussion fora.

In 2018 we will update the Alfresco Document Management System to the most recent stable community version. This update is long overdue, but because of the many customizations and the time it will take to apply and test these on new versions, we try to limit updates to less than yearly. Interruption of the ICOS work-flows by problems in Alfresco should be avoided at all cost.

The current fsicos server that hosts ICOS websites and all the CP services will have been in use in 2018 for over 3 years and will be replaced in 2018 with an up-to-date system. This is necessary to ensure reliability and continuity of the services and prevent increasing cost of ownership for maintenance due to increasing risk of faulty hardware.

1.2.3 Data management and elaborated products

All data transferred between sites and Thematic Centers and between Thematic Centers and Carbon Portal should be registered and assigned Persistent Data Identifiers generated through or by the Carbon Portal.

The service to provide this has been setup in 2016 and has been completed in 2017. However, we expect that ICOS will evolve strongly with all stations becoming operational in 2018 and the stream of data, NRT and final products, will increase considerably. Also, we expect a lot of new data products to be developed, both by TC's and external users in the form of elaborated products, that all need to be supported by CP.

Operational products

The definition of the metadata is also expected to keep on being developed, where of course the relevant standards like INSPIRE and ISO19115 will be followed. For this a continued close cooperation with the Thematic Centers is needed. The practical definition of metadata profiles will be developed in connection with the continued and actual upload of the data and development of the data stream.

CP will co-organize another workshop on elaborated products with the modelling community in the 1st half of 2018 in the framework of the EUROCOM project.

To support the interpretation of and planning of event sampling for atmospheric observations and the interpretation of ecosystem observations we will setup a service providing near real-time available meteorological information from ECMWF, coupled to a dispersion and footprint model for the ICOS stations. The atmospheric footprint model will give information on the expected signal from fossil and biogenic sources and sinks separate and as total, and the percentages of land-use classes under the footprint. This complements the ATC product where observations can be compared with Copernicus forward modelled concentrations.

The (simple) ecosystem footprint model will be developed together with ETC based on the Klun footprint service (http://footprint.kljun.net/), tailored to the stations and spatial information on their study area. Daily flux data from a site can be compared with an historic set of simple DGVM results, e.g. from LPJ-guess similar like in the atmosphere Stilt footprint tool (https://data.icos-cp.eu/stilt/).

1.2.4 Training and user support

CP will contribute to the ICOS Summer School that will be organized in 2018 by Czechglobe/LSCE with a part on data identification and analysis. In Q1 an Alfresco user training will be offered to new users. The Carbon Portal user interface will be presented at numerous occasions, like conferences and workshops to different user groups.

Next to the regular feedback form on the website we plan to have two online consultations each with the modeler user group (EUROCOM) and the CP User Consultation Group on feedback on CP products and interfaces.

Based on user feedback we will implement a series of FAQ pages regarding the functionalities of the CP portal pages.

1.2.5 Management

This task is performed with the largest share from the position of the CP director and 20% of fte by his substitute. Starting September 2017 also support for this task is provided by the project assistant (0.3 fte).

Related to staff recruitment, the CP currently has a workforce of 10 full-time equivalents divided over 16 persons (1 fte in the form of one person in the Netherlands). No further expansion of the workforce at CP is foreseen for 2018, unless the Swedish S-NICE proposal is granted. In that case an additional programmer will be added to the team.

Management activities concern the regular meetings with ICOS Head Office (weekly telco's, Head of Unit telco's, two-monthly face to face meetings), ICOS RICom telco's and face-to-face meetings, WMO SAG GHG and IG3IS related meetings and representation of ICOS at

(inter)national conferences and symposia. Also, the in-kind contributions to EEA-Copernicus in-situ by CPD fall into this category.

Once or twice per year CPD will visit each central facility, usually in combination with the Head of operations from ICOS Head Office.

Project support will support CPD and carry out tasks related to project management like budget and resource planning, progress tracking, financial and progress reporting for EU, national projects and the CP core work.

1.2.6 Other activities 2018

Carbon Portal staff members are actively engaged in several groups of the Research Data Alliance, including the Research Data Collection working group (WG), the PID Kernel Information WG, Data Versioning WG, Metadata interest group (IG), and the Data Fabric IG. We are also involved in the GEDE Expert group, organized by RDA Europe.

1.2.7 Information on projects and international cooperation

EU projects include (see text boxes in ICOS ERIC HO section):

- EUDAT2020 – Community uptake for ICOS, integration of EUDAT services in ICOS, development of CDI, supported by H2020, ends March 2018.
- ENVRIplus – WP leader WP6, task leader WP5, WP9.2, activities in several WPs; RINGO – WP leader WP4, activities in several WPs, supported by H2020.
- SEACRIFOG - WP leader WPx, activities in several WPs; supported by H2020.
- EOSC Hub: Community Competence Center for station metadata as joint effort from eLTER and ICOS
- VERIFY - project on atmospheric verification of GHG fluxes, supported by H2020.
- CHE – H2020 project on emission verification, participation through Lund University, member of expert committee
- FOUNDATIONS – advice for Copernicus CAMS; in-kind support from core funding and supported by EEA/EC for LU activities.

Other projects/cooperation and activities, with in kind support from core funding:

- SITES – Swedish infrastructure for ecosystem observation sites, advice, funded by SLU/VR.
- GEO Carbon and GHG Initiative;
- eSSENCE, e@LU – steering committee, Lund University national Swedish eScience projects;

WMO GAW – In-kind support from core funding.

- Chair of Scientific Advisory Group on GHGs.
- Ex-officio member of Scientific Advisory Group on applications.
  IG3IS – Member of Implementation and Executive Committee

EOSC Hub

EOSC-hub is a H2020 EINFRA12 (A) project from a consortium of 74 partners under the coordination of EGI, EUDAT and INDIGO-DataCloud. The action was positively reviewed by the European Commission in July and the project is planned to start in early 2018.

The EOSC-hub mission is to contribute to the EOSC implementation by enabling seamless and open access to a system of research data and services provided across nations and multiple disciplines. The Hub builds on mature processes, policies and tools from the leading European federated e-Infrastructures to cover the whole life-cycle of services, from planning to delivery. The Hub aggregates services from local, regional and national e-Infrastructures in Europe and worldwide.

The Hub will act as a contact point for researchers and innovators to discover, access, use and reuse a broad spectrum of resources for advanced data-driven research. The services will include services in four broad areas: Common, Thematic, Collaborative and Federation.

In this project ICOS will together with eLTER set up a competence center on the management of station information.

CHE

This H2020 Coordination and Support Action project will explore the development of a European system to monitor human activity related carbon dioxide (CO_2) emissions across the world. Such capacity is vital to support Europe's leading role in worldwide action to address climate change. Starting on 1 October 2017, the CO_2 Human Emissions (CHE) project brings together a consortium of 22 European partners and will last for over 3 years. HO and CP are involved through Lund University and as member of the SAB and Expert boards.

The central questions that CHE will address are:

- What does it take to have a combined bottom-up and top-down estimation system capable of distinguishing the anthropogenic part of the CO2 budget from the natural fluxes?
- How can we make the first steps towards such a system that can use the high spatial and temporal resolution of satellite observations to monitor anthropogenic emissions at the required timescales?
- Finally, what does it take to transform a research system into a fully operational monitoring capacity?

1.3. ICOS ERIC Deliverables and Milestones 2018

D = Deliverable	Mi = Milestone

Deliverables and Milestones 2018	Q1 Jan- Mar	Q2 Apr- Jun	Q3 Jul - Sep	Q4 Oct- Dec
HO	D1 D2 D3 D4	D5 D6 D7 D8 D9 Mi1 Mi2 Mi4	D10 D11 D12 D13 Mi4 Mi5 Mi6 Mi7 Mi8	Mi9 Mi10 Mi11 Mi12
CP	D1 D2 D3 D5 Mi2	D1 D2 D4 Mi	D1 D2 D3 Mi1 Mi3 Mi4	D1 D2 D4

List of ICOS ERIC Deliverables and Milestones 2018

Head Office

Deliverables

D1: ICOS Communications strategy (Q1)

D2: Communications plan for impact analysis (Q1)

D3: Communications plan for ICOS/UNFCCC (Q1)

D4: EOSC Project Reporting (Q1)

D5: FIRI-application to the Academy of Finland (Q2)

D6: Communications plan for Science Conference (Q2)

D7: Edition of a leaflet for stakeholders from the Annual report (Q2)

D8: Annex 2 of ICOS ERIC and Central Facilities agreements updated (Q2)

D9: ICOS RI Impact analysis report (Q2)

D10: ICOS RI User strategy document (Q3)

D11: ICOS Identity study report (Q3)

D12: Production of #ICOScapes exhibition (Q3)

D13: RINGO, SEACRIFOG, RISCAPE Project Reporting in July- August (Q3)

Milestones:

Mi1: FIRI application done (Q2)

Mi2: Organization of first Focus event (Q2)

Mi3: Ecosystem protocols published (Q3)

Mi4: RI Committee meeting (Q1 and Q3)

Mi5: Focal Point meeting (Q3)

Mi6: Project Cost Claims done (Q3)

Mi7: Science Conference and launching of #ICOScapes exhibition (Q3)

Mi8: Meeting of the Communications network during the Science Conference (Q3)

Mi9: Results of impact and identity studies into implementation plan and communicated within ICOS (Q4)

Mi10: Participation in COP 24 as an admitted IGO/NGO (Q4)

Mi11: Participation in GEO Plenary (Q4)

Mi12: Publication and Promotion of ICOS' general strategy (Q4)

Carbon Portal

Deliverables:

D1: Data submission statistics report (continuous)

D2: Data download statistics report (continuous)

D3: Update of DMS (Q1)

D4: Lund fileserver update (Q2)

D5: Operational atmosphere footprint prediction VRE (Q3)

D6: Operational ecosystem footprint and flux comparison VRE (Q4)

D7: User-friendly submission web interface for publishing elaborated products under ICOS license (Q2)

Milestones:

Mi1: ICOS CP services integrated in CDI (Q3)

Mi2: Alfresco training session (Q1)

Mi3: Summer School (Q3)

Mi4: Ocean standard calibration method set up.