



European  
Commission



# Global change

Towards global  
research infrastructures

EU support for research infrastructures  
in environmental and earth sciences

*Research and  
Innovation*



## EUROPEAN COMMISSION

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**Global change: towards global  
research infrastructures**  
*EU support for research infrastructures  
in environmental and Earth sciences*

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# Global change: towards global research infrastructures

## Research infrastructures for environmental and Earth sciences addressing global change

It is widely recognised that environmental issues have been at the top of the agenda for several years already and climate change and global change still remain the most difficult societal challenges to confront. These topics have also wider implications related to food and fresh water supply and energy supply, i.e. access to essential resources and today's discussions also includes various mitigation strategies. The environmental societal challenges do not respect any borders and these issues naturally have to be solved from a sustainable global perspective.

Research Infrastructures in the environmental sciences, from the area of Understanding the Earth System to Sustainable Management of Natural Resources and Environmental Friendly Technologies are all necessary instruments and tools for scientists in their quest for understanding the underlying principles of the global change and its effects. Global, regional and national research infrastructures will all contribute to the global network of research infrastructures, needed for environmental research.

However, the societal needs do not only require answers to the why, but also needs answers to how to solve these problems, to ensure secure supply of essential scarce natural resources, and to minimise the effect of our enormous waste mountains, etc. Again relevant Research Infrastructures can offer the scientist excellent tools for research. The innovation potential is huge and needs to be supported and nourished.

## From local and national to European and global dimensions

Developing an EU policy for research infrastructures has been a constant subject of high level discussions at the national and European level and this stays a priority. The increasing pressure on budgets, in particular in times of economic crisis, and facilities ever more expensive, a fragmentation and duplication of efforts on research infrastructures is uneconomical, leaves research gaps and significantly reduces the excellence and the impact of European research.

At European level, the European Strategy Forum on Research Infrastructures, ESFRI, has been instrumental: it was set-up in 2002, with the mandate to support policy-making on research infrastructures, both existing and new, in Europe. ESFRI brings together representatives of EU Member States and Associated Countries and of the European Commission.

To date, the European roadmap for research infrastructures is the most significant ESFRI achievement. This roadmap highlights the key new research infrastructures needed for European research and innovation over the next few decades. The first ESFRI roadmap, published in 2006, included 34 projects. It was updated in 2008 and 2010 with currently 48 research infrastructures. Their total construction costs amount to about 20 billion euros and their estimated operation costs to about 2 billion euros per year. In addition, the ESFRI

roadmap was a direct incentive to the development of national roadmaps: by now 28 European countries are concerned. The whole process is helping to prioritise the existing and new Research Infrastructures and to pool resources at European level.

Member States will remain central in the development and financing of most infrastructures. However a strong cooperation amongst them, with the leveraging support of the EU, is needed to develop synergies and a common vision: this is a key element of the European Research Area vision and it has received major consideration within the successive EU R&D framework programmes and in the new Horizon 2020 proposal as well.

Some research infrastructures are so large, complex and expensive, or so global in scope, that they require cooperation on a worldwide scale for their planning, design, construction and operation in order to share knowledge, costs, and avoid unnecessary duplication. This is of crucial importance for research infrastructures for environmental and Earth sciences that are essential to address global change.

This is, for example, the case for observing and exploratory platforms in the Arctic or in the Antarctic (research icebreakers, drilling platforms, observing ground stations). An example of large scientific international cooperation involving major infrastructures is the International Ocean Discovery Program, IODP.

This is also the case for globally distributed observing systems which also require significant efforts towards interoperability or harmonisation, and on data management. The current initiative aiming at the Global Earth Observation System of System, GEOSS, is a major driver for international cooperation in particular as regards data policy and for compatibility of systems willing to contribute.

## Research infrastructures and international cooperation

For some global research infrastructures, dedicated fora therefore exist. However, no overall framework exists which looks at priority setting, identification of possible new areas of cooperation, mutual use of global or large scale research infrastructures, or strategies towards 'globalisation' of national and regional infrastructures.

The first meeting of S&T Ministers of the G8, held in 2008 in Japan, acknowledged the necessity of promoting international cooperation in large-scale research facilities and agreed to set up an ad hoc Group of Senior Officials to continue the dialogue for international cooperation on large scale research facilities. This group, which was launched in 2011, will propose by the end of 2012 a draft framework for international cooperation in the field of global Research Infrastructures. It will cover issues such as: decision making processes, funding, management, access etc. The European Commission, in coordination with the other European members, actively contribute to the work of the Group of Senior Officials.

In addition, in 2010, the European Commission set up a "European Expert Group on Cost Control and Management Issues of Global Research Infrastructures" which has published a report with its findings and provides twelve key recommendations<sup>1</sup>.

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<sup>1</sup> [http://ec.europa.eu/research/infrastructures\\_publications](http://ec.europa.eu/research/infrastructures_publications)

International cooperation in the area of Research Infrastructures will be promoted under the proposed next framework programme for research and innovation, Horizon 2020 (see below).

The organisation of an International Conference on Research Infrastructures, ICRI 2012, in Copenhagen, in March 2012, will help define needs, strategies and recommendations for effective international cooperation for research infrastructures.

## EU support to relevant research infrastructures

### Innovation Union and the Horizon 2020 proposed framework

Europe 2020 is the European strategy for smart, sustainable and inclusive growth. Among its several flagship initiatives, the Innovation Union Initiative sets out a strategic approach to innovation, driven by the highest political level. Innovation Union will focus Europe's efforts, and cooperation with third countries, on challenges like climate change, energy and food security, health and an ageing population. It will use public sector intervention to stimulate the private sector and to remove bottlenecks which stop ideas reaching the market. It will be supported, at European level, by the main funding instrument: Horizon 2020.

Playing a vital role in the Innovation Union Initiative, research infrastructures are addressed by three commitments:

- By end 2014, the "opening of Member State operated research infrastructures to the full European user community";
- "By 2015, Member States, together with the Commission, should have completed or launched the construction of 60% of the priority European research infrastructures currently identified by the ESFRI". Also Member States are invited to "review their Operational Programmes to facilitate the use of cohesion policy money for this purpose";
- "By 2012, agreement should be reached with international partners on the development of research infrastructures, including ICT infrastructures, which owing to cost, complexity and/or interoperability requirements can only be developed on a global scale."

Under Horizon 2020, the proposed new framework for funding, actions for Research Infrastructures are part of the 'Excellent Science' priority and would benefit from a budget of 2.5 billion euros (2011 prices) over 7 years, including 0.9 billion euros for e-infrastructures. This is a significant increase compared to FP7. The broad lines of activities will be to:

- facilitate and support the implementation and operation of ESFRI and other world-class research infrastructures;
- integrate and facilitate access to national research infrastructures;
- continue supporting the development, deployment and operation of e-infrastructures;
- foster the innovation potential of research infrastructures and their human capital;
- reinforce the European policy and international cooperation.

### Seventh Framework Programme (FP7)

FP7 is coming to an end, however most of the supported research infrastructures projects are on-going. The latest ones will be selected in spring 2012 and will start either end of 2012 or in 2013, usually for four years.

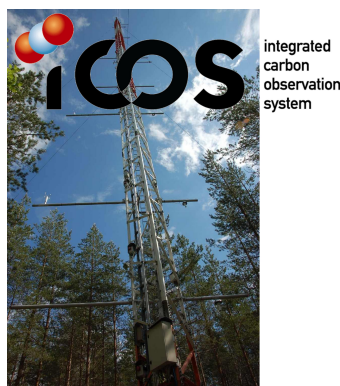
The major FP7 financial support has been implemented via the so-called "Integrating Activities" which bring together and integrate, on a European scale, key research infrastructures, in order to promote their coordinated use and development. Such projects combine *networking activities* (for coordination among the facilities but also with all relevant stakeholders including relevant international initiatives), *transnational access activities* (for a wider access by the scientific community) and *joint research activities* (for improving the scientific services offered by the infrastructures).

The EU is also supporting the preparatory phase of the new infrastructures identified by the ESFRI. The preparatory phase aims at bringing the project to a level of legal and financial maturity necessary to implement it. While considered "new" research infrastructures, most of them build on existing facilities and networks. However, the final objectives of these ESFRI projects are the long term sustainability of these infrastructures and their joint governance at European level. In particular, the majority of these projects are considering becoming a European Research Infrastructure Consortium, ERIC, the new Community Legal Framework adopted in 2009.

Further support to the conceptual design studies for new European research infrastructures is also part of the activities under FP7.

Lastly, a number of coordination actions are taking place with FP7 support, in particular several of them directly aiming at developing international cooperation for research infrastructures. In particular, interoperability, common data policies and standards are key issues that are dealt with not only Europe (see ENVRI project) but also with the other regions of the world. As an example, a new project aiming at reinforcing cooperation with the USA on these issues is in the pipeline.

The second part of this document presents FP7 projects and related research infrastructures that are needed to address the major challenges associated to global change including to help qualify and quantify global change.



#### The facility

ICOS will provide across Europe and adjacent regions a distributed infrastructure for standardised long-term high precision monitoring of atmospheric and oceanic greenhouse gas concentrations, ecosystem fluxes and essential carbon cycling variables. These measurements will allow daily determination of sources and sinks at scales down to about 100 km<sup>2</sup>, and will be a basis for understanding the carbon exchange processes between the atmosphere, the terrestrial surface and the ocean.

#### Background

ICOS has a high scientific and societal pan-European and global relevance in the field of long term monitoring and research of greenhouse gases, their fluxes between atmosphere and continental biosphere and storage in the ecosystem. This distributed Research Infrastructure is both research and operational oriented (in the frame of GMES) and will enable European Member States and the EC to better respond to the obligations of the United Nations Framework Convention on Climate Change (UNFCCC). ICOS is the continuation of an ongoing preliminary project (through the Integrated Project CarboEurope) that demonstrates its feasibility and the maturity of the scientific and technical concepts. To secure the continuation of these observations a long term perspective should be guaranteed through the set up of an institutional concept (Research Infrastructure).

#### Steps for implementation

ICOS will soon move to its construction phase. Finland and France offered to host the headquarters of ICOS, and have submitted a joint application for the Atmospheric Thematic Centre. Italy, Belgium and France have submitted a joint application for the Ecosystem Thematic Centre.

The ICOS infrastructure is part of the **ESFRI roadmap**.

**EU funding:** €5 million in the ICOS Preparatory Phase project

**Participation:** 14 countries are participating in the ICOS preparatory phase project funded by the EU, under the coordination of France. The ICOS consortium consists of 18 partners (including ministries and funding organisations) from 13 countries.

**First possible operation:** 2013

**More information:** [www.icos-infrastructure.eu](http://www.icos-infrastructure.eu)

*Note: the information relating to the infrastructures that are part of the ESFRI roadmap is mainly based on the document: ESFRI Strategy report on research infrastructures, Roadmap 2010.*

## EISCAT\_3D - The next Generation European Incoherent Scatter Radar System

ESFRI



### The facility

EISCAT\_3D will be a three-dimensional imaging radar for atmospheric and geo-space research, which constitutes an upgrade to EISCAT, an existing international infrastructure based in Europe and devoted to the study of the upper atmosphere, ionosphere and geospace. This new large-scale European Research Infrastructure will have applications in a

wide range of European research areas including Earth environment monitoring and technology solutions supporting sustainable development, well beyond atmospheric and space sciences.

### Background

EISCAT\_3D represents a new concept in research radars for the upper atmosphere, based on multi-static phased arrays with state-of-the-art digital signal processing, which are intended to replace EISCAT's existing radars in northern Scandinavia. The new design will greatly extend EISCAT's data coverage and provide unique volumetric and small-scale imaging capabilities. It will also allow major improvements in temporal and spatial resolution, as well as producing new data products.

EISCAT\_3D will contribute to Environmental sciences through studies of space weather and global change, as well as addressing atmospheric science and plasma physics. In addition to the EU-funded Preparatory Phase, a technology prototyping project has received 1M€ funding from regional development funds, to build a multi-beam test receiver at Kilpisjärvi in Northern Finland. The test station will use hardware concepts developed by the radio astronomy facility LOFAR. If successful, LOFAR hardware might provide the basis for the EISCAT\_3D receiver sites.

### Steps for implementation

EISCAT\_3D is a development project of the EISCAT Scientific Association, whose headquarters are located in Kiruna, Sweden. The current EISCAT host countries (Sweden, Norway and Finland) should play a key role in EISCAT\_3D, and it is expected that the other EISCAT members (UK, Germany, China and Japan) will participate at some level. Japan has invested strongly in Northern Scandinavia, financing one of EISCAT's two radar dishes on Svalbard, and has organized a national group discussing possible future participation in EISCAT\_3D. There are also indications of interest by third countries, who are currently not members of EISCAT, such as Russia and US.

Picture caption: antenna array e3d artist impression

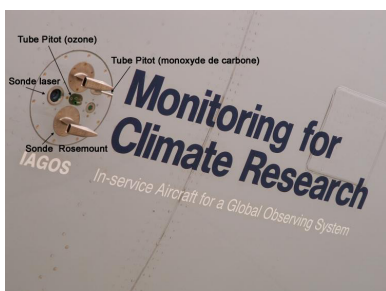
The EISCAT\_3D infrastructure is part of the **ESFRI roadmap**.

**EU funding:** €4.5 million in the EISCAT\_3D Preparatory Phase project

**Participation:** 5 countries are participating in the EISCAT\_3D Preparatory Phase project under the coordination of Sweden. The consortium consists of 8 partner institutions from 5 countries. Three additional countries are participating in research activities. Several countries outside Europe have also expressed interest.

**First possible operation:** 2016

**More information:** [www.eiscat.se](http://www.eiscat.se)



### The facility

IAGOS will be established and operated as a distributed infrastructure for long term observations of atmospheric composition, aerosol and cloud particles on a global scale from a fleet of initially 10-20 long range in-service aircraft of internationally operating airlines. It will likely become a key component of a GMES service on air quality.

### Background

IAGOS is an efficient and cost-effective approach to monitor the long-term variations of the atmospheric chemistry on the large scale, including many chemical species and aerosols. Data obtained by means of routine aircraft measurements have been widely used at the international level and notably within the Intergovernmental Panel on Climate Change (IPCC) process. Under full European leadership, IAGOS is important for long-term observations, given the scientific objectives of global climate change research. The first IAGOS aircraft was equipped in 2009 (deliverable of the Design Study IAGOS-ERI), while the CARIBIC aircraft is part of IAGOS since the start of Preparatory Phase. Three MOZAIC aircraft will be brought back to operation in 2010 as part of IAGOS.

### Steps for implementation

At present the preparation and decision of an appropriate legal structure for IAGOS as distributed infrastructure, as well as a sustainable funding scheme; the integration of new partners (research institutions and airlines); the preparation of the operational basis (certification and maintenance) and new technical developments is discussed. Germany is currently negotiating to host the headquarters of IAGOS and many Member States have expressed their interest in the facility. The legal structure (International Association or ERIC) is under discussion between partners.

Picture caption: measuring instrument on Airbus A340

The IAGOS infrastructure is part of the **ESFRI roadmap**.

**EU funding:** €3.3 million in the IAGOS Preparatory Phase project

**Participation:** 4 countries are participating in the IAGOS Preparatory Phase project under the coordination of Germany. The consortium consists of 16 partners (including 2 ministries and funding organisations, 2 airlines and 2 industrial partners and manufacturers of instrumentation) and one associated organisation.

**First possible operation:** 2012

**More information:** [www.iagos.org](http://www.iagos.org)

## COPAL - Heavy Payload long Endurance Tropospheric Aircraft

ESFRI



### The facility

COPAL aims at providing the European scientific community in the field of environmental and Geo-sciences, with a unique research aircraft platform, capable of reaching and operating in any remote area in the world. It will offer an unprecedented opportunity to countries that are not yet operating research aircraft to develop expertise in airborne

measurements and participate to international multidisciplinary experiments. With a payload of 10 tons or more and an endurance of 10 hours, a heavy-payload, long endurance (HPLE) aircraft will more than double the capabilities offered to European scientists. 15 to 20 research laboratories will contribute to the multidisciplinary instrumental setup.

### Background

COPAL (ex EUFAR) is supported by the European consortium of research aircraft operators and users under the umbrella of the EUFAR (European Fleet for Airborne Research) Integrating Activity. National management of research aircraft in Europe has resulted in a diverse fleet of small to large size aircraft. Today more than 30 instrumented aircraft are available for research, with a sampling speed from 30 to 200 m/s, a payload from 80 to 4500 kg, and a ceiling from the boundary layer up to 21 km. All aircraft of the European fleet however are limited to a practical endurance of 5 hours. This situation has so far precluded European scientists from performing research over oceanic, polar and remote continental areas, which are especially crucial for climate studies. COPAL will fill this gap in the European research aircraft fleet by providing a research aircraft platform capable of reaching and operating in any remote area in the world and offering a heavy-payload for integration of a wide range of instruments for research in environmental and geo-sciences. The design and implementation of the COPAL research aircraft will be done in cooperation with the operator of community research aircraft in the USA, and with the other Preparatory Phase studies, especially those with points of similarity with COPAL, such as the research vessels.

### Steps for implementation

The consortium today consists of 13 partners (including one funding organisation). France has offered to host the headquarters of COPAL and many Member States have expressed their interest in this Research Infrastructure.

Picture caption: with the permission of Lockheed Martin

The COPAL infrastructure is part of the **ESFRI roadmap**.

**EU funding:** €1 million in the COPAL Preparatory Phase project

**Participation:** 9 countries are participating in the COPAL preparatory phase project under the coordination of France. The consortium today consists of 13 partners.

**First possible operation:** not yet defined

**More information:** [www.eufar.net/cop-al](http://www.eufar.net/cop-al)

## ACTRIS - Aerosols, Clouds, and Trace Gases Research Infrastructure Network



Climate change is for a large part governed by atmospheric processes, in particular the interaction between radiation and atmospheric components (e.g. aerosols, clouds, greenhouse and trace gases). Some of these components are also those with adverse health effects influencing air quality. Strengthening the ground-based component of the Earth Observing System for these key atmospheric variables has unambiguously been asserted in the IPCC Fourth Assessment Report and Thematic Strategy on air pollution of the EU. However, a coordinated research infrastructure for these observations is presently lacking.

ACTRIS aims at filling this observational gap through the coordination of European ground-based network of stations equipped with advanced atmospheric probing instrumentation for aerosols, clouds and short-lived trace gases.

ACTRIS is a coordinated network that contributes to:

- providing long-term observational data relevant to climate and air quality research produced with standardized or comparable procedures;
- supporting transnational access to large infrastructures strengthening collaboration in and outside the EU and access to high quality information and services to the user communities;
- developing new integration tools to fully exploit the use of atmospheric techniques at ground-based stations, in particular for the calibration/validation/integration of satellite sensors and for the improvement of global and regional-scale climate and air quality models.

ACTRIS will have the essential role to support integrated research actions in Europe for building the scientific knowledge required to support policy issues on air quality and climate change.

Picture caption: Measuring tower in Cabauw, NL

**EU funding:** €7.8 million for the ACTRIS Integrating Activity project under FP7. ACTRIS is a follow-up project of the EARLINET-ASOS and EUSAAR projects on measurement of atmospheric aerosols from the ground that were supported by the EU under FP6 for a total of €7.9 million.

**Partners:** 28 organisations from 19 countries: Belarus, Belgium, Bulgaria, Czech Republic, Hungary, Italy, Finland, France, Germany, Greece, Ireland, Netherlands, Norway, Poland, Romania, Spain, Sweden, Switzerland, United Kingdom.

**Start date:** 01/04/2011 - **Duration:** 48 months

**More information:** <http://www.actris.net/>

## EUFAR - European Facility for Airborne Research in Environmental and Geoscience



EUFAR coordinates the operation of instrumented aircraft and hyperspectral imaging sensors, exploiting the skills of experts in airborne measurements in the fields of environmental and geosciences, in order to provide researchers with the infrastructure best suited to their needs. EUFAR provides trans-national access to 26 installations.

The EUFAR consortium comprises 35 legal entities, out of which 15 are operators of airborne facilities, and 20 experts in airborne research. A Scientific Advisory Committee contributes to a better integration of the users with the operators to tackle new user driven developments. The project also aims at the joint development of airborne infrastructures in terms of capacity and performance. It will facilitate a wider sharing of knowledge and technologies across fields and contribute to better structure the way research infrastructures operate. The development of a central database for airborne activities improves the access to the data collected by the aircraft. All these activities rely on a unique web portal to airborne research in Europe.

Picture caption: ATR42-SAFIRE

**EU funding:** €8.0 million for the Integrating Activity under FP7 and €5 million for the Integrated Infrastructure initiative under FP6. EUFAR activities have also been funded under FP5.

**Partners:** 34 organisations from 13 countries: Belgium, Czech Republic, Finland, France, Germany, Hungary, Israel, Italy, Netherlands, Poland, Spain, Switzerland, United Kingdom

**Start date:** 01/10/2008 - **Duration:** 48 months

**More information:** <http://www.eufar.net/>

## InGOS - Integrated non-CO<sub>2</sub> Greenhouse Gas Observation System



There is a big need to support and integrate the observing capacity of Europe on non-CO<sub>2</sub> greenhouse gases (NCGHG: CH<sub>4</sub>, N<sub>2</sub>O, SF<sub>6</sub>, H<sub>2</sub> and halocarbons). The emissions of these gases are very uncertain and it is unknown how future climate change will feedback into these (mainly land use coupled) emissions. The InGOS project will work on standardizing the measurements, strengthen the existing observation sites into supersites, capacity building in new member states, and prepare for integration of the network with other networks already in place or currently being set up (e.g. ICOS).

Attribution of source categories by using advanced isotope techniques and data-assimilation methods using high resolution transport model will be an integral part of the network to allow design and evaluation of the measurements and will link the network to remote sensing data and bottom up inventory developments.

Picture caption: Jungfrau EMPA (CH)

**EU funding:** €8.0 million for the Ingos Integrating Activity project under FP7.

**Partners:** 34 organisations from 14 countries: Belgium, Denmark, Finland, France, Germany, Hungary, Italy, Netherlands, Norway, Poland, Spain, Sweden, Switzerland, United Kingdom

**Start date:** 01/10/2011 - **Duration:** 48 months

**More information:** [www.ingos-infrastructure.eu](http://www.ingos-infrastructure.eu)

## IS-ENES - Infrastructure for the European Network for Earth System Modelling



ENES, through IS-ENES, promotes the development of a common distributed modelling research infrastructure in Europe in order to facilitate the development and exploitation of climate models and better fulfil the societal needs with regards to climate change issues. IS-ENES gathers 18 partners from 10

European countries and includes the 6 main European Global Climate Models. IS-ENES combines expertise in climate Earth system modelling (ESM), in computational science, and in studies of climate change impacts.

The IS-ENES project follows four main objectives:

- Fostering the integration of European climate & ESM community;
- Fostering the development of ESMs for the understanding of climate change;
- Fostering high-end simulations enabling better understanding & prediction of future climate change;
- Fostering the application of ESM simulations to better predict & understand future climate change impacts.

**EU funding:** €7.6 million for the Integrating Activity project under FP7

**Partners:** 18 partners from 10 countries: Germany, Greece, Finland, France, Italy, Netherlands, Romania, Spain, Sweden, United Kingdom

**Start date:** 01/03/2009      **Duration:** 48 months

**More information:** <https://is.enes.org/>

## ARISE - Atmospheric dynamics Infrastructure in Europe

ARISE proposes to design a new infrastructure that integrates different station networks in order to provide a new “3D” image of the atmosphere from the ground to the mesosphere with unprecedented spatio-temporal resolution. The infrastructure extends across Europe and outlying regions, including polar and equatorial regions. The expected benefits of ARISE are two-fold. First, the measurements will allow a better description of the atmosphere state, leading to an improved accuracy in short and medium range weather forecasts. Second, the measurements will be used to improve the simulation of middle atmosphere climate and its tropospheric impact. The benefits also include civil applications related to monitoring of natural hazards as volcanoes.

**EU funding:** €4.4 million for the Design Study project under FP7

**Partners:** 12 partners from 9 countries: Belgium, Czech Republic, France, Germany, Italy, the Netherlands, Norway, Sweden, United-Kingdom

**Start date:** 01/01/2012      **Duration:** 36 months

## EUROCHAMP-2 - Integration of European Simulation Chambers for Investigating Atmospheric Processes - Part 2



The fundamental objective of the project is the further integration of existing European research facilities to a grid of reaction chambers in a continuation of the EUROCHAMP project. These facilities were created to study the impact of atmospheric processes e.g. on regional photochemistry, global change, as well as cultural heritage and human health effects under as realistic conditions as possible.

Although initial advances in the application of large chambers occurred in the United States and Japan, Europe now leads the world in the use of large, highly instrumented chambers for atmospheric model development and evaluation. Smaller chambers that were designed for specific purposes and are operated by experts in their fields excellently supplement the larger chambers. The integration of all these environmental chamber facilities within the framework of the EUROCHAMP-2 project promotes the retention of Europe's international position of excellence in this area and is unique in its kind worldwide.

The EUROCHAMP-2 project will foster the structuring effect of atmospheric chemistry activities performed in European environmental chambers within the previous EUROCHAMP project, since it offers the full availability of corresponding facilities for the whole European scientific community.

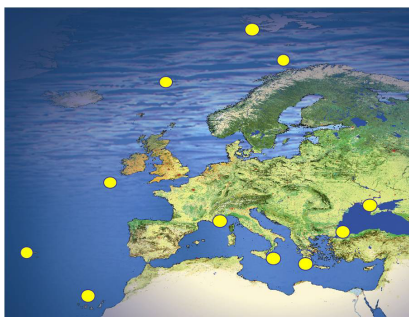
Picture caption: EUROPHORE Chamber at CEAM, Valencia  
Source: <http://www.eurochamp.org/>

**EU funding:** €5 million for the Integrating Activity project under FP7

**Partners:** 13 partners from 8 countries: Denmark, Germany, France, Ireland, Italy, Sweden, Switzerland, United-Kingdom

**Start date:** 01/05/2009      **Duration:** 48 months

More information: <http://www.eurochamp.org>



#### The facility

EMSO is the European Multidisciplinary Seafloor Observatory, a research infrastructure for long term permanent monitoring of the ocean margin environment around Europe. It is considered critical by the European Science Foundation marine board. EMSO is an essential tool for deep sea research including geosciences and geo-hazards, physical oceanography, biology and non-living resources.

#### Background

Cabled sea-floor observatories are needed to collect simultaneously long time series of data identifying temporal evolutions, cyclic changes and capturing episodic events related to oceanic circulation, deep-sea processes and ecosystems evolution. In addition, long-term monitoring will allow the capture of episodic events such as earthquakes, submarine slides, tsunamis, benthic storms, bio-diversity changes, pollution and other events that cannot be detected and monitored by conventional oceanographic sea-going campaigns.

A final detailed plan of involving the e-tools in EMSO is also needed. The plan should clearly state all connections with e-infrastructures for data gathering, processing, storage and transfer. A very good connection with other European projects has been developed by the EMSO Consortium, including not only projects from the field of environmental sciences but also with other domains (e.g. Km3NeT). Stronger links should nevertheless be forged with the Research Infrastructure Euro-Argo. EMSO has strong potential for international collaboration outside Europe.

#### Steps for implementation

Even though firmly on the way towards implementation, there are still several steps EMSO should take towards full operability. Thus, efforts should be taken towards achieving the ERIC (European Research Infrastructure Consortium) status for its consortium. EMSO will propose an ERIC in 2012. EMSO Secretariat is foreseen to be hosted in Italy.

The EMSO infrastructure is part of the **ESFRI roadmap**.

**EU funding:** €3.9 million in the EMSO Preparatory Phase project

**Participation:** 12 countries are participating in the EMSO preparatory phase project under the coordination of Italy. The consortium consists of 12 partners (including 8 with official mandate from ministries and funding organisations) from 12 countries

**First possible operation:** 2014

**More information:** [www.emso-eu.org](http://www.emso-eu.org)

### The facility

Argo is a global ocean observing system with the primary goal to maintain the 3000 floats array over the next 10 to 20 years. This is extremely challenging and success in such a major undertaking can be achieved only through a very high degree of international cooperation and integration. Euro-Argo will develop and progressively consolidate the European component of the global network. Specific European interests also require increased sampling in some regional seas. Overall, the Euro-Argo infrastructure should comprise 800 floats in operation at any given time. The maintenance of such an array would require Europe to deploy about 250 floats per year. Euro-Argo must be considered in its entirety: not only the instruments, but also the logistics necessary for their preparation and deployment, field operations, the associated data streams and data centres.



### Background

Argo is endorsed by the Climate Research Programme of the World Meteorological Organisation (WMO), the Global Ocean Observing System (GOOS), and the Intergovernmental Oceanographic Commission (IOC). In November 2007, the international Argo programme reached its initial target of 3,000 profiling floats. These floats measure every 10 days temperature and salinity throughout the deep global oceans, down to 2,000 metres. Argo is now the major, and only systematic, source of information and data over the ocean's interior. Argo is widely recognized as a revolutionary achievement in ocean observation. The Argo array is an indispensable component of the Global Ocean Observing System required to understand and monitor the role of the ocean in the Earth's climate system. Satellite observations constitute a useful complement to the Argo observations. The Argo data are readily assimilated with those from satellites into ocean circulation and climate models, in support of research and operational applications. Argo is the single most important in-situ data set used today for the Global Monitoring for Environment and Security (GMES) Marine Core Service.

### Steps for implementation

The Euro-Argo structure will include a central facility and distributed national facilities. The central facility will have a European legal structure (ERIC) to receive EC and Member states funding, to procure floats (including logistics and test facilities) and to provide funding to the international structure. The consortium submitted an application for the ERIC in August 2011.

Picture caption: an Arvor float at sea

The Euro-Argo infrastructure is part of the **ESFRI roadmap**.

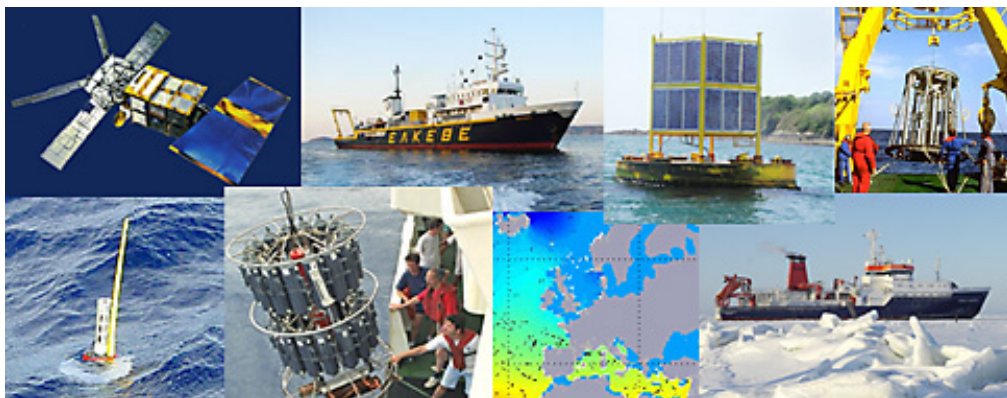
**EU funding:** €3 million in the Euro-Argo Preparatory Phase project. Euro-Argo is also supported with €0.9 million through the **SIDERI** project to strengthen its international dimension.

**Participation:** 12 countries are participating in the Euro-Argo preparatory phase project under the coordination of France. Eight European countries have indicated their interest in the construction phase, while 3 - 4 countries will likely have observer status.

**First possible operation:** 2011

**More information:** [www.euro-argo.eu](http://www.euro-argo.eu)

## SeaDataNet - Pan-European Infrastructure for Ocean and Marine Data Management



The overall objective of the SeaDataNet II project is to upgrade the SeaDataNet infrastructure into an operationally robust and state-of-the-art Pan-European infrastructure for providing up-to-date and high quality access to ocean and marine metadata, data and data products originating from data acquisition activities by all engaged coastal states. SeaDataNet is undertaken by the National Oceanographic Data Centres (NODCs) and marine information services of major research institutes from 30 coastal states bordering the European seas. It also includes Satellite Data Centres, expert modelling centres, and the international organisations IOC, ICES and EU-JRC in its network.

SeaDataNet II will undertake activities to achieve data access and data products services that meet requirements of end-users and intermediate user communities, such as GMES Marine Core Services (e.g. MyOcean), establishing SeaDataNet as the core data management component of the EMODNet infrastructure and contributing on behalf of Europe to global portal initiatives, such as the IOC/IODE – Ocean Data Portal (ODP), and GEOSS. Moreover it aims to achieve INSPIRE compliance and to contribute to the INSPIRE process for developing implementing rules for oceanography.

Picture source: <http://www.seadatanet.org/>

**EU funding:** €6 million for the Integrating Activity project under FP7 and €8.75 million for the SeaDataNet Integrated Infrastructure Initiative project under FP6.

**Partners:** 44 organisations from 30 countries: Belgium, Bulgaria, Croatia, Cyprus, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovenia, Sweden, Spain, Turkey, Ukraine, United Kingdom

**Start date:** 01/12/2011 - **Duration:** 48 months

**More information:** <http://www.seadatanet.org/>

## UP-GRADE BS-Scene – Up-Grade Black Sea Scientific Network



The Black Sea SCENE project established a Black Sea Scientific Network of leading environmental and socio-economic research institutes, universities and NGO's from the countries around the Black Sea. It developed a distributed virtual data and information infrastructure populated and maintained by these organisations aiming at improving the identification, access, exchange, quality indication and use of data about the Black Sea.

The Up-Grade of Black Sea SCENE extended the existing research infrastructure with 19 marine environmental institutes/organizations from the 6 Black Sea countries. The consortium is now undertaken by more than 50 partners of which more than 40 are located in the Black Sea countries.

The Black Sea SCENE research infrastructure network provides improved data & information delivery services for the Black Sea region at a European level. It strengthens the regional capacity and performance of marine environmental data & information management and underpins the harmonization with European marine data quality control/assessment procedures as well as the adoption of international meta-data standards and data-management practices.

Picture source: <http://www.blackseascene.net/>

**EU funding:** €3.4 million for the Integrating Activity project under FP7 and €2 million for the Integrated Infrastructure Initiative project under FP6.

**Partners:** 49 partners from 12 countries: Belgium, Bulgaria, Cyprus, Greece, Georgia, Netherlands, Poland, Romania, Russia, Turkey, Ukraine, United Kingdom

**Start date:** 01/01/2009      **Duration:** 36 months

**More information:** <http://www.blackseascene.net/>

## JERICO – Towards a Joint European Research Infrastructure Network for Coastal Observatories



Coastal observations are an important part of the marine research puzzle of activities and applications. However significant heterogeneity exists in Europe concerning technological design of observing systems, measured parameters, practices for maintenance and quality control, as well as quality standards for sensors and data exchange. Up to now, the expansion of “coastal observatories” has

been driven by domestic interests and mainly undertaken through short-term research projects.

Therefore the main challenge for the research community is now to increase the coherence and the sustainability of these dispersed infrastructures by addressing their future within a shared pan-European framework. This is the main objective of JERICO, which proposes a Pan European approach for a European coastal marine observatory network, integrating infrastructure and technologies such as moorings, drifters, ferrybox and gliders.

Networking activities will lead to the definitions of best practices for design, implementation, maintenance and distribution of data of coastal observing systems, as well as the definition of a quality standard. Harmonisation and strengthening coastal observation systems within EuroGOOS regions will be sought. Unique twin transnational access experiments will be carried out in order to reveal the potential of datasets used in synergy. Central coastal infrastructure in Europe will be opened for international research. This will among other benefits GMES and European contribution to climate change research. New joint research will be conducted in order to identify new and strategic technologies to be implemented in the next generation European coastal observatories. Focus is given on emerging technologies and the biochemical compartment.

JERICO intends to contribute to the international and global effort on climate change research (GEOSS), to provide coastal data inputs for operational ocean observing and forecasting, and also to answer to some of the needs of the environmental research and societal communities.

Picture caption: glider, autonomous underwater vehicle, Source: <http://cobs.pol.ac.uk/>

**EU funding:** €6.5 million for the Integrating Activity project under FP7

**Partners:** 27 partners from 17 countries: Belgium, Bulgaria, Denmark, Germany, Greece, Finland, France, Ireland, Italy, Malta, Netherlands, Norway, Poland, Portugal, Spain, Sweden, United Kingdom

**Start date:** 01/05/2011      **Duration:** 48 months

**More information:** <http://www.jerico-fp7.eu/>

## EUROFLEETS - Towards an Alliance of European Research Fleets



The quality of the infrastructures available for marine research affects directly Europe research performance. As marine research infrastructures are considered as key elements of the European Strategy for Marine Research under development, a coherent pan-European approach with enhanced partnership in investment, development and usage of fleets, will have a significant impact to better

meet the diverse needs of European marine research.

The EUROFLEETS process is based on the recent recommendations from the Marine Board of the ESF. It aims at bringing together the European research fleets owners to enhance their coordination and promote the cost-effective use of their facilities. It supports research services for the monitoring and the sustainable management of the Regional Seas and the Oceans,

and organises a common access to all European scientists on sole condition of scientific excellence.

EUROFLEETS provides all European researchers with access to 19 high performing research vessels from 15 different countries. This would enable the EU to reach its ambitious goals about maintaining the ocean biodiversity or understanding climate change.

Picture caption: Mare Nigrum, operator: GeoEcoMar, Romania, Copyright: GeoEcoMar

**EU funding:** €7.2 million for the Integrating Activity project under FP7

**Partners:** 24 partners from 16 countries: Belgium, Bulgaria, Germany, Estonia, Greece, France, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Romania, Spain, Turkey, United-Kingdom

**Start date:** 01/09/2009      **Duration:** 48 months

**More information:** <http://www.eurofleets.eu/>

## GROOM - Gliders for Research, Ocean Observation and Management



The project aims at the design of a new European research infrastructure to maintain and operate a European fleet of remotely controlled underwater gliders, in coordination with other European and international initiatives. Along with their rapidly growing importance in purely science driven applications, the implementation of gliders into the Global Ocean Observing System has been recognized as a key point to improve the

observational capabilities of the observing systems.

The proposal for this new infrastructure strongly relies on EuroARGO and JERICO infrastructures which are emerging and also considers the relevant international coordinating bodies such as GOOS. The technological infrastructures will be based on several dedicated 'gliderports' to maintain and operate a European fleet of gliders in coordination with US, Canadian, Australian and other similar infrastructures.

Complementary to other ocean observing systems, this new infrastructure will be beneficial for both academic oceanographic research and operational oceanography systems.

Picture caption: Slocum glider, source: <http://plocan.eu/en/>

**EU funding:** €3.5 million for the Design Study project under FP7

**Partners:** 19 partners from 9 countries: Cyprus, Finland, France, Germany, Greece, Italy, Norway, Spain, United-kingdom

**Start date:** 01/10/2011      **Duration:** 36 months

## MESOAQUA - Network of leading mesocosm facilities to advance the studies of future aquatic ecosystems from the Arctic to the Mediterranean



In marine ecology there is an urgent need to understand the functioning of the lower part of the pelagic food web, its response to and effect on climate change, its response to pollution and environmental toxins, and its role in producing food for commercially important

species at higher trophic level. This requires access for European scientists to tools allowing experimental approaches to near-natural pelagic systems.

To meet this need, the MESOAQUA network of European marine mesocosm facilities will:

- offer European researchers access to a range of mesocosm facilities in contrasting environments,
- develop and test new technologies that allow access to off-shore environments,
- improve the services of the facilities by exchange of technology and experience,
- facilitate cross-disciplinary fertilisation and a better coordination of mesocosm research,
- promote the training of young scientists in the use of experimental ecosystem research.

MESOAQUA will allow a system level experimentation that is required to understand and predict the responses of the pelagic ecosystem in changing ocean subject to increasing anthropogenic pressure.

Picture caption: KOSMOS mesocosms deployed in Raunefjord off Bergen, Norway  
Source: [http://mesoaqua.eu/kiel\\_kosmos](http://mesoaqua.eu/kiel_kosmos)

<p><b>EU funding:</b> €3.5 million for the Integrating Activity project under FP7 <b>Partners:</b> 5 partners from 5 countries: Germany, France, Greece, Norway, Sweden <b>Start date:</b> 01/01/2009      <b>Duration:</b> 48 months <b>More information:</b> <a href="http://mesoaqua.eu/">http://mesoaqua.eu/</a></p>
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#### The facility

The goal of SIOS is to establish an observational Research Infrastructure for the Arctic Earth System, integrating studies of geophysical, chemical and biological processes from the research and monitoring platforms. It corresponds to a need concerning climate change monitoring. The Research Infrastructure is mainly European with a strong international component, with the presence of a large number of research institutes from all over the world (EU Member States and associated states, and other countries such as Russia, China, Japan, Korea, USA and India). It is of use for a very broad and interdisciplinary user community and offers opportunities for education and training of young scientists - also in a broad international context.



#### Background

Svalbard's geographical location and extensive Research Infrastructure provides excellent opportunities for studies of ecosystem changes and its effects on the food chain, oceanic and atmospheric transport patterns which prevail in the Arctic region, integrating observations and analysis of the changing Arctic ice cover, unique studies of the energy balance between layers of the atmosphere, from the borders of space to the surface of Earth and for dense satellite monitoring. The impact of climate change, pollution and other pressures on the environment appear sooner and with more severe consequences in the High Arctic compared to regions at lower latitudes. The High Arctic can therefore be seen as an early warning region.

#### Towards a common polar research strategy

Most countries involved in SIOS have national polar research stations in the Svalbard area, and virtually all countries have national polar research plans. The SIOS project is a unique opportunity to harmonize existing and develop a future common polar research strategy with minimized redundancies. SIOS will provide a "one-stop shop" for arctic system data and a common information base for European Arctic topics.

Picture copyright: Terje Tellefsen

The SIOS infrastructure is part of the **ESFRI roadmap**

**EU funding:** €4 million in the SIOS Preparatory Phase project

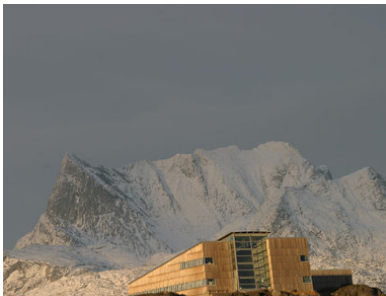
**Participation:** 14 countries are participating in the SIOS preparatory phase project funded by the EU, under the coordination of Norway. Moreover, major international programmes, organizations and core stakeholders are represented in the SIOS Advisory Board.

**More information:** <http://www.sios-svalbard.org>

## INTERACT - International Network for Terrestrial Research and Monitoring in the Arctic

Environmental change and particularly amplified global climate change are accelerating in the Arctic. These changes already affect local residents and feedback from the Arctic's land surface to the climate system, will have global implications. However, climate change and its impacts are variable throughout the wide environmental and land use envelopes of the Arctic.

The Arctic is generally remote, sparsely populated and research and monitoring activities are more restricted in time and space than elsewhere. This limitation comes when there is a rapidly expanding need for knowledge as well as increasing technological opportunities to make data collection in the field and accessibility more efficient.



INTERACT is a network under the auspices of SCANNET, a circumarctic network of terrestrial field bases. INTERACT specifically seeks to build capacity for research and monitoring in the European Arctic and beyond. Partnerships will be established between Station Managers and researchers within joint research

activities that will develop more efficient networks of sensors to measure changing environmental conditions and make data storage and accessibility more efficient through a single portal. New communities of researchers will be offered access to Arctic terrestrial infrastructures while local stakeholders as well as major international organisations will be involved in interactions with the infrastructures.

This will lead to increased public awareness of environmental change and methods to adapt to them, increased access to information for education at all levels, and input to major international research and assessment programmes. The whole consortium will form a coherent and integrated unit working within a concept of a wide environmental and land use envelopes in which local conditions determine the directions and magnitudes of environmental change whereas the balance and synergies of processes integrated across the whole region have global impacts.

Picture caption: Carsten Egevang, Greenland Institute of Natural Resources

**EU funding:** €7.3 million for the Integrating Activity project under FP7

**Partners:** 32 partners from 14 countries: Canada, Denmark, Germany, Greece, Finland, Faroe Islands, Greenland, Iceland, Italy, Norway, Russia, Sweden, United Kingdom, United States

**Start date:** 01/01/2011      **Duration:** 48 months

**More information:** [http:// www.eu-interact.org](http://www.eu-interact.org)

### The facility

EPOS will create a single sustainable, permanent observational infrastructure, integrating existing geophysical monitoring networks (e.g. seismic and geodetic networks), local observatories (e.g. volcano observatories) and experimental laboratories (e.g., experimental and analytic lab for rock physics and tectonic analogue modeling) in Europe and adjacent regions. It will coordinate the currently scattered, but highly advanced, European facilities into one distributed, coherent multidisciplinary Research Infrastructure.



### Background

Presently, different European countries own a mosaic of hundreds of impressive, but separated networks, observatories, temporary deployments and facilities for solid earth studies. Combining a wide variety of data and modelling tools are prerequisites to innovative research and for better understanding of the physical processes controlling earthquakes, volcanic eruptions and other catastrophic events, such as landslides and tsunamis. Europe's most active areas are also those where population density is high. Even moderate-size earthquakes may turn catastrophic when they strike large urban agglomerations with poor building construction practice. Advances in understanding of the behaviour of faults or volcanoes as well as quantifying hazards largely rely on strategic investments in Research Infrastructure in this field. EPOS is already actively networking the existing European facilities on seismological and geodetic monitoring as well as solid Earth observations. It will promote innovative approaches for a better understanding of the physical processes controlling earthquakes, volcanic eruptions and tsunamis, as well as those driving tectonics and Earth surface dynamics.

### Steps for implementation

In a first step, existing national Research Infrastructures will be integrated through the EPOS Data Centres, a network of community service providers for distributed data storage and processing. For seismology in particular, ORFEUS already integrates seismic monitoring infrastructures and has developed a first ICT infrastructure for data archiving and mining. In a second step, innovative and coherent e-infrastructure architecture will be developed, which will form the platform and data service infrastructure. By means of the EPOS Core Services, it will provide interdisciplinary data exchange, processing tools and computational simulations.

Picture source: [www.epos-eu.org](http://www.epos-eu.org)

The EPOS infrastructure is part of the **ESFRI roadmap**.

**EU funding:** €4.5 million in the EPOS Preparatory Phase project

**Participation:** 18 countries are participating in the EPOS preparatory phase project funded by the EU, under the coordination of Italy. The EPOS consortium today consists of 20 partners and 6 associated organisations from 23 countries.

**First possible operation:** 2020

**More information:** [www.epos-eu.org](http://www.epos-eu.org)

## NERA - Network of European Research Infrastructures for Earthquake Risk Assessment and Mitigation

The overall aim of NERA is to achieve a measurable improvement and a long-term impact in the assessment and reduction of the vulnerability of constructions and citizens to earthquakes.



NERA will integrate the key research infrastructures in Europe to monitor earthquakes and assess their hazard and risk, and will combine expertise in observational and strong-motion seismology, modelling, geotechnical and earthquake engineering to develop activities to improve the use of infrastructures and facilitate the access to data.

NERA will ensure the provision of high-quality services, including access to earthquake data and parameters and to hazard and risk products and tools. NERA will coordinate with other EC projects (SHARE, SYNER-G) a comprehensive dissemination effort.

NERA will contribute to the OECD GEM program and to the EPOS ESFRI infrastructure.

Picture caption: NERA partners

**EU funding:** €9 million for the Integrating Activity project under FP7  
**Partners:** 28 partners from 15 countries: Austria, Belgium, France, Germany, Greece, Iceland, Italy, the Netherlands, Norway, Portugal, Romania, Spain, Switzerland, Turkey, United-Kingdom  
**Start date:** 01/11/2010      **Duration:** 48 months  
**Integrating Activity (IA)**  
**More information:** <http://nera-eu.org/>



### The facility

LifeWatch is an e-science and technology infrastructure for biodiversity and ecosystem research to support the scientific community and other users. It is putting in place the infrastructure and information systems necessary to provide an analytical platform for the modelling and simulation of both existing and new data on biodiversity to enhance the knowledge of biodiversity

functioning and management.

### Background

While we are exploring other planets, it is surprising how little we still know about our own planet Earth. This is especially true for our understanding of the living world, the biological diversity of species, their genes and the ecosystems in which they occur. We also need novel approaches to understand and sustainably manage our environment so that human activities and the natural environment are balanced. EU projects and the Global Biodiversity Information Facility have made much progress in providing access to interoperable biodiversity databases, but data integration and large-scale analytical and modelling facilities have to provide the research community with a new methodological approach to understand the biodiversity system. The LifeWatch Research Infrastructure will contribute as a European component to the Global Earth Observation System of Systems (GEOSS) 10-year implementation plan, particularly in relation to enabling global, multi-system capabilities for research, ecosystem management and biodiversity conservation; and improving the coverage, quality, and availability of essential information from a variety of data resources, including in situ observatories and the integration of in situ and satellite data.

### Steps for implementation

Eight countries signed a Memorandum of Intent. These countries did enter the final negotiations towards submitting the ERIC Statutes for approval, and will establish a start-up organisation as a transition to the construction phase. The ERIC application is expected to be submitted to the European Commission in 2012. Three countries (Italy, the Netherlands and Spain) offered to take lead with advance funding to allow for continuity. The statutory seat of LifeWatch will be hosted in Spain.

Picture copyright: Phernambucq

The LIFEWATCH infrastructure is part of the **ESFRI roadmap**.

**EU funding:** €5.0 million in the LIFEWATCH Preparatory Phase project. The EU is also providing €0.7 million to the project **CReATIVE-B** to support the interaction between LifeWatch and research infrastructures on biodiversity research in other parts of the world.

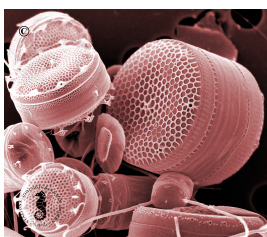
**Participation:** 20 countries are participating in the LIFEWATCH preparatory phase project funded by the EU, under the coordination of The Netherlands.

**First possible operation:** 2012

**More information:** [www.lifewatch.eu](http://www.lifewatch.eu)

### The Facility

The European Marine Biological Resource Centre will comprise a consortium of key European marine biological and molecular biology laboratories, together providing: (1) access to a wide range of European coastal marine biota and their ecosystems; (2) an integrated supply of marine organisms for interdisciplinary research, including existing and new models; (3) coordinated services including state-of-the-art bio-banks and dedicated platforms for genomics, structural and functional biology, microscopy and bioinformatics; (4) interdisciplinary training in marine biological sciences and genomics; and (5) outreach to stakeholders, users and the public at large.



### Background

Marine biodiversity is essential in ecosystem functioning and for our quality of life. This has stimulated construction of marine biological research institutes around the European coastline over the last 125 years. Over time, these have developed, largely independently, into world renowned facilities. Taken together, the European marine biological stations represent a critical mass of infrastructure and human resources that has had a significant influence on the history of worldwide marine research.

Marine biology is currently experiencing ground-breaking technological and theoretical advances, notably associated with the introduction of state-of-the-art '-omics' approaches. This is facilitating rapid progress in existing disciplines, integration of this field into a range of other research domains, and creation of major new avenues of research. The need for integrated study in marine biology is becoming increasingly compelling as global warming and ocean acidification start to affect whole ecosystems. In parallel, the pressure on stocks of commercial marine bio-resources is rapidly escalating, resulting in increasing focus on mariculture alternatives, and biotechnological interest in the extremely diverse pool of materials, molecules and genes from marine organisms is booming.

### Steps for implementation

The Preparatory Phase started in February 2011. The aim is to develop a coherent pan-European strategy for interconnecting, harmonising and upgrading the actual infrastructures and the common services they provide in light of common analysis and projection of Europe-wide user requirements.

Picture caption: A phytoplankton sample featuring *Thalassiosira* species, for one of which the genome has been sequenced. Copyright: SZN

The EMBRC infrastructure is part of the **ESFRI roadmap**.

**EU funding:** €7.5 million in the EMBRC Preparatory Phase project

**Participation:** 9 countries are participating in the EMBRC preparatory phase project funded by the EU, under the coordination of Italy.

**First possible operation:** 2014

**More information:** [www.embrc.eu](http://www.embrc.eu)

## ASSEMBLE - Association of European Marine Biological Laboratories



Europe has a very long and distinguished history in marine biology and its coastal marine biological stations are the oldest in the world. For example, Stazione

Zoologica in Naples (SZN), Station Biologique in Roscoff (SBR) and Kristineberg Marine Research Station in Fiskebäckskil (KMRS) were all established in the late 19th Century. They began an enviable tradition as marine biological research stations that acted, even at that time, as international infrastructure sites to serve, enhance and develop collaborative marine research worldwide.

Now, however, they have become a new breed of marine research station, developing and applying new technologies and facilities that allow a higher quality of service, not only to the marine biologist community but also to the increasing numbers of scientists that are turning to marine organisms as models with which to investigate fundamental questions in biology. Building upon this enviable tradition ASSEMBLE seeks to create a network of key marine biological research stations around the European coastline including the sub-tropical station at Eilat (IUI). Uniquely, ASSEMBLE also include a Pacific site in Chile (PUC) that provides access to one of the most important upwelling sites in the world.

The aim is to develop an integrated infrastructure that will make possible for biologists in Europe to study a range of unique coastal ecosystems and a wide variety of marine organisms using the most advanced approaches in modern biology. It will be based on the existing hosting capacities, sea-going facilities and research background of these marine stations, which, as noted above, already have a long experience in hosting students and visiting scientists. This infrastructure will focus on key marine ecosystems and biological models, making possible both the enhancement of existing infrastructures and the introduction and development of new technologies. These include, for example, indoor and outdoor equipment for the cultivation/raising/stud.

Picture caption: IUI - research vessels, M Cock  
Source: <http://www.assemblemarine.org/>

<p><b>EU funding:</b> €8.7 million for the Integrating Activity project under FP7 <b>Partners:</b> 8 partners from 8 countries: Chile, Germany, France, Israel, Italy, Portugal, Sweden, United Kingdom <b>Start date:</b> 01/03/2009    <b>Duration:</b> 48 months <b>More information:</b> <a href="http://www.assemblemarine.org/">http://www.assemblemarine.org/</a></p>
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## EXPEER - Distributed Infrastructure for Experimentation in Ecosystem Research



EXPEER brings together, major observational, experimental, analytical and modelling facilities in ecosystem science in Europe. By uniting these highly instrumented ecosystem research facilities under the same umbrella and with a common vision, EXPEER has the multidisciplinary expertise and critical mass to integrate and structure the European long-term ecosystem research facilities.

EXPEER builds on an ambitious plan for networking research groups and facilities. The joint research activities will provide a common framework and roadmap for improving the quality, interaction and individual as well as joint performance of these infrastructures in a durable and sustainable manner. EXPEER provides a framework for increased use and exploitation of the unique facilities through a strong and coordinated programme for transnational access to the infrastructures.

The establishment of the EXPEER Integrated Infrastructure enables integrated studies of the impacts of climate change, land use change and loss of biodiversity in terrestrial ecosystems through two major steps:

- Bringing together the EXPEER Infrastructures to enable collaboration and integration of observational, experimental and modelling approaches in ecosystem research (in line with the concept developed in ANAEE);
- Structuring existing network of ecosystem observational, monitoring and experimental sites across Europe (LTER-Europe).

Picture source: <http://www.expeer.fr/>

**EU funding:** €7.4 million for the Integrating Activity project under FP7

**Partners:** 37 partners from 19 countries: Austria, Belgium, Denmark, Germany, Finland, France, Hungary, Israel, Italy, The Netherlands, Norway, Poland, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, United Kingdom

**Start date:** 01/12/2010      **Duration:** 48 months

**More information:** <http://www.expeer.fr/>

## TREES4FUTURE - Designing Trees for the future



TREES4FUTURE will contribute in helping the European forestry sector respond, in a sustainable manner, to increasing demands for wood products and services (among which preservation of forest biodiversity) in a context of changing climatic conditions.

To do so TREES4FUTURE will integrate major, yet rarely interacting forestry communities (and their

resources) from geneticists to environmentalists and from communities working at the tree/population scale to those working at forestry landscape/wood basin levels as well as industry concerns.

The long-term objective of TREES4FUTURE is to provide the whole European forestry community, with an easy and comprehensive access to complementary sources of information and expertise to optimise the short and long-term exploitation of the forest resources by both the research community and the socio-economic players.

Picture © INRA, P. Frey

**EU funding:** € 7 million for the Integrating Activity project under FP7  
**Partners:** 28 partners from 13 countries: Austria, Belgium, Finland, France, Germany, Italy, the Netherlands, Poland, Portugal, Romania, Spain, Sweden, United-Kingdom  
**Start date:** 01/10/2011    **Duration:** 48 months

## Support to common operations of research infrastructures

### ENVRI - Common Operations of Environmental Research Infrastructures

The EU supports the Implementation phase of the ESFRI research infrastructures through cluster projects in a given scientific field. In environmental sciences, support is provided to the ENVRI project gathering seven ESFRI Environment projects (the others are represented in the advisory board) to develop, with the support from ICT experts, common data and software components and services for their facilities.

The results will speed up the construction of these infrastructures and will allow interoperability among them. Common challenges faced by the ENVRI infrastructures include data capture from distributed sensors, metadata standardisation, handling of high volume data, workflow execution and data visualisation. The common standards, deployable services and tools developed by ENVRI will be adopted by each infrastructure as it progresses through its construction phase. The project will be based on a common reference model created by capturing the semantic resources of the ESFRI infrastructures.

**EU funding:** €3.7 million  
**Partners:** 16 partners from 8 countries: Austria, Germany, Finland, France, Italy, The Netherlands, Sweden, United Kingdom  
**Start date:** 01/11/2011    **Duration:** 36 months

European Commission

**EUR 25253 - Global change: towards global research infrastructures  
EU support for research infrastructures in environmental and earth sciences**

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A major step took place in the European Research Area since 2006 with the inclusion into the ESFRI Roadmap of about ten pan-European distributed infrastructures aimed at atmospheric and ocean as well as the Arctic and plate observation. Two of them are more specifically orientated to the monitoring and research on biodiversity and marine ecosystems.

The present document outlines the contribution of EU research infrastructures to the global network of research infrastructures needed for environmental research to address global change.

Further information on the European policy regarding research infrastructures:  
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