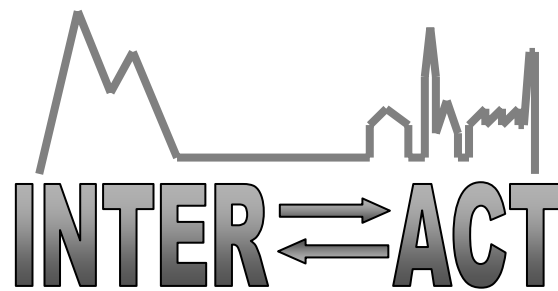
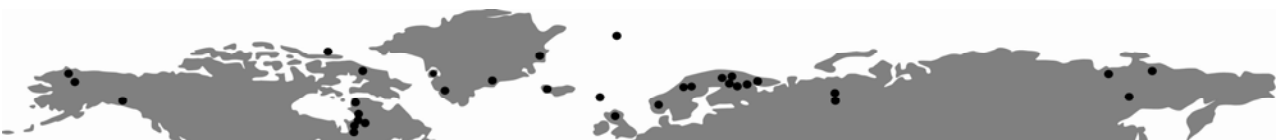


# International Network for Terrestrial Research and Monitoring in the Arctic



Work programme:  
**INFRA-2010-1.1.19: Research Infrastructures for Polar research**

Coordinator:  
**Prof. Terry V. Callaghan**



<b>Participant no. *</b>	<b>Participant organisation name</b>	<b>Country</b>
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2	National Environmental research Institute, NERI	DK
3	University of Oulu, UOULO	FI
4	Swedish University of Agricultural Sciences, SLU	SWE
5	Lund University, ULUND	SWE
6	IT University of Copenhagen, ITU	DK
7	Faroe Islands Nature Investigation, FINI	FO
8	CLU ltd, CLU	IT
9	Stockholm University, SU	SWE
10	University of Turku, UTURKU	FI
11	University of Helsinki, UH	FI
12	Finnish Forest Research Institute, FFRI	FI
13	Faculty of Science, University of Copenhagen, FS	DK
14	Dept of Geography and Geology, University of Copenhagen, DGG	DK
15	Greenland Institute of Natural Resources, GINR	GL
16	University of Oslo, UO	NOR
17	Norwegian Inst for Agriculture and Env. Research, BIOFORSK	NOR
18	Norwegian Polar Institute, NPI	NOR
19	Centre for Ecology and Hydrology, NERC	UK
20	Agricultural University of Iceland , AUI	ICE
21	Yugra State University, YSU	RUS
22	Institute for Biological Problems of Cryolithozone, IBPC	RUS
23	Geography Department, Moscow State University, MSU	RUS
24	Alfred Wegener Institute for Polar and Marine Research, AWI	GER
25	University of Alaska Fairbanks,UAF	USA
26	Uppsala University, UU	SWE
27	Research and Innovation Centre in Information, Communication and Knowledge Technologies,ATHENA	GR
28	Centre for Northern Studies, CEN	CAN
29	University of Alberta, UALBERTA	CAN
30	Arctic Monitoring and Assessment Programme	NOR
31	International Arctic Science Committee	GER
32	World Wide Fund For Nature	NOR

## **1: Scientific and/or technical quality, relevant to the topics addressed by the call**

### **1.1 Concept and objectives**

#### **Accelerating environmental changes in the Arctic and global impacts**

World attention is now focussed on the Arctic because of its rapidly changing climate that is faster than elsewhere, and changes in land use, socio-economics and globalisation of economies and cultures. In particular, geopolitical issues related to increased access to natural resources have alerted many nations to the growing importance of the Arctic.

There are major concerns about environmental changes in the Arctic and the implications of these both for the Arctic *per se* and for the rest of the world. Recent research and analysis of long term observations have indicated that the Arctic's land surface and its ecosystems are changing in many places. Permafrost temperatures are increasing, active layer thicknesses are increasing, snow cover duration, timing and snowpack structure are changing, most glaciers are retreating, lake ice duration is decreasing, ponds are forming in some areas as permafrost thaws while they are disappearing in other areas, biodiversity is changing as well as the timing (phenology) of biological events, vegetation zones are changing as shrub and forest expansion occur, and events such as forest fires and insect pest outbreaks are increasing in severity and frequency. These changes affect the residents of the North in terms of ecosystem services, transport and infrastructure stability while they affect the global community through feedbacks to climate and impacts on global biodiversity.

The processes leading to change are complex and vary in importance and even in direction throughout the large environmental envelope of the Arctic that encompasses huge variation in temperature and precipitation regimes (Fig. 1), topography, soil, hydrology, ecosystems and land use.

#### **Needs for, and concept to build capacity for observing, research and outreach**

The Arctic is so vast and so sparsely populated that our environmental observing capacity is limited compared to most other latitudes. Many Arctic observing systems have been relatively recently established, some older ones have been discontinued and many operate only for a few months of each year. Further, many terrestrial infrastructures have individual disciplinary foci while the general problem of environmental change is a multidisciplinary problem: drivers of change and impacts of responses vary from location to location. Consequently, our predictive power is limited and the rates of some important changes (such as changes in terrestrial biodiversity, permafrost and trace gas emissions) have been underestimated. Many new initiatives have been developed to improve our observational capacity (e.g. SAON, CBMP, ICOS) and our understanding of the Arctic's rapidly changing environment (e.g. many IPY initiatives). However, these major initiatives require the development of existing building blocks of infrastructures and their networks on which to base higher level co-ordination.

Key pre-requisites of improving environmental observation in the Arctic are to sustain the current observing capacity of existing infrastructures and their networking activities throughout the Arctic, expand this observing capacity by responding to new needs from the research, assessment and wider community (local, regional and global stakeholders), improve the efficiency of observing by developing and deploying new observing technologies implemented with standard protocols, and making archived and new observations more accessible to a wide range of users including developing partnerships with the research community, particularly those using experimental and modelling approaches. An essential part of capacity building is to engage the next generation of researchers by networking with educational organisations such as the University of the Arctic.

#### **A "bottom-up" existing building block for development into a Sustained Arctic Observing Network**

An existing and proven effective network of 33 terrestrial field bases throughout the Arctic is SCANNET ([www.SCANNET.nu](http://www.SCANNET.nu)). This network strategically samples the wide environmental and land-use envelopes of the Arctic (Fig. 1) and is also geographically diverse. It provides a wide range of disciplinary observations and research and gives outreach at all levels from school students to Government Ministers. These infrastructures already provide and facilitate the research and observations that contribute to major environmental assessments such as the Millennium Assessment of Ecosystems, the Arctic Climate Impact Assessment, IPCC and the current Arctic Council's Cryosphere Assessment, but the demands for innovative

observation, research and outreach are accelerating. These additional demands together with new opportunities arising from novel observation technologies and data management systems challenge the capacity of the existing infrastructures and their networks. Further, the compelling obligation to capture IPY legacy and particularly to build capacity by facilitating involvement by a new generation of researchers, requires a radical and innovative development of networking among the infrastructures and numerous stakeholders. INTERACT has a main objective *to build capacity for identifying, understanding, predicting and responding to diverse environmental changes throughout the wide environmental and land-use envelopes of the Arctic.*

Work package 1, “Management and Coordination” via its Project Office will facilitate this process by integrating the overall activities of the consortium. In parallel with the Project Office, an *internal* integrating activity will be a Station Managers’ Forum (work package 2). The main objective of this work package is *to provide a platform for exchange of information between station managers and other participants within SCANNET, and to use this platform to collect and disseminate knowledge embedded within the network.* The Station Managers’ Forum will be established as a cooperation, coordination and consultancy platform to generate input from the individual infrastructures to the network, its administration and its external partners and users. It will also be a gateway for access by all the remaining work packages to the infrastructures.

Work package 3, “International Cooperation”, is the *external* networking component of INTERACT. Its objective is *to secure the further integration of SCANNET (i) across the boundary of the EU, (ii) with other projects and networks within the EU, (iii) into the development of a Sustained Arctic Observing Network, (iv) as a player in the International Arctic Science Committee, and (v) as a lead of the terrestrial aspects of the Circum Polar Biodiversity Monitoring Project.* Work package 3 will insert INTERACT as an important element into the Sustained Arctic Observation Network as a coordinated/integrated, bottom-up driven platform for future terrestrial research and monitoring, covering the entire circum-arctic area. This work package aims specifically to further develop the cooperation between European, Russian, Canadian and US partners.

A key objective is to offer researchers access to infrastructures via the EU Transnational Access scheme. Work package 4 aims *to manage an efficient and transparent system to allocate funding to researchers that apply for access offered by Infrastructures in the network.* It also aims *to ensure the high quality of the science undertaken by the visiting researchers and the relevance of this research in the context of high level research questions formulated by leading international organisations such as IASC.*

INTERACT also aims to build capacity for observation in the remote, often harsh locations where SCANNET infrastructures are located and at periods of time when the stations are unmanned. Part of this capacity building is to consolidate virtual instruments as autonomous data acquisition systems that continuously adapt to changes in the environment, maintain high utility in the face of failures or interesting events and degrade gracefully when the optimal regime is no longer sustainable. Work package 5, “Virtual Instrumentation” has a main objective *to leverage low-power wireless communication capabilities to make in-situ sensing easier to manage and more effective.* WP 6 targets difficult, currently spatially and temporally restricted measurements of regionally and globally important biospheric feedbacks to climate. Work package 6, “Improved measurements of terrestrial feedbacks to climate” has a main objective *to use the site infrastructures to improve monitoring and facilitate research into key feedback mechanisms from northern terrestrial ecosystems in a changing climate.* Focus will be on the most sensitive parts of the Arctic terrestrial environment that hold the greatest importance for feedbacks in the climate system. Work package 7, “Data management” seeks to organise this data in a more efficient way to make it more relevant and accessible to the wider community. The two objectives of this work package are: *a) to develop and experimentally deploy a geo-tagging service for collecting spatio-temporal metadata about the activities of research in the field, and b) to develop a repository, adapted to the needs of ecologists and other terrestrial researchers, that will make it easier and more efficient to manage, publish and curate the data products obtained through SCANNET.*

All the information available from INTERACT will be passed on (by WP8 Outreach) to stakeholders including local residents, education at all levels and international organisations responsible for monitoring, research and assessment agendas.

## 1.2 Progress beyond the state-of-the-art

### 1.2.1 Networking activities, improved services and a culture of cooperation

The INTERACT sites already act as hosts to important network activities in the arctic arena such as IPA CALM (permafrost monitoring), ITEX (an ecosystem manipulation experiment), and ICOS (a climate carbon cycling measurement network). There is a current lack of resources to operate a comprehensive Arctic terrestrial network providing a “one-stop-shop” for the offers of research infrastructure in the Arctic. It comes at a time when the demands on the northern infrastructures to contribute to understanding our greatest global environmental concern are particularly acute. This problem has attracted the attention of the Arctic Council which has requested the development of a *Sustained Arctic Observing System*. Although this *process* has started, it is not a network and requires existing building blocks. Also, there is a new and increasing need for the development of adaptation strategies to climate change and its impacts (IPCC 5<sup>th</sup> Assessment, Nordic Council of Ministers). Although adaptation is a local process, networking will significantly improve the capacities of the infrastructures to supply appropriate tools for adaptation (e.g. statistical downscaling of climate to local scales) along with an enriched expertise (e.g. projections of changes in climate, climate feedbacks, changes in permafrost, hydrology, ecosystems and biodiversity).

Most of the arctic terrestrial infrastructures are located in remote, harsh environments and are unmanned for most of the year. This provides many practical problems to the technology of monitoring. However, the development of novel technologies and methodologies in the research and development communities provide as yet untested potential opportunities for the introduction of novel measurement systems. In other cases, the research community already has developed technology for specific measurements, e.g. climate feedbacks from energy and trace-gas fluxes, but this has not been tested or adapted to the variable environments and infrastructure operational procedures across the Arctic. Further, individual infrastructures have various practices for making data or metadata available, but there is no unified, easily accessible database for all the sites apart from the SCANNET web site which is at an early stage of development. Again modern developments in geo-tagging could provide tools that make data capture far more efficient than at present while providing tools that could greatly facilitate access to data from multiple disciplines in various contexts.

INTERACT will enhance the services provided by the research infrastructures in the proposed programme of activities and foster a culture of co-operation between the participants in the project and the scientific communities benefiting from the research infrastructures in many ways. It will enhance the services offered by the research infrastructures by:

- Developing “best practices” among infrastructures that will lead to better services in participating infrastructures across many areas including access, safety, on-going activities, etc. (WP 2)
- Supporting international initiatives on monitoring and research (e.g. SAON, CBMP, IASC, AMAP, ICOS, IPA/CALM, ITEX) as a combined network activity (WP 3).
- Providing a combined understanding of geographically varying processes to future environmental assessment programmes such as the IPCC 5th Assessment.
- Offering access to participating infrastructures to a wide research-user community in the EU (WP4) and developing staff exchanges with Canadian and US infrastructures, initially via the Embassies in Sweden.
- Extending the type of data that can be made available through the deployment of new sensors and improved monitoring activities (WPs 5 and 6)
- Making data capture more efficient and access to it easier and more appropriate through presentation in a geo-referenced format (WP 7)
- Offering access to data and metadata from throughout the network at one location (WP1)
- Providing central and local outreach that can extend local issues to wide audiences and general issues to local users (WP8). By linking INTERACT with citizen participation at the local scale and the University of the Arctic at the wider scale, INTERACT will greatly improve current services from the infrastructures to the public and all levels of education.

INTERACT will foster a culture of co-operation between the participants in the project and the scientific communities also in many ways that include: interactions among Station managers, interactions among the Joint Research Activities participants, interactions among the outreach participants and all other components of the network and interactions among existing researchers and participants and a new generation of researchers hosted at the infrastructures with support from transnational access funds.

1.2.2 Overall coherence of the infrastructure

The infrastructures offering transnational access are conceptually coherent by representing strategic “sampling” sites within the wide environmental and land use envelopes of the Arctic, both within the European North and beyond throughout the circumpolar North. The European infrastructures include representation of sites extending from the extremely cold, dry High Arctic in North-east Greenland to the relatively warm sub-arctic sites in Sweden and Norway, and from extremely wet locations (Faroe Islands) to the driest area in Scandinavia (Abisko) (Fig. 1). Further, the infrastructures are located in environmental space at locations where thresholds occur. For example, infrastructures located near the 0 degree mean annual temperature isotherm (Fig. 1) can expect severe changes in the cryosphere with increased temperatures whereas infrastructures located near the equilibrium line on glaciers could expect large environmental changes following changes in temperature or precipitation. Also, each infrastructure has its own surrounding environmental envelope, from the tops of mountains to the bottom of valleys. These local environmental envelopes can overlap between infrastructures and conceptually one can act as a future climate-change analogue of another. This relationship between local environmental envelopes together with the overall paradigm of sampling throughout environmental space, offers a conceptual coherence among infrastructures, each of which alone can contribute only partial knowledge on current environmental changes and their impacts.

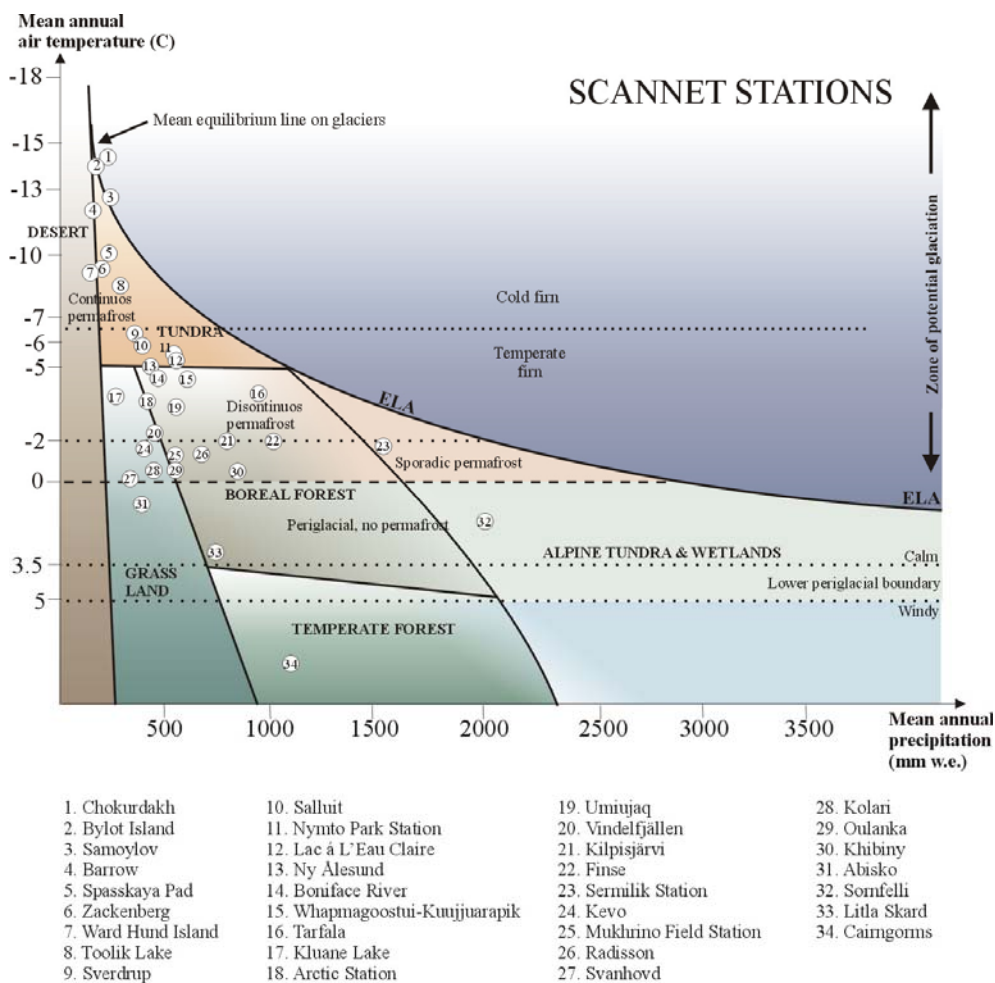


Figure 1: Location of the SCANNET/INTERACT infrastructures in environmental space. Note that land use variation and intensity decreases from top to bottom on the figure.

Many of the infrastructures offering transnational access within INTERACT already host state-of-the-art research and monitoring activities over a range of disciplines. This activity has resulted in the availability of high-quality services and unique operational possibilities within often harsh and geographically isolated locations. Other, smaller infrastructures add to the environmental and land use diversity, for example glaciological research stations and research stations focussing on permafrost and biogeochemical feedbacks to climate. Research from the arctic infrastructures has contributed to world-class science discoveries (e.g. autumn emissions of methane from the high Arctic (Mastepanov et al. in Nature), sensitivity of old carbon to temperature increases (Dorrepaal et al in Nature), failure of lemming cycles (Wahlgren et al. in Nature), penetration of glacial surface water to the glacier-bedrock interface and species responses to climate change (Post et al., Science) etc.

The current offer of transnational access will build on these achievements taking the infrastructures and their science to a new level to serve the current increases in demand by researchers and the global community for information on current and projected environmental change in the Arctic and its impacts on the planet. The transnational access committee (WP4) will develop strategies to maximise cross-fertilisation among new and existing researchers at the infrastructures, and also among existing and new members of the INTERACT network. The increase in data accessibility (WP1) will provide users with comprehensive contextual information on the environment around the infrastructures while new data handling procedures (WP7) will provide legacy in terms of readily-accessible data storage and access. Further, Joint Research Activities WPs 5 and 6 will develop partnerships between the research and monitoring communities to ensure that the infrastructures offer the best possible services in terms of data capture from environmentally complex and diverse terrain by developing appropriate sensors and networks of sensors. The Transnational Access Committee will work strategically to ensure that users of the infrastructures address high level research questions responding to gaps and recommendations published through international assessments (ICARP II, ACIA, IPCC, SWIPA) and required by Arctic Council working groups such as AMAP, CAFF and CBMP.

### 1.2.3 Improvement of the services provided by the infrastructures

There are three joint research activities within this consortium, work packages 5, 6 and 7: each is designed to improve the research and monitoring activities at the infrastructures and all are fully integrated with each other and within the network.

Work package 5 is a joint research activity that explicitly seeks to improve the performance of sensors already deployed at the sites, or intended to be deployed, and to improve data capture and communication. This development will focus in particular on sensor networking in remote, harsh environments and will use state-of-the-art wire-less technology to enhance current measurements of the environment that are often limited to locations close to the main infrastructure and time periods when stations are manned. The work package will also facilitate new measurements of environmental variables to enhance research and monitoring activities. The data loggers deployed today for in-situ sensing are stand-alone systems. Technicians spend a lot of time, checking these data loggers in the field, literally spending days walking around, checking that the data loggers are still working and uploading data on USB keys. Only few instruments already push their measurements to backend servers via satellite links because such communication is expensive. Low power wireless networks promise to transform in-situ ecosystem and related monitoring by (1) introducing automatic observations where only manual observation have been possible so far, and (2) by integrating stand-alone data loggers into virtual instruments, i.e., networked systems remotely monitored (telemetry) and controlled (telecommand) for higher utility. Implementation of this technology will greatly improve data capture at the infrastructures and this will serve numerous users of the facilities, from research to assessment. Further, the development and dissemination of a report on the developed technology, tested under extreme conditions at the infrastructures, will improve monitoring and research activities in the wider community.

Work package 6, is another joint research activity seeking to increase understanding of environmental change by improving technology and coverage of monitoring activities across the INTERACT sites. Whereas WP5 will develop technology for measuring environmental attributes with greater efficiency and feasibility, WP 6 will target improved measurement of the feedback processes to climate from the biosphere. This research topic has been identified as a major uncertainty and of global importance (IPCC, 2007). In the

terrestrial northern environments these feedback mechanisms relate to surface energy exchange and to greenhouse gas emissions. Relating to the latter a pan-European Integrated Carbon Observation Network (ICOS) is under establishment as an ESFRI project which deals with ecosystem greenhouse gas exchanges. Several INTERACT sites act as hosts for ICOS related measurements but as ICOS originated as a mainland European initiative the coverage in the INTERACT realm has important gaps. It is proposed to complement the ICOS network with a joint research initiative that develops measurements of greenhouse gas exchanges where these are not already anchored in the ICOS network. In terms of the energy exchange, climate modellers desperately need good measurements at dispersed sites in particular in the Arctic region where the feedbacks related to the seasonal snow and ice coverage are of great importance. INTERACT will aim at filling this gap by using the infrastructures as platforms for a series of internationally standard approved measurement stations distributed and maintained (using partly technology from WP5) at ten chosen sites in the INTERACT portfolio.

Work packages 7 logically follows from the two previous joint research activities in that it will develop and experimentally deploy a geo-tagging service for collecting spatio-temporal metadata about the activities of research in the field, and it will also develop a repository, adapted to the needs of ecologists and other terrestrial researchers, that will make it easier and more efficient to manage, publish and curate the data products obtained through INTERACT. This work package thus greatly improves the services of the infrastructures by making existing and new data more accessible and more efficiently stored. Both infrastructures and their users will benefit from this activity: the Station managers will have a new management tool to depict and plan research and monitoring locations while visitors will have access to geo-spatially explicit descriptions of relevant existing activities. Further, researchers will be able to use the tools for example, to identify geographical gaps in measurements.

### **1.3 S/T methodology and associated work plan**

#### **1.3.1 Overall strategy of the work plan**

See section 1.3.5 and section 2.3

#### **1.3.2 The timing of the different WPs**

The programme will run over four years and milestones and timing of deliverables can be seen in the table below.

YEAR 1					YEAR 2					YEAR 3					YEAR 4																																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
<b>WP1 (Management and Co-ordination)</b>																																															
T1.1 (Provide general co-ordination and administration)																																															
T1.2 (Establish and operate an International Advisory Board)																																															
T1.3 (Establish a Trans-national Access Board)																																															
T1.4 (Develop, up-date and extend the SCANNET web site)																																															
D1.4.1 (An extended and up-dated SCANNET web site that contains the products of the WP activities)																																															
T1.5 (Convene Consortium Meetings)																																															
T1.6 (Conduct project monitoring and perform any necessary interventions)																																															
D1.6.1 (PROGETTA)																																															
T1.7 (Report to the EC)																																															
T1.8 (Develop a "business plan" to secure maximum legacy from the project)																																															
D1.8.1 (Completion of a report that summarises the legacy of INTERACT ...)																																															
<b>WP2 (Networking activity: Station Managers Forum)</b>																																															
T2.1 (Establish and coordinate a Station Managers' Forum)																																															
D2.1.1 (Minute from the Annual Meetings in the Station Manager)																																															
D2.1.2 (Minute from the Annual Meetings in the Station Manager)																																															
D2.1.3 (Minute from the Annual Meetings in the Station Manager)																																															
D2.1.4 (Minute from the Annual Meetings in the Station Manager)																																															
D2.1.5 (Minute from the Annual Meetings in the Station Manager)																																															
D2.1.6 (Minute from the Annual Meetings in the Station Manager)																																															
D2.1.7 (Minute from the Annual Meetings in the Station Manager)																																															
T2.2 (Coordinate monitoring and research between sites)																																															
D2.2.1 (A report "Research and monitoring at SCANNET/INTERACT sites")																																															
T2.3 (Catalogue characteristics and abilities of SCANNET sites)																																															
D2.3.1 (A catalogue with descriptions of "Terrestrial field sites for environmental research in The Arctic")																																															
T2.4 (Establish best practices of station management)																																															
D2.4.1 (Report concerning "Best Practices" of Station Management...)																																															
T2.5 (Interaction with the stakeholder community)																																															
<b>WP3 (Networking activity: International co-operation)</b>																																															
T3.1 (Cooperate with non-EU SCANNET sites)																																															
D3.1.1 (Details of the non-EU infrastructures and their activities on the SCANNET web site)																																															
D3.1.2 ("Word models" of the non-EU infrastructures published...)																																															
T3.2 (Cooperate with other polar networks and infrastructures)																																															
D3.2.1 (Minutes from workshop with other European projects/programmes...)																																															
D3.2.2 (Report on the role of SCANNET in a European Arctic research strategy)																																															
T3.3 (Integrate SCANNET in SAON)																																															
D3.3.1 (Signing of Memoranda of Understanding with ...)																																															
T3.4 (Contribute to the work of International Arctic Science Committee)																																															
<b>WP4 (Transnational Access)</b>																																															
T4.1 (Management of Transnational Access)																																															
D4.1.1 (Selection and implementation of Transnational Access Board)																																															
T4.2 (Funding administration)																																															
D4.2.1 (Producing the reports)																																															
<b>WP5 (Joint Research Activity: Virtual instrumentation)</b>																																															
T5.1 (Best practice of...)																																															
D5.1.1 (Survey report of Networking in the Arctic)																																															
D5.1.2 (Web site pages on the SCANNET web site for networking best practises in the Arctic)																																															
T5.2 (Network data loggers)																																															
D5.2.1 (Prototype experimental deployment of ...)																																															
D5.2.2 (Synthesis report of Networked Data Loggers...)																																															
T5.3 (Automatic instrumentation)																																															
D5.3.1 (Design and Implementation of test an Automatic ...)																																															
D5.3.2 (Prototype test. Deployment of an Automatic ...)																																															
<b>WP6 (Up-gradina, extending and integrating measurements of feedback mechanisms from ...)</b>																																															
T6.1 (To develop and test in the field a fully ICOS compatible measurement station in connection with ...)																																															
D6.1.1 (ICOS station established in NE Greenland)																																															
T6.2 (Establish standardised continuous monitoring...)																																															
D6.2.1 (Ten distributed energy exchange stations established at key INTERACT sites ...)																																															
D6.2.2 (First year-round data on GHG and energy exchange available from...)																																															
D6.2.3 (Integrated analysis of relative importance of individual feedback mechanisms ...)																																															
D6.2.4 (Multi-year dataset on GHG and energy exchange from all northern ICOS and INTERACT energy exchange sites available...)																																															
T6.3 (Data provision)																																															
D6.3.1 (Fine-tuned operational system with multi-year data gathering experience in place providing legacy for continued...)																																															
<b>WP7 (Joint Research Activity: Data Management)</b>																																															
T7.1 (Geo-tagging data service)																																															
D7.1.1 (Abisko GIS)																																															
D7.1.2 (GIS user interface)																																															
D7.1.3 (Surveillance GIS)																																															
D7.1.4 (Document of standard protocols)																																															
D7.1.5 (Document of sampling rationale)																																															
T6.3 (Data provision)																																															
D7.2.1 (ScanDB specification Report)																																															
D7.2.2 (Demonstration of the ScanDB version 0 (software))																																															
D7.2.3 (Demonstration of the ScanDB version 1 (software))																																															
D7.2.4 (Usability Study of ScanDB (report))																																															
<b>WP8 (Interactions with Stakeholders including Outreach)</b>																																															
T8.1 (Task 8.1: Wider Knowledge Exchange)																																															
D8.1.1 (Info Pack and develop. of a Citizen Science program)																																															
T8.2 (Traditional Knowledge and Interaction with Indigenous Peoples)																																															
D8.2.1 (Capturing of traditional and indigenous knowledge)																																															
T8.3 (Interaction with the University of the Arctic through targeted educational programmes)																																															
D8.3.1 (Increased cooperation with the University of the Arctic)																																															
T8.4 (Public outreach website)																																															
D8.4.1 (Construction of a public website (connected to the SCANNET website))																																															

## 1.3.3 Work description

**Table 1.3 a: Work package list**

Work package No	Work package title	Type of activity <sup>1</sup>	Lead participant No	Lead participant short name	Person-months <sup>2</sup>	Start month	End month	Indicative Total costs	Indicative requested EC contribution
WP1	Management and Co-ordination	MGT	1	KVA	90	1	48	996000	996000
WP2	Networking activity: Station Managers Forum	COORD	2	NERI	139	1	48	1537784	1537784
WP3	Networking activity: International co-operation	COORD	2	NERI	41	1	48	293783	293783
WP4	Transnational Access	SUPP	3	UOULU	48	1	48	4761385	4761385
WP5	Joint Research Activity: Virtual instrumentation	RTD	6	ITU	47	1	30	524255	393191
WP6	Up-grading, extending and integrating measurements of feedback mechanisms from terrestrial environments in a changing climate	RTD	5	ULUND	72	1	48	1023288	767466
WP7	Joint Research Activity : Data Management	RTD	4	SLU	73	1	48	809032	606775
WP8	Interactions with Stakeholders including Outreach	COORD	19	NERC	12	1	48	219997	219997
				<b>TOTAL</b>	<b>522</b>			10,165526	9576382

<sup>1</sup> Please indicate one activity per work package:

MGT = Management of the consortium; COORD = Networking activity; SUPP = Transnational access activity or Service activity; RTD = Joint research activity; according to the description given previously in section 2.2 of the guide.

<sup>2</sup> The total number of person-months allocated to each work package, except human effort already included in the calculation of the access costs.

**Table 1.3 b1: Deliverables List**

Del. no.	Deliverable name	WP no.	Nature	Dissemination level	Delivery date
D1.4.1	Progetca management tool	WP1	O	PP	Month 1
D1.6.0	An extended and up-dated SCANNET web site that contains the products of the WP activities	WP1	O	PU	Month 1
D4.1.1	Selection and implementation of Transnational Access Board	WP4	O	PU	Month 1
D2.1.1	Minute from the Annual Meetings in the Station Manager	WP2	R	PU	Month 3
D7.2.1	ScanDB specification Report	WP7	R	PU	Month 6
D5.1.1	Survey report of Networking in the Arctic	WP5	R	PU	Month 12
D5.1.2	Web site pages on the SCANNET web site for networking best practises in the Arctic	WP5	R	PU	Month 12
D6.1.1	ICOS station established in NE Greenland	WP6	P	PP	Month 12
D6.2.1	Ten distributed energy exchange stations established at key INTERACT sites and operational through virtual instrumentation	WP6	O	PU	Month 12
D8.3.1	Increased cooperation with the University of the Arctic	WP8	R	PU	Month 12
D8.4.1	Construction of a public website (connected to the SCANNET website)	WP8	O	PU	Month 12
D3.2.1	Minutes from workshop with other European projects/programmes that provide arctic earth observations	WP3	O	RE	Month 13
D2.1.2	Minute from the Annual Meetings in the Station Manager	WP2	R	PU	Month 15
D2.2.1	A report concerning 'Research and monitoring at SCANNET/INTERACT sites'	WP2	R	PU	Month 15
D3.1.1	Details of the non-EU infrastructures and their activities on the SCANNET web site	WP3	O	PU	Month 15
D3.2.2	Report on the role of SCANNET in a European Arctic research strategy	WP3	R	PU	Month 18
D2.1.3	Minute from the Annual Meetings in the Station Manager	WP2	R	PU	Month 20
D3.1.2	"Word models" of the non-EU infrastructures published in the SCANNET Newsletter series	WP3	O	PU	Month 24
D3.3.1	Signing of Memoranda of Understanding with relevant international programmes, like AMAP and CBMP concerning the mutual interests of collecting, distributing and assessing information concerning the status of Arctic terrestrial earth systems and observations	WP3	O	CO	Month 24
D5.2.1	Prototype experimental deployment of Networked Data Acquisition Systems at Zackenberg and Abisko.	WP5	P	PU	Month 24
D5.3.1	Design and Implementation of test an Automatic Monitoring System for Phenology	WP5	R	PU	Month 24

D5.3.2	Prototype test. Deployment of an Automatic Monitoring System for Phenology at Zackenberg and Abisko.	WP5	D	PU	Month 24
D7.1.1	Abisko GIS	WP7	P	PU	Month 24
D7.2.2	Demonstration of the ScanDB version 0 (software)	WP7	P	PU	Month 24
D8.1.1	Information Packages and development of a Citizen Science program	WP8	R	PU	Month 24
D2.1.4	Minute from the Annual Meetings in the Station Manager	WP2	R	PU	Month 27
D2.4.1	Report concerning 'Best Practices' of Station Management and Administration at Arctic Research Infrastructures	WP2	R	PU	Month 27
D5.2.2	Synthesis report of Networked Data Loggers experimental deployments at Zackenberg and Abisko.	WP5	R	PU	Month 30
D6.2.2	First year-round data on GHG and energy exchange available from multiple sites	WP6	R	PU	Month 30
D2.1.5	Minute from the Annual Meetings in the Station Manager	WP2	R	PU	Month 31
D7.1.2	GIS user interface	WP7	P	PU	Month 32
D7.1.3	Surveillance GIS	WP7	P	PU	Month 32
D6.2.3	Integrated analysis of relative importance of individual feedback mechanisms associated with northern terrestrial ecosystems in a changing climate	WP6	R	PU	Month 36
D7.2.3	Demonstration of the ScanDB version 1 (software)	WP7	P	PU	Month 36
D8.2.1	Capturing of traditional and indigenous Knowledge	WP8	O	PU	Month 36
D2.1.6	Minute from the Annual Meetings in the Station Manager	WP2	R	PU	Month 39
D2.3.1	A catalogue with descriptions of 'Terrestrial field sites for environmental research in The Arctic'	WP2	R	PU	Month 39
D7.2.4	Usability Study of ScanDB (report)	WP7	R	PU	Month 42
D2.1.7	Minute from the Annual Meetings in the Station Manager	WP2	R	PU	Month 47
D1.8.1	Completion of a report that summarises the legacy of INTERACT and recommends ways forward to secure maximum legacy	WP1	R	CO	Month 48
D4.2.1	Producing the reports	WP4	R	PP	Month 48
D6.2.4	Multi-year dataset on GHG and energy exchange from all northern ICOS and INTERACT energy exchange sites available for analyses from INTERACT database	WP6	R	PU	Month 48
D6.3.1	Fine-tuned operational system with multi-year data gathering experience in place providing legacy for continued future monitoring of key parameters in the climate system	WP6	O	PP	Month 48
D7.1.4	Document of standard protocols	WP7	R	PU	Month 48
D7.1.5	Document of sampling rationale	WP7	R	PU	Month 48

**Table 1.3 b2: Summary of transnational access provision**

Participant number	Organisation short name	Short name of infrastructure	Installation		Operator country code <sup>2</sup>	Unit of access	Estimated unit cost (€)	Min. quantity of access to be provided	Estimated number of users	Estimated number of projects
			Number <sup>1</sup>	Short name						
1	KVA	ANS			+46	134	428800	3200	228	100
2	NERI	ZAC			+299	201	321152	1600	114	38
3	UOULU	OULANKA			+358	217	217380	1000	71	30
7	FINI	SCS			+298	38	61632	1600	114	40
9	SU	TRS			+46	138	99655	720	51	18
10	UTURKU	KEVO			+358	227	182008	800	57	20
11	UH	KILPIS			+358	232	162743	700	50	18
12	FFRI	KOLARI			+358	253	43020	170	12	8
13	FS	ARCST			+299	334	126969	380	27	10
14	DGG	SER			+7	84	40445	480	34	12
15	GINR	GINR			+299	676	301118	445	31	15
16	UO	FINSE			+47	136	97668	720	51	17
17	BIOFORSK	BIOFORSK			+47	295	354648	1200	85	30
19	CEH	CEH			+44	227	11593	51	7	4
20	AUI	LBHI			+354	208	12490	60	7	4
21	YSU	MFS			+7	33	53440	1600	114	38
22	IBPC	IBPC	1	CHO	+7	197	15750	80	6	4
22	IBPC	IBPC	2	SPA	+7	291	23283	80	6	4

<sup>1</sup> Number progressively the installations of a same infrastructure. An installation is a part of an *infrastructure* that could be used independently from the rest.

<sup>2</sup> Give the country code of the operator of the infrastructure or INO if the operator is an international organization.

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23	GD MSU	KHIBINY			+7	269	67365	250	18	10
24	AWI	SAM			+49	150	239264	1600	114	38

**Table 1.3 c: List of milestones**

<b>Milestone number</b>	<b>Milestone name</b>	<b>Work package (s) involved</b>	<b>Expected date</b>	<b>Means of verification</b>
WP2.M01	Station Manager Forum 1	WP2	Month 2	Meeting in the Station Manager Forum with participation of all station managers to collect, discuss and disseminate local knowledge embedded within the network for dissemination of management issues
WP4.M01	Transnational Access Board meeting	WP4	Month 2	Transnational Access Board will select the first users of INTERACT summer season based on the evaluation criteria jointly set and accepted.
WP5.M01	Presentation at Station Manager Forum - kickoff	WP5	Month 2	Meeting minutes
WP7.M01	1st Annual Station Manager Forum	WP7	Month 2	Integration with the SCANNET consortium at the annual station managers forum (WP2)
WP1.M01	International Advisory Board meeting	WP1	Month 2	Successful establishment of an appropriate International Advisory Board and implementation of annual meetings with appropriate outcomes
WP1.M02	Transnational Access Evaluation and Advisory Board	WP1	Month 3	Successful establishment of a Transnational Access Evaluation and Advisory Board
WP6.M01	Decision on detailed instrumentation requirements and ordering initiated.	WP6	Month 3	Equipment and protocols approved by user group.
WP6.M02	Establish standardised continuous monitoring of energy exchange at ten chosen INTERACT sites distributed around the North Atlantic region.	WP6	Month 6	Data quality validated.
WP4.M02	Transnational Access Board meeting	WP4	Month 9	Selection of users for first winter season by TA Board.
WP3.M01	Coordinating workshop with other relevant EU funded projects that provide arctic earth observations, forexample ICOS, SIOS, LifeWatch	WP3	Month 12	A workshop with other EU initiatives will be organised to co-ordinate observations, methodologies and standards used in observation and research and to promote common activities.
WP1.M03	First annual consortium meeting	WP1	Month 14	Meeting reports available on the web
WP2.M02	Station Manager Forum 2	WP2	Month 14	
WP4.M03	Transnational Access Board meeting	WP4	Month 14	Selection of users for second summer season by TA Board.
WP5.M02	Presentation at Station Manager Forum	WP5	Month 14	Minutes of the meeting
WP6.M03	Energy and trace gas exchange measurements	WP6	Month 14	Data quality validated.

	established at all sites and data stream initiated.			
WP7.M02	2nd Annual Station Manager Forum	WP7	Month 14	Coordination with the SCANNET consortium at the annual station manager forum (WP2)
WP1.M04	First Periodic report	WP1	Month 20	First Periodic report submitted to the commission
WP2.M03	Station Manager Forum 3	WP2	Month 20	Meeting in the Station Manager Forum with participation of all station managers to collect, discuss and disseminate local knowledge embedded within the network for dissemination of management issues
WP4.M04	Transnational Access Board meeting	WP4	Month 21	Selection of users for second winter season by TA board.
WP6.M04	First full year dataset evaluated and adjustments to routines decided on	WP6	Month 25	First full year dataset evaluated and adjustments to routines decided on
WP1.M05	Second annual consortium meeting	WP1	Month 26	Meeting reports available on the web
WP2.M04	Station Manager Forum 4	WP2	Month 26	Meeting in the Station Manager Forum with participation of all station managers to collect, discuss and disseminate local knowledge embedded within the network for dissemination of management issues
WP4.M05	Transnational Access Board meeting	WP4	Month 26	Selection of users for third summer season by TA board.
WP5.M03	Presentation at Station Manager Forum	WP5	Month 26	Minutes of the meeting
WP7.M03	3rd Annual Station Manager Forum	WP7	Month 26	Integration with the SCANNET consortium at the annual station managers forum (WP2)
WP2.M05	Station Manager Forum 5	WP2	Month 31	Meeting in the Station Manager Forum with participation of all station managers to collect, discuss and disseminate local knowledge embedded within the network for dissemination of management issues
WP4.M06	Transnational Access Board meeting	WP4	Month 33	Selection of users for third winter season by TA board.
WP1.M06	Third annual consortium meeting	WP1	Month 38	Meeting reports available on the web
WP1.M07	Second Periodic report	WP1	Month 38	Second Periodic report submitted to the commission
WP2.M06	Station Manager Forum 6	WP2	Month 38	Meeting in the Station Manager Forum with participation of all station managers to collect, discuss and disseminate local knowledge embedded within the network for dissemination of management issues
WP4.M07	Transnational Access Board meeting	WP4	Month 38	Selection of users for fourth summer season by TA Board.
WP7.M04	4th Annual Station Manager Forum	WP7	Month 38	Integration with the SCANNET consortium at the annual station

				managers forum (WP2)
WP6.M05	Multi-year datasets available and plan for continuation of measurements beyond month 48 made.	WP6	Month 42	Plan approved by user group.
WP1.M08	Final consortium meeting	WP1	Month 46	Meeting reports available on the web
WP2.M07	Station Manager 7	WP2	Month 46	Meeting in the Station Manager Forum with participation of all station managers to collect, discuss and disseminate local knowledge embedded within the network for dissemination of management issues
WP4.M08	Transnational Access Board meeting	WP4	Month 46	Selection of users for last winter season by TA Board.
WP1.M09	Final report	WP1	Month 48	Final report submitted to the EU commission
WP1.M10	Successful coordination	WP1	Month 48	Successful and timely completion of the deliverables in all work packages

**Table 1.3 d1: Work package description for Management, Networking activity or Joint research activity**

<b>Work package number</b>	1	<b>Start date or starting event:</b>				Month 1
<b>Work package title</b>	Management and Co-ordination					
<b>Activity Type</b>	MGT					
<b>Participant number</b>	1	2	8	3		
<b>Participant short name</b>	KVA	NERI	CLU	UOULU		
<b>Person-months per participant:</b>	80	0	10	0		
<b>Objectives</b>						
<p>The overall main objectives of Work package 1 are to facilitate and ensure the smooth-operation of the consortium, the integration of the various work packages to achieve synergy, and the successful and timely completion of the agreed tasks to yield the specified deliverables. To achieve these results, an important task of the Work package is to administrate resources and report to the EC.</p>						
<b>Description of work</b> (possibly broken down into tasks), and role of participants						
<u>T1.1: Provide general co-ordination and administration</u> (Leading Partner: KVA)						
<p>Task 1.1 will take care of the general administration, financial management, meeting planning and communication within and outside the consortium. ANS will provide an experienced coordinator and an executive secretary who will overview and facilitate all the activities of the consortium. ANS will also provide staff for general administration including financial management, arranging meetings and communicating within and outside the consortium.</p>						
<u>T1.2: Establish and operate an International Advisory Board</u> (Leading Partner: KVA Participants: CLU, NERI)						
<p>Task 1.2 will consult with work package 2 (Station Managers' Forum) and IASC (International Arctic Science Committee) to establish an International Advisory Board that will consist of representatives of the research user group, stakeholders, appropriate (Arctic, Antarctic and Global) monitoring and research networks and international organisations that undertake environmental assessments. Task 1.2 will convene and administrate meetings of the International Advisory Board during and back-to-back with annual consortium meetings.</p>						
<u>T1.3: Establish a Trans-national Access Board</u> (Leading Partner: KVA Participants: UOULU)						
<p>Task 1.3 together with work package 4 (Transnational Access) and IASC will establish a Trans-national Access Board to advise on strategies for trans-national access (infrastructure allocations, research topics, seasonal use of facilities etc). Once established, the board will be operated and administrated by work package 4.</p>						
<u>T1.4: Develop, up-date and extend the SCANNET web site</u> (Leading Partner: KVA)						
<p>Task 1.4 will secure a continuous update of the SCANNET website with information provided by work package 1 and other work packages. ANS will employ a web site manager to ensure that the integration of advances from the work packages are captured in an extended and up-dated web site that will be a "one-stop-shop" for terrestrial research and observation activities in the circum-Arctic and North of Europe. The web site will provide a new function for communication among the network members in addition to its existing function of external communication. The web site manager will collate new information from all participants but in particular from:</p> <ul style="list-style-type: none"> <li>• WP 2, the Station Managers' Forum (e.g. best practices for station management, infrastructure descriptions, metadata of research and monitoring activities, protocols for monitoring and observation).</li> </ul>						

- WP 3, International cooperation (e.g. information on Networks and organisations cooperating with SCANNET)
- WP 4, Trans-national Access (e.g. announcements of opportunities for transnational access, list of recipients)
- WP 5, Virtual instrumentation (e.g. sensor networking best practices)
- WP 6, Improved measurements of terrestrial feedbacks to climate
- WP 7, Data management (e.g. experimental geospatial data base of research and monitoring activities)
- WP 8, outreach - all aspects.

**T1.5: Convene Consortium Meetings (Leading Partner: KVA)**

Task 1.5 will take care of practical issues in relation to the planning of consortium meetings. Annual consortium meetings will be arranged by ANS. The agendas of the meetings will be designed by ANS cooperating with the International Advisory Board and the leaders of the remaining Work Packages. Two fundamental objectives of the meetings will be a) to review progress and b) to enhance and facilitate interactions among partners and WPs. The final meeting will be extended by inviting delegates from other networks, research users and stakeholders to communicate the achievements, enhanced capacity and future potential roles of the network. The practical planning of the meeting will be carried out by the staff mentioned under Task 1.1.

**T1.6: Conduct project monitoring and perform any necessary interventions (Leading Partner: CLU Participants: KVA)**

The objective of this task is to design, build and maintain Progetca for INTERACT. Progetca is a web based tool specifically developed (provided by the SME CLU) to secure an efficient monitoring by experts in this field of the project progress, to monitor a large number of partners and activities and to ensure an efficient communication transfer. ANS will intervene, if necessary, to explore reasons for any deviations from the works plans and will work with those responsible for tasks to apply contingency plans. In particular, Progetca will support project management to monitor the state of advancement of all the project activities, to control and evaluate delay and deadlines, to allow communication among project coordinator and INTERACT partners, to use analytic tools like GANTT and Submission Report, to generate automatically management reports, to gather documents, data and scientific files, to keep tracks of budgets.

**T1.7: Report to the EC (Leading Partner: CLU Participants: KVA)**

Task 1.7 will provide all relevant reporting on project progress, financial issues etc. to EC. ANS and CLU will work together with ANS to report as required to the EC. CLU, as a consultancy expert on administrative issues related to running EC projects will provide an interface with appropriate EC administrators for administrative questions arising during the project. Periodically, partner's contribution to project reporting, will be collected through Progetca and then minimally re-processed to be submitted to the Commission.

**T1.8: Develop a "business plan" to secure maximum legacy from the project (Leading Partner: KVA)**

An agenda item at the final consortium meeting will be to develop a road map for the continuation of the activities established with INTERACT and also to ensure implementation of technology and methodology developed within the project by work packages 5-7. During the running of the project, ANS will strive together with work packages 2 and 3, and the International Advisory Board to gain international funding for the continuation of the network within and outside the EU.

**Deliverables**

D1.4.1 : Progetca management tool (Month 1)

D1.6.0: An extended and up-dated SCANNET web site that contains the products of the WP activities

(Month 1)

D1.8.1 : Completion of a report that summarises the legacy of INTERACT and recommends ways forward to secure maximum legacy (Month 48)

<b>Work package number</b>	2	<b>Start date or starting event:</b>				Month 1	
<b>Work package title</b>	Networking activity: Station Managers Forum						
<b>Activity Type</b>	COORD						
<b>Participant number</b>	1	2	3	4	5	6	7
<b>Participant short name</b>	KVA	NERI	UOUL U	SLU	ULUN D	ITU	FINI
<b>Person-months per participant:</b>	4	83	4	2	2	2	4
<b>Participant number</b>	9	10	11	12	13	14	15
<b>Participant short name</b>	SU	UTUR KU	UH	FFRI	FS	DGG	GINR
<b>Person-months per participant:</b>	2	2	2	2	2	2	2
<b>Participant number</b>	16	17	18	19	20	21	22
<b>Participant short name</b>	UO	BIOFO RSK	NPI	NERC	AUI	YSU	IBPC
<b>Person-months per participant:</b>	2	2	2	2	2	2	2
<b>Participant number</b>	23	24	25	26	29		
<b>Participant short name</b>	GD MSU	AWI	UAF	CEN	UALB ERTA		
<b>Person-months per participant:</b>	2	8					

### Objectives

The objective of work package 2 is to provide a platform for exchange of information between SCANNET station managers and other participants within INTERACT, and to use this platform to collect local knowledge embedded within the network for dissemination of management issues in reports, and activities via the web site and outreach work packages. For this purpose, a Station Managers' Forum will be established as a cooperation, coordination and consultancy platform to generate input from the individual infrastructures to the network, its administration and its external partners and users (other projects and networks, stakeholders etc.). The Station Managers Forum will (i) facilitate knowledge exchange between the leaders of the different infrastructures to secure a common high level of information concerning the activities of the different stations involved in SCANNET, and it will (ii) collect information from the different stations to develop 'best practices' in relation to tasks of relevance for ecosystem monitoring, station management and administration, and (iii) catalogue the environmental conditions and the services provided at the different SCANNET sites for production of standardised information packages in hard copy and on the web site. Finally, Work package 2 will (iv) be used for the consortium members to discuss issues relating to the needs for, and testing and implementation of virtual instrumentation, improved data management and improved measurements of terrestrial feedbacks to climate carried out as joint research activities.

### Description of work

A Station Managers' Forum will be established (Task 2.1). The Station Manager Forum will meet at the annual consortium meetings to discuss consortium issues of relevance for the infrastructures and to collect - and pass to appropriate Work packages - knowledge concerning:

1. Research and monitoring at SCANNET stations (Task 2.2), to include:
  - a An inventory of research projects being carried out at SCANNET sites since year 2000 to up-date the web site
  - b An inventory of parameters currently being monitored at SCANNET sites to up-date the web site

- c Best practices for environmental monitoring of selected chemical, physical and biological parameters

2. Abilities of the stations within SCANNET (Task 2.3), for example:

- a Location
- b Climate
- c Physical setting
- d Research facilities and equipment
- e Accommodation facilities
- f Teaching/tuition offered
- g Long-term monitoring
- h Other issues to be defined

3. 'Best practices' of station management for different topics (Task 2.4), for example:

- a Regulation of access to the infrastructure
- b Administration and protection of the study area
- c Data policy in relation to external and internal users of the infrastructures
- d Balancing between service level and user payment
- e Marketing (how to make scientists aware of what the stations can offer)
- f Outreach (how to keep the general public local to each station aware of the science there)
- g Contact with local stakeholders and policy makers
- h Practices in relation to maintenance of long-term monitoring programmes
- i Facilitation of cooperation between logistics, monitoring and research at the infrastructures
- j Facilitation of cooperation between different projects and across science disciplines
- k Safety issues
- l Press policy
- m Other issues to be defined

Based on the knowledge exchange and discussions in the Station Managers' Forum, two reports and a catalogue will be produced, with the following working titles:

1. Research and monitoring at SCANNET sites - establishing best practices for long-term integrated research and monitoring (Task 2.2)
2. Terrestrial field sites for environmental research in the Arctic - geographical settings and services provided (Task 2.3)
3. Best practices of Station Management and Administration at Arctic Research Infrastructures (Task 2.4)

Besides the two reports and the catalogue, minutes will be produced from each of the meetings in the Station Managers Forum, and the information given in the catalogue 'Terrestrial field sites for environmental research - physical settings and services provided' will further be communicated by integrating it in the section 'Field sites' on the SCANNET homepage.

Integration with local stakeholders is highly prioritised (Task 2.5). Meetings in the consortium will be held at different field sites. Representatives from the local communities as well as representatives from relevant international organisations will be invited to participate in the

meetings and to provide their input and wishes in relation to the work at the sites, and particularly to address the development of adaptation strategies to climate change and its impacts. This input will be integrated in the first two of the reports mentioned above.

T2.1: Establish and coordinate a Station Managers' Forum (Leading Partner: NERI)

Establish and run a Station Managers' Forum for knowledge transfer between leaders of arctic research infrastructures. This forum will be used as (i) a platform for the exchange, collection and refinement of the information needed for the tasks below, (ii) a platform for discussions between consortium members concerning the virtual instrumentation and data management carried out by the consortium as joint research activities, and as a forum for discussions of administrative issues of relevance for the operation of the project.

T2.2: Coordinate monitoring and research between sites (Leading Partner: NERI Participants: SLU, FINI, UTURKU , UH, FFRI, AUI, UO, BIOFORSK, NPI, IBPC, BASC, GD MSU, AWI, SU, CEN, UALBERTA, GINR, FS, NERC, ITU, UOULU, ULUND, KVA, DGG, YSU)

Make (i) an inventory of research projects being carried out at SCANNET sites since year 2000, (ii) a review and standardisation of monitoring protocols and (iii) an advisory report to improve interoperability of collecting data (environmental monitoring activities). The information will be disseminated in a report and through the web site. Task 2.2 will collect - and pass to appropriate Work packages - knowledge concerning research and monitoring at SCANNET stations, to include:

- a An inventory of research projects being carried out at SCANNET sites since year 2000 to up-date the web site.
- b An inventory of parameters currently being monitored at SCANNET sites to up-date the web site.
- c Best practices for environmental monitoring of selected chemical, physical and biological parameters.

T2.3: Catalogue characteristics and abilities of SCANNET sites (Leading Partner: AWI Participants: SLU, FINI, UTURKU , UH, FFRI, AUI, UO, BIOFORSK, NPI, IBPC, BASC, GD MSU, AWI, SU, CEN, UALBERTA , GINR, FS, CEH, ITU, UOULU, ULUND, KVA, DGG, YSU)

Collect information concerning the environmental conditions and the services provided at each infrastructure in SCANNET (i.e. location, climate, physical setting, research facilities and equipment, accommodation facilities, teaching/tuition offered, long-term monitoring, etc.) and to disseminate this knowledge as a catalogue to be used by scientists for choosing the most appropriate site for their arctic research. The information will be disseminated in a report and through the web site.

Task 2.3 will collect - and pass to appropriate Work packages - knowledge concerning the abilities of the stations within SCANNET, for example:

- a Location
- b Climate
- c Physical setting
- d Research facilities and equipment
- e Accommodation facilities
- f Teaching/tuition offered
- g Long-term monitoring
- h Other issues to be defined

T2.4: Establish best practices of station management (Leading Partner: NERI Participants: SLU, FINI, UTURKU , UH, FFRI, AUI, UO, BIOFORSK, NPI, IBPC, BASC, GD MSU, AWI, SU, CEN, UALBERTA, GINR, FS, NERC, ITU, UOULU, ULUND, KVA, DGG, YSU)

Discuss and disseminate relevant information concerning 'best practice' of station management at the SCANNET stations to improve the services provided to the user communities. The information will be disseminated in a report and through the web site (Work package 1 and Work package 7).

Task 2.4 will collect - and pass to appropriate Workpackages - knowledge concerning 'Best practices' of station management for different topics, for example:

- a Regulation of access to the infrastructure
- b Administration and protection of the study area
- c Data policy in relation to external and internal users of the infrastructures
- d Balancing between service level and user payment
- e Marketing (how to make scientists aware of what the stations can offer)
- f Outreach (how to keep the general public local to each station aware of the science there)
- g Contact with local stakeholders and policy makers
- h Practices in relation to maintenance of long-term monitoring programmes
- i Facilitation of cooperation between logistics, monitoring and research at the infrastructures
- j Facilitation of cooperation between different projects and across science disciplines
- k Safety issues
- l Press policy
- m Other issues to be defined

#### T2.5: Interaction with the stakeholder community (Leading Partner: FINI Participants: NERI)

Interact with local and other stakeholders to encourage dialogues with the infrastructures, contribute with local-based monitoring and to provide Work Package 8 with relevant contacts.

Integration with local stakeholders is highly prioritised. Meetings in the consortium will be held at different field sites. Representatives from the local communities as well as representatives from relevant international organisations will be invited to participate in the meetings and to provide their input and wishes in relation to the work at the sites, and particularly to address the development of adaptation strategies to climate change and its impacts. This input will be integrated in the first two of the reports mentioned above.

#### **Deliverables**

- D2.1.1 : Minute from the Annual Meetings in the Station Manager (Month 3)
- D2.1.2 : Minute from the Annual Meetings in the Station Manager (Month 15)
- D2.1.3 : Minute from the Annual Meetings in the Station Manager (Month 20)
- D2.1.4 : Minute from the Annual Meetings in the Station Manager (Month 27)
- D2.1.5 : Minute from the Annual Meetings in the Station Manager (Month 31)
- D2.1.6 : Minute from the Annual Meetings in the Station Manager (Month 39)
- D2.1.7 : Minute from the Annual Meetings in the Station Manager (Month 47)
- D2.2.1 : A report concerning 'Research and monitoring at SCANNET/INTERACT sites' (Month 15)
- D2.3.1 : A catalogue with descriptions of 'Terrestrial field sites for environmental research in The Arctic' (Month 39)
- D2.4.1 : Report concerning 'Best Practices' of Station Management and Administration at Arctic Research Infrastructures (Month 27)

<b>Work package number</b>	3		<b>Start date or starting event:</b>			Month 1	
<b>Work package title</b>	Networking activity: International co-operation						
<b>Activity Type</b>	COORD						
<b>Participant number</b>	1	2	21	22	23	24	
<b>Participant short name</b>	KVA	NERI	YSU	IBPC	GD MSU	AWI	
<b>Person-months per participant:</b>	7	26	2	2		1	
<b>Participant number</b>	25	28	29	30			
<b>Participant short name</b>	UAF	CEN	UALB ERTA (LEC)	AMAP	CAFF	CBMP	EEA
<b>Person-months per participant:</b>							
<b>Participant number</b>	31	32					
<b>Participant short name</b>	IASC	WWF	SAON				
<b>Person-months per participant:</b>	1	2					

### Objectives

The main objective of Work package 3 is to secure the further integration and expansion of SCANNET/INTERACT (i) across the boundary of the EU, (ii) with other relevant projects and networks within the EU, (iii) within the development of a circum-arctic Sustained Arctic Observing Network, and (iv) as a leader of coordinated Arctic terrestrial science through participation in the International Arctic Science Committee.

Work package 3 will establish SCANNET/INTERACT as an important element in the arctic observation system as a coordinated/integrated, bottom-up-driven platform for future terrestrial research and monitoring, covering the entire circum-arctic area. The vision is that SCANNET will eventually become the terrestrial ecology component in a Sustained Arctic Observing Network and a one-stop entity for access to information on environmental change in land-based ecosystems, and landscape processes in the North. To achieve this vision, it is important to integrate SCANNET further both within the existing network (to develop the cooperation between European, Russian, Canadian and US partners) and also with relevant projects and stakeholders outside SCANNET. SCANNET/INTERACT will contribute to and facilitate the achievement of the terrestrial science agendas set by major international processes (e.g. the Arctic Observing Network (US), the sustained Arctic Observing Network (Arctic Council), the International Conference on Research Planning (International) and organisations (e.g. Arctic Council Working Groups, International Arctic Science Committee, European Environment Agency, World Wildlife Fund).

### Description of work

The specific goals of this work package are to:

- Increase further the integration in SCANNET of the non-EU partners, by identifying and implementing various means for increasing research/monitoring cooperation and facilitating trans-national mobility between the stations inside and outside the EU.
- Establish or increase the cooperation with other relevant projects and networks in the European Arctic, as for example the ESFRI projects SIOS, LIFE WATCH and ICOS
- Develop SCANNET into a terrestrial building block in the Sustained Arctic Observing Network (SAON) and in the Circumpolar Biodiversity Monitoring Programme (CBMP) that are both being developed by the Arctic Council.
- Provide information and recommendations to, and coordinate and facilitate IASC's terrestrial component for research into environmental change in northern lands.
- Contribute to and facilitate the achievement of the terrestrial science agendas set by major,

relevant international processes

T3.1: Cooperate with non-EU SCANNET sites (Leading Partner: KVA Participants: IBPC, BASC, GD MSU, AWI, CEN, UALBERTA, NERI, YSU)

Task 3.1 will exchange information with and further integrate the SCANNET infrastructures outside the EU. SCANNET consists of 32 infrastructures of which 15 are situated outside the European Union. Most of the non-European infrastructures have joined recently and as a result, the mutual level of information needs to be improved and sustained via the web site, outreach and joint research and observation initiatives. Further, it is important to improve the mobility of researchers between the infrastructures inside and outside the EU to strengthen the common platform for a future arctic research and monitoring network. This task will work on establishing a common platform for funding the entire SCANNET as one entity and will, in cooperation with tasks 2.2 and 2.3, improve the mutual level of information between the different infrastructures about research, monitoring and logistics at the different sites. This aspect of international cooperation will ensure that developments within INTERACT, such as those from the Joint Research Activities, will be available to the non-EU members. Exchanges of information will occur via the normal networking activities (Newsletter, web site, outreach products and within specific meetings. We will seek to convene these on at least a bilateral basis with support from the Embassies of the non-EU infrastructures. Also, a network-wide meeting will be arranged shortly after the start of and before the end of the project. Other meetings will be convened opportunistically (e.g. at disciplinary meetings, international conferences, joint funding opportunities, and international environmental assessments).

T3.2: Cooperate with other polar networks and infrastructures (Leading Partner: NERI Participants: EEA, AWI, AMAP, CAFF, CBMP, IASC, WWF, SAON)

Task 3.2 will establish links to and co-operate with other polar networking activities in the European Arctic, for example the ESFRI projects SIOS, LIFE WATCH and ICOS. Several initiatives have been taken by the EU in recent years to build/enlarge the scientific infrastructures in the Arctic. Most of these infrastructure initiatives are still in their preparatory phase. Task 3.2 will be devoted to identifying possible synergies and mutual benefits between SCANNET and other EU projects/programs to co-ordinate observations, methodologies and standards used in observation and research and to promote common activities. A meeting with the participation of other EU initiatives will be organized during the first phase of the project, and later communication will be maintained on a regular basis. It is the goal that SCANNET/INTERACT shall contribute to all the above mentioned ESFRI projects, to any other relevant projects established in the European Arctic, and to any networks using arctic infrastructures as platforms (e.g. ITEX, IPA CALM).

T3.3: Integrate SCANNET in SAON (Leading Partner: NERI Participants: AWI, UALBERTA, AMAP, CBMP)

Task 3.3 will secure cooperation with the Arctic Monitoring and Assessment Programme (AMAP) and the Circumpolar Biodiversity Monitoring Programme (CBMP) to provide a terrestrial building block for the Arctic Council's Sustained Arctic Observing Network initiative. In recent years, several attempts have been made to secure better coordination on an intergovernmental level of the earth observations carried out in the Arctic. The most recent initiative is the Sustained Arctic Observing Network that will eventually secure a coordinated environmental monitoring in the arctic earth system. SCANNET/INTERACT will participate in this process by (i) being a one-stop entity for provision of relevant information to AMAP and CBMP concerning the current status of Arctic terrestrial earth observations (for example by providing the information gathered by Task 2.2), (ii) helping build up the relevant organisational framework for a future terrestrial observation network (for example by contributing to the development of the terrestrial theme of CBMP), (iii) contributing in a coordinated manner to relevant feasibility studies necessary for the establishment of a SAON, and (iv) providing itself as a possible platform for the terrestrial component of a SAON. This task will be achieved by representation of SCANNET/INTERACT at relevant meetings of SAON, CBMP and AMAP, dissemination of the goals, methods and developments of these networks throughout SCANNET/INTERACT, and implementation where possible of relevant activities.

T3.4: Contribute to the work of International Arctic Science Committee (Leading Partner: KVA  
Participants: NERI, AWI)

Task 3.4 will provide recommendations for the development of the pending IASC terrestrial sub-committee and contribute to assessments of environmental change. It will provide a one-stop-shop for access by IASC to terrestrial infrastructures and networks in the Arctic while forming a consultative body of the infrastructure managers (together with Work package 2) and research users that can be interrogated to give advice on and contributions to the development of IASC's terrestrial activities. This task will be achieved via dissemination of IASC material throughout SCANNET and its users and by specific e-mail consultative trawls for suggestions and advice. IASC is expected to reciprocate by providing suggestions for independent members of some of the INTERACT Boards.

**Deliverables** (brief description and month of delivery)

D3.1.1 : Details of the non-EU infrastructures and their activities on the SCANNET web site (Month 15)

D3.1.2 : "Word models" of the non-EU infrastructures published in the SCANNET Newsletter series (Month 24)

D3.2.1 : Minutes from workshop with other European projects/programmes that provide arctic earth observations (Month 13)

D3.2.2 : Report on the role of SCANNET in a European Arctic research strategy (Month 18)

D3.3.1 : Signing of Memoranda of Understanding with relevant international programmes, like AMAP and CBMP concerning the mutual interests of collecting, distributing and assessing information concerning the status of Arctic terrestrial earth systems and observations (Month 24)

<b>Work package number</b>	5	<b>Start date or starting event:</b>				Month 1
<b>Work package title</b>	Joint Research Activity: Virtual instrumentation					
<b>Activity Type</b>	RTD					
<b>Participant number</b>	2	4	5	6	26	
<b>Participant short name</b>	NERI	SLU	ULUND	ITU	UU	
<b>Person-months per participant:</b>	6	8	3	14	16	

### Objectives

The objective of this work package is to leverage low-power wireless communication capabilities to make in-situ sensing easier to manage and more effective effective. First, we aim at enhancing existing data loggers with telemetry and telecommand capabilities by integrating them into a networked system. More specifically, our goal is to (a) design and test in the field IP-based low power networks that augment existing data loggers with telemetry and telecommand functionalities, (b) consolidate a test network of data loggers into a virtual instrument, and possibly (c) allow to multiplex a satellite link across several (virtual) instruments. Second, we aim at leveraging the interconnections between data loggers (and possibly between the loggers and the Internet) to design virtual instruments that adapt to changing conditions as they remain unattended for long period of times (up to 9 months at Zackenberg). The solution promoted in commercial data acquisition systems to tackle failures and anomalous situations consists in involving human supervision. Such solutions are not efficient in the arctic, where human intervention is either costly or impossible. In order to collect relevant datasets all year round, SCANNET needs to consolidate virtual instruments as autonomous data acquisition systems that (a) continuously adapt to changes in the environment, (b) maintains high utility in the face of failures or interesting events and (c) degrade gracefully when the optimal regime is no longer sustainable. Third, we aim at developing and testing an automatic observation system to replace manual observation of plant phenology. Such a system that relies on imagers and classification should be cheap (so that it can be deployed in many locations), dependable (so that ecologists can rely on its output), and easy to train and configure (so that it is easy for SCANNET participants to deploy it).

### Description of work

#### T5.1: Best practice of wireless networking of sensors (Leading Partner: UU Participants: ITU)

Prepare and share surveys about relevant wireless networking techniques (satellite, long/mid/short range radio, routers, terminals), and their application in the Arctic (noise model, limitations, lessons learned). In terms of application, we will review existing results and lessons learned in the course of the project. We will produce a written survey (D5.1.1), and we will describe networking best practises in the Arctic on the SCANNET website (one the model of the NSF funded polarpower.org that focuses on remote energy subsystems in polar regions) (D5.1.2).

#### T5.2: Network data loggers (Leading Partner: ITU Participants: NERI, ULUND, SLU, UU)

We will adopt a bottom-up approach, where we identify existing data loggers that can be integrated into a networked system (climate stations at Zackenberg and measurement chambers at Abisko). We will consider both statically defined networks that cover narrow areas (a few km<sup>2</sup>) and networks based on delay-tolerant and opportunistic communications (facilitated by humans carrying a personal router, or autonomous vehicles) that cover wide areas (tens of km<sup>2</sup>). We will define telemetry and telecommand functionalities that allow a site manager or a technician to remotely monitor and control the networked data loggers. We will also define controllers that allows unattended, autonomous operation of the networked data loggers. We will design, implement and test such systems in the field (D5.2.1). We synthesize the results from these experiments and the lessons learned for a larger scale, future deployment of such virtual instruments in the SCANNET sites (D5.2.2).

#### T5.3: Automatic instrumentation (Leading Partner: ITU Participants: NERI,)

The design will be decomposed in three subtasks. First, we will focus on image classification

based on the images that are available of e.g., dryas (a priori easy to monitor because both color and features change during the plant lifecycle) or salix (a priori hard to monitor because its structure is folded in 3D). We will identify the candidate pattern recognition techniques for our system. Second, we will identify the imagers that present an interesting price/resolution trade-off and whose operating range matches the constraints of a high-arctic deployment. Third, we will define an imager sensornet that can correlate measurements between multiple imagers to improve the quality of the classification. We will synthesize our design and implement (D5.3.1) and deploy our system for a test in the field at both Zackenberg and Abisko (D5.3.2).

**Deliverables**

D5.1.1 : Survey report of Networking in the Arctic (Month 12)

D5.1.2 : Web site pages on the SCANNET web site for networking best practises in the Arctic (Month 12)

D5.2.1 : Prototype experimental deployment of Networked Data Acquisition Systems at Zackenberg and Abisko. (Month 24)

D5.2.2 : Synthesis report of Networked Data Loggers experimental deployments at Zackenberg and Abisko. (Month 30)

D5.3.1 : Design and Implementation of test an Automatic Monitoring System for Phenology (Month 24)

D5.3.2 : Prototype test. Deployment of an Automatic Monitoring System for Phenology at Zackenberg and Abisko. (Month 24)

<b>Work package number</b>	6	<b>Start date or starting event:</b>					Month 1
<b>Work package title</b>	Up-grading, extending and integrating measurements of feedback mechanisms from terrestrial environments in a changing climate						
<b>Activity Type</b>	RTD						
<b>Participant number</b>	1	2	3	5	6	7	20
<b>Participant short name</b>	KVA	NERI	UOULU	ULUND	ITU	FINI	AUI
<b>Person-months per participant:</b>	5	5	5	32	0	5	5
<b>Participant number</b>	22	24	26	27	30	17	
<b>Participant short name</b>	IBPC	AWI	UAF	UU	UALBE RTA	BIO FOR SK	
<b>Person-months per participant:</b>	5	5	0	0	0	5	

### Objectives

The main objective of this RTD WP in INTERACT is to use the site infrastructures to improve monitoring and facilitate research into key feedback mechanisms from northern terrestrial ecosystems in a changing climate. These key feedback mechanisms have regional and global consequences and relate to ecosystem energy and greenhouse gas exchange as these are affected by changes in snow and other cryospheric components such as permafrost measured at the infrastructures. The feedback measurements will form a unique extension of existing integrated assessment networks (such as ICOS) within the EU to provide added value from the special geographical setting and coverage of the INTERACT sites. Focus will be on the most sensitive parts of the Arctic terrestrial environment that hold the greatest importance for feedbacks in the climate system and that we may benefit from in our understanding by making dispersed comparable continuous measurements in the North Atlantic region (and beyond through INTERACT and other circumpolar networking).

### Description of work

A key component in understanding the impact that northern terrestrial ecosystems are having on climate is the interaction with the atmosphere of energy and key greenhouse gas exchanges at the scale where it matters for the global atmosphere. A pan-European Integrated Carbon Observing System (ICOS) is under construction as a large scale infrastructure and it has received an official approval in several northern European countries (funded in Finland, Sweden, planning grants in Denmark and Norway). While ICOS in its initial faces has had focus on the European mainland there are many key issues relating to global energy and greenhouse gas exchanges that relate to high northern latitudes and the SCANNET (INTERACT) realm. INTERACT provides a perfect logistical base for extending the ICOS network of atmospheric stations to encompass the whole of the North Atlantic area. Stations are already established in northern Finland and Sweden but in Greenland there is an obvious lack and this leads to the first task

T6.1: To develop and test in the field a fully ICOS compatible measurement station in connection with the INTERACT facilities at Zackenberg/Daneborg in NE Greenland and other INTERACT sites that host ICOS facilities such as in northern Scandinavia and on Svalbard. (Leading Partner: ULUND Participants: KVA, NERI)

This task ensures a solid base for research into the impact and feedbacks from ecosystem greenhouse gas exchange in the north Atlantic area and in close ties with the main EU integrating efforts in this area. A further key issue in studying and improving knowledge on the feedback mechanisms in a changing climate relates to energy exchange. Here there is a desperate need for spatially distributed and fully comparable year-round measurements of the energy balance at a range of sites. Issues such as evaluating the relative importance of changes in the snow covered period versus changes in GHG emissions may be evaluated on the basis of the combined information from such standardised measurements and those conducted under task 6.1.

T6.2: Establish standardised continuous monitoring of energy exchange and test the performance under a range of environmental conditions at ten chosen INTERACT sites distributed around the North Atlantic region (Leading Partner: ULUND Participants: FINI, AUI, IBPC, AWI, UAF, UALBERTA, NERI, UOULU, KVA)

The combined measurements of ecosystem GHG exchange at ICOS sites and integrated analysis of atmospheric concentrations as part of the ICOS analysis of three-dimensional transport of trace gases with the detailed spatially distributed monitoring of energy exchange (incoming and outgoing short- and long wave radiation and sensible heat flux) will form a unique data package that may be used for a range of different research purposes. A first step in making this available is to provide easy access to these data and that is proposed to be done through the efforts in WP5 and WP7.

T6.3: Data provision (Leading Partner: ULUND Participants: KVA, NERI, ITU)

In conjunction with WP 5, develop integration of the measurements of feedback mechanisms with the virtual instrumentation and data management tools developed under WP5 and develop methods for making the combined research/monitoring network and its data stream accessible and operational through the data management developments in WP 7.

### **Deliverables**

D6.1.1 : ICOS station established in NE Greenland (Month 12)

D6.2.1 : Ten distributed energy exchange stations established at key INTERACT sites and operational through virtual instrumentation (Month 12)

D6.2.2 : First year-round data on GHG and energy exchange available from multiple sites (Month 30)

D6.2.3 : Integrated analysis of relative importance of individual feedback mechanisms associated with northern terrestrial ecosystems in a changing climate (Month 36)

D6.2.4 : Multi-year dataset on GHG and energy exchange from all northern ICOS and INTERACT energy exchange sites available for analyses from INTERACT database (Month 48)

D6.3.1 : Fine-tuned operational system with multi-year data gathering experience in place providing legacy for continued future monitoring of key parameters in the climate system (Month 48)

<b>Work package number</b>	7	<b>Start date or starting event:</b>				Month 1
<b>Work package title</b>	Joint Research Activity : Data Management					
<b>Activity Type</b>	RTD					
<b>Participant number</b>	2	4	5	6	27	28
<b>Participant short name</b>	NERI	SLU	ULUND	ITU	UU	ATHENA RC
<b>Person-months per participant:</b>	2	21	1	21	0	28

### Objectives

The two objectives of work-package 7 are: WP7.1) to develop and experimentally deploy a geo-tagging service for collecting spatiotemporal metadata about the activities of research in the field, WP7.2) to develop a repository, adapted to the needs of environmental researchers, that will make it easier and more efficient to manage, publish and curate the data products obtained through SCANNET.

### Description of work

The Abisko Scientific Research Station, Sweden, is a convenient node in the Arctic/Subarctic network of environmental observers, since it combines a typical Subarctic environment with relatively easy access. Here, research has been conducted for more than a hundred years by now, with approximately 500 scholars presently passing the station per annum. Although these activities have been generally well documented, the presence of effective archives is weak. This imposes an accumulating risk of conducting new experiments on grounds that are affected by previous activities. There is also a risk that information gaps and redundancies remain undetected, and that synergies across projects remain unexploited. In addition, public outreach is hampered by the lack of centralised information, and data communication unnecessarily complicated.

The latter topic of data communication is, perhaps, particularly important since limited data access constrains the inference and modelling efforts that rely on Abisko data. Being a node in several international networks of data exchange (e.g. the SCANNET), the Abisko station is obligated to provide high-quality data for such purposes. The main objectives of WP7 is, therefore, to implement a computerised database system that establishes and exploits an effective archive at the Abisko site, and to thereby consider Abisko as a node in the wider international network (WP7.1), and to establish a repository for environmental data across the SCANNET (WP7.2).

In this work package, we envision tomorrow's system for environmental survey, performed at local nodes of a distributed network, and especially at locations too harsh for permanent attendance. In such a system, collaborating sensor systems adapt to changing environmental conditions, and report via wireless links to a locally installed geographic information manager equipped with artificial intelligence. In a distributed network for environmental survey, such local systems interact in order to form a surveillance network under protocols and standards in-common. Due to intelligent design, global system characteristics such as parameters of information quality and output-versus-demand, may be surveyed in real time and fed back to the respective strategies of local survey. Hence, the main focus is on global system characteristics rather than on local nodes, although, of course, local nodes constitute the network.

Our vision represents a true systems perspective, where the focus is elevated from local initiative to the collective observational effort made at the network level. With our proposal, we invite the Seventh Framework Programme to represent the fore-front of innovative systems thinking in terms of observatory environmental networks. Since we do not wish to re-invent the wheel, the envisioned technologies are already in plentiful use (in merely any application of systems control engineering), and could probably be migrated and adapted for environmental survey. Since this would require close collaboration with specialist on environmental applications, a joint effort such as offered in FP7 would be ideal.

T7.1: Geo-tagging data service (Leading Partner: SLU Participants: UU)

At the Abisko Scientific Research Station, a web-based geographic information system for

visualisation and dissemination of metadata reflecting the Abisko surveillance effort through the last century (since 1903) will be constructed (D7.1.1). As a crucial part of this system, the user interface will allow continuous input of new geographic metadata as the Abisko enterprise proceeds (D7.1.2), thus constantly keeping the system updated and connected with previous research activities. The system will also visualise and present metadata on the survey equipment permanently installed at the Abisko site (D7.1.3).

With the Abisko site being a central node in the SCANNET, the resulting technologies for data acquisition, storage, and dissemination will be migrated throughout the network. Since this requires database protocols and standards in-common, we will explore and suggest suitable transfer-formats that correspond with international standards (D7.1.4). With the overall objective of coordinating the global (in the network perspective) observational effort with respect to observational redundancy and/or deficiency, a strategy for sampling the observational network is required. We will thus develop a rationale for efficient network sampling, with special emphasis on the statistical design of sampling techniques (D7.1.5).

#### T7.2: SCANDB (Leading Partner: ITU Participants: NERI, ULUND, SLU, ATHENA RC)

We will design, develop and test the usability of ScanDB, a repository for ecological data products (i.e., spatio-temporal time series datasets and their associated metadata). Even if the needs from ecologists are already quite clear, the first step in this task will be to obtain a record of precise articulations of these requirements (D 7.2.1). Having that, we will then build a baseline system by extending an existing database system with the features that ecologists need to manage their datasets: e.g., automatic data and metadata loading, provenance tracking, management of persistent simulation runs. In a first iteration, we will rely on techniques described in the machine learning and database literature to implement these features. We will then revisit the baseline system to meet the ecologists' requirements in terms of functionality and performance. In this process, we will critically examine both the design and implementation of each feature of the system and the way it is integrated with the data store and then proceed with developing improved versions. Candidates for the existing database system on which our baseline system will be built include (but are not limited to) Postgres, Oracle, and SciDB an extensible open source system database system being developed specifically for applications from the sciences<sup>2</sup>. The possibility of using other data systems that have been developed for managing scientific data that arise in other sciences will also be explored. The decision for choosing the right platform will be made in parallel with the ScanDB specifications Overall, we will build ScanDB through successive iterations over a database system extension that fits the needs of ecologists (D7.2.2, D7.2.3). We will distribute this prototype system to DMU and LUN to study its usability for the data collected at Zackenberg and Abisko (D 7.2.4).

#### **Deliverables**

- D7.1.1 : Abisko GIS (Month 24)
- D7.1.2 : GIS user interface (Month 32)
- D7.1.3 : Surveillance GIS (Month 32)
- D7.1.4 : Document of standard protocols (Month 48)
- D7.1.5 : Document of sampling rationale (Month 48)
- D7.2.1 : ScanDB specification Report (Month 6)
- D7.2.2 : Demonstration of the ScanDB version 0 (software) (Month 24)
- D7.2.3 : Demonstration of the ScanDB version 1 (software) (Month 36)
- D7.2.4 : Usability Study of ScanDB (report) (Month 42)

<b>Work package number</b>	8	<b>Start date or starting event:</b>			Month 1
<b>Work package title</b>	Interactions with Stakeholders including Outreach				
<b>Activity Type</b>	COORD				
<b>Participant number</b>	1	7	19		
<b>Participant short name</b>	KVA	FINI	NERC		
<b>Person-months per participant:</b>	4	4	4		

### Objectives

- To create targeted education programmes as well as development of transferring of knowledge at local and regional levels. Within the programme on Wider Knowledge Exchange, one focus will be on transferring knowledge from the SCANNET sites and its activities to local societies but also to interact with local stakeholders to find out what information they require from the local environmental researchers to be able to adapt to future environmental change and to inform how environmental research can contribute to building such knowledge.
- To create a diversified Citizen Science program as a two-way cooperation between the scientific and the public communities. The program will include a Citizen Science monitoring component designed to fit long term objectives of SCANNET. The aim is to encourage educational activity within the student community and the public by enabling them to undertake their own environmental monitoring and interactively report their findings. The outdoor monitoring activity will be organized as EarthCache-sites ([www.earthcache.org](http://www.earthcache.org)) within the popular Geocache GPS global network. The information on the SCANNET website will be linked to the Geocache website ([www.geocache.org](http://www.geocache.org)) and other popular out-of-doors portals. This will provide innovative ways for the public to discover and contribute to SCANNET's wealth of information.
- To establish targeted Education programmes that will use the present organisation of the University of the Arctic as a platform and recruitment base for students.
- To create interactive website pages for inclusion in the SCANNET web site with a suite of facilities including mapping, webcams, discussion forums, data access, photographs and popular science articles.

### Description of work

The primary objective of this work package is for the SCANNET community to inform and interact with the public, local stakeholders and primary, secondary and tertiary students. The work package aims a) to disseminate the current knowledge and future discoveries of the SCANNET community in order to highlight the importance of the Arctic, to alert people to changes and to influence attitudes and behaviours and b) to gather information from stakeholders on topics such as traditional/indigenous knowledge and community monitoring programmes while working together to contribute to local adaptation strategies to cope with impacts of climate change.

#### T8.1: Wider Knowledge Exchange (Leading Partner: FINI Participants: KVA, NERC)

We find it extremely important that there is an open dialog between the operators of the research stations and stakeholders as well as transfer of information and knowledge from the research stations to local inhabitants and the surrounding society. There are several reasons for this. Many of the INTERACT sites are situated in remote areas where they are both a vital part of the society as well as an important employer. In order to receive acceptance, interest and support from local stakeholders, it is important that they are well informed about the research activities and that stakeholders embrace the research stations as rewarding parts of their society. a) Within the Wider Knowledge Exchange programme INTERACT will encourage target stakeholder groups, like local stakeholders, teachers and school classes from participating countries to cooperate with similar groups from other localities in the North Atlantic region. This will combine informal learning opportunities about environmental awareness with meaningful monitoring activities where co

working participants from many countries make valuable contributions to the knowledge pool. b) Two week job-trainee opportunities will be offered for young people interested in environmental science at selected SCANNET sites following reviewed and established guidelines. c) A catalogue will be produced listing local scientists who can be invited by local stakeholders to talk about environmental awareness and the work and findings of INTERACT partners. This catalogue will be listed on relevant portals such as the SCANNET web site and sciencelive.net of the UK. d) A four-wall mobile exhibition will be made available for schools and other stakeholders. The exhibition will be in the languages of the participating countries. e) A popular science PPT-presentation for INTERACT will be made available as an option to complement locally produced information when schools and other stakeholders visit the sites f) An INTERACT Brochure, mainly for the public, will be produced. The brochure will be in the languages of the participating countries. g) An inspiring Best Practice Manual on how to deal with visits from schools or the public will be produced. This will be based on information and experience from the different SCANNET sites. h) A diversified Citizen Science program will include educational self activating tasks where the public in addition to more regular information is invited to carry out and report on local nature observation and monitoring in their local area. The aim is to encourage cooperation between the scientific and public community, by two directional communications where the public is invited to take on monitoring requests in their local area and share their environmental observations with the scientific community. This will be achieved by: i) the design of strategy and content of the Wider Knowledge Exchange program including courses, lectures, excursions, mobile exhibition, exchange opportunities and other outreaching services. j) the design and organization of a Citizen Science Program with a monitoring scheme for the public adjusted to long term monitoring objectives of SCANNET using interactive Web 2.0 reporting facilities. k) setting up hikes in selected parts of the SCANNET-sites as virtual treasure hunts where visitors can explore the local nature and learn how further environmental research is carried out. The hikes will follow the concept of EarthCache sites within the popular GeoCache-network (<http://www.earthcache.org>) where visitors equipped with a GPS are given information about the locality and a set of specific monitoring challenges (observe for instance wildlife, flora or water level). This leads them to go information hunting and later report their findings on the web site along with comments and questions. l) organising a volunteer component of the Wider Knowledge Exchange Program, where people can organize local events in order to collect historic data, for instance relevant historic photographs on environmental change. m) presenting the Wider Knowledge Exchange program and the Citizen Science Program on global popular communication platforms like Facebook, Geocache and GoogleEarth, thereby providing new windows for the public onto INTERACT's and SCANNET's wealth of information.

T8.2: Traditional Knowledge and Interaction with Indigenous Peoples (Leading Partner: KVA Participants: NERC, FINI)

As a complement to Task 8.1, which deals with present day observations, Task 8.2 will focus on historic environmental knowledge by communicating with elderly local stakeholders and in particular Indigenous peoples. Local/Indigenous people can be a unique source of valued information on local environmental changes, natural events and important dynamics in the physical environment as well as in the ecosystems. This wealth of information within traditional knowledge builds on observant peoples' experiences which are sometimes life-preserving and have accumulated over many centuries. This long-lived knowledge survives mainly as oral communication such as stories and is at risk of being lost if not documented. Much of it, such as in-depth knowledge of snow and other winter conditions, can contribute greatly to science knowledge. INTERACT will explore local traditional knowledge by: a) searching for people in local communities and among indigenous peoples rich in environmental traditional knowledge. The search will be performed through cooperation with local communities and data will be gathered through interviews, stories in the local news media and other outreach activities. b) establishing a contact network with volunteer informants throughout the INTERACT region who are interested in contributing their traditional knowledge to the scientific community. c) The information gathered through the contributions from volunteer informants will be registered in the SCANNET database and presented in a report.

**T8.3: Interaction with the University of the Arctic through targeted educational programmes**  
(Leading Partner: KVA)

INTERACT will cooperate with the University of the Arctic to inspire students to focus on the scientific challenges of the Arctic/Sub-Arctic and this way secure a new generation of researchers who can carry on a legacy of environmental research in the north and contribute to future development and network renewal. This will be achieved through: a) Increasing mobility among northern students and those from elsewhere interested in northern issues by making courses and excursions at the INTERACT sites available and more easily accessible in catalogues. This information will be spread through the UArctic's catalogue as well as through updated information through the UArctic and SCANNET's web sites. b) organizing information events where students connected to the INTERACT sites will be informed about the UArctic activities and encouraged to participate and where students can seek supervision and participation in projects at INTERACT infrastructures as part of UArctic courses. c) applying for membership of the UArctic consortium, since SCANNET has the potential to contribute significantly to the UArctic through its network of specialists, field stations, data and outreach activities. SCANNET aims to be represented at the annual Council Meetings and to represent INTERACT

**T8.4: Public outreach website** (Leading Partner: NERC Participants: KVA, FINI)

To construct a public outreach component of the SCANNET web site through collaboration with partners and stakeholders. This will be achieved through the following steps: a) holding a workshop within the first three months of the project to determine target audiences and to plan strategies for how knowledge, skills, network and data within the Interact partners most efficiently reach these target audiences. b) Using information from Tasks 8.1 - 8.3 to design and construct an Outreach component of the SCANNET website which will be designed to appeal to the target audiences and achieve the specific objectives identified in the strategy. It is likely to include interactive web2.0 elements (e.g. discussion forum and polls) enabling people to more closely engage with SCANNET experts and to join in debates about arctic and sub-arctic environmental issues. c) Evaluating the participatory stakeholder approach by following stakeholder interactions during the lifetime of the project with continual feedback sought from the user community both via the website and at other project events such as use of multi-media features (e.g. video, podcasts, games) which will be included to attract and engage the target audiences

**Deliverables**

- D8.1.1 : Information Packages and development of a Citizen Science program (Month 24)
- D8.2.1 : Capturing of traditional and indigenous Knowledge (Month 36)
- D8.3.1 : Increased cooperation with the University of the Arctic (Month 12)
- D8.4.1 : Construction of a public website (connected to the SCANNET website) (Month 12)

**Table 1.3 d2: Work package description for Transnational access**

<b>Work package number</b>	4		<b>Start date or starting event:</b>			Month 1	
<b>Work package title</b>	Transnational Access						
<b>Activity Type</b>	SUPP						
<b>Participant number</b>	1	2	3	7	9	10	11
<b>Participant short name</b>	KVA	NERI	UOULU	FINI	SU	Uturku	UH
<b>Person-months per participant<sup>1</sup>:</b>			48				
<b>Participant number</b>	12	13	14	15	16	17	19
<b>Participant short name</b>	FFRI	FS	DGG	GINR	UO	BIOFO RSK	CEH
<b>Person-months per participant:</b>							
<b>Participant number</b>	20	21	22	23	24		
<b>Participant short name</b>	AUI	YSU	IBPC	GD MSU	AWI		
<b>Person-months per participant:</b>							

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> INTERACT
<u>Location (town, country):</u> INTERARCT is a network of infrastructures which locate in: Abisko, Sweden; Zackenberg, Greenland; Oulanka, Finland; Allt a'Mharcaidh, Scotland; Godhavn/Qeqertarsuaq, Greenland; Tasiilaq, Greenland; Nuuk, Greenland; Kevo, Finland, Kilpisjarvi, Finland; Kolari, Finland; Hordaland, Norway; Borgarnes, Iceland; Torshavn, Faroe Islands; Svanhovd, Norway; Khanty-Mansiysk, Russia; Chokurdakh, Russia; Tulagino, Russia; Kirovsk, Russia; Tiksi, Russia; Nikkaluokta, Sweden
<u>Web site address:</u> <a href="http://www.scannet.nu/">http://www.scannet.nu/</a>
<u>Legal name of organisation operating the infrastructure:</u> <i>The Swedish Royal Academy of Science</i> <i>National Environmental research Institute</i> <i>University of Oulu</i> <i>Swedish University of Agricultural Sciences</i> <i>Lund University</i> <i>IT University of Copenhagen</i> <i>Faroe Islands Nature Investigation</i> <i>CLU ltd</i> <i>Department of Physical Geography and Quaternary Geology, Stockholm University</i> <i>Centre for Environmental Research of the University of Turku</i> <i>Faculty of Biosciences, University of Helsinki</i> <i>Finnish Forest Research Institute</i> <i>Faculty of Science, University of Copenhagen</i> <i>Department of Geography and Geology, Geocenter Denmark, University of Copenhagen</i>

<sup>1</sup> except human effort already included in the calculation of the access costs.

*Greenland Institute of Natural Resources*  
*University of Oslo*  
*Norwegian Institute for Agriculture and Environmental Research*  
*Norwegian Polar Institute*  
*Centre for Ecology and Hydrology*  
*Agricultural University of Iceland*  
*Department of Physical Geography, Utrecht University*  
*Institute for Biological Problems of Cryolithozone SB RAS*  
*Geography Department, M.V.Lomonosov Moscow State University*  
*Alfred Wegener Institute for Polar and Marine Research*

Location of organisation (town, country):

Stockholm, Sweden (Royal Swedish Academy)  
 Stockholm, Sweden (University of Stockholm)  
 Oulu, Finland  
 Lund, Sweden  
 Torshavn, Faroe Islands  
 Copenhagen, Denmark  
 Oslo, Norway  
 Turku, Finland  
 Helsinki, Finland  
 Penicuik, UK  
 Nuuk, Greenland  
 Utrecht, Netherlands  
 Moscow, Russia  
 Khanty-Mansiysk, Russia  
 Borgarnes, Iceland  
 Potsdam, Germany

Annual operating costs (excl. investment costs) of the infrastructure (€): The annual operating costs varies from 15627 to 1 034390 euros.

Description of the infrastructure:

Transnational Access WP offers the access to infrastructure's field sites and stations, laboratories, and experimental sites ranging from High-Arctic Greenland to sub-arctic in Scandinavia and to Siperia in Russia. The state-of-the art research and monitoring is done over the range disciplines covering glaciology, permafrost research, biogeochemical cycles and traditional ecosystem studies. The access is also offered to monitoring data and databases that some are over 50 years old. Infrastructures form the SCANNET network that has been operating together since 2001, all logistics, field sites and stations are operating and ready for the access to be offered. This unique combination of infrastructures gives an opportunity to study the Arctic in very different climate and environment from highest mountains to river banks, from peatlands to subarctic forests to Arctic tundra. Some infrastructures locate in very remote areas, which are not easily accessible for normal users so access offered is truly unique.

These networks and the infrastructures that belong to them, together with other infrastructures host or participate in national and international single-discipline networks such as IPA CALM permafrost monitoring), ITEX (an ecosystem manipulation experiment), and ICOS (a climate feedback network) etc. Currently, only one network, SCANNET, links all the major northern terrestrial ecosystems in the European North and throughout the Arctic. Access is given to all these experimental sites.

Detailed descriptions from all infrastructures can be found from individual descriptions.

Services currently offered by the infrastructure:

Many of the infrastructures offering transnational access within INTERACT already host state-of-the-art research and monitoring activities over a range of disciplines. This activity has been attracted by high-quality services and unique operational possibilities within often harsh and geographically isolated locations. Other, smaller infrastructures add to the environmental and land use diversity, for example glaciological research stations and research stations focussing on permafrost and biogeochemical feedbacks to climate. Research from these infrastructures has contributed to world-class science discoveries (e.g. autumn emissions of methane from the high Arctic (published in Nature), sensitivity of old carbon to temperature increases (published in Nature), failure of lemming cycles (published in Nature) and penetration of glacial surface water to the glacier-bedrock interface (ref in Nature) etc. Also, unique long-term observations and world-class research have contributed to the highest level of international environmental assessment such as Millennium Assessment of Ecosystems, ACIA, IPCC 4th Assessment, Arctic Council's Cryosphere Report etc. while leaders of some of the infrastructures have hosted Ministers of Environment, Ambassadors and climate negotiators from around the world including the Coreper I Committee from the EU. This unparalleled excellence has attracted tributes to some leaders of the infrastructures such as part of the collective award of the Nobel Peace Prize for 2007 to IPCC. These many and diverse contributions to science exemplify the high quality services offered by the infrastructures in terms of international science environment and also demonstrate that the more tangible infrastructure services offered (e.g. laboratories, environmental setting, technical services etc) have been of high enough standard to facilitate world-class science.

Some of the INTERACT infrastructures have previously been EU TARI sites during FP 5 and 6 (LAPBIAT and ATANS). The experiences and feedback gained from previous infrastructure periods of ATANS and LAPBIAT will be used. Both ATANS and LAPBIAT have been very effective in attracting users and more access days would have been used than were offered. Therefore it is anticipated the days offered in INTERACT will be used by qualified users.

**Description of work**

Modality of access under this proposal:

INTERACT visitors will be fully accepted as the members of the research community at the infrastructure and will get the required technical and scientific assistance. Equipments and laboratories will be available as well as access to computers and data sets. When special skills are needed the local technicians will assist. Research projects conducted by scientists and graduate schools and training sites running at infrastructures enhance the collaboration between external visitors and research groups in SCANNET members. Visitors can also do their research independently with the support needed.

From previous experience at LAPBIAT TARI periods the typical duration of the visit will be 25 - 30 days. The projects disperse to all fields of science present at the infrastructures therefore it is not possible to give any typical equipment or service used by the visitors. Visitors are expected to publish their results from the work done at the infrastructure in international peer reviewed journals.

Support offered under this proposal:

Most of the infrastructures operate and offer support to the visitors throughout the year. In every infrastructure user gets access to computer with either wireless network or fast connection (up to 100 Mbit/s) to internet, laboratory space with instruments and laboratory equipments needed, help from field, laboratory, engineering, computer technicians, and transportation to the field sites. The well experienced local staff can assist the selected visitors in using e.g. the laboratories and installing instruments to the network, it has also been a common manner that visitors leave their instruments to the facility e.g. for data monitoring. In these cases the technicians of the infrastructure takes care of these instruments and monitors that the data is collected properly. This will be done with no extra cost for the selected user. All infrastructures are accessed either by the public or infrastructures own transport, some infrastructures need helicopter or charter transportation, those costs have been included into the travel costs.

SCANNET members have organized and held several scientific workshops and conferences and in the case that external visitors are staying at the infrastructure during some of the future workshop or conference they are welcomed to participate. This of course will stimulate visitors with their research and give an important feedback on their work.

#### Outreach of new users:

The call for users will be opened twice a year: first one in February 2011 targeting for the summer season and second one in August targeting for the winter season. All together eight calls will be opened during 2011-2014. Followed by the each call the Transnational Access Board will receive gathered information on all applicants for review and will be called up a selection meeting.

The WP leaders of the TA will each year before the advertisements of the calls, together with the TA Board, discuss and decide (decision will be taken by the board) the strategic and scientific priorities. The focus should be in young scientists representing the other countries than INTERACT home countries. Additionally the winter studies will be promoted which normally does not dominate the activity at terrestrial field stations or the use of new developed equipment.

#### Review procedure under this proposal:

The TA Board will be appointed by the WP leaders that form a steering group and that decides and will have representatives with scientific skills relevant to the varying research themes represented by the different SCANNET stations. The board will consist of participants from both the SCANNET consortium as well as independent representatives (majority of members will come outside the SCANNET countries). The major mission of the TA Board will be to evaluate and make decision on successful applicants based on scientific merits. The access will be given to the stations that applicant has applied for. The TA board accepts the amount of research days per station based on the applications and makes sure that all stations will have users as planned.

The process will begin with widely advertised information to potential applicants that describes the facilities available for the application and the peer review process and, importantly, the scientific fields in which applications are invited. The information will be advertised on the web-sites of the individual stations and the SCANNET web-site, together with web-sites of leading research organisations and some wide spread scientific journals. Information on the call will also be spread through previous scientists and organisation contacts with the different SCANNET stations as well as through the Arctic Portal. Direct contact will also be taken with major European Universities active within the relevant research topics.

The decision on successful applicants this will be taken by the TA Board. External experts within the board will guarantee the transparency of the process. In cases of doubt or controversy, high level scientific expertise can be accessed through the members of the Royal Swedish Academy of Sciences to which the Abisko Scientific Research Station belongs. The process of advertising, organising the peer review process, liaising with the unsuccessful/successful applicants and reporting on the outcome of the process each year will be handled by the Work Package leaders. The TA Board will use the following criteria to assess the quality of applications but at the initial

and following meetings they will be given the opportunity to refine the criteria.

The criteria are:

- relevance of proposed research for the SCANNET network
- quality of the proposed research
- professional quality of the applicant and associated researchers
- feasibility (logistic, technological, home institutional and financial) of the proposed research
- innovation of the proposed research
- Added value to existing research (developing or filling in gaps etc.)
- overlaps or conflicts with existing research groups (e.g. where there are limited facilities or research sites)
- initiation of new lines for research
- request for excessive resources

The timeline for each year of the scheme will be:

- Advertisement of opportunity for application for Transnational Access to the SCANNET Stations
- Collation of applications and delivery to the TA Board
- Reporting of the review process back to the administration
- Meeting of TA Board to discuss applications and agree priority list of potential users
- Notification of outcome to applicants
- Payment to the successful applicants
- Collation of reports after visits and evaluation by TA Board
- Reporting to the EC Transparency, fairness and impartiality will be achieved by having outside members in the evaluation board. Board will also drive to gender balance with equal number of female and male members. All applicants will be evaluated based on the above mentioned criteria no matter of their gender or home organisation.

T4.1: Management of Transnational Access (Leading Partner: UOULU Participants: FINI, Uturku , UH, FFRI, AUI, UO, BIOFORSK, IBPC, GD MSU, AWI, SU, GINR, FS, CEH, NERI, KVA, DGG, YSU)

The main objective of this WP is to ensure that the management quality and transparency of both recruitment, amount of support to and research carried out by the visiting scientists will be carried out in an correct, transparent and efficient manner. The high level research questions responding to gaps and recommendations published through international assessments (ICARP II, ACIA, IPCC, SWIPA) and required by Arctic Council working groups such as AMAP, CAFF and CBMP will be emphasised. The supported research will also address priority areas identified by IASC and will help to formulate future agendas within the northern terrestrial environment.

This WP includes the management of the transnational access including the all practicalities related to opening the call, evaluating and selecting the users by TA board and reporting.

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T4.2: Funding administration (Leading Partner: UOULU)

University of Oulu will take care of the full administration of the Access Workpackage based on the experience of coordinating the LAPBIAT infrastructure in FP 5 and 6. The person will be hired for

a full time position and his/her tasks include:

- financial administration of the WP
- coordination of the access with visitors and infrastructure
- calling up the TA board meetings and taking minutes
- be a contact person between the coordinator and the visiting scientists and infrastructures in issues related to the access
- preparing the reports biannually and at the end of the project to European Commission according to the general guidelines from European Commission. Reporting includes also the reports to all partners
- follow up and collecting the information on the scientific articles produced by visitors
- \* other tasks appointed by the coordinator

### Deliverables

D4.1.1 : Selection and implementation of Transnational Access Board (Month 1)

D4.2.1 : Producing the reports (Month 48)

### Implementation plan

*Give a multi annual implementation plan for the full duration of the proposed project using the table below (implementation plan). The implementation plan quantifies the minimum quantity of access to be provided (e.g. in terms of beam-hours, experimental days) by the infrastructure if the proposal were to be accepted for funding, including the estimated number of users, number of person-days they will spend at the infrastructure and corresponding number of user projects. This table should include as many lines as necessary when the infrastructure is made up of several installations*

Short name of installation	Unit of access	Unit cost	Min. quantity of access to be provided	Estimated number of users	Estimated number of days spent at the infrastructure	Estimated number of projects
ANS	person-day	134	3200	228	3200	100
ZAC	person-day	201	1600	114	1600	38
OULANKA	person-day	217	1000	71	1000	30
SCS	person-day	38	1600	114	1600	40
TRS	person-day	138	720	51	720	18
KEVO	person-day	227	800	57	800	20
KILPIS	person-day	232	700	50	700	18
KOLARI	person-day	253	170	12	170	8
ARCST	person-day	334	380	27	380	10
SER	person-day	84	480	34	480	12
GINR	person-day	676	445	31	445	15
FINSE	person-day	136	720	51	720	17
BIOFORSK	person-day	295	1200	85	1200	30
CEH	person-day	227	51	7	51	4
LBHI	person-day	208	60	7	60	4
MFS	person-day	33	1600	114	1600	38

IBPC/CHO	person-day	197	80	6	80	4
IBPC/SPA	person-day	291	80	6	80	4
KHIBINY	person-day	269	250	18	250	10
SAM	person-day	150	1600	114	1600	38

Unit of Access: *Define clearly the unit of access being offered*

**Table 1.3 e: Summary of staff**

ID	PARTNER	WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8	TOTAL person months
1	KVA	80	4	7			5		4	100
2	NERI		83	26		6	5	2		122
3	UOULU		4		48		5			57
4	SLU		2			8		21		31
5	ULUND		2			3	32	1		38
6	ITU		2			14		21		37
7	FINI		4				5		4	13
8	CLU	10								10
9	SU		2							2
10	UTURKU		2							2
11	UH		2							2
12	FFRI		2							2
13	FS		2							2
14	DGG		2							2
15	GINR		2							2
16	UO		2							2
17	BIOFORSK		2				5			7
18	NPI		2							2
19	NERC		2						4	6
20	AUI		2				5			7
21	YSU		2	2						4
22	IBPC		2	2			5			9
23	GD MSU		2							2
24	AWI		8	1			5			14
25	UAF									
26	UU					16				16
27	ATHENA RC							28		28
28	CEN									
29	UALBERTA (LEC)									
30	AMAP									
31	IASC			1						1
32	WWF			2						2
		90	139	41	48	47	72	73	12	522

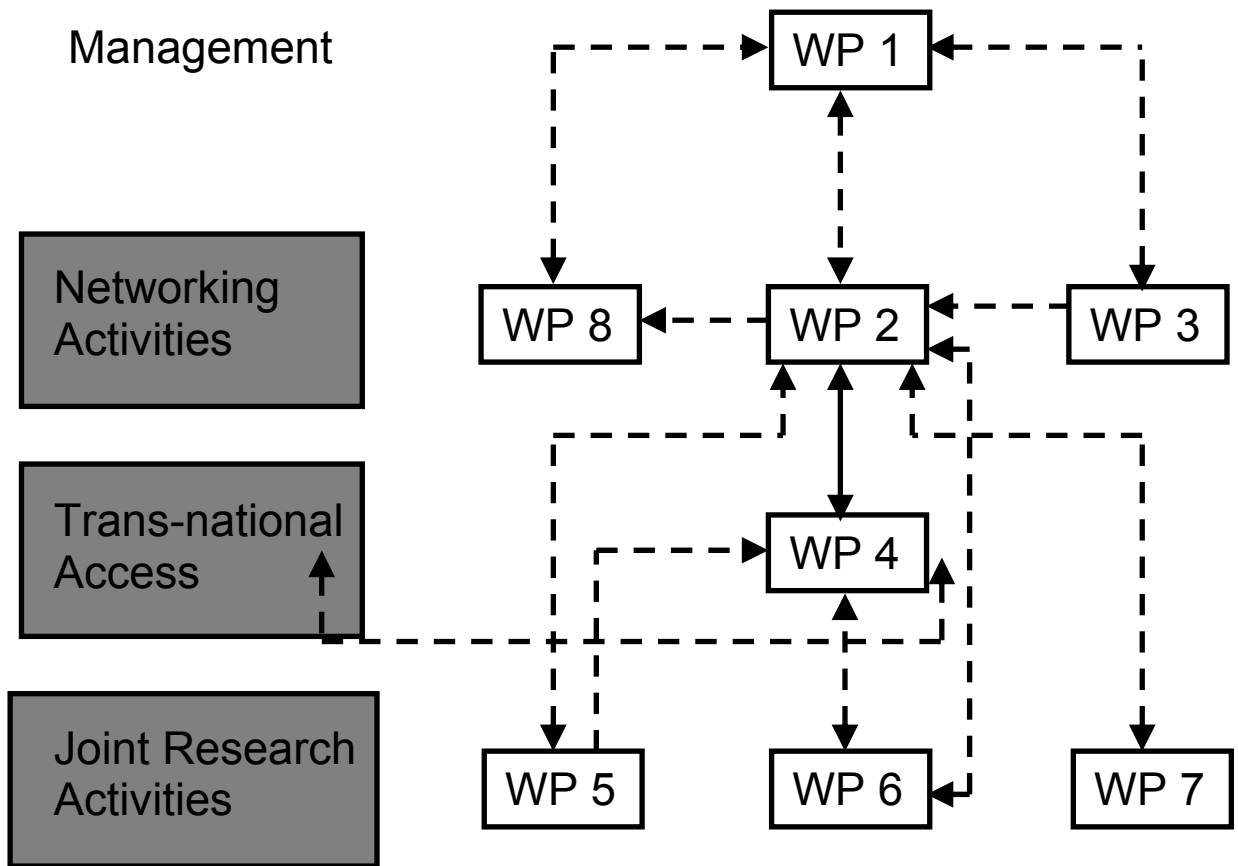
**Table 1.3 b2: Summary of transnational access provision**

Participant number	Organisation short name	Short name of infrastructure	Installation		Operator country code <sup>2</sup>	Unit of access	Estimated unit cost (€)	Min. quantity of access to be provided	Estimated number of users	Estimated number of projects
			Number <sup>1</sup>	Short name						
1	KVA	ANS			+46	134	428800	3200	228	100
2	NERI	ZAC			+299	201	321152	1600	114	38
3	UOULU	OULANKA			+358	217	217380	1000	71	30
7	FINI	SCS			+298	38	61632	1600	114	40
9	SU	TRS			+46	138	99655	720	51	18
10	UTURKU	KEVO			+358	227	182008	800	57	20
11	UH	KILPIS			+358	232	162743	700	50	18
12	FFRI	KOLARI			+358	253	43020	170	12	8
13	FS	ARCST			+299	334	126969	380	27	10
14	DGG	SER			+7	84	40445	480	34	12
15	GINR	GINR			+299	676	301118	445	31	15
16	UO	FINSE			+47	136	97668	720	51	17
17	BIOFORSK	BIOFORSK			+47	295	354648	1200	85	30
19	CEH	CEH			+44	227	11593	51	7	4
20	AUI	LBHI			+354	208	12490	60	7	4
21	YSU	MFS			+7	48	77056	1600	114	38
22	IBPC	IBPC	1	CHO	+7	197	15750	80	6	4
22	IBPC	IBPC	2	SPA	+7	291	23283	80	6	4
23	GDMSU	KHIBINY			+7	269	67365	250	18	10
24	AWI	SAM			+49	150	239264	1600	114	38

<sup>1</sup> Number progressively the installations of a same infrastructure. An installation is a part of an *infrastructure* that could be used independently from the rest.

<sup>2</sup> Give the country code of the operator of the infrastructure or INO if the operator is an international organization.

1. 4 Components interdependencies



1.5 Significant risks

The size and diversity of the network, together with its wider connections, provides a large buffering capacity that can deploy contingency plans should work plans be compromised by unforeseen events. No major risks to the work programmes can be identified but several minor risks exist as listed below (Table 1.5).

**Table 1.5:** Potential risks to the work plan, how they will be identified and actions to be taken

Activity	Potential risk	Mechanisms to identify deviation from work plan	Contingency plan
General	Delays in staff recruitment	a) Formal reporting through Projecta b) Information flow through the Coordination and Management Office c) Information flow through the Work Package leaders	Using the large buffering capacity of the whole network and its associated networks, together with the SCANNET Web Site to identify temporary (and project-duration) staff. (Note: working with arctic infrastructures is very attractive)
Co-ordination	Health	Within the project office	Using the buffering capacity of the project

			office and Station Managers Forum
Networking	None (Networking is already significant)		
Transnational Access	Over-representation of some infrastructures by applicants	TA Board and Project Office	Adjustments in future calls
	Under-representation of some infrastructures by applicants	TA Board and Project Office	Encouragements in future calls
	Failure of agreement by the TA Committee	Coordinator and Chair of the Station Managers Forum and Advisory Board	Directives from the Coordination
Joint Research activity: virtual instrumentation	High-cost of field tests in hostile high-arctic environments.	Partners experienced with preparing and conducting field tests in the arctic.	Experiments in SCANNET sites that are easier to access or have communication infrastructures
	Difficult classification of plant lifecycle in the arctic (low vegetation, low luminosity, low sun)	Image processing experts from ITU involved to review existing techniques that should be applied.	Involving image processing experts (from ITU) to develop new techniques.
Joint Research activity: feedbacks	GIS Large-scale engineering effort needed to obtain a usable prototype	Baseline system based on extensions of an existing system	Design of a complete system but implementation focused on specific functions.

## 2. Implementation

### 2.1 Management structure and procedures

#### 2.1.1. Management structure and procedures

The management structure proposed for INTERACT will be composed of several components as visualised in the following scheme (Figure 2), to ensure an efficient and well-structured project organisation resulting in a successful project.

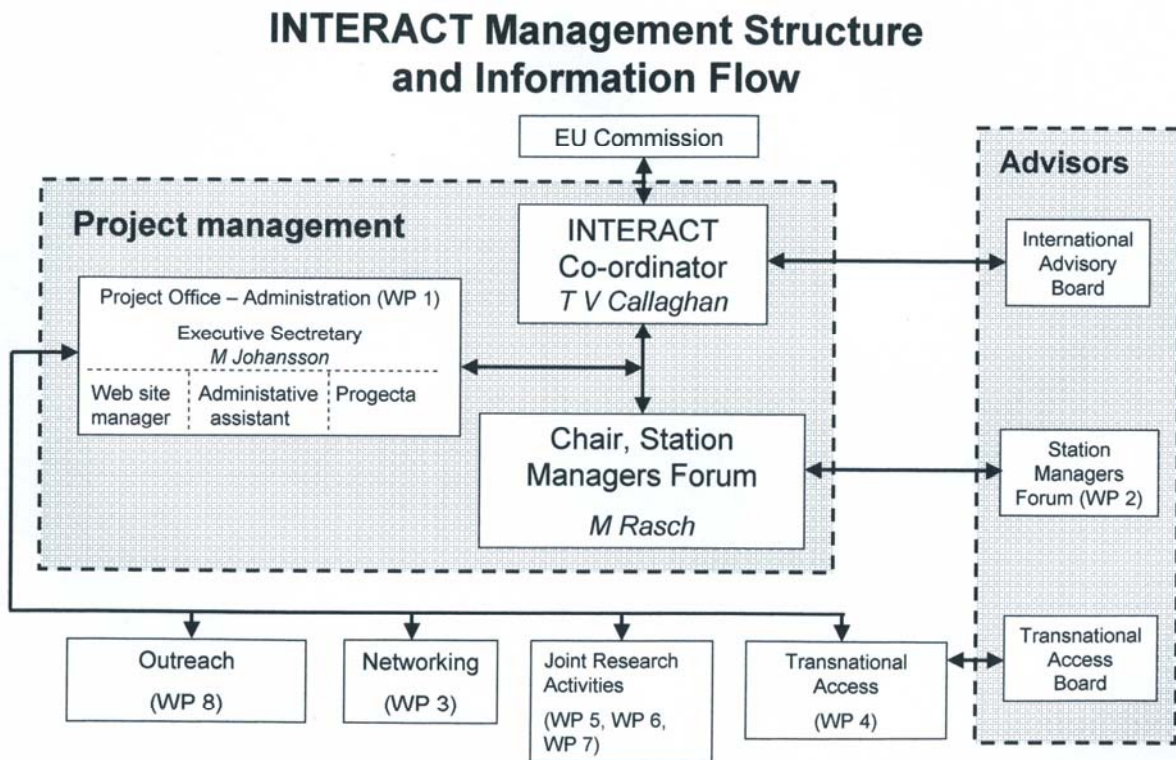


Figure 2: Interact management structure and lines of communication

##### 2.1.1.1. INTERACT Coordinator

The INTERACT Coordinator will be appointed by ANS and will be responsible overall for the project and the only interface between the project and the European Commission (EC).

He will also be responsible for a co-ordination office consisting of an Executive Secretary (M Johansson, Secretary of SCANNET), a web site manager (to be appointed), an officer in charge of reporting (Luisella Bianco, Director of CLU), and an administrative assistant (to be appointed).

The INTERACT Project Coordinator will be Prof. Terry Callaghan.

Prof. Terry Callaghan has studied Arctic ecosystems in all eight arctic countries for the past 42 years. He directs the Royal Swedish Academy of Sciences Abisko Research Station in Swedish Lapland (since 1996) that hosts up to 700 international scientists per year and an “in house” research centre (The Climate Impacts Research Centre) that he formed. He also directs the Sheffield Centre for Arctic Ecology and has Professorships at Sheffield University in the UK and Lund University in Sweden (honorary). He has a PhD, DSc and two honorary PhDs (from Sweden and Finland) for leading international collaborations in arctic research. He has published about 350 scientific papers with about 400 scientists from over 40 countries and is on the web of sciences’

most cited researcher list. Prof. Callaghan has led many international groups and major assessments of environmental change. He played a major role in the Arctic Climate Impact Assessment, was lead author on the polar chapters of the IPCC 4th Assessment, the Millennium Assessment of Ecosystems and is now co-leading (together with the Executive Secretary of INTERACT) the terrestrial components of the Arctic Council's Cryosphere Project (SWIPA). Terry Callaghan has successfully initiated and led many international groups of researchers and has chaired the EU consortium SCANNET since its inception in 2001. In 2007, he received the Nobel Peace Prize as part of the group award to the Intergovernmental Panel on Climate Change.

- Overall responsibility for the success and smooth running of the project.
- Overall quality of the project.
- Leading the Project Office through the Executive Secretary
- Planning and follow-up of General Consortium meetings and the Project Advisory Board meetings together with the secretariat.
- Preparing the Consortium Agreement
- Organising the project reviews by the Commission.
- Implementing (together with the Chair of the Station Manager's Forum when relevant) contingency plans following any possible deviation of a WP from a work plan
- Ensuring open communication between the Secretariat, via the Executive Secretary, and the Chair of the Station Managers' Forum
- Ensuring open communication between the Secretariat, via the Executive Secretary, and the Networking work package, the Transnational Access work package, three Joint Research Activity work packages and the outreach work package
- Ensuring open communication among all work packages, cross-fertilisation and synergy by arranging cross fertilisation meetings (together with the Chair of the Station Managers' Forum)
- Ensuring open communication between INTERACT and other relevant EU consortia and International networks
- Focussing and facilitating outreach by using the web site

The INTERACT Project Coordinator will be also be responsible for the correct application of all EU rules.

### **2.1.2. INTERACT Station Managers' Forum Chair**

A particular innovation of INTERACT's management structure is a parallel, but cooperative line of responsibilities, i.e. the coordination and the Station Managers' Forum (SMF). In parallel with the coordination activities, the management by the Chair of the SMF will include representing the interests of each infrastructure within INTERACT in the overall network and leading station-specific tasks. He will provide the interface that ensures that developments within the JRA's and TA are appropriate at individual infrastructure level while channeling material from the forum and the individual infrastructures to the web manager in the coordinator's office as well as to the outreach WP8 via the secretariat.

The Chair of the SMF will cooperate with the Coordinator to ensure the smooth running of the transnational access through WP4, networking through WP3 and the JRA's through WPs 5,6 and 7. Whereas the Coordinator will focus on the overall running and reporting of the WPs, the Chair of the SMF will focus on details of the WPs that relate to the functioning of the individual infrastructures. Both leaders will ensure that the three JRA's interact with each other and with the TA and Networking WPs: The coordinator will set meeting agendas to facilitate cross fertilisation while the Chair of the SMF will ensure that members of the various activities meet on the ground at relevant infrastructures.

The strengths of this system are

- a) the two parallel systems have a greater buffering capacity against management risks than one management line alone.

- b) The interests of the individual infrastructures (particularly the smaller ones) will be emphasised by the SMF whereas the interests of the WPs will be emphasised by the Coordinator.

The INTERACT Chair of the Station Managers' Forum is Dr Morten Rasch (ZAC).

Morten Rasch is scientific leader of Zackenberg Research Station in Greenland, he coordinates the programme "Greenland Ecosystem Monitoring" (GEM), and he is Executive Secretary of the Forum of Arctic Research Operators. He has more than fifteen years' experience in managing research stations and he has been deeply involved in developing the programme "Zackenberg Ecological Research Operations" to its current position as the most extensive cross-disciplinary ecosystem long-term research programme in The Arctic. Morten Rasch has been involved in SCANNET since the very beginning, and through GEM he is involved in many other international programmes like SIOS, ICOS, ITEX and CALM. He is mainly working as a manager, but has also his own scientific production including more than 100 publications.

### **2.1.3. Executive Secretary**

The Project Office will be managed by an Executive Secretary. This will be Dr Margareta Johansson, Secretary of SCANNET. Dr. Johansson works on permafrost in northern Sweden. Her research experience includes helping to coordinate major environmental assessments such as a chapter in the Arctic Climate Impact Assessment (ACIA) on terrestrial ecosystems, running the SCANNET Secretariat during the last 9 years, and being the coordinator for the Permafrost Young Researchers Network (PYRN) (2006-2008). Dr. Johansson is a convening lead author together with Prof. Callaghan for two chapters (snow and permafrost) of the new SWIPA cryosphere assessment (Snow Water Ice and Permafrost in the Arctic). Output: 24 peer reviewed scientific publications.

The Executive Secretary has the overall responsibilities of ensuring the smooth running of the Project Office (see below), that the staff of the Project Office implement the activities required by the Coordinator and Chair of the Station Managers' Forum, and that interactions between the Project Office and the partners work efficiently. When required, the Executive Secretary will deputise for the Coordinator or Chair, Station Managers' Forum.

### **2.1.4. INTERACT Project Office**

The INTERACT Project Office, to be led by the INTERACT Project Coordinator via the Executive Secretary, will be responsible for the day-by-day technical project management activities. It will ensure a continuous dialogue with consortium components and it will be in charge of the following activities:

- Monitoring the progress of the project:
  - supporting partners in following their schedule
  - keeping partners informed about project progress
  - logistical organisation of Project Meetings
- Efficient running of financial aspects with full accountability open to all participants:
  - receiving payment from the Commission and allocation to partners.
  - keeping accounts of payments received and distributed.
  - collection of cost statements and audit reports from partners and onward transmission to the Commission.
  - gathering information and reporting on access costs forwarded by the leader of the Transnational Access Work Package (UOULU)
- Partner contracting:
  - ensuring the signature, by all partners, of the EC Contract.
  - preparing and ensuring the signature of the Consortium Agreement, and providing support for any amendment of the Consortium Agreement.
- Reporting periodically to the Commission:
  - submitting all Project deliverables

- preparing intermediate and final reports with the collaboration of partners who will provide the necessary technical and financial material.
- organise the project reviews by the Commission.
- Planning Consortia meetings

#### **2.1.5. INTERACT Management Tool (Progetca)**

The Project Office will be supported by the project management tool Progetca, a web-based tool specifically tailored to monitor a large number of partners and activities, to ensure an efficient communication transfer and constantly to inform partners about their deadlines (Progetca has been used to structure this application). CLU Ltd will adapt the software to the specific needs and structure of the INTERACT project in order to have an efficient tool that will facilitate planning, allocation and good stewardship of resources, assessment of the risks and anticipation of the difficulties, constant monitoring of progress in respect of deadlines, quality control, reporting, and communication. Progetca will also manage mailing between the partners allowing different mailing lists to be set up for the whole project and for the components, WPs, and any other group that will have to use internal communication.

Different contributions, like EU Periodic Reports, will be collected through this system and then minimally re-processed to be submitted to the Commission. This last feature is a considerable help for the management since it avoids loss of time and effort of duplication. Finally, all documents will always be available on the web for ready access by all partners, thus speeding up revisions and avoiding delays as much as possible.

#### **2.1.6. The Work Package leaders**

The leaders of the individual work packages are responsible for ensuring the smooth running of the tasks within the work packages, and communicating with the Chair of the Station Managers' Forum, The Project Office and the Outreach work package. They are responsible for ensuring that milestones are reached and that deliverables are achieved satisfactorily and on time for submission to the Project Office. Also, the leader of WP4, transnational access, will be responsible for working with the transnational access board.

#### **2.1.7. INTERACT Meetings**

During the project life, a number of meetings will be organized by the Project Office together with the specific activity leaders, in order to make the internal communication as efficient as possible.

In particular, the following meetings will be organized:

- **General Consortium Meetings (all INTERACT partner's representatives and the Advisory Board)**
  - Kick-off meeting
  - 1st, 2nd and 3rd Annual meeting
  - Final meeting
- **Internal Project Meetings**
  - Networking activity meetings
  - Joint Research activity meetings
  - Individual Work package meetings (such as the Transnational Access Board)
- **Station Managers' Forum meetings.** The Station managers' forum meetings will mainly take place during the consortium meetings, but additionally two station managers' forum meetings are planned to take place at research stations with local communities. These meetings will allow the consortium to address specific SMF tasks (see work package 2) and will facilitate the smooth running of the project. A representative(s) from the SMF will

attend Internal project meetings to integrate the infrastructure perspectives with networking activities, JRA activities and outreach.

The two meetings at sites with local communities will further allow the forum to invite local stakeholders to the meetings, to give their input on issues of relevance.

- **Core group management meetings (Coordinator, Chair SMF, Executive Secretary)**  
These meetings will be called as needed by the Coordinator, Chair SMF or the Executive Secretary as needed. These meetings will be held in the most efficient ways possible, i.e. by conference phone, skype or during other meetings.

## 2.2 Individual participants

### Partner 1: The Royal Swedish Academy of Sciences (KVA)

The Royal Swedish Academy of Sciences is an independent organisation whose overall objective is to promote the sciences and strengthen their influence in society. The Academy seeks chiefly:

- to be a forum where researchers can meet across subject borders
- to offer unique research environments
- to support young researchers
- to reward prominent contributions to research
- to arrange international scientific contacts
- to act as a voice of science and influence research policy priorities
- to stimulate interest in mathematics and the natural sciences in schools
- to disseminate scientific and popular-scientific information in various forms.

Every year the Academy awards the Nobel Prizes in Physics and Chemistry, the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel, the Crafoord Prize and a number of other large prizes.

The Academy work is very much based upon the Academy's ten classes each representing a scientific subject field, and at its six research institutes. Committees, such as the Environmental Committee and the Energy Committee work with issues requiring a broad scientific competence. A secretariat assists the Academy in its day-to-day work and administers its many activities. It is headed by a Permanent Secretary and is situated in Stockholm.

The Abisko Scientific Research Station (ANS) is one of the Academy's research institutes. ANS is a unique, long-established, modern and comprehensive infrastructure situated in a wilderness area in Northern Sweden about 200 km north of the Arctic Circle. It has facilities of an international standard that support a range of research from observation and monitoring to high tech experimentation within a range of terrestrial and freshwater environments. It is open all around the year and can host up to 100 visiting scientists.

### Partner 2: National Environmental Research Institute, Aarhus University (NERI)

National Environmental Research Institute, Aarhus University (NERI) is the Danish national research institute for environmental research. The institute is situated at Aarhus University. NERI undertakes scientific consultancy work, monitoring of nature and the environment as well as applied and strategic research. NERI's task is to establish a scientific foundation for environmental policy decisions, *i.e.* to develop and disseminate knowledge on the structures, processes and linkages of significance for the use and protection of Denmark's environment and natural resources. As such, NERI undertakes monitoring in order to evaluate the effect of policy measures and to provide an overview of developments in order to facilitate the early identification of environmental problems. NERI has c. 400 employees working at the different facilities in the towns Roskilde, Kalø and Silkeborg.

Situated at NERI's Department of Arctic Environment is The Secretariat for Greenland Ecosystem Monitoring (GEM). GEM is organised as a centre-without-walls with participants from five Danish/Greenlandic institutions. GEM is responsible for ecosystem monitoring of climate change effects

changes in Greenland based on funding from The Danish Energy Agency, The Danish Environmental Protection Agency and The Government of Greenland. The work is carried out at the GEM research sites in Greenland, i.e. Zackenberg Research Station in Northeast Greenland and Kobbefjord close to Nuuk in West Greenland. The GEM Secretariat will represent NERI in SCANNET

### **Partner 3: UOULO, University of Oulu, Finland**

The University of Oulu was founded in 1958 and it has six faculties with 16 000 students. It is an international scientific community known for high-quality research and education that provides experts for demanding tasks on both national and international level.

The University of Oulu is one of the largest universities in Finland with an exceptionally wide academic base. Internationally pioneering research is conducted as a collaboration of different disciplines. The fields of information technology, biotechnology, northern and environmental issues have been defined as special research focus areas. The University cooperates closely with industry and commerce, and has broad connections with hundreds of international research and educational institutions. Research is conducted in 70 fields of science, new initiatives include advanced steel research, international business, geo- and mining engineering. The University promotes well-being and education in Northern Finland and is a significant player in the Finnish and European research based system of innovation and education.

The university's impact on and interaction with surrounding society rests on successful research and education and exceptionally close partnerships with City of Oulu, towns and municipalities, Oulu University Hospital, Council of Oulu Region, Employment and Economic Development Centre, Technical Research Centre of Finland, Geological Survey of Finland, Regional Environment Centre, Nokia, Polar Electro, EB, Stora Enso, Rautaruukki, Outokumpu, Kemira, Technopolis.

### **Partner 4: Swedish University of Agricultural Sciences (SLU)**

The Swedish University of Agricultural Sciences, SLU, is the prime Life Science university of Sweden with campuses located throughout the nation. Its research and education spans the range from genes and molecules to biological diversity, animal health, sustainable forestry and food supply at all possible scales from the microscopic to the global. The philosophy of SLU comprises interdisciplinary scholarship, a comprehensive view, applicability, and collaboration with industry and society.

The Department of Energy and Technology (ET) conducts research and education within the disciplines of bio-energy, biometry, systems analysis, and technology. Sustainable production of food, the logistics of food-supply, sustainable fuel production, recycling technologies, and mathematical/statistical assessment of biological and societal processes are some of the issues addressed.

Within the section of Biometry and Systems Analysis, the objective is to develop and apply methods for modelling, simulating and controlling societal, biological, as well as technical processes and systems.

### **Partner 5: The GeoBiosphere Science Centre at Lund University (ULUND)**

The GeoBiosphere Science Centre at Lund University (ULUND) is concerned with issues relating to the development of a predictive understanding of the impacts of changes in climate and atmospheric composition on terrestrial ecosystems and the feedback mechanisms on climate that may arise from these ecosystem processes. The Centre is merging and building on several strong research sectors represented by the co-applicants in Lund all concerned with ecosystem/atmosphere interaction studies. The proposing group from ULUND has in recent years been involved in several research and monitoring activities in relation to climate and environmental change in northern environments. The group furthermore has in-house close contact with associated modelling activities coupled to global dynamic vegetation modelling. The group is currently operating permafrost simulation facilities in the laboratory and in the field and is operating at several field sites for monitoring of land-atmosphere interactions in northern Sweden and in both low and high arctic Greenland. These sites are all using INTERACT infrastructure and are also connected with ICOS which the proposing group is coordinating the Swedish contribution to. The group has a long history of involvement and coordination of numerous EU projects e.g. CARBOEUROFLUX; CARBOMONT; CARBOEUROPE-GHG; GREENCYCLES-RTN; CARBOEUROPE-IP; NITROEUROPE-IP; ALARM-IP; CARBO-EXTREME.

Senior research personnel include Prof. Christensen who has 19 yr research experience on research into feedback mechanisms between high latitude ecosystems and the climate and has published 70+ peer reviewed articles on these topics. Prof. Lindroth has over 25 yr experience in ecosystem atmosphere exchange studies and is leading the Swedish national ICOS project.

#### **Partner 6: IT University of Copenhagen (ITU)**

The IT University of Copenhagen (ITU) was established in 1999 by the Danish Ministry of Science, Technology and Innovation to do teaching and research in IT including development of IT technology, its use, its interaction with other academic areas and its growing importance for all aspects of society. Approximately 1,500 students are enrolled at the university. There are around 60 full time faculty and 45 Ph.D.-students working in and across six faculty groups: Efficient Computation, Programming, Logics and Semantics, Software Development Group, Center for Computer Games Research, Innovative Communication and Design of Organisational IT.

Since its establishment, ITU has had a tradition for close collaboration with other research organizations as well as industry and professional and industrial bodies, nationally as well as internationally. Currently, ITU is in the process of becoming a globally interactive university with faculty, students and staff working in international teams together with Peking University (China), Georgia Institute of Technology (USA) and Singapore Management University (Singapore).

Associate Professor Philippe Bonnet

#### **Partner 7: Faroe Islands Nature Investigation, Jardfeingi (FINI)**

FINI is part of the Geoinformation Department of Jardfeingi (Faroese Geology and Energy Directorate). FINI is situated at Jardfeingi in Hoyvik, Faroe Islands, with monitoring facilities at Sornfelli and other places in the islands. FINI works in close cooperation with other monitoring institutions in the Faroe Islands focusing on landscape, erosion, climate, flora, grazing and other subjects. FINI undertakes multidisciplinary monitoring of nature and environment at onshore sites on the Faroe Islands. FINI has 3 part time employees.

Jardfeingi, the host of FINI, is situated in Hoyvik, Faroe Islands, and is the geoenvironmental survey of the Faroe Islands. The institution has the responsibility for geosurveys onshore and offshore, the administration of licences for oil exploration within Faroese territorial waters, the responsibility for geoscientific outreach including maintaining the geological museum and the development of alternative use of energy resources in the Faroe Islands. Jardfeingi has 26 employees.

#### **Partner 8: CLU**

CLU ltd is an Italian SME funded in 2001, focused on the project management of national and international researching project and the development of web applications related with Project Management. CLU ltd consultant activity aims at advising project Consortiums on issues of Project Management, Organization and Strategy. Moreover CLU Srl supports external and internal communication through dissemination action. CLU ltd personnel includes Project Managers, Environmental Scientists and Information Technology people. CLU is currently in the project offices and in the management bodies of several national and European project (ECOOP-IP, CIRCE-IP, SESAME-IP, WASSERMed, MFSTEP, other). CLU will lead the Task 1.2 (Project monitoring and reporting) setting-up the PROGETTA tool (web-based management tool) and will collaborate to the Task T1.3 (Financial management)

Key personnel: Dr. Luisella Bianco

She has got a degree in Physics. From 1994 to 1998 she has worked in a consulting company (Andersen Consulting) where she led different projects related to organization, communication matter and new media. From 1998 to 2001 she collaborated with Italian CNR, managing the implementation of communication tool for dissemination of the project results (MFSPP, MEDNET, SINAPSI). Currently she is the CLU Head of Division for Project Management

#### **Partner 9: Stockholm University (SU)**

The host, the Department of Physical Geography and Quaternary Geology at Stockholm University is northern Europe's largest Earth Science and Geography Department, offering education programmes in

geography, earth sciences and environmental management. The research programmes and advanced courses are focused on polar environments, climate change and landscape development, land- and water resources, landscape analysis, remote sensing and GIS.

TRS provides access to a unique alpine and sub-Arctic environment in northern Swedish Lapland. The environment offers good opportunities for research, education and within the fields of glaciology, glacial hydrology, alpine geomorphology, alpine ecosystem change, permafrost processes, mountain and glacier meteorology. The relationship between glaciers and climate has been studied in Sweden since the end of the 19<sup>th</sup> century. From 1945 onwards a detailed glacier massbalance program was set up in Tarfala now providing the longest massbalance monitoring data series of its kind in the world.

TRS is visited each year by scientists both from EU and outside EU countries. TRS is also regularly visited by University courses at undergraduate and postgraduate level.

Professor Gunhild Rosqvist

#### **Partner 10: University of Turku (UTURKU)**

The University of Turku, Finland's second largest university, is an international, multidisciplinary scientific University, which offers academic education and research-based instruction. Activities based on high quality and multidisciplinary create the preconditions for the University's profile internationally, nationally and regionally. The university is a member of the Coimbra Group, a network of prestigious universities in Europe.

Kevo Subarctic Research Institute of the University of Turku is part of the Centre for Environmental Research of the University of Turku, CERUT (one of the special units outside the faculties). CERUT's main function is to support and promote multidisciplinary environmental research and education, and it administrates the University Research Stations.

Key data University of Turku 2008: Students, degrees and staff

- Students 17,399
- Postgraduate students 2,095
- Foreign degree students 450
- Master's degrees 1,899
- Doctorates 133
- Employees 3,000
- Number of scientific publications 2,867, of which abroad published articles (ref.) 1,786

Key data 2008: Finances (€ 1000)

- Budgetary funding (Ministry of Education) 126,800
- External financing 56,500
- Overall expenditure, total 196,300

#### **Partner 11: University of Helsinki (Kilpis)**

The University of Helsinki carries out research of an internationally high standard. Research funding, honours and prizes awarded to our researchers are an indication of the wide-spread esteem among the global scientific community.

The University of Helsinki has regularly been ranked among Europe's 10 to 15 best universities on worldwide ranking lists of research universities. Some 470 doctorates are completed annually and nearly 10,000 scientific articles or monographs are published yearly by the university's researchers.

The University of Helsinki especially profiles an internationally high standard of scientific research and doctoral education. It is the only Finnish university listed in the League of European Research Universities (LERU), which was founded in 2002.

The high standard of research is borne out by Centres of Excellence, academy professor and research fellow positions, the Finland Distinguished Professor Programme (FiDiPro), and researchers who have received funding from the European Research Council (ERC).

#### **Partner 12: Finnish Forest Research Institute (FFRI)**

The Finnish Forest Research Institute (Metla) is an independent research organisation operating under the supervision of the Ministry of Agriculture and Forestry. Metla was established in 1917, and started its activities in July 1918. Since then Metla has grown considerably; the current network of research units covers the whole country. The Finnish Forest Research Institute is a governmental, sectoral research institute subordinate to the Ministry of Agriculture and Forestry. Metla's duties are defined by the law and statute to promote, through research, the economical, ecological, and socially sustainable management and use of forests. Metla's mission is to promote the ecologically, economically and socially sustainable development of the forests and forestry through research. In order to meet these goals.

Metla conducts research and generates research information about forest nature and environment, and different uses of forests, as well as about forestry and the forest cluster Metla serves the information end-users and acts as an expert in a wide range of forest-related statistical, monitoring and inspection tasks. Metla is responsible for forest-tree breeding at the national level, and conducts research in forest genetics. Metla performs the tasks assigned to it as a state authority. Metla publishes research results and serves information users by informing them about the latest results, events and other major topics related to forest research and forestry.

The research priorities include:

- Forest-based enterprise and business activities
- Social impact of forests
- Structure and functioning of forest ecosystems
- Information data bank on forestry and the forest environment

There are 330 researchers working at Metla, of whom about two thirds hold a degree in forestry. Other fields of expertise cover, e.g., general and business economics, social sciences, natural sciences, and technology. The supporting staff, i.e. technical staff and those working in administrative and other expert tasks, have a level of qualifications, motivation and wide range of skills. Approximately half of the staff are working in the Helsinki area and the other half at the other research units.

#### **Partner 13: Faculty of Science, University of Copenhagen (FS)**

The Faculty of Science at University of Copenhagen operates and is responsible for the Arctic Station. The station is supervised by a board set up by the Faculty of Science, University of Copenhagen. The board consists of four representatives from the botanical, zoological, geological and geographical research institutions, and a 5<sup>th</sup> member appointed directly by the Faculty of Science.

With its more than 525 years, the University of Copenhagen is one of the oldest universities in Northern Europe and has the role as the highest ranking and largest institution of education and research in Denmark. The Faculty of Science performs basic research and education ranging from traditional scientific disciplines such as biology, chemistry, physics, geography, geology, sports sciences and mathematics to specialised disciplines such as molecular biomedicine, nanotechnology, IT and computer science. All activities in education and research are conducted in nine departments in Copenhagen, Denmark. In addition, the faculty hosts nine national Research Centres of Excellence and with more than 6,000 students and 1,500 employees, it is Denmark's largest research and education institution within the natural sciences. The Faculty of Science stimulates interdisciplinary research environments through such initiatives as the establishment of a Polar Science Center, and the Faculty of Science is focused on strengthening its arctic research activities and its international position and further encouraging the Greenland-Denmark collaboration within arctic research and monitoring. Research infrastructures in the Arctic and in Greenland play an important role, and the faculty's two field stations (Sermilik Station and Arctic Station), both supporting comprehensive ecosystem monitoring programs, are absolutely central elements in further developing of internationally anchored arctic research and educational activities in Greenland.

**Partner 14: Department of Geography and Geology, University of Copenhagen (DGG)**

The Department of Geography and Geology operates and is responsible for the Sermilik Station. The Department is a part of the Faculty of Science at the University of Copenhagen. The department is also a part of Geocenter Denmark, a national center of geoscientific research, education, consulting, innovation and publishing at a high international level. The Geocenter Denmark is hosted by the University of Copenhagen and comprises the Department of Geography and Geology, the Geological Survey of Denmark and Greenland and the Geological Museum, with a total staff of about 500 and about 800 students. Arctic geosciences and climate change and a Greenland research program are among of the key research areas of Geocenter Denmark.

With its more than 525 years, the University of Copenhagen is one of the oldest universities in Northern Europe and has the role as the highest ranking and largest institution of education and research in Denmark. The Faculty of Science is organized in nine departments, including the Natural History Museum of Denmark, hosts nine national Research Centers of Excellence and has more than 6,000 students and 1,500 employees. It is Denmark's largest research and education institution within the natural sciences. The faculty stimulates interdisciplinary research environments through such initiatives as the establishment of a Polar Science Center, and the Faculty of Science is focused on reinforcing and solidifying its arctic research activities, strengthening its international position and further encouraging the Greenland-Denmark collaboration within arctic research and monitoring. Research infrastructures in the Arctic and in Greenland play an important role, and the faculty's two field stations (Sermilik Station and Arctic Station), both supporting comprehensive ecosystem monitoring programmes, are absolutely central elements in further developing of internationally anchored arctic research and educational activities in Greenland.

**Partner 15: Greenland Institute of Natural Resources (GINR)**

The Greenland Institute of Natural Resources (GINR) is the centre for environmental research of the Greenland Government. GINR's tasks, as defined by Greenland legislation, are to generate the scientific knowledge needed for using the living resources on a sustainable way and to provide advices on issues concerning the environment.

GINR is based in Nuuk, Greenland, and in 2009 it had a staff of around 50 people. A cross-disciplinary Danish/Greenlandic climate centre: "The Greenland Climate Research Centre" was imbedded in GINR in 2009 and as a result considerable growth is expected during the following years.

Research and monitoring activities focus on living marine resources (fish, shellfish, marine mammals and birds), land-based resources (land mammals and vegetation), as well as physical and chemical processes in the environment in relation to climate change and its impact upon society. Population surveys are conducted regularly. Population assessments and management advice are produced and reviewed in scientific committees under various international bodies in which GINR is represented.

In addition to the monitoring of fishing and hunting resources, GINR also takes part in the monitoring program "Greenland Ecosystem Monitoring" in high arctic Northeast Greenland at Zackenberg/Daneborg and in low arctic West Greenland at Nuuk.

GINR actively communicates with users of the environment (fishermen, hunters, and recreational users) and relevant stakeholder (administrators and politicians). Users of the environment, and their comprehensive knowledge of the natural environment, are included during planning and implementation of the Institute's activities.

**Partner 16: University of Oslo (UO)**

Finse Alpine Research Center (<http://www.finse.uio.no>) is located in the northwestern part of Hardangervidda, Europe's largest mountain plateau, in southern Norway. The surrounding landscape range from low/middle alpine zones around 1200 meters above sea level to high alpine environments at 1850 meters altitude. Precipitation is high and the snow-free season is only about 3 months long. The geology, as well as the small scale topography and soil types, is highly variable, making the area particularly interesting for environmental research. Ecological time-series have been collected at the center since early 1970's and the station is now part of the International Tundra Experiment, focusing on the impact of climate change on

selected plant species in tundra and alpine vegetation. The Hardangerjøkulen glacier, 2 km to the south of the center has also been subject of much research over the past decades.

The center is owned and operated by University of Oslo, but users from University of Bergen have equal access to the facilities. The center also attracts biologists, geologists, geophysicists and other researchers from a wide range of Norwegian and international institutions. The center consists of a research unit (13 beds) and a course and conference unit (44 beds). The research unit includes laboratories, IT-facilities (including broadband wireless internet), a temperature regulated room and four climate cabinets, aquarium facilities, a small library and a workshop. Seminars and meetings, as well as university field courses, are regularly held in the conference unit.

#### **Partner 17: Norwegian Institute for Agricultural and Environmental Research (Bioforsk)**

Bioforsk is a national R&D institute under the Norwegian Ministry of Agriculture and Food. The main areas of competence are linked to food quality and safety, agriculture and rural development, environmental protection and natural resources management. Bioforsk focuses on research-based innovation, value creation and sustainable resource utilisation. Bioforsk aims to be a regionally, nationally and internationally competitive knowledge producer and service provider.

Bioforsk has a staff of about 450, with an annual turnover of some €40 million. The R&D activities of Bioforsk are organized in seven research divisions, located in different regions of Norway.

Bioforsk Soil and Environment (with two units) have national responsibility for the research areas: soil, environment and resources. The division have a staff of about 85 persons, where 40 are researchers. The unit in Ås pursue applied science that contributes to a differentiated management concerning soil, waste, water and landscape. Whereas the unit at Svanhovd work with issues related to natural resources, environment and agriculture in the Barents Region, as well as Norwegian and Russian environmental cooperation.

The Svanhovd institution began its history in the middle of 1930`s. In 1993 Svanhovd Environmental Centre was established and received new assignments connected to Nature, Environmental and Agricultural questions in the Barents Region. Today Bioforsk Svanhovd is a unit within Bioforsk. Staffs consist of 26 employees with various competences. At Bioforsk Svanhovd, the work is organised as projects, and the work serves Ministries, regional and local authorities. Annual turnover budget is about 2 mills €, where 80 % is project sales.

The focus of Bioforsk Svanhovd work is towards tasks within ecology and environment and agricultural issues. Svanhovd is an essential partner in many nature and environmental projects, especially in the Russian part of the Barents Region. Bioforsk Svanhovd serve also documentation for the international environmental cooperation Barents Region, with emphasis on the border areas of Norway and Russia, where the target groups is researchers, managers, decision makers, journalists, schools, and local population. Activities like edition of publications, systematic collection of information, databases, organisation of information for the Internet, and quality insurance is carried out by Svanhovd. Barentswatch ([www.barentswatch.com](http://www.barentswatch.com)) is issued annually focusing on various aspects of environment. Svanhovd is also authorized National Park Centre for “Øvre Pasvik” National Park. The laboratory at Bioforsk Svanhovd has obtained accreditation on analyses of drinking and processing water quality and is the first European accredited laboratory (NS-EN ISO/IEC 17025) for individual genetic analyses of brown bear DNA by microsatellite analyses. Bioforsk Svanhovd has its own Svanhovd Conference Centre providing lodging with all facilities for up to 48 persons.

#### **Partner 18: Norwegian Polar Institute (NPI)**

The Norwegian Polar Institute (NPI) is the principal supplier of scientific information on polar regions for the Norwegian government, acting as its consultant on polar matters and helping to ensure that the environment is managed efficiently in keeping with international efforts to promote sustainable development. The institute is the main Norwegian institution concerned with scientific and environmental investigations in the Arctic and Antarctic. NPI is headquartered in Tromsø, with an office in Longyearbyen, Svalbard, and a research station (Sverdrup Stasjon) in Ny-Ålesund, Svalbard. The Institute operates an ice-strengthened research vessel, “R/V Lance”, equipped with modern marine science instrumentation and a

helicopter deck. NPI has a staff of 130 and an annual budget that exceeds 13.5 million EUR. The Research Division includes over 50 scientists that work in the fields of geophysics, biology, toxicology and geology. The institute also serves as a service institution, outfitting research expeditions via its logistics division. Finally, NPI provides public information about climate change and polar activities in general. NPI works in close co-operation with the special exhibition centre, Polaria, in Tromsø, as part of its public education activities. More information about the institute can be found at <http://www.npolar.no>.

#### **Partner 19: Natural Environmental Research Council (NERC)**

Natural Environmental Research Council (NERC) funds world-class science in universities and its own research centres in the United Kingdom including Center for Ecology and Hydrology. NERC is tackling the 21st century's major environmental issues such as [climate change](#), [biodiversity](#) and [natural hazards](#). They lead in providing independent research and training in the environmental sciences in the United Kingdom. [NERC's mission](#) is to gather and apply knowledge, create understanding and predict the behaviour of the natural environment and its resources, and communicate all aspects of our work.

The Centre for Ecology & Hydrology (CEH) is the UK's Centre of Excellence for integrated research in terrestrial and freshwater ecosystems and their interaction with the atmosphere. As part of the [Natural Environment Research Council](#), they provide National Capability based on innovative, independent and interdisciplinary science and long-term environmental monitoring, forming an integral part of NERC's vision and strategy. CEH has c. 600 employees working at the different facilities within the UK, including Wallingford and Lancaster in England, Bangor in Wales and Edinburgh in Scotland.

Working in partnership with the research community, policymakers, industry and society, they deliver world-class solutions to the most complex environmental challenges facing humankind. CEH is a major collector and custodian of long-term monitoring data and has significant capabilities in [data management](#). The majority of this work is carried out in collaboration with a wide range of partners. The Cairngorm long term monitoring site in Scotland is part of SCANNET and the UK Environmental Change Network (ECN). The ECN monitors a wide range of biota together with key aspects of climate, pollution and land management at a series of terrestrial sites across Great Britain and Northern Ireland. It aims to identify links between drivers of environmental change and biological responses across a range of trophic levels. The ECN was established in 1992 and currently has 12 terrestrial and 45 river and lake sites across the UK. ECN site manager of the Cairngorms will represent CEH and NERC in SCANNET.

#### **Partner 20: Agricultural University of Iceland (AUI)**

The Agricultural University of Iceland is a small institution with staff in excess of one hundred and approximately 400 students. The headquarters of the University are at Hvanneyri in Western Iceland, but four smaller research branches are located in different parts of the country. The environmental research carried out at the Agricultural University of Iceland is aimed at increasing our understanding of the processes and function of Icelandic ecosystems and the effects of land-use and climate there on. Within Iceland the AUI is foremost in the fields of soil science, restoration ecology, wetland ecology, rangeland ecology, ecosystem hydrology and ecosystem carbon cycling. Within these fields the AUI undertakes applied and strategic research, monitoring of nature and the environment as well as scientific consultancy work.

#### **Partner 21: Yugra State University (YSU)**

Ugra State University was founded in October 2001 on the initiative of the Government of the Khanty-Mansi Autonomous Okrug – Ugra by the Government of the Russian Federation

The Ugra State University is one of the youngest public universities in Russia. The University has 6 Institutes for Education and research: “Economics and Finance”, “Language, History and Culture of Ugra”, “Sports and Tourism”, “Applied Mathematics, Computer Science and Management”, “Geology, Oil and Gas” and 6 Departments: “Humanities”, “Engineering”, “Arts”, “Law” and “Distance Learning” The University has grown very fast. Today 6000 full-time students are registered.

Yugra State University (YuSU), with its state-of-the-art infrastructure and high quality of human resources, has challenged itself to pursue world-class research in the field of ecology, natural resource management and environmental education in KHMAO.

The attainment of this goal is greatly facilitated by the establishment of cooperation with the world's leading scholars and research institutions, a broad exchange of knowledge in the field of ecology and natural resource management, participation in international projects, creation of local organizations with a mandate to address regional and global environmental issues and monitor global climate change.

The Analytical Center of YuSU is furnished with the most advanced equipment. There are six laboratories operating in the Center: chromatographic methods, spectrographic methods, boring fluids and cement slurries, radiation monitoring, x-ray diffractometry, oil petrophysics and thermal research methods.

The UNESCO Chair of Environmental Dynamics and Climate Change (UC-EDCC), recognized in 2008 is embedded in the Yugra State University (YSU). A new International field station for environmental monitoring, where up-of-date laboratory-field equipment will be available for researchers, undergraduate (MSc) and graduate (PhD) students of YSU has been opened for worldwide multidisciplinary collaboration projects and data sharing.

YSU has significant experience and large knowledge in analysis, description and classification of the peat lands ('mire types') within the Boreal and Sub-arctic zones of Western Siberia by vegetation, hydrology, trophic properties, and permafrost appearance using remote sensing data, as well as studying of sub-recent and long-term (LORCA) peat accumulation rate.

Professional and technical personnel of UC-EDCC and Department of Ecology have an experience in international projects under support of International funds (EU-TASIS, EU-TEMPUS, EU-PF6, EU-INTAS, Darwin Initiative, Global Peat Initiative) and initiate new scientific collaborations within fields of global ecology, biodiversity assessment and environmental protection.

#### **Partner 22: The Institute for Biological Problems of Cryolithozone SB RAS (IBPC).**

In this project there will be a collaboration with the Institute for Biological Problems of Cryolithozone SB RAS (IBPC) in Yakutsk, Russia. This institute is part of the Siberian Branch of the Russian Academy of Sciences. The main feature of the Institute is that it conducts investigations in specific conditions of the Extreme North in Asian part of Russia. The main current scientific research topics are:

1. The structure, functions and stability of northern ecosystems and
2. Scientific basis of protection and optimization of the use of biological resources of cryolithozone.

Scientific study projects of the Institute currently include:

- The development of an integrated network of ecological monitoring of biodiversity in permafrost on the etalon territories of boreal forests, tundra and forest-tundra of Yakutia.
- Ecological problems and anthropogenic transformation of permafrost ecosystems of Yakutia as a part of the Asian-Pacific region.
- The development of a concept and complex actions on the protection, reproduction and rational use of rare and disappearing flora species of Yakutia.

The Institute consists of the following laboratories: Ecology of vertebrate animals; Taxonomy and ecology of invertebrates; Experimental ecology of animals; Subarctic and mountain ecosystems; Botanical Garden; BioGeoChemical Cycling; Ecological Biochemistry; Taiga-alas ecosystems; Vegetation recourses and Forestry.

For field works, stations for ecological monitoring have been set up in the Yakutian taiga, tundra and alas (open areas), two of which have mains electricity and are exploited year-round. The Institute has also a unique Botanical Garden on the north of the Russian Federation. The highly qualified scientific personnel consists of 107 research workers, including 1 member of Russian Academy of Sciences, 13 doctors and 63 candidates of sciences.

#### **Partner 23: M.V.Lomonosov Moscow State GDMSU Khibiny educational and scientific station**

Information is lacking

#### **Partner 24: Alfred Wegener Institute for Polar and Marine Research, Potsdam (AWI)**

The Alfred Wegener Institute for Polar and Marine Research (AWI) is a member of the Helmholtz Association of German Research Centers (HGF) and provides a major contribution to global environmental research, in conjunction with other HGF centers, as well as with university and non-university research institutions. The AWI coordinates polar research in Germany and provides the logistics necessary for

expeditions in extreme regions, including the wide range of periglacial and permafrost landscapes in the Arctic and Antarctic. The Potsdam Research Department (Director: Prof. Dr. H.-W. Hubberten) of the Alfred Wegener Institute exists since 1992. The Section *Periglacial Research* at the AWI Potsdam has concentrated on process studies and on paleoclimatic reconstruction in terrestrial polar regions. Studies on the geochemistry, hydrology, energy and carbon balance of the seasonally active layer provide key information on the impacts of climate change on permafrost. Within the scope of this research, numerous expeditions into the ice-free areas of continental Antarctica (Schirmacher Oasis 91/92, Bunge Oasis 93/94, Windmill Islands 98/99, Amery Oasis 01/02) and different Arctic regions (e.g. Taimyr 94, 95; Lena Delta 98-00) were accomplished. Since 1998 these research fields have been expanded through the addition of microbiological and soil ecological researchers and facilities. A new working group on *Geomicrobiology in Periglacial Regions* (Head: Dr. D. Wagner) was established in 2000 with a focus on microbial processes and the functioning and diversity of microorganisms in extreme environments of the polar regions (Livingston 05, East Greenland 03, Lena Delta 01-05).

#### **Partner 25: University of Alaska Fairbanks (UAF)**

The Institute of Arctic Biology, University of Alaska Fairbanks owns, manages and operates the Toolik Field Station (TFS), under a cooperative agreement with the US National Science Foundation. The mission of the Institute of Arctic Biology is to advance basic and applied knowledge of high-latitude biological systems through the integration of research, student education, and service to the nation and state of Alaska. The Institute supports faculty and post-doctoral research and graduate education in the life sciences of wildlife, physiology, genetics and evolutionary biology, ecology and ecosystems, biomedicine, and bioinformatics and computational biology.

Toolik Field Station supports field research and education year-round in all aspects of environmental science, and is a facility that serves researchers from around the United States and the world. TFS welcomes individual scientists or groups of scientists, PhD and MSc students, post- or undergraduate courses and workshops. Approximately 450 individual scientists that were part of 60 projects from 68 different institutions did research at TFS in 2008-2009.

#### **Partner 26: Uppsala University (UU)**

WISENET is a research centre on Wireless Sensor Networks. It is funded by VINNOVA, Uppsala university, SICS and industrial partners for the years 2007-2017.

The vision of WISENET is incorporating hundreds, even thousands, of tiny interconnected monitoring devices can be launched anywhere and almost instantly since there is no need for wiring. To meet this vision, a multidisciplinary research approach is necessary, combining expertise in networking, operating systems, sensor devices, micro-systems, and wireless communication.

WISENET research is focused on how to:

- Integrate sensing, data processing and communication into one sensor unit,
- Manage and generate energy in the sensor unit
- Make sensor networks self-configuring, robust and maintenance-free up to 10 years,
- Attach sensors to Internet in a secure way, with the objective to reach an integration size of 5x5x5 mm and a manufacturing cost of 1€ for a regular unit.

The WISENET research centre is located within the department of Information Technology at Uppsala University. With circa 200 employees, it is the biggest department within the university, hosting ~30 research groups and 5 research centres.

#### **Partner 27: ATHENA RC**

The Institute for the Management of Information Systems - IMIS is the newest institute of the [Research and Innovation Centre in Information, Communication and Knowledge Technologies "Athena"](#), and started operating in March 2007.

ATHENA RC/IMIS conducts research and participates in R&D projects in the area of data management and large-scale information systems. The current focus of research at ATHENA RC/IMIS is on the following areas:

- Workflows for data integration and system interoperability. Focus is on Digital Libraries, Ontology Engineering and Data Warehouses.
- Large Scale Distributed Information Systems. Focus is on Real-Time Information Systems, like

- sensor networks, and p2p networks/Grid-based systems.
- Web Information Systems. Focus is on Web data management issues and Semantic Web technologies.

*Main Tasks in GRDI2020 and relevant previous experience*

ATHENA RC/IMIS will be responsible for defining the set up of two working groups on Technological and Organisational issues and coordinating their operation. The key personnel of ATHENA RC/IMIS have a long and pertinent experience in participating and leading European funded projects. They are partners in a large number of projects of National and International scale. More particularly, the ATHENA RC people have a rich and long experience in several topics of computer Science such as Software Engineering, Databases and Knowledge Bases, Experiment Management Systems, Workflow Management Systems, Digital Libraries, User Interfaces, Personalization, Data Warehouses, Data Mining, and Distributed Systems and have participated in several relevant research and development projects. Those funded during the last five years include: DILIGENT Integrated Project (IST FP6), DIAS (eContent), DELOS Network of Excellence (IST FP6), DRIVER Targeted Project (IST FP6), BRICKS Integrated Project (IST FP6), KATOPTRON, DIAVION (under Greek initiatives), Health-e-Child Integrated Project (IST FP6), TELplus Targeted Project (ECP FP6), DRIVER II CP/CSA (INFRA FP7), BELIEF Specific Support Action (IST FP6) BELIEF II Coordination Action (INFRA FP7), D4Science CP/CSA (INFRA FP7), D4Science II CP/CSA (IP FP7), and PAPHYRUS Collaborative Project (ICT FP7), DL.org (ICT FP7), Open AIRE (IP ICT FP7).

Key personnel: Yannis Ioannidis

**Partner 28: Centre for Northern Studies (CEN)**

Park development and management in Nunavik is based solidly on consultation and co-operation with local communities. Local liaison officers ensure that concerned communities are kept abreast of developments at every stage of each park project, and they are key in relaying local knowledge to park planners at the Kativik Regional Government (KRG). In addition, working groups organized by the KRG ensure that elected municipal representatives and interested individuals have every opportunity to contribute to decisions concerning nearby park projects.

Park development and management in Nunavik is also based on a co-operative approach with the Ministère du Développement durable, de l'Environnement et des Parcs (sustainable development, environment and parks, MDDEP).

Regarding park development, the KRG is responsible for gathering information concerning the physical, natural and human contexts in each study area, in collaboration with elders, hunters and concerned citizens, as well as scientific researchers. This information is compiled into a status report. The status report for each park project is used by the MDDEP to prepare a draft master plan that identifies zoning and development concepts. The status report is also a starting point for the related environmental and social impact assessments required under Québec law.

With the creation of each new park in Nunavik, the MDDEP has undertaken to transfer the management of operation, protection and enhancement activities to the KRG. This responsibility includes the planning and construction of infrastructure and equipment, the drafting of operational plans and the organization of staffing, with priority placed on training and employment for local Inuit.

### 2.3 Consortium as a whole

The INTERACT consortium consists of a partnership of station managers, relevant stakeholders, relevant specialists (research scientists) and leadership/administration personnel. Some of the participants come from non-ICPC countries.

The overall aim of INTERACT is to build capacity for monitoring and research throughout the diverse terrestrial arctic regions of Europe and beyond. The general purposes of INTERACT are (i) to increase the cooperation between all participants, (ii) to bring the state of common knowledge to an updated stage, (iii) to develop the network into a coordinated circum-arctic terrestrial ecosystem observatory network using state-of-the-art-methods for data collection and storage, (iv) to analyse data, (v) to disseminate the resulting knowledge, (vi) and to secure a common higher scientific level by facilitating increased mobility of specialists between the sites and (vii) to make sure that the tasks above are in accordance with the needs of relevant stakeholders. To achieve the project objectives, the different participants are assigned different roles.

**The Station Managers' Forum component.** This group of participants consists of station managers from the participating field sites. They are a diverse group of people ranging from directors of research institutes to leaders of small field bases. It is a major aim of INTERACT to help developing the smaller sites in terms of extent and level of observations and research by including them as participants in an international framework together with more experienced people/stations. SCANNET was very successful in doing so during the 5<sup>th</sup> Framework Programme project. For example, Zackenberg Research Station was developed partly through this from a small field site to one of the major international research stations in the Arctic while the Faroe Islands were represented in the Arctic Climate Impact Assessment (ACIA).

The Station Managers will be an internal networking activity within the Consortium by operating a Station Managers Forum to facilitate knowledge exchange between the leaders of the different infrastructures to secure a common high level of information concerning the activities of the different stations involved in INTERACT. Further, the Station Managers Forum will be used to provide interactions between the infrastructure leaders and the leaders of the Joint Research Activities, Transnational Access and outreach. For example the Station Managers will discuss issues relating to the needs for testing and implementation of virtual instrumentation, improved data management and improved measurements of terrestrial feedbacks to climate change. Finally, the Station Managers Forum will be used for knowledge exchange between the Station Managers, local stakeholders, the specialists and those responsible for Transnational Access and outreach to secure the highest level possible of synergy between these different groups of participants.

The chair of the Station Manager Forum is an experienced leader of arctic research stations with a great experience in chairing different international fora. He is the executive secretary of Forum of Arctic Research Operators, and he is the manager of one of the most innovative research facilities, Zackenberg Research Station, in the entire polar region.

The leaders of the infrastructures are the keystones of the consortium and are totally committed to interacting with the other components because of great benefits to the stations and their users that improved data capture management, outreach and a new research community will provide. Further, the Station Managers are completely suited to the tasks as the whole consortium is a bottom-up process formed initially by the Station Managers through the SCANNET process: these are the people "on the ground" in the Arctic that have the technical and logistical capacity and the motivation to implement new development.

**The Joint Research Activities component.** The specialists will operate Joint Research Activities and in close cooperation with the Station Managers develop and test techniques for data collection and storage in relevant fields of research that particularly need improved methodology and observation. The consortium has identified that major gaps are related to methods for automatic data collection, methods for studies of ecosystem feedbacks to climate change and methods for coordinated storage of data from many sites. These methods will be developed and tested during the project and afterwards they will be implemented as a legacy of the project to improve the capabilities of the infrastructures to address relevant science questions.

The leaders of the three relevant work packages (Work packages 5, 6 and 7) are all highly ranked scientists within their field of expertise. They have relevant experience that makes them eminently suited to successfully complete their objectives. Further, they are totally committed to the project as they will have a unique opportunity of developing their technologies within a wide array of harsh environments in which they will be supported by experts in logistics i.e. the Station Managers.

**The Trans-national Access component.** The trans-national access component is crucial to building capacity for research in the European Arctic and beyond. It will give new opportunities to researchers throughout Europe to work in the field in often harsh and remote locations that are generally difficult to access. In return, the input of new researchers will lead to cross fertilisation, comparative measurements at different locations and new research directions at the individual infrastructures.

The relevant work package (Work package 4) is led by an institution and by staff with experience in successfully running several EU projects and specifically trans-national access. A trans-national access board will be convened to define the science themes to be addressed in the calls for trans-national access. A major task for the Trans-national Access Board will be to ensure that the calls address themes of relevance for (i) the scientific community, i.e. the most important pending science questions to be addressed according to a number of international assessments like ACIA, ICARP-II and SWIPA, (ii) the different stakeholders, and (iii) the network as a whole. In this way the Trans-national Access Board shall secure optimal synergies with the networking and joint research activities within the project and relevant actors outside the project. The trans-national access board will consist of Station Managers and independent science experts suggested by the International Arctic Science Committee. Thus, the board will be well suited to its task. Further, the infrastructure leaders of the board will be totally committed because of the new research input their stations will receive while previous experience shows that the recipients of transnational awards will be committed to developing their science through the unique opportunity they are offered.

**The leadership/administration component.** INTERACT will be administered by Work package 1 which will consist of a Coordinator who will run a project office. The project secretariat will be led by an Executive Secretary that has great experience in running and administering large international projects including several EU-projects, some with trans-national access components. The project coordinator is a top-class scientist in the field of research being addressed by the project, and he is among the world's most experienced leaders of international cooperation focussing on terrestrial ecosystems in the Arctic. For project monitoring, a commercial company, CLU, has been appointed. An International Advisory Board will be established with representatives of the research user group, stakeholders, appropriate (Arctic, Antarctic and Global) monitoring and research networks and international organisations that undertake environmental assessments. The role of the Advisory Board is to advise the project leadership on issues of relevance to the overall running of the project as well as creating links with relevant institutions and activities.

The experience and international reputations of the Coordinator and Executive Secretary, including the success of the SCANNET Network, the development of the Abisko Station into a world class facility and the successful coordination of international teams of world expert scientists in major environmental assessments proves both the suitability of these people and their commitment to science and international collaboration.

**The role of 'other countries'.** The consortium includes participants from Canada, Russia and USA. These participants are either Station Managers of relevant infrastructures and field sites or relevant stakeholders (e.g. SAON and CBMP). One of the key objectives in INTERACT is to build capacity for Arctic research and monitoring throughout the European Arctic and *beyond*. INTERACT will provide a circum-arctic network of terrestrial field sites, and as such it is crucial to include North American and Russian arctic infrastructures. Further, including these sites will open up new opportunities in research and monitoring techniques, while extending sampling of environmental change throughout the complete environmental envelope of the Arctic (Fig 1). In the budget means are allocated for these North American and Russian Station Managers to travel to relevant meetings, and the relevant infrastructures are included in the Trans-national Access component.

**The stakeholders' component.** The stakeholders represent local interests in environmental aspects surrounding the infrastructures. These range from residents and the general public through all stages of education to local administrations. There are also regional and global stakeholders that include major

international organisations involved in research and monitoring in the Arctic (and elsewhere). Stakeholders' role is to communicate their goals/needs to the network and in dialogue with the network to define means for achieving them. The project includes stakeholders representatives from major international organisations/programmes such as IASC (International Arctic Science Committee), AMAP (Arctic Monitoring and Assessment Programme), SAON (Sustaining Arctic Observing Network) and the Circumpolar Biodiversity Programme. INTERACT will ensure contributions from the whole consortium to the specific requirements such as new assessments of Arctic environmental change and improved sustained observing of the environment. The commitment of the stakeholders is demonstrated in the numerous and powerful letters of support (see Appendix I). Further, the suitability of the stakeholders is maximal as they represent the highest level activities in the Arctic.

INTERACT will focus significantly on the dissemination of results from the project and on most aspects of research and monitoring at the infrastructures. The stakeholders will be invited to relevant meetings and many forms of outreach will be developed through the activities of WP8.

**The Consortium as a whole.** The consortium is designed to balance and integrate the major activities of research, monitoring and assessment that integrate user requirements to provide a greatly improved understanding of environmental change in the Arctic and its impacts on local and global communities. The inclusion of Station Managers, research experts in technology development, the wider scientific community and major international organisations as well as the educational establishments provides a construct in which all components are truly integrated, complementary and well balanced. Further, the suitability and commitment of the actors has already been demonstrated by the success of the SCANNET Network and many of the infrastructures within it. This application seeks to build on the vast potential of a network without resources to build capacity to respond to dramatic increases in demands for knowledge on environmental change in the Arctic.

## 2.4 Resources to be committed

The total budget for the project is **10,165,526** EURO of which **9,576,382** EURO is being applied for. The complement from the consortium is 589,144 EURO.

The allocation of means for Management, Networking activities, Trans-national Access and Joint Research Activities is given in the table below.

	Total		Requested from EC		Months	
	EURO	%	EURO	%		%
Management	996,000	10	996,000	10	90	17
Networking Activities	2,051,565	20	2,051,565	21	192	37
Trans-national Access	4,761,385	47	4,761,385	50	48	10
Joint Research Activities	2,356,575	23	1,767,432	19	192	36
<b>Total</b>	<b>10,165,526</b>	<b>100</b>	<b>9,576,382</b>	<b>100</b>	<b>522</b>	<b>100</b>

Out of the total budget that has been applied for 10% is allocated for management, 21% for Networking Activities, 50% for Transnational Access and 19% for Joint Research Activities.

The allocation of means for the different work packages is given in the table below.

	Total		Requested from EC		Months	
	EURO	%	EURO	%		%
Work package 1	996,000	10	996,000	11	90	17
Work package 2	1,537,785	15	1,537,784	16	139	27
Work package 3	293,783	3	293,783	3	41	8
Work package 4	4,761,385	46	4,761,385	49	48	10

Work package 5	524,255	5	393,191	4	47	9
Work package 6	1,023,288	10	767,466	8	72	13
Work package 7	809,032	8	606,775	6	73	14
Work package 8	219,997	2	219,997	2	12	2
<b>Total</b>	<b>10,165,526</b>	<b>100</b>	<b>9,576,382</b>	<b>100</b>	<b>522</b>	<b>100</b>

All resources for participants' attendance in different meetings are allocated in work package 2. Each participant will have allocated two months salary and 14,000 Euros as direct costs to be able to join relevant consortia meetings, Station Managers Forums, workshops and other meetings.

Resources for North American and Russian partners to join consortia meetings equal 154,000 EURO. They are allocated for the work package leader of Work packages 2 and 3 (National Environmental Institute, Denmark) to be reimbursed due to actual travel costs.

In the budget for trans-national access, travel costs for visitors to the relevant stations are considered a direct cost, and 7% indirect costs have been added on top of these costs. In total 2,860,423 EURO are allocated to cover the expenses of the stations in relation to the trans-national access, 1,588,600 EURO are allocated for travel and 111,202 EURO are allocated for indirect costs on travel.

The allocation of resources has been agreed by all participants, and all work package leaders have confirmed that they will be able to complete the tasks within their work packages with the resources allocated. The coordinator and the executive secretary have checked all budget items, and consider the budget sound.

### 3. Impact

#### 3.1 Expected impacts listed in the work programme

**Background.** INTERACT is based on the existing SCANNET network of field stations in all eight Arctic countries. The cooperation has a long history especially between the European members, resulting from funding in 2001-2004. However the bottom-up network has expanded within Europe and also new members have joined from Russia and North America. These developments without resources, together with a greatly increasing demand for information on environmental change in the North as exemplified by IASC activities and also the Arctic Council's SAON project, require a new initiative with appropriate resources: this is INTERACT.

**Achieving the aims of the networking activity.** INTERACT will address the networking component of the call in two fundamental ways.

As a first step, a Station Managers' Forum will be convened to network the managers of facilities who are empowered to act on joint recommendations such as best practices for monitoring at the individual infrastructure level. This internal networking will have significant impacts as expertise is spread among infrastructures and best practices are adopted. The Station managers' Forum will have annual meetings as important steps for sharing the best practices on research, station management and administration, and in relation to the tasks relevant for ecosystem and environmental monitoring. The Station Manager's Forum will share views and needs for the issues related to joint research activities; virtual instrumentation, improved data management and improved measurements of terrestrial feedbacks to climate and give feedback and valuable views for the transnational access work package.

A second step will be to increase the impact of international networking externally to the station managers. INTERACT will co-operate with many other relevant projects and networks in the European Arctic such as the ESFRI project SIOS, and ICOS (WP 3) (see support letters, Appendix I). INTERACT will also interact with relevant networks outside the EU. As a 4 year project, INTERACT will enable SCANNET to be developed as a terrestrial block in the Sustained Arctic Observing Network (SAON) and in the Circumpolar Biodiversity Monitoring Programme (CBMP) which both are Arctic Council initiatives (see support letters in Appendix I). Co-operation with the International Arctic Science Committee (IASC) will include input to the coordination and facilitation of IASC's terrestrial component for research into environmental change in North (see support letter Appendix I). The co-operation between SAON, CBMP and IASC is already established and will be formally confirmed by the signing of the Memorandum of Understanding, that is an important step in the process. In addition to the substantial impacts thus expected from currently involved networks, INTERACT will undertake a further step to develop new links, for example with the sub Antarctic Islands.

This high-level networking can only be achieved by the collaboration on infrastructures throughout the European North and these infrastructures will be working within the coherent conceptual framework of the wide environmental and land use envelopes of the Arctic.

**Achieving the impacts of the Joint Research Activities.** The EU call for Joint Research Activities result in impacts of international importance in the efficiency of capturing data in harsh, remote and often unmanned infrastructures. The first step of development and testing of new wireless networking techniques, new virtual instrumentation and improved data management will make it possible to offer data collection with standardised systems from all stations in a final step. After the developing and testing step in INTERACT, implementation is planned for a future step when all stations will be able to use standardised techniques and contribute to a centralised database. The increase in data capture and accessibility will give researchers and science organizations access to unique data sets from all eight Arctic countries.

**Achieving the impacts expected from Transnational Access and Outreach.** Transnational access (WP4) will build capacity for the human capital involved in understanding current environmental change and its impacts in the North. Transnational access will stimulate the involvement of a new community of

researchers in the Arctic and together with existing researchers, the results of the Joint Research Activities will allow them to interact to deploy sensors and interrogate databases in ways not presently possible. All of this technological development and increased understanding will be shared through the outreach work package (WP8) with numerous stakeholders, from local inhabitants through education to policy makers. It is important to note that the infrastructures in INTERACT have already had the highest possible impacts on policy makers by contributing to world class science and assessments and by hosting and presenting to climate negotiators and Ministers of Environment from around Europe and the rest of the world. This impact is exemplified by the letter of support from numerous organizations and the Canadian Ambassador to Sweden (Appendix I) who fully recognises the high level impacts of northern research infrastructures. This high-level impact will be maintained in INTERACT but will also be distributed more widely throughout more stakeholders and educational institutions. Again, the involvement of the University of the Arctic demonstrates clearly the importance of this interaction.

The steps involved in this aspect of the consortium's activities are to convene an independent board that together with Station Managers will develop strategies for calling for applications from European researchers to the infrastructures. After this step, repeated call will be made and the project will be monitored to refine the strategies used to determine the science agenda. INTERACT will therefore contribute to and facilitate the achievement of the terrestrial science agendas set by major international processes (e.g. the Arctic Observing Network, US), SAON, the International Conference of Research Planning and organizations (e.g. Arctic Council Working Groups, IASC, European Environment Agency, World Wildlife Fund). After the steps of the transnational access implementation, networking (WP3) and outreach (WP8) will ensure the international impacts of the combined infrastructures.

Transnational Access is by definition Europe-wide and beyond the boundaries of any one nation. By integrating our activities with Russia, Canada and the US, a further internationalization will be achieved while again, the environmental envelope concept will provide coherence.

**Achieving socio-economic impacts.** Many beneficial socio-economic impacts are expected such as improved integration between education and the research community. One particular important socio-economic impact will be the dialogue between scientists and local stakeholders that will facilitate the development of local adaptation strategies that are becoming increasingly important. INTERACT will not have resources (although it collectively has the expertise) to co-develop these strategies, but it will be able to provide the tools relevant for this process (downscaled climate models, models of ecosystem change etc.). Further, through the development of a business plan for the continued development of SCANNET, it will seek to initiate a new project on adaptation. While adaptation is a local process, there are parallels between sites within INTERACT and the expertise available *at all sites* can be used to solve challenges at particular sites.

**Overall national representation in the INTERACT consortium.** The consortium structure is biased towards Nordic and Arctic countries. This represents the geopolitics of the Arctic and the fact that it is the Arctic countries that own most of the terrestrial infrastructures on their territories. However, through the Joint Research activities (WPs 5,6 and 7) and particularly through the Transnational Access work package (WP4), these infrastructures will ensure that the services and developments at the infrastructures will be available to the whole European community and the wider scientific community, particularly in Canada, Russia and the US. Further, by collaboration with SIOS (Appendix I), INTERACT will interact with those countries without Arctic territories but that have Arctic infrastructures hosted by Svalbard.

**Overall Impact.** All the above mentioned co-operative initiatives will increase the international visibility of INTERACT stations and attract world-class researchers. This will increase the quality and quantity of joint European research activities in a wider international context. All of the developments expected, together with the implementation of a business plan (see below) after the termination of INTERACT, will ensure a legacy that will prolong the 40+ year legacy on which INTERACT is based.

## **Business plan**

This proposal is largely based on legacy derived from the International Biological Programme of 1967-74. We will seek to secure the legacy of INTERACT beyond the project period (ending 2014). These legacies include:-

- Implementing the recommendations of the Station managers' Forum on various aspects of best management of the infrastructures
- Deploying the new sensor and data capture/processing technologies throughout the network
- Establishing the geo-tagged data presentation systems throughout the network
- Maintaining the outreach programmes and interactions among the infrastructures and local stakeholders
- Further strengthening the consortium network
- Maintaining communication and interactions between recipients of transnational access and the host infrastructures
- Implementing fundamental roles with networks such as SAON.
- Working with local stakeholders to provide relevant knowledge and tools for the development of multiple coherent adaptation strategies aimed at reducing impacts of climate change in the north.

These legacies will be achieved by many mechanisms. These include:-

Maintaining the SCANNET network to deploy the INTERACT legacy, independent of funding possibilities.  
 Seeking national funding sources for particular activities  
 Seeking appropriate EU funding sources  
 Seeking partnerships with software and hardware industries  
 Seeking Arctic funding, e.g. by contributing to Arctic Council initiatives such as SAON

A refined business plan will be developed towards the end of the project period and will be contained in the final report.

### **3.2 Dissemination and/or exploitation of project results, and management of intellectual property**

The multidisciplinary nature of the science throughout the INTERACT network and the many and diverse interactions with numerous stakeholders provides a wealth of opportunity for disseminating information. Because of the local significance of environmental change at specific infrastructures and the global importance of the feedbacks to climate from the Arctic in general, INTERACT stakeholders vary from the local to the global. We will focus on various categories of stakeholders although information will be general available to all stakeholders.

**The Science Community:** Dissemination will occur via published papers in internationally recognized journals and project reports from the Joint Research Activities. Most of the published papers are expected to result from the research carried out under Transnational Access (WP4). However, papers are expected from some of the technological developments in the Joint Research Activities such as WP 6 focusing on climate feedbacks. In the longer term the planned implementation of the new technologies (see business plan above) will lead to numerous scientific papers. A meta-database of this material and pdf will be made available on the INTERACT web site.

**Education:** INTERACT will contribute to education at all levels. It will:

- Encourage, within the Wider Knowledge Exchange programme, target stakeholder groups, like teachers and school classes from participating countries to cooperate with similar groups from other localities in the North Atlantic region. This will combine informal learning opportunities about environmental awareness with meaningful monitoring activities where co working participants from many countries make valuable contributions to the knowledge pool.
- Offer two week job-trainee opportunities to young people interested in environmental science at selected SCANNET sites following reviewed and established guidelines.

- Produce a catalogue listing local scientists who can be invited by local stakeholders to talk about environmental awareness and the work and findings of INTERACT partners. This catalogue will be listed on relevant portals such as the INTERACT web site and sciencelive.net of the UK.
- Develop a four-wall mobile exhibition for schools and other stakeholders at the more accessible sites. The exhibition will be in the languages of the participating countries.
- Make available a popular science PPT-presentation for INTERACT as an option to complement locally produced information when schools and other stakeholders visit the sites.
- Produce an inspiring Best Practice Manual on how to deal with visits from schools or the public. This will be based on information and experience from the different SCANNET sites.
- Interact with the University of the Arctic to develop and facilitate teaching materials and field courses.

**Local Stakeholders:** INTERACT website will disseminate information to local residents (where appropriate) and organizations. An INTERACT Brochure, mainly for the public, will be produced. The brochure will be in the languages of the participating countries. Also, a diversified Citizen Science program will be formulated with supporting written materials. These will include educational self activating tasks where the public is invited to carry out and report on local nature observation and monitoring in their local area.

**Regional and Global Stakeholders:** Those stakeholders without access to the infrastructures will be made aware of INTERACTs activities through its web site. The web site will include information from web cameras, photo archives and popular science articles.

**Science administration and Coordination:** INTERACT networks with many organizations involved in environmental research monitoring and assessment and will create links to other relevant networks. Via these connections, INTERACT will brief and provide material for assessments and science coordinating activities such as SAON. This will be in the form of reports, presentations and discussion for a.

**Decision makers:** INTERACT sites will continue to encourage decision makers to visit various participating infrastructure as previously been the extremely successful practice within SCANNET. Presentations will be given together with relevant reports.

Each participating organization will follow the national legislations and EU guidelines in issuing the intellectual property rights. All researchers participating in joint research activities will sign appropriate agreements on intellectual property rights.

#### 4. Ethical Issues

##### **ETHICAL ISSUES TABLE**

(Note: Research involving activities marked with an asterisk\* in the left column in the table below will be referred automatically to Ethical Review)

<b>Research on Human Embryo/ Foetus</b>		<b>YES</b>	<b>Page</b>
*	Does the proposed research involve human Embryos?		
*	Does the proposed research involve human Foetal Tissues/ Cells?		
*	Does the proposed research involve human Embryonic Stem Cells (hESCs)?		
*	Does the proposed research on human Embryonic Stem Cells involve cells in culture?		
*	Does the proposed research on Human Embryonic Stem Cells involve the derivation of cells from Embryos?		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	√	

<b>Research on Humans</b>		<b>YES</b>	<b>Page</b>
*	Does the proposed research involve children?		
*	Does the proposed research involve patients?		
*	Does the proposed research involve persons not able to give consent?		
*	Does the proposed research involve adult healthy volunteers?		
	Does the proposed research involve Human genetic material?		
	Does the proposed research involve Human biological samples?		
	Does the proposed research involve Human data collection?		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	√	

<b>Privacy</b>		<b>YES</b>	<b>Page</b>
	Does the proposed research involve processing of genetic information or personal data (e.g. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)?		
	Does the proposed research involve tracking the location or observation of people?		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	√	

<b>Research on Animals</b>		<b>YES</b>	<b>Page</b>
	Does the proposed research involve research on animals?	√	See below
	Are those animals transgenic small laboratory animals?		
	Are those animals transgenic farm animals?		
*	Are those animals non-human primates?		
	Are those animals cloned farm animals?		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL		

Some of the infrastructures within INTERACT carry out research on animals (see the Table below). However, this research is ecological in nature, there is no invasive surgery and the research complies with national and EU (where appropriate) ethical standards. The networking, outreach and joint research activities in INTERACT have **no** component of animal research, although the Transnational Access activity (work package 4) might receive applications that involve such research. Work package 4 together with work package 2 (Station Managers' Forum) will work together to ensure that any application for Transnational access that includes animal research will comply with appropriate (e.g. national and/or EU) regulations at the particular host infrastructure(s) and this will be a condition of receiving an award.

Infrastructure	Bird ringing and monitoring	Telemetry of birds	Telemetry of mammals e.g. caribou	Monitoring of rodent	Other vertebrates e.g. fish	Invertebrates
Abisko Scientific Research Station <sup>1</sup>	√		√	√	√	√
Zackenbergl Research Station <sup>2</sup>	√			√	√	√
Sornfelli Climate Station <sup>3</sup>	No animal studies					
Tarfala research station	No animal studies					
Vindelfjällen Research Station <sup>4</sup>	√			√	√	√
Kevo Subarctic Research Institute <sup>4</sup>	√			√	√	√
Kilipsjärvi Biological Station <sup>5</sup>				√		√
Kolari Research Station	No animal studies					
Oulanka Research Station <sup>4</sup>		√		√	√	√
Arctic Station <sup>6</sup>	√		√		√	
Sermilik Station, Greenland	No animal studies					
Greenland Institute of Natural Resources <sup>7</sup>	√		√		√	√
Finse Alpine Research Center <sup>8</sup>				√		√
Svanhovd <sup>9</sup>	√			√	√	√
Sverdrup Research Station <sup>10</sup>	√	√	√		√	
CEH Cairngorms <sup>11</sup>						√
Litla Skard	No animal studies					
Mukhrino Field Station <sup>12</sup>	√			√	√	√
Nymto Park Station <sup>13</sup>	√				√	
Chokurdakh <sup>14</sup>	√					
Spasskaya Pad	No animal studies					
Khibiny educational and	No animal studies					

scientific station						
Samoylov	No animal studies					
Barrow <sup>15</sup>	√	√	√	√	√	√
Toolik Lake <sup>16</sup>	√			√	√	
Whapmagoostui-Kuujjuarapik	No animal studies					
Radisson	No animal studies					
Boniface River	No animal studies					
Bylot Island <sup>17</sup>	√	√	√	√	√	√
Ward Hunt Island	No animal studies					
Salluit	No animal studies					
Umiujaq	No animal studies					
LEC	No animal studies					
Kluane Lake Research Station <sup>18</sup>	√	√	√	√		

1. All this has been conducted complying with Swedish and EU-regulations and persons doing the work are appropriately trained and licensed to do the tasks
2. All this has been conducted complying with Danish, Greenlandic and EU-regulations, and persons doing the work are appropriately trained and licensed to do the tasks
3. –
4. All this has been conducted complying with Swedish/Finnish and EU-regulations and persons doing the work are appropriately trained and licensed to do the tasks
5. –
6. –
7. We operate under Greenland legislation, with permits from the Greenland government. Permits are only needed for handling birds and mammals, and copies of those are available upon request.
8. Research activities conform to Norwegian law. Manipulations causing stress or pain on vertebrates or crustaceans must be approved by The National Animal Research Authority. All vertebrates in Norway are protected, and a number of plant species and invertebrates are also protected by law. One must obtain permission from The Directorate for Nature Management to trap, kill or collect any such species.
9. –
10. Research activities conform to Svalbard and Norwegian laws. Certain activities must be approved by Forsøksdyrvalget/The National Animal Research Authority. All vertebrates in Norway are protected, and a number of plant species and invertebrates are also protected. permission is required from The Directorate for Nature Management to trap, kill or collect any such species.
11. –
12. Regulated in accordance with the legislation of Khanty-Mansiysk autonomous Okrug
13. Regulated in accordance with the legislation of Khanty-Mansiysk autonomous Okrug
14. Within the frame WWF and Crane protection Foundation
15. all done in accordance with researcher home IACUCs & local permits
16. –
17. Yes this conforms with strict Canadian regulations and has to be approved by the animal ethics committee as well as by the Inuit
18. Approval for all research on vertebrates must be approved by Canadian Committee on Animal Care, Department of Environment in Yukon, and/or parks Canada.

Research Involving Developing Countries		YES	Page
	Does the proposed research involve the use of local resources (genetic, animal, plant, etc)?		
	Is the proposed research of benefit to local communities (e.g. capacity building, access to healthcare, education, etc)?		

	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	√	
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<b>Dual Use</b>		<b>YES</b>	<b>Page</b>
	Research having direct military use		
	Research having the potential for terrorist abuse		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	√	

## **5. Consideration of gender aspects**

Arctic research and exploration activities have been historically dominated by males. However, appropriate representation of both genders has been ensured in INTERACT from the beginning. Female colleagues are represented at all stages of the consortium management hierarchy at the levels of task leader, work package leader and Executive Secretary. Further, female colleagues are members of the Station Managers' Forum as they lead some of the infrastructures that belong to the consortium. The International Advisory and Transnational Access Boards have not yet been convened, but the present representation of females will ensure that there will be no gender biases in the appointments to the boards or in the allocation of transnational access funding. The Executive Secretary is part of a "Gender Issue" board at the University of Lund, Sweden and will have the task of ensuring equal opportunities to both genders throughout the consortium's activities. This will include demonstrating by example during outreach activities to schools and universities the equal opportunities for the two genders achieved within the INTERACT project.

**Appendix I Letters of Support**



## International Arctic Science Committee

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IASC • Telegrafenberg A43 • 14473 Potsdam • Germany  
Phone +49-331-2882214 • Fax +49-331-2882215 • [iasc@iasc.info](mailto:iasc@iasc.info) • [www.iasc.info](http://www.iasc.info)

3 December 2009

RE: Letter of Support - INTERACT Proposal

To whom it may concern

The International Arctic Science Committee (IASC) is a non-governmental, international scientific organization established to encourage and facilitate international consultation and cooperation in all aspects of arctic research. IASC is an International Scientific Associate of the International Council for Science (ICSU), observer on the Arctic Council and ex-officio member of the Joint Committee for the International Polar Year (IPY). The IASC mission is to encourage, facilitate and promote leading-edge multi-disciplinary research to foster a greater scientific understanding of the arctic region and its role in the Earth system.

IASC strongly supports the INTERACT project, proposed by SCANNET. INTERACT, if funded, will be an important mechanism to further develop and help sustain the circum-arctic network of terrestrial field stations, initiated by SCANNET in 2001. These field stations provide the most important instruments for long-term terrestrial research and observational activities in the Arctic.

IASC has followed the development of SCANNET since its formation in 2001. We think that the increased cooperation between the arctic field stations proposed by SCANNET/INTERACT is an extremely important and timely initiative. The need for long-term monitoring had been identified as one of the most important priorities for future arctic research at the International Conference on Arctic Research Planning (ICARP II), initiated by IASC in 2005. The Arctic Council has recently decided to take the lead in cooperation with IASC and the World Meteorological Organization (WMO) in the continuation of the Sustaining Arctic Observing Networks (SAON) process. SAON is considered one of the main legacy elements of the IPY. SCANNET/INTERACT will be an important building block of SAON and constitute the terrestrial cornerstone.

In conclusion, we believe that INTERACT will be a very important contribution to future arctic research and, thus, we strongly support the proposal.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'V. Rachold', written in a cursive style.

Dr. Volker Rachold  
Executive Secretary  
International Arctic Science Committee



## UNIVERSITY OF THE ARCTIC

Rovaniemi December 1, 2009

### Letter of Support

To whom it may concern:

University of the Arctic, UArctic, is a network of Higher Education Institutions and other organizations in the Circumpolar North aiming at cooperation and sharing of resources for capacity building and sustainable development of the North. Currently UArctic has 121 member organizations. One of the tools for collaboration within the UArctic network is UArctic Thematic Networks.

UArctic strongly supports the initiative taken by SCANNET with the project INTERACT. We see the initiative as an excellent way of coordinating the educational field based outreach at terrestrial field sites throughout the Arctic. Further, we see SCANNET/INTERACT as an important future cooperation partner for the University of the Arctic especially in the fields of terrestrial ecology and climate change feedback.

SCANNET/INTERACT will, in case it is funded, increase the mobility of young scientists between Arctic field sites in different countries. It will contribute to the education of new Polar researchers both with actual field based education but also by providing information through the web-page of educational materials as teaching resources. All of these are goals that the University of the Arctic strongly supports and shares with SCANNET and its Interact project, and therefore looks forward to mutual cooperation.

Yours sincerely,

Lars Kullerud  
President  
[Lars.Kullerud@uarctic.org](mailto:Lars.Kullerud@uarctic.org)

Outi Snellman  
Vice President Administration  
[Outi.Snellman@uarctic.org](mailto:Outi.Snellman@uarctic.org)



UArctic is endorsed by the  
International Polar Year (IPY)

28 November 2009

To Whom it may Concern

On behalf of Nordic branch of the ESFRI project Integrated Carbon Observation System (ICOS) we strongly welcome the SCANNET/INTERACT initiative. We see SCANNET/INTERACT as an important platform for field investigations on carbon balance in arctic terrestrial ecosystems in the most remote parts of Europe and the North Atlantic region with great future relevance for the global carbon budget. Having an integrated network of field sites in this region to develop and conduct in a coordinated manner carbon related observations and to provide a logistical platform for measurements of carbon exchange on an ecosystem scale is a very important contribution to ICOS.

With ICOS finally improved and in contract negotiations in both Finland and Sweden (and with Norway and Denmark in the granted planning phase) the Nordic countries are moving rapidly on the development of National commitments to ICOS. The joint research activity (WP6) in SCANNET/INTERACT will specifically include support for key gaps in the Nordic coverage so that it helps complete the ICOS coverage all the way from East Greenland over Svalbard to northern Scandinavia and European Russia. This will form a highly valuable geographical extension of the ICOS coverage.

Please accept this letter as a strong support for the development of the SCANNET/INTERACT project as an important cooperative partner for the Integrated Carbon Observation System.

Sincerely yours,



Anders Lindroth  
Professor, ICOS National focal point  
Sweden



Kim Pilegaard  
Professor, ICOS National focal point  
Denmark

Support letter for SCANNET INTERACT Proposal

To Whom It May Concern

We are writing to state our strong support for the proposal from SCANNET to increase its networking efforts among northern observing sites in Europe and its linkages to sites outside of Europe.

The larger science questions relevant to the northern high latitudes require knowledge of system characteristics and change over large spatial scales and for multiple decades. The evolving SCANNET concept of linking observing sites, improving measurement comparability, and building integrated data sets is “right on” with today's science needs.

To fulfill its promise, SCANNET needs support not only for the science that occurs at its various sites, but also for the networking and integrative aspects. As co-chairs of the Arctic Council Sustaining Arctic Observing Networks Steering Group (SAON SG), we have heard from many sources that the full value of environmental observations is not being attained because there are not well established mechanisms for integrating information over larger scales. SCANNET will make integration easier and the support requested in this proposal will increase the value that can be obtained from the primary science activities funded through other sources.

We support fully this SCANNET proposal and encourage its favorable consideration.

Sincerely,

John Calder

Co-Chair of SAON SG  
Vice Chair of Arctic Monitoring and  
Assessment Program  
Director, Arctic Research Program of NOAA  
Climate Program

David Hik

Co-Chair of SAON SG  
Vice President of International Arctic  
Science Committee  
Professor, University of Alberta

# Note

**From:** Georg Hansen, Research Council of Norway

**To:** Terry Callaghan (Abisko Research Station), Margareta Johansson (SCANNET), Morten Rasch (DMU-AU)

**Cc:** SIOS Steering Board

## Conc.: Cooperation between SIOS and SCANNET

The Svalbard Integrated Arctic Earth Observing System (SIOS) is a Norwegian initiative which was accepted for the European Strategy Forum on Research Infrastructures (ESFRI) Updated Roadmap 2008. The purpose of SIOS is to gather all research infrastructure in Svalbard and surrounding marine areas related to Arctic Earth System Science under one umbrella. In terms of disciplines, SIOS covers the whole geophysical system and the biosphere in the region, ranging from solar-terrestrial aspects via lower atmosphere, cryosphere and ocean all the way to terrestrial and marine ecosystems. It has the ambition to organize all major research stations in Svalbard (Ny-Ålesund, Longyearbyen, Hornsund, Barentsburg), smaller research sites sites such as Kinnvika and Kaffiøyra, and offshore installations like the Hausgarten seafloor observatory, in a closely cooperating network, a kind of Svalbard node for multi-purpose research.

Due to its multidisciplinary character, SIOS will have common goals with several ESFRI projects, e.g., EMSO (European Multidisciplinary Seafloor Observatories) and ICOS (Integrated Carbon Observing System) and other existing networks in the region. SCANNET is an organisation with a great potential of cooperation with SIOS. Research activities in Svalbard, especially in Ny-Ålesund have been part of this terrestrial network since it was founded in 2001. Currently, strong efforts are being made to strengthen the coordination of terrestrial research in Ny-Ålesund through a terrestrial flagship project, but these activities are already today influenced by the ambitions of SIOS to extend the flagship concept to the whole archipelago. This will lead to a major upgrade of the SCANNET station "Svalbard", providing a much more representative picture of one of the northernmost landmasses.

At present, terrestrial research in Svalbard is still a rather fragmented, and the systematic build-up of this field requires expert advice from the international research community, not only that in Svalbard, but on a Pan-Arctic scale. We invite SCANNET to contribute to this process and propose the participation of SCANNET in the SIOS (Scientific) Advisory Group. We hope to establish this body during the SIOS-Preparatory Phase project, for which we apply for funding from the EC via call INFRA-2010-2.2.3:SIAEOS.

We do not see any competitive situation between SIOS and SCANNET, since the dedicated SIOS call is formally separated from the call for an Arctic research infrastructure (call INFRA-2010-1.1.19). In fact, SIOS would support an application to the latter call, e.g. a land-atmosphere-ocean interaction network, with SCANNET as a major part (possibly the coordinator role) and SIOS as a regional node. We think that linking such an initiative to one or more ESFRI initiatives with Arctic nodes (SIOS, EMSO, ICOS, LIFEWATCH, ...) will enhance its chances of success considerably.



## Circumpolar Biodiversity Monitoring Program

91780 Alaska Highway, Whitehorse, Yukon, CANADA Y1A 5X7  
+1 (867) 393 6760

24<sup>th</sup> November 2009

To Whom It May Concern:

In my capacity as Chair of the Circumpolar Biodiversity Monitoring Program (CBMP), I would like to express my strong support for the SCANNET proposal to the EU 7<sup>th</sup> Framework programme (FP7).

With over 60 global partners to date, the CBMP is an international network of scientists and local resource users working together to harmonize and enhance monitoring efforts across the Arctic in order to improve our ability to detect, understand and report on significant trends and pressures. Much of the CBMP's work involves developing ecosystem-based (marine, coastal, freshwater and terrestrial), integrated pan-Arctic biodiversity monitoring plans involving the development of optimal sampling schemes and standardized measures and sampling methods. The CBMP relies on a network of research and monitoring stations and programs to both contribute to the development of these plans and implement them. The continued and expanded development of the SCANNET network will represent a significant advancement in our ability to detect and understand trends in a rapidly changing Arctic. SCANNET's scaled approach to coordinated and integrated research and monitoring using a circum-arctic network of field stations across environmental envelopes is directly aligned with the CBMP approach. As such, the proposed project represents a critically important component for the CBMP program.

The CBMP will directly engage the development of the SCANNET project in several ways. It will act as a stakeholder member providing direction to the development of the SCANNET network and serving on SCANNET committees. It will also directly engage SCANNET in the development and implementation of the CBMP's Arctic Terrestrial and Freshwater Biodiversity Monitoring Plans.

Please accept this letter as confirmation of the Circumpolar Biodiversity Monitoring Program's strong support for and direct involvement in the SCANNET project.

Sincerely,

Mike Gill  
Chair, Circumpolar Biodiversity Monitoring Program  
Environment Canada  
91780 Alaska Highway  
Whitehorse, Yukon  
Canada  
Y1A 5X7





Gouvernement du Canada  
Ambassade du Canada

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Embassy of Canada

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SE-103 29 Stockholm, Suède  
Téléphone: (46-8) 453-3000  
Télécopieur: (46-8) 453-3016

November 30, 2009

To Whom it May Concern,

The Embassy of Canada in Stockholm has had a long-standing cooperation with the Abisko Scientific Research Station (ASRS) in Northern Sweden.

We have been advised that ASRS intends to submit an EU-FP7 application under the "INTERACT-program", aiming at reactivating and strengthening the SCANNET Scientific Network to which several Canadian Arctic infrastructures belong.

The Canadian Embassy in Stockholm strongly supports ASRS's EU-FP7 application. We foresee increased research and educational opportunities between Sweden and Canada resulting from the project. We also welcome that Swedish-Canadian scientific cooperation has developed within the framework of the University of the Arctic, which also serves as a partner in the INTERACT project proposal.

Yours sincerely,

Alexandra Volkoff  
Ambassador



## Arctic Monitoring and Assessment Programme

Strømsveien 96., P.O. Box 8100 Dep., N - 0032 Oslo. Norway, Phone 47 – 23 24 16 30, Fax 47 - 22 67 67 06  
e-mail: [amap@amap.no](mailto:amap@amap.no), <http://www.amap.no>

To whom it may concern

Your ref.

Our ref.

Date

01.12.09

### SCANNET support

Arctic Monitoring and Assessment Programme (AMAP) is an international organisation established by initiative of the Arctic Council in 1991 to implement components of the Arctic Environmental Protection Strategy.

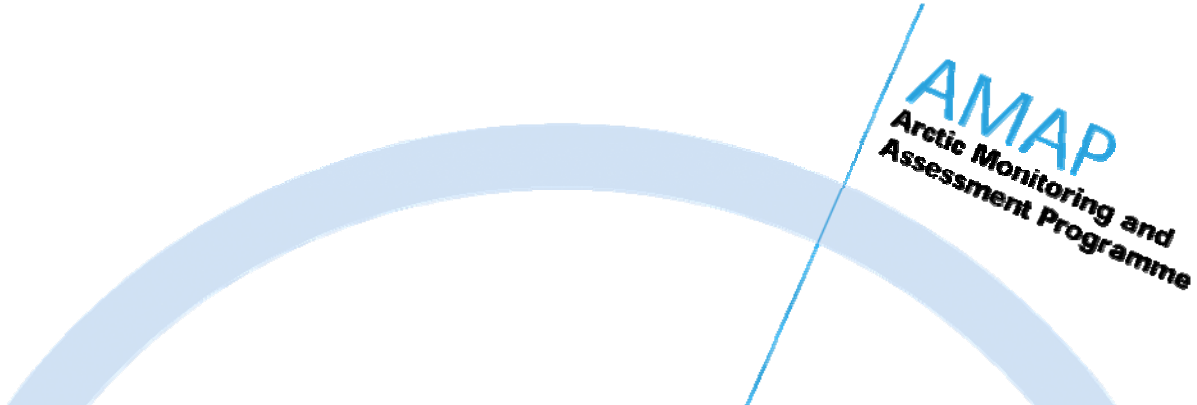
AMAP strongly supports the initiative taken by SCANNET to further develop their circum-arctic network of terrestrial field sites in the Arctic, a network that AMAP has followed and cooperated with since its establishment in 2001. We see SCANNET as a strong bottom-up driven initiative which is in strategic line with different initiatives recently taken by the Arctic Council to further coordinate the observations of the Arctic Earth system.

SCANNET will, in case their project is funded, increase the cooperation between the field sites in The Arctic. These field sites are important corner stones in the future research and monitoring in the region, and we expect a significant added value from the coordination between the sites proposed by the project due to (i) the proposed increased mobility of the scientists between different parts of the Arctic, (ii) the proposed networking between the station leaders in the Station Manager Forum, and (iii) the development of new technologies especially in the fields of automatic measurements of ecosystems processes, carbon exchange measurements and data management. Further, we see SCANNET as an important cooperation partner for AMAP, especially in relation to collection of data and dissemination of knowledge concerning terrestrial ecology and climate change feedback.

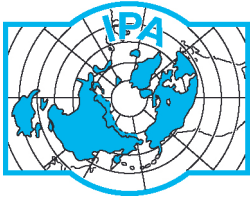
Yours sincerely



Lars-Otto Reiersen  
Executive Secretary  
Arctic Monitoring and Assessment Programme



**AMAP**  
Arctic Monitoring and  
Assessment Programme



# International Permafrost Association

Potsdam, 3 December 2009

## Executive Committee

(2008-2012)

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### PAST PRESIDENTS

Dr. Jerry Brown (2003-2008)  
Professor Hugh M. French (1998-2003)  
Academician Cheng Guodong (1993-98)  
Professor Troy L. Péwé (1988-1993)  
Academician P. I. Melnikov (1983-88)

<http://www.ipa-permafrost.org/>

Dear Colleague,

I am pleased to support this initiative. SCANNET is a network of 33 Arctic and northern terrestrial infrastructures located throughout the circum-polar north. These infrastructures support and facilitate research and monitoring on all aspects of the physical and biological environment. Currently, SCANNET, a bottom-up organisation without resources, seeks to secure support from the EU Framework 7 to strengthen its activities and particularly to respond to the rapidly increasing demands for data on the rapidly changing northern environment. It seeks to do this by building capacity for research and monitoring, initiating transnational access to researchers and providing new and more accessible data for numerous stakeholders. As an organisation that seeks to identify targets for conservation, the experiments and monitoring of ecosystems and biodiversity throughout the wide environmental envelope of the INTERACT concept will provide valuable information. Further, the one-stop-shop for information proposed by INTERACT will provide a mechanism to access relevant data and also request sampling to obtain missing information.

Sincerely,

Hans-Wolfgang Hubberten, President  
International Permafrost Association

### INTERNATIONAL SECRETARIAT:

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To Whom it may concern,

Re: "INTERACT" – a SCANNET initiative.

I am pleased to support this initiative. SCANNET is a network of 33 Arctic and northern terrestrial research sites and stations located throughout the circum-polar north. These sites support and facilitate research and monitoring on all aspects of the physical and biological environment. Many of the stations support research by scientists involved in the International Tundra Experiment (ITEX), which is a network examining responses of tundra ecosystems to climate variability and change since 1992. ITEX researchers use both experimental and observational studies, and the support at the research stations involved in SCANNET is critical to maintaining the research over the long-term. Currently, SCANNET, a bottom-up organisation without resources, seeks to secure support from the EU Framework 7 to strengthen its activities and particularly to respond to the rapidly increasing demands for data on the rapidly changing northern environment. It seeks to do this by building capacity for research and monitoring, initiating transnational access to researchers and providing new and more accessible data for numerous stakeholders. As an organisation that seeks to identify targets for conservation, the experiments and monitoring of ecosystems and biodiversity throughout the wide environmental envelope of the INTERACT concept will provide valuable information. Further, the one-stop-shop for information proposed by INTERACT will provide a mechanism to access relevant data and also request sampling to obtain missing information.

Yours sincerely,

Gregory H. R. Henry  
Professor  
Chair, International Tundra Experiment (ITEX)

<b>Work package number</b>	4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Transnational Access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	1		
<b>Participant short name</b>	ANS		
<b>Person-months per participant<sup>1</sup>:</b>	100		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> Abisko Scientific Research Station
<u>Location (town, country):</u> Northern Lapland, Sweden, 68°21'N, 18°49'E
<u>Web site address:</u> www.ans.kiruna.se
<u>Legal name of organisation operating the infrastructure:</u> The Royal Swedish Academy of Sciences
<u>Location of organisation (town, country):</u> Stockholm, Sweden
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> 860 000
<u>Description of the infrastructure:</u> <i>The Abisko Scientific Research Station - ANS</i> is a unique, long-established, modern and comprehensive infrastructure situated in a wilderness about 200 km north of the Arctic Circle. It has facilities of an international standard that support a range of research from observation and monitoring to high tech experimentation within a range of terrestrial and freshwater environments. This unique European environment is characterised by high variability of topography, geomorphology, geology, climate and biocomplexity represented by a range of landscape types, from lowland coniferous forests to ecosystems adjacent to permanent snow and ice on mountain tops. The Station is easily accessible by road and rail with airports about 100 km away in Kiruna, Sweden and Narvik, Norway. The main Station complex includes accommodation and catering facilities for up to 100 visiting scientists, laboratories, offices, workshops, lecture theatres, computer laboratories, greenhouses, experimental gardens, meteorological observatory and storage facilities. The Station is unique in the subarctic since it is open all through the year which is particularly important because warmer winter periods are having large effects on ecosystems and landscape processes
<u>Services currently offered by the infrastructure:</u> Research is facilitated by the physical infrastructure of the buildings and facilities outlined above and also by information and expertise available at the Station. The Station possesses long-term records of climate, phenology, and many other environmental and biological parameters. Some records extend back to 1913. These data are available in metadata bases on the web sites of the Station, and data are regularly supplied to scientists. In addition, the Station has a bibliography of over 2,800 scientific publications, which makes it the best known area of the Sub-arctic. The Station also provides expertise: the two permanent researchers encourage and supervise research in climate change issues, ecology and geomorphology, develop, contribute to, and host student courses and international courses. In addition, the considerable and varied expertise of other staff at the Abisko Station provide an “infrastructure” of advice and practical help including computing, library assistance, developing equipment for field and laboratory research, help with facilities in the experimental gardens (propagating plants, maintaining decomposition experiments etc.), establishing infrastructure for experiments in remote locations (travel and transport by snow scooter, helicopter and provision of electrical power), and maintenance of research equipment. A unique facility for the Station is the availability of qualified technical support in the lab, workshop and in the field throughout the year and particularly during winter when researchers are at their home institutions.

<sup>1</sup> except human effort already included in the calculation of the access costs.

<b>Work package number</b>	4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Transnational Access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	2		
<b>Participant short name</b>	ZAC		
<b>Person-months per participant<sup>1</sup>:</b>	122		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> Zackenberg Research Station
<u>Location (town, country):</u> Northeast Greenland (74°30'N 21°00'W). Nearest settlement is the military outpost Daneborg, 25 km south of the station. Nearest town is ittoqqortoormiit, 450 km south of the station
<u>Web site address:</u> <a href="http://www.zackenberg.dk">www.zackenberg.dk</a>
<u>Legal name of organisation operating the infrastructure:</u> National Environmental Research Institute, Aarhus University
<u>Location of organisation (town, country):</u> Frederiksborgvej 399, DK-4000 Roskilde, Denmark
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> 610,000
<p><u>Description of the infrastructure:</u> Zackenberg Research Station is an ecosystem research and monitoring facility at Zackenberg (74°30'N / 21°00'W) in Northeast Greenland, 25 km north of the military outpost Daneborg. A branch facility is situated at Daneborg in a former meteorological station. The station at Zackenberg consists of ten houses and it has capacity for 25 guests at a time. The station is open for use each year from 1. June to 31 August.</p> <p>The station provides several laboratories, a workshop, an accommodation building and a mess. An annex to the station for marine research is located in the settlement Daneborg, 25 km to the south. This facility accommodates ten scientists, has a small and primitive laboratory and several small boats for marine research. Zackenberg Research Station has its own airstrip. Transport to and from the station and stay at the station is handled as package solutions by National Environmental Research Institute, Aarhus University. The Local transportation is based on hiking, skiing, boating or use of all terrain vehicles.</p> <p><u>Services currently offered by the infrastructure:</u> The infrastructure provides access to a pristine high arctic ecosystem in the very remote Northeast Greenland. All modern facilities and equipment necessary for terrestrial ecosystem research are provided by the station. The station provides package solutions including travel, accommodation and meals for scientists visiting the station. As an integrated part of the activities at Zackenberg a long-term monitoring programme, Zackenberg Basic, was initiated in 1995 and fully implemented for the terrestrial part of the ecosystem in 1996. In 2003 the programme was supplemented with a sub-programme, MarineBasis taking care of the marine environment, and in 2008 it was supplemented with another sub-programme focusing on glaciers (GlacioBasis). The objective of the programme is to provide long time series of data on the natural innate oscillations and plasticity of a High Arctic ecosystem. This is accomplished through monitoring of selected biotic parameters and elements (BioBasis and MarineBasis) as well as climatic (ClimateBasis and GlacioBasis) and other abiotic (GeoBasis and MarineBasis) parameters and elements throughout the year on a long-term basis. Data from the monitoring is being provided free of charge to anyone being interested in using the data</p>

<sup>1</sup> except human effort already included in the calculation of the access costs.

<b>Work package number</b>	4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Transnational Access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	3		
<b>Participant short name</b>	OULANKA		
<b>Person-months per participant<sup>1</sup>:</b>	57		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> <i>Oulanka Research Station</i>
<u>Location (town, country):</u> <i>Kuusamo town in Northeastern Finland (66°22'N 29°19'E).</i>
<u>Web site address:</u> <a href="http://www oulu fi/oulanka">http://www oulu fi/oulanka</a>
<u>Legal name of organisation operating the infrastructure:</u> <i>University of Oulu, Finland</i>
<u>Location of organisation (town, country):</u> <i>P.O. 8000, 90014 University of Oulu, Finland</i>
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> 650 000 EURO
<u>Description of the infrastructure:</u> <i>Oulanka Research Station is a scientific research station of the Thule Institute / University of Oulu. It was founded in 1966 for research and teaching in bio- and geosciences into middle of Oulanka National Park. The main research areas are ecosystem and biodiversity research on boreal terrestrial and aquatic environments, geographic processes, tourism-related issues as well as long-term monitoring of environment. The location of the station within Oulanka National Park, an attractive nature tourist destination and active cooperation with local partners promotes the interdisciplinary research on nature-based tourism and traditional livelihoods. The permanent staff comprises 6 persons (two academic) and additionally several project researchers are working at the station. The station was renovated in 2004-05 and it has modern laboratory facilities with basic equipment and modern microscope system with high-resolution cameras for digital documentation. The station is part of the Finnish Long-Term Socio-Ecological Research network FinLTSER ("Northern LTSER-Platform"; <a href="http://northernltser oulu fi/LTER.htm">http://northernltser oulu fi/LTER.htm</a>). It offers accommodation for up to 95 persons in full board, and it is open the whole year round. The station is easily reached with the public transportation.</i>
<u>Services currently offered by the infrastructure:</u> <i>The infrastructure provides access to northern boreal ecosystems and many long-term ecological (e.g. bedrock, soils, vegetation site types, flora, insects, birds) and social (e.g. socio-demographic data, tourism) data sets on not only from the national park but also from wider biogeographical region. Access to modern and historical (1950'ies and 1980'ies) aerial images from the region is offered. The station and its staff provide accommodation (full board), laboratory and working facilities and support for cross-disciplinary scientific work in the region. Oulanka Research Station has been a successful partner in national and international cooperative projects, for instance, in the EU-funded LAPBIAT-project (Lapland Atmosphere-Biosphere Facility; <a href="http://www.sgo.fi/lapbiat/">www.sgo.fi/lapbiat/</a>) and Life-projects (e.g., <a href="http://www.ymparisto.fi/syke/vaccia">www.ymparisto.fi/syke/vaccia</a>).</i>

<sup>1</sup> except human effort already included in the calculation of the access costs.

<b>Work package number</b>	4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Transnational Access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	7		
<b>Participant short name</b>	SCS		
<b>Person-months per participant<sup>1</sup>:</b>	13		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> Faroe Islands Nature Investigation, FINI
<u>Location (town, country):</u> The infrastructure has several locations in the Faroe Islands, including the Sornfelli station, with its administrative centre in Torshavn, 62°02'N/6°46'W.
<u>Web site address:</u> <a href="http://www.jardfeingi.fo">www.jardfeingi.fo</a>
<u>Legal name of organisation operating the infrastructure:</u> <i>Jardfeingi</i>
<u>Location of organisation (town, country):</u> Brekkutun 1, FO-188 Hoyvík, Faroe Islands
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> 50.000
<u>Description of the infrastructure:</u> <p>The Faroe Islands Nature Investigation (FINI) is a network of stations in several islands building up monitoring activities including subjects such as geohazards and meteorology. Some of the activity has been going on for some years while other parts only started recently.</p> <p><u>Services currently offered by the infrastructure:</u> FINI provides access to an extreme oceanic landscape and ecosystem in the central part of the Northeast Atlantic ocean. The land area is very small in the vast ocean offering excellent opportunities to study the effect on land of changes in the atmospheric and ocean currents governing the climate in this part of the northern hemisphere.</p> <p>In close vicinity of all the stations it is possible to find convenient accommodation, including transportation both on land, on the sea and by helicopter. The network is able to provide for some laboratory facilities and equipment. The network is also able to provide practical and valuable logistical advice with regards to conducting data collection such as fieldwork in the Faroe Islands.</p>

<sup>1</sup> except human effort already included in the calculation of the access costs.

<b>Work package number</b>	4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Transnational access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	9		
<b>Participant short name</b>	TRS		
<b>Person-months per participant<sup>1</sup>:</b>	2		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> <i>Tarfala Research Station</i>
<u>Location (town, country):</u> <i>Northern Lapland, Sweden, 67°55N 18°35E at 1130 masl. Nearest settlement is the small village Nikkaluokta, 27 km, nearest town is Kiruna, 60 km.</i>
<u>Web site address:</u> <i>www.tarfala.su.se</i>
<u>Legal name of organisation operating the infrastructure:</u> <i>Department of Physical Geography &amp; Quaternary Geology, Stockholm university, Sweden</i>
<u>Location of organisation (town, country):</u> <i>Stockholm University, 106 91 Stockholm, Sweden</i>
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> <i>300,00 EURO</i>
<u>Description of the infrastructure:</u> <i>Tarfala Research Station (TRS) is located in a high alpine valley at 1130 m a.s.l. in the Kebnekaise mountains, only 1 km from several glaciers. Here scientists can carry out research with focus on glaciology, glacial hydrology, alpine geomorphology, permafrost processes, mountain and glacier meteorology or ecosystem responses to a changing climate. TRS holds the longest glacier massbalance record in the world, from Storglaciären since 1945. A wealth of background data has been collected since then, the use of which enables scientists to carry out state-of-the-art science on the glaciers and in their forefields. TRS can accommodate up to 30 scientists, has a well equipped lecture hall, workshop, wet laboratory, a mess and a sauna. Transport to and from the station from the village Nikkaluokta is with snowmobile or on skis in winter, on foot or with helicopter in summer</i>
<u>Services currently offered by the infrastructure:</u> <i>TRS provides access to a unique alpine and sub-Arctic environment and several glaciers in northern Swedish Lapland where glaciers have been monitored since the end of the 19<sup>th</sup> century. Modern facilities and equipment necessary for glaciological research is provided by the station (e.g. dGPS, geo-radar, ice-drill). TRS provides a package solution including accommodation and meals (full board), and help with arranging local transport.</i>
<i>A long-term monitoring programme started with glacier massbalance surveys already in 1945. The current programme also includes measurements of glacier extents (regional), glacial hydrology, mountain meteorology (AWS) and permafrost. Data from the monitoring programme is being provided free of charge.</i>
<i>TRS is visited each year by scientists both from EU and outside EU countries. TRS is also regularly visited by University courses at undergraduate and postgraduate level. Topics of research which have resulted in publications in high profile international journals recently are "routing of melt water in glaciers", "climate change effects on temperature regime of glaciers".</i>

<sup>1</sup> except human effort already included in the calculation of the access costs.

<b>Work package number</b>	4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Transnational access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	10		
<b>Participant short name</b>	KEVO		
<b>Person-months per participant<sup>1</sup>:</b>	2		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> <i>Kevo Subarctic Research Institute</i>
<u>Location (town, country):</u> Utsjoki, Finnish Lapland (69°45'N, 27°01'E).
<u>Web site address:</u> <a href="http://www.kevo.utu.fi/en">http://www.kevo.utu.fi/en</a>
<u>Legal name of organisation operating the infrastructure:</u> <i>University of Turku</i>
<u>Location of organisation (town, country):</u> Turku, Finland
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> 766 000 € (year 2008)
<u>Description of the infrastructure:</u> <i>Kevo Subarctic Research Institute, founded in 1958, lies about 60 km north of the continuous pine forest line and belongs to the subarctic of mountain birch forest zone close to both local pine tree line in the river valleys and the mountain birch treeline at forest – tundra ecotone. It is located in Utsjoki, which is the northernmost and municipality in Finland and the only one with Sami majority. The station, including weather station of Finnish Meteorological Institute, consists of several buildings. It has capacity to accomodate about 40 guests (up to 70 in summertime) at a time. It's is open year-round, but the kitchen offers meals (full board) outside the main field season (May-September) for larger groups only. The station provides laboratories, workshops, a lecture hall, accommodation buildings and a sauna. The Reindeer Research Station and the River Tenjoki Fisheries Research Station belonging to Finnish Game and Fisheries Research Institute (<a href="http://www.rktl.fi">http://www.rktl.fi</a>) are located 100 and 20 km away, respectively, from Kevo station and their facilities and equipment are also available upon agreement.</i>
<u>Services currently offered by the infrastructure:</u> <i>Kevo station gives access to ecological, geographical and geological research on the subarctic forestline ecosystem. The station is situated right next to Kevo Strict Nature Reserve (712 km<sup>2</sup>) and carries out research at the reserve (permits for conducting research in the reserve have to be applied beforehand). There are long-term field experiments studying the effects of pollutants (acids and heavy metals) as well as the impacts of reindeer grazing (exclosures) on subarctic ecosystems. The station has got treeline arboretums with different origins of arctic treeline species. Kevo gives access to long term data sets: population dynamics on moths, voles, birds of prey, hole-nesting passerines, arrival times on migrating birds, phenology of vascular plants, pollen monitoring as well as meteorological data. There is also up to 50 year old biogeographical and physical geographical mapping data available for comparisons with the present situation.</i>
<i>Kevo is internationally best known for the research on plant herbivore interactions that initiated from the study of the moth larvae outbreaks that may lead to death of birch forests in large areas. The latest outbreak in 2005-2009 destroyed about 400 km<sup>2</sup> of the treeline birch forests in Utsjoki and the station is monitoring the recovery of the ecosystem. In physical geography Kevo is best known for research on palsa mires. During the recent years the station has had yearly about 60-80 Finnish and 40-60 foreign visiting scientist (including research assistants)</i>

<sup>1</sup> except human effort already included in the calculation of the access costs.

Work package number	4	Start date or starting event:	Month 1
Work package title	Transnational access		
Activity Type	SUPP		
Participant number	11		
Participant short name	KILPIS		
Person-months per participant <sup>1</sup> :	2		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> <i>Kilpisjärvi Biological Station</i>
<u>Location (town, country):</u> <i>Kilpisjärvi village in Northwestern Finnish Lapland (69°03'N 20°50'E).</i>
<u>Web site address:</u> <a href="http://www.helsinki.fi/kilpis/">http://www.helsinki.fi/kilpis/</a>
<u>Legal name of organisation operating the infrastructure:</u> <i>University of Helsinki, Finland</i>
<u>Location of organisation (town, country):</u> <i>P.O.B. 33 (Yliopistonkatu 4), FI-00014 University of Helsinki, Finland</i>
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> 750,000 EURO
<u>Description of the infrastructure:</u> <i>Kilpisjärvi Biological Station is a scientific research station of the Faculty of Biosciences of the University of Helsinki. It was founded in 1964 to the subalpine mountain birch forest zone at the foot of Mount Saana (1029 m a.s.l., treeline at 600 m). Long-term studies (longest continuous data sets are over 60 years long) on small mammals, passerine birds and mountain vegetation are the most important fields of activity, although the whole range of studies is much wider. In this natural "cold laboratory" hydrobiology of mountain lakes, composition of alpine plant ecosystems and effects of climate change on plants and animals, etc., have been studied for decades (list of publications can be found on the web site address given above). The station is part of the Finnish Long-Term Socio-Ecological Research network FinLTSER ("Northern LTSER-Platform"; <a href="http://northernltser oulu.fi/LTER.htm">http://northernltser oulu.fi/LTER.htm</a>). During courses students of biology and geography are provided with information about natural phenomena in northern lands. The capacity of the station is 70 guests at a time and it is open the whole year round. Travel to and from the station is easy, for instance, by public transportation. <b>The permanent staff comprises 9 persons (three academic). The station and its staff provide accommodation (full board), laboratory and working facilities and support for field work but almost all research is carried out by independent visiting researches. The station was enlarged and renovated in 2003 and 2008 and it has modern laboratory facilities with basic equipment. Since 2008 the station has worked in close cooperation with the Finnish Bioart Society (<a href="http://www.kilpiscope.net/">http://www.kilpiscope.net/</a>). In 2009 the Ministry of Education provided money to make a plan to create a bioart laboratory, ArsBioarctica, within Kilpisjärvi Biololocal Station. ArsBioarctica seeks to combine biological and artistic work in innovative ways. Services currently offered by the infrastructure:</b> <i>The infrastructure provides access to subalpine and alpine ecosystems and many long-term ecological data sets collected in the northern end of the Scandinavian mountain range. Arctic Ocean (Skibotn, Norway) is only 40 km away. The steep biogeographical gradient between Kilpisjärvi and Skibotn is scientifically interesting. Kilpisjärvi Biological Station has been a successful partner in international cooperative projects, for instance, in the EU-funded LAPBIAT-project (Lapland Atmosphere-Biosphere Facility; <a href="http://www.sgo.fi/lapbiat/">http://www.sgo.fi/lapbiat/</a>)</i></i>

<sup>1</sup> except human effort already included in the calculation of the access costs.

Work package number	4	Start date or starting event:	Month 1
Work package title	Transnational Access		
Activity Type	SUPP		
Participant number	12		
Participant short name	KOLA RI		
Person-months per participant <sup>1</sup> :	2		

<b>Description of the infrastructure</b>
Name of the infrastructure: <b><i>Kolari Research Unit</i></b>
Location (town, country): <b><i>Kolari research unit (67° 21' N 23° 49' E) is the northernmost research station of the Finnish Forest Research Institute. It is located close to borderline between Finland and Sweden by the Muonio river.</i></b>
Web site address: <b><u><a href="http://www.metla.fi/ko/index.htm">http://www.metla.fi/ko/index.htm</a></u></b>
Legal name of organisation operating the infrastructure: <b><i>Finnish Forest Research Institute</i></b>
Location of organisation (town, country): <b><i>Kolari</i></b>
Annual operating costs (excl. investment costs) of the infrastructure (€): <b><i>150 000 €</i></b>
Description of the infrastructure: <b><i>The research topics of Kolari Research Unit concerns the forest biodiversity, forest fires, timberline, socio-cultural sustainability of land use and nature based tourism. The station is situated along the main road from Tornio to Kilpisjärvi (about 300 km south from Kilpisjärvi). So it is easy to make visit in the both research stations during the same trip. The station has participated in many EU-funded projects and co-operates in many ways especially with Swedish, Norwegian and Russian researchers.</i></b>
Services currently offered by the infrastructure:  <b><i>The station provides ability to make dendrochronological measurements in tree rings in the dendrolaboratory.</i></b>  <b><i>The station provides access to the boreal forest ecosystem especially to the tree line which is located about 100 km north from the station. Close to the station (40 km) there is the Pallas-Ylläs national park which provides pristine forests to make ecosystem and ecological studies, forest regeneration studies as well as sociological studies concerning land use, socio-cultural sustainability and natural based tourism. Internationally there are some visitors in the station from Russian, Norway and Sweden yearly. Data for several dissertations have been collected in the station.</i></b>  <b><i>Accommodation for about ten persons is provided. There are also several computers and working rooms for scientist in use and internet, phones and faxes. Modern facilities and small equipments to make ecological forest research are provided.</i></b>

<sup>1</sup> except human effort already included in the calculation of the access costs.

<b>Work package number</b>	WP4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Transnational Access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	13		
<b>Participant short name</b>	ARCS T		
<b>Person-months per participant<sup>1</sup>:</b>	2		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> Arctic Station
<u>Location (town, country):</u> West Greenland (69°15'N, 53°34'W). Arctic Station is situated in the town of Godhavn/Qeqertarsuaq on the island Disko in Disko Bugt.
<u>Web site address:</u> <a href="http://arktiskstation.ku.dk/">http://arktiskstation.ku.dk/</a>
<u>Legal name of organisation operating the infrastructure:</u> Faculty of Science, University of Copenhagen, Denmark
<u>Location of organisation (town, country):</u> Tagensvej 16, DK-2200 Copenhagen N, Denmark
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> 303000
<u>Description of the infrastructure:</u> Arctic Station is the oldest research station in Greenland. It was funded in 1906. The station consists of a main building (comprising guest accommodation facilities and the private home of the chief of logistician), a combined laboratory (three small laboratories, of which one is a cold laboratory – all with standard laboratory equipment), library and storage building, and the private home of the chief scientist. The station is located in a nature sanctuary, approximately 1 km west of the small town, Qeqertarsuaq (formerly Godhavn), with c. 1,100 inhabitants. The Arctic Station buildings and logistics have been continuously modernized, expanded and developed. The station therefore will appear as a 'state of the art' platform for year-round environmental research. In 1994 the Arctic Station took over its third (and present) research vessel named 'Porsild'. It is a 15 m long steel- and aluminium boat which has modern and comfortable passenger facilities, and 'state-of-the-art' equipment for marine biological and geological investigations.
<u>Services currently offered by the infrastructure:</u>
The station is located on the island Disko, a large island (8,578 km <sup>2</sup> ) off the west coast of Greenland. The nearest surroundings of the station offer a very diverse physical and biological setting with: <ul style="list-style-type: none"> <li>• Geological variation comprising Precambrian bedrock, slate and sandstone from the Cretaceous period and large series of Tertiary volcanic rocks</li> <li>• Numerous homothermic springs (some radioactive)</li> <li>• Easy access to high-dynamic, glacial geomorphical landscape features; numerous large and smaller glaciers and ice caps are accessible on single day hikes.</li> <li>• Easy access to six out of the eleven 'Ramsar' areas in Greenland.</li> <li>• Rich plant communities with approx. 250 of a total of 500 flowering plants found in Greenland.</li> <li>• Some of Greenlands largest bird cliffs (Fullmar, gulls, Cormorant, and Guillemot)</li> <li>• Ecosystem data directory and database for the study area</li> <li>• Easily accessible paleo-environment archives</li> </ul>

<sup>1</sup> except human effort already included in the calculation of the access costs.

<b>Work package number</b>	WP4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Transnational Access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	14		
<b>Participant short name</b>	SER		
<b>Person-months per participant<sup>1</sup>:</b>	2		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> Sermilik Research Station
<u>Location (town, country):</u> The Sermilik Research Station is located in Southeast Greenland (65°40'N 38°10'W), about 20 km north of the small town Tasiilaq (Ammassalik).
<u>Web site address:</u> <a href="http://www.geo.ku.dk">www.geo.ku.dk</a>
<u>Legal name of organisation operating the infrastructure:</u> Department of Geography and Geology, Geocenter Denmark, University of Copenhagen, Denmark.
<u>Location of organisation (town, country):</u> Oester Voldgade 10, Geocenter Denmark, DK 1350 Copenhagen K, Denmark.
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> 45 000
<u>Description of the infrastructure:</u> The Sermilik Research Station is an ecosystem research and monitoring facility in the humid low arctic Southeast sector of Greenland. The station is located in the Sermilik Fjord catchment holding a number of local ice caps and glaciers, and one of the largest ice streams from the Greenland Inland, the Helheim Glacier. The main station at the coast consists of three buildings and has a capacity for eight guests at a time. A small branch facility is situated on a nunatak at the equilibrium line of the adjacent Mittivakkat Glacier. The station is open from 1 June to 1 September. The main station provides an accommodation building including room for primitive laboratory activities, a workshop and boat house (a Zodiac for estuarine and near coastal research) and a house for storage and fuel. The small facility on the Mittivakkat Glaciers is used for accommodation, equipment and data loggers in relation to the research activities on the glacier. The Sermilik Research station is reached by commercial air carrier to Island, from there by Greenland Air or charter flight to Kulusuk Airport, close to the Town of Tasiilaq, and by helicopter to Tasiilaq. From Tasiilaq to the station boat or helicopter charter is recommended depending on weather, snow or ice conditions and amount of luggage/cargo. It is possible to reach the station by foot (15-20 km). Booking of favorable flight tickets is recommended a half a year in advance and travel time to the station will be 1-2 days from Copenhagen, normally with a stop-over in Iceland. One day are normally spent in Tasiilaq before and after each visit to the station, to handle cargo, food and fuel. Hotel accommodation or rented rooms are available in Tasiilaq.
<u>Services currently offered by the infrastructure:</u> Since the early 1990 <sup>th</sup> the station supports a comprehensive year-round monitoring program covering basic climatology and local climate gradients in the Mittivakkat Glacier drainage basin, glacier mass balance, run-off and sediment transport and the development of coastal and delta geomorphology. Research activities in the Mittivakkat Glacier catchment go back to 1933, when the first glacier surveys are documented. During the IGY 1958 and after building of the Sermilik Research station in 1970-72 research activities were expanding. Based on monitoring data from the Mittivakkat glaciated catchment models have been developed to test future scenarios for both local glaciers and for the Greenland

<sup>1</sup> except human effort already included in the calculation of the access costs.

Ice Sheet, and present hind casts and forecasts of response to climate change. The emphasis of most research projects are on the control of climate on landscape processes, different elements of energy and water balances, hydrology and sediment transport and pro-glacial weathering. Furthermore, geomorphology, sedimentary archives from lakes and near estuarine and coastal waters and from poly-sequent soils are studied to elucidate the Holocene climate dynamics, vegetation dynamics and environmental history, focusing on the late Holocene and the period after the culmination of The Little Ice Age. The Sermilik Research Station mostly acts as a platform for terrestrial research and data from the monitoring is being provided free of charge to anyone being interested in using the data.

<b>Work package number</b>	WP4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Transnational Access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	15		
<b>Participant short name</b>	GINR		
<b>Person-months per participant<sup>1</sup>:</b>	2		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> Greenland Institute of Natural Resources (GINR)
<u>Location (town, country):</u> Main buildings, laboratories and living quarters are situated in Nuuk, Greenland (64°11'N 51°41'W). Additional facilities include field stations in Kobbefjord, Nuuk (64°08'N 51°23'W) and Niaqornat, Uummannaq (70°47'N 53°40'W).
<u>Web site address:</u> <a href="http://www.natur.gl">www.natur.gl</a>
<u>Legal name of organisation operating the infrastructure:</u> Greenland Institute of Natural Resources
<u>Location of organisation (town, country):</u> Box 570, Kivioq 2, 3900 Nuuk, Greenland
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> 378898
<p><u>Description of the infrastructure</u> GINRs main building was inaugurated in 1998. It contains the facilities necessary for the Institute's activities, i.e. offices, laboratories (incl. cold laboratory), storage room, librar, and meeting rooms. By June 2010, a new 1,000 m<sup>2</sup> extension of the institute will be taken in use. By then, the main building of the institute will have 3.000 m<sup>2</sup> under roof.</p> <p>Adjacent to the main building is an 850 m<sup>2</sup> annex with a large multi-room used for meetings and seminars. The same building contains five apartments and eight rooms for visiting researchers, as well as a garage / storage room.</p> <p>Furthermore, GINR has a third building at its disposal in Nuuk. This building contains furnished guest rooms for students and visiting biologists.</p> <p>In addition to the buildings in Nuuk, GINR also owns two small field stations, one in Kobbefjord, near Nuuk and the other in Niaqornat, in the Uummannaq area in Northwest Greenland. These field stations function as field bases for small research teams.</p> <p><u>Services currently offered by the infrastructure:</u> The infrastructure provides access to a low arctic ecosystem in West Greenland. Modern facilities and equipment necessary for terrestrial and marine ecosystem research are provided by GINR. In parallel with the activities at the The Greenland Climate Research Centre, a long-term integrated monitoring programme, Nuuk Basic, is carried out. The marine component of this programme was initiated in 2005, and the terrestrial part was initiated in 2008. The objective of the programme is to provide long time series of data on the natural innate oscillations and plasticity of a low arctic ecosystem. This is accomplished through monitoring of selected biotic parameters and elements (BioBasis and MarineBasis) throughout the year on a long-term basis. The project is run in parallel and close coordination with Zackenberg Basic. Data from the monitoring is being provided free of charge to anyone being interested in using the data.</p> <p>GINR owns two ships named Adolf Jensen and Paamiut. They are used respectively for scientific investigations in sheltered and in open waters. Besides that the institute has two small boats and three aluminum dinghies. For transport over land, GINR owns three cars and two snow mobiles.</p>

<sup>1</sup> except human effort already included in the calculation of the access costs.

<b>Work package number</b>	4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Transnational Access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	16		
<b>Participant short name</b>	FINSE		
<b>Person-months per participant<sup>1</sup>:</b>	2		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> <i>Finse Alpine Research Center</i>
<u>Location (town, country):</u> Finse, Hordaland, Norway (60° 36' N, 7° 30' E).
<u>Web site address:</u> <a href="http://www.finse.uio.no">www.finse.uio.no</a>
<u>Legal name of organisation operating the infrastructure:</u> <i>University of Oslo (Universitetet i Oslo)</i>
<u>Location of organisation (town, country):</u> Oslo, Norway
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> 72 000 Euro
<u>Description of the infrastructure:</u> <p>Finse Alpine Research Center is located in the northwestern part of Hardangervidda, Europe's largest mountain plateau, in southern Norway. The surrounding landscape range from low/middle alpine zones around 1200 meters above sea level to high alpine environments at 1850 meters altitude. The natural environment is rather extreme with respect to the length of the plant growth season, only about 3 months long, due to high winter precipitation and late snow melt. The geology, as well as the small scale topography and soil type, is highly variable, making the area particularly interesting for environmental research.</p> <p>The center is located 1.5 km east of the of Finse railway station, and can be accessed year-round by train. There is a rough road connecting the station to Haugastøl (35 km) during the snow-free season (mid July to late September). The station has a 4 WD van, a snowmobile and several small boats. The research unit at the center has room for up to 15 researchers at a time and includes several laboratories, IT-facilities (including broadband wireless internet), a temperature regulated room and four climate cabinets, aquarium facilities, a small library and a workshop. The research unit has all essential facilities for long-term housing, including a well equipped kitchen, and meals can be served in the conference unit when the kitchen staff is present.</p> <p><u>Services currently offered by the infrastructure:</u></p> <p>The center widely used biologists, geologists, geophysicists and other researchers from a wide range of Norwegian and international institutions. Every year about 50 researchers (from about 10-15 institutions) use the research center as a base for fieldwork. About 10 to 20% of the researchers are from outside Norway. Although most research projects are short term (1 to 3 years) and independent, some long term projects are maintained. These include large-scale monitoring of the small rodent community, studies of the vegetation in relation to climate change and long term</p>

<sup>1</sup> except human effort already included in the calculation of the access costs.

studies of limnology of high alpine lakes. Ecological time-series have been collected at the center since early 1970's and the station is now part of the International Tundra Experiment, focusing on the impact of climate change on selected plant species in tundra and alpine vegetation. The Hardangerjøkulen glacier, 2 km to the south of the center has also been subject of much research over the past decades.

Every year, a 2-day research seminar is arranged where researchers at the station meet to present results, share ideas and plan collaboration. Management authorities and representatives from other interest groups also take part in these seminars. Short courses on various research related topics, besides regular field courses, are also sometimes held at the center.

<b>Work package number</b>	WP4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Trans-national access, Bioforsk Svanhovd		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	17		
<b>Participant short name</b>	BIOFO RSK		
<b>Person-months per participant<sup>1</sup>:</b>	7		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> <i>Bioforsk Soil and Environment Svanhovd</i>
<u>Location (town, country):</u> <i>Sør-Varanger Municipality, Finnmark County, Norway (N 69°14' E 30°02'). Nearest town is Kirkenes and Airport Kirkenes (Høybuktnoen), 43 km north of the Svanhovd..</i>
<u>Web site address:</u> <a href="http://www.pasvik.no/english">www.pasvik.no/english</a> <a href="http://www.bioforsk.no">www.bioforsk.no</a>
<u>Legal name of organisation operating the infrastructure:</u> <i>Norwegian Institute of Agricultural and Environmental research - Bioforsk</i>
<u>Location of organisation (town, country):</u> <i>Bioforsk Svanhovd, N.-9925 Svanvik, Norway</i>
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> total turnover 2.000.000 €
<u>Description of the infrastructure:</u> Bioforsk Svanhovd is situated in the Pasvik Vally, Eastern Finnmark (N 69°14' E 30°02') at the border between Norway and Russia and it also near Finland. Svanhovd has a conference centre facility with capacity for 50 guests at a time. Lodging can include meals etc or self service of meals (guest kitchen). The station is open year round. The station provides field laboratory, a workshop and some machinery. Transport to and from Svanhovd is easy by taxi to airport and then reachable for Europe through Oslo (Gardermoen) or by bus taxi from Svanhovd to Ivalo Finland (250 km) The local transportation is based on car, snowmobile, hiking, skiing, boating or use of all terrain vehicles. Bioforsk Svanhovd carry out work with issues related to nature resources, protected areas, biological diversity, climate effects and environmental research in the Barents Region. Bioforsk Svanhovd has the national responsibility for genetic monitoring of brown bear in Norway. Svanhovd holds a staff of 26 persons and 11 of these are research capacities.  Øvre Pasvik National Park Visitor Centre Svanhovd is the authorized Visitor Centre for the Øvre Pasvik National Park and serves as an information centre for the National Park and other protected areas in the region. Through films and exhibitions we present the nature, culture and history of the Pasvik Valley. The Visitor Centre is open daily in June, July and August and at weekdays from September to May.  Svanhovd Botanical Garden Svanhovd Botanical Garden turns Svanhovd into a flowering oasis during the summer months with different types of plants of northern and alpine origin. In this spectacular oasis at 69°N, there are more than 450 perennials, bushes, trees and roses. The subjects of the garden are cultural, historical, medical, threatened and decoration plants. The best time to visit the garden is July and August.

<sup>1</sup> except human effort already included in the calculation of the access costs.

Services currently offered by the infrastructure: The Pasvik Vally is of the north-western-most outreach of Taiga. Here is old forest and small patches of northern boreal virgin forest. The Pasvik valley is a mixture of mires, bogs and mixed pine birch forest. About 50 km northward you meet the Barents Sea. The nature consists of about 230 bird species and about 600 plant species, the flora and fauna is a mixture of eastern and western and alpine, arctic and boreal species. The Pasvik River is the outlet river from Lake Enare in Northern Finland and runs toward north through the Pasvik Vally. The Pasvik River provides a rich biodiversity compared to its northern location. In this area there are short distances between vegetation zones and between different climatic zones. In the area there are also various anthropogenic impacts sites like Pechenga nickel melter and Syd-Varanger mining company are operating.

In cooperation with Pasvik Zapovednik (Russian strict forest nature Reserve) long term monitoring of i.e. waterbirds, small mammals, muskrat, elk (*Alces alces*) bear and large predators and phenology. At Svanhovd also meteorological monitoring are carried out by different institutions. In the forest on the Norwegian side there are several cottages open for use.

The Pasvik Valley has several protected areas on Finnish, Norwegian and Russian side. The southern ones of them; Vetsari (Finland), Pasvik Nature Reserve (that include Pasvik RAMSAR area), Gjøkvassneset Nature Reserve and Øvre Pasvik National Park and Pasvik Landscape protected area (Norway) and Pasvik zapovednik (Russia) conform Pasvik Enare trilateral Park and is Europark certified. Norwegian part of Pasvik Vally is ENFORS area ,

<b>Work package number</b>	4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Transnational Access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	19		
<b>Participant short name</b>	CEH		
<b>Person-months per participant<sup>1</sup>:</b>	6		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> <i>Allt a'Mharcaidh. ECN Cairngorms</i>
<u>Location (town, country):</u> Allt a'Mharcaidh, Cairngorm National Park, Scotland (57:06:54N 3:49:55W). Nearest town and accommodation is Aviemore (15km).
<u>Web site address:</u> <a href="http://www.ecn.ac.uk/sites/ecnsites.asp?site=T12">www.ecn.ac.uk/sites/ecnsites.asp?site=T12</a>
<u>Legal name of organisation operating the infrastructure:</u> <i>Natural Environment Research Council (Centre for Ecology &amp; Hydrology (CEH))</i>
<u>Location of organisation (town, country):</u> CEH, Bush Estate, Penicuik, Midlothian, UK, EH26 0QB
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> 15628
<u>Description of the infrastructure:</u> <p>The site is owned by Scottish Natural Heritage (SNH) and operated by CEH as part of the United Kingdom Environmental Change Network (ECN). The site has been used for research for over 30 years by various projects; and by ECN since 1999. Research at the site is focused around targeted monitoring of biophysical systems to provide long-term datasets. Specific projects designed to compliment such research is under taken as necessary.</p> <p>Local accommodation and transport links (road/rail) can be found at Aviemore (15km), although vehicular access would be required to get to the site. On site transport is by foot only, on moderately rough terrain and exposed to the elements.</p> <p>As a minimum site visits occur weekly from CEH during spring-autumn, and once monthly during winter (Dec-Feb). Office and laboratory facilities are situated CEH near Edinburgh.</p> <p><u>Services currently offered by the infrastructure:</u> Due to the sites location within the Cairngorm National Park, it is not possible to house laboratory/office infrastructure on site. These facilities are available at CEH Edinburgh.</p> <p>The catchment covers 10km<sup>2</sup> rising from 330m to 1111m including planted and natural stands of Scots Pine, open Calluna moorland and sub-arctic Calluna-Cladonia heaths in the upper zones. A wide ranging suite of data exists for the site from the last 10 years including, water chemistry (precipitation, soil and stream), physical climate (by automatic weather station), and vegetation. Surveys of all nature may occur as and when research is necessary. As well as ECN &amp; SCANNET the site is also part of the ALTER-Net and GLORIA networks, and was also a member of the ECOMONT project. The UK Acid Water Monitoring Network (UKAWMN), and UK Eutrophying and Acidifying Atmospheric Pollutants (UKEAP) also use data from the site within their respective networks.</p>

<sup>1</sup> except human effort already included in the calculation of the access costs.

<b>Work package number</b>	4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Trans-national access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	20		
<b>Participant short name</b>	LBHI		
<b>Person-months per participant<sup>1</sup>:</b>	7		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> <i>Litla-Skard Monitoring Station</i>
<u>Location (town, country):</u> <i>Western Iceland (21 37 53 W; 64 43 34 N), about 30 km north of the town Borgarnes.</i>
<u>Web site address:</u> <a href="http://www.ust.is/litla_skard/english.html">http://www.ust.is/litla_skard/english.html</a>
<u>Legal name of organisation operating the infrastructure:</u> <i>Agricultural University of Iceland (AUI)- Several Icelandic institutions take part in operating the site but the AUI is responsible for its management.</i>
<u>Location of organisation (town, country):</u> <i>Hvanneyri, IS-311 Borgarnes, Iceland</i>
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> 18,500 EURO
<u>Description of the infrastructure:</u>  Litla-Skard is an integrated monitoring (IM) site and follows the common guidelines of the IM network. The site, established in 1996, is located in the lowlands of Western Iceland (21 37 53 W; 64 43 34 N), about 30 km from the coastline. The landscape is rugged with a moderate relief. In between ridges with birch scrubland and heathland are depressions with mires, small ponds and streams. The catchment is 55.5 ha in size and within the elevation of 115–229m a.s.l.  The main focus of the monitoring is on hydrology, chemical properties of precipitation, groundwater and surface water, as well as measurements of weather parameters. Results from Litla-Skard indicate that the site is a good background monitoring station. There are no significant sources of anthropogenic pollution. The location of the site in the middle of the North Atlantic with oceanic climate and lack of anthropogenic pollution makes it a unique and important monitoring station.

<sup>1</sup> except human effort already included in the calculation of the access costs.

<b>Work package number</b>	WP4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Transnational Access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	21		
<b>Participant short name</b>	MFS		
<b>Person-months per participant<sup>1</sup>:</b>	4		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> Shapsha-Mukhrino Field Station
<u>Location (town, country):</u> Khanty-Mansiysk, West Siberia ( <b>60.9 N, 68.7 E</b> ).
<u>Web site address:</u> <a href="#">na</a>
<u>Legal name of organisation operating the infrastructure:</u> Yugra State University, UNESCO Chair on Environmental Dynamics and Climate Change
<u>Location of organisation (town, country):</u> Khanty-Mansiysk, Russia
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> 50500
<p><u>Description of the infrastructure:</u> The Shapsha Field Station is the main field accommodation of Yugra State University and is located 26 km East of the town of Khanty-Mansiysk. The station comprises accommodation (hostel) for up to 60 persons, lecture room, physical –chemical laboratory and storage of field equipment and transport vehicles (including boats) . Field research is concentrated in the peatland study area next to the Mukhrino Field Station (MFS), which acts as a satellite of Shapsha Station. The MFS facility includes a 2-floor wooden building in a primary mixed forest, with study/laboratory rooms, simple equipped dining/kitchen room, beds for 14 persons and a (Russian) sauna. The Mukhrino Field Station is located at the margin of a vast, pristine peatland complex, 27 km West of the town of Khanty-Mansiysk in the centre of West Siberia. The MFS is accessible from Khanty-Mansiysk by road (first 20 km) and further on by boat (in spring and early summer only), by foot (7 km: late summer) or snowmobile.</p> <p>An additional experimental site has been operated in the Forest Tundra zone in the Nymto Regional Park: the “Nymto Park Station” (NPS: 63.7N, 70.9E) The “Nymto Park Station” has a basic field accommodation, which can be reached by helicopter, supported by the Park management.</p> <p>The main topics of <b>current scientific work</b> are: Environmental conditions, Biodiversity, Carbon and Water cycling of peat ecosystems in Western Siberia. We use chamber method to measure CO<sub>2</sub> and methane emission from different type of peatlands. On the base of high resolution satellite images and large number of ground data we calculate total gas flax from the whole Middle-North part of West Siberian lowland</p> <p><u>Services currently offered by the infrastructure:</u></p> <p>The experimental field at MFS is equipped with 1 km long walking boards, which crosses the main mire ecosystem types and facilitates researchers to perform experiments and measurements in and or above the mires, without disturbing the ecosystems</p> <p>The main mire types of the site (without permafrost) are raised bogs, poor fens and ridge-hollow complexes. Part of the poor fens are drowned in the summer season, the rest has water tables of –</p>

0.05 to 0.2 m below the moss surface. The water table under the raised bogs is 0.4 to 0.8 m below the moss surface. Peat depth is 3 - 4.5 m.

The field site is equipped with automated hydrological devices continuous monitoring of water levels and water discharge and for GHGas fluxes by exchange between vegetation/soil and atmosphere 9 full automatic chambers (1 m<sup>2</sup>) have been installed.

Eddy-covariation equipment (Path Flux System and short tower) is available.

In the Nymto Park Station area the raised bogs are replaced by flat palsas, which have permafrost. This additional site is very suitable for purposes of comparison.

<b>Work package number</b>	4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Transnational access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	22		
<b>Participant short name</b>	IBPC CHO		
<b>Person-months per participant<sup>1</sup>:</b>	5		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> <i>Chokurdakh Research Tundra Station (CKD)</i>
<u>Location (town, country):</u> <i>The station Chokurdakh in the Indigirka lowlands (Sakha Republic, eastern Siberia, Russia) is located at 70°48' N, 147°26' E., elevation 48 m. Station is located in 28 km to the north from Chokurdakh village. Station was founded in 2003.</i>
<u>Web site address:</u>
<u>Legal name of organisation operating the infrastructure:</u> <i>Institute for Biological Problems of Cryolithozone SB RAS (IBPC SB RAS)</i>
<u>Location of organisation (town, country):</u> <i>41 Lenin avenue, Yakutsk, 677980, Russia</i>
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> <i>15 750</i>
<u>Description of the infrastructure:</u> <i>Chokurdakh tundra Research Station is an ecosystem research and monitoring facility in Far Eastern Siberia (70°48' N, 147°26' E), 28 km north of Chokurdakh village the Sakha Republic, Russia. The station consists of four living houses with overall capacity of near 10 guests at a time. The station is open for use from April to November.</i> <i>The station provides one laboratories and one warehouses. Transport to and from the station by snowmobile or boats and stay at the station is handled as package solutions by Institute for Biological Problems of Cryolithozone SB RAS, Yakutsk. The local transportation is basically on foot, and use of all terrain vehicles if needed.</i>
<u>Services currently offered by the infrastructure:</u> <i>The infrastructure provides access to a pristine typical sub-tundra ecosystem. All modern facilities and equipment necessary for terrestrial ecosystem research are provided by the station. The station provides package solutions including travel, accommodation and meals for scientists visiting the station. As an integrated part of the activities at Chokurdakh a long-term heat, H<sub>2</sub>O, CO<sub>2</sub> and CH<sub>4</sub> flux tower monitoring program was initiated in 2001 within Europe Union-12 and Russian-Dutch international projects. The objective of the program is to provide long time series of data on C/H<sub>2</sub>O/Energy Balance and Climate in a tundra ecosystem. Data from the monitoring is being provided free of charge to anyone being interested in using the data.</i>

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<sup>1</sup> except human effort already included in the calculation of the access costs.

<b>Work package number</b>	4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Transnational Access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	22		
<b>Participant short name</b>	IBPC SPA		
<b>Person-months per participant<sup>1</sup>:</b>	4		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> <i>Spasskaya Pad Research Station (SPA)</i>
<u>Location (town, country):</u> <i>Eastern Siberia (62°14' N, 129°37' E). Nearest settlement is Tulagino, 11 km east of the station. Nearest town is Yakutsk, 25 km south of the station. Station was founded in 1953.</i>
<u>Web site address:</u>
<u>Legal name of organisation operating the infrastructure:</u> <i>Institute for Biological Problems of Cryolithozone SB RAS (IBPC SB RAS)</i>
<u>Location of organisation (town, country):</u> <i>41Lenin avenue, Yakutsk, 677980, Russia</i>
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> <i>23 283</i>
<u>Description of the infrastructure:</u> <i>Spasskaya Pad Research Station is an ecosystem research and monitoring facility in Eastern Siberia (62°14' N, 129°37' E), 25 km north of Yakutsk city, the capital of the Sakha Republic, Russia. The station consists of seven living houses with overall capacity of near 40 guests at a time. The station is open for use year-round.</i>  <i>The station provides two laboratories and two warehouses. Transport to and from the station by car and stay at the station is handled as package solutions by Institute for Biological Problems of Cryolithozone SB RAS, Yakutsk. The local transportation is basically on foot, and use of all terrain vehicles if needed.</i>  <u>Services currently offered by the infrastructure:</u> <i>The infrastructure provides access to a pristine boreal forest ecosystem. All modern facilities and equipment necessary for terrestrial ecosystem research are provided by the station. The station provides package solutions including travel, accommodation and meals for scientists visiting the station. As an integrated part of the activities at Spasskaya Pad a long-term H2O and CO2 flux tower monitoring program was initiated in 1996 within international GAME-Siberia project and further supplemented by similar observation within Dutch-Russian cooperation. The objective of the program is to provide long time series of data on C/H2O/Energy Balance and Climate in a boreal ecosystem. This is accomplished through complex monitoring of larch and pine forests throughout the year on a long-term basis. Data from the monitoring is being provided free of charge to anyone being interested in using the data.</i>

<sup>1</sup> except human effort already included in the calculation of the access costs.

<b>Work package number</b>	4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Transnational access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	23		
<b>Participant short name</b>	KHIBI NY		
<b>Person-months per participant<sup>1</sup>:</b>	2		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> <b><i>Khibiny educational-scientific base MSU</i></b>
<u>Location (town, country):</u> <b><i>Murmansk Region, Kola Peninsula (NW Russian Arctic, 67°38'14"N, 33°43'31"E). Nearest town is Kirovsk (2 km) and Apatity (23 km). Station was founded in 1948.</i></b>
<u>Web site address:</u>
<u>Legal name of organisation operating the infrastructure:</u> <b><i>Geography Department of Lomonosov Moscow State University</i></b>
<u>Location of organisation (town, country):</u>
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> <b><i>23112</i></b>
<u>Description of the infrastructure:</u> <b><i>Khibiny station is the round-the-year field station for scientists and students, set in the heart of Khibiny Mountains, Kola Peninsula (NW Russian Arctic, 67°38'14"N, 33°43'31"E). It is one of the oldest stations at the Faculty of Geography (MSU) and, perhaps, the unique one. The station was founded in 1948. Every year the station hosts summer field courses and winter scientific expeditions for students, as well as researches who come for specific field projects (with an annual total of over 200 visitors). The scientific staff of the station consists of 4 research scientists. Facilities include a student accommodation building with dormitories, a lecture room, 2 lab rooms and a dining room, as well as the staff accommodation building with a few flats available for visiting researches. A minibus and a 4 WD truck with drivers may be available. Services currently offered by the infrastructure: Post-graduate students and scientists carry out researches on glaciology, soil science, biogeography, landscape science, meteorology and geomorphology in here. The station provides package solutions including travel, accommodation and meals for scientists visiting the station. A station provides a long-term monitoring and data sets of meteorological and glaciological data.</i></b>

<sup>1</sup> except human effort already included in the calculation of the access costs.

<b>Work package number</b>	WP4	<b>Start date or starting event:</b>	Month 1
<b>Work package title</b>	Transnational Access		
<b>Activity Type</b>	SUPP		
<b>Participant number</b>	24		
<b>Participant short name</b>	SAM		
<b>Person-months per participant<sup>1</sup>:</b>	14		

<b>Description of the infrastructure</b>
<u>Name of the infrastructure:</u> Research Station Samoylov
<u>Location (town, country):</u> Lena Delta, Siberia, Russia (72°22'N 126°28'E). Nearest settlement is the village Tiksi (with airport), 100 km southeast of the station. Nearest town is Yakutsk, 1100 km south of the station
<u>Web site address:</u> <a href="http://www.awi.de/en/infrastructure/stations/samoylov_station/">www.awi.de/en/infrastructure/stations/samoylov_station/</a>
<u>Legal name of organisation operating the infrastructure:</u> Alfred Wegener Institute for Polar and Marine Research
<u>Location of organisation (town, country):</u> Telegrafenberg A43, 14473 Potsdam, Germany
<u>Annual operating costs (excl. investment costs) of the infrastructure (€):</u> 180 000
<p><u>Description of the infrastructure:</u> Samoylov Research Station is an ecosystem research and monitoring facility on Samoylov Island, (72°22'N 126°28'E) in the Lena Delta, 100 km north of Tiksi. The station on Samoylov consists of a main wooden house (106 m<sup>2</sup>) and a new extension (68 m<sup>2</sup>). The station provides space for eight scientists and up to 16 people by using additional tents. The station is open for use each year from about middle of June to the end of September. The universal lab has a size of about 15 m<sup>2</sup> and is equipped with two working benches with a total length of 6.5 m. The second laboratory is about 12 m<sup>2</sup> and equipped with a gas chromatograph (Agilent; FID, WLD) and a hydrogen generator (Domnick Hunter UHP-20H) for trace gas analyses. The length of the working benches is 6 m. Distilled water for extraction and sample preparation is provided by the Lena Delta Reserve in Tiksi and transported in cans to the station.</p> <p><u>Services currently offered by the infrastructure:</u> The infrastructure provides access to a pristine high arctic permafrost ecosystem in the very remote Lena Delta, northeast Siberia. The laboratories are equipped with basic instruments necessary for terrestrial ecosystem research, but it is possible to transport further own instruments for specific analyses to the station at the beginning of the season. The station provides package solutions including travel from Moscow, accommodation and meals for scientists visiting the station. For power supply a 6 KVA diesel generator is used. The power rating of the generator supplies sufficient energy for the general equipment of the station and the scientific instruments and still holds reserves for the future. In order to have a power supply independent from the diesel generator during periods of low power consumption, a wind generator, a set of lead batteries (12V, 390Ah) and an AC converter were installed. This system supplies sufficient energy for the laboratory lights, notebooks, chargers and other low energy devices.</p> <p>Within the scope of the Russian-German cooperation long-term studies on carbon fluxes of the Lena Delta have been carried out since 1998. In 2002 the long-term studies on carbon dynamics were supplemented by a micrometeorological eddy covariance measurement system, which was designed to continuously determine the turbulent fluxes of carbon dioxide, methane, momentum, heat and water in the atmospheric boundary layer.</p>