Integrated Arctic Observation System

Research and Innovation Action under EC Horizon2020
Grant Agreement no. 727890

Project coordinator:
Nansen Environmental and Remote Sensing Center, Norway

Deliverable 8.10

Strategy for Intellectual Property exploitation

final version

Start date of project:	01 December 2016	Duration:	63 months
Due date of deliverable:	30 November 2021	Actual submission date:	24 April 2022
		Resubmission after review:	17 August 2022
Lead beneficiary for preparing the deliverable:		NERSC	
Person-months used to produce deliverable:		0.2 pm	

Authors: Stein Sandven, Kjetil Lygre (NERSC)

Version	DATE	CHANGE RECORDS	LEAD AUTHOR
0.1	26/11/2019	Initial version	S. Sandven
1.0	30/11/2019	Final version	S. Sandven
1.1	30/11/2019	Technical review and submission	K. Lygre
1.2	22/04/2022	Final version	S. Sandven
1.3	16/08/2022	Revised version after external review	S. Sandven

Approval X	Date: 17 Aug 2022	Sign. Coordinator

USED PERSON-MONTHS FOR THIS DELIVERABLE					
No	***Beneficiary***	***PM***	***No***	***Beneficiary***	***PM***
1	NERSC	*0.2*	**24**	TDUE	
2	UiB		**25**	GINR	
3	IMR		**48**	UNEXE	
4	MISU		**27**	NIVA	
5	AWI		**28**	CNRS	
6	IOPAN		**29**	U Helsinki	
7	DTU		**30**	GFZ	
8	AU		**31**	ARMINE	
9	GEUS		**32**	IGPAN	
10	FMI		**33**	U SLASKI	
11	UNIS		**34**	BSC	
12	NORDECO		**35**	DNV GL	
13	SMHI		**36**	RIHMI-WDC	
14	USFD		**37**	NIERSC	
15	NUIM		**38**	WHOI	
16	IFREMER		**39**	SIO	
17	MPG		**40**	UAF	
18	EUROGOOS		**41**	U Laval	
19	EUROCEAN		**42**	ONC	
20	UPM		**43**	NMEFC	
21	UB		**44**	RADI	
22	UHAM		**45**	KOPRI	
23	NORCE		**46**	NIPR	
			47	PRIC	

DISSEMINATION LEVEL		
PU	Public, fully open	X
CO	Confidential, restricted under conditions set out in Model Grant Agreement	
CI	Classified, information as referred to in Commission Decision 2001/844/EC	

EXECUTIVE SUMMARY

This document describes the general actions in the project related to management of intellectual property in knowledge transfer activities. The document is an updated version of D8.7 and is complementary to the Dissemination Plan (D7.5) and the Exploitation Plan (D8.4).

Rules for ownership, access rights, transfer, dissemination and protection of project results follow Section 3 of the Grant Agreement articles 23 – 31: Rights and Obligations related to background and results. In the Consortium Agreement, the partners have specified the limitations and/or conditions for implementation of the action and exploitation of project results.

By the end of INTAROS there is a wide range of exploitable results from the work performed by the consortium members. The results have evolved for atmosphere, ocean and terrestrial observation systems where INTAROS and many other projects have contributed to the progress. The exploitable results include progress in use of new platforms, sensors and increased data production from these platforms. INTAROS has made progress in data management, including standardization of metadata and data products, improved access to data from numerous data repositories, and capacity-building among the data producers as well as the data managers. INTAROS has developed a data catalogue of the data produced in the project which are stored in distributed data repositories. INTAROS has established new collaboration between numerous institutions from Europe, North America and Asia working in the Arctic, which is necessary to build an integrated Arctic Observation System. Finally, many of the exploitable results have been used in application studies, where examples of integrating various observations and models were demonstrated to stakeholder groups. The exploitation of the results will continue after the end of the project.

Table of Contents

1. Introduction

The European Commission has issued several documents with recommendations on the management of intellectual property in knowledge transfer activities and Code of Practice for universities and other public research organisations [1,2]. These documents emphasize that public organisations, including universities, need to more actively engage in the exploitation of publicly funded research, for instance through academia-industry collaborations, licensing and spin-offs. Management of Intellectual Property (IP) plays a crucial role in the success of these knowledge transfer activities and in building an effective European Research Area (ERA). IP in this context refers to knowledge in the broadest sense, encompassing any R&D results such as inventions, software, databases, etc., whether or not they are protected by legal instruments such as patents.

2. Consortium agreement

The rules for ownership, access rights, transfer, dissemination and protection of project results follow Section 3 of the Grant Agreement articles 23 – 31: Rights and Obligations related to background and results [3]. In addition to the Grant Agreement, the partners have signed the Consortium Agreement [4] at start of the project. Background is defined as "data, know-how or information (…) that is needed to implement the action or exploit the results". Because of this need, Access Rights are granted in principle, but Parties have identified and agreed amongst them on the "Specific limitations and/or conditions for implementation" and "Specific limitations and/or conditions for exploitation", as described in Attachment 1: "Background included". .

3. Definition of exploitable results from INTAROS

There is a wide range of exploitable results from the ongoing INTAROS work. Much of the new results come from synergies between the partners' experiences, competences, capabilities, and scientific-technical network. The exploitable results from INTAROS can be grouped into the following categories:

- New or improved observing platforms and sensors
- Contribution to providing new data or data products
- Provision of data services/processing services
- Improved access to data from repositories
- New or improved standards, metadata or protocol for observing systems
- Improved interoperability and access to distributed data repositories
- Demonstration of useful applications towards stakeholders
- Collaboration development and planning of joint work with new partners,
- Establish a new spinoff or a follow-up project

Furthermore, the results can be grouped according to the physical domain or sphere from where they have been obtained:

(1) Data access

The data from the observing systems represent the first step in the data value-chain from raw data to higher-level data products. These products are used in scientific analysis, modelling and remote sensing algorithms. The observational data are collected in various scientific disciplines and stored in different data repositories which are organized on international, national or institutional level. The complexity of the data repositories is a challenge for data management and data sharing within and between the scientific disciplines. INTAROS has contributed to several distributed data repositories which are accessible via portals. The INTAROS data catalogue is a single entry point to the data produce or made available through the project https://catalog-intaros.nersc.no/) .

(2) Land-based observations

The observing capacity of terrestrial observing stations has been strengthened in Greenland, Alaska, Canada, Northern Finland, and Siberia. The quality and number of observed parameters have increased and their data management (storage, access, interoperability) have improved. Novel technical solutions were applied to increase the instrumental resilience to Arctic weather conditions and the automatization, thus enhancing temporal resolution and reducing the costs associated to human-operations. The developed instrumentation was operated from stations on the ground as well as from platforms such as aircraft, helicopters and drones, enabling data collection on different spatial scales. These activities increased the value of supersites, which are larger stations with many advanced instruments. Supersites provide long time series for climate monitoring and ground truth for validation/calibration of satellite-based data and model development. In addition to the supersites, which only exist in few locations, there are many smaller research stations in different parts of the Arctic land areas., where important in situ measurements are obtained, contributing to a geographical spreading of the data collection.

(3) Ocean-based observations

The observing systems for the ocean areas are based on field experiments with ships and icebreakers in the central Arctic Ocean, in the Svalbard area, the Fram Strait, Barents Sea, Baffin Bay and in the coastal waters of Greenland. Data are collected along the sailing routes from ships carrying atmospheric and oceanographic instruments, mainly during the summer when most of the ship cruises take place. Icebreakers are used to deploy and recover instruments in ice-covered areas, in particular drifting ice buoys (SIMBA and ITP buoys), oceanographic and acoustic moorings and seafloor observatories that operate continuously through the year. During ice stations in situ measurements of sea ice thickness and snow cover are obtained together with atmospheric and ocean observations. In the ice-free waters Argo floats are gliders are also used. In addition to physical oceanography, data collection included biogeochemical variables (pCO2, pH), isotope analysis, optical measurements, and passive acoustics. significant part of the work is devoted to test the instruments and prepare for deployment and recovery during the field expeditions. Calibration, processing and analysis of the collected data is performed before uploading to various data repositories.

(4) Community-based monitoring

In the Arctic, it is a priority of governments and Indigenous peoples' organizations to increase the spatial and temporal coverage of environmental observations. One solution is to enhance community-based monitoring and citizen science observations. By their nature, community-based and citizen science programs tend to focus on those issues of greatest concern to local stakeholders thus, outcomes from such observing programs have considerable potential to influence on-the-ground decision-making and natural resource management. Arctic community-based and citizen science programs are diverse, with many successful approaches. INTAROS has shown examples of CBM systems ranging from programs entirely undertaken by community members to programs led by scientists and where citizens are collecting the data.

(5) Satellite observations

Polar orbiting satellites provide regular data coverage of all Arctic land and ocean areas. The data are important both for long-term climate observations and in daily, operational monitoring providing near real-time data for weather and ice forecasting. The data are used to retrieve a number of environmental variables, e.g. of sea ice, snow, glacier, hydrology, vegetation, permafrost, biodiversity and more. The Copernicus programme with the series of Sentinel satellites and other polar orbiting satellites represent most extensive contribution to the Arctic observing systems. However, the satellite data require in situ data for algorithm development and validation of the data products. INTAROS has contributed with in situ data that can support such validation.

(6) Modelling and use of observational data

Relevant observational data are needed to develop, evaluate and initialize various numerical models used in research and services. Modelling systems are invaluable tools to understand climate and environmental processes. The climate model systems are important for prediction of future climate under different mitigation scenarios and provide input to assessments of climate change, climate services and climate impact research. In this section examples are presented showing how some modelling systems use observational data.

4. Innovation potential

There is a large innovation potential in the development of integrated Arctic Observing systems. Innovation occurs in a wide range of activities from data transmission to unique combinations of multi-disciplinary data and from new products to use of cloud technology for massive data access. Platforms providing data for integrated observing systems include polar orbiting satellites, aircraft, drones, ships, moorings, and underwater vehicles. Data are provided from all these platforms, which are increasingly used in Arctic observing systems.

The participation of stakeholders and companies in the project has helped to strengthen the collaboration between researchers, technology developers and user requirements from different thematic areas. This collaboration can foster development of new prototypes of services and products.

5. Knowledge management and protection

Management of knowledge and innovation has been an integral part of the project. The Executive Board has had the responsibility to oversee synergies between partners' experiences, competences, capabilities, and on how partners will protect, share, manage IPR capital. Access to Background Intellectual Property and protection and exploitation of Foreground IP follows the Grant Agreement signed by the beneficiaries. Background means any data, know-how or information (tangible or intangible) including any rights such as intellectual property right that is *(a) held by the beneficiaries before acceded to the Grant Agreement, and (b) needed to implement the action or exploit the results*. Results means any output of the action such as data, knowledge or information – whatever its form or nature, whether it can be protected or not – that is *generated in the action, as well as any right attached to it, including intellectual property rights.* The management of the IPR, generated by the project, has been monitored by the Executive Board, via the project coordinator, to ensure that it complies with the Grant Agreement.

The knowledge management have addressed the following points:

- Protection: procedures for protecting new results and agreeing on dissemination and publishing of information.
- Ownership: agreements on access rights for research and commercial use.
- Implementation of "innovation-related activities": including validation or take-up activities, definition of strategies relating to the granting of licenses to third parties or to the identification of potential hurdles for the implementation of the project's results (e.g. standards or third parties' patents)
- Identification and collaboration with potential users: the strategy will be updated along with the exploitation potential of the results becoming more accurate.

The IPR management activity in INTAROS has mainly been to oversee that the consortium members follow the Consortium Agreement, especially the points regarding use of "Background". The following points have been emphasized:

(1) Regarding observing platforms, instruments and sensors for data collection. These are owned by individual partners. Further use of the instruments needs to be agreed with the owner.

(2) Data collected by these instruments also belongs the instrument owner, who is responsible for the initial processing and quality control of the data. The data owner is committed to make the data accessible for the consortium and other users ("Access Right"). INTAROS has emphasized that data ownerships need to be properly documented in the metadata when the data are used by the consortium partners and published.

(3) Data are often collected from several instruments during a field experiment and therefore joint ownership often applies to data sets from an experiment with several participants. The involved partners need to agree on what data should have joint ownership

(4) When the data are used in further research by other scientist, reference to data owner must be given when the research is presented at conferences, workshops, outreach material, etc.

(5) Software used or developed in the project is owned by the developer, and further use requires agreements with the owner.

(6) Authorship to publications, including peer review articles, popular science articles, blogs and other outreach material using INTAROS material need to be agreed between the scientists involved and proper references must be given.

(7) Proper credit must be given to personnel involved in the project, following ethical guidelines for research

(8) Data, documents and knowledge held by Indigenous Groups involved in the project have not been published or shared without their consent. Community-Based Monitoring programs supported by INTAROS have followed the principles of "Free, Prior and Informed Consent" and taken care to protect the intellectual property rights of Indigenous and local communities

6. Conclusion

The project has produced a wide range of publishable results that are made openly available in scientific and popular science journals, at conferences, workshops, meetings with stakeholders, on websites and other social media. The results are related observing systems for climate and environment, technologies used in the systems, data collection, provision of time series of data sets, access to data repositories and improvements in the data delivery chain. Ownership of the results lies with the authors, the technology providers or the service providers who have been leaders of the activities leading to the results. The results are further exploited in spin-off projects and other follow-up activities, including service development, training and education. In cases where Indigenous People have contributed to data through CBM programs data ownership and data use rights have been declared following the principles of "Free, Prior and Informed Consent".

7. References

1. Commission Recommendation including Code of Practice (2008), ISBN 978-92-79-09850-5, DOI 10.2777/13162
2. European IPR Helpdesk. Your Guide to IP in Horizon 2020 (www.ipr.helpdesk.eu)
3. Grant Agreement for INTAROS (https://intaros.nersc.no/sites/intaros.nersc.no/files/Grant%20Agreement-727890-INTAROS_0.pdf)
4. Consortium Agreement for INTAROS: https://intaros.nersc.no/sites/intaros.nersc.no/files/INTAROS-CA-V1.7-signed-Print28June2017.pdf

-- END OF DOCUMENT --

INTAROS

This report is made under the project
Integrated Arctic Observation System (INTAROS)
funded by the European Commission Horizon 2020 program
Grant Agreement no. 727890.

Project partners: