WP 1
T1.1 INITIAL REQUIREMENT REPORT
T1.2 STAKEHOLDER MEETING

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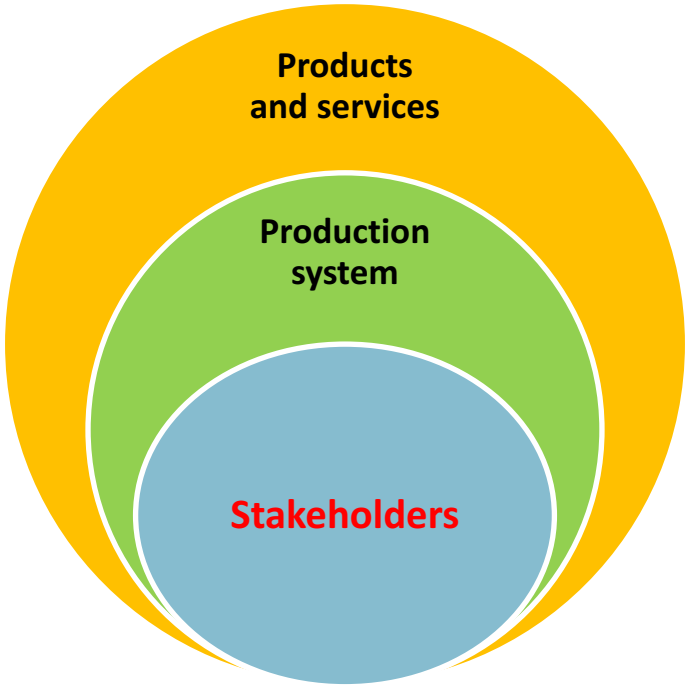
Requirements



- **Stakeholders/users:**
  - **articulate requests for a particular service or product**
- **Service providers:**
  - **deliver the services and products.**

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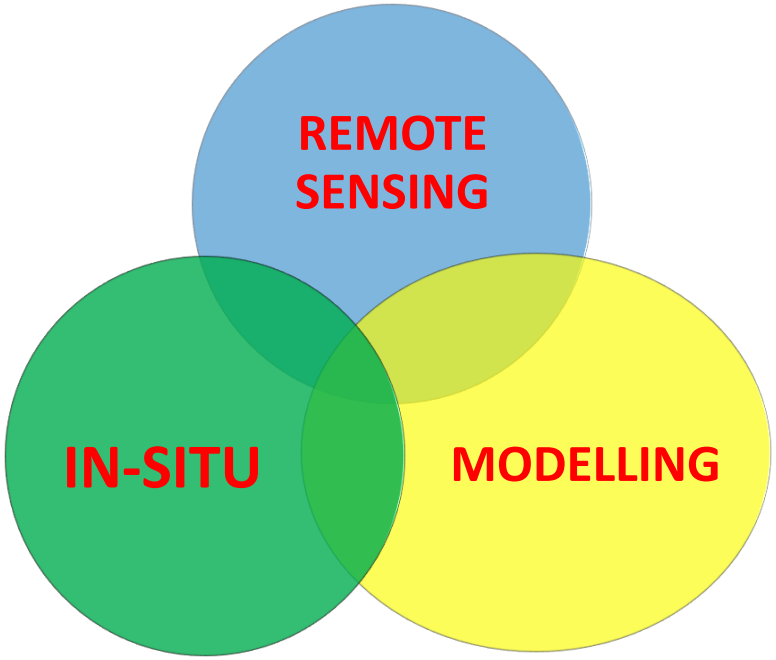
PRODUCTION SYSTEM



- **Experts define the best solution**
  - **phenomenons**
  - **Model resolution**
  - **Data – remote sensing and in-situ incl definition on requirements to data (resolution in space and time, quality, timeliness etc)**

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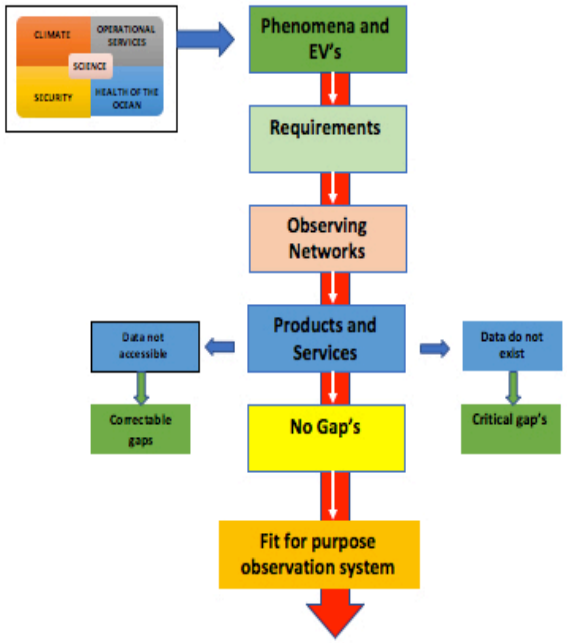
Observation network design



Design of a fit-for purpose Arctic observation network includes several steps:

- **Map societal and policy needs for knowledge, information and services;**
- **Analyse what phenomena and essential variables to observe;**
- **Set up requirements (resolution in time and space, quality, timeliness) for observations;**
- **Evaluate existing observation system;**
- **Identify gaps**

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High level requirements

- **GEO societal benefit area:**
  - **Disaster Resilience**
  - **Health**
  - **Energy and mineral resource management**
  - **Water resources management**
  - **Infrastructure and transport**
  - **Food security and sustainable agriculture**
  - **Biodiversity and ecosystem sustainability**
- **Marine Strategy Framework Directive**
- **Other International Initiativs for the Arctic**

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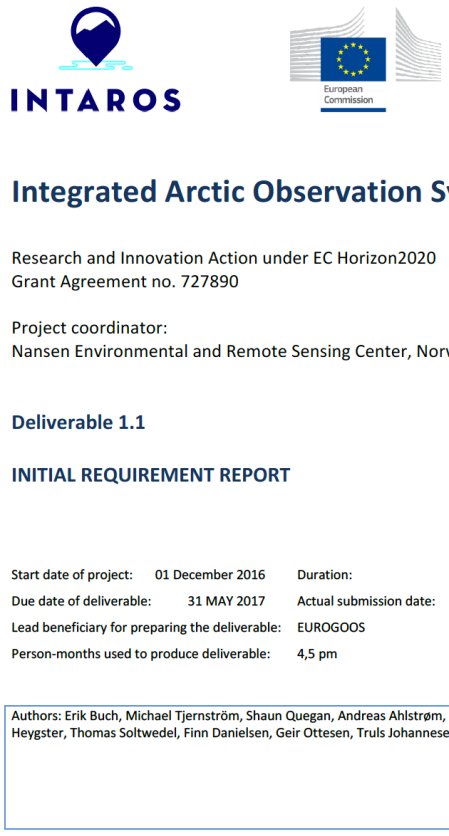
Initial requirement report



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European Commission

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 1.1

INITIAL REQUIREMENT REPORT

Start date of project:	01 December 2016	Duration:	60 months
Due date of deliverable:	31 MAY 2017	Actual submission date:	31 MAY 2017
Lead beneficiary for preparing the deliverable:	EUROGOOS		
Person-months used to produce deliverable:	4,5 pm		

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Adresses:

- **Requirements for Observations**
- **Phenomena**
- **Essential variables**
- **Observing technology/platforms**

for

- **Atmosphere**
- **Terrestrial**
- **Cryosphere**
- **Sea ice**
- **Ocean**

Delivered 31 May 2017

Did not include data requirements (resolution in time and space, quality, timelines etc) and gap analysis

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Copernicus In-situ data requirements mapping

Name	Dissemination	Quality Control Procedure	Group	Uncertainty	Update Frequency	Timeliness	Horizontal resolution	Vertical resolution	State
Subsurface salinity	NRT Service	Automatic	TBD	0,1psu 0,07psu 0,05psu	12h 3h 1h	1d 6h 3h	30km 5km 1km	100m 10m 1m	ready
sea surface salinity	NRT Service	Automatic	TBD	0,1psu 0,07psu 0,05psu	72d 24d 6d	3d 2d 1d	25km 10km 5km		ready
Sea state	NRT Service	Automatic	TBD	0,25m 0,25m 0,1m	24h 3h 6min	6h 1h 5min	60km 10km 5km	N/A N/A N/A	ready
Sea state	Offline	Automatic	TBD	0,25m 0,25m 0,1m	24h 3h 6min	6h 1h 5min	60km 10km N/A	N/A N/A N/A	ready
Sea surface temperature	NRT Service	Automatic	TBD	0,5K 0,2K 0,1K	3d 1d 6h	3h 2h 1h	25km 10km 5km		draft
subsurface temperature	NRT Service	Automatic	TBD	1k 0,5k 0,1k	24d 3d 1d	3d 1d 12h	50km 10km 2km	50m 10m 1m	ready
subsurface temperature	Offline	Manual	TBD	1k 0,5k 0,1k	24d 3d 1d	3d 1d 12h	50km 10km 2km	50m 10m 1m	ready
HRL VALCAL	View and Download Service	TBD	Land cover			N/A N/A N/A			draft
Settlement_Building_Footprint	View and Download Service	Manual	Settlements	25% 10% 5%	6 months 3 months 1 hour	2 Week 1 Week 1 Day	5 m 2 m 0.3 m	N/A N/A N/A	draft

tps://cis2.eea.europa.eu/requirement/13/

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Initial requirement report

- The Arctic is a region very sensitive to environmental changes. There is a very close interrelation and delicate balance between the five thematic areas (atmosphere, terrestrial, cryosphere, sea ice and ocean) especially in relation to solar energy retainment and radiation budget and hydrological cycle. This has a great impact on physical, chemical and biological processes in the area.
- Due to the hostile environment, there is a great lack of basic observations in the Arctic that can support scientific understanding of key processes. Most of the existing data are collected via time limited research project. This lack of process knowledge is reflected in big errors in forecasting models – operational as well as climate.
- It is therefore crucial to establish a sustained Integrated Arctic Observing System that in the short timeframe can increase fundamental scientific understanding of the complex and sensitive Arctic environment and in a longer timeframe can secure a robust basis for decision making to the benefit of the people living in the Arctic, the environment, the broader international society, and commercial activities.
- It is foreseen that a future Arctic observation system will rely heavily on satellite observations supplemented more traditional in-situ platforms. Especially the ocean will use several other platforms such as ships, profiling floats, gliders, moorings, AUV's etc. to monitor the interior of the Arctic Ocean.
- In all countries around the Arctic, there are community based observing systems that represent a strong potential for further development. Existing activities shall form the natural basis for a future more intensive and integrated sustainable Arctic Observing System.

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Stakeholders

- Science - all relevant disciplines
- Service providers
- Private sector – shipping, oil/gas, fishery, aquaculture, tourism
- Government agencies (Europe, US, Canada, Russia, China South Korea etc)
- Military
- International programmes (SAON, AMAP, IPCC, GOOS, WMO etc)
- Projects (Interact, Blue Action, AtlantOS, Applicate, EU-Polarnet, EMODnet checkpoint; Projects in US, Canada, Russia etc)
- Civil society organisations and NGO's incl. indigeneous people organisations
- Selected representatives from these groups will be involved in INTAROS to discuss and review their requirements for iAOS to increase the relevance and usefulness of the project

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1. Stakeholder workshop 5 May 2017

"Building long term observing systems in the Arctic – requirements and challenges"

The objective of the workshop:

- **Review and discuss the requirements for observational data in the Arctic across thematic areas such as**
  1) **Atmosphere,**
  2) **Ocean and seafloor,**
  3) **Sea ice,**
  4) **Marine Ecosystem,**
  5) **Terrestrial data,**
  6) **Glaciology,**
  7) **Natural hazards, and**
  8) **Community-based monitoring.**

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Workshop outcome

- The workshop elaborated on ways ahead to develop and operate long-term observing systems.
- The presentations and discussions displayed:
  - Severe gaps in the in-situ observation network
  - Gaps in the open free sharing of data
  - Gaps in technology
  - Gaps in sustainability
- Satellite earth observation data, has secured long-term funding and is therefore relative sustainable via meteorological missions and the Copernicus programme,
- Most of the in situ data collected in the Arctic are funded by research projects with duration of a few years and are therefore not necessarily sustainable.

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Workshop outcome

- **Key challenges that INTAROS will need to address during the project period are:**

  (1) Coordination and collaboration between data providers and stakeholders in the pan-Arctic region in order to better use existing systems and resources

  (2) Improvement of the observing platforms and sensors, filling of gaps in the observing network and facilitate for year-round operation

  (3) Data sampling, transmission, calibration, processing, archiving and retrieval of required variables and building distributed and connected databases

  (4) How to develop sustainability of the observing systems
- **In addition to technical and logistical challenges, there are also organisational barriers to building and operating a multidisciplinary observing system. These issues will be addressed in follow-up workshops.**
- **Input to "Initial Requirement Report" (D1.1)**

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