



Strategy 2026

10 October 2023



1. Introduction

SIOS is an international consortium of research institutions with research interest and infrastructure in and around the Arctic Archipelago of Svalbard. Within SIOS, researchers collaborate by sharing data and research infrastructure to build an efficient observing system that focuses on long-term monitoring of parameters that are important to understand the Arctic in the context of global environmental change.

SIOS entered the operational phase in January 2018, after a three-year long interim phase (November 2014 – January 2018) and a four year long preparatory phase (October 2010 – November 2014). Currently, the consortium consists of 28 institutions from 10 countries. SIOS has secured funding to support the central hub, the SIOS Knowledge Centre, until the end of 2026.

The strategy of SIOS is based on a vision, a mission statement and three pillars of operations. One key element is the concept of the SIOS Science Wheel which ties most activities to a temporal cycle of developing the observing system. The strategy of SIOS has been more or less unaltered from the beginning of the operational phase. However, the operating environment has changed since 2018. For instance, SIOS is no longer on the ESFRI roadmap, and the pandemic especially has challenged us to find new working conditions. During 2021, a process to renew the strategy was initiated. The SIOS Knowledge Centre has gathered information and feedback from member institutions as well as individual researchers in various events and questionnaires. These, together with lessons learned during the first four years of the operational phase, have been used to form the SIOS strategy 2026.

2. The Vision

The vision of SIOS:

We will be the leading long-term observing system in the Arctic to serve Earth system science and society.

SIOS is a distributed regional research infrastructure for long term acquisition and proliferation of fundamental knowledge on global environmental change (GEC) with an Earth System Science (ESS) perspective in and around Svalbard. SIOS is systematically developing and implementing methods for how observational networks are to be constructed and thus becomes a leader regarding observational systems in the Arctic and Polar regions.

3. The Mission statement

SIOS is a collaborative effort to develop and maintain a regional observational system for long term measurements in and around Svalbard. The observing system and

research facilities offered by SIOS build on the extensive observation capacity and diverse research infrastructure provided by many institutions already established in Svalbard.

The core of SIOS is based on existing and new infrastructure owned by members (Figure 1). A fundamental objective for SIOS is to supply added value to all the investors beyond what their own investments would provide alone. The integration and structuring of coordinated observations with clear scientific goals are the means used by SIOS to achieve an understanding of ongoing environmental change. Investments based on a mutually agreed roadmap to develop infrastructure shall further facilitate this process.

The mission of SIOS is to

- **Develop an efficient observing system**
- **Share technology, knowledge experience and data**
- **Close knowledge gaps**
- **Decrease the environmental footprint of science**

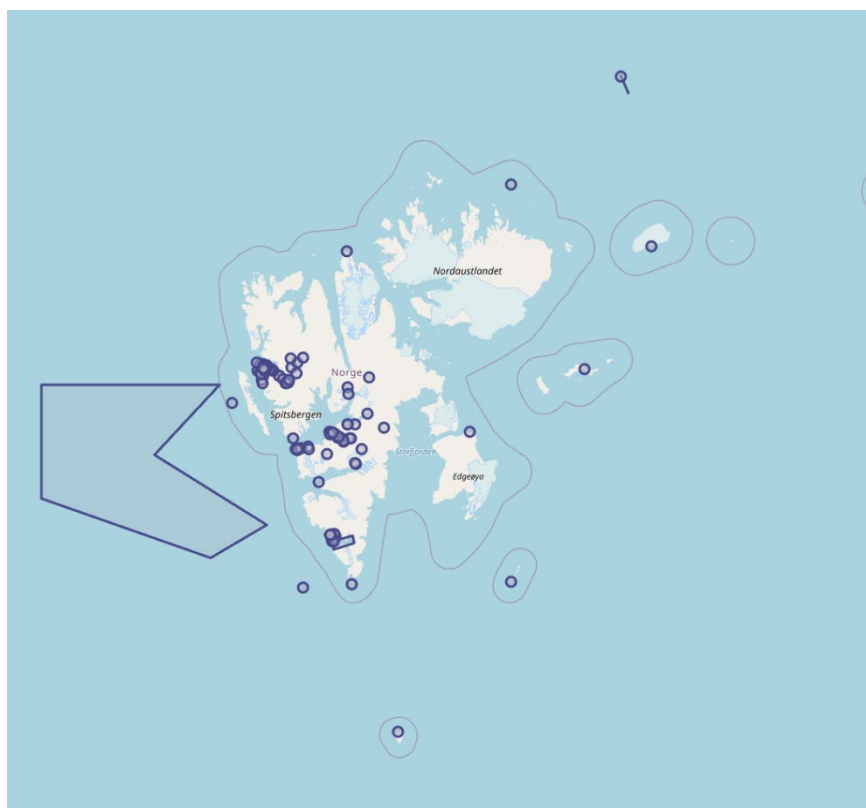


Figure 1: Operational SIOS observations - from the [SIOS observation facility catalogue](#).

4.3. The three pillars of operations

The vision is achieved and the mission fulfilled with the three pillars of operations:

1. Joint activities
2. Services
3. Sustainability

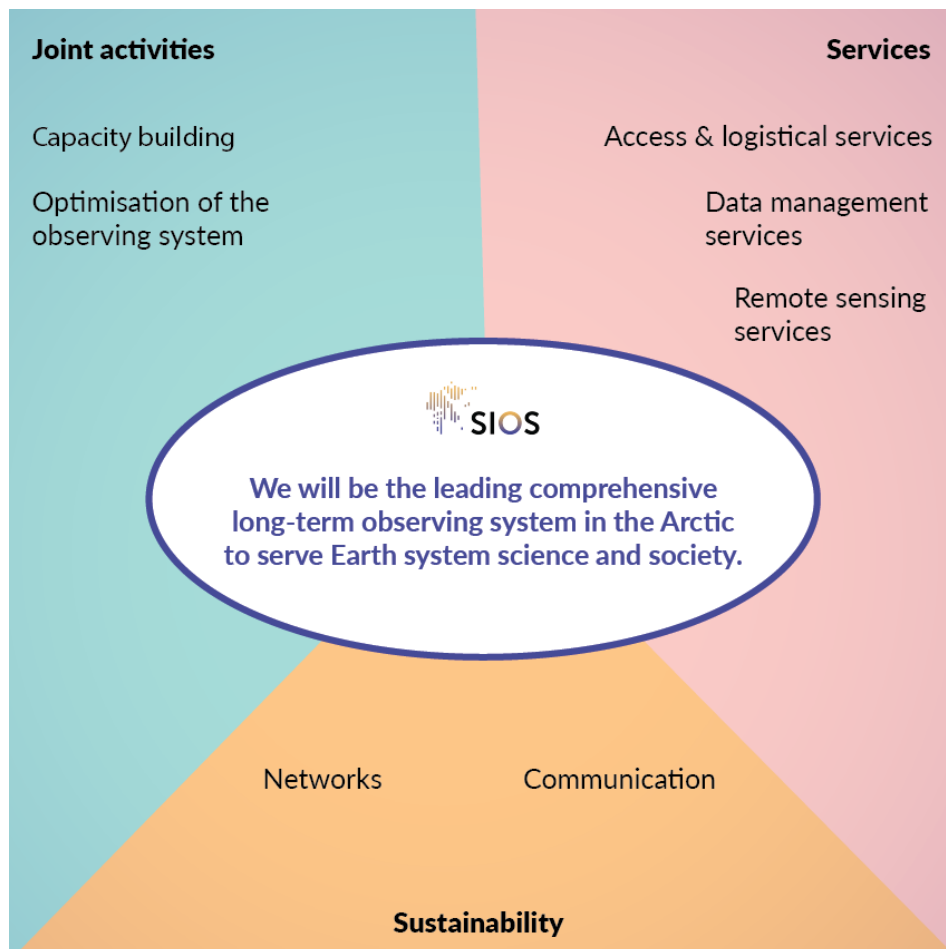


Figure 2: The three pillars of operation supporting the vision and mission.

4.1 Joint Activities

Capacity Building

SIOS' ability to fulfil its mission is strengthened with continuous capacity building relevant to SIOS. We will enhance and facilitate sharing of knowledge, technologies, expertise, and experiences within SIOS. The activities include organising topical workshops and training, webinars and Polar Night Week, the main event of SIOS. These activities shall always focus on SIOS optimisation relevant themes.

The more frequent use of the secondment programme opportunity contributes to achieving one of the main tasks for the SIOS consortium, which is to strengthen the collaboration between infrastructure owners and to increase the mutual and optimal use of the available infrastructure.

The concept of Arctic chairs will be developed as temporary appointments for well-established expert(s) to specifically interact with SIOS members and to generate research activities and science cases.

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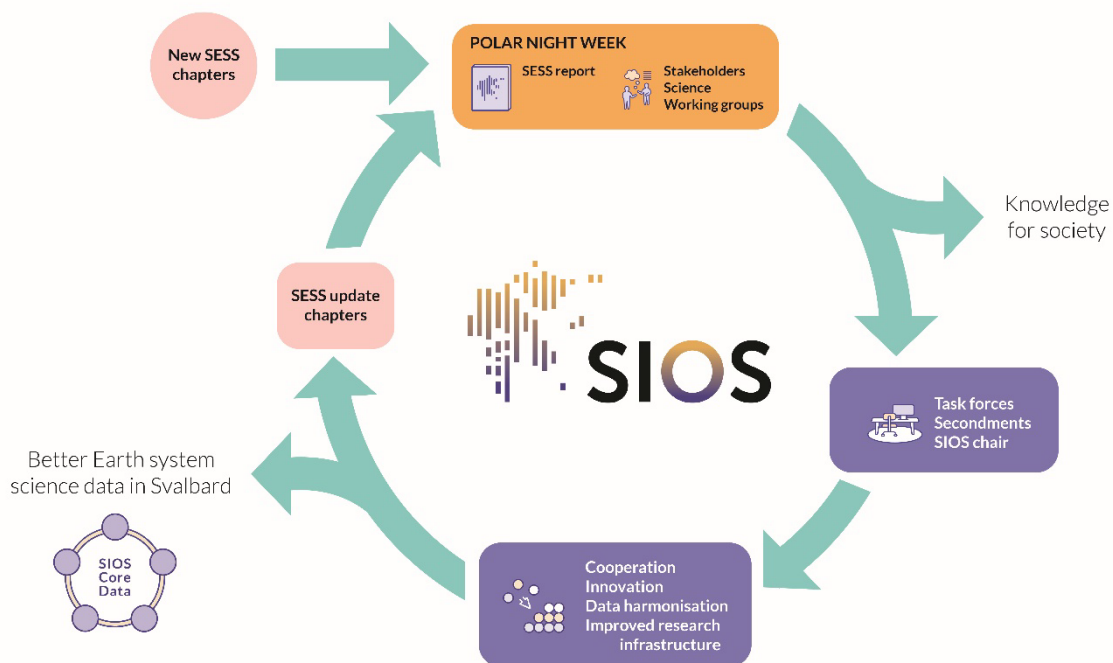


Figure 3: **Concept of the SIOS science wheel to develop an observing system for many uses and users.** SIOS, i.e. the SIOS member institutions, the working groups, and the SIOS Knowledge Centre are the internal forces that move the SIOS wheel forward with the aim to provide better Earth system science data in Svalbard and thus, serve the societal needs related to climate change, pollution and bio-diversity loss. The different aspects of the Earth System and the means to improve the observing system are the preoccupation of many work units, incl. task forces, secondments, and expert residents as the SIOS chair. With the principles of cooperation, innovation and data harmonisation this work ensures that the SIOS community produces relevant long-term data series, *the SIOS core data*, and improved *research infrastructure* as basis for new research projects and capacity building. The State of Environmental Science in Svalbard (SESS) report allows research groups from member institutions to identify observational gaps and provide recommendations on how to close those (bottom-up process). The SIOS collaboration culminates in annual gatherings, the Polar Night Weeks. There, the SESS report is released and stakeholders, researchers, and SIOS working groups meet to discuss and finalize consortium activity plans for the following

year. The plans are aligned with strategic aspects by the General Assembly (top-down process), allowing the wheel to roll on.

Optimisation of the observing system

The concept we call the SIOS Science Wheel, showing the development of the State of Environmental Science in Svalbard report and the Optimisation call, is illustrated in Figure 3. The science wheel is driven mainly through bottom-up processes but is regularly aligned through top-down decisions. Innovation is central in both circles to improve the observing system. The SIOS Knowledge Centre ensures continuous development of the observing system. The teeth of the cogwheel represent the coordinated services that drive SIOS and the observing system forward. The services are developed by the Knowledge Centre together with working groups and task forces deployed by the governing bodies of SIOS. A science case is considered as a whole chain of actions that occur from science wheel, from recommendation to implementation and further to a scientific achievement e.g., publication or new data set.

STRATEGIC OBJECTIVES

1. Roadmap of optimisation agreed with members
2. Innovation to increase observing capabilities while lowering the environmental footprint of science
3. Science cases as result of the SIOS Science Wheel
4. Science cases in form of high-quality science to be published in open access journals

4.2 Services

Members have identified these cornerstone services to support Earth System research in Svalbard. Services are provided by SIOS Knowledge Centre or by member institutions.

Access and logistical services

The SIOS access services provide coordinated access to the various scientific facilities and equipment owned by SIOS members. Logistical services are coordinated sharing of logistical support and possibilities as well as requests for support.

Remote sensing services

Remote sensing services are designed to offer researchers a single-point of contact for ground-, airborne-, and satellite-borne information for Svalbard while drawing on the combined knowledge of the network of SIOS partner institutions. The service coordinates commissioned remote sensing data processing to make geoinformation products available via the SIOS data access portal.

Data management services

The SIOS Data Management System (SDMS) is providing a unified interface to data that are produced using SIOS related infrastructure and third-party datasets that are of



relevance to the SIOS scientific community. This is a distributed data management system where SIOS partners operating their own data centre are connected to SDMS using specific technological and documentation standards.

STRATEGIC OBJECTIVES

1. Increase the visibility, accessibility and usability of all data collected by SIOS
2. Provide easy and comprehensive access to all SIOS data through the SIOS Data Management System, especially the SIOS core data
3. The SIOS Data Management System is the main place to find Svalbard related ESS data.
4. Complement the observational data with remote sensing data from satellites, thus also reducing the environmental footprint of data collection.
5. Facilitate the access to logistical services and support the work for more standardised solutions
6. Further reduction of the environmental footprint through sharing of logistics and observational infrastructure access
7. Provide opportunities to develop the observing system through an Optimisation call (campaigns, workshops, access, etc.)

4.3 Sustainability

Based on the SIOS governance structure, the collaboration within SIOS is organised in a way that ensures a systematic improvement of the observing system but at the same time allows frequent evaluation and adjustments to ensure active member engagement and relevant activities. As such, a sustained operation and development of SIOS can be secured for the benefit of ESS. A proactive and dynamic SIOS Knowledge Centre is at the centre of a successful SIOS. Its competent and dedicated team is fostered by a creative and inclusive work environment.

Networks

SIOS is actively engaging in external networks, projects and project opportunities to position SIOS in the Arctic and European scientific landscape. The purpose is to establish SIOS as key player and preferred partner and through this generate activities that are strengthening SIOS.

Communications

The main goal of the communications is to promote and raise awareness of SIOS and its benefits among ESS researchers, potential new members and other stakeholders like the local community and authorities. Societal benefits must be communicated and societal needs must influence the evolution of SIOS priorities.

STRATEGIC OBJECTIVES

1. Maintain a steady portfolio of externally funded projects to support the SIOS Knowledge Centre and SIOS members
2. Become a key Arctic RI in the European landscape of RIs
3. Be actively present in pan-Arctic settings like SAON
4. Engage with partners and stakeholders in a continuous dialogue.
5. Deliver RI and data that will make SIOS a relevant resource for climate adaptation and mitigation

5. Conditions for success

- SIOS and the headquarters, SIOS Knowledge Centre, are very dependent on the host contribution. The host contribution is now secured until the end of 2026. Measured only in cash the host contribution covers about 80 % of all activities. Including in-kind contributions the host contribution is around 50% of the whole budget. The in-kind contributions are very unevenly distributed among the members. The objective in the next five years is to grow to be less dependent on the host contribution. The goal is that the host contribution is less than 50 % calculated from the in-cash budget. An insufficiently precise definition and communication of partner benefits and SIOS added value for members is also hampering our success.
- The diversity of members and their infrastructures' needs and what different members can offer is uneven. This is also reflected in the in-kind contributions. This creates an imbalance where some of the members are providers and some users. Due to this diversity, defining the benefits from a service point of view is difficult, and what the role of SIOS in coordinating these services is, is likewise difficult. Most institutions have also developed their own logistical structures before the time of SIOS. The services should be developed to a direction that is not overlapping with other institutions' ambitions in providing activities but are clearly complementary and unique for SIOS. The current logistical services and access services need to be reconsidered.
- The outreach of benefits of being in SIOS should be improved. The message should reach not only members but also stakeholders and policy makers. SIOS has been operational for almost four years and is just starting to become more pronounced in the Arctic context, which is seen in invitations to projects and to various Arctic related networks. Lifting the profile should also have many other outcomes, including the promotion of Svalbard as an Arctic laboratory which is made available for scientists to study Arctic environmental change.