1. Task Description: Contributing to the “Roadmap for Arctic Observing and Data Systems (ROADS)”

SAON has identified the need for a Roadmap for Arctic Observing and Data Systems (ROADS) to set a course for a pan-Arctic Observing System and to specify how partners are going to collectively work towards achieving it. This includes the engagement of, and partnership with, Arctic Indigenous Peoples.

A well-defined assessment process is required to establish a communal view of the *societal benefits* of Arctic observations; such assessments are critical to the case for sustained observing. A key tool for such assessment is the *International* *Arctic Observations Assessment Framework* (IAOAF, IDA 2017), jointly created by SAON and the Science and Technology Policy Institute following the 2016 Arctic Science Ministerial. The IAOAF identified 12 Arctic-specific Societal Benefit Areas (SBAs).

2. Objective of the task (clear and measurable objective, consistent with expected results and impact)

SAON has defined the ROADS process to be organized around *Essential Arctic Variables* (*EAVs*). These are *identified* for their criticality to achieving Arctic societal benefit, following assessment using the *International Arctic Observations Assessment Framework* (IAOAF). *EAVs* are *defined* by their observing system (e.g. spatial resolution, frequency, coverage, accuracy) and data system requirements. They are *implemented* through specific recommendations based on best available technology and practices. Implementation covers all activities from deploying observational systems through developing user services.

3. Task leader and other participating personnel

The Task leader will be Jan Rene Larsen, AMAP Secretariat.

4. Work description

4.1 A paragraph on background and state-of-the-art of the task (incl. a few references)

Considerable work on *Essential Variables* (EVs) have already been done in the context of several global networks (e.g. *Essential Ocean Variables*, *Essential Climate Variables*, *Essential Biodiversity Variables*), regional programs (e.g. Arctic Monitoring and Assessment Programme (AMAP) and Circumpolar Biodiversity Monitoring Programme, (CBMP)). *EAVs* should extend the requirements (e.g. adding requirements for fast ice observations to global variables for sea ice) and implementation strategies of the global networks, where necessary, to account for Arctic conditions (e.g. polar night) and opportunities (e.g. community observers).

References:

* IDA Science and Technology Policy Institute and Sustaining Arctic Observing Networks. 2017. International Arctic Observations Assessment Framework. IDA Science and Technology Policy Institute, Washington, DC, U.S.A., and Sustaining Arctic Observing Networks, Oslo, Norway, 73 pp.
* Frameworks for EVs include the GOOS Framework for Ocean Observing; Circumpolar Biodiversity Monitoring Program (and GEOBON); Arctic Monitoring Assessment Program (and GCOS); GEO Global Water Sustainability (GEOGLOWS); WMO Integrated Global Observing System (WIGOS)

4.2 A paragraph describing in detail what will be done in the task and what are the expected results. Describe the role and contribution of the participants. Describe collaboration with other projects when relevant

From the call text, there is an understanding that the overall project will deliver the full implementation from observations and all the way through to services. This Task will develop the documentation framework necessary to identify, describe and evaluate priority *EAVs*. It will support work across a relevant pan-Arctic community of experts to identify and define a series of *EAVs*. It will also develop impact assessments to argue for an extended and sustained Arctic Observing System.

The AMAP Secretariat will convene and co-ordinate one or more Expert Panels, that will develop the generic framework necessary to identify 2-4 *EAVs*. Other partners in the consortium will contribute to the population of the Expert Panels. An *implementation strategy* will include documentation that *Pilot Services* derived from *EAV*s critically support *Key Objectives* of the *Arctic Observing Assessment Framework*. The *implementation strategy* for the *EAV*s will define what needs to happen for these to be implemented. The actual implementation is outside the scope of this task, but should be the scope of the consortium itself.

SAON has wanted to establish *ArcticGEOSS* and this was approved as a so-called GEO *Community Activity* by the GEO Plenary in November, 2019. The task will prepare and submit an application for *ArcticGEOSS* as a *GEO Initiative*.

4.3 Deliverable from the task: a report, a prototype, a data set, or a service, etc. including month of delivery during the 48 months project period

There will be two deliverables:

* The AMAP Secretariat will facilitate and co-ordinate one or more Expert Panels that will develop 2-4 documented *EAV*s, contributing to the ROADS.
* Preparing and submitting an application for ArcticGEOSS as a *GEO Initiative*.

4.4 Description the expect impact of the results: explain how the work contributes to the seven impact points in the call text, and possible other impact

The outcome of the task will address several impacts points in the call text, and mainly:

* *Sound and effective decision-making by policy makers in the Arctic regions through the use of reliable and science-based Earth observation and information*:Developing the framework for the definition of *EAVs* and defining impactful EAVs will allow a coordinated observing effort among initiatives that are engaged in the Arctic.
* *The implementations* [of] *the GEO-Cold Region Initiative with a specific emphasis on the Arctic, and the initiating of an ArcticGEOSS initiative*. By preparing and submitting an application for ArcticGEOSS will bring this from the *Community Activity* to the *Initiative* level.

4.5 Suggested start and end month for the task. Duration of the project is planned for four years (48 months) starting tentatively in April-May 2021

M1-M36.

4.6 Suggested effort in person month: give an indication of man-month per partner and for the task in total

Effort for the AMAP Secretariat is 36 person months.