

## **Guidance for AOS Working Groups – Supporting the SAON Roadmap for Arctic Observing and Data Systems (ROADS) Process**

### *(1) Background*

Sustaining Arctic Observing Networks (SAON) is a joint initiative of the Arctic Council and the International Arctic Science Committee (IASC). It was created to strengthen multinational engagement and coordination of pan-Arctic observing (Arctic Council, 2011). The Arctic Observing Summit (AOS), a task under SAON, has served as a mechanism to convene researchers, Indigenous experts, agency personnel, the private sector, and others to provide community-driven, science-based guidance for the design, implementation, coordination and sustained long-term operation of an international network of Arctic observing systems.

Collaboration towards sustained observations require a framework or mechanism that helps bring together the existing and emerging patchwork of different types of observing activities. SAON has emerged as the governance body that can provide an inclusive environment for such a framework. SAON’s vision is for a connected, collaborative, and comprehensive long-term pan-Arctic Observing System that serves societal needs. SAON has identified development of a [Roadmap for Arctic Observing and Data Systems \(ROADS\)](#) as a key starting point for implementing its strategy: to detail where observing and data management efforts need to go and how all partners will jointly get there. To this end, SAON and partners identified the following key principles:

- ROADS should complement and integrate, without duplication, the current planning approaches used by existing networks (regional to global), activities and projects;
- ROADS should support step-wise development through a flexible, federated (in other words, collaborative) and evolving structure that allows “bottom-up” identification of themes and focus regions;
- Indigenous Peoples’ equitable partnership and funding for their active participation are critical to ROADS from its inception through its implementation.

### *(2) Role of AOS 2020 in ROADS process*

The goals and key principles of ROADS build on three sets of activities.

- (i) First, Essential Arctic Variables (EAVs) need to be defined. EAVs link to a single thematic bundle of potential observations, such as “coastal erosion”. EAVs are tied to important shared societal benefits (e.g., “food security”). EAVs guide observing system design in terms of what and how to observe, and how to share resulting data products.
- (ii) Different observing activities and approaches will have to be linked into a cluster or alliance. This need requires the development of a schema or conceptual framework that guides the design and implementation of EAV observations. The right balance between sharing best practices and prescribing some key aspects of how to aggregate and integrate a range of different observing activities needs to be found.
- (iii) Meeting societal benefits, such as human health or fundamental understanding of Arctic systems, requires the development of information infrastructure that guides use,

sharing, and archival of data products across a range of different applications and approaches in an interoperable fashion.

The AOS 2020 will be essential in launching and providing initial input and direction to the SAON ROADS process. Collaboration within and amongst the five Working Groups (see Tables at end of document for details), joint work on summit recommendations, and a follow-on work plan will help identify key priorities and provide a framework that is specific enough to guide a range of observing system collaborations. Where necessary, the AOS products will call out the need for support and new partnerships – to be passed on to the Third Arctic Science Ministerial (ASM3) in Fall of 2020 with a request for action. More focused efforts, guided by SAON's ROADS governance framework and supported by SAON Committees (CON, ADC, and ad-hoc working groups), will build on the AOS 2020 output and execute a work plan that serves as input to AOS 2022.

### *(3) Specific charge to AOS WGs*

Working Groups, both through activities prior to the AOS and in particular during work sessions over the course of the 2.5 day summit itself, will provide critical guidance to the three core ROADS activities identified under (2).

Specifically, for EAVs, the overarching goal (see Table 1) is to have AOS WGs 2-3 and 5 contribute to developing a process for how ROADS should assess (jointly between different data users and observing network operators) the most impactful EAVs. The goal of AOS 2020 is to take the first step and identify a framework within which impactful EAVs can be assessed and prioritized. By working through an example specific to the expertise and focus area of the participants, each of the AOS WGs is asked to provide feedback on the process of identifying the Societal Benefit Areas (SBA) and associated observing requirements. WG 1 is then tasked with consolidating these experiences into a recommended process for ROADS to evaluate EAVs and the associated requirements. By basing these recommendations off the work of WGs 2-3 and 5 in this step of the process, the goal is to include the perspectives of a variety of observing communities with sometimes conflicting needs.

WG5 is also asked for input on how EVs defined at the global scale would complement EAVs.

WG 4 would then focus on how ROADS assessments (e.g., of EAV status and network implementation) are best structured for (i) machine readable documentation to support revised analyses and future assessment, and (ii) optimal utility for relevant data use cases.

For Schema and Conceptual Framework development, both co-production and development of structured documentation to guide and assess implementation figure prominently (see Table 2).

For these activities, a template will be created that lays out the type of information that each WG (or smaller breakout groups from WGs) would provide, using the summary of activities in Tables 1 and 2 as guidance (found on the last two pages of this document). In order to make best use of the time at AOS, suitable breakout sessions (e.g., Day 1, 4-5pm) would be used to have members of WG1 and 4 split up and join WG 2, 3 and 5 for discussions and group work aimed at providing content on the questions identified in Tables 1 and 2. In order to obtain a more diverse range of specific guidance, we propose that after initial clarification or working through of a brief single joint example, each of WG 2, 3, and 5 split up into smaller groups.

These smaller discussion groups will then select (or be given, if easier) a proposed EAV (e.g., sea ice concentration) as a starting point. They will be asked to identify the SBAs relevant to their working group and come up with observing system requirements to meet these SBAs (e.g., daily data at high spatial resolution up to 5 km from a community). The goal here is to focus on the SBAs most relevant to the WG, where participant expertise can help link these SBAs to specific requirements for measurements of the EAV. WG1 members joining in these discussions will be tasked with paying special attention to the process of generating these requirements, along with gathering comments and feedback from the discussion group on the process. WGs will be provided with a template mirroring drafts of the ROADS assessment framework, but are not bound to it and are encouraged to provide feedback on that as well. Like WG1, WG4 could be joining these discussions in order to identify data needs of the relevant communities.

### *References*

Arctic Council. 2011. Nuuk Declaration. ([https://oaarchive.arctic-council.org/bitstream/handle/11374/92/07\\_nuuk\\_declaration\\_2011\\_signed.pdf?sequence=1&isAllowed=y](https://oaarchive.arctic-council.org/bitstream/handle/11374/92/07_nuuk_declaration_2011_signed.pdf?sequence=1&isAllowed=y))

**Table 1 – Deliverables from AOS WGs in first set of activities**

<b>Themes</b>	<b>EAV Deliverables</b>
Theme 1: Design, Optimization, Implementation	1. Recommend how ROADS co-assesses most impactful EAV's
Theme 2: Observing in Support of Adaptation and Mitigation	<ol style="list-style-type: none"><li>1. Provide guidance on the process of assessing EAVs, societal benefit areas, and generating observational requirements</li><li>2. Input on what constitutes an impactful EAV</li></ol>
Theme 3: Observing in Support of Indigenous Food Security and Related Needs	<ol style="list-style-type: none"><li>1. Provide guidance on the process of assessing EAVs, societal benefit areas, and generating observational requirements</li><li>2. Input on what constitutes an impactful EAV</li></ol>
Theme 4: Data Interoperability and Federated Search	1. Recommend how ROADS assessments are structured for machine readable documentation to support revised analyses and future assessment;
Theme 5: Arctic Observations in the context of Global Observing initiatives	<ol style="list-style-type: none"><li>1. Provide guidance on the process of assessing EAVs, societal benefit areas, and generating observational requirements</li><li>2. Input on what constitutes an impactful EAV</li><li>3. Guidance from global EVs on EAVs</li></ol>

**Table 2 – Deliverables from AOS WGs in second set of activities**

<b>Themes</b>	<b>Schema Deliverables</b>
Theme 1: Design, Optimization, Implementation	<ol style="list-style-type: none"><li>1. Recommend a structured model for documenting the SBAs and corresponding observing system requirements that should be captured for each EAV;</li><li>2. Recommend a structured model for documenting implementation strategies for each EAV.</li></ol>
Theme 2: Observing in Support of Adaptation and Mitigation	<ol style="list-style-type: none"><li>1. Recommend strategies for co-production of requirements and implementation strategies.</li></ol>
Theme 3: Observing in Support of Indigenous Food Security and Related Needs	<ol style="list-style-type: none"><li>1. Recommend strategies for co-production of requirements and implementation strategies.</li></ol>
Theme 4: Data Interoperability and Federated Search	<ol style="list-style-type: none"><li>1. Recommend a structured model for documenting data system requirements that should be captured for each EAV;</li><li>2. Recommend a structured model for documenting data management strategies for each EAV.</li></ol>
Theme 5: Arctic Observations in the context of Global Observing initiatives	<ol style="list-style-type: none"><li>1. Provide a summary of existing schemas for requirements and implementation and related cyber-infrastructures from the relevant global and regional networks; describe interoperability mechanisms if they exist.</li></ol>

# *The Arctic provides important services for all of humanity*

## Regulation of, e.g.,:

- Climate
- Sealevel

## Support of, e.g.,:

- Marine foodwebs
- Biodiversity

## Provision of, e.g.,:

- Food
- Transportation corridor

## Cultural services for, e.g.,:

- Subsistence activities
- Cultural landscape



*Eicken et al. (2009) Arctic*