



Study of Environmental Arctic Change (SEARCH) and a Framework for Effective and Sustained Observations in the Arctic Summary¹

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Drafting of this summary vision document was co-led by Hajo Eicken, chair of the SEARCH Science Steering Committee (SSC), and Craig Lee, chair of the SEARCH Observing Change Panel (OCP), with input from the SEARCH SSC, SEARCH OCP and SEARCH Science Office.

SEARCH envisions an Arctic observing system organized through a framework of “Arctic Services”, which are benefits to society derived from the geophysical system such as clean air and/or clean water. It is those services that governments seek to ensure and scientists seek to understand and predict. A shared articulation of Arctic Services would provide a common framework for aligning Arctic-observing systems to support operations and scientific understanding.

We propose that using the lens of Arctic Services helps to better combine the different roles for agencies supporting basic research, those with operational missions, and non-governmental entities and stakeholders. The National Science Foundation’s mission is consistent with supporting research on the optimal design of observational networks. Mission agencies focus on observations that help ensure sustainable natural resources and safety of life and property. Decision-makers in government, industry, and elsewhere augment these efforts with targeted additional observations specific to their needs. In every case, the use of Arctic Services as a framework uncovers synergies that are possible in an integrated observing system. For example, monitoring permafrost serves society by reducing hazards to life and property caused by permafrost thaw while contributing to our understanding of ecosystem and climate regulation. Effective observation of permafrost requires an efficiently designed and engineered observational network (hence, original research); integration with models that can predict thaw and its impacts on infrastructure (hence, mission agency operations); and fine-scale observations to inform local infrastructure (hence, industry and municipality operations).

An integrated network would: increase efficiency in observational activities; facilitate individual efforts by emphasizing their societal importance; encourage clearer delineation of roles and responsibilities of observing entities; encourage formation and exploitation of a Pan-Arctic systems perspective through integration; open channels for updating observing protocols; and facilitate standards for data processing, storage, and accessibility.

Integrating observing efforts requires a collaborative effort representing the different motivations for establishing a network. SEARCH proposes four key steps towards a better and transparent integration that could best be realized under the leadership of IARPC:

1. agree on a framework for assessing Arctic observing priorities (e.g., Arctic Services),
2. apply that framework with a transparent protocol to iteratively assess priorities,
3. coordinate planning for Arctic observing amongst all relevant US initiatives and with international efforts, and
4. implement priority observations through an Interagency Arctic Observing System.

The SEARCH program can augment governmental efforts by articulating the broad perspective of the greater research community and stakeholders, and by providing a platform for collaborative development of systems-level syntheses and integrated services.

¹ SEARCH. *Arctic Services: A Framework for Effective and Sustained Observations in the Arctic*. Fairbanks, AK: 2015. (see also: https://www.arcus.org/files/page/documents/18992/search_aon_2015visionstmt.pdf)