

Arctic Marine Research Capabilities Committee

Statement of Task

Purpose: Review and refresh science missions and affiliated science mission requirements of future Federal icebreakers operating in the Arctic Ocean and other northern polar regions

Tasking:

Federal agencies, including the National Science Foundation (NSF), the Office of Naval Research (ONR), and the U.S. Arctic Research Commission (USARC) request that the UNOLS Chair and Council establish a *Special Purpose* Arctic Marine Research Capabilities Committee (AMRCC) to review and refresh the anticipated science missions (SMs) and affiliated science mission requirements (SMRs) for: (a) any commercially available polar icebreaker that may be acquired or procured and refit for operation by the Federal government; and (b) the conceptual design of future “medium”¹ or “heavy”² federal-flagged and owned icebreakers that will operate in the Arctic Ocean and other northern polar regions including, but not limited to, the approximate extent of the area described in the international [“Agreement on Enhancing International Arctic Scientific Cooperation.”](#)³

In so doing, the committee will consider, among other documents, the SMs and SMRs identified during a prior UNOLS Polar Research Vessel Study completed in 2011⁴, the 2017 report by the National Academies of Sciences, Engineering, and Medicine, *Acquisition and Operation of Polar Icebreakers: Fulfilling the Nation’s Needs*⁵, SMRs identified for the National Science Foundation’s Antarctic Research Vessel completed in 2022⁶, and UNOLS reports such as the SMRs documents published for Regional Class, and Global Class Research Vessels.

During this effort, the AMRCC may also consider the security or “dual use” aspects of data collection from shipboard observational systems. For example, bathymetry, backscatter, and water column structure are not only fundamental to addressing basic science questions, but also contain critical operational environmental information that may inform decisions on potential cable routes, detection of infrastructure, and other matters.

¹ According to the USCG, a “medium” icebreaker has the ability to break through 4.5 feet of ice at 3 knots, and can back and ram through at least eight feet of ice. See here:

<https://crsreports.congress.gov/product/pdf/RL/RL34391/250>

² The operational classification of “heavy” is defined by the USCG and the Office of Science and Technology Policy as vessels that have icebreaking capability of six feet of ice continuously at three knots, and can back and ram through at least 20 feet of ice. See here: <https://nap.nationalacademies.org/read/11525/chapter/5>

³ Arctic science cooperation agreement: <https://www.arctic.gov/science-agreement/>

⁴ https://www.unols.org/sites/default/files/PRV_SMR_FinalReport_Feb2012.pdf

⁵ <https://doi.org/10.17226/24834>

⁶ <https://future.usap.gov/ARV/ARV-Science-Mission-Requirements.pdf?348213888206>

The AMRCC will also consider the “lessons learned” from operation of the *R/V Sikuliaq* and how they may translate to the conceptual design of future Federal icebreakers. Similarly, innovations adopted in the designs and operations of other Arctic research vessels, such as, but not limited to *Polarstern II*, *Aaron*, *Oden*, and *Kronprinz Haakon* should be considered.

Through consultation with the research community, the committee will assess whether existing SMs and SMRs meet current and emerging needs for Arctic research on Federal icebreakers. The committee is also asked to identify any additional SMRs required to ensure that Federal icebreakers will meet the needs of the Arctic marine research community for the next 30 years, which is especially important given the pace of technological advancements in data collection and processing.

It is anticipated that a report from this activity will be transmitted to the federal agencies requesting this report in the second quarter of 2025.

Actions:

1. Create AMRCC
 - a. UNOLS - develop Charter from Council
 - i. Up to 12 people
 - ii. Chair – academic researcher
 - iii. 8-9 members from research vessel user community (international membership, disciplinary balance).
 - iv. 3-4 Technical / Operational Experts (naval architects, R/V operators, and R/V Technical Support personnel).
2. Nominations
 - a. Nominations to the AMRCC and for the AMRCC Chair will be solicited from the research community and other organizations with relevant expertise. Candidates will be asked to submit their vitae and letters of interest.
 - b. Applications for membership to the AMRCC and the AMRCC Chair will be reviewed by a AMRCC selection group that includes:
 - i. UNOLS Chair,
 - ii. UNOLS Immediate Past Chair,
 - iii. Fleet Improvement Committee Chair, and
 - iv. Arctic Icebreaker Coordinating Committee Chair.
 - c. The UNOLS Chair shall appoint AMRCC members and the Chair from the nominations put forward by the AMRCC selection group.
 - d. Members of the AMRCC will be appointed for the duration of the task that has an expected completion date of June 30, 2025.
 - e. UNOLS draft & release announcement soliciting nominations.

- f. UNOLS receive nominations & share with AMRCC Selection Group.
 - g. UNOLS host AMRCC Selection Group Virtual Meeting.
 - h. UNOLS Notify AMRCC selectees.
3. Meetings:
- a. The AMRCC will meet three times in addition to the AMRCC workshop. The meeting schedule is indicated below.
 - i. The first meeting will focus on reviewing existing icebreaker research vessel documents, developing science mission scenarios and draft SMRs, determining whether a community workshop would be beneficial and planning for it.
 - ii. The second and third meetings will be devoted to drafting and finalizing the SMR document.
 - iii. Meeting logistics and travel arrangements will be coordinated by the UNOLS Office.
4. Workshop (optional):
- a. One community workshop is a possibility, if determined to be appropriate by the AMRCC. If so, the workshop will present mission scenarios, review community input to the AMRCC SMR survey, and gather additional community feedback.
 - b. The workshop date is tentatively planned for the last quarter of CY 2024.
 - c. The UNOLS Office will coordinate all logistics and travel arrangements for such a Workshop.
5. Charge to the AMRCC
- a. Review SMRs identified in other documents, such as those in a UNOLS Polar Research Vessel Study,⁷ completed in 2011, and those identified for the NSF Antarctic Research Vessel⁸, completed in 2022.
 - b. Consult existing UNOLS reports such as the SMRs documents published for Regional Class⁹, and Global Class¹⁰ Research Vessels for guidance on the process and structure of this activity.
 - c. Develop an online survey to gather feedback from the Arctic marine research community on the anticipated SMs and the capabilities that will be required by future federal icebreakers operating in the Arctic to carry out these missions. The

⁷ https://www.unols.org/sites/default/files/PRV_SMR_FinalReport_Feb2012.pdf

⁸ <https://future.usap.gov/ARV/ARV-Science-Mission-Requirements.pdf?348213888206>

⁹ https://www.unols.org/sites/default/files/rcsmr_version1_0.pdf

¹⁰ https://www.unols.org/sites/default/files/Global_Class_SMR_March_2022.pdf

UNOLS Office will assist by publishing the survey online and compiling responses that are submitted.

- d. Plan and hold a community workshop (optional) to discuss mission scenarios, review community input to the AMRCC SMR survey, and gather additional community feedback.
- e. Through consultation with the research community, the AMRCC will:
 - i. Assess whether the existing icebreaker SMRs meet current and emerging needs for polar research.
 - ii. Identify any additional SMRs required to ensure that the future federal icebreakers operating in the Arctic will meet the needs of the polar marine research community for the next 30 years.
- f. Prepare a report to the federal agencies affiliated with UNOLS that shows a clear connection between critical science questions and the SMRs identified. The format of the final report should be consistent with available UNOLS SMRs documents for Regional and Global Class vessels.
- g. Transmit the final report to the UNOLS Office in early June 30, 2025.
- h. The timeline for the actions discussed above is as follows:

Date	Activity
4/1/2024	Post Call for Nominations
4/28/2024	Deadline for Submitting Nominations
May 2024	AMRCC Selection Group finalizes membership and appoint Chair
June 2024	Finalize online survey
June 2024	Open online survey for public comment
June 2024	Committee Meeting 1
	Plan Activity
	Plan Workshop
	Review icebreaker documents
	Develop mission scenarios with input from AICC and others
	Strawman Science Mission Requirements
	Identify areas requiring additional information
Late May	Invite workshop participants
July 2024	Close online survey
Oct/Nov	Workshop
	Present use case scenarios and online survey results
	Gather additional input
Jan 2025	Committee Meeting 2
	Draft Science Mission Requirements
March 2025	Committee Meeting 3
	Finalize Science Mission Requirements
April 2025	Post Science Mission Requirements for public comment
May 2025	Close public comments
6/30/25	Submit Final Science Mission Requirements to UNOLS