

Finnish-Swedish Winter Navigation Research Board

Call for research projects for the 2021-2022 winter season

1. Invitation

Finnish-Swedish cooperation within the Winter Navigation Research Board started in 1972 and it is funded by the maritime administrations of the two countries. The Research Board administers a joint winter navigation research program based on a bilateral agreement between the Finnish Maritime Administration and the Swedish Maritime Administration. The joint program includes yearly research calls.

The present parties to the agreement – the Finnish Transport and Communications Agency, the Finnish Transport Infrastructure Agency and the Swedish Maritime Administration in association with the Swedish Transport Agency – hereby invite research institutions, government agencies, organizations and companies to apply for funding of winter navigation research projects for the year 2022.

2. Purpose of the call

Sustainable, safe, efficient and environmentally friendly year-round navigation to and from Finnish and Swedish ports, as well as an efficient winter navigation system is important for our industry and the competitiveness of our countries.

The purpose of the winter navigation call is to develop and improve services and technologies that influence the winter navigation system in the Baltic and Gulf of Bothnia through research, development, innovation and demonstration projects.

Research, innovation, demonstration and development should focus on the meteorological, oceanographic, technical or nautical conditions and aspects of navigation in ice. The Research Board administers a yearly call for projects focusing either on parts, or all, of the aforementioned aspects. Based on operational experiences in our administrations the Research Board can define specific thematic priority areas in need extra of research attention or of particular interest for improving winter navigation and operations.

All of the results of the projects funded through the call will be made publicly available to enable renewal and development of the winter navigation system. The results of the research projects can also be used by the Administrations to improve the Finnish-Swedish ice class rules.

3. Background and rationale

The research program is based on the long-standing cooperation in winter navigation between Finland and Sweden. Our countries also share a common view on the importance of winter navigation and icebreaking activities. Because of the close cooperation, the icebreakers nowadays work almost as a single fleet.

Another important outcome of the cooperation is the introduction of the joint Finnish-Swedish ice class rules for merchant ships and its further development. Continuous emphasis on research and development is necessary if Finland and Sweden wish to have an impact on the actual development in the field of common winter navigation system.

Projects financed in the winter navigation research program are often relatively small. This gives the Winter Navigation Research Board and administrations an opportunity to monitor the projects in more detail. The winter navigation research program is unique and it influences international classification societies in their development of ice class rules for merchant ships.

4. General topics of the call

This call is aimed at projects that address one or more of the following areas:

- Meteorological research
 - research related to marine meteorology in winter conditions
 - research related to ice formation
 - climatologic research related to the aforementioned topics
 - development of forecasting and modelling
 - development of new tools for presentation of satellite images
- Oceanographic research
 - research related to ice conditions at sea or sea water temperature
 - sea currents, sea water level and sea waves in winter
 - climatologic research related to the aforementioned topics
 - development of forecasting and modelling
 - development of new tools for presentation of satellite images
- Technical research
 - structural design of hulls of ice-going ships
 - structural design of propulsion machinery of ice-going ships
 - development of minimum engine power regulations for merchant ships
 - winterization of merchant ships
- Winter navigation
 - research on the effectiveness and costs of icebreaker assistance
 - research on winter traffic flows in the Baltic Sea area, including efficiency, safety, environmental impact and economics of winter navigation.

4.1 Specific thematic research topic for 2021

Efforts to decrease the impact of shipping on the climate as well as economic considerations drive a trend of decreasing engine power of merchant vessels. This is partly effected by legislation such as EEDI-requirements and partly by voluntary action by ship owners. Meanwhile decreasing temporal and geographic extent of the ice cover in the Baltic Sea leads to optimization of new ice-classed merchant vessels to open water more than before.

Even with decreasing ice cover in the Baltic, year-round navigation to Finnish and Swedish ports is still dependent on ice-breaker operations. In order for the Finnish-Swedish winter navigation system to remain viable and safe, ice-classed merchant vessels need sufficient performance in ice.

Special research topic 1: Operational experience has shown that there is a need for more precision in determining the minimum engine power requirement for Finnish-Swedish ice classes. The ability of a merchant vessel's propulsion to provide thrust in ice conditions and speeds below the open water design speed is very important for ice navigation and more information concerning both variable and fixed pitch propellers is needed.

The Winter Navigation Research Board requests research concerning requirements for propulsion systems to provide thrust in ice conditions and low speeds. Literature reviews and experimental research concerning the dimensioning of the main engine for fixed pitch propellers or required characteristics of control systems for controllable pitch propellers could be considered. Especially research that could be used to support new requirements in FSICR is requested.

Special Research topic 2: The ability of icebreakers to assist ice-classed merchant vessels when needed is also of high importance to the Finnish-Swedish winter navigation system. The Winter

Navigation Research Board has funded research concerning the towing arrangements of ice-classed merchant vessels and it is planned to include requirements concerning towing arrangements into FSICR.

The Winter Navigation Research Board requests draft technical requirements for inclusion into FSICR with technical background and justification. The Finnish and Swedish Administrations would use the draft technical requirements as the basis for updating FSICR.

Special research topic 3: Although the dimensioning of hull structures has been proven to be at a good level, the prescriptive requirements can lead to structural details that are not optimal for manufacturing or weight optimization. The current text of FSICR is reserved with regard to the use of Finite Element Method (FEM) calculations for dimensioning of hull structures for ice-classed vessels. To reflect changing technology and ship design practice, the use of FEM in the design of ice-classed vessels should be reconsidered.

The Winter Navigation Research Board requests research into the use of FEM for dimensioning of hull structures of ice-classed vessels. Research concerning the proper application of loads, suitable approval criteria and required characteristics of the used solvers and models is especially requested.

5. Requirements for the project

The planned project shall be in line with at least one of the priority areas mentioned above. The project may start in late 2021 or in early 2022, and may last for 6 to 24 months. However, end dates no later than end of September 2022 are requested for projects concerning Special research topics 1 or 2.

A short Work Plan describing the sequence of work and containing an updated research plan is required before invoicing the first part of the project budget. At project's end, a final project report in English shall be presented to and be approved by the Winter Navigation Research Board before final invoicing. If the project continues for more than 12 months, intermediate reporting is required.

The final reports will be published in the Winter Navigation Research Reports series (ISSN 2342-4303) under CC BY (4.0) license. Content other than original research shall be referenced with proper sources. Figures, tables and formulae shall be labeled and referenced in the text. As well as the results, also methods and used data shall be described in the final report.

6. Evaluation process and criteria

The proposals will be evaluated by the members of the Winter Navigation Research Board, and the Board will make the formal decision about financing.

The following criteria, weighted as indicated, will determine the decision of financing:

- Relevance (35%):
 - Is the project in line with the aim of the call?
 - To what extent does the project contribute to a sustainable winter navigation transport system?
 - What defined winter navigation problem should the project solve?
- Quality (15%):
 - How will the project contribute to the technical and scientific development?
 - Does the project contribute to moving the research front and knowledge forward?
 - Is the project considered to be of high scientific quality?
 - Does the project include a new idea or innovation?

- Viability (15%):
 - Are there risks involved in accomplishing the project?
 - Are the goals of the project concrete, well-defined and reasonably ambitious?
 - Is the draft work plan concrete and is the schedule realistic?
 - Do the actors have the right skills, competences and proper resources to complete the project?
 - Is the budget reasonable in relation to the intended efforts and objectives?
- Impact (35%):
 - Is there an identified need for project results, such as a clear knowledge gap or market potential?
 - To what extent can the project be of use, for example through building knowledge, publications, new types of goods, services or processes, or for commercialization?
 - What ambitions does the project have for spreading the results? Is there a plan for how the results should be utilized and disseminated?
 - Are the end-users of the project results represented in or participate in the project?

7. Budget

The budget for the research projects will be settled on a yearly basis. The annual budget was €200 000 in 2021. If approved projects last for more than one year, this will result in a partially limited budget for the coming year. Co-financing both from research institutions, industry and other funding organizations is always welcomed.

The Winter Navigation Board applies the European Union levels, rules and conditions set up for public funding of research and innovation (2015:208) including support to SME:s and GBER exempt.

8. Time schedule

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| Call text available: | 30 June 2021 |
| Deadline for applications: | 12 September 2021 |
| Announcement of the financing decision: | 19 October 2021 |
| Earliest project start: | 1 December 2021 |

9. How to apply

Proposals should be sent by email to the contact persons of the secretariat given below.

The application form for research projects shall be used.

The deadline for applications is 12 September 2021. The Winter Navigation Research Board will not consider applications received after the deadline.

10. Content of the application

Please use the application form provided with this call for projects. General information shall contain the items mentioned below. A maximum of one page can be used.

- Project title
- Acronym
- Project summary – maximum 100 words
- Start and end dates
- Funding

- Project manager
- Project organization

The following parts shall be described in the project outline. A maximum of 5 pages can be used.

- **Relevance:** Description of problems the project will address and how it contributes to improvements in winter navigation.
- **Quality:** A short description of the research aims within this area, and the projects relation of the “state of the art” in research and technology.
- **Viability:** Strategy and methodology. Expertise in research group.
- **Impact:** A plan for how the result will be used and the impact results will have on winter navigation
- **Dissemination:** How will project results be disseminated and made available?
- Brief **project plan** with defined milestones and deliverables.
- **Relation to other projects:** How the project relates to other ongoing or planned projects
- **Budget and resources.**

11. Contact persons

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