

About SITRA project

Safety of Industrial Development and Transportation Routes in the Arctic, 2015–2018 (SITRA) is a part of A SCIENTIFIC HIGH NORTH EXCHANGE PROGRAM ON HIGHER UNIVERSITY EDUCATION.

Sponsored by SIU.

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Project background

Issues and needs to be addressed

Industrial development of offshore and coastal regions and extension of navigational activity in the Arctic is related to the increase in the risk of accidents under harsh environmental conditions. Deep knowledge of the environmental conditions and of methods of risk reduction are necessary for technical experts and for young specialists planning to work in companies providing industrial development in the Arctic. The proposed project "Safety of industrial development and transportation routes in the Arctic" is focused on the organizing of a multi-international educational network of experts having experience in Arctic research and on the teaching of courses for students in the field of their expertise in Arctic engineering. The project aims at the organizing of joint lecture courses that will provide basic knowledge about the physical environment in relation to running industrial activity in the Arctic. An important element will be student exchange and joint field work in Svalbard and in the Barents Sea.

Regions of industrial development and navigational routes in Svalbard will be used as natural laboratories for the study of physical-environmental loads on coastal structures and of potential risks to shipping activity in Arctic straits.

The objectives and priorities

SITRA project will increase cooperation in higher education and dissemination of knowledge amongst two Norwegian universities (NTNU and UNIS), a Canadian university (Memorial University of Newfoundland), two US universities (Dartmouth College and University of Alaska Fairbanks) and a Russian university (Moscow Institute of Physics and Technology).

Professors of these universities will participate in the formulation of programmes for lecture courses, for laboratory studies and for field work and will provide teaching for courses at UNIS and NTNU. PhD and MSc students involved in the programme will visit partner universities for study and for joint research projects. All universities involved in the project have extensive experience in both education and research in relation to High North issues. A joint educational project organized at UNIS, based in Svalbard, will strengthen links amongst partner universities, administrations of local harbors in Longyearbyen, the

Norwegian coal company SNSK and Russian Research Center in Spitsbergen, Barentsburg.

SITRA partners take parts in the multi-international SIU project in the field of Arctic Technology for the first time. Projects (SAFELOT and SMIDA) were focused on cooperation with Russian universities only. Multi- international cooperation in education amongst universities involved in the development of research and industrial activities on the Arctic shelves of Alaska, Canada and Russia will increase significantly the flux of knowledge to students. Students will get more information about ongoing industrial projects and research activities focused on safety issues that arise through both industrial activity and navigation within ice-infested waters.

Organizing of joint field work will help to increase knowledge of modern equipment and skills necessary for safe field work in the Arctic. The proposed project will help to increase interest from young specialists from USA and Canada for research work in the Centre for Research-Based Innovation "Sustainable Arctic Marine and Coastal Technology" (SAMCoT), organized and based at NTNU, SINTEF and UNIS. The project will attract experienced researchers to teach at UNIS, will provide a good base for organizing new courses at UNIS, and finally will help to increase the number of students interested in research-based education in disciplines related to Arctic technology. These goals are linked to UNIS' development strategy.

Project goals, activities and expected results

The overall project goals and outline

The goal of the project is the organizing of lectures on:

1. fundamentals of ice mechanics and engineering applications;
2. hydrodynamics of ice-covered waters and engineering applications;
3. safety problems of offshore structures on the Arctic shelf;
4. safety problems of coastal structures and pipelines in the Arctic; and
5. safe navigation in Arctic straits.

Projects management will be implemented via regular meetings for the partners. We plan 4 international projects meetings in the partner locations (Trondheim, St.Johns, Hannover, Moscow). All main decision on carrying out the project will be made on these meetings. Several Skype meetings will be taken as necessary. In between project coordinator will prepare project documents (minutes after meeting, work schedule, participants list with the task), spread them and keep communication with all participants and students, advise students how to apply and come to UNIS, help them during application process and staying at UNIS. All main decisions, projects schedules and achievements will be shown on project web- page.

Organizing of field work by boats and snow mobiles on land-fast ice of Spitsbergen Fjords and drifting ice of the Barents Sea for international student teams under the supervision of qualified and experienced researchers. Organizing of field work around coastal structures, fixed and floating quays in Svalbard. Organizing of joint MSc and PhD projects based at the universities involved in the project.

Lectures will be organized at UNIS within four existing courses-- AT-211 "Ice Mechanics, Loads on Structures and Instrumentation" (BSc, MSc), AT-332/832 "Physical Environmental

Loads on Arctic Coastal and Offshore Structures" (MSc,PhD), AT 327 "Arctic Offshore Engineering" (MSc,PhD) and AT-307 "Arctic Offshore Engineering - Fieldwork"--and within a new course in Marine Technology. Professors from partner universities will visit UNIS as Guest Lecturers for a period of 1-2 weeks, for lecturing and for field activities. The visits of Guest Lecturers will be partly covered by course budgets and by ongoing research projects.

Results, expected during the project and on its completion

Teaching development:

1. Increase in quality of existing courses at UNIS.
2. New methodology for advanced experimental and field work with students.

Published lecture notes on:

1. fundamentals of ice mechanics and engineering applications.
2. hydrodynamics of ice covered waters and engineering applications.
3. safety problems of offshore structures on the Arctic shelf.
4. safety problems of coastal structures and pipelines in the Arctic.
5. safe navigation in Arctic straits.

MSc/PhD education based at UNIS for ten Technology students from partner universities, highly qualified and relevant for the market.

Teaching by US professors in Norway, teaching by Norwegian professors in Canada and Russia, teaching by Canadian and US professors in Russia.

Four project meetings combined with thematic seminars with presentation for students. Participation in three International conferences (POAC, IAHR, OMAE). Ten publications in conference proceedings and scientific journals. Four-five visits per year of professors from partner universities. HSE education for academic, administrative and technical staff. Participation of students in industry-based projects. Creation and regular updating of project web-site.

Academic discipline

- 1: Mechanical engineering (407)
- 2: Physical sciences (303)
- 3: Marine technology (408)
- 4: Earth sciences (304)