HOME

Maritime transportation is of vital importance to the countries surrounding the Baltic Sea area. During winter, ship navigation is challenging due to the presence of sea ice. Navigational accidents occur rather frequently. While these usually lead to minor consequences, there is a risk of serious accidents harming the marine environment. Consequently, regional and sub-regional policies highlight the need for developing preventive measures to improve the safety of navigation in ice conditions.

The BONUS STORMWINDS project aims to contribute science-based analyses and practice-oriented tool developments for enhancing maritime safety and accident response, during winter in the northern Baltic Sea. STORMWINDS is a BONUS - Science for a better future of the Baltic Seas region - project, equally funded by national and European means. The project has a life-time of 3 years and a total budget of 1.8 Mio EUR. Scientists and practitioners from four European countries and nine different partner institutions are involved. Project coordination is the responsibility of the maritime risk and safety research group at the School of Engineering, Aalto University, Finland.

BONUS STORMWINDS addresses three key research themes.

The **first research theme** addresses accident prevention through the development and application of systems-theoretical accident theories to the vessel control system. This is manifested in two development paths. The first concerns the development and application of a new framework for maritime risk management, linking systems-theoretic accident theories to maritime spatial planning tools and processes. The second development path builds on systems-theoretic accident theories to develop an indicators-based safety management model for Vessel Traffic Services (VTS).

A **second research theme** addresses accident prevention through the development of e-navigation services, focusing on information and route planning services to support voyage planning in sea ice environments. One development concerns methods for classifying satellite images in terms of expected ship performance. Another development concerns a method for optimal routing in actual sea ice environment, accounting for both efficiency and safety. These methods can be implemented in onboard navigation equipment as an additional information layer and used in operational planning.

A **third research theme** addresses pollution response in winter conditions. A risk management model is developed to support policy decisions related to the organization of the pollution response fleet. Questions such as the appropriate number, location and equipment of response vessels are addressed through a risk analysis which integrates navigational accident and traffic system analyses, future sea ice climate scenarios and accidental spill and recovery modeling. Another development path addresses improvements in situation awareness tools for use in accident response operations. Several web-based applications are developed for improved tracking of oil spills in sea ice environments and for integrating information services relevant for operational decision making in spill response operations. Thus, STORMWINDS aims to advance maritime risk analysis and management, taking an interdisciplinary approach to improve maritime safety.

BONUS STORMWINDS was awarded status of **flagship project** in context of the **European Union Strategy for the Baltic Sea Region** (EUSBSR).

Download project flyer and poster!

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STORMWINDS News

January 26 2018. Participants from AALTO give an invited talk at the School of Civil and Environmental Engineering at the University of Technology Sydney "Winter navigation risk management in the Northern Baltic Sea".

January 29 2018. Participants from AALTO give an invited talk at the Centre for Transportation Research at the National University of Singapore on "Winter navigation risk management in the Northern Baltic Sea".

January 8 2018. Participants from NOVIA and AALTO organize a validation workshop on Safety Management System design procedures and SMS monitoring tool, in Novia University of Applied Sciences, Turku.

December 15 2017. Participants from NOVIA and FGI organize a validation workshop on developments in e-Navigation support tools for route planning in Baltic Sea ice conditions, in Novia University of Applied Science, Turku.

Novermber 6-10 2017. Participants from AALTO participate in the 3rd annual meeting of the ICES Working Group on the risks of Maritime Activities in the Baltic Sea in Helsinki, Finland. More information **here.**

November 1-3 2017. Participants from AALTO present a STAMP-based approach for designing a maritime safety management system at the 2nd Industrial cross-industry safety conference (ICSC) in Amsterdam, the Netherlands. More information **here.**