Making Shipping in Ice Regions Safer

Sea ice is declining significantly due to climate change. This means a rethinking of shipping is necessary: increasing navigation decisions in ice-covered waters require a detailed assessment of the ice situation. The FAST-CAST 2 project aims to make a decisive contribution to route planning.

Since January 1, 2017, the IMO Polar Code has been in force - IMO stands for International Maritime Organization. It prescribes up-to-date ice information on board ships in polar regions. This is because, despite ice retreat, pack ice and icebergs are among the biggest risk factors for shipping in polar regions, along with poorly mapped sea depths, experts say.

Polar Shipping Needs Solutions

Digitalization in the maritime industry is lagging behind current opportunities. Examples include modern web technologies, high-resolution earth observation, and artificial intelligence (AI). “Polar shipping has been waiting in vain for many years for daily updated ice information to be displayed in standardized navigation instruments,” says Dr. Lasse Rabenstein from project partner Drift Noise GmbH. The start-up and spin-off company of the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI) supports agents in polar waters with operational ice information. According to Rabenstein, one solution would be to convert ice information into automatic route recommendations that are already able to be displayed in common navigation instruments on board vessels.

Project Aims to Use AI-Based Data Analysis to Calculate Optimized Ship Routes

This is where the FAST-CAST 2 project from the Center for Industrial Mathematics (ZeTeM) at the University of Bremen comes in. It builds on the predecessor project FAST-CAST, which focused on optimizing processes for generating high-resolution and simultaneously fast ice drift predictions for polar shipping. Using satellite-based Earth observation, ice drift forecasts, and with methods from the field of machine learning, navigation decisions in polar shipping are to be improved. The data will be used to create risk and speed maps for the shipping areas and automatically generate optimal route suggestions. These can then be used as an assistance system for navigation support on ship bridges. “The project forms the basis for moving from assisted to automated to autonomous navigation of ships in the future,” says project leader Professor Christof Büskens from ZeTeM at the University of Bremen.

Funding of Over 1.4 Million Euros

The German Federal Ministry for Digital Affairs and Transport (BMDV) is funding FAST-CAST 2 with over 1.4 million euros for three years as part of the mFUND innovation initiative. In addition to the University of Bremen, the project partners are Drift Noise GmbH from Bremen, the Maritime Safety and Security Lab Bremen of the German Aerospace Center, and EOMAP GmbH & Co. KG from Seefeld.
About the BMDV’s mFUND:

As part of the mFUND innovation initiative, the BMDV has been funding data-based research and development projects for digital and networked mobility 4.0 since 2016. Project funding is supplemented by active professional networking between agents from politics, business, administration, and research, and by making open data available on the mCLOUD portal.

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The research vessel POLARSTERN in the central Arctic.