

Title: **Station Keeping in Solid Drift Ice**

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Abstract

The paper discusses certain aspects in the development of the AURORA BOREALIS (AB), a dynamically-positioned Polar Research and (Scientific) Drill Vessel for the European Polar Research Icebreaker Consortium (ERICON).

The design of the vessel was contracted with Wärtsilä Ship Design Germany (WSDG) under the project management of Alfred Wegener Institute for Polar and Marine Research (AWI).

The AB is a heavy icebreaker with the highest ice class. She is powered to break continuously in more than 2.5 m of multi-year ice and is able to manage ridges up to 15 m. The ship shall perform research tasks including scientific drilling year-round in the Arctic and Antarctic without any support vessels.

The key issue in the performance specification of the vessel is the mandatory requirement of performing stationkeeping operations in drifting solid ice of more than 2.0 m thickness during drilling and other research tasks.

The paper presents and discusses the design challenges and problems, as well as the test results and design solutions. It includes selected results of the ice tests for stationkeeping in drifting solid ice of up to 2.0-meter thickness, i.e., icebreaking in a practically stationary mode, which was carried out in two ice tanks in Helsinki and Hamburg.

For the various propulsion tasks -- transit at 16 knots, icebreaking, and stationkeeping in ice -- a propulsion system is installed totaling 108,000 kW.

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