MARIN

Challenging wind and waves

Linking hydrodynamic research to the maritime industry

Safe Arctic Logistics, Transport & Operations

SALTO

Background:

Offshore operations in the Arctic and related transport will encounter ice and icing, or at least have to be prepared to encounter such ice features. With developing interest to exploit Arctic resources, shipping industrial goods to and from the Arctic will become frequent. Also unloading and re-loading of cargoes in Arctic exposed conditions become a real possibility as many Arctic oil and gas developments are offshore. These oil and gas developments will initiate many other maritime activities, such as drilling, pipe-laying, installation operations and supply.

The industry as well as the Arctic Coastal states are increasingly aware of the benefit of risk based engineering and operations design to control the safety of such economic activities in the Arctic[1].

The Arctic is not only an unforgiving environment, but also an environment to preserve and protect from pollutions.

Objective:

The SALTO JIP will develop an engineering and preparation design method for Arctic operations, based on probabilistic operations simulations and risk evaluation. The PC tool will help industry to prepare for the Arctic environmental conditions (wind, fog, ice, icing) and hence to optimise their operations.

Monte Carlo type simulations

Voyage simulation through ice areas will be based on a route seeking approach, and operations in a step-wise approach. That implies that a 'captain's decision mimic' (CDM) representing the ship master, will decide after each time step in the simulation what the next settings will be, e.g.: whether the ship or the operations will continue as planned, or that the route has to be adapted or that assistance has to be planned (ice breaker support). In this approach, conditional hazards can be taken into account to estimate the risk, while voyage/operation statistics are computed to develop design standards for sea-fastening and loads in cargo, and for precautions and time schedules for safe completion to be considered. By joining the JIP, the participants will:

- Have a learning experience with partners;
- Receive a functional design and operations planning preparation tool;
- Acquire enhanced relationships with Operators and Contractors;
- Through the tool get access to high quality Arctic MetOcean and Ice information.

Expertise and validation input from:

- MonteCarlo simulation technology as used in SafeTrans PC tool (MARIN);
- Ship masters' experience through partners (DMI, Canatec, AKAC Inc) and participants;
- Arctic experience from consultants (TU Delft, Canatec, DMI, AKAC Inc. and others);
- Mammal breeding areas & migration areas to be avoided (ImaresWUR).

SafeTrans

Monte Carlo simulation tool for sea transport & offshore operations

[1] see "Risk in Arctic" - report of the Friedtjof Nansen Institute presented at ONS summit 2012

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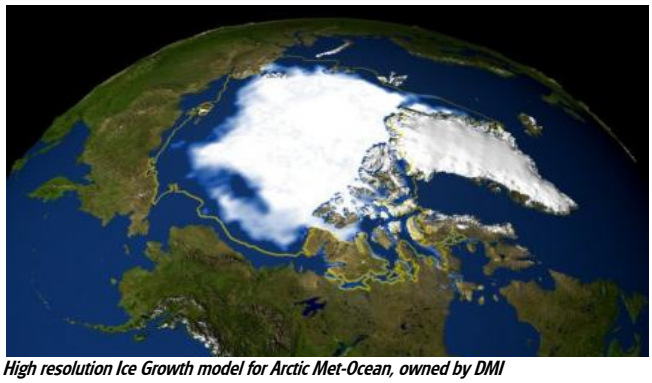
Ice chart dB tools owned by Canatec, to support ice routing consultancy

DMI HYCOM CICE

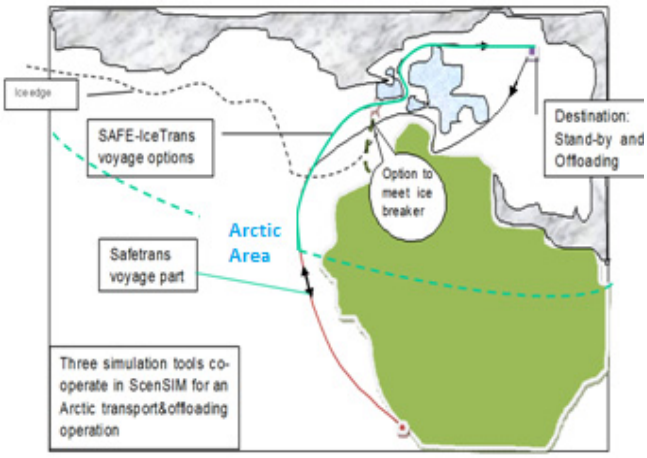


High resolution Ice Growth model for Arctic Met-Ocean, owned by DMI

Deliverables

In the JIP the partners will co-operate to develop the PC software tool, 'SAFE-IceTrans' containing 10 years of Arctic MetOcean and Ice conditions. The tool can be operated stand-alone as well as together with other scenario simulations in the ScenSIM[2]) software framework to model the full operation. The project is carried out in 3 phases:

- Build SAFE-IceTrans;
- Build Offshore Operation module;
- Build in nested simulations with ScenSIM.



JIP organisation and contact

The participants of the JIP will receive a free license to use the software tool and they are members of the Project Steering Committee. The JIP duration will be about 3 years, and kicked-off February 13, 2014. Late participation starts September 1, 2014.

Target participation fee €45,000.-, payable in 3 annual terms. After completion of the software a user group will be formed.

Partners

MARIN (NL), Danish Meteorological Institute (DK), Canatec (CAN), AKAC Inc. (CAN), IMARES (NL).

Joint Industry Project for

Transport Contractors, Oil Companies, Marine Contractors, Dredging, Class & Warranty Surveyors, (Winterisation) Suppliers and Authorities.

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[2] ScenSIM is a MARIN owned 'user run-time environment' made available to participants