Jäänmurtotekniikan uudet tuulet

Mikko Niini, Managing Director
(Reko-Antti Suojanen, R&D Manager)

Aker Arctic Technology Inc.

Kanavan vuokrasopimus jatkuu – Seminaari Lappeenrannssa

25.1.2012 Lappeenranta

Sisältö

- Esittely – Aker Arctic Technology
- Pienet jäissäkulkevat alukset
- DAS jäänmurtotekniikka on jo nykypäivää
- Mihin jäänmurtotekniikka on tullut – vinottain kulkeva jäänmurtaja?
- Saimaan alueen ympärivuotisen liikenteen haasteet
- Yhteenveto

AARC basic services

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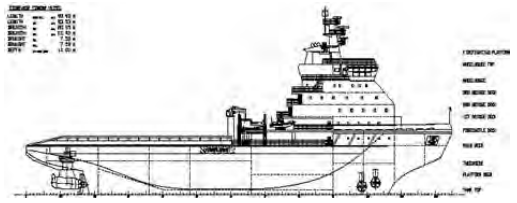
Ship design

- Concept developement
- Feasibility studies
- Performance predictions
- Simulations
- Basic design packages



Field research

- Ice conditions
- Ice properties
- Route selection
- Design basis development

Testing in model and fullscale

- Ships
- Structures
- Offloading operations
- Rescue and evacuation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Aker Arctic – THE ice technology partner

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- Since establishing of the Company we have grown from 1,5 Mill. EUR to 6 Mill. EUR in turnover.
- Today 35 experienced naval architects and are growing
- We are a solid company with an equity of 8 Mill. EUR
- AARC shareholders:

STX Europe	71,4 %
ABB Marine	14,3 %
Aker Solutions	14,3 %

- Co-operating with Helsinki University of Technology, Rovaniemi Polytechnics (cold laboratory), Finnish Institute of Marine Research, SSPA in Sweden, NTNU and Marintek in Norway, Froce Technologies in Denmark

Building the domestic icebreaker fleet created a knowledge to achieve a 60% market share in icebreakers globally

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Talviliikenteen tavoitteet sisävesillä

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- Saimax-laivan ympärivuotinen käyttö
- Kanavan pitäminen auki talvella
- Jäänmurto
- Bioenergiakuljetukset – tulevaisuuden potentiaali
- Erilaisia proomukombinaatioita (mm. tankki/kontti)

Esimerkki - ympärivuotinen DAS kanavalaiva

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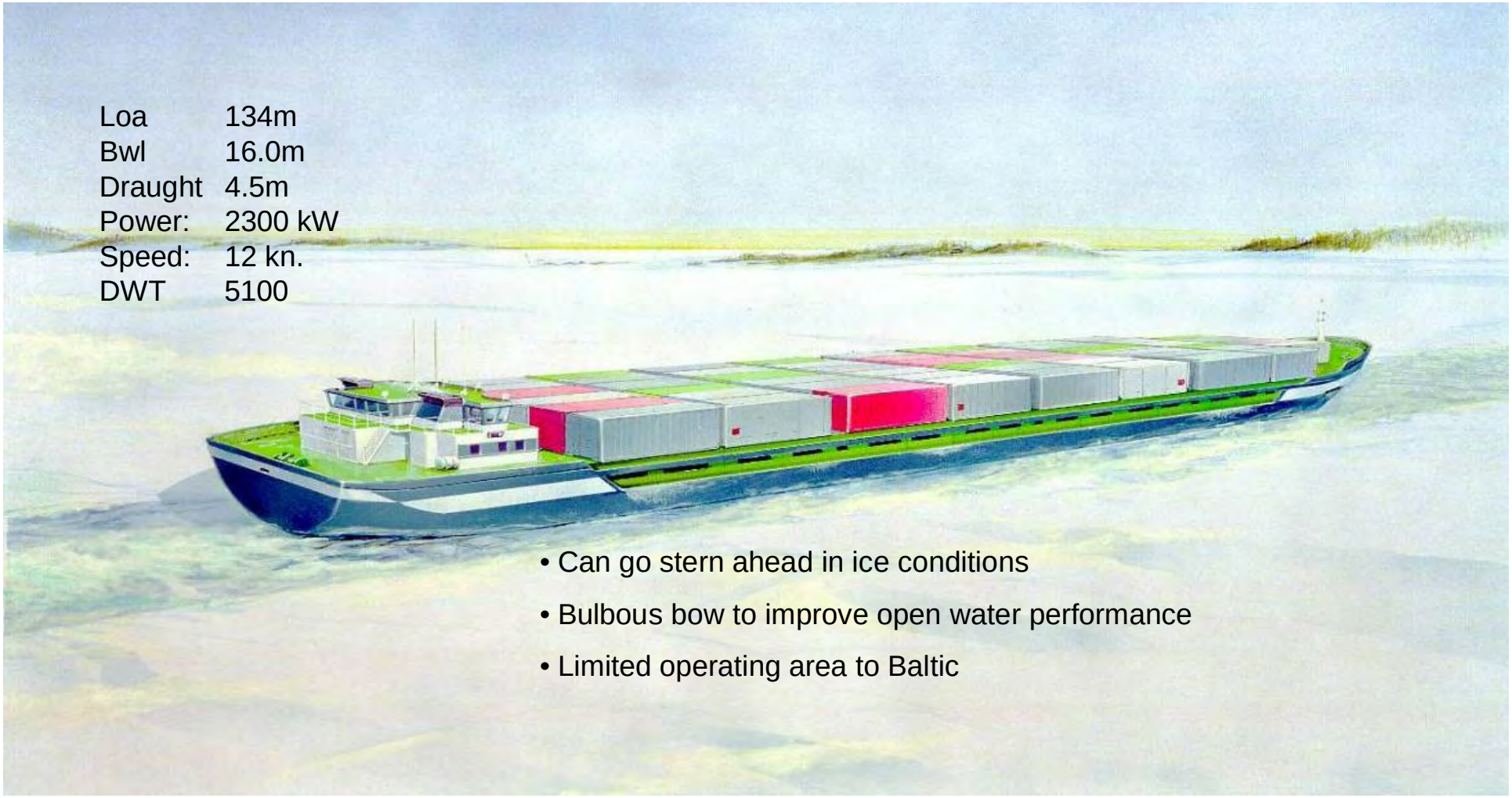

Matalakulkuisia jäissäkulkevia aluksia

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- Röthelstein (1995)
- Syväys 1.5 - 2.0m
- 40m x 10m
- Teho 2 x 560 kW

Matalakulkuisia jäissäkulkevia aluksia

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- Arcticaborg (Wagenborg)
- 65m x 16m x 2.9m
- 2 x 1600 kW

Shallow Draught Caspian Icebreaker tug Aker Aker Arctic ARC 104 PSV contracted by Caspian Offshore Construction. Built in STX Romania.

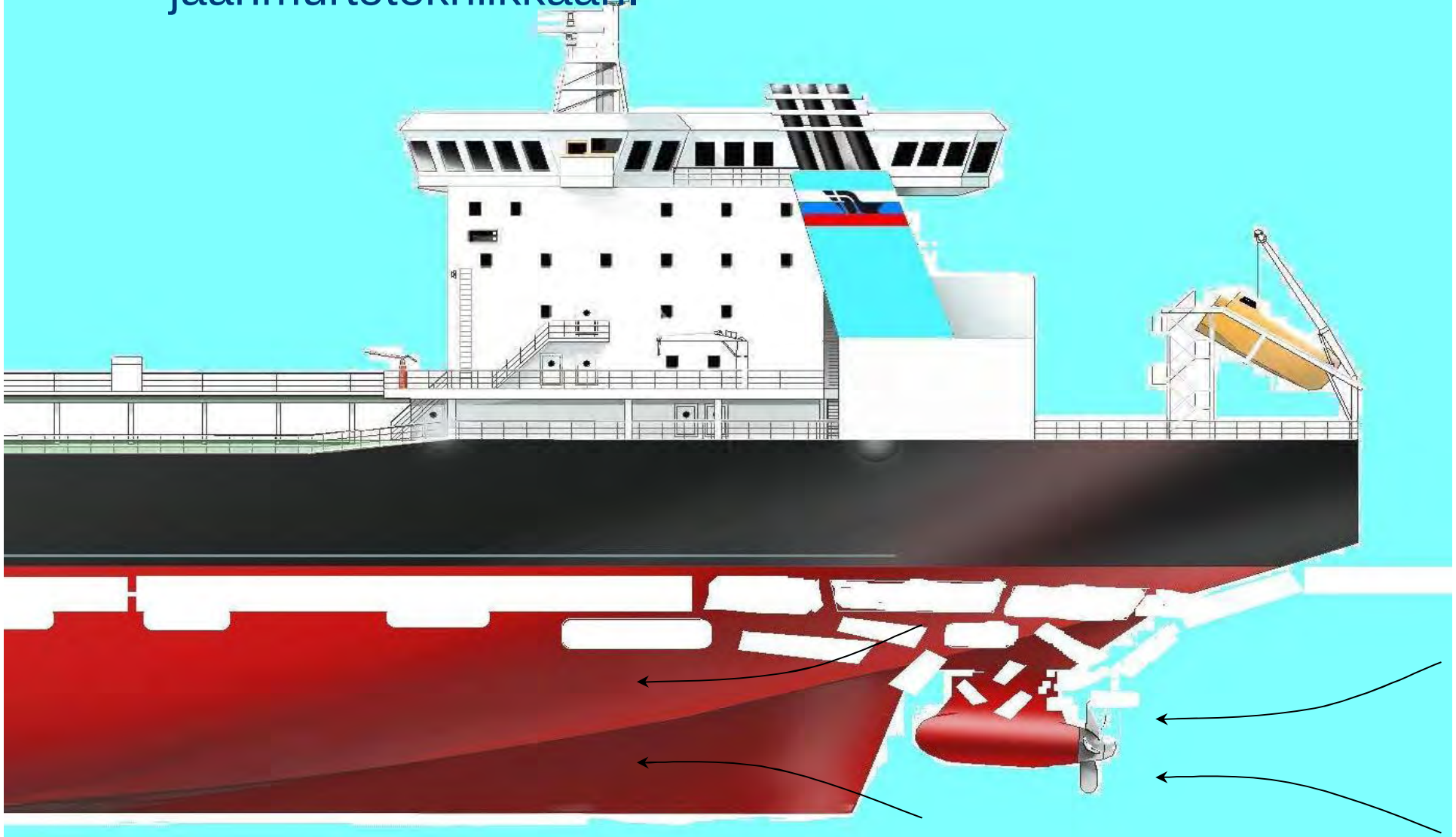
Length oa	abt. 65.0 m
Length dwl	abt. 61.7 m
Width	abt. 16.4 m
Depth	abt. 4.4 m
Draught dwl	3.0 m
Minimum operating draught	2.5 m

Main propulsion to be by three azimuthing thrusters of abt. 1400 kW each.

In 60 cm level ice the vessel shall be able to move at 4 knots speed and to proceed at

5 knots speed in prebroken ice channel when towing a barge

Edellämainitut laivat perustuvat DAS-jäänmurtotekniikkaan.



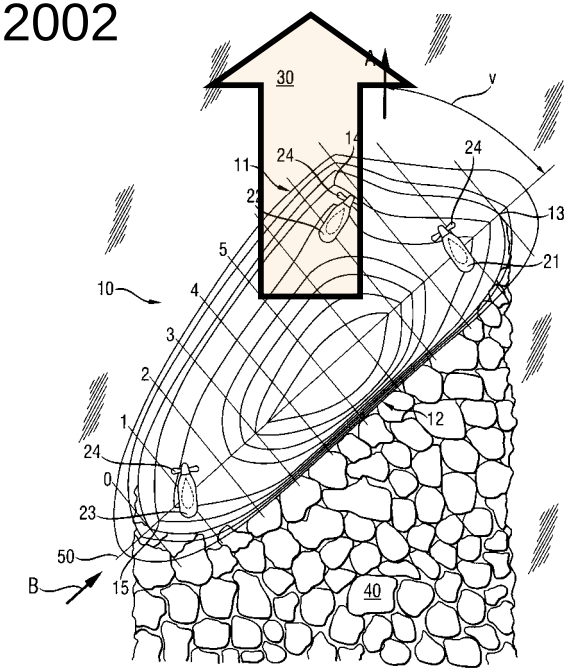
DAS-tekniikan avulla voidaan jää murtaa 50% pienemmällä teholla.

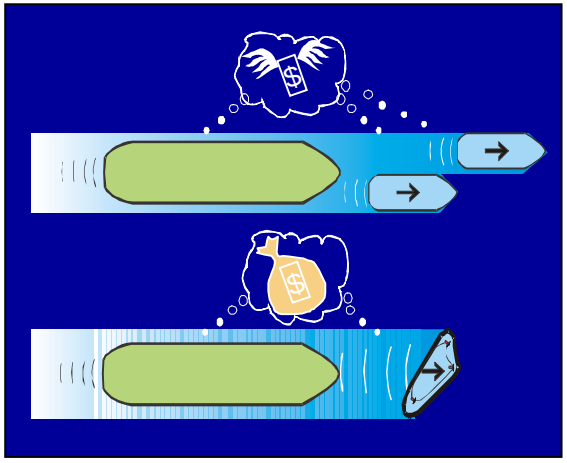
Oblique Oil Combat Icebreaker

- Concept
  - Development
  - Functions / Modes of Operation
  - Environmental Friendliness

Original Development

- Project established in 1997 to develop an icebreaker which could provide independent assistance to 40m beam vessels
- Oil recovery function by using vertical side as a sweep arm was founded 2002





Icebreaking Modes

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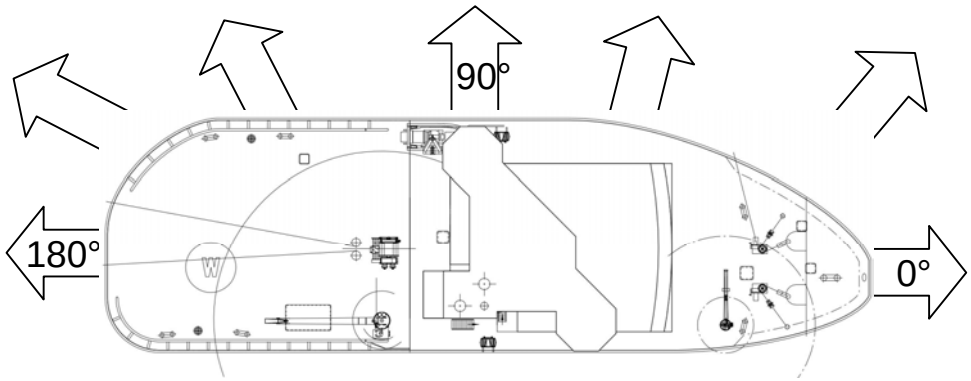
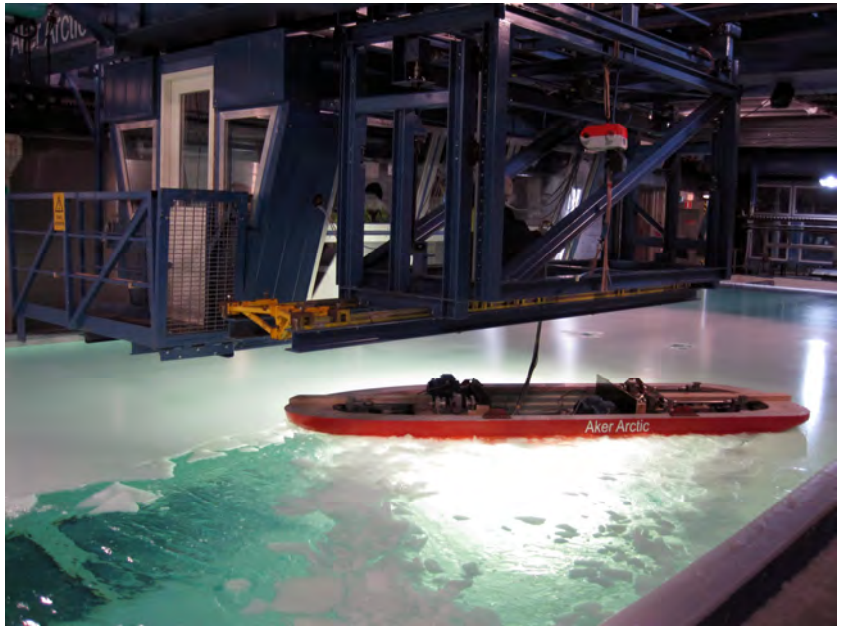
- Ahead and astern
  - Transit in level ice
  - Penetration of ridge fields by milling and flushing
- Oblique mode
  - Possible directions from 0°-180° without restrictions
  - Channel widening





Icebreaking Modes

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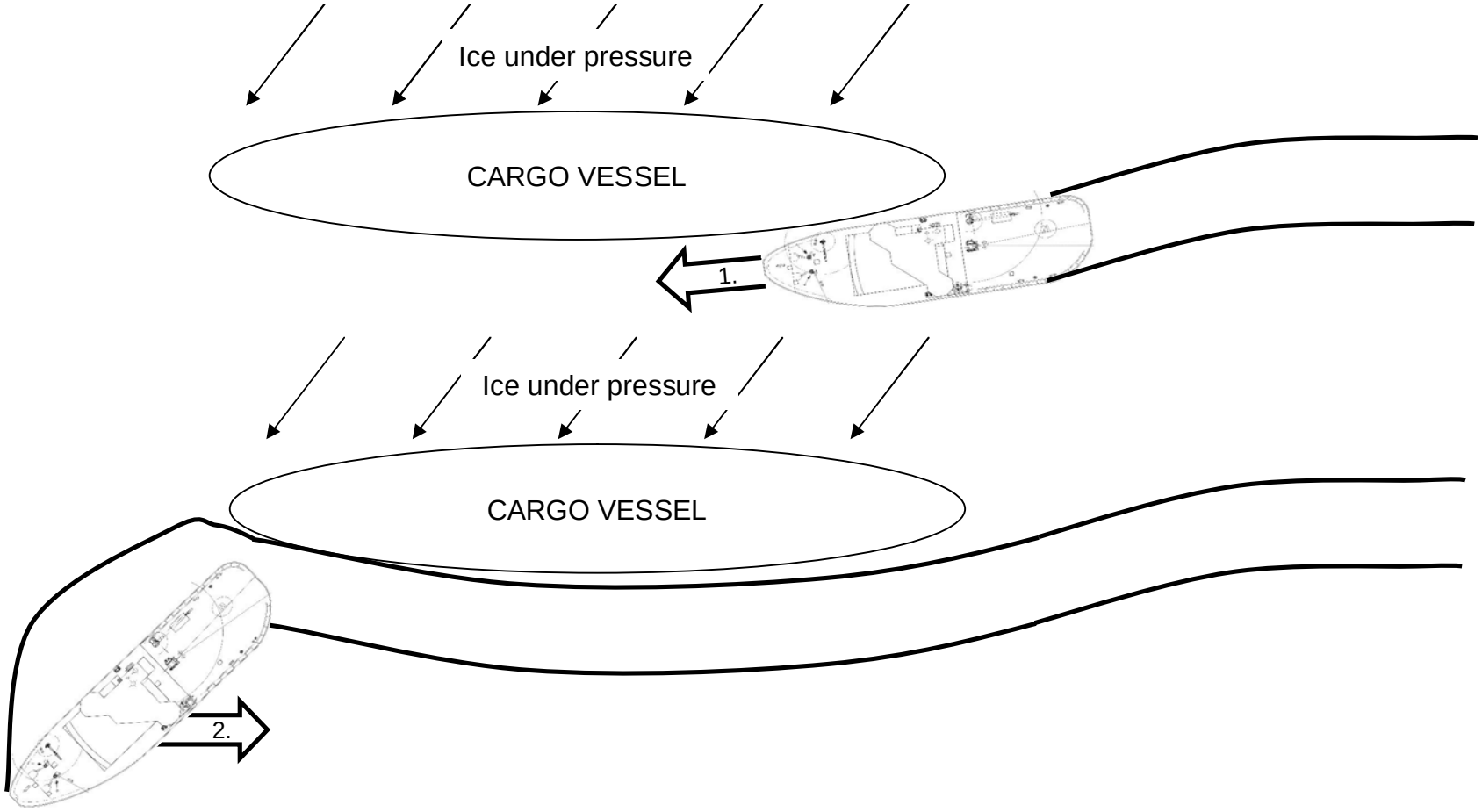
- Icebreaking assistance – releasing stuck vessel



Icebreaking Modes

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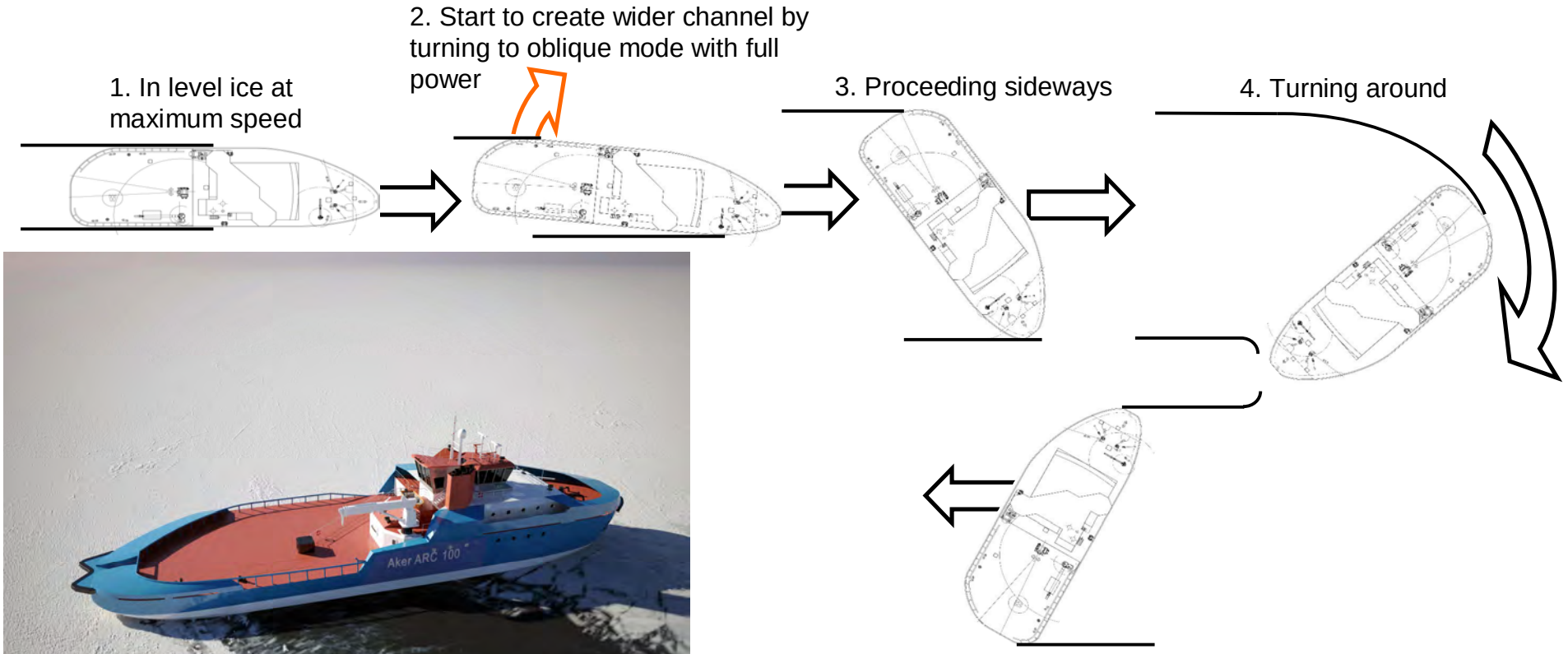
- Harbour operation assistance
  - Breaking space for maneuvring operation in harbour area



Icebreaking Modes

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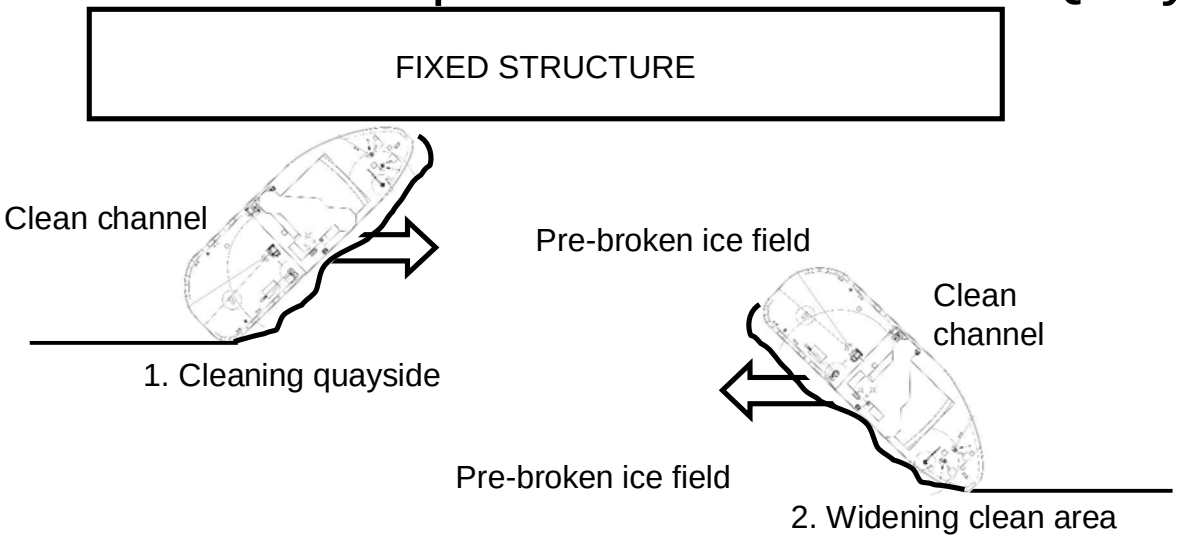
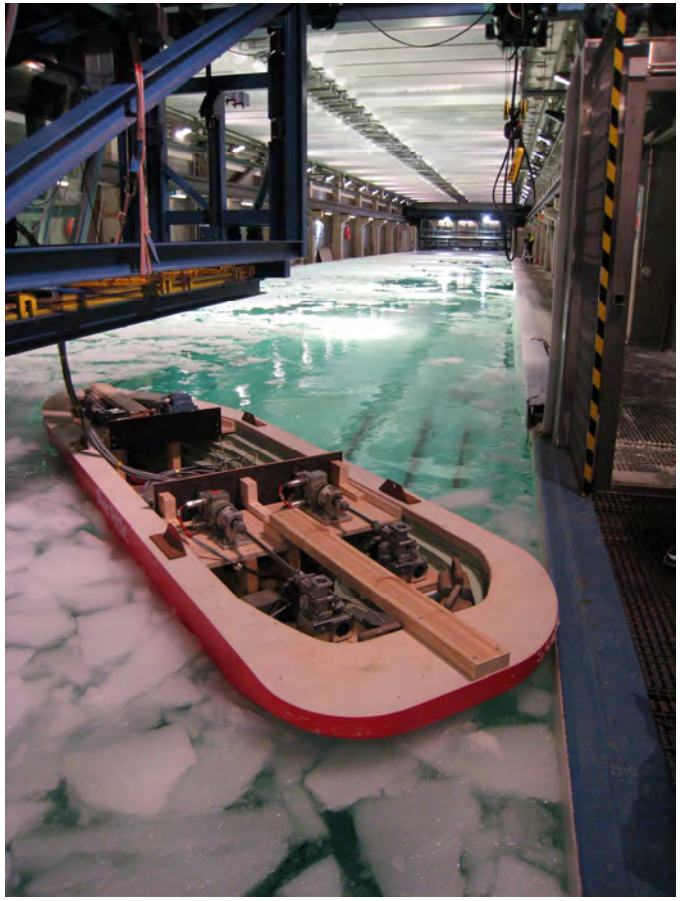
- Harbour operation assistance - Quayside cleaning





Oil Recovery Modes

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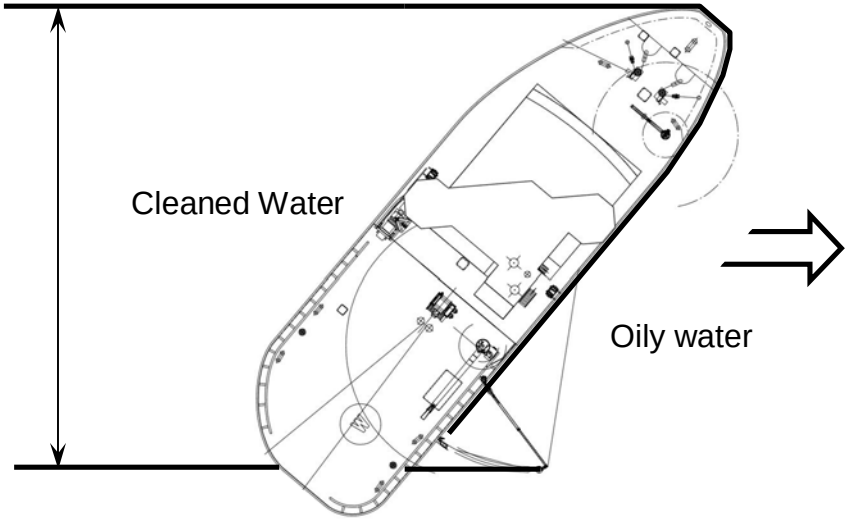
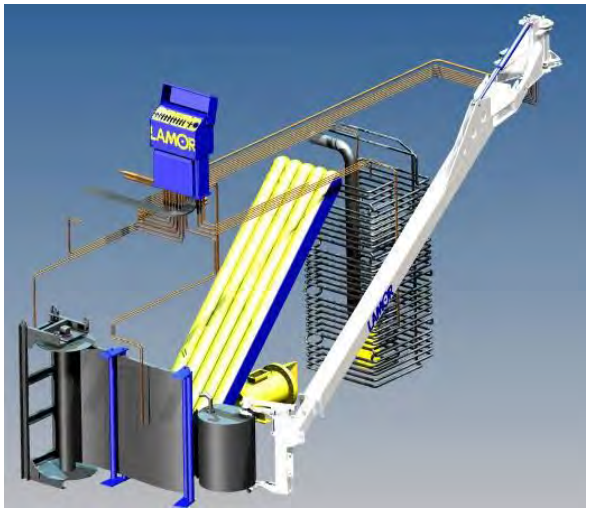
- Oil recovery in open water
  - In heavy waves by using hull vertical side as a sweep arm
  - Rubber boom for leading oil to brush collectors
  - Oil separation by built-in brush collectors





Ice conditions and performance

- **Ice conditions in operation area – Eastern Gulf of Finland**
  - **Season (days)**
    - **Average winter about 120 days**
    - **Severe winter about 150 days**
    - **Mild winter about 60 days**
  - **Level ice thickness**
    - **Average 50 cm**
    - **Maximum 70 cm**

Image: NASA

- **Performance of the Vessel (model tested)**
  - **Icebreaking ahead and astern**
    - **3.5 knots speed at 1.0 m ice**
    - **6.5 knots speed at 60 cm ice**
  - **Icebreaking in oblique mode (70 m)**
    - **2 knots speed at 60 cm ice**

Video of recent model tests for Oblique Icebreaker

* Ice test
* Seakeeping test (oil recovery mode)

Mission

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- Operating area: Year round service in Eastern Gulf of Finland
- Main functions
  - Oil spill response in open water and winter conditions
  - Icebreaking + terminal ice management
  - ECO environment monitoring
  - Salvage operations and emergency towing
  - Towing and tug operations
  - Fire fighting of external fires
  - Education, training

Main parameters

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Length over all	78.8 m
Length at dwl	74.5 m
Breadth over all	20.5 m
Breadth at dwl	19.2 m
Draught, minimum operating	6.0 m
Draught at design waterline	6.3 m

Draught maximum	7.0 m
Depth to main deck	9.0 m
Propulsion Power	3 x 2.5 MW
Main engine power	10200 kW
Bollard pull	80 ton
Accommodation	24 person

Ympärivuotisen liikenteen haasteet

- Väistämättä kustannukset suuremmat kuin kesällä
- Nykytekniikka mahdollistaa ympärivuotisuuden
- Esimerkit maailmalta osoittavat tämän kun ei muita vaihtoehtoja ole ja rahtitaso on hyvä (oil&gas)
- Kanavien jäänhallinta on ratkaistavissa
- Tuki- ja väylämaksupolitiikkaa tarvitaan investointien aikaansaamiseksi
- Tuoko talviliikenne lisää kuljetuksia?

Luovuus on liiketoimintamme

Kohti uusia haasteita

Kiitos mielenkiinnostanne!

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