

New Swedish Icebreakers

Briefing at Arctic Passion Seminar
February 16th 2023, Helsinki

A joint Finnish-Swedish design cooperation



A joint Finnish – Swedish design cooperation

- SMA/Project IB 2020 delivered a pre-study in mid-November 2017.
- Decision to start design work in March 2019.
- In summer 2020 invitation to FTIA to join.
- Letter of Intent January 2020 and cooperation Agreement in March 2020. In parallel the procurement documentation was adapted and further developed.
- A close three-party cooperative work.
- Intention to run the design work longer and deeper than you normally do before procuring construction.
- November 2020 Agreement with Aker Arctic.
- Covid -19 have had an impact on how to work but did not stop us from doing what was intended!



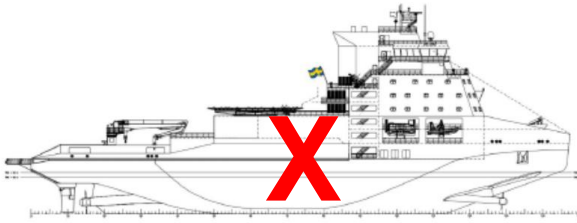
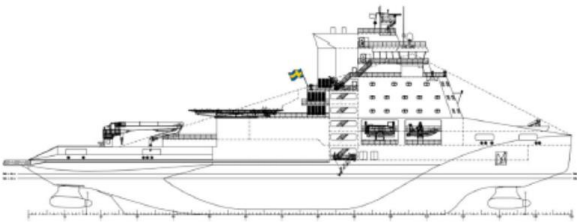
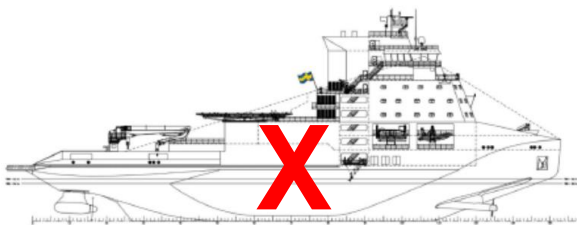
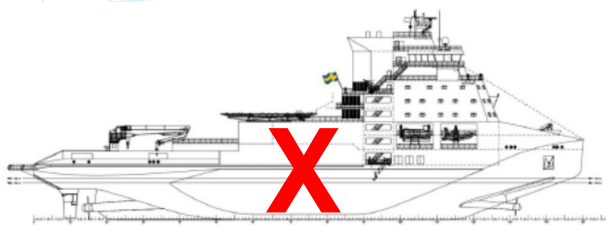
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The cooperation admitted:

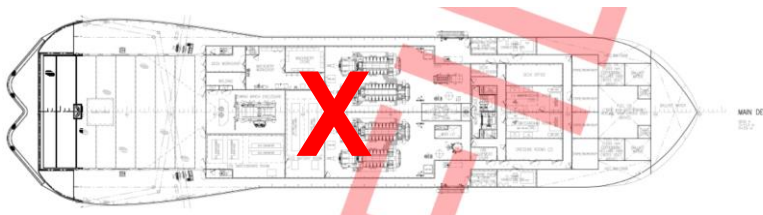
- Sharing of costs.
- Sharing of operational and technical experience with impact on a new design, and
- Made it possible to create a project team that involve more people with different skills and experience.

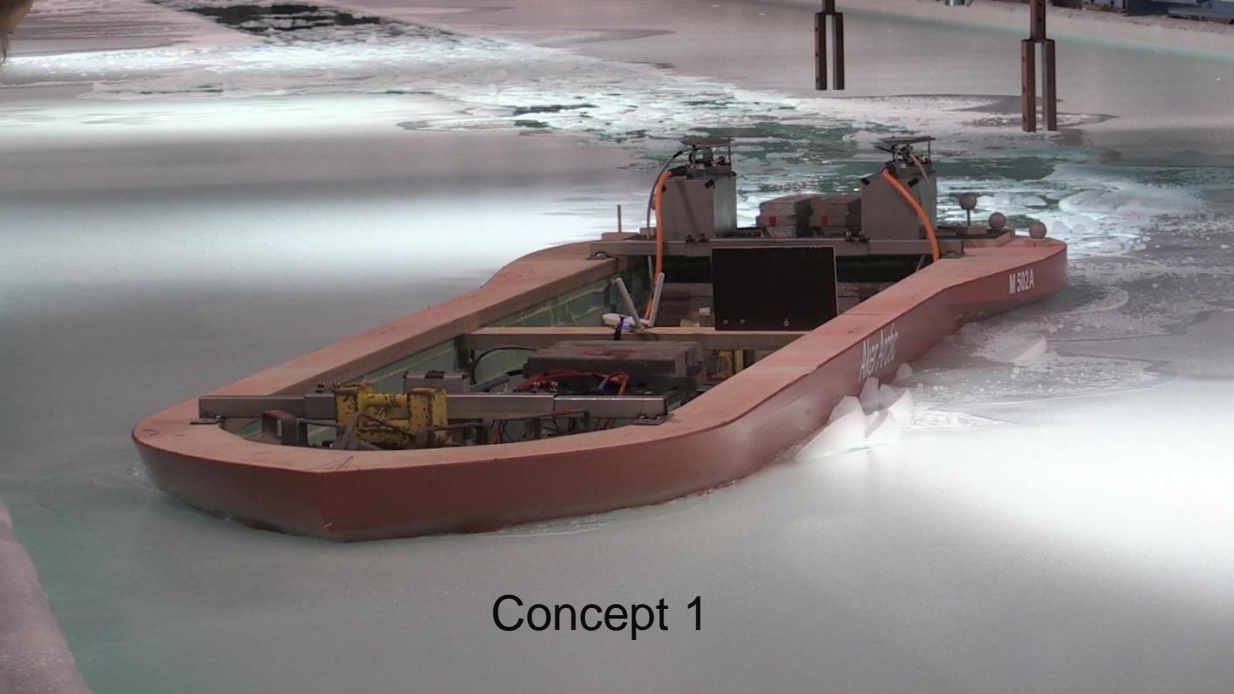


IB 2020 – Performed work

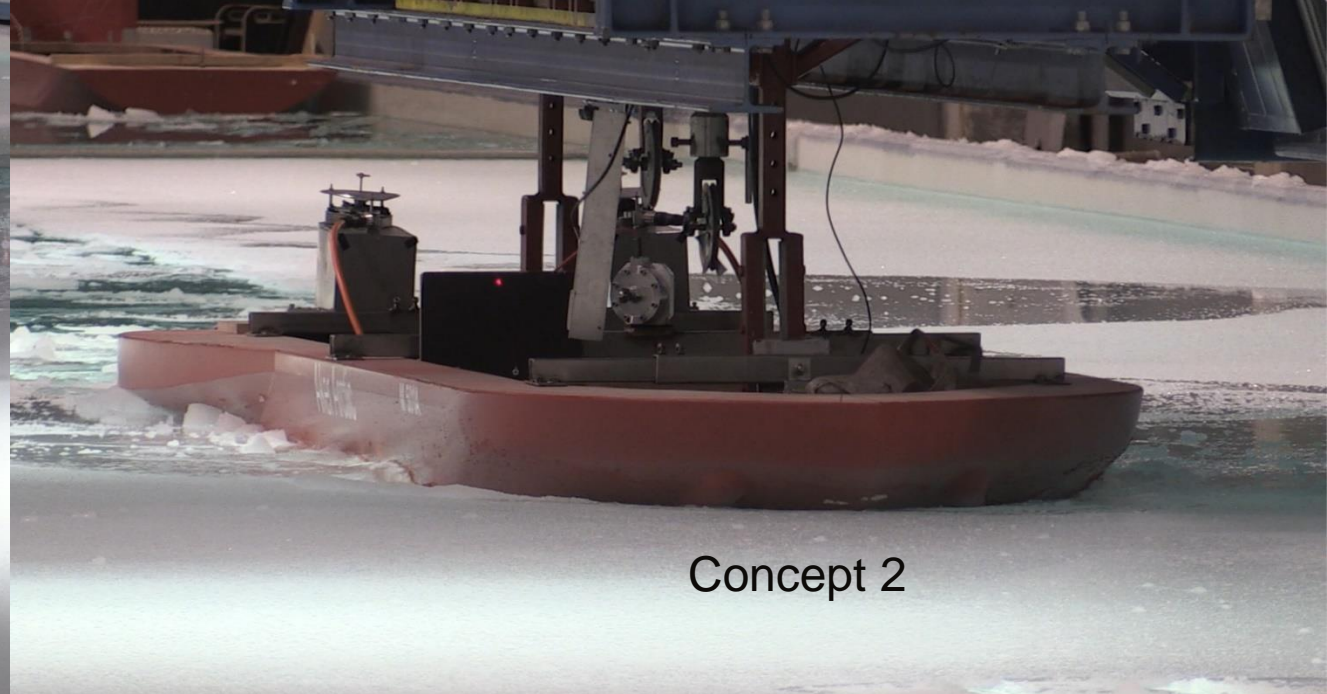


- Concept design Jan-Feb 2021; Comparative analyses of four different concepts including model tests in ice and open water
- Outline design delivered in the end of June 2021
- Tender design initiated in Aug 2021
- Approved in Principle by Lloyds Register
- When the design was fully developed, in Nov-Jan 2021--22 verifying model tests were performed in ice, open water and based on aerodynamic influence
- In end of March 2022 the Tender design was delivered to FTIA and SMA
 - >100 drawings and documents
 - A large amount of supporting documents i.a. analysis/investigations concerning choice of propulsion and fuel, environmental impact and LCC and LCA analyses.
- ❖ With the delivery the cooperation between FTIA and SMA ended.

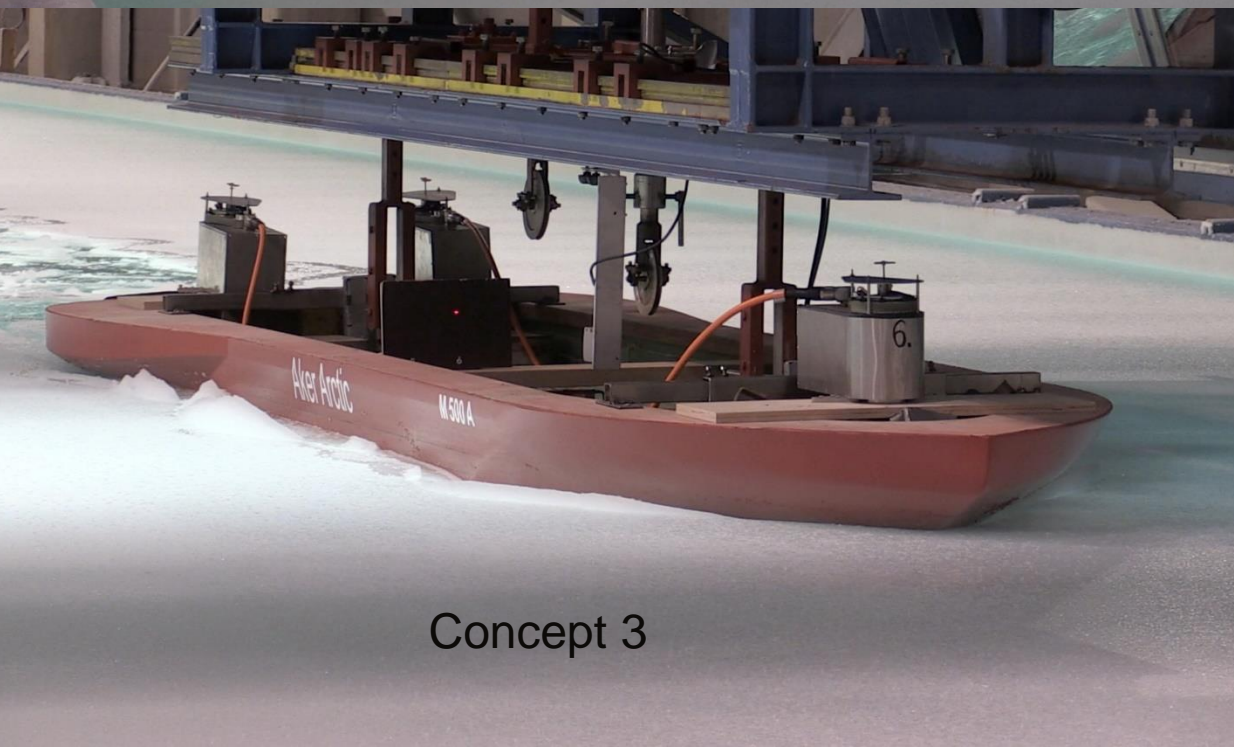




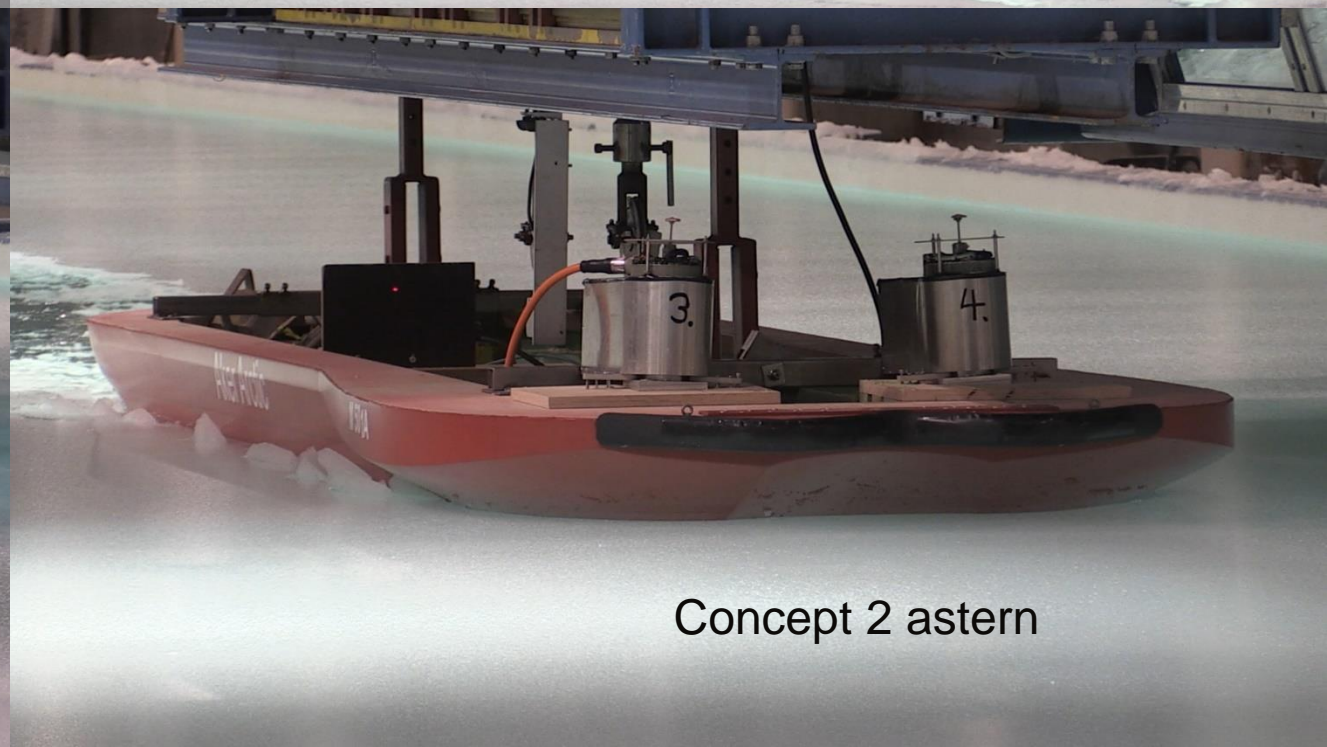
Concept 1



Concept 2

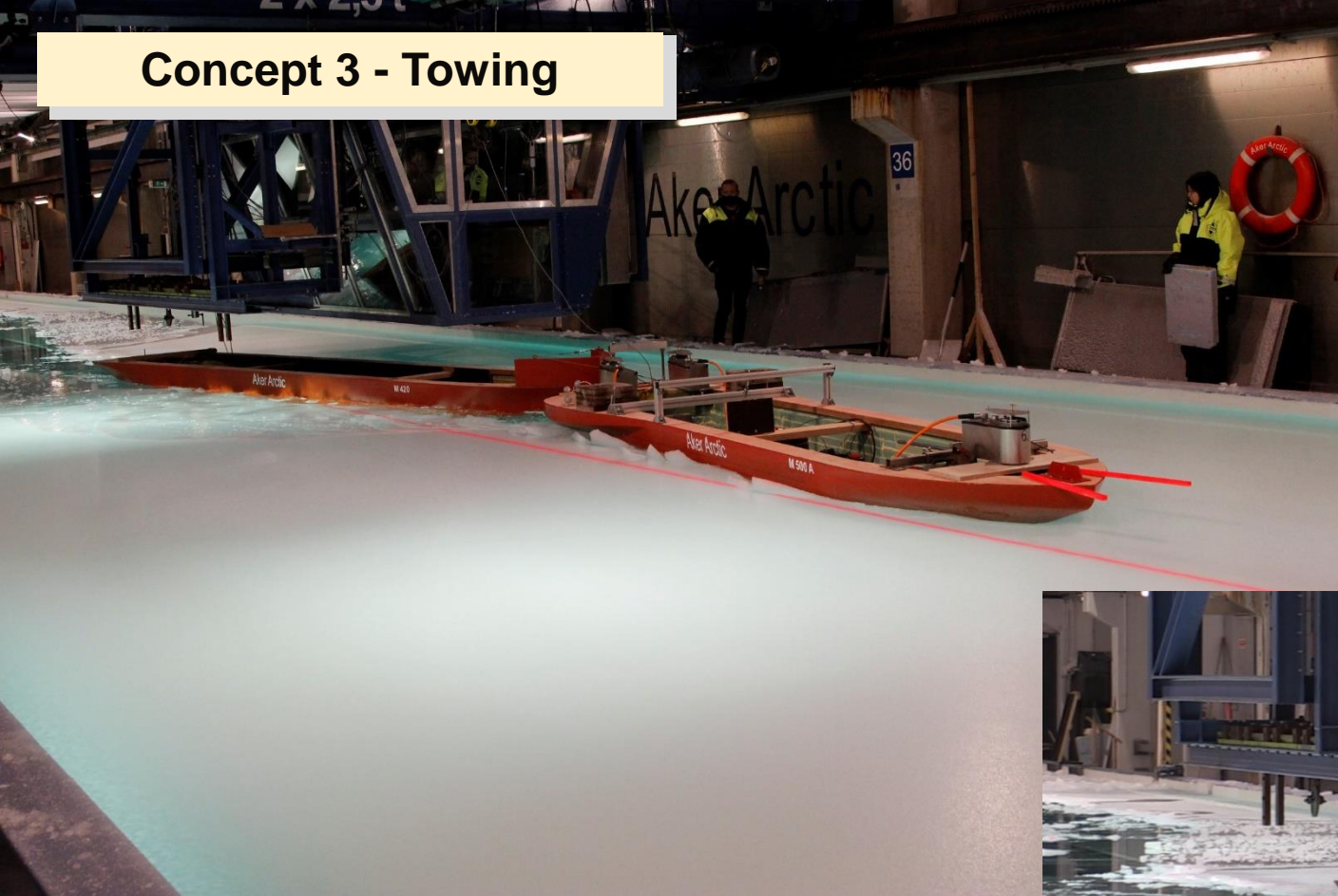


Concept 3



Concept 2 astern

Concept 3 - Towing

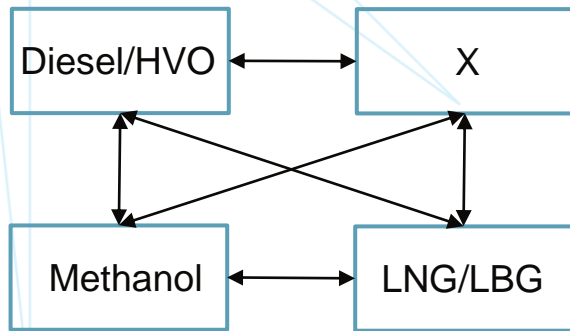


- SMA concluded a need to broaden and deepen the decision-making basis.
- The work was decided to be done "step by step".
- Based on the delivered design, an investigation was carried out that reported the possibilities and consequences of replacing gas with methanol, based on the otherwise given design conditions.
- Step 1 showed it seems to be possible.
- Decision to continue with deeper analysis (step 2).
- Step 2 presented a solution and SMA decided to order a complete Tender design package including an updated Tender specification.

Assumptions step one

- Estimated shipbuilding contract Q3/Q4 2023
- Minimum changes to the General Arrangement
- Keep same main engines as in the Tender Specification
- Assume same endurance as in the Functional Specification as a design goal
- Assume same fuel endurance split as currently between MGO/HVO and LNG/LBG as a design goal

Design that is ready for the marine fuels of the future



- Different fuels in combinations are possible
 - Tanks adaptable for different fuels.
- Two different designs performed (diesel-gas and diesel-methanol).
 - The final design is built on diesel/HVO in combination with Methanol/Bio-Methanol.
- Space that is convertible and can accommodate another fuel solution in the future.
- Today no modern duel-fuel diesel-methanol engines available.

HVO: Hydrogenated Vegetable Oil

LNG: Liquefied Natural Gas

LBG: Liquefied Biogas

Design that imply state of the art solutions and becoming the world's most environmentally sustainable icebreaker

- Hull with a propulsion solution that can break an ice channel wider than the hull when needed
- Innovative icebreaking with emission reduction
- Energy optimisation (consumes 45% less energy than the current icebreakers of Atle-class)
- Around 70% less CO₂ emissions than the Atle-class
- Energy storage (battery hybrid)
- Energy recycling



IB 2020 – Design comparison exterior



Diesel - Gas



Diesel - Methanol



IB 2020 – Time schedule

- Political consensus on the need of building new icebreakers.
- Government decision in June 2022 to build 2 new icebreakers, decision on the third one at a later stage.
- Funding for 2 vessels was approved by the Parliament in Dec 2022.
- RFQ to yards will be distributed Q2 2023.
- Contract with supplier/yard estimated to be signed late Q3 2023.
- Delivery of first icebreaker estimated to Q2 2026 and will be operational Q2 2027.
- Delivery of second vessel is estimated to Q1 2027 but is depending on contract with yard.



Thank you!
Questions?



Length: About 126 m
Width: About 27,5 m
Depth: Max 8,95 m
Power: 21-22 MW
Polar class: PC 4
Displacement: 15400 t