WINMOS
WINTER NAVIGATION
MOTORWAYS OF THE SEA

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Activity 7
Acquisition of new icebreaker

New propulsion concept and worlds first LNG powered icebreaker

EU co-financing is vital to overcome winter related logistical barriers

WINMOS

WINMOS
WINTER NAVIGATION
MOTORWAYS OF THE SEA

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Activity 7, Concept of Icebreaker Polaris

Mika Hovilainen
Project Manager
Aker Arctic Technology Inc
Helsinki 2016-04-07

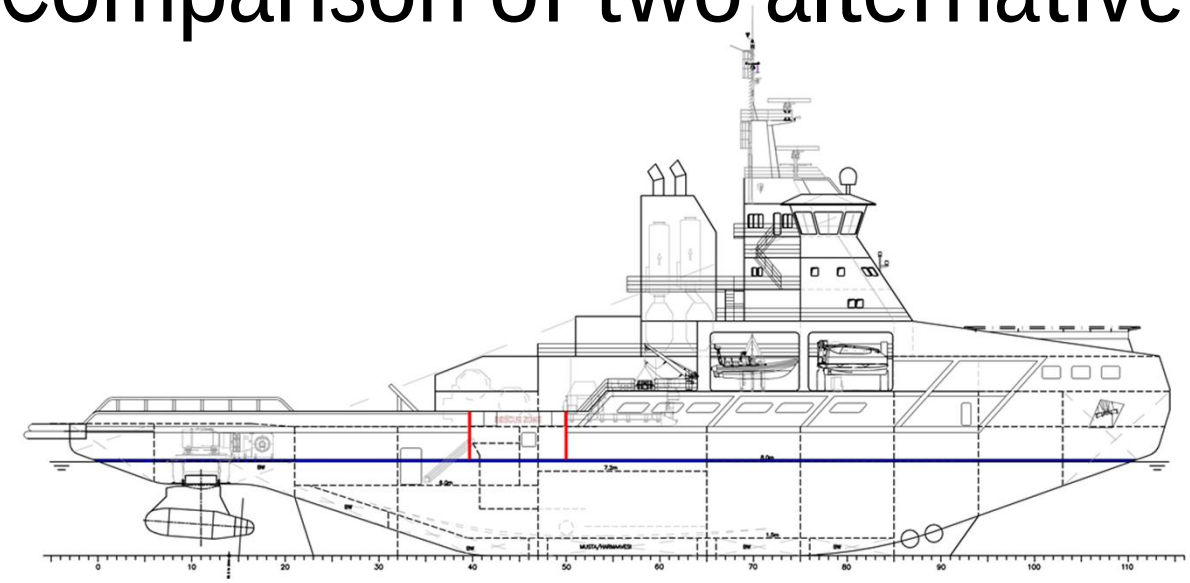
Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Tasks of the vessel

- Primary task: Baltic icebreaker
  - Icebreaking
  - Escort icebreaking; convoys, contact towing, contactless towing
- Secondary tasks:
  - Oil spill response; recovery and reception
  - Emergency towing and salvage operations
  - Rescue operations

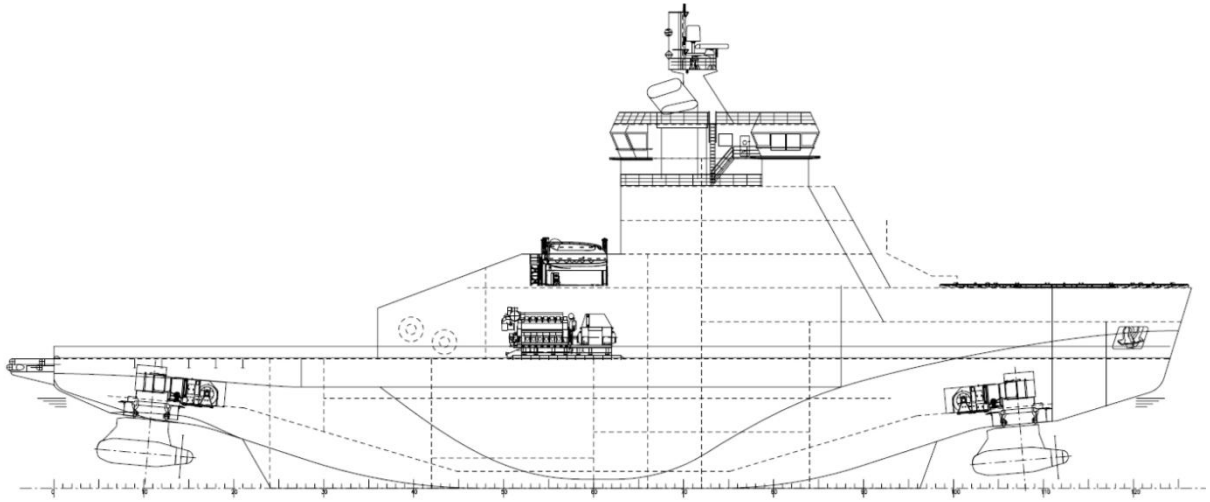
Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Comparison of two alternative concepts



Main parameters

- L_{oa} 98 m
- B_{dwl} 24 m
- T_{dwl} 8.0 m
- P_{prop} 17.6 MW
- Cost 100 %



Main parameters

- L_{oa} 106 m
- B_{dwl} 24 m
- T_{dwl} 8.0 m
- P_{prop} 15 MW
- Cost 104 %

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Concept selection

Main arguments for concept selection of triple azimuth solution:

- Good experiences of Urho/Atle class four-screw icebreakers especially in heavies Baltic ice conditions
- Possibility to increase propulsion power to 19 MW of very minor cost implications (less than +1% of costs)
  - Significant improvement to icebreaking capability
    - Improved operational efficient => more icebreaking in same time
    - Reduce overall costs of icebreaker assistance
- Excellent manoeuvring capability, exceptional in contact towing operations

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Main characteristics of IB Polaris

Main parameters

• Length over all	110 m
• Beam at design water line	24 m
• Design draught	8.0 m
• Maximum draught	9.0 m
• Deadweight at design draught	3000 t
• Nominal ice class	PC-4

Performance (based on model tests)

• Bollard pull ahead/astern	abt. 193/187 t
• Trial speed	abt. 17 knots
• Level icebreaking capability ahead	abt 4.0 kn @ 1.80 m abt 6.8 kn @ 1.27 m abt 9.2 kn @ 0.87 m
• Level icebreaking capability astern	abt 5.5 kn @ 1.27 m abt 8.7 kn @ 0.87 m

WINMOS
WINTER NAVIGATION
MOTORWAYS OF THE SEA

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Main characteristics of IB Polaris

Propulsion machinery

• Diesel electric propulsion with Dual-Fuel power plant		
• Propulsion 3 x azimuth, total power		abt. 19 MW
• Power plant: 2+2+1 diesels, total power		abt. 22 MW

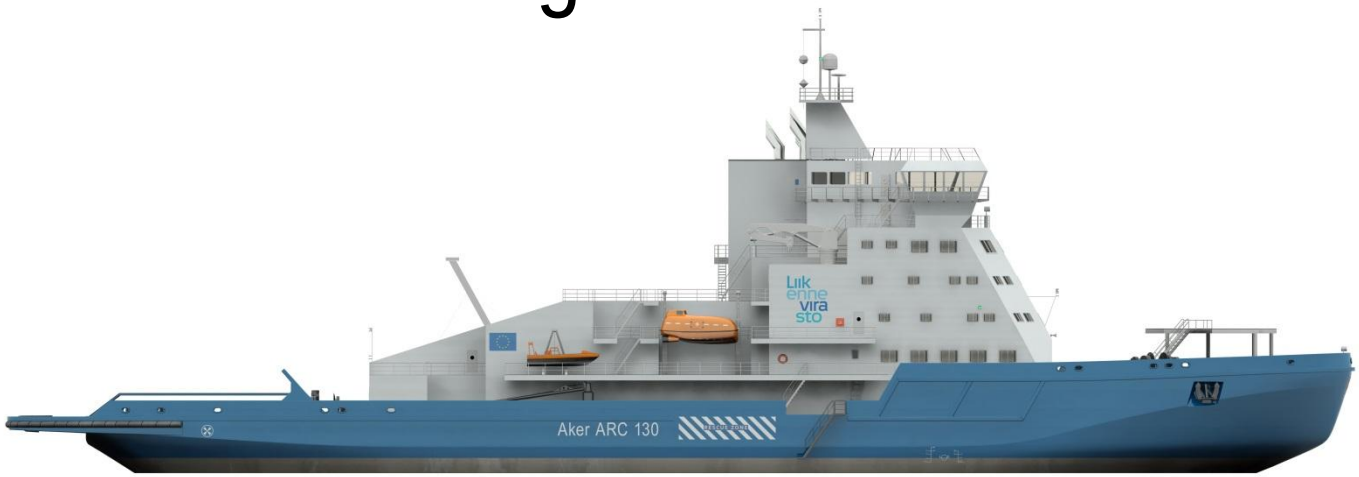
Tank capacities

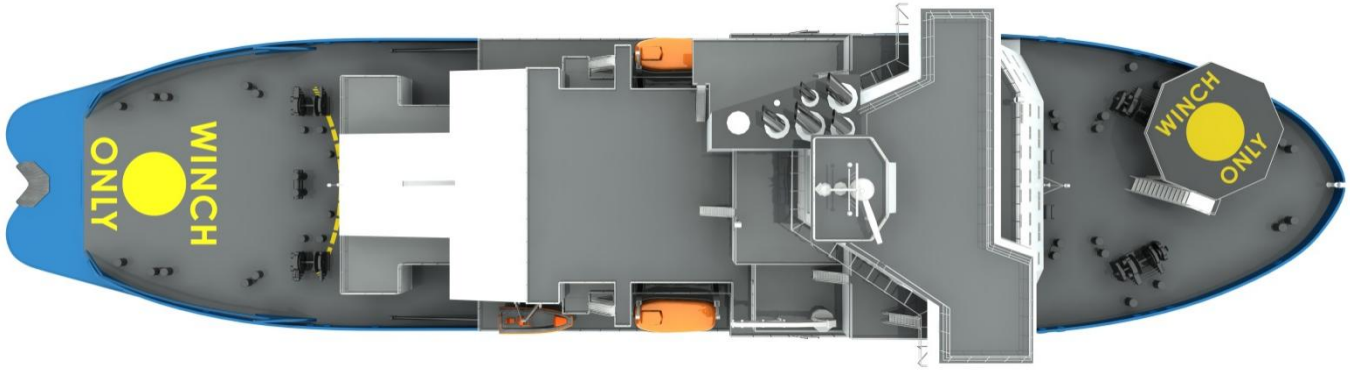
• LNG fuel tanks, 2 pcs, total volume		abt. 800 m^3
• Fuel oil storage tanks		abt. 2500 m^3
• Autonomy time at average winter:	by LNG fuel	abt. 10 days
	by Fuel oil	abt. 20 days
• Oil recovery tanks		abt. 1300 m^3
• Ballast water tanks		abt. 2500 m^3
• Roll reduction tank (U-shape)		abt. 700 m^3

WINMOS
WINTER NAVIGATION
MOTORWAYS OF THE SEA

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

General Arrangement

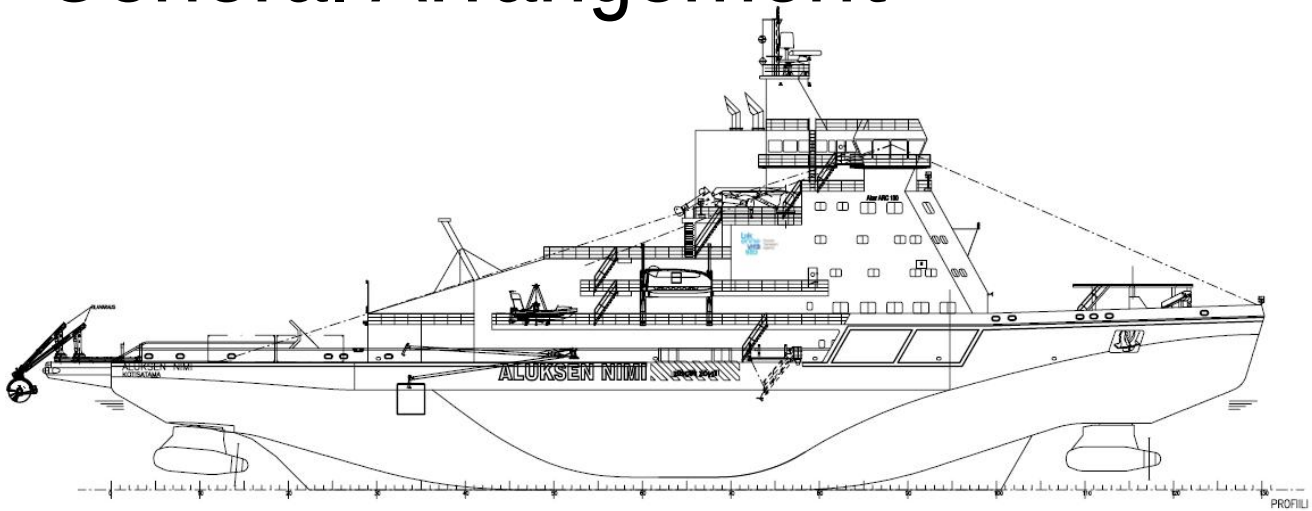




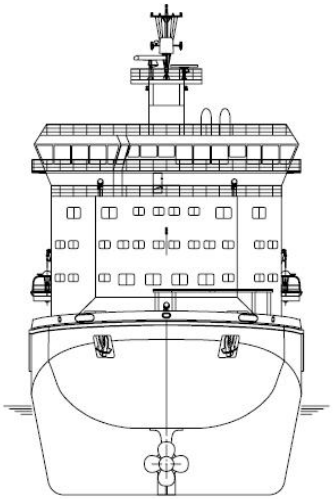
WINMOS
WINTER NAVIGATION
MOTORWAYS OF THE SEA

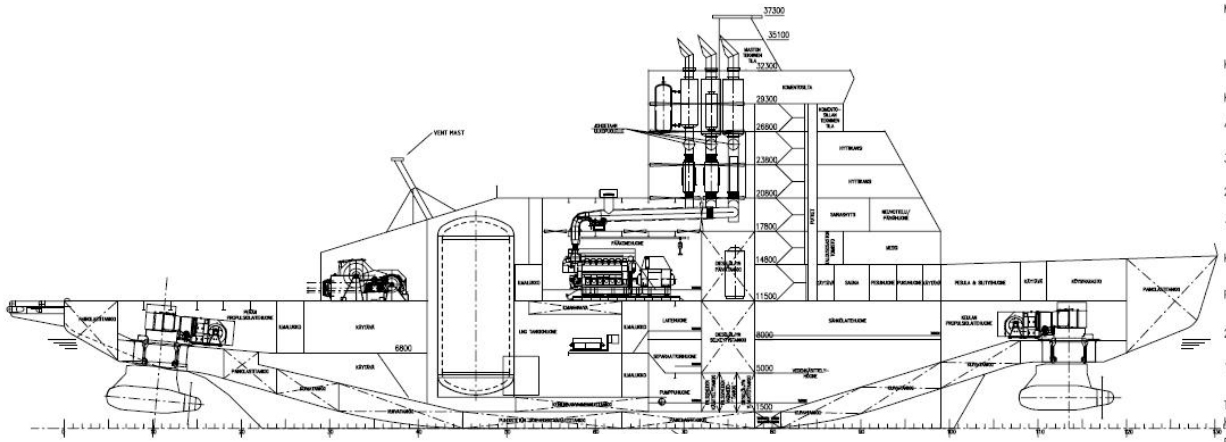
Co-financed by the European Union
Trans-European Transport Network (TEN-T)

General Arrangement

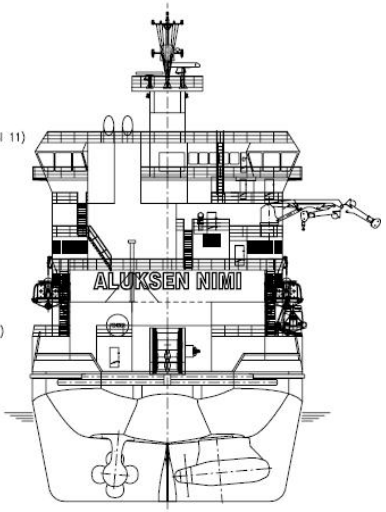


PROFIILI


KEULANÄKYMÄ



MASTO (KANSI 12)
KOMENTOSILLAN KATTO (KANSI 11)
KOMENTOSILTA (KANSI 10)
4. SILTAKANSI (KANSI 9)
3. SILTAKANSI (KANSI 8)
2. SILTAKANSI (KANSI 7)
1. SILTAKANSI (KANSI 6)
KEULAKOROKEKANSI (KANSI 5)
PÄÄKANSI (KANSI 4)
2. VÄLIKANSI (KANSI 3)
1. VÄLIKANSI (KANSI 2)
TANKINKATTO (KANSI 1)
KAKSOISPOHJA
PITKITTÄISLEIKKAUS

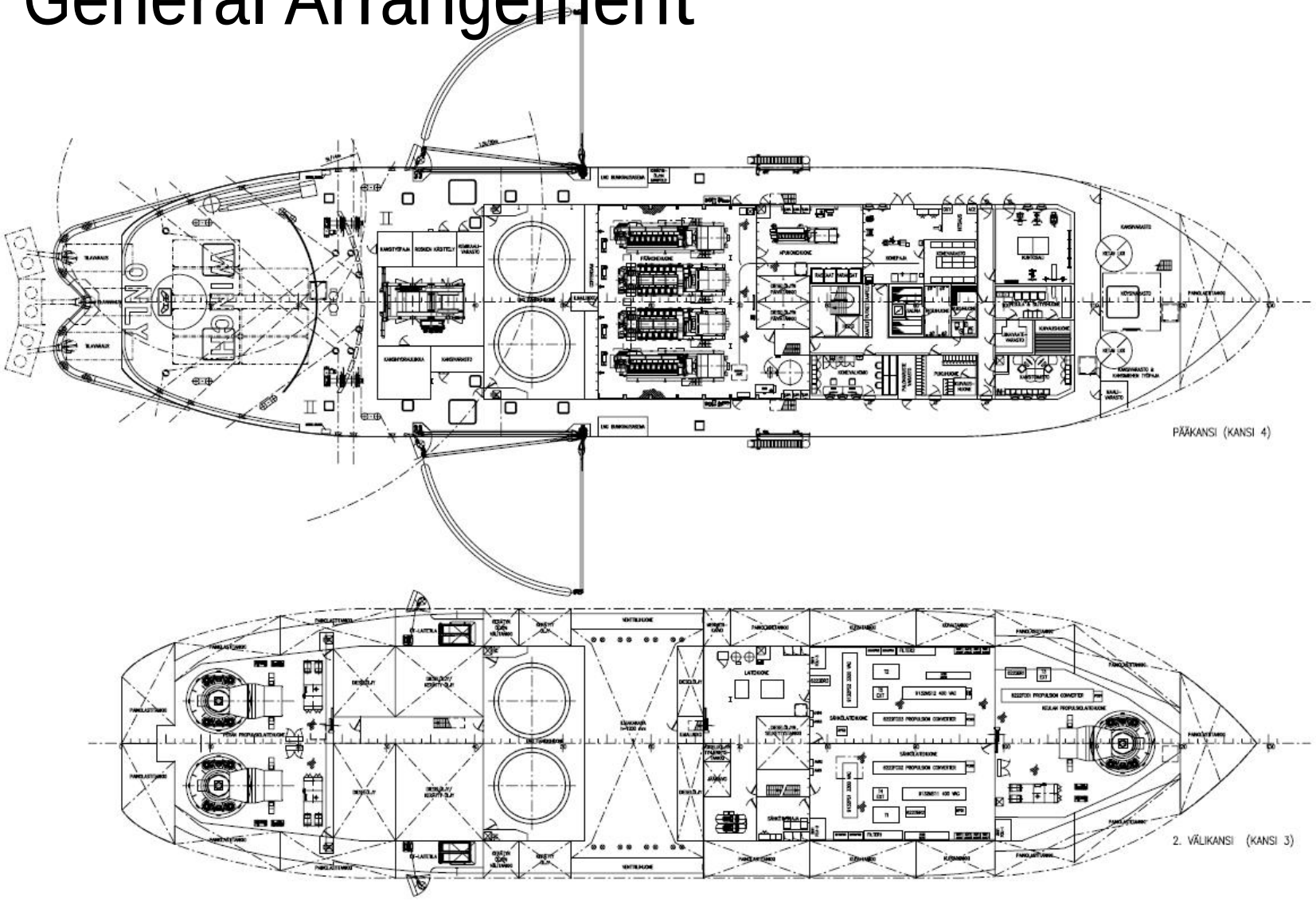


PERÄNÄKYMÄ

WINMOS
WINTER NAVIGATION
MOTORWAYS OF THE SEA

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

General Arrangement



WINMOS
WINTER NAVIGATION
MOTORWAYS OF THE SEA

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Thank You!

Aker Arctic Technology Inc
Merenkulkijankatu 6
FI-00980 HELSINKI
Finland
Tel.: +358 10 3236 300
Fax: +358 10 3236 400
E-mail: info@akerarctic.fi