

New era in Antarctic vessels



Activities in Antarctica are limited to science only by the Antarctic Treaty for the next few decades. Still, Antarctica has gradually become an increasingly important research place, which has and will intensify permitted activities progressively. The available research vessels are getting older and there are more and more plans to upgrade or replace these vessels.

Antarctic operation, predominantly research, is not commercial business as such. However, where money is required, business elements are involved. The same cost and business elements are involved regardless of which kind of organisation operates and owns Antarctic vessels, whether it is government directly, a government-managed and -owned institute, or a private enterprise. Without exception, all countries are suffering from a lack of funding for Antarctic operations. Thus, there is tremendous pressure to deliver more in science for less money.

First-class technology

Aker Arctic can offer cost-competitive and technologically first-class products for Antarctic operations, and we have been involved in more than ten different vessels/projected vessels for Antarctica. With our experience in all kinds of demanding ice-going vessels, we can be considered an expert in vessels for commercial, support and research use.

Antarctic vessels are required to act both as cargo-carrying vessels, people-carrying vessels and ocean research platforms. An additional challenging feature is that the vessels have a long open water leg – very often in rough seas – and ice conditions can be very difficult when approaching the destination.

Generic concept for future vessels

Based on our understanding of future activities, the general level requirements for an Antarctic combination vessel serving average needs are outlined on the right. This can be used as the basis for developing a concept, which is optimised for desired technical functions and minimum costs.

Scientific laboratories:	250 m ²
Science deck aft:	400 m ² with A-frame and other "standard" equipment
Scientific personnel:	about 30 people for ship-based research
	50 passengers to be carried to and from the Antarctic bases
Dry cargo volume:	200 m ³ , 800 tons
Liquid cargo in tanks:	800 tons
Maximum flexibility between scientific areas and dry cargo areas	
Minimum crew	
Maximum speed	
in open water:	16 knots
optimum transit speed:	10–12 knots
Icebreaking capability	1.2 m

Endurance:

Europe to Antarctica at transit speed	
60 days in Antarctica, 50% of that time in ice	
Over-wintering in case of emergency	
Helicopter operations and helicopter base	
Cargo handling:	
Crane	
Helicopter	
Ice strengthening IA Super plus (PC 5 to 4), adjustment for differences in ice conditions between Antarctic waters and Baltic	
Waste return capability	
Top of the line environmental protection	



The European polar research icebreaker Aurora Slim is a cost-effective and technically unique design developed, designed and tested by Aker Arctic.

From a technical point of view, an azimuthing propulsion system has benefits in manoeuvring capabilities and in vessel design, but the shaftline alternative is also a good choice if the vessel's operation profile allows it. Both can be combined with the double-acting concept, which we have developed, where a ship operates with a bulbous bow first in ice-free conditions and in very thin ice. In heavier ice, the ship operates in stern-first mode. The bulbous bow gives the ship significant advantages such as better fuel efficiency, better seakeeping characteristics and a better platform for equipment sensitive to hydrographical disturbances. It is to be noted that if ramming in heavy ice is expected, an icebreaking bow is justified.

Recent research vessel projects

The most recent research vessel projects we have been involved with are the Chinese polar research vessel, which is now being constructed in China, and the European polar research icebreaker Aurora Slim. S.A. Agulhas II is a South African icebreaking polar supply and research ship built in Finland in 2012, in which Aker Arctic had a strong design and development involvement. Other upcoming projects worldwide are from the UK, Australia, Argentina, Chile, Peru, Germany, India, Korea and Norway.



The advanced icebreaking research vessel we have designed for the Polar Research Institute of China will be used for polar oceans research mainly in Antarctica.

"The last boom in Antarctic research vessel projects was twenty years ago, so not many people remember all the issues from that time. Therefore, it is essential to choose a partner with the capability to advise and give input on the different options which are possible within the range of a given budget," Sales and Marketing Manager Arto Uuskallio emphasises.

"Researchers are naturally looking for the best technical equipment available, but this is not always possible with government-funded projects, where money is a limiting factor. We can help by providing options which will fulfil most researchers' needs, in addition to designing a top-of-the-line vessel." ■