

FINNISH SOLUTIONS FOR THE ENTIRE
ICEBREAKING
VALUE CHAIN



#FINLANDWORKS

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FINLAND – YOUR RELIABLE ICEBREAKING TECHNOLOGY PARTNER

FINLAND IS A GLOBAL LEADER IN ICEBREAKER DESIGN, POLAR SHIPBUILDING, ICE TECHNOLOGY AND FLEET OPERATION

Finnish companies have designed about 80 percent of the world's icebreakers, and about 60 percent of them have been built by Finnish shipyards. We have a creative and agile polar maritime network that is known for delivering on schedule and on budget. We are known for delivering sustainable, innovative, and effective solutions for demanding tasks in polar conditions. Partnering with Finland in icebreaker projects means you will benefit from the latest research and technological advances both when building locally or when using the world-leading competences of shipyards in Finland.

Finland is the only nation in the world that offers ice-proven products and services created through a solid, cost-effective value chain. This value

chain covers R&D, education, ship design, engineering, building, operation, program management and life cycle support services. Globally recognized Finnish companies and shipyards offer icebreaking solutions that can be considered as a complete package or configured as individual options to suit specific needs.

The key players in Finland's innovative shipbuilding and marine ecosystem are regulators and policy makers, industries, research institutes, internationally recognized research universities, the Innovation Funding Agency Business Finland, and the Finnish Meteorological Institute.

According to Finland's Arctic Strategy published in 2021, all activities in the Arctic region must be based on ecological carrying

capacity, climate protection, principles of sustainable development, and respect for the rights of indigenous peoples. As a member of Arctic

Council, the EU and the NATO, Finland wants to contribute to the stability of the operating environment in the Arctic region.

A GLOBAL NETWORK FOR YOUR ICEBREAKING AND RESEARCH OPERATIONS

Finland is known for designing both ice-breaking and advanced ice-going vessels that meet performance requirements while still being economical to build, maintain and operate in both open water and ice-covered seas. Finland has the capacity to develop, build, deliver and commission several icebreaking ships every year. The latest Finnish icebreaker, Polaris, delivered in 2016, is the most recent example of our cost-efficient advanced technology. The vessel is energy efficient, capable of using either MGO or LNG and can be operated with crew of only 17 persons.

Finnish icebreaker innovations are used worldwide. The world's first environmentally friendly LNG-powered icebreaker was built in Finland. Additionally, the oblique icebreaker - maximizing icebreaking efficiency and operational capability -, the azimuth propulsion system, the air bubbling system and the multipurpose icebreaker concept are Finnish innovations.

Finland leads the development and implementation of decarbonized solutions such as alternative fuels, fuel cells, and ship's energy efficiency. Finland is a key player within intelligent, digital solutions for optimization of ice-management

and vessel operational efficiency.

The Finnish government actively supports testing of autonomous solutions and remote pilotage in real-life conditions at a designated sea testing area, providing opportunities for agile pilot projects.

Partnering with Finland gives you the vast advantages of the latest research and innovation applied to both ice-breaker building and operation at an agile manner.

For example, OUR TECHNOLOGIES ARE USED FOR:

- optimizing ice-management and operations
- automated and autonomous operation
- fleet and asset management
- IT-technologies for emergency and rescue
- 5G/6G to ensure fast and reliable networks in critical operations
- artificial intelligence (AI) applied to shipbuilding and fleet operation
- integration of scientific functionalities and operational capabilities
- catering for the future fuel options
- lowering emissions through optimized energy efficiency
- operation of arctic ports with icy conditions

YOUR RELIABLE PARTNER IN ARCTIC COLLABORATION AND WINTER NAVIGATION

Finland is a forerunner in bilateral partnerships as well as public-private arrangements for icebreaking services. Finland procures icebreaking services from both public and private partners and currently has three icebreaking agreements with neighboring countries.

In Finland, icebreaking services are financed through a market-driven system based on fairway dues. During the Arctic summer when the fleet is not required in the Baltic Sea, Finnish icebreakers are available for charter missions in polar areas. An icebreaker charter is a cost-effective way to experience the latest technologies and operating procedures, to

conduct technology benchmarking, to train future crews before making final decisions on operational requirements for your own icebreaker, or for filling a shorter-term capacity gap.

Previous international icebreaker projects have benefitted from Finnish cooperation. For example, Finnish companies have provided ship designs, extensive equipment deliveries, execution of the projects and commissioning for icebreakers around the polar regions.

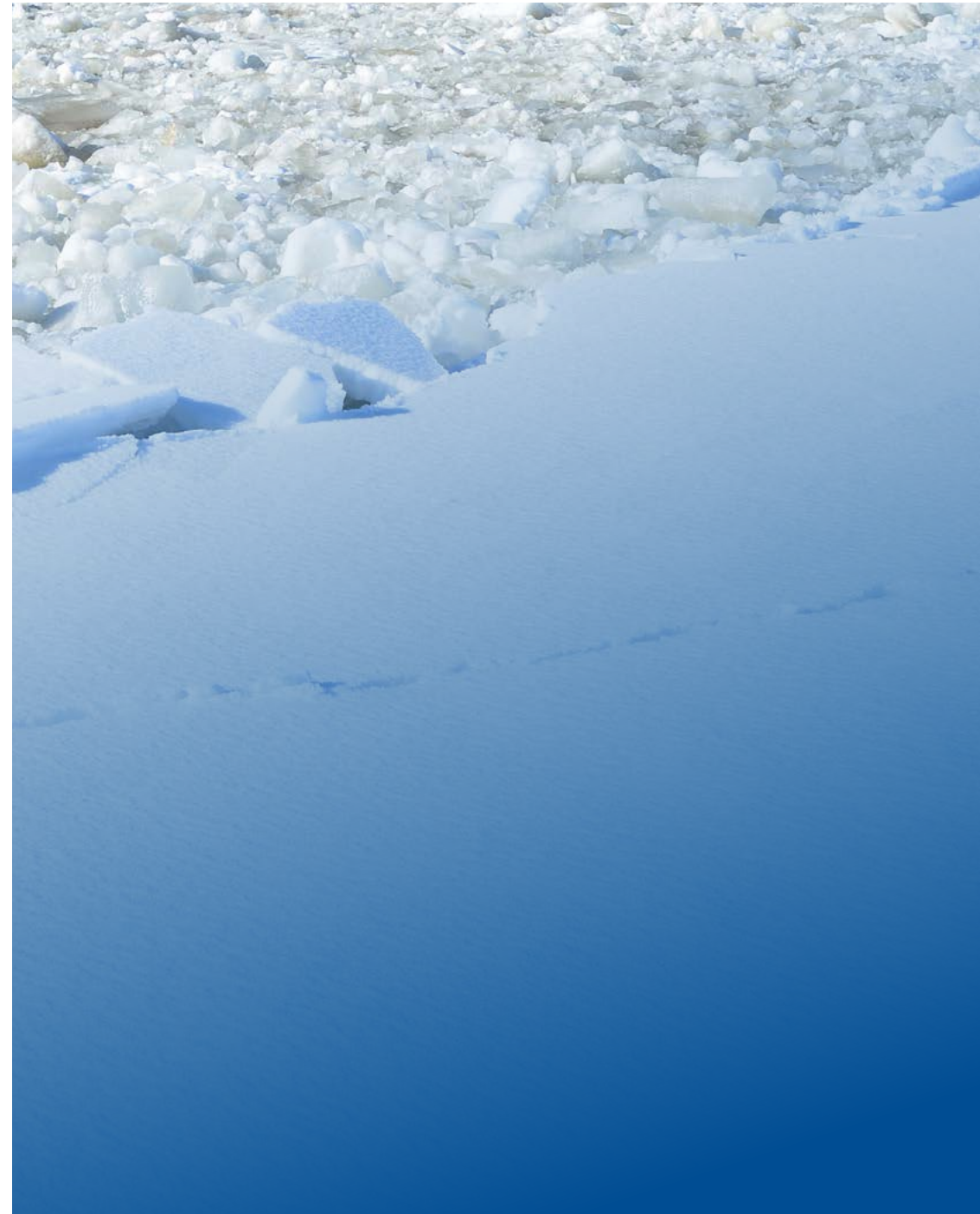
Finnish multi-purpose icebreakers have operated in Arctic waters and transited through both the Northwest Passage and the Northern Sea Route.

LONG-TERM, DEEP PARTNERSHIPS INCREASE ICEBREAKING OPTIONS

Global geopolitical challenges call for trusted, reliable partners and long-term, deep coordination to ensure secure winter navigation and safe fairways at critical areas of operation. Finland's cost-efficient deployment of new icebreakers, globally leading

ice-technology knowledge, and capacity to share icebreaker assets provide access to unique partnerships.

IN THE FOLLOWING PAGES, LEADING FINNISH COMPANIES DESCRIBE THEIR SOLUTIONS.



DESIGN

Aker Arctic
The Ice Technology Partner

 **bluetechnology**

 **COMATEC**[®]

 **ELOMATIC**
Visions of Tomorrow, Engineered Today

 **ILS Oy**
Ship Design
& Engineering

AKER ARCTIC

Aker Arctic
The Ice Technology Partner

THE LEADING DESIGNER

Aker Arctic claims many firsts in the world of icebreakers. Our in-house testing laboratory and close connection between ice model testing and design are central to our success.

operations such as AHS and OSV, Antarctic research vessels, and Arctic cruise and expedition cruise vessels.

ABOUT OUR COMPANY

Aker Arctic is a private company specializing in development, design, engineering, consulting, and testing services for ice-going vessels, icebreakers, offshore marine structures, marine transport solutions, and ports.

OUR VALUE PROPOSITION

Designing vessels entails not only meeting performance requirements but also ensuring cost-effectiveness in their construction, maintenance and operation in both open water and ice-covered seas.

WHAT WE OFFER

Aker Arctic offers a range of proven icebreaking ship designs for different needs. Our ship types include icebreakers, ice-going vessels such as cargo ships and tankers, vessels intended for arctic offshore

THE PARTNERS WE ARE LOOKING FOR

We help oil, gas, mining and energy companies to get the most from their investment in major projects.



OF ICEBREAKING VESSELS

REFERENCES

Aker Arctic is engaged in most of the high ice class projects that are on order or under development around the world.

CONTACT

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BLUETECH FINLAND



FIRST-CLASS MARINE —

We have extensive experience in the design of a large variety of ship types. Several highly positive references relating to the design of ice class ships are testimony to our ability to offer state-of-the-art icebreaking solutions.

company has a unique combination of people with decades of experience as well as newcomers bringing fresh ideas to the industry. The competence portfolio of our employees is internationally recognized and esteemed.

OUR VALUE PROPOSITION

Our ability to design, coordinate, analyze, and support production combined with passion, expertise, and vision help us see further, aim higher and make better, everything in one port.

ABOUT OUR COMPANY

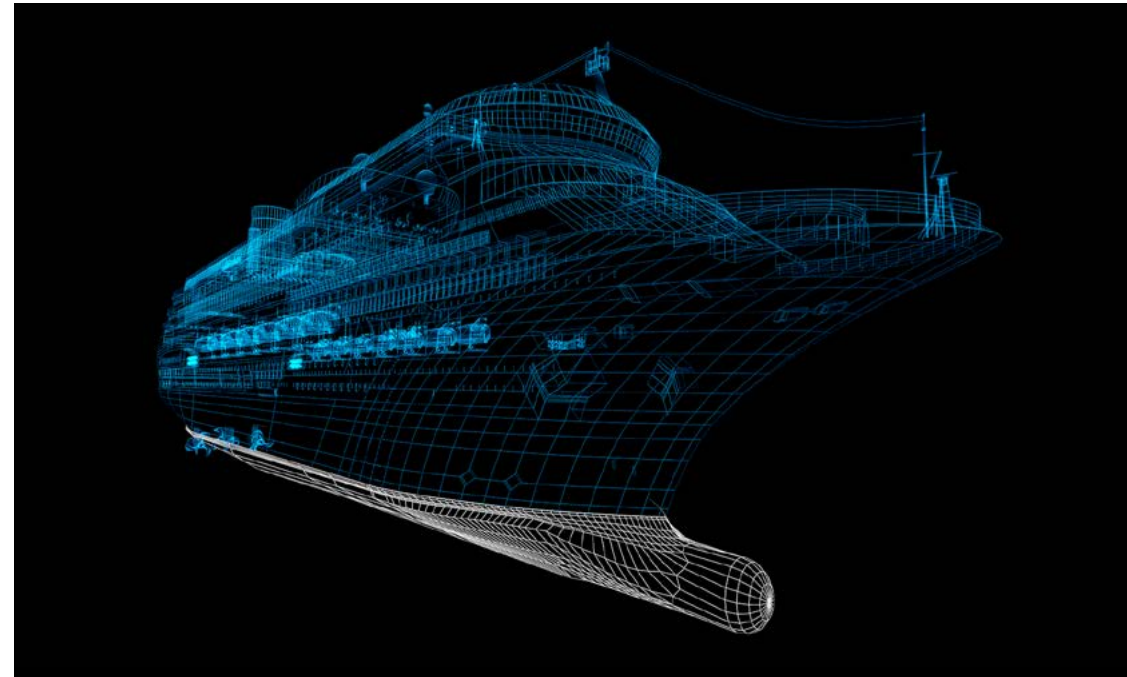
Headquartered in Helsinki, the group of companies currently employs over 80 professionals. Additionally, we have offices in Turku, Ho Chi Minh City, and Goa. This is an arrangement that guarantees the very best in modern maritime engineering.

WHAT WE OFFER

We offer ship design from concept to production in all engineering disciplines, analysis and calculation services from ship theory to weight control, design coordination at all ship project stages, and production support at the shipbuilding site. The

THE PARTNERS ARE WE LOOKING FOR

We believe in people, teamwork, and collaboration. We are seeking partnerships with shipowners, shipyards, and other maritime companies globally.



— ENGINEERING

REFERENCES

Aker Arctic PC2 Le Commandant Charcot Luxury Cruiser Helsinki Shipyard, PC5 Vega Class Ships, SH Minerva Luxury Cruiser RMC: Hammershus, SQ2020 Corvette

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COMATEC INDUSTRIAL AND MARINE



COMATEC INDUSTRIAL

Whether you need help with ideas for a new product or a delivery project, we can provide the expertise and manpower needed.

design through to the basic and detailed design phases.

OUR VALUE PROPOSITION

We help our customers at all stages of the product's life cycle by providing expertise and long-term solutions, as well as added value for product development and processes.

Established in 1986, Comatec Group's turnover in 2022 was approximately EUR 45 million. Comatec Group employs over 600 experts in 10 subsidiaries in Finland and abroad, serving the marine and other technology industries.

WHAT WE OFFER

We provide engineering design, project management and expert services. We specialize in integrating various complex electrical and automation systems into a fully functional solution, from the initial conceptual

THE PARTNERS WE ARE LOOKING FOR

We are seeking partnerships with shipyards, shipowners or other engineering companies needing assistance with electrical engineering for ice-going vessels.

ABOUT OUR COMPANY



— AND MARINE

REFERENCES

Electrical design and consultation for the Finnish icebreaker Polaris; electrical design for stand-by/supply icebreakers built at Arctech Helsinki Shipyard.

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ELOMATIC CONSULTING AND ENGINEERING



ELOMATIC CONSULTING —

Elomatic is an international consulting and engineering company.

enhancing the internal process landscape and supporting software.

OUR VALUE PROPOSITION

A trustworthy and responsible company, Elomatic designs solutions that improve environmental and human wellbeing and the competitiveness of our customers.

ABOUT OUR COMPANY

Founded by Ari Elo in 1970, Elomatic is a recognized pioneer in the development of design methods. Our almost 1,300 professionals bring visions of the future alive with groundbreaking engineering solutions in several technology-driven industries.

WHAT WE OFFER

We provide shipyards and shipowners with expertise from the first consultation to the end of the ship's lifespan. We deliver ship design and engineering, embracing all disciplines from naval architecture, machinery, electrical, HVAC to interior and outfitting from the idea to concept, basic and detailed design, including site and commissioning support. We assist in

THE PARTNERS WE ARE LOOKING FOR

We are seeking partnerships with shipowners and shipyards aiming to elevate their market positioning by utilizing our expert design, engineering and consultancy services.



— AND ENGINEERING

REFERENCES

Elomatic has more than 50 years of experience in the design of icebreakers, including the world's largest diesel-electric icebreaker.

CONTACT

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ILS SHIP DESIGN & ENGINEERING



ILS SHIP DESIGN & —

We are a Finnish naval architecture and marine engineering company founded in 1988. We specialize in conceptual, basic and detailed design of icebreakers and ice-classified vessels.

OUR VALUE PROPOSITION

With our long experience, we have developed a compelling view of how the icebreaking, maneuverability, and other requirements for icebreaking ships are best met.

WHAT WE OFFER

We are, above all, a reliable naval architecture partner for our customers. We carry out high-quality design work related to all aspects of ship design. Over the years, we have carried out numerous high-profile

assignments for customers in Finland and abroad. Our services are always customer-oriented and cost-effective. We are a straightforward, dynamic and resilient SME.

ABOUT OUR COMPANY

We are located in Turku and Helsinki. Our staff is a high-performing mix of long experience and youthfulness, and our close-knit core is surrounded by a high-quality network of established strategic partners.

THE PARTNERS WE ARE LOOKING FOR

We are continuously seeking partnerships with operators such as ship-owners, other ship design companies, and shipyards worldwide.



— ENGINEERING

REFERENCES

2023: Offshore Icebreaker concept, foreign customer;
2020: Detachable Icebreaking Bow Saimaa, FTIA;
2018: Harbor Icebreaker Vityaz, VSS, Russia

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BUILD



ALMACO GROUP

ALMACO - AN EXPERT IN SUPERSTRUCTURES

ALMACO offers both traditional and optimized topside construction methods, with the help of synergies from our expertise in offshore and marine sectors.

OUR VALUE PROPOSITION

ALMACO builds superstructures remotely to achieve cost and time savings. We ensure cruise-standard interiors and comfort for icebreaker crews.

WHAT WE OFFER

Almaco manufactures expertly built modular cabins and superstructures, and also offers catering and laundry solutions.

ABOUT OUR COMPANY

ALMACO Group is a turnkey provider for the newbuilding and modernization of accommodation and catering areas for the marine and offshore industries. We build complete interiors including cabins, catering and laundry areas, and living quarters.

THE PARTNERS WE ARE LOOKING FOR

We are seeking long-term partnerships with shipyards willing to rethink the construction process for maximum feasibility.



REFERENCES

All our references are available on our website at www.almaco.cc/references
For more information, please contact jussi.laimi@almaco.cc.

CONTACT

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CRAFTMER

CRAFTMER SHIPBUILDING TOOLS

Craftmer specializes in developing tools for shipbuilding, enabling easier mutual positioning of large pieces at shipyards.

low-weight construction that helps eliminate unnecessary welding, cutting and grinding of temporary lugs.

OUR VALUE PROPOSITION

We aim to increase our customers' productivity by solving problems related to specific working conditions and applications. Most Craftmer tools help apply the right amount of force for shifting heavy components in the assembly of ship structures.

ABOUT OUR COMPANY

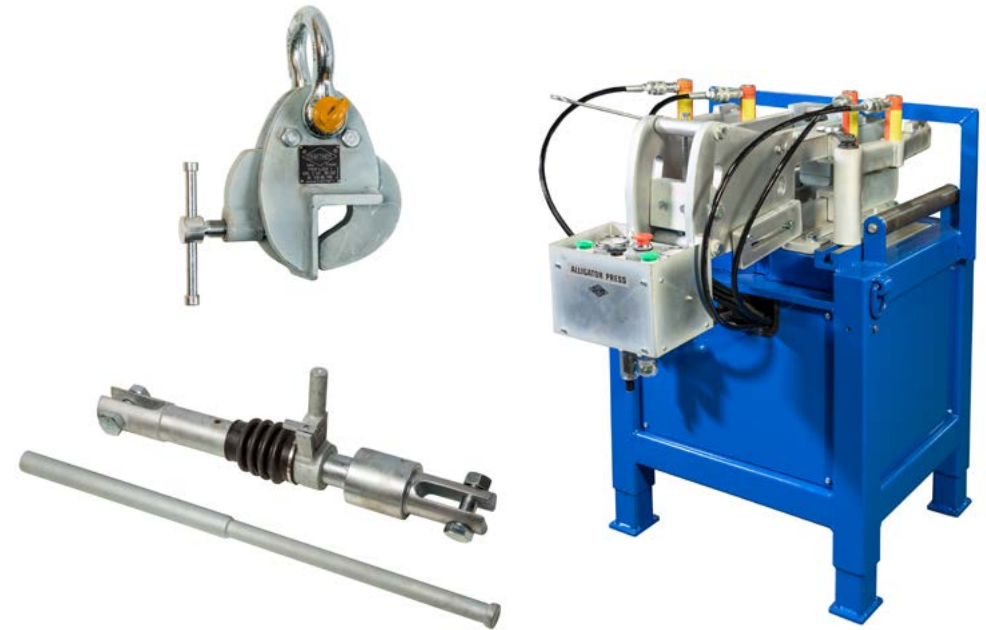
The company was founded in the 1970s, and started out with the production of the Jakki tool, with a pushing or pulling force of up to 12 tonnes. All Craftmer products are designed and manufactured in Finland.

WHAT WE OFFER

Craftmer's tools are used for the installation of heavy steel structures at shipyards and other heavy workshops. New products are developed in close collaboration with customers. They have a simple design and

THE PARTNERS WE ARE LOOKING FOR

We are seeking partnerships with shipyards and steel fabricators in the maritime industry.



REFERENCES

Shipbuilders in over 50 shipyards on five continents rely on our tools.

CONTACT

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HELKAMA BICA

A SPECIALIST IN CABLE DESIGN AND PRODUCTION

Helkama Bica offers cables as a full service from project conception to customized product design, complete with in-house laboratory testing, custom labeling, and a logistics service.

OUR VALUE PROPOSITION

With decades of experience, Helkama Bica excels in designing complex cabling solutions for demanding marine and offshore requirements, producing cables to meet the highest marine quality standards.

WHAT WE OFFER

The marine sector's trusted choice for cabling, Helkama Bica cables power over 2,000 ships worldwide. From vast cruise liners to offshore wind farms, our cables are used in demanding environments, including icebreakers and Arctic luxury cruise vessels. In addition to designing and manufacturing standard marine

cables, Helkama Bica is a one-stop-shop supplier for complete cable sets in all marine cabling projects.

ABOUT OUR COMPANY

As part of the Finnish Helkama Emotor Group, established in 1905, Helkama Bica operates three production facilities with global reach. Our in-house R&D and testing facilities ensure all cables meet the highest standards for fire and cold resistance.

THE PARTNERS WE ARE LOOKING FOR

Helkama Bica prioritizes service, and production can respond swiftly to changes in projects of any scale for flexibility and dependability. We are the flexible marine cabling supplier and producer, and our expertise makes us the dependable long-term partner for maritime industry projects of any scale.



HELKAMA
THE PERFECT CONNECTION

REFERENCES

Arctech Helsinki Shipyard Polaris.

CONTACT

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HELSINKI SHIPYARD

HELSINKI SHIPYARD – EVEN STRONGER WITH DAVIE

Helsinki Shipyard has formidable experience and know-how. Over half of the icebreakers in operation worldwide are built in Helsinki.

OUR VALUE PROPOSITION

Helsinki Shipyard is open for new business. Davie and Helsinki Shipyard form a world-class maritime cluster specialized in Arctic operations for all icebreaking needs.

WHAT WE OFFER

We are widely acknowledged as the leading provider of icebreakers and other types of vessels for operation in cold and harsh environment. Our ships usually make use of novel technologies. Our ice-classified products are expedition vessels, icebreakers, icebreaking emergency and rescue vessels and multifunctional icebreaking supply and standby vessels. About our company: Helsinki

Shipyard recently opened a new chapter in its history. In November 2023 Chantier Davie Canada Inc. announced they had finalized the acquisition of the assets of the shipyard.

ABOUT OUR COMPANY

Finland's Helsinki Shipyard recently opened a new chapter in its history. In November 2023, Chantier Davie Canada Inc. (Davie) announced it has finalized the acquisition of the assets of Helsinki Shipyard Oy.

THE PARTNERS WE ARE LOOKING FOR

We have a long tradition of delivering capable vessels for clients in both the public and private sector.



HELSINKI
SHIPYARD

DAVIE

REFERENCES

POLARIS, 2016, for the Finnish Transport Infrastructure Agency, further handed over to Arctia Oy. SH VEGA, 2022, Arctic Expedition Cruise Vessel, ice class PC5.

CONTACT

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HEXAGON

DIGITALIZING YOUR FABRICATION PROCESS

Almost 500 customers in 40 countries and more than 8,000 professionals use Hexagon's fabrication solutions.

OUR VALUE PROPOSITION

Hexagon's Asset Lifecycle Intelligence (ALI) division helps clients design, construct, and operate more profitable, safe, and sustainable industrial facilities.

WHAT WE OFFER

As part of Hexagon's ALI division, NESTIX develops shop floor management solutions for yards and fabricators. Intergraph Smart® production

powered by NESTIX features a unique bottom-up approach to controlling the complete production process, based on Industry 4.0 concepts. Smart® Production Enterprise provides engineering and design data-agnostic import capabilities and integration with standard scheduling and ERP systems.

ABOUT OUR COMPANY

Hexagon is the global leader in digital reality solutions, combining sensor, software, and autonomous technologies.



REFERENCES

Our software is utilized in building many of the biggest cruise ships in the world and in several extremely complex naval vessels.

CONTACT

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NIT NAVAL INTERIOR TEAM

SUSTAINABLE TURNKEY OUTFITTING

With 20 years of experience, NIT provides turnkey solutions for the leaders of the ship industry.

OUR VALUE PROPOSITION

NIT delivers sustainable and high-quality turnkey outfitting for the ship industry, putting the customer first and providing highly innovative custom solutions built with expertise.

WHAT WE OFFER

NIT specializes in turnkey outfitting solutions, covering everything within the ship from structural steel to final surfaces, and including the technical background work such as insulation, electrical installation, piping, and HVAC.

ABOUT OUR COMPANY

NIT provides turnkey outfitting solutions and construction deliveries for all kinds of ships. We have built great spaces for the world's leading shipyards and shipowners for over 20 years, aiming at being the most respected partner in the market. We focus on more sustainable strategies and developing our operations, and have launched a carbon footprint calculation for measuring the environmental impact of ship interiors.

THE PARTNERS WE ARE LOOKING FOR

NIT is looking for suppliers and subcontractors to serve NIT's customers, which are shipyards and shipowners.



REFERENCES

STX Finland S.A. Agulhas II, Suomen Ympäristökeskus SYKE Aranda, STX Finland Turva, Arctech Helsinki Sakhalin series, STX Finland MSV Fennica

CONTACT

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RAUMA MARINE CONSTRUCTIONS

A SPECIALIST IN ICE-GOING VESSELS

Rauma Marine Constructions (RMC) has decades of experience in shipbuilding. We understand the requirements for ships operating in demanding sea conditions, both now and in the future.

OUR VALUE PROPOSITION

We specialize in building ships tailored to customer's needs based on technological innovations. Our operations are founded on expertise and collaboration within a network.

WHAT WE OFFER

We offer icebreakers, coast guard, research, naval vessels, and passenger ferries. We have our own steel production for up to 18,000 tonnes annually, and a dry dock for vessels of up to 260 meters. In 2023, a new multipurpose hall of 186 m x 44 m x

32 m was completed, with a volume of 226,000 cubic meters. The hall is optimized for the construction of government vessels.

ABOUT OUR COMPANY

Established in 2014, RMC upholds Rauma's shipbuilding legacy. RMC focuses on design, construction, and maintenance. Currently, the company is constructing two passenger ferries for Spirit of Tasmania, and four multi-role corvettes for the Finnish Navy.

THE PARTNERS WE ARE LOOKING FOR

We are looking for partners in engineering, testing, construction, and verification to deliver customized solutions for specialized vessels.



REFERENCES

Fennica 1993 and Nordica 1994 icebreakers, Finnish Navy ships since 1991, ice-going vessel S. A. Agulhas II 2012, Turva Border Guard Patrol vessel 2014

CONTACT

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SYSTEMS AND EQUIPMENT



KONGSBERG



ABB



ABB FUTURE-PROOF SOLUTIONS FOR ICEBREAKERS



ABB solutions meet stringent requirements for polar vessels, offering superior maneuverability and reliability provided by electrical systems and Azipod® propulsion.

OUR VALUE PROPOSITION

ABB is driving the evolution of sustainable shipping. Its electrical propulsion, data-driven decision support and integrated solutions for ship and shore are paving the way to zero-emission vessels.

WHAT WE OFFER

ABB's future-proof sustainable solutions include Onboard DC Grid, a modular power system platform taking full advantage of batteries, fuel cells, and even future energy carriers. Azipod® propulsion delivers up to 20 percent better fuel economy, superior maneuverability, greater flexibility of design, and lower maintenance. Remote (onshore) monitoring and condition-based maintenance reduces operation and maintenance costs and increases uptime.

ABOUT OUR COMPANY

ABB is a pioneering global technology leader in the marine industry for electrical power and propulsion systems for ships. ABB is helping to create the future of industrial digitalization and is at the forefront of the energy revolution.

THE PARTNERS WE ARE LOOKING FOR

We are seeking partnerships with shipyards, ship designers, and ship-owners and operators.

REFERENCES

Le Commandant Charcot for Ponant, Xue Long 2 for the Polar Research Institute of China. Web links can be provided on request.

CONTACT

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ALFA LAVAL AALBORG



HIGH-PERFORMANCE BOILER SYSTEMS



Alfa Laval's innovative solutions enhance energy efficiency and reduce emissions in icebreakers, delivering substantial cost savings throughout the lifetime of the ship.

OUR VALUE PROPOSITION

We are dedicated to empowering ship-owners and operators to meet marine legislation requirements through our cutting-edge technologies and support in transitioning to eco-friendly fuels.

WHAT WE OFFER

We offer boiler systems and services that help customers to decarbonize, save energy, and comply with environmental regulations. Our solutions facilitate the high utilization of waste heat through natural circulation boilers, offering considerable savings and optimal operating safety. Alfa Laval Aalborg-fired boilers are designed for low- and zero-carbon fuels, facilitating the transition to carbon free technologies and smart operations.

ABOUT OUR COMPANY

Alfa Laval is active in the areas of energy, marine, and food and water, offering expertise, products, and service to a wide range of industries in 100 countries. Sustainability is at the core of our business, serving as the principle for all our decision-making.

THE PARTNERS WE ARE LOOKING FOR

We welcome partners who share our commitment to more environmentally friendly marine technology and innovation.

REFERENCES

LNG-powered IB Polaris, MSV Nordica, MSV Fennica. Our reference base includes over 3,000 marine boilers.

CONTACT

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ALUPRO



HIGH PERFORMANCE WATER SEPARATORS



Alupro designs, develops, and manufactures high performance, maintenance free and sustainable water droplet separators, and marine louvers for the most extreme climate conditions.

OUR VALUE PROPOSITION

At sea, HVAC systems are put to the test by fast and drastic weather changes. During their life cycle, traditional systems demand an excessive amount of energy, maintenance, and spare parts. We have the technology and know-how to overcome these problems.

WHAT WE OFFER

Alupro's separators can help with the aforementioned problems by filtering out 99.9% of water particles already at the air intake. Our patented filter-free separators stop mist and water droplets from entering the engine through inlets. Heated vanes prevent water and snow from freezing and blocking ventilation ducts in arctic conditions. All Alupro products are made to measure for individual requirements, ensuring a custom fit every time.

ABOUT OUR COMPANY

Alupro has been manufacturing grilles for the Finnish construction industry since the 1960s. Today, Alupro also supplies technical louver solutions worldwide to the HVAC and Marine & Offshore industries. Our mission is to provide perfect air.

THE PARTNERS WE ARE LOOKING FOR

We work closely with shipyards, designers, and HVAC engineers to ensure the perfect result and guarantee long-term success for our clients.

REFERENCES

Meyer Turku - Icon of the Seas,
Chantiers de l'Atlantique - MSC
Euribia, Rauma Marine - Spirit of
Tasmania IV, Chantiers de l'Atlantique - Ritz-Carlton Ilma

CONTACT

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AQ TRAFOTEK



AQ TRAFOTEK



AQ Trafotek

AQ Trafotek is specialized in providing fit-for-purpose dry-type transformer, reactor and filter solutions for demanding marine, offshore and heavy industry applications.

OUR VALUE PROPOSITION

Trafotek transformers and reactors have a small footprint and weight thanks to optimized core construction, intelligent structural solutions, and efficient cooling.

WHAT WE OFFER

The power output of AQ Trafotek transformers ranges from 1 kVA to 12.5 MVA, with a maximum voltage of 17.5 kV. Transformers for marine electrical propulsion systems, LCT solutions and battery charging applications are one of the core areas of our expertise. Our reactor and filter portfolio begins with products of a few kilowatts, and the upper limit is around 6,000 A. Cooling can be natural air, forced air or water-based cooling with a heat exchanger.

ABOUT OUR COMPANY

AQ Trafotek has been providing the major shipyards of the world with transformer and electrical filter

solutions since 1983. Part of the AQ Group, AQ Trafotek is based in Kaarina, Finland.

THE PARTNERS WE ARE LOOKING FOR

AQ Trafotek typically provides transformers and reactors directly to shipyards and through electrical system integrators and ship service companies.

REFERENCES

AQ Trafotek transformers are used on more than 1,400 vessels, including 26 icebreakers or vessels with significant icebreaking capability. We are happy to provide details upon request.

CONTACT

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AURAMARINE



AURAMARINE – PIONEERS IN FUEL SYSTEMS



Since 1974, Auramarine has provided proven customer value and expertise to deliver world-class fuel systems and auxiliary units to the marine, power, and process industries.

OUR VALUE PROPOSITION

With our 50 years of experience, Auramarine pioneers fuel supply systems and solutions that help our customers meet the challenges of the energy transition reliably, safely, and sustainably.

WHAT WE OFFER

Auramarine develops and delivers ready-to-install, pre-tested systems to ensure swift installation at the customer's site, fast and trouble-free startup, and continuous life cycle support.

We offer solutions for methanol operation, biofuels, and fuel supply systems for conventional fuels. We also provide retrofit and

modernization services based on the customer's needs, as well as in-service system support, including annual health checks, and Auramarine original spare parts.

ABOUT OUR COMPANY

Part of Hollming Group, Auramarine is headquartered in Lieto, Finland and has a factory in Shanghai and an agent network in over 20 countries. Auramarine has delivered more than 15,000 fuel supply and auxiliary units to clients worldwide.

REFERENCES

Fuel supply units and auxiliary systems for three Finnish icebreakers.

CONTACT

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FURUNO FINLAND



FICE-100 ICE RADAR

The FICE-100 ice radar system is suitable for all sizes of vessels in icy conditions. Its software has been developed in Finland by Furuno's R&D department in collaboration with our customers.

OUR VALUE PROPOSITION

With the FICE-100 ice radar, vessels can find the old rifts, clean ice and channels made by other vessels. By using these, the vessel consumes much less power and saves fuel and time.

WHAT WE OFFER

FICE-100 is connected to the vessel's navigation radar, and it utilizes the navigation radar signals. FICE-100's algorithm calculates and presents the ice condition. It creates the image, making the fine structures of the ice and rifts visible. The system discovers the optimum route to go through the ice, and shows the track in poor visibility. The usable ice detection is up to 6 NM. FICE-100 has been tested for compliance with the IEC60945 standard.

ABOUT OUR COMPANY

Furuno Finland designs, supplies and maintains the navigation systems of ships. The company has long experience in navigation bridge solutions deliveries for various types of vessels. Furuno Finland has an R&D department in Espoo, Finland.

THE PARTNERS WE ARE LOOKING FOR

Furuno Finland is looking for collaboration with shipyards, authorities, and shipowners building icebreakers and ice-going vessels

REFERENCES

Finnish icebreaker Sampo, Swedish icebreaker Scandica.

CONTACT

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HALTON MARINE



VENTILATION DAMPERS AND SEPARATORS

Halton

Halton Marine manufactures fire dampers, gas tight shut-off dampers, and droplet separators for arctic conditions.

OUR VALUE PROPOSITION

We provide robust, customized products and solutions for marine environments, including challenging Arctic conditions.

WHAT WE OFFER

A0(A60) Fire and gas dampers, gas tight shut-off dampers, droplet separators with heating.

ABOUT OUR COMPANY

Halton Marine, one of the world's leading suppliers of marine HVAC, develops and manufactures reliable, high-quality ventilation solutions specifically designed for different types of ships, offshore oil and gas, heavy industry, and offshore wind farms.

THE PARTNERS WE ARE LOOKING FOR

We are seeking long-term customer relationships.

REFERENCES

Arctic and offshore patrol ships,
Royal Canadian Navy

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KONGSBERG MARITIME FINLAND



RELIABLE PERFORMANCE IN POLAR CONDITIONS



KONGSBERG

Kongsberg Maritime Finland revolutionizes maritime operations in frozen waters, delivering trusted solutions for today's icebreakers as well as the next generation of vessels.

OUR VALUE PROPOSITION

With decades of experience and market knowledge, Kongsberg Maritime safeguards operating capability with reliable, innovative equipment that is meticulously designed and manufactured to perform in harsh conditions.

WHAT WE OFFER

Kongsberg Maritime in Finland manufactures cutting-edge thrusters, anchoring, mooring and towing equipment. Its solutions exceed the stringent requirements of icebreaking vessels for reliability, power, and precision to ensure streamlined operations, manoeuvrability, and safety. The mission-critical specialist products include robust azimuth Arctic (ARC) thrusters and tunnel thrusters up to Polar Class 1 and 2, for powerful thrust in Arctic waters.

ABOUT OUR COMPANY

A part of global technology pioneers Kongsberg Maritime, Kongsberg Maritime Finland OY delivers a range of advanced equipment, standalone products and integrated solutions, created to facilitate and maximize customer success.

THE PARTNERS WE ARE LOOKING FOR

Kongsberg Maritime develops products and solutions for shipyards, owners, and designers, optimizing operations above and below the oceans.

REFERENCES

Icebreakers Nordica and Fennica and polar research vessel RRS Sir David Attenborough and research vessel Kronprins Haakon.

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LAMOR



LET'S CLEAN THE WORLD TOGETHER.

LAMOR

At Lamor, we strive to be the preferred partner on the journey toward a cleaner future. We focus on understanding our customers' needs and creating winning solutions to meet them.

OUR VALUE PROPOSITION

Lamor has an extensive portfolio of Arctic oil recovery products, including high-capacity vessel-mounted and inbuilt skimmers, pumps, heavy duty oil booms, and dedicated ice class oil recovery vessels.

WHAT WE OFFER

Addressing the world's need for Arctic oil spill prevention, response and recovery has been a priority for Lamor since the company's inception over 40 years ago. Through collaborative research, internal development, and global involvement in Arctic advancements, Lamor provides innovative environmental protection solutions suited for Arctic conditions such as the Sternmax, Arctic skimmers, and heavy-duty booms across the globe.

ABOUT OUR COMPANY

For four decades, Lamor has been dedicated to developing oil spill response products and practices to

protect the environment. We have globally distributed equipment inventories and networks that enable professional emergency responses in any location.

THE PARTNERS WE ARE LOOKING FOR

The world can't clean itself and we can't do it alone, but together we can create a cleaner world for future generations to enjoy.

REFERENCES

Client references for Arctic equipment deliveries include Arctia, Shell Alaska, the Norwegian Coast Guard, and the Swedish Coast Guard.

CONTACT

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MAKRON



MAKRON – A PROMISE TO COMPLETE.

MAKRON

A Promise to Complete.

Makron is a complete industry service provider of automation, mechanical engineering, and manufacturing services as a subcontracting partner for technology providers.

OUR VALUE PROPOSITION

Our core business is providing engineering, production, and industrial automation expertise as a single partner. We work as a contract manufacturer for technology companies with machinery needs.

WHAT WE OFFER

Makron industrial automation covers everything from the planning and programming of control systems to electrical control cabinet manufacturing, electrical installations, commissioning, and life cycle services. Our engineering and design team is ready to complete all sizes of demanding mechanical engineering and technical calculation projects. And with expertise from start to finish, we can take control of the entire manufacturing process.

ABOUT OUR COMPANY

Makron is a complete industry service house. With headquarters in Lahti, Finland, and electrical control cabinet manufacturing in Finland

and machine production in Estonia, Makron has a revenue of 17 MEUR, and we employ over 100 professionals.

THE PARTNERS WE ARE LOOKING FOR

We are looking for organizations that need a single partner for complex solutions related to automation, mechanical engineering, and machine manufacturing.

REFERENCES

We offer our automation expertise for waste and wastewater treatment systems in icebreakers. We are happy to provide more details upon request.

CONTACT

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MARIOFF CORPORATION



HI-FOG® PROTECTS ALL SPACES ONBOARD



Since the 1990s, Marioff Corporation has been the world's leading supplier of Marioff's HI-FOG® water mist fire protection technology, with unrivalled experience supplying system solutions worldwide.

OUR VALUE PROPOSITION

Your safety is our area of expertise. We are a pioneer in the industry, and we keep people and business safe as well as providing peace of mind.

WHAT WE OFFER

We offer unparalleled expertise in the fire protection of ships, and we have experience in thousands of marine projects on different types of ships. The Marioff HI-FOG® high-pressure water mist system has been proven in full-scale fire tests to meet these requirements. It is an effective, safe, and environmentally sustainable fire protection system for all engine, technical and crew spaces, for example on board icebreaking vessels.

ABOUT OUR COMPANY

Marioff is a leading supplier of high-pressure water mist fire protection systems, and a pioneer in the

industry with thousands of deliveries of high-pressure water mist systems. We are a widely trusted expert in all water mist fire protection solutions.

THE PARTNERS WE ARE LOOKING FOR

We are seeking partnerships with ship designers, shipyards, and shipowners for our HI-FOG® water mist fire protection systems.

REFERENCES

Thousands of vessels including numerous icebreakers are protected from fire with the Marioff HI-FOG water mist fire protection systems.

CONTACT

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PROMECCO GROUP



WHEN EXPERIENCE COUNTS

Promeco

An experienced contract manufacturer of high-quality electromechanical systems and services for leading companies.

OUR VALUE PROPOSITION

From engineering to commissioning, we provide all services under one roof to enable cost-efficient and agile project execution.

WHAT WE OFFER

We offer electromechanical systems, engineering, services and installations, 3D scanning, SOLAS solutions, marine control systems, switchboards, under 1,000 V control centers, starters, exhaust systems for engines and insulation solutions, and hydraulic and pneumatic assemblies.

ABOUT OUR COMPANY

We are a contract manufacturer focusing on the marine sector, specializing in electromechanics. Our almost 600

professionals make quality happen every day to ensure success with major technological leaders.

THE PARTNERS WE ARE LOOKING FOR

We are seeking long-term partnerships with shipyards and technology leaders in the segment.

REFERENCES

The Finnish Border Guard Patrol vessel Turva

CONTACT

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STEERPROP



RELENTLESS PERFORMANCE FOR UNRELENTING CONDITIONS



Excelling in demanding applications and harsh conditions, Steerprop delivers unwavering performance in harsh environments with its high-quality azimuth propulsion systems.

OUR VALUE PROPOSITION

Steerprop specializes in azimuth propulsion, delivering market-leading reliability and a promise of breakdown-free performance, efficiency, life cycle costs, and trustworthiness.

WHAT WE OFFER

Steerprop offers reliable life cycle cost predictability, ensuring cost-effective performance and durability for icebreakers operating in challenging ice conditions. Steerprop's PULL ARC and CRP ARC Arctic azimuth propulsors are designed for dependable icebreaker operation in harsh Arctic environments. These advanced propulsors combine ice-breaking power with mechanical reliability and modern automation technology.

ABOUT OUR COMPANY

Steerprop is a leading designer and manufacturer of azimuth propulsion systems. The company's unrivaled

Arctic experience, fit-for-purpose solutions, and customer-centric approach ensures solutions that perfectly align with customer's needs.

THE PARTNERS WE ARE LOOKING FOR

We are seeking partners among end users who want to ensure the efficient operation of icebreakers.

REFERENCES

Steerprop has delivered fit-for-purpose units for hundreds of vessels, including every third icebreaker equipped with azimuth propulsion.

CONTACT

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SYNKRONEX



MAINTENANCE SERVICES FOR ARCTIC VESSELS



We are an experienced ship repair company for demanding customers.

OUR VALUE PROPOSITION

Synkronex's mission is to provide professional knowledge and flexibility to clients around the world, wherever we are needed.

WHAT WE OFFER

Our expertise lies in providing IMO environmental and other green shipping-related solutions such as scrubbers, BWMS, fuel boosters, and ultrasonic anti-fouling systems. We can carry out even the most demanding tasks, sometimes with a very short delivery time. Synkronex also designs and manufactures window washing units and maintenance platforms for new builds and retrofits. In addition, we provide ship repair services for technical areas.

ABOUT OUR COMPANY

Established in 1982, Synkronex is a reliable and flexible partner that provides technical products, solutions, and services for vessels around the world.

THE PARTNERS WE ARE LOOKING FOR

We are seeking partnerships with shipowners, ship managers, shipyards, and marine technology manufacturers.

REFERENCES

Arctia, IB Sisu, IB Voima. Interior refurbishment Alfons Håkans, TB Castor, Ultraguard Antifouling system

CONTACT

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VIBROL



WE ARE SPECIALISTS IN VIBRATION CONTROL.

OUR VALUE PROPOSITION

Vibrol offers flexible and innovative services, and we pride ourselves on always putting the customer first.

WHAT WE OFFER

We offer cost-conscious state-of-the-art products and services, including vibration isolators, wire rope isolators, resonance killers, mass dampers, troubleshooting, vibration measurements, and finite element analysis. All Vibrol's solutions are science-based.

ABOUT OUR COMPANY

Located in Finland but operating globally, Vibrol is a reliable partner in vibration and shock control.

THE PARTNERS WE ARE LOOKING FOR

We are seeking partnerships with shipyards, suppliers for shipyards, and shipowners.

REFERENCES

Icebreakers Ponant, Polaris, Voima, Otso

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WÄRTSILÄ



WÄRTSILÄ – AN INTEGRATED SOLUTIONS PROVIDER



Wärtsilä is a global leader in innovative technology and life cycle solutions, and has extensive experience in technologies for vessels with ice class requirements.

OUR VALUE PROPOSITION

We emphasize innovation in sustainable marine technology and services to help our customers continuously improve their environmental and economic performance.

WHAT WE OFFER

One example of our expertise is the Wärtsilä 31 engine, which is an efficient medium-speed marine engine that provides the best fuel economy in its class. It is available with a power output ranging from 4.6 to 10.4 MW, and maintains its outstanding performance across the operating range. The latest ultra-low emission version for gas mode operation cuts methane slip by up to 85%. Our life cycle services enable reliable operations.

ABOUT OUR COMPANY

Wärtsilä is a global leader in innovative technologies and life cycle solutions for the marine and energy markets. We have a team of 17,500 professionals in more than 240 locations in 79 countries.

THE PARTNERS WE ARE LOOKING FOR

We are seeking collaboration across the industry.

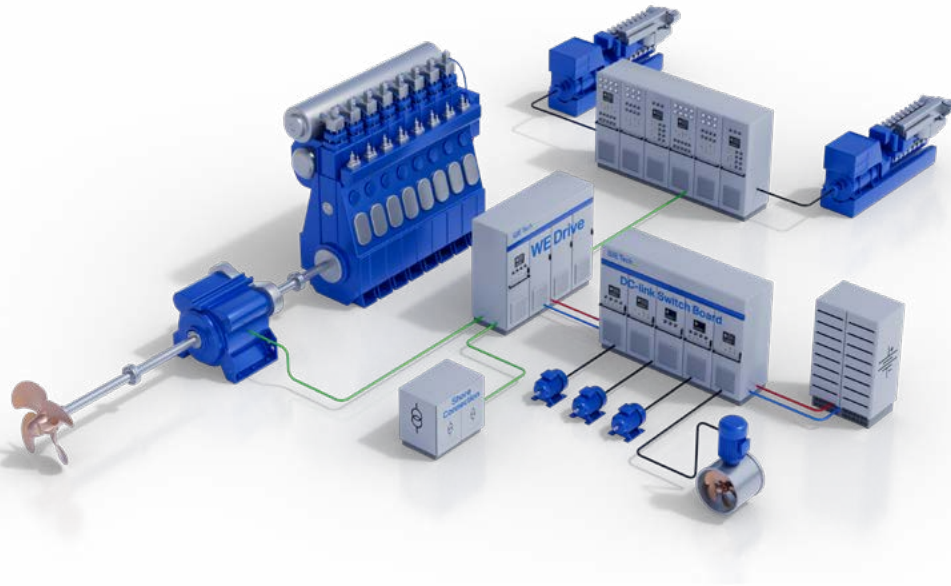
REFERENCES

Ponant: Le Commandant Charcot,
Wasaline: Aurora Botnia, Arctia
Offshore: Polaris, Fennica, Nordica

CONTACT

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WE TECH SOLUTIONS



SOLUTIONS TOWARDS ZERO EMISSION SHIPPING

With headquarters in Vaasa, Finland, WE Tech Solutions is a leading energy solution provider with a global presence in the shipping industry.

OUR VALUE PROPOSITION

We are leading the transition towards a sustainable future in shipping by using pioneering technology to create savings and emissions reductions for the global shipping industry.

WHAT WE OFFER

We provide customizable solutions built on widely proven technologies, including variable frequency drives (WE Drive®), permanent magnet generator technology, DC-link power distribution, and energy management systems. Our solutions are applicable for any ship type and any propulsion machinery.

ABOUT OUR COMPANY

WE Tech Solutions is a global leader in energy solutions for the shipping industry. We deliver end-to-end

solutions by bringing together innovation, state-of-the-art technologies, and first-class services.

THE PARTNERS WE ARE LOOKING FOR

Our focus is on oceangoing vessels, and we are always looking for partnerships with shipowners, ship designers, and shipbuilders.

REFERENCES

Selected 1A Ice Class References: UECC Bore ESL Lanh Ship Wasaline Donsötank. Our full list of references is available at wetech.fi/references.

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OPERATE



ICEYE

Marfle



VAISALA

ARCTIA

A WORLD-LEADING POLAR MARITIME SERVICE PARTNER

Arctia has one of the most versatile fleets in the world, and we have extensive international experience in icebreaking, ice management, and multipurpose vessel services.



OUR VALUE PROPOSITION

Arctia enables environmentally friendly and efficient Arctic operations, offering reliable services under demanding conditions in polar waters.

WHAT WE OFFER

Arctia's services are fairway icebreaking, ice management, pipe and cable laying, towing, service work for production platforms, and the installation and maintenance of underwater structures. Our customer base includes international energy companies, research institutions, and other organizations that are active in polar areas. Arctia safeguards winter navigation and offers reliable services in sea areas throughout the world.

ABOUT OUR COMPANY

Arctia's fleet includes the conventional icebreakers Voima, Urho, Sisu, Otso, Kontio, the multipurpose icebreakers Fennica and Nordica, and the world's first LNG-powered icebreaker, Polaris. Our crews have globally recognized knowhow in icebreaking.

THE PARTNERS WE ARE
LOOKING FOR

Arctia is ready to provide services for customers with a need for an Arctic specialist.

REFERENCES

Arctia has operated on the Northern Sea Route, the Northwest Passage, as well as offshore operations in Alaska, Greenland and elsewhere in the Arctic.

CONTACT

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ICEYE

TRACK SEA ICE WITH ICEYE SAR SATELLITE DATA

To ensure the efficiency and safety of offshore operations, Iceye provides reliable data on ice conditions, movements, and locations in icy waters with the world's leading SAR satellite system.



OUR VALUE PROPOSITION

Our system provides the most up to date radar satellite imagery data about icebergs and ice conditions to create the safest and most efficient shipping routes for icebreakers, cargo vessels, and other ships.

WHAT WE OFFER

To ensure the safety and efficiency of operations, up to date data on ice conditions is required. Persistent sea ice monitoring with ICEYE radar satellite imagery provides frequently updated data that ensures maritime safety. The system enables tracking of icebergs and ice movements and their prediction, and provides data streams for iceberg mapping and ice charting.

ABOUT OUR COMPANY

ICEYE delivers unmatched persistent ice monitoring capabilities for any location on Earth, collected day or night, through cloud cover. As the owner of the world's largest SAR satellite constellation, ICEYE enables data-driven decision-making for its customers.

WHAT KIND OF PARTNERS
WE ARE LOOKING FOR

ICEYE's full-scale SAR images on ice formation developments support fairway navigation, maritime cargo transportation, and Arctic infrastructure development.

REFERENCES

We will be happy to provide more details upon request.

CONTACT

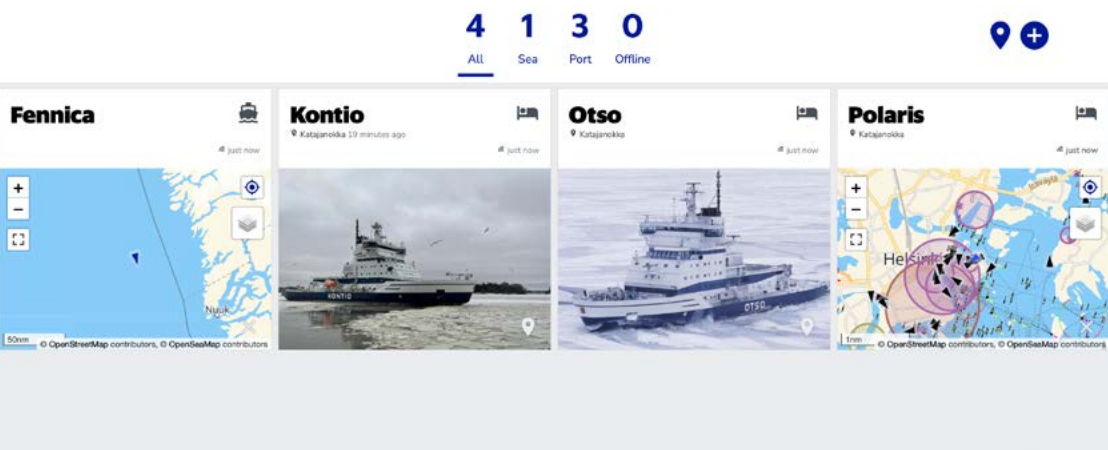
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ICEYE

MARFLE

MARFLE FLEET ANALYTICS

Marfle Fleet Analytics collects and analyses data from vessels, providing crucial insights and guidance for increasing the efficiency of fleet operations.



OUR VALUE PROPOSITION

Analysis of vessel usage patterns and fuel consumption helps ensure economical operation of vessels.

WHAT WE OFFER

Marfle Fleet analytics is onboard and onshore SaaS software created by Marfle to improve operating efficiency and reduce the environmental impact. It includes hardware onboard the vessel, but onshore engineers can also review the analyses with a browser-based user interface.

ABOUT OUR COMPANY

Marfle is a data analytics software company founded in Helsinki in 2016. We are a team of seven engineers and software engineers developing our SaaS and supporting customers on their journey to more efficient and environmentally friendly maritime operations.

THE PARTNERS WE ARE LOOKING FOR

We are looking for sales and installation partners.

REFERENCES

Kontio, Otso, Polaris, Castor, Nobleman

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NAPA

NAPA SAFETY AND EFFICIENCY SOLUTIONS

NAPA is a market leader in ship stability, digital logbook and fleet intelligence data services. Our cutting edge solutions have global users both onboard and shoreside.



OUR VALUE PROPOSITION

We are a highly trusted provider with over 30 years of experience. We provide digital and data services for maximum operating safety and efficiency, and support is available both onboard and shoreside. Our cloud services ensure effortless data reporting and sharing.

WHAT WE OFFER

We offer NAPA Stability, a next generation loading computer, and NAPA Emergency Computer, for faster response with precise and real-time information. We also offer NAPA Logbook for electronic reporting and compliance, and NAPA Fleet Intelligence, for shoreside real-time vessel monitoring and analysis.

ABOUT OUR COMPANY

NAPA offers software and data services for ship design and operations. We combine expertise in naval architecture, shipping, and digital technology to provide intelligent solutions for the maritime industry.

THE PARTNERS WE ARE LOOKING FOR

We are seeking partnerships with icebreaker shipping operators and shipyards departments that are responsible for stability planning and bridge equipment.

REFERENCES

Arctia, Carnival Corporation, Royal Caribbean Group, Norwegian Cruise Line Holding, MSC Cruise, Stena, Tallink Silja, and various Navy ships.

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VAISALA

ENVIRONMENTAL MONITORING FOR ICEBREAKERS

Vaisala's Environmental Monitoring System (EMS) provides high-quality, reliable met-ocean data to help icebreakers navigate safely in icy and difficult conditions.

OUR VALUE PROPOSITION

With over 85 years of expertise, we are a global maritime weather expert offering unrivaled accuracy and dependable measurements of environmental parameters that are critical for safe icebreaker operations.

WHAT WE OFFER

Vaisala offers specialized meteorological, hydrological, and oceanographic environmental measurement solutions and engineering services for icebreakers. Vaisala weather sensors—featuring our world-class WINDCAP®, RAINCAP®, HUMICAP® and BAROCAP® technologies—are designed to stand up to whatever the weather throws at them. A Vaisala Environmental Monitoring

System (EMS) can also be upgraded to comply to a CAP437 Helideck Monitoring System (HMS).

ABOUT OUR COMPANY

Vaisala is a global leader in weather, environmental, and industrial measurements with over 85 years of experience in building the most accurate and dependable weather solutions.

THE PARTNERS WE ARE LOOKING FOR

We are seeking partnerships with system integrators providing navigation, dynamic positioning (DP), and telecommunications systems on icebreakers.

REFERENCES

Our EMS systems are used by numerous icebreakers and research vessels around the globe to enhance their operating efficiency and safety.

CONTACT

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VAISALA

RESEARCH



Aalto University

AALTO

AALTO UNIVERSITY MARINE & ARCTIC TECHNOLOGY

Aalto University Marine & Arctic Technology is a highly recognized research unit aiming for radical creativity in marine and Arctic technology to improve operating efficiency and promote sustainable use of the oceans. Our research focuses on marine structures, hydrodynamics, marine system intelligence, and sea ice and its impact on structures in normal and extreme environments. www.aalto.fi/marineandarctic

Aalto Ice and Wave Tank is the world's largest ice tank with a 40 m x 40 m plan for model testing on a unique scale. Ship test capabilities with bending- or compression-optimized model ice include resistance, maneuvering, compressive fields and ridges, rubble mounds, pack ice, and ice in waves. More information is available at www.aalto.fi/iwt.

A!

Aalto University

CONTACT

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BUSINESS FINLAND

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