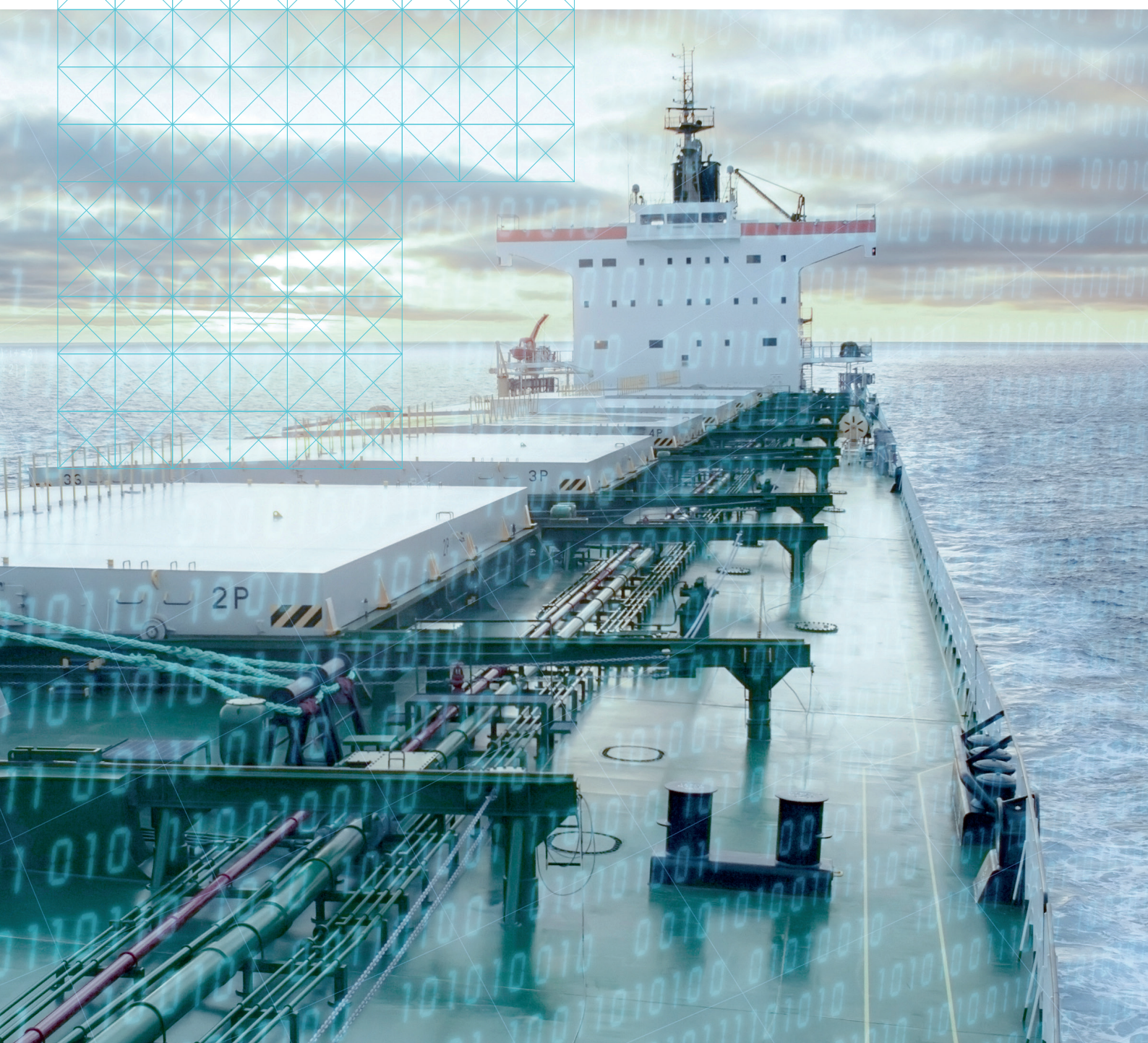




KONGSBERG

# K-NAV

Navigation products



## MISSION STATEMENT

We are dedicated to providing innovative and reliable marine electronics that ensure optimal operation at sea. With our unique technology and experience – in positioning, hydroacoustics, communication, vessel control, navigation, simulation, and automation – we aim to give customers **The Full Picture**. The Full Picture yields professional solutions and global services that make a critical difference to vessel performance, enabling our customers to stay ahead of the competition.

## OUR PHILOSOPHY

### **Our success depends on the success of our customers.**

Actively listening to customers and truly understanding their needs – then translating these needs into successful products and solutions – is central to the achievement of our goal.

### **Our people are key to our success and we empower them to achieve.**

Kongsberg people collaborate globally – guided by shared values and sharing their expertise – to achieve world-class performance every day. Every day they think a little differently, because every client is unique. Our aspiration is to translate the imagination and dedication of our staff into successful technologies and solutions.

Our commitment is to add value to your operations by providing you with **The Full Picture**.



# Content

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## K-Nav system technology

K-Nav products are tailored to the SOLAS market, meeting all mandatory requirements from maritime flag states.

### Design

Developed by users and human factor specialists, K-Nav products have been designed to support critical decision making by professional navigators.

### Sensor interface

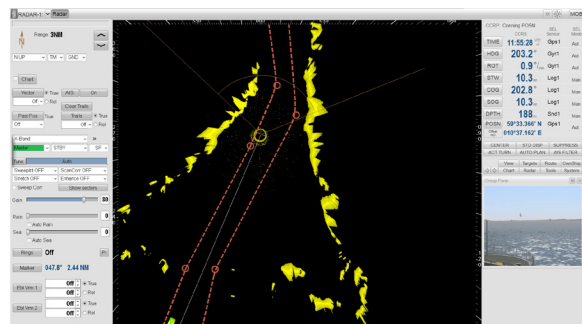
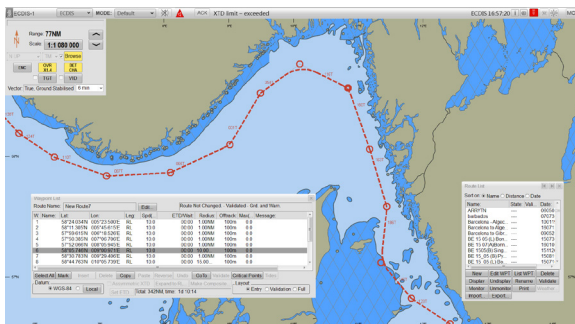
K-Nav products use a traditional sensor interface solution based on serial connection from each sensor to each operator station. A standardized sensor set-up – with dedicated ports for the respective sensors – ensures efficient configuration and installation.

### Radar signal distribution

K-Nav Radar uses a high-speed network for collecting radar signals at the transceiver and distributing them to the display unit: a radar interface (RIN) unit converts analog radar signals to digital signals at the antenna location and sends them to the display unit over the network. Processing of the video, including target tracking, is performed locally by the display unit, and filtering is also applied locally to give the operator full control over the displayed picture.

Optional interswitching capabilities are available to allow different display units to access radar data from any antenna over the network. This option provides fault tolerance with respect to signal processing.

To enhance radar performance and avoid blind sectors, an additional option permits video from up to four radars to be displayed simultaneously in a composite radar picture. In such a composite picture, targets are automatically tracked across the boundaries between the sectors from each radar.





## K-Nav products

### K-Nav Radar

The radar display unit is a type-approved radar / ARPA on which approved nautical charts can be displayed as an underlay to the radar video.

Raw data from the antenna is processed in the display unit, which means that filtering is applied locally according to the operator's requirements. The display unit tracks its own targets and also displays AIS targets. If radar and AIS targets duplicate each other, they are "associated": the system replaces them with a single new target (and identifier). This ensures that the operator cannot mistake a single ship detected by both radar and AIS for two vessels.

To enhance radar performance and avoid blind sectors, video from up to four radars can be displayed simultaneously in a composite radar picture. The system automatically tracks targets across boundaries between the sectors covered by each radar.

### Radar transceivers

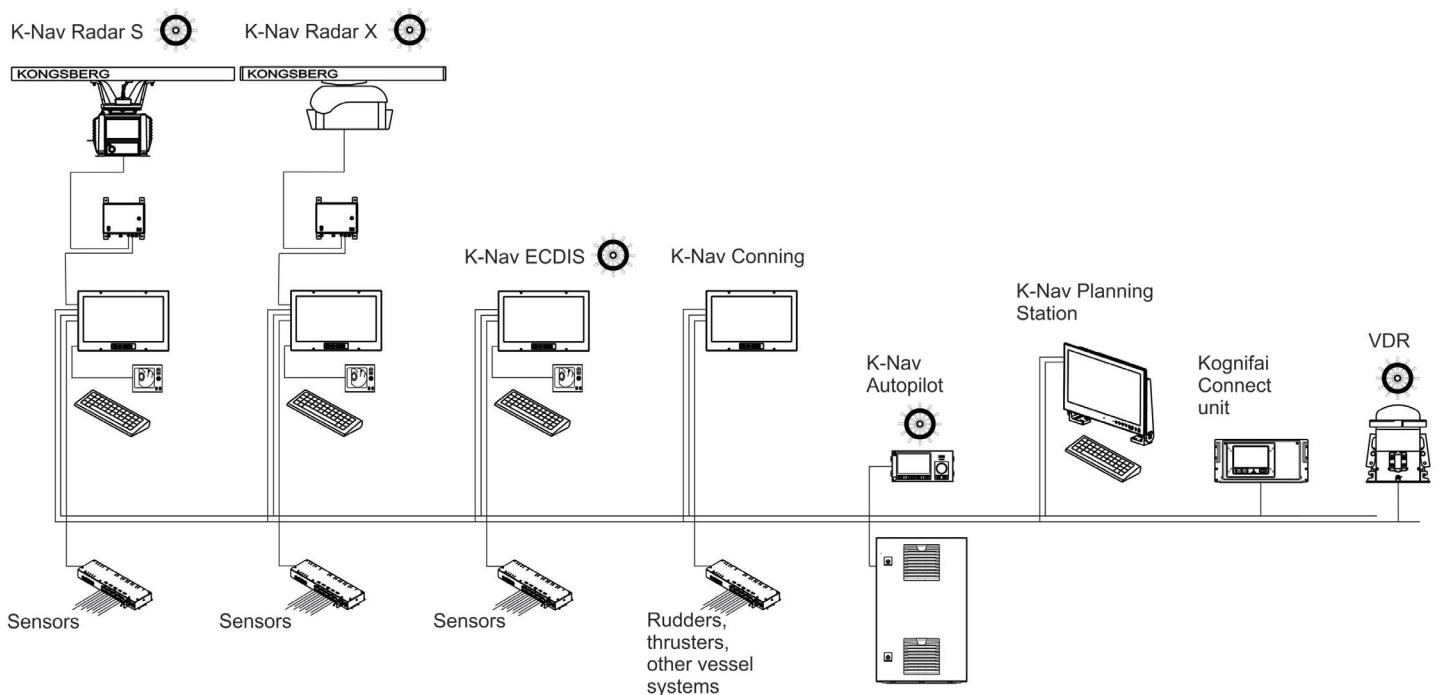
The following radar transceivers are available:

#### X-band

- 3 cm scanner, antenna and turning unit.
- Antenna sizes: 6 or 8 ft. (1.8 or 2.4 m)
- Transceiver configurations: Upmast.
- Power: 10 kW or 25 kW

#### S-band

- 10 cm scanner, antenna and turning unit
- Antenna sizes: 12 ft. (3.6 m)
- Transceiver configurations: Upmast
- Power: 30kW





# K-NAV







## Product Features

### K-Nav Radar

- Range scales: 11 (0.125 - 96nm)
- Manual/automatic clutter reduction: Yes
- Stern indicator: Yes
- Electronic Bearing Lines (EBL): 2
- Variable Range Makers (VRM): 2
- Parallel index lines: Yes
- Square picture: Yes - 27% larger radar area
- Chart underlay available: Yes
- Target tracking: Up to 100 targets at once
- Target acquisition: Manual or automatic
- Trails (afterglow): Yes
- Maximum target speed: 100 kn relative
- Target tracking range: 24 nm
- AIS targets and information: Yes

### K-Nav ECDIS

- Route planning and validation
- Route monitoring
- Radar video overlay from K-Nav Radar
- "Active lights" support
- Displays up to 100 ARPA tracked targets
- AIS targets and information: Yes
- EBL / VRM
- Echo-sounder monitoring and recording
- Voyage recording and replay
- Navtex interface
- IMO-defined functions
- Type approved



### K-Nav ECDIS

The K-Nav ECDIS continuously monitors the ship's position against the voyage plan. The plan can be defined at the K-Nav Planning Station or the ECDIS itself.

K-Nav ECDIS can show radar video from selected radars – in addition to radar and AIS targets – as an overlay to the chart.

NAVTEX messages referring to specific positions appear when the ship is in the area relevant to them.

K-Nav ECDIS accepts all chart formats required by the IHO.

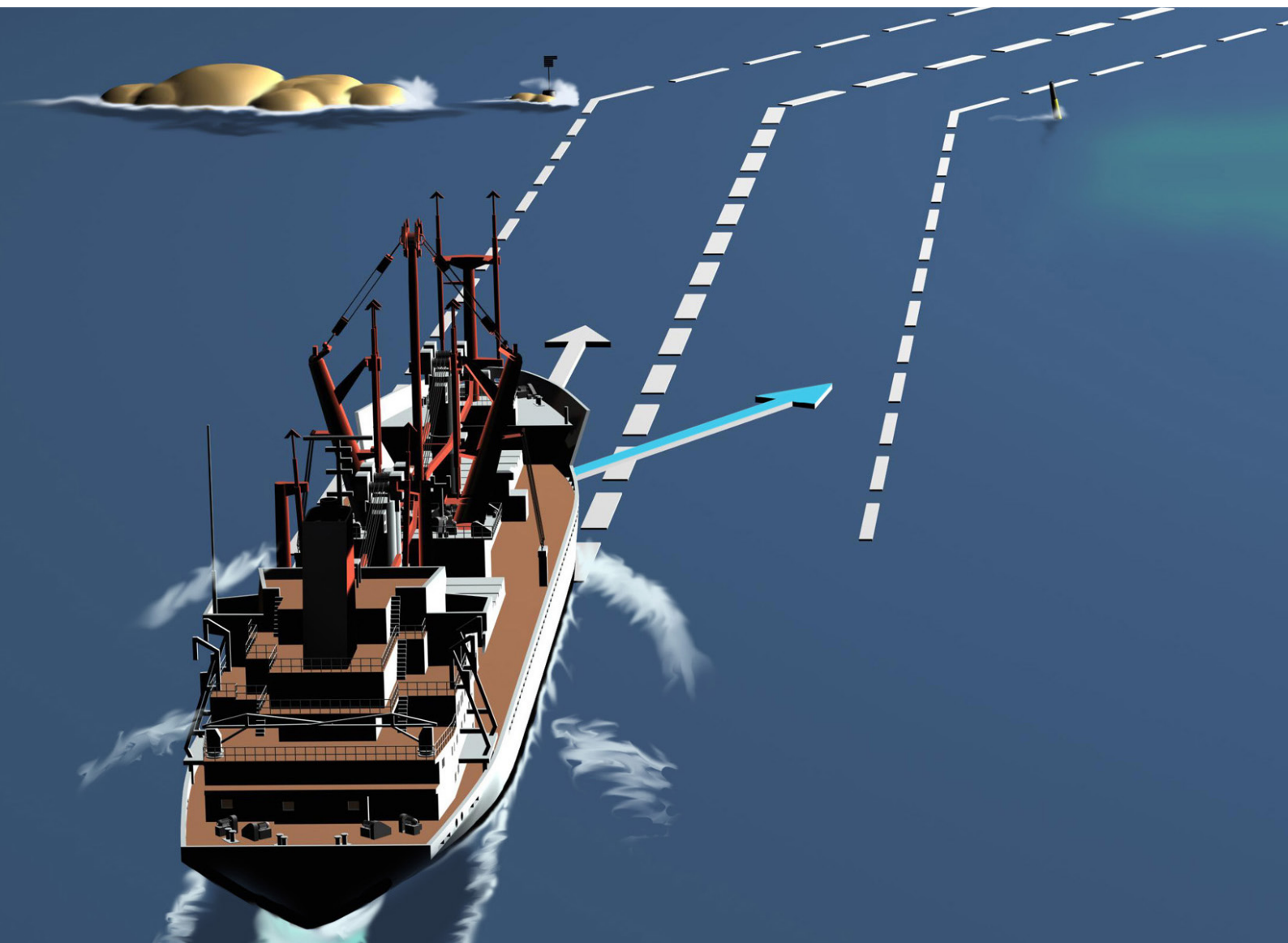
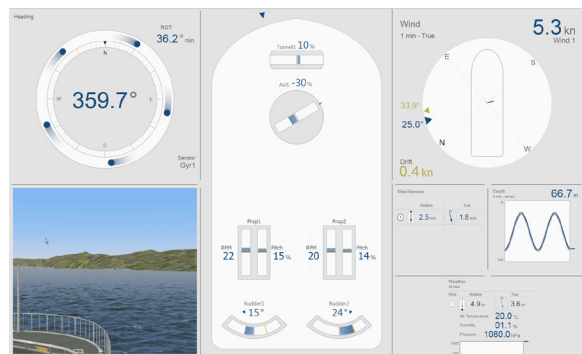
### K-Nav Planning Station

The K-Nav Planning Station is a “back-office” station designed for chart maintenance and voyage planning. It provides standard ECDIS functionality – including route planning and validation – but on a desktop Panel PC.

### K-Nav Conning

According to customer requirements, K-Nav Conning collects sensor input, rudder and propulsion feedback, and steering and other orders (if available) from multiple vessel systems and instruments and presents them conveniently on a single display. It can also display CCTV from cameras mounted around the vessel.

Conning data is displayed on and around a representation of the own-ship that shows the location and status of the thrusters and rudders.





### K-Nav Autopilot

K-Nav Autopilot is a heading control system that provides optimal steering under different vessel loads and in all sea and weather conditions.

It can be operated in both precision and economy modes.

The autopilot user interface is provided by means of a dedicated operator unit. This is connected to a controller cabinet running sophisticated software for performing adaptive automatic steering of the vessel.

The K-Nav Autopilot learns, mainly during the sea-trial phase of its installation and configuration, how the vessel reacts to different rudder commands. Then, when it is controlling the vessel on real voyages, it uses this information to steer as smoothly and comfortably as possible in the given sea conditions.

### Kongsberg VDR

The Kongsberg VDR is a cost-effective way to meet mandatory SOLAS requirements for voyage data recording.

For investigating incidents – or, more routinely, for checking the operation of the VDR or reviewing voyage history – a VDR replay tool is available for use on the K-Nav Planning Station.

### Kognifai Connect

The optional Kognifai Connect unit provides automatic chart updates over a secure ship-to-shore service connection. The unit comprises a Malware Protection System (with rugged touch-control display), a Cisco router, and a type-approved marine computer.



## Life-cycle Support

Purpose built; maintained to last. Our life-cycle management service assists customers through all phases of their system's life-time – including design and commissioning – as well as during the system's operational life.

Solid in-house expertise in system design and user requirements enables us to provide solutions that are both fit-for-purpose and operationally efficient.

A common base technology ensures a robust system design (based on few - and reliable - parts). It provides an excellent and economical foundation for the design of diverse vessel systems.

Our systems also have a distributed, modular, and open architecture. They employ industry-standard communications networks, and – combined with the use of the same standard hardware components for multiple applications – this results in:

- Increased reliability
- Competitive life-cycle support
- Easy up-grade solutions

### Frequent updates

We offer continuous hardware and software upgrades to keep your vessel operating at maximum efficiency. Our modular designs make it easy to add new functionality to systems without replacing existing equipment. We can therefore offer frequent upgrades to keep your system evergreen.

### Training

Qualified personnel are a major asset. We offer training courses so that you can help your employees to keep their skills and qualifications up to date. Courses are available covering all major aspects of vessel operation using Kongsberg systems.

PLANNING, DESIGN & DEVELOPMENT	PROJECT ENGINEERING & DEVELOPMENT	INSTALLATION & COMMISSIONING	OPERATION & MAINTENANCE	MODERNISATION
		Technical	support »	
Technical consulting »				
	Design and	software engineering »		
		Field service »		
			Repairs and	spare parts »
			Optimization and	modernization »



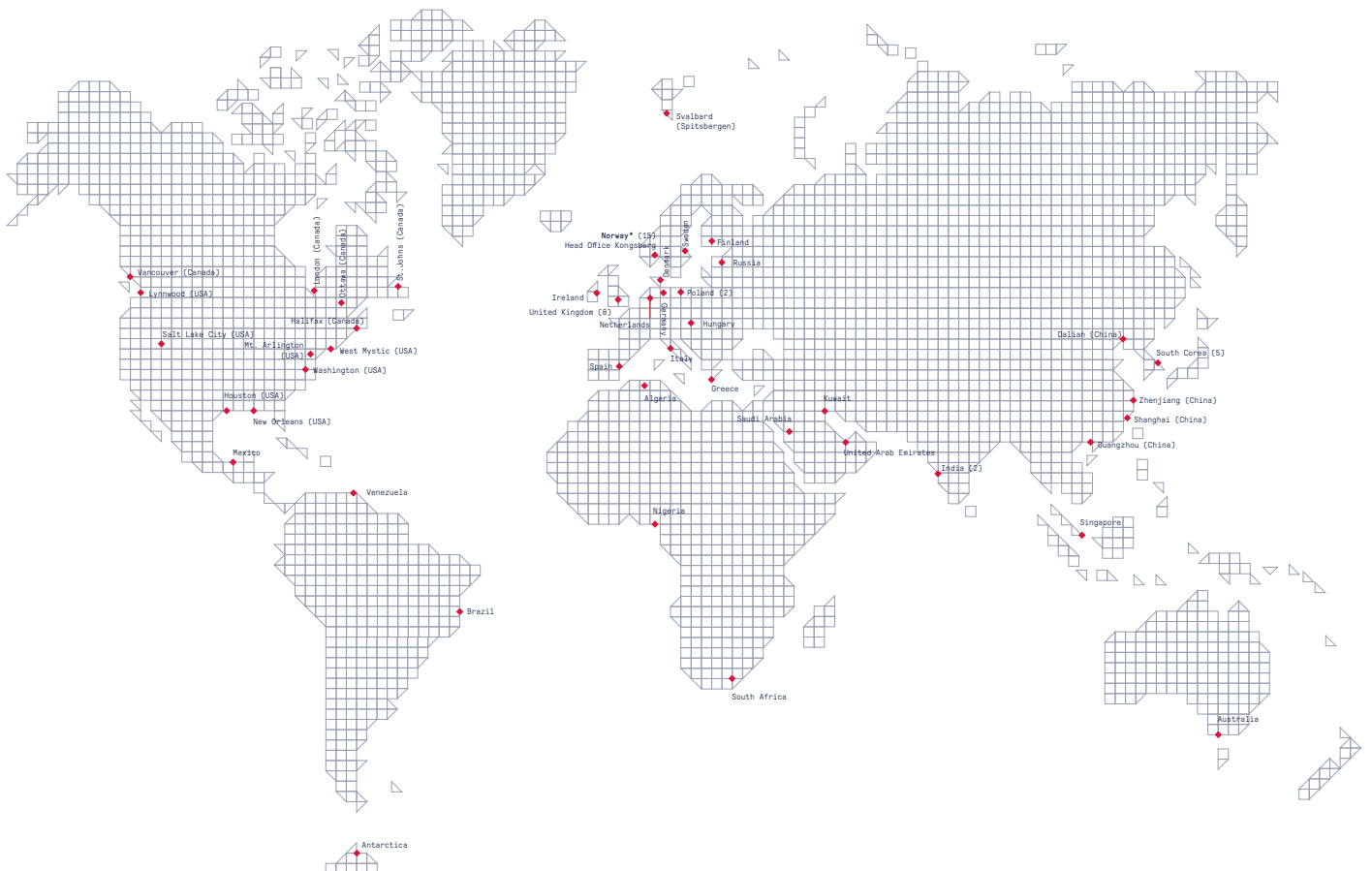
## Global Support: 24/7

We are always there when you need us. Our customer service organization is designed to provide high-quality, global support whenever and wherever it's needed.

Service contracts are available from KM that offer global support from local service and support facilities. These facilities are placed at strategic locations worldwide, and each is equipped with its own inventory of spare parts.

Work is carried out by expert field-service engineers under the direction of a dedicated technical account manager.

The technical account manager works closely with your personnel to maximise system up-time and performance. This involves anticipating necessary maintenance work and scheduling it at the optimal time in the operating life of the system. As well as maximising system up-time, this gives you improved cost control by allowing you to plan (and budget) for maintenance ahead of need. It also enables KM to serve you better by developing a detailed understanding of your needs.





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