

Customized Integrated Bridge Systems for Megayachts





Excellence in bridge integration

Raytheon Anschütz engineers, manufactures and supports the most advanced, customized integrated bridge systems for megayachts. Loaded with quality and innovation from across our portfolio, powered by the expertise and passion of our employees, and backed by the experience from more than 150 large megayacht projects.





“ Our passion for navigation drives us to develop products and systems which make yachting even more comfortable and safer. ”

From a great history in navigation into future



Anschütz stands for experience and expertise in navigation like no other company, with passion and innovation being just as much part of our roots as the goal of making navigation at sea reliable and safe. Our history has significantly impacted today's navigation technology:

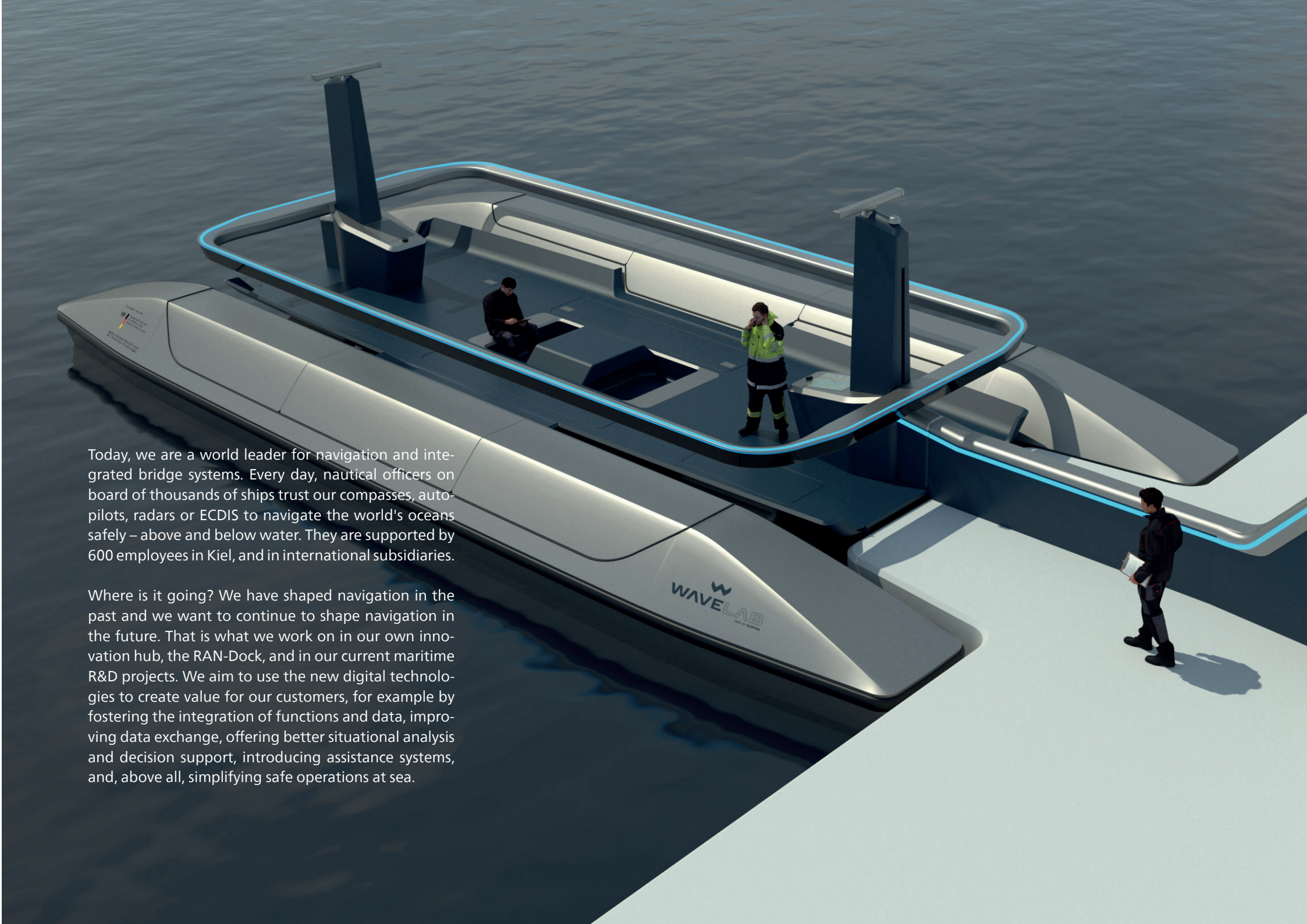
Around the turn of the 20th century, the young Dr. Hermann Anschütz-Kaempfe, who studied history of arts, joined scientific expeditions to Svalbard. He got involved in navigation and observed a classic problem of high-seas navigation: reliable course-keeping, especially near the poles, where the magnetic compass does not work properly.

Anschütz was obsessed with finding a suitable course-keeping instrument and concentrated on locating the geographical north direction with the help of a gyro. In

1904, he was able to test the first "gyro course keeper" on the Kiel fjord, and later, in 1908, Anschütz presented the first gyro compass that could be used on board a ship. The company Anschütz & Co. was founded in Kiel, Germany in 1905.

Further innovations followed the gyro compass, for example, the world's first chart plotter, a great grandfather of the present generation of electronic sea chart systems. And another innovation of Anschütz has made a deep impact on navigating: the first autopilot for ships, the so-called "iron helmsman".

More than a decade ago, with the first functionally integrated systems, digitization found its way into the bridge, and at the latest, when we introduced the first IMO-compliant "Integrated Navigation System", we laid the foundation for digital innovations.



Today, we are a world leader for navigation and integrated bridge systems. Every day, nautical officers on board of thousands of ships trust our compasses, autopilots, radars or ECDIS to navigate the world's oceans safely – above and below water. They are supported by 600 employees in Kiel, and in international subsidiaries.

Where is it going? We have shaped navigation in the past and we want to continue to shape navigation in the future. That is what we work on in our own innovation hub, the RAN-Dock, and in our current maritime R&D projects. We aim to use the new digital technologies to create value for our customers, for example by fostering the integration of functions and data, improving data exchange, offering better situational analysis and decision support, introducing assistance systems, and, above all, simplifying safe operations at sea.

“ Our knowledge and care
to support your dreams. ”





Partner for navigation and bridge integration

With our experience in navigation and system expertise, we serve our customers as a reliable and competent partner in newbuilding or refit projects.


Project managers, supported by a professional, dedicated team from across the company, provide dedicated support for customers, starting with early consultancy and individual advice, design suggestions and specifications through realization to setting in operation and beyond.

The team of system experts take care for the total system design including technical diagrams, approvals and a full factory acceptance test, and also coordinate requirement engineering and the integration of customer-specific equipment.

Our customers benefit from a dedicated point of contact which can be reached at any time and provides competent advice and support within a minimum of time. Customers also value our flexible handling of

customer needs, our reliable and firm order processing, and our commitment to deliver as promised in terms of function and quality, delivery time and budget.

We are also familiar with the usual as well as the special processes and ensure smooth installation and commissioning on board. Where required, we can adapt shipment to shipyard logistics. Customers enjoy hassle-free operation right from the start.



Customer Benefit

- Professional, firm order processing ("delivered as promised")
- Dedicated point of contact (fast response, at any time)
- Experienced, competent advice and technical support
- Flexibility for customer-specific designs and systems integration
- Transparency and reliability with regard to delivery date and budget

Customized bridge design and functionality





A well thought out bridge design contributes to an attractive wheelhouse surrounding, making the bridge a comfortable public area covering only indispensable devices for navigation and control.

Right from the start, our project managers put the individual design of the bridge in the foreground and harmonize it with ergonomics, space requirements and technical feasibility. Our modern LAN-based system architecture opens up a wide range of design options.

We can also adapt the function of the bridge to the customer, at a high-quality level and at almost any project stage. This also includes integration of OEM systems, such as the dynamic positioning system or CCTV systems, by choice of the customer. Our project managers take advantage of a close relationship with shipyards and partners as well as of our scalable system architecture and, if required, our ability of in-house customer-specific engineering and development.

Of course: our bridge systems fulfill class requirements without compromises. Customers benefit from widely-proven systems, based on state-of-the-art technology, which are continuously maintained and updated to meet current and future IMO standards.



We can provide modular and customizable foil panel solutions, which allow creation of an eye-catching, seamless bridge design with standardized HMI for various bridge control devices.

The foil panels are based on reliable CAN-bus technology and feature flexibly programmable interfaces to connect with third-party operation devices, for example engine remote control, bow and stern thrusters or azimuth controls.

The benefit is having no longer inhomogeneous control devices of different manufacturers, but instead a unified surface design, with common lighting, colors, and fonts, as well as foil-impressed push buttons for a common haptics.

Dedicated technical services for mega yachts

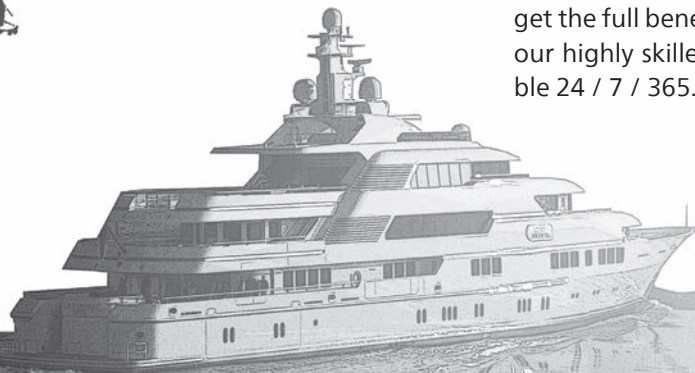
We service all delivered equipment and wherever cruise is taking place – mega yacht customers can count on reliable operation and maximum cruise time around all the world's top yachting spots. Our experience in mega yacht business has grown from more than one hundred large projects.

Being well-known as one of the largest maritime service providers, we offer maintenance and repair as well as refit for the whole life cycle of a ship – our customers get the full benefit of the know-how and experience of our highly skilled coordinators and supporters, available 24 / 7 / 365.

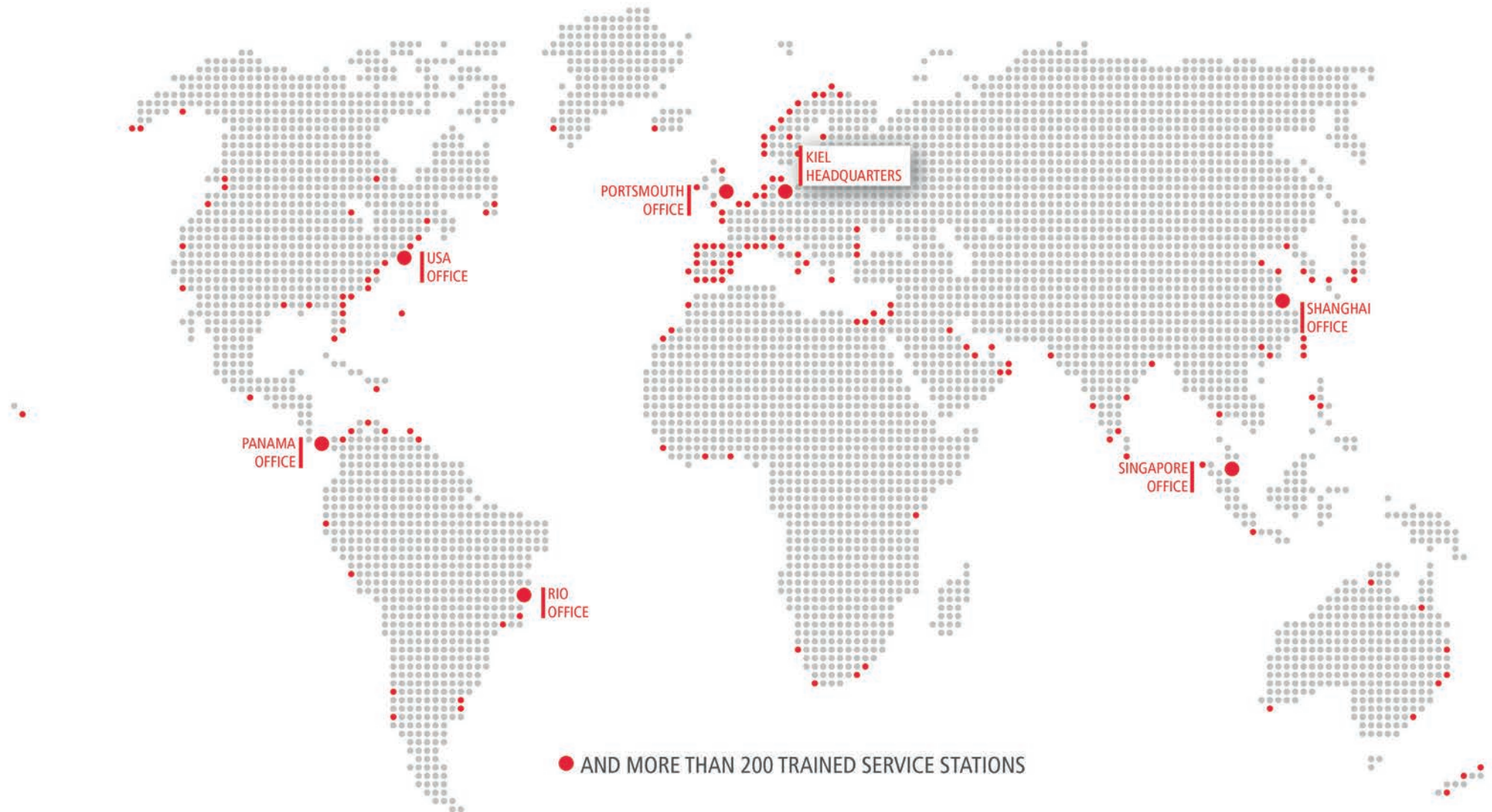
Our service team is the dedicated point of contact for mega yacht service around the world. Depending on the needs on board, our team clarifies the situation and sends out trained and well-suited technicians to solve any problem within the shortest possible reaction time. Recognizing the importance of excellent, reliable and diligent service attendance, we have established a program to ensure that only specially trained technicians are sent out to services on board of mega yachts. All technicians are selected on the criteria of being highly qualified to deal with cutting-edge ship borne technologies, being familiar with the characteristics of mega yachts and their environment, and being of trustworthy appearance.

Remote Diagnose Option


Remote Diagnosis is a service which allows our shore-based service experts to check actual system status and error logs via a secured connection. This ensures optimized service actions with predictable results and avoids unnecessary attendance.



Worldwide customer service







Experienced team for bridge system refits

After the project has been completed and the megayacht has started sailing, we remain the partner in navigation for our customers and the crew aboard, through the lifetime of the ship.

Our customer team is available to our customers as a contact for all questions related to the bridge and bridge operations. This team is also working closely with our technical support team and is organizing spare parts or trainings.

When it comes to updates and upgrades of the functionalities, the modernization of individual system components or a refit of the entire bridge, the team takes care of the whole process, from first consultancy to a qualified price offer, and from a first survey to project planning and completion.

The advantage for our customers is to have contact persons who can be reached quickly and directly, who in turn can rely internally on lean, simple processes in order to arrive at a reliable budget and solution planning even for complex refits in the shortest possible time.





Refit expertise and technological merits

We have gained a refit expertise, collected over many years from experiences in upgrades, updates and replacements of navigation and bridge equipment from various generations and makers. Typical considerations for retrofits have been:

- Upmost of safety and reliability with state-of-the-art systems
- Modern bridge meets the requirements for comfort and functionality
- Updates and upgrades make bridge systems future-proof (availability of spares, compliance)

We keep refits simple through precise planning and lean processes. Thanks to our modular system architecture and backward compatible products, our retrofit solutions allow replacing virtually any existing systems on board.

A retrofit project always starts with an analysis of the existing system aboard, for example taking into consideration existing documentation about the systems, interfaces or cabling aboard as well as operational or class requirements and even available installation space in the bridge consoles.

Our experienced refit team works closely with the customer and other partners and makes sure that any questions or tasks that come up are handled answered quickly. Work steps include the definition of the new system layout, interfaces to peripherals, new equipment, required class approvals and coordination of the installation process and sea trials.

“ We are proud to work with the
most prestigious shipyards for megayachts. ”


LÜRSSEN

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Benetti
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ABEKING & RASMUSSEN

 **NOBISKRUG**
GERMAN SUPERYACHTS FOR THE 22ND CENTURY

 **MARIOTTI**
YACHTS


KUSCH
YACHTS


BILGIN YACHTS

TURQUOISE
YACHTS

 **RMK**MARINE



Synapsis NX Integrated Navigation System

We have further innovated the Integrated Navigation System (INS) in order to make navigation and bridge operations easier, more efficient and safer.

Synapsis NX introduces a modular, LAN-based system architecture for more flexibility in bridge design and integration, as well as newly designed user interfaces for easier operation.

In the center of the integrated bridge, Synapsis NX features multifunctional workstations for the navigational applications and data management, which integrate various sensors for target detection, heading, position and further navigation data, and steering control systems.

Synapsis NX is compliant with the new Bridge Alert Management Standard (IMO.302(87), IEC 62923-1 and -2 as well as IEC 61162-450 Ed.2). It is also type-approved according to IMO performance and IEC test standards MSC.252(83)/IEC 61924-2 for integrated navigation systems.

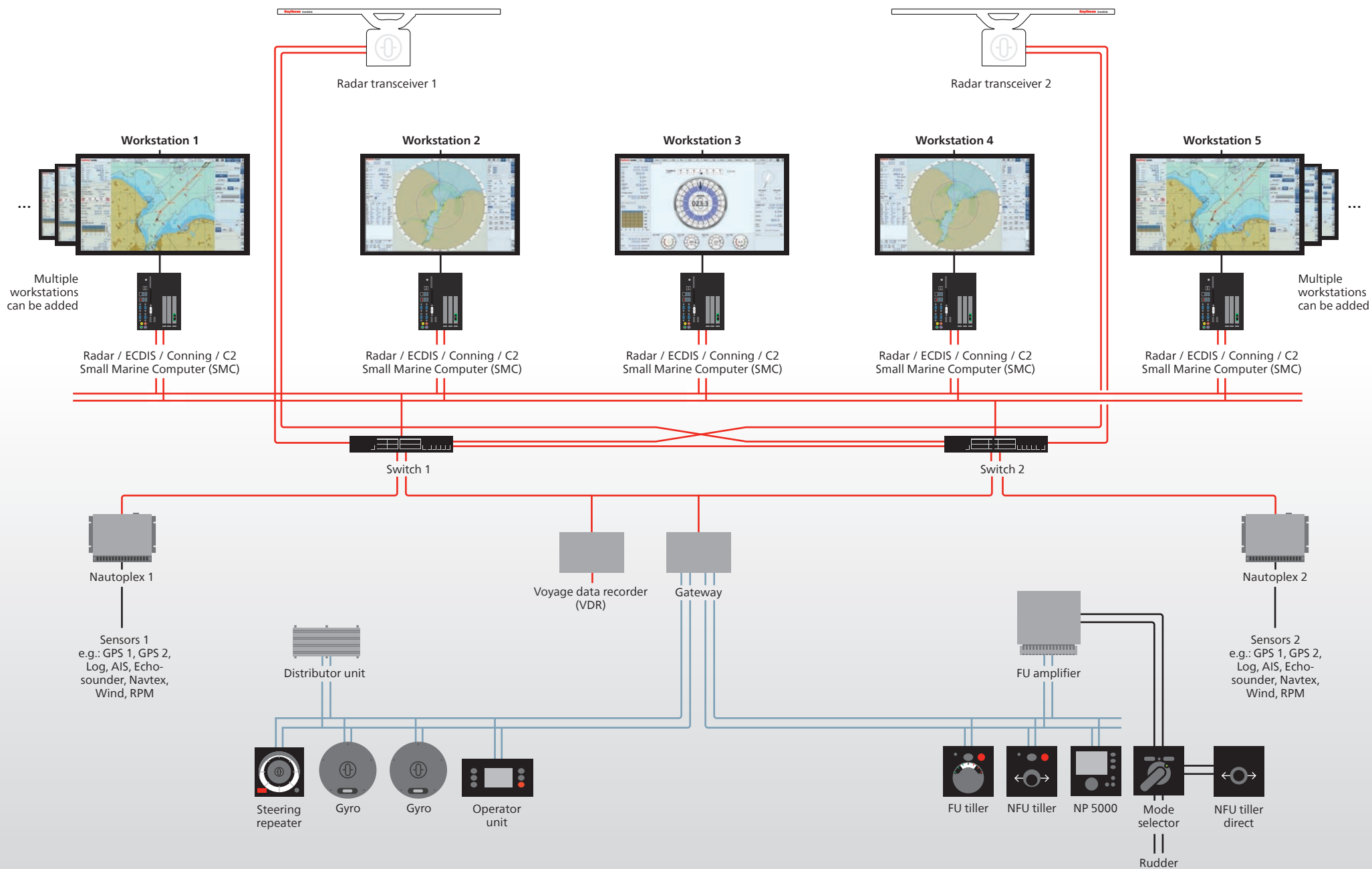
Compliance with these standards means higher safety as well as clear operational advantages over non-compliant systems:

- The INS automatically observes the “health status” of all connected workstations and sensors and informs the operator on a central display at a glance.
- The consistent common reference system (CCRS) continuously monitors integrity of sensor data to the best set of sensor data with the whole bridge system.
- The central target management associates tracked targets from individual radar and AIS sensors to create new system-level targets, which are further processed throughout the navigation network to appear consistently on any radar or ECDIS display.
- The central, intelligent handling and presentation of bridge alarms reduces operating stress but also directs attention to critical alerts and thus significantly increases safety.



Customer Benefit

- Users interact with a single, harmonized system (consistent data, designations, alerts)
- Better situational overview improves situation assessment and decision making
- Modern, intuitive user interfaces simplify operations (lower risk of human error)
- Comfort, efficiency and safety through multifunction workstations
- Built-in redundancy, maximum availability of data and function
- System architecture supports flexibility in system design (bridge design, system modifications)
- Functions moved from panels to displays, hardware installation in a rack possible
- Integration of third-party systems (owner's choice)



Smart system architecture

SMART SYSTEM ARCHITECTURE

Synapsis comes with a smart “next generation” system architecture – this is what the “NX” stands for. Synapsis NX Workstations can be easily configured according to customer’s individual requirements.

MULFIFUNCTIONAL WORKSTATIONS

Synapsis NX consists of multifunctional workstations that use ultra-compact, powerful Small Marine Computers (SMC) with solid-state disk and passive cooling to increase reliability and lifetime. Customers can decide to run the software applications Radar NX, ECDIS NX and Conning NX or any combination in parallel on each computer.

Configuration is done easily by software licenses. Solutions for enhanced situational awareness and security, including the integration of camera systems, and further third-party applications can be added as an option.

BRIDGE INTEGRATION PLATFORM (BIP)

The Bridge Integration Platform (BIP) is the innovative, central software framework of the bridge system. It is part of each workstation and controls all central services of the navigation system, such as data distribution, system and sensor health status monitoring, redundancy and backup management, intelligent alert management, and settings.

The BIP ensures the integrity of data as well as availability and consistent handling of data and alerts throughout the entire bridge system.

HIGH PERFORMANCE RADARS

The NautoScan NX radar transceivers create a high-fidelity radar raw video, which is distributed to the bridge via redundant Gigabit LAN. The raw data processing on workstation level ensures high flexibility and optimized performance for collision avoidance or any other end-user application.

The radar also supports an advanced radar video merge without quality losses and interference.

LAN-BASED DATA DISTRIBUTION

The NautoPlex Serial to LAN converters collect and convert all serial sensor data as well as status information to LAN.

The workstations then have full access to the sensor data as well as to the raw radar videos via LAN, this makes the system even more flexible and scalable and also adds redundancy to the system. Moreover, cabling is more transparent and related efforts much reduced.

Highest flexibility for advanced systems

With the new generation of Synapsis NX, we offer an efficient approach contributing to a seamless and lean bridge system design whilst providing an advanced level of integration with other bridge systems.

Multifunctional workstations allow operation of a variety of sensors and navigation aids directly on the screen, from any bridge workplace. This includes larger bridge system solutions by integrating software and workstations of OEM's such as ship automation systems, sonars, dynamic positioning systems or camera systems.

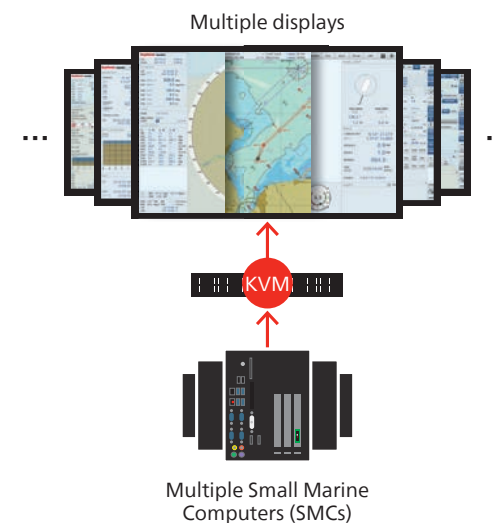
DIGITAL KVM MATRIX: ANY FUNCTION, ANY PLACE

Together with various OEM's we have realized harmonized and fully functional integrated bridge systems. Computers as well as displays and operation controls of OEM's are connected to a digital KVM matrix system. A fingertip at the Synapsis NX Multifunctional Workstation or the 12" Synapsis NX Touch Panels enables the remote display of virtually any application / PC at a dedicated workplace – a true "any function, any place" principle, including a hard wired fallback to primary

connections as redundancy for the matrix itself. This means a highly flexible and scalable integration of the navigation and further bridge systems according to owner's choice, and also with regard to interior design and ergonomics. Customers also benefit from a type-approved, cost-effective solution, without any compromises in the integrity of the navigation system or ship safety.

The system includes the following components:

- The processor as the "source" connects to the processor module.
The processor module converts all signals and connects via Ethernet to the central matrix center.
- The components of the workstation side connect to the workstation module linked as the "target" to the matrix as well. The maximum distance between the components is up to 140 meters, offering a variety of options for bridge designers.
- The matrix center features further intelligence for configuration, offering a total of 64 inputs and outputs to connect several sources and target workstations.



Thanks to the merits of modern network infrastructure and components, neither the workstation hardware nor further computers or the operation devices of various navigation aids need to be installed on the bridge but can be located in a 19" rack off the wheelhouse in a separate technical room.

19" Rack



HARDWARE SEPARATED FROM THE BRIDGE

Thanks to its capable network infrastructure and smart system components, Synapsis NX allows moving hardware off the bridge and enables an appealing interior design for the entire wheelhouse. Further, this contributes to a flexible and ergonomic console design.



ALL DATA ON ETHERNET

All data of navigational sensors, radar, ECDIS and other systems is distributed and made available within a redundant LAN. Each connected PC receives relevant data automatically. Data is bundled, shared, processed, and presented by the end user applications - as needed by the operator.



RACK INSTALLATION ANYWHERE ON BOARD

Computers, data collectors and switches, as well as further boxes can be installed in a standard 19" rack, delivered in a customized configuration, fully wired and tested. Through integration of capable DVI extenders, the distances between hardware and displays can range up to 140 meters.



“ We support your dreams.”







Software applications with intuitive user interfaces

In times of ongoing digitalization and integration aboard, the design of new navigational software applications is concentrating on "user needs" and the "human element".

A "human-centered" software design improves right situational assessment and decision making, eases work of navigators, and altogether increases safety. When designing our new generation of navigational software applications, we adopted a new course of continuous user participation. The goal was to design such "human-centered", intuitive and consistent user interfaces and operation concepts which meet or even exceed the expectations of the operators with regard

to daily tasks and use cases. The new applications not only incorporate latest software technologies but an user interface based on customer feedback and user experience.

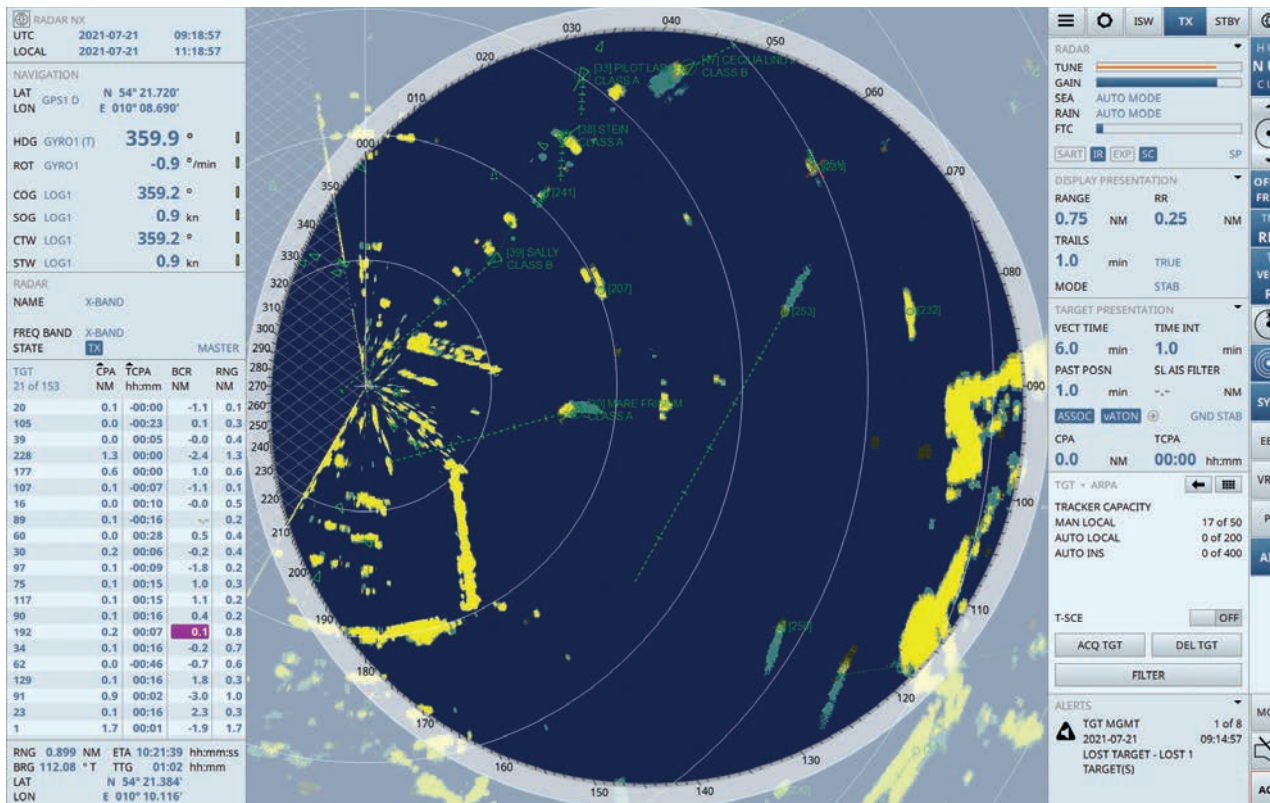
The new applications now have standardized and clear-structured user interfaces. They also obtain the same operation philosophy, including a large chart or PPI display, a quick access bar for the most important functions on the right hand side, and a data indication area on the left hand side. The applications also allow operation via touch screen and support common interaction patterns.

On a megayacht, a Synapsis NX workstation is typically loaded with these applications:

- Radar NX / Chart Radar NX
- ECDIS NX
- Conning NX

The applications provide a central and local change of colors and dimming, and share individual and situation-specific user settings. They can also integrate autopilot remote control (with curved heading line display) as well as data and operation of other systems such as AIS or NAVTEX.

Radar NX



Radar NX offers high performance collision avoidance assistance under any weather and traffic condition. It features an advanced tracker and unique, patented clutter suppression that optimize target detection, filtering and presentation. The clear and precise presentation of the traffic situation as the base for navigational safety.

- High performance thanks to advanced target tracking (derived from commercial small target tracking application), target association and target management
- Unique automatic clutter suppression for a clear target display under any condition (CFAR technology, "Cloud" atmospheric clutter reduction)
- Individual PPI organization and filtering on each console thanks to the network wide distribution and local processing of raw video
- Sortable and filterable target lists
- Advanced, industry leading parallel index line (PIL) functionality with up to 99 PILs
- User profiles to store favorite settings
- Option: Chart radar (electronic sea chart underlay for better situational awareness)

UNIQUE RADAR VIDEO MERGING

As optional feature, an advanced radar video merging of multiple radar sensors (and distribution to ECDIS) is available. A "virtual transceiver" controls and merges the video of multiple radars so that the user experiences a single seamless 360° image.

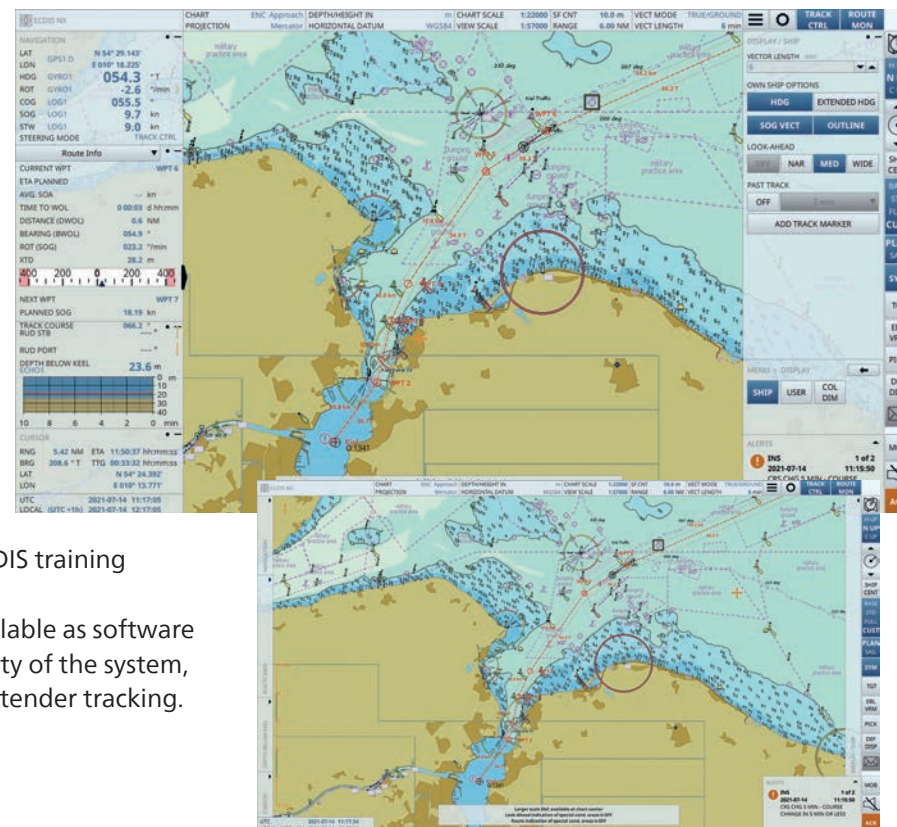
ECDIS NX

ECDIS NX is intuitive to operate and offers a quick familiarization for crew. It effectively supports daily tasks and use cases of navigators and improves situational awareness. Standard features include:

- Smart tools for voyage management, such as Wizard based route planning
- Graphical editing of routes, supported through intuitive interaction patterns (e.g. drag'n drop)
- ETA calculation and speed of advance (SOA) for individual waypoints in UTC or local time
- Editable look ahead zones for anti-collision, route monitoring and anti-grounding
- Support of Admiralty Information Overlay (AIO)

- Filtering tools to reduce unnecessary alarms
- Central chart and route management (dual configurations)
- Track Control with Anschütz NP 5400/5500
- Embedded online user manual and free online type-specific ECDIS training

Numerous "Plus Features" are available as software modules to extend the functionality of the system, including radar video overlay and tender tracking.



55" ECDIS planning station

ECDIS NX is also available as in a configuration as a planning station. The large touch screen in combination with the intuitive user interface of ECDIS NX supports and simplifies the cooperative planning of routes

and maneuvers, fully integrated with the bridge navigation workstations. Available with VESA and as a tilt-able pedestal.

Conning NX

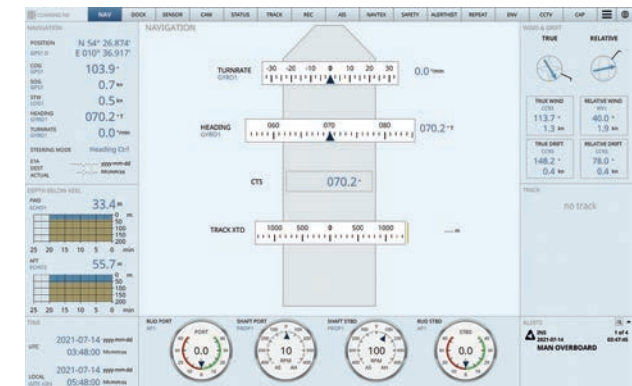
Conning NX is a centralized navigation data display for the ship's command. On pre-defined pages, it presents bridge navigation and machine status data conveniently at a glance. Flexible graphic elements – like widgets – can also be elected, adapted and combined as needed. The combination of different instruments and indications at a central display increases situational awareness, even in critical situations of maneuvering and docking.

Main features:

- Standard pages for various vessel types
- Different pre-configured pages for different maneuvering situations
- Graphics are individually adapted to the specific type of equipment
- Not only a display: Conning allows operation of various functions provided e.g. with an integrated navigation system (e.g. CCRS sensor selection, CAM centralized alert presentation)
- Approved to latest IMO standard for bridge alert management (MSC.302(87))

DOCKING DISPLAY, CAPTAINS DISPLAY AND CCTV

Special features (options) include a Docking Display (displaying the ship's condition and influencing parameters in the docking maneuver, in addition to a chart window to facilitate docking), a Captain's Display (customized display offering a live experience of navigation, can be provided within crew areas and even to passengers and guests on board), and CCTV.



12" Touch panels

12.1" Panel-PC with touch display can serve as the hardware platform for a central alert management system on INS or bridge level, or alternatively as the hardware platform to control existing or even new functionalities. The functionality provided includes but is not limited to window wipers, air horn, search lights, interior and exterior lightings, remote engine control, stern and bow thrusters, pumps, KVM switches, power management and dimming.

The user interface is built upon the Conning NX software application and is in line with all the other navigational applications. The flexible software elements make it easy to adapt or upgrade to changing requirements and new functionalities in future. The external hardware is interfaced "below the surface" – either with the PCs directly or via central data collectors within the bridge system.

The benefits are obvious: The actual number of devices on the bridge is significantly reduced, a direct contribution to less complexity and ease of use. The touch panel provides a seamless look and feel for these control systems, and are the ideal complement to existing foil panel solutions for rudder steering, dynamic positioning system or engine controls.



| Anschütz Autopilots |

PROVEN ANSCHÜTZ STEERING PERFORMANCE WITH BUILT-IN RELIABILITY

NautoSteer AS is the latest generation of Anschütz steering control. All important components such as follow-up amplifiers, autopilots, interface units and alarm monitoring units are connected via redundant CAN-bus systems, providing most secure data communication throughout the whole system.

- Flexible system configurations in order to fulfil sophisticated requirements
- Built-in reliability with CAN-Bus technology
- Fail-to-safe principle with integrated steering failure and wire-break monitoring
- Clear operation in emergency situations helps the crew when time is crucial
- Comfortable operation with take-over or give-over of steering control positions
- Central alarm reset and central dimming
- Ease of installation with simplified wiring and computer-based commissioning

NautoSteer AS is available in customized configurations for single and double rudder with follow-up and non-follow-up controls.



Anschütz Autopilots

Anschütz autopilots are well known on the market for their excellent steering performance, accuracy and reliability. A large TFT color display with touch screen supports easy operations.

Most advanced features for a safe and comfortable cruise are included. As an example, the new acceleration monitor will avoid damages during sharp turns at high speed, whereas new modes for course control and high precision steering allow most accurate navigation even in narrow waters.

The top-of-the-range autopilot NP 5000 forms a track control system in combination with ECDIS NX. NP 5000 also offers remote control with curved headline line display from the bridge workstations.

Anschütz Gyro Compass System

Anschütz gyro compasses ensure highest accuracy, reliability and operational safety in maneuvering and position keeping under all environmental conditions. Customers have the choice between our classical Standard 22 NX gyro compass with an unbeatable price-performance ratio, and our Standard 30 MF, which is a maintenance-free compass also offering rate-of-turn and roll/pitch.





“ Our job is to engineer and support the most advanced navigation and bridge systems. ”

| Yacht crew |

The competence team is an experienced and specialized point of contact for all mega yacht customers, offering competent and immediate support with regard to the special characteristics and needs which may arise during a mega yacht project.

After delivery, we offer central service coordination, immediate spare parts supply, worldwide maintenance and repair, individual logistic support and service contracts, training for crews and maintainers, as well as retrofit solutions across the whole life cycle.



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Wulf Mielsch
Expert Foil Panels



Stefan Graw
Expert 3rd Party Systems
Steering Control



“ Wherever you navigate.
We are with you. ”



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