Synapsis
Intelligent Bridge Control
Integrated Navigation System / Integrated Bridge System

- High system performance and functionality
- Type approved acc. to IMO and IEC INS Standards
- Intelligent system architecture for safety and flexibility
- Worldwide diligent customer services
Synapsis Intelligent Bridge Control

Raytheon Anschütz offers customers proven navigation system solutions and expertise in navigation system integration, based on more than 110 years in the navigation business and more than 1,100 integrated navigation and bridge systems (INS/IBS) supplied. Integrated bridge systems engineered and customized by Raytheon Anschütz focus on safety and performance and simplicity. The open, modular, fault tolerant architecture provides high availability, an enhanced operator experience, and reduced ownership costs.

Synapsis Intelligent Bridge Control is the latest generation of the Raytheon Anschütz Integrated Navigation System and is type-approved according to IMO performance and IEC test standard MSC.252(83)/IEC 61924-2.

**BENEFITS AT A GLANCE**

- Full INS compliance – reduced workload, increased safety
- Advanced functionality of applications and as a system
- “Any function, any place” increases situation awareness and capabilities
- Standardized software for flexible configuration
- Standardized PCs for reliability and lifetime performance
- Built-in redundancy and maximum data availability
- Proven sensors for reliability and accuracy, even under harshest environmental conditions
- LAN-based radar sensor ensures brilliant performance and almost unlimited flexibility
- Smart system architecture for high flexibility in system design and workstation configuration
- Simplified installation and cheaper cabling
- Designed for low maintenance, and cost-effective updating/upgrading
WHY DECIDE FOR WORKING WITH RAYTHEON ANSCHÜTZ?

Raytheon Anschütz has decades of experience and an unsurpassed expertise in navigation technology and navigation system integration. Raytheon Anschütz also stands for flexible handling of customer requirements, reliability and continuity in customer relations and excellence in customer service.

Dedicated project management
• Experienced individual support from early system layout to setting in operation
• Coordination and project planning in project-specific engineering teams
• Competent advice regarding IMO and class requirements
• Intimate knowledge in products and technical feasibility
• Firm, reliable project processing and delivery as promised
• Technical support with the know-how of a manufacturer
• Total system design including wiring, circuit and connection diagrams
• Meticulous product and system testing
• Approvals, factory acceptance test, setting to work

When deciding for Raytheon Anschütz, customers will always benefit from individual and dedicated customer services. After sales, customers can rely on a variety of services including highly qualified technical support – worldwide, wherever they navigate.

Worldwide first-class technical support
• 365/24/7 service coordination and support for all products delivered
• High transparency and regular updates about service status
• Reduced administrative workload for customers
• Global network with own hubs in Germany, Singapore and Panama
• Performance monitoring and training program for more than 200 service stations
• Proven spare part supply chain with 20+ large depots
• Maximum uptime thanks to highest first time fixed rates
• Customer-oriented after sales management
• Maintenance contracts
SYNAPSIS – STATE-OF-THE-ART INTEGRATED NAVIGATION

Raytheon Anschütz presents, with the Synapsis series, a state-of-the-art and high performance bridge navigation system. Synapsis is based on task-oriented multifunctional workstations which can be easily configured according to customer’s individual requirements – from a radar or ECDIS workplace up to a fully integrated multifunctional workstation. Synapsis thus seamlessly integrates sensors for target detection, heading, position and further navigation data, and a variety of steering control systems.

SYNAPSIS NX SMART SYSTEM ARCHITECTURE

Synapsis now comes with the smart “next generation” system architecture – this is what the “NX” stands for. By utilizing standard hardware components through the entire bridge navigation system and the LAN-based radar transceivers, and by having all sensor information enabled to LAN, the architecture increases redundancy, flexibility and scalability.

With regard to safety, the system concept is designed so that even a single point of failure leads to reduced redundancy, but not to reduced functionality. Each function at each workstation with full redundancy contributes to secure ship operation.

• No need for analog radar video distribution
• No reduced performance due to damping in the video distribution
• No need for extensive cabling of sensors to workstations
• No need for NMEA boosters for serial attached sensors
• No reduced functionality in case of single point failures
Synapsis INS fulfills basic IMO requirements as well as highest class notations such as NAUT (AW) and NAUT (OSV). While the core components provide the backbone for the system and the shared services, workstations and applications can be flexibly added as needed in the individual project. The new system architecture reduces complexity of the system for easier installation, higher reliability and better resistance to failures.

- The NautoScan NX radars distribute the raw radar video via redundant LAN to all connected workstations.
- The NautoPlex collects and distributes sensor data via redundant LAN to all connected workstations.
- Each workstation is connected to the redundant LAN and configured according to customer requirements, providing data processing and distribution for navigational applications.
SYNAPSIS NX SYSTEM COMPONENTS

**Multifunctional workstations**

Synapsis NX Workstations can be easily configured according to customer’s individual requirements – from a radar or ECDIS workplace up to a fully integrated multifunctional workstation. All workstations use a standardized HMI, provide central and local change of colors and dimming and share individual and situation-specific user settings. The workstations also integrate data and operation of other systems such as autopilot, AIS or NAVTEX.

**Standardized PCs**

The Small Marine Computer (SMC) is the standard for all Synapsis Workstations, making logistics fairly simply and thus shortening service time and cost. The SMC features a solid-state disk and passive cooling to increase reliability and lifetime. With its ultra-compact design and powerful processing capabilities, the SMC is ready for universal use on various ship types.

**NautoScan NX – superior LAN-based radar sensor**

The new NautoScan NX radar transceivers use state-of-the-art network technology. Key benefits are the redundant Gigabit LAN video distribution and the raw data processing on workstation level for high flexibility and optimized performance. The radars feature a future-proof design with built-in reliability and have been optimized for easier installation and cost savings at shipyards.

**Streamlined sensor collection and distribution**

The new, central NautoPlex serial to LAN converters collects sensor data as well as status information. The data is distributed via LAN to every workstation. Thanks to a free selection of installation place the NautoPlex series leads to reduced cabling and termination cost, simplified project engineering and commissioning, and finally high flexibility to adapt to any system layouts.
**Intelligent infrastructure software framework**

As part of each workstation, the Synapsis Integration Platform concentrates and processes all central services of the navigation system such as data storage and distribution, health monitoring, redundancy and backup management, alarm monitoring and data display. This makes possible an easy configuration, modification or even extension of the respective tasks on a workstation (e.g., chart-radar, ECDIS, conning). The platform also allows for the integration of further sensors and systems.

**Flexibility and safety through state-of-the-art LAN**

All information of navigational sensors, radar, ECDIS and other systems is distributed within a redundant LAN. Data is bundled, shared, locally stored at each workstation and presented by the end user applications. The implemented redundancy ensures highest availability of information and offers high flexibility in bridge system layouts (including moving hardware off the bridge). New workstations can be easily added via LAN and receive all relevant data and configurations automatically.

**12" Synapsis Touch Panel**

The new Synapsis Touch Panel (STP) is available for mounting into the consoles as a centralized display for alert management (INS, bridge level or as NAUT(OSV) CAM-HMI) or other specific functions (via Conning NX software modules). The STP is a 12" powerful panel PC with multifunctional touch display, solid-state disk and low-noise passive cooling.

**Remote Diagnosis Option**

Synapsis Remote Diagnosis is a new service which allows Raytheon Anschütz shore-based service experts to check actual system status and download parameter and error logs. This ensures optimized service actions with predictable result and avoids unnecessary attendance, altogether resulting in lower service cost. Synapsis Remote Diagnosis is easy to integrate with low hardware efforts.
SYNAPSID APPLICATIONS, SENSORS, STEERING SYSTEMS

Synapsis (Chart-) Radar: Effective collision avoidance
Synapsis Radar features a sensitive tracker, anti-clutter technology and advanced radar functions such as the enhanced integrated target management-, or the intuitive and unique SeaScout collision avoidance function. The square radar pictures as well as the chart radar function further increase efficiency in watch keeping and support optimal situation assessment in any traffic situation and under any weather or sea state conditions.

Synapsis ECDIS: Route planning and route monitoring
Synapsis ECDIS offers a clear presentation of all information needed for safe route monitoring and anti-grounding control. The ECDIS features intelligent functions such as weather data and forecast symbol overlay, radar video overlay, autopilot remote control with curved heading line display, AIS operation and text messaging and NAVTEX data integration. Also, route planning has become fairly easy with Synapsis ECDIS. The automatic route planning function allows creation of a safe and optimized route with only a handful of clicks. Before and during the voyage the ECDIS offers a simplified display and calculation of ETA for different waypoints as defined by the operator. Together with the Anschütz NP 5000 autopilot series, Synapsis ECDIS forms a track control system Cat. C.

Synapsis Conning NX: Central data display and control
The Synapsis Conning NX is the centralized data display for the ship’s command. The combination of different instruments and indications such as navigation and machine status data at a central display increases situational awareness even in critical situations of maneuvering and docking and provides the operator with efficient help in decision making. Conning NX is a versatile and extremely capable software. It allows the implementation of further functions, including the ability to control and actuate external hardware interfaces.

In addition, together with the Synapsis Touch Panels, Conning NX can provide the HMI for a centralized alert HMI (CAM-HMI) of the INS, on bridge level or as a bridge alert management system for DNV Class Notation NAUT(OSV).
**Anschütz heading sensors**

Anschütz gyro compasses are known for their superior accuracy and reliability even under harshest environmental conditions. The Standard 22 is the most popular gyro compass on the market – thanks to its accuracy and robustness, its reliability and functionality, as well as its long maintenance intervals and cost effectiveness over lifetime. Standard 30 MF is the latest Anschütz gyro compass and the perfect choice for customers, who require a maintenance-free gyro compass. Based on Hemispherical Resonator Gyro (HRG) technology it offers an outstanding lifetime performance (significant better than FOG).

**Anschütz steering systems**

Synapsis INS offers a seamless integration of the Anschütz NautoSteer AS advanced steering control system and Anschütz autopilots. NautoSteer AS is the next generation of a sophisticated manual steering gear control system for customers that require reliability, safety and an outstanding functional range. The modular system architecture of NautoSteer AS allows for standardized and cost-effective solutions as well as individual and advanced system configurations. Anschütz autopilots use proven steering algorithms that are known by seafarers for their outstanding steering performance and precision. The autopilots are designed for ease-of-use and offer valuable functions. Depending on the autopilot type, this can include course and track control modes, an acceleration monitor and fuel-saving capabilities.

**Track control system with Synapsis ECDIS and NP5000**

In combination with Anschütz NautoPilot 5000 series, Synapsis ECDIS is approved for track control category C to offer highest precision in automatic steering.
ADVANTAGES OF AN INS

Synapsis has also set the standard as the world’s first system in compliance with the IMO and IEC standards for integrated navigation systems (INS). This offers advantages with regard to safe and efficient operation.

Central bridge alert management
The bridge alert management collects alerts in the network and determines, with regard to system configuration and status, whether the situation is sufficiently critical to set off an alarm, or whether the watch officer will only get an alert of lower priority. The conning serves as the central alert display. Advantages: less beeping and blinking to attend to reduces stress and work load. Additionally, attention is directed to the really essential alarms on the bridge.

Performance management
The system automatically observes the performance and status of all workstations and sensors connected to the INS. On a central display the operator has all information about the total navigation system configuration and its health status available at a glance.

Central target management
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. Consequently, target-related alerts are based on system-level targets to offer immediate and clear situational assessment.

User setting management
The user management allows storage and sharing of user settings for either a single application or the entire system. This includes the possibility to define standardized user profiles or standardized settings for certain maneuvering situations such as docking, harbor or open sea.

Central sensor management
The redundant INS central sensor management allows automatic central sensor selection and monitoring (Consistent Common Reference System (CCRS)). Advanced monitoring functions detect malfunction and disturbance, mark and exclude such sensors from selection and distribution.
System health status at a glance

Alert history
Raytheon Anschütz, with its international companies, is close to the most important shipping routes and close to the world’s leading shipyards. Shipyards and ship owners can rely on on-site technical support and supervision of installations, provided with the know-how and flexibility of a developing and manufacturing company.

365/24/7 – CUSTOMER SERVICE

Highly skilled coordinators. Personal support. Transparent service status. No delays.

Service Center Kiel, Germany +49 171 651 0708
Service Center Bremerhaven, Germany +49 171 303 4853
Service Center Panama +507 667 276 76
Service Center Singapore +65 829 888 44