



SAAB

R6 NAV NAVIGATION SYSTEM

Integrity and Precision



R6 NAV – Navigate with Integrity and Precision

Next-generation maritime navigation system – exceptional precision and integrity protection.

The R6 NAV is a class-leading, versatile, advanced navigation system built to exceed the demands defined by the IMO and classification organizations. It underscores the need for reliable and protective tools capable of countering the rapidly increasing threats to vessel integrity while providing precise navigation tailored to different segments. The R6 NAV system is simply your partner when looking for a reliable, precise, and secure solution that is future-proof and easy to upgrade.

Maritime security at risk

A major growing security threat in the maritime sector is jamming and spoofing attacks, where fake incoming signals jeopardize the vessel position, and where older designs of GPS equipment is extra vulnerable to interfering signals.

Uncompromised, these attacks may lead to catastrophic outcomes, resulting in the loss of life and goods. Such threats not only impact the safety and security of the shipping industry but also have potential systemic effects on the world economy. Saab is determined to counter this development, and by introducing the R6 NAV suite, we offer our customers class-leading navigation with unmatched integrity protection.

Redundancy in its DNA

Security at sea spells redundancy, which, in the context of maritime navigation, means that as long as you have access to positioning data, you are safe. The R6 NAV GNSS and NAV DGNSS offers multi-system support with access to GPS, GLONASS, Galileo, BeiDou, NavIC and QZSS, with augmentation support through SBAS or external input. Powered by an 800+ channel receiver, it provides class-leading satellite coverage capable of coping in challenging environments with signal drop-off and strong interference.

Serving your needs

No matter whether you operate a general cargo or special-purpose vessel within maintenance, dredging, icebreaking, or offshore business, Saab has a solution tailored to fit your needs. Rooted in years of development, the R6 NAV system is offered in four configurations – R6 NAV GNSS, R6 NAV DGNSS, R6 NAV PRO, and the R6 NAV PRO RTK – catered to meet your requirements for precise navigation and integrity protection.

Multi-frequency support with Atlas and RTK

The R6 NAV PRO and PRO RTK feature our most advanced navigation solutions, offering DGNSS combined with support for satellite L-band and RTK correction data. These versions provide extreme navigation precision down to one centimeter in demanding environments, whether in special-purpose operations such as dredging, maintenance, or research. The PRO series further enhances redundancy by adding multi-frequency support, substantially increasing the capacity to listen to multiple channels in parallel. Below is a chart illustrating the different solutions and their configurations. Regardless of the system you opt for, Saab promises unmatched performance compared to the industry average.

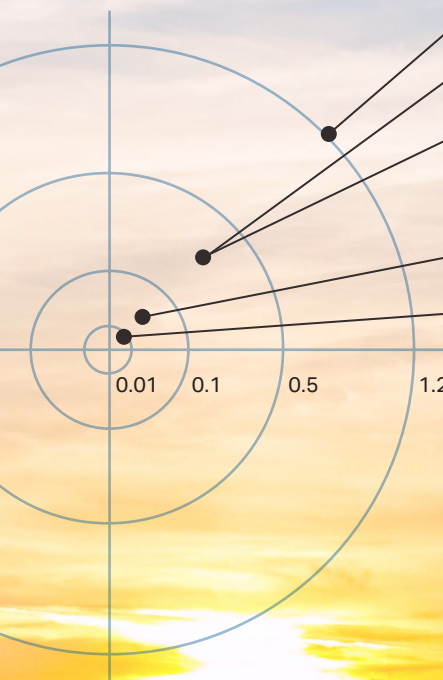


R6 NAV system overview

The R6 NAV systems are fully compliant with IMO requirements for safe navigation according to SOLAS Chapter V, and are easy to upgrade. The systems are delivered as complete kits with the R6 CDU (control and display unit) and antenna.



System	External corrections	Precision and Accuracy RMS 67% / 2DRMS 95%
R6 NAV systems (uncorrected)		1.2 m / 2.5 m
R6 NAV GNSS	SBAS	0.3 m / 0.6 m
R6 NAV DGNSS	+ IALA Beacon	0.3 m / 0.6 m
R6 NAV PRO	+ L-band corrections: • Atlas H10	4 cm / 8 cm
R6 NAV PRO RTK	+ Local RTK	8 mm +1ppm / 15 mm +2ppm



1.2 meters, not to scale

10 m
IMO Requirements
Coastal Waters

100 m
IMO Requirements
Open Sea

R6 NAV GNSS

7001 000-730

The 800+ channel multi-GNSS receiver provides class-leading satellite coverage from all constellations including GPS, Galileo, GLONASS, BeiDou, NavIC and QZSS. SBAS (Satellite-Based Augmentation System) enhances GNSS accuracy with position errors below 1 meter. It provides GEO ranging, integrity, and correction information, improving both accuracy and integrity assurance. Antenna: MGA-3

Differential corrections:

- SBAS (WAAS, EGNOS, MSAS)
- Input from external IALA Beacon receiver

R6 NAV DGNSS

7001 000-731

Built-in beacon receiver for Differential GNSS (DGNSS) as required by most classification societies. Correction data and integrity information from fixed ground-based reference stations in the 300 kHz radio-navigation band with ranges up to 250 km, enhancing accuracy and integrity according to the IALA-standard. Antenna: MGL-5

Additional corrections:

- IALA Beacon (internal input)

R6 NAV PRO

7001 000-732

When extreme precision is required, typically for surveying, dredging or integrated in DP-systems, the R6 NAV PRO or NAV PRO RTK system is often the preferred choice. L-band satellite corrections provides precision below 1 decimetre. Multi-frequency operations enabled for improved position integrity when Atlas H10 is active. Antenna: A43

Additional corrections:

- L-band corrections Atlas H10 (by subscription)
- L-band corrections Galileo HAS (when fully operational)

R6 NAV PRO RTK

7001 000-733

Adding an RTK license enables usage of local RTK services when extreme precision is a prerequisite for mission accomplishment, providing real-time navigation down to centimeter precision. Antenna: A43

Additional corrections:

- Local RTK

Each R6 NAV system include all features in the version listed above.

Features that make a difference



Next generation GNSS receiver

The R6 NAV system features the latest generation of GNSS receiver, capable of tracking 800+ channels across multiple frequency bands using integrated software to handle incoming signals. It comes equipped with a dedicated acquisition engine that scans multi-hypotheses in parallel for effective Time-To-First-Fix (TTFF) in cold-start and signal-degraded environments. The GNSS receiver chipset architecture keeps the number of components low, reducing complexity while increasing reliability and lowering power consumption.

Flexible system architecture

The R6 NAV system's modularity sets it apart from the competition, offering a flexible architecture characterized by a high level of interoperability and ease of integration with other bridge solutions. The R6 NAV system also offers upgradability and provides an easy path to enhance your system's performance when needed.

The R6 NAV system may share the CDU with the R6 Supreme AIS/VDES transponder, saving bridge space and cost. The CDU boasts a high-resolution sunlight-readable 7-inch capacitive touch display with a modern user interface, providing an unmatched experience. The display features a resolution of 1024x600 pixels, supporting more than 16 million colours, along with an interface for dimming central bridge equipment.

Anti-jamming and anti-spoofing technology

The R6 NAV system features built-in anti-jamming and anti-spoofing technology that effectively suppresses any attempt to compromise vessel integrity. The system combines digital filtering with advanced algorithms to analyse and detect signal interference.

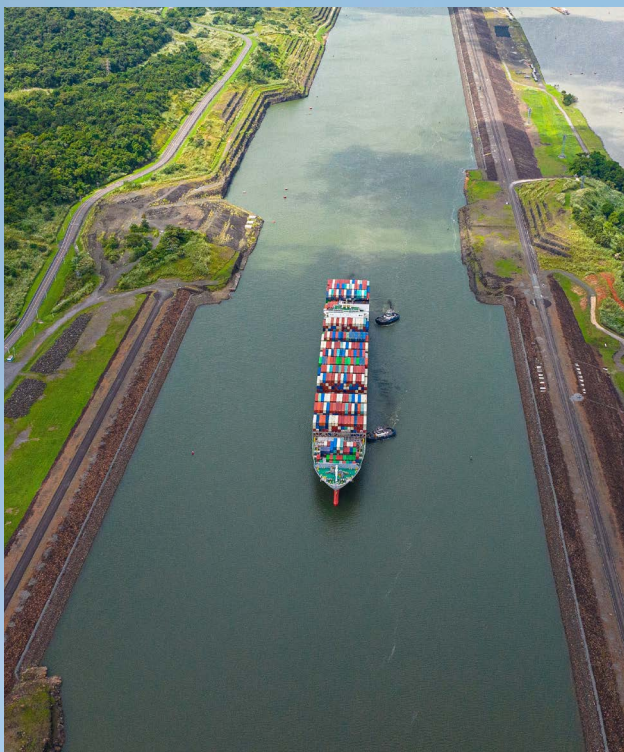
It successfully identifies, separates, and suppresses interfering signals from available GNSS constellation signals, resulting in higher satellite availability in environments with band interference. The R6 NAV system also incorporates high-resolution Analog to Digital Converters (ADC) for class-leading anti-jamming performance.

Overall, the R6 NAV system's active jamming and anti-spoofing protection help prevent attacks on vessels by manipulating GNSS signals. Combined with multi-system and multi-frequency support, this creates an extremely robust navigation platform capable of maintaining vessel integrity even in the most challenging environments where many navigation systems fail.

Built for the future

The R6 NAV is prepared for Galileo OS-NMA (Open Service Navigation Message Authentication) and Galileo HAS (High-Accuracy Service). OS-NMA provides authentication for Galileo signals, ensuring they are from legitimate sources, while HAS offers enhanced positional accuracy through precise correction data. These enhancements ensure the system not only meets current navigation challenges but is also equipped to handle evolving threats and requirements, solidifying its position as a class-leading solution in maritime navigation.

The R6 NAV system's future-proof design and comprehensive protection measures make it indispensable for ensuring secure and reliable maritime operations in the ever-evolving landscape of navigational threats.



R6 NEO – our new family member

Built on the robust foundation of the R6 NAV, the newly released **R6 NEO** and R6 NAV NEO systems represent a next step in high-precision navigation solutions.

R6 NAV NEO is designed to meet the increased demand for precision navigation, and is SOLAS approved for bridge integration and general use on any waters while also approved by the Panama Canal Authority (ACP) as a non-portable piloting unit (NPPU) required onboard NeoPanamax vessels.

The R6 NAV NEO boasts an array of additional features beyond the R6 NAV PRO RTK, delivering not only high-precision but also enhanced speed, course, heading, and rate of turn data, providing you with comprehensive navigational insights for optimal performance and safety. The integrated IMU (Inertial Measurement Unit) provides backup of the GNSS position and further improved integrity.

By combining SOLAS and Panama approvals, the R6 NAV NEO sets a new standard for high-precision navigation.

Learn more at: www.saab.com/products/r6-neo





Technical specification

Dimensions/Weight

R5 Navigation Sensor:	261x53x177 mm / 1900 g
R6 CDU:	220x125x45 mm / 1500 g

Interfaces

IEC 61162-1/2	8+1 IEC 61162-1/2 - Output 5+1 IEC 61162-1/2 - Input
LAN	2x2 IEC 61162-450 Ethernet RJ45
Alert relay	5A, 30VDC

(D)GNSS Receiver

GNSS/DGNSS approvals:	61108-1, 61108-4
Supported systems:	GPS/GLONASS/ BeiDou / GALILEO
Differential modes:	SBAS/ IALA Beacon / RTCM-104
Sensitivity:	-142 dBm
Channels:	800+
Update rate:	Up to 10 Hz
Accuracy* (RMS 67% / 95%):	Uncorrected: 1.2 m / 2.5 m SBAS (WAAS): 0.3 m / 0.6 m
Timing (1PPS) accuracy:	20 ns
Cold start:	1 min typical

IALA Beacon Receiver (DGNSS/NAV PRO)

Dual receiver:	Manual or Automatic
Frequency:	283.5 to 325.0 kHz
MSK Bit Rates:	50, 100, 200 bps
Cold Start Time:	< 1 minute typical
Reacquisition:	< 2 seconds typical
Sensitivity:	25 µV/m for 6 dB SNR @ 200 bps

Environmental data

R5 Navigation Sensor:	IEC 60945 Protected
R6 Supreme CDU:	IEC 60945 Protected

Power input

Input voltage	12-24 VDC Nominal
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Power consumption

R5 Navigation Sensor:	8 Watts
R6 CDU:	5 Watts

GNSS Antenna interface	50 Ohm (TNC), 5 VDC
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Bridge alert management	IEC 62923-1/-2
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R6 NAV PRO additions

License options:	Multi frequency RTK (L1, L2, L5, G1, G2, E1, E5, B1, B2) L-Band correction subscriptions (can be combined with RTK)
Antenna:	Precise Multi Frequency DGNSS
Accuracy* (RMS 67% / 95%):	RTK: 0.8 cm / 1.5 cm L-Band correction: 4 cm / 8 cm
RTK protocols supported:	ROX, RTCM v3.1, CMR, CMR+

*Accuracy depends on multipath environment, number of satellites in view, satellite geometry, baseline length (for local services) and ionospheric activity.

Warranty and Support

All our systems are delivered with a three-year warranty. We offer global support through our widespread distribution and integration network, providing local presence for easy installation and aftermarket support. Our products undergo extreme testing to ensure that the finished product upholds the highest possible quality, for maximum reliability and longevity. In addition to local distributors, you get access to our technical team in Sweden, comprised of industry-leading developers ready to assist you in cases that demand special attention.

It is in our DNA to make sure that you, as a customer, are satisfied, and that we do whatever it takes to deliver outstanding value.

Join the Saab development team

At Saab TransponderTech, we are dedicated to providing our customers with best-in-class maritime communications and navigation solutions. With over 30 years of industry experience, we have continually contributed to its advancement by offering innovative solutions to emerging challenges. As pioneers, we were the first to introduce an AIS transponder, and now we have launched our maiden VDES satellite payload into orbit. Our solutions are crafted by customers, for customers, ensuring that every development step addresses a specific need.

By joining the Saab TransponderTech community, you become part of a collaborative effort where we work together as one strong team to meet new challenges – what we call **'Connecting Everything Maritime'**.

