Marine

Positioning and Orientation Solutions for Marine Applications

PART OF HEXAGON

FEWER ROUGH WATERS

Marine environments present some of the most challenging positioning conditions in the world—raging currents, rugged coastlines, narrow passageways and high winds. With industry leading technology spanning over two decades, NovAtel delivers reliable, high precision positioning products that marine application developers can count on for their competitive advantage. And with engineering-based customer support provided to all of our customers, you can be confident NovAtel will deliver the performance you need for success.

INNOVATIVE THINKING SETS US APART

NovAtel's Global Navigation Satellite System (GNSS) positioning solutions are used in marine positioning, hydrographic survey and navigation applications around the world. State-of-the-art, our technology is easy to integrate and configure, and delivers future-proof features and capabilities.

Precise Products, Superior Solutions

With high quality GNSS products that include receivers, antennas, inertial systems, correction services and post-processing software, NovAtel provides a single source for purchase and customer support of all aspects of a marine positioning solution.

GNSS PRECISE POSITIONING RECEIVERS

NovAtel's GNSS receivers set the standard when it comes to positioning performance, flexibility and ease of integration. Available card-level or enclosed, our multi-constellation, multi-frequency receivers offer low power consumption, field upgradeable software and comprehensive message suites. Our rugged enclosed receivers provide maximum protection and a variety of connectivity and configuration capabilities. Our ProPak6™ GNSS receiver, with delayed heave signal, provides an excellent rover option.



GNSS ANTENNAS

NovAtel's patented VEXXIS™ antenna series delivers exceptional GNSS tracking and positioning performance with triple-frequency, multi-constellation and L-Band reception (1525-1560 MHz). They provide excellent multipath rejection and minimal phase center variation that are quintessential for high accuracy positioning applications.

Our ATEX qualified marine GNSS antennas are designed with INMARSAT interference rejection, for optimal performance in challenging conditions. Our low profile compact antennas offer a variety of form factors and configurations suitable for space constrained applications.

NovAtel SMART antennas are high precision products that include a board level GNSS receiver and GNSS antenna integrated into one compact enclosure.



SPAN® GNSS INERTIAL SYSTEMS

SPAN (Synchronous Position, Attitude and Navigation) technology tightly couples our precision GNSS receivers with IMUs to provide continuous 3D position, velocity and attitude (roll, pitch, yaw) determination—even when satellite signals are blocked or unavailable for short periods of time. Our SPAN systems include receivers, IMUs, single enclosure GNSS+INS systems and interface cards.




MARINE CORRECTION SERVICES

Our Oceanix™ GNSS correction service delivers exceptional sub-decimetre positioning for diverse marine applications including dredging, hydrographic survey and mapping. Combined with NovAtel CORRECT™, it provides high accuracy positioning and aids rapid reconvergence following GNSS signal interruptions.

WAYPOINT PRODUCTS GROUP

FIRMWARE/SOFTWARE

NovAtel offers a range of firmware and software options that are field upgradeable and designed to optimize your equipment's performance. Marine integrators can leverage our ALIGN® heading and relative positioning firmware and Inertial Explorer® GNSS+INS post-processing software to optimize system performance.

For additional information on all our industry leading products, visit novatel.com

SPOTLIGHT ON HYDROGRAPHIC SURVEY

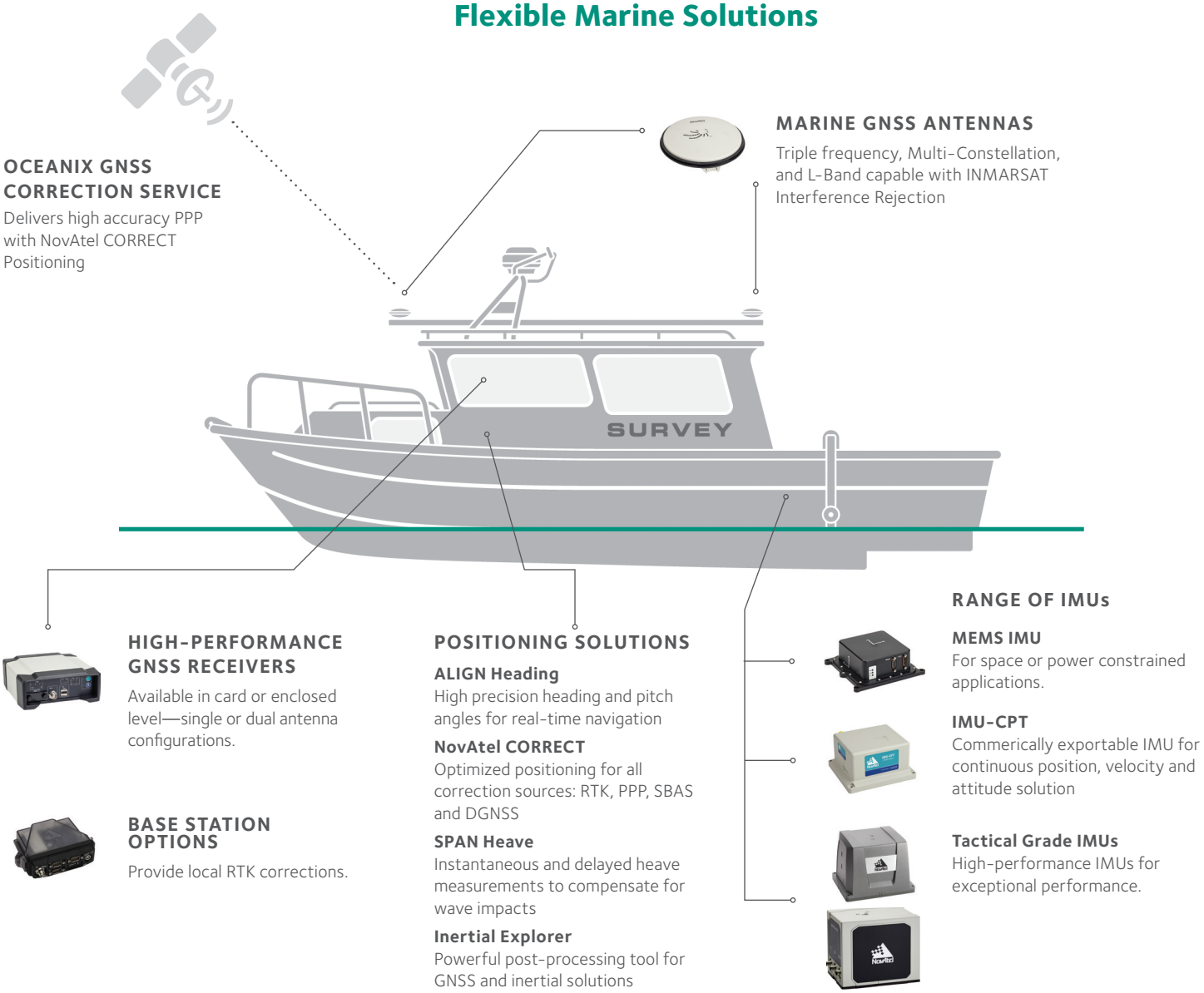
Explore the Secrets of the Deep

Advances in technology make exploring the oceans one of the greatest opportunities of the 21st century. Our leading GNSS innovations are already helping hydrographic surveyors discover the secrets of the deep—and they're doing it more precisely than ever. Our positioning and orientation products have been tested, evaluated and accepted in sea trials by major sonar manufacturers around the world.

Customized and Configured for You

Wie offer a number of options when it comes to system performance, size and cost. Dual antenna systems can be configured with the receiver, IMU and firmware options necessary to create solutions that meet your product's market and competitive demands.

Flexible Marine Solutions



TAKE POSITIONING TO THE NEXT LEVEL

Our innovative firmware, software and correction services maximize your marine application's positioning performance.

SPAN Heave

SPAN technology efficiently integrates the GNSS and inertial outputs to provide accurate measurements of wave motion under the most difficult marine conditions and vessel dynamics.

SPAN Heave provides instantaneous and delayed heave measurements to compensate for wave effects, with a configurable heave filter window. This allows bathymetric measurements to compensate for the range errors introduced by the heaves.

ALIGN Heading and Relative Positioning Firmware

ALIGN firmware combines two or more receivers to generate precise positioning and heading for dynamic applications. ALIGN uses GPS, GLONASS and SBAS to provide high solution accuracy and availability, with output rates up to 20 Hz on our OEM6® receiver platform.

WE OFFER TWO MODELS:

ALIGN Heading Generates high precision heading and pitch angles between two receivers for real-time navigation.

ALIGN Relative Positioning Generates high accuracy heading, pitch, relative separation and positioning between two or more receivers. It's ideal for customers like marine towing operators who benefit from relative directional heading information.

Waypoint® Post-Processing for Greater Accuracy

Inertial Explorer, post-processing software from NovAtel's Waypoint products group, is a powerful and highly configurable processing engine that ensures the best possible accuracy using all available GNSS data. It processes data in forward and reverse time and takes advantage of features like local base station differential processing, backward smoothing and the application of precise satellite clock and orbit information. The result is accuracy beyond what is possible in real-time.

Learn more at novatel.com/Waypoint

NovAtel CORRECT Positioning

The depth of NovAtel's GNSS experience, reflected in how we process correction data in the receiver, sets us apart from others. NovAtel CORRECT is the state-of-the art positioning technology that ensures optimized performance for all correction sources: RTK, PPP, SBAS or DGNSS.

Combined with Oceanix GNSS correction service, NovAtel CORRECT delivers high accuracy PPP solutions globally. Designed for optimal performance, NovAtel CORRECT with Oceanix enables sub-decimetre positioning with rapid re-convergence. It also helps maintain a decimetre level solution through correction outages (up to 5 minutes).

Learn more at novatel.com/correct

Oceanix GNSS Correction Service

Oceanix provides accurate GNSS corrections to enable sub-decimetre positioning for marine hydrographic survey, dredging, mapping, coastal patrolling and other non-oil and gas marine applications. The high rate corrections broadcast enables carrier phase ambiguity resolution within the GNSS receiver, greatly enhancing the accuracy and speeding recovery from GNSS signal interruptions.

Oceanix Nearshore correction service includes precise GNSS clock and orbit correction data providing high accuracy sub-decimetre solutions worldwide[1]:

» 4 cm horizontal and 6 cm vertical accuracy RMS[2]

Oceanix Nearshore correction service is offered with multiple subscription durations.

Oceanix Advantage

» Proprietary network with over 80 strategically located GNSS reference stations globally.

» Corrections data delivered via geostationary satellites for world wide coverage.

» Independent Network Control Centers

» Control over entire data generation process

» Customer support for the entire positioning solution from NovAtel

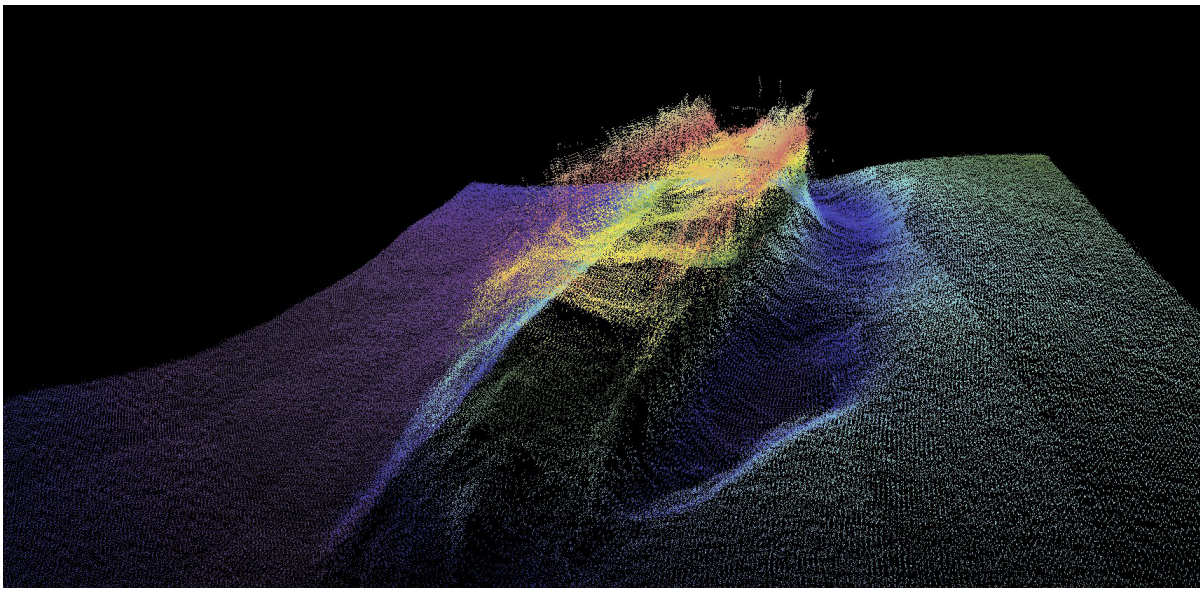
Learn more at novatel.com/products/correction-services/oceanix

OCEANIX

1. Limited by GEO satellite coverage and receiver antenna performance.
2. Calculated from 7 day static data. Accuracy will vary with observing conditions.

SUPERIOR RESULTS

NovAtel's suite of marine solutions provides exceptional 3D position and attitude data in any sea state, even through short GNSS outages.



This image of the Drum Point Wreck was made by the NOAA Bay Hydro II (Chesapeake Bay) with the Kongsberg EM2040 Multi-beam Sonar, NovAtel SPAN, CARIS HIPS & SIPS

Sample Technical Specifications

MOTION SENSOR	IMU-IGM-S1 Entry Level Performance		IMU-CPT Mid Range Performance		IMU-ISA-100C High Range Performance	
	Real Time	Post Processed[3]	Real Time	Post Processed[3]	Real Time	Post Processed[3]
Roll/Pitch	0.015°	0.015°	0.02°	0.015°	0.007°	0.005°
Heading	0.08°	0.08°	0.06°	0.03°	0.007°	0.010°
Position Accuracy[1]	0.02 m^2	0.01 m^2	0.02 m^2	0.01 m^2	0.02 m^2	0.01 m^2
Heave	5 cm or 5%	2.5 cm or 2.5%	5 cm or 5%	2.5 cm or 2.5%	5 cm or 5%	2.5 cm or 2.5%
Data Rate	125 Hz		100 Hz		200 Hz	
Power Consumption	<4.6 W (typical), i/p +10 to +30 VDC		13 W Max, i/p +9 to +18 VDC		18 W (typical), i/p +10 to +34 VDC	
Operating Temperature	-40° C to +65° C		-40° C to +65° C		-40° C to +55° C	
MTBF	> 75,000 hrs[4]		> 10,500 hrs		> 46,100 hrs	
IMU Dimensions	152 × 137 × 51 mm		152 × 168 × 89 mm		180 × 150 × 137 mm	

1. Typical values. Performance specifications subject to GNSS system characteristics. Signal-In-Space (SIS) operational degradation, ionospheric and tropospheric conditions, satellite geometry, baseline length, multipath effects and the presence of intentional or unintentional interference sources.
2. RTK horizontal position accuracy. 1 ppm should be added to all values to account for additional error due to baseline length.
3. Post-processing results using WayPoint Inertial Explorer software.
4. The MTBF for the SPAN-IGM-S1 design has been calculated, using the PRISM Reliability Prediction model for Electronic Equipment and the Parts Stress methodology at 25 °C operating ambient temperature.

Contact Information

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NovAtel offers the marine navigation and hydrographic survey market the most accurate and reliable precise position and orientation solutions in the industry. From R&D to customer service, we're constantly thinking about how we can help our customers do more, be better and maximize their investment. With an exceptional track record in GNSS innovation, NovAtel makes your success our number one priority.

Version C Specifications subject to change without notice.

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