Improve Depth Measurement by Eliminating Effect of Wave Motion in Marine Applications

Benefits and Features

Provides real-time change in height to compensate for wave effects

Configurable heave filter window

Inertial Explorer® processing offers a post-processed heave filter solution

SPAN INS functionality

SPAN Technology

SPAN (Synchronous Position, Attitude and Navigation) technology brings together two different but complementary technologies: Global Navigation Satellite System (GNSS) positioning and inertial navigation. The absolute accuracy of GNSS positioning and the stability of Inertial Measurement Unit (IMU) gyro and accelerometer measurements, combine to provide an exceptional 3D navigation solution delivering full attitude and orientation.

SPAN Heave Overview

The rise and fall movement of a vessel correlates directly to the returning sonar data in marine mapping applications, leading to errors in depth measurement. To compensate for these errors, select SPAN receivers feature the robust heave output option.

The images below show the ocean floor mapped with and without heave compensation. With wave motion eliminated from the data, a much more accurate and coherent image is generated.

No Compensation   Heave Compensation
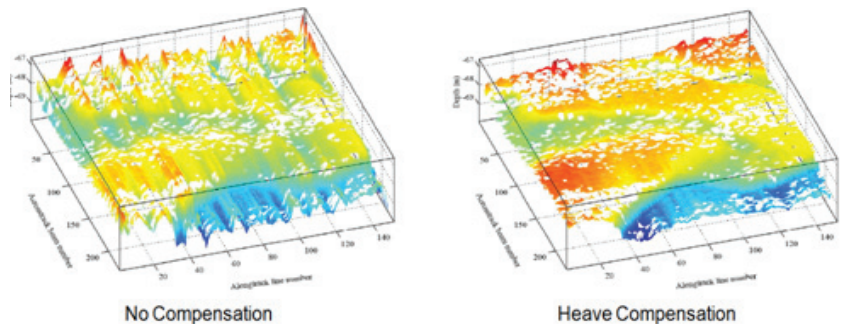
*Credit: Defence Research and Development Canada TM 2003-243
"Removing Roll and Heave Artifacts from High-Resolution Multibeam Bathymetric Data"*

Two SPAN Heave Solutions Available

NovAtel offers real-time and post-processing options for marine application developers.

Real-Time Measurements: SPAN receivers provide accurate, real-time measurement of wave motion under the most difficult marine conditions and vessel dynamics. They offer a full six degrees-of-freedom position and orientation, measuring position, velocity and attitude. The heave filter is an asynchronous log available at 10 Hz.

Post-Processed Solution: Inertial Explorer® software from NovAtel's Waypoint® Product Group, post-processes data forward and backward, ensuring the most accurate heave solution.

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SPAN Heave Compatible Receivers[1]

- SPAN-SE-D[2]
- OEM-SPAN-SE-D[2]
- OEM615[3]
- OEM628[3]
- FlexPak6[3]
- SPAN-CPT[3]

SPAN Heave Compatible IMUs

- IMU-CPT
- IMU-FSAS
- UIMU-HG
- UIMU-LCI
- UIMU-LN200

Heave Accuracy[4]

Real-Time Measurements: SPAN heave 5 cm or 5%

Post-Processed Solution: Waypoint® Inertial Explorer® heave 3.5 cm or 3.5%

Heave Filter Algorithm

The SPAN heave algorithm estimates the short term, vertical displacement of a vessel, relative to the mean sea state caused by waves or swells. This allows a sonar system to compensate for the range errors caused by these effects.
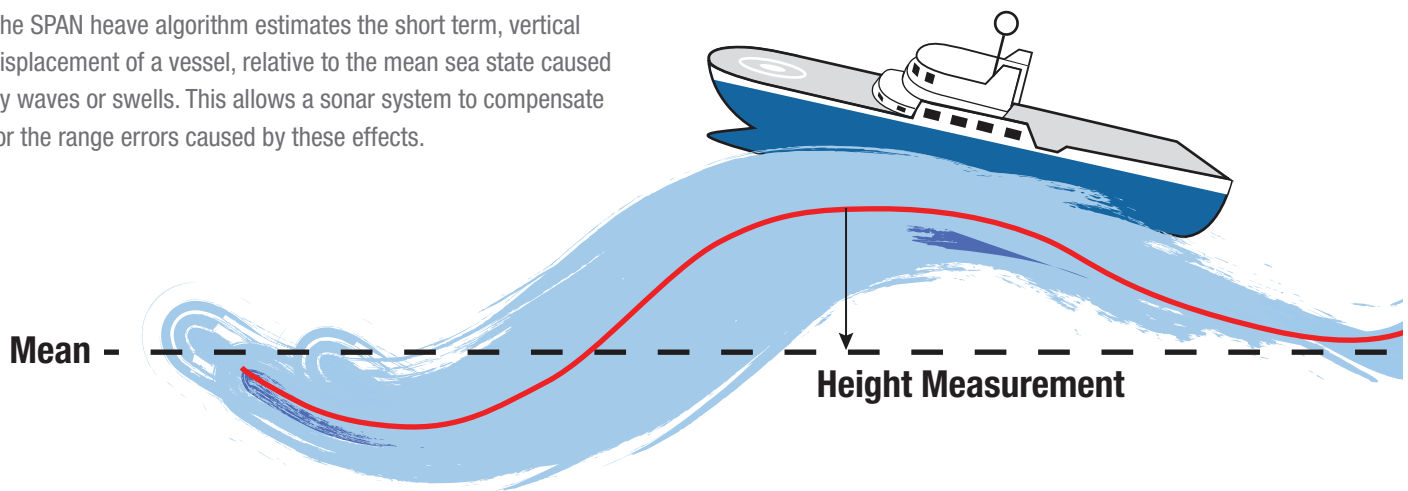
Mean

Height Measurement

1. Consult the product specific technical specifications located at: http://www.novatel.com/products/products-overviewnovatel-gnss-products/
2. Requires dual antenna ALIGN capable SE-D hardware.
3. Requires a second NovAtel receiver to be paired with the SPAN receiver as an ALIGN rover.
4. NovAtel's accuracy specifications are ground mobile derived. For specific application performance results, contact NovAtel.

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