DeviGyro Survey Tool

DeviGyro

The DeviGyro instrument is a miniature, non-magnetic survey tool delivering robust, efficient and accurate performance at any location and in any hole direction. Latest technology, solid-state gyro sensors, fitted with back-up systems, quality control features and advanced navigational algorithms achieve reliable results in any condition or situation.

The instrument itself is a small 1 x 5.5 inch probe, that can be installed within various pressure barrels and running gears, depending on the application. Running gears adapt to the following modes: standard survey, overshot, blast hole survey and core barrel head, and all within one small DeviGyro sensor package.

Before its release, the DeviGyro was subject to a thorough trial program, in cooperation with Downhole Surveys Australia, where it was compared with other leading survey tools – magnetic multi-shots, reference gyros, north-seeking gyros, and breakout holes. DeviGyro's compact size and user-friendly software proved popular and seemed easier to operate than its competition, while delivering accuracy and quality control.

Android Device with DeviGyro

DeviGyro ready for a survey

Continuous operation

DeviGyro provides continuous operation for efficient surveying with minimal impact on the drilling operation itself. The surveying occurs while the tool assembly is lowered and retrieved from the drill string at speeds of up to 100 meters per minute (330 ft per minute). Thus a 1000-meter hole can be surveyed twice, in and out, in less than 30 minutes. 'Multi-shot mode' is also supported for situations where continuous surveying is not possible, like conventional drilling.

Depth is controlled during survey by the DeviCounter, which transmits depth data wirelessly to a handheld Android device for logging and display. The operator has full control of the tool's speed and current depth, securing safe operation and accurate trajectory calculations.

Continuous survey instruments are often limited by hole inclination, especially when the angle is close to vertical. DeviGyro uses filtering and navigational algorithms to avoid such problems, maintaining accuracy while surveying continuously, even in absolute vertical holes.

Rotation while surveying

Internal bias and improper centralization are common issues with surveying technology. These cause multiple errors if the survey tool remains at a steady roll angle throughout survey. The solution is to rotate the tool at a constant rate to cancel bias and eliminate centralization issues. DeviGyro uses patent pending helix centralizers to automatically rotate the tool as it moves inside the drill string.

Overshot mode

DeviGyro offers an 'overshot mode' where it is assembled within a compact overshot system. The patented, long-range wireless antenna system allows communication between the DeviGyro and a handheld device without opening a single thread. Rotating centralizers combat sensor drift and misalignment.

DeviGyro's overshot system can be applied to most core drilling applications. Its short length and ability to survey all hole angles make it ideal for smaller rigs and underground drilling where alternate overshot survey systems struggle due to the short drill rig masts and confined work spaces.

Reference options

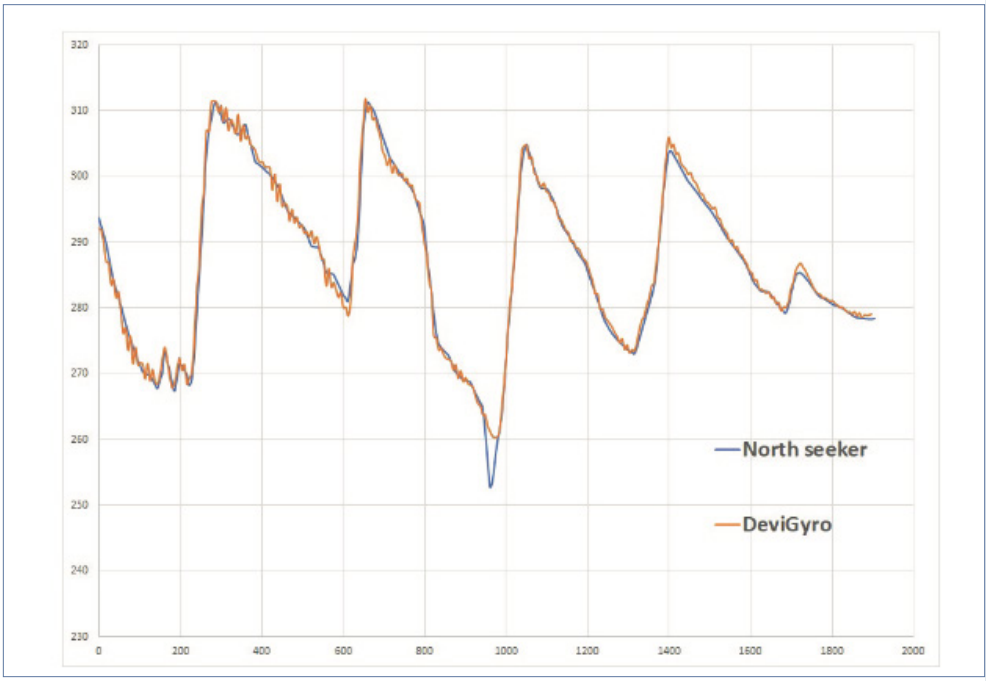
DeviGyro measures changes in direction over the length of the hole to secure accuracy and stability at any location and in any direction. Users can then reference the survey data with the most suitable angle alignment system for their specific drill site. Dedicated, specialized north-seeking alignment solutions typically provide greater accuracy than a downhole, north-seeking survey tool. The DeviGyro can be packaged with such alignment options, including the DeviAligner north-seeker and the DeviSight GPS alignment system.

2400-meter survey

Since its launch, the DeviGyro has been used to survey a variety of drill holes, including RC-, production- and core- drilled holes. Downhole Surveys Australia completed notable surveys at a DDH1 drill site in Western Australia. Namely, a 2410-meter deep, near-vertical hole, with seven significant directional cuts to aim the hole to target. DDH1 are renowned for accuracy in deep hole directional drilling, employing two separate survey methods on critical holes to ensure survey precision. DeviGyro was selected due to its unique design and reputation for accuracy, while a single shot, north-seeking gyro measured azimuth and dip every six meters drilled.

The DeviGyro was set up with standard running gear and auto-rotating centralizers, while the DeviCounter measured depth and velocity. The surveys were performed as continuous surveys and completed with speeds averaging up to 80 meters per minute (262 ft per minute). During final survey, the complete 2410-meter hole was surveyed – in and out, and in less than 75 minutes, with over 45 000 survey stations logged. With the instrument back on surface, the data was downloaded, processed and directly approved by the automatic quality assurance test. Results showed minimal difference between the two survey runs and a mere 0.16° azimuth difference, compared to the north-seeking gyro. These surveys served as solid evidence that DeviGyro delivers accuracy and quality under extreme conditions.

Adapted from an article in Coring Magazine, Issue 12 by Rune Lindhjem, product manager at Devico AS



Azimuth plot confirms DeviGyro's data integrity, aligning with north-seeking surveys