

CASE STUDY

SUITE OF GYRO SURVEYING AND GWD TECHNOLOGIES ADDRESS WELLBORE COLLISION AND MAGNETIC INTERFERENCE RISKS IN HIGH-ANGLE NORTH SEA WELLS

► TECHNOLOGY

- CAAT gyros
- GWD70™
- GWD90™
- Omega^x™ multishot

► APPLICATION

- Riserless tophole drilling
- Wellbore collision risk mitigation
- High-angle well design

► LOCATION

- North Sea, Norway

INDUSTRY CHALLENGE + OBJECTIVE

A major E&P company operating in the North Sea was drilling a series of wells from a platform. Several challenges necessitated a survey program incorporating a range of gyro services, with the dual objectives of optimizing well placement to maximize the wells' recovery factor and acquiring the information necessary to de-risk future well targets. The challenges associated with this campaign included the following:

- Tightly spaced wells in the tophole section with high AC
- Magnetic interference from adjacent conductors and a magnetic formation near the reservoir causing MWD issues
- Environmental noise resulting from riserless drilling in tophole section
- Complex well design requiring specialized high-angle gyro surveying tools

TECHNOLOGY + SERVICE SOLUTION

We provided the operator with a full suite of gyro surveying services, including the following:

- Wireline gyro sighting orientation survey
 - The sighting tool utilizes a z-axis gyro to allow toolface to be determined where conventional gyro technology cannot, such as in challenging offshore environments (high noise in rough seas). It can also switch tool modes downhole to allow stationary surveys to be taken when conditions allow.
- GWD70 and GWD90 surveys
 - The GWD70 and GWD90 systems collect real-time survey data at inclinations up to 70° and 90°, respectively, and in any direction, enabling safer operations and more accurate wellbore positioning.
 - Gyro accuracy ensures precise wellbore guidance for collision avoidance, with the GWD tool providing continuous inclination and toolface from vertical while sliding and full surveys on demand.
 - Outrun multishot mode (OMM) was triggered at TD to allow additional survey on trip out of hole. This allowed improved data quality and additional gross error detection.
- Omega^x drop multishot surveys
 - Omega^x is an all-attitude, solid-state, drop gyro surveying system that integrates two independent, three-axis sensor probes.
 - Solid-state gyro technology can eliminate the added cost and complexity of calculating typical MWD corrections.

RESULTS + VALUE DELIVERED

- Our sighting tool (CAAT) was able to present reliable toolface in challenging riserless conditions, reducing collision risk.
- The OMM of both the GWD70 and GWD90 systems triggered via the MWD downlink perfectly.
- The Omega^x drop multishot survey run with tandem SPEAR probes passed a chi squared test, leading to the high accuracy survey. A competitor's high-angle drop gyro survey equivalent has previously been proven as less time-efficient and less accurate than the Omega^x system.
- The wells could not have been delivered without gyro surveying services due to the high-risk AC environment and the need for accurate well placement for production efficiency