THE TOP 10 QUESTIONS YOU SHOULD BE ASKING YOUR SURVEY PROVIDER

Scientific Drilling is dedicated to survey accuracy to ensure safe and efficient operations—yielding the optimal recovery, and ultimately impacting your bottom line.

To learn more about our commitment, head to our responses to key surveying questions.

01 HOW DO YOU CALIBRATE YOUR GYRO SENSORS & HOW OFTEN IS THIS DONE?
Scientific Drilling’s gyro survey instruments are calibrated using a rigorous process at our manufacturing facility. The calibration process involves development and validation of a “calibration file,” the tool logging around 75 hr to complete. The file consists of over 50 parameters, which model the physical behavior of every tool component. Many of these parameters are temperature-dependent, meaning that they are modeled over our entire operating range with a complex formula, containing dozens of coefficients.

02 HOW DO YOU DETERMINE IF YOUR SENSORS REQUIRE CALIBRATION?
Each District office chooses precision gyro-calibration check stands that are accurately aligned to true north. Before and after each job, each tool is checked in these stands to verify tool performance across its entire operating temperature range.

Once onsite, pre and post job field calibration checks ensure key sensor parameters are still within acceptable ranges. If any parameter is found to have drifted from the calibration file value, the tool is returned to the manufacturing facility for recalibration.

03 WHAT ARE YOUR QA/QC MEASURES?
FIELD CALIBRATION, TOOL TEMPERATURE, IN-HOLE, INTRUM/OUTRUM.
There are several QA/QC measures in use by Scientific Drilling’s gyro survey system.

FIELD CALIBRATION
The most important QA/QC measure is the pre/post job field calibration check. This check ensures that the tool personality file is valid, and that there have been no performance shifts in the tool.

TOOL TEMPERATURE
The gyro is a sensitive instrument, and it is carefully calibrated over a temperature range. In order to perform to SDI’s exacting standards, the tool must only be run in its calibrated range.

IN-HOLE MEASURES
There are over 20 different in-hole QA/QC parameters that apply to the various operational modes of the tool. These parameters measure the performance of the sensors, as well as the optical component of the tool.

INTRUM/OUTRUM
When conditions permit, an Inflow and separate Outflow are performed for every survey. This provides two separate measurements of the well, with independent initializations where possible.

04 DOES YOUR GYRO MEASURE EARTH RATE, IF SO, HOW IS IT COMPUTED?
SDI’s Keeper tools do measure Earth Rate, during its north-seeking operation. Earth Rate can be computed using the formula 15.041° × cosine (latitude).

05 HOW DO YOU KNOW IF YOUR TOOL IS WORKING PROPERLY ON LOCATION?
The QA/QC measures mentioned above ensure that the tool was working properly, and enable the surveyor on location to verify the accuracy of the survey, or call a mission immediately if something went wrong.

06 WHAT LEVEL OF EXPERIENCE AND TRAINING DO YOUR SURVEYORS HAVE?
SDI surveyors undergo a comprehensive training program— including an intense school conducted at a test well in various locations around the world. Many of our surveyors have been running tools for decades and have operated survey tools of various types since they were invented. In addition to learning how to operate the tools and perform quality checks on surveys, our surveyors are fully trained on the theory and mechanics of gyroscopes and our other technologies.

07 HOW ACCURATE IS YOUR SURVEY TOOL AND HOW IS THIS VERIFIED?
The accuracy of Scientific Drilling’s gyro tools is dependent on a variety of factors, and is modeled in the standard ISWCA format. However, our goal is to make the most accurate tool available, and every attempt is made to improve the accuracy of gyro tools by continuing to improve tool geometry and software algorithms.

[See Back Cover for the Expanded Accuracy Information.]

08 DO YOU HAVE AN ISWCA ERROR MODEL FOR YOUR SURVEYS?
Yes, and in fact, Scientific Drilling has different models depending on how the gyro tools are run, such as during survey, stop gyro, etc., in order to achieve accuracy. SDI is an active founding member of ISWCA, and played a key role in the development of the latest ISWCA models.

09 WHO VERIFIES YOUR ERROR MODEL & HOW IS THIS ACCOMPLISHED?
SDI uses several methods for validating its error models. First, the models are subjected to mathematical validation, where specific parameters are compared using scientific analysis of the tool performance. Next, these parameters are validated through regular analysis of the tool calibration records. Every tool that comes through the factory contributes to the development of our error model, and we are always working towards the validation of Keeper error models. And finally, we have run hundreds of test surveys in wells around the world to show repeat performance of our system within our error models.

10 WHO MANUFACTURES YOUR SENSORS & WHAT APPLICATIONS ARE SUPPORTED?
Scientific manufactures our own accelerometers and gyroscopes at our Applied Technology Center located in Paso Robles, California.

SDI was founded by a group of experts from the aerospace industry, who designed and built missile guidance systems for the US military during the cold war. They used their experience to develop a new gyro that met the specific needs of horizontal surveying. This sensor eliminated dependency on government missile contracts, and enabled SDI to design sensors that met the demands of today’s applications.

The sensors are designed and built only for use in SDI’s Keeper and not adapted from some other use. SDI’s sensors offer exceptional performance in the horizontal environment and allows us to constantly measure the quality of our final product.