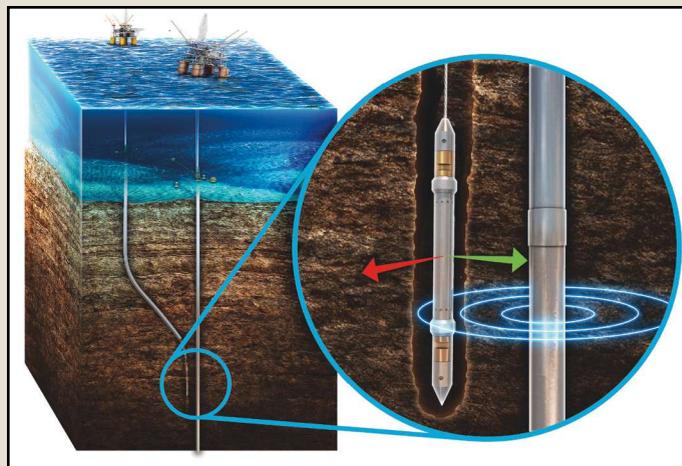


## GYRO-REFERENCED MAGNETIC RANGING

Drilling a relief well often involves magnetic ranging operations. In most cases, active magnetic ranging is the preferred solution. Such tools can define the distance and direction to the target with respect to their own inner reference axis.

In a magnetically clean environment, the azimuthal magnetic toolface could be used to align this inner reference axis with the world's northeast vertical coordinates. However, when the ranging tool is in close proximity to the target well, magnetic azimuthal toolface referencing is problematic. To make it possible to drill ahead in the presence of this magnetic interference, the normal industry practice is to run a gyro survey and ranging tool separately in a well. However, due to poorly defined highside reference and azimuth, this may not be sufficient if the wells are near-vertical.

A proven workaround to this problem is to combine and align both gyro and ranging systems in one tool string and use azimuthal gyro toolface (instead of the azimuthal magnetic or highside gravity toolface) to define the position of the ranging probe reference axis within the world coordinate frame. Scientific Drilling International owns both



**Gyro allows ranging to target when the azimuthal magnetic or highside gravity methods fail to define position. (Source: Scientific Drilling International)**

gyro and ranging technologies which, when combined and deployed during relief well operations, yield dramatic gains in efficiency in well-to-well referencing. [scientificdrilling.com](http://scientificdrilling.com) ■

## LINER SYSTEM DESIGNED FOR LONG LATERALS



Longer laterals equate to increased production for shale drillers. As part of a well construction design for long laterals, a liner often is installed in one of these laterals. This installation typically requires increased torsional and compressive strength from the running tool to get to total depth. The Powerscrew Liner System from Seminole Services was designed to effectively address this demand.

The system's setting tool uses both compression and torsion while setting the liner top. As a result, these loads transfer more easily to the liner during run-in without the need for a special adapter. Another challenge presented by long laterals is the need to rotate and circulate during liner deployment. The system meets this challenge by providing the rotation and circulation necessary for today's well construction. In addition, the system's modern expandable design delivers a step change in reliability. Today's operators do not hang liners. Liners are worked into the lateral section with compression and torque and then set to engage the intermediate casing. [seminole-services.com](http://seminole-services.com) ■

**By using compression and torsion, the Powerscrew is able to set the liner top and ensures easier transfer of loads to the liner during run-in. (Source: Seminole Services)**