

Gyrodata's rate-gyroscopic survey technology offers the versatility to perform multishot and orientation surveys in most pipe sizes, pressures and temperatures.

» Multishot Surveys (Wellbore Trajectory Definition)

Conductor/Drive Pipe:

Rate-gyro survey accuracy in the conductor or drive pipe section assures accurate multiwell planning, slot-target allocation and prevents wellbore collisions. In large pipe sizes of 20-30 inches in diameter, a set of precision "Centrollers" assures a high level of accuracy.



Batch Surveying:

If conductors are batch set at the beginning of a project, Gyrodata can usually survey all pipes from the production deck. This saves time and cost by not having to utilize the rig for survey operations. In subsea operations, ROV can be used to place the survey probe in conductors.

» Casing Section Surveys

Surface Casing:

Rate-gyro accuracy in surface casing prevents wellbore collisions and assures an accurate starting point for directional drilling operations. Depending on pipe size and angle, a decentralized casing survey system or one utilizing centrollers is usually run.

Intermediate Casing:

Rate-gyro accuracy in intermediate casing corrects magnetic MWD surveys and assures accurate target penetration. A decentralized casing survey system is usually run.

TD/Liner:

Rate-gyro surveys to TD provide an accurate wellbore profile for the life of the well—assuring precise reservoir delineation and accurate correlation with seismic and logging information.

Tubing:

The 1.75" OD rate-gyro system, with a pipe ID restriction of 2.25", is ideal for surveying most tubing sizes. The downhole probe typically runs with two bow-spring centralizers or slick.

Resurveying wells:

Rate-gyros are often used to resurvey existing wells to correct for conventional survey error. The new precise survey information is used to re-map a structure for new or remedial drilling operations. Surveys can be conducted in multiple wells on electric line or slickline with the battery-powered system.

Drillpipe:

Rate-gyro surveys run in drillpipe during the drilling sequence correct for magnetic error and provide precision gyro surveying at points other than casing sections. The centralized

1.75" OD battery-probe is usually run.

Depth Control:

Rate-gyros can be run in combination with a casing collar locator or gamma sub to provide added depth correlation over wireline measurement. When run in drillpipe to survey on the trip out of the hole, the pipe measurement is used.

» Directional Orientation/Guidance Services

Drilling Assemblies:

The highest possible orientation accuracy of directional drilling assemblies is achieved with rate-gyro systems, which are used when magnetic interference prevents the use of MWD systems. A mule-shoe stinger at the bottom of the survey probe lands in an orienting sub with a key placed above the MWD and motor.

Steering:

Unlike assembly orientation, where the tool is pulled out of the hole when drilling ahead, the rate-gyro steering probe stays in the hole. In addition to real-time orientation data while drilling, drilling torque is also observed.

Whipstocks/Packers:

Along with the increase in horizontal drilling and re-entry operations, rate-gyros are being used routinely throughout the world to orient the whipstock/packer assemblies prior to drilling out of the casing window. Rate-gyro precision is especially critical to a successful operation as these operations move to greater depths and smaller, high-torque assemblies.

Perforating Guns:

Rate-gyros can be run on wireline in conjunction with perforating guns to provide orientation of the gun. Gyrodata has oriented guns as deep as 16,000 feet in a relief well operation to fire into the blowing well in order to pump kill fluid.

Logging Instrumentation:

While usually run in combination with logging instrumentation for depth correlation and to save time, rate-gyros are also run to define the orientation of some newer directional logging systems, such as the Halliburton Rotascan tool.

Borehole Geophones:

Rate-gyros are often required in borehole seismic operations when tri-axis geophones are employed in Vertical Seismic Profiling. Typically, the rate-gyro is connected to the bottom of the geophone to provide axis orientation at each level in the well and also to survey the well in the same run.

Wellhead Orientation/Leveling:

Rate-gyros can be run to provide the orientation, direction and inclination, of subsea wellheads and templates.