GYRO WHILE DRILLING:
A REVOLUTION IN PERFORMANCE

Quest™ GWD
powered by SPEAR™
A revolution in performance has arrived with an all new solid-state gyro-while-drilling (GWD) tool. The Quest™ GWD system is the second release that utilizes Gyrodata’s innovative SPEAR™ solid-state technology. This ground-breaking technology reduces gyro surveying time and the ellipse of uncertainty for increased speed, precision, efficiency, accuracy, and reliability. This improved performance helps operators avoid lease lines, mitigates frac hits, and enhances ability to hit hydrocarbon-rich target zones. The solid-state sensor package is not affected by shock and vibration under normal drilling conditions, or magnetic interference.

Quest GWD reduces the ellipse of uncertainty by 41% compared to competing MEMS GWD systems, while being two times faster to perform surveys.

### FEATURES + BENEFITS

- Fast survey data collection
- Very high precision
- Reduced tool length – sensors closer to the bit
- Fully transparent quality control – third party verification is now possible
- Very low power requirements, longer run duration
- High accuracy gyro-compassing at all inclinations
- Resistant to shock and vibration

### MARKET + APPLICATIONS

- Vertical, Directional & Horizontal Drilling
- Ellipse of Uncertainty Reduction
- Multi-Well Pad Drilling
- Offshore & Riserless Drilling
- Onshore Drilling
- Batch Well Drilling
- High Latitude Drilling
- Definitive Wellbore Placement
- Areas of Magnetic Interference
- Gross Error Detection
- Collision Avoidance
- Side-Tracking
- Relief/Intervention Well
- IFR & MWD Validation

### ALL-ATTITUDE GWD SYSTEM COMPARISON

<table>
<thead>
<tr>
<th></th>
<th>Gyrodata QUEST™ GWD</th>
<th>Gyrodata GWD90™</th>
<th>Competitor MEMS GWD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Gyro Sensor</td>
<td>3 Single Axis Coriolis Vibratory Rate Gyros</td>
<td>Mechanical 3-Axis DTG</td>
<td>1 Single Axis MEMS Gyro</td>
</tr>
<tr>
<td>Survey Collection Time, Including Steering Initialization</td>
<td>63 seconds</td>
<td>250 - 310 seconds</td>
<td>150 seconds</td>
</tr>
<tr>
<td>Repeatability of Measurements</td>
<td>Highest Precision</td>
<td>High Precision</td>
<td>Low Precision</td>
</tr>
<tr>
<td>Instrument Performance Model (IPM) Accuracy (ISCWSA Well #1 @ Total Depth)</td>
<td>269ft / 82m</td>
<td>352ft / 107m</td>
<td>453ft / 138m</td>
</tr>
<tr>
<td>Memory Multishot Option while TOOH</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>MicroGuide Tortuosity Log Option while TOOH</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Reduction of Personnel at Rig Site</td>
<td>Yes</td>
<td>No</td>
<td>Partial</td>
</tr>
<tr>
<td>Collar Length</td>
<td>11.4ft / 3.5m</td>
<td>24.9ft / 7.6m</td>
<td>25.4ft / 7.7m</td>
</tr>
<tr>
<td>Power Requirements</td>
<td>Very Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Shock Rating</td>
<td>20 g&lt;sub&gt; RMS &lt;/sub&gt;</td>
<td>8 g&lt;sub&gt; RMS &lt;/sub&gt;</td>
<td>Unknown</td>
</tr>
<tr>
<td>Maximum Temperature (unlimited time)</td>
<td>150°C</td>
<td>150°C</td>
<td>100°C</td>
</tr>
<tr>
<td>Fully Transparent Quality Control</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>East-West Cautionary Zones</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Gyroscopic Surveying Experience</td>
<td>39 Years</td>
<td>39 Years</td>
<td>1 Year</td>
</tr>
</tbody>
</table>

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