Orientus is a ruggedized miniature orientation sensor and AHRS that provides accurate orientation under the most demanding conditions.

It combines temperature calibrated accelerometers, gyroscopes and magnetometers in a sophisticated fusion algorithm to deliver accurate and reliable orientation.
**RELIABILITY**
Orientus has been designed from the ground up for mission critical control applications where reliability is very important. It is built on top of a safety oriented real time operating system and all software is designed and tested to safety standards with fault tolerance in mind. The hardware is protected from reverse polarity, overvoltage, surges, static and short circuits on all external interfaces.

**MINIATURE RUGGED ENCLOSURE**
Orientus’s precision marine grade aluminium enclosure is waterproof and dirtproof to the IIP68 standard and shockproof to 2000g, allowing it to be used in the most extreme conditions. It’s minimal size, weight and power requirements allow for easy integration into almost any system.

**HIGH UPDATE RATE**
Orientus’s internal filter runs at 1000Hz and data can also be output at this rate over high speed RS232. This allows for control of dynamically unstable platforms and makes Orientus virtually immune to vibration.

**LINEAR ACCELERATION COMPENSATION**
Orientus uses an innovative algorithm to compensate for linear accelerations. This allows Orientus to maintain accurate roll and pitch through short term linear accelerations that typically cause significant errors in competitors systems. For long term linear accelerations Orientus supports the addition of an external GNSS receiver for full linear acceleration compensation.

**CALIBRATED DYNAMIC RANGING SENSORS**
Orientus contains very high performance MEMs inertial sensors. These are put through Advanced Navigation's intensive calibration process to increase their performance further still and provide consistently accurate data over an extended temperature range of -40°C to 85°C. Advanced Navigation’s custom calibration process is the only full sensor calibration that can provide dynamic ranging, allowing the user to select a sensor range for high accuracy or high accelerations on the fly. As part of this calibration, every Orientus unit spends 8 hours in our specially built rotating temperature chamber.

**MAGNETIC INTERFERENCE MITIGATION**
Orientus’s advanced filter is able to detect when there is magnetic interference present and ignore magnetic data until the interference disappears. This allows Orientus to maintain accurate heading through periods of magnetic interference.

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### ORIENTATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roll &amp; Pitch Accuracy (Static)</td>
<td>0.2°</td>
</tr>
<tr>
<td>Heading Accuracy (Static)</td>
<td>0.5°</td>
</tr>
<tr>
<td>Roll &amp; Pitch Accuracy (Dynamic)</td>
<td>0.6°</td>
</tr>
<tr>
<td>Heading Accuracy (Dynamic)</td>
<td>1.0°</td>
</tr>
<tr>
<td>Orientation Range</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Internal Filter Rate</td>
<td>1000 Hz</td>
</tr>
<tr>
<td>Output Data Rate</td>
<td>Up to 1000 Hz</td>
</tr>
<tr>
<td>Latency</td>
<td>0.3 ms</td>
</tr>
</tbody>
</table>

### SENSORS

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Accelerometers</th>
<th>Gyroscopes</th>
<th>Magnetothers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>2g</td>
<td>250 °/s</td>
<td>2g</td>
</tr>
<tr>
<td></td>
<td>4g</td>
<td>100 °/s</td>
<td>4g</td>
</tr>
<tr>
<td></td>
<td>16g</td>
<td>2000 °/s</td>
<td>8g</td>
</tr>
<tr>
<td>Bias Instability</td>
<td>&lt; 20 μg</td>
<td>&lt; 0.04 °/s</td>
<td>-</td>
</tr>
<tr>
<td>Initial Bias</td>
<td>&lt; 5 mg</td>
<td>&lt; 0.2 °/s</td>
<td>-</td>
</tr>
<tr>
<td>Initial Scaling Error</td>
<td>&lt; 0.06%</td>
<td>&lt; 0.04%</td>
<td>&lt; 0.07%</td>
</tr>
<tr>
<td>Scale Factor Stability</td>
<td>&lt; 0.05%</td>
<td>&lt; 0.05%</td>
<td>&lt; 0.09%</td>
</tr>
<tr>
<td>Non-linearity</td>
<td>&lt; 0.05%</td>
<td>&lt; 0.05%</td>
<td>&lt; 0.08%</td>
</tr>
<tr>
<td>Cross-axis Alignment Error</td>
<td>&lt; 0.05°</td>
<td>&lt; 0.05°</td>
<td>&lt; 0.05°</td>
</tr>
<tr>
<td>Noise Density</td>
<td>100 μg/√Hz</td>
<td>0.004 °/√Hz</td>
<td>210 μg/√Hz</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>400 Hz</td>
<td>400 Hz</td>
<td>110 Hz</td>
</tr>
</tbody>
</table>

### HARDWARE

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Voltage</td>
<td>4 to 36 V</td>
</tr>
<tr>
<td>Input Protection</td>
<td>±60 V</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>0.325 W</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40 °C to 85 °C</td>
</tr>
<tr>
<td>Environmental Protection</td>
<td>IP68, MIL-STD-810G</td>
</tr>
<tr>
<td>MTBF</td>
<td>380,000 hrs</td>
</tr>
<tr>
<td>Shock Limit</td>
<td>2000 g</td>
</tr>
<tr>
<td>Dimensions (excluding tabs)</td>
<td>30x30x24 mm</td>
</tr>
<tr>
<td>Dimensions (including tabs)</td>
<td>30x40.6x24 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>25 grams</td>
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</tbody>
</table>

### COMMUNICATION

<table>
<thead>
<tr>
<th>Interface</th>
<th>RS232</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>4800 to 1M baud</td>
</tr>
<tr>
<td>Protocol</td>
<td>AN Packet Protocol, NMEA or TSS</td>
</tr>
<tr>
<td>Peripheral Interfaces</td>
<td>2x GPIO and Auxiliary RS232</td>
</tr>
<tr>
<td>GPIO Level</td>
<td>5 V</td>
</tr>
<tr>
<td>Peripheral Functions</td>
<td>NMEA input/output</td>
</tr>
<tr>
<td></td>
<td>Novatel input</td>
</tr>
<tr>
<td></td>
<td>AN Packet Protocol input/output</td>
</tr>
<tr>
<td></td>
<td>Magnetometers disable</td>
</tr>
<tr>
<td></td>
<td>Set zero orientation</td>
</tr>
<tr>
<td></td>
<td>Packet trigger</td>
</tr>
<tr>
<td></td>
<td>u-blox input</td>
</tr>
<tr>
<td></td>
<td>TSS output</td>
</tr>
<tr>
<td></td>
<td>Custom (contact us)</td>
</tr>
</tbody>
</table>

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