SPATIAL FOG DUAL
FOG GNSS/INS

Spatial FOG Dual is an industry-proven GNSS/INS and AHRS. It combines high accuracy fibre optic gyroscopes, accelerometers, magnetometers and a pressure sensor with a dual antenna RTK GNSS receiver. These are coupled in an AI based fusion algorithm to deliver accurate and reliable navigation data.

PERFORMANCE

- 0.01° Roll and Pitch
- 0.01° Heading
- 8 mm RTK Positioning
- 0.1°/hr FOG Gyroscope
- Heave: 2% or 0.02 m (whichever is greater)

KEY FEATURES

- Dual Antenna Heading
- Multi-constellation L1/L2 GNSS
- Hot Start Time: 2 seconds
- Low size, Weight and Power

APPLICATIONS

AIR
- Georeferencing
- UAV Navigation
- Stabilisation & Pointing

LAND
- Georeferencing
- Underground Navigation
- Ground Vehicle Navigation

SEA
- Hydrography
- Oil Rig Monitoring
- Marine Navigation
FEATURES

Spatial FOG Dual contains a dual frequency RTK GNSS receiver that provides up to 8mm accuracy positioning and supports all of the current and future satellite navigation systems, including GPS, GLONASS, GALILEO, BeiDou and QZSS.

Dual antenna heading provides high accuracy heading that is not impacted by magnetic interference and has no motion requirements.

Spatial FOG features Advanced Navigation’s revolutionary AI neural network sensor fusion algorithm. This provides accuracy of up to 10 times that of a traditional kalman filter.

It was designed for control applications and has a high level of health monitoring and instability prevention to ensure stable and reliable data.

Spatial FOG contains the KVH Industries 1750 fiber optic gyro IMU, which provides very accurate inertial data, beyond the best MEMS technology available. This allows Spatial FOG to achieve very high accuracies and dead reckon without GNSS for extended periods of time. Despite the high accuracy FOG IMU, Spatial FOG has a very competitive price tag that is lower than many MEMS systems on the market.

Spatial FOG 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 designed and manufactured to mil standards.

Spatial FOG Dual features two general purpose input output pins and two auxiliary RS232/RS422 ports that support an extensive number of peripherals.

Including odometer based input for ground vehicles, DVLs and USBLs for underwater navigation, NMEA input/output and more.

AI NAVIGATION ALGORITHM

DUAL ANTENNA RTK GNSS

HIGH ACCURACY FOG

RELIABILITY

PERIPHERALS
SPECIFICATIONS

NAUTICAL

Operating Voltage 9 to 36 V
Input Protection -40 to 100 V
Power Consumption (typical) 6.12 W
Hot Start Battery Capacity > 48 hrs
Hot Start Battery Charge Time 30 mins
Hot Start Battery Endurance > 10 years
Operating Temperature -40 °C to 85 °C
Environmental Protection IP67
MIL-STD-810G
MTBF > 36,000 hrs
Shock Limit 40 g 11 ms
Vibration Limit 12 g
Dimensions 94 x 94 x 95 mm
Weight 740 grams

COMMUNICATION

Interface RS422 (RS232 optional)
Speed 4800 to 10M baud
Protocol AN Packet Protocol or NMEA
Peripheral Interface 2x GPIO and 2x Auxiliary RS232
GPIO Level 5 V or RS232
GPIO Functions IPPS
Odometer Stationary Pitot Tube NMEA input/output
Novatel GNSS input Trimble GNSS input
AN Packet Protocol input/output
Packet Trigger input
Event Input

SENSORS

<table>
<thead>
<tr>
<th>SENSOR</th>
<th>ACCELEROMETERS</th>
<th>GYROSOPHES</th>
<th>MAGNETOMETERS</th>
<th>PRESSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>± 10 g</td>
<td>± 490 °/s</td>
<td>± 8 G</td>
<td>10 to 120 KPa</td>
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<tr>
<td>Bias Instability</td>
<td>15 ug</td>
<td>0.1 °/hr</td>
<td>-</td>
<td>10 Pa</td>
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<tr>
<td>Initial Bias</td>
<td>&lt; 1 mg</td>
<td>&lt; 2 °/hr</td>
<td>-</td>
<td>&lt; 100 Pa</td>
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<tr>
<td>Initial Scaling Error</td>
<td>&lt; 0.03 %</td>
<td>&lt; 0.01 %</td>
<td>&lt; 0.07 %</td>
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<tr>
<td>Scale Factor Stability</td>
<td>&lt; 0.04 %</td>
<td>&lt; 0.02 %</td>
<td>&lt; 0.09 %</td>
<td>-</td>
</tr>
<tr>
<td>Non-linearity</td>
<td>&lt; 0.03 %</td>
<td>&lt; 0.005 %</td>
<td>&lt; 0.08 %</td>
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<tr>
<td>Cross-axis Alignment Error</td>
<td>&lt; 0.04 °</td>
<td>&lt; 0.02 °</td>
<td>&lt; 0.05 °</td>
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<tr>
<td>Noise Density</td>
<td>120 ug/√Hz</td>
<td>0.7 °/hr/√Hz</td>
<td>210 uG/√Hz</td>
<td>0.56 Pa/√Hz</td>
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<tr>
<td>Bandwidth</td>
<td>200 Hz</td>
<td>440 Hz</td>
<td>110 Hz</td>
<td>50 Hz</td>
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