

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 great)

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

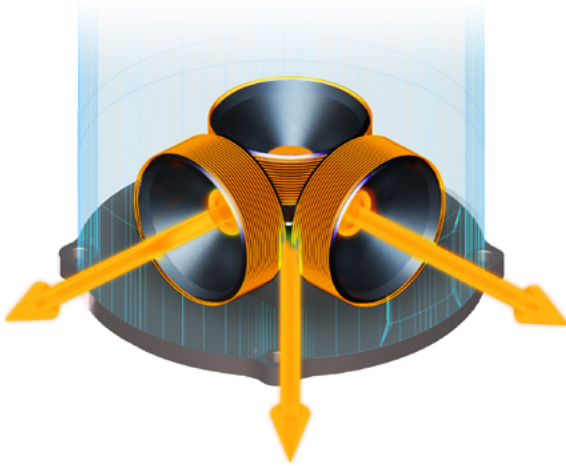
- Georeferencing
- Underground Navigation
- Ground Vehicle Navigation



SEA

- Hydrography
- Oil Rig Monitoring
- Marine Navigation

FEATURES



HIGH ACCURACY FOG

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.



AI NAVIGATION ALGORITHM

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.



RELIABILITY

Spatial FOG has been designed from the ground up for mission critical control applications where reliability is very important.

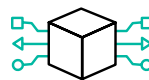
It is built on top of a safety oriented real time operating system and all software is designed and tested to safety standards with fault tolerance in mind. The hardware is designed and manufactured to mil standards.



DUAL ANTENNA RTK GNSS

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.



PERIPHERALS

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.



SPECIFICATIONS

NAVIGATION

| | |
|---|---------------|
| Horizontal Position Accuracy | 0.8 m |
| Vertical Position Accuracy | 1.5 m |
| Horizontal Position Accuracy (with SBAS) | 0.5 m |
| Vertical Position Accuracy (with SBAS) | 0.8 m |
| Horizontal Position Accuracy (with RTK or Kinematica PPK) | 0.008 m |
| Vertical Position Accuracy (with RTK or Kinematica PPK) | 0.015 m |
| Velocity Accuracy | 0.005 m/s |
| Roll & Pitch Accuracy | 0.01 ° |
| Heading Accuracy | 0.01 ° |
| Roll & Pitch Accuracy (Kinematica post-processing) | 0.005 ° |
| Heading Accuracy (Kinematica post-processing) | 0.007 ° |
| Slip Accuracy | 0.01 ° |
| Heave Accuracy (whichever is greater) | 2 % or 0.02 m |
| Orientation Range | Unlimited |
| Hot Start Time | 2 s |
| Internal Filter Rate | 1000 Hz |
| Output Data Rate | Up to 1000 Hz |

HARDWARE

| | |
|-------------------------------|----------------------|
| 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 |

SENSORS

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

GNSS

| | |
|--|---|
| Model | Trimble MB-Two |
| Supported Navigation Systems | GPS L1, L2 GLONASS L1, L2 GALILEO E1 BeiDou B1 |
| Supported SBAS Systems | WAAS EGNOS MSAS GAGAN QZSS Trimble RTX |
| Update Rate | 20 Hz |
| Hot Start First Fix | 3 s |
| Cold Start First Fix | 30 s |
| Horizontal Position Accuracy | 1.2 m |
| Horizontal Position Accuracy (with SBAS) | 0.5 m |
| Horizontal Position Accuracy (with RTK) | 0.008 m |
| Velocity Accuracy | 0.05 m/s |
| Timing Accuracy | 20 ns |
| Acceleration Limit | 11 g |

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 | 1PPS Odometer Stationary Pitot Tube NMEA input / output Novatel GNSS input Trimble GNSS input AN Packet Protocol input/output Packet Trigger Input Event Input |

