ADVANCED NAVIGATION

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 (GNSS)
- 10 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

ITAR FREE

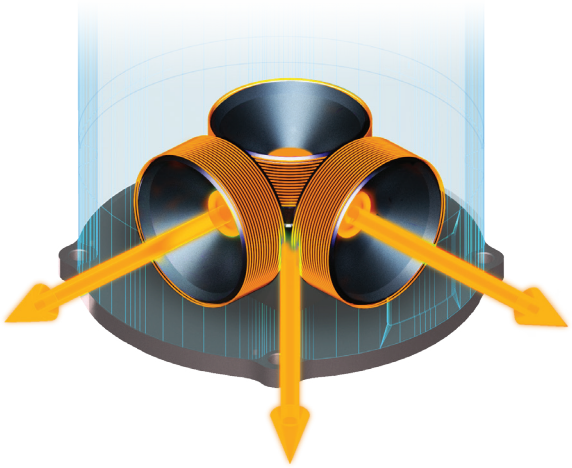
APPLICATIONS

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 EMCORE TAC-450 fibre optic gyro IMU, which provides very accurate inertial data, beyond the best MEMS technology available.

This allows Spatial FOG to acheive 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 10mm accuracy positioning and supports all of the current and future satellite navigation systems, including GPS, GLONASS, GALILEO and BeiDou.

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)	0.01 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)	0.01 °
Heading Accuracy (Kinematica post-processing)	0.01 °
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

GNSS

Model	Advanced Navigation Aries
Supported Navigation Systems	GPS L1, L2 GLONASS L1, L2 GALILEO E1, E5b BeiDou B1, B2
Supported SBAS Systems	WAAS EGNOS MSAS GAGAN QZSS
Update Rate	Up to 20 Hz
Hot Start First Fix	2 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)	0.01 m
Velocity Accuracy	0.05 m/s
Timing Accuracy	20 ns
Acceleration Limit	4 g

HARDWARE

Operating Voltage	9 to 36 V
Input Protection	-40 to 100 V
Power Consumption (typical)	6.1 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 75 °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 98 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	1PPS Odometer Stationary Pitot Tube NMEA input / output Novatel GNSS input Trimble GNSS input AN Packet Protocol input/output Packet Trigger Input Event Input

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

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