



# CERTUS MINI N





## MEMS GNSS/INS

Certus Mini N combines temperature-calibrated accelerometers, gyroscopes, pressure sensor and magnetometers with an advanced GNSS receiver.

These are coupled in an AI-based fusion algorithm to deliver accurate and reliable navigation data. The Certus Mini N features low SWaP-C (Size, Weight, Power and Cost) and multiple communication interfaces for easy integration.

It is available in both rugged and OEM packages and includes licence-free L1/L5 multi-constellation GNSS.

### PERFORMANCE

-  0.1° Roll and Pitch
-  0.2° Heading (Velocity)
-  10 mm RTK Positioning
-  1000 Hz Update Rate

### KEY FEATURES

- L1 /L5 Multi-Constellation RTK
- High Performance Tactical Grade IMU
- Low SWaP-C
- Rugged & OEM options



### APPLICATIONS



**AIR**

- UAV Navigation
- Georeferencing
- Stabilisation & Pointing



**LAND**

- Ground Vehicle Navigation
- Georeferencing
- Robotics Control

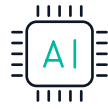


**SEA**

- AUV Navigation
- ROV Navigation
- Hydrography

# FEATURES

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## AI NAVIGATION ALGORITHM

The Certus Mini range features Advanced Navigation's revolutionary AI neural network sensor fusion algorithm.

This provides accuracy levels up to 10 times that of a traditional Kalman filter.

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



## HIGH PERFORMANCE MEMS

The Certus Mini range contains high performance MEMS sensors that are put through Advanced Navigation's intensive 8 hour temperature calibration process.

This provides the highest accuracy possible from this sensor class and outputs consistent accuracy over the full temperature range from  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ .



## RELIABILITY

The Certus Mini range has been designed from the ground up for mission-critical control applications where reliability is essential.

Built using a safety-oriented real-time operating system, all software is designed and tested to high safety standards with fault-tolerance in mind.

The Certus Mini range is designed, manufactured and tested to military standards.



## L1/L5 MULTI CONSTELLATION RTK GNSS

The Certus Mini N supports L1/L5 dual frequencies, and GPS, GLONASS, Galileo, BeiDou and NavIC constellations.

Access to multiple constellations and frequencies provides enhanced accuracy, availability and performance even in difficult environments such as multi-storey urban canyons.

The GNSS receiver has 10 mm position accuracy with real-time RTK or post-processed PPK.



## EXTENSIVE INTEROPERABILITY

Certus Mini seamlessly communicates with a wide range of industry standard protocols including NMEA 0183, NMEA 2000 and CANOpen making it easy to integrate into existing systems.

Certus Mini effortlessly interfaces with ROS 1, ROS 2, and Ardupilot, streamlining your development processes for maximum efficiency and effectiveness.



# SPECIFICATIONS

## NAVIGATION

Horizontal Position Accuracy	1.5 m
Vertical Position Accuracy	2.0 m
Horizontal Position Accuracy (with SBAS)	0.7 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	0.05 m/s
Roll & Pitch Accuracy	0.1 °
Heading Accuracy (Velocity)	0.2 °
Heading Accuracy (Magnetic Only)	0.8 °
Roll & Pitch Accuracy (Kinematica post processing)	0.03 °
Heading Accuracy (Kinematica post processing)	0.06 °
Heave Accuracy (whichever is greater)	5 % or 0.05 m
Orientation Range	Unlimited
Hot Start Filter Initialisation	1 s
Output Data Rate	Up to 1000 Hz

## HARDWARE

Operating Voltage (Rugged)	5 to 36 V
Operating Voltage (OEM)	5 V
Power Consumption (typical) (Rugged)	0.8 W
Power Consumption (typical) (OEM)	0.5 W
Hot Start Battery	Yes
Operating Temperature (MIL-STD-810H 502.7)	-40 °C to 85 °C
Ingress Protection (IEC 60529) (Rugged)	IP67
Shock Limit (IEC 60068-2-27)	150 g, 6 ms
Shock Limit (MIL-STD-810H 516.8)	40 g, 11 ms
Vibration Limit (MIL-STD-810H 514.8)	7.7 g RMS
Dimensions (Rugged)	30 x 41 x 24 mm
Dimensions (OEM)	25 x 25 x 10 mm
Weight (Rugged)	43 grams
Weight (OEM)	8 grams

## SENSORS

	ACCELEROMETERS	GYROSCOPES	MAGNETOMETERS	PRESSURE
Range (dynamic)	± 2 g ± 4 g ± 16 g	± 250 °/s ± 500 °/s ± 2000 °/s	± 8 G	30 to 125 kPa
Initial Bias	< 5 mg	< 0.2°/s	-	< 6 Pa
Initial Scaling Error	< 0.06 %	< 0.04 %	< 0.07 %	-
Scale Factor Stability	< 0.06 %	< 0.05 %	< 0.09 %	-
Non-linearity	< 0.05 %	< 0.05 %	< 0.08 %	-
Cross-axis Alignment Error	< 0.05 °	< 0.05 °	< 0.05 °	-
Noise Density	100 ug/√Hz	0.004 °/s/√Hz	210 uG/√Hz	0.08 Pa/√Hz
Random Walk	58 mm/sec/√hr VRW	0.24 °/√h ARW	-	-
Bandwidth	400 Hz	400 Hz	110 Hz	-

## GNSS

Model	Aries CM
Supported Navigation Systems	GPS L1C/A, L5 GLONASS L1OF Galileo E1B/C, E5a BeiDou B1I, B2a NavIC L5 SPS
Supported SBAS Systems	WAAS EGNOS MSAS GAGAN QZSS
Update Rate	Up to 25 Hz
Hot Start First Fix	3 s
Timing Accuracy	30 ns RMS

## COMMUNICATION

Interface (Rugged)	Primary RS232/RS422 Auxiliary RS232 CAN 2x GPIO
Interface (OEM)	Primary & Auxiliary UART CAN 2x GPIO
Protocols and Functions	Digital Input / Output Frequency Input AN Packet Protocol (ANPP) NMEA GNSS CANOpen 1PPS Odometer / Air Data DVL / USBL RTCM



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