

# CERTUS EVO

## MEMS GNSS/INS






Certus Evo is an AI based GNSS-aided INS that provides extremely accurate position, velocity, acceleration and orientation under the most demanding conditions.

It offers FOG-like performance combined with the reliability and affordability of MEMS sensors. It features low SWaP-C (Size, Weight, Power and Cost), internal data logging and multiple communication interfaces for easy integration.

Certus Evo is available in both OEM and rugged packages, and comes standard with license free 10 mm RTK position accuracy.



## PERFORMANCE

-  0.03 ° Roll and Pitch
-  0.05 ° Heading
-  10 mm RTK Positioning
-  0.2 °/hr MEMS Gyroscope
-  1000 Hz Update Rate

## KEY FEATURES

- Dual Antenna Heading
- Free Multi-Constellation RTK
- Ethernet, CAN, RS232, etc.
- Internal Data Logging
- OEM or Rugged options

## APPLICATIONS



AIR

- UAV Geopointing
- UAV Lidar
- Stabilisation & Pointing



LAND

- Gimbal Stabilisation
- Structural Monitoring
- Vehicle Navigation



SEA

- AUV Navigation
- ROV Navigation
- Hydrography

# FEATURES

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## ULTRA HIGH ACCURACY MEMS

Certus Evo features some of the highest accuracy MEMS accelerometers and gyroscopes currently available.

Certus Evo's inertial performance exceeds some FOG IMUs and is up to 10x smaller and 10x cheaper.

Certus Evo is put through Advanced Navigation's intensive calibration process to provide consistently accurate data over an extended temperature range of  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ .



## AI NAVIGATION ALGORITHM

Certus Evo 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.



## DUAL ANTENNA HEADING

Certus Evo contains a dual frequency RTK GNSS receiver that provides up to 10 mm 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.



## TIME SYNCHRONISATION

Certus Evo contains a GNSS disciplined oscillator that can act as the primary time source within a distributed time system, enabling access to ultra-accurate system time using PTP or NTP network time sync.

Certus also has a high-accuracy 1PPS and frequency output.



## MULTI CONSTELLATION RTK

Certus Evo features multiple interfaces including Ethernet, CAN, RS232, RS422 and GPIOs.

Certus supports all the industry standard protocols including NMEA 0183, NMEA 2000, TSS, PASHR, Simrad as well as a wide variety of proprietary protocols.

It features a rich web UI and 256GB of internal logging.



# SPECIFICATIONS

## NAVIGATION

Horizontal Position Accuracy	1.2 m
Vertical Position Accuracy	2.0 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	0.05 m/s
Roll & Pitch Accuracy	0.03 °
Heading Accuracy (1m Antenna Separation)	0.05 °
Roll & Pitch Accuracy (Kinematica post processing)	0.01 °
Heading Accuracy (Kinematica post processing)	0.01 °
Slip Accuracy	0.1 °
Heave Accuracy (whichever is greater)	5 % or 0.05 m
Range	Unlimited
Hot Start Time	500 ms
Internal Filter Rate	1000 Hz
Output Data Rate	Up to 1000 Hz

## HARDWARE

Operating Voltage (Rugged)	9 to 36 V
Operating Voltage (OEM)	9 to 30 V (or 5 V)
Input Protection (Rugged only)	-40 to 100 V
Power Consumption (typical)	2.9 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 (Rugged only)	IP67 MIL-STD-810G
MTBF	140,000 hrs
Shock Limit	2000 g
Vibration Limit	8 g
Dimensions (Rugged)	78 x 115 x 44 mm
Dimensions (OEM)	75 x 101.5 x 40.2 mm
Weight (Rugged)	300 grams
Weight (OEM)	125 grams

## SENSORS

SENSOR	ACCELEROMETERS	GYROSCOPES	MAGNETOMETERS
Range	± 10 g	± 475 °/s	± 8 G
Bias Instability	8 µg	0.2 °/hr	-
Initial Bias	< 0.45 mg	< 3 °/Hr	-
Initial Scaling Error	< 0.03 %	< 0.02 %	< 0.07 %
Scale Factor Stability	< 0.04 %	< 0.03 %	< 0.09 %
Non-linearity	< 0.05 %	< 0.03 %	< 0.08 %
Cross-axis Alignment Error	< 0.05 °	< 0.05 °	< 0.05 %
Noise Density	2 ug/√Hz	6 °/hr/√Hz	210 uG/√Hz
Bandwidth	250 Hz	200 Hz	110 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	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)	0.01 m
Velocity Accuracy	0.05 m/s
Timing Accuracy	20 ns
Acceleration Limit	4 g

## COMMUNICATION

Interface (Rugged)	Ethernet, RS232 / RS422, CAN
Interface (OEM)	Ethernet, UART, CAN
Speed	100Mbit 4800 to 4M baud serial
Protocol	AN Packet Protocol or NMEA
Peripheral Interface	2x GPIO 1x Auxiliary RS232
GPIO Level	5 V or RS232
GPIO Functions	1PPS input / output Odometer Stationary Air data input NMEA input / output Novatel GNSS input Trimble GNSS input AN Packet Protocol CAN / CANopen Event trigger

