Certus combines temperature calibrated accelerometers, gyroscopes, magnetometers and a pressure sensor with a dual antenna GNSS receiver. These are coupled in an AI based fusion algorithm to deliver accurate and reliable navigation data. It features low SWaP-C (Size, Weight, Power and Cost), internal data logging and multiple communication interfaces for easy integration.

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

**PERFORMANCE**
- 0.1 ° Roll and Pitch
- 0.1 ° Heading
- 10 mm RTK Positioning
- 3 °/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 Navigation
  - Georeferencing
  - Camera Pointing
- LAND
  - Vehicle Navigation
  - Georeferencing
  - Antenna Targeting
- SEA
  - Hydrography
  - Marine Navigation
Certus 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°C to 85°C.

Certus 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.

Certus 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.

Certus 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.

Certus 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.

Certus 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.
**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: 0.1 °
- Heading Accuracy (1m Antenna Separation): 0.1 °
- Roll & Pitch Accuracy (Kinematica post processing): 0.03 °
- Heading Accuracy (Kinematica post processing): 0.06 °
- Slip Accuracy: 0.1 °
- Heave Accuracy: 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): 2.64 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
- Dimensions (Rugged): 78 x 115 x 34 mm
- Dimensions (OEM): 75 x 101.5 x 24 mm
- Weight (Rugged): 280 grams
- Weight (OEM): 110 grams

### 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
- Interfaces (Rugged): Ethernet, RS232 / RS422, CAN
- Interfaces (OEM): Ethernet, UART, CAN
- Speed: 100 Mbit
- Protocol: 4800 to 4M baud serial
- 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

### SENSORS
- ACCELEROMETERS
  - Range (dynamic): ± 2 g, ± 4 g, ± 16 g
  - Bias Instability: 20 μg
  - Initial Bias: < 5 mg
  - Initial Scaling Error: < 0.06 %
  - Scale Factor Stability: < 0.06 %
  - Non-linearity: < 0.05 %
  - Cross-axis Alignment Error: < 0.05 °
  - Noise Density: 100 ug/√Hz
  - Bandwidth: 400 Hz
- GYROSOPHES
  - Range (dynamic): ± 250 °/s, ± 500 °/s, ± 2000 °/s
  - Bias Instability: 3 °/hr
  - Initial Bias: < 0.2 °/s
  - Initial Scaling Error: < 0.04 %
  - Scale Factor Stability: < 0.05 %
  - Non-linearity: < 0.05 %
  - Cross-axis Alignment Error: < 0.05 °
  - Noise Density: 0.004 °/s/√Hz, 210 μG/√Hz
  - Bandwidth: 400 Hz
- MAGNETOMETERS
  - Range (dynamic): ± 2 G, ± 4 G, ± 8 G
  - Bias Instability: < 10 Pa
  - Initial Bias: < 0.2 %
  - Initial Scaling Error: < 0.07 %
  - Scale Factor Stability: < 0.09 %
  - Non-linearity: < 0.08 %
  - Cross-axis Alignment Error: < 0.05 °
  - Noise Density: 0.56 Pa/√Hz
  - Bandwidth: 110 Hz
- PRESSURE
  - Range (dynamic): 10 to 120 KPa
  - Bias Instability: 10 Pa
  - Initial Bias: < 100 Pa
  - Initial Scaling Error: < 0.04 %
  - Scale Factor Stability: < 0.09 %
  - Non-linearity: < 0.08 %
  - Cross-axis Alignment Error: < 0.05 °
  - Noise Density: 50 Hz