



OEM GNSS

# Portfolio Brochure



# Precise positioning solutions for OEM integrators

Trimble® OEM GNSS provides high-precision GNSS receivers for positioning and navigation solutions that serve a broad range of applications in construction, mining, agriculture, aviation, marine, and industrial automation. Easy to integrate high-precision GNSS products offer OEMs and system integrators the ability to differentiate their solutions and gain a competitive edge in the marketplace. Whether you need positioning tools that help you do a job better, faster, cheaper, greener or safer, we offer a full range of products from receiver modules, boxed enclosures, smart antennas, antennas and correction services.

## **Trimble RTX Correction Service Means Precise Corrections in real-time. Every time.**

Trimble RTX® is our exclusive, advanced precise point positioning technology that provides real-time, centimeter-level corrections. Experience true mobility working without the constraints of a local base station or VRS network, with high-level accuracy delivered to you worldwide via satellite or cellular/IP.

# 01



## GNSS Receiver Enclosures

Trimble OEM GNSS receiver enclosures encapsulate high-precision GNSS receiver modules within rugged, durable housings, making them ideal for demanding applications that require reliable and accurate positioning.

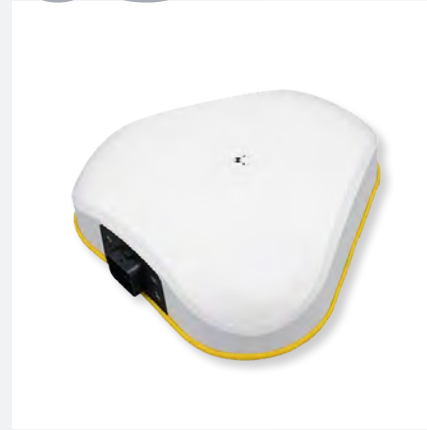
# 02



## GNSS Receiver Boards

Trimble OEM receiver boards offer versatile integration and support for all GNSS constellations, signals, and frequencies, providing customizable solutions for various applications.

# 03



## Smart Antennas

Trimble smart antennas offer weather-resistant, high-precision positioning for vehicle-mounted applications.

# 04



## GNSS Antennas

Trimble GNSS antennas offer high-precision, reliable satellite signal reception for various applications, featuring advanced technologies, rugged designs, and compatibility with Trimble receivers.

# Trimble advantages



## Centimeter level accuracy

Positioning technology that has evolved over 45 years and continues to raise the bar when it comes to accuracy, availability and integrity.



## Precise, consistent performance

Trimble ProPoint® positioning engine that is designed with sensor fusion in mind and delivers unparalleled performance in challenging environments.



## Flexible integration

Extensive documentation, easy to integrate APIs and world-class application engineering team to help you every step of your integration process.



## Peace of mind

Decades of domain expertise and real-world deployment experience to be your trusted consultative partner.



## Longer product life cycles

OEM centric mindset to support your machines and applications for a long time with product supply and quality that you can count on.

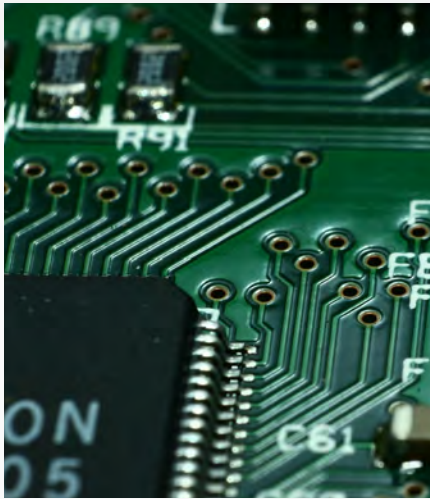


## Global coverage and support

With development centers, test sites, field deployments and support staff around the globe, we got you covered no matter where you go.



# Technology overview



## Maxwell technology

Trimble precision positioning solution is derived from a set of hardware and software innovations that are collectively known as Trimble Maxwell™ technology. Maxwell7 is our 7th generation ASIC and has been designed to maximize the quality of observables derived from all signals transmitted from all navigation constellations.



## Interference detection

Trimble Maxwell provides the ability to monitor and analyze signals received in each of the GNSS frequency bands using receiver's graphical user interface. RF Spectrum Analyzer feature embedded in the web user interface of Trimble precision receivers replicates many of the familiar features found in benchtop analyzers.



## Protection against GNSS spoofing

Trimble next-generation ASIC, RF and processor developments have enabled Maxwell 7 to include a robust set of innovations to protect from spoofing. Advanced tracking algorithms detect if multiple signals are received for each satellite and ensure only the true signal is tracked.



## Advanced multipath mitigation

Trimble Maxwell incorporates patented Trimble EVEREST™ Plus multipath rejection technology to identify and remove unwanted multipath signals using advanced digital signal processing. This allows for faster and more reliable RTK initializations in challenging conditions.

**Position and orientation** form the foundational building blocks for enabling vehicle autonomy.

Trimble positioning technology has continuously evolved over 45 years rooted in its mission to transform the way the world works. Trimble positioning technology stands at the forefront of accuracy, availability and integrity by leveraging advanced GNSS hardware, software and inertial sensor fusion to deliver centimeter-level accuracy even in the most challenging conditions.





Trimble ProPoint GNSS technology, integrated with Maxwell technology, **supports all available GNSS signals and frequencies**, ensuring robust performance amidst signal obstructions and multipath effects.

With innovations such as Trimble IonoGuard™ for ionospheric mitigation and Trimble xFill® technology for seamless operation during correction signal outages, Trimble technology ensures uninterrupted, high-precision positioning making it ideal for applications ranging from autonomous vehicles to construction, mining and agriculture.



## Trimble ProPoint

Trimble ProPoint is the fifth generation high-precision positioning engine from Trimble that is engineered to provide position and orientation data from the fusion of GNSS signals, globally accessible high-accuracy correction services, and measurement data from a variety of sensors. This resulted in increased accuracy, improved availability and enhanced integrity in challenging environments.



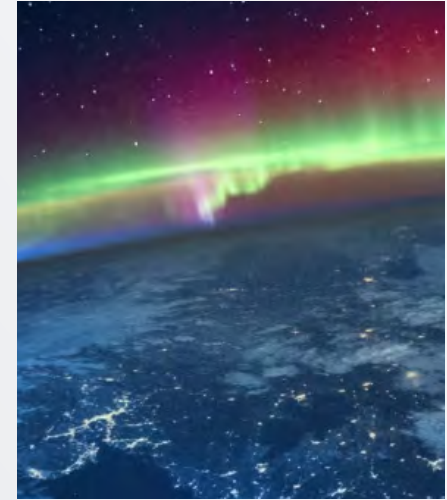
## Tightly coupled GNSS/INS integration

IMU sensor data is tightly coupled with the GNSS observations in the ProPoint RTK/RTX positioning and orientation engine. Dynamic models based on real world application data further assist the engine in providing continuous high-rate low latency output to guidance and control systems even in GNSS denied environments. Dual GNSS antenna systems allow robust alignment of gyro sensors while the platform is static.



## Trimble xFill

Trimble xFill is an innovative service that extends Real-Time Kinematic (RTK) positioning for several minutes when the RTK correction stream is temporarily unavailable, thereby enhancing field productivity by reducing downtime. Utilizing Trimble RTX® technology, xFill broadcasts specialized correction data via L-band satellites, allowing GNSS receivers to maintain centimeter-level accuracy even during extended interruptions.



## Trimble IonoGuard

Trimble IonoGuard is a sophisticated ionospheric mitigation technology integrated into Trimble ProPoint RTK GNSS receivers, designed to enhance positioning accuracy during periods of high ionospheric activity. By leveraging data from a global network of reference stations, IonoGuard continuously monitors ionospheric conditions and adjusts signal processing algorithms to minimize errors caused by ionospheric disturbances.

# Enabling autonomy applications on land, air and sea.

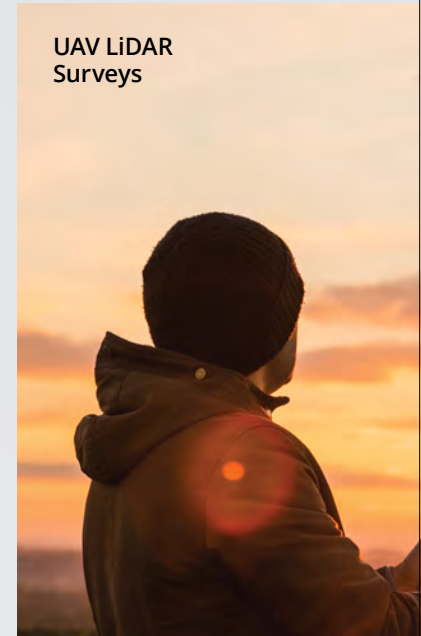
Autonomous UV Treatment



Mining Haul Trucks



UAV LiDAR Surveys



Autonomous Tractors



The **GNSS receivers have been successfully integrated and deployed** by customers in a broad range of applications in construction, mining, agriculture, forestry, marine, drones, logistics, and industrial robotics.

Autonomous Sea Ferries



Underwater Dredgers



Yard Trucks





Construction Drills



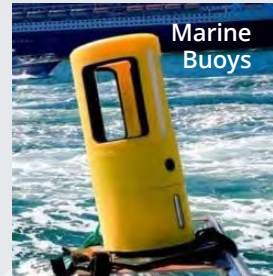
Solar Pile Drivers



Mass Transporters



Valet Parking Robots



Marine Buoys



Forest Harvesters



Autonomous Mowers



Snow Groomers

# Rugged GNSS receiver enclosures

01

Trimble OEM GNSS receiver enclosures encapsulate high-precision GNSS receiver modules within rugged, durable housings, making them ideal for demanding applications that require reliable and accurate positioning.



## Trimble BX940

The BX940 receiver enclosure is an integrated GNSS-Inertial engine delivering high accuracy GNSS, DGNSS positions in the most challenging environments powered by the BD940-INS.



## Trimble BX992

The BX992 is a dual-antenna receiver enclosure with integrated inertial navigation system powered by the BD992-INS.

With versatile interfacing options, including Ethernet and serial ports, and a wide operating temperature range, the BX99x enclosures are ideal for use in applications where ease of integration, precision and reliability are paramount.

## GNSS and inertial tight integration

Robust high accuracy positions and orientations are produced in all environments due to the integration of inertial sensors on the same module.

## Trimble Maxwell 7 technology

Delivers 336 tracking channels, Trimble EVEREST Plus multipath mitigation, advanced RF spectrum monitoring/ analysis, and proven low-elevation tracking technology.

## Robust centimeter accurate solutions

Offers continuous positioning in GNSS denied areas while delivering high-update rate position and orientation solutions.

## Flexible RS232, USB, and ethernet interfacing

Allows high-speed data transfer and configuration via standard web browsers.



# GNSS Receiver Boards

Trimble OEM receiver boards are designed to provide industry standard form factor and versatile interface options for OEMs and system integrators to easily integrate proven Trimble GNSS technology into variety of different solutions.

These boards support all available satellite constellations, signals and frequencies and integrate all available Trimble positioning technology. They are offered in single antenna, dual antenna and integrated IMU configurations with field upgradable options to fit the application specific requirements.



## Trimble BD992-INS

The BD992-INS is a dual-antenna, quad-frequency receiver with an integrated inertial navigation system to provide centimeter level positioning and orientation. Its integrated MSS-band enables Trimble RTX correction service right out of the box.



## Trimble BD992

The BD992 is a dual-antenna, quad-frequency receiver that can track all GNSS constellations and provide centimeter level positioning and heading. Its integrated MSS-band enables Trimble RTX correction service right out of the box.



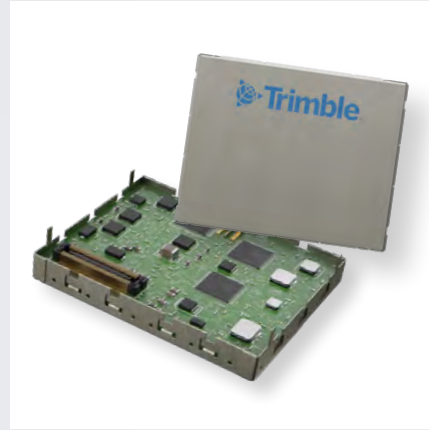
## Trimble BD990

The BD990 is a single-antenna, quad-frequency receiver that can track all GNSS constellations and provide centimeter level positioning. Its integrated MSS-band enables Trimble RTX correction service right out of the box.



## Trimble BD940-INS

The BD940-INS is a single-antenna, triple-frequency receiver with an integrated inertial navigation system in a compact form factor. Its integrated MSS-band enables Trimble RTX correction service right out of the box.



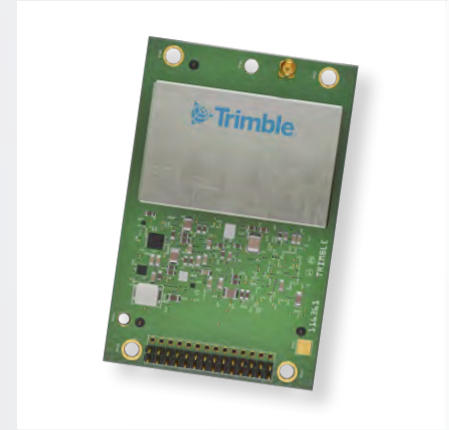
## Trimble BD940

The BD940 is a single-antenna, triple-frequency receiver that can track all GNSS constellations in a compact form factor to allow for integration into tight spaces. Its integrated MSS-band enables Trimble RTX correction service right out of the box.



## Trimble BD9250

The BD9250 is a dual-frequency L1/L2 or L5 field-switchable GNSS receiver with integrated MSS-Band to support Trimble RTX correction service.



## Trimble BD9250s

The BD9250s is a dual-frequency L1/L2 or L5 field-switchable GNSS receiver with integrated S-Band frequency to support the Indian Regional Navigation Satellite System, NavIC.

# Smart Antennas

Trimble smart antennas, including the **AX940** and **AX940i** models, integrate advanced GNSS technology with robust, weather-proof designs to deliver high-precision positioning solutions suitable for vehicle mounted applications requiring precise positioning.



## Trimble AX940i

A compact and easy-to-install high-precision GNSS smart antenna with an integrated receiver contained within a sleek enclosure, built-in inertial sensors and WiFi and Bluetooth connectivity.



## Trimble AX940

A compact and easy-to-install high-precision GNSS smart antenna with an integrated receiver contained within a sleek enclosure

The Trimble AX940i is a triple-frequency smart antenna with integrated inertial navigation system. Taking advantage of Trimble expertise in both GNSS and Inertial technology the AX940i has been designed for applications requiring continuous centimeter accuracy in a compact package. By integrating inertial sensors on the same module, robust high-accuracy positions are produced in all environments. The receiver is also ideal for use as a GNSS DGPS/RTK base station.

## Comprehensive GNSS support

Offers support for GPS, Galileo, GLONASS, BeiDou, QZSS and NavIC.

## High-precision performance

High-accuracy positioning without the constraints of a local base station or cell modem using Trimble RTX correction services.

## Built in inertial sensors

Offers tight integration with GNSS observations in the RTK/RTX positioning and orientation engine, providing continuous high-rate low-latency output to guidance and control systems.

## Staying connected

Wi-Fi® and Bluetooth® connectivity for wireless interface and control.



# GNSS Antennas

Trimble offers a wide range of antennas to deliver high-precision, reliable satellite signal reception for a wide range of applications. Featuring advanced technologies such as low-elevation tracking and multipath mitigation, Trimble GNSS antennas provide superior signal quality and accuracy.

Featuring advanced Their rugged, weather-resistant designs make them suitable for use in harsh outdoor conditions, while their compatibility with various Trimble GNSS receivers ensures seamless integration. They also come in various form factors and a broad range of mounting options.



## Trimble Zephyr™ 3 Rugged

Designed for applications in high shock and vibration environments like machine-control up to 75g shock and 20.4g RMS, the Zephyr Rugged is available in two versions with 5/8" mast mounting and with 3" mast clamp.



## Trimble Zephyr 3 Base

The antenna of choice not just for all RTK reference stations but also for rover applications in highly reflective reception environments.



## **Trimble Zephyr 3 Rover**

A high-performing lightweight GNSS rover antenna optimized for precision RTK and roving applications. The Zephyr rover minimizes multipath and offers robust low elevation tracking and millimeter phase center repeatability.



## **Trimble GA830**

The Trimble GA830 antenna is designed to support centimeter-level accuracy for rugged land and marine applications.



## **Trimble AG25**

Trimble AG25 antennas are designed to support centimeter-level land platforms like agriculture and logistic vehicles.

# GNSS Antennas



## Trimble LV59

The LV59 is a highly robust antenna with an all-aluminum base for 5/8" thread mount, equipped with sub-centimeter phase center accuracy and superior signal tracking of current and near-future GNSS signals for land and marine applications.



## Trimble AV59

The AV59 is a highly robust antenna with rugged 8-hole bulkhead mounting with rubber o-ring sealing for aerial, land, and marine applications. It offers sub-centimeter phase center accuracy and superior signal tracking of current and near-future GNSS signals.



## Trimble AV39

The AV39 is a lightweight, FAA TSO certified antenna for primary flight navigation with an ARINC 743 footprint.



## Trimble AV17

A helix based, triple-frequency L-band antenna ideal for UAV applications due to its lightweight, small form factor and low power consumption design.



## Trimble AV28

A precise triple-frequency, L-band antenna suitable for a wide range of applications where the weight and size really matter.



## Trimble AV29

A lightweight, helix-based quad-frequency GNSS L-Band antenna with a versatile small form factor and low power consumption design.

# Correction Services

Trimble RTX is our exclusive, advanced precise point positioning technology that provides real-time, centimeter-level corrections. Experience true mobility working without the constraints of a local base station or VRS network, with high-level accuracy delivered to you worldwide via satellite or cellular/IP.



**Centimeter level accuracy**



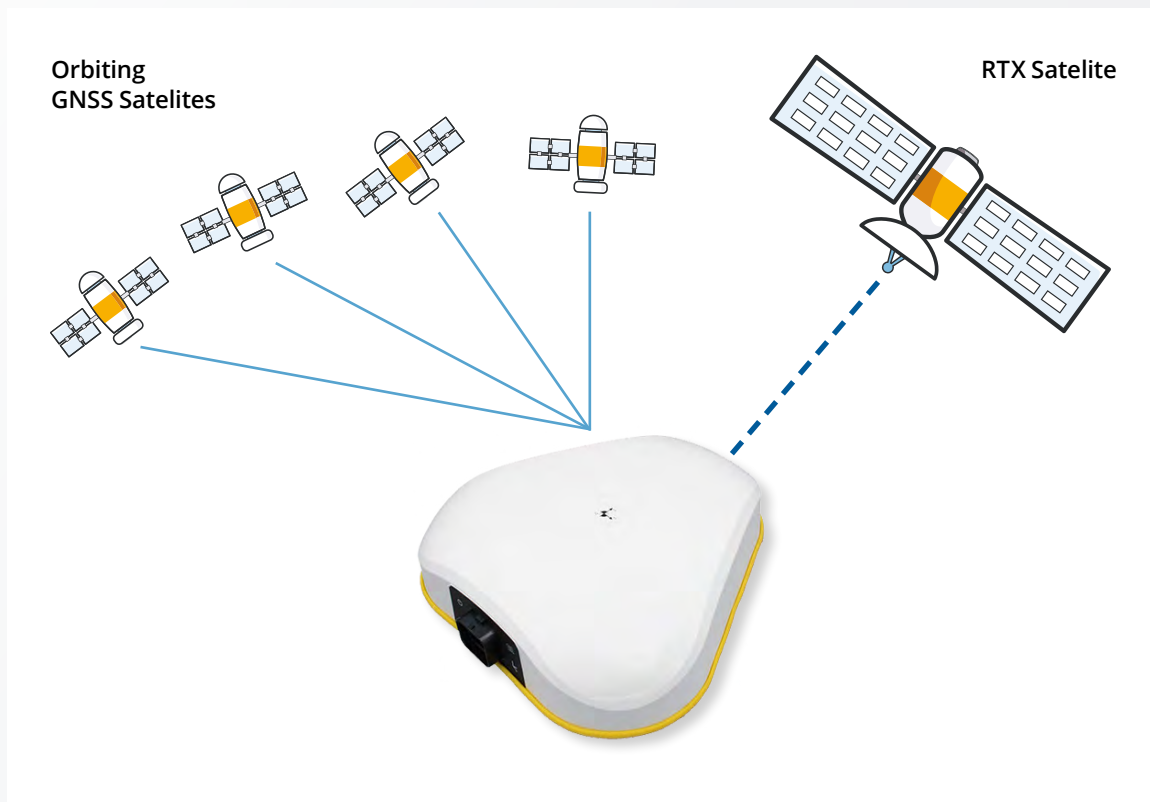
**Fast initialization under a minute**



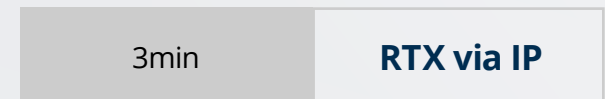
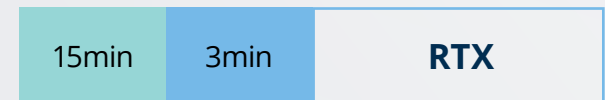
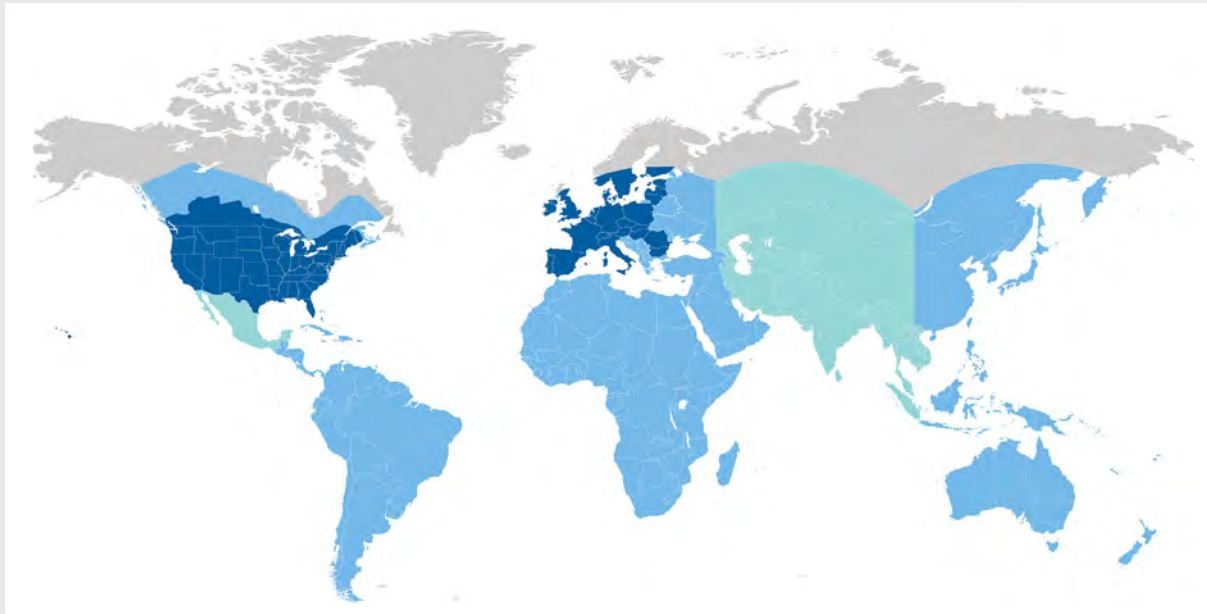
**Global service, anywhere anytime**



**Reliable uptime without interruption**



# Global Coverage



\*\* <3 mins for Trimble ProPoint receiver

GNSS Correction Service	GNSS Precision	Initialization	Delivery
CenterPoint® RTX (Fast)	Horizontal < 2cm Vertical < 5cm	< 1 minute	Geostation Satellite, Internet (in certain defined geographic areas)
CenterPoint® RTX (Standard)	Horizontal < 2cm Vertical < 5cm	< 3** or 15 minutes	Geostation Satellite, Internet
FieldPoint RTX	Horizontal 10cm Vertical 20cm	< 3** or 15 minutes	Geostation Satellite, Internet
RangePoint® RTX	Horizontal 30cm	< 3** or 15 minutes	Geostation Satellite, Internet



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