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GPS Pathfinder ProXRT Receiver: Customer FAQs

What is the GPS Pathfinder ProXRT receiver?

The Trimble® GPS Pathfinder® ProXRT receiver is a high-precision GNSS receiver, ideal for GIS data collection and maintenance applications that require high accuracy in real time (that is, in the field). When combined with a suitable field computer and compatible software, the ProXRT receiver provides the ultimate in high-accuracy GIS positioning.

Model 2 of the ProXRT receiver also includes a new GNSS processor, offering better tracking, faster initialization, and higher accuracy in tough conditions. It also enables the support of the OmniSTAR G2 service with OmniSTAR HP, which incorporates GLONASS corrections, provided the user has also purchased the GLONASS option,

With the latest generation of Trimble 360 receiver technology¹, the receiver is also capable of tracking the Galileo GIOVE-A and GIOVE-B test satellites for signal evaluation and test purposes, through the Web Browser interface available with the NMEA optional upgrade..

What are the main differences between the original ProXRT receiver and the Model 2?

Capabilities supported by Model 2 of the ProXRT receiver (shipping from October 2010) and not supported by the original ProXRT receiver are as follows:

- A new GNSS processor, offering better tracking, faster initialization, and higher accuracy in tough conditions.
- Support of the G2 OmniSTAR service for GLONASS.
- Tracking of the Galileo GIOVE-A and GIOVE-B test satellites for signal evaluation and test purposes, through the Web Browser interface available with the NMEA optional upgrade.

¹ This powerful receiver technology conforms to the current Open Service Signals-in-Space Interface Control Document (OS SIS ICD), Issue 1, Revision1, September 2010. Sale of receivers based on information in the Galileo ICD is subject to the licensing terms for manufactures promulgated by the European Commission (EC).

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Trimble Navigation Limited, 10355 Westmoor Drive, Suite #100, Westminster, CO 80021, USA

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Model 2 of the ProXRT receiver can be distinguished by the label on the back of receiver. Original model ProXRT receivers do not support these new capabilities.

What are the main benefits of using the ProXRT receiver?

- *High accuracy:* The ProXRT receiver is designed specifically for GIS data collection that offers real-time decimeter (10 cm / 4 inch) to subfoot (<30 cm) accuracy.
- *Flexibility:* The receiver offers a wide range of real-time capabilities, together with the option of GLONASS support and the ability to mount the system on a pole, in a backpack, or on a vehicle.
- *Worldwide real-time capability:* The receiver's integrated OmniSTAR capability allows for real-time accuracy at the decimeter/subfoot/submeter level practically anywhere on earth.
- *Ruggedness:* The receiver is rugged and waterproof, so it can work as hard as you do, wherever you work.

What applications will benefit from subfoot and decimeter accuracy in real time?

Anyone requiring the highest levels of accuracy for their GIS database will benefit from achieving subfoot and decimeter accuracy in real time (in the field).

With real-time subfoot accuracy you can be confident that you have logged data to the required accuracy, and you don't need to rely on the availability of base station data for postprocessing. This is particularly beneficial for contractors and in circumstances where any processing issue can't be corrected later (for example, when mapping a site just before the bulldozers come in to clear it).

But the greatest benefits of real-time subfoot accuracy are realized when relocating previously-mapped assets, particularly those which are buried or hidden. Cables and pipes can be excavated immediately without the need for postprocessing or risk of damage to nearby assets.

Applications that will benefit from subfoot and decimeter accuracy in real time are:

- High-accuracy GIS data collection and "as-built" mapping
- Relocating buried and hidden assets
- Navigation to existing assets where exact location identifies the proper asset
- Electric and gas utilities projects
- Water and wastewater services projects
- Land reform projects
- Other applications where on-the-spot positioning is crucial

What is H-Star technology?

H-Star™ technology is a patented Trimble technology that uses a combination of GPS code and carrier data to compute positions in the decimeter to subfoot (10 cm to <30 cm) range. For information on how H-Star technology works, and how to get the best performance from receivers that have H-Star technology, refer to the white paper *H-Star Technology Explained*, available at www.trimble.com.

What is GNSS?

GNSS (Global Navigation Satellite System) is the collective term used to describe satellite-based positioning systems that offer global coverage. At present there are two available GNSS systems: the US Global Positioning System (GPS) and the Russian GLONASS system. Planned future GNSS systems include the European Union's Galileo system and the Chinese COMPASS system.

A *GNSS receiver* is a device that can compute its position based on signals received from one or more GNSS systems. The ProXRT receiver always uses signals from GPS and, when the GLONASS option is installed, also from GLONASS.

For more information, refer to the *Global Navigation Satellite System (GNSS) FAQs for Mapping and GIS*, available at www.trimble.com.

What is GLONASS?

GLONASS is the Russian **G**LObal **N**avigation **S**atellite **S**ystem, originally developed by the Soviet Union and now managed for the Russian Government by the Russian Space Forces.

At the time of writing, the GLONASS constellation remains incomplete, with between 4 and 6 satellites typically above the horizon at any moment in time. Until such time as the constellation is complete, GLONASS will remain a viable GNSS only when combined with GPS.

What applications will benefit from GLONASS support?

Installing the GLONASS option on your ProXRT receiver increases the number of satellites that you can potentially observe when working in the field. By tracking GPS and GLONASS satellites when sky visibility is limited, the receiver may maintain lock on enough satellites to keep positioning, letting you work for longer periods in tough environments.

Tracking GLONASS satellites as well as GPS satellites can also improve productivity by reducing the time required to achieve real-time decimeter to subfoot accuracy.

Logging and postprocessing of GLONASS measurements with Model 2 of the ProXRT receiver is supported in the following software versions:

- Field software
 - TerraSync™ software version 5.00 or later
 - Trimble GPSCorrect™ extension for ESRI ArcPad software version 3.14 or later
 - Applications developed with GPS Pathfinder Tools Software Development Kit (SDK), version 2.42 or later
- Office software
 - GPS Pathfinder Office software version 5.000 or later
 - Trimble GPS Analyst™ extension for ESRI ArcGIS Desktop software version 2.20 or later (with the latest updates installed)

What is Galileo?

Galileo is Europe's global navigation satellite system, providing a highly accurate, guaranteed global positioning service under civilian control. It will be inter-operable with GPS and GLONASS, the two other global navigation satellite systems.

The first experimental satellite, GIOVE-A, was launched on 28 December 2005; the second, GIOVE-B, in April 2008. At the time of writing four additional satellites are planned for 2011.

What is the OmniSTAR G2 service?

An optional service to HP that provides GLONASS corrections, G2 can also be used with the GPS Pathfinder ProXRT receiver with the GLONASS option to improve productivity in tough environments.

What level of real-time horizontal accuracy can I expect with the ProXRT receiver?

The ProXRT receiver provides a range of horizontal accuracy in real time, depending on the real-time differential correction source used:

Real-time correction source	Horizontal accuracy	Notes
VRS™ network, accessed using a cellular connection to the Internet	Real-time H-Star technology typically provides 10 cm (4 inch) accuracy, anywhere within a VRS network	Accuracy degrades outside the VRS network even though corrections may still be available
Single dual-frequency base station, accessed using a cellular connection to the Internet	Real-time H-Star technology provides: <ul style="list-style-type: none"> • 10 cm (4 inch) accuracy up to 30 km from the base station • Subfoot (<30 cm) accuracy 30 km to 80 km from the base station • Submeter accuracy (+1ppm) beyond 80 km of the base station 	H-Star specified accuracy is typically achieved within 2 minutes
OmniSTAR HP service	10 cm (4 inch) accuracy, after initialization time of up to 60 minutes	Subscription required. For pricing, coverage and additional accuracy and initialization information, contact OmniSTAR (www.omnistar.com)
OmniSTAR HP + G2 service	20 cm accuracy, after initialization time of up to 60 minutes	
OmniSTAR XP service	Submeter accuracy, with no initialization delay	
OmniSTAR VBS service	Submeter accuracy, with no initialization delay	Coverage depends on the specific SBAS service.
SBAS	Submeter within the coverage area	
Marine beacon	Submeter within 200 km of an	Requires purchase of a Trimble

	MSK marine beacon	GeoBeacon™ receiver.
Other external radio or cellular connection to a base station	Depends on the base station, the range, and connection latency	

What level of horizontal accuracy can I expect after postprocessing?

After H-Star postprocessing, the ProXRT receiver achieves horizontal accuracy of 10 cm + 1 ppm, except in conditions where most GNSS signals are affected by trees, or buildings, or other objects.

The following factors increase the availability of 10 cm (4 inch) accuracy with H-Star receivers:

- Longer elapsed time tracking uninterrupted L1/L2 carrier phase data
- Tracking of more satellites with L2 carrier measurements
- Shorter distance to the base station(s)
- Use of more base stations for postprocessing

When GNSS carrier data is logged for a period of at least 45 minutes without interruption, carrier postprocessing will yield horizontal accuracy of 1 cm + 2 ppm, provided the baseline length is no longer than 10 km.

In conditions where H-Star processing is not possible (for example, due to frequent loss of carrier lock) or where code-processing alone is selected, the ProXRT receiver provides postprocessed horizontal code accuracy of 50 cm + 1 due to the Trimble DeltaPhase™ technology. This new enhanced code processing technology was introduced in the GPS Pathfinder Office software version 4.20 and the Trimble GPS Analyst extension for ESRI ArcGIS Desktop software version 2.20.

What level of real-time vertical accuracy can I expect from the ProXRT receiver?

The ProXRT receiver provides a range of vertical accuracy, depending on the real-time differential correction source or the type of postprocessing used:

Real-time correction source	Vertical accuracy	Notes
VRS network, accessed using a cellular connection to the Internet	Real-time H-Star technology typically provides 10 cm (4 inch) accuracy, anywhere within a VRS network	Accuracy degrades outside the VRS network even though corrections may still be available
Single dual-frequency base station, accessed using a cellular connection to the Internet	Real-time H-Star technology provides: <ul style="list-style-type: none"> • 10 cm (4 inch) accuracy up to 30 km from the base station • 45 cm accuracy 30 km to 80 km from the base station • Submeter accuracy (+2ppm) beyond 80 km of the base station 	H-Star specified accuracy is typically achieved within 2 minutes

OmniSTAR HP service OmniSTAR HP + G2 service	15 cm accuracy, after initialization time of up to 60 minutes	Subscription required. For pricing, coverage, and additional accuracy and initialization information, contact OmniSTAR (www.omnistar.com)
OmniSTAR XP service	30 cm accuracy, after initialization time of up to 60 minutes	
OmniSTAR VBS service	Better than 5 meters, with no initialization delay	
SBAS	Better than 5 meters, within the coverage area	Coverage depends on the specific SBAS service.

What level of vertical accuracy can I expect after postprocessing?

After H-Star postprocessing, the ProXRT receiver achieves vertical accuracy of 10 cm + 2 ppm, except in conditions where most GNSS signals are affected by trees, or buildings, or other objects.

The following factors increase the availability of 10 cm accuracy with H-Star receivers:

- Longer elapsed time tracking uninterrupted L1/L2 carrier phase data
- Tracking of more satellites with L2 carrier measurements
- Shorter distance to the base station(s)
- Use of more base stations for postprocessing

When GNSS carrier data is logged for a period of at least 45 minutes without interruption, carrier postprocessing will yield vertical accuracy of 2 cm + 2 ppm, provided the baseline length is no longer than 10 km.

In conditions where H-Star processing is not possible (for example, due to frequent loss of carrier lock) or where code-processing alone is selected, the ProXRT receiver provides postprocessed vertical code accuracy at the submeter level, due to DeltaPhase technology. This new enhanced code processing technology was introduced in the GPS Pathfinder Office software version 4.20 and the Trimble GPS Analyst extension for ESRI ArcGIS Desktop software version 2.20.

Which real-time correction options provide the highest accuracy?

Only the real-time H-Star technology and OmniSTAR XP or HP service options reliably deliver accuracy better than submeter. H-Star technology relies on local GNSS infrastructure to achieve accuracy in the decimeter to subfoot range using VRS, while OmniSTAR XP and HP services deliver this level of accuracy in remote areas where local infrastructure is unavailable.

Note: *OmniSTAR XP and HP services typically require up to 60 minutes' initialization time which may make these services impractical in environments with many obstacles (for example, trees and buildings) that can obstruct OmniSTAR signals.*

What real-time correction options are available in my area?

Contact your Trimble reseller to talk about the options available in your area. In some parts of the world, there may be very few options; in other areas there may be numerous ways to achieve high accuracy in

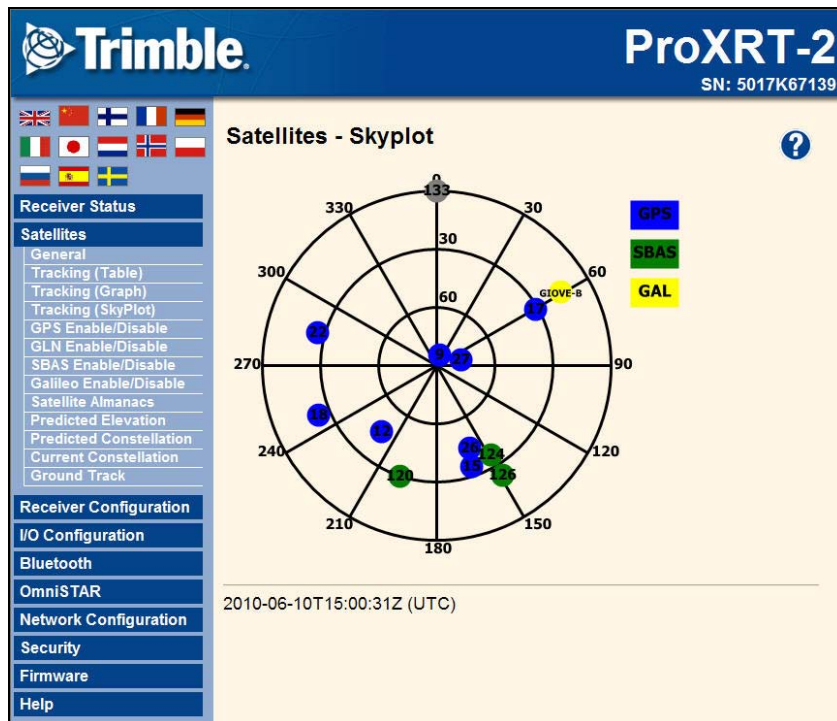
real time, and you'll want to discuss the economic and workflow differences between each of these options.

How does the ProXRT receiver support GLONASS?

The ProXRT receiver has a dual-constellation RF signal processor and can decode and process signals from both GPS and GLONASS. The ProXRT receiver has 72 channels, each capable of tracking one of two frequency ranges for the GPS and/or GLONASS systems. Model 2 of the ProXRT receiver also supports G2, an optional service to OmniSTAR HP, providing GLONASS corrections.

How does Model 2 of the ProXRT receiver support Galileo?

Model 2 of the GPS Pathfinder ProXRT receiver is capable of tracking the Galileo GIOVE-A and GIOVE-B test satellites for signal evaluation and test purposes. The tracking of the satellites can be seen through the Web Browser interface in the Satellites – Skyplot screen available with the NMEA optional upgrade (P/N 85360-20-UPG):



Can I use the Galileo GIOVE-A and GIOVE-B to help with my GNSS position solution?

No. Currently, receiver technology which has Galileo capability to operate in the Galileo frequency bands and uses information from the Galileo system for future operational satellites, is restricted in the publicly available Galileo open Service Signal-In-Space Interface Control document (GAL OS SIS ICD). It is not currently authorized for commercial use. Receiver technology that tracks the GIOVE-A and GIOVE-B test satellites uses information that is unrestricted in the public domain in the GIOVE A + B Navigation Signals-In-Space Interface Control document. Receiver technology which has developmental GIOVE-A and B capability is intended for signal evaluation and test purposes.

What field computers work with the ProXRT receiver?

The ProXRT receiver can work with any field computer that can connect to the receiver using a serial cable (RS232) or Bluetooth® wireless technology. In particular, the ProXRT receiver has been intensively tested with the following Trimble rugged field computers:

- Trimble Nomad® series handhelds
- Trimble Recon® handheld
- Trimble Ranger™ handheld
- Trimble Yuma® rugged tablet computer
- Trimble Juno® series handhelds

What software is available for use with Model 2 of the ProXRT receiver?

With the Model 2 of the ProXRT receiver, use the following field software applications:

- Trimble TerraSync software (Standard and Professional editions), version 5.00 or later
- Trimble GPSCorrect extension for ESRI ArcPad software, version 3.14 or later, with the latest updates applied
- Applications created using the Trimble GPS Pathfinder Tools SDK, version 2.42 or later, with the latest updates applied

Note: *The ProXRT receiver does not output data using the NMEA protocol, unless the NMEA Output option has been purchased and installed (P/N 85360-20-UPG)*

For optimal postprocessing performance, data collected using the ProXRT receiver should be downloaded and processed by one of the following office software applications:

- Trimble GPS Pathfinder Office software, version 5.00 or later
- Trimble GPS Analyst extension for ESRI ArcGIS software, version 2.20 with the latest updates installed, or later

What do I get in the box?

Purchasers of the ProXRT Receiver (P/N 85351-00 or 85361-10) receive the following items:



What mounting options should I purchase?

In addition to the items you receive with the ProXRT, you may need to purchase some of the following:

- To achieve decimeter to subfoot level accuracy, Trimble recommends that you purchase the Pole Field Kit (P/N 85355-00). In addition, don't forget to purchase the appropriate pole-mount for your handheld (P/N 58913 for the Trimble Ranger handheld, P/N EGL-Z2009 for the Trimble Nomad series handhelds, P/N 77013-00 for the Trimble Recon handheld, 69572-00 for the Trimble Yuma rugged tablet computer).
- To use the receiver in a backpack (similar to using the Pro XRS receiver), purchase the Backpack Field Kit (P/N 85356-00).
- To use the ProXRT receiver on a vehicle, purchase the following vehicle mounting accessories: quick-release adapter (P/Ns 19487 & 19493).

What ProXRT receiver options are available?

You can purchase the ProXRT receiver with GLONASS pre-installed using (P/N 85361-10) or you can purchase the ProXRT without GLONASS (using P/N 85351-00) and subsequently upgrade the receiver to GLONASS capability using P/N 85360-10-UPG. The GLONASS option is discounted when purchased at the same time as the receiver. For pricing information, see your Trimble reseller.

If you require NMEA output for use with third party software applications, you must purchase the NMEA Output option for the ProXRT receiver (P/N 85360-20-UPG). This option enables the Web Browser interface, which allows you to view the tracked Galileo GIOVE-A and GIOVE-B test satellites for signal evaluation and test purposes.

You must purchase a subscription to an OmniSTAR service before you can use an OmniSTAR service with the ProXRT receiver. For details of subscription charges and coverage, contact OmniSTAR (www.omnistar.com).

What trade-in programs are available for the ProXRT receiver?

Customers wishing to purchase a ProXRT receiver who have existing GPS Pathfinder Pro XRS, ProXH™ or ProXT™ receiver can claim a preferential trade-in credit. Customers with any other submeter GPS receiver can claim a lesser trade-in credit.

For trade-in pricing details, contact your Trimble reseller.

Can I deactivate the Bluetooth radio?

The internal Bluetooth radio is always on and discoverable. There is no user control to disable the Bluetooth radio.

Can I use the ProXRT receiver as a reference station?

The ProXRT receiver is configured as a roving receiver and does not support operation as a real-time or postprocessing reference station. For customers who require their own local base station, Trimble recommends the NetR8™ or NetR9™ reference station, available from Trimble infrastructure resellers.

Where can I get more information?

For further information, go to www.trimble.com or contact your local [Trimble reseller](#).