



FAQ

**Trimble RTX<sup>®</sup>**  
Correction Services





# Trimble RTX frequently asked questions

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# About Trimble RTX

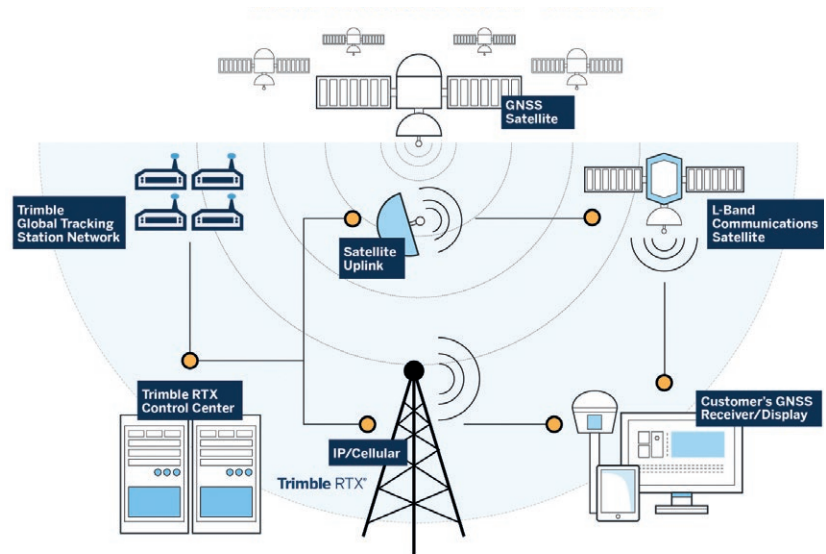
Trimble RTX® GNSS correction services is a GNSS correction services for agricultural guidance systems that provide users with real-time, high-accuracy positioning delivered via satellite and Internet worldwide. Farmers can quickly and easily work anywhere on their farm with repeatable pass to pass, and year to year accuracy, without the need for additional equipment like an RTK base station or Radio transmitters.

## What does RTX stand for?

RTX stands for Real Time eXtended (RTX). It is the technology that powers Trimble RTX correction services.

## How does Trimble RTX technology work?

Trimble RTX technology works by using real-time navigation satellite measurements received by a global network of tracking base stations. These measurements, along with highly accurate atmospheric models and other sophisticated algorithms, generate Trimble RTX corrections at worldwide control centers that are broadcast to the receiver by satellite or over the Internet. The GNSS receiver uses these corrections to improve the accuracy of its positions



## Which GNSS constellations do Trimble RTX corrections support?

Trimble RTX correction services support GPS, GLONASS, Galileo, BeiDou, and QZSS GNSS constellations. The actual use of the constellations' navigation satellites on your GNSS receiver are regional dependent.

## What correction services are available?

### CenterPoint® RTX

2.5 cm accuracy

The best GNSS correction solution for your most precise jobs, providing you the freedom to work anywhere without interruptions.

### Trimble RangePoint® RTX

15-50 cm accuracy

An affordable, entry-level alternative to free-to-air satellite systems.

### Trimble CenterPoint® VRS

2.5 cm accuracy

Instant access to RTK-level corrections via cellular delivery, no local base station or radio required.

### Trimble xFill® Premium

2.5 cm accuracy

Maintain 2.5 centimeter-level accuracy as long as needed when faced with network connectivity issues using RTK or VRS systems.

### Trimble ViewPoint RTX®

30 cm accuracy

An affordable, entry-level alternative to free-to-air satellite systems that gives farmers a more stable signal with the same ease of use.

## What are Trimble RTX corrections used for?

Trimble RTX corrections are used for high-accuracy GNSS positioning in place of, or to complement traditional RTK single-base or VRS Now™ networks. Farmers use Trimble RTX corrections in many applications along the growing cycle. Starting with land preparation to planting, spreading and spraying and harvesting.

Additionally modern farming practices like strip-till and controlled traffic farming are supported by Trimble RTX.



## What is CenterPoint RTX Fast?

Trimble CenterPoint RTX Fast is a regionally available correction service that delivers a convergence time of less than 2 minutes for 2.5cm (1 inch) horizontal accuracy.

## What is xFill and how does it work?

xFill is a backup solution based on the Trimble RTX technology, for RTK and VRS corrections during times of signal interruptions due to the loss of cellular or radio signals and outages due to scintillation interference. If you were to lose your RTK or VRS correction services signal for any reason, xFill can be used to bridge these interruptions with **high accuracy** for 20 minutes. xFill works seamlessly in the background, calculating Trimble RTX positions constantly and will automatically bridge positioning gaps delivered by satellite (not available for an

Internet delivery method), allowing continued field operations during RTK/VRS signal interruptions and during most periods of scintillation interference that renders RTK inoperable.

## What is xFill Premium and how does it work?

xFill Premium is similar to Trimble's standard xFill service, but delivers CenterPoint RTX positioning accuracy (<2.5 cm / 1 inch) for the entire duration of the interruption, extending xFill's service which is limited to just 20 minutes. xFill Premium works seamlessly in the background, calculating Trimble RTX positions constantly and will automatically bridge positioning gaps delivered by satellite (not available for an Internet delivery method), allowing continued field operations during RTK/VRS signal interruptions and during most periods of scintillation interference that renders RTK inoperable.



# Performance and operation

## What performance can I expect from Trimble RTX correction services?

The performance specifications for Trimble RTX correction services are listed below, dependent on receiver type and region of operation.

Correction service	Delivery method	Horizontal accuracy <sup>1</sup> (cm) or (in)	Convergence time time (mins)
CenterPoint RTX	Satellite and Internet	2.5 cm (1")	< 2 min in Fast coverage regions < 5 min for Trimble ProPoint® devices <sup>2</sup> < 20 min in Standard coverage regions
RangePoint RTX	Satellite	15 cm (6") pass to pass 50 cm (20") repeatable	< 5 min
ViewPoint RTX	Satellite	30 cm (12") pass to pass	< 5 min
CenterPoint VRS	Internet (in select regions only)	2.5 cm (1")	Instant
xFill Premium	Satellite	2.5 cm (1")	Instant switch over after RTK signal loss

<sup>1</sup> 95% performance based on repeatable in field measurements. Achievable accuracy and initialization time may vary based on type and capability of receiver and antenna, user's geographic location and atmospheric activity, scintillation levels, GNSS constellation health and availability and level of multipath including obstructions such as large trees and buildings.

<sup>2</sup> Average initialization time when using GPS, GLONASS, Galileo, and BeiDou.

### What is convergence?

Convergence is the start-up process of calculating the receiver's position to a desired accuracy level. When the position of the receiver reaches full accuracy, then it is considered fully converged, and you can start working with confidence. Once converged, the receiver is able to provide the desired level of accuracy dependent on the chosen correction service. Achievable accuracy and convergence time may vary based on type and capability of receiver and antenna, user's geographic location and atmospheric activity, scintillation levels, GNSS constellation health and availability and level of multipath including obstructions such as large trees and buildings.

### How long does convergence take?

Convergence time ranges from 2 to 20 minutes based on type of correction service, type of receiver and antenna, geographic location, atmospheric activity, scintillation levels, and other variables. **Please see table above.**

### Can I start working before the receiver is fully converged?

Yes, but it is highly recommended that you wait for your receiver to be fully converged in order to work with the correction service's full accuracy. If you start recording guidance lines before your receiver is fully converged you may see unexpected shifts during fieldwork. Most Trimble RTX capable receivers will allow you to set a "convergence threshold", which allows you to determine what accuracy level must be reached before you begin working.

### Does the receiver need to remain stationary while converging?

No, the receiver does not need to remain stationary while converging, and the convergence time will be similar whether the receiver is moving or stationary. However, it is recommended that you remain stationary because any overhead obstructions that may occur while you are moving will extend the convergence time.

## How long will it take my receiver to resume high precision positioning after a temporary loss of GNSS signals?

If your receiver loses all GNSS signals at once, positioning will stop immediately. When GNSS signals are reacquired the RTX position calculation will start again.

If GNSS signals were lost for less than 5 minutes, a special method is used to rapidly produce quality positions again by accounting for the ionospheric delays. Otherwise, a regular convergence time may occur.

## How long will my receiver continue working with high precision positions if I temporarily lose the Trimble RTX correction stream?

If you temporarily lose the Trimble RTX correction signal, the receiver can continue working for over 3 minutes with a very slow degradation in accuracy before a full re-convergence is necessary.

Full accuracy will resume quickly whenever the RTX correction stream resumes within 3 minutes. Otherwise, a regular convergence time may occur.

## Why does CenterPoint RTX have multiple initialization times listed?

CenterPoint RTX has multiple initialization times for various reasons:

- Satellite baud rates, which affect initialization times, are different in various regions.
- The type of receiver you use impacts the initialization time you can achieve.
- There are regions where CenterPoint RTX Fast is available; these regions receive a convergence time of < 2 minutes.
- If you are using a Trimble NAV-900 receiver with ProPoint technology, you will experience initialization times < 5 minutes in a majority of regions worldwide.
- The standard performance for initialization time for any other positioning receiver in most regions is about < 20 minutes.

Please [view the coverage map](#) to see what is available on your farm.

## What is CenterPoint RTX Fast Restart?

CenterPoint RTX Fast Restart is a feature that allows rapid re-initialization of CenterPoint RTX based on a previously known point.

By starting the receiver in the same location that it was in when it was last turned off, CenterPoint RTX can fully initialize in less than 5 minutes. Note that any minor movement away from the turn off point can have a negative impact on the convergence.

It is recommended for use on dual constellation receivers only such as Trimble AG-372 receiver, Trimble CFX-750 display, Trimble FmX® integrated display, Trimble TMX-250™ display. Also, when using CenterPoint RTX Fast, this feature is not applicable, as the solution can fully initialize in less than 2 minutes.



## What is the difference between CenterPoint RTX and RTK?

CenterPoint RTX and RTK both offer high-accuracy GNSS corrections however they differ in several ways:

	<b>CenterPoint RTX</b> (Satellite support - Multi-Constellation)	<b>RTK</b> (Dependent on base station capabilities)
<b>Availability</b>	Global	Local by RTK base station connection, or regional VRS network
<b>Delivery</b>	Satellite or over IP/cellular (No radio or base station required)	Radio or cellular connection with modem or radio transmitters
<b>Horizontal accuracy</b>	2.5 cm (1")	< 2.5 cm (< 1") degrades as distance from base station increases
<b>How it works</b>	Using real-time satellite measurements and highly accurate atmospheric models and algorithms, corrections are generated at worldwide control centers that are broadcast to the receiver by satellite or over the Internet	Using local or regional base stations RTK works on the basis of canceling GNSS error sources between the local base and receiver, and delivers these corrections by radio or Internet
<b>Support</b>	24/7 Trimble Support	Dependent on operator 24/7 Trimble Support for Trimble VRS Now networks

## How are Trimble RTX correction services different from SBAS systems such as WAAS and EGNOS?

Trimble RTX correction services are different from SBAS systems like WAAS and EGNOS because Trimble RTX technology is compatible with multiple GNSS constellations whereas SBAS systems typically use only one GNSS constellation to generate corrections. Trimble RTX technology provides more accurate, consistent, and repeatable positioning than WAAS or EGNOS. Trimble RTX correction services are also available worldwide while SBAS systems are limited to certain regions.

## How do Trimble RTX correction services compare to other GNSS correction methods?

Solution	Availability	Delivery Method	Horizontal Accuracy	Convergence Time	Additional requirements
Trimble RTX	Global (Standard) Regional (Fast)	Satellite and/or Internet	2.5 cm - 1 m <i>dependent on subscribed service</i>	< 2 min - Fast regions < 5 min - Global with Trimble ProPoint < 20 min - Global non ProPoint	non
Virtual Reference Station (VRS) (Network RTK)	Regional (State or Country)	Internet	2.5 cm 1 in	Instant	Modem with data plan
Differential RTK (Single-Baseline)	Local	Radio or Internet	2.5 cm 1 in <i>accuracy degrades with distance to base</i>	Instant	Base Station Radio or Modem with data plan
SBAS – WAAS, EGNOS, etc.	Continental	Satellite	1-2 m 3 - 6 ft	Instant	non
Autonomous	Global	Navigation Satellite Signals	3 - 5 m 10 - 16 ft	Instant	non

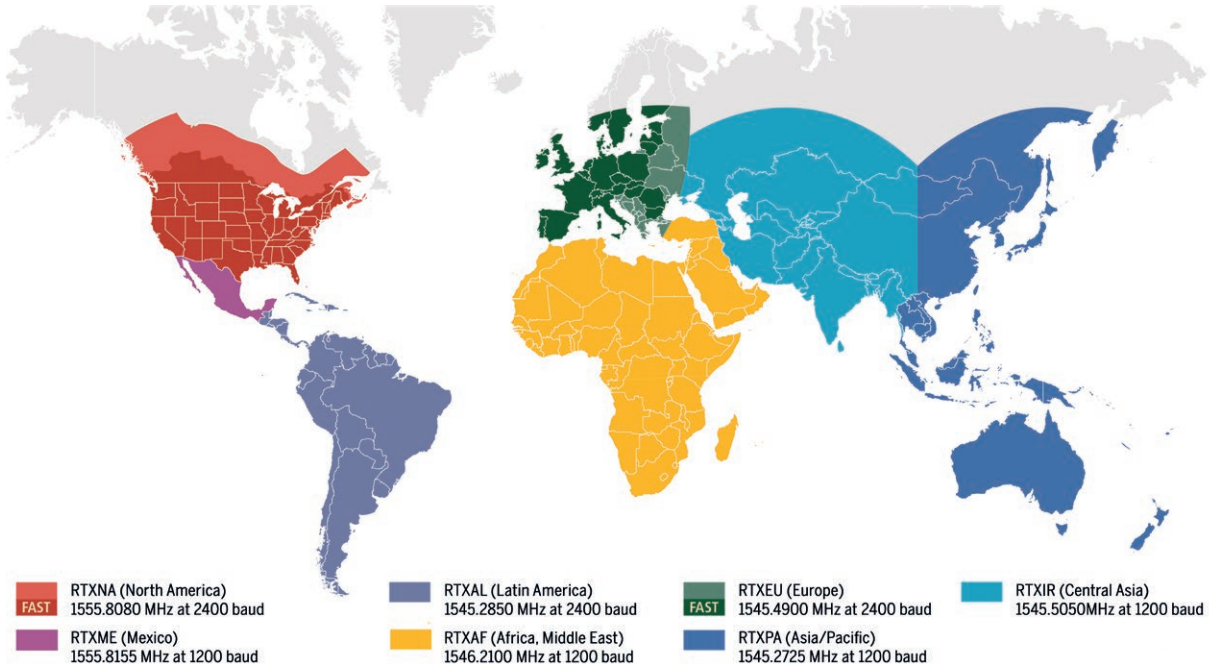


# Delivery and availability

## Where are Trimble RTX corrections available?

Trimble RTX correction services are available worldwide through satellite and internet delivery. The satellite coverage area is shown on the map below. Trimble RTX Fast is available in most of North America and Europe. Delivery by IP/cellular is available anywhere that an internet connection is available.

Trimble RTX satellite broadcast frequency [coverage map](#)



IP/ cellular coverage anywhere an internet connection is available

## Are there any factors that can cause errors or outages of Trimble RTX correction services?

There are external environmental factors that can cause errors or temporary outages of the Trimble RTX correction services that might degrade accuracy and convergence. These factors can also affect other GNSS correction sources and include:

**Obstructions:** Any objects that prevent a receiver from receiving information from the GNSS navigation satellites or the Trimble RTX geostationary satellite can impact accuracy or cause outages. Tall trees and steep terrain are common obstructions that impact farmers. Trimble RTX delivered by IP can help mitigate

outages when the Trimble RTX satellite is blocked by obstructions, but won't help when GNSS satellites are blocked or when GNSS signals are degraded by obstructions.

**Solar activity:** GNSS signals can be impacted by solar activity as they pass through the Earth's atmosphere and result in a phenomenon known as scintillation.

**Interference:** Other signals which are adjacent and similar to the GNSS navigation signals frequency will disrupt the reception of the true signal in the GNSS receiver.

## Will Trimble RTX corrections work indoors?

No. Trimble RTX correction services will not work indoors. GNSS positioning requires a clear line of sight between the GNSS receiver and GNSS satellites.

## How reliable are Trimble RTX services?

Trimble RTX correction services have exceptional up-time because it uses a worldwide network of base stations, with redundancies in the entire infrastructure system, to calculate and deliver the correction services. All base stations, correction solutions, and delivery mechanisms are monitored and supported 24 hours a day, 7 days a week, 365 days a year by Trimble's global team of network engineers and IT specialists to ensure reliability in worldwide positioning and broadcasting.

## What agriculture receivers are compatible with Trimble RTX correction services?

Device	CenterPoint RTX	RangePoint RTX	ViewPoint RTX	xFill Premium
NAV-900	✓	✓		✓
AG-372, AG-392, AFS-372™, PLM-372	✓	✓		✓
TMX-2050, XCN-2050™	✓	✓		✓
AG-382, AG-482	✓	✓		✓
CFX-750, FM-750™	✓	✓		
FmX	✓	✓		
FM-1000™	✓	✓		
NAV-500™			✓	
AG-200™			✓	





# Datum reference frames

## What are reference frames / datums and why are they important for me?

If you have ever exported your A-B lines or features you have ran and logged on your farm it has a bunch of coordinates in up to height or northing/easting/up or even in units of meters and inches. This describes your A-B line or feature at some location in space. The space that it is on, is what a reference frame is. A reference frame describes the space itself by providing information like origin, axes, unit of measurement, etc... For example, if your farm is located in Munich, Germany, and you have saved all your A-B lines and features in a reference frame that has its origin in Munich, Germany and then decide to change your reference frame to a frame with an origin in San Francisco, USA, your coordinates may show your farm being somewhere in the middle of the ocean or a place nowhere near your farm. Correct Reference Frame selection is essential to making your coordinates relevant to your farm. Incorrect selection of a reference frame can result with your tractor or implement tilling, planting, or harvesting in an incorrect location or worse.

## What are ITRF and ITRF2020?

The International Terrestrial Reference Frame (ITRF) is a terrestrial reference frame established and maintained by the International Earth Rotation and Reference Systems Service (IERS). ITRF is the realization of an ideal reference frame, the International Celestial Reference System (ICRS), which is also maintained by IERS; this realization is based on estimates of position and velocity of terrestrial stations observed by VLBI, LLR, GPS, SLR, and DORIS. Due to the motion of the Earth's crust, the terrestrial positions of points on Earth are constantly changing. A position at a specific instance in time will have both a reference frame (e.g. ITRF2014) and an epoch (e.g. epoch 2005.00); the epoch is the time the realization refers to.

## What is the difference between ITRF and WGS84?

Both ITRF and WGS84 are global datums; WGS84 is used by GPS, and is based on a specific realization being updated periodically. Since 1997, WGS84 has been maintained to within 10 cm of the then current ITRF realization. While Trimble RTX positions are computed in ITRF2020 current epoch, autonomous GPS positions are provided in the current realization of WGS84. This discrepancy in time will usually result in a small difference between the coordinates of a position in ITRF and the coordinates of the same position in WGS84.

## In which coordinate reference frame are Trimble RTX positions calculated and stored?

Trimble RTX coordinates are generally computed in ITRF2020 current epoch; these coordinates will be transformed to a fixed epoch dependent on the receiver's geographical location.

The used default datums per geographical regions are:

North America	NAD83 1997.000
Australia/New Zealand	GDA94 1994.000
Europe	ETRS89 2000.000
Latin America	SIRGAS-CON 2005.000
Rest of World	ITRF2014 2021.000



Additionally, starting with the NAV-900's, agriculture receivers can utilize the **Advanced Datum Feature**, which can transform Trimble RTX coordinates in up to **47 available local datums**.

xFill Premium applies an offset to the Trimble RTX positions resulting in positions that match the RTK/VRS coordinate reference frame that is being used.

NOTE: Use the Trimble CenterPoint RTX Post Processing service to determine a position in an actual datum for your base station and/or control points. The Trimble CenterPoint RTX Post Processing service is available at [www.TrimbleRTX.com](http://www.TrimbleRTX.com)

# Purchasing & Activation

## How can I purchase Trimble RTX correction services?

You can purchase Trimble RTX correction services through a local [Trimble dealer](#), through the [online store](#), or by contacting [Trimble Customer Care](#) by phone or email. Subscriptions can be managed directly through the online store.

## How much will Trimble RTX correction services cost?

Please contact your local [Trimble dealer](#) or find pricing on the Positioning Services [online store](#). For any further details please contact [Trimble Customer Care](#).

## Are there Trimble RTX demo subscriptions available?

Yes, there are demo subscription available for all Trimble RTX compatible GNSS receivers. This can be [activated here](#) or by contacting [Trimble Customer Care](#).

## How will I know when my current subscription will expire?

You will receive a renewal notice 45 days before your subscription is due to expire advising you of your expiration date and the renewal process. All subscription information is also available by [logging into your account](#).

Note: A subscription can be renewed before the expiration date. There is no need to wait until you receive the renewal notice.

Most Trimble receivers will show the expiration date on the display. If you are unsure on how to find this, you can contact your local dealer or [Trimble Customer Care](#) and a member of our team will be able to assist you.

## Does Trimble automatically renew my subscription?

Trimble will automatically renew your subscription if you are enrolled in Automatic Renewal. For more information on your enrollment, contact [Trimble Customer Care](#). If you are not enrolled in Automatic Renewal, you will need to renew your subscription by [logging in to your account](#) or by contacting Customer Care.

## How are Trimble RTX correction services activated?

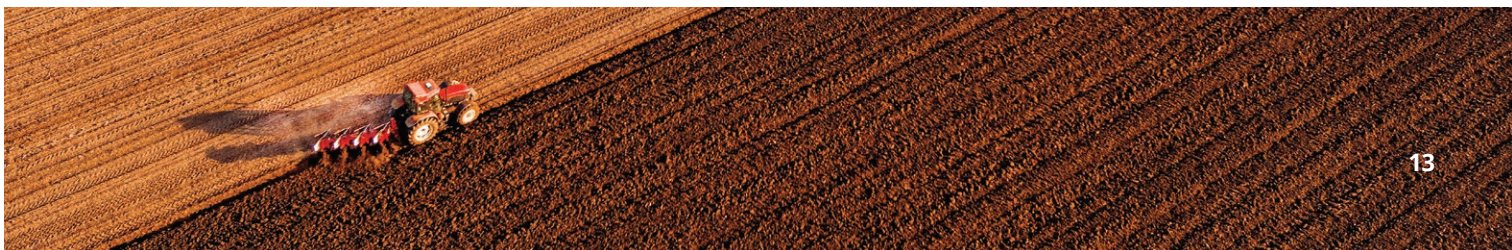
Trimble RTX correction services are activated with a subscription. After purchasing your RTX subscription, it can be activated either over-the-air (OTA) or through a manual passcode entry on your GNSS receiver. Some receivers also support activation through scanning a QR code or uploading a license file. If you need assistance with activation, please contact your local [Trimble dealer](#) or [Trimble Customer Care](#) and provide them with your account information and/or the serial number of your receiver.

- **Over-the-air activation:** This is an activation that is sent via satellite and/or Internet directly to the receiver. Once this activation is received, the service will be ready to use. This is currently supported on the Trimble AG-372 GNSS receiver, Trimble AG-382 GNSS receiver, and Trimble AG-482 GNSS receiver.
- **Passcode:** An activation passcode is emailed to you when you purchase a Trimble RTX subscription. You then key this passcode into your receiver to activate your subscription, which can be used right away.
- **QR code:** The activation email will include a QR code that can be scanned using the camera on your display. This is currently supported on the TMX-2050, and NAV-900/NAV-500 (using the GFX or XCN display series).
- **License file:** The activation email will include a license file that can be uploaded onto the display via USB drive or Toolbox+ App, which is then read by the software to activate the subscription.

## What can I do if I missed the over-the-air activation?

If you missed the over-the-air activation, you can resend the OTA activation yourself at [resend.trimble.com](#). You can also contact your local [Trimble dealer](#) or [Trimble Customer Care](#) to request the activation broadcast be re-sent.

Please have your account information and/or the serial number of your receiver with you when contacting Trimble Customer Care. If you received a passcode, you may also manually enter the passcode into your GNSS receiver.





# Support

## What kind of customer support is available for Trimble RTX correction services?

Customer support is available through your local dealer, and 24 hours a day, 7 days a week, 365 days a year by contacting [Trimble Customer Care](#) by phone and email.

With regional offices worldwide, we can help you with any questions or concerns you have.

## Trimble RTX®

