![Trimble logo]

POSPac Post-Processed CenterPoint RTX

Frequently Asked Questions

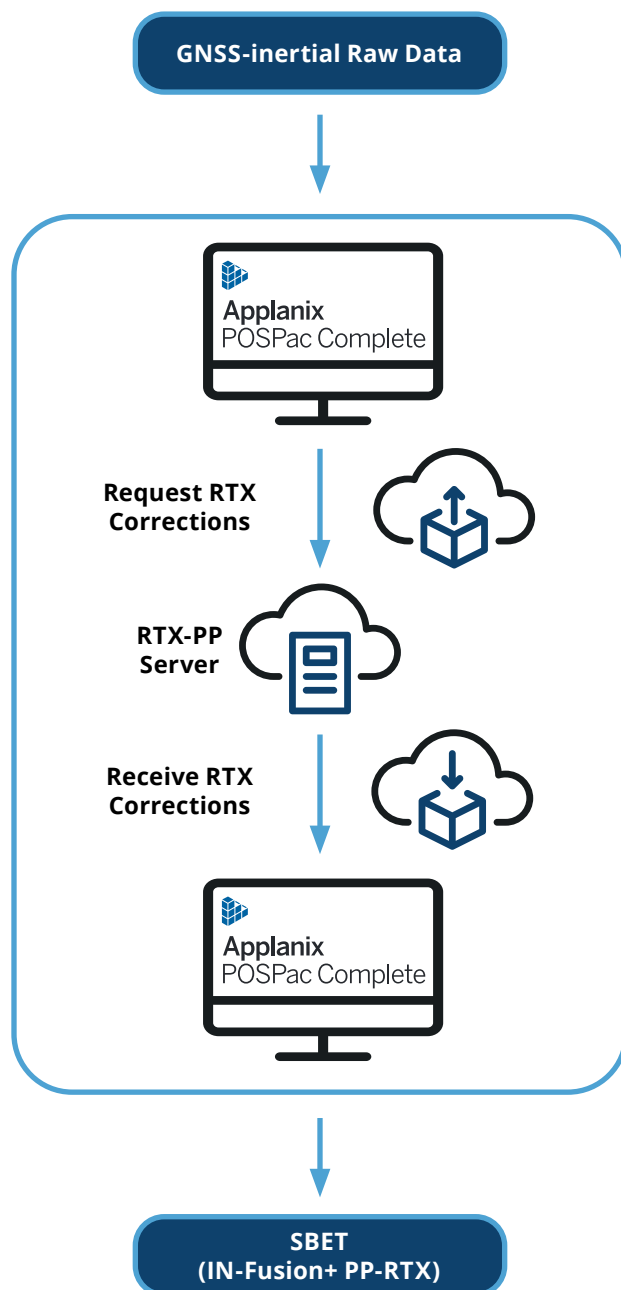### 1. What is Applanix® POSPac™ Post-processed Trimble® CenterPoint® RTX (PP-RTX)?

POSPac PP-RTX is a cloud based global GNSS correction service which utilizes Trimble RTX® technology to provide centimeter level post-processed positioning accuracy without base stations. The Trimble RTX technology utilizes data from a dedicated global network of tracking stations to compute corrections to satellite orbit and clock information as well as atmospheric delay models. POSPac uses this data to post-process the GNSS-Inertial Trajectory as an alternative to the known Single Base, Applanix SmartBase™ and Multi-SingleBase augmentation processing methods.

2. What is the coverage of this service and when is it available?

The service works globally and correction data are available within minutes after data collection has been completed.

3. How does PP-RTX work?

The latest generation Applanix IN-Fusion®+ PP-RTX service available in POSPac Complete, directly downloads the correction data without the need to upload trajectory information to the RTX-PP Server (one way direction). In addition, if an internet connection is not available, RTX corrections can be logged over the air from L-Band satellite using the Trimble GNSS-Inertial hardware products, and processed directly in POSPac. Trajectory information logged during the mission is sent to the Trimble RTX server by POSPac.

GNSS-inertial Raw Data

Applanix POSPac Complete

Request RTX Corrections

RTX-PP Server

Receive RTX Corrections

Applanix POSPac Complete

SBET (IN-Fusion+ PP-RTX)

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4. What is meant by "Convergence time" and does this matter for POSPac PP-RTX?

Convergence time is the amount of time it takes for the RTX position accuracy to reach its final centimeter level accuracy, as the residual errors left after the corrections are applied are estimated. Since the POSPac PP-RTX solution is processed in the forward and reverse directions and then combined, all convergence effects are removed. The only restriction is that the length of trajectory itself must be longer than the convergence time in order to achieve full accuracy.

5. Is there a difference in convergence time for different regions of the world?

Yes, the RTX service is segmented into a global region and fast regions.

- **Fast Regions:**
  - Convergence time is < 1 - 2 minutes.
- **Global Region:**
  - Convergence time is < 3 minutes with IN-Fusion+ PP-RTX and Beidou-III satellites.

6. Why is the convergence time better in the Fast Regions?

Fast Regions use a denser network of reference stations to compute a regional ionospheric model for atmospheric corrections while the global region uses a global model.

7. Where are the Fast Regions?

The current Fast Regions are illustrated below.
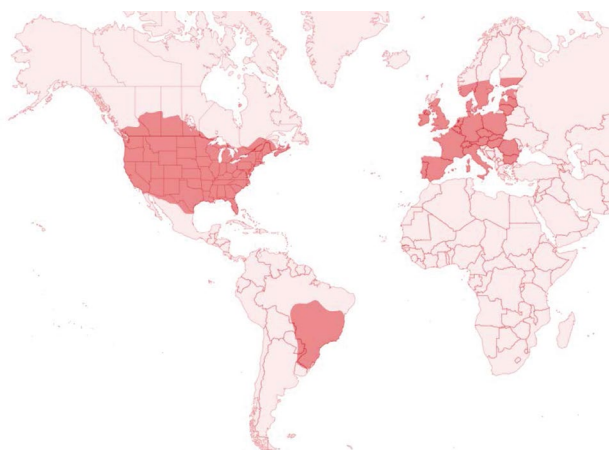
8. What application can PP-RTX be used for?

Crewed Airborne: Due to the mission size, crewed airborne projects can exceed the maximum of 20 km distance from a single base station required for a precise GNSS-Inertial solution. PP-RTX has no such limitation and is hence ideal for crewed aerial surveys. Since PP-RTX is a global service, it eliminates the cost and headache of setting up or procuring local base stations in different countries or remote locations.

Uncrewed Airborne (UAV): Short flights (10 – 20 minutes) can be processed using IN-Fusion+ PP-RTX in Fast or Global Regions. For the Global Regions it is strongly recommended to have BDS-III signals logged for optimal conversion. PP-RTX is also ideal for UAV mapping applications in remote regions such as mountainous and forested areas where base stations are not present, and setting up a base station can be difficult.

Land Application: PP-RTX currently requires clean GNSS observables with minimal cycle slips and interruptions. Since land applications are typically exposed to frequent GNSS disruptions (buildings, vegetation, tunnels) in urban environments, the PP-RTX service may not achieve full accuracy. For missions in rural areas with no or only a few GNSS occlusions, it may produce adequate results. Contact Trimble Applanix for more details.

Marine Application: The POSPac PP-RTX service can be used for all Applanix POS MV® systems and applications. For off shore projects and remote coastal line surveys, it is the only cost-effective method for achieving centimeter level position accuracy. Surveys in ports or missions close to the mainland, POSPac PP-RTX eliminates the cost needed to procure or set up local base stations.

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9. What sensors can be used in conjunction with the PP-RTX service?

A wide variety of sensors for direct geo-referencing can be used such as:

- LiDAR
- Camera (RGB, NIR etc.)
- Hyperspectral Sensor
- Multibeam Sonar
- SAR

10. How do I enable PP-RTX in POSPac?

PP-RTX post-processing requires the desktop licenses POSPac Complete or POSPac UAV Complete. In addition, the hardware-software license "RTX Complete" will also function.

11. What are the requirements to run PP-RTX in POSPac?

- POSPac Complete, POSPac UAV Complete License, or RTX Complete (APX RTX)
- Internet Connection[1]
- Minimum of 10 – 15 min rover data, ideally including BDS-III logged signals
- Clean L1/L2 data
- Calibrated antenna model

[1] Not needed if RTX correction have been logged in real-time (over-the-air)

12. What are the core benefits of PP-RTX?

- Worldwide coverage
- Data are available within minutes after mission completion
- CM level accuracy, approaching that of RTK
- Eliminate the need of base station data
    - From own setup
    - From various download sources
    - From commercial provider procurement
- Reliable 24/7/365 monitored cloud service
- Single button or automated functionality
- Improves efficiency and productivity

13. What are the limitations when using PP-RTX?

While PP-RTX is a very robust technique it is currently not necessarily recommended for urban land application. PP-RTX requires clean observables which is a challenge in land applications exposed to obstructions.

14. Is this service supported in real-time?

Yes, Trimble CenterPoint RTX is also available in real-time. Please note, this is not PP-RTX. It requires a separate subscription (activated over-the-air or via a manual passcode on the hardware) and the appropriate infrastructure (e.g. L-Band Antenna or Internet). The coverage is not worldwide when receiving the data through the L-Band antenna over satellite.

You can check the coverage here:
https://positioningservices.trimble.com/resources/coverage-maps/

In addition, the expected performance is lower than the PP-RTX feature in POSPac.

15. Can I use PP-RTX in POSPac if I have a valid Real-Time CenterPoint RTX subscription?

No, PP-RTX is a separate subscription and tied to POSPac. However, for APX RTX, POS AVX RTX and POS LVX+ coming with the RTX Complete subscription, PP-RTX is included.

16. Which GNSS constellations are supported by PP-RTX?

PP-RTX service supports GPS, GLONASS, GALILEO, BEIDOU and QZSS.

17. Are there PP-RTX demo subscriptions available?

Yes, please contact or **techsupport@applanix.com** to obtain a demo license for PP-RTX.

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18. How much does PP-RTX Subscription cost?

Please get in touch with **techsupport@applanix.com**
or **customersuccess@applanix.com**

19. When do I use PP-RTX?

PP-RTX is best to use when:

- Mission area is large (baseline exceeds 20km)
- Mission consists of several short sub-missions distributed over wider areas
- Corridor mapping
- Coastal zone mapping
- Access restricted areas
- No CORS or VRS serviced areas
- Operating international

20. What is the benefit of using IN-Fusion+ PP-RTX?

- Faster convergence time, especially in the Global Region for short UAV flights
- Correction data can be logged in real-time (over-the-air corrections)
- Better performance

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