

Spot Lite and Spot Prime with Leica Zeno GG04 / GG04 plus smart antenna

1. What is PPP?

Precise Point Positioning (PPP) is a new correction service introduced with the Leica Zeno GG04 smart antenna. The service is also available with GG04 plus antennas. PPP includes both Spot Lite and Spot Prime subscription services, that enable correction data to be received from a satellite. These services are an ideal solution for precise applications in areas where a mobile data connection is unavailable or unreliable and real-time high accuracy is necessary. It should be mentioned, that by using the latest measuring engine 7.500 with GG04 / GG04 plus smart antenna, signals from Galileo satellites are now available.

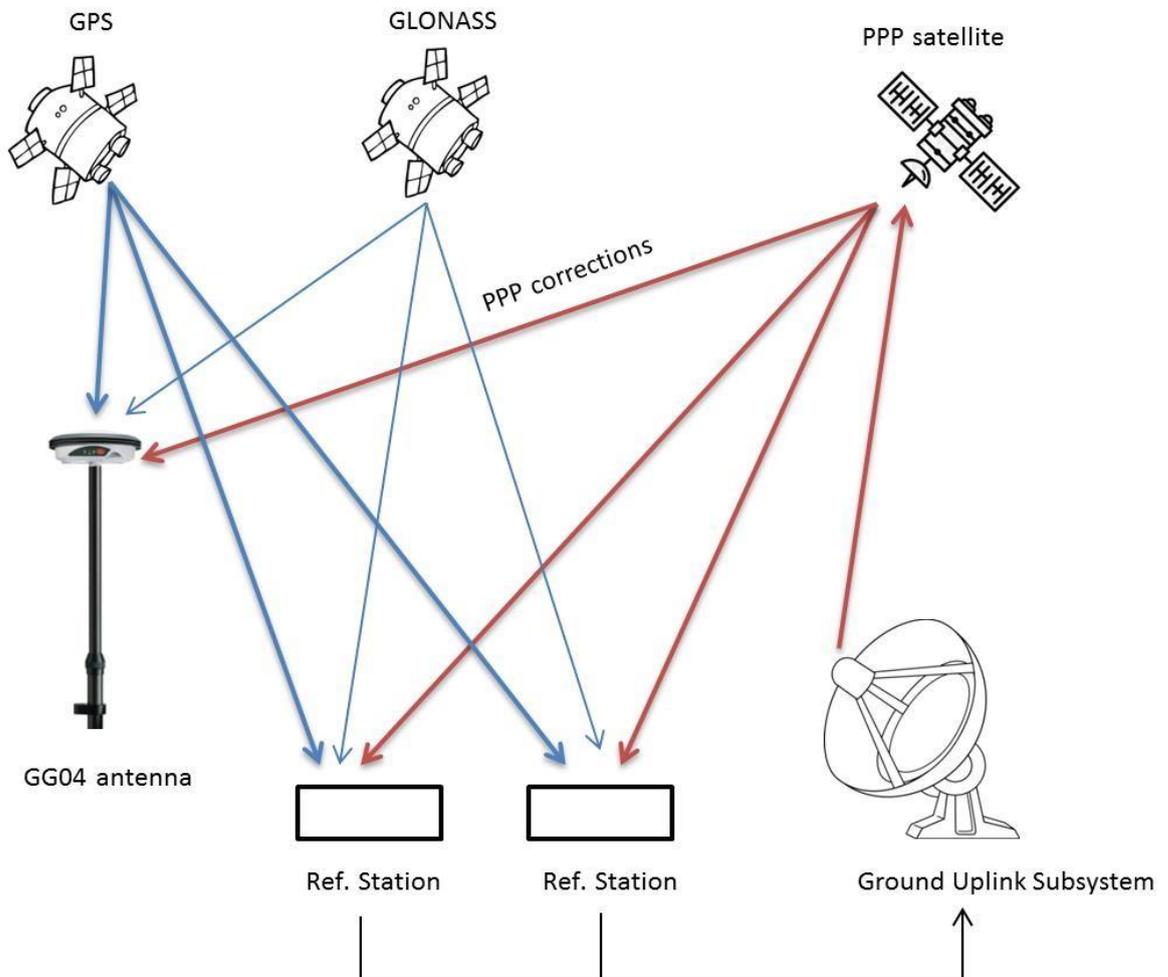


Figure 1 - PPP Infrastructure

With the PPP correction service, the positional accuracy will be enhanced autonomously after a necessary convergence time.

Spot option	Convergence time	Accuracy
Spot Prime	up to 15 min	10 cm and better
Spot Lite	up to 8 min	60 cm and better

Note: An L1/L2 option is necessary to use both Spot options.

2. How to use PPP with Leica Zeno?

- Activation of the PPP service

After ordering a subscription service, activate the respective Spot option within 30 days of the order date. To complete the activation process no license key has to be loaded manually on the GG04 or the software used with the GG04, switch on the antenna and leave it running in very good GNSS conditions for up to 3 hours. Stable tracking of a PPP satellite is necessary for the initial activation. Once the activation is complete, a corrected position by the Spot option is possible.

The following PPP packages are available for the GG04 / GG04 plus smart antenna:

Art.Num.	Spot Option
5307334	1 year Spot Lite
5307335	2 year Spot Lite
5307339	1 year Spot Prime
5307340	2 year Spot Prime
5307345	1 month Spot Prime Trial

Note: Re-ordering a Spot option is only possible after expiration of the current valid option. Therefore, an upgrade of Spot Lite to Spot Prime will be activated after the Spot Lite subscription has expired.

An active Spot trial option will be cancelled, if a Spot Lite or Spot Prime option is purchased.

If you want to switch from Spot Lite to Spot Prime please write an email to Zeno.Support@leica-geosystems.com.

- Using the PPP service

After the initial activation, the Spot option can be activated like any other correction service. After activation, the convergence period begins, where the positional accuracy is gradually improved over time until the best possible positional accuracy is achieved.

The tracking of at least one correction satellite is necessary to receive a corrected GNSS position, during both the convergence period and spot usage.

How to use Spot services in Zeno software:

Here is an example of Zeno Connect. Once you are connected to a GG04 smart antenna in Zeno Connect, go to Settings/Realtime Corrections.

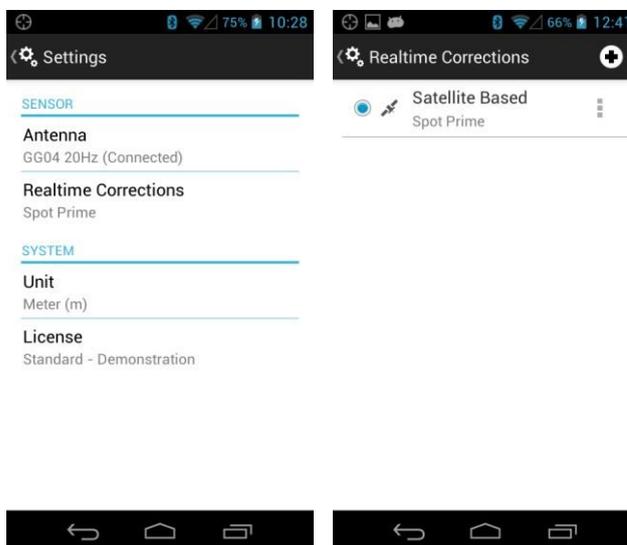


Figure 2 - Where to find PPP Realtime Corrections in Zeno Connect

The Spot Option is shown automatically as a correction service as soon as the activation of the PPP service has successfully been completed.

The Satellite Based Spot Prime service has to be selected, and then Auto Connect is selected by default. If Auto Connect is switched off manually the Spot service can be activated from the notification view with the satellite button:

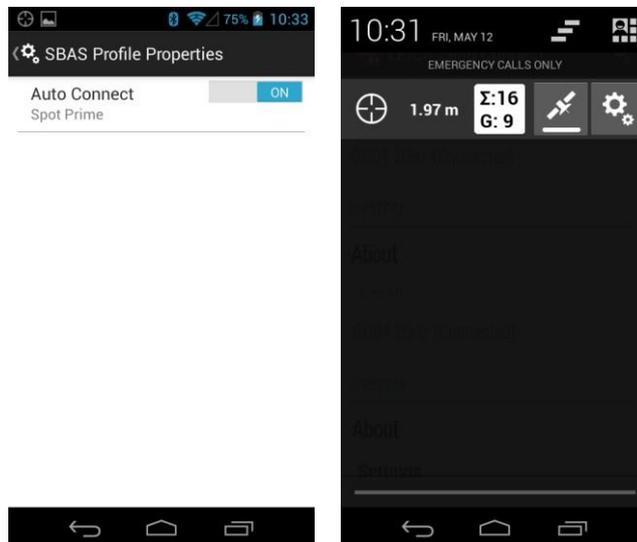


Figure 3 - How to activate the Spot option

When the convergence processes start the RTK icon starts blinking. The blinking continues until the convergence is finished and the corrected position is achieved. The solution type icon will also change from Navigated to Code to a Phase Fixed solution. Here we can see what the status bar looks like once the convergence process is finished:

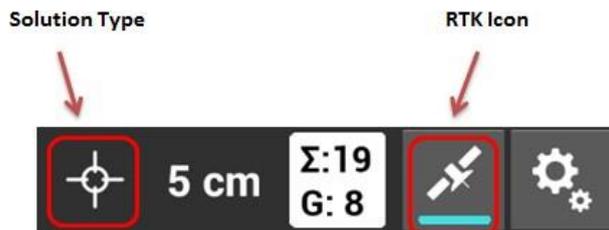


Figure 4 - Phase fix position after converging is completed

The Spot option can be reviewed in the Antenna Info dialog:



Figure 5 - GG04 smart antenna settings in Zeno Connect PPP service license details

3. Benefits and Limitations of PPP

- Benefits

The major benefit of the Spot correction service is that real-time high accuracy positioning is possible in regions where there is:

- ✓ no (stable) internet connection
- ✓ no reference network, or
- ✓ no local reference station

available and therefore no real-time high accuracy position has been calculated before. Additionally, different Spot options are available to choose the accuracy level required.

- Limitations

To utilize the Spot service, at least one PPP satellite has to be tracked. The PPP satellites are geo-stationary and therefore you are able to see at least one satellite almost everywhere in the world. However, when all visible PPP satellites are covered by obstructions and cannot be tracked, no corrected position can be calculated.

Furthermore, when calculating a converged position, losing the PPP satellite signal will result in a re-convergence process. The necessary re-convergence time varies depending on which GNSS signals were not tracked and for what duration. If you lose the PPP Satellite signal for a very short duration, the re-convergence takes only a few minutes. If you have a full loss of lock, the re-convergence has to start again from the beginning.