



NovAtel CORRECT™

Optimize your
positioning performance



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One Source for Positioning Success

RTK, PPP, SBAS OR DGNSS. NOVATEL CORRECT OPTIMIZES ALL CORRECTION SOURCES, PUTTING MORE POWER, FLEXIBILITY AND CONTROL IN YOUR HANDS.

NovAtel CORRECT is the culmination of over 20 years of leadership and product innovation in Global Navigation Satellite System (GNSS) positioning. It is the state-of-the-art positioning algorithms on NovAtel's high precision GNSS receivers that optimize corrections from Real Time Kinematic (RTK), Precise Point Positioning (PPP), Space Based Augmentation Systems (SBAS) and Differential Global Navigation Satellite Systems (DGNSS).

NovAtel CORRECT ensures you receive the positioning accuracy needed for your application, whether that is metre, decimetre or centimetre-level.

NovAtel® receivers provide the flexibility to maximize positioning performance using any available correction source.

NovAtel offers:

- One source of GNSS hardware, correction service and support to simplify the process of acquiring the best possible position.
- One source for an OEM partnership that delivers proven, flexible, scalable and competitive positioning technology.
- One source for success.

NovAtel CORRECT Delivers on Every Performance Need

Choosing the best positioning solution starts with understanding the success factors of your application. Is high accuracy the most important criteria or is availability in remote locations paramount? How important is it to reduce or minimize downtime? Do you have good connectivity to the outside world?

Each correction method has benefits and limitations that must be considered in relation to the performance specifications and environmental setting of your end-user application.

1 DECISION CRITERIA

Solution Accuracy

Operating Environment

System Connectivity

Solution Availability

2 MATCH CORRECTIONS TO YOUR APPLICATION NEEDS

RTK



Corrections based on surveyed base receiver or network

PPP



Precise point positioning corrections based on global reference network

SBAS



Corrections based on publicly available SBAS augmentation data

DGNSS



Range-only corrections from local base receiver via radio

3 SOLUTION

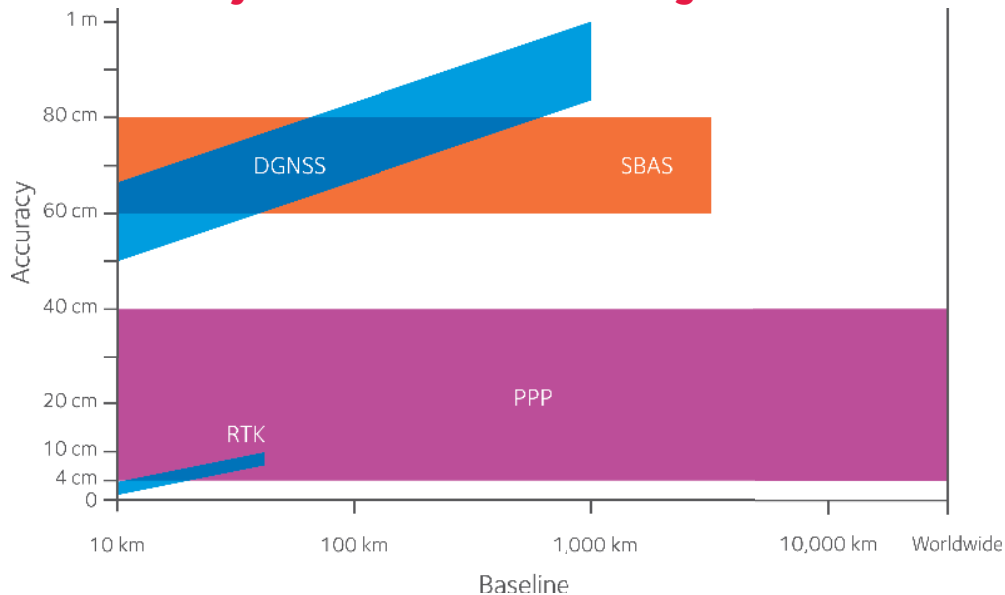


NovAtel CORRECT brings it all together on your NovAtel GNSS receiver (card or enclosure level)

NovAtel CORRECT Options at a Glance

PERFORMANCE PARAMETER ¹	NOVATEL CORRECT WITH RTK	NOVATEL CORRECT WITH PPP	NOVATEL CORRECT WITH SBAS	NOVATEL CORRECT WITH DGNS
HARDWARE REQUIREMENTS	Rover required plus GNSS base station and/or communication link to base station. Utilizes RTK corrections.	Rover only. No additional hardware required. Utilizes TerraStar corrections.	Rover only. No additional hardware required. Utilizes any available SBAS signal.	Rover required plus GNSS base station and/or communication link to base station.
SOLUTION ACCURACY (RMS)	GPS+GLONASS: 1 cm + 1 ppm Horizontal Vertical: 1 cm	TerraStar-C: 4 cm TerraStar-L ³ : 40 cm	60 cm	40 cm
SOLUTION AVAILABILITY	Anywhere RTK network can be set up. Baselines of <40 km required for best accuracy. RTK ASSIST ³⁴ extends RTK operation when corrections are lost	Global	SBAS dependent	Within range of DGNS base station and communication link - up to 100 km.
NOVATEL PRODUCTS SUPPORTED	All OEM7 TM , OEM6 [®] and GNSS receivers.	All OEM7, OEM628, OEM638 ³ and SMART6-L GNSS receivers	All OEM7, OEM6 and OEMStar [®] receivers.	All OEM7, OEM6 and OEMStar receivers.
CONVERGENCE TIME⁵	No initial convergence period and instantaneous re-convergence.	TerraStar-C: initial convergence to full accuracy 30-45 minutes. TerraStar-L: convergence to 40 cm in <5 minutes. Re-convergence <1 minute ²	No initial convergence period. Instantaneous re-convergence.	No initial convergence period. Instantaneous re-convergence.

Solution Accuracy Relative to Baseline Length

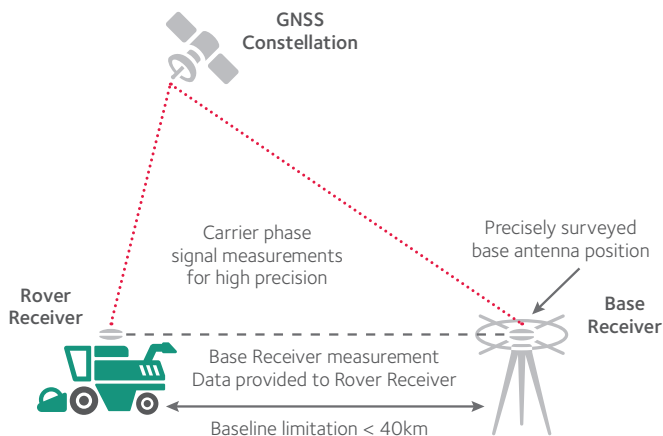


1. Performance achieved will vary depending on operational factors such as geographic location, static vs dynamic application, etc.
The impact of baseline length on accuracy of the different correction methods needs to be considered when choosing a solution.
2. For 30 second outages.
3. TerraStar-L and RTK ASSIST currently not available on OEM638.
4. RTK ASSIST requires a subscription.
5. Convergence times may vary by several minutes and are dependent on observing conditions including number of visible GNSS signals, level of multipath and proximity to obstructions like large trees or buildings.

RTK for Centimetre Accuracy

RTK offers the highest accuracy of any corrections method, delivering up to centimetre-level positioning. RTK is a relative positioning method that provides the position of one receiver antenna (the “rover”) relative to another receiver antenna (the “base”). If the location of the base receiver is known, an absolute position of the rover can be determined.

Most error sources are common to both the rover and base receivers, and therefore can be mitigated by differencing measurements across receivers. This reduces the magnitude of the errors significantly when the distance (baseline) between receivers is not long. RTK solutions are possible on baselines of up to 40 kilometres² in benign ionospheric conditions.



RTK software resolves the integer ambiguities in the carrier phase measurements

Errors in satellite clocks are removed and errors in satellite orbits and the atmospheric effects on signal propagation are mitigated because the error sources are common to both receivers

1. Learn more at novatel.com/rtkassist
2. RTK baselines can extend to 100 km, but accuracy and initialization time will be affected

NovAtel CORRECT with RTK is customized for NovAtel’s OEM7 and OEM6 receiver hardware, delivering fast initialization times as well as increased position accuracy even over long baseline lengths. An independent quality check indicates whether a fixed position solution was verified, ensuring a higher level of robustness and a more reliable position solution.

NovAtel CORRECT with RTK Overview:

FEATURES

- » RTK 1 cm + 1 ppm accuracy
- » Instantaneous initialization
- » Recovery from signal outages near-instantaneous
- » Rapid Time to Narrow Lane (TTNL)
- » RTK: Ambiguity fixing out to 40 + km
- » GPS, GLONASS and BeiDou modes
- » RTK ASSIST¹: Uses L-Band delivered corrections to extend RTK operation for up to 20 minutes after RTK corrections are lost or unavailable. A subscription-based service, it utilizes correction data from TerraStar.

BENEFITS

- » Most accurate, rapid and robust positioning technique
- » Self-sensing and adaptive to ionospheric activity
- » Delivers superior performance across many applications, including challenging environments such as urban canyons or under heavy foliage.
- » GLONASS and BeiDou options provide more satellite availability
- » High fix availability and reliability to maximize productivity

OPERATIONAL FACTORS

- » Requires local base station or access to reference network data
- » Must have radio or cellular equipment to receive (and pay for) correction data
- » Limited to RTK coverage area, typically within 40 km²
- » High ionospheric activity (common in South America) can reduce effective baselines to as short as 10 km

PPP for Sub-Decimetre Accuracy

NovAtel CORRECT with PPP utilizes robust correction data from TerraStar to deliver solutions with high accuracy and instant re-convergence in challenging conditions. GNSS satellite clock and orbit correction data, from the global TerraStar reference station network, is combined with NovAtel CORRECT algorithms to deliver robust positioning with up to 4 cm accuracy without the need for base station infrastructure—anywhere in the world.

Two Service Levels:

TerraStar-C delivers enhanced solution accuracy and reliable performance that maximizes uptime.

- » 4 cm RMS accuracy
- » 30-45 minute convergence
- » <1 minute re-convergence

TerraStar-L is ideal for decimetre-level applications that demand reliable, robust performance.

- » 40 cm RMS accuracy
- » <5 minute convergence
- » <1 minute re-convergence

NovAtel CORRECT with PPP Overview:

FEATURES

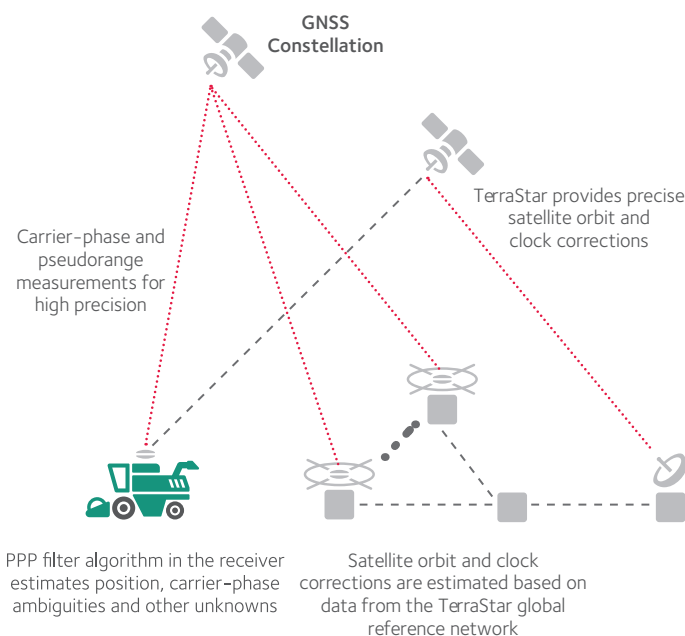
- » Two service levels to meet any application need
- » Rapid re-convergence after GNSS outages
- » Satellite or Internet-based delivery
- » Variable subscription durations available
- » TerraStar subscriptions available for land, airborne and near-shore applications¹

BENEFITS

- » Simplifies equipment needs by eliminating base station and communications equipment
- » Same performance anywhere on earth
- » Robust performance in variable conditions
- » Maintains solution accuracy through correction outages of up to 5 minutes
- » Sole source for GNSS hardware and corrections
- » Corrections delivered direct to end user
- » Supported on all OEM7, OEM628, OEM638, SMART6-L, ProPak6 and SPAN on OEM7 and OEM6 products³

OPERATIONAL FACTORS

- » Initial convergence period to reach full accuracy²
- » Solution availability affected by long GNSS outages (>5 minutes)
- » Subscription required



1. Land and airborne subscriptions have a geogate of 5 km and nearshore subscriptions have a geogate of 10 km.

For applications more than 10 km from shore, NovAtel CORRECT can also be used with Veripos Apex service for marine applications.

2. Convergence times dependent on observing conditions including number of visible GNSS signals, level of multipath and proximity to obstructions like large trees or buildings.

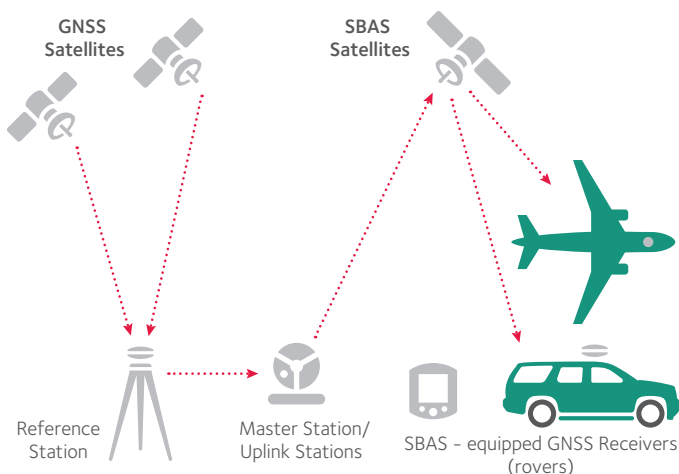
3. TerraStar-L currently only available on OEM7, OEM628 and SMART6-L products.

SBAS or DGNSS for Sub-Metre Accuracy

NovAtel CORRECT utilizes corrections generated by Spaced Based Augmentation Systems (SBAS) and Differential GNSS (DGNSS).

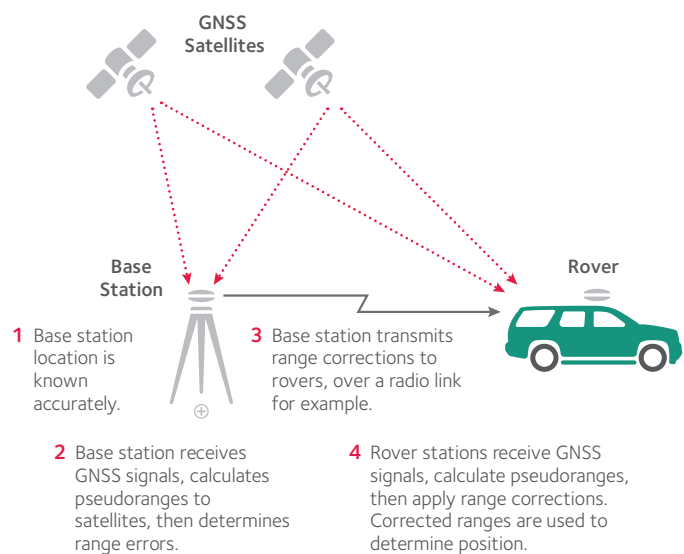
SBAS

For applications where the cost of a differential GNSS system is not justified, or if the rover stations are spread over too large an area, using SBAS may be more appropriate for enhancing position accuracy. SBAS systems are geosynchronous satellite systems that provide services for improving the accuracy, integrity and availability of basic GNSS signals through the transmission of wide-area corrections for GNSS range errors. With SBAS, accuracy of 60 cm is possible with no initial convergence time and instant re-convergence should the signals be interrupted. SBAS systems include reference stations, master stations, uplink stations and geosynchronous satellites. Available SBAS systems include Wide Area Augmentation System (WAAS) in the US, European Geostationary Navigation Overlay Service (EGNOS), MTSAT Satellite Based Augmentation System (MSAS) in Japan, GPS-Aided GEO Augmented Navigation System (GAGAN) in India and System for Differential Corrections and Monitoring (SDCM) in Russia. SBAS systems are available free of charge.



DGNSS

With differential GNSS, the position of a fixed GNSS receiver, referred to as a base station, is determined to a high degree of accuracy using conventional surveying techniques. The base station determines ranges to the GNSS satellites in view using code-based positioning techniques plus the location of the satellites determined from the precisely known orbit ephemerides and satellite time. The base station compares the surveyed position to the position calculated from the satellite ranges. Differences between the positions can be attributed to satellite ephemeris and clock errors, but mostly to errors associated with atmospheric delay. The base station sends these errors to other receivers (rovers), which incorporate the corrections into their position calculations. Position accuracy of 40 cm is possible with DGNSS. It works very well with base-station-to-rover separations of up to tens of kilometres.





NovAtel CORRECT

For superior technology with flexible, scalable and competitive positioning solutions—whatever your application—choose NovAtel. Our OEM business model and our commitment to ongoing innovation have made us a trusted partner with customers across many different industries for over 20 years.

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Version 7 Specifications subject to change without notice.

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Refer to novatel.com/correct for specification revisions.

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