Atlas® BaseLink™

Self-Surveying GNSS Receiver Technology

Overview

This document provides a brief overview of Hemisphere GNSS' Atlas BaseLink technology.

What Is Atlas BaseLink?

GNSS reference station networks have become a key tool for the GNSS industry, providing convenient and accurate position solutions. However, when working in remote areas that are not supported by these networks, users can be left with few options. In a typical workflow, users must either locate a point that has pre-existing coordinates or establish a point themselves. The latter requires communication with existing infrastructure, if done in real-time, or requires collecting and post-processing the data in order to achieve the required accuracy. Thanks to Atlas BaseLink technology, there is now a third option.

BaseLink technology leverages Hemisphere's global GNSS correction service, Atlas. Atlas transforms a traditional GNSS receiver into a smart, self-calibrating GNSS reference station. This smart receiver can now augment existing GNSS networks in areas with poor internet connectivity or simply be used as a stand-alone reference station in remote regions that do not have existing GNSS infrastructure.

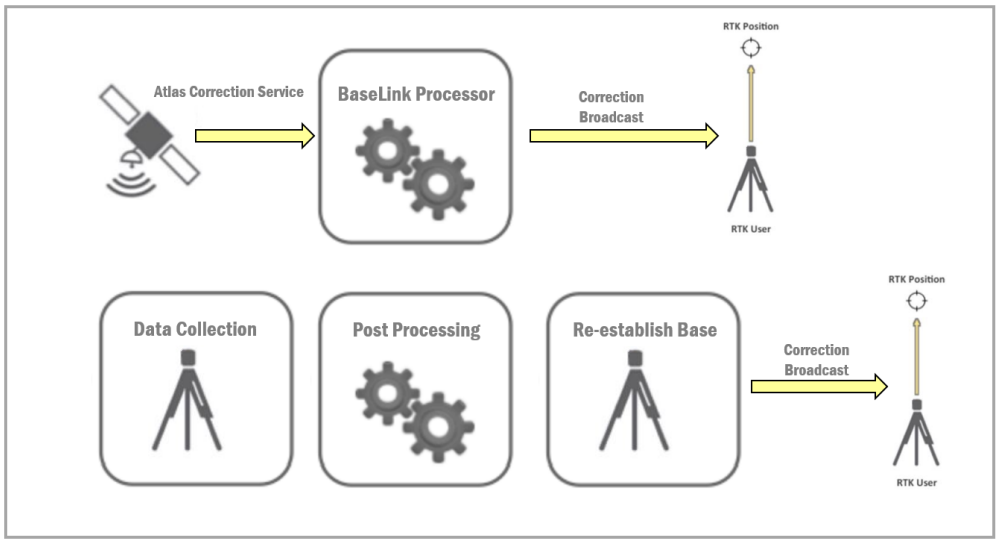

Figure 1 – Workflow: BaseLink vs. Traditional

How Does It Work?

BaseLink was designed with simplicity in mind. To begin, the user simply configures the desired accuracy level for the reference position and the desired output correction format. The receiver does the rest—establishing its own position, then automatically broadcasting the differential corrections once the accuracy level is obtained.

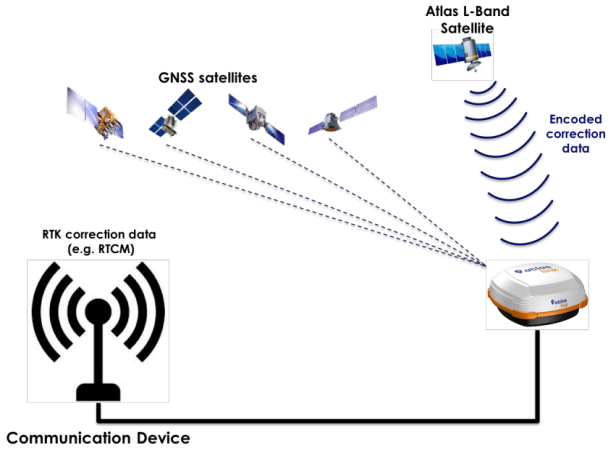

Figure 2 *– The BaseLink technology*

At the core of BaseLink is Hemisphere's Atlas technology. Atlas is a global GNSS correction service that meets or exceeds the performance of other industry leaders. Atlas corrections are derived from over 200 reference stations worldwide and delivered via L-band satellites to any location on Earth. An Atlas-enabled receiver uses raw GNSS measurements and precise satellite orbit and clocks to compute a position with accuracies down to 2 cm RMS. This allows a BaseLink receiver to precisely position itself in an operation termed *self-calibration*.

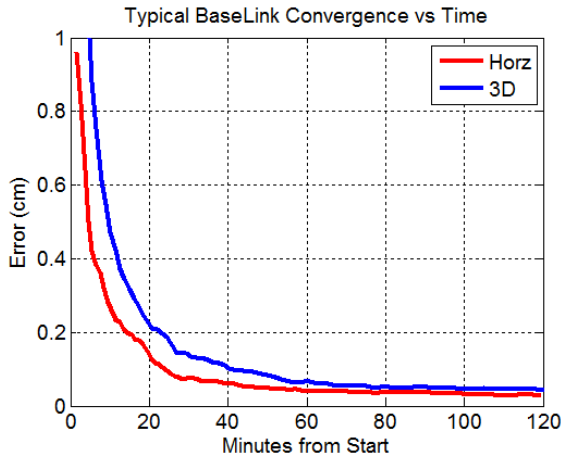

Figure 3 *– BaseLink - Typical convergence*

The self-calibration time is dependent on the time-to-convergence of the BaseLink's position solution. The user can select from a range of accuracies that will determine how long it takes for the base station to become operational.

Users can set the accuracy threshold based on their project requirements. Under nominal conditions, BaseLink requires about 20 minutes to achieve an RMS of 10 cm (horizontal), and about 2.5 hours to achieve an accuracy of 2 cm horizontal RMS. Figure 3 shows typical real-world convergence times for a BaseLink receiver. The blue and red lines are the expected convergence times for the horizontal and 3D position based on three days of trials.

Once the receiver's position has converged to the required accuracy, the receiver will automatically begin sending differential corrections in any one of the industries open communication standards, such as RTCM2 and RTCM3. If the reference station should be disturbed or moved, BaseLink can instantly recognize this and will stop sending corrections. This provides an extra level of security for the end user.

By default BaseLink uses the same reference frame as Atlas, which is ITRF2008. Users also have the option to choose from a list of pre-defined reference frames or enter their own custom offsets with respect to ITRF2008. The supported reference frames are shown in the table below.

Reference Frames Supported by BaseLink
ITRF2008
GDA94
ETRF
CUSTOM

Summary

BaseLink is a novel solution made possible by Hemisphere's Atlas GNSS Global Correction Service. It can be used to extend GNSS reference networks in areas of poor internet connectivity or in remote regions. Thanks to BaseLink's self-calibrating capability and adjustable accuracy thresholds, users can experience significant time and cost savings by integrating BaseLink into their workflow.

BaseLink Summary		
Convergence	**3D**	**Horizontal**
100 cm	5 minutes	< 5 minutes
10 cm	40 minutes	25 minutes
2 cm	-	2.5 hours
Output Correction Formats	RTCM2, RTCM3	
Constellations	GPS, GLONASS, BeiDou, Galileo, QZSS	
Frequency Support	Triple-Frequency	