



## **Industry leading satellite based GNSS (Global Navigation Satellite System) positioning and monitoring solutions with real-time CORS (Continuously Operating Reference Station) networks**

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Real-Time CORS (Continuously Operating Reference Station Networks) today are typically GNSS networks for positioning and monitoring purposes. Real-Time networks can consist of a few stations for a local network up to nation- or continental wide networks with several hundred CORS stations. Such networks use wide area modeling of GNSS error sources including ionospheric, tropospheric and satellite orbit correction parameters to produce highest precision and efficiency method of positioning using GNSS.

In 1998 Trimble Navigation Ltd. introduced a method of surveying with a non-physical or computed base station, called VRS (Virtual Reference Station). It is the most widely supported method of producing a network solution for precise carrier phase positioning in the industry. Surveying historically required one base as the fixed point of reference, and one or multiple rovers using that point of reference to compute their location by processing a vector result, either in real-time or in a postprocessed sense. Real-time survey is often referred to as RTK, short for real-time kinematic, and as the name suggests the results are in real time and you can move. The power of VRS is in the ability to compute a real-time wide-area solution to the factors that cause single base methods to degrade with distance. Namely, ionospheric and tropospheric modeling, and satellite orbit corrections. This is achieved by the reference network of CORS. A wide scattering of CORS across a state, typically 50-70km in mid-latitudes, creates a ground based sampling which significantly reduces the distance dependent errors that accumulate in the single base-rover relationship described early.

Furthermore, GNSS networks can be used for real-time monitoring purposes at various distance range. Trimble Integrity Manager software provides a suite of motion engines designed to detect and quantify any movement in a range of scales from slow, creeping movement like subsidence, through sudden events such as plate tectonics. GNSS data will be shown to be invaluable in monitoring e.g. continental movements as well as dams, levees or landslide areas.