Hardware
What is Differential GPS (DGPS)?

Differential Global Positioning System (DGPS) is an enhancement to Global Positioning System that uses a network of fixed, ground-based reference stations to broadcast the difference between the positions indicated by the satellite systems and the known fixed positions. These stations broadcast the difference between the measured satellite pseudoranges and actual (internally computed) pseudoranges, and receiver stations may correct their pseudoranges by the same amount. The correction signal is typically broadcast over UHF radio modem.

The term can refer both to the generalized technique as well as specific implementations using it. It is often used to refer specifically to systems that re-broadcast the corrections from ground-based transmitters of shorter range. For instance, the United States Coast Guard runs one such system in the US and Canada on the longwave radio frequencies between 285 kHz and 325 kHz. These frequencies are commonly used for marine radio, and are broadcast near major waterways and harbors.

Post-processing is used in Differential GPS to obtain precise positions of unknown points by relating them to known points such as survey markers.

The GPS measurements are usually stored in computer memory in the GPS receivers, and are subsequently transferred to a computer running the GPS post-processing software. The software computes baselines using simultaneous measurement data from two or more GPS receivers.

The baselines represent a three-dimensional line drawn between the two points occupied by each pair of GPS antennas. The post-processed measurements allow more precise positioning, because most GPS errors affect each receiver nearly equally, and therefore can be cancelled out in the calculations.

Differential GPS measurements can also be computed in real-time by some GPS receivers if they receive a correction signal using a separate radio receiver, for example in Real Time Kinematic (RTK) surveying or navigation.

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