



Imagine...

A Space-Age Address— For Your Home... and Your Mailbox

The Global Positioning System (GPS) is a constellation of 24 satellites that transmit signals to receivers throughout the world. With this system, it's possible to assign every point on Earth its own unique address – its latitude, longitude, and height.

For example, the coordinate counterpart of 18 Poplar Street might be 40 degrees 35 minutes 20 seconds N by 78 degrees 00 minutes 30 seconds W by 60 meters. NOAA's National Spatial Reference System provides a consistent framework for identifying those GPS coordinates. Each feature of the property at 18 Poplar – the house, the underground oil tank, the sewer line – has its own coordinate address. Fortunately, we won't have to remember all those coordinates, since our technologies will do that for us.

Complementing this space-based system is a growing multi-agency network of Continuously

Operating Reference Stations (CORS). These ground stations provide real-time navigation information 24 hours a day, 7 days a week, to guide our transportation and communications systems and manage our natural resources. As a major component of NOAA's National Spatial Reference System, the CORS network corrects GPS satellite signals to accuracies within $1/32$ of an inch, and then distributes the corrected data to users.

Standard civilian GPS can tell us which field a football is on. With CORS we can determine which yard line and, sometimes, which blades of grass the ball is on. NOAA sets the standards for CORS stations, processes the standardized satellite observations, ensures the quality of the stations' positional accuracy and operation, and makes the data available to users.

*“The National Geodetic Survey, under NOAA,
effectively launched our industry.”*

– Charles Trimble, Chair, U.S. GPS Industry Council



Where we were...

LEFT: Before the advent of satellite technology, NOAA line-of-sight surveys were made at night with a theodolite, an instrument combining a telescope with a way to measure angles accurately. Temporary towers were built directly over the geodetic control points, which were brass disks set in concrete, similar to the one shown above, to the right. From the top of each tower, NOAA surveyors would observe lights set on top of the other towers, and then compute the coordinates of the control points. (Photos: National Geodetic Survey)



...and where we are.

RIGHT: With GPS, a survey that once took days can now be completed in a few hours, with 10 to 100 times more accuracy. GPS satellites beam signals in real time to GPS receivers, like the one shown here, revealing their coordinates – exactly where they are in space at any given time. With that information, a microprocessor in the receiver can calculate the receiver's position.

(Photo: William Stone)

INSET: Like calculators, GPS equipment is becoming less expensive with time. Hand-held devices are available today for under \$200. (Photo: William Stone)

