

Triangulation and Space

While simultaneously tracking distance to several satellites, a Global Positioning System (GPS) receiver uses the method of triangulation to determine its location in real time. This is the basics of how GPS and other positioning systems work.

Helper's Guide

How to Prepare

Setup several GPS receivers: check the batteries, enable differential correction service, customize Satellite Page, if needed. The page should indicate GPS receiver accuracy and show the map of visible satellites in the sky.

Answers to Learning by Doing exercises:

1. Treasure is hidden in the capital city of
Assuming the scale is 364 miles for an inch we draw three circles: 1 circle at capital city of SD with 0.85 inches radius, 1 circle at capital city of WI with a radius of 1 inch and another circle at capital city of TX with a radius of 2.05 inches. All the three circles intersect in the capital city of NE
2. Time = 20,200 km / 300,000 km/s =
3. Distance = 300,000 km * 0.000001 s = 0.3 km =

Need to Emphasize

- Triangulation is used by many professionals and involves some basic math.
- GPS is only one of GNSS, which uses triangulation to find position in space.
- A GPS receiver uses time measurements to calculate distance to several GPS satellites with known locations at every moment of time.
- A minimum of three visible satellites are needed to achieve "position fix".
- More visible satellites and use of a differential correction service assures a better accuracy of a GPS receiver.

Related Links

- <http://www.trimble.com/gps/howgps.shtml>
 - <http://www.marinecomputer.com/seminars/2000-10-21/nyyc43.htm>
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