



# STEPHENS

Environmental Consulting, Inc.

- Environmental Consulting •Engineering
- Land Planning •Remediation
- Underground Storage Tank Removal and Closure
- RTK & Static GPS Surveys •Conventional Surveys



## What is GPS?

Global Positioning System (GPS) technology is a fast and accurate method of determining the location of any point of interest anywhere on the face of the earth at any time during the day or night, 365 days per year. The technology collects and processes signals from U.S. Satellites in orbit around the earth to determine the location of points of interest on the ground.

Different technologies with different accuracy are available for different applications. Hand held units costing from a few hundred to a few thousand dollars are available to the public, and with accuracies ranging from +/- 100 meters to +/- 5 meters, are suitable only for navigation and orienteering. The position of the unit is displayed "on-the-fly". Training and expertise required is minimal.

More expensive mapping grade systems can produce sub-meter level horizontal accuracies, with generally variable and unreliable vertical (elevation or altitude) accuracies. The user must occupy each point for a brief time to collect data before a location is obtained. These systems are suitable for mapping natural resources such as timber, farmland, wetlands/marsh and are less affected by "canopy" than survey grade technologies. Decimeter level horizontal accuracies can be obtained with "post processing". Some expertise and training are required.

Survey grade systems come in 2 basic types: single frequency and dual frequency. With single frequency systems, data collection is slow and data collected must be "post processed" before the location information is obtained. Occupation times are long-generally 45 minutes to several hours. These systems are useful only for establishing control.

This type of surveying with a single frequency system is called "static" mode GPS surveying. Some single frequency systems can collect data in static or Post- Processed Kinematic (PPK) mode, but the rate of data collection cannot compare to that produced by dual frequency systems. Also, if the single-frequency unit loses its signal when operating in PPK mode, it takes some time to re-initialize before survey work can begin again.

Dual frequency systems only require post-processing when operating in static or "fast static". In Real Time Kinematic (RTK) GPS, the positional data are displayed and recorded immediately. Subcentimeter to millimeter level accuracies (both horizontal and vertical) are obtainable with



both single and dual frequency technologies. To obtain true latitude, longitude, and elevation for new points, both systems need to occupy existing established control monumentation. Considerable skill, training, and expertise are required to operate either type of system effectively.

### **SECI's System:**

SECI currently uses the state-of-the-art Trimble 4800/4700 series RTK GPS system. In our hands, the accuracy, speed, and productivity of this system is unparalleled for survey grade work. Our system can function in either static or RTK mode. In RTK mode, SECI personnel can collect survey grade data rapidly. For engineering design quality topographic mapping, our ATV mounted system can collect up to a few thousands points per day over open ground.

Our Trimble data collection system is fully integrated with our conventional total stations. Our data collector can be "unplugged" from the GPS receiver and "plugged" into the total station and plugged back into the GPS receiver, allowing us to use the same survey software and the same file to compile "infill" in areas where satellites observations are obstructed by trees, tall buildings and the like. The completed data file is then downloaded to our field laptop or office computer either for plan preparation or to be e-mailed directly to our client.

### **Advantages of SECI's RTK GPS Systems**

- Operates in either static or RTK mode
- Mounts to a vehicle, ATV or boat for rapid collection of survey grade topographic or hydrographic data
- Data collector and software are fully integrated with our total stations for seamless transition to and from conventional survey systems.
- Units are fully weatherproof, shock resistant ( and can be decontaminated) for operation in all weather situations
- More accurate, consistent and reliable than conventional surveying systems, less room for and fewer sources of error
- Requires less manpower than conventional surveying: one man minimum vs. two man minimum
- Much faster than conventional survey methods or static/fast static single frequency GPS systems
- Provides accurate horizontal and vertical coordinates in either the true State Plane

Coordinate system or your local control network

- SECI's survey staff are 40 OSHA HAZWOPER trained and are ready for work on HAZMAT sites

### **GPS APPLICATIONS**

- Accurate control densification and/or as-built conditions for utility, highway, municipal, photogrammetric, and private site-specific projects including right-of-ways
- GIS Data Acquisition
- Monitor well, soil boring, and other types of sampling locations
- Establish State Plane Coordinates or Geodetic Coordinates
- As-Built and Topographic surveys
- Baseline surveys and traverse control surveys or traverse verification surveys
- Mine Exploration
- Natural Resource Mapping
- Hydrographic and Coastal Surveys
- Communication Tower Site Surveys and Certifications
- Construction Stakeout – utilities, highways, facilities, pilings, etc.



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