In one of the largest electric utility field mapping initiatives ever undertaken, Allegheny Power (AP) of Greensburg, Pennsylvania awarded a Field Data Inventory services contract to GeoResearch, Inc. of Bethesda, Maryland. GeoResearch is equipping field crews with its patented GeoLink® Field Mapping System and the company’s GPS Workhorse™ receivers to collect geographically referenced electric facility feature and attribute data for AP’s AM/FM system.

This project is one of the largest GPS/GIS field inventory data collection efforts ever undertaken by an electric utility. Subtransmission and primary distribution facilities along 22,900 circuit miles in 12,000 of AP’s 29,100 square mile service area are being cataloged and mapped. At the conclusion of the project, GeoResearch field crews will have mapped an estimated 560,000 utility poles and 202,000 overhead distribution transformers in West Virginia, South Central Pennsylvania and Southern Ohio over a twelve month period.

The Allegheny Power project is part of an initiative at AP to build a geo-spatial inventory of electric facilities for their AM/FM system. Once the database is complete, Allegheny Power will create an electrical connectivity model of their network for load analysis, and be able to provide more automated tools for outage analysis. It all leads up to better customer service.

To complete the project, GeoResearch is augmenting its own staff with local data collection personnel who have been trained in the use of GeoLink. Customized GeoLink single keystroke ‘hot keys’ and ‘pick lists’ are being used to streamline the field collection process while ensuring conformance with the utility’s AM/FM data model. Differential GPS techniques provide the positional accuracy required for this project. Much of the data is being collected by field crews walking the lines on foot in rough terrain.

Along with recording the geographic location of each feature using GPS, facility data being collected includes all electrical equipment, circuit number, phasing and attributes, such as utility pole height and type. Delivered data files include electrical connectivity information for each circuit that can be imported into AP’s AM/FM data model.

Field crews carry either Prolinear Palmtop or Omnidata RDT3200 386-based computers running a customized version of the GeoLink GPS/GIS Field Mapping software to perform the mapping and data collection tasks. Each GeoLink system also includes an 8-channel GPS Workhorse™ receiver which provides GPS position data. For this project, differential correction is performed during post-processing.

Project base stations are established in the Allegheny Power service territory as field crews move into new areas. Each project base station also uses a GPS Workhorse™ receiver to log data, which is processed by the GeoLink Base Logger software. Project base stations provide differential correction for all field data collected within an eighty mile radius of the base.

One aspect of the Allegheny Power project entails the re-tagging of some poles. A database of known duplicate pole ID numbers has been provided to field crews. A copy of this database is loaded into each GeoLink field computer. When a field worker enters the pole ID number from an existing pole tag into the system, the software quickly checks to see if it is a duplicate. When a duplicate is found, a new pole ID number is
Once field data is collected, it is imported into ESRI’s ArcView software environment for post processing. GeoResearch staff have written ArcView Avenue scripts which are used to perform integrity checks on the field data. TIGER files are used as an interim landbase for course reference while the final landbase is being developed. The final step involves translating ArcView files into Allegheny Power’s Smallworld AM/FM system and building the electrical connectivity model.

"The Allegheny Power project represents a milestone for both GeoResearch as a company and the adoption of GPS/GIS technology at electric utilities," commented Doug Richardson, president of GeoResearch. "Allegheny Power has recognized the benefit of utilizing GPS/GIS to create an accurate and complete facilities database based on a GPS reference grid. This approach to geo-spatial data modeling will provide for the ongoing collection of new and changed facility data using GPS in the field, and create a foundation for tracking the company’s service vehicles using GPS-based automatic vehicle location (AVL) techniques in the future. For GeoResearch, this project is the culmination of many years of refining the GeoLink software and our field procedures in order to efficiently complete an effort of this magnitude."

Companies such as Yardmark of Michigan and Novtek of California have been outfitting golf carts with GPS fairway measuring systems for a couple of years. Many of your better golf clubs now offer these “electronic caddies” on rental carts for an extra charge. Course owners confirm that the cart-mounted GPS measurement and display systems speed-up course play, improve game scores and are well-liked by most golfers. Now add to this a base station computer for tracking the fleet of roving golf carts in real-time, and one has something more akin to a dispatch center than a clubhouse. That’s what PinMark Corporation of Dallas, Texas has done with their PinMark® Satellite-Based Course Management and Yardage System.

Customarily installed in the pro shop, the PinMark base station color monitor displays the location of every cart on the course in real-time and provides two-way messaging with each golfer. The system improves course management and the bottom line by providing the following features:

- Automatic detection of player groups behind pace. This information can be used to improve the speed of play, reduce bottlenecks and identify repeat offenders.
- Course-wide tracking of all carts and maintenance vehicles can provide better cart fleet management. The system automatically generates cart usage reports for better maintenance scheduling.
- Provides advance food order placement for players who are finishing up their game through direct communication with the clubhouse.
- Supports emergency two-way messaging between the clubhouse and any golfer.

Of course, the golfer benefits by having GPS measurement, two-way messaging and a display screen right in the cart. In fact, the PinMark system provides separate front and rear cart mounted displays for the golfer’s convenience. An aerial view of the fairway is displayed automatically on the screen at each tee. Approach shot distances are shown on the fairway background map as play proceeds. A "zoom" feature automatically magnifies the hole as the player progresses down the fairway. Real-time electronic scorecards and a leader board are also available for display in the cart.

All this and the ability to order-up a meal before finishing the back nine. What next: GPS-guided golf balls?