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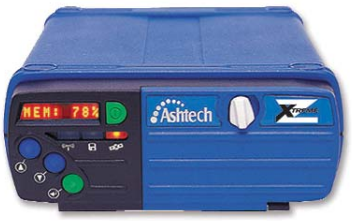

Now is the Time for GPS

As a professional surveyor who's only recently come to discover the benefits of global positioning systems (GPS), I can summarize those benefits in two words: staying competitive. GPS technology's ease of use – coupled with affordability and accuracy – make it a time-saving tool that can win jobs and boost the profitability of any size surveying outfit.

My company, Dillis and Mische, Inc., is a small surveying firm located in Ayer, Massachusetts. Primarily serving central Massachusetts, we also work statewide, covering most aspects of land surveying services. My partner Stan Dillis and I are Professional Land Surveyors and certified Massachusetts Soil Evaluators. Our firm often does contract work for Dufresne-Henry, Inc. Engineers, a national company specializing in municipal engineering for sewer, drainage and water design. For many years, they have done work for the City of Fitchburg on the Nashua River in North Central Massachusetts. Recently, Dufresne-Henry hired us for a combined sewer and storm separation project to repair five miles of Fitchburg's old sewer lines. Dufresne-Henry was awarded a four-year contract, which included aerial mapping, design and construction monitoring services. The scope of the project brought up an issue we had been considering for some time: adding GPS to our surveying capabilities.

The first step in the Fitchburg project was mapping the targeted areas in the city, and aerial topography was chosen for the base map. The target areas for the project were located across the city, and we were provided with a list of more than 50 control points to coordinate for the aerial mapping firm. We also needed to put the project on the upgraded NAD 83 coordinates for the NGS CORS (National Geodetic Survey continuously operating reference stations). In addition, studying the NGS data sheets uncovered another group of 20 stations for us to observe.

In order to handle this extensive project, we felt it was time to incorporate GPS technology into our survey procedures. We had already considered GPS because of its efficiency, especially in large-scale control projects. In recent years we've been losing aerial survey control jobs that we used to win, because we could no longer compete – in terms of time to completion – with survey firms using GPS. Our time frames were at least three to four times longer than the competition. Also, the surveyors with GPS were able to jump on the work much faster than we could, due to the fact that they wouldn't be as tied down to the project as we would be with our traditional techniques. All those factors considered, we finally concluded that now was the time for GPS.

Selecting The Right Receiver

For our first GPS receiver, after a fairly long and in-depth evaluation process, we selected the Z-Xtreme™ real-time kinematic (RTK) system from Thales Navigation. We're not GPS experts, so we were looking for a product we could understand easily and start using quickly. We also wanted a product with a long history in the GPS business and a solid reputation with the trade press. The Z-Xtreme met all those criteria and seemed to be a good fit for our needs. We were also impressed with the strong product and technical knowledge of our local dealer, GPS & C.
The Z-Xtreme is a rugged and reliable dual-frequency GPS receiver delivering accurate and fast centimeter-level positioning. Thales Navigation's Z-Tracking feature offers excellent GPS signal reception, and the user-friendly interface on the front panel enables us to easily enter site information, check survey status, and set up RTK base stations. My preference for the Z-Xtreme is also based on the ease of the Thales Navigation post-processing software programs. I was using the Z-Xtreme receiver and downloading to my PC on the first day of use.

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Putting GPS To Work

Armed with our new Z-Xtreme receiver, we were ready to tackle Dufresne-Henry's project in Fitchburg. The first phase of our control work in Fitchburg was a static GPS control survey. Fitchburg is a hilly city and we needed good control vectors forming solid geometric triangles throughout the city. First, we identified several areas where we could set up control base points and leave the base station safely unattended – such as the local wastewater treatment plant, hospital and airport – while we collected other data throughout the city with the rover.

We started each day by setting up the base station and occupying other points throughout the city. After we had a primary network set up, we rented an additional rover unit from our dealer and solidified our control network by leapfrogging our two rover units throughout the city. Navigating between all of Fitchburg's hills, valleys, and river crossings was challenging and interesting work.

The receiver's ease of use in the field was an advantage on the project. Our field operator was able to pick up the set and operation of the static unit quickly, and any steps he missed were quickly overcome via cell phone contact. At day's end we picked up all the units and the base station and went back to the office to download the data.

We also included NAD control points in our static work and started a network that will soon contain all our work on NAD coordinates. We spent the days on this work occupying points very far apart across the city, and communicating our moves via cell phone.

The downloading process was simple and fast with the Ashtech software, as were post- processing and adjustments. We adjusted our lats and longs to the desired coordinate system and elevation datum again very easily. The many analysis and adjustment options ensured that we had solid data, and that it was adjusted correctly throughout the project.

Finally, we set up our system for RTK work to locate the bulk of the control points for the aerial mappers. I worked alone on the RTK portion of the project, leaving our field crew free to work on other jobs. This had been one of my hopes in investing in GPS – the ability to work through jobs alone while the crew is making progress elsewhere, to help us meet our commitments to clients at a time when qualified in-field personnel are scarce. This is where GPS can truly augment the profitability of a survey firm, by dramatically raising the productivity of the current team rather than requiring the addition of new employees.

While putting together a proposal for a job of this size, I also tried to make an estimate of ground total station survey time, for comparison purposes. The elevation changes and number of streets involved made me realize that GPS would be dramatically quicker and more accurate over what would be long, winding traverses. GPS was really the only way to go for a job of this magnitude. After analyzing my time estimates, I concluded that with GPS we completed the Fitchburg job in one quarter of the time that a ground survey would have taken – and much of that time I was working alone.

We completed the job on time, and the mappers found the work very accurate when using their scaling techniques. We now have a network of points to use during the next phases of sewer work. We are also able to use this data for other jobs we have in the Fitchburg area.

As the City of Fitchburg project continues, we will be involved with detail location of rims and inverts of city sewer and utility structures. We are sure the new GPS technology will be useful for this project, as well as for augmenting the rest of our services. We seem to find another use for the GPS equipment daily, and we're constantly pleased with the ease of the field procedures and the office processing. My only regret is waiting so long to get involved with GPS.

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