

Indiana Government Uses Benefits of Satellite Global Positioning System.

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Jul. 29-Human thought seems to follow a series of age-old considerations.

Cogito ergo sum - I think, therefore I am. Descartes, the French philosopher, nailed that one awhile back.

But where am I?

The U.S. Department of Defense spent almost 30 years and more than \$12 billion to answer that question precisely with the creation of a 24-satellite Global Positioning System (GPS).

Since the first GPS satellite was launched in 1978, it has quickly become a civilian technology with applications as varied as construction planning, automotive, marine and aeronautic vehicle tracking, mapmaking, environmental and archeological research, and land surveying.

"The whole world needs to know where things are ... people want to know their boundaries," said Richard Cacioppe, owner of G. Lengemann Co., a Niles-based distributor of surveying equipment.

Now, a Michiana metropolitan planning organization, G. Lengemann and Elkhart County have teamed up to find new municipal uses for GPS technology.

With the help of the Michiana Area Council of Governments (MACOG) and GPS equipment it purchased from G. Lengemann, one of the largest distributors of survey equipment in Michigan and northern Indiana, Elkhart County will develop a graphic information system using "smart maps" to assist with a "myriad of uses", according to MACOG Executive Director Sandra Seanor.

"Smart maps" are a creation novel to GPS technology that allow for the combination of precise locations and related information - thus creating a resource for county officials to use in any number of situations.

One day, for example, if a gas leak were to occur, a response unit could use a smart map to instantly locate the manhole cover closest to the leak, know what condition the pipes below the cover are in, what replacement parts might be needed, and link to a telephone directory of the affected area to immediately alert residents about the problem.

GPS surveying equipment comes in two grades: map quality and survey quality.

Survey quality equipment provides measurements accurate within 1 centimeter - an unfathomable feat for information from satellites more than 11,000 nautical miles above the earth moving at more than 2,000 mph.

Although map quality equipment is slightly less accurate, it's also less expensive. GPS survey systems including a base receiver, a mounted "rover" or mobile receiver, and radios cost roughly \$30,000; whereas map-grade systems cost about \$5,000 per hand-held rover, said Cacioppe.

Locations and measurements are found by placing a base receiver on a previously identified "known point" before taking the rover receiver to the location that needs

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precise identification. Before GPS, such measurements could take dozens of "line of sight" measurements, now they are calculated in seconds with even better accuracy, Cacioppe said.

The map quality system purchased by MACOG for its work in Elkhart county will include seven or eight receivers at roughly \$4,500 each, according to Cacioppe and Seanor.

Local governments in Marshall, St. Joseph and Cass counties have already discovered the benefits of using GPS survey equipment for graphic information systems. Cass is using its system in a number of townships to find the exact location of every driveway.

This system could help EMS crews retrieve precise directions almost instantly in emergency situations, or simply make address assignments more precise for new housing. Although GPS surveying equipment is a new resource for county governments, for Marbach and Brady, an Elkhart-based surveying company, GPS is becoming standard procedure.

As a local pioneer for GPS equipment in surveying, Marbach and Brady purchased their first receivers in 1989. Before all 24 satellites had been launched into orbit, surveyors often had to work in the middle of the night to find satellites at the angles they needed for accurate readings, said Chris Marbach, president of the surveying firm.

"Flashlights often posed a problem for the crews," he added.

Although tall trees and buildings still block satellite signals, the technology has advanced significantly since Marbach's first purchase. Now capabilities like real-time data and smaller, faster equipment can be purchased for much less money.

"There are now quite a few vendors and product lines," Marbach said. "The market has leveled out."

Although traditional survey equipment is hardly obsolete, the possibilities GPS presents for combinations of geo-spatial data are endless, Cacioppe and Marbach agreed.

"Producing maps has always been a human curiosity, said Cacioppe. "And the fear of straying too far without a map has prevented people from many discoveries."

GPS seems to have quelled those fears - so on to the next eternal question.

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