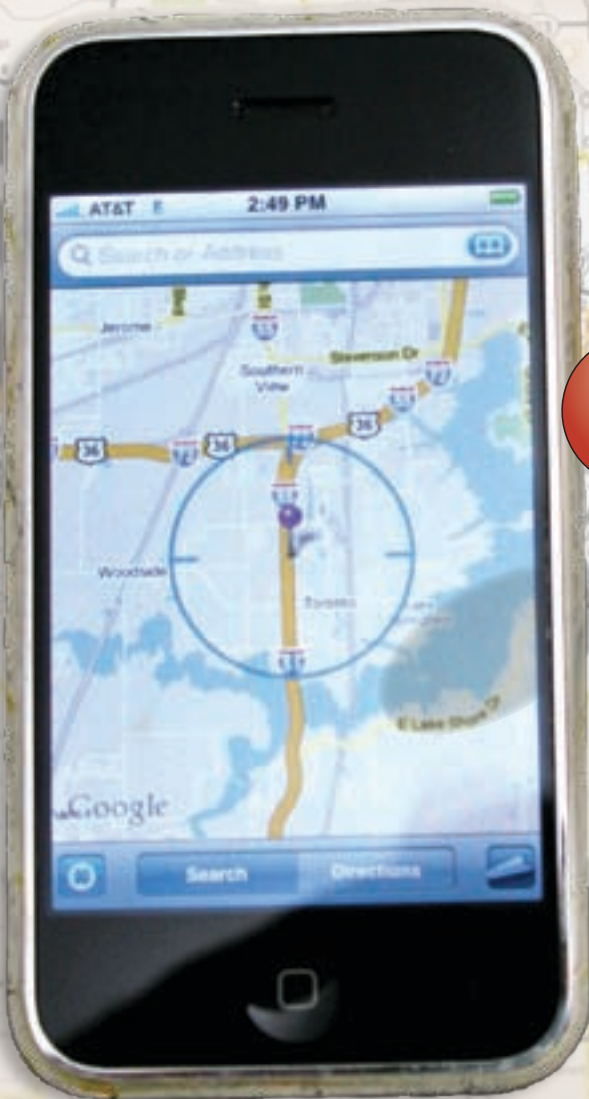


ILLINOISTM

COUNTRY LIVING



FINDING YOUR WAY

How GPS technology is
expanding our world





FINDING YOUR WAY

How GPS technology is expanding our world

By Catrina McCulley Wagner

We all have a basic need to know where we are and how to get from point A to point B. Early man guided himself by the stars. Next he invented the compass, map and sextant. Today the cool gadget for finding your way is a GPS (global positioning system). You may have one in your car, maybe even on your cell phone. If you are a guy, you'll never have to stop and ask someone for directions if you have a GPS. How cool is that?

GPS was originally developed by the Department of Defense in 1973 to assist soldiers and military vehicles in accurately determining their locations worldwide. In a sense, satellites orbiting the earth have replaced early man's use of the stars. At least 24 satellites circle the earth. GPS units use these satellites as reference points. By employing a little trigonometry, the distance the signal travels between the GPS unit and the satellites can be determined by estimating the amount of time it takes to reach the receiver. Using this technology, you can pinpoint where you are on Earth within inches.

Today, just about everyone has a GPS of some kind. They are usable everywhere except where the GPS can't receive a signal from the satellites, such as inside most buildings, subterranean locations and under wa-

ter. Pilots use GPS units to plot their courses, balloon pilots use them to help guide them safely around power lines and to help them find a safe place to land. Recreational boaters, commercial fishermen and professional mariners use GPS devices for navigation on the water. Other uses include outage tracking and mapping for electric cooperatives, farm field mapping, finding lost pets, 911 support, roadside assistance, hiking, hunting, camping and a new hide and seek outdoor activity called geocaching.

How Co-ops Are Using GPS Units

Electric cooperatives own millions of dollars in assets, poles and wires, stretching for thousands of miles across open country and along country roads. Illinois co-ops, for example, maintain 55,592 miles of line with poles, transformers, switches and substations throughout 90 of the state's 102 counties.

Unfortunately the paper maps used to locate co-op utility infrastructures are often inaccurate, incomplete and outdated.

But thanks to GPS and geographic information systems (GIS), electric co-ops are able to quickly overhaul and computerize outdated paper maps.

A GIS is basically a computer system capable of assembling, storing, manipulating and displaying geographically referenced information. In other words, it's a map with brains. And you don't have to figure out how to refold it.

Eighty percent of the information managed by an electric co-op is connected to a specific place on earth - a street address, a highway intersection or a simple x-y coordinate. That's why a GIS database is a revolutionary technology that cuts across every industry.

Spoon River Electric Cooperative in Canton is one of nine Illinois cooperatives using this technology to streamline operations, create greater accountability and improve safety.

"I'm very pleased with the program," says Spoon River Electric President and CEO Bill Dodds.

"We've made something that is far more than just a mapping system. It's an operational tool. I'd recommend this to other co-ops and invite anyone to come see our system."

The program was designed and implemented by Josh DeWees, Spoon River Electric's Manager of Forestry and Engineering Support. The co-op had been using old paper maps to locate poles, transformers and other equipment. Some of those maps were nearly 70 years old.

Updates to those maps were done



Tim Brecht, Manager of Engineering and Operations at Adams Electric Cooperative, shows Adam's customer, Craig Burwinkel of Fowler, the topography of his property via the GIS mapping system Adams uses. "We have it at the office and in our trucks and can zoom into each customer's location." Brecht had the GIS mapping system available at Adams Electric Cooperative Annual Meeting in September at Bailey Park in Camp Point.



by hand, DeWees says. His plan did away with the old maps by creating more accurate electronic ones with all equipment – meters, poles, transformers, regulators and capacitors – precisely plotted.

But the process wasn't easy. Co-op employees had to drive to each piece of equipment and collect more than 69,000 location coordinates with GPS handheld devices.

"Two people were dedicated to this project every day for 15 months," DeWees says. "It was very intensive."

As the GPS coordinates were gathered, DeWees entered them into the GIS software, which allowed him to produce layered maps of the co-op's territory and equipment.

Now Spoon River Electric employees can locate members on the maps by name, phone number or address. They can zoom into maps of individual homes and see what equipment is there. The layered maps can show all equipment or just certain components.

In an outage, knowing exactly where equipment is located is a plus.

"It makes our response faster and

it makes us more efficient," DeWees says. "That means better service for our members."

After successfully implementing the new technology, the co-op added GPS technology to company trucks. Units in bucket trucks communicate back to the main office about a lineman's location. This can help the co-op's dispatcher know where the nearest truck is during an outage, which in turn helps to speed repairs and improve day to day efficiency.

"This creates accountability for time and documentation of when we were at a member's house and how long we spent there," DeWees says.

The units also improve safety. Knowing exactly where other linemen are located can help ensure their safety when a line is re-energized. When line employees can't be reached by cell phone or radio, employees at the

main office can see where their trucks are located. And in case of an accident, 911 dispatchers can be given an exact location.

In the future, DeWees hopes to expand on the GPS and GIS programs by tying into the existing automated meter reading (AMR) program, improving outage response time by allowing workers to see exactly what equipment is affected. The new smart maps will be a building block for the smart grid infrastructure every utility is working to build.

If the co-op implements broadband service in the future, DeWees says employees could have immediate laptop access to up-to-the-minute accurate electronic maps and other information on the co-op's computer network.

The GPS and GIS programs have become bigger and better than DeWees first imagined. "Providing the best ser-

vice to members is our priority,” he says. “This technology helps us do that.”

Other Illinois cooperatives using this technology include: Adams Electric Cooperative in Camp Point, Corn Belt Energy Cooperative in Bloomington, Egyptian Electric Cooperative in Steeleville, Illinois Rural Electric Cooperative in Winchester, Jo-Carroll Energy in Elizabeth, Menard Electric Cooperative in Petersburg, Monroe County Electric Co-Operative, Inc. in Waterloo and Wayne-White Counties Electric Cooperative in Fairfield.

How Farmers Are Using GPS

Duane Noland, President/CEO of the Association of Illinois Electric Cooperatives, also helps farm his family’s farm established in 1833. Like many farmers across the state, he has dramatically improved the productivity and efficiency of his farm with GPS technology.

In the spring he fills his planter’s hoppers with soybean seed. He climbs

into the cab of the tractor, ready for a morning of planting. But, before he turns on the tractor’s motor and before a single seed ever hits the ground; Noland fires up his GPS and GIS mapping system. After the coordinates are locked into the GPS unit, he is ready to start planting the field — the same field his father, Neil

Noland, and seven generations before him plowed by hitching up a team of horses. This is precision farming where the soil characteristics of every foot of the farm’s soil is mapped in the GIS and the GPS helps deliver the precise amount of fertilizer and seed for that location on the farm.

“Using GPS technology, we can now easily calculate yield monitoring, yield mapping, variable rate application of fertilizer and sprays, machine guidance and weed mapping. Each of these de-

mands absolute driving accuracy. But with a GPS, everything is automatic after you set the coordinates. GPS allows

farmers to work during low visibility field conditions such as rain, dust, fog and darkness,” Noland says.

Emerging technologies are helping farmers gather information from their fields that they can use to harvest more crops

than ever before. For instance, sensors in Noland’s soybean field can measure how fertile the soil is. This technology prevents farmers from over or under-fertilizing their crops.

“It’s been a huge benefit to today’s farmers,” Noland says. “GPS satellites overhead read where the sensors are, and then a computer puts the data together and draws a map to show which areas need more fertilizer, and what kind. It’s pretty remarkable.” Other sensors see where pests inhabit crops.

Noland says when he thinks back at how far we’ve come in technology for farming, it amazes him. “When my great grandfather farmed, he harvested corn by hand. At the end of the day, if he got 100 bushels, that was considered a very productive day. Not only have I never had to harvest corn by hand, but technology has made it so that a good day for us is 18,000 bushels

This is precision farming where the soil characteristics of every foot of the farm’s soil is mapped...



Planting a straight row in 1833 on the Noland family farm near Blue Mound meant controlling a team of mules. Today, Duane Noland can plug in a few coordinates on the GPS guidance system and the tractor steers itself. GPS and GIS mapping technology have made yield monitoring and precision crop input application possible. Noland, who also serves as the President and CEO of the Association of Illinois Electric Cooperatives, says mapping technology is also key to helping electric co-ops improve efficiency.

of corn per day,” Noland says. “I will be interested to see how far technology will bring us in another 30 years.”

Recreational Uses of GPS

Recreational uses of GPS devices are almost as varied as the number of recreational sports available. GPS is popular among hikers, hunters, snowmobilers, mountain bikers and cross-country skiers, just to name a few.

One recreational use that’s quickly becoming a favorite pastime among owners of handheld GPS units is geocaching. Geocaching started in May 2000 soon after GPS technology became available for civilian use. Geocaching is essentially a game of hide and seek treasure hunting. The word geocaching is the combination of two words. Geo is taken from the word geography, and caching is a term used in hiking/camping to mean a hiding place for concealing and preserving supplies. Push them together and let the games begin.

“Geocaching is a game that is played worldwide and sends eager GPSers on the hunt for hidden treasure with a pair of coordinates as the only clue,” says Mark Pitchford, a Springfield resident who enjoys geocaching with his wife, Julie, and their son, Ian.

“A geocacher can place a geocache (treasure) anywhere in the world, pinpoint its location using GPS technology and then share the geocache’s existence and location online at a listing site. Anyone with a GPS unit can then try to locate the geocache,” says Julie.

The Pitchfords began geocaching when their son, Ian, who is now 6 years old, was a baby. It was an inexpensive way to get the family out together enjoying nature. “We’d pack a picnic lunch and head out for the day,” says Julie. And the family just fell in love with the sport from there. “It’s interesting to see the little trin-



Julie and Mark Pitchford sift through the contents of a kiddie cache, a cache filled with toys intended to be found by children.

kets and treasures other geocachers leave behind. Some have family significance; others historical and others are just silly such as a kid’s meal toy. The most interesting treasure we’ve found so far was a Dan Hampton Hall of Fame Induction pin,” remembers Julie. “It just goes to show that one person’s junk is another’s treasure,” she laughs.

The Pitchfords even found time to geocache while on their vacation in Austria. “We found three caches in Austria. The most memorable of those was in Maribel Gardens in the gnome garden. They had 12 gnome statues in this garden, and there were two additional statues somewhere else in Austria. Our job was to find the missing two gnomes,” Mark says.

“Ultimately, we found ourselves walking completely around a mountain into a residential area where the gnomes were part of someone’s landscaping. That one was pretty cool,” Julie remembers.

“We’ve set a small goal to geocache everywhere we go, and we’re trying to find at least one cache in each of the 50 states,” Mark says.

“If nothing else, it’s a good excuse to see the world,” says Julie.

There are only three rules to geocaching. They are:

1. If you take something from the cache, leave something of equal or greater value.
2. Write about your find in the cache logbook.
3. Log your experience at www.geocaching.com.

So, what are you waiting for? Go find some treasures! ■