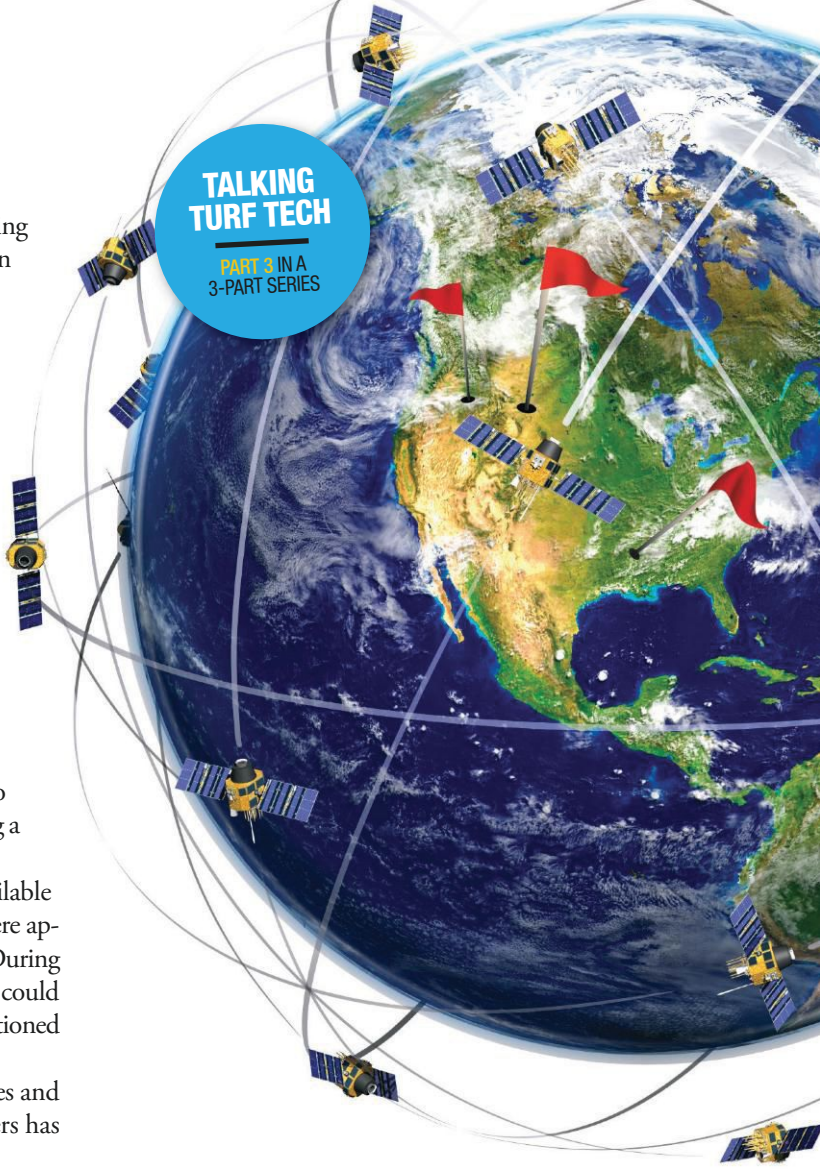




TALKING TURF TECH

PART 3 IN A
3-PART SERIES

WHEN THE DEPARTMENT OF DEFENSE began developing the Global Positioning System (GPS) of satellite navigation in the early '70s, its thoughts were limited to military use. The Cold War was still burning hot, and the threat of nuclear war was used to justify the billions of dollars it would require to develop accurate satellite-based navigation for defense. Little did they know the general public would be using this constellation of satellites 40 years later to map the fastest route to a Starbucks, find where the bass are biting or aid in deciding between a 7 iron and an 8 iron.

For many years, GPS use was reserved primarily for government operations, offering only a degraded signal to civilians behind a curtain called "selective availability." But in 1996, President Bill Clinton signed an executive order declaring GPS to be a dual-use system. The order became official in the spring of 2000, when selective availability was discontinued, allowing civilians to receive the nondegraded GPS signal globally and opening a floodgate of public-use GPS products and software.

The golf industry was quick to adopt this newly available technology. Soon, bulky and expensive GPS receivers were appearing in golf carts and golf bags throughout the world. During these early years, satellite acquisition often was slow and could be hindered by clouds and trees. Consequently, users questioned the accuracy of the new devices.

But as the technology continued to improve, the uses and application of GPS for golfers and golf course managers has

PINPOINT ACCURACY

broadened. From pin sheets to course mapping to satellite control of individual sprayer tips, forward-thinking entrepreneurs and superintendents are developing systems and uses for GPS technology to manage golf courses more efficiently, economically and ecologically.

Pin rotations

"It came to be out of frustration," says Jon Schultz, president of ezLocator, when asked for the spark that ignited the concept for his GPS-based pin management system. "Frustrated as a player, we were seeing the same pin locations every week."

Schultz, an avid golfer and 30-year veteran of the technology industry, set out to develop a system that would allow superintendents to rotate their pin positions more efficiently while

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BY STEVEN TINGLE

The Right Direction

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offering players more variety.

Enlisting the help of Kevin Nettles, superintendent at the Dallas Athletic Club, where Schultz is a member, he quickly learned the limitations of traditional pin-rotation systems.

"It was eye opening," Schultz says. "Nettles didn't have the technology at his disposal to do something. He didn't have the expertise to understand what GPS technology could bring to him. What could a 3-D scanning system bring to help him? What could mobile devices, such as iPhones and iPads, do to help him?"

What resulted is a system that creates a 3-D map of each green, including the topology and percentage of slope.

"It's a highly accurate survey of each green," Schultz says. "It's accurate to plus or minus 1 centimeter to any point on the green."

From there, each cupable location — adhering to the USGA's preference of pin locations with less than 2 percent of slope — is mapped, GPS referenced and entered into a database.

"We're able to depict where to put each location accurately," Schultz says. "We measure everything from the front and edge of the green."

Tom Bailey, superintendent at Wade Hampton Golf Club in Cashiers, N.C., is receiving positive feedback about the system.

"The members like the layout of the pin sheets and having a pin sheet every day," Bailey says. "They like the variety. There were several locations that hadn't been used previously, so it gives us a good rotation."

The system discovers many unknown, or previously thought unusable, pin locations.

"On average, we're getting between 150 to 200 locations per green, depending on size, topology, slope and severity of the green," Schultz says.

Map it out

Course mapping is another area ripe for GPS technology. While traditional mapping still is relatively expensive, some companies are developing ways to place accurate maps in the hands of superintendents at a fraction of the cost.

"Typically, a course superintendent would pay someone to conduct a survey and provide them with a map based on GPS points, and that's a fairly expensive proposition in most places," says Jeff Ryan, a partner with CourseVision. "Our approach is different because we start with an aerial photo of the property that's orthorectified. It's a high-resolution photo tied to GPS points that adjusts for the curvature of the earth and



establishes ground accuracy."

CourseVision then digitizes the photo, creating a map that allows for the calculation of measurement data of fairways, bunkers, cart paths, water features, buildings or anything else.

"The map is GPS enabled," Ryan says. "We're just getting there in a different way.

Rather than walk with a backpack and a satellite receiver, we do it with a photo that's been tied to GPS.

It's \$1,500 for an 18-hole course for us to produce a map. Depending on the region of the country, it's a \$5,000 to \$10,000 process just to get turf and heads GPSed in the field with a backpack."

Superintendents are using the data provided by these maps in various ways.

Hartefeld National in Avondale, Pa., changed ownership recently, and William Brown, CGCS, notes the usefulness of the CourseVision data during the transition. He views the map on his iPad.

"During the acquisition, there were questions about acreage and costs," Brown says. "It was a time-saver, because I was able to print Excel sheets formulated from CourseVision about acreage, greens, tees, fairways and bunkers. The company that acquired us was impressed with that."

Easy being green

A completely enabled GPS map also helps superintendents with environmental issues. Michael Rayman, CGCS at Weibring Golf Club at Illinois State University, was working toward certification in the Audubon program, and the first step toward certification is a site assessment. Rayman used the map to complete his course's site assessment and used CourseVision's tree layer, along with an energetic Illinois State horticulture student, to create a database of all the trees on the property.

"The capabilities of the entire program are unique for the superintendent because it's not only providing you with accurate measurements of your existing golf course, it gives you an opportunity to detail a sub-area," Rayman says.

Look ma, no hands

But for superintendents, the ultimate GPS technology might be hands-free equipment control. While most turf equipment manufacturers say the viability of this concept is years away, a former North Carolina tobacco farmer is putting the technology to work now.

"I'm the guy who brought GPS to the industry," says Marc

Thigpen, owner of NuTech Soils, a Trenton, N.C.-based fertility analysis and variable-rate application company. “I was the first one in North Carolina to do GPS on the farm. I saw the technology and decided to take it to the golf course.”

Thigpen uses GPS technology to balance soil levels with accuracy once thought impossible. Thigpen soil samples a golf course, and each sample is GPS referenced.

“By taking multiple samples all over the golf course, we’re able to take the data, process it and put it back to that point,” he says.

NuTech will take as many as 10 samples per acre, the results of which allow a superintendent to apply only what’s needed to each area.

“Our application equipment can put what the superintendent wants in that location,” Thigpen says. “The machine will change thousands of times per hole depending on what’s needed.”

The benefits of this process are economical and ecological.

“We’re cutting fertilizer consumption by at least 30 percent,” Thigpen says.

Tom Bailey at Wade Hampton is an early adopter of this technology as well.

“Historically, everything’s been done on a one-, two- or three-acre basis,” Bailey says. “You’d take one or two samples off a fairway, now we’ll take a couple of hundred. We can tailor our fertilizer to what each region of the fairway needs.”

Never one to slow down, Thigpen is taking the concept to the sprayer market. (See Part 1, “Smart Spray,” in the August issue.)

“We have an alliance with Toro and are doing individual tip control on sprayers,” Thigpen says. “We have sub-centimeter accuracy — not sub-inch, sub-centimeter. There’s instant gratification because you see the tip turn on and off, and it won’t overlap.”

Because the popularity of NuTech’s systems has grown, Thigpen is providing superintendents with more GPS options.

“We have a program in which each golf course can do their own sampling in-house,” he says. “We teach them how, then they take it and run with it. They evolve the system to what they want to do with their golf course. By having a handheld unit, they can do sprinkler heads, boundaries and a water management program.”

As technology evolves, entrepreneurs such as Schultz, Ryan and Thigpen will continue to tweak and improve their systems, while creative superintendents will continue to find new ways to use them.

“It’s just an all-around win-win for everybody,” Thigpen says. “You’re giving the superintendent a new tool in a new era of technology.” ■

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APPED UP

With today’s apps, superintendents have control in the palm of their hand.

BY BETH GERACI SENIOR EDITOR

Superintendents looking to know the forecast or manage paperwork straight from the course now have those tools right at their fingertips, courtesy of the latest apps.

Bob Porter, superintendent at Hiawatha Golf Course in Minneapolis, Minn., spoke about one of his favorites, **Evernote (1)**, at the 2012 GIS. The app enables superintendents to access and organize their files and record and store information from anywhere.

“It acts as a repository for anything you want to remember,” explains Porter, who uses it to search for and send invoices, discover products and take notes.

And interest in apps is growing, he says.

“When I gave my talk at the GIS there were 100 people in the audience,” he says. “There was standing room only.” Compare that to his talk three years ago, when just 30 people attended.

Like Porter, Justin Ruiz, CGCS at Indian Summer Golf & Country Club in Olympia, Wash., uses Evernote to organize invoices and collect information from the Internet. The app aficionado also posts to his blog and edits Word documents through apps such as **Blogsy** and **Quickoffice**, and relies heavily on the **Weather Channel (2)** app for help on the job.

“I always go to the 10-day forecast and try to plan projects around that,” he says. “In the Northwest, if you can get a break from the rain, you try to get as much as you can done.”

Adam Moeller, agronomist with the USGA Green Section Northeast, likes the **Sun Seeker (3)** app, which allows superintendents to analyze sunlight at any point on the course at any time of day. “If we wanted to know what the sun pattern will be standing on one green and

how that sun angle changes throughout the day on September 30 at 10 a.m., we could do that,” he says.

Looking ahead, Porter says, “the more of us that are using technology, the more we can speak to each other and learn what others are using. It broadens your horizons.”

