

GPS on the way

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what has taken place over the last few years. That way he can hit the ground running," he said.

ParView's golf car system is in use on 70 golf courses and Whurr expects that the maintenance equipment GPS system will go into beta testing in the next few months.

Toro's Center for Advanced Turf Technology is working with ProShot's GPS technology to adapt it to maintenance applications.

"Toro is attempting to take the GPS technology and couple it with Geographic Information Systems (GIS) and take it to another level and apply it to our own equipment," said Chip Engdahl, marketing manager for Toro's commercial division.

"One of the big ideas is precision turf maintenance and management. By coupling GPS, GIS and variable rate spraying technology you can be more precise on rates—tracking where, how much and when you put stuff down."

The ProShot system is being used on more than 150 courses nationwide and Engdahl said that maintenance related product testing is ongoing.

RESEARCH AND DEVELOPMENT

GPS research and development has

been time-consuming. In addition to developing maintenance-specific systems, companies have to solve reliability, durability, cost and marketability issues.

"You can't simply apply the technology that is being used on golf cars to equipment," said Engdahl. "Data capture needs to be more precise, it needs to communicate more often and it needs to be more durable. A mower gets more abuse than a golf car because you have grass, water, pesticides and dirt going through the unit as opposed to driving over it."

Textron has been working with superintendents to determine what features and systems will be the most helpful.

"We want to make sure that the product we have is what the customer wants," said Whurr. "We can put all sorts of bells and whistles on this and show people how clever we are, but that doesn't necessarily mean that a superintendent will find it useful."

A GPS system for golf cars costs between \$100,000 and \$300,000 depending upon the number of features and cars

involved. While none of the companies have set prices for maintenance-only systems, a total course GPS system would work off the golf car price baseline.

Meanwhile, companies are still working on reducing costs.

"We have to make sure that this is something that courses can afford and find value in," said Meyers.



ProShot's GPS readout.

For communication alone, Bruce Williams, superintendent at Los Angeles Country Club, thinks GPS systems will be very useful on courses.

"This is a communication vehicle. Many courses didn't have radios 20 years ago; now we have radios, cell phones and two-way pagers for upward, downward and lateral communication," he said. "This is another way to stay in

touch. It is just as important to know where your staff is if you have four guys or 40 guys."

While Scott Cybulski, superintendent at Falmouth Country Club outside of Portland, Maine, thinks GPS may be a little overly sophisticated, he too sees the po-

tential value.

"Marking out sprayed areas with GPS may be the most handy," he said. "Knowing area sizes and where valve boxes and irrigation heads are would be great. ... If I could do it, that is why I would do it."

MARKET POTENTIAL

According to those in the industry the market potential is large.

"The industry is booming right now," said Nate Yoder, vice president of marketing for ParView. "We sold more systems in the last quarter than we had in the previous three years."

Of the nearly 17,000 golf courses in the U.S., Engdahl believes that every course will eventually be touched by GPS or GIS.

"At some point the technology will effect every course," he said. "GIS for irrigation, GPS for cars, and at some point it will be everywhere. The management of the golf course will be more unified because of these technologies."

According to Whurr, GPS systems will be well suited to the needs of course management companies. "The biggest concern from a management perspective is monitoring equipment and preventative maintenance," he said. "This would be a benefit to management companies because they'd know that they are getting the best out of their equipment." ▴

Chlorophyll meter

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management (IPM), soil and water quality and environmental monitoring. They currently have a prototype of the meter and are testing it with superintendents and turfgrass researchers this summer. Thurow plans to unveil the meter early next year.

Dan Dinelli, superintendent at North Shores Country Club, in Northbrook, Ill., will be using the meter in a compost study that he is doing this summer.

"We are working with compost and the dynamics of nitrogen," he said. "We are doing a weekly analysis of different plots that have different rates of compost."

Dinelli will be using the chlorophyll meter as an early-warning signal to see what changes the plant is going through. As a result, Dinelli hopes to correlate the compost/nitrogen study with the chlorophyll meter to see if the tool can be used for nitrogen assessment.

"Stress can be caused by a lack of fertility and nitrogen," he said. "This won't tell you what the problems are, but it clues you in to dig deeper. You have to open the IPM tool box, get soil cores and send in samples. The point is to get as early a jump [on stress issues] as possible."

Through this summer's research Thurow hopes to gain some insight into how the meter can be used.

"We will be trying to develop general guidelines to get people through the learning curve faster and correlate it with fertility conditions," he said.

Initially, Thurow said, the meter would be used by higher-end courses or more innovative superintendents. The final price has not been set, but it will likely cost around \$2,000.

Dinelli thinks the tool could have a universal use to back up fertilization practices.

"The tool could help us justify what we do from an environmental perspective," he said. "It could help reduce nitrogen applications or justify the ones we do." ▴

PGC launches site

DENVER — Professional Golf Commerce has launched its web site (www.pgcgolf.com), an online, one-stop-shop that directly links PGA golf professionals and golf course superintendents with golf and golf-related manufacturers, distributors and merchandisers.

First previewed as a demonstration at the 1999 PGA Merchandise Show in Las Vegas, the site currently hosts products from more than 40 vendors and is available to buyers and sellers all over the world.



Flowtronex

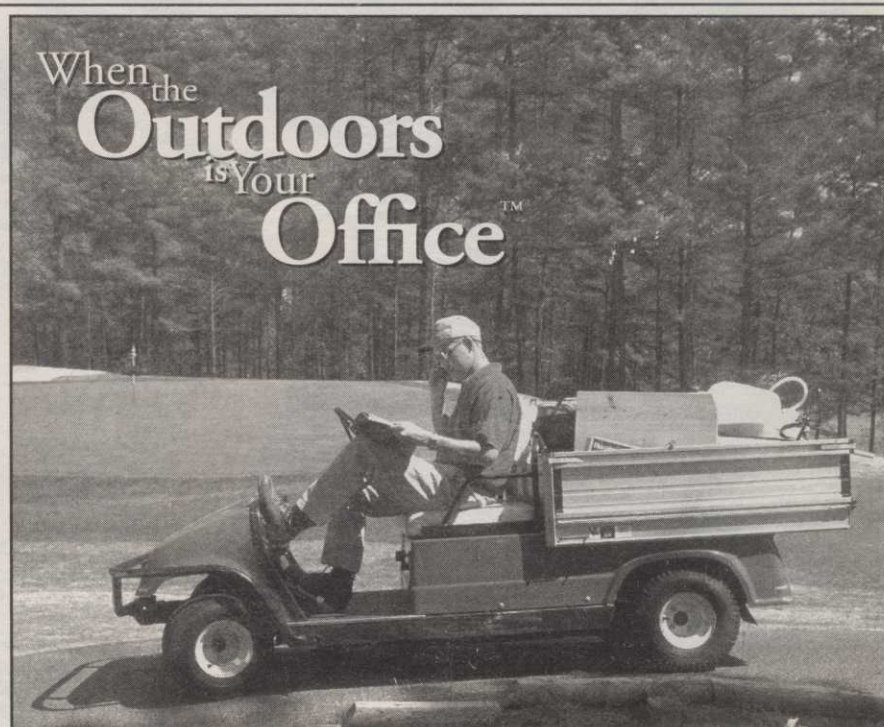
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Turf Feeding Systems, however, will provide technical expertise and support to customers.

Three models of the Nutrifeed system are available and they cost between \$8,000 and \$12,000.

The 1000 is suited to small courses and has a single head for the control of one nutrient at a time. The 2000 is for medium sized courses and has two heads and a 60 gallon-per-minute capacity. The 3000 is for large courses and has three heads and can provide three separate nutrients at once.

All Nutrifeed systems will be fully integrated into the pump system's controls. ▴



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