

# Tomorrow's Mowers?

Unmanned computer-aided machines  
draw rave reviews from superintendents

BY ANTHONY PIOPP

**T**he next wave of high tech in the golf course maintenance business is just around the corner. And you've never heard of the company that could bring it to you.

Chaperone Guidance Systems, a Massachusetts-based company, has unveiled computer-guided mowers that need no human operator. The mowers have been tested and have received rave reviews.

Utilizing mechanics designed for intricate three-dimensional milling of airplane parts and submarine propellers among others, Chaperone Guidance has come up with a way to control mowers using myriad technology, including Global Positioning Systems with precision to 1 centimeter.

The machines, however, will never be alone. Edward Wagner, president and CEO of the company, said a "chaperone" will be in constant contact with the mowers and will be able to stop them in a split second if need be.

At no time will the mowers be out of visual contact of the chaperone, who will be able to control many mowers or more at one time — termed, "flocking" by Chaperone Guidance — allowing the chaperone to perform other tasks if desired, while the mowers do their jobs.

This is the keystone to the success of the technology, Wagner says.

Currently, the ratio of man to machine on a golf course is 1-to-1.

"That didn't make sense to us," Wagner says. "The foundation concept is to change it to 3-to-1 or 4-to-1."

That can mean two advantages for golf courses: monumental savings in labor costs and increased productivity of workers.

The unmanned mowers were tested throughout the summer at two Massachusetts courses, Stow Acres Country Club, where a Jacobsen triplex was retrofitted with the device, and The International Golf Club in Bolton, where a Toro triplex was used.

Stow superintendent Erick Koskinen is impressed with the new technology, although his initial response to it was negative.

"No way. It's not going to happen," he said was his first thought. "I couldn't think outside the box enough to envision this."

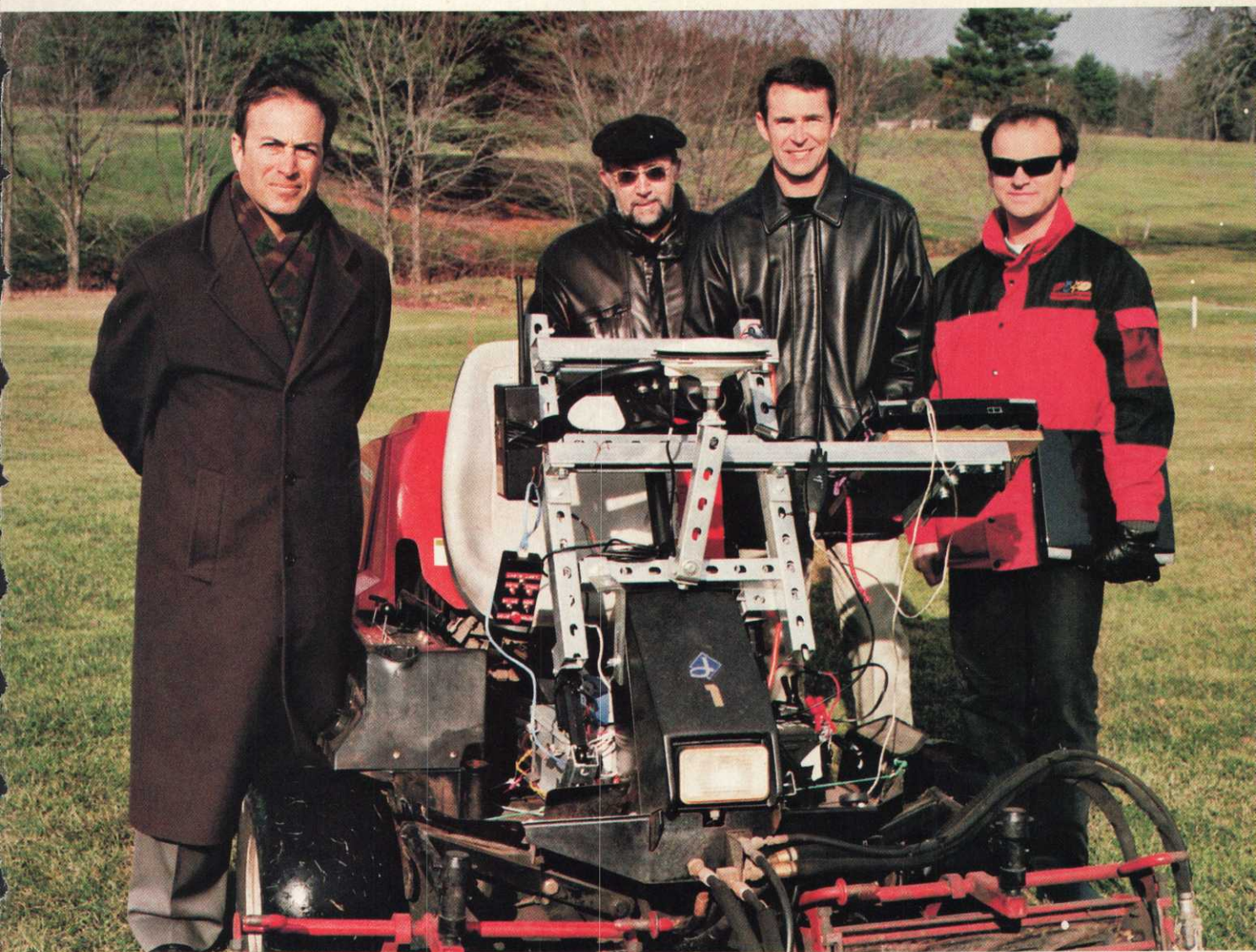
His opinion has changed 180 degrees.

"Now? I think it's a home run," he says.

Throughout the year, superintendents were brought in to view the technology, ask questions and criticize it. According to Koskinen, they walked away impressed.

"They've taken everyone's possible concerns





and addressed them," Koskinen says of Chaperone Guidance.

Wagner says the three biggest manufacturers of golf course equipment — The Toro Co., Jacobsen and John Deere — have all been working on ways of developing riderless mowers, but have been approaching from the wrong angle. While those three focused on the technology of GPS, Wagner said his company came at the idea from a different angle.

Chaperone Guidance uses the science of computer-aided design and computer-aided manufacturing (CAD/CAM) to cut grass using the same precise three-dimensional mapping found in the high-tech manufacturing industry.

"We didn't look for the technology. We looked for the problem," Wagner says.

On the golf course, the technology at its most basic works this way.

First, Chaperone Guidance will create an intricate three-dimensional map of the course.

Then, using an existing greens mower, a superintendent will have his best worker mow all 18 greens. A device on the mower will register the actual path the mower took with blades up and blades down, storing that information in an onboard computer. The software will then correct any errors, such as crooked mowing lines. The information is downloaded into a computer in the superintendent's office.

The mower is then fitted with a GPS receiver, a tablet PC and the mechanical parts needed to control steering, braking and mower engaging.

The mower can now be controlled by a chaperone using a PC mounted on a golf car. The chaperone can remotely lead the mower on to the course. Once at a job site, the chaperone will instruct the mower to begin working, which it will along a predetermined path and stop once the work is complete. While this is going on, the

*Continued on page 44*

**(Left to right) Edward Wagner, Vladimir Geisberg, Mike Field and Alexey Zaporovanny — the people who comprise Chaperone Guidance Systems — pose with their computer-aided mower.**

ANTHONY PLOPPI



## Tomorrow's Mowers?

*Continued from page 43*

chaperone is free to perform other duties such as bunker raking or cup cutting.

A GPS device mounted on the golf car and one carried by the chaperone prevents the worker from going out of site of the mower, which will stop if he does so. A superintendent will also be able to monitor machine and man from his office computer.



**This is how the computer screen appears when the unmanned mower is in use. The circular green spot within the red spot is the mower.**

Wagner envisions a chaperone watching over up to four machines simultaneously, acting as the mother goose to the flock of mowers.

The mowers will be guided by GPS that checks the machine's location 20 times a second. As backups in case the GPS signal is lost in heavily wooded areas, the mowers will also be equipped with inertial guidance systems (IGS), a laser-based gyroscope already used on aircraft and ships as backup to GPS. With it, mowers will be able to stay on track for up to 100 yards without GPS contact. One reconnection with a GPS satellite of a second or less will recalculate the position of the mower and allow the IGS to guide it again if need be.

"This is not science fiction, I assure you," says Vladimir Geisberg, executive vice president and chairman of Chaperone Guidance,

in his thick Russian accent. "It is existing, common technology being used today. All we did was put it in a cohesive package."

The computer guidance systems can be modified on a daily basis to change such commands as mowing direction. Chaperones will also be able to make modification in the field on a daily basis. If an overnight rain has left large puddles on a fairway, the mowing pattern can be easily altered on the spot so the machine avoids the problem areas. Once the water is gone, the original pattern can be easily restored.

Chaperone Systems will install the software. A competent mechanic can retrofit a mower with the needed parts in 90 minutes, Wagner says, adding that the hardware will fit any mower. It can be disassembled in less than a half hour.

Sprayers, aerifiers, tractors and even mechanical bunker rakes can be fitted with the technology.

The cost of the Chaperone software package, installation and hardware will depend on the savings realized by a facility, according to Wagner, and will be based on a five-year contract.

He used the example of a golf course that saves \$300,000 a year by reducing labor costs through flocking. Chaperone Guidance will charge 50 percent of the savings or \$150,000 a year.

"Owners have given us a clear message that they are not interested in additional costs. They are interested in applying technology when they can save money by doing it," Wagner says.

Walter Lankau Jr., owner of the 36-hole daily-fee Stow Acres and president of the National Golf Course Owners Association, says that plan makes sense to him since the savings goes right to the bottom line.

Chaperone Technologies is targeting facilities with golf course maintenance labor budgets that exceed \$200,000, which number about 3,100 in the United States.

Lankau says the technology might change when superintendents do their work. Since the mowers will no longer need daylight to work, mowing aerifying and spraying could be done at night.

According to Wagner, there are 47 million acres of turf in the United States that are mowed with one operator for one machine at a labor

*Continued on page 46*

ANTHONY PLOPPI



# Princess 77 Helps New Mexico State Develop a Strong Field for Their Team



Dr. Arden Baltensperger (left) and Dr. Bernd Leinauer, Turfgrass Specialists at New Mexico State stand on the football field 50 days after the grounds crew renovated it with Princess 77 hybrid bermudagrass from seed.

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Removal of the existing ryegrass revealed an 85 - 90% loss of Tifway (419) on the field.

Following their first undefeated season at home, the New Mexico State University Aggies were looking to start the 2003 football season with their second consecutive home opening win. However, the players weren't the only people preparing for the upcoming season. The responsibility of having the field ready for play by the first snap of the ball fell on the shoulders of Bud Jones and the New Mexico State Grounds Crew.

Removal of the existing ryegrass revealed an 85 - 90% loss of Tifway (419) on the playing field. Renovation of the field using Princess 77 hybrid bermudagrass from seed solved the problem. 50 days later, the field was pronounced to be "at full density and in excellent condition." According to the grounds crew, Princess 77 held up "remarkably well" to the traffic of the first game.

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\*Response of Bermudagrasses and Zoysiagrasses to Applied Water Using a Linear Gradient Irrigation Design, Sean Reynolds, 2000, Master's Thesis

## Tomorrow's Mowers?

*Continued from page 44*

cost of \$30 billion. Along with golf there is mowing of road-side, commercial, public and residential areas.

Wagner and his company have been in contact with Toro, Jacobsen and Deere about the product. Representatives from Toro and Jacobsen came to Massachusetts for demonstrations. Both said the concept makes sense, but is not ready for the field.

"I think Chaperone has some good ideas," says Dana Lonn, Toro's director of advanced turf technology in its Commercial Division. But he adds, "What I saw was a ways away yet."

Dennis Schwieger, vice president of strategy and marketing for Jacobsen agreed. The biggest concern for both is the collision avoidance system

that the machines must have. Geisberg assured one would be ready when the product debuts.

"It has to be very reliable," Schwieger says.

Lonn and Schwieger said the concern is not over stationary objects, but living ones such as golfers. Lonn questioned

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VLADIMIR GEISBERG

what would happen if mischievous children decided to mess with the mower while it went along. He wonders if the role of the chaperone will be to keep bystanders away.

"What really is the chaperone's responsibility? How do you keep that chaperone engaged with multiple machines so he does not become complacent?" Lonn asks.

According to Lonn, Toro and other companies have been working on the same concept as Chaperone Guidance.

"It's not a matter of if. It's a matter of when," Lonn says.

Jacobsen market research found superintendents in favor of switching to unmanned mowers.

"There is a very high interest in this technology because of the labor-saving opportunities," Schwieger says.

Wagner predicts that the way mowers are made will soon change as a result of his company's advances. "Automation leads to miniaturization," he says.

Not too far in the future mowers may not be any bigger than a 50-pound bag of seed. They will be lightweight, reduce compaction and have no hydraulics, thus eliminating the chance of leaks. With no operator, the problem of worker injury will also be eliminated.

In the space where three fairway mowers now sit in a maintenance facility, Wagner and Geisberg envision a day when 10 or so mini-mowers will take up the same area.

Lonn has a good-natured laugh at the prospect.

"Personally, I think we're a ways away from the George Jetson syndrome," he says. ■

*Pioppi is a freelance writer from Middletown, Conn.*