Boilermaker Breakthrough

Already a premier research site, the Plant Growth Facility at Purdue University is a shining example of how to make a good thing even better.

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PICTURE this scenario. It’s a fall football Saturday afternoon in West Lafayette, Ind., home to the Big Ten’s Purdue University Boilermakers.

You’re the greenhouse manager at Purdue’s Horticultural & Landscape Architecture Plant Growth Facility, but you do double time as a father of three children— one of whose soccer team you’re coaching at the moment. Bam! Your pager goes off. A sensor alarm has sounded at the greenhouse. Though the facility is just miles away, with bumper-to-bumper football traffic it’ll take nearly 40 minutes to get there.

What do you do?
If you’re Rob Eddy, the real Plant Growth Facility manager, you don’t sweat it. Instead, you pull out your handy iPAQ Pocket PC, which is already equipped with a Verizon Wireless phone card, and check the alarms wirelessly from the soccer field. At least, that’s what Eddy wished had happened when he was stuck out on that field years ago without a way to find out what was going on at the greenhouse.

“That’s when I began to realize that I was really leashed to the greenhouse, and it would be worth the investment—and luckily Purdue agreed too and paid for all this—to have a wireless control,” says Eddy, remembering that day. “Then we spent months literally working it out after that. It took a long time to figure out.”

The wireless remote control technology Eddy uses today, modified from Priva Computer technology, is just one of several improvements made to the already spectacular, $7.2 million facility that opened in March 1998. The building was constructed as the ultimate facility for research in agricultural and horticultural studies, and Eddy is happy with the progress made since the doors opened.

Opening Up The House

The 24-zone, 31,400 square foot facility was designed with flexibility in mind, says Eddy. Aside from one zone, which features copper lines with mist nozzles and bottom heat, the rest of the zones are generic with no specific designations. None of the benches are bolted to the floor, either, allowing for removal in case research calls for growing on the floor.

“I think that was one of the good parts of the design. I think there was a lot more technology that could have...
been put into it that existed but maybe hadn’t been quite proven yet,” says Eddy, who came on board from Dow AgroSciences after the facility was completed. “You could do any temperature regime, or any configuration of benches or lights, so there was a lot of flexibility in the original design.”

Priva Computers won the bid to provide technology in the facility, and followed specifications that included multiple sensors, a weather station, microprocessors and software. Since then, says Priva spokesman Pete Hendriksen, four new software versions have been installed to keep up with changing technology, and PDA access has evolved, as well as the use of HTML and geo-imaging.

**Making Progress**

Since 1998, Purdue has added a polyhouse, complete with polycarbonate rigid side walls and a double polyethylene roof, to simulate a commercial greenhouse structure. The research in that house is usually projects that directly benefit flower growers or producers. And considering Eddy estimates 80 percent of Indiana greenhouses are poly houses, it gives students a good idea of the environment in which they could eventually be working.

The technology from Priva Computers continues to make the facility state-of-the-art, as well. Eddy has computer control over heating, temperature sensors and, on some projects, irrigation. The sensors continuously record data and print out graphs and charts for analysis; but most importantly, the sensors set off alarms in the event of temperature spike or power outage. Eddy can receive that notification via a call to his pager—which is conveniently built into his watch a la James Bond—within minutes after the sensor goes off.

He and Ed Fischer, Plant Growth Facilities manager at the Donald Danforth Plant Science Center in St. Louis, modified the Priva software to allow Eddy to make adjustments from his pocket PC. He can do that by dialing into an Internet site called GoToMyPC.com on the iPAQ pocket PC. From the iPAQ, he can see the greenhouse computer screen, access all the files and make the appropriate control changes. Hendriksen says the company is learning about the future possibilities of PDA access from Eddy’s experimental designs.

“So we’ve only scratched the surfaces in terms of what our Priva computers can do,” Eddy adds.

**Wide Open Spaces**

The future for the greenhouses is wide open, thanks to the flexibility built in to the facility initially. Eddy says the
mission when the greenhouses opened was to become one of the top university
greenhouses in the country. He feels
confident the university has achieved
that by looking at the amount of other
college officials coming to see the de-
sign and asking for the blueprints.
“Five years has come and gone, and
no one of course ranks you like they
would a football team, but we felt we
were very successful and had a facility
that was enviable,” says Eddy. “Lots
of universities used us as a resource in
designing their new facilities. The next
step is how can you keep ahead? How
can you make sure your greenhouse is
better now than it was when you
opened it?”

Not only have other universities gone
to Eddy’s facility, but they’ve gone to
Priva, as well, to check out what’s avail-
able for them, says Hendriksen. At least
three major universities have requested
information on technology.

Future projects for Eddy include
looking into more security, considering
the unstable environment of today’s
world, more computerized irrigation on
projects and possibly some carbon diox-
ide enhancement in the greenhouse.
Alarms continue to be a major factor in
providing environments conducive to
precise experiments, and Eddy says
he’d like to explore more options there
to get the fastest response times.

Hendriksen, meanwhile, says there’s
still more technology out there for Eddy
to try when the time is right, including
a computerized fertilizing injection unit
called Nutrijet, the Vialux system to
disinfect drain water and a substrate
weighing unit called Groscale.

See For Yourself

Eddy and several volunteer master
gardeners offer a wide range of tours of
the facility, from scientifically in-depth
tours geared more toward the gener-
al public. A tour can be lined up one of
three ways: Either through Eddy him-
self at 765-496-3710; via the
Horticultural and Landscape
Architecture department’s Web site at
www.hort.purdue.edu/hort/ – click on
Facilities, then Plant Growth Facility to
Visiting the Facility; or call the Purdue
University Visitor Information Center at
765-494-4636.

For Details Circle No. 7 on Postcard or at www.greenhousegrower.com

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