

# Leveling by Satellite

"You've come a long way baby!"

By Tim Linden

Excerpt from Western Grower & Shipper  
 September 2002

**T**he tasks involved in preparing a field for a crop has been one of the biggest areas of change in the world of agricultural machinery. One could argue that farm implement firms have done more to help the farmer in this area than any other. In the beginning, farmers used their own power and crude tools. Then horse-drawn plows were invented and improved for decades. The tractor and its accompanying products then came upon the scene making grading, leveling, listing and bed preparation about as easy as old timers could imagine.

But allied companies were not finished yet. About 20 years ago, the world of lasers came to agriculture as some sharp minds discovered that with this new technology, a field could be leveled to a much higher standard than ever before.

It became the solution to an industry problem that had plagued farmers forever.

After all, a level field is much more efficient than one with hills and valleys. The most obvious advantage is irrigation. A properly-leveled field with the right amount of east and south fall, will result in efficient watering void of puddles and dry spots. Plants, of course, perform better and yields increase.

Laser leveling did an excellent job of creating a much flatter field than ever before. But it had its limitations. In the first place, a laser does not compensate for the curvature of the earth. Over a quarter of a mile, experts say the curvature creates about an inch differentiation. But over a mile that differentiation can grow to as much as

six inches. In addition, use of the lasers can be problematic as the base stations have a limited range and constant adjusting and repositioning is necessary.

These, of course, have been minor issues as most laser leveling systems in operation today do a very credible job at a fraction of the discomfort of the methods employed years ago.

But now a manufacturer claims to have built even a better, more precise mouse trap, using GPS - global positioning system.

IntegriNautics was founded in the 1990s as a firm dedicated to finding commercial uses for the global positioning system developed by the military a decade ago. When the satellite-based system was first developed, it was assumed that about 90-95 percent of its applications would be for the military, with the commercial sector making up only 5 percent of its business. But in the last decade, the commercial uses have expanded tremendously and now are

the driving force behind GPS. In fact, the usage figures have flipped as commercial now represents about 95 percent of the applications, with only 5 percent devoted to military. A very familiar commercial application involves the use of GPS to estimate how far a golfball is from the flag on some of your more upscale course, which equip golf carts with the system.

As IntegriNautics has evolved over the years, it has determined that there are many good agricultural uses for the GPS systems. Consequently it launched its AutoFarm division a few years ago to develop those uses. The first product introduced by that firm was AutoSteer, three years ago, which uses the GPS technology to move a tractor down a field in a very straight line. It has since added AutoSpray to facilitate sub- inch steering for floaters and spreaders and is working on AutoHarvest, to fully automate the harvesting operation. In August, the newest product of the firm was introduced - AutoLevel.



Lars Leckie, director of product marketing for AutoFarm, explained that by adding a fixed base station in the field - either portable or permanent - GPS can have sub-inch accuracy. He said the same technology that is used to steer a tractor down a straight line with less than a one-inch variance, when turned on its side, can level a field to the same of accuracy. And the system follows the curvature of the earth, so there is no greater differentiation when leveling a quarter mile square field or a field that measure a mile or more on each side.

In addition AutoLevel to the firm's family of products, Leckie said growers can use any of the components or all in conjunction to create an extremely level and straight field that can be sprayed, disked and leveled with pinpoint accuracy. This results in a multiple of cost-savings for a grower.

For example, Leckie said when disking a field, a tractor driver can completely eliminate overlap. "One grower told us it use to take 24 hours to disk his field, now he can do it in 18."

Leckie said a processed tomato grower told him that in using the system for bedding purposes, he was able to get a couple of extra rows by placing the spread between the rows at a precise distant...no more or no less. "He told us he was getting an extra truck load of tomatoes per filed, which meant an additional \$3,000 revenue per field. He expected to cover the cost of the system in 11 months in just increased yields."

When spraying the same precision can be used which can eliminate overspray and actually reduce the use of chemicals.

The computer system that is at the core of these operations can be used for all of the different operations with upgrade kits. The system including the in-cab screen and base stations cost about \$45,000 and will handle about 1,000 acres. Each modular upgrade costs an additional \$15,000-\$20,000.

While the capital outlay may be expensive, the AutoFarm representatives claim the economics of increased yields, reduced water usage, lower chemical usage and lower labor costs justify the cost. In

over it. This data can be stored and used for your own automatic leveling or when hiring a commercial leveler. Leckie said surveyors charge \$8-\$12 per acre so this charge can be completed eliminated. And the GPS leveler surveys constantly rather than at 100-foot intervals, the practice of most commercial surveyors.

Leckie said the need for this new product is apparent by the response the firm has received from the grower community. Though it wasn't unveiled until August, positive word-of-mouth reports from the testing the firm did

had already traveled throughout California. "We sold two units, sight unseen, before we unveiled it," Leckie said.

A field day in the central San Joaquin Valley in early August was to be followed by another in northern San Joaquin Valley in September. In addition, plans were underway to show growers the

AutoLevel system in Salinas and other parts of California and Arizona. Leckie said the marketing of AutoLevel will soon spread to other production states.

While it can be used for any crops, the AutoFarm representatives believe it has its greatest utilization among the higher value vegetable row crops.



addition, a base station works accurately up to six miles away. Consequently, Leckie said some growers have expressed interest in sharing the cost of the base station with neighbors. Each base station costs \$17,000 so sharing that expense is significant. Leckie said growers using the same base station would have different codes so each system would operate totally independent of another.

In addition, the computer can be programmed to retain its memory so a field can be leveled, listed and sprayed and even harvested using the same coordinates. In addition, a datalogger can be attached that can survey a field as the system passes