

Integrating vision guidance and GPS

By Gary Alcorn

Imagine mapping leaf area index and crop vitality on the move using video cameras mounted on field implements, or measuring soil and plant moisture levels in real time.

Pioneer of vision guidance (VG) technology for agriculture, the National Centre for Engineering in Agriculture (NCEA), plans to expand its application into new areas of application by collaborating with Australian agricultural guidance system manufacturer, AgGuide.

The collaboration between NCEA and AgGuide will create an inventory of current vision and GPS guidance systems and create practical interfaces to optimise these two systems.

NCEA mechatronic engineer Jason Stone, who worked with Professor John Billingsley on tractor mounted VG systems 10 years ago, sees an exciting future for the expansion of this technology across a range of pri-

mary industries.

“VG still has plenty of applications in agriculture even though GPS has assumed the tractor guidance role. By creating working interfaces between GPS systems on tractors and VG on implements we can combine the advantages of both systems,” he said.

AgGuide’s Alan Fetherstonhaugh agrees. “At the moment if you buy a particular type of tractor you are almost forced into buying that brand of guidance system,” he says.

“What we are trying to do with this project is open the door for farmers to actually purchase what they need from any supplier that will best suit their needs.”

The third team member, mechatronic engineer Mark Dunn, is investigating the application of VG across agricultural, horticultural and livestock industries through 12 case studies for his PhD in machine vision.

His portfolio includes mapping cotton leaf area index and assessing plant vigour ‘on the go’, tractor guidance, counting macadamia nuts with machine vision, grading citrus by surface texture mapping, and estimation of pork production using vision measurement.

“One of the main thrusts of my research project will be to look at the integration of GPS on tractors and VG on



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implements. Instead of using them as stand-alone systems they will be integrated in a range of options," he said.

AgGuide sees GPS guidance systems as essential for establishing controlled traffic layouts on broadacre farms and then using VG to steer both tractors and implements to maintain the patterns.

"Benefits will come from combining technologies to provide multiple solutions in a unified package, but it is important to remember that bigger is not always better, so the right solution must be tailored to meet the customer's needs," says Alan.

"The diverse display and computing requirements of tractor and implement steering, variable rate control, camera guidance, plant health etc, may be best

handled by separate modules," he said.

The collaborative research will look at cost-efficiency of various technologies and how interfaces could deliver better outcomes at affordable cost. One future role is mapping both soil and plant moisture levels from the cabin using various wavelengths.

While Australian farmers are among the most innovative producers in the world when it comes to adopting and adapting new technologies, they are becoming more discerning and cost-benefit conscious.

The ability to mix and match VG and GPS components to suit specific applications will be of increasing importance in today's highly competitive farm management environment. 



Integrating various GPS and vision guidance technologies will help farmers achieve even higher levels of precision.