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Navigating Complexity: Building Confidence in GPS-Guided Linear Irrigation



Can retrofitted GPS Guidance improve accuracy, reliability and ease of operation of an existing linear irrigator?

Linear irrigators can provide efficient irrigation over long rectangular paddocks, but guidance becomes difficult where fence lines, boggy areas, powerlines and vegetation limit the available path. When a machine becomes stuck, deviates from its intended route or is damaged, irrigation can continue in one location for an extended period, increasing the risk of overwatering, runoff and off-site impacts to neighbouring properties and local waterways.

Hosts: Nicole and Brendan Saunders, The Berry Dairy
Trial location: Maffra, Gippsland
Farming System: Mixed enterprise dairy farm

Background

The existing seven-span linear irrigator travels approximately 993 m and is supplied from three hydrants. It was originally cable guided and was later converted to furrow guidance, but it would still veer off course and require close operator attention. A modular GPS guidance system has been retrofitted to the irrigator. The project is building practical knowledge about installation, programming and performance before the technology is considered for more complex vegetated river-flat areas.

Key focus areas

This project will investigate whether GPS guidance can:

- Keep the linear accurately on its programmed route
- Navigate fence lines, boggy areas and other obstacles
- Reduce deviations, stoppages and operator intervention
- Improve confidence in retrofitting existing linear irrigators
- Support irrigation of difficult-to-reach or irregular areas
- Inform future investment in GPS-guided linear systems



Nicole and Bredan Saunders, The Berry Dairy

Method

The demonstration follows the system from installation through normal farm operation:

- Retrofit and program GPS guidance on the existing seven-span linear
- Monitor route accuracy, reliability and incidents across irrigation seasons

The guidance system stores multiple GPS reference points along the run. These points allow the machine to follow the required alignment and make controlled changes in direction where needed.

The fence gaps that allow the linear's wheel towers to pass through are not aligned in a perfectly straight line, as the fences were installed to suit the old guidance system's less precise path.

The GPS route therefore uses 10 separate AB lines, one between each successive fence line, to guide the machine through the existing gaps as it moves up the paddock.

Performance will be documented through operating logs, photographs and landholder feedback, with a focus on route accuracy, breakdowns, collisions, stoppages and labour requirements.

Guidance accuracy
The linear will be observed for its ability to follow the programmed GPS route and maintain alignment over the full run.

Reliability
Breakdowns, collisions, bogging, stoppages and deviations from the programmed route will be recorded.

Obstacle navigation
Programmed route changes will test the machine's ability to negotiate constraints while maintaining safe clearances. GPS programming and route performance will be monitored during normal irrigation



Navigating power poles in the paddock using GPS guidance.

Operator input
The amount of supervision and intervention required during irrigation will be documented.

System performance
Monitoring across different operating conditions will identify installation, programming and integration lessons.

Farmer confidence
Landholder experience and field-day feedback will help assess whether the demonstration builds confidence in this technology.



GPS Guided system

Potential benefits for irrigators

The project will provide practical information to help irrigators:

- Understand what is involved in retrofitting GPS guidance
- Improve route accuracy and machine reliability
- Reduce the need for close operator supervision
- Plan around fences, powerlines, wet areas and vegetation
- Assess whether existing linear irrigators can be upgraded cost-effectively
- Make more informed decisions about future linear irrigation investment

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This farmer-led demonstration is part of the Learn.Irrigate.Grow program, delivered in partnership by Agriculture Victoria and WGCMA.

The program uses on-farm trials to help local farmers explore new ways to irrigate smarter, improve productivity and protect our waterways.

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We acknowledge and pay our respects to the Traditional Owners of the region, the Gunaikurnai, the Bunurong, the Boonwurrung and the Wurundjeri Peoples and pay respects to Elders, past, present and emerging.

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