

VIRTUAL HERDING RESEARCH UPDATE - OVERVIEW

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Background

'Enhancing the profitability and productivity of livestock farming through virtual herding technology' is a 4-year project that began in July, 2016 to evaluate the application of virtual herding (VH) technology across different livestock production systems and to examine the responses of dairy cattle, beef cattle and sheep to various cues and stimuli to improve productivity and profitability in the livestock industries.

The Virtual Herding project received \$2.6 million from the Australian Government through its Rural R&D for Profit program. A further \$1.365 million was been provided by a number of Rural Research and Development Corporations and R&D providers. The R&D providers include, CSIRO, University of Sydney, University of New England, University of Tasmania, the University of Melbourne and Agersens Pty Ltd, with additional contributions from Dairy Australia, Meat and Livestock Australia, Australian Wool Innovation and Australian Pork Limited.

Using VH technology, the project team investigated the potential to:

- Constrain animals to certain areas for better grazing management and environmental outcomes
- Autonomously herd animals, or
- Move individual or groups of animals in a herd differently to the rest of that herd.

Fundamental research involving behavioural observations and physiological measurements was critical to ensure that the technology did not compromise animal welfare. In addition, the project team has developed an understanding of the learning, management and ethical challenges faced by farmers that may implement VH on their farms.

This project is supported by funding from the Australian Government as part of its Rural R&D for Profit program.

The project comprised five Subprograms, each led by a Research Leader from one of the contributing R&D institutes.

Subprogram 1



Optimising the animal response to virtual herding technology.

This subprogram was led by Dr Dana Campbell and the CSIRO team at Armidale, NSW and investigated the response of beef cows to VH cues and controls, as well as the use of VH technology to aid better pasture and herd management or move animals around the farm.

Subprogram 2



Determine best livestock and pasture management for intensive dairy and beef through more controlled pasture allocation.

This subprogram was led by Dr Megan Verdon and the Tasmanian Institute of Agriculture Dairy Team at Burnie, Tasmania and investigated how VH technology may be used to strategically alter pasture allocation in intensive grazing systems to improve pasture utilisation.

Subprogram 3



Determine best sub-herd and individual animal management for dairy and beef.

This subprogram, led by Dr Sabrina Lomax and the University of Sydney team at Camden, NSW, developed training programs for animals to learn to respond effectively to the cues and controls, and also examined moving groups of animals in a herd differently to the rest of that herd.

Subprogram 4



Identify opportunities for labour savings through the application of VH in sheep wool and meat enterprises.

This subprogram was led by Dr Danila Marini and the University of New England and CSIRO teams at Armidale, NSW who had to use manual neckbands and small numbers of animals, as an automated system has only been developed for cattle. They conducted fundamental research to examine the development of VH cues applicable to sheep and how the technology may be used with sheep.

Subprogram 5



Identify considerations and challenges for integration and adoption of VH.

This subprogram was led by Ms Nikki Reichelt and The University of Melbourne team at Parkville, Victoria and developed an understanding of the learning, management and ethical challenges faced by farmers that may implement VH on their farms. Furthermore, to enable livestock farmers to make decisions on the value of VH technology in their farming system, Dr Brendan Cullen conducted benefit cost analyses for 3 livestock production systems; pasture based dairy, extensive beef grazing and a mixed farm system comprising sheep and beef cattle.

The series of Technical Notes that follow provides technical information about the VH technology and how it may be used by the Australian livestock industries, including the results of some of the R&D conducted in the Project presented as case studies. The following series of stand-alone documents provide a legacy of some of the main achievements from the VH Project.

THIS SERIES OF TECHNICAL NOTES INCLUDE:

1. Introduction to VH technology.
2. Welfare assessment of applying VH technology in cattle.
3. Factors affecting the response to virtual fences.
4. Use of VH technology to improve pasture utilisation.
5. Use of VH technology to herd animals.
6. Use of VH technology to control sub-herd livestock management.
7. Use of VH technology for environmental outcomes.
8. Use of VH technology in the sheep industry.
9. Break-even cost of implementation of VH technology in the livestock industries.
10. Adoption pathways for VH technology.

KEY CONTACTS

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