Australian Government
Department of Agriculture and Water Resources

Dairy Australia

Virtual herding NEWSLETTER

Virtual herding research update

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

The project

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

The project aims to evaluate the on-farm application of virtual herding (VH) technology; demonstrate its implementation; and, quantify and extend its benefits across Australia's major livestock industries.

Using VH, the research team will investigate the potential to constrain animals to certain areas (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 will be critical to ensure that the technology does not compromise animal welfare.

Introducing project team members – Dr Sabrina Lomax

Dr. Sabrina Lomax is a Research Fellow at the University of Sydney. Sabrina's family agricultural background led to her interest in animal health and production. Sabrina graduated from the University of Sydney in 2006 with an Honours degree in Animal and

Veterinary Biosciences. She then enrolled in the PhD program at the University of Sydney and completed this in 2011. The area of study towards her PhD was examining topical anaesthesia for painful livestock husbandry procedures.

Postdoctoral studies at Sydney followed, with Sabrina investigating novel methods of pain assessment and alleviation, to focus on improving the welfare of extensively farmed livestock. Sabrina also supervised a PhD student investigating the use of electroencephalography as a measure of pain and analgesia in sheep.

Sabrina transferred to the Dairy Science Group at the University of Sydney, Camden at the beginning of 2017 as a Research Fellow to focus on the Rural R&D for Profit Virtual Herding project.

Dr. Sabrina Lomax from University of Sydney inspecting some dairy cattle as candidates for future research in virtual herding.

Ms Nikki Reichelt (third from the right) with others that attended the producer-based workshop held at Ellinbank in October, 2017.

Her current research involves undertaking experiments to integrate the virtual herding technology on farm to extract value for farmers and to investigate the interaction between this on-farm technology and animal behaviour and welfare.

Update on sub-program activities

Sub-program 5: Identify considerations and challenges for integration and adoption of Virtual Herding.

Ms Nikki Reichelt is working with Dr Ruth Nettle and Dr Brendon Cullen at The University of Melbourne to conduct social research with farmers from the major livestock industries and other community and industry stakeholders across Australia. Nikki convened four very successful focus group workshops during October-November 2017 to identify the challenges and opportunities to adopt and integrate VH technology in a commercial livestock farm context.

These four producer-based workshops that separately involved the dairy, sheep/cropping and both intensive and extensive beef production industries were held in Colac, Vic. (southern beef industry), Hamilton, Vic (sheep and cropping industry), Ellinbank, Vic. (dairy industry) and Longreach, Qld (northern beef industry).

Each of the four Livestock producer workshops involved an average of eight farmers, two to three members of the Project team, including a representative from Agersens Pty Ltd, as well as an external facilitator. A short 10 minute video presentation of what virtual herding technology is and how it works was prepared and presented towards the start of the workshop to help explain the technology to the farmers. The presentation included recent footage from the project's livestock trials to link farmers with the research aspect of developing VH technology. Workshop participants across the livestock industries were generally enthusiastic about the prospect of VH technology being available for adoption and could easily imagine a wide range of potential applications of a VH system in their farming context including managing herd movements, mustering, animal monitoring and protecting waterways and high erosion areas. Virtual Herding technology was mostly considered by the workshop producers as a value adding 'tool' to their current livestock farming situation and was not likely to involve a major transformation to their farming system, practices or 'look' to their farm.

Key insights from these farmer workshops included identifying a wide range of potential applications of the VH technology across the livestock industries. The main concerns expressed about adopting the VH technology included the set-up costs, the reliability of internet and satellite connectivity, need for local demonstrations of the technology on commercial farms, uncertainties about ownership and management of data collected by the technology and any potential animal welfare issues that may be associated with the use of the collar.

Further focus group workshops targeting both the farmer advisory sector and the land management sector will be designed and delivered in the first half of 2018. In addition, dairy, sheep and beef farm case studies will be developed in the second half of 2018 to examine the integration challenges for VH and assess the costs and benefits of VH technology on-farm based on farmer interviews, farm data collection and whole farm systems modeling.

Dr Danila Marini with some petential candidates for her Virtual Herding research program.

Introducing project team members – Dr Danila Marini

Dr. Danila Marini has always been passionate about animals and after finishing high school, headed straight into a Bachelor of Science, majoring in animal science, at the University of Adelaide. During her undergraduate studies, Danila developed her interest in animal behaviour and welfare which led to an honours project looking at intrauterine growth restriction and how it affected stress response in sheep.

After graduating from the University of Adelaide, Danila looked to further her research career and moved to Armidale in 2013 to commence a PhD looking at self-medication methods in sheep and cattle at the University of New England, in conjunction with the CSIRO. Danila investigated the potential for incorporating pain relief into feed during the periods when sheep were undergoing painful husbandry procedures. Her work also looked into the learning behaviour in sheep and the potential to train sheep to self-administer pain relief.

In December 2016, Danila began her postdoctoral research at the University of New England, looking at using virtual herding technology to manage sheep as part of the Virtual Herding project. Danila is excited about the potential use of virtual herding technology for sheep and its application for both the animals and pasture management. Danila and her research team at the University of Armidale and CSIRO will be spending the next two years looking at the most effective audio and stimulus cues to train sheep to the virtual herding technology, as well as investigating how flock dynamics may play a part in learning. Their research will also focus on behavioural and physiological responses to the technology to ensure that the animal's welfare is maintained.

Latest news

› In the past six months, efforts to attract post-graduate students to the Project have been successful.

Ms Tellisa Kearton started her PhD studies at University of New England in September 2017. Tellisa will be assessing the welfare implications in sheep of various cues associated with the virtual herding technology.

Ms Patricia Colusso commenced her PhD studies at the University of Sydney in January 2018. Patricia will be investigating training and learning cues in dairy cattle and how this may be used to control cattle location and movement in dairy milking systems.

› A major potential constraint for this project was identified as the supply of suitable VH devices for the DAWR research program. Up to about 150 devices will be required to meet the project obligations of the Project partners in 2018. The Project has successfully negotiated with Agersens to supply the R&D Project with these VH devices and associated infrastructure and base stations at each of the three key R&D sites at Armidale, Elliot and Camden in April 2018.

› Agersens continue to further develop the VH collar suitable for all breeds of both beef cattle and dairy cattle. They plan to conduct several field trials which involve applying the VH technology to beef cattle in Northern Australia in the first part of 2018.

› Approaches to various State Governments by Agersens have continued and led to positive discussions about the legislative and regulatory requirements for using VH technology in the livestock industries. Already the South Australian Government has allowed the technology to be used under experimental conditions. The R&D animal studies in the Project at the moment are confined to those states where use of the technology is presently allowed.

› Engagement with the Farmer Panel continued with the second of a series of webinars run on 21st September 2017. Twenty one people registered for the first webinar in June 2017 and 22 people registered for this second webinar with 14 (including eight farmers from the Farmer Panel) attending. A thirds webinar is planned for 28 February 2018.

› The fourth Milestone Report for the project was submitted to the Department of Agriculture and Water Resources in December 2017.

Further information

Visit the Virtual Herding Program online at Dairy Australia.

The site contains information about project activities and recent news about the Project, including copies of a number of presentations that members of the Project Team have made to industry over the past few months.