



Subprogram 1: Optimising the animal response to virtual herding technology.

Why is this project being undertaken?

This subproject is being undertaken to determine the optimum virtual herding (VH) collar cues (audio and electrical stimulus level) that will successfully keep cattle out of specific areas or moved to specific locations on a farm without adverse effects on health and welfare. This will ensure virtual herding technology is sustainable long-term, without increasing animal stress and decreasing productivity.

Who are the main partners?

The majority of the animal studies will be conducted on site at CSIRO, Armidale, NSW, using naïve cattle selected from the CSIRO beef research herd. Trials on commercial farms will also be undertaken following successful fence applications in the controlled setting at Armidale. The two research scientists leading the projects are Dr Caroline Lee and Dr Dana Campbell who are well supported by the CSIRO technical staff, led by Jim Lea. The CSIRO team is working in close collaboration with Agersens, the commercial partner developing the automated collar technology. This partnership ensures updated prototypes are tested in the experimental environment so that collar refinements can be quickly applied to improve animal responses and the effectiveness of the virtual fence.

What will the project achieve?

This subproject will refine an automated collar to provide appropriate non-aversive (audio) and aversive (electric stimuli) cues to deter animals from exclusion zones, without compromising the behaviour and welfare of the individual animal or group. For VH to be welfare-friendly, appropriate delivery of the audio and stimuli cues is critical to ensure that animals quickly learn to avoid the electrical stimuli through subsequent avoidance responses.

A major component of this subprogram is to fully assess animal welfare implications from the implementation of

VH technology into livestock systems. The extensive testing of the collar prototypes, in controlled and field settings, will inform technology refinement to ensure it is effective and user-friendly.

This subproject will also establish the learning period for naïve cattle to optimise the effectiveness of VH technology and define any limitations of moving and more complex virtual fences that cattle will respond to. Results will be available to livestock producers to ensure VH technology can be successfully applied in a range of farm settings.

How is the research being done?

CSIRO will conduct experiments on-site at Armidale and later, on commercial farms, to:

- > Optimise the cues and controls necessary for the most efficient use of VH technology to restrict animals in line with acceptable welfare outcomes for cattle.
- > Determine how cattle respond to moving and more complex virtual fences, including thorough behavioural and welfare assessments.
- > Determine how to encourage cattle to move from one location to another using VH technology.
- > Determine the capacity to control individual animals within herds and determine the efficiency of individual control with minimal impacts on animal welfare.
- > Determine the effectiveness of specific applications of VH technology on commercial farms to restrict or encourage movement of cattle.
- > Document detailed welfare assessments of the application of VH technology in cattle from controlled and field experiments.

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This project is supported by funding from the Australian Government Department of Agriculture and Water Resources as part of its Rural R&D for Profit program. For information about this project contact Cathy Phelps at Dairy Australia, on 0439 555 001 or cphelps@dairyaustralia.com.au