

VIRTUAL HERDING RESEARCH UPDATE

TECHNOTE 1: INTRODUCTION TO VIRTUAL HERDING TECHNOLOGY



Background

Virtual fencing is an animal-friendly fencing system that enables livestock to be confined or moved without using fixed fences. CSIRO first conducted studies in virtual herding (VH) in the early 2000s. From these studies, they developed and patented a 'virtual fencing' algorithm, based on animal behaviour, learning and welfare principles. Refined through years of CSIRO's evidence-based research and development, the VH technology trains livestock to recognise and stay within virtual boundaries by detecting and responding to animal behaviour. When an animal approaches a virtual fence, the algorithm delivers a non-aversive audio cue (beep). If the animal continues towards the virtual fence, the algorithm delivers an aversive electrical pulse. If the animal stops, turns sideways or walks away when it hears the audio cue, the algorithm does not deliver the pulse but continues to monitor animal behaviour. The sequence of stimuli (non-aversive audio cue followed by a pulse) is predictable and the animal quickly learns to avoid the pulse by responding to the audio cue alone.

The algorithm was first incorporated into an experimental battery-powered prototype mounted on a specially designed halter. CSIRO successfully piloted this prototype to manage beef cattle during 2009 and 2010. The R&D conducted by CSIRO demonstrated that cattle could be controlled using effective and ethical delivery of audio and electrical cues. Furthermore, CSIRO were able to quantify the stress responses of livestock to demonstrate that welfare was not negatively impacted from using the system. Two patents in 2006 and 2010 resulted from CSIRO's research. Since 2010, there were still a number of technological issues that limited the commercial viability of the product, including the need for regular battery changes, its bulky dimensions and poor robustness, animal fitment issues, and GPS inaccuracies. Many of these technical issues have now been overcome during the commercialisation phase.

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

Figure 1 Photo of early experimental prototype on the virtual herding neckband



Figure 2 Photo of the pre-commercial prototype (eShepherd®, Agersens, Melbourne, Vic) that was used in many of the animal studies in the Project.



In 2015, Agersens Pty Ltd agersens.com licensed CSIRO IP to commercialise the virtual fencing system. The result is the eShepherd® system, a cloud-based, solar-powered, GPS-enabled virtual fencing system for cattle that lets farmers improve pasture utilisation, livestock management and protection of environmentally sensitive areas, via a computer or smart phone, without the expense and inflexibility of physical fences. Agersens are a Partner in the R&D Project, 'Enhancing the profitability and productivity of livestock farming through virtual herding technology', that is supported by the Australian Government Department of Agriculture, Water and the Environment as part of its Rural R&D for Profit program.

KEY CONTACTS

Dr Ray King – Project Manager
E r.h.king@bigpond.net.au
M 0412 322 047

Cath Lescun – Dairy Australia
E clescun@dairyaustralia.com.au
M 0408 568 003