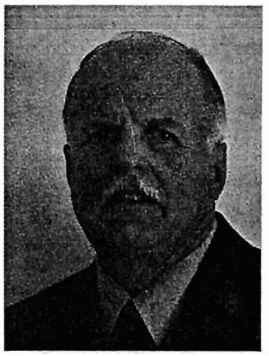
Virtual Fencing —
Automated animal control in the 21st century

Controlling free-ranging animal distribution is among the most challenging jobs a producer faces when managing livestock.

In 1874 Joseph F. Glidden changed the face of range animal management with his barbed wire patent. Now satellite signals may soon become the method of choice for controlling and distributing animals across rangeland landscapes in the 21st century.

The United States Department of Agriculture – Agriculture Research Service's Dr Dean M. Anderson is the proponent of a new cyber alternative to fences he has termed Directional Virtual Fencing (DVF™).

Dr Anderson is working with CSIRO on a three month Sir Frederick McMaster Fellowship and will be participating in the Horizons in Livestock Sciences conference on 2-5 October in Queensland.



Dr Dean Anderson

Anderson's work melds time-tested animal husbandry practices with cutting-edge technological advances and scientific breakthroughs coming from the disciplines of range, animal and ethological sciences.

> "Preliminary research indicates that VPs™ can assume any size and shape and can be moved across the landscape while controlling groups of cattle in which only a few animals need be instrumented"

Decades of agricultural research have consistently revealed that flexibility is the first key in the proper management of complex biological systems.

"Where legal as well as health and safety issues are of paramount concern in controlling animals, conventional fences are the tool of choice and will remain so well into the foreseeable future," says Dr Anderson.

"However, where adaptive management is the goal, new methodologies such as DVF™ will provide flexible animal control within a sound ecological framework."

This innovative, patented methodology is the most recent tool to allow near real-time management of animal control and distribution with flexibility equaled only by herding. DVF™ is a methodology that uses animal behaviour and electro-mechanically produced cues to control an animal's location and subsequently its movement. DVF™ uses Global Positional Systems (GPS) satellites that can provide second-by-second information on animal location.

Together with GPS data, the solar powered animal mounted device uses cues activated by algorithms in a central processing unit that are graded from least to most irritating as the animal approaches the Virtual Center Line (VCL™) located at the centre of a Virtual Boundary (VB™). A Geographic Information System (GIS) allows pre-programmed longitude-latitude pairs to define a VCL™ whose width is fully programmable. A Virtual Paddock (VP™) created from one to several VBs™ can either hold animals stationary or move animal groups at variable rates across a landscape.

Preliminary research indicates that VPs™ can assume any size and shape and can be moved across the landscape while controlling groups of cattle in which only a few animals need be instrumented.

Says Anderson: "Our future research includes wireless technology to download data without the need to restrain the animal and using satellite imagery of vegetation to determine where on landscapes to construct the VPs™."

DVF™ can change not only the animal's location but also its direction of movement through audio and electric cues delivered to either the right or left side of the animal by means of a small device (an ear tag, for example) located on the animal to get the animal to move to the left or right, respectively.

However, Dr Anderson says, Glidden's barbed wire will never be completely eliminated from landscapes and is required where absolute animal control is required since DVF™ relies on altering animal behaviour, something that is never completly predictable.

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Livestock horizons

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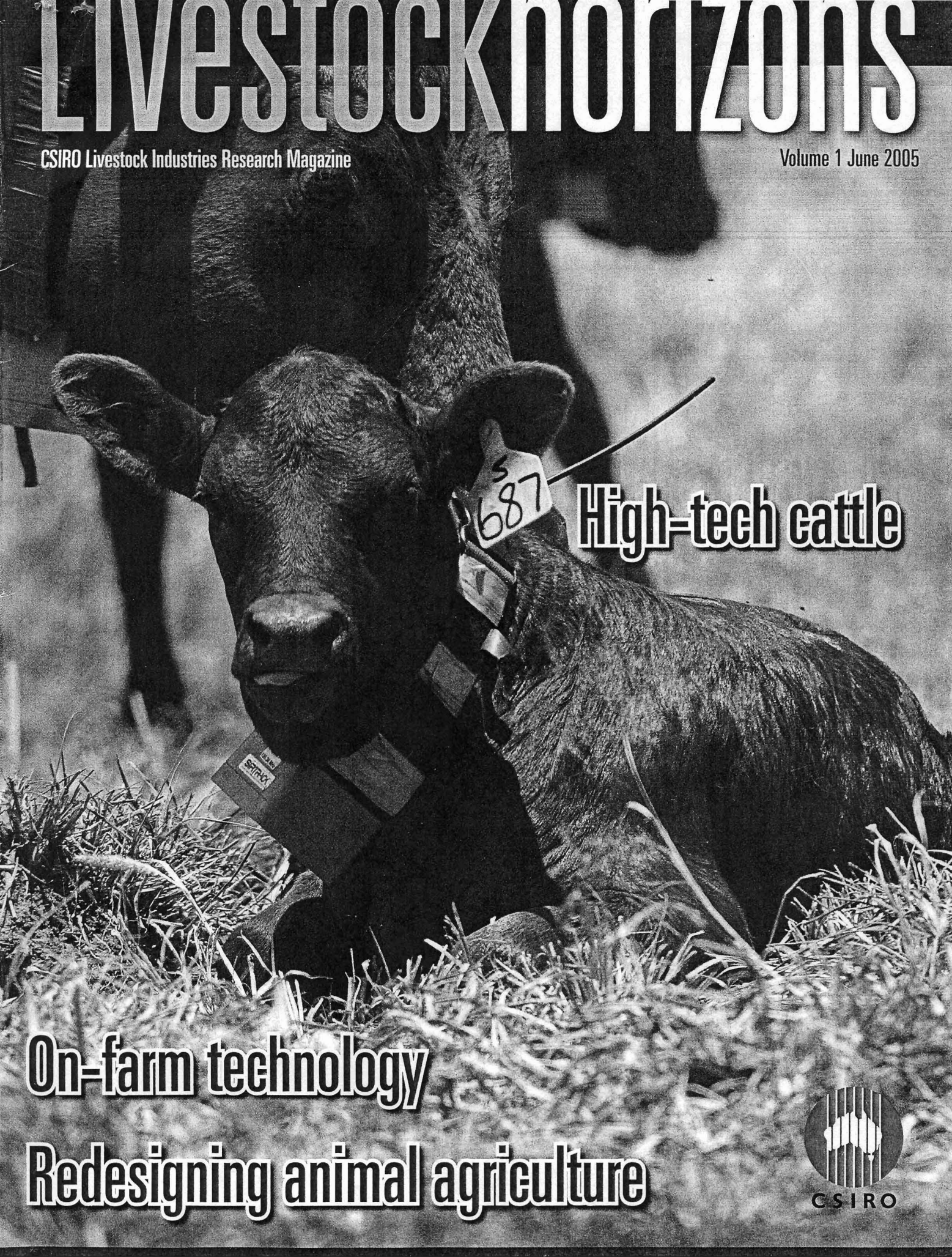

High-tech cattle

On-farm technology

Redesigning animal agriculture

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