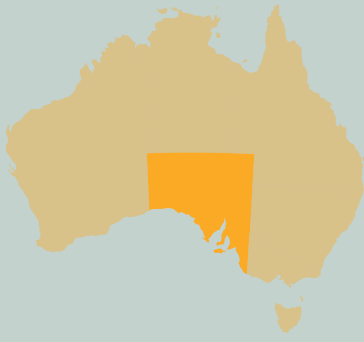# INNOVATION PROFILE

BUSINESS SNAPSHOT

OWNERS
Jane Luckraft

PROPERTY NAME
Bendleby Pastoral

PROPERTY LOCATION
Bendleby, 42 km north of Orroroo, South Australia

SIZE OF PROPERTY
13,000 hectares

BRIEF ENTERPRISE DESCRIPTION
Sheep and cattle grazing

NUMBER OF PEOPLE WORKING IN THE BUSINESS
3 full time equivalents

AVERAGE ANNUAL RAINFALL
270mm

WHY THIS IS A PASTORAL ZONE INNOVATION
Monitoring and controlling remote infrastructure is a time consuming activity on pastoral properties. Remotely opening and closing gates saves time and money.

Telemetry Controlled Gate System

Pastoralists need to use as much technology as possible to increase production and reduce overheads at the same time. Jane Luckraft envisaged that a remotely controlled gate system may be implemented as part of a rotational grazing system. A rotational grazing system has the potential to improve carrying capacity without requiring more land at their station in the Flinders Ranges.

A remote infrastructure management system provides efficiencies in operation and can be used to capture operational data. The data has the potential to be used to support research and changes in management practices as well as benchmark the impact of these changes.

This innovation profile outlines the implementation of a remote gate opening and closing system. The system has been set up to control stock access to feed and water by using telemetry through NextG mobile phone, satellite or UHF radio connectivity.

Figure 1: A photo of the automatic gate opening and closing system. The photo is taken from the camera which is triggered by a telemetry signal initiated from the purpose built website.

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WHAT WAS THE MOTIVATION TO CHANGE?

Monitoring and controlling remote infrastructure, particularly water infrastructure, is an expensive and time-consuming activity at Bendleby Station. Remote infrastructure management systems that use telemetry and specialised computer software can reduce labour and fuel costs, and potentially improve system reliability.

WHAT IS TELEMETRY?

Telemetry is the wireless transfer of data and transmission of signals. The word is derived from Greek roots: tele = remote, and metron = measure. It is used for the purpose of remotely monitoring environmental conditions or equipment parameters.

There are various levels of infrastructure available. The suitability of different options depends on what technology can work on a given property. Data can be transferred telephone or computer network. More recent telemetry systems use the GSM networks through text messages to transmit telemetry data. They are used as they are low cost and are widely available.

Factors to consider include mobile phone reception, UHF signals, or if there is a line-of-sight between the antennas sending and receiving the signals.

Automatic responses can be set-up and warning systems can be activated to signal any issues.

Electronic devices are widely used in telemetry and can be wireless or hard-wired, analog or digital. Other technologies are also possible, such as mechanical, hydraulic and optical.

HOW DOES THE INNOVATION WORK?

The innovation opens and closes a paddock gate automatically through the use of telemetry. The Luckraft's followed these steps to implement the innovation:

- Initial desktop research to look for businesses with gate opening and closing systems that could be adapted to telemetry.
- A local communications business was asked to adapt the gate opening and closing system so a trial could be set up at Bendleby.
- A trial system was set up on a gate in a remote location, ready to be operated by telemetry.
- A camera was set up on a high point near the gate, incorporating the telemetry technology to open and shut the gate.
- The existing Telstra Smart Antennae was used to transmit the Wi-Fi signal from the homestead. This enabled them to operate the camera and gate opening mechanism using their current Wi-Fi connection.
- A purpose-built web page was set up to send a signal to the camera to capture photographs of the gate. The gate opening and closing is also initiated from the website with the signal going to the camera/telemetry device and then to the gate.
- Photos taken by the camera are viewed on the website.
- The movement of the gate can be checked by taking photos during the process.

"The camera is integral to the device as the signal goes from the computer to the camera and then to the gate mechanism," said Jane.

KEY FEATURES

Key features of the innovation include the following:

- Simplicity of use; opening and closing a gate from a computer.
- The ability to see it working by using a camera. The photos ensure the gates are opened and shut at appropriate times, for example when all stock have moved to the next paddock.
- It can be powered by batteries or solar panels.
- Other sensors can be added that enable stock counting, trough monitoring and electric fence monitoring.

WHAT ARE THE KEY BENEFITS?

The Luckraft's have observed the following benefits:

- This is a labour-saving device which enables properties to be managed with less staff. It reduces the time needed to travel to and from paddocks to open and close gates for sheep movement and water monitoring.
- Fuel costs and wear and tear on vehicles is reduced. The roads to the paddocks are travelled less. This reduces soil compaction, and likely to reduce the overall effect of wind and water erosion.
- This could be added to existing rotational grazing systems, and with other sensors such as sheep, goat or kangaroo counters and electric fence monitors. The whole process could be run from the office by using NextG, satellite or radio technology.

Figure 2: The gate system opening remotely (right). The camera takes photos as proof that the system is working.

Figure 3: The purpose built website that controls the gate system. The signal goes from the website to the camera and then to the gate mechanism.

KEY RESOURCES REQUIRED FOR THE INNOVATION

The materials used for this innovation are:

- Gate opening and closing device.
- Battery.
- Solar panel.
- Camera, mounted on a pole.
- Telemetry technology installed in the camera.
- A website set-up to control the gate mechanism and initiate the camera to take photos. Photos are viewed on the website.

Alex Woolford from Booleroo Farm & Business Communications assessed the gate opening and closing device and adapted the existing technology for remote control. Alex set up a password-protected network where photos of the gate were operate from, taken by the camera and then stored. The gate can be opened or closed by clicking a tab on the web page.

POTENTIAL CAUTION AND RISK

Jane strongly suggests ensuring the website is password-protected so that it is not available for misuse by others.

LOOKING FORWARD

At this stage, only the trial system is in place and it has not been added to a larger system, such as a cell grazing system; however, this is planned to be installed soon.

Jane plans to implement the telemetry system initially over two rotational grazing cells, incorporating a central watering system which can be monitored by a camera. This will involve sub-dividing two existing paddocks into eight cells each with a central water cell.

Future gate installations away from the homestead will not be within the Telstra Smart Antenna's WI-Fi range. These gates will require a mobile phone aerial mounted on a pole with a box housing the appropriate computer hardware and software. This system can still be controlled through the internet from the homestead computer, or essentially from a computer anywhere in the world.

FURTHER RESOURCES

For further information on the telemetry controlled gate system, Jane recommends contacting Alex Woolford from Booleroo Farm & Business Communications on 08 8667 2268.

COST BENEFIT ANALYSIS

The cost of trialling this innovation at Bendleby Pastoral is below:

	Item	Cost
Capital costs	APC Gate opener mechanism/motor and arm, including delivery.	$360
	Complete web-based control system, including: • Control unit at the gate with 900 mhz radio link. • Camera interface control at the homestead. • All mounting hardware and AC supply.	$320
	Battery to operate mechanism.	$200
Labour	Installation of the gate opening and closing mechanism.	$200
	Installation of a web-based camera and gate opener/actuator for a field trial at the property. Includes configuration of the operation on NextG WIFI LAN system.	$308
Travel	Two trips to Bendleby Ranges at 50c/km.	$100
	Total Cost	$1,488

Initial inquiries about the gate control mechanism indicated a cost of $800; however, an equally robust mechanism was found that is less expensive.

"As it is only a trial we have not set up a solar panel, so that would be an extra cost" said Jane.

The benefits of this innovation are labour cost savings and the ability to run the property from a distance.

THE FINAL WORD

"The system has been tried and tested, and operates without a hitch via my computer," said Jane.

Bestprac acknowledges the contribution of Jane Luckraft in the development of this innovation profile.

To view more innovation profiles, business cases and videos of innovations in the pastoral zone, visit the Bestprac website www.bestprac.info

Figure 4: The gate system opened (right). The camera takes photos as proof that the system is working.

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