



final report

Project code: P.PSH.0861

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Date published: 28th August 2018

PUBLISHED BY
Meat and Livestock Australia Limited
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NORTH SYDNEY NSW 2059

Customer led design thinking aerial drone strategy

This is an MLA Donor Company funded project.

Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

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Executive summary

MLA is developing a land and aerial drone strategy as part of MLA's red meat digital agriculture strategy. Ruralco was approached to partner with MLA in this space to work directly with Australian red meat producers, through demonstration and evaluation activities. The overall purpose of the project was to assist MLA in the development of an aerial drone strategy, identify current aerial drone deployment, new uses as well as future development needs.

A customer led design thinking approach was used to ensure consistent producer feedback was provided and considered throughout the duration. The overall project objectives for MLA and Ruralco were:

1. Input into the development of an MLA aerial drone Research and Development (R&D) strategy
2. Demonstration to red meat producers for existing drone capability, across Australia
3. Identification of new development needs for aerial drone R&D
4. Submissions by Ruralco to undertake any developments identified that add value to the Ruralco and PrecisionHawk business
5. Submissions to MLA with producer support on aerial drone R&D
6. Summary of indicative aerial drone adoption numbers by Australian red meat producers during the duration of this project

The project methodology was a design led approach and included two key elements:

1. Live demonstrations
2. Survey distribution, completion and collection

Ruralco successfully presented to and/or demonstrated the current capabilities of aerial drones to thousands of producers across 13 events. 750+ surveys were offered/ distributed with a completion rate of approximately 30 percent. In order to increase survey completion Ruralco offered producers the chance to win a drone if the survey was filled out in its entirety.

Generally speaking it was found that producers currently use drones for the following 4 key use cases:

- Locating/ checking livestock
- Mustering livestock/ assistance with mustering
- Checking water points
- Recreationally

Throughout the course of the project Ruralco found that some of the potential use cases identified by producers for drones may have other, more efficient solutions, which have increased in use over the last 12 months. For example checking water points can be conducted autonomously and automatically by sensors.

Ruralco believes the greatest opportunity for drones in the Australian red meat industry, in terms of long term return on investment (ROI) for the producer is location, identification and quantification of livestock. This proposed use case cannot yet be realised due to current hardware and software capabilities (not yet market ready), Beyond Visual Line of Sight (BVLOS) regulations as well as limited

connectivity/ telecommunications coverage in the rural and remote areas that would benefit most from these solutions. It will take strong industry advocacy and further advancement in technology in order to meet Australian industry needs.

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1 Background

The customer led design thinking aerial drone strategy project was undertaken to contribute to the development of a land and aerial drone strategy as part of MLA's red meat digital agriculture Strategy.

Ruralco formed an exclusive distribution arrangement with PrecisionHawk in early 2017 to extend a drone offering to customers. PrecisionHawk is an American drone and software company with the largest network of commercial pilots and is also the highest funded drone company in the world. In August 2016, PrecisionHawk became the first U.S. Company to receive an FAA (US Federal Aviation Administration) exemption to commercially fly drones beyond the operator's visual line of sight. PrecisionHawk have offered advice and support around completing the objectives of this project.

This project assisted the red meat industry to gain an in depth understanding of drones, their current and future capabilities as well as the gaps stopping widespread adoption.

The overarching aims of the project were to demonstrate the current capabilities of aerial drones in the red meat industry, gain an understanding of their potential use cases and identify new development needs for aerial drone R&D.

2 Project objectives

The overall customer led design thinking aerial drone strategy project objectives for MLA and Ruralco were:

1. Input into the development of an MLA aerial drone Research and Development (R&D) strategy
2. Demonstration to red meat producers for existing drone capability, across Australia
3. Identification of new development needs for aerial drone R&D
4. Submissions by Ruralco to undertake any developments identified that add value to the Ruralco and PrecisionHawk business
5. Submissions to MLA with producer support on aerial drone R&D
6. Summary of indicative aerial drone adoption numbers by Australian red meat producers during the duration of this project

3 Methodology

3.1 Live demonstrations

In order to achieve the outcomes and objectives of the customer led design thinking aerial drone strategy Ruralco and MLA worked in collaboration identifying, engaging and inviting target producer groups to demonstration days and/or information workshops. These events demonstrated the current capabilities of aerial drones in a show and tell, touch and feel demonstration program. Ruralco employees were also asked to scan their local areas for key red meat producer events/ field days and notify the Ruralco Innovation Team.

3.1.1 List of demonstrations/ information workshops over the course of the project

Table one (below) provides a list of all demonstrations/ information workshops that took place over the course of the project.

Start Date	End Date	Event	Location	Delegates/ Attendees	Representation/ Description
6/06/2017	8/06/2017	CRT Farmfest	Toowoomba, QLD	60 000	Trade show/ field day/ survey distribution/ daily drone demonstrations (approx. 80 attended each demonstration)
15/06/2017	17/06/2017	Primex	Casino, NSW	30 000	Trade show/ field day/ survey distribution (due to undesirable weather conditions, no drone demonstrations were undertaken)
01/08/2017	3/08/2017	BeefUp	Nebo, QLD	80	Drone demonstration/ partnership project announcement
03/8/2017	03/08/2017	Property demonstration	Private Station in Nebo, QLD	8	Drone demonstration for the purposes of media release article/s
7/08/2017	8/08/2017	Sheepvention	Hamilton, VIC	25 000	Trade show/ presentation/ drone demonstration/ survey distribution
12/10/2017	16/10/2017	BeefUp	Karumba, QLD	120	Drone demonstration/ survey distribution
23/10/2017	31/10/2017	Kimberly Pilbara Cattleman's Association	Kununurra, WA	240	Drone demonstration at Carlton Hill Station, trade show, producer survey and presentation

		(KPCA) Annual Conference			
16/11/2017	18/11/2017	Young Beef Producer Forum	Roma, QLD	150	Survey distribution and collection
08/02/2018	10/02/2018	CRT National Conference	Perth, WA	1000	Presentation: pasture management, real world use cases
12/02/2018	20/02/2018	Queensland Roadshow	Various Queensland locations: Bundaberg, Emerald and Innisfail	30	Workshops, property demonstrations, Q & A with Ruralco employees and producers
15/03/2018	16/03/2018	Farmer Field Day & Trade Show	Gilgandra, NSW	50	Trade show/ presentation/ on farm drone demonstration/ survey distribution
6/05/2018	12/05/2018	Beef Week 2018	Rockhampton, QLD	90 000	Trade show, producer engagement/ survey distribution and collection
05/06/2018	08/05/2018	CRT Farmfest	Toowoomba, QLD	60 000	Trade show/ drone demonstration/ survey distribution

3.2 Survey distribution and completion

As part of the project Ruralco designed two surveys;

1. The first survey was created for events prior to the August 2017 media announcement and was updated
2. The second survey was aimed at red meat producers

The surveys were based on the project outcomes and objectives and were completed by red meat producers over the course of the project.

Ruralco engaged and communicated to all relevant staff the purpose and objectives of the project. 750+ surveys were offered/ distributed and to incentivise completion producers were given the chance to win a PrecisionHawk DJI Phantom 4 Drone. See Attachment A – MLA Survey Collation for individual survey responses.

3.3 Holding discussions with other industry bodies and businesses

Ruralco and PrecisionHawk held conversations and workshops with numerous industry bodies and businesses to work together to:

1. Identify, prioritise and develop drone technology for the future
2. Combat the current restrictions to drone operation on red meat producing properties

Priorities included:

- Connectivity and data movements – being able to be in paddock and fly, download data, upload data, run algorithm and convert the data into a commercial format– i.e. into a tractor
- Flying drones remotely, BVLOS – beyond visual line of sight – ability to fly drone without having to be in line of sight
- Identification and count of individual livestock

Ruralco was also recently approached by an Australian drone company who have developed two market ready solutions that could alleviate some producer pain points:

1. Alarm options that can be attached to small and large drones, creating a noise that may assist in moving livestock. Please note that Ruralco does not endorse this action as there may be warranty implications on the drone
2. Image classification that is currently being used for shark detection that has the potential to be used on livestock
 - a. This business is also ready to commence trials counting livestock. If MLA is interested, Ruralco will assist with introductions

3.4 Informal conversations with producers

Ruralco and PrecisionHawk actively engaged with red meat producers across the country, holding informal discussions regarding the current value of drones to producers, the current restrictions or

incapability of drones to producers as well as the untapped potential benefits and efficiencies a drone could provide.

3.5 Media and communications

3.5.1 Internal media and communications

Ruralco communicated the project to all its staff through a variety of different mediums throughout the course of the project.

- The project was mentioned in the 2017 annual results video that is accessible by all staff, with a reach of 2000+
- An email was sent to all staff praising the involvement of key employees who have shown interest in the project and assisted the project management team to progress
- The project was mentioned at the annual CRT National Conference in Perth, WA with an attendance of approximately 1000 staff as well as members of the Board, external media and communications teams
- Information regarding the project was also communicated via various forms for of internal media including:
 - Internal digital communication networks, emails, store posters, business unit local newsletters, client meetings etc.
 - The desktop background of every Ruralco computer across the country had a call out for interested staff to engage with producers and the Ruralco Innovation Team to host demonstration/ information days

3.5.2 External media and communications

In addition to the communication sent to relevant staff regarding the project, Ruralco was also asked to appear in numerous media publications, to discuss the project and partnership with MLA.

Table 2 (below) provides a list of external media and communications.

Date	Event	Location	External Media	Description/ Website Link
03/08/2017	BeefUp	Nebo, QLD	MLA Media Release	See Appendix 9.1.1
03/08/2017	BeefUp	Nebo, QLD	ABC Article	See Appendix 9.1.2
03/08/2017	BeefUp	Nebo, QLD	ABC Radio Interview	Felicity Hennessy was interviewed by ABC reporter Lara Webster regarding the announcement of the project
27/10/2017	KPCA Conference	Kununurra, WA	ABC NW Radio Interview	Sam Hunt (Ruralco) was interviewed by ABC reporter Courtney Fowler regarding the partnership project and how drones could benefit the northern livestock industry
07/11/2017	Kimberly Pilbara Cattleman's Conference	Kununurra, WA	The West Australian Newspaper Article	See Appendix 9.1.3
Feb/ March Edition	MLA Feedback Magazine	NA	MLA Feedback Magazine	Ruralco was approached by MLA to provide a lead to a red meat producer currently using a drone as part of their operation. See Appendix 9.1.4
10/02/2018	CRT National Conference	Perth, WA	Weekend West & The Countryman	See Appendix 9.1.5
10/05/2018	Beef Week	Rockhampton QLD	The Land & Farm Online	See Appendix 9.1.7

In addition to the above media releases, Ruralco also mentioned the project when communicating to the market and investors (current and future).

3.5.3 Other

Ruralco and PrecisionHawk were approached by the Kimberly Pilbara Cattleman's Association and asked to donate a drone for the Royal Flying Doctors Service Auction, hosted at the Gala Dinner. PrecisionHawk donated a DJI Spark drone which helped to continue the discussions regarding drone usage in the industry as well as fuel further discussions once the new owners utilise it and share feedback with their community.

4 Results

4.1 Identification of new development needs for aerial drone R&D

New development needs for aerial drone R&D have been identified through survey completion and informal discussions. The following section provides a summary of:

1. Current drone use on surveyed red meat producer properties
2. Potential drone use on red meat producer properties
3. Drone technology limitations or challenges as stated in a survey or discussed
4. Producer identified development needs and/or opportunities for R&D as stated in a survey or discussed

4.1.1 Current and potential drone usage and the limitations or pain points

Generally speaking it was found that producers currently use drones for the following 4 key use cases:

- Locating/ checking livestock
- Mustering livestock/ assistance with mustering
- Checking water points
- Recreationally

Producers were generally enthusiastic when discussing the potential use cases of drones however many use cases identified, (such as autonomous weed identification and spraying, autonomous livestock health check and alerts, autonomous detection of fence line breakages) exceed the near future development horizons for drones as these would require artificial intelligence, BVLOS and autonomous operation.

The challenges identified by producers were fairly consistent across all locations and events and include:

Direct	Indirect
<ul style="list-style-type: none"> • Hardware limitations – battery life, payload (carrying capacity) • Inhibitive cost of hardware and supporting software • Software compatibility with other farm management platforms • Civil Aviation Safety Authority Regulations 	<ul style="list-style-type: none"> • Internet connectivity • Speed to process and interpret data

4.1.2 List of producer identified development needs and/or opportunities for R&D

The following table lists the key development opportunities that were consistently identified by producers throughout the course of the project as well as the actions/ requirements that will need to be undertaken in order to realise the opportunity.

Opportunity	Opportunity Enabler
BVLOS	Regulations and training
Wild animal identification	Improved hardware and algorithm creation
Weed identification and mapping	Improved hardware, algorithm creation and training
Counting stock	Improved hardware, algorithm creation and training
Health tracking/ monitoring	Cost effective thermal imaging camera and algorithm creation

4.2 Drones vs other technology solutions

Throughout the course of the project Ruralco found that some of the potential use cases identified by producers for drones may have other, more efficient solutions. The table below outlines the use cases, traditional methods, emergent solution and UAV solution implications. Ruralco is happy to provide recommendations for emergent solutions providers to MLA if required.

Use Case	Traditional Solution	Emergent Solution	UAV Solution
Checking water points	Visual check	Sensors	More expensive
Locating and mustering livestock	Helicopter/ boots on the ground	Virtual fencing/ GPS location devices	<ul style="list-style-type: none"> - BVLOS required - Current hardware limitations impact the efficiency of locating livestock (especially in woody areas or on larger properties) - More time required
Pasture assessment	Visual check, soil tests	Satellite imagery	<ul style="list-style-type: none"> - Greater resolution however is more expensive and requires more time - Data transfer and interpretation requires time and skill

4.3 Summary of indicative aerial drone adoption numbers by Australian red meat producers during the duration of this project

Aerial drone sales and imports are unregulated, so it is difficult to estimate adoption numbers by Australian red meat producers (Commonwealth of Australia (2014) Eyes in the Sky, Enquiry into drones and the regulation of air safety and privacy, Page 5). Over the course of this project Ruralco surveyed producers and asked them if they use drones (remotely piloted aircraft) on their property. To-date approximately 18 percent of survey respondents answered yes to using a drone on their property. It is important to note however, that Ruralco do not make it compulsory to fill out the drone technology survey and therefore the results were skewed towards producers with an interest in the

technology, which may influence the results. It is also important to note that survey respondents could also include industry employees that may not own or be working on a red meat producer property.

5 Discussion

5.1 Summary of project objectives

5.1.1 Input into the development of an MLA aerial drone R&D strategy

- Ruralco has assisted MLA in creating a current state assessment of drones in the red meat industry as well as the gaps
- Ruralco has provided industry knowledge, advice and opinions regarding drones in the red meat industry

5.1.2 Demonstration to red meat producers for existing drone capability, across Australia

- Ruralco had presented at 13 industry events
- Ruralco's communications department worked with various media to ensure the project was publicised and producers were aware of the opportunity to be involved
- Overall producers were enthusiastic about UAV technology and the capabilities. The majority of producers had sound technology knowledge and a strong desire to find solutions for issues they were having on farm

5.1.3 Identification of new development needs for aerial drone R&D

- Ruralco engaged with producers to gain a thorough understanding of current drone capabilities, current limitations and future work necessary in order to realise the full potential of drones in the red meat industry
- Numerous development needs were identified regarding hardware, connectivity, regulatory environment, training and support software

○ BVLOS

In our opinion, BVLOS is potentially the greatest opportunity for Drones in the Australian red meat industry and provides the greatest ROI for producers. Locating and counting livestock BVLOS with a drone capable of flying for significantly longer than current battery life could potentially generate meaningful value to producers (especially those on larger stations) as this would assist with:

- property valuations
- property sales
- insurance
- credit applications and increases
- decreased time and cost of locating/ mustering with helicopter or staff and increasing safety as staff potentially would not have to venture into potentially unsafe environments to locate/ muster livestock

BVLOS is a tightly regulated market and an area that has not yet been opened up to producers in a commercially viable way. It is currently cost prohibitive for many producers and will take a strong industry voice in order to advocate for the required shift in the opening of this avenue. In addition, the drone pilot skillset required to fly

BVLOS and use the software necessary to fly (e.g. PrecisionFlight Pro) requires a high level of understanding and advanced capability far beyond current pilot capabilities

- **Hardware/ Battery life**

Hardware limitations were identified as a barrier to adoption as the majority of drones on the market have a battery life of between 20 and 40 minutes. Improvements are being made, however this is still in commercial infancy and in all cases means an increase in price

5.1.4 Submissions by Ruralco to undertake any developments identified that add value to the Ruralco and PrecisionHawk business

- Ruralco found that numerous use cases for drones already had other alternative market ready solutions available that in most cases are more efficient and cost effective than performing the required task with an UAV e.g. water checks/ monitoring can be conducted autonomously and remotely using sensors. If MLA is interested in other technology solutions, Ruralco will assist with introductions to identified businesses
- Ruralco believes that satellite capabilities will provide producers with an efficient way to view their crops/ pasture and perform crop/ pasture analysis, however if a producer needed to gain an understanding of the crop/ pasture in real time and at a clearer resolution, a drone will still be necessary. Ruralco sees the biggest future opportunity for drones in their ability to locate and count individual animals and has advised PrecisionHawk to develop an algorithm with this capability
- PrecisionHawk are continuously working on their software solutions as well as their beyond visual line of sight (BVLOS) capability. PrecisionHawk have recently released their BVLOS high level technical spec and services. They have developed a drone equipped with aircraft detection and avoidance that will fly for over 2 hours and 60+ kilometres. This drone combined with PrecisionFlight Pro could perform an autonomous flight plan to inspect multiple water facilities within a 2 hour flight and give the operator the ability to deviate from the flight plan to take a closer look at anything they feel necessary and then resume the autonomous flight plan. It is expected that this drone will be commercially available in 5 months
- PrecisionHawks PrecisionFlight Pro software allows a drone operator to hand over control of the drone to someone in a remote location to review what the drone is seeing (regulations are yet to catch up)
- PrecisionHawk now also provide BVLOS consulting to organisations who wish to initiate a BVLOS operation. It is important to note that assistance will most likely be required to commercialise this offering for the Australian market and achieve the BVLOS waiver from regulators (Ferguson, n.d.) as BVLOS operations require higher pilot/ operator qualifications and experience to operate safely (Australian certified UAV operators, 2018) as well as supporting information and risk assessment documentation (Australian Government Civil Aviation Authority, 2018). For further information on the PrecisionHawk BVLOS drone operations see Attachment B – PrecisionHawk BVLOS Drone Operations

5.1.5 Submissions to MLA with producer support on aerial drone R&D

- Ruralco believes the current project has provided significant insights and recommendations and would like to partner with the MLA on future R&D that will assist in bringing market ready solutions to red meat producers in the satellite or drones space
- Ruralco believes a strong whole of industry voice is needed to solve for BVLOS, industry must work together to bring regulators on the BVLOS and autonomous flight journey
- Ruralco believes the biggest opportunity for drones in the red meat industry is for large pastoral properties which are often located in areas with no connectivity. In order to solve for this R&D needs to be undertaken with major telecommunication players to find alternative connectivity options

5.1.6 Summary of indicative aerial drone adoption numbers by Australian red meat producers during the duration of this project

- Aerial drone sales and imports are unregulated, so it is difficult to estimate adoption numbers by Australian red meat producers (Commonwealth of Australia (2014) Eyes in the Sky, Enquiry into drones and the regulation of air safety and privacy, Page 5)
- Ruralco sold approximately 25 entry level drones to red meat producing customers across Australia, the majority of which were sold to producers on cattle stations in rural and remote Queensland

6 Conclusions/recommendations

As a result of the demonstrations, workshops, industry discussions, surveys, producer feedback and information analysis Ruralco has reached the conclusion that drones, like other AgTech developed overseas, were not market ready for Australian conditions when they became commercially available and solutions now applicable to the Australian market are still in commercial infancy. Ruralco believes alternative solutions for many current drone use cases will surpass drone capability. In our opinion, BVLOS is potentially the greatest opportunity for Drones in livestock. Locating and counting livestock BVLOS with a drone capable of flying for hours longer than current battery life could potentially create huge value to producers (especially those on larger stations) as this would assist with property valuations, property sales, insurance, credit applications, credit increases, decreased time and cost of locating/ mustering with helicopter or staff and increasing safety as staff would not have to venture into potentially unsafe environments to locate/ muster livestock. Ruralco can facilitate an introduction for MLA to any of the partners mentioned within the report.

7 Key messages

- Support industry advocacy for BVLOS and improved connectivity in order to realise the full potential of drones and to assist in bridging the gap between global solutions and Australian market needs
- Be open to innovation. An openness to innovation will ensure producers remain aware of available technology and solutions to problems they may be experiencing on farm

- Be open to trial technology. Trialing technology will assist in understanding the capabilities and imitations of the technology and provides insight into the technology before purchasing.
- Be open to adoption. Assess all technology for their ROI before adopting

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9 Appendix

9.1 Media coverage of the project

9.1.1 Media Release - MLA and Ruralco aerial drone innovation farming partnership

Posted 2 September 2017

Meat & Livestock Australia (MLA) and Ruralco Holdings Ltd (Ruralco) today launched a new innovation partnership that will see the organisations refine new approaches to monitoring and maintaining pasture and herds through aerial drones.

Announcing the partnership at the MLA BeefUp event in Nebo, Queensland, the new project, delivered by MLA Donor Company (MDC) will engage directly with producers to develop an aerial drone strategy for the benefit of the red meat and livestock industry.

The project will also map the current use of aerial drones and identify the future development needs around how aerial drones can be used more effectively on-farm.



Sean Starling and Felicity Hennessy holding a PrecisionHawk Fixed Wing Lancaster Drone. Photo courtesy of Lara Webster, ABC Tropical North.

MLA and Ruralco Queensland are reaching out locally to engage producers in the discussion around research and development (R&D) to drive beneficial outcomes for producers and their businesses. The collaboration will focus on developing Australian-specific insights and unique algorithms for livestock producers with Ruralco's partner PrecisionHawk, the leading drone, data collection and analytics company in the United States.

Initially running for 12 months, the project will engage with producers and rural communities through a series of hands-on demonstrations showing the current capabilities of aerial drone technologies.

MLA General Manager – Research, Development & Innovation, Sean Starling, said the new partnership with Ruralco is the first step in developing a broader land and aerial drone strategy across the red meat industry, as part of MLA’s Digital Value Chain Strategy for the red meat and livestock industry.

Mr Starling said direct feedback from producers will also assist in identifying commercial opportunities for aerial drones and pin-pointing technology gaps that currently exist.

“As an industry it’s important we embrace technology to ensure we get the best from the land and integrate the best surveillance techniques of our flocks and herds,” Mr Starling said.

“By engaging producers directly with hands-on demonstrations and using a ‘design led’ approach to the development of new technology we are hoping we can ensure quicker and more effective adoption of technology that assists the whole industry.”

Ruralco CEO and Managing Director, Travis Dillon, said drone technology was facilitating data-driven decision making in agriculture.

“Farmers can better analyse issues which affect productivity and sustainability such as effective nutrient delivery, livestock health, and combat biosecurity issues,” Mr Dillon said.

“Together, Ruralco and MLA are well positioned to deliver innovative technology through Ruralco’s national outlets. With PrecisionHawk we will be able to access the latest farmer-friendly apps used to analyse agricultural data as used in the USA, South America and Europe.

“Agriculture in Australia is a sector that has always embraced innovation, and is worth more than \$50 billion and grew by \$3.1 billion in 2015-16.”

9.1.2 Drones for livestock: Ruralco and producers join forces in technology development plan - QLD Country Hour

By Lara Webster

Posted 3 August 2017

Refining drone technology so that it becomes more suited for livestock producers is a priority for a new innovation partnership.

Drones are already widely used to check fences, cattle, and water troughs on remote parts of a property, but they're not perfect.

Now agribusiness Ruralco Holdings has teamed up with Meat and Livestock Australia (MLA) for an initial 12-month program to map the use of drones and identify how they could be more effectively used on-farm.

MLA General Manager of research, development and innovation, Sean Starling, said producers would play an active role in the research project.

Mr Starling said the challenge was to look at how they're used today and find ways of adapting them for best-practice usage in the future.

He said MLA had received a lot of general inquiries from producers about the use of drones.



MLA and Ruralco will run a series of drone demonstrations for producers during the next 12 months. Photo courtesy of Felicity Hennessey, Ruralco.

The project will focus on drone development but also provide education about the technology.

"By working with Ruralco and getting producer groups together for demonstrations we are going to have a bigger educational impact," Mr Starling said.

"Drones are a bit of a toy at the moment. I get a sense that producers do not mind being a pilot, but I believe as years go on it should actually be a silent service.

He said ultimately the goal would be to make drones autonomous.

Plenty of ideas for Australian skies

Ruralco's manager of innovation Felicity Hennessey is talking to livestock producers who want drones to address a number of issues.

"Simple things like water runs and the time and effort it takes to check all the water runs, particularly out in pastoral areas, fence runs and checking fences are not broken," she said.

She said locating livestock pre-muster and tracking animal health were also on the wish-list.

Ms Hennessey has seen how the technology is applied in agriculture around the world.

She said there were plenty of ideas that could be applied to Australian skies.

"There is a significant amount of work that is being done in cropping in North America, Argentina and Europe," she said.

"I think where Australia has got an opportunity to take the lead is when it comes to livestock."

She said at the moment there were not any really obvious solutions for livestock producers.

For example, the battery lifespan of drones continues to be a barrier but Ms Hennessey is confident that particular issue can be addressed.

"We will bring in other partners to the ecosystem because there are other drones that can fly far further than that," she said.

9.1.3 Drone potential in industry explored - The West Australian

By Peter de Kruijff

Posted 7 November 2017



Ruralco's Sam Hunt and Majella Nolan who spoke with pastoralists about the latest in drone technology. Picture courtesy of Peter de Kruijff, The Kimberley Echo.

Uses for drones and other innovative technology in the pastoral industry are being explored by business leaders and farmers alike.

Several speakers explored the latest in the application of technology on cattle stations at the recent Kimberley Pilbara Cattleman's Association's annual conference.

Ruralco national category manager Sam Hunt gave a flight demonstration of a drone out at Carlton Hill Station on Thursday as well as a presentation during the sit-down conference on Friday. "This technology is being used in cropping. It's not exactly there yet with cattle but it's getting there," he said.



The drones-eye-view of the Carlton Hill yards. Picture courtesy of Sam Hunt, Ruralco.

Mr Hunt said these days you did not have to even fly a drone yourself and you could plot out a flight path which could allow it do things like water inspections.

“You can tell the drone to fly out to a trough, take stills, take video and go to the next waypoint, do the same and come home,” he said.

“You might have telemetry on your tank which will tell you your tank is full but not there’s a cow bogged to the side of it.”

Mr Hunt said the regulations were not keeping up with the leaps in technology given pastoralists still had to adhere to CASA laws and could only fly a drone within the operator’s line of sight.

Fossil Downs Station has experimented with drone technology for bore runs but run into the same problem of not being able to do it yet with an unsupervised drone.

The Gina Rinehart-owned station is also leading the way in the industry with use of walk-over weighing stations and similar communications technology to what is used on mine sites.

9.1.4 February/ March 2018 Edition of MLA Feedback Magazine

The February/ March 2018 edition of the MLA Feedback magazine showcases a Davidson and Cameron (a Ruralco joint venture business) client and shares his views on drone application on his property.

Access the article here: <https://www.mla.com.au/news-and-events/publications/feedback-magazine/>

9.1.5 Ruralco looks to the skies. The Weekend West & The Countryman

By Jenne Brammer

10 Feb 2018

Ruralco plans to further build its national network presence this year and sees agricultural technology such as drone supply and service provision as key growth areas.

Ruralco chief executive Travis Dillon said the group would create new revenue streams by using technology and industry partnerships to develop practical technological solutions sought by farmers.

The group entered into a venture with US drone and data analytics provider PrecisionHawk in 2016, followed by partnerships last year with the CSIRO and Meat and Livestock Australia to drive digital farming and drone innovation.

"We will combine the technology and data analytics of Ruralco's drone program with the CSIRO's globally recognised capability in robotics, remote sensing and data analytics for commercial advantage," he said at a conference in Perth yesterday.

"Similarly we have partnered with MLA for the benefit of their members to refine the use of drones for monitoring and maintaining pastures and herds." The MLA project will initially run for 12 months, involving engagement with producers and rural communities to develop a drone strategy that will benefit the livestock industry.

Mr Dillon said Ruralco last year acquired Great Northern Rural Services in Geraldton, had CCR Kununurra join the network, and established a new greenfield site at Esperance called Primaries CRT Esperance.

The expansion, along with acquisitions in other States, was funded after a successful \$65 million capital raising a year ago.

He said Ruralco now has a presence in all key agricultural regions in WA but could expand its footprint by integrating into these locations other business lines within the Ruralco portfolio, for example water equipment supplies from Total Eden.

"The investment in our network is a key pillar of our Future Farming Strategy.

The increased footprint, coupled with back office enhancements, set up a strong foundation for solid growth across the business in 2018," Mr Dillon said.

He said RuralcoNet, a new portal launched in December, would help create a stronger buying group and leverage better deals for its member businesses.

The group posted record results for the 2017 financial year. Net profit after tax of \$26.2 million was up by 95 per cent.

Underlying EBITDA of \$65.4 million was a 58 per cent increase on 2016.

9.1.6 Queensland Roadshow



Figure 7 Josh Voelker, Bobby Vick of PrecisionHawk with Ruralco employees in Bundaberg Queensland.



Figure 8 Josh Voelker of PrecisionHawk presenting to a group of producers in Emerald Queensland.

9.1.7 Ruralco has partnered with MLA to conduct drone research – The Land and Farm Online

By Sharon O'Keeffe

10 May 2018



Ruralco, procurement manager, Leonie Furze with a Phantom IV drone sold by the company.

A DRONE may soon be as common, and as useful, as a cattle dog on Australian properties.

Ruralco, procurement manager, Leonie Furze said Ruralco, along with partner Precision Hawke, is carrying out a research project with Meat and Livestock Australia (MLA) to investigate the future of drones.

“We are looking at how drones can assist beef cattle producers,” she said.

Ms Furze said the project involved surveying producers to crowdsource information on how drones could or should be used.

“We are finding activities like checking water points, fence lines and stock are the obvious uses,” she said.

Ms Furze said labour saving and workplace safety were potential benefits perceived by farmers of the technology.

“If you don’t have to climb up a tank to check the water level, it is safer,” she said.

Ms Furze said the project would provide information to help industry make choices on where to invest.

“There is a lot of technology already for crops,” she said.

“If there is flooding, there is a lot of plant health data that can be assessed.

“There are indexes such as NDVI which can be used.

“We are almost at the stage where we can go straight to the variable rate.

Ms Furze said Ruralco were pleased to use their relationship with farmers to add value to the industry.

“We are doing this project with MLA to really try and direct technology to assist beef and sheep producers.

“Australia is such a large, diverse country.

“Using technology is the direction agriculture needs to go in.”

9.1.8 Producer Field Day, Gilgandra



Josh Voelker of PrecisionHawk demonstrating setting up a Matrice 100 at a producer’s property in Gilgandra, NSW.

9.1.9 Beef Week Rockhampton



Producers leaving their contact details with Majella Nolan for Ruralco to send them the MLA project survey.

9.1.10 Internal staff desktop background



This image was displayed on every Ruralco owned desktop computer across the country, asking for staff involvement in the project.