Snapshot report





Ovine carcase Inspection/Contamination Management

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Project description

Cattle and sheep are ruminants, thus faecal samples contain green plant material. At a cellular level, green plant material contains chlorophyll. Chlorophyll is an optically active compound that yields strong fluorescence signals when exposed to particular excitation wavelengths of light.

Veritide have developed sensors and models which can identify chlorophyll present in faecal material, which is strongly correlated with the presence of E. coli and other pathogenic and spoilage bacteria. Several international export markets have zero tolerance for such contamination. If detected, carcases are cleaned and trimmed or condemned, with costs borne by the exporter. Bacterial contamination like E. coli is responsible for the majority of the meat industry recalls.

A previous proof-of-concept (PoC) project sponsored by AMPC illustrated the technical and scientific credibility of the technology platform in a large format configuration. This was done by leveraging the technology found in the handheld 'BluLine' scanners, which Veritide have been selling internationally for 6 years.

With the BluMax technology (Figure 1) now ready for commercialisation, this project has focused on its operational deployment and has taken a "deep dive" approach to explore where the value proposition lies for this technology within the ovine processing environment.



Figure 1: The latest commercial version of Veritide's BluMax Scanner and Industrial Monitor System

Project content

When we set out, the original objectives of the project were to:

- Send BluMax scanned partial carcase images to an industrial monitor that precisely informs and guides a
 designated and trained operator to specific contaminated locations for manual removal via knife or steam-vac.
- Send BluMax scanned partial carcase images to Augmented Reality lenses that precisely informs and guides
 a designated and trained operator to specific contaminated locations for manual removal via knife or steamvac.
- Compare and contrast the two potential solutions in terms of operator preference, efficacy, speed, accuracy, line integration, etc. Validate the various techniques by applying the Veritide BluLine Scanner and laboratory testing for the microbiological status of carcases before and after contamination detection and intervention.
- Build a database of images and reports that enables processors to "track and trace" their specific contamination risk profile (by carcase/hour/day/mob/shift according to the processors requirements); whereby operational and quality control staff have actionable data for lowering contamination risks over time, improving operational outcomes.
- Determine if this Industry 4.0 system of digital contamination management delivers on the core operational improvement objectives and primary goals (detailed below).
 - I. Reduce labour or utilise labour more efficiently.
 - II. Reduce trimming of the carcase and lower trim waste.
 - III. Reduce energy and/or chemical and/or water utilization, improving environmental and sustainability outcomes.
 - IV. Lower pathogenic and spoilage bacterial cell counts, improving food safety outcomes and extending product shelf-life.
 - V. "Track and Trace" the specific contamination risk profile of the plant (by carcase/hour/day/mob/shift according to the processors requirements); whereby operational and quality control staff have actionable data for lowering contamination risks over time and improving operational outcomes.



Scanning Ovine carcasses and displaying images for precision trimming





The world's first Augmented Reality enabled trimmer.

Project outcome

While we were able to deliver on many of the projects core objectives, as we progressed, we discovered that the trial site was starting to contemplate operational uses for the technology that we hadn't necessarily considered earlier. Of course, with any new and disruptive innovation, the best laid plans/ideas often get recalibrated once the technology gets placed in the hands of the customer; this was certainly the case at this trial facility when the BluMax was deployed on site for a longer term.

We noted that the trial site started to gravitate to the utility of the introductory daily reporting programme. They became very focused on the mob-tracking and carcass heat-mapping data [Figure 2] and infographics as a way of informing themselves about their standard operating procedures (SOPs) and operational improvements that could be extracted from the harvest and evisceration floor vs guiding trimming operations on the trim floor.

For this facility and trial, and potentially for the ovine species generally, we discovered that an intermediate step needs to be considered, whereby the BluMax System could be leveraged to deliver powerful, real-time operational improvements and behavioural change on the harvest and evisceration floor first, prior to deployment on the trim floor. The trim floor use case is still entirely valid, but only after deploying the technology to improve upstream, standard operating procedures first.

Contained within this major learning, the stakeholders in this trial realised that the power of the Veritide BluMax technology was not limited to its ability to illuminate and detect faecal contamination (in real-time, at line speeds); we collaboratively discovered that the underlying data and analytics platform is where substantial residual value and operational utility lies. Commercially, there is a substantial Data-As-A-Service (DaaS) offer that can be delivered to the Ovine processing industry; it's embedded within the BluMax technology now, and can be leveraged for strategic and operational purposes in the future.

Going forward, it is envisaged that the BluMax DaaS offer (or specific sub-components contained within it) will provide powerful operational, quality management, product verification and traceability insights that will cascade value throughout the supply chain. Initially, this will be engineered to the needs of executive and senior level managers and on-site, operational processing personnel. Later on, specific elements of this reporting/analytics programme could be shared with industry auditors, regulatory agencies and downstream supply chain clients.



Carcass Contamination Heat Map illustrating results from two different mobs on the same day

Benefit for industry

This trial has proven the benefit of using Veritide's technology to identify chlorophyll-based contamination - the main source of E. coli and other bacteria present in Ovine primary processing facilities - in real time. Given the number of results which had not been predicted at the project outset, but which have been identified using the BluMax scanner, this could suggest that additional benefits are yet to be discovered. It is difficult to predict what further benefits could result over time, since no precedent has been set for how this new and groundbreaking technology could be used.

Augmented reality technology has not yet matured such that it can be integrated as a precision trimming tool. However, the trial has proven AR-assisted trimming to be a feasible concept which may warrant further investigation in the future.

The quality of the BluMax scanner continues to improve, as does the confidence in the results. Cross checking identified contamination with BluLine handheld scanners demonstrates the high accuracy of both devices. The work completed to improve sensitivity and visible contamination detection is a clear indication of the system's robustness.

The use of data generated by the BluMax scanner continues to be a growing area of interest. How this data is displayed to both management and operational staff has evolved significantly over the course of this project. More work is still required to enable full integration across multiple facilities, and for people to be able to customise the data they see. Additionally, quality alerts could be sent to supervisors on the detection of significant shifts in contamination rates.

With the experience and knowledge gained in the trial, the ovine trial facility has identified the location and methodology which will produce tangible benefits for them. At the start of the trial, this location was not something that AMPC or Veritide had considered. This highlights the potential benefits of industry trials of new technologies - such as those offered by Veritide and AMPC - for the purpose of enhancing the operational performance and international competitiveness of the Australian ovine processing sector.

Three areas of work that support wider industry benefit have been identified and described below.

Recommended Research Area 1: Integration of BluMax into an ovine slaughter floor for process improvement

Rather than focusing on contamination removal, this approach aims to minimise the amount of contamination from the slaughter floor - before trimming - in real time. This could be done by feeding data back to slaughter floor workers. How this data is displayed and monitored is crucial to keeping workers engaged and focussed on best practices.

A 2025 project that delivers this commercial outcome within an Australian ovine processing facility is currently being scoped with the collaborative support of AMPC and a primary processor.

Recommended Research Area 2: Identification of other zero tolerance contaminations

Faecal matter is normally the largest of the zero tolerance contaminations found on ovine carcases. To detect other contaminants, various spectroscopic techniques could be used in combination with a hyperspectral camera. This would enable a wider range of precision trimming and removal of the other contaminations.

Recommended Research Area 3: Develop Veritide automated inspection and automated carcase cleaning

Removing contamination from carcases is a laborious process, even after Veritide technologies identify which areas require trimming. The Veritide system generates x/y/z coordinates for each carcase scanned, and therefore the exact locations within the three-dimensional space that require cleaning. The project proposes to investigate how this three-dimensional data could be used to drive some form of automation that removes contaminants.

Useful resources

BluMax Promotional Video – Vimeo Link https://vimeo.com/930067617

Introductory Daily Reporting Template/Sample (see below): to be made available in a readily accessible cloud-based platform in 2025.





---- BluMax Scanner Report ----



Contamination Percentage (Last 31 Days)

Cumulative Count of Detected Carcasses



Cumulative Count of Detections on Carcasses

