

Sheep Primal Picking & Packing Training

Immersive reality - Sheep Primal Packing training program

As part of Remote Operations (Gamification) – Stage

Project Code
2021-1241

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1.0 Executive Summary

Following completion of the Beef Rib Scribing module as part of The **Remote Operations (Gamification) – Stage I**, AMPC commissioned the development of five additional digital training modules that build on the objectives of the Gamification Project. The third in the series was the Sheep Primal Picking & Packing module (The Project).

The Sheep Primal Picking & Packing project involves the design and development of a fully immersive virtual reality training application that teaches participants the basic skills of correctly identifying and packing a range of Sheep Primal cuts. A web-based extension of this training was also included within the project scope to optimise access amongst industry participants. The key objectives of this project were to facilitate highly realistic training modules that improve skill levels and worker health and safety and drive industry engagement amongst people both within and outside industry. Specific deliverables included fully immersive and interactive training module for correctly identifying sheep primal cuts incorporating cut image and specification; knowledge review via a quiz; and assessment of cut knowledge via gamified test. Versions were created for use on both immersive VR headsets and computer via web browser.

The following benefits have been identified for the meat processing industry from this project:

- Short term: development and deployment of a comprehensive suite of training modules to support recruitment activities, improve workforce capability and reduce work health and safety challenges.
- Mid-term: contribute to automation initiatives through the integration of 3D models in robotics and AI based projects.

Virtually There is now working with AMPC's co-innovation managers to demonstrate the technology to members and assess the level of interest in stage II.

2.0 Introduction

Following completion of the Beef Rib Scribing module as part of The **Remote Operations (Gamification) – Stage I**, AMPC commissioned the development of five additional digital training modules that build on the objectives of the Gamification Project. The third in the series was the Sheep Primal Picking & Packing module (The Project).

The Sheep Primal Picking & Packing project involves the design and development of a fully immersive virtual reality training application that teaches participants the basic skills of correctly identifying and packing a range of Sheep Primal cuts. A web-based extension of this training was also included within the project scope to optimise access amongst industry participants.

3.0 Project Objectives

The specific objectives of the Sheep Primal Picking & Packing project were as follows:

- Facilitate highly realistic training of entry level associates to correctly identify and pack the right cuts into the correct boxes, to accelerate onboarding, minimise potential economic loss and reduce the risk of causing market access issues.
- Improve skill levels and worker health and safety amongst industry workers by training them to pick and pack correctly.
- Drive industry engagement amongst people both within and outside industry, to break down misconceptions around the type of work involved in meat processing and demonstrate potential career opportunities.
- Provide a tool that can be used in recruitment activities by meat processors

The specific deliverables of the Sheep Cuts Picking & Packing project were as follows:

- Develop a training and assessment application around correctly identifying and packing a range of Sheep Primal cuts.
- Develop a 'gaming' option within the app that enables skill levels to be developed and recorded through individual or group competition.

- Demonstrate the app to industry stakeholders, predominantly processors, and develop stage 2 plan for potential deployment and future development.

4.0 Methodology

The Project involved four phases:

4.1 Design phase:

- Hold project kick off meeting to define key steps and milestones for the project
- Map the sheep primal picking and packing process based on photos and video, interviews with operators and observation of actual plant during site visits
- Develop an outline of environment and UX to be built and get signed off by AMPC

4.2 Build phase:

- Build the 'Sheep Primal Cut Picking & Packing' learning stage, incorporating three elements:
 - Learn: display up to 37 individual sheep primal cuts along with the specs for each cut for participants to learn.
 - Quiz: review each of the 37 cuts and select the correct name from 4 possible answers (multiple choice)
 - Practice: stand at a conveyor and practice selecting cuts off the conveyor and placing them in the correct box
- Build 'Sheep Primal Cut Picking & Packing' game stage
 - Take the practice stage from the training module and build a gaming module that incorporates a series of time based execution challenges for sheep primal picking and packing.
 - Incorporate variable game parameters that can be changed by the participant to make the training easier / harder. These parameters include:
 - Number of cuts to be coming down the conveyor
 - Speed of conveyor
 - Frequency and density of cuts on the conveyor
 - Number of boxes to be packed simultaneously
 - Constant or changing box labels
 - The task is then to identify the correct cuts from the conveyor and place them in the corresponding labelled box. A score is given for each cut accurately selected and put in the correct box.
 - A score is given at the end of each activity showing the correct number of cuts and % accuracy against the total selected.
 - The participant can repeat the game as many times as they wish until they achieve the desired score
- These two stages are then integrated to create an immersive sheep primal cuts application in virtual reality.
- On signing off this application, a web based version are developed

4.3 Deployment phase

- On completing the two applications - Sheep Primal Cuts (immersive & online) - work with AMPC's co-innovation managers to demonstrate the technology to key stakeholders across the industry.
- Work with AMPC's communications and field team to market and deploy the training and gaming modules in partner processing plants
- Build interest and commitment amongst processors to develop and deploy additional interactive training applications across the processing chain to build capability and reduce injury amongst processor workers.

5.0 Project Outcomes

The following outcomes were delivered at the end of the project:

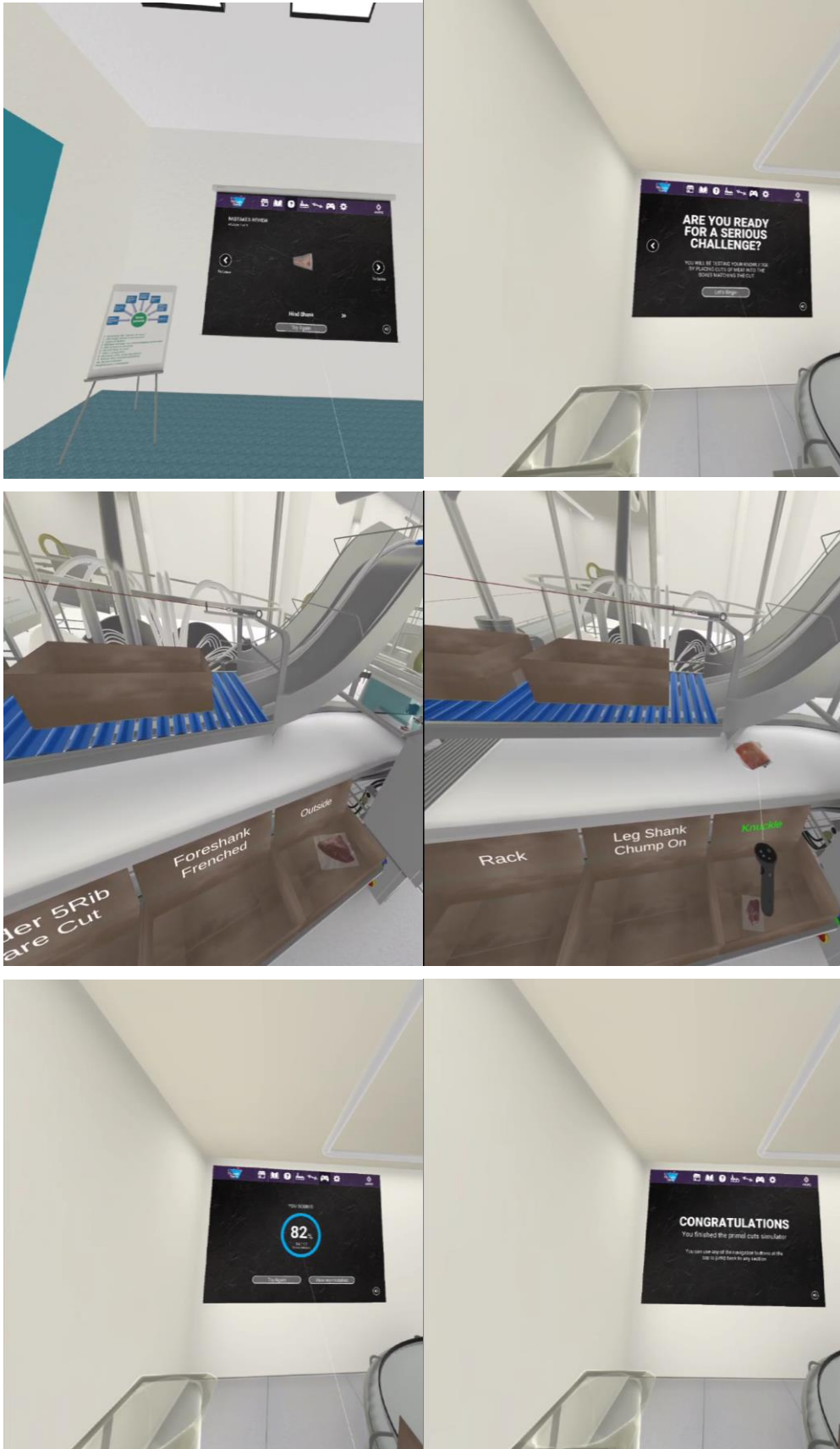
5.1 Virtual reality Sheep Primal Cut picking & packing application:

A fully immersive and interactive training module delivered on portable, low cost, virtual reality devices, incorporating the following elements:

- 5.1.1 Cut learning stage: 3D image and written specifications of each cut
- 5.1.2 Multiple choice quiz on each cut
- 5.1.3 Cut selection and packing practice stage
- 5.1.4 Cut selection and game stage (with multiple variables described above)



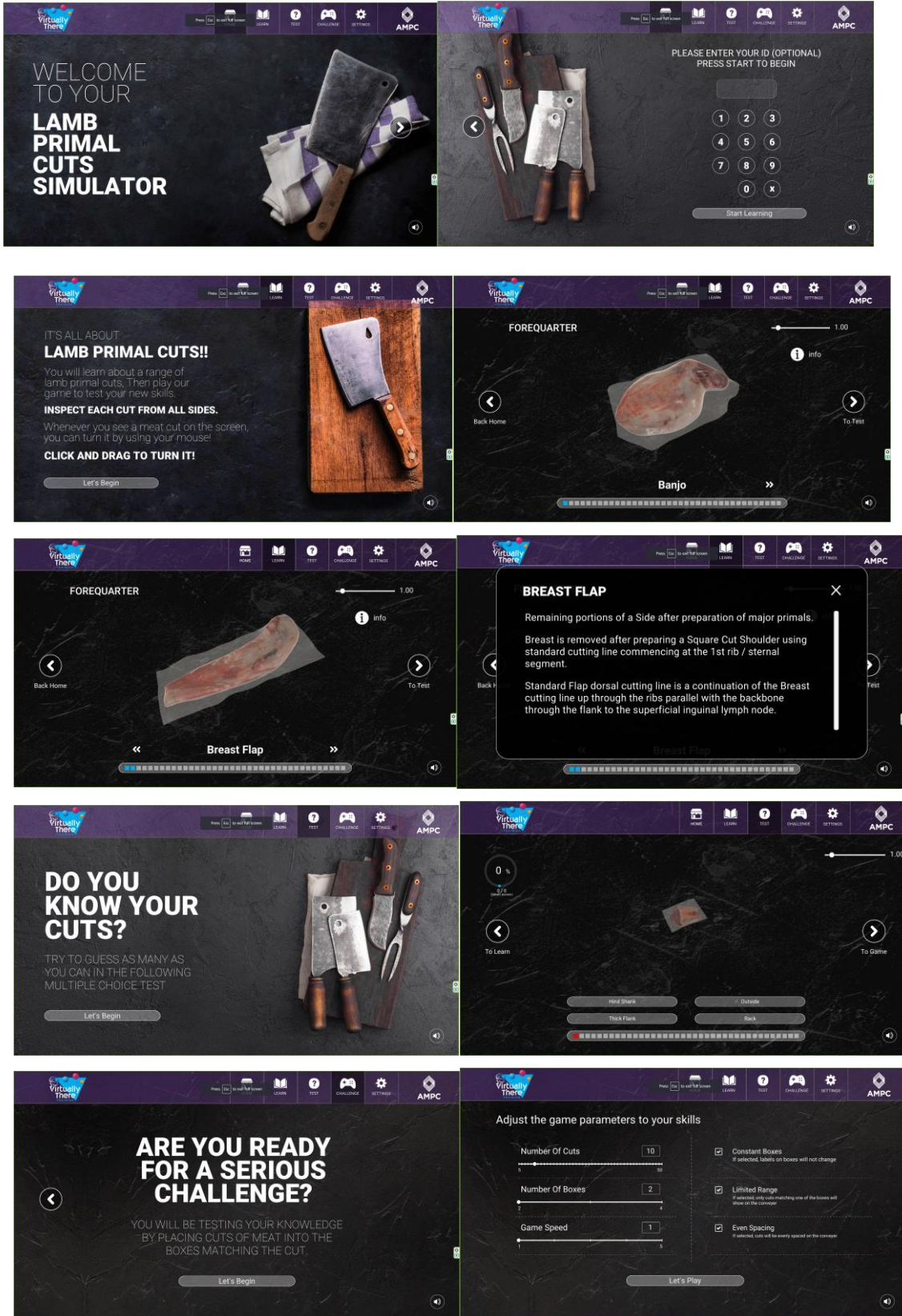


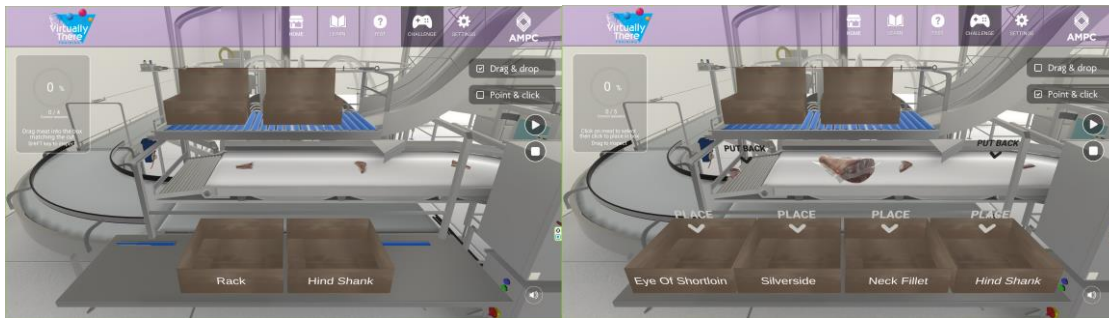


Click on the link to view video:

<https://www.dropbox.com/s/gjp1vgzhsq4rkah/20220913%20Lamb%20Primal%20raw%20video.mp4?dl=0>

5.2 Online version of the Sheep Primal Cut picking and packing application





5.3 Demonstration to key processor stakeholders

We have visited 16 processors over the last 4 months for demonstrations of the VR training modules developed to date, including the Sheep Primal Picking & Packing module. This is in addition to 5 processors visited in the 6 months prior.

Four processors have agreed to run pilot tests of VR Training, which will run from Sept-Dec 2022

In addition, 9 processors have expressed an interest in deploying and / or developing additional interactive training content

6.0 Discussion

The following benefits have been identified for the meat processing industry from this project:

6.1 Immediate development and deployment of a comprehensive suite of training modules

AMPC's 2020-2025 Strategic Plan identifies both within the Advance Manufacturing and People and Culture programs that:

- Removing staff from dangerous operations, via Hands-Off processing (Adv. Mft.),
- Carcase Primal Profitability Optimisation, via accurate processing (Adv. Mft.)
- Digitisation, via acquiring product information and leveraging data insights (Adv. Mft.),
- Attraction, via demonstration and developing a wide range of operations (People & Culture),
- Retention, via improving working conditions and making tasks exciting (People & Culture),
- Development, via developing tasks that require higher skills and intellect – operational & technical (People & Culture),
- Safety and Wellbeing, via reducing the high-risk nature of processing operations (People & Culture), are all foci of AMPC, and that this one innovation theme will aim to make a significant impact upon all seven.

Of these, the Picking and Packing project as part of the **Remote Operations (Gamification) – Stage I** has demonstrated its relevance and ability to deliver immediate benefits to industry around Attraction, Retention, Development and Safety. This is clearly supported by the level of interest and inquiry across stakeholder groups at Beef 2021, AMPC WHS conference 2022 and based on feedback from various plant visits throughout 2022 including:

- Processors: interest in developing a range of modules to train existing and future workforce (Retention, Development, Safety).
- Industry bodies: interest in accessing training modules as part of their skilling up of remote workforce (meat safety)

6.2 Future benefits in contributing to the path to automation

Strategic alliances with other technology and industry providers have been identified to work on the potential integration of different technologies (e.g. robotics with visualisation modules)

7.0 Conclusions / Recommendations

Virtually There is now working with AMPC’s co-innovation managers to demonstrate the technology to members and assess the level of interest in stage II. Initial feedback from members on the use of 3D and immersive technologies to support recruitment and retention objectives, and reduce work health and safety issues has been very positive so far. Eight processors have indicated that they would like to progress with stage 2. In addition, we will be running pilots in three processors between now and 2022 and will share the resulting data with industry. Finally, we are in discussions with TAFE QLD, TAFE NSW and Task Labour to establish a usage model that will benefit industry.

AMPC is now in discussions with leading processors about the potential scope for future works and the funding model moving forward.

8.0 Bibliography

N/A

9.0 Appendices

9.1 Appendix 1: Draft PIP Digital Immersive Training Applications

PLANT INITIATED PROJECT APPLICATION

Project Title	Digital Immersive Training Applications		
Start Date	tbc	Completion Date	tbc

<p>Project Summary / Overview</p> <p>In no more than <u>100 words</u>, provide a brief summary / overview of the project.</p> <p>The Digital Immersive Training Applications Project (The Project) involves the development and deployment of immersive virtual training solutions tailored to an individual processors needs.</p> <p>The objectives of this project are to:</p> <ul style="list-style-type: none"> Facilitate highly realistic training for entry level associates to accelerate onboarding, reduce cost and wastage, minimise potential economic loss and reduce the risk of causing market access issues (labeling, etc). Improve existing employee skill levels and work health and safety (WHS) Drive industry engagement amongst people both within and outside industry, to break down misconceptions around the type of work involved in meat processing and demonstrate potential career opportunities.

- Provide a tool that can be used in recruitment activities by meat processors

In addition to the expected immediate benefits of increased engagement, better capability and better safety outcomes, this program will enable data to be captured around training participation, completion and competency rates to assist with future planning and development of capability building initiatives for the industry.

MEMBER ORGANISATION DETAILS

Member Organisation Name	tbc
Member Organisation ABN	tbc
Member Organisation Street Address	tbc
Member Organisation Mailing Address	tbc

PROCESSING SITE WHERE THE PROJECT WILL BE CONDUCTED

Name of Processing Site	tbc
Processing Site Street Address	tbc
Processing Site Mailing Address	tbc

PROJECT LEADER CONTACT DETAILS

Salutation	tbc	First Name	tbc	Surname	tbc
Phone Number	tbc	Email	tbc	Job Title	tbc

ADMINISTRATION CONTACT DETAILS

Salutation	tbc	First Name	tbc	Surname	tbc
Phone Number	tbc	Email	tbc	Job Title	tbc

RESEARCH ORGANISATION / SUBCONTRACTOR CONTACT DETAILS

Research Organisation Name		Virtually There Training			
Research Organisation ABN		39 647 988 789			
Research Organisation Street Address		71-73 Alexander Street, Crows Nest			
Research Organisation Mailing Address		P.O. Box 154, Lane Cove 1595			
Salutation	Mr	First Name	Sean	Surname	Cunial
Phone Number	0422 459 668	Email	sean@virtuallytherevr.com		

RESEARCH ORGANISATION / SUBCONTRACTOR CONTACT DETAILS

Research Organisation Name		n/a			
Research Organisation ABN		n/a			
Research Organisation Street Address		n/a			
Research Organisation Mailing Address		n/a			
Salutation	n/a	First Name	n/a	Surname	n/a
Phone Number	n/a	Email	n/a		

Project Description

In no more than 250 words, provide a summary of the project and its intent.

The project involves development of the following training modules:

- **TBC**

In addition, the project will include:

- **Deployment of XX headsets (purchase or lease)**
- **Subscription to training management platform for 12 months**
- **Ongoing technical support (hardware and software) for 12 months**

Project Background & Rationale

In no more than 500 words, define the problem or opportunity that this project is aiming to address. For example:

- How has the project 'come about'?
- What currently happens and why does it need changing?
- What alternatives have been investigated or are available?
- What happens in other industries?
- Experimentation/investigation work to date
- Amounts spent on previous projects or research (with or without industry funding)

Meat processing companies are currently facing a number of structural challenges:

- Staff turnover **XX%**
- Position vacancy rates **XX%**
- Annual work, health and safety costs **\$XX (compliance, insurance and compensation payments)**

Industry has formulated the following strategies within its 2020-2025 strategic plan to address these challenges:

- Attraction, via demonstration and development of a wide range of operations (People & Culture),
- Retention, via improving working conditions and making tasks exciting (People & Culture),
- Development, via developing tasks that require higher skills and intellect – operational & technical (People & Culture),
- Safety and Wellbeing, via reducing the high-risk nature of processing operations (People & Culture),
- Develop hands off processing capability to remove staff from dangerous operations (Adv. Mft.),
- Digitisation, via acquiring product information and leveraging data insights (Adv. Mft.),
- are all foci of AMPC, and that this one innovation theme will aim to make a significant impact upon all seven.

One of the key initiatives being undertaken to deliver against these strategies is the development of Digital Immersive Training Applications. Immersive and interactive training programs have been shown to increase the level of engagement, learning and competency amongst participants and led to greater confidence in performing the actual task post training over traditional learning approaches. A paper published by PwC suggests that students who learnt via immersive technology (VR) were:

- 4x faster to train than in the classroom
- 275% more confident to apply skills learned after training
- 3.75x more emotionally connected to content than classroom learners
- 4x more focused than their e-learning peers

AMPC has invested in a set of base training modules as a 'proof of concept' to demonstrate that VR technology is relevant and applicable to training in the meat industry. These modules have been demonstrated to key industry stakeholders, eliciting positive response. This project represents Phase II, where AMPC is seeking processor partners to collaborate on developing a suite of training modules that can be deployed by processors to determine the true effectiveness and capture data for identification of future training needs.

Project Objectives

Outline in dot points the objectives to be achieved.

Structural

- Deploy a range of immersive content that is used to onboard new recruits
- Deploy same / additional content that is used to assess and improve existing staff skills (processing chain, supervisor, Q&A, WHS, Maintenance)
- Use of content at job fairs, recruitment centers, etc to attract people to industry

Financial

- **Higher recruitment rates per method (% recruited, \$ per head to recruit)**
- **Higher retention rates amongst new recruits (% retained vs recruited, \$ per head improvement)**
- **Reduced wastage of meat product used in training (\$ value)**
- **Reduced packing errors (# of issues)**
- **Reduced workplace accidents (# for specific task, \$ cost)**

Project Methodology

Outline in dot points the steps that will be undertaken in the project to address the issue / problem / challenge and deliver the solution. This may include a description of the phases, tasks, methods, techniques and tools included in the project.

The project will include the following steps:

- Mapping: the processor's work force (operators, supervisors, QA WHS, Maintenance) will be mapped against the businesses current workflow to identify the roles and tasks requiring training, those most relevant for VR training and a prioritization of these VR relevant applications.
- Design: Select the key tasks for VR training development and draft a design flow for each incorporating the phases of

- learn, quiz, practice and test using gamification.
- Build: sign off the final designs and then build the application. This task includes the capture of content through photos, videos and interviews, design and construction of 3D digital assets, programming of training integrating learn, quiz, practice and test, programming of data capture
 - Deploy:

Project Outputs /Deliverables
 Using dot points, list the specific outputs that this particular project will deliver.

TBC

Value Proposition to the Red Meat Processing Sector
 Describe the value proposition and benefits to the Australian red meat processing sector relative to the R&D investment.
 We would encourage both qualitative and quantitative assessments of value, for example, return on investment, pay-back period etc.

Immersive and interactive technologies have been shown to increase the level of engagement, learning and competency in performing the actual task over traditional learning approaches. A paper published by PwC suggests that students who learnt via immersive technology (VR) were:

- 4x faster to train than in the classroom
- 275% more confident to apply skills learned after training
- 3.75x more emotionally connected to content than classroom learners
- 4x more focused than their e-learning peers

The value proposition for the meat industry would be:

- Higher recruitment rates per method (% recruited, \$ per head to recruit)
- Higher retention rates amongst new recruits (% retained vs recruited, \$ per head improvement)
- Reduced wastage of meat product used in training (\$ value)
- Reduced packing errors (# of issues)
- Reduced workplace accidents (# for specific task, \$ cost)

Pathway to Adoption
 Describe the activities, if any, that will contribute to the project outputs being integrated or adopted in the wider industry.
 Please specify in dot points any 14ommercialization activities that would be required for adoption.

- Establish a cross functional team within the processor incorporating a senior executive sponsor, head of learning and development, head of work health safety, senior supervisor / training team representative, relevant operations representative
- Where relevant, include the processors contracted RTO to be part of the team to ensure the system can be integrated into their program delivery
- Execute a launch / familiarization program with staff on deployment of the program
- Quarterly routine to review uptake and make adjustments
- Regular communication / promotion by AMPC through field team and communications department

Outcome Assessment
 How and when will the outcomes be measured so as to evaluate the success of the project? For example, ex-post or ex-ante CBA.

Tbc but some thought starters:

- XX users (weekly, monthly, annually)
- XX% completion rate (individual programs through to gaming module (assessment)
- XX% repeat use rate

- Avg XX improvement in specific task based on completing gaming module (assessment)

Capital Assets

- Enter details of all Capital Assets to be purchased for the project. The total value in this section must match the total budget requested for Capital Assets in the Milestone section.
- All values are exclusive of GST.

Milestone	Asset Item Name	Asset Description	Initial Value
4	HTC Vive Focus 3 VR Headsets	VR headsets for running the training programs	tbc

Milestones & Budget

- All budget amounts are \$AUD and exclusive of GST
- Professional Fees includes agent/subcontractor fees.
- Operating Expenses includes all reasonable travel, accommodation, venue and other project related incidental costs, such as materials and component parts.

MS	Due Date	Activity Description	Professional Fees	Operating Expenses	Capital Assets	Total Budget
1	tbc	tbc	tbc	tbc	tbc	tbc
2	tbc	tbc	tbc	tbc	tbc	tbc
3						
4						
5						
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Total Budget requested from AMPC:			\$	\$	\$	\$

Funding Contributions

Eligible R&D projects will attract government matched funding for up to 50% of the total project cost.

AMPC Members are entitled to access a percentage of their levy contributions to cover up to 25% of the project cost. The Member company must agree to at least match this figure dollar for dollar, however this does not limit the amount that the company can contribute to the project.

Please contact AMPC for confirmation of the level of levy funds available for your company.

Please note, the project budget does not include in-kind contributions.

Organisation Name	Funding Type	Funding Percentage	Contribution (AUD)
Member	Cash Contribution	25%	tbc
Australian Meat Processor Corporation	PIP Funds	25%	tbc
Government Matching	Commonwealth Funds	50%	tbc
Total		100%	\$

Additional Comments

Please note any alternative funding arrangements for consideration.