final report

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Mobile Research and Training Robotic Cell

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1 Background

The purpose of this project is to support and assist adoption and commercialisation of MAR developed automation for red meat processing.

One of MAR's identified strategic imperatives to underpin our innovation strategy is adoption within the industry of developed robot systems either commercially available or new systems under development.

Successful adoption of new automation technology in the industry relies highly upon the confidence and ability of engineering and maintenance staff to accept adoption at their processing facility.

Although site dependent, more often than not engineering/maintenance staff generally hold back from taking responsibility for new technology until they are forced to do so through necessity. Automation, such as robotics, is seen as being foreign and processing staff often do not have the familiarity, training, experience or confidence to be assured that robots can operate in a continuous production environment without concern - provided they are maintained correctly. This project aims to address this gap in familiarity, training, experience, and confidence.

2 Project Objectives

In this project MAR will build a mobile robotic training cell tailored for the red meat industry. The training cell will incorporate functions used in standard MAR red meat technologies including controls, sensing and MAR remote functions. It will offer the opportunity for one-on-one training and/or training workshops at one of MAR's facilities or on-site at a processing facility. This training cell will provide engineering and maintenance staff of new and prospective processing plants the opportunity to train and learn about robot technology or for plants with existing robots to maintain or upgrade their robotic knowledge.

The aim of the workshop project is to:

☐ Inspire and create a level of confidence for using robotic technology in red meat processing.

☐ Break communication barriers by creating a forum to discuss concerns and learn from others.

☐ Create ownership and change management when adopting new technologies

☐ Provide operational understanding of robot systems, tooling and sensing systems used.

☐ Provide service and maintenance training for robot systems, tooling and sensing systems used.

☐ Conduct a hands on demonstration of MAR Remote-RM to provide an understanding of operations and benefits.

☐ Conduct a hands on demonstration of MAR iPad Service tools, demonstrating uses.

3 Methodology

Milestone 1 – Design & Functional Specification of Mobile Training Cell

Milestone 2 – Manufacture & Assembly

Milestone 3 – Setup & Test at MAR

Milestone 4 – Prepare Training and Workshop Documentation

Milestone 5 – Demonstration of Prepared Cell & Documentation

Milestone 6 – Final Report

4 Results and Discussion

Attached to this report are the following supporting documents that have been produced as part of the Milestones for this project:

- Project Risk Assessment
- Functional Specification
- Electrical Schematics
- Mechanical Design documentation
- Cell handout /operation manual and training guide
- Brochure for use of training cell

4.1 Cell Functions and Uses

An image of the completed cell is shown below and operation of the cell was demonstrated to Darryl Heidke from MLA on 9/5/13.

Fig.1 Training Cell Setup at MAR

The intention now is that the cell be promoted to Processors as being available either for training courses at MAR workshops or on their site. It can be seen from the images below that the cell can be ‘compressed’ for transport by drawing in the base supports for the conveyor and lowering the upright supports.

Fig.1 Retractable conveyor base supports

Fig.2 Conveyor posts that can be lowered for transport

The cell is seen as being suitable for training Operator and Maintenance staff likely to use or maintain MAR Robotic Cells in particular Brisket Cutters, Sani Vac's and Kidney Fat Removal Systems, the cell will be used to provide the following:

- Basic robot training including:
    - Use of the teach pendant and using it to manipulate the robot
    - Fault diagnostics

- Cell operation including:
    - Starting
    - Stopping
    - Functionality of Estops and Safety mats
    - Recovering from Estops and safety mat stops
    - Recovering from Robot Faults
    - Training on the sensors used to detect carcass presence and height
    - Training on the encoder system used to keep track of the carcass as it travels down the line
    - Operator panel interface and indicators
-
- Setup and use of MAR Remote

5 Conclusions and Recommendations

The attached brochure will now be used to promote the use of this cell for training purposes.