# final report

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# Smallstock automation program (Phase 1)

# Abstract

JBS Australia has requested that MLA assist in reviewing current technologies and capability (specifically in Australasian where international leadership is being demonstrated) to identify compatible automated technologies for JBS's operations across all ten plants.   One of the early initiatives proposed is for a focused investigation of a number of technologies commissioned in New Zealand.

This work involved five (5) key operational JBS personnel be involved, with facilitated discussions with key technology leaders (specifically Scotts RTL & Argus Realcold)  on various targeted automated and semi-automated technologies by 2 MLA managers.  Ultimately, this project is the first step in JBS developing their automated program strategy, which assist MLA is planning industry delivery of the various technologies.  This project was proposed to determine technologies compatible with JBS Australia's sheep and / or beef processing operations and identify areas that MLA & JBS may work collaboratively on.

A final report has been prepared in co-operation with MLA outlining common areas in automated and semi-automated technologies for MLA & JBS Australia to collaborate on in future.  The report includes recommendations for the next phase of developing JBS's Automated and Semi-Automated Program Strategy.

The NZ study tour of automated and semi-automated technologies has identified areas of technological advancement for any further development.  Specifically, the project has enabled key JBS operational personnel to inspect targeted automated technologies and determine their compatibility with JBS Australia's sheep and / or beef processing operations and identify areas that MLA & JBS may work collaboratively on.

The areas showing most promise to JBS in optimal beef and/or lamb processing were:
- Loin boning & chine removal
- BLM loin boning
- Automated 3-way lamb cutting
- Chine boning
- X-ray sensing

Specifically, the project has focused on :
i)   Proposed joint JBS & MLA activities related to JBS Automation Strategy &
ii)  Recommendations for the next phase of developing JBS's Automated and Semi-Automated Program Strategy.

The anticipated benefits of the technologies that are being inspected and considered in JBS's Automation and Semi-automation Program Strategy are:
- improved consistency of cut quality;
- reduced physical stress on the Boner (hence less reliance on "muscular" Boners);
- yield improvement/reduced trimming;
- easier and less expensive incorporation into existing Boning Rooms than existing boning aids; the first step towards full automation of the task.

# Contents

# 1 Background

MLA and JBS Australia are commencing the process of entering into a Collaborative Innovation Strategy program. An apparent JBS Australian strategy that has emerged from early discussions on consistency of manufacturing and operations for JBS Australia across all of its processing plants.

Automation has been identified as key initiative within this area aimed at improving efficiency and productivity. JBS Australia has requested that MLA assist in reviewing current technologies and capability (specifically in Australasian where international leadership is being demonstrated) to identify compatible automated technologies for JBS's operations across all ten plants.

JBS's automated program strategy will be developed with inputs from a number of areas, including from MLA & technology partners. One of the early initiatives proposed is for a focused investigation of a number of technologies commissioned in New Zealand.

This proposed initial scoping study is required to enable key JBS operations personnel to inspect key technologies under development in Australasia by Scotts RTL & Argus Realcold, specifically for Smallstock. Ultimately, this project is the first step in JBS developing their Automated Program strategy, which assist MLA is planning industry delivery of the various technologies.

The outcome will be a report on proposed joint JBS & MLA activities related to JBS Automation Strategy & recommendations for the next phase of developing JBS's Automated and Semi-Automated Program Strategy.

# 2 Project Objectives

At the completion of the Project, JBS Australia will have completed the following to MLA's satisfaction:

- To inspect key automated technologies and determine their compatibility with JBS Australia's sheep and / or beef processing operations and identify areas that MLA & JBS may work collaboratively on

- To enable key JBS operational personnel who are also involved in planning priority capital expenditure across the 10 plants (due to be finalised in June 2009 for next calendar year) to see how the system integrates into a processing plant.

- To review and develop new Automated Program Strategy through facilitated discussions with key technology companies including RTL Scotts and Argus Realcold.

- To investigate automation and semi-automation options & technologies for smallstock and beef.

- To identify common areas in Automated and Semi-automated technologies for MLA & JBS Australia to collaborate on in future.

# 3 Methodology

Evolution of JBS Australia's manufacturing and operations is a key strategic company theme. Consistent with this theme, the two smallstock processing plants that JBS has recently acquired via the acquisition of Tasman Group Services have been earmarked for considerable redevelopment and investment commencing in 2010.

A recent presentation by Robotic Technologies (RTL) /Scott Automation in Melbourne to the industry, at which JBS attended, has reaffirmed an opportunity for JBS Australia and their position to consider engaging in RTL's and MLA's vision for a substantially fully automated lamb boning room.

The first significant stage of this process will be the installation of a complete X-ray, Leap III (Primal cutting) and Leap II (automated hind quartering) process that is fully process integrated. To date, MLA has not successfully been able to attract suitable processing company investment to commission this complete system within Australia.

MLA and JBS Australia would like to commence a process with RTL, Realcold and other technology leaders to determine;

i) how a system might fit into the existing confines of one of the two JBS Australian smallstock processing plants;

ii) identity a budget and resourcing, and

iii) determine any R&D components that MLA might be willing to co-invest in with JBS. It should be noted, for example, that Leap II systems have still not been developed for Australian conditions and neither has an x-ray system.

Any planning and discussions in Small Stock technologies is proposed to be expanded and considered for beef applications as well.

# 4 Observations

Trip Notes provided from NZ study tour (14th Oct 2011)

As part of the collaboration between Australia & NZ, MLA invited JBS representatives Graham Treffone, Dennis McClenaghan & Neil Brereton to again visit New Zealand in early June, 2011 to review the progress make with the Scott RTL lamb cutting system (Leap III) which is being trialled and developed at the Silver Fern Farms plant at Finnegan, along with the forequarter robots, the middle machine & the hindquarter boning system.

The team left Brisbane or Melbourne on Wednesday 1/6/2011 for Dunedin. On Thursday 2/6/2011, after meeting at Scott RTL office Dunedin, the entire tour party visited the Finnegan plant to see what progress had been made since the initial visit in June, 2010.

After 12 months considerable progress had been made in the development of some of the modules.

The X-ray and primal cutting system continued to work reliably and accurately. The forequarter robots were "handshaking" with the cutting system.

The middle machine which was only under development in Scott's workshop in 2010 was in position and working extremely well.

The hindquarter boning system was still working but not very well. Scott's and Silver Fern both admitted that they had done little or no further development on that system in the past 12 months.

Although the cutting system and the middle machine were producing extremely well, it was disappointing that the forequarter robots and bandsaw process appeared to have lost it's way.

This was disappointing at the time, but I'm sure that Scott RTL will resolve the issues.

The tour concluded with a meeting at the Scott office to discuss the review and the future developments associated with chime and feather bone removal.

The tour party departed Dunedin on Friday morning 3/6/2011 for Australia.

We look forward to the next visit where we could expect the total system to be running at 10 per minute.

# 5  Opportunities arising

The following automated and semi-automated technologies were of primary interest to JBS :

5.1 Loin boning & chine removal
- MLA advised Colin Roberts (Macpro) now aware of TEC, PSH, and PIP funding options.  Collaborative project opportunity identified in a revised format for lamb loin deboning proposal with JBS.
- MACPRO is a small operation in Hamilton and did not seem to have a big capability staff base.  Noted that Colin Roberts has been involved in the industry for a considerable period of time and has good knowledge in the processing area and engineering solutions specifically in smallstock processing.

5.2 BLM loin boning
- Matt Coombes has setup a new factory and business to maintain & provide consumerables for the current 85 installed chining and loin deboning machines.

5.3 Automated 3-way lamb cutting
- Scott Technology LEAP IV machines demonstrated to be working well
- LEAP V needs further work, chining module working well;
- Leap III incorporates the original system design with recent upgrades and seemed to work efficiently.
- The X-Ray images were viewed by JBS & MLA staff after being processed and they appeared sound with the system locating the cut point between ribs 4 and 5 effectively.
- The middle processing system Leap IV with recent modifications to the flap cutting module, noted that it now provides a superior product by cutting the flap straight relative to the

vertebrae.  The transfer system from the primal cutting machine to the middle machine via robot and the stability of the product is under development.

- The Leap V forequarter system with the transfer to the robot grippers is under development with facilitated adoption options available in the future.
- The Leap V system does require development to be viable and to meet cycle time. The Leap II system was not functioning with scaleable and yield efficient cutting lines still need to be developed.

5.4 Chine boning

- The Chine boning system was demonstrated on site (SFF Silverstream) and appeared to produce a product with far greater yield than the BLM Chine Boning machine.  Noted generally producers improved yields between 3% to 5% greater yield over manual methods.
- Bone fragments resulting from the transverse process being cut by the lower blades – the cut is placed close to the bone to maximise yield performance.  Scott Laubsche (JBS) noted that this would not be a problem in the final product however MLA needs to further evaluate this product for market acceptance. Graham Traffone has also confirmed to us that these fragments will not be an issue (however, this point will need ongoing confirmation).

5.5 X-ray sensing

- NZ processors using x-ray module for producer feedback on carcase suitability
- Additional components may make the Australian projects non-viable so excluded from JBS proposed installation(s) during the piloting phases.
- Options considered y Scotts for x-ray dual & quad energy may be a lower cost alternative to OCM by CT scanning
- There may be some potential for low cost OCM utilising Scott's patented stereo x-ray concept but this needs some further evaluation.

# 6  Outcomes

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