

Key findings- Phase Two National Applied Research Project

This multi-phase research project took place in ten auction markets and three buying stations, located in four Canadian provinces. Systems from three manufacturers were installed in auction markets both before and after the sale ring and at receiving. At buying stations all systems were installed at receiving. One auction market and all three buying stations were equipped with multiple systems to service their multiple receiving areas. Phase One and Phase Two testing took place over 41 weeks, scanning a combined total of 537,000 head of cattle in over 138,000 groups.

Phase One was a proof of concept on the RFID hardware, results were documented in report in June of 2010. Phase Two advanced the evaluation of RFID systems by integrating the tag collection and reporting software with the enterprise software. This integration enabled the tag numbers to be recorded on the consigner and buyer invoices as well as settlement documentation. The integrated systems were evaluated on three metrics:

1. Impact on speed of commerce
2. Software efficiency and effectiveness of capturing and reporting tag numbers
3. Weekly and global read accuracy

Further evaluation determined:

1. If there was any business value created at the operational level
2. If the RFID systems had the potential to cause employee or animal injury or illness
3. Documented the capital, operating and ongoing costs of administration and maintenance.

Evaluation of software options

The variable in the RFID system is the type of software used to record and report the tag numbers. If the software does not align with business process and operating objectives, it will not be efficient or effective. Three options were evaluated:

Option One Stand alone software with third party entering information by group	Option Two Integrated software with site personnel entering information by group	Option Three Stand alone software with once daily input of total head handled by site personnel
RFID hardware located either at receiving or sale ring: single, wide or dual lane scanning alley		
<ul style="list-style-type: none"> • Software to record and report tag numbers stands outside of business process • Information entry by a third party at the location of the system • No integration with enterprise software or operations processes 	<ul style="list-style-type: none"> • Software that links with enterprise software to record and report tag numbers • Information entry by site personnel at the location of the system • Integration with enterprise servers, software and operation processes 	<ul style="list-style-type: none"> • Software to record and report tag numbers stands outside of business process • Daily total entered by site staff • Software resides on administrative computers • No integration with enterprise software and operation processes

- Option Two was the least efficient as it had the greatest impact on speed of commerce, especially at receiving where the impact was up to 30 seconds to 5 minutes per group. Further, it generated numerous tag recording errors such as recording duplicate or invalid tag numbers. This affected the read accuracy and data accuracy in reporting to the CLTS.
- Some of the complaints from auction market operators regarding integrated software (Option Two) included: software crashing and stalling or interrupting the sale, technical functionality issues requiring many hours on technical support, difficulties with communication between the hardware and software.
- A number of test sites noted concerns over difficulties associated with being able to recruit and retain trained staff to use the software and the effect it would have on operations if these persons were unavailable on scanning days. As noted by the Ottawa market, “the important aspect of the system is a competent software operator who pays attention and doesn’t make mistakes.”
- A few sites perceived potential benefits from being able to identify cattle that have moved out of the selling group or in situations where a back tag had fallen off. However, a common issue that detracted from value creation was that the data accuracy was not high enough to depend on. Further, a potential benefit was not met because the age verification numbers were low; between 7.8% and 31.3% of all head scanned. Most sites reported not seeing any value for operations in terms of the buyer or consigner now having the tag numbers available on all invoicing and settlement sheets.

Read accuracy

- In Phase One, the global read accuracy was 93%, in Phase Two it dropped to an average of 89%.
- Six of the 13 sites were above 90%, three were at 89%, four were between 85% and 89% and two sites had low reads under 85%. Three sites, Gladstone, Ste Rose and McCall brought the global average down with read rates of 85.7%, 83.7% and 76.6%, respectively.
- The lower read accuracy rates are the result of numerous factors including: human error capturing tag numbers with software that was linked to enterprise systems, multiple systems in one facility that made it difficult to locate the source of error, panels on chutes with a width of 40 inches (therefore creating data collision), tag recording errors that may have affected the read accuracy calculation, and the difficulty in determining the weak link between the hardware, data connections, data entry device and the software.

Animal and Employee Health and Safety

- The systems had minimal effect on the overall health and safety of employees or animals.
- No employees were injured as a result of operating the systems in Phase One or Phase Two.
- Animal health can be affected if large animals are moved through the narrow (single) alleys and become wedged. The narrow alleys can also cause bruising on the animal's shoulders, ribs or hips.

Capital and Operating Costs

- The costs documented in this study are **based on one RFID system per facility** and **assume one movement report per site**. However, it must be noted that many facilities will require multiple scanning alleys to support traceability.
- It is important to note that an industry capital cost per head cannot be calculated because the volume of cattle handled at a facility does not equate to cost. Smaller volume sites require the same software and hardware as high volume sites. As such, the capital costs are not volume dependant.
- Capital costs can range from a low of \$23,794 to a high of \$131,338. Option two has the highest capital costs.
- Annual maintenance costs are relatively consistent across all options with a high being Option Two at \$27,544 and a low with Option Three at \$26,944.
- Internal labor is the largest cost factor in the operating costs.
 - Systems at the sale ring have the lowest operating costs ranging from a high of \$47,700 using integrated software (Option Two) at large volume facilities to \$27,934 using Option Three at small volume facilities.
 - Systems at receiving have dramatically higher operating costs as one part time person is required to facilitate cattle movement and additional time is required throughout the scanning day for a trained person to enter software with Option Two. Costs range from a high of \$89,944 at large volume markets using integrated software (Option Two) to a low of \$35,854 for Option Three at small volume markets.
- Option Three was consistently the least expensive operating cost.

Conclusions

Hardware and software is not to the level that will enable 100% read accuracy. Option Three is clearly the most efficient and effective software choice:

- Provides a movement report without definition by consigner or group number but does support traceability.
- Has the lowest capital and operating costs.
- Provides further benefits through a decreased reliance on labour, and in turn, lower stress on personnel, reduced recruiting and retention issues and fewer hours in the work day.
- Minimal training and labor commitments.

Further study on Option Three will take place during the fall run in six test sites with results being determined in December of 2011.