Phase Two-B: National Applied Research Project

Study of by-pass software for use with RFID systems at auction markets and buying stations in Canada

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Canadian Cattle Identification Agency

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EXECUTIVE SUMMARY

The Canadian Cattle Identification Agency sponsored a multi-phase research project to evaluate the impact of RFID systems at auction markets and buying stations. The first two phases of the research evaluated the efficiency and effectiveness of the hardware, and then evaluated the different options for recording and reporting software. This report details the final phase of the research, studying by-pass software for tag recording and reporting.

Phase One was a proof of concept that showed the hardware was efficient and effective for the collection of tag numbers. The speed of commerce was affected by the location when the system was not placed within the normal process flow. Global read accuracy in Phase One was 93% based on a total of 144,197 head of cattle scanned in 31,736 groups through nine systems. The software was custom designed and installed on a laptop operated by project personnel.

Phase Two evaluated software that was integrated with enterprise systems. It was found that integrated systems, with software that linked to enterprise systems, was complicated, costly and test site operators did not perceive any benefits to the buyer, the consigner or the business operation. Read accuracy dropped to a global average of 89% as a result of software errors and one site that had extensive problems with the system. In total, 393,474 head of cattle were scanned in over 107,423 groups.

The variable in the RFID system is the type of software used to record and report the tag numbers. Each facility is unique in its business process and flow of cattle. As such, there is no one standard software or hardware solution. Three variations of tag recording software were evaluated in Phase Two. Option One reflects the processes used in Phase One, Option Two reflects the process from Phase Two and Option Three reflects of hybrid of both phases that was further tested in Phase Two-B. The Phase Two report details that Option Two software (integrated with management systems) has the highest impact on speed of commerce, costs and labor requirements. It also concluded that when evaluating a single movement report without consigner or group information, it is evident that Option Three (stand alone or by-pass software) has the least impact and least cost to industry. The only data recorded under an Option Three scenario is the total number of tag numbers scanned in one day; there is no listing of consigner or group number.

As a result of promising results using Option Three in Phase Two, further testing of the by-pass system was recommended. Six of the original test sites volunteered to continue testing basic functionality software that by-passed the enterprise systems, to record animal movement over a 24-hour period rather than in individual groups/lots. The test sites used the hardware from Phase Two, but changed all software to a by-pass system, loaded on a laptop or an office computer. One report was generated with the total number of head through the system in one day, without detailing the consigner or number in the group. The test took place at six auction markets for a 15-week period from the first of September to the end of November 2011. A total of 118,200 head of cattle were scanned over 15 weeks.

Two software vendors were used, Viewtrak Technologies - Manifest Manager, and Integrated Traceability Solutions (ITS) - Stockman Software. The key factors in choosing this software for a test of the by-pass or stand alone software systems were:

- Affordability
- Training
- Ease of use

The retail cost of both software packages was under $2,000, but Manifest Manager has an annual license and maintenance fee of $1,800 versus $300 for Stockman. Viewtrak software is deployed electronically and training is provided by telephone. In contrast, ITS did onsite installations of the software and provide onsite training.

Both software packages had high ease of use and functionality.

The software was loaded on office computers and laptops. If the data entry device is linked to the RFID hardware at the time of installation, linking these two devices is not complicated. However, linking data devices to hardware after the hardware has been installed is a more complicated and costly process.

Table One:

Auction Market	Software	RFID Hardware Location	Data Entry Device
Gladstone Auction Mart	Stockman Software	Receiving	Office computer
Ontario Stockyards	Manifest Manager	Sale ring entrance	Panasonic Tough Notebook at sale ring
Saskatoon Livestock	Stockman Software	Sale ring exit	Laptop in auction booth
Spiritwood Stockyards	Stockman Software	Sale ring exit	Office computer
Ste Rose Auction Mart	Stockman Software	Receiving	Laptop at receiving
Winnipeg Auction Mart	Stockman Software	Receiving	Laptop in office

The installation on office computers was the most effective:

1. The office staff always remembered to open and engage the software. When located at other areas, the staff sometimes forgot to turn on the software.
2. Reporting was easier as the computer was linked to the internet and did not have to be moved to transfer the reports and data to CLTS.
3. The computer was protected from the elements.

When the data entry device was placed in locations other than the office, there were a greater number of issues:

1. There were days that the yard staff forgot to turn on the computer and therefore did not collect and record tag numbers from scanning.
2. Often the reports were delayed as the yard staff had to move the laptop from the receiving area into the office to use the internet to send the files.
3. When there were software errors, this was not discovered until after the scanning day, resulting in inaccurate reads.
4. Dust and cold affect laptops at receiving, even when placed in a receiving booth.

Table Two:

Auction Market	Phase Two-B		Phase One	Change Phase One-Two B		Phase Two	Change Phase Two-2B
Gladstone Auction Mart	93%		93%	0%		86%	7%
Ontario Stockyards	91%		94%	-3%		89%	2%
Saskatoon Livestock	58%		93%	-35%		96%	-38%
Spiritwood Stockyards	96%		91%	5%		89%	7%
Ste Rose Auction Mart	83%		97%	-14%		84%	-1%
Winnipeg Auction Mart	92%		90%	2%		88%	4%

The variance in read accuracy from Phase One to Two-B indicates a decrease in half the sites and remained the same or increased in three sites. The software used in Phase One was operated by a project person, entering each group individually.

1. **Gladstone-no change**: Notable even though there was a change from dual alley to wide alley system.
2. **Ontario Stockyards-decrease**: On one scanning day the system was not turned on until half way through the sale day causing a read accuracy of 66%. If this day was eliminated from the data set, the read accuracy would have equaled Phase One.
3. **Saskatoon- decrease**: An electrical power failure caused the system (hardware, software or data entry device) failure that was never resolved throughout the test period.
4. **Spiritwood-increase**: As a result of an ambient interference test done between Phase One and Two-B, the electrical interference was decreased, therefore increasing read accuracy.
5. Ste Rose- decrease: A change from a single alley system to multiple systems with a combination of single and dual alleys.
6. **Winnipeg- increase**: No apparent reason for the increase.

The variation is most significant from Phase Two to Two-B, with only one facility having a dramatically lower rate (Saskatoon Livestock Sales) and one other not having a material difference (Ste Rose). The increase in read accuracy is coupled with the benefit of not having extensive labor involvement in the data entry by consigner or buyer. The by-pass software had very low labor requirement.

The assumption stated in the Phase Two report was that the by-pass software would collect and record tag numbers with a higher rate of accuracy than what was achieved with integrated software where data entry was done by market personnel. Eliminating the data set from the system failure at Saskatoon Livestock, the by-pass system generally out-performed the integrated systems from Phase Two with regards to read accuracy. Benefits are: low labor requirement, efficient reporting and low cost.

The factor that was substantiated once again was that having a dedicated project person, such as in Phase One, will show more favorable results than either integrated or by-pass software where the data is entered by market personnel. Market personnel have busy positions and adding the responsibility for managing the RFID system adds work load and stress. A dedicated resource, trained in the operation of the hardware and software, is accountable for ensuring that both are operating at the highest levels of performance, that errors are corrected in a timely fashion, and that all cattle are moved through an operating system on scanning day is critical to success.

There is no one solution that will work in every facility, but this test indicates that by-pass software will work efficiently, cost effectively and have a low labor requirement as the software component for an RFID system. Even with cost effective software, the cost of hardware and installation must be considered when evaluating the investment of RFID systems for traceability. The impact on business process, cost and speed of commerce will be directly proportional to the level of detail required in reporting and the level of integration of the systems.

Agriculture and Agri-Food Canada, through the Growing Forward Program, funded this multi-phase study in support of animal movement reporting for traceability. There were a total of 13 test sites: 10 auction market and three buying stations. Systems from three manufacturers were installed in auction markets at receiving and both before and after the sale ring. A total of 655,871 cattle were scanned through the three phases of the project.

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