



Adopting Animal Identification Systems and Services in Kansas Auction Markets

Costs, Opportunities, and Recommendations

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Cover photo courtesy of USDA Natural Resources Conservation Service

There is growing interest in adopting electronic animal identification services at livestock markets. The National Animal Identification System (NAIS) has provided broad recognition of the need for, and supplied momentum for development of, premises registration and associated animal identification systems. Furthermore, specialized marketing programs that target beef products to particular customer markets, especially export trade, are increasingly requiring individual animal identification. Livestock markets are a major center for cattle trade as 80 percent of feeder cattle sales occur through local auction markets or video auctions.¹ For disease tracing and control reasons, animal identification systems become especially important at the time cattle are marketed. When an animal leaves its farm or ranch of origin is when recording individual animal identification and movement information begins. Thus, it is likely that livestock auctions will be a primary industry segment where animal identification and movement information is electronically recorded. Because of the high percentage of cattle marketed through livestock markets, electronic individual animal identification scanning may be an important addition at auction facilities.

Some livestock auction markets have already adopted premises identification, tag reading and recording, and animal-tracking information systems. Others are considering adoption and investigating potential costs and benefits of such a system and related services. Auction markets have substantial economic incentive to provide a package of marketing services to attract a large, loyal customer base of both buyers and sellers. All livestock auctions provide the primary service of bringing sellers and buyers together in a central location to discover prices for individual transactions in a public auction. One way auction markets might differentiate themselves is by offering additional services, such as a package of animal identification and tracking services.

The general purpose of this publication is to provide guidance to livestock auction markets considering adoption of animal identification systems that expand beyond the traditional record keeping of animals in auction markets. In particular, the specific objectives pursued in this report are to:

1. provide a summary of the status of the National Animal Identification System,

2. describe major components of the NAIS,
3. review a process livestock auction markets considering recording animal ID to support the NAIS and/or added value marketing opportunities could follow,
4. provide a summary of costs of facility modifications and equipment needs experienced by some auction markets that have adopted animal identification recording systems,
5. present an overview of some of the concerns and opportunities associated with a livestock auction market investing in animal identification systems, and
6. develop recommendations for auction markets considering the integration of radio frequency identification technology and related services.

The National Animal identification System

The NAIS is a voluntary (at the Federal level) animal tracing system composed of three components: 1) premises registration, 2) animal identification, and 3) animal tracing. To facilitate the ultimate goal of establishing a system that can provide complete traceback information within 48 hours of detecting a disease, commercial livestock owners need to participate in all three levels of the program. Currently, USDA's primary efforts with regard to the NAIS program are being focused on premises registration.

Premises Registration

Premises registration (where the location of livestock operations are assigned a nationally unique Premises Identification Number [PIN]) is the primary building block of the NAIS program. Without knowing the premises where animals have been, efficacy of conducting a disease trace back process is limited, at best. Premises registration has been an ongoing activity for the past couple of years. As of May 1, 2007, 388,269 premises (approximately 27 percent) of the 1.4 million livestock operations in the United States were registered with NAIS.² Currently, premises registration is being used to inform premises owners/caretakers of animal disease outbreaks that may present a risk to them. In the future, premises registration information, in conjunction with individual animal identification numbers,

¹ Schmitz, et al.

² "Premises Registration Update." NAIS Home Page. <http://animalid.aphis.usda.gov/nais/index.shtml>.

will be used to record animal movements in private/state administered animal tracking databases.

Animal Identification

Animal identification options exist through existing disease programs and in interstate commerce for many species including: cattle, bison, poultry, swine, sheep, goats, cervids (deer and elk), equine (horses, mules, donkeys, burros), and camelids (llamas and alpacas). The NAIS provides the opportunity to officially identify animals for various disease programs and to utilize the same number and identification method for other purposes. Animal identification is especially important for disease control programs when animals from multiple premises/locations come into contact or are commingled. These locations could include ranches or concentration points such as livestock markets. In these situations the risk of disease transfer is an important concern. There are two broad options of livestock identification, either individual animal or group/lot identification. Group/lot identification is designed for animals typically raised as one group that travel through the production chain as a single group. An example would be a group of hogs that move from farrowing, to growing, to finishing, and to harvest as a unit going through each phase without commingling with other animals.

When commingling with other animals during the production or marketing processes is common, as it is with cattle, individual animal identification is necessary for successful animal tracking. The NAIS, when individual identification is warranted, identifies animals with a unique 15-digit number that remains with the animal throughout its lifetime. An analogy often used is that this animal ID number is comparable to a person's social security number (i.e., it is unique and stays with the animal throughout its life). Other official numbering systems may also be used in the NAIS.

The NAIS Draft User Guide indicates that "USDA has not designated any specific identification technologies..."³ Meaning the USDA is taking a "technology neutral" stance, with regard to what technology will best work for the producers while meeting the needs to successfully trace animal movements to support responses to a potential disease outbreak. Regulations currently exist in the Code of Federal Regulations (CFR) for certain diseases and

some interstate commerce; all NAIS devices meet the requirements of the CFR.

When the USDA began its initial work on establishing the NAIS program, individual species working groups were created in order to generate feedback from producers of each livestock species covered under the proposed NAIS program.

The Cattle Industry Working Group Report recommends that cattle be identified using low frequency radio frequency identification (RFID) ear tags. A list of acceptable tags (official NAIS devices) can be found on the NAIS Web site: (http://animalid.aphis.usda.gov/nais/animal_id/index.shtml). The industry's recommendation is to have only the receiving premises report animal movement.

The Sheep Working Group has stated that radio frequency identification could be an option for individual sheep identification if the technology is further developed. The group requested that the current National Scrapie Eradication Program (NSEP) forms of identification be compliant with NAIS and USDA has acknowledged that these forms of identification meet the needs of NAIS. These forms of identification now include visual and electronic methods. Again, this working group recommends the receiving premises be asked to report movement of sheep.

The Equine Working Group is striving to have all forms of current equine identification incorporated into NAIS, however, they have recommended ISO-compliant RFID injectable transponders as the method of identification for official use in the NAIS. This group would also like biometrics and DNA testing to be researched more to see if these methods would work well for equine identification. This group would like the buyer and seller to be responsible for reporting change of ownership; however, they do not feel it is necessary to record any other forms of movement.

The Goat Working Group would like the basic identification methods used for the NSEP to be compliant with NAIS. They believe the following forms of identification should be acceptable: metal ear tag, RFID tag, electronic implants, tattoos, and freeze brands. The group is also interested in rumen boluses, where research is currently being conducted. Until NAIS is further developed, this group believes that producers should be allowed to use existing methods of collecting and reporting animal movement like the certificate of veterinary inspection

³ *User Guide, p. 34.*

and other regulatory programs. However, when the animal tracing segment of NAIS is completed, they believe the receiving premises should report movement. The group would like the owner of the animal to also be able to voluntarily report animal movements.

Animal Tracing

The animal tracing segment of NAIS is currently under development with the participation of state and industry partners. In 2006, USDA entered into interim cooperative agreements with 14 private industry and state organizations with animal tracking databases (ATDs) that met certain technical requirements. Working with states and industry, USDA developed the technical requirements necessary for full integration of private/state ATDs with USDA's Animal Trace Processing System (ATPS) – a Web-based portal that will allow authorized animal health officials to request information from ATDs in certain disease situations. USDA published a guidance document with these requirements on February 1, 2007, which is available on the NAIS Web site. USDA is now progressing with the implementation (production) phase and will establish formal cooperative agreements with interested organizations and states whose systems meet the technical specifications. In May 2007, state/private ATDs began the process of coming online for integration with the ATPS.

Owners of livestock will choose the animal tracking database they want to be affiliated with and report all movements deemed as a significant risk in disease transmission. Species working groups are recommending which movements should be reported for the individual species. The databases will record reported individual animal movements and be able to identify other animals the individual livestock have come into contact with. If a disease outbreak occurs, these records would be helpful in discovering potentially infected livestock and the scope of the disease. The NAIS Web site lists participating animal tracking databases (http://animalid.aphis.usda.gov/nais/animal_track/index.shtml). NAIS requires only the premises identification number, animal identification number, date of event, and the event type (move-in or move-out) to be recorded for animal tracing. Many of the animal tracking databases may also offer additional “production management” services for livestock producers at a

cost. The livestock owner will decide what tracking database and level of service they want to use.

Opportunities for Livestock Markets with Electronic Animal Identification

Livestock markets can participate in the NAIS by tracking animal movements that occur through their facility. To do this livestock markets need to be able to read individual animal identification numbers so animal movement can be reported to a NAIS-compliant animal-tracking database. However, because identification methods can vary by species, livestock markets may need multiple systems. For example, with cattle, the livestock market would need to be able to read ISO-compliant RFID tags by using an RFID reading system.

The systems put in place to record individual animal identification and movement records will need to be electronically based, so as not to interfere with the speed at which livestock market sales are conducted. Traditional paper-based means of recording animal movements through livestock markets offer two drawbacks with respect to conducting a fully functioning animal identification program. First, there are tremendous opportunities for data entry errors in a paper-based system. Secondly, a paper-based system does not support capturing individual animal identification information at the “speed of commerce” and would potentially slow the livestock market selling process.

Other opportunities that exist for livestock markets to offer their customers are tagging services, data management, and program verification (age/source verification) among many other options. Because livestock identification and tracing systems are relatively new in the United States, market segmentation and service differentiation opportunities exist for auction markets. These opportunities enable a livestock market to vertically align with industry partners to capture value from animal tagging and tracing services. Some auction markets that have discovered benefits associated with these services have aligned with process certification or related programs (e.g., source- and age-verification sales) to offer customer services and animal information exchange that are not available at more traditional auction markets. Added services can potentially increase the customer base and potentially enhance profits for an auction market.

How Livestock Markets Adopt an Animal Identification System

Determining what a particular business needs to do to adopt an animal identification tracking system requires considerable assessment of individual company goals and facility needs. Below are a few simple steps to help livestock markets in this decision.

1. Register for a NAIS premises identification number.
2. Determine the needs and goals of the business; including customer needs. Do they include individual animal identification or tracking?
3. Research companies that offer animal identification products.
4. Select an animal identification company to work with.
5. Schedule a site survey with the company of choice.
6. Meet with a field representative at the livestock market during the site survey.
7. Approve the final plan/drawing of the new reader system from the company.
8. Complete facility modifications that need to occur before the installment of the reader system.
9. Install the new reader system.
10. Have RFID tagged cattle available to test the RFID reader system at the time of installation to verify accuracy of the reading system and compatibility with the livestock market software program. The testing process should be conducted while the RFID installation technician is on-site.
11. Maintain contact with the provider of the livestock market clerking software prior to and during the installation process to assure the software is RFID compatible.
12. Begin using the new reader system.
13. Continually monitor read rate success of the RFID reading system and convey results to equipment vendor.

The first step in the process, registering for a premises identification number (PIN), can be done by contacting your state's Department of Agriculture, NAIS Coordinator. Contact information for each state can be found at the USDA NAIS Web site: <http://animalid.aphis.usda.gov/nais/prem->

[ises_id/register.shtml](#). The information collected from the auction facility to complete the premises registration process will include: name of entity, contact person name, address for the premise, contact phone number, and operation type (i.e., livestock market). An auction company can register the premises and decide not to carry out any of the other steps of NAIS. However, if the facility wants to go on to the next step and officially record animal movements under NAIS, a PIN is necessary.

Next, the facility needs to determine the needs and goals of the business and associated customers (livestock buyers and sellers). If goals of the business and current or prospective customers include the use of individual electronic animal identification and/or animal tracking, the livestock market should consider animal identification and tracking options. If the livestock market elects to invest in animal identification readers they should begin researching available alternatives and determine how these fit into existing facilities. The NAIS Web site lists authorized animal identification number (AIN) tag manufacturers, including those that provide official tags that incorporate RFID technology. Also, the Beef Stocker USA Web site (www.beefstockerusa.org) includes a list of companies offering products to the animal identification industry and compares them based on many different factors including types of readers and tags, data management, and costs. Because variability in costs, options, and uses vary, it is important to research the companies to find the best fit to the business.

Since the inception of the NAIS program, many companies not traditionally involved in the livestock identification industry have decided to invest in the production and marketing of individual animal identification tags (more specifically RFID tags) and RFID readers. Time would be well spent to extensively research the company(s) being considered to equip the livestock market with RFID tags and reading equipment. There are several questions that should be answered:

1. Is the company's technology cross-compatible with technology from a competing company? (This would allow the market to not be locked into one company if issues arise.)
2. Are the RFID tags/readers to be installed created under the ISO 11784/11785 guidelines?

3. What are the average retention rates on the company's RFID tags?
4. What are the average read rates of the company's RFID readers?
5. Is the RFID reading system to be installed scalable to accommodate market growth in the future?
6. Is a list of references available of other livestock markets that have used the RFID technology from this company?

Before choosing an animal tracking company to work with, it would be advisable to talk to other livestock market owners and producers that have experiences with RFID technology to obtain a perspective of what has worked well and, perhaps more importantly, what has not worked well in their operations.

After choosing the animal tracking company, set up a "site survey." During a site survey, the animal tracking equipment company will send a field representative to the livestock market to assess the best location for RFID readers and the ideal type of technology for the facility. This is a crucial meeting because most livestock markets will need a custom-built reader system installed. As a follow-up to the site survey, the field representative will send a detailed drawing of the proposed RFID reading system plan to the livestock market. The drawings from the company of choice should include information on electrical supply needs for the reader system and how the RFID reader system will

access the livestock market's computer system (i.e., through wireless or tied directly into a computer), all of which should be discussed during the site survey. This plan will allow the livestock market to decide if the proposed plan will fit their needs. At this time, it will become apparent as to the amount of facility modifications that are needed before the company can install RFID readers. The time frame for installation of the RFID reading system will vary dramatically depending on the extent of modifications needed to accommodate the reading system at the livestock market.

As decisions are being made to incorporate RFID technology at the livestock market, it is critical to work closely with the livestock market's software provider. By working with the software provider, one can better assure that the new RFID system will comply with existing computer systems. Compatible computer systems help assure that RFID tags that are read can be recorded into the computer system and reported accordingly.

Once the RFID reading system has been installed, tested, and it has been verified that the RFID reads have been captured and properly stored in the livestock market's clerking software package, the reader system should be ready for daily use. The system may work perfectly or may need improvements to accommodate smooth and timely animal movements. The livestock market needs to be flexible, and work with the company where the readers were purchased to make the transition successful. It is important to understand that all livestock markets

Table 1. *Comparison of Handheld Readers and Stationary Panel Readers*

Handheld Readers	Stationary Panel Readers
Manual Scanning	Automated scanning
Handles lower volumes of livestock	Handles higher volumes of livestock
Reader is mobile	Panel is fixed
Wireless, Bluetooth®, and tethered options	Typically hard wired

Table 2. *Comparison of RFID Reader Placement Within a Livestock Market*

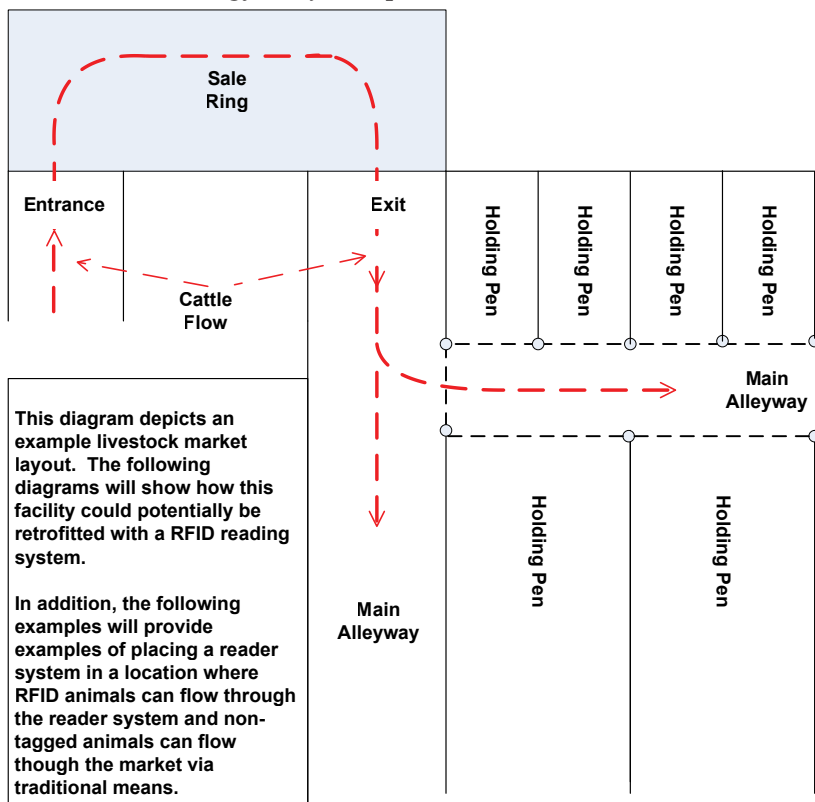
Unloading Area	Loading Area	Sale Ring Entrance	Sale Ring Exit
Seller known	Seller known	Seller known	Seller known
Buyer unknown	Buyer known	Buyer unknown	Buyer known
Electronic transaction would need to occur	Electronic transaction would need to occur	Electronic transaction about to occur	Electronic transaction already occurring

need to be prepared for imperfections with their new systems. The livestock market also needs to be aware of the different animal tracking databases and know how to comply with each.

Logistics of an Animal Identification Reader System

There are many types and brands of RFID readers available. Two main types are *handheld* readers and *stationary panel* readers. Handheld readers are great for mobility but they typically require livestock to be restrained to successfully capture the RFID tag information. Stationary panel readers are set up in an alleyway and need little attention when reading RFID tags if they are properly installed. Other options are also available, but these are the two most popular choices. Table 1 compares handheld readers to stationary panel readers.

Diagram 1. Existing facility example



This diagram depicts an example livestock market layout. The following diagrams will show how this facility could potentially be retrofitted with a RFID reading system.

In addition, the following examples will provide examples of placing a reader system in a location where RFID animals can flow through the reader system and non-tagged animals can flow through the market via traditional means.

NOTE:

One benefit of placing the RFID reading system at the sale ring exit versus the sale ring entrance or cattle unloading facilities, is the fact that when the cattle enter the ring, the seller information is known and at the close of the transaction, the buyer information will be known. As the RFID tags are read and the transaction is closed out, this will allow capture of the entire buying/selling transaction in the livestock market clerking software program. This will allow not only multiple options of reporting NAIS based information, it will also aid in recording QSA/PVP based (i.e., age and source verification) information.

Choosing the best location for the installation of RFID readers can be challenging. Each livestock market should decide if they want all cattle to travel through the readers versus only tagged cattle traveling through the area. The system should also be designed so it does not interfere with daily work at the livestock market. For example, be sure the RFID reader system does not block the only opening that a skid loader can enter to clean the sale ring. Common locations for readers include: sale ring entrance, sale ring exit, loading facility, or unloading facilities. Table 2 compares these locations.

Designing sufficient space for the reader system is important for efficiency and effectiveness. For example, if panel readers are installed, it is desirable to have 30- to 32-inch-wide alleys for cattle to travel through; the alleys can be tapered at the bottom to accommodate smaller livestock. If a multi-alley reader system is employed, it is recommended to

allow 12 to 24 inches between each alley for wires, cables, and storage of RFID reading equipment. The length of the alley depends on the number of panel readers and the number of alleys used. It is important to allow room at the entrance of the RFID reading alley(s) to transition the animals into the reading system. The system does not necessarily need to be under a roof, with the exception of a computer that needs to be protected from the elements (e.g., excessive heat, cold, moisture).

Construction of the alley(s) is usually the responsibility of the livestock market to complete after final plans have been established with a technology company. The frame of the structure could be made from wood or pipe. But, generally, the panel readers should not be directly mounted on iron, pipe, or metal as this will negatively influence their performance (i.e., low read rates). Panel readers could be directly mounted on heavy (¾-inch or greater) polyurethane plastic sheeting or wood. Diagrams 1 through 7 depict examples of how a livestock market could implement an RFID reader system into their facility.

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Diagram 2. *Modified facility example — RFID reading system — single animal alley*

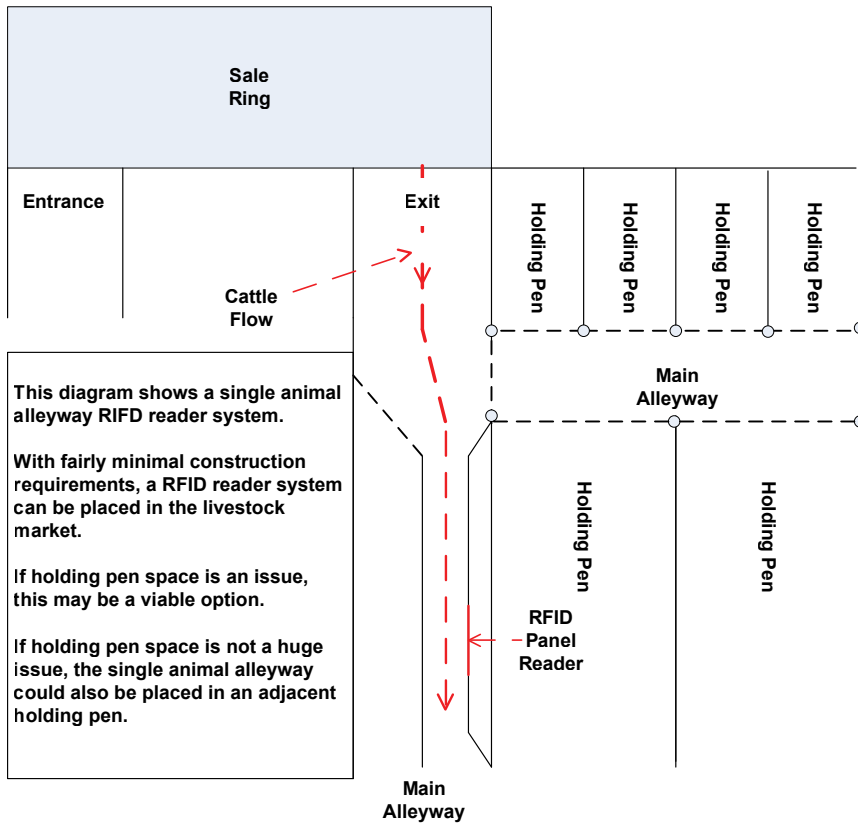


Diagram 3. *Modified facility example — RFID reading system — dual animal alley*

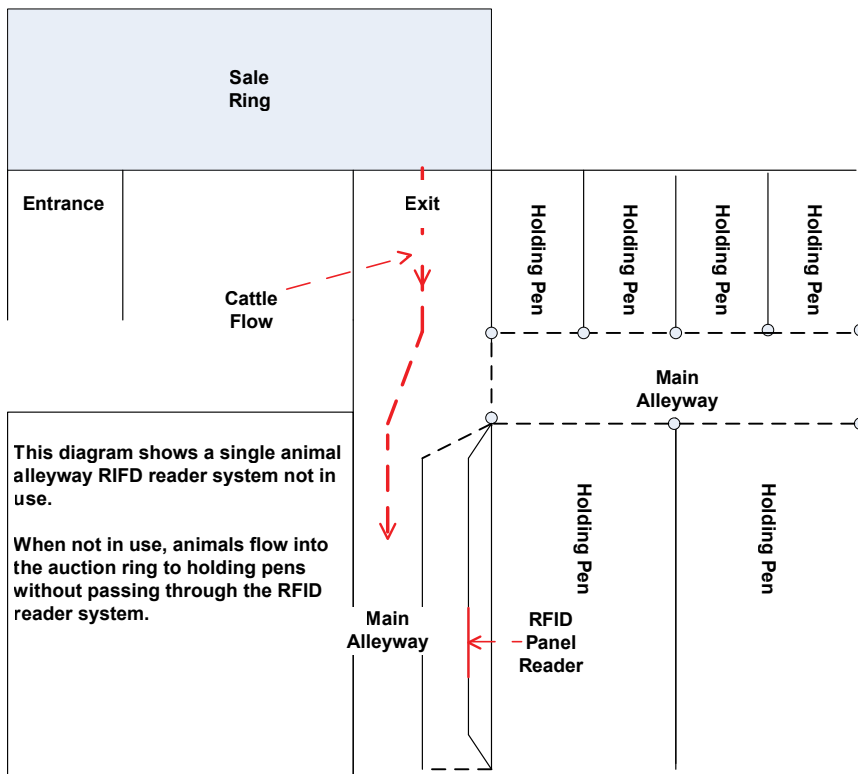


Diagram 4. *Modified facility example — RFID reading system — dual alley*

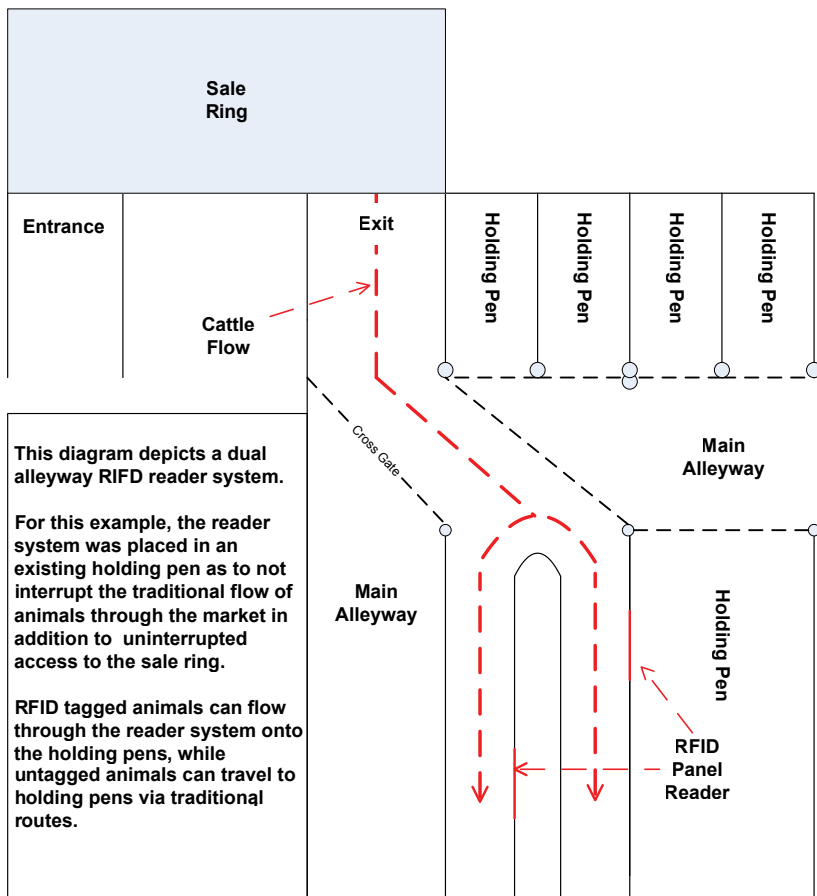
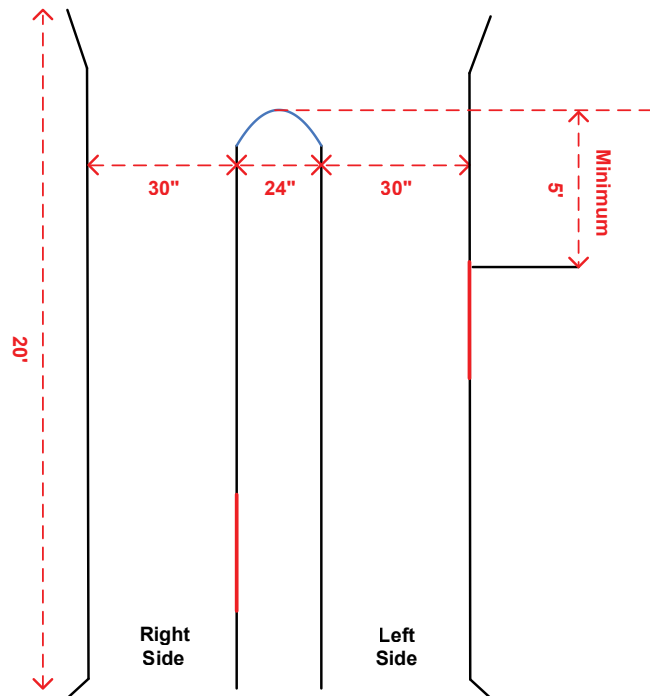


Diagram 5. *Panel Reader Structure*



Note. *Dimensions represented in Diagram 5 are optimal ranges to obtain best possible RFID read rate results.*

Diagram 6. Panel Reader Structure — Frontal view

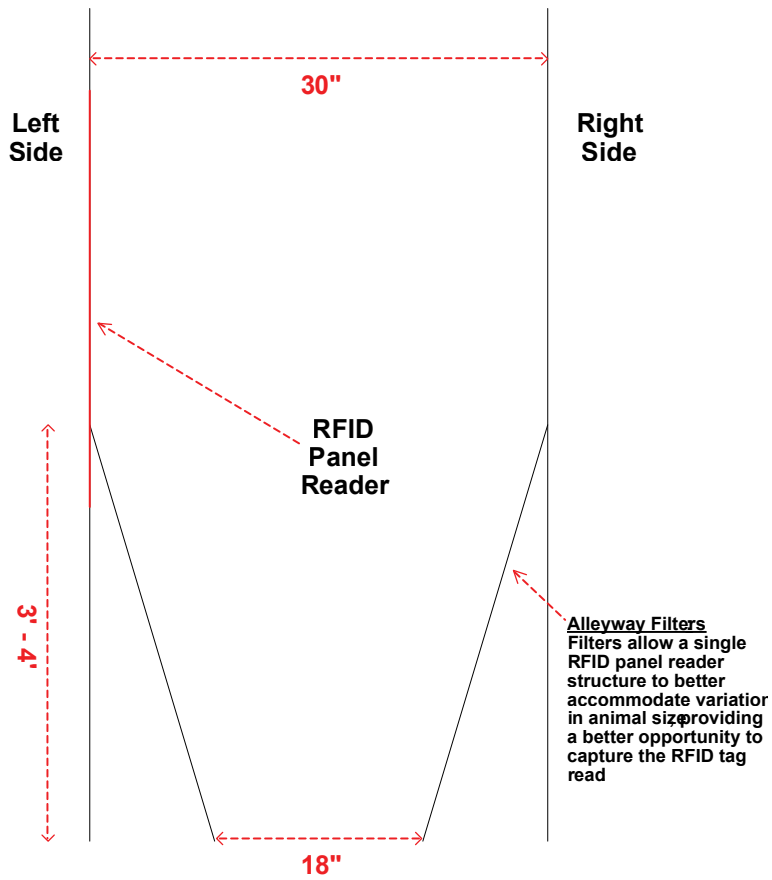


Diagram 7. Panel reader structure — side view

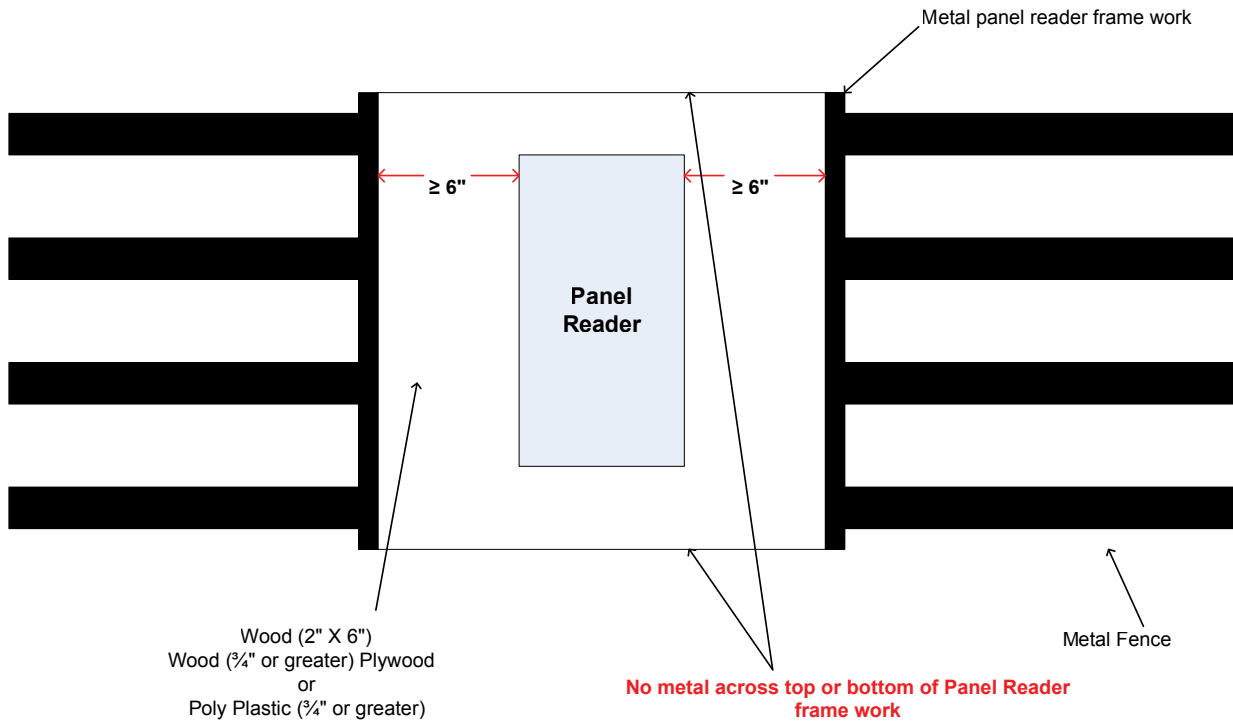


Table 3. Kansas Pilot Study Livestock Market Tag Reader Adoption Methods for Different Sized Operations

Approximate Head of Cattle Sold per Year	Number of Alleys	Number of Readers	Location of Readers	Type of Readers
5,000	1	1	unloading area	handheld reader
13,000	1	2	sale ring exit	panel readers
13,000	1	2	unloading area	panel readers
24,000	1	2	sale ring exit	panel readers
35,000	1		unloading area	transfer reading chute ¹
37,000	2	2	sale ring exit	panel readers
40,000	2	2	sale ring exit	panel readers
44,000	2	2	sale ring exit	panel readers
55,000	1		unloading area	transfer reading chute ¹
64,000	2	2	sale ring exit	panel readers
75,000	2	2	sale ring exit	panel readers
95,000	2	2	sale ring exit	panel readers
200,000	2	4	sale ring exit	panel readers ²
200,000	3	3	sale ring exit	panel readers

¹ A transfer reading chute is a mobile trailer with panel readers installed. The mobile chute can be pulled behind a vehicle. The trailer has one alley and can be raised and lowered to accommodate unloading cattle from a semi-trailer or conventional cattle trailer.

² This facility installed a pre-made unit consisting of two alleys with 4 panel readers. The company they purchased this from manufactured the entire unit and delivered it to the livestock market, where they anchored it into their facility.

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Table 3 summarizes the number of alleys, readers, location, and type of readers that were used for a variety of different sized livestock markets participating in a pilot study completed in Kansas in 2006/07. Larger livestock markets prefer more readers and alleys to accommodate more cattle. A smaller livestock market can possibly get by with a handheld reader and one alley. Most of the locations in the Kansas pilot study installed their reader systems near the exit of the sale ring. However, each livestock market is uniquely designed and will not necessarily conform to one of these scenarios. That is, the design and layout of a reading system will be, in large part determined by the location of readers and number of readers required to adequately handle the particular volume of cattle.

The Cost of Adopting an RFID Service System

The cost of providing RFID data capture services depends on business needs and the amount of renovations necessary at the facility. Table 4 depicts the costs of reader systems associated with five Kansas pilot study livestock markets. The livestock markets included in this study are divided into two size categories, medium and large. The medium-sized operations sell 40,000 to 150,000 head of

cattle annually and the large livestock markets sell more than 150,000 head of cattle annually. The row labeled “number of readers,” refers to the number of panel readers mounted in the alleys. The row labeled “number of alleys” refers to the number of alleys equipped with RFID panel readers that cattle funnel through when being read.

Labor costs are divided into facility modification costs, contractor costs, and installation costs. Facility modification labor costs refer to the cost of modifying the livestock market, by livestock market employees, to prepare it for the installation of the RFID reading system and are based on a wage rate of \$10 per hour. Contractor labor costs refer to the amount the contractor charged the livestock market to modify the facility to prepare it for the installation of the RFID reading system. Installation labor costs refer to the cost of installing the RFID reading system by livestock market employees at \$10 per hour. Material costs are broken into two categories, one category for the materials purchased by the livestock market and another for the materials purchased by the contractor, for facility modifications. RFID technology cost refers to the amount charged to the livestock market from the company that provided and installed the RFID readers, including the cost of the readers, other equipment,

Table 4. *Cost of Animal Identification Reader System in Kansas Pilot Auctions*

	Size of Facility ¹				
	Medium	Medium	Medium	Large	Large
Number of Readers	2	2	2	3	4
Number of Alleys	2	2	2	3	2
Labor Costs (\$):					
Facility Modification	\$0	\$0	\$960	\$1,500	\$0
Contractor	\$2,500	\$1,600	\$150	\$0	\$75
Installation	\$450	\$0	\$0	\$0	\$350
Material Costs (\$):					
General Materials	\$1,480	\$0	\$930	\$5,550	\$0
Contractor Materials	\$1,014	\$400	\$0	\$0	\$75
RFID Technology (\$)	\$10,750	\$10,750	\$7,708	\$9,900	\$28,765
Software Upgrade (\$)	\$1,000	\$0	\$0	\$4,200	\$3,500
Total Investment	\$17,194	\$12,750	\$9,748	\$21,150	\$32,765
Additional Annual Cost					
Increased Technology Support Fees (\$)	\$0	\$0	\$0	\$1,020	\$0

¹ *Medium facilities market 40,000–150,000 head of cattle annually and large facilities market more than 150,000 head of cattle annually.*

and labor. Software upgrade costs are the costs associated with updating the livestock market’s current computer system to one that can handle an RFID reader system. The summation of these costs shows the total amount invested in an RFID reader system at five Kansas livestock markets. The average investment of adopting a NAIS system for a medium-sized livestock market is \$13,231 and for a large market is \$26,958.

Another cost realized by one of the five livestock markets was an increase in technology support fees for their computer software. This additional annual fee was induced by the addition of the RFID reader system. Finally, it is important for livestock market managers to recognize that RFID reflects a new technology in the livestock industry and thus costs initially will be highly variable but also that relative costs could decrease as the technology becomes more widely adopted.

Experience with How Systems Work in Livestock Markets

By working closely with five Kansas pilot study livestock markets as they adopted RFID reader systems, a number of things have been learned. All five livestock markets had unanticipated problems they had to overcome to develop a successful system. Initially, a wide range of ID tag read rates on indi-

vidual animals was experienced among the livestock markets during their first reading cycle. If a livestock market had unsatisfactory ID tag read rates, the facility worked with the technology provider to fix the problems.

Several of the livestock market managers included in the study were concerned prior to installation that the RFID system would slow down the rate of their sale. After completing actual sales at five livestock markets using the new RFID technology system, managers at all five livestock markets indicated they have experienced little to no change in the speed of sale when using the RFID system.

Livestock market managers were also concerned about needing to hire new employees or pay for the training of employees. However, in this study none of the livestock markets hired new personnel to work with the RFID system and there were no training fees for employees to learn to use the system. The livestock market managers are aware that the system may not work perfectly, but they generally recognize that additional efforts may be required in order to add services for their customers.

Among the livestock auction market industry and the livestock industry in general there are many concerns with NAIS. An interview was conducted for this study with 10 Kansas livestock market operators who were asked to rank their concerns of

seven items related to NAIS. The following were the concerns voiced (ranked in order of most concern to least concern):

1. Speed of sale adversely impacted
2. Reliability of electronic animal identification equipment
3. Cost of operating the system (e.g., labor)
4. Confidentiality of NAIS
5. Cost of technology (e.g., readers, computers)
6. Cost of renovations/facility modifications
7. Additional technology expertise needed

Not surprisingly, speed of sale was the biggest concern because sale speed is critical to maintaining customers and controlling the cost of selling cattle. However, based on experience with the Kansas pilot study auction markets, this perceived concern has not been a problem.

The 10 livestock market operators were also asked to rank their knowledge of the NAIS regarding program standards, compliance, and costs (using a scale from 1 to 9, where 1 reflects having no knowledge/understanding and 9 indicating they are extremely knowledgeable/understanding). Livestock markets on average ranked their knowledge of the NAIS program standards at 4.85, meaning they feel, at best, moderately knowledgeable about the program. The livestock markets ranked their level of understanding of what their facilities need to do to participate in the NAIS at 3.45, meaning they do not feel they have an adequate understanding of what will be required, regarding their facilities, for compliance. They ranked their level of understanding of costs they will incur to participate in NAIS within their facilities at 4.65 indicating a moderate understanding of costs.

Experience of Two Livestock Markets with RFID Readers

Another aspect of this project was to interview managers from two livestock markets that have been using RFID readers at their sales for approximately the last 3 years. The companies interviewed were a livestock company located in the Midwest and one in the Western United States. The purpose of these interviews was to assess what might be learned from companies that have had experience with the systems over longer time periods than the livestock markets participating in the Kansas pilot study.

At the Western livestock market about 85 percent of cattle sold are identified with RFID tags. They originally placed an RFID reader system at the sale ring exit, after their scales, and the reader system is still located in this same location. They have had no major problems with the RFID reader system since it was installed. This livestock market's RFID readers usually read 100 percent of cattle sold with RFID tags. Occasionally there are misread or unread tags, so the entire lot of cattle that contains the misread cattle must be run through the reader system a second time after the sale is complete. They attest that the speed of sale has not changed since they installed the RFID reader system. They have no trouble getting sellers to participate in tagging their cattle with RFID tags. They attribute this to educating and informing producers through newsletters. They also advertise to cattle buyers to increase awareness of the cattle being sold at their market. This facility has not hired any new employees to handle the RFID readers during sales; their biggest labor change occurred when they added a tagging service for their customers.

At this Western livestock market producers receive premiums for RFID tagged cattle. According to the manager, vaccinated and RFID tagged cattle bring a \$5.00 per hundredweight premium, when compared to cattle that have not been vaccinated or RFID tagged. Those producers that participate in the livestock market's Quality System Assessment QSA program (which requires animals to be RFID tagged) bring an \$8.00 to \$10.00 per hundredweight premium, when compared to cattle that have not been vaccinated, RFID tagged, or QSA approved. They believe at this livestock market that NAIS will protect their business and can do the same for other businesses. Overall, the RFID system has met their expectations of a system that would benefit their business and they are continuously adding new technology measures to their operation.

At the Midwestern livestock market, about 40 percent of cattle sold at the facility have RFID tags. They have tried many different locations for the reader system. The first location for the readers was at the unloading area of the facility. They moved the readers to the sale ring exit, next to the load-out area. Finally, they placed the readers in the back of the facility. The optimum location for the reader was found through much trial and error. The livestock market attested that it depends a lot on the configu-

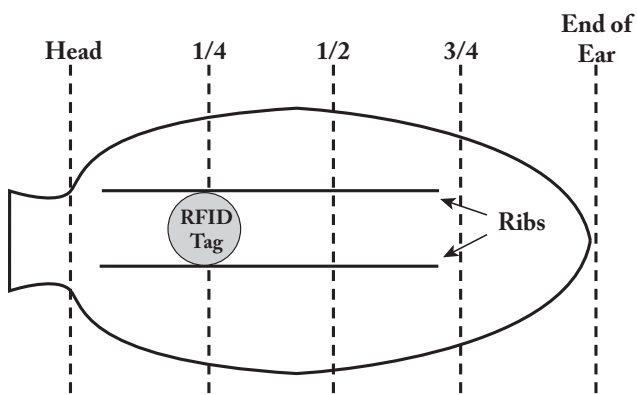
ration of the facility and intended use of the system as to where the readers should be located. This livestock market believes one of the most important factors that affect read rates is the orientation of the RFID tag in the calf's ear. If producers tag their cattle incorrectly, it adversely affects read rates of those calves. (Refer to diagram 8 for primary RFID ear tag placement.) They also believe factors such as metal and weather affect read rates. When they have a sale that uses the RFID readers about five of the employees work specifically in the area of the RFID readers, but they did not hire any new employees. They have had little trouble getting producers to try the RFID tags in their cattle.

The livestock market holds an annual informational meeting about the special marketing programs available to producers. They also work continuously to advertise to buyers about the cattle sold at their facility. Before installing the reader system, they had high expectations. They thought it would work easily; however, they were surprised to find many problems with the system. However, because this livestock market believes this system adds value, they are not going to weaken their efforts in making the system work. That is, this market is committed to making the animal identification system work because they are convinced it adds value for their clientele.

Conclusion

Because of the growing use of electronic animal identification, livestock markets need to be prepared for changes in the industry. The National Animal Identification System (NAIS) is still in development stages. As the owner or manager of a livestock market, it is important to stay up-to-date on what is occurring in the industry for strategic management of the business. Auction markets provide marketing services to their customers and attracting new customers requires continued assessment of customer needs. Livestock identification and tracking services is one potential way an auction market might enhance services to customers. A relatively small number of auction markets currently offer animal identification and tracking services, but the number is growing. Costs and benefits provided by this new technology and how it might best be adopted are important considerations for an auction market. This report is based on preliminary data collected from a pilot study of Kansas auction markets that were in the process of adopting animal identification systems. Further analysis about costs, benefits, opportunities, and concerns associated with animal identification systems will be presented in the near future from data being collected in a national livestock market survey.

Diagram 8. *Primary RFID Ear Tag Placement*



The RFID tag should be placed on the first quarter of the calf's left ear, between the cartilage ribs.

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