



## Livestock Identification #3 in a series for producers

### An Introduction to Electronic Animal Identification Systems and Comparison of Technologies

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**A**nimal identification is a familiar topic for livestock producers. In the Western U.S., animal identification (ID) can be traced back to early California settlers.<sup>1</sup> Historically, animal ID methods were used to manage animals for open range grazing and for several health programs, such as brucellosis.<sup>2</sup> Many producers still routinely use traditional technologies, such as branding, tags, and tattoos; however, the application of electronic animal ID technologies is a growing trend in the livestock industry and plays an important role in the future of the National Animal Identification System (NAIS). The main goal of the NAIS is to provide a standard and efficient system to protect US animal agriculture from disease outbreaks. If a disease outbreak occurred, federal and state animal health officials would use NAIS to identify all animals and premises that came in contact with the suspect animal within a 48 hour period.<sup>2</sup> For the cattle industry, electronic animal ID is the favored technology to conduct a rapid traceback of cattle.

As a livestock producer, you have probably heard or read about the development of NAIS and the application of electronic animal ID for the past several years. As a result, you are potentially faced with adapting your current ID program to meet the future requirements of a national system. This program will most likely require additional labor, cost, new equipment, and computer systems to capture and report information.<sup>3</sup> Therefore, the goals of this fact sheet are to provide you with a basic understanding of the concepts for electronic animal ID and information on available technologies (hardware and software). Using this information, you should be more informed and better able to make cost effective decisions for your livestock operation. The technologies described in this fact sheet focus on cattle; however, the basic principles should apply to other livestock groups.

#### **Q: Why electronic animal ID?**

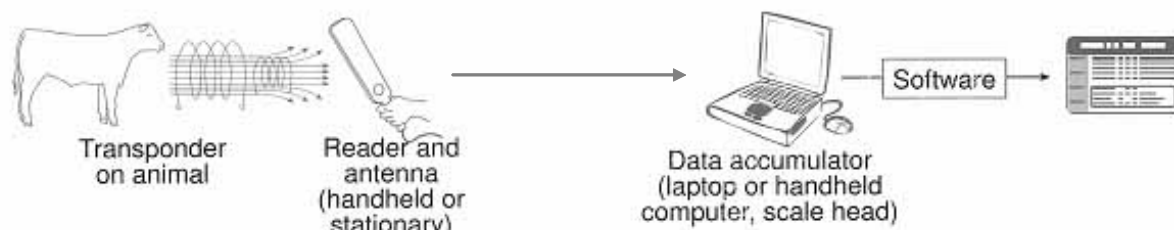
There are numerous animal ID technologies available to livestock producers. For cattle, the NAIS working group recommends using Radio Frequency

Identification (RFID) tags because it is the most appropriate for the current industry needs.<sup>4</sup> The NAIS beef cattle working group is composed of industry, government, and academic individuals with extensive background in animal ID technologies and the animal agriculture industry. Each major animal agriculture species has a committee that guides decisions on what technologies to consider for NAIS. Radio Frequency ID is the recommended technology for cattle; however, there are multiple viable alternatives to RFID including DNA and biometrics (i.e., retinal imaging).

The decision to purchase an electronic ID system needs to be well thought out because the purchase will probably impact profitability. The cost of a new animal ID system requires additional inputs with labor, equipment, and data management.<sup>3</sup> Taking the time to learn some of the terminology and develop a basic understanding of the NAIS will help you to identify the best system for your situation. The appendix section includes a comparison list of different companies (Tables 3 and 4) for electronic ear tags, readers (handheld and stationary), scale heads, herd management software, central data storage, and alternative paper-based options. These tables were adapted from a survey published by Kansas State University ([www.beefstockerusa.org/](http://www.beefstockerusa.org/)) and *Drovers* magazine. There are a variety of companies and this table should help you identify a short list appropriate for your production situation.<sup>5</sup> If you are still asking questions about the technical details of animal ID technology after reading this fact sheet, you should contact the Kansas State University Cooperative Extension Service to obtain a copy of "The Guide for Electronic Identification of Cattle"<sup>6</sup> ([beefstockerusa.org/rfid/eidorderform.pdf](http://beefstockerusa.org/rfid/eidorderform.pdf)).

#### **Animal ID System Goals and Considerations**

Farm and ranch operations deal with genetic improvement, animal health, nutrition, data collection, account management, and pasture management in a variety of ways. Some ranchers have developed sophisticated management systems and keep



**Figure 1. Basic components of an RFID system<sup>6</sup>**

extensive records, while others keep simple written records in a diary. Anytime a new technology is being considered for a ranch, it is valuable for the producer to determine how that technology will mesh with their current management system and their future goals. When considering investing in an electronic animal identification system, producers need to ask tough questions about their animal identification needs. How valuable will the information be to your operation and will you actually use the information to make improvements? Is it warranted to make the economic investment into a higher cost system when the market price signals may not justify the additional expense?<sup>7</sup>

**Q: As a livestock producer, why is animal identification important to your operation?**

You probably have a simple ID system that allows you to distinguish one animal from another, manage records in your herd, and maybe comply with the requirements of a source verified beef program. When considering a new ID system, the questions you need to ask yourself should include whether the system complies with the NAIS, how expensive and complicated the ID system is to use, and the potential of the ID system to enable you to participate in more lucrative marketing opportunities.<sup>7</sup>

Program compliance is a top priority for the USDA NAIS, whereas the additional expense is a top concern of the livestock industry. As of 2005, animal ID is not a mandatory program; however, several producers are justifying the additional cost with improvements to management and opportunities to sell their animals at a higher price. Using an electronic ID system provides the potential to capture data on performance in the feedlot and in the packing plant. For example, the GrowSafe system developed by a Canadian Company in Alberta, uses radio frequency identification technology to monitor feeding and watering practices in a feedlot setting. Using this information, they can improve the accuracy of their decision processes.<sup>8,9</sup>

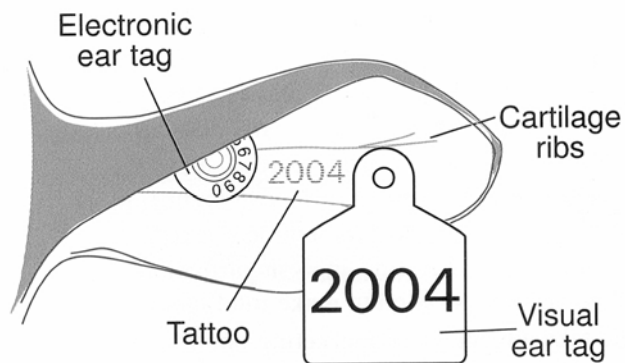
Discussions about “Traceability” and “Source Verification” are common themes among cattle producers. Some livestock producers view animal ID technology as an investment because they see new marketing opportunities. Currently, McDonalds is paying premiums to producers for source verified cattle.<sup>7</sup> Additionally, livestock marketing facilities like 101 Livestock in California or the Montana Beef Network use electronic ID technology combined with documentation to sell source verified cattle.<sup>10,11</sup> As of 2005, the majority of alliance programs claim electronic ID capability.<sup>12</sup> There are numerous opportunities for producers to capitalize on animal ID technology; however, a little investigation into the profit potential is very important. For your livestock situation, you may decide to use the simplest approach available.

**TECHNOLOGY BASICS**

**Q: What parts make up an electronic animal identification system?**

A complete electronic animal ID system includes: 1) a Transponder, 2) a Transceiver/Reader/Interrogator/, 3) a Data accumulator, and 4) a Software/Data management system (Fig. 1). An electronic ID system is nothing more than a data capture system until a livestock producer decides how to effectively integrate it into their program.<sup>6</sup> For basic compliance, your simplest option might be to purchase the unique numbered RFID ear tags and maintain simple records for animals with the ear tags.

**1. Transponder (eartag, bolus, or microchip) —** The transponder comes in different forms including ear tags, rumen boluses, and implantable microchips. In the U.S., the RFID ear tag is the most common form, the one referenced for this discussion, and recommended for the NAIS. The eartag (transponder) is a donut-shaped tag about one inch in diameter with a hard plastic exterior and an internal set of electronic components. The components include an electronic circuit or chip with a capacitor and a copper antenna



**Figure 2. Correct placement of a visual and electronic ear tag in the left ear<sup>6</sup>**

coil. The microchip contains a 12 digit animal ID number and a 3 digit country code.<sup>6,4,13</sup> The three digit code for the US is 840. In addition to the button tags, many companies market combination sets with a visual tag (Fig. 2).

**Q: What are the standards for the animal ID tag?**

The ID tag will be referred to as an Animal Identification Number (AIN). It is required to meet the following standards: 1) The tag must bear the approved 15 digit number, 2) The tag must be designated for one time use, 3) The tag may not be readily altered or tampered with, 4) The national identification number must be easily and reliably read, 5) The tag must have the US Shield imprinted, and 6) The tag must be placed in the animal's left ear.<sup>4</sup>

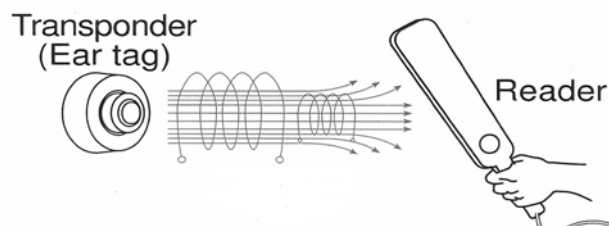
**Q: Does the electronic tag emit a signal?**

There are two types of RFID transponders, active and passive devices, and the main distinction is the location of the power source. For cattle and several other livestock species, passive RFID technology is the most cost effective. A passive RFID tag does not have its own power source and it is activated by an outside source called a transceiver/reader. The reader sends out a signal to the tag and the tag sends back a signal with the unique number on it (Fig. 3). Most tags are manufactured as read-only; however, read-write technology is available. The information on read-only tags is permanent. Tags capable of read/write technology are more expensive and memory is limited.<sup>6</sup> The proposed guidelines for NAIS recommend RFID tags that comply with ISO standards 11784 and 11785.<sup>4</sup>

A typical conversation with an animal ID salesperson will involve the acronym "ISO." You will probably hear them say, "our company sells ISO compliant tags." What is ISO? In simple terms, ISO stands for the International Organization for Standardization. This non-profit organization establishes technical standards for the development of products like RFID transponders. The standards are internationally recognized by many countries and allow for uniform specifications. The two ISO standards for RFID tags include the 11784 and 11785, which provide details for the memory storage of the tag and the technology used to transmit signals between the tag and the reader.<sup>6</sup>

For the 11785 standards, the two forms of transmission are Half-duplex (HDX) and Full-duplex (FDX). A Half-duplex tag transmits data after it is fully charged by the reader while the Full-duplex tag sends a signal back the instant it is activated by the reader (Fig. 3). The difference between HDX and FDX is analogous to the difference between a walkie-talkie and a telephone. The tag manufacturers will each argue for their respective product technology.<sup>6</sup> Therefore, it is valuable to you to identify the best technology for your operation because either complies with NAIS.

**2. Transceiver/Reader/Interrogator/ Scanner** —The reader sends an electronic signal to the tag, the tag is charged and replies with the stored information. The two basic readers are a portable handheld and a stationary panel device. The handheld readers can be powered by a rechargeable battery or plugged into a wall outlet. For many small to average size producers, the handheld reader might be a cost effective option. The stationary reader is designed for packing plants, large processing facilities, feedlots, and cattle marketing facilities. The read range is longer in a panel reader, but it is more expensive.<sup>14</sup> If you plan to read tags from a variety of manufacturers, it is important to purchase an ISO compliant reader that communicates with both HDX and FDX tags.<sup>6</sup>



**Figure 3. Electronic communication between a reader and transponder (tag)<sup>6</sup>**

In the past, some companies marketed readers for only one type of tag; however, this problem has been reduced because of the ISO standards.

### **Q: Which reader is best?**

For many producers, portability is valuable and they don't need a long read range. The read range for a handheld reader is usually 0 to 6 inches. For a stationary or panel reader, the maximum read range is 9 to 38 inches (Dale Blasi, pers. com.) The portable readers are available either as tethered models that have connecting cables and wireless forms using radio frequency and Bluetooth technologies. The tethered connection uses a regular computer cord attached to a 9-pin port on your computer. If you need wireless capability, you should plan on paying more for the convenience and the Bluetooth technology is new to the animal ID market.<sup>14</sup> Bluetooth is a more advanced wireless technology that allows the computer to simultaneously work with multiple wireless devices. Some wireless systems can be affected or interfered with by other wireless devices, such as cell phones.

**3. Data Accumulator**—The laptop computer is a popular form of data accumulator. Other types include: hand held computers or Personal Digital Assistants (PDA), desktop computers, and scale heads. The data accumulator contains software that allows communication with the reader. Also, some readers may contain the software or a portion of the software for communications between the reader and the data accumulator. The data accumulator also has software, such as a database, that holds the tag numbers from the reader and in some cases additional management information. Interestingly, several scale companies integrate features to capture data from electronic tags into several models. The number of data fields available through the scale head may be limited, but the average producer might find this more appealing as the equipment is designed to withstand more abuse than some laptop computers. The data accumulator you buy should be based on your needs. If you already own an electronic scale, you might look at using it. Also, remember that the laptop or handheld computer can be used for additional tasks beyond animal ID.<sup>6</sup>

**4. Software and Data Management**—For the reader to communicate with your data accumulator, software is necessary. Software allows for communication

between the data accumulator with the database and the reader. Software and data management services come in a variety of forms and you should carefully consider the options. Several companies only offer localized software packages and others offer internet services with off site data storage (Table 3). Many companies produce a variety of software configurations to best match the producer's data collection needs. Additionally, some companies also offer a paper based solution for those individuals who don't want to use a full electronic ID system. The paper or card system provides you with the RFID tags and a data card. After processing the cattle and filling out the data cards, you mail them to the company and they input the data for you. The type and amount of information you can record with a data card system will vary across companies. For example, AgInfoLink provides the user with health management data fields on a card with a barcode. The barcode corresponds with a specific RFID ear tag. The service is not free, but you are not required to purchase a computer and you can collect important information for the purposes of the NAIS and basic management of your cow herd.<sup>6, 14</sup>

## **ANIMAL ID SYSTEM CHALLENGES**

Electronic ID systems provide livestock producers with new opportunities to improve management efficiency; however, these systems are more complex. Here are a few items to consider before buying an electronic ID system:

**Equipment failure**—The average failure rate of tags (i.e., tags not communicating with the reader) is very low. In a Canadian study with feedlot cattle, the failure of tags was 0.21%.<sup>15</sup> Animal ID representatives report estimates of less than 0.10% (1 in 1,000 tags fails). To prevent tag failure, several reputable tag companies have high levels of quality control and testing before shipping tags. Retention rates for the tags under field conditions are reported to be 97% to 98%.<sup>16, 17</sup> Retention rates are sometimes affected by age of the animal, tag placement, infections, and physical surroundings. Livestock producers in the Western states operate in a variety of different environments, which includes brush and chaparral. These harsh environments can elevate the risk of tag loss, but reports indicate that the electronic ID button

tags, when properly placed in the left ear (Fig. 2), are less likely to be lost.<sup>1</sup>

**Environment and facility challenges**—The working environment for livestock involves dust, water, manure, and many elements that are unfriendly to electronic equipment. The additional dust impacts the life of the equipment, but we present a few suggestions later in the document to help with the situation.

Electromagnetic interference is another source of problems. Several forms of electronic animal ID use radio signals to send information between the tag and the reader antenna. In many livestock processing facilities, there are multiple sources of electromagnetic interference including: metal, motors, and other radio frequency signals.<sup>8</sup> If you are operating in a high metal environment, you will need to work with the animal ID company to minimize the interference.

A common concern for producers is the impact electronic animal ID will have on the efficiency of working cattle. Equipment breakdowns can be particularly frustrating when labor costs increase due to down time. Therefore, some cattle handlers, such as livestock auction markets, want to minimize the amount of down time and keep a fast pace. In those cases, issues with how cattle flow past the panel reader to make sure each ID is captured will require advice from the technology provider. In these types of installations, if alleys and gates don't force animals to walk single file, the system may experience problems with tag collision. Tag collision occurs when more than one electronic identification tag passes by the reader simultaneously. It might be a good idea to have your electronic ID technology provider visit your facilities or take a few pictures of it for suggestions to reduce the number of problems.<sup>18</sup>

**Q: How much will a system cost?**

Our goal is to present an example of how to evaluate cost to the average cow/calf producer for an electronic animal ID system at the ranch level. Additional information on the NAIS is available in the resources section of this document. One paper (<http://lmic.info/memberspublic/animalID/fs02.pdf>)<sup>19</sup> focuses on the details of the national ID system cost.

A comprehensive RFID system often includes: tags (transponders), electronic readers, computer hardware, software, internet access, and labor.<sup>6</sup> Expenses will vary, depending on the needs and goals for an animal ID program. The cost range for RFID tags is ~ \$1.50 - \$3.00 for a simple button tag. The cost increases for combination tag sets (button tag and visual tag) and tags with read/write memory. For a basic reader, you can expect to pay approximately \$450, but the cost can be as high as \$1,200 for wireless models.<sup>6</sup> Additional costs for software, internet access, and labor will be different depending on your production situation. Some software companies offer their software for free and charge a fee for services; while others will sell you a complete package for your computer.<sup>20</sup>

The cost of these packages will be variable. Table 1 is a description of the costs associated with an RFID system and illustrates the price differences associated with changes in herd size. As the herd size increases, the cost per animal decreases for specific fixed costs and total costs. To estimate the cost for your own herd, Kansas State University Agricultural economists developed an MS Excel spreadsheet tool (see <http://beefstockerusa.org/rfid/>).

**Table 1. Annual RFID System cost for a commercial cow-calf enterprise**<sup>7,19</sup>

No. of animals	Size of herd		
	125	250	1250
<b>Electronic Tag</b>	\$2.34	\$2.34	\$2.34
<b>Electronic Reader</b>	\$1.24	\$0.62	\$0.12
<b>Laptop Computer</b>	\$1.00	\$0.50	\$0.10
<b>Software</b>	\$1.40	\$0.70	\$0.14
<b>Internet access</b>	\$1.00	\$0.50	\$0.10
<b>Fees (subscription and upgrades)</b>	\$2.08	\$1.04	\$0.21
<b>Labor</b>	\$4.16	\$2.08	\$0.42
<b>Total cost (\$/head)</b>	<b>\$13.22</b>	<b>\$7.78</b>	<b>\$3.43</b>

There is no argument an Electronic ID system represents a new expense for your livestock enterprise. Therefore, it is important to determine your “realistic” animal ID needs.<sup>7</sup> You need to ask yourself the tough questions about how an animal ID system will work into your current program. You should consider the advantages and disadvantages

to owning an electronic ID system (Table 2). The value of an electronic ID system could increase revenues because your cattle comply with a source verified calf program. You may reduce your production costs using information collected and analyzed with a software program. Of course, you can take a simple route and only use the RFID tags and keep track of the numbers on paper. The simple approach would significantly reduce your costs outlined in Table 1 because you could eliminate several expenses, such as a laptop computer. If you have a good working relationship with your neighbors and a small number of animals, you might collaborate on the purchase of equipment (readers, laptops).<sup>19</sup> Through joint ownership, smaller scale producers can afford to buy better systems and reduce the cost per person.

**Table 2. The advantages and disadvantages of an electronic animal ID system**<sup>7,6,21</sup>

**Advantages**

- Qualification for specific marketing programs
- Reduction in data entry errors
- Increased efficiency in the capture of data
- Reduced data errors reading tags
- Unique ID for each animal
- Instant ability to generate management reports

**Disadvantages**

- Increased expense for animal ID supplies
- No guarantee of additional market value
- Increased complexity
- Not all equipment and tags are ISO compliant
- Challenges with technical issues (collision, interference)
- Short read ranges between scanner and tags

**Questions to ask your Animal ID Company**

If you are comparison shopping for an animal ID system provider, here are a few questions to ask before you sign your check. This is not an all inclusive list because you might have certain requirements for your livestock facility. If you are interested in additional information on questions to ask your animal

ID provider, please review a paper by Michael Coe titled “Working with Animal Identification Technology Providers.”<sup>3</sup>

1. Do you sell equipment that is compliant with ISO 11784 and 11785 standards?
2. How well does your equipment function with other brands of equipment? Are there any problems reading other brands or types of ISO compliant tags?
3. What is the read range of your readers in a work environment (handheld and panel)? What reduction in performance can I expect when metal is present in the working area?
4. Do I need to purchase a reader to use the electronic ID tags? Do you offer a paper-based alternative?
5. If I purchase larger quantities of tags, do I receive a reduced price per tag?
6. How does my data get retrieved and stored?
7. If the service provider has central database services, you should ask about security of the system, data storage and backup procedures, and ability to use the data for herd management.
8. How much will it cost to submit my records?

**SURVEY OF RESOURCES**

The best purchase decisions are usually made with good information. For example, you probably don’t buy a John Deere garden tractor to plow a 1,000 acre field. Similarly, it is not logical to purchase an animal ID system designed for a feedlot when you only own 100 cattle. So, it is important to have a clear understanding of your basic needs. The following list reviews a few things to consider prior to making a purchase and installing an electronic identification system:

- Do I have electrical power at the working facility?
- How do I deal with bad weather (heat, rain, lightning)?
- Who will run the equipment and does it require additional labor and experience?
- Do I need to purchase a simple system or something more complex? What will it cost me? If I purchase an advanced system, how do I justify the cost?
- What is my budget for the purchase and what is the cost per animal over time?

You purchased an animal ID system and now you are preparing to start using it. All of us have experienced the frustrations of the truck not starting up, leaving the syringe gun at the house, or dealing with broken equipment. These technical difficulties can be frustrating at processing time and it is important to minimize the impact. Before the first day of scanning, here are a few items to consider.

## **Getting Started**

What happens if the tag applicator breaks? It is probably a good idea to bring an extra applicator and pins with you. You can always have one person loading tags with the extra applicator.

Do I have a power surge protector? If you have a computer at home, you probably have a electrical surge protector between the computer and the power outlet. This device can prevent unwanted damage to sensitive equipment.

How do I record data if the computer experiences a failure or the electronic reader fails? This situation will probably increase your blood pressure and test your faith in electronic equipment, but it does happen. As a precaution, you might consider bringing paper printouts of the data with the appropriate data columns marked and a clipboard. If there is a catastrophic problem, the paper system can be used in its place. Also, some handheld readers have data storage for 600 to 1,200 IDs. If the computer malfunctions, you can still process cattle using the reader storage.

Who do I call about assistance with the software? Hopefully, you have someone running the computer that is already very comfortable with the program. Unfortunately, we sometimes experience problems that require the help of a trained professional. In your pocket book or on your cell phone, you should keep the phone number of the technical support person for the software and animal ID system. Many companies offer some type of technical support service program when you purchase the system.

What if the cord is cut between the electronic reader and the computer? First, you should look at your working facility and design it to prevent the problem. If it does happen, you might be in trouble unless you have an electrician on the crew.

An accidental miswiring of the electronic equipment might be damaging to the electronic components and void any warranty on it. This is when you can activate your paper system until the problem is resolved.

Conduct a practice run with the new equipment. A couple of days before you plan to use the equipment; you should do a dry run to work out potential problems. You can take the electronic ID equipment out to the working chute and set it up for processing. If you are using remote RFID equipment with wireless capability, it is a good idea to test the hardware with active sources of electromagnetic interference. If there is going to be a big problem, this will make you aware of it and you can contact your animal ID representative for assistance. Using this approach, you can resolve problems under less stressful conditions.

Keep the equipment clean. Electronic equipment, dirt and water are not good companions. Portable computers, such as laptops, are designed to be portable, but they will be dirty at the end of the day. It is helpful to keep a cloth around to wipe them down and also buy a "can of air" at your local supply store. You can use the compressed air to clean the screen and keyboard off during use. The computer is also portable, which means it is lightweight and can easily fall off the table. It is important to tape down or keep power cords out of the way and make sure the computer is located in a safe area.

Computer cover. Using a simple cardboard box or a more expensive box to place around the computer might be very helpful to keep the computer clean and allow you to view the screen in sunlight. To prevent dirt in the keyboard, some stores sell keyboard and screen covers to protect against damage.

Mouse vs. touchpad. Many laptop computers are configured with a touchpad mouse or similar device on keyboard. If you prefer to use an external mouse, you can disable the touchpad mouse and use a desktop type mouse instead.

Review proper tag placement. It is important to remember that the tags for cattle should be placed in the animal's **left** ear (Fig 2). The sales representative, local extension educator, or your veterinarian can provide you some basic guidelines on the best placement of the electronic tag.

Use disinfectant. The tag being placed in the animal's ear is not sterile. Using a little disinfectant on the tag applicator and tag before inserting it in the ear can decrease the chance of any infection and cross contamination.

Bring an extra battery. Several RFID readers use a battery pack as a source of power. You might look up the life of the battery pack and consider the purchase of a backup for extended usage. The night before you work cattle, check to make sure the battery is charged for use.

Bring extra supplies. It is always a good idea to pack a box with extra supplies. You might pack a few extra tags, fuses for any electrical devices, an extension cord, cleaning cloths for the computer screen, and extra pens.

Make a check list. The concept of a checklist does not just apply to animal ID, but it is a good management practice. Using a list can make the preparation process more efficient and reduce the number of trips back to the barn for supplies, especially when the cattle are located several hours from the house.

## Summary

Electronic Animal ID is a developing field and producers need to be aware of their technology options. As NAIS matures, new and different technologies will be available. Producers need to understand their goals relative to NAIS and evaluate opportunities to improve their production systems. This fact sheet provides producers with the basic terms, an understanding of technology, methods to evaluate system cost, basic guidelines to assist with a purchase, and advice for potential problems with operation of an electronic ID system.

## Information Resources

- California Department of Food and Agriculture, <http://www.cdfa.ca.gov/pais>
- USDA/APHIS National Animal ID, <http://animalid.aphis.usda.gov/nais/index.shtml>
- Beef Stocker USA, <http://www.beefstockerusa.org/>
- Livestock Marketing Information Center, <http://lmic.info/memberspublic/animalID/AnimalID.htm>
- International Livestock Congress, <http://www.livestockcongress.com/>
- United States Animal ID Plan, <http://www.usaip.info/>
- BEEF Magazine, <http://www.beef-mag.com/>
- National Institute for Animal Agriculture, <http://animalagriculture.org/>
- NCBA Animal ID, <http://www.beefusa.org/AnimalID.aspx>

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- <sup>16</sup>Rusk, Clinton P. 2002. Electronic identification of 4-H livestock projects. J. of Extension. Vol 40. <http://www.joe.org/joe/2002december/rb3.shtml> Accessed 8/1/2005.
- <sup>17</sup>Saa, C., M.J. Milan, G. Caja, and J.J. Ghirardi. 2005. Comparison of cattle identification costs using conventional or electronic systems in Spain. J. Anim. Sci. Abstract, ASAS meetings.
- <sup>18</sup>Rainey, Brian. 2005. Personal communication. Allflex USA.
- <sup>19</sup>Bailey, DeeVon. 2004. Benefits and Costs Associated with an Animal Identification System for Cattle in the United States. Western Extension Marketing Committee, Utah State Univ., Logan, UT. WEMC FS #2-04. Retrieved from <http://lmic.info/memberspublic/animalID/AnimalID.htm>
- <sup>20</sup>Lalman, David, Damona Doye, Randy True, Christina Higgins. 2005. Cow-Calf Production Record Software. OSU Extension Facts CR-3279, Cooperative Extension Service, Oklahoma State University. Retrieved from [pods.dasnr.okstate.edu/docushare/dsweb/HomePage](http://pods.dasnr.okstate.edu/docushare/dsweb/HomePage)
- <sup>21</sup>Ringwall, Kris. 2005. Manual tracking outdoes electronic tracking to date. Beef Talk. June. Retrieved from <http://www.ext.nodak.edu/extnews/newsrelease/2005/0630/05/02beefta.htm>
- <sup>22</sup>Drovers. 2004. Directory of Service Providers. Drovers. August. pp. 44.-45.

Table 3 is a summary of companies that supply different products for National Animal ID. It is adapted from a survey compiled by Dr. Dale Blasi with Kansas State University and BEEF magazine. The data fields for each company include:

- Ear tags-Company markets and manufactures electronic ear tags for livestock
- Handheld and Stationary Reader-Company markets and manufactures handheld or stationary RFID tag readers
- Scale head-Company markets and manufactures scale equipment to interface with RFID equipment
- Management Software-Company develops software for collection of Animal ID records
- Data Storage-Company provides offsite data storage services
- Paper option-Offer a non-computer or paper worksheet option for collection of animal ID information and some production management information
- Target Animal Industry-Company markets technology to these different industries

**Table 3. Comparison of Animal ID Systems** <sup>5,14</sup>

Company Contact Information	Ear Tags	Handheld Tag Readers	Stationary Tag Readers	Scale head	Management Software	Data Storage	Paper option	Target Animal Industry
AgInfoLink USA <a href="http://www.aginfo.com">www.aginfo.com</a> Longmont, CO, 303-682-9898	No*	Yes	No*	No*	Yes	Yes	Yes	Multiple Livestock Species
Aleis International <a href="http://www.aleis.com">www.aleis.com</a> Jandowae, Queensland, Australia, +61 7 4668 5941	Yes	Yes	Yes	No*	No	No*	No	Beef, Dairy
Allflex USA <a href="http://www.allflexusa.com">www.allflexusa.com</a> Dallas Fort Worth Airport, TX, 800-989-TAGS	Yes	Yes	Yes	No	No*	No*	No	Beef, Dairy, Swine, Sheep, Goat, Cervid
Beef Concepts <a href="http://www.beefconcepts.com">www.beefconcepts.com</a> Springfield, MN, 800-504-4562	Yes	Yes	No*	No*	Yes	Yes	Yes	Beef, Dairy, Veal
Boontech Pty, Ltd. <a href="http://www.boontech.com">www.boontech.com</a> Kyneton, Victoria, Australia +61 3 5424 8482	No*	Yes	Yes	No	Yes	No	No	Beef, Dairy, Swine, Sheep
Cattlesoft, Inc. <a href="http://www.cattlemax.com">www.cattlemax.com</a> College Station, TX, 877-454-COWS	No	No*	No*	No*	Yes	Yes	No	Beef
Digi-Star <a href="http://www.digi-star.com">www.digi-star.com</a> Fort Atkinson, WI, 800-225-7695	No	No	No	Yes	Yes	No	No	Beef, Dairy, Poultry, Swine
Digital Angel Corporation <a href="http://www.digitalangelcorp.com">www.digitalangelcorp.com</a> South St. Paul, MN, 800-328-0118	Yes	Yes	Yes	No	Yes* <sup>1</sup>	No	No	Beef, Dairy, Sheep, Swine
EIDAP, Inc. <a href="http://www.eidap.com">www.eidap.com</a> Sherwood Park, Alberta, Canada, 780-467-2707	Yes	No*	No*	No	No	No	No	Beef, Dairy, Swine
eMerge Interactive <a href="http://www.emergeinteractive.com">www.emergeinteractive.com</a> Sebastian, FL, 877-578-BEEF	No*	No*	No	No*	Yes	Yes	Yes	Beef, Dairy, Equine, Goat, Sheep
EZ-ID, LLC <a href="http://www.ezidavid.com">www.ezidavid.com</a> Greeley, CO, 877-330-3943	Yes	Yes	Yes	No	No	No	No	Beef, Dairy, Fish, Goats, Sheep, Swine, Cervidae
Farnam Companies, Inc <a href="http://www.farnam.com">www.farnam.com</a> Phoenix, AZ, 800-234-2269	Yes	No*	No*	No	No*	No	No	Beef, Dairy, Sheep, Swine
Feedlot Solutions, LTD <a href="http://www.feedlotsolutions.com">www.feedlotsolutions.com</a> Kearney, NE, 888-300-2727	No	No	No	No	Yes	No	No	Beef (feedlot)
Gallagher Power Fence, Inc. <a href="http://www.gallagherusa.com">www.gallagherusa.com</a> North Kansas City, MO, 800-531-5908	No*	No*	No	Yes	Yes	No	No	Beef, Dairy, Goat, Sheep, Swine
Global Animal Management, Inc. <a href="http://www.mygamonline.com">www.mygamonline.com</a> Union, NJ., 800-235-9824	No*	No*	No	No*	Yes	Yes	No	Beef, Dairy, Sheep, Swine, Deer
GrowSafe Systems, LTD <a href="http://www.growsafe.com">www.growsafe.com</a> Airdrie, Alberta, Canada, 403-912-1879	No*	Yes <sup>4</sup>	Yes <sup>4</sup>	Yes	Yes	No	No	Beef, Dairy, and exotic species

Company Contact Information	Ear Tags	Handheld Tag Readers	Stationary Tag Readers	Scale head	Management Software	Data Storage	Paper option	Target Animal Industry
I.D. ology <a href="http://www.id-ology.com">www.id-ology.com</a> Eau Claire, WI, 800-395-5585	Yes	Yes	Yes	No*	Yes	No	Yes	Beef, Dairy, Goats, Sheep
IMI, Inc. <a href="http://www.imiglobal.com">www.imiglobal.com</a> Platte City, MO, 888-343-4796/816-858-4796	No*	No*	No*	No*	Yes	Yes	No	Beef, Swine
Lion Edge Technologies Inc <a href="http://www.lionedge.com">www.lionedge.com</a> Aurora, CO, 720-222-0681	No*	No	No	No	Yes	No	No	Beef
Micro Beef Technologies, LTD. <a href="http://www.microbeef.com">www.microbeef.com</a> Amarillo, TX, 800-858-4330	No*	No*	No*	No*	Yes	Yes	Yes	Beef, Dairy, Swine
Midwest MicroSystems, LLC <a href="http://www.midwestmicro.com">www.midwestmicro.com</a> Lincoln, NE, 402-323-6969	No*	No*	No*	No*	Yes	Yes	Yes	Beef
Optibrand Ltc., LLC <a href="http://www.optibrand.com">www.optibrand.com</a> Fort Collins, CO, 866-516-1462	No* <sup>2</sup>	No*	No*	No*	Yes	No	No	Beef, Dairy, Sheep, Swine, Exotics (Deer, Elk, Bison)
Osborne Industries, Inc <a href="http://www.osborne-ind.com">www.osborne-ind.com</a> Osborne, KS, 800-255-0316	Yes	No*	Yes	No*	Yes	No	No	Beef, Dairy, Goats, Sheep, Swine, Cervidae
Red Wing Software <a href="http://www.redwingsoftware.com">www.redwingsoftware.com</a> Red Wing, MN, 800-732-9464	No	No	No	No*	Yes	No	No	Beef
Reliable Scale Corp. <a href="http://www.reliablescale.com">www.reliablescale.com</a> Calgary, Alberta, Canada, 800-419-1189	No	No*	No	Yes	No	No	No	Beef
Research Management Systems (RMS) <a href="http://www.rmsusa.com">www.rmsusa.com</a> Fort Collins, CO, 970-226-4080	No*	No*	No*	No*	Yes	Yes	No	Beef, Dairy, Sheep, Swine
SFK Technology, Inc. <a href="http://www.sfktech.com">www.sfktech.com</a> Denmark, +45 4450 3700	Yes	No*	Yes	No	No	No	No	Beef, Sheep, Swine
ScoringSystem, Inc <a href="http://www.scoringsystem.info">www.scoringsystem.info</a> Sarasota, FL, 877-684-0018	No*	No*	No	No	Yes	Yes	Yes	Multiple livestock species
Temple Tag, LTD. <a href="http://www.templetag.com">www.templetag.com</a> Temple, TX, 800-433-3112	Yes	Yes	Yes	No*	No*	No	No	Beef, Dairy, Goat, Sheep, Swine
Tru-Test, Inc. <a href="http://www.tru-test.com">www.tru-test.com</a> Mineral Wells, TX, 800-874-8494	No*	No*	No	Yes	Yes	No	No	Beef, Dairy, Sheep, Swine
Turnkey Computer Systems <a href="http://www.turnkeynet.com">www.turnkeynet.com</a> Amarillo, TX, 800-999-0049	No*	No*	No*	No*	Yes	Yes	No	Beef
VeriLogik, Inc. <a href="http://www.verilogik.com">www.verilogik.com</a> San Antonio, TX, 210-767-8878	Yes	Yes	No*	No*	No*	Yes	No	Beef, Dairy, Deer Goats, Sheep, Swine, and Red
Y-TEX Corporation <a href="http://www.y-tex.com">www.y-tex.com</a> Cody, WY, 888-600-YTEX	Yes	Yes	Yes	No*	Yes <sup>3</sup>	No	Yes	Beef, Dairy, Sheep, Swine

\*Company has an affiliation with another manufacturer or the ability to interface with other brands of ear tags, readers, software, and data storage systems. The producer might want to contact the company for additional details.

<sup>1</sup>Software is only available for swine and not beef cattle. However, the company has affiliates for beef software.

<sup>2</sup>Optibrand has multiple EID and biometric options for collection of animal ID information.

<sup>3</sup>Software is an Aginfolink product.

<sup>4</sup>Non-ISO compliant technology

**Table 4. Animal ID or data management companies that provide technology or support services for National Animal ID<sup>22</sup>**

Contact Information	Comments	Target Industry
American Angus Assoc. <a href="http://www.angussource.com">www.angussource.com</a> www.beefrecords.com St. Joseph, MO 816-383-5100	-Software for commercial and seedstock breeders -Marketing program using Allflex electronic ID technology	Beef
American Hereford Assoc. <a href="http://www.herefordverified.com/">www.herefordverified.com/</a> Kansas City, MO 866-437-3638	-Marketing program using RFID electronic ID technology	Beef
Chaps 2000 <a href="http://www.chaps2000.com">www.chaps2000.com</a> Dickinson, ND (701) 483-2045	- Commercial and seedstock production record software	Beef
Cow Calf 5 <a href="http://www.cowcalf.com">www.cowcalf.com</a> Clay Center, NE 402-762-4357	-Commercial and seedstock production record software	Beef
DHI Computing Service, Inc <a href="http://www.dhiprovo.com">www.dhiprovo.com</a> Provo, UT 800-992-1344	-Software for dairy cattle management	Dairy
Dairy Records Mgmt. Sys. <a href="http://www.drms.org">www.drms.org</a> Clovis, CA 877-225-3442	-Software for dairy cattle management (PCDART)	Dairy
Global Vet Link, LCL <a href="http://www.globalvetlink.com">www.globalvetlink.com</a> Ames, IA 515-296-0860	-Electronic health certificates and animal health regulations -Designed for use by animal health officials, veterinarians, and laboratories	Multiple Species
National FAIR (Farm Animal ID and Records) <a href="http://www.nationalfair.com">www.nationalfair.com</a> Brattleboro, VT 802-254-4551	-Markets animal ID equipment -Data management system tracks movements and maintains animal health data	Dairy
Pardalis Software <a href="http://www.pardalis.com">www.pardalis.com</a> Stillwater, OK 877-696-9282	-Animal traceability and information marketing system	Multiple Species
Premier <a href="http://www.premier1supplies.com">www.premier1supplies.com</a> Washington, IA 800-282-6631	-Markets animal ID equipment	Multiple Species
Valley Agricultural Software <a href="http://www.vas.com">www.vas.com</a> Tulare, CA 888-225-6753	-Software for dairy cattle management -Markets animal ID equipment	Dairy