Animal Identification

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Working with Animal Identification Technology Providers

Overview

There is a wide array of terms and technology associated with animal ID, and these terms and technology tend to be very confusing. In addition, there are a growing number of companies providing products and services to assist production agriculture as animal ID is introduced to our industry. The following discussion is intended to provide an introduction to some of the more common terms and technology tools that will be used in the future. Also described in this discussion are the ID devices/methods and the hardware to support these new systems. The final section provides some questions to ask technology providers regarding their products and services.

Introduction

The National Food Animal Identification Plan (NAIP) was initially developed by the National Food Animal Identification Task Force and is now sponsored by the National Institute for Animal Agriculture. This is a joint effort of industry and government working diligently to create a National Animal Identification System (NAIS). The plan serves as a template for both standardization of ID numbering systems as well as establishment of standard format specifications of required data associated with an animal. The plan can be viewed at www.usaip.info.

Individual identification (ID) of cattle will require additional input costs associated not only with the cost of the ID device, but also with the labor and equipment needed to read, record, and store the individual ID number and related data at each of the production segments. As individual ID is used facilitate collection and analysis of production data, it will become increasingly important that the ID systems are reliable and efficient to use. The tools and resources that technology providers offer to the industry will be vital to the successful implementation of the NAIS.

Western Extension Marketing Committee

LMIC Livestock Marketing Information Center

Western Center for Risk Management Education

Technology Providers Glossary of Terms:

The NAIS and the components supporting it bring several new words not previously part of day-to-day life in animal agriculture. What follows is not intended to be a comprehensive list of "technology" terms, nor will it impress a "technology professional" with the accuracy or completeness of the descriptions. The goal is to provide a basic list that will assist in navigation through a technology provider's informational literature (e.g. advertisements) about its products and services.

Terms Related to Data and Databases

Data – Facts or figures from which conclusions can be determined. For example, information about animals and their premises.

Data element – A segment of data such as the premise ID or the animal birth date.

Database – A collection of data managed and stored in one place. These databases look like a ledger sheet. One example would be Microsoft Excel.

Relational database – A database with a set of tables containing data fitted into predefined categories. Examples include Microsoft Access and FoxPro.

Enterprise database – A robust relational database that can manage extremely large amounts of data. These are often referred to as a centralized database. Examples include Oracle and Sequel Server.

Distributed database system – Consists of several enterprise databases that talk to each other via the internet.

Relational database management system (RDBMS) – A program that allows users to create, update, and administer a relational database. An RDBMS takes Structured Query Language (SQL) statements either contained in an application program or entered by a user and creates, updates, or provides access to the database.

Types of Computer and Traceback Technology Terminology:

Desktop PC – Standard home computer that sits on your desk. Components include a monitor, a tower (the computer), a printer and several cables that connect the components.

Laptop or Notebook – A computer that "folds up" (about the size of a standard notebook) to be easily moved from one location to another.

Personal Digital Assistant (PDA) – A small, handheld (palmtop) computer that fits into a shirt pocket. These devices do not have the full capabilities of a notebook computer but are good for collecting smaller amounts of data. They may also allow access to the internet to transfer data. Additionally, many of them recognize handwriting and use a touch screen.

Tablet PC – A hybrid cross between a PDA and a notebook computer. They combine a fully functional computer with a screen that works like a PDA device. They also recognize handwriting and function as a touch screen.

Scale head – The brains of a weighing system that displays the weight received from the load cells. Several manufacturers of weighing systems have incorporated simple computer functionality into their products.

Server – A robust computer that can run multiple computer programs 24 hours a day.
Internet – A collection of computers all over the world that are networked (talk to each other).
Web-enabled – The computer's software and data are available using any computer connected to the internet.
Internet Portal – A complete, browser-based (web-enabled) environment for creating, managing, and managing information. Portals are built using the industry's fastest, most complete, and integrated servers.
Comma Separated Value (CSV) – CSV's are one of the older computer industry standards for transmitting data between computer programs or over the Internet. Each piece of data is separated by a comma and must remain in a specific predefined order. If even one comma is missed, the data will placed in the wrong column when being imported into a new database. For example, 3/15/2004,100,Bull,
XML – A markup language for documents containing structured information. This type of data file contains a sort of dictionary that describes the data contained in the file. Then each piece of data is associated with its corresponding definition. The primary advantage to this type of a file is that each data file provides a built in explanation of the data contained in the file; thus, the order in which the data are received is not important. This greatly reduces the possibility of data translation error when communicating information between databases. For example, Birth Date = 3/15/2004; Birth Weight = 100; Sex = Bull
Secured Sockets Layer (SSL) and Public Key Infrastructure (PKI) – Describes a type of secured environment by which data access is limited to specific owners of the information.
Tier 1 Host Site – A reliable environment for mission critical systems. The locations where the database servers are located have back-up power supplies, multiple lines of communication to the internet, 24 hours a day/7 days a week onsite personnel, physical security, and off-site data backup storage.
RFID (Radio Frequency Identification) – A system consisting of a tag, an antenna, a reader, and some sort of data processing equipment, such as a computer. A reader sends a request for ID information to the tag. The signal hits the chip and creates an electronic current in the first coil, which causes it to charge the microchip. The tag responds with the respective information, which the reader then forwards to the data processing device.
EID (Electronic Identification Device) – A silicone chip and copper wire. The microchip has an imbedded EID number code on it.
Antenna – A device that sends and receives radio frequency signals.
Reader – A computer-like device that controls antennae and can activate a tag or chip.
Retinal Scan – A digitized picture of the blood vessel pattern in the retina of an animal's eye. This pattern is more distinctive than a human fingerprint and can serve as unique ID.
DNA Sample – A biological sample from an animal, usually blood, hair, or tissue.

Identification Devices / Methods

The animal identification tools that will be used in the future will need to include a unique ID number, support the ability to manage volumes of livestock, be tamper proof, function at current production line speeds, and incorporate streamlined coordination of data management. The current recommendations in the NAIS are clear that rules will remain "technology neutral," which results in an industry free to choose the method of individual animal ID that best suits its production system. There are a number of ways to individually identify animals. Plastic tags are available with both visual ID numbers and bar codes. Metal tags have been used for permanent individual animal ID in the past, most notably in the Brucellosis Eradication Program.

In the area of electronic devices there are a couple versions of the implantable microchips, rumen boluses, and several companies produce the more commonly used external button tags. At last count there were at least 13 different companies manufacturing electronic identification (EID) tags for use in animals. Radio frequency identification (RFID) is a generic term for technologies that use radio waves to automatically identify individual items. While there are several methods of identifying objects using RFID, the most common is to store a serial number that identifies a product, and perhaps other information, on a microchip attached to an antenna (the chip and the antenna together are called an RFID transponder or an RFID tag). The antenna enables the chip to transmit the ID information to a reader. The reader converts the radio waves returned from the RFID tag into a form that can then be passed on to computers which can then make use of it.

Two biological technologies include DNA "finger printing" and retinal scanning as methods of permanent ID. Currently an important consideration when choosing an ID method is that current rapid production line speeds dictate that the ID method utilized will need to be an automated process.

Data Collection Hardware

Data readers can be large or small. Feedlots, sale barns, and packing plants will likely be using the large panel and portal "walk through" readers. There is a perception that everyone wants larger read ranges on antennas so they can read the tags from a longer distance. Two variables predict the read range: 1) how much copper wire is in the ID device and the antenna, and 2) the amount of power provided to the system from the reader. The way to get a longer read range with the microchips is to use larger antennas. With small microchips, read range is measured in inches (six inches or less). The bigger the microchip used, the more read range attained.

Antennas are available in many formats, ranging from large stationary panels to small hand-held devices that can be attached directly to computers or scale heads. In its simplest form, an antenna is a coil of copper wire that can send out a radio frequency signal and then read it back to get the number into the computer.

Data Management

Discussion continues concerning whether the NAIS individual animal database will be a single central database or a dispersed database system. A completely separate discussion involves the management of production data. This will most certainly not be managed on a central database system. Realization of a value proposition will require the ability to coordinate and share data across all industry segments. The model will need to include both local data availability as well as uploads to off-site data storage. This will provide for protection of the data in the case of a disaster. Producers could use consolidated reports on data collected across industry segments. One example of this is the ability to compare carcass quality to the incidence of illness. The use of large, coordinated databases in conjunction with the internet will allow for reports to be generated regarding the farm or production facility as often as management demands. The sharing of data across industry segments utilizing these large, coordinated databases and the internet will require stratified security access to data. This means that data will need to be username and password protected. Third party providers utilize this type of data security for military intelligence and the banking industry now on a continuous can't-fail basis.

Questions to Ask Technology Providers Regarding Data Collection

Q. Does your system meet the requirements described for the National Animal Identification System?

Q. I have different types of animals in my livestock operation; can your products handle them all?

Q. What types of technology does your system support?

Q. Do I have to carry the computer with me when I am out in the field collecting data?

A technology provider should have their software platforms developed to support any guidelines agreed upon by the livestock industry and the USDA in support of the NAIS. You should ask your technology provider if their software is configured to work on multiple hardware devices such as laptops, Personal Digital Assistants (PDAs), tablet {PCs, touch screen monitors (similar to the type utilized in the restaurant industry) or your desktop. Changes in hardware technology are very rapid, so most computer software technology providers have configured their software to work with a variety of hardware devices such as various models of EID readers, scales, barcode readers, thermometers, etc. It is very important that the technology provider with whom you choose to work supports the species (cattle, horses, swine, sheep, cervidae, etc.) on your operation. In order to facilitate the implementation of the NAIS, some of the providers will need to adapt their services to accommodate multi-species applications. The NAIS plan will start with the registration of

premises and slowly phase in the individual animals. It is important that your technology provider has the software ability to capture both visual and electronic tag information.

Questions to Ask Technology Providers Regarding Data Storage

Q. Where is my data stored?

Q. Will my data be lost?

Q. Can I back up my data when I am working my herd?

Your technology provider should provide details on how your livestock data is stored and maintained. They should also be able to share information about who has access to your data, where it is stored, and how the data is backed up for safe keeping. Almost all systems store your data on your local computer, and most will also have a copy of the same data stored on a server computer that they maintain at a central location or at several locations. In addition, the centralized databases should be backed up to a separate, off-site storage system to be used in case of a catastrophic event such as a fire, computer failure, tornado, or flood. Most systems will also contain a toolset provided to enable you to save all of your data manually or automatically as your livestock are being processed.

Questions to Ask Technology Providers Regarding Data Security

Q. When sending my information, will my data be exposed to hackers?

Q. If I upload data, who will be able to see it?

Technology providers will need to provide an encrypted (coded) method of sending data to a safe storage facility. Therefore, your data are as safe as modern technology allows. Your technology provider will grant control to others who will have access to your data. In some systems no third party will be able to access your information without permission, while in other systems the data is transferred with ownership of the cattle. You need know how your data is being handled and who is doing the handling.

Questions to Ask Technology Providers Regarding Data Access

Q. Can I create reports of my data in the software products I have purchased?

Q. Can I export data collected to Microsoft Excel or other spreadsheet or database applications?

Q. Will I be able to receive carcass information from a packing plant?

Most software products should provide basic reporting from within their applications. In addition, many technology providers have more extensive reporting capabilities accessible from their internet portals seamlessly integrated with the front-end software product lines. As a producer, you should have the ability to export or transfer data into a spreadsheet format. Your data can be transferred to other programs, and can also be printed in a hard copy format for your files. The NAIS is interested in 48-hour traceback to protect our national herd from a foreign animal disease (FAD) or other catastrophic disease outbreak only. There are currently many alliances being formed that will be able to help coordinate carcass information back to the producer. Multiple technology providers will be offering

tools to coordinate all types of production information (including carcass data) across all production segments, but these activities will be outside of NAIS activities. It is important to keep in mind that currently most packing plants and carcass/box operations do not have the ability to automatically coordinate live animal ID numbers to individual carcass data. The NAIS, once fully implemented, will provide some of the basic infrastructure needed for the industry to take the next step toward individual carcass data integration.

Questions to Ask Technology Providers Regarding Service and Support

Q. Which types of technology do you sell, service, and support?

Q. How can I contact your technical support?

Q. What type of training will you provide for both myself and my employees if I purchase your product?

Q. What do I do if I forget my password?

Q. Where are current installations of your software product line?

As far as technical support, at minimum technology providers should give you a telephone number to call for assistance and their support staff's hours of operation. You should also be sure to test the software on your operation before you make a substantial investment and begin using it to work livestock. Poor performing software makes for unnecessary costs and a long day at the chute. Your technology provider should have technical manuals to help troubleshoot and answer questions. It is important to make sure that you know where these manuals are located in the program or in a hardcopy format. Your technology provider should also provide easy access to your passwords and give you the ability to update or change your password as you desire. Technology providers should be able and happy to provide you with a contact list of customers who have used their software, hardware, and/or data management services. The early adopters will likely be called upon to provide advice and relay not only their experiences with service providers but also these new tools to other producers.

Conclusions

The relative costs and efficiencies associated with the collection and recording of individual ID numbers at each level of the production chain (including cow/calf operations, auction markets, stocker operations, feedlots, packing plants, brand inspections, state regulatory activities, and retail outlets) are not well established today. In addition to the evaluation of ID devices, the hardware used to record and transmit the individual ID number and the data collection software must also be considered. The methods by which this new data is stored in a database and how long it needs to be stored will be important considerations for ongoing costs associated with the NAIS. Current pilot projects and future initial implementation projects will help provide the answers to these questions.