
Biometric Identification Of Livestock

**The Role of Biometric Identification for Source
Verification of Livestock**

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Objectives

- Options and methods
 - Where does it fit
 - Implementation strategies
-
-

Biometric Identifiers in People

Biometric	<u>Verify</u>	<u>ID</u>	<u>Accuracy</u>	<u>False Pos.</u>	<u>False Neg.</u>
<u>Fingerprint</u>	✓	✓	High	Difficult	Difficult
<u>Facial Recognition</u>	✓	✗	Medium	Difficult	Easy
<u>Hand Geometry</u>	✓	✗	Medium	Very Diff.	Medium
<u>Speaker Recognition</u>	✓	✗	Low	Medium	Easy
<u>Iris Scan</u>	✓	✓	High	Very Diff.	Very Diff.
<u>Retinal Scan</u>	✓	✓	High	Ext. Diff.	Ext. Diff.
<u>Signature Recognition</u>	✓	✗	Medium	Medium	Easy
<u>Keystroke Recognition</u>	✓	✗	Low	Difficult	Easy
<u>DNA</u>	✓	✓	High	Ext. Diff.	Ext. Diff.

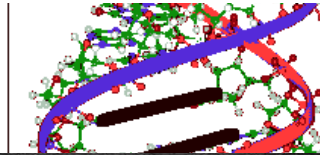
Source: National Center for State Courts

Biometric Identifiers in Livestock

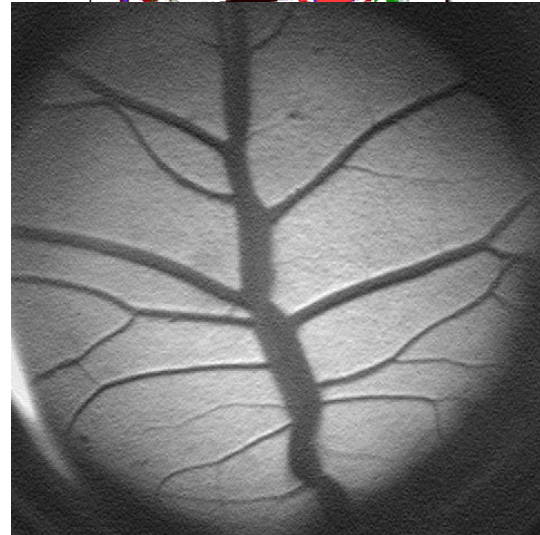
- Nose print



- DNA



- Retinal Image





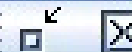


Image 1

Retinal Image

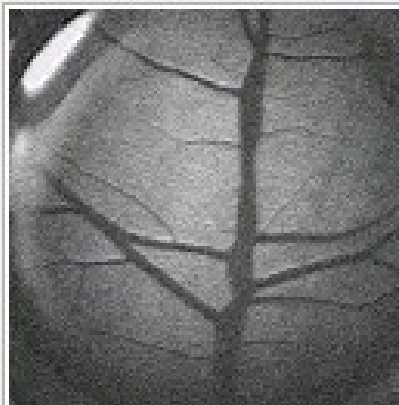


Image Template

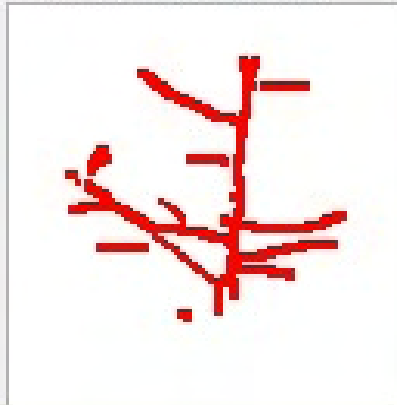


Image 2

Retinal Image

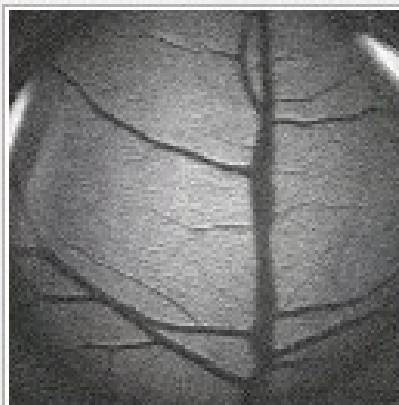
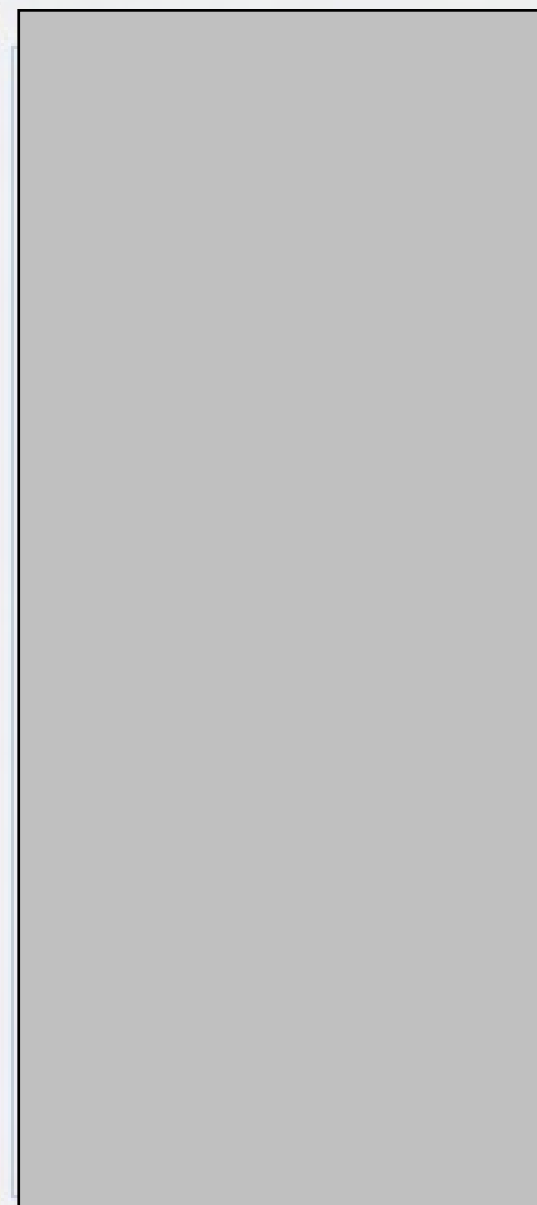
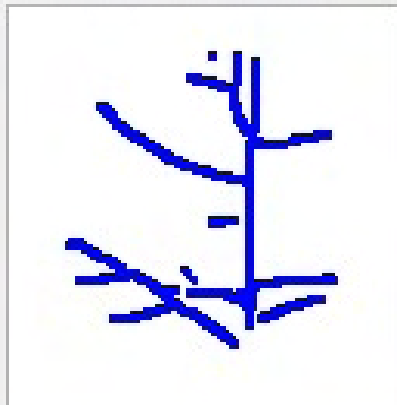


Image Template



Finished



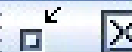


Image 1

Retinal Image

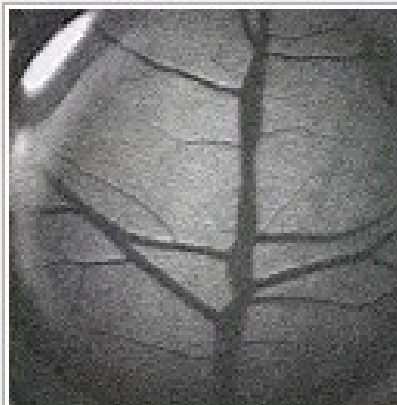


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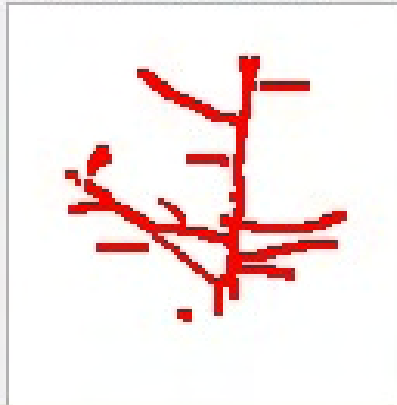


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Retinal Image

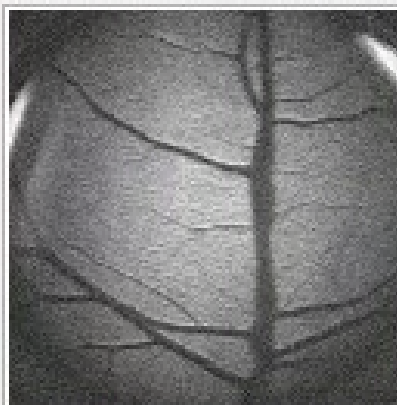
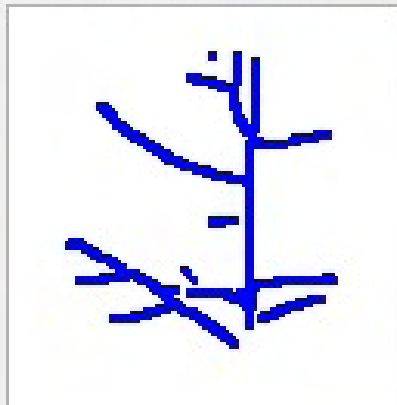
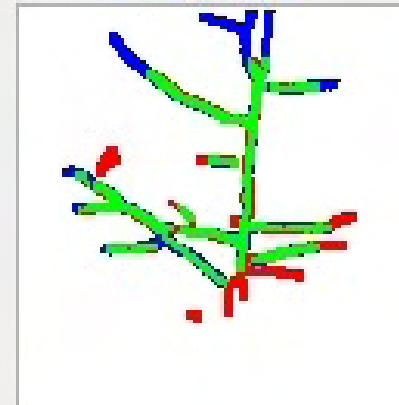


Image Template



Match Output

Overlay Image



Overall

Score: 100.00

Cancel Match

Show Report

Close

Finished



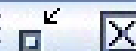


Image 1

Retinal Image



Image Template

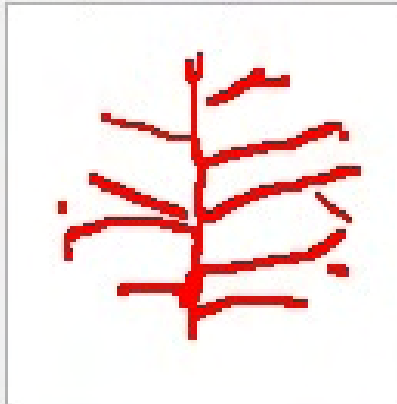
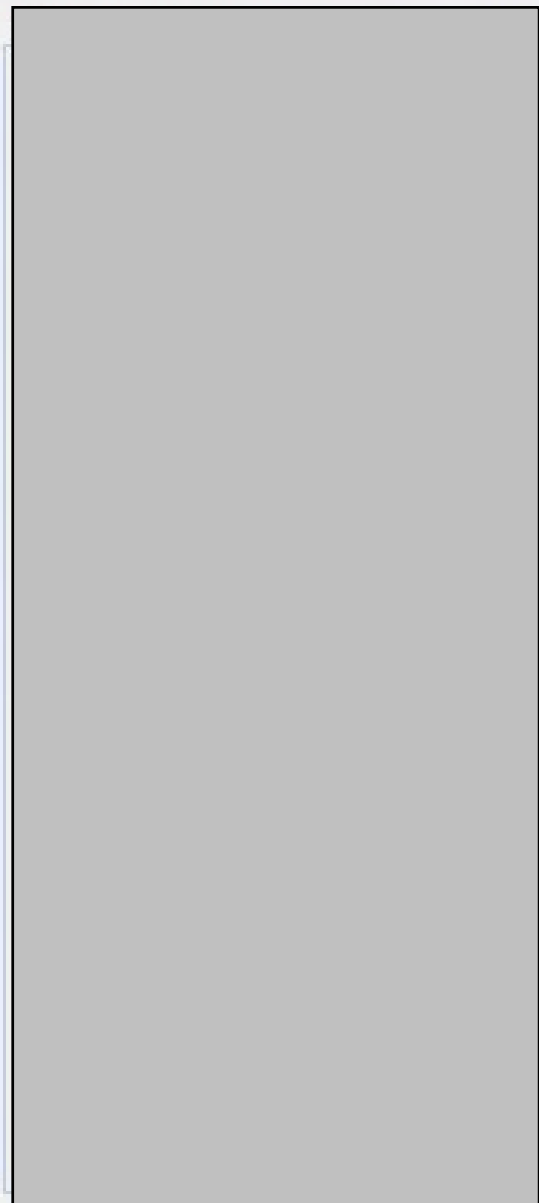
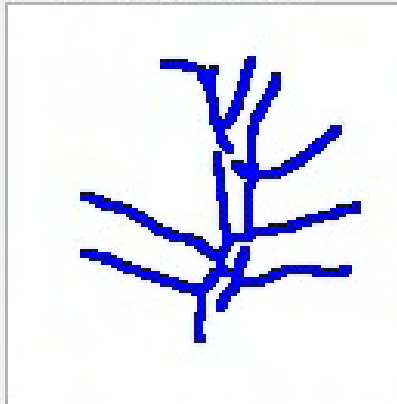


Image 2

Retinal Image



Image Template



Finished



Image 1

Retinal Image



Image Template

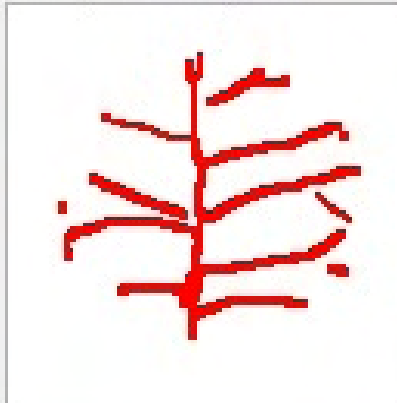
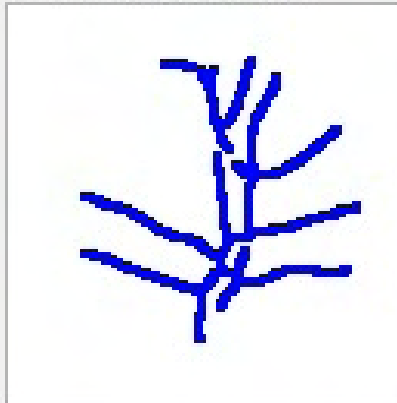


Image 2

Retinal Image

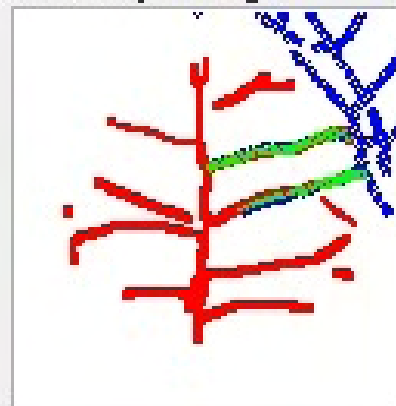


Image Template



Match Output

Overlay Image



Overall

Score: 48.68

Cancel Match

Show Report

Close

Finished





United States Department of Agriculture
Animal and Plant Health Inspection Service

The National Animal Identification System (NAIS)

Why Animal Identification?
Why Now? What First?

Program Aid No. 1797



-
- “Speed of commerce”
 - ISO standards
 - Confidentiality
 - Performance standards
 - 48 hour traceback
 - Etc...
-



Identifying and Tracking Livestock in England

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL
HC 1146 Session 2002-2003: 12 November 2003



- \$3.69/animal
 - ~\$35/head cattle
 - \$16.6M loss for postal applications
 - 25% inaccurate
 - 2/3 staff for correcting errors
 - Fined \$25.8M for anomalies
 - 1,000,000 cattle unaccounted for
 - \$240M invested so far.
-

Forensic and Non-forensic applications

- Original Motivation
 - USDA APHIS – disease control
- Smith et. al (2005)
 - Ownership
 - Biosecurity
 - International customer
 - COOL
 - Supply-side management
 - Value-based marketing
 - Value added marketing
 - Food safety
 - Product recalls
- Secure title on collateral



United States Department of Agriculture
Animal and Plant Health Inspection Service

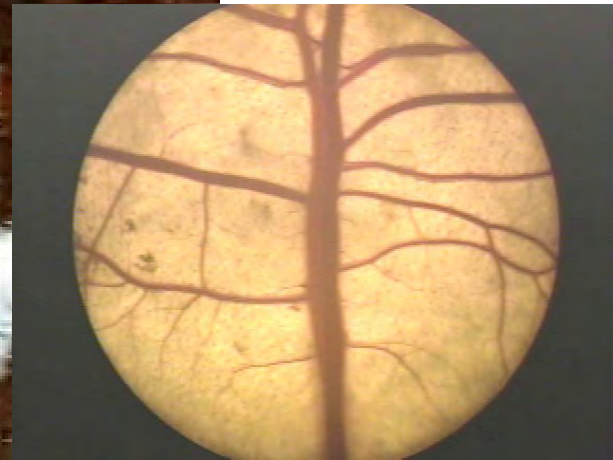
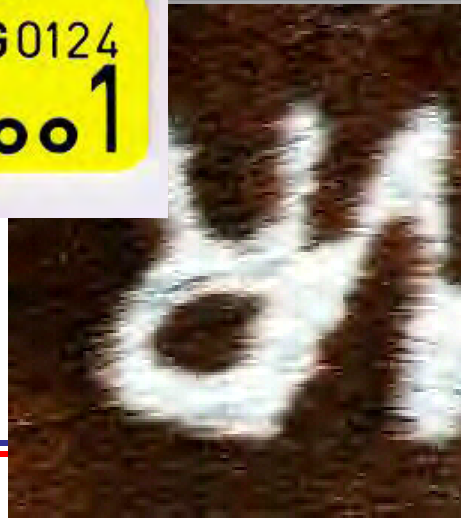
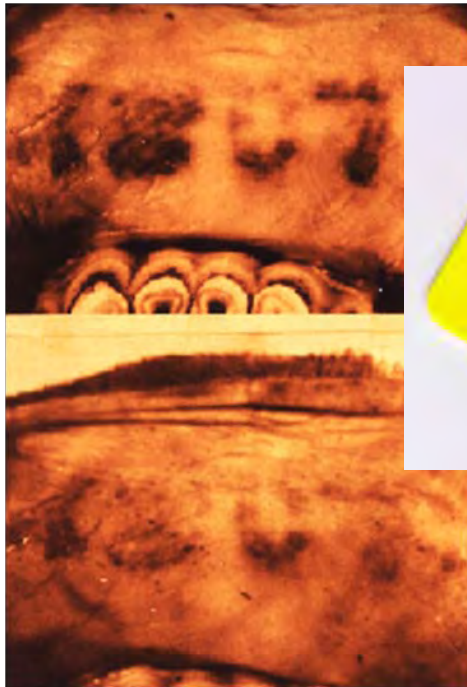
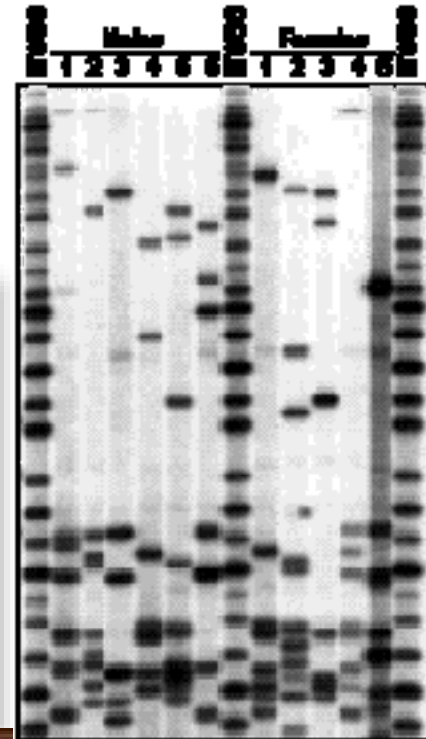
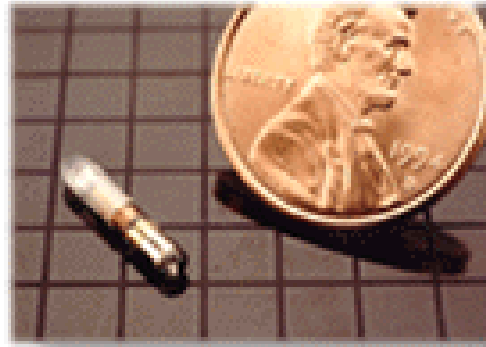
The National Animal Identification System (NAIS)

Why Animal Identification?
Why Now? What First?

Program Aid No. 1797



- Admissibility
 - » Identifier
 - » Source information



Daubert Factors

- Proof of testing of the underlying hypothesis
- Peer review and publications
- Known or potential error rate
- Existence of accepted methodology
- General acceptance by the forensic community



Japan

- ~180,000 BSE cases worldwide
- 84 under 30moa ~ 0.05%
 - Mostly UK
 - None since 1996
- Japan has 2 out of 17
 - Age determine by tag ID





This is Fraud!



Fraud is a crime at everyone's expense!
...and it costs millions

The Department is determined to crack down on Fraudsters but we need your help!

Northern Ireland Dept. of Ag. Evaluation

- *System can verify an animal ID with 100% accuracy*
 - Imaged 306 ARINI dairy animals
 - 1142 images from 273 of these animals collected at later date.
 - ALL 1142 re-tests matched the original ID.
 - *System can detect fraudulent ID switching with 100% accuracy*
 - Fraud scenario – 113 animals with switched official Northern Ireland ID system tags
 - No images from animals with switched tags matched the original retinal ID for that animal
-



Biometric Implementation

- High risk animals
 - Regulatory application
 - Could implement immediately
 - High value animals
 - Commercial application
 - Multi-modal Identification
 - Common in human applications
-
-

Recommendation

Define and implement
procedure for incorporation of
technology

About Optibrand

- CSU Roots
- Founded in 1998
- Commercial Release
 - North America-January 2004
 - Europe-February 2004





Core Technology: The Retinal Vascular Pattern

- Unique to every animal
- Each eye is different
- Does not change from birth to hours after death
- Can not be altered, lost or changed
- Link to GPS time, date & location data to provide secure traceability





Core Vision: Universal Data Collection

- Retinal images
- RFID tags
- Bar code tags
- Printed tags
- Photo documentation
- Link to GPS time, date & location
- Secure and fraud resistant



The OptiReader™ Live Animal System

- Captures a RVP image \leq 15 seconds
- Wireless RFID reader
- Photo-documentation
- Easy entry of management data
- GPS records date, time and location
- Data is encrypted for security
- Massive storage – Compact flash card
- Programmable data collection - *multilingual*





Geburtsdatum 11 11 1997
Ohrmarke 057710507909
Rasse SBT



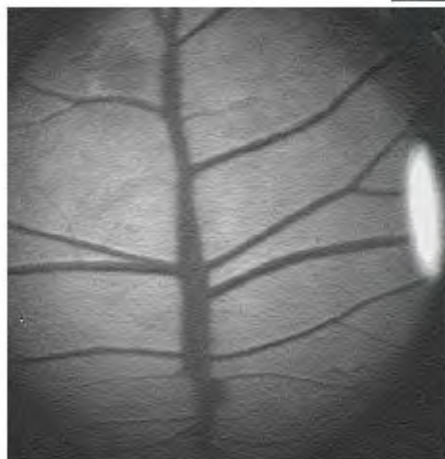
Optibrand™

secure source verification

Geburtsdatum 11 11 1997

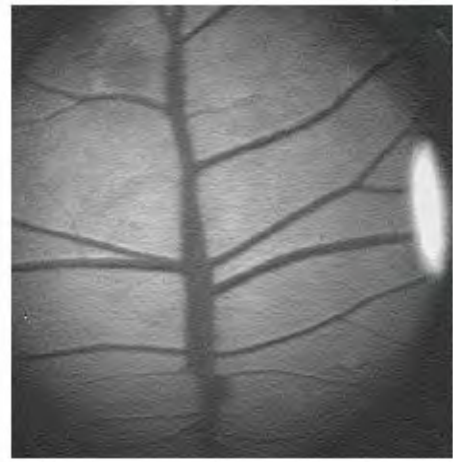
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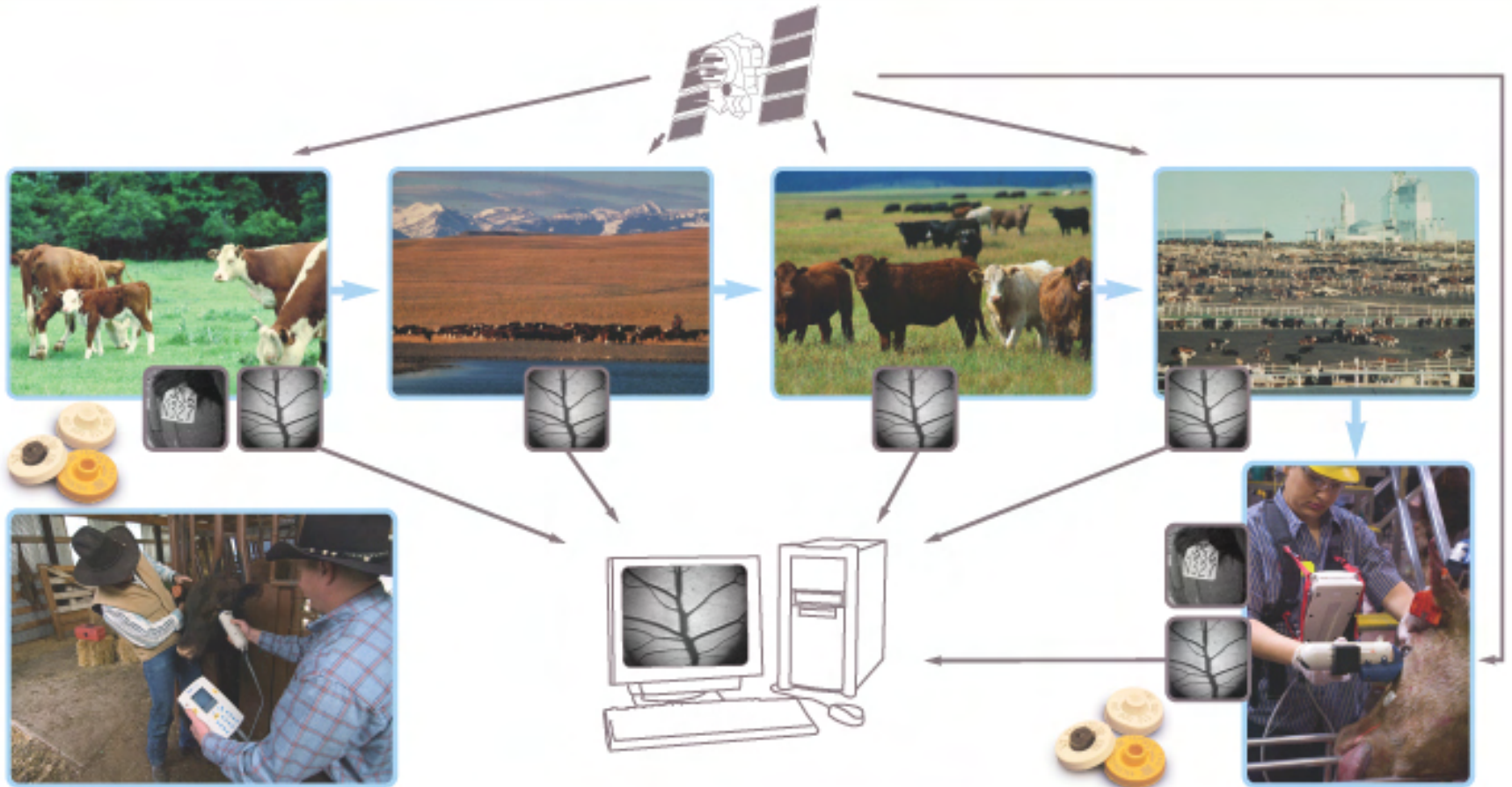




Geburtsdatum 11 11 1997
Ohrmarke 057710507909
Rasse SBT



HOW THE OPTIBRAND™ SYSTEM WORKS



Optibrand™

Re - establishing identity : CSU - ECRC

- July 14, 2004; n = 189 cows
 - 74 lost original RFID tags (39%)
 - October 2, 2004; n = 219 cows (189 + 30 heifers)
 - Another 35 lost original RFID Tags (30.4%)
 - Analysis
 - ID correctly confirmed in 80 animals w/ original RFID;
 - Original RFID tag number correctly re-established for all animals that lost tags from July to Oct.
-

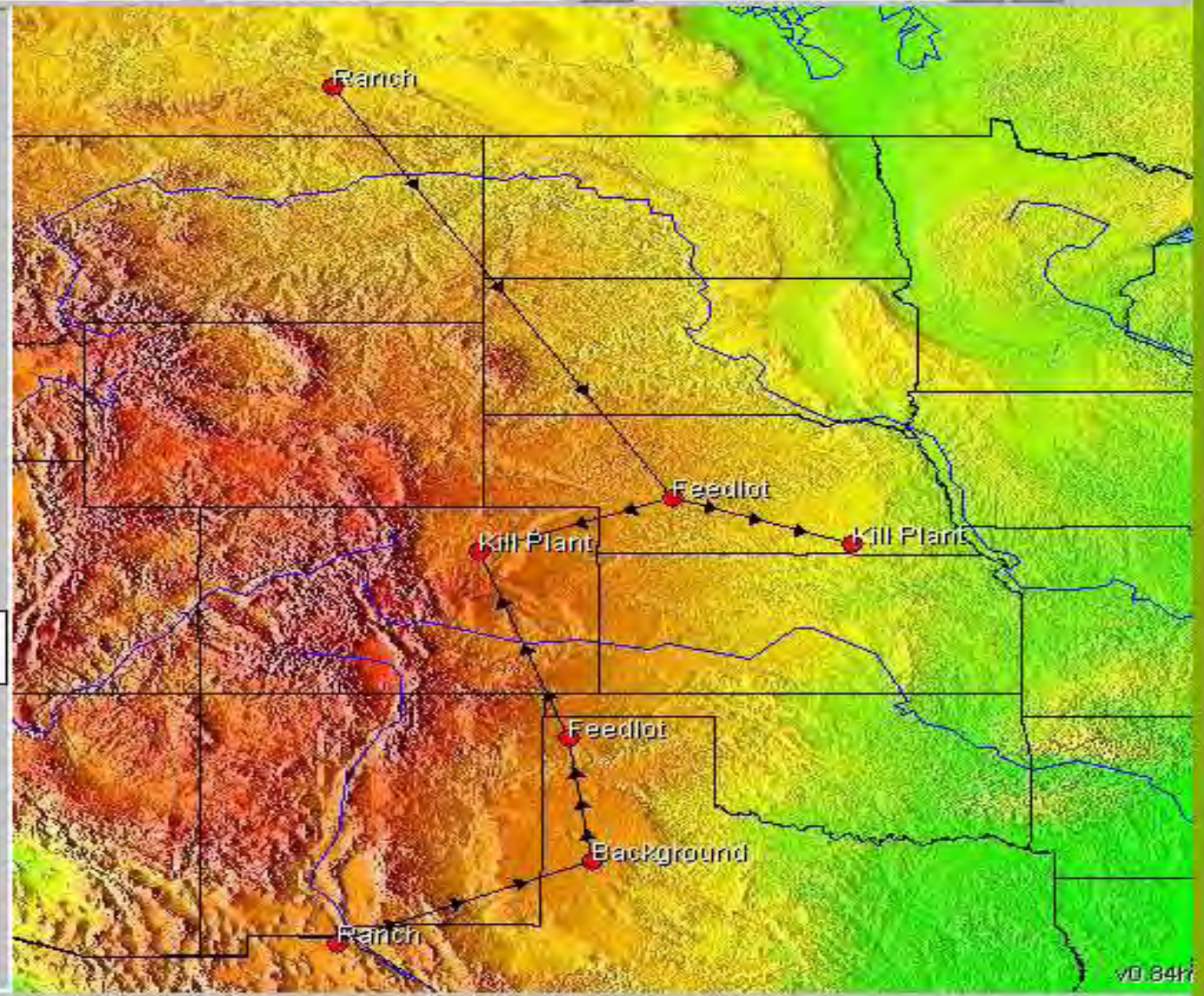




North America

Optibrand GIS

- Countries
- US Borders
- Movement
- Rivers
- Cities
 - ★ Capital
 - <100,000
 - >100,000
 - >1 mil
- Locations
 - Location
 -
- Cows
 - ★ Cows



LOG

The active layer is Cows

-112.32, 30.59
Zoom 1722 km



Livestock Identification, Traceability
and Source Verification Systems

(970) 490-6022

www.optibrand.com
