

Milk and Protecting it Against Agri-terrorism
Milk Transport Security
“The Tanker of Tomorrow”
NALMA and ICAR Joint Meeting
June 16, 2008



Chris Thompson, Milk Coordinator, Regulatory Services
University of Kentucky, College of Agriculture



Homeland Security Project

- National Institute for Hometown Security
 - Non-profit R & D organization
- Kentucky Homeland Security Consortium
 - Kentucky's public and private universities



Project Objective

- Develop a Milk Transport Security System that will provide assurance that the milk, milk samples and security data are securely transported between the dairy farm and milk plant.
- Demonstrate a wireless electronic security system at two milk plants and multiple dairy farms.
- Deliver the technology to the national community through collaborations, technical conferences, publications and standards.



Functional Requirements

- Provide “Secure Transport” of milk
- Operate with the current U.S. milk transport infrastructure
- Physically store the milk data and security data with the milk transport tank
- Provide redundant milk data and security data storage
- Adaptable to “differences” in bulk milk marketing and transportation systems



A Wireless Electronic System for Securing Milk from Farm to Processor

Security Protocol's attributes

- Who
- Why
- When
- Where
- What



A Wireless Electronic System for Securing Milk from Farm to Processor

System components

- Security
- Accountability
- Data gathering
- Data management
- Traceability



Terminology

- **Security:** something not only *is secure* but that it *has been secured*. Includes measures that prevent or deter unauthorized individuals from accessing a facility, resource or vessel.
- **Accountability:** the traceability of actions performed on a system i.e. the use of unique identifiers and authentications supports accountability.
- **Surveillance:** the monitoring of activities or behavior... verification, identification...



Security System Challenges

- **Adaptable**
 - Tanker designs
 - Farm and plant systems
 - Environmental stress
- **Compliant with current requirements**
- **User friendly**
- **Cost effective**



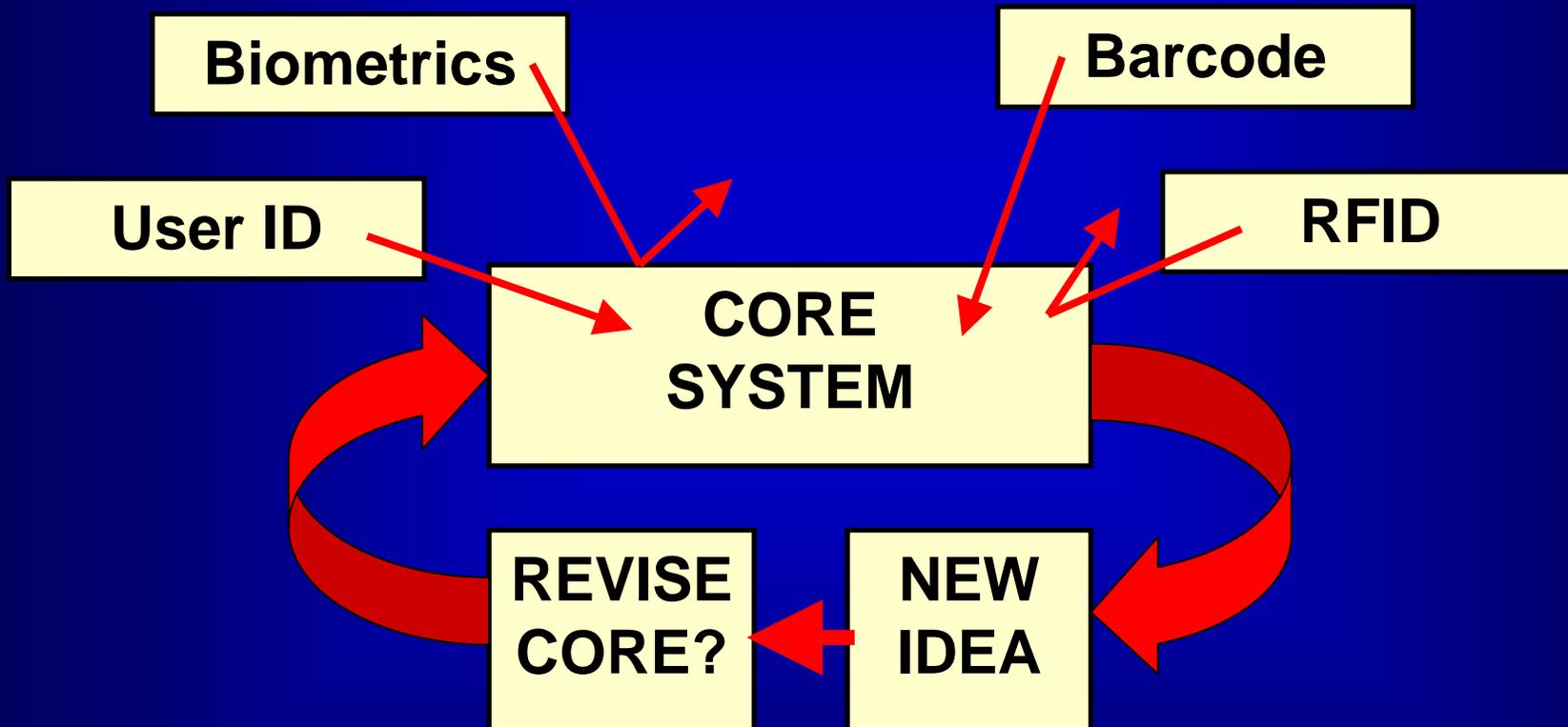
A Wireless Electronic System for Securing Milk from Farm to Processor

- **Industry input**
 - A. Wilson Trucking
 - Bluegrass Tank and Equipment
 - Dairy Farmers of America Mideast Council
 - KY Dept. Public Health
 - Slayback Milk Transport
 - Southern Belle Dairy
 - Starr Stainless
 - Winchester Farms Dairy



System Development

Cell phone vs. Land line upload



Approach has been broad...

- **Success means**
 - Enhanced security
 - Adoption
- **Business rationale for adoption**
 - Deter pushback
 - Added value
 - Provide means to measure value
 - Provide enhanced value, time savings, cost avoidance
 - Provide all users with more information



The Public has a great deal of interest!



Feds: Science paper a terrorist's road map

Health agency seeks to halt scholarly publication

Tuesday, June 7, 2005 Posted: 9:33 AM EDT (1333 GMT)

WASHINGTON (CNN) -- The federal government has asked the National Academy of Sciences not to publish a research paper that feds describe as a "road map for terrorists" on how to contaminate the nation's milk supply.



Milk trucks could be likely targets for terrorists, according to a paper on biological terrorism.

The research paper on biological terrorism, by Stanford University professor Lawrence M. Wein and graduate student Yifan Liu, provides details on how terrorists might attack the milk supply and offers suggestions on how to safeguard it.

The New York Times

ON THE WEB

NATIONAL DESK | June 29, 2005, Wednesday

Paper Describes Potential Poisoning of Milk

By SCOTT SHANE (NYT) 666 words
Late Edition - Final, Section A, Page 20, Column 3

DISPLAYING FIRST 50 OF 666 WORDS - The National Academy of Sciences published a paper Tuesday describing how terrorists could
te a protest from top federal health
"a road map for ... The article, by
ers a case study in a continuing



Report sounds alarm on milk supply safety

By Scott Sherman
Terrorists could poison thousands of people by dumping a toxin in the nation's milk supply, set a report published today by the National Academy of Sciences, despite government objections.
The authors, Lawrence Wein and Yifan Liu of Stanford University, would publicly available information to demonstrate that the nation's contamination with the toxin in just 1 year of roads released into the milk supply that could poison more than 100,000 people, the article said.
The authors also said that the report could prompt nearly 100,000 people to stop drinking milk, says the report in the online Proceedings of the National Academy of Sciences.
The dairy industry is an obvious target of the researchers' report. But the authors said the article is not intended to be a road map for terrorists, but rather a case study in a continuing process, they've been very little of them to cover from food safety to food security," he says.
The researchers based their calculations on an attack at a single processing facility, reported by a study released in 2002, which found that some cow milk was contaminated by the toxin. Each gallon of milk is typically consumed by one child and three adults in 10 days, they say.
The report was to be published May 30, but it was delayed at the request of Homeland Security, assistant secretary of Health and Human Services, who called it a "road map for terrorism," HHS spokesman Bill Mahoney said. "Our concern is that if the academy is wrong, the consequences are going to be dire. And it's going to be 100,000, not the academy, that has decided on the science," he says.
The authors said they are not providing information to terrorists, but rather to help the government understand the threat. The authors said they are not providing information to terrorists, but rather to help the government understand the threat. The authors said they are not providing information to terrorists, but rather to help the government understand the threat.



DAILY CHECKUP

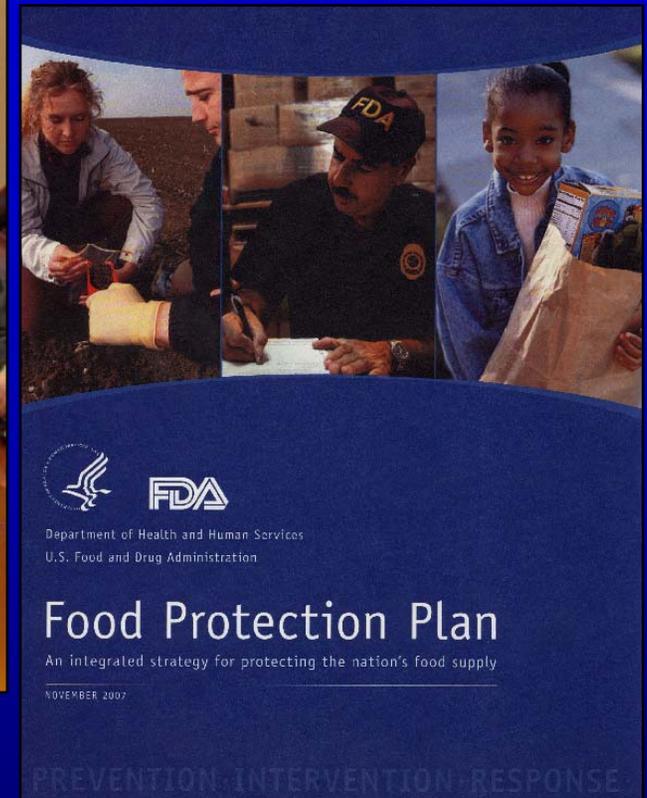
Study: Spinach scare likely to last

September's national spinach recall has shaken consumer confidence in the safety of leafy green vegetables, according to a new national survey.
Consumers are avoiding greens and questioning safety issues, months after spinach contaminated with E. coli bacteria killed three people and sickened nearly 200.
Plummeting spinach sales have also prompted the produce industry to seek federal oversight to assure buyers that fresh produce is safe.
A new national survey to be released today by Rutgers University suggests the broad recall could have lasting effects on spinach and other similar vegetables.
The survey showed about 1 in 5 who were aware of the recall also stopped eating other bagged produce, and 7 percent threw out fresh produce other than spinach during the recall. More than 75 percent of respondents with spinach in their home threw it out.
More than half of the people who ate spinach before the recall hadn't returned to eating it when the survey was taken.
ASSOCIATED PRESS

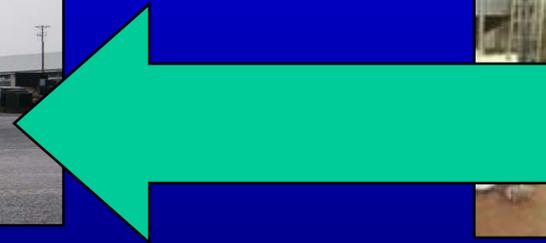
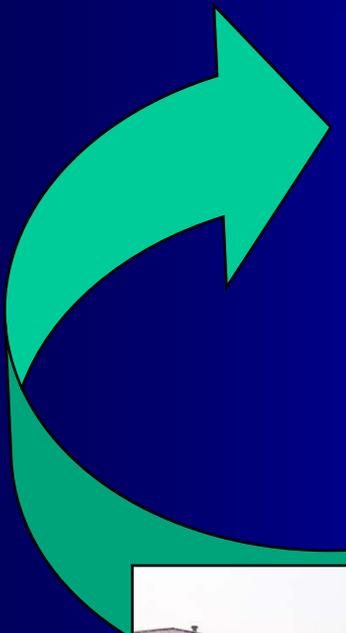
Will there be more stringent security requirements in the future?



HHS Deputy Secretary Tevi Troy; FDA Commissioner Andrew C. von Eschenbach & FDA Assistant Commissioner for Food Protection, David Acheson, M.D. announce FDA's integrated strategy for protecting the food supply.

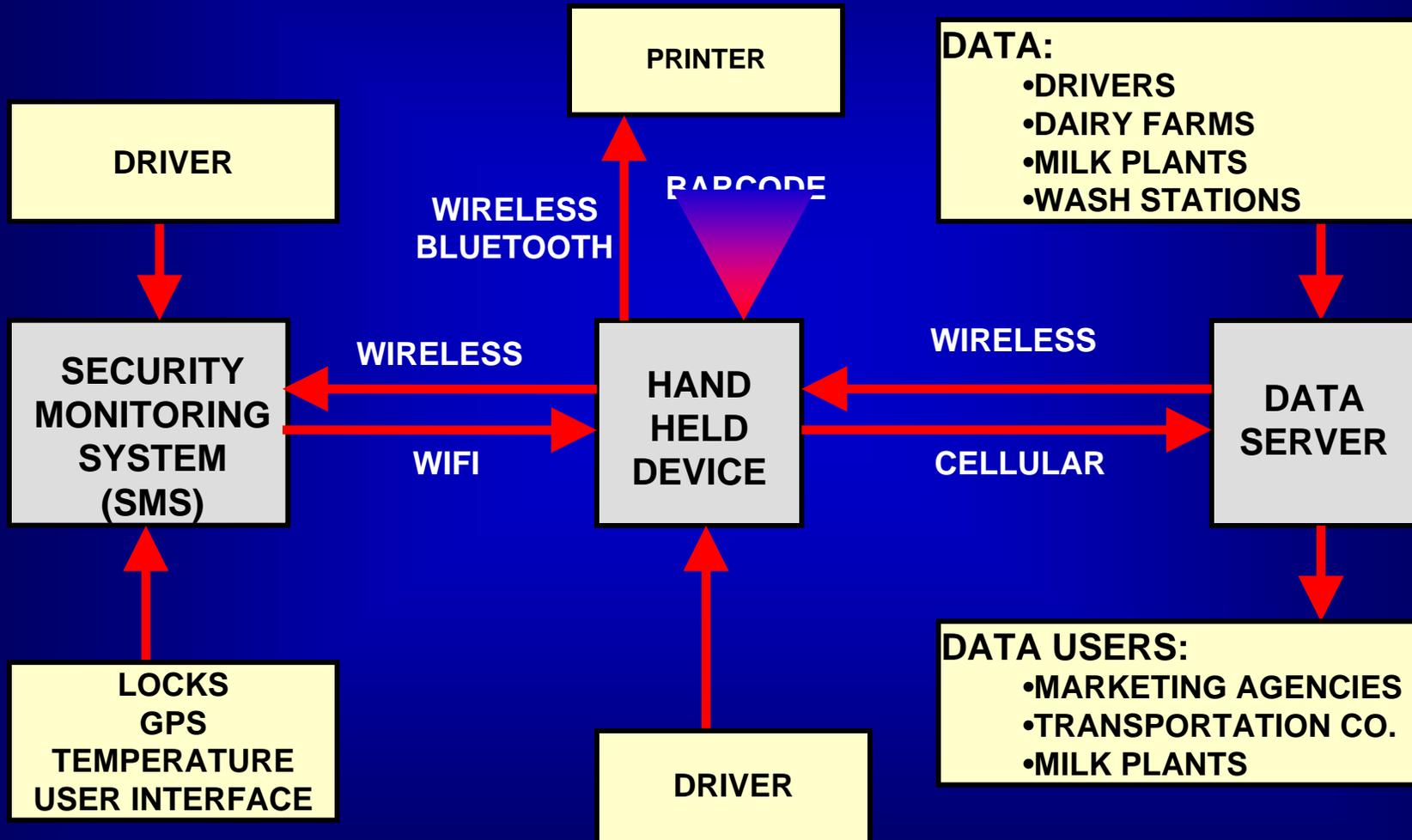


November 6, 2007



Milk Transport Security System Design

Three Processors (computers)



Data entered by the Transportation Company



TABLES:

- Route
- Truck
- Hauler/Sampler
- Transport Tank
- Transport Company

Data entered by the Milk Marketing Agency



TABLES:

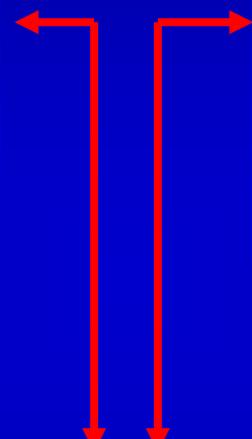
- Agency
- Dairy Farm
- Farm Bulk Tank
- Cargo: Grade A Milk

Data entered by the Milk Plant



TABLES:

- Drop-off Location
- Receiver
- Wash Station
- Wash Method



SERVER

Microprocessor from Milk Truck

Security



Hand held

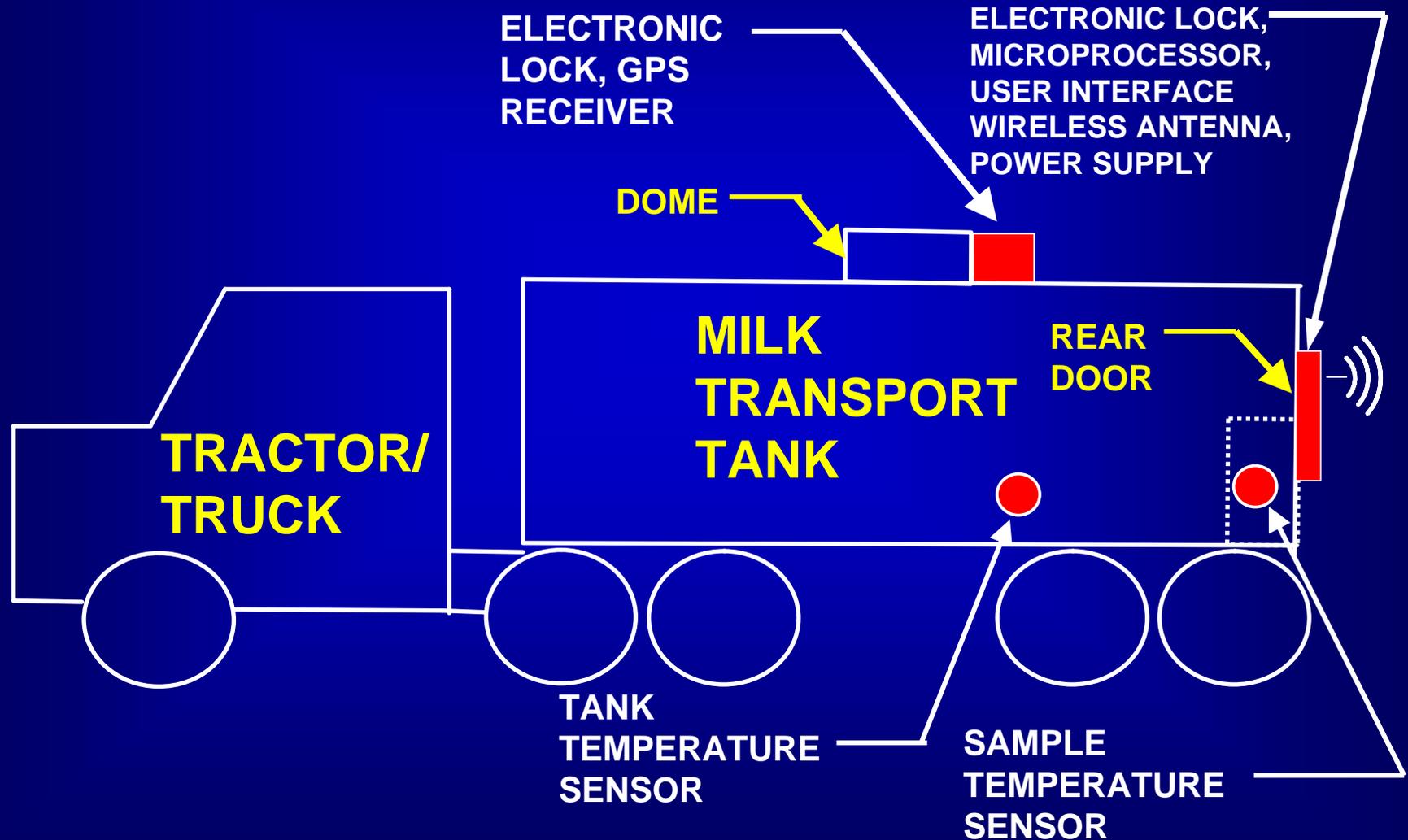
TABLES:

- Picked up load
- Wash Tag
- Dropped of load



Data exchanged every 1-5 minutes

Security Monitoring System (SMS)



Handheld Device and Printer

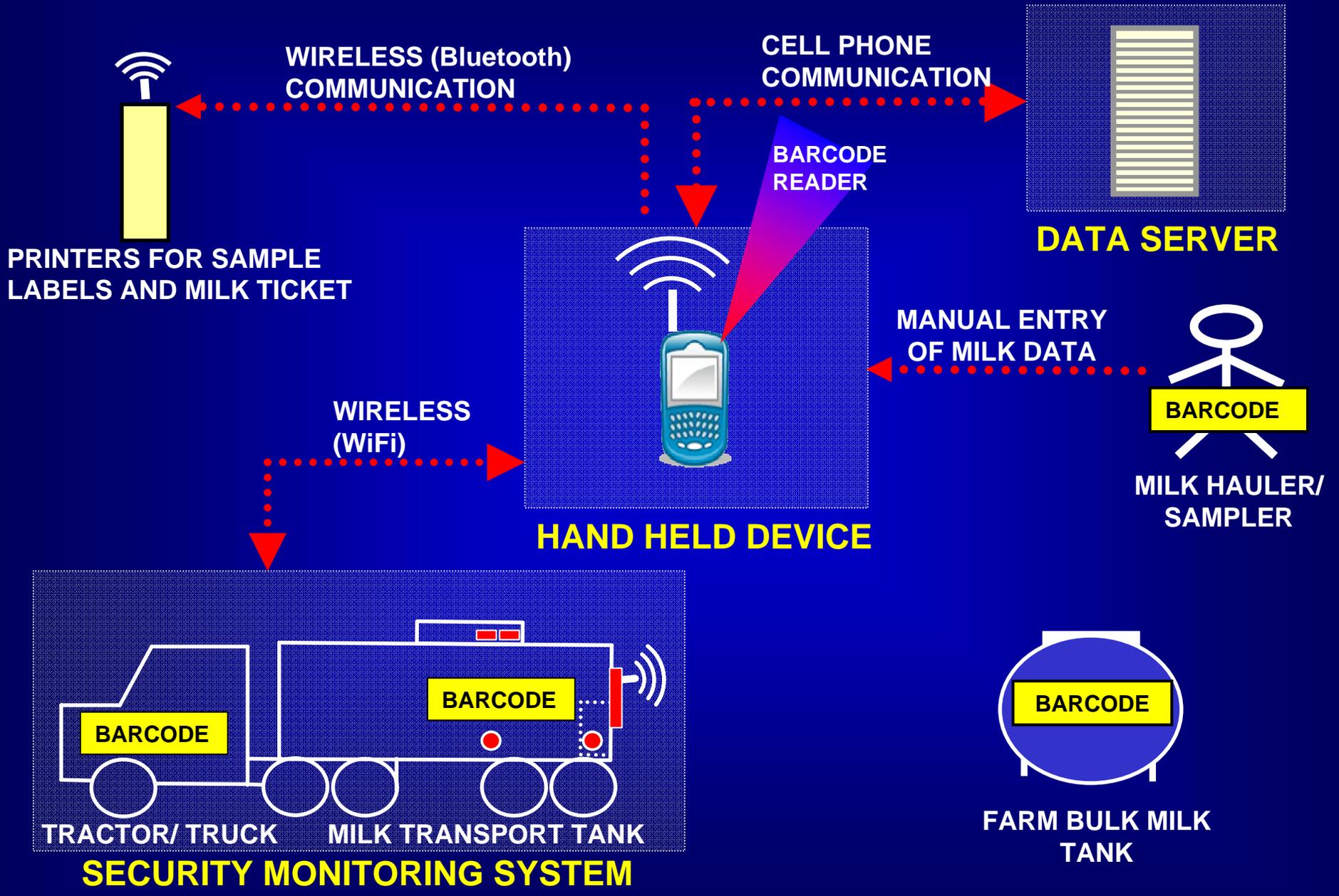


Intermec CN3



Zebra QL 220

MILK TRANSPORT SECURITY SYSTEM DESIGN



September 12, 2007 Demonstration





K209

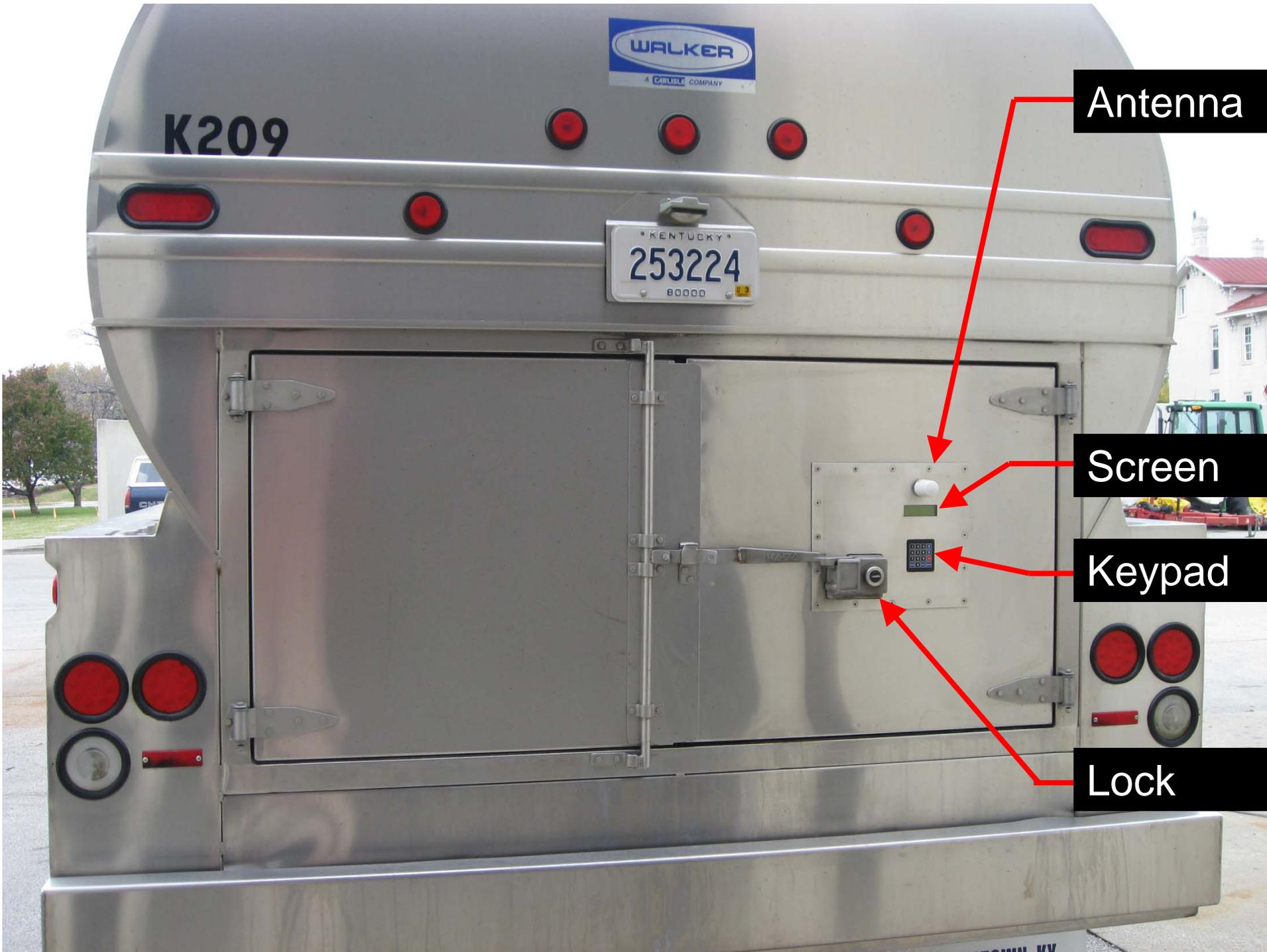


Antenna

Screen

Keypad

Lock





Dome Lock

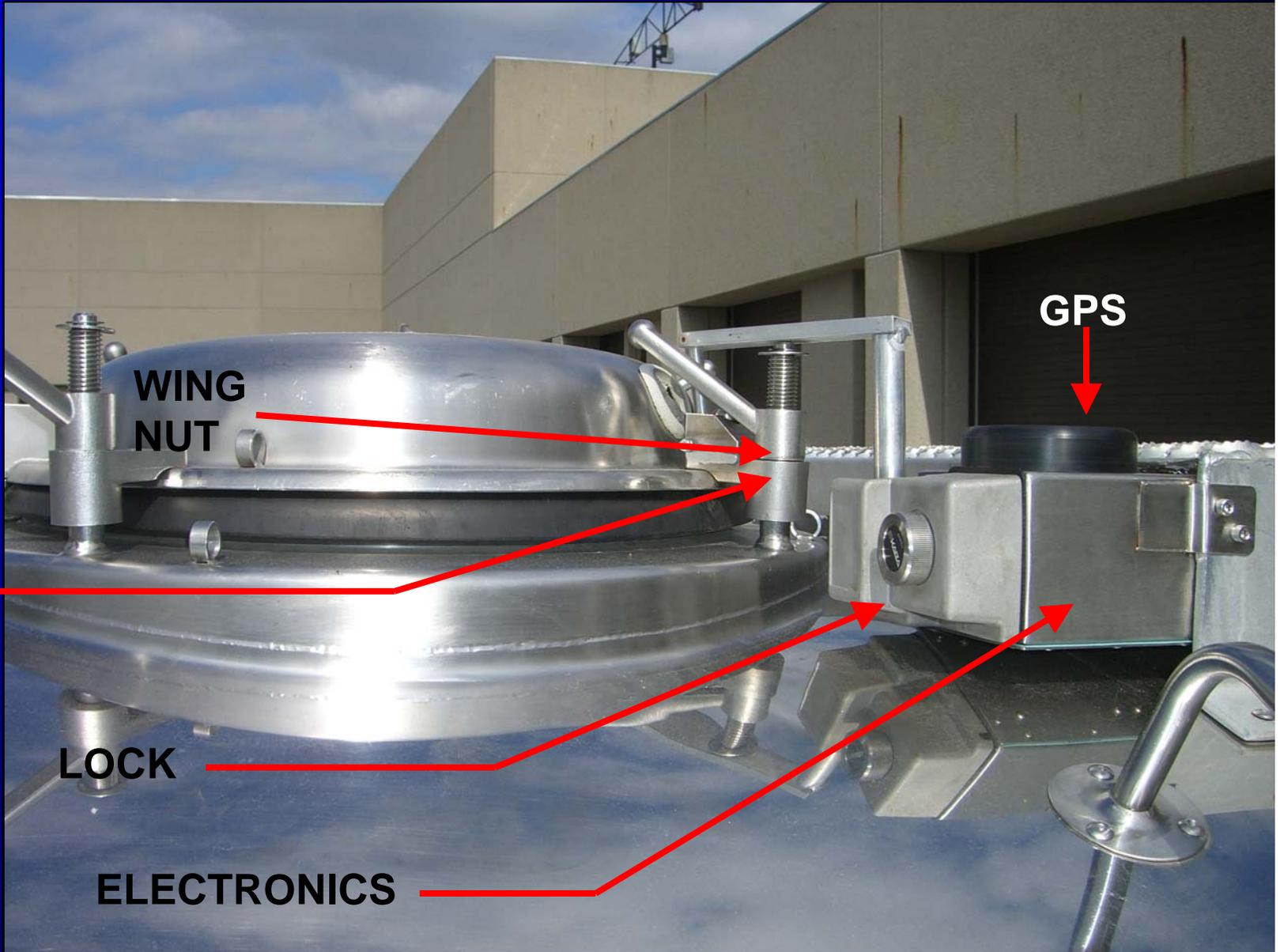
LATCH
DOG

WING
NUT

LOCK

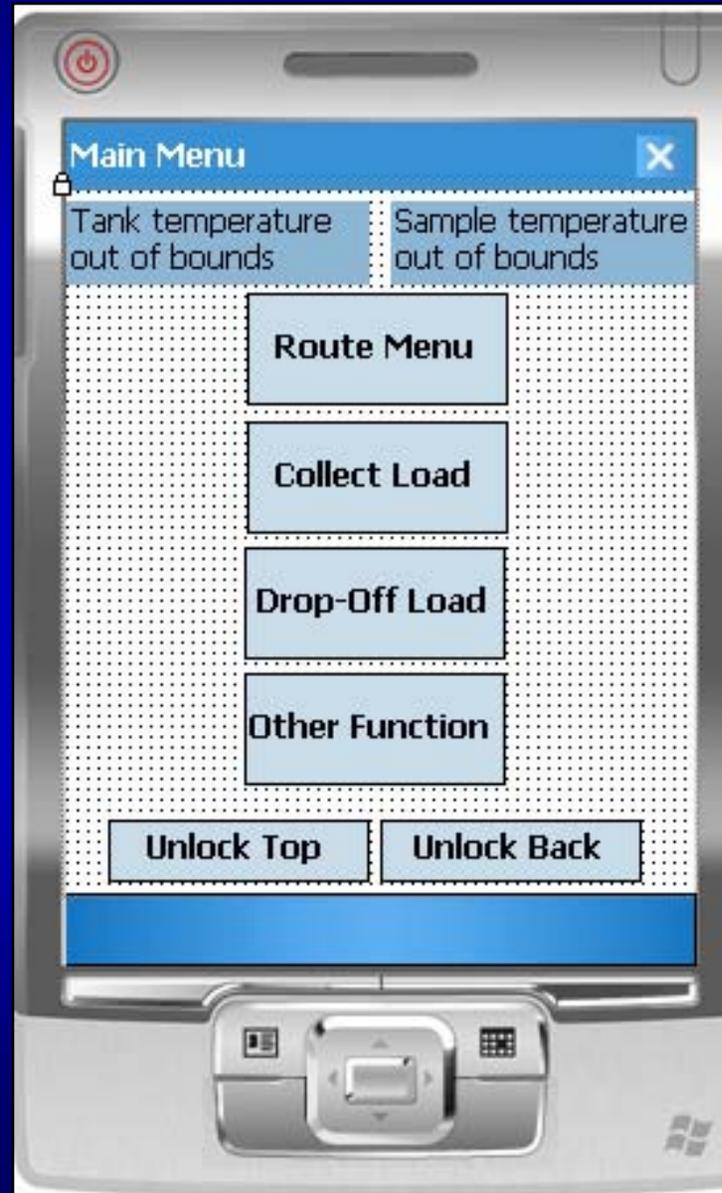
ELECTRONICS

GPS



Handheld Device Screens

User friendly
and intuitive...



Handheld Device Screens

Scan Farm Tank

Current farm information:

Agency Route:

Name:

Cargo:

Address:

Choose a tank from the list, or leave the box empty

Accept Cancel

This screenshot shows a handheld device screen with a blue header bar containing the title "Scan Farm Tank" and a close button. Below the header, there are several text input fields for "Current farm information", "Agency Route", "Name", "Cargo", and "Address". A section titled "Choose a tank from the list, or leave the box empty" contains a dropdown menu. At the bottom of the screen, there are two buttons labeled "Accept" and "Cancel". The device has a physical keypad and a power button at the top.

Load Information

Tank: Temperature:

Dipstick: /32 Final Stick:

Pickup: Leave Behind: Truck Total:

Vol:

Wt:

Partial Pickup

Sample:

Accept Reject Cancel

This screenshot shows a handheld device screen with a blue header bar containing the title "Load Information" and a close button. The form contains several input fields: "Tank" and "Temperature" (with a dropdown arrow), "Dipstick" (with a "/32" label and a dropdown arrow), and "Final Stick". Below these are three columns of input fields labeled "Pickup", "Leave Behind", and "Truck Total", each with "Vol" and "Wt" sub-labels. There is a radio button for "Partial Pickup" and a "Sample" input field. At the bottom, there are three buttons labeled "Accept", "Reject", and "Cancel". The device has a physical keypad and a power button at the top.

46 564312 1 121
Howard A. Rowlett
01-09-08 12:43 36F

TC
Brian Luck
K209

46 564312 1 121
Howard A. Rowlett
01-09-08 12:43 36F



465643121
Brian Luck
K209

46 564312 1 121
Howard A. Rowlett
01-09-08 12:43 36F
Ga:120/6 Wt:10385

Sampler Info:
Brian Luck
H21-999-1
9998

2007111605KYK209										Bulk Milk Ticket				Page	
Load No.	Transport Company	Cargo			Security Session ID No.		Wash Tag Information								
----	Slyback Milk Transport	Grade A Milk			2007111605KYK209		K209; Winchester Farms Dairy - Winchester, KY; 56123; 2007-11-15 14:10:50 John Smith								
Route No.	Tanker No.	Pickup Truck No.			Delivery Truck No.										
----	K209	-----			-----										
Marketing Agency 	Div.-Producer No.-Tank Name 465645161813 Billie D Hotfil	Grade	Grade A Milk	Pickup Date	11-16-2007	Gauge Reading	11 16/32 IN	Temp	36	Hauler Name	Brian Luck				
		BTU	21320	Military Time	06:41:56	Weight	1,374	Comments		No Comments					
Marketing Agency 	Div.-Producer No.-Tank Name 465643171714 Richard D Webster	Grade	Grade A Milk	Pickup Date	11-16-2007	Gauge Reading	27 20/32 IN	Temp	38	Hauler Name	Brian Luck				
		BTU	21320	Military Time	07:13:14	Weight	6,302	Comments		No Comments					
Marketing Agency 	Div.-Producer No.-Tank Name 465643181816 Betty Heaton	Grade	Grade A Milk	Pickup Date	11-16-2007	Gauge Reading	17 20/32 IN	Temp	37	Hauler Name	Brian Luck				
		BTU	21320	Military Time	07:52:04	Weight	2,210	Comments		No Comments					
Marketing Agency 	Div.-Producer No.-Tank Name 465643161816 James E Logan	Grade	Grade A Milk	Pickup Date	11-16-2007	Gauge Reading	8 13/32 IN	Temp	38	Hauler Name	Brian Luck				
		BTU	21320	Military Time	08:27:07	Weight	543	Comments		No Comments					
Marketing Agency 	Div.-Producer No.-Tank Name 465643091913 Donald C Clark	Grade	Grade A Milk	Pickup Date	11-16-2007	Gauge Reading	9 3/32 IN	Temp	35	Hauler Name	Brian Luck				
		BTU	21320	Military Time	09:07:48	Weight	1,405	Comments		No Comments					
Marketing Agency 	Div.-Producer No.-Tank Name 465643121216 Howard A. Rowlett	Grade	Grade A Milk	Pickup Date	11-16-2007	Gauge Reading	118/3 CM	Temp	36	Hauler Name	Brian Luck				
		BTU	21320	Military Time	09:26:25	Weight	10,234	Comments		No Comments					
Marketing Agency 	Div.-Producer No.-Tank Name 462284441417 John L Fischer	Grade	Grade A Milk	Pickup Date	11-16-2007	Gauge Reading	39/8 CM	Temp	39	Hauler Name	Brian Luck				
		BTU	21320	Military Time	10:11:57	Weight	2,804	Comments		No Comments					
Marketing Agency 	Div.-Producer No.-Tank Name 465643041416 Douglas S King	Grade	Grade A Milk	Pickup Date	11-16-2007	Gauge Reading	15 20/32 IN	Temp	37	Hauler Name	Brian Luck				
		BTU	21320	Military Time	10:27:18	Weight	2,440	Comments		No Comments					
Marketing Agency 	Div.-Producer No.-Tank Name 465648091918 Mckee Farm 1	Grade	Grade A Milk	Pickup Date	11-16-2007	Gauge Reading	35 11/32 IN	Temp	38	Hauler Name	Brian Luck				
		BTU	21320	Military Time	11:07:50	Weight	10,477	Comments		No Comments					

Load Summary for Load ----, ---, K209

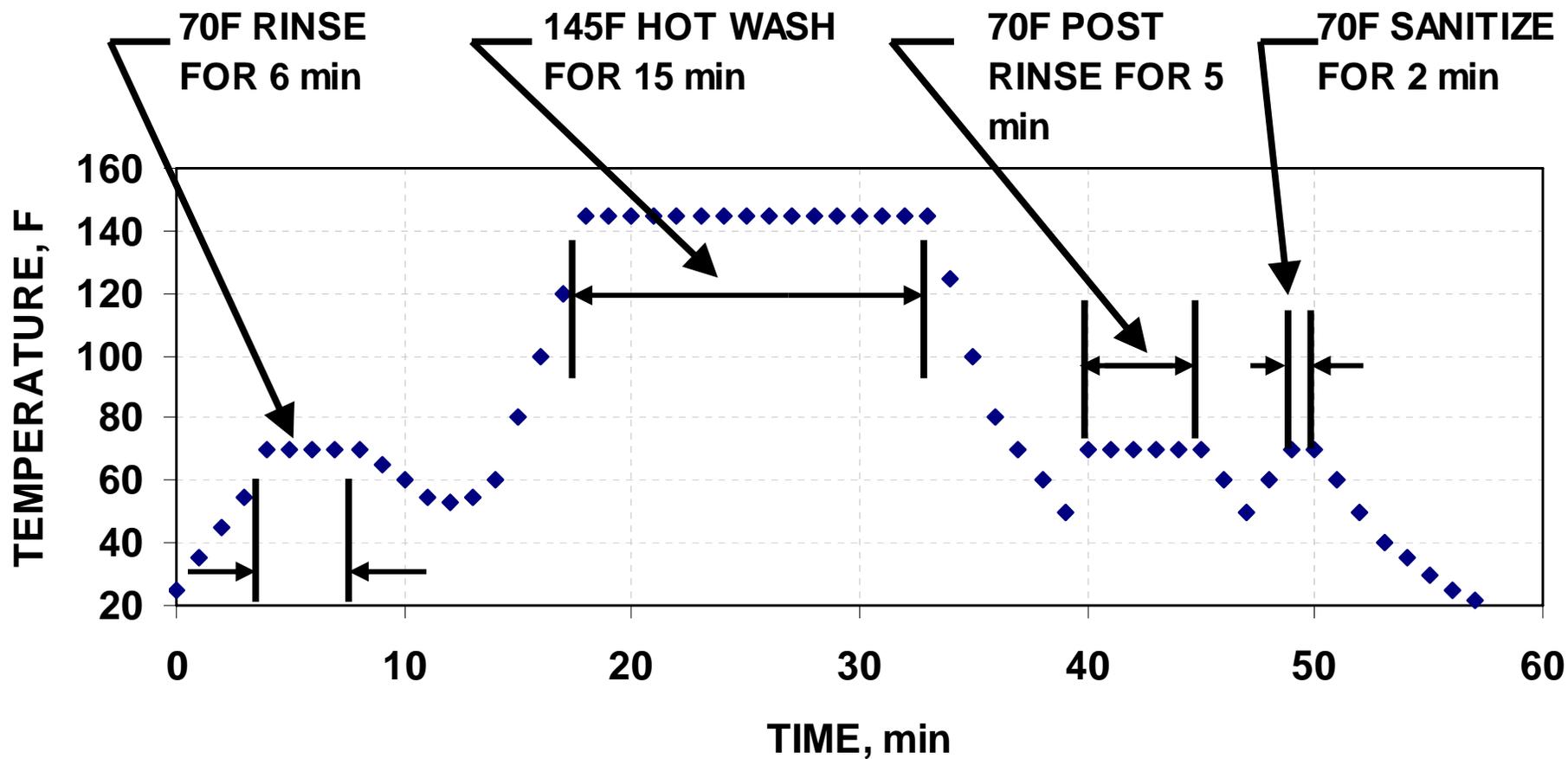
Meter Weight	----	Scale Weight	37,700	Accumulated Milk Weight	37,789	Difference	-89
Pickup Date	11-16-2007	Delivery Date	11-16-2007	Arrival Time	13:17:21	Departure Time	15:03:25
Delivery Location	Winchester Farms Dairy (WFD)	Antibiotic Test	Negative	Appearance/Odor	Accepted	Load Temp.	36
Hauler1 Name	Brian Luck	Hauler 1 Permit No.	H21-999-8	Hauler 1 License No.	9998	Hauler 1 Signature Signature image here.	
Transport Driver Name	-----	Transport Driver Signature Signature image here.				Receiver Signature Signature Image here.	
Receiver Name	John Smith	Receiver Permit No.		S21-999-7			

Additional uses

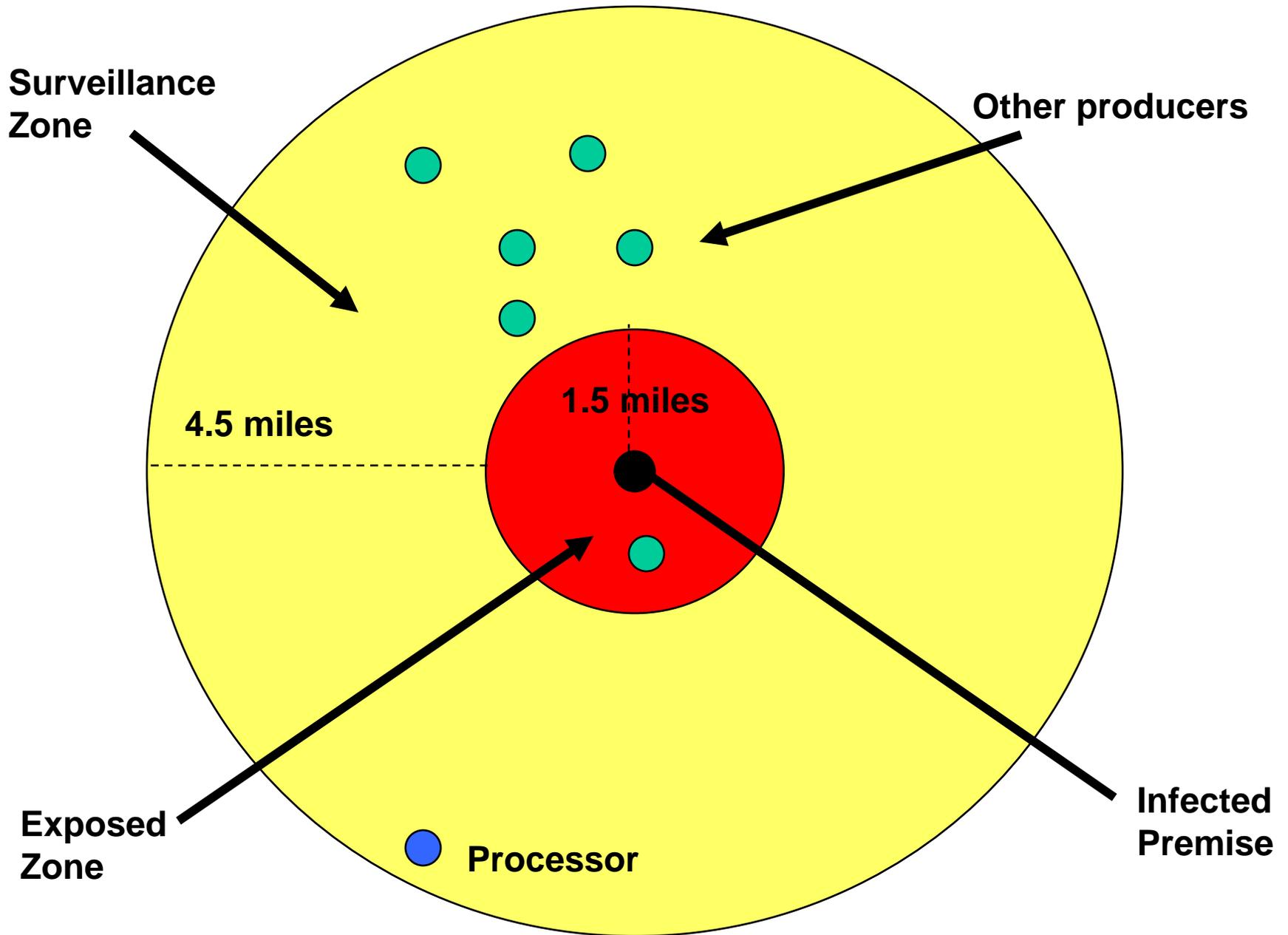
- Quality control
 - Tanker cleaning
 - Sample care
- Communications
 - Potential to enhance compliance
 - Field Services
 - Special precautions
- If data is collected, it can be tracked, utilized...



TANK WASH CYCLE MONITORING



Quarantine Area for FMD



Project Schedule

- Collaborators Meeting, January 26, 2006
- Collaborators Meeting, September 9, 2006
- System Defined, January 1, 2007
- Bench Scale System, May 26, 2007
- Prototype Installed August 4, 2007
- Prototype Demonstration, September 12-13, 2007
- Field Test 1 October/November 2007
- **Field Test 2 February/May 2008**
- **Testing Complete June/July 2008**
- ***The Demonstration Meeting October 9, 2008***
- **Project Completion December 31, 2008**



Demonstration Meeting

Thursday, October 9, 2008
Lexington, Kentucky



Chris Thompson

Email: chris.thompson@uky.edu

Division of Regulatory Services
University of Kentucky
College of Agriculture
103 Regulatory Services Building
Lexington, KY 40546-0275

Phone: (859) 257-2785

Fax: (859) 323-9931

Web: www.rs.uky.edu

QUESTIONS?

