

Milk and Protecting it Against Agri-terrorism

Milk Transport Security

“The Tanker of Tomorrow”

NALMA and ICAR Joint Meeting
June 16, 2008



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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**



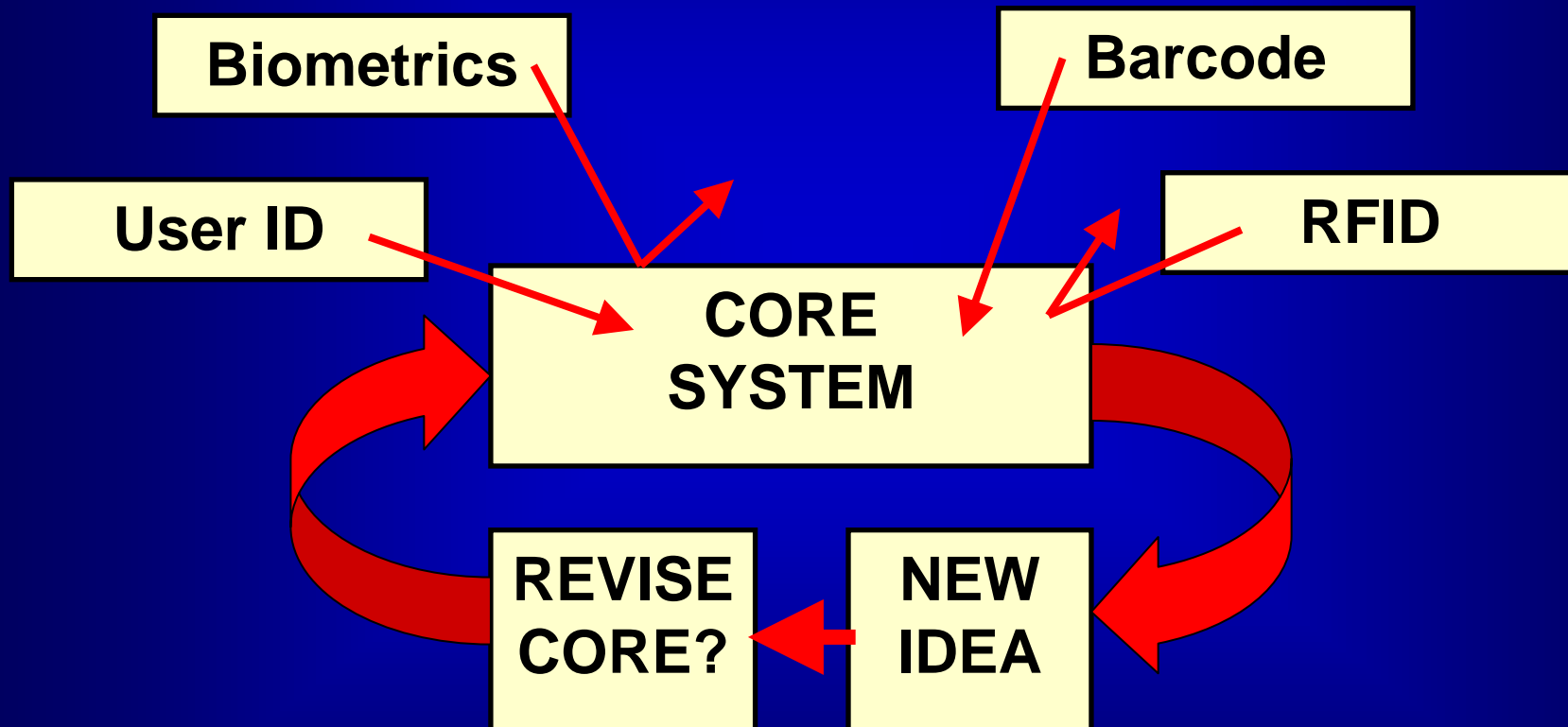
A Wireless Electronic System for Securing Milk from Farm to Processor

- **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.

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.



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

The New York Times

NATIONAL DESK | June 29, 2005, Wednesday

Paper Describes Potential Poisoning of Milk

By SCOTT SIMONE (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 create a protest from top federal health "a road map for ... The article, by ... a case study in a continuing



Report sounds alarm on milk supply safety

By Steve Stremberg
USA TODAY

terrorists could poison thousands of people by dumping a toxin in the nation's milk supply, said a report published today by the National Academy of Sciences over government objections.

The authors, Lawrence Wein and Yifan Liu of Stanford University, would publicly available information to demonstrate that the nation's milk supply might be vulnerable to contamination by biological terrorism. Just 1 gram of toxin released into the milk supply then could poison more than 100,000 people, the study says.

Health officials say they reject the study's findings in the journal Proceedings of the National Academy of Sciences.

The dairy industry is an obvious target, the researchers say. But the authors say the study is not a threat to the industry. It is a warning, they say, that the nation's milk supply is vulnerable to attack. Without treatment, at least 100,000 people die each year from biological terrorism, the study says. It is a warning that the nation's milk supply is vulnerable to attack. Without treatment, at least 100,000 people die each year from biological terrorism, the study says.

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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.

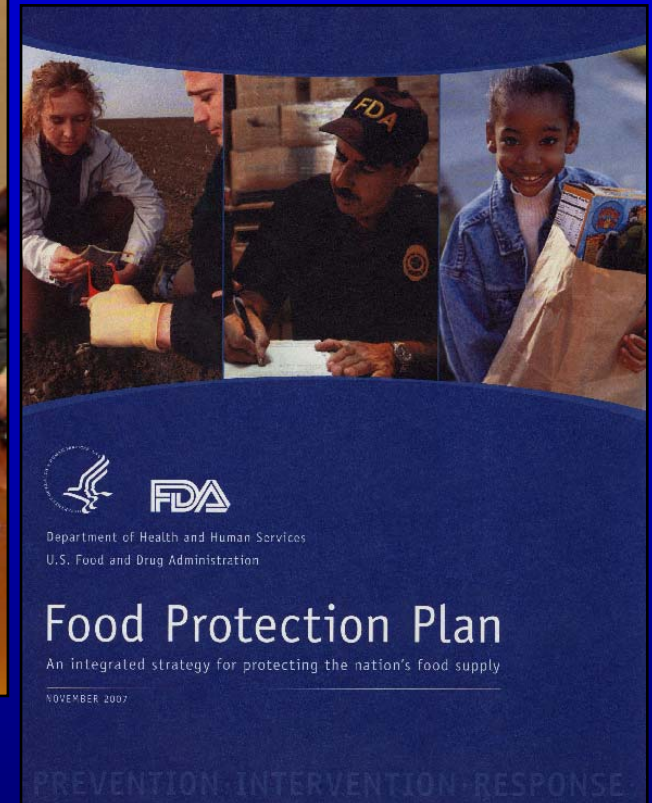
More than half of the people who ate spinach before the recall hadn't returned to eating it when the survey was taken.

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.

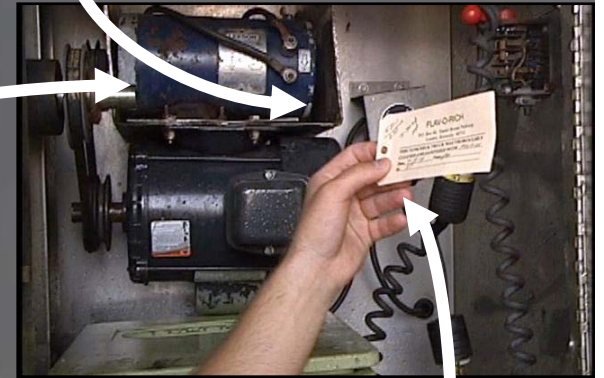
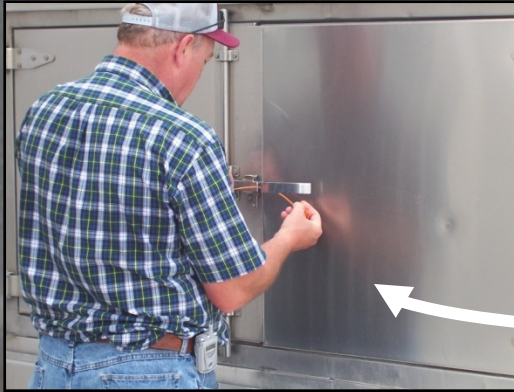


November 6, 2007

Our vision of the system operations.

The diagram illustrates the system operations workflow. At the center is a clipboard with a form titled "Daily Farmers of America, Inc." containing various fields for data entry, including "LWEP", "061704", "01558311", and "061704". Five arrows radiate from this central form to five different images showing the physical steps of the process:

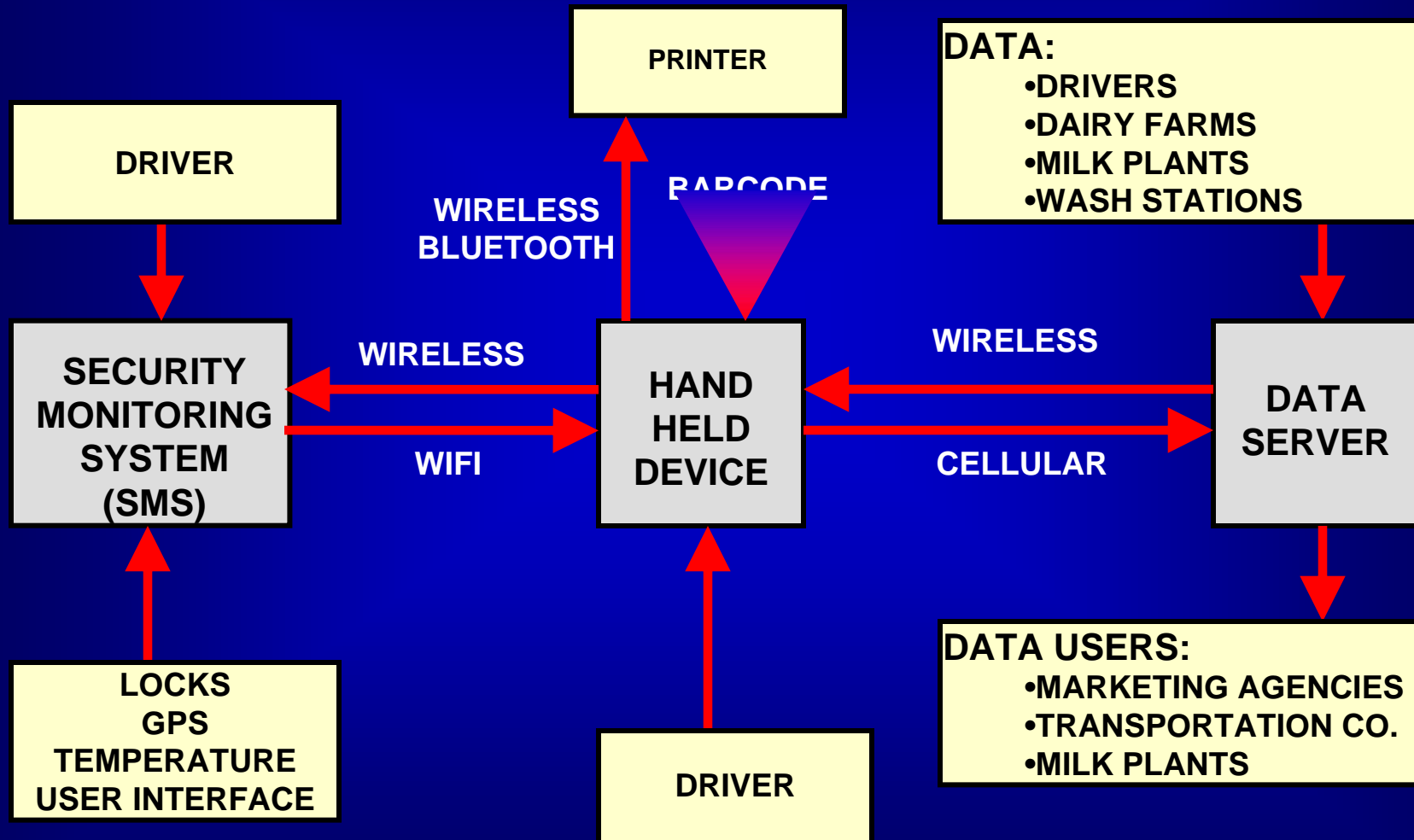
- Top Left:** A worker in a plaid shirt and cap is shown from the back, interacting with a large metal door or container.
- Top Right:** A hand holds a small white tag with a barcode and text, positioned near a piece of machinery.
- Bottom Left:** A close-up of hands writing on a blue tag with a red marker.
- Bottom Center:** A hand holds a blue tag with a barcode, positioned near a large, dark, cylindrical metal container.
- Bottom Right:** A hand holds a small white tag with a barcode and text, positioned near a piece of machinery.

[illegible]



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

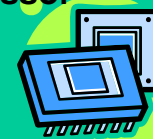
Wash Station

Wash Method

SERVER

**Microprocessor
from Milk
Truck**

Security



Hand held

TABLES:

Picked up load

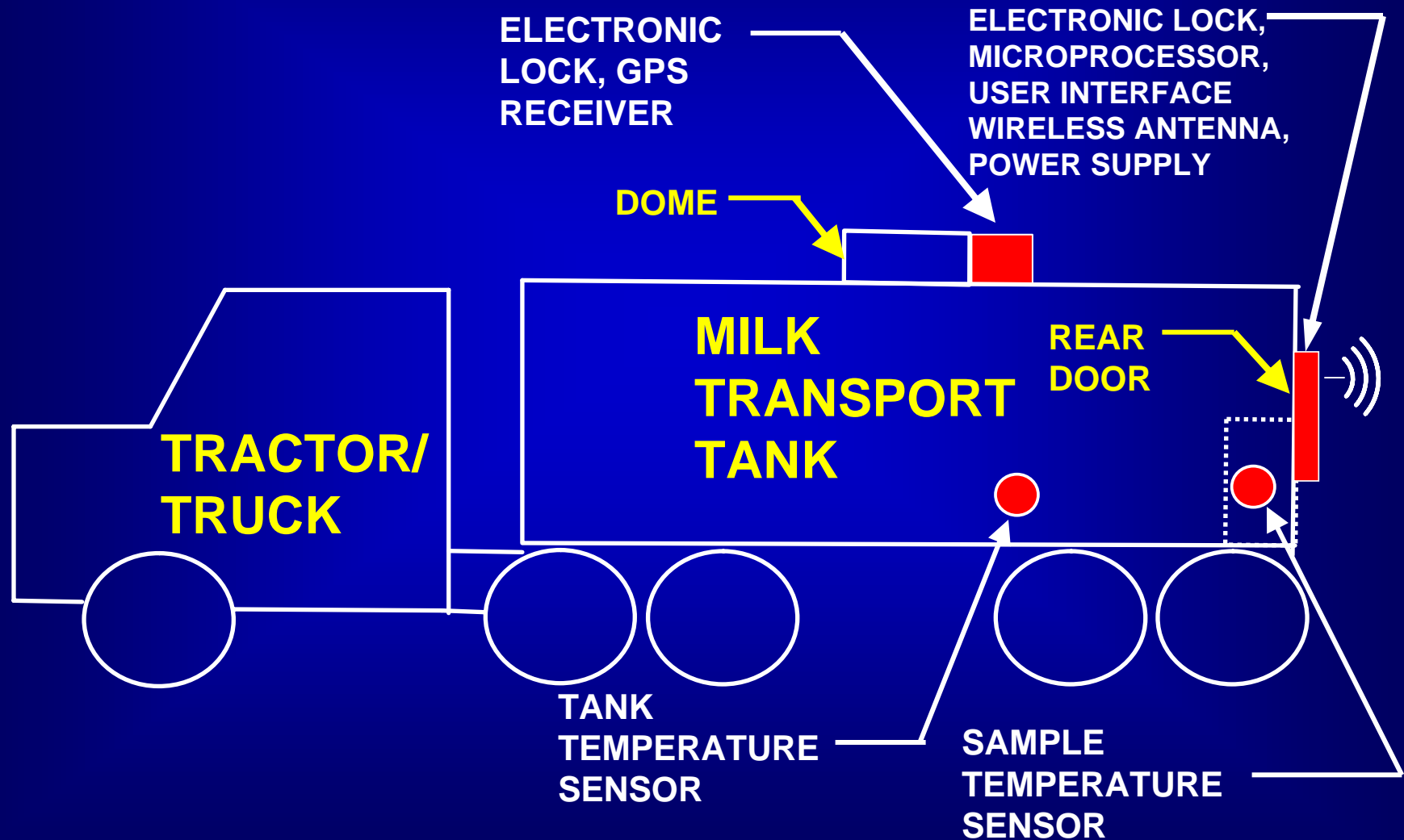
Wash Tag

Dropped of load



**Data
exchanged
every 1-5
minutes**

Security Monitoring System (SMS)



Handheld Device and Printer

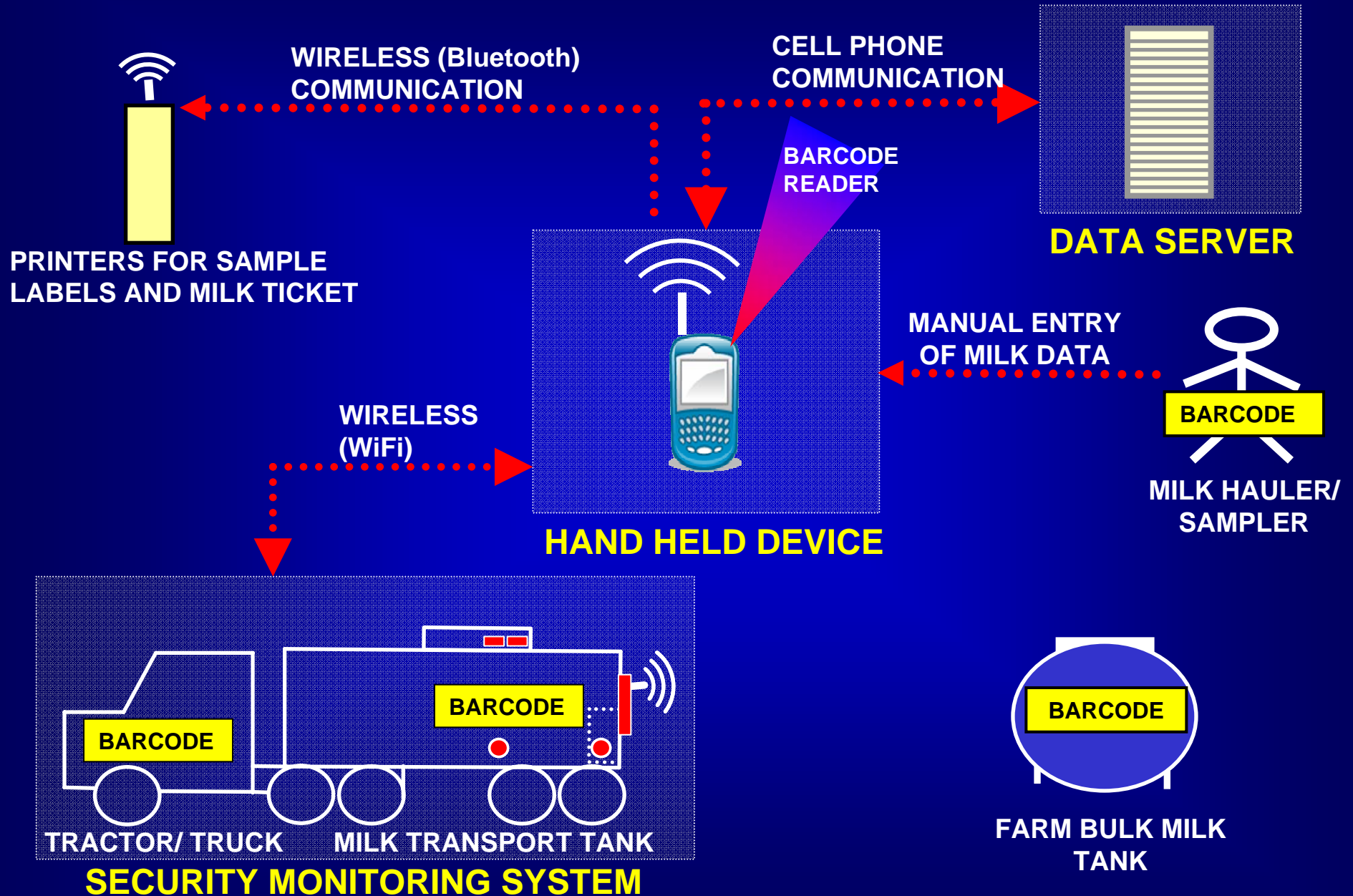


Intermec CN3



Zebra QL 220

MILK TRANSPORT SECURITY SYSTEM DESIGN



September 12, 2007 Demonstration





K209

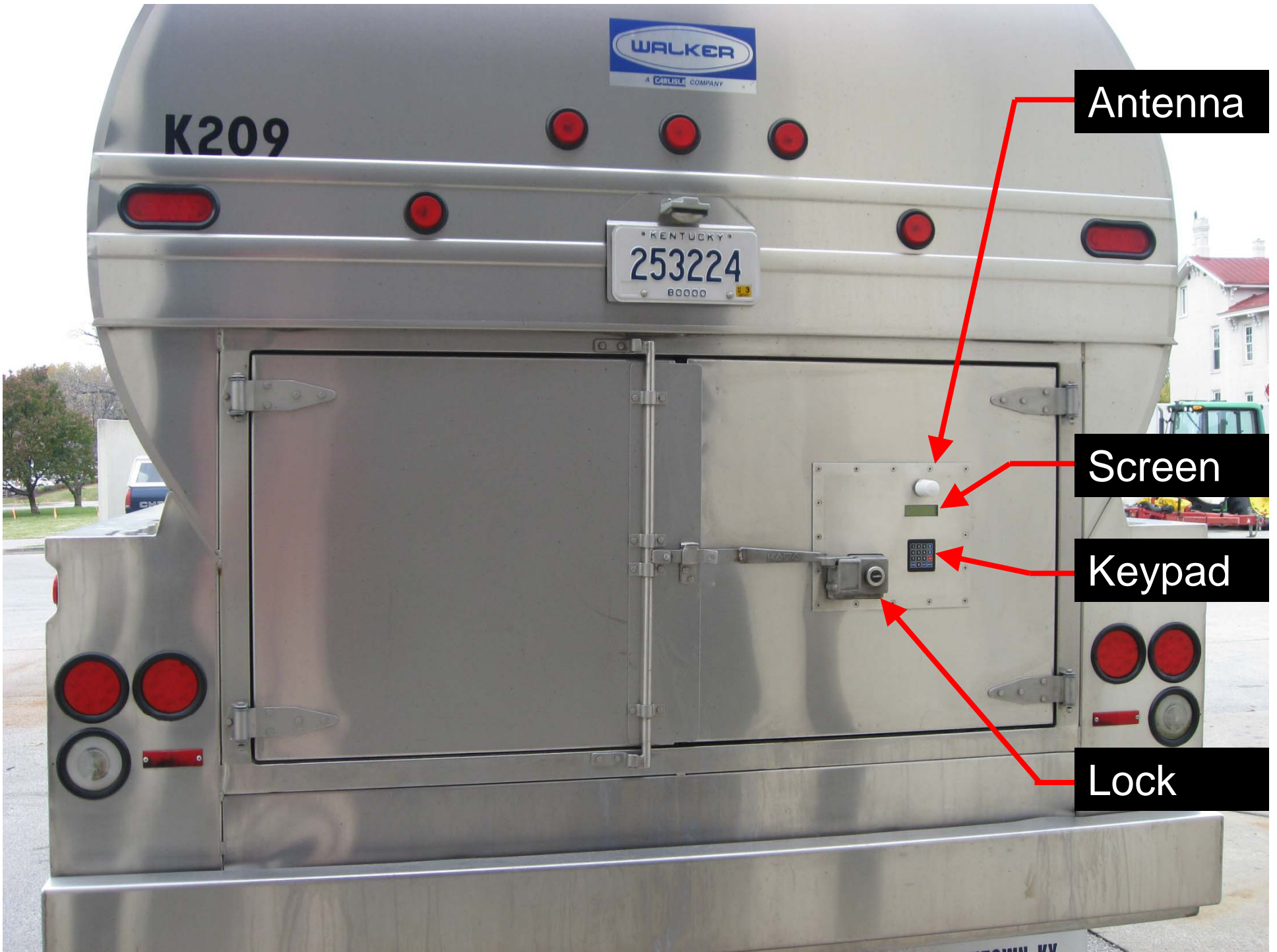


Antenna

Screen

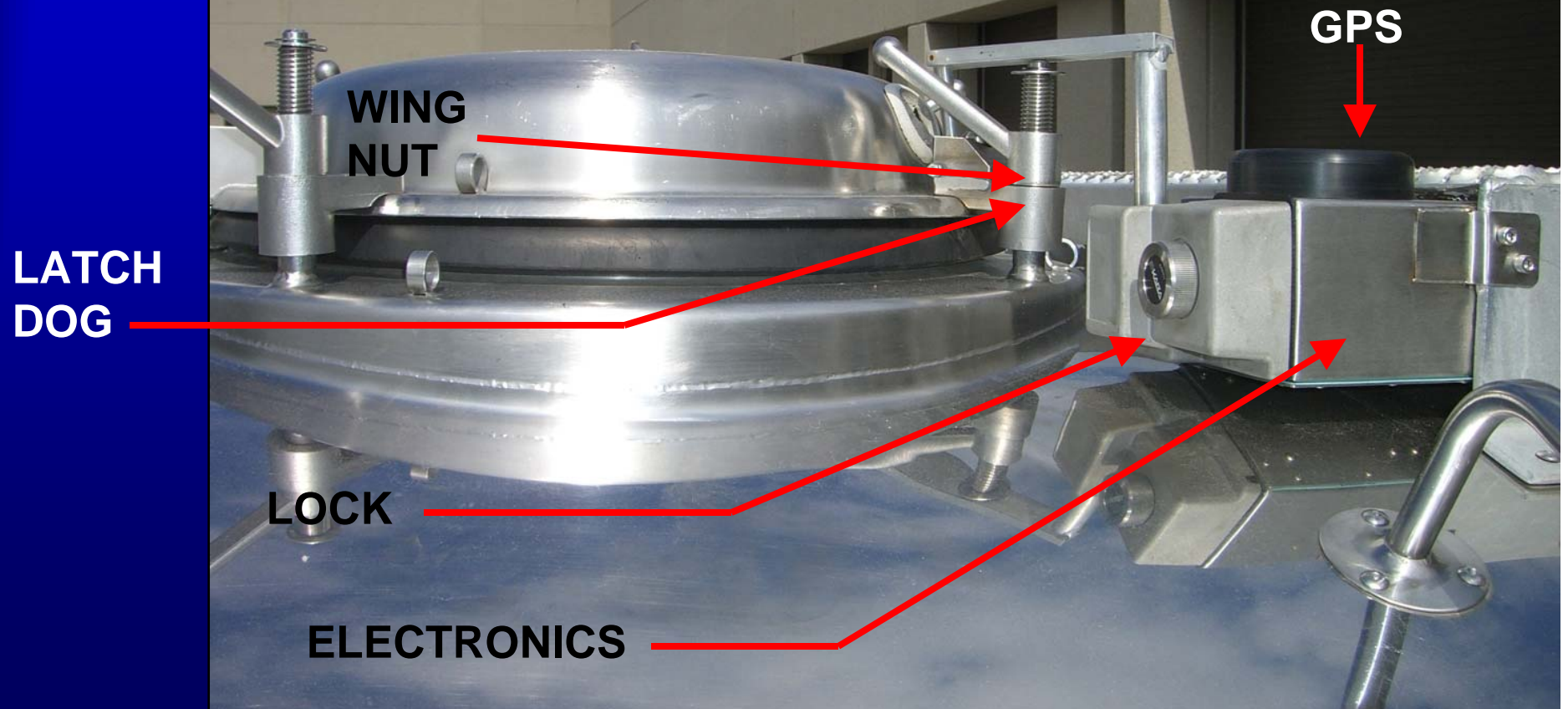
Keypad

Lock



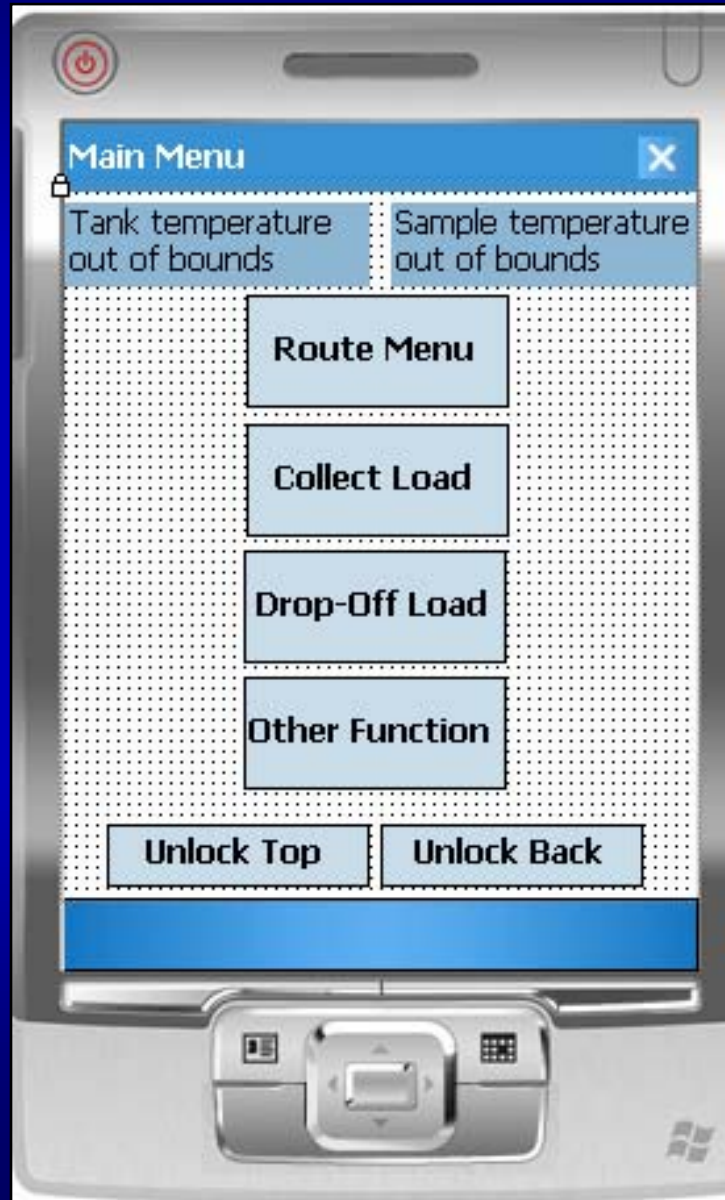


Dome Lock



Handheld Device Screens

User friendly
and intuitive...



Handheld Device Screens

A handheld device screen displaying a form titled "Scan Farm Tank". The form has a blue header bar with a close button (X). Below the header, there is a section for "Current farm information:" with fields for "Agency Route:", "Name:", "Cargo:", and "Address:". Below these fields is a large text area with the instruction "Choose a tank from the list, or leave the box empty" and a dropdown menu. At the bottom of the form are two buttons: "Accept" and "Cancel". The device has a physical keypad and a power button at the top.

Scan Farm Tank

Current farm information:

Agency Route:

Name:

Cargo:

Address:

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

Accept **Cancel**

A handheld device screen displaying a form titled "Load Information". The form has a blue header bar with a close button (X). Below the header, there are several input fields and a table. The fields include "Tank", "Temperature", "Dipstick", and "Final Stick". Below these is a table with three columns: "Pickup", "Leave Behind", and "Truck Total". The table has two rows for "Vol" and "Wt". Below the table is a radio button for "Partial Pickup" and a "Sample" field. At the bottom of the form are three buttons: "Accept", "Reject", 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	<input type="text"/>	<input type="text"/>	<input type="text"/>
Wt	<input type="text"/>	<input type="text"/>	<input type="text"/>

☐ Partial Pickup

Sample

Accept **Reject** **Cancel**

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								
-----	Slayback 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 465645161613 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 465643161616 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							

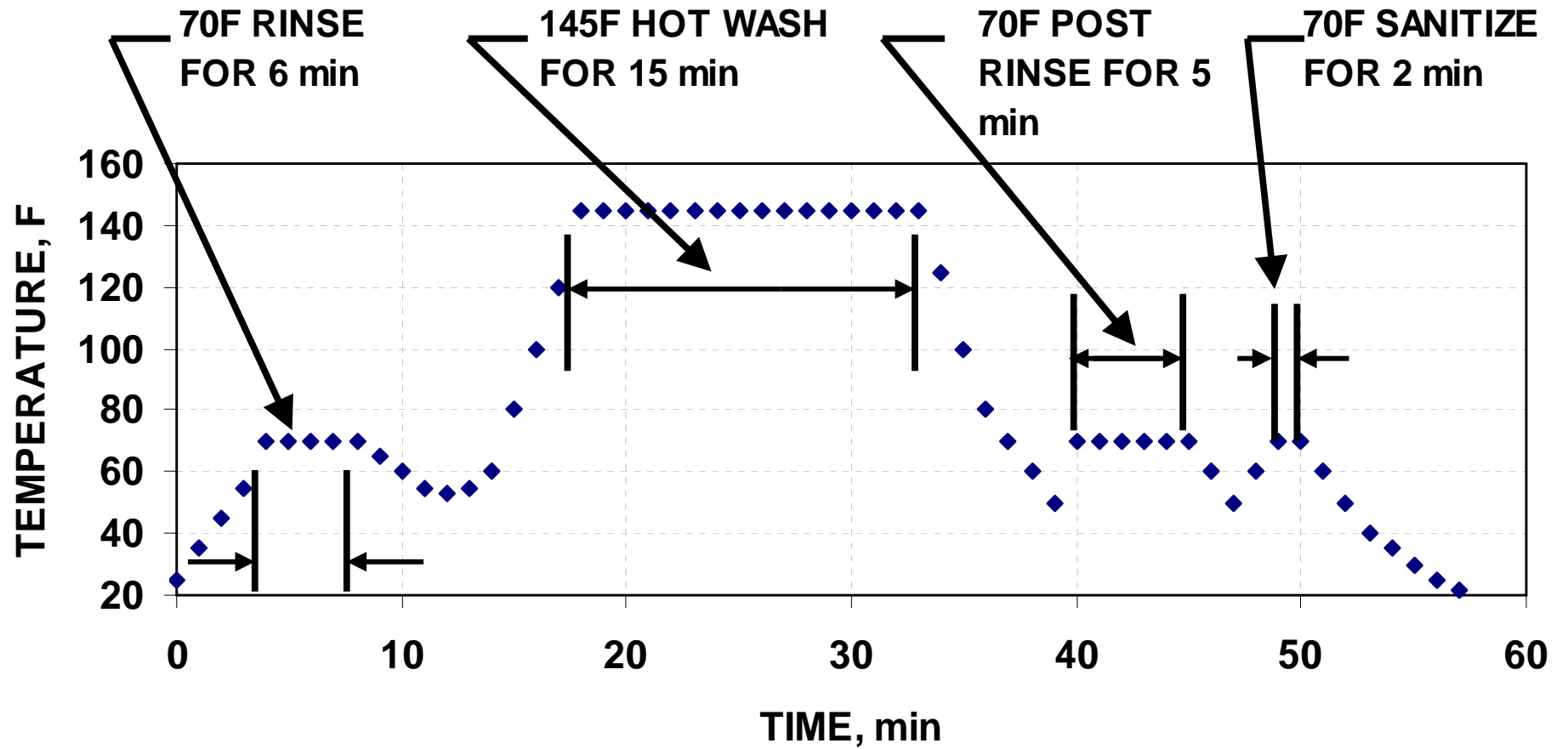
Load Summary for Load -----, ---, K209					
Meter Weight	-----	Scale Weight	37,700	Accumulated Milk Weight	37,789
Pickup Date	11-16-2007	Delivery Date	11-16-2007	Arrival Time	13:17:21
Delivery Location	Winchester Farms Dairy (WFD)	Antibiotic Test	Negative	Appearance/Odor	Accepted
Hauler1 Name	Brian Luck	Hauler 1 Permit No.	H21-999-8	Hauler 1 License No.	9998
Transport Driver Name	-----	Hauler 1 Signature			Signature image here.
Receiver Name	John Smith	Transport Driver Signature			Signature image here.
		Receiver Permit No.			S21-999-7
		Receiver Signature			Signature Image here.

Additional uses

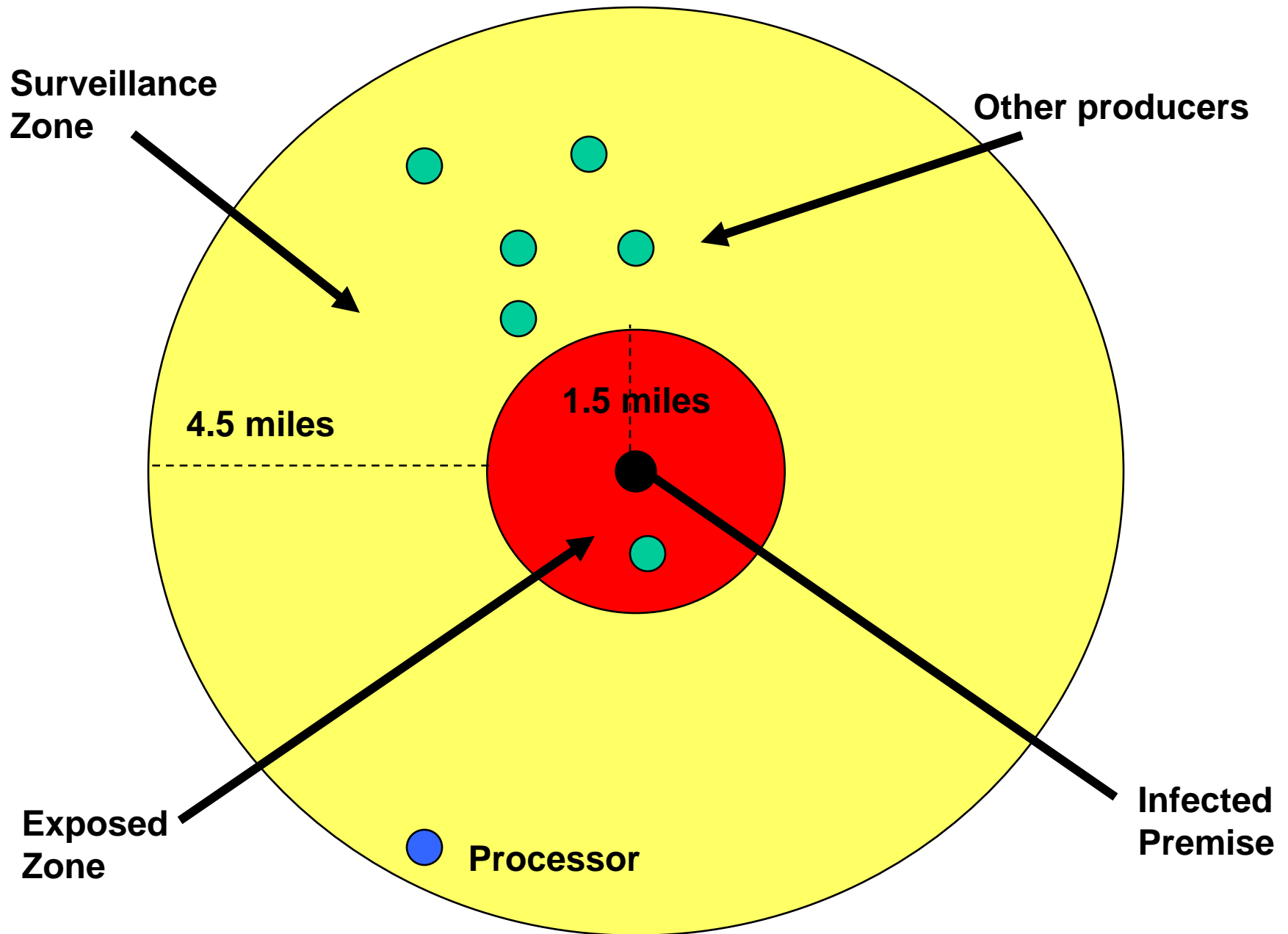
- Quality control
 - Tanker cleaning
 - Sample care
- Communications
 - Potential to enhance compliance
 - Field Services
 - Special precautions
- If data is collected, it can be tracked, utilized...



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



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Questions?

