



# **Emerging/Converging Technologies in the Solid Waste Industry**

**By Pat Fahey, Pacific Systems**

# Where we came from

- Average Route Size 200
- Method of Operation: Manual
- Creature Comforts: None
- Radio Communication: Doughtfull



# Where we are now

- Average Route Size: 850
- Fully Automated
- Air Conditioned, Stereo Equipped
- Radio Dispatched
- Computer Equipped ?



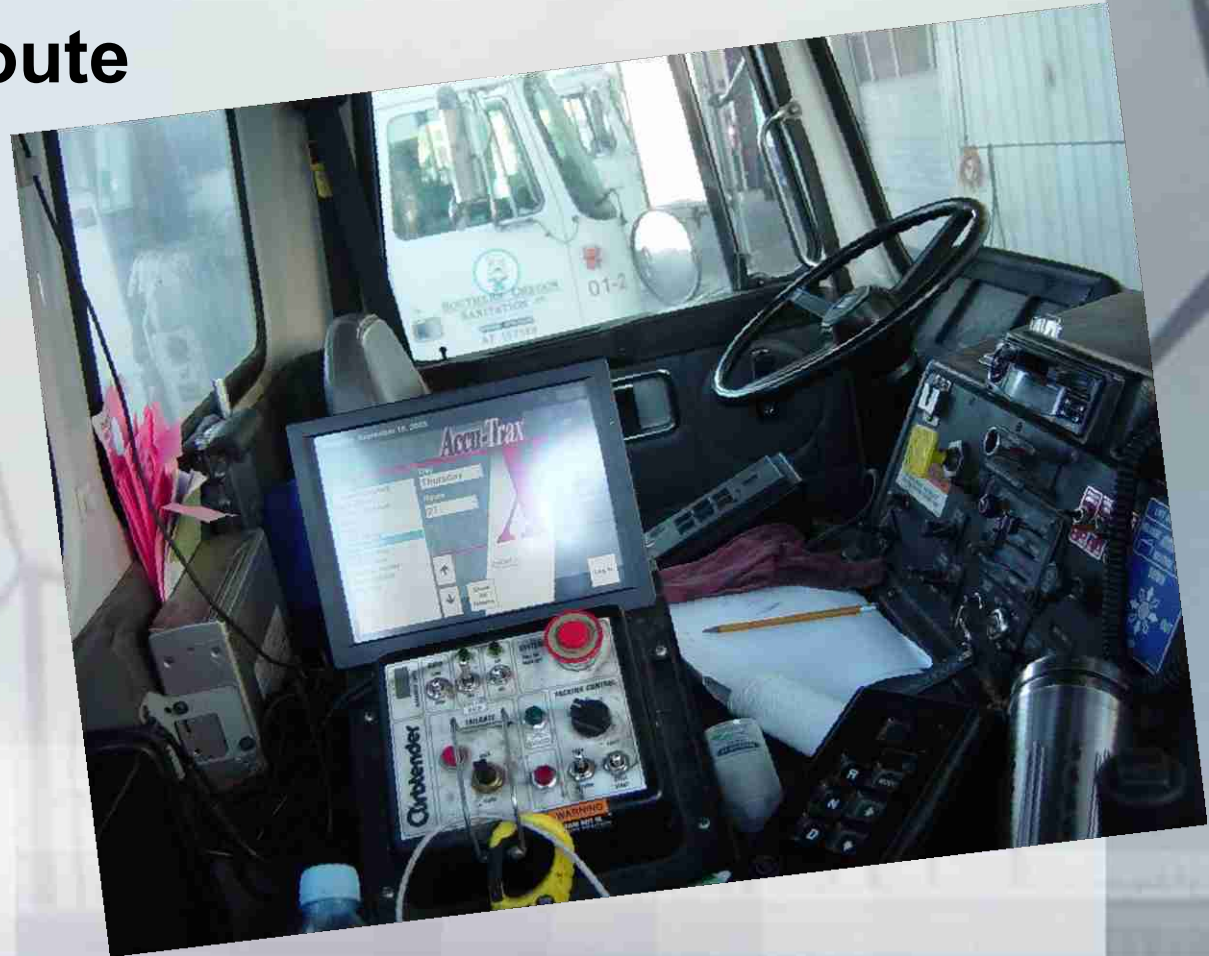
# **Curent and Emerging Technology**

- **Onboard Computers**
- **GPS: Global Positioning System**
- **Rfid: Radio Frequency Identification**
- **Real Time Digital Communication**
- **Route Optimization**



# OnBoard Computers

- Handling Much Larger Route Files Generated by Residential Route Automation



# **OnBoard Computers**



**Functions**

**Computerized Route List**

**Posting Of Extra**

**Recording of No Cans Out 'NCO'**

**Sequencing of Route**

**GPS Route Auditing**

**And.....**

# OnBoard Computers Pictures



5:08 PM 3268 ELK LN S-CT 1/W Act# 26528

↑	501 STRINGER GAP RD	35CT-1/W	65012703
↓	135 STRINGER GAP RD	35CT-1/W	
↻	2111 STRINGER GAP RD	35CT-1/W	
	236 ROBERT AVE	35CT-1/W	KOLB, KIRK
	373 GENVERNA GLEN B	35CT-1/W	NICOLE
	2391 SAND CRK RD	1-CT1/W	

Regular Service

1ST RIGHT PAST 1 MILE MARKER

Search [Globe Icon] Extra NCO Route Events Home

26528



# Onboard Computer

## Desktop View

Accutrax Office Sql

File Edit Reports View Navigation Tools System Developer Window Help Codes

Customers Batch Processing Web Browser Containers Dispatch Center Billing Mapping Services Other Reports

Master The 20:24:14

JANICE DOW

**DOW, JANICE**

**Data Entry** Selection Criteria List **Southern Oregon Sanitation, Inc**

Search By 8 ( ) - ( ) - Clear Quick Query

Account 80037 JANICE DOW 120 Days \$0.00

Address 1 633 E ARCHWOOD DR UNIT 60 Company 90 Days \$0.00

Address 2 Care Of 80 Days \$0.00

Address 3 Cust Type Residential 30 Days \$5.00

City EAGLE POINT OR 97524-9430 Current \$0.00

Status Regular Service Statusdate 10/14/2002 Billcode RES-BILL-AHEAD Total 5.00

Home Phone (541)828-2746 Work Phone ( ) - Cell Phone 80037

Startdate 12/10/2001 Send to Collection

Route Info Transactions Customer Information Text Contacts Route Events Driver Notes Billing History Roll Off Boxes

Postdate	Date	Description	Tran Type	Debits
08/25/2005	08/25/2005	August		21.00
08/15/2005	08/15/2005	Payment		
07/28/2005	07/26/2005	July		21.00
07/25/2005	07/25/2005	Overfull Cart		2.00
07/18/2005	07/18/2005	Overfull Cart		2.00
07/15/2005	07/15/2005	Payment		
06/24/2005	06/24/2005	June		21.00
06/13/2005	06/13/2005	Payment		
05/25/2005	05/25/2005	May		19.00
05/09/2005	05/09/2005	Payment		

Accutrax Office Sql

File Edit Reports View Navigation Tools System Developer Window Help Codes

Customers Batch Processing Web Browser Containers Dispatch Center Billing Mapping Services Other Reports

Master The 20:25:14

JANICE DOW

**Transaction Detail Form**

Date 07/25/2005

Description Overfull Cart

Amount 2.00 Balance -17.00

Type

Postdate 07/25/2005

Gpostdate 07/25/2005

Checknum Batch

Period Jul-2005 City 0

Unallocated 0.00 Frequency undefined

07/25/2005 7:43:27 AM - Overfull Cart

Date	Description	Startdate	Stopdate	Debcred	Amount	Units	Balance	Catagon
07/25/2005	Overfull Cart	07/01/2005	07/31/2005	Debit	2.00	.00	.00	

Accutrax Office Sql

File Edit Reports View Navigation Tools System Developer Window Help Codes

Customers Batch Processing Web Browser Containers Dispatch Center Billing Mapping Services Other Reports

Master The 20:26:14

JANICE DOW

**Picture Viewer**

80037 - 7/25/2005 7:43:27 AM - Overfull Cart

MVTB Conversion 07/25/2005

Accutrax Office Sql

Microsoft PowerP... 3 Windows Expl... Accutrax Office Sql SQL Server Enterp... desktop2 - Paint 8:26 PM

# OnBoard Computers

## Our Results

- 40% increase in 'Extra' Revenue
- 20 minutes per day per route decrease in administrative time
- Unknown drop in unauthorized breaks

**Accu-Trax**

# GPS

## Common Myths

- There is a fee for Service
- It isn't accurate
- Its too Expensive



GPS Receiver under \$150

## Costs Overview

**Antenna and Transceivers \$2400**

**Tags/Labels under \$.50 per tag**

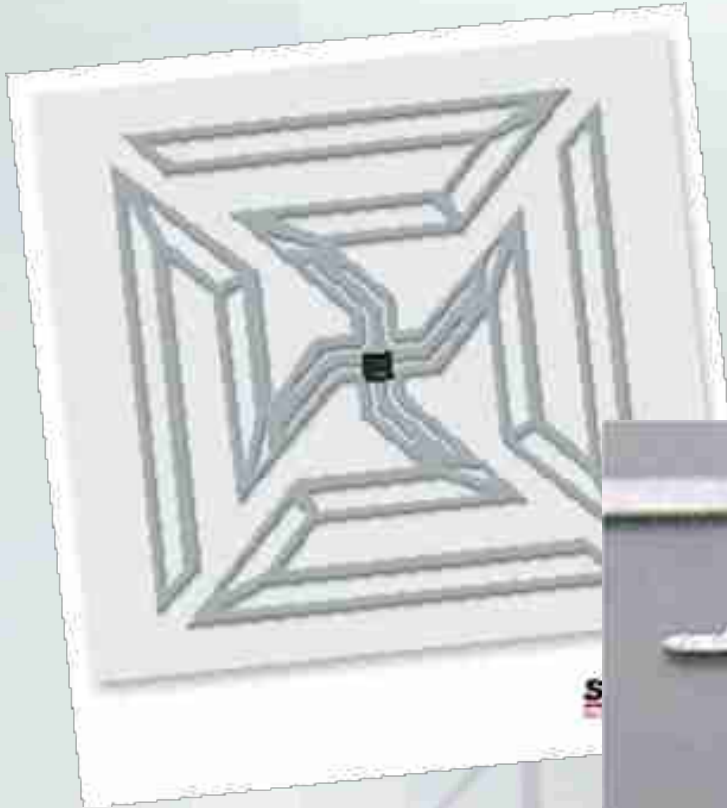
**Tag Read Results from field testing**

**299 out of 300 tested at read range of**

**Eight feet. Single failure do to  
damaged tag**

# RFID

- Radio Frequency Identification



# RFID

**RFID Tags give a positive confirmation of service to a particular cart.**

**Used for**

- **Container/Cart Inventory Control**
- **Positioning Computerized Route Book**
- **Determine type of Cart/Container**

# RFID



**Antenna**



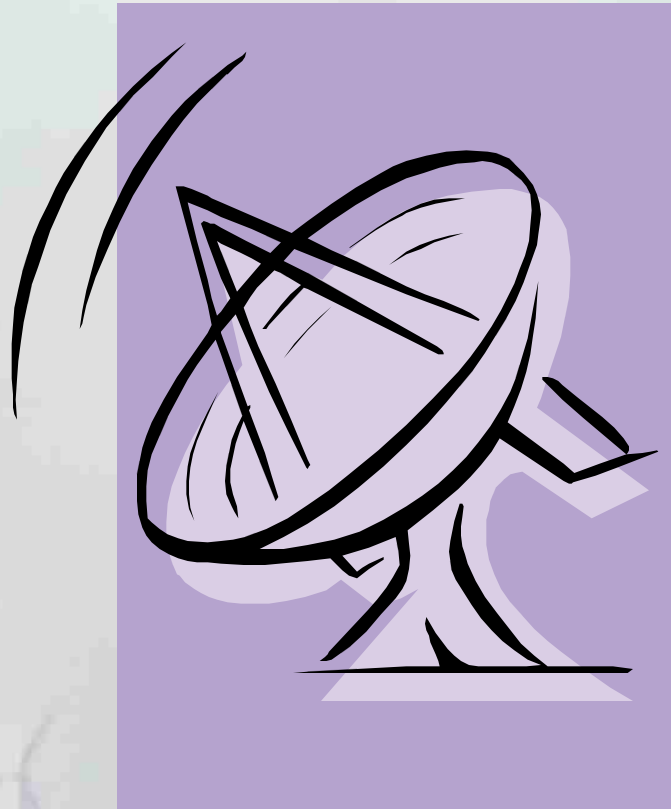
**Readers/Transceiver**

# Digital Communication

Where's Waldo

## Real Time Update Information

- Trucks Location
- Status of Load
- Tip Record



# Route Optimizations

## The Map Scurge

- How efficient are we ?
- Do we need that other Truck
- The Data Issue
- The Map Issue
- National Benchmarks



# We Need to Talk

- **Pat Fahey,**
- **Southern Oregon Sanitation**
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