

# Operating Improvement Initiative

---

**(GPS)**

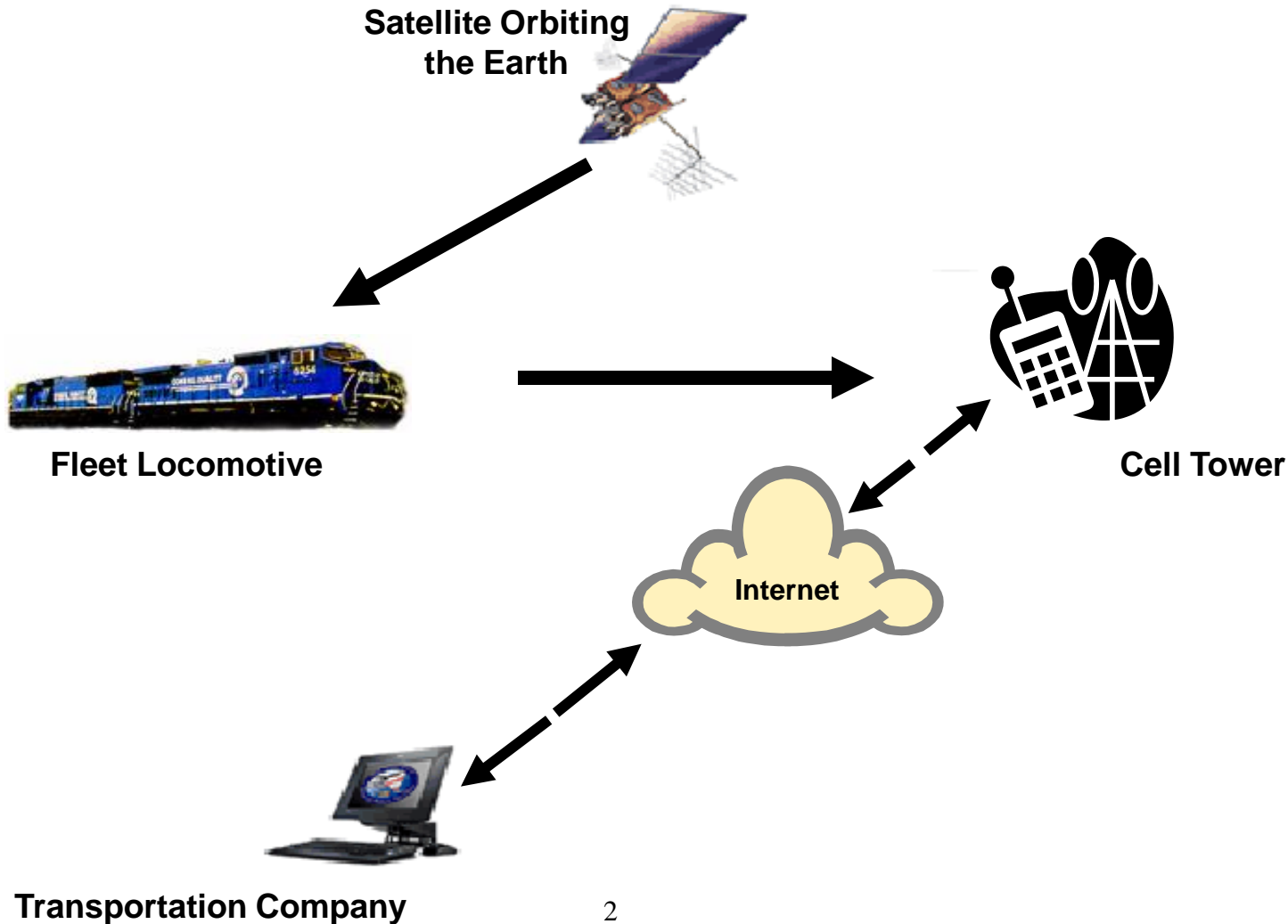


# Continued focus on maximizing efficiencies requires tools that make line supervision mobile and more productive



- ◆ Management's focus on maximizing productivity and efficiency has resulted in significant reductions making future reductions more difficult to attain. (Law of diminishing returns)
- ◆ The expected expiration of New York Dock protective benefits created a need for a method to prevent artificial increases in required overtime.
- ◆ Maximizing the efforts of a streamlined Field Management team requires new tools that provide a supervisor with historical and real-time T&E performance information.
- ◆ Tools that allow a field supervisor to be mobile (take the office with you) were needed to maximize efforts and identify where tactical focus was needed.

# GPS technology provides a potential solution to further enhance efficiency



Very reasonable one time and recurring unit cost makes the application of basic GPS technology possible

- ◆ The decision was made to move forward with a Pilot program to validate the potential uses of GPS technology.
- ◆ Two GPS units were purchased and installed.



GPS Unit Cost - \$500



Recurring Unit Cost - \$480/Year

# Desktop Audits were manually performed to analyze crew productivity utilizing GPS, Payroll and Car Reporting information



## Desk Top Audit Report

WPPA 21 / FP 26

CX 4409

Date	On Duty Time	Locomotive Start Moving	Paul Yard Out	Cars Out	Paul Yard In	Cars In	Locomotive Stop Moving	Off Duty	Crew Crew Overtime	Day	Customer Info
7/13/2004	2PM	234 PM	221 PM	0	615 PM	0	611 PM	643 PM	0	Tue	Worked Neveon Worked Oxi Worked Ferro Cars handle: 65
7/14/2004	2PM	323 PM	206 PM	0	949 PM	0	944 PM	1208 AM	2:08	Wed	Worked Neveon Worked Oxi Worked Ferro Cars handle: 49
7/15/2004	2PM	256 PM	250 PM	0	7:00 PM	0	646 PM	702 PM	0	Thu	Worked Neveon Worked Oxi Worked Ferro Cars handle: 34
7/16/2004	2PM	345 PM	324 Pm	0	1033 Pm	0	1032 PM	1225 AM	2:25	Fri	Worked Neveon Worked Oxi Worked Ferro Cars handle: 52
7/19/2004	2PM	405 PM	209 PM	0	1055 PM	0	1102 PM	155 Am	3:55	Mon	Worked Neveon Worked Oxi Worked Ferro Cars handle: 63
7/20/2004	2PM	352 PM	250 PM	0	1059 PM	0	1055 PM	1240 AM	3:40	Tue	Worked Neveon Worked Oxi Worked Ferro Cars handle: 76

# Results of the Desktop Audit identified many uses of combining GPS information with other data and the decision was made to move forward with a formal initiative



- ◆ The manually performed desk top audits validated the benefits of utilizing GPS technology.
- ◆ The decision was made to develop a management reporting tool to analyze crew productivity and locomotive shutdown compliance.
- ◆ The new management reporting tool provides daily/tactical reports as well as weekly, monthly and year to date management reports.

## Tactical

Daily Crew Reports  
Daily Fuel Conservation Report

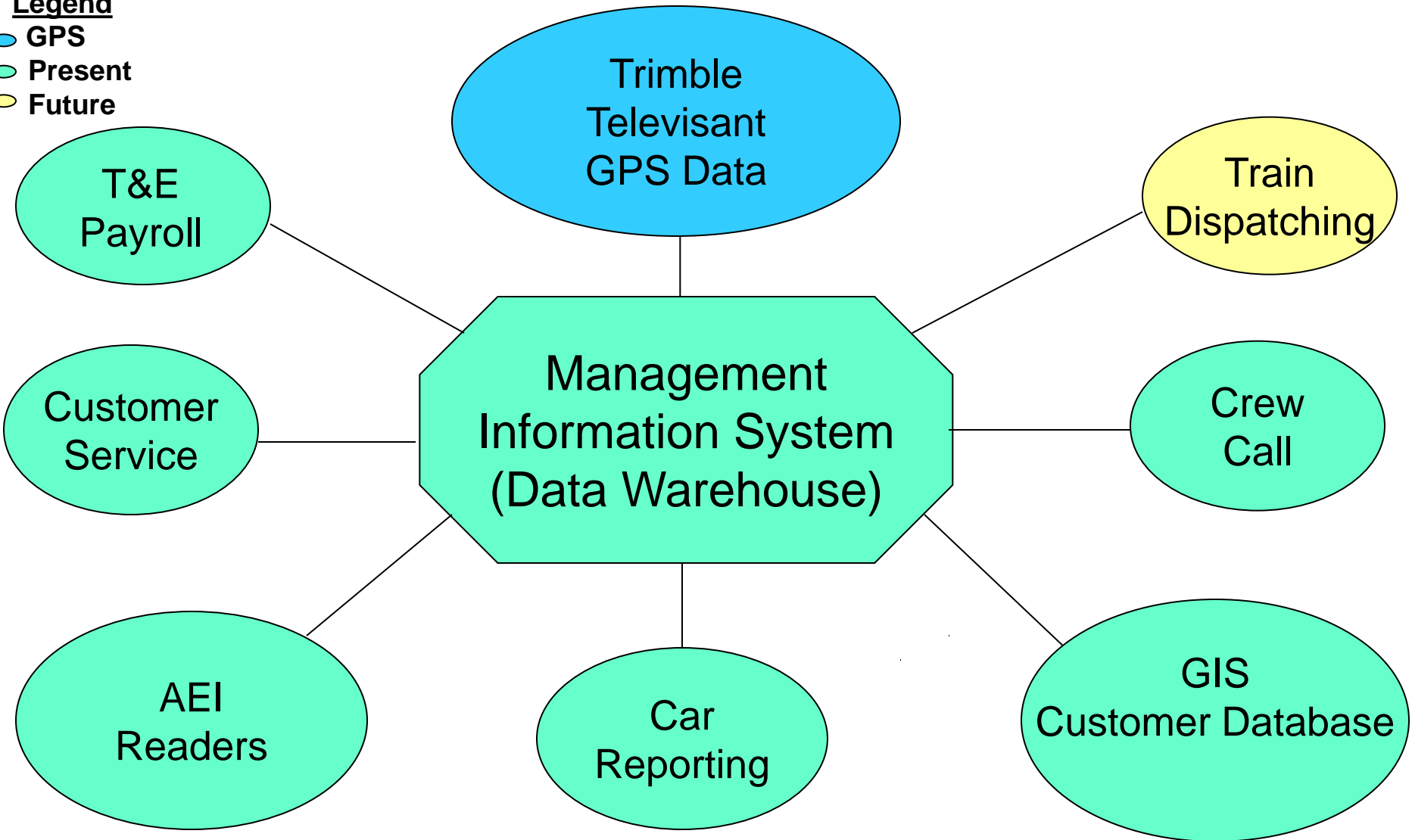
## Management

Summary Crew Report  
Summary Fuel Conservation Rpt.

# The new GPS data blended with information available in the Conrail data warehouse provides a powerful tactical and strategic management information system



- Legend**
- GPS
  - Present
  - Future



Tactical crew information can be accessed through the Conrail data warehouse.



The screenshot shows a software window titled "Crew Reports" with a blue title bar. The main area is titled "Select Report Criteria" and contains several input fields and buttons. On the left, under "Select Report Type", there are two radio buttons: "Summary" (unselected) and "Detail" (selected). To the right, there are four dropdown menus: "SAA" (set to "South Jersey"), "Time Period" (set to "Select Time"), "From" (set to "6 /29/2005"), "Yard" (set to "PAVONIA"), and "Crew" (set to "FC05 WPCA51"). At the bottom, there are four buttons: "Reset", "Go", "Exit", and "OK".



# The Crew report provides line supervision with information to evaluate workload, efficiency, and customer service.



## CONRAIL CREW REPORT

Crew: FC05 for 06/29/2005

### Crew:

J.CASSIDY	Conductor	On Duty Time	: 10:00 AM
J.PERRI	Engineer	Off Duty Time	: 10:00 PM
		Total Time on Duty:	12:00

### Locomotives:

** NS 5225	First Movement:	11:03 AM	Origin Idle Time	:01:03
NS 5280	Last Movement:	09:44 PM	Destination Idle Time	:00:16
	Total Time	: 10:41	Origin/Dest Idle Time	:01:19
	Time Moving:	07:23	Total Miles Traveled	:64.7
	Stopped:	03:18	Average Speed	:8.8 MPH

### Locomotive Speed (MPH) Distribution in Minutes

0	: 251	39.2%	1- 4.9:	85	13.3%	5- 9.9:	141	22.0%	10-14.9:	67	10.5%
15-19.9:	61	9.5%	20-24.9:	35	5.5%	25-29.9:	1	0.0%	30+	: 0	0.0%

Min Moved	Miles	Speed	Locomotive	Stops	Min Stop	Location
15	1.1	4.4	11:18 AM -	11:53 AM	35	1444 RIVER RD CAMDEN NJ
40	2.0	3.0	12:33 PM -	12:47 PM	14	I 676 N CAMDEN NJ
52	7.3	8.4	01:39 PM -	01:48 PM	9	NEW JERSEY TPKE S BARRINGTON NJ
20	1.3	3.9	02:08 PM -	02:23 PM	15	40 ATLANTIC AVE LAWNSIDE NJ
4	0.5	7.5	02:27 PM -	02:38 PM	11	ATLANTIC AVE NE MAGNOLIA NJ
37	7.2	11.7	03:15 PM -	04:03 PM	48	PINE VALLEY COUNTRY CLUB CLEMENTON NJ
45	3.3	4.4	04:48 PM -	04:54 PM	6	260 ATLANTIC AVE BERLIN NJ
13	4.1	18.9	05:07 PM -	05:13 PM	6	RAILROAD AVE HAMMONTON NJ
26	0.5	1.2	05:39 PM -	05:50 PM	11	98 BERLIN BLUE ANCHOR RD HAMMONTON NJ
57	6.4	6.7	06:47 PM -	06:54 PM	7	799 BAIRDMORE AVE HAMMONTON NJ
7	0.4	3.4	07:01 PM -	07:15 PM	14	CEDARBROOK RD HAMMONTON NJ
30	3.3	6.6	07:45 PM -	08:07 PM	22	CEDARBROOK RD HAMMONTON NJ

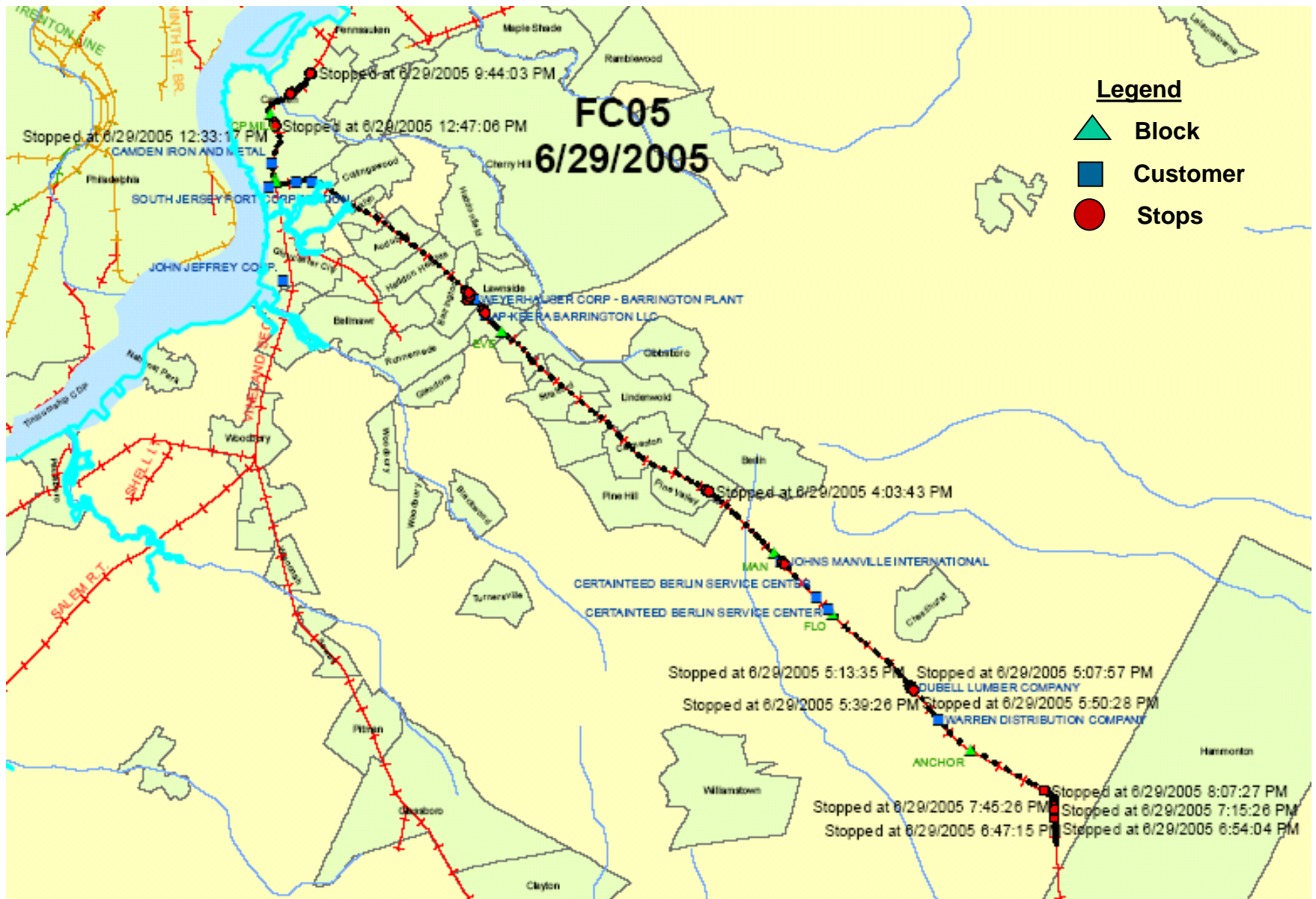
### AEI Reads: Date/Time Cars Engines

PAVONIA SOUTH	0629 0101 PM	11	2
PAVONIA SOUTH	0629 0930 PM	19	2

### Work Performed:

Customer	Reported Time	Placed	Pulled	Total	In Gate	Out Gate	Total Time	Min/Car
SJPBECKET	06/29 1000 AM	1	0	1	00:00	00:00	00:00	0.0
WEYERHAEU	06/29 0215 PM	5	5	10	01:37 PM	02:25 PM	00:48	4.8
JOHMANINT	06/29 0450 PM	5	2	7	00:00	00:00	00:00	0.0
DUBELLUMB	06/29 0550 PM	1	1	2	00:00	00:00	00:00	0.0
Total		12	8	20				

Graphical displays/maps identify train movement delays, customer locations and stops greater than 5 minutes.



# GPS data is also used to identify locomotive inactivity, shutdown opportunity, and fuel conservation



## CONSOLIDATED RAIL CORPORATION Daily Fuel Conservation Report 06/29/05

Region	Init	Number	Total Opportunity	Shutdown Time	Fuel Saved	Money Saved	Opportunity Lost	Fuel Burned	Money Lost	Incidents
Detroit	NS	1429	24.00	24.00	108.00	\$179.28	0.00	0.00	\$0.00	1
	NS	1445	24.00	24.00	108.00	\$179.28	0.00	0.00	\$0.00	1
	NS	5242	16.52	15.46	70.95	\$117.78	1.06	4.95	\$8.22	5
	CSX	1563	13.57	13.57	62.78	\$104.21	0.00	0.00	\$0.00	3
	NS	1448	15.54	11.34	52.05	\$86.40	4.20	19.50	\$32.37	3
	NS	1407	11.33	11.33	51.98	\$86.28	0.00	0.00	\$0.00	4
	NS	1454	15.28	3.37	16.28	\$27.02	11.51	53.33	\$88.52	3
<b>Count/Totals Averages</b>		<b>7</b>	<b>120.24</b> <b>17.18</b>	<b>103.07</b> <b>14.72</b>	<b>470.04</b> <b>67.15</b>	<b>\$780.25</b> <b>\$111.46</b>	<b>16.77</b> <b>2.40</b>	<b>77.78</b> <b>11.11</b>	<b>\$129.11</b> <b>\$18.44</b>	<b>20</b> <b>2.86</b>
North Jersey	NS	1427	23.58	23.58	107.85	\$179.03	0.00	0.00	\$0.00	2
	NS	2103	20.19	20.19	91.43	\$151.77	0.00	0.00	\$0.00	2
	CSX	8815	12.19	3.31	15.83	\$26.27	8.48	39.60	\$65.74	6
	CSX	2746	16.11	1.38	7.35	\$12.20	14.33	65.48	\$108.69	3
	CSX	4419	19.08	0.00	0.00	\$0.00	19.08	86.10	\$142.93	2
	NS	5313	15.54	0.00	0.00	\$0.00	15.54	71.55	\$118.77	4
	NS	5314	18.54	0.00	0.00	\$0.00	18.54	85.05	\$141.18	4
<b>Count/Totals Averages</b>		<b>7</b>	<b>125.23</b> <b>17.89</b>	<b>48.46</b> <b>6.92</b>	<b>222.46</b> <b>31.78</b>	<b>\$369.27</b> <b>\$52.75</b>	<b>75.97</b> <b>10.85</b>	<b>347.78</b> <b>49.68</b>	<b>\$577.31</b> <b>\$82.47</b>	<b>23.00</b> <b>3.29</b>
South Jersey	CSX	4428	24.00	24.00	108.00	\$179.28	0.00	0.00	\$0.00	1
	NS	5223	23.39	23.39	106.43	\$176.67	0.00	0.00	\$0.00	2
	NS	5312	18.34	17.00	76.50	\$126.99	1.34	7.05	\$11.70	3
	CSX	4412	11.19	10.18	46.35	\$76.94	1.01	4.58	\$7.59	3
	NS	5280	3.46	0.00	0.00	\$0.00	3.46	16.95	\$28.14	2
	NS	5284	9.47	0.00	0.00	\$0.00	9.47	44.03	\$73.08	5
<b>Count/Totals Averages</b>		<b>6</b>	<b>89.85</b> <b>14.98</b>	<b>74.57</b> <b>12.43</b>	<b>337.28</b> <b>56.21</b>	<b>\$559.88</b> <b>\$93.31</b>	<b>15.28</b> <b>2.55</b>	<b>72.61</b> <b>12.10</b>	<b>\$120.51</b> <b>\$20.09</b>	<b>16</b> <b>2.66</b>
<b>Count/Totals Averages</b>		<b>20</b>	<b>335.32</b> <b>16.77</b>	<b>226.10</b> <b>11.31</b>	<b>1,029.78</b> <b>51.49</b>	<b>\$1,709.40</b> <b>\$85.47</b>	<b>108.02</b> <b>5.40</b>	<b>498.17</b> <b>24.91</b>	<b>\$826.93</b> <b>\$41.35</b>	<b>59</b> <b>2.95</b>

# The Summary Crew Report can be generated by Yard, District or System



**Consolidated Rail Corporation  
Summary - Crew Report  
PAVONIA  
July 1, 2005 - July 11, 2005**

NS Crew	CR Crew	Starts	GPS Starts	Avg On Duty Time	Avg Loco Time	Total Idle Time	Orig Idle Time	Dest Idle Time	Avg Loco Moving Time	Avg Loco Stop Time	# of Stops	Avg Miles Traveled	Avg Speed	Avg # Cust. Served	Avg # Cars
FC05	WPCA51	6	6	11:29	9:07	2:22	1:34	0:48	6:43	2:24	9.2	60.3	9.0	6.3	75.5
FC06	WPCA20	6	5	12:01	10:09	1:52	1:32	0:20	6:11	3:58	12.0	55.4	9.0	2.6	23.4
FC14	YPCA05	6	6	10:35	8:34	2:01	1:17	0:44	5:54	2:40	7.5	35.5	6.0	3.8	38.5
FC20	YPCA20	7	7	7:14	4:10	3:04	1:44	1:21	2:16	1:54	4.3	9.0	4.0	0.7	19.0
FC25	YPCA25	1	1	6:03	4:59	1:04	0:10	0:54	2:30	2:29	5.0	8.2	3.3	0.0	0.0
FC26	WPCA01	6	1	5:20	2:23	2:57	0:07	2:50	1:09	1:14	2.0	8.5	7.4	0.0	0.0
FC27	YPCA27	6	4	7:38	5:51	1:47	1:12	0:35	3:50	2:01	6.8	8.6	2.3	0.0	0.0
FC40	YPCA60	5	4	8:46	6:34	2:12	1:12	0:00	3:43	2:51	6.0	10.8	2.9	5.0	20.5
FC42	WPCA11	9	9	6:55	4:19	2:36	1:59	0:37	2:41	1:38	5.7	24.7	9.2	1.9	79.8
FC44	YPCA41	6	3	9:27	6:29	2:58	1:49	1:10	3:50	2:39	11.0	11.5	3.0	0.0	0.0
FC45	WPCA29	4	3	11:36	9:24	2:12	1:19	0:52	5:44	3:40	8.3	44.3	7.7	5.0	27.0
FC48	YPCA48	4	4	10:11	4:20	5:51	2:28	3:23	2:22	1:58	3.8	10.6	4.5	0.0	0.0
FC49	YPCA69	5	5	9:53	7:34	2:19	1:13	1:05	5:23	2:11	6.4	19.1	3.5	4.6	27.6
Average		5.46	4.46	9:00	6:27	2:33	1:21	1:07	4:01	2:25	6.77	23.58	5.52	2.30	23.95

**June 2005**

NS Crew	CR Crew	Starts	GPS Starts	Avg On Duty Time	Avg Loco Time	Total Idle Time	Orig Idle Time	Dest Idle Time	Avg Loco Moving Time	Avg Loco Stop Time	# of Stops	Avg Miles Traveled	Avg Speed	Avg # Cust. Served	Avg # Cars
FC05	WPCA51	22	22	12:02	9:40	2:22	1:28	0:55	6:30	3:10	10.2	58.9	9.1	5.6	42.2
FC06	WPCA20	22	19	10:47	8:42	2:05	1:12	0:54	5:29	3:13	10.8	34.4	6.3	2.1	28.1
FC14	YPCA05	22	22	11:26	8:34	2:52	1:16	1:37	6:13	2:21	7.3	31.8	5.1	3.5	40.0
FC20	YPCA20	21	21	8:53	5:49	3:04	1:52	1:11	2:51	2:58	6.6	12.8	4.5	0.6	21.1
FC25	YPCA25	4	2	9:55	6:31	3:24	1:01	2:24	3:37	2:54	5.5	18.3	5.0	0.0	0.0
FC26	WPCA01	22	8	9:22	4:18	5:04	2:22	2:42	1:47	2:31	4.5	14.0	7.8	0.0	0.0
FC27	YPCA27	21	10	8:37	5:30	3:07	1:18	1:49	2:57	2:33	6.3	10.1	3.4	0.0	0.0
FC40	YPCA60	21	19	7:30	5:34	1:56	0:59	0:57	2:47	2:47	7.1	14.5	5.2	4.7	20.7
FC42	WPCA11	26	8	7:30	4:36	2:54	2:03	0:51	2:45	1:51	6.3	25.7	9.4	2.1	77.6
FC44	YPCA41	19	9	10:34	7:29	3:05	1:13	1:52	4:55	2:34	7.0	10.2	2.1	0.0	0.0
FC45	WPCA29	20	19	10:38	8:09	2:29	1:21	1:08	5:09	3:00	6.2	42.3	8.2	5.1	25.4
FC48	YPCA48	20	18	8:39	6:43	1:56	1:05	0:51	3:30	3:13	8.8	12.7	3.6	0.0	0.0
FC49	YPCA69	21	20	11:03	8:52	2:11	1:21	0:50	5:35	3:17	9.3	21.8	3.9	4.3	37.2
Average		20.08	15.15	9:45	6:57	2:48	1:25	1:23	4:09	2:47	7.38	23.65	5.66	2.15	22.48

Real-time location information can be accessed by locomotive and presented in text format or a visual map display.

Vehicle	Date	Time	Address
L-CSX-1128-M0670	7/13/2005	09:38:40 AM	1968 E Butler St, Philadelphia, PA, 19137



The event report can be generated on demand and will identify stops, starts and location.



**TrimWeb™** [Logout](#)

HOME STATUS MAPS **REPORTS** MESSAGES SITES SET UP

**Reports**

**Report Generation**  
[Create Schedule](#)  
[View Schedules](#)

1. Select report type:

2. Quick time range:

Start Date\* / Time:

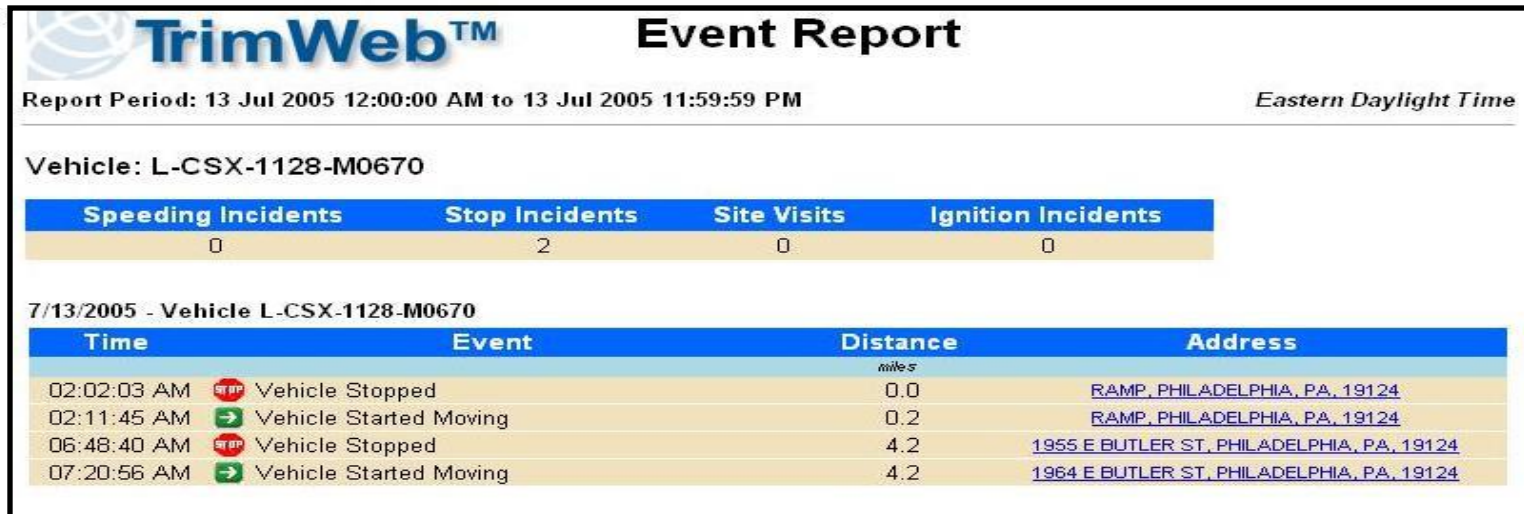
End Date\* / Time:

\* dd MMM yyyy hh:mm:ss tt.

3. Select group / vehicle(s):

Vehicle
<input type="checkbox"/> L-CSX-1123-M6170
<input type="checkbox"/> L-CSX-1127-M0906
<input checked="" type="checkbox"/> L-CSX-1128-M0670
<input type="checkbox"/> L-CSX-1537-M6264

[Select All](#)  
[Deselect All](#)



**TrimWeb™** **Event Report**

Report Period: 13 Jul 2005 12:00:00 AM to 13 Jul 2005 11:59:59 PM *Eastern Daylight Time*

Vehicle: L-CSX-1128-M0670

Speeding Incidents	Stop Incidents	Site Visits	Ignition Incidents
0	2	0	0

7/13/2005 - Vehicle L-CSX-1128-M0670

Time	Event	Distance	Address
		<small>miles</small>	
02:02:03 AM	Vehicle Stopped	0.0	<a href="#">RAMP, PHILADELPHIA, PA, 19124</a>
02:11:45 AM	Vehicle Started Moving	0.2	<a href="#">RAMP, PHILADELPHIA, PA, 19124</a>
06:48:40 AM	Vehicle Stopped	4.2	<a href="#">1955 E BUTLER ST, PHILADELPHIA, PA, 19124</a>
07:20:56 AM	Vehicle Started Moving	4.2	<a href="#">1964 E BUTLER ST, PHILADELPHIA, PA, 19124</a>

END OF REPORT

# Questions and Answers

---

