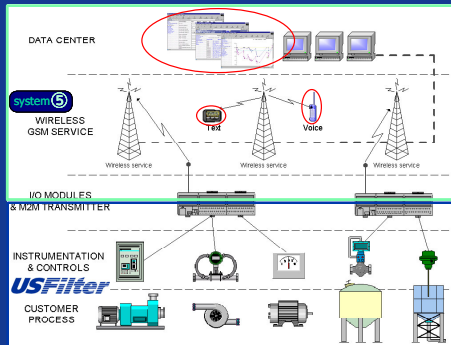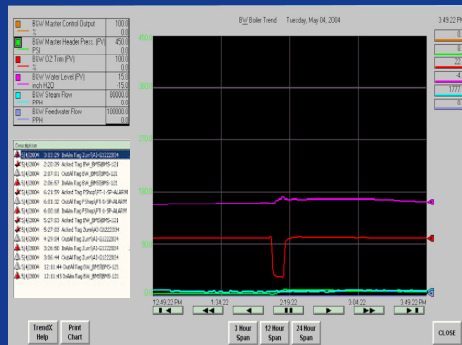# Remote Asset Management Solutions
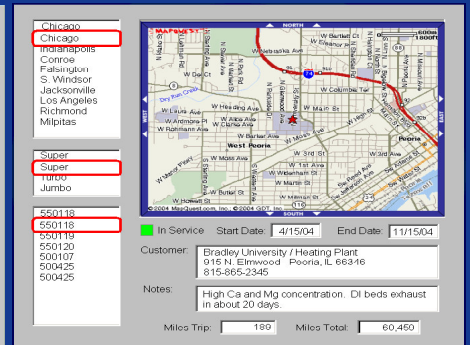## Information & Specifications Sheet
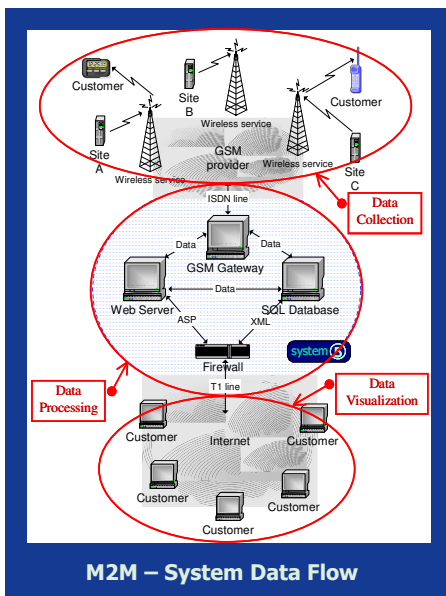

M2M – System Architecture

M2M – Data Trending & Alarming

M2M – GPS Functionality

M2M – System Data Flow

Introduction

The MERCURY system is a Fleet Management Solution that includes:

- **asset geographical tracking by means of GPS;**
- **data acquisition, data historical logging/reporting and data visualization;**
- **event/alarm detection, handling and annunciation;**
- **asset administration;**

The system makes use of M2M wireless communication technologies for field data acquisition and communication, and of Internet technologies for data visualization and reporting.

system ⑤ HD-SCADA Technology

Data Acquisition and Processing:

- **poll/time based data acquisition;**
- **exception/event based data acquisition;**
- **data historical logging (SQL database);**
- **data transformation services (calculations);**
- **XML data transfer (to Enterprise systems);**
- **custom reporting (web-based, e-mail, FTP, etc...);**

Data Visualization and Alarming:

- **Web-Browser based graphical user interface (dynamic / user configurable equipment and data entry/review screens);**
- **portable device (PDA, G2/G3 cell phone) graphical user interface (dynamic equipment and data entry/review screens);**

- **cell phone/pager text based user interface;**
- **PUSH/RSS alarm messages to subscribers Internet connected PC (to monitoring station);**
- **voice alarm messages over the phone to programmed numbers;**
- **text alarm messages to cell-phone or pager;**

Remote Control and Programming:

- **remote control through Web-based user interface;**
- **remote control through G2/G3 cellular phone;**
- **remote programming through dedicated software accessed through Data Center;**
- **remote programming (simple functions) through G2/G3 cellular phone;**

Unmanned Response:

- **"Business Rules" Editor and Engine (take a programmed action based on certain I/O tag values and/or events detection);**
- **Calculated and Indirect SCADA Tags;**

Managed IT Services

All the system applications and data are hosted on System5's servers, who is also responsible for all the data administration and maintenance functions:

- **IT hardware/software installation and maintenance;**
- **Data (SQL database) regular back-ups;**
- **Web Site (user interface) management & maintenance;**
- **Server and Internet connection 24/7/355 up-time monitoring;**

Continuous and reliable access to the data (by means of Internet or other communication technologies) is assured.

Why Managed Services:

- ▶ **Expertise and focus (familiarity with the applications);**
- ▶ **Faster response to problems (Mean Time To Repair (MTTR) commitment);**
- ▶ **Flexibility (one can always up-size without a large upfront investment just to cover the eventuality one may up-size in the future);**
- ▶ **Cost savings and increased productivity;**

Service Level:

- **Service commitment: 99.99% uptime guaranty over the course of 12 month;**
- **Eight (8) hour Mean Time To Repair (MTTR) commitment;**
- **Two (2) hours/month technical assistance (outside of the time spent in response to operating problems);**
- **Twelve (12) hours continuous coverage: 8:00AM Eastern Time to 5:00PM Pacific Time;**
- **After-hours emergency response commitment;**

MERCURY System

Technical objectives:

- **acquire discrete and analog I/O data from the local instrumentation;**

- **securely store process data for reviewing, reporting and statistical analysis;**
- **enable secure data access to administrative and technical personnel;**
- **data access over thin-client interfaces (Web-Browser, PDA, Cell-Phone);**

Value Proposition

Asset Utilization:

- **Asset Billable Time: Current Month, Last Six Month, Last 12 Month;**
- **Asset Time in Transit (travel times – compare with expected travel times);**
- **Asset Downtime at Customer Site (percent utilization 1);**
- **Asset Time in Storage/Stand-by (percent utilization 2);**

Labor Utilization:

- **record and historically log actual travel times;**
- **compare actual travel times to average travel times and automatically notify if preset margins are exceeded;**
- **compare travel distances to average travel distances and automatically notify if preset margins are exceeded;**

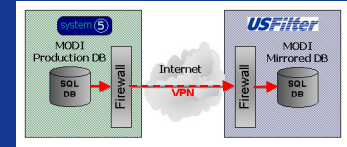### Incident Prevention, Detection and Historical Logging:

- **notify/alarm and take automatic action upon detection of abnormal operating conditions: power loss, exceeding operating limits, etc… Automatic response: take immediate local action upon detection of abnormal conditions, or use the HD-SCADA "Business Rules" functionality to generate a pre-programmed unmanned response;**
- **log (time stamp) the alarm associated with the abnormal operating condition and also log process data;**

Data Logging & Automatic Analysis – Asset Usage Optimization:

- **historically log all the process data and generate reports;**
- **periodically analyze critical process parameters and automatically notify technical personnel (thru e-mail or**
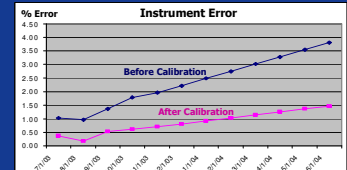
phone message) if limits are exceeded;

- **automatically generate reports and distribute them thru e-mail to recipients list;**

12:00AM: synchronize

Date	Before Calibration			Average % Error	After Calibration			Average % Error
	4mA	12mA	20mA		4mA	12mA	20mA	
7/15/2003	0.2	151	299.5	1.03	0.1	150.3	299.8	0.37
8/15/2003	0.2	150.8	299.3	0.97	0.05	150.1	299.8	0.18
9/15/2003	0.3	151	298.8	1.37	0.1	150.5	299.7	0.53
10/15/2003	0.32	151.2	298	1.79	0.15	150.5	299.6	0.62
11/15/2003	0.37	151.2	297.65	1.95	0.15	150.6	299.55	0.70
12/15/2003	0.416	151.28	297.15	2.22	0.17	150.7	299.48	0.81
1/15/2004	0.462	151.36	296.65	2.49	0.19	150.8	299.41	0.92
2/15/2004	0.508	151.44	296.15	2.75	0.21	150.9	299.34	1.03
3/15/2004	0.554	151.52	295.65	3.02	0.23	151	299.27	1.14
4/15/2004	0.6	151.6	295.15	3.28	0.25	151.1	299.2	1.25
5/15/2004	0.646	151.68	294.65	3.55	0.27	151.2	299.13	1.36
6/15/2004	0.692	151.76	294.15	3.82	0.29	151.3	299.06	1.47

Instrument Calibration Management

Data Accuracy Assurance:

- **data daily backup, periodic archiving, off-site mirroring;**
- **instrument fault detection: bad quality check, Boolean check, limit check, run-time check, X-Y profile deviation. Annunciation through phone message, text message, e-mail – Work-Order requests generated automatically;**
- **instrument Calibration Management Program (optional): due-calibration notification, calibration "as-found"/"as-left" data recording, reporting and trending;**

Why system ⑤ solution:

- ▶ **Process Controls and Instrumentation experience:**
- ▶ **Outsourcing and operations support experience;**
- ▶ **Takes advantage of each business core competences;**
- ▶ **Low risk, low overhead and low initial investment;**
- ▶ **No need to reallocate or acquire additional technical resources;**
- ▶ **Local organization, local office and local support**

MERCURY by **system ⑤**