VIPER

VIPER Overview

VIPER is a wireless network-based communications system designed to enable real time transmission of data from field sensors to a local computer, remote computer, or enterprise server also providing data management, analysis, and visualization.

USEPA-ERT has developed this wireless sensor communication system utilizing Safe Environment Engineering's LifeLine Wireless Monitoring system. LifeLine's core technology has been leveraged and enhanced by ERT custom software which draws on the Scribe.NET Enterprise Data model to provide data capture, aggregation, persistence, communication, and visualization of sensor data in a manner applicable to a wide range of environmental monitoring equipment and field monitoring scenarios.

The VIPER system supports mobile and fixed monitoring modes with independent or clustered sensor arrays and local and/or enterprise communication strategies. The custom application (VIPER Survey Controller) allows the user to compose and control a field survey with great flexibility. The VIPER Survey Controller manages the LifeLine hardware and software, launching instances of the LifeLine sensor controller application with specific configuration files based on the user-defined survey components, communications strategy, and survey mode.

In addition, the VIPER Survey Controller manipulates the Common Alerting Protocol (CAP) XML data streams, locally persists the data in SQL Server Express, produces KML dataforms viewable in Google Earth, and publishes data to the VIPER.NET Enterprise servers for access via the Internet. Enterprise services include a subscription service for maintaining a SQL Server database and a service that provides monitoring system status and reporting.

LifeLine Specifications

Range: **Wi-fi** 800 feet

Cellular infinite

Battery: **LINC** – 12 hours

Gateway – 8 hours

Cost: **LINC** ~ $1500

Gateway $3700

LifeLine Linc attached to a MultiRAE and wirelessly connecting to a gateway

Integrated Instruments

- RAE(Area,Multi, Ultra, Chem)
- DataRAM
- E-Bam
- Ludlum 2241
- Single Point Monitor
- Complete list http://safeenv.com/wireless_integrated_instruments.htm

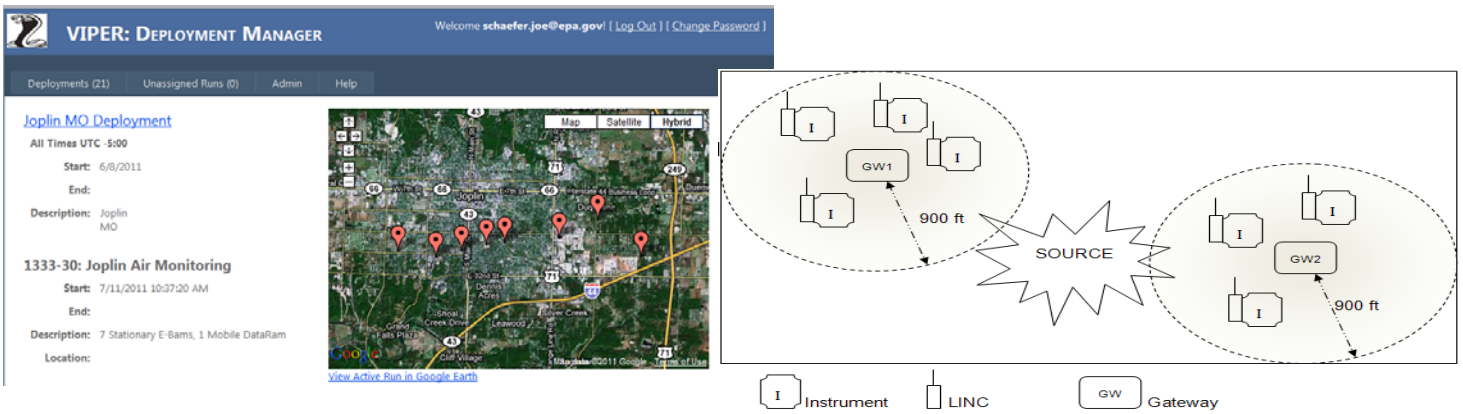
Lifeline Hardware

LifeLine is a commercially available IP-based data acquisition integration system. There are three(3) main hardware components:

LINC - connects to a single instrument's communications port and then connects via Wi-fi to a Gateway. Includes an embedded GPS and appends coordinates to sensor readings.

Gateway - connects to one or more LINCs via Wi-fi. Access the LINCs on a laptop through the gateway via either a local Wi-fi connection or through the Internet. The Gateway can be accessible via the Internet by using one of the two USB cellular air card slots or by connecting it to a LAN via its Ethernet port. The Gateways are also capable of forming a mesh network.

Meter Application – instrument-specific software that connects to the LINC through the Gateway; receives the native sensor data and converts it into a CAP message.



VIPER Field Deployment Configuration for Stationary Deployment

Analysis

As Deployment Manager receives data from the field, it can be configured to calculate Time Weighted Averages (TWA) for a parameter in real-time. These TWAs can be adjusted to average by any number of minutes, hours or days. A user may also set instrument-specific alarms for a regular parameter or a calculated parameter and configure email alerts and notifications based on those alarms.

Storage

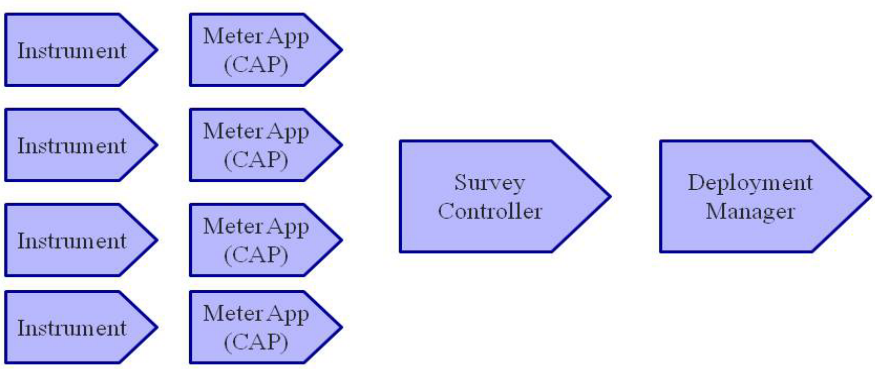
Using the Survey Controller, all data is stored **locally** in a SQL database and then published to a server where the data is also persisted and stored alongside calculated Time Weighted Averages and alarms. Local data is accessible in the SQL database and as auto-generated text files for local use.

Visualization

Survey Controller provides an operational status view of the survey components, as well as a real time view of all active Meter Applications.

Deployment manager provides a live web view of the data, the locations of the instruments, and trend graphs for each instrument. Data is also displayed via a Google Earth KML file which automatically updates with new readings showing the real-time movements of mobile survey teams.

VIPER System Workflow



"The VIPER rocks"
Paul Peronard, R8 OSC

VIPER Deployments

- Walton & Lonsbury
- Pilgrim's Pride
- Libby, MT
- Minot Floods
- Joplin Tornado
- Hurricane Irene
- Pocono 500
- St. John Ambient Air Quality

"VIPER kicks ass"
Ken Rhames, R4 OSC

For more information:

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