

Wireless Handheld Data Collection System for EPA Compliance

An EPA-regulated manufacturer needed a mobile computer system to record daily emission observations throughout their large plant site. The purpose of the system was to provide reliable documentation that emission control equipment performed effectively for EPA compliance.

The manufacturer required that certain staff members at the plant be specially trained to observe and record emission conditions. On a daily basis, these specially trained people must observe and record emissions data from 70 emission points located throughout the large plant site. For each emission point, the observer must indicate that emission conditions were acceptable, or that emission conditions were unacceptable and remediation activities were initiated. The observer must "sign" for his observations electronically. The system must automatically record a time, date, and location for each observation. The manufacturer required that emission data recorded on several mobile systems be synchronized to a single database using Ethernet or wireless networks. The manufacturer also required that responsible managers be notified automatically with e-mails, pages, or text messaging regarding observation and remediation activities. The entire system must be implemented with security and audit trails.

Project Associates designed and integrated several data technologies to meet these requirements. Handheld computers based on Microsoft PocketPC 2002 Windows CE with integrated barcode readers and wireless networking were selected for the mobile systems. These handheld computers were programmed for data collection using Microsoft eMbedded Visual Basic. Security, audit trail, and synchronization features were also programmed on these handheld computers.

Observation data was synchronized to Microsoft SQL Server. Data was transformed for long-term warehousing on corporate Oracle servers. A desktop workstation interface was programmed using Microsoft Visual Basic to allow responsible managers to record additional observation and remediation information. Security and audit trails were also implemented for the desktop workstation interface. Reports were designed as required by the manufacturer and for EPA compliance.

Automatic alerts and notifications were triggered to notify responsible managers regarding significant observation and remediation activities. These alerts were automatically escalated from e-mails to pages, text messaging, and telephone notifications using a specified escalation protocol.