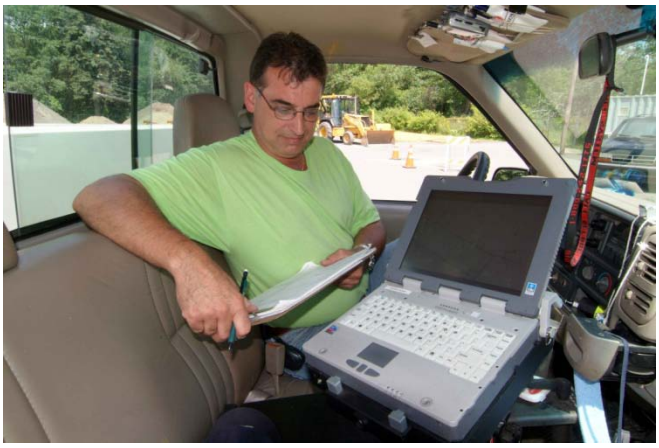
Feed the FLAME — Utility Integrates Field Applications

By Judy Haas, UGI Utilities, and Tom Helmer, Enspiria Solutions, Inc.

Utilities have historically planned, designed and deployed each of their major information-technology (IT) systems into the utility enterprise independently. As a result, these systems often sit in solitude, incapable of sharing their information with the rest of the enterprise. Utility IT system integration unlocks the potential of these legacy products and applications, enabling a leap forward in capability and efficiency.

At UGI Utilities, a major integration initiative is underway to increase the efficiency of construction and maintenance processes as well as electronically enable its field crews. This initiative introduces four new technologies while integrating with 14 existing computer systems to enhance the efficiency of UGI's business processes. Implementation of the four-year project began Oct. 1, 2003, and will continue through 2007.



Joe Kulesa uses a truck-mounted FLAME touch-screen computer to obtain near-real-time information for locating underground facilities as well as recording leak, valve and repair data at the source.

ROOM FOR IMPROVEMENT

UGI Utilities serves approximately 320,000 gas customers and 60,000 electric customers in central and eastern Pennsylvania. The Gas Division has five operating areas: Lancaster, Lehigh, Harrisburg, Hazelton and Reading.

In 2003, UGI embarked on the Field-Level Asset –Management Environment (FLAME) project to increase operating efficiency through systems integration. At that time, UGI's design, construction and maintenance processes were paper driven and not integrated with other systems. The work was arduous and mostly done in the office.

Characteristics of this manual process included the following:

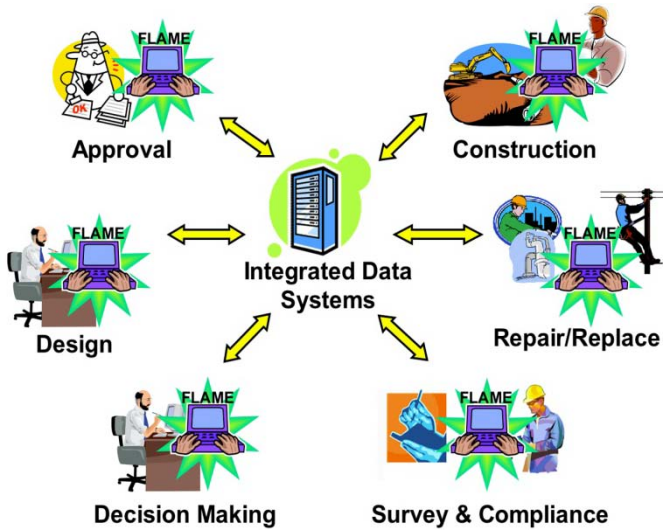
- New or replacement facilities designed with pen and paper by sifting through paper maps and facilities sketches
- Network-analysis runs completed against a year-old data model
- Gathering service, leak and valve information from three separate legacy mainframe systems
- Pouring over doorstop-sized statistical reports on green-bar continuous forms
- Manually entering units required to complete a job into work-order management and purchasing systems
- Toting paper job packets to construction sites to be used as blueprints
- After construction, manual inputting/ digitizing/filing service, main as-built, valve, meter, leaks and units into six separate computer systems as well as loose-leaf binders and metal file cabinets

*Published in the March 2007 issue of Geoworld.

A COMPREHENSIVE SOLUTION

The FLAME project is the largest information-services project undertaken by UGI. The core project team is led by a UGI project director, who has a construction and maintenance background. As a result, the FLAME project is business and operations driven, rather than driven by information services.

FLAME integrates UGI's current GIS with new mobile GIS, graphical design and content-/document-management systems as well as several existing systems, such as work management, mobile-workforce management, SCADA and engineering analysis (see "Key Elements of the FLAME Solution"). The FLAME initiative integrates and automates all construction and maintenance processes into a seamless system.



FLAME integrates and automates all construction and maintenance processes into one seamless system.

"My goal is to electronically place current and accurate information about UGI's gas-distribution facilities at the fingertips of all gas division office and field personnel," says David Stahovich, FLAME project director. "This will enhance decision making, place data collection at its source and reduce data redundancy."

The system's primary innovations consist of providing field crews with editable access to the latest maps and records, providing engineers with electronic design and drafting, giving enterprise access to GIS maps and records via an intranet site.

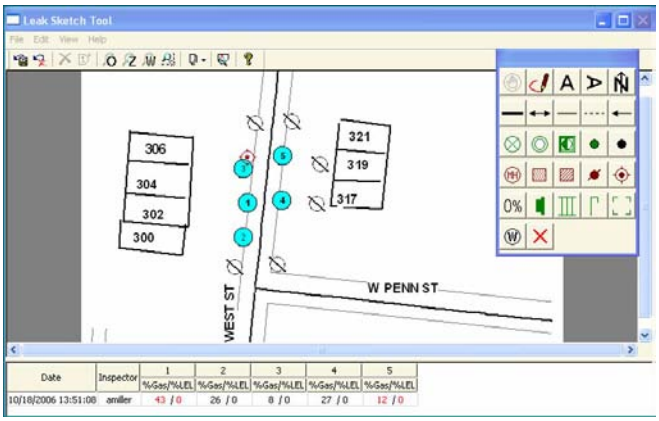
As part of the intranet site, a new document-management system maintains digital renditions of UGI documents, including service cards, as-built construction drawings, leak-report sketches and other documents. Another component provides GIS map access and navigation by address or identifier as well as document access through associations to graphical objects in the GIS or ad-hoc attribute searching.

Other improvements enabled by FLAME include the following:

- Making data about UGI's current, proposed and in-progress facilities available in real time as well as electronically in the field and office shortly after they're entered
- Using electronic job packages for field construction crews, accessed via a hardened laptop
- Instant field access to existing and planned facilities data via touch screen, spatial query, metadata or mapping coordinates
- Creating field sketches electronically by "dragging and dropping" symbols from a palette onto a snapshot of UGI's GIS
- Field recording services and leak positions with a stylus
- Automatic updating of actual labor and materials information upon job completion
- Eliminating duplicate data entry into six separate systems
- Automated processing of "call before you dig" tickets
- Less trips to the office for paper sketches and maps, enabling faster crew response
- Seamless interface between mobile workforce and mobile GIS

enspiria SOLUTIONS
A BLACK & VEATCH COMPANY

- Immediate dissemination of critical information



A leak-sketch tool records leak-spread and gas-concentration readings via drag-and-drop symbols. A fresh sketch can be created from a snapshot on the GIS, or an existing drawing can be redlined.

THE ROLLOUT

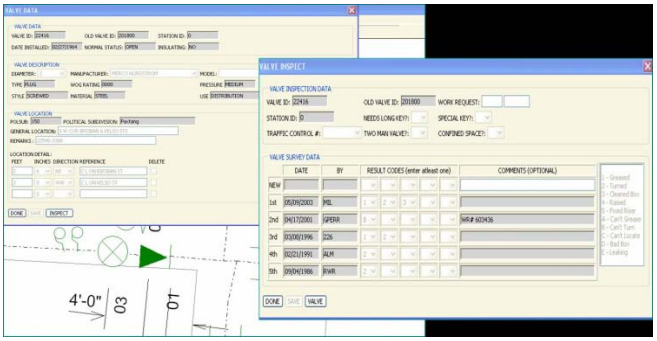
FLAME is being rolled out in five business releases (BRs), and each is then rolled out by operating area. All releases build on each other and are based on process-driven integration. To date, more than 400 UGI personnel have access to FLAME.

During BR1, data to support the one-call ("call before you dig") locate process were migrated from the mainframe to the GIS and Oracle tables. An enterprise GIS framework was built via Smallworld 4.0 Smallworld Internet Applications Server (SIAS), and a one-call Web application was built on top of that.

UGI created and populated an enterprise E-DOC framework via Documentum DMS. A one-way incremental feed was created for maps, service cards, as-builts, maintenance sketches and detail-sketch historical documents to go into the MapFrame FieldSmart mobile GIS.

"The beauty of having loaded all the map, document and attribute data is that there's no need to be connected to the 'mother ship' to see the facility data — they're self-contained," adds Stahovich.

BR2 turned the one-way interface into a two-way interface to enable valve inspection and attribute data to be captured electronically at the source. BR3 added redlining (i.e., electronic markup) of existing sketches and creation of new sketches, like leak spreads and gas-concentration readings. It also added field placement of leaks and repair points via the field GIS.



FLAME's two-way electronic valve interface captures inspections and attributes via pull-down selections. The data are available for next-day viewing by all field clients.

Completion of BR4 and BR5 is planned for 2007. BR4 automates the design and construction process as well as integration between work-order management and GE Smallworld Design Manager. BR5 will enhance the main repair/replace analysis process.

Key Elements of the FLAME Solution

New Technologies Introduced

- Mobile GIS (MapFrame FieldSmart)
- Intranet GIS (GE Smallworld Internet Application Server)
- Graphical work design/electronic job design (GE Smallworld Design Manager)
- Content/document management (EMS Documentum DMS)

Existing Business Systems Integrated

- GIS (GE Smallworld GIS)
- Network-analysis modeling (Stoner SynerGEE)
- Work-order management (Severn Trent)
- Computer-aided dispatch/mobile workforce (Virynet MobileUP)
- Material purchasing (Walker)
- Repair/replace analysis (Opvantek Optimain)
- General ledger (Oracle E-business suite)
- Contractor management
- Customer appointment scheduling
- Customer information/accounting
- Property accounting (for plant assets)
- LDAP (for security)
- Data warehouse (for adhoc queries)
- E-mail notification (Groupwise)

Business Processes Addressed

- Call before you dig
- Cathodic protection design
- Cathodic protection survey
- Leak survey
- Leak management
- Valve maintenance
- Map maintenance
- Repair/replace
- New business

THE USERS

The system supports users through three main interfaces. Field users access maps and documents via MapFrame. Daily changes from Smallworld and Documentum data stores are synchronized, so all required information is available on mobile computers. Work orders are dispatched via MobileUP, and attribute and redline changes made in the field are synchronized beck to master data stores and made available for record postings and updates.

Harrisburg, Hazleton, Lancaster and Lehigh designers as well as new business engineers (GIS users) access Smallworld through a Citrix Server, allowing remote operation of the application running in the Reading data center. Design Manager is installed on top of Smallworld Core to provide drafting tools and integration with work-order and material-purchasing systems for labor and material as well as dispatch of designs directly to the field.

Central Maps and Records, Reading designers, and new business engineers access Smallworld and Design Manager via the native Smallworld client interface running locally on their computers. Office users access maps, records, and documents through base and custom enhancements to the framework SIAS and MapFrame.

BUSINESS PROCESSES AND CHANGE MANAGEMENT

FLAME is introducing new technologies and automating processes. It's also revamping the business processes and improving availability of the resources that employees use to do their jobs — empowering them with more information for decision making. Because of the dramatic changes involved, UGI employed a phased deployment and incorporated extensive training and change management.

"Change management plays an important role in the acceptance of these changes by managing client expectations, keeping them involved during the whole process," notes Stahovich. "So there is less of a 'surprise' and more confident 'buy-in' when the system is rolled out."

UGI has run into issues along the FLAME development process. Users are working with completely new technology, and it has been difficult to get everything integrated and all the servers to "talk."

In the last year, the business has grown even more with UGI's acquisition of PG Energy, adding nearly 158,000 new customers in Wilkes-Barre, Pa.

"We've had to pull out all the stops and call in the experts, because there's a lot of pressure as we are up against deadlines," adds Stahovich. "We have used a high degree of teamwork to get in there and get it done. That seems to be working, as we have met our goals."

About the authors

Judy Haas is the FLAME Information Systems lead at UGI Utilities; e-mail: jhaas@ugi.com.

Tom Helmer is the solutions architect for the UGI FLAME project with Enspiria Solutions; e-mail: thelmer@enspiria.com.