SPATIAL SYSTEMS GOES TO SAN DIEGO!

A Message from Vice President, Eric Stetser, GISP

Esri's annual User Conference (UC) was held in San Diego, CA, in July and was attended by approximately 15,000 people. The major themes of the conference were ArcGIS 10.1 and ArcGIS in the Cloud. Both of these are technology themes. A new usage theme is ArcGIS for Facilities. In fact, for the first time, the extensive exhibit hall included a Facilities Showcase which centrally located Esri staff and business partners focused on this emerging use of Geospatial technology. Spatial Systems was one of eight exhibitors in the showcase allowing us to publicize our SpatialMMS product offering for this growing community. This was our first time exhibiting at the UC, and we were very pleased to see many of our customers in attendance as well as make new relationships to build upon.

The Facilities Showcase provided a platform for us to increase the awareness of the use of GIS within buildings to better manage their operations to maximize worker productivity, and minimize cost by taking advantage of the spatial and temporal information available via SpatialMMS. Many visitors to our booth were able to relate their own experiences with unsatisfactory office temperature and humidity conditions on a daily or seasonal basis, and saw the potential to use SpatialMMS to convey critical information to the people who manage their workspaces. Countless other visitors indicated that energy saving was an

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organizational priority that isn't being well addressed and believed that SpatialMMS could be utilized to better understand the problem to help solve it.

Spatial Systems introduced a new proof of concept use of SpatialMMS by integrating it with ArcGIS Online. This prototype demonstrates posting near real-time data (every 5 minutes) to the entirely cloud-hosted ArcGIS Online platform. The site included not only current temperatures but also 24-hour history graphs for each temperature sensor. The demonstration application is open for public use by ArcGIS Online users—just search for SpatialMMS. We have also posted demonstration videos on YouTube, again—just search for SpatialMMS.

Beyond the Facilities Showcase, there was also a Facilities Management Tract for the technical sessions at the conference. The sessions included technical workshops presented by Esri as well as user paper sessions presented by end-users including one by a Spatial Systems customer, Mr. Robert Horsch of the National Institutes of Health (NIH). Robert's presentation, entitled "Data Management, Facilities, and the Asbestos

Management Plan," highlighted the NIH's vision for using geospatial technology and techniques to better support their needs for reporting and tracking this hazardous material for both daily operations as well as long-term planning.

In addition to our own booth in the Facilities Showcase, we participated in NIH's exhibit in the Federal Facilities Showcase where we demonstrated an asbestos application that we had developed for them. The application uses GIS as an enabling technology for data collection, management, and reporting related to asbestos-containing building materials found within their facilities. This approach can be applied to other important facilities related information such as asset inventories or general condition assessments.

Overall, the 2012 UC was highly successful. If you have never attended the UC or haven't been in a long time, you should consider attending in 2013 to expand your knowledge of the depth and breadth in the use of GIS software.
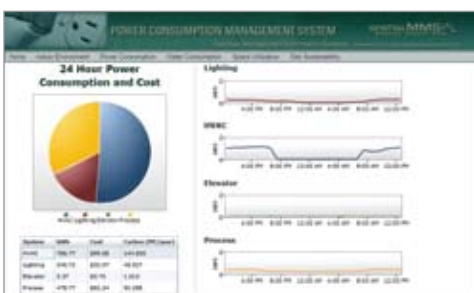
See you in San Diego… **SSA**

HIGHLIGHTS

» Asbestos management utilizing GIS *See page 2.*

» Census Data and Esri's Community Analyst product *See page 2.*

PRODUCTS
in the SPOTLIGHT

The Asbestos Field Investigation Application

By Stephen Sporik
GIS Application Developer

The Asbestos Field Investigation Application is a solution built on Esri's ArcGIS Desktop software for the National Institutes of Health. It utilizes a .NET custom toolbar and a custom geoprocessing toolbox. The solution was based on the Facilities Environment Tracking System (FACETS) application developed by the Department of State and enhanced using the ArcGIS Desktop object libraries with a geodatabase back end.

The solution is broken into three major components: *The Field Collection Application*, *The Reporting Application*, and *The Abatement Data Management Application*. Each component is available from one toolbar which includes other tools such as importing and exporting asbestos sample lab results through Excel®, and navigating campus-wide datasets using custom controls.

The Field Collection Application

The Field Collection Application operates as the initial base toolset that the industrial hygiene crews use in the field while collecting asbestos samples within buildings. The application allows the users to assign barcode IDs to samples, represent the location of the sample within a floor plan, assign numerous attributes about the sample, and upload photographs. The application also manages the creation and association of other GIS features that represent actual building structures and materials such as pipes, ducts, walls, ceilings, and floors. By allowing crews the ability to create these features in the field, the application provides the opportunity to create highly accurate and detailed GIS information.

Because materials and structures are being stored as GIS features with definitive areas, lengths, and shapes, we can use the GIS to analyze the quantity of a specified material within a building.

The Asbestos Reporting Application

In the Asbestos Reporting Application, the geoprocessing environment is utilized to produce floor wide tabular reports about the materials sampled in the building, their quantity, select attributes, and the results of laboratory testing for asbestos. The report PDF is output from ArcGIS and includes floor plan maps produced using Esri's Data Driven Pages and an appendix of the associated photos that were captured during the field collection process. These reports are designed to give Building and Campus Facility managers easy access to the vast amounts of asbestos-related data being collected in the field. It aids in decision making, regarding emergencies and budget forecasting for remediation.

> **FACT:** The U.S. EPA began regulating asbestos exposure levels in the early 1970's. Now the use of asbestos in new construction is prohibited.

The Abatement Data Management Application

The third component, The Abatement Data Management Application, enables users to edit and move features into an archive feature class that represents materials and structures that have been abated and removed from a building. This tool also manages information concerning the abatement project itself by storing polygon features that represent the extent of a certain project. One special feature of this tool is the ability to upload the working documents, PDFs, and Excel spreadsheets as attachments to the feature, stored directly in the geodatabase and accessible through a custom user interface.

The solution that has been developed has provided access to enormous amounts of information not otherwise available to campus facilities planners and environmental safety personnel. The workflows, tools, and methods used at each stage of the solution are scalable for many different built environments and have promoted the development of very useful and sophisticated GIS tools and processes that are unique to modeling facilities *in situ* and in operation.

Community Analyst

Census data has been and will continue to be one of the most revealing collections of data regarding our population. The release of the 2010 Census and American Community Survey data received a lot attention as there has been considerable change in the population and characteristics since the previous census data release in 2000. Each state's data is released in what is termed an SF1 file. This file contains an overwhelming amount of data available at the state, county, census tract, block group, and block level geographies and requires a tedious process to extract the data into a usable format for mapping and analysis. The American Community Survey data, (the replacement of the long form from the census data collection), contains a wealth of information regarding population characteristics that, once incorporated into a mapping format, reveal a significant amount of information in an easy to interpret, visual product.

Esri has utilized the information collected in the 2010 Census and American Community Survey data to create a web-based system that allows for a greater understanding of demographics, trends, and characteristics for a given geographic area. This web-based system allows the user to gain an in-depth understanding of an area for better decision making by leveraging a unique set of tools to analyze and compare locations. These tools allow the user to go beyond the basic demographics to fully understand the population within an area. Planning for the future and allocating resources is a challenge for any community, but with the use of **Community Analyst**, decisions impacting the area can be

PROJECTS
in the SPOTLIGHT

Charlottesville, VA
Public Utilities Gas Department

By Patrick McLoughlin
Project Manager

The City of Charlottesville has been distributing natural gas since 1951. The City's Public Utilities Gas Department is responsible for the distribution of natural gas to more than 18,000 customers throughout the city as well as the urban areas of surrounding Albemarle County. To support the maintenance and operation of the gas distribution system, the Gas Department implemented a Geographic Information System (GIS) in 1993 with the help of SSA's Principals. The City had taken over the GIS data updating process following the system implementation. The City's distribution system experiences a growth of approximately 200 customers and four to six miles of new pipeline on an annual basis. With this growth, as well as Departmental staff's existing responsibility, the Department contracted with SSA in 2011 to assist in the maintenance of the GIS distribution system, as well as to introduce new applications to assist in the Department's business operations

The Department needs to comply with a regulatory requirement to map new gas distribution infrastructure data within 15 days of its construction. SSA's initial effort was to assist the Department in vectorizing these gas mains, gas service lines, and related gas

TECHNOLOGY *CONTINUED*

made confidently with the numbers and reports to back up decisions. **Community Analyst** provides a means to communicate with people effectively through the use of maps and reporting capabilities. **Community Analyst** is a powerful tool to assist in both short and long term planning for a prosperous community. SSA

—*Catherine Burroughs*
GIS Technician

operational assets that had been recently installed or modified. During this process, it became evident that associating the GIS data with the source documents from which it had been captured would provide Department staff with direct (and easy) access to the legal document depicting what was underground. To accomplish this, the hard copy source documents, previously stored in filing cabinets at the Department headquarters, would need to be converted to a digital form. SSA scanned and indexed the hardcopy as-builts (gas service and gas main cards), leak detection reports, and work orders for 17,500+ customers. With the source documents in digital form, SSA linked them with gas GIS features, providing the Department access to the source information at their fingertips when working with the GIS data.

As this task was being completed, it was apparent that a variety of Department staff, most of whom were not GIS users, would benefit from access to the data. Utilizing the City's Enterprise Licensing Agreement (ELA) with Esri, SSA developed a password protected, ArcGIS for Server-based website that provides data and document access to the Department's staff, simply through a web browser. The user can leverage the application's measuring and red lining tools to mark-up the system and send off updates remotely. Leveraging the web browser, Departmental staff has access to all of the data remotely allowing them to make decisions more efficiently—no need to return to the shop to review hard copy plan sets. The website also contains analytical geoprocessing tools that allow the user to more efficiently understand their system. SSA developed a valve isolation tool which allows the user to select a gas structure that may need to be repaired, and run analysis to visualize which system gas valves and which customers will need to be shut off to isolate that pipe. This tool provides a more efficient approach to the repair crew allowing them to fix the problem rather than spend time determining how to isolate it.

To determine system capacity and functionality, the Department is developing a gas model. Prior to calibrating the model, SSA reviewed the City's existing gas GIS data to assess and improve the overall quality and to ensure its "model readiness." We ran extensive

network analysis, cleaning up topological violations (connectivity) and updating flow direction. SSA also updated the attribute uniformity, enforcing consistency dataset-wide. The network logic was validated by performing checks on the data confirming that attributes of connecting features matched. For example, checks were completed to verify that the attributes of a tee, connecting three pipes with differing diameters, reflected the appropriate diameter information of the associated pipes. With the data review complete, SSA is now assisting the Department in developing and calibrating their gas model. The updated GIS datasets are being used to provide input to the chosen Gas Modeling software, and information from the City's billing database is being used to calibrate the model. As updates to the system are made, the City has the ability to automatically reanalyze the network at any time to assist in identifying potential capacity issues. Through training provided by SSA, the Department will be able to calibrate and run their model as needed.

The City is also required by Federal and State regulatory authorities to inspect the distribution system periodically for leaks. SSA has developed a Leak Detection Application that integrates the City's Infrared optical methane gas detection system and a GPS enabled ArcGIS Mobile application. The tablet-based device allows the inspection process to be tracked via GPS-enabled hand-held devices, thus creating a permanent record of where and when inspections have taken place. As leaks are detected, this system allows the inspector to immediately notify dispatch personnel, who can generate a work order for repair personnel to react to the detected leak. Integrated with the existing work-order system, this inspection system will both provide a permanent record of the process and can be used to demonstrate compliance with regulations.

The City of Charlottesville's Gas Department has been successfully utilizing GIS for almost 20 years, due in large part to the vision of the Department leaders who are continually looking for ways that GIS can assist in their business operations. These leaders have seen the efficiencies that complete GIS datasets can create and plan to continue using GIS as a component of the Department's day-to-day operations. SSA

GIS
GEOGRAPHIC INFORMATION SYSTEMS

Needs/Cost Benefit Analysis
Excited, curious, or confused about the potential for GIS in your organization? Spatial Systems has been implementing these technologies for years. Allow us to evaluate your needs, project the potential for savings or increased revenues, and otherwise explain the potential for GIS in your business.

GIS Systems/On-Site Consulting
Maybe you need a little help bringing it all together. No one ever said GIS could be integrated overnight. Let us come on-site, provide implementation management and QA/QC to help you implement this time and money saving technology.

Web-Based Hosting
Perhaps you don't really want the hassle of building and maintaining a GIS internally. Consider allowing Spatial Systems to host your GIS data or its services and make GIS functionality available to you and/or your clients over the internet.

Wide-Format Scanning
Make it digital! Convert maps, blueprints, and imagery into a new theme/layer for your GIS. Unlimited length specifications with widths accepted up to 50". B/W, full-color, with various resolutions and output formats available.

Analysis
If you simply want to be able to take advantage of the ability of GIS technology to help meet the needs of your organization without the bother and cost of acquiring GIS software and learning to use it, Spatial Systems offers the services of our experienced staff to perform analysis and produce suitable reports and cartography for you.

Vectorization
Take all of your hardcopy or image files and turn them into topologically structured GIS compatible layers, with attribute links to your database.

Integration
Combine the new datasets with your existing data or models to fully integrate GIS technology with your legacy data systems.

CONTACT US

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FMIS
FACILITIES MANAGEMENT INFORMATION SYSTEMS

System Design
We specialize in the use of legacy systems and data in the implementation of our SpatialMMS product line. Allow us to sit down with you to understand your need for FMIS technology and to recommend the most effective approach to implementation.

Data Development
Whether you have no as-builts or a sophisticated Building Information Model (BIM), or anything in between, Spatial Systems is prepared to use what is currently available in the establishment of a consistent and accurate dataset that is customized for your facility. When necessary, our field staff will gather relevant information on-site to meet the requirements of your desired functionality.

Monitoring Tools
Spatial Systems will arrange, when necessary, for the installation of energy, water, and indoor environmental sensors to capture relevant data for your facility. If your facility already has a monitoring or other control system, Spatial Systems will integrate our SpatialMMS tools to use the output from those systems to the extent permitted by your other vendors.

Dashboard Customization
SpatialMMS utilizes a fully customizable dashboard for your interface with the system. By understanding your specific requirements, we will deliver a web-based solution that meets your needs.

Hosting
If preferred, Spatial Systems will host your FMIS data and interface on our in-house servers. There is no need to purchase hardware or software to take advantage of this technology, and access to your facility data can be made available to anyone you designate who has access to the internet.

Alerts
If any of the monitoring technology detects that the readings from a sensor fall outside of parameters that you establish, SpatialMMS can generate an alert in the form of an email, a mail message, or establishment of a new work order in your existing work order management system.

Reports
Reports from SpatialMMS can be generated on demand or on a regularly scheduled basis to confirm for you that the building systems are operating properly and to report the periodic results of automated analysis of the collected data.