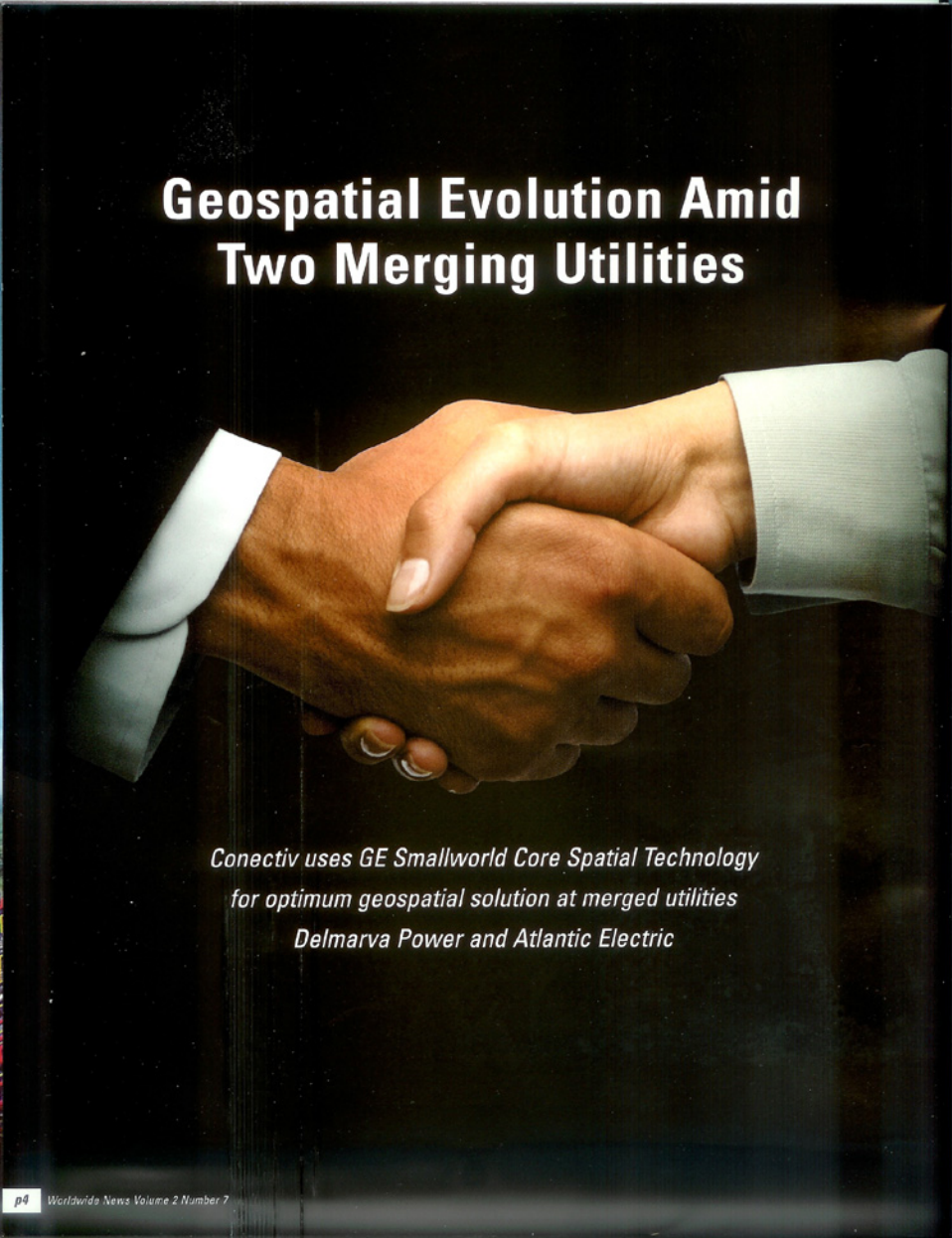# Geospatial Evolution Amid Two Merging Utilities

*Conectiv uses GE Smallworld Core Spatial Technology
for optimum geospatial solution at merged utilities
Delmarva Power and Atlantic Electric*

What happens when two merging utilities have varying stages of automation in their mapping systems? In 1998, Delmarva Power and Atlantic Electric merged under the Conectiv banner and developed a mutually satisfying geospatial solution based on GE Smallworld software. Conectiv serves approximately 1 million electric and 100,000 gas customers on the East Coast, throughout southern New Jersey, Delaware, Maryland, and Virginia.

In a joint effort, the two merging utilities agreed to develop their geospatial information system, known as "Conectiv GIS," based on GE Smallworld Core Spatial Technology. Connectiv has also implemented GE Smallworld PowerOn™ software for its outage management system.

## Geospatial Information System Backbone

Executives at both Delmarva and Atlantic Electric knew the advantages of an integrated geospatial system in which to store and optimize distribution and transmission network data. It took a lot of coordinated effort, but the two utilities came up with an effective corporate-wide solution.

## Delmarva's Story

Delmarva had an automated mapping system in place that ran on top of MicroStation. Users could query by coordinate, it was easy to access and plot maps, and data was stored at various levels. However, the automated mapping system was similar to paper in that it consisted mainly of graphics, and did not allow circuit tracing or database links.

## Atlantic Electric's Story

Atlantic Electric had recently received executive management approval to proceed with implementing a GIS system, and the utility had submitted a competitive bid, choosing GE Smallworld as the system provider. The data was held in paper record form and was out of date.

## The Solution

When informed about the merger in 1996, the engineering departments at both utilities were also provided with a mandate to create one GIS system - one that was created cooperatively and would meet the needs of the two disparate distribution systems. Atlantic Electric and Delmarva immediately established implementation teams and began considering all options.

Atlantic Electric gave a presentation to Delmarva on the benefits of the GE Smallworld software. J. Cabot Wright was a member of the implementation team on the Delmarva side. He is now the GIS Project Manager, in charge of all Conectiv GIS operations, implementation, and development. "After seeing the presentation on GE Smallworld's capabilities," he states, "we were firmly convinced it would satisfy Delmarva needs as well. We started working on the specs together before the merger even took place."

The team hired Cook-Hurlbert, a highly experienced software development firm that specializes in GIS, to help implement applications and develop the data model. The team also elected to use Cook-Hurlbert's Expert Designer™ as the design tool. In a well-coordinated effort, the group developed a joint project design using the Cook-Hurlbert data model template.

## Shared Benefits

Both utilities took advantage of creating a new, better way to operate. According to Cabot, "We gained numerous efficiencies, built on the best of both companies, and right-sized our staff." All personnel employed at Atlantic Electric and Delmarva had to rebid on their jobs. As part of the rebid process, a full-time GIS team was established for the project.

Fortunately, executive support has been and continues to be very strong. Management was very aware of the benefits of an effective geospatial system and planned the new work structure based on expected efficiencies. Cost savings from manual and clerical staff reductions added to the value of the system.

## Data Conversion Still in Progress

By the time the merger was finalized in 1998, the implementation team had issued an RFP for data conversion that included a field inventory on the Atlantic Electric side. The team awarded the project in mid-1998 to ASI for conversion of the Atlantic Electric data. As of February 2001, two out of four Atlantic Electric districts rolled out on the GE Smallworld system, with completion of the conversion effort expected in mid-2001.

On the Delmarva side, Conectiv hired Apex, who was originally involved in the data conversion for the automated mapping system, to create intelligent connections between the MicroStation graphics, and links to the database. The migration of the data to the GE Smallworld system is complete, with conversion of transmission data still in progress. All six of the districts are now online.

Management had initially wanted the data conversion completed by December 1999. However, both Conectiv and the conversion vendors greatly underestimated the effort involved. Along with budget constraints, the conversion schedule was extended. The first district with full data conversion eventually out in February 2000. According to Cabot, "It was important that every attribute being converted was handled correctly. And, because of the extended timeframe, we also incorporated some beneficial data model changes."

## Design Process – Critical to the Company's Well-being

Designers at Conectiv use Expert Designer software from GE Smallworld World Class Partner Cook-Hurlbert to keep converted data current, and to plan and engineer new work and facilities maintenance work. The GE Smallworld-based system provides the backbone for geospatial information, asset information, queries, analysis, and outage management, saving hours of time over previous manual and automated systems.

The design system incorporates Logica's Work Management Information System (WMIS) software. A by-product of the design system is a work sketch and the building of point and span data. When placed into the Conectiv GIS, the Cook-Hurlbert tools allow the user to click on a button and the information travels through an interface to WMIS, providing input for their compatible units systems.

The Conectiv design and construction flow process is outlined in the chart below.



**Connectiv Design and Construction Flow**
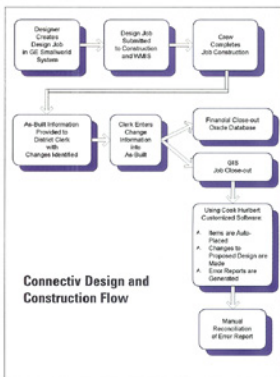
There are a number of integrated processes that take place within the WMIS to GIS Interface:

1. **WMIS to GIS** – Jobs initiated in WMIS and marked for design are listed in the Conectiv GIS by the designer.

2. **GIS to WMIS** – The designer can create multiple design alternatives in GIS, and send point and span locations from each design to WMIS.

3. **WMIS to GIS** – In WMIS, designers perform cost estimates, and lock down and submit the final plan to construction. Locking down the job in WMIS also automatically posts the proposed work to the parent alternative (version management) in the GIS.

4. **As-Built Revisions** – When the as-built work is completed, the WMIS clerk enters any changes

and additional attributes, and the job is closed in WMIS. This triggers sending the data to the GIS, where any changes are automatically posted, and data is modified from a proposed state to an in-service state. Any discrepancies or errors are returned to either the designer or the clerk, depending upon their classification. If the error requires changes in the GIS, only engineers and designers are allowed update access to the GIS.

An example of this process might be the need for providing service to a new customer. When the initial call for the service is received at the district level, clerks determine whether or not a design job is needed. The clerk accesses the WMIS and classifies the type of job. The designer plans the job using Expert Designer from Cook-Hurlert and submits the work to the GIS and the WMIS. After the work in the field is completed, the job is considered closed. The clerk types the information into the WMIS, which interfaces with the GIS. Items appearing on the error report are then resolved and the process is complete.

Out of a total of 10 districts within the Conectiv service area, eight districts have gone online. All of the online districts follow the WMIS to GIS work flow.

### Still a Lot of Work to be Done

Cabot's GIS team of eight persons, along with seven in-house contractors, supports all the districts, provides system administration, day-to-day programming needs, data clean-up, quality assurance, backlog posting, and more. The group is working on finalizing a number of items, including the means to

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>
> J. Cabot Wright,
> GIS Project Manager

access GIS data via Internet and remotely, map products for users, and improvements in the street light management system. Future plans include using the GIS for tax reporting purposes.

There is also a constant need for keeping up GE Smallworld system usage training at each district office, so that team members are ready for the district when it goes online.

There are 40 users/designers/engineers now updating the GIS. There will eventually be a total of 60 to 70, as well as many others within the company who will access GIS data. Providing refresher training is an ongoing process.

With the data conversion still underway, Conectiv is playing catch-up. When a district is being digitized, posting of backlog work orders is frozen. Conectiv now employs a team of drafters who assist the GIS team in catching up on this process, posting work order updates to completed areas.

### Benefits of the GIS

According to Cabot, "The biggest benefit is not in the design effort, but in maintaining a system model for operations and planning, that allows additional applications." He adds, "Another benefit is that we can keep data current and complete. We save a lot of time because the GIS can be easily accessed – paper maps are becoming obsolete." The only use for paper maps at present is for work crews, and an effort is underway to gain their support in using the new digital system. Plans include implementation of remote PC access for those not connected to the data network.

Additional areas in which Conectiv takes advantage of their GE Smallworld-based GIS include:

- **Load Voltage and Feeder Analysis**
  Each district employs one or more engineers who are responsible for distribution design planning and circuitry. Engineers use network analysis software from CYME International for feeder analysis, which uses information from the GIS as its basis. The system also allows load voltage analysis, extracting circuit data from the GE Smallworld system.
- **Customer Information System Tie**
  Conectiv links its GIS to their Customer Information System (CIS) through a one-way tie. The GIS database contains the name, address, phone number, transformer number, service pole, and peak load data for each customer as read-only information. Once a week this data is downloaded from the CIS to the GIS. An internally developed program verifies that the transformer exists in the GIS and adds services as indicated.
- **Access for Everyone**
  Conectiv has incorporated user access through its



J. Cabot Wright, GIS Project Manager.

Intranet to a "View only" map image of the GE Smallworld-based GIS system. The utility uses 100 GE SmallworldWeb licenses.

- **Data Validation Processes**
  Conectiv uses a number of methods to ensure the data in the GIS is accurate. The WMIS provides automated error checking for the designers. The Cook-Hurlbert software checks for connectivity within the database. Conectiv's in-house quality assurance team checks incoming work from conversion vendors. When Conectiv performs the weekly CIS load, all discrepancies are identified and cleaned. Additionally, a field inventory QA/QC takes place. Originally checking only a percentage of inventoried data, Conectiv is now working to verify the accuracy and clean all data in the Districts.

### Looking Ahead

In spite of project delays, Conectiv has been pleased with the results of incorporating GE Smallworld Core Spatial Technology. "The real value of our system is just coming into focus now," says Cabot. "As we become more accustomed to using it, we'll continue to recognize time and cost benefits." An integrated geospatial system provides Conectiv with easy to access, current, and accurate information about its distribution and transmission systems. The GE Smallworld data provides the circuit network for their outage management system. Conectiv personnel and customers reap the rewards.

Another merger is in store for the utility. In February 2001, it was announced that Pepco, formerly known as Potomac Electric, and Conectiv are seeking a merger. Conectiv has 1 million electric customers and 100,000 gas customers. Pepco operates in Washington DC and has approximately 700,000 electric customers. The combination will create the largest electricity delivery company in the dynamic mid-Atlantic region. The evolution continues.