A NaviGate Customer Success Story
Georgia Power Company's Distribution Viewer

NaviGate: Delivering Spatial Data to the People Who Need It

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Powerful Web-Based Application a Hit at Dynamic Southern Utility

## System is Tool for Distribution System Information Dissemination

When engineers and operators at **Georgia Power Company** (GPC) need maps or reports about their electrical distribution network, they turn to the **Distribution Viewer** (DistView). DistView provides a map-based window into a spatial data warehouse that contains information on every object in the distribution system, every customer and every abnormal condition. DistView also gives one-click access to detailed schematic drawings for underground distribution systems.

The data accessible in DistView is extracted on a weekly basis from 103,000 basemaps and stored in an Oracle Locator spatial data warehouse, together with data from many other data sources such as the Georgia Department of Transportation, summarized customer data from the Southern Company CIS system, topographic imagery from the USGS, and transmission system data. The DistView system also stores many kinds of summaries and cross-references in the data warehouse, adding value to the data extracted from the other systems.

DistView is an implementation of *NaviGate* from Gatekeeper Systems. The DistView system uses the *NaviGate* Core System for map viewing and reports, the *NaviGate* Print Module for high-quality engineering printing, the *NaviGate* Document Manager for organizing and managing 37,000 detailed schematic drawings, and *NaviGate* Operations Visualization System for real-time display of data from Georgia Power's Trouble Call Management System.

Distribution Viewer Fast Facts	
Initial Implementation Period	Three months, completed March 2001
Number of System Upgrades and Phases	Currently in Phase 5 using the fourth version of NaviGate
Server Hardware	Two 1U Windows 2000 Servers (one primary and one backup/development) plus one file server for documents, imagery, and the data exported from DistView for use in GIS systems
Source of Realtime Distribution System Status Information	Centricity from CES International (two separate systems)
Basemap Mapping System	AM/C, a custom GPC application implemented in AutoCAD Map
Customer Information System	Custom, using Oracle on an IBM Mainframe
NaviGate Modules Used	NaviGate Core, NaviGate Printing Module, NaviGate Operations Visualization System, NaviGate Document Manager Module

The following figure shows the basic layout of the *DistView* user interface. *DistView* is a Web-based application, and runs as a Java application in Internet Explorer.
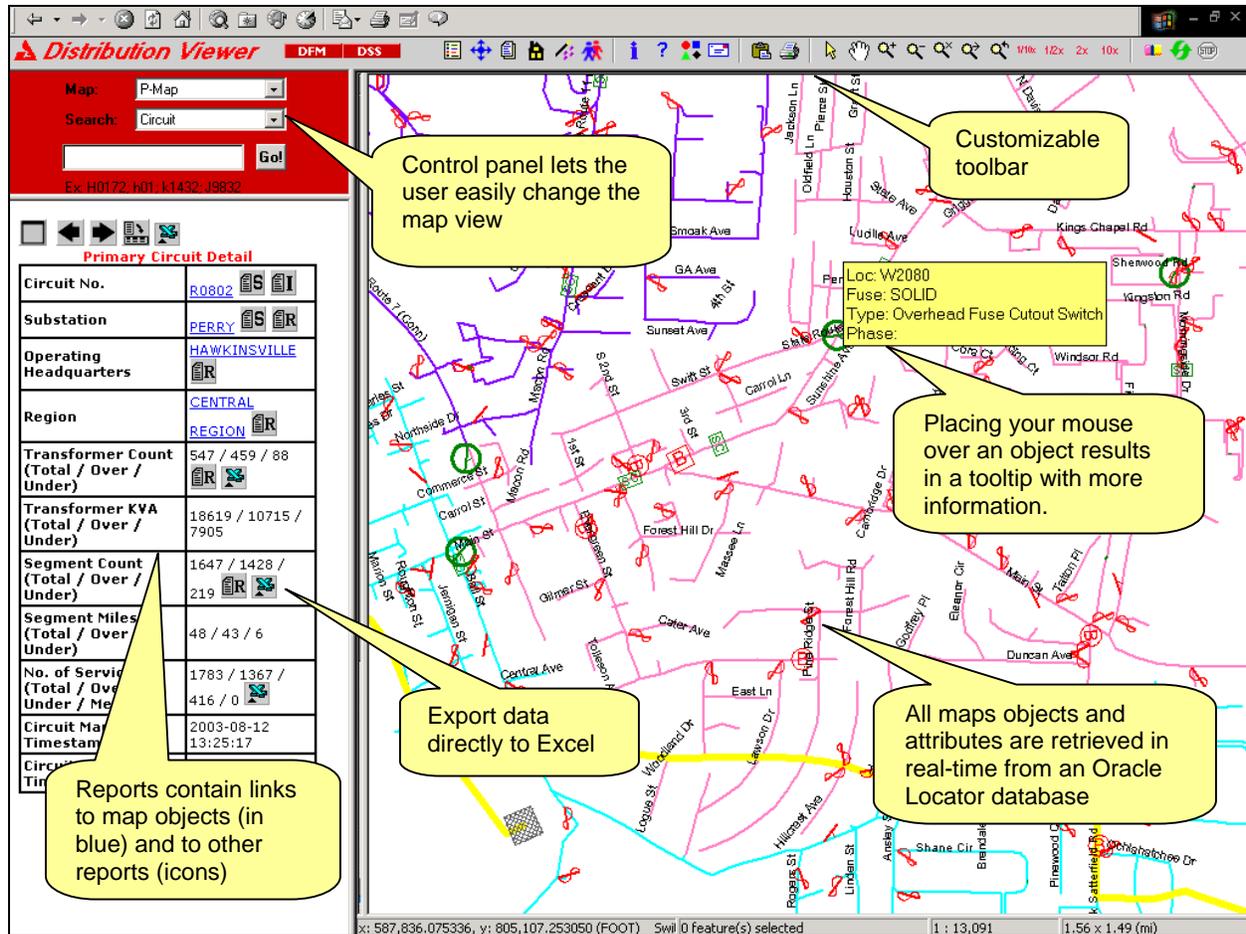
DistView Sees Heavy Use Throughout Company

The Distribution Viewer System has become critical to the operations of the Georgia Power Company. The figures in the table below illustrate how widely used the system has become.

Distribution Viewer By The Numbers		
Usage Statistics	Number of Users	1200+
	Average Daily Logins	262
	Average Daily Distinct Users	141
	Peak Daily Users	257
	Average Daily Map Views	8368
	Average Map View Response Time (server)	0.934 sec
	Peak Daily Map Views	15,038
	Peak Daily Report Views	1572
	Monthly Average Number of Hardcopy Maps Printed	1538
	Number of Mobile Users of Document Manager Module	100+
Facility and Mapping Statistics	Number of Input Basemaps Processed	103,696
	Number of One-Line Schematic Drawings Processed	27,703
	Number of Transformers	566,597
	Number of Poles	1,692,676
	Number of Circuit Segments	5,671,042
	Length of Circuits	117,846 mi

	Number of Primary Circuits	2357
	Number of Substations (including customer substations)	2281
Database	Total Number of Database Objects	28,139,355
Statistics	Database Size	12.45 GB

As you might expect, the Distribution Viewer system is used heavily by engineers, who use the system to access detailed facility, customer, and outage-related information. But the DistView system enjoys broad application throughout a number of different user communities at Georgia Power, as shown in the following table.

User Community	Typical Uses
Engineers	View facilities data
	Link from transformer to customer information system to obtain customer load and usage data
	Verify that customers are connected to proper transformer to assure proper load distribution and in support of automated outage analysis
	Examine circuits for basic load analysis
	Locate affected customers when line work may interrupt service
	Access Underground One-Line schematic diagrams when underground work
	View Outage Management System data
	View current abnormal device configuration when planning new work
Forestry Department	Calculate line miles to be trimmed
	Print paper maps for vegetation management crews
	Identify potentially affected customers to contact when work may affect customer service
Control Center	View detailed facilities data during trouble restoration
	Use customer search to identify customer connectivity during outages
	Use equipment search to find detailed equipment data during outage restoration
Lighting Department	Print maps of customer lights to give to customers
	In response to customer inquiries, find customers from customer information system and locate customer's facilities on map
Marketing Department	Find distribution equipment serving Priority Customers, Critical Customers, Key Accounts, and other special-needs customers
	Verify accurate customer-to-transformer links

Window Into Outage Management Systems

Georgia Power operates a pair of very sophisticated outage management systems (OMS), one for the Metropolitan Atlanta area and one for the rest of the company's service territory. These systems, running software from CES International, maintain detailed databases of real-time electrical system status, including the status of every active device (switches, breakers, reclosers, etc.). The systems also continuously track customer outages, using data from trouble call reports and field crews to monitor exactly which customers have been affected by a network failure or repair operation. In addition, the systems maintain a database of detailed notes about devices, recording, for example, which switches cannot be operated because of equipment failure or local conditions.

The OMS systems are critical tools the electrical system operators, especially during storm conditions, to safely operate the network. However, the OMS systems require special training to use, and because system performance is critical (especially during large outages) the number of users of the system must be tightly controlled.

The data in the OMS systems is also of critical importance to many other users in the organization, both during outages and during normal operations. DistView uses a bridge to the OMS system databases to retrieve this valuable data from the OMS systems and make it available to hundreds of DistView users. Instead of using the special-purpose OMS system to see this data, users employ the familiar DistView tool to view outage information such as abnormal status devices and notes from field crews. In addition, DistView aggregates this data from the two separate OMS systems and displays it in a single, easy-to-use summary format. The *NaviGate* Operations Visualization Module's Area Browser provides for hierarchical searching and "rolled up" summary reports of operational data throughout the system.

High Quality Printing

The Georgia Power mapping data is maintained in over 103,000 AutoCAD drawings. This approach has worked very well for the company, allowing them to very cost effectively maintain extremely detailed drawings. However, prior to DistView, if an engineer or operator wanted a hardcopy drawing to use to study the distribution network, they would have to "piece together" some number of maps (possibly many) and print the drawing. It was difficult to print a useful map from a dozen AutoCAD files, and there was no way to incorporate other data such as GIS, USGS maps, or data from the OMS.

DistView provides a powerful printing tool to address this critical need, the *NaviGate* Printing Module. Via this tool, DistView users can choose any geographic area, at any scale, and print it to any hardcopy device. Users routinely print on devices ranging from laser printers and desktop inkjet printers to E-size (24"x36") engineering plotters. The DistView software also lets users customize their printed map view, selecting the layers and annotation appropriate for their specific usage.

Since the system has been installed, DistView users have created over 15,000 hardcopy maps using the system, saving Georgia Power's engineers countless hours and immeasurable frustration.

Enterprise Spatial Database Yields Other Benefits

The DistView database is always complete and up-to-date with the most accurate mapping information. Since it is an Oracle Locator database of all Company facilities plus a large amount of landbase information (streets, political boundaries, etc.), the DistView database is extremely valuable to Georgia Power for applications outside of DistView.

For example, each year Georgia Power is required to compute the number of poles and the total length of wires in each of hundreds of tax districts in the GP service area. The company pays taxes based on this data, so getting it right is important. In the past, performing this calculation was a multi-month process that involved running AutoLISP scripts in each of the 103,000 AutoCAD maps that make up the company's facility basemaps. A variation of the process was to extract all of the data from the 103,000 maps and then do the calculations externally in a GIS system. This process was also very lengthy, complex, and resource-intensive for both computer resources and staff time.

Since all of the facility data and the tax boundaries (basically city and county boundaries) are stored in the Oracle Locator-based DistView database, this process was greatly simplified for the 2003 Year End. The tax computation process was changed to use the Locator database. Instead of processing 103,000 map files, the calculations were performed against a seamless extract built from the Oracle Locator database. The result was a savings of hundreds of man-hours and weeks of elapsed time.

For the upcoming Year End, the computation will be even further simplified. The count, measurement, and assignment of facilities to tax districts can now be computed using a few lines of standard SQL using Oracle Locator's spatial functions. The tax reports can now be calculated in only a few hours of elapsed time.

Field Mapping

Georgia Power maintains a variety of special-purpose maps and drawings in addition to the facility basemaps. These drawings include schematic drawings of underground facilities, drawings of lighting projects, and other types of documents. These documents can be viewed in DistView. Users can locate the documents by viewing the extent of the document on the DistView map, or by searching for information from the document such as a project name or switch number.

Georgia Power uses the *NaviGate* Document Manager Module to allow operators and engineers to take these drawings into the field. The Document Manager Module maintains a cache of documents on the user's laptop, allowing the user to conveniently take these documents into the field. Documents in the Document Manager Module are organized by mapping district, which allows users to choose a district,

quickly download all the documents for that district, and then take those documents into the field. Over 100 users routinely take these documents into the field on a daily basis.

Future Phases to Add Further Capabilities

Georgia Power plans to implement additional *NaviGate* features in the future. Features currently planned or under study include:

- Application of the *NaviGate* Joint Use Module to maintain data about other utilities who attach to Georgia Power's utility poles
- The Distribution Control Centers (DCC) are responsible for operating the electrical distribution system, and they manage all of the switching and maintenance activity in the network. The DCCs make heavy use of DistView during both normal and storm conditions. In a planned upgrade to DistView, DCC operators will get their own special DistView site tuned specifically to their needs, with custom search and reporting capability, special capabilities for viewing on multi-screen displays, and a separate system for improved reliability.
- Georgia Power's distribution engineers are responsible for maintaining detailed information about the capacity of the electrical network. Future enhancements to DistView will allow engineers to maintain and view device capacity and demand directly in DistView, greatly improving record keeping, convenience and accuracy.