

Electric Distribution R&D Peer Review 2006 Project Summary

YOUR ORGANIZATION:	Southern Company Services
PROJECT TITLE:	Integrated Distribution Management System
PRESENTERS:	Joe Schatz
FY 2005 FUNDING:	N/A
FY 2006 FUNDING:	\$2,500,000
START/COMPLETION DATES:	20 Month Duration

Overall Project Purpose and Objectives: Southern Company, through selection from response to Funding Opportunity Number DE-PS02-05CH11270, *Topic Area 1: Demonstration of Advanced Distribution Operations/Automation with Distributed Energy Resource (DER) Integration*, will develop and demonstrate the principal concepts required for modernizing and operating the next generation Distribution System through the implementation of an Integrated Distribution Management System (IDMS). IDMS will be the integrated platform that will tie together the functions of operating an electric power distribution system and will; enhance power reliability and power quality; ensure maximum utilization of power system assets; facilitate rapid service restoration following outages; advance the level of distribution system security; demonstrate DER applications for distribution grid enhancements and; provide for training of distribution system operators to ensure electric power distribution keeps pace with growing demands and technology evolutions.

IDMS provides a seamlessly integrated set of Advanced Distribution Automation and Operations applications that raise electric system operating intelligence, and it is a logical technology development and progression to Southern's, and many other nationwide utilities', DA and SCADA systems. IDMS will enhance DA and SCADA through integration of applications such as Geographic Information Systems (GIS), Outage Management Systems (OMS), Switching Management and Analysis, Operator Training Simulator, and other Advanced Applications, including unbalanced load flow and Fault Isolation and Service Restoration (FISR). All of these applications, along with others that will be described later, are capable of obtaining information from and utilizing DER installations, and by integrating all of these disparate systems, the Distribution Operators will benefit from advanced capabilities when analyzing, controlling and operating the electric system.

As one of many functions, IDMS will be used to identify areas along a feeder, or as an aggregated load at the substation, which are overloading or are migrating towards overload condition. The advanced applications of IDMS will then be used to determine the preferred method of relieving the imminent overload or congested situation. Upon complete analysis, recommended actions that the operator can take will be submitted and displayed. This capacity limitation and congestion avoidance scheme will be able to incorporate demand response activities such as dynamic reconfiguration, load response applications and where appropriate, DER dispatch through the advanced SCADA applications.

FY 2005 and FY 2006 Results and Accomplishments: Received notification of selection of project and working on contracts. Project definitions and detail design continues, but no billable or reimbursable activities have started due to contract negotiations. Activities in 2006 will include continuation of development of detailed specification and requirements for implementation of IDMS at a broad scale and in a scalable fashion.

A critical issue with any solution for an electrical distribution utility is the creation and maintenance of the Network Model. This involves the extraction of data from a GIS to automatically generate the complete Network Operations Model. The data extracted includes network device information including all of its limit settings, connectivity, topology, normal status and non-electrical data such as roads and buildings. This development activity includes the GIS extract tool and will include all types of network data including DER devices, fault location devices and composite switches. The importance of this GIS extract tool as it relates to DER can be realized through the critical operational issues and safety concerns of having an active DER system operating and interconnected to the distribution network. Once this application is developed and completes the initial validation, the models will be tuned through sample runs of existing data. It is anticipated that the development of this tool will take approximately 20 months, with 2006 activities being the initial configurations and system requirements.

The **Network View** user interface is an environment providing advanced panning zooming and de-cluttering features. Network View supports full real time operations by maintaining both static and dynamic data through the SCADA interface and presents this information to the user in a simple single view of the network. Users can view

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the network either in a geographic or a schematic format. The user interface reads the data to be displayed directly from the Network Operations Model without the need for separately prepared display definitions. A dispatcher can make temporary network changes such as jumpers, cuts and grounds on the display and those changes will be instantly reflected in the Network Operations Model. SCADA data is updated on the Network view platform and SCADA controlled devices, including DER, can be operated and controlled through this Network View application. It is anticipated that Network View will be developed and completed in 11 months from commencement of the project.

Prototypes of Switching Operations and Network Analysis will be started.

FY 2007 Plans and Expectations: 2007 plans include further development and final prototype demonstration, Factory Acceptance Testing, Site Acceptance Testing and finally including completion of this phase of IDMS. Future activities include the complete integration of these features and further Advanced Distribution functionality. Future work also includes the development of a Distribution Operator Training Simulator that accounts for the many advanced features and functions that will be available to operators of the "Modern Distribution System of the future.

Public/Private Partnerships: Major partners working on this project, outside of Southern and its subsidiaries include AREVA T&D and Miner & Miner. AREVA T&D is a world leader in delivering Energy Management Systems. They are a member of the international AREVA T&D group which serves the industrial automation and electrical engineering market worldwide. AREVA T&D develops the SCADA/EMS technology for the worldwide AREVA T&D group out of the Bellevue, Washington office and is the premier software product developer in the international AREVA T&D group.

Their product approach has been well received by the corporate R&D group as they apply all of the rigorous testing required for ISO 9001 certification. This recognition in the corporate group has provided them with the funding required to provide a truly portable system to the market place. As a result of the product and delivery approach, AREVA T&D is the leading supplier of Energy Management Systems in North America. The proposal to this program is based on the software architecture and software development and made in the USA at the Bellevue, WA facility.

Miner & Miner, a Telvent company, is a rapidly growing software development company that has become a major force in the Geographical Information Systems (GIS) industry. Miner & Miner has provided engineering services for the utility industry since 1946, and has been an ArcInfo, AM/FM/GIS (Automated Mapping/Facilities Management/Geographic Information Systems) implementer since 1986. Over the years, Miner & Miner has become an industry leader in GIS enterprise solution technology and is proud to supply superior software solutions to energy and water/wastewater utilities and municipalities around the world.

Within the industry, Miner & Miner has adopted the following philosophies for doing business:

- Acquire the brightest and most talented Utility Engineers, Computer Scientists, and GIS Specialists;
- Build enterprise GIS based upon industry standard components;
- Create flexible, open, and powerful utility solutions;
- Deliver leading edge technology to the end user;
- Build applications designed to enhance the integrated enterprise;
- Implement technology solutions for a dynamically changing industry

Other cooperative efforts and outreach have been started through discussions with the Electric Power Research Institute and other utilities around periphery products that will help future developments of IDMS and other distribution software. This includes Common Information Model development and application.