

BIOGRAPHICAL INFORMATION

George Orellana
Software Engineer
Science Applications International Corporation (SAIC)

Specific Responsibilities

Joined Entergy/SAIC in 1995.

Team Lead for Entergy's system critical Operations Management (OM) application. Assist in the development and implementation of the Automated Mapping and Facilities Management (AM/FM) development environment. Includes continued 24x7 Operations Management (OM) support and development of the SmallWorld Geographical Information System (GIS) application software.

Past Experience

Developer and System Administrator for small business.
Self-employed. Offered computer services to small businesses.

Educational Information

B.A. – Psychology, University of New Orleans

B.S. – Computer Science, Minor in Mathematics, University of New Orleans

Professional Memberships

GITA

President of Gulf South GITA Chapter. Established end of 2003.

Providing Electrical Service Before, During and After Inclement Weather

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In the late 1980's, Entergy had a vision of how they could effectively use a GIS system to help operate their Electric Distribution business. There were only a few GIS companies that had the potential to provide the needed core system to support such a vision. After months of evaluations and vendor demos, Smallworld was selected to be the core GIS system at Entergy, making them one of the first North American companies to purchase this technology.

After the conversion effort and data maintenance business processes had been established and stabilized, Entergy was ready to begin developing one of its internal core systems that would help them get their Return on Investment. An Outage Management system was to be developed in-house. Historically, the Distribution Operations Centers (DOC) manually sorted paper tickets to determine where the outages were located. Developing Entergy's Outage Management System was not to be an easy task, but Entergy was able to gather key resources that would allow the development of a successful Outage Management System around Smallworld's core system. Entergy's Outage Management System now includes interfaces to SCADA, Customer Care applications (including SAP) and a Work Management System. Entergy's service territory is susceptible to a variety of weather events. Severe weather can include Hurricanes, Ice Storms, Thunderstorms and Heat waves. These varying weather patterns can lead to major outages and constantly challenges the Outage Management system and those who operate it. Over the years, the system has proven itself to be a very effective tool in helping reduce the outage duration.

ENTERGY BACKGROUND:

Headquartered in New Orleans, LA, Entergy currently provides services to four states: Louisiana, Mississippi, Arkansas and Texas. It serves roughly 2.6 million customers.

APPLICATION INFORMATION:

The five separate applications comprising Entergy's AM/FM System give users an integrated business solution they can use to effectively manage all aspects of the distribution system.

- Data Conversion
- Distribution Facilities Management
- Data Maintenance
- Operations Management
- Engineering Analysis

Data Conversion

The AM/FM Data Conversion application was used to convert and load the existing electrical facilities and landbase mapping information into a database in order to create a connected distribution electrical model. Data conversion was performed on a variety of data from multiple sources. The data was converted into a digital form within the GIS database.

This process historically has been the major obstacle within the industry for implementing AM/FM systems because of the significant associated cost. But contrary to historical industry practice, Entergy chose to manage the conversion internally. Innovations allowed the conversion to be done incrementally, providing users access to the data as soon as it was entered and checked for quality. Many state-of-the art techniques were used, including map scanning, automated graphic/ database population using geographic coordinates, field inventories using hand held data collectors, aerial photography and others. The conversion process for electrical distribution facilities started in January 1995 and was completed in January 2001, at significantly less cost than that quoted by outside vendors. Recently Entergy began converting Street Lights.

Distribution Facilities Management

This application is used to catalog and track Entergy's electrical distribution equipment and the characteristics of that equipment. The status and the location of equipment are tracked, indicating whether it is in-service in the field, in reserve in a storeroom, in a repair facility or retired. Distribution Facilities Management also maintains the customer-to-distribution location relationship, allowing customers to be connected to their distribution transformers and associated with a feeder circuit. This connectivity is important for engineering analysis and distribution system planning purposes, and for outage restoration and reporting purposes. It results in a geographically correct feeder model down to the individual customer level, a tremendous improvement over the previous systems.

Data Maintenance

The AM/FM Data Maintenance application is used to maintain the connected electrical facilities model and landbase. Data Maintenance personnel are responsible for the timely and accurate updating of the GIS database. Several different user groups input data to the application, including engineering, design, construction and maintenance departments. To insure accuracy, the application includes an extensive data model and built in "data rules" to insure that the information is entered properly.

Operations Management

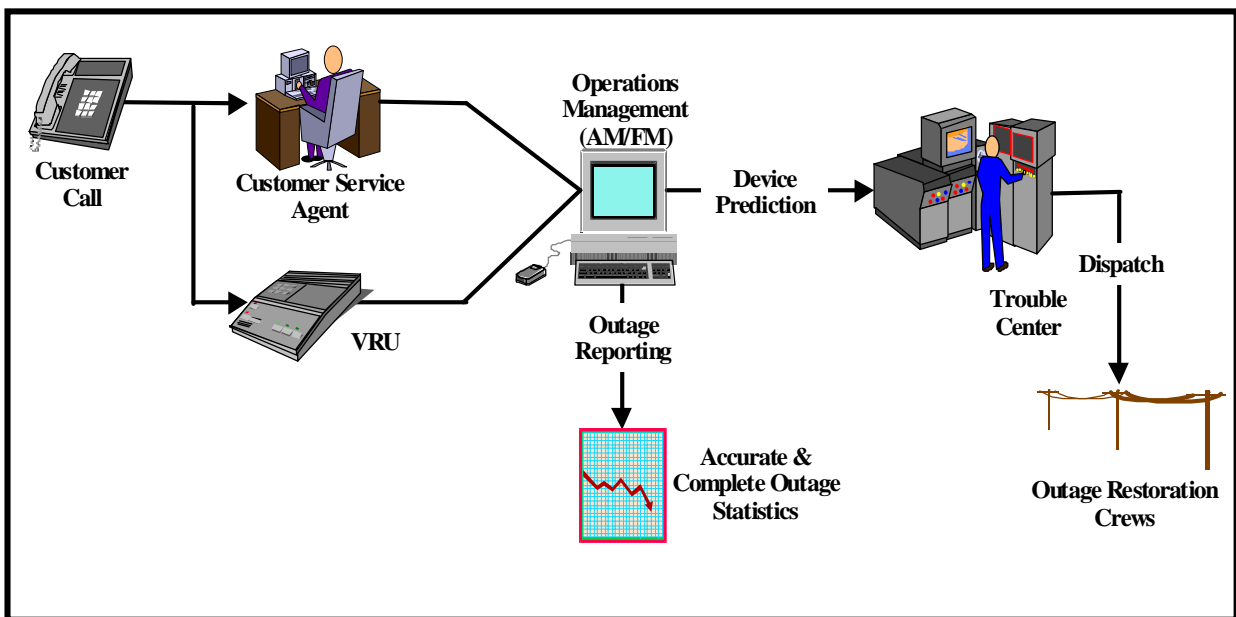
The AM/FM Operations Management application is designed to support and enhance the restoration of electric service following power outages by managing "Lights Out" calls

and other emergency service requests. The application helps Entergy meet customers' needs by:

- providing enhanced outage information
- integrating all key applications
- enhancing restoration management and dispatching
- and providing outage records with enhanced accuracy.

Restoration Management and Dispatching

The Operations Management application has been instrumental in the consolidation of Entergy's dispatch centers, reducing them from eight to six. These dispatch centers provide around-the-clock monitoring of the distribution system, dispatching for outage restoration and status reporting to provide real time outage information to customers.



The application allows the dispatcher to manage the status of trouble cases throughout the outage lifecycle. The system is capable of taking hundreds of calls per minute and predicts which device(s) have operated, a significant improvement in outage call handling capability. The predicted devices are automatically sorted, based on criteria chosen by the operations coordinators, and dispatched to restoration crews. Based on the system predictions and using the graphical interface, operations coordinators are able to send crews directly to a device location rather than sending them to a general area or customer address to look for the trouble.

The Operations Management application also contains an automated paging system, where operations personnel receive alphanumeric pages under certain conditions, such as when specific breaker operations occur. This provides key management personnel with a heads-up of critical outages.

The application played a significant role during the December 2000 ice storms that hit Entergy's Arkansas territory. At the peak the storms, the system handled 16,700 calls per hour. This ability was a major factor in the success Entergy enjoyed in handling these storms, a success acknowledged by Arkansas governor Mike Huckabee through a television commercial thanking workers for the restoration effort.

One of the more advanced features of the application is the ability to reconfigure the electrical model in "real-time." One method to restore power to customers as quickly as possible is to switch circuits to isolate damaged equipment. The electrical model can be switched to match the distribution system. Based on the position of the switches, the system will predict the effect of the switching on customers. If a switch isolates customers and reflects an outage, a trouble case is created without the need for a customer to call. In addition, the system is linked to Entergy's SCADA system, which indicates that an outage has occurred based on the position of feeder breakers.

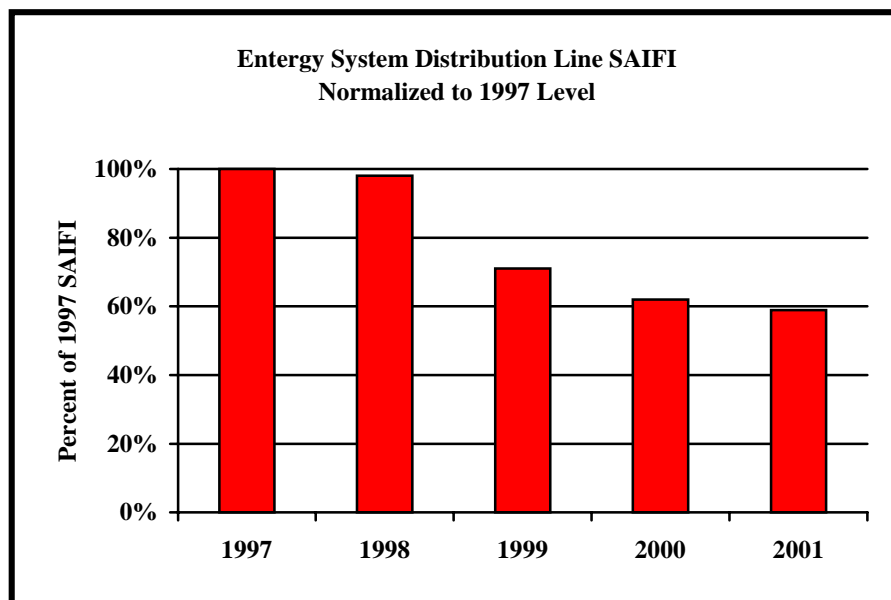
Outage Records

AM/FM automatically records all outage records to meet regulatory requirements, provide for reliability analysis and make other performance improvements. The system provides real time outage life-cycle information including acknowledged, dispatched, confirmed and restored. It time stamps each step and returns information on dispatched crews.

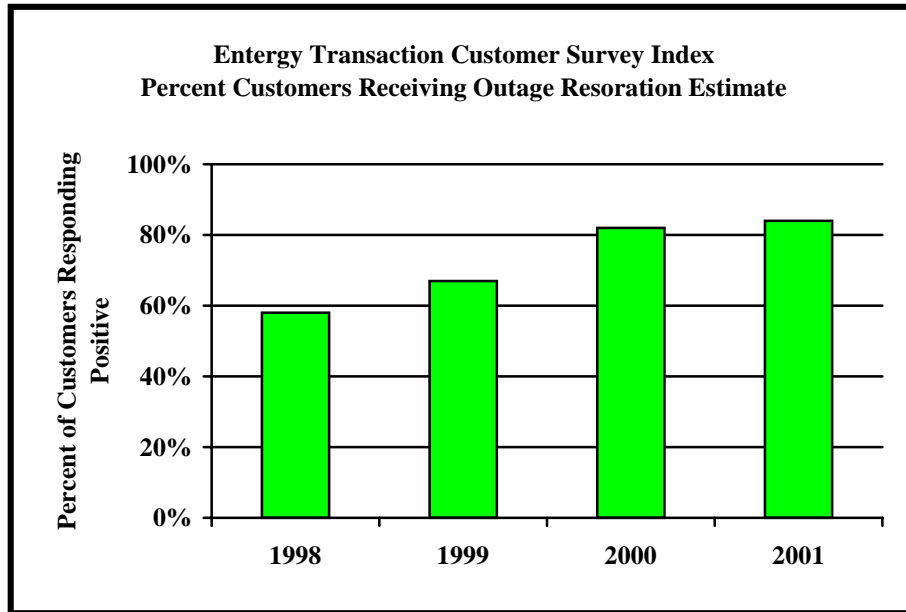
With the fully connected model, AM/FM keeps an accurate record of the customers affected, rather than merely tracking the number of customers reporting outages. This information is used to direct maintenance and engineering activities. Common regulatory-required industry measurements, such as SAIDA, SAIFI, CAIDI, are easier to track and report because of the system.

In the reliability area, system-wide performance measurement reports are generated from the historical outage data. AM/FM facilitates tracking and identification of devices that operate too often. Maintenance work is then targeted to these devices.

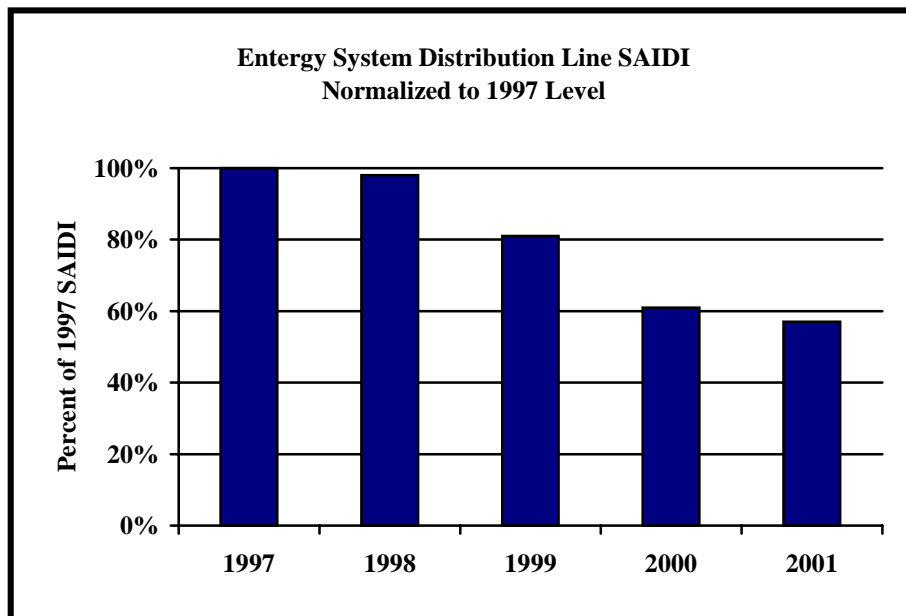
- The frequency of outages has significantly decreased.



- Customer surveys show significant improvement in providing outage information.



- The duration of outages has been reduced significantly.



Engineering Analysis

The AM/FM Engineering Analysis application provides integrated tools to facilitate analysis of the Entergy Distribution System using the connected electrical model. It enables load allocation of metered peak demands down to the distribution transformer level extraction of line section and equipment data to support radial circuit analysis by external packages. The Engineering Analysis application is used to perform electric circuit load flow analysis and protective device coordination studies on all distribution feeders in order to maintain acceptable system reliability and to predict system overload and undervoltage conditions.

Asset Planning Engineers utilize the Engineering Analysis application to analyze existing facility utilization and plan load additions from new construction, without having to patrol and draw the line from scratch. The package provides a consistent and predictable model that is updated as part of normal data maintenance. Engineers are now able to spend more time analyzing data and less time entering data.

Recognition

- March 1995, Entergy received Smallworld “Fast Tracker Award”, at the AM/FM International Conference in Baltimore, MD.
- September 27, 1998, Entergy received Smallworld Spatial Resource Planning Award.
- June 2003, Entergy received S.E.E. 2002 Industry Excellence Award

Conclusion

- All of Entergy’s major GIS applications are now considered mature.
- Entergy continues to look for ways to leverage it’s AMFM system
- Entergy has reached its goal of developing a strategic distribution asset management system for the future.
- The five separate applications comprising Entergy’s AM/FM System give users an integrated business solution they can use to effectively manage all aspects of the distribution system.
- Its effectiveness is shown by improved service indices and service restoration performance.