



The solution developed by PDR saves us a lot of time and resources. Our field personnel used to spend precious time looking at old maps or clogging up the radio network asking for direction information on the locations of houses and facilities, now they have been empowered to do it more quickly and more accurately since it interfaces with our SQL server in real time. Its cross functionality transcends all the different divisions vastly improving our service efficiency

Mario Villasan
General Manager
Cabanatuan City Water District

Spatial Based Asset Management System

Integrating web based Solutions for Small and Medium Sized Utilities powered by Autodesk MapGuide

ABSTRACT

The implementation of a spatial based assets management system based on MapGuide technology revolutionized the workflow process at Cabanatuan City Water District (CCWD), the largest and most progressive city in Central Luzon Island. For decades, engineering and billing staff have located parcel maps, as-built drawings, and records of survey maps, and route maps by physically searching for documents that may or may not exist within the records room. Historically, searching for these crucial records has been a time consuming process and therefore a costly and cumbersome procedure. Company visionaries and IT personnel, created a virtual records archive provides district-wide desktop access through architecting secure, customized intranet modules and georeferenced aerial images, and highly scrutinized facilities and infrastructure data. The new system improves the efficiency of updating and data retrieval as well as improves the quality of mapping and decision making.

Unique Problem, Unique MapGuide Solution

Cabanatuan City Water District is a semi-public owned water service agency. The District is located in Central Luzon and encompasses approximately 200 square kilometers and serves a population of approximately 300,000 people. The Water District is required to keep complete and detailed inventory, including location and condition of all assets and facilities. In 1996, CCWD started implementing GIS by

creating digital maps of building footprints and facilities. Updating the maps was the responsibility of the engineering department and a copy of the DWG file was sent to the Billing department for their reference. This method however does not meet CCWD's requirements of an integrated, real-time GIS for all the departments.

They needed a solution that would increase the efficiency of the field crews yet not be cost prohibitive and not require days of unwanted CAD and GIS training. A decision was then made to find an experienced consultant to draft a plan that would meet the new requirements to keep the database and maps secure, centralized and accessible to everyone yet speed up field operations and maintain their high standards of data integrity.

CCWD chose Pacific Data Resources (PDR), Inc., an engineering solutions integration group, to investigate how CCWD could meet this new PDR discovered through inter-department consultations that a web-based mapping application will provide them low-cost solution for map and database integrated. PDR outlined four modules that could take the original vision for a desktop viewer beyond CCWD's expectations. These modules became the foundation for the newest addition to the GIS project, coined Atlantis. The four modules are; Facilities Mapping, Concessionaire Mapping, Work Order, and Monitoring of Pumps.



Facilities Mapping Module handles all queries in regards to mapping facilities and retrieving information about it. This application, locates facilities, allows field personnel to update the Engineering database themselves. Install dates for all equipment can be searched, monitored, updated from the field offices. Concessionaire Mapping Module handles all queries in regards to concessionaire (customer) info including the building footprints and is connected to the Billing System Database. This is the application for locating and tracking customers and consumption. The customer can be searched and located via Name, account number or by management zone. Parcels, buildings or entire neighborhoods can be tracked and displayed thematically for water consumption, meter status, or, account information. The Work Order/Maintenance Order Module includes location mapping integrated with the release of work order forms, maintenance order forms and bill of materials. This application allows field engineers to locate and resolve daily work orders and complete the status report of each. Field crews can readily locate, update and review approval status on simply by reviewing the drawing from their MapGuide plug-in on their desktop. The Monitoring of Pumps Module connects to their SCADA database, developed using VB and MS Access, and reflects the current status of pumps. All of their pump locations running at the same time can now be easily located and individually monitored via the web. The system transmits information from pumping stations via radio signal and stores it in the database. The old SCADA system did not have any visual maps to show its users the data that is stored in the MS Access database, but today, it is automatically reflected via Mapguide. Using the Pump Monitoring application, the pump station results now reflects the current status of the pumping stations as mapped.

PDR and CCWD identified the right technology to accommodate these modules. CCWD engineers immediately saw the efficiency and simplicity of MapGuide. It was the selected web GIS solution is due to its highly scalable server architecture for supported clients and open architecture enabling major GIS formats to be imported into MapGuide. The district also recognized the power of MapGuide technology to present data in real-time and provide access to staff district-wide at lower cost.

The enterprise database consists of tabular attribute data. GIS layers, depicting the District's highly complex water distribution system, were created using existing digital DWG maps, paper maps, engineering design documents, as-built plans, field surveys. The engineers do not have access to the SQL billing database for their facilities because the Engineering department handled the mapping and updating its information and do not store any of their information inside the Billing department's SQL Server. The Engineering department used MS Access for their attribute tables. One of the reasons CCWD chose MapGuide is that it can connect multiple disparate database at the same time.

Benefits

The asset management system, based on location, proved to be a center piece in integrating data and application in a water utility which generally has large amounts of data from a variety of categories. The applications, especially the web-based application provides great accessibility and can be implemented with user-friendly interfaces. It is an efficient and productive tool for staff in different departments within a water utility.

Due to these additional benefits, field workers like meter readers and disconnectors now has access to map and concessionaire information. Instead of viewing paper maps, they are now able to view and print location map with exact directions and concessionaire information. New concessionaires also benefits from the new system as the waiting time for new connection has been improved tremendously. Estimates for pipe length running from the tapping point to the consumer's water meter is done using MapGuide's measure feature. It eliminates the need for an actual site inspection for new service connections.

With the District's centralized data warehouse and network users, the District shows its strong requirements for accessing GIS data through a LAN system which the web-based GIS solution was the right fit. Distributing geographic information over the web allows real time data integration in a cost-effective manner. The interactive maps allow users to query the data to derive more information.

Conclusion

Even though data collection and database creation is a costly and time-consuming process, it is certainly worthwhile when the data can be appropriately used to improve the organization's daily operation. At Cabanatuan City Water District, the web-based asset management applications provide the non-professional GIS user with easy and fast access to the centralized GIS data to assist them in their day-to-day work. It also makes it easy for a water utility to work seamlessly across platforms and to manage water systems in an enterprise environment.

Using Pacific Data Resources experienced development team and MapGuide to build Atlantis has given CCWD new benefits they previously could not achieve. PDR's use of MapGuide gave CCWD a pleasant, familiar and easy to use, graphical interface of four Internet web applications. Even persons with little or no knowledge on GIS have found Atlantis easy to use. MapGuide automatically installs in demand if plugin is not available. This makes the client environment virtually free from system administration and results in a considerable amount of time savings for the Information Technology Department. The Security module limits access and use of specific map models and layers to specific end users. Along with MapGuide's comparatively low cost of ownership against a desktop GIS application and considering that a large number of end users can access the map server concurrently, the purchase of MapGuide has been a huge success.

For more information about the solution, please contact [Jake Armstrong \(jake.armstrong@pacificdr.com\)](mailto:jake.armstrong@pacificdr.com) or [Maverick Evangelista \(mav.evangelista@pacificdr.com\)](mailto:maverick.evangelista@pacificdr.com).

Autodesk Asia Pte Ltd

391B Orchard Road #12-06
Ngee Ann City Tower B, Singapore 238874
Tel: 65-6461 8100
Fax: 65-6735 5188

Autodesk India Private Limited

A4, "A" Wing, 2nd Floor, Divyasree Chambers
Langford Road, Bangalore 560025, India
Tel: 91-80-229 8855
Fax: 91-80-299 8845

Autodesk Australia Pte Ltd

Level 4, 13-15 Lyonpark Road
North Ryde NSW 2113, Australia
Tel: +61 2 9844 8000
Fax: +61 2 9844 8044