BIOGRAPHICAL INFORMATION

John A. Middlestead
Manager, Data Integrity & Technology
DTE Energy Gas / MichCon

Specific Responsibilities

Joined MichCon in 1974. MichCon is now part of the DTE Energy family. Responsible for managing data integrity and technology for DTE Energy Gas - Engineering & Construction in addition to business unit strategic review, analysis and planning of technology across the enterprise as it relates to geospatial information and technology. Also responsible for the process ownership of MichCon's AM/FM/GIS system known as MARS (Mapping & Automated Recordkeeping System) and the three project teams converting over 4 million records and over 24,000 maps. Technical (non-programming) support of CADD, MARS and interfacing application analysis, design, testing and training across the gas enterprise is also a responsibility.

Past Experience

Began employment at MichCon as a Drafter in the Engineering Department, 1974-1975; Staff/Planning Analyst, Gas Operations 1976-1979; Systems Specialist, Gas Operations, 1980-1981; Project Analyst, Information Systems, 1981-1984; General Supervisor, MARS Operations, Distribution Operations, 1985-1990; Manager, MARS Operations, Distribution Operations 1990-1992; Manager, Distribution Drafting & Resource Planning, Gas Delivery, 1992-1995; Manager, Distribution Drafting & MARS Technical Services, Engineering & Construction, 1996-2001; Manager, Data Integrity & Technology, Engineering & Construction DTE Energy Gas, 2002 to present.

Educational Information

BFA - Industrial Design, Michigan State University
MBA - Managerial Accounting, Wayne State University

Professional Memberships

Geospatial Information & Technology Association (GITA) formerly, AM/FM International

- Past Membership Chair (1986-1988)
- Annual Conference Principal (1991-1992)
- Annual Conference Chair (1993)
- AM/FM International Board - Secretary (1995-1996)
- Education Chair (1993-1996)
- AM/FM International Board - President Elect (1997)
- GITA Board - President (1998)
- GITA Board – Past President (1999)

UtiliComms - Intergraph Utilities & Communications User Group

- Chair (2003 - 2004)

GITA Great Lakes Chapter – Treasurer
IMAGIN (GIS Association in Michigan)

John M. Federowicz
Vice President Sales & Marketing
Analytical Surveys Inc.

Specific Responsibilities

Joined ASI in 2003. Responsible for developing and implementing the sales strategy for ASI. Principal focus is on shifting ASI's service and product offerings to align with an evolving marketplace. ASI has traditional strengths in the areas of GIS data conversion and field inventory of distribution network assets for electric, gas, telecom and water utilities. Our sales strategy is to continue to win business in data conversion and field services, while developing new business in the area of long-term data maintenance for our traditional markets.

Past Experience

Started in the utility industry as a structural designer for Gilbert/Commonwealth (now a subsidiary of Parsons) working in nuclear power plant design, 1976-1979. Joined Pennsylvania Power & Light company and worked there from 1979-1997. Key positions held at PP&L included; Construction Project Engineer 1979-1983; Supervisor of Construction Planning & Resources, 1983-1989; Assistant to Manager of Distribution, 1989-1991; Area Operating Manager, 1991-1994; Re-engineering Project Manager, 1994-1997. Worked for UMS Group from 1998-2000, rising to the position of Principal Consultant. From 2000-2003 worked for LogicaCMG as Vice President Asset & Resource Management.

Educational Information

BSCE – Pennsylvania State University

Professional Memberships

Geospatial Information & Technology Association (GITA) formerly, AM/FM International
Registered Professional Engineer – State of Pennsylvania

Deriving Value from the Asset Data Management Process

John A. Middlestead
Manager, Data Integrity & Technology
MichCon Gas, a subsidiary of DTE Energy
3200 Hobson St.
Detroit, Michigan 48201
middlesteadj@dteenergy.com

John Federowicz
Vice President, Asset Data Management
Analytical Surveys Inc.
11900 Crownpoint Dr. Suite 100
San Antonio, Texas 78233-5355
john.federowicz@anlt.com

ABSTRACT

Virtually all electric, gas and water utilities utilize GIS technology to help manage their distribution and transmission networks. The assets that make-up these networks have specific data associated with them that is critical for operators, engineers, asset managers, technicians and craftsmen to perform their job functions. Network businesses have a dynamic aspect to them that introduces continual change to the asset data contained in their GIS systems. These systems will provide maximum value to the various users only when asset data is timely and accurate to fulfill the need of each particular user. By adopting Asset Data Management as a critical business process, utilities can align personnel and technology to deliver maximum value to the organization. The authors will share their experiences regarding what constitutes the Asset Data Management Process, how to drive value from the process, and how to assess if your organization has an effective Asset Data Management Process in place.

INTRODUCTION

Asset Data Management deals with all of a Corporation's assets. This includes all of a Company's capital properties, which generally have a value of $1,000 or more. These assets must be operated, tracked, depreciated and maintained on a routine basis in order to extend the assets' life. Likewise, facilities that used to transport communication data, gas, electric power, liquid hydrocarbons, water/ wastewater, etc., require that we construct, operate and maintain them as well. Information about the asset is critical if we are to maximize the use of the facility and provide safe and reliable service. In light of the August 2003 Northeast U.S. Blackout the ability of the electric industry to know what they have and the options available to react and better yet to be proactive so we do not have any additional wide-spread catastrophic events.

Asset Data Management (ADM) is different than Work Management. These terms are sometimes used interchangeably and a certain amount of confusion can occur. In order to clarify this lets look at a few examples:

Asset Management System – all of the assets of a Company are accounted for, maintained on a schedule (if required), operated, added or changed or retired from the asset base, depreciated and controlled.

Asset Data Management – the continual change of the "data" to keep it up-to-date. In the case of a GIS the maintenance of all of the facility information contained. Typically, scheduling information, the deployment of resources, the pricing of jobs, etc., are not included. What is of utmost importance is that all facilities i.e. assets are accounted for and the data is accurate.

Work Management (System) – think about your daily work. A typical utility or communications company has a wide variety of tasks – both operation & maintenance and construction. A work management system helps in the planning, scheduling, deploying of resources (e.g. people, equipment, materials), pricing of jobs, and analysis of what took place.

As you can see, each has purpose in the workplace and each has value. For our purposes, this paper deals with the ADM of existing facilities assets where it is the construction of new facilities, changes to existing facilities, additions to facilities or the retirement of facilities. Without a means to track, operate and maintain these facilities the first crisis will quickly provide finger pointing and we all know that the GIS will provide a convenient scapegoat. ADM, if included as part of the various business processes, provides a means to add efficiency and reduce wasted time and money. The rest of this paper is intended to give you an overview of the importance of ADM, what are alternative methods to insure incorporation into the business work processes and what happens when it is not.

HISTORICAL ASSET DATA CONVERSION

- Initial GIS implementations focused on automated mapping (i.e., replacing paper, mylar and raster maps). Accuracy and quality of map sources varied widely, as central mapping groups had to struggle to keep up with user initiated/customer driven changes. In these early implementations, the users pushed the application vendors to develop better technology (applications for end-users, more functionality, faster, more quality checks). The projects were sold to upper management on the basis of payroll reductions. Business processes were often introduced into formerly hierarchal functional organizations. Data was cleaned up during the conversion process, but long term data maintenance was in many cases more of a challenge in the new digital world, than it was in the old paper world. Land bases sources were not readily available, and oftentimes had to be digitized along with the facility records.
- As GIS technology improved, customers began using GIS systems to support functions beyond mapping. Early adopters typically would integrate work management and GIS systems in an effort to streamline the engineering design & construction business process. Other companies leveraged the inherent connected network models to support an outage

management process, or emergency leak response. Mobile solutions were typically view only. Data conversion for these efforts generally involved the use of multiple data sources beyond just maps. Tabular data containing transformer records, customer information, or perhaps partial vector CAD sources were often combined into a new more comprehensive GIS database. For those assigned the responsibility to oversee and/or manage the quality of the data, the new environment brought pluses and minuses. On the positive side, more users were now relying on the GIS database to do their jobs, and typically with any database, the more exercise it gets, the better the data gets. The downside was that multiple user demands would have to be balanced by those responsible for keeping the data up-to-date.

- Most of today's GIS systems support multiple end-user applications and significant integration with corporate, and other department systems. These include property records, customer information, marketing, fleet and the introduction of functionally rich mobile solutions. As the user base increased, so did the criticality of maintaining accurate and timely data. Likewise, the accuracy of the land base becomes more important as field crews, and in some cases customers begin relying on the data. Today's public in general expects that a utility knows where its facilities are and how customers are connected to it. The challenge of course, is that distributed electric and gas networks are continually changing driven by maintenance, construction and operation of the system. The data maintenance challenge becomes twofold, establishing an effective process to expeditiously incorporate changes from internal users, establishing an effective process to expeditiously incorporate changes from external sources (customers, general public, governments, more accurate land bases).
- In the future, GIS will likely become a transparent and necessary component of a network business technology footprint. Engineers and operators will continue to need configuration and load information to design and setup the network. Maintenance technicians will need maps and equipment information to perform their tasks. Customer representatives and dispatchers will need to know how customers are connected to and affected by network operation. Mobile solutions will leverage wireless technology. The demands on data quality and timeliness will continue to increase. Establishing an effective Asset Data Management Process for GIS will ensure that your company will get the most value from your future GIS investment.

BUSINESS PROCESS INVOLVEMENT

Many utility organizations have incorporated business process and asset management concepts and methodology into their daily operations. Business process models allow an organization to breakdown organizational barriers, and to utilize enabling technology to deliver critical business services at optimum levels. Standardizing on business processes provides the opportunity to establish performance measures that can lead to continuous improvement. For example, many organizations will establish a business process associated with connecting new customers. A typical measure for this process is cycle time to connect a new customer. Very quickly, the organization learns that the measure, for example, is three

days from the time the customer is ready for service. The entire organization embraces the goal, and it becomes a common theme that all employees strive for.

Asset management concepts, in part, encourage organizations to integrate decisions about the construction, maintenance, operation and performance of assets. The "Asset Manager" is typically assigned the responsibility to make decisions that result in choices of how CapEx and OpEx funds will be applied to the existing and planned asset base. The asset management model differs from traditional utility decision-making models in that a centralized organization takes on added responsibility for investment from local organizations. In order to be effective in their roles, the asset manager must have sufficient information regarding the location, performance, and condition of assets in order to make effective choices on where to spend limited financial resources.

Traditional business process models for utility organizations have considered processes for customer connections, emergency response/restoration, maintenance, design & construction, network operation, etc. Each of these processes relies on accurate and timely asset data to be effective. With the addition of asset management business processes, the need for accurate and timely asset data increases. An organization can bring the proper level of focus, and appropriate level of effort to managing asset data by establishing an Asset Data Management business process.

INCORPORATING ADM

Our collective experience tells us that there is no "one-size fits all" solution for asset data management. On one end of the spectrum are the organizations that do little or nothing to change internal processes for managing asset data. Individual user groups are left to do much of the care and feeding of the system, with the exception of a small central function that is typically understaffed to do much more than keep the system up and running. In these organizations, backlog of completed but not posted orders are typically large. Network models become out-of-date, as do customer associations to the network. The use of the data is restrained by the lack of quality and timeliness. We'll call this the "rule of the jungle" model, because what typically happens is the system is maintained to the level necessary to survive. This model will work until the organization is strained by an unusual event. The unusual event can be in the form of a major storm, change in regulation, merger, technology upgrade, or significant organization change. Depending on the severity of the unusual event, the data problems will be addressed, or the organization may slip right back into the "rule of the jungle" mode.

On the other end of the spectrum are the organizations that attempt to make their GIS solution larger than the business needs it to be. We forget to ask the question what do we need the system to consist of to meet our business objectives? We'll call this the "larger than life" model. This model emerges when the organization cannot resist the temptation to collect information above what is required for that business to operate. We typically do not accurately reflect the life cycle costs of owning and operating a GIS system when we make the initial investment to build one. If we overbuild the system, and it becomes too costly to

maintain it, or if we just don't know what it should cost us to maintain it, we stand the risk of losing the internal support needed for maintaining the system.

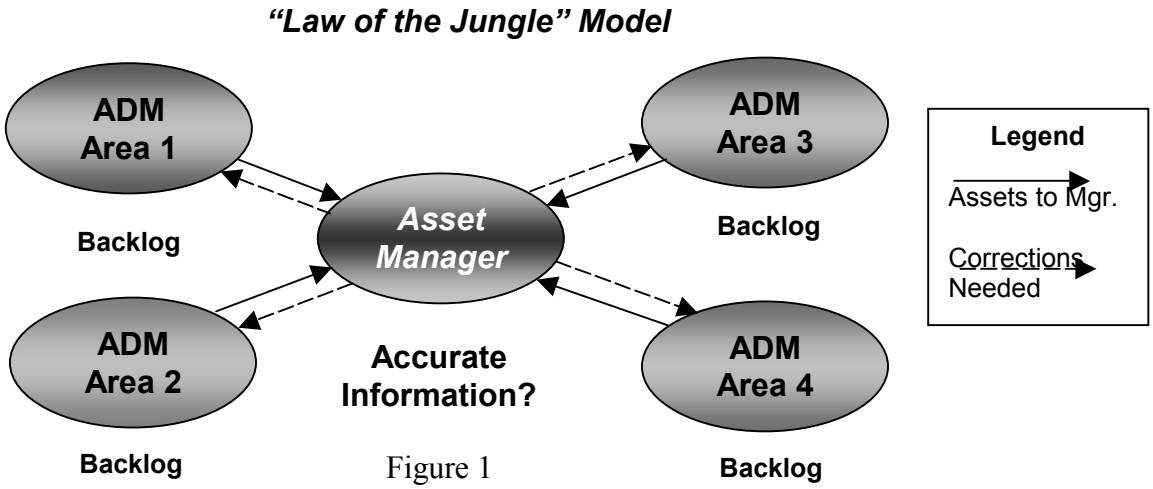

Figure 1

There are several key factors for incorporating Asset Data Management as a business process in your organization. First is to gain recognition that this is a critical business process for which a value proposition will be developed so that investment in the ADM process will be weighed in light of other critical business processes. We need ADM in order to take the emotion out of the annual clamor for funding called the CapEx and OpEx budget.

Second is to take the time to do the current and future state mapping for ADM. This is a necessary step for gaining stakeholder buy-in for the changes that will occur.

Third is to establish realistic performance measures for the future state ADM process. Typical measures for ADM will be in the areas of cycle time, volumes, unit costs and quality. For example, some data elements will require updating in a near real time fashion, while for other data elements it may be acceptable to set one week for a cycle time. Throughput volumes must be measured and variations assessed for different staffing approaches. For example, if you live in a college town with a high volume of fall and spring meter changes, you may want to relax targets in these timeframes, or plan for adding resources in these timeframes. Production costs can be benchmarked based on work orders, map sheets, or other readily available units. Continuous improvement efforts will typically enable cost reductions over time in a well-documented process. Quality should include sampling of work tasks, as well as incorporating technology to enforce database integrity.

Finally, it is critical that process ownership be well established and communicated among the stakeholders, and supported by executive management. The ADM process owner will have many internal customers. If the value proposition is well understood, the process is well documented, and measures are understandable and achievable then the process owner has the opportunity to make a significant contribution to the organization.

ADM ALTERNATIVES & DESIRED STATE

There are two basic approaches for building an ADM process, the "single step" and the "multi-step". In reality, most companies adopt a hybrid of the two. The software suppliers provide software that is capable of supporting either model.

The single step ADM relies on a "front-line" user of the data to take responsibility for making changes to the data, including posting those changes to the production database. Typically this responsibility will fall upon an engineering design technician, a maintenance technician, a system operator, or in some cases even a field crew. In the single step model, the front line user will be working with a sophisticated design application. The design application will be integrated directly with the GIS, and in many cases with a work management and/or maintenance management application. The design application will have built-in edit checks and versioning capability to deal with scenarios like open/closed devices, designed/partial in-service, and design/as built. When implemented properly, this approach can yield quick turnaround of asset updates and a high quality database. It can breakdown if the front-line users don't have the time to keep up with the system, or if training is inadequate.

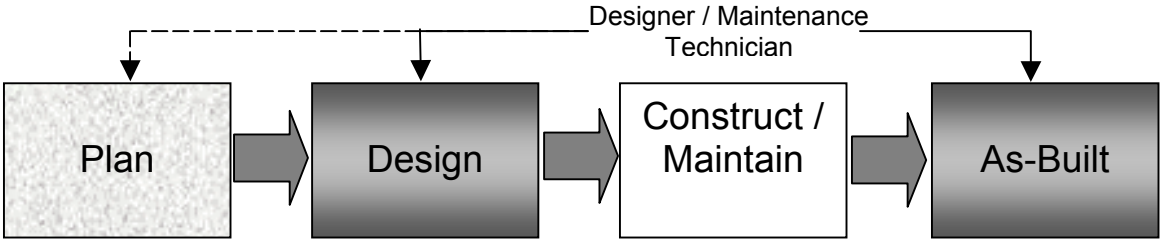

Figure 2 - Designer as ADM "Single Step"

The multi-step ADM relies on a back-office capability to make final posting and perform maintenance tasks on the system. In this model, the front-end users, i.e. designers, technicians, system operators, and field crews have access to and use of the system. The difference is that the changes and edits the front-end users make flow to a back-office group who is responsible for posting the changes to the system. The advantage to this approach is that it allows front-end users to focus on their primary job tasks, and provides them with a support group to manage the care and feeding of the database. The challenges in the multi-step model are building a workflow that produces an acceptable cycle time for processing edits, and one that minimizes the time to interpret and post changes.

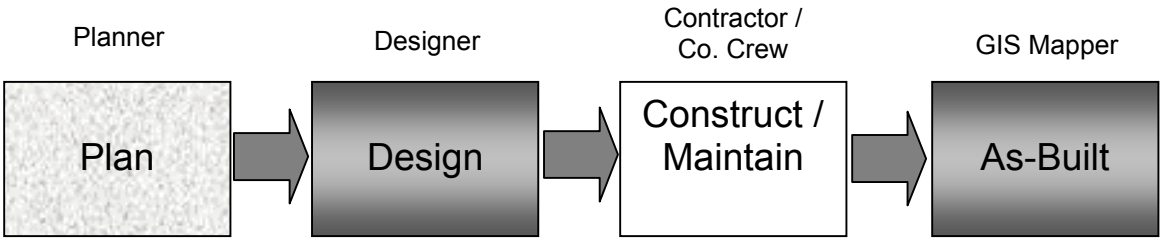

Figure 3 – Multiple Employees in ADM "Multi - Step"

In reality, most companies adopt a hybrid of the two approaches. Where practical they will try to leverage sophisticated front-end users to achieve as much single-step updating as they can. However, at the end of the day, it is our experience that a central role is required to provide a system that will support the varying demands from the many users of today's GIS systems. In essence, as we achieve the goal of providing GIS capability to a broader set of users in our organization, we increase the importance of having an effective ADM process to support the user community.

PITFALLS

While the importance of an effective ADM process has become critical within today's organization pitfalls exit. Measuring the efficiency and reliability of the assets contained within electric / gas / water / wastewater / communication organizations is still a hodge-podge of information from many different sources, with many different levels of data currency. Contained within many of our user organizations are still "islands of automation", cycles of decentralized verses centralized organization charts, significant resource constraints, power struggles, political issues, etc. To list a few of the pitfalls that one may fall into we have assembled the following:

- Executive Management changes and so does the knowledge of why GIS / ADM is so important.
- Cash strapped organizations do not have the luxury to spend dollars or replace employees to keep the GIS up-to-date. Other parts of the ADM workflow suffer.
- Commitment to have current information lags need to gain / retain customer revenue.
- Systems that do not talk to one another, thus inefficiencies expand. In some cases, which system do you trust?
- Engagement of leaders and employees in their understanding of GIS and the requirements of an effective ADM are lacking.

CONCLUSION

GIS and associated applications have become a critical element of the technology solution for electric, gas, telecom and water utility companies. Early implementations focused on replacing paper maps and the technology provided limited additional functionality. As the technology evolved from a software, hardware and communications perspective, the notion of utilizing GIS as a central repository for asset data began to emerge. Over time, functional groups that previously maintained separate representations of the assets, (whether graphical or not) began to push the market for tools that would allow multiple users to work off a common database. Today's implementations almost universally include significant integration of GIS-related applications to other business systems, with the resultant dependency on a common ASSET DATABASE. With increased use and dependency on the underlying data, it becomes critical that utilities develop an ASSET DATA MANAGEMENT process that supports their business situation. Adopting a process-view will enable asset managers to assign a value to the currency, accuracy and accessibility of the data. When the value is understood, rationale business decisions can be made regarding how much financial and human resource to allocate to the process.