

THE EFFICACY OF UTILITY DATABASE MANAGEMENT

PROBLEM STATEMENT

A substantial number of utilities facilities share the transportation right of way with roads. Continual expansion and renovation of the roadway frequently forces relocation of existing utilities, and as time goes by additional space is required as new facilities are placed in the right of way. Inevitably, planning conflicts and problems arise due to limited available space. Due to limited access to accurate records of existing facilities, particularly in the underground corridor, design and construction activities associated with utility installation and relocation are unduly expensive and risky. While some records are retained, it is often difficult to recover such information rapidly in a desirable format.

OBJECTIVES

The purpose of this study was to examine information technology/information systems (IT/IS) solutions to the challenge of maintaining an ongoing record of utilities facilities installations in the right of way for the Florida Department of Transportation. Researchers focused on the benefits and the challenges of developing a system to archive, manage and access available records of facilities installations—herein referred to as a Utilities Information Management System (UIMS).

The UIMS would consist of a collection of software applications and operational procedures, preferably with substantial graphics capabilities to accommodate visual images of facilities organization, which would be of considerable value to the UIMS client. Within the geographic information systems (GIS) community, a model for this type of management system is the geospatial database. Although GIS incorporates a number of application tools that would be of considerable use for a UIMS, it is not clear that this choice is cost-effective or realistic, since many plans are constructed using computer assisted drafting and design formats (CADD).

Thus, the objectives of this study include the following:

- Examine the resources maintained by FDOT and the pattern of workflow regarding utilities installations
- Identify the potential sources of information for an archive
- Investigate questions of accuracy and precision with respect to spatial data
- Study the challenges involved in developing a UIMS, especially in terms of graphic presentation
- Summarize functional requirements for a UIMS and present recommendations regarding system structure
- Outline a plan for implementing a UIMS
- Make a preliminary assessment of benefits and costs of adoption

FINDINGS AND CONCLUSIONS

The research team identified four factors that would contribute to making a UIMS more complex than typical governmental geodatabases intended for other applications:

1. To be useful, facility location information requires a high level of accuracy.
2. Utility network connectivity should be understandable
3. The vertical position of facilities is a critical component of location.
4. The sources of as-built information regarding facilities are diverse and the information generally is incomplete.

In light of the identified challenges, the research team developed the following recommendations for implementing a UIMS:

1. Adopt a hybrid CADD/GIS structure for the UIMS
2. Attach the UIMS to emerging enterprise GIS efforts at FDOT
3. Establish an oversight committee
4. Adopt robust data standards and metadata format
5. Inventory and evaluate data concerned with older installations
6. Initiate (as soon as feasible) a program to archive newly developed data
7. Use commercial software for GIS applications and other data operations, if possible
8. Begin a pilot study
9. Actively search for data partners
10. Establish an ongoing training and education program
11. Consider requiring changes in standards for contractor submittals to facilitate direct deposit of information into the UIMS.

BENEFITS

Successful implementation of a UIMS would reduce the expenses associated with utility location efforts required for resurfacing, widening lanes, and other construction activities. A UIMS would provide information that could either eliminate the need for utility location work or serve as the basis for additional location work, as would be determined by the nature of the construction activity.

Anticipated short- and long-term benefits of this research include the following:

- Improve workflow for utilities projects
- Facilitate management of right-of-way resources
- Minimize disruption of utility services and improve safety during utilities construction, maintenance, or location activities
- Ensure better maintenance of traffic during these activities
- Facilitate reimbursement for utility relocation
- Potentially reduce claims and delays on FDOT construction projects involving utilities

This research project was conducted by Stanley C. Kranc and Ali Yalcin, of the College of Engineering, University of South Florida. For more information, contact Gordon Wheeler, Project Manager, at 850-414-4366, gordon.wheeler@dot.state.fl.us