Title: Online Asset Management in the Village of Arlington Heights, Illinois
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Abstract:
Last year, Arlington Heights collected digital images of its roads and right-of-way assets to enhance its GIS. Using these stereo images TRANSMAP Corporation created an accurate road centerline network, and precisely inventoried 25 different roadway assets — including more than 45,000 trees that lined the streets. The digital images are available to different departments on the village's Intranet through a custom ArcIMS application. The latest addition to Arlington Height's online system is mobile computers equipped with tiny GPS receivers and ESRI's ArcPad. Workers access the infrastructure information directly in the field to keep the system up-to-date.

Paper Body:

The Village of Arlington Heights, Illinois, is a densely populated suburb of Chicago and has been actively developing a GIS program over the past several years. A major focus of GIS development in Arlington Heights has been the effective management of public infrastructure assets. Effective asset management allows the Village to comply with GASB 34 standards as well as to provide greater accountability and service to Village residents. To become a reality, Arlington Heights needed to develop an asset management database, tools for disseminating data to Village departments, and a data maintenance program to ensure that the database would remain viable once it was built.

At first, the development of a GIS for asset management seemed like a daunting task. The Village had very little digital data and the cost and complexity of developing digital data for asset management were unknown. Village officials began researching different methodologies for developing an asset management database. Traditional surveying techniques were evaluated but were found to be too costly and time-consuming. Finally, Arlington Heights decided to use a van-based data collection system in which digital photographs would be taken along Village streets complete with Global Positioning System (GPS) coordinates. The Village contracted with Transmap Corporation, based in Columbus, Ohio, to complete the van-based data collection.

The van data collection system included four cameras mounted on top of a van, two forward-mounted and two side-mounted cameras. The vans covered 268 street miles throughout the Village capturing photos every thirty feet for a total of more than 400,000 digital photos. Using multiple cameras and the on-board GPS receivers, Transmap was able to capture strereo pairs of images for nearly all infrastructure assets along Village roads. Using a software program called STEPS (STEreo Positioning System), Transmap was able to locate features along Village roads to sub-meter horizontal accuracy. More than 20 GIS layers of municipal infrastructure assets were collected from the van-based images including street lights, traffic lights, signs, driveways, sidewalks, trees, and fire hydrants. In the end, the cost for locating all of these features and for creating a GIS database with a set of pre-defined attributes was less than the cost of simply surveying the trees with traditional surveying techniques. In addition to cost, the automated process

of data collection proved to be much faster than traditional surveying. The field data collection effort was conducted in the spring of 2001 and took ten days to complete. By August of 2001, all of the infrastructure asset data had been extracted from the digital photos and added to the Village GIS as vector feature classes complete with attributes.

Following the initial development of the GIS database, the Village of Arlington Heights next needed to develop tools to provide Village staff with access to the data as well as procedures for maintaining the database on a go-forward basis. To provide access to the GIS data to multiple Village departments, the Village decided to implement Arc Internet Map Server (ArcIMS). ArcIMS allows a broad range of users to access the GIS data with minimal training providing a significant return on the software investment. Users from Engineering, Public Works, Fire, and other departments can access the variety of GIS data available, perform specialized queries, and print customized maps as needed.

To develop a robust ArcIMS application, Arlington Heights contracted with Patrick Engineering in Lisle, Illinois. Patrick developed the custom ArcIMS application using Active Server Pages (ASP) to provide optimized performance and the flexibility for future expansion. One of the unique challenges for the Arlington Heights GIS application was to design a tool to provide Village staff with access to the more than 400,000 digital photos collected as part of the asset management program. Through the ArcIMS application, Village staff can simply click on any location on the Village map and view digital photos of the area. The custom tools then allow the user to virtually "drive" down any Village street with the use of an Image Navigator tool. Likewise, Village staff can access detailed information about specific hydrants, signs, signals, etc. In addition, Patrick developed a suite of map navigation tools and database query tools accessible through the web browser. The overall intent was to create an application that would both facilitate and simplify the use of GIS. Village staff can easily search for specific parcels, addresses, buildings, etc. Once an area of interest has been found within the Village GIS data, custom maps can be generated through the web browser and sent directly to a printer.

Finally, as with any GIS program, a database should only be developed if a maintenance program is in place to keep the information current. Village GIS staff use the ArcIMS application to access data as necessary. However, when changes occur to Village infrastructure, procedures have been established for capturing those changes and updating the Village GIS database. For example, when the Public Works department installs a new road sign, they use a mobile GIS application built with ArcPad combined with a handheld GPS receiver. Attributes of the new sign are collected in the field using ArcPad and the coordinates are collected using GPS. Once back in the office, the information is uploaded to the Village GIS database so that other Village staff will have access to current and accurate data. Currently, the Village is testing the use of PC pen tablet computers with a more robust MapObjects field application for mobile data collection.

Building a useful and successful GIS-based asset management program requires significant resources and effort. However, certain technologies are much more efficient than others. The Village of Arlington Heights was able to build a successful GIS program in only a couple of years by researching and selecting efficient van-based data collection procedures and developing a user-friendly ArcIMS application. Combined with an

effective data maintenance program, the Village of Arlington Heights is now able to provide more effective and efficient operations relative to asset management.

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