

ESRI Paper Number: 527

Jason Amadori, Space Imaging

Development of an Integrated Asset Management System for the Marion County Engineering Department

ABSTRACT

Governmental Accounting Standards Board Statement No. 34 (GASB 34) establishes financial reporting standards for state and local governments, including states, cities, towns, villages, and special-purpose governments such as school districts and public utilities. Governments should report all capital assets, including infrastructure assets, in the government-wide statement of net assets and generally should report depreciation expense in the statement of activities. Space Imaging and Jones, Edmunds and Associates, Inc. are working with the Marion County, FL Engineering Department to collect roadway asset data for incorporation into an integrated Asset Management System. This asset management solution utilizes field data collection and image-based feature extraction to build the required asset databases.

Development of an Integrated Asset Management System for the Marion County Engineering Department

Over the past year, the Marion County Engineering Department has been working on collecting, consolidating, and improving access to roadway asset data. This effort will save time and money while significantly increasing the quality of work produced by the group as a whole. The concept has materialized over the past year leading to the Engineering Department streamlining its many processes and tasks by developing an **Asset Management System**.

The idea behind an Asset Management System is to keep a running inventory of all capitalized assets owned by an agency and allow for reporting of their condition and value as a function of depreciation or modification. In the past, it had been common

practice to take a reactive approach in maintaining an asset, as opposed to proactively tracking the condition and life-cycle of the asset.

Marion County has decided to proactively maintain their assets by following the "Modified Approach" to fulfilling GASB 34 reporting requirements. This approach encourages good stewardship of assets through preventative maintenance of capitalized assets. This approach also allows Marion County to periodically assess the condition and functionality of their assets and budget their maintenance activities accordingly.

These activities are all tracked in an Asset Management System that integrates field collected data and legacy system data into a relational database management system (RDBMS). This RDBMS allows the County to comprehensively track assets and the associated cost to maintain them at a minimal condition level acceptable to remain GASB34 compliant.

Basic Structure

The Marion County Engineering Department has decided to track assets that they are directly responsible for maintaining. These include:

1. Stormwater Features
 - a. Pipes
 - b. Inlets
 - c. Culverts
 - d. Water Retention Areas
2. Pavement
 - a. Marking Condition
 - b. Pavement Condition Index (PCI)
3. Sign Features

This data is tracked using Cartograph's Asset Management Software and leveraging their *Flex Technology* to customize forms, reports, and filters that will manage their daily activities.

Field Collection Efforts

Space Imaging has employed the services of Jones, Edmunds, & Associates, Inc. (JEA) to collect the field data associated with this project. JEA collected over 35,000 features with full attribution in the field that drives a number of GASB34 and NPDES-related activities.

This data is collected using ArcPad on PDA's, outfitted with sub-meter GPS units. Field crews used many forms of transportation to get around the County, including ATVs, mountain bikes, and field vehicles. The data collection was divided into two crews, the signs and stormwater crew and road condition crew.

The signs and stormwater features were collected on ATV and bicycle. Due to the fact that most features were close to one another, these two forms of transportation allowed for speed and ease from one feature to the next while allowing the field crew to get next to or on top of the feature collected. Each crew member was outfitted with a PDA using ArcPad software, and a digital camera. A custom ArcPad data collection was created in to facilitate accurate and consistent recording of attributes on each feature such as pipe size, material and photo number (figure 2). The PDA

also served as a navigation device showing what roads were to be collected for that day, real-time location, and what data had been collected (figure 3).

The next step in the sign and stormwater data collection was the QA process. This was done on a daily basis in the office. JEA designed the ‘Photo Processor’ that was used to hot-link the correct picture with the correct feature. Even though the image number was attributed with the feature while in the field, several problems occurred during the process – such as duplicate or corrupt images and imagery falling out of sync with the spatial files – making the ‘Photo Processor’(figure xx) and invaluable part of the QA process.

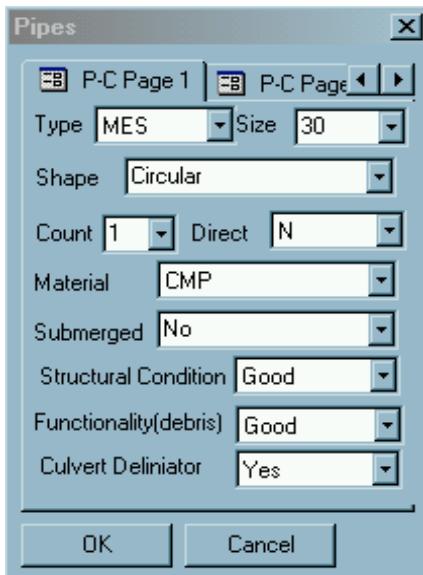


Figure 2 - ArcPad feature attribution form



Figure 2 - Sign and Stormwater data collection using an ATV and ArcPad

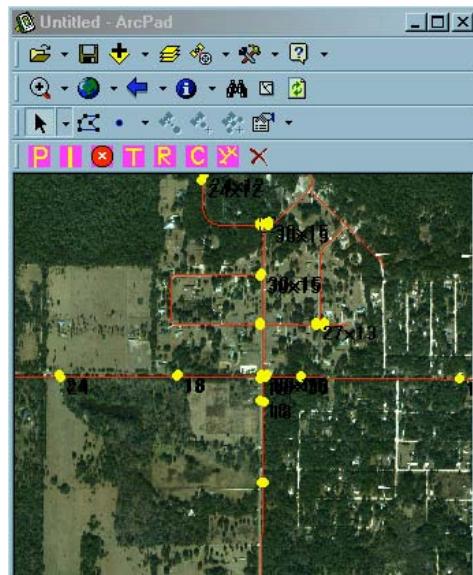


Figure 3 - Interface view of PDA with ArcPad displaying imagery, roads, and

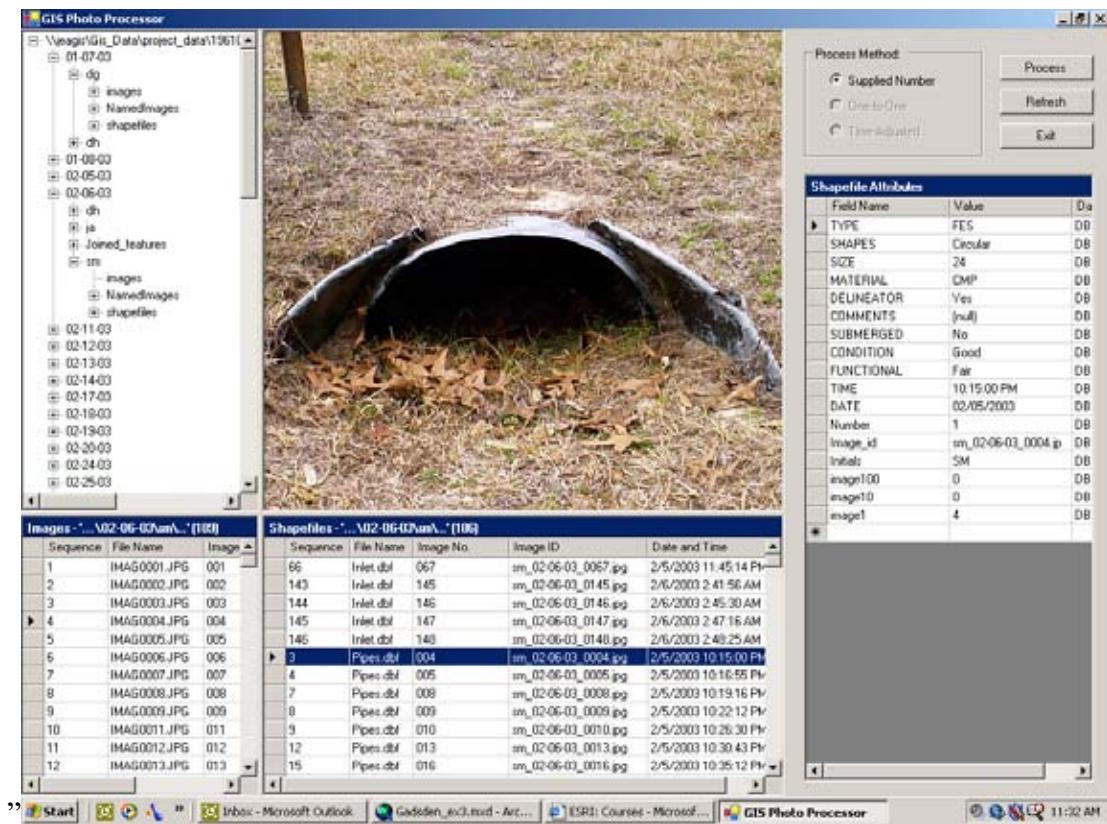


Figure 4 44444- 'Photo Processor' created by JEA and used in the QA process of photo hot-linking. The captions on the right show the attributes of the feature in the picture. If the two do not match, the user can assess the problem and align the correct picture

On average a crew of three was able to cover 40 road miles a day while collecting 600 features. After 61 days in the field, 19,000 signs, 12,000 pipe ends, 5,000 inlets, and 1,000 ponds were collected.

Jones Edmunds developed a methodology for calculating a pavement condition index (PCI) for each roadway segment. The PCI was based on the American Society of Testing Materials (ASTM) standard no. D6433. The PCI focused on six visually assessed stresses – alligator cracking, block cracking, longitudinal/transverse cracking, weathering, raveling, and depression.

Data collection for calculation of the Pavement Condition Index (PCI) was conducted by a two man team that evaluated the roads through a “windshield survey”. This consisted on driving a road two times, once at the posted speed limit where the crew noted the feel on the road, and once at 3-5 mph where the crew

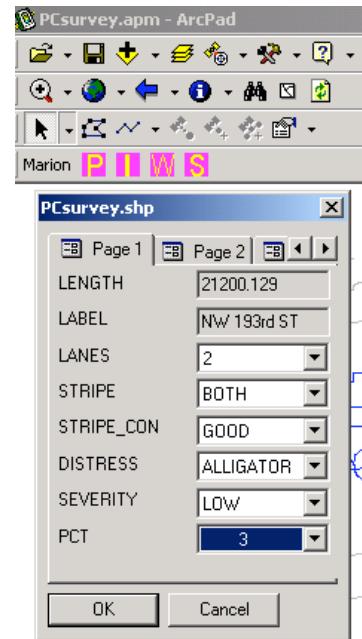


Figure 5 - ArcPad PCI data collection form

could view and evaluate the problems with the road such a cracking, holes, and faded paint. The PCI crew used a custom ArcPad form (Figure 5) that allowed the crew to easily attribute the road as they drove it. A total of 2,352.5 miles of road were driven and evaluated. The final datasets from the field data collection have been uploaded to the Cartograph Asset Management Database in a SQL database environment.

The Cartograph Asset Management System allows for the County to track labor, equipment, and material costs via a direct link to their Alliance Human Resource System database. As cost information changes in the Alliance database, the cost adjustments will be reflected in the asset management database.

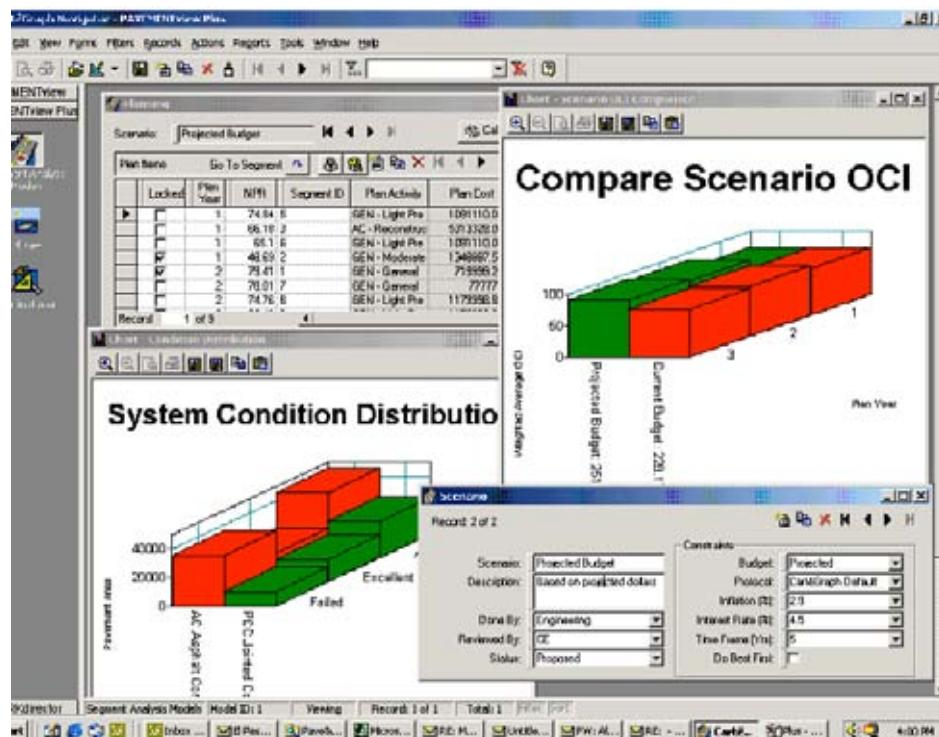


Figure 6 - Cartograph Software

The Future of Asset Management in Marion County

The next step in this Asset Management System implementation will be for the County to implement Standard Operating Procedures (SOPs) related to these activities. The SOPs will ensure that all activities related to data maintenance are coordinated and codified so that all users will enter data in a standardized format, thus, ensuring data integrity.

Since the County is in the early stages of implementation, it is vital that any implementation activities are coordinated and simple enough to execute during the acceptance stage of the implementation process. Since many new methods of data entry have been introduced, users will have to learn how to assimilate these activities into their every day activities.

In the long run, this Asset Management System will be available to users within the County via an ArcIMS website. This information can be accessed by anyone throughout the County Intranet for viewing, filtering, and reporting activities. As a result, the County is able to fulfill its GASB34 and NPDES reporting requirements while managing their assets in a cost-effective manner.

CONCLUSION

In conclusion, Marion County has taken a large step towards being GASB34 and NPDES-compliant with their Asset Management System. The next step in this project will involve assigning capitalization limits and values to their current assets and infrastructure. Once this is complete, the County will be ready to adhere to the modified GASB34 capital infrastructure reporting requirements, utilizing reports generated from the Marion County Asset Management System.

Jason Amadori
Space Imaging
Manager of Southeast Operations

Mark W. Nelson
Jones, Edmunds and Associates, Inc.
Vice President of GIS/Engineering