6.4.2   **Managing Multiple Linear Referening Methods for Highway Assets: from Field Device to Office Back-End to use Desktop**

Presenter

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There is presently significant interest in asset management within state Departments of Transportation. This interest is partially driven by GASB 34 and overall interest in developing better information system to support decision-making. GIS is seen as an important tool in developing asset management systems and is second to none in its ability to integrate disparate assets along the roadway, based on spatial proximity. Oftentimes the challenge in developing a decision support system for transportation road asset management is the requirement that multiple linear referencing systems be supported in addition to GPS data.

This presentation will review the functional design of the GIS and location referencing management component of a highway asset maintenance application built for a private company that manages highway assets for state and city Departments of Transportation. This presentation will be oriented towards a GIS/IT viewpoint and will review the architecture used in field collection of roadway asset inventory and maintenance, means of synchronization with the back-office servers, and the data model used by the GIS in managing location referencing to enable users to view asset locations in the LRS of choice. The system is designed to handle various incoming location referencing methods including Link Node, Route Mileage, Street Address, and GPS coordinates in such a manner as to enable the company to easily add new referencing methods based on new customer requirements.

The presentation will look at how linear referencing translation and synchronization occurs between SQL Server's relational attributes for each asset on the back-end and SDE's spatial representation of each asset's location. It will also review how field devices use ArcIMS and ArcXML to prep laptops for the beginning of each workday.

The Synchronization process will be presented from the perspective of managing asset locations in terms of three distinct sub processes:
1) The download of custom spatial (GIS) data through ArcIMS to the mobile in GIS format for field operators,
2) The upload of asset additions and location changes to the central server as relational attributes, and
3) Synchronization and updating of spatial representations of inventory item locations in the spatial data server (ESRI's ArcSDE) from the uploaded relational attributes including translation of location descriptors across multiple referencing methods.

In summary, this presentation would provide an overview of one approach for integrating GIS and relational databases for the management of multiple linear referencing systems and GPS data. The location referencing model utilized in design of this application utilized concepts put forth in the Deuker and Vonderhoe location referencing models. Although the particular business focus for this application is asset management, the techniques presented could be implemented for any DOT business areas data.