

GIS Asset Management Workflow for San Mateo County Department of Public Works

BACKGROUND

County Public Works agencies must ensure that critical assets such as roads, water, and waste water utilities are proactively designed, managed, and maintained. In this way, Public Works agencies make a vital, albeit often overlooked, contribution to sustaining regional commerce, public health, and public safety.

Public Works departments in counties with large urban areas and dense population centers, such as San Mateo County, traditionally use GIS to identify the location and characteristics of utilities. In contrast, Asset management systems, such as Hansen, are usually used to support the planning and maintenance activities necessary to run public utilities. Examples of how Hansen is used include managing tasks such as tracking and responding to community-initiated service requests, scheduling work orders for routine maintenance, tracking inventory, and managing the financial aspects of running public utilities.

BUSINESS PROBLEM

Despite a utility manager's need for up-to-date and accurate location-based information, GIS and asset management systems traditionally do a poor job of synchronizing geographic, engineering, and financial data. Although most GIS software vendors sell a Hansen integration solution, typically this "integration" only provides a map interface to Hansen asset records. While this functionality is necessary for map-based access and analysis of data, it stops short of addressing the long-standing information management problem of maintaining geospatial data consistency across disparate systems.

Consider the following simple illustrative example: sewer districts often extend their boundaries over time. GIS analysts will reflect this change in the geodatabase by graphically editing the district boundary. However, public works staff must then manually update the Hansen asset management system separately to reflect the new disposition of the sewer system. Often this manual update requires keying-in data for hundreds of sewer system features that were affected by a boundary change. Because two systems (eg: the GIS and the asset management system) are used to track the same information - one in the geodatabase and one in a tabular database - they are duplicating data maintenance efforts. Perhaps more significantly, this multi-system approach inevitably leads to data errors. The result is that both systems lose integrity as an authoritative data source.

GEODATABASE SOLUTION

Using the openly published geometry specification in Oracle Spatial geodatabase, San Mateo County DPW pioneered an automated, standards-based, and cost-effective solution to this spatial data management problem. They developed an automated approach to updating Hansen data with GIS information using Oracle Spatial procedures. These procedures update Hansen data in real-time with location-based and spatial information managed within the County's enterprise-scale GIS and geodatabase. Thus, when features are added or edited in the geodatabase, Oracle Spatial triggers update tables in Hansen with the correct geospatial data, such as the length of a new sewer main. This approach guarantees that all geometric or location-based attributes in Hansen (eg: length of pipeline segment, special district designation, etc) automatically remain synchronized with the digital map.

RESULTS

We believe San Mateo County has implemented a truly innovative GIS solution. Their GIS-centric data management approach manages both spatial data within an enterprise-scale

geodatabase and simultaneously ensures mission-critical systems like the Hansen asset management system remain synchronized with validated data at all times. The County's efforts resulted in a Hansen asset data maintenance workflow that is entirely map-centric; is fully automated and transparent to the end-user; requires no error-prone human tabular data entry; avoids the need to develop any customized graphical user interface (GUI); and is not bound to any particular third party desktop GIS software.

With the help of Farallon Geographics (<http://www.fargeo.com/>), they completed the entire GIS-Hansen system integration in about a month, and have already recouped their investment. I believe that their approach will directly benefit the citizens of San Mateo County by saving thousands of staff-hours, reducing the number of data errors, and dramatically improving their ability to keep County assets functioning properly (and invisibly).