Building an ""in-house"" AVL System with ArcIMS for the City of Garland, TX

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Abstract:

In the City of Garland, Texas (population 215,000), Garland Water Utilities is responsible for the maintenance of approximately 1,000 miles (1,600 km) of water line and sewer collection infrastructure.

The Water Utility also performs a secondary mission; dispatching non-emergency 311-type calls for other departments (e.g. animal control, traffic, facilities management) after regular business hours. Water System Operators did the best they could when dispatching new service requests to field crews. However without knowing the location and activity level of each crew, it was largely guesswork to determine which crew to assign to a new call.

The department recognized the opportunity to improve workload scheduling and balancing efficiency. Its goal was to make best use of available workforce and physical assets, while enhancing crew safety and oversight of the department's $3M rolling vehicle inventory. Due to its after-hours call center mandate, the department also wanted a system that could be easily adapted for use with other city departments without costly upgrades or modifications. In autumn 2005, City of Garland developed a custom vehicle tracking and service order management system for its Water Utilities field operations section. After several months of testing, the production system was launched in January 2006.

The back-end system consists of a "Service Order Management" SQL database, ArcIMS, and Geocortex IMF (using a custom vehicle location module). The location and movement of any of the forty GPS and Panasonic Toughbook® equipped vehicles can be precisely tracked anywhere in the city—in real time. "The system was designed to minimize disruptions in service delivery to our customer base", notes Fred Souza, Interim GIS Director at City of Garland, "We sought to use proven technologies at the core of our solution, rather than invent anything that strayed from established best practices."

Utility operators can view database records alongside a map showing all active vehicle locations in proximity to a service call. An operator chooses which vehicle should be assigned to the call by following predetermined departmental criteria and the "Nearest Vehicle to Address" tool. The operator assigns the appropriate vehicle to the call, and map symbology is updated to reflect this assignment.

Departmental managers can view real-time work requests and updated vehicle locations in the office or in the field. If a vehicle exceeds the posted speed limit by a predetermined margin or leaves the city limits, an email is automatically sent to the crew's supervisor. The City of Garland estimates that fuel, maintenance, and staff time savings will provide a five-fold return on investment, within the first year alone.

The presentation will provide an overview of the department, problem statement, options considered, and the implemented solution. The presenter will show how an AVL system can be implemented with off the shelf hardware and software solutions. Attendees will understand some of the challenges encountered when building an AVL from scratch, as opposed to a complete, turn-key vendor solution.