City of Buffalo, New York, Instantly Communicates Updates with GIS Mapping and GPS

Fire Department Streamlines Data Access

Highlights

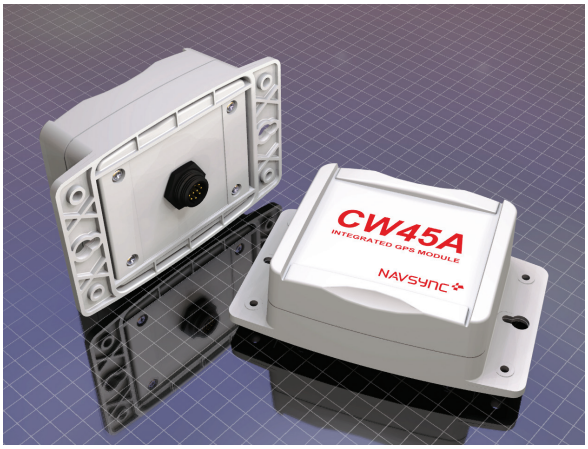
- Fire truck locations are always visible to department users.
- A GIS address matching tool quickly identifies the locations of calls.
- Mobile devices ensure that each fire truck has the most up-to-date information on each hydrant.

With a population of approximately 293,000, the City of Buffalo, New York, is the second-largest city in the state. Located where Lake Erie and the Buffalo and Niagara rivers meet, the waterfront is being transformed into a marina and recreational center. Once a railroad and industrial hub, the city is currently a mix of light manufacturing, high-technology, and service-oriented companies and is also home to a number of universities and colleges, including the State University of New York.

City of Buffalo Fire Department

Once a truck has used a fire hydrant, that hydrant feature is flagged in the system.

The City of Buffalo Fire Department needed a robust mobile GIS to help support its firefighting operations. Of the many challenges faced, a lack of fire hydrant location and condition information was a chronic problem for on-scene firefighters. With limited or outdated hydrant location, size, and condition information, critical time could be lost locating the largest (most pressurized) hydrant for a fire. A second challenge to the fire department came with the city's firehouse consolidation efforts that were completed in 2006. This process reassigned many firefighters to new stations covering service areas with which they were not familiar. This loss of local road and address knowledge was also seen as a potential issue for engines navigating to new locations. The department recognized the need for GIS that could map hydrant locations while offering navigation capabilities to its engines. An additional requirement was that the application be easy to use and require minimal training or IT involvement. Wireless connectivity and a simple graphical user interface (GUI) were identified as requirements to meet these technical needs.



After competitive analysis of the various products, the department selected ArcGIS Mobile for a variety of reasons. One was the small licensing fee. The city's Department of Public Works had already purchased ArcGIS Server Advanced, and the additional mobile licenses were a cost-effective solution to get a mobile GIS into many vehicles. Additionally, the ability to seamlessly download and update critical hydrant and address data from the central geodatabase using map caching technology removed the need for complex data maintenance routines.

"The GPS unit, NavSync CW45A, was selected for its robust satellite acquisition capabilities"

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Navitation

To ensure that drivers and firefighters know the location of the call, an address matching tool was developed against the parcel address centroid layer that creates a specific point to identify the location of the call. Using autocomplete typing tools, a user begins typing the first few letters of a street to return matching street names. Once the correct street is identified and an address (or intersection) selected, a call point marker symbol is placed on the map to aid in the navigation to the call. Popular place-name locations, such as schools and parks, can be selected from a drop-down menu. A user can also manually place a new call point or move an existing call point with a simple map tool. These different methods to locate a call offer quick and reliable ways to create a target for the truck's navigation.

In addition to finding a call point location, a built-in GPS unit allows drivers to orient themselves on the local road network. The application's autopanning functionality automatically redraws the map with the truck's GPS location always centered on the map. This ensures that the truck's location is always visible to the user while navigating to the call. The application also allows the user to navigate the map view between the call point and rig location using simple button clicks, allowing the review and preplanning of the call point while quickly assessing the rig's current location without needing to zoom in or out.

The GPS unit, NavSync CW45A, was selected for its robust satellite acquisition capabilities, as early testing showed it to return GPS positions more reliably compared with other products. This was especially apparent in the downtown urban canyon, where its low-angle reception technology maintained GPS signal strength. The GPS unit is physically attached to the rig and hardwired to a console in the fire truck. A Panasonic Toughbook CF-19 was selected as the mobile computer.

Application GUI

Knowing that the application was to be run in a vehicle, the development team at Bergmann Associates, an ESRI Business Partner located in Buffalo, focused on an easy-to-use, intuitive GUI. Large buttons with visually descriptive icons were placed on the application form. Autopan and fixed zoom buttons were added to allow quick map navigation. The GPS tab allows users to confirm the location and signal strength of the GPS satellites. The Data Synchronization tab allows a user to manually synchronize the hydrant and other base layer map caches with the central database using a single-click operation.

Hydrant Data

A critical component of the application is the display and update of hydrant data. At night and in deep snow, fire crews were sometimes hampered by not having precall knowledge of hydrant locations. The GIS remedies this need by showing each hydrant's location with its size and type symbolized on the map. An outside vendor using submeter GPS surveyed these locations. This map data allows on-site commanders to quickly evaluate the most powerful and accessible hydrants for optimized firefighting. For example, a high-pressure hydrant may be on the back lot of a call location but hidden from street view. A fire chief can quickly identify the better hydrant, then have a hose run through a backyard to access the preferred hydrant and optimize water pressure.

Once a hydrant has been used, it must be pumped out by the Buffalo Water Authority. This is required to ensure the hydrant is ready for use on the next call and is critically important in winter conditions, when an unpumped hydrant may freeze. Hydrant use is tracked in the application by a simple selection tool that opens a small dialog box. The tool updates the date and time of hydrant use and tags the record with the engine number and operator note. Once the fire truck returns to the station, the application picks up the wireless network and transmits the hydrant data back to the central server using the ArcGIS Mobile native caching tools. These updates are stored in the city's enterprise geodatabase (ArcSDE 9.2).

More Information

For more information, contact Thomas Coyne, captain of communications, City of Buffalo Fire Department (tel.: 716-851-4184, ext. 259), or Jeff Volpe, Bergmann Associates (tel.: 716-852-3211).