

Global Positioning Systems Aids Planning Process in Richmond, Virginia



Urban and Municipal

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Planning for growth is not an easy process. As more and more people move into continuously expanding urban areas, it is inevitable that development follows. City planners are faced with the critical job of balancing the growth of a city while maintaining its quality of life.

Chesterfield County, outside of Richmond, is the fastest growing metropolitan area in central Virginia. It is the responsibility of GRTCTransit (formerly Greater Richmond Transit Company) to provide regional transportation for the greater Richmond metropolitan area. GRTC, a privately incorporated, non-profit organization jointly owned by the City of Richmond and Chesterfield County, provides bus service as well as other public transportation to both urban and suburban residents.

Jakob Helmboldt, a GIS (Geographic Information Systems) Coordinator/Planner for the GRTCTransit System, is very familiar with planning for growth. Helmboldt explains, "As the metro area continued to grow, we realized the need for better planning tools. I work in the Planning Department, but we did not have our own in-house database of bus stops and routes. When we needed a new bus route we had to guess where the areas of high ridership might be. As demographics change and the population grows, we had to adjust routes and add more stops – we needed a more accurate planning tool, rather than relying on history."

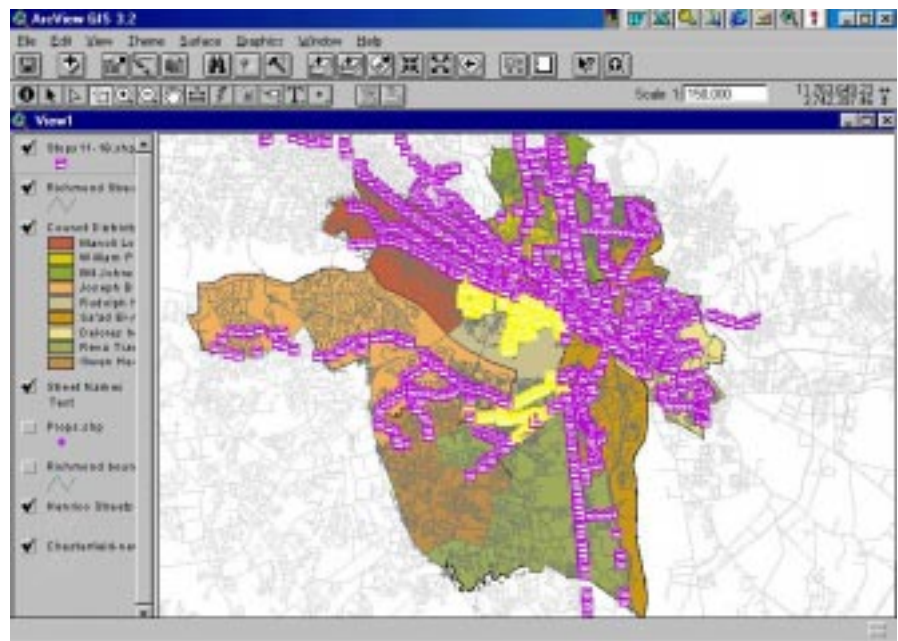
That's when GRTCTransit decided to acquire a GS50 GPS/GIS (Global Positioning System) receiver from Leica Geosystems. GRTC immediately began recording GPS locations for all bus stops within their

jurisdiction – all 2500 of them! In addition to collecting the physical location (GPS coordinate) and amenities at each bus stop, GRTC also recorded the curb length in order to verify that there was enough room for buses to pull to the curb. Using a codelist specifically prepared to collect attribute data during field collection, the organization could record the kind of signage at the stop and whether or not it needed to be replaced. The GPS was also used to record any benches, shelters, ramps and trash cans at each stop.

Once the field data was collected, GRTC downloaded the GPS data into

Leica's GIS DataPRO™ software. GIS DataPRO automatically creates ESRI shapefiles, so that the data can immediately be used in ESRI's ArcView GIS software. Helmboldt says, "prior to having GIS, we outsourced everything to the regional planning organization. Since then we have created our entire route network using the GIS, and now we can produce our own maps. With ArcView, we have a tool that integrates all of our GPS data with additional data layers from other sources."

GRTC has seen the immediate effect of adding GIS and GPS to the planning



GRTC used the Leica GS50 GPS/GIS receiver to collect all bus stops and amenities for Chesterfield County, Virginia. Combining the bus stop data with other layers in a GIS enabled GRTC to better query and analyze its data, which in turn greatly improved the planning process for new bus routes in one of the fastest growing metropolitan areas in Virginia.

process. According to Jakob Helmboldt, "Now we have a tool to help us perform more concrete scientific analysis. We are managing our resources better - we know for certain which bus stops and routes need improving. We can plan for additional stops, and add new stops. We have also utilized the GIS in terms of handling customer requests for more amenities at bus stops. Because we collected attribute data with the Leica GS50 GPS/GIS receiver, we can query the GIS for all bus stops that have ramps, for example. The GIS can tell us if a particular stop is 'high-use,' and if it has access for wheelchairs or walkers. Combined with 2000 Census data, we can perform some demographic analysis to determine which areas are favorable for high ridership. Overall, the technology has allowed us to do more thorough planning."

Benefits

Having a Geographic Information System has definitely improved the analysis capability for GRTC. Helmboldt says, "A GIS gives us analysis and query capabilities that we did not have before.



Jakob Helmboldt, GIS (Geographic Information Systems) Coordinator/Planner for the GRTC Transit System, uses a GS50 GPS/GIS receiver from Leica Geosystems to capture bus stop data in Richmond, Virginia.

With ArcView, we can address customer requests in a particular service area by pulling up a map. We can also use the GIS to model how a new bus stop would affect an area, or map proposed improvements or new routes. Maps are great visual tools for illustrating concepts - we have given maps to City Council members, which works to our advantage because it helps them to immediately grasp a complex issue."

Another benefit that GRTC has seen is better data management and time savings. GRTC was able to collect over 80% of its 2500 bus stops in a short amount of time. In fact, now that GRTC is almost finished with the actual data collection, it can focus more on planning ahead instead of trying to put out fires. Having all of the information in the GIS, literally 'at its fingertips,' saves GRTC time and money by not having to physically check the condition of a particular bus stop.

The Future Is Now

The bus stop data collection project was so successful that GRTC used the Leica GS50 GPS/GIS receiver for another project that involved replacing transportation signs in the greater Richmond area. The new signs contained routing information for passengers, and also were clearly marked "GRTC" in large letters for branding and identification purposes. The Leica GS50 GPS/GIS receiver was used to record not only every sign's location, but also any attribute information associated with it (including type of sign) via a code-list. Each sign's GPS coordinate was then compared to data in the GIS to make sure it was properly located, and/or had been installed at the correct location.

Helmboldt elaborates on this aspect of the project, "The installation of the signs was awarded to an outside contractor. From a project management component, we can query the GIS to show signs that need to be revisited by the contractor. We have been able to track incorrect installations (signs with incorrect route

numbers installed at certain bus stops), sites needing additional work, dilapidated and damaged signs and even billing errors indicating work that may not have been completed. From this work, we have cleaned up our database - for instance, if a street changes name, there may be a duplicate name, or if bus stop is no longer in use, we update our database. We also note other work that may be needed, such as removal of the amenities or signage. From a data management perspective GIS and GPS have been great tools. Every week we update our GIS with the GPS information, and we also update our bus stop list. We have been able to sort through a lot of data that over time has built up a lot of errors that are hard to identify by looking at data manually in a database."

Implementing a GIS and GPS has had added benefits for GRTC and for the public it serves. The organization is currently preparing a new route system map and customer guidelines with the aim of providing more user-friendly maps and schedules for its ridership. In addition, GRTC plans to expand the GIS capability to other departments, including the customer service department, which traditionally had relied on paper maps to service customers. The use of a GIS can greatly automate certain processes, providing a faster way to look up street addresses and identify the closest bus stop to the caller, as well as identify routes that service the caller's origin and destination.

Summary

Overall, using GIS and GPS has had a phenomenal impact on GRTC. The organization has realized internal cost-savings by eliminating some of the services it had previously contracted out that are now accomplished through the use of GIS and GPS technologies. The next step for GRTC is to put the mapping information onto its website, so customers can go online for bus schedules and routing information.

To learn more, call 1-866-LEICAGIS or visit www.gis.leica-geosystems.com

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