

Holmes County Highway Department Relies on MOTOTRBO™ GPS to Improve Road Crew Safety



“The real power of this solution is that it improves work crew safety. We have very steep terrain here and in a blizzard, trucks could slide off into a ravine and the tracks would be quickly covered up. With MOTOTRBO sending data through the GPS, we will see when that truck stops moving. We’ll know where that guy went off the road and we can send someone to that exact location.”

- Erik Parker, Holmes County GIS Director

Situation: Increasing safety and improving operations at an affordable price

Located in central Ohio, Holmes County’s nearly 40,000 residents include the nation’s largest Amish and Mennonite community. Horse-drawn buggies and motorized vehicles share the county’s 250 miles of roads and 271 bridges spread throughout 424 square miles of terrain spotted with rolling hills, steep ravines, and waterways. Keeping those roads and bridges in good condition during the summer and clear of snow during Ohio’s often challenging winters is the responsibility of the Holmes County Highway Department.

When Chris Young, Holmes County Engineer, was elected to the position in 2003, one of his first priorities was to replace and update the county’s two-way radio communications system. The aging analog radios were nearing end of life and coverage was not always reliable. Young wanted better technology that would improve the safety and efficiency of his crew, as well as reduce costs for the department.

“A few years ago, we had a bad snowstorm,” Young recalls. “The crew was out plowing and at some point, one of our drivers got into trouble. He had flipped the truck and we weren’t sure where he was. If he hadn’t found his radio to report in, or even worse if he had been knocked unconscious, the situation could have been very bad.”

Young contacted Motorola to discuss options for developing a digital communications system that would improve worker safety through location tracking for all of the Highway Department’s 35 vehicles that included trucks, backhoes, graders, loaders, and cranes. However, because no general funds, sales tax, or property tax revenues are used for road and bridge maintenance in Holmes County, Young was also looking for a very cost-effective solution.

Products

- MOTOTRBO XPR 6550 portable radios
- MOTOTRBO XPR 4550 mobile radios
- MOTOTRBO XPR 8300 repeater

Benefits

- Improved worker safety
- Greater operational efficiency
- Reduced costs
- Unique applications flexibility



“Through the MOTOTRBO we’re able to split the narrow band frequency, creating two channels out of one frequency... We use one channel for voice and the other channel to transmit the GPS data from the trucks back to our server.”

- Erik Parker, Holmes County Director of Geographic Information Systems.

Solution: MOTOTRBO digital radios with GPS location tracking

The local Motorola Channel Partner proposed MOTOTRBO digital radios with built-in GPS capability. Not only would the digital radios provide better coverage and clarity, the location tracking function would be able to monitor the trucks and report back, up to every second if necessary, where each truck was at all times.

The GPS-equipped portable and mobile radios can be configured to transmit the coordinates of Holmes County vehicles at pre-programmed intervals from several minutes to virtual real-time intervals of one second. Monitoring of fleet movement is clearly displayed on a high resolution, color coded map showing each truck’s location.

“It was a great solution because we’d be able to watch the trucks and in the event of an accident, we’d know exactly where they were and could get someone out there quickly,” Young says.

Results: “The real power of this solution is work crew safety”

MOTOTRBO delivers improved spectrum efficiency compared to analog radios and alternative digital offerings, by doubling channel capacity, supporting more users, and enabling more information to be transmitted on existing frequencies.

“Through the MOTOTRBO we’re able to split the narrow band frequency, creating two channels out of one frequency,” says Erik Parker, Holmes County Director of Geographic Information Systems. “We use one channel for voice and the other channel to transmit the GPS data from the trucks back to our server.”

Holmes County uses a fleet management application developed specifically for MOTOTRBO radios by NeoTerra™ Systems, a Motorola Professional Radio Application Provider. The MOTOTRBO radios mounted on the vehicle sends the location data to a MOTOTRBO radio connected to the server which is then processed by the fleet management application and displayed through a web-based mapping application developed by the Holmes County GIS.

Holmes County sets the cadence of data transmission depending on weather conditions and activity. For example, a backhoe confined to the small area of a work site only needs to be tracked once every five to 15 minutes. However, in the winter during a snowstorm when salt trucks are plowing the roads, safety is a critical issue and the County needs to know where those trucks are every 15 seconds.

“The real power of this solution is that it improves work crew safety,” says Parker. “We have very steep terrain here and in a blizzard, trucks could slide off into a ravine and the tracks would be quickly covered up. With MOTOTRBO sending GPS positions of the vehicles through the data channel, we will see when that truck stops moving. We’ll know where that guy went off the road and we can send someone to that exact location.”

“We’re very happy with the MOTOTRBO solution. With the level of confidence it has given us to keep our team safe, we can now look ahead to Phase Two – reducing our costs even further by monitoring and tracking salt usage.”

– Chris Young, County Engineer, Holmes County Highway Department

Extending the value of the solution

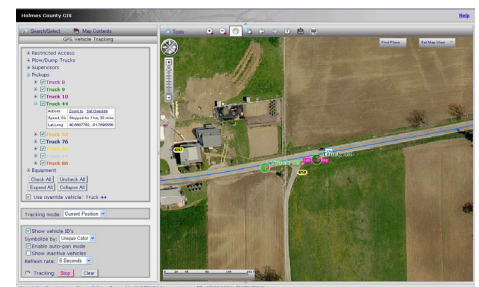
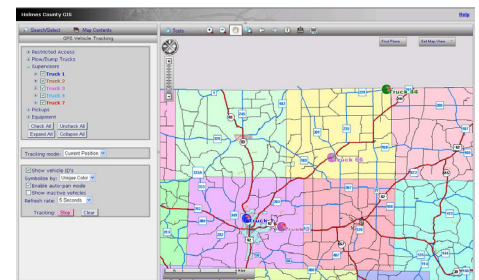
In addition to increased safety, the MOTOTRBO solution also provides Holmes County with:

- **Better operations control:** With a macroview of where each vehicle is located at any point in time, supervisors can ensure that work teams are where they are supposed to be.
- **Reduced cost through supply monitoring:** Through the MOTOTRBO radios, data can be pulled from the control box on the salt spreader that monitors salt usage, telling supervisors when the driver is running low and helping them make decisions about the rate of salt flow.
- **Finding lost or stolen equipment:** Whether the radios have been stolen or simply lost, the GPS continues to transmit its location, making recovery easier and reducing the need to purchase replacement radios.
- **Making information available to the public:** The county makes the mapping feature available on its website, enabling residents to see exactly where the trucks are and estimate when their local roads will be cleared.
- **Pre-define authorized access:** While the public can view the location of snowplows, Holmes County supervisors, depending upon their level of authorization, are given access to track and monitor the location of additional county vehicles, including trucks, graders, loaders, and cranes.

- **Accountability:** Sometimes residents call in complaining that the salt trucks knocked down their mailbox or that their roads haven’t yet been cleared. With time stamped location data, the County can prove whether or not those claims are accurate.
- **Providing greater coverage:** MOTOTRBO radios with the stronger digital signal also enables the road crew to communicate farther throughout the county and with greater audio clarity than the County’s previous analog radios, in spite of challenging terrain filled with steep hills and deep valleys.



Motorola MOTOTRBO XPR Digital Radios





Looking forward

In the future, Holmes County hopes to further integrate the data for even greater worker safety by allowing information to flow back to the vehicles. "The GPS positioning data will be sent through the radio into the database and mapping application," says Parker. "The map will then be made available back to the drivers through a wireless card in the vehicle's computer. So even if the snow is three feet deep and visibility is limited, they can watch their progress on the map and identify with a large degree of accuracy when they are approaching a sharp bend in the road, culvert, ravine, or any other feature we map in our GIS."

FCC mandates move to narrowband

On January 1, 2013, the FCC is requiring all private land mobile radio license holders to convert their systems from wideband 25 kHz to narrowband 12.5 kHz. While analog radios will still work at 12.5 kHz, the next logical step is to further improve the effective capacity of 12.5 kHz channels. The Time-Division Multiple-Access (TDMA) technology of digital radio spectrum splits the 12.5 kHz channels, known as 6.25 kHz equivalency, delivering increased capacity and spectral efficiency.

"We decided not to wait until 2013 to make our move from analog to digital," says Parker. "That's why MOTOTRBO was such a good fit. It gave us the data transmission capabilities we wanted and it will give us the bandwidth we need when we make the move to narrowband."



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