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Real-time wall-mounted screens keep rail operations aware of up-to-the-minute changes in the location and functionality of each rail line. In an adjoining room, closed-circuit television feeds from each station are constantly monitored by observers. Both systems are controlled by the new SCADA upgrade.



Photos by Jimmy Stroup

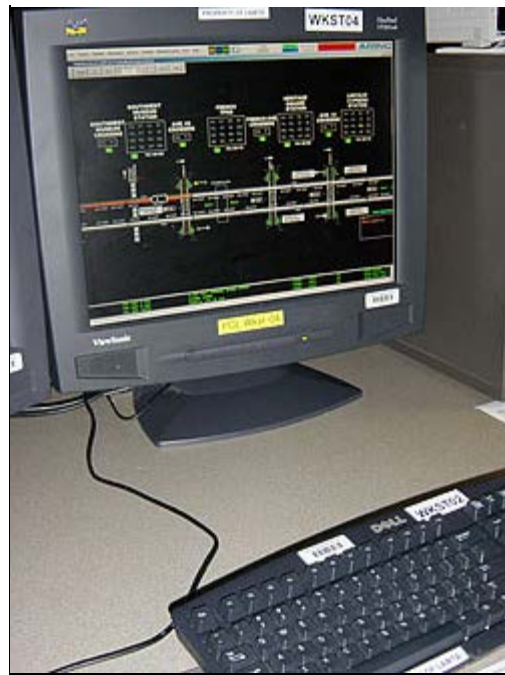
SCADA: New Light Rail Monitor and Control System Comes On-Line at the ROC

By JIMMY STROUP

(July 24, 2007) Just like your body's central nervous system, a complex array of computers controls Metro's light rail system, sending out instructions that keep trains running and support equipment functioning around the clock.

Recently expanded and upgraded, the control system – called SCADA (Supervisory Control and Data Acquisition) – is now on-line. Switching the Metro Blue Line over to the system in July signified the completion of a project that began in late 2002.

The SCADA system is a sort of catch-all of technology that monitors and controls almost every



The consoles at the ROC allow rail operations controllers to ensure the various parts of the rail system are working properly. One or two controllers watch each line every moment it is in operation, using software developed by ARINC Corp. in the recently completed SCADA upgrade installation.

aspect of the light rail operation – from controlling the power that runs the trains to monitoring the power that charges the batteries on the emergency floodlights on the train platforms.

SCADA is part new installation and part upgrade. The Blue Line, as the oldest of the light rail lines, required the heaviest SCADA upgrade and refitting. The Green Line was only moderately modified to work with the new SCADA system and the Gold Line was designed with the system in mind,

so little was altered on the newest of Metro's light rail lines. The Red Line works with its own, independent SCADA and wasn't part of the upgrade.

"SCADA has a lot of technical aspects to it. But the most important is letting us run rail operations from one central location – and really monitor and control all the important parts of the system," said Chuck Weissman, Transit Systems Engineering supervising engineer. "It greatly reduces the amount of manpower needed to run the system safely and efficiently."

A dimly-lit room

From a large, dimly-lit room at the ROC (Rail Operations Control), the new SCADA system is used by Metro Rail officials to direct and monitor all three of the light rail lines 24 hours a day.

SCADA is accessed by controllers at the ROC on dual-screened consoles, augmented by giant, real-time representations of each rail line on large screens mounted on walls around the room. Colored graphics on the wall displays provide a complete overview of the rail system, including current train positions and alarm summaries.

Comprised of both the hardware that connects everything on the rail lines to the ROC and the software that allows controllers to manage any piece of the rail system to keep the rail lines going, SCADA is truly the central nervous system of Metro Rail operations.



This row of electronic racks were part of the old SCADA system that once controlled the Metro Blue Line. What it took 10 racks of electronic equipment to achieve in 1990 is now easily contained in one of the storage system consoles that run the newly upgraded SCADA system.

"The smallest aspect of control can be monitored at the ROC – power, communications, even the crossing gate positions are tied into the SCADA. We can even see if the arms are lingering too long in the down position, irritating drivers, or we can see if it's stuck," Weissman said. "And if this is happening, we can send someone out to fix it, fully informed of the problem."

When the Blue Line opened in July 1990, it operated with a SCADA system that still functions. But as technology has improved in the years since, it's become difficult to obtain equipment to maintain that SCADA. Compared to the new multi-rail line SCADA, designed and installed by ARINC Corp. under contract to Metro, the old Blue Line SCADA looks positively "ancient," said Weissman.

'Ready to pick up the slack'

"SCADA monitors the back-up capability of systems, too, ensuring that emergency systems are ready to pick up the slack in case of a system fault," Weissman said.

The SCADA upgrade was also designed to handle the additional load of monitoring and controlling the Gold Line's Eastside Expansion, due to open in 2009, so this system should serve Metro long into the future, Weissman said.

Eventually a single SCADA system will allow all rail operations to be controlled by the same system. For now, though, the Red Line's SCADA system – which is not as sophisticated as the upgraded system, but is capable of nearly everything the light rail SCADA is – will remain separate.

Melanie Reis, ARINC project manager in charge of assisting Metro with the installation of the SCADA system, was pleased with the way the project came together, as are the Metro Rail engineers. For her, the SCADA system is simply the best way to monitor and control a rail system as complicated as Metro's.

"You know about the little things before they become big things so you make sure you can deal with them," she said.