

Sea-Tac Satellite Transit

Complex system delivered under schedule, budget

Of all the projects within the Sea-Tac capital development program, Seattle Airport Director Mark Reis said the renovation of the satellite transit system was one of the biggest and most complicated yet.

Consisting of three components - the North loop, the South loop and an interconnecting shuttle line - Sea-Tac's train system was the oldest system in the United States that had not undergone reconstruction, Reis explained.

Implemented in the early 1970s as a fixed block approach train control



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Completed in November 2003, a new fleet of 21 Bombardier CX-100 vehicles uses Sea-Tac's revamped Bombardier CITYFLO® 650 automated train control technology.

system, the metro system's guideway, or tracks, were separated into fixed distance areas. This fixed block technology, allowing only one train per block, imposed a restricted number of trains, thus imposing a fixed number of passengers to be moved in the system.

To allow for higher performance, transit system supplier Bombardier installed its state-of-the-art CITYFLO 650 signaling technology, a radio Communication Based Train Control (CBTC) system. Having the ability to overlay the CITYFLO 650 product over the existing system, without impacting the operation, is key to providing an effective implementation

approach. This feature enabled passenger service to be maintained throughout the upgrade program.

Marc Drolet, Vice President of Signaling for the Total Transit Systems Division, explained that the CITYFLO 650 driverless system with moving block technology allows for a dynamic envelope of protection around the vehicle as it moves.

"The faster a train moves, the longer the safety distance, and the safety distance is shorter at lower speeds, allowing for a more efficient operation," he said, noting that the ability to increase the capacity at will allows for the optimum performance of the Sea-Tac system. "With the CITYFLO 650, the operation has the capability to increase the system capacity in a safe manner, thus providing more efficient service for end customers."

Drolet said that a significant advantage of the CITYFLO product is the ability to overlay the signaling over existing infrastructure without stopping operations. "We do not need to replace any hardware on the track, but we do install a radiating radio frequency cable on the side of the track so we can communicate with the vehicles," he said. "With minimum hardware to install on the track, it allows us to deploy the system on top of an existing system without interrupting the operations. This has been demonstrated successfully."

Reis marveled that this projected four-plus year project - which included replacement of the trains, guideways, electronics, control and ventilation systems - was completed under budget and ahead of schedule.

"This is a real success story and it really had to do with the close cooperation between the operations folks that run the airport every day, and the construction people on the fly adjusting how each of them did business to produce this outcome," he said.

Drolet said this outcome was achieved with exceptional planning by the dedicated team that focused on overachieving the schedule. "The CITYFLO 650 is a modular product where we can do a lot of testing in the factory before we roll it out onto the system," he said. "This allows us to install a system with minimal defects in the operation."

Drolet noted that the relationship with the Port of Seattle-Tacoma was a vital element that allowed the project to succeed.

"Having a very knowledgeable and comprehensive customer allowed us to work as a team to address issues, and provide access to the system. It provided for a positive delivery environment which resulted in overachieving," he said, each case is particular and it is necessary to work closely with the customer to develop the approach. "Most of the work has to be done during off-peak hours and down times. So in Seattle, we had to work closely with the customers and all parties to affect the most

effective implementation and testing plan."

Reis said he was impressed by the minimal impact to passenger service throughout the project.

"Certainly those passengers using the system while it was being reconstructed noted the workarounds we had to do, but we had very little need to substitute other modes of transportation like buses across the ramp - which we did occasionally at night to handle particular elements of the construction," he said. "But to rebuild a system as complicated as that while you continue to operate it was really quite remarkable." n