OSIsoft®



# THE PI SYSTEM KEEPS MONTREAL'S MASS TRANSIT SYSTEM ON TRACK

*STM, the public company that manages Montreal's subway and bus system, is the second most utilized transportation company in Canada, and the third most utilized in North America, overseeing 4 subway lines with 68 stations, as well as 220 bus lines served by about 1700 buses, along with elevators, escalators and other fixed assets. But despite the crucial services STM provides to support over 416 million passenger-trips a year, the company had limited visibility to its mass transit equipment using SCADA displays restricted to the control room.*

## USEFUL DATA REQUIRES A CULTURE CHANGE

STM needed to change its way of thinking about data. "The maintenance department had no historical data for fixed equipment such as escalators or elevators," said Pascal Dubois, Process Control Engineer at STM, during the OSIsoft Regional Seminar in Montreal in 2017. The company's only indicators of failure were system alarms, which warned that something had already broken down, creating huge delays in maintenance response time. To create maintenance KPIs, diagnostics, and reports was time-consuming and laborious. With alarm management data for assets confined to the command center at headquarters for security purposes, it was nearly impossible to put it to good use. Analysts had to be physically present in the command center to access the data, and maintenance

workers did not have user-friendly access to data logs and had to be in the escalator mechanical rooms to access asset information. "It was important to have real-time data from anywhere," said Dubois. STM began their upgrades by adopting the PI System™ for its subway system in 2017 as part of the Optimization of Processes and Maintenance Activities (OPALE) project, with the goal to improve maintenance on fixed assets through operational data.

## STARTING FROM THE GROUND UP

STM is now planning to expand its use of the PI System and wants to collect data for its train wheel integrity tests assessed at every station. With new modern trains joining its fleet, STM is also looking forward to acquiring equipment with built-in data communication capabilities. "What we would like," said Dubois, "is for our

### CHALLENGE

Improve the maintenance of fixed subway assets through data access.
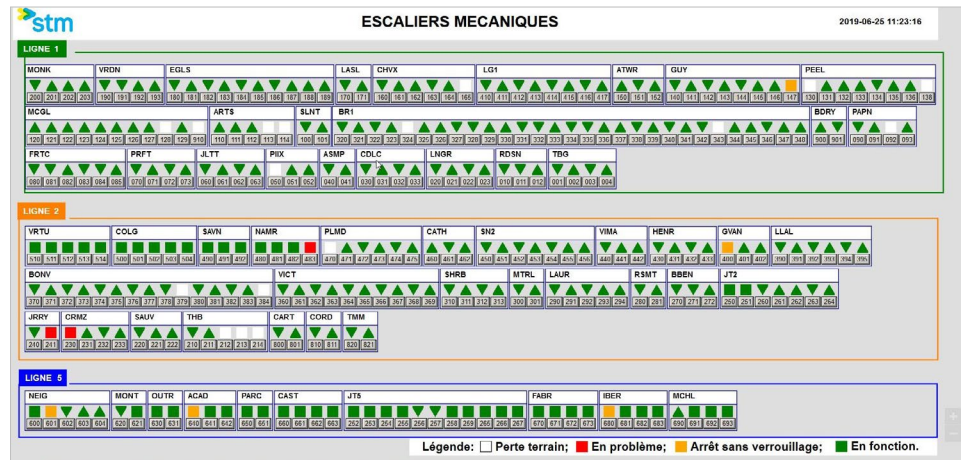
### SOLUTION

Implemented the PI System through project OPALE with secure, one-way diodes.

### BENEFIT

Maintenance workers have access to real-time information to spot asset anomalies, improving customer experience.

employees at the stations to have the ability to troubleshoot problems or help customers using a tablet that is connected to the PI System." The PI System starts with STM's data production network, replicating and sending data from the company's fixed equipment through a special one-way diode to the corporate network. Because data flows one way from assets to the network, it's impossible to hack "backwards" into the system. The PI System acts a single source of truth, allowing STM's engineers, maintenance workers, and programmers to interact directly with critical, real-time information from anywhere.

"The whole [customer] experience is important," emphasized Dubois, "so we started with the escalators." There are nearly 300 escalators in the Montreal metro system, with different kinds of data sensors. The first step for Dubois's team was to deploy Asset Framework (AF), the contextualization layer of the PI Server, to create a digital twin of the metro's escalators and other fixed assets. AF transforms strings of data into easy-to-understand information by supplying important meta-data, such as equipment location and status, in real time. The team also adopted PI Vision to monitor operations with web-based displays that can be used anywhere. "If a user selects an escalator and goes to the details of the asset, there are about forty attributes for that single escalator," Dubois said.

"This detail page is available to everyone, but is intended for the maintenance team." With PI Vision, the team can now prioritize maintenance to improve customer experience in real time.

STM is now using its wealth of asset data to set up more effective alarms for breakdowns and anomalies and to create reports that allow engineers to identify the root cause of common escalator issues. "Where are we today after nine months with the PI System?" asked Dubois. The company now has access to data from over 1300 pieces of subway equipment, collecting over 50,000 data streams to remotely detect issues before they occur — a far cry from having to run to the next building to look at the data.

## MORE PROJECTS ON THE HORIZON

STM is now considering to expand its use of the PI System and wants to collect data for its train wheel integrity tests assessed at every station. With new modern trains joining its fleet, STM is also looking forward to acquiring equipment with built-in data communication capabilities. "What we would like," said Dubois, "is for our employees at the stations to have the ability to troubleshoot problems or help customers using a tablet that is connected to the PI System."

*For more information about STM and the PI System, watch the full presentation here.*

> "
> The maintenance team can now see in real time a global overview of the states of the escalators from their office. This reduces the time to fix issues with escalators and increases customer satisfaction."
>
> *— Pascal Dubois, Process Control Engineer, STM*

Dubois, Pascal. "Les actifs fixes du métro, un procédé en continu"
< https://www.osisoft.com/Presentations/Les-actifs-fixes-du-m%C3%A9tro--un-proc%C3%A9d%C3%A9-en-continu/>