Customer Story

Autonomous Rail Solutions Rely on Trimble's Applanix POS LV

Trimble

On Track for Greener, More Efficient Rail

Established in 2014, Railergy is a leader in the design and implementation of the next generation of command and control systems (CCS) for rail solutions.

Railergy provides innovative solutions and consulting to industry and railway traffic operators. By bringing together skills and expertise from their team and from proven partners, Railergy delivers green transportation solutions at a lower cost. With innovative solutions and consulting that include driver assistance systems, automatic train operation and train control management system (TCMS) retrofit and integration, Railergy brings up-to-date software technology to the conservative domain of rail command and control systems.

Challenge: Creating a turnkey solution for a laborious process

The approval in 2020 of the European Green Deal put in play a set of policy initiatives by the European Commission with the aim of making the European Union climate neutral by 2050. A primary initiative to aid in achieving this goal is in the work of rail freight to deliver a greater level of energy efficiency.

Railergy is on the path to creating energy efficiency in railyards by partnering with an international transport and logistics company. Together, they are creating more efficient operations by automating the shunting yards. In shunting yards, trains arrive, the cars are separated and moved to new locations and then a train with new cars is linked together to form a new train. With a project on track for a 2024 launch, Railergy is testing autonomous capabilities that allow the locomotive that shunts the cars around into the positions to do so without a driver or remote control. The end goal is for the locomotive to operate autonomously within the shunting yard.

A key component for successful autonomous shunting requires Railergy to position the engine without setting up ground control points. Typically ground control points are used to do a survey and make a map when direct georeferencing technology isn't available. With Trimble's Applanix direct georeferencing solutions, Railergy didn't need to set up ground control points, and was able to achieve its goals faster and at a lower cost.

Railergy recognized early on that relying on GPS data alone is not safe enough because if known objects on the map are not seen by the sensors where they should be, the system stops. The autonomous movement of the shunting system relies on the accurate positioning provided by GPS as well as noting anything that may have changed, specifically something that in real-time may be blocking the railroad. The Railergy system uses redundant and diverse sensors, all of which must agree or the system stops.

Approach:
Mobile Mapping Delivers Real-Time Accuracy

Tasked with a big vision and an aggressive implementation timeline, Railergy turned to Trimble's Applanix mobile mapping technology. With the Applanix POS LV, Railergy is able to create an accurate map of the rail yard in an automated, quick and efficient manner without relying on ground surveyors to disrupt the rail operation. Additionally, Applanix POS LV gives Railergy the ability to accurately track the live operation in real-time. From the map, speed limits are set and vehicles' speed control system will automatically restrict it to the known limits.

With 2 cameras, 2 LiDAR and numerous GNSS receivers, the system can be used to create a 3-dimensional model of the space of where the train operates, as well as translate information to a 1-dimensional coordinate system on the rail used for trains. The Applanix POS LV creates the map of the railyard, and is positioned on the locomotive as it is moving along the mapped route. As an enhanced safety feature, if a person or object is identified in real-time that is not on the map at the location of the locomotive, the system shuts down.

Solution:
Initial Trials Show Promising Future for Rail

The Applanix POS LV provides fast and efficient 3D mobile mapping of the train yard, and delivers live operations for the locomotive. "POS LV proved to be a turnkey platform for the research and development phase of our autonomous solution. Easy integration and excellent support helped us to build our technology platform. In the future, we will integrate the Applanix technology even deeper into our systems", said Jakob Gärtner, Railergy director.

The first trials were in the Munich North shunting yards in December 2021. Evaluating the system presents a significant challenge due to the difficulty and expense of shutting down the railyard to accurately test the system. To avoid significant disruptions to an operating train line, Munich North built a separate testing yard with the lab on the rail car. Events and demonstrations of the system draw interest from other train operators across Europe.

Results:
Creating a turnkey solution for a laborious process

Railergy is on track to deliver in 2024 the first autonomous locomotive certified on public utility in the world. The introduction of automatic train operation (ATO) will help significantly increase capacity, availability of trains and speed of travel. With the use of Applanix POS LV and high accuracy HD maps and real-time positioning on the maps, the autonomous rail yards of the future are within reach.

RAILERGY™

Trimble Applanix
85 Leek Crescent
Richmond Hill, Ontario
L4B 3B3 Canada
T +1-289-695-6000
F +1-905-709-6027
https://www.applanix.com

Trimble®