

CASE STUDY RELIABOTICS: **ROBOT-MOUNTED GOCATOR® USED FOR VISION GUIDANCE IN SUBWAY TRAIN CONTROL SYSTEM INSTALLATION**



www.reliabotics.com

New Jersey-based company Reliabotics LLC designs innovative robotic automation solutions for industrial grinding and deburring, sewing cells, installing train control systems and other unique applications. The company also markets its surface technology group dedicated to designing robot-ready technologies used in industrial cleaning of surfaces prior to painting or bonding.

The Application

Communications-Based Train Control (CBTC) is a modern railway signaling system that improves the monitoring of train location, direction of travel and speed. CBTC makes use of telecommunications between the train and track equipment for traffic management and infrastructure control. To implement such a system, tracking sensors must be installed at various points along the rail path, including on interior walls of the tunnels.



The Challenge

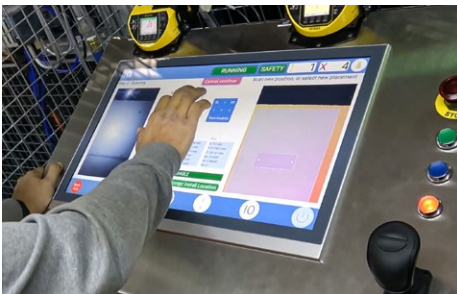
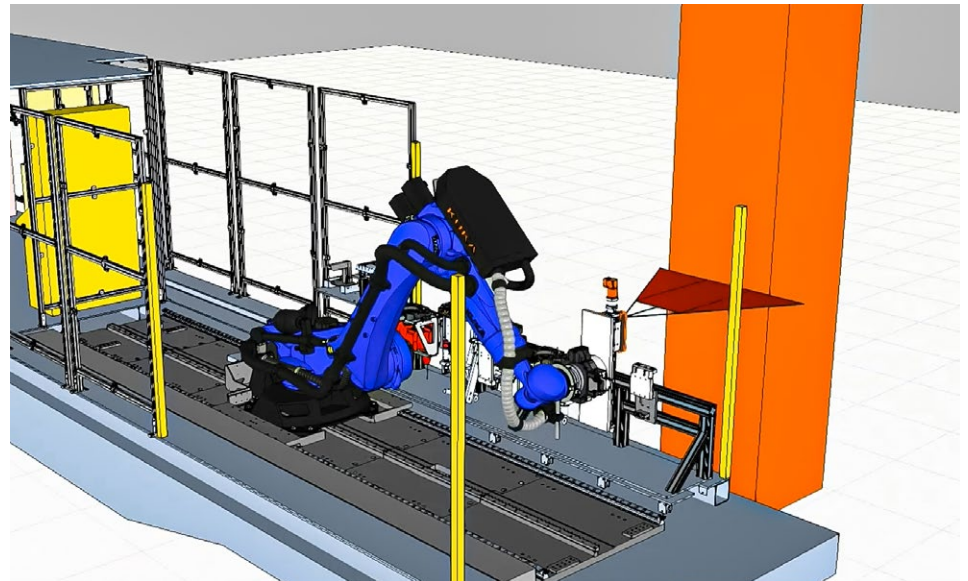
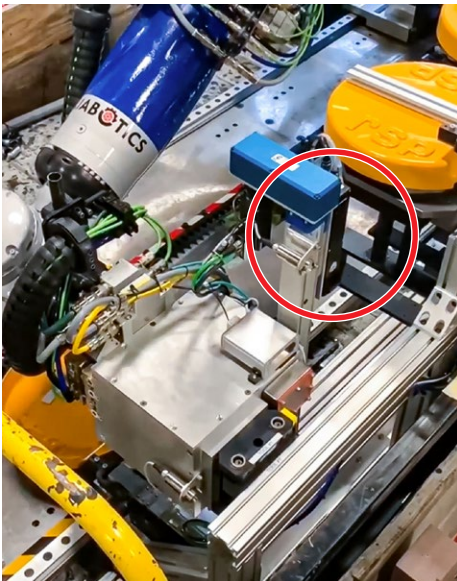
The installation of wayside infrastructure for CBTC is challenging using manual methods. Installers must work late at night in poorly-lit transit tunnels. Workers use ladders to survey potential locations and install equipment high on the wall, beyond the obstructions of existing infrastructure. Drilling concrete walls exposes these workers to unhealthy airborne contaminants found in aged tunnels.

The Solution

To automate this process, protect transit worker safety and to more efficiently install transit hardware, Reliabotics designed a specialized rig for the Metropolitan Transit Authority of New York (MTA). Their rig sits atop a custom rail maintenance cart which houses all the equipment needed to automatically install the CBTC beacons.



Needing machine vision to scan walls for potential obstructions, the company chose the Gocator® sensor for its ability to generate high-quality, 3D surface information (i.e., height data for determining position of sensor, robot, and target), large field of view, and rugged industrial design. Reliabotics' System Integration Engineers mounted the Gocator 2380 sensor on a dedicated end-of-arm tool for its six-axis robot. This tool consisted of a linear slide that sweeps the laser profiler across wall sections to map their surfaces.



In this capacity, the Gocator® 2380 sensor generates 3D surface data and finds any potential obstructions at the targeted beacon installation location. A remote operator controls the entire operation from a housed workstation aboard the robotic rig.

The Gocator® Advantage

- Wide field of view 3D laser profiling for scans large areas of subway tunnel walls without sacrificing measurement accuracy
- Rugged IP67-rated industrial design for long-lasting performance in harsh environments (i.e., sensor stands up to repeated stop/go motions, drill vibration, potential low-impact collisions due to installation)
- Accurate performance when mounted on robot end-of-arm
- High-quality 3D data even on dark scan areas/targets
- Built-in robot calibration makes system integration easy



"LMI's Gocator® 3D sensor allowed our system to quickly scan large sections of subway tunnel walls and made this application the success it is."

- Steve Evers, VP of Sales and Marketing, Reliabotics



The Result

The use of a Gocator® sensor automated a previously human operation, which significantly increased the safety, speed, and efficiency of the installation process.

Reliabotics is partnering with Bechtel Corporation to industrialize additional versions of this train based robot or TBR* for mass production in commercial rail and transit construction and maintenance-of-way applications.

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