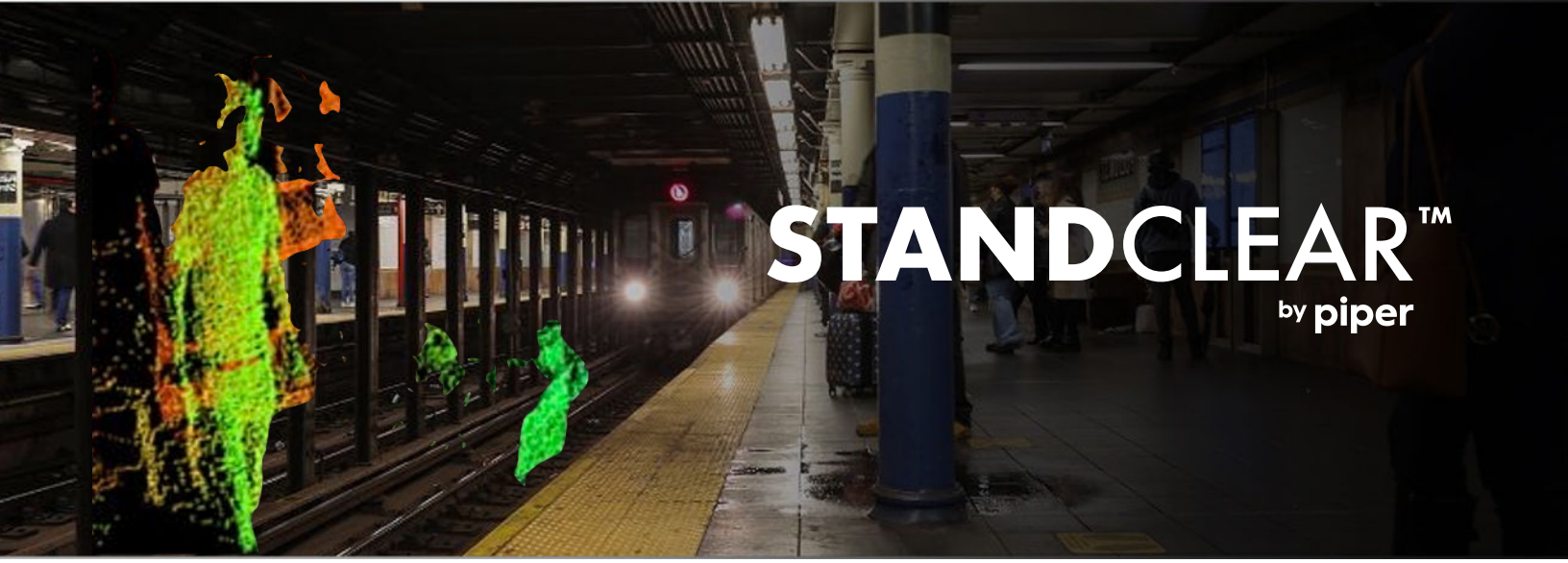
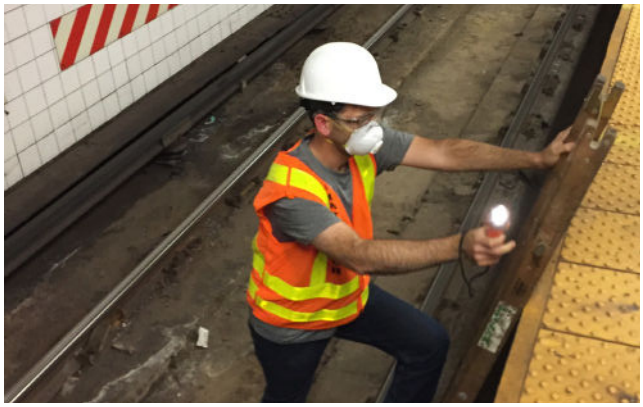


TRACK INTRUSION DETECTION SAFETY SOLUTION

Piper's STANDCLEAR™ Track Intrusion Detection System is an Object Detection Solution that combines advanced carborne and wayside sensors at passenger stations. The integrated system is designed to capture malicious track intrusion, accidental passenger falls from the platform, and the presence of objects in the fouling area of the track that can lead to safety incidents or costly delays.



How Piper's StandClear™ Works

The system integrates Piper's proprietary Time of Flight (TOF) cameras and Piper TrackSight™ LiDAR to continually scan tunnel entrances and platform edges to detect obstacles and intrusions. The high definition TOF cameras and LiDAR are installed on ceilings above the platform edges facing down. Using a database image as reference, they can detect any changes to the fouling area in real-time and reliably discerns animate from inanimate objects. A communications system is used for alerting operators to the presence of obstacles on the platforms and for delivering the data to Rail Control Center (RCC) operators. A systems administration control management platform monitors the health and safe operations of all components.

Piper Networks is an innovative rail engineering solutions provider and systems integrator specializing in the development of transportation technologies. Founded in 2011, Piper has four primary product lines that serve the industry, including: Vital Train Positioning, Maintenance of Way (MOW) Protection, Automatic Train Protection (ATP), and Passenger Information Display Systems (PIDS). Piper's proprietary Ultra Wideband (UWB), GPS-RTK, and patent-pending TrackSight™ LiDAR image positioning technology are designed to operate in some of the most challenging transportation environments while maintaining pinpoint accuracy that improves performance for train operators and train control suppliers.

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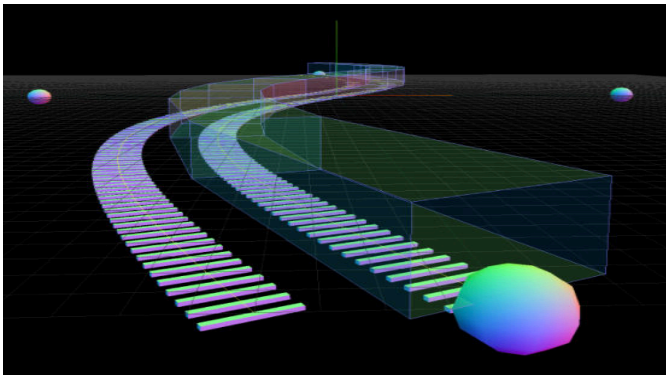
Watch Video

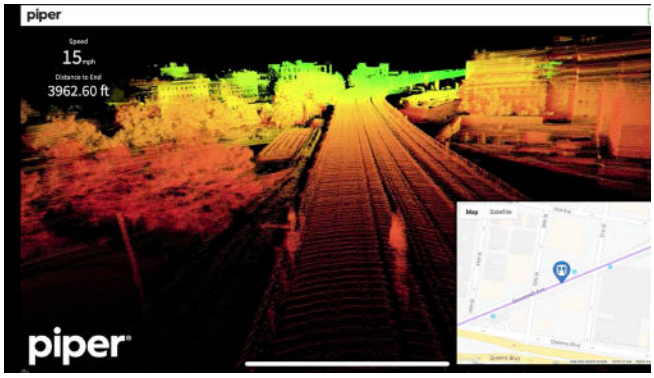
TIME OF FLIGHT (TOF) IS THE PERFECT SENSOR TECHNOLOGY FOR THE DETECTION OF HUMAN INTRUSION AND ACCIDENTAL FALLS FROM THE PLATFORMS IN SUBWAY STATIONS.

Benefits of StandClear™

- Detects accidental falls, malicious intrusions and debris on the trackway from the platform or right of way.
- Alerts train operator through variety of alerts including audible/visible from right of way, integrating with track lighting, through Piper's onboard display in the cab, or by using communication link into the train control system.
- OTA remote management software for system maintenance.
- Reliable recognition and distinguishing of animate and inanimate objects, even in low light conditions.
- Meets stringent rail standards including CENELEC, AREMA, IEEE. etc.
- Piper is an experienced systems integrator and can integrate into existing systems.



The image above illustrates how Piper assembles a string of polyhedrons to define the protected area and alert only on obstructions within the fouling area.



StandClear™ also utilizes Piper's advanced patent pending LiDAR system called TrackSight™ for additional object detection capability.

About Time of Flight (TOF)

TOF cameras measure the distance to objects by calculating the round trip time for an artificial light signal to reflect off of the object. TOF, while similar to LiDAR, has many advantages, especially in applications where the objective is detection of objects in areas of limited depth. This makes TOF the perfect sensor technology for the detection of human intrusion and accidental falls from the platforms in subway stations.

The header image on the front page and the image to the right show a composite image of the distance and reflectivity of a person adjacent to a platform edge at a metro station. Note the quality of the scan and the ability to unambiguously discern the identified obstacle as a person. And because the TOF camera operates based on LED scattering, the devices will perform well in low or no-light conditions.

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