

CONCLUSIONS OF THE TRACK INTRUSION DETECTION PILOT PROJECTS

Background: New York City Transit has always been proactive in regard to the safety of its customers and employees in the subway system. Several awareness campaigns have been implemented to increase the customer's safety while using the subway system, including station announcements to stand back from the platform edge and static advertising on the platforms and in the trains. Additionally, platform edge warning strips have been installed in most stations to support visual and tactile warning when approaching the platform edge.

In an effort to expand beyond these campaigns and find technology to address incidents of customers coming into contact with trains, NYC Transit has been investigating the feasibility of Track Intrusion Detection Systems (TIDS) and physical barriers at the platform edges, namely, Platform Screen Doors (PSD) in both half and full height variations. A separate PSD feasibility summary report has been provided.

In tandem with the research and feasibility study of PSDs, in 2013 NYCT began an investigation of TIDS technologies that could identify customers who entered the trackway within the stations and alert train operators to their presence. At that time, there were no US-based transit systems employing TIDS for passenger safety. A few systems in Europe were either piloting systems or had started to deploy systems required by law for automated train operation without platform screen doors. After an extensive worldwide search and outreach, NYCT selected four vendor technologies to pilot; this pilot was named TIDS 1. Four additional emergent vendor technologies that were being explored would become part of a TIDS 2 pilot. Together these pilots would gather technical, constructability, maintainability and operational information to guide the selection of feasible technologies for possible deployment in a phased rollout in the NYCT System. Systems with ideal operating parameters are those with relative ease of construction, low false positives (nuisance alarms), zero false negatives (failure to legitimately alarm) and low maintenance, and applicability to all or some of our station configurations.

The testing and evaluation objectives of the pilots were to demonstrate the systems' effectiveness in identifying persons/objects entering the right of way with dimensions of twelve (12) inches or larger. The size criteria was important because NYCT was not aware of any TIDS technology, in service or being tested, that could precisely differentiate a human adult, child or baby, from animals or inanimate objects that may enter the tracks from the platforms.

Results from TIDS 1 & 2 pilots: These pilots were conducted at the Rector Street Station on the Broadway Line and West 50th Street Station on the 8th Ave. Line, respectively. Their purpose was to detect intrusions on active tracks, and alert and provide situational awareness to train operators and station personnel via strobe lights installed on the approach to the stations and intrusion alarms and video to supervisory personnel at the Rail Control Center (RCC). Installation, testing and evaluation of the TIDS 1 and 2 pilot systems was completed in 2015 and 2019 respectively. A total of 6 vendor systems performed well and could be included in a potential future deployment of TIDS at various stations. Over the period of the tests there were numerous valid alarms with minimal false positives or nuisance alarms.

Design and Construction Costs: The rounded total budget for the TID 1 and 2 pilots were \$3.4M and \$6.1M respectively, which amounts to an average cost of \$2.4M per platform edge. Therefore, the total rough order of magnitude (ROM) capital costs to install TIDS at all 472 stations (1237 platform edge), based on 2014-19 dollars, is around \$3 billion. Since it is unknown when TIDS projects would be awarded, escalation costs out to possible year of award are not included and are expected to be around 4% per annum. Maintenance, Service Delivery and related operational costs are yet to be determined.

Challenges to Implementation: The following have been identified as the key challenges to implementation of TIDS:

- Obtaining a source of capital funding.
- Obtaining adequate operating funds for staffing to maintain systems and manage the expectedly high volume of intrusion alarms.
- Ensuring that the expectedly high volume of intrusion alarms do not negatively impact on-time service.
- TIDS technologies are not yet sufficiently advanced to rule out detections of all inanimate objects entering the track area that meets the size criteria.
- Reliance on authorized personnel (employees and contractors) entering TIDS zones, to routinely deactivate and reactivate the system, to avoid nuisance detections/alarms.
- Service diversions (GOs) would be necessary for installation.
- Development of operating rules for train operators and dispatchers to respond to and clear alarms.