Weapons Detection Systems Pilot Findings

Regular Board Meeting
February 27, 2025

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Background

April 2024
Board Motion 34.1

July 2024
The Board authorized the piloting of two weapons detection systems (Dual-lane & Millimeter Wave)

August 21 – October 15, 2024
Brandished Firearm Video Analytics Proof of Concept Pilots

October 21 – December 19, 2024
Concealed Weapons Passenger Screening No-Cost Proof of Concept Pilots (Dual-lane & Pillar-type)

From Left to Right: Millimeter wave technology, Brandished Firearm Video Analytics, Dual-lane type, and Pillar-type

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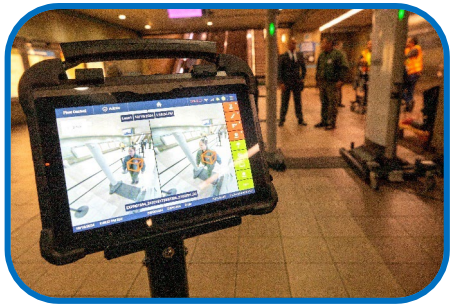
Two Proof of Concept Pilots

From August through December 2024, staff conducted proof-of-concept pilots of passenger screening and brandished firearms technologies. Staff assessed *detection accuracy*, *false positives*, *effects on passenger flow*, and *integration* with Metro's security infrastructure.

Concealed Weapons Passenger Screening

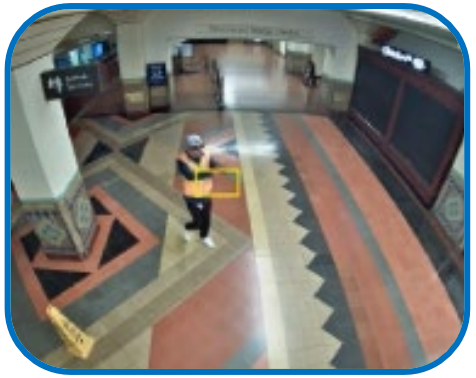
- Lane and Pillar-type systems were tested at Union Station and APU/Citrus College stations.
- As riders walk through, the system uses its advanced sensors, AI, and other technologies to detect concealed weapons without requiring them to stop and remove any belongings.



Lane-type (previously Dual-Lane) at Union Station (Left) & Pillar-type at APU/Citrus Station (Right)

Brandished Firearm Video Analytics

- Four different systems were tested in the Union Station West area.
- This system scans existing CCTV video feeds in real time to identify threats, including brandished weapons, and sends alerts to designated security groups.



Brandished Firearms Analytics Detecting a Replica Firearm

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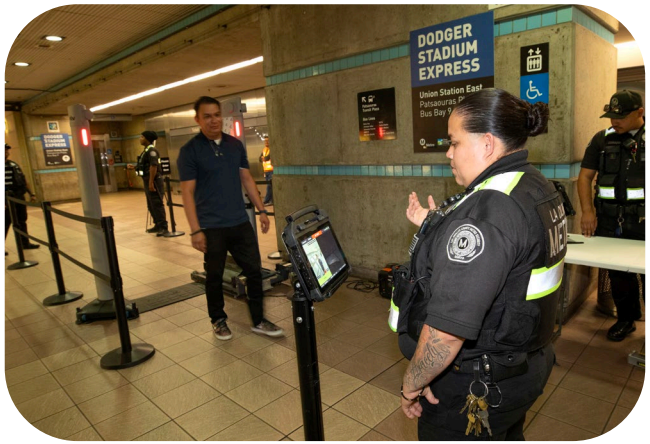
Proof of Concept:
Concealed Weapons Passenger Screening

	Lane-type (Vendor A)	Pillar-type (Vendor B)
Enhanced Safety	➢ No weapon threats were identified on passengers ➢ Both systems detected the officers' service weapons with 100% accuracy each time	
Impact on Riders	➢ The primary screening took less than two seconds. ➢ False positives ranged from 30%-50% ➢ For the secondary screening, staff visually inspected passenger's belongings in under 15 seconds.	
	• Used a pedestrian count interval during peak hours	• All passengers were screened during peak hours at APU/Citrus Station
Screening Throughput	➢ Applied a pedestrian count interval to determine how many passengers were selected for screening per hour– allowed up to 30 passengers per hour	
Deployment Flexibility	• Requires grid power • Has physical cabling connection which requires a raised floor mat • Large & heavier size requires large vehicle	• Self contained power, data, & cable routing • Size and weight do not require a vehicle with a motorized lift



Proof of Concept of Lane-type at Union Station (Top) & Pillar-type at APU/Citrus College (Bottom)

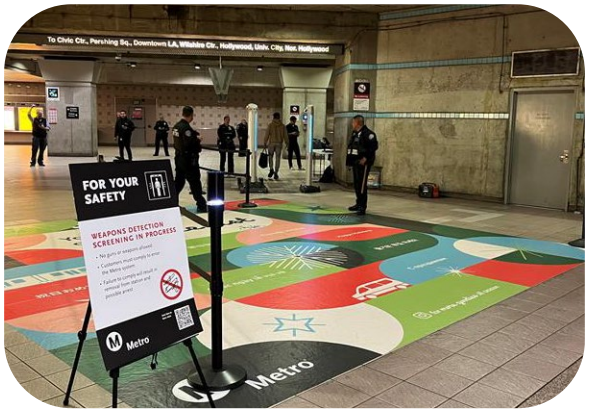
Proof of Concept:
Concealed Weapons Passenger Screening (cont.)

- **Customer & Employee Feedback**: The public's reception to the screenings was overwhelmingly positive, with most patrons willingly participating and raising no significant concerns about privacy or inconvenience.

"This is great! It's a good thing to have so people feel safe!"
- Passenger, Union Station B/D Line

"It's a great idea! Long time coming!"
- Metro Facility Maintenance employee

"This is great to see! My husband takes the train every Thursday, so I know he'll be safe seeing this safety measure in place."
- Passenger, APU/Citrus College Station



For a small number of riders who expressed concerns about the operation, officers indicated that the **selection for the screening process was based upon a *pre-determined count* and *not* at the officer's discretion.**

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Scalability:
Concealed Weapons Passenger Screening

- A longer-term pilot would be necessary to fully assess operational requirements, resource allocation, and sustainability.
- Expanding to all 222 station entrances would require a significant amount of personnel to operate effectively. This does not include future system expansion over the next 5 years.

Cost model for the scalability of deployment systemwide.

ESTIMATED SYSTEMWIDE PASSENGER SCREENING EQUIPMENT & LABOR COST, FTEs, SCREENING EQUIPMENT, AND VEHICLE NEEDS
ALL RAIL STATION ENTRANCES

**All costs in millions*

Personnel
**FTE numbers based on 5 days/week deployments*

	FTEs	MTS TSO II FTEs	MTS Sergeant FTEs	Cost
Metro Transit Security[1]	1066	888	178	$141.2
Project Manager FTE[2]	1			$0.1
Total	1067			
			Annual Labor Cost	$141.3

Equipment[3]

			Cost
Current Number of Rail Stations	107		
Total Number of Station Entrances	222		$6.9
Screening Equipment	222		$18.1
Vehicles[4]	223		$24.9
		1st Year Total	$166.3
		5-Year Total	$731.6

[1] *FTE personnel cost assumes MTS TSO II at $124,800/yr and MTS Sergeant at $170,560/yr*
[2] *One FTE Project Manager for the program at $148,928/yr*
[3] *Assumes a 5-year useful life for screening equipment*
[4] *Includes vehicle transport for equipment and 1,066 MTS personnel and one field operations unit*

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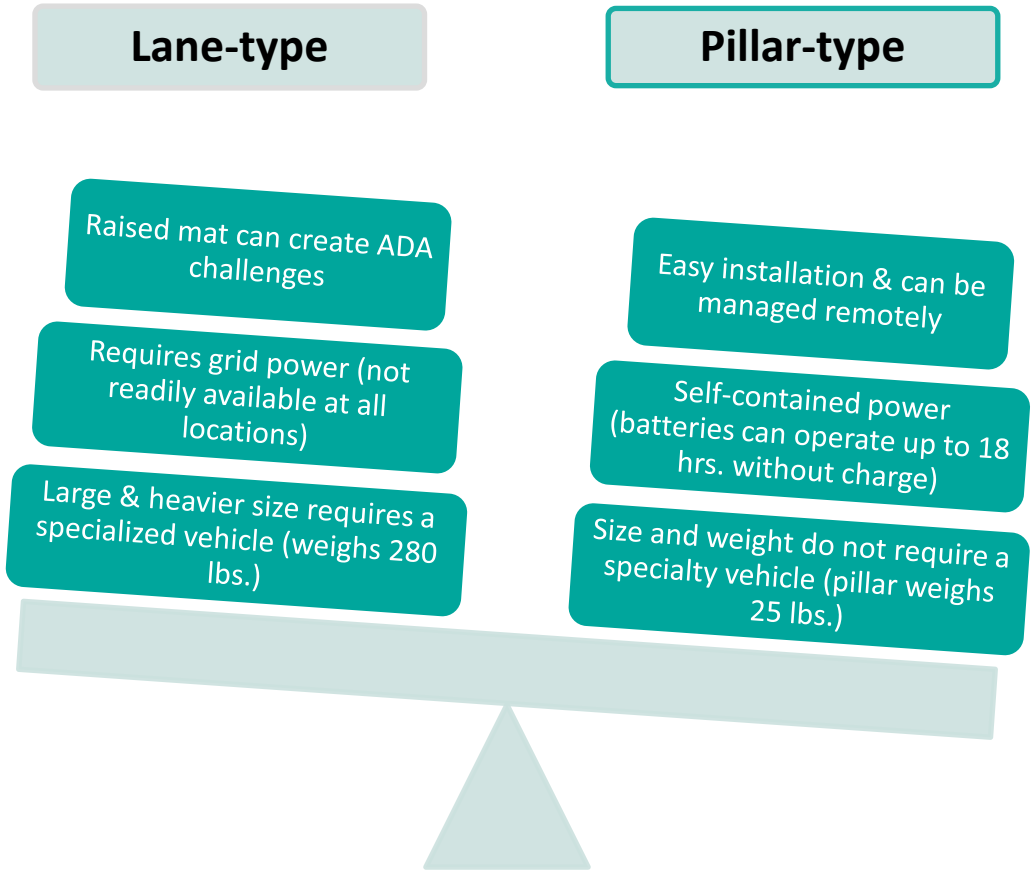
Concealed Weapons Passenger Screening: System Comparison

After evaluating pros and cons of each system, it was determined that the Lane-type system (Vendor A) would prevent Metro from having the logistical agility to deploy it across the system. **Thus, the Pillar-type system (Vendor B) demonstrated to be most feasible piloted system for Metro.**



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Proof of Concept:
Brandished Firearm Video Analytics

Tested four video analytic-based solutions of brandished firearm detection technologies at Union Station West. Detection capabilities varied widely between the different analytic systems, but **one of the four video analytic-based solutions outperformed the rest**.

Best-Performing System

- ✓ Detected a replica full-size pistol every time it was brandished, in every testing session, and in every camera tested—the only system to do so
- ✓ Achieved a high detection rate for other types of firearms
- ✓ Offered instant notification alerts via multiple communication channels
- ✓ Included an online dashboard and mobile app

Other Systems

- Varying detection capabilities of different sized firearms
  - One system misidentified everyday items, such as walking canes and bicycles, as threats
- Some did not have a human-in-the-loop verification built in
- Some did not have ancillary features (e.g., text/email/push notifications, application user interface)

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Scalability:
Brandished Firearm Video Analytics

- For a full systemwide implementation, AI technology requires integration with more than **30,000** cameras currently on the Metro system today.
- Since network and CCTV infrastructure are in varying states at different Metro locations, leveraging this security solution would only be possible at the West area of Union Station and the upcoming Metro Transit Center.
- The cost of a longer and larger scale pilot at Union Station, rail stations, bus terminals, and Metro Operating Divisions, which covers about 3,300 CCTVs, is shown in the table below.
  - These CCTVs are still being upgraded to meet specifications, which will take a few years.
- Additional testing for different lighting conditions would be needed to account for camera quality and age, weather, crowd density, lighting variations, background colors, cabling infrastructure, and network bandwidth and speed.

SYSTEMWIDE VIDEO ANALYTICS BRANDISHED FIREARM DETECTION IMPLEMENTATION COST				
Note: All cost figures in millions	Prerequisite CCTV System Upgrades	Detection Hardware	Detection Licensing	Total
Year 1	$0.6	$1.7	$2.4	$4.7
Year-Over-Year	-	-	$2.4	$2.4

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Compliance with Bias-Free Policing & Public Safety Data Analytics Policies

- Metro is committed to ensuring all weapons detection initiatives comply with its Bias-Free Policing and Public Safety Data Analytics policies.
- Staff engaged in a comprehensive review process to ensure that the pilots were substantiated by the policy framework governing the agency's public safety policies and practices.
- Staff established a sound randomized screening process to remove the perception of bias.
- The use of video analytics has been carefully evaluated to balance security objectives with privacy considerations and data protection.

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Next Steps

- Metro staff is in communication with one vendor to explore the feasibility of deploying a weapons detection solution on buses and trains.

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