

Vehicle Collision
Avoidance System Pilot

Vehicle Collision Avoidance System Pilot

Using Technology to Improve Vehicle Safety



Bay Area Transportation Authority

- ▶ Located in northwest lower Michigan and services all of Grand Traverse and Leelanau Counties (900 square miles)
- ▶ Provides both fixed route, on-demand / demand response services
- ▶ BATA's total ridership for FY2021 (Oct. 2020 – Sept. 2021) was 319,245
- ▶ Fleet of 80+ vehicles



Challenge : Reduce Vehicle Impacts



- ▶ Prior to the pilot, BATA's preventable collision rate for FY2019 was an average of 2.5 preventable collisions per 100,000 miles. Due to COVID-19 in FY2020 BATA did not have a particularly high rate of preventable collisions, meeting its quarterly goal of less than 0.3 preventable collisions per 100,000 miles of travel for three of the four quarters and for the year as a whole.
- ▶ The reason this type of technology was pursued is that a disproportionate amount of BATA's safety incidents were occurring at low speeds, on agency properties, and were often tied back to driver distraction and spatial awareness. Rear-ending and side swipe collisions were also common. Collisions were predominately with fixed objects, such as low overhangs and branches, parked cars, bike racks, bollards, signs, and mailboxes.
- ▶ While these types of incidents are relatively low-impact and not always directly visible to many passengers, the frequency at which they occur means that the costs add up over time, especially at the statewide level. This system was also believed to have the potential to be scalable to many other Michigan transit agencies, as they experience similar problems.

Challenge : Reduce Vehicle Impacts

Tail swipes

Backings

Bike racks

Property damage (bollards, trees, signs)

Mirrors

Avoid future risk



Process and Goals

▶ Goals of this pilot included:

1. Assisting drivers in increasing spatial awareness while limiting driver distraction.
2. Reducing the incidence of minor BATA bus collisions with fixed objects, between fellow BATA buses, and with other vehicles and moving objects on the roadway.
3. Demonstrating how a transit agency can integrate new technologies into its vehicle fleet.
4. Validating a scalable solution to improve safety for transit agencies across the State of Michigan and beyond.

▶ RFP - Equip 25 vehicles of various sizes across BATA's rural service area

▶ Eventually received 4 responses: REI/Mobileye, Rosco, SDS - Safe Drive Systems and PRECO

- ▶ (RFP went out three times - #1 Only 2 responses, #2 COVID-19 no responses, #3 third time is a charm)



REI / Mobileye

- ▶ Selected REI / Mobileye - Technology integration, additional features beyond collision avoidance, 360-degree camera, rearview camera, good training program and installation plan, flexibility to work around vehicle specification (aka bike rack), Armor capabilities
- ▶ Sensors and devices were installed on 25 vehicles (Ford E-450s and F-550s) in BATA's fleet to enable:
 - ▶ Forward Collision Warnings
 - ▶ Headway Monitoring and Warnings
 - ▶ Pedestrian and Cyclist Warnings
 - ▶ Lane Departure Warnings
 - ▶ Speed Limit Indicator
 - ▶ Audible alerts were made available for the front of the vehicle and a 360-degree camera system can provide visual feedback of objects around the vehicle.





Installation

- ▶ Initial installation - Feb. 2021, Recalibration April/May 2021, pilot continues until April 2022

Application



Application



Findings / Results



	2018	2019	2020	2021	2021 (equipped vehicles)	Total
Preventable						
Parking (IV)	6	21	3	5	2	35
Sideswipe (IV)	6	12	12	1	1	31
Backing (IV)	6	9	6	5	2	26
Intersection (IV)	3	3	1	4	2	11
Fixed Object (IV)		5	1			6
Tailswing (IV)	3	3				6
Rear end (IV)	4		1			5
Overhead Obstruction (IV)	1	3				4
Curb jump (IV)			2			2
Sideswipe (IV)	2					2
Non-Preventable						
Intersection (OV)	4	5	3	3	2	15
Rear end (OV)	4	4	3			11
Deerstrike	3	2	3			8
Sideswipe (OV)	1	4	3			8
Backing (OV)	1	1	5			7
Backing (IV)		1	1			2
Parking (IV)		2				2
Sideswipe (IV)	1	1				2

Findings / Results

- ▶ The most common types of preventable crashes continue to be parking, sideswipe, and backing, and the most common types of non-preventable crashes tend to be intersection and rear-end.
- ▶ Sideswipes have also become less common.
- ▶ Drivers don't always choose to use the system, and often to their detriment – two of the backing collisions that have occurred in 2021 had the system installed, and if they had been using the video monitor they may have seen the object they were about to back into.
- ▶ Two of the parking collisions that also had the system installed occurred when a vehicle was traveling backwards into a tight space, which could've also been prevented if they had been using the system.
- ▶ Providing specific examples to drivers of when to use the visual system (i.e., when traveling backwards at low speeds) and when to use the audible system, or possibly ignore the system entirely depending on the vehicle they are in (i.e. when traveling forwards at regular speeds with a bike in the bike rack) could help improve driver confidence in the system and potentially improve the performance of the pilot going forward.

Lessons Learned

“My goal every day is to have less alarms today than I had yesterday. I thought I was a safe driver before, but this system is helping me be even safer.” – BATA Driver

- ▶ Technology overload - 360 cameras connectivity, constant alerts and beeps
- ▶ One size doesn't fit all - vehicle type, bike racks, etc.
- ▶ Training and staff buy in is essential (intro before tech is installed, roll out, and follow up training sessions)
- ▶ Feedback and flexibility
- ▶ Change is hard
- ▶ Behavior impacts: Improvements, better drivers, ignoring technology, work around
- ▶ Refinement - Start small and expand (Ex: vehicle spacing distance/time)
- ▶ Customer support and communication
- ▶ SUCCESS Example: Instead of being a high-end rear end / low-speed sideswipe



Video Clip

