



# RAIL CONFERENCE

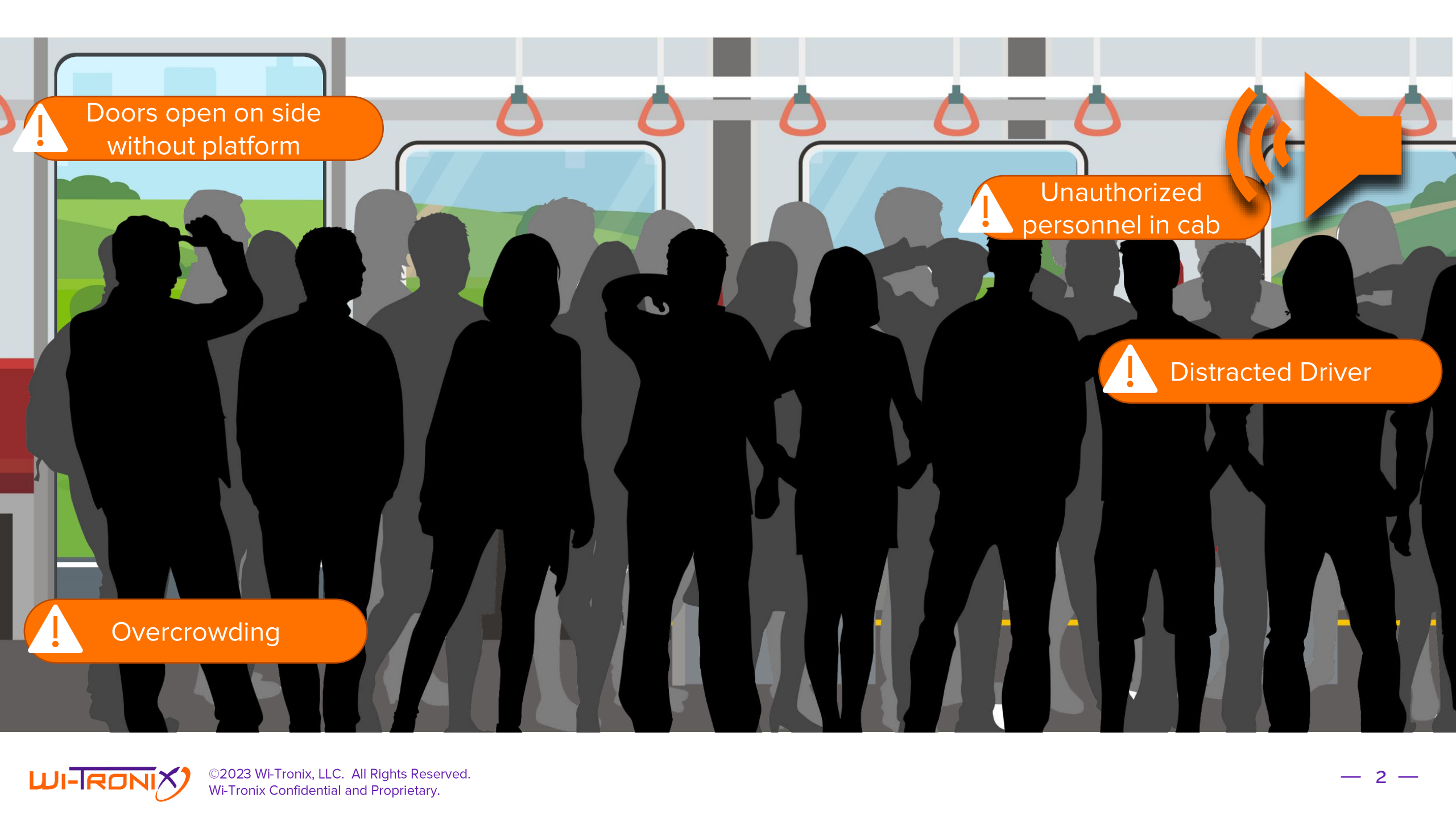
JUNE 11-14, 2023 ▫ PITTSBURGH, PA



## Improving Passenger Safety with AI and other Technologies

Lisa Matta | VP of Product Management





! Doors open on side without platform

! Unauthorized personnel in cab

! Distracted Driver

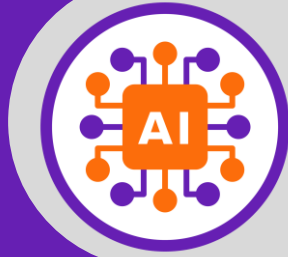
! Overcrowding

# Solution overview

*Building a safety culture*



CCTV with AI-powered passenger occupancy by zone



Cab intrusion detection using AI



Mobile Device Detection using AI



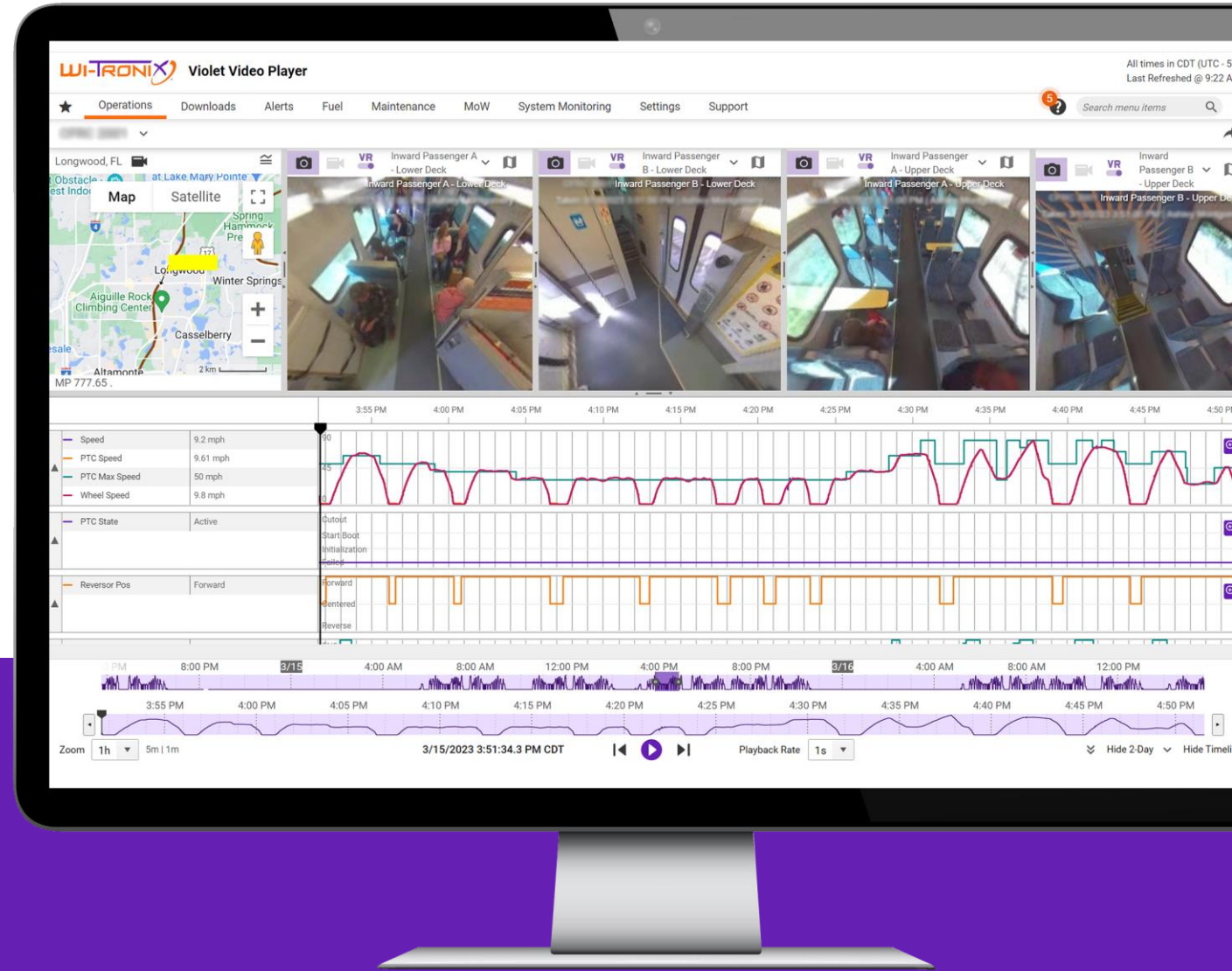
Smart Door Assistant inhibits doors from opening on the wrong side



# Connected Coach Car: CCTV solution

- Increase visibility and passenger safety with 360-degree VR mode capabilities
- Passenger surveillance or triage incidents in progress via real-time camera viewing
- Download OnDemand videos remotely for faster dispatching and incident investigation
- Full situational awareness with time synchronized vehicle data and thumbnail imagery

- ✓ Customizable user configuration
- ✓ No proprietary software required – web-based access anywhere, anytime



# Real-time awareness of passenger occupancy by zone

## Using Artificial Intelligence

### Safety and Security:

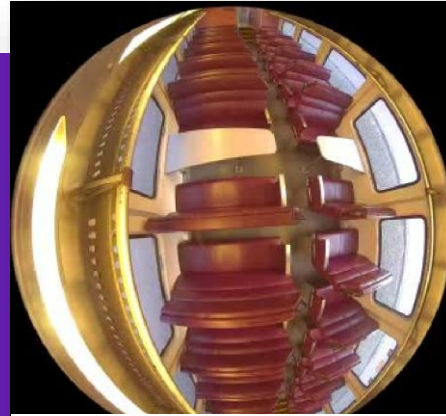
- ✓ Prevent overcrowding
- ✓ Effective emergency response
- ✓ Adherence to weight and load restrictions

### Resource planning:

- ✓ Adjust service frequency and staffing levels based on demand

### Service improvement:

- ✓ Insights into passenger demand, peak travel times, trends
- ✓ Real-time access to car occupancy to passengers



Empty



Many seats available



Few seats available



Standing room only



Full

# Unauthorized cab occupancy detection

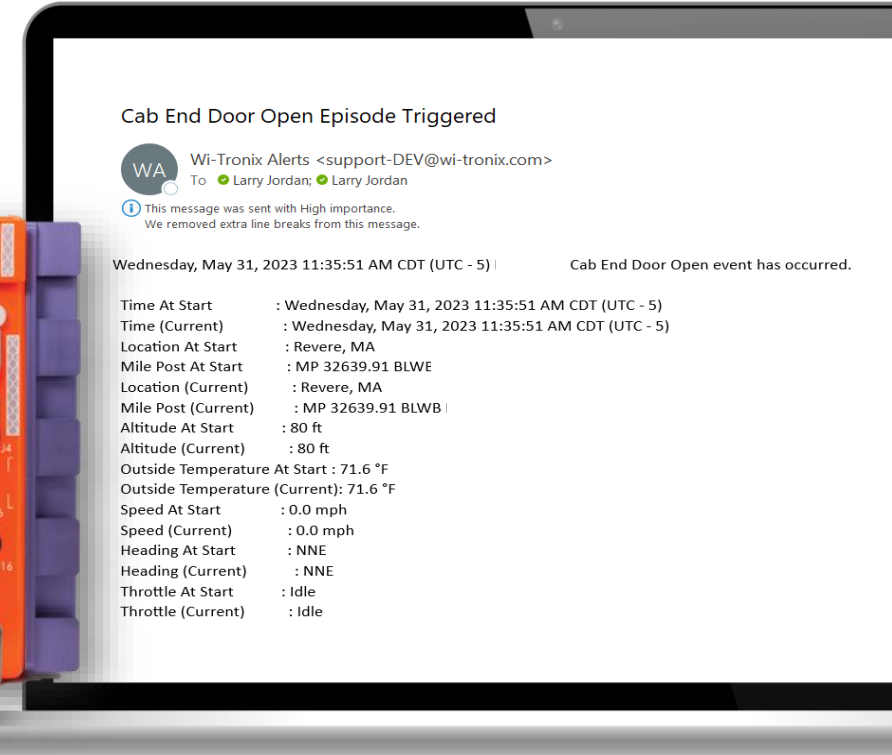
**Problem:** Unauthorized personnel enter a non-active cab when it is in service and take over the Passenger Information System, making announcements and playing music.

## Solution:

- Real-time alert when cab end door is opened while in service so law enforcement can be rapidly deployed
- Uses remote / real-time operator cab cameras for situational assessment and to gather video evidence for law enforcement

## How it works:

- Uses a flexible IoT platform on the vehicle which uses underground navigation for reliable location
- Existing sensors available on the vehicle bus detect the cab end door state and which cab is active
- Geo-fences block the alert under normal conditions such as yards and crew change locations



*In Development: AI counts people in the cab and if they are wearing appropriate attire (safety vest) or not.*



# Unauthorized cab occupancy detection

*\*Video blurred for privacy*



# Mobile Device Detection

## *Monitor operator attentiveness using AI*

- Detects devices that transmit or receive cellular information in the cab of the locomotive
  - Distinguishes between cellular signals originating inside versus outside of the cab
- Whether a train is stopped in a station or moving, the mobile device detection system can identify communications on powered and transmitting cellular devices
  - Customizable alert logic





# Mobile Device Detection

*Monitor operator attentiveness using AI*



AI detects 1 person and 1 phone



AI detects 2 people and 1 phone





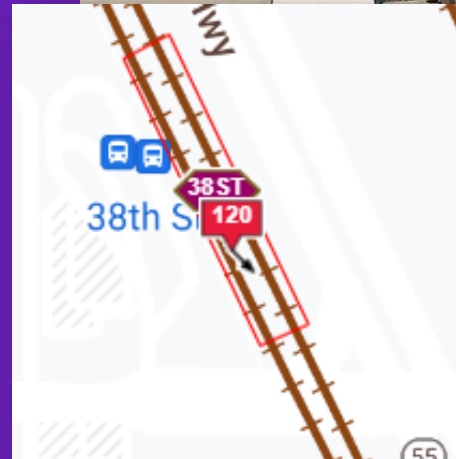
# Smart Door Assistant

**Problem:** Passenger doors open on the wrong side of the vehicle where a platform is not present

**Solution:** Door inhibiting software prevents operator from opening doors when a platform is not present

## How it works:

- GPS recognizes station arrival
- System determines platform side based on station and direction of travel
- System inhibits trainline door operation on side without platform
- Audible “beep” alerts operator when attempting to open door on wrong side (Manual override option is available)



\*Wi-Tronix developed Smart Door Assistant in partnership with Charlotte Area Transit System (CATS) light rail and Siemens

*Future: Use AI with forward facing cameras to visually inspect platform side to address track repairs and other situations causing non-standard operations.*



303-

9:02 AM

123/303

OPERATING SCREEN

120 123

OPERATIONS

- IN MOTION
- STOPPED
- EMERGENCY STOP
- DOOR OPEN
- DOOR CLOSED
- ALARM

30

AUTOMATIC EMERGENCY CONTROL PANEL

EMERGENCY STOP

EMERGENCY RELEASE

EMERGENCY STOP

External camera monitor displaying a view of the tracks and platform area.



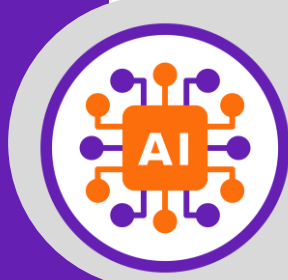


# Wi-Tronix solution

*Building a safety culture*



Cloud-based remote monitoring gives total CCTV visibility and provides insight into passenger occupancy



Detect and prevent unauthorized personnel in cab with Artificial Intelligence



Monitor operator attentiveness with AI-powered mobile device detection



Improve passenger safety with door inhibiting software to prevent doors from opening on wrong side of vehicle

# thank you

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