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MTR

IRSC 2025

Advancing Railway Safety through Innovations and Collaborations

Hong Kong, China 25th - 30th November 2025

LR Intelligent Safety 2.0

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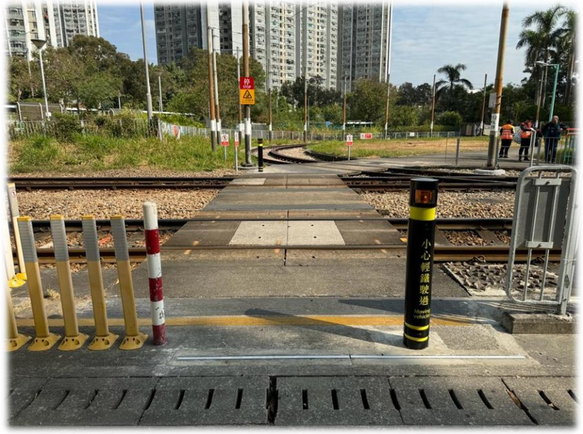
MTR Corporation Limited

Light Rail in Hong Kong

- 37-year operations since 1988
- Street-level open system
- Shared road with community closely
- Manual driving with high traffic density



- Over 230 pedestrian crossings
- 90 road junctions in the network

Challenges and Initiatives

- Close interactions with road vehicles at junctions, crossings and platforms
- High vigilance is required from Train Captains to ensure safety

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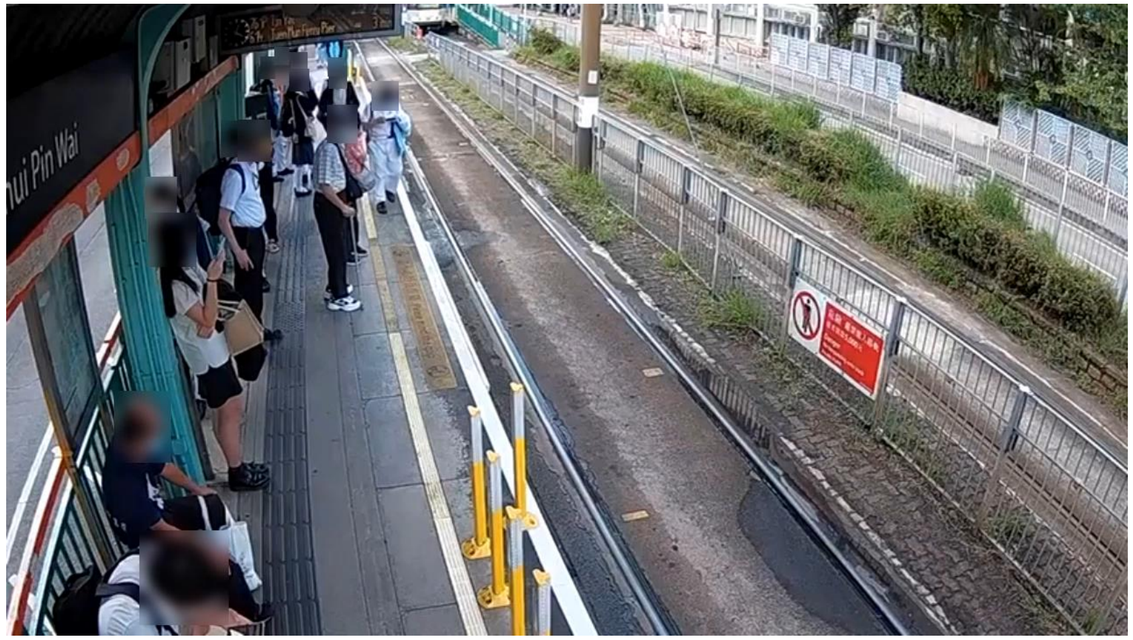
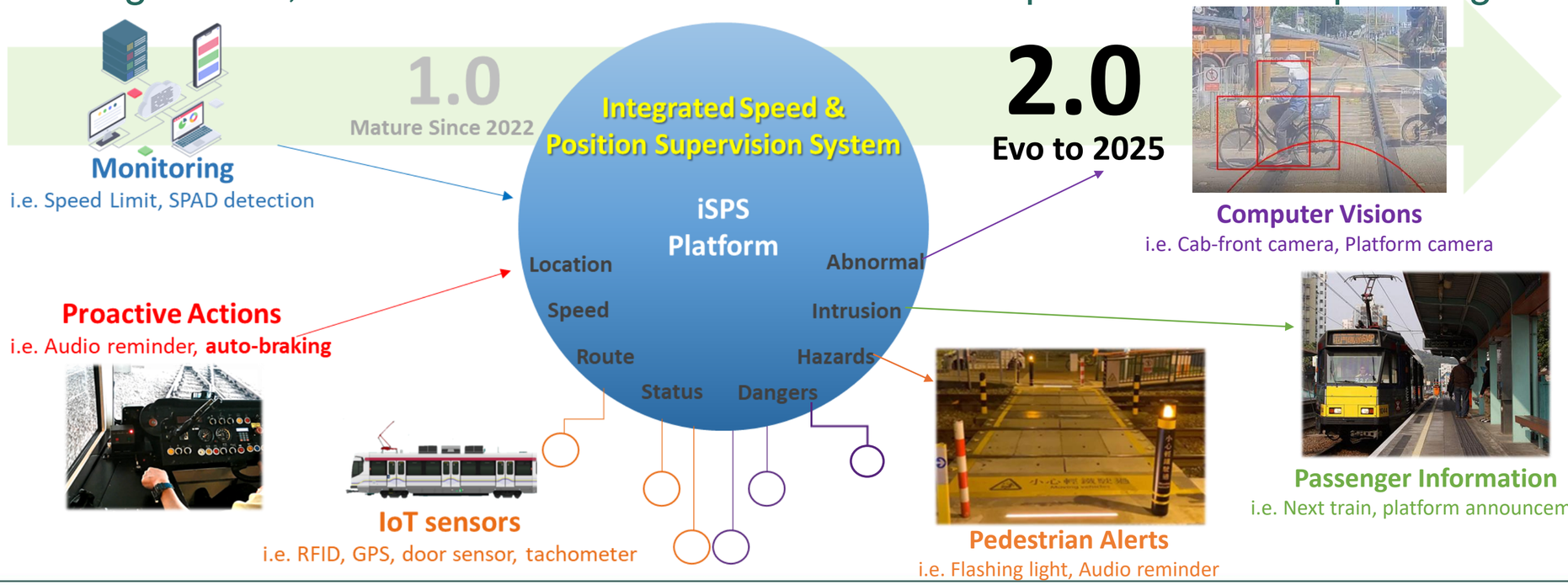


Intelligent Safety 2.0

- Use new technologies to modernize Light Rail network
- Providing a safer, more efficient and customer-centric experience for our passengers



iSPS – Patented Safety Certified System

- iSPS: Combining GPS, RFID, and IoT sensors for real-time LRV tracking and safety precaution
- Patented Home-Grown Solution

iSPS – Patented Safety Certified System

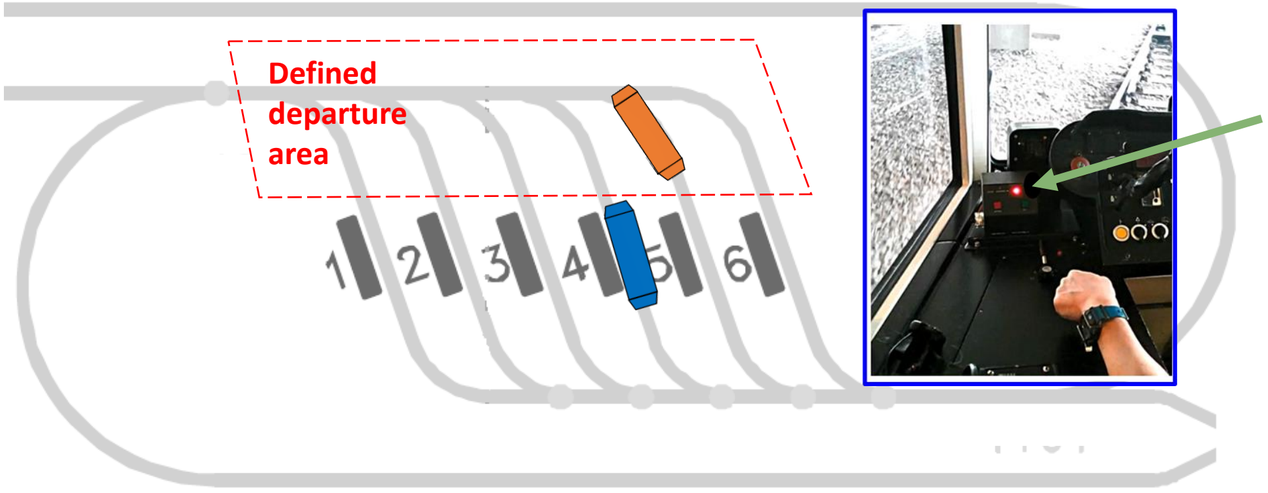
- High Reliability: Resilient design that meets International Standard (Safety Integrity Level – 2)

Platform Management	Speed Supervision	Close-up Monitoring
Turnout Management	Fleet Management	Conflicting Movement

- Send alerts to Train Captain
- Cut power and apply brake automatically
- Provide historical data for future analysis

Collision Prevention at LR Termini

- When a Light Rail vehicle (LRV) has entered the departure area:
  - Cut out traction power to other LRV(s) berthing at platform
  - Traction for other LRV(s) is resumed when the LRV has left the departure area

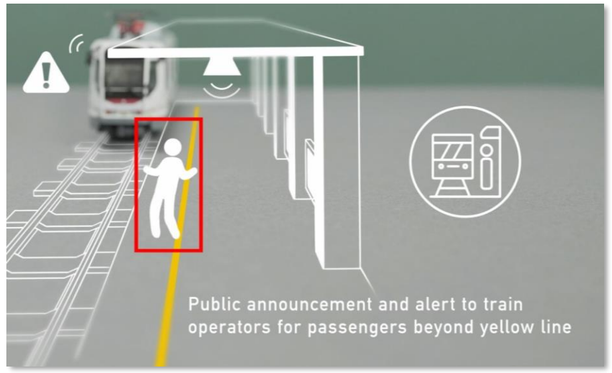


In-Cab Alert Panel

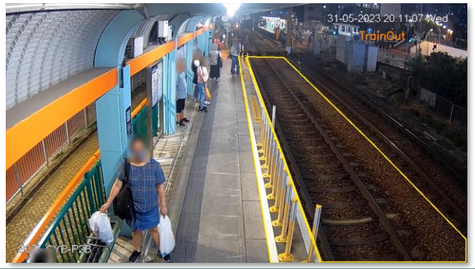
- **Voice reminder & LED lit up when another LRV leaving**
- **Stop when traction is resumed**

Computer Vision – Managing External Factors

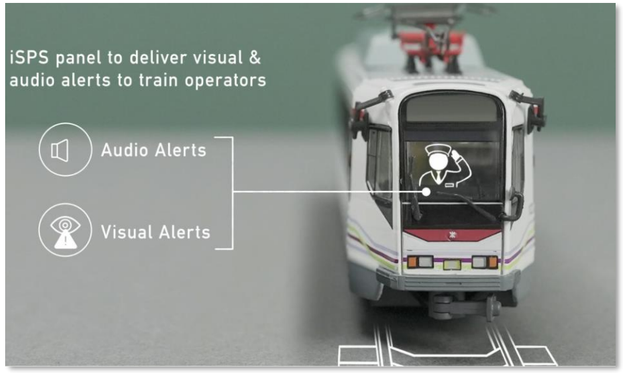
- Advanced AI analytics to detect and respond to potential hazards promptly



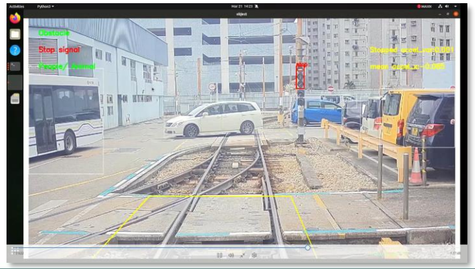
Platform Safety



Junction & Level Crossing Safety

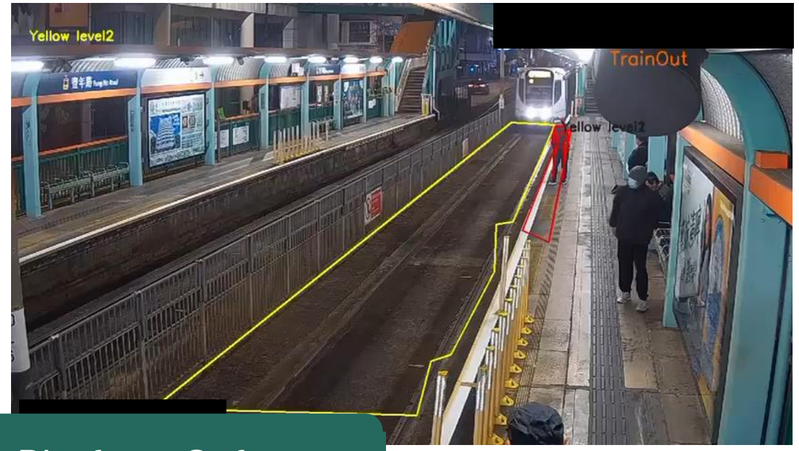


Driving Safety



Computer Vision – Real Cases

- 32 Platforms and 13 Junctions in use
- Assisted Train Captain to avoid incident



Platform Safety

Junction &
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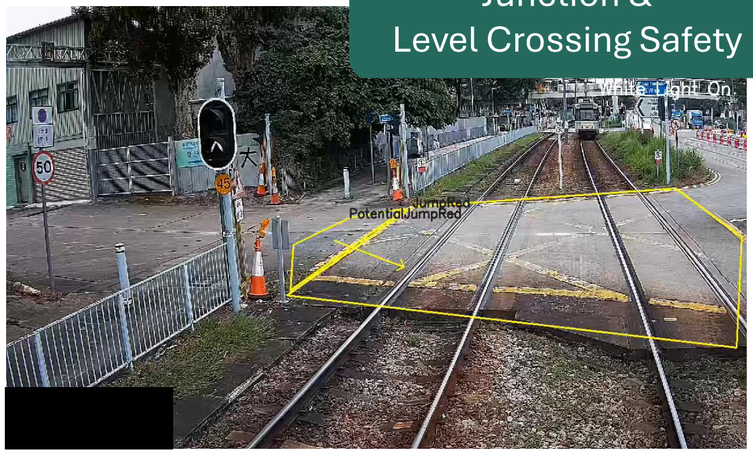
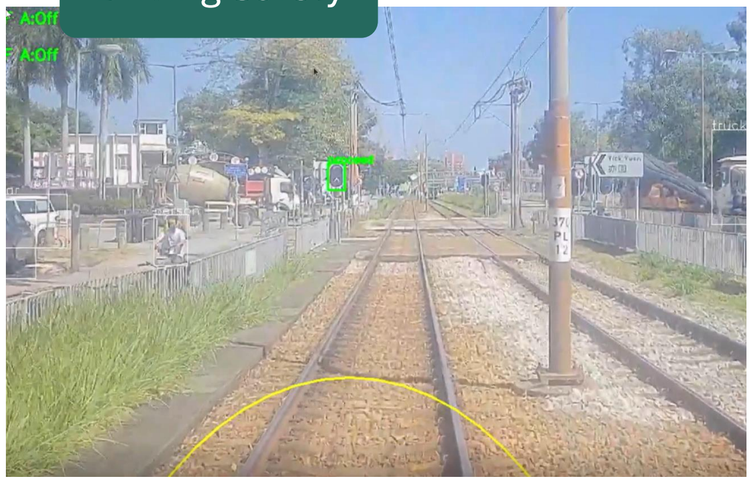


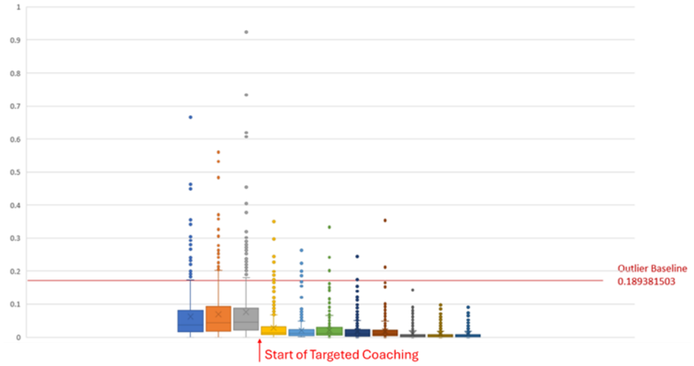
Driving Safety



Enhancing Driving Safety by Data Analytics

- Driving behavior
  - Staff performance reinforcement
- Speed profile
  - Adaptive traffic/timetable planning
- Help identify hotspot locations
  - Draw Train Captain's extra attention
  - Communications with external stakeholders

Driving Behavior/ Speed Profile Data Analysis



Focusing on Customer and Community

Provide real-time, location specific and new form of information to our passenger and community

Flashing light with vocal reminder

New Passenger Information Displays

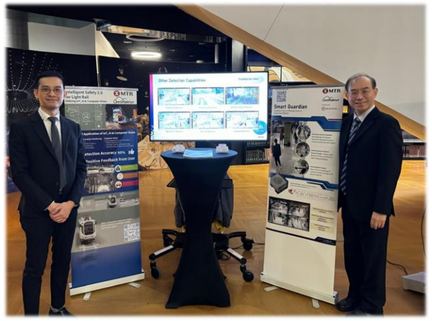
Promoting MTR Stories to Global

HKMA/HKT Global Innovation Award 2024/25 –
HKT Innovation Champion of the Year
Technology Adoption and Social Impact Innovation Special Award
Excellence in Technology Adoption (Large Organizations)

International Exhibition of Inventions Geneva 2025 – Gold Medal

The HKIE Grand Award 2024 – Innovation Category (Grand Prize)

The IET Excellence and Innovation Awards 2024 at United Kingdom –
International Category (Finalist)



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Promoting MTR Stories to Global

Earned Patents:

- **3 Standard patents obtained in both HK & UK**
- **1 more under application**

Registered Jurisdiction	Patent No.	Invention
Hong Kong Standard Patent	1254826	Railway Monitoring Systems, Apparatus and Methods
	40010269	System and Method for Rail Vehicle Detection and Alert
	40059754	Monitoring Railway Nodes
	Application ID: 32024090155.5	Integrated Video Analytics and Pre-emptive Alert System for Enhancing Commuter Safety
United Kingdom Patent	GB2557623	Railway Monitoring Systems, Apparatus and Methods
	GB2569452	System and Method for Rail Vehicle Detection and Alert
	GB2597561	Monitoring Railway Nodes

Light Rail has always played an important role in the
Hong Kong railway network.

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