

ENHANCING RUNWAY SAFETY WITH **REAL-TIME RUNWAY INCURSION PREVENTION (RIPPLE)**

Overdrive's Runway Incursion Pre-Warning Prevention Location Equipment (RIPPLE) was developed to help Changi Airport Group strengthen runway safety by giving airside vehicle operators earlier awareness of restricted runway zones. Through real-time GPS tracking, intelligent geofencing, in-vehicle alerts, and centralised operational visibility, RIPPLE continuously monitors vehicle movements and warns drivers before unauthorised runway entry can occur. By combining live location intelligence with immediate visual and audio notifications, the system helps reduce runway incursion risk, improve driver response, and give airport operations teams greater control and visibility across the airside environment.



The Challenge

Airside vehicle operations are one of the highest-stakes aspects of running an airport. Every day, ground vehicles move near active runways under tight turnaround schedules, shifting priorities, and complex airside layouts.

Procedures, driver training, and radio communication remain essential, but they rely heavily on human awareness and timely communication. A driver navigating an unfamiliar route, working under pressure, or operating in reduced visibility may unintentionally move

towards a restricted runway area without realising it. By the time the error is detected, it may already have resulted in a runway incursion, leading to flight delays, operational disruption, and a safety investigation.

Airport operators needed a proactive solution that could warn drivers before they entered restricted areas while giving operations teams real-time visibility of vehicle movements across the airside environment.



The Solution

Overdrive deployed RIPPLE (Runway Incursion Pre-Warning Prevention Location Equipment) at Changi Airport Group to deliver predictive, location-based alerts that help prevent unauthorised runway entry before it occurs.

RIPPLE combines:

- GPS-enabled vehicle tracking
- Intelligent geofencing
- Mobile Display Terminals (MDTs)
- The Overdrive IoT Platform

As vehicles move through the airside environment, RIPPLE continuously checks their position against predefined operational and restricted zones.

When a vehicle approaches a protected area, the driver immediately receives visual and audio warnings, providing time to take corrective action before entering the restricted zone.

At the same time, airport operations teams gain live visibility of vehicle locations, alerts, and operational events through a unified dashboard.



How does it work?

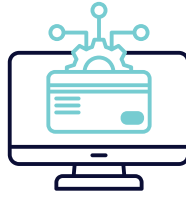
The system captures and processes operational data through an integrated workflow:

1



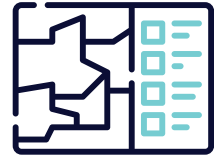
GPS-enabled vehicle trackers continuously transmit real-time location data.

2



The Overdrive IoT Platform checks vehicle positions against predefined operational and restricted zones.

3



Intelligent zone monitoring continuously evaluates vehicle proximity to protected runway areas.

4



Mobile Display Terminals (MDTs) display live maps, operational messages, and navigation guidance.

5



Visual and audio alerts automatically notify drivers before entering restricted runway zones.

6



Airport operations teams monitor vehicle movements, alerts, and system activity through a central operational dashboard.

Key Features:



Predictive runway approach alerts



Real-time GPS vehicle tracking



Intelligent geofencing and zone monitoring



Mobile Display Terminal (MDT) integration



Live map navigation support



Visual and audio driver warnings



Message broadcast capability



Backlog functionality during temporary connectivity interruptions



Centralised operational monitoring and reporting



Seamless integration with Overdrive's aviation platform

The Results

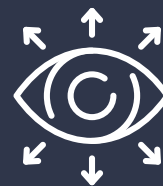
Since deployment, RIPPLE has strengthened runway safety at Changi Airport Group by:



Giving drivers earlier awareness when approaching restricted areas



Improving response time through immediate visual and audio alerts



Increasing operational visibility across all airside vehicle movements



Reducing the risk of runway incursions and the disruptions that may follow



Improving coordination between vehicle operators and airport operations teams



Enabling faster and more confident real-time decision-making

Why Overdrive?

RIPPLE goes beyond traditional vehicle tracking by actively helping prevent runway incursions before they happen.

Purpose-built for airport environments, RIPPLE combines real-time GPS tracking, intelligent geofencing, predictive alerts, in-vehicle guidance,

and operational visibility in a single integrated platform.

Deployed at Changi Airport Group, RIPPLE demonstrates how airports can strengthen runway safety while maintaining efficient, coordinated, and safer airside operations.

Who Are We

Overdrive is the leading real-time asset monitoring IOT company in Asia that provides end-to-end IoT solutions and automates data sensing of various types of assets within a business ecosystem, from vehicles and machinery to facilities and people – all under one roof.

What We Do

Specialises in

- Vehicles Monitoring
- Airport Management
- Vessel Tracking
- Heavy Machinery Monitoring
- Smart Hygiene
- Environmental Monitoring
- Sustainability Solution

Hello,
We Are **Overdrive.**

Overdrive IOT Pte Ltd



www.overdriveiot.com



ask@overdriveiot.com



+65 6950 0890

