MEDIA FACT SHEET FOR
SMRT-GUANGZHOU METRO RAIL INNOVATION LABORATORY

ABOUT THE SMRT-GUANGZHOU METRO RAIL INNOVATION LABORATORY

The SMRT–Guangzhou Metro Rail Innovation Laboratory is a joint facility set up by SMRT and Guangzhou Metro Group (GMG) to develop, test and deploy digital and AI solutions for rail operations and maintenance.

Launched on 3 June 2026 at Bishan Depot, the Lab serves as an innovation sandbox where emerging solutions can be safely trialled and validated prior to large-scale deployment. This allows both organisations to collaborate on engineering and technology innovations, strengthen operational and maintenance capabilities, and improve rail reliability for commuters.

The collaboration also supports SMRT's digital and AI transformation by drawing on GMG's Swifton Intelligent Rail System, known as Suiteng OS. Suiteng OS was developed by Suiteng Digital Technology, a joint venture between GMG and Tencent. It combines GMG's rail operations expertise with Tencent's cloud computing and AI capabilities to enable smarter operations, including the earlier detection and prediction of potential faults.

SMRT and GMG will study how solutions built on Suiteng OS can be applied to SMRT's network. Digital solutions developed by GMG and already deployed in the Guangzhou network will be adapted, tested and validated in a controlled environment before they are deployed in SMRT's live operating systems.

The two rail operators also have plans to jointly develop new digital and AI solutions for use in the wider rail eco-system.

The Lab currently supports the adaptation and integration of three systems that are already mature and proven in Guangzhou Metro's operations:

- SMART Station
- Commuter pattern analysis
- Track and tunnel inspection

SYSTEMS IN THE SMRT-GUANGZHOU METRO RAIL INNOVATION LABORATORY		
1	**SMART Station**	**<u>What is it?</u>** SMART Station uses a Digital Twin—a real-time virtual model of the physical station—that brings together data from sensors, CCTV cameras, station equipment and operational systems, to enable the monitoring of the station via a single dashboard. It provides a comprehensive view of station operations and facilities, including the real-time status and condition of facilities such as escalators, lifts and air-conditioning systems, for more effective monitoring and management. Developed using a station's as-built drawings and technical documents, the Digital Twin accurately maps the station's assets and infrastructure, including where equipment is located and how the different systems are connected. The Digital Twin is linked to Internet of Things (IoT) devices, including sensors, controllers and gateways installed throughout the station. These devices provide live data, enabling authorised staff to monitor equipment and detect potential issues early. The system can also automate routine station functions, such as operating shutters, lighting, air-conditioning, escalators, lifts and fare gates, reducing the need for manual tasks. For this proof of concept, the Digital Twin was modelled on Marina Bay station. As an interchange station, it provides a realistic setting to test how the system works across different station assets and operations. Its more manageable passenger volumes also give the team greater room to trial, monitor and refine the system carefully in a live environment before applying it at busier stations. Benefits of the Smart Station: • A consolidated view of station facilities in one platform, enabling more efficient monitoring and management.

		• Improved situational awareness through real-time visibility of station operations and asset conditions. • Greater control over station facilities through automated and remote operation of selected systems. • Faster response, decision-making and coordination during incidents and service disruptions. • Reduced manual intervention for routine operational tasks, allowing station staff to focus on higher-value work and commuter service. **Before:** Station staff relied on multiple systems and manual inspections to monitor station facilities and respond to issues. **After:** The Digital Twin provides real-time visibility of station conditions, enabling proactive management of amenities and allowing station staff to focus more effectively on serving commuters.

2	**Track and Tunnel Inspection**	**<u>What is it?</u>** A Digital Twin of track and tunnel infrastructure integrates data from inspections, monitoring systems and asset databases into a real-time virtual model. Currently being developed for the North-South and East-West Lines (NSEWL), the Digital Twin uses simulated data to test and validate its capabilities. By bringing disparate data sources together on a single platform, it provides maintenance teams with a consolidated view of asset conditions and maintenance activities, enabling them to identify trends and anomalies to support data-driven maintenance. **<u>Before:</u>** Track and tunnel inspections relied on multiple systems and manual reviews by different teams, making it more challenging to consolidate information, identify defects, coordinate maintenance works, and optimise maintenance planning. **<u>After:</u>** The Digital Twin integrates inspection, monitoring and asset data into an integrated platform, providing unified visibility of track, tunnel and rail system conditions. By consolidating information from multiple sources, including maintenance findings, inspection scans and train captains' reports, teams are able to better analyse trends, detect anomalies, and understand defects by location, type and severity. Beyond track and tunnel infrastructure, the Digital Twin incorporates data from interconnected rail systems such as signalling, power and cabling. This holistic view helps SMRT assess system interdependencies, understand the impact of faults across assets, and improve fault diagnosis and maintenance planning. The platform also supports predictive maintenance, enhances collaboration across teams, and enables more effective deployment of resources, improving maintenance quality, productivity and operational responsiveness.

3	**Commuter Pattern Analysis**	**<u>What is it?</u>** Commuter Pattern Analysis, also known as Origin-Destination Analysis, uses faregate data and AI to understand and forecast where commuters travel, the routes they take and how travel patterns change over time. As Singapore's rail network expands and becomes more complex, such a system provides greater visibility of commuter movements, including travel patterns, demand trends and key commuter hotspots, to support more effective planning. During normal operations, it helps forecast commuter demand and travel patterns, enabling more dynamic train scheduling and crowd management. During unplanned and planned service disruptions (e.g. major events, early closures and late openings), it provides AI-driven insights and route recommendations. This helps SMRT direct commuters to alternative routes more quickly, anticipate shifts in demand, optimise train deployment and reduce crowding across the network. **<u>Before:</u>** Train service planning and crowd management relied on historical data and manual monitoring, limiting the ability to respond quickly to sudden changes in commuter demand and unexpected crowd build-ups. **<u>After:</u>** Real-time commuter pattern analysis provides surge warnings and detects anomalies in commuter flows early, enabling SMRT to proactively manage crowding, optimise train deployment, and ease congestion across the network. During disruptive events, the system enables rapid and optimised response planning by directing commuters to alternative routes, managing station congestion, and adjusting train deployment to meet demand. This allows SMRT to respond more quickly, deploy resources more effectively and minimise impact to commuters.