

Innovations presented at the “Delivering into the future: Enabling safe and efficient deliveries” exhibition

1) Islandwide locker network

Pick Network, a wholly owned subsidiary of the Infocomm Media Development Authority (IMDA), currently operates more than 1,000 parcel lockers across Singapore. Located in housing estates, community clubs and transport nodes, the lockers allow consumers and delivery personnel to conveniently drop off or pick up their parcels, reducing the need for delivery vehicles to make multiple trips within the same area. Since the launch of the Pick lockers in 2021, the average number of parcels picked up and dropped off at the lockers daily have increased from less than 100 to more than 20,000 per day.

From November 2024, an additional 150 lockers will be installed in new housing estates such as Tampines GreenCourt, Fernvale Glades and Alkaff Oasis at Bidadari Park.

2) Battery-swapping stations

While deliveries of smaller volumes and within shorter distances could be done using non-motorised modes of transport, deliveries involving larger volumes or longer distances would require the use of motorised transport, which generates carbon emissions. Under LTA’s sandbox¹, Gogoro, Cycle & Carriage Singapore and foodpanda have piloted the use of battery-swapping and smart electric two-wheelers for last-mile deliveries, to support two-wheeler users with battery-swapping stations to quickly switch out depleted batteries. Not only does this reduce carbon emissions, but also eliminates the downtime incurred by delivery personnel from charging their vehicles. These stations support Gogoro’s Smartscooters, which are leased to close to 20 delivery partners for food, grocery and goods deliveries in Singapore. This sandbox trial has since come to an end with Gogoro and Cycle & Carriage moving into a full commercial partnership.

3) Autonomous delivery robots

QuikBot’s autonomous final-mile delivery (AFMD) platform utilises autonomous delivery robots to complete deliveries within high density urban areas by independently passing through turnstile and lifts, providing floor-to-floor deliveries and alleviating access-related challenges

¹ The LTA sandbox facilitates the development and use of new technologies which are not within the [scope of current standards and regulations](#).

faced by delivery personnel. Additionally, QuikBot's Autonomous Mobile Robot (AMR) is designed as a smart locker with four to six compartments, eliminating the need to invest in multiple robots while allowing multiple deliveries.

QuikBot's robots currently serve the South Beach Tower cluster, partnering third-party logistics companies such as FedEx, SingPost and DHL. QuikBot will extend the trial to Marina Bay, Fusionopolis and Punggol Digital District by January 2025, and potentially to other business clusters across Singapore in the future.

To facilitate the deployment of AMRs, agencies are working with the industry to establish physical infrastructure requirements, such as the gradient of ramps and width of paths, to ensure the safety of other road and footpath users.

4) Dynamic Route Optimisation with AI for same day delivery

uParcel, a local same-day delivery company focused on e-commerce and medicine, collaborated with Singapore Management University (SMU) and AI Singapore to use AI to match delivery bookings with a network of subcontractors, logistics companies and freelance delivery personnel. The model clusters deliveries from multiple collection points by proximity, reducing the number of vehicles and distance travelled by 40 to 50%.

5) Resource-sharing among logistics companies

The Agency for Science, Technology and Research (A*STAR) is working with logistics companies to develop an AI-assisted collaborative model to optimise delivery journeys by:

- Job-pooling – Multiple delivery tasks across different logistics companies are grouped together, allowing delivery personnel to complete several deliveries in one trip.
- Job-matching – Assigning delivery jobs to the most suitable drivers based on real-time status to minimise delivery distance, time and cost.
- Dynamic route optimisation – Calculating the most efficient route for drivers to reach destinations by considering live traffic conditions and resource constraints.

The study by A*STAR and companies has shown that the AI-assisted model could improve the timeliness of deliveries by 10%, optimise delivery vehicle utilisation by 20% and reduce the time spent on planning delivery schedules by 40%.

6) Crowdshipping

Currently adopted by e-commerce players such as Amazon, Walmart and DHL as well as uParcel, crowdshipping taps on members of the public to make deliveries by picking up and dropping off parcels enroute their journeys. Through a study conducted by the Singapore University of Technology and Design (SUTD) using delivery and public transport ridership data in Singapore, it was found that by outsourcing just 11% of deliveries to crowdshippers, delivery vehicles can cut down travel distance by 20% thereby reducing carbon emissions.

If scaled up, companies can potentially reduce cost by downsizing their delivery fleets while crowdshippers can earn extra income without disruption to their journeys.