



HTX Ground Robot on trial at Toa Payoh Central to support Public Officers in enhancing public health and safety

SINGAPORE, 5 September 2021 – For the first time, ground robots will be put on trial to patrol and survey a public area with high foot traffic to augment the work of public officers in enhancing public health and safety.

This is a joint project involving five public agencies, namely HTX (Home Team Science and Technology Agency), National Environment Agency, Land Transport Authority, Singapore Food Agency, and Housing & Development Board.

For a three-week period from 5 Sep 2021, Xavier (the name of the HTX robot¹) will weave its way autonomously through the crowds in Toa Payoh Central to detect the following undesirable social behaviours:

- smoking in prohibited areas
- illegal hawking
- improperly parked bicycles within HDB Hub
- congregation of more than five people (in line with prevailing Safe Management Measures)
- motorised active mobility devices and motorcycles on footpaths

Once Xavier detects any of the above, it will trigger real-time alerts to the command and control centre, and display the appropriate message (depending on the scenario) to educate the public and deter such behaviours.

The deployment of Xavier will support the work of public officers as it will reduce the manpower required for foot patrols and improve operation efficiency.

Lily Ling, SFA's Director of East Regional Office, said, "The deployment of ground robots will help to augment our surveillance and enforcement resources. For instance, the surveillance of illegal hawkers can be manpower intensive as officers need to be deployed at various areas across the island. The adoption of robotics technology can be used to enhance such operations, and reduce the need for our officers to do physical patrols."

¹ Xavier is developed by HTX in partnership with A*STAR.

Calvin Ng, LTA's Director of Enforcement and Compliance Management, said, "Xavier can potentially augment our enforcement presence and deter errant active mobility behavior on footpaths. It could also provide intelligence on new hotspots or areas where egregious active mobility users have been spotted to help focus our physical enforcement efforts."



Xavier the ground robot on duty in Toa Payoh Central

Advantages of deploying Xavier

Cheng Wee Kiang, Director of HTX's Robotics, Automation & Unmanned Systems Centre of Expertise, said, "HTX's ground robots are highly versatile and can be customised for broad and widespread application in different fields and operational environments. With Xavier, we are able to force multiply agencies beyond the Home Team by augmenting their workforce needs and achieve greater operational efficiency on a single robotic platform. This synergy enables government agencies to build a strong ops-tech ecosystem and continue enhancing public health and safety."

Autonomous navigation

- Xavier is fitted with different types of sensors, including safety features, to enable it to navigate autonomously, and avoid stationary and dynamic obstacles such as pedestrians and vehicles along its patrol route configured in advance by public officers. Deploying Xavier will augment the ground operations of public officers.

Video Analytics

- Xavier is equipped with cameras that can provide 360-degree video feed to the command and control centre. Xavier is also able to capture images and videos in dim light and in the dark with its IR and LED illumination as well as low light cameras. Data captured from Xavier's cameras are streamed to a video analytics system with artificial intelligence capability developed by HTX's in-house computer vision engineers. With real-time sensing and analysis, public officers can gain insights on these behaviours more efficiently and effectively, and activate additional resources to respond to on-ground situations when necessary.

Interactive Dashboard

- The interactive dashboard developed by HTX and NCS further provides an overview of Xavier's deployment and health, such as battery and communication status. Public officers can receive real-time information via this dashboard in a command and control centre, and be able to monitor and control multiple robots simultaneously. The interactive dashboard allows officers to remotely respond to incidents on the ground via a two-way intercom or using pre-recorded audio messages.

Xavier is similar to HTX's Multi-purpose All-Terrain Autonomous Robot (M.A.T.A.R.) that was developed by HTX and A*STAR's Institute for Infocomm Research (I2R). M.A.T.A.R. has been deployed by the Singapore Police Force (SPF) as patrol robots to support the SPF's frontline operations during National Day parades, Marina Bay Countdown and Chingay.

Commenting on the deployment of Xavier, Augustine Tan, HDB's Director of Commercial Complexes, said, "As part of our concerted push to transform the way we deliver our services and operations, HDB will be deploying HTX's ground robots to patrol the mall area at HDB Hub. The use of robotic technology will complement our efforts in ensuring that we continue to provide a safe, welcoming and conducive environment for our customers and residents."

Tony Teo, NEA's Group Director for Environmental Public Health Operations, said, "The National Environment Agency (NEA)'s partnership with HTX and the trial of robot Xavier marks an important development in our continued journey to tap on technology to transform the way we operate and enhance service delivery. We look forward to exploring how the robotic platform capabilities can augment our ground operations for public health offences, such as smoking in prohibited areas and littering."

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