

# Researches to develop vehicular communications for multi-modal mobility solutions

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NTU and NXP demonstrated new applications of safety warning systems using V2X, such as alerting the car behind as the car in front reverses. Credit: NTU Singapore

Nanyang Technological University, Singapore (NTU Singapore) today announced that it will be working with industry partners to integrate cellular communication into vehicle-to-everything (V2X) technologies, as part of NTU's upcoming research in the smart mobility sector.

Different vehicular communications technology will be studied, including dedicated short-range [communication](#) V2X, existing 4.5G and the upcoming 5G mobile networks, to improve the data transmission speed and radio coverage distance for communication between vehicles to infrastructure, paving the way for faster notifications and warnings.

Starting next year, NTU will work with industry partners to study the above-mentioned technologies, how they can synergistically complement each other and be explored for use in autonomous [vehicle](#) (AV) prototypes, traffic

infrastructure and unmanned aircraft systems. These vehicular communications will be used to relay real-time navigation traffic and hazard information to vehicles in advance.

NTU Vice President (Research) Prof Lam Khin Yong said NTU is well-positioned to advance smart mobility solutions on its Smart Campus together with its industry partners from the communications, electronics, and transport sectors.

"Employing cellular communication and integrating them into existing V2X technologies for mobility can help to reduce travelling time, minimise the risk of serious accidents and optimise road usage for a densely populated urban city like Singapore. The emerging technologies researched today may soon become the norm for our everyday lives, contributing to Singapore's vision to be a Smart Nation," Prof Lam said.

## NTU—a leader in V2X communication technology

NTU's decision to carry out further research in V2X and cellular-V2X communication comes after several successful development and tests of transportation technologies using the international car-to-car wireless standard for vehicular use. Known as the dedicated short-range communication V2X communication technology, they were tested at the NTU-NXP Smart Mobility Test Bed.

Launched in 2015, the NTU-NXP Smart Mobility Test Bed turned the NTU campus into a V2X-enabled campus for researching and testing secure, smart connectivity and mobility solutions. These are aimed at improving traffic flow in cities, preventing road accidents, and enhancing the user experience for mobility services.



Continental, Schaeffler and NTU researchers showcased a V2X system which alerts both driver and rider when the PMD passes behind the vehicle. Credit: NTU Singapore

"Since its set-up in 2015, the NTU Smart Mobility Test Bed has been a valuable contributor to Singapore's innovation ecosystem, bringing together industry partners to co-create and commercialise V2X solutions for a safer and more efficient driving environment. EDB is delighted to support NTU in pushing the envelope on the next generation of intelligent mobility solutions, such as cellular communications for autonomous vehicles and drone air traffic management." said Mr Pee Beng Kong, Director, Singapore Economic Development Board (EDB).

Four completed research projects were showcased today.

### Early warning system for vehicles

An early warning system for vehicles was demonstrated today. The system gives advance warning to drivers on road hazards such as a car stopping unexpectedly or a passenger suddenly opening a vehicle door.

Such an early warning system requires a smart in-vehicle unit that can tap into the automotive electronics systems to detect the actions of the driver and its passengers and notify other nearby vehicles through a special car-to-car Wi-Fi signal.

### Cellular communication for PMDs

Also showcased at today's event is a project by NTU, Continental and Schaeffler that utilises V2X communication to connect vehicles to e-scooters or e-bikes. It allows drivers and users of personal mobility devices (PMDs) to detect one another.

Besides cellular communication technologies for vehicles on land, NTU is also working on the development of drone air traffic management via 4.5G mobile networks. This will give better localisation and positioning to the drones, as well as a smoother stream for high definition video footage.

NTU is a world leader in smart mobility solutions and has partnered top companies like Volvo, BMW Group, Blue Solutions, ST Engineering, and mobilityX, to develop innovative technologies for AVs, electric vehicles and multi-modal mobility solutions.

Provided by Nanyang Technological University

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