

**An End-to-end Multi-tier vehicle to everything system with low-latency and reliable communications, which can enhance road safety and traffic efficiency.**

### Keywords:

- Cellular-vehicle to everything, C-V2X, Smart City, road-side unit, RSU, On-board unit, OBU, 5G, Smart Mobility, Traffic Management, Edge Computing, V2X alarms

## Problems addressed

- Smart Mobility is crucial for road safety and traffic efficiency
- A fast, safe, and reliable with low latency network is required for connected vehicles, pedestrians, and road infrastructures to share information such as abnormal road conditions
- A central management system is also required to manage all V2X devices (vehicles, RSUs, etc.) and provide different services. However, it is usually deployed in data centre, which will increase the communication latency

ASTRI's Multi-tier V2X system enables management of all V2X devices (vehicles, RSUs, etc.), alarms, configuration, performance, services and with multi-tier management capability at edge, regional and central office, to enhance road safety and traffic efficiency.

## Innovations

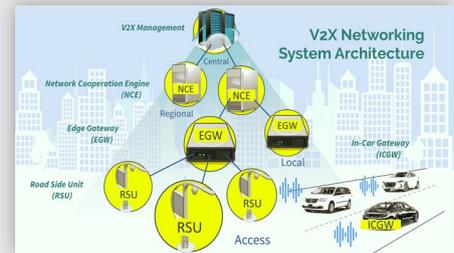
**ASTRI's Multi-tier V2X system is composed of Central & Regional V2X Management & Data Analytics for Real-time Traffic Monitoring of the city, V2X Edge Gateway for Intelligent & Fast Traffic Management, Road-side infrastructure for monitoring area road conditions, and In-Car Gateway (ICGW) for managing all in-vehicle devices & sensors:**

- V2X Management Platform** enables management of all V2X devices (vehicles, RSUs, etc.), alarms, configuration, performance, services and system with multi-tier management capability at edge, regional and central office
- Smart road-side infrastructure** provides multi-sensor fusion (e.g. lidar, radar, and camera, etc.) based on deep learning, to enhance road safety and traffic efficiency
- Low latency & Intelligent V2X Algorithms** can detect different abnormal traffic conditions and send **real time alert** notifications via V2X (**within milliseconds**)
- Intelligent Traffic Management & Data Analytics** can suggest fast path to increase traffic efficiency
- High Availability (HA) system** is designed with redundant management server & database
- V2X data security & protection**, only authorized users can register & access the system & data

## Key impact

- Fully compliant with Smart Mobility Initiatives in the 'Hong Kong Smart City Blueprint 2.0' promulgated by the HKSAR Government to help enhance road safety and efficiency
- 5G and C-V2X technologies enable effective, accurate and faster data exchange
- The first C-V2X Open Road Test symbolise a milestone in Hong Kong's Smart Mobility
- Will create a new Smart Mobility Eco-System and new business opportunities for Hong Kong in the long term, and provide a safer, more convenient and efficient Smart Mobility experience for people

## Innovation snapshot



### Project completed

- 4 March 2020

### Applications

- Smart City Applications
- V2X System
- Automated Valet Parking (AVP) Applications
- Electronic Road Pricing (ERP) Applications
- Connected Autonomous Vehicles (CAV)

### Patent(s)

- CN App. No. 201980000523.7
- US Patent No. 11,195,413;
- CN App. No. 202080001090.X and HK App. No. 62020022211.0
- US App. No. 17/673,506
- US App. No. 17/689,184

[ASTRI Patent Search](#)

### Commercialisation opportunities

- IP licensing
- Technology co-development

### Contact details

Director, Commercialisation  
Priscilla Yeung  
Email: [priscillayeung@astri.org](mailto:priscillayeung@astri.org)  
Telephone: (852) 3406 0280