Using V2X & AI to Realize Connected & Automated Mobility:

Lessons from Qatar

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Future Networked Car Symposium (FNC-2023) spin-off Qatar, Oct. 2023

QMIC: *Enabling Sustainable, Smart, and Safe Living*

Positioning *(since 2009)*

A National Technology Innovations Center → Market Impact, National Strategies, Mega Projects

Core Technologies

- Internet of Things
- Artificial Intelligence
- Location Intelligence
- Embedded Sensing

Market-Focused

Data-Centric Platforms : from *data to smart applications & intelligence*

Domains

- Intelligent Mobility
- Smart Cities

Digital Platforms

مسرك MASRAK · iFLEET Connected Fleets & Dispatch · Connected Vehicles · Awain · DRIVE SAFE · FALCON-I · humidex · labeeb

QMIC: Tackling Mobility & Road Safety Challenges

Enterprises

Government Agencies

Public Users

Services, APIs

Sub-Systems

Data Platforms

QMIC's Intelligent Mobility Portfolio

"rich portfolio centered around mobility data management and intelligent services"

qmic Mobility Services Cloud

Data Sources

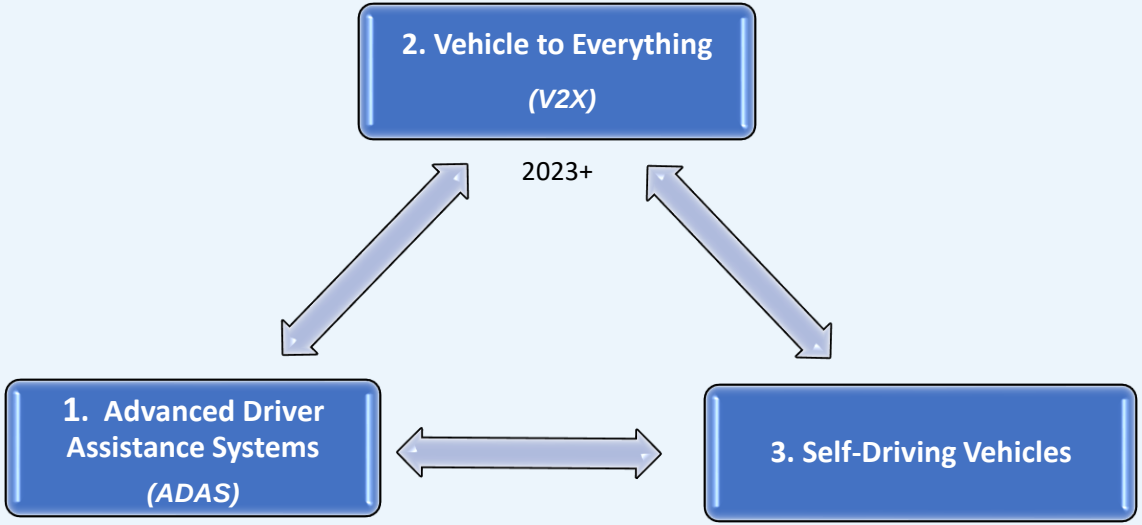
Road Sensors

Mobile Data

Fleet Data

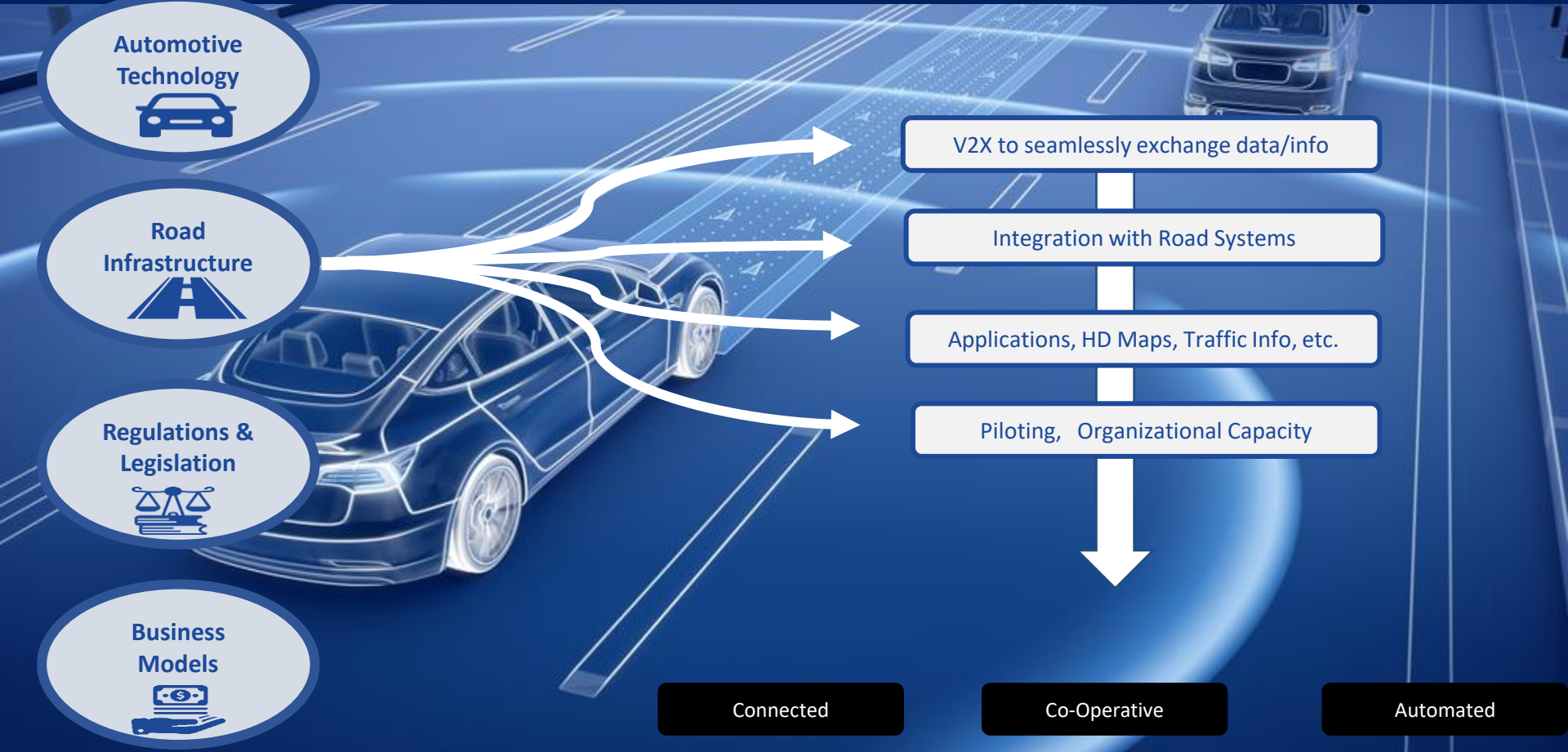
V2X System

Realizing Connected & Automated Mobility: *three inter-related trends*



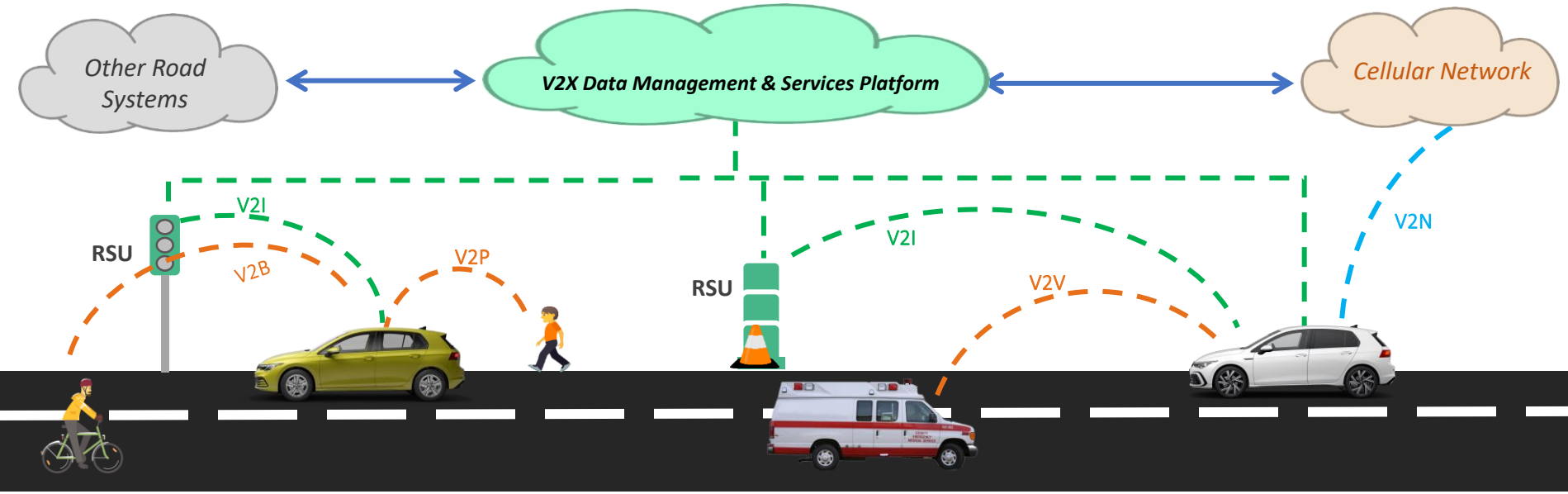
Automation	L1	L2	L3 (*conditional*)	L4 *(high)*	L5 *(full)*

AI & V2X for Safer & Automated Mobility



Vehicles-to-Everything (V2X)

Cars to Seamlessly Talk to Each Other & with Roads

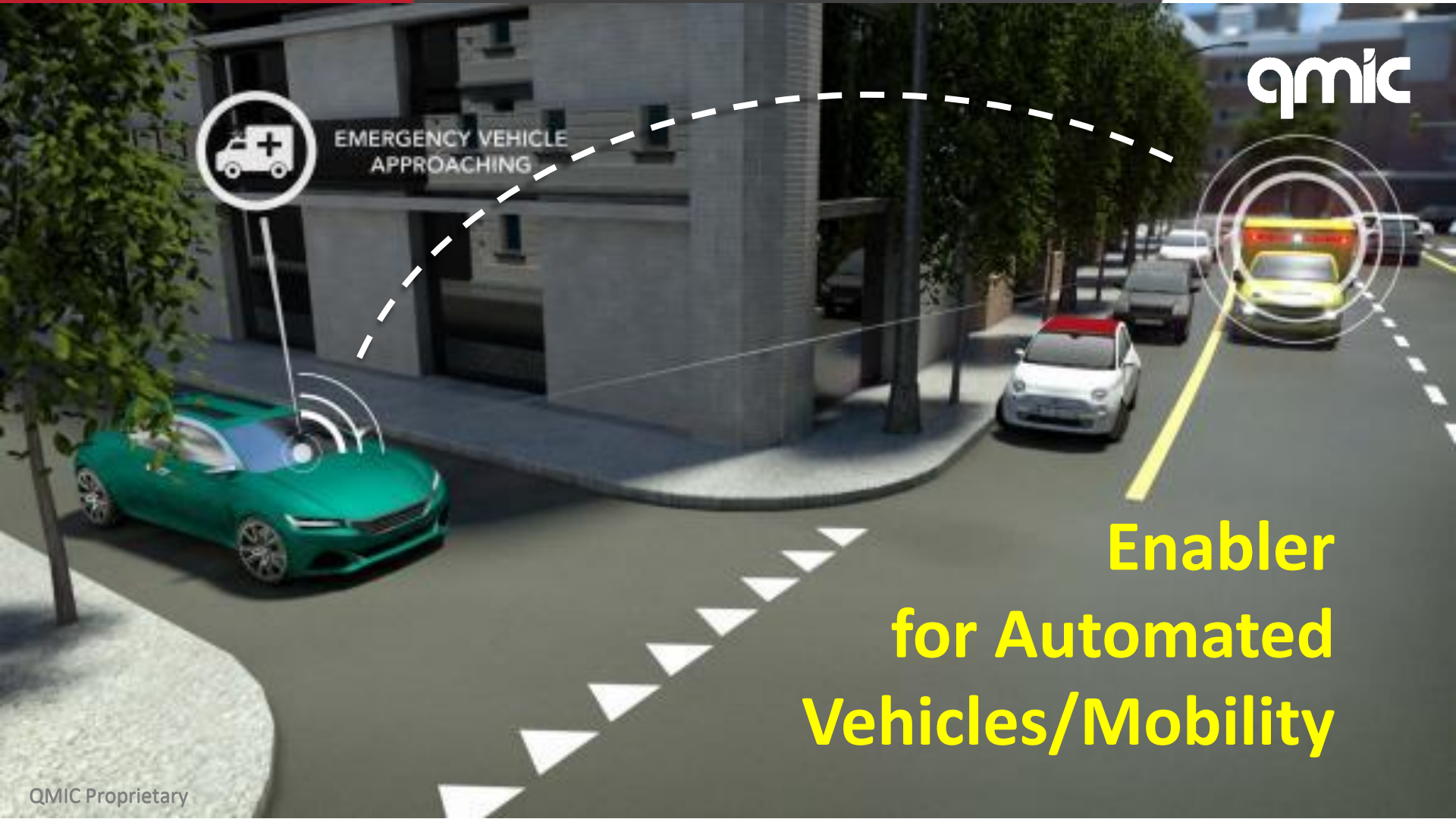


>2 m cars in Europe natively enabled with V2X

Reduce Accidents & Save Lives (1.3m deaths a year)

V2X is expected to mitigate up to **80% of unpaired accidents**.

Traffic Efficiency



Enabler for Automated Vehicles/Mobility

A Leader in the MENA Region

in **2014**,

QMIC has deployed & demonstrated the
First MENA Field V2X Demo

Gulf Times
Tuesday, April 29, 2014 | 7

QATAR

HE Sheikh Abdulrahman bin Khalifa bin Abdulaziz al-Thani, Minister of Municipality and Urban Planning gets ready for the field demo of Connected Vehicles as Dr Adnan Abu-Dayya opens the door of the car. **PICTURE:** Jayaram

'Connected Vehicles' tech to enhance road safety

In **2018**,

QMIC has deployed
A Limited Scope Pilot in Qatar

Spectrum Allocation
5.9 GHz

Communications Regulatory Authority
State of Qatar

هيئة تنظيم الاتصالات
دولة قطر



2020-2021: Qatar V2X National Pilot

15 V2X Use-Cases/Applications Implemented & Deployed

Communicate with Traffic Signals

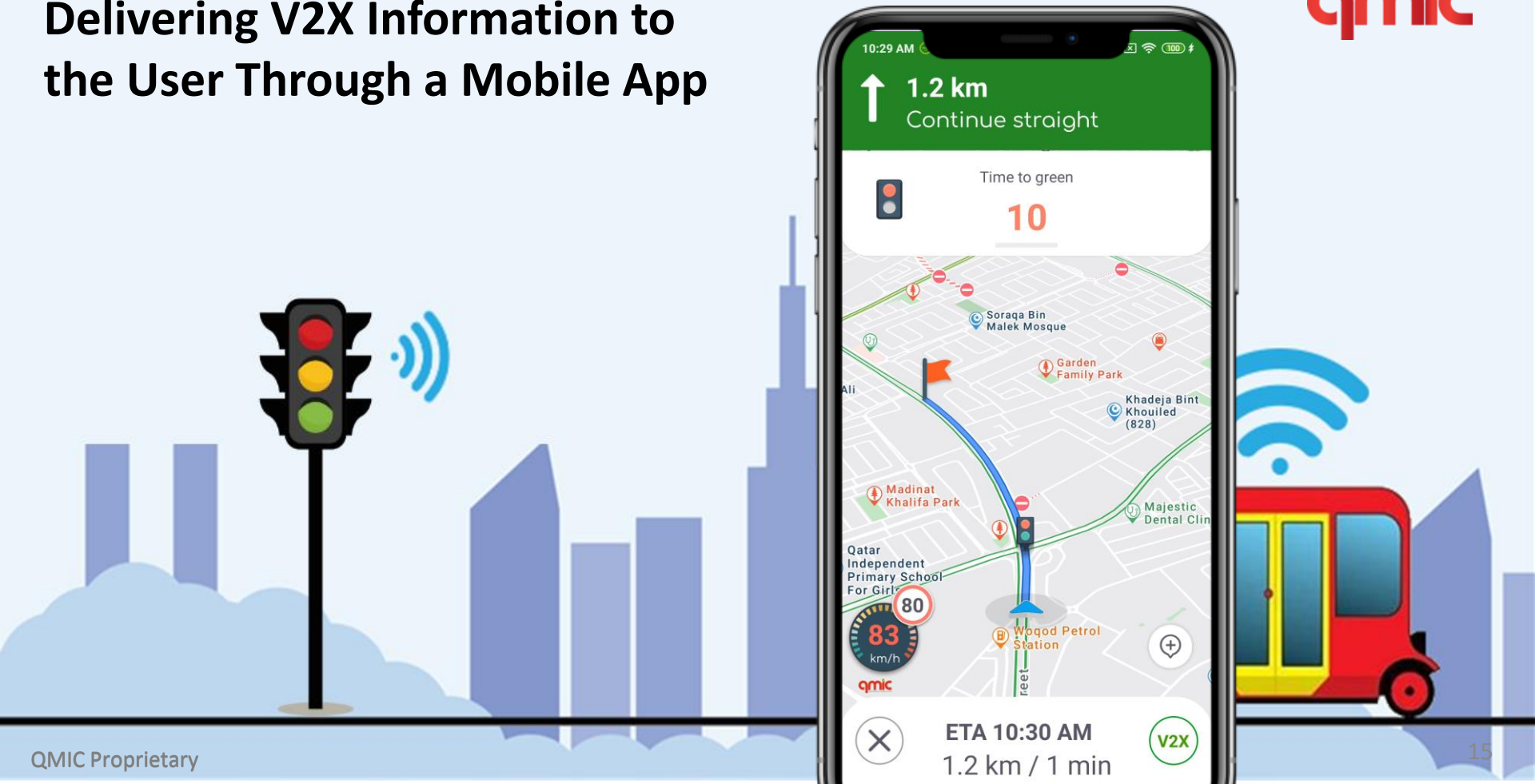
Collision Avoidance

Broken/Emergency Vehicles

Pedestrian Safety

Support Both Global Technology Standards: DSRC-V2X & Cellular-V2X *(C-V2X)*

Delivering V2X Information to the User Through a Mobile App




Integration with
Road Systems and
Sub-Systems

Using AI to Digitize Road Infrastructure

Low Reliability *Lack of Automation* *HW Dependency* *High Cost*

Challenges- CCTV Cameras

Falcon-I Platform

Using AI Video / Image Analytics to Enable Smart Spaces

Services & Management

- Dashboards, Alerts
- Integration with Other Systems
- Sharing Data with 3rd Parties
- Management Tools

Core AI Data Platform

- Multiple AI Models
- Data Engineering
- Applications for Different Domains

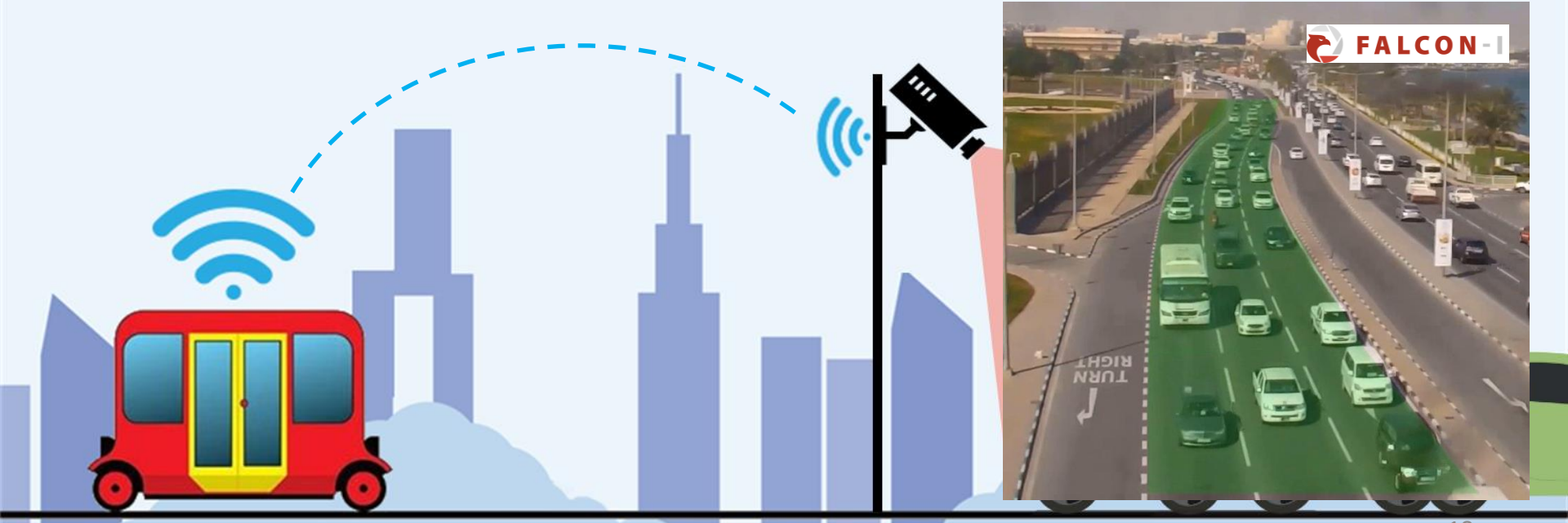
Data Sources *(videos, images)*

- Existing CCTV Cameras
- New Cameras
- Aerial Videos
- Pre-Saved Videos/Images

AI Sensing to Augment Roads Intelligence

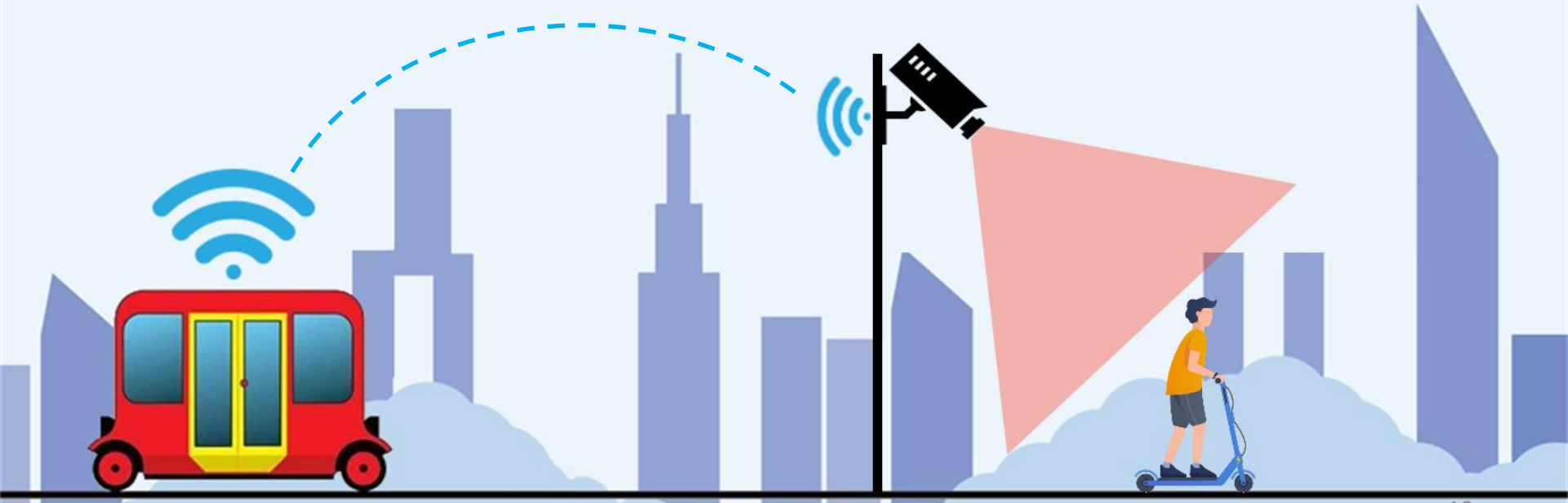
AI-based Sensing

Traffic queue at 565m



AI Sensing to Augment Roads Intelligence

AI-based Sensing
Vulnerable Road Users Protection




80
13
km/h
qmic

- ✓ Large Scale Piloting is Important
  - *technology pilots, user-centric pilots*
- ✓ Road Integration Requires Time and Effort
- ✓ V2X Technology Standards Keep Evolving
  - *focus on software/data intelligence, be hardware independent*
- ✓ Local Technology Knowledge & Organizational Capacity
- ✓ Regional Coordination needed
  - *regulations, technology/standards, cross border testing*

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Roadmap to Full Impact in Qatar

2011/12 — V2X R&D Initiative, Hosted ETSI Workshop

2014 — 1st Live Field Demo of V2X System in MENA region

2020/21 — National Technical Pilot in Qatar

2024-2026 — Full Integration with Road Sub-Systems, Early Deployment

2027+ — Large Scale Deployment, Autonomous Support

Completed

Forecast