Pole position with satellite navigation: Leading with precise time and exact location

Connected Cooperative Automated Mobility, CCAM

Tugrul Güner | January 2025

Time and Position
relevance for CCAM &
C-ITS

Content

Connected Vehicles and Co-operative ITS

Connected Vehicles and Co-operative ITS change road traffic.

Traffic Safety

Vehicles and infrastructure are progressing from passive systems for protection to active systems for prevention and automated driving in the future. The milestones are awareness, sensing and co-operation.

Environment and Emissions

Environmental impact and reduction of emissions shall not be limited to only individual contributions which are necessary and are improved by new technologies but also to co-operative optimization.

Services and Convenience

Co-operative ITS based on Connected Vehicle technologies and their deployment enable electronic tolling, access services and enforcement processes seamlessly operate on interoperable platforms and resolve silos and improve operation and efficiency.
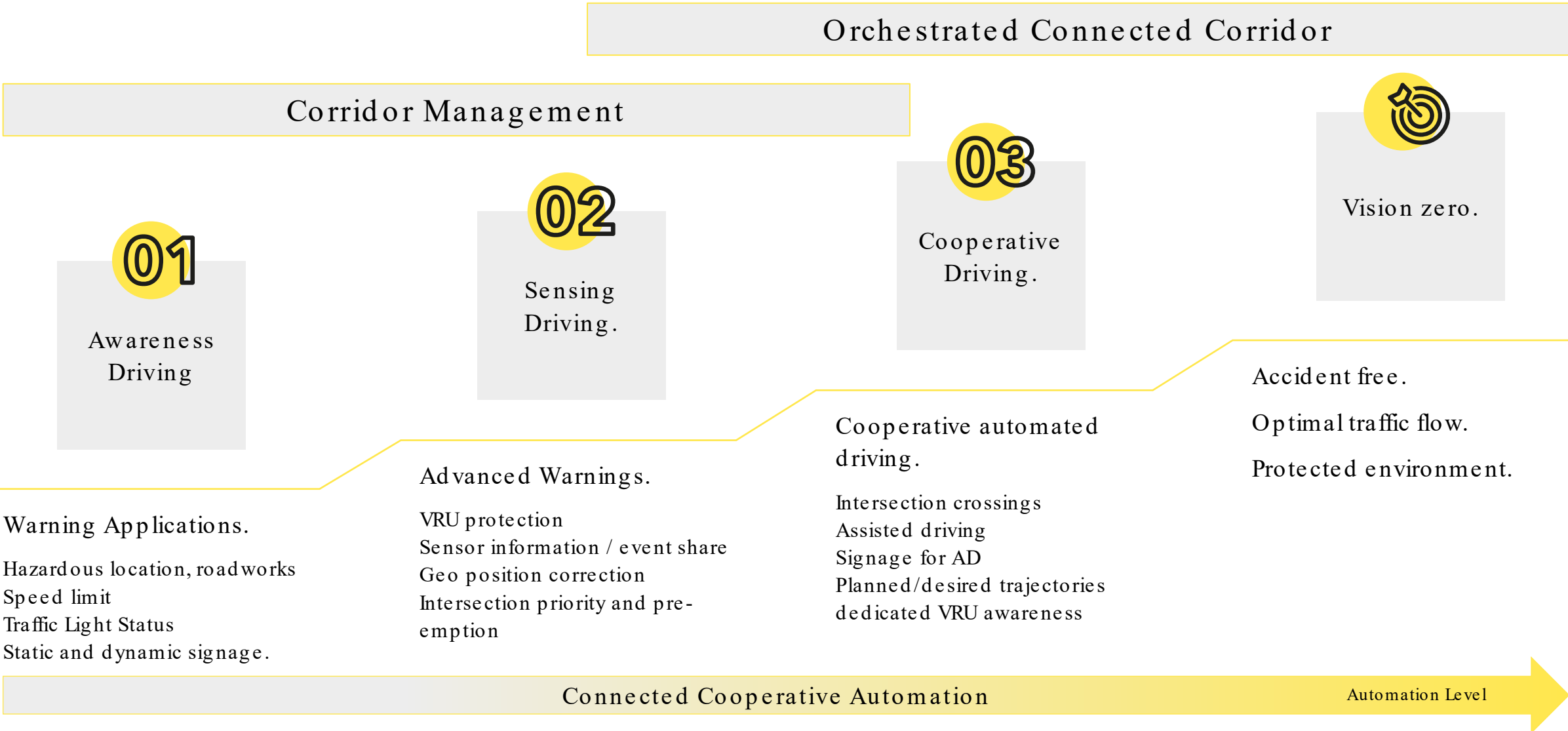
Congestion and Travel Times

Advanced and Smart Traffic Management and controlled intersections in urban areas progress and evolve by creation of Orchestrated Corridors and implementation of Demand Management based on Connected vehicles and Co-operative traffic participants.

Connected Vehicles and Co-operative ITS

Connected automated driving for safety and mobility.

Orchestrated Connected Corridor

Corridor Management

01

Awareness Driving

Warning Applications.

Hazardous location, roadworks
Speed limit
Traffic Light Status
Static and dynamic signage.

02

Sensing Driving.

Advanced Warnings.

VRU protection
Sensor information / event share
Geo position correction
Intersection priority and pre-emption

03

Cooperative Driving.

Cooperative automated driving.

Intersection crossings
Assisted driving
Signage for AD
Planned/desired trajectories
dedicated VRU awareness

Vision zero.

Accident free.

Optimal traffic flow.

Protected environment.

Connected Cooperative Automation   Automation Level

Services

Phase 1 and 1+

Cooperative Awareness Service

Time is the reference and

position, speed, direction.

Additional sensor data e.g. breaks, lights, wipers, ABS.

Decentralized Environmental Notification Service

Time is the reference and

position, event, details.

Details e.g. roadworks, broken vehicle, accident, congestion, weather ….

In Vehicle Information

Time is the reference and

position, traffic sign or text.

Information similar to VMS speed limit, lane closure, free text ….

Signal Phase and Timing

Time is the reference and

lane reference to MAP traffic signal status and time remaining until next status change.

MAP

Road topology, description e.g. to be used at intersections to complement signal phase and timing.

Almost static.

Collective Perception Service

Time is the reference and

sensor information provided by neighbour stations e.g. pedestrians, bi-cycles, obstacles or wild animals….
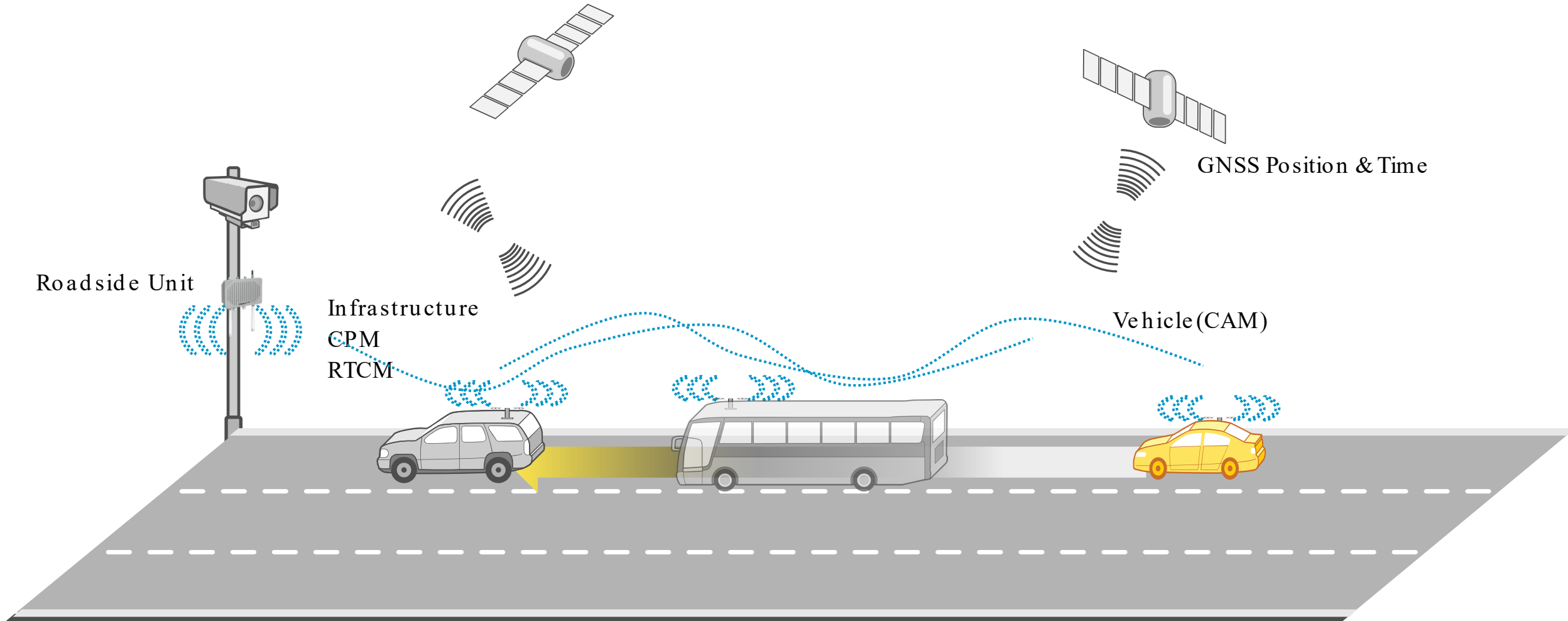
Service Requirements

Position and Time
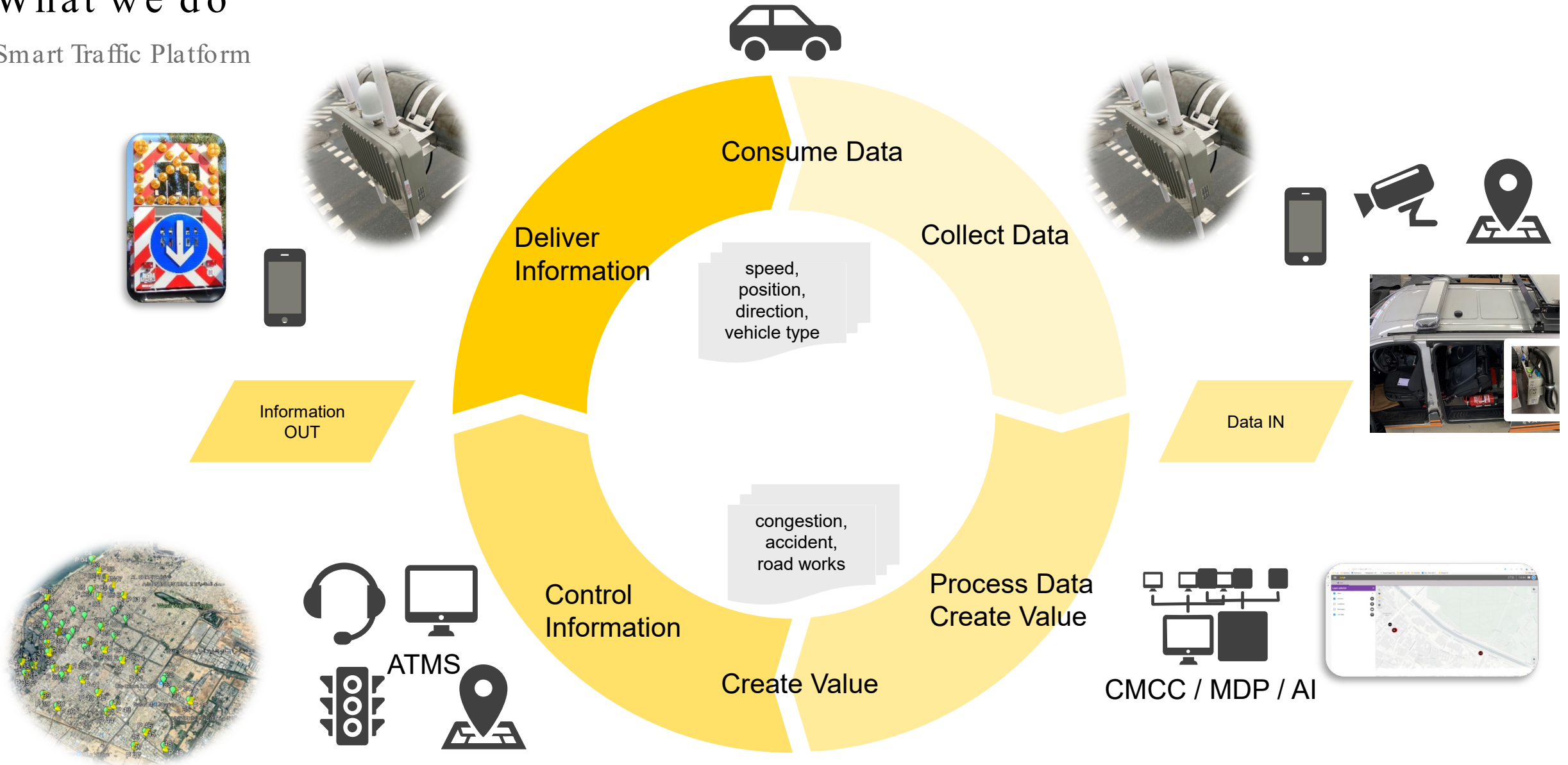

GNSS Position & Time

C-ITS
SPaT & MAP
CAM
SRMEM / SSMEM

Vehicle

L3

L2

L1

~3.9m

Traffic Light Controller
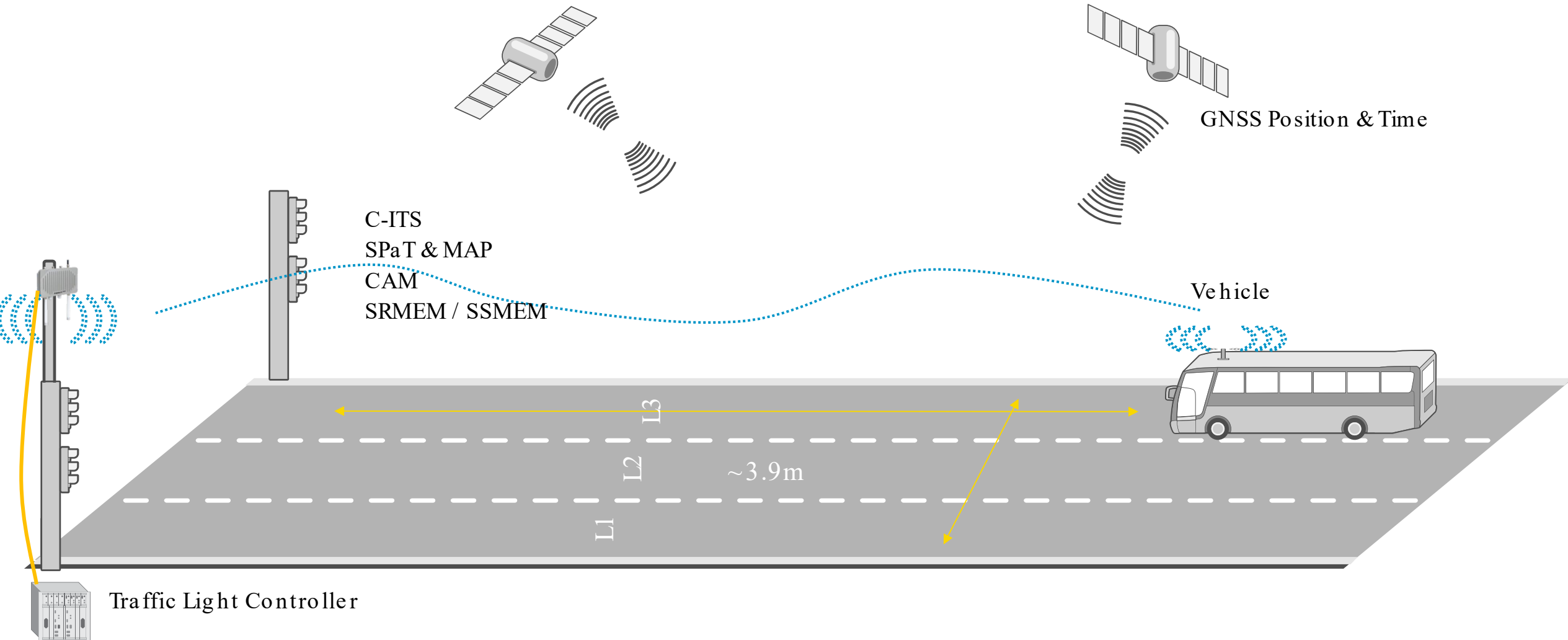
Extending the Horizon

eHorizon beyond LOS sensors

GNSS Position & Time

Roadside Unit

Infrastructure
CPM
RTCM

Vehicle (CAM)

What we do

Smart Traffic Platform

Consume Data

Collect Data

Deliver Information

Process Data
Create Value

Control Information

Create Value

speed, position, direction, vehicle type

congestion, accident, road works

Information OUT

Data IN

ATMS

CMCC / MDP / AI

Wireless Communication Products

Connected Vehicle

Product Management
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