

# Smart Mobility Hub: V2X-based Supervision System

Built on the **Smart Mobility Hub architecture**, the intelligent road and traffic management system leverages sensors, cameras, drones, and V2X communication to integrate real-time data and deliver deep learning (DL)-based predictive supervision to connected vehicles, including carpooling fleets and other smart mobility devices.

-  **Tested in** Yvelines (Île-de-France)
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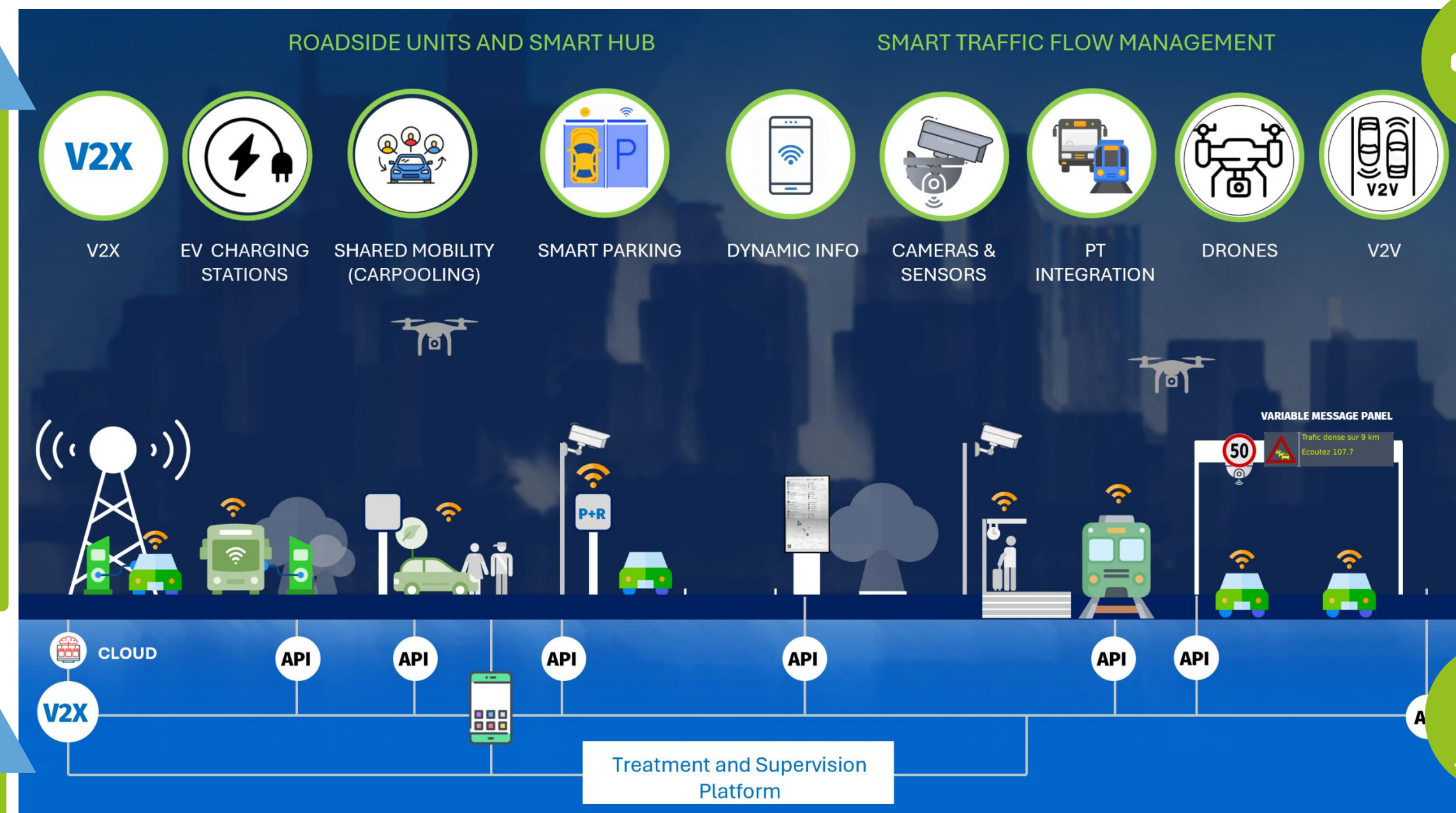
## Data Requirements

- Free space at the parking lots (Occupancy)
- Camera & sensors data (Traffic flow, speed, OD)
- Drone data (Trajectories, congestion level)
- State vector of ego vehicle
- Public transport operation data (Schedules & services)



## Decisions

- Shares real-time and aggregated supervision based KPIs with operators, connected devices and connected vehicles
- Trains, learns & predicts demand, occupancy, speed profile, incidents & infra-service availability at hubs



## Methods

Embedded Software Stack:

- Spatiotemporal integration of big data via V2X
- Deep learning forecasting model (e.g., graph transformer-based architecture) for mobility sensing



## Scalability

- The architecture enables modular integration of mobility solutions and infrastructure into system
- Supports synchronization of services through inter-hub communication
- Ensures interoperability with new mobility hubs

The **metaInnovation** involves technological & operational setup

- **Infrastructure:** Sensors & camera, V2X, drones, EVs, Parking, Train-Bus Stations
- **Communication:** CV2X radio unit enhancing TCU capability with support from a V2X gateway module for edge/cloud deployment
- **Protocol:** ETSI's new message standard for V2X in **smart parking management**
- **Testing:** System performance and efficiency evaluated in integrating multimodal public transport with low-emission EV-based carpooling services
- **Fine-tuning:** Spatiotemporal integration of big data using a DL model