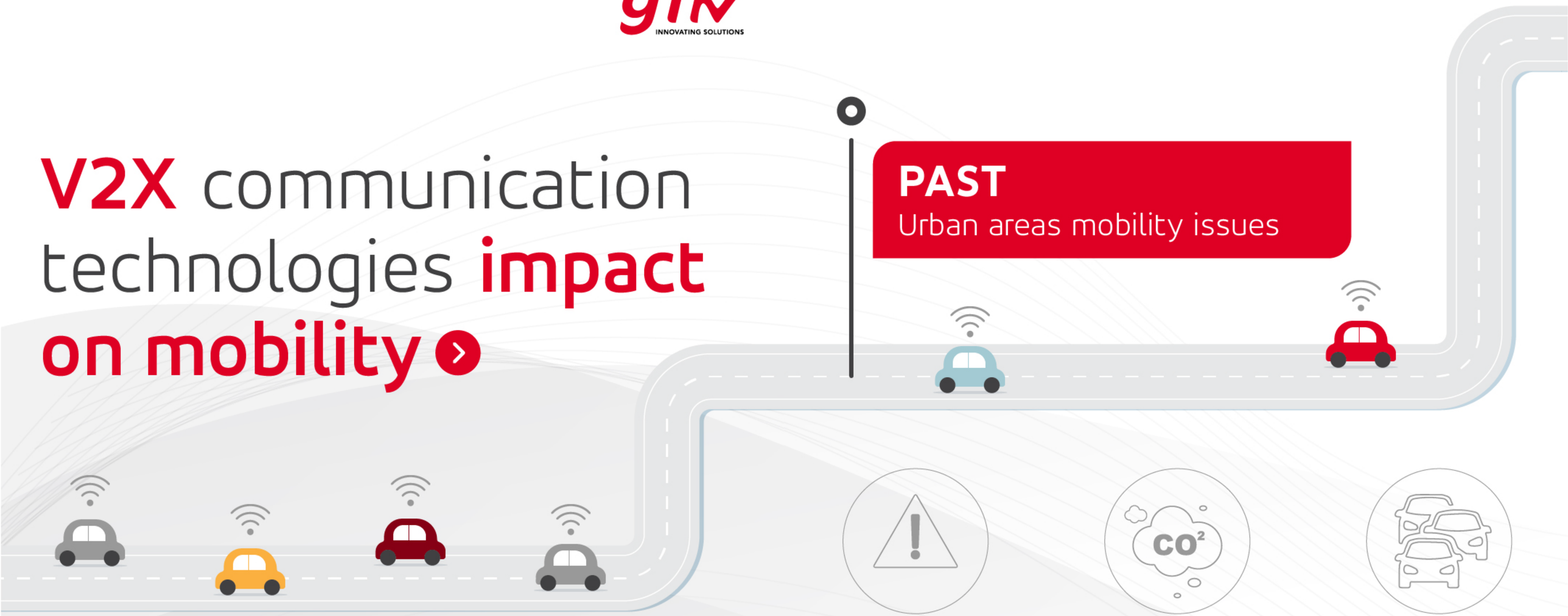
V2X communication technologies impact on mobility

PAST
Urban areas mobility issues



Road safety problems

Environmental emissions

Congestions

NOW

V2X (Vehicle-to-everything) communication technologies, the key to C-ITS:

1. MOBILITY IMPROVEMENTS:

Safer

Improved awareness leads to fewer and less critical accidents

Quicker

Route optimization + speed based on real-time traffic information

Sustainable

Less emissions, less traffic, less time driving

2. TECNOLOGY:

Wireless signals allow actors (car, bus, infrastructure, pedestrians, cyclists) to **talk to each other.**

Single-centralized-platform coordination: real-time, predictive & reactive information.

Notifications among these actors:

- If **traffic rules** are not respected.
- **Localization of actors** (position, speed and direction).
- **Potential hazards.**

Enabler of **autonomous driving**.

Roadmap of use cases for V2X technology

DAY 1

AWARENESS DRIVING

Warning Applications
Road Works Warning

Examples:
- Lane Closure
- Mobile Road Works
- Road Closure

Hazardous Location Notification

Examples:
- Accident Zone
- Animal or Person on the Road
- Traffic Jam Ahead
- Emergency Vehicle Approaching
- Stationary Vehicle

Information from infrastructure
In-vehicle signage

Examples:
- Dynamic Speed Limit
- Other Signage Information
- Embedded VMS “Free Text”

DAY 2

SENSING DRIVING

Advanced Warnings + Cooperation with traffic light controllers
Signalized Intersections

Examples:
- Signal Phase and Timing Information
- Imminent Signal Violation Warning
- Traffic Light Prioritization
- Emergency Vehicle Priority

VRU Protection
Vulnerable Road User

Examples:
- VRU Crossing a road
- Emergency Electronic Brake Light
- Intelligent traffic lights for all

DAY 3

COOPERATIVE DRIVING

Collective Perception Service

Examples:
- Detection of non-connected road users
- Detection of safety - critical objects

V2V safety applications

Examples:
- Forward collision warning
- Intersection movement assist
- Control loss warning

V2X Use Cases deployed by GMV

DAY 1 — **AWARENESS DRIVING**

Warning Applications

- Road Works Warning

Information from infrastructure

- In-vehicle signage

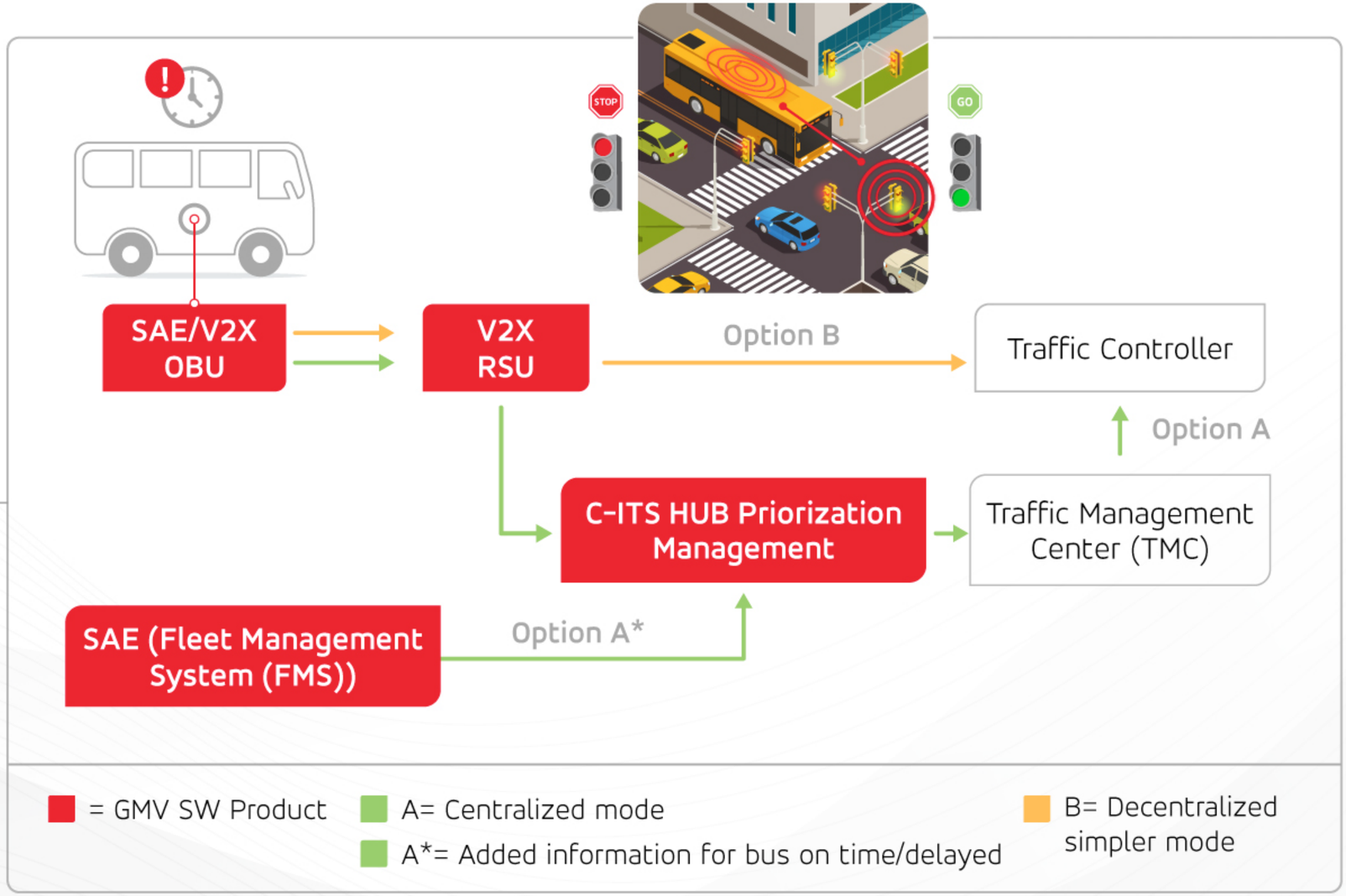
DAY 2 — **SENSING DRIVING**

Traffic Light Prioritization

DAY 3 — **COOPERATIVE DRIVING**

Collective Perception Service

V2V safety applications



V2X Use Cases deployed by GMV (II)

DAY 1 — **AWARENESS DRIVING**

Warning Applications

- Road Works Warning

Information from infrastructure

- In-vehicle signage

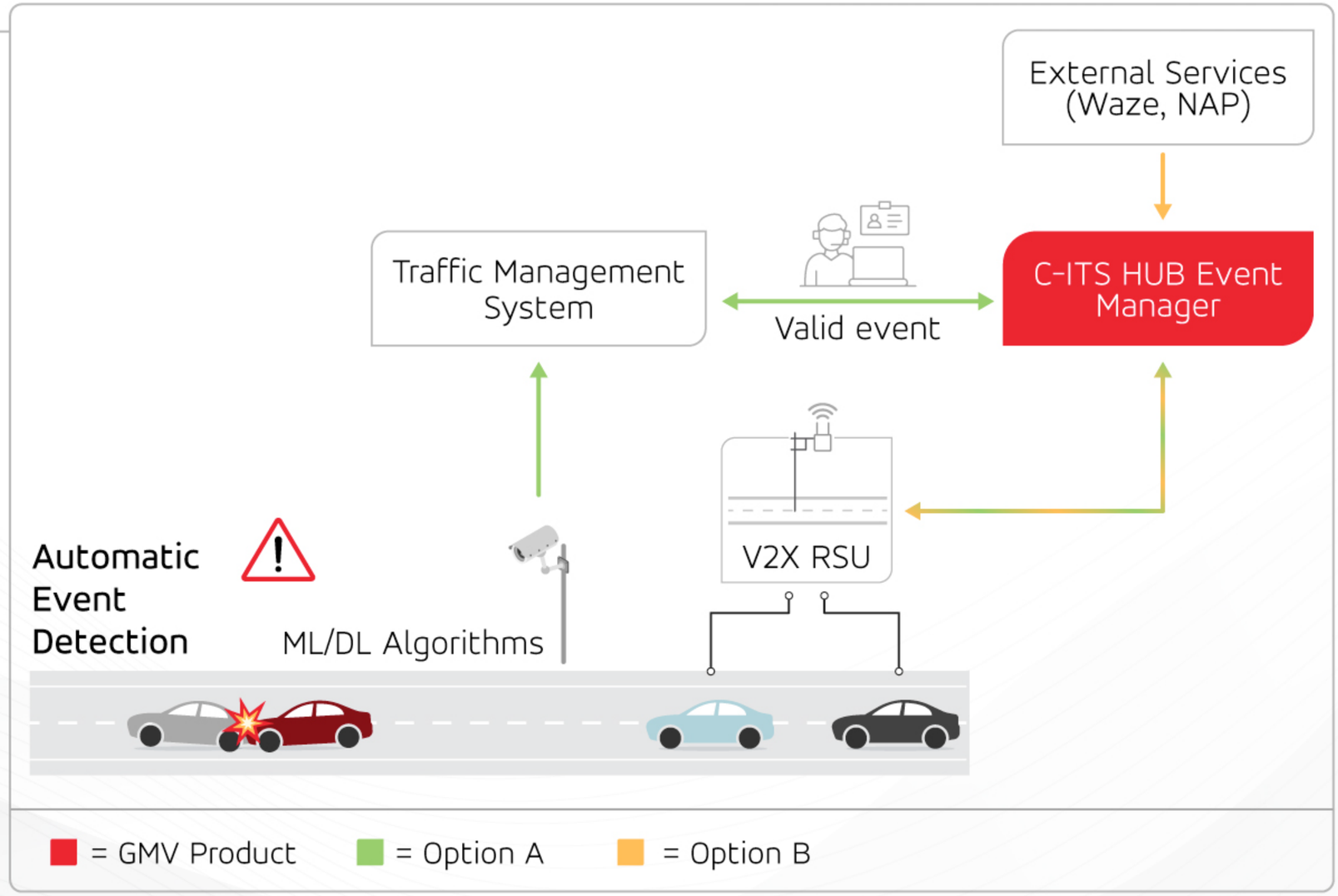
DAY 2 — **SENSING DRIVING**

Traffic Light Prioritization

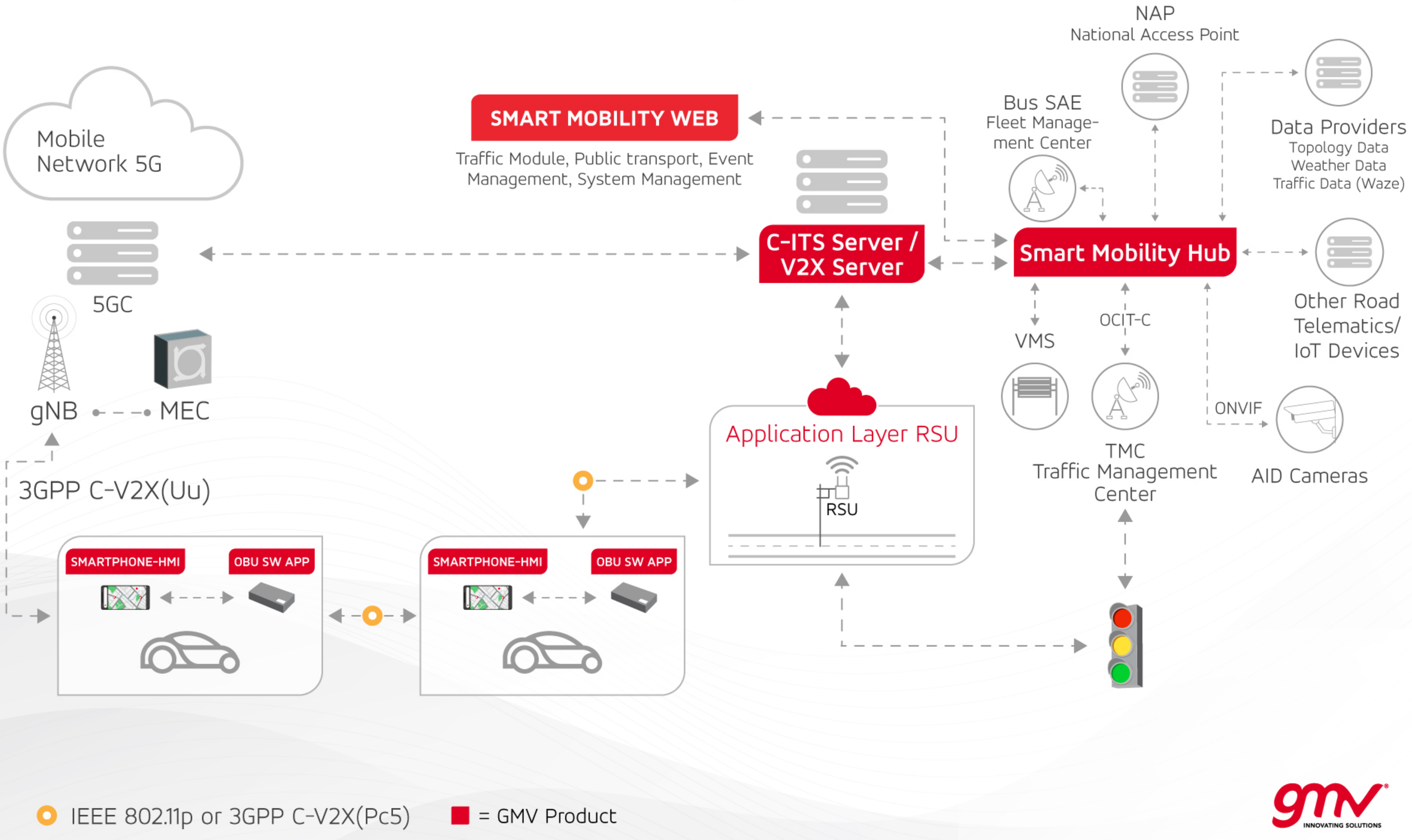
DAY 3 — **COOPERATIVE DRIVING**

Collective Perception Service

V2V safety applications



GMV Smart Mobility Suite solution



IEEE 802.11p or 3GPP C-V2X(Pc5)

= GMV Product