

**MAVEN (Managing Automated Vehicles Enhances Network)**

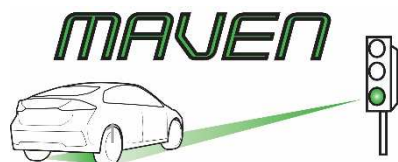
**Project introduction  
as input to the C2C-CC roadmap**

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C2C-CC WG Roadmap meeting  
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Honda R&D Europe GmbH – Offenbach, Germany



MAVEN is funded by the EC Horizon 2020 Research and Innovation Framework Programme, under Grant Agreement No. 690727



# General Information

## ❑ Full title

- ✓ Managing Automated Vehicles Enhances Network

## ❑ Duration

- ✓ 36 months (Sept '16 – Aug '19)

## ❑ Funding

- ✓ ~3M€ under EC H2020 programme

## ❑ Partners:

- ✓ From five countries: DE, NL, CZ, BE, UK



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# Project Summary

## ❑ Assumption:

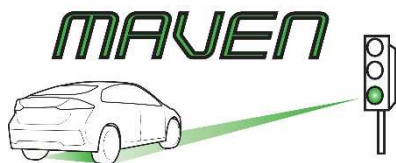
- ✓ In future cooperative automated driving, road infra can play a key role in monitoring and support vehicle traffic for increased efficiency and safety

## ❑ Objective:

- ✓ Provide automated vehicles management solutions based on I2V and V2V interaction for urban signalized intersections & corridors

## ❑ Approach:

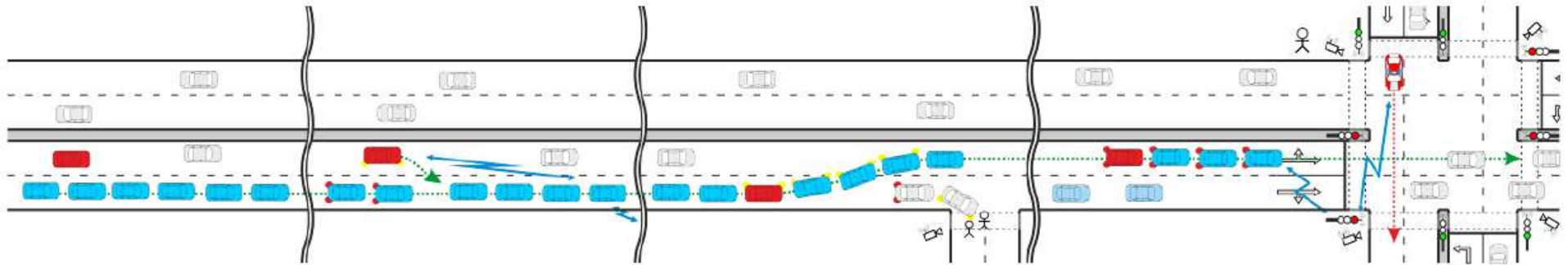
- ✓ Create algorithms (at both infra and vehicle side) for optimally organizing the automated traffic flow (e.g. I2V Negotiations, platooning)
- ✓ Develop suitable enabling technologies (e.g. Comms schemes)
- ✓ Include conventional traffic and VRUs
- ✓ Test/prove via simulation and real-world prototype (ITS G5-based)



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# Use cases overview



## ❑ I2V interactions

- ✓ Negotiation, speed change advisory, lane change advisory

## ❑ Traffic controllers optimization

- ✓ Signal optimization, priority management, queue estimation, green wave

## ❑ Platoon management

- ✓ Forming, joining, travelling in, leaving, breaking a platoon

## ❑ Conventional traffic and VRUs

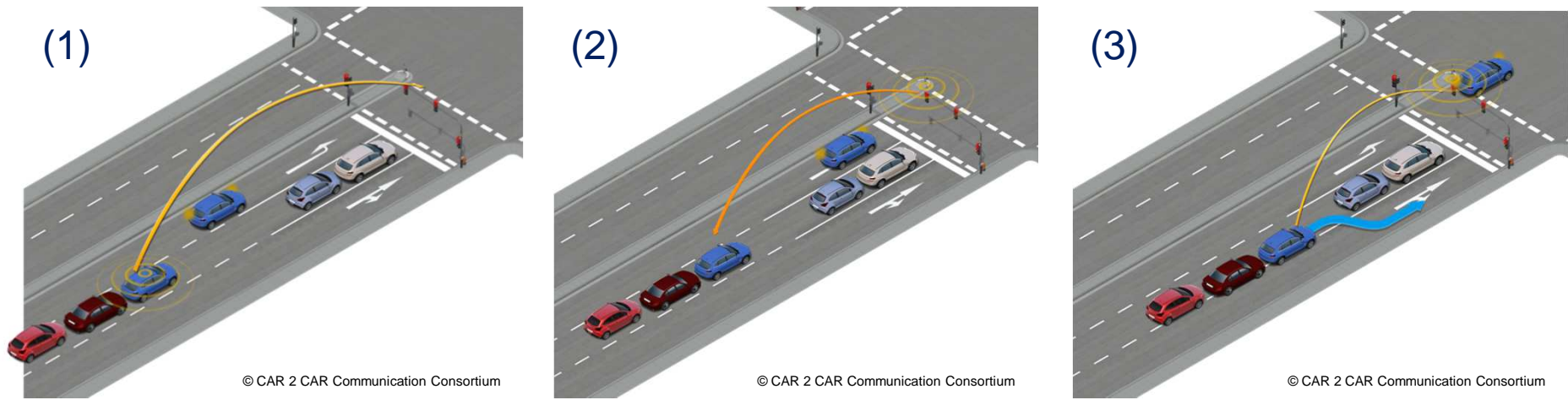
- ✓ Detection of non-coop cars, VRUs, emergency situations



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# MAVEN I2V interactions



## ❑ Negotiation (1)

- ✓ Vehicle and/or platoon transmits expected route, desired speed, platoon size, etc.

## ❑ Infra advisories - negotiation (2)

- ✓ Based on rx info, suggestions to adapt speed and/or change lanes

## ❑ Negotiation (3)

- ✓ Vehicle and/or platoon communicates if suggestion can be executed → gives more inputs for infra optimization algorithms

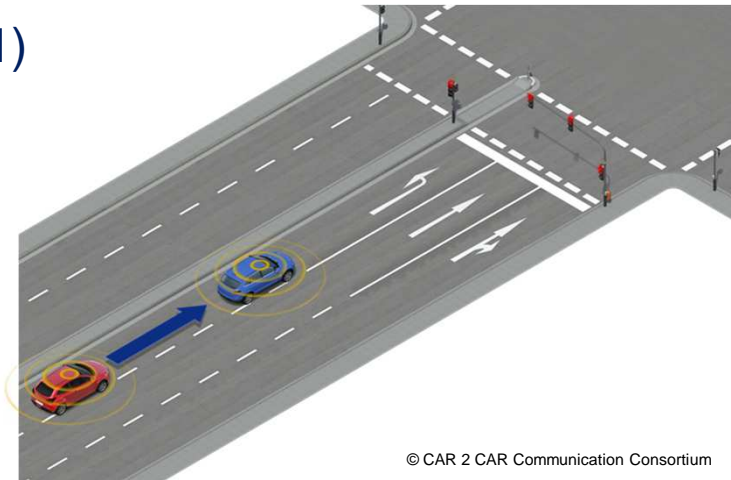


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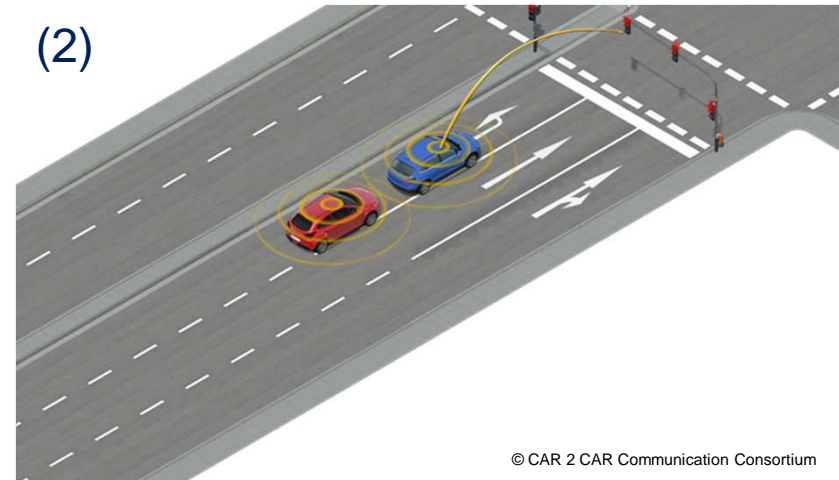
# MAVEN platooning

(1)



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(2)



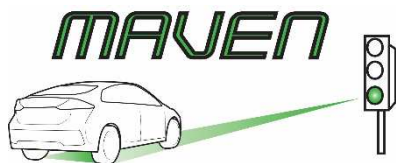
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## ❑ Mix between distributed and centralized approach

- ✓ Based on common distributed algorithm and V2V exchanged info, individual vehicles form platoons and manage their operation (joining, leaving, etc.) (1)
- ✓ Yet, platoon leader has the central role of communicating platoon properties to the infra (2)

## ❑ Use of 2 parallel radio channels

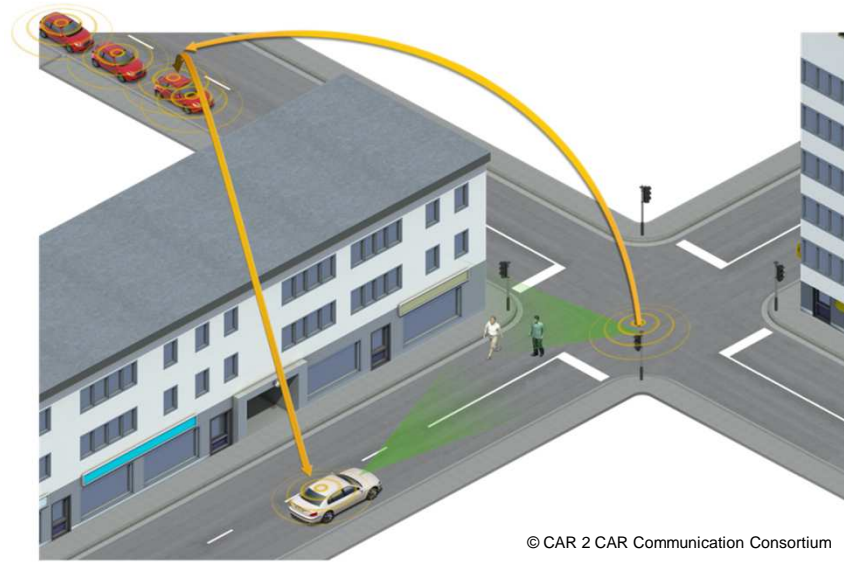
- ✓ One for advertising vehicle and/or platoon characteristics to other vehicle or infra
- ✓ The other, to transport platoon control and management info



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# Inclusion of conventional traffic and VRUs



## ❑ Use of cooperative sensing for improved detection and reaction

- ✓ Both vehicles and infra can detect and share info about non-cooperative road users
- ✓ Improved awareness used to adapt vehicle trajectory for ensuring increased safety

## ❑ Management of emergency situations

- ✓ Vehicles in platoon keep monitoring the environment and controlling the system all the time to possibly undertake emergency (automated) reactions



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*Thank you!*

*Questions?*



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