# MCS for managing transition areas in autonomous driving

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# TransAID

Full title:

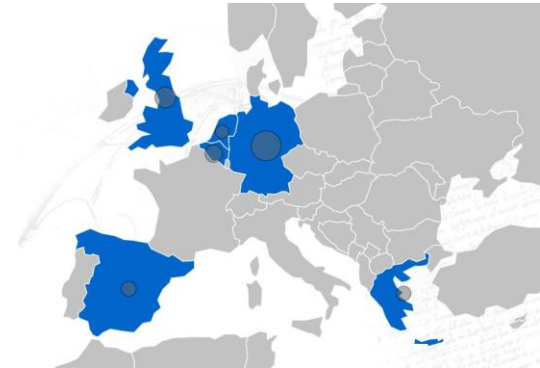– Transition Areas for Infrastructure-Assisted Driving

Duration:

– 36 months (Sept. 17 – Aug. 2020)

Funding:

– ~ 3.8M€ under EC H2020-ART-2016

Partners:

– From 6 countries: DE, UK, BE, NL, GR, ES

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# Project Summary

TransAID develops and demonstrates infrastructure-assisted traffic management procedures, protocols and guidelines for smooth coexistence between automated, connected and conventional vehicles especially at Transition Areas:

- Modelling of automation prototypes and drivers' behaviour

- Simulation of the impact of Transition Areas on traffic safety and efficiency

⇨ Definition of V2X message sets and protocols for cooperative maneuvers and collective perception

- Test and evaluation of the TransAID V2X-aided traffic management procedures in scenarios with cooperative, automated and conventional vehicles

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# Transition Area

Transition area: area where vehicles perform automation level transitions

- Possible reasons: unexpected situation, sensing limitation, external disturbance to automation decisions or executions…

- Example: in a road works area, vehicles must cross a solid lane. Since automation would not allow this, transition of control to driver is requested by the system
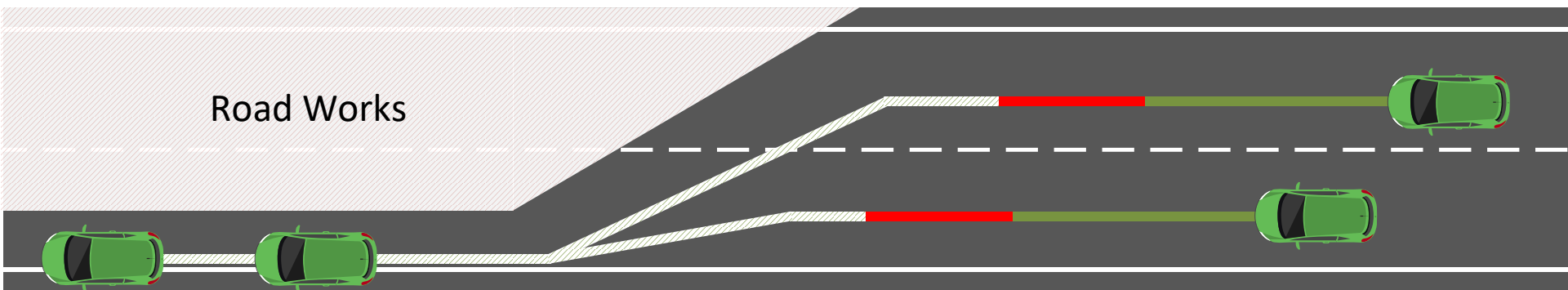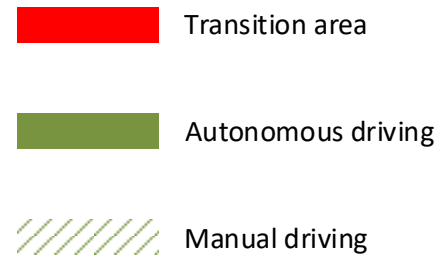
Road Works
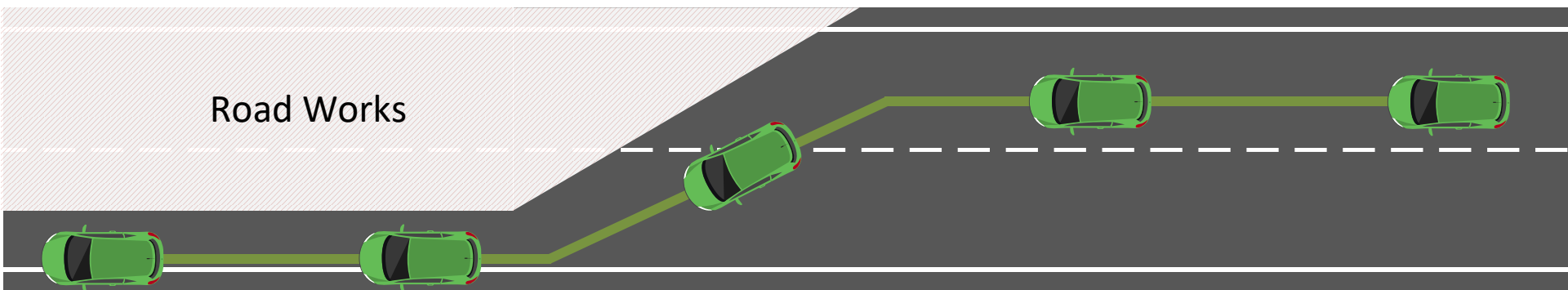
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# TransAID approach

Uncrontrolled transitions can be traffic-inefficient and unsafe (e.g. occurrence of minimum risk maneuvers)

TransAID approach: utilize V2X and cooperative maneuvers to

- Prevent transitions whenever posible
- Manage transition of vehicles
- Distribute in time and space transitions of vehicles

Transition area

Autonomous driving

Manual driving

Road Works

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# MCM road works use case

1. Slow down drastically vehicle A to avoid collision

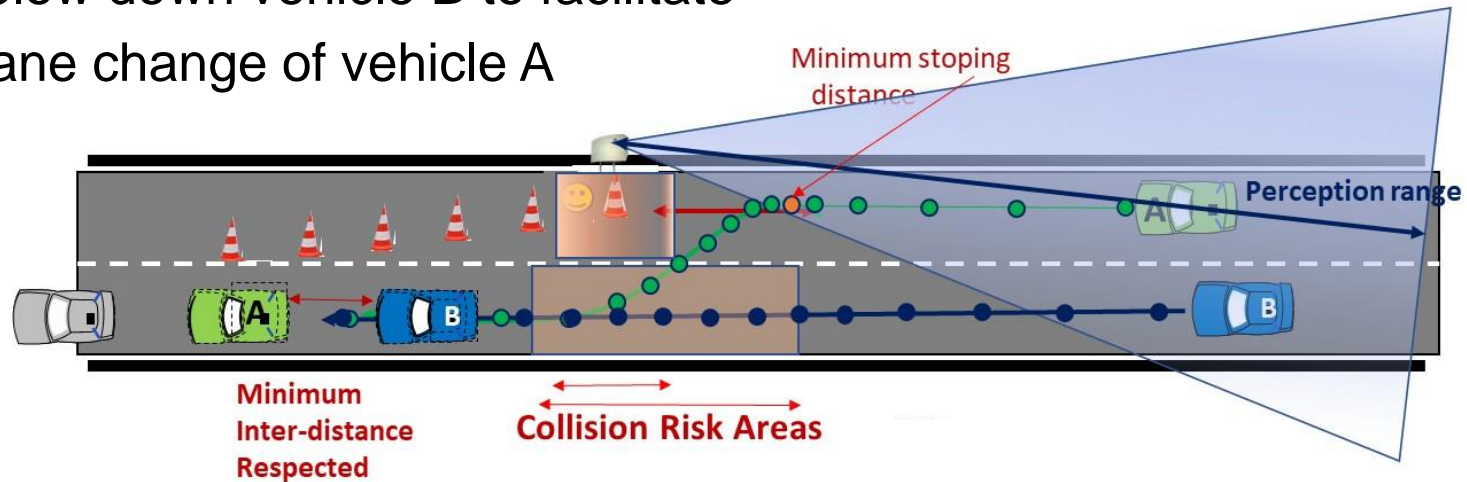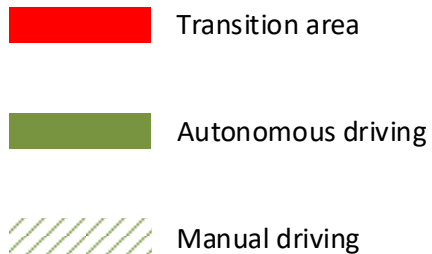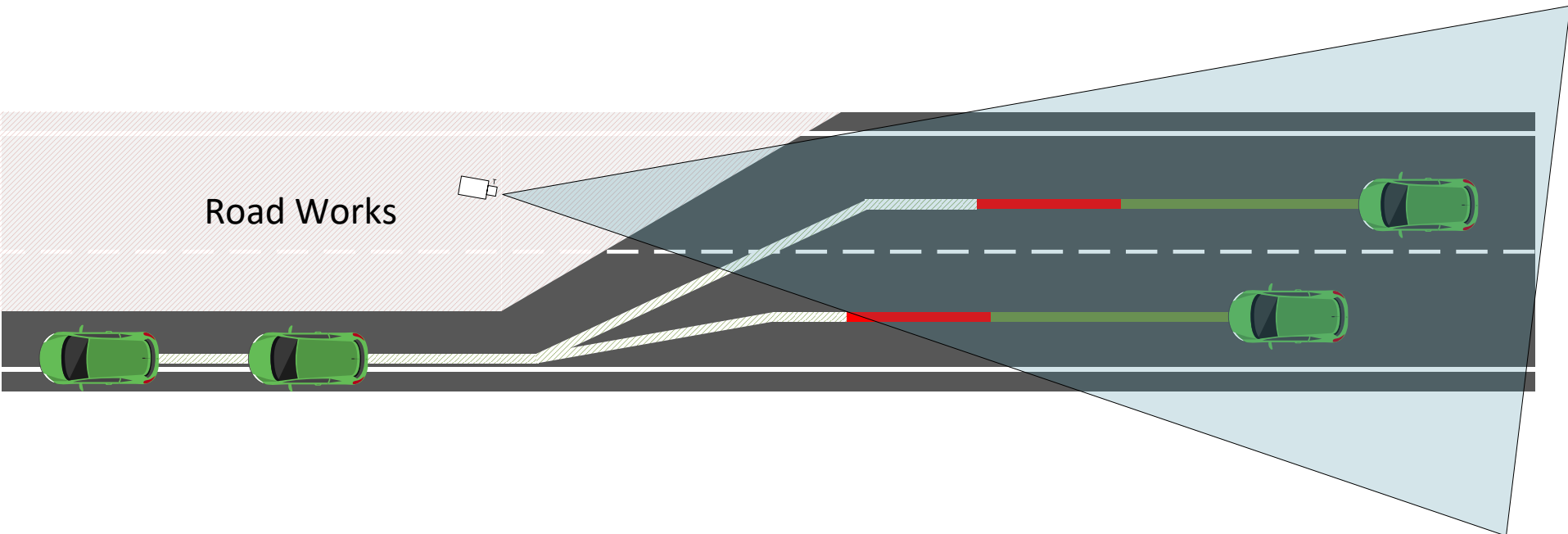2. Slow down vehicle B to facilitate lane change of vehicle A



Image obtained from ITSWG1(18)042007 Specification of Manoeuvre Coordination Service document by Gérard Ségarra.

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# TransAID example of road works use case



Road Works

**Transition area** (red)

**Autonomous driving** (olive)

**Manual driving** (hatched)

- Scenario: transition to manual driving needed
- TransAID: manage and distribute transitions
- Infrastructure-assisted: transition policies could be centrally managed and distributed using I2V
- V2V cooperative maneuvers: local support to execute policies

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# MCM lane merging use case

1. Option 1: prioritize vehicle A

2. Option 2: prioritize vehicle B

3. Option 3: lane change of vehicle B



**Perception Distance**

**Collision Risk Area**

**Highest Risk Spot**

**RSU**

Similar approach in TransAID:

prevent transitions as 1st option

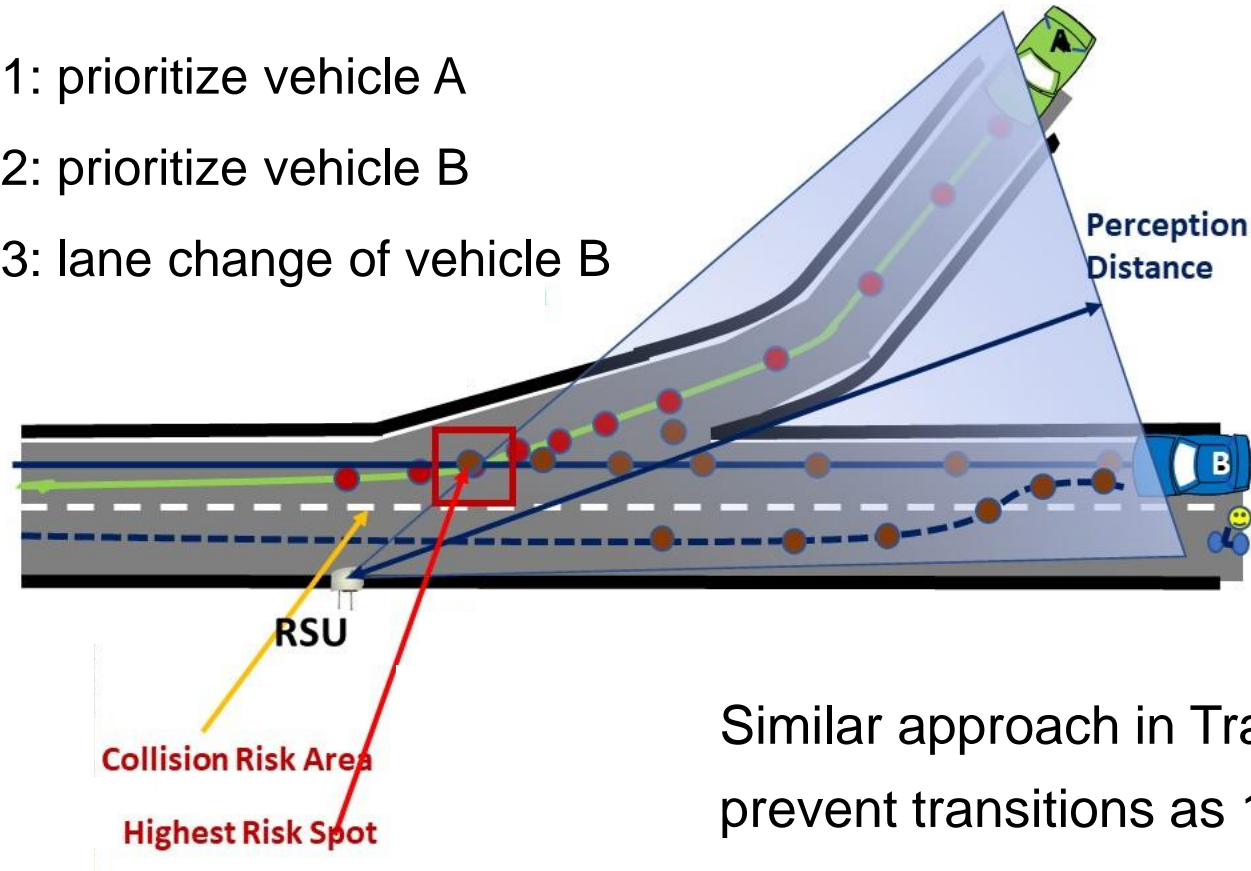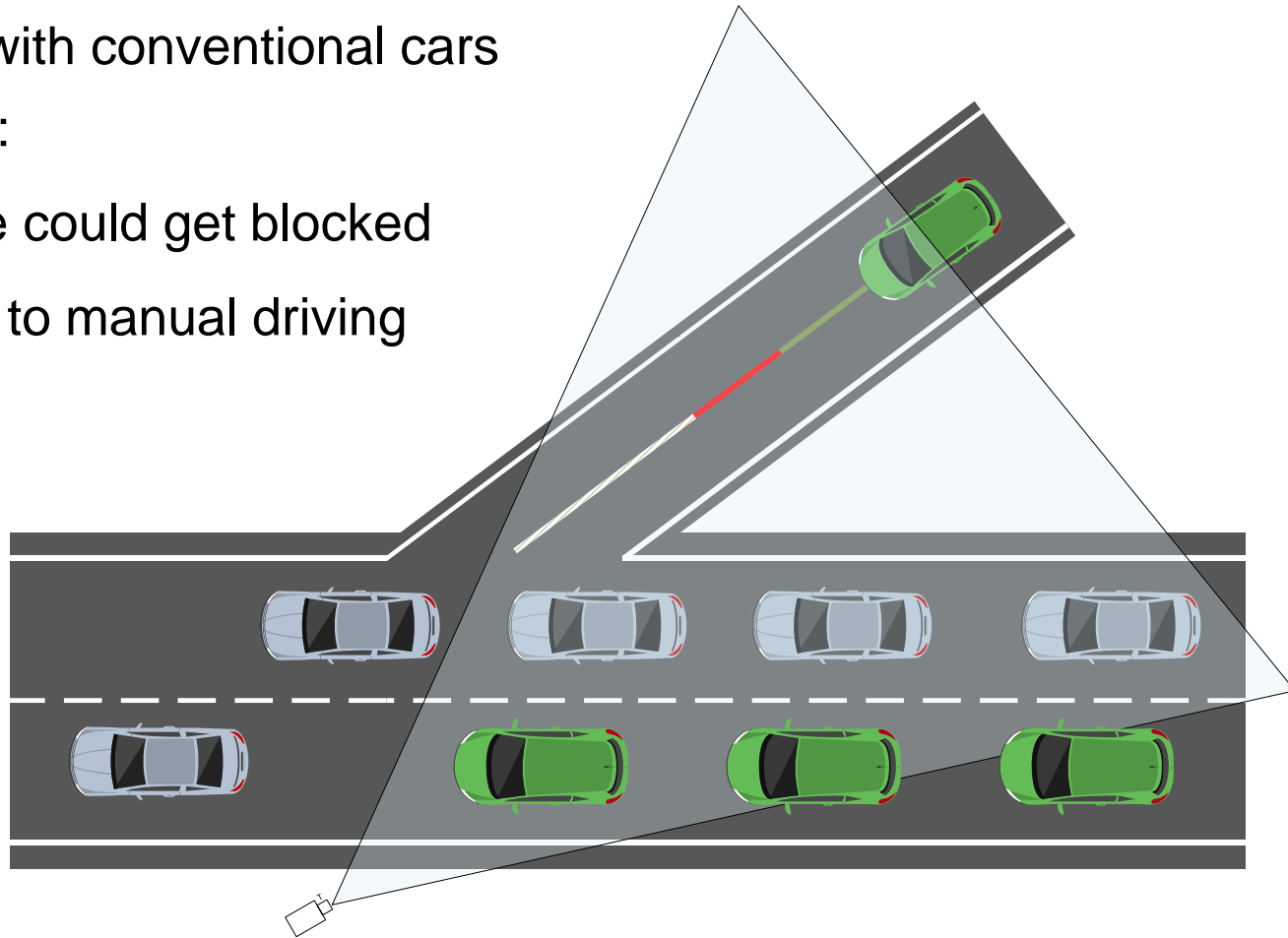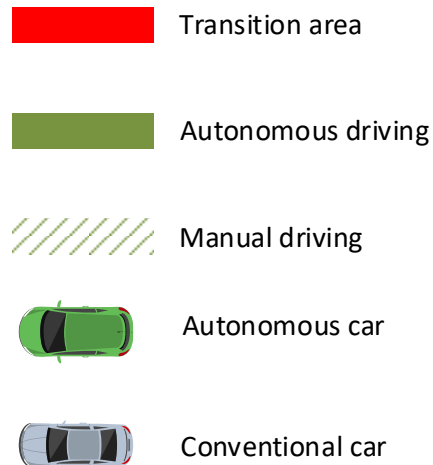Image obtained from ITSWG1(18)042007 Specification of Manoeuvre Coordination Service document by Gérard Ségarra.

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# TransAID example of lane merging use case

Dense traffic situation with conventional cars
blocking road entrance:

⇨ Autonomous vehicle could get blocked

⇨ Perform a transition to manual driving

**Transition area**

**Autonomous driving**

**Manual driving**

**Autonomous car**

**Conventional car**

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# **Proposal**

Employ the Maneuver Coordination Service to:

- – Prevent transitions with cooperative maneuvers

- – When transitions cannot be prevented: coordinate vehicles within transition areas

    - • Extend cooperative maneuvers to manage and distribute transitions

TransAID/CoEXist/Maven Workshop

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# Thank you

# Questions?

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