



Challenges and solutions for maneuver coordination

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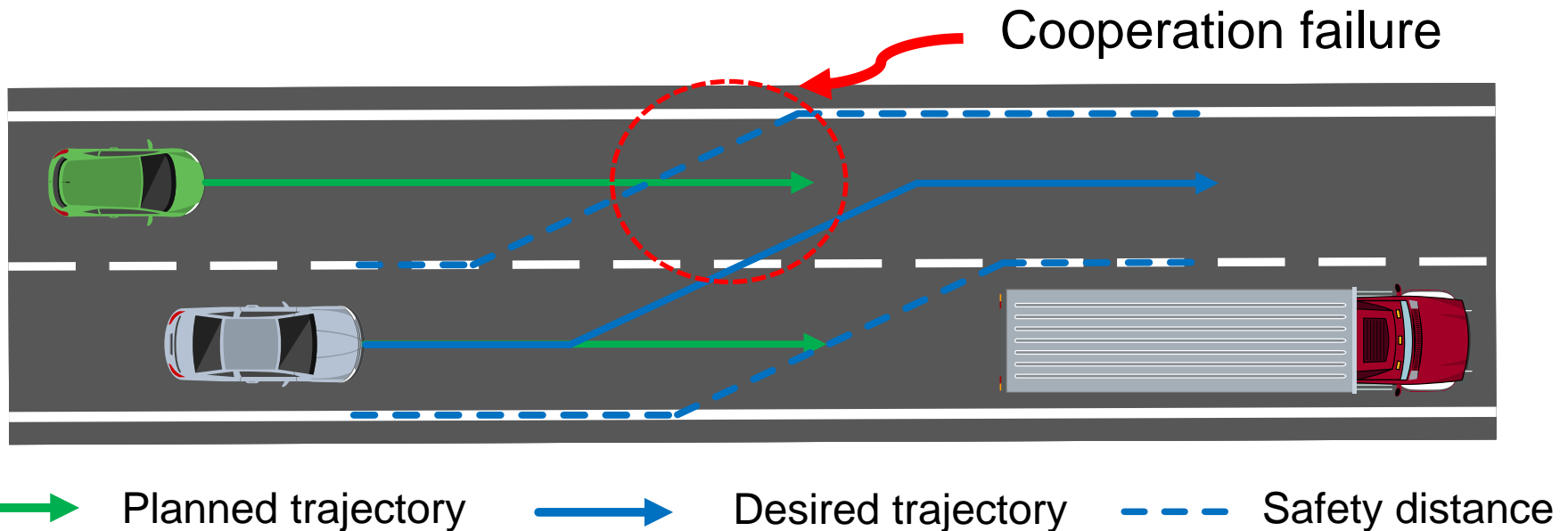


Content

- Challenges identified:
 - Different safety distances for different vehicles
 - CAVs unwillingness to cooperate
 - Limited perception capabilities of CAVs
 - Uncertainties during Transition of Control
- Message format concept proposal
- Conclusions

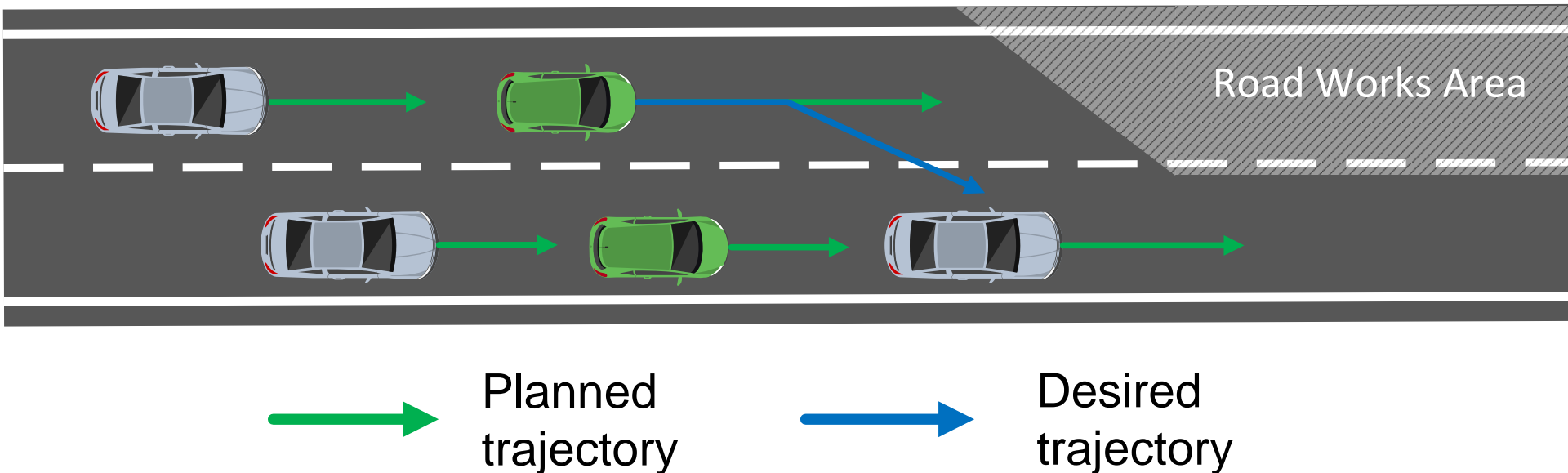
Different safety distances for different vehicles

- Cooperation fails if vehicles use different safety distances to adapt planned trajectories
- Potential solutions:
 - Include required safety distance in MCM
 - Create common rules for cooperation



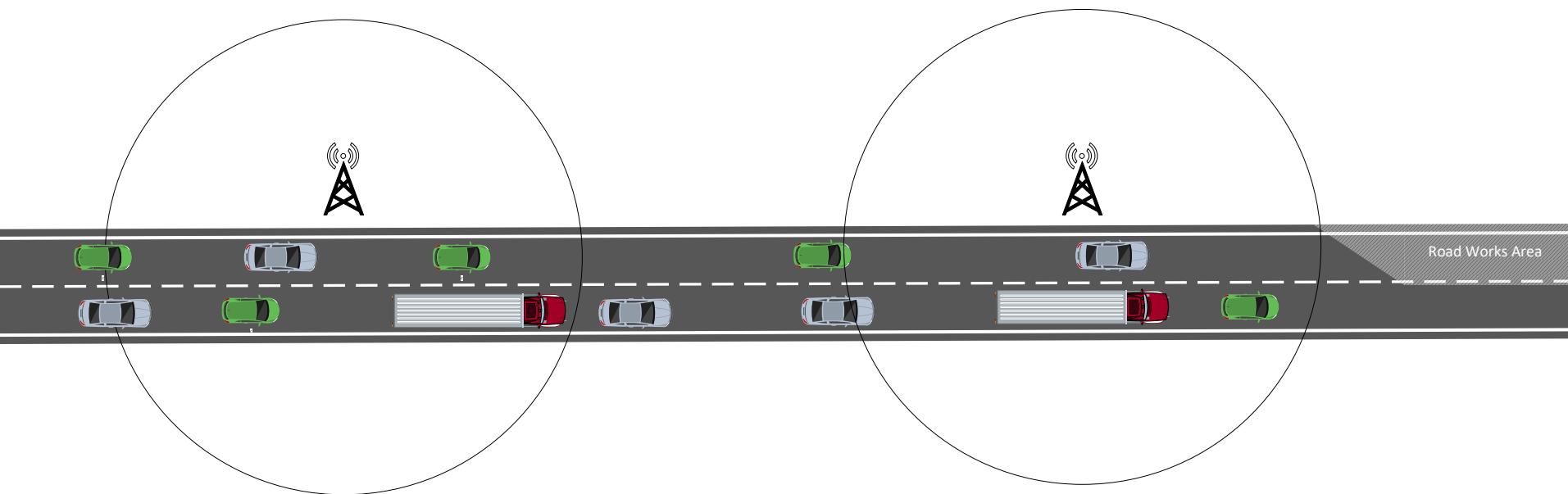
CAVs unwillingness to cooperate

- CAVs might not let other vehicles pass if they are not obliged to: potential traffic jam
- Potential solutions:
 - Common rules (in all countries)



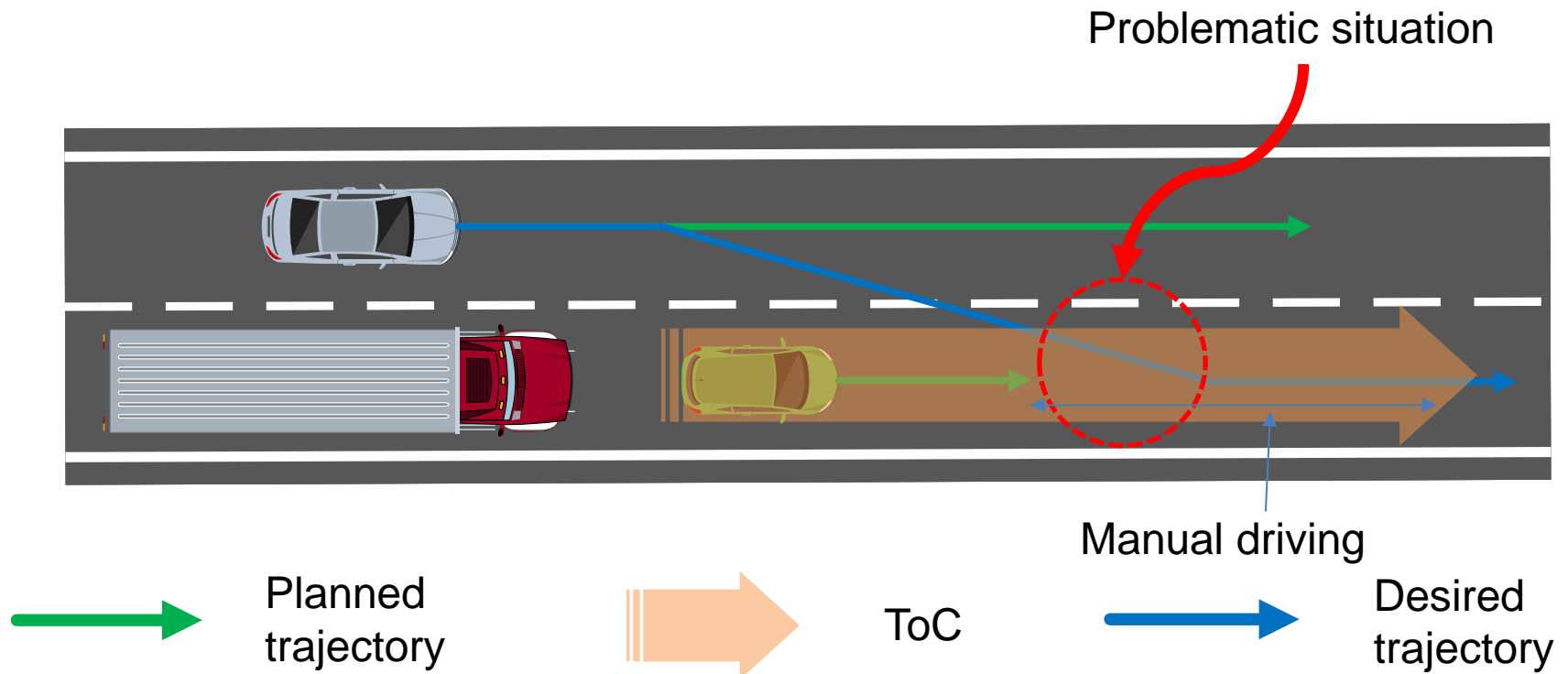
Limited perception capabilities of CAVs

- CAVs cannot perceive the environment at more than one hop (e.g. CAM and CPM)
- Potential solutions:
 - Infrastructure advices for cooperation



Uncertainties during Transition of Control

- A CAV doing a Transition of Control (ToC) to manual driving cannot share its exact planned trajectory
- Potential solution:
 - Include additional information for ToC



Multiple ToCs in the same area

- Complex traffic situations can produce multiple ToCs in the same area that negatively impact traffic safety
- Potential solution:
 - The infrastructure can provide advices to CAVs:
 - Speed advice, Lane change advice, ToC advice, etc.



Message format concept proposal

- Information from the vehicle:
 - Planned maneuver
 - Desired maneuver
 - Vehicle dynamics
 - Information about ToC (time to ToR, time to MRM)
- Information from the infrastructure:
 - List of specific advice for target vehicles:
 - Lane change advice
 - Speed or gap creation advice
 - ToC advice
 - Etc.

Message format concept proposal

MCM	ItsPduHeader (as in [ETSI EN 102 894-2])			
	ManeuverCoordination	GenerationDeltaTime (as in [ETSI EN 302 637-2])		
		MCMParameters	BasicContainer (RefPos + StationType)	
			ManeuverContainer = CHOICE [VehicleManeuver OR RsuManeuver]	RsuManeuver (list target vehicle-specific advices: speed, lane change, transition of control)
		VehicleManeuver (Dynamics + plannedTrajectory + desiredTrajectory + transition of control info)		

Initial version available: [TransAID Deliverable 5.1](#)

Conclusions

- Need for common rules for cooperation
- Don't forget about Transitions of Control
- Let the door open to infrastructure advices



Thank you for your attention!

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Transition of Control process

