



Transition Areas for Infrastructure-Assisted Driving




























‘Vehicle automation: implications for city and regional
authorities’ workshop – 10/10/17, Brussels

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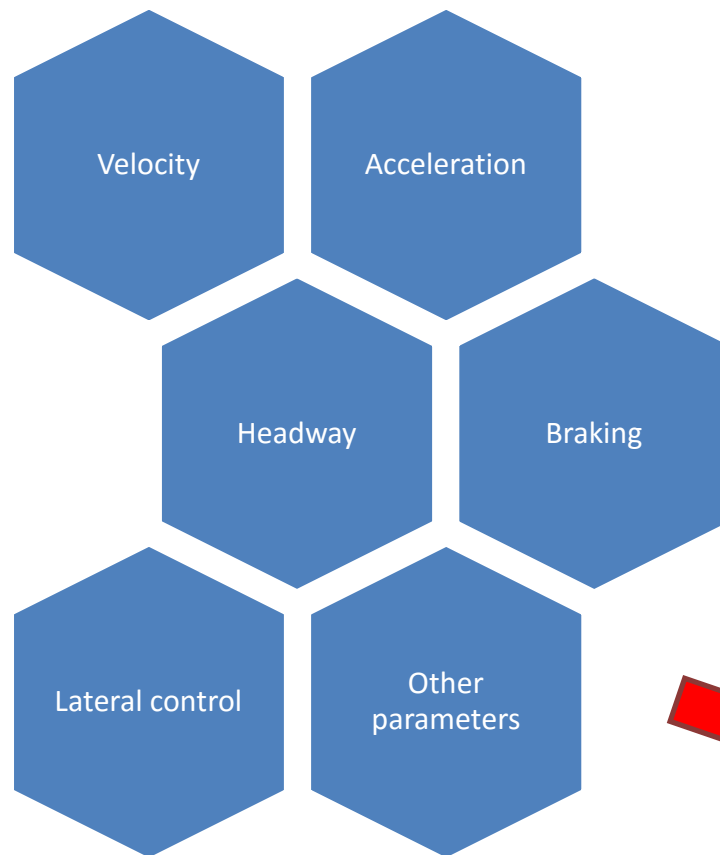
Transitions



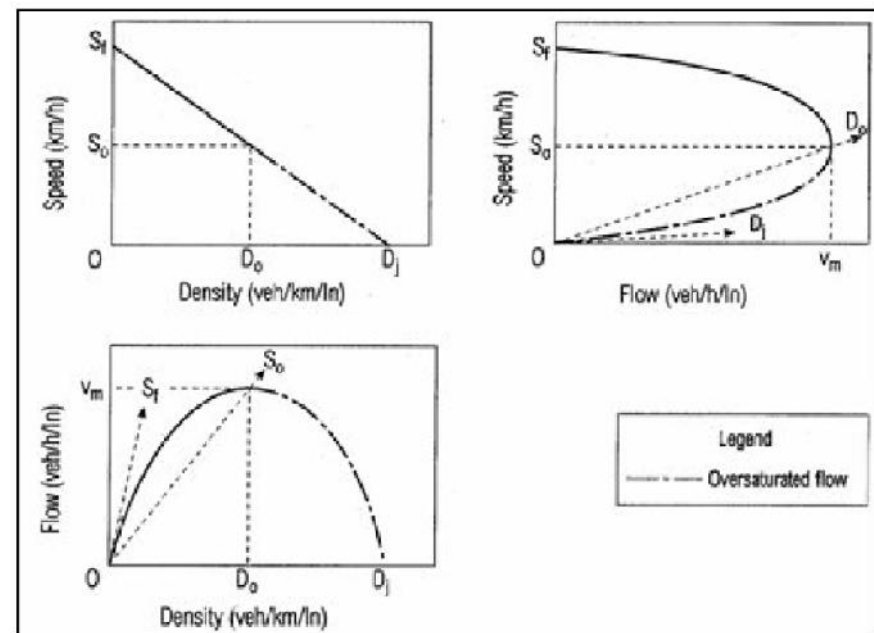
	SAE Level	Name	Steering, acceleration, deceleration	Monitoring driving environment	Fallback performance of dynamic driving task	System capability (driving modes)
Human monitors environment	0	No automation the full-time performance by the human driver of all aspects of the dynamic driving task, even when enhanced by warning or intervention systems				
	1	Driver assistance the driving mode-specific execution by a driver assistance system of either steering or acceleration/deceleration using information about the driving environment and with the expectation that the human driver perform all remaining aspects of the dynamic driving task.	 			Some driving modes 
	2	Partial automation the driving mode-specific execution by one or more driver assistance systems of both steering and acceleration/deceleration using information about the driving environment and with the expectation that the human driver perform all remaining aspects of the dynamic driving task	 			Some driving modes 
Car monitors environment	3	Conditional automation the driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task with the expectation that the human driver will respond appropriately to a request to intervene	 			Some driving modes 
	4	High automation the driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task, even if a human driver does not respond appropriately to a request to intervene			 	Some driving modes 
	5	Full automation the full-time performance by an automated driving system of all aspects of the dynamic driving task under all roadway and environmental conditions that can be managed by a human driver				All driving modes 

Impact of transitions

Driving behaviour



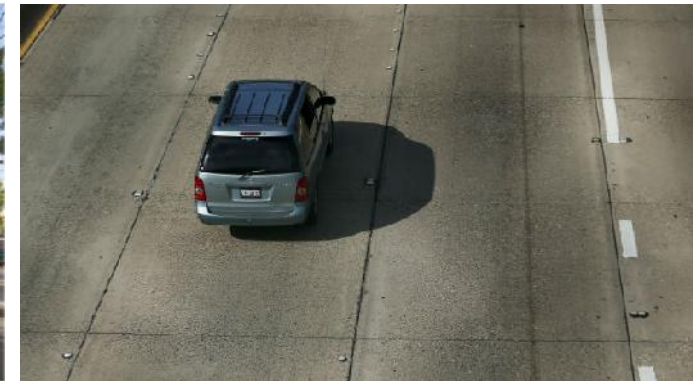
Traffic flow dynamics



Surrogate safety indicators

What if...

- ...your automated vehicle is not able to solve the situation ahead?



- ...this happens not to single vehicles only, but to several?
- ...it always happens on the same location?

Range of reasons

Situation not understood (e.g. irregular or complexity)

Required action not possible (e.g. safety margin)

Required action not allowed (e.g. rules)

Required action needs confirmation

No response from human driver

Hardware or software limitation or failure

Road infrastructure to support the transition to automation

H2020 call ART-05 – 2016

Specific challenge: ... highly automated vehicles will have to be managed in order to ensure an uninterrupted level of safety and efficiency. Road infrastructure will play a major role in managing this transition period.

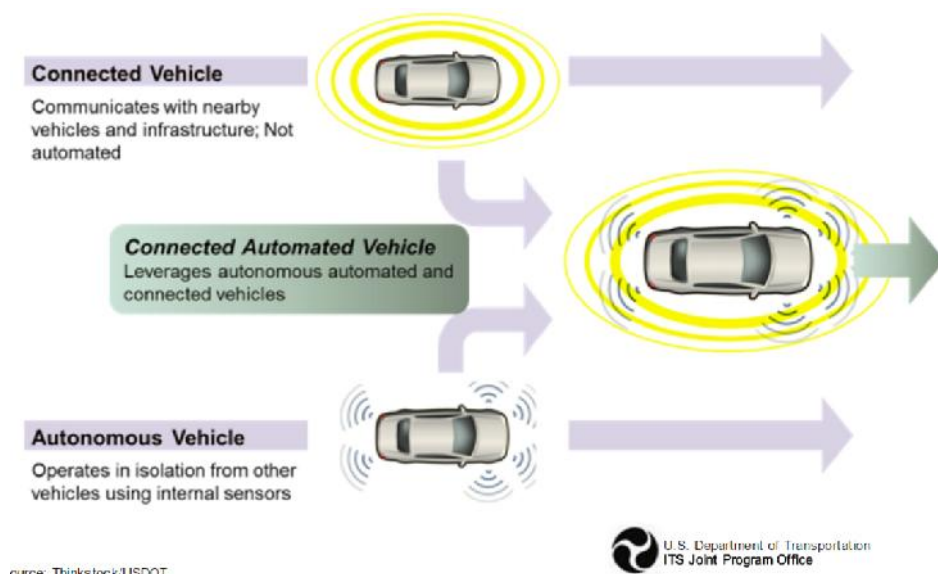
...

Required forms of visual and electronic signalling and optical guidance, ensuring readability by both automated and conventional vehicles, and enabling automated driving in also adverse road weather conditions.

...

Best ways to enlarge the electronic road horizon for automated vehicle ensuring timely reaction to hazards ahead via real-time warnings and information, traffic management plans, up-to-date digital maps, etc.

Communication is a precondition for HAD



Societal traffic management & control:

- Safeguard collective interests
- Set constraints and rules
- Intervene oversaturated conditions

Infrastructure support:

- Help to identify potential risks
- Solutions & suggested behaviour
- Coordinate movements

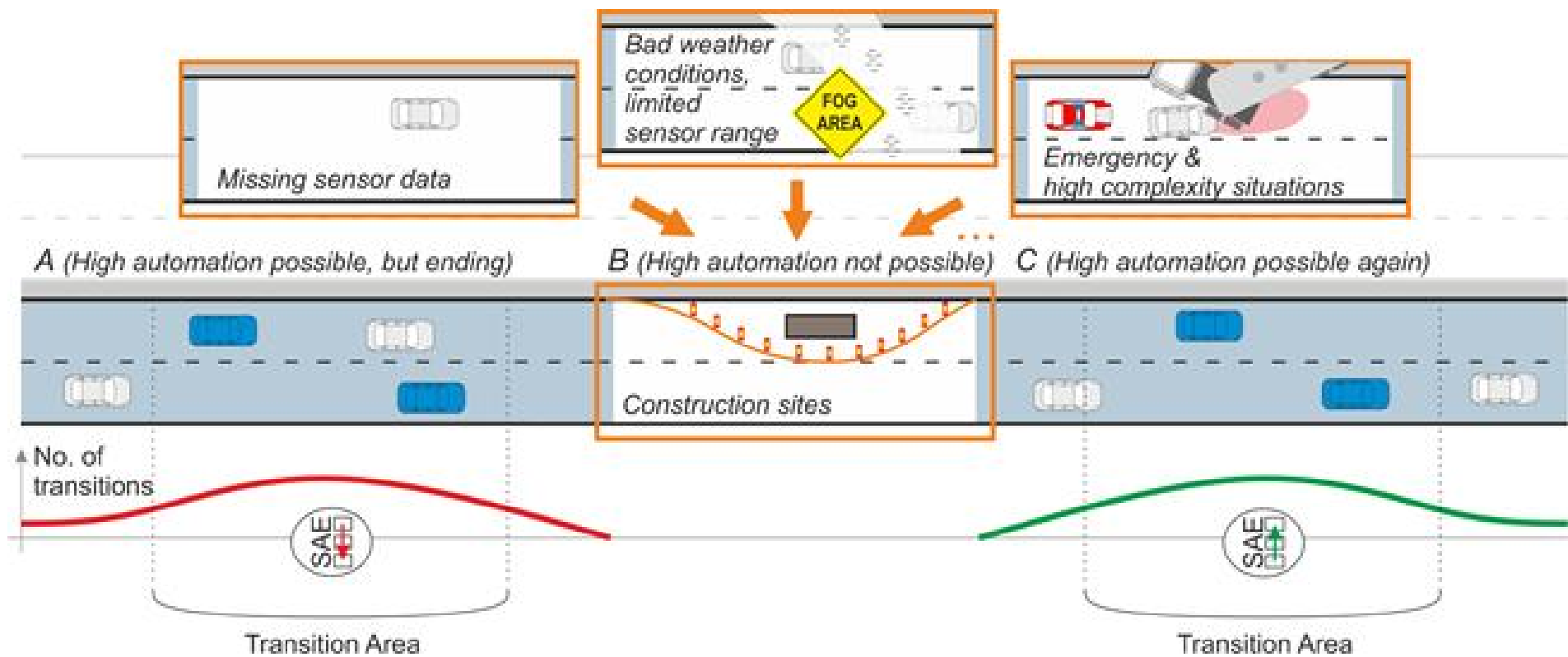
TransAID

- Transition Areas for Infrastructure-Assisted Driving
- 01/09/2017 ~ 31/08/2019
- Budget: EUR 3,836,353.75
- Seven partners from 6 countries: DE, UK, BE, NL, EL, ES

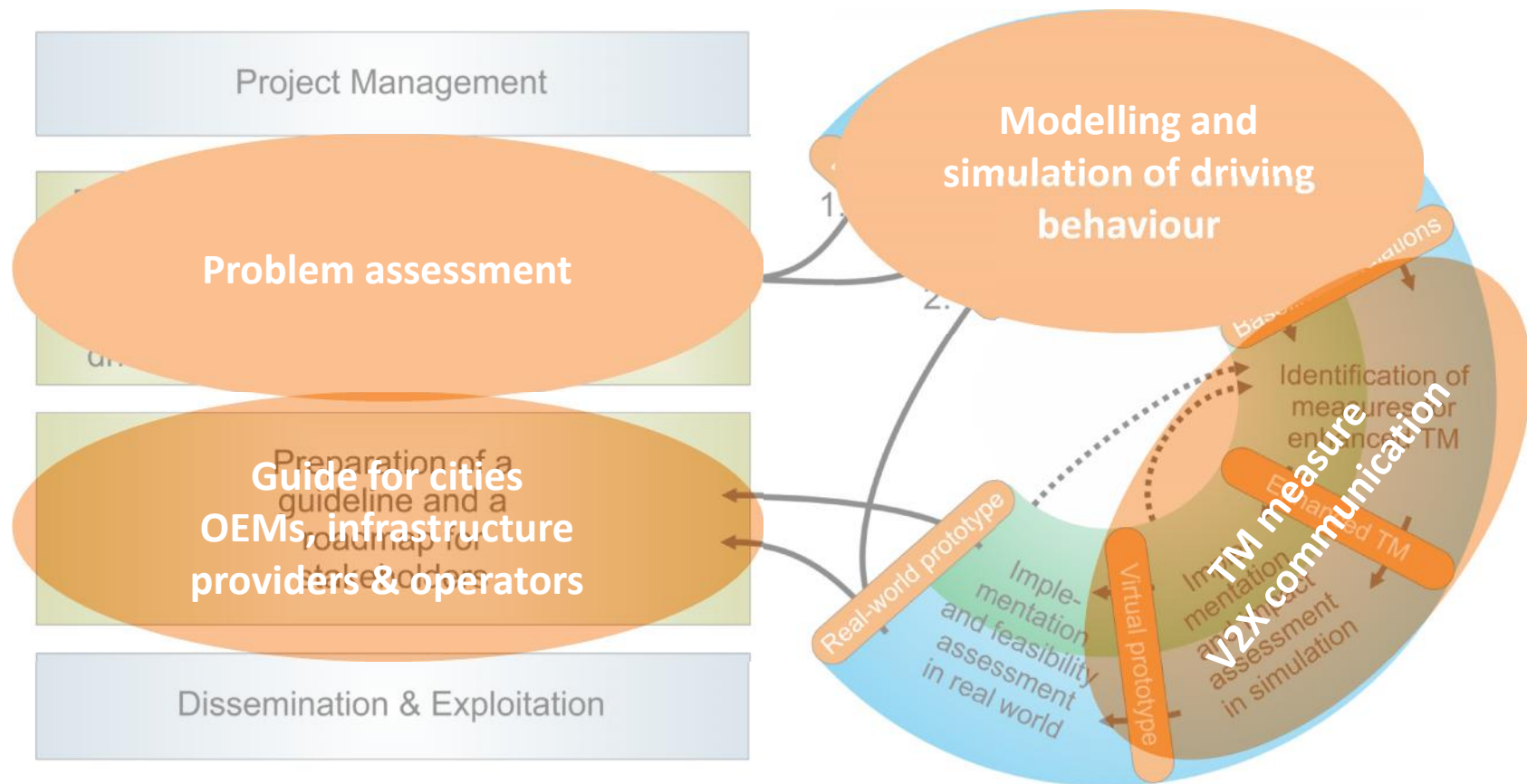


Objective and approach

Develop and demonstrate **infrastructure-assisted** traffic management procedures and protocols for smooth **coexistence** between automated, connected, and conventional vehicles especially at **Transition Areas** in an **urban** environment.



Approach



A non-urban case: Truck Platooning



Objective break-out session



- What situations?
- What criteria, constraints and priorities?
- What interventions / operational measures?
- What role / task for authorities & infrastructure?



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