Enhanced Traffic Management Procedures in Transition Areas

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Scope and background

- Different SAE levels, (C)AVs, legacy vehicles, ... share the road

- Missing sensor inputs, highly complex situations, adverse weather, ...
  - Current limitations of automated driving may require a change of level
  - Transition Areas

- TransAID focuses on:
  - Realistic driver/vehicle behaviour and V2X communications
  - Hierarchical traffic management procedures for transition areas
  - Field tests in The Netherlands and Germany
  - Guidelines and roadmap for stakeholders (OEMs, authorities, cities, ...
The TransAID project

- Horizon 2020 ART-05-2016
- 36 months (09/17-09/20)

Associated partners: Attikes Diadromes, Car2Car-Communication Consortium, DGT, ECTRI, EURECOM, Huawei, IKUSI, ITS Niedersachen, Region of Central Macedonia, Rijkswaterstaat, TRL, and University of Twente.
SotA of traffic management

• **Main topics**
  – General approaches
    • Coordinated network-wide traffic management
    • Using KPIs, hierarchical controls via layered architectures, TMaaS
  – Cooperative systems
    • V2X / VANETs / C-ITS
  – Machine learning techniques (AI)
    • Traffic light control and congestion / queue length predictions

• **Conclusion**
  – No (readily available) implementations of more advanced TM schemes
  – Focus on solving partial problems with specific measures
Intermediary service provider

High- and low-level traffic management operations
Simulation environment
When AD is not possible/allowed

- Take-over request (TOR) issued by the car
- Transition of Control (ToC) from car to driver
- Minimum-Risk Maneuver (MRM) by the car
First selection of services / use cases

Prevent ToC/MRM by providing vehicle path information

Prevent ToC/MRM by providing speed, headway and/or lane advice

Prevent ToC/MRM by traffic separation

Manage MRM by guidance to safe spot (urban & motorway)

Distribute ToC/MRM by scheduling ToCs

(with traffic conditions (LoS) and vehicle mixes)
Ex. Distribution of TORs

Without traffic management

With traffic management

no-AD zone

no-AD zone
Main results and outlook

- **Smother** traffic flows (higher average speeds and throughputs) + lower emissions (CO$_2$)
- **Safer** conditions (less time-to-collisions < 3 sec)
- Insights lead to:
  - New/modified use cases
  - Incorporation of realistic V2X communications

Deliverable D4.2
Let’s stay in touch

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