

Cooperative Connected Automated Mobility needs Physical and Digital Infratructure! ARCADE Webinar on how to support fast innovation by different levels of physical and digital infrastructure

measures, 15.05.2020, Armin Gräter, BMW Group



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## Infrastructure in the ERTRAC CAD Roadmap 2019.





- Increased scope to better cover the **Connected** aspect of automation.
- Strengthens the link to the **Infrastructure**, through CEDR.
- Deeper dive into three development paths including requirements on 'connected & infrastructure':
  - Automated Passenger Cars
  - Automated Freight Vehicles
  - Urban Mobility Vehicles

# Infrastructure Support levels for Automated Driving (ISAD) explained on a schematic road segment.

VMS

Based on the ISAD Level of information and services different on-board vehicle decisions can be supported.

CAVs will have to be able to drive on Elevel, but the additional possibilities provided by A-level sections enable a much higher customer satisfaction as well as support road safety and capacity management related goals





# ODD and ISAD meet traffic regulations and the homologation framework.



- Explanation and information on Operational Design Domain and Infrastructure Interaction
- Regulatory and standardisation framework for Automation
- Connectivity as a requirement for vehicle-infrastructure interaction



## CAD still faces huge technological challenges. **Rollout limited by scenario complexity and driving speed. Digital Infrastructure needs to deliver its contribution.**



### L3/L4 Highway

- HD Map updates
- Digitized variable traffic signs
- Reliable real time localized traffic info (roadworks, traffic situation, weather,

## L4 Urban additionally

- Digitized traffic lights

- Reliable real time localized traffic info (traffic management governance, pickup/drop-off zones resp. shuttle/bus

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## All use cases build on the same principles.

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#### **Automated Passenger Car Development Path**





Highway Autopilot (Level 4)



Highway Convoy (Level 4)



Urban and Suburban Pilot (Level 4)

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#### **Automated Freight Vehicle Development Paths**







#### **Automated Urban Mobility Vehicle Development Paths**





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# Thank you!

