D9.5

TransAID Final Conference

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Dissemination level:

■ PU: Public

□ RE: Restricted to a group specified by the consortium (including the Commission Services)

□ CO: Confidential, only for members of the consortium (including the Commission Services)

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Executive summary

The TransAID (Transition Areas for Infrastructure-Assisted Driving) project focuses on development and demonstration of infrastructure-assisted traffic management procedures, protocols, and guidelines for smooth coexistence between automated, connected, and conventional vehicles especially at Transition Areas. Main objectives are:

- Evaluation and modelling of current automation prototypes and the behaviour of the drivers.
- Assessment of the impact of Transition Areas on traffic safety and efficiency. Generate requirements on enhanced traffic management procedures.
- Development of infrastructure-assisted management procedures and protocols to control connected, automated, and conventional vehicles at Transition Areas.
- Definition of V2X message sets and communication protocols for the cooperation between connected/automated vehicles and the road infrastructure.
- Development of procedures to enhance the detection of conventional vehicles and obstacles on the roads and to inform/influence conventional vehicles.
- Integration, testing, and evaluation of the TransAID infrastructure-assisted traffic management protocols and procedures in a simulation environment. Validation and demonstration of them by means of real-world prototypes at test sites.
- Provision of a guideline/roadmap to stakeholders regarding the requirements on traffic infrastructure and traffic management in order to cope with Transition Areas considering mixed traffic.

This Deliverable describes the organisation and main outcome of the TransAID Final Conference. The event was first planned on 1 July 2020 (one full day), in conjunction with IEEE (Institute of Electrical and Electronics Engineers) FISTS (Forum on Integrated and Sustainable Transportation System) on 30 June to 2 July in Delft, The Netherlands. A Call for Papers was published, and a Special Session on cooperative and automated driving in a transition phase (dedicated for TransAID) was arranged with scientific papers, and invited speakers without papers. Experts in the domain of cooperative and automated driving outside the consortium and public at large were invited. Various dissemination materials were prepared, and promotion activities were conducted. In addition, a demonstration with automated vehicles (from DLR) on a section of public road in the campus of Delft University of Technology was under preparation.

Due to COVID-19, the format of the Final Conference was changed. The demonstration had to be cancelled, and the event was held online on 1-2 July 2020 with a different programme by changing moderator and invited speakers. The online event had around 49-63 participants. On Day-1, the Project Officer Georgios Sarros (EC INEA) gave an opening speech. After a brief project introduction given by Julian Schindler (DLR - Project Coordinator), some TransAID partners presented the main technical results of the project, such as modelling and impact assessment of automated vehicles, traffic management procedures for transition areas, connectivity and signalling, and system integration and evaluation approach. Between each presentation a survey was conducted to get the view of the participants on some specific subjects in the domain and to make the online event interactive. During the break, some project videos were shown (which have been published on the project website). The Day-2 online workshop targeted city participants and non-technical issues. The results are detailed in TransAID Deliverable D8.1 Stakeholder consultation report. In general, the final conference was successful, and achieved the main goals. However, an online event could not be as interactive as face-to-face, and there were no effective networking opportunities for participants. The TransAID consortium planned to have demonstration activities in November, but unfortunately both had to be cancelled in the last moment due to the worsened COVID-19 situation. Instead, a video has been prepared.

1 Introduction

In the following sections a concise overview of the TransAID project is provided, followed by the purpose of this document, and its structure.

1.1 About TransAID

The introduction of Automated Vehicles (AVs) is expected to improve traffic safety, reduce fuel consumption and improve traffic efficiency. To do so, automatization of perception and control tasks is employed with the aim of outperforming the capabilities of human drivers. The efforts of the automotive industry are focused on preparing future AVs to support an increasing number of road conditions and traffic situations. However, there will be situations where the automated systems will reach their functional limits and will not be able to handle specific traffic situations on their own. In these situations, a Transition of Control (ToC) to manual driving will be required. The duration of ToC will be influenced by the time required by the driver to recover full situation awareness and safely take over control of the vehicle. This time increases in higher automation levels, where drivers are allowed to perform non-driving related secondary tasks. If the driver is not able to take over control of the car, the automated vehicle will perform a so-called Minimum-Risk Manoeuvre (MRM) to bring the vehicle into a safe spot (e.g. decelerating to full stop, or change lane to occupy a safe spot). There will be areas and situations on the roads where high automation can be granted, and others where it will not be allowed or feasible due to system failures, highly complex traffic situations, human factors and possibly other reasons. At these areas, many AVs will have to perform ToCs. These areas are refer to as *Transition Areas*.

TransAID develops and demonstrates traffic management procedures and protocols to enable smooth coexistence of cooperative and automated vehicles (CAVs), AVs of different SAE (Society of Automotive Engineers) levels, Cooperative Vehicles (CVs) able to communicate via V2X (Vehicle to everything), and legacy vehicles (LVs), especially at *Transition Areas*. A hierarchical and centralised approach is adopted, where control actions are implemented at different layers including Traffic Management Centres (TMC), roadside infrastructure, and vehicles. Following this approach, in the TransAID project, different services have been defined addressing specific complex traffic situations at *Transition Areas*. The road infrastructure supports the coordination of manoeuvres of vehicles by providing advices, notifications or information to vehicles in order to increase the overall traffic safety and efficiency.

To validate the effectiveness of the traffic management measures developed in the TransAID project simulations taking into account traffic safety and efficiency metrics will be performed. For the simulations to be as reliable as possible, the most relevant microscopic traffic models for mixed traffic behaviour and interactions with Automated Driving (AD) cars are developed. Also, communication protocols for the cooperation between CAVs, CVs, and Road Side Units (RSUs) are implemented, modelled and included. Based on the results of these simulations, the most promising solutions are then implemented as real-world prototypes and demonstrated in closed and controlled environments as proof of concepts for real world's technical feasibility.

1.2 The TransAID iterative approach

The hierarchical and centralised approach of the TransAID project is applied over two iterations, each taking half of the total duration of the project. During the first iteration, the focus is on studying aspects of ToCs and *Transition Areas* through basic scenarios. This implies that realistic models for automated driving and communication protocols need to be developed and/or adopted to cover the requirements of these simulation scenarios. Using basic scenarios, it is possible to run initial simulations and focus in detail on the relatively new aspects of ToCs, *Transition Areas* and measures mitigating negative effects of ToCs. The goal of the first iteration is hence to gain experience with all aspects relevant to *Transition Areas* and mitigating measures. In the second iteration, the achieved experience is used to improve/extend the traffic management measures while at the same time increasing the complexity of the investigated scenarios (e.g. including more challenging scenarios not considered in the first iteration, or combining multiple scenarios in the same evaluation).

1.3 Purpose of this document

This report describes the organisation and outcome of the TransAID Final Conference, planned in Delft with demonstrations in conjunction with IEEE (Institute of Electrical and Electronics Engineers) FISTS (Forum on Integrated and Sustainable Transportation Systems) on 30 June to 2 July 2020, but finally held online on 1-2 July 2020.

1.4 Structure of this document

In this deliverable, the setup of the TransAID Final Conference, as well as its organisational aspects is described. Moreover, the programme, especially some of the presentations given, is detailed. In addition, the main survey results are presented. The document is structured to allow a good overview on the planning taking place before COVID-19 (section 2), and the required modifications which had to be done due to the pandemic (section 3).

1.5 Glossary

Abbreviation/Term	Definition
AD	Automated Driving
AV	Automated Vehicle
C-ITS	Cooperative Intelligent Transport Systems
CAD	Cooperative/connected and Automated Driving
CAV	Cooperative and Automated Vehicle
COVID-19	Corona Virus Disease 2019
CV	Cooperative Vehicle
FISTS	Forum on Integrated and Sustainable Transportation Systems
IEEE	Institute of Electrical and Electronics Engineers
ITS	Intelligent Transport Systems
KPI	Key Performance Indicator
LV	Legacy Vehicle
MRM	Minimum-Risk Manoeuvre
ODD	Operational Design Domain
RSU	Road-side unit
SAE	Society of Automotive Engineers
TA	Transition Area
TMC	Traffic Management Centre
ToC	Transition of Control
TransAID	Transition Areas for Infrastructure-Assisted Driving
TU Delft	Technische Universiteit Delft (in English: Delft University of Technology)
V2X	Vehicle to everything

2 Pre-COVID-19 planning

2.1 Venue

Originally, the TransAID Final Conference would have been taking place, in conjunction with an IEEE (Institute of Electrical and Electronics Engineers) international event - *Forum on Integrated and Sustainable Transportation Systems* (FISTS 2020)[1] on 30 June to 2 July 2020.

IEEE FISTS 2020 targeted 300 participants. It would have hosted classic detailed scientific presentations based on high quality submitted papers but also provide the floor for authorities to share their strategies and concerns or for companies to show how they view the future of mobility through structured presentations, which do not necessarily have to be of a detailed scientific nature. All these authorities and companies would be listed as participant organisations in the Forum webpage.

The TransAID Final Conference would be organised at the Delft University of Technology (TU Delft) *Aula Conference Center*, a state-of-the-art conference centre within the TU Delft campus. The Aula Congress Center, located in the heart of the university campus, is the best venue for international conferences in Delft. It offers a perfect combination of meeting rooms, an auditorium, various facilities, and large exhibition areas. A bar and a buffet restaurant are located on the ground floor.

Its address is:

TU Delft Aula Congress Center (Building 20)

Mekelweg 5

2628 CC Delft (The Netherlands)

[1] http://forum-ists2020.org/

2.2 Getting the word out

In order to spread the world about the event, an announcement of "Save the date" was posted on the website and social media channels of TransAID.


OCTOBER 28, 2019

Save the date! TransAID Final Event (1 July 2020, Delft, The Netherlands)

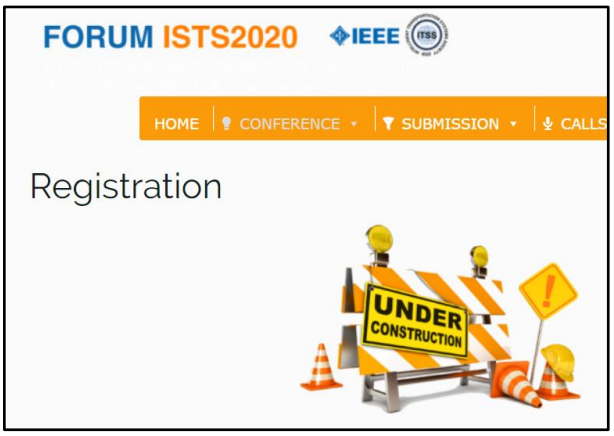
Save the date! 1 July 2020 in Delft, The Netherlands, where TransAID will host its final event during the FISTS2020 conference. We are open to contributions from all projects, researchers, and policy makers.

More information will be published here.

https://www.transaid.eu/final-event-1-july-2020-delft-the-netherlands/

At the time, the website also contained a draft programme and would provide a via-link to register for the conference, which was arranged via the website of IEEE FISTS 2020:

http://forum-ists2020.org/registration/



Dynniq Nederland B.V. (one of the TransAID Consortium Partners) would cover the registrations and make an arrangement for the participants of the TransAID event. This concerned a technical issue in registration, without any financial impact on IEEE FISTS2020. There should be a rate for 1) one-day registration including Gala Dinner for all TransAID partners and invited speakers, guests, and AB members; 2) one-day registration, excluding Gala Dinner for other participants who would register for the Special Session dedicated for TransAID; 3) full registrations for speakers from the TransAID consortium partners, whose papers would have been accepted, presented at the Special Session dedicated for TransAID, and published in the proceedings and IEEE Xplore (IE index). Everyone who would registered to attend the TransAID event, and would arrive one day earlier (i.e. on 30 June 2020) could also get a free ticket to the Welcome Reception of IEEE FISITS 2020, which was arranged by Dynniq. A TransAID stakeholder workshop was also planned in the same period, especially for city participants. People could buy (additional) Gala Dinner tickets separately if they registered only for one day of IEEE FISTS 2020. The idea was also to give POLIS a forum to speak at the TransAID Final Conference, and in return ask them to distribute the information of TransAID Final Conference via its network of cities, and to promote the event.

2.3 Invitations

In order to attract a (large) group of attendees, the TransAID Consortium would specifically address the different topics/sections of the TransAID conference and use these to target dedicated audiences. In addition, individually invitation were sent to related projects, e.g. COeXIST, ARCADE, INFRAMIX, BRAVE, L3Pilot, PaSCAL, SUaaVE, Trustonomy, DriveToTheFuture.

A preliminary draft text for the invitations was made available, and a Call for Papers was initiated by Dynniq and published on the website of IEEE FISTS 2020.

Final Event
Cooperative and Automated Driving in a Transition Phase

Date: 1 July 2020
Time: 09:00-17:30
Location: Auditorium Conference Center (Aula), Delft University of Technology, Mekelweg 5, 2628 CC Delft, Netherlands

Description

The TransAID Final Event will be held on 1 July 2020 in Delft, The Netherlands. It is in conjunction with *IEEE Forum on Integrated and Sustainable Transportation System* (FISTS) on 30 June to 2 July 2020 at Delft University of Technology. FISTS is one of the financially co-sponsored conferences of the *IEEE Intelligent Transportation Systems Society* (ITSS).

The one-full day event targets connected, cooperative, and autonomous technologies for cooperative and automated road transport. The also features technical sessions, and panels with experts from related domains, which will again foster the interactive exchange of academia, authorities and industry.

Recent developments in telecommunications, sensor, information processing and control technologies have enabled substantial progress in the domain of ITS. Automated driving is on the horizon, and will still need substantial and longer-term development and testing to make even the high automation levels a reality in complex situations, such as in a transit period of only partial market penetration. Cooperative and automated transport are certainly complementary. They are expected to bring substantial benefits in terms of road safety, comfort, (traffic and fuel) efficiency, environmental friendliness (therefore air quality improvement) and economic growth. Many challenges exist in this important domain.

The event targets the challenges of connected and cooperative systems towards automated driving. It will discuss use cases, traffic management procedures, role of digital infrastructure, V2X message sets, system integration, impacts of cooperative and automated driving and roadmaps. Requirements for strong cooperation between industry, authorities and academia will also be addressed.

Participants will have an excellent opportunity to discuss with and to challenge distinguished speakers and panellists. The technical areas to be discussed include, but are not limited to the following:

- Connected and automated vehicles
- V2X communications
- C-ITS deployment
- Standardisation
- Simulation and testing
- (Future) Traffic management
- Connected and cooperative systems
- Impacts assessment of connected, cooperative and automated road transport

Main Organiser(s)

Meng Lu, Dynniq, The Netherlands

Julian Schindler, DLR, Germany

Sven Maerivoet TML, Belgium

Jaap Vreeswijk, MAPtm, The Netherlands (workshop)

Moderator(s)

Dr. Meng Lu, Dynniq, The Netherlands

Dr. Sven Maerivoet TML, Belgium

2.4 Organisation and programme

As the TransAID Final Conference would have fallen under the umbrella of the larger IEEE conference FISTS2020, the Consortium have ensured that TransAID would be mentioned during the official opening of the main conference FISTS 2020, as well as at the Gala Dinner of IEEE FISTS 2020. All the details had been initiated and arranged by Dynniq.

The goal was to have a single session room dedicated to all TransAID-related activities/sessions, such that TransAID generated higher visibility and awareness of the project.

The TransAID consortium would then organise a Specific Session (which is a term generally used by the IEEE conferences) that are sufficiently high-level, centred around certain technical topics, loosely corresponding to the various work packages (WPs) of TransAID, such as:

- Modelling of automated driving (including e.g. behaviour, simulation tools, and caveats)
- Procedures and tools for traffic management in light of automated driving (including e.g. what works? what is feasible?)
- Field testing (including e.g. bridging the gap between modelling and real-world observations, what experiments are possible?)
- Outlook on automated driving from different perspectives, e.g. policy makers and automotive industry, especially OEMs.

It was important that the timing of the TransAID own sessions align with those of the time slots of IEEE FISTS 2020, and even better if the TransAID session would became a natural part of the main conference. All the details of the setup, including the TransAID Special Session, TransAID stand (2m x 8 m, located at the most visible location of the exhibition hall), indoor video showcases, and outdoor demos, were initiated by Dynniq and arranged, together with the local organiser TU Delft.

The main FISTS2020 conference allowed for both presentations and papers.

> *Forum ISTS 2020 is innovating on how people can participate in a top transportation conference. We have two tracks, one that is a traditional track of submitting a **full scientific paper** that will be published in the proceedings if it gets accepted by the reviewers, and another track whereby we want to invite people from companies, authorities, or just top practitioners to **deliver a presentation** at our conference and in6tereact with top scientists. We are searching for high productive discussions on the future of mobility whereby only through a dialog between these two parts we will be able to come up with the more sustainable solutions for our transport systems. We also have a call for workshops and tutorials that you should check below.*

TransAID partners submitted three papers reflecting the main results from WP3, WP4, WP5 and WP6 to highlight the project to IEEE FISTS 2020:

- WP3/6: Joint Deployment of infrastructure-assisted traffic management and cooperative driving around work zones
- WP4: Enhanced Traffic Management Procedures of Connected and Autonomous Vehicles in Transition Areas
- WP5: Context-based Broadcast Acknowledgement for Enhanced Reliability of Cooperative V2X Messages

More importantly, TransAID planned to at least start the first presentation in both morning sessions and afternoon sessions that it would be hosting. These could then be used to introduce the various topics, e.g. how TransAID contributed to them, including a showcase of the most relevant results.

All the TransAID Advisory Board (AB) members had been invited to attend the Final Conference. A draft programme of the TransAID Final Conference was made, and invited speakers and panellists had confirmed, including some AB members, and Dr. Angelos Amditis (Research Director ICCS; Director I-SENSE Group; Supervisory Board Chairman, ERTICO ITS-Europe).

TransAID did not explicitly require the invited speakers to submit papers. The TransAID partners planned to present the project results (with or without papers), to invite external experts to present their research results, and to invite some authors outside the consortium who have accepted papers of IEEE FISTS 2020 to give short presentations on cooperative and automated driving at the TransAID Special Session.

In addition, the moderators would have had to enforce a strict time keeping of the speakers. Programme-wise, this did raise the question as to whether or not to have complete freedom regarding the timings of the presentations in TransAID own sessions (e.g. 10 minutes, 15 minutes) in relation to the rest of the conference.

A nice feature would have been that all TransAID "personnel" would wear the same T-Shirt (both in the sessions, as well as outside the session room for the explanations at the exhibition, and outdoor demonstrations), greatly enhancing the visibility of the project.

The TransAID time slots would have needed to be aligned with the main conference IEEE FISTS 2020, but these were not yet known at the time when the conference programme was not finalised. In addition, TransAID would avoid overlaps between the topics of parallel sessions (maximum 3-4 were proposed by Dynniq and discussed with the organiser of IEEE FISTS 2020).

- Human factors
- Mobility as a Service (MaaS)
- Cooperative and Automated Driving (CAD)

The topic of CAD of IEEE FISTS 2020 on 1 July 2020 was planned to be solely dedicated to the TransAID Special Session (one whole day). And the Gala Dinner of IEEE FISTS 2020 was also planned on 1 July.

The TransAID Consortium aimed to have the biggest room for the TransAID Special Session. The target was around 300 participants (i.e. for the entire participants of IEEE FISTS 2020). It was estimated that around 75 to 100 people would attend the TransAID Special Session. The TransAID stand in the exhibition area would have contained 2-3 screens, a poster wall (cf. setup in the Graz Joint Workshop), and some table(s) with paraphernalia, flyers and in addition some smaller posters from other projects. Furthermore, it was intended to provide time slots for participants to attend the TransAID outdoor demo, as well as an indoor VR (Virtual Reality) demo operated by DLR.

Dynniq was directly involved in supporting the organisation of IEEE FISTS 2020 on behalf of IEEE, and therefore it took the advantage to make an appropriate arrangement for TransAID, which would benefit both the TransAID Final Conference and IEEE FISTS 2020.

It was also possible for TransAID to get a session slot at the host conference IEEE FISTS 2020 for cities. However, considering the host conference might mainly get participants from academia, the TransAID Consortium opted to identify another opportunity to organise own city-stakeholders workshop rather at a separate event, for example in conjunction with the Urbanism Next Europe 2020 conference, organised by POLIS:

> https://www.polisnetwork.eu/document/urbanism-next-europe-2020-call-for-sessions-and-speakers/
>
> https://www.polisnetwork.eu/wp-content/uploads/2020/01/UNext-Europe-2020-Call-for-Sessions-and-Speakers.pdf

2.5 Paraphernalia for session attendants

Outside the TransAID session room, some videos were planned to be shown on a screen to present the TransAID simulation results, and the field tests. The latter should be accompanied by a big "*Sign up!*" sign, to enlist people to experience the developed automated driving protocols in the demonstration that would be set up nearby the venue.

Furthermore, various panels containing posters highlighting the most relevant results of TransAID (explained in a easy-to-understand, straightforward manner) should be placed in the exhibition hall outside/alongside the session room of TransAID.

2.5.1 Possible items

In order to disseminate the results of TransAID as well as to thank the people who attended the TransAID sessions, various items were considered to be provided to the participants. Examples were:

- T-shirts
- USB sticks (at least 16 GB, USB3, containing all "Public" deliverables of TransAID)
- Umbrellas
- Traffic cones
- Good quality, sturdy, and aesthetic bags (*check if the main conference has its own bag*)
- Pocket knifes
- (Beer) can / bottle openers
- (Giant) pens
- (Giant) pencils
- Sharpeners (with container)

- Contact/information business cards
- Stickers
- Refrigerator clips
- Drinking mugs / containers / reusable water bottles
- Frisbees
- Mobile device chargers
- Socks
- Food items (mints, chocolate-flavoured M&Ms)
- Moleskines (agendas, notebooks)
- Keychains
- Poste-It noteblocks
- Colourful text markers
- Phone grips / mounts
- Octopus charging cables
- Lighting rods
- Luggage tags
- Books
- Electric mug warmers (USB powered)
- Mini drones
- Bluetooth speakers
- Wireless charging pads
- Smart light bulbs
- Powerbanks
- (Key)card holders
- Cutlery
- Origami sets
- Shampoo/shower gel bottles
- Paper clips
- Wireless Bluetooth mice
- Good quality wireless earbuds
- Solar power cells
- Power outlet converters
- Furry creatures (for children)
- Fruit (e.g., apples, pears, mandarins, bananas, oranges, with TransAID logo printed on)
- Document pouches for around your neck
- (Mini) clocks

If possible, the items/gadgets would have contained the TransAID logo. To attract more people to attend the TransAID event, the consortium also planned to create specific advertisements that highlight these paraphernalia.

2.5.2 Final selection

After an internal voting, the following items were selected:

- **USB sticks** (**only TransAID logo**, at least 32-64 GB, USB3, containing project "Public" deliverables) for the participants of TransAID session.
- Drinking mugs / containers / **reusable water bottles (only with TransAID logo)** for all the IEEE FISTS participants, for example:

- **T-shirt**: dark blue with TransAID logo for the TransAID staffs on site. An example of such a T-Shirt design is the following:

Note that the TransAID Consortium would have provided some different designs (e.g. logo big, logo small aside), different sizes (M, L, XL), and different colours (e.g. dark blue, or white, blue-inverted).

- **TransAID backpack** with **TransAID logo** for consortium partners, EC representatives, AB members, invited speakers and event organisers. For example:

In addition, on behalf of the TransAID Consortium, Dynniq arranged the following items for the TransAID Final Conference, in conjunction with IEEE FISTS 2020 in Delft, The Netherlands.

- **Free hard copies** of TransAID book chapter in Lu, M. (Ed.) (2019). Cooperative Intelligent Transport Systems: Towards High-Level Automated Driving. IET (Institution of Engineering and Technology), London. DOI: 10.1049/PBTR025E
- **Flags** with **TransAID logo** outside the entrance of the IEEE FISTS 2020 venue (in front of TU Delft Aula), and also at the demo site.
- **TransAID logo projected on the floor** inside the venue.
- **TransAID stand** with a poster wall (2m x 8m) at the most visible place in the exhibition hall, next to the stand of the local organiser (TU Delft), and next to the TransAID Special Session room.
- **TransAID video showcases** with 2 or 3 screens at the TransAID stand. Dynniq and DLR planned to confirm the detailed in May 2020.
- **TransAID demo (on site) registration** next to the IEEE FISTS 2020 registration desk. It could be located at the entrance of the venue. A big tent at the outdoor demo site was also an option.

2.6 Real world demonstration plan

An outdoor TransAID demonstration on "Cooperative Automated Driving" was planned, in conjunction with IEEE FISTS 2020 on 30 June to 2 July 2020 in Delft. For its preparation, Dynniq contacted RDW (Dienst Wegverkeer) and TU Delft to make an arrangement for the demo using automated vehicles from DLR, Germany.

2.6.1 Demonstration setup

An outdoor TransAID demonstration on “Cooperative Automated Driving” was planned, in conjunction with IEEE FISTS 2020 on 30 June to 2 July 2020 in Delft. The demonstration was planned to take place directly on the Christiaan-Huygensweg next to Aula, TU Delft. The following figure illustrates the TransAID demo setup on the Christiaan-Huygensweg. It was planned to have a driving demonstration on a closed road, using

- Two automated vehicles (from DLR)
- Possibly up to two manually driven vehicles
- One variable message sign
- One mobile pole equipped with a camera, a computer and a V2X Roadside Unit.

For the testing, the road would be completely closed, best by putting barriers between the road and the cycle path, as shown in the figure (red-dotted line).

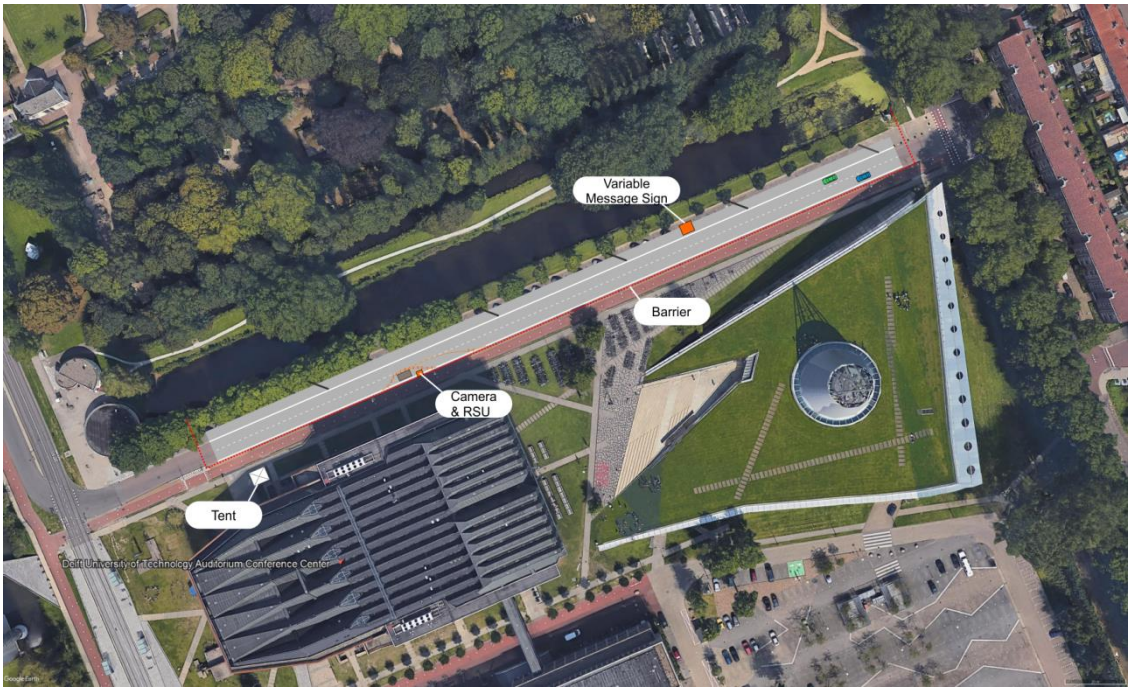


Figure 1: Demonstration area near the Delft Aula.

A closed area would have allowed us to perform tests/demonstrations with more flexible vehicle behaviour, also probably reducing the required efforts for allowing the demonstration.

If a complete closing would have been impossible, best would be a gated entry, allowing, e.g., busses to use the lane on demand.

If closing in general would have been impossible, we would have highly recommend avoiding parked cars in the area. We also would like to have put a faked construction side on the road, which may have had implications on the driving permit/demonstration allowance.

On the road, the lane layout is only present virtually on a digital map. Obstacles and poles would be placed in reality. Physical temporary lane markings would only be used if this was necessary for understanding the demonstration and if allowed by the road authorities. All lane markings would have been removed when the demonstration would have ended.

An additional tent would be needed where people wait for the next driving round. The plan was to take people from that tent directly to the closed area when demonstration starts.

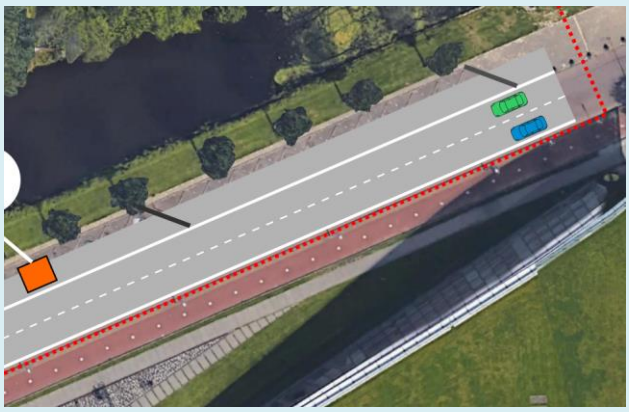
2.6.2 Scenarios selection

Before the lockdown or intelligent lockdown in European countries, the complete list of scenarios for the demonstration was not finally decided. TransAID covers a set of 10 scenarios, which are all dealing with a cooperative infrastructure advising connected automated vehicles (and all others) how to overcome transitions of control or how to deal with it. Some of the scenarios are more highway-specific, others deal with urban traffic. Furthermore, some are applied on straight roads, some need intersections or on-/off-ramps. As the available stretch of roads limits the possibilities, the following shows different scenario options which are presentable.

Scenario I

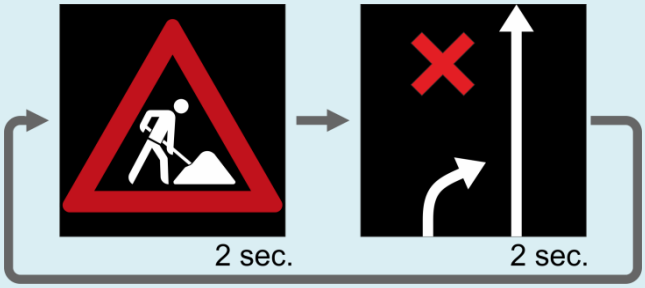
Goal: Show cooperative lane change (V2V), early Transition of Control advice from infrastructure, Lane advices from infrastructure and SafeSpot usage.

Initial situation (see the figure below): FASCarE and ViewCar2 stand at the beginning of the road, FASCarE on the left lane, ViewCar2 on the right. FASCarE is able to pass roadworks ahead, which is blocking the left lane, ViewCar2 is not. Both cars accelerate at the same time.

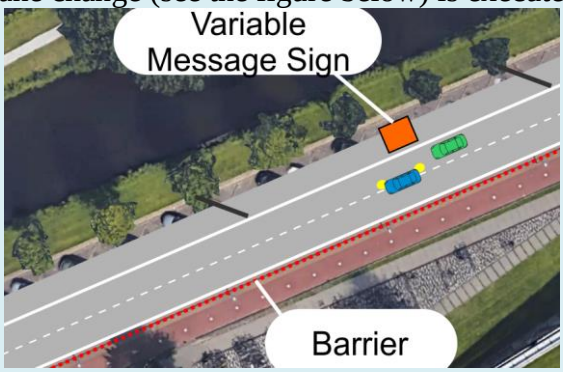


Script:

1) VMS displays the following animation



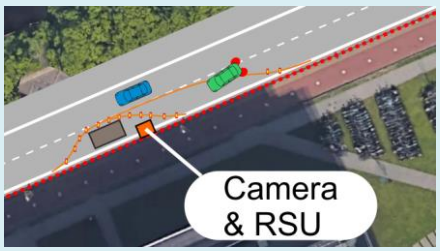
2) RSU broadcasts DENM: Roadworks
3) RSU sends speed and lane advices to both vehicles (FASCarE should change to right lane).
4) Cooperative lane change (see the figure below) is executed



5) RSU sends ToCAdvice (advice that a transition of control is needed) to ViewCar2
6) ViewCar2 receives message, starts reducing speed with -0.5m/s² during ToC interval. The following HMI is shown:

7) Driver ignores ToC
8) RSU sends SafeSpot advice to ViewCar2
9) FASCarE passes the road works area
10) ViewCar2 executes MRM into the SafeSpot. The following HMI is shown:

11) ViewCar2 performs lane change and stops in the SafeSpot,



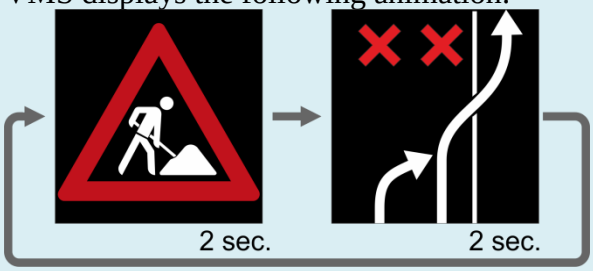
Scenario II

Goal: In a situation where all driving lanes are blocked and passing is only possible by using the emergency lane: Show standard behaviour of automated cars when no measure is taken, which is stopping behind the obstacle. Other car shows behaviour with reception of messages allowing the vehicle to pass the obstacle. Possibly integrate cooperative lane change as before.

Initial situation: FASCarE and ViewCar2 stand at the beginning of the road, FASCarE on the left lane, ViewCar2 on the right. Both cars accelerate at the same time. FASCarE is receiving an advice for passing a two-lane-blockage by using the emergency lane. ViewCar2 is showing the case without any measure.

Script:

1) VMS displays the following animation:



2) RSU sends DENM::roadWorksAlert
3) RSU sends MAPEM making emergency lane drivable in a specific area, which is received by FASCarE only.
4) FASCarE changes lane to the emergency lane at the given position and back to the main road after passing.
5) ViewCar2 is stopping in front of the roadworks, performing a Transition of Control.

2.6.3 Procedure

Participants could sign up for the test drives in advance. Two people per vehicle would have had the chance to participate at a time. Test drives would last at least the whole final event day, possibly two days, or even the whole conference.

One ride would take approximately 10 minutes per scenario. It had to be decided how many scenarios are shown and when. It would also have been possible to have different scenarios on different days.

In the tent, demonstration participants would have been instructed. Participants consent form and form on collection of data would have been explained and signed.

After signing all documents, participants could get into the cars near the tent.

Vehicles would drive to the start position and perform the test runs.

Participants would leave the vehicles near the tents and leave the closed areas.

Possibly, people would have had the chance to rate the prototypes.

3 Modifications due to COVID-19 restrictions

3.1 Organisation

In light of the COVID-19 travel and organisational restrictions, the Consortium were forced to modify the conference concept. Rather than cancelling or postponing the conference, it opted for a fully virtual conference, limited in time so as to keep both content sharp and the audience attentive.

There were various software options available for hosting the conference, such as:

- GoToMeeting, GoToWebinar, and GoToTraining
- ExpoPolis
- WebinarGeek
- Community app / Meet 'n Greet
- Zoom

The TransAID Consortium checked all these applications for their flexibility regarding operating system support, browser support, the possibility to organise break-out rooms for discussion, their ability to organise polls, how access control is taken care of, and the stability of the platform based on earlier experiences. This resulted in the following table:

	Operating system support				Browser support								
Name	Windows	Mac	Linux	iOS/Android	Chrome	Firefox	IE/Edge	Safari	Breakouts	Polls	Questions	Access control	Stability
GoToMeeting												200 attendees	
GoToWebinar												200 attendees	
GoToTraining									max 6			200 attendees	
Zoom												"unlimited"	
WebEx										cumbersome		200 attendees	
WebinarJam													
Slido	N/A	N/A	N/A	N/A					N/A		N/A	N/A	
Mentimeter	N/A	N/A	N/A	N/A					N/A		N/A	N/A	

Given certain restrictions, e.g., people are not always able to download and install a piece of software on their laptops, PCs, the Consortium opted for GoToWebinar, which provided operating system and browser support (as well as an app for the mobile phones running iOS and Android). This was done at the expense of having break-out rooms, as the GoToTraining package did not prove to be a stable and flexible solution.

The consortium provided a one-month beforehand invitation to save the date for the webinars, as well as preliminary agendas of speakers and presentations, all put online at the website of TransAID. In addition, people were directed to a Google Forms sheet in order to register themselves for Day-1, Day-2, or both days. One to two days before the final links were then sent out to participants to join the webinars, all with personal communication.

On the project website, a dedicated page for the final event was reserved, where all presentations of the speakers, as well as downloadable videos of all live presentations and discussions in HD Ready (720p) and Full HD (1080p) formats were made available for public.

3.2 Programme

3.2.1 Day-1 programme

The TransAID Final Conference programme of Day-1 is summarised below.

The Project Officer Georgios Sarros (European Commission Innovation and Networks Executive Agency - EC INEA) delivered the opening speech. He provided an overview of projects on cooperative and automated road transport under Horizon2020, introduced the single EU-wide platform on CCAM (Cooperative, Connected, Automated and Autonomous Mobility), other funding programmes and related agencies, as well as upcoming EC Transport Research and Innovation related events.

Project Coordinator Julian Schindler (German Aerospace Center - DLR) briefly introduced the project, its approach, the main terminology, and key findings. TransAID targets Transition Areas (i.e. areas on the road where many highly automated vehicles are changing their level of automation due to various reasons), and has clearly defined research actions and related terminology, such as Transition of Control (ToC), Take Over Request (TOR) and Minimum Risk Maneuver (MRM).

Start time	Slot	Duration	Topic	Speaker
14:00	0:05	0:05	Grace time for warmup / Buffer for technical issues	
14:05	0:05	0:10	Opening and conference introduction	Sven Maerivoet, TML
14:10	0:15	0:25	Overview of projects on cooperative and automated road transport	Georgios Sarros, EC
14:25	0:15	0:40	TransAID setup (+ acronyms) / Key findings and summary	Julian Schindler, DLR
14:40	0:15	0:55	TransAID “Enhanced traffic management” (+ questions)	Sven Maerivoet, TML
14:55	0:05	1:00	Small interactive poll	
15:00	0:15	1:15	TransAID “Modelling of automated driving” (+ questions)	Evangelos Mintsis, CERTH/HIT
15:15	0:05	1:20	Small interactive poll	
15:20	0:10	1:30	Break	
15:30	0:15	1:45	TransAID “Cooperative V2X communication” (+ questions)	Miguel Sepulcre Ribes, UMH
15:45	0:05	1:50	Small interactive poll	
15:50	0:15	2:05	TransAID “Simulation and field testing” (+ questions)	Julian Schindler, DLR
16:05	0:05	2:10	Small interactive poll	
16:10	0:15	2:25	Interactive discussion (include audience questions, considerations, ...)	
16:25	0:05	2:30	Closing remarks	Julian Schindler, DLR

Several TransAID partners presented the main technical results of the project. Dr. Sven Maerivoet (Transport & Mobility Leuven - TML) detailed the contribution of TransAID to the enhancement of traffic management. He provided an analysis of the challenges and requirements, and proposed solutions for preventing ToC/MRM, for managing or supporting ToC/MRM in case it cannot be avoided, and for distributing ToC/MRM (in time and space). Relevant KPIs (Key Performance Indicators), such as traffic efficiency, safety, and environmental friendliness, were used for impact assessment. Simulation studies demonstrated very positive impacts on traffic management.

Dr. Evangelos Mintsis (Centre for Research & Technology, Hellas / Hellenic Institute of Transport - CERTH/HIT) presented the most recent results of vehicle automation modelling and simulation. He reviewed vehicle/driver models for (cooperative and) automated vehicles, such as car-following, (cooperative) lane changing, control transitions (ToC, MRM, TOR), summarised the TransAID use cases that were simulated, as well as the setup of the simulation studies, and especially highlighted the results of a work zone use case on a motorway network, including impacts of vehicle disengagements on *traffic efficiency* and *conflict risk* (under both uncongested and congested conditions). Specific considerations of the simulation studies and further research were also proposed.

Dr. Miguel Sepulcre Ribes (Universidad Miguel Hernandez - UMH) provided an update of the current status cooperative V2X (Vehicle to everything) communication, and the TransAID contribution to ETSI standards on cooperative manoeuvring and sensing. He gave an overview of the definitions of V2X messages and standards, such as CAM (Cooperative Awareness Message), DENM (Decentralized Environmental Notification Message), Maneuver Coordination Message (MCM), Collective Perception Message (CPM), MAP Extended Message (MAPEM), and Infrastructure to Vehicle Information Message (IVIM). He also elaborated the use of V2X for cooperative manoeuvring and cooperative perception, as well as V2X message compression.

Finally, Julian Schindler summarised status and results of the TransAID simulation and field testing activities. Within TransAID the open source microscopic traffic simulation tool SUMO (Simulation of Urban MObility) was used. In addition to presenting the approach, components, data exchange, and key findings of the simulation efforts, Julian introduced the real world test equipment, the method for feasibility assessment, and the assessment results. All presentations were published immediately after the online event at the project website (www.transaid.eu/final-event/). During the break, some project videos were shown, and these videos have also been published at the project website. For real world demonstration plan and preparations, see also Section 2.6.

Ninety-five people registered for the Day-1 part of the TransAID online event. Around sixty-three people attended. Around 65%-80% of the attendees responded to polls posted during the online event, and the results are presented in Appendix A, while some screenshots are included in Appendix B.

The survey results can be summarised as follows:

- A majority of 68% the participants came from academia, 8% from road authorities and 11% from OEMs. Most of the participants, 53% had learned about the TransAID final event through personal invitation, another 19% via the project Newsletter and social media, and only 7% via the project website.

- Asked for their expectations when Level-4 vehicles will become mainstream on motorways, 40% responded in the year 2035, 7% after 2045, and 7% already in 2025. A majority of 61% expressed as their view that infrastructure support at Transition Areas is essential, around one-third that it is nice to have, and only 2% that it is not really required. Regarding the conflict between the intention of an (automated) vehicle and the perception of the traffic management system, 73% were of the opinion that the latter has priority, and 23% that the vehicle should be able to do as the vehicle system has planned.

- Concerning the type of lane change behaviour of highly automated vehicles compared to manually driven vehicles, 63% had the view that it has be more conservative, and 20% that it has to be less conservative, and 11% that can be similar. To the question if drivers should be allowed to resume vehicle control during an MRM (prior to full vehicle stop) or not, 54% answered yes, and 32% no. As for the question how long the available lead time should last in case of control transitions for highly automated vehicles, 70% answered about 10 seconds, and 19% about 1 minutes.

- About half of the participants were directly involved in standardisation bodies on topics related to V2X, of which 30% in ETSI (European Telecommunications Standards Institute), 13% in IEEE (Institute of Electrical and Electronics Engineers) and 7% in SAE (Society of Automotive Engineers). Concerning the working areas these standardisation-involved participants are dealing with, 53% chose V2X for manoeuvre coordination, 44% V2X for cooperative sensing, and 16% multi-channel V2X communications. Asked for the best option to support the cooperative-manoeuvre use case, a majority of 84% chose a combination of V2V (Vehicle-to-Vehicle) and V2I (Vehicle-to-Infrastructure) or V2N (Vehicle-to-Network) depending on scenarios.

- In case of a ToC, 59% had the view that a vehicle should instantly start slowly reducing speed, 38% that it should continue driving with the current speed until the MRM starts, and only 3% that it should instantly start to drastically reduce speed. A majority of 64% held the opinion that a cooperative and automated vehicle should always indicate its current automation engagement to the surroundings, 24% that it should indicate only ToCs and MRMs, and only 3% that it should indicate only MRMs. 66% of the survey participants considered infrastructure support at Transition Areas essential, and 34% that it is nice to have.

3.2.2 Day-2 programme

The Day-2 stakeholder workshop targeted city participants and non-technical issues. The stakeholder workshop aimed to disseminate project results to relevant stakeholders, discuss deployment aspects of proposed TransAID services, identify further stakeholder needs, and validate TransAID recommendations. The workshop consisted of three topics:

1) Digital infrastructure. In a sense traffic management can become more complex as more stakeholders get involved. Rather than just a classic approach, whereby (local) authorities manage their roads, we now encounter an ecosystem where intelligence and sensor information also resides in the vehicles. Automated communication between road users and the infrastructure becomes a prerequisite for enhanced traffic management, making the systems more performant by targeting (cooperative/connected and/or automated) vehicles individually.

2) Remote management. For the foreseeable future, safe and comfortable Level-4 automated mobility applications in mixed traffic (i.e. without steward or fall-back on board), will rely on a remote supervisory service. These include: monitoring of functional (safety), telemetry and technical surveillance; publish information and updates to support the sense-plan-act stages of the automated driving systems; operate digital infrastructure for infrastructure segment information and guidance, and facilitate (public and private) stakeholder interaction and manage clearance. Moreover, the presence of operators in a control room also contributes to the public acceptance of autonomous vehicles.

3) Operational design domain and road classification. Automated vehicles will not be able to cope with all possible situations. Each vehicle has its own Operational Design Domain (ODD), specifically defining all capabilities, and limitations. Each time an automated vehicle is about to leave its ODD, it has to issue a ToC. To allow automated driving without Transitions of Control for long periods of driving, road authorities need to be aware of "common" ODD restrictions and related requirements for physical and digital infrastructure. Clustering the infrastructure into infrastructure support levels for automated driving will help to create common rules for road and infrastructure capabilities.

Start time	Slot	Duration	Topic	Speaker
13:30	0:05	0:05	Grace time for warmup / Buffer for technical issues	
13:35	0:05	0:10	Opening and conference introduction	Jaap Vreeswijk, MAPtm
13:40	0:05	0:15	Introduction to theme 1: **Digital Infrastructure**	TransAID rep. **Sven Maerivoet**, TML
13:45	0:05	0:20	Invited pitch 1	**Mikael Ivari, City of Gothenburg and Polis, Chair of Traffic Efficiency Working Group**
13:50	0:05	0:25	Invited pitch 2	**Jacqueline Erhart, Asfinag**
13:55	0:05	0:30	Small interactive poll	TransAID rep.
14:00	0:20	0:50	Discussion	Break-out moderators
14:20	0:05	0:55	Wrap-up theme 1	TransAID rep. + break-out moderators
14:25	0:15	1:10	Break (people can leave and/or arrive)	
14:40	0:05	1:15	Introduction to theme 2: **Remote Management**	TransAID rep. **Jaap Vreeswijk**, MAPtm
14:45	0:05	1:20	Invited pitch 3	**Olav Madland, Applied Autonomy**
14:50	0:05	1:25	Invited pitch 4	**Dries Declercq, De Lijn**
14:55	0:05	1:30	Small interactive poll	TransAID rep.
15:00	0:20	1:50	Discussion	Break-out moderators
15:20	0:05	1:55	Wrap-up theme 2	TransAID rep. + break-out moderators
15:25	0:15	2:10	Break (people can leave and/or arrive)	
15:40	0:05	2:15	Introduction to theme 3: **ODD & Road Classification**	TransAID rep. **Julian Schindler**, DLR
15:45	0:05	2:20	Invited pitch 5	**Risto Kulmala, Traficon**
15:50	0:05	2:25	Invited pitch 6	**Lina Konstantinopoulou, EuroRAP**
15:55	0:05	2:30	Small interactive poll	TransAID rep.
16:00	0:20	2:50	Discussion	Break-out moderators
16:20	0:05	2:55	Wrap-up theme 3	TransAID rep. + break-out moderators
16:25	0:05	3:00	Closing remarks	Jaap Vreeswijk, MAPtm

The Day-2 workshop programme is summarised above. Details of the results are included in Appendix A, and some screenshots are included in Appendix B.

Eighty-eight people registered for the Day-2 workshop, and forty-nine attended. About three-quarter of the participants represented research, academia or consulting, 7% represented OEMs. Around 75% of the attendees responded to polls during the workshop.

1) Digital infrastructure: 65% of the participants thought that hybrid connectivity is required for some levels of automation (Leve-3 and higher), 15% favoured ITS-G5, 15% preferred 4G/5G. 70% of the participants thought that CAVs "breaking the law" in order to behave as all other road users should be allowed but regulated by context, 20% stated no, under no circumstance, and 7% was fine to leave this to the own judgement of the vehicle systems. 46% of the participants thought that road authorities should not provide dedicated lanes for automated driving, 27% stated yes, but only on motorways, 15% stated yes, but only in urban areas. On the question if automated driving disengagements should be mandatorily reported by OEMs to the road authorities to tune traffic management, 77% stated yes via an open standard/interface, 31% thought yes via an intermediate party, 12% though yes but with a compensation, 8% stated.
2) Remote management: 52% of the participants thought that a CAV will stop in the driving lane or at a safe spot in case of a minimum risk manoeuvre, 33% that the CAV will drive carefully, 11% that is will initiate a handover of control, 4% that it will execute a diversion automatically. On the question which TransAID service for infrastructure-assisted driving the participants consider to be most realistic, 44% stated "Provide speed, headway and/or lane advice", 20% thought "Guidance to safe spot", another 20% thought "Orchestration, distribution, and scheduling", and 16% stated "Provide vehicle path information". 45% of the participants thought that remote management and control is about extending the environmental awareness of vehicles, 27% choose remote driving, 14% thought mission management, and another 14% selected autopilot assistance. 50% of the participants stated that remote monitoring and control centres should be owned and operated by road authorities, 21% thought fleet owners, another 21% selected qualified entity, 4% stated vehicle manufacturers.
3) Operational design domain & road classification: 73% of the participants thought that ODD definitions of vehicles should be openly accessible, 23% stated confidential and only accessible for specific entities, and 4% choose confidential and only accessible for the OEM/Tier-1. On the question what ODD definitions should be used for when they are openly accessible, 82% stated traffic management measures, 59% thought road access control, 50% choose road network developments, 32% selected lane access control. 48% of the participants thought that ODD definitions when openly accessible, should be shared by using a centralised database of vehicle capabilities, 44% stated by constantly broadcasting capabilities using communication, and 8% thought by retrieving information off-line from the OEM. On the question how cities/road authorities should best use their budget for automation readiness, 42% stated equip road/intersections with communication technology, 35% choose equip roads/intersections with sensors to enhance efficiency, 12% selected categorise roads according to infrastructure support levels for automated driving, and another 12% stated enhance the quality of roads.

The details of the Day-2 workshop programme and the survey results are presented in TransAID *Deliverable D8.1 Stakeholder consultation report*. The workshop materials and presentations can be downloaded from: www.transaid.eu/final-event/

3.3 Final Demonstration

As it was decided to have an online final event, no demonstration activity could be linked to this event. Therefore, it has been decided to aim for other solutions to showcase the developments. In summer 2020, the COVID-19 situation relaxed all over Europe, and it was again planned to have at least parts of the FISTS conference as an on-site event. Esp. the demonstration activities have been planned to take place on an airport near Delft during the conference time in the first week of November.

In parallel, another event closer to the location of the test vehicles and therefore minimizing the preparation effort and skipping international COVID-19 limitations was planned in Hannover, Germany. On November 4th, the ADAC Forum was scheduled on the ADAC Center for Safe Driving in Hannover-Laatzen. Here, the ministry of Lower Saxony was invited together with press (camera teams of the regional TV together with newspapers and magazines).

Both events have been further prepared whole summer. While the Delft demonstration was cancelled due to the worsened COVID-19 situation in mid-October, preparation for the Laatzen event continued.

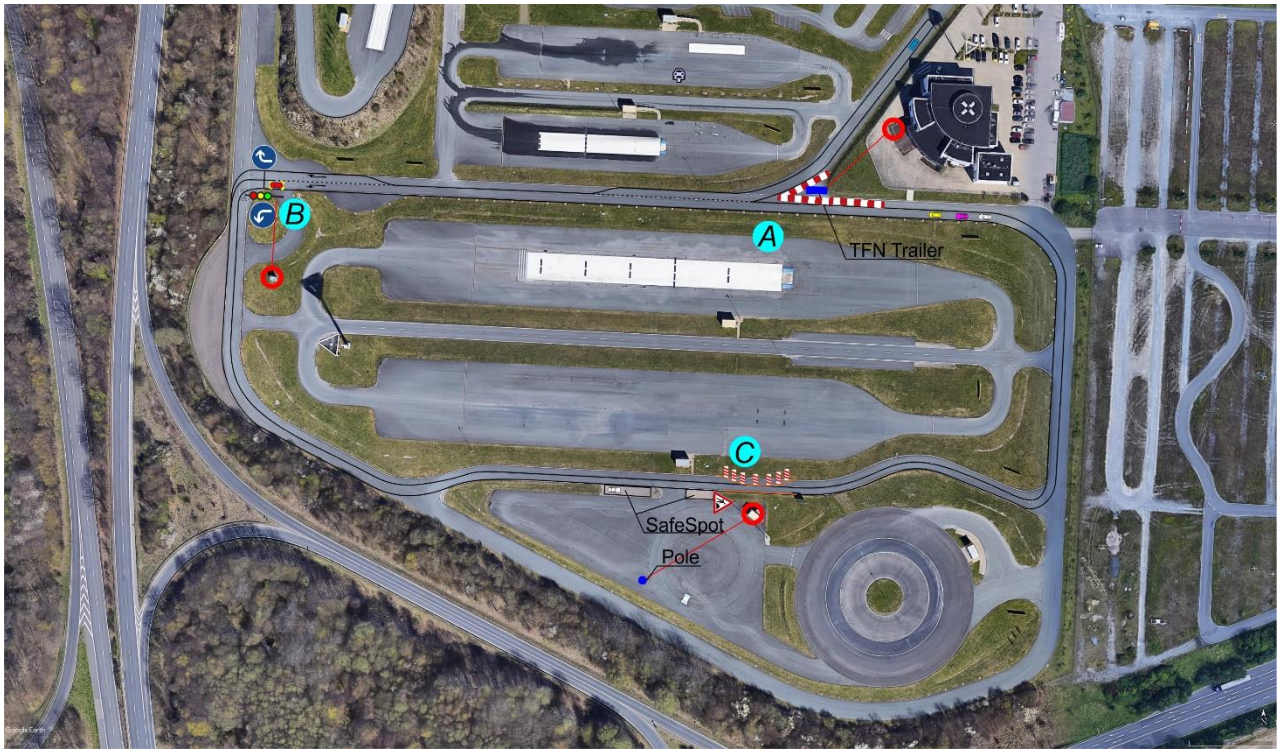


Figure 2: Demonstration area at the ADAC Forum, where three TransAID use cases (A-C) have been showcased.

In Laatzen, it was planned to showcase a round-trip of three TransAID scenarios with the two DLR connected automated vehicles, as shown in Figure 2. The scenarios are:

A) Cooperative merging (Use case 2.1): A couple of legacy vehicles (yellow and grey in the figure) and the automated DLR FASCarE (purple) are driving with low headways on the "highway". The automated DLR ViewCar2 (blue) is driving on the on-ramp and trying to merge in between the row of vehicles. Infrastructure is monitoring the merging area (here: a mobile trailer from the Testbed Lower Saxony). The view between highway and on-ramp is blocked by barriers to highlight that the vehicles' sensors are not able to see each other directly. Merging is done by V2V maneuver coordination using the V2V-MCM (see

TransAID Deliverable 5.2 for details). The FASCarE is opening a gap to allow the ViewCar2 to merge.

B) Left turn from a right-turn lane (Use case 2.3): Here, a broken-down legacy vehicle is blocking the only left-turn lane at a signalized intersection. The traffic light is responding to this by sending DENM messages indicating the position of the broken-down vehicle and by sending MAPEM messages allowing the left turn from the right-turn lane. Both automated vehicles are following this advice and perform the left turn accordingly while also respecting SPATEM messages reflecting the current traffic light state.

C) Arrival at No-AD-zone with safe-spots (Use case 4.1-5): Further down the road, the automated vehicles where heading for a No-AD-zone, displayed by a road works area with a narrowed lane. There are two possible safe spots in front of the No-AD-zone, which are monitored by a camera mounted on a pole. One of the safe spots is already blocked by a parking legacy vehicle. Only one safe-spot is left. Therefore, the first cooperative automated vehicle (ViewCar2) is getting the advice to use the remaining free safe-spot by I2V-MCM. The FASCarE has no available safe-spot, so it needs to stop on the road in front of the No-AD-zone. Other legacy vehicles are queueing behind the stopped FASCarE. This behavior has also been chosen to showcase how automated vehicles are possibly blocking roads in front of No-AD-zones in the future.

During the event, the idea was to allow the members of the ministry to take part in the test rides by sitting in the back of the ViewCar2. Later on that day, also press members would have been allowed to participate, strictly following the COVID-19 rules (like e.g. limiting the number of people, mandatory FFP2-masks).

Unfortunately, also this event has been cancelled as Germany released new COVID-19 rules going into force on the day of the trial. As everything was prepared for the show, and as a camera team was already ordered to film the whole day, it has been decided to perform at least the filming on the day of the planned demo and to release this video later on. This has finally been done. The produced video is available on www.transaid.eu and on the DLR YouTube channel. Impressions from the video are put into Appendix C.

4 Conclusion

The TransAID Final Conference was fist planned with one full day Special Session and three-day exhibition and indoor/outdoor demonstrations, in conjunction with one of the international conferences of IEEE (Institute of Electrical and Electronics Engineers), i.e. FISTS (Forum on Integrated and Sustainable Transportation System) on 30 June to 2 July in Delft, The Netherlands. A Special Session on cooperative and automated driving in a transition phase (dedicated for TransAID) was arranged. A Call for Papers of this Special Session was published, and accepted papers will be published in the Proceedings of IEEE FISTS 2020 and IEEE Xplore. In this Special Session, invited speakers could also give presentations without submitting scientific papers. Experts in the domain of cooperative and automated driving and public at large were invited. Various dissemination materials were carefully planned, selected, and prepared. Promotion activities were conducted via consortium partners and related projects and network partners. In addition, a demonstration with automated vehicles (from DLR) on a section of public road in the campus of TU Delft was under preparation by Dynniq and DLR.

Due to COVID-19, the format of the Final Conference was changed. The demonstration had to be cancelled, and the event was held online on 1-2 July 2020 with a different programme by changing moderator and invited external speakers. The online event had around 63 participants on Day-1, and up to 49 participants on Day-2. The number of participants outside the consortium was not very large. On Day-1, the Project Officer Georgios Sarros (EC INEA) gave an opening speech. After a brief project introduction given by Julian Schindler (DLR - Project Coordinator), several TransAID partners presented the main technical results of the project, such as modelling and impact assessment of automated vehicles, traffic management procedures for transition areas, connectivity and signalling, and system integration and evaluation approach. Between presentations some polls were conducted to get the view of the participants on some specific subjects in the domain and to make the online event interactive. The Day-2 online workshop targeted city participants and non-technical issues related to digital infrastructure, remote management, operational design domain and road classification.

In general, the virtual TransAID Final Conference was successful, and achieved the dissemination goal. However, an online event could not be as interactive as face-to-face, and there were no effective networking opportunities for participants. These were the key limitations and drawback of the online event. Due to COVID-19, there was no other option. The TransAID consortium put great efforts to make the online event successful. In addition to the re-preparation of the content, the consortium had to make sure about the quality of presentation. No negative comment (or complain) from participants was received. The TransAID consortium has learned by doing such an event that it is not easy to communicate with people in the audience without knowing their background, knowledge, expertise, and real-time reactions. The survey results are helpful for TransAID to further develop the roadmaps and guidelines for stakeholders, although the sample size is not large. The project results are good from both scientific and technical perspectives. The TransAID consortium shall put more effort on exploitation.

With local support from Dynniq, the TransAID Consortium planned to organise a demonstration with automated vehicles from DLR in The Netherlands and in Germany. Both options had to be cancelled shortly before the show. Instead, a video has been prepared presenting the content of the planned demonstration.

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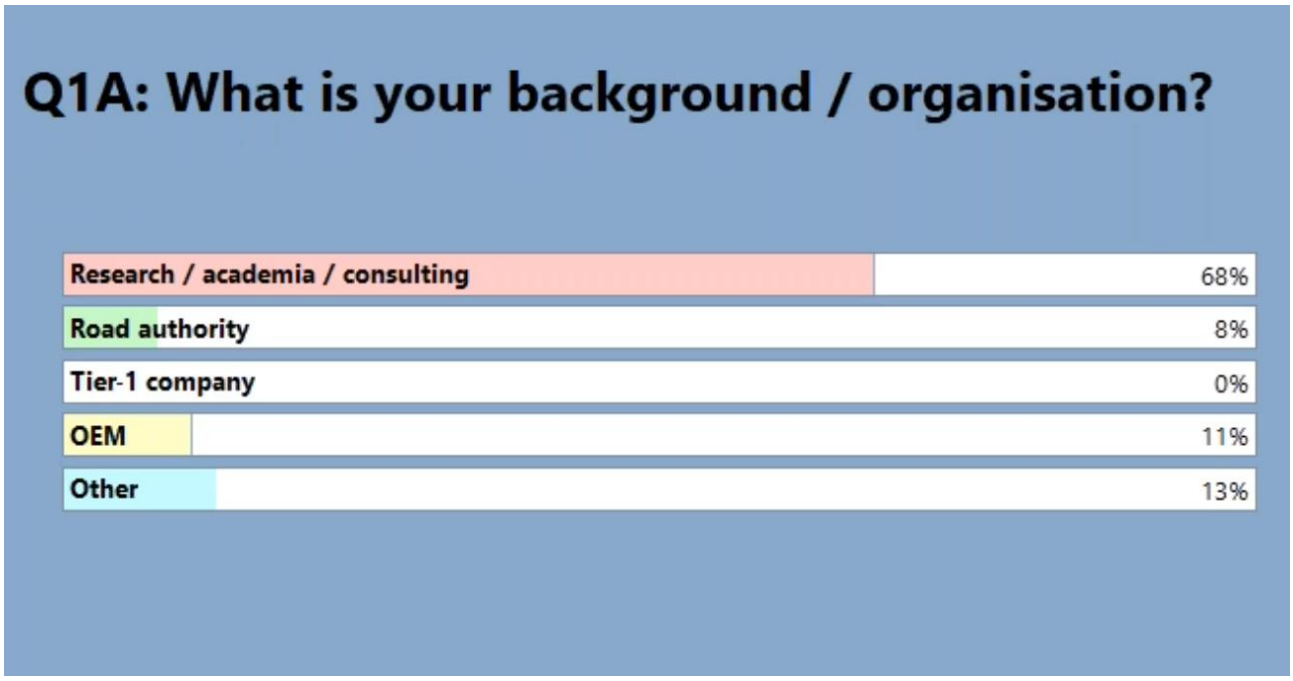
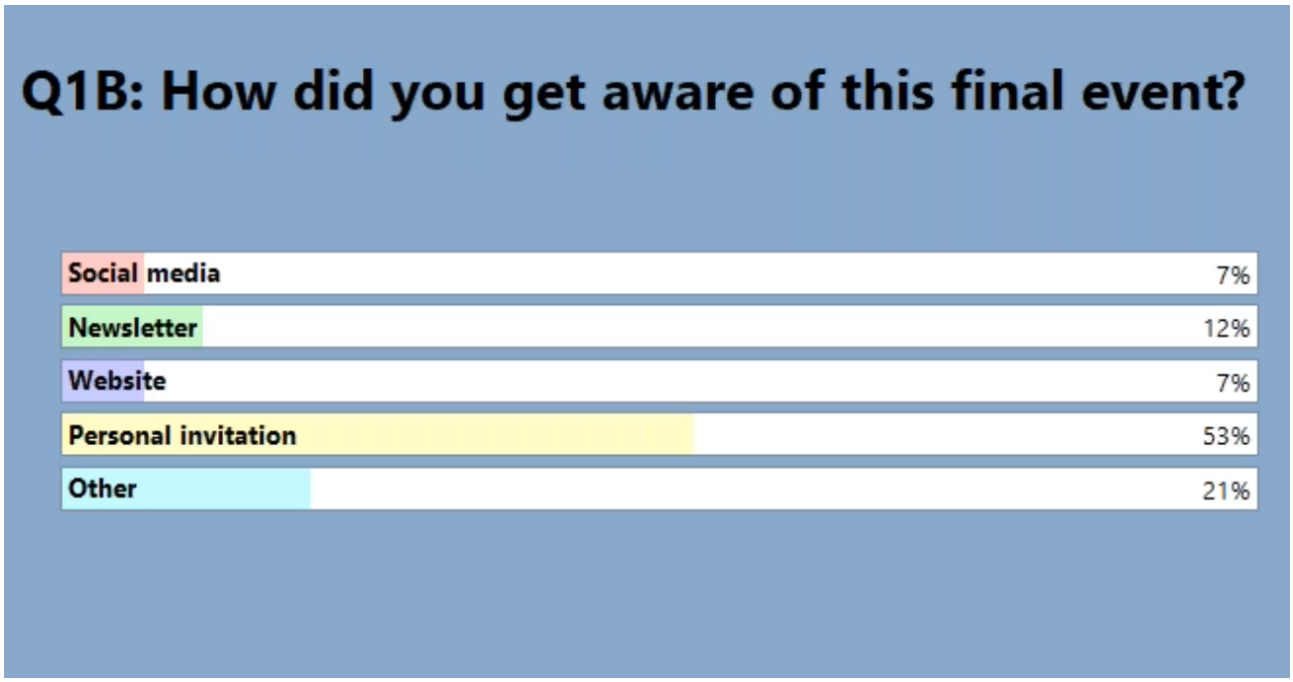
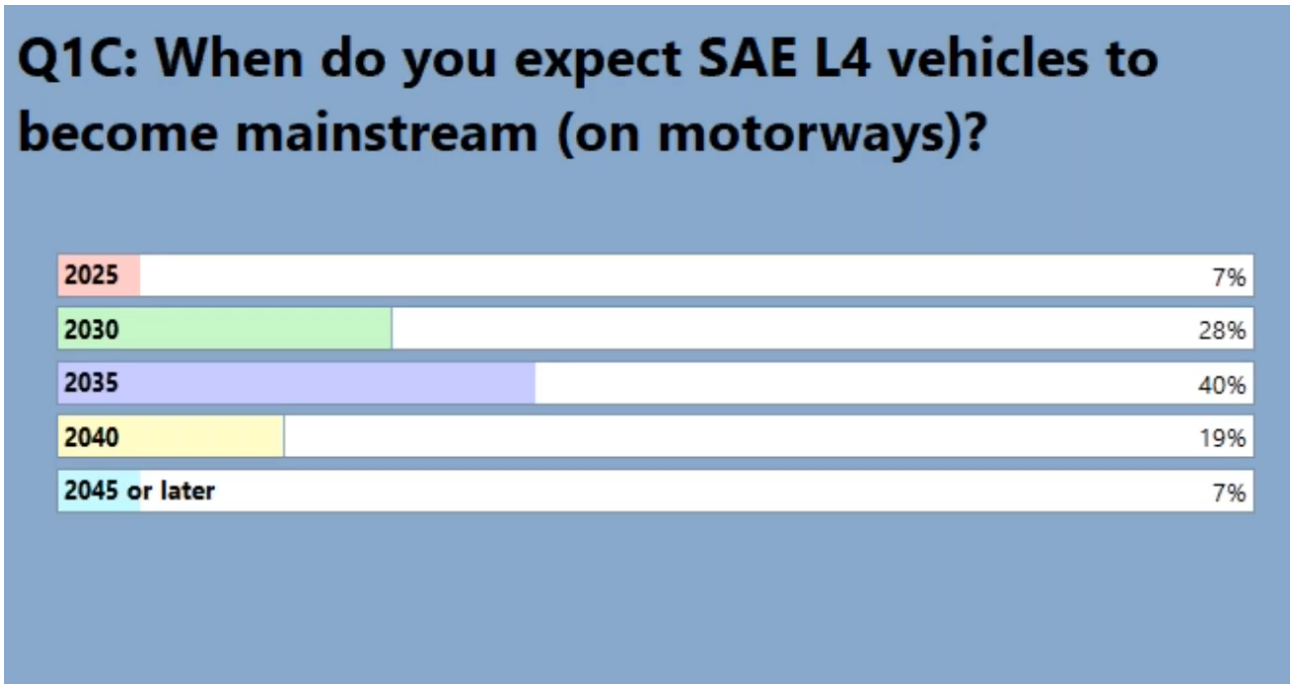
5. Rondinone, M., Correa, A., Blokpoel, R., Andert, F., Khan, S., Wijbenga, A., Vrees-wijk, J., Sepulcre, M., Gozalvez, J., Coll, B., Carlier, K. (2019). TransAID Deliverable D5.1 Definition of V2X message sets. TransAID Consortium.
6. Correa, A., Andert, F., Blokpoel, R., Wojke, N., Thandavarayan, G., Coll Perales, B., Sepulcre, M., Gozalvez, J., Wijbenga, A., Schindler, J., Maerivoet, S. (2019). TransAID Deliverable D5.2 V2X-based cooperative sensing and driving in Transition Areas. TransAID Consortium.
7. Coll Perales, B., Thandavarayan, G., Sepulcre, M., Gozalvez, J., Correa, A. (2020). TransAID Deliverable D5.3: Protocols for reliable V2X message exchange. TransAID Consortium.
8. Schindler, J., Zhang, X., Wijbenga, A., Mintsis, E., Herbig, D. (2020). TransAID Deliverable D5.4 Signalling for informing conventional vehicles. TransAID Consortium.
9. Lücken, L., Mintsis, E., Correa, A., Maerivoet, S., Akkermans, L., Carlier, K., Mayeres, I., Flötteröd, Y.-P., Behrisch, M., Schindler, J. (2018). TransAID Deliverable D6.1 An integrated platform for the simulation and the assessment of traffic management procedures in Transition Areas. TransAID Consortium.
10. Lücken, L., Schwamborn, M., Maerivot, S., Mintsis, E., Dimitrios, K., Correa, A., Sepulcre, M., Coll Perales, B., Blokpoel, R., Huisken, G., Schindler, J. (2019) TransAID Deliverable D6.2 Assessment of Traffic Management Procedures in Transition Areas. TransAID Consortium.
11. Vreeswijk, J. et al., (2020) Deliverable D8.1 Stakeholder consultation report. TransAID Consortium.

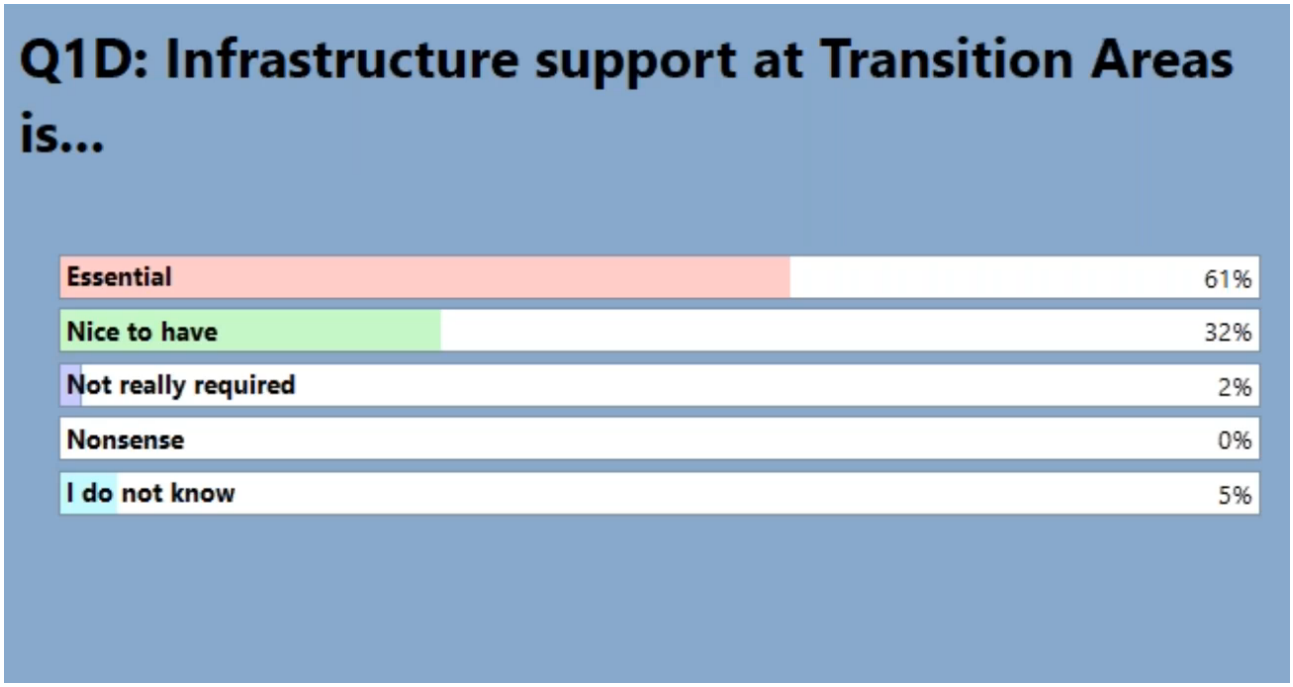
Appendix A. Detailed survey results

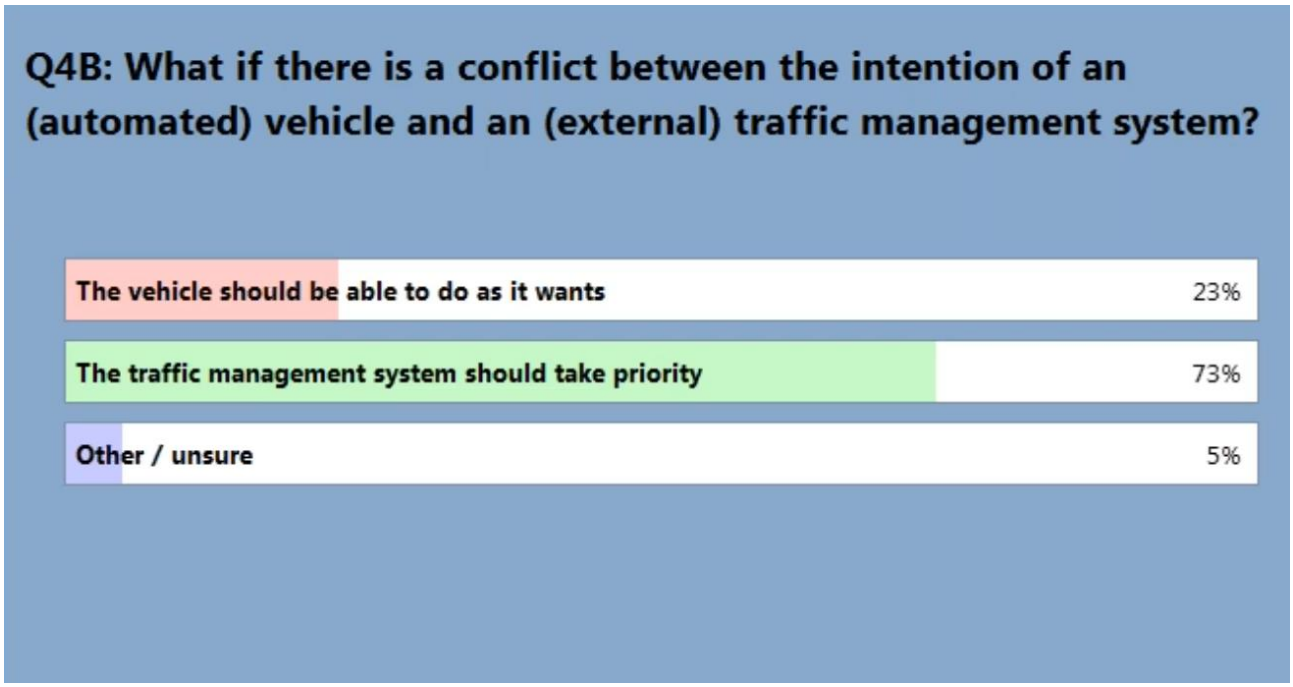
Questions posted on Day-1 of the Final Conference and results

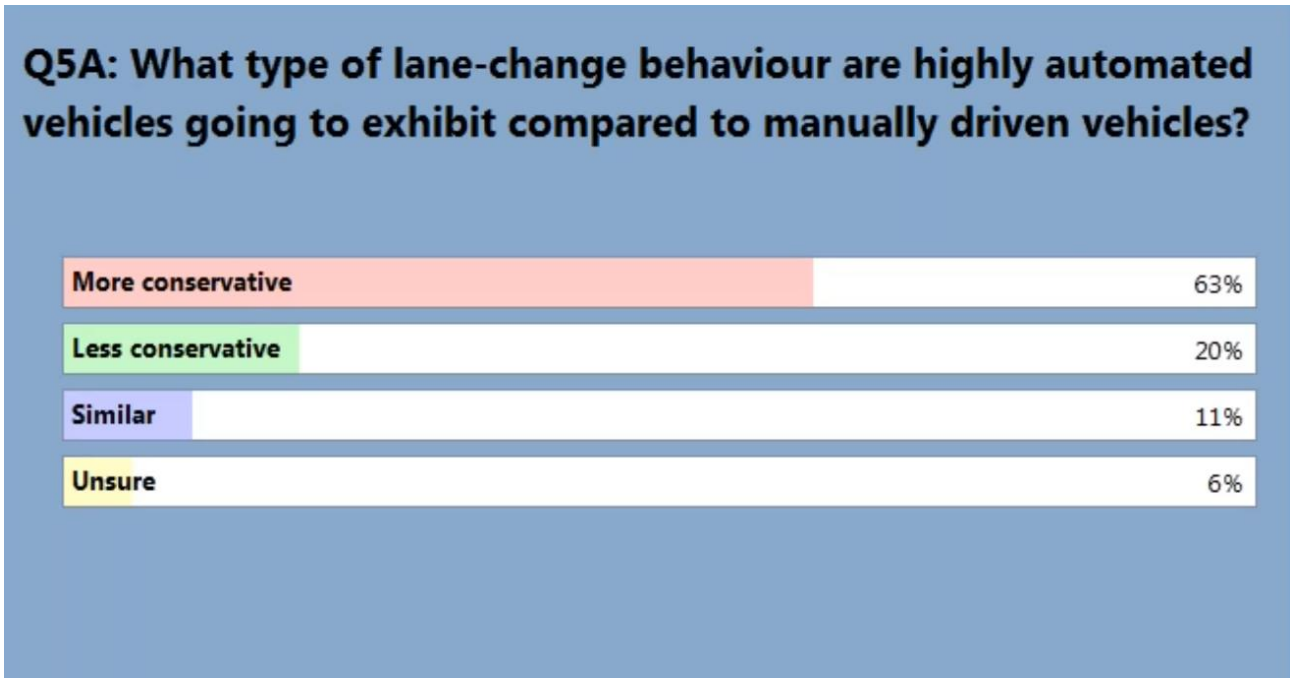


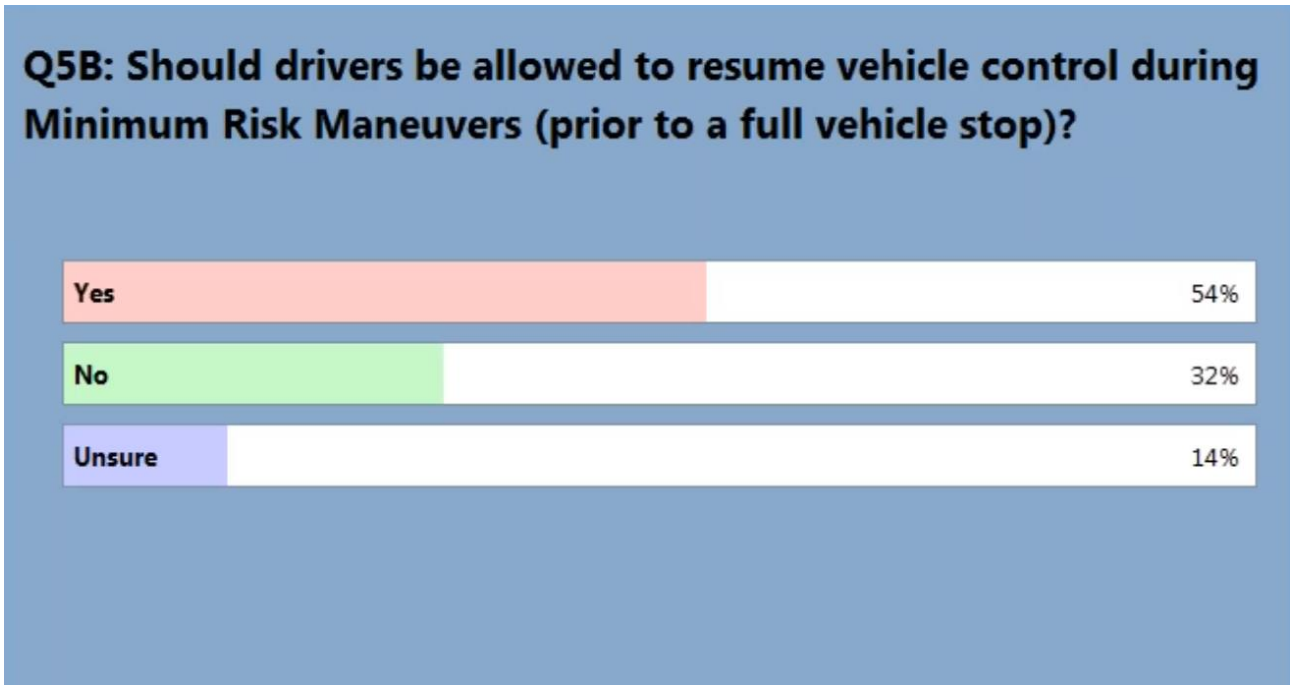


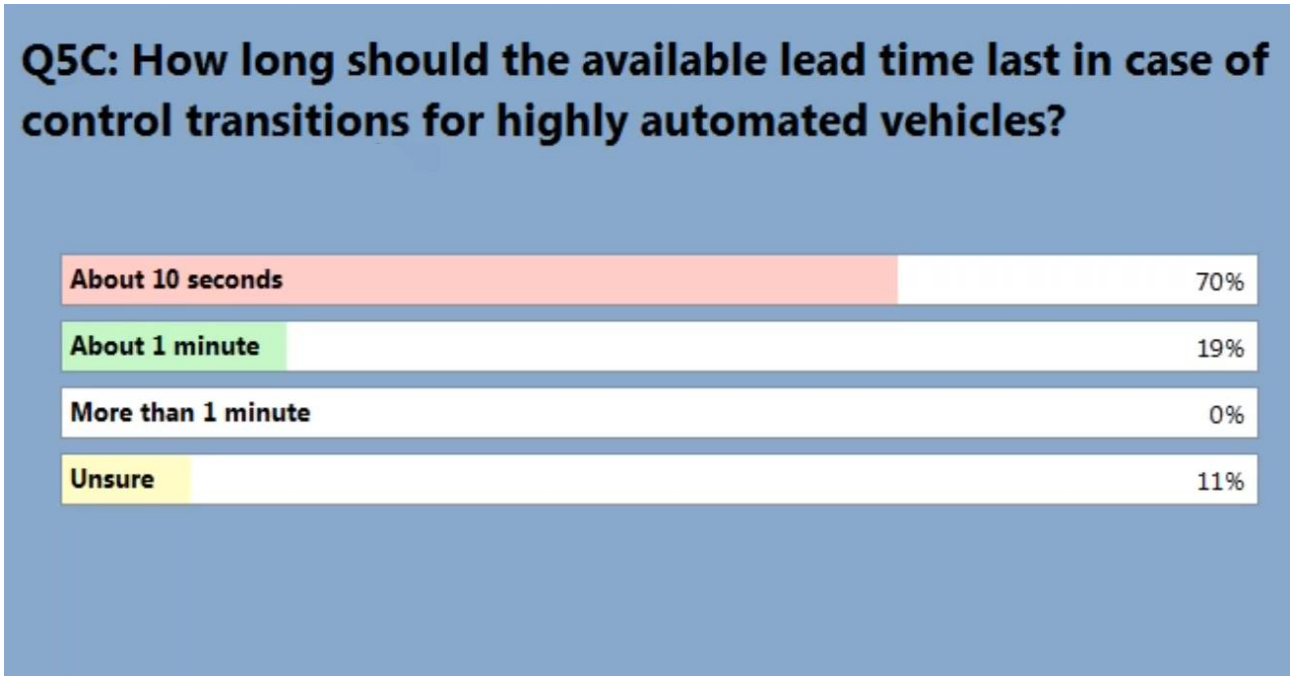

Q1C: When do you expect SAE L4 vehicles to become mainstream (on motorways)?
2025
7%
2030
28%
2035
40%
2040
19%
2045 or later
7%

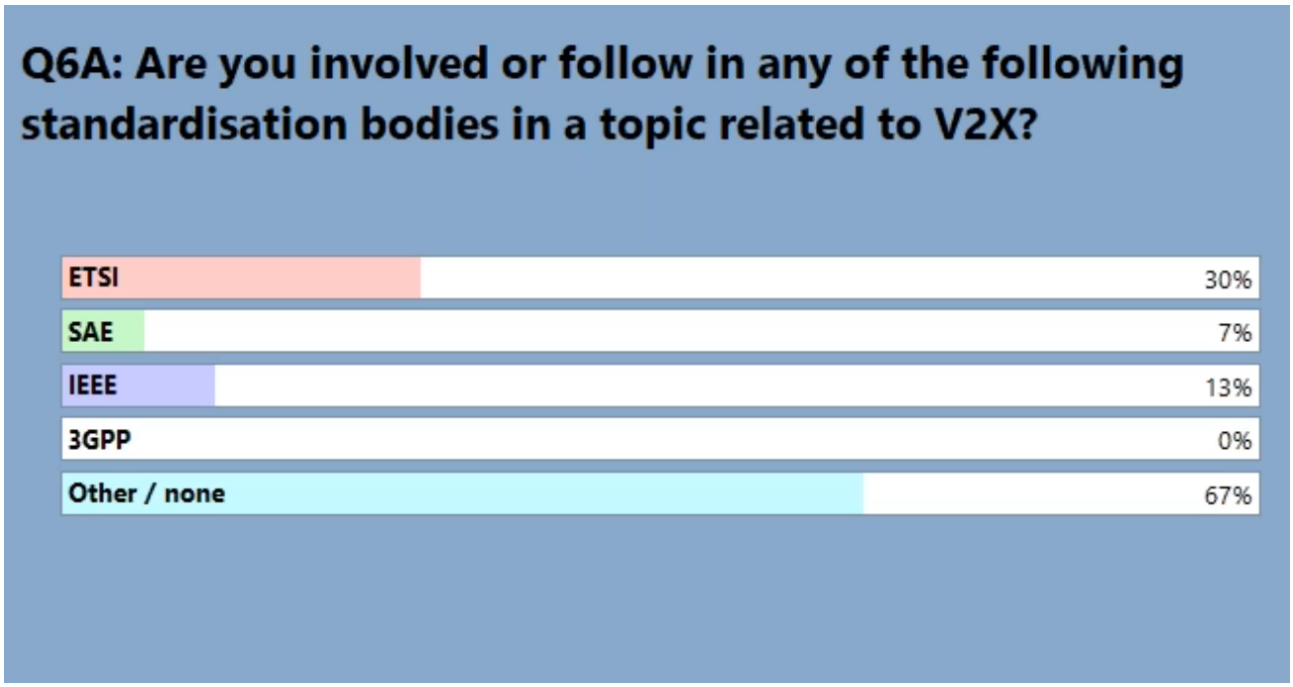

Q1D: Infrastructure support at Transition Areas is...
Essential
61%
Nice to have
32%
Not really required
2%
Nonsense
0%
I do not know
5%

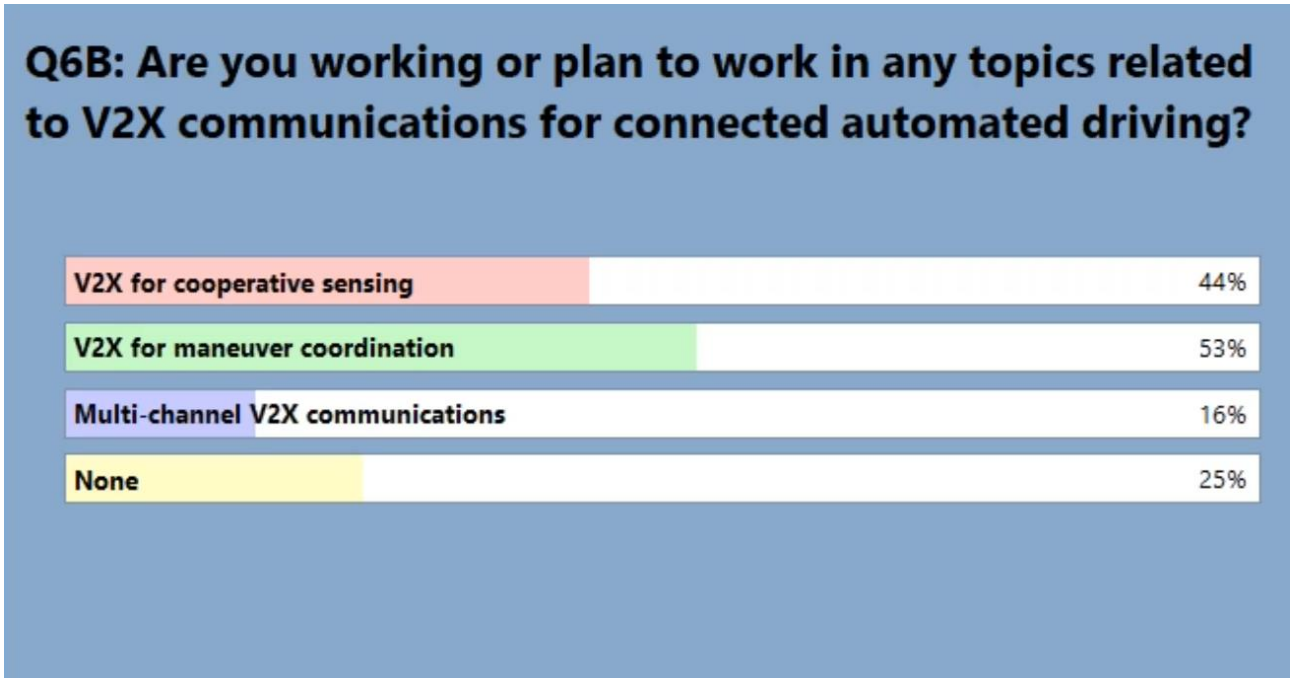

Q4B: What if there is a conflict between the intention of an (automated) vehicle and an (external) traffic management system?
The vehicle should be able to do as it wants
23%
The traffic management system should take priority
73%
Other / unsure
5%

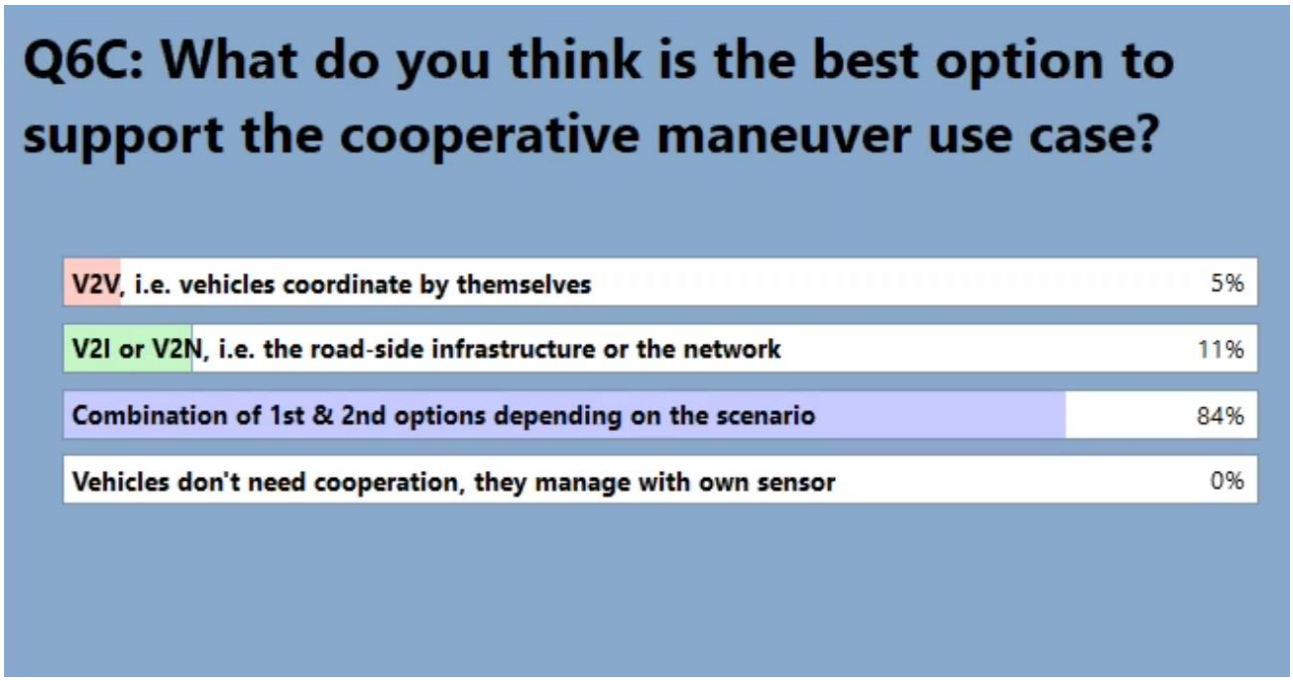

Q5A: What type of lane-change behaviour are highly automated vehicles going to exhibit compared to manually driven vehicles?
More conservative
63%
Less conservative
20%
Similar
11%
Unsure
6%

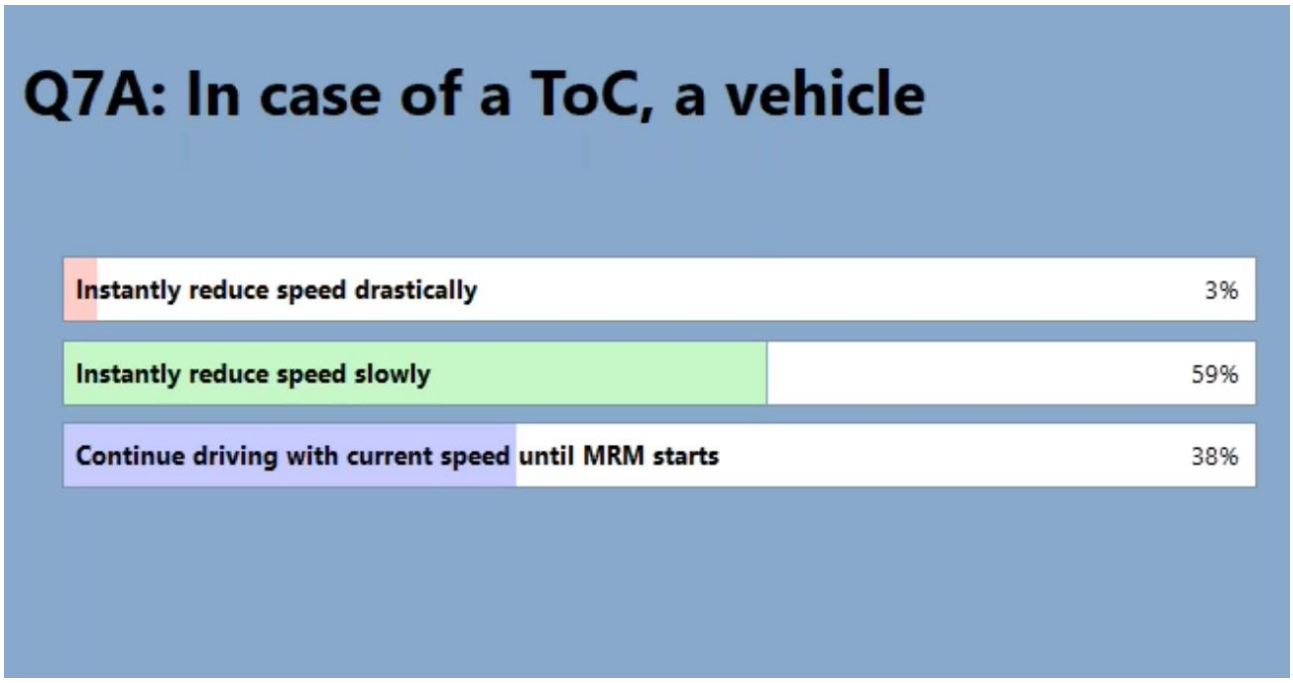

Q5B: Should drivers be allowed to resume vehicle control during Minimum Risk Maneuvers (prior to a full vehicle stop)?
Yes
54%
No
32%
Unsure
14%

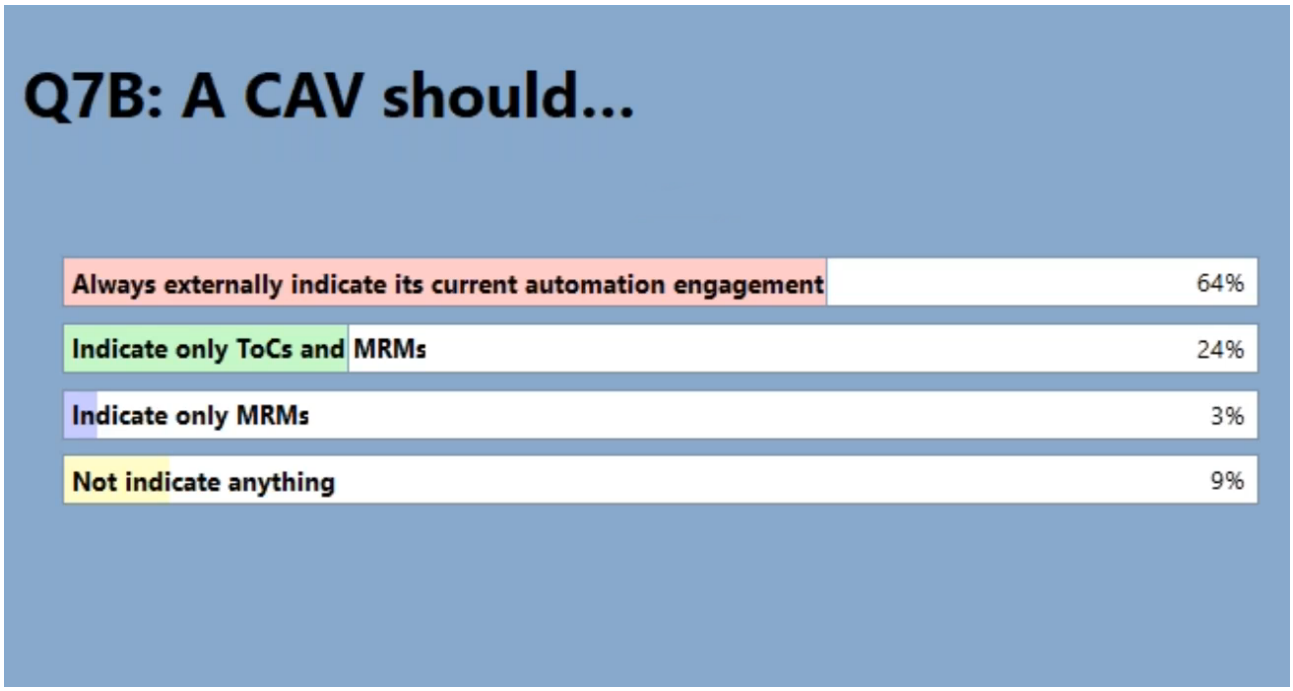

Q5C: How long should the available lead time last in case of control transitions for highly automated vehicles?
About 10 seconds
70%
About 1 minute
19%
More than 1 minute
0%
Unsure
11%

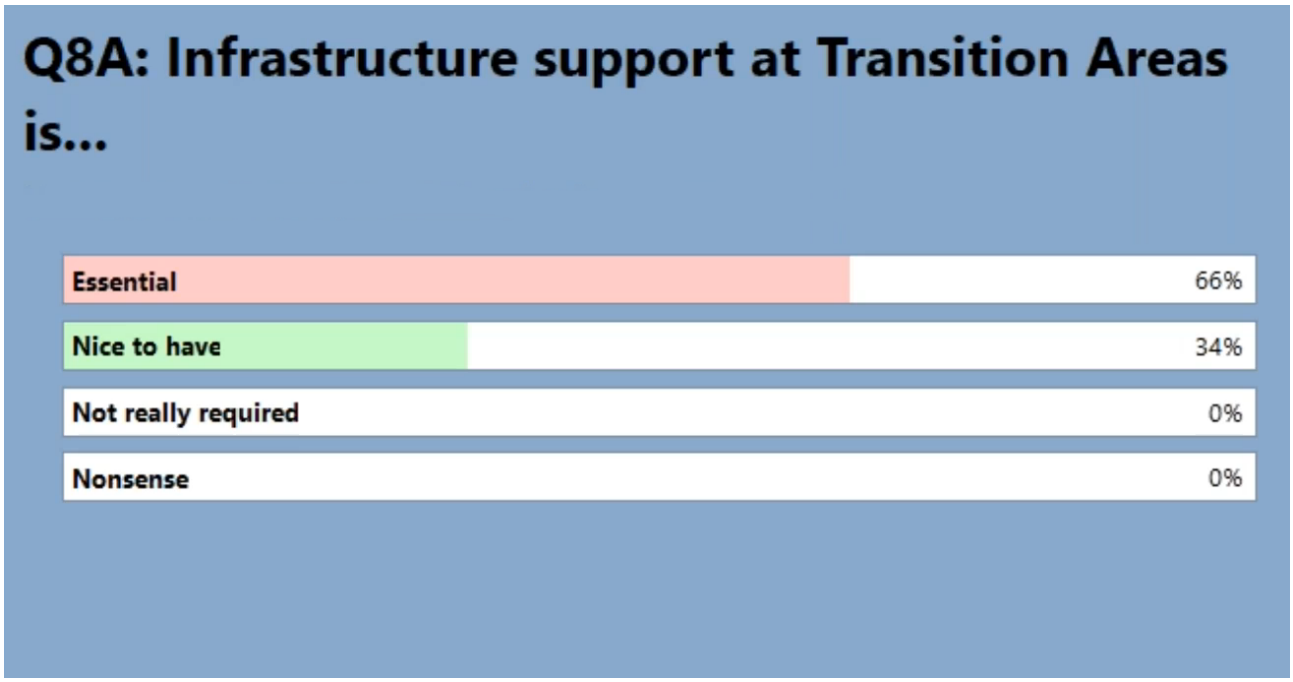

Q6A: Are you involved or follow in any of the following standardisation bodies in a topic related to V2X?
ETSI
30%
SAE
7%
IEEE
13%
3GPP
0%
Other / none
67%


Q6B: Are you working or plan to work in any topics related to V2X communications for connected automated driving?
V2X for cooperative sensing
44%
V2X for maneuver coordination
53%
Multi-channel V2X communications
16%
None
25%


Q6C: What do you think is the best option to support the cooperative maneuver use case?
V2V, i.e. vehicles coordinate by themselves
5%
V2I or V2N, i.e. the road-side infrastructure or the network
11%
Combination of 1st & 2nd options depending on the scenario
84%
Vehicles don't need cooperation, they manage with own sensor
0%

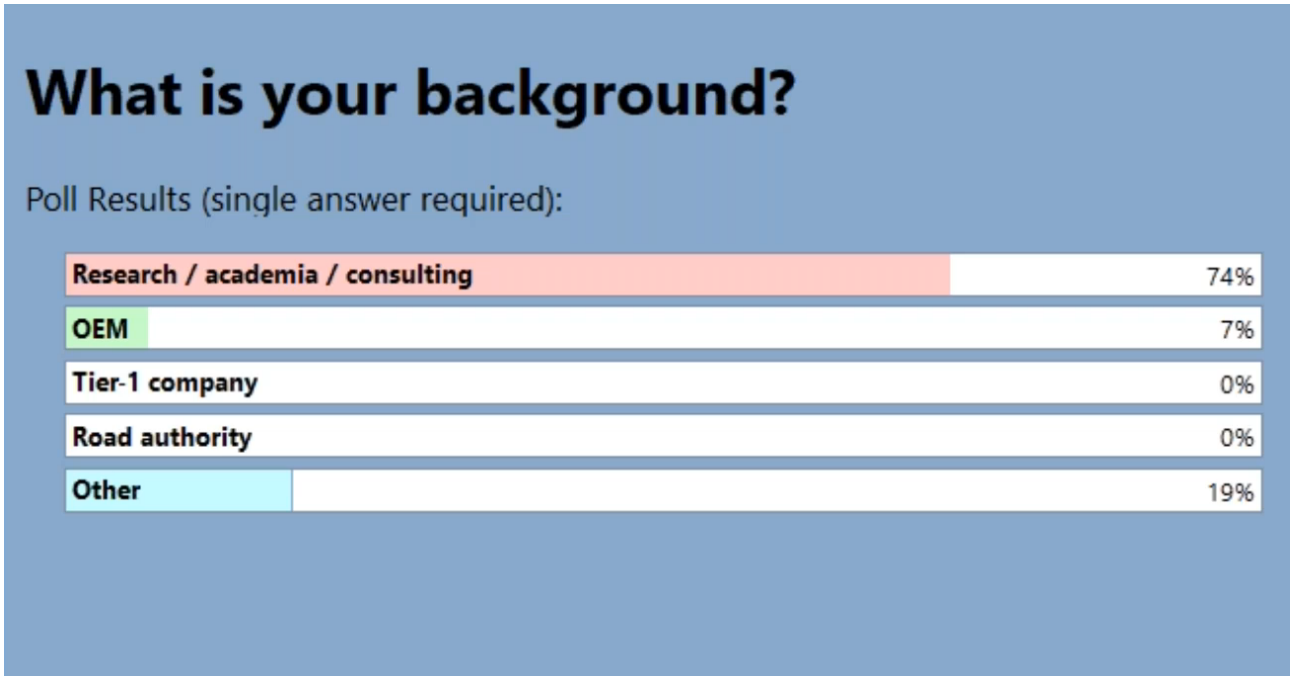

Q7A: In case of a ToC, a vehicle
Instantly reduce speed drastically
3%
Instantly reduce speed slowly
59%
Continue driving with current speed until MRM starts
38%

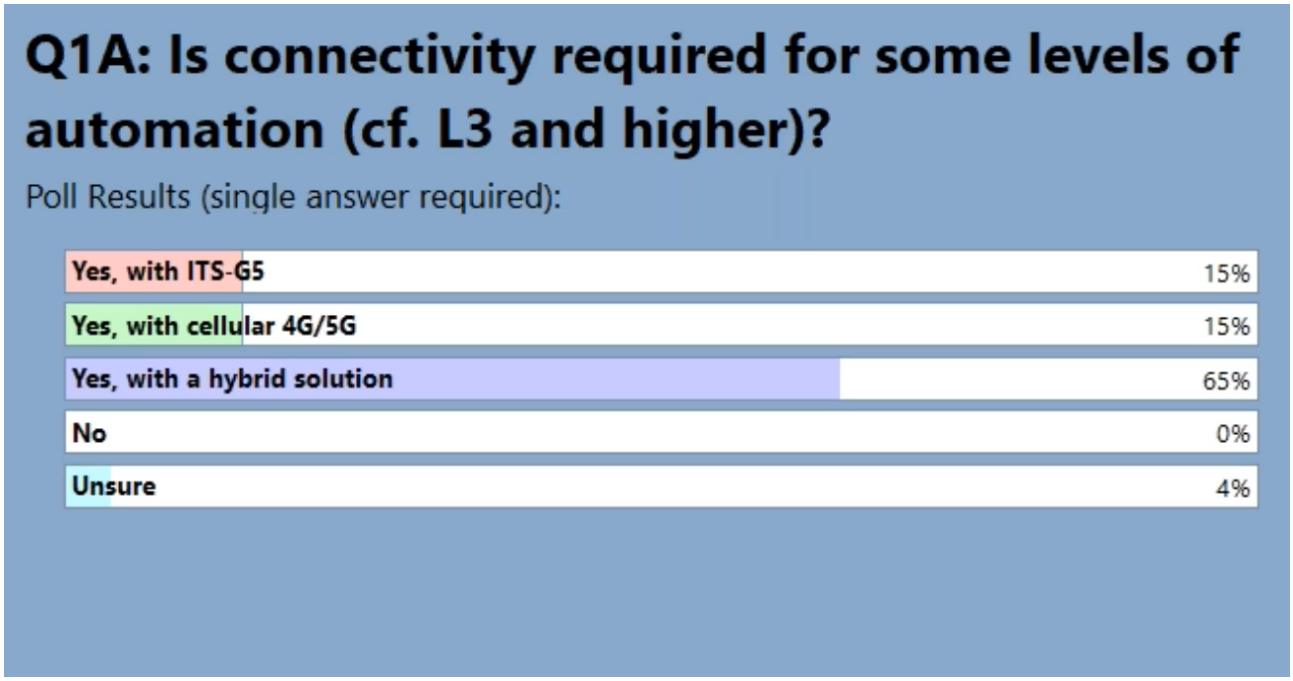

Q7B: A CAV should...
Always externally indicate its current automation engagement
64%
Indicate only ToCs and MRMs
24%
Indicate only MRMs
3%
Not indicate anything
9%

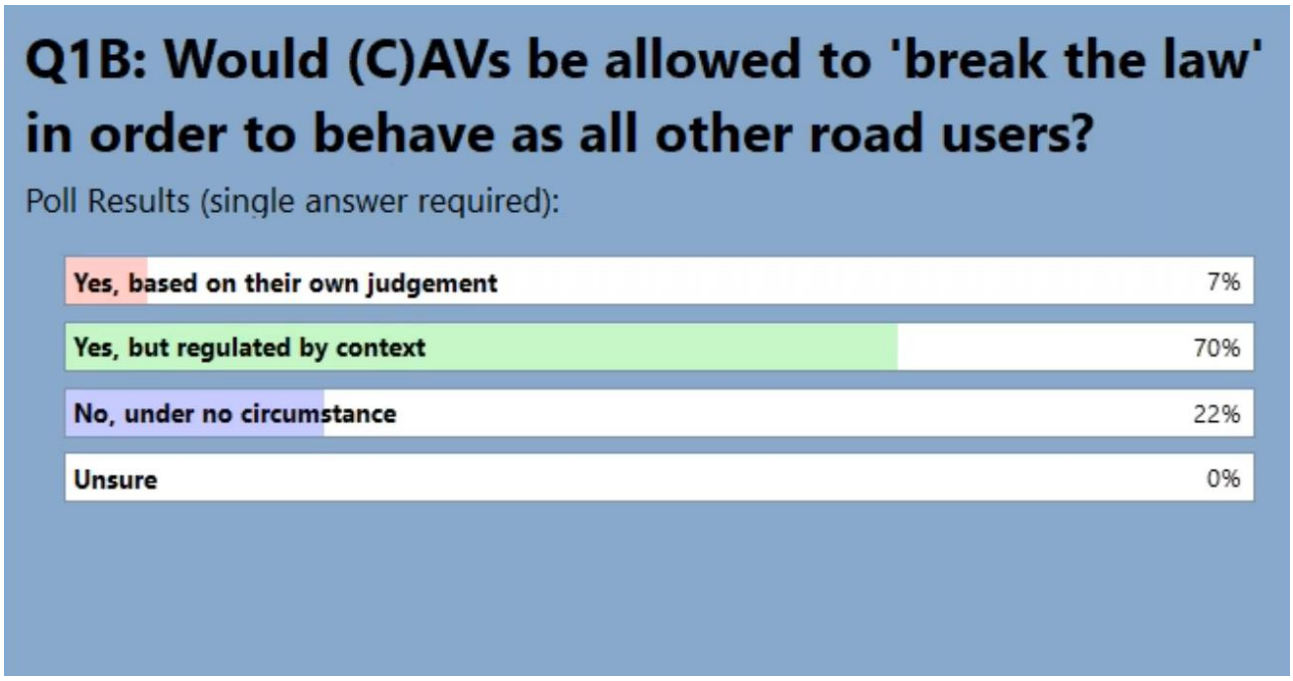

Q8A: Infrastructure support at Transition Areas is...
Essential
66%
Nice to have
34%
Not really required
0%
Nonsense
0%

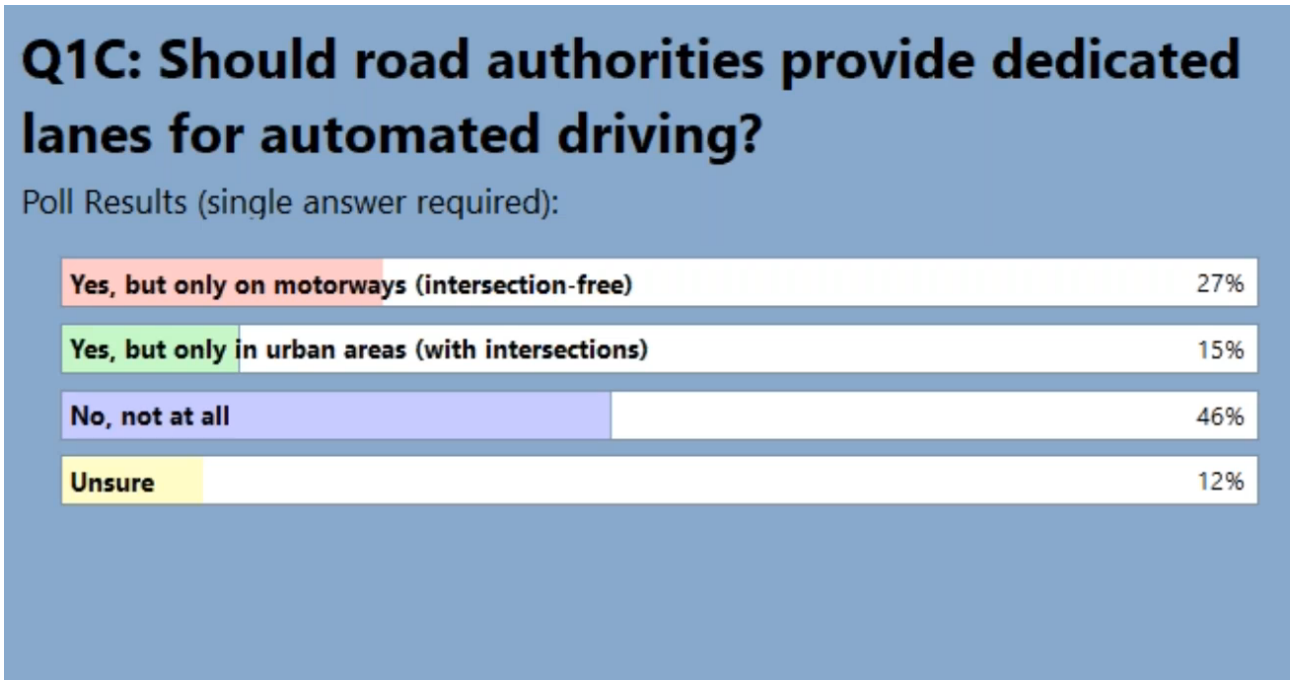
Questions posted on Day-2 of the Final Conference and results

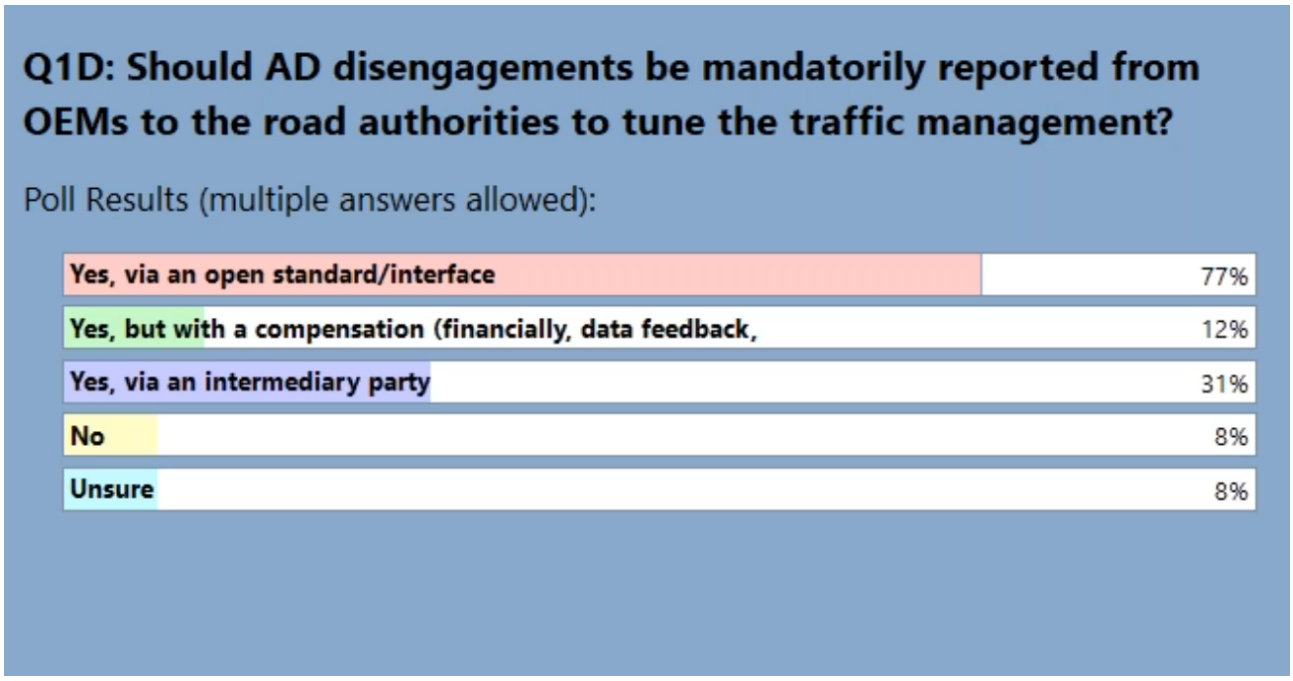
(note: the following results are reproduced from D8.1 Appendix C)

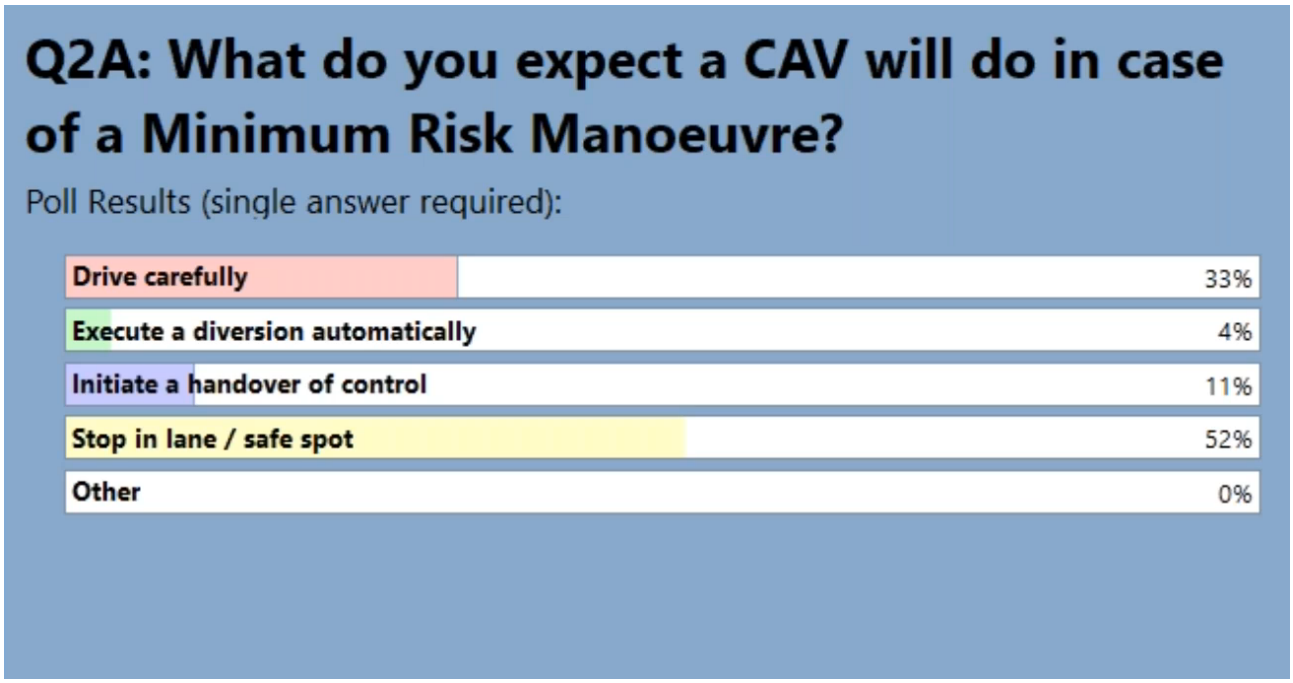


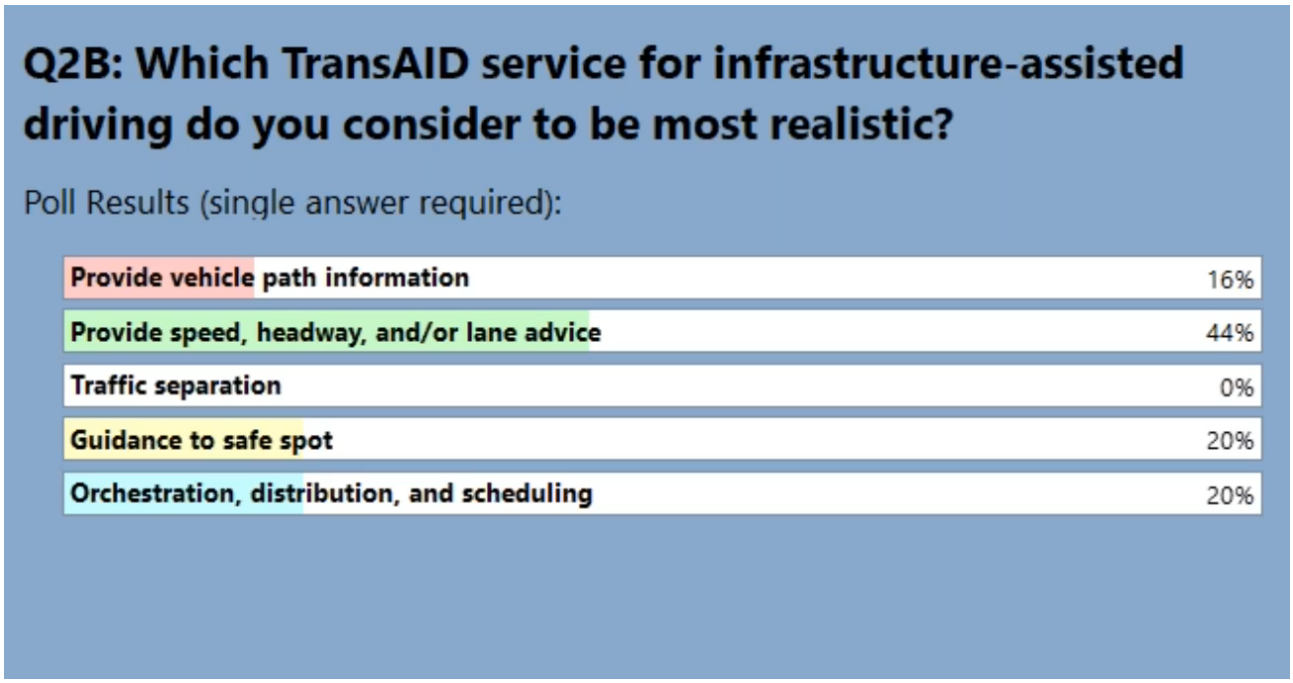


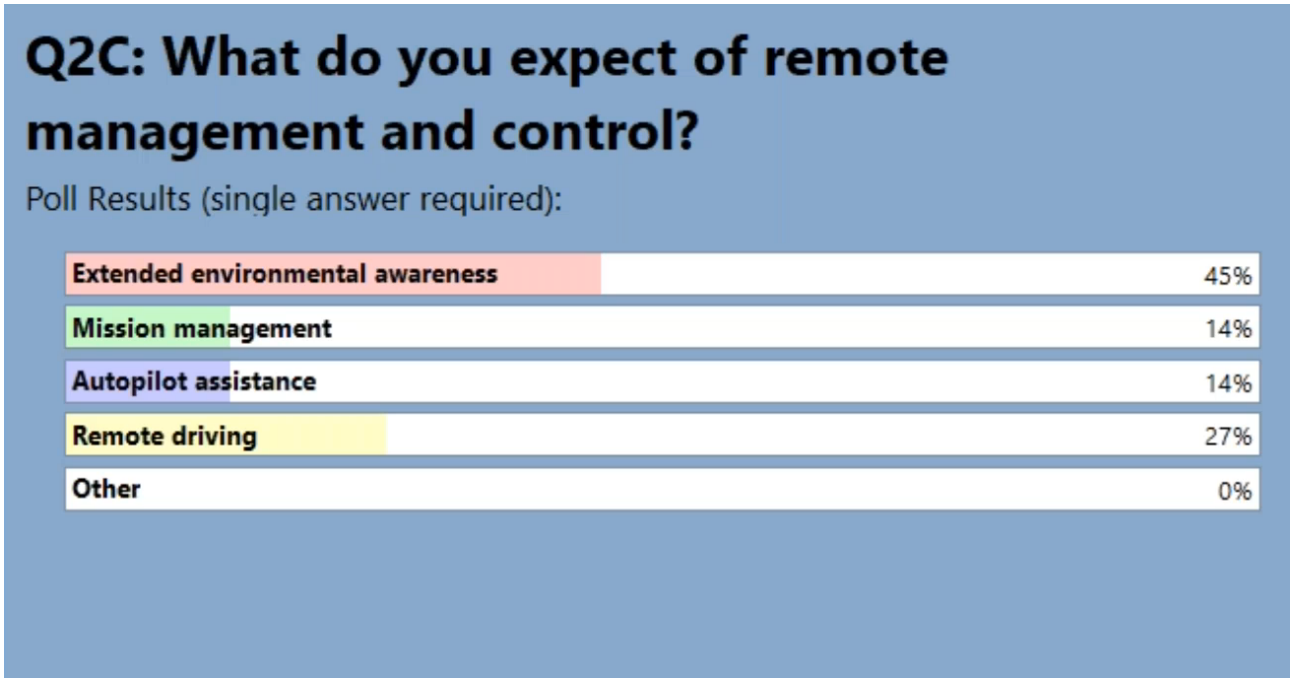

Q1B: Would (C)AVs be allowed to 'break the law' in order to behave as all other road users?
Poll Results (single answer required):
Yes, based on their own judgement 7%
Yes, but regulated by context 70%
No, under no circumstance 22%
Unsure 0%

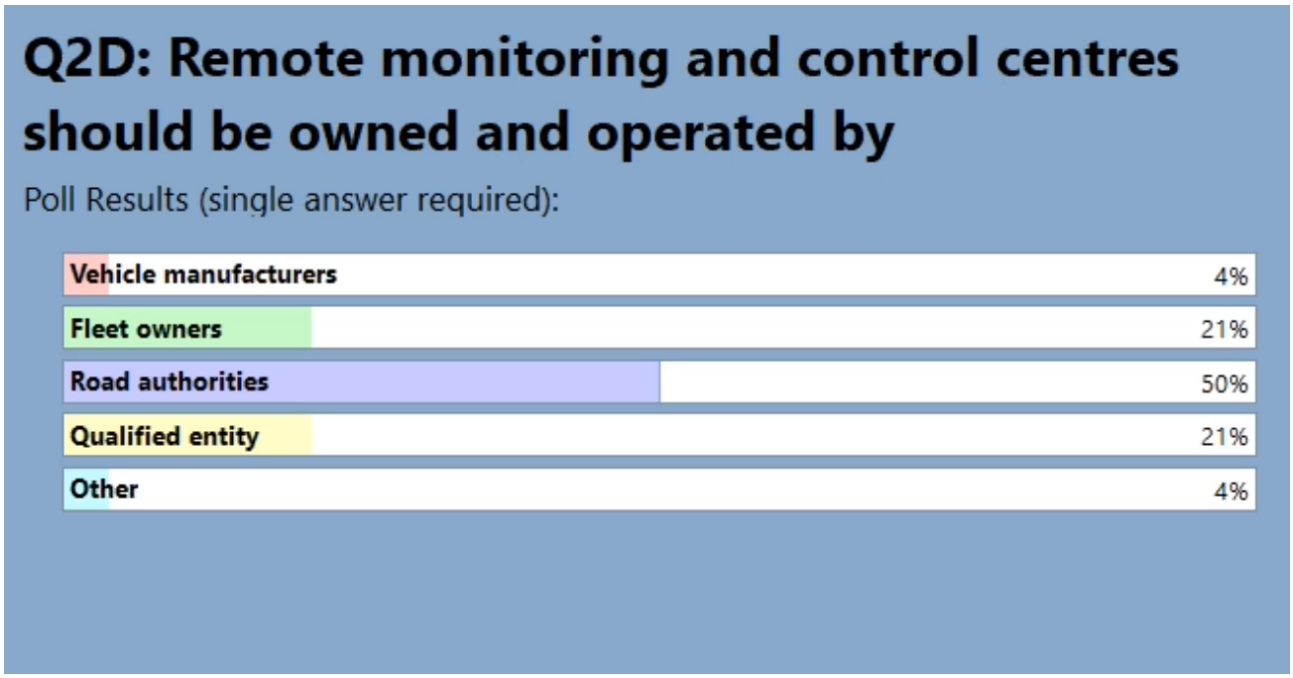

Q1C: Should road authorities provide dedicated lanes for automated driving?
Poll Results (single answer required):
Yes, but only on motorways (intersection-free) 27%
Yes, but only in urban areas (with intersections) 15%
No, not at all 46%
Unsure 12%

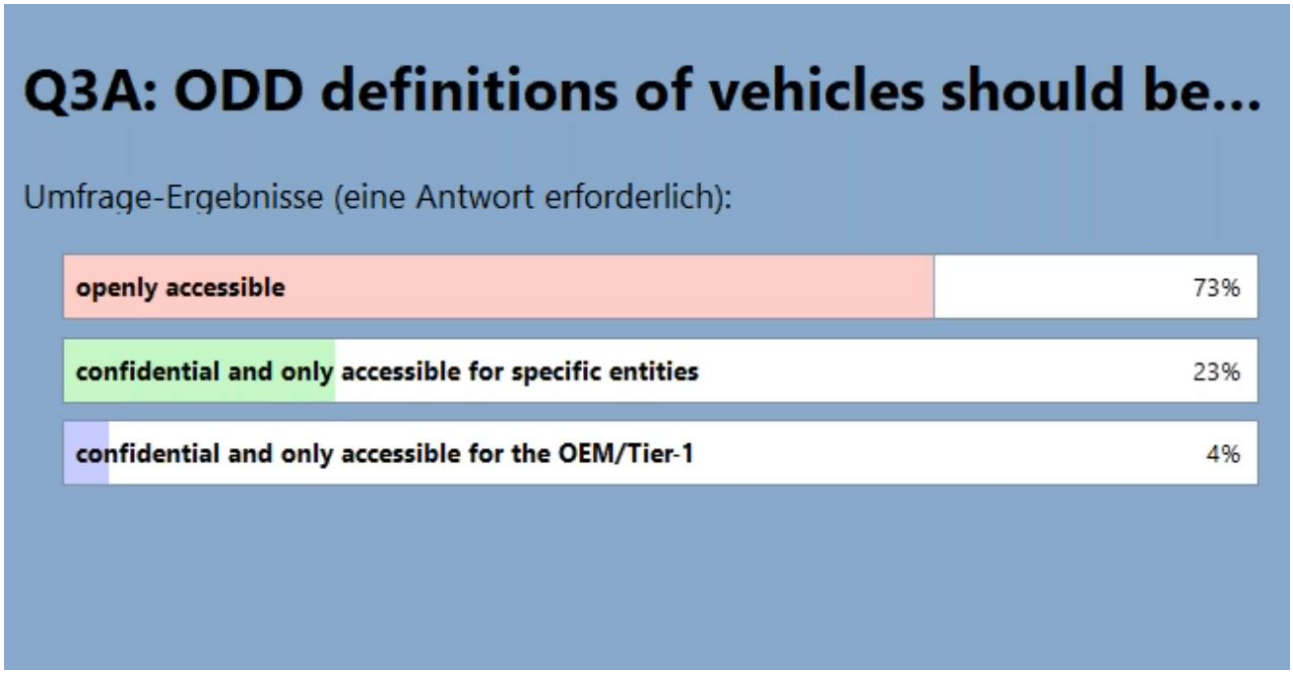

Q1D: Should AD disengagements be mandatorily reported from OEMs to the road authorities to tune the traffic management?
Poll Results (multiple answers allowed):
Yes, via an open standard/interface 77%
Yes, but with a compensation (financially, data feedback, 12%
Yes, via an intermediary party 31%
No 8%
Unsure 8%

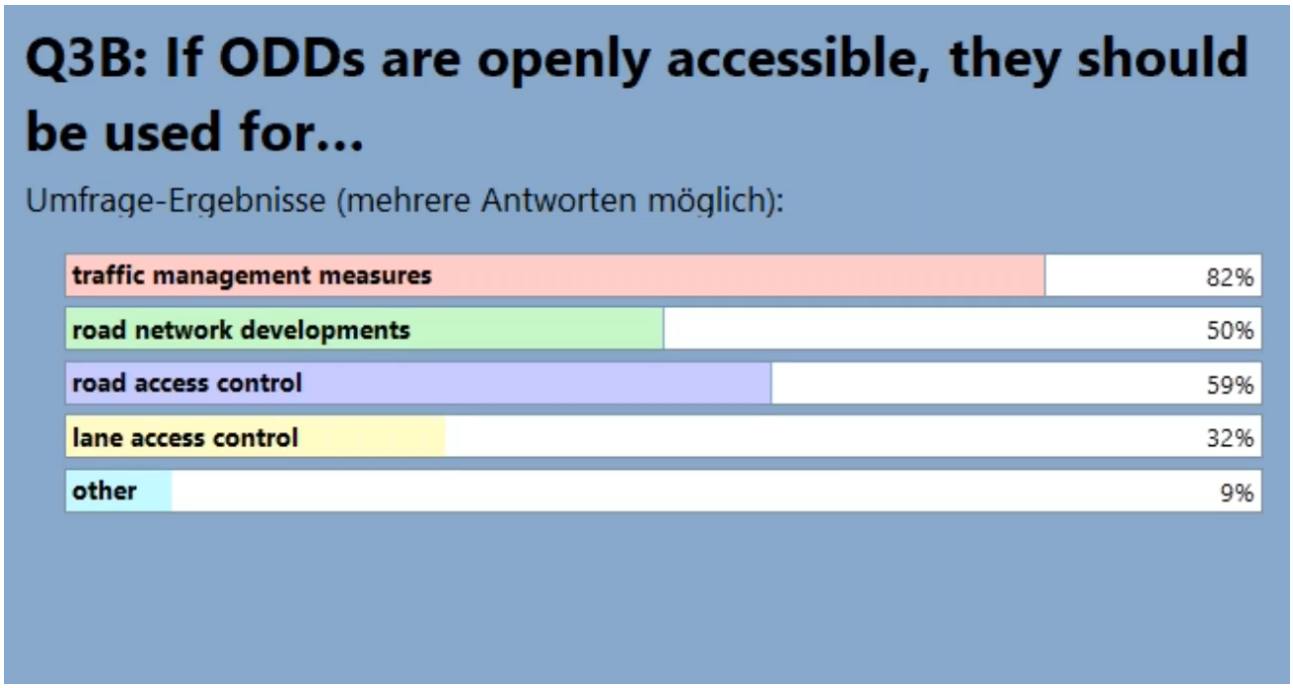

Q2A: What do you expect a CAV will do in case of a Minimum Risk Manoeuvre?
Poll Results (single answer required):
Drive carefully 33%
Execute a diversion automatically 4%
Initiate a handover of control 11%
Stop in lane / safe spot 52%
Other 0%

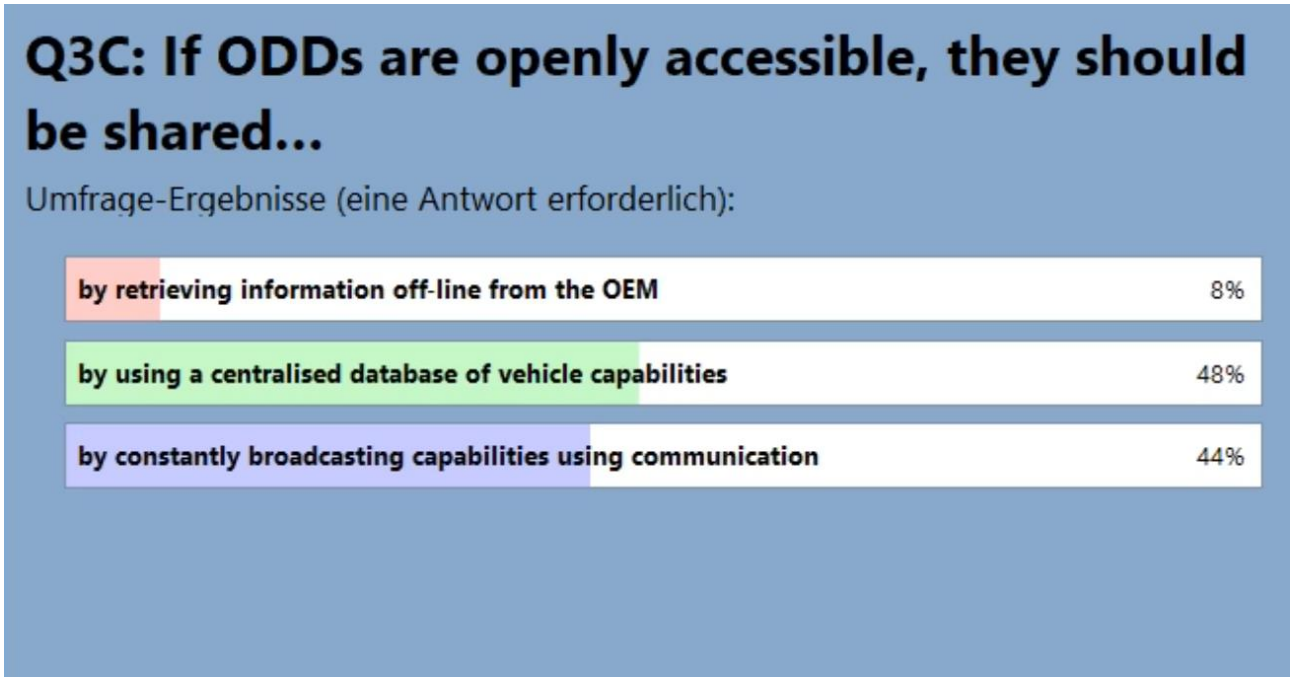

Q2B: Which TransAID service for infrastructure-assisted driving do you consider to be most realistic?
Poll Results (single answer required):
Provide vehicle path information 16%
Provide speed, headway, and/or lane advice 44%
Traffic separation 0%
Guidance to safe spot 20%
Orchestration, distribution, and scheduling 20%


Q2C: What do you expect of remote management and control?
Poll Results (single answer required):
Extended environmental awareness 45%
Mission management 14%
Autopilot assistance 14%
Remote driving 27%
Other 0%


Q2D: Remote monitoring and control centres should be owned and operated by
Poll Results (single answer required):
Vehicle manufacturers 4%
Fleet owners 21%
Road authorities 50%
Qualified entity 21%
Other 4%

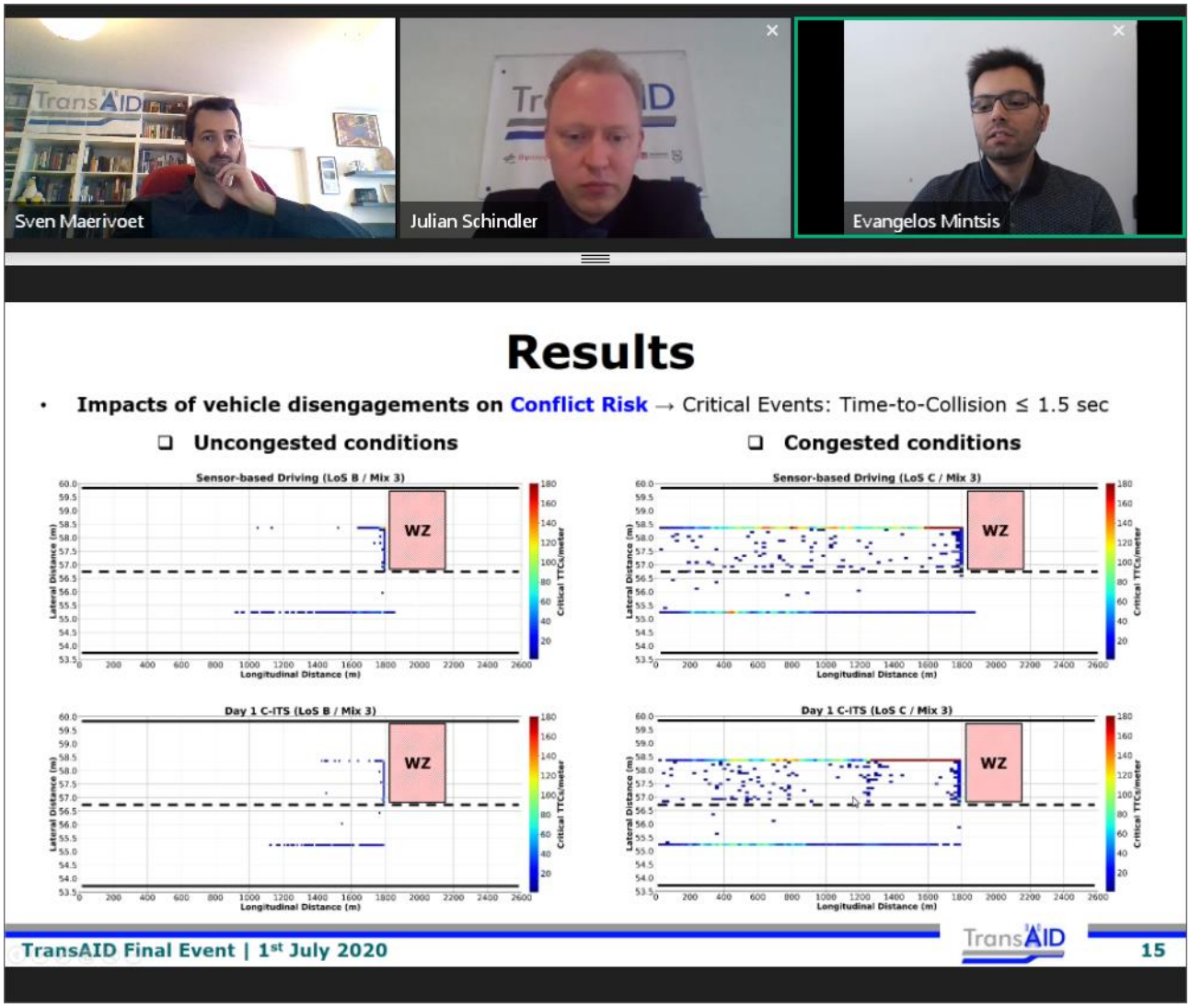

Q3A: ODD definitions of vehicles should be...
Umfrage-Ergebnisse (eine Antwort erforderlich):
openly accessible 73%
confidential and only accessible for specific entities 23%
confidential and only accessible for the OEM/Tier-1 4%

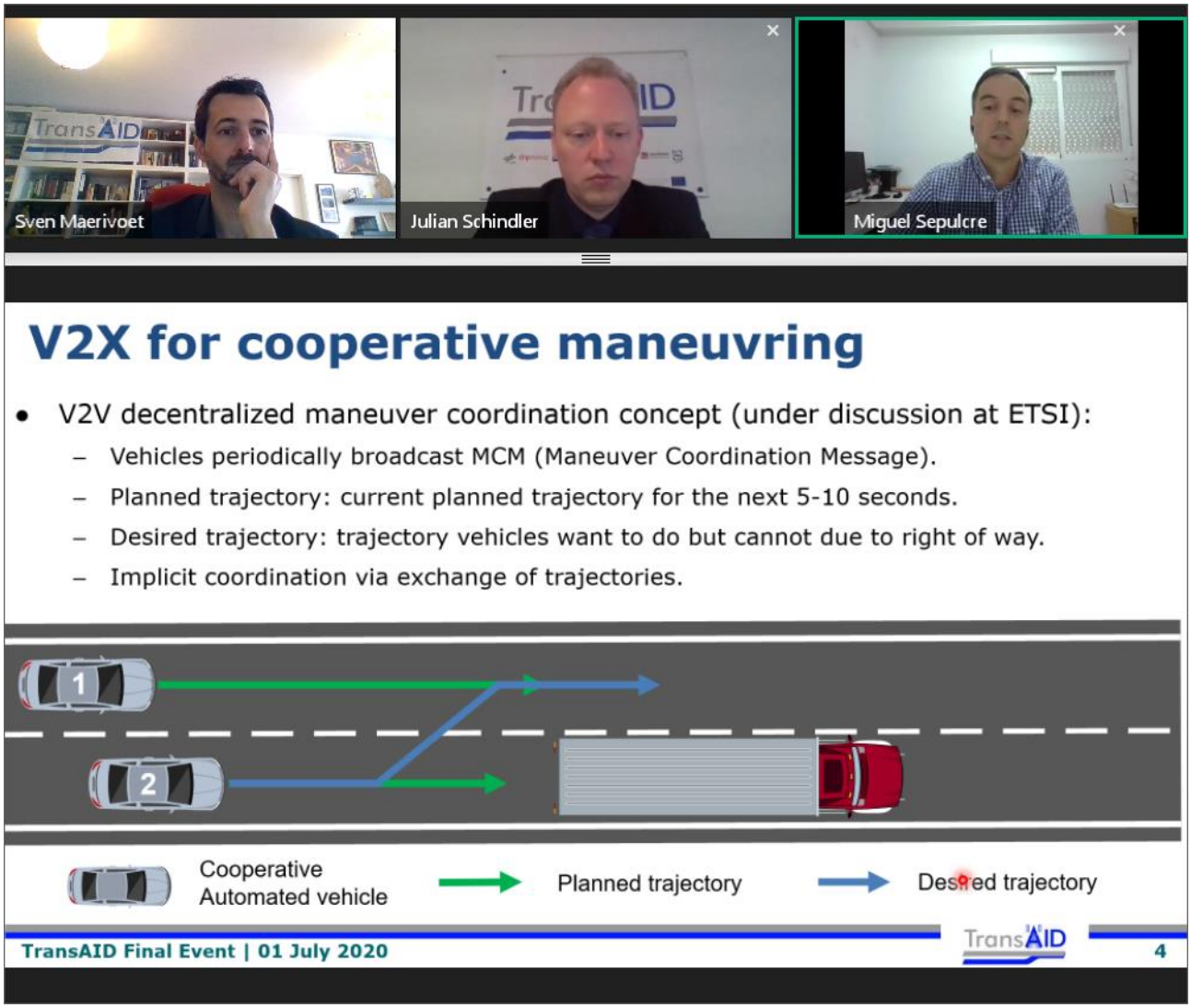

Q3B: If ODDs are openly accessible, they should be used for...
Umfrage-Ergebnisse (mehrere Antworten möglich):
traffic management measures
82%
road network developments
50%
road access control
59%
lane access control
32%
other
9%


Q3C: If ODDs are openly accessible, they should be shared...
Umfrage-Ergebnisse (eine Antwort erforderlich):
by retrieving information off-line from the OEM
8%
by using a centralised database of vehicle capabilities
48%
by constantly broadcasting capabilities using communication
44%


Q3D: Cities/Road authorities should use budget for automation readiness best to...
Umfrage-Ergebnisse (eine Antwort erforderlich):
Categorise roads according to ISAD levels 12%
Enhance the quality of roads 12%
Equip roads/intersections with communication technology 42%
Equip roads/intersections with sensors to enhance efficiency 35%

Appendix B. Screenshots




Sven Maerivoet
Julian Schindler
Miguel Sepulcre
V2X for cooperative maneuvring
V2V decentralized maneuver coordination concept (under discussion at ETSI):
Vehicles periodically broadcast MCM (Maneuver Coordination Message).
Planned trajectory: current planned trajectory for the next 5-10 seconds.
Desired trajectory: trajectory vehicles want to do but cannot due to right of way.
Implicit coordination via exchange of trajectories.
1
2
Cooperative Automated vehicle
Planned trajectory
Desired trajectory
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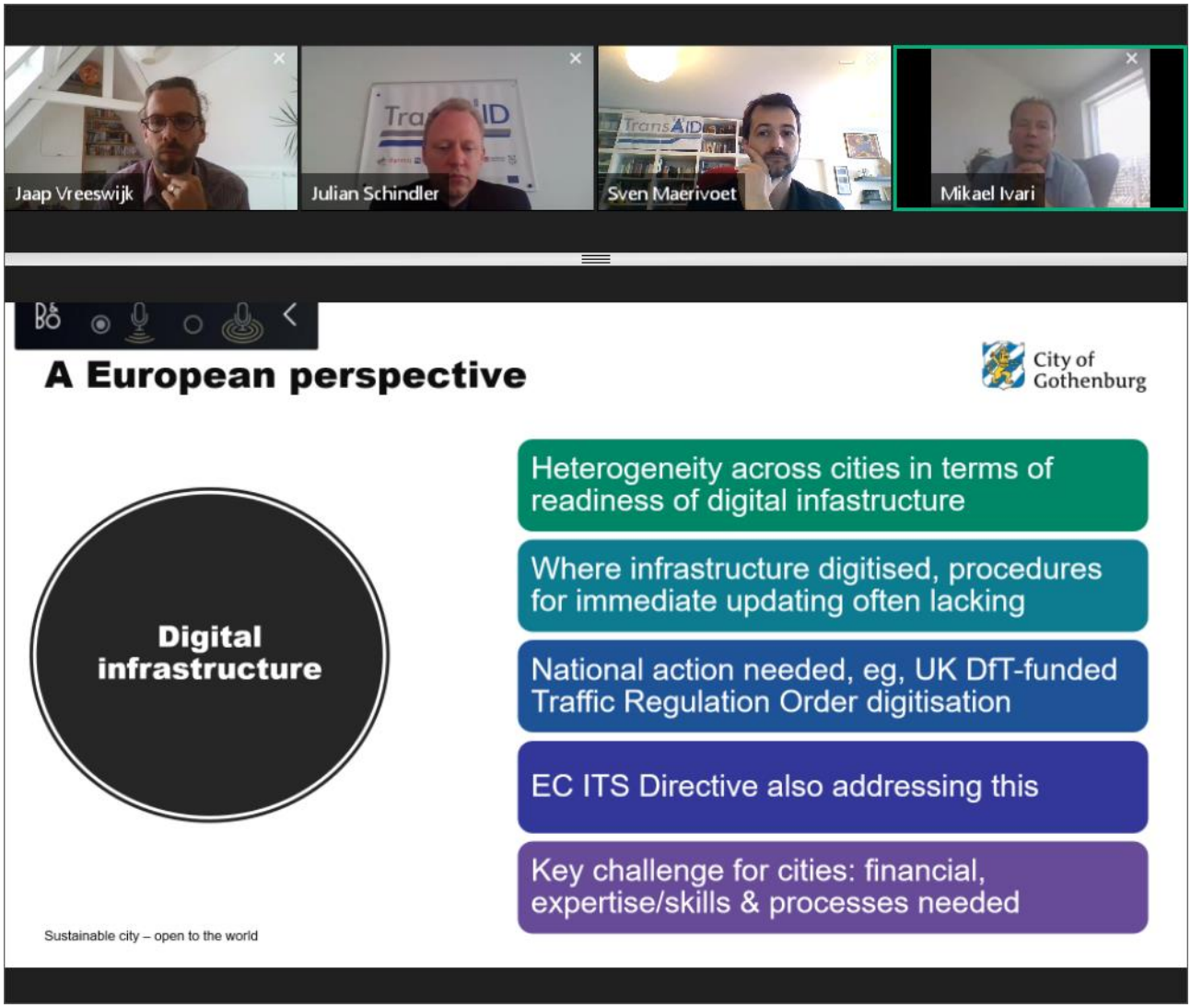
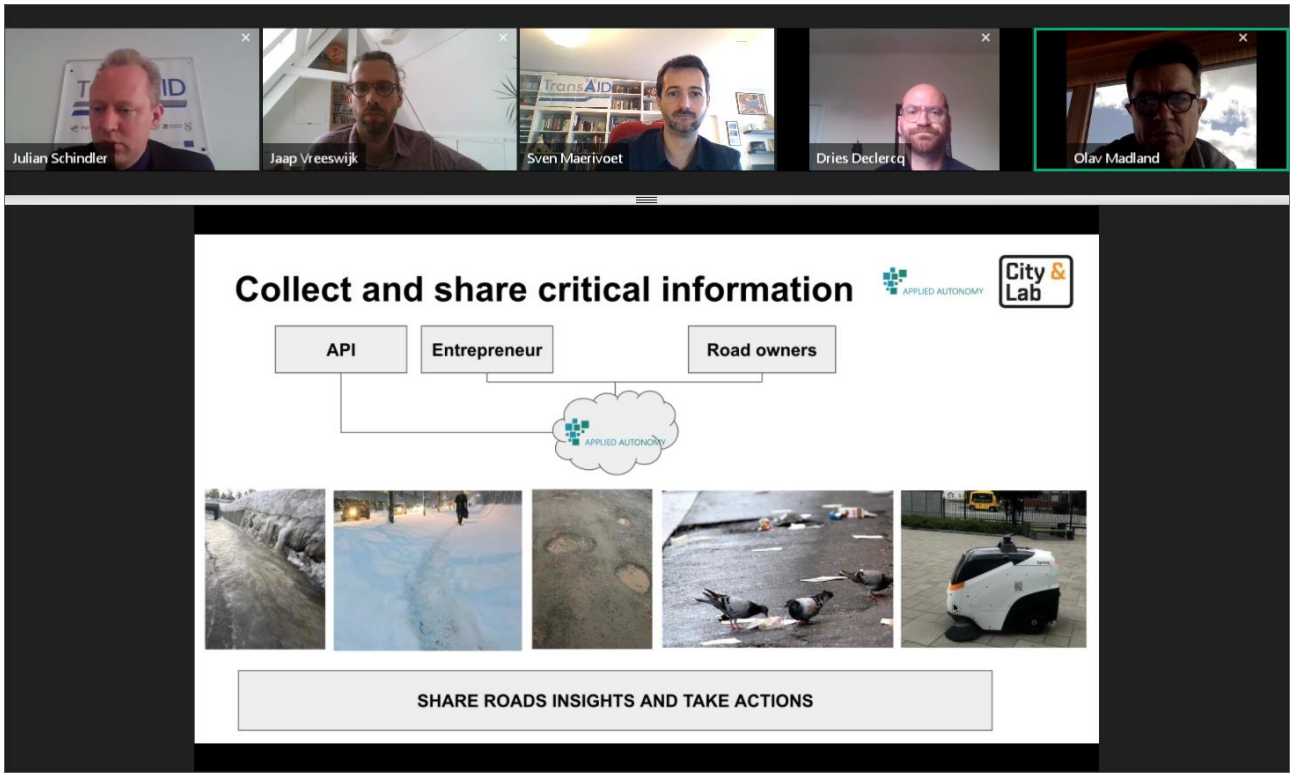
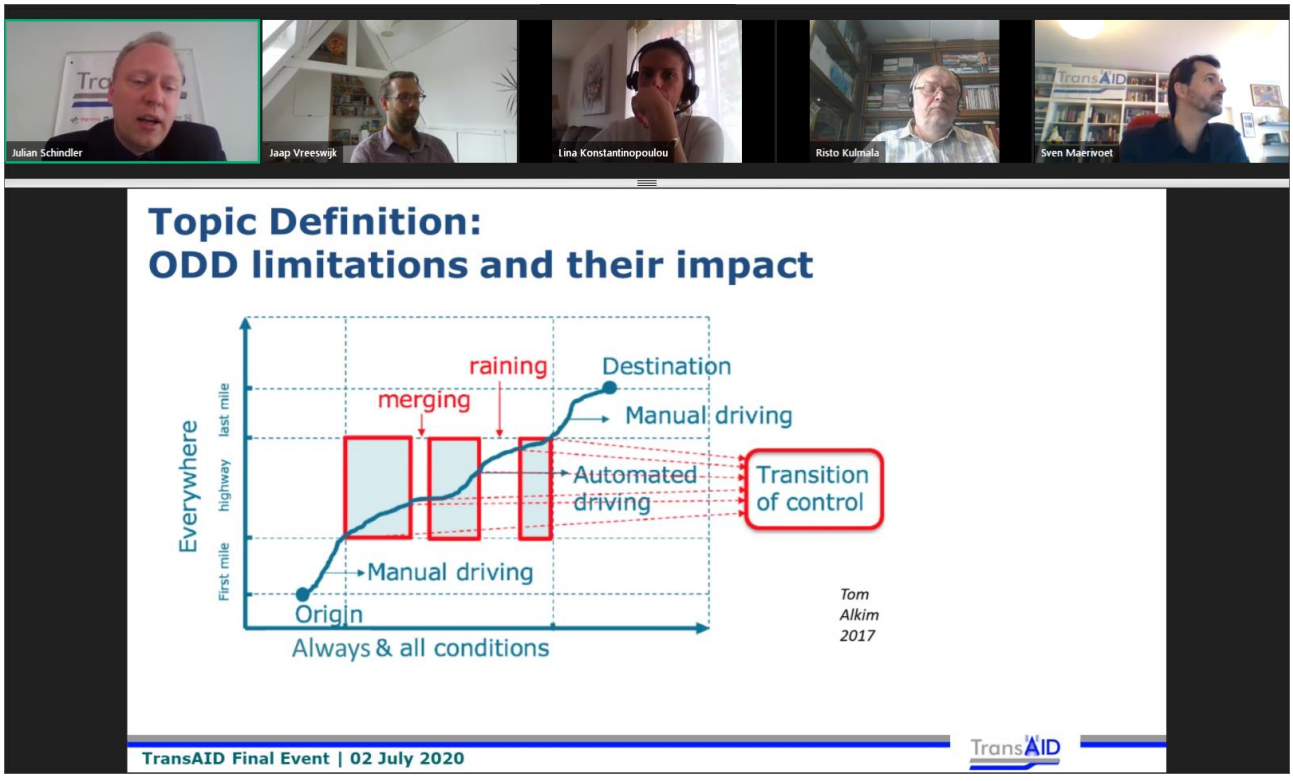
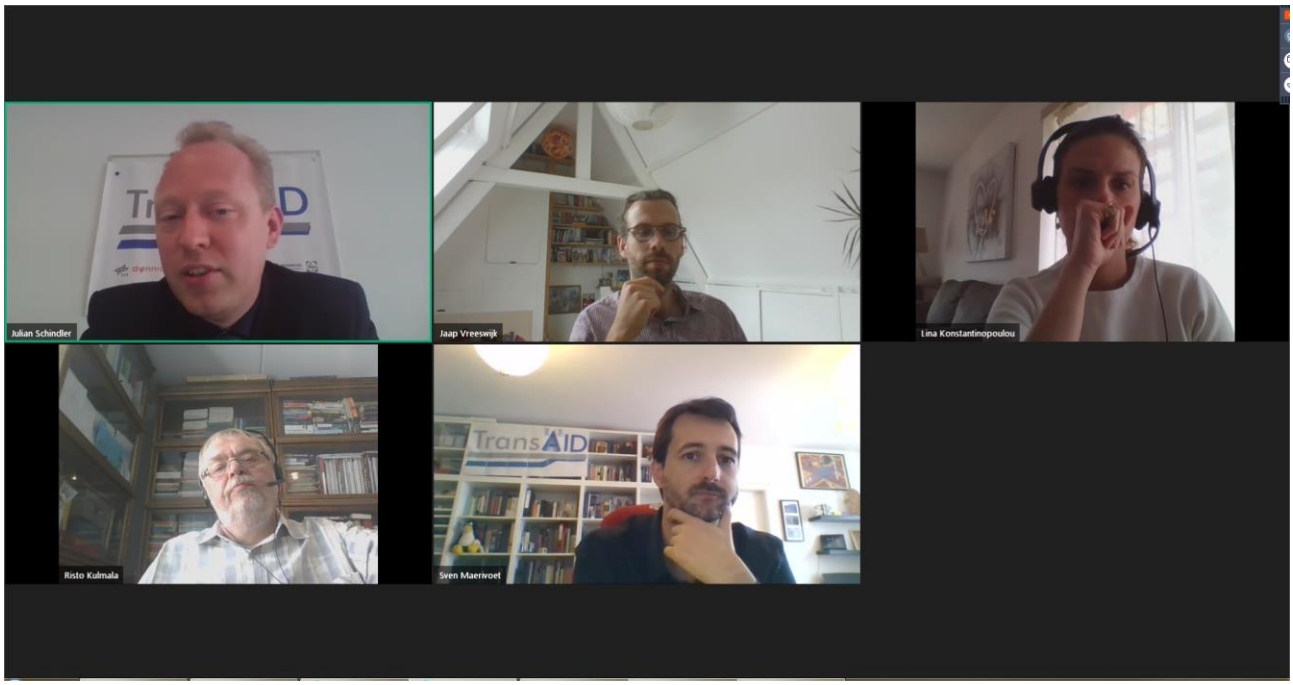
4


Jaap Vreeswijk
Julian Schindler
Sven Maerivoet
Mikael Ivari
A European perspective
City of Gothenburg
Digital infrastructure
Heterogeneity across cities in terms of readiness of digital infastructure
Where infrastructure digitised, procedures for immediate updating often lacking
National action needed, eg, UK DfT-funded Traffic Regulation Order digitisation
EC ITS Directive also addressing this
Key challenge for cities: financial, expertise/skills & processes needed
Sustainable city – open to the world


Julian Schindler
Jaap Vreeswijk
Sven Maerivoet
Dries Declercq
Olav Madland
Collect and share critical information
APPLIED AUTONOMY
City & Lab
API
Entrepreneur
Road owners
APPLIED AUTONOMY
SHARE ROADS INSIGHTS AND TAKE ACTIONS


Julian Schindler
Jaap Vreeswijk
Lina Konstantinopoulou
Risto Kulmala
Sven Maerivoet
Topic Definition:
ODD limitations and their impact
Everywhere
last mile
highway
First mile
raining
Destination
merging
Manual driving
Automated driving
Transition of control
Manual driving
Origin
Always & all conditions
Tom Alkim 2017
TransAID Final Event | 02 July 2020
TransAID


Julian Schindler
Jaap Vreeswijk
Lina Konstantinopoulou
Risto Kulmala
Sven Maerivoet
TransAID

Appendix C. Final demonstration video impressions.

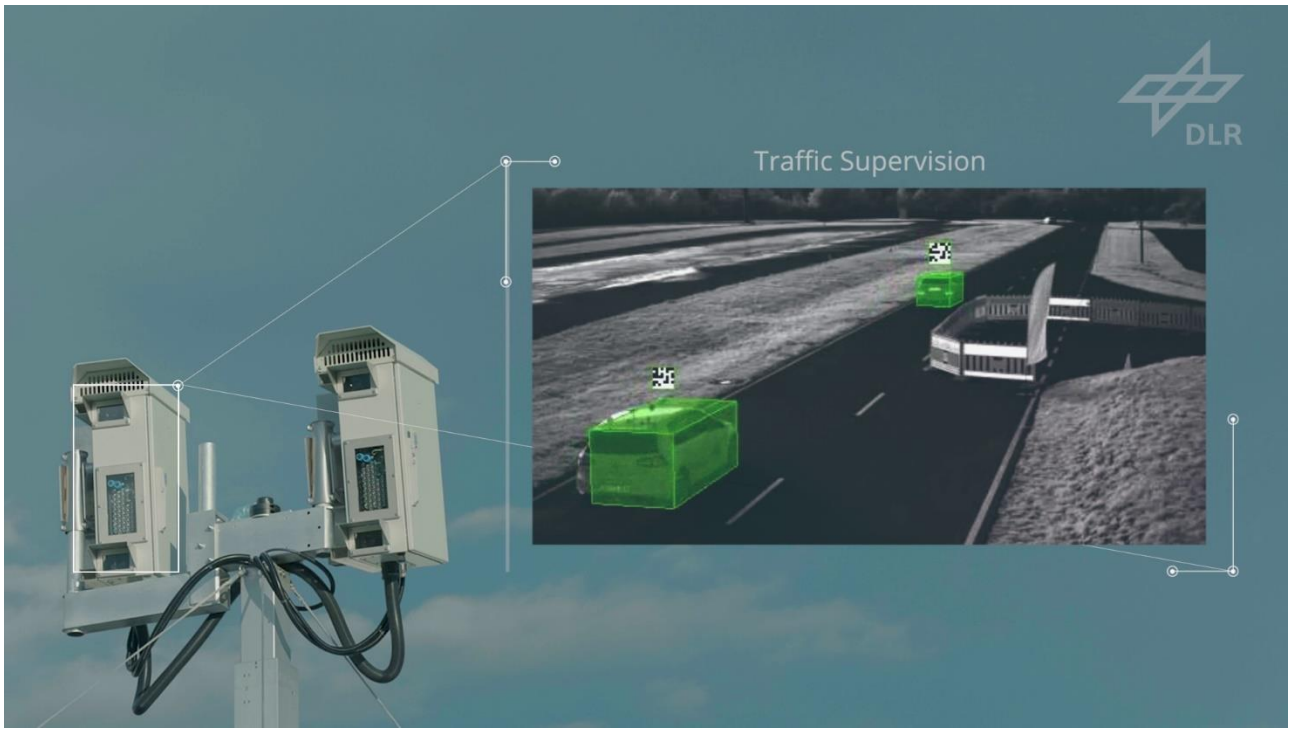


Figure 3: Traffic supervision in the merging area.

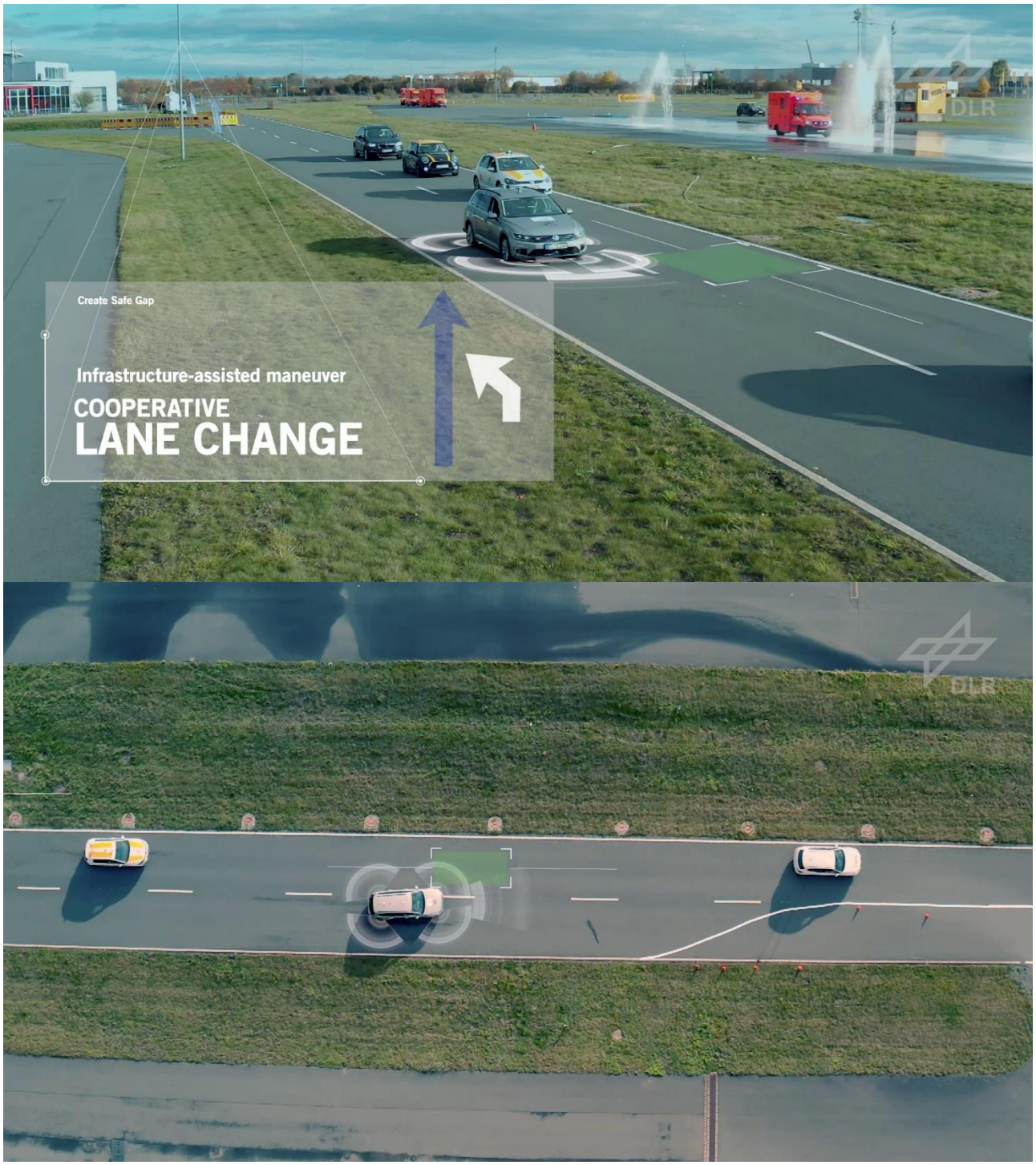


Figure 4: Cooperative Merging.

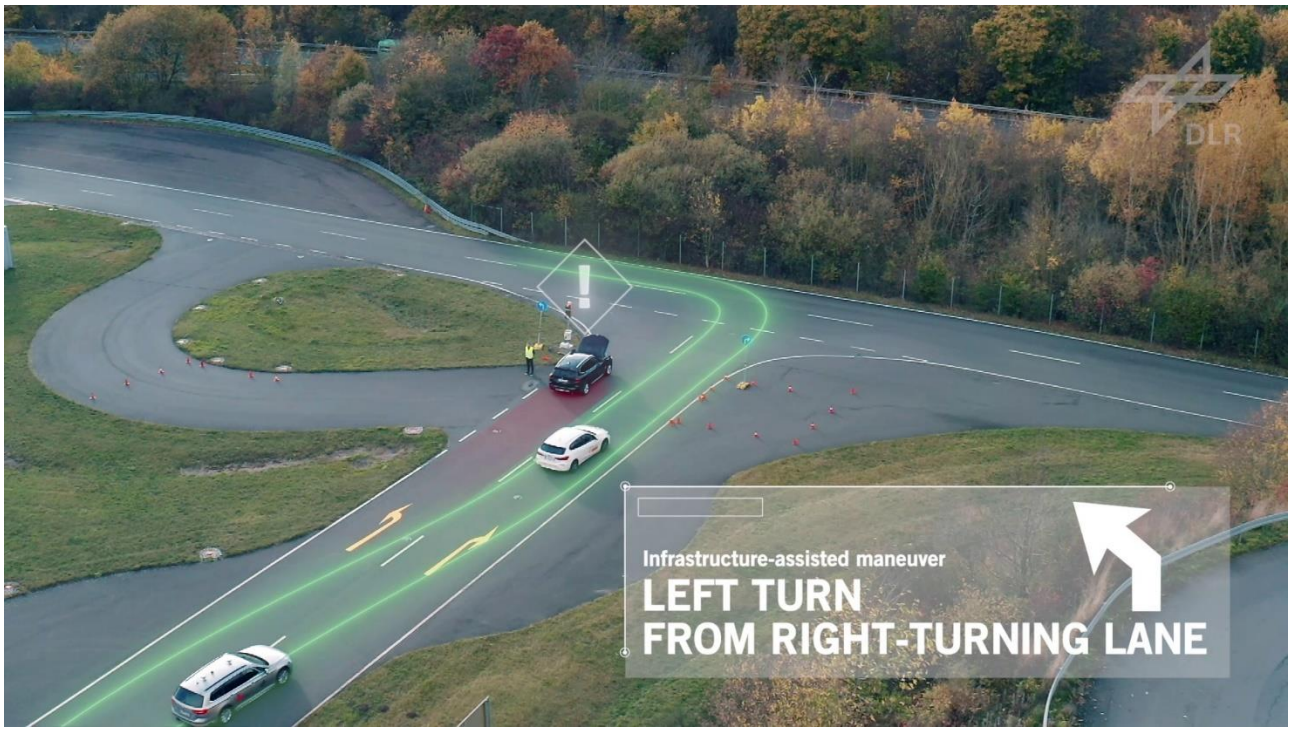


Figure 5: Left turn from right-turn lane.

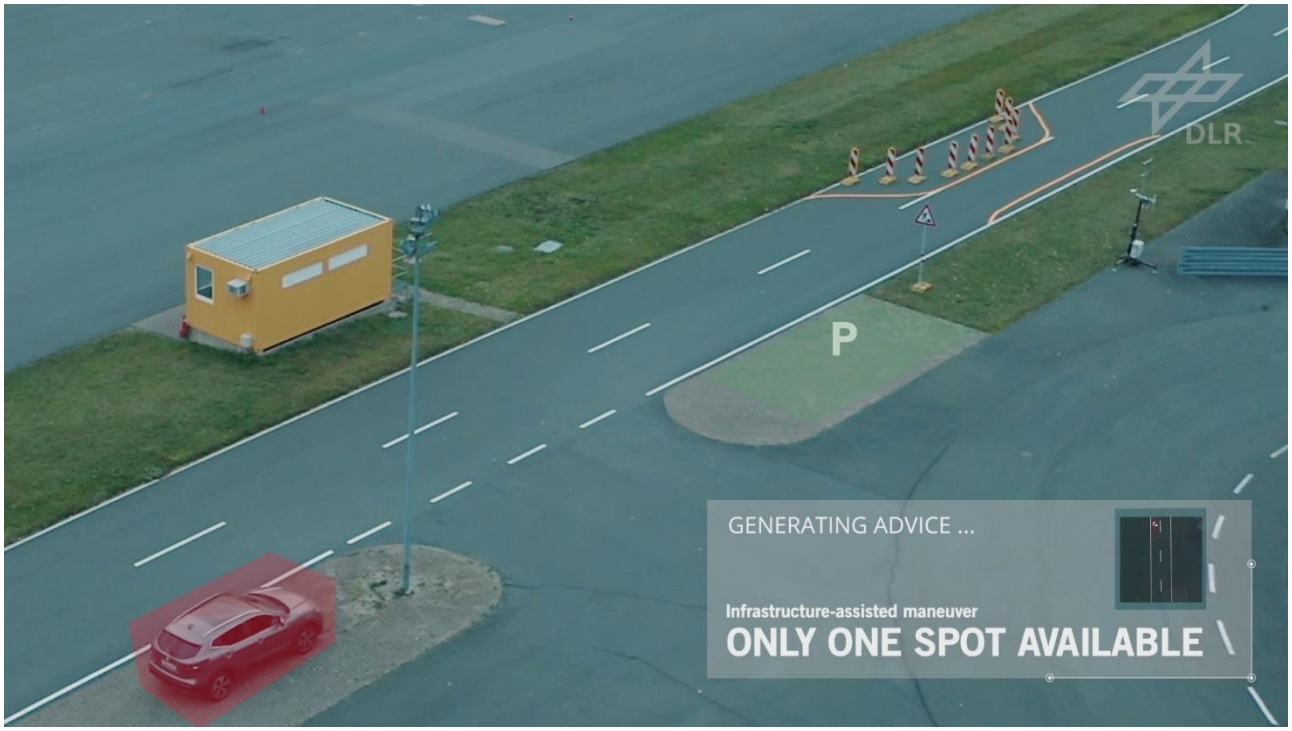


Figure 6: Safe spot detection using camera.

Figure 7: ViewCar2 enters available safe-spot (top) upon I2V message reception. FASCarE needs to stop on the road as no safe-spot is available (bottom).

Figure 8: Take over request as shown in the automated vehicles cluster display.