CCAM for society, responsible mobility

(CCAM: Connected, Cooperative & Automated Mobility)

If done right, it can contribute to

» Increased safety, towards vision zero

» Increased accessibility of mobility services

» Reduced harmful emissions from transport

» Increased value of time

» Driver shortage

However, these challenges have to be addressed

» Key technologies are still being developed: they need to be safe, tested, validated

» The right legal framework has to be set up and adopted at Member State and EU-level

» CAVs will have to be integrated into the transport system and interact with other forms of mobility

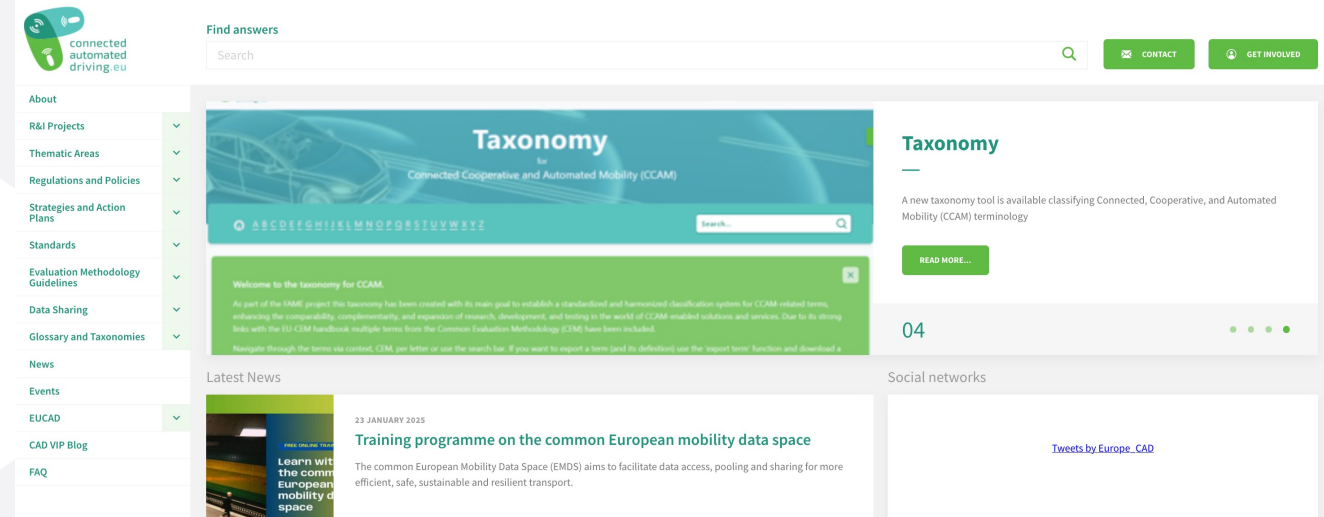» Acceptance and trust in CCAM technology, by users and society

What do we do in CCAM?

- Projects, national and international

- CCAM knowledge sessions Connekt

- member CCAM association and delegate PDI

- Co-chair IRF Connected and Autonomous Mobility Committee

- International Advisory Board Intertraffic

- ITFVHA

- Fact finding missions

- Advisory board Augmented CCAM

- SUNRISE expert platform

CCAM projects

- ADAS map province of Overijssel

- RWS research ISA x MTM

- current HE projects:
    - FAME (Coordination)
    - Aithena (AI and CCAM)

- New HE projects:
    - CCAMbassador (Coordination)
    - AIGGREGATE (AI and CCAM)
    - CERTAIN (Safety assurance for CAVs)
    - CHORUS (CCAM in mixed traffic coordination)

- CEDR projects: TM4CAD and DROIDS

- XCARCITY

- Mobility DesAIgn Lab
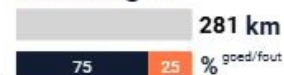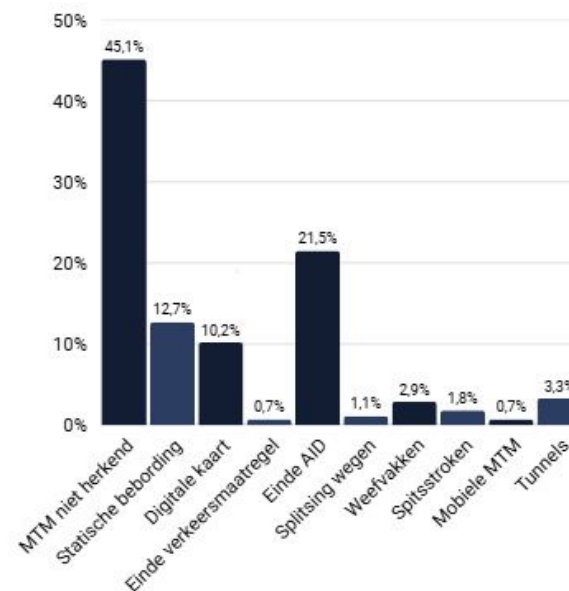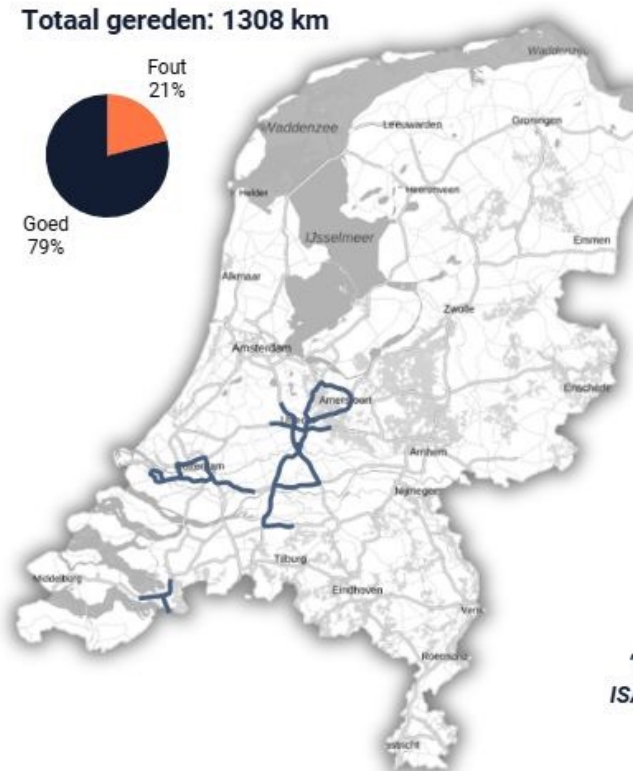
Factsheet Veldonderzoek ISAxMTM

Voertuig 1

450 km

| 91 | 9 |
% goed/fout

Voertuig 2

327 km

| 78 | 22 |
% goed/fout

Voertuig 3

205 km

| 76 | 24 |
% goed/fout

Voertuig 4

281 km

| 75 | 25 |
% goed/fout

Voertuig 5

52 km

| 100 |
% goed/fout

Totaal gereden: 1308 km

Fout 21%

Goed 79%
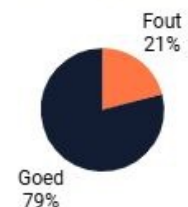
"De scanvoertuigen presteren nog onvoldoende qua ISA-MTM; op maximaal 21% van de gereden kilometers is niet het juiste snelheidsregime getoond."

Grafiek (percentages):
- MTM niet herkend: 45,1%
- Statische bebording: 12,7%
- Digitale kaart: 10,2%
- Einde verkeersmaatregel: 0,7%
- Einde AID: 21,5%
- Splitsing wegen: 1,1%
- Weefvakken: 2,9%
- Spitsstroken: 1,8%
- Mobiele MTM: 0,7%
- Tunnels: 3,3%

De verbetering van de interactie tussen ISA en MTM vereist een multidisciplinaire aanpak. Oplossingen bevinden zich op het snijvlak van wegbeheer, voertuigtechnologie en infrastructuur. Door samenwerking tussen wegbeheerders, OEM's en andere belanghebbenden kunnen fouten worden geminimaliseerd en de veiligheid op de weg worden vergroot.

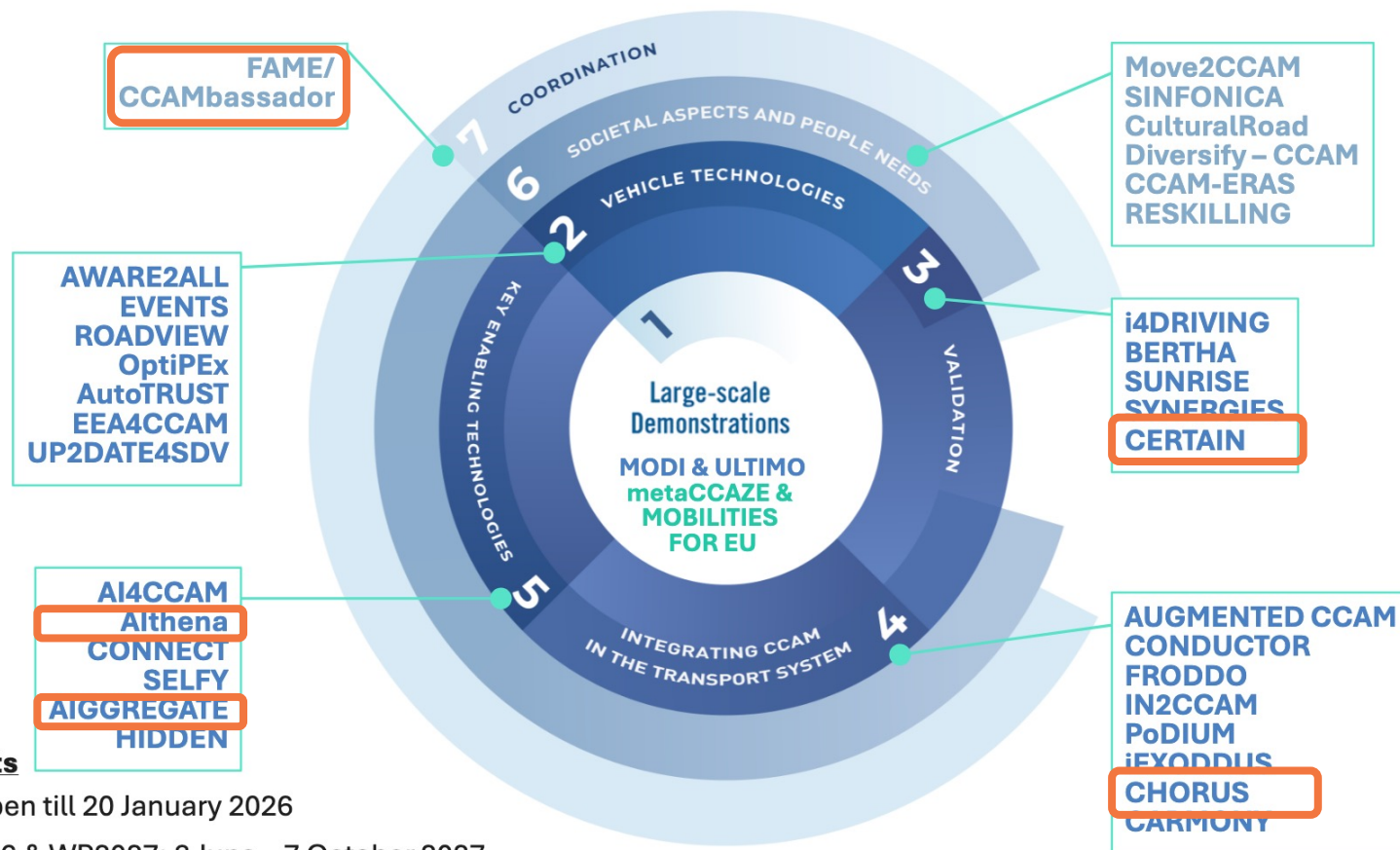# Project overview in CCAM clusters

Horizon Europe Work Programme

Destination Transport and Smart Mobility services

Calls 2021, 2022, 2023 & 2024 Projects

https://www.ccam.eu/projects

WP2025 project submissions open till 20 January 2026

WP2026: 4 June – 8 October 2026 & WP2027: 3 June – 7 October 2027

FAME/ CCAMbassador

Move2CCAM
SINFONICA
CulturalRoad
Diversify – CCAM
CCAM-ERAS
RESKILLING

AWARE2ALL
EVENTS
ROADVIEW
OptiPEx
AutoTRUST
EEA4CCAM
UP2DATE4SDV

i4DRIVING
BERTHA
SUNRISE
SYNERGIES
CERTAIN

AI4CCAM
Althena
CONNECT
SELFY
AIGGREGATE
HIDDEN

AUGMENTED CCAM
CONDUCTOR
FRODDO
IN2CCAM
PoDIUM
iEXODDUS
CHORUS
CARMONY

COORDINATION

SOCIETAL ASPECTS AND PEOPLE NEEDS

VEHICLE TECHNOLOGIES

KEY ENABLING TECHNOLOGIES

VALIDATION

INTEGRATING CCAM IN THE TRANSPORT SYSTEM

7
6
2
1
3
5
4

Large-scale Demonstrations
MODI & ULTIMO metaCCAZE & MOBILITIES FOR EU

Objectives

- Advance trustworthy, ethical, and resilient AI for Connected and Automated Mobility (CCAM) in Europe
- Develop hybrid intelligence systems to support collective awareness and decision-making
- Ensure transparency, inclusiveness, and safety in future mobility solutions

Key Pillars

SAFETY	RESILIENCE	HUMAN-LIKE CONTROL	COLLECTIVE DECISION-MAKING

HIDDEN's Concept

To advance **collective awareness & decision-making** for CCAM systems in complex urban scenarios, with or without road infrastructure support, focusing on timely detection of occluded vehicles and Vulnerable Road Users (VRUs) and prediction of their trajectories.

HIDDEN deploys **Hybrid Intelligence** tools and techniques promising increased performance of AVs, reaping the benefits of combining human with machine intelligence.

HIDDEN is developing CCAM systems which are not just **technologically advanced** but also deeply **aligned with human driving styles, ethical principles and regulation**s, setting a new benchmark for the future of AVs technology.

https://www.hiddenproject.eu/

CERTAIN | Resilient and continuous safety assurance methodology for CCAM and its HMI components

CERTAIN is developing a comprehensive, human-centric safety assurance framework for Connected, Cooperative and Automated Mobility (CCAM), with a sharp focus on Safety, Trust, Acceptance, and Comfort (STAC). By integrating advanced AI systems, user-centered HMI design, and continuous lifecycle validation, CERTAIN ensures that automated vehicles interact safely and predictably with the full spectrum of human behaviour - across the full lifecycle of the vehicle.

What CERTAIN will deliver
- Scenario-based resilient safety framework
- Continuous, in-service monitoring
- AI and V2X communication validation
- Harmonized standards and certification
- A framework that adapts to the cognitive needs of human road users
- Real-world use cases involving diverse vehicles, automation levels, road users and testing environments
- Alignment with EU's goals for sustainable, competitive, and safe mobility

What makes CERTAIN unique
- Builds on and extends the SUNRISE's SAF with real-world-ready components
- Goes beyond existing efforts (e.g. SUNRISE, SYNERGIES) by developing tools for immediate deployment
- Integrates cutting-edge technologies
- Engages a pan-European consortium of 25 partners from research, industry, and regulation bodies
- Promotes alignment with EU regulatory bodies through structured stakeholder collaboration
- Tackles safety, competitiveness, and environmental impact in one unified approach

Our goal?
To enable trustworthy and scalable CCAM adoption through resilient, adaptive, and regulation-ready safety assurance.

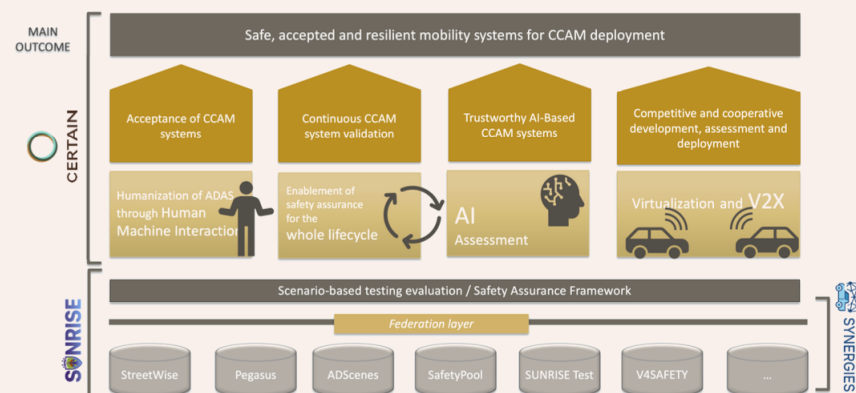Project duration: 36 months | 1 June 2025 – 31 May 2028
Coordinated by: Applus+ IDIADA
certainproject.eu
Follow CERTAIN on LinkedIn

Concept

CERTAIN project partners

| OEM | Tier 1 | Service Provider | Research and SMEs |

International Task Force on Vehicle-Highway Automation
ITFVHA 28th Annual Meeting — Atlanta, United States

Sponsored by: INTERTRAFFIC, ERTICO, AAA FTS FOUNDATION FOR TRAFFIC SAFETY, Cityfi, Network Optix, Qualcomm

Draft Agenda | Saturday, 23 August, 2025 | 09:30 – 17.00 | Atlanta Financial Center (South Tower)
Address: 3333 Peachtree Road NE Atlanta, GA 30326 (next to Buckhead Metro station)

Time	Session	Details
09:00 – 09.30	Registration, coffee & tea	
09.30 – 09.45	ITFVHA welcome opening address review of the agenda (Note: meeting is under Chatham House rules)	**ITFVHA Chair** Tom Alkim, Strategic Advisor Connected & Automated Mobility, MAPtm **ITFVHA founder** Richard Bishop, Principal, Automated Driving Strategy & Partnerships, Bishop Consulting
09.45 – 10.00	Tour de table and Group discussion Moderators: Richard Bishop & Tom Alkim • What are the most significant developments in vehicle automation of the last year? • What are the key ingredients for successful deployments for automated mobility? • What have you done for CCAM lately?	
10.00 – 11.20	Automated Mobility around the world • **United States** — US update: Bobby McCurdy, Vice President of Policy and Advocacy, ITS America • **Japan** — Mobility Innovation Alliance update: Ryota Shirato, Vice President, ITS Japan • **Europe** — EU CCAM update: Joost Vantomme, CEO and Stephane Dreher, Head of CCAM, Ertico • **China** – Bin-Ran, Professor, University of Wisconsin at Madison and Chair for Committee on Connected Autonomous Mobility, International Road Federation (IRF) • **UK** – Michael Talbot, Deputy Head, Centre for Connected & Autonomous Vehicles • **Korea** – Kyeong-pyo Kang, Head, Center for Connected & Automated Driving, Korea Transport Institute (KOTI)	
11.20 – 11.45	Coffee break	
11.45 – 12.00	Paths to connected & automated vehicles • **Qualcomm** - Jim Misener, Senior Director Product Management	
12.00 – 12.20	A word from our sponsors • **AAA Foundation for Traffic Safety** - David Yang, President and Executive Director • **Intertraffic** - Joyce de Winter, Director • **Network Optix** - Darren Odom, Vice President Mobility Platform • **Ertico** - Joost Vantomme, CEO • **Cityfi** - Karina Ricks, partner	
12.20 – 12.30	Group picture	
12.30 – 14.00	Lunch	
14.00 – 15.45	Panel discussions **Autonomous vehicles, are citizens on board?** David Yang, President and Executive Director, AAA Foundation Karina Ricks, partner, Cityfi Henriette Cornet, CEO and founder, Urban Innovate and Adjunct Director, AV & the City initiative Moderator: tbd	

Augmenting automation
Carl Andersen, Technical Director, Operations R&D, Federal Highway Administrion, US DOT
Gonzalo Alcaraz, Deputy Director General, International Road Federation (IRF)
Hironao Kawashima, Professor Emeritus, Mobility Culture Research Center, Keio University
Moderator: Tom Alkim

AI and safety assurance
Johanna Tzanidaki, Executive Director EU Policy & Innovation Research, SAE group
Siddartha Khastgir, Professor, Head of Safe Autonomy, WMG, University of Warwick
Moderator: Steve Shladover

| 15.45 – 16.15 | Coffee break |
| 16.15 – 17.15 | Panel discussions |

What's Cooking? Goods movement / industrial operations
tbc
Moderator: Richard Bishop

What's Cooking? Passengers
Chris Riley, Chief Commercial Officer, Glydways
Wolfgang Hoefs, Adviser for Digitalisation and Mobility, New Mobility Solutions Hamburg
Alex Poirot, Vice President Policy and Regulatory, Beep
Moderator: Tom Alkim

| 17.15 – 17.30 | Wrap up and adjourn | |
| 18.30 – 21.00 | Group Dinner | South City Kitchen Buckhead 3350 Peachtree Rd NE Suite 175 (next to Buckhead metro station) |

This meeting is brought to you by:

Richard Bishop Bishop Consulting Founder

BISHOP CONSULTING

Tom Alkim MAP Chairman

MAP

Augmenting automation
Carl Andersen, Technical Director, Operations R&D, Federal Highway Administrion, US DOT
Gonzalo Alcaraz, Deputy Director General, International Road Federation (IRF)
Hironao Kawashima, Professor Emeritus, Mobility Culture Research Center, Keio University
Moderator: Tom Alkim

Possible coordination of vehicle and road by Digital Operations for Automated Driving and Road Management

Panel discussion: Augmenting Automation

ITFVHA 28th Annual Meeting, Atlanta, 23 August 2025

Hironao Kawashima
Emeritus Professor

Mobility Culture Research Center, Keio University

STORYLINE ODD FRAMEWORK

A
Driver leaves home to drive to work. First mile is driven manually.

B
... gives control to vehicle (ToC) and continues the trip in automated mode. Does something else with the freed up time, like reading email, posting on instagram or drinking coffee.

E
Vehicle approaches the exit and driver prepares to take back control (ToC) and drives last mile manually to destination.

SAE / J3016

limited ODD

always & all conditions

first mile   highway   last mile

= limited ODD
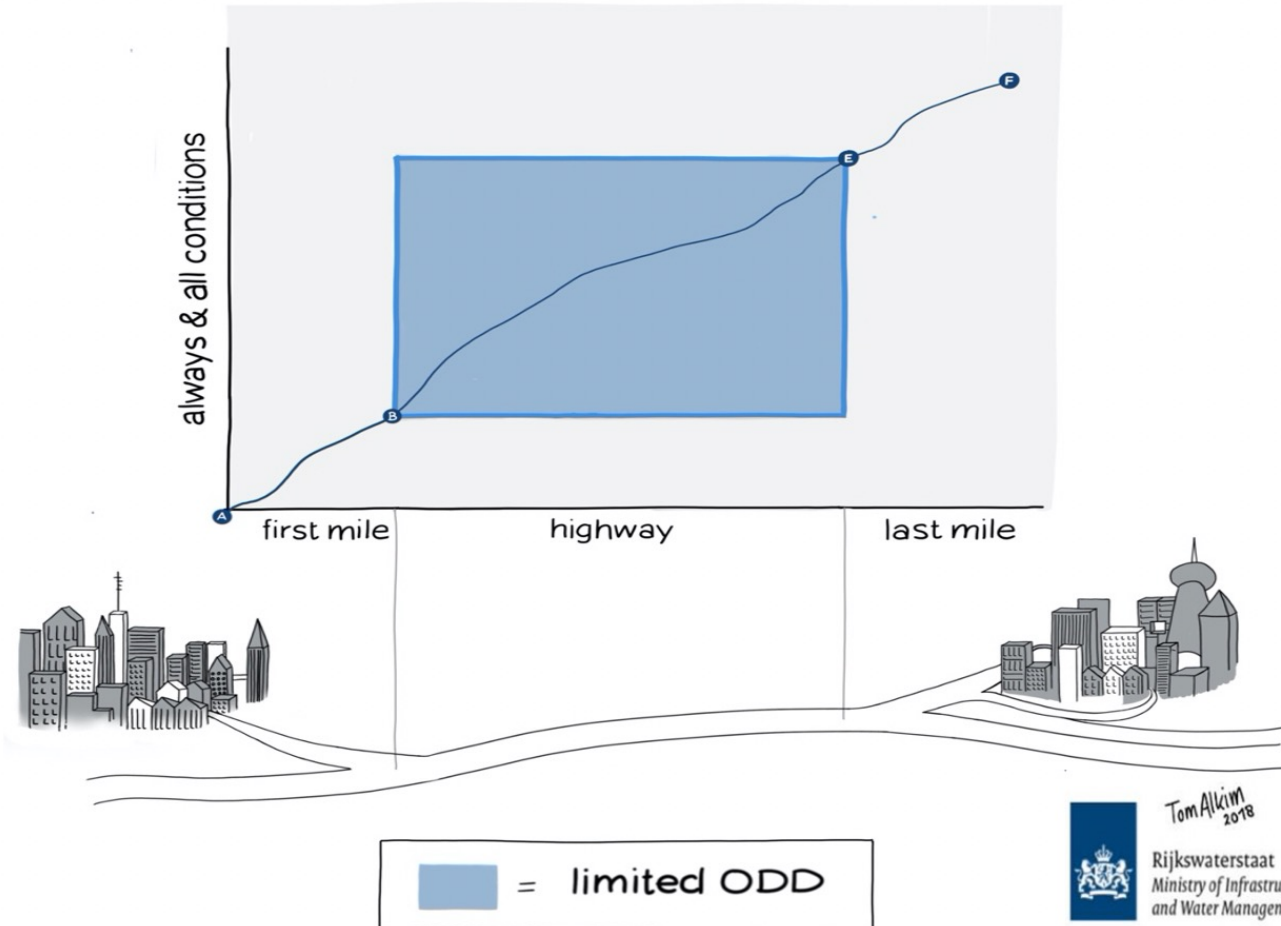
Tom Alkim 2018
Rijkswaterstaat
Ministry of Infrastructure and Water Management

STORYLINE ODD FRAMEWORK

A
Driver leaves home to drive to work. First mile is driven manually.

B
... gives control to vehicle (ToC) and continues the trip in automated mode. Does something else with the freed up time, like reading email, posting on instagram or drinking coffee.

C1
During the trip vehicle encounters temporary lane markings, vehicle is confused and ODD ends. Driver needs to take over control (ToC).

D1
Conditions back to normal, ODD is available again, driver gives back control (ToC).

= limited ODD

Tom Alkim 2018

Rijkswaterstaat
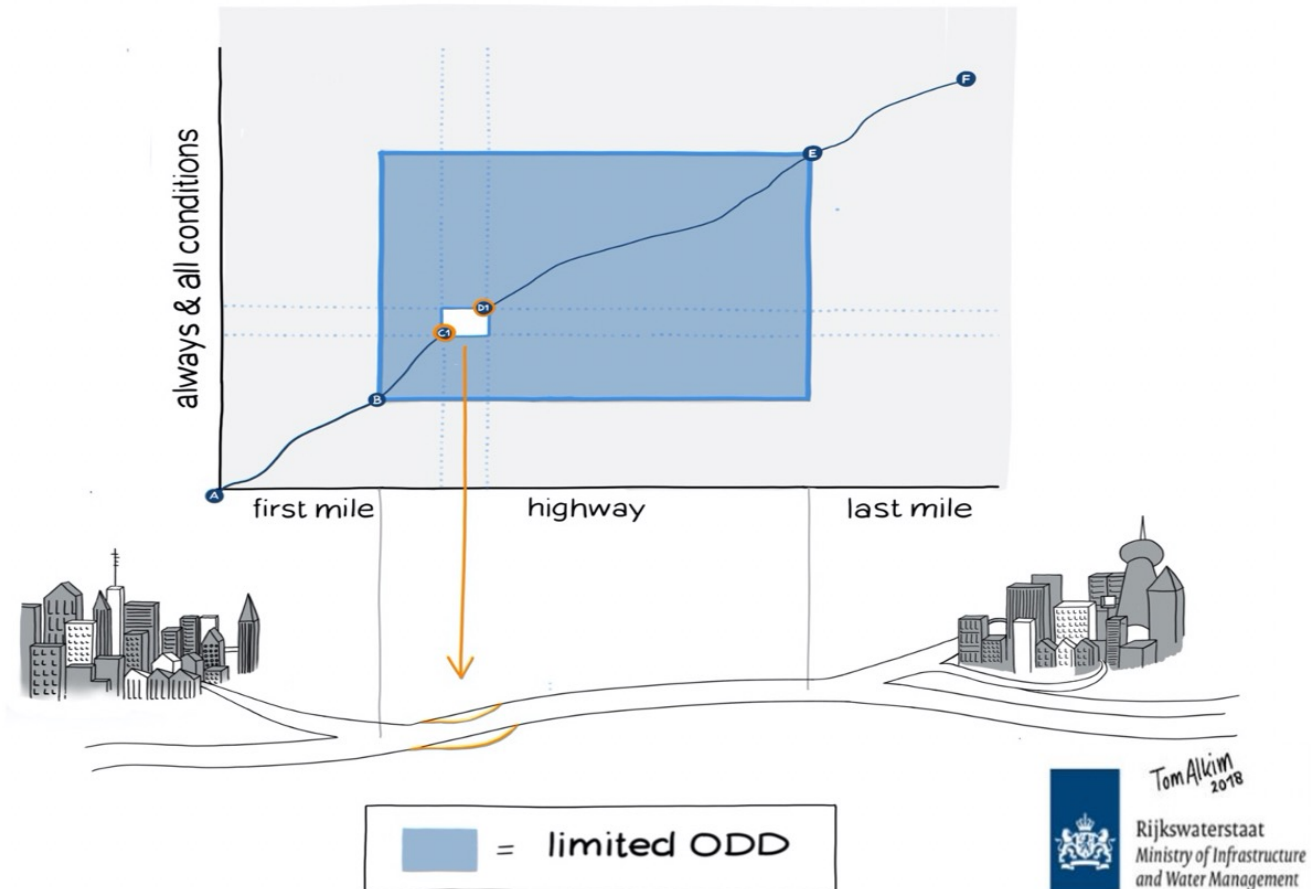Ministry of Infrastructure and Water Management

STORYLINE ODD FRAMEWORK

A
Driver leaves home to drive to work. First mile is driven manually.

B
... gives control to vehicle (ToC) and continues the trip in automated mode. Does something else with the freed up time, like reading email, posting on instagram or drinking coffee.
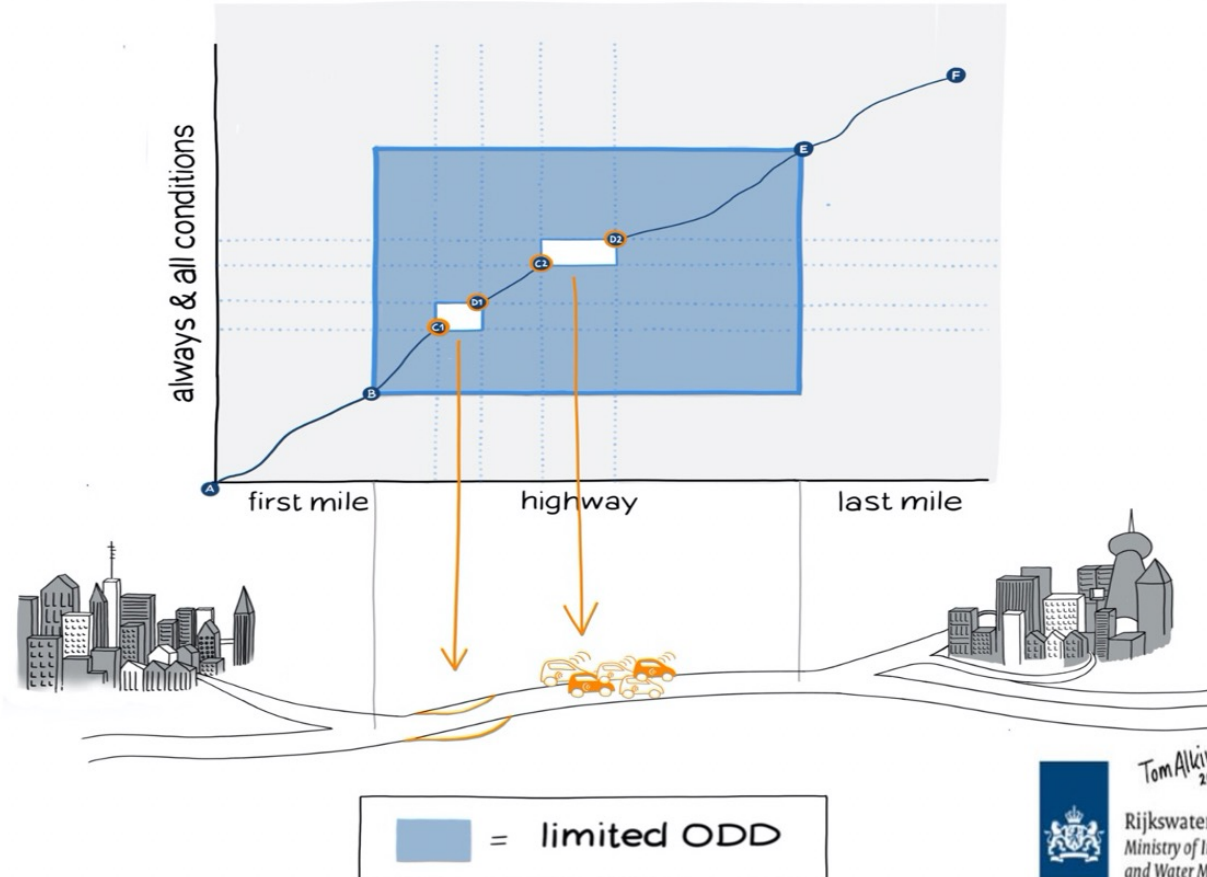
C1
During the trip vehicle encounters temporary lane markings, vehicle is confused and ODD ends. Driver needs to take over control (ToC).

D1
Conditions back to normal, ODD is available again, driver gives back control (ToC).

C2
During the trip vehicle has to merge in heavy mixed traffic, vehicle can't handle the situation and ODD ends. Driver needs to take over control (ToC).

D2
Conditions back to normal, ODD is available again, driver gives back control (ToC).

always & all conditions

first mile   highway   last mile

= limited ODD

TomAlkim 2018

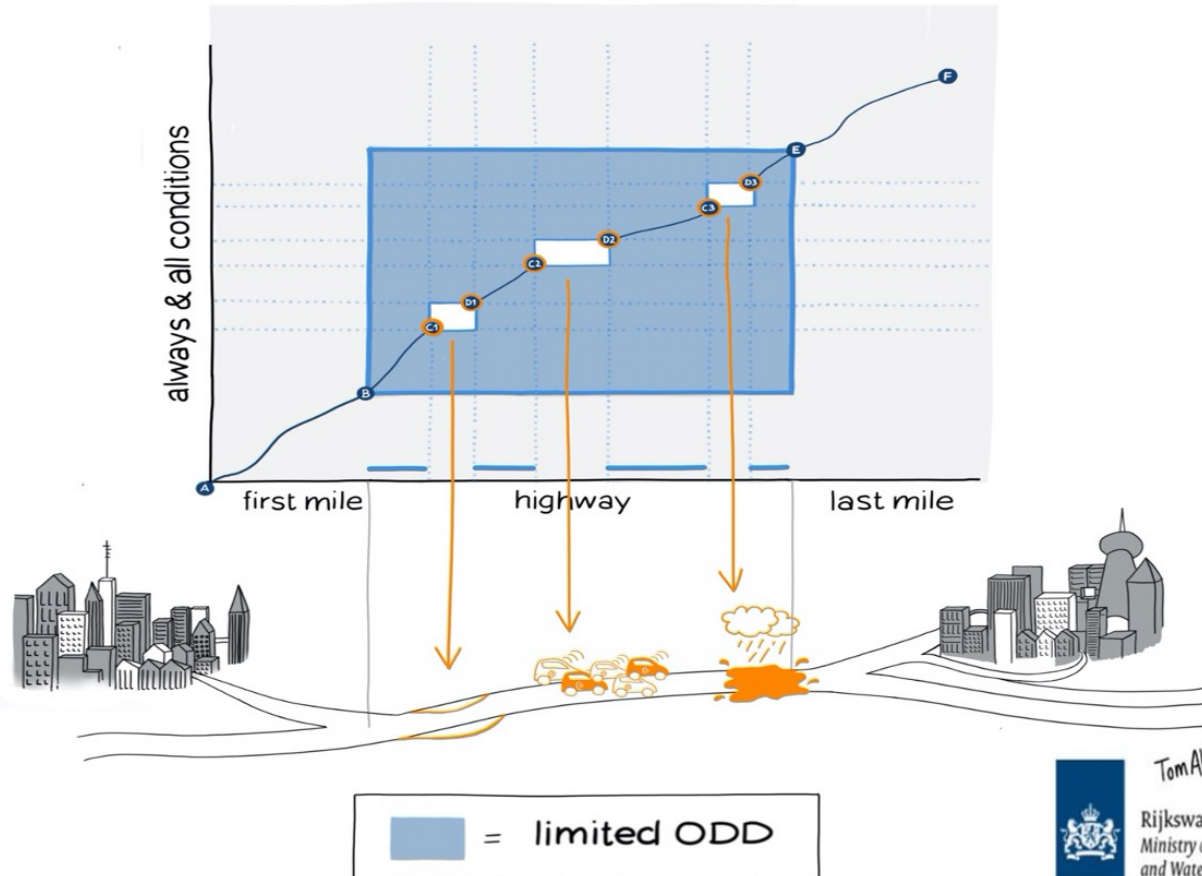Rijkswaterstaat
Ministry of Infrastructure and Water Management

STORYLINE ODD FRAMEWORK

C3
During the trip a heavy rain shower occurs, vehicle can't handle the situation and ODD ends. Driver needs to take over control (ToC).

D3
Conditions back to normal, ODD is available again, driver gives back control (ToC).

E
Vehicle approaches the exit and driver prepares to take back control (ToC) and drives last mile manually to destination.

always & all conditions

first mile   highway   last mile

= limited ODD

Tom Alkim 2018

Rijkswaterstaat
Ministry of Infrastructure and Water Management

Defragmentation ODD – Hi-Drive
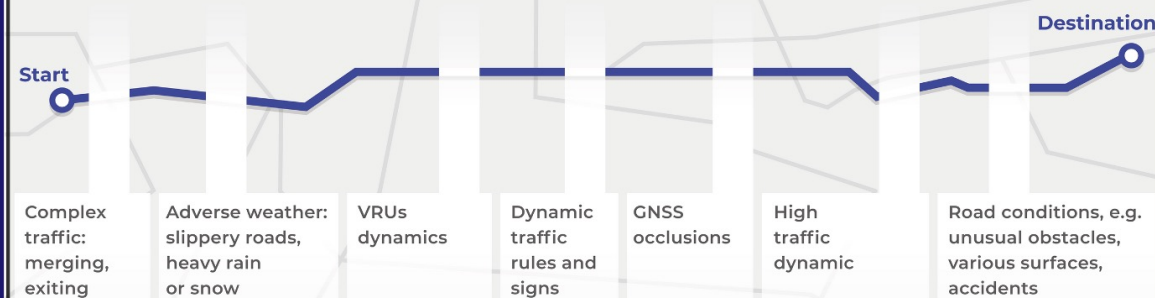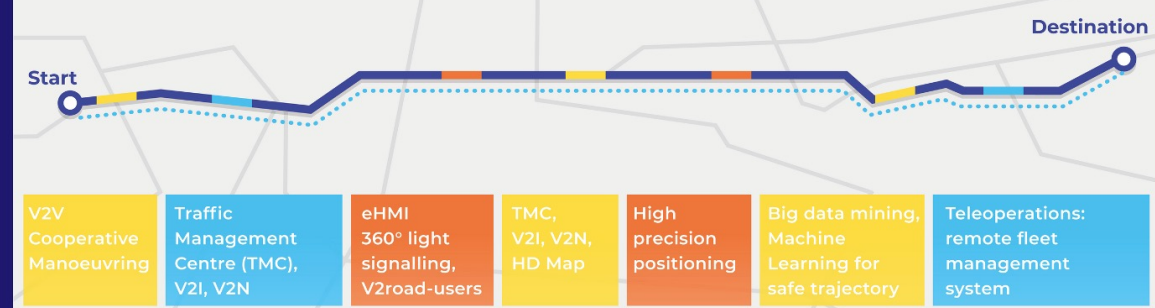
Exit strategies
Backing up into traffic

Remote operations for CCAM

» At EUCAD symposium, in conjunction with TRA 2024 (Dublin), several perspectives were discussed in a session on "Remote Management Operations"

» Follow up session at EUCAD2025 (13/14 May 2025, Ispra)

» Cross cluster topic for 2025 workprogram: Advancing remote operations to enable the sustainable and smart mobility of people and goods based on operational and societal needs

https://www.connectedautomateddriving.eu/blog/eucad2024-symposium-outcome/
https://www.connectedautomateddriving.eu/eucad/eucad2025/programme/

DOVA

Distributed ODD Attribute Value Awareness

Vehicle sensed ODD attribute information [H]

NRA sensed & comm. ODD attribute information [I]

(mandated) Third party sensed & comm. ODD attribute information [J]

ODD attribute information availability [A]

ADS technological & behavioural competencies [B]

[A] confronted with [B] leads to [C]

[H], [I] and/or [J] make [A]

Driving behaviour (ADS capability) [C]

[C] does (not) conform to [D] therefore can (not) operate (safely / efficiently) [E]

Automation Driveability [E]

ODD attribute status [G]

[D] may affect [G] in space, time and conditionally

Rules of the road [D]

[G] is detected by [H], [I] and/or [J]

Some [F] directly control ODD attribute status, therefore [G]

TM systems and measures [F]

Some [F] are prescriptive and define [D] (temporarily)

https://tm4cad.project.cedr.eu/

Road Manager roles in digital representations

- 19 stakeholder roles in life cycle of road infrastructure digital representations

- Road manager has a naturally active role in digital representation in their core business or road maintenance and asset management as well as in use of the models in road planning and building

- Road manager role will evolve in collaboration with the ecosystem stakeholders depending on the use case and its requirements

Road operator roles	Life cycle of road infrastructure digital model/shadow/twin			
Use Case	Development	Operation	Maintenance	Use
Road planning and building (model)	A	A	A	A
Road maintenance (shadow)	A	A	A	A
Winter maintenance (shadow)	A	A	A	A
Asset management (model)	A	A	A	A
Common operational picture for traffic management (network level use case)				
➢ Traffic jam conditions and end of queue (shadow)	P	P	P	A
➢ Surface condition monitoring (shadow)	A - own	A - own	A - own	A
➢ Tunnel closure and management (shadow)	P/A - own	P/A - own	P/A - own	A
➢ Road works (shadow)	A - own	A - own	A - own	A
➢ Safety related incidents and incident management (model)	A/P	A/P	A/P	A
➢ Incident detection (shadow)	A/P	A/P	A/P	A
➢ Event management (model)	(A)	(A)	A	A
Electronic/Digital traffic rules/regulations				
➢ General traffic regulations (model)	P/A		A	A
➢ Speed limits (shadow)			A	A
➢ Access Control / UVAR (shadow)	A (road tolls etc)	A (road tolls)	A (road tolls)	A
Signal control (shadow / twin)	A/P	A/P	P	A
Hard shoulder running (shadow / twin)	A/P	A/P	P	A
Automated traffic enforcement (shadow)	P/A	P/A	P/A	P/A
HD Map (shadow / model)	A (DM) - own	A (DM) - own	A (DM) - own	A
Cooperative Connected and Automated Mobility (CCAM) – Distributed ODD attribute value awareness (shadow)			P/A	A

Top 5 estimated likelihood use case deployment

#	Use case	Unlikely	Likely	Very Likely
1	**Asset management**	Digital Twin	Digital Shadow (high-risk assets)	Digital Model
2	**Speed Limits** (Electronic / Digital traffic rules / regulations)	–	Digital Twin (dynamic)	Digital Shadow
3	**Road works** (Common operational picture of Traffic Management)	Digital Twin	Digital Shadow	Digital Model (static RW data)
4	**Incident detection** (Common operational picture of Traffic Management)	Digital Twin	–	Digital Shadow
5	**Access controll / UVAR** (Electronic / Digital traffic rules / regulations)		Digital Twin (dynamic)	Digital Shadow

Discussion

- PDI, or no PDI for CCAM?
- Joint challenge to close / overcome ODD gaps
- Multistakeholder and multidisciplinary challenge(s), cooperation is key
- Connectivity is key to facilitate and/or enhance automated driving
- Externally sourced information to augment CAV performance
- Digitizing the rules of the road
- Difference between automating vehicles (individual) and automating traffic (collective)
- Traffic Management for CAVs is different than for humans
- Necessity of remote monitoring and remote support

VISITOR REGISTRATION IS NOW OPEN!

10 - 13 MAR 2026
INTERTRAFFIC AMSTERDAM

DRIVE THE FUTURE: SMART, CUSTOMIZED & AUTONOMOUS MOBILITY

- Advanced driver assistance systems
- Automated vehicles and autonomous ride pooling
- Autonomous Vehicles' Impact
- Big data, data sharing and connectivity
- Digital infrastructures, V2X and V2V
- Human factors of automated driving
- Preparing road infrastructure for automated driving
- Vehicle sensors, AI and machine learning

Register for free

Transforming Mobility

Thank you for your attention

Let's discuss!

Tom Alkim – Strategic Advisor Connected & Automated Mobility

tom.alkim@maptm.nl