Hi-Drive
Designing Automation

# Hi-Drive and its evaluation plan for assessing the impact of high automation on the user and society

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VTT

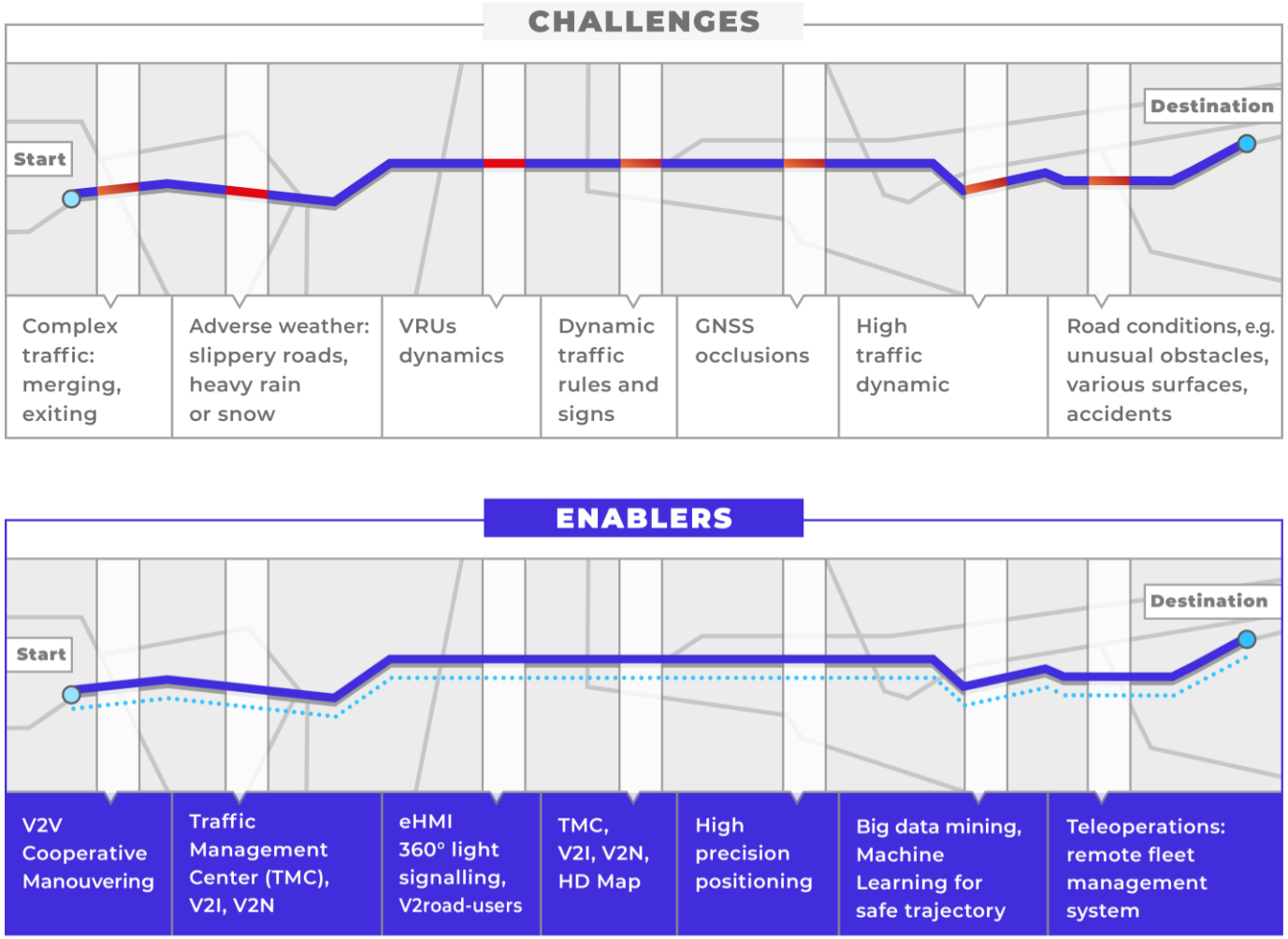

Our history of automated driving – long lasting successful collaborations
Hi-Drive
Designing Automation
L3Pilot
Driving Automation
Adapt:/Ve
Automated Driving
eur8FOT
Bringing intelligent vehicles to the road
Complexity
Time


Hi-Drive
Designing Automation

## PUSH TOWARDS HIGHER AUTOMATION

- Robust and reliable automated driving
- Extended and defragmented ODDs
- Interoperability across countries and brands

# Defragmentation of the Operational Design Domain (ODD)




**ODD**

**MANUAL DRIVING**

**AUTOMATED DRIVING**

**Cybersecure, interoperable, interactive** and **user-aware vehicles**

# Project Facts

**€60 MILLION** BUDGET

**€30 MILLION** FUNDING

**48 MONTHS** from July 2021 to June 2025

**40 PARTNERS** among them OEMs, automotive suppliers, research institutes, associations, traffic engineering, deployment organisations and mobility clubs

**14 COUNTRIES** involved: Belgium, France, Finland, Germany, Greece, Hungary, Italy, Israel, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom

eucar
EUROPEAN COUNCIL FOR AUTOMOTIVE R&D
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# Partners


VOLKSWAGEN
AKTIENGESELLSCHAFT
STELLANTIS
CRF
Ford
HONDA
The Power of Dreams
HYUNDAI
STELLANTIS
LAB
SEAT
TOYOTA
VOLVO
VOLVO
VOLVO GROUP
APTIV
AAI
AUTOMOTIVE
ARTIFICIAL
INTELLIGENCE
BOSCH
FEV.io
TNG
commsignia
PTV GROUP
Valeo
DLR
Deutsches Zentrum
für Luft- und Raumfahrt
German Aerospace Center
ENIZEY
ICCS
ika
RWTH AACHEN
UNIVERSITY
TU Delft
UNIVERSITY OF LEEDS
WIVW
INSTITUT
VEDECOM
IRF
International Road Federation
Fédération Routière Internationale
Federación Internacional de Carreteras
CHALMERS
UNIVERSITY OF TECHNOLOGY
SNF
CENTRE FOR APPLIED RESEARCH AT NHH
TNO
innovation
for life
UNIVERSITÀ
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CTAG
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WMG
THE UNIVERSITY OF WARWICK
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Straßenwesen
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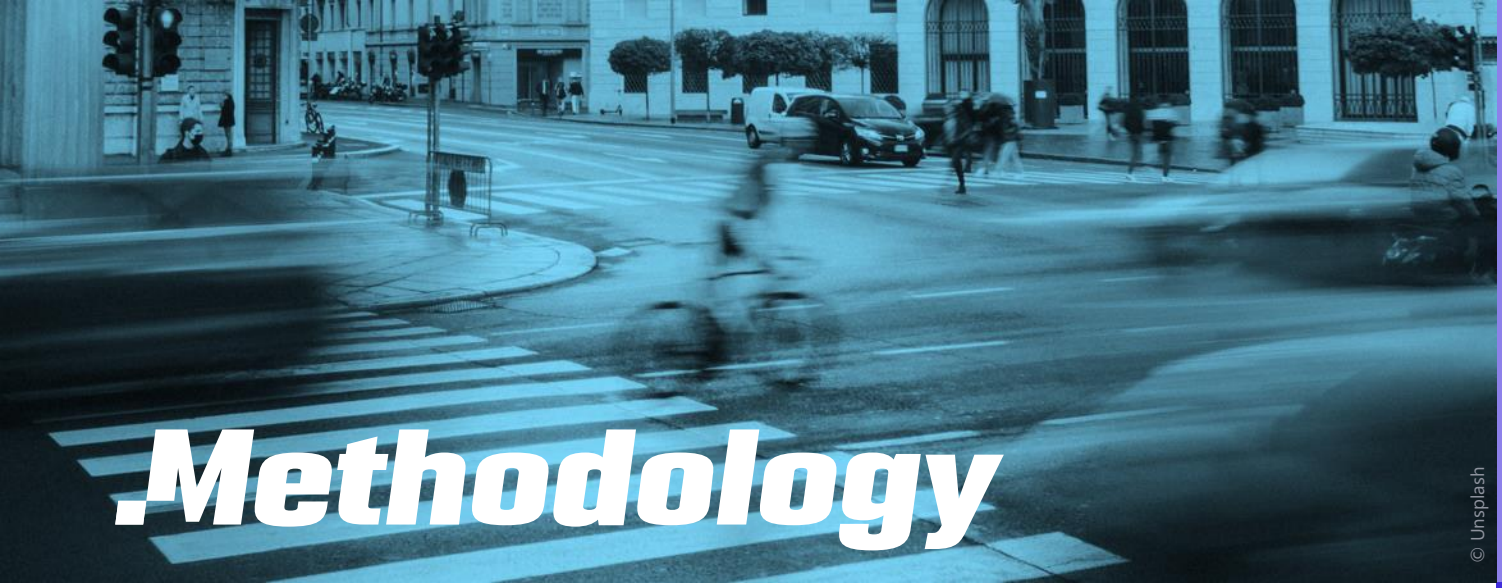
FIA
AUTOMOBILE CLUB
ASSOCIATION
ADAC
ACI
AMZS
anwb
AL
autoliitto
HAK
HRVATSKI AUTOKLUB
iam
RoadSmart
MAGYAR AUTÓKLUB
1900
RACC
ROYAL AUTOMOBILE CLUB
BELGIUM



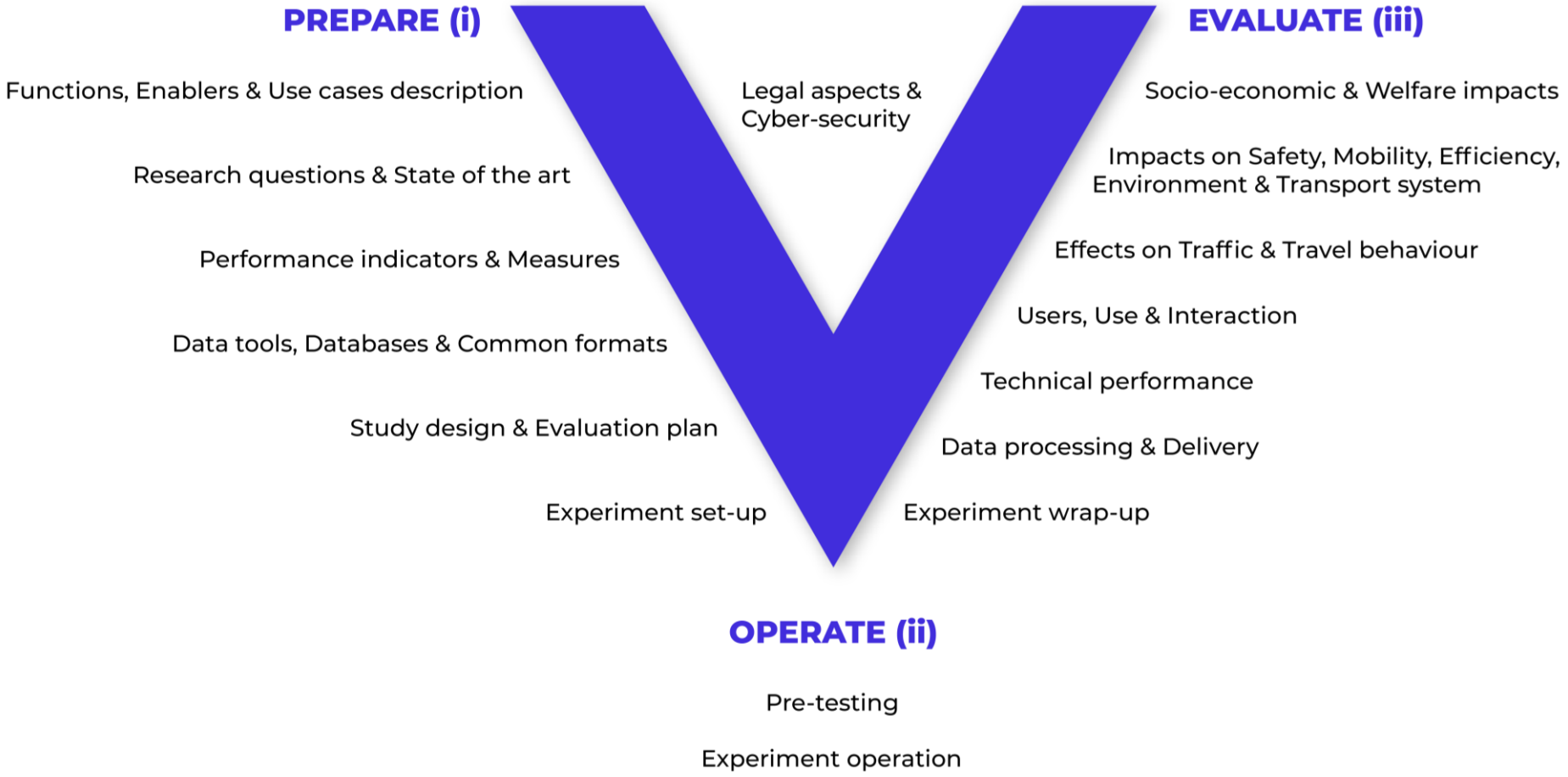

# Methodology

Hi-Drive

## Extended methodology for testing high automation across Europe – from single users and vehicles to the transport system and socio-economics.

Multidisciplinary Methodology
Research Questions & Data
Impact Mechanisms
Experimental Procedures
Evaluation Methods
Common Data Formats

# FESTA Implementation plan adapted for Hi-Drive



# Process for setting the Hi-Drive Methodology

## Drafting phase

- Initial list of research questions
- Data needs for evaluation
- Requirements for experimental design & procedures
- Methods for users & effects evaluation

## Dialogue phase

- Dialogue with operation owners & data providers
- Feasibility check for research question

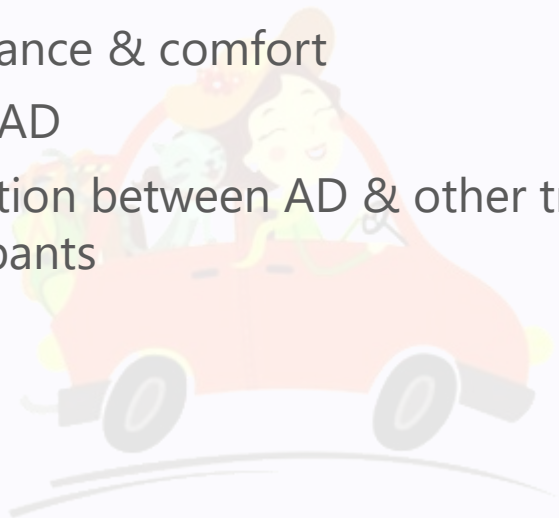
## Finalisation phase

- Final list of research questions
- Agreement on data shared for evaluation
- Agreement on experimental design & procedures
- Detailed plan for users & effects evaluation

# Dual focus in evaluation

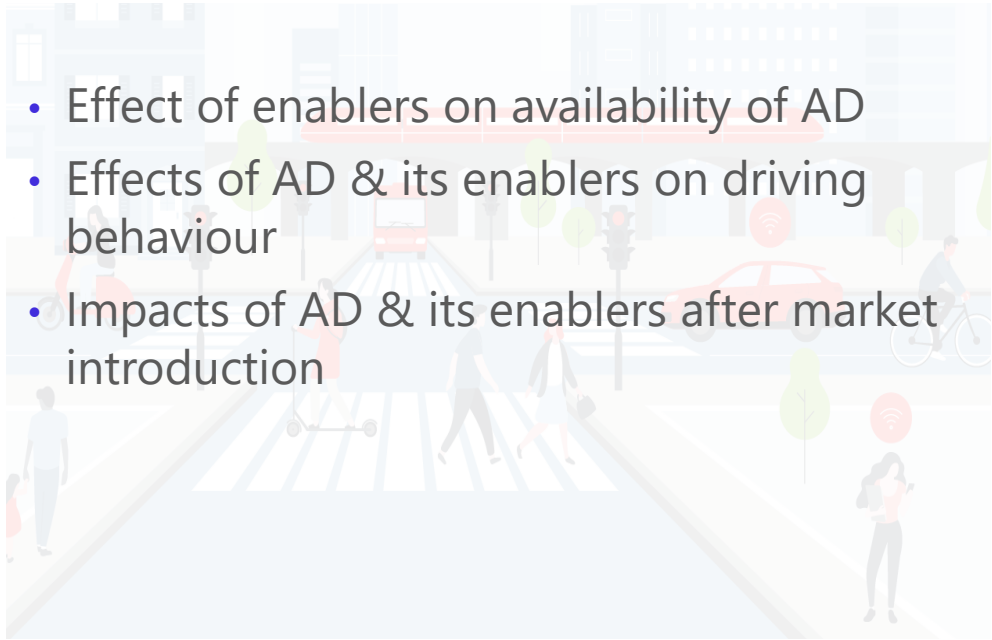
## Users

- Acceptance & comfort
- Use of AD
- Interaction between AD & other traffic participants



## Effects

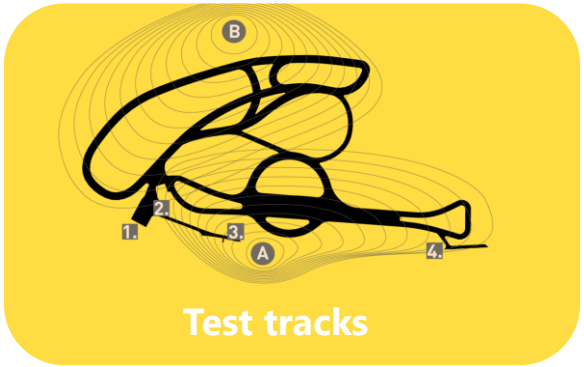
- Effect of enablers on availability of AD
- Effects of AD & its enablers on driving behaviour
- Impacts of AD & its enablers after market introduction



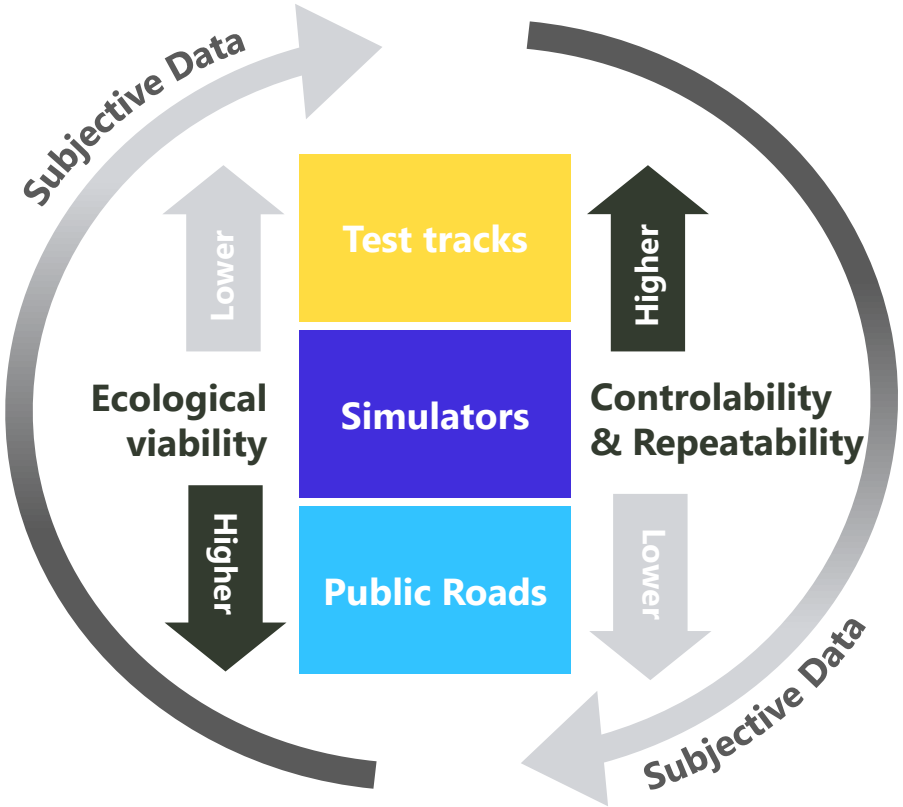
# User evaluation plan

| | |
|---|---|
| All users | Acceptance & awareness |
| On-board drivers/passengers | Comfort & human-like driving |
| | Car sickness |
| | User monitoring |
| | HMI |
| External road users | Implicit & explicit communication (dHMI & eHMI) |
| External teleoperators | User monitoring |
| | HMI |

# User evaluation plan

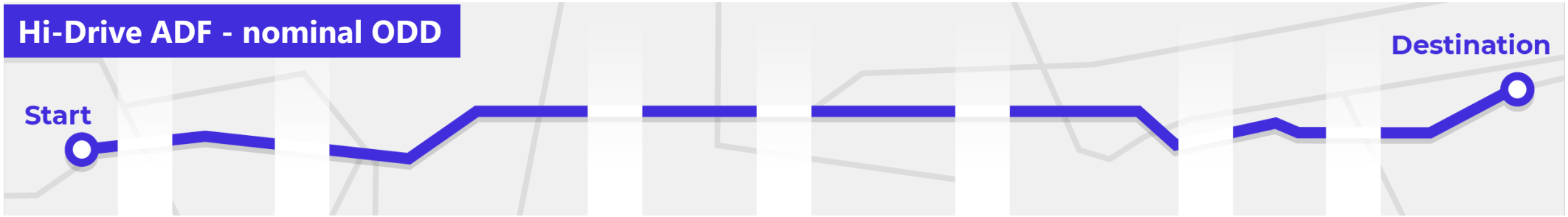




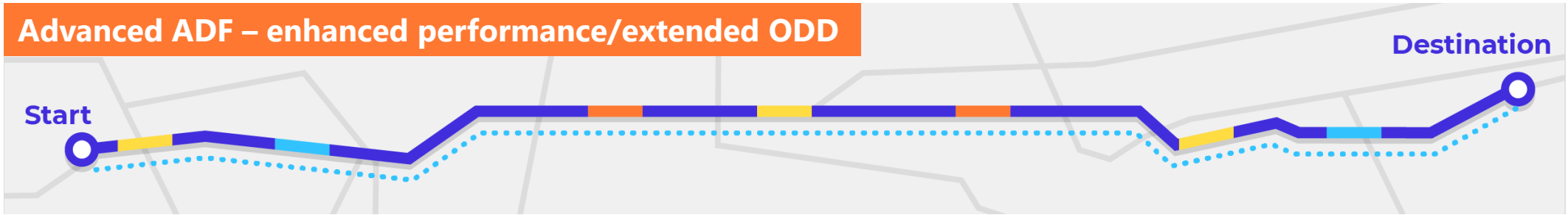




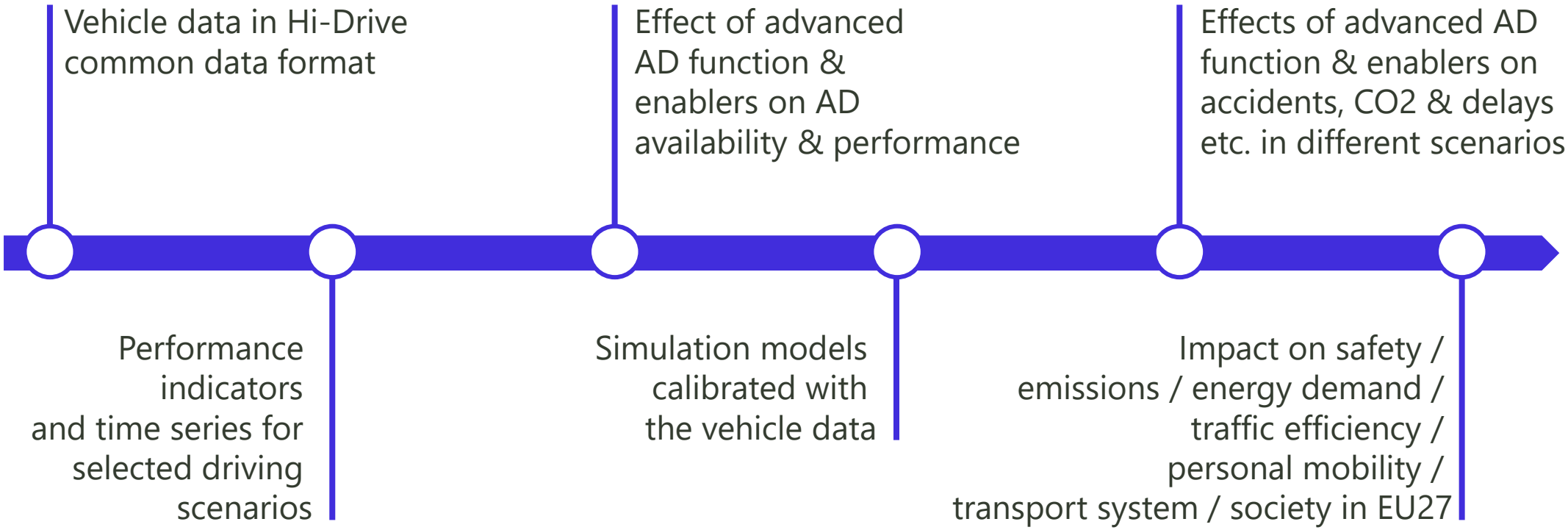
# Effects evaluation plan




+ Enabler: Connectivity | High-precision positioning | Context learning via ML | Cybersecurity =



# Effects evaluation plan

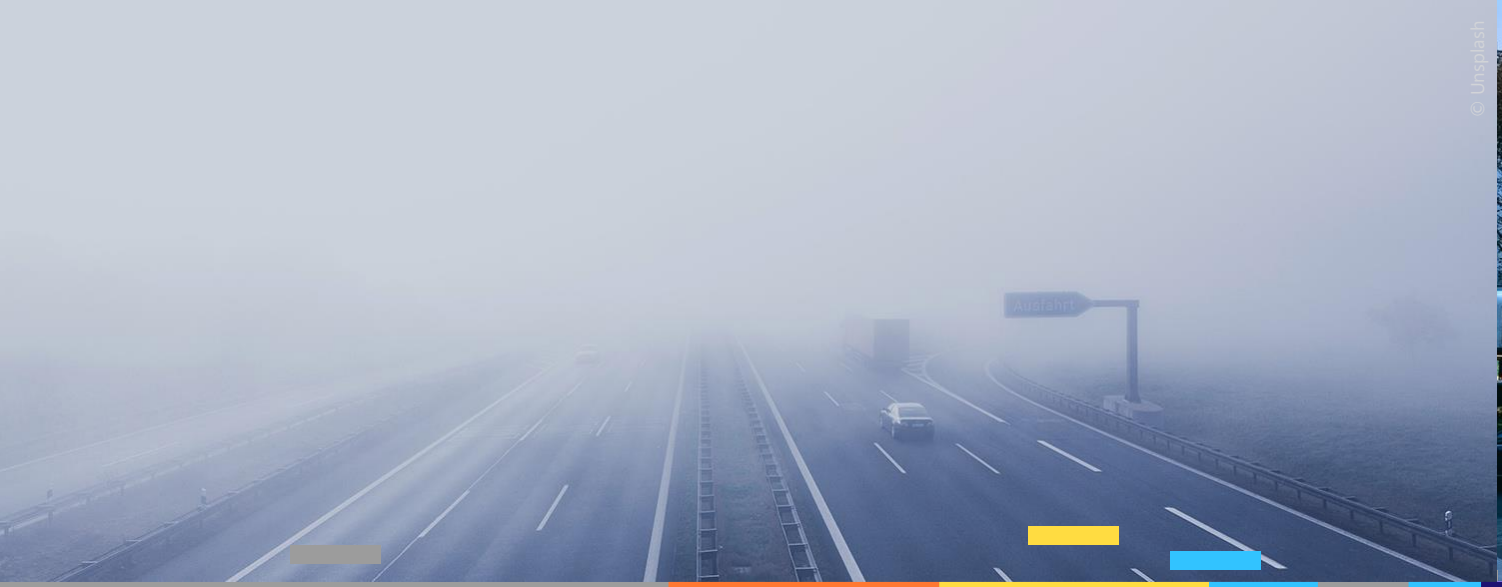


# Foundation for successful evaluation

- Multitude of experiments providing evidence that allows extensive evaluation
- Established partnerships between evaluation team, enabler providers and operation owners
- Smooth data flow from experiments via tools to all evaluation methods
- Multidisciplinary evaluation methodology
- Well-defined and tested evaluation plan

# VTT test site on Arctic CAD

- See video: https://www.hi-drive.eu/news/laplandvideo/




# THANK YOU FOR YOUR KIND ATTENTION.

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