

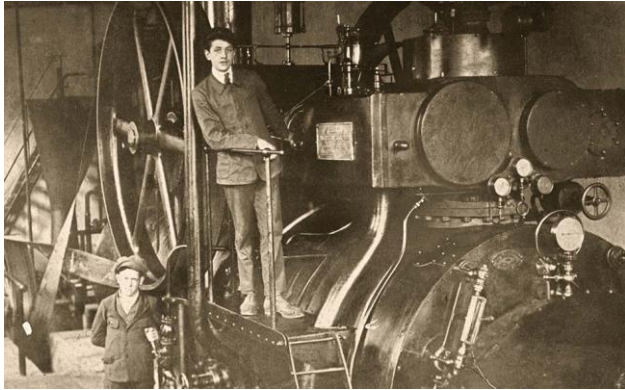
Acceleration of internationalization  
of standardized testing methods for  
highly automated driving through  
formation of an alliance

IEEE  
2<sup>nd</sup> December 2019  
Munich



Add value.  
Inspire trust.

# TÜV SÜD, a German-founded 3rd Party Service Provider



***Protect People, the Environment  
and Property against the adverse  
Effects of Technology.***

***Prove of Safety, Quality and  
Sustainability***



**150+**  
YEARS OF  
SAFETY, SECURITY  
& SUSTAINABILITY



**1,000+**  
LOCATIONS  
WORLDWIDE



**€2.5**  
BILLION  
IN ANNUAL  
REVENUE



**24,500+**  
EMPLOYEES



**41%**  
OF REVENUE  
OUTSIDE  
GERMANY



**574,000**  
CERTIFICATES



**100%**  
INDEPENDENT  
& IMPARTIAL

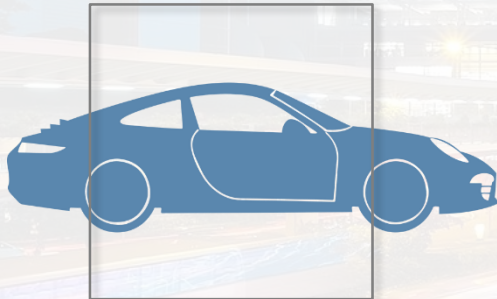


**1**-STOP  
SOLUTIONS  
PROVIDER

# Changing of the future mobility set-up

... from car centric towards driver centric view and intermodal mobility

## Today

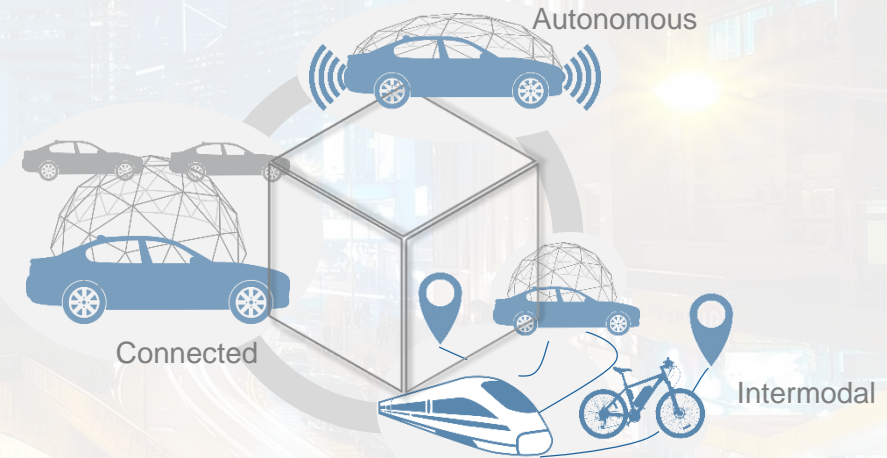


**Individual vehicle**

**Vehicle safety – focusing on hardware**  
(one dimensional)

**Periodical** (homologation & PTI)

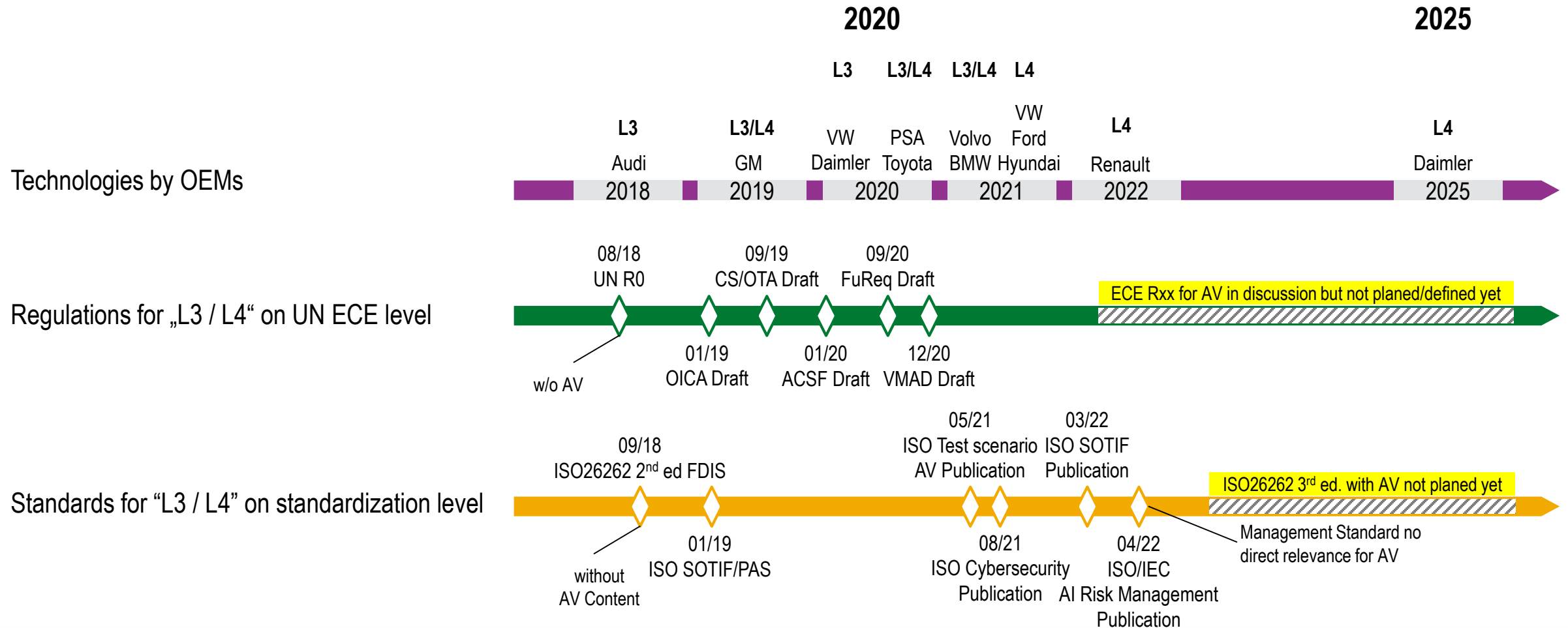
## Future



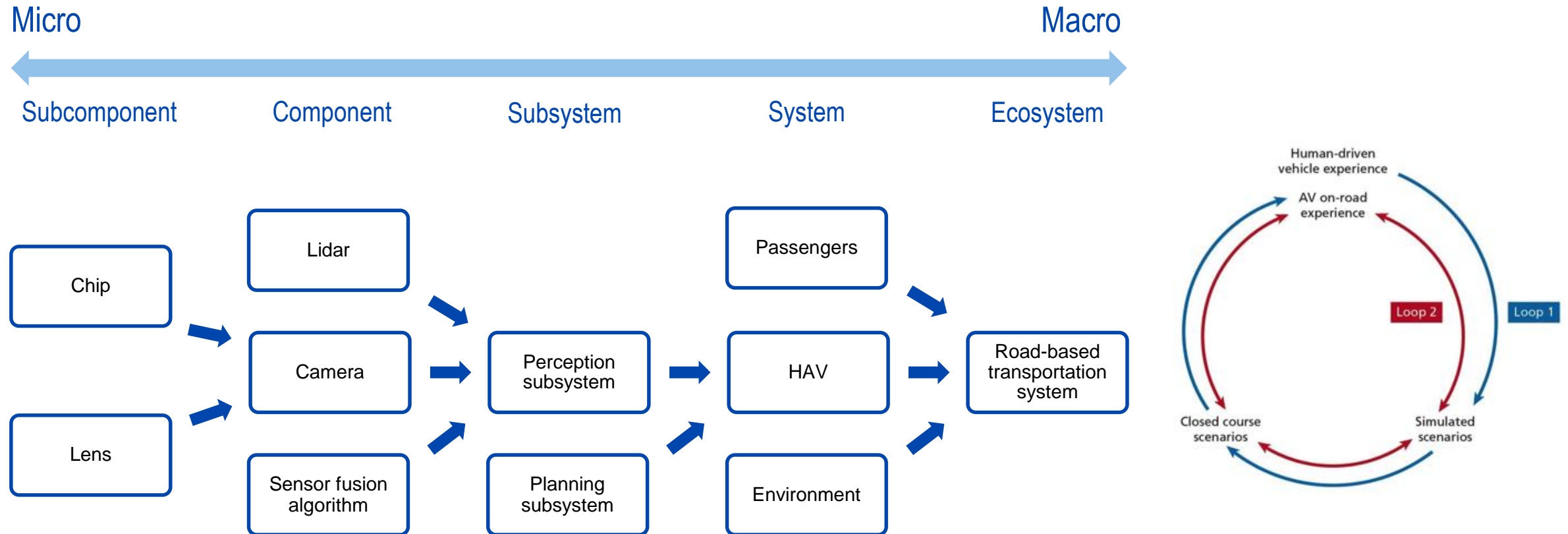
**Intermodal mobility in connected environment** (e.g. X2X)  
**Vehicle-, software-, data- and process safety**  
(multi dimensional)  
**Continuous** (digital & remote)

# Automated Driving: Technology vs. Regulation Roadmaps

## Technology develops faster than regulations and standards!



# Highly and fully automated vehicles systems and mobility services to the market is both a technological and regulatory challenge



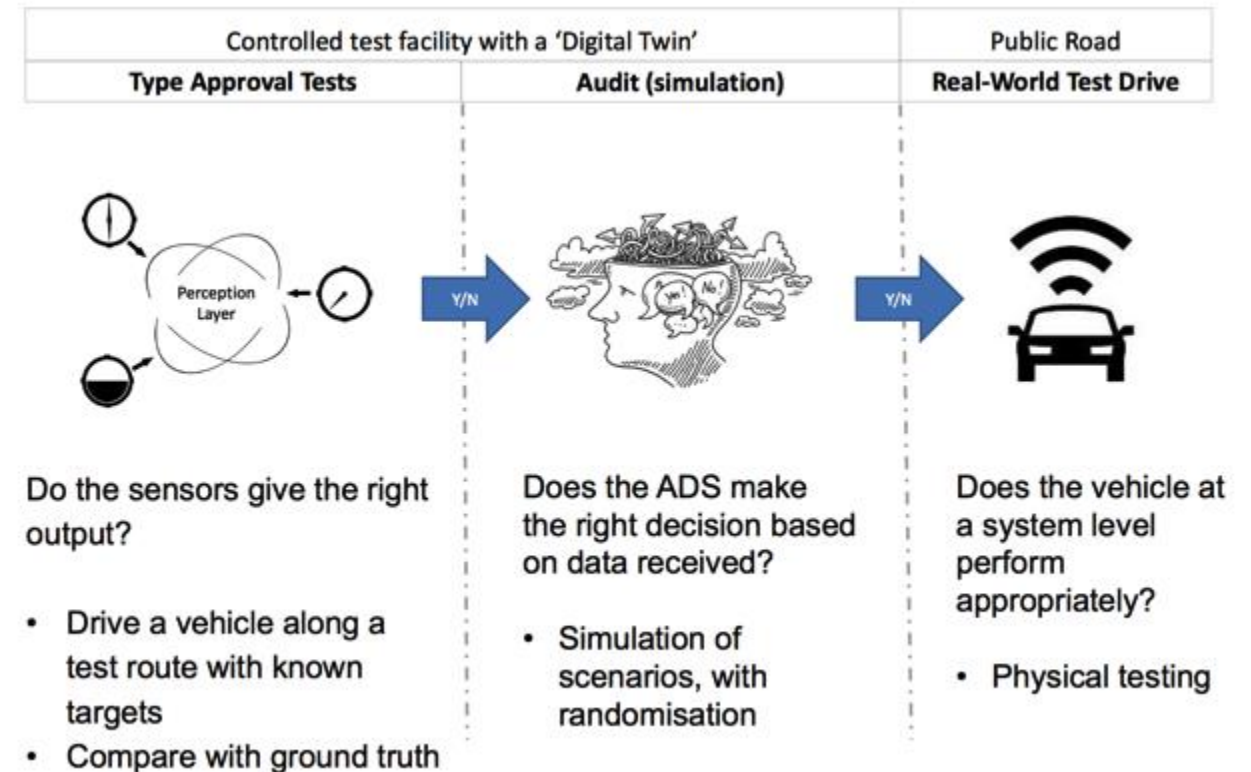
Source: Rand Corporation

# Highly and fully automated vehicles systems and mobility services to the market is both a technological and regulatory challenge



*Automated vehicles that accurately detect, recognize, anticipate, and respond to the movements of all transportation system users could lead to breakthrough gains in transportation safety.*

Source: USDOT



Source: CATAPULT

# Problems and challenges of automotive technology

- Growing complexity of potential risks and testing needs
- No measuring stick for what tests should be conducted and how they should be conducted
- Lack of global harmonization of standards, regulations and approaches regarding testing
- Need to match rapidly evolving technologies with a process for creating standards that is equally rapid and flexible
- Difficulty with comparability and replicability of tests across facilities, geographies and physical/virtual boundaries
- Issues with test data portability and compatibility
- Validating simulation fidelity, Optimizing simulation and physical testing
- .....

# International Alliance for Mobility Testing and Standardization



## Our Vision

- Create a global community comprised of advanced mobility testing service providers and companies, organizations and agencies in need of such services.
- Learn, develop and share best-practices to ensure consistent, replicable and reliable testing.
- Maintain a global directory of physical, virtual and cyber-physical testbeds and support and promote their audited capabilities.
- Promote the rapid evolution of globally harmonized standards and certifications to ensure reliable deployment of advanced mobility systems and services.

# Building a global community for smart mobility testing



September 2018  
WAVE  
Conference  
Shanghai, China



April 2019  
SAE WCX  
Detroit, USA



May 2019  
Committees  
Meeting  
Munich, Germany



August 2019  
Committees  
Meeting  
Tianjin, China



October 2019  
Committees  
Meeting  
Munich, Germany

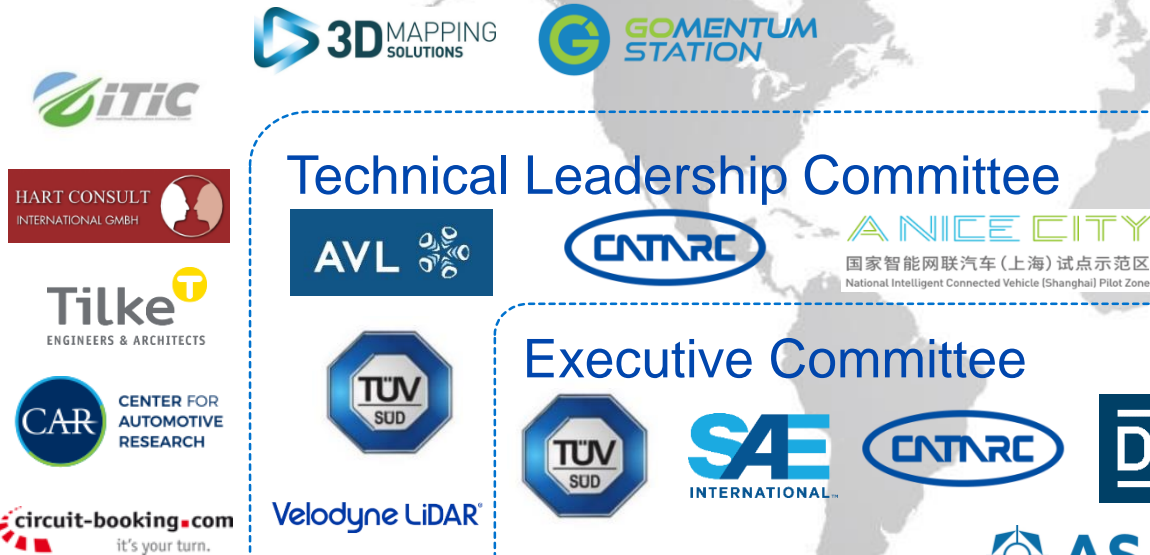


To be continued...

# International Alliance for Mobility Testing and Standardization



## Members



## Technical Leadership Committee

### Executive Committee

## Our Mission

To develop and grow an international portfolio of advanced mobility testbeds and service providers that meet the highest quality implementation and operational standards.

### Executive Committee

Chairman: Alexander Kraus  
(TÜV SÜD)  
Vice Chairman: Prof. Dr. Zhixin Wu  
(CATARC)  
Secretary: John W. Tintinalli  
(SAE)  
Consultant: Dr. Joachim G. Taiber

### Technical Leadership Committee

Chairman: Dr. Lin Li  
(A NICE CITY)

# What is the scope of IAMTS?



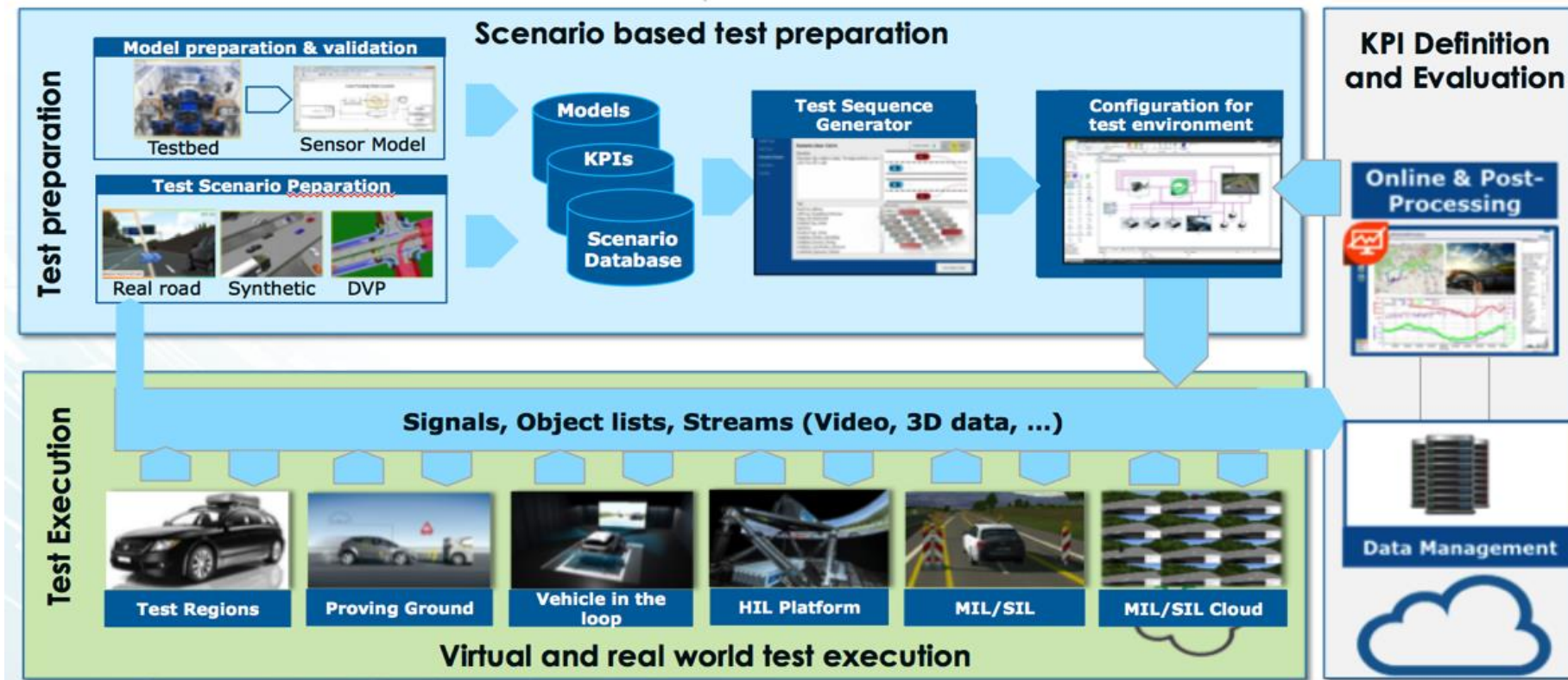
Provide an overview about dedicated shared use smart mobility testbed facilities world wide

Provide access to certified high quality data linked to dedicated testbeds and road systems (public or private) which can be utilized for AV testing and certification

Allow testbed operators to get their facilities certified by independent auditors to achieve a minimum quality standard in terms of AV testing capabilities which will benefit testbed users

Identify key knowledge required for a successful AV testing ecosystem

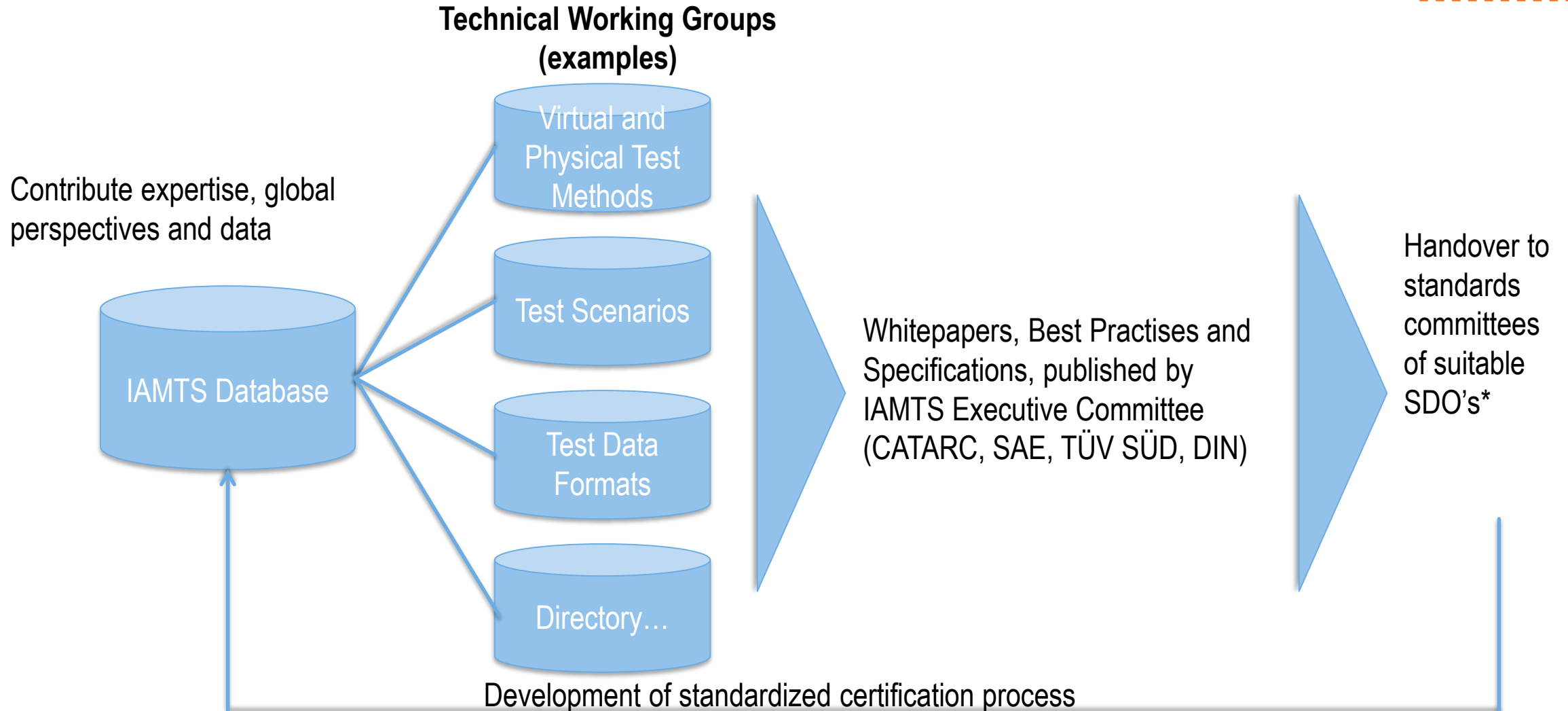
# What is a smart mobility testbed?



Source: AVL

A smart mobility testbed means the complete **cyberphysical** mobility test ecosystem, including but not limited to tools, scenarios, roads, communication and energy related infrastructure, simulation models, physical testing methods and test objects.

# How does IAMTS contribute to standards development



\* Standard Development Organizations

# Technical Project Priorities and Working Groups



Working Group 1: Global Differences  
and Harmonized Test Library

- **Working Group Leader**
- CATARC
- **Participants**
- TÜV SÜD, A NICE CITY, AVL, Velodyne



Working Group 2: Qualification and  
Directory of Global CAV Testbeds

- **Working Group Leader**
- TÜV SÜD
- **Participants**
- CATARC, A NICE CITY, Tilke, 3D Mapping, Circuit Booking, Hart Consult, CAR



Working Group 3: Correlation between  
Physical and Simulation Testing

- **Working Group Leader**
- AVL
- **Participants**
- CATARC, A NICE CITY, Tilke, 3D Mapping, SAE, ITIC, Retrospect, TÜV SÜD, Hart Consult

# Contact us



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Vice Chairman IAMTS

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Let's create safety and trust in  
tomorrow's world of smart mobility  
together.

sustainable. integrated. leading.