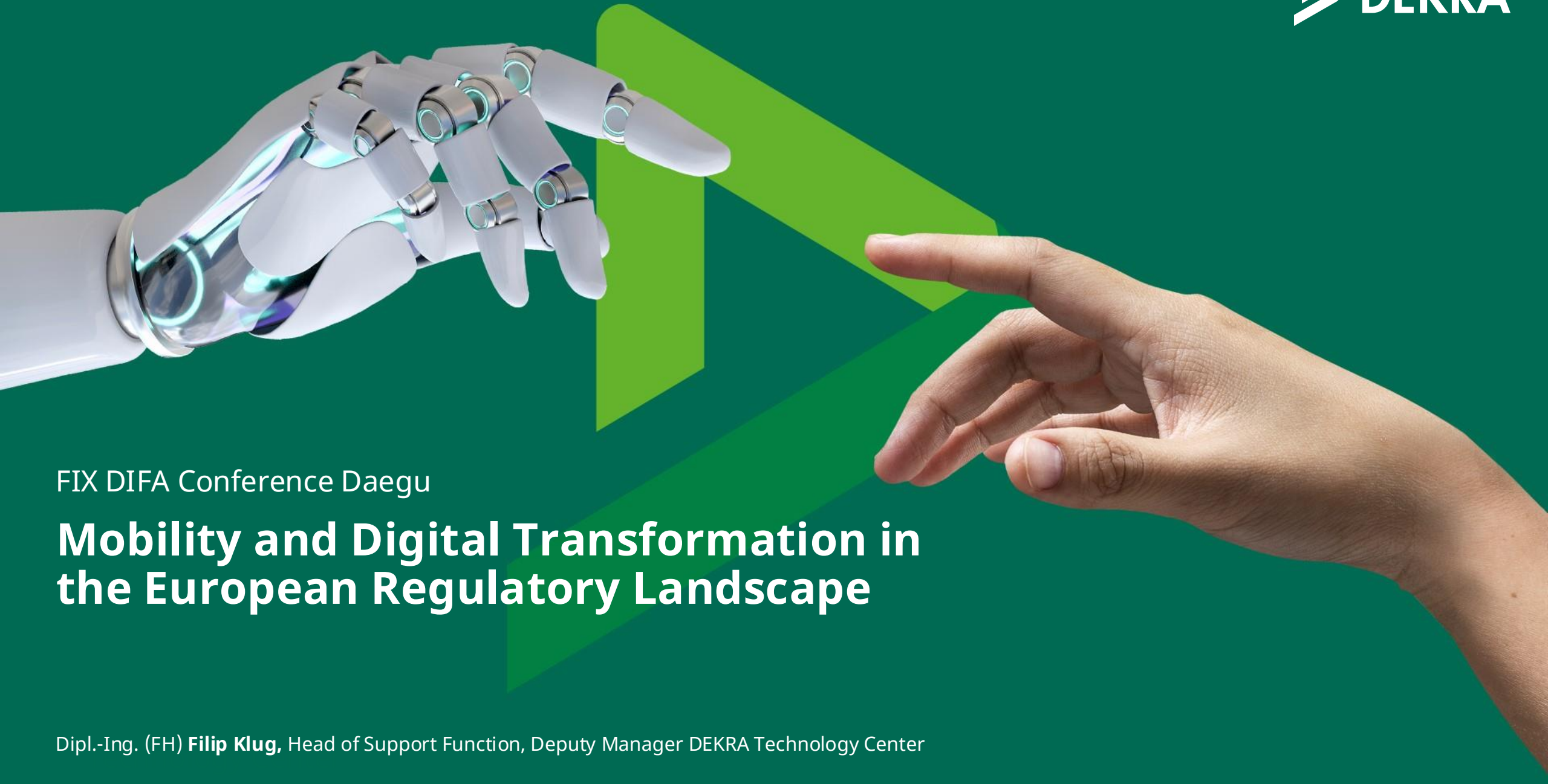




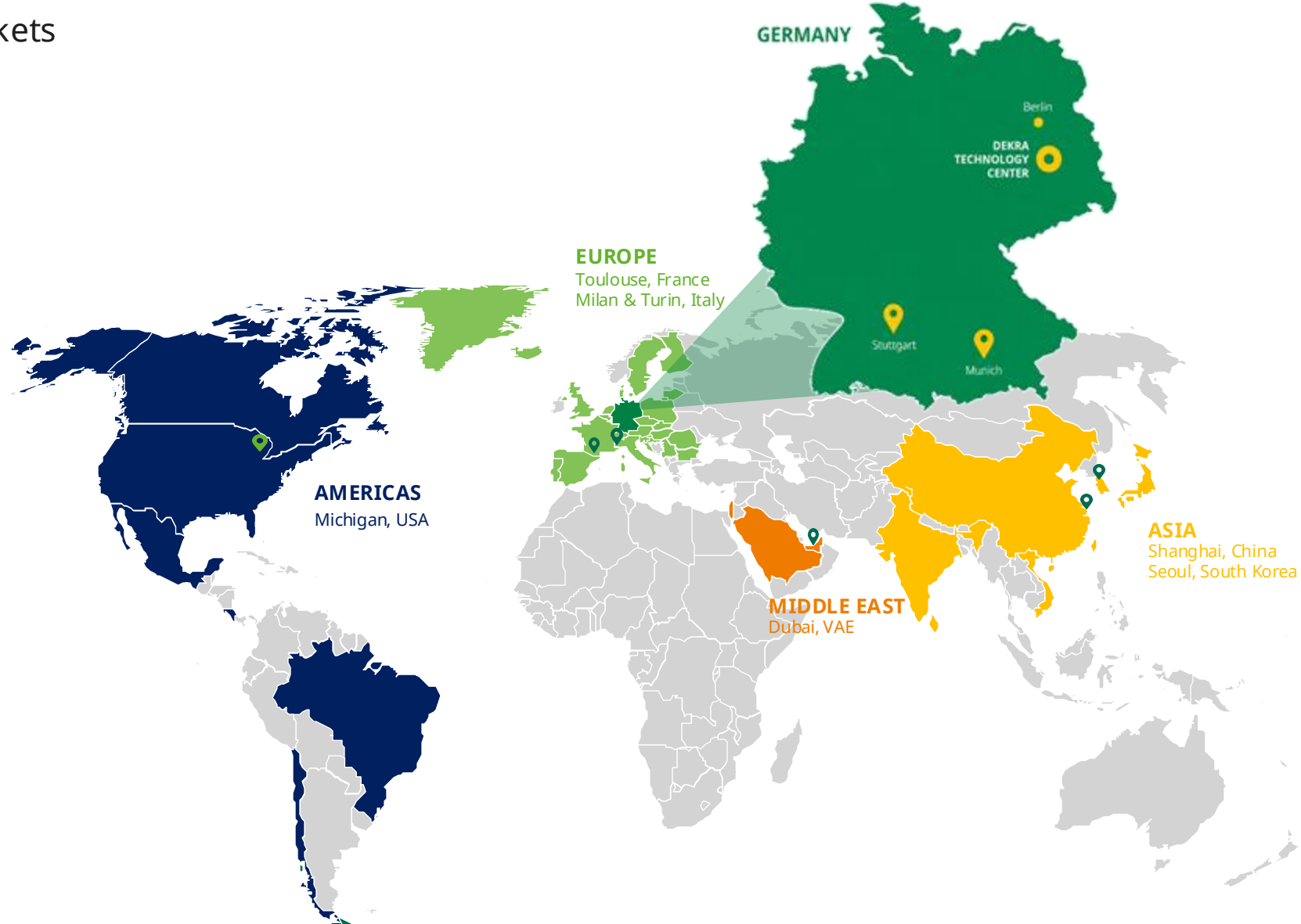
FIX DIFA Conference Daegu

Mobility and Digital Transformation in the European Regulatory Landscape

Dipl.-Ing. (FH) **Filip Klug**, Head of Support Function, Deputy Manager DEKRA Technology Center

DEKRA Technology Center- One of Europe's largest mobility test centers

Target Markets



DEKRA Technology Center – Transformation to Future Mobility



Test Site Overview

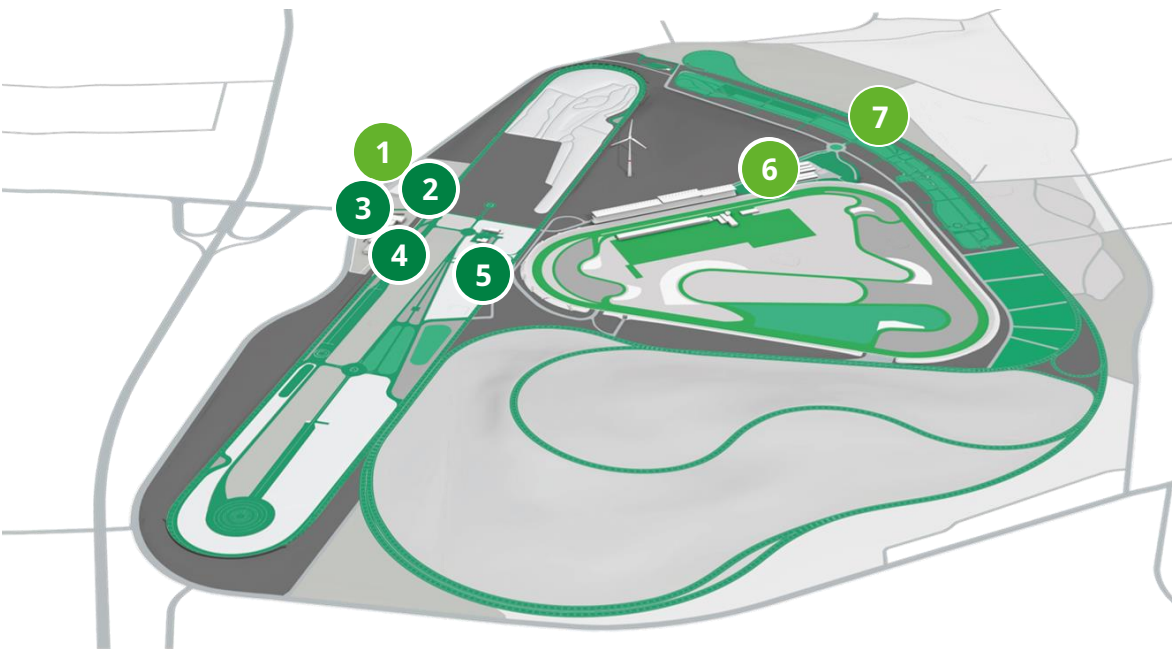
Focus Technologies:

New Energy Vehicle

Automated & Autonomous Driving

Software Defined Vehicle

Connectivity



1 Battery/ HV

2 Powertrain & Emission

3 Passive Safety & Crash

4 Structural Durability

5 Whole Vehicle & Components

6 Digital Trust Mobility

7 ADAS / AD

DEKRA
Technology Center
Excellence in Testing

540
hectares proving
ground

250+
engineers &
technicians

200+
test benches

21
test tracks

Sustainability
certified
ISO 50001 &



Why Now?

Key trends shaping the future of vehicle approval



Rapid deployment
of **AI-enabled
vehicle functions**



Growing rollout of
**automated driving
systems** and
connected vehicles



**Software-defined
vehicles** and
**continuous Over
The Air Updates**
becoming the norm



Increasing focus on
**Cybersecurity, AI
governance** and
**lifecycle
compliance**

Regulation is moving:

from certifying vehicles at SOP

**to assuring safety throughout
the entire vehicle lifecycle**



What will change with Automated Driving - a regulatory perspective

Increasing regulatory complexity

General Safety Regulation (GSR): The European Commission mandates many ADAS features on every new vehicle



Feature	Description	New Type Approvals	New Vehicle Sales	Next Regulatory Wave
All Vehicles (Class M1 N1)		required as of 6/7 July in the year:		
AEBS Vhl	Advanced Emergency Braking System	2022	2024	Extension to new scenarios
AEBS Pe & Cy	Pedestrian & Cyclist Protection	2024	2026	Enhanced VRU detection
ADDW	Driver Distraction Warning	2024	2026	Enhanced Driver Monitoring
DDAW	Driver Drowsiness Warning	2022	2024	Monitoring performance updates
ELKS	Emergency Lane Keeping System	2022	2024	Higher speed / wider ODD
ISA	Intelligent Speed Assistance	2022	2024	Performance improvements
REV	Reversing Detection	2022	2024	
EDR	Event Data Recorder	2022	2024	Extended data requirements
DCAS	Driver Control Assistance Systems	2025 (01)		DCAS L2 „If fitted“ Regulation, Expected Q1/2027 (S02)
Vehicle Class M2, M3 - N2, N3				
BSIS	Blind Spot Information System	2022	2024	
MOIS	Moving Off Information System	2022	2024	
EDR	Event Data Recorder	2026	2029	
Continuous / Upcoming Regulations				
CSMS	Cybersecurity Management System	Required	Required	Continuous compliance, Vehicle Class L 2027 onwards
SUMS	Software Update Management System	Required	Required	OTA governance evolution
CPD	Child Presence Detection	2026	2028	Further occupant monitoring
ADS	Automated Driving Systems	Emerging	Emerging	ADS L4- Type approval framework, Lifecycle safety management, multi pillar validation, expanded ODD, higher speeds, DSSAD (Data Storage System for Automated Driving) requirements and in-service monitoring
AI Compliance	AI-based Vehicle Functions	Emerging	Emerging	High-risk AI systems, conformity assessment, technical documentation, post-market monitoring

Increasing regulatory complexity



L1 R79 Steering

“Vehicle can steer safely”

Focus: steering function & controllability

10/2017



L2 R171 (DCAS)

“System safely assists the driver for a limited time”

Focus: driver assistance & monitoring

09/2025 (S01) / Q1/2027? (S02)



L3 R157 (ALKS)

“ADS drives safely & independently within its ODD”

Focus: ODD, driverless operation & fallback

01/2021 (R157, max. 60 km/h)
01/2023 (R157, max. 130 km/h)



L4 Upcoming regulations

- R185 (L4-ADS)
- R157 extension
- EU Machinery Regulation
- New X/Y vehicle classes (ADS)
- CS/AI evidence & type approval – ongoing

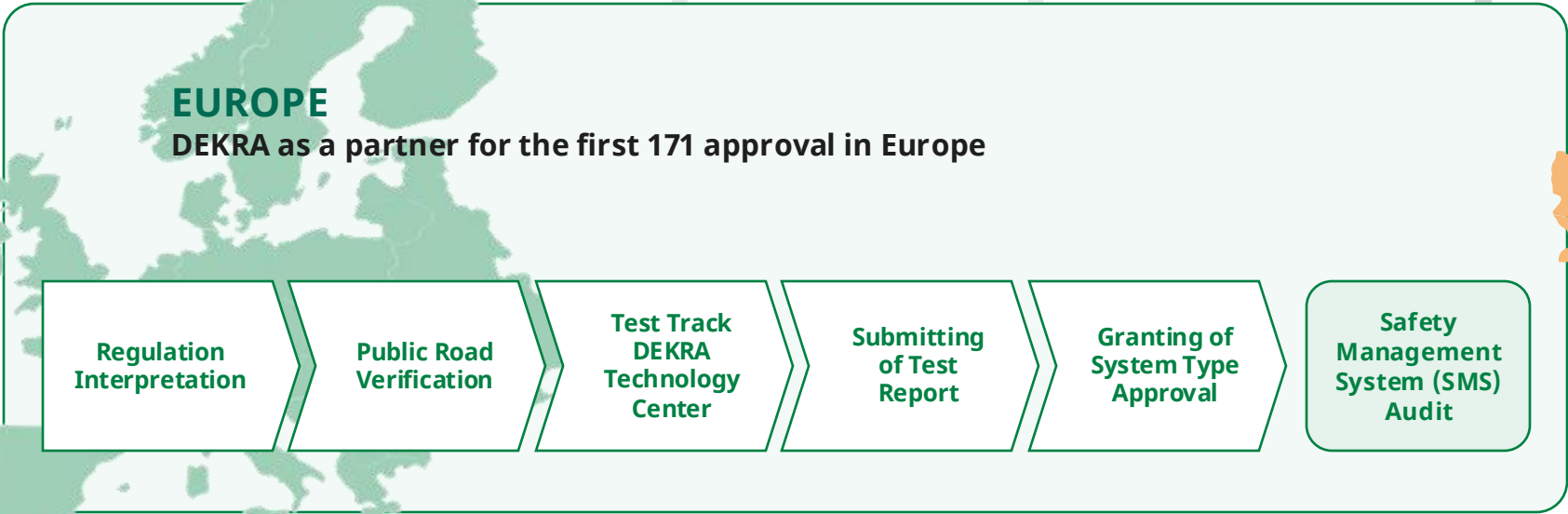
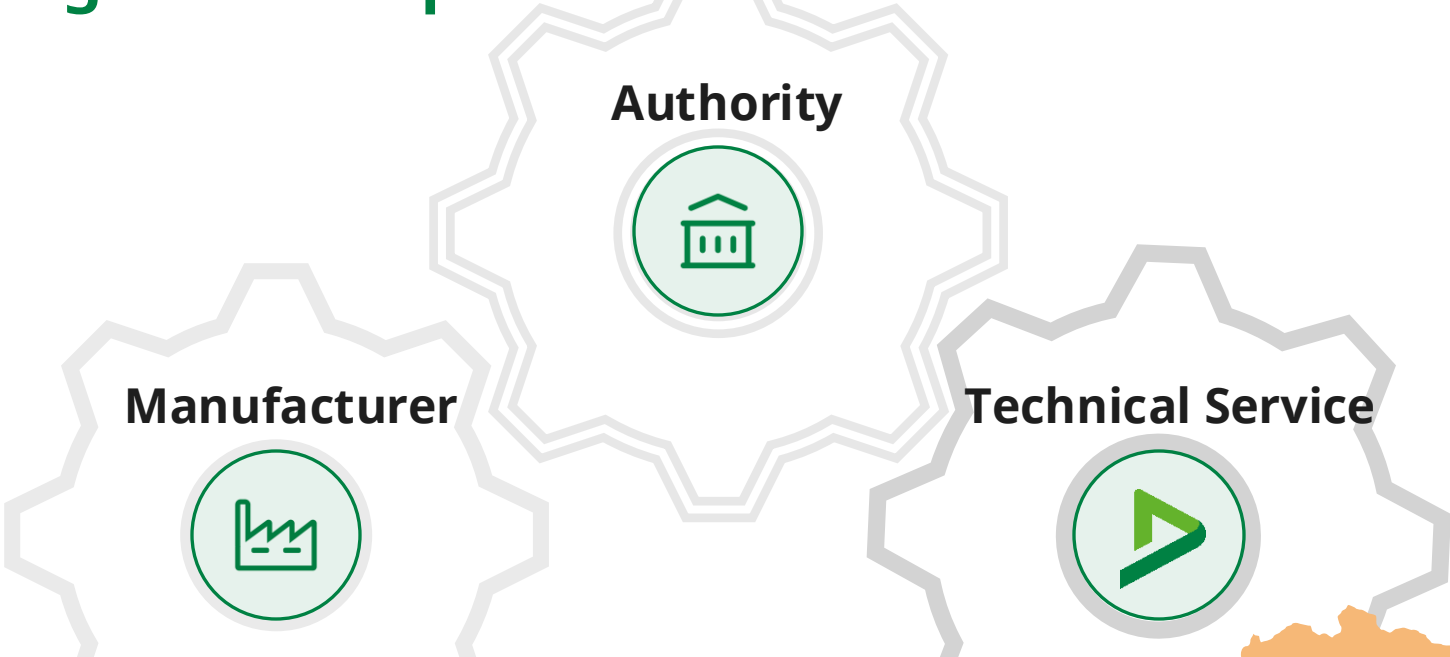
Q1/2027? (R185)
Q1/2027? (MR (EU) 2023/1230)

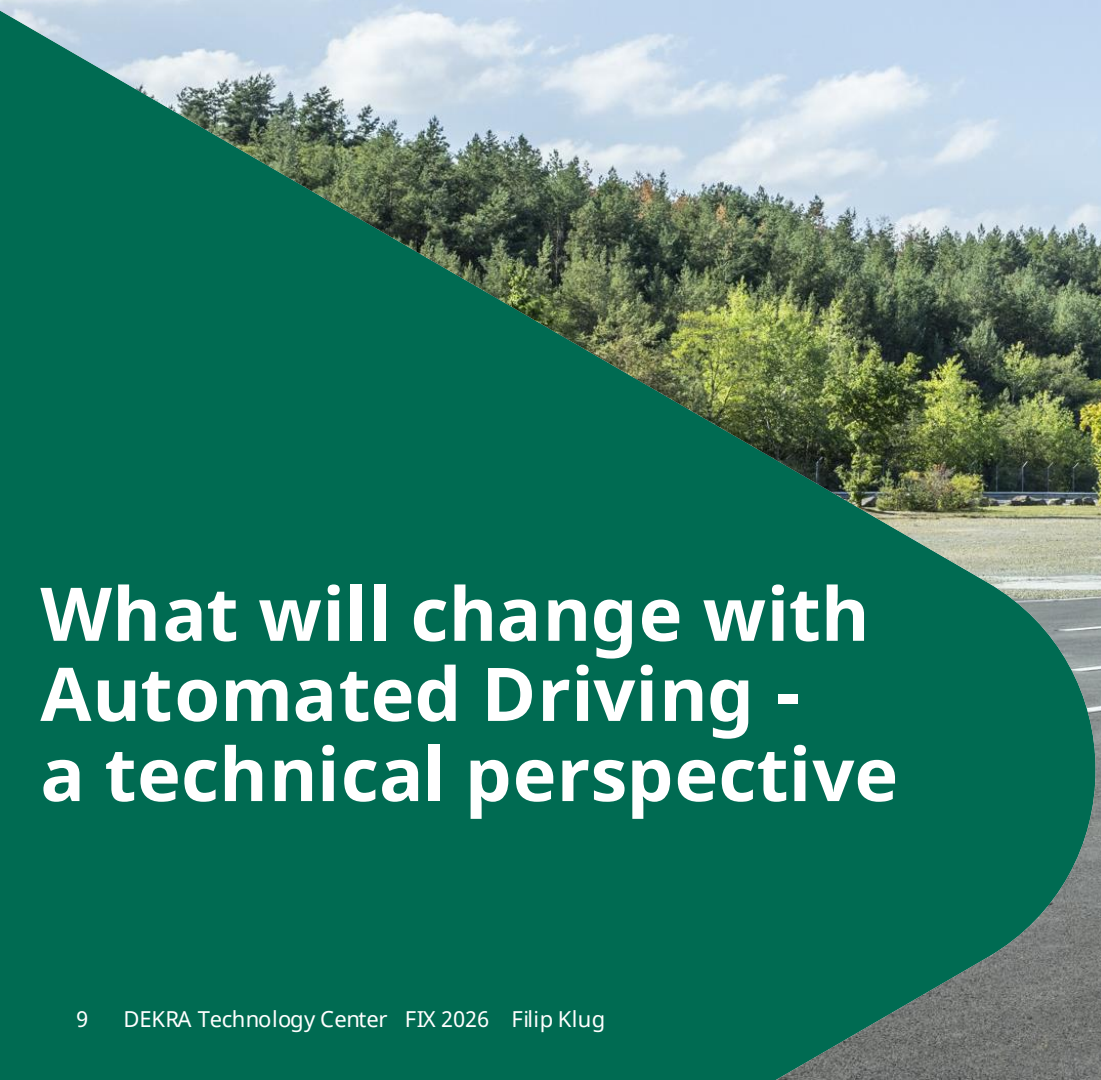
Regulation is shifting:

From approving individual functions

to proving the safety of the complete Automated Driving System throughout lifecycle.

Reference project using the example of the UN R171 EU and APAC





What will change with Automated Driving - a technical perspective



Increasing technical complexity



Driver support

Drive-, steer-, & brake-by-wire systems replace traditional mechanical or hydraulic connections with electronic controls & electrical actuators.



System responsibility

	ECE/UN R79	ECE/UN R171-02 DCAS	Level 4 - UN R185 / GTR ADS + AFGBV (Germany)
 Function	Steering / automated steering	Longitudinal + lateral assistance	Automated driving R185 = market access GTR 26 = technical standard
 Responsibility / SAE level	Driver responsible SAE L1-2	Driver responsible SAE L2	System responsible SAE L4
 Driver monitoring	Hands-on	Eyes-on / hands-off*	No driver monitoring
 Emergency / fallback	Driver takeover	Warning + driver takeover	Safe-state fallback
 Operating domain	Functional limits	Defined system limits	Approved ODD / AFGBV (GER) / AV Act 2024 (UK)



What will change with Automated Driving - a vehicle lifetime perspective



Increasing lifetime complexity



	ECE/UN R79	ECE/UN R171-02 DCAS	Level 4 – ADS / UN R185 + GTR ADS
 Conformity of production (CoP)	compliance with the approved vehicle	Ongoing conformity of vehicle and system	Ongoing conformity of vehicle, system, ODD and safety processes
 In-service monitoring	Limited	Required , including regular evaluation and reporting	Central requirement , with continuous safety monitoring
 Safety events	No requirement	Identification and assessment of safety-relevant events	Systematic identification, assessment. Data recording (DSSAD) & follow-up (with authority and TS)
 Software / system changes	Assessment of approval relevance	Change assessment required	Comprehensive safety and approval assessment
 Authority coordination / Technical Service	Mainly for changes or safety deviations	Regularly through monitoring , reporting and changes (DETA)	Continuous , especially for safety events & SW changes
 Lifecycle	Focus on CoP	Production conformity + monitoring	Continuous audited safety assurance throughout the vehicle lifecycle





What will change with Automated Driving - Summary

Summary



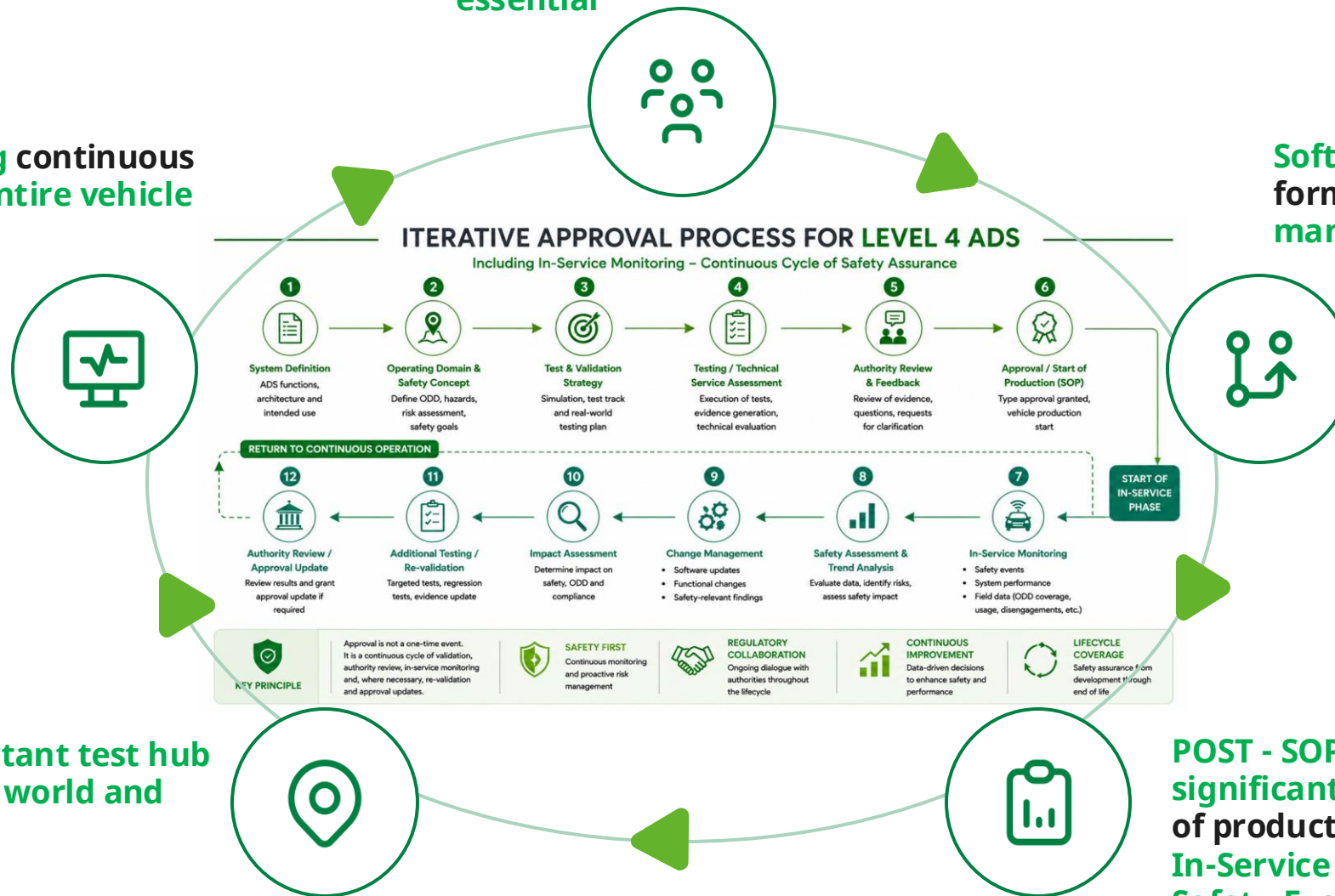
Strong cooperation with European Technical Services and authorities essential

Safety monitoring continuous throughout the entire vehicle lifecycle

Software changes require formal change management

Europe as an important test hub for mandatory real world and test track testing

POST - SOP obligations increase significantly: beyond conformity of production (CoP); continuous In-Service Monitoring (ISM) and Safety-Event Reporting (SER) are required.



DEKRA perspective on an Iterative Approval Process for Level 4







Driving Automotive Cybersecurity with UN R155 - A DEKRA perspective

UN R155: The Regulation Driving Automotive Cybersecurity



UN R155 is a UNECE regulation that requires vehicle manufacturers **to implement and maintain a lifecycle cybersecurity management system to identify, manage, and mitigate cyber risks as a condition for vehicle type approval.**

However, the implementation of UN R155 also reveals several ongoing challenges



Growing cybersecurity requirements increase the need for robust validation and compliance processes.



Translating regulatory requirements into product-specific cybersecurity measures remains a key challenge.



Clear and scalable compliance testing strategies are becoming a critical success factor.



Close cooperation between OEMs, technical services, and authorities is fundamental for efficient approvals.



Market surveillance is expected to drive additional cybersecurity verification and testing activities beyond initial type approval.

Fast Track to UN R155 Compliance



UN R155 makes cybersecurity evidence a key part of vehicle type approval. DEKRA V-Sec PRO structures testing & evidence for a faster, more efficient approval process.

What V-Sec PRO brings to customers



Full UN R155 Coverage:

Structured evidence ready for type approval.



Lower Compliance Effort:

Reuse one tool across products and projects.



Faster Time to Market:

Streamline testing and shorten the path to certification.

A Testing Tool Built For:



OEMs

Demonstrate UN R155 compliance for type approval.



Tier Suppliers

Meet OEM cybersecurity requirements for systems and components.



Institutions

Support cybersecurity research, testing and technical evaluation.

DEKRA Solution V-Sec PRO

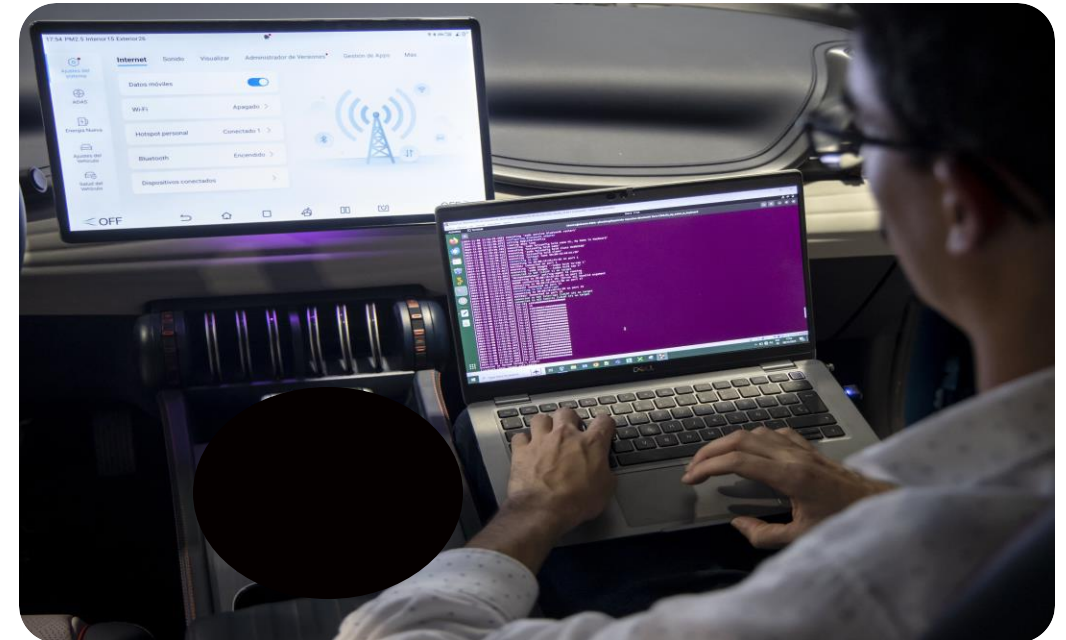
V-Sec Testing Platform

- ▶ Aligned with ISO/IEC 17025.
- ▶ Static Testing Plan aligned with R155, Annex 5.



V-Sec Studio on Real Projects

- ▶ Aligned with ISO 17025.
- ▶ Dynamic Testing Plan.
- ▶ Security analysis.
- ▶ AI implementation.
- ▶ Ability to use it in R&D projects.
- ▶ Scalable testing cases (based on projects carried out or in)





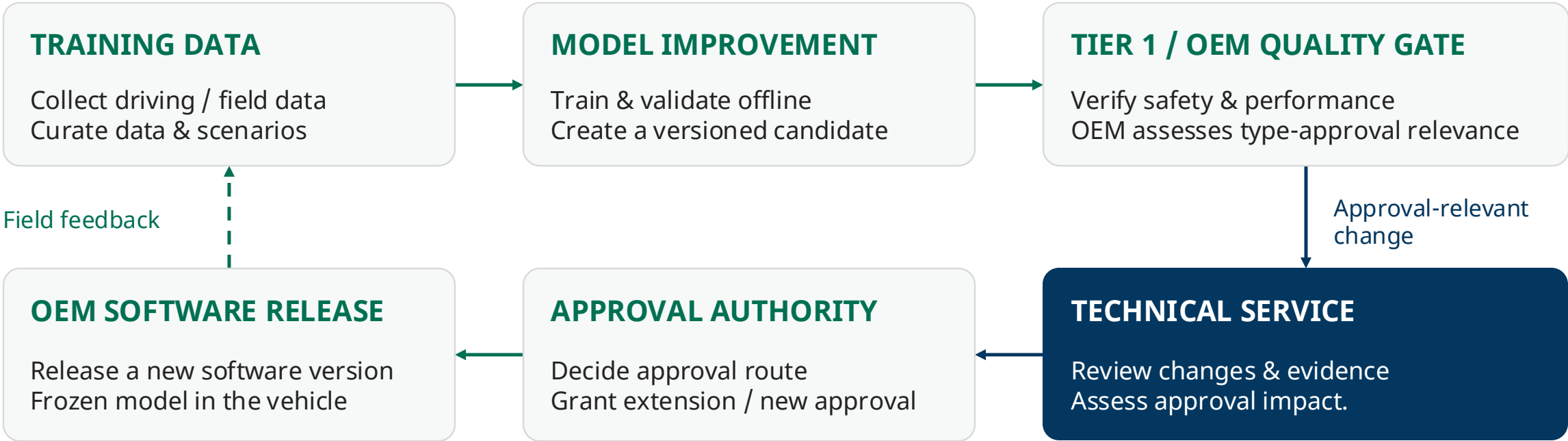
Which impact has Artificial Intelligence – A mobility usecase

AI lifecycle: the Technical Service perspective



OFFLINE MODEL IMPROVEMENT & CONTROLLED SOFTWARE RELEASE

AI inference in the vehicle. Training and model improvement offline.
No continuous self-modification of approved functions in service



Updates without approval impact follow the documented SUMS UN-R 156 release process.

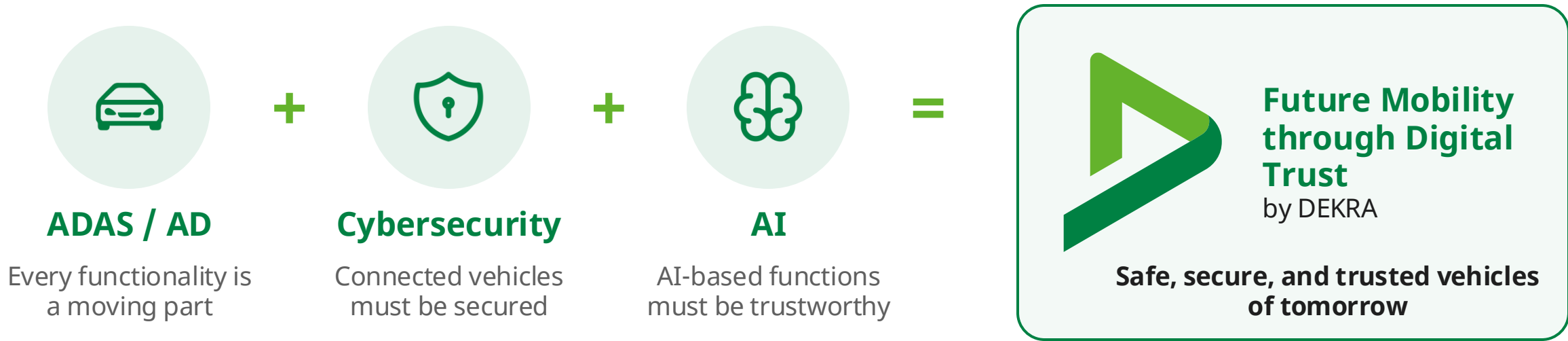
Lifecycle controls: Safety Management System under UN-R 171 (DCAS) + SUMS under UN-R 156

The Technical Service connects OEM evidence with authority decisions.

Digital Trust: DEKRA as Enabler for Future Mobility



Safety no longer stops at physical components



Consumers will only embrace the next generation of mobility if they can trust the technologies behind it.
Creating this trust through independent safety expertise has been at the heart of DEKRA's DNA for decades, making safety and security fundamental enablers of future mobility.

>100 years of automotive expertise

 ADAS / AD · Cybersecurity · AI

 Tested, verified, and certified

Thank you!

Let's shape the future of safe and trusted mobility!



Scan to connect on LinkedIn:



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Filip Klug

Head of Support Function

Deputy Manager DEKRA Technology Center