

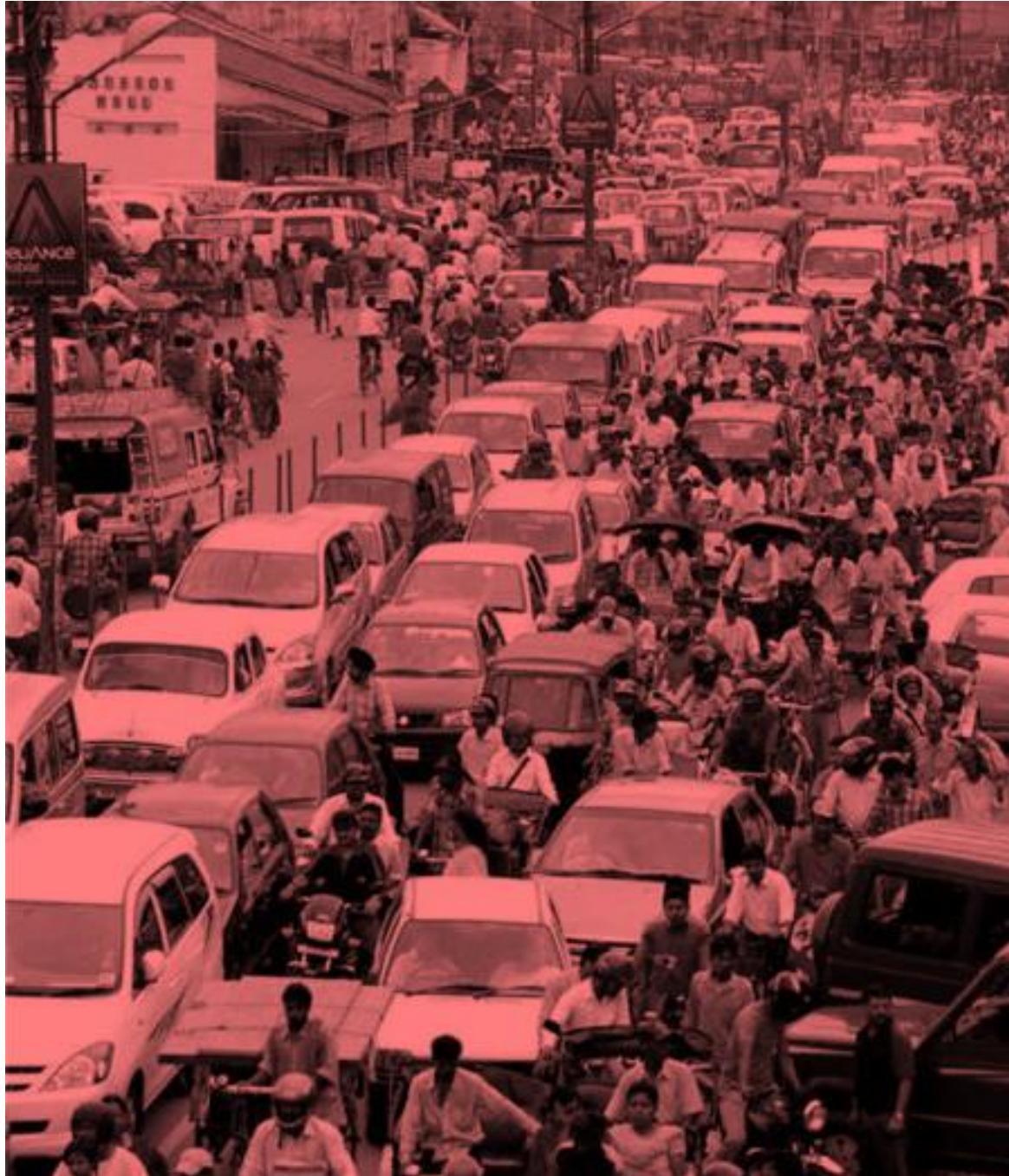


austriatech

Automatisierte
Mobilität – was
macht uns fit?

Martin Russ, AustriaTech

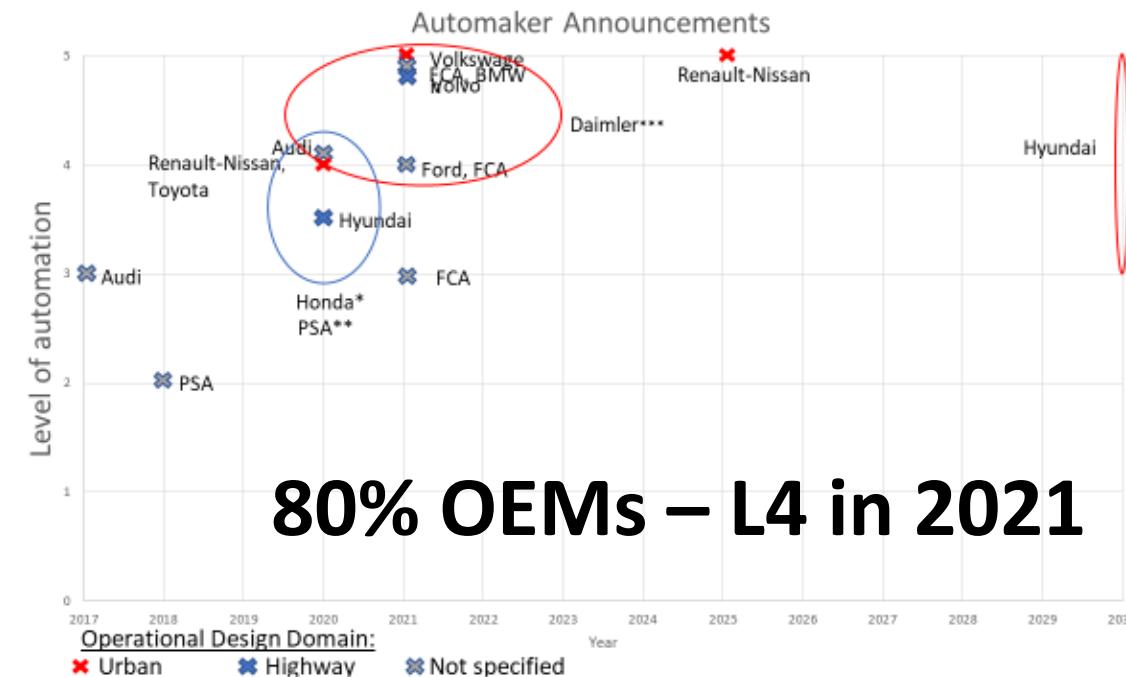
**„... notwendige und sinnvolle
Anpassungen bei Infrastruktur,
Steuerung und....**



1_Misch-Kulanz

Something Everywhere – Everything somewhere!
Durchdringende Wirkung...
Anwendungsszenarien und Erwartungen

Robo Taxi Fleets in 2030

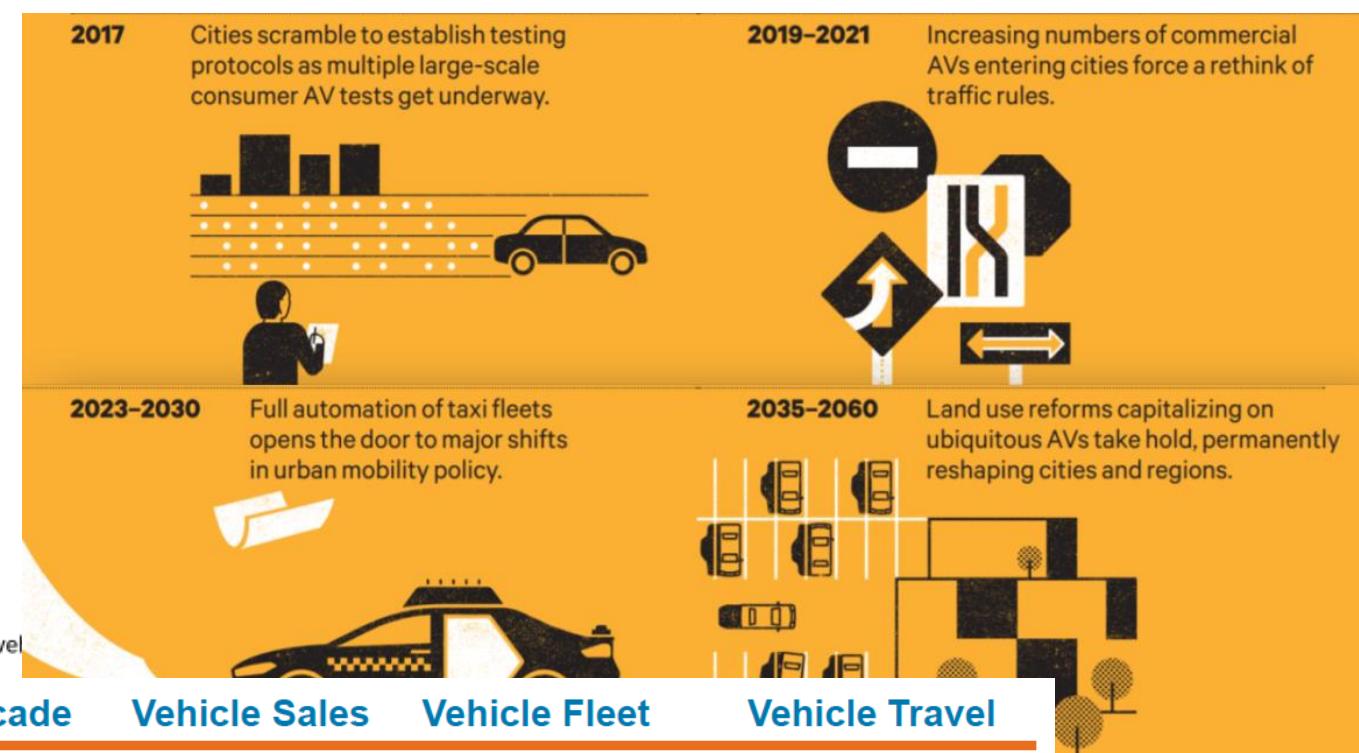


80% OEMs – L4 in 2021

*vehicles with automated driving capabilities on highways sometime around 2020

**Starting in 2020, autonomous driving functions will enable the driver to fully delegate the driving of the vehicle

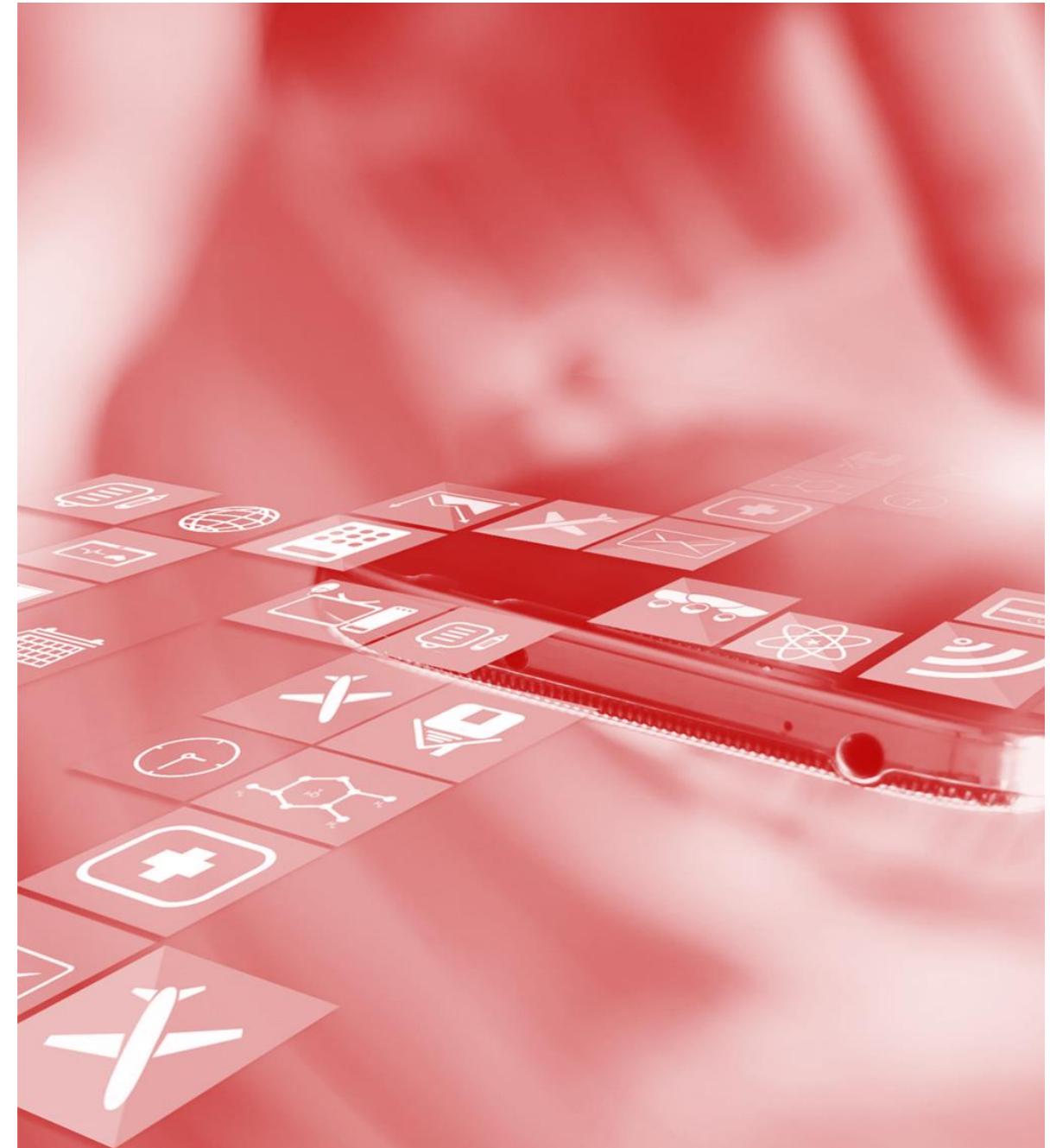
***Level 4and Level 5 driving for urban roads by the beginning of the next decade



Stage	Decade	Vehicle Sales	Vehicle Fleet	Vehicle Travel
Large price premium	2020s	2-5%	1-2%	1-4%
Moderate price premium	2030s	20-40%	10-20%	10-30%
Minimal price premium	2040s	40-60%	20-40%	30-50%
Standard feature on most new vehicles	2050s	80-100%	40-60%	50-80%
Saturation (everybody who wants it has it)	2060s	?	?	?
Required for all vehicles on road	???	100%	100%	100%

2_Bausteine für ein automatisiertes Verkehrssystem

Ein Fitness-Programm nicht nur für die Infrastruktur
Anwendungsszenarien und ihr
„Lösungsbeitrag“ im Zentrum

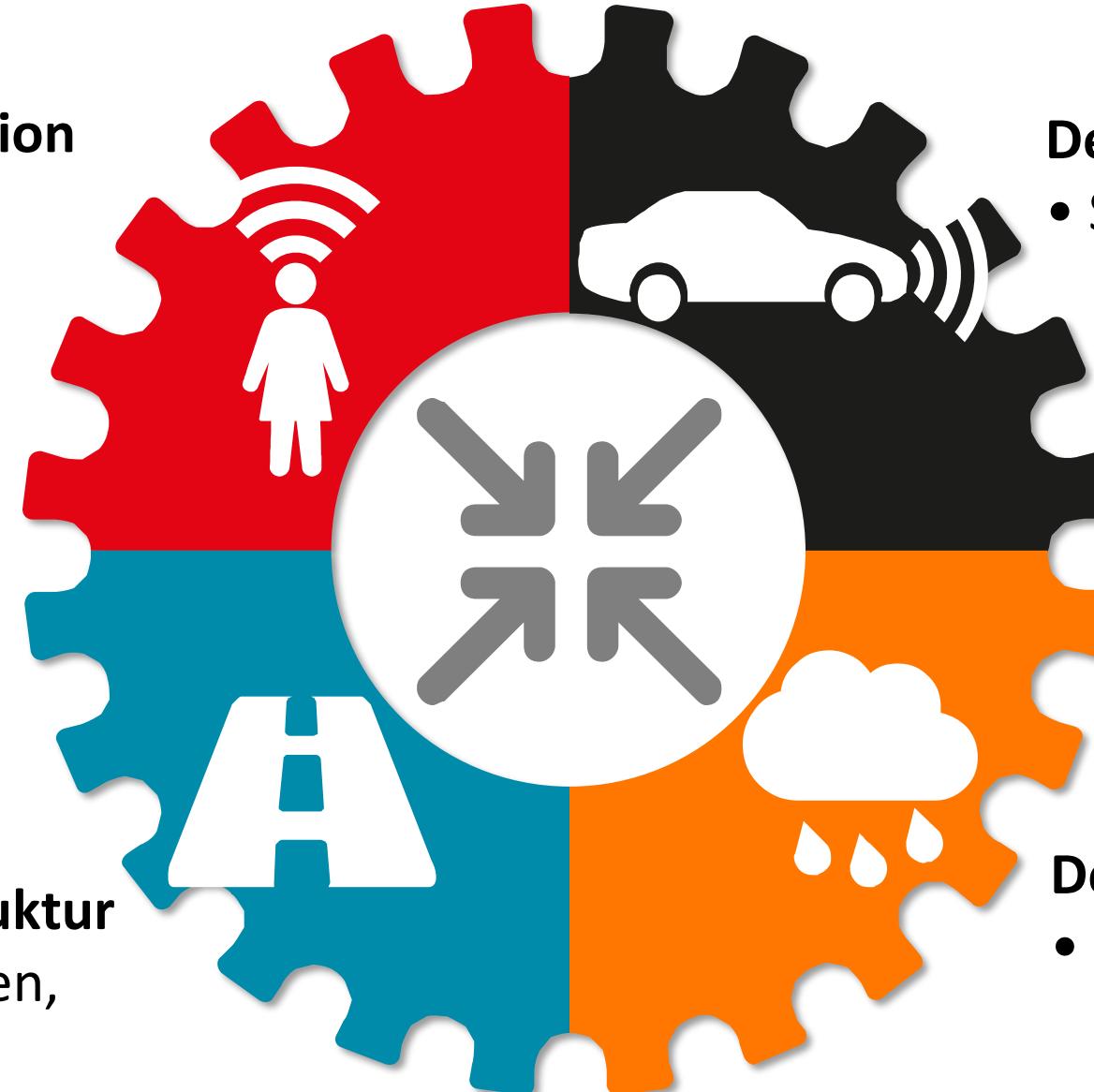


Design der Interaktion

- Visual, Akustisch,

Design der Infrastruktur

- Querchnitte, Spuren,



Design der Fahrzeuge

- Shuttles, Pods,

Design der Manöver

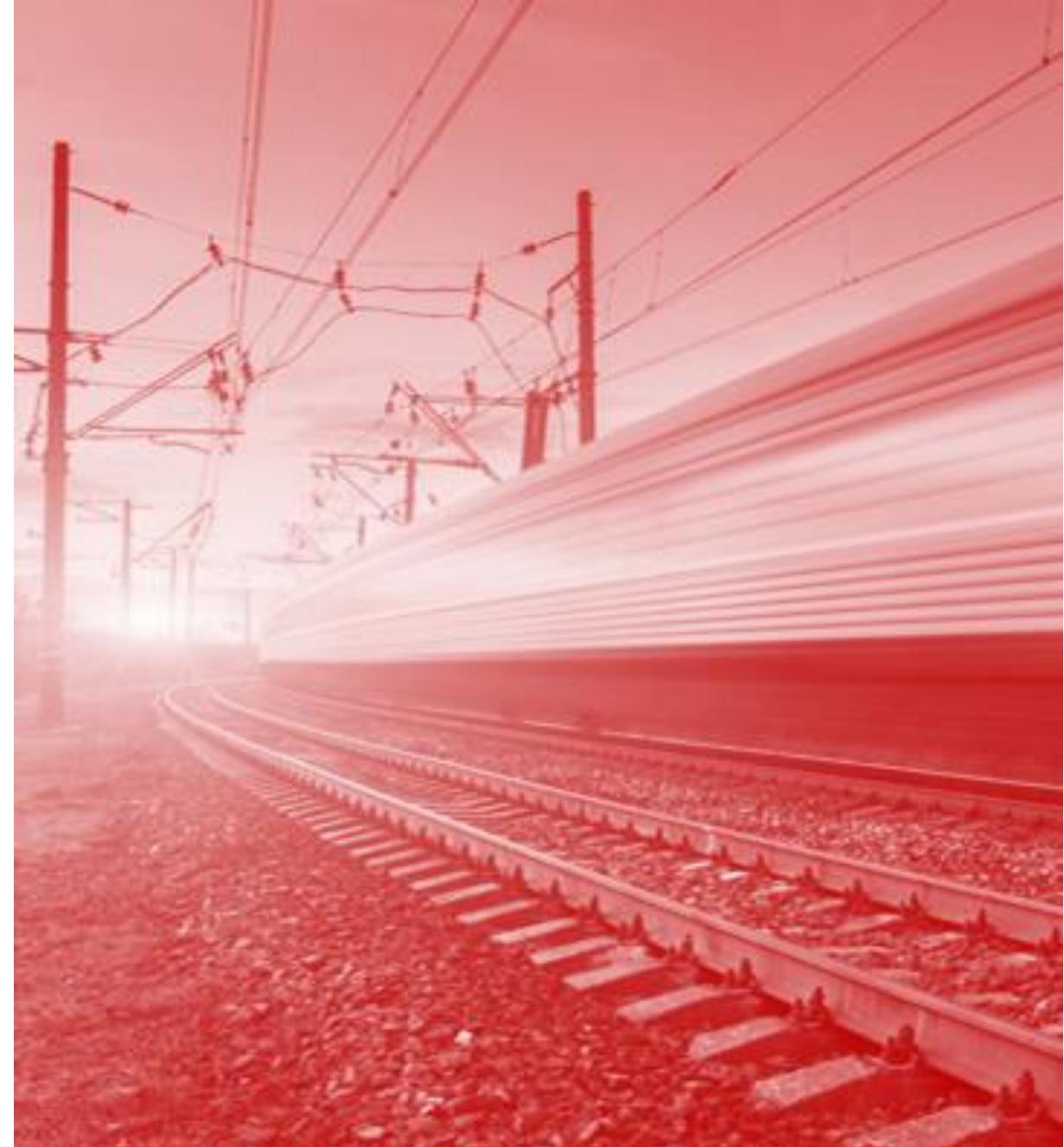
- Annäherung, Beschleunigung

Ausgewählte Bausteine

	Lane Markings	Curb Usage	Stations & Stops	Network Planning	City Planning	Test site/Test Track (Topology/Topogra- phy)	SUMP integration	Link to energy, land use, ...	Road Design Standards	Reference points		
Physical Infrastructure Layout and Planning												
Components and Vehicle Technologies	Lidar	Radar	Cameras	Optics	Sensor Fusion	AI	Customer Interfaces	Propulsion	Charging	Positioning	High performance Computing	
Digital Infrastructures & Connectivity	LTE	V2X	DSRC	E-Horizon	ITS-G5	5G	Cloud Services	DTI Inventory map				
Traffic & transport services	C-ITS D1	C-ITS D1.6	RTT	Booking & Ticketing	Fleet management	In-Vehicle Services	Incident MM	MaaS Integration	Trip-Planning	On-demand Service provision		
Data Management and APIs	Test Data Platform	Vehicle Black Box	Collect & Analyze	Open Standards Data Categories	Back Office Services (Billing, Payment, Evaluation)	B2B (OEM, TMC, Insurance, Fleet)	B2G (Municipalities, Federal Govs.)	B2B/B2G (Road Operations, TMC, Training Data)		Data Source Combination (FRT, Test/actual)	Interoperability with other modes	
Legal and Regulatory and Institutional Framework	Vehicle Type Approval	Vehicle registration	Use Case Definition	Operational Duties	Test Approval/	Spatial & time limits	Test-Pre-Conditions	Driving license	Commercial law	Competition law	Procurement Law	
Risk Management and Risk Mitigation	Risk MM Strategy	Risk Assessment	Risk Mitigation Plan	Methods/Processes	Site Assessment	Training	Weather, Climate, environmental conditions					
Traffic Safety	Passive Safety	Active Safety	Vulnerable Road Users	Traffic Safety KPIs	Road Safety Audit	Public transport	Disengagements					
Digital Security and Privacy	Data protection & privacy	Safety & security concepts	Certificate Policy (CP)	Security Policy (SP)	Security Infrastructures (PKI, ..)							
Liability & Insurance	Public Transport License	Reliability	Inspection	Enforcement	Product liability							
Vehicle Concepts and Integration	Vehicle Types L1/L2	Vehicle Features	Vehicle Features & limitations	Compensation measures	Vehicle Capabilities	Transport system (other modes)						
Operations & Manoeuvres	Dynamic Routing	Dynamic Route Planning	Test Planning	Scenario Evolution & Integration	Traffic management Plans	Trial Guidelines	Mixed Traffic	Traffic situation analysis	Scalability			
User interaction & Experience	Operator Training	Driver Training	customer Interfaces	User Experience	User Groups integration (handicapped/ children, ..)	Service level agreements	Public Awareness & social interaction					
Business models & shared value/responsibility	Cross Sector/New Partnership	Niche Market Development	Involvement of Road operator	Involvement of Police	Shared Mobility perspective	Policy principles	Pricing Aspects					
Specific Benefits & Impacts (Evaluation KPIs)	Crash Reduction	Behavioural Aspects & social acceptance	Environmental Aspects	Traffic Flow	Evaluation Guidelines	Simulation	Target oriented Monitoring Guidelines	User Acceptance	Impact Assessment (environmental/ spatial/economic/ mobility system...)			
Reporting	On Demand	media	Periodic Reports	Standardised reporting	Final reports	Who reports to whom? For what purpose?						
Institutional capacity	National contact point	Trustworthy entity	Institutional framing & responsibility (one-stop-shop)	Capacity building with institutions	Stakeholder Management/ Balancing Interests	Policy Intervention Tools / Steering						

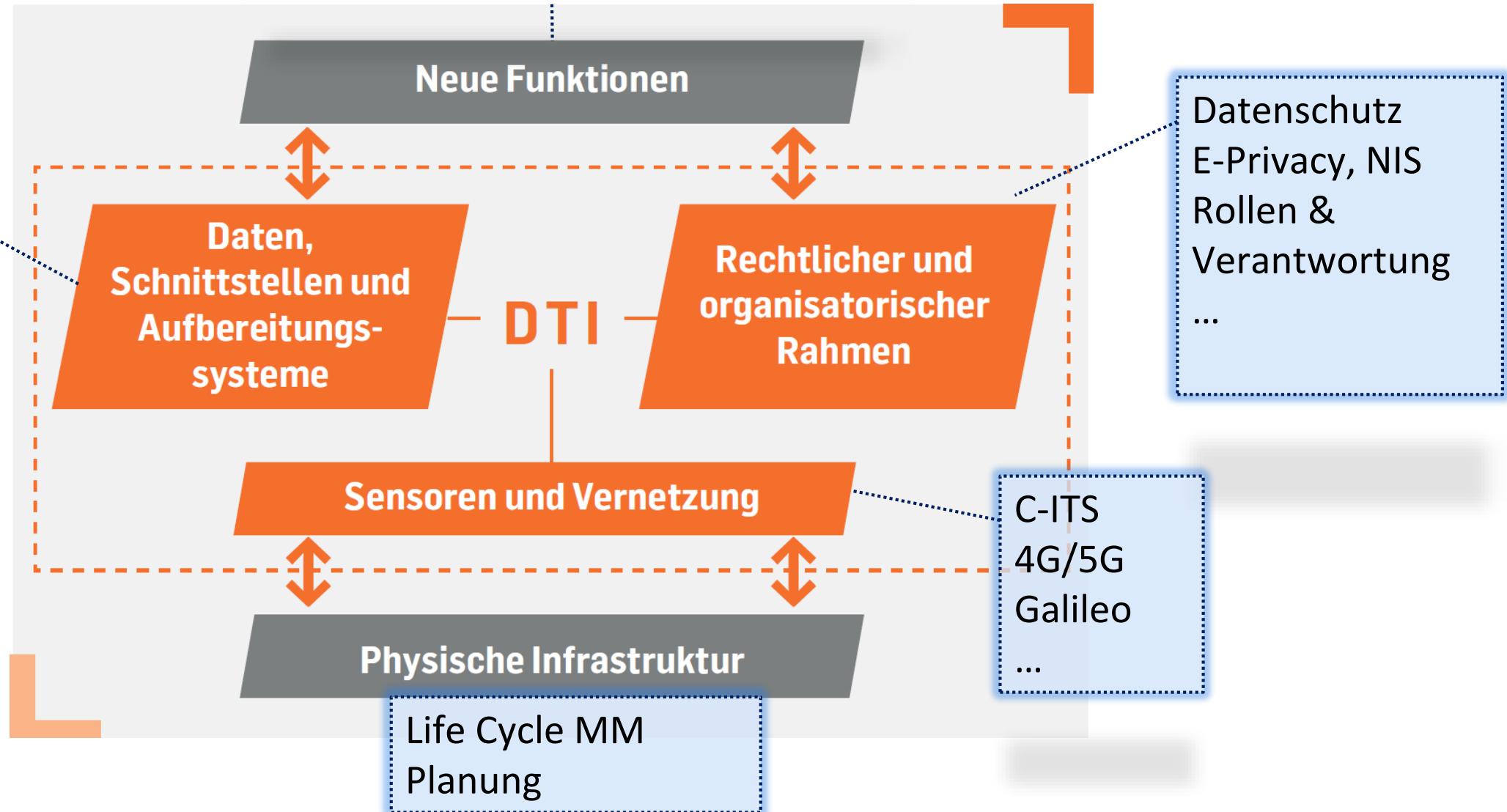
3_Digitale (Verkehrs-) Infrastrukturen

Neue Grundlagen
Neue Zuständigkeiten
Neue Funktionen
Und was vom Alten lassen wir weg?



Modular, Adaptierbar, Skalierbar,
Sicher, Redundant, Interoperabel, ...

Data trust
Quality
Sharing &
Access
Analytics



Was ist dabei wichtig für CCAM:

- Einigung auf **DTI Elemente** and Attribute mit entsprechender Relevanz
 - Funktionen/Levels/Use cases
- **Standardisierung** von Attributes und vorhalten eines Electronic Repository
- **Quality of Service (QoS)**

4_Digital, vernetzte & kooperative Steuerung

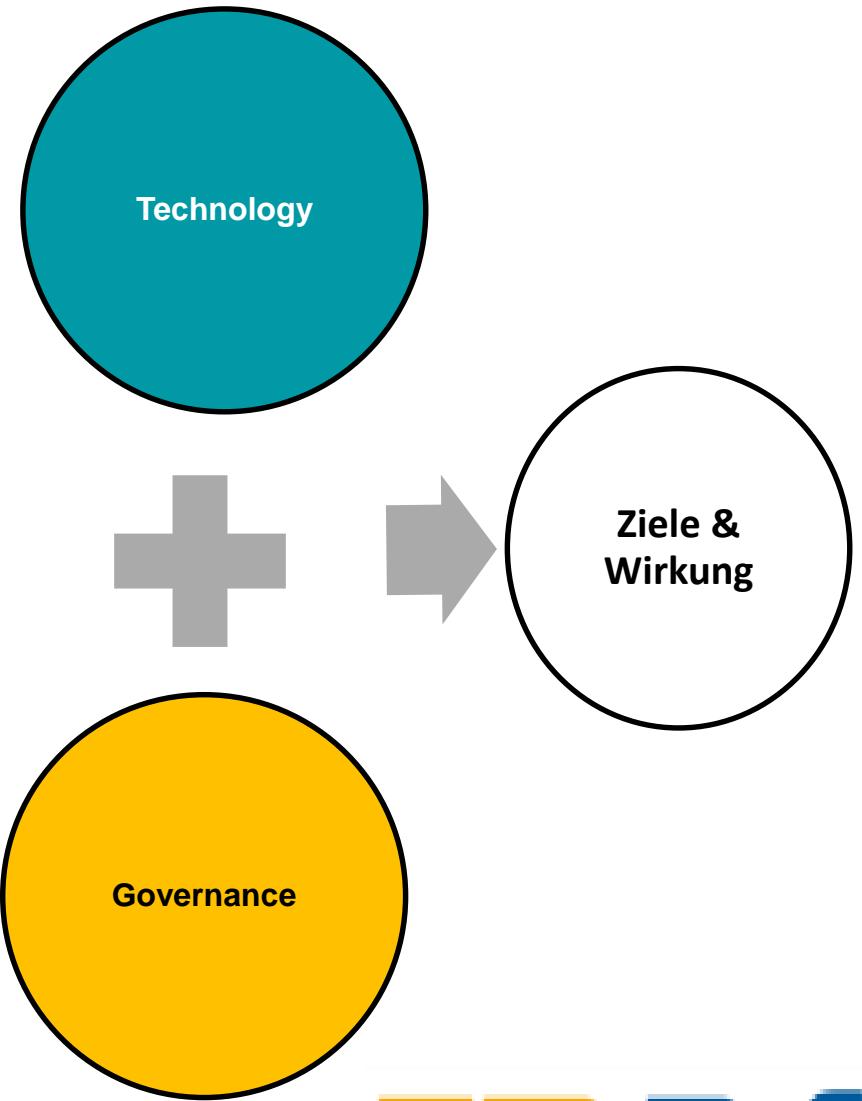
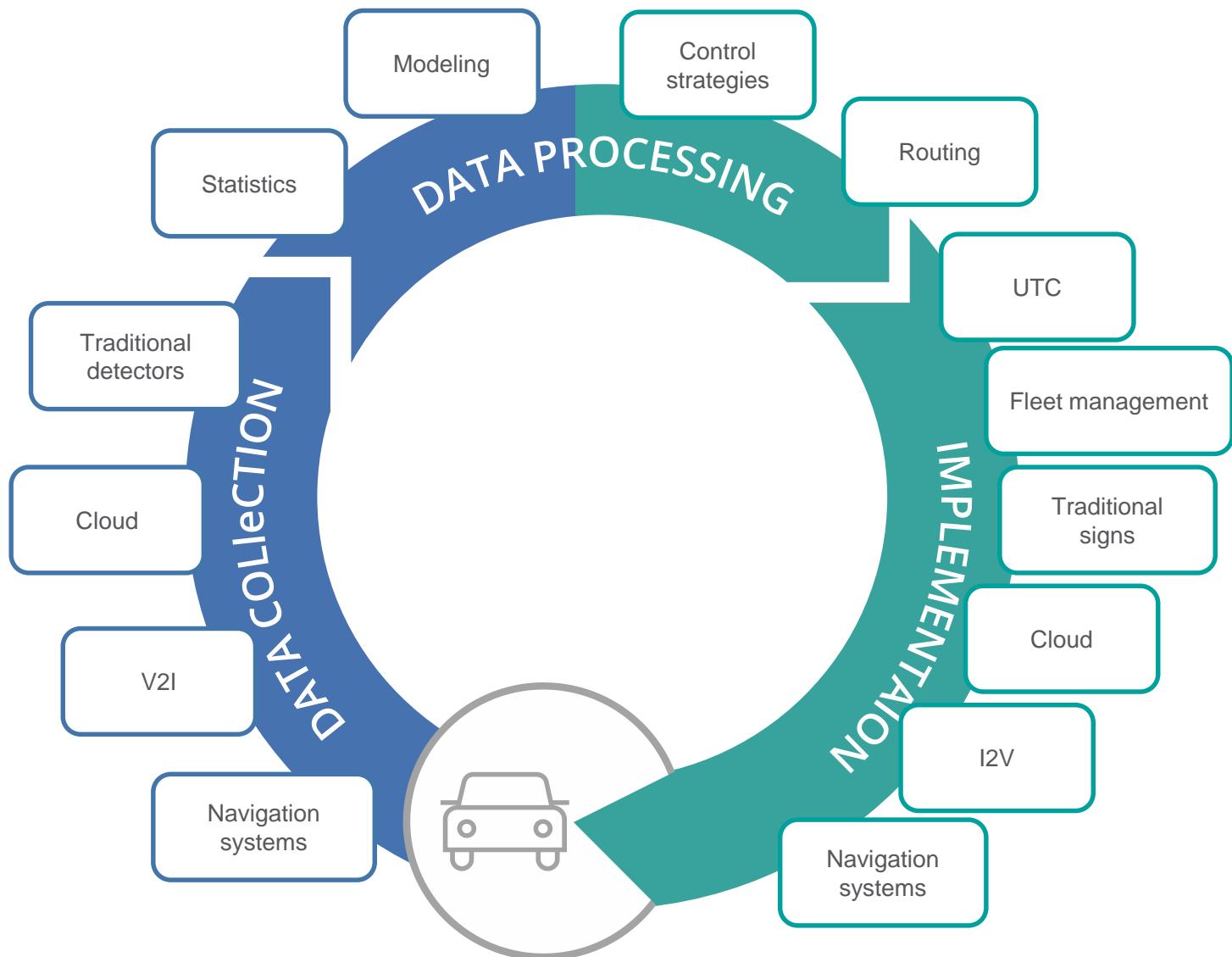
Kapazitätsmanagement

Makro & Mikro

Korridore und Hubs

Personen und Güterverkehr

Im GROSSEN...



TM2.0 – ISA for CAD

Function	Necessity	Justification
Automated flow data collection	must	A system can only be dynamic when data is collected, processed and the results transferred automatically
Automated data processing	must	idem
Automated decision making about the speed limit	must	Idem; although
Automated update of digital infrastructure	nice	Changes in the infrastructure
Continuous connectivity along the segment	must	Necessary to c vehicles
Availability of highly accurate maps	nice	Accurate locali
Good lane markings condition	n.a.	If speeds are communicated to the vehicle by TMC's, no lane markings are needed
Dense location referencing points	nice	Accurate localisation is not so important for ISA

??

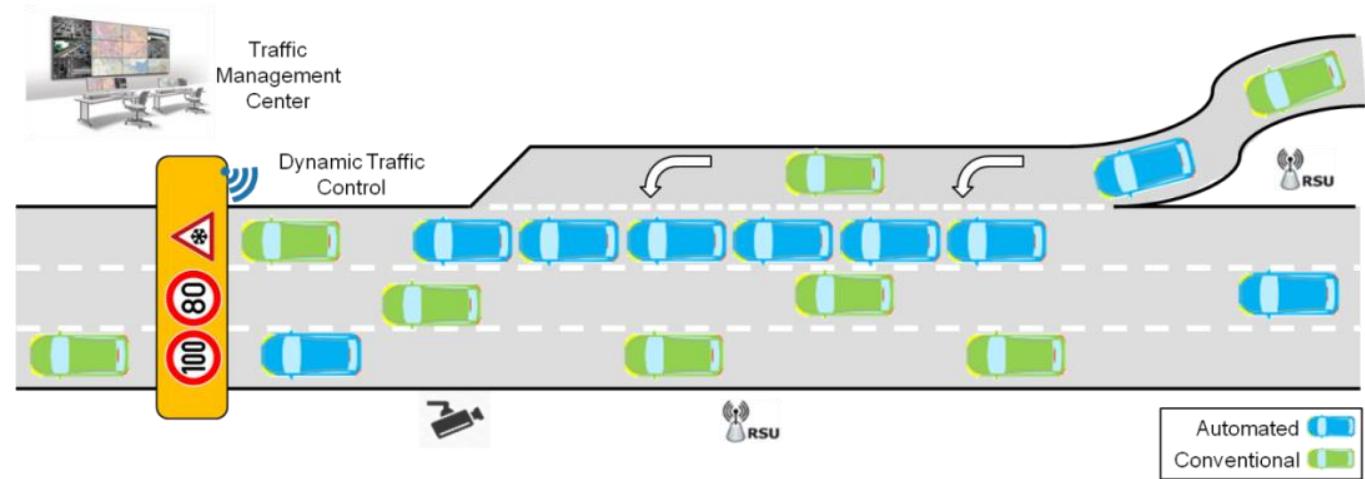
Für spezifische ADAS Funktionen
Für unterschiedliche SAE Levels
Für unterschiedliche Use Cases

Preparing Road infrastructure for mixed vehicle traffic flows

- **Aim:** help to prepare road infrastructure to support the coexistence of conventional and automated vehicles
- **Key outcome:** “hybrid” road infrastructure & simulation tools
 - able to handle the transition period and
 - become the basis for future automated transport systems
- **Start und duration:** 1 June 2017 - 31 May 2020
- **Partners:** AustriaTech (Coordinator), ICCS, ASFINAG, Fraunhofer, Siemens Austria, VIRTUAL VEHICLE, Technical University of Crete, Abertis Autopistas España, Enide Solutions, TomTom Germany, BMW

Coexistence of conventional and automated vehicles

- Develop, implement and validate **traffic control algorithms** for mixed vehicle traffic
- **Design, adapt and test physical** and **digital elements** of the road infrastructure
- Development of an **infrastructure classification scheme** for ART

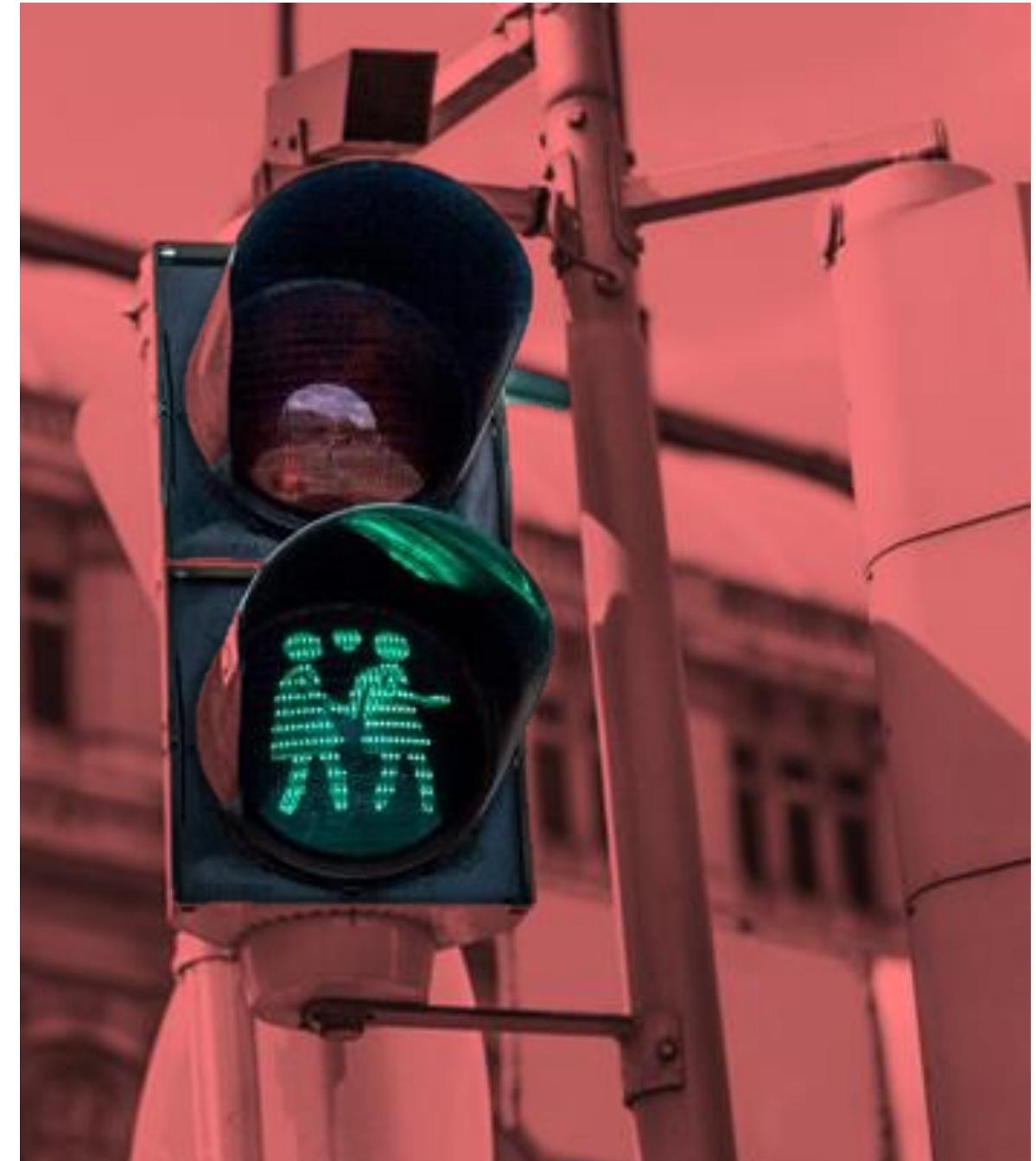


Scenarios:

- **Dynamic lane assignment**
- **Roadworks zones**
- **Bottlenecks**

5. Infrastruktur nachhaltig nutzen

Ein teil unseres nationalen Fitness - Programms



...Im neuen Aktionspaket der Bundesregierung

Netzverfügbarkeit
sicherstellen Anpassung
physische & digitale Infra inkl.
Verkehrsmanagement



**Straßengestaltung,
Querschnitte, Mobilitätsknoten**



**Digital Repository – Bedarfe
und Möglichkeiten**



**Bedarf C-ITS (Day 1, 1,5 & 2)
und DTI für CCAD**



**Infrastruktur Support Levels
(ISAD) festlegen**



**Konnex zu Mensch-Maschine
Interaktion**



Für Ihre Fragen und Anliegen

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