



2021



TechShow

*Around the World. **Mobility.** Our Heartbeat for 150 Years.*

The digital guardian angel

How connectivity helps to avoid crashes with vulnerable road users such as cyclists or pedestrians

Dr. Johannes Springer, Deutsche Telekom / T-Systems
Dr. Frank Försterling, Continental

Vulnerable Road User Protection

Safety Statistics & Market Needs



1.35M road deaths worldwide annually

50%+ of the fatalities are pedestrians, cyclists, and motorcyclists

(WHO, 2018)⁴

3 out of 4

fatalities happen on open roads (not at intersections)

Every 84 Minutes

A pedestrian is killed in a traffic crash

Every 7 Minutes

A pedestrian gets injured in a traffic crash

(US DOT, 2020)¹¹



Vulnerable Road Users Protection

Challenges of Cities



VRU Protection Integrated approach

Connected VRU Protection

VRU Protection based on **Cloud** solution

- Based on 5G / MEC (low latency/managed Network)
- **Flexible hotspot allocation** via dynamic geofencing
- Involved "parties": all vehicles, all VRU's with 5G device



VRU Protection based on Intelligent **Infrastructure**

- Based on V2X technology, infrastructure upgrade (Cam, Radar, ..)
- Safety support for local accident hotspot
- Involved "parties": infrastructure, V2X enabled devices (vehicles, buses, ..)

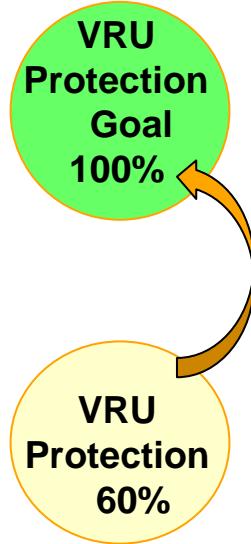


Vehicle-only VRU Protection

- Based on in-vehicle sensors
- No connectivity
- NCAP capable
- Integrated features (examples):
 - Blind Spot Detection,
 - 360-degree surround view
 - Right-Turn Assist



Accident Prevention



VRU Protection

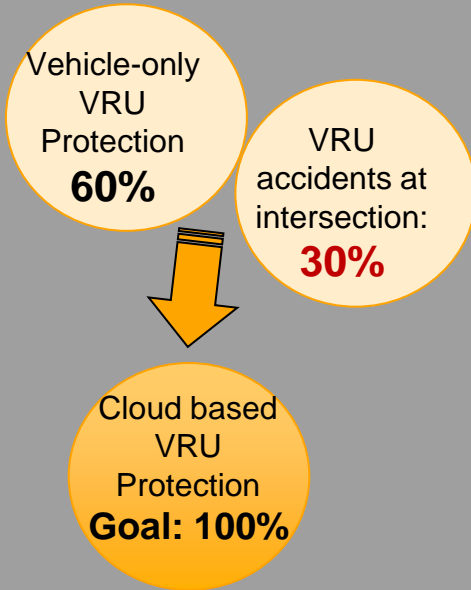
Critical Use Cases – Overview (References)

	Running Up	Turning	Crossing	Oncoming
Car vs Motorcycle	2%	21%	31%	11%
Car vs Bicycle	47%	5%	35%	6%
Car vs Pedestrian	26%	4%	59%	
Truck vs VRU	27%	12%	40%	
Other Use Cases				
Parking		Construction Area		
Dooring		PT AV dispatch (on demand service)		
Tram/Rail		Confined space		

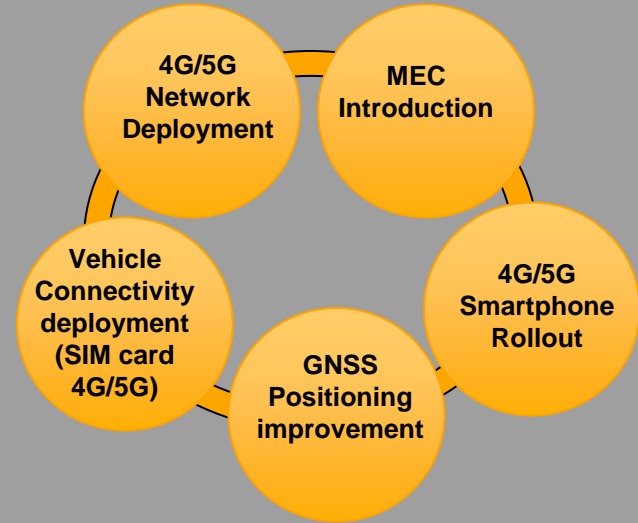
Why Cloud based VRU Protection

Towards ZERO Accident; SW & Services based solution

Increase Safety in Cities



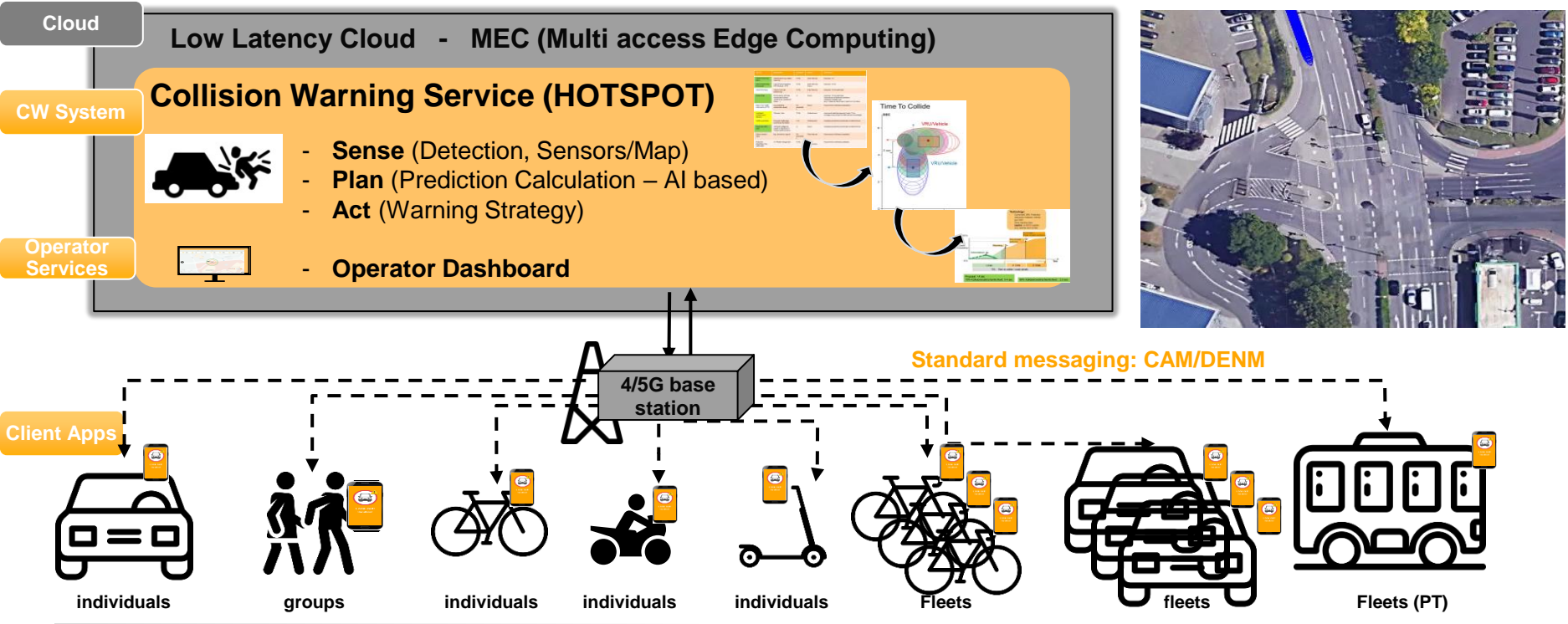
Simplify Deployment Options



HW deployment evolves independently
focus on SW & Service rollout

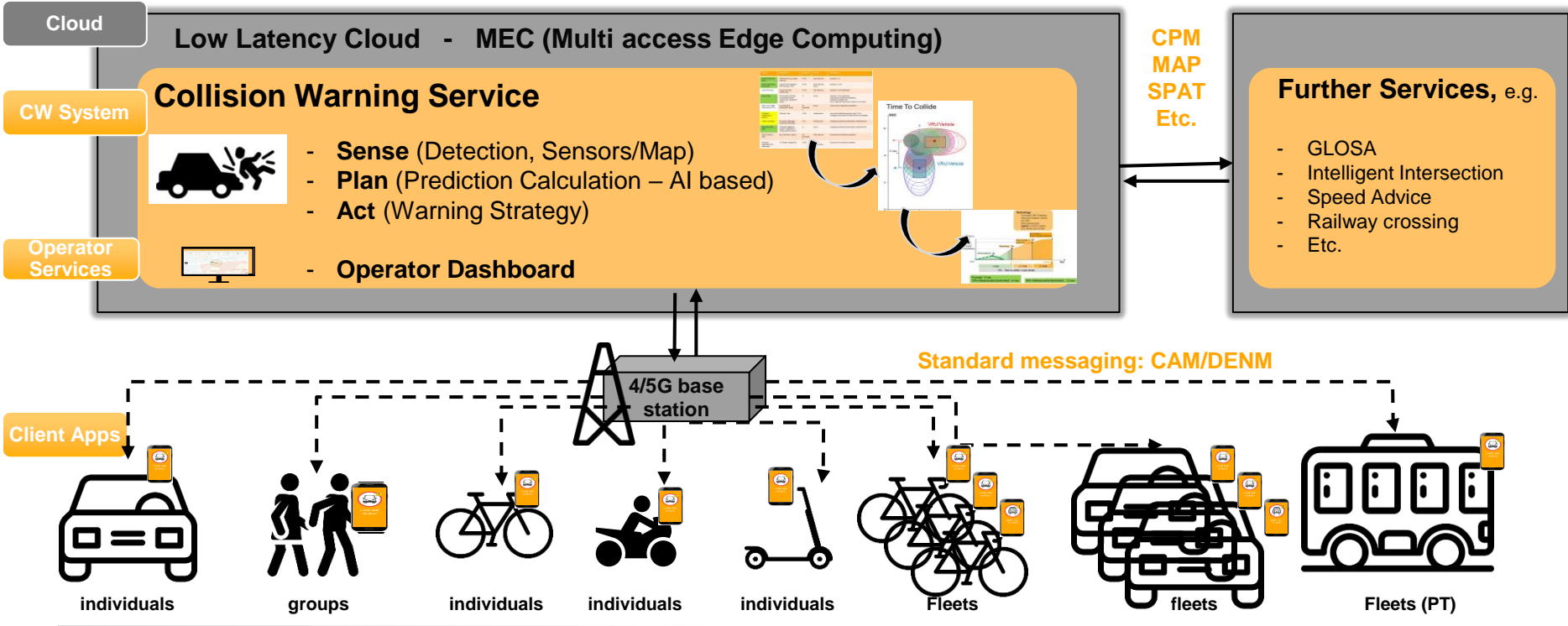
Cloud based VRU Protection

Architecture – Cloud based Solution



Cloud based VRU Protection

Architecture – Cloud based Solution / Enhancements



5G MULTI ACCESS EDGE COMPUTE ENABLES VARIOUS C-ITS SERVICES

- C-ITS Services @ MEC
- VRU Protection
- Green Light opt. Speed Advise
- Preemption
- Rail Crossing
- ... further



Bicycle detection

Time-To-Green

Driving time / Speed

Lane detection

Motorbike detection

Bicycle detection

Traffic density

Platooning

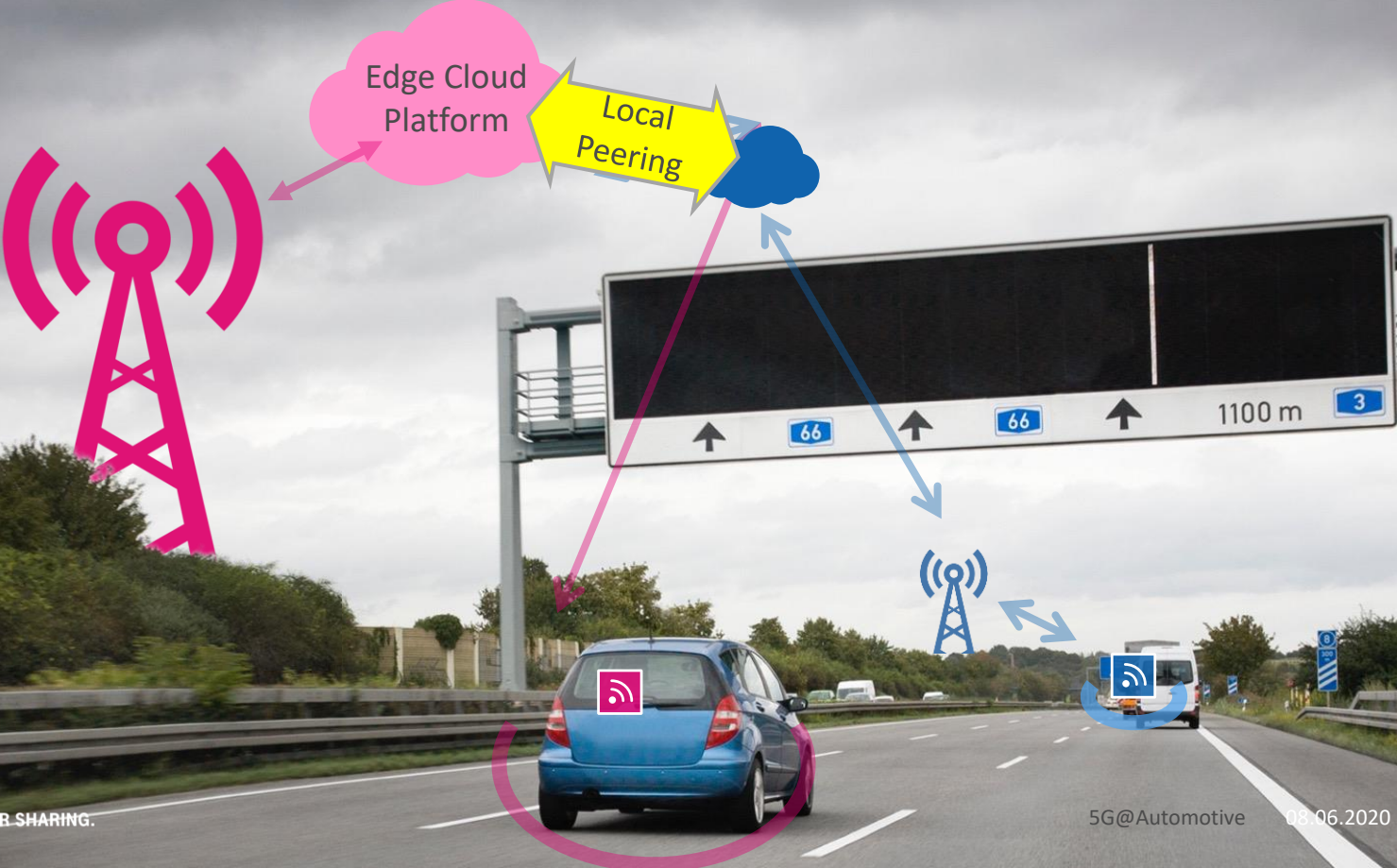


Pedestrian detection



LIFE IS FOR SHARING.

LOCAL PEERING OF MULTI-OPERATOR EDGE CLOUD SERVICES



LIFE IS FOR SHARING.

5G@Automotive

08.06.2020

Cloud based VRU Protection – The digital guardian angel

Our Highlights

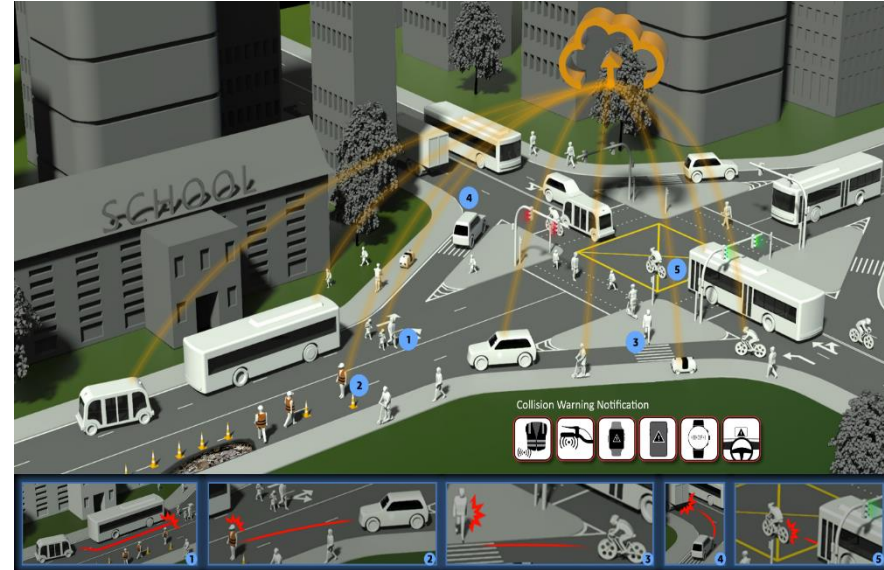
Technology: High Performance/Low Latency solution via integration of enhanced Telecom network capabilities

Deployment: simplified deployment via SW and Services driven approach; traffic infrastructure upgrade on demand

Flexibility: multitude of Use Cases, ease of integration of all traffic participants including AD Shuttles, bikers, pedestrians, last mile delivery robots

Extendability: combination with further services (like Intersection Monitoring, traffic light integration, traffic rules violation warning services)

POC: running PoC's in Asia and Europe





TechTalk **CONNECTIVITY**

Thanks For Your Attention!



VRU & RU Collision avoidance strategy → VRU group: Cyclists

