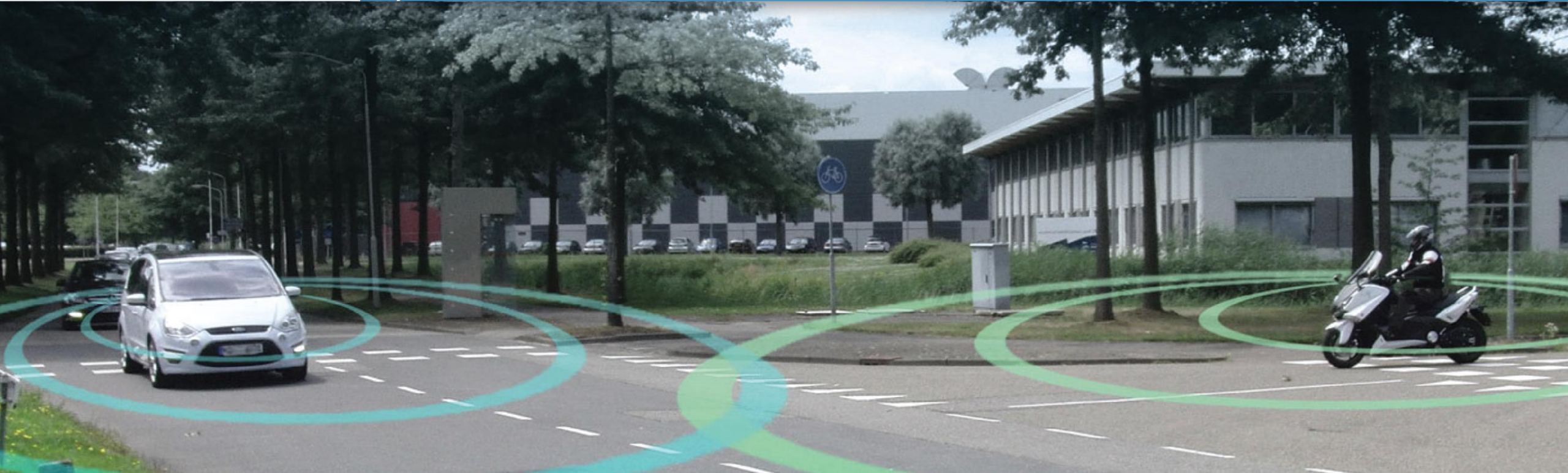




# Together for Rider Safety



Hennes Fischer YAMAHA MOTOR Europe N.V.

Fastzero25  
Arles/France  
September 2025

# CMC Introduction



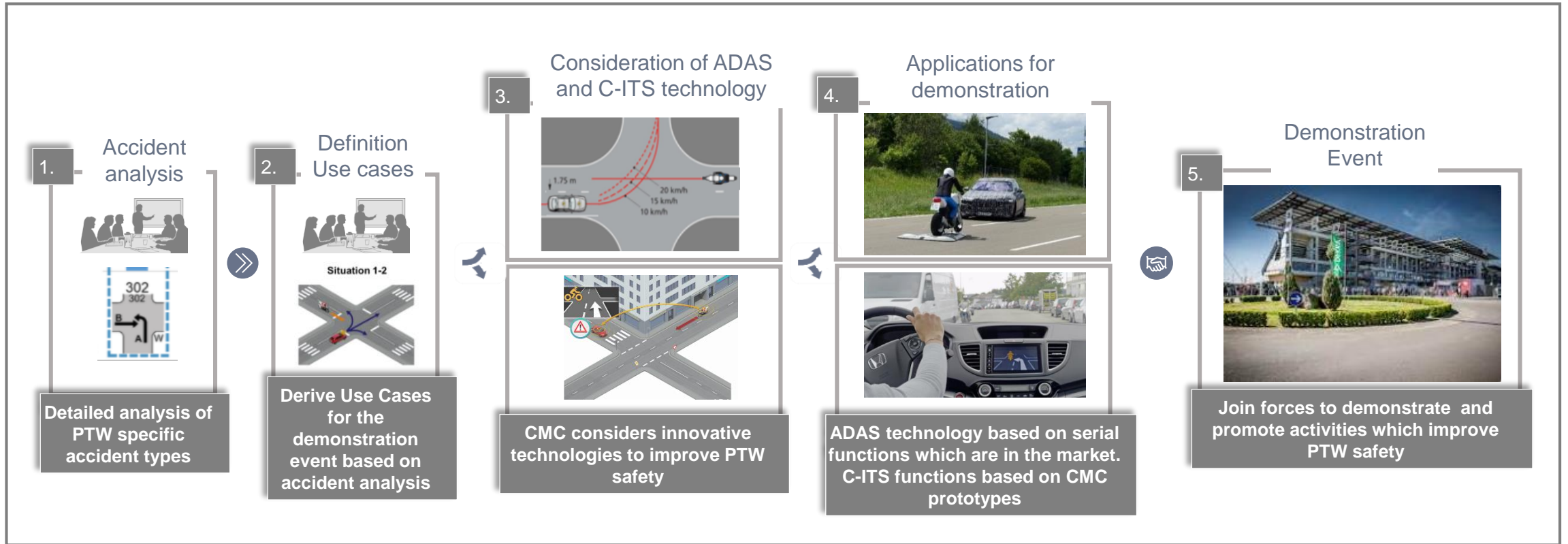
**CMC introduction video available under:**  
[https://www.cmc-info.net/uploads/b/121453783-901552788644394755/cmc\\_introfilm\\_2023\\_v3\\_678.mp4](https://www.cmc-info.net/uploads/b/121453783-901552788644394755/cmc_introfilm_2023_v3_678.mp4)

# CMC phases & achievements

- **CMC 1.0 (2016 - 2020)**
  - **BS 1.0**
  - Test case definition for relevant safety use cases
  - Setting of functional requirements
  - Define architecture of C-ITS unit
- **CMC 2.0 (2021 - 2023)**
  - **Live Demo Event**
  - Additional focus on ADAS and C-ITS
  - Accident study (in depth) Simulation & Application
  - Rider Reaction study - Accident study Europe, US, Japan
- **CMC 3.0 (2024 - 2026)**
  - Basic academic research in the context of C-ITS and ADAS technology
  - Further standardization activities
  - Strengthen cooperation with infrastructure stakeholders
  - Strengthen cooperation with other relevant road users

# CMC Approach to improve Motorcycle safety

## CMC Use Case Driven Approach



# Why don't drivers see motorcyclists?

- First motorcycle in-depth analysis using GIDAS



- Understand dynamics and accident **key factors** of motorcycle ↔ car
- Rate potential of C-ITS and ADAS technology for typical motorcycle accidents



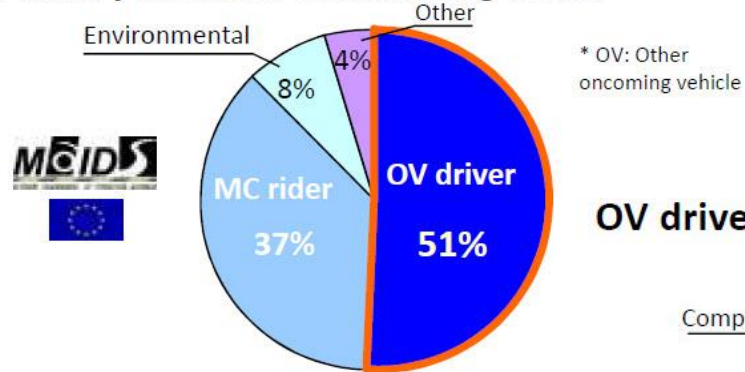
*So why do car drivers crash into motorcyclists...?*

1. Drivers don't know where to look for motorcyclists
2. The small size and unexpected nature of motorcycles make them harder to identify
3. It can be hard to judge the speed and distance of narrow motorcycles

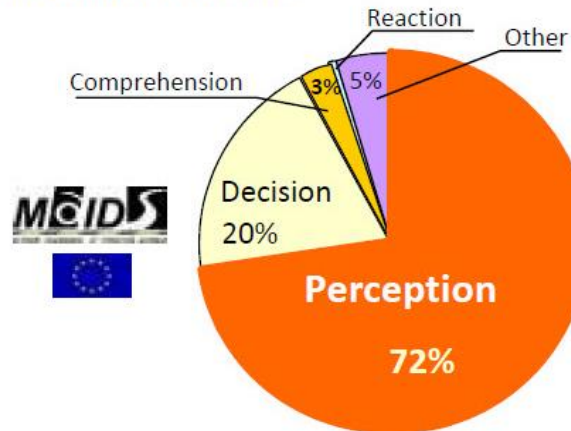
# Motorcycle safety – the hard data

## Motorcycle traffic accident factor analysis

### Primary accident contributing factor



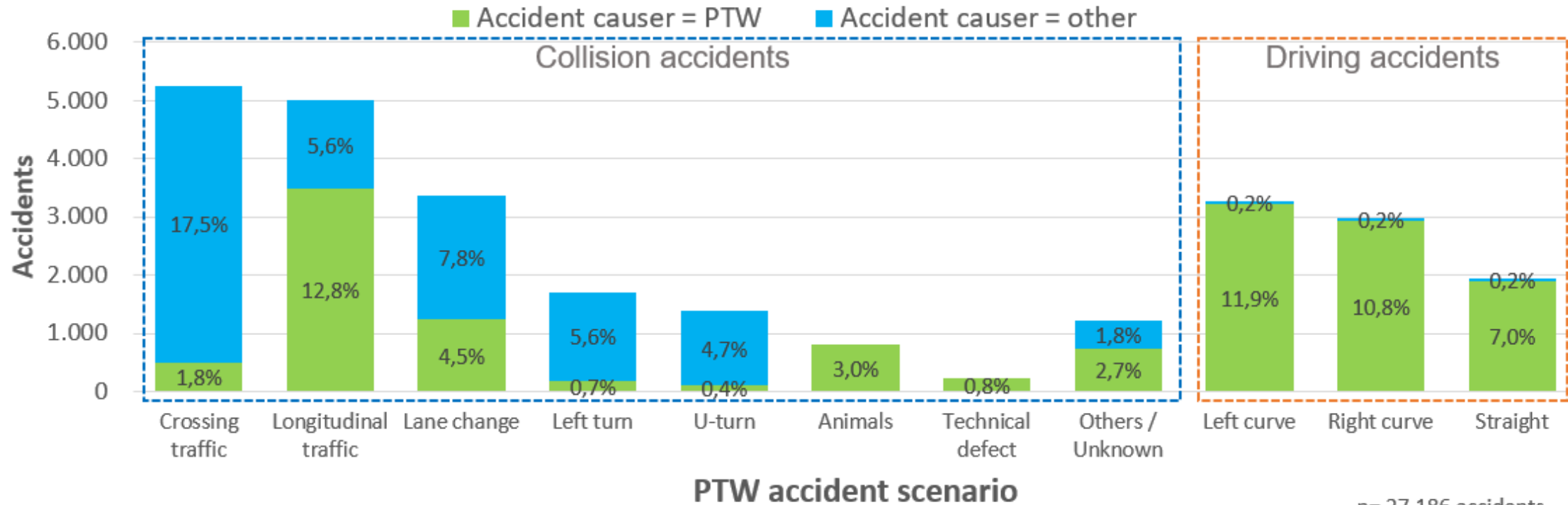
### OV driver failures



MAIDS accident causation data – perception failures



## Accident causation in the PTW scenarios



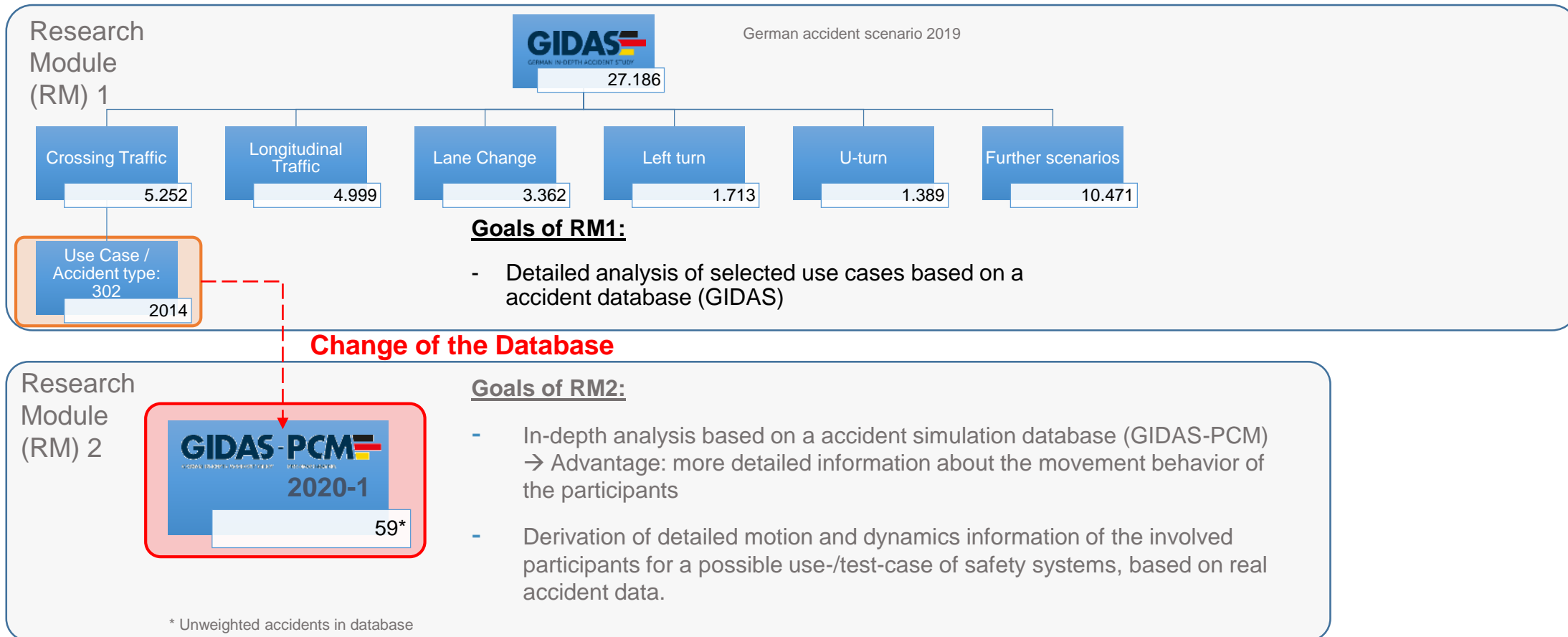
n= 27.186 accidents

Data source: GIDAS data on PTW accidents; 2005-2019

TOP 4 accident types: Crossing, Longitudinal, Lane change and Left turn

# In depth accident research method

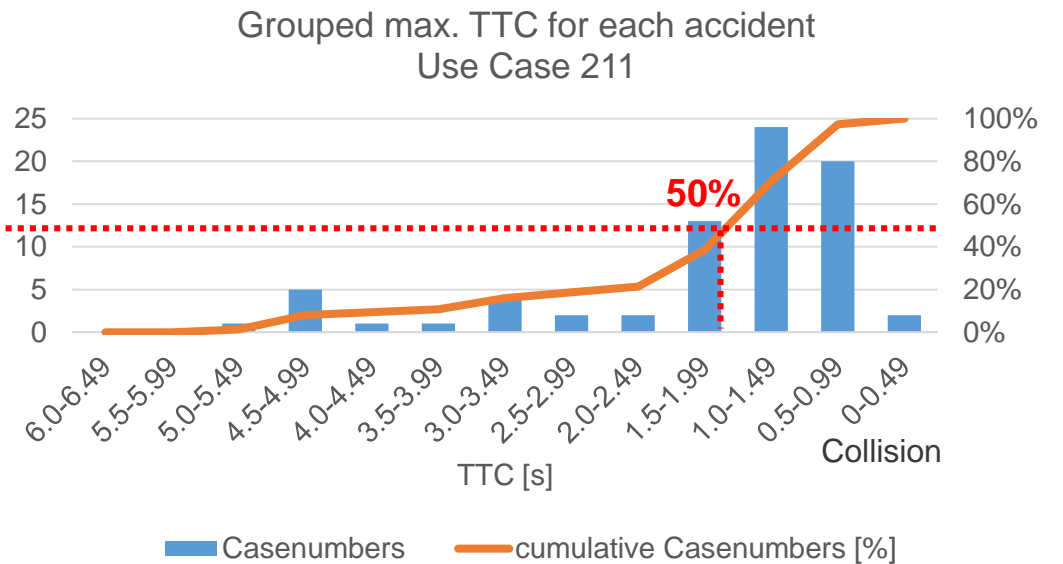
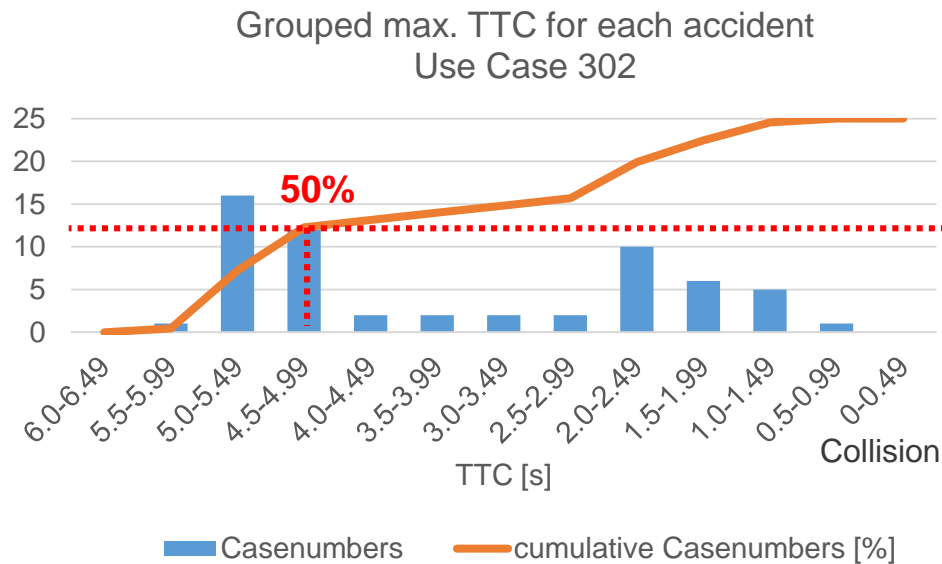
- Difference of RM 1 and RM 2:



# TTC – Analysis Result

- Comparison Use Case 302 (crossing) and 211 (left turn)




- The graphs show the calculated max. possible TTC per accident.



- In Use Case 302, an max. TTC greater than 4.5 sec. before collision could be calculated in 50% of the accidents.
- This can mean, for example, that a system can warn the rider already **4.5 sec.** before collision in 50% of the accidents.

- In Use Case 211, an max. TTC greater than 1.5 sec. before collision could be calculated in 50% of the accidents.
- This can mean, for example, that a system can warn the rider only **1.5 sec.** before collision in 50% of the accidents.

## Lessons learned

<b>IGLAD</b> 	<b>CRSS</b> 	<b>ITARDA</b> (macro data) 
<ul style="list-style-type: none"> <li>• Accident scenarios of Germany (GIDAS) and European Countries (IGLAD) are very similar</li> <li>• Similar accident events in GIDAS and IGLAD (regarding location, velocities, road use, road conditions, ...)</li> </ul>	<ul style="list-style-type: none"> <li>• Valid comparison of scenarios in GIDAS (Germany) and CRSS (US) – after adjustment of accident type (GIDAS) and crash type (CRSS)</li> <li>• Tendency to higher speed limits in CRSS (due to the focus on highway accidents)</li> </ul>	<ul style="list-style-type: none"> <li>• Rough comparison of scenarios in GIDAS (Germany) and ITARDA (Japan) so far – analysis is currently being processed together with ITARDA (micro data)</li> </ul>

- Several (in-depth) data sources are available for comparison of PTW accidents in different regions
- Different definitions of critical situations and scenarios must be taken into account, resp. converted
- Comparable ranking of accident scenarios was found

**→ The CMC Approach to use the GIDAS in-depth data for several analyses was the right decision. The analysed accident scenarios are comparable to the global PTW accident occurrence**

## C-ITS

- C-ITS enables information exchange between road users in real time and critical situations can be recognized early on
- C-ITS technology is capable to display warnings on which the drivers/riders have to react also if the view is obstructed
- C-ITS PTW applications are in a prototype stage and have been developed by CMC members
- CMC specifications grants compatibility with other C-ITS applications

## ADAS

- ADAS are based on state-of-the-art onboard sensors and dangerous situations can be avoided or mitigated
- ADAS is capable to display warnings and trigger autonomous emergency braking maneuvers
- ADAS is on the market and serial cars are equipped with the technology
- Advanced rider assistance systems are brought onto the market by more and more motorcycle OEMs

C-ITS (Early notification)

Time to Collision



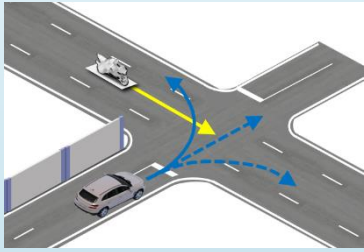
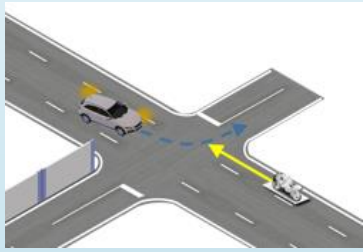
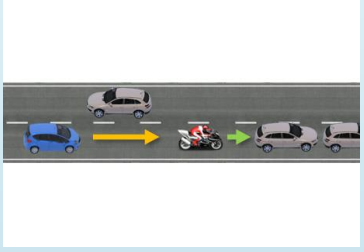
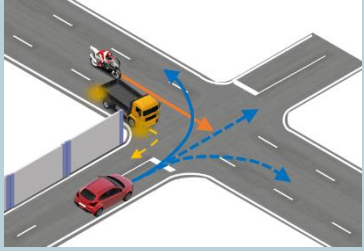


Collision

ADAS (AEB)

# The Use Cases

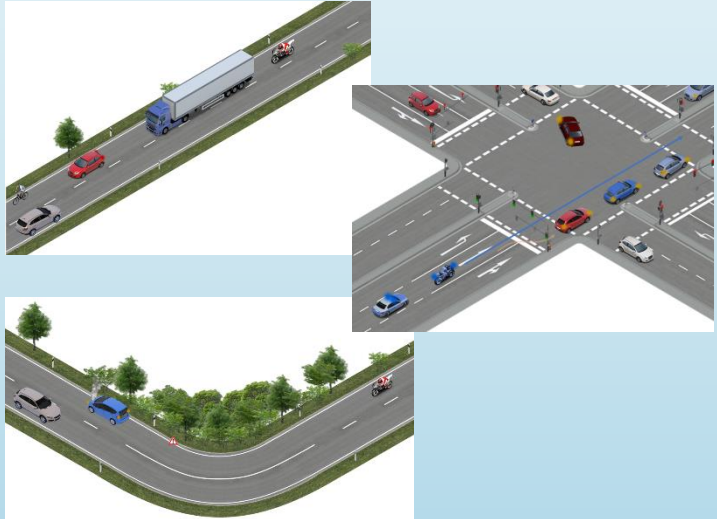
## See and be seen by others

Use cases with highest safety relevance

Crossing Traffic	Left Turn Across Path Opposite direction	Longitudinal traffic & Lane Change
ADAS	ADAS	ADAS
		
C-ITS	C-ITS	C-ITS
		

## Be aware of the unexpected

CMC specifications grants compatibility with C-ITS applications

Traffic situations
C-ITS: EEBL, SVW and AEVW *


*Emergency electronic brake light systems (EEBL), Stationary Vehicle Warning (SVW), Approaching emergency vehicle warning*



- RESEARCH
- NEWS
- DOWNLOADS
- ACCIDENTOLOGY
- CONSPICUITY
- RIDER REACTION TIME
- PATH PREDICTION



**Basic Specification v1.0 Documents:**

- Overview - Executive Summary
- Assessment of C-ITS applications potential
- Security Specification
- Evaluation Report
- CMC position towards other standards
- SMI Outline
- Application Roadmap
- Use Case - Identification - C-ITS2020
- Use Case - Identification - C-ITS2025
- Application Specification - Phase 1
- Application Specification - Phase 2
- L4/L5 Test Bed - USA
- Lane Change Warning / Blind Spot Warning - C-ITS2020
- Forward Collision Warning - F2W
- Do Not Pass Warning - DNPW
- Intersection Emergency Brake Light - IEBL
- Headlight On/Off - H2O
- Approaching Emergency Vehicle Warning - AEVW
- Adaptive Weather Warning - AWW

## Welcome to the Connected Motorcycle Consortium

The Connected Motorcycle Consortium (CMC) is a collaboration between manufacturers, suppliers, researchers and associations to make Powered Two Wheelers (motorcycles and scooters) part of the future connected mobility.

CMC is a non-profit organisation established by key motorcycle makers with the unilateral goal to promote and develop Cooperative Intelligent Transport

<https://www.cmc-info.net/research.html> (ITS) on a global scale.



# Thank you for your attention



[www.cmc-info.net](http://www.cmc-info.net)



[contact@cmc-info.net](mailto:contact@cmc-info.net)



**bertrandt**



FÉDÉRATION INTERNATIONALE  
DE MOTOCYCLISME