



## Towards C-ITS DAY1 for PTW Issues and opportunities



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# Intelligent Transportation Systems (ITS) current status without Power Two Wheelers



# ACEM Memorandum of Understanding on C-ITS



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The Motorcycle Industry in Europe

## ACEM Memorandum of Understanding for a harmonised implementation and deployment of safety-relevant cooperative ITS for Powered Two Wheelers in Europe

### Purpose

The purpose of this Memorandum of Understanding (MoU) is to agree on the harmonised implementation and deployment of safety-relevant cooperative Intelligent Transport Systems (ITS)\* on Powered Two Wheelers (PTWs) in Europe. This MoU is an expression of the individual and collective commitment of the ACEM manufacturing members to build on the commitment of the C2C Communication Consortium (C2C CC) \*\* and realize a shared objective to the benefit of everyone. Specifically but not uniquely, ACEM manufacturing members aim for PTWs, as Vulnerable Road Users (VRUs), to achieve electronic conspicuity as foreseen in the phase 2 of the C2C CC's MoU in collaboration with other vehicle manufacturers.

### Implementation and Deployment

The ACEM manufacturing members agree to initiate deployment of safety-relevant cooperative ITS on PTWs in Europe and agree to have at least one of their models available for sale with a cooperative ITS, either as standard equipment or as optional equipment, by 2020.

Initiation of market introduction requires the finalisation of ongoing activities on standardization, validation and Field Operational Tests which is expected to be completed by 2015. It also requires the finalisation of a number of related activities, in other industries, including infrastructure organisations and authorities.

Signatory

Date

Xx Yy  
Function - Company

\* Cooperative ITS is defined as a network of systems in which communication partners (vehicles, traffic infrastructure and/or service providers) provide and/or exchange information (i.e. 1- or 2-way communication).  
\*\* Memorandum of Understanding for C2C/Me within the CAR 2 CAR Communication Consortium on Deployment Strategy for cooperative ITS in Europe

[http://www.c2c-cc.org/index.php?c=1&f=1&newsourced&u=0&file=ffeadm/download/DOCs/MoU\\_on\\_deployment\\_v40001\\_02\\_Final.pdf&f=1389709337&hash=693970c2ab720818f55f73655919dea12a5621](http://www.c2c-cc.org/index.php?c=1&f=1&newsourced&u=0&file=ffeadm/download/DOCs/MoU_on_deployment_v40001_02_Final.pdf&f=1389709337&hash=693970c2ab720818f55f73655919dea12a5621)



“...The ACEM manufacturing members agree to initiate deployment of safety-relevant cooperative ITS on PTWs in Europe and agree to have at **least one of their models available for sale with a cooperative ITS**, either as standard equipment or as optional equipment, by 2020.”



**Conclusion:** Connectivity technology like ITS will become a major part of future mobility.

## VISION

**Enhance Riding safety** by jointly promoting, researching and developing C-ITS for Powered Two-Wheelers

## OBJECTIVES

**Integrating** PTW as an accepted and recognized partner into global future ITS strategies  
**Joining** our forces to create a common approach on ITS for PTW  
**Achieving** a successful implementation and deployment of PTW ITS functions



### PROMOTING & EXTERNAL RELATIONS



### UNIFICATION & INTEROPERABILITY

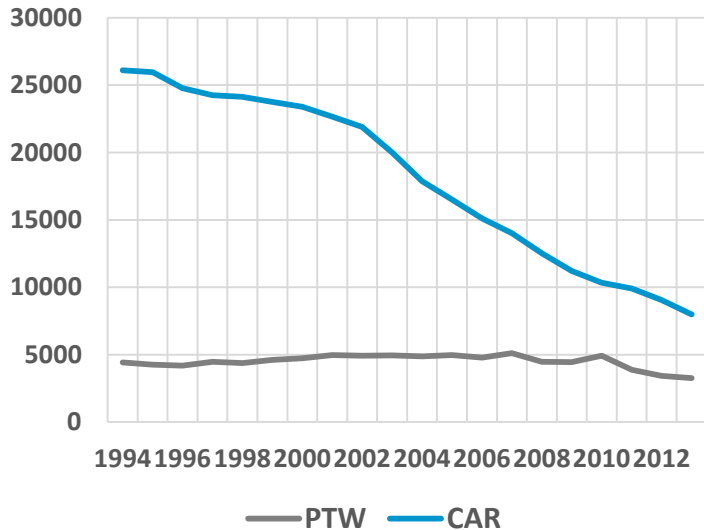


### FEASIBILITY & PROTOTYPING

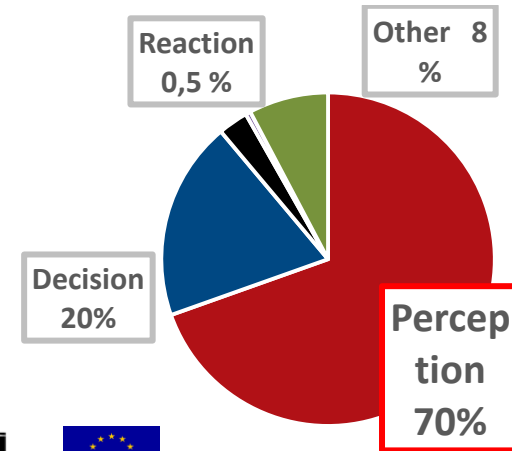
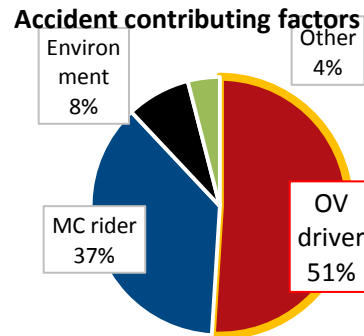


## PTW often not noticed – “Sorry mate, I did not see you”

### Europe (EU-15) - Road Fatalities



### Perception failure by other driver is main cause of accidents



Source: MAIDS final report 2.0 (April 2009)

# PTW is regarded Vulnerable Road User We are “Special Case”



Rider is Vulnerable Road User

Motorcycle is a vehicle

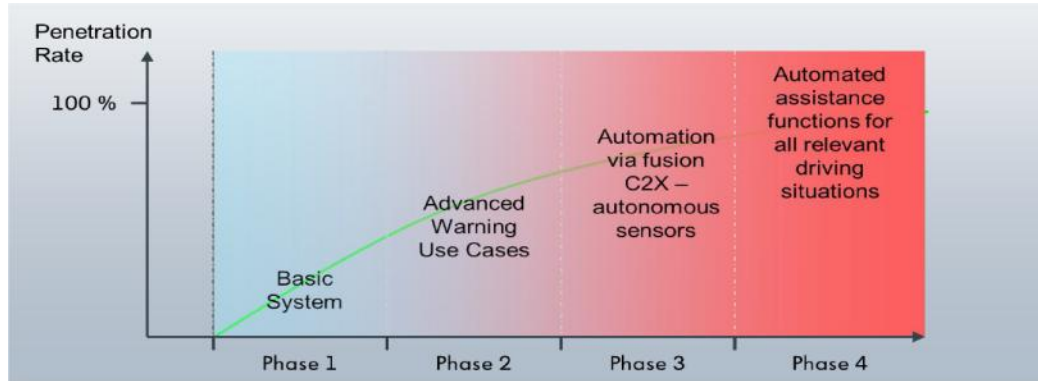
Ready for ITS deployment



- Share same road with cars, trucks, etc.
- Moving with similar speed like cars
- Power supply (12V) on board
- C-ITS equipment on board



# PTW in future ITS scenarios and automation



**Phase 1 & 2:** Define applications suitable for PTW

**Phase 3:** How far can PTW cope?

**Phase 4:** How to cope with PTW?

## Day 1 Applications

### Basic Systems

- Slow or Stationary Vehicle Warning
- Traffic Jam Ahead Warning
- Road Works Warning
- Emergency Brake Light
- Emergency Vehicle Warning

## Day 1.5 Applications

*Simplified  
implementation*

### MAI-Motorcycle Approach Indication 'BEACONING'

- Basic requirements
- Lower market penetration rate

## Day 2 Applications

### Advanced Systems

- Intersection Violation Warning\*
- Green Light Optimal Speed Advisory (GLOSA)
- Left Turn Assistant\*

\*motorcycle safety relevant



# Car solutions will not work on Motorcycles



## Design

- Limited space
- High vibrations
- Limitation on sensing parameters

## No cabin

- Antenna positioning
- Exposed to elements (*rain, humidity, etc.*)

## Dynamics

- Leaning in corners
- Steering by inertia
- High influence of rider

## Localisation

- Width of PTW is under 1 meter
- Vehicle movement
- Higher positioning accuracy needed

## Use case: Stationary Vehicle Warning



Hazard light on	✓	(✓)
Parking break	✓	X
Door open	✓	X
Trunk open	✓	X
Drivers seat not occupied	✓	X
Proposal: side stand	X	✓

## Use case: Traffic Jam



Requirement:

...indicate a velocity less than or equal to 30 km/h of at least five other vehicles in at most 100 m distance and the same driving direction...

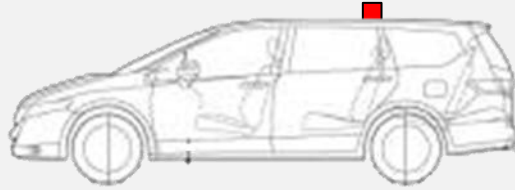
## Use case: Traffic Jam



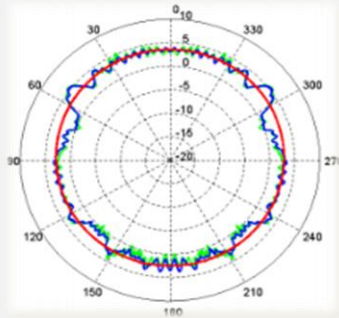
PTW can ride through traffic jam  
Sends „wrong“ trigger conditions – cancel traffic jam

# Antenna challenge for PTW C-ITS

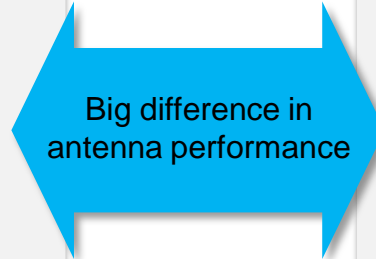
## In case of car



- Easy to install antenna on the roof
- Good antenna performance



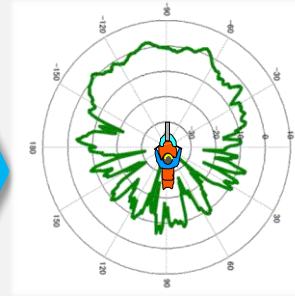
An antenna on the roof



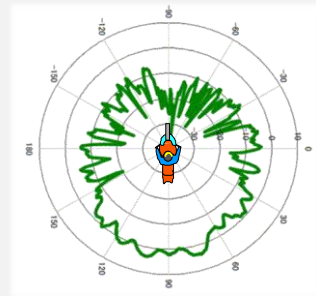
## In case of scooter



- Attenuation by rider body
- Scattering by metal frame



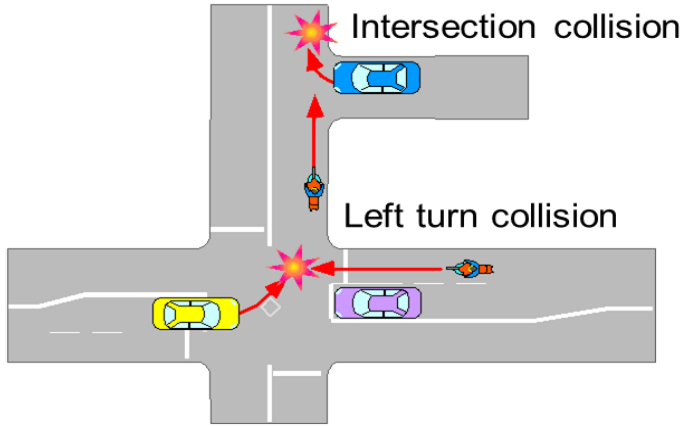
An antenna above  
the head lamp



An antenna above  
the tail lamp

\*Measurement with Honda FORZA  
1scale = 10dB

## Statistics pointing to use cases



**15% Intersection collision**

**18% Left Turn collision**

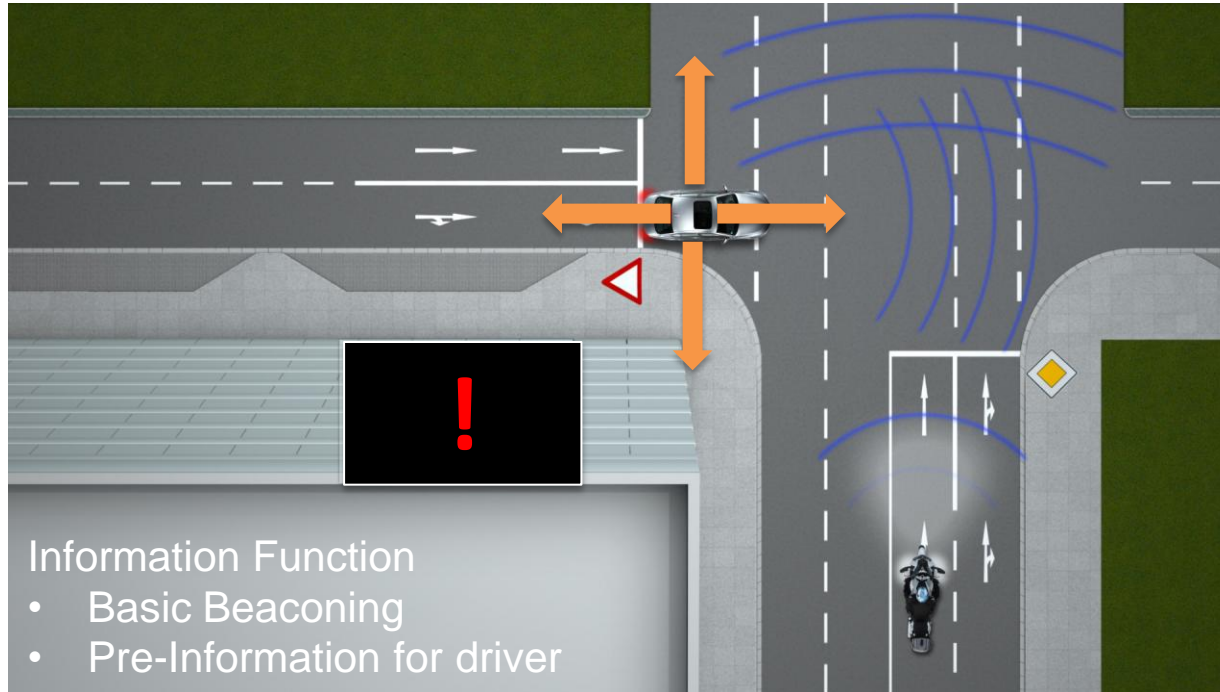


Source: MAIDS final Report 2.0 (April 2009)

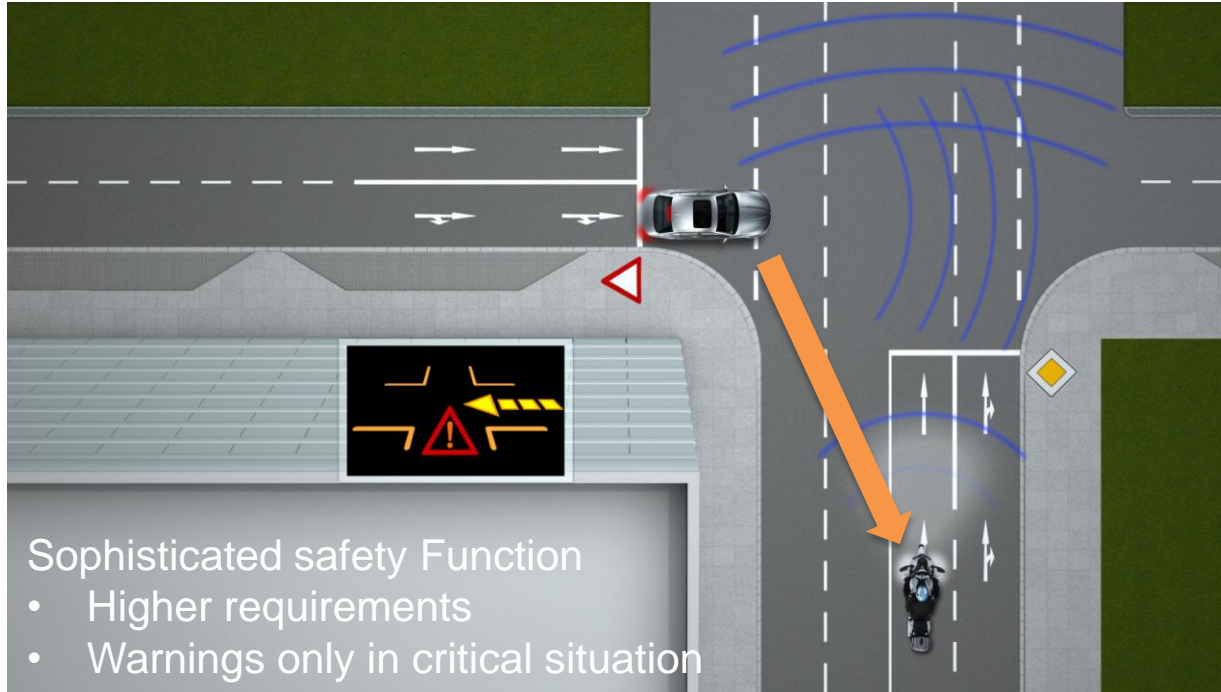
C2C CC – Roadmap:

**Intersection Violation Warning & Left Turn Assistant** addressing this scenarios

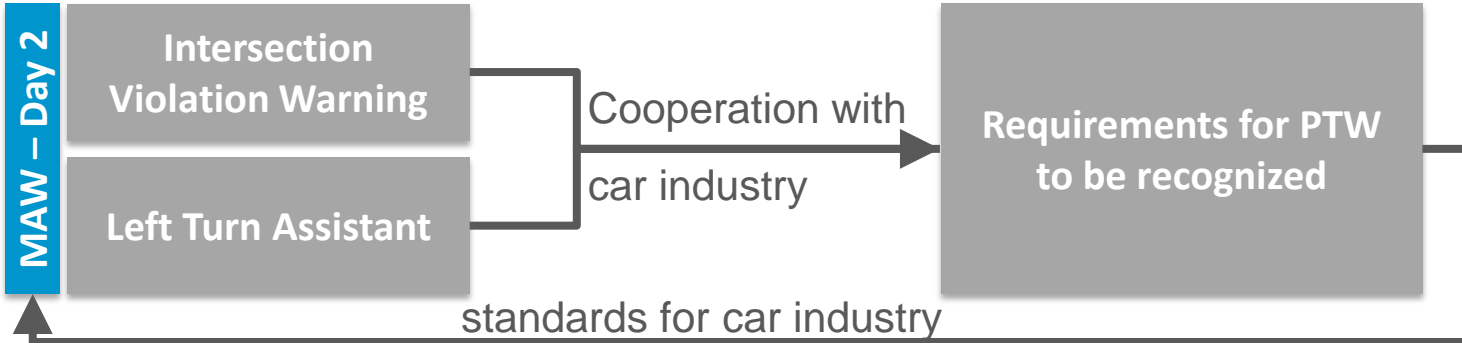
# Motorcycle Approach Indication (MAI) – Day 1.5



# Motorcycle Approach Warning (MAW) – Day 2

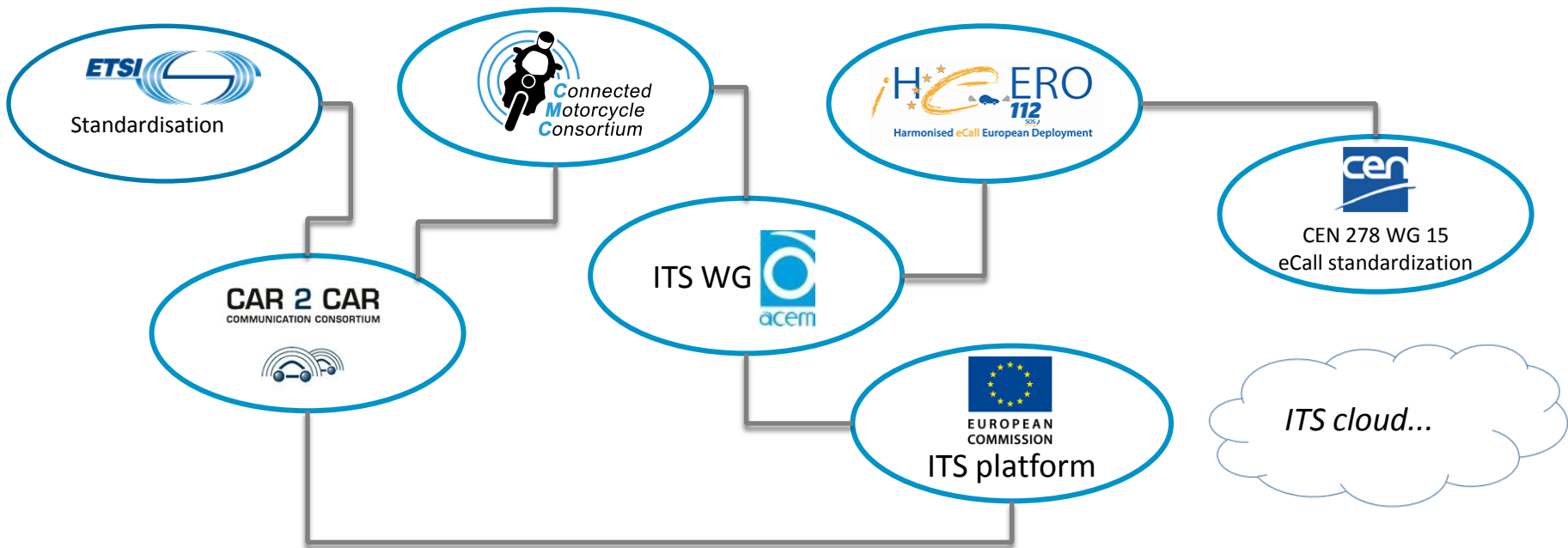






- MAW is a real safety function with only warning in critical situation
- MAW huge impact on motorcycle safety but it is a DAY 2 function

# ITS Landscape – many stakeholders need to cooperate



# C-ITS requires cooperation

- PTW OEMs
- Car OEMs
- Truck OEMs
- Suppliers
- Telecoms
- Road operators
- Ministries of transport
- European Commission
- NHTSA (US)
- JAMA (JP)
- Ministry of Land, Infrastructure, Transport and Tourism (JP)
- Various national authorities



Thank you for your attention