



WP2 User needs and requirements

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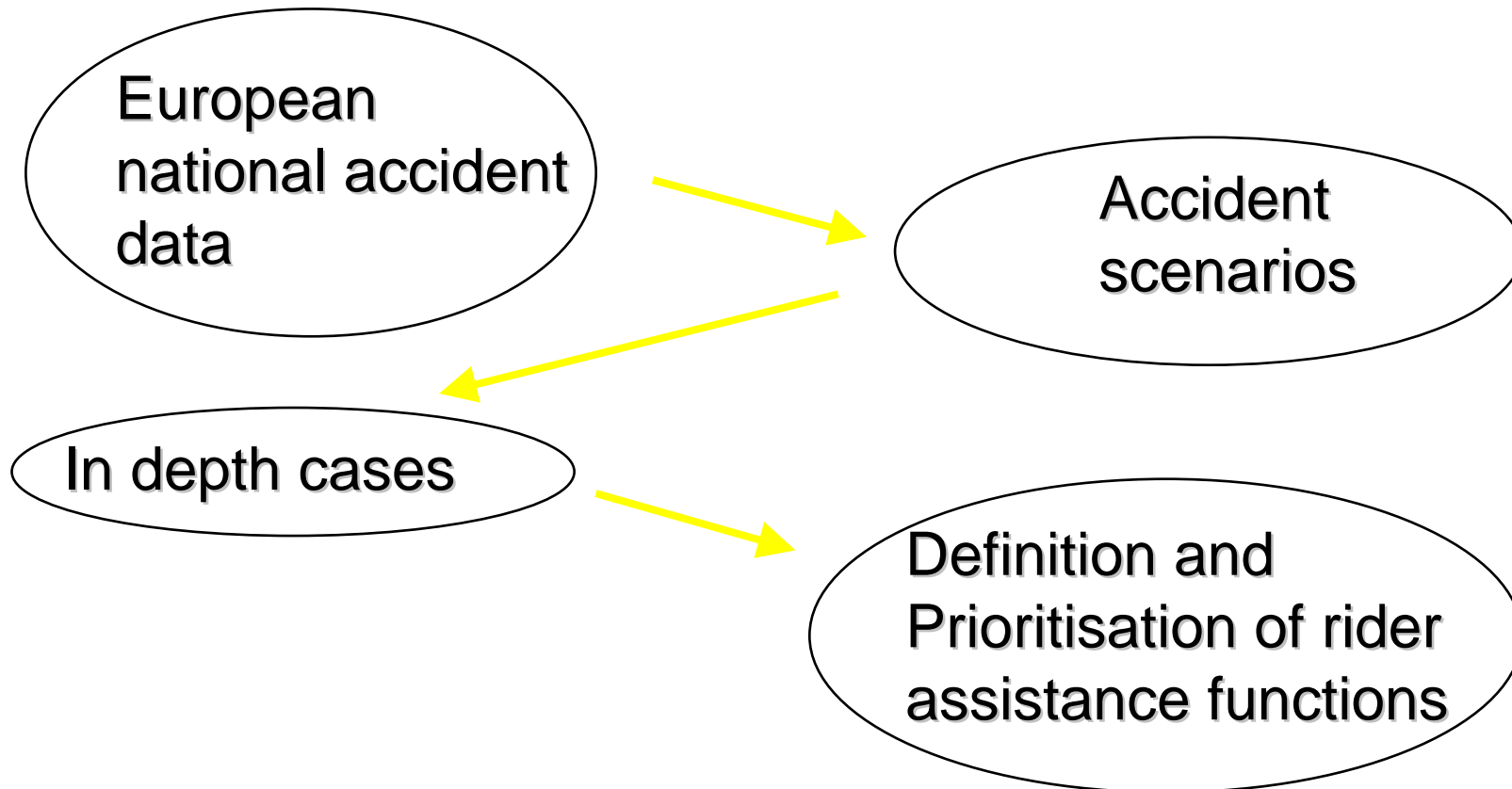




WP2 User needs and requirements

- Statistics and literature
- User information
- In-depth accident case reviews
- Functions matrix
- Determine intervention priorities

Development of System Functional Requirements





WP2.1 Statistics and literature

- Used 7 scenarios from APROSYS
- 7 scenarios verified using national data (Germany, Italy, Spain & the Netherlands) and national and fatal data from Great Britain
- Literature review of PTW safety: vehicles, use, riders, technologies.



WP2.2 User information

- Survey of PTW users in Germany, Italy, the Netherlands and complimented by existing survey data from Great Britain.
- 261 PTW riders
- 223 (85%) male and 38 (15%) female
- Of the 253 PTWs owned 35% sports bikes, 35% roadster/tourer/cruiser, 16% scooters <250cc and 4% scooter >250cc



WP2.2 User information

- The participants were in favour of (and willing to pay a small amount for) direct driving support systems
 - Automatic Handling Systems: eg. ABS
 - Navigational Support: eg. GPS
 - Night vision displays
- The participants disliked Automatic Support Systems which take away tasks from the PTW rider eg. ACC



WP2.2 Relevant accident scenarios

- 60 in-depth crash cases from Germany and Great Britain;
- For each crash summary & for most ride-through videos
- Crash description: circumstances, vehicles and damage, rider and injuries, location and road features, environmental and weather, scene plan and photographs.



WP2.3 Functions

- 43 functions identified - pre-crash, crash, post-crash phases
- Vehicle dynamics, rider behaviour, protective equipment, HMI issues, environmental and road infrastructure, technological developments and vehicle to vehicle/infrastructure communications
- Each crash was reviewed
- Determined contribution (score 0-5) of each function to accident avoidance or injury avoidance/mitigation.

WP2.3 Functions matrix

Function Number	Functional Requirement	System Global	System Specific	Accident Case Number		
				TRL0001	VSRC0002	LMU0003
1	Prevent PTW from starting if BAL (blood alcohol level) > 0.5mg	Drive Safe	Alco-lock key	1 (blue)	0	4 (red)
23	Improve PTW conspicuity	Enhanced Conspicuity	Active lighting	0	2 (blue)	3 (orange)
28	Prevent PTW wheels from locking in straight line	Optimised Braking	ABS	5 (red)	1 (blue)	0



WP2.3 Determining intervention priorities

- Used a process based on frequency of occurrence and level of applicability to prioritise the interventions in order of importance
- Top 2 priorities were:
 - warning the other vehicle in the crash of the PTW presence
 - automatically stopping the other vehicle



WP2.3 Intervention priorities for development within PISa

1. Slow/stop PTW (autonomous braking)
2. PTW to detect other vehicle and provide warning (to PTW rider)
3. Improve PTW conspicuity (active lighting)
4. Brake assist – EBS (enhanced braking system)
5. ABS – anti-lock braking system
6. Brake assist – CBS (combined braking system/linked brakes)
7. ACC (adaptive cruise control – safe following)



WP2.3 Cost benefit analysis

- These 7 interventions were then mapped onto the accident scenarios.
- The data were then scaled up to the frequency of occurrence of those scenarios in GB and Europe.
- This has enabled an initial assessment of the potential benefits of these interventions on casualty reduction.
- These initial assessments will be validated in WP6 when there is more information about the system performance and costs.



These findings, and specifically the functions priorities, were passed on to WP3.



7 Scenarios

1. Urban moped car intersection
2. Urban moped car straight
3. Urban motorcycle car intersection
4. Urban motorcycle car straight
5. Non-urban motorcycle single vehicle
6. Non-urban motorcycle car straight
7. Non-urban motorcycle car intersection