OASIM

BY ASEAN NCAP & UTAC

Proposal for
Car to Motorcyclist ASEAN NCAP Assessment for 2026

OASIM - Overall ASEAN market Safety Improvement for Motorcycle

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- ❑ **CONTEXT ACCIDENTS IN ASEAN REGION**

- ❑ **OASIM PROJECT**

- ❑ **ACCIDENT DATA STUDY**

- ❑ **MOTORCYCLIST TARGET DEVELOPMENT**
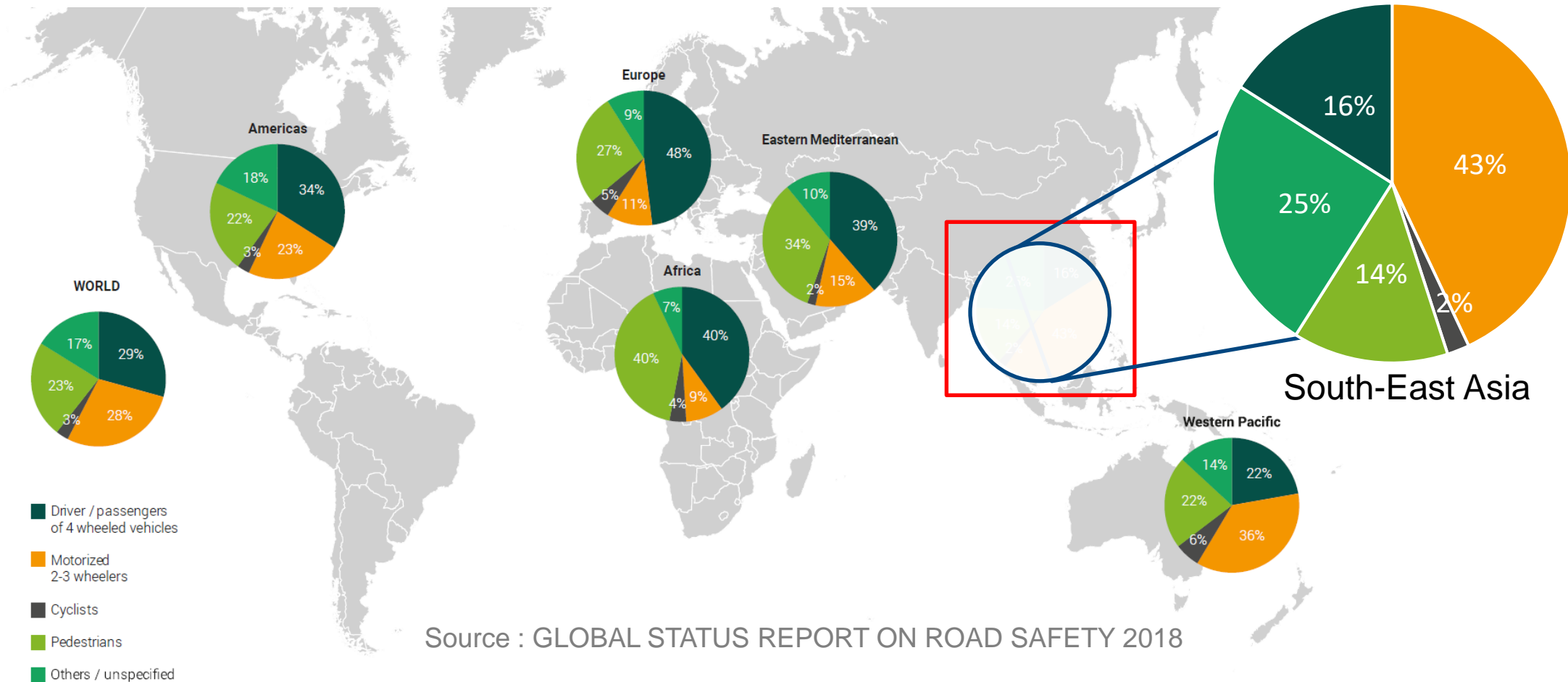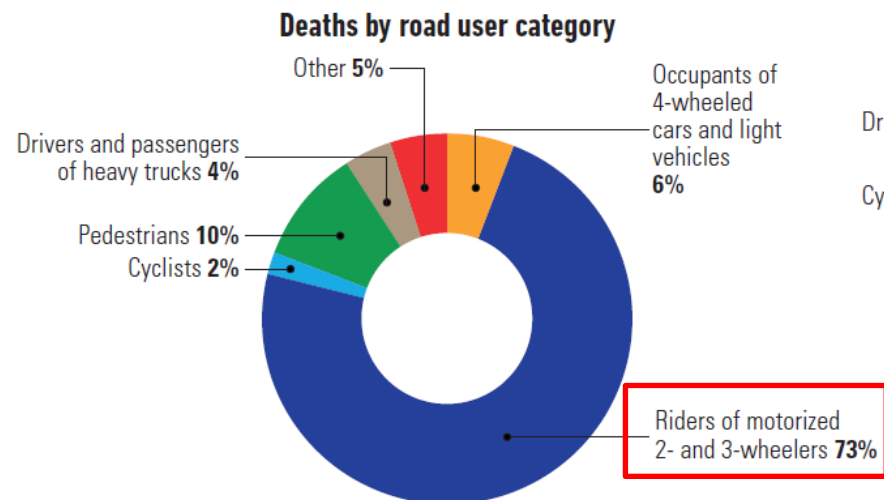
- ❑ **TEST SCENARIOS**

CONTEXT

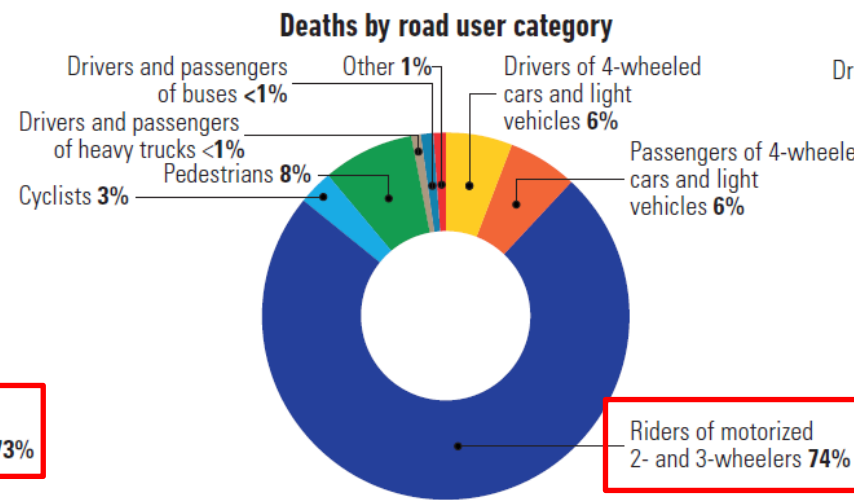## Distribution of deaths by road user type by WHO Region

South-East Asia

Source : GLOBAL STATUS REPORT ON ROAD SAFETY 2018

Legend:
- Driver / passengers of 4 wheeled vehicles
- Motorized 2-3 wheelers
- Cyclists
- Pedestrians
- Others / unspecified

➢ Exemples of the PTW dramatic situation in ASEAN region

Deaths by road user category

Other 5%
Occupants of 4-wheeled cars and light vehicles 6%
Drivers and passengers of heavy trucks 4%
Pedestrians 10%
Cyclists 2%
Riders of motorized 2- and 3-wheelers **73%**

Cambodia

Deaths by road user category

Drivers and passengers of buses <1%
Other 1%
Drivers of 4-wheeled cars and light vehicles 6%
Drivers and passengers of heavy trucks <1%
Pedestrians 8%
Passengers of 4-wheeled cars and light vehicles 6%
Cyclists 3%
Riders of motorized 2- and 3-wheelers **74%**

Thailand

Deaths by road user category

Drivers and passengers of buses <1%
Other <1%
Drivers of 4-wheeled cars and light vehicles 2%
Drivers and passengers of heavy trucks 2%
Passengers of 4-wheeled cars and light vehicles 3%
Pedestrians 16%
Cyclists 3%
Riders of motorized 2- and 3-wheelers **74%**

Indonesia

Source : GLOBAL STATUS REPORT ON ROAD SAFETY 2018
(2016 Data)
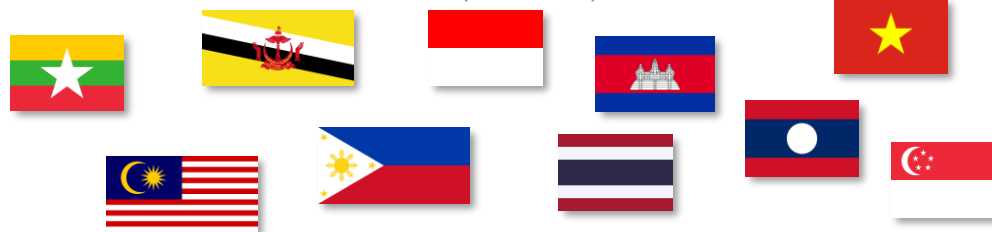
➢ **ASEAN NCAP ➔ Integration of Motorcyclist Safety assessment in the Guideline of 2021 – 2025**

   ➢ Need to focus on improving the safety of motorized 2- and 3- wheelers since it represents the most important part of motorized vehicle in the region.

➢ **From 2026 : ASEAN NCAP would become the most challenging protocol in Motorcyclist safety**

	AOP		COP		Safety Assist		Motorcyclist Safety	
ASEAN NCAP 2021-2025	Item	Max	Item	Max	Item	Max	Item	Max
	Frontal	16	Frontal	16	EBA	6	BSD / BSV	8
	Side	8	Side	8	SBR(Fr.)	3	Rear View Technology	4
	HPT Evaluation	8	CRS Installation	12	SBR(Rr.)	1.5	AHB	2
			Vehicle Based Assessment	13	SBR(Rr.) Advanced	1.5	Pedestrian Protection	2
			Child Presence Detection	2	AEB City	2.5		
					AEB Inter Urban	3.5	[Advanced MST]*	2*
					Advanced SAT	3	*BONUS POINT	
Score		32		51		1		16
Weighting		40%		20%		20%		20%

Slanting = Fitment Rating System

* To add 2 points MAX to total MS point

	AOP (%)	COP (%)	Safety Assist (%)	Motorcyclist Safety (%)
5 ★	80	75	70	50
4 ★	70	60	50	40
3 ★	60	30	40	30
2 ★	50	25	30	20
1 ★	40	15	20	10

ASEAN NCAP places high importance on Motorcyclist Safety and this shall distinguish us from the other NCAPs. In 2026, ASEAN
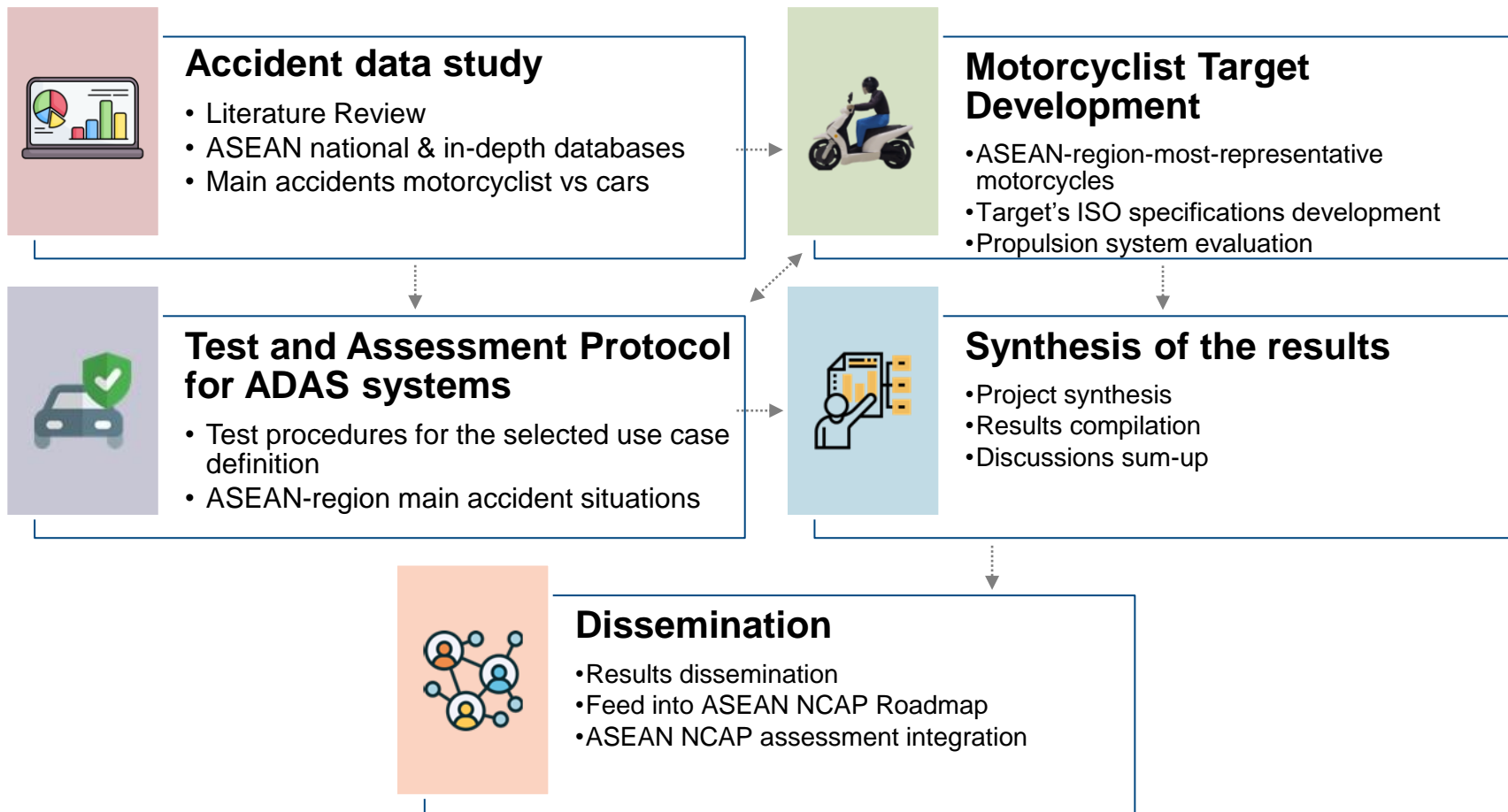
ASEAN NCAP Roadmap 2021-2025

OASIM Project

Improve the motorcyclist safety in the ASEAN region

❑ By identifying the **main accident situations** between motorcycle and passengers cars.

❑ **Develop the testing tools to reproduce these accident scenarios to be able to evaluate** possible advanced driver assistance system (**ADAS**).

❑ Support active system development **that can avoid the accident or limit the consequences** of the impact.

❑ **Promote motorcyclist safety** with an official rating

☐ Overall ASEAN market Safety Improvement for Motorcycle (OASIM)

Accident data study
- Literature Review
- ASEAN national & in-depth databases
- Main accidents motorcyclist vs cars

Motorcyclist Target Development
- ASEAN-region-most-representative motorcycles
- Target's ISO specifications development
- Propulsion system evaluation

Test and Assessment Protocol for ADAS systems
- Test procedures for the selected use case definition
- ASEAN-region main accident situations

Synthesis of the results
- Project synthesis
- Results compilation
- Discussions sum-up

Dissemination
- Results dissemination
- Feed into ASEAN NCAP Roadmap
- ASEAN NCAP assessment integration

Partners

ASEAN NCAP www.aseancap.org

UTAC

Valeo

TOYOTA — TOYOTA DAIHATSU ENGINEERING & MANUFACTURING CO., LTD.

NISSAN

HONDA

DAIHATSU

DENSO Crafting the Core

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Contributors

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4active SYSTEMS

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ACCIDENT DATA STUDY

ACCIDENT DATA STUDY

Objective: Compile accident data for ASEAN countries, identify the main accident scenarios & parameters

Scope: Accidents between one passenger car/pick-up against one motorcycle within 10 countries (ASEAN region)

Literature review	National database	In-depth database
- Accident characteristics, driver and riders characteristics - Vehicle fleet composition, network characteristics	Country : Malaysia N = 1160 cases Years: 2016-2018 56 variables	Country : Thailand N = 751 cases Years: 2016-2020 700 variables

ASEAN countries road traffic context
Main collisions
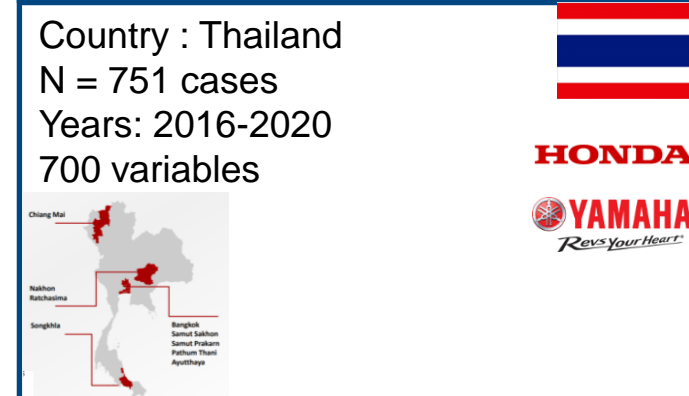
Main accidents situations

Accident sub-scenarios and detailed parameters

Literature review

Data on Cambodia, Malaysia, Singapore, Thailand, Vietnam, ASEAN

Collision type :
Angular
Head-on
Rear-end
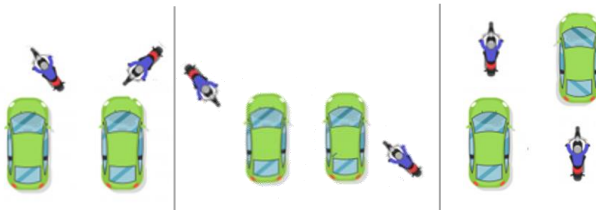
Databases

Malaysia (national) and Thailand (in-depth)

Fleet composition about 50/50 car and motorcycle
High% of motorcycle among the road deaths
(73% Thailand, 62% Malaysia)

OASIM accident scenarios	Type of collision	Impact on the motorcycle	Manoeuvre of the motorcycle	% KSI Malaysian data	% KSI Thai data
Rear-end	Rear-end	MC – Rear / Car - Front	▪ Same direction	5%	9%
Head-on	Head-on	Front	▪ Opposite	36%	19%
Angular with frontal impact on the motorcycle	Angular	Front	▪ Forward/other (Malaysia) ▪ Forward same direction/ opposite direction (Thailand) ▪ Forward/other (Malaysia)	15%	20%
Angular with lateral impact on the motorcycle	Angular	Lateral	▪ Forward same direction/ opposite direction (Thailand)	4%	9%
Angular with motorcycle turning	Angular	Lateral/Frontal	▪ Motorcycle turning	6%	13%
Right-angle (crossing)	Lateral 90°	Lateral/Frontal	▪ Perpendicular direction	5%	7%
Side-swipe	Lateral for both	Lateral	▪ Same direction	7%	6%
Total Coverage				78%	83%

❏ **Study of 12 sub-scenarios based on 24 variables (general conditions, road characteristics, accident characteristics)**

		% Day	Road configuration	% Intersection	Car manoeuvre	MC manoeuvre	Car Collision Speed	MC Collision Speed	% Avoidance action (car)	% Obstruction (car)
REAR-END		53%	76%	24%	Going straight	Going straight	77 kph	45 kph	44%	20%
HEAD-ON	1	46%	46%	19%	Going straight constant speed or passing on the right	Going straight constant speed	62 kph	60 kph	62%	4%
	2	55%	64%	9%			55 kph	71 kph	45%	70%
	3	50%	50%	20%			66 kph	55 kph	60%	70%
ANGULAR	1	57%	55%	75%	Turning right/left or U-turn	Going straight constant speed	22 kph	59 kph	18%	29%
	2	60%	68%	46%			18 kph	52 kph	27%	62%
	3	74%	50%	55%			19 kph	52 kph	12%	16%
MC TURNING RIGHT		91%	65%	31%	Going straight	Changing lane, entering the trafic	65 kph	34 kph	78%	17%
CROSSING		47%	40%	94%	Going straight in acceleration or constant speed	Going straight in acceleration or constant speed	46 kph	44 kph	34%	60%
SIDE-SWIPE	1	78%	37%	28%	Going straight, changing lane or entering the trafic	Changing lane, entering the trafic, going straight	70 kph	50 kph	44%	6%
	2	75%	54%	33%			35 kph	55 kph	0%	0%
	3	60%	30%	50%			35 kph	55 kph	10%	10%

MC = Motorcycle

Highway

Rural

City street

MOTORCYCLIST TARGET DEVELOPMENT

REPRODUCTION OF ACCIDENTS

Test ADAS system within accident situations

- Risk of collision ⇨ develop a crashable motorcyclist target

- Accuracy ⇨ use driving robots to reproduce the trajectories and the synchronisation with the motorcyclist

Objective: Development of a crashable target with the same detection characteristics as a real representative ASEAN market motorcycle.

Realistic 3D-360°-RCS distribution

Realistic optical appearance

Ultrasonic behaviour

Micro Doppler included

Specific NIR behaviour

Specified Lidar properties

Measurement workshop

Crashable dummy

Propulsion system

Properties verified according to the methods described in the related ISO/WD 19206-5:2023(E) – Standard (Road vehicles — Test devices for target vehicles, vulnerable road users and other objects, for assessment of active safety functions — Part 5: Requirements for Powered Two-Wheeler targets).

Objective: Development of a crashable target with the same detection characteristics as a real representative ASEAN market motorcycle.

Measurement workshop

Crashable dummy

Propulsion system

TEST SCENARIOS

SELECTION OF THE TEST SCENARIOS

❏ Based on the main accidents studied and the feasibility to address the situation with ADAS systems
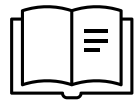
Literature Review scenarios
- Head-on
- Side impact / Angular
- Side-swipe
- Rear-end

Priority 1

Priority 2

Priority 3
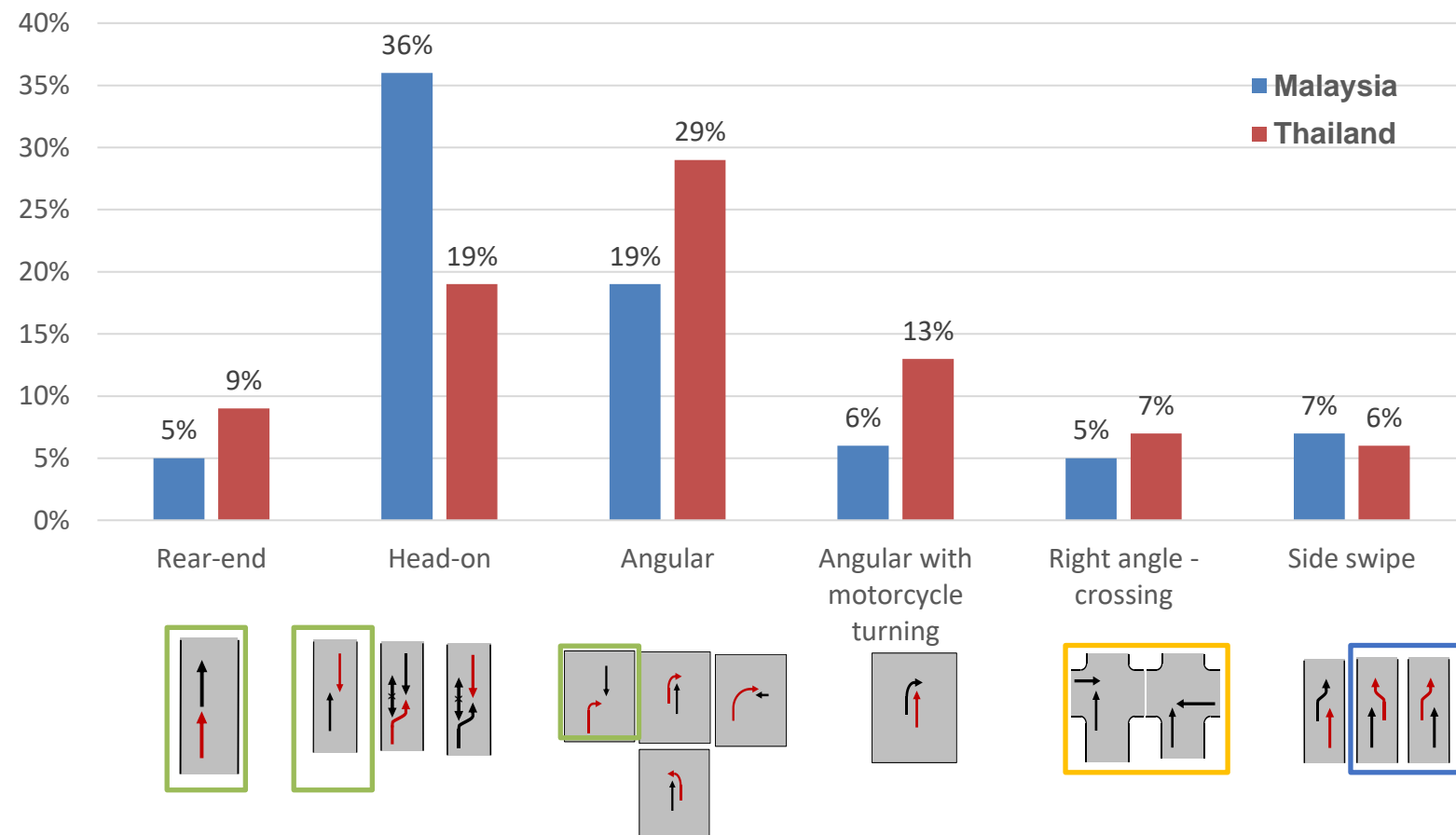
Selection of the test scenarios

❏ Based on the main accidents studied and the feasibility to address the situation with ADAS systems
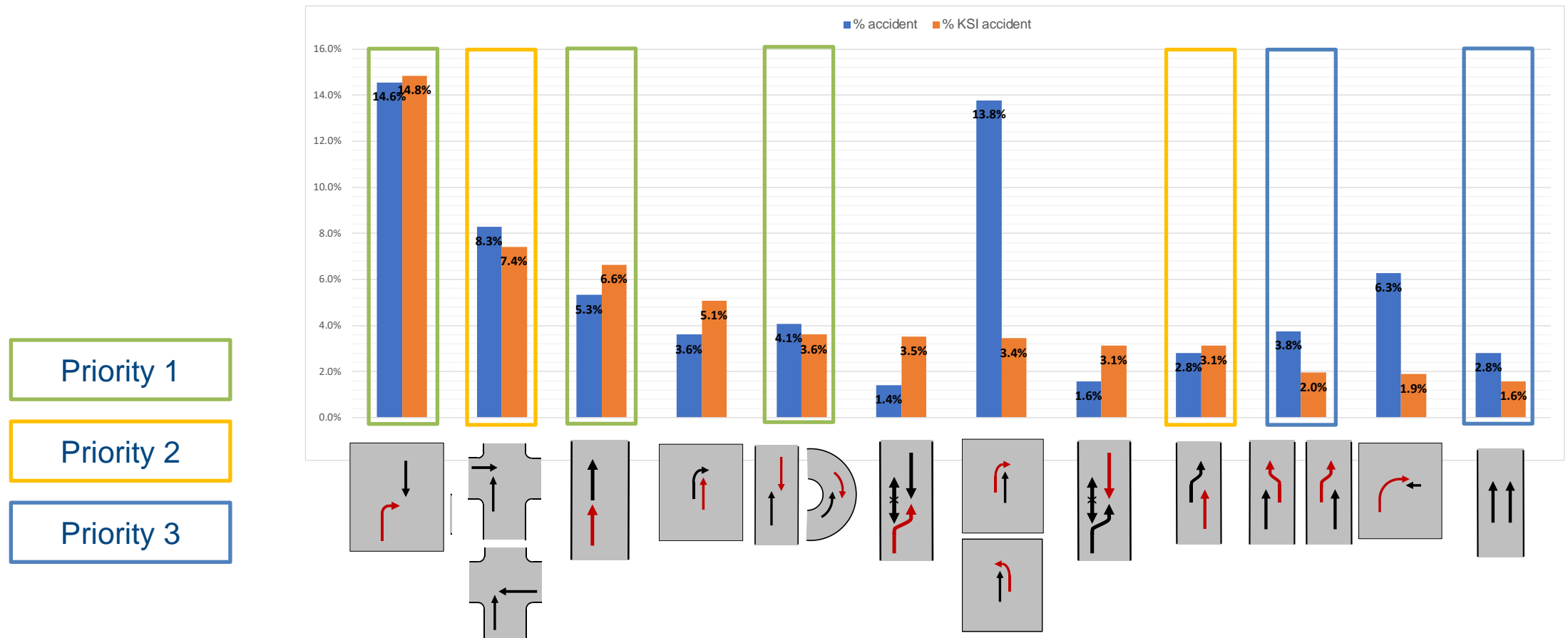
Test scenarios for 2026

Represent around 30% of cases observed in the accident data study

	CMRm		CMFtap	CMCrossing	CMOncoming
Paragraph	8.3.1		8.2.2	8.2.3	8.2.6
Type of test	AEB	FCW	AEB	AEB	LSS
VUT Speed [km/h]	40-60	40-80	(2026) 10,20	20-60	72
VUT direction	Forward		Farside turn	Farside and nearside	Farside
Target speed [km/h]	30,45,60		30,45,60	20	60
Impact location [%VUT width]	50	50 and 25	50	50 -50% motorcycle length	10
Lighting condition	Day		Day	Day	Day
Number of test	36 speed combinations (best case: 22 tests)		6 tests	9 speed combinations (best case: 5 tests)	4 – 5 tests
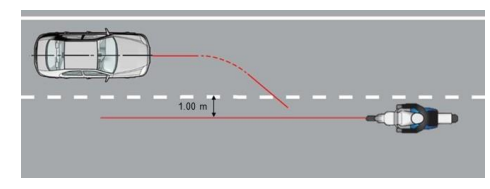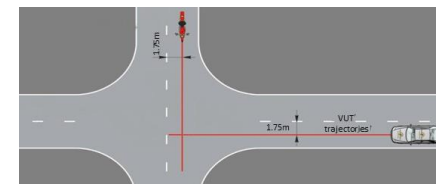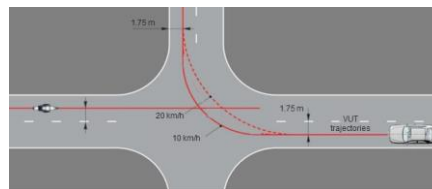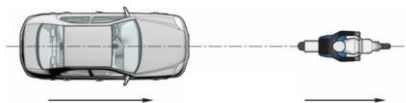
❑ **Test on the track: boundaries VUT side**

AEB-FCW CMFtap
VUT 10kmh - AMT 45kmh
Test Execution Boundaries

AEB-FCW CMFtap
VUT 10kmh - AMT 45kmh
Test results

Test on track – OASIM Workshop

Example CMFTap VUT 10km/h – AMT 45kph
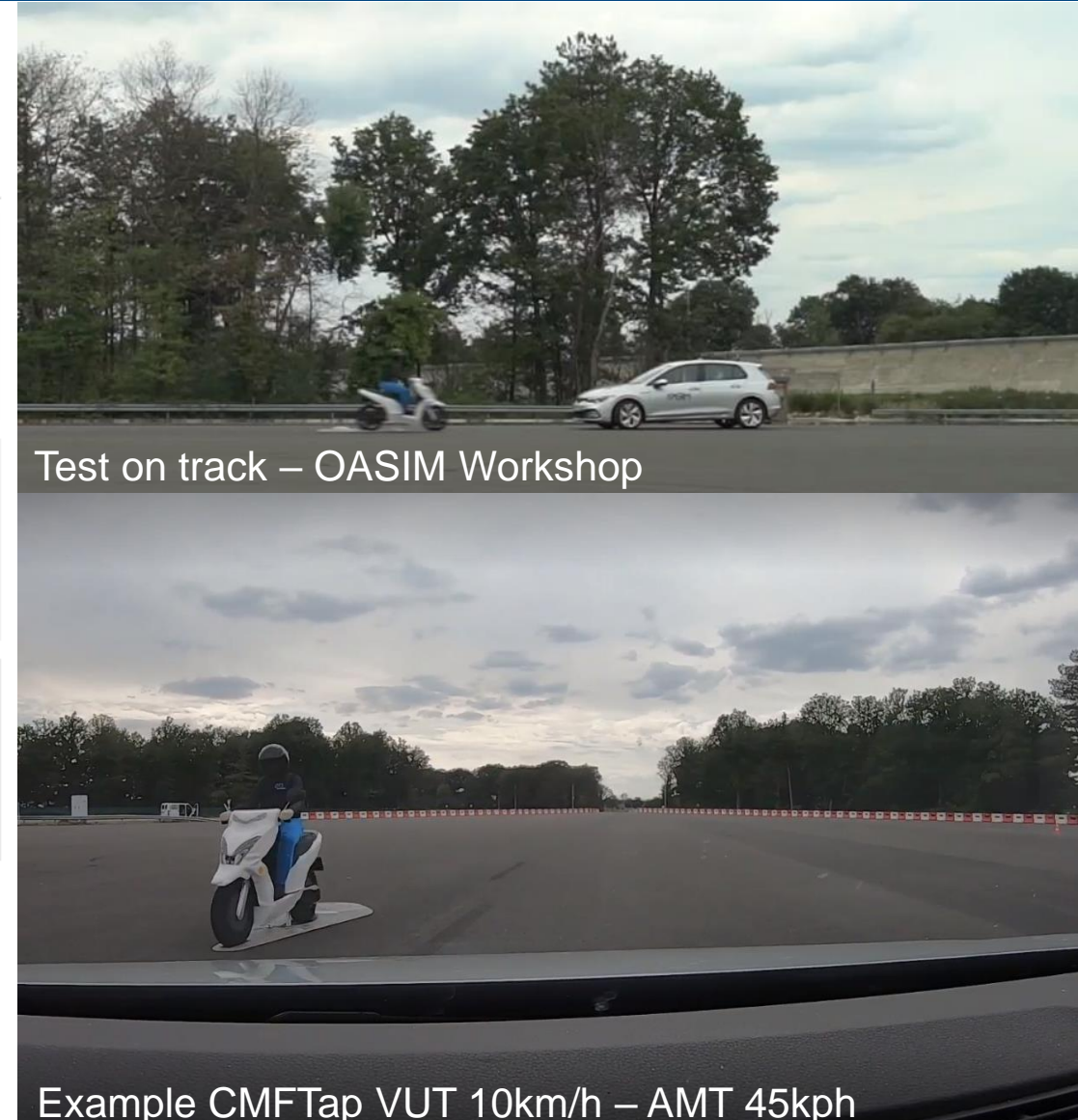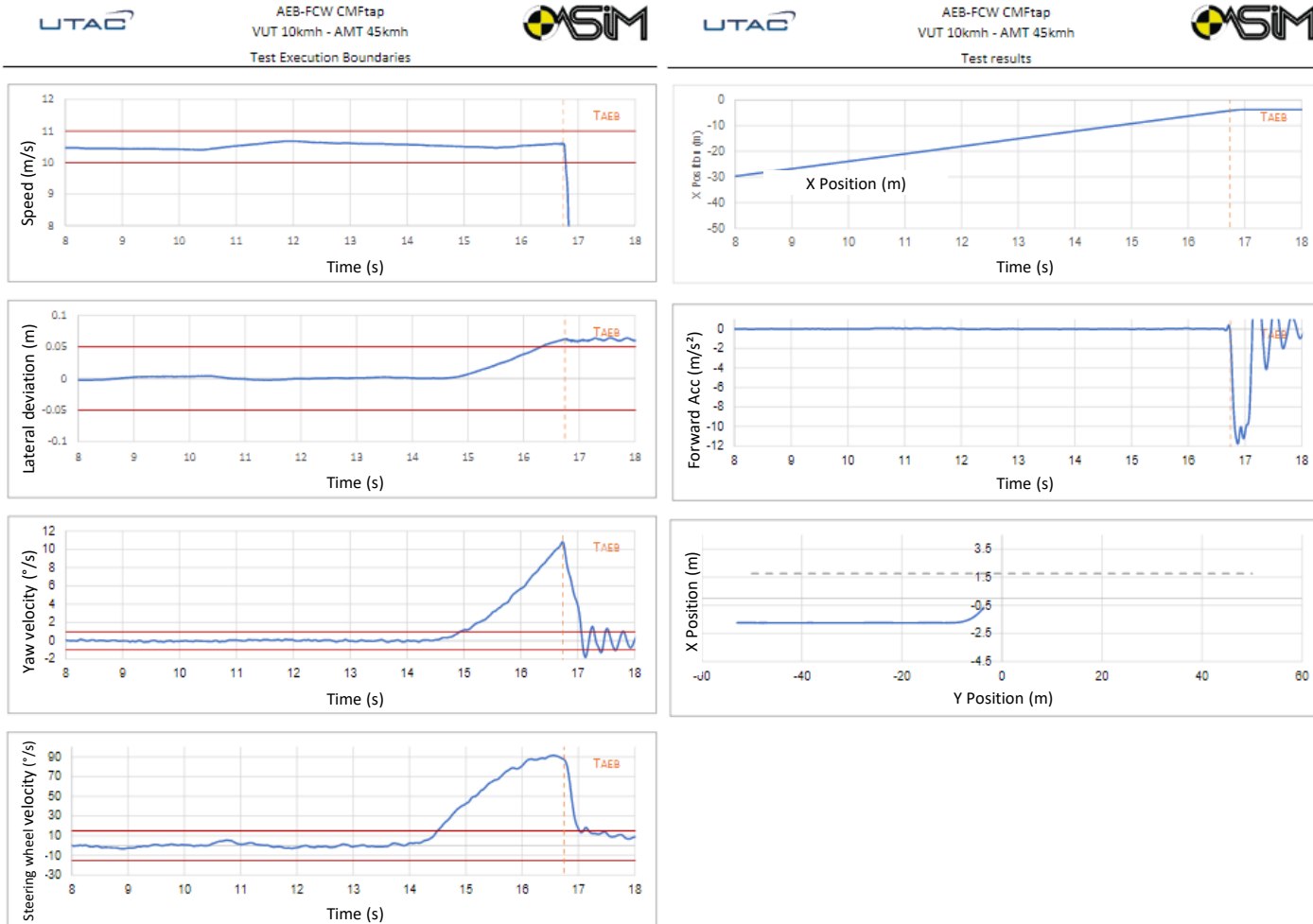
☐ **Test on the track: Target {dummy + platform} side**
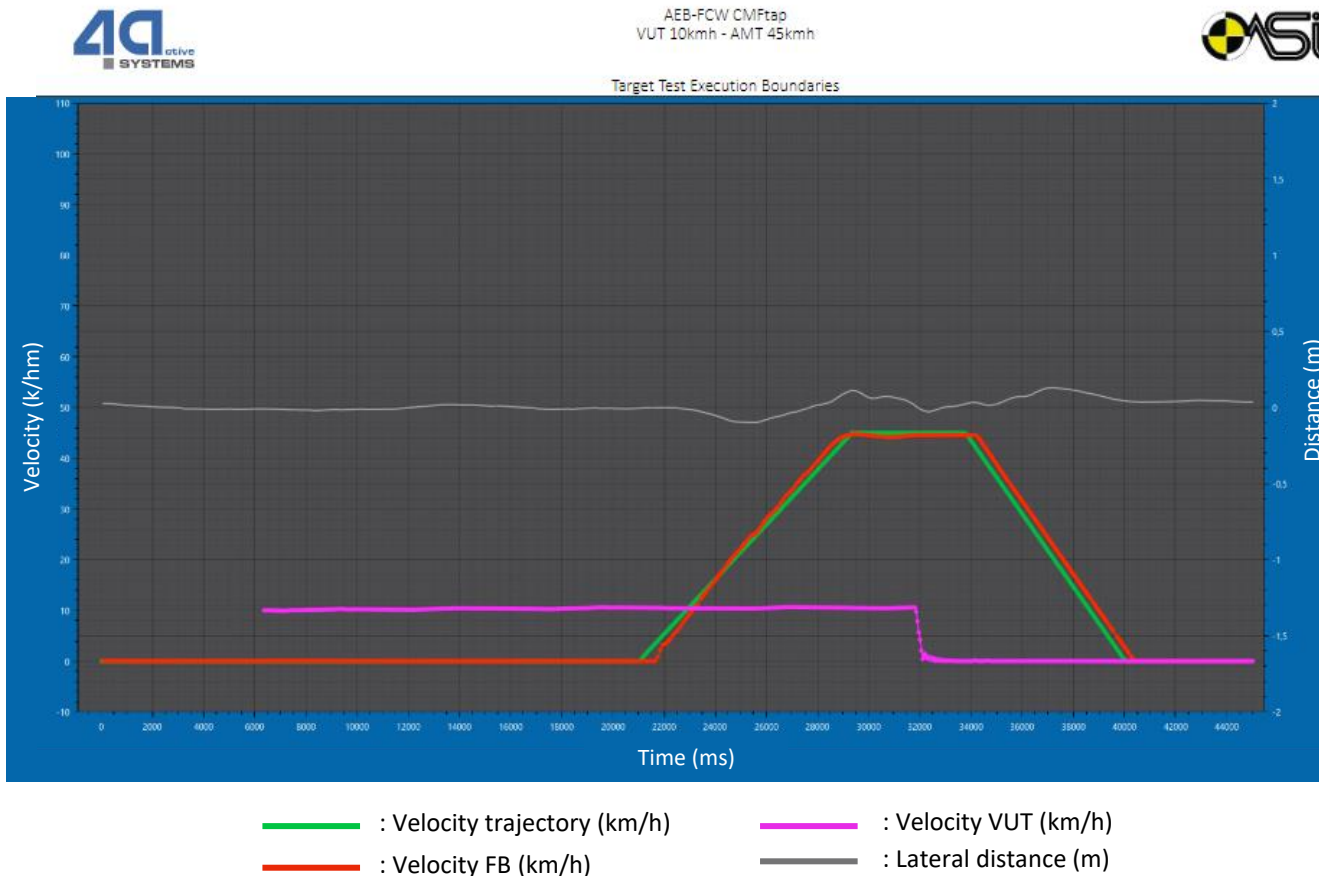
Test on track – OASIM Workshop

Example CMFTap VUT 10km/h – AMT 45kph

Proposal for
Car to Motorcyclist ASEAN NCAP Assessment for >2026

OASIM - Overall ASEAN market Safety Improvement for Motorcycle

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☐ Roadmap proposal ADAS Assessment

BSW/BSD
AEB
LSS-ELK/LDW
>2031*

BSW/BSD
AEB
LSS-ELK/LDW
2031*

BSW/BSD
AEB
LSS-ELK/LDW

2026

BST(BSV/BSD)
2021
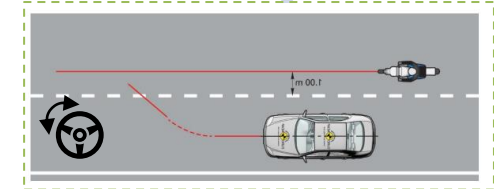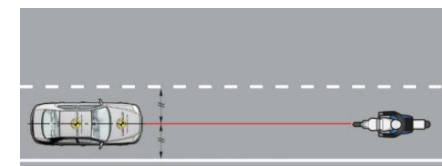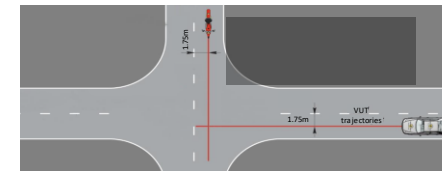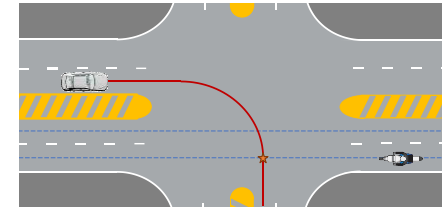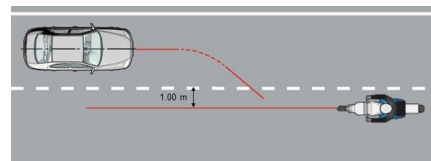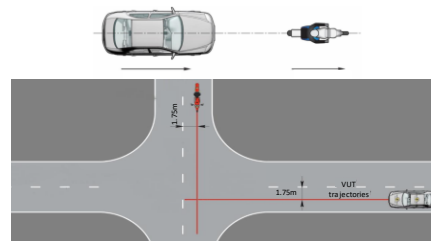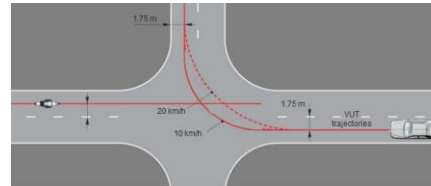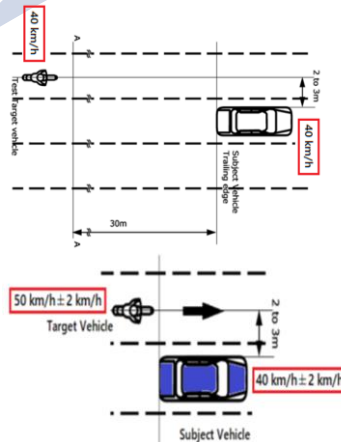
*to adjusted along with ASEAN NCAP future updates

2031 Test scenarios

	CMFtap	**CMCrossing**	**CM Head-on**
Type of test	AEB	AEB	AEB / +
VUT Speed [km/h]	**30**	20-60	**55-60**
VUT direction	Farside turn	From farside and nearside	Forward
Target speed [km/h]	30,45,60	**>20**	**50-72**
Impact location [%VUT width]	50 **Lane of the motorcycle**	50 -50% motorcycle length	**50**
Lighting condition	Day	Day	Day
Obstruction	No	**YES**	No
Feasibility			
Comment	Investigate higher speed for VUT 30km/h and intersection configuration	Second step of the crossing scenario integration	Main issue is the test feasability High relative speed

| **Feasability**	
	Feasible
	Complicated
	Highly complicated
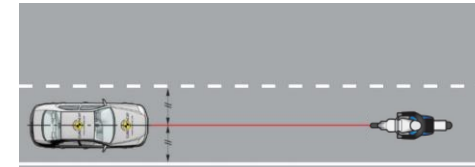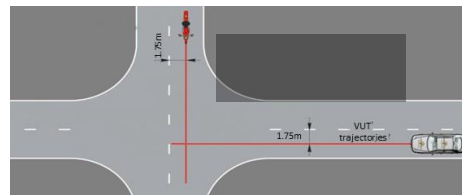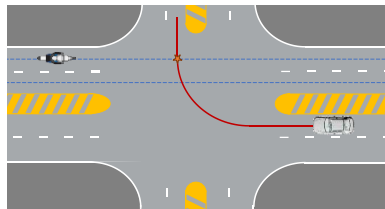
>2031 Test scenarios

|	Turning scenario, Right Turn Into Path – Perpendicular Direction	Turning scenario, Right/Left Turn Across Path – Same Direction	Head-on scenario, opposite direction - lane change motorcycle manoeuver	Head-on scenario, lane change vehicle manoeuver - opposite direction
Type of test	AEB	AEB	AEB / FCW	AEB / FCW
VUT Speed [km/h]	20	30	60	60-90
VUT direction	From farside	From farside and nearside	From farside	From farside
Target speed [km/h]	40-70	50-70	60	50-60
Impact location [%VUT width]	Front right 20-40°	Side right (wheel) 0-20°	50	50 10°
Lighting condition	Day	Day	Day	Day
Obstruction	No	No	Yes	Yes
Feasability				
Comment	Similar to crossing (CMCrossing) and turning (CMFtap)	In complementary to BSD Similar to BSD and turning (CMFtap)	Half of the accident with obstruction / half clear	

*adapted to the timeline and expactations
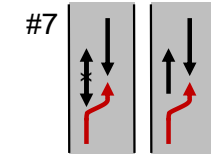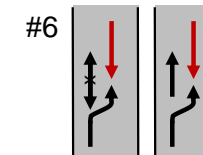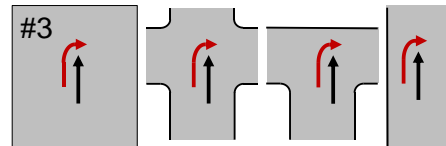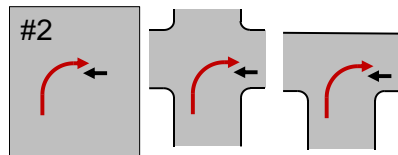
#2   #3   #6   #7

>2031 Test scenarios

	Car-to-Motorcycle Cut-in scenario	Turning scenario, straight path - right turn across path – same direction	Head-on scenario, (case: motorcycle enters car lane)
Type of test	AEB	AEB	AEB / +
VUT Speed [km/h]	**70-80**	10-40	**55-60**
VUT direction	Forward	From farside	Forward
Target speed [km/h]	40-60	**50-70**	**50-72**
Impact location [%VUT width]	Dépend of the manœuvre of the motorycle / Front left of the VUT / right side of the M	Front Right side (wheel) / 0-10° up to 60°	**100%**
Lighting condition	Day	Day	Day
Obstruction	No	No	No
Feasability			
Comment	Motorcycle manoeuvre complicated to define Impact point shows the last minute lane and it would be really difficult for the system to react.	Motorcyclist fault	Similar to head-on scenario but motorcyclist fault
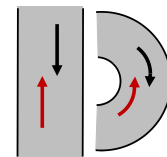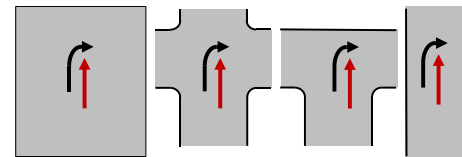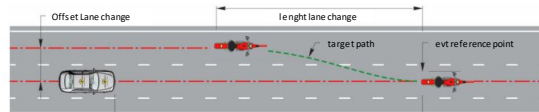
Thank you for your attention

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