ASSESSMENT AND COMPARISON OF ADVANCED DRIVER ASSISTANCE SYSTEM TEST PROCEDURES

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ABSTRACT

Vehicle safety testing programs such as the National Highway Traffic Safety Administration's (NHTSA's) New Car Assessment Program (NCAP), the Insurance Institute for Highway Safety (IIHS), the Euro NCAP, and many other regional NCAPs, have been established to elevate vehicle safety standards, raise consumer awareness, and encourage a market for safer vehicles on our roads. These testing programs have historically focused on the passive safety performance of a vehicle across a variety of collision types (e.g., frontal and side impacts) and assigning safety ratings to vehicles based on how well they perform in a series of crash tests. Active safety systems, however, increase road safety by helping the driver to either avoid potential collisions or, in the event of a collision, by mitigating the severity of the crash. While the inclusion of advanced driver assistance systems (ADAS) in these vehicle assessments began in the early part of the latter decade, assessments vary across testing organizations, both in terms of pace and implementation.

Currently, each testing program has its own testing and rating process for evaluating ADAS technologies. The goal of this project was to examine coverage of ADAS technologies across the established test programs, as well as differences between ADAS test procedures conducted or planned. Objectives consisted of gathering and reviewing ADAS test procedures, quantifying differences between available and upcoming ADAS test procedures, and summarizing differences among these global ADAS test procedures. A review of Car-to-car Automatic Emergency Braking (AEB) is included herein to demonstrate the approach and primary differences observed.

This investigation revealed a healthy coverage of ADAS technologies currently included in vehicle assessments, along with revisions and additions planned for upcoming years. General differences were observed at the organizational level, across protocols available from each testing organization and, most notably, the scoring assessments and how those were communicated. Importantly, differences pertaining to the selected scenarios, number of trials, and test equipment received most of the attention due to their direct impact on the vehicle's overall assessment.

INTRODUCTION

Vehicle safety testing programs such as the National Highway Traffic Safety Administration's New Car Assessment Program (NCAP), the Insurance Institute for Highway Safety (IIHS), Euro NCAP, and many other regional NCAPs, were established to elevate vehicle safety standards, raise consumer awareness, and encourage a market for safer vehicles on our roads. These testing programs have historically focused on a vehicle's passive safety performance across a variety of collision types (e.g., frontal and side impacts) and assigning safety ratings to vehicles based on how well the vehicle performs. Active safety systems, however, increase road safety by helping the driver to either avoid potential collisions or, in the event of a collision, mitigate the severity of the crash. These technologies are becoming increasingly common in new vehicles, with a recent report [1] citing that 92.7 percent of new vehicles in the United States had at least one available advanced driver assistance system (ADAS) feature. While the inclusion of ADAS in these vehicle assessments began in the early part of the latter decade, rapid development of additional technologies, and increased capabilities thereof, have spurred continued integration of more active safety technologies into the established rating systems across global testing organizations. The inclusion of ADAS in these vehicle assessments varies widely across testing organizations, both in terms of pace and implementation.

While these organizations share common goals of improving vehicle safety, raising consumer awareness, and encouraging a market for safer vehicles on the roads, there are fundamental differences in the types of tests conducted, how the safety tests are evaluated, and how the test results are shared with the consumer [2]. The requirements for a vehicle to score highly on a safety rating system must also be continually adapted to account for technical progress; thus, a vehicle with a high safety rating today may not necessarily be a highly rated vehicle in the future. At the same time, updating safety rating systems too often will reduce the ability of consumers to be able to compare among model years. Currently, there is no single existing standard when it comes to ADAS and crash avoidance testing procedures and performance metrics, which means that each testing program assessing active safety systems may have its own testing and rating process. Key information that may vary between testing/rating organizations includes system safety performance thresholds, assumptions, reasoning, and justification for the selection of technologies, tests, and procedures; test equipment used; the number of scenarios and test repetitions completed by a test vehicle; definitions of relevant terms and metrics; and how the results are used to create a final score/rating. Each of these factors may impact the outcomes of the testing procedures; thus, in order to better plan for future testing and understand the landscape of international testing, it is necessary to describe and quantify the differences between ADAS tests under development and/or conducted by credible domestic and international vehicle safety testing organizations.

METHODS

The goal of this project, outlined in greater detail in Neurauter et.al [3], was to examine coverage and differences between ADAS test procedures conducted by test programs across the globe. This analysis offers a review of varying approaches, shedding light on the implemented procedures per documented justifications and expert assessments. Objectives consisted of gathering and reviewing ADAS test procedures, quantifying differences between available and upcoming ADAS test procedures, and providing deliverables summarizing differences among ADAS test procedures.

Efforts were guided by a series of research questions encompassing the anticipated differences across test procedures and areas of focus during the required comparisons and assessments. Beyond taking inventory of all applicable ADAS technologies and their coverage across the identified testing organizations, addressing the provided research questions required assessing differences in test scenarios, number of trials, prescribed equipment, and data availability, while also characterizing the influence of crash statistics, key terms, assessment and scoring methods, any related assumptions or limitations, and further research needed to quantify identified differences. Finally, attempts were made to maintain awareness of upcoming changes to the protocols or technologies included within each test organization's overall vehicle assessment.

RESULTS

The following table (Table 1) provides an overview of the various vehicle testing organizations and identifies the ADAS technologies included in the safety assessments, as captured during the project's period of performance. A notation of "D" or "F" identifies ADAS technologies where draft test protocols have either been developed or are planned for future implementation. As shown, test organizations accounted for in these evaluations include NHTSA (U.S. NCAP), Euro NCAP, IIHS, and the remaining regional NCAPs (ASEAN, Australasian, Bharat, China, Global, Japan, Korean, Latin, and Taiwan), plus an emerging test organization (CIASI). A heavy emphasis on traditional ADAS technologies exists, with multiple AEB variations, FCW, blind spot, lane support systems, and speed assist systems accounted for by many of the test organizations. Other technologies have been added more recently or are considered for inclusion.

Table 1.
Overview of ADAS technologies by Testing Organization (as of September 2021)

ADAS Technologies

Legend:
Same as Euro NCAP
Emerging NCAPs / Test Houses
Primarily Passive Safety Evaluations

ADAS Technologies	Acronym	NHTSA NCAP	Euro NCAP	IIHS	ASEAN NCAP	Australasian NCAP	Bharat NCAP	China NCAP	CIASI	Global NCAP	Japan NCAP	Korean NCAP	Latin NCAP	Taiwan NCAP
Forward Collision Warning (C-to-C)	FCW	✓	✓		✓	✓		✓	✓*		✓	✓	✓	
Forward Collision Warning (C-to-VRU)		D	✓		F(25)	✓		✓	F		✓	✓	F(23)	
Automatic Emergency Braking (C-to-C)	AEB	✓	✓	✓	✓	✓		✓	✓*;F		✓	✓	✓	✓*
Pedestrian Automatic Emergency Braking	PAEB	D	✓	✓	F(25)	✓		✓	F		✓;F(24)	✓	F(23)	
Bicyclist Automatic Emergency Braking	BAEB		✓		F(25)	✓		✓	F		F(22)	✓		
Rear Automatic Braking	RAEB	D	✓		F(25)	✓						F		
Intersection Safety Assist	ISA	D	✓;F(23)			✓;F(23)					F(24)			
Blind Spot Monitoring	BSM	D	✓		✓	✓		✓				✓	✓	
Lane Support Systems	LSS	✓	✓		✓	✓		✓	✓*		✓	✓	✓	✓*
Traffic Jam Assist	TJA	D												
Rear Cross Traffic Alert	RCTA											✓		
Speed Assist Systems	SAS		✓			✓		✓				✓	✓	✓*
Active Parking Assist	APA	D												
Occupant Status Monitoring			✓;F(23)		✓	√;F(23)	✓	✓			✓	✓	✓	✓*

✓: included in vehicle assessment (*translated version not available)
D: available draft
F(--): planned for future inclusion (year where known)

Since the conclusion of the original project, the following NCAP organizations have made known, publicly, that they are planning to either implement revised test protocols in 2023 or are proposing significant changes to their test programs:

- Euro NCAP released a new protocol in June 2021, *AEB/LSS VRU Systems Test protocol v4.0*, which is scheduled to go into effect starting January 2023. The new protocol introduces a new Euro NCAP Motorcyclist Target (larger than the China NCAP scooter target) and includes new test scenarios involving both bicyclists and motorcycles.
- US NCAP (NHTSA) issued a request for comments (RFC) on March 9, 2022, proposing updates to the existing AEB procedures as well as several changes to the 2019 PAEB Draft test procedure for the purpose of adopting it for use in their assessment program.

To demonstrate the changing landscape of ADAS coverage, a cursory review across the test organizations was performed at the time of this writing to illustrate the latest awareness of planned or revised protocols that have been implemented. These changes are shown in orange in the following table (Table 2).

Table 2.
Overview of ADAS technologies by Testing Organization (2023)

ADAS Technologies	Acronym	NHTSA NCAP	Euro NCAP	IIHS	ASEAN NCAP	Australasian NCAP	Bharat NCAP	China NCAP	CIASI	Global NCAP	Japan NCAP	Korean NCAP	Latin NCAP	Taiwan NCAP
Legend:														
Same as Euro NCAP														
Emerging NCAPs / Test Houses														
Primarily Passive Safety Evaluations														
Forward Collision Warning (C-to-C)	FCW	✓	✓		✓	✓		✓	✓		✓	✓	✓	
Forward Collision Warning (C-to-VRU)		D	✓		F(25)	✓		✓	✓		✓	✓	F(23)	
Automatic Emergency Braking (C-to-C)	AEB	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓*
Pedestrian Automatic Emergency Braking	PAEB	D	✓	✓	F(25)	✓		✓	✓		✓;F(24)	✓	F(23)	
Bicyclist Automatic Emergency Braking	BAEB		✓		F(25)	✓		✓	✓		✓	✓		
PTW Automatic Emergency Braking			✓			✓								
Rear Automatic Braking	RAEB	D	✓		F(25)	✓		F(25)				F	F	
Intersection Safety Assist	ISA	D	✓			✓		F(25)			F(24)			
Blind Spot Monitoring	BSM	D	✓		✓	✓		✓				✓	✓	
Lane Support Systems	LSS	✓	✓		✓	✓		✓	✓		✓	✓	✓	✓*
Traffic Jam Assist	TJA	D												
Rear Cross Traffic Alert	RCTA							F(25)				✓		
Speed Assist Systems	SAS		✓			✓		✓				✓	✓	✓*
Active Parking Assist	APA	D												
Occupant Status Monitoring			✓		✓	✓	✓	✓	✓		✓	✓	✓	✓*

✓: included in vehicle assessment (*translated version not available)
D: available draft
F(--): planned for future inclusion (year where known)

General Differences
When analysing the available test procedures per the provided research questions, a number of typical differences stood out and were generally consistent, regardless of technology type. At a high level, this analysis of available test procedures revealed varying approaches and degrees of detail. The research team noticed that the level of detail provided in the test procedure documents varies across test organizations, particularly with respect to vehicle preparation, photographic and video documentation, instrumentation calibration, etc. In some cases, this detail was included in a general document as opposed to within each ADAS technology test procedure; but in some cases, it was simply missing.

Notably, the regional NCAP test organizations typically mimic, or at least start with, Euro NCAP procedures. Australasian NCAP, for example, is identical to Euro NCAP except for test procedures that account for road signs. Elsewhere, the other regional NCAPs typically mimic the Euro NCAP test procedures, but in some cases are modified in varying capacities and for different reasons. Related, there is a noticeable time lag between when Euro NCAP updates their procedures and when others update thereafter, which can result in temporary misalignment between procedure versions. This can result in temporary misalignment, where scenarios, required equipment, and scoring may be different between procedure versions.

Non-NCAP test organizations included in this analysis are IIHS and CIASI. The model for these organizations is different from their NCAP counterparts due to primary support offered by the insurance industry. As such, they have more flexibility in terms of the vehicles and ADAS technologies they choose to test, guided primarily by the desire to provide useful feedback to potential consumers.

Applicable Vehicles
The vehicles that the test procedures applied to also varied across the test organizations. For example, NHTSA's criteria limits testing to light vehicles with a gross vehicle weight rating (GVWR) of less than or equal to 4,536kg (10,000lbs). Euro NCAP evaluates passenger vehicles with at least four wheels, a GVWR of less than or equal to 3,500kg (7,716lbs), and less than or equal to nine seats including the driver's seat. Notably, only safety equipment available as standard features across the model range are included in the Euro NCAP safety assessments. Per conversations with IIHS, they evaluate what vehicles to prioritize based on what they feel consumers are interested in, along with considering time and cost to conduct the test, as well as vehicle popularity.

Scenario Selection and Number of Repetitions
While clear differences regarding prescribed scenarios and number of trials were observed across the various test organizations, there exists a shared philosophy to evaluate features within their anticipated capabilities, both to provide useful ratings for consumers while also driving industry towards continued improvement.

Euro NCAP, for example, relies on a consortium of members who collaboratively review recent trends and determine where revisions are appropriate for existing tests, along with what new technologies should be added to the vehicle assessments. Decisions are driven by crash statistics and feature feasibility, with the former typically based on overlapping trends, or, in some cases, driven by trends specific to a region (e.g., prevalence of cyclists or other two-wheeled vehicles). Ultimately, Euro NCAP wants every vehicle to come equipped with, and thereby benefit from, these ADAS technologies, with real-world performance similar to that observed during controlled testing.

Similarly, IIHS develops their test procedures based on real-world conditions (speeds, scenarios, etc.), driven by a desire to provide useful information for both consumers and manufacturers. For example, if all available technologies achieve 'good' ratings it may not drive the manufacturers towards continued improvement; alternatively, 'poor' ratings across the board would be indicative of tests that are beyond current feature capabilities, and not useful for consumers.

There appeared to be two different philosophies regarding repeat trials, and how to account for test-to-test variability. Using AEB as an example, IIHS and NHTSA chose 5 and 7 repeated trials respectively for a limited number of vehicle speeds, while other organizations chose 1 to 3 repeat trials across a range of speeds. With the latter, systems that respond to targets at higher speeds yield higher ratings. The organizations which utilize a smaller number of repeat trials over a wider range of relative speeds use a weighted mean of normalized results, mitigating the effect of test-to-test variability.

Example technology: Car-to-Car Automatic Emergency Braking (AEB)
Beyond identifying coverage of ADAS technologies across global test organizations, the goal of this project was to also review and examine specific differences between existing or planned test protocols. The full range of technologies and related analysis are discussed, and in greater detail, in the formal NHTSA report [3]. For this paper, the following section briefly describes the general approach taken for Car-to-Car AEB, as an example, highlighting differences between test procedures.

Automatic emergency braking (AEB), is a system that detects a potential collision and automatically applies the vehicle's brakes, regardless of the driver's response. AEB systems are often combined with an FCW system, in which case the driver would receive a warning (e.g., visual + audible) when the collision is still deemed avoidable. If the driver fails to respond in time, the system applies the brakes, thereby avoiding a collision or, at the very least, slowing the vehicle sufficiently to reduce the severity of the crash.

Although AEB technology was initially developed to address the issue of car-to-car rear-end collisions (i.e., front-to-rear), the technology has been expanded to cover VRUs, such as pedestrians (PAEB), bicycles, and motorcycles, as well as collisions that occur during backing maneuvers (i.e., rear AEB). AEB technology appears to be one of the most promising active safety systems currently available. An analysis of police-reported crash rates for vehicles equipped with low-speed AEB systems and combined, higher-speed, FCW/AEB systems versus similar vehicles not equipped found rear-end crash involvement rates were reduced by 43 and 50 percent, respectively [4]. The National Transportation Safety Board (NTSB) is now recommending that FCW and AEB technologies be required as standard equipment on all new vehicles [5]. Similarly, the United Nations has drafted a regulation supported by 40 countries that sets out the technical requirements for car-to-car AEB and PAEB systems. As a result, the European Union and Japan announced that AEB systems would be mandatory for all new vehicle types starting in 2022 [6], and on all new vehicles in 2024, respectively. Additionally, AEB looks to potentially have a positive impact on traffic safety in the United States after 20 automobile manufacturers, encompassing 99 percent of the U.S. new vehicle market, committed to a voluntary agreement in 2016 to make FCW and AEB systems standard on all new vehicles by 2022, regardless of the lack of a Federal mandate [7].

Euro NCAP was the first organization to include car-to-car AEB technologies in their safety rating and evaluations in 2014, with assessment protocols included for both low and high-speed systems. Since then, many more organizations have recognized the safety benefits of AEB systems, as shown in the following table (Table 3).

Table 3.
Organizations with Current Car-to-Car AEB Test Procedures(as of September 2021)

NHTSA NCAP	Euro NCAP	IIHS	ASEAN NCAP	Australasian NCAP	Bharat NCAP	China NCAP	CIASI	Global NCAP	Japan NCAP	Korean NCAP	Latin NCAP	Taiwan NCAP
✓	✓	✓	✓	✓	X	✓	✓	X	✓	✓	✓	✓*

✓ *- included in vehicle assessment (*translated versions not yet available)*
X *– not currently included and no information to indicate plans for future inclusion*

Scenarios to evaluate the performance of car-to-car AEB involve the SV approaching a lead vehicle from behind in the same travel lane. The difference between the scenarios relates to the actions of the lead vehicle, which is either decelerating, stationary, or braking. These same scenarios are also used to evaluate the performance of car-to-car FCW.

As illustrated in Table 4, the main differences between the testing procedures developed by the various organizations are the range of Subject Vehicle (SV) speeds covered and the overlap. Overlap percentage refers to the lateral overlap of the Principal Other Vehicle (POV) relative to the centerline of the SV. For example, 100 percent overlap means the POV is directly in front of the SV, whereas 50 percent means the POV is offset from the center of the SV and the POV is in front of only the left half of the SV.

The number of trials of each speed and scenario condition also differs between organizations. The NHTSA draft test procedures prescribe seven trials of each speed/scenario combination, whereas IIHS uses five trials. Korean and Latin NCAP only test each speed/scenario combination once; however, they test a greater range of SV speeds than NHTSA or IIHS. ASEAN, China, and Japan NCAP conduct between one and three trials per speed/scenario condition, with the number of trials dependent on how well their test results relate to the test data submitted by the manufacturer. The total number of test trials conducted by Euro NCAP and Australasian NCAP is based on manufacturer-supplied information comprising a grid of estimates of impact speed for each speed/scenario condition. The total number of trials selected for verification ranges between 10 and 20, using one trial per grid location.

Table 4.
Car-to-Car AEB Test Scenario Differences by Organization (as of September 2021)

Test Scenario	Test Parameters	NHTSA	Euro NCAP (& Australasian NCAP	IIHS	ASEAN NCAP	China NCAP	Japan NCAP	Korean NCAP	Latin NCAP
POV Stationary	SV Speed (km/h)	40	10 – 80 *increments of 5 km/h*	20, 40	10 – 60 *increments of 5 km/h*	20, 30, 40	10 – 60 *increments of 5 km/h*	10 – 60 *increments of 5 km/h*	
	Overlap (%)	100	-50, -75, 100, 75, 50	100	100	-50, 100, 50	100	100	
	Trials	7	10 - 20 total	5 each	1-3 each	1-3 each	1-3 each	1 each	
POV Moving	SV Speed (km/h)	40, 72	30 – 80 *increments of 5 km/h*		30 – 60 *increments of 5 km/h*	30, 40, 50	35 – 60 *increments of 5 km/h*	30 – 60 *increments of 5 km/h*	30 – 70 *increments of 5 km/h*
	POV Speed (km/h)	16, 32	20		20	20	20	20	20
	Overlap (%)	100	-50, -75, 100, 75, 50		100	-50, 100, 50	100	100	100
	Trials	7 each	10 - 20 total		1-3 each	1-3 each	1-3 each	1 each	1 each
POV Braking	SV Speed (km/h)	56	50					50	50
	POV Initial Headway (m)	13	12, 40					12, 40	12, 40
	POV Braking Rate (m/s^2)	-3	-2, -6					-2, -6	-2, -6
	Trials	7	1 each					1 each	1 each

Scoring
Differences in scoring were also observed, both by technology level and for how ADAS performance is incorporated into the overall vehicle assessment. Scoring for ADAS ranges anywhere from credit awarded for the technology simply being available on a vehicle, through elevated ratings for well-performing ADAS features, up to directly impacting the overall numeric score. There appears to be a shared philosophy in terms of wanting to communicate results in a meaningful manner, both to provide useful information for a consumer, while also providing feedback to manufacturers in an attempt to help drive the continued evolution, availability, and adoption of ADAS technologies.

Today, NHTSA's 5-Star Safety Rating consists of a Frontal Crash rating, a Side Crash rating, and a Rollover rating, all factoring into an Overall Vehicle Score. The current 5-Star Safety Rating does not include an evaluation of ADAS technologies. However, NHTSA does recognize the contributions that ADAS technologies can make to driver, passenger, and pedestrian safety. FCW, LDW, and AEB are recognized as Recommended Safety Technologies, and NHTSA has established test protocols and performance criteria to evaluate them. NHTSA has proposed increasing their coverage of ADAS technologies by adding a variety of ADAS technologies as part of their overall vehicle assessments.

Euro NCAP introduced the overall safety rating in 2009, based upon an assessment of the following categories: Adult Occupant Protection, Child Occupant Protection, Vulnerable Road User Protection, and Safety Assist. Total scores are determined for each category. Each category is then normalized against set thresholds, weighted, and a balance criterion is applied to determine if the vehicle would receive a 5-Star rating. Euro NCAP also has an award, Euro NCAP Advanced, that recognizes new technologies. This reward complements the Euro NCAP existing overall vehicle star rating. Its intent is to reward manufacturers who promote new technologies that have a proven safety benefit and to provide additional guidance on these new technologies to the consumer when making their purchasing decisions. Euro NCAP believes this will provide an incentive to manufacturers to accelerate the standard fitment of important new safety equipment across the entire model ranges.

IIHS began conducting its own moderate overlap frontal crash test in 1995. Side and rear tests were added over the years and IIHS introduced their Top Safety Pick rating in 2005. In 2013, IIHS began to rate vehicles for front crash prevention and introduced their Top Safety Pick+ rating. Today, to earn a Top Safety Pick rating, the vehicle must be rated Good in all of the crashworthiness tests and also receive an Advanced or Superior rating in their vehicle to vehicle and vehicle to pedestrian AEB tests. The rating also requires that the vehicle offers optional headlamps that would achieve an Acceptable or Good rating in their Headlamp Evaluation test. Top Safety Pick+ rating requires the same level of performance as Top Safety Pick and in addition, requires the Acceptable or Good rated headlamps to be standard equipment.

DISCUSSION/CONCLUSIONS

The review of all vehicle safety programs revealed a broad coverage of ADAS technologies currently included in vehicle assessments, along with revisions and additions planned for upcoming years. Test organizations examined included the range of NCAPs, notably NHTSA (U.S. NCAP) and Euro NCAP, along with the regional NCAPs (ASEAN, Australasian, Bharat, China, Global, Japan, Korean, Latin, and Taiwan). IIHS and the emerging China Insurance Automotive Safety Index (CIASI) represented the public sector. The included inventory matrix illustrates an increasing emphasis on integrating ADAS into these vehicle assessments. These active safety assessments, in combination with continued advancements on the passive safety tests and metrics, serve as the primary manner for comparing vehicle safety.

Euro NCAP leads the way in terms of overall coverage, both with the number of technologies included and the scenario variations accounted for. While the regional NCAPs typically take their cue from Euro NCAP, using their established test procedures as a starting point, our analysis revealed that modifications are frequently applied, from scenario variations through unique additions. In some cases, regional NCAPs have implemented test procedures for a technology not covered by Euro NCAP, such as Korean NCAP's sole coverage of RCTA, for example.

General differences were observed across the organizations' specific test procedures for each technology included in their vehicle assessments, as expected. Differences pertaining to the selected scenarios, number of trials, and test equipment were frequently observed. Clearly, these test procedures are influenced by each organization's awareness of crash statistics and trends, along with accounting for the maturity of each available technology. These differences may be explained by regional differences in crash trends and conflict types, ADAS penetration, and the use of older Euro NCAP protocols. The strategy associated with number of trials also varied but was typically consistent within an individual organization's approach.

Scoring for ADAS ranges anywhere from credit awarded for the technology simply being available on a vehicle, through elevated ratings for well-performing ADAS features, up to directly impacting the overall numeric score. As discussed, there appears to be a shared philosophy in terms of wanting to communicate results in a meaningful manner, both to provide useful information for a consumer, while also providing feedback to manufacturers in an attempt to help drive the continued evolution, availability, and adoption of ADAS technologies. Notably, some testing organizations only review performance for ADAS technologies that are available as standard equipment on a given vehicle model, which could influence the increasing availability of these technologies into vehicles that are within reach of a larger percentage of the population.

Ultimately, the analysis conducted throughout this project provides a snapshot of the current ADAS test procedure landscape across vehicle assessment programs. Using Car-to-Car AEB as an example, differences were highlighted to emphasize the varying approaches employed.

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