

# Development of Malaysia's Dashcam Rating Program: Results and Insights from CAMSCORE Phase 1

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## REVIEW

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**ABSTRACT** – *The Dashboard Camera Safety Scorecard (CAMSCORE) is a national initiative launched in 2022 by the Malaysian Institute of Road Safety Research (MIROS) in collaboration with CyberSecurity Malaysia (CSM). Developed under the Memorandum of Cooperation between both agencies, the program introduces a star rating system to evaluate dashcams available in the Malaysian market. CAMSCORE assesses products based on three main criteria: basic features, advanced features, and Advanced Driver Assistance System (ADAS) alerts. The program aims to enhance consumer awareness, promote the adoption of reliable dashcam technologies, and encourage safer driving practices while supporting road crash investigation efforts. During Phase 1 of the program, 60 dashcam models from both international and local brands were evaluated, with results ranging from two to five stars. Findings from this phase provide key insights into current market readiness, feature distribution, and the potential of dashcam technology to strengthen national road safety outcomes. By serving as a reliable tool for guiding consumer purchasing decisions, CAMSCORE is expected to contribute to national road safety efforts through the adoption of in-vehicle digital technologies, particularly dashcams.*

**KEYWORDS:** CAMSCORE, dashcam, star rating, in-vehicle digital technology, consumer awareness, road safety.

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## 1. INTRODUCTION

It has been reported that children transported in private vehicles are the leading group of casualties. Approximately half a million road crashes were recorded over the 10 years up to 2024, excluding the COVID-19 pandemic years of 2020 and 2021. From the figure, more than 6,000 road fatalities were recorded each year for the same period. Motorcyclists contributed over two-thirds of total road deaths, followed by passenger vehicles. In 2023 alone, 6,473 road deaths were recorded (Royal Malaysia Police, 2023), which led to around RM 20.1 billion of economic loss to the nation.

Road crashes and near-miss incidents are typically the result of multiple interacting factors, including human error, vehicle performance, and environmental conditions. These elements often combine in complex ways, with driver-related issues – such as inattention, speeding, or impairment – amplified by road design and weather factors. Addressing these challenges requires the adoption of technologies capable of both reducing associated risks and offering valuable insights into the underlying causes of such incidents.

Dashboard cameras (dashcams) are among the technologies that have proven effective for traffic and accident monitoring. As highlighted in a study by MIROS, dashcams are capable of recording real-time footage of road conditions, driver behavior, and accident events, making them a valuable tool for

accident investigation and for identifying contributing factors in road crashes and near-miss incidents. The video evidence they capture can serve as crucial support in such analyses (Ariffin et al., 2021). Additionally, dashcams offer important documentation in the event of disputes or insurance claims, assisting authorities in making more accurate evaluations and enhancing road safety policies. An online dashcam consumer study conducted in Malaysia reported encouraging results (Tamrin, 2022). Most respondents believed that using a dashcam helps them become more responsible drivers and encourages greater compliance with traffic laws. A remarkable 99.5% of respondents agreed that dashcams serve as reliable evidence in road incidents, such as collisions or near-miss occurrences. Notably, over 80% of respondents supported the idea of making dashcams a mandatory feature in vehicles.

Other related technologies, such as vehicle collision warning systems, lane-keeping assist, and advanced driver-assistance systems (ADAS), also play significant roles in reducing road accidents. These systems can detect potential hazards, alert drivers to unsafe conditions, and even take corrective actions to prevent collisions, thus enhancing vehicle safety and reducing the likelihood of accidents. Certain warning systems, such as forward collision and lane departure alerts, have already been integrated into dashcams by manufacturers. Other common ADAS warning systems include front vehicle start alert, driver attention, pedestrian detection, and blind spot monitoring.

In combination, these in-vehicle digital technologies reinforce the role of dashcams and ADAS in offering a holistic approach to road safety enhancement. They not only facilitate accident investigations and the identification of contributing risk factors but also play a crucial role in reducing road traffic fatalities and injuries. The broader integration of such technologies into vehicles nationwide has the potential to elevate public awareness of safe driving practices, enhance the enforcement of traffic regulations, and support data-driven infrastructure planning based on actual traffic patterns and incident records.

As Malaysia continues its efforts to enhance road safety, adopting and integrating vehicle digital technologies like dashcams, motorcycle cameras, and other advanced vehicle technologies will be essential in reducing road fatalities, minimizing economic losses, and fostering a safer road environment for all users.

### **1.1 Global Perspectives on Dashcam Legality and Usage Trends**

According to Mordor Intelligence (2025), the dashcam market is expected to grow from USD 5.40 billion in 2025 to about USD 8.89 billion by 2030, at a compound annual growth rate (CAGR) of around 10.5%. This growth is largely fueled by the mandatory installation of in-vehicle data recorders in Europe, insurance telematics programs in North America, and AI features, which fuel dashcam adoption among fleet operators. Strict regulations in Europe have made factory-installed dashcams standard, while Asia's strong auto production and supportive insurers drive rapid growth.

The legal status of dashcam varies greatly around the world, making it a complex topic. There is no single law that governs their use globally, and existing regulations differ from one country to another. In some countries with clear laws – such as those in the European Union – strict privacy rules under the General Data Protection Regulation (GDPR) make dashcam use more limited (European Data Protection Board, 2020; Christensen, 2024). Public sharing of footage is often restricted, and user acceptance tends to be lower. In contrast, countries like Russia, the United States, and Malaysia show higher acceptance of dashcams, especially where there are no strict laws or privacy regulations (Lavrinc, 2013; Laukkonen, 2021; Ariffin et al., 2021; Tamrin, 2022). Dashcam footage in these places is commonly used for accident investigations and legal claims. Even within regions that have regulations, the level of public use can vary widely depending on government support, enforcement, and public awareness.

In Malaysia, although there are no specific laws regulating dashcams, efforts like the CAMSCORE program have been introduced to promote higher standards and more responsible use (MIROS, n.d.). Across countries, several common trends can be seen: dashcam footage is often accepted in court if privacy laws are followed; privacy remains a key concern, especially in Europe; some places have rules about where dashcams can be mounted to avoid blocking the driver's view (Henderson Law, 2022);

and commercial use of dashcams is growing, particularly in fleet management and road safety programs (Geotab, 2023; Berg Insight, 2022; Morder Intelligence, 2025). These differences highlight the need for balanced policies that protect privacy while encouraging the safe and responsible use of dashcams.

## 1.2 CAMSCORE Program

With the CAMSCORE program, consumers and users gain valuable insights into the quality of a dashcam while also ensuring that their purchase is worth the price. By providing objective and reliable ratings, CAMSCORE empowers users to make informed decisions, enhancing both their driving experience and safety.

The following outlines the main objectives of the program:

- To stimulate good dashcams to enter the Malaysian market;
- To assist in crash investigation and ultimately reduce related road crashes by encouraging safe driving; and
- To provide consumers with an additional tool to be used when choosing a dashcam to purchase while providing deeper insights into the safety aspect.

## 2. APPROACH

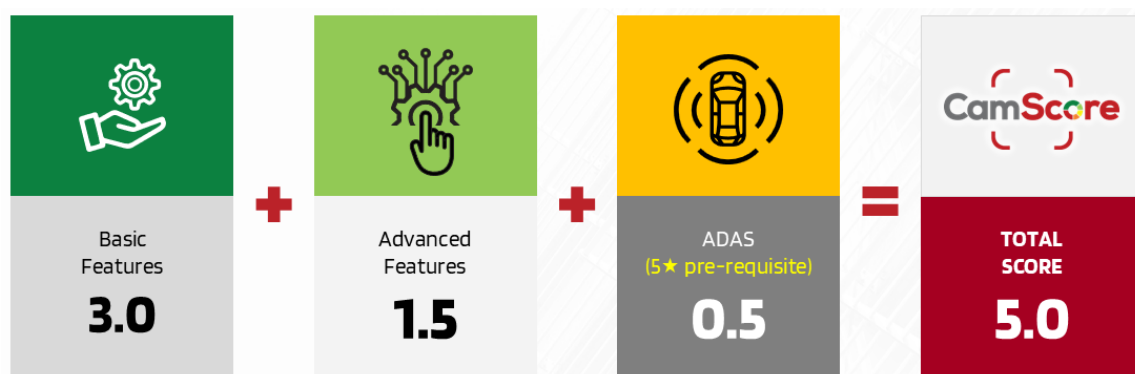
Manufacturers or distributors first submit applications through an official online portal. Dashcams are then subjected to assessments carried out by technical assessors and experts from MIROS' Vehicle Safety and Biomechanics Centre (VSB) and CyberSecurity Malaysia's Digital Forensics unit. The initial phase (Phase 1) of CAMSCORE evaluates dashcam model specifications across three predefined feature components – basic, advanced, and Advanced Driver Assistance System (ADAS) – in providing a comprehensive review of the items within each category.

**TABLE 1:** Feature components

| Features                             | Items                                                                                                                                                                                                                                                                                      |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Basic features</b>                | Frame rate (fps), night mode, resolution, pixel, recording angle (field-of-view), storage, loop recording, emergency recording (automatic trigger), warranty period, OS compatibility, date & time stamp, auto ON/OFF operation (auto start and recording), built-in battery, user manual. |
| <b>Advanced features</b>             | App control, Wi-Fi connectivity, GPS (built-in), parking mode, display – screen availability, audio recording, voice control/command, speed indicator, backup power supply, multi-input cameras, package inclusive of rear dashcam.                                                        |
| <b>ADAS</b><br>(5-star prerequisite) | Lane departure warning system, forward collision warning system.                                                                                                                                                                                                                           |

Each item is scored and verified against predefined criteria in accordance with the CAMSCORE Assessment and Application Guide (Ariffin et al., 2023). The assessment follows the score distribution illustrated in Figure 1, wherein Basic Features (3.0), Advanced Features (1.5), and ADAS (0.5) are weighted components contributing to the total score. After assessment, the dashcam model is assigned a 1- to 5-star rating and awarded a CAMSCORE rating plate, reflecting its overall performance based on the evaluated specifications.

To qualify for a 5-star rating, a dashcam must first satisfy an exclusive ADAS prerequisite. This requires achieving the full minimum score of 14 points in the Basic Features category. In addition, the dashcam must include at least one ADAS alert feature – specifically Lane Departure Warning (LDW) and/or Forward Collision Warning (FCW) – to meet the 5-star eligibility criteria. Detailed descriptions of the assessment criteria, evaluation methodology, and scoring procedures are provided in the CAMSCORE Assessment and Application Guide. The final ratings of evaluated models are then published to promote transparency and enable informed consumer purchasing decision-making.



**FIGURE 1:** CAMSCORE score distribution

### 3. 2022 – 2024 PHASE 1 RESULTS

In 2022, Phase 1 of CAMSCORE assessed 40 dashcam models, with the results publicly released at the CSM MOVE Conference in November. Phase 1 continued into 2023-2024, during which the program expanded its evaluation to include 20 additional popular dashcams from both international and local brands. The ratings ranged from 2 to 5 stars, with 12 models earning 5 stars throughout the 2022–2024 assessment period. This structured evaluation process not only provides consumers with transparent insights into product performance but also encourages manufacturers to integrate advanced safety features. The following Table 2 presents a summary of the 2022–2024 CAMSCORE Phase 1 results.

**TABLE 2:** Results overview

| Star Rating |       | No. of Dashcams | Total Score |      |
|-------------|-------|-----------------|-------------|------|
|             |       |                 | Min         | Max  |
| 5           | ★★★★★ | 12              | 4.51        | 4.83 |
| 4           | ★★★★  | 28              | 3.75        | 4.48 |
| 3           | ★★★   | 19              | 3.07        | 3.73 |
| 2           | ★★    | 1               | 2.96        | 2.96 |
| 1           | ★     | –               | –           | –    |
| 0           | –     | –               | –           | –    |

The list of assessed dashcam brands and models, along with their respective total scores and star ratings, is presented in the Supplementary Table S1.

### 4. LIMITATIONS

CAMSCORE Phase 1 currently focuses on evaluating dashcams based on key specifications, including image resolution, field of view, and features such as GPS, voice command, and night vision. While this provides valuable insights into a dashcam’s specifications, future assessments will expand to include real-world performance and long-term durability. As the program evolves, it will incorporate assessments of key factors such as image quality (e.g., high-resolution clarity, sharp and detailed recording, low-light performance, and sufficient frame rates) as well as robustness (e.g., impact recording, data preservation after impact, and overall durability). These additions will provide a more complete evaluation of a dashcam’s performance, considering both its technical specifications and real-world reliability.

The establishment of CAMSCORE was driven by the absence of a dedicated regulation or standardized benchmark for dashcams specifically in Malaysia, which created inconsistencies in product quality and consumer expectations. Hence, the CAMSCORE program was introduced to serve as a reference framework that guides the industry in improving technical specifications and product quality. However, unlike established rating programs such as the New Car Assessment Program (NCAP) and similar automotive rating bodies for vehicle safety, Unlike vehicle crash safety, where established rating programs and international bodies such as the New Car Assessment Program (NCAP) and the Insurance Institute for Highway Safety (IIHS) provide standardized testing and regulatory benchmarks, CAMSCORE currently lacks an international reference or standardized testing protocols, posing challenges during its initial development. This posed significant challenges during its early development, as it relied heavily on existing research, data, and stakeholder engagement and manufacturer-declared specifications available on the market to define relevant performance criteria.

Additionally, current assessments do not include factors such as driver experience or installation ease, which could influence the effectiveness of dashcams in real-world driving scenarios. Incorporating these factors will enhance the rating ability to guide consumers in making more informed, holistic purchasing decisions. Future enhancements will cover additional areas like power management (e.g., battery life and parking mode reliability) and interoperability with vehicle systems – key elements for everyday reliability that will round out our evaluations. Advanced features like AI-based event detection, cloud storage integration, or loop recording efficiency are not yet assessed, overlooking aspects critical for modern usage.

## 5. CONCLUSION

The introduction of CAMSCORE, a pioneering initiative in Malaysia, marks a significant advancement in the nation's efforts to enhance road safety through the evaluation of in-vehicle digital technologies, particularly dashcams. As an independent rating program, CAMSCORE not only supports informed consumer decision-making but also promotes the manufacture of high-quality dashcams and encourages safer driving behavior among road users. This paper presents the rationale behind CAMSCORE's establishment, its assessment methodology, and the results of Phase 1 conducted during the 2022-2024 period. It is hoped that the CAMSCORE dashcam rating program will play a vital role in ensuring high-quality, standardized dashcams are available in the market. The program encourages manufacturers to maintain quality standards and raises consumer awareness of dashcam benefits and proper usage. By empowering consumers with reliable product information and fostering industry accountability, CAMSCORE serves as a catalyst for advancing road safety and the development of in-vehicle digital technologies. As public interest in in-vehicle digital technologies continues to grow, CAMSCORE is expected to play an increasingly important role in supporting national road safety strategies, industry development, consumer education, and ultimately the reduction of traffic-related fatalities and injuries in Malaysia.

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## SUPPLEMENTARY

**TABLE S1:** List of assessed brands and models with rating

| CS-ID | Dashcam Brand & Model                     | Assessment Year | Total Score | Star Rating |   |
|-------|-------------------------------------------|-----------------|-------------|-------------|---|
| C60   | AZDOME M17PRO                             | 2024            | 4.55        | ★★★★★       | 5 |
| C59   | AZDOME GS63HPRO                           | 2024            | 4.14        | ★★★★        | 4 |
| C58   | AZDOME M330                               | 2024            | 3.82        | ★★★★        | 4 |
| C57   | AZDOME AR12                               | 2024            | 4.01        | ★★★★        | 4 |
| C56   | AZDOME AR09                               | 2024            | 3.96        | ★★★★        | 4 |
| C55   | AZDOME M550PRO                            | 2024            | 4.23        | ★★★★        | 4 |
| C54   | AZDOME M300S                              | 2024            | 4.29        | ★★★★        | 4 |
| C53   | AZDOME M27S                               | 2024            | 4.19        | ★★★★        | 4 |
| C52   | 70mai A510                                | 2024            | 4.69        | ★★★★★       | 5 |
| C51   | AZDOME M580                               | 2024            | 4.19        | ★★★★        | 4 |
| C50   | AZDOME GS63Pro                            | 2024            | 4.83        | ★★★★★       | 5 |
| C49   | DDPAI N5                                  | 2024            | 4.78        | ★★★★★       | 5 |
| C48   | Machtig X3                                | 2024            | 4.38        | ★★★★        | 4 |
| C47   | Gnet G-ONX                                | 2024            | 4.24        | ★★★★        | 4 |
| C46   | 70mai A810                                | 2024            | 4.69        | ★★★★★       | 5 |
| C45   | TRAPO i-SIGHT T-350                       | 2023            | 3.97        | ★★★★        | 4 |
| C44   | TRAPO i-SIGHT T-550                       | 2023            | 4.20        | ★★★★        | 4 |
| C43   | AKEEYO AKY-D10                            | 2023            | 4.10        | ★★★★        | 4 |
| C42   | FineVu GX1000                             | 2023            | 4.51        | ★★★★★       | 5 |
| C41   | FineVu GX300                              | 2023            | 4.51        | ★★★★★       | 5 |
| C40   | SAFECAM V8 PLUS                           | 2022            | 3.27        | ★★★         | 3 |
| C39   | SAFECAM V20 PRO                           | 2022            | 3.57        | ★★★         | 3 |
| C38   | SAFECAM VI 3 TOUCH                        | 2022            | 3.10        | ★★★         | 3 |
| C37   | AZDOME BN03                               | 2022            | 3.98        | ★★★★        | 4 |
| C36   | AZDOME AR08                               | 2022            | 4.15        | ★★★★        | 4 |
| C35   | AZDOME M63                                | 2022            | 3.99        | ★★★★        | 4 |
| C34   | AZDOME PG16S-R                            | 2022            | 4.13        | ★★★★        | 4 |
| C33   | AZDOME M300                               | 2022            | 4.09        | ★★★★        | 4 |
| C32   | AZDOME GS63H                              | 2022            | 3.98        | ★★★★        | 4 |
| C31   | AZDOME MO1 PRO                            | 2022            | 4.15        | ★★★★        | 4 |
| C30   | AZDOME M550                               | 2022            | 4.08        | ★★★★        | 4 |
| C29   | AZDOME M17                                | 2022            | 4.15        | ★★★★        | 4 |
| C28   | DDPAI Z50                                 | 2022            | 4.44        | ★★★★        | 4 |
| C27   | [WT] 1296P / 1080P Dual Lens Car Dash Cam | 2022            | 3.10        | ★★★         | 3 |
| C26   | [WT] 1080P HD U2 USB Car Camera           | 2022            | 3.26        | ★★★         | 3 |
| C25   | SIPII SP300                               | 2022            | 3.48        | ★★★         | 3 |

|     |                             |      |      |       |   |
|-----|-----------------------------|------|------|-------|---|
| C24 | Thinkware U1000             | 2022 | 4.56 | ★★★★★ | 5 |
| C23 | SIPRII SP400                | 2022 | 3.43 | ★★★   | 3 |
| C22 | SIPRII SP200i               | 2022 | 3.69 | ★★★   | 3 |
| C21 | [WT] 4IN1 HD Car Recorder   | 2022 | 3.07 | ★★★   | 3 |
| C20 | IROAD X11                   | 2022 | 4.48 | ★★★★  | 4 |
| C19 | Goluk T3                    | 2022 | 3.41 | ★★★   | 3 |
| C18 | Ettro 4-inch Car Recorder   | 2022 | 2.96 | ★★    | 2 |
| C17 | DDPAI Mola A2               | 2022 | 3.41 | ★★★   | 3 |
| C16 | DDPAI X2S Pro               | 2022 | 3.93 | ★★★★  | 4 |
| C15 | DDPAI MINI5                 | 2022 | 4.03 | ★★★★  | 4 |
| C14 | DDPAI Mola N3 Pro           | 2022 | 3.73 | ★★★   | 3 |
| C13 | DDPAI Mini3                 | 2022 | 3.58 | ★★★   | 3 |
| C12 | DDPAI Z40                   | 2022 | 3.88 | ★★★★  | 4 |
| C11 | DDPAI X5 Pro                | 2022 | 4.52 | ★★★★★ | 5 |
| C10 | DDPAI Mini                  | 2022 | 3.45 | ★★★   | 3 |
| C9  | DDPAI Mola N3               | 2022 | 3.63 | ★★★   | 3 |
| C8  | 70mai Lite                  | 2022 | 3.40 | ★★★   | 3 |
| C7  | 70mai Rearview Dashcam Wide | 2022 | 3.63 | ★★★   | 3 |
| C6  | 70mai M500                  | 2022 | 4.53 | ★★★★★ | 5 |
| C5  | 70mai M300                  | 2022 | 3.38 | ★★★   | 3 |
| C4  | 70mai Pro Plus+ A500S       | 2022 | 4.59 | ★★★★★ | 5 |
| C3  | 70mai A800S                 | 2022 | 4.59 | ★★★★★ | 5 |
| C2  | 70mai A400                  | 2022 | 3.75 | ★★★★  | 4 |
| C1  | 70mai 1S                    | 2022 | 3.37 | ★★★   | 3 |

\*Note: [WT] – without trademark