Technology to make the **roads safer**

By: Jon Knox

Vehicle occupants, other road users and pedestrians are benefiting from the increasing amount of safety technology being built into vehicles as standard equipment.

"New cars on the market continue to offer more advanced technology as standard, and include systems that were not even considered an option a few years ago," says Michiel van Ratingen, Secretary General of Euro NCAP.

"Vehicle manufacturers must respond on all levels to consumer expectations, but adding more safety is often challenged by market conditions. Despite this, we see the latest state- of-the-art safety technology being made standard on many of Europe's best-selling family cars," he said in May when Euro NCAP published the safety ratings of five new vehicles.

Safety systems that will help improve road safety include: advanced emergency braking systems, intelligent speed assistance, emergency lane-keeping systems, driver drowsiness and attention warning, advanced driver distraction warning and reversing detection systems. Many of these safety systems form the basis of technologies that will be used for the deployment of automated vehicles.

In its 2025 Roadmap, NCAP says, "Euro NCAP will keep challenging vehicle manufacturers on what they are actually selling to consumers on the European market. This means offering the best possible technology as standard in all segments and countries, protecting car occupants of all ages, sizes and shapes while also looking out for the safety of other road users in traffic.

"Euro NCAP has already introduced some important updates to the crash test program in recent years, and revisions to the front and side impact tests are planned as well. This shows that secondary safety is and will remain at the heart of Euro NCAP's consumer ratings for some time.

"But Euro NCAP has clearly recognized that primary safety has an increasingly important role to play. As the rate of development in this area accelerates, the safety rating is expected to include more and more ADAS and crash avoidance technologies that will be introduced by vehicle manufacturers. In the upcoming period, Euro NCAP will also pay more attention to tertiary safety in the rating using the Haddon Matrix (Haddon, 1972) as guidance. Hence, the strategy going forward will emphasize primary, secondary and tertiary vehicle safety as important enablers on the road to vision zero".

Automotive Industries (AI) asked Dr Mike Lenné, SVP, Fleet and Human Factors at Seeing Machines, where Euro NCAP stands on the use of technology for safety.

Dr Mike Lenné, SVP, Fleet and Human Factors at Seeing Machines.

Lenné: Euro NCAP is actively aiming to standardize vehicle and road safety measures by promoting the use of new technologies. The organization's 2025 Roadmap references driver monitoring solutions (DMS) as a means to improve safety outcomes:

"Euro NCAP envisages an incentive for driver monitoring systems that detect impaired and distracted driving and give appropriate warning and take effective action. The assessment will evolve around how reliably and accurately the status of the driver is detected and what action the vehicle takes based on the information."

Following the ideas outlined in their 2025 Roadmap, Euro NCAP is defining key protocol enhancements for the introduction of occupant state monitoring technology to improve safety measures in all new vehicles from 2022. More importantly, the group's direction is generally followed globally, which means that automakers outside of Europe are also likely to adopt its requirements.

In the spirit of collaboration, Euro NCAP hosted a workshop in France earlier this year and brought together auto manufacturers and suppliers to begin discussions about the testing protocols for the application of new technologies. We were present at the workshop and offered our own insights surrounding driver monitoring system (DMS) implementation.

The outcome of that workshop, which included technology and solution presentations, will become evident in the months ahead. Results will demonstrate which standards must be adopted to realize the objective of enhanced vehicle safety.

Euro NCAP's approach will remain important in the years ahead, even as autonomous transportation becomes more

commonplace. Driverless vehicles will require driver assist systems in the event of backup scenarios and to better help bridge the transition into increasing levels of autonomy.

AI: How does Seeing Machines fit in?

Lenné: As a leading provider of monitoring solutions, Seeing Machines is well positioned to define issues around driver state assessment concepts and the supporting technology. Seeing Machines has developed occupant state monitoring solutions for nearly 20 years, and we're actively leveraging our deep experience with our customers and groups like Euro NCAP to better shape driver safety protocols.

Our human factors-led (collaboration with customers and research partners) approach, combined with the data collected from our Guardian product, offers us a competitive advantage and drives the validation and development of our technology. We frequently join forces with industry and regulatory bodies to help shape proper protocols based on results from our numerous private and public partnerships and

the mandatory installation of DMS in all new car models sold in Europe starting as soon as 2022.

However, the industry is waiting to understand how they are going to meet requirements put forward by safety technology requirements. If camera-based monitoring is mandated by 2022, OEMs will need to make technology sourcing decisions in the next six to nine months in order to meet the regulatory timeframes and achieve the best possible safety ratings.

Given that this is still a relatively new technology for the industry we are seeing OEMs expanding their supply network to incorporate specialist providers of this technology, like Seeing Machines, to provide robust solutions and meets the needs of consumers, regulators and legislative bodies.

Some OEMs are already trying to meet the upcoming requirements. These companies are working with providers like Seeing Machines to pre-empt the protocols in order to prepare their upcoming models with features that will help improve safety and meet the standards that are yet to be defined and set by these bodies.

Dr Mike Lenné discussing the testing and refining of camera-based driver monitoring systems for trucks.

Seeing Machines systems being tested on the road.

industry collaborations surrounding drowsy and distracted driver states.

We maintain that safety technology requirements should be advanced enough to handle all challenges, and would like to see OEMs rewarded in the star rating system for adopting more advanced solutions.

AI: What technology are you developing for the next level of safety?

Lenné: Seeing Machines works with major suppliers and OEM customers to develop DMS that will meet their specific needs – safety, comfort and convenience-based – depending on the automaker's particular objectives. Our collaborative efforts and deep understanding of the safety landscape will determine what driver states and characteristics need to be understood to provide better safety outcomes.

AI: How are OEMs being affected by the consumer and legislative demand to constantly improve safety?

Lenné: They are closely monitoring decisions put forth by influential bodies like Euro NCAP, the European Commission, and the National Transportation Safety Board to help shape all vehicle requirements. As mentioned previously, Euro NCAP has called for

AI: What is the role of camera-based driver monitoring systems in helping OEMs to comply with the regulations?

Lenné: Compared to other inputs, camera-based DMS is considered to be the most accurate approach. The technology improves safety by providing instantaneous detection of driver events.

AI: What are the most important factors to consider?

When incorporating DMS in vehicles, these three factors should be top of mind:

- What should minimum viable technology concepts be – how are drowsy and distracted driver states defined and measured?
- Concerns around HMI (human machine interface) – how and when cars should inform their drivers of an impaired state in order to achieve the desired change in behavior
- What should be the testing protocols for this technology?

AI: What would you like to see happen next?

Lenné: Seeing Machines plans to promote continued industry collaboration on the three key issues previously outlined. Beyond that, we anticipate that camera-based driver monitoring systems will become mandatory across mobility sectors – including cars, vans, trucks and busses – for enhanced safety around the world. **AI**