



Driver Experience – Quality of View – Safety – Ergonomics

Racetrack CMS by Kappa optronics

Tough tests in the workshop and on the racetrack:

What drivers and technicians say about the racetrack CMS from Kappa optronics

Ergonomic vision for all drivers:

“Now, the view is perfect for everyone and every seat position.”



Reinhard Kofler

Driver / KTM True Racing Team

The biggest difference to classic side mirrors?

The quality of the view and the automatic dimming for driving at night.

The most surprising advantage of the camera system?

Probably the fact, that I don't need to move my head into the right position to have an excellent view, which has always been the case with normal rear mirrors, as they are positioned outside the car.

How does the CMS help you in a race?

In endurance races, we have always had to find a compromise between smaller and taller drivers & different seat positions, as the view needed changes. Now, the view is perfect for everyone and every seat position. This enhances the security and is therefore a large improvement.





A high risk is minimized:

“The biggest advantage in the races for sure is not to have a blind spot.”



Laura Kraihamer

Driver / KTM True Racing Team
and Marketing Specialist at KTM

The biggest difference to classic side mirrors?

The field of vision has increased enormously. There is a lot going on inside the race car and with the safety net etc. There has often been very limited vision. Now, the view is very generous.

The most surprising advantage of the camera system?

Most surprising probably was the quality of the view – there is no delay in image transmission, which gives me a great feeling as driver, to have the best possible overview in traffic.

How does the CMS help you in a race?

The biggest advantage in the races for sure is not to have a blind spot. In racing the cars often come very close to each other at very high speeds. Sometimes only centimeters separate them and it is essential to keep an overview. The so-called “blind spot” is one of the highest risks in those maneuvers and it is a great advantage to minimize this risk now. Also, I think the dimming function will be very helpful at night, as handling the traffic at night is always a big challenge.



From a technical point of view:

This is how Franz Reindl summarizes the advantages of the camera monitor system (CMS) from Kappa optronics.



Franz Reindl

Head of R&D Sportcar
at KTM AG

Enlarged field of view

The size of the standard side mirror is limited by specifications regarding air resistance, design and the overall width of the vehicle. The field of vision is therefore limited. The camera lens has an opening angle of up to approx. 60° or more. This means that the camera can capture more of the surroundings than the driver needs. The required field of vision is cut by the software and displayed to the driver on the monitor.



No blind spot

Numerous accidents happen every year because road users are in the blind spot of a vehicle. Motorcyclists and cyclists are often affected. By correctly positioning the CMS, these accidents can be avoided.

Reduced vibrations, ergonomic vision

The standard side mirror is attached to the outside of the vehicle on so-called mirror arms. At higher speeds or uneven roads, the mirror glass can start to vibrate and the field of view of the mirror becomes difficult to see. This phenomenon is particularly pronounced in racing cars. As the KTM X-Bow is also a racetrack car the advantage of the CMS can be seen on rough circuits too. In these driving situations, the CMS offers a much better view for the driver.

No glare

UN ECE Revision 46 stipulates that the driver must be able to identify vehicles driving behind based on the pair of headlights. This means that the CMS does not allow glare from headlights or other light sources. This requirement is regulated by the exposure of the camera images and provides the driver with an optimized indirect view.

Improved visibility in the dark

The CMS has a brightness sensor that enables images that are exposed for different lengths of time. In the dark, the camera image is exposed longer and thus the driver is provided with a clearly recognizable image even in the dark.

Improved visibility in pollution and bad weather

Due to the compact design of the camera and the extended field of view through the camera lens, the camera can be positioned in such a way that it is protected against environmental influences outside of the vehicle. In addition, the camera lenses are coated with a hydrophobic coating. This means that the camera lens is water-repellent. In addition to the coating, the camera lens has a much smaller area that can become dirty. The CMS thus offers a better field of vision in bad weather, since there is a much lower sensitivity to contamination.



Belt systems: the mobility of the driver in the cockpit is extremely restricted.

Ergonomics

Since the blind spot problem is minimized due to the CMS, the so-called 3S view is no longer necessary, as is required with the standard side mirror. Drivers with reduced upper body mobility can benefit from using a CMS. In the race car, the occupants are fastened with a 4- or 6-point belt.

This belt system is mandatory for most race classes for racing operation. The mobility of the upper body with a buckled multi-point belt system is limited accordingly. Since the upper body movement of the shoulder gaze is eliminated when using the CMS, this improves the ergonomics of the vehicle.

The race car has integrated the CMS monitors in the interior of the vehicle. This means that the distance to the monitors is less than the distance to the standard side mirrors on the outside of the vehicle. This reduces the movement of the driver's head to recognize the field of view.



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