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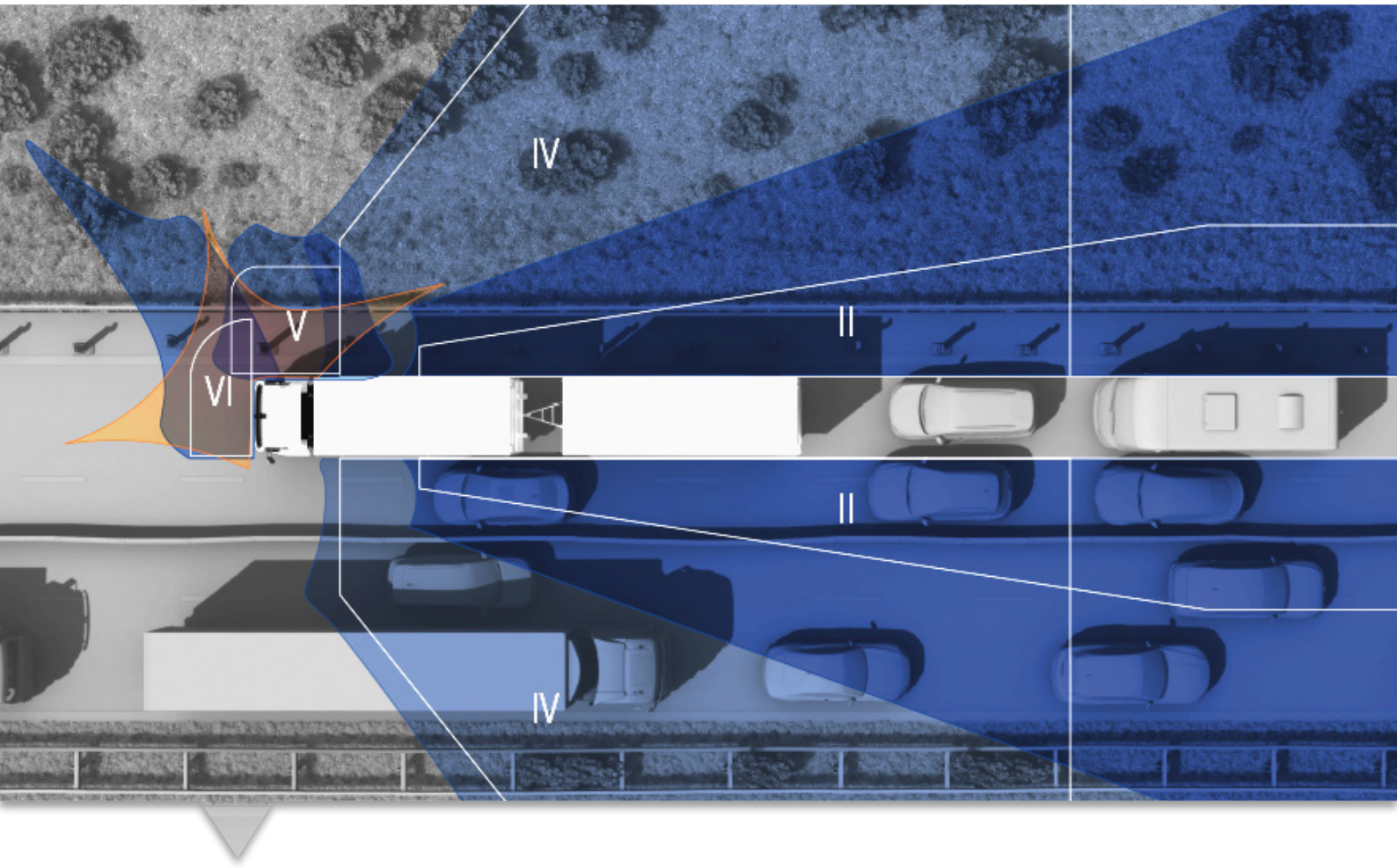


Working together for greater safety: MEKRA Lang and TRIOPTICS are implementing an efficient manufacturing solution for reliable camera systems

ProCam® Align Smart success story
in cooperation with MEKRA Lang

MEKRA LANG Group

Advanced camera platform for driver assistance systems in commercial vehicles

To ensure road safety, driver assistance systems for commercial vehicles need powerful and robust cameras, a core business of MEKRA Lang. In a process of close cooperation, TRIOPTICS realised the optimal production solution for MEKRA Lang for the cost-efficient, automated production of a new high-performance camera platform.

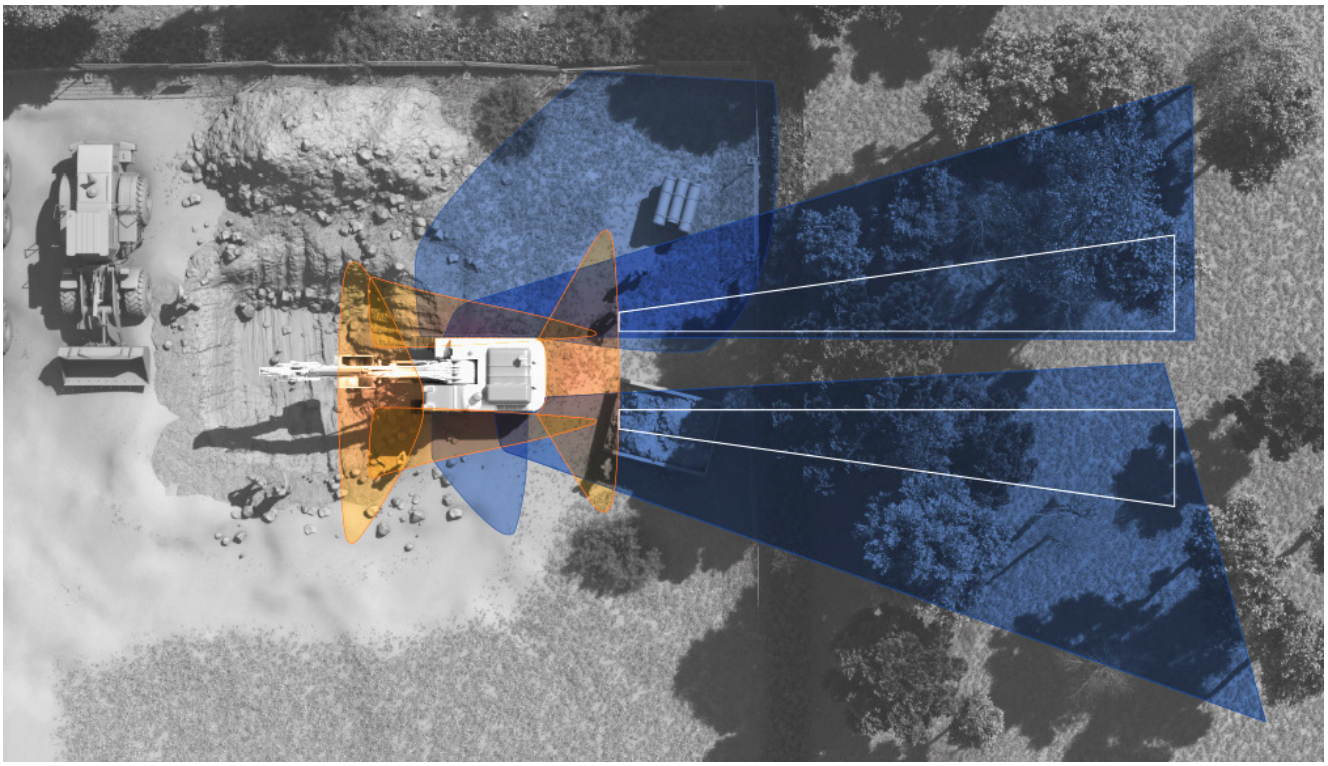
According to the ADAC, a total of 4,314 pedestrians and cyclists were involved in collisions between pedestrians or cyclists and trucks in 2019. 132 were killed. It is estimated that about one-third of the fatal collisions between heavy trucks and cyclists are accidents during turning manoeuvres.

Improved all-round visibility, combined with intelligent driver assistance systems, is intended to remedy this situation. However, such a driving assistant needs great eyesight, i.e. a robust, highly accurate camera system like the latest innovation from MEKRA Lang.

The camera systems do not currently replace mirrors but complement them by facilitating a complete, all-round view. Probably the best example is a well-known European truck manufacturer where the MEKRA Lang platform camera is installed as standard in the mirror base on the passenger side, in order to monitor the blind spot. The truck can be equipped with up to eight cameras, and up to four views can be displayed simultaneously on the monitor.

From a few hundred cameras to many thousands per year.

Rapidly increasing demand – and with it, growing production figures – have brought MEKRA Lang and TRIOPTICS together. “We have ramped up the assembly of camera modules for our platform camera from a few hundred cameras to many thousands per year using the ProCam® Align Smart system supplied by TRIOPTICS,” reports Jens Stürzenhofecker – Deputy Team Leader of Industrialisation at MEKRA Lang.



Field of view requirements for construction machines met by MEKRA Lang vision systems

In order to meet as many customer requirements as possible, a modular system has been developed to allow efficient customisation. The variants differ in terms of optical parameters, software, image signals, housing designs, and mechanical and electrical interfaces to the vehicle.

Active alignment is ground-breaking in terms of optimising the image quality.

In a first work step, the assembly – consisting of the optics and the lens holder - is pre-assembled. In the next step, the TRIOPTICS active alignment system automatically sets the focus of the assembly correctly and fixes it with adhesive. “One key challenge lies in the increasing demands on the quality of the images. Higher resolutions require larger pixel counts, often accompanied by smaller pixel dimensions and decreasing depth of field of the lenses. Active alignment systems must meet this challenge”, summarises Dirk Seebaum, Business Unit Manager of Automation at TRIOPTICS. Even with a perfect lens system, the image quality of a complete camera will deteriorate if the lens is poorly aligned with the sensor. This effect is reinforced by the camera modules’ increasing power and the higher resolution of the sensors. The most important production step is the high-precision alignment of the optics relative to the camera sensor in six axes. Active alignment with sub-micron resolution is even suitable for wide-angle optics with a field of view (FOV) of up to 170°.

Checking the results of the ProCam® software

Active alignment of optics and sensor for best possible image

“With our ProCam® Align Smart measuring and production device, TRIOPTICS offers an extremely flexible solution for the active alignment and production of high-precision camera systems. Active alignment technology is ground-breaking in terms of optimising the image quality of camera modules and is an established and efficient manufacturing process for the production of high-end camera applications,” concludes Dirk Seebaum. Thanks to having configuration files on hand, a variant change can be done in less than a minute. In doing so, various customised set-ups can be produced cost-efficiently.

Cooperation between TRIOPTICS and MEKRA Lang - it fits!

Cameras for commercial vehicles, therefore, require very robust, high-quality components that can withstand the high mechanical stresses during work. The camera system from MEKRA Lang is not only robust but also flexible in terms of its application: it can be used for blind spot monitoring on trucks, as a reversing camera to monitor the loading space on combine harvesters, and so much more. The consequences of the Coronavirus pandemic have shown how vulnerable supply chains can be. Moreover, the necessary vertical integration can only be achieved if production, process and competence are located on site. MEKRA Lang, therefore, also wanted to produce the camera module itself, and was looking for a suitable supplier for a camera production system, preferably from Germany. TRIOPTICS was found via an online search. The teams from both companies quickly hit it off, and the active alignment system was commissioned just under three quarters of a year after the order was placed.

Thanks to the partnership and expertise of TRIOPTICS, MEKRA Lang now manages the production of camera modules using active alignment. MEKRA Lang is thus ideally positioned for the future, and can manufacture the camera modules itself, independent of the supplier's process expertise. Jens Stürzenhofecker knows that "TRIOPTICS and MEKRA Lang are an excellent match. Specifically, we saw a clear advantage in the fact that TROPTICS comes from optical measurement technology. The competencies in the field of technical optics and precision mechanics offer a significant knowledge advantage."

For road safety, it is necessary that the cameras used provide reliable and optimal image quality. This is ensured by actively aligning the lens and sensor to each other and by extensive testing procedures.

ProCam® Align Smart device tested and approved by MEKRA Lang engineers

TRIOPTICS is constantly working on the further development of these technologies, and MEKRA Lang will also continue to benefit from this. And so, the next active alignment system has already been ordered from TRIOTICS and is under construction for MEKRA Lang to enable another camera production line.

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TRIOPTICS GmbH

Strandbaddamm 6
22880 Wedel
Deutschland

+49 4103 18006-0
sales@trioptics.com
www.trioptics.com

A member of the JENOPTIK Group

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