

## LASER-BASED SCANNING PIXEL LIGHT

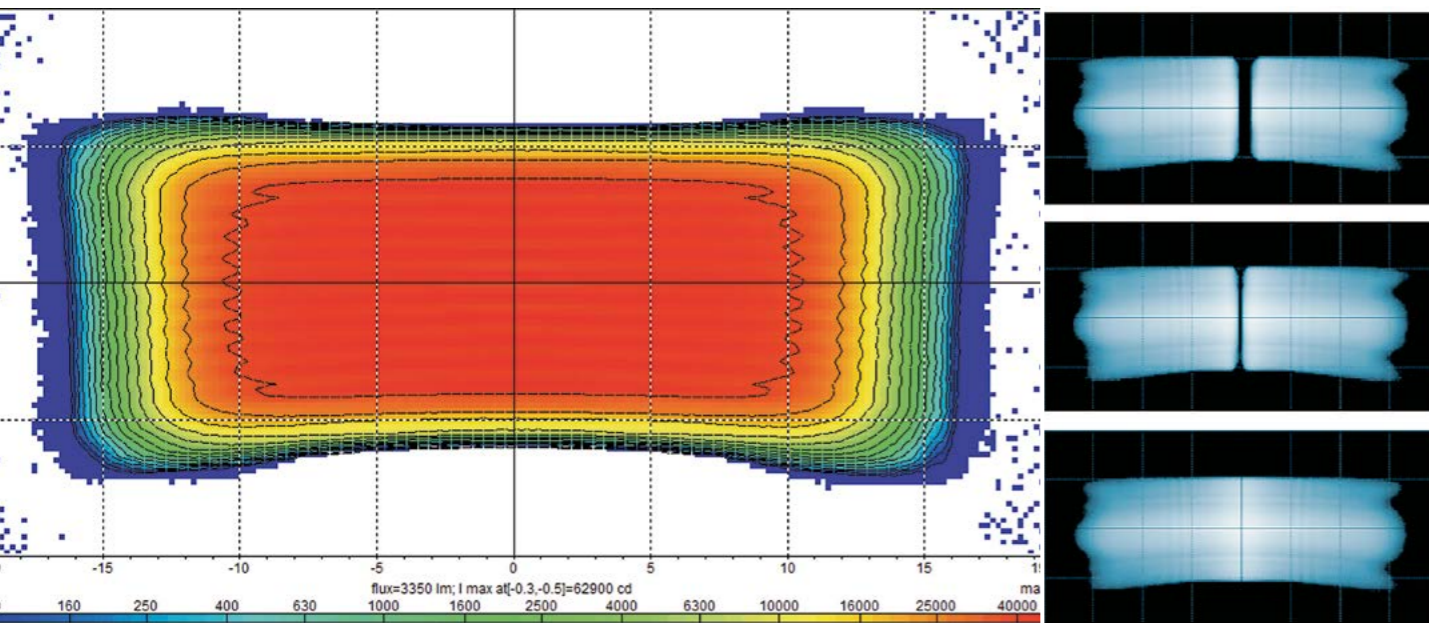
### A LOOK AT THE LIGHTS OF THE FUTURE

Halogen, xenon and LED headlights are already standard features in a wide range of models, but some interesting changes can be expected in the near future in this area, including the introduction of laser technology into vehicle lighting. Bertrandt has designed a high-resolution projection module based on this technology: the laser-based scanning pixel light.

The lighting department at Bertrandt's Cologne site has been in existence since 1995 and there have been a number of new developments in this field in recent years. The headlights of the future will be able to do more than just light up the road. Modern lighting systems provide the best possible distribution of light and also display information for drivers and pedestrians. The result is a significant improvement in safety. Bertrandt's engineers are working with this functionality to develop systems that will be used in the cars of the future. »

### THE LIGHTING REQUIREMENTS FOR THE HEADLIGHTS OF THE FUTURE:

- High resolution
- Fading individual pixels in and out
- Variable light distribution



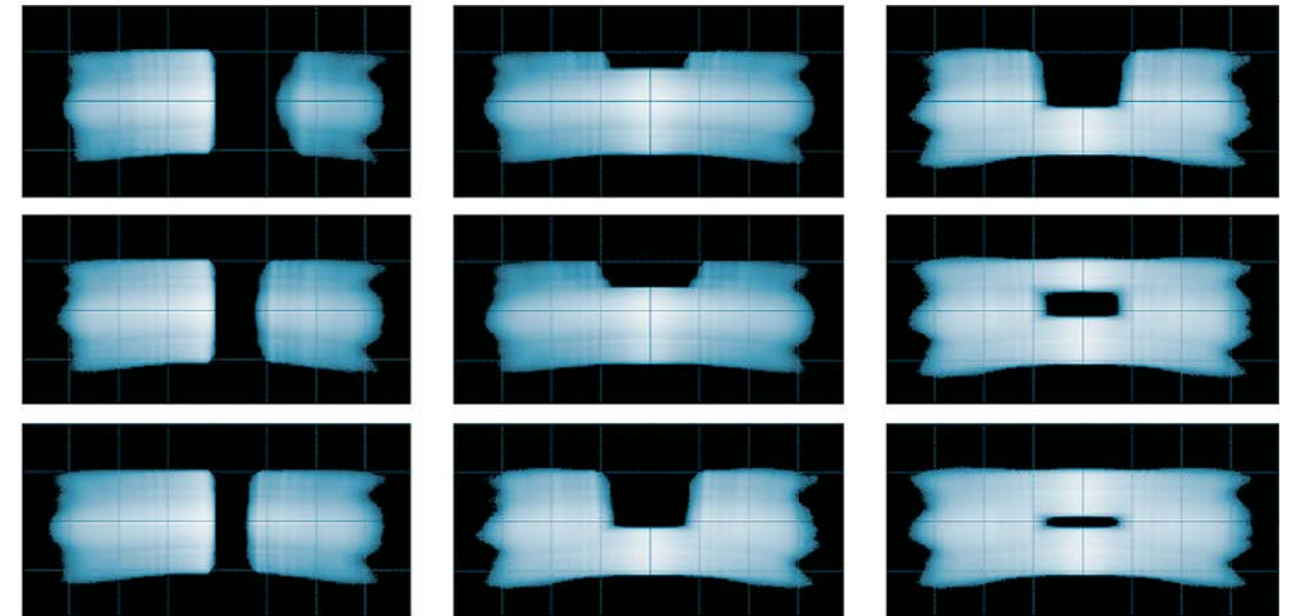
Simulation results:  
fading pixels out horizontally.

#### Introducing a new technology

The goal is to provide users with the best possible light distribution in any given situation. The main features of the light systems that the engineers are working on include maximum depth and breadth of lighting, a design that prevents oncoming traffic and pedestrians from being dazzled, the ability to highlight obstacles that have been identified and functions that illuminate road signs and project information on the road. High-resolution lighting systems are needed to meet these requirements. The automotive industry is currently exploring three technologies: MEMS, DMD and LCD. The specialists in Cologne are taking a fourth approach: the laser-based scanning pixel light which was presented at the conference of the Association of German Engineers (VDI) in Karlsruhe. The technology received a very positive response and Bertrandt was immediately commissioned to develop a prototype system.

#### Increasing skill levels

The project began with the initial idea and ran through to the construction of the first prototype. As the system was being developed on the basis of a completely new technology, there were no reference projects available with findings or other information that could be used. The project enabled Bertrandt to expand its skills in basic research, system requirements, customers' needs, regulations, vehicle integration and mechanical, optical and electronic system development.



#### In a strong position for the future

The USP of this project is that Bertrandt's Cologne site can provide all the disciplines needed for the development of lighting systems and has expertise covering all the phases of the process right through to the start of volume production. This includes the design of headlights and rear lights, simulation and visualisation of lighting, thermal simulation and electronics development. This combination of skills will continue to be a factor in the success of the Cologne site in future. Light is becoming an increasingly important feature of cars, not only as a design element, but also as an intelligent function. For Bertrandt it was essential to move one step ahead and to help to shape the future by designing the pixel light. No one currently knows how lighting systems will develop in autonomous vehicles. The Bertrandt specialists are working on the assumption that light will continue to play a key role even if there is no driver.

Sensor systems need light and are sometimes even based on lighting functions. In addition, "being seen" will continue to be crucial and it is likely that lights will also be used to communicate with other road users. ■

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