

# VRXPERIENCE

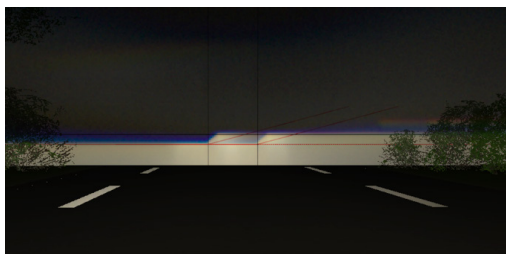
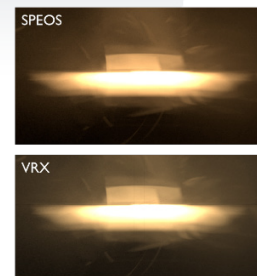
## Headlamp

**Test and validate headlamp performance with a complete physics-based simulation in a dynamic virtual driving environment.**

ANSYS VRXPERIENCE Headlamp is part of the ANSYS VRXPERIENCE product family. It reduces the need for night road tests by virtually assessing headlamp performance in real-time. It extends testing for intelligent lighting (AFS, ADB, matrix and pixel beam) and control law models to assess IIHS ratings.

### Headlamp Simulation

**Real-time and physics-based** - With this real-time and physics-based solution, users can simulate virtual prototypes of headlamps in real-time with a physically realistic simulation. Users can also consider optical properties of material and light propagation from the headlamp and other light sources. The physically realistic results produced by VRXPERIENCE Headlamp, allows users to perform accurate reviews and make reliable decisions before the physical prototyping phase. Simulations are validated in comparison to those for CIE certified ANSYS SPEOS light simulation tools. Real-time simulation allows users to include test drivers within the decision loop.



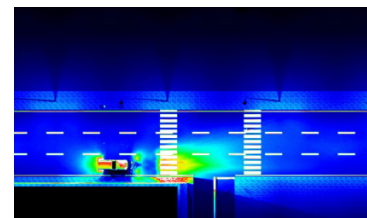
**Headlight simulation** - Simulate and test vehicle headlights during night driving conditions. Light distribution of the headlight system is based on beam distribution that is measured or simulated within ANSYS SPEOS. SPEOS generates IES (Illumination Engineering Society) files, which are standard digital files in ASCII format that measure the distribution of light, in other words the intensity of the light and its shape. It also generates a proprietary format named XMP that includes the spectrum of light as well. Intelligent lighting such as matrix beam up to 250 cells and pixel beam are simulated. Simulation can be deployed on multiple screens to provide a wide immersive environment for human-in-the-loop simulation or quality review.

**Driving scenarios** allow users to create and simulate simple driving situations that can include several vehicles. With the pixel beam or matrix beam testing scenarios, several cars can be added to the simulation. This allows users to generate scenarios, such as following a car and a crossing car in parallel. Each vehicle included in the scenario can be static or automatic. Static mode allows users to perform static evaluation at a specific point of interest. Automatic mode enables users to drive along a predefined trajectory while the operator stays focused on lighting performances. Ego vehicles can be added within a basic vehicle dynamic simulation. This allows users to test simple driving situations using either a keyboard or a Logitech<sup>®</sup> Steering Wheel. More advanced scenarios and vehicle dynamics can be addressed in co-simulation with VRXPERIENCE Driving Simulator powered by SCANer<sup>™</sup>.

**Digital mock-Up** allows users to import vehicle shapes from CAD software in 3DXML to offer an assessment of the visibility when driving a specific vehicle.

### Lighting System development

**Virtual measurement** features include tools dedicated to beam assessment and regulation check. It offers a wide set of analysis tools to detect, measure and compare any defects in beam pattern. Visualization in false colors facilitates the comparisons between different behaviors and light sources - Halogen, Xenon or LED. Measurement grids ease the assessment of homogeneity of light distribution. The aiming wall allow users to check the conformity of the cut-off according to regional regulation.

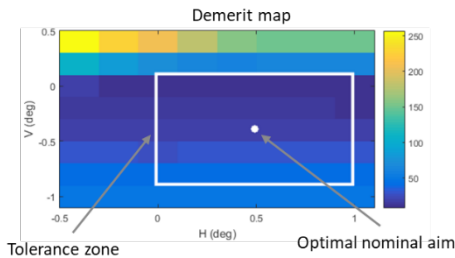




**Intelligent lighting systems** - VRXPERIENCE Headlamp includes advanced features dedicated to the development of dynamic and intelligent lighting systems. It addresses: Cornering light, Adaptive Front Lighting System, Dynamic Bending Light, Adaptive Driving Beam, Matrix Beam and Pixel Light. Functions to modify lighting modules orientation and cells power are available through C++ API, ANSYS SCADE connector or MATLAB Simulink. In addition, the solution offers pixel beam control through a mask application to the lighting system to simulate the impact of DMD or LCD behavior in real time. These functions allow users to develop or test algorithms for Matrix Beam.

## Performance Assessment

The purpose of developing a matrix beam is to put as much light as possible on the road to optimize driver safety without creating dangerous or distracting glare for drivers of other cars. This is the **Glare-Free High Beam** feature. The product feature enables users to measure the discomfort of the glare generated by the other vehicle headlamp from a driver's perspective. It comes with a visual gauge to objectively measure the discomfort of the glare on the De Boer Scale. A corresponding visual effect is also added to the rendering view to graphically show the glare impact. Measures are available through C++ API, ANSYS SCADE connector or MATLAB Simulink toolbox, to allow quantified detailed analysis on several lighting configurations and scenarios.



VRXPERIENCE Headlamp enables users to virtually evaluate and optimize the rating of the headlamp according to **IIHS - Insurance Institute for Highway Safety** - test track and measurement devices. The vehicle under test automatically drives on the defined trajectories where virtual illuminance sensors are positioned. It considers vehicle dynamics and intelligent lighting control laws. A pdf report is produced that takes into consideration the 5 lux detection threshold. Batching mode allows users to evaluate several headlamp positioning tolerances.

ANSYS VRXPERIENCE Headlamp Features	Pro	Premium
Headlamp simulation	●	●
Basic driving scenario	●	●
Real-time physics-based lighting	●	●
Virtual measurement	●	●
Smart camera		●
Lamp control		●
Glare		●
IIHS Test		●

### ANSYS VRXPERIENCE Product Line

- VRXPERIENCE Driving Simulator powered by SCANeR
- VRXPERIENCE Sensors
- VRXPERIENCE Headlamp
- VRXPERIENCE HMI
- VRXPERIENCE Sound
- VRXPERIENCE Perceived Quality
- VRXPERIENCE MRO

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