

AR/VR Lens

For Near-Eye Display Testing within Headsets



Applications

- Measurement of near-eye displays (NEDs); ideal for augmented (AR), mixed (MR), and virtual reality (VR) headsets
- Test and measurement of luminance, chromaticity, contrast, modulation transfer function (MTF), image distortion, image sticking, and x,y image position
- Characterization and quality control for devices in R&D and production

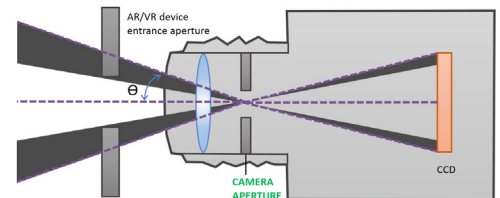
Benefits

- High-resolution, wide-FOV measurements up to 120°
- Image distortion correction to normalize wide-FOV images before testing
- Spatial x,y positions reported in degrees (°) via software
- Pairs with high-resolution ProMetric® Imaging Colorimeters and Photometers
- Easy-to-use measurement control and analysis software

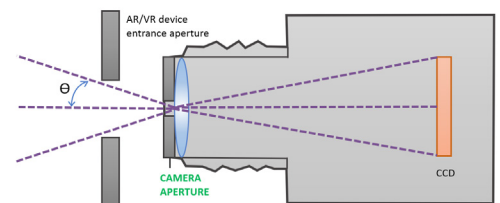
Specially-designed lens option for near-eye display testing within augmented and virtual reality headsets

The Radiant Vision Systems AR/VR lens has a unique optical design specially engineered for measuring near-eye displays (NEDs), such as those integrated into virtual (VR), mixed (MR), and augmented reality (AR) headsets. The lens design simulates the size, position, and field of view of the human eye. Unlike alternative lens options, where the aperture is located inside the lens, the aperture of the AR/VR lens is located on the front of the lens, enabling positioning of the imaging system's entrance pupil within NED headsets to view head-mounted displays (HMDs) at the same location as the human eye. With the aperture at the front of the lens, the connected imaging system can capture the full field of view (FOV) of the display (up to 120° horizontal, covering approximate human binocular FOV) without occlusion by the lens hardware. The aperture size of 3.6 mm also matches the size of a human entrance pupil, allowing displays to be measured under the same conditions as they are viewed by a human observer.

The AR/VR lens mounts directly to a Radiant high-resolution ProMetric® Y-series Imaging Photometer or I-series Colorimeter. Radiant TrueTest™ Software provides the leading display test algorithms, as well as a specialized test suite for AR/VR display analysis including Slant Edge Contrast (for MTF measurement based on ISO 12233), Image Distortion, reporting device FOV, and spatial x,y position given in degrees (°). Extensive data analysis functions are supported, including isometric plots, cross-section graphs, radar plots, bitmaps and CIE color plots.



Aperture location inside of standard lens results in image occlusion.



Aperture location in AR/VR lens enables imaging the full display field of view.



Key Features

- Aperture positioned at front of lens to simulate human eye entrance pupil, capturing full FOV of head-mounted display (HMD) projections through headset viewing lenses
- Aperture size (3.6 mm) simulates human eye pupil size
- FOV of lens (120° horizontal) covers approximate FOV of binocular human vision
- Designed to be positioned in the eye relief location

Specifications*

Parameter	AR/VR Lens				
Primary Application	Light and color measurement for near-eye displays (NED) in headsets				
Aperture	3.6 mm; Located at front of lens				
Focus	Manual; Range 0.25 m to infinity				
Luminance - Minimum	0.05 cd/m ²				
Luminance - Maximum**	10,000 cd/m ² (Y-Series); 1,000,000 cd/m ² (I-Series)				
Measurement capabilities***	Luminance, Radiance, CIE Chromaticity Coordinates, Correlated Color Temperature (CCT)				
Units***	cd/m ² , nit, W/sr/m ² , foot-lambert, CIE (x, y) and (u', v'), Kelvin (CCT)				
Paired with Camera	ProMetric I2/Y2	ProMetric I8	ProMetric I16/Y16	ProMetric I29/Y29	ProMetric Y43
Approximate Field of View**** (Horizontal)	30°	60°	90°	120°	
Approximate Field of View**** (Vertical)	22°	45°	60°	80°	

* Specifications subject to change without notice.

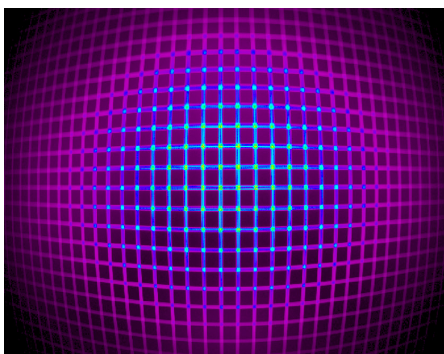
** Maximum luminance is for 1 ms. For higher luminance for Y-series cameras, contact Info@RadiantVS.com.

*** Color measurement available with I-series cameras only.

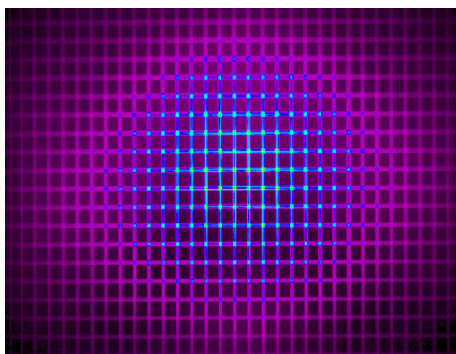
**** At 2 m working distance. Actual field of view may vary by approximately 1%.

Factory Distortion Calibration

Distortion calibration of each system ensures accurate spatial data is acquired by normalizing the lens effects in wide-field-of-view images. Radiant Vision Systems factory calibrates each AR/VR lens and camera solution to normalize image distortion before application.



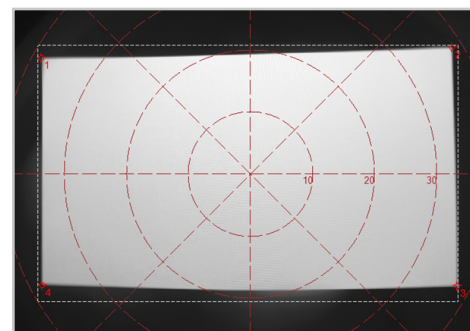
Wide-field-of-view image captured by the AR/VR lens paired with ProMetric I29—before factory distortion calibration.



Wide-field-of-view image captured by the AR/VR lens and ProMetric I29 solution—after factory distortion calibration.



Compact design for positioning the camera entrance pupil at the human eye position.



Capture and report the full display field of view to 120° horizontal.

System Recommendations

- 29- or 43-megapixel ProMetric Imaging Photometer (Y29, Y43) or Colorimeter (I29) (for maximum FOV imaging)
- 3.0 GHz and 8 cores
- 16 - 32 GB RAM
- Windows® 7 or 10, 64 bit
- Ethernet 100/1000 or USB 2.0