

# CONOSCOPE LENS

## Large field of view measurements

Imaging luminance measurement cameras (**LMK**) combined with adapted lenses offer effective all-in-one solutions for evaluating advanced near-eye displays (NED). NED manufacturers require **LMK** solutions adapted to the specific design of their devices. This involves considering the wide range of fields of view (FOV) and NED resolutions. Based on our experience in developing **LMKs**, we offer a set of formulas to determine the basic parameters of lenses for different NED concepts.



### Conoscopic lens arrangement

In a conoscopic lens, the ray bundles form a true intermediate image plane, and the final image on the image sensor is reversed compared to a classic LMK lens. The chosen conoscopic lens arrangement is convergent and provides a variable focal length for capturing different FOV up to 120° (circular image).

### Paraxial LMK Relationship

When designing a lens, the main starting point must be a classical optical instrument such as a microscope or binoculars. The human eye can only see the entire field of view when the iris is in the eye-box of the NED. This means that in NED designs, the iris must reach this space.

The eye box concept also includes space, both axially and laterally, to accommodate the iris. This is due to the diameter of the NED-XP, which can be much larger than in classical optical instruments. Very often this position is very close to the last optical NED surface. If the LMK is to capture the entire field of view of the NED, the LMK entrance pupil (EP) must be inside the NED-XP. Therefore, in a universal LMK lens design, the aperture stop (or EP) must be in front of all optical surfaces.

