

# Kaleo MTF

Automated MTF & WFE  
measurement station for  
high CRA lenses

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the phase control company





# QUICKLY CHARACTERIZE YOUR COMPLEX LENSES ...

The specifications of small lenses and assemblies have become challenging with **large Field Of Views** (FOV up to  $\pm 90^\circ$ ) and **very high Chief Ray Angles** (CRA up to  $50^\circ$ ). When either manufacturing or using small lenses, it is necessary to easily check their optical quality.

**Kaleo MTF** allows this complete and comprehensive characterization, by automatically measuring **on and off-axis MTF** and **wavefront aberrations** at multiple wavelengths.

This test station is used both in production facilities with programmable sequences or in R&D laboratories with access to advanced features and settings.

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## KEY FEATURES

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Automated



MTF & WFE



On and Off-axis



Very high CRA

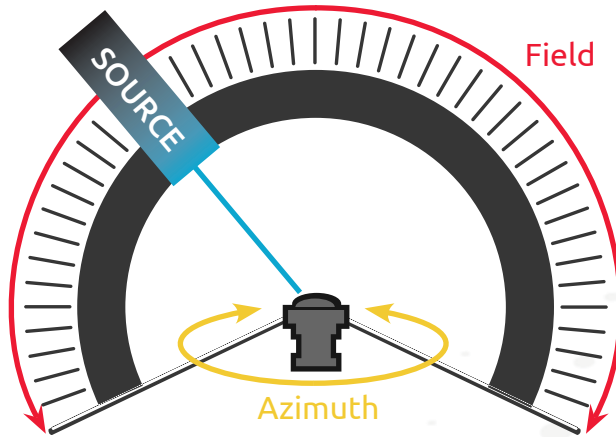


Multi-wavelength

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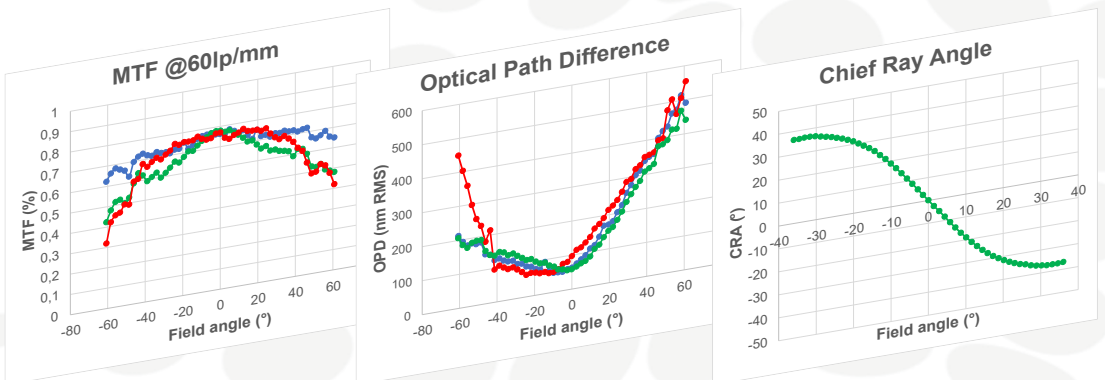
# ... THROUGH THEIR ENTIRE FIELD AND FOR ALL AZIMUTHS ...

Select your wavelengths, field angles, azimuths and number of repetitions (when repeatability assessment is needed), **Kaleo MTF does the rest.**



Access the **complete characterization** of your lenses, for each wavelength and azimuth:

- MTF (on-axis & off-axis)
- OPD (on-axis & off-axis)
- EFL
- F#
- Image height
- CRA
- Field curvature
- Distortion
- PSF
- Through focus MTF
- Zernike polynomials
- Relative illumination



Aberrations of a complex lens at — 455 nm — 530 nm — 656 nm

# ... IN JUST A FEW CLICKS

**Manage the results easily** thanks to the user friendly interface:

- Access all parameters and settings
- Ensure optimal throughput via an intuitive touch-screen interface
- Monitor acquisitions and analysis via real time status
- Access all results, available for each wavelength and azimuth, and select the desired analysis.
- Post-process data after acquisition
- Compare the results to the optical design file (compatible with Zemax)

## 1 EASY-TO-USE

- Fast and fully automated measurements and analysis
- Quick set-up with no alignment
- Easy data management with an intuitive software

## 2 COMPLETE CHARACTERIZATION

- On and off-axis MTF measurement at any frequency without target
- More than MTF with access to all aberrations of the lenses
- Highly accurate and reproducible measurements

## 3 VERSATILE MEASUREMENTS

- Various samples, even with very high CRA
- Acquisitions available at several wavelengths
- Measurement available for wide fields and all azimuths

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## MARKETS

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Automotive  
ADAS



Smartphone



AR/VR



Drone



Security

# Kaleo MTF ON & OFF-AXIS TESTING

## SPECIFICATIONS

MTF on-axis	Accuracy <1%* Repeatability <0.5%*
MTF off-axis	Accuracy <2%** Repeatability <1%**
MTF max frequency	1000 lp/mm
EFL accuracy	Accuracy 1% Repeatability 0.5%
OPD (on-axis)	Accuracy <20nm RMS Repeatability <5nm RMS

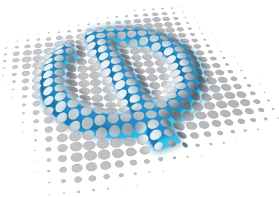
\* This specification is obtained for reference sample measured at 660 nm for 3 frequencies.

\*\* This specification is given over the whole field of view.

## FUNCTIONALITIES

Optical set up	Infinite to finite configuration
Wavelengths	Up to 8 wavelengths between 405 and 940 nm
Entrance pupil diameter	Up to 8.8 mm
f#	> 1.7
Focal length range	5 to 40 mm***
Flange focal length	8 to 33 mm***
Field of view	Up to $\pm 90^\circ$
Chief Ray angle	Up to $50^\circ$
Option	motorized azimuth ( $0^\circ$ to $360^\circ$ ) motorized lens tray
Dimensions (height x width x depth)	1520 mm x 650 mm x 890 mm
Weight	150 kg

\*\*\* Results depending on the F# of the sample



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