TechnoTeam
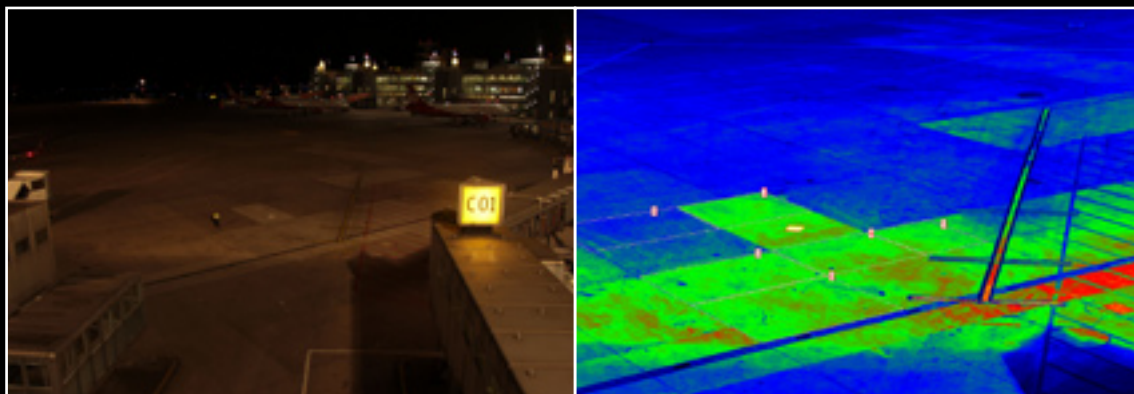## Bildverarbeitung GmbH

CAMERA PHOTOMETER
based on the Canon EOS 70D digital reflex camera

LMK
mobile air

Measuring the luminance distribution and horizontal illumination on the airports apron

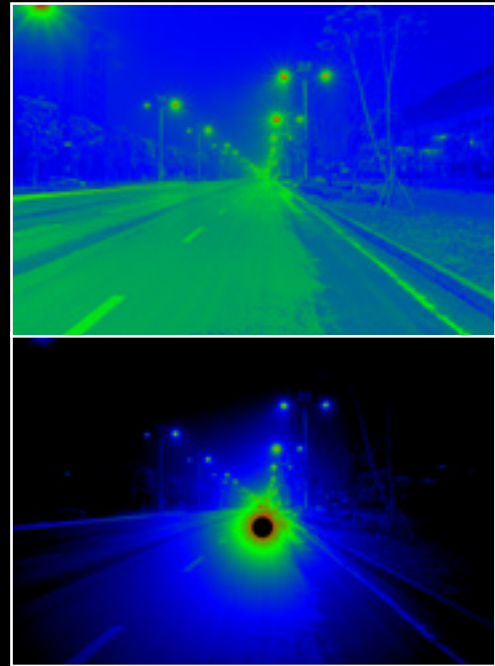**Canon 70D**
(DSLR)

SIGMA 4.5mm/2.8 EX DC
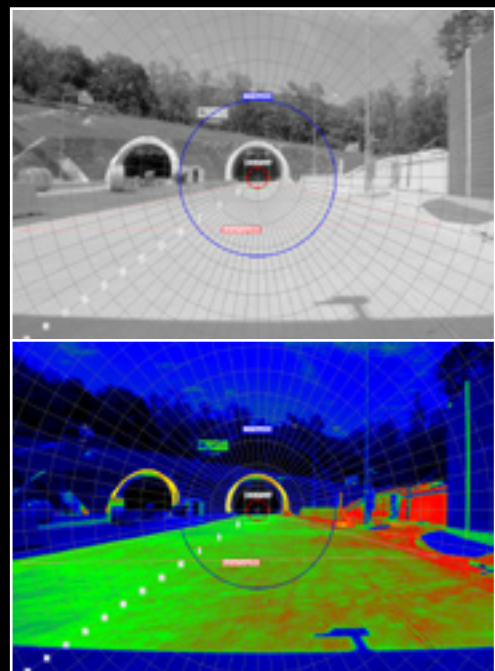Circular Fisheye

Glare evaluation

The LMK mobile air **allows easy measuring and verification of existing standards and real lighting applications concepts with regards to full illumination, glare, ergonomics and hazards.**

- ■ Glare assessment based on the TI - method for artificial road lighting (EN13201)

- ■ Performing the L20° measures for artificial lighting at tunnel entrances (CIE Publ. 88)

- ■ Determining glare values for artificial outdoor lighting like at sports facilities or lighted outdoor advertisement. For example the maximum tolerable luminance (LAI) or equivalent veiling luminance

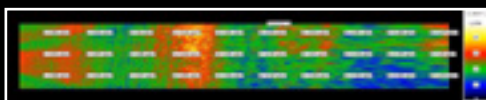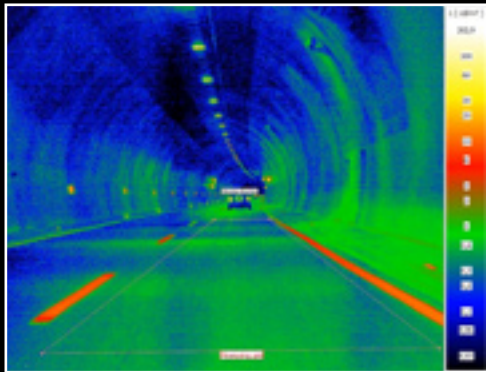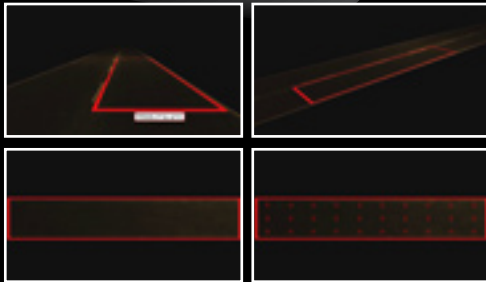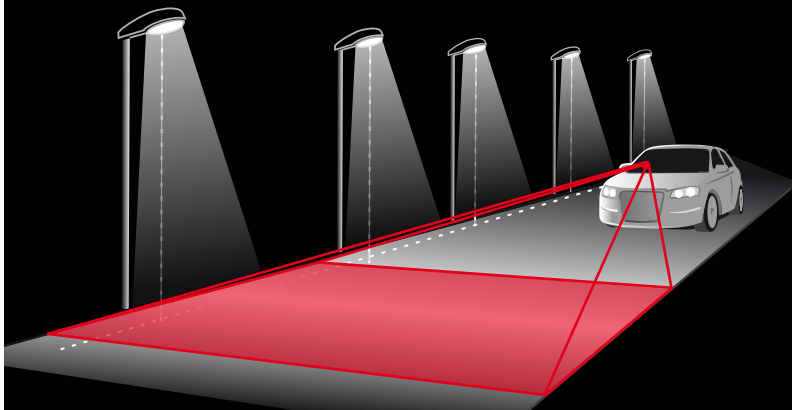- ■ Glare assessment of artificial indoor lighting (UGR, DGP, GR)

Determination of glare using the TI – method for artificial road lighting

Measuring the L20° luminance of the approach zone in front of tunnel entrances

LMK mobile air

Standard based analysis of the road luminance using LMK LabSoft

Measuring Roads and Tunnels

The LMK mobile air allows a smart and quick evaluation and verification of luminance values relevant to security of public traffic ways by using intelligent software tools.

- Assessment of the luminance values (i.e. according to EN13201) on road and tunnels

- Checking the visibility of transport users, road signs and markers among various weather conditions

- Reviewing the luminance level and the illumination of other public traffic ways

Further Applications

The LMK mobile air is very-well suited for fast and easy assessment for luminances in outdoor areas, roads and public places in an urban environment.

- Quick and easy determination of the highlighting on facades and gladdings – and other vertical surfaces

- Evaluation of the luminance distribution on illuminated surfaces like airport apron – and other horizontal planes

Another application is the assessment of luminance levels and distribution in indoor environments. Also the determination of perceptible contrasts helps to assess the quality of existing conditions for any visual task.

Restrictions

- Can not be used for measuring coloured light sources (i.e. LED)

- Limited use for measuring modulated light sources with strong modulation

LMK
mobile air

Electronics	**Sensor / Resolution**	CMOS Canon APS-C with 5566(H) x 3706(V)
	File format	14 Bit RAW - data as uncompressed Bayer structure
	PC-Interface	CR2 image file transfer via USB 2.0 to the PC
Measurement results	**Luminance image resolution**	2748(H) x 1834(V)
	Dynamic resolution	Single measurement: 1:4000
		High-Dyn measurement: 1:30000 (1/1000 s < ti < 8 s)
Configuration	**Selection of measuring range**	selecting aperture value, exposure time and ISO speed
	Measuring distance	> ca. 280mm
	Focus	automatic focus / manual focus
	Aperture values	F4 - F11 (calibrated for luminance measurements) in 1/3 steps
	Focal length	17mm - 50mm stepless
	Viewing angle	focal length 17mm: 65°(H) x 45°(V)
		focal length 50mm: 28°(H) x 19°(V)
	Exposure time	30s - 1/1000s

Measurement

Light sensitivity
(typical full scale)

aperture	4	4	11
ISO	100	1600	100
t_i= 0.001 s	12 kcd/m²	750 cd/m²	90 kcd/m²
t_i= 3.0 s	4 cd/m²	0.2 cd/m²	30 cd/m²

V(λ)-matching   numerical transformation from R,G,B – sensor data

spectral matching EOS70D

Integral spectral mismatch in % for several lamp types / spectra	
Halogen metal discharge lamps	2-9%
High pressure sodium discharge lamp	7-13%
Fluorescent lamp	8-10%
LED white	5-12%

Calibration uncertainty ΔL in % ΔL = 2.5% (standard illuminant A)
Repeatability ΔL in % ΔL = 0.5 … 2%
Uniformity ΔL in % ΔL ± 2% (f_{22} ≤4%)
Measuring uncertainty ΔL in %
(standard illuminant A)

Ti\Av	4	5.6	8	11
1 ms	6.6	7.0	7.2	7.8
2.5 ms	5.0	5.3	5.5	6.2
25 ms	4.8	5.2	5.4	6.0
0.25 s	4.8	5.2	5.4	6.0
2.5 s	4.8	5.2	5.4	6.0

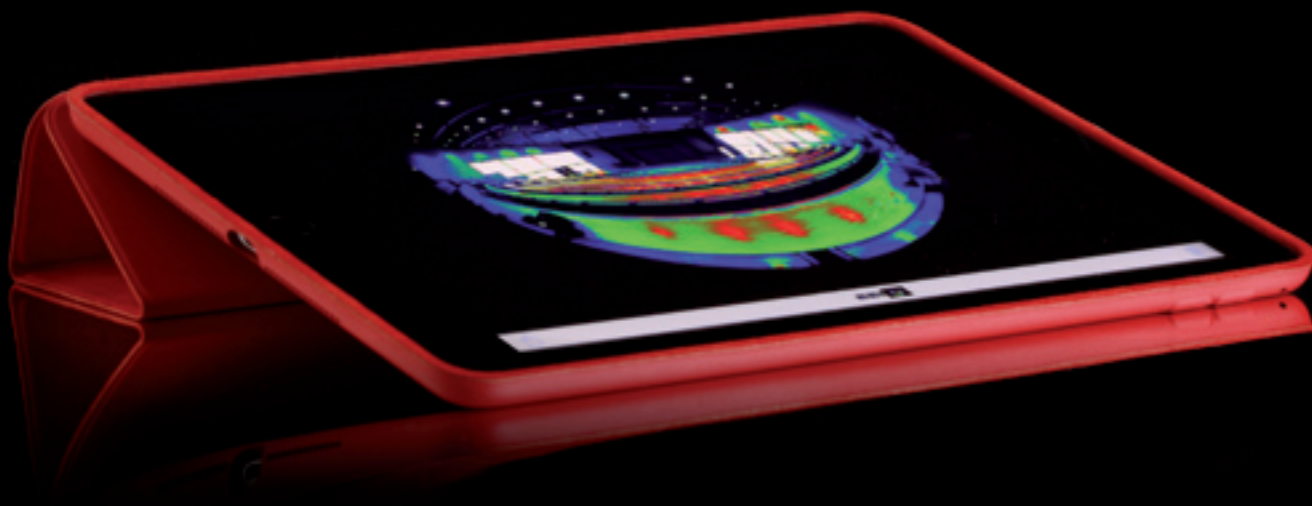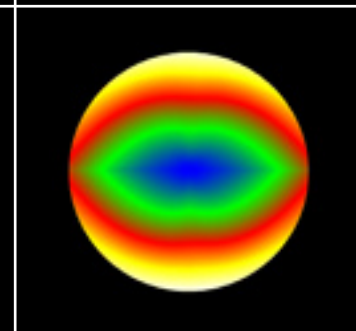|		
Operating data	**Memory**	SDHC card memory chip 16GB (ca. 21MB per image)
	Operating system	Windows 10/8/7
	Software	**LMK** LabSoft (monochrome luminance analysis software)

Determination of the UGR or the DGP for indoor lighting

LMK mobile air APP (iOS)
Just install!

Use our APP for a save and comfortable control of your LMK mobile air. The functional diversity of a digital mirror reflecting camera often overstrains the user. Using our App all valid settings are predefined and can be adjusted very quick and easy. Thus incorrect and faulty measuring results are almost impossible.

If you are already using iPad you can directly download this App from the AppStore and start working immediately.

Alternatively it is possible to order the iPad optionally with the LMK mobile air product bundle. In this case the App is already installed and instantly usable.

Components

Lens

Sigma [17-50mm F2.8 EX DC OS HSM]
Sigma [70-200mm F2.8 II EX DG APO HSM]
Sigma Fisheye [4.5mm F2.8 EX DC HSM]
(incl. lens hood and dust cover)

Transport

Mobility case + carrying strap
Transport case TechnoTeam
Wide strap

Power supply

2 x Lithium-Ion Akku [LP-E6]
Battery charger [LC-E6] + power plug
Compact mains adapter [ACK E6]

Cable / Interface

Stereo-AV-Cable
USB Interface cable

Memory card

SDHC card 16GB

Software

EOS Digital Solution (CD ROM)
LMK Labsoft measuring software (CD ROM)

Manual / Certification

Manual Canon EOS 70D
Manual LMK mobile air
Manual LMK Labsoft
Calibration certification

Optional

additional SDHC card 16GB
Remote control RC6
Tripod
Sucking tripod "Cullmann"
Neutral density filter - single or set
(opt. density: 1.0; 2.0; 3.0)
Sigma Fisheye [4.5mm F2.8 EX DC HSM]
Sigma [70-200mm F2.8 II EX DG APO HSM]

Canon 70D (DSLR)
Sigma 17-50mm F2.8 EX DC OS HSM

LMK mobile air Set

LMK mobile air