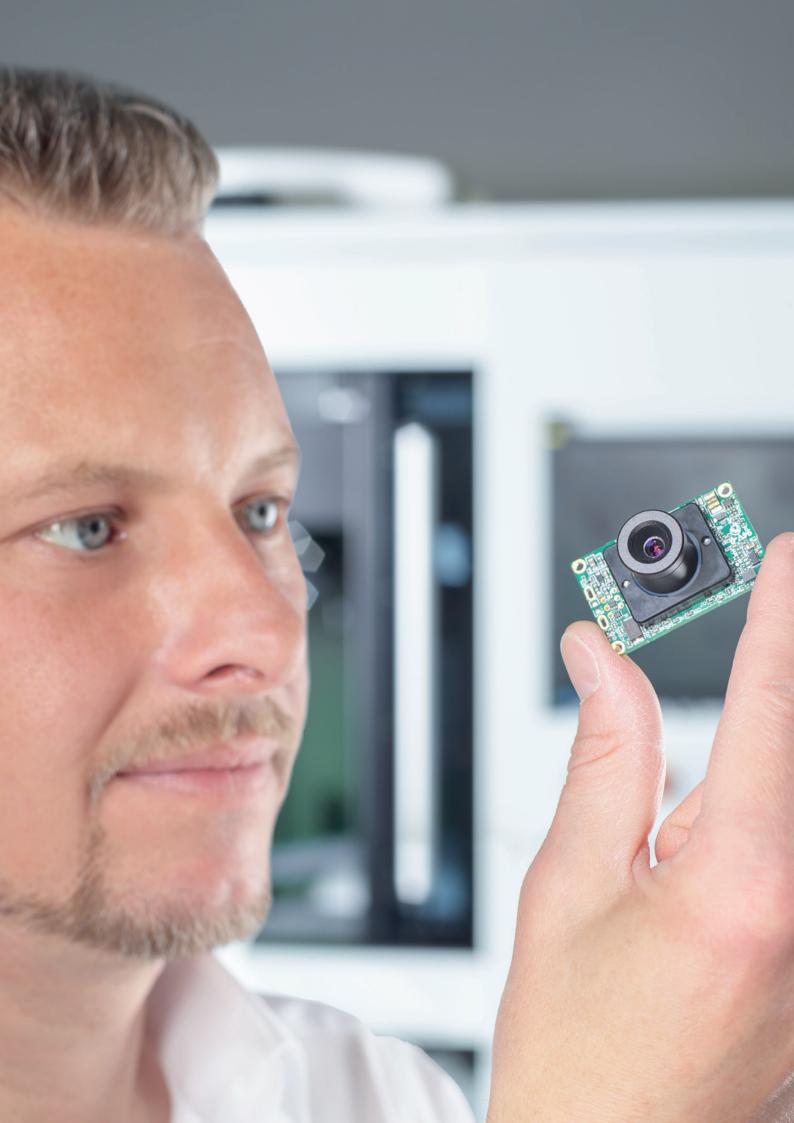# TRIOPTICS
See the Difference

ProCam® Align Smart

The most precise instrument
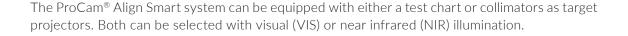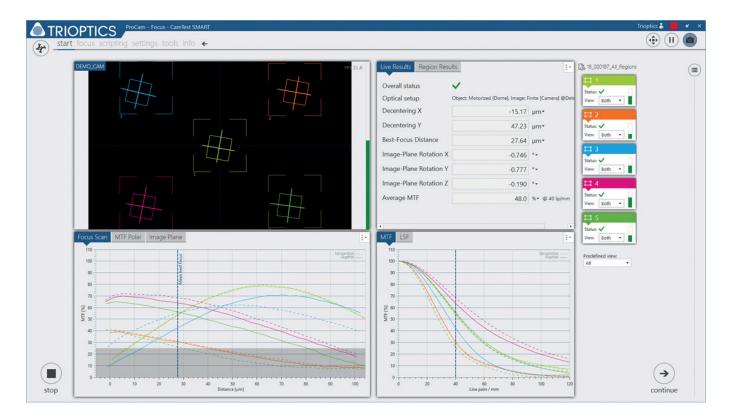for active alignment of camera
modules and LiDAR systems

ProCam® Align Smart

With the measurement and production instruments of the ProCam® series we offer solutions for the critical challenge of active alignment and assembly of high-precision optical sensor systems. Due to an automated production process based on unique algorithms, our systems ensure accurate, repeatable and fast alignment and thus a better image quality of the camera modules. The optimisation of image quality through the use of active alignment technology leads to a reduction in production rejects. Active alignment is therefore an efficient production method for high-end camera and LIDAR applications, resulting in high yield and best image quality.

Proven active alignment technology

- Active alignment with sub-micron/sub-arc min resolution
- Five or six alignment axes
- Suitable for wide-angle optics with a field of view (FOV) up to 170°[1]
- Alignment of sensor to the camera optics and vice versa
- The components are focused in a single alignment step, centered, tilt-adjusted and rotated with respect to each other
- For stereo or triple cameras as well as for LiDAR systems

The ProCam® Align Smart system can be equipped with either a test chart or collimators as target projectors. Both can be selected with visual (VIS) or near infrared (NIR) illumination.

1) depending on the individual customer's camera data and requirements

ProCam® Software for the fully-automated active alignment process

- High precision image analysis algorithms: all relevant parameters for the accurate alignment process (such as the MTF at multiple field positions and the tilt of the image plane) are automatically analyzed in real-time and used in the alignment process
- With the integrated scripting tool, the measurement and alignment process can easily be tailored to specific customer needs and products
- The measurement data can be saved in a database so that the process is completely traceable
- Configuration files for different types of camera modules for fast product change over

Worldwide support & service

- Close network of service centers in Asia, USA and Europe
- Individual training and consulting at TRIOPTICS or on site at customers' location
- Online service portal with email ticket system
- IT-based remote maintenance
- Individual maintenance and service contracts

Technical Data

	ProCam® Align Smart
Alignment axes	5 or 6
Resolution linear	0.2 µm (X,Y) 0.08 µm (Z)
Resolution rotatory	2.5 µrad (Θx, Θy) 5 µrad (Θz)
Repeatability linear	± 0.15 µm (X,Y) ± 0.06 µm (Z)
Repeatability rotatory	± 2 µrad (Θx, Θy) ± 3 µrad (Θz)
Typical sample alignment accuracy, linear	± 2 µm[1]
Typical sample alignment accuracy, rotatory	± 1.7 mrad[1] (Sensor to sensor) ± 3.5 mrad[1] (Sensor to mechanical reference)
Sample objective lens EFL	0.7 mm ... 30 mm (1 mm ... 12 mm Standard)
Sample objective lens diameter	4 mm ... 30 mm (smaller or bigger diameter on request)
Field of view test chart	up to 70° (up to 100° possible after individual clarification)
Field of view collimators	up to 160° mechanical set up[2] up to 140° for optical measurement[3]
Test targets	Test chart or collimators Available with VIS or NIR
Performance	<60 sec. process time (without sample loading/unloading) Process time calculated on following parameter: sensor board initialization time <1 s, camera frames >30 fps, continuous images from camera, UV snap curing <2s with preselected lenses.
Dimensions (h x w x d)	1.840 mm x 1.700 mm x 1.100 mm
Camera interface	MIPI, Parallel, LVDS, Analog or directly to PC via e.g. USB, FireWire, CamLink, GigE and others
Weight	600 kg ... 800 kg
Type	stand alone

1) Typical accuracy reached on following sample parameter: pixel size 6µm, F# = 2.8, EFL = 4.5mm.
2) Up to 180° possible after individual clarification, depending on sample and mechanical surrounding, for bigger FoV technical investigations necessary.
3) Depending on distortion, individual clarification necessary.

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