



Company presentation

asphericon GmbH

1. Company



Locations worldwide

THE INTERNATIONAL SALES NETWORK



Key figures I

ASPHERICON IN NUMBERS



200

Employees

>800

Customers
worldwide

5,600

Facility area (m²)

1,500

Manufacturing
Capacity (pc/week)



Company Premises Germany and Czech Republic



JENA (HQ) AND JEŘMANICE SITE



- ① R&D Center and prototyping manufacturing (1.600 sqm)
- ② Main production (4.000 sqm)
- ③ Management and Administration
- ④ Expansion area (up to 10.000 sqm)



- ⑤ Management and Administration
- ⑥ Main production (1.600 sqm)
- ⑦ Expansion area (up to 12.000 sqm)



Locations worldwide

THE INTERNATIONAL SALES NETWORK

Current production



Vizualization 2025/26:



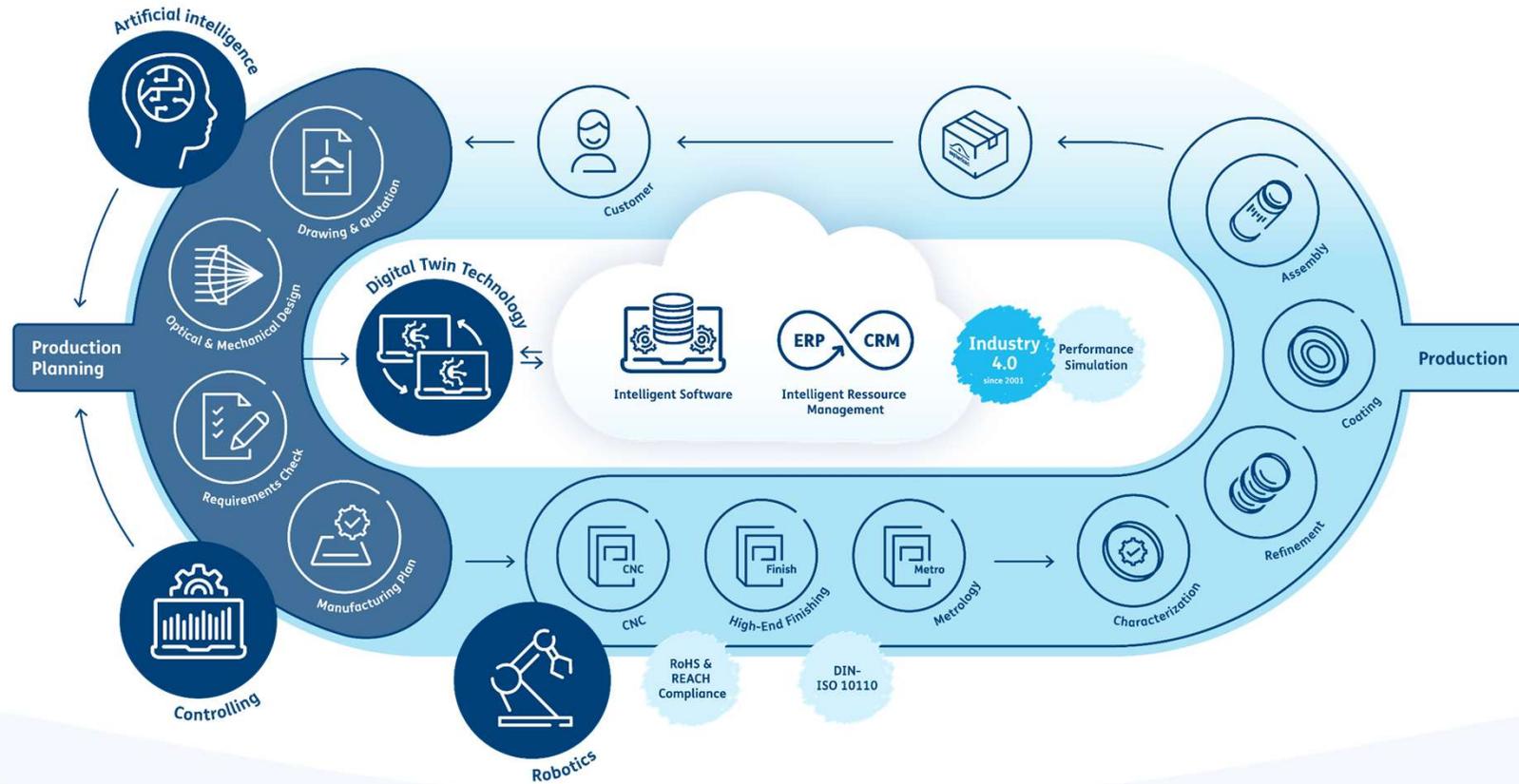
A photograph of two men standing on a rooftop covered in solar panels. The man on the left is wearing a blue patterned shirt and light-colored trousers. The man on the right is wearing a light blue shirt and dark jeans. In the background, there are buildings and hills under a cloudy sky.

Sustainability

We have been operating without using gas and oil since 2011. 100% green electricity, an in-house solar system, our own charging stations for a large number of e-cars and company bicycles as well as a new wood-hybrid building characterize our sustainable strategy.

Fully digitized process landscape

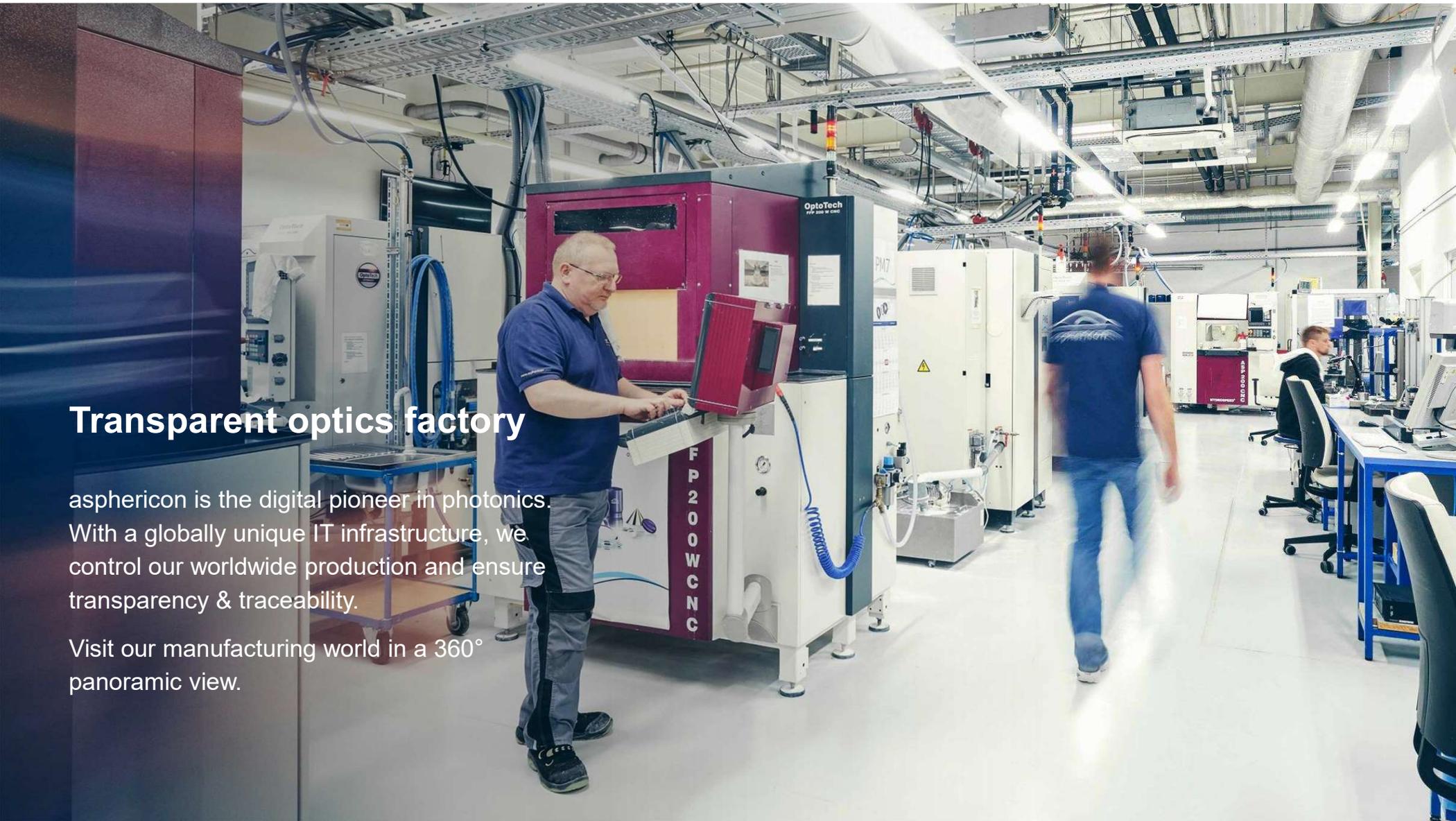
INTEGRATED MANUFACTURING FOR HIGH-QUALITY AND EFFICIENT RESULTS



Transparent optics factory

asphericon is the digital pioneer in photonics. With a globally unique IT infrastructure, we control our worldwide production and ensure transparency & traceability.

Visit our manufacturing world in a 360° panoramic view.



3. Products



Precision out of passion

ASPHERICON SETS STANDARDS IN ASPHERE MANUFACTURING



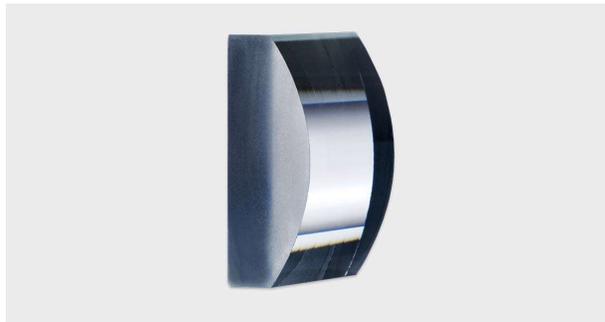
asphericon Custom

INDIVIDUAL AND UNIQUE – COSTUM-MADE ASPHERIC OPTICS



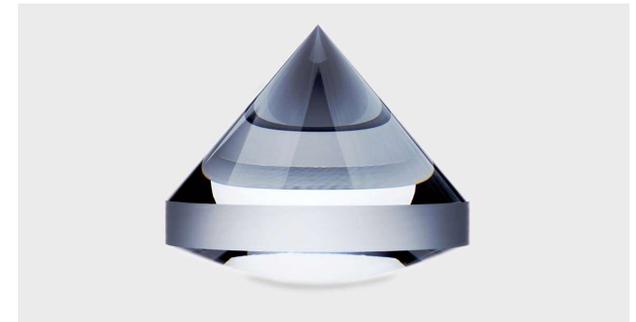
Aspheres

- = Maximum of precision (RMSi: up to 0.03 μm)
- = Diameter: 2.0 mm to 420 mm
- = Surface roughness: up to $< 1 \text{ nm Rq}$



Acylinders

- = Shapes: plano-convex, plano-concave, bi-convex or bi-concave
- = Spherical and/or aspheric back-surface available
- = Outer shapes can be user-defined



Axicons

- = Large variety of shapes and sizes
- = Materials: almost every variety of glass, silica, germanium, silicon, infrared glass and zerodur



asphericon Custom

INDIVIDUAL AND UNIQUE – COSTUM-MADE ASPHERIC OPTICS



Reflector On-Axis/Off-Axis

- = Parabolic or custom-defined aspheric surface curvatures
- = Materials: almost all types of glass, silicon, germanium, infrared glass and zerodur
- = Production according to individual requirements for geometry and deflection angle



Spheres

- = Diameter: 8 - 300 mm
- = Plano-convex/plano-concave, bi-convex/bi-concave lenses
- = Achromatic singlets, doublets and triplets
- = Material: crystals, e.g. germanium and silicon, metals, PMMA, IR materials



Doublets/Multiplets

- = Shapes: any edge geometries, also steps
- = Outer surfaces can be cylindrical or freeform
- = Diameter: up to 250 mm
- = < 10 μm ETV



Freeform/Monoliths

- = Unconventional shapes, many material
- = Lenses, mirrors, monoliths
- = Diameter: up to 300 mm
- = Excellent surface quality (up to at least RMSi 50 nm)
- = CGH-free measurement including all position tolerances (complete component)



asphericon BeamTuning

BEAM EXPANSION HAS NEVER BEEN SO SIMPLE



a|BeamExpander

- = Design wavelengths [nm]: 355, 532, 632, 780, 1064
- = Optimization to all wavelengths [355, 500-1600 nm]
- = Guaranteed diffraction-limited up to 32x beam expansion



a|Waveλdapt

- = Optimized adaptation to any wavelength from 500 to 1600 nm
- = Compensation of divergent incoming beams up to 1 mrad



a|AspheriColl

- = Flexible choice of output beam diameter
- = Simple mounting via metric fine thread



a|Adapter

- = Intra-system adapters enable easy combination of BeamTuning elements
- = Cross-system adapters guarantee high level of compatibility with systems
- = a|Adapter tilt ensures precise alignment within beam path (flexibly tilted in x- and y-direction)



asphericon BeamBoxes – Mix & Match

INDIVIDUAL BOXES WITH BEAMTUNING ELEMENTS



a|BeamBox Essential

- = Consisting of up to eight a|BeamExpander, a|AspheriColl, a|WaveAdapt and matching a|Adapters
- = Available for wavelengths 355 nm, 532 nm, 632 nm, 780 nm and 1064 nm
- = Certified diffraction-limited system



a|BeamBox TopShape

- = Consisting of up to five a|BeamExpanders, a|TopShape, a|AspheriColl and matching a|Adapters as well as MountedOptics
- = Perfect support for applications in the field of metrology or microscopy



a|BeamBox AiryShape/SqAiryShape

- = Consisting of up to six a|BeamExpanders, a|AiryShape or a|SqAiryShape, a|AspheriColl and matching a|Adapters as well as a|MountedAspheres
- = Perfect support applications in the field of material processing

Custom Systems

NEXT GENERATION OF OPTICAL SYSTEMS



1. Miniaturized designs, e.g. monolithic (freeform) systems
2. High quality optical surfaces
3. Intelligent assembly concepts
4. Coatings for all wavelengths (UV-VIS-IR)
5. Perfect integration for high stability
6. Demanding materials, such as CaF₂

System Provider

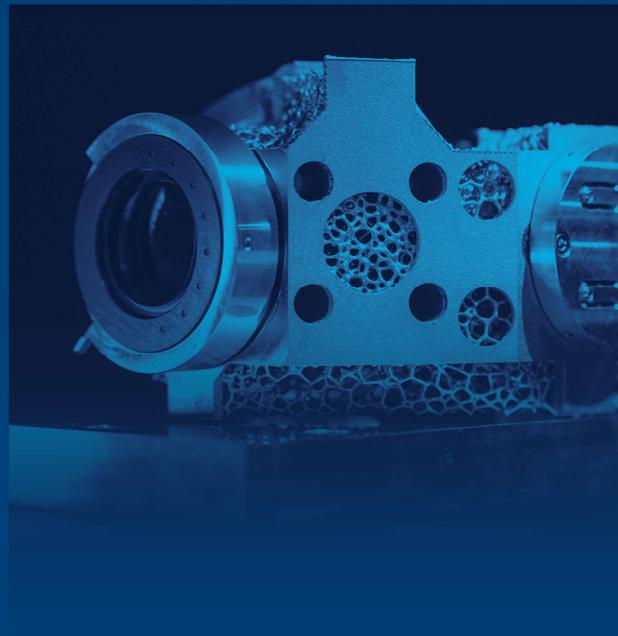


BeamTuning



- = World's first aspheric beam shaping and expansion system
- = High precision wavefront for all wavelengths

Fo+



- = Reflective beam shaper based on freeform optics
- = Laser becomes a flexible tool (high laser power up to 10 kW, all wavelengths)

OEM-System



- = World's first aspheric Fizeau lenses
- = Largest measuring range
- = Up to three times lighter



4. Services

Metrology

MOST ACCURATE RESULTS FROM THE SPECIALIST



- = Exact/retrievable at any time evaluation & documentation of measurement results by an integrated database system
- = Tactile measurement up to diameters of 260 mm, full-surface non-contact measurement up to 420 mm
- = Measurement/position check of freeform surfaces (form and positional tolerances, roughness, etc.), mounts, mounted optics and complete systems

Interferometric measuring (selection)

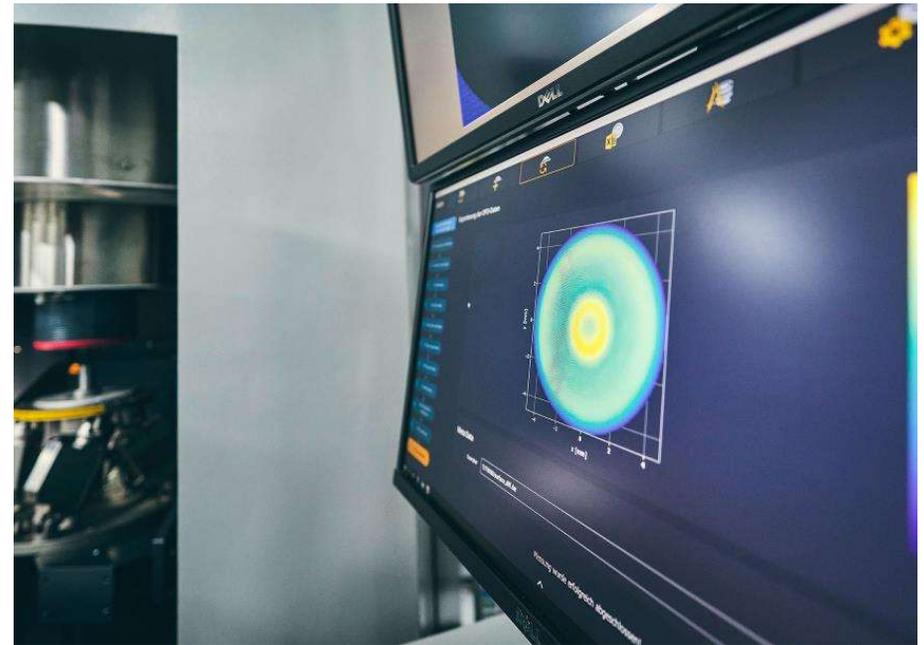
- = LumphoScan 260 HD and 420, Zygo Verifire Asphere™

Tactile measuring (selection)

- = MarSurf LD 120 Aspheric, Taylor Hobson - Talysurf PGI 1240/PGI 120

Optical measuring (selection)

- = Zygo NewView™ 7100, MarSurf WM 100

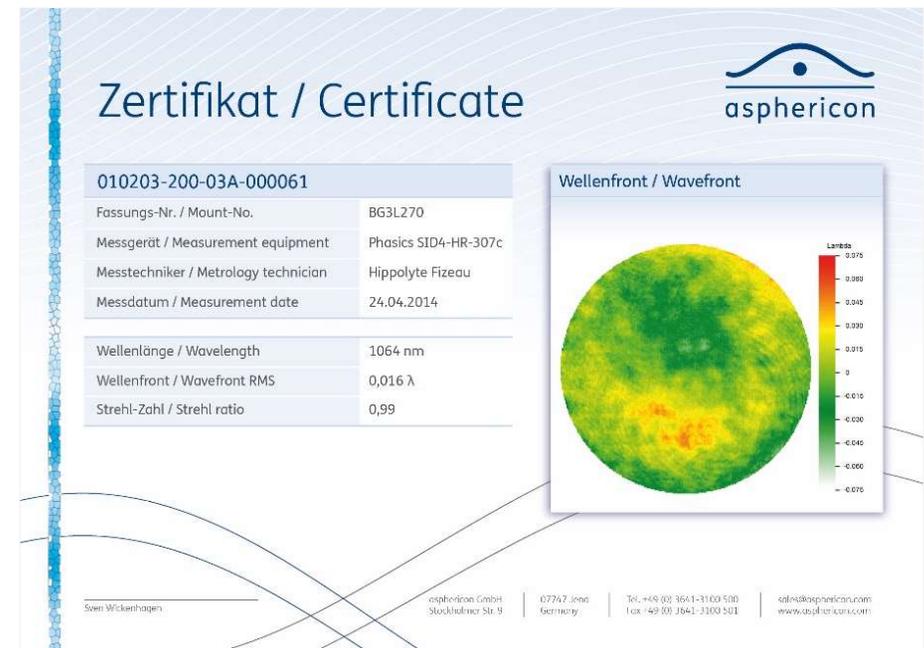


Optical characterization

CERTIFIED MEASURING RESULTS



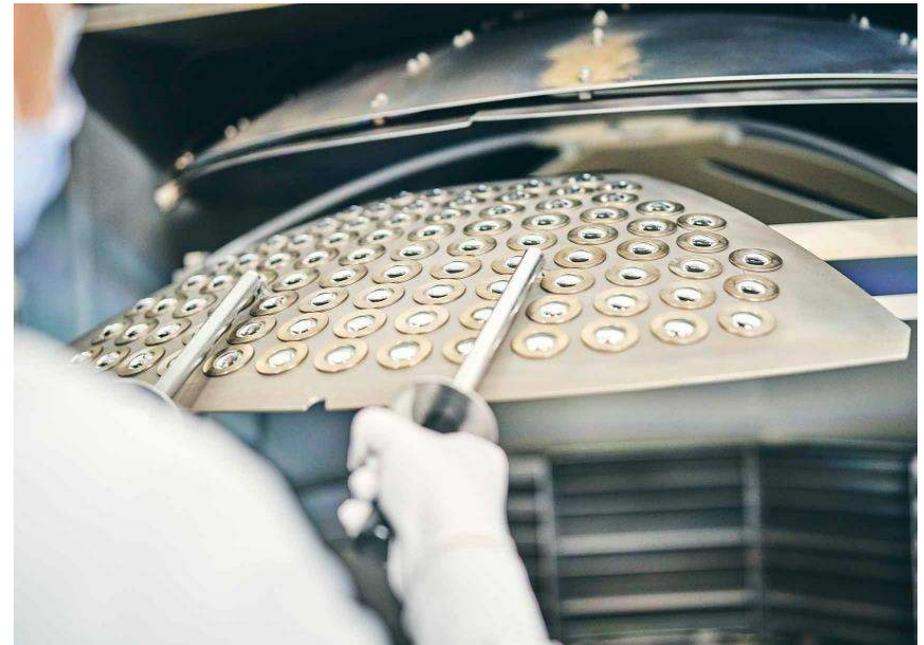
- = Optical characterization of all optical components possible
- = Measuring the wave front using a Phasics SID4-HR wave front sensor
- = asphericon certificate includes :
 - Measurement of wave front (wavelength range 400 to 1064 nm, other wavelengths on request)
 - Measurement of MTF, PSF and Strehl ratio
 - Illustration of the wave front measurement



Sputtering

FOR ULTRA-HARD COATINGS WITH HIGH CLIMATIC/MECHANICAL STABILITY

- = Spectroscopically monitored, non-reactive magnetron sputtering
- = Substrate size: 15 - 250 mm
 - Customized shapes
 - Materials: glass, fused silica, crystals
- = Spectral range: UV - NIR (190 - 5100 nm)
- = Residual reflection for AR coatings $R_{\text{abs}} < 0.05\%$ (V-Coating)
- = Reflection for laser line mirrors $\geq 99.98\%$
- = Fields of application:
 - AR and HR layers
 - Laser applications (low scattering, high reflection, high laser damage thresholds)
 - Demanding environmental conditions (temperature fluctuations, heavy cleaning requirements)



Coating

WIDE SPECTRUM OF HIGH-QUALITY COATINGS FOR EACH APPLICATION



Dielectric mirrors

- = Can be made for single wavelengths, two wavelengths and the broad band range
- = High-Power coatings
- = For powerful laser applications



AR coatings

- = Maximum transmission of optics
- = Single layers to broad-band or reflection-minimizing coatings



Filter coatings

- = Short, long or band-pass filters
- = Based on dielectric layers



Beam splitters

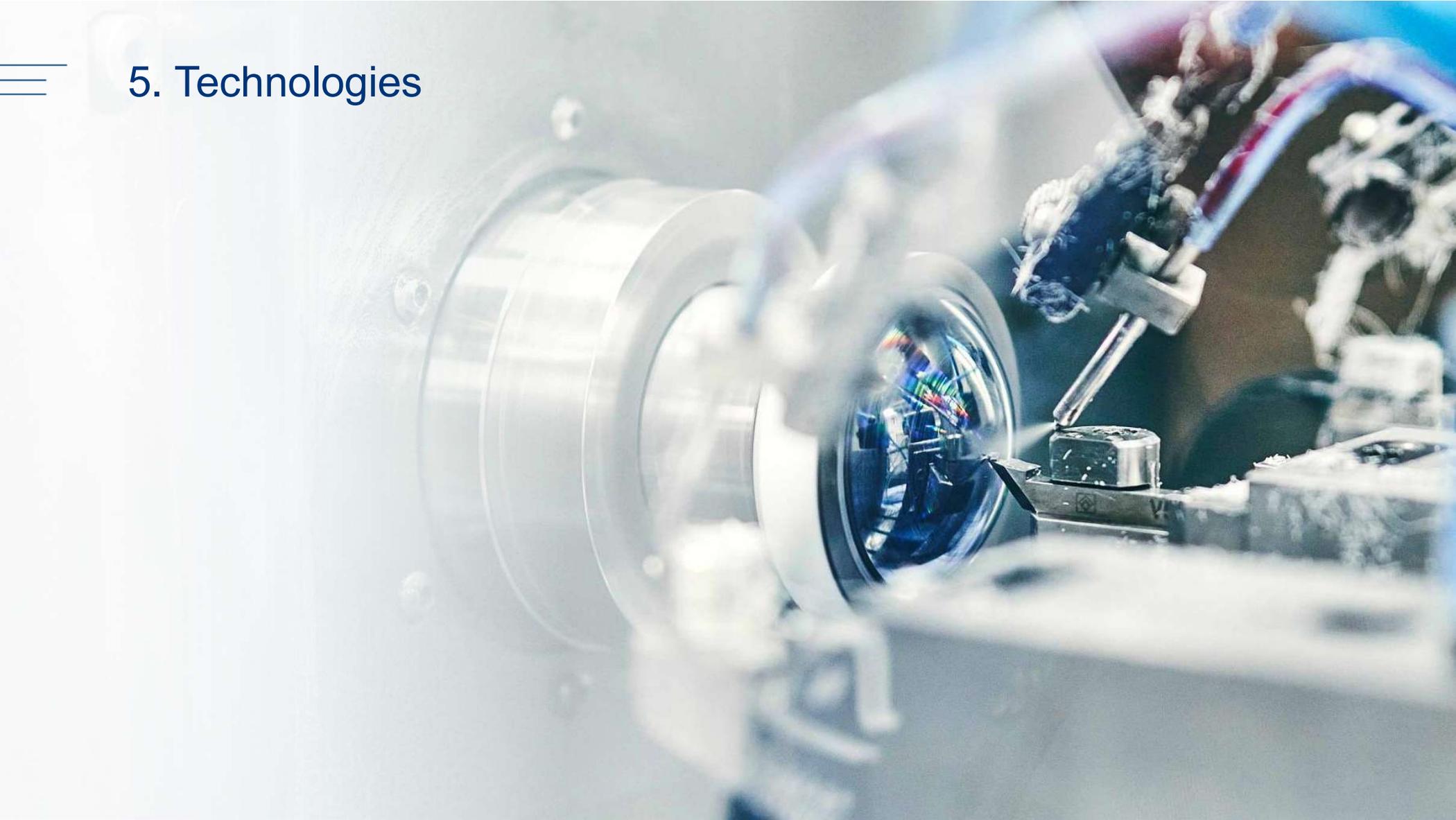
- = Customer-specific splitting ratio (T/R) is achieved with thermally stable dielectric layers



Metallic mirrors

- = Reflective surfaces based on metals
- = Very wide wavelength range
- = Constant degree of reflection

5. Technologies



CNC processing

INDIVIDUAL SOLUTIONS AT THE HIGHEST LEVEL



- = Specially developed, patented technology to control CNC grinding & polishing machines
- = Ability to simulate processing methods
- = Digital documentation of all processing parameters
- = Prototypes right through large series can be manufactured with a high level of precision

Dimensions [ISO 10110-1]

Diameter: 2 - 300 mm

Surface form tolerances [ISO 10110-5; 12]

Irregularity – B (PV): 10 - 1 fringes

RMS Irregularity – RMSi – D: 3 - 0.3 fringes

Surface imperfections [ISO 10110-7]

MIL – Scratch / Dig: 40 - 10

Surface texture [ISO 10110-8]

Surface roughness – Rq: 1.5 – 3.0 nm



Diamond turning

PRECISION RE-DEFINED – DIAMOND-TURNED OPTICS IN PERFECTION

- = Ultra-precise cutting using monocrystalline diamonds
- = Manufacturing of any optical surface with utmost precision
- = Achievable optical component geometries:
 - Aspheres, Spheres, Toroids, Cylinders, Microlenses, Fresnel structures, Freeforms, Diffractive optical elements

Manufacturing dimensions [ISO 10110-1]

Achievable diameters:	1 - 420 mm
Center thickness:	up to 0.5 mm

Surface shape [ISO 10110-1; 5; 8; 12]

Irregularity – B (PV):	100 nm
RMS Irregularity – RMSi – D:	20 nm
Surface roughness – Rq:	1 nm



Production capabilities



LATEST TECHNOLOGIES FOR HIGH-QUALITY, EFFICIENT SOLUTIONS

	CNC Processing Standard Quality*	CNC Processing Precision Quality*	Diamond turning*	High-End Finishing*
Diameter [mm]	8 - 300	4 - 250	1 - 420	6 - 300
Irregularity (PV) [Fringes/ μm]	4.00 / 1.00	1.00 / 0.30	0.10	0.30 / 0.08
RMSi [Fringes/ μm]	1.20 / 0.30	0.30 / 0.09	0.02	0.10 / 0.03
MIL – Scratch/Dig	40 - 20	20 - 10	–	20 - 10
Surface roughness – Rq [nm]	2.0	1.5	1.0	0.5
Full-surface interferometric measurement	optional	optional	✓	✓

*maximum value

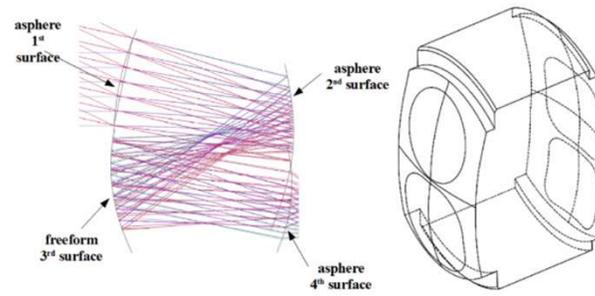


2. References



Freeform Optics Plus fo+

SMALLER, LIGHTER, MORE EFFICIENT – FREEFORM SURFACES



- = Merging of eight Thuringian Photonics companies and two research institutes
- = Development of methods for processing freeform surfaces on various materials (UV, VIS, IR) as well as of a germanium monolith for simplified positioning of IR optics (e.g. in thermographic systems) by asphericon
- = Areas of application: safety technology, remote sensing and material processing

Jena Optronik – Sentinel-4

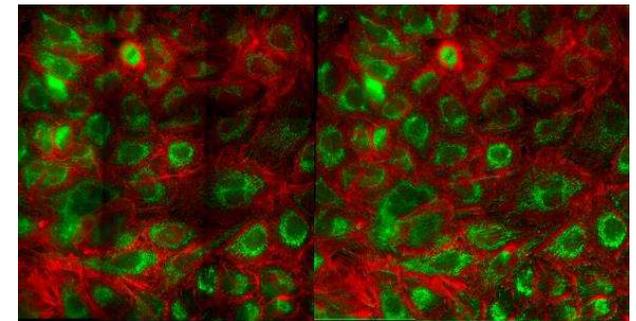
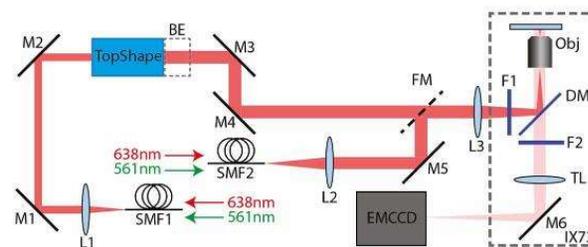
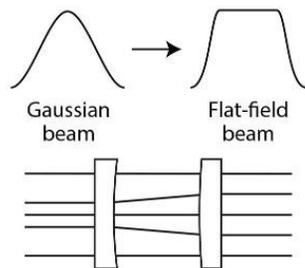
SOPHISTICATED MATERIALS. UNSURPASSABLE PRECISION.



- = Satellite Sentinel-4 (part of the Copernicus Earth Observation Program) provides data on trace gases in the atmosphere from 2022 onwards
- = Development of sensors for position control by Jena-Optronik for use in satellites, production of lenses for the sensors by asphericon
- = Requirements: developing and manufacturing lenses to withstand extreme conditions in space, through development work and complex test procedures with demanding materials (e.g., CaF₂)

CREOL – Beam shaper for microscopy

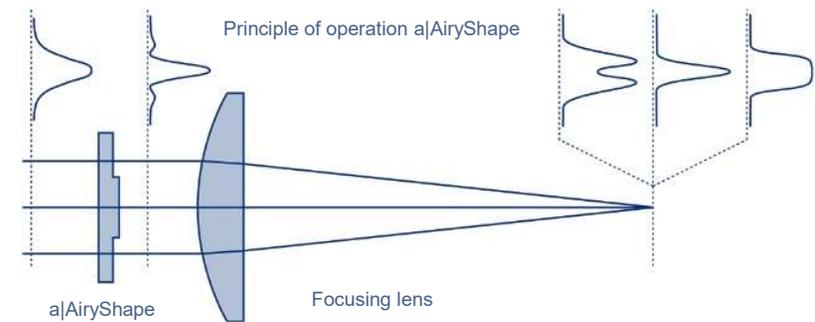
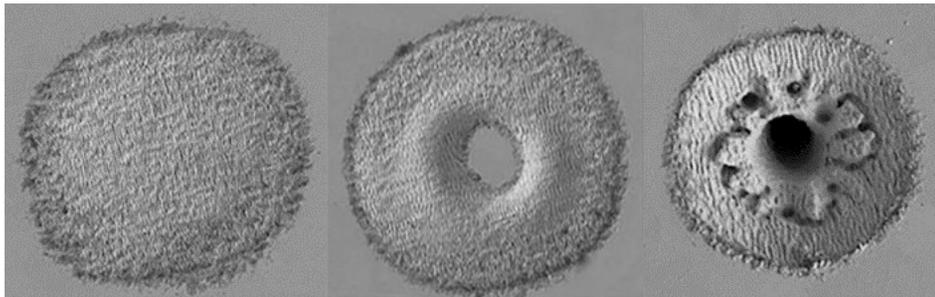
UNIFORM ILLUMINATION IN (FLUORESCENCE) MICROSCOPY



- = College of Optics and Photonics/University of Central Florida (CREOL) worked on further development of a laser-based microscope set-up for uniform illumination
- = asphericon's TopShape and BeamExpander allow the transformation of Gaussian beams into a flat Top-Hat profile and thus the uniform illumination of the slide
- = Homogeneity of illumination: > 95 %

OSIM – Laser-included structuring

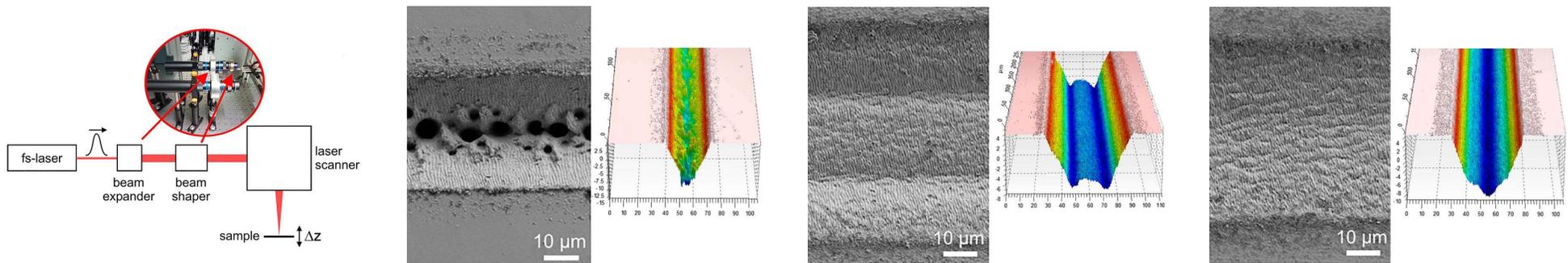
SURFACE FUNTIONALIZATION WITH TAILORED TOP-HATS



- = Together with Otto-Schott-Institute für material research (OSIM) in Jena, impacts of Top-Hat intensity distributions were investigated with respect to their suitability for the generation of laser-induced periodic surface structures (LIPSS) on stainless steel
- = Compact beam shaper a|AiryShape was used to generate focused Top-Hat beams
- = Results:
 - Doubling of scanning velocity
 - Reduction of processing time by a factor of 2 with constant surface structure quality

OSIM – Laser material processing

BEAM SHAPER FOR IMPROVED LASER MATERIAL PROCESSING



- = OSIM and asphericon examined different focused intensity distributions (e.g. Top-Hat, Donut) regarding their suitability for material processing with femtosecond lasers
- = To generate different focused beam profiles (Top-Hat, Donut, Beam Waist) in different working planes, compact beam shaper a|AiryShape was used
- = Result: enlargement of channel widths and smaller ablation depths due to more homogeneous distribution of pulse energy over a larger area



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