

OPTICAL SYSTEMS & COMPONENTS FOR SPACE.

SPACE QUALIFIED TECHNOLOGIES FOR
THE HIGHEST REQUIREMENTS.



BERLINER GLAS
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OPTICAL SYSTEMS & COMPONENTS FOR SPACE.

The Berliner Glas Group offers technically advanced optical OEM solutions with respect to very high quality and extraordinary performance. We support system companies and manufacturers of devices that utilize the broad spectrum of light. With the competence of our engineers and experts we offer space optics which has to cope with strong cosmic radiation, shock and vibration stress and severe temperature fluctuations, e.g. optical space systems for laser communication and for spectrometers on satellites. Additionally we are specialized on technologies of anodic bonding of glass and ceramics to contribute to the high performance at GEO and LEO operations.

APPLICATIONS

- ▶ Aerospace
- ▶ Laser-based satellite communication
- ▶ Instruments for earth-observation
- ▶ Ground station for satellite communication
- ▶ Environmental monitoring and scientific research scenarios

ENGINEERING SERVICES

- ▶ Optical design
- ▶ Mechanical design and system architecture
- ▶ Development, research and analyses
- ▶ Layout and definition of housing and structural fixations
- ▶ Analysis of thermal design and environmental conditions
- ▶ Application-specific metrology development
- ▶ Optimization of systems
- ▶ Definition and documentation of qualification processes

PRODUCTS

- ▶ High-end precision optics (spherical, aspherical, cylindrical)
- ▶ Light-weight mirror systems
- ▶ Optical components and systems for space applications

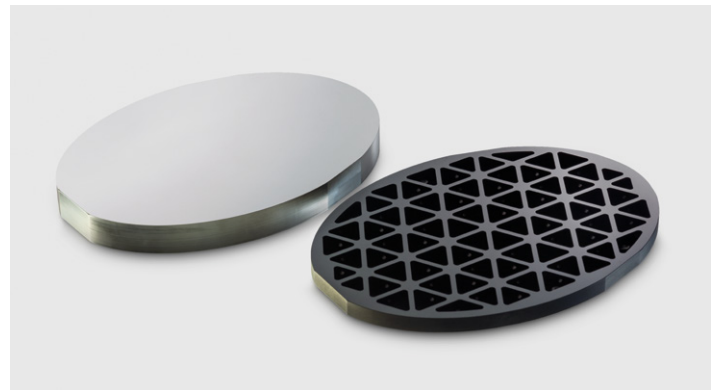
PRODUCTION/FACILITIES

- ▶ Space qualified coatings
- ▶ State-of-the-art optics production
- ▶ Anodic bonding of glass and ceramics
- ▶ Assembly, integration and verification
- ▶ Qualification for space applications
- ▶ Laboratories and clean room facilities ISO 5 and ISO 7
- ▶ High-performance test and measurement equipment

* The EnMAP project is commissioned by the Space Agency of the German Center for Aerospace (DLR) with funds from the Federal Ministry of Economics and Technology conducted under the support project number 50 EP 0801.

SPECIFICATIONS

Material	Zerodur®, SiSiC, ceramic, fused silica, optical glass
Temperature range	typical -40 °C to 65 °C
Surface roughness	< 0.5 nm (RMS)
Wave front error	< $\lambda/20$ (PV)
Radiation	according to GEO and LEO requirements
Mass	example: light-weight optimized ceramic mirror 215 x 154 mm, 825 g
Life cycle	> 15 years in orbit



Light-weight mirror.



Prism for EnMAP project*.