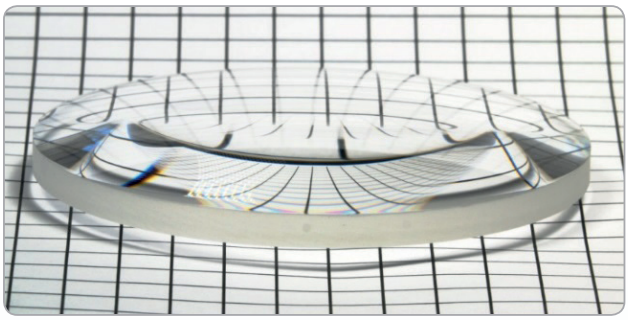
Project no.: TA03010843
Provider: Technology Agency of the Czech Republic
Realization period: 1st January, 2013 – 31st December, 2016

Project Title:

Advanced Optical Systems Using Aspheric Surfaces

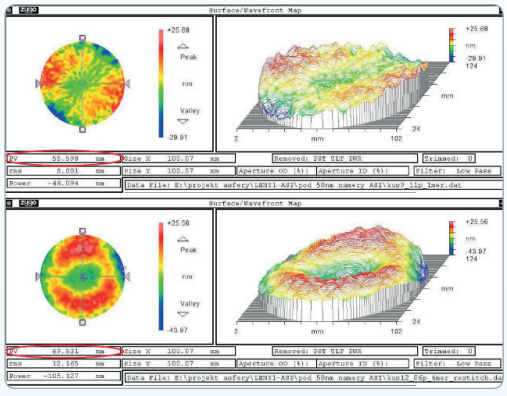


The main motivation of the successfully realized project was to manage a comprehensive process of advanced aspheric optical systems manufacturing. This involved the development of technological processes in the field of optical design, as well as the development of high-precision machining and measurement technology.

The project was undertaken in cooperation with Meopta - optika, s. r. o. which is a leading Czech manufacturer of optics and optical systems. While the research and development of technological processes was mainly carried out at the TOPTEC Centre, Meopta was responsible for the practical verification of the developed processes and their implementation on an industrial scale.

Our team carried out research and development tasks in the following fields:

- **Optical design** – using Zemax software for the design and tolerance analysis of advanced optical systems with aspheric elements; design of surfaces for process tests.
- **Development and improvement of aspheric surfaces production technology** – definition of the basic production chain (shaping, grinding, polishing, measuring, shape correction); implementation of other devices – IBF for final correction; process optimization.
- **Development and improvement of measurement procedures** – creation of methodologies; identification of problematic aspects and minimization of their impact (environmental conditions stability, measurement averaging, data filtering).



As part of the project solution, we developed and subsequently optimized a technology for aspheric optical elements production and achieved a wide range of RIV-evaluated results in the form of Verified Technology (4x) and publications in scientific literature (5x).

The capability of the proposed technology to commonly produce aspheric surfaces with a shape error less than 250 nm PV, surface micro-roughness below 2 nm Ra, and shape error below 50 nm PV if the final shape correction is included was subsequently demonstrated on the realized pieces of different aspheric optical elements.