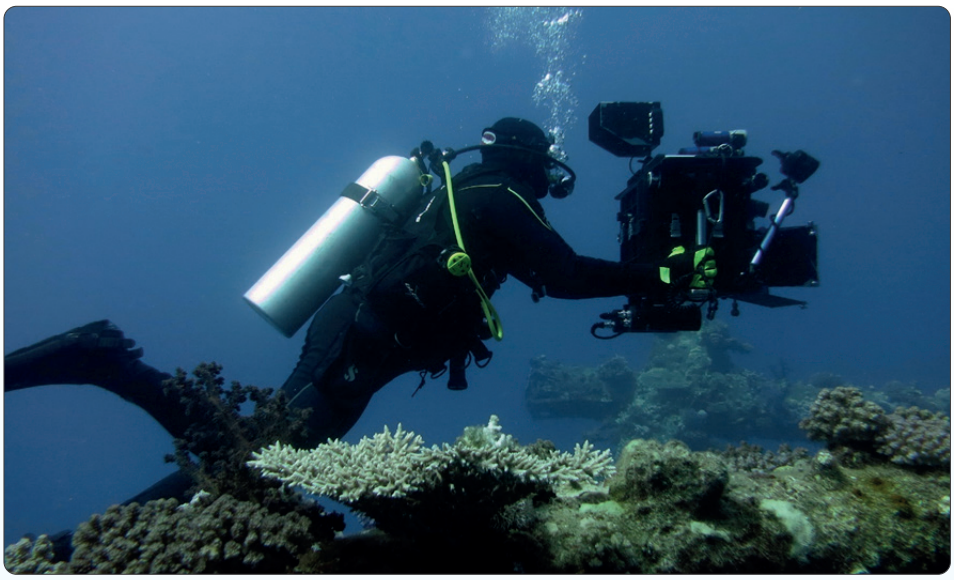
Project number: FV40234
Provider: Ministry of Industry and Trade
Realization period: 1st August 2019 - 31st December 2022

Project Name:

Development of Devices for Stereoscopic Imaging in Difficult Physical Conditions

One of the main tasks of this project will be the development of a UW-CASE for underwater stereoscopic imaging at a resolution of up to 8 K. The UW-CASE will ensure adequate system tightness for special working environments and maximum efficiency as autonomous working units.

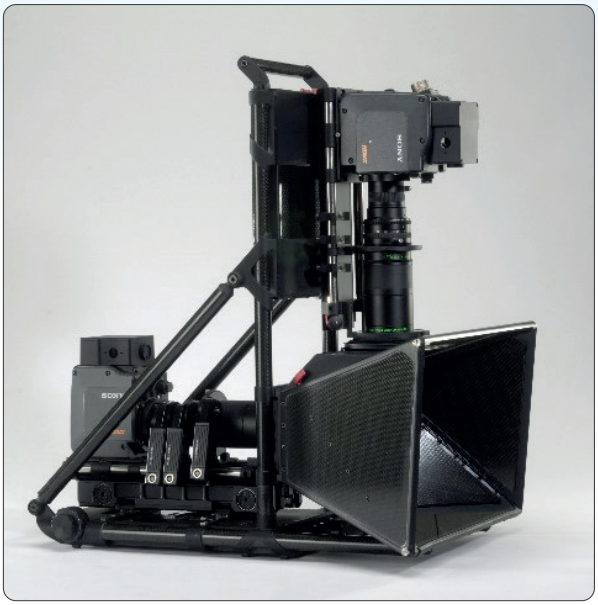


The design of the camera equipment for stereoscopic imaging will be arranged in a beam splitter system. This is an arrangement where a semi-transparent mirror divides the scanned image into two cameras that are rotated 90° towards each other. A significant reduction of unwanted light reflections will improve the image quality just around the semi-transparent mirror, which will eliminate (or at least substantially reduce) the need for subsequent complex post-processing adjustments of the obtained video, thus saving time and money in film production. Post-processing adjustments are particularly difficult when processing stereoscopic images.

Research and development is directed to the following areas:

- resistance to environmental influences – especially ensuring the function of the system in a wide temperature range, resistance to sudden changes in temperature and resistance to humidity. The planned solution is heading towards the use of a hermetic outer shell, utilizing hydrophilic or hydrophobic thin layers on the outer optical parts, and using antireflective thin films on the inner optical components;
- optical simulation and stereoscopic scanning – raytracing of designed optical assemblies in the Zemax OpticStudio® software, ray analysis, optical design of lenses and their conversion lens, solution of optical aberrations, simulation of beams through the whole optical system, tolerance analysis, stereoscopy in high resolution;

- physical modeling – modeling the influence of external pressure on the viewing window and solution of its thickness, gradient temperature fields modeling and its influence on mechanical and optical components, thermodynamic issues and their solution;
- thin film development – design of hydrophobic and hydrophilic thin films, development of antireflective films for optical components, prototype testing.



Interim results of the project:

- Prototype device for shooting 3D movies in up to 8K resolution
- Utility model for the construction of the entire device
- Two articles in peer-reviewed journals