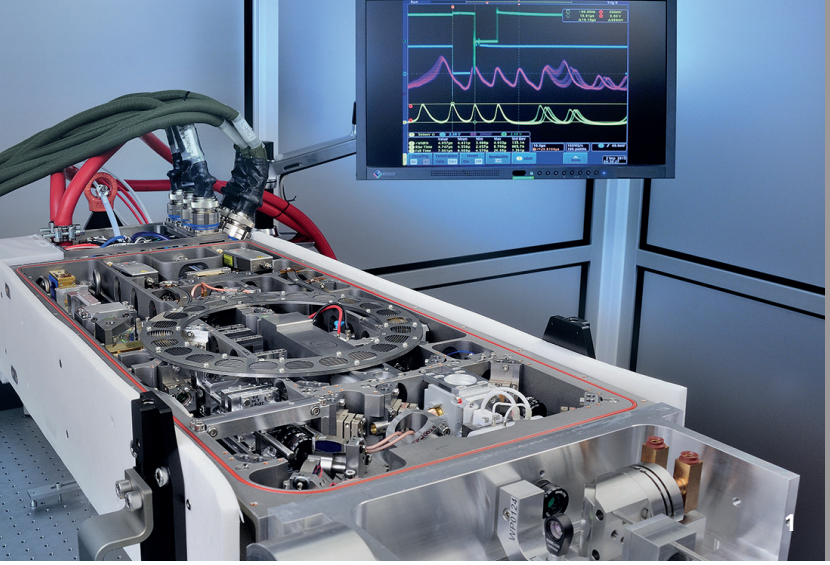

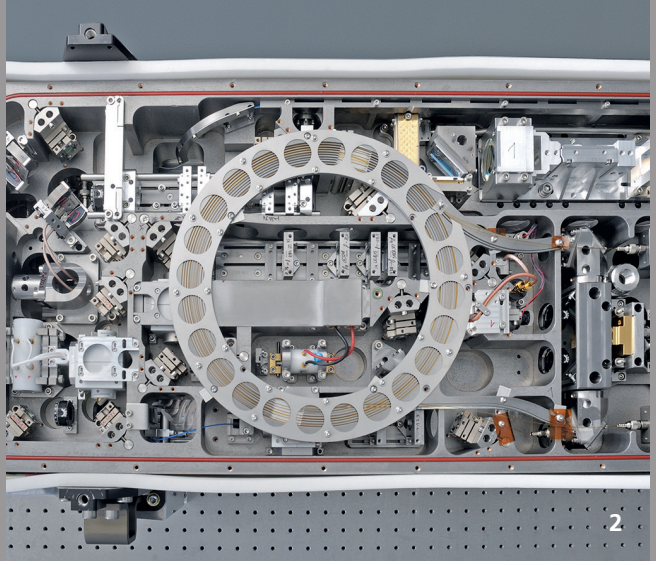

QUALIFICATION OF A LIDAR BEAM SOURCE FOR OPERATION ON A HELICOPTER

Task

For several years, the company Open Grid Europe has been using the helicopter-based LIDAR system »CHARM®« to detect leaks in gas pipelines. Using the INNOSLAB concept, Fraunhofer ILT has designed and built a more powerful beam source with a ten-time higher pulse repetition rate and other advantageous properties – such as a double pulse mode adjustable over a wide range. The use of a helicopter requires not only a compact, weight-saving construction, but also high robustness, both in operation as well as during transport and storage. Several measurement campaigns served to prove that these properties are feasible.

Method

After the specified laser features were checked, a load-free continuous test was first carried out in the laboratory environment in which relevant temporal, spatial and energy parameters were monitored. Subsequently vibration and shock tests in all spatial axes were conducted with the beam source at a service provider. Operational and non-operational stress scenarios (e.g. excitation frequencies and bandwidths, shocks) were simulated and relevant laser parameters measured after or during the trial.

Result

The beam source has successfully withstood all tests and shows no relevant changes in beam characteristics. Thus, the tests have demonstrated fundamental suitability for the intended use. After temperature tests have been conducted, the client will supplement the beam source with a frequency converter for methane detection and subsequently incorporate it into the CHARM-2 LIDAR system.

Applications

These kinds of beam sources and the construction technology used can be deployed for numerous LIDAR measurement tasks, for example, wind speed measurements, detection of water vapor, methane, CO_2 and emissions measurements from industrial plants and traffic. Generally, these applications require a mobile application, thereby causing the associated loads upon the beam source. The results are also relevant for the development of lasers for use in industry and medical technology.

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1 LIDAR beam source in test mode.

2 Detail of the LIDAR beam source.

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