# High-Efficient Beam Sources for Highly Productive Electronics Production

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The role of laser technology in the manufacture of electronic components and products continues to grow. For instance, more than 20 different laser processes are used in the production of smartphones, such as for structuring thin layers, for producing three-dimensional conductor structures on plastic bodies, and for cutting glass and printed circuit boards. For these applications, the importance of short-pulse and ultrashort-pulse lasers is continually rising. The joint project “(U)SP Laser Beam Sources for Industrial Use and System-wide Productivity Improvement for Highly Dynamic Drilling and Cutting Applications” (InBUS) focuses on increasing efficiency, available output power, and flexibility of these laser sources.

New laser beam sources only constitute a portion of the necessary process technology – the manufacturing industry requires complete systems that are productive and efficient. In order to remain competitive and incorporate new applications, the capacity of the laser systems needs to be improved continuously. Two challenges arise in connection with development of laser beam sources:

1. efficient guiding of the laser radiation to the workpiece,
2. productive movement of the beam across the workpiece.

Therefore, further application-focused development of beam sources requires parallel development of beam guidance and beam deflection systems. This increases acceptance of laser technology in production and opens up new avenues for more cost-effective products with novel functions.

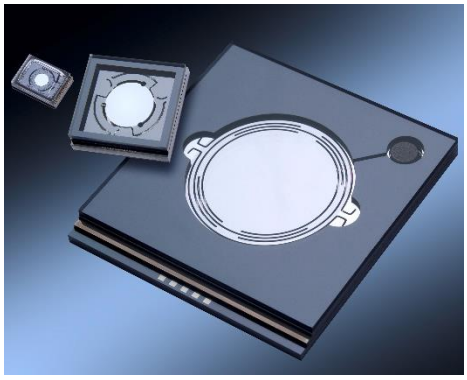
In the course of the public funded InBUS project, solutions for these two challenges will be developed in form of system-related solutions for selected applications, with emphasis on the structuring of electronic components – in particular, on drilling and cutting printed circuit boards.

The objective of the project is to devise highly efficient system technology adapted to specific applications by developing the most important components from scratch. LPKF is developing laser sources based on novel concepts for increasing energy efficiency and flexibility. Two different laser sources are used for demonstration of the pilot application.

A combination of conventional and novel scanning technology is em-

ployed as a solution for application-specific beam guidance. To this end, Qubig is developing new electro-optical deflectors (EOD), Fraunhofer ISIT focuses on micro-electromechanical mirrors (MEMS, see Fig. 1). In order to provide efficient beam delivery, Photonic Tools is refining its fiber technology. The combination of these technologies enables processing of large substrates at a high throughput rate.

As an associated partner, Continental will be testing and evaluating developed scanner solutions.



**Hermetically sealed 2D MEMS scanners as an element of the InBUS project. (Source: Fraunhofer ISIT)**

**Project partners are:**

LPKF Laser & Electronics AG (project management / www.lpkf.com)
PT Photonic Tools GmbH (www.photonic-tools.de)
Qubig GmbH (www.qubig.com)
Fraunhofer-Institut für Siliziumtechnologie ISIT (www.isit.fraunhofer.de)
Continental Automotive GmbH (www.continental-corporation.com)

Bundesministerium für Bildung und Forschung

The InBUS project (“(U)SP Beam Sources for Industrial Use and System-wide Productivity Increases for Highly Dynamic Drilling and Cutting Applications”) was launched at the beginning of November 2016. The project will be sponsored by the German Federal Ministry of Education and Research (BMBF) over a period of three years in the framework of the “Efficient High-capacity Laser Beam Sources (EffiLAS)” initiative by 1.6 Mio. Euro.