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PROCESS FOR THE INDIVIDUALIZATION OF PAINTED COMPONENTS

Task

Individualization of products is increasingly becoming an important argument for the market success of all types of goods. In classic printing processes such as pad and screen printing, masks and tools have to be produced, which means that these processes can only be used economically in large series. Direct methods, such as digital printing, allow a flexible design of individual parts, but they have limitations in terms of workpiece geometry. Along with partners from the industry, Fraunhofer ILT is developing a series-based process that can generate free-form surfaces with colored, high-resolution motifs. These can be designed individually and are competitive with conventional printing processes at identical production rates.

Method

Since the painting systems and subsequent selective laser ablation are applied over a large-area, colored images with a high resolution can be generated. A correspondingly high productivity is necessary for the process to become cost-efficient; a multi-beam optics has been developed to accomplish this. The laser beam is divided into approx. 100 to 200 partial beams that can process the workpiece simultaneously.

Results

The basic features needed to generate colored motifs with high resolution have already been developed in a prototype plant. The partners are currently working on paints that are specially adapted to the process, which allow thinner layers to be applied at the same opacity and can be structured better by means of a laser. The other goals are to transfer the process to arbitrary freeforms and to scale the process speed.

Applications

The method developed here can be used to address a variety of applications. They include individual design and personalized surface layouts in automotive engineering or user-friendly control elements in mechanical engineering. In the bulk goods and packaging sector, it is thus possible to create individualized special series.

This project has been funded by grants from the state of North-Rhine Westphalia using the funds from the European Regional Development Fund (ERDF) as part of the project »LAPIX 3D« under grant number ERDF-0800259.

Contact

Dipl.-Phys. Patrick Gretzki
Telephone +49 241 8906-8078
patrick.gretzki@ilt.fraunhofer.de

Dipl.-Ing. Christian Hördemann
Telephone +49 241 8906-8013
christian.hoerdmann@ilt.fraunhofer.de

1 Laser-based generation of colored pictograms.

2 High-resolution grey-scale images.