The POLYLINE project brings together 15 industrial and research partners from Germany to develop a next-generation digitized production line. This line will be used to produce plastic components for the automotive industry. The aim is to supplement established production techniques (e.g., machining, casting, etc.) with additive manufacturing (AM) high performance line production systems.

**Project objective**

The main objective of the POLYLINE project is to further develop additive manufacturing with polymer-based laser-sintering (LS) into an automated and efficient production process (see figure 1). The additive manufacturing technology (AM technology) will be enabled to meet established processes (machining, casting, etc.) in high performance line production systems. In the future, this will result in a production that is more flexible with parts manufactured directly in Germany. This will be demonstrated using examples of series parts from the automotive industry.

**Motivation**

Currently, both vertical and horizontal integration of additive manufacturing processes in conventional lines is only feasible to a limited extent. On the one hand, this is due to AM-specific production steps (e.g., production line in a "batch process") as well as the generally low degree of automation of the machining and transport processes. This leads to very discrete production intervals and high manual effort. On the other hand, the digital data chain along the horizontal process chain is not continuous at many interfaces, which currently leads to intransparency, error susceptibility and limited monitoring along the processes and makes integration into relevant production control systems more difficult. These barriers greatly limit the high potential of additive manufacturing processes in existing series production and assembly lines.

**Procedured**

In order to achieve the formulated project objective, the project aims at a digital and physical system breakthrough. This means that from the CAD model to the finished component, all central characteristic values and quality criteria (including identification, history and measured values) are recorded and documented. The individual sub-processes of production - from process preparation to the laser-sintering process, cooling and unpacking as well as cleaning and post processing of the parts - are automated and brought into the planned production line, where all the trades of an LS production chain are fully linked for the first time.

**FIGURE 1 Aim of the project**

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