POLYLINE – INTEGRATED PRODUCTION LINE FOR POLYMER-BASED AM APPLICATIONS

POLYLINE
Integrierte Linienanwendung von polymerbasierten AM-Technologien

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 OVERVIEW

DURATION

02/2020 – 01/2023

PARTNER

- BMW Group – Additive Manufacturing Center
- EOS GmbH Electro Optical Systems
- Grenzebach Maschinenbau GmbH
- DyeMansion GmbH
- Krumm-tec
- 3YOURMIND GmbH
- Additive Marking GmbH
- Bernd Olschner GmbH
- Optris GmbH
- Fraunhofer IGCV
- Fraunhofer IML
- Technische Universität Dortmund
- Universität Augsburg
- Universität Duisburg Essen
- Universität Paderborn

FUNDED BY

Federal Ministry of Education and Research (BMBF)

RESEACHER

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Federal Ministry of Education and Research

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 time 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.

Project Information

The research project prevailed within the framework of the research program “Line integration of additive manufacturing processes” of the Federal Ministry of Education and Research (BMBF). It is funded with 10.7 Mio. € by the BMBF and supported by the VDI-Technology Center (VDI-TZ GmbH) as project executing organization.

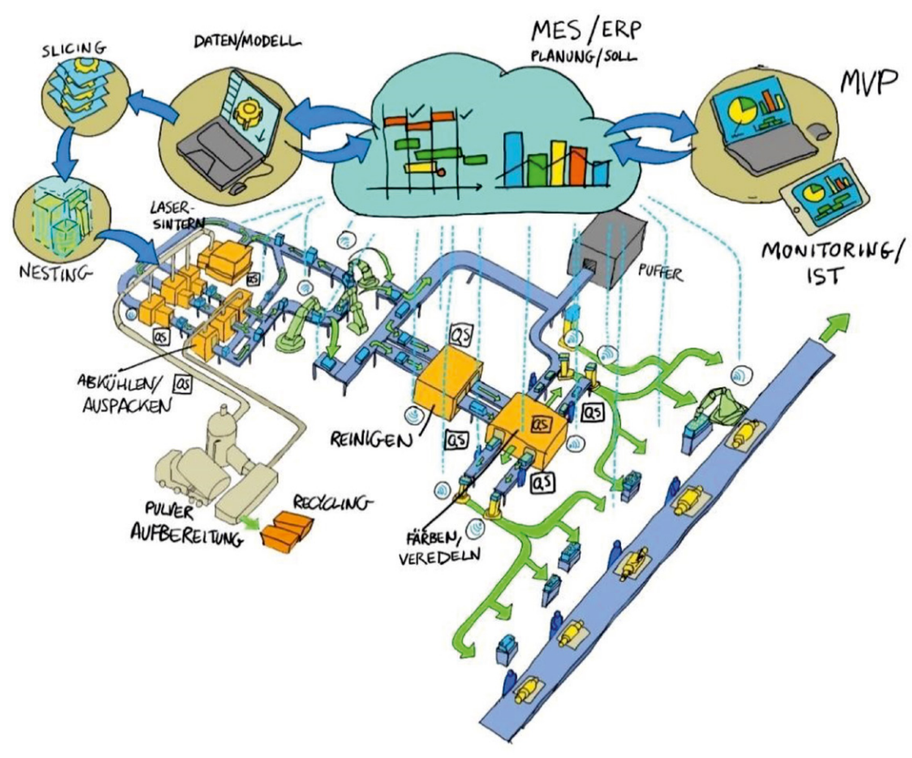

FIGURE 1 Aim of the project