

SkoMaTEX – Shopfloor framework for cooperative matrix production in individual textile finishing

Objective

Textile finishing producers should be enabled to use mobile systems and matrix production strategies through a versatile shopfloor framework. Matrix production combines the advantages of make-to-order production (flexibility) and classic flow production (productivity) through adaptive and agile process chains. The project also integrates employees into this production strategy and creates the manufacturer-independent basis for cooperative matrix production.

Approach and results

The manufacturer-independent integration of automated guided vehicle systems was implemented using the VDA5050 guideline and Industry 4.0 communication standards (OPC UA, MQTT and DDS) for the interoperability of the shopfloor framework.

The use of middleware with digital abstraction for the executive and connective levels, and the advantages of a distributed software system based on the open source framework ROS 2, allows the transfer the existing system technology with fixed process chaining to flexibly deployable production modules, as well as the integration of other systems for versatility and adaptability. The focus of cooperative matrix production for SME suitability was on human-centred interaction, which was implemented by integrating feedback and interaction options for employees (human-machine interaction).



Interactive demonstrator (© STFI/Dirk Hanus)

A modular demonstrator was created in order to make the interaction possibilities and advantages of such systems (distributed software systems, mobile robotics) tangible.

The following outlines the results and findings from the project at different context levels:

- real (research and test field “Textile factory of the future”)
- virtual (3D simulation environment with VR connection)
- compact (miniature models of the AGVs with driving functionality and communication options)

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The final report on this project is available on request.

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