

**Unsettled Technology
Domains in Industrial
Smart Assembly Tools
Supporting Industry 4.0**

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Printed in USA

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EPR2020018

ISSN 2640-3533

e-ISSN 2640-3541

ISBN 978-1-4416-0213-5

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About the Editor



Thorsten Roye is the Manufacturing Engineering Expert for Fastening Systems at Airbus. In this role, he serves as an advisor to management and all production plants across Airbus for final and temporary fasteners, fastening tools, and fastening processes for commercial aircraft, defense and space, and helicopters.

He has a diploma in mechanical engineering–aircraft systems (Technische Universität in Hamburg, Germany) and a Master of Science in Composites (Prüfungsteilnehmer Universität Hannover, Germany).

Mr. Roye has worked for Airbus for the past 15 years, having been responsible for automation, robotics, and mechatronics. Currently, he leads Airbus in collaboration with multifunctional teams in procurement, engineering, quality, and research and development. He represents Airbus in several workshops, training programs, and conferences worldwide.

Named on more than five issued patents, Mr. Roye is highly interested in assembly and manufacturing topics touching a broad range of industries, including automotive.

He is an assistant professor at two German universities and focuses on assembly technologies. He is also an instructor for SAE International teaching “Introduction to Airframe Engineering—Design for Manufacturing, Assembly and Automation.”

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Abstract

This SAE EDGE Research Report identifies key unsettled definitions of the role of smart assembly tools in the Industry 4.0 world. “Smart” refers to tools that are “specific, measurable, achievable, reasonable/realistic, and time bound.” Smart assembly tools are used in all industries, including automotive, aerospace, and space. These tools are employed for measuring, inspecting, marking, drilling, and installing all existing fastening systems. The role of an assembly tool inside the Industry 4.0 environment is quite important as the smart, intelligent assembly tools have an enablement function. Smart assembly tools have a large influence on Information and Communication Technology (ICT), assembly cost reduction, process control, and even the product and process quality.

These four domains—and their undefined nature—are the focus of this SAE EDGE Research Report. The technical issues identified here need to be discussed, the goals clarifying the scope of the industry-wide need to be aligned, and the issues requiring standardization need prioritized.

NOTE: SAE EDGE Research Reports are intended to identify and illuminate key issues in emerging, but still unsettled, technologies of interest to the mobility industry. The goal of SAE EDGE Research Reports is to stimulate discussion and work in the hope of promoting and speeding resolution of identified issues. SAE EDGE Research Reports are not intended to resolve the challenges they identify or close any topic to further scrutiny.

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ISSN 2640-3536