



Industry 4.0 – technologies for the factory of the future

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Abstract. Our industries are facing a period of major challenges. The customer demand for new products is coming at ever shorter intervals and is increasingly dependent on customized products that must be adapted for individual preferences. Although enormous performance improvements in computer-aided technology (CAx) during the past 10 years have allowed the design and planning phases to be adapted to the different limiting conditions, a similar breakthrough is still awaited in the actual manufacturing technologies.

For solving this dilemma we can learn from the field of information and communication technologies. Computers are getting smaller and smaller and vanish inside nearly all of our technical devices. Beyond this, things communicate in a world-wide network: the Internet. When we contemplate following this path into the future, we find that nearly all the things of everyday life will become smart nodes or cyber physical systems within a global network. This phenomenon is called the Internet-of-Things (IoT). This trend will certainly find its way also into industrial production. The strong bias of the electro-technical and hierarchical world of factory automation will transition to smart factory networks, which increasingly benefit from the advances in Information and Communication Technology (ICT) and computer sciences. This will lead us to smart production processes in smart factories.

Short Bio. Prof. Zuehlke received the MSc and PhD from RWTH Aachen. After his academic career he joined Lufthansa German Airlines where he was responsible for the aircraft maintenance division as a vice president. Since 1991 he is Professor for industrial automation at the University of Kaiserslautern. In 2008 he was appointed director of the innovative factory systems department at the German Research Center for Artificial Intelligence DFKI in Kaiserslautern. Furthermore, he is the founder and since 2005 chairman of the executive board of the smartfactory^{KL} – an industry driven research and demonstration center for smart factory technologies which is recognized as the birthplace of the Industry 4.0 paradigm.

He is consulting many companies and organizations and has given numerous invited keynotes on national and international events. His research has been recognized by the Borchers medal of honor, the medal of honor as well as the high-ranking badge of honor of the German Society of Engineers and the IFAC outstanding service award. He is a guest professor at the Univ. of Cincinnati and was awarded the honore doctor degree from Sibiu University Romania. Dr. Zuehlke has published over 200 journal and conference papers, 5 books, and numerous other technical publications. He is an affiliated member of IFAC where he was active in the technical board for a long time.

In the US he is a member of the board of governors of the Manufacturing Leadership Council. The US magazine Smart Industry named Prof. Zuehlke as one of the TOP 50 Innovators for Digital Transformation of industry. The US Smart Manufacturing Magazine recognizes Prof. Zuehlke as one of 30 Advanced Manufacturing Visionaries worldwide.