**Lehrstuhl für Fertigungsautomatisierung
und Produktionssystematik**
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Event

SIITME 2021
IEEE 27th International Symposium for Design and Technology in Electronic Packaging
27th - 30th of October - ONLINE/LIVE
CONFERENCE AND EXHIBITION

Key Note Speaker

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1. Introduction

Prof. Jörg Franke heads the Institute for Factory Automation and Production Systems (FAPS) at the Friedrich-Alexander-University of Erlangen-Nuremberg since 2009. He focuses the research on manufacturing of mechatronic products, starting from packaging of electronic circuits, additive manufacturing of circuit carriers, printed electronics technology, assembly of electric drives engines, automation solutions and ending with engineering, planning and simulation of complex mechatronic systems.

Previously, he held various management positions with global responsibility e.g. at McKinsey&Co, Robert Bosch GmbH, ZF Lenksysteme GmbH, Schaeffler AG and ABM Greiffenberger GmbH. Jörg Franke studied and prepared his doctor's thesis in the field of 3D-MID technology at the Friedrich-Alexander-University of Erlangen-Nuremberg.

Amongst other honorary assignments Jörg Franke is chairman of the board of the Research Association 3D Mechatronic Integrated Devices (3D-MID), member of the board of the Bavarian Cluster Mechatronic and Automation, the German Research Association for Assembly, Handling and Industrial Robots (WG MHI), as well as member of the International Academy for Production Technology (CIRP) and of the German Research Association of Production Technology (WGP). Beside that he is reviewer of numerous research funding associations as well as member of various conference program committees and editorial boards of technical journals.

2. Title

MID Technologies for Microelectronic Packaging

3. Abstract

In the light of mega trends like digitalization and autonomous driving, electronic modules gain further importance by increasing demand for efficient functional electronic systems. Regarding standardization and reduced production costs, state-of-the-art methods for producing electronic assemblies, which include additive and subtractive processes, are still unsurpassed. However, conventional electronic packaging uses typically two-dimensional substrates and regular designs. When it comes to microelectronics in particular, there is rising need for both miniaturization and high functional integration. These factors are often limited by two-dimensional space.

The great advantage of 3D-MID technologies compared to conventional circuit carrier technologies is the high degree of integration solutions for a wide variety of functions, accompanied by components and structures with decreasing size. On the one hand, electrical functions can be realized, but on the other hand, also thermal, magnetical, fluidical or optical integration options are possible. 3D-MID are no longer just Molded Interconnected Devices based on thermoplastics. By extending the term to Mechatronic Integrated Devices, it is taken into account that three-dimensional parts with integrated conductive structures can also be produced with other materials like ceramics, and hence can be metallized with new processes. These do not only enable miniaturization and functional integration, they also shorten manufacturing chains, reduce weight, and give higher freedom of design.

A few years ago, there was hardly any way around laser direct structuring (LDS) with 3D circuit carriers for producing 3D-MID. Now there is a broad portfolio of 3D capable manufacturing processes, such as FDM with integrated Piezojet printing or plasma-based copper coating. Hence, using printed electronics may no longer make subsequent SMD assembly necessary, since the integration and interconnection of SMT components can be realized in combination with the metallization process in the same machine.

In order to be able to assess the reliability of these new types of 3D-MID technologies, a major challenge lies in generating valid test and inspection methods and adapting and standardizing existing procedures to new capabilities and external requirements. This is the basis for opening up a broad market regarding the use of new technologies like 3D-MID for microelectronic packaging.