Hahn-Schickard Stuttgart

Hahn-Schickard comprises four sites in Baden-Württemberg, Germany, which are located in Stuttgart, Villingen-Schwenningen, Freiburg and Ulm. Their common scope is to develop innovative cross-industry products using microsystems technology – from the first idea to the final product. The Hahn-Schickard Institute of Microassembly Technology located in Stuttgart thereby focusses on six core competences, which serve six main application areas, as displayed in Figure 1.

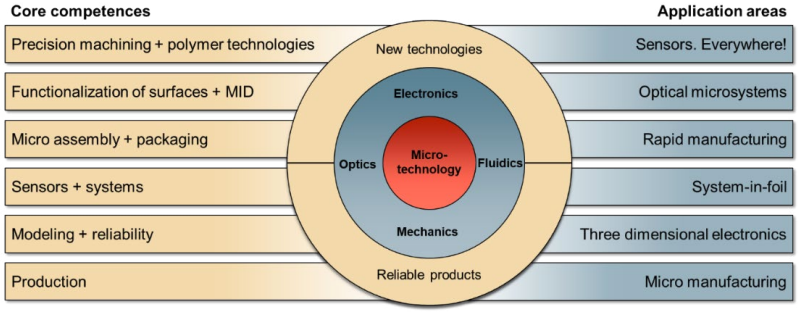

Figure 1: Core competences and application areas of Hahn-Schickard Stuttgart

Sensors. Everywhere! – Hahn-Schickard Stuttgart develops sensors and sensor systems based on various physical principles and technologies, and integrates them as closely as possible at the optimal site, utilizing competency on micro integration. These developments enable megatrends, such as internet of things, smart factory, smart home and ambient assisted living.

Optical microsystems – The institute offers a portfolio of micro-optical components, including micro-lenses, diffractive components, hybrid optical components, micro-mirrors and wave guides as well as their active alignment and high-precision-assembly. The obtained optical systems can be applied e.g. for touchless measurements or high-speed data transfer.

Rapid manufacturing – In order to enable individualized products, starting from lot size 1 in a cost-competitive manner, digital/tool-free process chains based on additive and subtractive 2D and 3D processes are being developed. Such process chains comprise laser technologies, direct imaging, printing technologies and plating technologies.

System-in-foil – Another aim is the miniaturization of components in z-direction. Structuring of foil substrates, assembly and interconnection of ultrathin components and the production of multi-layer systems yield ultra-thin microsystems, which allow the adaptation to curved shapes or the deformability during application.

Three dimensional electronics – The institute's portfolio further includes several process chains to obtain complex and highly integrated 3D electronics, so-called MIDs (Mechatronic Integrated Devices). Depending on their application, different substrate materials, such as polymers or ceramics and even aluminum, can be functionalized using different approaches (Figure 2). Several simulation tools, e.g. for thermal management (Figure 3), complement the development of new products, which find application in e.g. industrial technology, automotive, medical technology or ICT.

Micro manufacturing – Hahn-Schickard Stuttgart uses high-precision patterning and machining to develop innovative products based on micro technology, thus enabling optical, electronic, fluidic and/or mechanical functions. The integration of micro-structured components in injection and transfer molding tools enables their replication in polymers.

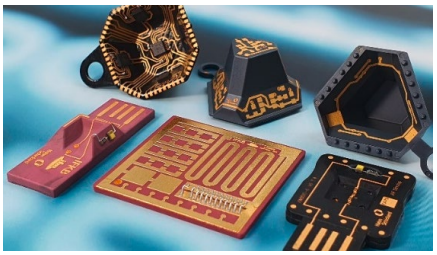

Figure 2: Different MIDs based on thermoplastic, thermoset and ceramic substrates.

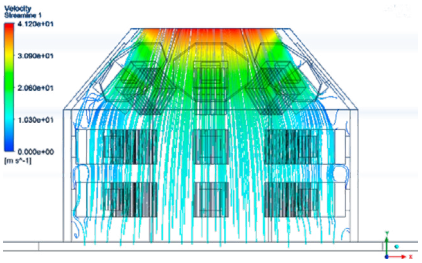

Figure 3: Thermal management of a MID.

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