



# ELECTRONICS AND MICROSYSTEMS

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“Electronics and Microsystems” is a business division in which Fraunhofer IKTS offers materials, technologies, components, and systems for microelectronics and nanoelectronics, energy engineering, sensors and actuator technology as well as for industrial testing systems.

In the future, microsystems will not only become substantially more sophisticated, more robust and smaller, they will also increasingly interact directly with their environment through enhanced functionalities. This will result in ever more complex demands being placed on the development of more cost-effective and reliable materials as well as production solutions for miniaturized assemblies. Fraunhofer IKTS resolves these challenges by taking an integrated approach to materials, processes and system design.

Fraunhofer IKTS engineers develop functional ceramic materials with extraordinary properties that make them suitable for use in harsh environments. These materials can be processed using an array of technologies (synthesis, packaging, joining, deposition and structuring technologies), depending on general requirements and customer preferences, and then be applied to sophisticated microsystems. Using standardized production processes as well as tried-and-true methods, they succeed in attaining competitive cost rates. Ceramic components can also realize additional fluid, thermal, sensor, and actuator functions that interact directly with the electronic components of signal processing and power electronics. Fraunhofer IKTS has special expertise in relation to multifunctional materials, such as piezoceramics, electrocaloric materials and shape memory alloys. These kinds of materials can be used to engineer so-called “smart” systems in which the material itself connects multiple functions with each other.

Sensors and complex sensor systems represent a focus within this business division’s portfolio, enabling the team to record multiple chemical, electrochemical, electrical, thermal, acoustic, electromagnetic, mechanical and optical parameters. Adapted to customized process specifications, evaluation electronics – together with its hardware and software – are created entirely in-house at IKTS. These systems are utilized in automotive engineering and energy engineering, non-destructive testing as well as condition and process monitoring.

In the “Electronics and Microsystems” business division, customized materials, design rules, and testing technologies are available so that it can continue to expand the fields of application for miniaturized systems, attenuate development cycles, and ensure systems reliability. Its comprehensive technical infrastructure and specific offerings to the industrial sector ensure that its development processes retain their industrial focus, for efficient transfer of expertise and technology to the customer.