Printed Electronic Elements and Systems on Ceramic Substrates

(FEIM – **F**uture **E**lectronics for **I**ndustry 4.0 and **M**edical 4.0 project)

Objectives of the Project

Development of precise industrial electronic components and sensors based on ceramic substrates, focusing on 3D structures and advanced printing technologies. Research focuses on additive manufacturing of structured ceramics, including 3D printing and advanced printing of functional materials on ceramic substrates.

Topics Covered by the Project

- **3D Ceramic Structures for Electronics**
  Development of 3D substrates using additive techniques like 3D printing (FFD, SLA) and gel casting.
  Development of 3D ceramic structures through pressing, mechanical machining, and laser microfabrication.

- **Advanced Printed Pastes for Ceramic Substrates**
  Multi-modal and nanoparticle Cu pastes and inks with enhanced solderability.
  Composite and organic dielectric pastes with high permittivity (High-K).
  Material deposition using advanced digital printing techniques.
  New adhesion enhancement approaches for printed layers on ceramics.

- **Next-Generation Sensors and Modules**
  Development of innovative sensors and electronic modules utilizing 3D ceramic substrates and advanced metallization.

What will the Project Results enable?

- New manufacturing technologies for rapid prototyping and low volume production of structured ceramic-based electronics
- New copper pastes with increased solderability and high-K dielectric inks for ceramic substrates
- Innovative industrial pressure sensors based on ceramics for extreme environments
- Temperature, chemical and radiation-resistant electronic components and sensors
- High efficiency monolithic ceramic-based heat sinks for liquid cooling

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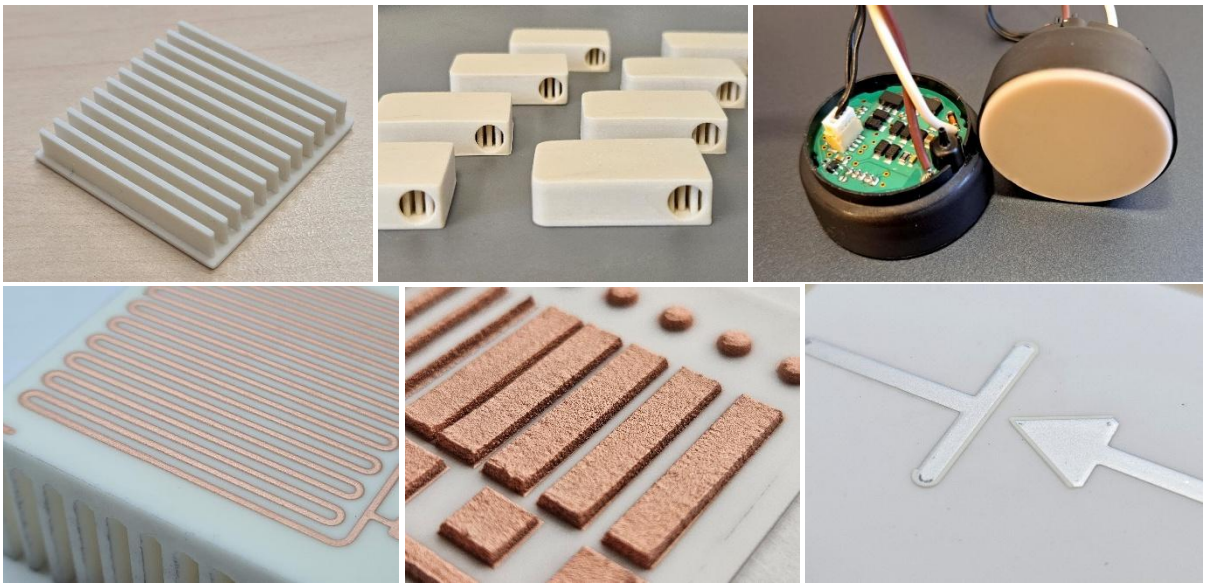

Selected Results

- Verified Technology (Ztech): Additive manufacturing for 3D ceramic structures
- Patents (P): 3D ceramic elements and printed layer structures
- Utility Models (Fuzit): 3D printed ceramic elements and structures
- Prototypes (Gprot): Conductive pastes and ceramic pressure sensors
- Publications: Conference and journal publications on project outcomes

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Leader : Assoc. Prof. Ing. Jan Reboun, Ph.D., FEE UWB, RICE

Contact: jreboun@fel.zcu.cz,

Partners involved:

More about FEIM project can be found on projects webpage.

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