

**Modular biochemical, chemical and physical
laboratory systems based on innovative 3-D LTCC
packaging and interconnection solutions - Cheap Lab**

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Ministry of Education and Research, Germany

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Partners

France

Temex Ceramics, Bordeaux
Crimat/University of Toulouse
CitySensor Paris
Lusac/University of Caen

Germany

Fraunhofer-IKTS Dresden
Pro-Net GmbH Cottbus
Helmholtz Institut Braunschweig
(Gesellschaft für Biotechnologische Forschung)
VIA electronic GmbH Hermsdorf

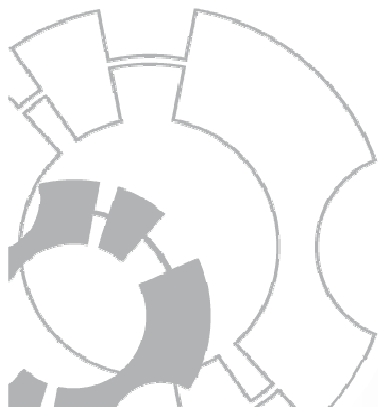
Overall Objectives

Development of a Modular Multi-Sensor System

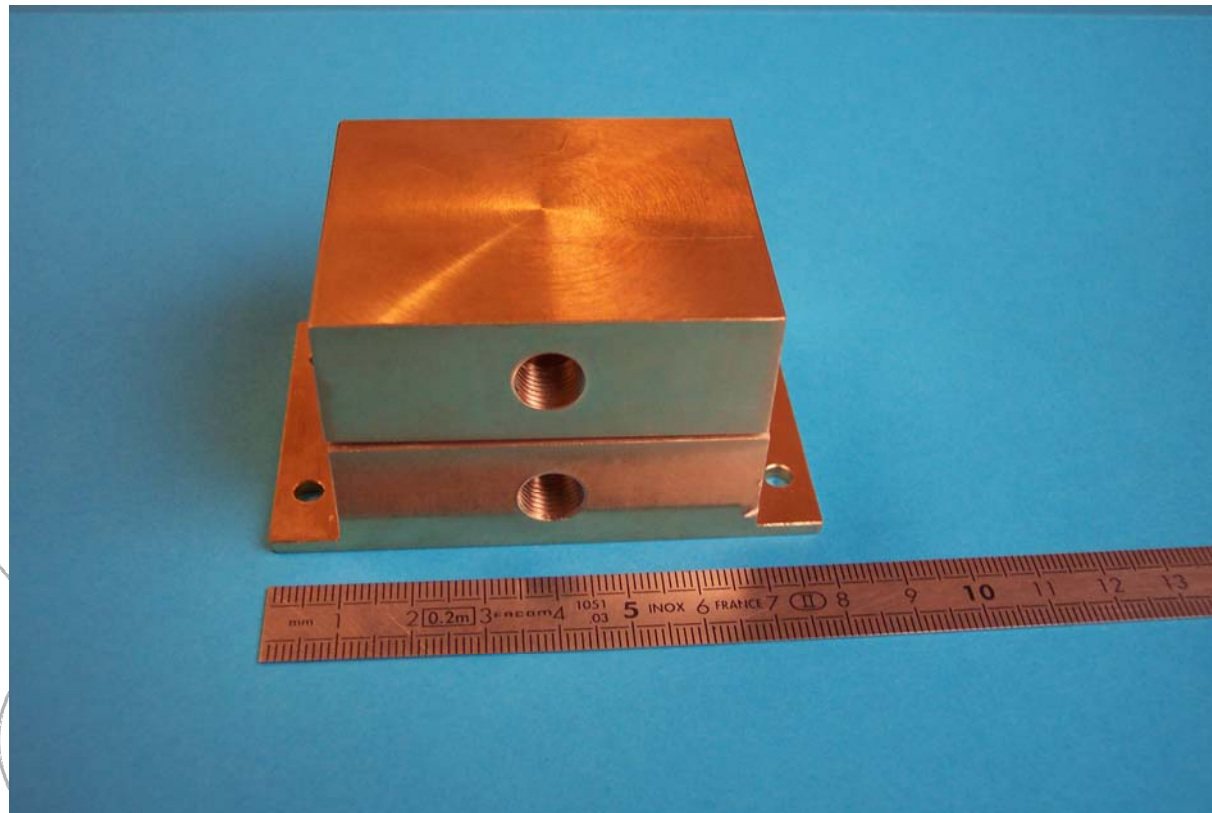
- different sensor technologies
- chemical/physical sensor elements
- bio-reactor elements
- Fuel cell
- evaluation electronics
- communication electronics

Based on Advanced 3d-LTCC Technology

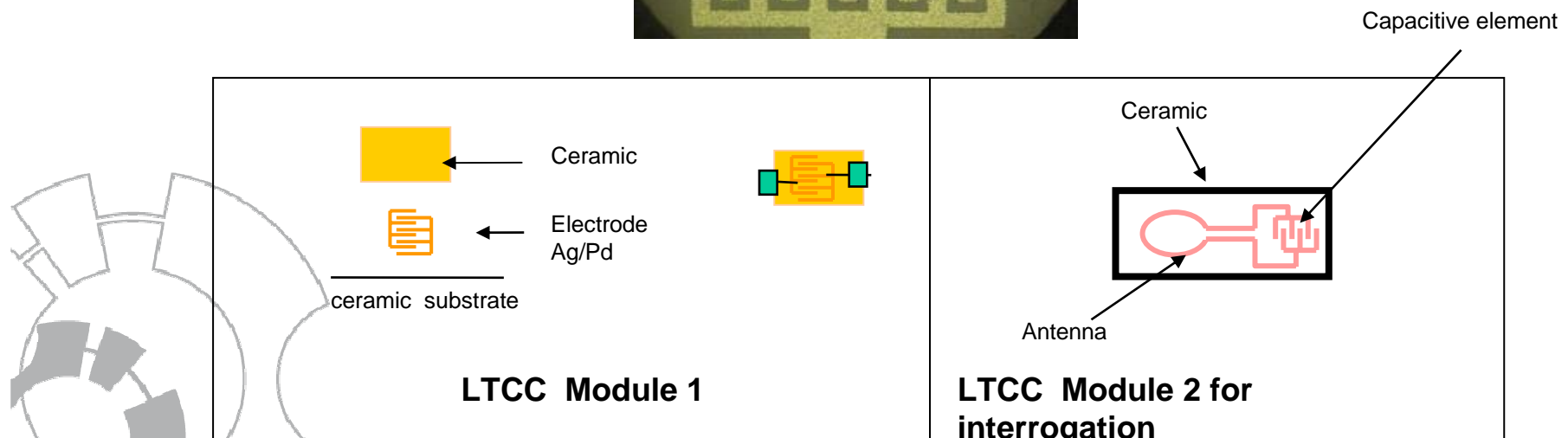
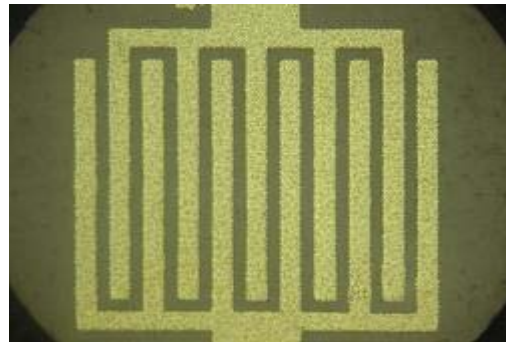
- Integrated fluidics
- Integrated electrochemical and physical sensors
- fuel cell constructions
- highly integrated packages
- compatible outputs for modularity
- Biocompatibel and reliable in harsh environment



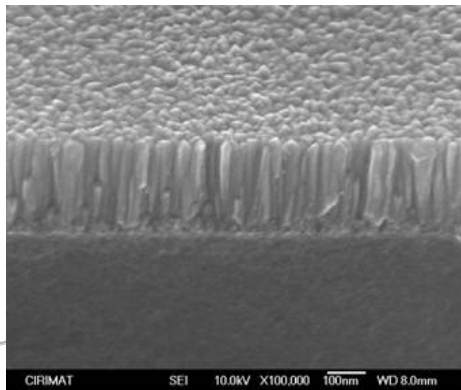
Achievements City Sensors: COMPLETE LTCC TRANSDUCER



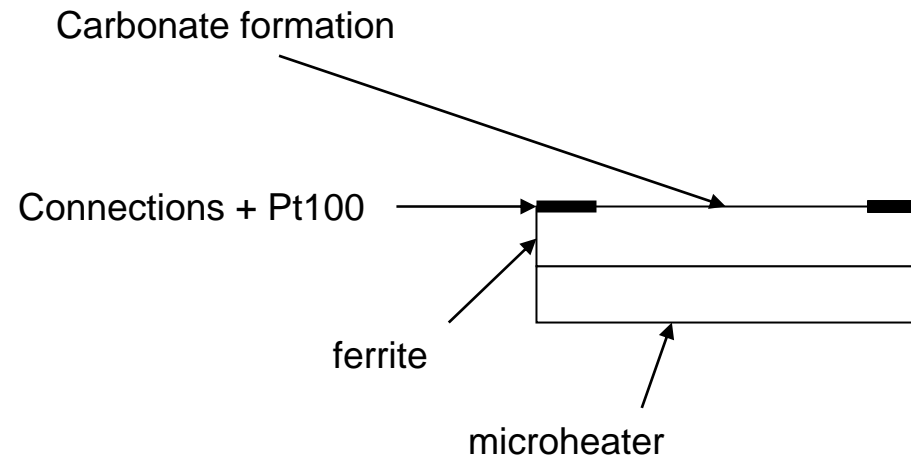
Achievements Temex Ceramics and LUSAC: Ceramic Humidity Sensor



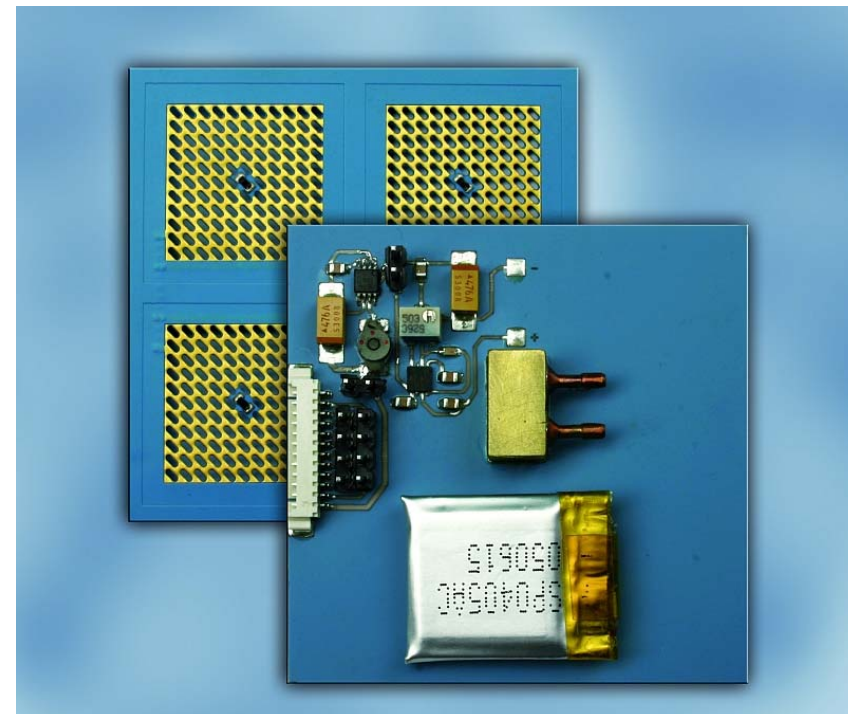
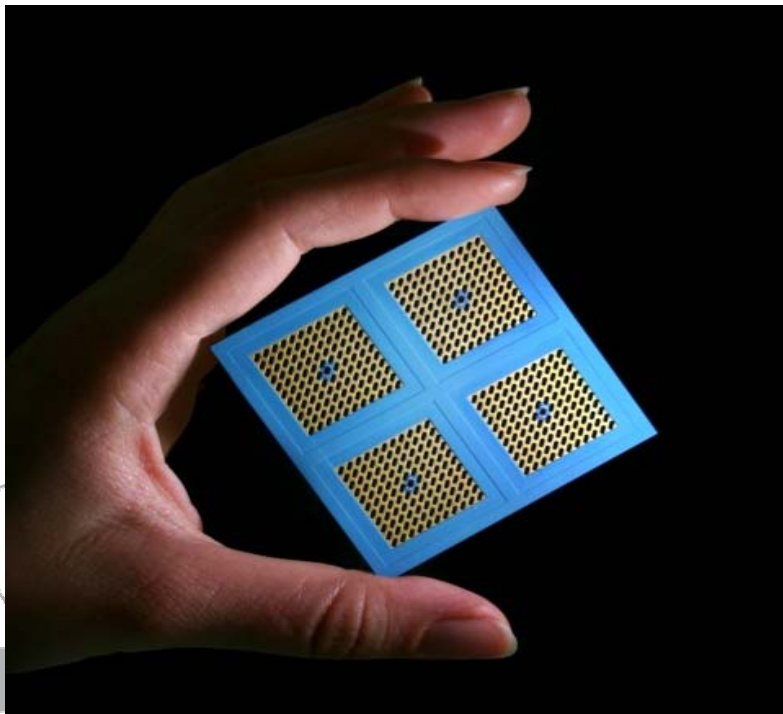
Achievements Temex Ceramics and Cirimat: Ferritic Gas Sensor



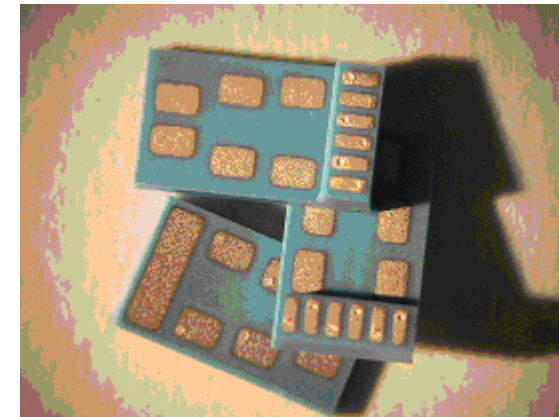
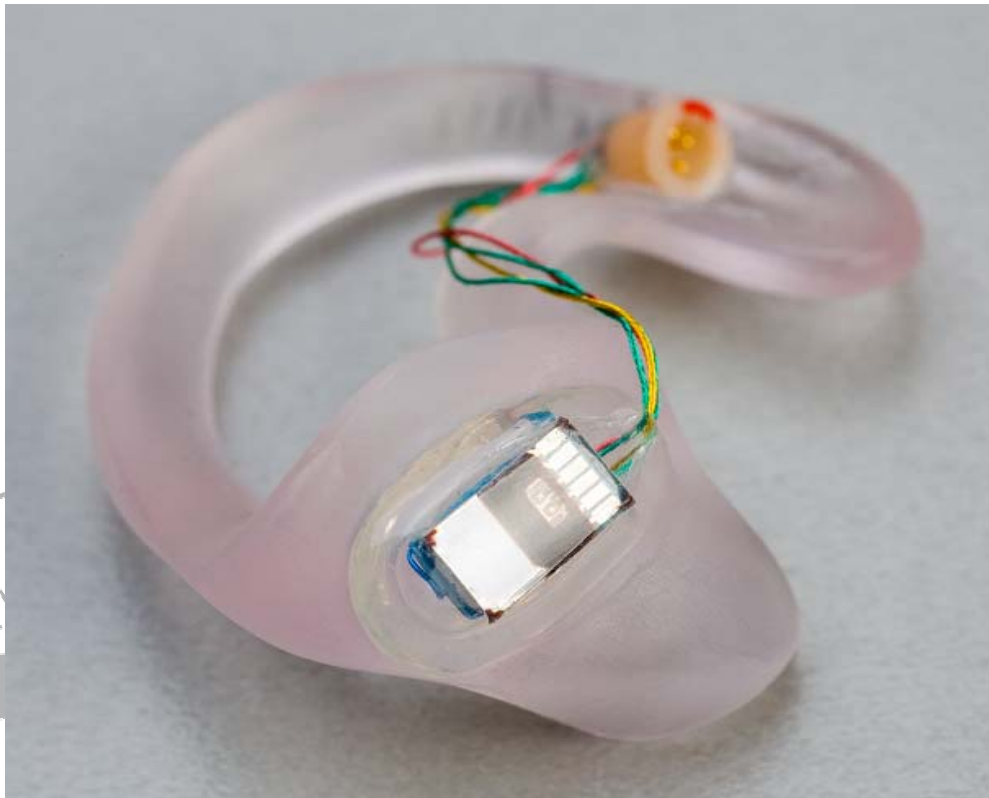
PVD Ferrite layer



Achievements Fraunhofer Institut IKTS: LTCC integrated Fuel Cell



Achievements Center of Intelligent Sensors CIS: LTCC integrated Optical pO₂- Sensor



Achievements Helmholtz-Institute and VIA electronic: LTCC integrated Electrophoretic Screening Chip

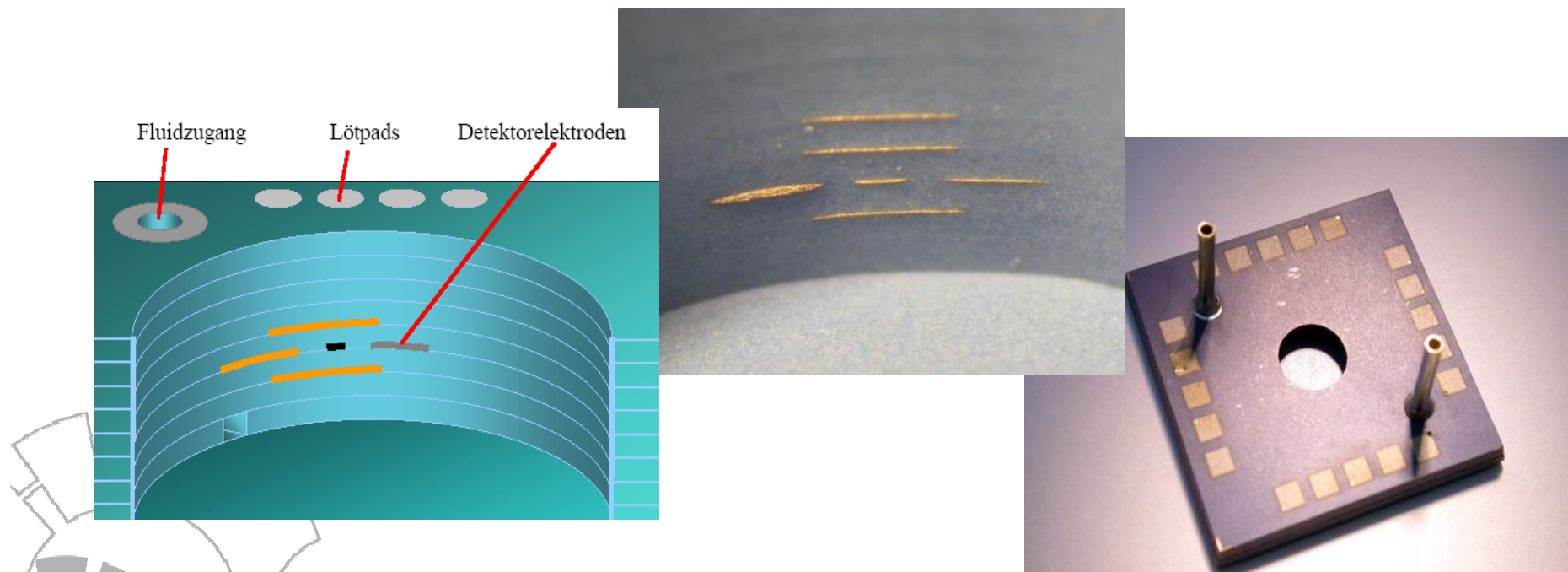


Fluidic Chip with integrated high voltage conductors



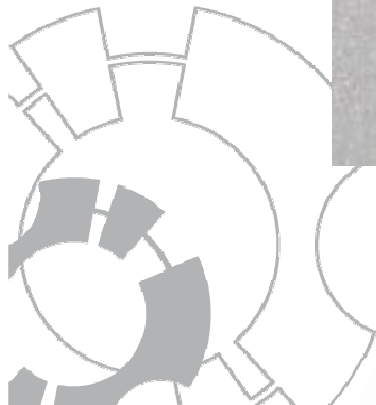
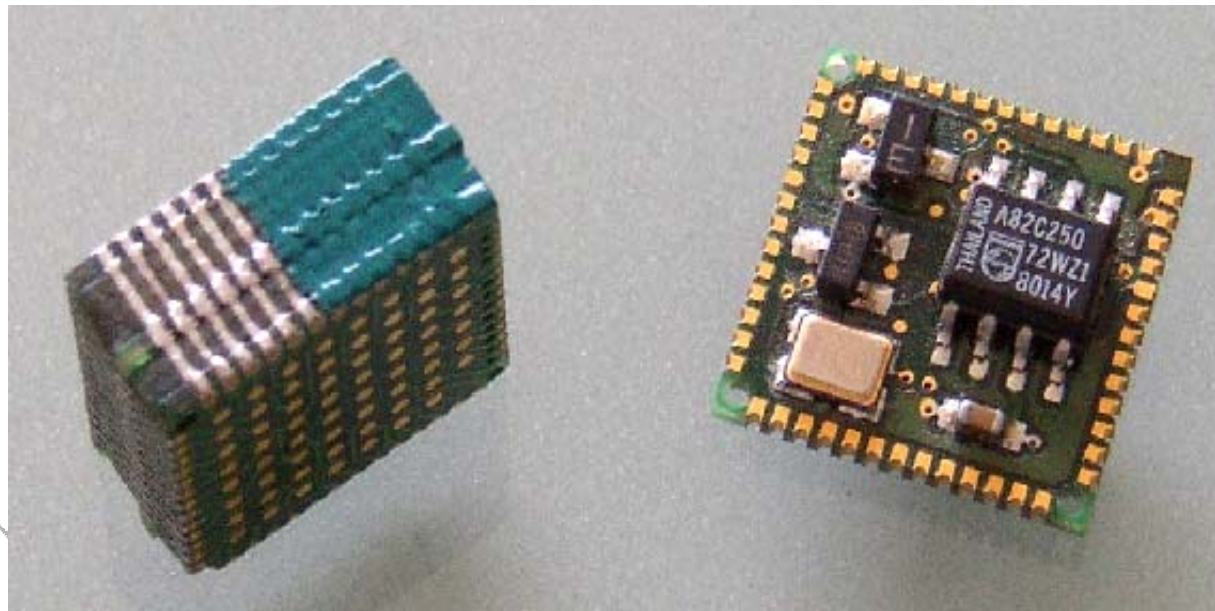
Fluidic interconnection
at 100 μ m channel

Achievements Helmholtz-Institute and VIA electronic: LTCC integrate Microreactor

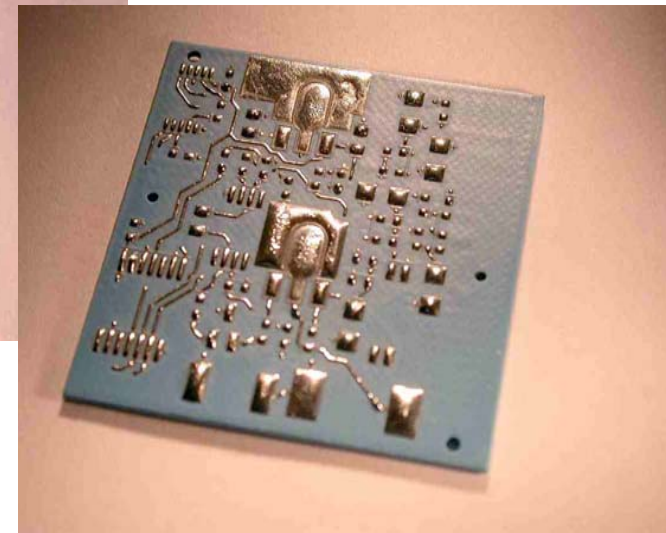
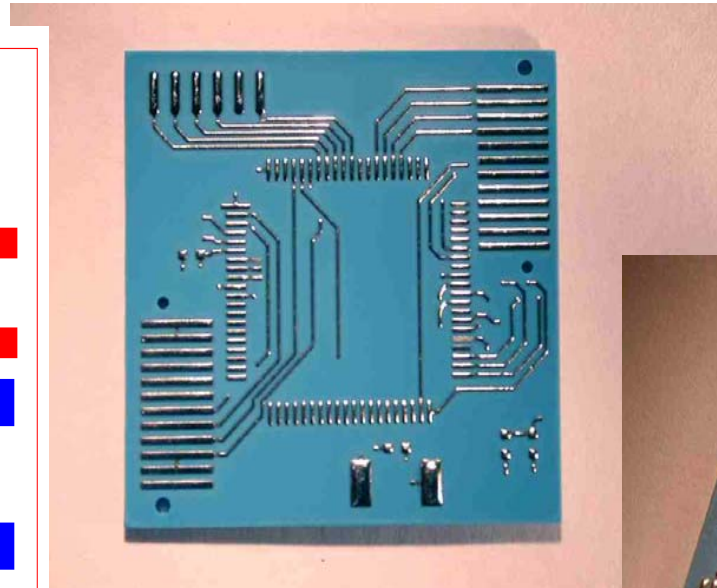
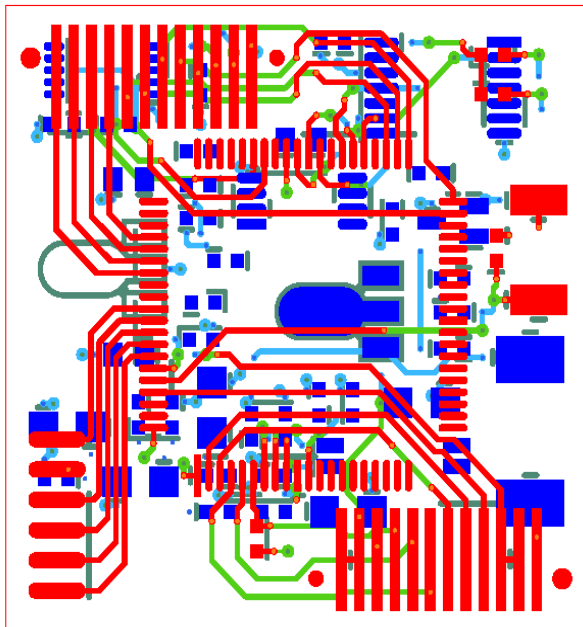


Schematic construction, microscopic picture and complete reactor

Achievements VIA electronic: Match-X Can Bus



Achievements Pronet and VIA electronic: LTCC integrated I-nose Gas Sensor



Overall Achievements and conclusion

Humidity Sensor for automotive applications

Oxygen Sensor for automotive applications

Photoplethysmographic optical sensor for medical applications


Gas Sensor for Security applications fire and carbonisation gas

Fuel Cell for autonomous power supply

Microreactor for pharmaceutical screening

Interface CAN Bus for system communication

Differential Pressure Sensor for industrial applications



Advanced LTCC Technology has proven to be a flexible, reliable and cost efficient solution for the integration and packaging of modular sensor systems for future applications.