Press Release

X-FAB and Fraunhofer ENAS Sign Strategic Cooperation Agreement to Accelerate Microtechnology Innovations

"Lab-in-Fab" Model Combines Cutting-Edge Research and Manufacturing Expertise in Microsystems Technology

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The Fraunhofer Institute for Electronic Nano Systems ENAS and X-FAB are joining forces in an innovative cooperation model: the "Lab-in-Fab" approach that integrates research, development, manufacturing, and commercialization to accelerate the transition of microtechnology innovations into industrial-scale production. The technical focus of the collaboration is on advanced packaging and heterogeneous integration of electronic components and systems.

The "Lab-in-Fab" model enables efficient development of new processes and technologies in the fields of MEMS, microfluidics, photonics, and heterogeneous integration, and their direct transfer into manufacturing – customer-oriented, flexible, and scalable.

Integration of Research and Manufacturing for Maximum Speed

The innovative technologies' time span from development to market entry is crucial and an important competitive factor for Europe. This requires new, efficient channels between research institutions and the industry. At the heart of the "Lab-in-Fab" model is a more efficient technology development and its smooth and fast transition to the production environment at X-FAB. This brings research and manufacturing closer together in terms of both content and technology.

When joint customers transition to volume production, missing expertise for scaling new technologies for microelectronics is specifically supplemented or built up. This eliminates

the need for additional rounds of development, which significantly reduces the time to market.

A particular focus of the cooperation is on the joint development of wafer bonding techniques for wafer-level packaging, heterogeneous integration as key technology for future applications in sensing, communication, and medical technology, as well as the development of testing and reliability methods. The cooperation also includes targeted staff exchanges, joint research and funding projects, active participation in technical conferences, and joint market development. This close collaboration not only promotes knowledge transfer but also strengthens the visibility and innovative strength of both partners on the international stage.

Holistic Approach – From Idea to Series Production

The long-standing collaboration between Fraunhofer ENAS and X-FAB reaches a milestone with this model. Customers benefit from an end-to-end service offering: from research and the development of customized technologies to prototyping and volume manufacturing.

“Our integrated and collaborative approach enables us to efficiently support new micro- and nanotechnologies from research through to series production,” explains Prof. Dr. Harald Kuhn, Director of Fraunhofer ENAS. “Customers benefit from a seamless service – from the development of individual technology projects to prototyping and small series, all the way to volume production with our partner X-FAB. Thanks to our long-standing collaboration, we are deeply familiar with X-FAB’s manufacturing processes and infrastructure. This knowledge, combined with close exchange, allows us to transfer technologies and processes seamlessly and bring them to market readiness – fast, reliable, and with high quality. This enables our customers to better meet rapidly changing market demands, and it significantly increases their innovation and production speed.”

Volker Herbig, Vice President Microsystems at X-FAB, highlights the benefits of the close collaboration with Fraunhofer ENAS: “This allows us to develop tailored solutions faster, bring new technologies into production more quickly, while strengthening our customers’

competitiveness. Research, development, and mass production are more closely integrated – for the mutual benefit of end customers, Fraunhofer ENAS, and X-FAB."

Long-Standing Successful Collaboration

The cooperation is based on a long-standing, trusted partnership and complementary strengths: scientific excellence on the part of Fraunhofer ENAS and industrial manufacturing expertise at X-FAB. Completed projects range from MEMS design and the development of TSV modules for 3D integration to the integration of noble metal deposition and structuring into foundry process chains.

A current example of pilot production is the transfer of a complex packaging process for high-precision MEMS sensors in the automotive sector: a screen-printing technology with solder glass pastes developed at Fraunhofer ENAS was successfully integrated into the X-FAB process chain and is now available to customers worldwide as a high-volume foundry service.

Within the framework of the European Chips Act, the pilot line for "Advanced Packaging and Heterogeneous Integration for Electronic Components and Systems" (APECS) is a key focus of the initiative "Forschungsfabrik Mikroelektronik Deutschland" (Research Fab Microelectronics Germany, FMD). Fraunhofer ENAS is part of FMD.

With their cooperation, Fraunhofer ENAS and X-FAB are laying the foundation for accelerating the implementation of innovative technologies in industrial practice while also making an important contribution to strengthening the microelectronics ecosystem in Europe.

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Glossary

APECS – Advanced Packaging and Heterogeneous Integration for Electronic Components and Systems

MEMS – Micro-Electro-Mechanical Systems

TSV – Through Silicon Via

WLP – Wafer Level Packaging

About X-FAB

X-FAB is a global foundry group providing a comprehensive set of specialty technologies and design IP to enable its customers to develop world-leading semiconductor products that are manufactured at X-FAB's six wafer fabs located in Malaysia, Germany, France, and the United States. With its expertise in analog/mixed-signal technologies, microsystems/MEMS, Photonics, silicon carbide (SiC) and gallium nitride (GaN), X-FAB is the development and manufacturing partner for its customers, primarily serving the automotive, industrial and medical end markets. X-FAB has approximately 4,500 employees and has been listed on Euronext Paris since April 2017 (XFAB). For more information, please visit www.xfab.com

About Fraunhofer ENAS

The Fraunhofer Institute for Electronic Nano Systems ENAS' key strength lies in the holistic development of "intelligent systems" for various applications. Its research activities range from the development of innovative wafer and packaging technologies to the production of electronic components, micro- and nano sensors, and actuators, as well as developing system concepts and system integration technologies, including communication interfaces. Fraunhofer ENAS uses state-of-the-art and AI-supported test and reliability methods to transfer the developed solutions into practical applications. The institute guides customer projects from the initial idea through to the design phase, technology development or implementation using existing technologies, to the final tested prototype. For more information, please visit www.enas.fraunhofer.de

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