

Contributions to the APECS Pilot Line: Fraunhofer IPMS

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Fraunhofer IPMS is one of 14 German research institutes involved in the implementation of the APECS pilot line. As one of the 12 Fraunhofer institutes, Fraunhofer IPMS develops the technologies that connect advanced chiplets into reliable, high-performance AI systems. Through quasi-monolithic integration, wafer-level heterogeneous integration and comprehensive validation, we bridge sensing, computing and packaging to accelerate European innovation.

The role of Fraunhofer IPMS in the APECS pilot line

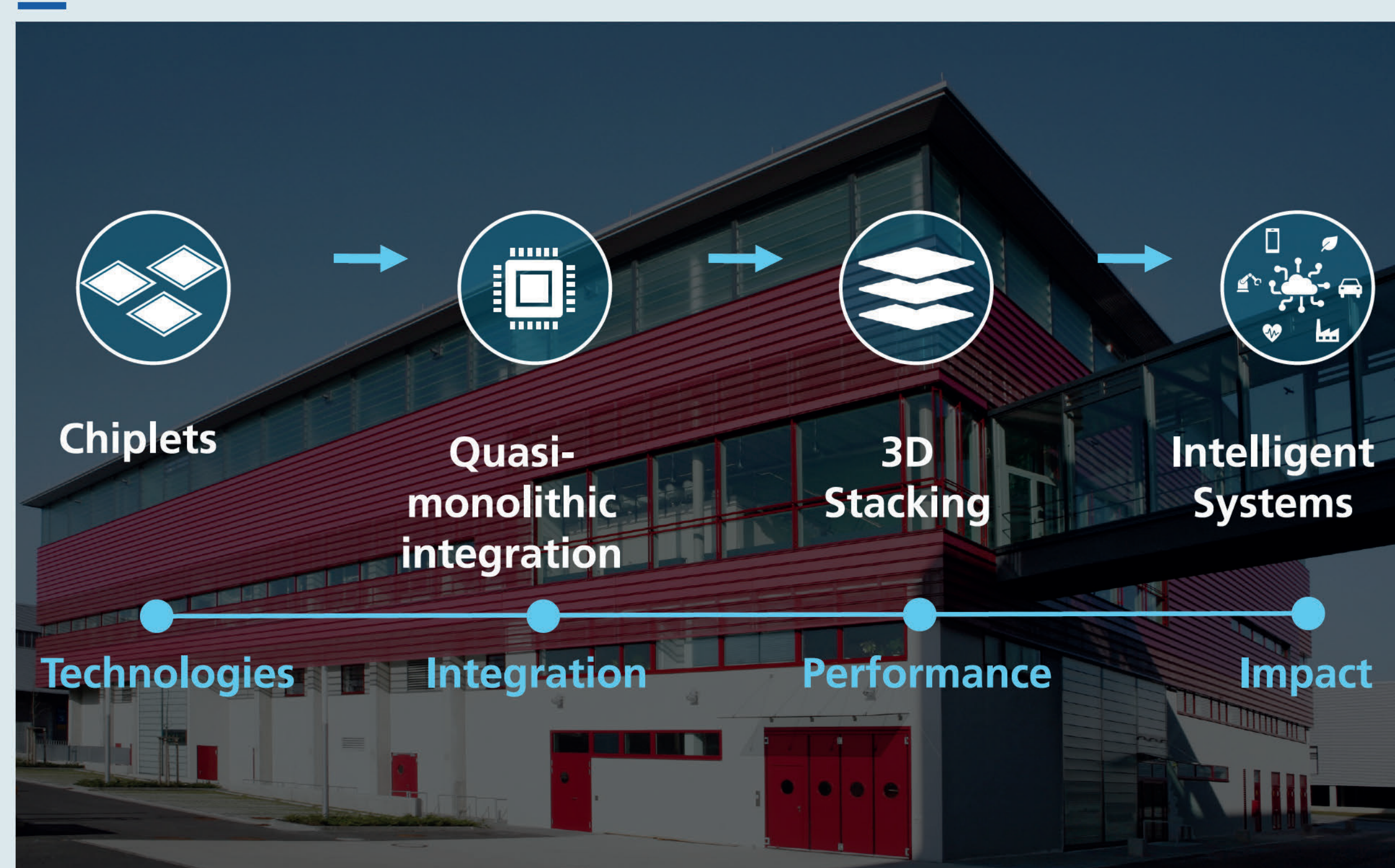
Accelerate your path from innovation to manufacturing with Fraunhofer IPMS. We combine state-of-the-art 200 mm and 300 mm cleanroom facilities with world-class expertise in 3D stacking, chiplet integration and microsystems engineering. We support our partners throughout the entire development cycle, from concept studies and prototype development to pilot manufacturing, reducing technology risks and shortening time-to-market.

This comprehensive infrastructure also plays a crucial role in the APECS pilot line, helping drive the project's goals in chiplet development and integration technology.

- Chiplet system design: Designing high-performance, scalable chiplet system architectures for computing, AI, and MEMS sensors/actuators
- Integration: Enabling 2.5D, 3D and quasi-monolithic integration on 200 mm and 300 mm platforms using CMOS, MEMS and non-silicon chiplets.
- Functional safety by design: Developing design flows, IP cores and system architectures for reliable, safety-critical applications.
- Testing, characterization & qualification: Leveraging extensive characterization, testing, and reliability research to deliver robust and scalable solutions.
- Pilot manufacturing & technology transfer: Bridging innovation and industrial production with scalable pilot manufacturing and rapid technology transfer.

Where chiplets become intelligent systems

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Find out more about
Fraunhofer IPMS in APECS

Example of QMI: Pocket wafer with placed chiplets

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What is APECS?

APECS (Advanced Packaging and Heterogeneous Integration for Electronic Components and Systems) is one of 5 European pilot lines established under the EU Chips Act. APECS is the foundation for Europe's competitive position in heterogeneous system integration and advanced packaging. It plays a vital role in enhancing Europe's strategic autonomy by reducing dependence on foreign suppliers and strengthening Europe's capabilities in critical technology areas.

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Additional information

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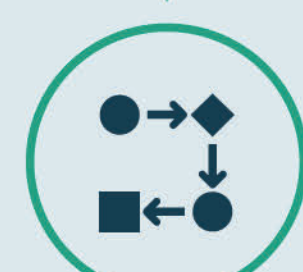
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Industrial innovation starts with us

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Concept & Design
From idea to feasibility



Research & Innovation
Development of materials,
processes and devices



Scaling
From prototype to qualified process



Pilot Manufacturing
& Technology transfer

Spotlight: Quasi-monolithic integration (QMI)

QMI enables the seamless combination of heterogeneous chiplets and technologies into highly integrated, high-performance systems. QMI delivers superior system performance, reliability and integration density while supporting cost-efficient manufacturing.

- Maximum performance: Reduced signal losses and ultra-low latency for high-speed data processing
- Reliability and durability: Robust integration with improved lifetime and reduced mechanical failure rates
- Compact systems: Near-monolithic integration for maximum functionality in minimum space
- Cost efficiency: Faster development cycles and scalable manufacturing through chiplet integration

Applications we empower:

AI-enabled Systems-on-Chip ♦ Sensor AI ♦ Intelligent MEMS ♦
High-bandwidth Transceivers ♦ Industrial Automation ♦
Automotive ♦ Medical Technology