



CONNECTS

Heterogeneous Integration for
Connectivity and Sustainability

HICONNECTS – An Introduction by NXP

Dr. Andrea Sanfilippo – NXP Semiconductors Germany GmbH

HICONNECTS

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Grant agreement ID: 101097296

Start date

1 January 2023

End date

31 December 2025

Total cost

€ 102 134 399,08

EU contribution

€ 24 655 938,01

64 Partners, coordinated by

NXP SEMICONDUCTORS GERMANY GMBH

Technology Readiness Level: 4-8

DOI

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Webpage

<https://www.hiconnects.org>



About NXP Semiconductors

Secure Connections for a Smarter World



AUTOMOTIVE

Enabling carmakers to develop smarter solutions for complex autonomy, connectivity, and electrification challenges

Accelerating the shift to greater mobility



INDUSTRIAL

Reducing wasted time, money, and effort by helping business run more efficiently.

Enabling more efficient data processing



MOBILE

Giving wearable and mobile devices easier access to the services that make modern life more convenient without compromising security and safety.

Transforming how people and devices connect



SMART HOME

Solutions that listen, learn, and adapt into the places we call home for more comfort, affordability, safety, and convenience.

Powering the intelligence behind the technologies



SMART CITY

Simplifying how people access and interact with local services to achieve new standards of sustainability, efficiency, mobility, and economic growth.

Anticipating the demands of tomorrow



COMMUNICATION INFRASTRUCTURE

Powering insights and inspiring performance with hardware solutions for handling 5G connectivity across the emerging communications spectrum.

Delivering real-time responsiveness at the speed of 5G



EMPLOYEES IN

30+ COUNTRIES

Headquartered in Eindhoven, Netherlands

~34,500

TEAM MEMBERS

9,500

Patent Families

~11,000

Engineers

60+

Year History

\$13.21B

Annual Revenue ¹

HICONNECTS

Consortium Partners

- HICONNECTS covers the **full semiconductors value chain** from design to manufacturing front and back end.
- The consortium consists of a well-balanced set of **large enterprises** (55%), **SMEs** (23%), **RTO** (14%) and **academic institutions** (8%).
- Partners from **15 countries**.



HICONNECTS

“Heterogeneous Integration (HI) for Connectivity and Sustainability”

Technology Challenges

- **IoT:** High latency and power consumption, low bandwidth limiting real-time IoT applications.
- **Connectivity:** Lack of resolution, classification, segmentation, localization, and mapping in radars not enough to achieve L4-5 Autonomous Driving.
- **More than Moore's Law:** need of alternative chips design, process and metrology which are cost-competitive, low power, and have high performance.
- **Digital Sovereignty:** Current EU semiconductors market share is only 10%.

Scope

To develop compelling and cost competitive **heterogenous integration (HI) core technology solutions** for energy-efficient and high-performance Silicon based RF and photonics solutions enabling:

- 1- Fast transmission of IoT data over the network.
- 2- Sensing for L4-5 Autonomous Driving.

HICONNECTS will also aim at using the novel RF solutions (5G/6G and radar) and IT cloud infrastructure for connected vehicles, industry 4.0 and smart health, smart cities.

Societal and Environmental Impacts

EU Sovereignty and Industrial Competitiveness

Digital Autonomy	Novel low power, cost- and performance- efficient, scalable HI products boosting EU market share in cloud, smart cities and automotive applications.
Digital Health Care	Smart drugs&vaccines development (Cryo-EM workflow) and delivery enabled by high-speed data transfer in data centers.
Cities of the Future	Deployment of a reliable connectivity infrastructure (IoT, cloud), incl. A.I. solutions. Highly effective vehicular communications for traffic management.

EU Green Deal

Resource efficient and carbon neutral EU	Energy efficient communications, radar and cloud, which will pave the way to real-time response and resilience against hazards & related CO2 emissions (e.g. wildfires).
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Product Development

HICONNECTS Product Pillars



Automotive radar, 5G/6G

- One-chip SOC 77 GHz and next gen. 140 GHz radar system.
- >100GHz transceivers for next gen. 5G modules and future 6G.
- Enhanced-5G ref. platform “El Mandadero” for industrial use cases.

Exploitation > automotive, I4.0, 5G/6G infrastructure, secure edge/IoT, Safety

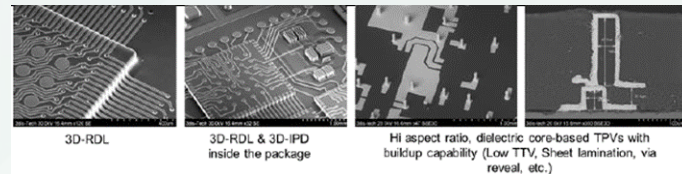
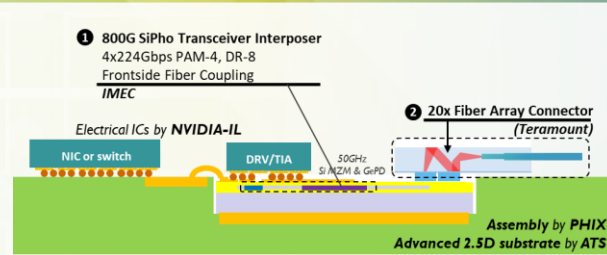
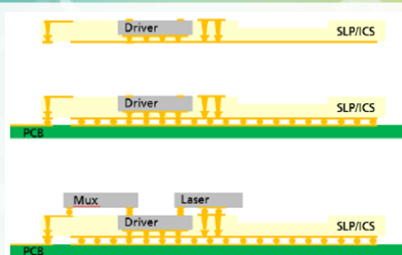


Data Centers and edge connectivity

- Next generation smart NIC and switch platform (TRx) via co-packaging and multi-chip module (MCM) with Si-photonics based connections, up to 70% energy per bit reduction, and 1,6 Tbs capacity.

Exploitation > cloud IT infrastructure and edge/IoT, HPC

Pilot Lines



Pilot Line 1 RF Electronics HI

Lead: FBH

- HI for high-speed broadband & RF electronics based on InP on BiCMOS, incl. thermal management.
- Photonic and electronic heterogeneous integration.

Pilot Line 2 Photonic Components for HI

Lead: IMEC

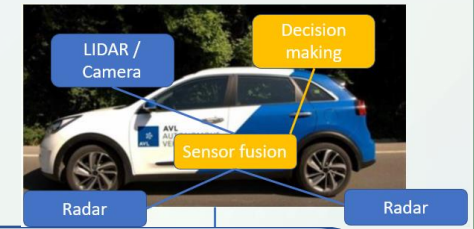
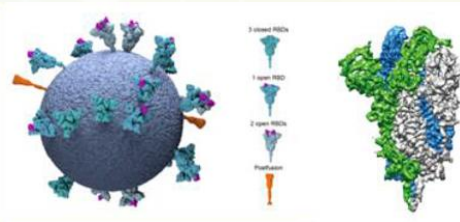
- Next gen. photonics components and Si photonics based on HI platform development.
- High-Speed Lasers and Photodetector.

Pilot Line 3 Advanced Packaging

Lead: 3DiS

- 3D-Fan-Out Wafer Level Packaging, pivotal for antenna in packages, and 5G/6G packages (beyond 100 GHz).
- Next gen. interconnects based on glass interposer.

Demonstrators



Public Health

Lead: THERMO

- Cryo-electron microscopy Data Management Platform (DMP) for fast access and processing.
- AI-enabled data-analytics.

Public protection and disaster relief

Lead: CENTRIA

- Drone equipped with 77 GHz radar, sensor and camera tech.
- Situation Awareness: edge processing and AI acceleration.
- Comms: 5G/6G.

Smart Construction

Lead: ULAK

- Holographic communication
- Mobile Edge.
- Fully connected and autonomous UGV and excavator with sensors (LIDAR, radar & stereo camera).

Connected & Autonomous mobility

Lead: AVL

- Trustworthy and explainable AI for L4 car.
- High performance radar, C-V2X modem.
- High accuracy intention recognition.

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Dr. Andrea Sanfilippo
Senior Manager Public Funding

NXP Semiconductors Germany GmbH
Schatzbogen 7, 81829, München
E-Mail: andrea.sanfilippo@nxp.com

