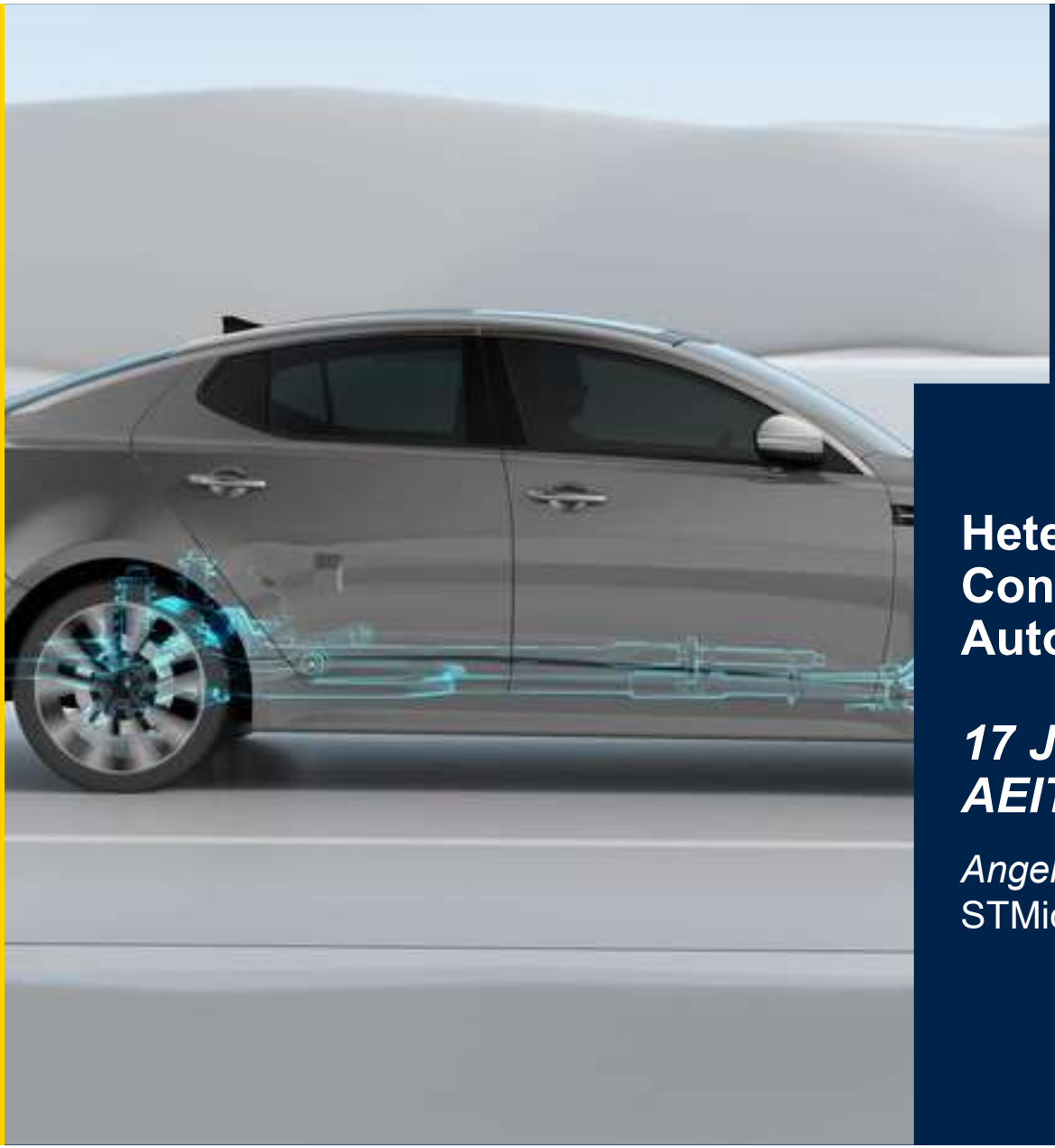

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Heterogeneous Integration for Connectivity and Sustainability for the Automotive Power Electronics Sector

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AEIT Automotive 2023

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STMicroelectronics

Agenda

1. Introduction Internet of Things (IoT) by 2025
2. HiCONNECTS High level activities description
3. First activities
4. HiCONNECTS Heterogenous integration
5. Conclusion

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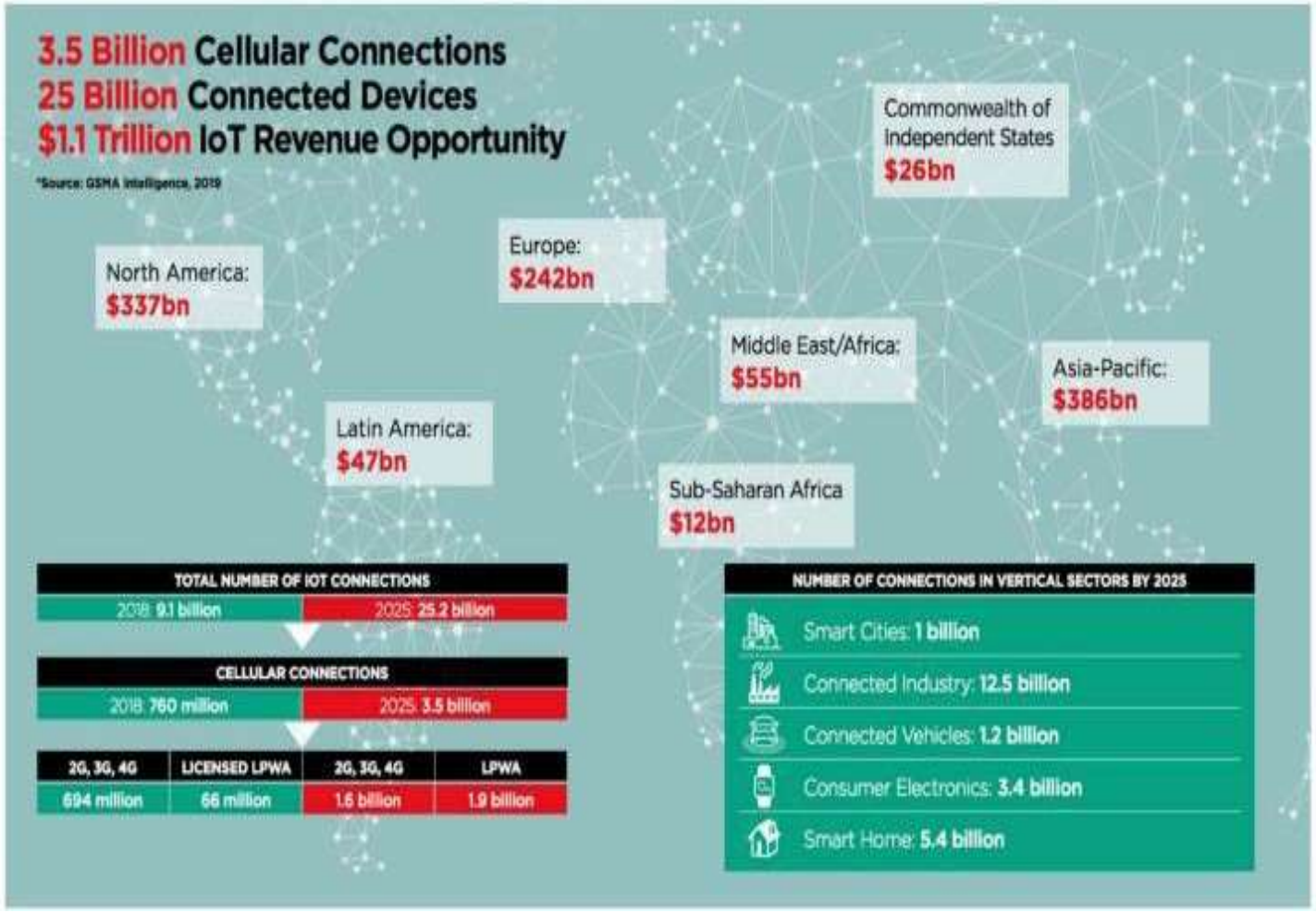
Introduction

Internet of Things (IoT) by 2025 (ref: IEEE HIR 2021)



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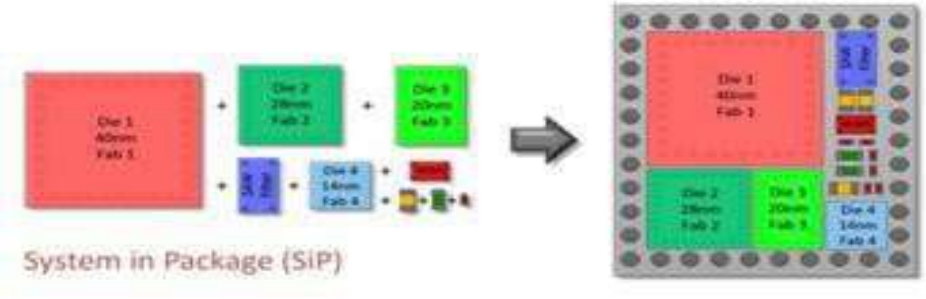
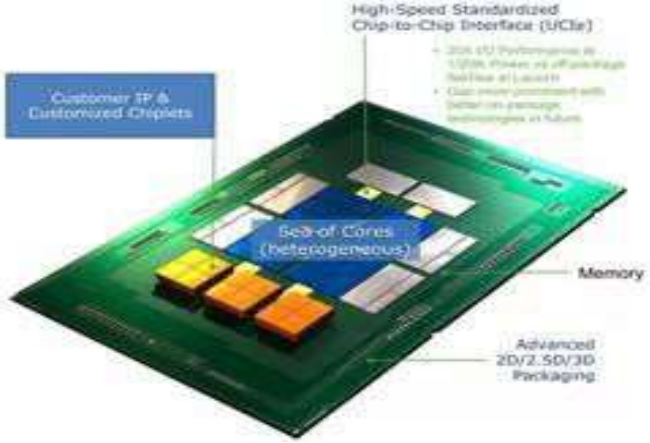
Internet of Things (IoT) data over the IT network and sensing of objects to enable Highly Automated Driving (HAD). Today, high latency, limited bandwidth, and high energy consumption per bit of information of current wireless/cloud platforms cannot satisfy the IoT applications that require real-time response.

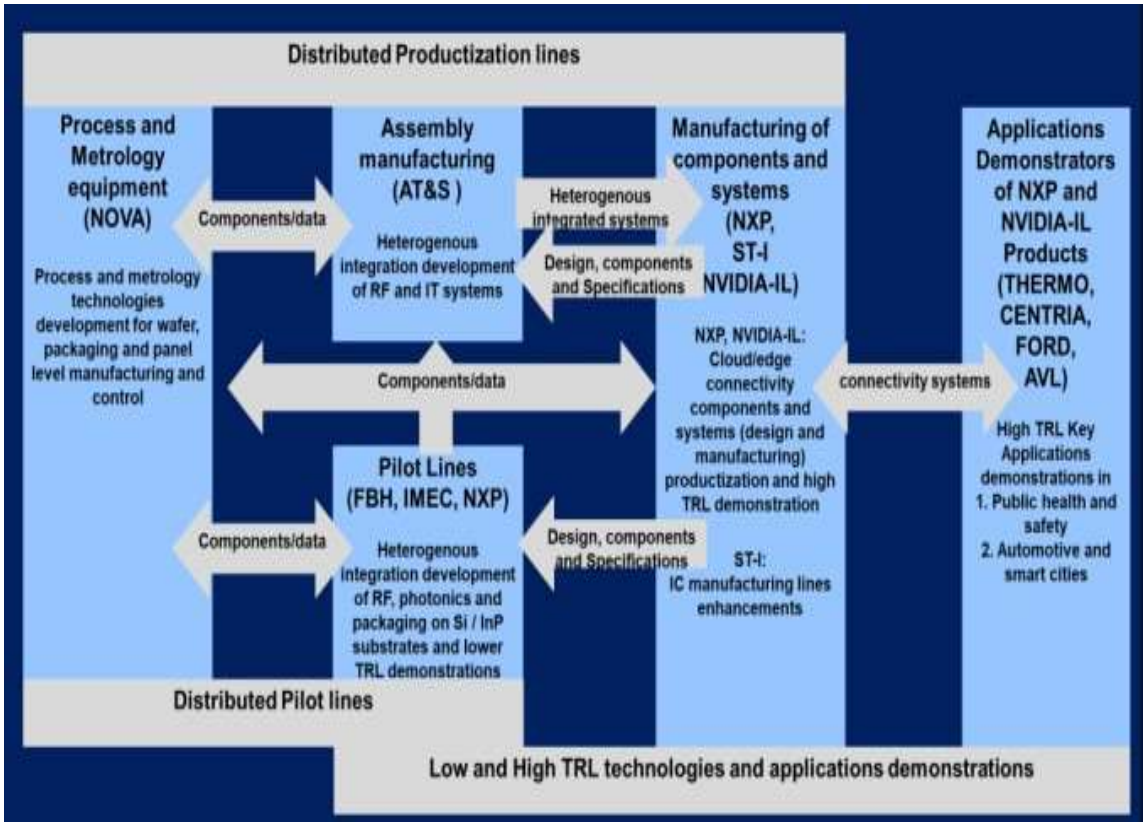
HiCONNECTS Heterogenous integration





Heterogenous integration (HI) includes many technology nodes and various types of components in one package (as known as system in package or SiP), such as combined monolithic IC, SoC, discrete, RF, MEMS, etc.

HiCONNECTS High level activities description 1/2



As an high level activity description, HiCONNECTS ' scope includes the design and manufacturing of high-performance Radio Frequency (RF) as well as energy-efficient cloud and edge Information Technology (IT) components and partners, in addition to manufacturing technology enhancements by STMicroelectronics and partners.

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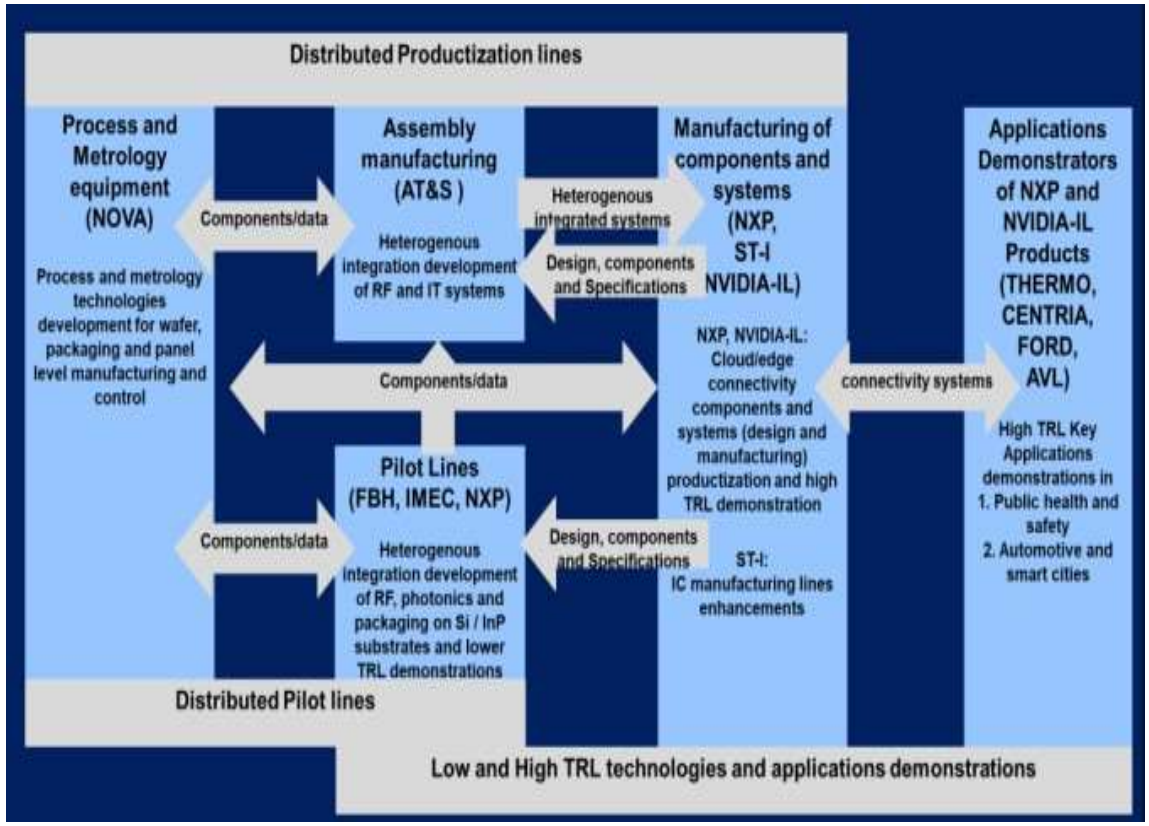
HiCONNECTS High level activities description 2/2



HiCONNECTS's scope includes also Heterogeneous integration'pilot lines; key applications demonstrators in Europe for the automotive, Public safety and life science and health industries, where efficient high-speed transmission of data is essential, and are relevant for society and the economic growth. Within this envelope are grouped the heterogenous Integration equipment and modules manufacturers, RTOs and academia.

(SAE) Level

Besides the size also power consumption and price need to be decreased, which urges a new degree of integration and processing performance, the latter also needed to deal with increasing algorithmic capabilities.

Looking beyond state of the art towards higher ***Society of Automotive Engineers*** (SAE) Level (4-5) of automated or autonomous driving, a clear path to more sensors with a higher degree of integration will be needed. A total of at least eight radar sensors per car is expected for SAE Level 5 which triggers the need of miniaturized modules to enable OEMs to integrate the vast number of different sensors in the overall system.

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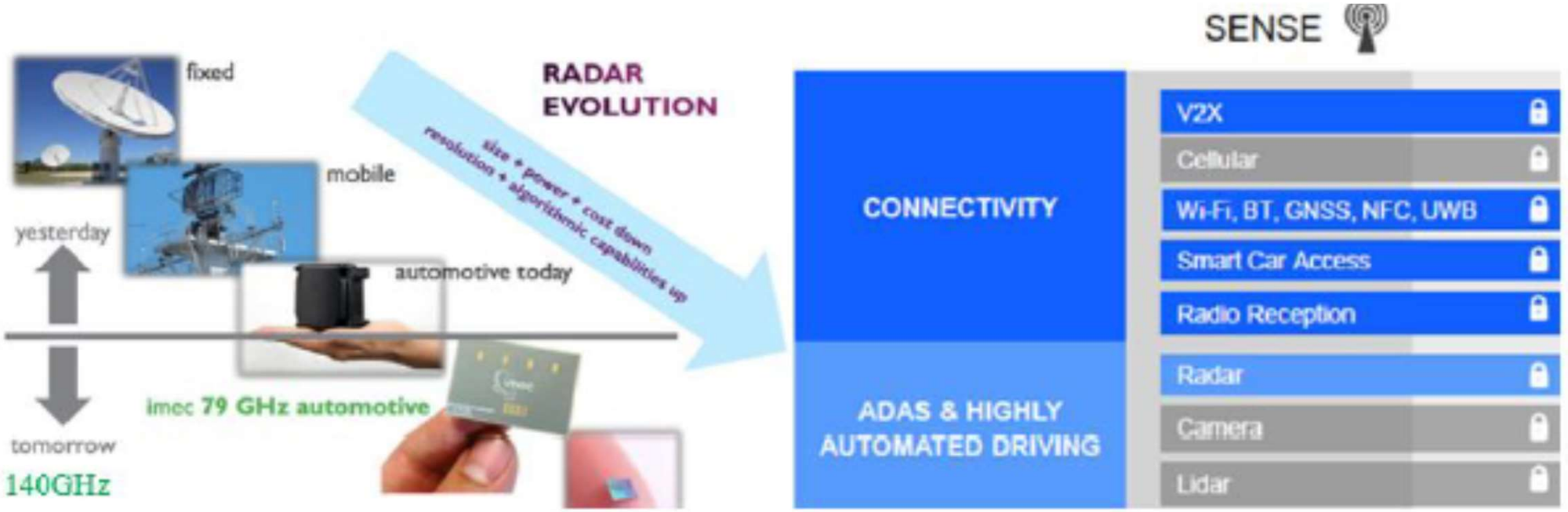
RADAR Evolution

During the HiCONNECTS' lifespan (2022 – 2025), the requirements from edge systems is expected to increase exponentially with the introduction of edge and cloud-based AI for real time multi streaming of media, health diagnosis and smart mobility IoTs connectivity such as V2X, WiFi7, UWB, and radar



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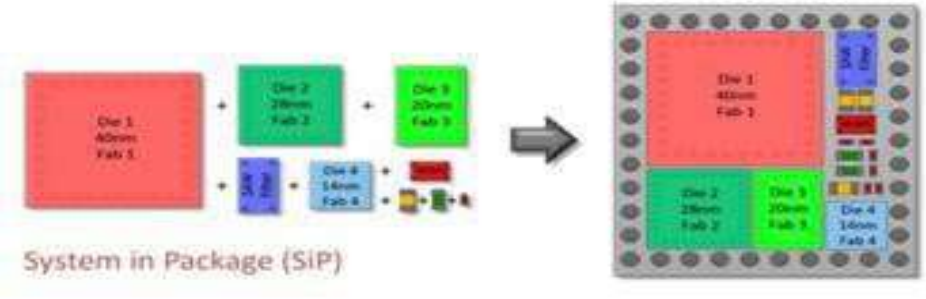
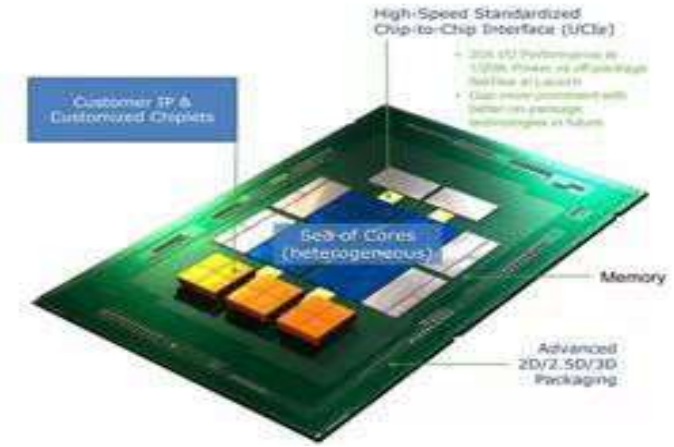
HiCONNECTS First activities





At today's date, researchers mainly focused on starting to build next generation Industry 4.0 demonstrators applying distributed and connected AI and ML-based processing on large amounts of data set for using in specific applications related to semiconductors manufacturing. This will enhance the efficiency of the semiconductor industry, by deploying a new stage of Industry 4.0. In this respect, as first results it has begun to provide the use cases, the definition of constraints, the KPIs and the objectives, the user requirements for the development of the AI-Enhanced Digital Twin architecture and smart sensors implementation as well its evaluation and deployment.

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Acknowledgment to HICONNECTs Project