



imec

Driving European Semiconductor Leadership: A Chiplet-Based Approach for the Automotive Sector

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Key Challenges Facing the European Automotive Sector

The perfect storm

Economic importance (2024 data)

Automotive accounts for ~7% of EU GDP and

8% of manufacturing value added

Generates €170 billion in exports

Provides 13.8 million jobs (direct and indirect), including 3.5 million in manufacturing, about 8.5% of Europe's manufacturing workforce

Supply Chain Vulnerabilities

Geopolitical tensions disrupt supply chains

Digital Transformation

Shift to software-defined vehicles demands new capabilities

Cars increasingly feature autonomous systems and connected services

High-performance in-car compute a must have!

Electrification and Decarbonization

EU mandates zero-emission vehicles by 2035

Global Competition Pressure

China's rapid rise in EV manufacturing threatens EU market position.

Chinese EVs offer competitive pricing and advanced tech.

China TAM shrinking for EU car OEMs

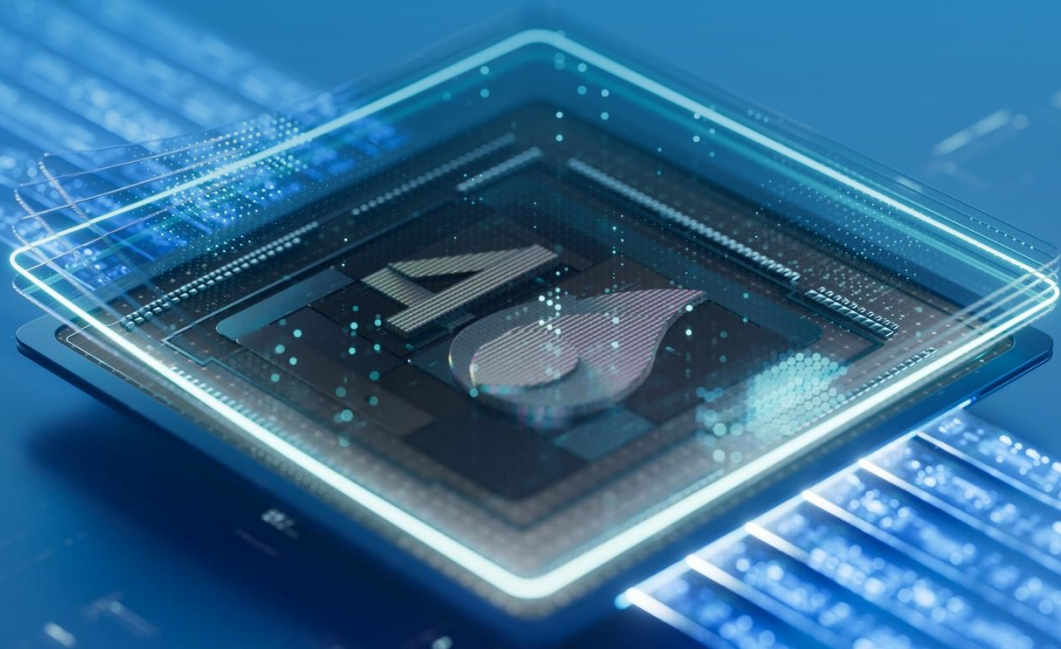
A satellite image of Earth showing a large hurricane with a distinct eye and spiral cloud bands over a dark ocean. The horizon of the Earth is visible at the top of the frame.

 **mec** is here to help!

We are more than just another R&D hub



For 40 years, we have been pioneering the semiconductor roadmap



...and massive NanoIC (sub 2nm) pilot line build out to come!



€3,5B investment



~12,000m² cleanroom



over 250 tools



24/7 operation



6,000m² cleanroom expansion
€2,5B investment

Mahtab • Tom • Andre • Wout • Vera • Mohammad Raed • Stijn • Valerie • Javad • Alessandri • Yusuf • Neha • Peter • Jan • Henrique • Jun • Shruthi • Jeroen • Sam • Danica • Soheila • Annie • Mohamed El Kordy • Emre • Jonas • Thomas • Franjo • Rishad • Marwan • Hong Hai • Christian • Genis • Noemie • Laura • Sarah • Patricia • Guy • Giulia • Lea • Caro • Virginie • Karol • Morena • Valentine • Amber • Francesca • Nathan • Sien • Nele • Francesco • Sofie • Gaelle • Thomas • Jana • Wouter • Lennerd • Halil • Beatriz • Luca • Yannick • Robert • Marie • Lize • Damon • Domenico • Alaa • Rick • Shu-Ngwa • Yosuke • Nicole • Hikaru • Michiel • Anna • James • Fernando • Natan • Julian • Yashovardhan • Jonas • Jasper • Vitaly • Irene • Arno • Bram • Sarah • Konstantin • Wafae • Gianpiero • Julian • Sang Cheol • Laila • Abdaoui • Preston • Wout • Thais • Onur • Woo Jin • Michiel • Ali • Peter • Maarten • Hasantha • Willi • Mehmet Kutay • Behzat Utku • Rostislav • Kurt • Evelien • Stijn • Roman • Brent • Seger • Seger • E • Tom • Marleen • Koen • Filip • Yoann • Thomas • Erik • Kristoffel • Mireille • Liesbeth • Ursula • Lammert • Nicholas • Yiming • Kishan • Vincent • Frederik • Dirk • Kevin • Veerle • Alex • Pieter • Aida • Cheng • Fabian • Jesu Kiran • Karen • Sathisha • Nick • Erik • Filip • Chidharth • Haijin • Jesse • Francesco • Wenqi • Willy • Sander • Stephane • Sulakshna • Victor • Jonas • Hua • Xiaolong • Sandeep • Chenming • Benjamin • Makoto • Giulia • Celine • Daniel • Arthur • Giordano • Carlo • Nathalie • Jannes • Charlo • Frederic • Michiel • Liesbeth • Maxim • Bryan • James • Stephanie • Robbe • Wei2 • Kenny • Annelies • Kushagra Singh • Nishant • Jason • Yishu • Arno • Akshit • Ananya • Yiwei • Katrien • Bas • Thomas • Laura • Alexander • David • Varun • Jasper • Bo • K • Anh Minh • Alमुदना • Shahriar • Jelle • Jerome • Luis Alberto • Jalal • Wei-Yu • Marion • Salma • Jonne • Charlotte • Michiel • Stuart • César • Saja • Carmen • Tammy • Vincent • Andrey • Reza • Charis • Hisashi • Kazutaka • Ian • Stefan • Hicham • Ju Hyuck • Hana • Theo • Ioannis • Nico • Marcel • Takashi • Aurore • Yann • Felipe Kenji • Igor • Rossa • Jack • Lisa • Hsiao-Lun • Jun-noh • Chen • Samson • Marco • Catalina • Meryem • Daria • Fatma • Amine • Maria Jose • Ikhtas • Omid • Milica • Sin Fu • Ja • raf • Mathijs • Laura • Milad • Stephen • Javad Arian • Thanos • Chelsey • Ege • Safae • Marko • Hojjat • Sander • Sahar • Ahmed • Kanta • Shinya • Christoph • Nancy • Laetitia • Jonathan • Mohammadsadeh • Matthieu • Youngwook • Fawaz • Aladdin • Fran • ren • Ann • Flora • Marion • Bruno • Sander • Delphine • Anthony • Joachim • Ricardo • Boris • Joonyoung • Stephanie • Karan • Lene • Benjamin • Zhengtao • Christoforos • Apostolia • Lucan • Vinod • Gerson • Yuchao • Emre • Asuncion • Santhosh • Naza • Natasya • Matthias • Sylvia • Thomas • Olivier • Michiel • Bas • Ralf • Maarten • Hannes • Annelies • Ine • Sanne • Daniel • Isaac • Matthias • Kenzo • Laura • Jasper • Tom • Wanda • Ruben • Kyle • Dieter • Lien • Anni • Emiel • Thomas • Ruben • Miel • Pieter • Yan • Daniel • Mike • Yao • Ruben • Karien • Wim • Hubert • Yoann • Geert • Peter • Reginald • Jan • Dieter • Davinia • Martin • Christophe • Joni • Pascal • Kim • Stefaan • Pieter • Joël • Jan • Veerle • Werner • Jan • Anthony • Tom • Mario • Marilize • Gert • n • David • Nathalie • Arnaud • Stephane • Ben • Mohit • Bart • Alan • Bjorn • Rik • Jesse • Yannick • Piet • Kaushik • Niek • Wouter • Ine • Bart • Frank • Rik • Max • Yannick • Peter • Nik • Hemant Kumar • Willemien • Ali • Joshua • Werner • Christophe • Fran • r • Arnaud • Dongyang • Shirotori • Lukas • Hanna • Frederik • Geoffroy • Eric • David • Laura • Laura • Bart • Cedric • Xuelong • Gianluca • Ruben • Emmeric • Jens • Bram • Jeroen • Els • Eric • Wim • Patrick • Gijssbert • Marijn • Ellen • Simon • Alessandra • T • Yusuf • Tom • Thomas • Thys • Mathieu • Huguet • Xiaohua • Liesbeth • Peter • Gilles • Stephen • Andrea • Xuening • Raees • Ilse • Jared • Olivier • Mathias • Francois • Robbe • Aurentje • Katrien • Philippe • Saartje • Stefan • Louis • Thomas • Jef • Tian • nadur • Georgios • Elisabeth • Vladimir • Francesca • Andriy • Vincent • Rene • Douglas • Ziad • Michael • Gosia • Kathleen • Ken • Gavin • Paulius • Ainhua • Amir-Hossein • Jonas • Sebastian • Pierre • Lucien • Karen • Pishko • Aftab • Jose Ignacio • Andrew • H • v • Gabriel • Mateo • Abdelhalim • Hy • Guillem • Edward • Iulian • Catherine • Dorin • Irfan • Arnau • Dolores • Cheng Chung • Christian • Jacopo • Sam • Andrea • Juergen • Rutger • Yair • Bouckou • Po Chun • Tangla David • Tom • Norma • Jaroslav • Ma

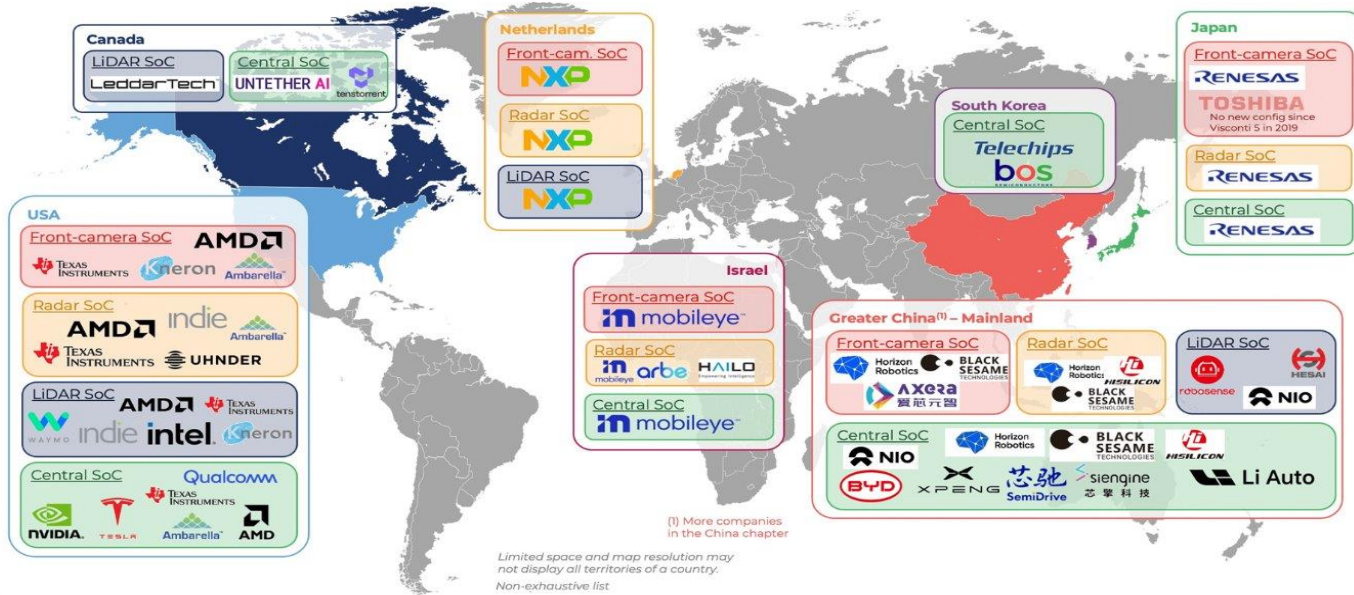
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from more than 100 nationalities.

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What's wrong with this picture?

AUTOMOTIVE PROCESSOR ECOSYSTEM – COMPUTING FOR ADAS

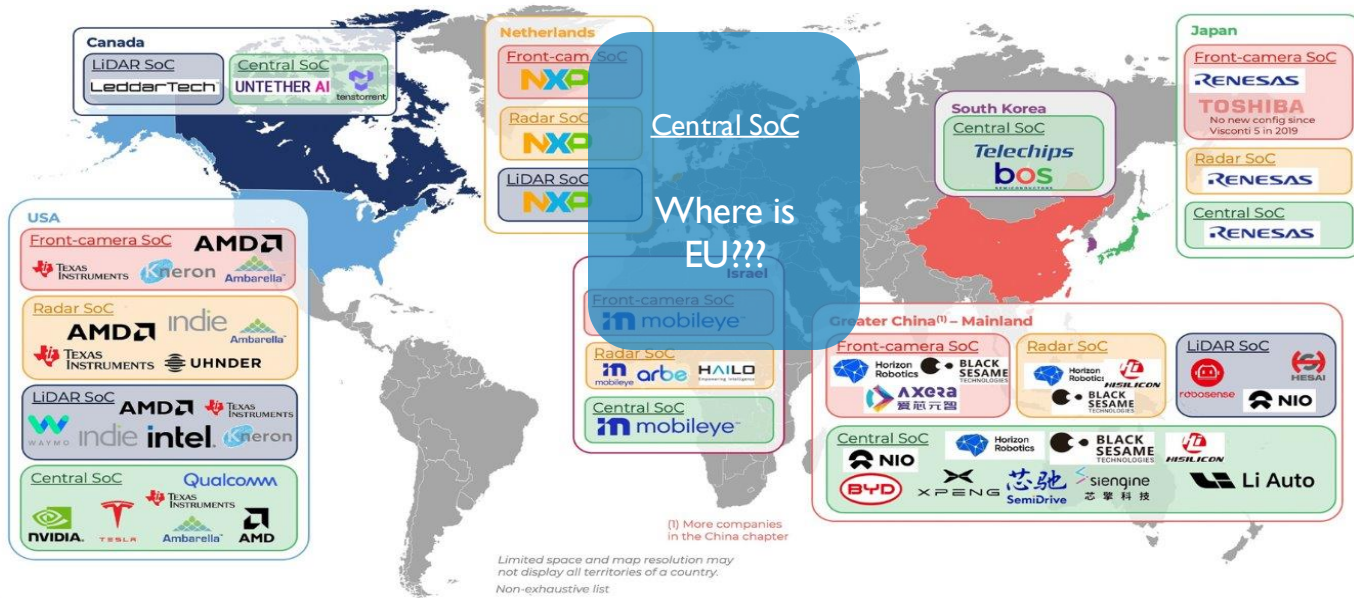
Source: Automotive Computing & AI 2025 report, Yole Group



What's wrong with this picture?

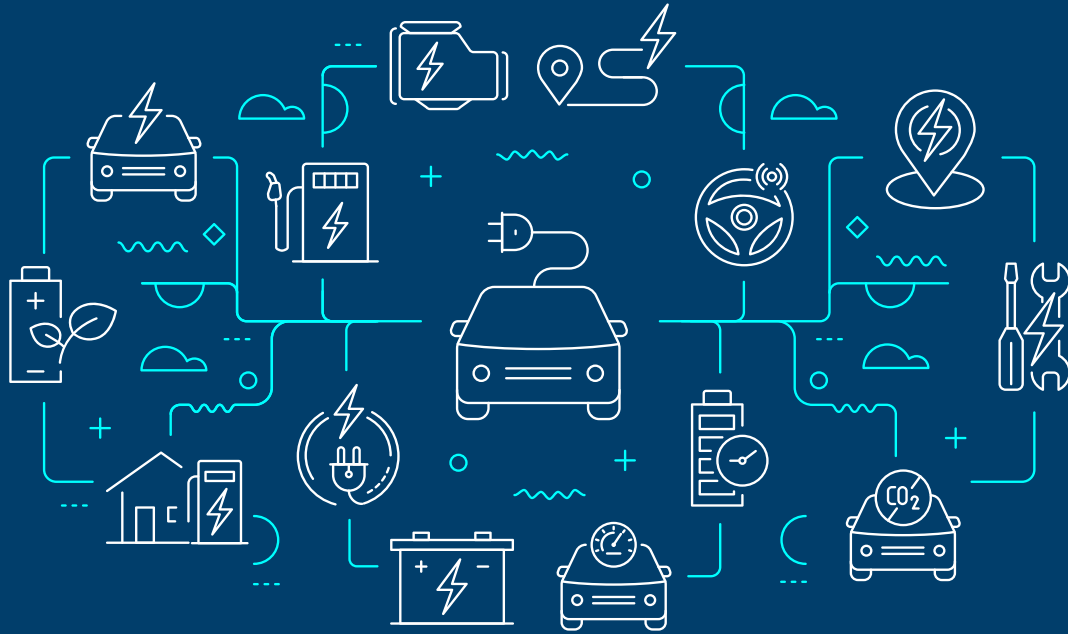
AUTOMOTIVE PROCESSOR ECOSYSTEM – COMPUTING FOR ADAS

Source: Automotive Computing & AI 2025 report, Yole Group



It's about time we take imec's 40 years of semiconductor expertise to the **automotive industry**.

Smart, safe, affordable mobility for everyone at any time

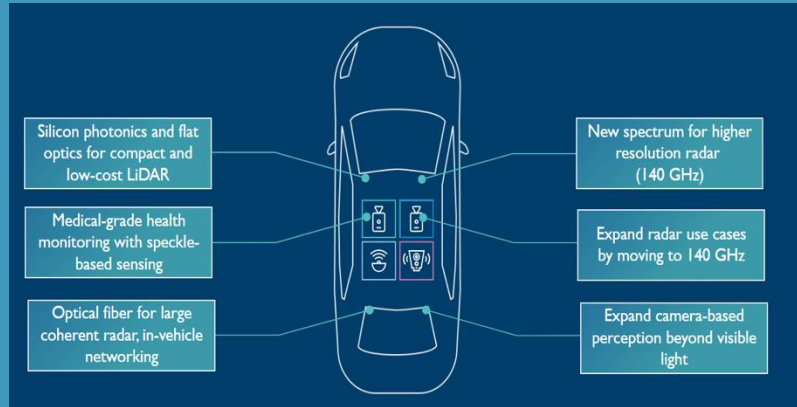


Imec automotive focus areas

Automotive Chiplets

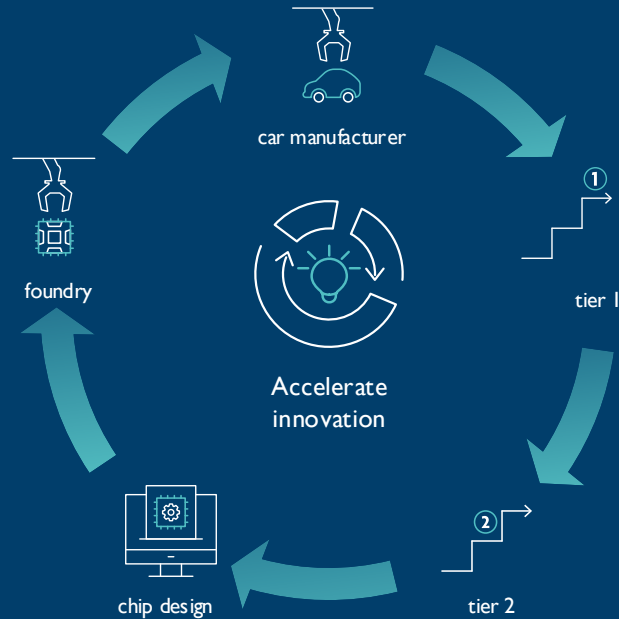


Sensors for AD/ADAS



Imec response to the automotive challenges

Automotive ecosystem building



Automotive ecosystem building (2023 Start)
Bi-annual Automotive Chiplet Forum



Drive standardization
Automotive Chiplet Program



Implementation in reference platform
Advanced Chip Design Accelerator



Industrialization

*It may prove to be more economical to
build large systems out of smaller
functions, which are separately packaged
and interconnected.*

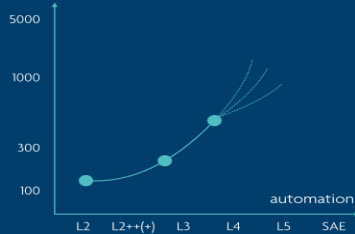
- Gordon Moore, 1964



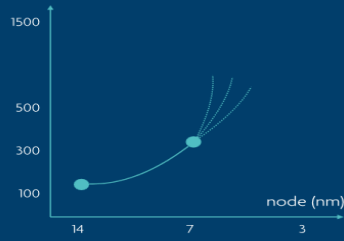
Why automotive chiplets are more important than ever

Technical / Biz Rational 2023

computer performance (TOPS)



total dev cost (M\$)



Call to action – Automotive CHIPLET ecosystem.

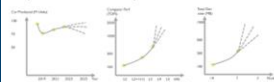
Automotive companies need to continue to grow with inclusion of performance driver assist and interior information and entertainment functions.

The electronic control units to drive these workloads are quickly growing into what used to be a supercomputer performance level. The SoC with these ECUs are one of the most complex monolithic designs one can find and are built using the most advanced silicon processing nodes.

There are only a few suppliers left that can build these complex monolithic SoCs, it requires a lot of NRE invest in design, validation and test and is only affordable for the biggest of markets.

Flexibility to include market specific requirements in those SoCs is (very) limited. Adding for instance a unique accelerator IP for an ADAS AI workload will have to be weighed against the cost of that accelerator IP for the broad market this same SoC also serves. There is a careful tradeoff these monolithic designs need to make not to grow too big which will rapidly deteriorate the manufacturing yield and drive-up unit cost.

Compounding the technical challenges are the backlogs of staggering globally produced cars and exponential increase of the total development cost of SoCs in advanced nodes.

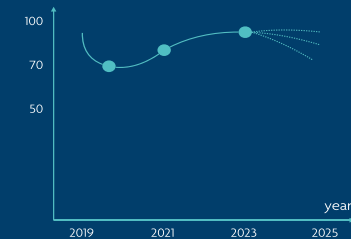


The above trends are not new and are the key reason why over the course of the last 10 years we went from 10-15 automotive application processor vendors to today's 2 to 3 suppliers.

Even for the remaining suppliers the increased market share is not able to compensate for the explosive growth in development costs, forcing them to make a single solution that is reusable across multiple market segments to get sufficient volume per design.

Company X recent supplier volume reduction in the region's market has led to a significant increase in the development cost of their SoC. This is due to the fact that the company has not been able to scale its design across multiple market segments, leading to a significant increase in the development cost of their SoC. This is due to the fact that the company has not been able to scale its design across multiple market segments, leading to a significant increase in the development cost of their SoC.

cars produced (M units)



Reality 2025



Geopolitical tensions



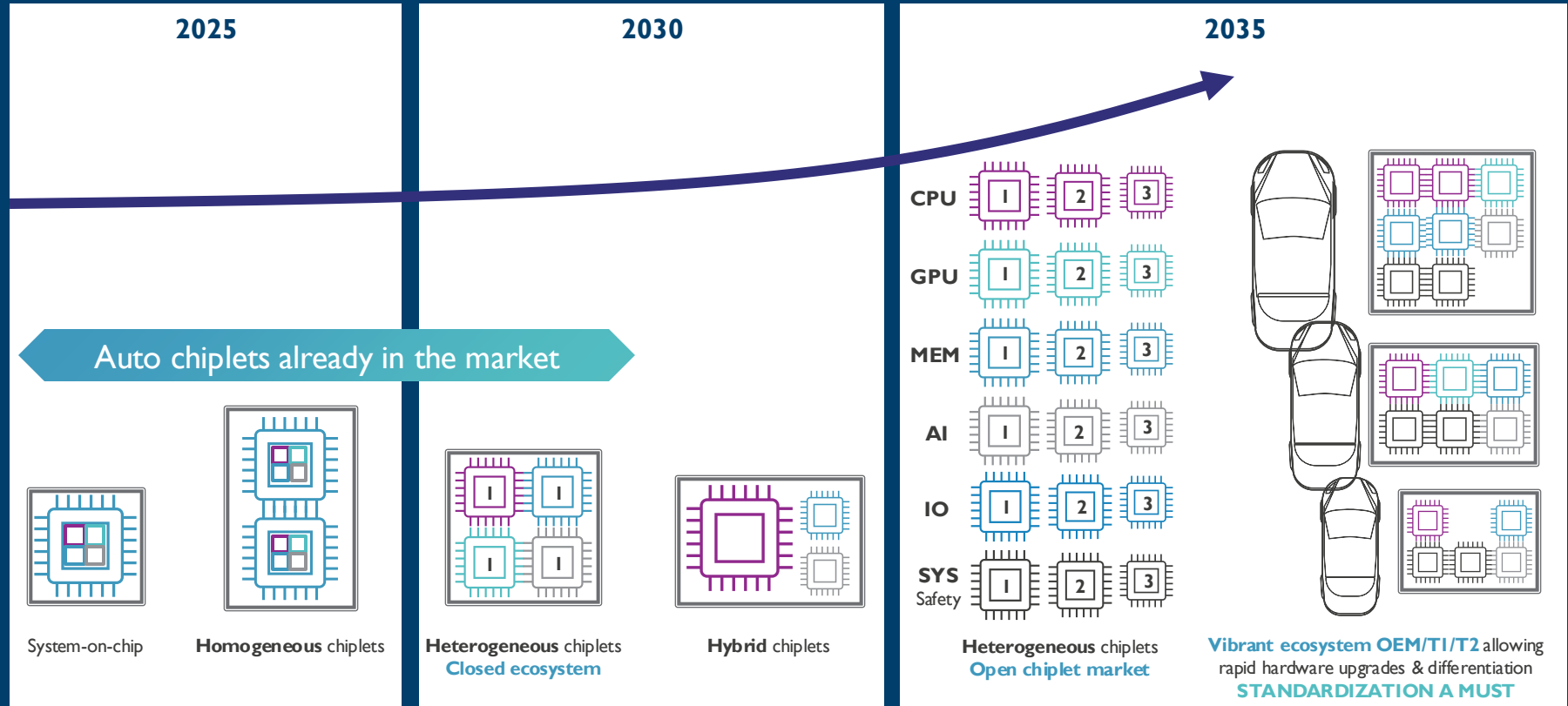
Technology disruptions



New entrants

- Cost effective
- Competitive
- Sustainable
- Supply resilient

Automotive chiplets: from today to tomorrow

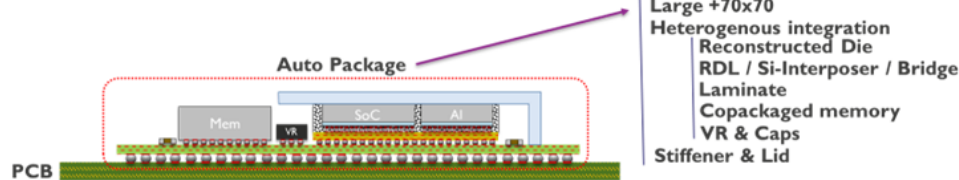


Imec Automotive Chiplet Program

A pre-competitive research initiative

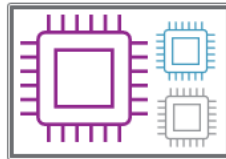
Quality and Reliability

what package technology can be made automotive compliant?



Architecture

what architecture supports multi party chiplets?



UCIe
Universal Chiplet
Interconnect Express

e.g. OEM differentiation through 3th party NPU

Automotive Chiplet Program Members (Oct 2025)

arm

BMW
GROUP

 BOSCH

PORSCHE

cādence®

Siemens


SiliconAuto

SYNOPSYS®

infineon

 tenstorrent

 LG

Valeo

 Tier IV
intelligent solutions for everyone

 SILICON BOX

 GlobalFoundries®

 MIPS
a GlobalFoundries company

STATSChipPAC

The Advanced Chip Design Accelerator (ACDA)

Bridging the gap between research and industrialization



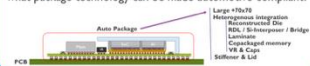
Located at the
home of human AI
in Heilbronn @ IPAI

ECOSYSTEM BUILDING

Automotive
Chiplet
Forum

ACP TRACK A&B

Quality and Reliability
what package technology can be made automotive compliant?



Architecture
what architecture supports multi party chiplets?



e.g. OEM differentiation through 3rd party NPU

TRACK A & B REF ARCH

ACP TRACK C



Advanced Chip Design Accelerator
(ACDA)

TRACK C IMPLEMENTATION

INDUSTRIALIZATION



Imec Automotive

IC-link design services & VCA

The Advanced Chip Design Accelerator (ACDA)

Bridging the gap between research and industrialization

LOCATION



Imec design center at IPAI,
Baden-Württemberg, Germany

AMBITION



Staff up to
70 R&D talents
over 5 years

TALENT



Build up regional competences in
System architecture and design/
System and sensor integration/
Perception, sensor fusion and AI

Summary

- Challenging times in the automotive segment
- Imec is taking 40 years of semiconductor innovation to the automotive industry
- A coalition of the willing is forming under imec's Automotive Chiplet Program
- ACDA in Heilbronn/Germany is where automotive chiplets come to life
- Chiplets can create “the airbus of automotive high-performance compute” in EU

...and a final preview

Introducing: The European Executive Forum (EEF)

May 18, 2026 | Botanic Sanctuary, Antwerp



Strategic dialogue
aimed at advancing
the chiplet evolution



High-level audience
and attendees,
decision makers and
strategy leaders and
technical experts



World-class venue,
exclusive invitations
and the ITF World
VIP dinner.



De-risk and accelerate
EU automotive chiplet innovation for
global scale



imec

Thank you for your attention!

Dieter.Hoffend@imec.be