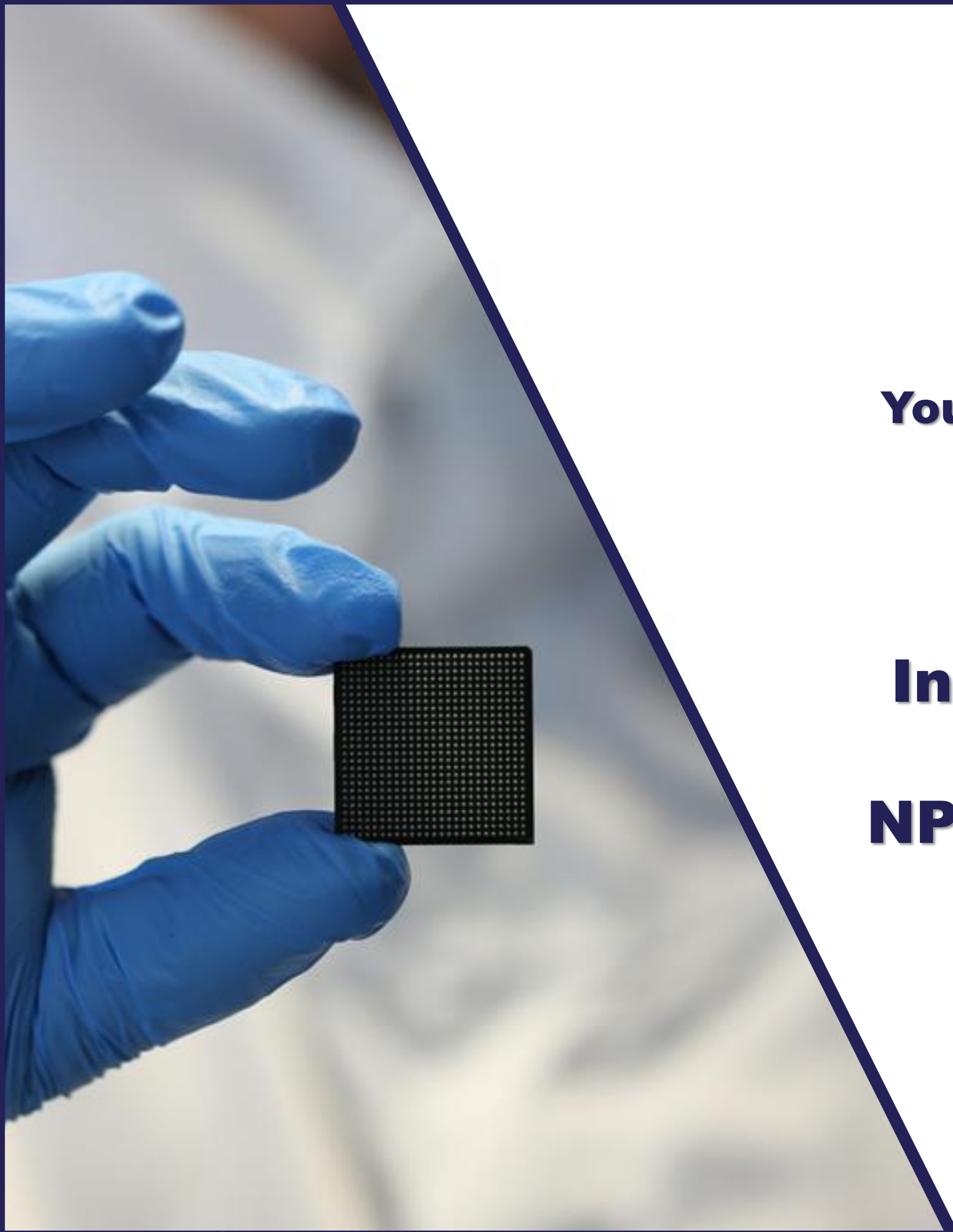


Your KEY PARTNER for All Semiconductor Applications

Semiconductor IC's
Industrialisation & Production Services
-
NPI and Production Supply Chain services

sales-psc@synergie-cad.fr

October 16, 2025

MISSIONS

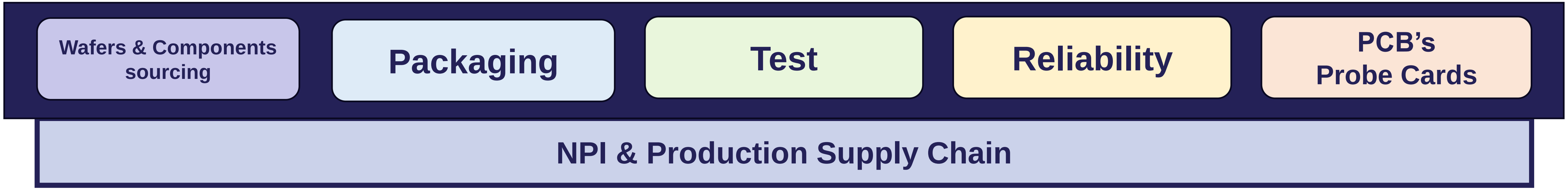
- ✓ **Semiconductors 'one stop shop' company** (small series to large series)

  From wafers sourcing to Finished Goods delivery (small series to large series)

  European supply chain – Asian Supply chain

- ✓ **European Assembly & Test House** (small and mid series)

  Unique in-house global Engineering & Manufacturing Solution(s)



Wafers & Components sourcing

Packaging

Test

Reliability

PCB's
Probe Cards

NPI & Production Supply Chain

ABOUT

SYNERGIE CAD GROUP

495 Employees

PCB / Electronics Boards
Probe Cards
Reliability systems

Capabilities in
- PCB Engineering
- PCB Design
- PCB Manufacturing
- PCB Assembly
- Probe Card Assembly

International group present in 14 countries
Head Quartered in Carros, France

SYNERGIE CAD PSC
PARTNER SEMICONDUCTORS

41 Employees

Semiconductors
Industrialization & Production

Capabilities in
- PCB Engineering
- PCB Mounting/Assembly
- IC Packaging
- IC Test Development & Production
- IC Reliability Qualification

Toulouse and Grenoble, France
IC Operations in Toulouse

SYNERGIE CAD GLOBAL PRESENCE

- 2 PCB's Factories
- 2 PCB's Auto Assembly Lines
- 1 Probe Card assembly Line
- 11 PCB Design Centers

- 2 Test Houses
- 1 Package Design Center
- 1 Packaging line
- 1 Reliability Lab.

18 SITES WW

EUROPE

- Carros (Nice) Headquarter FRANCE
- Meyreuil (Aix-en-Provence) FRANCE
- Colombe (Grenoble) FRANCE
- Toulouse FRANCE
- Chiari (Milan) ITALY
- Terni (Rome) ITALY
- Catania (Sicilia) ITALY
- Lincoln UNITED KINGDOM
- Ismaning (Munich) GERMANY

ASIA

- Ang Mo Kio SINGAPORE
- Penang MALAYSIA
- Seoul KOREA
- Muntinlupa PHILIPPINES
- Hsin Chu TAIWAN
- Hainoï VIETNAM – New PCB Factory under Construction

USA

- Dallas TEXAS

AFRICA

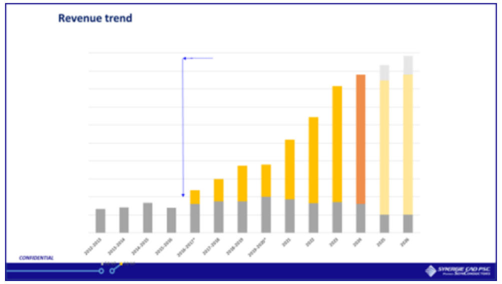
- Casablanca MOROCCO

ABOUT

- ✓ **2000 : Creation around PCB Engineering & Fabrication services**

- ✓ **2017 : Semiconductors IC’s industrialisation and production becomes the core activity**
  - **Acquisition of Packaging line from NXP / Freescale**
  - **Rapatriation of all Group test activities**
  - **Initiation of Back-End TurnKey activity**

- ✓ **+30% Average Annual Growth**



- ✓ **2024.Dec : Acquisition by ARDIAN Semiconductors**
  - ✓ **Launch ‘PSC2030’ Project**
  - ✓ **9M€ Capex over 2025-2027– Packaging & Test capacity**

Move to new site – 1700m²
Octt.-2025

Grenoble site: ~ 400m²
Hardware & Test Engineering
Chemin des Noyers-38690 Colombe

Toulouse Site 1 : 700m²
Test & Reliability
Operations
12 rue de Caulet -31300 Toulouse

May-22 : Move Packaging
Line to TAS site 200m²
JF. CHampollion-31100 Toulouse

- ✓ **2026.Feb. : New site – 1600m²**

DOMAINS

Consumer

Industrial

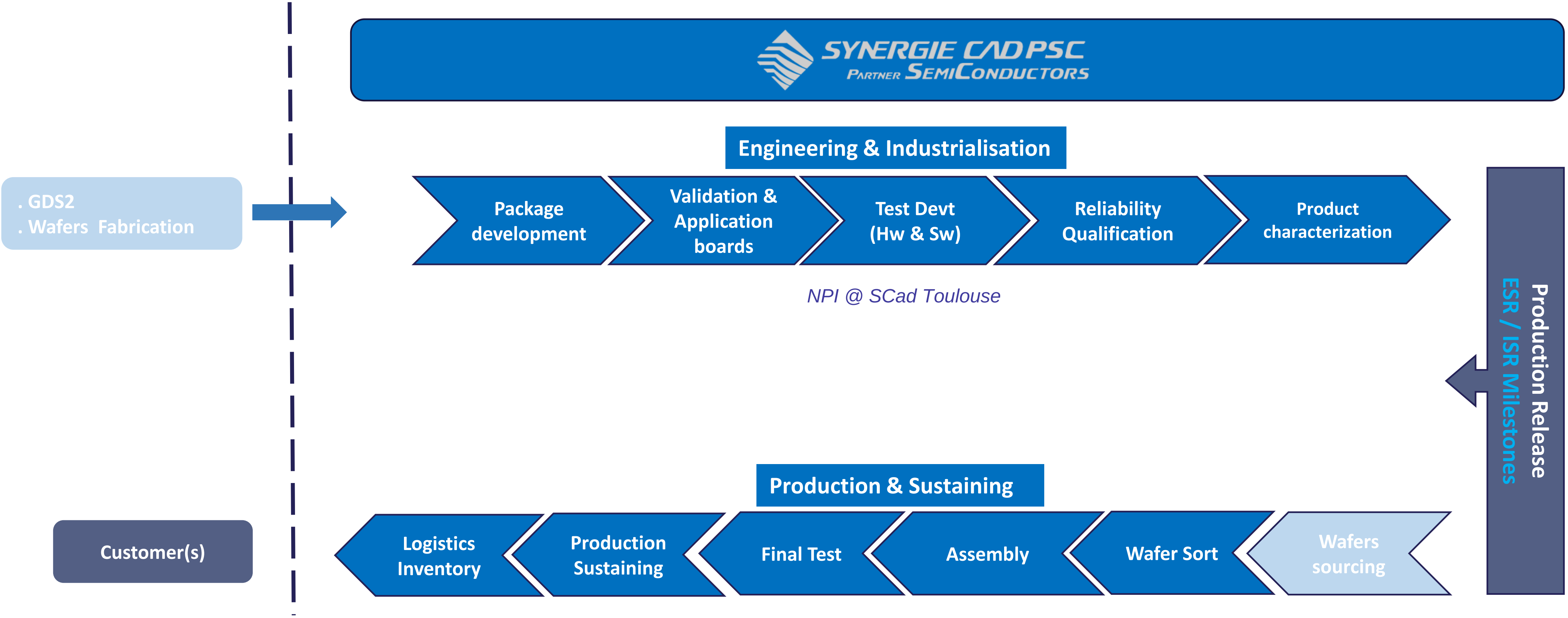
Automotive

Telecommunications

AI & HPC

Space & Defence

Proposed NPI & Supply chain scenario



SYNERGIE CAD PSC
PARTNER SEMICONDUCTORS

- GDS2
- Wafers Fabrication

Engineering & Industrialisation

Package development → Validation & Application boards → Test Devt (Hw & Sw) → Reliability Qualification → Product characterization

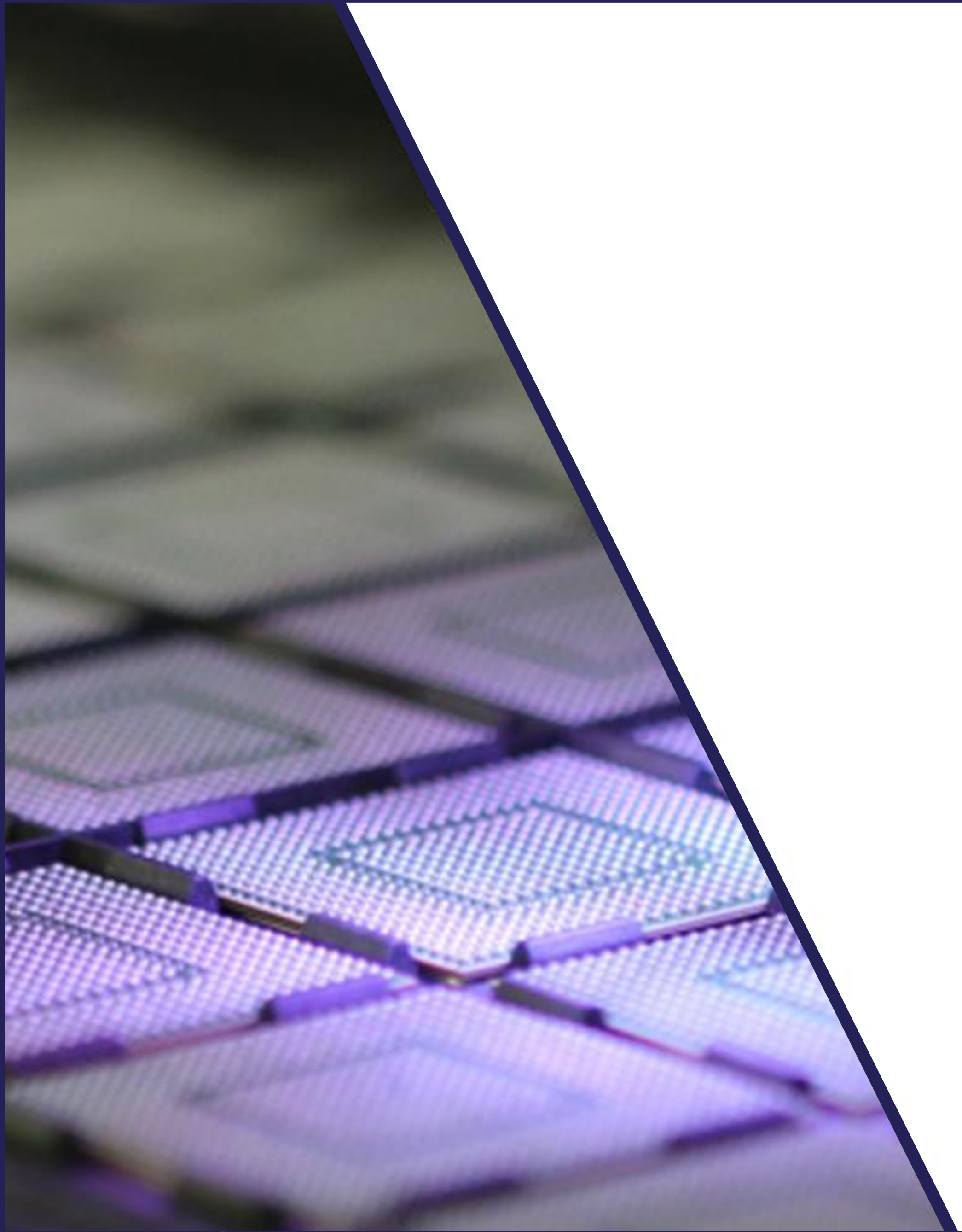
NPI @ SCad Toulouse

Production Release
ESR / ISR Milestones

Production & Sustaining

Wafers sourcing → Wafer Sort → Assembly → Final Test → Production Sustaining → Logistics Inventory

Customer(s)



PACKAGING

Design & Assembly Capabilities

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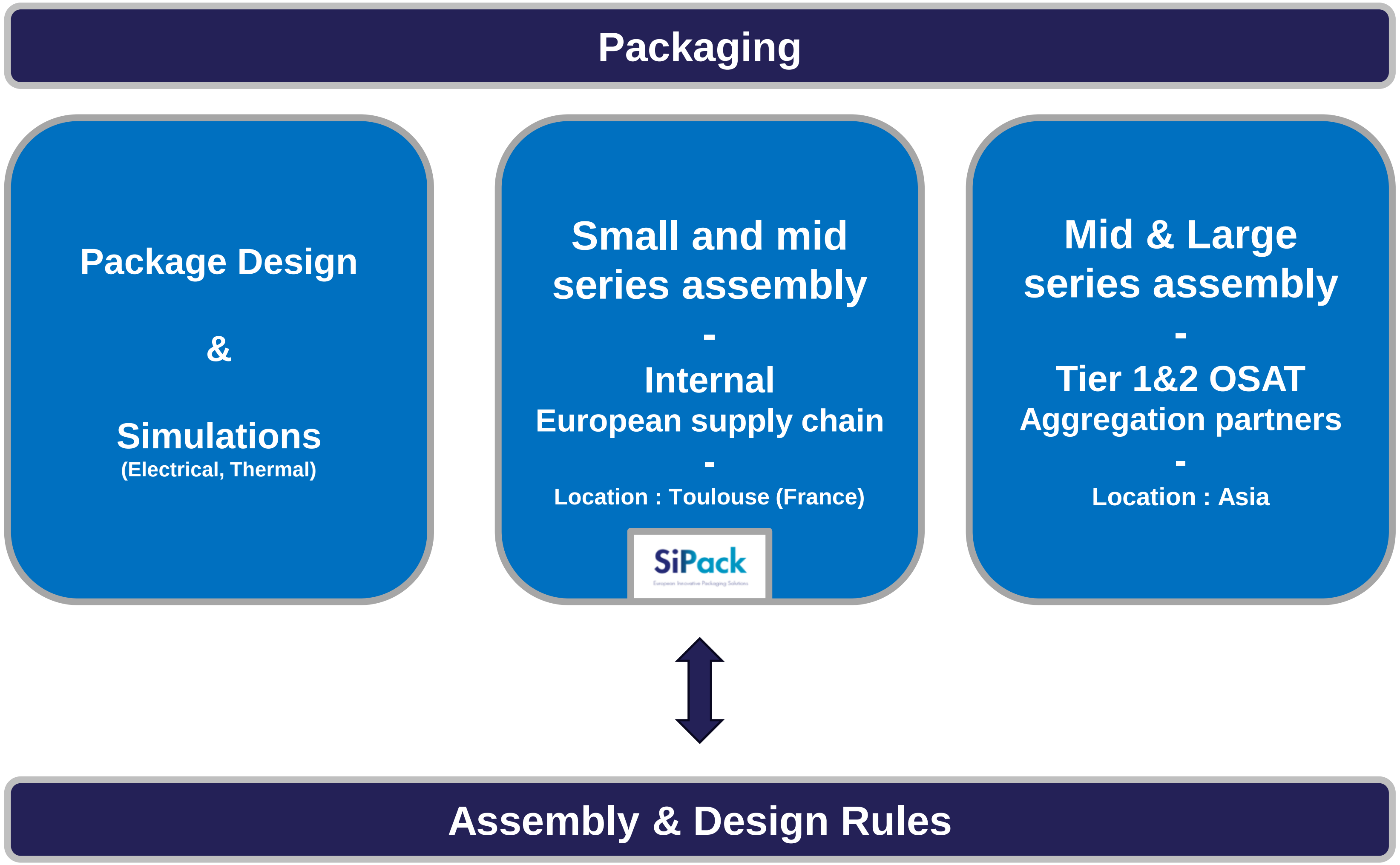
Design & Assembly Capabilities - Overview



Packaging

Package Design

&

Simulations
(Electrical, Thermal)

Small and mid series assembly
-
Internal
European supply chain
-
Location : Toulouse (France)

SiPack
European Innovative Packaging Solutions

Mid & Large series assembly
-
Tier 1&2 OSAT
Aggregation partners
-
Location : Asia

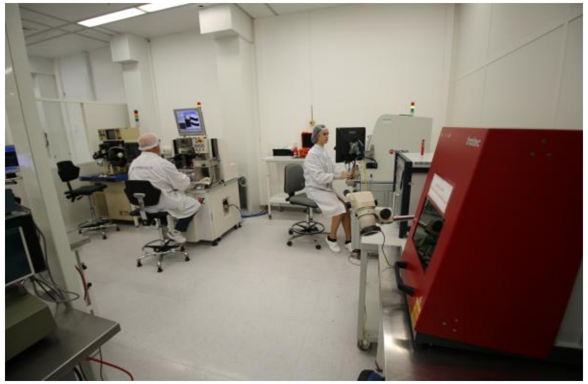
Assembly & Design Rules

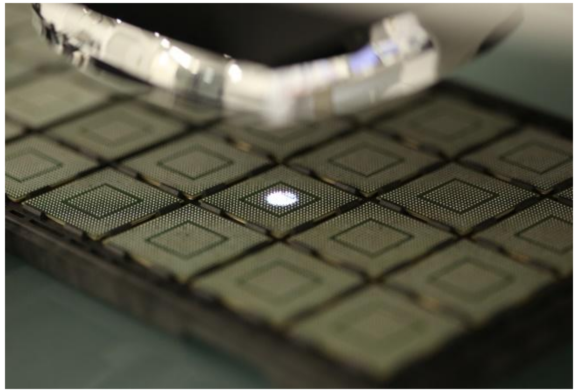
Packaging & Assembly

Internal Line

Location : Toulouse (France)

- ✓ Located in Toulouse (France)
- ✓ Clean room ISO7
- ✓ Moved from prototyping to small-mid volumes in 2022

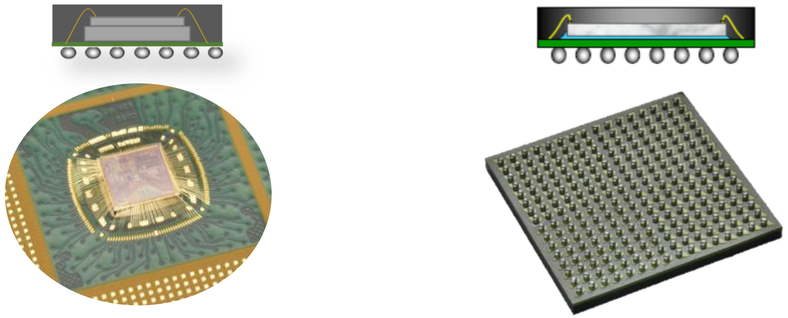




Packaging assembly capabilities - BGA/LGA type(s)

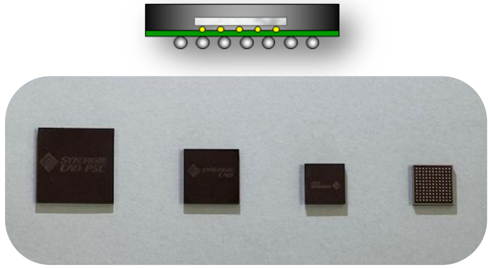
WB-BGA (xfbga - CABGA)

Overmoulded Wire Bonded BGA - 3x3mm to 35x35mm



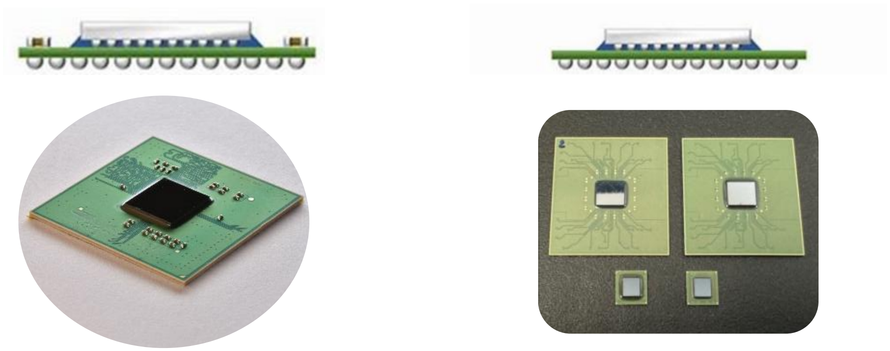
FCCSP

Overmoulded Flip Chip BGA - 3x3mm to 17x17mm



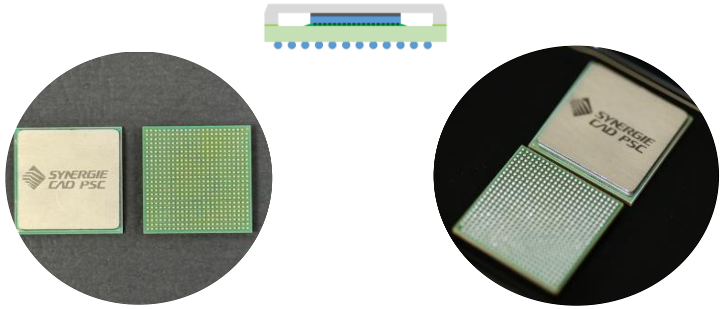
Bare die FCBGA

Flip Chip BGA - 7x7mm to 50x50mm



ThermallyEnhanced-FCBGA

Lidded BGA with TIM – 15x15mm to 45x45mm

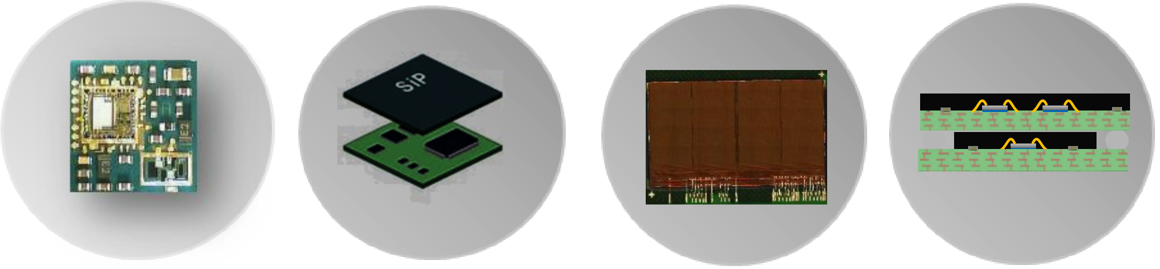


Packaging assembly capabilities - SIP / WLCSP type(s)

Laminate

Chip On Board - MCM – SIP - Stacking

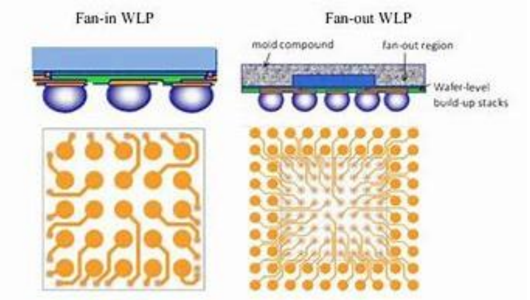
Overmoulded or glop-top epoxy or exposed



Wafer Level Package (manufacturing outsourced)

WLCSP

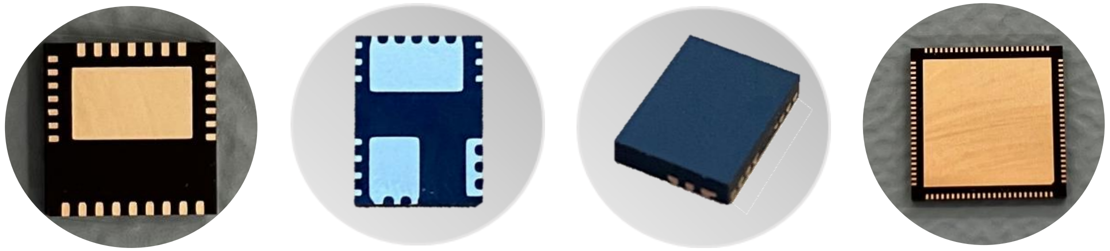
Fan In – Fan Out



Leadframe

QFN

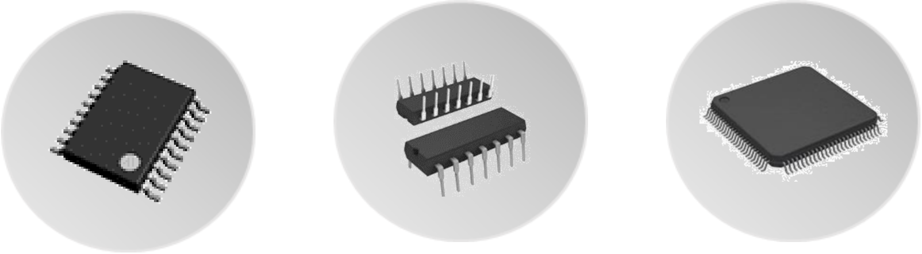
Overmoulded or Premoulded



SOIC – TSSOP – QFP – DIP - SOT

SOIC Narrow body : 8L – 14L – 16L
SOIC Wide body : 20L – 24L – 28L

DIP : 8L – 14L – 16L – 20L – 24L
QFP : 100L



SiPack technological roadmap

European Innovative Packaging Solutions

Substrate

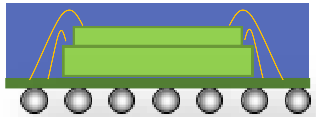
Min. L/S 18/18µm SAP
Laminate 12 layers

2026

L/S 15/15µm SAP
14 layers

2027

Packages

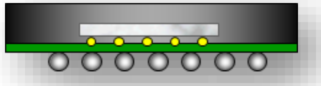


Stacked dies
(dual pyramidal)

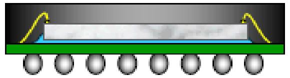
Bare die FCBGA

SiP bare die FCBGA

Lidded FCBGA (+TIM)



FCCSP



CABGA / LfBGA

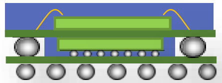
MCM

PQFP / TQFP

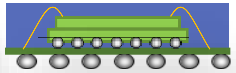
SOIC /
TSSOP

QFN

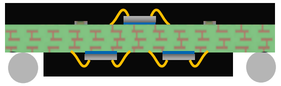
3D Stacking



POP

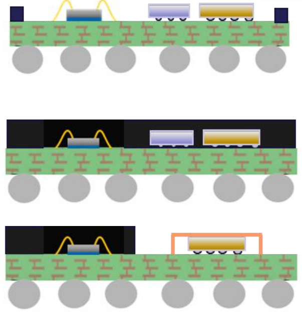


Stacked dies (FC)

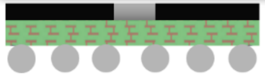


Double side BGA

2D SIP



Film Assisted Moulding

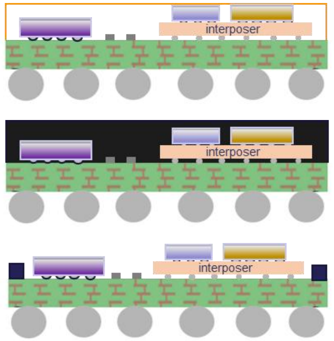


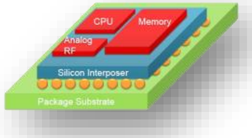
Exposed die moulded BGA (with or w/o metal plate)

Shields & Adaptive Heat sink

Bump Pitch 150µm production – 120µm Engineering

3D Silicon Interposer

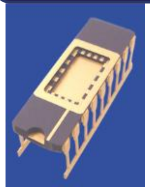




Bump Pitch 100µm

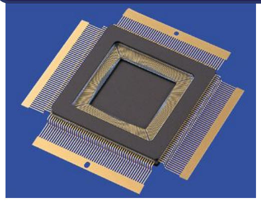
Ceramic (hermetic or non-hermetic) assembly capabilities

C-DIP



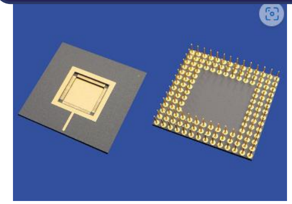
70 Leads max.

CERQUAD



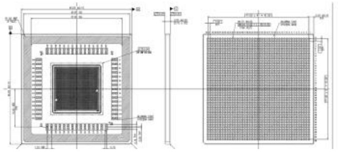
64 to 304 Leads

C-PGA



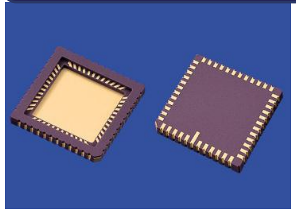
68 to 145 Leads

'Ceramic' BGA / LGA (non-hermetic)



Up to 45x45mm

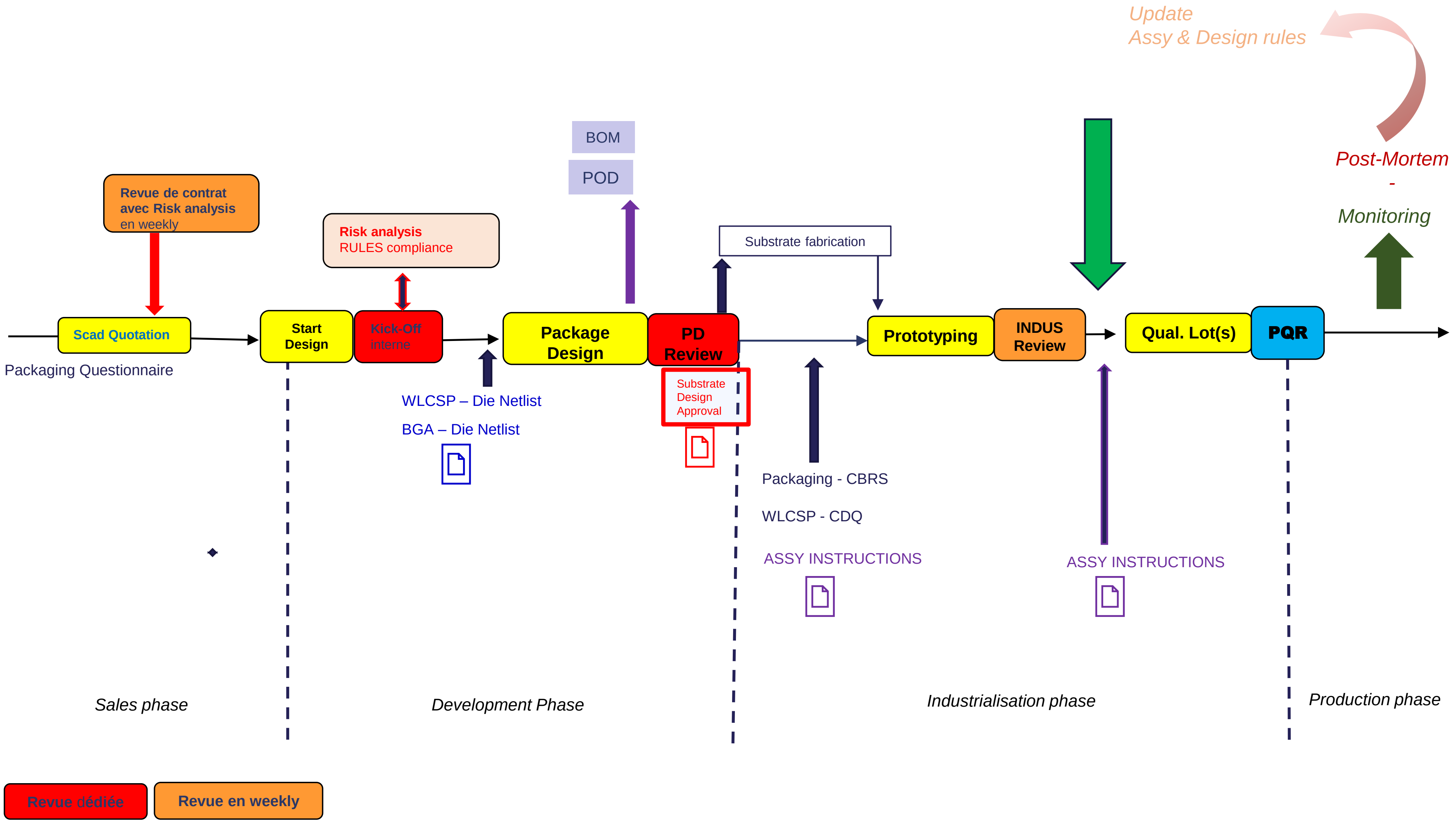
C-QFN



12 to 84 Leads

- ✓ Standard or Custom package
- ✓ Hermetic sealing (Nitrogen atmosphere)
- ✓ Non-hermetic encapsulation (Lid attach or epoxy fill)
- ✓ Fine and Gross leak control test

Project phases & Milestones (KP14 - PACKAGING)



Update
Assy & Design rules

Revue de contrat avec Risk analysis
en weekly

Risk analysis
RULES compliance

BOM

POD

Substrate fabrication

Post-Mortem
-
Monitoring

Scad Quotation

Packaging Questionnaire

Start Design

Kick-Off
interne

Package Design

PD Review

Substrate Design Approval

Prototyping

INDUS Review

Qual. Lot(s)

PQR

WLCSP – Die Netlist

BGA – Die Netlist

Packaging - CBRS

WLCSP - CDQ

ASSY INSTRUCTIONS

ASSY INSTRUCTIONS

Sales phase

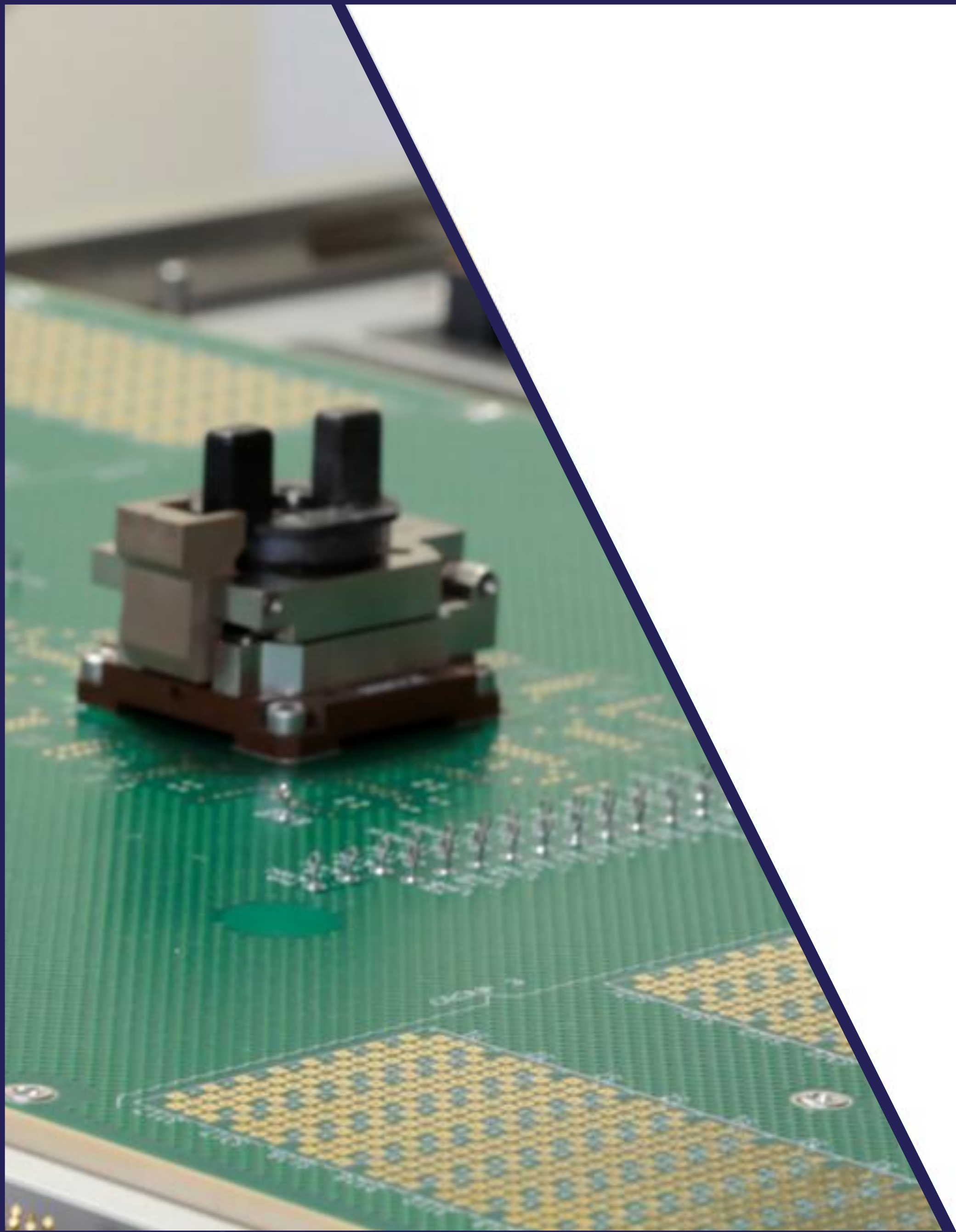
Development Phase

Industrialisation phase

Production phase

Revue dédiée

Revue en weekly



TEST

Wafer Test & Final Test

sales-psc@synergie-cad.fr

TEST & PRODUCT ENGINEERING

- ✓ **Test Solution Development**
  - Hardware (parametric cards, probe cards, loadboards)
  - Software
  - Specialties : Digital, Mixed-Signal, Analog, RF / MMW (up to 86GHz)
  - Consumer / Industrial, Automotive, Space/New Space

- ✓ **Product characterization**
- ✓ **Prototyping, Pre-series, and Production**
  - Europe
  - Asia
  - 6, 8, 12in. Probers [-55C / +200C]
  - Automatic Handler

- ✓ **Production Sustaining**
  - Cost optimization
  - Product Q.A. & PPAP

- ✓ **ATE's**
  - In-House : Credence Sapphire, Advantest V93K, Advantest V93K , Teradyne J750, Teradyne UltraFlex-RF
  - Other competences : Teradyne Flex, Eagle ETS364, Diamond D10, Advantest T2000
- ✓ **Class 10K local environment**

TEST & PRODUCTION SYSTEMS

TESTERS


Advanced V93K Smarscale
640 PS1600, 194 DPS, MBAV8


Advanced V93K Smartscale
512 PS1600, 194 DPS, WS-MX


Advantest T2000
(Catania)

TEST FLOOR
24/24
7/7


Teradyne ULTRAFLEX-RF
512 UP1600, RF24, UPAC, UVI80


Teradyne ULTRAFLEX-RF
512 UP1600, RF24, UPAC, UVI80


Teradyne J750
384p

Planned for Sept-2025


Chroma 3650
Power GaN

PERIPHERALS

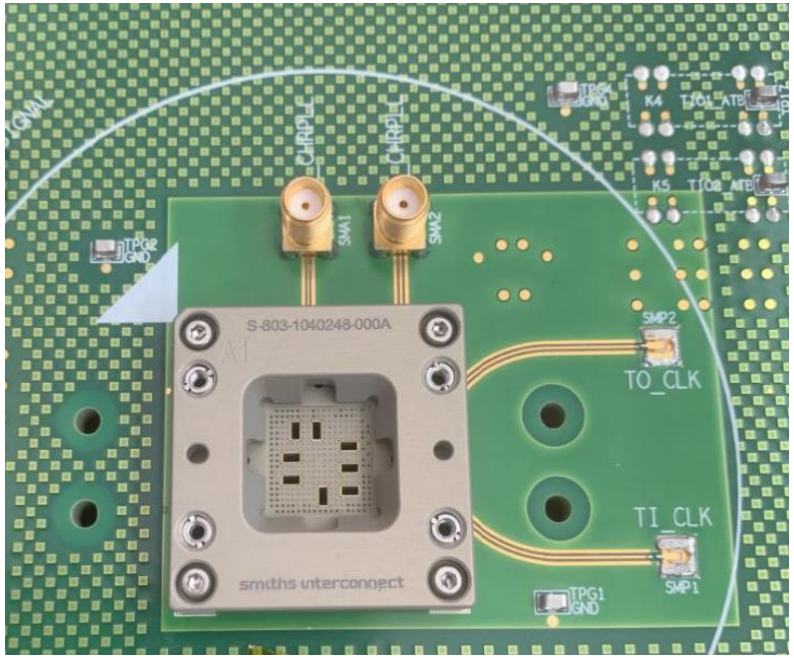

Thermostreams
-55 / +175 C°


Automatic Handler
MT9510 Room + Tri-Temp

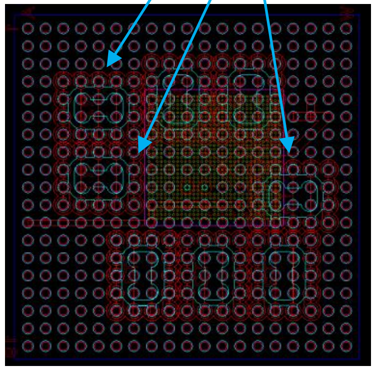

Opus3 12in. Probers
-55 / +200 C°, Troom, Direct& standard Docking

Some examples – Analog & RF MMW

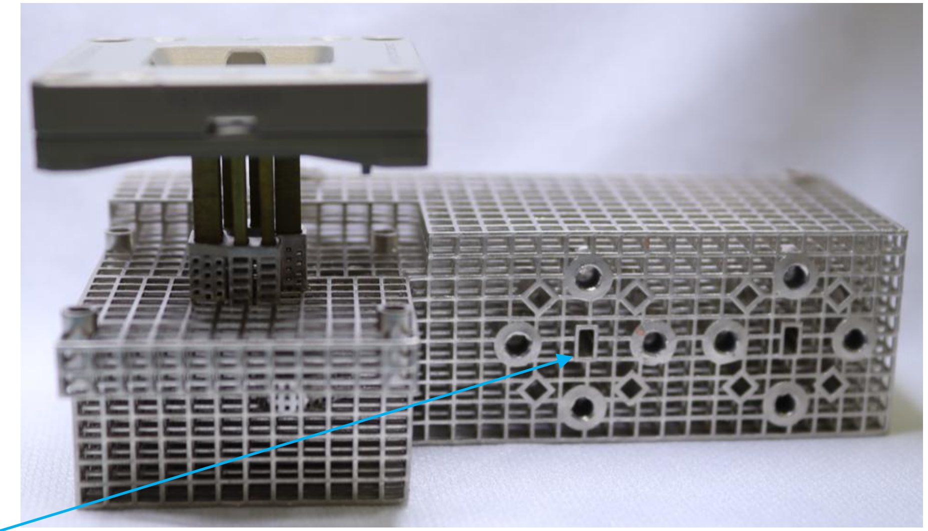
- MMW 77GHz Automotive Radar
  - FCBGA 13x13mm
  - Substrate Embedded Antennas (x8)
  - True RX & TX test
  - OverTheAir based testing
  - Embedded up/downconverter
  - Direct connection to a standard ATE
  - Full waveguide, low losses contact



Antennas

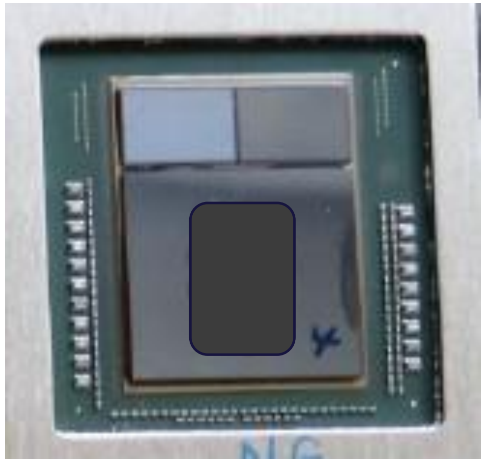


waveguide

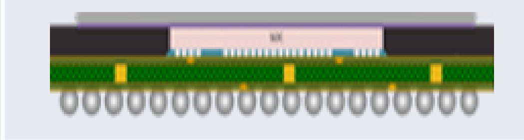


Some examples - DIGITAL

- DIGITAL HighPowerComputing
  - FCBGA 35x35mm
  - Silicon Interposer + bare dies + smd’s + stiffener metal ring
  - 150µm Flip Chip > 10K bumps
  - 200W power consumption full speed
  - Serdes 16Gbps (internal + external loopback)

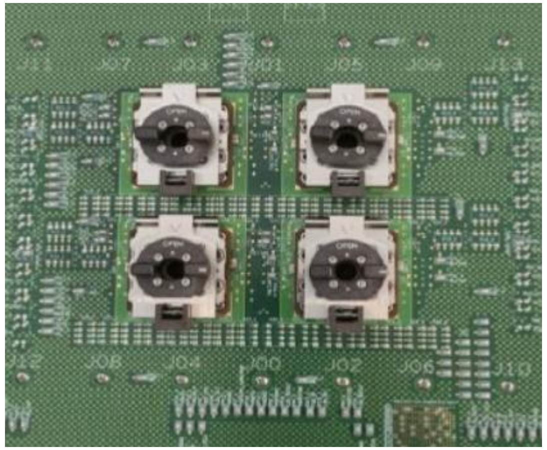


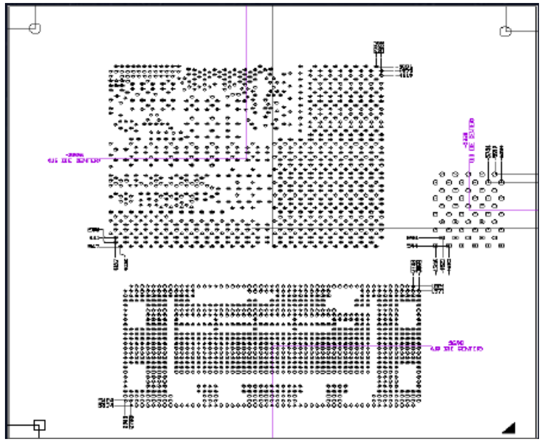
- DIGITAL ArtificialIntelligence processor
  - Exposed Die Lidded FCBGA 15x15mm
  - 7nm FinFet
  - PCIe 5Gbps (external loopback)
  - Auto Production Test in Toulouse



Some examples – ANALOG & RF SIP

- RF SIP Automotive
  - FCBGA 14x14mm
  - AEC-Q100 Grade2
  - RF + DSP + SDRAM
  - Quad sites testing

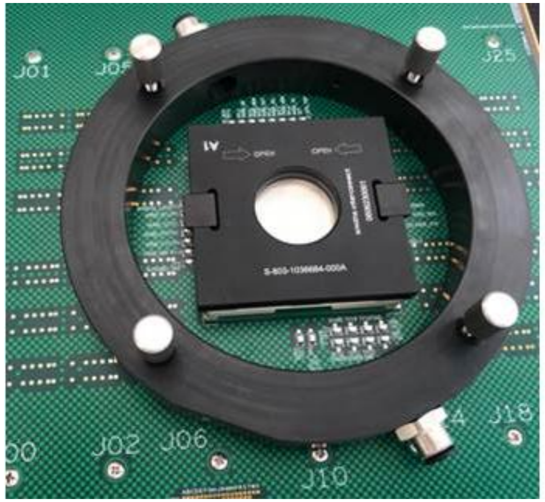




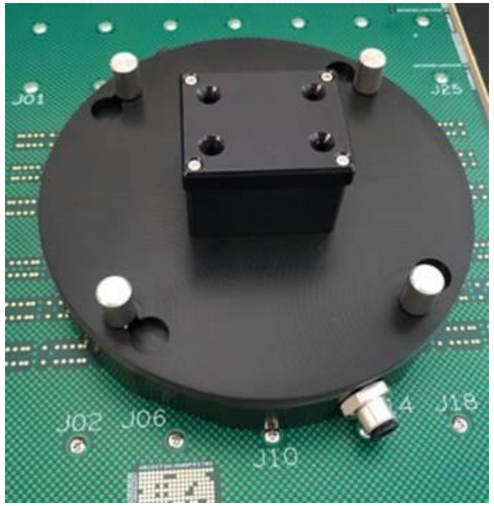
Some examples - IMAGERS

- Image CMOS Sensors
  - Wafer Test &/or Final Test
  - LGA288balls 40x38mm
  - 12in wafer – Die size 26 x 29mm
  - Including Optical Tests with illuminator on board
  - Tri-Temp testing

FT Room Temp.

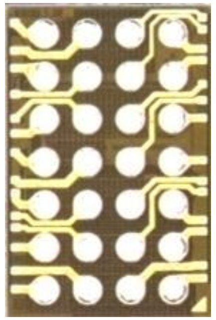


FT Tri-Temp

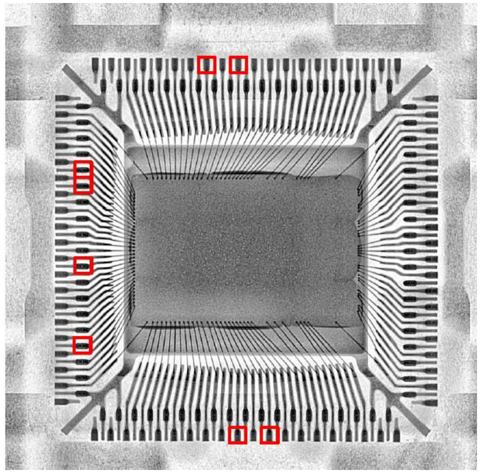


Some examples – MIXED-SIGNAL

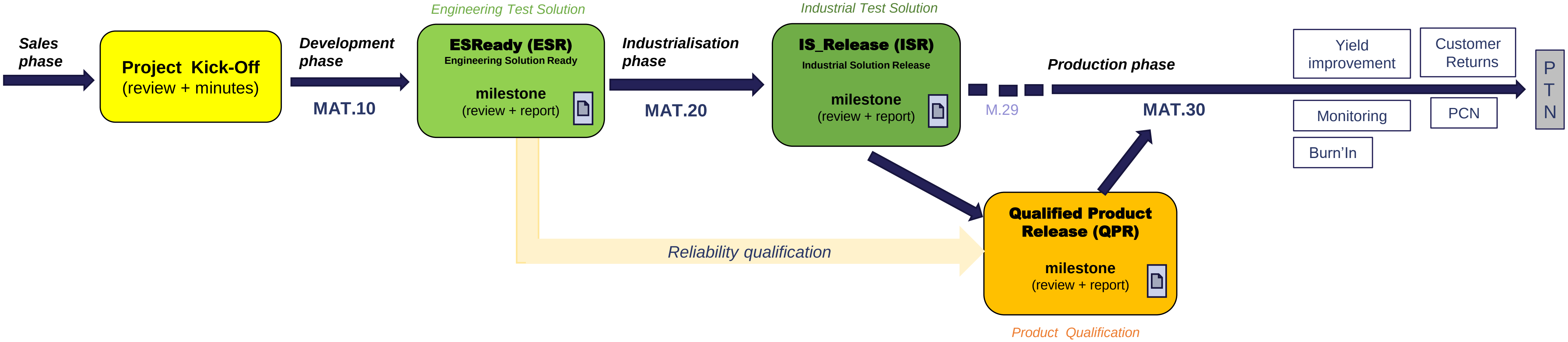
- Mixed Audio converter-Mono
  - WLCSP 2P2M
  - GF22
  - 8 sites wafer testing



- Mixed Audio converter - stereo
  - QFN12x12mm Dual row 156pins
  - XFAB180nm
  - Full TurnKey – in production since 2019



Project phases & Milestones (KP10 – TEST & TURNKEY)



Sales phase

Project Kick-Off
(review + minutes)

Development phase

MAT.10

Engineering Test Solution

ESReady (ESR)
Engineering Solution Ready
milestone
(review + report)

Industrialisation phase

MAT.20

Industrial Test Solution

IS_Release (ISR)
Industrial Solution Release
milestone
(review + report)

M.29

Production phase

MAT.30

Yield improvement

Customer Returns

Monitoring

PCN

Burn'In

P T N

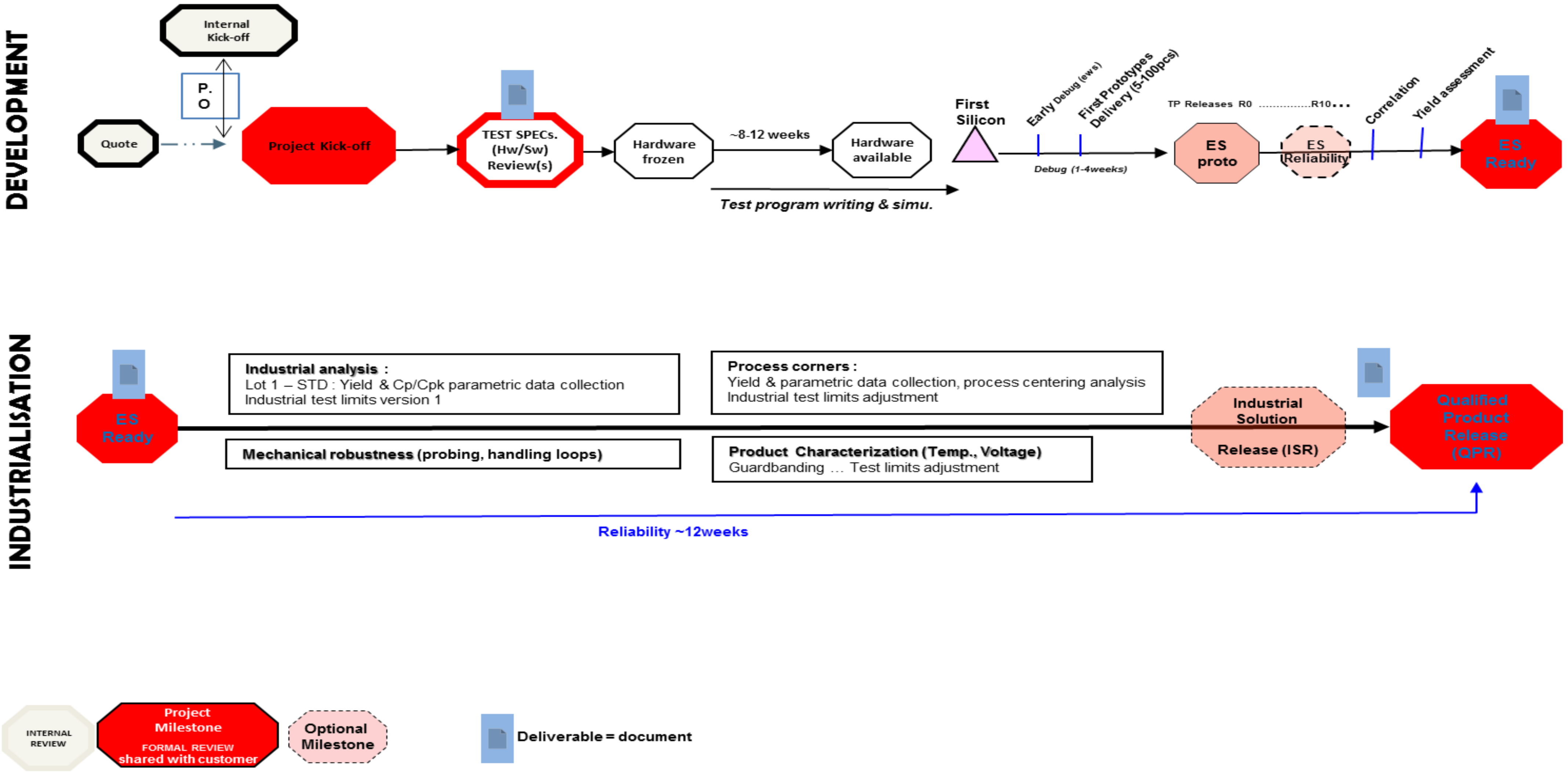
Reliability qualification

Qualified Product Release (QPR)
milestone
(review + report)

Product Qualification

Product Industrialisation Flow (KP10-100)

Product / Project Flow



DEVELOPMENT

Internal Kick-off

P. O

Quote

Project Kick-off

TEST SPECs. (Hw/Sw) Review(s)

Hardware frozen

~8-12 weeks

Hardware available

Test program writing & simu.

First Silicon

Early Debug (ews)

First Prototypes Delivery (5-100pcs)

Debug (1-4weeks)

TP Releases R0 ....R10...

ES proto

ES Reliability

Correlation

Yield assessment

ES Ready

INDUSTRIALISATION

ES Ready

Industrial analysis :
Lot 1 – STD : Yield & Cp/Cpk parametric data collection
Industrial test limits version 1

Mechanical robustness (probing, handling loops)

Process corners :
Yield & parametric data collection, process centering analysis
Industrial test limits adjustment

Product Characterization (Temp., Voltage)
Guardbanding … Test limits adjustment

Industrial Solution Release (ISR)

Qualified Product Release (QPR)

Reliability ~12weeks

INTERNAL REVIEW

Project Milestone
FORMAL REVIEW
shared with customer

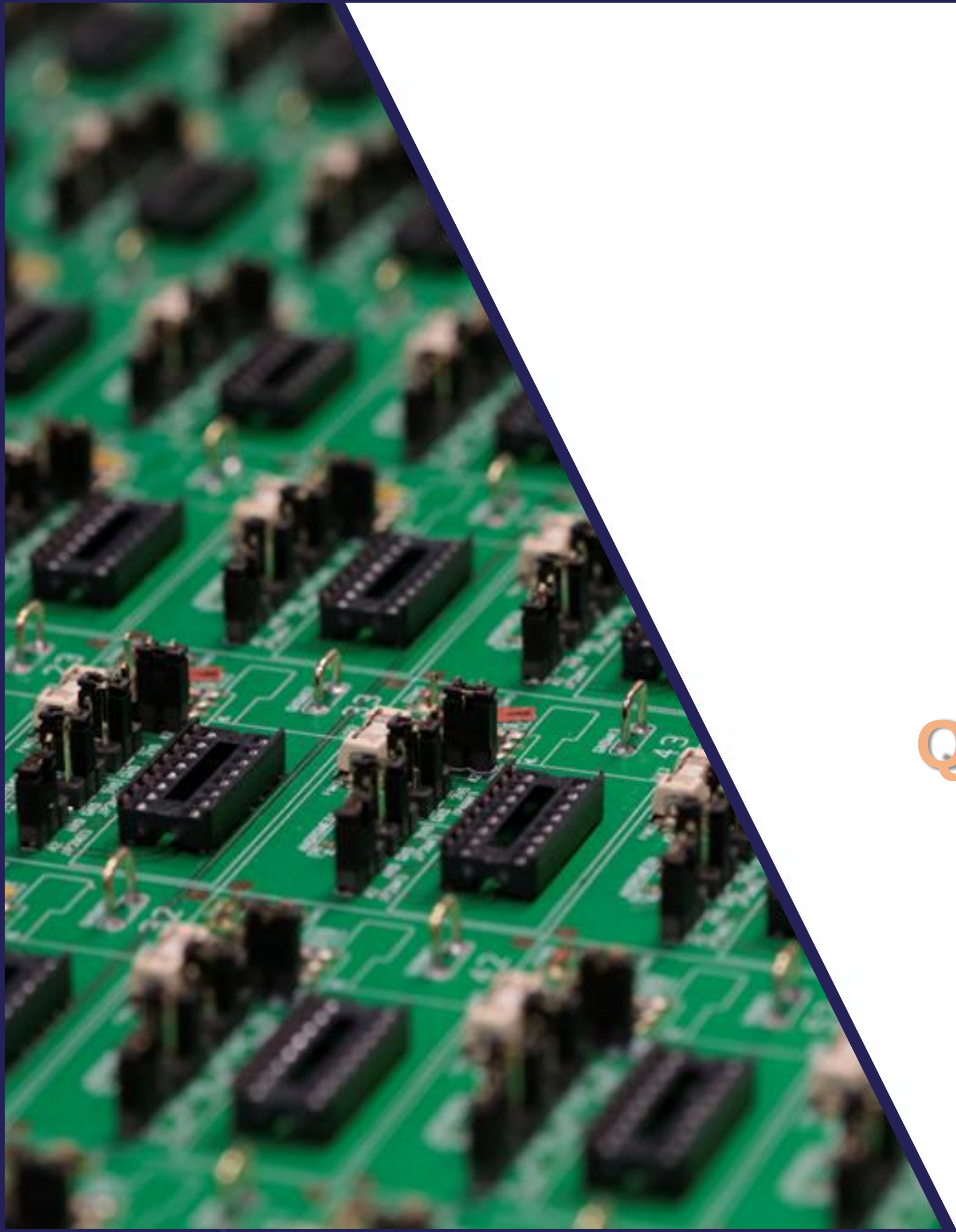
Optional Milestone

Deliverable = document

PRODUCTION SUSTAINING

- **Production sustaining** includes all Quality Assurance and Cost optimisation activities that support production life ; those include :
    - Non-conform lots management
    - Process and Product changes
    - Test Program and Test limits adjustments
    - Test Time optimization
    - Cost of Manufacturing optimisation
    - Reliability Monitoring, Re-qualification, Lot Acceptance, …

Very often, production sustaining is not considered ; however, this activity which requires global knowHow and fact-based experience, when correctly done will bring high added value either in terms of Quality & Reliability, Productivity, and cost of Manufacturing. At Synergie Cad PSC, the long experience of some of our product engineers in all back-end activities combining Packaging, Quality, Reliability, Hardware, Test provide us with a unique added value.



RELIABILITY

Qualification, LAT, Burn In, Monitoring

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RELIABILITY

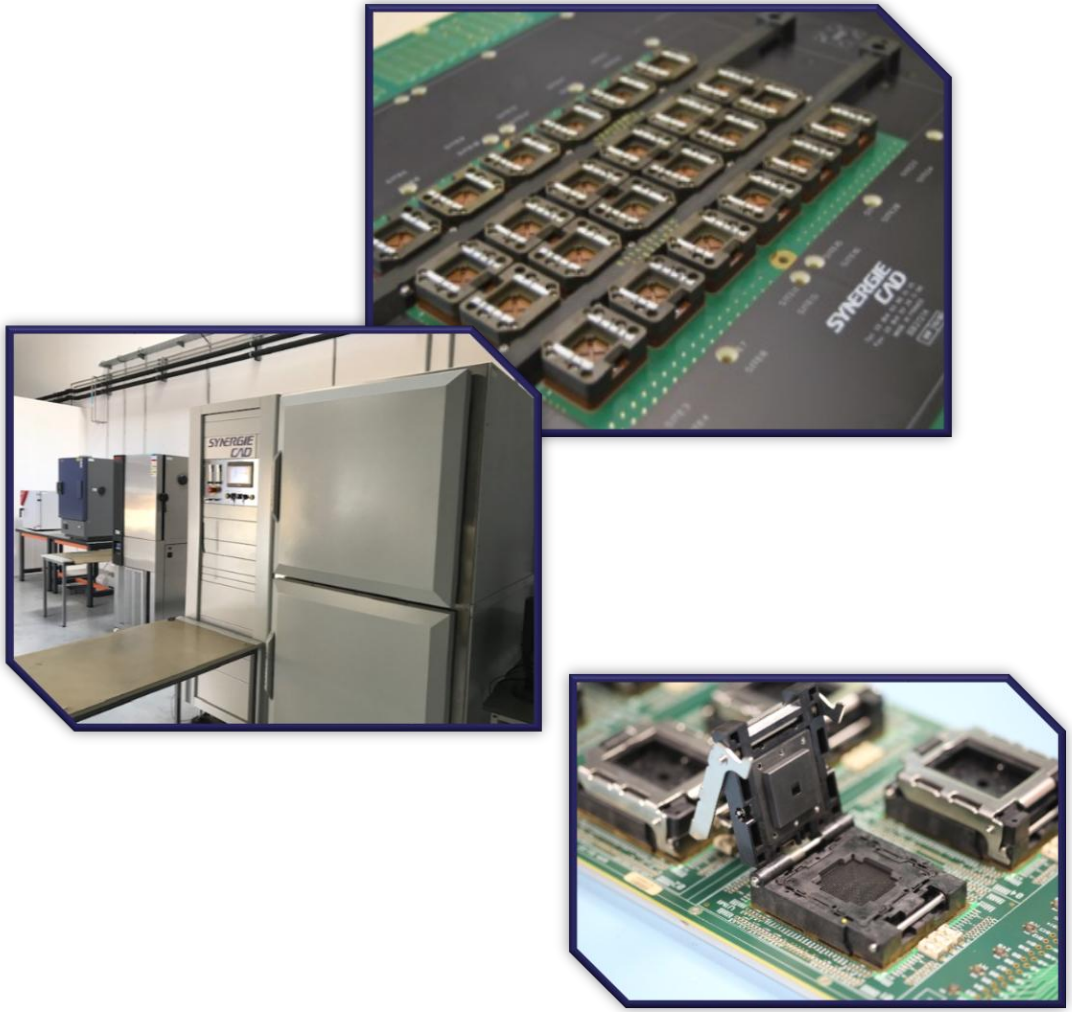
- **Standards : Jedec, AEC-Q100, ESCC …**
- **Qualification, Burn 'In, L.A.T, Monitoring**

- **Boards / Hardware design and Fabrication (in-house)**

- **Environmental tests**
  - HTOL / LTOL
  - THB 85C/85% RH
  - Hast/uHast/PPT
  - Preconditioning/Reflow
  - Thermal Cycling / VRT 15C/min.
  - THNB/Thu 85C/85%
  - High Temperature Storage 300C

- **(ESD / Latch-Up)**
  - ESD HBM / MM
  - ESD CDM
  - Latch-Up

- **X-rays inspection (2D/3D) - External Visual - Decapsulation**
- **Delamination analysis - Acoustic Microscopy (SAM)**



HARDWARE

Loadboards, Probe cards, other PCB’s

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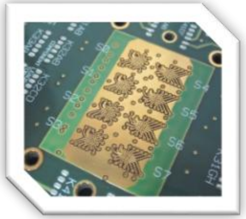
WIDE HARDWARE CAPABILITIES FOR SEMICONDUCTORS

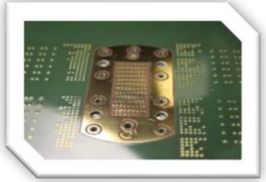
In-House development and fabrication - Factory location : Carros (France – 06)

Engineering Boards

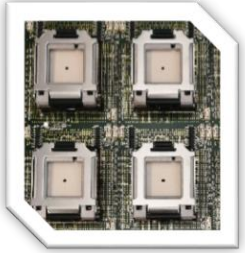
Final Test Boards



Probe Cards



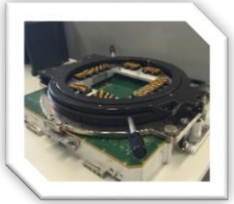
Burn-in Solutions



Special Drivers

Burn-in Systems

Mechanical Interfaces & Parts



WHY CHOOSING SYNERGIE CAD SEMICONDUCTORS

- Staff with more than **15 years average experience** in Semiconductors development, industrialisation and manufacturing

- **True TurnKey offer** (Packaging, Test, Reliability, Supply chain, PCB)

- **Unique combined offer** in both Packaging & Test services serving all types of volumes
  - Packaging Line for prototyping & small series in Toulouse (France)
  - Agregation partnership with major Tier1 OSAT’s for mid & large series

- **Large experience** and **deep know-how** in New Product Introduction, product industrialisation, and production sustaining / Quality Assurance from small to High volumes….

  We are not only a simple Test House or Assy house …

- **Continuous growth dynamics and investments since creation**

- **Local support teams in all semiconductor main Hubs and mainly Asian major Hubs**

- **Flexible**, **reactive**, and «**easy-to-work with**» organization