INPHOTEC
INTEGRATED PHOTONIC TECHNOLOGY CENTER
Mission:
- To provide center of competence
- Fabrication facilities and technologies platforms for research
- Prototyping and production of high added value components and circuits to academic and industrial SME

Vision:
- To create value through innovation developing proprietary solutions
- To have high flexibility and reduced tooling and set-up costs
- To focus on small and medium production level to support industries

Goal:
The major areas where INPHOTEC can provide innovative front end and back end processes and technologies are:
- Photonic integrated circuits and optoelectronics
- Bio photonics and medical
- Sensors and MEMS, MOEMS
Infrastructure: Clean room

- Optimizations ratio service area /clean area
- Cross contaminations control
- Technology Up grade low impact

- 490m² Clean Area →
- 25 m² class 100, 190m² class 1000, 275m² class 10000
- 150m² Service Area
Infrastructure: Advanced Packaging Lab

CR: Class 100
T°C 21± 1°C

CR: Class 10000
T°C 21± 2°C
Technology Platforms

- Silicon photonics
- Hybrid Integration
- Glass on silicon
- Advanced packaging

FOR

DEVELOPMENT OF PROPRIETARY SOLUTIONS

PROTOTIPATIONS UP TO THOUSANDS PIECES/YEAR
Waveguide Grating coupling Structure for silicon photonics
SUB-MICRON ETCHING OF DIELECTRICS

**DEEP ETCHING** of PECVD - SiO$_2$
with Soft Mask (e-Beam)

Etch Depth = 650 nm

Grating Size: 310/680 nm

88° Sidewalls

Development in Progress
DEPOSITION OF THICK TEOS BY PECVD

Conformal deposition

PECVD deposition from liquid precursors.
Thick depositions are possible (several microns)
The “Hybrid Integration” Platform aims to develop technologies that can suit the necessity to integrate different devices and parts together, enabling compactness and interoperability. In particular, the Platform will develop the use of micro-structured silicon as the SiOB Silicon Optical Bench.
Design, development, prototipation, small production packaging line on:

- silicon photonics and optoelectronics components,
- sensors,
- MEMS, MOEMS.

FOR Technology Platform: Advanced packaging

- Datacom,
- Internet of Things and 5G
- Medical
- Biotechnology
MAIN EQUIPMENT

- 1 automatic die-attach FINETECH PICO
- 1 manual Wire Bonder TPT model HB16
- 1 Automatic ball wire bonder K&S
- 1 Automatic Alignment and Pigtail Bench
- 1 Splicer FUJIKURA (PM fibers)
- 1 Stereo microscope,
- 1 Chemical Hood, cleaning
- 1 Pull-shear tests XYZTEC model Condor EZ

MAIN PROCESSES

- Vertical and horizontal alignment and pigtailing
- Lenses and Fiber Ribbon Alignment and Pigtail
- Die Bonding, Flip-Chip Bonding,
- Tacking, In situ reflow, Eutetic bonding
- Thermocompression
- Single-Step solder ball placement
- Flux less / solder paste / void free soldering
- Wafer bump reflow
- Wire and ribbon bonding

MAIN EQUIPMENT from January 2016

- 1 automatic flip chip machine submicron accuracy
- 1 solder reflow oven with vacuum and reduced atmosphere
- 1 thermal cycling equipment
Technology Platform: Advanced Packaging

Automatic die bonder
Finetech

Automatic ball bonder
K&S

Automatic pigtailling/flip chip bench
PI-miCos
Automatic alignment bench for Si photonic chips pigtailing

- Bench designed for fibers and lenses pigtailing
- Robot used for component pick-up, vision, glue dispensing and UV curing
- Two submicron precision SpaceFAB positioners are used
- Vision assisted passive pre-alignment
- Active alignment performed using power monitoring
- Bench is designed to be flexible → allows different kind of chips/packages/fibers to be used
Inphotec Advanced Packaging Examples
Inphotec Advanced Packaging

Examples
ACTIVE PROJECTS AND CONTRACTS

Short History:

➢ Packaging Platform started activity January 2014
➢ Inphotec Facilities completed December 2014
➢ Inphotec Center Full Activities Started January 2015

European Projects

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Conclusion

Process

Infrastructure

Team
thank you!

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