

# Chip Scale Review®

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*The Future of Semiconductor Packaging*

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## Thermocompression bonding

INTERNATIONAL DIRECTORY OF BONDING EQUIPMENT FOR 2.5D and 3D ASSEMBLY



- Wafer-level packaging
- Glass-based interposers
- Cu-pillar flip-chip assembly
- High-temperature electronics
- Integration of polymer optical waveguides
- Optical inspection technologies for 3D packaging
- Addressing the challenges of custom and standard MEMS products





## Europe - a growing hub for advanced packaging

By António Barny [NANIUM, S.A.]

On June 18-19, 2015, major European players in the field of semiconductor packaging, assembly and test met at NANIUM in Portugal to showcase their capabilities, discuss the current state of advanced packaging, their projections for the future, what they believe will be needed to strengthen this industry in Europe, and how to better work together throughout the complete semiconductor supply chain.

The continuous need for miniaturized system integration that allows for higher performance at less space and lower cost at the package and module levels serves the “More-than-Moore” domain. The present times are marked by a game-changing environment both in terms of the concepts of what is made, and the ways in which the industry makes it.

There is a tremendous rise of applications seen in the field of wearables, the internet of things/everything (IoT/IoE), and smart cities. Additionally, further system integration for fast mobile connectivity devices and integrating die-partitioned large system-on-chip (SoC) into new system-in-package (SiP) solutions with SoC-like performance are increasing. To implement these applications fast and efficiently, collaborative work in joint projects and consortia together with institutes, academic, suppliers, service providers and customers seems to be the most promising way. New business models enforcing co-design and co-development along the complete supply chain from the very beginning of the development project are needed to meet the first-time-right and time-to-market needs, as well as to be competitive.

This changing atmosphere certainly represents a big opportunity for Europe to benefit from the knowledge and know-how it has been gathering throughout

the years in all the areas of the supply chain. Furthermore, some reinforcement of manufacturing in Europe is needed to close the “valley of death” between new development and its manufacturability in high-volume manufacturing lines. To address and discuss this topic with European decision makers was also an objective of the meetings.

The “SEMI Packaging Tech Seminar,” organized by SEMI, the international association for Semiconductor Equipment and Materials suppliers, had 180 attendees and focused on the most recent industry and market developments. It showcased the capabilities in Europe and international trends in terms of advanced packaging manufacturing. The day after, approximately 60 participants gathered together for the European Semiconductor Packaging, Assembly and Test (ESPAT) Industry Interest Group, to discuss the next steps on working more closely together in Europe to get prepared for the upcoming challenges with respect to the international competitive situation facing the industry. The team decided to become a SEMI ESPAT Special Interest Group (SIG) within SEMI. The objectives of the group were summarized, and the charter and by-laws were discussed and approved. For more information, please refer to: <http://espat.weebly.com>

The events took place at the headquarters of Europe’s largest outsourced semiconductor, assembly, and test (OSAT) supplier, NANIUM, S.A., located in Porto in the north of Portugal. Throughout the event, what became clear was the competence and advanced packaging and test know-how available all over Europe in applications as diverse as MEMS, sensors, mobile, automotive, industrial, health and healthcare, aerospace, and security.

Indeed, nowadays Europe puts forward a very competent offering in

advanced packaging, both where it comes to research close to the industry needs, equipment and material supplier activities, and advanced packaging and test services provided by the OSATs and test houses. All participating companies agreed that this current situation provides a strong basis to tackle the booming opportunities expected in the near term.

Over the past few years, we have witnessed European companies’ increasing importance in niche markets. On the other hand, today’s advanced packaging is less dependent on the Asian supply chain because the focus is not so much on conventional packaging technologies, such as wirebond and flip-chip interconnect-based packages using leadframe and organic substrate as interposers and packaging less complex single-die solutions. Rather, it is focused on smart system integration for more demanding applications in terms of performance, security and reliability, as well as the customer’s demand for close cooperation with the highly educated and experienced engineering teams of the partners.

Europe’s message is clear: It relies not only on the big IDMs (Infineon, Bosch, NXP, STMicroelectronics, austriamicrosystems), but also on its OSATs and test houses, small or large (e.g., NANIUM, First Sensor Microelectronic Packaging, Sencio, GS Nanotech, e2v, Rood Microtec, Presto Engineering), and R&D centers distributed all over Europe (e.g., CEA-Leti, Fraunhofer, imec).

### Biography

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