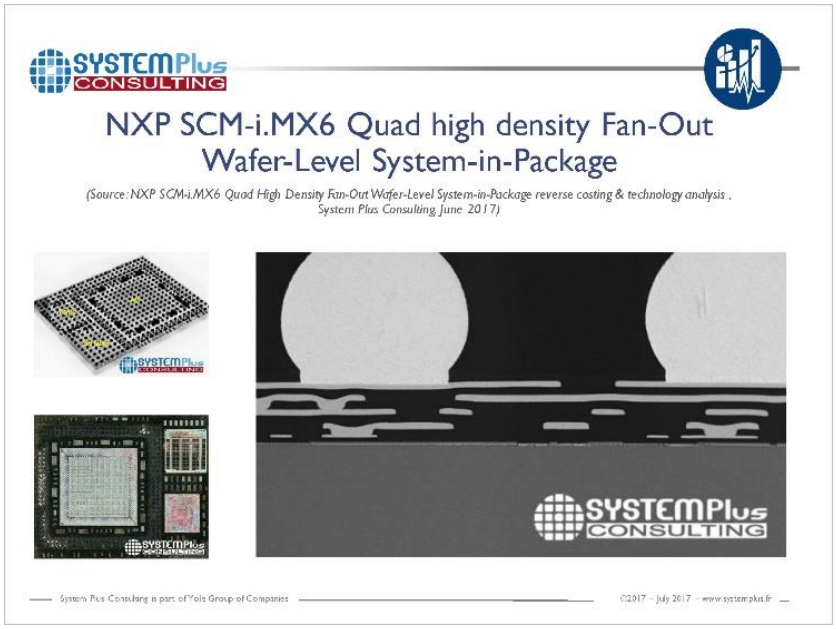
FOR IMMEDIATE RELEASE:

NXP and Nepes are creating value with their first FO PoP SiP for IoT

NXP SCM-i.MX6 Quad High Density Fan-Out Wafer-Level System-in-Package report from System Plus Consulting

LYON, France – July 6, 2017: Advanced packaging is a key enabling technology that not only serves as packaging support but also offers more value and cost reduction to the final products. The advanced packaging industry with its 7% CAGR[1] between 2016 and 2022 (in revenues)[2] is undoubtedly a dynamic sector where innovations play a key role. NXP's SCM-i.MX6Q FO PoP SiP[3] with boot memory and power management is a good illustration of the evolution of advanced packaging platforms. Therefore, NXP proposes a simple but smart combination of SiP and PoP integration with very small form factor for IoT applications… *"NXP's module is a demonstration of emerging advanced packaging technologies such as FO PoP SiP"*, comments **Jérôme Azémar, Technology & Market Analyst at Yole Développement (Yole), sister company of System Plus Consulting**. *"With this design, NXP distinguishes it from other companies. NXP, in collaboration with its historic partner Nepes, is clearly showing its strategy focused on the integration of several chips to create a module with higher added-value."* NXP's module has been initially developed for simple IoT applications. However, tomorrow, this SiP approach might be intended to high-end market segments. This will be interesting to watch…



System Plus Consulting proposes today a relevant reverse engineering and costing analysis dedicated to NXP FO PoP SiP, titled NXP SCM-i.MX6 Quad High Density Fan-Out Wafer-Level System-in-Package report. This analysis includes a complete review of PoP SiP solution, featuring die analyses, processes, and package cross-sections. It also

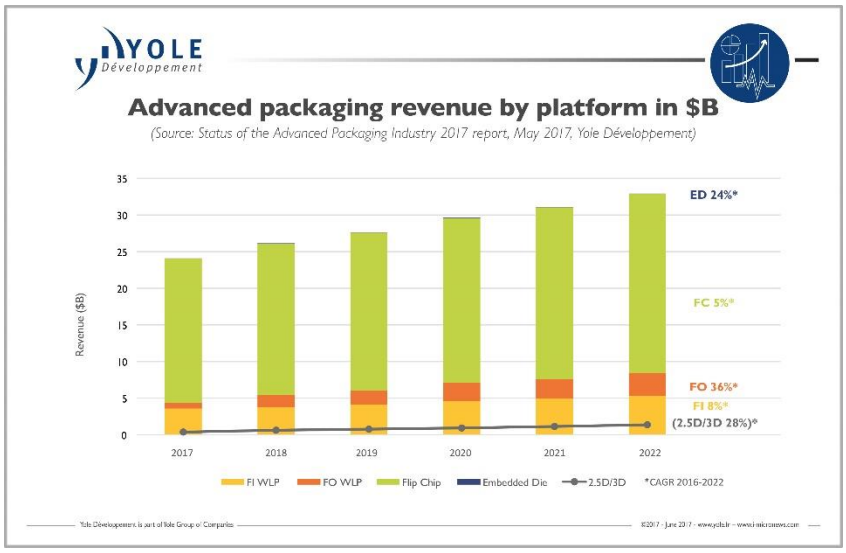
[1] CAGR: Compound Annual Growth Rate
[2] Source : Status of the Advanced Packaging Industry report, Yole Développement, May 2017
[3] FO PoP SiP : Fan-Out Package-on-Package System-in-Package

includes a comparison with competitive solutions: TSMC's inFO and Shinko's MCeP PoP technology. System Plus Consulting report contains a complete cost analysis and a selling price estimation of the system.

In several applications, SiP integration of several devices with a very small form factor has become a huge challenge. Emerging markets like the IoT bring new system configurations looking for low power consumption and high performance. NXP has therefore brought in a tiny wafer-level SiP, an application processor that has been well-proven in automotive applications, a PMIC[4] and a boot memory based on flash technology. Its footprint is about half the size of a discrete implementation on standard PCB[5].

Fully dedicated to IoT applications, NXP's module includes the i.MX6-Quad application processor, MMPF0100 power management system, a 16MB Flash memory and about 100 surface mounted devices, all in a single package smaller than 200 mm³. *"This is the first multi die fan-out device than we have found in the market, and could be a key milestone for fan-out SiP technology,"* **asserts Stéphane Elisabeth, Advanced Packaging & RF Cost Engineer at System Plus Consulting.**

The system uses non-conventional wafer-level packaging developed by Nepes. It has innovative interconnections, enabling a PoP[6] configuration with Micron's SDRAM memory chip. A custom redistribution device, called Via Frame, allows memory stacking. These components are integrated in EMC[7] on few RDL[8].



"Powered by the NXP i.MX6 Quad application processor and enabling PoP configuration, the SCM-i.MX6Q is extremely power efficient," comments Stéphane Elisabeth from System Plus Consulting. This makes it ideal to reduce product time to market by simplifying the high-speed memory design and significantly reducing the overall design complexity of the processor/PMIC/memory sub-system. Thanks to the

[4] PMIC : Power Management Integrated Circuit
[5] PCB : Printed Circuit Board
[6] PoP : Package-on-Package
[7] EMC : Epoxy Molding Compounds
[8] RDL : Redistribution Layer

redistributed chip packaging technology applied to this SiP, NXP has realized a complete, very small, low-power, high performance solution.

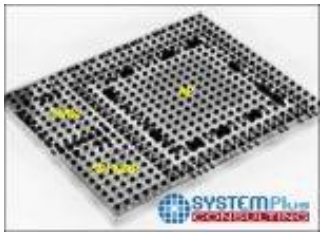
What will be the next step? According to Yole's analysts, FO remains the highest growing advanced packaging platform with a 36% CAGR between 2016 and 2022 (in revenues)[9]. System Plus Consulting and Yole are convinced that FO SiP will strongly penetrate the market in a near future. And Apple's processor, A11 in the future iPhone8 is a good example.

Both partners will so pursue their investigation to analyze emerging technologies and make the link with the market evolution and the strategy of leading advanced packaging companies. System Plus Consulting and Yole presents their vision of the industry, technology evolution and market trends all year long, at leading trade shows and conference. Next presentations take place in:

- SEMICON Taiwan (More information). Yole's analysts will welcome you on our booth #828
- On October 25, 2:15PM at IWLPC: *"Technology Trends for Sensors using WLP and 3D TSV Integration"* – Speaker: Romain Fraux, CTO, System Plus Consulting

For more information, please contact Clotilde Fabre (fabre@yole.fr).

[9] Source : Fan-Out: Technologies & Market Trends 2016 report, Yole Développement, 2016



About NXP SCM-i.MX6 Quad High Density Fan-Out Wafer-Level System-in-Package report:

The first ultra-small multi-die low power module with boot memory and power management integrated in a package-on-package compatible device for the Internet of Things…

This report has been performed by System Plus Consulting, part of Yole Group of Companies.

About System Plus Consulting:

System Plus Consulting specializes in the cost analysis of electronics, from semiconductor devices to electronic systems. Created more than 20 years ago, System Plus Consulting has developed a complete range of services, costing tools and reports to deliver in-depth production cost studies and estimate the objective selling price of a product. System Plus Consulting engineers are experts in Integrated Circuits - Power Devices & Modules - MEMS & Sensors - Photonics – LED - Imaging – Display - Packaging - Electronic Boards & Systems.

Through hundreds of analyses performed each year, System Plus Consulting offers deep added-value reports to help its customers understand their production processes and determine production costs. Based on System Plus Consulting's results, manufacturers are able to compare their production costs to those of competitors.

System Plus Consulting is a sister company of Yole Développement. More info on www.systemplus.fr

About Yole Développement :

Founded in 1998, Yole Développement has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole Développement group has expanded to include more than 50 collaborators worldwide covering MEMS, Compound Semiconductors, RF Electronics, Solid-state lighting, Displays, Image Sensors, Optoelectronics, Microfluidics & Medical, Advanced Packaging, Manufacturing, Nanomaterials, Power Electronics and Batteries & Energy Management.

The "More than Moore" company Yole, along with its partners System Plus Consulting, PISEO, Blumorpho and KnowMade, support industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to grow their business.

- Consulting & Financial Services: Jean-Christophe Eloy (eloy@yole.fr)
- Reports: David Jourdan (jourdan@yole.fr)

Yole Group of Companies - Press Relations & Corporate Communication: Sandrine Leroy (leroy@yole.fr)

###