LYON, France – November 21, 2018: “Automotive is the new El Dorado for microelectronics,” announces Emilie Jolivet, Director, Semiconductor & Software at Yole Développement (Yole). The market is showing significant market drivers that are daily supporting the growth: electrification, connectivity, autonomy and comfort are the key words of the today’s automotive industry.

Under this dynamic context, the market research and strategy consulting company releases a comprehensive technology & market report focused on advanced packaging solutions for automotive electronic components.

Titled, Trends in Automotive Packaging, this study identifies and analyzes the major platforms currently used in the automotive industry and points out technical trends related to LiDAR, CIS¹, radar, power and lighting devices, MEMS² and sensors. Yole’s Semiconductor & Software team shares with you their advanced packaging knowledge applied to the automotive sector.

“For the first time, we clearly see packaging innovations for automotive components,” comments Emilie Jolivet from Yole. “Step by step, advanced packaging technologies initially developed for consumer purposes are implemented by Tiers 1 and 2. And the diversity of automotive components is a strong business opportunity for the advanced packaging companies.” Therefore, for the first time, the automotive industry is ready to accept consumer solutions, even for more dedicated applications like powertrain.

Based on the impressive growths of this industry (+7% for automotive sale – +15% for the electronics systems in automotive – And +20% for semiconductors in automotive...), Yole’s report highlights the attractiveness of this historic industry.

¹ CIS : CMOS Image Sensor
² MEMS: Micro Electro Mechanical System
Automotive industry: where is advanced packaging implemented? What is the impact of regulations on these solutions? Who are the big advanced packaging big players? The Semiconductor & Software team from Yole invites you to discover the latest advanced packaging trends for the automotive industry.

Electronic devices are more and more common in cars and the number of electronic systems is also increasing. The quantity of electronics in a car has increased 2.5 times since the 90’s. In 2017, 26 cm² of semiconductor substrates was used in a car, while in 2023 Yole expects 35 cm². The four main trends empower the strong diversity of functions and so a large number of sensors, power supplies, communication chips, lighting components and processors that can either come from the consumer market or be especially developed for automotive.

“As an example, almost all OEMs have announced large investments or electrification plans of their fleet in the coming years,” comments Lauranne Chemisky, Technology & Market Analyst at Yole. “Impact of electrification should be first limited. Then, at long term, the story should be different. Automation and sensors guide innovation in the automotive industry, especially packaging solutions.”

This impressive increase in electronic devices integrated in vehicles will directly drive the packaging market. In 2017, the packaging for automotive total revenue was quoted at about US$3.7 billion. According to Yole, it will reach roughly US$7 billion in 2023. The automotive packaging industry is involved in many device types and thus in many packaging platforms: the largest volume growth appears in power module, high power discrete and CIS markets. From a revenue point of view, LED is showing the highest figure and in parallel, LiDARs has the highest growth…

Yole’s team identified five main application groups with very different needs and operating conditions: infotainment & comfort, powertrain, safety, lighting and connectivity. Electronic devices can be either specific to one application group (Example: LEDs for automotive lighting applications) or be part of several groups, but with specific specifications. MCUs is a good example for the safety and infotainment applications.

Packaging affects how, where and how long the device can function… Yole’s analysts identified a new era for automotive development that may accelerate the adoption of innovative packaging technologies. “At Yole, there are today significant demands for power applications,” explains Emilie Jolivet from Yole. “A second wave could be led by new advanced packaging needs like embedded chips and more computing on the edge.”

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3 OEM: Original Equipment Manufacturer
4 Including LED module
5 LED: Lighting Emitting Diode
6 MCU: Microcontroller Unit
In addition, for the first time in history, a big effort is made to adapt consumer technologies to the automotive sector. Although the main platform in term of units is the WBBGA\textsuperscript{7} package, which represents half of the market, advanced packaging platforms such as flip-chip and fan-out are finding their place.

The next packaging innovation expected is embedded die in substrate for converter dies. Packages like QFN\textsuperscript{8} package, iBGA\textsuperscript{9} Package and ceramic packaging are also growing for specific applications like CIS\textsuperscript{10}, MEMS and power devices.

These results will be presented by Santosh Kumar, Principal Analyst & Director Packaging, Assembly & Substrates, Yole Korea at the \textit{20th Electronics Packaging Technology Conference (EPTC)}. This presentation will take place on December 5th at 4:00 PM during the Plenary Session 2, titled Packaging for next generation automobiles/autonomous vehicles. Make sure to attend this presentation and discuss with our expert. Feel free to visit also our team in the exhibition area (Booth #19).

A detailed description of the automotive packaging report from Yole is available today on \url{i-micronews.com, advanced packaging reports section}. All the types of packages used in the automotive industry, in addition to technology roadmaps are well detailed in this technology & market analysis.

\textsuperscript{7} WBBGA : Wire Bond Ball Grid Array  
\textsuperscript{8} QFN : Quad Flat No-leads  
\textsuperscript{9} iBGA : Interstitial Ball Grid Array  
\textsuperscript{10} CIS : CMOS Image Sensors
ABOUT THE REPORT:

**Trends in Automotive Packaging 2018**
OSATs are gaining benefits from advanced packaging in automotive. – Produced by Yole Développement (Yole).

**Companies cited in the report:**

**Authors:**

- **Emilie Jolivet** is Director of the Semiconductor & Software Division at Yole Développement (Yole), part of Yole Group of Companies, where her specific interests cover package & assembly, semiconductor manufacturing, memory and software & computing fields. Based on her valuable experience in the semiconductor industry, Emilie manages the expansion of the technical and market expertise of her team. In addition, Emilie’s mission focuses on the management of business relationships with semiconductor leaders and the development of market research and strategy consulting activities inside the Yole group. Emilie Jolivet holds a Master’s degree in Applied Physics specializing in Microelectronics from INSA (Toulouse, France).

- **Jerôme Azémar** is supporting the development of strategic projects, following leading customers of the company within the semiconductor industry, from manufacturing to packaging. His mission is to develop Yole’s business and technical knowledge in the industry, maintain long-term relationships with its accounts and meet their expectations. Jerôme is the author of numerous analysis and international publications covering advanced packaging, power electronics and semiconductor manufacturing. Prior to this and upon graduating from INSA Toulouse (France) with a Master’s in Microelectronics and Applied Physics, Jerôme worked three years at ASML as application engineer and two years at STMicroelectronics as process engineer.

- **Lauranne Chemisky** is a technology and market analyst in the Semiconductor & Software Team at Yole Développement (Yole). Lauranne is currently engaged in the development of market research reports as well as customized services for clients. She is able to leverage her technology training and experience in the fields of materials and semiconductor manufacturing processes for advanced packaging applications. Previously, Lauranne worked at Apple in the Softgoods Product Design Team as a material development engineer (CA, USA). Lauranne holds a master’s degree in Materials Science & Polymers from ITECH (Lyon, FR) and a M.Sc. in Technology and Innovation Management from EM Lyon Business School (Lyon, FR).

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Founded in 1998, Yole Développement (Yole) has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services, reverse engineering and reverse costing services and well as IP and patent analysis. With a strong focus on emerging applications using silicon and/or micro manufacturing,
the Yole group of companies has expanded to include more than 80 collaborators worldwide covering MEMS & Sensors - Imaging - Medical Technologies - Compound Semiconductors - RF Electronics - Solid State Lighting - Displays - Photonics - Power Electronics - Batteries & Energy Management - Advanced Packaging - Semiconductor Manufacturing - Software & Computing - Memory and more...

The “More than Moore” market research, technology and strategy consulting company Yole Développement, along with its partners System Plus Consulting, PISEO and KnowMade, support industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to grow their business. For more information, visit www.yole.fr and follow Yole on LinkedIn and Twitter.

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