LYON, France – June 21, 2018: The semiconductor industry posted record results in 2017, with revenue exceeding US$400 billion. Overall demand for semiconductor devices was robust throughout the year, driven by the growing adoption of electronics components across all applications, with particular strength in the mobile and data center markets. Semiconductor growth in 2017 was led by the memory segment, with impressive revenue reaching US$126 billion. It represents an increase of over 60% year-over-year. Yole Développement (Yole) Memory Team forecasts the memory market to reach US$177 billion in 2018, with 40% growth.

Under this dynamic ecosystem, Yole and its partners System Plus Consulting and Knowmade, all parts of Yole Group of Companies, deeply scan the memory area. They propose today valuable memory services to deliver world class research, data and insight. Their aim is to ensure its clients are well-versed in all aspects of this competitive industry. Yole Group of Companies leverage decades of industry experience and expertise while partnering with its clients to make sure they are consistently well-informed on this pushy market. Today two memory research services, DRAM Service and NAND Service have been developed by Yole Group of Companies. Full description of both services are available in a new dedicated Memory section on i-micronews.com. In addition, a selection of technology & market news are daily selected by Yole’s memory team and posted in this section.

Make sure to collect deep insights and significant analyses from leading industry experts, combining over 50-year experience in memory and semiconductor-related fields.
Both DRAM and NAND markets were in a state of undersupply throughout the year, leading to rising prices and record revenue and profitability for the memory suppliers. Demand was very strong, led by mobile and data center / SSD\(^1\) and augmented by emerging growth drivers including AI\(^2\), IoT\(^3\) and automotive. Supply growth across both DRAM and NAND was constrained, due to a combination of limited wafer growth and technological challenges.

The current macro trends of AI and machine learning, mobility, and connectivity, are favorable to both the DRAM and NAND markets, and will likely result in Memory continuing to increase its share of the overall the semiconductor market.

“The understanding memory supply/demand dynamics and its relationship with pricing is vital to understanding the broader semiconductor market and all associated supply chains”, asserts Emilie Jolivet, Division Director, Semiconductor & Software at Yole.

The DRAM market is constantly evolving and changing. Yole Group is announcing a 22% CAGR\(^4\) for bit demand over the next five years.

“New Chinese suppliers threaten the current market balance, and emerging memory technologies are poised to cannibalize huge chunks of DRAM demand while the demand drivers of the past, including PCs and smartphones lose steam and no longer push industry demand,” comments Mike Howards, VP of DRAM & Memory research within the Semiconductor & Software division at Yole.

In parallel, NAND market is expected to set another revenue record in 2018, before a flattish 2019. Therefore it continues to expand, with several consecutive quarters of record revenue and profitability for suppliers.

NAND’s competitive landscape remains incredibly dynamic. Samsung is prepping its first fab at its massive Pyeongtaek site; Intel is emerging as a stand-alone supplier with capacity in China; and the sale of Toshiba’s memory business to a consortium led by Bain Capital is finally happening. Meanwhile, a new entrant looms on the horizon: China’s Yangtze Memory Technologies Co. (YMTC), which threatens to disrupt the status-quo as well as multiple other Chinese projects.

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\(^{1}\) SSD : Solid-State Drive
\(^{2}\) AI : Artificial Intelligence
\(^{3}\) IoT : Internet of Things
\(^{4}\) CAGR : Compound Annual Growth Rate
“NAND demand remains robust, with strong growth for enterprise SSDs in data centers, increasing adoption of SSDs in laptop PCs, and continued content growth in smartphones and other mobile devices,” asserts Walt Coon, VP of NAND and Memory Research at Yole. “These segments will continue driving the bulk of NAND bit consumption, though several emerging trends are poised to augment future growth, including AI and VR adoption, automotive, and IoT,” he adds.

Memory Research Service from Yole, provides all data related to NAND/DRAM revenue per quarter, NAND/DRAM shipments, pricing per NAND/DRAM type, near and long-term revenue, market share per quarter, CAPEX per company, and a market demand/supply forecast. It also includes a complete analysis and details on the demand side, with a deep dive into client and enterprise SSD, data centers, mobile, automotive, graphics, PC, and more. Each Memory Research Service is composed of both products, the Quarterly Market Monitor and the Monthly Pricing Monitor.

During the next few weeks, Yole’s Memory Team will attend a selection of key trade shows and conferences to present the Memory Research Services. Make sure you will be there and ask for a meeting right now. Mike Howard and Walt Coon will for example be at SEMICON West mid-July and the Flash Memory Summit (Santa Clara, CA, North America – From August 6 to 9) in August. More information: Yole’s Agenda.

Feel free to contact us right now to set-up face to face discussions. Contact: Fanny Vitrey, Marketing & Communication Assistant, Yole Développement (vitrey@yole.fr).
ABOUT DRAM/NAND MEMORY SERVICES

A full package: The DRAM/NAND Quarterly Market Monitor and the Monthly Pricing Monitor include the following deliverables:

- Excel database with all historical and forecast data.
- PDF slide deck with graphs and comments/analysis covering expected evolutions.
- Direct access to a Yole Développement analyst for one year, providing an opportunity for on-demand Q&A and discussions regarding trends, analyses, forecasts, and breaking news.

Frequency: Receive every quarter the updated Market Monitor documents and every month the updated Pricing Monitor documents.

Options:
- Pricing Monitors can be bought individually (NAND, DRAM or both).
- Memory Research are available for DRAM, NAND and both.

More Information about memory reports on i-micronews.com, memory reports section.

ABOUT THE MEMORY TEAM

Walt Coon joins Yole Développement (Yole) memory team as VP of NAND and Memory Research, part of the Semiconductor & Software division.

Walt is leading the day-to-day production of both market updates, Market Monitors and Pricing Monitors, with a focus on the NAND market and semiconductor industries. In addition, he is deeply involved in the business development of these activities.

Walt has significant experience within the memory & semiconductor industry. He spent 16 years at Micron Technology, managing the team responsible for competitor benchmarking, and industry supply, demand, and cost modeling. His team also supported both corporate strategy and Mergers & Acquisitions analysis. Previously, he spent time in Information Systems, developing engineering applications to support memory process and yield enhancement.

Walt Coon earned a Master of Business Administration from Boise State University (Idaho, United-States) and a Bachelor of Science in Computer Science from the University of Utah (United-States).

Mike Howard is member of the memory team at Yole Développement (Yole) as VP of DRAM and Memory Research.

Mike is a daily contributor to the business development of memory activities with a special focus on the DRAM industry. Mike’s mission at Yole, is to propose a comprehensive understanding of the entire memory and semiconductor markets, with a dedicated collection of market updates, Market Monitors and Pricing Monitors. Mike developed a broad DRAM memory expertise with a relevant combination of industrial and market research experiences. Prior his position as Senior Director of DRAM and Memory Research for more than a decade, Mike served at Micron Technology. He had several roles in corporate development, marketing, and as photolithography engineer in R&D. Mike earned a Master of Business Administration at The Ohio State University (United-States), a Bachelor of Science in Chemical Engineering as well as a Bachelor of Arts in Finance at the University of Washington (Washington, United-States).

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 the Semiconductor and Software Team. The team interacts daily with leading companies allowing semiconductor & software analysts to collect a large amount of data and integrate their understanding of the evolution of the market with technology breakthroughs.

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). After an internship in failure analysis at Freescale (France), she was an R&D engineer for seven years in the photovoltaic business where she co-authored several scientific articles. Enriched by this experience, she
graduated with an MBA from IAE Lyon and then joined EV Group (Austria) as a business development manager in 3D & Advanced Packaging before joining Yole Développement in 2016.

**Thibault Buisson** serves as a General Manager of Yole Développement (Yole), part of Yole Group of Companies. Previously he was Business Unit Manager of the Advanced Packaging & Semiconductor Manufacturing team, and has 15 years of direct experience within the semiconductor industry.

Before Yole, Thibault worked for over 5 years at IMEC (Leuven, Belgium) as a process integration engineer in the field of 3D technology. He started his career at NXP Semiconductors (Grenoble, France) as an R&D process engineer in the thermal treatment area to develop CMOS technology devices.

Thibault Buisson has authored or co-authored more than fifteen international publications in the semiconductor field and has spoken at several conferences and symposiums, including keynotes, in the field of advanced packaging and semiconductor.

Thibault graduated from the Institute of Technology (INP – Grenoble, France) with a Master of Research Degree in Micro and Nano Electronics, and from Polytech (Grenoble, France) with an engineering degree in Material Sciences.
ABOUT YOLE GROUP OF COMPANIES

Specializing in patent analysis and scientific information, **Knowmade** provides technology intelligence and IP strategy consulting services. The company supports R&D organizations, industrial companies, and investors in their business development by offering them a deep understanding of their IP environment and technology trends. Knowmade operates in the following industrial sectors: Compound Semiconductors, Power Electronics, RF & Microwave Technologies, LED/OLED Lighting & Display, Photonics, Memory, MEMS & Sensors, Manufacturing & Advanced Packaging, Batteries & Energy Management, Biotechnology, Pharmaceuticals, Medical Devices, Medical Imaging, and Agri-Food & Environment. Knowmade’s experts provide prior art search, patent landscape analysis, scientific literature analysis, patent valuation, IP due diligence, and freedom-to-operate analysis. In parallel, the company offers litigation/licensing support, technology scouting, and IP/technology watch services. Knowmade’s analysts combine their technical and patent expertise with powerful analytics tools and proprietary methodologies to deliver relevant patent analyses and scientific reviews. More information on www.knowmade.com and follow Knowmade on LinkedIn.

**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 and on LinkedIn and Twitter.

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 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.

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

Yole Développement, System Plus Consulting, Knowmade, PISEO and Blumorpho are part of Yole Group of Companies.

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