



即时发布：

## MEMS 麦克风之后，AI 引领音频世界的变革

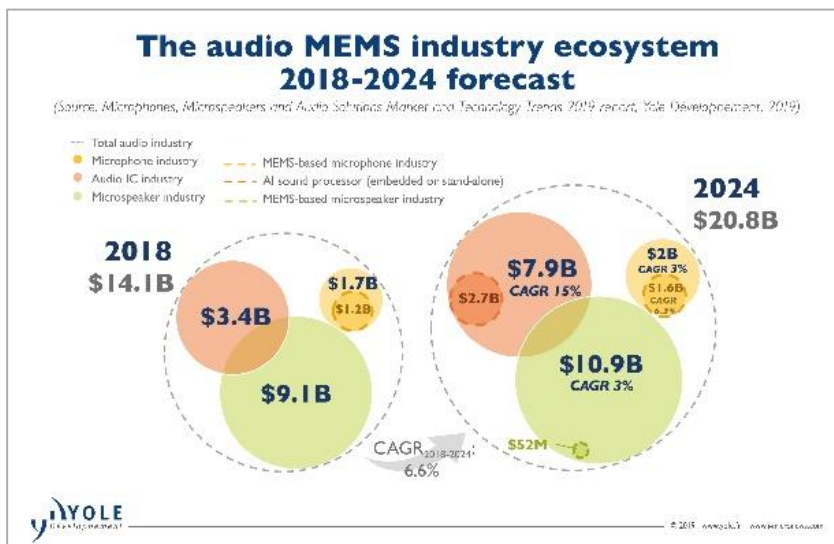
摘自：

- 《麦克风、微型扬声器和音频解决方案——市场与技术趋势》，Yole Développement, 2019
- 《USound Achelous UT-P 2016 MEMS 扬声器》报告，System Plus Consulting, 2019

**LYON, France – December 5, 2019: 法国里昂讯—2019 年 12 月 5 日：**“VPA *Erreur ! Signet non défini.* 是当今音频产业的主要动力”，[Yole Développement](#) (Yole) 的光电业务技术与市场分析师 **Alexis Debray** 博士说。

Yole 的光电、传感与显示器业务技术与市场分析师 **Dimitrios Damianos** 博士也表示：“这项新应用的一个有趣之处在于，它散布于各种系统中：智能手机、智能扬声器、智能手表、无线耳机、汽车、智能电视及其遥控器。”

该应用基于音频系统的传统组件：麦克风、扬声器、音频编解码器和音频放大器。但它也依赖于消费级 AI 的兴起带来的语音数据计算和分析相关新组件。麦克风、音频 IC 和微型扬声器的消费市场累计预期将以 6.6% 的 CAGR 从 2018 年的 141 亿美元增至 2024 年的 208 亿美元。观察 MEMS 麦克风的数量增长，就会对所涉及的产品有所了解。这家市场调研与策略咨询公司宣传，智能扬声器中的 MEMS 麦克风数量将以 13% 的 CAGR 在 2024 年增长至 12 亿个。而在无线耳机中的 MEMS 麦克风数量将以 29% 的 CAGR 在 2024 年达到 13 亿个。



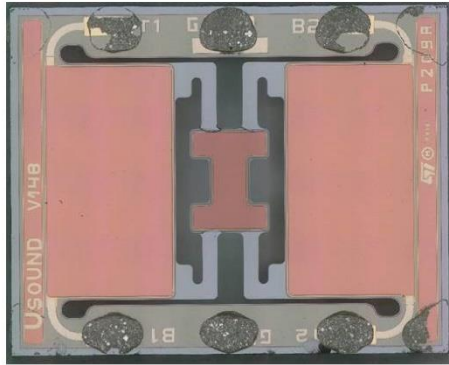
作为这个热力勃发而活力十足的生态系统的一部分，Yole 及其兄弟公司 [System Plus Consulting](#) 密切合作，分享技术专长与产业知识。两家合作伙伴都对这个繁荣的产业及相关技术进行了深入分析，并在今天带来了一份对这个音频世界的全面描述。

Yole 宣布发布了题为《[麦克风、微型扬声器和音频解决方案市场与技术趋势](#)》的报告。这项新出炉的技术与市场分析侧重市场预测与趋势，

以及供应链。该报告还为消费麦克风、微型扬声器和音频 IC 提出了一幅直到 2024 年的详细技术发展路线图。它旨在研究主要技术趋势，了解价值链、基础设施和厂商的策略，并分析相关问题。

### MEMS speaker developed by USound: top optical view

(Source: USound Achelous UT-P 2016 MEMS Speaker report, System Plus Consulting, 2019)



与此同时，System Plus Consulting 也针对欧洲公司 USound 推出的首款量产 MEMS 扬声器进行了一项完整的逆成本分析：《[USound Achelous UT-P 2016 MEMS 扬声器](#)》。这项创新解决方案体积仅为 49 立方毫米，小于经典解决方案，专为入耳式音频系统而打造。USound 开发了一项专用技术，以整合多个 MEMS 扬声器（多达 80 个）、提高输出声音功率并提供更好的空间音效分布。

“这一首款 MEMS 扬声器的秘密不仅仅在于其硅片”，System Plus Consulting 的 IC、功率与 MEMS 高级成本分析师 Sylvain Hallereau 称，他补充道：“USound 开发的封装解决方案也非常重要。听觉薄膜确已附于封装上，这对音效会带来相应影响。从横截面和分解图来看，所有封装结构的设计都是为了提高音效和保护 MEMS 硅片，封装就是扬声器本身。”

如今 USound 和多家厂商都在积极参与麦克风、音频 IC 和微型扬声器产业。System Plus Consulting 和 Yole 对该行业进行调研，以看清每家厂商的策略并了解其市场定位。那么是谁在分食这块音频馅饼呢？

“就 MEMS 麦克风而言，Knowles 和 Goertek 都是主要厂商”，Yole 的 Alexis Debray 详述道：“在 2018 年价值 12 亿美元的市场中，它们所占的份额分别为 39% 和 28%。” Knowles 的收益近年来可能已达到饱和，然而身处不断扩张的市场，面对提供更低成本解决方案的中国厂商，它依然地位稳固。

同时，英飞凌一直向 Goertek 和 AAC 这样的厂商供应麦克风芯片，而今其策略似乎发生了转变。该公司确已开始提供一款完整的 MEMS 麦克风方案。Yole 的分析师们借此机会就此与英飞凌的传感器主管 Roland Helm 博士进行对谈，就技术、技术性挑战、市场机遇和产业演变进行了切磋。您也可以在 [i-Micronews.com](#) 网站上找到访谈内容。

而在音频编解码器和放大器方面，Cirrus Logic、高通和德州仪器都是 2018 年价值 34 亿美元市场中的主要厂商，其市场份额分别为 35%、18% 和 12%。Yole 的技术与市场报告中包含了对音频供应链的完整分析，其中就包括这些领先公司。

苹果、高通和海思半导体都将在未来集成 AI 处理技术，这项技术可能也会广泛见于各家厂商。Knowles 和 Goertek 正在推出将 AI 性能和编解码器与数字处理功能整合在一起的专用音频芯片。

另一方面，如 CEVA 和 Xperi 这样的 IP 供应商正在朝 AI 处理技术芯片设计的方向上努力。无论是通过哪种途径，AI 都在吸引所有关注。最后，不断扩展的用例所产生的大量新数据正在为 AI 提供养分，为其带来强大的功能性。而且，有什么比用自己的声音来对这些设备实现无缝控

制更棒的呢？这就是整个供应链上音频厂商的下一个战场：语音领域……欢迎访问 [i-Micronews.com](http://i-Micronews.com) 网站，获得 Yole 和 System Plus Consulting 提供的两份音频报告的详细介绍。

*Yole 集团全年发布多项光电与传感技术报告，包括音频报告系列。Yole 的专家们也将全年进行多项关键讲演。欢迎访问 [i-Micronews](http://i-Micronews) 了解详情，并查看 2020 年的精彩计划。敬请期待！*

## ABOUT THE REPORTS

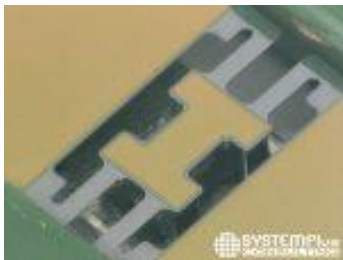


### [Microphones, microspeakers, and audio solutions market and technology trends](#)

*The voice-based world is shaking up the audio industry, making it worth \$20.8B in 2024 - Performed by Yole Développement*

#### **Companies cited**

AAC Technologies, Alibaba, Amazon, ams AG, Analog Devices, Apple, ASE, Audience, Audiopixels, Bosch Sensortec, BSE, CEVA, Cirrus Logic, DSP Group, Gettop, Goertek, Google, Harman, Hosiden, HTC, Huawei, Infineon, Intel, InvenSense, Knowles, MEMSensing, Merus Audio, Motorola, NeoMEMS, Nokia, NXP, Omron, Oppo, Qualcomm, Samsung, SensiBel, Sony, STMicroelectronics, TDK-Invensense, Texas Instruments, TSMC, USound, Vesper, XFab, Xiaomi, xMOS and many more...



### [USound Achelous UT-P 2016 MEMS Speaker](#)

*First mass-produced MEMS speaker based on SOI and PZT thin film technology - Performed by System Plus Consulting*

This report includes technology and cost analysis of the UT-P 2016 MEMS Speaker. These analyses provide the technical intelligence necessary to understand this technology.

## Authors

- **Dimitrios Damianos**, PhD joined Yole Développement as a Technology and Market Analyst and is working within the Photonics, Sensing & Display division. Dimitrios works with his team to deliver valuable technology and market reports regarding the imaging industry including photonics and sensors. After his research on theoretical and experimental quantum optics and laser light generation, Dimitrios pursued a PhD in optical and electrical characterization of dielectric materials on silicon with applications in photovoltaics and image sensors, as well as silicon-on-insulator for microelectronics at Grenoble University, France. In addition, Dimitrios holds an MSc degree in Photonics from the University of Patras, Greece. He has also authored and co-authored several scientific papers in international peer-reviewed journals.
- **Alexis Debray**, PhD is a Technology & Market Analyst, Optoelectronics at Yole Développement. As a member of the Photonics, Sensing & Display division, Alexis is today engaged in the development of technology & market reports as well as the production of custom consulting projects dedicated to the imaging industry. After spending 2 years at the University of Tokyo developing expertise focused on MEMS technologies, Alexis served as a research engineer at Canon Inc. Over 15 years he contributed to numerous development projects, focused on MEMS devices, language comprehension, and terahertz imaging devices. Alexis is the author of various scientific publications and patents. He graduated from ENSICAEN and holds a PhD in applied acoustics.
- **Sylvain Hallereau** is Senior Cost Analyst for IC, power and MEMS at System Plus Consulting. He has more than 10 years of experience in power device manufacturing cost analysis and has studied a wide range of technologies.
- **Guillaume Chevalier** has joined System Plus Consulting in early 2018 to perform physical analyses. He holds a two-year university degree in technology of physical measurements and instrumentation technics.

## ABOUT YOLE GROUP



**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 <https://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 - 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](http://www.yole.fr) and follow Yole on [LinkedIn](#) and [Twitter](#). Consulting & Financial Services: Jean-Christophe Eloy ([eloy@yole.fr](mailto:eloy@yole.fr)) Reports: David Jourdan ([jourdan@yole.fr](mailto:jourdan@yole.fr)). Yole Développement, System Plus Consulting, Knowmade, PISEO and Blumorpho are part of Yole Group of Companies. Yole Group of Companies - Press Relations & Corporate Communication: Sandrine Leroy ([leroy@yole.fr](mailto:leroy@yole.fr)).

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