

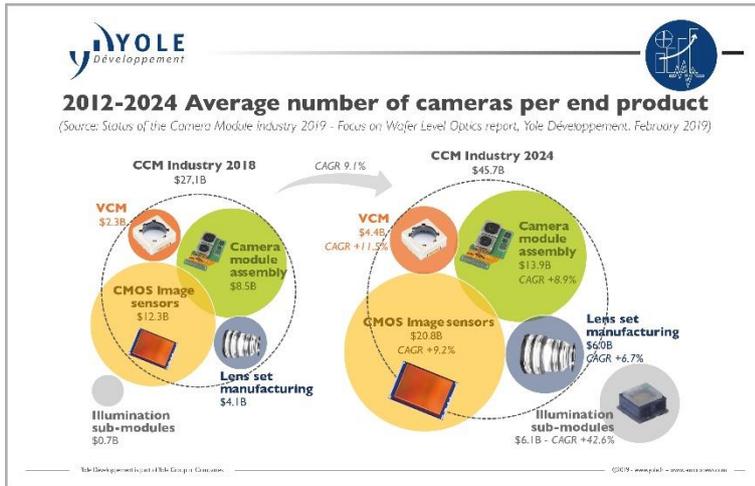


**FOR IMMEDIATE RELEASE:**

**The camera module industry, a dynamic and innovative ecosystem**

Extracted from: Status of the Camera Module Industry – Focus on Wafer Level Optics, Yole Développement, 2019 | Mobile Camera Module Comparison, System Plus Consulting, 2019

**LYON, France – March 7, 2019:** “Despite headwinds the CCM<sup>1</sup> market remains highly attractive,” states **Pierre Cambou, Activity Leader at Yole Développement (Yole)**. The camera module industry has reached a new stage in its development. With US\$27.1 billion of global revenues generated in 2018, the market maintains a 9.1% CAGR<sup>2</sup> for the next 5 years. This industry, which covers image sensors, lenses, voice coil motors, illuminators and camera assemblies, is showing an impressive US\$45.7 billion market by 2024. The overall growth is a combination of mega trends monitored by Yole Group companies including Yole and [System Plus Consulting](#).



Both partners combine their expertise to deliver their vision of the CCM market and technology trends with two significant reports, [Status of the Camera Module Industry](#) and [Mobile Camera Module Comparison](#).

Status of the Camera Module Industry report provides up-to-date market data on key CCM metrics and dynamics including revenue forecast, volume shipment and component share, as well as market

share with detailed breakdown by player. In addition, this analysis is offering an in-depth understanding of the competitive landscape with the CCM value chain, infrastructure and players.

System Plus Consulting proposes an impressive comparative study with solid insights on the structure and the technology of 28 CCMs extracted from seven flagship smartphones from several major brands: the Apple iPhone X/XS Max/XR, Samsung Galaxy S9 Plus, Huawei P20 Pro, Huawei Mate 20 Pro, Xiaomi Mi8 Explorer Edition, Oppo Find X and Vivo X21UD. The team detail the main OEM’s choices and reveal in this report, state of the art of camera modules for leading flagships in 2018.

<sup>1</sup> CCM : CMOS Camera Module  
<sup>2</sup> CAGR : Compound Annual Growth Rate

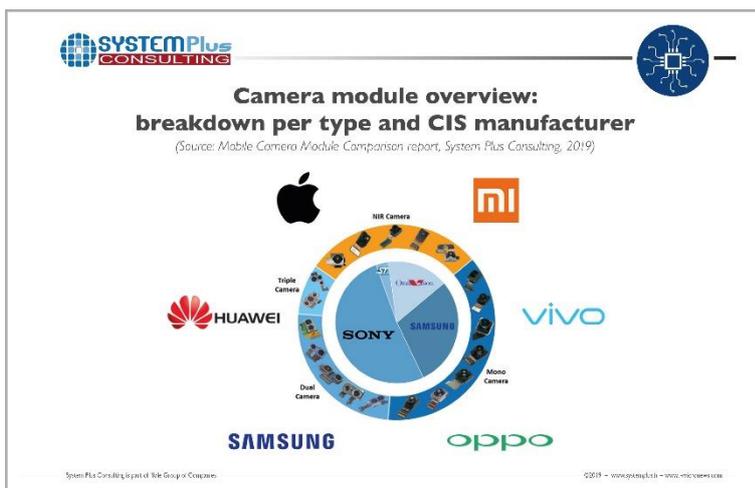
What are the CCM market drivers? How is the CCM ecosystem organized? How do players collaborate together? What are their technology choices? System Plus Consulting and Yole analysts propose today a relevant snapshot of this industry.

*“The main upward driver is the increasing number of cameras in products such as smartphones and cars,”* asserts Pierre Cambou from Yole. 3D sensing cameras are part of this trend, invading mobile devices, computing and automotive industries.

If the nature of camera module making is unchanged with 3D sensing, illuminator submodules create a new market area. This brings new technologies, such as WLO<sup>3</sup>, along with it. The market for devices involved in illumination for 3D sensing accounted for US\$720 million in 2018 and will expand ninefold within five years, reaching US\$6.1 billion by 2024. This is helping compensate for the shipment volume slowdown in smartphones, computers, tablet and digital cameras.

While the complexity and cost of each individual camera is still increasing on average, reaching US\$5.5 per unit, Yole’s analysts point out now more diversity. In recent years the distribution of resolution, optical format and camera type was only heading towards uniformly high specifications. But in 2018 the smartphone market has evolved quite dramatically. In an attempt to work around the increasing cost of imaging, mid-range phones have been implementing 2 and 5Mp formats that were previously fading away.

*“This new equilibrium between volume, cost and specification is lowering Yole’s forecast with respect to the previous 2017 report, but overall the direction of the industry remains highly attractive”*, explains Pierre.



From her side, **Audrey Lahrach, Cost Analyst from System Plus Consulting** comments: *“The CCM ecosystem is extremely dynamic. Market has seen several innovations this year, especially within the smartphones industry.”*

The main one is the multiple camera approach, seen in multiple models. The average is around four cameras per smartphone, announces System Plus Consulting in its new Mobile Camera Module Comparison

report. Four years ago, only two cameras on average could be found in smartphone. Today this number has risen to four in the high end models in order to add other features such as face recognition, with

<sup>3</sup> WLO: Wafer Level Optics

infrared camera modules, in the front camera or to improve the zoom in the rear camera.

The second innovation is the generalization of OIS<sup>4</sup> on the rear CCM. And last, four out of seven smartphones analyzed by System Plus Consulting have 3D cameras for face recognition...

Under its comparison report, the reverse engineering company analyzes rear and front-facing CCMs including standard mono modules, dual modules, iris scanners, 3D camera modules and triple modules. It also compares them in terms of structure overview, module integration, lens numbers and dimensions, CIS resolution, pixel size and other parameters.

Yole and System Plus Consulting propose today a comprehensive overview of the CCM industry and understand the technical choices made the leading smartphones manufacturers. Full description of both reports is available on [i-micronews.com, imaging reports section](https://www.i-micronews.com/imaging-reports-section).

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<sup>4</sup> OIS : Optical Image Stabilization

**ABOUT THE REPORTS:**[Status of the Camera Module Industry 2019 – Focus on Wafer Level Optics](#)

CMOS Camera Modules (CCM) have become a key sensor technology – what are the dynamics and strategies in this highly competitive market? - Produced by Yole Développement

**Companies cited in the report:**

AAC Technologies, Ability Opto, AGC, Alps, Apple, Asia Optical, Brigates, BYD Microelectronics, Calin Technology, Cammsys, Cha Diostech, Chicony, Continental, Cowell Optics, Cresyn, Crystal-Optech, Ddk, DJI, Foxconn, Fujifilm, Fujinon, Fujitsu, Galaxycore, Genius Optical, Google, Gopro, Haesung Optics, Himax, Hirose, Hoya, Huawei, IM, Intel, Jawah, JSR, Kantatsu, Kinko Optical, Kolen, Kyocera, Largan, Lenovo, LG Innotek, Liteon, and more ...

**Authors:**

- **Pierre Cambou** has been part of the imaging industry since 1999. He first took several positions at Thomson TCS, which became Atmel Grenoble in 2001 and e2v Semiconductors in 2006. In 2012 Pierre founded Vence Innovation, later renamed Irlynx, to bring to market an infrared sensor technology for smart environments and interactions. He has an Engineering degree from Université de Technologie de Compiègne and a Master of Science from Virginia Tech. Pierre also graduated with an MBA from Grenoble Ecole de Management. In 2014 he joined Yole Développement as Imaging Activity Leader.
- Since 1966 **Jean-Luc Jaffard** has made invaluable contributions to imaging activity at STMicroelectronics, working at the forefront of this business's emergence and impressive growth. At STMicroelectronics' Imaging Division, Jean-Luc was appointed Research Development and Innovation Director, managing a large multidisciplinary/multicultural team. Soon after, he was promoted to Deputy General Manager and Advanced Technology Director, in charge of identifying and developing breakthrough imaging technologies and transforming them into innovative, profitable products. In 2010 he was appointed STMicroelectronics' Intellectual Property Business Unit Director, and in January 2014 he created Red Belt Conseil's Technology and Innovation branch.

[Mobile Camera Module Comparison 2019](#)

Physical analysis and cost comparison of seven leading flagship smartphone cameras: Apple iPhone X/XS Max/XR, Samsung Galaxy S9 Plus, Huawei Mate 20 Pro and P20 Pro, Xiaomi Mi8 Explorer Edition, Oppo Find X and Vivo X21UD – Produced by System Plus Consulting

**Authors:**

- **Audrey Lahrach** is in charge of costing analyses for IC, LCD & OLED Displays and Sensor Devices. She holds a Master degree in Microelectronics from the University of Nantes.
- **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, and previously worked for four years for chemistry, mechanical and mass metrology laboratories

**ABOUT YOLE GROUP OF COMPANIES**

**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](http://www.systemplus.fr) and on [LinkedIn](#) and [Twitter](#).

Founded in 1998, Yole Développement 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 and image sensors, Compound Semiconductors, RF Electronics, Solid-state lighting, Displays, software, Optoelectronics, Microfluidics & Medical,

Advanced Packaging, Manufacturing, Nanomaterials, Power Electronics and Batteries & Energy Management.

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](#).

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