Press Release
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LYON, France

Radar industry: Yole announces major transformations[1]

OUTLINES:

- Significant growth for an already large market: the radar market is expected to show a 5% CAGR[2] between 2019 and 2025.
- COVID-19 pandemic will have a strong effect in 2020: the automotive segment will be the most impacted…
- Military and automotive applications: Yole Développement underlines the emergence of a strong emphasis on signal processing and computing.
- One of the most game-changing evolutions is the potential acceptance of radar for HMIs[3].
- Each market segment, military, automotive… has its own ecosystem.

"We saw drastic changes for the radar industry in the past decade," asserts **Cédric Malaquin, Technology & Market Analyst, RF Devices & Technology at Yole Développement (Yole)**. *"And today radar is a mandatory tool in a variety of applications. In the military field, the need for improved survivability, low probability of intercept and longer detection range has oriented the industry towards active antenna arrays using solid state technologies".* Indeed, the possibility to use more integrated and lighter devices together with the advanced capabilities offered by multiple beam shaping and steering, for example, motivated the transition from vacuum tubes to solid state solutions.

In this context, Yole Group of Companies, including Yole Développement and System Plus Consulting deeply investigates the radar technologies and related industries and proposes today a comprehensive collection of dedicated technology, market and reverse engineering & costing reports. Both companies combine their expertise to deliver a relevant and up-to-date picture of this industry.
The market research & strategy consulting company Yole releases its new technology & market analysis: Status of the Radar Industry: players, applications and technology trends 2020 report. In this study, analysts propose a deep understanding of the radar industry, including automotive radar market forecast extended to in-cabin occupancy detection, along with

[1] Extracted from :
- Status of the Radar Industry: players, applications and technology trends 2020 report, Yole Développement
- Smartphone Camera Module Comparison 2020 Vol. 1, System Plus Consulting
- RF Front-End Module Comparison 2020 – Volume 2, System Plus Consulting

[2] CAGR : Compound Annual Growth Rate
[3] HMI : Human Machine Interface

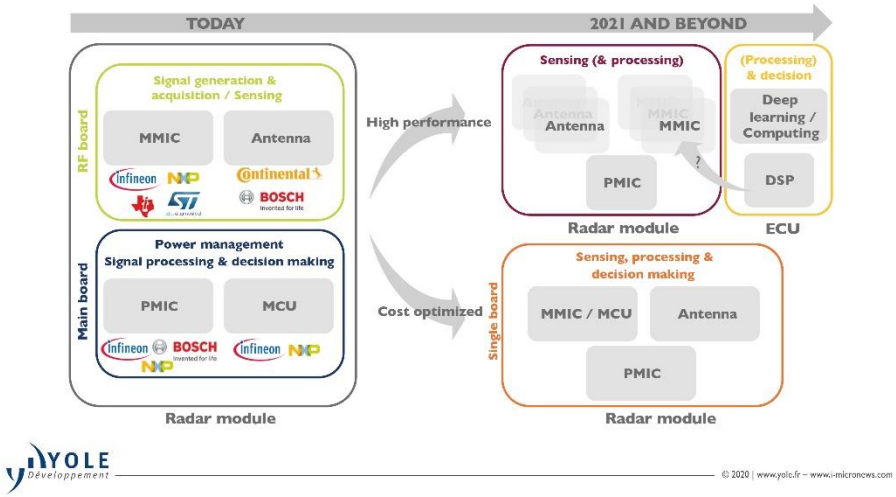
automotive radar imaging, defense, security and aerospace, industrial, consumer and medical market forecasts. This new report also points out market and technology trends, supply chain and market share per segment.
In addition, System Plus Consulting proposes a special focus on a selection of key radar solutions developed by the leading companies, MediaTek andTexas Instruments: Mediatek Autus R10 (MT2706) 77/79 GHz eWLB/AiP Radar Chipset and Texas Instruments AWR1843AoP 7779 GHz Radar Chipset. And more reverse engineering and costing analyses are available here.
What is the status of the radar industry? How will the market evolve? Who are the players? Who are the key suppliers to watch, and what technologies do they provide? What are the technical challenges? Yole and System Plus Consulting present today their vision of the radar industry.

As analyzed by Yole's team in the new Status of the Radar Industry: players, applications and technology trends 2020 report, radars for automotive applications have now become standard equipment. Regarding the major incoming transformations, and following more stringent test scenarios, two trends are emerging, explain Yole's analysts in this 2020 report:

- One consists of moving forward with imaging radar capable of more accurately describing the scene in front of and around the car.
- The other is to increase the number of sensors around the car and coordinate it to improve scene perception.

The central position of radar processing

(Source: Status of the Radar industry: Players, Applications and Technology Trends 2020 report, Yole Développement, 2020)



In both cases, a strong emphasis on signal processing and computing is emerging, while cost issues particularly matter in automotive. Multiple questions have been raised about where to

move the signal processing and how better to exploit radar sensor inputs. This will likely contribute to a major transformation of the automotive radar industry.

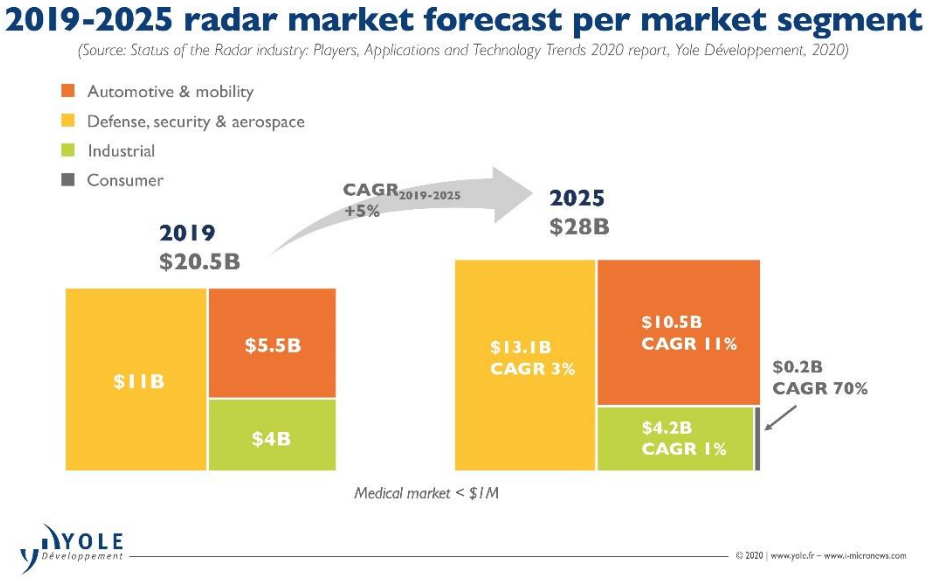
For **Antoine Bonnabel, Technology & Market Analyst for the Power & Wireless at Yole**: *"Nevertheless, one of the most game-changing evolutions is the potential acceptance of radar for HMIs through penetration in consumer electronics, where cost, integration and resolution are most challenging. Here again, this asks a lot of computing and software".*

All these factors have induced strong technological changes in this market that was slow paced several years ago.

According to Yole's analysts, prior to automotive penetration, the radar industry was a huge, mature market. But today, it is expected to show a 5% CAGR between 2019 and 2025. This is high given its large size and formerly slow growth.

Defense is the 1st radar market. It has been and will be steady year over year. And today it represents more than half of the total radar market. Yole's analysts announce a moderate 3% CAGR between 2019 and 2025. This is in line with its mature dynamics and nations' budget constraints.

On the other hand, the automotive market is expected to grow at an 11% CAGR, and the consumer market at up to 70% CAGR. *"Automotive radar market growth has been impressive in the last decade and will pursue up to 2025 with the trend toward ADAS and HAD,"* details **Cédric Malaquin from Yole**.



This growth is due to the recent development of radar for the automotive market, and the nascent nature of consumer applications. These two fast moving markets are the radar industry's growth drivers. The industrial radar market will suffer a decline at first. Nevertheless, new demand coming from building automation will dampen the losses and

actually result in a 1% CAGR during the 2019-2025 period. The medical market is still in the incubation stage.

In this dynamic industry, many actors are strongly involved and propose innovative solutions. System Plus Consulting identified for example, Mediatek and its Autus R10 (MT2706) 77/79 GHz eWLB/AiP Radar Chipset and Texas Instrument with its AWR1843AoP 77/79 GHz Radar Chipset. The company proposes today significant reverse engineering and costing analyses dedicated to both RF electronics modules.
The Texas Instruments AWR1843AoP 77/79 GHz Radar Chipset is the world's first 76-81 GHz automotive single-chip radar, announces System Plus Consulting. It is a SoC[4] device with integrated AoP[5]. Last year, the leading company entered the radar chipset market with the first highly-integrated radar sensor chip, the AWR1642. Unlike its competitors, Texas Instruments chose to integrate more than just a transmitter, receiver and local oscillator on the same SoC by adding a MCU[6] and a DSP[7].
Stéphane Elisabeth, Expert Cost Analyst in RF, Sensors and Advanced Packaging at System Plus Consulting asserts: *"This year, Texas Instruments is trying to keep ahead of its competitors by upgrading its previous chip with an integrated AoP in the AWR1843AoP".* More information about this analysis is available here.

Both companies, Yole Développement and System Plus Consulting are pleased to announce a dedicated radar online event taken place on June 4th: The Radar Industry is Entering its Commercial Era.
For many years, the radar market was limited to small-volume production for defense and high-end industrial applications, each with its own dedicated ecosystem. However, over the last decade this has started to change. Register today! In addition, throughout the year, Yole Développement and System Plus Consulting publish numerous power and wireless-related reports including the radar ones. Make sure to be aware of the latest news coming from the industry and get an overview of our activities, including interviews with leading companies and more. Stay tuned!

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[4] SoC : System-on-Chip
[5] AoP : Antenna-on-Package
[6] MCU : Microcontroller Unit
[7] DSP : Digital Signal Processor

About our analysts

As a Technology & Market Analyst, specialized in RF devices & technologies within the Power & Wireless division at Yole Développement (Yole), **Cédric Malaquin** is involved in the development of technology & market reports as well as the production of custom consulting projects. Prior his mission at Yole, Cédric first served Soitec as a process integration engineer during 9 years, then as an electrical characterization engineer during 6 years. He deeply contributed to FDSOI and RFSOI products characterization. He has also authored or co-authored three patents and five international publications in the semiconductor field. Cédric graduated from Polytech Lille in France with an engineering degree in microelectronics and material sciences.

Antoine Bonnabel works as a Technology & Market Analyst for the Power & Wireless team of Yole Développement (Yole). He carries out technical, marketing and strategic analyses focused on RF devices, related technologies and markets. Prior to Yole, Antoine was R&D Program Manager for DelfMEMS (FR), a company specializing in RF switches and supervised Intellectual Property and Business Intelligence activities of this company. In addition, he also has co-authored several market reports and is co-inventor of three patents in RF MEMS design. Antoine holds a M.Sc. in Microelectronics from Grenoble Institute of Technologies (France) and a M.Sc. in Management from Grenoble Graduate School of Business (France).

Stéphane Elisabeth, PhD has joined System Plus Consulting's team in 2016. Stéphane is Expert Cost Analyst in RF, Sensors and Advanced Packaging. He has a deep knowledge of materials characterizations and electronics systems. He holds an Engineering Degree in Electronics and Numerical Technology, and a PhD in Materials for Microelectronics.

About the reports

Status of the Radar Industry: players, applications and technology trends 2020

Worth more than $20B in 2019, the radar industry is experiencing a major transformation prior to entering the commercial era – Performed by Yole Développement

Companies cited:

ABB, Acconeer, Acura, Ainstein, Airbus Defense Group, Alfa Romeo, Alps Electric, Apollo, Aptiv, Astyx, Autoroad, Audi, BAE systems, BAIC, Baumer, Baron, BAW, BMW, Boeing, Bosch, Bugatti, Caterpillar, CETC, ChengTech, Chevrolet, Chery, Chrysler, Continental, Cruise, DongFeng, EEC, Fiat, FLIR, Ford, Furukawa Electric, Geely, General Atomics, GM, GlobalFoundries, GMC, Google, Great Wall, Hexagon, Hitachi, Honda, Honeywell, Huawei, Hyundai, Hyundai MOBIS, IEE, IDT, IMSemi, IMS Systems, IMST, InnoSent, Infineon, Infinity, Intel, Jaguar, Jeep, JRC, Kia, Kiwi, Knowles, Leonardo, Lexus, LG Innotek, Lincoln, MediaTek, Mercedes, MicroChip, Mini, Mitsubishi, Mitsubishi Electric, Mobil Eye, Nanoradar, NavTech Radar, Nissan, Nuro, Nvidia, NXP, Oculii, Omniradar, ON Semiconductor, Panasonic, Peugeot, Porsche, Qorvo, Qualcomm, Radiometrics, Range Rover, Renault, Saab, Sakura Tech, Samsung, SAIC, SEAT, Siemens, Silicon Radar, Sixth Sensor, Skyworks, Skoda, Smart Radar System, Socionext, SpaceEyes, Starship, Starsky, STMicroelectronics, Subaru, Sumitomo Electric, Symeo, Terma, Tesla, Texas Instruments, Tata, Thales, TomTom, Toshiba, Toyota, Tower Semiconductor, TSMC, TTTech, TU Simple, Uber, Umbra, United Monolithic Semiconductors, Valeo, Vaisala, Vayyar,Veoneer, Volkswagen, Volvo, Waymo, XeThru, Xilinx, Zendar, Zenuity, ZF-TRW, Zoox, and many more…

RF Front-End Module Comparison 2020 – Volume 2

Technical and cost overview of Huawei's Mate and P series Radio Frequency Front-End Module technologies from 2015 to 2019. – Performed by System Plus Consulting.

Smartphone Camera Module Comparison 2020 Vol. I

Overview of the latest flagship smartphone cameras released in 2019 with detailed technical and cost analyses of the Huawei P30 Pro, Samsung Galaxy S10 5G/S10+ and Apple iPhone 11 Pro. - Performed by System Plus Consulting.

Related reports:

- Sensing and Computing for ADAS Vehicle 2020

- Artificial Intelligence Computing for Automotive 2020
- Mediatek Autus R10 (MT2706) 77/79 GHz eWLB/AiP Radar Chipset
- Texas Instruments AWR1843AoP 7779 GHz Radar Chipset

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… More

About Yole Développement

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… More

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