SMART Transportation Forum

How next generation cars will impact the automotive industry?

P. Boulay
Yole Développement, Villeurbanne, France

Abstract

A vision shared by OEMs and Tier-1s is that next generation of cars will be more and more electric, autonomous and connected. To achieve these goals, automotive players will have to work on the electrification of vehicles that can be hybrid or 100% electric. They will also have to develop and integrate sensors like radars, cameras and LiDARs to increase the level of autonomy. Cars will be increasingly connected meaning that more and more software and AI will be needed as well as technology to connect cars to their environment.

Stricter emission regulations, lower battery costs, and increasing consumer acceptance will create new and strong momentum for penetration of electrified vehicles in the coming years. The speed of adoption will be determined by the interaction of consumer pull and regulatory push, which will vary strongly at the regional and local level.

The autonomous trend is pushed by the development of sensors to monitor the surroundings of the vehicle. To do that, sensors are continuously developed to increase resolution, frame rate and dynamic range for cameras. Radar manufacturers have also released products from short-range to long-range detection and new entrants are working on 4D radars to increase the level of resolution. Finally, the interest into LiDAR sensors is continuously increasing with different technologies being pushed by manufacturers.

Finally all these sensors will need higher level of computation as the amount of data generated will boom in the next years. Therefore, the artificial intelligence is slowly but surely invading the automotive ecosystem through autonomous cars and infotainment applications/systems. On the connectivity side, V2X, pushed by the development of 4G/5G-based cellular communication, provides direct communication from the car to other vehicles and infrastructure, and does not involve network operators in the process.

Biography

As part of the Photonics, Sensing & Display division at Yole Développement (Yole), Pierrick Boulay works as Market and Technology Analyst in the fields of Solid State Lighting and Lighting Systems to carry out technical, economic and marketing analysis. Pierrick has authored several reports and custom analysis dedicated to topics such as general lighting, automotive lighting, LiDAR, IR LEDs, UV LEDs and VCSELs. Prior to Yole, Pierrick has worked in several companies where he developed his knowledge on general lighting and on automotive lighting. In the past, he has mostly worked in R&D department for LED lighting applications. Pierrick holds a master degree in Electronics (ESEO – Angers, France).

Trends in Automotive: Fab Inspection and Metrology Changing Role in “Zero Defect”

O. Donzella
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KLA Corporation, San Francisco, United States

Abstract

Semiconductor fabs have historically used inspection and metrology equipment for yield learning – to monitor individual process tools for excursions and to assure that their manufacturing processes stay in control to maximize productivity. The increasing semiconductor content in automobiles, driven by growth in ADAS, electrification and autonomy, has put a growing focus on the quality and reliability of these devices and their implications for consumer safety and satisfaction.

This push for better reliability is embodied in the industry’s Zero Defect initiative, as car manufacturers drive semiconductor DPPM requirements for their chip suppliers below 1PPM. More than half of the semiconductor failures that occur on the automotive assembly line today (so-called 0km failures) have their origin in semiconductor fab defectivity. To successfully meet their customers’ reliability goals, fabs across the full range of design rules and device types are looking at their inspection and metrology data in a fresh light. Not only are they using their process control tools to do a better job of reducing overall sources of defectivity, they are also looking to the data to help disposition individual die, removing high-risk defective die from the supply chain.

In this keynote, KLA will update some of these industry trends and some of the exciting steps forward in quality and reliability made possible by these novel methods.

Biography

Oreste Donzella serves as Sr. Vice President and Chief Marketing Officer at KLA Corporation.

In his current position, Oreste is responsible for corporate communications, market analytics, customer technology roadmap and semiconductor ecosystem collaborations. In addition to his CMO responsibilities, he is also in charge of automotive solutions and collaborations, the ICOS division and back-end packaging initiatives.

Prior to his current role, Oreste led the world-wide field applications engineering team, and was responsible for Customer Engagement projects and product portfolio optimization for wafer inspection platforms at KLA.

Previously, Oreste was Vice President and General Manager of the Surfscan and SWIFT divisions at KLA-Tencor. In these positions, Oreste was responsible for the unpatterned wafer inspection, wafer geometry, and macro inspection business, overseeing new products development, sales, and marketing activities, customer support, and ultimately, division financial performance (P&L).

Oreste brings 25+ years of experience in the semiconductor industry. Prior to joining KLA in 1999, he spent more than six years at Texas Instruments and Micron Technology, holding engineering and management positions in the process integration and yield enhancement departments.

A new collaborative approach to defectivity challenges in the automotive industry

A. Amade
Senior Regional Director EMEA
Entegris SAS, Global Sales, Moirans, France

Abstract
By 2030, 50% of the automotive costs are expected to be electronics related with the advent of driver assistance and automation technologies. Reaching new levels of automotive innovation poses a new challenge to the industry -reaching the ppb level in failure rate at the component level.

The solution is in collaboration.

The purity and performance of materials will play a key role in reducing latent defects. Non-visible “black box” contamination, which can be missed by the installed metrology tools, have the potential to negatively impact the reliability of the semiconductor chips later in the life of the automobile. If the industry wants to reach the goal of “zero defects,” a new collaborative approach is necessary.

The semiconductor industry is here in the 3rd generation of the contamination control strategy where baseline and excursion control could be improved with an adequate particle and metal ion management strategy focused on materials. Besides the obvious options of filtration and purification, there is a vast list of potential solutions with the challenge to identify the ones that are the most impactful to yield and defectivity. Based on benchmark, case studies, technical meetings and process reviews, this approach is practical and cost effective to implement. A collaborative engagement model exists where device makers and material purity experts work together in task force mode to build the capabilities required to enable the reliable electrification, connectivity and automation of transportation ecosystem. This is the “New Collaborative Approach”.

Biography
Mr. Amade joined Entegris in 1995 as an Application Engineer in its Semiconductor business. In his current role as EMEA Sr. Regional Director, Mr. Amade’s primary responsibilities include growing the semiconductor business in Europe and Middle East through market strategies, and in the management of a sales, customer service and marketing team.

Mr. Amade held leadership positions at Entegris which included: gas microcontamination market management, strategical account management and regional sales management.

Mr. Amade has a degree in Chemical Engineering from ENS Chimie Lille and he is a member of Semi Electronic Materials Group and of the Global Automotive Advisory Council for Europe.

What you should expect from Smart Manufacturing/Industry 4.0

J. R. Behnke
General Manager Final Phase Systems
Inficon, Austin, TX, United States

Abstract
The Smart Manufacturing/Industry 4.0 revolution is underway and already driving changes throughout the supply chain. A comprehensive Digital Twin of a factory is the backbone of this initiative and can deliver significant improvement in classic factory Key Performance Indicators including Cycle Time, On-Time-Delivery, Overall Equipment Effectiveness, and Cost.

Another aspect of Smart Manufacturing/Industry 4.0 is its enablement of new capabilities which can improve the fundamental quality of products as well. These “quality centric” capabilities are key to meeting the quality levels expected by the Automotive Industry to support the deployment of autonomous driving vehicles.
This talk will provide an overview of existing, in development, and future Smart Manufacturing/Industry 4.0 solutions for the Semi Industry and their impact on the Automotive Supply Chain.

Biography
John R Behnke
GM Final Phase Systems
An INFICON Product Line

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Mr. Behnke has 35 years of semiconductor industry experience including: logic and memory manufacturing, technology/product development and fab operational excellence. As the GM of Final Phase Systems an INFICON Product Line, John leads a team that develop and deploy SMART software solutions that enable fabs to improve their manufacturing efficiency. FPS’s suite of software solutions are built upon a common Datawarehouse which enables advanced Fab Scheduling and optimized WIP movement as well as other related capabilities. He is also a Co-Chair of the Semi North America Smart Manufacturing Special Interest Group.
Prior to FPS John served as the CEO and President of Novati Technologies, the SVP and GM of the Semiconductor Group of Intermolecular, the CVP for Front End Manufacturing, Process R&D and Technology Transfers at Spansion and the Director of AMD’s Fab 25’s Engineering and Operations groups where he was a founding member of AMD’s Automated Precision Manufacturing (APM) initiative which led the Semiconductor industry’s development and use of APC and other advanced factory systems. He also led the successful conversion of Fab 25 from Logic to Flash memory which was enabled through the virtual automation of the fab.
Mr. Behnke earned a B.S. degree in Mechanical Engineering with an Industrial Engineering Minor from Marquette University. Mr. Behnke holds five U.S. patents.