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MARCH/APRIL 2020

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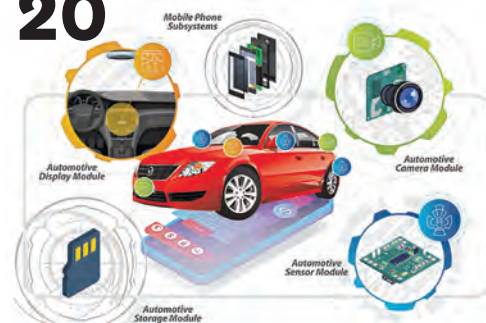
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# Coronavirus outbreak: impact rips ecosystem

*Most electronic players use manufacturing hubs in China*



A black cloud of uncertainty hangs over the global electronics industry, as the novel coronavirus crisis continues (at presstime) to negatively weave its way through all aspects of the ecosystem.

It's a well-known fact that companies around the world rely on China to supply electronic parts, partially assembled goods and finished products to OEMs. Needless to say, high-tech companies here at home have been keeping a close eye on the impact to their supply lines, as the superbug continues to spread. Its impact on manufacturing facilities continues to reverberate – thus, if one component or electronic assembly of a larger design is missing or is in short supply, it can halt production entirely. As a result, many firms that build hardware or physical products have been forced into emergency mode.

During the onset of the crisis several technology companies were quick to impose travel restrictions to and from China. Temporary office and factory closures in the Asian nation have definitely had an impact on the product offerings and development initiatives targeted within its own domestic audience. These closures certainly pack a much larger wallop on new product releases and the roadmap for technology giants relying so heavily on China.

## NPI production delays

According to industry pundits, it will likely have a direct impact on products destined for delivery during the 2020 holiday season. That's because electronics design firms work on new products in Chinese factories at the same time they are producing last year's products — a process referred to as new product introduction or 'NPI'.

Production schedules for these devices are already tight, and time is slipping away because the factories aren't open

and the supply chains aren't up and running.

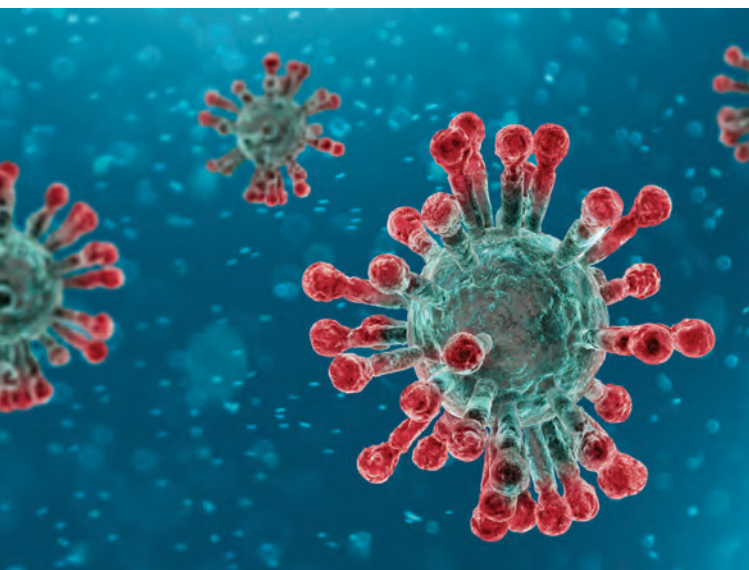
Creating a prototype of an electronic design on home turf using a local CEM or EMS player will likely not be the problem. However, after the engineering verification test build, where the major features and components are examined and corrected – that NPI design should be ready to 'ramp' or be produced in large quantities – most often in China. This process takes months, and a delay can slow down the entire development.

Its impact on such globally significant players as Apple speaks for itself. The American tech titan's reliance on the Chinese mainland for parts and assembly is unprecedented. Foxconn, which makes most of Apple's iPhones in China, could not get its assembly plants back to full capacity due to the coronavirus. Analysts anticipate that the viral strain could lead to Apple shipping 5-10% fewer iPhones – forcing the firm to scrap its plans to ramp up production of its popular AirPods.

A recent report from Reuters news agency stated that the coronavirus has significantly affected Foxconn, which was operating at only 50% capacity at the end of February, and expected to be at 80% capacity by the end of March.

It is increasingly clear that the coronavirus could cause unprecedented damage to global supply chains, costing the world's economy dearly. It appears that the economic impact of the outbreak will be dependent on how long coronavirus ultimately lasts. **EP&T**

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*The coronavirus has had a profoundly negative impact on industry.*

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# EP&T

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## AUTOMOTIVE

### APMA AIMS FOR ALL-CANADIAN, ZERO-EMISSIONS CAR DEMO



Canada's Automotive Parts Manufacturers Association (APMA) revealed plans for its next demonstration car at CES 2020 this year, a zero-emissions vehicle build exclusively from Canadian parts and technologies. Called Project Arrow, the fully-built one-off vehicle will be completed by 2022 in an effort to show-off the Canadian industry's cutting edge automotive expertise, according to the industry association.

"At the intersection of advanced mobility and climate change lies the challenge of our times. Future generations will ask if we ran faster or stretched out our arms farther. The Arrow will be remembered as the gauntlet we dropped in response to this call to action," said Flavio Volpe, President of the APMA.

The APMA says Project Arrow will offer Canadian universities and colleges the opportunity to submit concept ideas for the car to a design contest scheduled for summer 2020. In the fall of this year, suppliers will bid on the project, and a virtual concept is scheduled to debut next year. As yet, the APMA says no price limit has been placed on the demonstration car's development.

## TECH HUBS

### TECH INCUBATOR TO DRIVE MEDICAL DESIGNS

Medical Innovation Xchange (MIX), Canada's first industry-led hub for medtech startups, officially opened at its Kitchener ON headquarters. Aimed at retaining and scaling Canadian medical technology startups, MIX residents have a unique opportunity to retain ownership in early stages and succeed by leveraging resources to avoid early stage pitfalls and post-prototype growing pains.



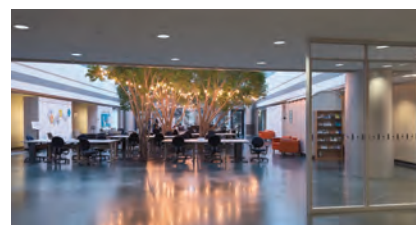
**Medical Innovation Xchange in Kitchener is Canada's first tech hub for medical technology start-ups.**

**Project Arrow aims to create an all-Canadian made zero-emissions automobile by 2022.**

MIX offers residents a place to engage in impactful dialogues with peers and strategic advisors. It also provides assistance navigating costs associated with legal / IP requirements, manufacturing prototypes and products eventually used to diagnose and treat humans and testing for compliance and medical trials. Too often, these costs overwhelm Canadian medtech startups and limit their ability to benefit from Canada's startup-friendly ecosystem and economy, where high-tech manufacturing and SMEs typically thrive.

Spearheaded by Intellijoint Surgical CEO Armen Bakirtzian, MIX joins the powerful community within the Toronto-Waterloo Innovation Corridor to provide Canadian medtech companies an environment to grow locally and go to market globally. Intellijoint Surgical specializes in developing and commercializing a new standard in miniature 3D measurement with its surgical smart tools.

### VENTURELAB WELCOMES BREAKTHROUGH TECH COMPANIES



ventureLAB, a leading technology hub located in York Region — Canada's second largest tech hub — identified the first cohort of companies in its Hardware Catalyst Initiative (HCI) and \$8 million in resources and mentorship from founding partners, including such tech players as AMD,

Synopsys, Microart Services, and ReMAP.

The HCI features a state-of-the-art 1,500 square foot lab with specialized equipment and Electronic Design Automation (EDA) toolsets, critical for manufacturing semiconductor, silicon, or advanced hardware-based solutions. The hardware equipment can cost millions of dollars per product, causing a major barrier to entry and making it difficult for startups to commercialize products. The HCI was born out of the need to access expensive tools, lab space, investment, and industry expertise.

"The Hardware Catalyst Initiative is our solution for emerging tech companies to become competitors in the global hardware economy, which generates \$7 trillion in economic activity," says Melissa Chee, President and CEO, ventureLAB. "Without this opportunity, it's extremely difficult for hardware and silicon startups to afford the barriers to entry. York Region's unmatched tech expertise will ensure that HCI participants have every opportunity to hone their skills, scale their operations, and commercialize their products globally."

## INDUSTRY 4.0

### CANADIAN MFG LAG IN IIOT ADOPTION

Manufacturers around the world are adopting Industry 4.0 technologies and integrating digital technologies that optimize their processes. But Canadian companies have not been quick to adopt advanced technologies, according to the 2020 Advanced Manufacturing survey of mostly small and medium-sized manufacturers.





Industry 4.0 focuses on automation, interconnectivity, machine learning and the analysis of real time data that involves the Internet of Things (IoT), the cloud, advanced computing and artificial intelligence.

The survey for BDO Canada LLP by PLANT Magazine/Annex Business Media looked at how 251 owners and senior executives view these technologies and probed their level of adoption. Many see the value of advanced technologies but are wary of costs and return on investment as they continue to apply more traditional manufacturing methods. They're also concerned that people with the skills necessary to make the most of digital technologies and networks are in too short supply. Challenges include data being complicated and requiring special knowledge, increased cybersecurity risks, and the massive investment needed to replace machinery.

#### SILICON DESIGN

### NUVIA OPENS OFFICE IN TORONTO

NUVIA Inc. a leading-edge silicon design company, will open its first international office in Markham ON, located northeast of Toronto. The new office is part of ventureLAB, a leading technology hub located in the York Region, Canada's second-largest tech cluster. The new office will accommodate as many as 30 employees with continued room for future expansion.

NUVIA also announced the hiring of Anthony Scarpino as senior director of software engineering and site leader for the Toronto office. Tony brings over 25 years of semiconductor industry experience, holding a variety of senior software positions at ATI and then AMD, focusing on open source, MacOS and Android platforms.

#### SATCOM

### ADVANTECH LANDS MAJOR ORDER OF MIL GRADE SATCOM TERMINALS

Advantech Wireless Technologies Inc., a wholly owned subsidiary of Toronto-based Baylin

Technologies Inc., has received over \$2-million in orders of its satellite communication terminals from a NATO member country.

"The products are advanced satellite terminals that include state of the art digital and RF technologies. These orders are part of a complex modernization program that this active NATO member and has been undergoing in the field since 2017," says Randy Dewey, Baylin Technologies' president and CEO.

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# Prairie drone innovator achieves new heights

Saskatchewan-based Draganfly buoyed by \$7M private placement. **BY SOHAIL KAMA**



Quickly rising from the prairies as an innovator of drone technology, Saskatchewan-based Draganfly Inc. is an award-winning, industry-leading systems developer within the commercial Unmanned Aerial Vehicle (UAV) and the Unmanned Vehicle Systems (UVS) space. The firm has helped shape how people do business, serving

Draganfly to scale its business to expand offerings, grow the engineering team, and follow up on research and development initiatives.

Perhaps more importantly, however, the funding comes at a really good time, according to Dragan. “Having an injection of capital comes at a time when the commercial drone space is at an inflection point with mass adop-

Despite its relative isolation in Saskatoon, it also served as a positive for Draganfly, as the large university provided critical talent for the growing company. Further to this, Dragan explains that being from Saskatchewan provides a number of geographic advantages, including “being able to learn and operate in large open areas. This has been extremely useful for the testing of



*Draganflyer Commander with Sequoia Camera.*



*Zenon Dragan, founder of Draganfly Inc.*

in the public safety space, agriculture, industrial inspections and mapping and surveying markets with the goal of saving time, money, and lives.

Draganfly was the first to commercialize a quadcopter, add commercial sensors to drones, while also creating the first six and eight bladed drones. If that isn't impressive enough, it was a Draganfly drone that became the first to be credited with saving a life.

Founded in 1998, West Coast Report took the opportunity to speak with original founder Zenon Dragan about the recent \$7M private placement. The financial infusion will allow

tion set to occur. [This] positively translates to providing our customers with broader and in some cases, more efficient solutions than before,” he says. They also recently became a publicly traded company and are listed on the Canadian Securities Exchange; US OTCQB Exchange; and the Frankfurt Stock Exchange.

our systems. Additionally, the university and many of the new technology companies are contributing to the increase in use cases for drone technology,” says Dragan. Being in Western Canada also positions Draganfly favourably with new partnership opportunities ranging from oil and gas exploration and environmental projects.

The founder never had dreams of building a giant company.

“I never set out for world domination when I started the company. Most people in the drone industry know who we are. In our geeky community, I'm a mini-celebrity. My aspiration was to be

profitable and build amazing, world changing stuff,” he explains. The team has succeeded perhaps without a strong emphasis on marketing, public relations, and broader distribution channels, which they are now benefitting from.

“For 20-years, we didn't even have a sign on the door. And, the door was locked. For myself, I want to invent, which is my passion. I love flying machines. This is why we now have great people to take us to the next level.”

The quadcopter was not a new concept when Dragan created his version of it, however, after flying conventional RC helicopters for many years, he points out that there definitely was an appeal to further develop a new kind of multi-rotor platform – which would be mechanically easier to build, and simpler and safer to operate.

In a way, this is what sets Draganfly apart. As pioneers, they had to make their own counter rotating blades. They had to work through reliability.

“Everything is so much easier now than back then, but we did it all from scratch, so that's why we have been so successful in our contract engineering and special projects,” explains Dragan.

Despite their first mover advantage, the company out of quiet Saskatchewan had to find ways to overcome obstacles.

“Funding the growth of a company in order to stay relevant in a changing industry is always a challenge. My suggestion is to choose investment partners who understand your business and have working knowledge of the markets you seek to grow within,” notes Dragan. “Choose partners who are smarter than you as they can contribute to your intellectual growth, and choose projects no matter how big or small that allow your area of expertise to shine.”

To learn more about Draganfly and their drones, go to [www.draganfly.com](http://www.draganfly.com). **EP&T**



*Sohail Kamal is EP&T's West Coast correspondent. [sohail@nextgear.ca](mailto:sohail@nextgear.ca)*



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# Environmental testing takes a front seat in automotive industry

*Emergence of autonomous vehicles further underscores the importance of proper reliability and ingress protection (IP) testing.*

BY EMTS LAB INC.



Since the introduction of first mass-produced car, the Ford Model-T, the automotive industry has witnessed a series of continuous technical breakthroughs and innovations. Starting with the improvements in engine and transmission technology to the incremental inclusion of sensors and electronics, cars have come a long way from the four wheels and a carriage they used to be.

Thanks to the fast-paced research and development undertaken by the world's largest automotive manufacturers, the dream of autonomous vehicles has materialized into reality.

## Modern car is comprised of sophisticated systems

Modern day cars are not exactly the simplistic mechanical metal-boxes which they appear to be at the first glance. Rather, under the hood, modern vehicles are quite sophisticated computer-assisted electromechanical systems.

A modern car can incorporate and orchestrate hundreds of distinct micro-processor units. Even basic vehicles have at least 30 of these micro-processor controller units, luxury cars can have as many as a 100. Apart from the micro-processor units, a typical car also includes an array of sensors and power electronic components. Examples of such electronic systems include the engine control system, alarm & immobilizer system, anti-lock braking system, automatic transmission system, automatic wiper control system, airbag control unit, and climate control system. The presence of these modern control systems makes an automobile

a continuous orchestration of communication between a network of sensors and controllers.

## Electronic subsystems in cars will only continue to grow

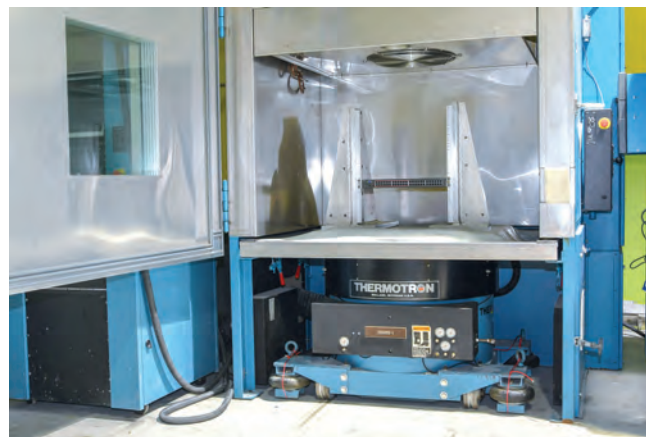
With the introduction of cutting-edge automotive technologies by manufacturers such as Tesla, General Motors and BMW, it is evident that the future of the automotive industry lies in autonomous vehicles. As time goes on and technology develops, we can expect the number of electronic subsystems in autonomous electric vehicles will continue to grow; not only that, but these systems will become more complex and integral to the basic function of the vehicle.

Autonomous vehicles depend heavily on camera systems, ultrasonic sensors and GPS in order to gain spatial and situational awareness. These cars need even more powerful processing power for the implementation of advanced AI and ML related algorithms. Other than the electronic systems, these advanced cars also need cutting edge power electronic converters, drives and batteries in order to squeeze maximum performance and efficiency out of the system; these advanced electric systems are part of the reason that electric and autonomous vehicles are technologically possible in the 21st century.

Reliability testing has been long set in the consumer automotive space, with auto manufacturers mandated to meet global and regional standards in order to certify products for sale.

## Ingress protection: A building block to future reliability

One of the most important durability



preparations for a manufacturer to do is to create a degree of resistance towards dust and liquids for the electronic components inside the car - this is called ingress protection (IP). The IP rating of an electrical or electronic enclosure refers to the degree of protection offered against external solids and liquids.

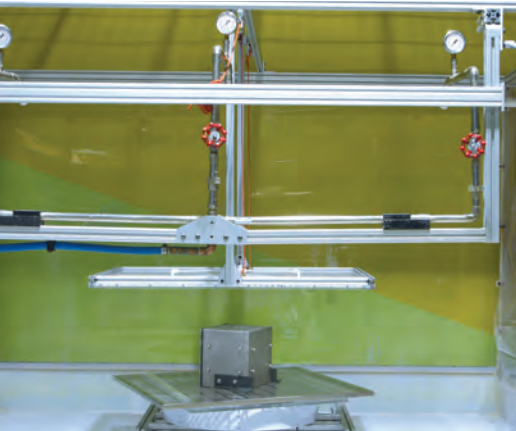
It is a well-known fact that moisture, liquids and dust particles can damage or corrode the electrical / electronic components. That's why products that are destined to be installed outside or used underwater carry an IP code that illustrates how protected against liquid and solid ingress they are.

In the automotive industry, manufacturers utilize IPX9 & IPX9K jet spray tests as dictated by IEC 60529 (Degrees of protection provided by enclosures) & ISO 20653 (Road vehicles — Degrees of protection). The IPX9/K series of tests subject samples to temperatures of almost 180°F and pressures of up to 1450PSI, the product is subjected to a tremendous amount of stress for those two





*Future vehicle technologies are growing rapidly, thus conducting proper testing of electronic systems are more critical than has been necessary in the past.*



minutes; rubber and plastic parts often deform during testing.

### Compliant with relevant codes

We've discussed how proactive environmental protection is critical for the safe and reliable operation of electrical and electronic systems. This is particularly true for the systems which are deployed outdoors as these systems are much more exposed to the elements of nature. Automobiles also fall under the category of outdoor machines and therefore require thorough testing and in greater intensity and scrutiny than ever before.

Cars and vehicles must have safety critical systems due to the human cargo they transport. Legally, it is the responsibility of the automotive manufacturers to ensure that all cars are compliant with all the safety related standards.

Automotive manufacturers perform a series of tests on their cars in order to make sure that these vehicles are compliant with relevant codes and pass the set performance criterion. Some common automo-

tive tests include:

**Corrosion and durability testing:** In the past few years, cyclic corrosion testing has become a common practice in the automotive industry. Cyclic corrosion testing allows manufacturers to accelerate the corrosion process & evaluate how their products will react to conditions found on the weather, input and road condition. In a cyclic corrosion test, a sample is exposed to repeating cycles of humidity, salt fog and drying cycles, accelerating the natural corrosion processes found on the road. Common automotive corrosion testing standards include ISO 16151 (corrosion of metals & alloys), ASTM B117 (operating salt spray) & SAE J2334 (laboratory cyclic corrosion test).

**Temperature and humidity testing:** These tests are conducted on the vehicle in order to test the resistance of electronic systems against the adverse effects of both temperature and humidity. Automotive manufacturers also test products to endure rapid changes in temperature: for example, an electronics enclosure that cracks when rapidly changing temperature might not be well suited to operation in extremely cold areas where drivers park underground. Similarly, excessive moisture can also condense, block sensors and undermine the operation of the system. Common automotive temperature testing standards include IEC 60068-2-1 (low temperature wakeup), ISO 16750-4 (high temperature degradation), & IEC 60068-2-64 (vibration with thermal cycling)

**Vibration testing:** Vibration testing & mechanical shock help evaluate automotive products for structural soundness and overall reliability. A lab can subject a material sample to sine vibration testing, random vibration testing or both. Such testing helps simulate the conditions of the road

— such as a vehicle running over a potholed road. Such vibrations can disrupt both mechanical and electric systems of a car. Common vibration testing standards include GM 3172 (general specification electrical function), SAE J1211 (robustness validation of automotive electrical/electronic modules), & ISO 16750 (road vehicles—environmental conditions and electrical testing)

### Future of automotive test

Safety is one of the foremost considerations during the design and development of any kind of machine or system. Future vehicle technologies are rapidly growing but still nascent, making proper testing of electronic systems more critical than has been necessary in the past. As technologies are developed it is up to manufacturers and standards authors to come to consensus on the best way to protect consumers in consumer automotive vehicles.

As the automotive industry moves towards increased adoption of autonomous vehicles, the dependence on electronic systems will continue to grow and expand. This means that the future cars will continue to utilize increasingly complex & numerous electronic/electrical systems.

On one hand the autonomous cars eliminate the room for human error and negligence. On the other hand, autonomous vehicles are susceptible to bugs, errors and glitches which can lead to disastrous results. As a direct effect, environmental durability testing, such as ingress protection, vibration testing, corrosion testing & temperature testing will come to the forefront of consumer awareness.

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IPX9K	(14 to16) L/min	0°, 30°, 60°, 90°	(5 +/-1) r/min	30 seconds per position	100 to 180	(80 +/-5)°C	approx (8,000 to 10,000 kPa (pressure)

**Table of IPX9/9K comparison and parameters**



# How premium electric motorcycles could redefine transportation space?

BY GLOBAL MARKET INSIGHTS INC.

➔ Mounting environmental concern has led to a fierce race among OEMs to produce and develop electric vehicles, fueled by both government initiatives and customer demand. Concepts such as 'go green' through premium electric motorcycles are likely to attract more customers as governments globally adopt rigorous carbon emission standards. Some of the factors such as fluctuation of gas prices, environmental concerns, and depletion of oil reserves are set to transpire into demand growth for premium electric motorcycles.

Revelation of instantaneous power delivery, innovative technologies and lightweight cells have triggered profound interest among OEMs with droves of companies, engineers and developers coming to the fore of premium electric motorcycle landscape. Prominent companies sharpening their strategies for premium electric bikes have attributed premium motorcycles' features such as enhanced speed, more power, maximum torque, aesthetic appeal and highest travelling range to attract the potential customers.

Industry players believe the emergence of lithium-ion

(Li-ion) has redefined premium electric motorcycle industry outlook. Palpable traction towards Li-ion batteries has come against the backdrop of innate characteristics of the batteries to bolster the overall performance of the vehicles by reducing maintenance requirements and improving range.

The impetus to embrace premium electric motorcycle comes in the wake of growing traction for sport premium electric motorcycles. Leading companies are updating their throttle control and introducing new traction control. Energica Motor Company, an Italian manufacturer of electric motorcycles popular as a premium manufacturer of high power electric sport motorcycles, revealed a slew of updates to their model line of 2019 Energica electric motorcycle.

## **Bike makers up their game**

For instance, the company introduced Energica Ego Sport Black that is apparently akin to actual racing bikes. Seemingly, the Energica Ego Sport Black soars to 150mph and has a 107kW motor with 200Nm of torque. Prominently, the company has included charging upgrades and heated hand grips to its 2019 models.

With soaring aspiration for luxury brands and changing lifestyles, OEMs are leaving no stone unturned to expand their product portfolios as pursuit of environmentally-friendly alternatives gains momentum. Harley Davidson revealed prototypes of two of its new electric bikes at the 2019 EICMA Motorcycle show in Milan that is touted to go on sale in 2020.

Notably, Harley Davidson motorcycle (LiveWire) has garnered interest among end-use consumers in light of its potent electric motor and supposedly sleek bodywork. It is believed that the livewire motorcycle has aerodynamic panels, sporty appearance with 15.5KWh battery and has a top speed of 95 mph.

Vancouver-based Damon Motorcycles recently debuted its fully electric, 4G-connected bike at CES 2020 in Las Vegas. It is the expressed mission of Damon founder & CEO Jay Giraud to cause a paradigm shift for safer, smarter motorcycling. The firm's latest introduction is the Hyper-sport Pro, which comes equipped with CoPilot technology. Not a self-riding motorbike, but rather a bike that reads the roads via the same blend of sensors, cameras and radar you will find in cars with active safety tech. So far, Damon is the only manufacturer dedicating itself to technology that proactively reduces the risk of accidents.

US-based Zero Motorcycles has released its sophisticated model SR – expanding its product portfolio from Zero Dual Sports (DS) bikes. Zero has been dubbed 'Tesla of motorcycles' and it is worth mentioning that SR has 223 mile range, 458 pound curb weight with 102 mph speed. Prominently, the electric motorcycle has 14.4 kWh battery and a cycle charge time of 2.5 hours.

KTM, an Austrian sports car

maker, is working with Bajaj to bring premium electric bike to the fore. The electric vehicle will have output ranging from 3kW to 10kW. Both the companies will co-develop a 48-volt electric platform that will be used for electric scooters.

The Austrian sports car manufacturer has developed KTM SX-E 5 that has an electric motor fueled by lithium-ion battery pack, with relevance given to maximum protection and safety. The electric motorcycle has premium disc brakes, tapered aluminum handlebars and race ergonomics.

## **Premium vehicles**

Amidst OEMs rushing to produce the most marketable premium electric vehicles, they are looking for ways to put a brake or decrease the so-called high purchasing price. Several governments have come to the rescue by offering special incentive programs on taxes and purchase price.

Prominent companies rolling out state-of-the-art motorcycles are expected to alleviate gridlock put forth by congestion and pollution. Implementation of emission and safety norms have triggered demand for premium electric motorcycles. Increased traction for sports premium electric motorcycles has been attributed as the main driver that has led for roll outs at massive scale.

With electric bikes touted to be the future of transportation, premium electric motorcycle industry revenue is anticipated to scale to new heights. Indeed, new regulations and consumer demand for sports premium electric motorcycle will influence the marketability of innovations in the industry landscape. **EP&T**

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BC-based Damon Motors seeks to create safer, smarter motorcycles.



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# Next Gen avionics: from aircraft to spaceship

*High data speeds, miniaturization and improved functionality place new demands on connectivity & infrastructure.* **BY ASTUTE ELECTRONICS LTD.**



Aviation's reliance on data to make critical flying decisions increases year on year.

The latest aircraft designs now entering fleets are equipped with technologies that can deliver unprecedented collection and transmission of data. Though thousands of sensors and sophisticated digitised systems, the latest generation of aircraft collects enormous amounts of data. By 2026, new fleets could generate 98 million terabytes annually, according to a 2016 estimate by Oliver Wyman – that's a whopping 5-8 terabytes per flight!

## **The 'flying data-centres' analogy has a lot of truth**

We cannot underestimate the critical importance of this data. For a stark reminder of the trust we place in autonomous avionics we need look no further than the tragic Boeing 737 Max crashes that killed 346 people in all, and eventually prompted the grounding of all 737 Max planes across the world. Investigations suggest that sensors may have been



**Fig 1.** The modern airliner flight deck where virtually everything on board is directly controlled by electronics..

feeding incorrect data to the MCAS (Maneuvering Characteristics Augmentation System), leading to a series of events that put the plane into a nosedive.

## **Challenges of Avionics Design**

What's driving the rise in data? Virtually everything on board is now directly controlled by, or has a related dependency on electronics. Complex electronic systems throughout aircraft, satellites and spacecraft are designed by specialist avionics engineers (a blend of aviation and electronics) to control engine management, communications, navigation and the multitude of systems that perform individual functions – information displays, passenger comfort & entertainment, collision avoidance, fuel systems, flight recorders, weapons guidance... a truly dizzying array.

There are enormous challenges in avionics design, both environmental and technological.

From scorching deserts to cryogenic atmospheres and lightning storms, through sandstorms and dust clouds to explosions, shocks and extreme vibration, these systems must be fully ruggedized. As if surviving some of the toughest field conditions on the planet – and beyond – aren't enough, avionics engineers are demanding smaller and lighter components that can be mounted in higher densities, consume less power, generate less heat and are standardised for maximum interoperability and service life.

Security presents a further challenge. Electronics are typically the most sensitive pieces of equipment on board and may need added protection against disruption from cyber attacks and electronic countermeasures



**Fig 2.** Environmental & technological challenges exist in avionics design



(ECM), ranging from radar jamming and deception to a devastating electromagnetic pulse (EMP) attack.

One area of avionics design that is sometimes overlooked is the role of connectors. Electronics engineers need to be aware of how greater functionality, higher data speeds, miniaturisation and ruggedization for harsh environments are impacting on the connectivity and infrastructure in the next generation of avionics. As a franchised distributor, Astute Electronics not only offers a huge range of connectors designed for the aviation and aerospace industry but works closely with manufacturers in what is actually a highly complex area.

### Cockpit Evolution: Aircraft to Spacecraft

Pilots who have been flying for several decades have witnessed a gradual but dramatic evolution in cockpit design, as data-driven avionics systems take over many of the functions. The cockpit of today's airliner looks like science fiction when compared to those of a generation ago. Pilots are no longer faced with a sea of circular dials, and are much more likely to use a small number of multi-function displays (MFD). (Fig. 1)

This trend has been driven by the demands of military aviation. Third generation fighter aircraft such as the F-4 Phantom still use mechanical gauges to present information to the pilot. In the 1970s the fourth generation fighter began to take over. At the same time, the increased use of electronic warfare was demanding new and complicated systems be introduced. The designers of aircraft like the F-16 Fighting Falcon and the F-18 Hornet had to find ways for these new capabilities to be controlled by a single pilot. This simply could not be achieved with conventional dials. (Fig. 3)

Thus was born the multi-function display. By condensing a huge amount of information into a simple, easily understood picture, pilots could spend more time concentrating on their role of flying the aircraft rather than managing electronic systems.



**Fig 3.** Designers of fighter aircraft had to find ways for its capabilities to be controlled by a single pilot.



**Fig 4.** A lot of computing power is required behind the cockpit screens.

At the same time, the head-up display (HUD) was reaching maturity. This is a device which takes the same combined information that might be shown on an MFD, and projects it onto a glass screen in the direct eye-line of the pilot. Suddenly, pilots could fly their aircraft with their "heads up" – looking out of the aircraft – instead of "heads down", managing a huge array of dials, switches and controls. (Fig. 2)

You can imagine that, behind the screens, a huge amount of computing power was required to

gather, combine and then present this information instantly to the pilot, and you would be correct.

If we look forward to the present day the MFD has become a standard tool, not just for fighter pilots but in commercial and even in general aviation. The latest Boeing airliners are fitted with a HUD for each pilot, and the latest Cessna aircraft – designed for private pilots – are fitted with full-colour, programmable multi-function displays. Head-up displays are even available for cars now, showing quite

how far this technology has spread. (Fig. 4)

The problem of connectivity remains, however. Such fantastic displays must combine inputs from such sources as engine management systems, the airframe (speed, altitude and attitude), and the latest GPS navigation systems. Each of these connections must perform without fault in an environment that is subject to vibration, acceleration and extremes of temperature. Failure could have life-threatening consequences.

Cockpit displays have come a long way in 50 years, and engineers need to be aware of the challenges that the latest technologies present. High data speeds, miniaturisation and improved functionality make new and interesting demands of the connectivity and infrastructure in the next generation of aviation electronics. The latest families of connectors are ready and able to take up those challenges. **EP&T**

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# The secrets of position sensing for autonomous vehicles

BY MICHAEL MURRAY



There are many big trends in the technology space. Among the most interesting is development of autonomous vehicles. In addition to autonomous cars, buses and trucks, autonomous vehicles also include delivery robots used in warehouses, industrial complexes, large business facilities as well as “last mile” autonomous vehicles and drones used to deliver meals, medicine and smaller packages.

However, as autonomous cars are gathering the most industry interest and investment, let's start there.

Fully autonomous (Level 5) driving vehicles are still a number of years away from full production, and more importantly, adoption. However, the adoption rate for autonomous vehicles is gaining traction due to ongoing advancements in sensing, computing and connecting infrastructure and policies required to operate such vehicles in a ubiquitous and democratized environment.

There are actually two main systems of classification for the levels of autonomous vehicles: the National Highway Safety Administration (NHTSA) divides the continuum of autonomy into five levels, while the Society of Automotive Engineers (SAE) divides them into six.

The SAE and NHTSA scales are fairly similar. For example, the best-known car currently for sale with an appreciable level of autonomy, the Tesla Model S' Autopilot, happens to fall on the same level in both scales, Level 2.

## What is needed for next gen autonomous vehicles?

The success of autonomous vehicles is based upon solving the needs for fast response time, precision and long term calibration over time, temperature and use.

Perhaps, the largest gating item to the adoption rates of autonomous vehicles is that the costs and commissioning of these systems remains high.

*To succeed, autonomous vehicles must deliver fast response time, precision and long term calibration over time, temperature and use.*

Furthermore, some technologies like LIDAR remain difficult to use, commission, and esthetically unappealing for consumers. Consumers will surely push back against the ungainly appearance of LIDAR devices on their car roof, windows and outside mirrors. In addition, ongoing maintenance and repair will need to be factored in. Environmental challenges such as snow, smog and dust will surely have a corrosive impact upon external LiDAR modules.

In spite of those issues, investment into technologies like LIDAR have dominated the headlines in recent years while folks like Tesla's Elon Musk maintained that LIDAR is not needed and vision systems coupled to inertial measurement units (IMU's) for GPS and GPS denied applications will persist and grow.

I believe this to be true for many autonomous applications, but not all however.

## Where did autonomous begin?

You might find this surprising but agricultural equipment – tractors and combines – were among the first commercial uses of vehicle autonomy. Over the last decades, the market acceptance and technical advancements within autonomous vehicles on the ground have been aggressive.

Worldwide, manufacturers of smart agriculture, heavy construction equipment and last mile delivery vehicles are demanding higher levels of accuracy from their embedded GNSS and INS sensor systems, the systems need to be as accurate as possible to ensure highly accurate positioning and accuracy, as well as to ensure safety of human operators and nearby workers.

In addition to the sensors that measure positioning relative to signals from the GNSS and GPS satellite networks, there is a lesser-known, but equally critical, sensing technology.

We are speaking of Inertial Measurement Unit (IMU) sensors. Within most positioning systems there is an IMU that helps the positioning engine calculate the position using the physical motion as part of the positioning calculation. This is critical for highly accurate systems which calculate the force, angular rate and orientation of



The adoption rate for autonomous vehicles is gaining traction due to ongoing advancements in sensing, computing and connecting infrastructure...



the system over time and temperature changes. IMU's are used in many GPS, GNSS and INS systems and provide absolute heading, positioning and dead reckoning. The backbone to any good IMU is the performance of the system measured by the Allan Deviation of the sensor specifically, the bias stability and Angle Random Walk of the Gyroscope.

### Solving the 'Stiction' Issues

Micro electrical mechanical systems (MEMS) sensors have an inherent stiction issue in which the microscopic silicon fingers of the accelerometer and gyroscope structure can get stuck together. Usually caused by a shock or high acceleration event, once stuck together they can be very difficult to separate due to a phenomenon known as the Van der Waals force. This poses a significant issue for functionally safe applications and ASIL B rated applications. One way to solve this problem is by using triple redundant sensors embedded within the IMU. If one sensor fails because of stiction, the other two will continue to function and will keep the vehicle on its path.

The reason bias instability and ARW are important can be explained thusly - An autonomous vehicle driving from one point to another in a perfect straight line will drift over time by the bias stability rating of the IMU. If the IMU is rated at 6 degrees, per hour of bias stability, the car will arrive potentially 6 degrees from the straight line on either side which would equate to 6-8 feet of inaccuracies.

Said differently, if an autonomous vehicle attempted to pass through the Holland Tunnel in New York City using a 6 Degree per hour IMU, it will likely not make it...

On their own, Automotive GPS receivers cannot provide highly accurate continuous position information. With optimal reception from a few dozen global satellites, the GPS receiver can calculate its position to within a few meters. By also including correction signals to correct satellite clock errors and atmospheric distortion, the GPS

receiver can calculate position to around 2cm to 4cm using algorithmic techniques such as Real-Time Kinematics (RTK). The calculations take time to perform so the update rate for the GPS receivers is typically about 1Hz or once a second but it can be as fast as 10Hz to 20Hz for more dynamic applications. At highway speeds and under optimal conditions, the vehicle can move 10 ft. or so between GPS updates under optimal conditions.

Currently, highly precise and expensive IMU's are used in many highly precise applications ranging from missiles, commercial aircraft to UAV controls and navigation applications.

The gating items for higher performance IMU's in automotive applications has been three-fold. Cost has been prohibitive for vehicle manufacturers to adopt higher performance IMU's for autonomous applications.

Even though IMU's are already in vehicles for navigation, roll over detection and air bag controls, the performance levels of these class of IMU devices will not solve the problem of dead reckoning in a major tunnel or in vision impaired instances, that are prolonged, and not well supported by cameras in white out conditions due to heavy snowfall and fog along with sun saturation issues.

As performance needs increase for autonomy, the demand for functionally safe devices also increases, while at the same time, the quest for low costs increases almost linearly.

Big picture, autonomy is enabling wonderful advancements in vehicles, UAV's and last mile delivery robots that which will help reduce our carbon footprint, increase efficiencies and productivity while hopefully saving lives. Yes, there are challenges to be met - however, using technology currently on the market, as well as new and evolving sensing technologies, one day, within a decade or so, autonomous vehicles will be able safely on our highways and in our urban centers. **EP&T**

*Michael Murray is the executive vice president at Aceinna.*



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# Driving the wires of automation

MIPI specifications for wired connectivity interfaces in automotive designs. **BY MIPI ALLIANCE**

➔ It's not uncommon to hear new cars with advanced electronics referred to as 'smart-phones on wheels' or 'mobile data centers.' Regardless of the analogy used, there's no doubt that today's increasingly connected vehicles are very different from the cars of yesterday, sharing more in common with a continuously connected device that's just a fraction of its size: the mobile smartphone.

Consumers may see the use of mobile technologies in automotive in 'visible' features such as high-resolution front cluster displays connected to back-up rear cameras, infotainment displays with GPS navigation, and multi-wireless Bluetooth, Wi-Fi and 4G/5G cellular connections.

This can be imagined in Figure 1 with the notion that many smartphone-like subsystems may be placed around the car to achieve this functionality.

However, perhaps the greater convergence is happening behind the scenes in advanced electronics for Advanced Driver Assistance Systems (ADAS) and Automated Driving Systems (ADS) and the interconnects or interfaces that enable them to perform as a system, much as in the continued fast pace of technology integration that's

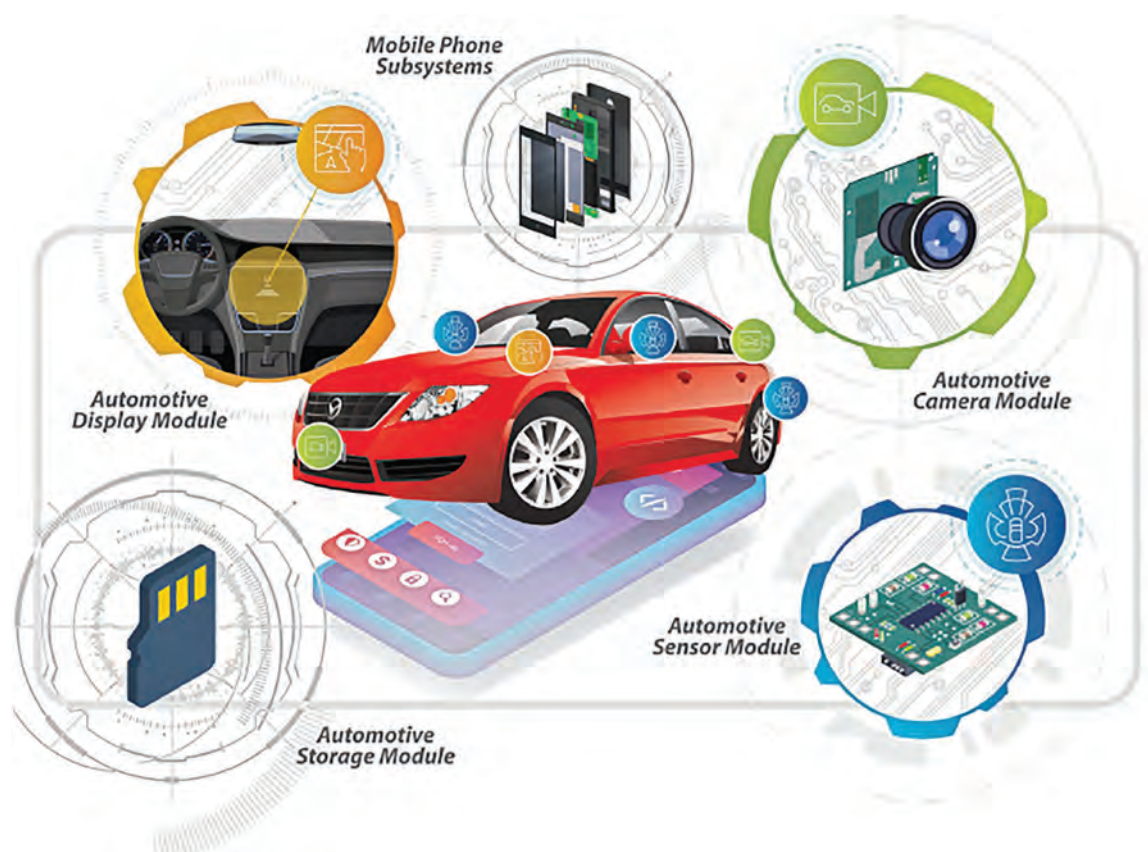


FIG 1. Automotive leveraging of the mobile smartphone.

happened in the smartphone over the past decade.

A white paper produced by MIPI Alliance provides an understanding of its specifications for wired connectivity interfaces in automotive today, heavily leveraged from MIPI's influence

over the mobile smartphone ecosystems, and share how new enhancements and specifications are being developed with automotive applications in mind. In particular, it delivers an in-depth look at the upcoming MIPI A-PHY physical layer specification, which provides a solution for the 'long-reach, high-speed challenge' of connecting the highest speed electronic components throughout a vehicle.

MIPI initiated development of A-PHY in 2017 to drive the convergence of multiple proprietary long-reach interfaces in automotive toward one standard

with a strong roadmap vision for the future.

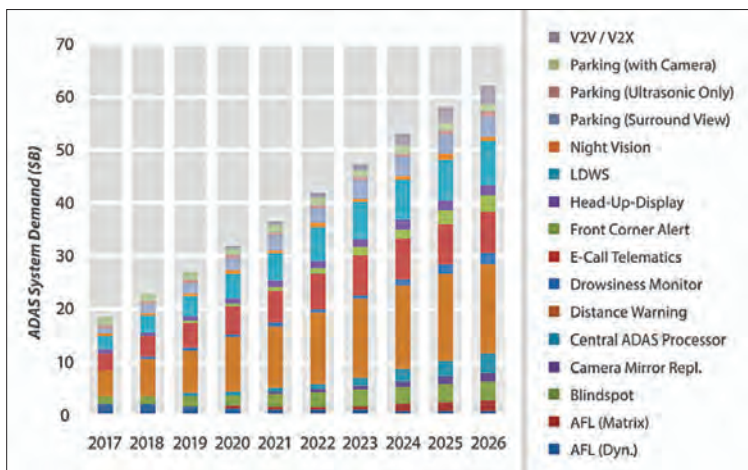
## The changing industry

The auto industry is being transformed by several global trends, including a growing embrace of electric vehicles, increasing vehicle automation, tighter safety and fuel economy standards, and new ownership models such as car sharing.

These are all generally requiring that cars become smarter, connected and more automated, which means additional electronics. As vehicles progress along the Society of Automotive

**The automotive industry is being transformed by several global trends, including a growing embrace of electric vehicles, increasing vehicle automation, tighter safety and fuel economy standards and new ownership models - such as car sharing.**





**Automotive ADAS growth forecast.**

Engineers (SAE) levels of driving automation, they will be enabled by increasingly sophisticated sensor electronics and processing, brought together by high-speed interconnects.

The sensors driving automation can be broken down into four specific types, each generating data at extremely high rates: optical cameras at rates of 12Gbps and rising, radio-based radars at 5Gbps, light-based lidar sensors at 1 to 2Gbps, and ultrasonic sensors in the range of 25 to 150 Mbps. Data from each sensor is delivered to the one or more “central” processors or electronic control units (ECUs) by a high-speed interface, often a dedicated one.

#### **Automotive camera market**

A key automotive sensor is the optical camera, which leverages technologies from the billions of cameras developed for the smartphone market. A look at the automotive camera market reveals this explosive growth on the early roads to automation.

Studies predict the automotive camera market will grow to \$7.5 billion in annual revenue by 2023, with compound annual growth of 24.3% from 2018 to 2023. Taking the view out further, annual revenue for all ADAS technologies is predicted to reach more than \$65 billion by 2026.

Estimates of the number of cameras per car vary widely, but production volume of hundreds of millions of cameras per year is reminiscent of the large volumes seen in smartphones. Current

estimates are 8-12 cameras per car in the immediate future.

In this rapidly evolving landscape, while the existing broadly embraced automotive interfaces such as LIN and CAN see continued use for lower-speed (mainly control applications), auto manufacturers and suppliers have no clear standardized solutions for high-speed interfaces between cameras and ECUs, and for the most part they have had to rely on proprietary solutions.

While these solutions may employ good technology themselves, the many competing solutions cause confusion in the marketplace, and the lack of a single standard limits economies of scale. In mid-2015, MIPI Alliance identified the need for a unified in-vehicle connectivity specification that would meet the automotive industry’s need for high speed, low latency, functional safety, light weight, low power consumption and the desired economies of scale.

Since that time, MIPI has been working with automotive OEMs to define the requirements and understand the challenges of the noise channel. In the last two years, MIPI has produced several incremental versions of its Automotive Requirements Document (ARD). **EP&T**

*This article was created from a white paper produced by MIPI Alliance: Driving the Wires of Automotive – MIPI specifications in automotive and the A-PHY solution.*

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# EU SCIP database – Reporting obligations for electronics

BY WALTER JAGER

On January 5, 2021 – in less than a year – the reporting obligations for the European Substances of Concern in Products (SCIP) database comes into effect for manufacturers, importers and distributors (duty holders). The reporting applies to products placed on the EU market that contain a REACH Candidate List SVHC above 0.1% w/w in any article in the product.

There are still several common EEE applications where SVHCs are needed and cannot be easily substituted, especially given that lead (Pb) is now on the REACH Candidate List. This means that many complex EEE products will need to be submitted into the SCIP database. If they aren't in SCIP, they're easy enforcement targets for customs and surveillance authorities.

The database poses difficult challenges for manufacturers and suppliers given complex supply chains, data requirements that go beyond what most manufacturers have collected from their suppliers and no volume thresholds for small and medium sized manufacturers.

The mandate for SCIP comes from Directive (EU) 2018/851 revising the EU Waste Framework Directive (WFD). It requires ECHA to develop and operate the database and directs EU Members States to require the duty holders to submit information about their products into the database. The EU is imposing this new obligation in part due to what it sees as poor REACH Article 33 compliance.

## Information Requirements

The SCIP data requirements include article identification, safe use information, and information about the substance of

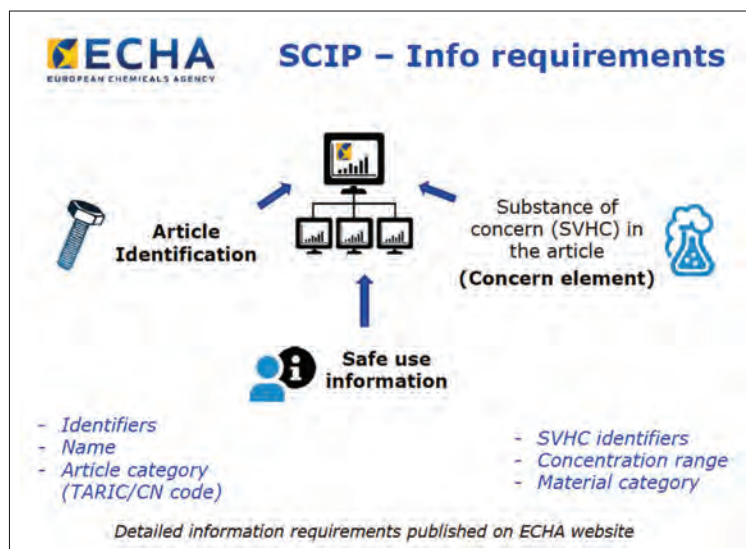


Figure 1: SCIP information requirements.

concern (SVHC) (see FIG 1). This includes identifying the component articles that contain SVHCs. Several industry associations and standards development groups have been working with ECHA to help them understand the complexities of global supply chains, multi-sourced BOMS, and concerns about confidential information. Some of the efforts have been successful with ECHA changing some data fields to optional; but there is still information that may not be readily available.

Mandatory information about articles includes article name, primary article identifier, article category (CN tariff code), safe use instructions, number of units, and whether or not the article was produced in the EU. Information about the substance includes the version of the Candidate List used in the assessment, the Candidate List entry, concentration range and the material or mixture category. Optional information such as other names, identifiers, size, weight, and colour characteristics, pictures, disassembly

instructions may be provided.

In an attempt to reduce concerns about confidential information (CBI), ECHA has taken steps to hide certain information from public access, especially information that could be used to identify suppliers. The SCIP data format is implemented as a series of XML schemas and picklists (drop down lists) in the ECHA IUCLID 6.4 software. ECHA is also providing an online web interface into

SCIP to simplify the process for manufacturers with only a few submissions and a system-to-system portal for bulk uploads.

The “Link to a component article” (FIG 2) allows a complex object to link to a supplier's part (if already in the SCIP database) or otherwise a component article submitted by the OEM.

Awareness of the SCIP data format is important to manufacturers because it provides insight into the information needed from their supply base. For example, a specific data element may need to include a data type, use a specific format or correspond to an entry in a picklist.

## Collect supply chain data

Several industry associations continue to oppose the broad content requirements for SCIP and court challenges are being considered. But this isn't likely to affect legal obligations in the short term; in the meantime, manufacturers with products that potentially contain REACH Candidate List substances should be preparing their supply base. The time that remains before OEM obligations take effect is minimal given the task. Eliminating SVHCs from products is ideal, but there are products and applications for which this is not yet feasible.

## In addition

More information on the SCIP database and reporting obligations can be found on ECD's blog (<https://rohs.ca/news/?s=SCIP>). **EP&T**

Walter Jager, principal consultant, ECD Compliance.

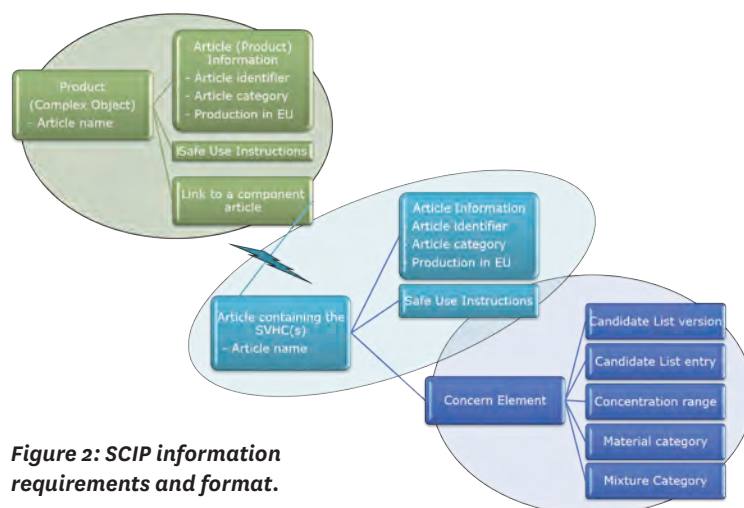
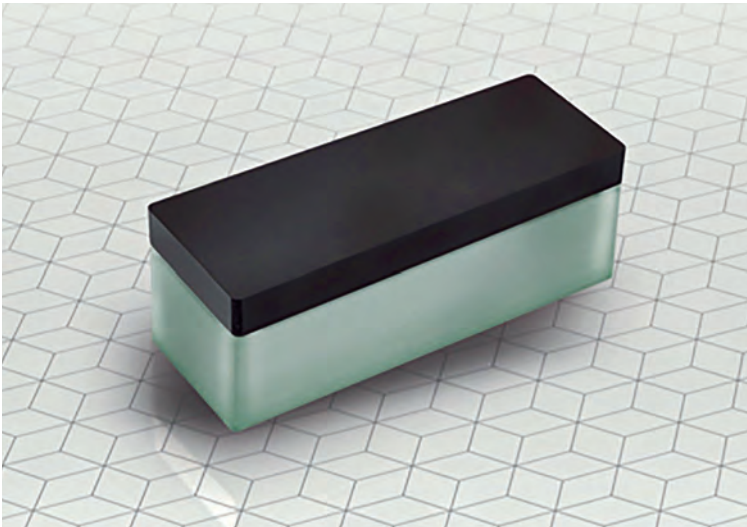


Figure 2: SCIP information requirements and format.





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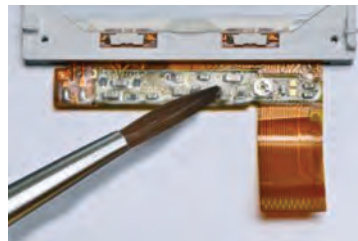
LXTBKZMCMG-010 RFID tag is designed to be placed directly on metal, such as surgical tools. Measuring 6.0 x 2.0 x 2.3mm, solution can be incorporated into a tool tracking system to quickly determine a specific item's usage, warranty status, and assign user accountability. Beyond its miniaturized footprint, tag delivers a robust design, has a read range up to 150cm, and covers a UHF frequency band range of 865-928MHz.

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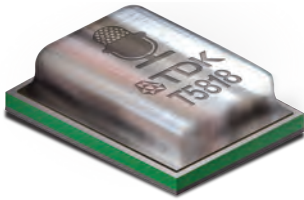
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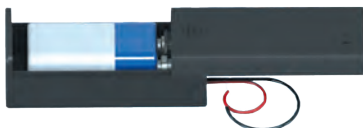


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# SUPPLY SIDE

## ACQUISITIONS

### ROCKWELL AUTOMATION TO ACQUIRE AVNET



Rockwell Automation Inc. has signed an agreement to acquire privately held Avnet Data Security Ltd., an Israeli-based cybersecurity provider with more than 20-years of experience providing cybersecurity services. Avnet offers a full set of IT/OT cyber services and solutions ranging from assessments, penetration testing, network & security solutions and training to converged IT/OT managed services.

“Avnet’s combination of service delivery, training, research, and managed services will enable us to service a much larger set of customers globally while also continuing to accelerate our portfolio development in this rapidly developing market,” says Frank Kulaszewicz, senior VP control products & solutions at Rockwell Automation.

Cybersecurity is one of the fastest growing parts of Rockwell Automation’s services business. As the manufacturing industry has evolved and become more connected than ever before, legacy physical security strategies are no longer enough to protect production operations.

## SEMICONDUCTORS

### GaN SYSTEMS CAPTURES CLEANTECH AWARD



GaN Systems, Ottawa-based provider of GaN (gallium nitride) power semiconductors, has been named a 2020 Global Cleantech 100 company by Cleantech Group.

The 2020 Global Cleantech 100 is the 11th edition of the annual guide to the leading companies and themes in sustainable innovation. It features the private, independent and for-profit companies best positioned to contribute to a more digitized, de-carbonized and resource-efficient industrial future.

“We are honored to be named in the 2020 Global Cleantech 100,” says GaN System CEO Jim Witham. “It is

yet another validation of our current position as the leader in GaN power semiconductors and as a company that continues to transform innovative energy-efficient solutions.”

## INTERCONNECT

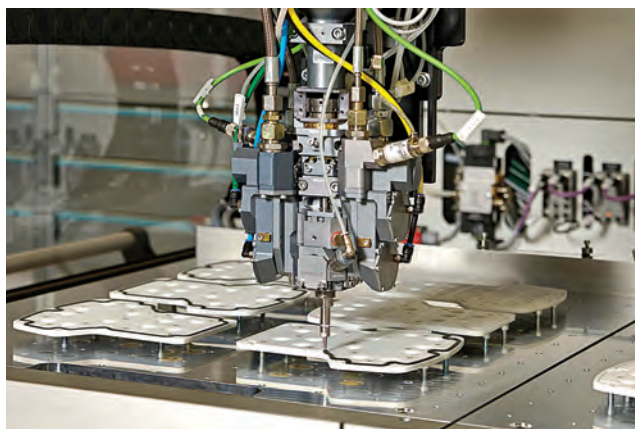
### DUPONT EXPANDS INTERCONNECT SALES INTO CANADA



DuPont Interconnect Solutions has expanded Insulectro’s role in North America by adding Canada to its sales territory for DuPont Pyralux flexible circuit materials. Effective since January, Canadian customers are now able to purchase Pyralux and Interra through Insulectro, a specialty distributor of materials used in the manufacture of complex, multilayer circuit boards and printed electronics.

Insulectro also plans to expand its warehouse location in Canada to better serve its customers there. Pyralux flexible circuit materials are part of a comprehensive, industry-leading portfolio of materials and systems designed to meet popular and next gen design challenges. Insulectro’s support and warehousing will expedite regional product shipments.

### HENKEL EXPANDS PORTFOLIO WITH THE SONDERHOFF BRAND



*After two and a half years of integration, the Sonderhoff Group has been merged into the Adhesive Technologies business unit at Henkel AG.*

The two and a half year’s integration phase of the Sonderhoff Group into Henkel AG & Co. KGaA has been completed. As of January 2020, all Sonderhoff companies have been merged into the Adhesive Technologies business unit. The former Sonderhoff sites in Germany, Austria, Italy and the USA are now also operating under the Henkel name – only the Sonderhoff site in China will continue to operate under its previous name. Customers will continue to be served from these locations as before.

Sonderhoff’s activities will continue

to be managed operationally from Cologne and are organizationally assigned to a business area of Henkel Adhesive Technologies. The Sonderhoff portfolio will continue as the SONDERHOFF brand of Henkel Adhesive Technologies, a leading global supplier of adhesives, sealants and functional coatings.

## SUPPLY SHORTAGES

### FIRMS STRUGGLE WITH SSD SHORTAGE



There are no signs of recovery from the SSD shortage previously reported by Fusion Worldwide. With manufacturers cutting NAND flash production in 2019, demand for storage capacity growing and unforeseen events affecting supply, manufacturers are still struggling to meet the intensifying demand for SSDs – causing lead times to stretch to a minimum of 10 weeks.

Demand for SSDs is expected to grow at a compound annual gross rate of 15% for the next four years and is forecast to reach \$70-billion by 2024. This is caused by the growth of big data in IoT devices and enterprise applications needing faster storage. SSDs are also the best in executing large data used in smart devices, wireless technologies and advanced systems found in vehicles.

“With the rollout of 5G, increased IoT demand, hyperscale and gaming advancements requiring more storage, there are no signs of recovery for the SSD shortage,” said Mavis Ong, Fusion Worldwide’s global finished goods commodity manager. “Because of this, buyers who are looking to buy these components should expect high prices to remain while the shortage continues. Those who wait for prices to lower before purchasing could be in for a very long wait.”

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## SUPPLY SIDE

(GF) that will provide Canadian universities and college researchers access to advanced and specialized silicon photonics platforms.



Santa Clara-based GF is a leading global specialty foundry, that produces advanced and specialized FinFET, RF SOI, FDX, SiGe, and silicon photonics platforms. Under the agreement, CMC customers will have access to the GF GlobalShuttle Multi-Project Wafer (MPW) program, as well as dedicated prototype and production runs in GF technologies.

"This is a landmark agreement and through it CMC can help Canadian and U.S. researchers to access highly sophisticated microelectronic and photonic design and manufacturing at a fraction of what this would typically cost," says Gordon Harling, president of CMC. "It will have a lasting impact on the ongoing development of high-technology design in Canada, and it is open to international clients in academia or industry."

### TEST & MEASUREMENT

#### ROHDE & SCHWARZ EXTENDS PACKAGE PRICING

Rohde & Schwarz, leading global manufacturers of information and communications technology products for design engineers, announced the firm is changing its industry-first promotion to provide customers new, extended offerings.

The extended 'This Changed Everything' promotion runs to June 30th and includes 10 value bench instrument solutions for customers to choose from. The aim is to support customers' long-term viability and



**Corey Mugford,**  
product support  
associate, TOA  
Canada Corp.

### PEOPLE

#### TOA CANADA ADDS TO TECHNICAL DEPARTMENT

TOA Canada Corp., Mississauga ON, is excited to announce the hiring of Corey Mugford to the technical team as product support associate. Mugford comes from the dynamic world of live pro audio and event operation. With almost 20-years of experience in the live event and broadcast television industry, he has a rich background in medium to large scale professional audio and wireless microphone technology. Mugford holds a diploma in media arts from Sheridan College and has achieved many industry related certifications.

### CEM

#### MICROART SERVICES EXPANDS TEAM



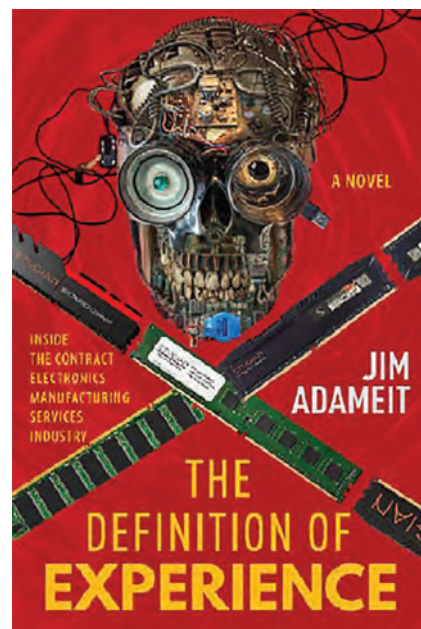
Contract electronics manufacturer Microart Services Inc. recently appointed Charles Tonna to the position of executive vice president. Operating from the firm's headquarters in Markham ON, Tonna will assist Microart CEO Mark Wood and team with focus on business development, customer value, commercial/business process & operations supporting both the Markham & Buffalo locations.

Tonna has a degree in operations management from Durham College in Oshawa ON and brings a passion to enrich partnerships, best practices & people development while keeping business simple by focusing on vulnerability, transparency and collaborative growth. With more than two decades of experience in the manufacturing

sector with OEM's and CM's alike Tonna has enjoyed roles both customer and supplier facing within supply chain, operations, account management, customer growth, strategy and executive leadership.

His leadership is influenced by several avenues including work experience at Bombardier, Celestica, Creation Technologies, KS2 Corp and the Season Group, according to Wood.

### NOVEL EXPOUNDS ON



### CEM/EMS INDUSTRY

A thriller novel about the electronics manufacturing services (EMS) and contract electronic manufacturing (CEM) industry? Yes, it is a thing – and it would appear to be the first-ever, according to the book's author Jim Adameit.

The Atlanta GA-based writer is also a 30+ year veteran of the CEM/EMS industry – a field that can be sometimes controversial, and always extremely competitive. Adameit has held global positions in project management, sales and marketing, contracts, and manufacturing operations.

"A primer on an industry that most people don't know exist...a cautionary tale for those people who do," says Adameit.

The author says he is confident those in the CEM/EMS industry will easily relate to the business aspects, terminology, and drama – and hopeful that others unfamiliar will find this a fascinating and insightful journey into new world.

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# Women in Electronics

*Exploring diversity through women in the Canadian electronics engineering and industry profession*



**Justine Decaens**, is the head of technological innovation - smart textiles at CTT Group, a centre of excellence in research, development and innovation in Saint-Hyacinthe, QC. She is responsible for managing all R&D departments including smart textile, technical textile, textile chemistry and 3D textile/composites.

## How has your role or career path evolved over the years?

I was very lucky to have very quick evolution of my career path over the years. I had a few opportunities which presented themselves and were aligned with my professional objectives. I started at CTT Group as a trainee during my Bachelor degree and then as a student during my Masters and began working fulltime as a project leader. Shortly after that, I took charge of a part of our research group for smart textiles. Most recently, I took the lead role within the R&D department. Sometimes, it is a question of being at the right place at the right time and not being afraid to respond to the challenge.



## What is your message to female engineers seeking to take on leadership roles?

I think you need to accept the possibility of some gender imbalance and not take offense to that if you ever encounter a situation like this. You need to be confident in your capacities and show initiatives. Never be afraid to ask for new challenges whenever there is an opportunity for you to show what you can do. By demonstrating your skills, you will gain respect from your superiors and colleagues regardless of gender.

## What key words of advice do you have for employers seeking to create a supportive environment for women?

Do not differentiate! We do not need to receive any preferential treatment, as it

would just create another form of imbalance and make it more difficult to gain respect from our male colleagues. Equal treatment and neutrality is the key to a balanced work environment.

## How would you sum up the work/life balance advice you share with female engineers and their employers?

The most crucial point is the organization. When things can be planned ahead, it is a lot easier to manage. Always leave time in your day for the 'unexpected', which could be either urgent professional issues rising up, and need to be dealt with immediately or a personal emergency. It is also important to have good communication with colleagues, so they are aware of the project you are working on or the client you need to meet with. Be sure you are never in a position of isolation, where only you are left to handle it. Having a substitution system is also very important for having more freedom at work.

Moreover, I may add it is important to have realistic expectations of the workload you can tackle on any given day. You have to look at it as having eight hours to accomplish as much as possible. But, at the end of the day, that's it; you need to go home. There will always be emergencies and other things that land on your desk - often due yesterday. But, you need to push back and recognize that whatever is not fitting in today can be scheduled for tomorrow.

## Industry employers and associations have set some goals to achieve when it comes to equalization of genders within engineering circles. How do you think imposed gender initiatives will help women in their field?

I personally do not think imposing quota related to gender equalization is a good initiative. Forcing companies to recruit a woman because her gender rather than her qualification is a mistake for many reasons. From a business standpoint you should obviously hire whoever is the most



qualified. From a social standpoint - it will make acceptance of the new hire a lot harder among her new colleagues.

Initiatives based on the modification of recruitment process: no pictures, no name and/or modified voice (neutral digital voice) would be really interesting to look into rather than imposed quota.

## What impact does the lack of female role models in higher level positions have on aspiring engineers or young women entering the field?

**A** The lack of female role models may have a negative impact on our perception of our worth and may be limiting our career aspirations. Meaning we may not consider reaching for a CEO position for example, as we might unconsciously assume it to be a man's role.

On the flipside, when a woman achieves a position or role that we didn't think was possible - it makes the success even more exciting, and it becomes a bigger deal. It becomes both a professional and personal accomplishment.

## What does diversity mean to you and why is it important for engineering?

To me, the diversity relates to social background and personal experiences: any travels, past work experience, any personal hobbies. Most of the inspiration you have in engineering (at least for me) comes from everyday life experiences. How you put them into practice will come from books and research, but the conceptual idea will be inspired from your life. The more diversity you have, the better the ideas. **EP&T**

For more Women in Electronics, check out [ept.ca](http://ept.ca).





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Transformers



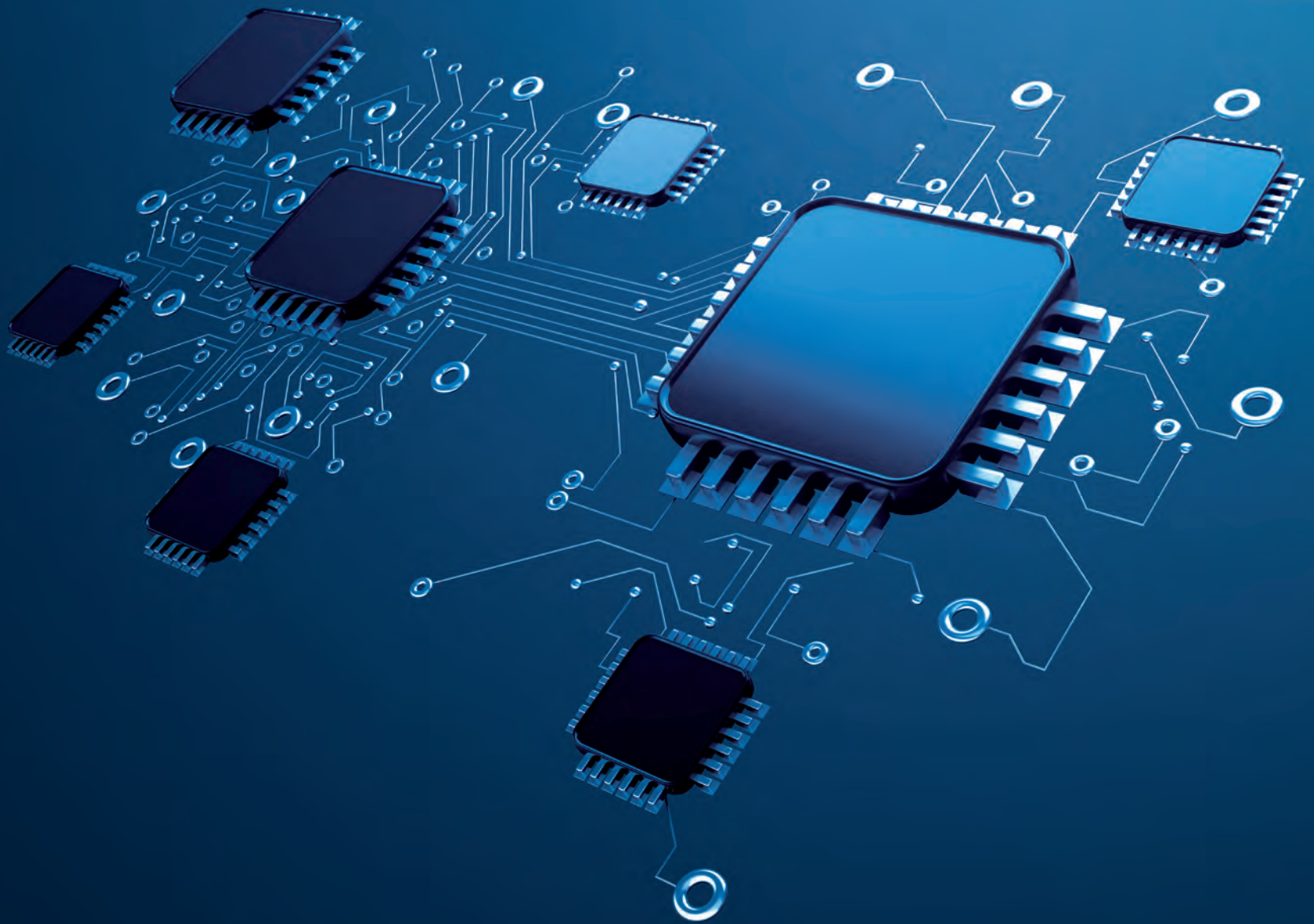
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