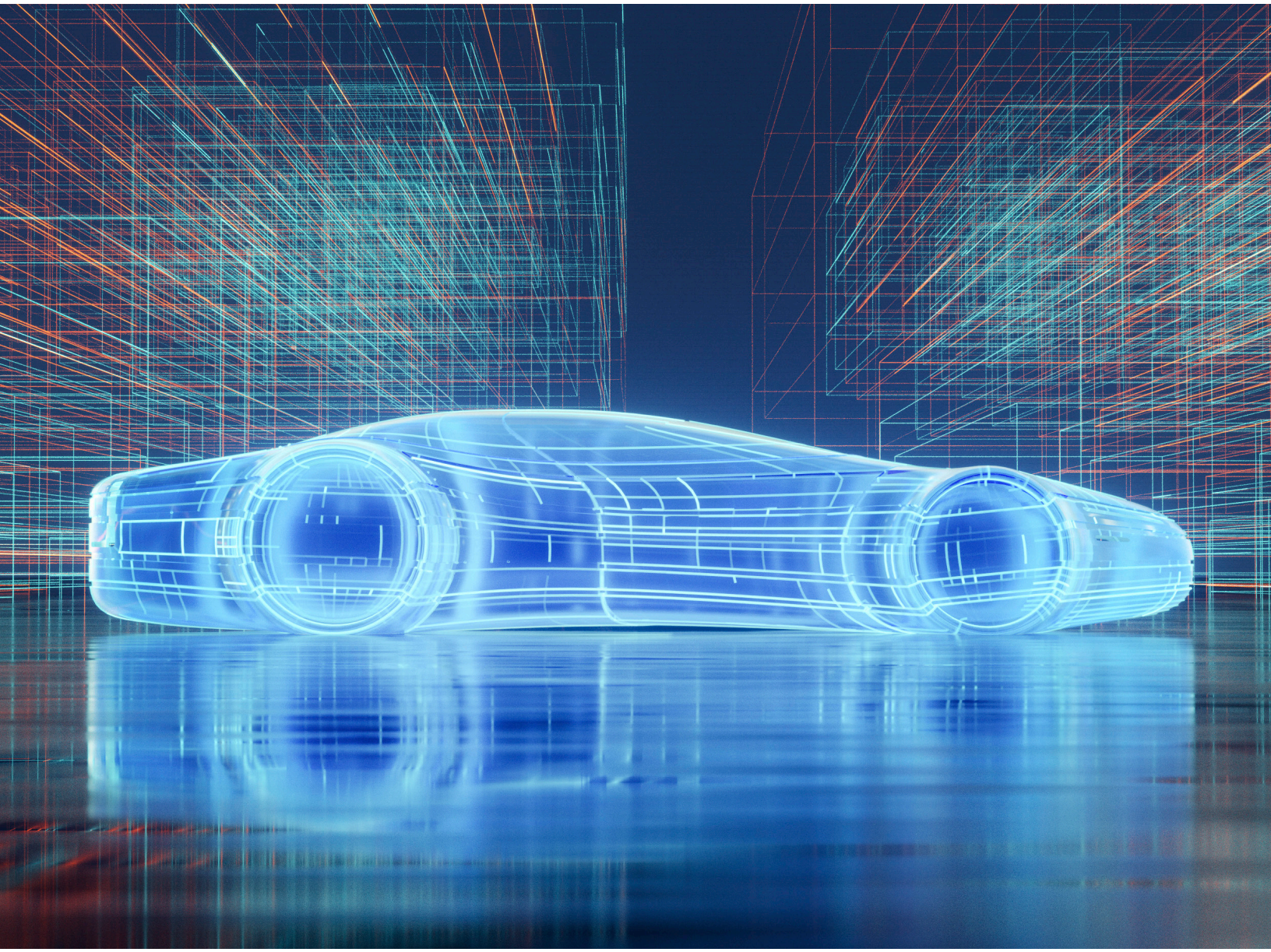
PULSE REPORT

PULSE OF THE INDUSTRY

Next Generation Automotive: The C.A.S.E. for a Reimagined Future



creating connections for life

molex

A challenging year of pandemic protocols, massive supply chain disruption, chip and labor shortages and general human angst is now in the rearview mirror – at least on paper. The final page of the 2021 calendar has been ripped out, crumpled up and thrown in the Christmas tree bonfire. It's officially 2022, and all eyes are facing forward in the hopes that a New Year will bring new opportunity and meaningful change to a world hard hit by COVID impacts for far too long.

Will it happen? Only time will tell. With a New Year of change and opportunity, one age-old industry is ideally positioned to serve as its poster child: Automotive.

Constant disruption and rapid transformation in not just one, but four material categories, define the automotive industry in 2022 and beyond. From a connected home on wheels enabling unprecedented data flow and car sharing to an evolutionary shift from combustion engines to fully electric and eventually self-driving cars – the automobile consumers have known and loved is a thing of the past. And it all boils down to a simple acronym: **C.A.S.E**.

- **Connected cars**
- **Autonomous/Automated driving**
- **Shared/Subscription services**
- **Electric**

So, how will C.A.S.E. impact the world and businesses? Let's explore.

C CONNECTING THE FUTURE

A connected car is a car that can communicate bidirectionally with other systems, allowing the vehicle to share internet access and its corresponding data with other devices both inside and outside of itself. It's available here and now and has been for years with every automotive OEM offering connected services dating back decades. (General Motors was first to market in 1995 with OnStar.) In fact, connectivity is transforming the automotive experience with consumers making or receiving voice calls, sharing remote diagnostic information, and using digital navigation as a matter of course.

Connectivity can be provided in a car using embedded, integrated, or tethered connectivity solutions, allowing the integration of every system and component of the car with each other to enable safer, more secure, and better maintained vehicles. But convenience and experience are also driving the adoption. Advanced infotainment devices, including gaming with a fast wireless connection and multimedia streaming, are putting connected cars on the fast track.

Original research conducted in January 2021 by Molex and third-party research firm, Dimensional Research, confirms it. Survey participants said "The Car of the Future" would include three top features most likely to be standard by 2030: High-speed WiFi, wireless charging, and car-to-car communication. And in selecting the five most important innovation areas in the next decade, respondents picked electrification (38%), connectivity (33%), passenger safety (29%), quality and reliability (28%), and software-defined infrastructure (27%), all powerful enablers of the connected car future.

Moreover, 60% of those polled favor the ability to deliver innovation via software as a priority, encompassing the intelligence needed for autonomous driving, advanced algorithms to reduce energy consumption, remote updates of new capabilities and customized driving experiences.

Smartphones have changed the definition of connectivity over time. Indeed, the shift to increased connectivity during all moments of life — whether at home or on the go — has drastically transformed the auto industry as OEMs and suppliers alike envision how to create a frictionless, personalized, and safer experience for drivers and passengers.

Without question, vehicle connectivity solutions have become the leading priority for automotive OEMs. And the stats tell the story. Statista estimates that there are more than one billion motor vehicles in use worldwide and in 2020, the global connected car market generated approximately $54 billion in corresponding revenue. But, what a difference seven years will make: Allied Market Research predicts that the global connected car market will reach $225 billion by 2027. And the market is well on its way. Mordor Intelligence reports that the share of connected cars among new vehicles sold will rise from 35% in 2015 to fully 100% in 2025.

Automakers are following new vehicle safety norms to inspire the safety of the vehicle and make it more secure from both cyber hacking and malfunction, and this too is propelling the demand for the connected car. It has also brought about massive disruption in the market's key players. Case in point: Ford, GM, Mercedes, Volvo and BMW are facing a new form of competitive tension from a new wave of companies from outside the automotive industry supplying the supporting software, components and infrastructure. Tech firms like Google, Facebook, Nokia, Cisco, Apple, and Intel have all announced plans for multimillion dollar investments in connected car technology in large part fueled by the promise of new data-driven business models. And they are on to something. After all, when consumers connect from their cars, they generate data that's infinitely valuable to third-party companies – from insurers to wireless carriers and advertisers.

According to the McKinsey article, "Unlocking the full life-cycle value from connected-car data," connected car-data monetization could deliver between $250 billion to $400 billion in annual incremental value. And that's revenue that OEMs cannot afford to ignore or be slow to exploit.

Many think the disruption is not only healthy, but also a game-changing accelerator that's inspiring traditional automakers to make what may have previously been considered riskier investments. Indeed, connected cars are here to stay and the future is being written today, but there are hurdles that must be overcome first to deliver a fully connected experience. Everything from better integration into the global mobility ecosystem and advanced infrastructure (5G and beyond), progress in telematics and software and firmware over-the-air capabilities (SOTA and FOTA), as well as system and data security and more seamless technology interfaces with less complexity are powerful blockers.

There's no doubt that alignment with the very players that are giving OEMs a run for their money will support an accelerated future for connected cars. Automotive manufacturing is a multi-disciplinary enterprise that demands high levels of collaboration and input from numerous cross-industry sectors to ensure effective production of advanced technology.

Molex partners on all fronts, with automotive and connectivity expertise and experience dating back 30 years and including significant investments in high-bandwidth cabling, seamless connectivity of wired and wireless consumer devices, and industry-leading mobile antenna technology. As electronics become a bigger player in the car of the future, Molex will continue to focus on accelerating innovation where it's needed most: enabling connectivity. Its global footprint and longstanding reputation for excellence extends across the entire automotive ecosystem, spanning electrification, Advanced Driver-Assistance Systems (ADAS), automotive high-speed networking, vehicle antenna systems, connected mobility solutions and vehicle-to-everything communications (V2X).

A AUTONOMY FOR ALL

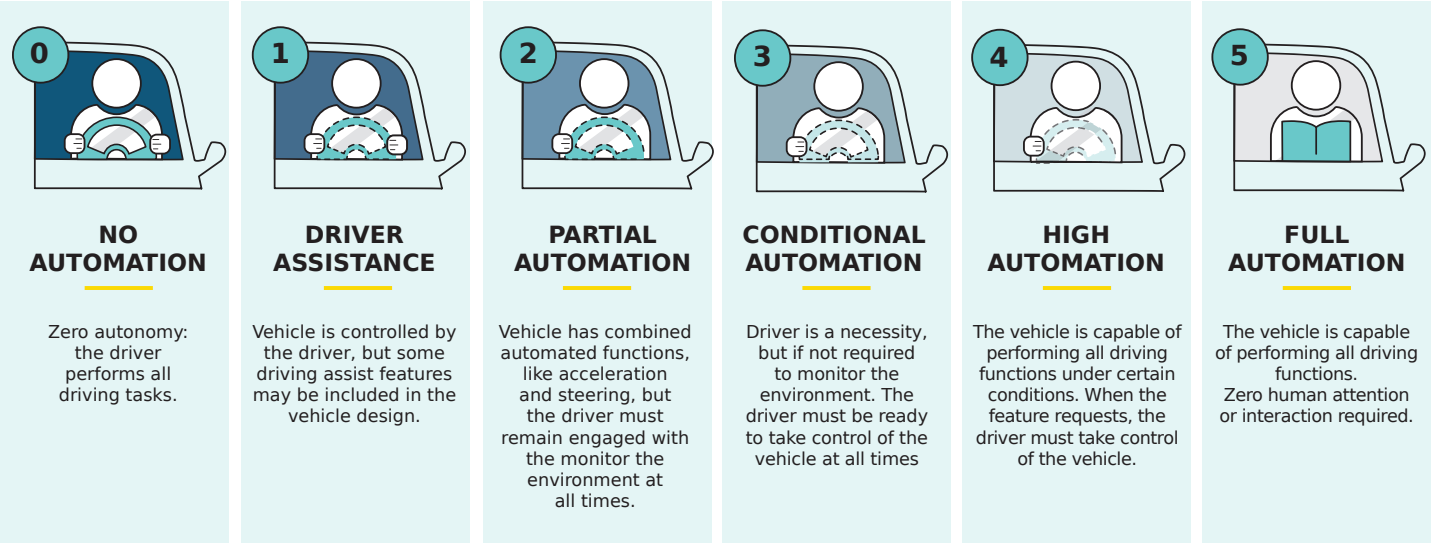
Connectivity inspiring new monetized business models and more powerful driver experiences justifies investment in new capabilities and technologies. And one of the most inspiring value-drivers of them all is the rise in vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications and the advent of semi- and fully autonomous driving – or the "A" in C.A.S.E.

The evolution of autonomy levels is outlined by the Society of Automotive Engineers, starting with no automation where the driver performs all driving tasks and progressing over time to full automation where the vehicle performs all driving functions under all conditions.

The autonomy levels are billed as an evolution for a reason. Technology will both enable and deter the evolution of autonomous driving because seamless connectivity is table stakes for the movement across the autonomous spectrum from zero to full. The connectivity blockers highlighted earlier in the report – from interface complexities to cyber security and infrastructure lags – all stand in the way. And so does the notable factor of human reluctance.

Researchers from Arizona State University, along with those at four other universities, conducted a survey in four American cities in 2020 including Phoenix, Atlanta, Tampa, and Austin. Approximately 40% of respondents said they'd never buy an autonomous vehicle, while 5% said they'd be early adopters. The rest said they'd eventually buy one but need to feel more comfortable with them first. Accordingly, reports have shown that vehicle development and deployment is based on experience with previous vehicle technologies, their likely benefits and costs, how they will affect travel activity, and their impacts on road, parking and public transit planning.

LEVELS OF DRIVING AUTOMATION



Autonomy levels outlined by Society of Automotive Engineers (SAE)

Despite this, autonomous vehicles are slowly gaining market share. While in 2019, there were some 31 million with at least some level of automation in operation worldwide, Statista reports that the number is expected to surpass 54 million in 2024. Correspondingly, the global autonomous car market is projected to grow as well. Although the market shrank by around three percent in 2020 due to the economic slowdown caused by the Covid-19 pandemic, it is forecast that between 2020 and 2023, the market will grow by almost 60 percent.

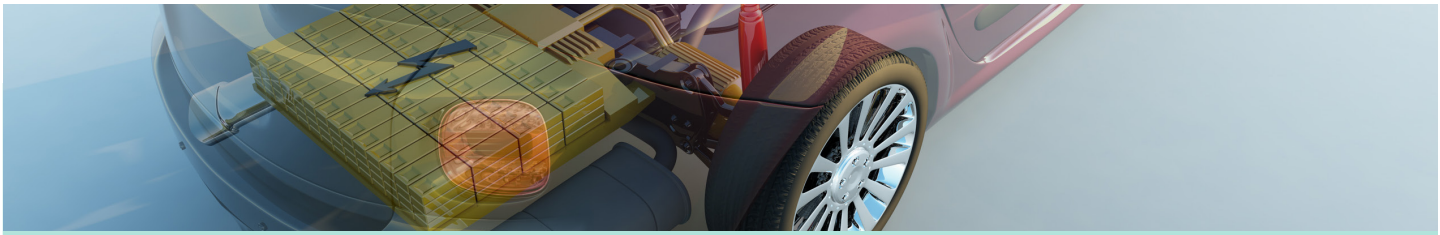
The evolution of electric vehicles and autonomous driving capabilities has led the auto industry to rapidly pursue technological changes that represent a paradigm shift in how vehicles are made. A remarkable 91% of automotive decision maker respondents to the Molex Car of the Future survey believed that by 2030 all newly purchased cars will be either fully electric or hybrid and they also expect new cars will all have some degree of autonomous functionality by 2030. That means that within a decade or so, nearly all cars and trucks will be technologically unrecognizable when compared to their predecessors, accommodating design features needed for the latest EV technology while also being robust enough to perform reliably under harsh conditions.

Technologically unrecognizable. What, exactly, does that mean? Molex believes there are four notable factors to keep in mind. Recognizing and resolving these four key considerations early in the design phase will help optimize performance and capabilities to drive EV and ADAS/AD applications to achieve their highly anticipated potential.

1 HIGH-VOLTAGE POWERTRAINS

As electric vehicles in their various forms replace mechanical and hydraulic systems, there is greater demand for DC power, which can’t be delivered by the typical 12V DC systems. Even internal combustion engines and “mild hybrid” vehicles are seeing an evolution of basic electrical systems with increases commonly quadrupling voltages to 48V DC, and power requirements for all-electric vehicles starting at 400V DC. In turn, higher voltage delivers greater efficiencies, realized by the need for smaller-diameter wire, decreasing cost and weight, and reduced charging times.

Further, to ensure proper safety in the high-voltage environment of an electric powertrain, interconnects require greater degrees of isolation and strong connections that can withstand various heat, moisture and vibration conditions are required in the harsh environment of the vehicle powertrain. Operational reliability is also critical in preventing vehicle failures and corresponding repair costs.



2 KEEPING POWER UNDER CONTROL

The battery management system (BMS) plays a key role in ensuring the safety and reliability of electric vehicle batteries, as it monitors the health and charging state of the battery cells. The BMS relies on sensors distributed throughout the battery that monitor current output, temperature and other factors with interconnects ensuring that nothing occurs to disrupt this relationship.

Molex leveraged its automotive industry expertise along with consumer device experience to develop micro-interconnect solutions with design features needed for the latest EV technology while also being robust enough to perform reliably under harsh conditions.

For example, Molex has designed FPC-to-board connectors for use in BMS applications that have a low-profile and contacts that are slightly recessed so they cannot be damaged if the mating shell is ‘scooped’ into it during mating. Additionally, the dual-beam contact delivers connection integrity even under high levels of vibration and thermal shock, providing high-caliber micro-interconnect products that ensure dependable and robust power for battery management.

Likewise, for high-voltage powertrains, Molex has designed compact 1.00mm-pitch high-power board-to-board connectors with a dielectric withstand value of <100mA (when voltages under 500V are applied), plus >100 Megohms insulation resistance (below 1,000V AC/1,600V DC). They also have a deep wipe length of ±1.75mm and dust-proof terminal covers to help mitigate the risk of short circuits, delivering both high reliability and safety.

3 MEETING DATA REQUIREMENTS

Turning the focus to high-speed data, cars have relied on controller area network (CAN) and local interconnect network (LIN) technology for decades. However, the data rate limitations of these protocols make them incapable of handling the amount of data produced by electronic control units (ECUs), cameras, radar, lidar and the other data-producing devices within today’s vehicle. Therefore, the widespread adoption of ethernet-based connectivity and zonal architectures will enable more efficient data transmission throughout the vehicle, reducing cabling weight and cost. In zonal architecture, ECUs will be replaced by domain controller units (DCUs), which are expected to proliferate.

4 HIGH-PERFORMING CAMERAS

As vehicles move toward higher levels of autonomy, the number of ADAS cameras inside and outside the vehicle is increasing, with some car models having 10 to 12 cameras. These cameras also will require high-speed data transfer and low latency to quickly inform driver safety systems of potential hazards. Additionally, cameras must provide 8-megapixel resolution, compared to the 1.3-megapixel-resolution cameras generally deployed today.
As camera modules get smaller, they require single PCB arrangements, which creates additional electromagnetic interference (EMI) due to more densely packed components. Finally, both the camera and cabling must operate reliably under harsh conditions, including high degrees of shock, vibrational forces, and extreme temperatures.

To accommodate these high data rate requirements of the new autonomous vehicles, Molex camera cable assemblies have bandwidths from 3 to 6 GHz and include robust connection features, such as retention force capabilities to withstand 110 N. Integrated plastic backshells also prevent EMI from impacting signal integrity performance. At the board level, Molex connectors for PCIe Gen 4 have up to 200 contacts and support data rates up to 20 Gbps, more than enough bandwidth to accommodate in-vehicle networking requirements.

To dive in deeper on these topics, please refer to the Molex tech briefs: Micro-Interconnect Solutions Addressing Electric Vehicle Demands and Micro-Interconnect Solutions for Increasing Vehicle Autonomy.

S SHARING IS CARING – AND SO IS SUBSCRIBING

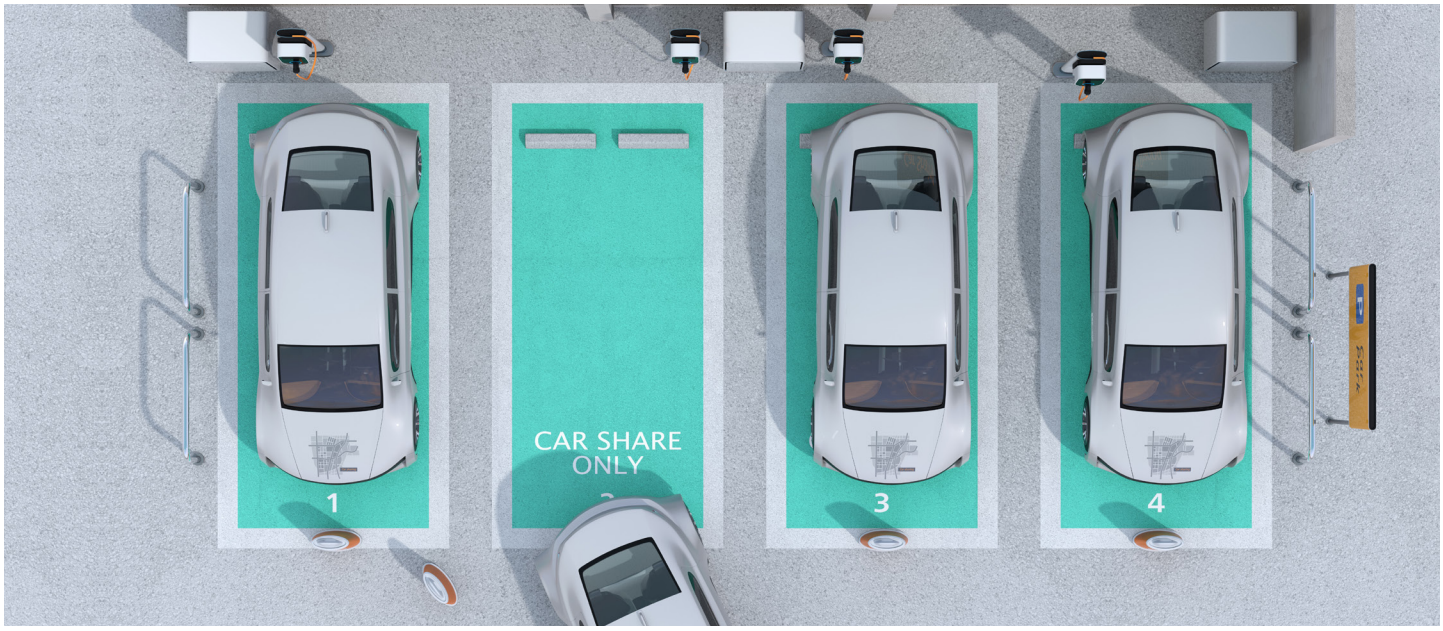
The “S” in C.A.S.E., is where things get interesting and (if possible) even more disruptive, with Sharing and Subscriptions being the name of the game.

The future of automotive and the transportation industry itself is changing with speed as new players like Lyft and Uber invade the market to shift the model from taxis to rideshare convenience. But ride on-demand is now relatively old news in the transportation vernacular. And the next evolution is car sharing, one of the ground-breaking ideas introduced by Singapore’s sharing economy. A rental service where drivers rent a private car by the hour or day, car-sharing is gaining popularity as individuals and families balance the need to get from place to place with the growing cost of car ownership. Deferring maintenance and repair costs, the new model calls for the driver to pay per time used and distance traveled – and only that.

Although slow to take hold, car manufacturers are also seeing the trend and are designing cars for the car-sharing economy. For example, transportation giant Penske Corp, jumped into the car-sharing business in 2019, providing customers with a wide range of vehicles. German Carmaker Daimler partnered with Uber in 2017 to supply them with autonomous vehicles. General Motors tested the concept with ahead of its time and now failed car-sharing service, Maven. And Tesla is also building an app to allow car owners to rent their cars for extra income. The market disruption seems to predict that people are beginning to devalue car ownership in place of car-sharing.

But sharing comes in many forms. Another economic driver supporting the “S” in C.A.S.E. is Subscription services – which allows buyers to subscribe only to the car features they want. And what a brilliant concept for both automakers and owners. Car makers can collect recurring revenue from car owners as they roll out regular software improvements. And lease vehicle owners and frequent traders can buy only the features they want and need for the few years they own their cars.

Automakers including Porsche, Volvo and GM’s Cadillac brand have tried vehicle subscription models with mixed success. But industry disruptor Tesla is leading the new subscription charge, having announced in July 2021 that it will allow customers to subscribe to its “Full Self-Driving” advanced driver assistance package for $199 a month, rather than paying $10,000 upfront. And a spate



of carmakers are now offering subscriptions to individual features as a new twist on the model. Mercedes-Benz will offer rear-wheel steering on its EQS electric sedan as a $575 annual subscription in Germany, for example. Likewise, certain features in the BMW such as heated seats and steering wheels can be unlocked via subscription fees, and Cadillac charges drivers $25 per month for its Super Cruise hands-free driving option after expiration of the three-year free trial as well.

What's inspiring the shift to subscription models? Clearly, learned consumer behavior has everything to do with it. After all consumers buy subscriptions in their daily lives for everything from movies and wine to premium shipping services. But in the automotive business, the key is pricing. The minute it gets too high, it seems, all bets are off. In fact, a survey by the automotive website Autolist found that most people were willing to pay just $11 to $25 a month for subscription features, so automakers are watching the data (enabled by connectivity, of course) carefully to gauge fluctuation and nuanced understanding of what will fly (or drive) the new subscription models.

So, what's the upshot for automakers given new subscription realities? Kelly McCartney, director of corporate strategy at Molex, predicts that the decoupling of hardware and software will impact every part of the vehicle, well beyond infotainment, forcing both OEMs and suppliers to leverage software expertise for automotive design. This supports zonal architectures and the central nervous system analogy.

"Consumers will continue to ramp up demand for more customization in their automotive choices, requesting more pick and choose and ad hoc bundles that allow them to create their own world, including entertainment, warranties, maintenance bundles, and insurance bundles," she said. "But 2022 will likely see a delay in providing these full features due to the chip shortage, forcing auto makers to keep buyers engaged and interested with creative solutions that rely on connected devices and fast data in the short term and offering the promise of leap-frogged advancements once chipsets become available." Only time will tell. But, there's little doubt that the "S" in C.A.S.E. will be one factor to watch as the automotive industry continues to swiftly transform.

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Kelly McCartney
Director of Corporate Strategy at Molex

E IT'S ELECTRIC

The "E" in C.A.S.E. is as predictable as the ball drop on New Year's Eve. And the reasons are clear. Electrification is on fire!

Research firm McKinsey believes the tipping point in passenger EV adoption occurred in the second half of 2020 when EV sales and penetration accelerated in major markets despite the economic crisis caused by the COVID-19 pandemic. All signs point to Europe as the facilitators of the development, where EV adoption reached 8% due to stricter emissions targets for OEMs and generous subsidies for consumers.

Looking ahead, The McKinsey Center for Future Mobility predicts that China will continue to see strong growth in electrification and remain the largest EV market in absolute terms. Despite low EV subsidies, strong consumer pull coupled with the government's dual-credit policy has driven an increased EV share of manufacturers' portfolios. McKinsey research models a Chinese EV share above 70% for new car sales in 2030. And the United States isn't far behind, with government targets for electrification placed at 50% by 2030, fueled by substantial investments in infrastructure and stringent fleet emissions targets. California regulatory support for EV and the other states following its CARB ZEV regulation is driving uptake. So much so that some believe the US will exceed regulatory targets and reach 65% EV sales by 2030.

In November 2021, Molex unveiled results of a global survey of automotive stakeholders that identify top trends and roadblocks impacting innovation in Electrified Vehicles (EVs). Fully 93% of respondents believe electrification is on the cusp of a huge breakthrough, but 94% of those polled agree that electrification goes well beyond a move to electric motors.

The top-three growth factors identified by the survey respondents include the increase in pro-electrification government policies, improved battery technology and a wider selection of electric/hybrid cars for the consumers leaning to an electric future. Clearly the focus on

electrification among automakers and their suppliers has increased dramatically over the past two years in relation to customer experience (55%), business results (51%), executive attention (50%) and expected speed of market delivery (48%).

But those same automaker respondents point to hurdles as well. "Automobile electrification is a complex undertaking, involving much more than transitioning from internal combustion to electric engines," said Kevin Alberts, SVP and GM, Power & Signal Business Unit (PSBU), Molex. "The quickening pace of innovation across all aspects of electrification is being propelled by highly sophisticated engineering and fully integrated manufacturing that leverages ultrasonic welding, sustainable production and automation to speed delivery of next-generation electrification solutions."

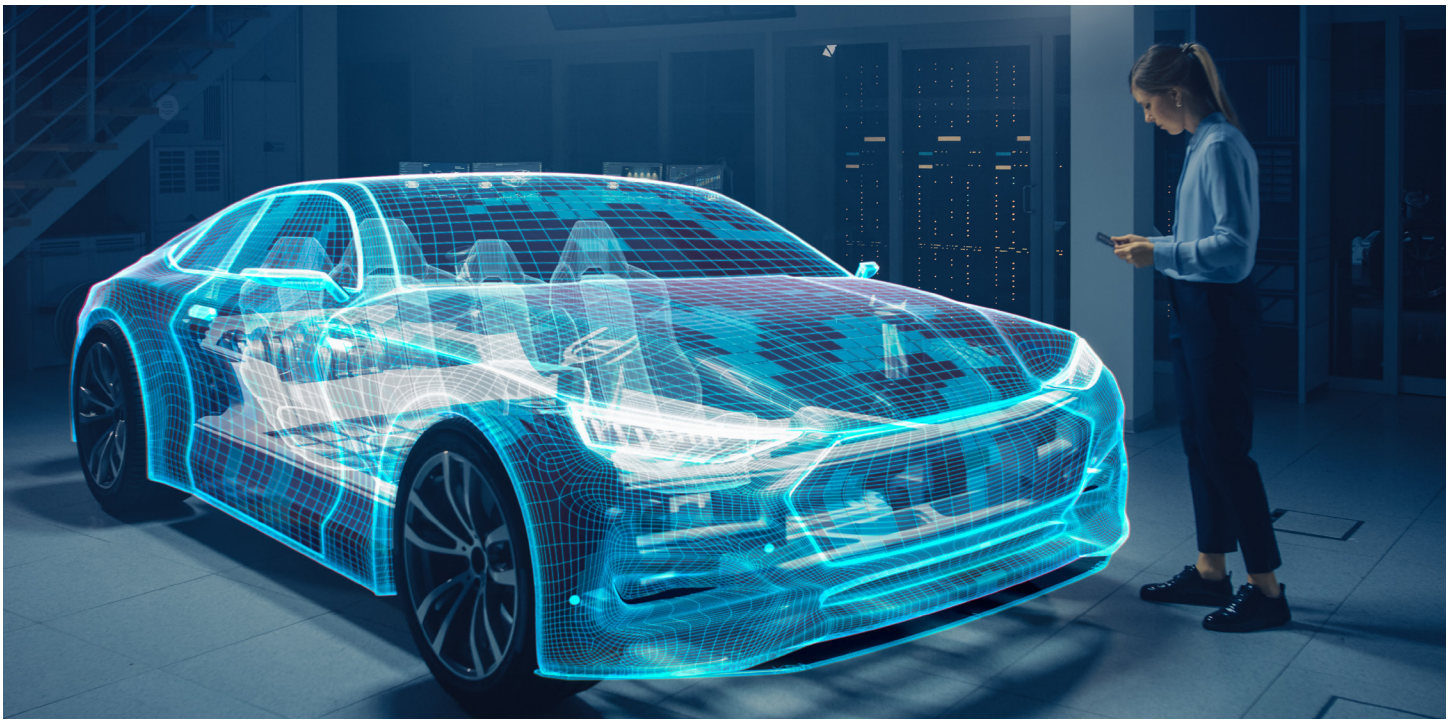
As a major catalyst for change in the complete vehicle architecture, including charging stations, successful electrification requires greater collaboration among automotive OEMs and their suppliers, increased R&D and capital investments, as well as the design, development and delivery of breakthrough technologies in power control and battery management.

And that's no small feat. Fully 92% of those polled in the Molex survey report their design teams face difficulties with electrification while 91% report challenges finding much-needed expertise to engineer the right solutions to changing consumer needs. Indeed, consumers are demanding safer cars that are not only comfortable, but convenient, sustainable, and packed with infotainment functionality. And that requires electronic systems and modules with newly designed electrical architecture.

Take electronic control units (ECU's), for example. To meet consumer demands, the design of high-end vehicles can have over 100 ECUs, creating new challenges in how to connect, package, and manage the systems that transport command-and-control specific functions that are vital to the vehicle. This is where zonal architecture comes in to increase the limits of scalability posed by incumbent architectures. By segmenting the vehicle into zones, each zone has assigned functionality and then passes information between the zones as necessary. Zonal architecture optimizes and reduces the overall volume of wiring, and it also consolidates the ECUs. In addition to gaining topology that is better suited to the increasing number of electronic systems in the vehicle, zonal architectures also introduce weight savings that translates into increased efficiency and improved range on each charge. Successful implementation of zonal architectures requires flawless, robust, and high-speed data connections that can keep data flowing securely.

According to the Molex Electrification survey, 84% of respondents agreed that zonal architecture is the future and will address new design concerns as traditional approaches reach their limits, which is why Molex is focused on helping customers transition from traditional to all the intermediate phases that ultimately lead to flexible products supporting a true zonal architecture.

But the move to zonal is just one of the engineering hurdles. Heat or "thermal management" is heating up as an electric car challenge with the volume of electronics and ECUs being designed into both ICE vehicles and EVs. The combination creates design complexities that



require innovation in connector miniaturization due to space constraints that also raise temperature levels that must be addressed with innovative design solutions and advanced predictive modeling. Further, miniaturization and increased electrical content necessitate greater component density. Dissipating the same or more heat in a smaller space over the reduced surface area of miniaturized systems can create excessive heat risks that must be managed. Likewise, heat risks can increase if the electronics are in a sealed ECU and located where extremes of ambient temperatures are experienced, such as under the hood. The harsh environment combined with high-circuit density and small package size requirements for next-generation connection systems can result in thermal challenges that cause safety, reliability and lifetime issues if not designed properly.

Molex executes high-fidelity thermal simulation to drive design exploration and mitigate thermal issues before mass production, providing immediate visibility into potential concerns and allowing for accelerated modification cycles and custom development that avoids “build then test” approaches that are rife with rework.

If heat wasn’t scary enough, noise is the final frontier in the electric evolution. And it’s rather scary in its own right due to the impacts it creates for drivers. How? Internal combustion engines dampen ambient noise generated from the road, tire, wind, and vehicle structures that elevate fatigue and corresponding driver safety concerns. But in the electric car, engineers can no longer rely on mechanical methods of noise dampening, such as sound deadening materials or foam lining, as these add cost and weight to a vehicle which impacts both energy consumption and range. But noise cancellation sensors enable automakers to electronically control unwanted sound.

Molex’s accelerometer-based road noise cancellation sensor is strategically positioned on the vehicle chassis to monitor road noise, and along with intelligent algorithms, deliver a noise cancellation wave at the moment unwanted noise hits the occupants’ ears. Noise management technology is giving OEMs a wider range of noise reduction benefit enabling a head-start in designing and deploying a lighter, higher-performing, more flexible, and more efficient solutions for reducing unwanted noise.

IT TAKES A VILLAGE

The continued increase of electrical content and the electrification of powertrains on vehicles is a positive and inevitable progression in the lifecycle of the automobile. It is important for experienced innovators like Molex to support this megatrend by collaborating across the automotive ecosystems.

This means staying at the forefront of design requirements, reducing potential risks associated with profoundly squeezed supply chains and developing solutions that fit the unique needs of a dynamic and disruptive market. It also means partnering to achieve new levels of success.

Automotive manufacturing is a multi-disciplinary enterprise that demands high levels of rapport and input from numerous cross-industry sectors to ensure effective production of new models. But acceleration of the EV sector requires collaboration on a completely unprecedented scale. Molex's recent Innovation in Automotive Electrification survey has revealed that increased collaboration is seen as the most likely driver for innovation in vehicle electrification. Indeed, leading OEMs and Tier 1 and 2 suppliers need to work together and leverage distribution partners to utilize new technology to put new EV models on the road – and fast.

Successful collaboration that ultimately solves some of the biggest design challenges in automotive is not a chance happening between providers – it requires decades of experience not just in automotive but also in data center and mobile device industries, supply chains and beyond.

Keeping this reality keenly in its focus, Molex helps customers across industries make a connected world possible — not only with innovative solutions but with a world-class supply chain that focuses on providing reliability and service to its customers.

SUPPLY CHAIN MATTERS

At the heart of this is a global organization built on a shared vision of mutual benefit between its customers, suppliers and employees. Molex continues to evaluate and invest in capabilities that empower its teams to better serve customers, work with suppliers and create value. One of those critical capabilities is "Design For" thinking, which Molex applies during new product development (NPD) that enables enhanced supply-chain resiliency throughout the product lifecycle.

The impact of effective "Design for Supply Chain" strategies have been put to the test during the pandemic, responding to lockdowns, new protocols and unprecedented logistics events. It's easy to forget that disruptions in global supply chains are not reserved for pandemics. Lesser-known events this year, including extreme cold in Texas, a cargo ship blockage of the Suez Canal, power outages in southern China and a fire at a semiconductor factory in Japan have all driven supply and demand disruptions.

For Molex, anticipating and mitigating potential supply chain threats starts at the beginning of the NPD lifecycle. NPD sourcing initiates the linkage for its end-to-end Intelligent Digital Supply Chain. Its enhanced supply chain and optimal customer experience is achieved by applying these four NPD sourcing strategies: Design for Architecture, Design for Supply Chain, Design for Procurement, and Time to Market.

The “Design for Architecture” methodology involves deep collaboration with both customers and supply chain partners to make sure supply chain resiliency and reliability are a crucial part of product development. Utilizing new data-driven intelligence capabilities, Molex designs-in component optionality and leverages actionable insights on technologies, materials, categories, suppliers, and markets to help its designers make better product-architect decisions. Access to real-time data informs Molex of opportunities and risks so Molex can plan for potential obstacles during the design phase and adjust as the product matures. The goal is to deliver reliability and best-in-class service to its customers throughout the lifecycle of the products they deliver.

“Design for Supply Chain” drives end-to-end supply chain risk assessments and mitigation, from purchasing of raw materials and other sourcing to product delivery. It involves new product development teams working closely with category management and other supply chain stakeholders utilizing comprehensive intelligence capabilities to develop contingency plans, alternative sourcing and more. Advanced “Design for Supply Chain” mitigates risk throughout the product life cycle.

“Design for Procurement” methodologies ensure preferred suppliers are used to maximize mutual benefit and provide safeguards to ensure that Molex’s supply chains are reliable and compliant. Establishing relationships with trusted suppliers is a crucial part of NPD and supply chain security. In addition to the ethical matter of following laws and regulations as well as humane practices, the use of preferred suppliers that have proved compliance in areas such as conflict minerals, for example, protects production from the potential instability generated by noncompliant organizations and behaviors.

As programs move from NPD to production, Molex continually monitors and mitigates for emerging supply chain risks by leveraging its Intelligent Digital Supply Chain capabilities and working closely with key supply chain stakeholders on proactive risk mitigation such as business continuity planning and contingencies for every part capability. By identifying and planning for potential problems, Molex avoids delays and helps ensure timely product launches.

The upshot? Reliable solutions require reliable supply chains as well as a “Design for” mentality and mindset around solution architecture, supply chain and procurement. Further, access to real-time data reveals insights that uncover both opportunities and risks — and continuing to invest here to drive Intelligent Digital Supply Chain capabilities is vital to long-term success. But risk mitigation can never be far from the top of the priority list either. It starts early and runs throughout the product lifecycle to help ensure a successful NPD process.

As a leading supplier of electronics and connectivity solutions to most of the largest global OEMs and suppliers in the automotive industry, Molex provides the automotive industry with dependable products and custom solutions. Our customers are encouraged to design-in our solutions with a level of supply chain and product reliability confidence, building a C.A.S.E. for a smooth road ahead for the next generation of transportation in all its connected, autonomous, subscribed, and electric glory.

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