DVN-I
Automotive Interior

Thu, 16 December 2021 Weekly Newsletter **NEWSLETTER #91**

Editorial

Whole New Kinds Of Surface Content Integration

This week we present our conversation with Dave Rice. He's SVP of Marketing and Business Development at TactoTek, a Finnish technology supplier serving the automotive interior sector (among others). His is the newest in our ongoing series of feature interviews with DVN Interior community members.

This interview fully justifies its In-Depth title. By reading it, you'll better understand all the benefits of TactoTek's IMSE technology, and also the unique TactoTek technology-transfer business model. IMSE perfectly supports the automotive Interior Trend of potentially transforming any plastic surface into a functional surface with integrated lighting; touch controls; decoration, or alerts. Because of the flexibility of the technology, it can be integrated exactly where it is needed, to appear when it needed. Integration also drives down parts count, making the overall stacking much more reliable.

Want to join the list for a DVN-I interview? Gladly, just **drop us a line**! Not a DVN-I member yet? Join us here!

Sincerely yours,

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

Interview: TactoTek SVP Dave Rice

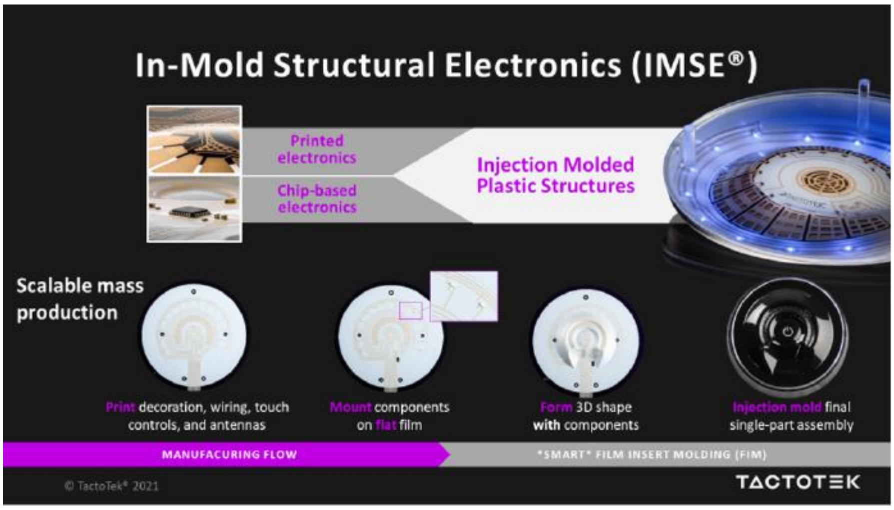
TACTOTEK

DVN Interior General Editor Philippe Aumont recently met with Dave Rice, Senior Vice President of Marketing and Business Development at Taktotek, Finnish specialists in IMSE (Injection Molded Structural Electronics). The goal: to bring DVN Interior members better understanding of this unique company and their technology. Dave has a special focus on the North American market, as he's located in the Pacific Northwest.

DVN Interior: Where did TactoTek come from?

Dave Rice: TactoTek was founded as a spinoff of VTT, the Finnish public-private research institute. VTT does considerable research in the areas of printed electronics. Our two founders came from VTT, and established TactoTek in 2011. The company was originally established around printed electronics and in-mold components, for the very specific use case of optical touch. Jussi Harvela, our current CEO, joined the company in late 2012. We evaluated the marketplace for that specific application of the technology, and it was really not a large commercial opportunity. But what we found, is that everyone was very excited about the ability to integrate printed electronics and discrete electronic components within 3D injection molded structures. And that enthusiasm spanned automotive, home appliances, consumer products, medical products, even aerospace, so instead of having a vertical implementation of one use case, we had a horizontal technology that served many use cases and many marketplaces.

DVN-I: What is your base technology at the moment?



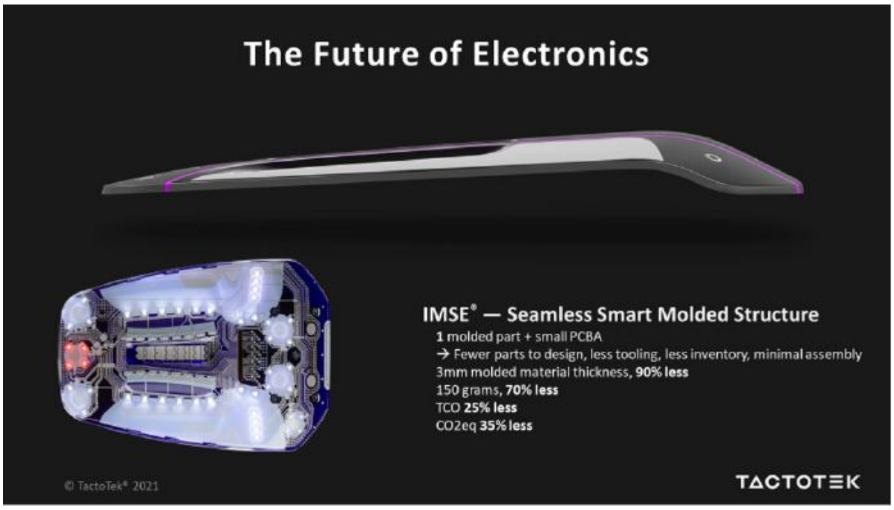
TACTOTEK IMAGE

DR: That's IMSE, which stands for Injection Molded Structural Electronics. In IMSE parts we integrate electronic functions, structural and mechanical aspects of the part, and cosmetics into a single-piece, seamless structure. There is a lot of design freedom as we eliminate many of the components that typically go into an electromechanical assembly, and in that way, we reduce complexity.

DVN-I: How does it work?

DR: Making IMSE parts is an advanced film-insert-molding (FIM) process. We use films made of materials compatible with the structural plastic resin of the part as carriers for the electronics and as a surface on which we print decoration for the cosmetic surface. For the electronics we start by screen printing any needed circuitry, touch controls, antennas and proximity sensors on flat film, let's say polycarbonate. Then we surface-mount electronics, most commonly LEDs for illumination, to create various styles of lighting features. We surface-mount components on the film while it's flat for multiple reasons: it's fast, accurate, and the equipment is commonly available globally. Then we form those films into the 3D shape of the part. Lastly, we use the films as inserts into the injection mold and standard high temperature, high pressure plastics, such as polycarbonate, are injected between the films which encapsulates and protects the electronics as it creates a seamless, single piece smart structure that's typically 2-4 mm thick. Each of these additive processes efficiently uses materials and doesn't generate toxic waste streams.

DVN-I: Do you have an example, where you're using this process?



TACTOTEK IMAGE

DR: Almost all of the projects that we work on are for our customers, such as automakers, whose designs are confidential, so I'll speak to a technology demonstrator that TactoTek developed. Let's consider an overhead control panel. It's a popular use case with many prospects, so we created our own example showing different features and functions.

The reference conventional electromechanical assembly has about 64 parts, and is more than 45 mm thick. In our solution it's about 3 mm thick, weight is reduced by 70 per cent, and we've reduced the number of parts to *two*. That's fewer parts to be designed, to be sourced, to be produced, to be inventoried, to be assembled. It is also a significant total cost of ownership reduction. In parallel, we have a significant reduction in greenhouse gas equivalents for manufacturing this part. So, it's a great solution, meeting customer needs in terms user experience and aesthetics. Of course, an automaker would want their own specific shape, selection of electronic features, and cosmetics.

In the picture we're looking at here is a part without the decoration layer, so it's easy to see the printed circuitry, touch controls, and Bluetooth antenna, as well as LEDs that are encapsulated in the plastic structure.

DVN-I: Who are your customers, within the whole value chain?

DR: In the automotive space, we license our technology to established tier suppliers who mass produce parts for automakers. Market leaders including LS Automotive, Faurecia, Kyocera, and Techniplas are announced licensees who can manufacture IMSE parts. We have many other licensees within negotiations. We also have specific licenses for design groups and examples include Lightworks and Phiaro. TactoTek does work directly with automakers to help them learn the possibilities with IMSE technology, and we develop and manufacture prototype designs for them in our manufacturing facility at Oulu, Finland.

TactoTek does mass-produce parts for other markets, like industrial and consumer goods, and smart home products. One example is the faceplate of the Shepherd smart lock from PassiveBolt that has won multiple CES innovation awards.

DVN-I: How do you manage technology transfer to licensees?

DR: TactoTek offers two types of licenses: one for manufacturing IMSE parts, and one for designing IMSE parts—IMSE Builder and IMSE Designer, respectively. We take a very hands-on approach to technology transfer. For IMSE Builder we provide extensive written and online training materials. But that isn't enough; we have in-person 'classroom' training sessions and have licensee staff manufacture parts on our production line to put that theory into practice. Often, we send a team to their facility as well and manufacture IMSE parts using their own equipment. This confirms a licensee has effectively learned and adopted the techniques needed to successfully manufacture IMSE parts. We only succeed if our customers succeed, so we're highly motivated to ensure effective technology transfer.

We also work directly with automakers to accelerate technology adoption and create market pull for designs using our technology. The maker may then engage directly with one of our licensees, or they may as an existing supplier who is not a licensee to become one. We do probably 2/3 of our projects today directly with automakers. Most of these are pre-production projects in which we work with the maker's design and engineering teams and in the process, they learn how they can represent their design language and to differentiate their products in the marketplace using IMSE technology.

We are witnessing a rapid expansion of IMSE use cases: as automakers, tiers, and designers learn the capabilities of IMSE, they come up with new designs and uses cases that support their vision for their brand and products. Meanwhile, the capabilities of IMSE solutions are expanding rapidly.

DVN-I: What would be a technology transfer package?

DR: It is a large collection of intellectual property, reflecting an immense amount of engineering investment that has generated significant know-how and trade secrets, as well as over 120 patents globally. Much of this information is very practical. For instance, automakers and our licensees must have confidence that IMSE parts can be mass produced efficiently at high yield and deliver a lifetime of reliable performance in demanding automotive conditions. We provide 'recipes' of materials and identify electronic components that meet those requirements when our design rules are followed. To that end we have teams that characterize all of the materials and components that go into an IMSE part, both individually and as material stacks. Then we make parts using those material stacks and subject them to automotive environmental tests. This is applied and validated learning; even when material stacks don't meet performance requirements, it's valuable learning.

TACTOTEK IMAGE

DVN-I: What are typical applications of your technology?

DR: Today, most use cases are for control panels, styling and functional illumination, and integrated controls. Increasingly lighting is being used as an important aspect of styling and also taking on functional roles, such as driver notifications, by changing color or patterns. We only need a few millimeters of depth to create functional and stylish controls and lighting effects, and the parts can be in conformal 3D shapes, so these types of features can be easily integrated throughout a vehicle. Some of these design concepts are evolving from consumer electronics and taking on forms more appropriate for vehicle cockpits.

The overhead console is one example of how the feel of an interior can be changed. It's easy to shape that control in a way that the sunroof could extend further forward, enhancing the feel of openness for the driver. Meanwhile, because it's a single-piece seamless part: assembly is minimized, integration is easier, and it won't rattle or squeak over time.

While TactoTek doesn't offer industrial design services—that is the territory of our customers and design experts—we do have a talented employee who has developed some truly inspired designs, and we will be showing one of those at CES 2022. It's elegantly simple in appearance and provides an intuitive user experience.

ORIGO STEERING WHEEL (DVN INTERIOR, 7 MAY 2020), BOASTS LIT AND HANDS-ON FEATURES THAT ARE EASILY CONTROLLED WITH MINIMAL HAND MOVEMENT.

TACTOTEK IMAGE

DVN-I: You talked about cosmetic layers and decoration. What about when the surface becomes functional?

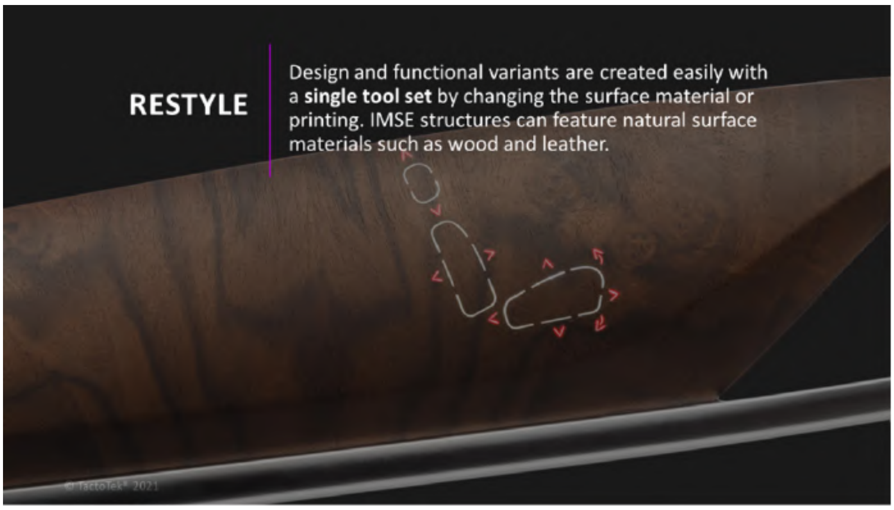
DR: With this above example in the rear armrest, we integrate capacitive touch controls, proximity sensors, lighting, even an antenna if that makes sense. This type of function integration is probably 95 per cent of what we do today. Ambient lighting is now everywhere, and includes often touch functionality.

DVN-I: How do you consider a Tesla-like solution, where all functional surfaces are grouped on the screen?

DR: We do see these trends, having a tablet on your dashboard. Personally, I'm not fond of that aesthetic or user interface for primary controls. I test drove a vehicle recently that required using the touch screen to operate the rear windows—that doesn't make sense to me. It does seem that there's a shift away from the dashboard tablet design to having user functions located where they're their intuitive to use, rather than always reaching to a centralized display.

DVN-I: And what do you think about the trend of having pillar-to-pillar displays, like on the new S-Class?

DR: It's a very elegant solution, and there's still a need for controls that are easily within reach for all vehicle occupants. As we think about the rise of autonomous vehicles, seating positions become dynamic, so you'll not always be looking to the screen from a forward-facing seating position. For alternate seating positions, you may want controls that are prominent only when needed, perhaps activating them with a proximity sensor, then having them blend into the interior the designer created for you.



TACTOTEK IMAGE

DVN-I: Is it easier to make them disappear, compared to a screen?

DR: You can always turn the screen off. Alternatively, some controls can blend into the cosmetic surfaces such as the door panel with seat controls example. When light is off, you see the elegant wood veneer surface. For this part, the challenge from the automaker to the tier-1 was to add electronic functionality to that beautiful wood surface without increasing the assembly depth, and only have it appeared when you want to use it. IMSE technology was the right solution.

DVN-I: Do you have haptic feedback here, for when the driver is not looking where they're touching?

DR: In this application, as feedback comes from the seat movement, and you feel it moving! There are however applications where mechanical haptics makes a lot of sense. TactoTek is not a mechanical haptics expert, but our parts have many qualities that make them great candidates for mechanical haptics: they are very light, so easy to move; and they are single piece, seamless parts, so they don't create audio artifacts by rattling. We have partners who are mechanical haptics experts and have created demonstrators using IMSE parts.

Sometimes I do think that we get carried away with mechanical haptics. For a seat control, the movement of the seat is very effective confirmation of control input. Similarly, a light going on or a window opening is obvious. Of course, there are also controls that benefit from mechanical feedback.

There's another aspect of haptics that doesn't get as much attention these days, and that's the traditional use of the term: how a part feels, its texture, shape, and contours. IMSE parts create a lot of design freedom to create shapes and features that both feel good for the user and guide user interactions. In the overhead control panel, we looked at previously, the slider has ridges and texture which gives you a sense of how far you have moved your finger, as well as a light line.

DVN-I: How do IMSE costs compare versus a mechanical solution?

DR: It's most effective to consider IMSE parts at a system level. In a Geely example that they've shown publicly, they designed an IMSE seat control made out of one or two parts instead of the 25 in the conventional assembly, so the total cost of ownership is considerably lower for the IMSE part. Fewer parts to design, fewer tools to make, fewer suppliers to manage, fewer parts to manufacture, less assembly—it all adds up. Meanwhile, both cosmetic and functional variants for IMSE parts can be made with printing processes—no tooling changes.

DVN-I: How do you develop these parts and industrial processes?

TACTOTEK IMAGE

DR: In our Finland headquarters TactoTek has a vertically integrated IMSE design and manufacturing facility. It's where we do our R&D and our own manufacturing. That includes the primary IMSE production processes: printing, SMT, thermoforming, and injection molding. Some of these processes are cleanroom operations.

We have all the engineering disciplines for engineering and producing IMSE parts in-house. They work together as agile teams to design and manufacture IMSE parts. Industrial design is coming from our customers, then, we engineer electronics, mechanics, and cosmetics. There are essential supporting capabilities as well, for example, we electrically test each part at every step in the production process.

Our customers span many markets. While the majority of our business is with automotive customers, we have significant business in smart-home, aerospace, and appliance markets. We have also done some modest scale mass production, but for automotive production we refer opportunities to our licensees.

DVN-I: Do you use a different design approach when integrating IMSE, compared to a traditional design?

DR: We do have a different approach. Because mechanics, electronics, and cosmetics are integrated within a single part, designers/engineers in each of those disciplines need to collaborate in real time. Changes in the mechanical shape or different mechanical features may influence lighting performance requiring repositioning or changing LEDs, which in turn may change the circuit layout. Our engineers discuss some of these collaboration needs in a webinar available from our website.

DVN-I: What about larger parts, like a complete instrument panel or a door panel?

DR: TactoTek's own production equipment limits the size of parts that we can make. Of course, our licensees have much larger equipment. The specific approach for designing IMSE electronics for a larger part depends on the electronic features and their locations.

DVN-I: Within your vertical integration, are you designing and manufacturing printed circuitry? What about design software?

DR: We design all the mechanics and electronics in our IMSE parts. We also train IMSE Designer licensees how to do that. For design tools we use off-the-shelf mechanical and electrical CAD tools to design parts; we have worked with the publishers of some of those tools to improve how they work for designing IMSE parts. Internally, we use DS 3D experience or Catia and for electronics we use Altium Designer.

Software that drives electronics is often overlooked, and we do develop the software that drives the parts we produce for our demonstrators as well as customer designs. When IMSE parts are integrated into a production platform, typically the tier-1 or automaker does the programming.

DVN-I: What about all the different materials you use?

DR: Key inputs for IMSE parts include plastic films, resin, decorative inks, functional inks, and electronic components. We have long standing relationships and joint R&D activities with vendors in each of these categories. To use functional inks (conductive and insulative) as examples, we are constantly evaluating new materials from many vendors and have close long-term relationships with Dupont and Sun Chemical. Our partners have dedicated a lot of resources to ensure that their materials meet the demands of IMSE and their advances increase the capabilities of IMSE parts, and all in-mold electronics parts, for that matter.

DVN-I: How do you address the environmental and sustainability issue with these many materials you stack together?

TACTOTEK IMAGE

DR: We often hear that sustainability has three pillars: reduce, reuse, recycle. Already, IMSE excels on *reduce*, which may be the most powerful. A typical IMSE part uses 50-75 per cent less plastics than a conventional electronics equivalent. Less raw materials to extract and process, fewer parts, less tooling, less transport, no toxic waste streams. That's part of a compelling story. An independent lifecycle analysis of the overhead control panel showed 35 per cent less CO_2 equivalent than the conventional reference part from cradle to gate.

We have had materials recovery companies evaluate IMSE parts and they have demonstrated that high value materials, such as the silver used in functional inks, is easily and economically recoverable from our parts.

That said, there is mixed materials challenge because we in-mold components, inks, and metals within plastics. This is not a unique challenge for IMSE. Our sustainability lead is now working with four different recyclers around the world to identify the best techniques for recycling IMSE parts.

Interior News

Qualcomm Snapdragon for Opel-Vauxhall Astra

INTERIOR NEWS

OPEL IMAGE

Qualcomm Technologies and Opel have announced that the upcoming Opel-Vauxhall Astra will use Qualcomm's Snapdragon automotive cockpit platforms.

Qualcomm is a global innovation leader in wireless technologies and the driving force behind the development, launch and expansion of 5G. They're aggressively targeting the automotive sector, and say their integrated automotive platforms for cockpits and chassis now have an order pipeline of more than USD $13bn.

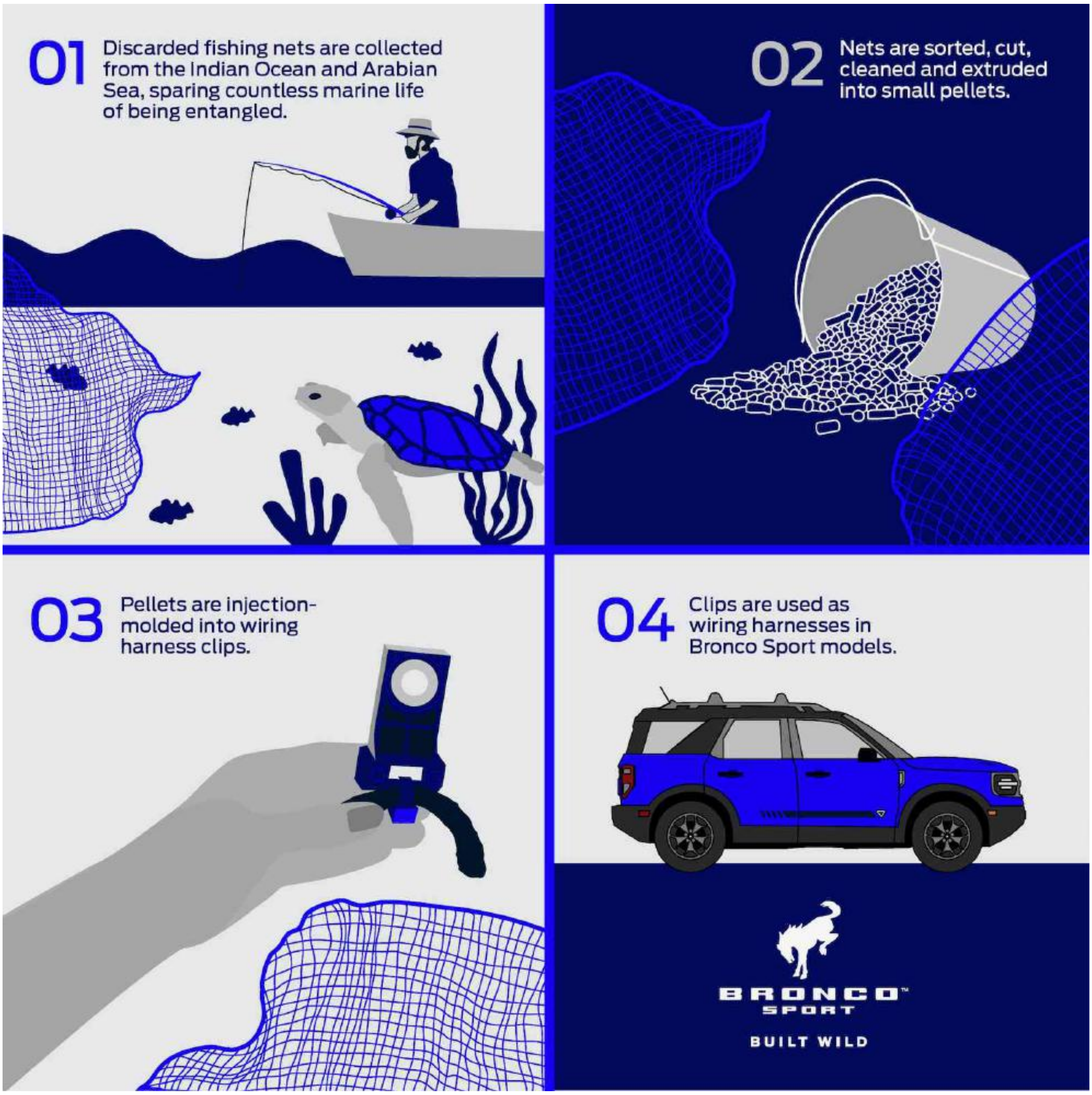
These platforms will power the Astra's fully digital Pure Panel digital cockpit with a new HMI designed to provide a simple, seamless and intuitive in-cabin experience for the vehicle's occupants.

Designed to provide premium experiences, the Snapdragon automotive cockpit platforms will also support the vehicle's precise positioning navigation as well as voice command capabilities, wireless mirroring, and premium audio and sound. It should be available in the first half of 2022.

Qualcomm describes this newest Snapdragon generation as their most advanced automotive platforms, custom-built with highly optimized cores designed for heterogeneous computing. They're designed to allow digital cockpit systems to be upgradable through software updates, allowing vehicles to be upgraded with the latest features and differentiation.

Ford's Wire Clip From Recycled Ocean Plastic

INTERIOR NEWS



FORD IMAGE

Wiring harness clips in Ford's Bronco Sport are made of ocean-harvested plastic called "ghost gear": fishing gear that has been abandoned, lost, or discarded, and is the most harmful form of marine debris.

Up to 13 million tons of plastic enter the ocean each year, much of it from the fishing industry's nets and other equipment. These items are overwhelmingly made out of plastic because of its durability, light weight, buoyancy, and low cost. Those same qualities are what make it a bad pollutant, and a prolific one. Ghost gear comprises nearly 10 per cent of all sea-based plastic waste.

The plastic material is collected from the Indian Ocean and Arabian Sea by DSM Engineering Materials. Items produced using plastics collected from the oceans include a wide range of consumer goods, but not until now have automotive parts been on that list.

Despite spending time in saltwater and sunlight, the material has proven as strong and durable as virgin plastic items. The five-gram wiring harness clips, which vehicle occupants, never see, fasten to the sides of the second-row seats and guide wires that power side curtain airbags.

This circular economy application is a small first step which opens the way to many other applications.

Yanfeng's 'Zero Gravity' Seat is Production-Ready

INTERIOR NEWS

YANFENG IMAGE

Yanfeng recently revealed their Zero Gravity Seat as a new, production-ready item. Zero-gravity has been a popular bit of hype since astronauts first returned from space. NASA says when a human's body is in Zero-G, the spine takes a neutral position naturally, which reduces stress and strain on muscles.

Fine for astronauts, but there aren't many of those. Now it is no longer necessary to travel into space to experience the same effects, though; see DVN Interior's coverage of the Nissan version of the concept (19 August 2021) and BMW's version (16 January, 2020).

Here, Yanfeng shows how they leverage capabilities and engineering expertise based on end-user insights and automaker needs. "Through consumer clinics and product road shows, we received feedback that the new, ultimate feeling of comfortable, weightless relaxation is appealing," said Yangfeng Europe VP and General Manager Chunfeng Xu.

The new seat features weightless relaxation in the Zero Gravity mode, which allows passengers to recline the seat up to 126° (angle torso to thighs) at the touch of a button. The backrest of the new seat can be fully reclined, creating a feeling of zero-gravity weightlessness that allows passengers to unwind.

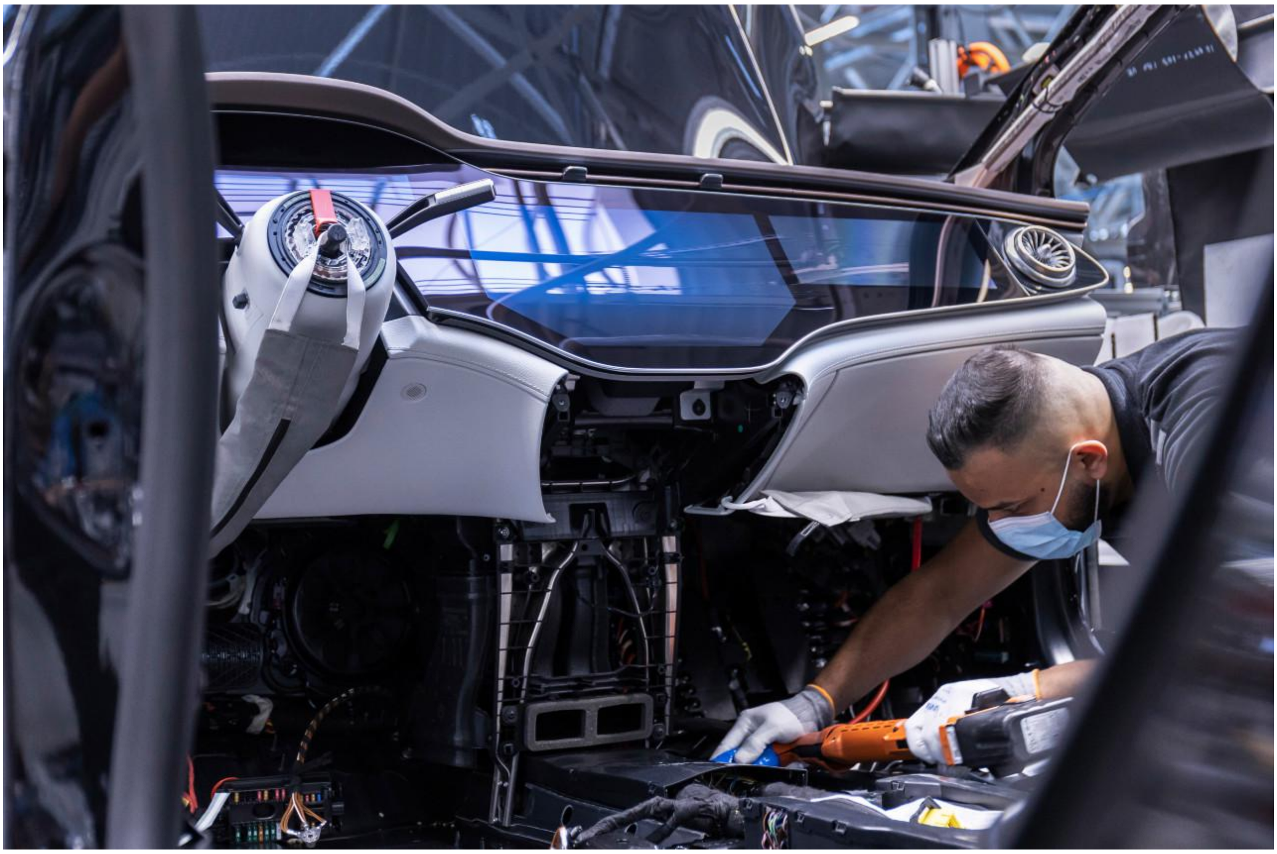
The integrated seatbelt provides even support, and with a restraint system to ensure safety in any position. Yangfeng says the functionality of the seat can be tailored to automaker needs, such as the choice of rotation, horizontal movement, manual or electric long rails.

Optional functions such as massage, heating and ventilation, and an electric four-way adjustable headrest enhance passenger comfort. A sound system can be integrated in the area of the shoulder part of the seat, offering a discreetly integrated set of speakers for private, cocoon-like audio enjoyment. With a touch-sensitive control unit, which is embedded in the soft surface of the armrest, all functions can be used intuitively.

Because of its kinematics this seat is usable in spacious interiors, making it ideal for vans, SUVs, and CUVs. It will go into production vehicles in Europe in 2024.

Chip Shortage Accelerates Smart Cockpit Development

INTERIOR NEWS



MERCEDES S-CLASS COCKPIT ASSEMBLY (ECOMENTO IMAGE)

The ongoing shortage of semiconductor chips is having a big impact on the whole automotive industry, limiting production volume as well as the content of the vehicles that are getting built—pretty much all vehicle features nowadays need electronic support, so it's not just esoteric add-ons affected. For instance, GM recently announced they are temporarily eliminating one of the most popular interior option, heated seats. They took this drastic action in a move to reduce all entry level trim options.

A few years ago, semiconductors were confined to the infotainment system, powertrain control, airbags, stability control, and that sort of thing. Today, with the growing number of safety functions, ADAS, cockpit, connectivity, comfort and services, higher computing power has to be installed and only modern semiconductors can meet it. According to A2MAC1, a Mercedes S-Class has 2,444 semiconductors! The Tesla Model 3 has a total of 1,380; the BMW X1 now has 1,254—and this number jumped 200 per cent between 2016 and 2021. Even a Dacia Duster has 180!

A2MAC1 indicates that the number of semiconductors is not the only relevant item to judge. We must also look at the level of integration, where, through smart design, one semiconductor can replace many others and handle more functions. In that respect, and as interior/cockpit is concerned, that’s why there are so many announcements popping up about smart cockpit development and new partnerships.

Interior Sustainable Materials Keep Growing!

INTERIOR NEWS

RANGE ROVER EVOQUE (JLR IMAGE)

DVN Interior recently published an In-Depth article on new materials for interior sustainability. More and more now, we're seeing announcements about new natural materials. Ethically-sourced Eucalyptus, for example, both as a cosmetic material as seen in the BMW i3's dashboard trim, and as a fiber for soft textiles, under the name 'Eucalyptus Melange'. It uses less water, grows quickly, and requires less surface processing than other materials. JLR says their Eucalyptus Melange seats even use less water than Alcantara and many other alternate leather materials.

Sustainable organic materials are used in the interior of the BMW i3 Urban Suite. In addition to the PET fabrics, the floor mats are made of a material that can be 100 per cent recycled.

In the Volvo XC60 prototype, the center tunnel is made from renewable fibers and the floor mats contain fibers from PET plastic bottles and a recycled cotton blend from remnants of clothing manufacturers.

The seat covers of the Mercedes study Vision AVTR are made of vegan leather. The interior of the Polestar 2 is also made of vegan materials. The fabric seat covers in the new Audi A3 are made of 89 per cent recycled PET bottles, from 45 such plastic containers. The fabric is called 'Torsion'. Target is a recycling rate for covers of nearly 100 per cent.

MERCEDES IMAGE

VOLVO IMAGE

The processing of a thread made from recycled plastic bottles is not very different from that of a fiber made from virgin PET. The only difference is that the bottle has to be shredded into pellets before the thread is made out of it.

After all, there are around 350 kilograms of plastic in a car, about half of which is recyclable, including the tires. Volvo and Michelin have now teamed up with a Swedish startup called Enviro. Using a special type of pyrolysis, they can extract rubber soot, pyrolysis oil, steel, and gas from the used tire, which can then be recycled.

The (sustainable) ball is rolling, and it's picking up speed; surely there's more news to come!

Best Cockpit of the Future Award for Eyeris

INTERIOR NEWS

Eyeris Technologies, specialists in automotive in-cabin sensing AI, gave an interesting talk at the DVN Workshop this past September in Michigan. Now they've won the Informa Tech Automotive Award in the Best Cockpit of the Future Product/Service of the Year category at the 2021 Automotive Tech Week conference in Detroit.

Informa Tech Automotive Awards director Caroline Hicks says "We created for the first time the Best Cockpit of Future Technology Award this year, and congratulate Eyeris for being the winner in this new category at the 2021 Automotive Tech Week. This is the 2nd award for Eyeris with us, and a strong testament for its innovation journey throughout the years in the automotive in-cabin sensing and monitoring industry".

And Eyeris founder and CEO Modar Alaoui says "Eyeris continues to cement its leading position in the cockpit artificial intelligence (AI) industry through constant innovation, with its world's first in-cabin sensor fusion AI and robust AI models that adhere to global NCAP and functional safety standards, while ensuring efficient inference and flexible interior image sensor locations. With a safety-comfort-convenience approach, we built in-cabin understanding AI technologies that are paving the way for the automotive industry towards a safer, more dynamic Cockpit of the Future. Today's in-cabin monitoring solutions are deficient, limited to 2D perception; and most importantly, fail to fully understand occupants' overall behavior while taking the rest of the interior environment into context".

Automakers and tier-1 suppliers such as Ford, Toyota, Jaguar Land Rover, Honda, Mitsubishi Motors, Bosch, and Veoneer have licensed Eyeris in-cabin sensing AI solutions. Eyeris expects their in-cabin sensing AI software portfolio to go into vehicle mass production in late 2022.

Eyeris and some of their automotive semiconductor and sensor partners will exhibit at CES 2022.

News Mobility

_Car Interiors Unplugged (Summary Series 6 out of 7)

NEWS MOBILITY

F1 2019 FERRARI VR GAMEPLAY

Physical, Digital, Remote

Hey! You ever ridden in a time machine before? Oh, sure what do you think this is?
> A car!
You're looking at this thing…this is a 20^{th} century time machine! I'm captain; you're the navigator. Out there (pointing forward), that's future, back there…well, that's the past. If you move too slow and you wanna project yourself to the future, you step right here (throttle). You see? (car accelerates). And if you wanna slow down, well, hell, you wanna step on the brake, here, and you slow 'er down (car gradually stops). This is the present, fella! Enjoy while it lasts."

These were 'Butch' Haynes's revealing words while he spins off in a stolen 1959 Chevrolet Bel Air in the attempt to escape from his convict past in the *1993 film 'A Perfect World'*. Simultaneously, his words stand for the car mythology that entire generations have been brought up with. A machine contrasting time; a man-made gadget to win against our greatest eternal enemy, time. In other words, how to get there faster, earlier or before someone else. We could certainly assess that any machine humans ever built is ultimately made to serve this purpose. However, time, distance and speed are interchangeable notions at the very moment we are mobile.

From the first marathon runner in 490BC equipped with just a pair of sandals, to the last weekend's F1 race, we share the same anxiety: is he going to make it there first? and we somehow engage, we become part of it.

Jeddah Cornice Circuit is the most modern, fastest ever, street track conceived and built as such. Placed on an exotic location is the benchmark of any previously known racetrack and it is designed to evoke emotions. Buildings, paddocks, lighting, cameras and brand-new flawless lanes constitute undoubtedly one of the greatest shooting stages of all times. Tens of thousands of spectators can be physically present but likewise tens of millions remote spectators, are connected to the speed without being there. During the race, stunning broadcasted views and digital popup menus bring us closer to the wheel. Watching, was as participatory as if a copilot was now transferred to the audience through the screen. In addition to the circuit, F1 cars have several camera fixings and often capture angles that the driver himself would not see. Hundreds of sensors monitor thousands of parameters, transmitting several gigabytes as seed to computation and distance is measured in time.

From the grainy footage of the early days to the high-quality images, onboard cameras have caught some of the most exciting moments over the past 35 years. Putting us in the race, on top of a wing or a helmet sticker, inside the cockpit during the accident, several times over through different views and settings. While looking at the Race we are becoming part of it by distance. Like in a video game.

The speed legacy starts ever since the first vehicle put top speed in its technical sheet. However, it took over 50 years to bring that notion into production cars from the 1949 jaguar xk120 (124mph) to 1955 Mercedes 300sl (140mph) based on light aluminum body, or to James Bonds Aston Martin DB4 1958 (141mph) and then of course to Lamborghini Miura p400 V12 (171mph). During that time, the speed quest paralleled space race between USSR and USA where each one was trying to get there first, alluding into galactic speeds, boosting furthermore the wild speed chronicle. In 1984, Ferrari 288gto reached 188mph and then Ferrari f40 1987 stretched to 202mph. In 1991 the Bugatti brand resurrected on ev110 quad turbo v12 full carbon and certainly the 1993 McLaren F1, with its central cockpit and gold-coated engine, clocked as the fastest to this day, naturally aspirated engine at 240mph. In 2011, Bugatti Veyron Supersport W16Quad turbo engine, rocked 1200hp and a max torque of 1,500N.m reaching 267mph, hence speed equals power. The race goes on with people asking for more, and speed becomes a marketing tool. Indeed, we are selling speed instead of cars. This is the exact narrative of an f1 race that in automotive business makes us feel that we all somehow participate by building the parts for it. Meanwhile durable goods value grows on steady rhythm while consumption services grow exponentially and Instagram culture converts anything into a shooting stage, but there is more.

In the ambition to maximize both exterior vehicle performance and equally interior piloting skills, we have tempted to detach gravity or at least its consequences. The only link, between vehicle/exterior and interior/cockpit, became the data. This is the case of driverless race vehicles. Somehow, pilots and audience merge in one unique race for speed. We assessed that robocars can be infinitely optimized but remain predictable thus never reach the degree of sophistication and reflex of a real pilot. But right there something else happened. We, humans, are great to synthetize events and project them to the next big thing. While ongoing race for top speed continues on the tarmac, humans on space have long ago detected the maximum speed we could ever reach, and this is precisely 186.000 miles /sec, the so-called speed of light. Thus, we used this speed to connect through fiber optics to the race, to any race on the ground, to any broadcasted event and here is what occurred.

While cars race, we transmit emotions, the more the connection speed, the closer to real time emotions. We are almost broadcasting real life. So is not anymore about the actual speed cars go, neither about the ongoing comparison and technical debates alluding to vehicle optimization. It is precisely the perceived aspects of reality that matter. From land speed we turned into internet speed crossing borders and worlds of perception that we could not do otherwise based on mechanical speed alone. The moment we found our speed limits we turned speed into something else. Observation merges participation into a new overall reality. What is real? How do you define real?

“If you are talking about what you can feel, what you can smell, what you can taste and see, then real is simply electrical signals interpreted by your brain.”

These are the shivering lines of Matrix spelled by Morpheus and his science fueled fantasy. Back then, as audience in the movie theater, we were mesmerized by the mysterious and exotic vision, what we didn’t know is that Morpheus was talking indeed about something that today exists.

The ability to change perceptions and create a sense of presence, trained us continuously into something that can be subjective to each one. So now more ‘realities’ can be exploited and developed. The exponential growth of technologies could rupture the narrative of human history itself. We have always created worlds through ‘windows’ and now with Virtual Reality we can step into them and participate. Unlike all other media, VR does not have a format.

Why does it matter? Because narratives shape perceptions and perceptions drive action. It is not about reproducing an equal type of intelligence by replicating humans but much rather extending and amplifying their capacity in order to create supporting systems. The latter is exactly what car interiors do well: everything surrounding human body.

Automobile is not about invention, but about time spent to develop what was an expensive curiosity into a practical convenience by deeply restructuring our social model. Equally, these derivate technologies are a byproduct of one of the most complex processes of making.

We have thousands of years of experience in translating our proximity into reflex and that is difficult to redo. Can virtual exist in the absence of real? We are trapped by the mere possibility of instant achievement, by a click. Virtual reality is the short-cut to the future. It is a representation medium in a way we have never seen before. It is a picture about the use of a picture, representing reality not as it is but as needed to be and often works like an empathy machine. Yet, identity is crucial to any perceived aspect of reality.

Indeed, last weekend's F1 race was not about the setup, the camera views, or the popup menus, Honda or Renault, Mercedes or Red bull. It was quite exclusively about Verstappen vs Hamilton. The two most used words along the whole evening. It is about the pilots …

With technology far more performing than policies and data being always ahead of anything regulatory, it seems itinerant and static inhabited spaces are merging into one new type of interior setup. VR makes us feel we are part of something but we are still hardwired to care about things that are precious to us.

What used to be 'the vehicle' perhaps is now becoming its multiple narratives, unique to everyone thus vehicles enabling us to leap this phase and get into 'the experience itself'. However, the only real physical part of it remains anything within our reach during motion, and this is the (car) interior.

This is the real case of interiors opening a new age of itinerant proximity and inhabited motion, weather analog, virtual or both.

General News

Bosch Vehicle Software: New Infotainment Computer

GENERAL NEWS

BOSCH IMAGE

Bosch will develop and sell basic vehicle software, middleware, cloud services and development tools under the umbrella of its subsidiary Etas. From mid-2022, a total of 2,300 experts from different development areas of both companies will work together there. Today, Etas has around 1,500 employees in twelve countries, 800 of whom come from Bosch. The aim is to create a platform that will enable the automotive supplier to develop software faster and together with partners.

This was preceded about a year ago by the founding of the Cross-Domain Computing Solutions business unit. Here, vehicle software was developed for specific models and equipment, for example for driver assistance and infotainment. The company is now expanding this division to include application-independent software for vehicles and the cloud.

It includes new domain controllers, expected for expanded features and capability, from in-vehicle video streaming to autonomous driving. It is developed in partnership with several technology companies and is aimed at infotainment functions, including in-car communication, in-car payment, video streaming and voice assistants.

This unit is flexible, meaning automakers will be able to add features developed in-house to those already built in, speeding time to market for new products and capabilities and lowering development cost. The computer is powered by Qualcomm Technologies' third-generation Snapdragon microprocessor and utilizes the QNX Neutrino Realtime Operating System. Options include a virtual voice assistant through Amazon Alexa and Cerence; in-vehicle streaming via Access Twine4Car; and embedded and cloud-based navigation through TomTom.

The controller will support the BlackBerry IVY Intelligent Vehicle Data Platform co-developed by BlackBerry and Amazon Web Services to enable development of new applications and use cases. Rightware and Wipro also provide software for the system.

The new division, called Cross-Domain Computing Solutions (or XC for short), includes some 17,000 employees worldwide and is tasked with gaining a share of the $24bn market for software intensive in-vehicle electronic systems, a sector expected to grow 15% annually through 2030.

BAIC, Huawei Co-Develop Mofang With HarmonyOS

GENERAL NEWS

MARKLINES IMAGE

The previously dubbed "C52X", the Huawei HarmonyOS powered BAIC's Beijing brand model is unveiled at the 2021 Auto Guangzhou, with its official name, the Mofang (meaning Rubik's Cube). It's not an EV, but it's the world's first SUV with Huawei's HarmonyOS, a distributed operating system to run on multiple devices, including smartphones, tablets, watches, and cars.

With the Huawei intelligent cockpit as its main feature, the Mofang is also equipped with a large central control screen and advanced functions like the AR-HUD. In order to match up with the HarmonyOS, the vehicle is implemented with the Kirin 990A chip and the four-core Taishan V120 Lite, Cortex-a55 CPU, Mali-G76 GPU, and 5G connectivity.

The system includes voice recognition, facial recognition and gesture control. The HUD is based on a 60" large screen, it displays navigation, ADAS, and real-time traffic conditions.

The vehicle is designed with a closed front grating making it more like an EV, with the actual intake underneath. The hovering roof and hidden doorknob give a sporty vibe. The Mofang is 4.62 m long, 1.89 m wide, and 1.68 m high, with a 2.74 m wheelbase.