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Weekly Newsletter

DVN-I
Automotive Interior

NEWSLETTER #116

Editorial

BOE Varitronix: Interior Screen Strategy & Technology

BOE'S 8K UHD DISPLAY AT CES 2018

It was a challenge to interview a Chinese company, as no travel is possible due to that country's lockdowns. We managed, though, via videoconference, to virtually meet with a BOE Varitronix team, headed by its CTO. They're the world's leading supplier of in-vehicle display panels, so naturally it is of great value to understand their strategy, how they're managing the ceaseless enlargement trend in screen size, and how they integrate environmental protection into all aspects of production and product lifecycle. You'll find our interview in this week's in-depth article.

Hey, who had the world's first screen-type dashboard display, and when? Take your best guess, then read the Coffee Corner to find out. The answer may shock you!

And of course we bring you a cornucopia of other news about interior trends, innovations, regulations, and materials. HMI and sustainability, too, which will be two major themes of our Think Tank seminar in November.

I hope you enjoy our work; we appreciate your loyalty.

Sincerely yours,

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

BOE Varitronix Team Interview

As vehicles grow smarter and smarter, becoming computers on wheels, the huge demand for infotainment systems and navigation systems in smart electric vehicles is driving the rapid development of the in-vehicle display market. Automotive display development trends include larger and larger screen size; higher and higher definition; greater interactivity; multi-screen setups, and multi-form arrangements. According to Market Research Future, the global automotive display market is expected to reach USD $39.7bn by 2027, up from $18.4bn in 2020, with a compound growth rate of up to 13 per cent in those six years.

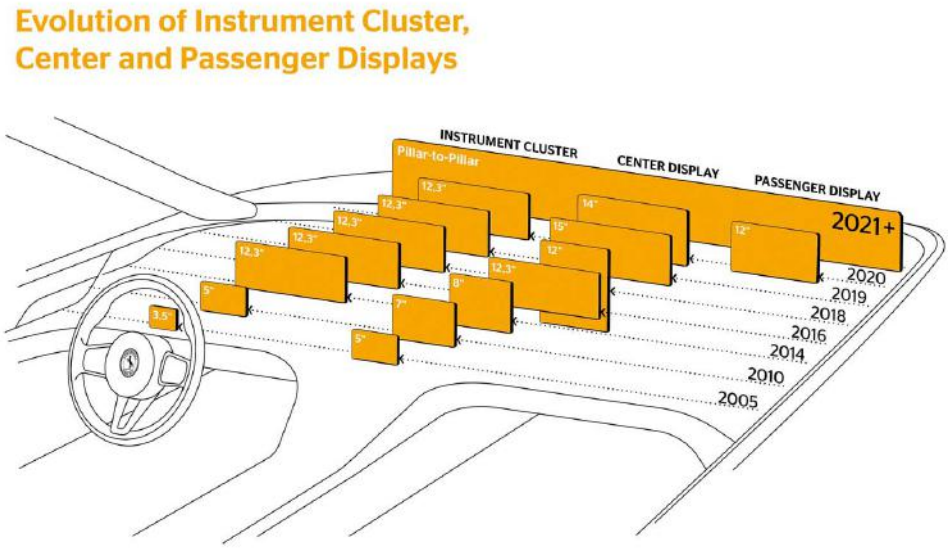
BOE Varitronix is an IoT (internet of things) company and a global leader in semiconductor display products. Across all applications they make more than a quarter of the world's display screens, and they're the world's leading supplier of in-vehicle display panels. Their products enable thousands of application scenarios for screen-based IoT platforms in the fields of retail; finance; IoV; and education, with a mission to bring people high-quality products and smart solutions with the integration of software and hardware. BOE's automotive business provides complete display products and system solutions for intelligent cockpits, and their customers include global mainstream automobile brands.

DVN Interior recently conducted an online interview with BOE Varitronix, the world's leading supplier of in-vehicle display panels. We're honored to share their insights on in-vehicle displays.

BOE SMART COCKPIT DISPLAY AT SID 2022 (BOE IMAGE)

DVN Interior: What are the trends in automotive intelligent cockpit displays?

BOE: The development of smart cockpit display can be divided into three stages. The first stage products are mainly for the existing mature market, mostly are 3" to 12" flat rectangular single screen, with a-Si TFT process, side-mounted backlight, external touch screen type; the second stage products are mainly for the existing growth market, which is also the market we are transforming. At this stage, the smart cockpit display with more diverse forms, free shapes, and more screens, such as dual 10.25" and dual 12.3" touch integrated displays become popular. Besides, some products will also adopt direct-type backlights to achieve regional light control and improve viewing and operating experience; the third stage products are mainly for emerging markets in the field of smart cockpit displays. With the rapid development of the industry, intelligence and connection are important trends. The global mainstream automobile brands also pay more attention to the upgrade of human-vehicle interaction, so personalized and function integrated ultra-high-definition automotive display with curved and special-shaped large screen will become the trend.



AUTOMOTIVE INTERIORS WORLD IMAGE

DVN-I: What applications are covered by BOE smart cockpit products?

BOE: BOE's smart cockpit solution integrates functions such as on-board instrument, smart navigation, rear-view imagery, central control assembly, and entertainment information, which not only brings more intelligent interaction to applications such as voice navigation and AI-assisted driving, it also brings more possibilities for the diversification of car interior design.

BOE applies innovative display technology to automotive instrument, central control assembly, electronic rearview mirror, head-up display, transparent display windows, rear seat entertainment, taillights, transparent A-pillars and other fields. In addition, BOE also promotes the application of new antennas such as film antennas to intelligent networked vehicles to meet the higher requirements of autonomous driving on vehicle communication bandwidth.

BOE ANTIGLARE REARVIEW MIRROR AT SID 2022 (BOE IMAGE)

DVN-I: What is BOE's position in the smart cockpit field?

BOE: According to data from market research agency Omdia, in 2021, the shipment area of BOE on-board display jumped to the first in the world, while the shipment volume of 8” and above onboard display panels remained the first in the world. BOE has launched a number of technologies and products such as flexible AMOLED, BD Cell, Mini-LED, large-size, multi-screen, curved surface, and full lamination in the fields of automotive instrumentation, central control assembly, and entertainment system display, and they are fully applied to mainstream automobile brands in China, the United States, Germany, the United Kingdom, Japan, and South Korea, etc. BOE will continue to create a new ecosystem for future smart mobility, promote product innovation in the field of automotive display and interaction, and continue to provide one-stop products and services for the intelligent upgrade of automotive, bringing people a more convenient and comfortable travel experience.

12.3" 4K UHD AUTOMOTIVE DISPLAY (BOE IMAGE)

DVN-I: Tell us about your products and technologies in terms of user experience.

BOE: BOE's OLED automotive display technology shows a very leading industry advantage. It has OLED R & D and production bases in many places, and has world-class technical reserves and industrial resources. It has been applied to automotive instruments, central control assembly, tail lights and other fields. The flexible automotive flexible screen makes the car cockpit and appearance design more personalized and diversified; transparent A-

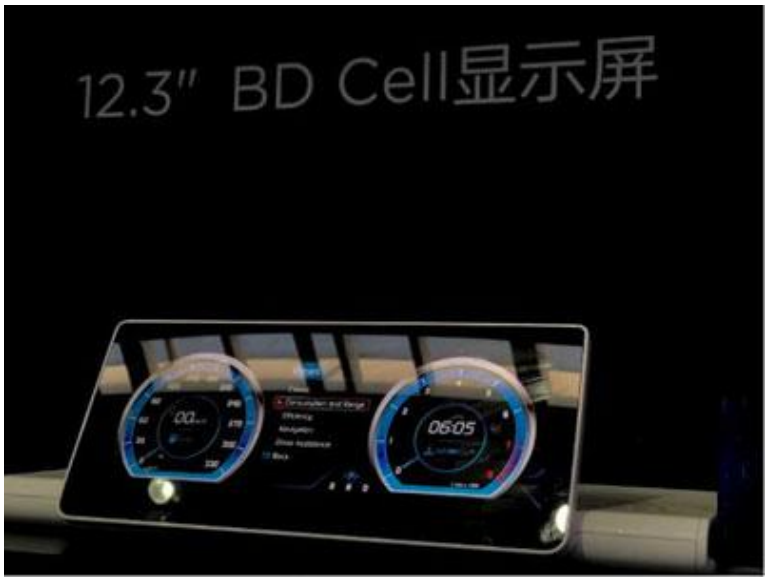
pillar with flexible screen eliminate the blind spot of A-pillar vision and make driving safer. The BD Cell display on the vehicle has the advantages of fine picture quality and higher contrast, which can display detailed information more clearly; the Mini LED display adopts the regional dimming technology to realize the refined light control of thousand-level partitions, and the million-level ultra-high contrast brings a more pure and natural display effect, whether it is in the sunny day or on the dark night road, the vehicle information can be displayed clearly enough, greatly improve driving safety. Switching between anti-peep and dual-view technology can be realized through smart optical design, which provide different display contents for the driver and co-driver on the same display screen, providing more choices for driving safety and interior space; the reflective LCD fully makes use of ambient light, with low power consumption and realize healthy eye protection; the knob touch technology on the screen perfectly combines the traditional mechanical buttons with screen, the stylish appearance brings a great sense of technology; taillight with OLED technology realize flexible and free bending, bringing more imagination to interior design; AR HUD (augmented reality head-up display) system can virtually present driving information such as vehicle speed and navigation in front of the windshield to accurately identify road images information, combined with AR technology, it can also warn the distance of vehicles ahead, pedestrians and obstacles, and monitor the driver's status, etc., which greatly improves the driving experience and safety; As to smart windows for sunroofs and side windows, dye liquid crystal technology is used to control the light transmittance, which can realize intelligent dimming of the whole surface or partition, with high transparency and low power consumption. The driver and passenger can make adjustment through touch or key operation. The smart dimming light window can also be adapted to the hyperbolic design of passenger cars, with glass of low-emissivity thermal insulation, making the driving experience more comfortable.

BOE has been deeply involved in the display field for many years, and focusing on innovation of display technology. In addition to the main display technologies and products of the smart cockpit introduced above, BOE can also provide more diverse smart cockpit display solutions according to customer needs.

MINILED BD DISPLAY (BOE IMAGE)

DVN-I: What's your strategy for smart cockpit display technology?

BOE: BOE is committed to providing users with fresh driving experience with new display technology. We formulate technology development plans based on customer needs, including the use of flexible AMOLED, Mini-LED, BD Cell and other technologies to bring users ultra-high contrast and immersive visual experience, with professional full-fit technology to bring users All-in-one black interior look and feel. We hope to apply 4K 3D display technology to in-vehicle display products, provide consumers with clearer, smarter, more three-dimensional augmented reality experience; integrate the photosensitive Sensor into the display screen, so that the screen brightness can be controlled more precisely, and the interior is more compact and attractive; with the curved special-shaped screen technology, to realize differentiated and personalized design; adopt in-vehicle multi-screen technology to freely combine multiple screens according to the needs of vehicle interiors, while showing the sense of automotive technology.



BD CELL AUTOMOTIVE DISPLAY (BOE IMAGE)

DVN-I: What are some of the challenges you're presently grappling with?

BOE: The iterative upgrade of screen technology is accelerating, and the competitive environment is complex and changeable. This requires BOE to always maintain a sense of crisis in times of peace and change. The ongoing digital transformation of BOE responds to this spirit, whether it is in terms of technology and management, we cannot be satisfied with the current status. Only through continuous innovation can we overcome the severe challenges facing the current industry, seize the development opportunities of the Internet of Things industry, and achieve healthy development in the industry.

DVN-I: How does BOE address carbon reduction and sustainability goals?

BOE: BOE has always attached great importance to its own social responsibility, BOE is committed to becoming a leading enterprise in green innovation, taking environmental protection, clean production and sustainable development as key business topics, actively utilizes and develops clean energy, and integrates the concept of green environmental protection into all aspects of production and life. BOE also actively responded to the sustainable development strategy on the production side, and put the green concept throughout the whole life cycle of production. BOE incorporated eco evaluation into the product design and R&D stage, introduced the product life cycle management system to ensure that the product design, quality, function and production process meet the requirements of green products, and strive to achieve energy conservation and emission reduction in production. Every production link should be scientific and rigorous as far as possible to reduce duplication and unnecessary production processes. By the end of 2021, BOE had won the title of "national green factory". As a global Internet of things innovation enterprise, BOE will continue to drive high-quality development through innovation, provide customers and consumers with higher quality and lower energy consumption products, and promote green intelligent manufacturing.

Interior News

Apple CarPlay Gains Ground

INTERIOR NEWS

APPLE IMAGE

Most of Apple's latest innovations will be in the car business, going by CEO Tim Cook's presentations at Apple's Worldwide Developers' Conference shortly ago.

CarPlay will support multiple screens—of any size and layout—and will be able to show information including weather and navigation, according to images shown during a presentation. So far, CarPlay has mainly been able to transfer content from the iPhone to the screen in the car. Soon, though, drivers will be able to use it to control HVAC and other car functions. In a demonstration of the revised software, CarPlay took over the display on a monitor in front of the driver's steering wheel with information such as speed, tachometer, and fuel level.

APPLE IMAGE

Apple senior manager Emily Shubert said at the conference that there will be "deep integration with the car's hardware". Sensor data from the vehicle could be read out in real time, for example. And there are said to be numerous other new functionalities and capabilities in the offing. A considerable number of automakers are working with Apple, Schubert said, showing a slide of 14 car brands including Ford; Volvo; Nissan; Jaguar, and German automakers.

With this next generation of CarPlay, drivers will be able to change temperature settings, access audiobooks; news, and podcasts, and tune the car's stereo without leaving the CarPlay interface. The iPhone will communicate with the vehicle's systems in real time in what was called a "privacy-friendly" manner to show driving information such as speed; fuel level, and temperature. Apple's Maps app will be able to plan routes with up to 15 stops.

These latest developments make it rather clear Apple is moving in the direction of an operating system for the car.

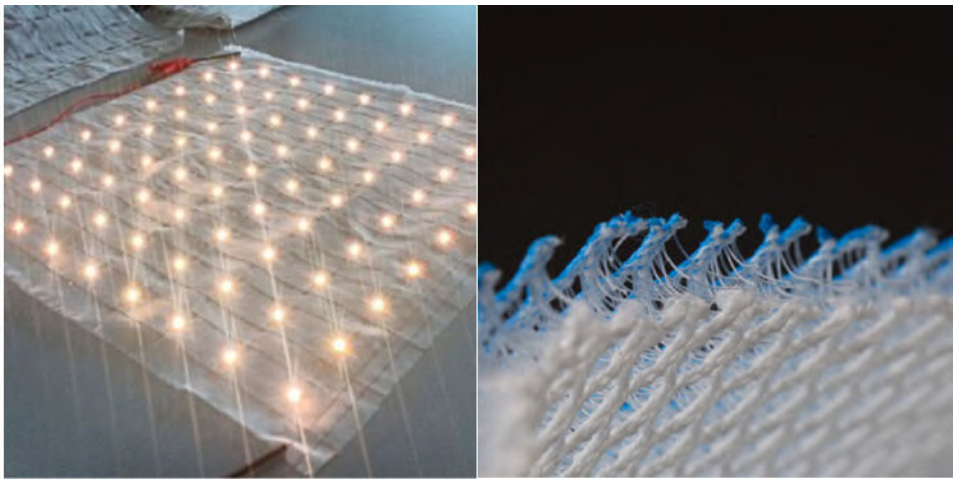
Another announcement at the event: Apple Passkeys allows users to go without passwords. Instead, Passkeys creates a crypto key for biometric login using a fingerprint or FaceID facial recognition. These crypto keys can be shared across different Apple devices and also across platforms.

Functional Textile Surfaces at Techtextil Trade Fair

INTERIOR NEWS

ETTLIN IMAGE

Will air conditioning and media in cars soon be controlled via textile surfaces on the center console? Companies will be showing the technology for this at Techtextil 2022. Richard Müller, head of development at Ettlin in Ettlingen, Germany, says "Since Infineon integrated an MP3 player into clothing in 2002, a great deal has happened in the functionalization of textiles". Much of what seemed like fantasy or science fiction at the time is technologically feasible today, he says—including for use in cars. Ettlin says they have already implemented smart-textile show car projects with major automakers from Germany and Asia. At Techtextil 2022, they plan to show a new type of embroidery fabric with interactive electronics. The trade show will take place from 21 to 24 June in Frankfurt.



ETTLIN IMAGE

LED fabric could also increasingly appear in cars as ambient lighting. 3D spacer fabrics with bio-based blue polymer coating are expected to make seat covers and door panels more sustainable.

Müller says "Textiles have always been the interface between man and machine in the car, so it's only natural that they also take on smart functions. Developers, designers, constructors and buyers from well-known car manufacturers are now among the frequent visitors to our booth".

Other Techtextil news: Carl Meiser will be presenting their sugarcane-based coating. Wherever textiles are used in cars, they are usually coated. According to Meiser, the new product can replace up to half of classic coatings with the target to achieve the same properties as petrochemical-based products.

UBQ-Teknor Apex TPE Material Sourced from Landfills

INTERIOR NEWS

IMAGE UBQ MATERIALS

Israel-based UBQ Materials specializes in developing advanced materials from unsorted household waste. They're working with Rhode Island-based custom thermoplastics compounders Teknor Apex on a new range of of sustainable TPE (thermoplastic elastomers).

UBQ's main product, also called UBQ, is a sustainable plastic substitute converted entirely from unsorted municipal solid waste diverted from landfills—including any and all organics. The partnership marks the first time UBQ will be used in TPE compounds. As the preferred material for applications requiring flexibility in the automotive and other industries, TPEs combine the performance of thermoset rubber with the processability of a thermoplastic, and they can be recycled. Teknor Apex's TPE production offerings are as diverse as the industries they serve—consisting of formulations specifically designed to meet market requirements for physical and thermal performance.

Over the past year, Teknor Apex and UBQ have developed a series of TPEs incorporating various levels of UBQ and high-quality postconsumer recycled raw materials, diverting plastics from landfills, and creating greater circularity within the polymers supply chain.

Luxury car manufacturers such as Mercedes-Benz are already partnering with UBQ and swapping out oil-based plastic parts with the greenest thermoplastic material in the world without compromising on the quality or luxury design of their cars.

Volvo, Epic Games Partner for EV HMI

INTERIOR NEWS

VOLVO IMAGE

Volvo Cars will be the first European manufacturer to deploy Epic Games' Unreal Engine to provide high-quality graphics for vehicle displays.

Epic is an American video game and software developer and publisher based in North Carolina. Their Unreal Engine is widely considered the most advanced real-time 3D creation tool used in a variety of industries beyond games, and which will now be used by Volvo Cars for developing digital interfaces and rendering real-time graphics in the car.

Volvo will initially focus on the DMI (driver information module), one of the displays in the cabin that provides the driver with relevant information and infotainment features. Volvo says by coupling the Unreal Engine with the high-performance computing power of the third-generation Qualcomm Snapdragon cockpit platforms, the next generation of Volvo cars will set new standards in graphics and infotainment system performance: the new infotainment systems will be more than twice as fast as current ones, while graphics generation and processing inside the cabin will be up to 10 times faster.

Epic's HMI and automotive Unreal Engine director Heiko Wenczel says "When you bring interactive, high-resolution graphics running in real time into the car, you open the door to a vast range of new ways to inform and entertain everyone inside. Volvo Cars' deeply talented design and product development teams have grasped this opportunity to do something fresh that will keep evolving with exciting new features that take advantage of the capabilities of Unreal Engine".
The first car to contain the new graphics is the new, electric flagship model to be revealed later this year—the first of a new generation of all-electric Volvo models, as the company aims to sell only pure electric cars by 2030.

Benova: Continental's Sustainable Premium Surface Material

INTERIOR NEWS

CONTINENTAL IMAGE

Benova Eco Protect is Continental's new leather-alternative premium surface material for automotive interiors. The first generation of Benova is already in production for Volvo. Said to make vehicle interiors more sustainable, durable and comfortable, the material is currently being manufactured in Germany. Continental says more production capacities will be made available at Continental's US plant in Winchester, Virginia.

Continental's global automotive surface head Christian Noell says "Whether on the instrument panel, door panel, side or center console, seat cover or headrest—wherever Benova Eco Protect is used, it impresses with its particularly soft feel and exceptional value appeal combined with high ageing resistance and fastness to light. Due to its excellent heat and UV resistance, the material also withstands special environmental influences in the vehicle compartment. This makes it particularly durable".

Thanks to the choice of suitable base materials and the optimal interaction of the entire construction, the material is said to be resistant even to prolonged heat up to 120°C. It is 0.9–4.3mm thick, with backings of textile; PU foam; sandwich foam, or spacer fabric.

Gabriele Wittmann, Continental's global research director, says "On the road to sustainable vehicle interiors, Benova Eco Protect is an important milestone in product development. By consistently avoiding any critical ingredients; plasticizers, and solvents, the material is particularly low in emissions and odors and has a low product carbon footprint". The material meets the requirements of all automaker-specific substance prohibition and declaration lists; the GADSL (Global Automotive Declarable Substance list) and the EU's REACH chemical regulation.

Continental says the material is about 20 per cent lighter in weight compared with traditional surface finishes, and is free from animal-originl materials. Too, the resource-conserving, energy-efficient production process makes a positive contribution to the ecological balance of the entire vehicle.

Dirac, Upmixing Technology for Car Audio

INTERIOR NEWS

DIRAC IMAGE

Swedish digital audio developer Dirac has introduced an updated version of their Virtuo automotive system. It now features the company's Upmixer technology; Intelligent Audio Platform, and multichannel content support.

Dirac Virtuo is a sophisticated audio algorithm to envelop drivers and passengers in high-quality, immersive sound. With the addition of multichannel content support, Dirac Virtuo ensures high fidelity, even in the challenging environment of a car cabin.

Dirac says their Upmixer technology transforms any stereo content into flexible, customizeable, immersive listening experiences, free from artifacts, and without requiring any hardware upgrades. Upmixing is a process that transforms two audio channels into 5.1 channels. Dirac says their Upmixing technology employs new patent-pending algorithms to minimize unwanted effects, so the results sound accurate; natural, and immersive.

It is modular; scalable, and customizeable, allowing manufacturers to develop, optimize, and integrate their audio experiences with high reproducibility and efficiency. It is fully data-driven—70 per cent of the audio development and optimization work can be done virtually, and all results can be shared globally throughout an organization. Moreover, the Intelligent Audio Platform is supported by the industry's most common chipsets and frameworks.

The Virtuo automotive solution also includes cabin sound optimization with advanced sound field control technology, which achieves better speaker performance and minimizes cabin colorations; target sound management, which achieves signature sound with greater consistency and ease; and center image optimization, which enables a stable phantom center for each listener with improved staging and localization.

The Design Lounge

The Design Lounge

THE DESIGN LOUNGE

Designed by Chuck Jordan and presented at Motorama GM in 1956, the Buick Centurion concept car featured a freestanding speedometer with a fixed indicator and rotating dial—typifying some of the far-out styling gimmicks of the era. Matching the Electron Red paintwork of the body, the interior upholstery was trimmed in red leather and brushed metal. There were four bucket seats before "bucket seats" were a thing anyone talked about, and the front ones automatically slid when the doors were opened. But its most prescient, pioneering feature is right at the center of the dashboard: a "closed-circuit display"—that is, a TV screen—serving as rearview mirror and reversing camera. Screens entered car interiors a whole lot earlier than one might think!

The screen was tiny by today's standards, for the cathode-ray tube technology of the time was power-hungry and imposed a giant, bulky depth relative to any given screen diameter. And CRTs of any size were bitingly expensive. As often mentioned in design reviews, the Centurion's screen, though small, was a visual touchstone in the interior of the show car—a showy, futuristic central focal point in a different way than today’s screens. The Centurion certainly paved the way to what car interiors would look like eventually, but it would be awhile; the first screen (a touchscreen, at that) in a production car was in the 1986 Buick Riviera. Today, most of 70 years after the Centurion show car, ever-growing screens have reached a peak level on the dashboard surface, to the point where they've taken over completely, displacing all discrete controls and displays and merging to the overall IP trim as in the Mercedes door-to-door Hyperscreen. So, what will be the next focal feature in car interiors…? We'll have to wait and see!

News Mobility

Cruise-Waymo Robotaxi War Hots Up

NEWS MOBILITY

CRUISE IMAGE

After nine years of research, development and piloting autonomous vehicle technology, Cruise will begin charging the general public for robotaxi rides in San Francisco. The decision came after Cruise received permission from the California Public Utilities Commission to charge for rides without safety drivers behind the wheel—a first for a driverless ride hail service in a major US city.

The fleet is limited to 30 units; fully-driverless mode is allowed only between 10pm and 6am when traffic is at its lightest—at other times a safety driver must be present, and they have to stay aboard in bad weather, even during the overnight hours.

Cruise says they plan to start phasing in fared rides gradually over the coming months. Meanwhile, Waymo is progressing in parallel. Waymo has a growing fleet of robotaxis in San Francisco, and they have more money behind their technology; more travelled miles, and more experience with commercialization thanks to their Waymo One service in Phoenix, even if it is a simpler use case.

Geely Push C2x With Own Satellites

NEWS MOBILITY

GEESPACE IMAGE

Geely is working on their own satellite network for vehicle communications. They're calling it Geely Future Mobility Constellation, and this month, subsidiary Geespace launched the first stage, set to run until 2025, to put 72 satellites into orbit. In the second stage, another 168 satellites are to be launched, for a total of 240. Geely says the satellites are China's first modular-mass satellites, and at the end of their projected five-year service life they'll disintegrate in Earth's atmosphere without leaving behind any space debris.

With their GeeSAT-1 low-orbit satellites, Geely intends to implement what they describe as "centimeter-level, precise positioning and connectivity support" for Geely vehicles, which will be able to communicate with other vehicles or infrastructure. Geely says initial applications are focused on logistics projects such as real-time management and control of transport. The plan is to cover the Chinese market and the Asia-Pacific region at first, with global coverage phasing in after 2026.

Since its establishment in 2018, Geespace has built an industrial chain for satellite development, production, and operation. It includes R&D centers in Shanghai; Xi'an; and Nanjing, operation centers in Guangzhou and Qingdao; business development centers in Beijing, and a highly automated satellite testing and production facility in Taizhou. Commercial satellites have been created at the production and test center since early September 2021. Annual capacity is 500 units, and Geespace has left open the possibility of selling satellites to others.

Geely also wants to contribute to environmental protection by having the satellites identify ocean trash fields to be cleaned up. Geespace sees further opportunities in infrastructure services; smart mobility applications; consumer electronics; and smart cities, among others.

General News

Renault E-Tech EV OpenR-Link for Connected Experience

GENERAL NEWS

RENAULT MÉGANE E-TECH (RENAULT IMAGE)

Renault has developed four new partnerships with application developers to enhance the customer experience in new vehicles equipped with the OpenR Link multimedia system to provide accessible and user-friendly applications and services, as well as an always up-to-date system. It offers an unprecedented connected experience, totally similar to that of a smartphone or tablet, and can be controlled with the fingers or with the voice.

In conjunction with the arrival of the new Mégane E-Tech EV at dealerships, Renault has added four new apps for customers to download via OpenR Link. EasyPark enhances the unique connected driving experience by helping drivers manage and pay for parking without requiring a physical machine or even a smartphone.

With the free Radioplayer for Renault application, users will have access to thousands of radio stations; web radios, and podcasts from countries covered by Radioplayer in Europe. Radioplayer gives them simple access to all this content in live and replay modes, and to the associated data. Features include easy personalized listening, display of titles currently being broadcast, and the possibility of finding all the programs in podcasts.

With the Sybel application, drivers and passengers will benefit from an experience entirely designed for a serene journey while boasting a wide range of audio content bringing together thousands of hours of podcasts; fiction; documentaries; audiobooks, and children's stories. It also features a range of features specially designed by the teams at Sybel to be used when driving: thematic playlists with three hours of preloaded content; pick up where you left off no matter which device you started on; intelligent voice assistant; personalized recommendations, and favorites lists.

With the free Vivaldi browser app, customers can watch; buy, and browse from the comfort of their own car seat, keeping themselves entertained while waiting for the car to charge without needing a smartphone or tablet. Users can make video calls; set up access to commonly-used online apps; easily access streaming services; securely synchronize browser data, and more. The in-car browser can be used only when the car is parked.

Antolin-Osram Interactive ID Light Alerts

GENERAL NEWS

VW ID.BUZZ WITH ID LIGHT (VW IMAGE)

Grupo Antolin, who published Q1-22 sales of €981m, at the beginning of 2022 accelerated their plans to create an ecosystem of partners to bolster their strategic position as a global provider of technology solutions for car interiors. To that end, they've made an agreement with AMS Osram Automotive Lighting Systems to devise new functionalities for digital projection systems inside the vehicle. For user interface technologies, the group will be collaborating with Uniphy in the development of smart surfaces that combine lighting and decorative technologies.

A prominent example of Grupo Antolin's functional and dynamic interior lighting is interactive ID.Light in the passenger model of the Volkswagen ID.Buzz launched this past March. It greets occupants with a distinct sound and an interactive ID.Light—a narrow illuminated strip that stretches across in front of the windscreen. It's right in the driver's field of vision, and its main purpose is to give visual alerts. For example, for an instruction to change lane, it illuminates with a signal on the respective side, right or left. A signal in the right or left area of the strip alerts the driver to an obstruction in the indicated area, with specific information color-coded. When the entire strip lights up in red, it means that the driver has to slam the brakes immediately.

Grupo Antolin will equip three additional car models with the ID.Light, and they're confident this technology will become a model for many future innovations in this field.