Thu, 8 September 2022
Weekly Newsletter

DVN-I
Automotive Interior

NEWSLETTER #126

Editorial

An Inch Deeper: HMI OS Influences Driver Behavior

VOLVO V90 CC (9TO5GOOGLE IMAGE)

Last week, we looked at growing evidence that physical controls are better than touchscreens. Industry sometimes refers to whatever is visible and palpable as the first inch, so this week we'll go an inch deeper on the constellation of questions about tangible contact between driver and controls. An inch below the surface lies the software and hardware, and this week's in-depth presents perspectives on HMI software and operating systems. What's the best existing solution; is it the one from Apple or Google, or one of the automakers' in-house OSs? This is an important IT question and a key user experience differentiator. Beyond that, it is a business model issue—a battle with data as weapons! As cars have become more connected, automakers are eager to leverage the data generated by vehicles and their users as a central revenue stream and profitable core of business plans.

This HMI "second inch", including operating systems, will be on the agenda of the upcoming DVN Interior Think Tank seminar, set for 28-29 November in Köln. It will include an academic contribution on HMI and mental workload to help the community understand the confluent effects of interior conditions; human factors, and unconscious behaviors.

Stay tuned, and again, save the date, that's 28-29 November. Not yet a member? Come and **join in**!

Sincerely yours,

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

Who's Winning on In-Car Apps?

GOOGLE ANDROID, APPLE CARPLAY (MANTECH.IT IMAGE)

Automakers have long struggled at infotainment; Ford's MyFord Touch being a prime example from last decade. Apple CarPlay and Google's Android Auto debuted in 2014, and both companies sought to take an indomitable lead in that domain to foreclose automakers devising their own OSs. Their logic was—and is—to replicate their respective smartphone apps for phoning, messaging, navigation, and more on a car's in-dash screen. And they also include third-party apps such as Waze, Spotify and others that are controlled the via a car's touchscreen and voice control.

Because CarPlay and Android Auto are uniform across all vehicles, automakers can't provide brand differentiation on in-dash displays. Perhaps more importantly, user data from navigation searches or Spotify playlists or whatever—and the revenue from monetizing that data—goes to Apple or Google, not to automakers.

It's hard to doubt the attraction of a seamless transition between personal personal and office digital environments. It means one less HMI learning curve to hike; those accustomed to their smart phone and its HMI logic will quickly and easily come to feel at home and in control of their car digital environment.

APPLE CARPLAY IN A MERCEDES

Audi, Mercedes-Benz, Volkswagen, and other automakers expressed concerns about big tech's incursion into the dashboard; Toyota resisted adding CarPlay and Android Auto until 2018. So what's the current situation—have automakers capitulated to the digital giants, due to consumer demand and competitive issues?

Recently Apple unveiled a new version of CarPlay that takes control of every screen in a car, replacing even more user interfaces and controls, and accesses additional vehicle and driver data. Apple says they're "working with automakers around the world" to implement the new version of CarPlay, which will be available starting late next year; a demonstration video displayed 14 major car company logos. In parallel, Google has officially revealed Android Automotive OS 13 and confirmed what is new in the update for carmakers that will be using the platform.

What are the benefits of these recent updates, and are they really helping automakers to sustain their brand image?

Apple CarPlay

A new version of Apple's CarPlay takes control of every screen in a car, and could replace automaker user interfaces and controls while gaining access to additional vehicle and driver data.

APPLE CARPLAY (APPLE IMAGE)

Within a vehicle's infotainment system, Apple CarPlay is said to offers a car-optimized app experience; the convenience of Siri; the ability to set up reminders; GPS navigation; voice-to-text; audio streaming, and more. Most functions can be voice-controlled, to reduce distraction versus having to poke at the touchscreen.

The app experience is optimized specifically for cars. The screen will be much larger and easier to quickly read. It also has a layout specifically designed for car use, with interface elements easy to see and use, and stripped of smaller and redundant features. All in all it gives a full iOS experience, perfectly optimized for vehicles, without extra distractions. It also allows users to command the infotainment system with Siri, activated on some systems with a button on the touchscreen or steering wheel; others allow you to simply say "Hey, Siri…" to get updates and information without taking eyes off the road. GPS navigation is integrated, as well as audio streaming; internet radio apps, and voice-to-text.

APPLE CARPLAY (APPLE IMAGE)

All fine as far as it goes; extending iPhone functions into the dashboard is a matter of convenience and safety, providing a consistent interface and logic within and outside the car. Now, what of Apple's new drive to take over every screen on the dashboard, replacing user interfaces and controls while gaining access to crucial vehicle and driver data? Most automakers would be very reluctant to give up such valuable real estate. Beyond that, there's another battle—this one over data. As cars have become more connected, automakers see vehicle data as an essential and profitable lever of their business plans.

McKinsey estimates vehicle data will be worth up to USD $400bn annually by 2030. Fortune Business Insights predicts the global connected-car market will grow from nearly $60bn in 2021 to more than $190bn in 2028. "At stake is the search experience in cars, which are essentially browsers on wheels," says Roger Lanctot, Strategy Analytics' director of automotive connected mobility. Only the smallest and newest automakers will be willing to surrender their in-vehicle experiences to Apple, he said.

Up to now, automakers have been able to restrict CarPlay to a vehicle's central display and allow it to duplicate iPhone apps for calls, messages and navigation. The system includes third-party apps such as Waze; Spotify, and others. Drivers control the apps via a car's touchscreen and voice control.

The new version of CarPlay reaches even deeper into the dashboard and "communicates with your vehicle's real-time systems," says Emily Schubert, Apple's senior manager for car experience engineering. A preview showed how CarPlay could replace an automaker's instrument panel displays for speedometer; tachometer; temperature gauges, and fuel or EV battery level. It also allows customizing an instrument panel using Apple-curated layouts; colors; backgrounds, and dials. And it can add customizable widgets to car displays that show calendar items; weather information; address book contacts, and more from a connected iPhone.

According to Schubert, 98 per cent of new vehicles now come with CarPlay and 79 per cent of buyers consider only CarPlay-capable vehicles when selecting a new vehicle. Buyers now see CarPlay as standard equipment, says AutoTrader executive editor Brian Moody.

Google Android Automotive OS 13

ANDROID IN A POLESTAR (POLESTAR IMAGE)

Google has already moved deeper into the dashboard with GM; Volvo/Polestar; the Renault-Nissan-Mitsubishi alliance, and others implementing the Android Automotive Operating System—not to be confused with Android Auto, which works more like CarPlay. Android Automotive could be compared with QNX or Linux; it is an agnostic automotive operating system that lets automakers build their own systems and restrict or allow anything to run on it, and collect and control vehicle data. It allows automakers to keep more control, as automakers build their own systems using Android Automotive OS and restrict or allow anything to run on it.

Google's official release notes for Android Automotive OS 13 describe improvements for the camera subsystem; car framework; connectivity; privacy; sensors; telemetry; user management, and vehicle integration. Some of the most noteworthy additions include ultra-wideband support; Android 12's Privacy Dashboard, and a new version of Android's Bluetooth stack called Gabeldorsche. Another interesting development is the Android Auto Receiver app which allows cars with Android Automotive OS to run the traditional Android Auto UI for cases such as rental cars or borrowing a vehicle. Google explains: *In cars that provide Google Automotive Services directly on the car screen, it can still be convenient to use Android Auto from your phone. It may sometimes be easier to connect your phone and get quick access to your accounts and favorite apps, rather than taking the time to set up the car's built-in infotainment system*. The quiet part: connecting a phone means Google gets to slurp up its data!

Conclusion

Since 98 per cent of new vehicles now come with CarPlay—directly or through Google Android—Apple has incredible leverage over automakers. Fortune Business Insights predicting that the global connected car market will grow from nearly USD $60bn in 2021 to more than $190bn in 2028, so clearly this is a huge battleground with much at stake. For the time being, Apple and Google are leading the user experience battle. Mirroring smart phone application eases user experience, and immediately opens the way to monetizing vehicle and user data. Business models must shift accordingly to focus on providing value beyond a single point of sale. Automakers have to built-in optimal connected car experience over a vehicle's entire lifecycle.

GEOTAB IMAGE

And what could be the role and value of the main tier-q suppliers like Continental; Bosch; Forvia, and others? They create audio and navigation interfaces, which could foster eCommerce. For example, solutions like in-vehicle driver coaching. Typically, in-vehicle driver safety alerts would only beep or buzz or light up. Soon, driver safety solutions like in-vehicle driver coaching deliver real-time spoken alerts to help drivers keep their eyes on the road and promote safe driving habits.

Then there's geotargeting, a method of delivering different content to consumers based on their location and driving habits. For example, drivers could receive notifications identifying upcoming service stations, rest stops, or hotels. There is likely no end to the amount of targetted advertising vehicle occupants could be bombarded with; we are not even sure that sky is the limit!

Interior News

Eyeris Interior AI Sensing Improves Safety

INTERIOR NEWS

MIKE MAREEN IMAGE AT STOCK.ADOBE.COM

Eyeris, a company of specialists in automotive in-cabin sensing AI, got started in 2013 as a human-centric artificial intelligence company. They aim to make driving safer and more comfortable by monitoring interior conditions. In a recent blog, CEO Modar Alaoui expounded on AI and sensor fusion:

As vehicle interior conditions are very diverse—number of persons; size; skin tones; light, temperature; pets, and objects—the monitoring system needs to fuse a variety of hardware sensing elements. As such, Eyeris has partnered with a wide range of hardware manufacturers for sensing technologies, including traditional infrared; red-green-blue-infrared (RGBIR) sensors; thermal imagers, and radar. This sensor fusion, combined with an extremely large dataset used for training, means that the interior space of a vehicle can be accurately interpreted in the same way a human amalgamates sight; hearing; touch; smell, and possibly even taste to perform a complicated task.

For efficient integration, reliable methods of handling and abstracting data transfer are important to consider. Eyeris has used for some of their reference designs a Maxim MAX96706 deserializer to connect mobile industry processor interface-based image sensors and camera modules into the AI processing board. This vision system has to work all the time in all conditions, not just most of the time in favorable lighting and other conditions, so adding additional sensing capabilities—a second RGB visible-light device; an IR sensor; radar, or a thermal sensor for enhanced presence detection—may enable AI to sufficiently monitor and control an environment.

Touch Netix Chip for Precise Positioning on Touch Surfaces

INTERIOR NEWS

TOUCH NETIX IMAGE

Incorrect operation on the touchscreen in an automobile can have fatal consequences. A new chip allows forces on touch surfaces to be measured precisely, and the position of the fingers to be determined accurately.

User interfaces of both industrial displays and HMI interfaces in modern automobiles must not only be appealingly designed, but above all ensure safety. This is the need addressed by Norwegian supplier Touch Netix's HMI chip, the Axiom AX54A-Force with patented force-sensing technology.

The force-sensing technology measures precise data of the force acting on a user-touched surface. The force can be measured from 0.1 to 20 N (10 to 2,000 g), and different points on the surface can be measured. Here, the manufacturer speaks of multi-force position detection with a spatial separation of up to 1.5 cm.

The chip's high sensitivity and excellent signal:noise ratio are said to make it possible to detect the smallest force signals with very high precision, and to detect a wide range of forces to serve different applications. The force-sensing technology uses standard components and integrates well mechanically.

Touch Netix also offers the dial-on-display feature, which is also integrated into the chip, and contactless user interfaces in which a finger and its position above the touch display or touch surface are precisely detected without an actual, physical touch.

Porsche's Variable Light Control Sunroof

INTERIOR NEWS

PORSCHE IMAGES

Usually, an electrically-operated roller arrangement controlled by a switch is the solution selected to cover up a sunroof when needed. Porsche's Variable Light Control, on the other hand, is a blind that isn't a blind. It uses an electrically-switchable liquid crystal film on the glass. Available on the Taycan, and split into nine zones, it can be made totally transparent, completely opaque, or a mixture of the two.

There is a touch-sensitive slider up in the roof lining where you'd expect a switch to be. Run your finger over it and you can change the translucency of the roof. If you want finer control, there's a menu in the main infotainment touchscreen that is accessed by an easy-to-find shortcut icon.

Liquid crystals are contained in a film using PDLC (polymer-dispersed liquid crystal) technology. These crystals are supplied with power via electrical contacts. At low AC voltage, the crystals arrange themselves in milliseconds in such a way that the pane becomes transparent. Conversely, if the glass is disconnected from the power supply, the liquid crystals change to a disordered state. As a result, the transparency disappears. Light Control is operated via the central infotainment display after the function has been selected on the touch panel.

Even when "opaque", the roof allows plenty of diffused light into the cabin, while protecting occupants from burning sun rays. It has a multi-layered structure that shields against heat radiation so effectively that even in the transparent state the roof is protected against heat better than with a mechanical roller blind or a conventional glass roof. Only 15 per cent of the heat enters the interior of the car, as proven by measurements in the solar simulation chamber at the Porsche Development Centre in Weissach. This figure is more than 30 per cent with conventional roofs.

The nine-zone architecture permits close to occupant-level adjustment, especially between front and rear. Porsche states it's a €5,045 option in Germany.

Toyota's Collaborative Safety Research Projects

INTERIOR NEWS

TOYOTA CSRC IMAGE

The Toyota Collaborative Safety Research Center (CSRC) in Michigan conducts mobility safety research and publicly shares it for societal benefit. Since 2011, CSRC has partnered with leading universities, hospitals, and other research institutions.

Four new research projects have been launched by CSRC: Effectiveness of Driver Management Systems for Driver Attention; Biomechanical Factors for Ankle Injury Considering Population Diversity and Equity (photo); Assessing Driver Alcohol and Drug Impairment Using Driver Monitor Systems, and Investigation of Mechanisms Leading to Sudden Medical Emergencies. These topics are directly linked to human behavior and interaction with the vehicle—right in the middle of DVN Interior's ambit.

To look (with the University of Wisconsin–Madison) at how vehicle interfaces enhance a driver's engagement in the driving task as automation capability advances, researchers will use a driving simulator to evaluate driver management technologies and develop tools to enhance cooperation between human drivers and automated driving systems.

In studying (with the University of California–San Diego) what technologies can help prevent impaired drivers from endangering themselves and others, researchers will recruit and evaluate volunteers in a simulator to test the

feasibility of using existing in-vehicle technologies for detecting driving impairment due to alcohol and cannabis.

Meanwhile, smaller research investigations will look into potential new topics and collaborative relationships. Topics include differences in risky driving behavior across cultures; relationships between child passengers and crash trends, and differences in safety perceptions across socioeconomic groups. CSRC welcomes scientific discussion on these and other potential items for early investigations.

BMW's New Ambient Lighting

INTERIOR NEWS

BMW IMAGE

A study by engineers at BMW and the Lighting Engineering Group at Ilmenau University of Technology found that ambient lighting improved drivers' perceptions of a vehicle's interior. Ambient lighting is realized in an array of colors in a growing number of mid- and high-end automobiles. It intensifies for example spacial perception, enhances the perceived quality of materials and makes drivers feel safer.

The number of light sources inside an automobile has strongly increased in the last decades, and the trend is to more and more light sources and static and dynamic light applications. Previous studies have shown that distracting and uncomfortable glare is eliminated when luminance is kept below 0.1 cd/m^2. The studies show that drivers and vehicle occupants feel less distraction when they can control the lighting level individually.

For the study, 31 people "drove" a real car in a simulator. Light levels on the simulated roadway varied from 0.1 to 1.5 cd/m^2. The engineers tested a dozen lighting scenarios, with different colors, luminance and positions. Drivers were questioned on spacial perception within the car, interior quality, perceived safety and other factors. Their emotional states were also recorded via questionnaire before and after the test.

Some results of the study:

- Each driver's perception of the vehicle was improved through the use of ambient light
- Drivers found the lit interiors more spacious
- The interior design and finish seemed more attractive and the controls easier to use
- The occupants felt safer
- A few well-placed lights were just as effective as a whole lot of lights
- An increased brightness did nothing to enhance the driver's impressions, and spurred complaints of distracting glare
- No conclusive results on the effect of ambient light on driver's emotional state
- Ambient light didn't influence driver performance

The researchers want to expand the study to include more light colors and examine the extent to which ambient lighting helps or hinders tasks like finding controls and using features like a nav system. In the next step, they want to test an adaptive interior lighting that responds to input from passengers, the car and the environment. The results could be the basis for development of the future vehicle interior lighting.

Genesis Dazzles at Chengdu and in JD Power Survey

INTERIOR NEWS

GENESIS GV80, SIX-SEATER CONFIGURATION (GENESIS IMAGES)

The Chengdu Motor Show just finished on September 4, and Genesis presented their GV80 Four- and Six-Seater. In addition to bringing high comfort; convenience, and choices to fit various lifestyles, it is now the only mid-large-size luxury SUV in the Chinese market to be offering the choice of four-; five-; six-, and seven-seat configurations.

Available with a panoramic roof, the luxury SUV focuses on making space for occupants. There are seven individual seat-embedded airbags, and the GV80's available Ergo Motion driver seat adjusts for support and posture, also providing 'stretching mode' for tired muscles. Door panels are finished with perforated leatherette inserts.

Meanwhile, Genesis is the highest-ranked overall brand in the J.D. Power 2022 U.S. Tech Experience Index study, which tries to measure how effectively each automotive brand brings technologies to market. The index, measured on a 1,000-point scale, combines the level of adoption of new technologies for each brand with excellence in execution. The execution measurement examines how much owners like the technologies and how many problems they experience while using them. It analyzes 35 technologies, which are divided into four categories: convenience; emerging automation; energy and sustainability; and infotainment and connectivity. Genesis earned the top Innovation Index score of 643, offering a significant number of advanced technologies across their product range. This is the brand's second consecutive year at the top of the list. The 2022 study was based on responses from 84,165 owners of new 2022 model-year vehicles who were surveyed after 90 days of ownership. The study was fielded from February through May 2022.

The Design Lounge

Lincoln L100 Concept: Futuristic Autonomous Luxury

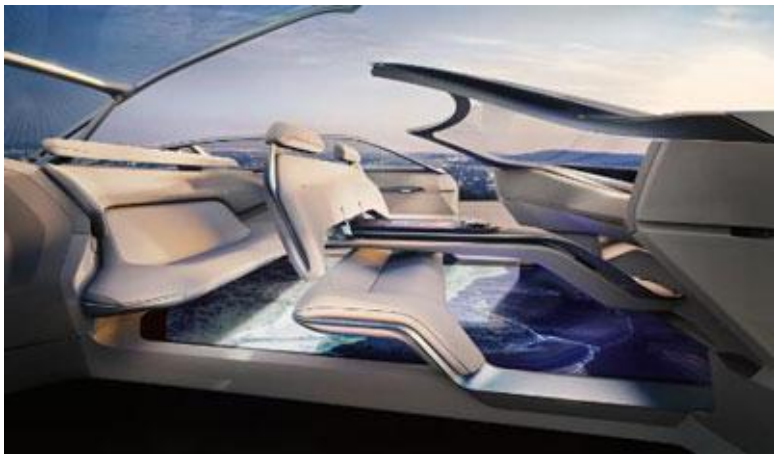
THE DESIGN LOUNGE

Ford revealed their vision for future luxury mobility, embodied in the Lincoln L100 concept. It dazzles with aero-influenced styling—it has been described by design director Kemal Curic as a "polished pebble"—and advanced technology that creates 'the immersive interior sanctuary of tomorrow'. The L100 name is in celebration of Lincoln's 100th anniversary as a brand, and pays homage to the automaker's first luxury vehicle, the 1922 Model L.

Like Cadillac's upcoming Celestiq, the L100 is a massive machine that prioritizes personal luxury above all else. Unlike the Celestiq, which previews a forthcoming production model, the Model L100 is purely a concept car, showcased in this **online video**.

The long-wheelbase SUV is 5.6 m long. Total length is over 6 m, and it's 2 m wide. It has giant 4.3 m rear-hinged doors (longer than some entire vehicles!) recalling the rear-hinged "suicide" doors on early-'60s Lincoln Continental models.

It's definitely visually striking, with an OLED floor; a vertically-opening roof, and front converting seats. It also has hints of inspiration from the **Audi Grandsphere**: the bench rear seat, and those front converting bucket seats.



There's no steering wheel or pedals. Instead, those within the L100 let the car do the driving. Should the need arise to override the Model L100's autonomous driving, passengers can use a miniature model of the car—Lincoln calls it a "chess piece"—that rests on a center-console screen (the "chessboard") to accelerate, stop, and steer the vehicle.

Passenger experience is the focus; this includes a front seating space capable of switching between a typical forward-facing position or a more sociable (and possibly more nauseating) rearward-facing position that allows front and rear passengers to face one another. A massive floorboard-mounted screen helps set the cabin ambiance, as well, with the display projecting the likes of clouds to create a more serene setting.

Aerodynamic shape has been optimized, including body surface treatment. A big Lincoln badge on the car's front end and another on each front fender remind passersby what type of vehicle they are looking at.

It has a hub-mounted electric motor at each wheel, with power from by solid-state battery built into the structure.

Many of the features of the Lincoln L100 concept may not make it to production—for the matter of that, the whole car might well be a nonstarter as a sedan in the heavily SUV-centric US market. Nevertheless, this L100 concept presents itself as a vision of a future Lincoln hopes they—and to some degree, society—will be able to achieve.

When Travel, Telephone, and Entertainment First Got Together

THE DESIGN LOUNGE

Bugsy Siegel is often cited as the founder of Las Vegas, the city-symbol of the emerging economy of gambling during the prohibition era. If we wanted to rewrite that story through a technological lens, we could certainly say that Bugsy had a very clear vision about the application of the latest technologies of his era: the telephone and the automobile. In other words: information and mobility. His most successful tasks often related to the mastery of calculating time and distance between the instant a message (telephone) was emitted and the ground operation (automobile) took place. Hence, how to get there (or out of there) on time! Building a casino off-track, in the middle of the Mojave desert, gave Bugsy a clear time-advantage to any police car arriving from Los Angeles (a 4-hour drive) since he had his own telephone line and the information was there beforehand. Consequently, the entire Vegas plot could be played in three verses: information, mobility and entertainment. Of course, that was when cars and telephones were clearly separated and the early economic expansion in Vegas was actually due to its specific location and distance from the closest city centers. Millions of dollars were put in this race and a few decades later a colossal gambling empire emerged attracting millions of visitors and trillions of dollars to southern Nevada. What happens here stays here.

Las Vegas is often portrayed as a prototype of modern consumerism. A place of excess, change of status, motion and speed with consumer trends that always helped to better understand contemporary culture. What could Las Vegas teach us? In the middle of a desert, in a hostile natural environment, it was, after all, not an actual city, not a place to live in, but a fantasyland that could satisfy human desires, illicit passions and futile dreams with a sprinkle of glitter. It became the symbol of entertainment and madness, the opposite facet of the conservative and ordered life in America, a place where people went to let go and immerse themselves in total instant gratification, to do what they would not or could not do elsewhere.

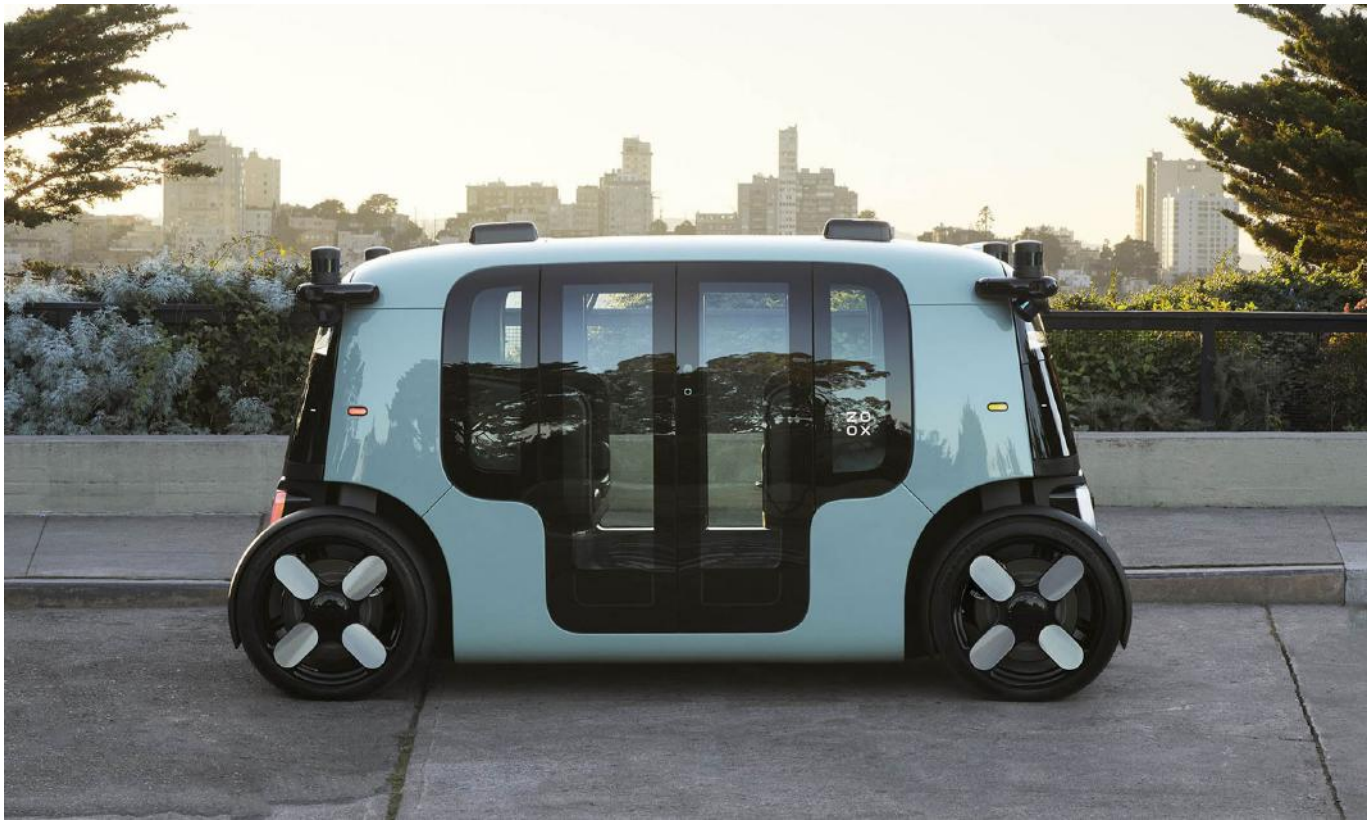
Meanwhile in today's automotive tech business, information is about to merge with travel while telephone and automobile are flirting with entertainment. The relationship between consumer electronics and automotive **infotainment** systems is strengthening as smartphone operating systems (OSs) influence development strategies. Google's Android Auto and Apple's CarPlay offer a growing number of options controlled by radio head units. Now they are all ends in themselves rather than means to arrive at a destination.

An investors' El Dorado or maybe a new Bugsy's Las Vegas is opening infinite opportunities for both sectors: Information is not stationary and location is ubiquitous. It might be that we are about to shift in a new free era where, unlike prohibition and the Las Vegas story, entertainment as the most lucrative of all businesses, will be itinerant and interconnected. Certainly, what happens here stays…everywhere!

News Mobility

Zoox: The Amazon Golden Nugget?

NEWS MOBILITY



ZOOX IMAGE

As we've previously **reported**, Zoox—an Amazon-owned startup specialized in autonomous driving—now has vehicles on the streets of San Francisco. The vehicle is functional, says the company, and it meets all U.S. safety standards. To carry out this work, Zoox has secured the services of Mark R. Rosekind, an expert who worked for NHTSA and the NTSB (National Transportation Safety Board). He has worked for Zooks for five years.

No fewer than 100 innovations are present on board. As far as occupants are directly concerned, let's focus on occupant protection. Zoox's goal is for their vehicle to provide five-star crash protection for every seat in the vehicle; how close they've come will be known soon, as the vehicles are currently undergoing the relevant tests.

They also designed a new inflatable restraint system comprising five kinds of airbag: curtain airbags are on each side of the vehicle; a frontal one is divided in two parts to protect the head, neck, and chest, and there are also rear and side seat airbags. Within the system is an airbag control unit that can monitor where a collision is coming as well as the velocity and determine which airbags and in what order to deploy. Instead of every airbag deploying at once, they will inflate based on the collision location and the severity of the impact.

Finally, the vehicle has sensors in the seat, the buckle and even the coating on the webbing of the seatbelt to be able to tell if passengers are using the seatbelt. The vehicle will not start until everybody is buckled up.

In driving, the vehicle uses the same sensors as those of the competition: cameras, radars, and lidars. And of course, it integrates specific driving software with artificial intelligence. The difference is that it was designed for passengers, not drivers. And it is presented as a new means of transport, not a car. Its robo-taxi is not derived from an existing model (as with Waymo, which uses Chryslers and Jaguars, or Cruise, which uses the basis of the Chevrolet Bolt). It was designed from a blank sheet.

Five Directions to Turn Mobility Around

NEWS MOBILITY

E-VOLUTION MOBILITY IMAGE

CO_2 pricing; reduced speed limits; abolition of the commuter allowance, and car tolls—quite a bundle of measures for traffic control. In addition to these high-profile, controversial topics, however, there are also other ideas on how to tackle climate and mobility collapse. Five examples from recent weeks and months:

30 km/h speed limit in cities

Inner-city speed limits remain under the radar, even though they have strong advocates, especially among municipalities. The mayors of several cities are calling on the federal government to create a legal framework for the large-scale use of 30 km/h zones.

In the view of the initiative, the performance of traffic would not be restricted by large-scale introduction, while the quality of life for residents would be noticeably increased. According to the plans, speed limits of 50 km/h would remain possible on some main roads.

More safety for cyclists

In cities, bicycles can be a viable alternative to cars and public transportation. However, cycling is not much fun in most cities, if only because of fears about personal safety. Almost every fifth accident between a cyclist and a car takes place at the entrances to company premises; gas stations; supermarket parking lots, and parking garages—and it has **been this way** for many years.

Depending on the frequency and location, municipalities could mandate clear sight lines; better securing of driveways; the installation of mirrors, or even the installation of traffic lights for driveways.

Electric light vehicles

The E-Car premium and company car tax credits primarily support electric SUVs and premium sedans with a gross vehicle weight of two tons or more. No money, however, at least from these pots, is available for electric light vehicles. The major automakers almost completely ignore the efficient and resource-saving electric vehicles, with a few exceptions such as the Opel E-Rocks and the Renault Twizy.

The micromobiles are suitable for commuting, shopping, sightseeing and transporting goods. The German E-Mobility Association (BEM) has long been calling for financial support and an increase in the speed limit for such vehicles, which is usually 45 km/h. So far, it has been not successful.

Commuting together

"Traffic suffers mainly because commuters clog everything twice a day," says Günter Schuh. The e-mobility pioneer and university professor wants to solve the problem with his freshly founded shuttle service E-Volution. The service provider provides companies with electric minivans with seven seats that collect the workforce in the morning and provide them with mobile workstations during the drive to the office. Because of this, the commute already pays into the time account, which should increase the acceptance of shared transportation. Negotiations with major companies are already underway, and the first Meta-Mobils are expected to be on the road in 2024.

Cable cars as an alternative

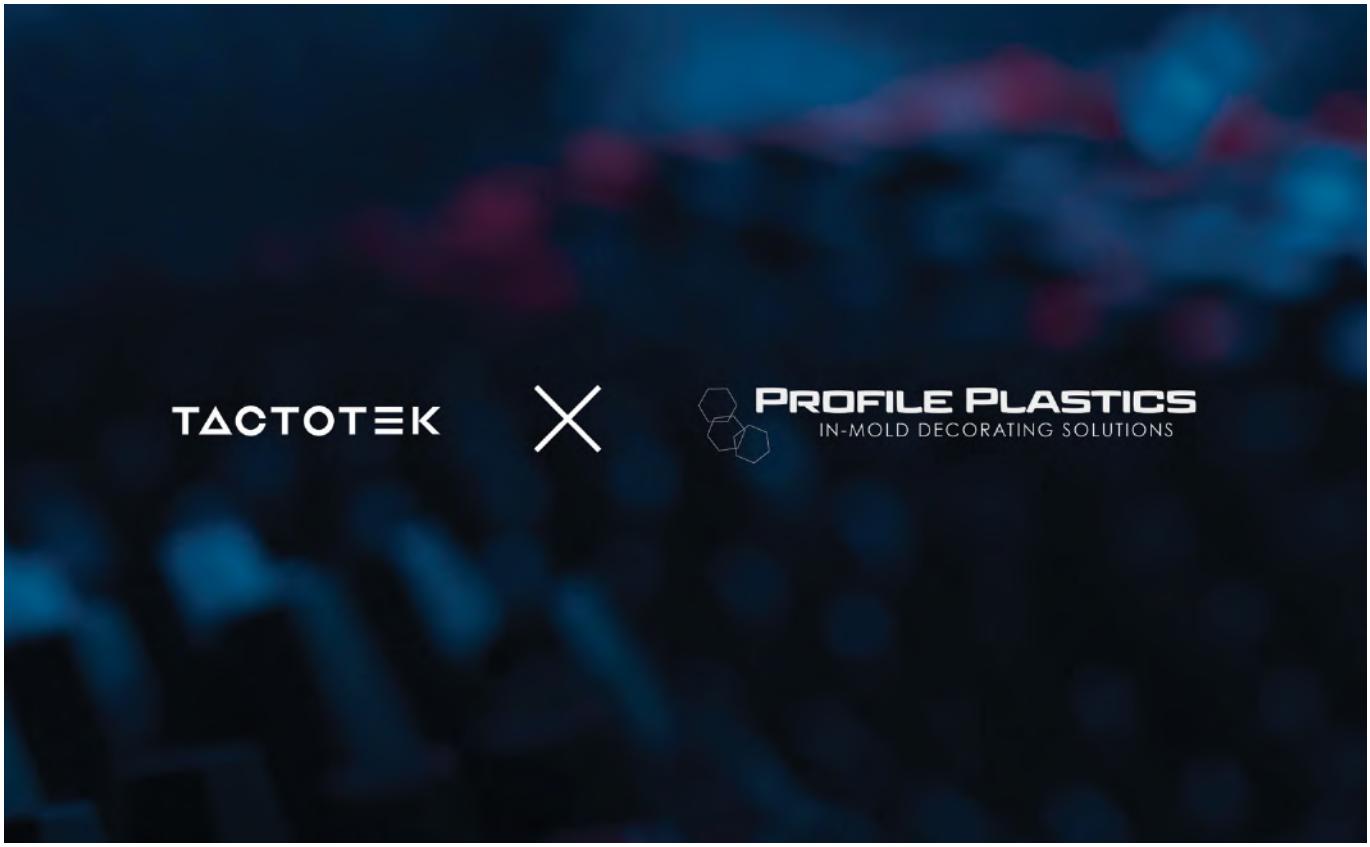
New subways and streetcars are expensive and take a long time to build. In some applications, ropeways could be an alternative. According to a study by consulting firm PwC, they perform better than rail-based public transport solutions in terms of construction and operation. According to the experts, the cost of ropeway systems per kilometer is around €10m to €20m—on par with a streetcar line.

However, since no depot and no signaling and traffic control technology are required, the total investment costs are low in a transportation comparison. In addition, the construction time for ropeways is relatively short at 12 to 18 months and, according to the study, there are also economic advantages in maintenance, including energy consumption that is only half that of rail-based means of transport.

General News

Profile Plastics Licenses TactoTek for IMSE Supply

GENERAL NEWS



Profile Plastics has become a TactoTek Design & Innovate licensee, with rights to design and produce in-mold structural electronics (IMSE®) solutions that use TactoTek intellectual property, and creating a complete IMSE supply ecosystem in North America. Find our previous coverage of **IMSE technology** and **TactoTek interview**.

Profile Plastics, based in Clovis, California, specializes in in-mold decorating (IMD); film-insert molding (FIM); in-mold electronics (IME), and in-mold structural electronics (IMSE)—all with precision registered graphics. They engineer and develop processes and mold products in-house, and also have business in home appliance and medical markets.

As an expert at thermoforming and injection molding FIM parts, they master key steps to manufacturing IMSE solutions. "Profile Plastics is one of the pioneers of film-insert- molding and has decades of FIM-manufacturing experience. A comprehensive understanding of the manufacturing process and already existing experience with multi- film structures is a very good background to become IMSE capable quickly and efficiently," says TactoTek engineering SVP Marko Suo-Anttila.

TactoTek licenses their technology to others who sell, design, and produce IMSE parts for global reach and scaling; the company also works directly with automakers and brands to help them develop and prototype IMSE designs. "We are very excited to welcome Profile Plastics as a Design Innovate licensee and support them as they introduce IMSE solutions to their customers," said TactoTek business development SVP Dave Rice. "Our licensees are central to the adoption of IMSE solutions. In North America we now have anchor customers, and with Profile Plastics and their long-time partner DuraTech Industries, also a Design Innovate licensee, a top-quality supply chain for IMSE parts."

India, the Forever Market of the Future

GENERAL NEWS

AUDI IMAGE

Time and again, India has become the focus of attention for car manufacturers because it is home to around 1.4bn people and relatively few of them own a car by international standards. Henner Lehne, VP Forecasting at S&P Global Mobility, says: "India is a market to watch. But anyone who wants to succeed there needs staying power and entrepreneurial courage. It's a bet on the day after tomorrow".

Hyundai "rolled up the market from below" and thus showed that foreign suppliers can be successful, explains Lehne. According to analyses by S&P Global Mobility, the Korean manufacturer moved up to sixth place in passenger car sales in 2021, with Maruti-Suzuki occupying seven of the top 10 places. When it comes to EVs, the ranking is already more colorful: This segment is shared by Mahindra (15,000 EVs in 2021) and MG (2,800), while Hyundai and BYD play along with very small numbers (121 and 117 units). In total, just over three million passenger cars and light commercial vehicles were sold in India in 2021—and 15 million motorcycles.

Even though India's e-car market is still in its infancy, it is becoming exciting. Electric cars are becoming increasingly popular. Saumitra Sehgal, Senior Partner and Managing Partner at Roland Berger, expects the extensive government support measures for e-cars to have a rapid impact. This increase will be driven by growing middle- and higher-income groups, a lower average vehicle ownership period—from 6 years in 2011 to 4.5 years in 2020—and a high number of model launches: over 100 new passenger car models by 2024. Other macro trends driving this development include the introduction of the scrappage scheme and the growing auto finance industry.

Both the government and individual states are quite active in supporting the growth of e-vehicles. The government has announced the Champion automaker Incentive program for manufacturers of battery electric vehicles and hydrogen fuel cell vehicles. This provides incentives of about 13 to 16 per cent of the total sales value, for manufacturers with at least 50 per cent domestic value added in India. In addition, the goods and services tax on e-vehicles and chargers/charging stations has been reduced from 12 and 18 per cent, respectively, to 5 per cent. The Indian government may consider lowering tariffs on e-cars from 60 to 40 per cent for vehicles costing less than $40,000, and from 100 to 60 per cent for more expensive vehicles.

The Indian e-vehicle market is dominated by local suppliers with a market share of over 80 per cent. Indian automakers benefit from brand trust, first mover advantage, their existing dealer networks, their investments in the e-vehicle market and the launch of several e-vehicle models in the next two to three years.