DVN-I
Automotive Interior

Thu, 2 July 2020 Weekly Newsletter **NEWSLETTER #31**

Editorial

Technology Startups At Sept 24 Conference

The evolution of car interiors is in a reciprocal push-pull with new technology and new use cases, as the automotive realm at large progresses towards more automated, connected and shared vehicles. This week's in-depth article looks at recent surveys' convergence on the importance of the interior in car purchasing decisions, and how an attractive abundance of new technology must be appropriately balanced and properly leveraged to optimize the vehicle occupant experience.

When we talk about occupant experience, that includes things like usability, wellbeing, safe and intuitive access to information and services, and otherwise like that. It's not just any single interaction, or any single added feature, but rather a continuum of interactions along the complete mobility process. Take a look at this week's mobility news section for a series of short essays aiming to describe and understand mobility trajectories as a shaping element of our environment. This travel along mobility's history will guide us progressively towards the mobility of the future, and consequently to the new use cases and new interiors.

Our upcoming September 24 online conference and exhibition will address new technology for smart car interiors. We are proud to report that many startups have accepted our invitation; surely, they will strengthen the prospective technology perspective of the event in domains as various as air quality, passenger monitoring, tactile sensing, digital mapping, and mobility commerce, and more. Plan to visit them online—**sign up here!**

We're glad you're on board with us!

Sincerely yours,

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

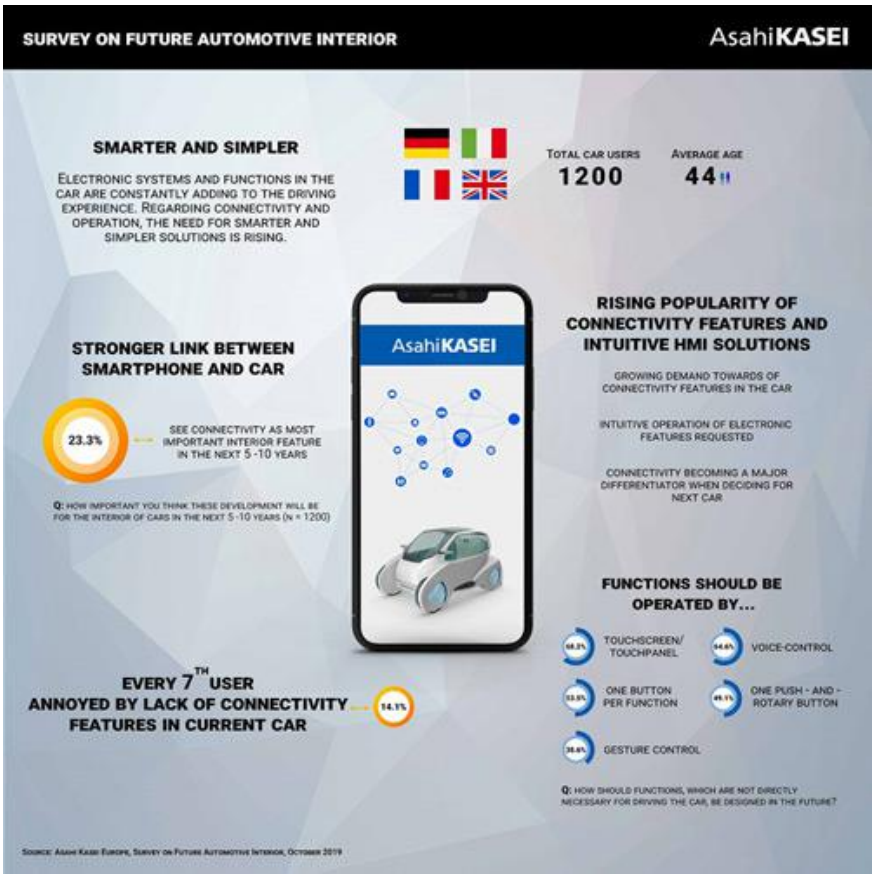
Surveys Show New Focus on Interior

BOSCH SHOW CAR 2017

Recent surveys show convergent results on how car users are changing, and looking for smarter and simpler HMI to end up with a better and safer experience.

As described in almost any edition of DVN-I, a growing number of electronic systems and functions in the car are constantly adding to the driving experience, under the CASE megatrend umbrella (Connected, Autonomous, Shared, Electric). It is disrupting the entire automotive world—not just the vehicle itself, but also the driving and passenger experience. With increasing autonomy of the car, the passengers will have to focus less on the traffic, and so will have more time to spend on relaxation, work, and entertainment. We can expect the focus of buyers' attention to shift from the long-dominant power and exterior styling towards the interior as a living space. In recent years, automakers and suppliers have presented a great variety of automotive interior concepts. Now, what are users really expecting from the auto interior of the future?

Last October, the European operations of Japanese chemical and material science specialists Asahi Kasei conducted a representative survey together with Cologne-based market research institute SKOPOS, interviewing a total of 1,200 car users in Germany, France, Italy, and the United Kingdom regarding their preferences in mobility and especially on the future automotive interior.



The key outcome of this survey: Even as power, fuel economy, and driving performance remain important drivers in the car purchase decision process, there is an obvious trend towards interior features catching up. Within the interior, HMI (human-machine interface) features are playing an increasingly important role—aided by the increasing autonomy of the cars, but mostly due to the fact that user expectations are changing. HMI solutions add significantly to comfort and safety of the car.

Connectivity is the major interior differentiator, with 56.9% of user's considering connectivity features (starting with smartphone integration) will play an essential role when deciding on their next car. The trend is evident in all four major European automotive markets, notably in Italy (45.6% to 66.0%). The same growth, albeit at a lesser level, can be seen in France (42.1% to 53.3%), Germany (41.2% to 52.2%) and the United Kingdom (37.7% to 55.4%).

User are extending smartphone logic to intuitive control of infotainment, navigation, and other features. Difficult control of vehicle functions is an obvious safety hazard and annoyance, and can easily distract the driver. More than 10% of respondents mentioned difficult operation of features as the biggest annoyance in their current car, and 72.7% agree these kinds of features should be operable intuitively.

What's the most-wanted new feature in their next car? 68.2% want a touchscreen or touch panel, closely followed by voice control (64.6%). In contrast, 49.1% favor one main rotary push button for all functions, the most common control interface in today's cars. Gesture control is much less desired with only 38.6%.

Interior surfaces need to be attractive as well; 10.3% say poor-quality interior surface materials are the most annoying thing in their current car. Meanwhile, 44.8% of all respondents saw a benefit in surfaces that look and feel especially high quality—seats, dashboards and headliners—compared with just 11.4% who did not. And 32.5% would be willing to pay a reasonable price for extra-nice surfaces as an optional upgrade. About the surface material itself, 57% of the respondents felt that sustainable materials for seat covers and surfaces will become increasingly important

in the next five to 10 years, while the need for real leather equipment will fall drastically.

The whole of the report can be **downloaded**.

outcomes were found in a study by the Experiences Per Mile (EPM) Advisory Council, a collaboration of automotive and technology stakeholders, including VW, Salesforce, Ford, Spotify, and Harman (sponsor). That **report** predicts built-in vehicle connectivity will grow sharply from 48% of all new global automobiles in 2020 to nearly 96% by 2030. Similarly, by 2030, 79% of vehicles shipped around the world will have L^2 autonomy or higher.

Meanwhile, as new consumer values like the sharing economy and sustainability continue to take hold, US-based SBD Automotive, who conducted the research, estimates that 26% of mobility profits will be derived from new sources such as on-demand mobility, while 24% of all new cars sold by 2030 will be electric. The report emphasizes the shift, as connectivity proliferates, from simply being connected to more fulsome consumer experiences; as the authors phrase it, "from RPM to EPM (experiences per mile)". And that's where this survey complements the previous one, in that consumer are willing to get smart features and technology in their car, but want them to be really integrated to get a meaningful experience.

How to combine many technologies, complexity in a way, and creating a very smooth and simple user experience, that’s the challenge: how disparate technologies and services can come together to create coherent use cases. The report suggests three focus areas to bridge this gap between technology and experience:

• Reduce complexity, for example by integrating devices into a single digital experience;
• Increase focus on usability to help users safely access information while driving, and
• Prioritize the connectivity experience with practical services such as where's the next fuel station, ETA, music, focused tips, etc.

There’s still a long way to go, and a **study** run by the UK’s Transport Research Laboratory (TRL), IAM Roadsmart, FIA Road Safety, and the Rees Jeffreys Road Fund, found a detrimental impact of in-vehicle infotainment systems on driver response

times—and not just a small effect, either; the research shows infotainment touchscreens can worsen driver response time more than being drunk!

So maybe we shouldn't hurry to bury all the dashboard buttons yet, when voice-activated systems are not yet either the safest solution. TRL says further research is necessary to steer the use of spoken instructions as the safest method. They spoke about development of conversational artificial intelligence which enables speech interfaces to operate at a complex level. Voice control systems only understand a set of key commands when applying conversational AI could widen its capabilities to include all forms of dialogue to enable a versatile, natural and safe interaction.

Interior News

Honda's New Stain-Repellant Seat Fabric

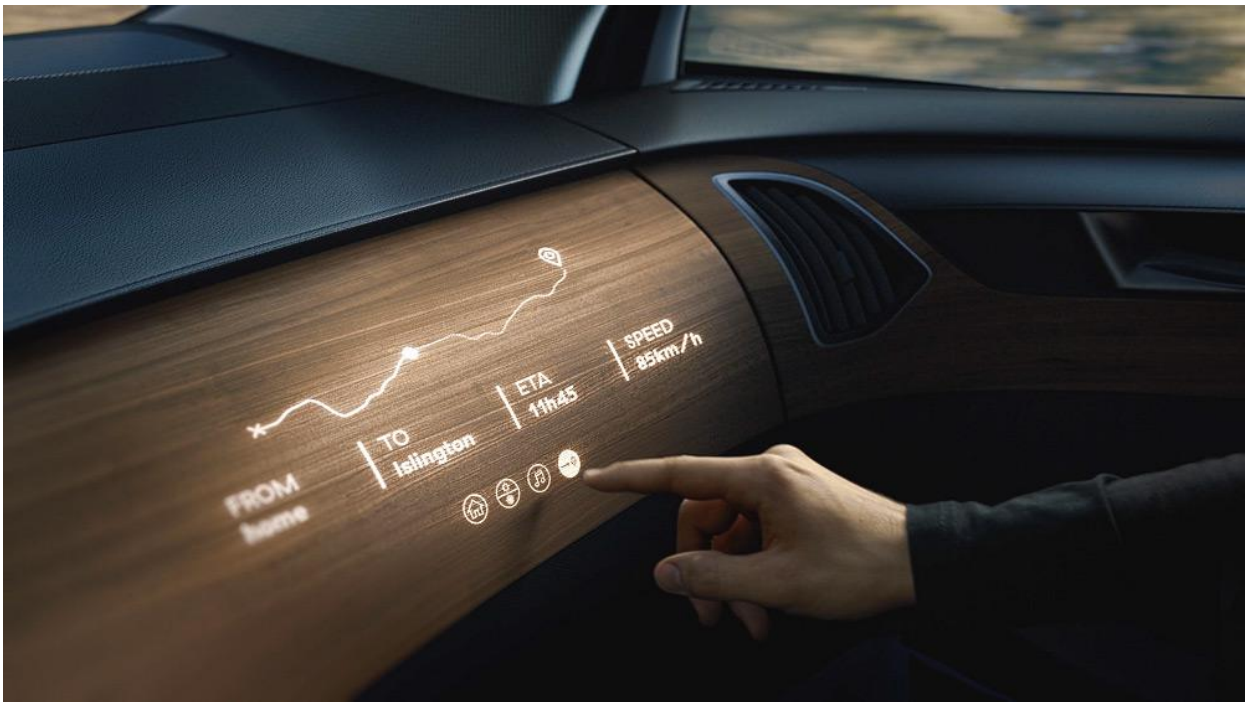
INTERIOR NEWS

Honda's R&D department is working to develop a special car seat fabric that shrugs off food, beverages, mud, and whatever other stain might come menacing. The goal is to build car seats that never get stained. Based on a special fluororesin plastic commonly used for electrical cables and pipes, Honda developed a hydrophobic and lipophobic tissue, i.e. capable of repelling both water and oil. After a long series of tests, Honda's chemists and engineers have obtained a new product that seems immune to spots and maintains all the aesthetic and tactile qualities required of an interior upholstery. The structure of the textile is new, as well, using different resins that together block the passage of many liquids and oils.

To date, the new material has only been introduced in the upholstery of the 2020 model Honda Stepwgn 6-seater MPV in the Japanese market, but in the coming years it could be used to cover the fabrics of all Honda cars.

Woodoo's Translucent "Augmented Wood"

INTERIOR NEWS



Woodoo, a French startup, was founded in 2016 with technology to upgrade all wood species into high-performance advanced materials. It was born from 5 years of intensive research in cellulosic nano-technology.

Their CEO, Timothée Boitouzet is a young architect trained in Japan; he has worked for prestigious firms like Kengo Kuma, SANAA, and Herzog & De Meuron. Passionate about materials, he then moved to the United States in 2010 to conduct research at Harvard and MIT. He continued his work in France from 2012, until finding a brilliant solution to improve the wood.

This "augmented" wood has had its lignin content reduced. Woodoo extracts lignin, a kind of glue that attracts insects while making the wood rigid and putrescible, then replace it with an ultra-resistant polymer to turn the wood into a rot-proof, malleable, translucent, and fire-resistant material ideal for construction, as it maintains the wood's structural integrity. At the end of our manufacturing process, the result is a 3D wood material with an unprecedented translucency, perfectly adapted to functional automotive interior instrument panel surface.

For maximum impact, they focus most on unused, low-grade wood species. In parallel, Woodoo's process produces highly pure lignin, which can be sold as a byproduct to the specialty chemistry market to transform waste into additional revenue.

Design Award for Continental Curved Lens Display

INTERIOR NEWS

Continental received two German Design Awards for new in-car controls and displays that improve user experience. The first winning innovation is the Curved Plastic Lens Display. This display solution shows the next evolutionary step for large automotive user interfaces. Industrialization of the production of 3D formed plastic lenses with complex decoration prints is an economic alternative to traditional real glass solutions. Smaller curvature radii in combination with topographic surface elements significantly improve the user experience of multi-display systems in the vehicle, make it easier to display larger amounts of data more effectively and offer a new level of design flexibility.

The jury stated that curved cockpit displays with integrated topographic elements is impressive, expanding the creative scope of designers and creating a completely new driving experience.

The second product to win is the Morphing Controls functional surfaces. With Morphing Controls, clean surfaces become intuitive user interfaces. The buttons stay invisible until demanded. Thanks to proximity sensors and actuators, they take shape only when needed. The smart surface material can be reversibly stretched and allows precise translucence for button symbols and display content. The topographic surface in combination with force sensing and haptic feedback significantly improve the blind operability in the vehicle.

The jury stated that morphing controls only become visible when the user needs them. Otherwise the surface remains refreshingly clear and undistracting—an impressive technology that reinterprets the classic car cockpit in a revolutionary way.

Audi Wins with a Virtual Exterior Mirror

INTERIOR NEWS

Given by the "Society for Information Display" (SID) in the categories "Display Application of the Year", Audi receives the award for the development of a virtual exterior mirror.

The Society for Information Display (SID) is a global professional organization that focuses on the further development of electronic display and visual information technologies and offers a platform for cooperation, communication and further development of the display industry and its technologies. The members are specialists from a wide range of business areas in the display industry, such as research, design, manufacture, application, marketing and sales.

Audi's solution uses small exterior side cameras and a door-mounted 7” OLED interior display, that being the best technology for clear vision no matter what the sun and ambient temperature might be doig. It has been developed in parallel to EVs, as improved aerodynamics reduces wind noise, more audible in an EV because of no combustion engine.

This display provides a much better image than a conventional mirror can in certain situations, such as driving in direct sunlight. The mirrors also adjust automatically to three driving situations: highway, turning, and parking. On the highway, the field of vision is reduced so that the driver can better estimate speeds when driving fast. When turning, the indicator view extends the relevant side's image detail to reduce the blind spot. When parking, the field of vision is extended downward.

The camera is integrated into the hexagonal end of the virtual mirror's flat supports and its images are digitally processed and displayed on high-contrast, 1,280 × 800-pixel OLED screens.

Ford Hands-Free Mode With Driver-Facing Camera

INTERIOR NEWS

Ford's are adding new ADAS offerings including Active Drive Assist, which allows hands-free driving on more than 160,000 km of divided highways mapped in all 50 U.S. states and Canada.
Active Drive Assist is the next evolution of Ford's Intelligent Adaptive Cruise Control with Lane Centering, adding Ford's first no-hands mode with the potential for more enhancements in the future.

The hands-free mode allows drivers on certain sections of pre-mapped, divided highways to drive with their hands off the steering wheel—if they keep their attention on the road—granting them an additional level of comfort during long drives. An advanced infrared driver-facing camera will track eye gaze and head position to ensure drivers are paying attention to the road while in hands-free mode as well as hands-on lane centering mode, which works on any road with lane lines. Drivers will be notified by visual prompts on their instrument cluster when they need to return their attention to the road or resume control of the vehicle. Active Drive Assist will be available on certain 2021 model year Ford vehicles and will be available across the Mustang Mach-E lineup.

The interface will use an animation of a steering wheel with the driver’s hands, and a graphic of a protective bubble surrounding the car.

It’s part of an all-digital instrument cluster, available on the Mustang since 2018, which received as well a German Design Award for "virtual pleasantly familiar fittings—as modern as their current appearance may be—look", and "new functions and settings which have been added for contemporary driving pleasure".

‘Cricket Ball’ Red Bentley Flying Spur

INTERIOR NEWS

If Design and Perceived Quality is about attention to any detail, then Bentley all-new Flying Spur flagship sedan surely must be a benchmark! Examples abound: chrome-plated seat tracks, artistically designed B-pillars, vanity mirrors wrapped in leather and finished in chrome, and the cricket ball stitching and burgundy shade color. It all looks so perfectly, splendidly British!

Details mean continuity and consistency between all parts, like the B-pillar having as much attention as the instrument panel or steering wheel. From floor to headliner, the same top-grade leather on the doors extends to the B-pillar, as does the diamond-shaped 3D-faceted quilting.

The long doors of the Continental allowed designers to extend the trim from the instrument panel toward the B-pillar, creating a more tapered surface that appears stretched and taut—just right for a sporty coupé. As the Flying Spur is a sedan, the front doors are shorter so the trim is less tapered but more luxurious.

Following the Bentayga in 2017 and the Continental GT coupe in 2019, these cars, assembled in Crewe, U.K., share an assembly architecture, the steering wheel, much of the instrument panel, digital gauge cluster, certain knurled metallic surfaces, the James Bond rotating display screen and much of the center console. But big massaging seats, doors and stitch patterns are different in part because Flying Spur is

a sedan. Seat stitching is unique with diamond motifs starting out of small and double stitches, to elongate on the lower seat back and bottom cushions when reclined.

Recticel Technical Foams Launched Into Space

INTERIOR NEWS

On 30 May, SpaceX launched two NASA astronauts to the International Space Station. This is the first time that a private company has carried humans into Earth's orbit.

Recticel, a Belgium-based global PU foam producer and DVN Interior member, is proud to report they have supported SpaceX in this project by providing essential technical foams, manufactured by their North American subsidiary Soundcoat, used in the Crew Dragon spacecraft.

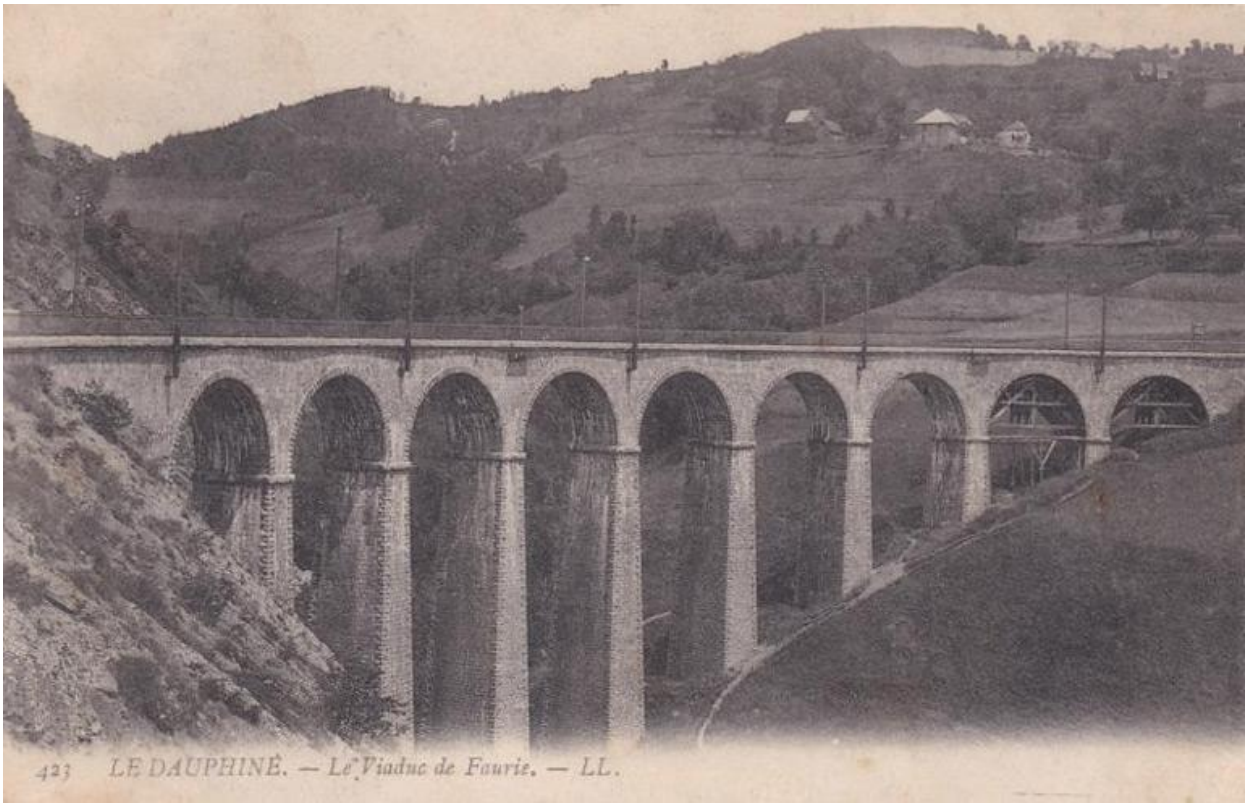
Soundcoat is well known for designing engineered noise control solutions, and are considered experts in creating quietness in aerospace and roadgoing vehicles and in medical devices.

The Crew Dragon capsule carries the astronauts into orbit on a SpaceX Falcon 9 rocket. The capsule measures almost 4 m in diameter and is equipped with seven seats and touchscreen controls. It was home to the crew for about 19 hours before they arrive at the International Space Station.

News Mobility

Trajectories, Our Mobile Signature

NEWS MOBILITY



(a designer’s look at our mobility-centric culture).

1. The first segregation of mobility

Design professionals often think in terms of lines. Every line is a representation of motion on paper. Big gestures draw long and fast lines; small wrist-moves draw short arcs and a constant-speed trace with a ballpoint pen, while talking at the phone and doodling, lays down an infinite string of labyrinthine paths. Mobility can be traced in the same way, while people and vehicles move on a landscape. This is the first of a series of short essays aiming to describe and understand mobile trajectories as a shaping element of our environment.

Representations, scribbled by the traveler's hand, during the 17th Century while commuting by carriage, soon developed into the first modern maps. Those linear paths of driving-riding and drawing various trajectories became the rough draft of our infrastructure, re-territorializing every era to our up-to-date footprint. By 1760, the outspread network in Europe was a mosaic of all sorts of trails drawn according to distance and territorial conditions, leading to crossroads, urbanization, congestion and a clear new typology of intersecting paths. They kept multiplying up to the 19th Century, following trajectories strictly related to topography.

The appearance of railways brought upside-down all perceptions, segregating mobility by a new kind of travel that reduced time and space. High mountain or deep river was no reason for delays. Bridges, viaducts, and tunnels were painting the rigid trajectories of modern era and the technical landscape of the years to come. Travelers struggled to understand the fact that travel did not perfectly follow the topography of the land and often disobeyed to this basic rule of perception. At times went above and even through the land, showing an unquestioned obedience to its technical self!

By the middle of the 19th Century, with the expansion of both railway and horse-powered networks, linear constant-speed steam engine tracks often cut horse carriage paths, while in townships slow-moving carriages were mixed with scrambling and crossing pedestrians. We were entering the modern era of mobility and urban planning by the need of ranking all given means of transportation. A complex system of trajectories that would never stop augmenting and regenerating and soon gave place to a disruptive mode of urban planning.

to be continued…

INDUSTRIOUS_

NHTSA's New AV TEST Initiative

NEWS MOBILITY

NHTSA, the U.S. Government's Department of Transportation agency tasked with writing, promulgating, and enforcing vehicle safety standards, is launching the Automated Vehicles Transparency and Engagement for Safe Testing Initiative with states, local governments, and companies in the automated driving system community. Test automated vehicles can now voluntarily submit information to NHTSA as part of this AV TEST Initiative, and information will be made available to all. Then, any member can learn about the types of activities happening, including testing of various types of motor vehicles—cars, low-speed shuttles, trucks, and driverless electric delivery vehicles.

The participating companies so far are Beep, Cruise, FCA, Navya, Nuro, Toyota, Uber, and Waymo. The states include California, Florida, Maryland, Michigan, Ohio, Pennsylvania, Texas, and Utah.

The AV TEST Initiative will include a series of public events across the country to improve transparency and safety in the development and testing of automated driving systems, and to help increase the public’s awareness of testing.

It is part of an overall DOT strategy to increase public acceptance of future automated transportation systems.

Invisible Air Shield For Shared-Mobility Hygiene?

NEWS MOBILITY

In the aftermath of COVID 19, people would likely to be a bit reluctant to use shared mobility, when meeting with other people in a restricted car body volume.

The same problem exists for any public transport system. For air travel, a Seattle-based design company called Teague has proposed a solution based on new kinds of ventilation.

Teague's concept is called AirShield, meant to keep coughs and sneezes confined to just one passenger seat: the one in which the person who coughed and sneezed is sitting. Then, the air is directly picked up and immediately re-directed downwards and out of the cabin to the HEPA filtration units, before even entering the personal space of a neighboring passenger.

As designed to improve existing aircrafts, AirShield can be 3D-printed, and easily clips onto the airplane's already-existing air conditioning unit.

All those characteristics fit perfectly with what would be needed into a shared mobility vehicle. What might it cost to put into a car…? Perhaps time will tell.

The Design Lounge

VW Group Design Language – Volkswagen Brand

THE DESIGN LOUNGE

For part 2 in our min-series on Volkswagen Groups design, let us look at Volkswagen brand design. As the namesake of the maker, Volkswagen has a substantial history and breadth of product offerings that have expanded during their history. Volkswagen vehicles are represented within all global markets so, for this edition, we will only focus on VW's major design theme drivers and brand execution.

The Volkswagen Golf

This product has clearly driven the identity of Volkswagen through eight generations including the market positioning within each segment that is now a premium offer for the consumer.

GOLF 1

The original Giorgetto Giugiaro 2 box exterior design balanced a substantial solid aesthetic that also managed to feel nimble and airy.

GOLF 1

A very simple and straightforward aesthetic with a dominant rectangular cluster, radio, and HVAC controls that contrasted with the airy interior space. The classic golf ball-styled dimpled shifter knob along with plaid cloth seating gave a more lighthearted feel to the cabin environment.

GOLF 1 FACELIFT

The updated facelift Golf 1 added a soft-touch instrument panel, a more substantial glovebox and storage, and introduced what would become VW's classic 4-button, 4-spoke steering wheel.

GOLF 2

VW's in-house design team added a more solid feeling for the Golf 2 while removing some of the initial design's lightheartedness.

GOLF 2

The interior expanded on the facelifted Golf 1's quality materials with a deeper soft touch IP.

GOLF 3

Removal of the round headlight and adding more bulk to the exterior with a shoulder line slowly moved the Golf 3 into a sportier direction.

GOLF 3

The Golf 3 interior had its first major packaging update. Airbags were integrated into the IP and steering wheel—which still remained a 4-spoke design, albeit a softer one. By locating the air ducts above the HVAC controls (now with rotary dials) the interior environment became more substantial and imposing, much more massive than in the original Golf 1.

GOLF 4

Removal of the belt line in the body metal and the addition of more prominent wheel arches created a clean yet sporty feel for the Golf 4 exterior.

GOLF 4

The Golf 4 was when the VW Group first moved the Golf upmarket. With higher quality materials such as soft touch plastics, aluminum (note the dead pedal) and highly improved fit and finish boosting perceived quality, the Golf 4 Golf started the upmarket positioning of the VW brand's product positioning within each segment offering. No more 4-spoke steering wheel and no more link to the Golf 1's cockpit design; instead,

we find upmarket materials and finishes and well-controlled gaps as a design/brand differentiator theme.

GOLF 5

In the Golf 5, reintroducing the body belt line—this time only in the rear—enhanced the Golf's aggressiveness So did eliminating the upright, blunt grille of previous models.

GOLF 5

The Golf 5 integrated the center stack as one visual element. This opened up the spatial aspect of the cabin—yes, there was a massive center stack, but it managed not to interfere with an airiness that had been missing from the previous generation. Rotary dial HVAC controls are re-introduced and the beginnings of a central display can be seen.

GOLF 6

Move of an evolution than a new aesthetic, the Golf 6 extended the belt line to the front again and further smoothed the overall aesthetics while keeping the same overall proportions since the Golf 4.

GOLF 6

For the interior, the Golf 6 integrated the IP, door window and mirror switches, and center stack into a flowing unit. This was then contrasted by the material detailing, such as aluminum inserts to improve the high perceived quality aesthetics that started with the Golf 4. The central display is now an integrated feature of the overall design theme and function.

GOLF 7

Sharp lines replace soft forms for the Golf 7 for a more aggressive look. No proportion changes and a far cry from the airiness of the Golf 1.

GOLF 7

For the interior there was a major design theme change, though the underlining architecture remained. An eyebrow now visually integrated the cluster with the air ducts leading to the substantial center stack that is now more integrated into the center console. Materials and perceived quality continue to improve.

GOLF 7 FACELIFT

Display integrations and touch screens. This marked the entrance of the Golf into the modern UX/HMI era. Piano-black finishes are decidedly upscale and upmarket.

GOLF 8

A lower and flatter hood that overrides flatter headlights have completely eliminated any of the playfulness found from the original Golf 1, and have placed the Golf 8 on a clearly sport- oriented path.

GOLF 8

With the Golf 8, VW has now made the displays into an integrated unit that spans the driver's side of the vehicle. The massiveness and encapsulating feeling of the previous generation is now replaced with an airier environment that harks back to the Golf 1 facelift.

The Volkswagen ID3

ID 3

With the Golf 8 current positioned as an upmarket vehicle within its segment, the new ID3 EV is taking the position as the fresh/new vehicle—as the original Golf 1 did in the 1970s.

ID 3

Relying only on displays for the cluster and center stack UX/HMI, touch sensitive screens and buttons (window, door controls, etc.), the ID3 has an open and playful space to contrast with the Golf 8's more serious, sporty environment.

Volkswagen Golf to ID3, 1974 to 2020

By executing the new ID3 and Golf 8 designs as such, I see a direct evolution form the Golf 1. The Golf 8 is akin to the Golf 1 facelift with its driver's orientation, and the ID3 to the original Golf 1. These design executions are allowing for the VW Golf lineage to continue within both vehicles.

GOLF 1 FACELIFT

GOLF 8

GOLF 1

ID 3

ID3

General News

Mercedes and Nvidia AI for Self-Driving Starting 2024

GENERAL NEWS

A week after BMW and Mercedes canceled their tie-up for autonomous car development, Mercedes announced they will use a full Nvidia software and hardware system for to power self-driving cars set to first roll in 2024.

The system will be based on Nvidia's Orin chip, which they claim outperforms Tesla's FSD computer by ~38%.

Nvidia's system will be available progressively on all Mercedes vehicles. All cars will come with the hardware built in, regardless of whether or not they are ordered with self-driving options installed. This sounds similar to Tesla's current model of including Autopilot hardware on all cars, then selling full self-driving as a software option.

The companies emphasized that next-gen vehicles will be "software-defined" with continuous upgradeability—also similar to Tesla.

Another aspect of the software-defined car will be the presence of apps, much like those on a smartphone. Some apps may be free and some may be paid, but this will be a way for owners to customize their driving experience and for cars to lengthen their usable life by getting new features (OTA?) after release. No information at this stage, if it could be open to third-party developers.

While Nvidia claims their Orin is capable of up to L^5, Mercedes only plans to take the system up to L^2 or L^3, with L^4 parking capability as a geofenced fully autonomous operation, with human override available.

Volkswagen Accelerates China EV Push

GENERAL NEWS

With a difficult market in Europe, VW will invest around €2bn to develop EVs in (and for) China, where the market is showing signs of recovery.
Concretely, VW will spend €1.1bn to become the largest shareholder (26%) in a Chinese manufacturer of electric batteries, Guoxuan High-Tech. To this investment is added a pour of €1bn aimed at increasing from 50% to 75% in the joint venture created with Chinese EV maker JAC Automobile.

At the annual meeting of the Chinese Parliament which ended last week, Premier Li Keqiang promised to "generalize new energy vehicles" as part of a plan to revive the Chinese economy. The push is intended to confirm China as the world's largest e-mobility market.

China already represents 40% of VW's sales and a significant part of their profits. VW has recently set themselves the target of selling 1.5 million additional electric vehicles each year by 2025. In April, Volkswagen announced an agreement with the Chinese group Ganfeng to obtain lithium, a fundamental component of batteries.