DVN-I
Automotive Interior

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Editorial

It's Time To Subscribe!

DVN Interior now has six editions and 1 Report out—a good, strong showing of what DVN-I offers the automotive interior community.

As the ongoing automotive transport revolution is quickly bringing connected, autonomous, shared, and electric vehicles onstream, mobility use cases are changing drastically. Car interiors are becoming a stronger-than-ever product differentiator, facilitating new activities for vehicle occupants: relaxing, working, phoning, watching movies, and other suchlike.

At DVN Interior we're building a community of car interior experts with DVN-I Reports, DVN-I Workshops, and a twice-monthly DVN-I Newsletter, all aimed at consolidating and presenting pertinent news and analysis to help DVN-I members stay efficiently and easily informed and up-to-date without having to chase widely-scattered, difficult-to-find articles in dozens of sources.

DVN-I is also always linking the automotive market, new technology, and new mobility services to present and explain relevance in the car interior realm. Technology and services are the building blocks of today's and tomorrow's vehicle occupant experience, and that's where interior and mobility overlap. Mobility service providers will of course brand and promote their services, not least by creating a unique customer experience, from ordering with a smartphone tap to relaxing into a mobility tool. Here again, the interior is a major pillar of the experience, so new mobility will drive new interiors, and vice versa.

So far, DVN-I has published 180 total pages—54,000 words—of vehicle interior news and analysis. Your free subscription will end soon, so it's time to subscribe; we need your support to continue cutting through the cruft, saving you many hours of research, and efficiently getting you well informed. We're dedicated to excellence in that task on an ongoing basis, so please step up and contact us today your personal subscription proposal.

Enjoy reading, recommend DVN-I to those in your circles, and we look forward to welcoming you to

the community of DVN-I members!

Sincerely yours,

Philippe Aumont
General Editor, DVN-Interior

In Depth Automotive Interior

Israeli Startups Monitor Occupants

We reported in our last Newsletter that Israel's Tel Aviv is becoming a new Silicon Valley— USD $6bn has been invested in Israeli smart mobility startups there since 2013.

This week we bring you more details from EcoMotion, Israel's annual big startup expo showcasing the country's vibrant startup ecosystem and providing a support platform for sharing knowledge, networking, and collaboration for the smart transportation sector. It is a JV of Israel Innovation Institute, the Ministry of Economy and the Israeli automotive and high-tech industries, and is equivalent of a small CES or VivaTech.

ECOMOTION
SMART TRANSPORTATION COMMUNITY

EcoMotion brings together young and experienced entrepreneurs, market leaders, international and local industry companies, technology-oriented people, policy makers, academic researchers and investors. It is a dynamic community with more than 5000 members, and over 600 affiliated startups related to the sector. Over the course of the multi-day event, there was emphasis on the three ongoing mobility revolutions: electrification, autonomous driving, and digital mobility services.

Today we describe important startups involved in vehicle interiors. All are using AI and algorithm-based technology applied to data captured by many sensors—most of them already existing in the car. The main target is to monitor occupants, understand their state, and then help improve safety, and comfort and meet individual preferences.

Abilisense

Abilisense offers a sophisticated way to analyze sounds in home, work, city and transport environments. It provides assistance for life-threatening and unexpected situations based on sound analysis that use unique algorithms.
The Abilisense hardware monitors various sounds of dangerous situations and suspicious activities by transforming them into alerts directly to applications, command centers and IoT devices. It could cover car security and unusual occupant behavior, especially babies in their baby seat.

Caaresys

Caaresys are developing a contact-free vital-signs sensor for occupant in vehicles. The fully autonomous sensor monitors riders' heart rate, respiratory rate, and movements. The device is designed to prevent vehicle-related tragedies, such children left in hot cars or collisions resulting from cardiac events.
The Caaresys sensor emits RF waves that report vital signs to the system. By analyzing the data against logs in the cloud, the platform interprets the riders' conditions. If a dangerous situation is detected, a warning is sent.
The system has two main sensors: a vehicle occupancy sensor counts the number of passengers and positioning, and a vital sign sensor analyses heart rate and breath rate and driver health and vigilance condition. It could be especially useful for Level 3 transition between autonomous driving scenario back to manual drive.

ContinUse Biometrics

CCrispify is an innovative automotive air quality management system. Their product is an all-in-one air quality management system that monitors all factors of a ride, including in-cabin and outdoor air quality, pollutants, temperature, humidity and barometric pressure. Its cloud-based big data analytics combine in-cabin and environmental data and use AI to find the best solution for cleaner air, whatever the circumstances. It is designed to be easily implemented in an HVAC, instrument panel, or infotainment system, and can ensure vehicle interior will have clean air while providing operators with alerts to clean up vehicles from garbage, dirt, bad odors, spilled liquids, and more, ultimately saving both money and time.

Crispify

ContinUse delivers smart sensing solutions for automakers. Its sensing platform is designed for more than just medical monitoring with the comprehensive cloud-based solution aimed at enhancing driver safety which tracks competence and alertness of the driver (fatigue, drowsiness) as well as passenger comfort, and analyzes captured data continuously to provide real time warnings. ContinUse Biometrics exhibited at MWC19 in Barcelona in collaboration with Mercedes-Benz.

Elegant Monkeys/Kenko Technology

Elegant Monkeys has changed its name to Kenko Technology. Kenko develops science-driven emotions AI products, having gathered top data science talents and world-class researchers to make emotions measurable. Digitizing human emotions enables endless applications in health, performance and lifestyle. It is a subscription-based API/SDK that utilizes AI algorithms to derive emotional state from physiological sensors data. Using physiological measurements enables potential customers to get emotions data without compromising usability and privacy. In a car, it could help occupants to manage stress and anxiety in an autonomous vehicle, and through reactions, help occupants have a more positive experience.

Eyesight Technologies

Eyesight develops embedded computer-vision solutions, bringing sensing and gesture recognition technology to a variety of devices and industries. The company's products for the in-car environment track the driver's attention on the road, detecting when the driver is distracted or shows signs of drowsiness..
With advanced gaze detection, it enables contextual control based on the driver's gaze trajectory, enabling seamless interactions with HUDs and augmented reality windshields. The technology detects if a driver is present in the car or not, and the in-car environment can be adjusted to the detected driver setting seat, mirrors, and HVAC according to their preferences, including also through detection of age and gender of the driver.

Guardian Optical Technologies

Guardian is a startup focusing on providing solution for in-cabin and driving monitoring. Guardian's technology offers a unique electro-optical sensor coupled with deep neural network and advanced computer vision algorithms. It picks up motions in the micrometer scale so as to detect presence in the vehicle with no need for line of sight, thus competing with radar-based technologies. It can be used for driver/passenger recognition and preferences for seats, steering column, mirror position, lighting, and more. It can also drive weight-attuned airbag operation and selective airbag suppression in the event of out-of-position passengers.

Moodify

Moodify develops innovative olfactory systems that harness the power of implicit and explicit scents for improved vehicle occupant performance, safety, and well-being. The company's "Emphatic Car System", based on AI and neurobiology, will predict and prevent human conditions that endanger the vehicle occupants, such as driver microsleep, stress, motion sickness, discomfort, etc. Moodify's interventions include an innovative multi-channel fragrance diffuser that dispenses synthetic human pheromones and other active scents.

Tactile Mobility

Feeling the tactility that is created between a vehicle and the road is key for optimizing safety, user experience, and efficiency, whether a person or a computer drives a vehicle. Tactile Mobility provides smart and autonomous vehicles with tactile sensing and data the company says smartens vehicles, improves roads, and enhances the mobility ecosystem. The company's technology, which leverages vehicles' embedded sensors, collects real-time data and turns it into actionable insights, enabling smart and autonomous vehicles to feel the road under their tires. These insights will open many options to enhance driving experience and comfort.

Vayyar

Vayyar's equipment monitors presence, location, posture, distances, vital signs and obstacles by detecting over 150K points of interest per second. It can monitor driver vital signs, head position and movement, proximity and posture for airbag optimization, and recognize gestures for infotainment control. It can identify passenger location within the car to ensure maximal safety, sense occupant presence to baby-proof the automobile (avoid young children getting left inside, etc), classify passengers according to size, height, age and other parameters, and optimize airbag deployment parameters.

INTERIOR NEWS

Continental, Leia in 3D Display Development Pact

Continental will collaborate with Leia, a Silicon Valley company, to develop lightfield automotive displays, providing 3D information of the surrounding environment of the vehicle with a sort of holographic effect. Through the partnership, Continental

aims to develop a new light-field drive deck solution, the Natural 3D Lightfield Instrument Cluster,

which they say is an evolutionary step in the design of the human-machine interaction within automotive vehicles.

The 3D image produced by the lightfield display is made up of a total of eight perspectives of the same object that subtly vary according to the point of view. The 3D effect of the display is achieved through a special method of diffracting light through a screen; passengers in the front and back seats can clearly see the same 3D image from their seated positions.

Leia is bringing its experience from its growing lightfield ecosystem of immersive gaming, video streaming, social sharing, and e-commerce. It is expected the collaboration with Continental will open many new application opportunities to automakers, perhaps including holographic navigation, park assist, and augmented reality on the digital cluster or central information display.

Ford Explorer Gets Thinner, Better Seats

Ford's global seating and design team has maintained the comfort standard in the new Explorer's front-row seat while eliminating some of the bulk by reducing the thickness of the seatback and shoulder area. The main target of a less-cumbersome front seat design is to maintain the same comfort standard (especially torso support) while freeing up space for second-row passengers.

The Explorer's front seats are highly feature-dense; they include such niceties as 10-way adjustments, a multicontour system with various massage patterns, and a ventilation system that draws warm air from the body. New front-row back panels provide a more sculpted appearance and improved second-row knee room.

Second-row seats feature new "EZ-entry" functionality, allowing easy access to the third row without having to remove a child's booster seat.

Development has been driven by Mike Kolich, Ford's seat and comfort development boss.

Convertibles, Limited by China's Air Pollution, May Have Bright Future There

Droptop cars are rare in China because not many people want them—poor outdoor air quality versus improved interior air quality means Chinese drivers want closed-roof cars.

Webasto, the world's largest maker of vehicle roof systems, is optimistic about changing that. They're getting positive feedback about convertibles from Chinese people. Webasto Chairman Holger Engelmann describes the supplier's small survey during the Shanghai auto show in April to ask visitors to the company's booth whether they might be interested in buying a convertible in the future. He says 400 people took the survey. Over 80% said they like convertibles, and over 60% said they could imagine buying one in the future. Engelmann mused, "Maybe when the environmental conditions become better in China, we will see a huge recovery for the convertible".

For now, the air in Chinese cities is too polluted to drive with the top down. In fact, a number of automakers including Volvo have promoted their filtration systems' ability to provide clean interior air. Someday it may be possible to manage clean air flow within a bubble around the occupants, even if the roof is open and the ambient air is...not so fresh.

Safety Systems are Felt to Work: Survey

A new survey by Consumer Reports found 57 percent of drivers say advanced driver assistance systems have helped them avoid a crash. The survey, which tracked data on about 72,000 vehicles from the 2015–2019 model years in the United States, asked drivers about forward collision warning, automatic emergency braking, blind spot warning, and other active safety and driver systems.

Survey participants reported the highest satisfaction with adaptive cruise control, automatic emergency braking, and blind spot warning systems. Lanekeeping features were less popular or effective, with respondents reporting annoying alert chimes, vibrations, and overly aggressive steering corrections.

One of the reported issues is how the systems notify driver and/or occupants of changes in their

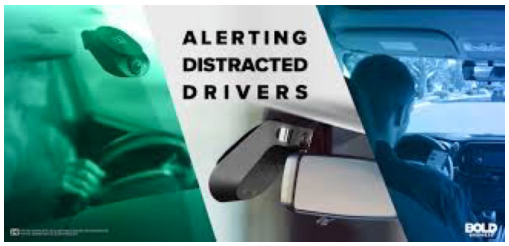
environment. If an alert is annoying, "people turn them off and then it's never going to help avoid a potential crash if they go over a lane or something", says Consumer Reports' Mike Monticello.

According to the survey, 60 percent of drivers said blind spot warning prevented a collision. It's also the system drivers turn off least often, the survey found.

"A lot of people are very unaware of these systems or what they do," Monticello says. "With as distracted as people have become these days in their driving, these systems have become important."

The Insurance Institute for Highway Safety said this past March that automatic emergency braking systems with forward collision warning and crash-imminent braking reduce rear-end crashes by half, and still by more than a quarter with forward collision warning alone.

Real-Time Alerts Can Cut Distracted Driving



A new study finds distraction could be reduced as much as 47 percent if drivers get non-annoying, real-time alerts that help refocus their attention on the road. Nauto, an AI company in Palo Alto, California, found nearly four of five drivers in fleets across multiple industries improved driving performance with real-time alerts produced by in-cabin monitoring systems. These drivers reduced their frequency of distraction by 40 percent, duration of distraction by 43 percent, and distance traveled while distracted by 47 percent.

Taken with other studies, the findings are part of a growing body of work that suggests substantial improvements in traffic safety can be made with technology available today, and that the industry does not need to wait for self-driving vehicles to hit the road before deaths and injuries are reduced.

NHTSA (the US National Highway Traffic Safety Administration) recently found that 9 percent of fatal crashes involved distractions of all kinds, and that almost 500 people died just in phone-distraction-related fatal crashes in 2017, not even counting all the many other types of distraction. Nauto's people think they're well positioned to take a good whack at that statistic.

"I'm excited about the possibility of autonomous vehicles, but as we're all experiencing, we've got a while to wait," said Jennifer Haroon, COO at Nauto. "One of our goals is to use AI to enhance human drivers and change human behavior, and actually have an impact today."

In Nauto's system, a device roughly the size of a smartphone that's installed on the windshield contains forward-looking and cabin-facing cameras whose software identifies road hazards and driver distractions.

Restified VW Microbus Blends Heritage, Technology

Volkswagen's innovation hub in Silicon Valley has built a one-off battery-electric concept vehicle from an almost 60-year-old 11-window Microbus to showcase some of the automaker's latest toys that are being developed for its future mass-market vehicles.

The Type 20 concept uses the body of a 1962 Type 2 Microbus as its base, but the underpowered, gross-polluter gasoline engine and powertrain have been replaced with a 120-hp electric motor and small 10-kilowatt-hour battery with a 2,500-watt onboard charger. A pneumatic suspension system was borrowed from Porsche to adjust the vehicle's ride height via software, including when the driver approaches the vehicle.

Interior design harks back to the Microbus' historic role in California's 1960s counterculture. In its original form, the dashboard was spartan and minimal. VW's designers integrated a Looking Glass II holographic display, generating 3D images that can be viewed without the need for special glasses.

But looking to interior electronics system, it's where things get interesting. For example, the Type 20 includes an experimental facial recognition system that employs a high-definition camera in the driver's-side door window to allow access. Three integrated directional microphones, including one on the exterior, allow the driver to interact with the Type 20 similar to how one might interact with a digital home assistant. On the exterior, the vehicle responds to driver commands via flashes of its LED headlights and its light-up VW logo.

THE DESIGN LOUNGE

On Volvo's Design Language

Design language and brand identity are key elements defining aesthetic and haptic look and feel and, perhaps most importantly, the perceived value of an interior today. This differentiates the competition and visually expresses the value positioning

of a vehicle interior. All vehicles within a brand's portfolio can be tied together in a familial fashion regardless of segment and options or trim levels. Volvo show us an excellent example of this as applied to form a sort of "entry platform" to the entire carline.

Volvo's previous generation highlighted a thin floating console and display/control interface as shown here in the S40 center console—the last model implemented.


Now Volvo has updated their IP/interior image away form the console to a display/interface/vent convergence debuted in the XC90 model (below, left). This created the base EE and visual architecture then carried over onto the V90 (below, right). Volvo Design established what they call a more 'statured' form language with this model, to offset the massive IP volume used in the XC90 with vertical vents that protrude out of the IP form, complimented with a high quality ribbon deco running the length of the IP, around the interface/vents on a horizontal axis.

As Volvo's brand identity theme spread to the rest of the maker's range, as shown in the XC 60, it has been further refined by the use of fine metal detailing and quality attention to craftsmanship.


With the introduction of the XC 40, the carline implementation is now complete. Spanning from their lower segment vehicles up to their premium luxury segment, the new design harmoniously

captures Volvo's strong Scandinavian brand heritage.

Polestar's New Interior Design

Volvo's Polestar EV brand had a clean slate to start with. For their first battery-electric sedan, which will arrive in the U.S. sometime next year, they chose an interior architecture that is sort of the antithesis of an EV, including a tunnel—obviously not a transmission tunnel, it's a battery pack tunnel. This choice is functional and aesthetic. Electric vehicles typically adopt a skateboard design, with their battery packs lying flat under the floor. But that adds to the height of the vehicle, which could compromise aerodynamics and driving range.

This battery layout allows passengers to sit more comfortably, while the tunnel acts like a raised center console and gives the performance sedan a cockpit-like interior, a bit reminding the old Volvo floating center consoles of the 2000s.

From an exterior perspective, removing batteries from the rear-seat footwells helped designers to lower the height of the Polestar 2 and create what they call a sleek fastback silhouette.

Is Bentley's Concept the Future of Ultra-Luxe Mobility?

Bentley unveiled a concept showing its vision of ultraluxury electric motoring for a time when battery technology has improved far beyond its current level.

The EXP 100 GT is a 5.8-metre-long (19 feet) grand tourer, with a driving range of 700 km. The two-door coupé was unveiled at Bentley's headquarters in Crewe, England on the day of the 100th anniversary of the Bentley brand's founding.

The concept takes inspiration from Bentley cars of previous eras to represent the "future of luxury mobility", according to CEO Adrian Hallmark. The car would be capable of being driven or driving itself autonomously and integrates what Hallmark called "emotionally intelligent" technology to enhance long journeys.

The personal assistant is voice or gesture operated and can offer information, suggest journeys or luxury experiences, and control the various driving modes. One such mode is called "Enhance", which would be activated on countryside drives to bring the sounds and smells of the outside into the cabin. "Cocoon" does the reverse, turning the glass opaque focusing on the inside.

Seats can be swiveled around in autonomous mode and incorporate biometric technology that reacts automatically to body weight and temperature and adjusts positioning and temperature accordingly.

The materials in the car include 5000-year-old wood that has been preserved in bogs, and a faux-leather for the seating made from the byproducts of wine production.

NEWS MOBILITY

Waymo Partners with Renault-Nissan

Waymo has entered into a partnership with the Renault–Nissan Alliance to pursue development of

self-driving systems for a range of vehicles that will carry passengers and haul packages.

The companies plan to work together exclusively to develop technology for vehicles that may be deployed in France and Japan. The collaboration marks the first step, and executives say it's too early to place a timeline on when any vehicles might be ready for testing or commercial deployment. Waymo, the commercial spinoff of Google's self-driving car project based in Mountain View, California, already works in partnership with Fiat Chrysler, Jaguar Land Rover, the AutoNation dealership group, Lyft, and others.

The partnership with Renault-Nissan bolsters Waymo's bids to commercialize self-driving systems across a variety of applications and offers access to an alliance that sold more than 10.7 million vehicles in 2018.

The tie-up expands Waymo's technology imprint beyond North America for the first time.
Renault and Nissan will create joint-venture companies in France and Japan, respectively, that are dedicated to developing self-driving mobility services. Together with Waymo, the companies will explore market opportunities and research commercial, legal and regulatory issues related to autonomous technology. In the future, the partners may explore joint work in other markets—but the companies say those long-term plans don't include China.

The partnership adds more momentum to Waymo's aspirations to be a leader in AV tech. The company has restarted testing of self-driving truck technology in the vicinity of Phoenix, Arizona.

Joint Ventures, Mergers, and Pacts—Oh, My!

Navya and Esmo
Navya has signed a memorandum of understanding with Korea's Esmo Corporation, which will make it the second largest shareholder in the French autonomous driving systems company. This

strategic partnership involves a joint development of R & D activity, an industrial alliance to optimize production costs and operational support, and finally the distribution of Navya autonomous shuttles exclusively in South Korea, Japan and China.

Uber and Mighty AI

To improve the way its autonomous cars analyze their environment, Uber bought Mighty AI. Mighty AI specializes in computer vision, an area of artificial intelligence that allows vehicles that move independently to better analyze their environment. Its technology is designed to better detect, catalog and use all the data collected by vehicle sensors.

Apple and Drive.ai

Apple bought Drive.ai and hired dozens of its engineers. The takeover of this startup specializing in autonomous vehicles and valued at USD $200m two years ago (before its financial difficulties) suggests that the Apple has not yet finalized and frozen its autonomous vehicle project. This acquisition includes driverless vehicles manufactured by the young company as well as related technologies.

Nissan, Dongfeng and DiDi Chuxing

Nissan and its Chinese partner Dongfeng are ready to set up a joint venture with Didi to manage vehicle fleets for DiDi's ride-hailing and car-sharing services. The agreement could include the supply by Nissan-Dongfeng of EVs—or even AVs—specifically designed and built for the ride-hailing activity of DiDi. This partnership could be similar to the one signed on by Volkswagen and DiDi last year.

DiDi Chuxing and Guanzhou Automobile Group

In April 2018, DiDi launched DiDi Auto Alliance by gathering 31 auto-industry partners, including GAC Group, to jointly build an open platform for automotive operations.

Under a new agreement, DiDi and GAC Group will enlarge their cooperation to explore opportunities in fleet operation, with a focus on fleet expansion and management, development of new mobility products, and collaboration on smart driving, including autonomous driving technology. The parties will also share expertise and explore innovative models for integrated auto services and solutions, including marketing, after-sales services, smart recharging, refueling, car-sharing and auto-financing services.

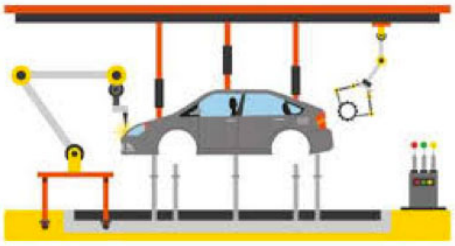
GENERAL NEWS

Who are the Auto Parts Big Gorillas?

The annual Automotive News ranking of the top global suppliers reveals, they remain in much the same order of size as they were a year ago.

Top global suppliers (in $bn)

Bosch	Denso	Magna	Continental	ZF	Seiki	Mobis	Lear	Faurecia	Valeo
49.5	42.8	40.8	37.8	37	35	25.6	21.1	20.7	19.7



Bosch, Denso, Magna, Continental and ZF Friedrichshafen remain the world's five biggest suppliers, in the same order as a year ago. Only two of the top 10—Valeo and Faurecia—changed rankings last year. They swapped positions on the list, with Faurecia № 9 and Valeo № 10th.

The cost of entry has risen in the past few years, making it hard for any but the wealthiest of companies to acquire the requisite technologies. "You can't buy anything related to autonomous vehicle software technology now that's not in the billions of dollars," says Dietmar Ostermann, U.S. automotive advisory leader at PriceWaterhouseCoopers, who track global automotive merger and acquisition activities around the world. "Technology is the dominating factor in supplier strategy," he said. "A few years ago, suppliers were on [a merger and acquisition] drive because automakers were moving to global platforms with global architectures, and suppliers needed to quickly merge and create more global capabilities to supply in all regions. The real need now is to be able to support electric vehicles, connected cars and autonomous driving."

Interesting to notice that all of them have a role in automotive interiors, either through parts, such as seats, or instrument panels, surface materials, or through electronic systems, or safety systems or thermal systems.

Last year, there were 20 deals each worth more $1bn—that's twice the level of activity of the past three years. The sector recorded 903 merger-acquisitions during the year. Among those that reported a deal value, the average size was just under $287m.

Dakkota to Bolster FCA Detroit Ecosystem

Dakkota Integrated Systems is a joint venture established in 2001 between majority partner Rush Group and Magna International. Their new plant plant in Detroit will be supplying Fiat-Chrysler Automobiles, in their effort to expand their Jeep and Ram brands in response to declining traditional sedan type segments.

Rush group is one of the largest Native-American- and woman-owned enterprises in the United States. Between 2012 and 2018 they owned a majority stake in Detroit Manufacturing System, a JV with Faurecia to produce interior parts.

FCA says "We applaud Dakkota's commitment to invest in a new manufacturing facility on Detroit's east side and to join FCA in putting Detroiters first". Dakkota has committed to recruit from the "Detroit at Work" priority application list for locals for jobs at the new plant. Returning citizens also will have an opportunity to participate in the entire job application process.

Rush Group is specialized in component manufacturing, complex assembly and sequencing, supply chain management, logistics, and freight distribution for global brands. Their 3,000 highly trained team members at 20 locations in the U.S. and Canada build and deliver parts through innovative technologies, including injection molding, vibration and ultrasonic welding, and mechanical and robotics engineering.