Get the message, driver?
Innovative human-machine interaction delivers greater safety
Freedom on two wheels
The motorcycle industry is booming, and more and more bikers are taking to the roads as spring arrives.

What's the air quality like?
Ask a street lamp.

NEWS

New 5G hybrid V2X platform for high-speed data exchange.

Transforming trucks
Digitalization, electrification, automation

15

10

14

18

Did you know ...
... that seat belts were invented in Sweden?
Get the message, driver?

Guido Meier-Arendt is Principal Expert for Human-Machine Interfaces and Ergonomics in Continental’s Interior division.

Vibrating steering wheels, flashing displays and beeps in the cockpit – driver assistance systems communicate in all sorts of different ways. Isn’t all this information confusing for drivers?

Guido Meier-Arendt, today’s drivers are bombarded with everything from driver assistance system alerts to messages from Facebook friends. Isn’t there a danger that too much information could compromise safe driving?

You’re absolutely right. The volume of information in our cars is growing constantly. This makes it particularly important to develop smart solutions which ensure that interactions between drivers and their vehicles are both user-friendly and above all safe.

Once we have ascertained exactly which information the driver requires in a given driving situation, we then need to package and communicate it in a user-friendly manner. How do you do this?

You have to combine information from different driver assistance systems. You don’t need a separate vehicle-user interface for every single system. For instance, we look for clever ways of combining adaptive cruise control and lane control information to enable intelligent priority management.

The driver should only receive the information that they need in order to drive safely at the current point in time – no more and no less. Driver assistance systems employ an inform–warn–intervene escalation strategy in which the relevant information for the current escalation level is communicated to the driver multimodally – visually, acoustically and haptically.

Couldn’t this be dangerous? What happens if drivers who are used to the interaction system of one particular make of car suddenly find themselves confronted with different feedback systems when driving a vehicle built by another manufacturer?

That is a very valid point and is of course something we are working on all the time. The solution is to develop self-explanatory human-machine interface designs which don’t do anything unfamiliar that could confuse drivers accustomed to a different form of communication. The car must communicate clearly - every relevant system in the vehicle must send messages that are unambiguous and easy to understand. Whenever the steering wheel vibrates, the correspon-
What part does HMI play in Continental’s vision of zero road accidents?

It has a vital part to play. The goal is always to improve traffic safety by ensuring genuinely intuitive collaboration between user and vehicle. At Continental, we have established a “search field” explicitly devoted to optimizing the human-machine interface in line with users’ needs. We are also increasingly adopting a user-centered design approach to ensure that our innovations and future technologies are precisely tailored to users’ wishes and needs. This user-centered approach is in fact critical to the development and design of modern vehicles, which makes it key to the achievement of our Vision Zero.

“...the goal is always to improve traffic safety by ensuring genuinely intuitive collaboration between user and vehicle.”

Continental’s Integrated Cockpit System, which recently won the German Design Council’s Innovation Of The Year award, features large curved glass surfaces with multiple displays and touchscreens — is the average driver ready for such futuristic cockpit designs?

There is no reason why an innovation like Continental’s Integrated Cockpit System shouldn’t succeed, given that it delivers direct, tangible benefits, enhances user comfort and above all improves safety. There is obviously no point in producing a flashy cockpit with futuristic aesthetics and all sorts of high-tech bells and whistles if it ultimately fails to provide the important information in a user-friendly manner.

In other words, you stick to the famous “form follows function” design principle?

Exactly. It’s essentially the same problem as a designer chair that wins lots of prizes but is really uncomfortable to sit on. So yes, we stick to the “form follows function” principle, or more accurately “form follows user requirements.” This is particularly important in vehicle cockpits, where we expect to see more and more technological solutions tailored as flexibly as possible to specific contexts of use, with customizable content enabling users’ individual wishes to be met. The inclusion of large display surfaces is one way in which the Integrated Cockpit System responds to these challenges. So we took various consumer electronics trends into account in the system’s design, as well as asking ourselves what we needed to do to optimize the interactions on board the vehicle. One of the solutions we came up with was to use haptic alerts. In other words, rather than simply fulfilling the basic ergonomic requirements, the cockpit also contributes to a positive overall in-vehicle experience.

While strong A-pillars play an important role in optimizing crash safety, they also restrict the driver’s field of view. Continental has come up with the idea of developing a virtual A-pillar that the driver can see through …

This is a good example of an innovative proof of concept study that adds genuine value for users by eliminating the forward blind spot created by the A-pillar. There are various road traffic situations where drivers are unable to see everything that is going on as well as they would ideally need to. Our proof of concept demonstrates how special displays can show drivers what is happening in the areas that are hidden from their view. With this system, they really can see everything that is going on — it is as if the A-pillar were transparent. To make this possible, an interior camera tracks the driver’s head movements to ensure that the display provides a realistic perspective on what is happening outside. At the same time, externally mounted Surround View cameras generate a live video feed of the outside environment.

Autonomous driving is the next big thing. But it promises to be quite a challenge, especially for HMI developers …

This is a very important topic. The transition between manual and automated driving in particular will call for completely new approaches to the design of the human-machine dialogue. If the human driver is no longer solely occupied with driving the vehicle, their role becomes that of a critical user and supervisor in the cockpit. This makes it essential for them to always know what the vehicle is doing and which driving mode it is in whenever the situation requires them to resume control. This change in the driver’s role and the associated needs and requirements constitute one of the greatest challenges in the development of automated driving.
What will life be like in the city of the future? One thing is for sure: As time goes by, more and more people will live in urban spaces – and move around those spaces in large numbers of different vehicles. So it’s going to take innovative technologies to prevent accidents and collisions. At the recent Consumer Electronics Show (CES) in Las Vegas, USA, Continental showcased key technologies for the city of the future. Among other things, with the aid of virtual reality visitors were able to experience how the Intelligent Intersection works. This system, currently being piloted in Walnut Creek, California, involves direct communication between intersection and vehicle. For example, the system can warn an oncoming driver about a pedestrian crossing a street outside the driver’s line of sight. Continental also presented a new Intelligent Street Lamp concept: Using secure connectivity and sensorics, this solution enables remote light control as well as adaptive street lighting governed by the presence of nearby road users. At the same time, the street lamp can communicate data on air quality, traffic levels, hazards or available parking spaces.

What’s the air quality like? Ask a street lamp.

Modern cars are becoming smarter and smarter – now even the doors are getting in on the act. Continental has developed an intelligent door system that prevents you from opening the door without thinking, if there is an obstacle approaching or in the way. This new technology led to Continental being recognized by the US Consumer Electronics Association as a CES 2019 Innovation Award winner in the Vehicle Intelligence and Self-Driving Technology category. Technologies such as the intelligent door brake system and the smart autonomous door help to make opening and closing the door comfortable and convenient, while preventing the uncontrolled slamming of vehicle doors. At the same time, their obstacle detection capability leads to greater safety in traffic scenarios. The smart autonomous door system is also a prerequisite for automated driving. After all, driverless vehicles must be able to open and close their doors when there’s no one around and no door handles, come to that.

Artificial intelligence: Continental cooperating with Berlin-based start-up

Continental is cooperating with German start-up company Automotive Artificial Intelligence (AAI) on the virtual development and simulation of driver assistance systems and automated driving technologies. Virtual development already plays an integral part in the modern product development process. Now, together with AAI, Continental is developing a highly scalable, highly modular development and testing environment. AAI, founded in Berlin in 2017, brings to the table the expertise required to create virtual environments based on HD maps and artificial intelligence. The start-up is responsible for simulating the environment, providing software that enables vehicles to be driven in a virtual world. The aim is to do justice to the increasingly broader scope of validation in automated driving. Continental intends to make the simulation tools developed within this collaboration available to the entire automotive industry.

Door system from Continental scoops Innovation Award

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Transforming trucks

The car industry megatrends of digitalization, electrification and automation are also shaping the development of trucks and buses. Continental’s innovations are constantly raising the bar for safety and connectivity.

The CEOs of the major automakers like to talk about “reinventing the automobile” when referring to the rapid pace of technological progress in the car industry. But things are no different in the commercial vehicles sector, where the “reinvention of the truck” has been in full swing for some time now. This trend has been further accelerated by the recent adoption of new EU regulations for reducing CO₂ emissions. Trucks will be required to cut their CO₂ emissions by 15 percent from 2025 and 30 percent from 2030, compared to the average level for 2019. To help truck manufacturers meet these challenging targets, Continental has developed numerous innovations that will make tomorrow’s commercial vehicles more efficient, smarter, safer and eco-friendlier.

The environment model currently being developed by Continental is one example. The system models the vehicle’s environment by combining route data with data from sensors such as cameras, radar and lidar. The acquired data is analyzed and interpreted more than fifty times a second by a powerful computer known as the Assisted and Automated Driving Control Unit (ADCU). This means that the vehicle’s electronic systems can “see” things like a vehicle approaching on the other side of the road, another vehicle 200 meters up ahead in the same lane, or a car pulling out to overtake.

The safety benefits are enormous – the fact that the vehicle has a clear picture of the environment it is driving through ensures optimal operation of its assistance systems. The environment model is also key to enabling different automated driving functions such as platooning, where multiple digitally coupled trucks drive in convoy. This technology makes life easier for the drivers of the trucks following the convoy’s lead vehicle and cuts emissions by reducing fuel consumption.

“The environment model rounds off Continental’s portfolio of components and subsystems for vehicle environment detection. With our sensors, our applications for vehicle connectivity and our intelligent control units for automated driving, Continental will in future be in a position to offer its customers everything they need for the reliable detection of the vehicle environment – from a single source,” said Jörg Lützner, Head Commercial Vehicles, Division Interior, Systems and Technology at Continental.

As well as developing gas-powered and electric vehicles, truck manufacturers like Volvo are also working on aerodynamic enhancements in order to reduce CO₂ emissions. The Volvo Concept Truck delivers fuel and emission savings of up to 30 percent.
The right turn assistant (in left-hand drive vehicles) is another of the environment model’s concrete uses. Continental will be augmenting future versions of this radar-based system with camera technology. The right turn assistant aims to prevent collisions between buses or trucks making a right turn and pedestrians or cyclists in the blind spot on the right-hand side of the vehicle. In the past, this maneuver has resulted in multiple fatal accidents involving pedestrians and cyclists. The right turn assistant detects hazardous situations and instantly activates emergency braking to prevent a collision. The EU is currently discussing the mandatory installation of these systems. The enhanced right turn assistant could represent an important step towards the “Vision Zero” goal of zero road traffic fatalities.

Continental supplies a modular driver’s workplace for city buses. The image shows the individual modules, which can be combined in accordance with the customer’s needs and preferences. The right turn assistant (in left-hand drive vehicles) is another of the environment model’s concrete uses. Continental will be augmenting future versions of this radar-based system with camera technology. The right turn assistant aims to prevent collisions between buses or trucks making a right turn and pedestrians or cyclists in the blind spot on the right-hand side of the vehicle. In the past, this maneuver has resulted in multiple fatal accidents involving pedestrians and cyclists. The right turn assistant detects hazardous situations and instantly activates emergency braking to prevent a collision. The EU is currently discussing the mandatory installation of these systems. The enhanced right turn assistant could represent an important step towards the “Vision Zero” goal of zero road traffic fatalities.

Other Continental innovations are also geared toward achieving this goal. One example is the modular digital bus cockpit, designed to provide bus drivers with improved ergonomics, comfort and thus safety in their daily work. The drivers of these large vehicles are constantly being bombarded with information. The modular cockpit enables this information to be communicated clearly and without distracting the driver. Be it the speed of the vehicle, the battery status or the satnav, images from the door cameras at stops or 360-degree vision when reversing, the drivers are supplied with all the relevant information on three displays. Pop-up messages can be flashed onto the displays to warn the driver of hazards or emergencies. This solution can be installed on almost any city bus and has already won the IF Product Design Award and the German Design Award. According to Michael Glunk, Program Manager for the modular driver’s workplace at Continental, “With our new concept, we are opening a new chapter in the history of the driver’s workplace, putting people at the heart of everything we do.”

Tires will of course also play a key role in helping to deliver the EU emissions targets. The IAA Commercial Vehicles show held in Hanover in the fall of last year saw the global premiere of both the MAN eCite electric truck and the striking Continental concept tires that it was fitted with. The four Conti eMotionPro design tires are a prototype for the development of tires designed specifically for electric commercial vehicles. As Klaus Kriepel, Head of Original Equipment Truck Tires at Continental, explains, “The new powertrains and the new vehicle concepts that are sometimes associated with them will change the requirements for commercial vehicle tires. We are currently engaging in partnerships to gain valuable experience for the development of tires for electric trucks and buses.”

With these innovative systems, Continental is playing a decisive part in shaping a future with lower emissions. One system that can already ‘see’ into that future is dynamic eHorizon for commercial vehicles. Based on ultra-precise topographical route data and GPS signals, the system supplies all kinds of information about the road ahead, enabling the control units in the vehicle to automatically adapt the speed and style of driving. In the near future, vehicles equipped with dynamic eHorizon will be able to ‘see’ for kilometers ahead. This will not only save fuel but also prevent accidents, for instance by warning of a tailback hidden around a bend. The predecessor system, static eHorizon, has already been able to save some 1 billion liters of diesel fuel since 2012, which equates to savings of the order of €1 billion. And simulations indicate that the dynamic version has the potential to increase fuel savings by as much as two percent.
News

New 5G hybrid V2X platform for high-speed data exchange

Cars that can talk to one another, adaptive driver assistance systems, active road signs... the innovative technologies on and around our roads all mean one thing: much more data. To ensure the fluent exchange of all this data in real-time will call for powerful mobile networks. Continental is currently developing a flexible 5G hybrid V2X (Vehicle to Everything) platform that allows both mobile network communication and the rapid and reliable direct exchange of data – to communicate real-time traffic updates and road hazards, for example, and underpin future driver assistance functions. Continental’s Hybrid V2X solution not only integrates technologies for 4G and 5G network access, but also supports two standards – Dedicated Short-Range Communication (DSRC) and Cellular-V2X – for direct V2X communication. With this new hybrid V2X solution, the same hardware and software platform can be used to support either standard, reducing not only the cost but also the complexity of the global application of such systems.

Smart wearables make life safer

That’s a smart jacket you’re wearing... in more ways than one. Because now, digitalization has come to the clothing sector. Intelligent items of clothing or ‘smart wearables’ for short, are making life safer out on the roads. Continental recently presented an actively illuminated safety jacket with LEDs that light up and an integrated heating function. The batteries for the LEDs and the heating are charged by a coil incorporated in the driver’s seat. And looking ahead, there are opportunities for further interaction between this innovative jacket and the vehicle electronics: For one thing, sensors in the jacket could measure the temperature and humidity in the cab and automatically adjust the climate control system accordingly. For delivery drivers, emergency vehicle or utility service crews and truckers, smart wearables can make their work a whole lot safer by making them much easier for other road users to see in hazardous situations or poor visibility.

Freedom on two wheels

The motorcycle industry is booming, and more and more bikers are taking to the roads as spring approaches. New technology is helping to make motorcycling not only safer and more comfortable, but also boosting the fun factor. Continental’s new Emergency Brake Assist is a case in point.

Green shoots are out in the fields of rapeseed, and soon the countryside will be ablaze with bright yellow flowers. The last snow of a long winter is thawing on the high ground, and herds of cattle are returning to lush green pastures. Tables and chairs are being placed in the sunshine outside country inns. In other words, spring is here with all its joys – which include eager anticipation of the first outing of the new biking year. An entire industry is waiting for the start of what promises to be a record season. In Germany alone – one of Europe’s most important motorcycle markets – there are more motorbikes registered than ever before. According to official figures from the Federal Motor Transport Authority KBA, some 4.44 million motorcycles were registered as of January 1, 2019 – and that does not include mopeds and other motorized two-wheelers. This is an increase of more than half a million on 2010. And one of the reasons for the rising popularity of motorcycles is that they are getting safer all the time.

The growing impact of digitalization, a major mobility trend, is making itself felt on the motorcycle market too. Increasingly bikes are being fitted with assistance systems to make them even safer. Better and better tires for every conceivable type of use are delivering a marked increase in safety. But one of the key factors is connectivity, which is pointing the way forward for the industry. “Communication between motorcycles or between motorcycles and other road users” is, according to Reiner Brendicke, CEO of the Association of German Motorcycle Manufacturers (IVM), essential to ensure traffic safety. “This will become increasingly critical as more driverless cars take to the roads.”
Continental is also following this trend. The technology company is aiming to be the first supplier to market an Emergency Brake Assist for motorcycles. The radar-based system forms part of a wide range of Advanced Rider Assistance Systems (ARAS) from Continental. The new fifth generation of radar sensors from Continental, characterized by – among other things – an enhanced object recognition capability, clears the way for a particularly high-performance Emergency Brake Assist. And while the development of the system for motorcycles benefited from Continental’s long experience in the design and construction of safety systems for cars and trucks, there are still some differences: Where the car’s Emergency Brake Assist autonomously triggers an emergency stop with full braking power when a collision is imminent, the motorcycle system brakes much more gradually. It is designed to help the rider rather than taking complete control. Continental’s accident research reveals that an Emergency Brake Assist system can prevent most rear-end collisions – and in the near future, even side-on or head-on collisions, too.

“Unlike car drivers, motorcyclists have virtually no protection against environmental factors such as wind, weather and vibration – factors that can make for a very challenging ride. As a result, bikers often find themselves in situations where it is hard for them to judge the speed of other vehicles on the road. So motorcycle Emergency Brake Assist is mainly indicative. It alerts the rider to critical situations and makes them easier to grasp more quickly,” says Christian Pfeiffer, ARAS project leader for the 2-Wheeler & Powersports segment at Continental. “Like in a car, this system too will reduce the speed, but the aim is to trigger a process which is then controlled by the rider. Response times are reduced and the overall stopping distance can be significantly shorter.”

Continental has also developed numerous other Advanced Rider Assistance Systems. These include Intelligent Adaptive Cruise Control, which adapts the speed of the motorcycle to that of the vehicle in front. Also in the development pipeline are Blind Spot Detection & Lane Change Assist and Traffic Sign Assist, as well as Intelligent Headlight Assist, which ensures that high beam is automatically selected whenever possible and necessary. All systems are modular, so Continental can provide customized solutions that meet the special requirements of individual markets. In Asian countries in particular, where motorized two-wheelers are often the preferred everyday mode of transportation, these systems have the potential to deliver a significant increase in safety.

Tires also have a vital part to play in accident prevention, and a range of innovative tire technology is providing bikers with additional safety. By way of example, to coincide with the start of the new season, Continental is launching its ContiTrailAttack 3 – the ideal tire for both long-distance touring and urban riding. Riders of a variety of machines will benefit: The new tire covers a very wide range of applications, from the classic Enduro to the likes of the BMW R 80 Basic, or from high-performance tourers such as Honda’s Africa Twin to the thoroughbred Kawasaki Z 900 superbike. The tire reaches its operating temperature after only 1,500 meters and, thanks to Continental’s innovative “TractionSkin” technology, requires a minimum of running-in time. The selected compound and modified tread pattern deliver even better wet-weather grip, along with high reliability throughout the service life of the tire.
... that seat belts were invented in Sweden?

The topic of safety has never been far from the top of the agenda in Sweden. The domestic car industry has a reputation for turning out particularly robust models, and no wonder, given that around every corner there could be an elk in the middle of the road.

As long ago as 1959, Volvo hit the headlines when development...

... engineer Nils Ivar Bohlin filed a patent for the three-point seat belt. Rudimentary belt systems had been around for some time, not least in the USA in the shape of the shoulder harnesses fitted to the record-breaking 1902 Baker Torpedo. But it was Volvo who brought the seat belt to a wider market. The basic design of the three-point seat belt remains largely unchanged to this day, with the one major difference that today the belt forms part of a high-tech safety system that is constantly being optimized. One part of this system is the active belt-tensioner which prepares the vehicle occupants for an impending impact or emergency braking maneuver by tightening the belt and thereby shifting the body into the safest position.

The seat belt’s key role in occupant protection was not restricted to Volvo models and in Germany the introduction of the “safety belt” caused quite a stir. “Belt up, please” ran the headline in the German weekly newspaper “Die Zeit” on January 2, 1976. What had happened? The government of the day had introduced a new law prescribing the fitting of seat belts in all passenger cars built in or after 1974. Initially, belts only had to be fitted on the front seats, but this nevertheless marked the dawn of a new, safer era in motor vehicle transport. But while the law said the belts must be fitted, it stopped short of requiring occupants to wear them. For a while this led to amusing scenarios at intersections and traffic lights, with journalists knocking on car windows, holding out microphones and asking: “How does it feel with a belt on?” or “Why aren’t you belted up?”

Then, as people struggled to come to terms with wearing a seat belt, weird rumors began to circulate. People were going to be unable to escape from their cars if ever they happened to land in a river, they said. Women drivers and passengers complained that wearing a seat belt would have a negative impact on the shape and size of their breasts. There were no bounds to the absurdity of the tales doing the rounds. Even former VW boss Kurt Lotz chipped in: “Safety is hard to sell,” he announced in a 1970 interview. History would soon prove him wrong. Today, 95 percent of all drivers in Central Europe belt up. “The seat belt remains the number one life-saver in the car,” says Stefanie Ritter, accident researcher at German technical inspectorate Dekra. “Even low speed impacts generate forces that the human body cannot simply absorb. And for occupants who are not belted up, even airbags are largely ineffective.”