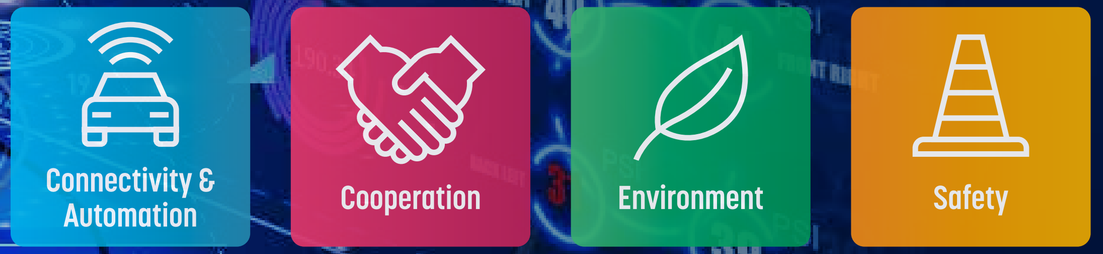
CLEPA Innovation Awards 2020

Innovation in the Automotive Ecosystem



3.000+
SMEs represented

75%
of the vehicle value comes from suppliers

5 million
Direct jobs

€30 bn
Invested in R&D

±9.000
Patents filed by the automotive industry each year

€600 bn
Turnover each year

What is CLEPA?

CLEPA, the European association of automotive suppliers brings together over 120 global suppliers of car parts, systems and modules and more than 20 national trade associations and European sector associations.

CLEPA strives for the automotive supply industry to be the leading provider of innovative technologies and solutions for safe, sustainable and smart mobility around the world.

As a team, together with its members, CLEPA's mission is to co-create the framework conditions for advancing a sustainable and competitive supply industry in Europe; an industry that is innovating mobility and bringing prosperity and employment to society at large.

Word from the Secretary General

Driving innovation forward

2020 marks the fifth edition of the CLEPA Innovation Awards, which celebrate outstanding achievements in the European automotive supply industry in the fields of Connectivity and Automation, Cooperation, Environment, and Safety.

The automotive industry is an industry experiencing great changes, driven by new technologies, new regulations, and consumer expectations. 2020 has been an incredibly challenging year for all of us. The pandemic is accelerating a fundamental transformation of our society to decarbonise and digitalise, as well as adding high economic stress.

The record number of more than 80 applicants is a testament to the importance of innovation: a clear sign that our industry recognises that we need new and creative technologies to guide us through this transformation, and that working together is crucial to achieve success. Innovation is key to shaping the mobility of the future. The automotive parts suppliers are at the forefront of developing these new technologies which are making our mobility safer, smarter, and more sustainable, as well as keeping our industry competitive.

Our finalists and winners have been selected by a distinguished jury of international experts. The innovations listed in this booklet scored highest in terms of ambition, market relevance, impact, and quality. For the third time, we also acknowledge the important contributions being made by small and mid-sized companies and start-ups with a special prize for SMEs.

CLEPA (the European Association of Automotive Suppliers) is proud to showcase these innovations coming from the automotive suppliers, leaders in providing highly efficient and sustainable mobility worldwide. CLEPA brings together well over 120 of the world's most prominent suppliers for car parts, systems and modules and more than 20 national trade associations and European sector associations.

I would like to thank our Innovation Awards partner Deloitte, the members of the jury for completing the challenging task of selecting our finalists and winners, and all our entrants for taking part. We thank each and every one of you for your contributions! Next, year we hope to receive even more applications!

Kind regards,

Sigrid de Vries
CLEPA Secretary General

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CLEPA Innovation Awards 2020

Connectivity & Automation

WINNER

CONNECTIVITY & AUTOMATION

Infotainment Compute Platform

A collaborative approach to infotainment development

APTIV

Vehicles are becoming increasingly defined by software, and there is a growing demand for more interconnectivity and personalisation opportunities. Aptiv addressed the limitations of traditional infotainment systems, which lock into a proprietary operating system at the time of the vehicle's development and remain fixed for the life of the car. Aptiv's vehicle infotainment solution is powered by Android's Automotive Operating System which has Google apps and services built-in.

By enabling Google Automotive Services in the system, vehicle owners can start with a fresh system every day if they wish. They can download apps to customise their experience as they do with their smartphones. Relying on software which users are already familiar with lowers the learning curve, and allows consumers to enjoy the benefits right from the start.

The new Android automotive-based platform acts as its own device, connected to a user's digital ecosystem – for example, the user's Google account. It does not require a smartphone to be present; instead it gets the user's contacts, music playlists and more directly from the cloud. Consumers can access both familiar apps, and a growing variety of embedded apps and services. Consumers get continuously updated security and operating system functions, and they gain the opportunity to take advantage of new after-production services.

As consumers demand more from infotainment systems and connectivity becomes more ubiquitous, the on-board capabilities of the vehicle will increasingly merge with off-board capabilities in the cloud. With an automated update infrastructure and the right systems integration expertise, these software-defined platforms are well positioned to take advantage of 5G and other wireless technologies to bring a wide variety of applications to the vehicle through a broad ecosystem. As a result, powerful cockpit domain controllers fully integrated with these leading service platforms will become the digital hub of the connected vehicle.

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2nd PRIZE

CONNECTIVITY & AUTOMATION

Xevo Market

Automotive commerce and services platform

Xevo Market is a digital commerce platform which is aimed at drivers, allowing them to do things like find the nearest gas station and pay for fuel, order their favourite food and beverages, make a dinner reservation, or reserve and pay for parking, all from the comfort of their car, though their vehicle touch screen or companion smartphone app. The platform enables millions of drivers to use their touch screens much like a smartphone. The network enables merchant brands to deliver their experiences into vehicles across multiple automakers on a single intuitive platform, simplifying and enhancing the in-vehicle experience. Xevo also adapts apps to vehicle requirements and simplifies them to reduce driver distraction.

Xevo Market is the first white-label, intelligent, cloud-based, in-vehicle commerce and services platform for the automotive industry. This technology allows automakers to connect merchants with consumers to offer tailored in-vehicle user experiences.

For consumers, Xevo Market enables in-vehicle purchases with an integrated wallet, all with distraction-free driving and safety-tested interfaces. Applications are continuously updated, and new services are suggested based on the user's preferences, which move across vehicles whether it is their own car, a rental car, or they are using a car-share service.

The platform provides post-sale revenue opportunities, encourages brand loyalty, reduces data usage and in-vehicle software, and obtains data-driven consumer insights. Employing a thin-client architecture, the platform is backwards-compatible and can be deployed globally to vehicles already on the road.

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3rd PRIZE

CONNECTIVITY & AUTOMATION

Natural 3D Display

3D Experience with touch function

Continental

In times of e-mobility, interior design and user experience are becoming key to customers. Continental's Natural 3D Display is a new safe and intuitive way for drivers and their passengers to interface with their vehicle, through both gesture recognition and touch control. The central console will float 3D images and data a few inches from the display's surface and be visible from any seat in the vehicle without the need for special glasses. People are able to perceive information faster, and more intuitively when it is presented to them 3-dimensionally.

Natural 3D stands for the reinvention of 3D displays based on innovative nanotechnology from Silicon Valley startup company Leia. Conventional 3D display technologies mostly rely on head-tracking cameras to provide a stable 3D image for just one viewer. The so-called Lightfield technology, in contrast, enables an entirely new 3D experience for all vehicle occupants at the same time – without the need for a camera. This is achieved by the combination of nanotechnology backlights and innovative software algorithms, executed on a powerful Cockpit High Performance Computer. The holographic image generated with this technology results in a more natural 3D perception for the viewers.

Thanks to capacitive gesture recognition, interaction with the holographic elements is remarkably intuitive. Continental's Natural 3D Lightfield Centerstack is the first automotive display to combine 3D user experience with 3D gesture interaction, touch operation and haptic feedback. It is developed to enrich the user experience and offer new use cases and content apps in the fields of information, navigation and entertainment.

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SMEs WINNER

CONNECTIVITY & AUTOMATION

Electric Vehicle Routing Engine

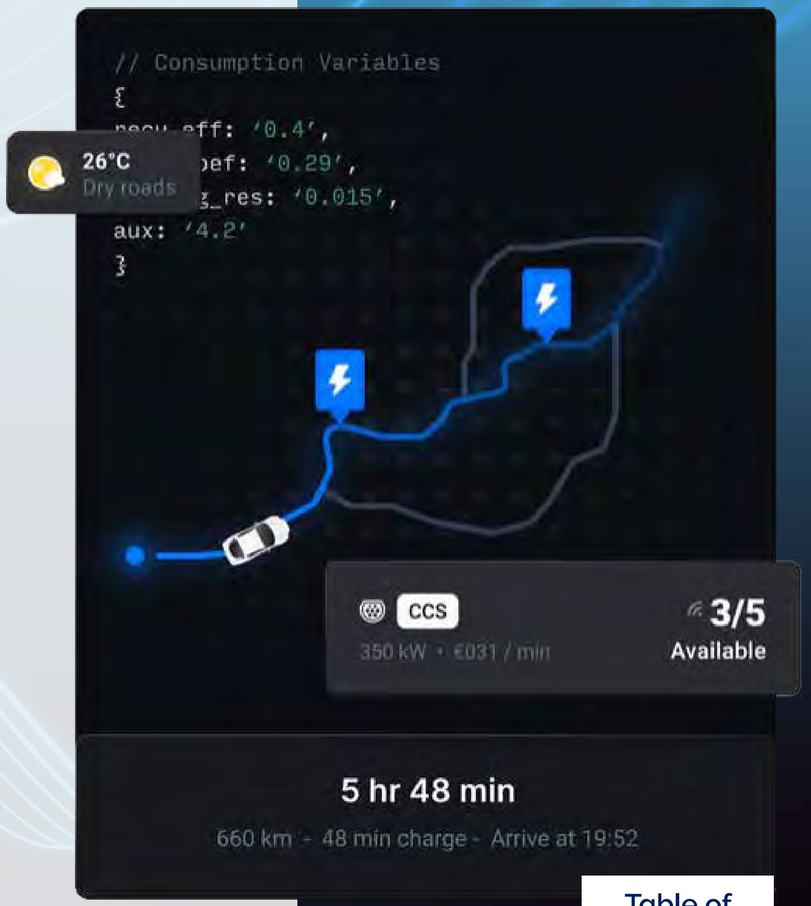
Smart navigation for electric mobility

chargetrip

Designed to remove the anxiety of driving an electric car, Chargetrip's routing engine uses over fifteen different variables to calculate the real-time range of any electric vehicle. Among other factors, it takes into account the outside temperature, weather, charge speed, elevation, rolling resistance, real-time vehicle data, and congestion at charging stations.

Based on this data, the routing algorithm then calculates the best route to a user's destination, and notes the optimal charge stations in between. Built-in predictive models optimise for total travel-time and travel-costs. Like, station availability, the weather, temperature, traffic etc. When variables change, the route is updated automatically using the GraphQL subscription method. This allows for flexible and highly efficient dynamic re-routing and route optimisation.

Chargetrip designed its routing engine with high volume connected mobility in mind. It uses in-house developed graph database technology in combination with a proprietary electric vehicle-specific planning algorithm optimised for multiple dynamic variables. One of the most vital ingredients for electric vehicle specific navigation are accurate consumption models under different circumstances. To address this, Chargetrip developed an electric vehicle consumption model database of all electronic vehicles on the road. This database is constantly updated and improved with input from users around the world.



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SMEs
2ND PRIZE

CONNECTIVITY & AUTOMATION

Virtual Sensors

Making connected things smart

EKKONO.AI

A sensor measures a value or detects a change in state; Temperature, pressure, torque, weight, humidity, rotation etc. Multiple sensor values are usually combined, especially for the purposes of driving assistance, to create a more comprehensive picture. However, sometimes, the environment where you need to install a physical sensor is too hostile or hard to deploy in, or the cost is more than you would like. Well then, how do you manage if you cannot measure a particular value directly? By combining other value detections, it can be possible to calculate the variable you wanted. A virtual sensor is like a digital twin that can replace or complement a physical sensor.

Edge Machine Learning is excellent at predicting sensor values. It learns by using other available data, saving on expensive or redundant sensors, and obtaining data where it would otherwise be impossible due to physical limitations. Ekkono makes it possible tto do incremental learning at the edge, which means that the machine learning model continuously gets better, and more personalised as it is fed with sensor data while in production. The benefit of machine learning is that it learns from data instead of a developer having to program every alternative scenario. This makes virtual sensors a good example for using machine learning since most machines and vehicles operate in different environments and with unique configurations.

By learning individually for each device, edge machine learning enables connected things to become smart. Self-optimisation of an engine based on driver patterns and road conditions, predictive maintenance on brakes based on where and how a car is driven or smart battery management to give the driver an estimate of remaining range. Opportunities are endless for this technique and expands beyond just automotive. Interconnected electronic devices are weaved into the fabric of our lives.

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3ND PRIZE

CONNECTIVITY & AUTOMATION

Blickfeld
LiDAR / scan your world

3D Light Detection and Ranging System

Giving autonomous systems the eyes to see the world

LiDAR (Light Detection and Ranging) is a method for measuring distances, including ranging distances, by illuminating the target with laser light and measuring the reflection with a sensor. Differences in laser return times and wavelengths can then be used to make digital 3D representations of the target. This technology allows Blickfeld's solid-state LiDAR to pick up on things in proximity to the vehicle which other sensors miss. Optimisation has resulted in a durable, small and high-performing 3D sensor that is particularly suitable for highly automated production.

Data collected by the sensor is stored in point clouds which contain vast amounts of valuable environmental information. However, this data volume is often too complex for specific applications. What is needed is a software stack to bridge the gap, which extracts information from the wealth of data and makes it easily accessible so it can be used for a wide variety of applications. The Blickfeld software stack enables environmental perception based on the point clouds collected by LiDAR sensors and extracts environmental information as required.

The Blickfeld 3D solid-state LiDARs combines performance and mass availability, providing a wide field of view as well as a long detection range. Sunlight suppression, mechanical robustness and longevity are a few core features that qualify the sensors. The sensors are designed for autonomous navigation, HD mapping, people counting and many other LiDAR applications. Blickfeld provides software for many perception tasks, e.g. object detection and classification.

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CLEPA Innovation Awards 2020

Cooperation

WINNER

COOPERATION

Body High-Performance Computer

The vehicle becomes a mobile data centre

Many functions in modern cars, such as the airbag, air conditioning system or mobile network connection, require their own electronic control unit. As a result, depending on equipment levels, one vehicle may have over 100 electronic control units on board. A modern mid-range car also contains over two kilometres of electronic wiring, which supplies the various systems with energy and allows them to communicate with each other.

After all, while voice- or touch-operated displays may be attractive and convenient, they require lots of computing power – especially as they become larger, smarter, and snazzier. In the future, autonomous driving in particular will generate gigantic volumes of data, with complexity also increasing tremendously as vehicles become more and more connected.

Continental saw this trend coming and is responding to it with its intelligent high-performance computers. Each of these computers occupies a circuit board roughly the size of an A4 sheet of paper, but its data transmission speed is many times faster than standard wiring.

Customers stand to gain almost infinite flexibility. Users can easily install the apps and services of their choice in the car, just as they would on a smartphone. Security loopholes can be remotely patched, and soon it will even be possible to install new driving functions without the car having to visit the workshop – all done wirelessly via the mobile communications network or Wi-Fi.

This means a car stays up to date even years after it was purchased. High-performance computers also make costly product recalls due to software errors a thing of the past. Continental developed this solution in collaboration with its subsidiary Elektrobit.

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2nd PRIZE

COOPERATION

SmartFACE

The first smart bumper

PLASTIC OMNIUM

HELLA

The SmartFACE is an innovative concept that improves the vehicle body and architecture, through the integration of advanced electronics technologies like lighting, radars, LiDAR and other devices. The innovation relies on organising the design content and activities differently, in order to integrate more efficiently pieces of exterior lighting modules into the vehicle front end, such as head lamps and day running lights.

The SmartFACE is a unique concept built with the strengths and know-how of Plastic Omnium and Hella combining their forces in order to create added-value synergies. The resulting technology guaranties a perfect integration of advanced lighting systems into vehicle body exterior panels.

The major challenge for this kind of systems is the protection of sensors in hostile driving environments and their costs. The sensors integrity is guaranteed during the whole life of the vehicle thanks to the optimised assembly behind a bumper, which allows permanent protection from crashes despite the use of transparent surfaces with embedded cleaning and defrosting systems.

The technology allows incremental integration of autonomous driving functions, from basic driving assistance to full autonomous driving, including the integration of lightning displays to allow the communication with the external environment of the car.

The demand for differentiation and performance of connected and autonomous vehicles will continue to grow in the future. Platform like battery electric vehicles, hybrid SUVs and premium vehicles are potential targets in the future.

The innovation brings unique technology improvements that enable to offer to car makers an optimised product solution for the complete front end of the vehicle incorporating to the bumper, additional lighting and sensors-technologies fully integrated. Also, the system approach, helps the manufacturers develop more functionalities, while decreasing their supplier management complexity and cost.

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3rd PRIZE

COOPERATION

Floating Seat

Enhanced comfort through dynamic seating

The human body is designed for constant movement – sitting still for long periods can lead to discomfort and pain. Adient's innovative Floating Seat concept enables dynamic seating during rides to increase the comfort over a long journey, as well as making it easier to get in and out of the car. Using dedicated safety systems, the floating seat contains all the necessary functions to ensure safety and comfort.

The seat is easy to adjust: The occupant must only release the mechanism, causing the seat to intuitively follow body movements without any physical effort in order to seamlessly float into the desired position. Furthermore, the Floating Seat concept will make it possible in the future for people with certain kinds of physical disabilities to no longer need specially adapted vehicles.

With regard to safety, the system is able to differentiate between an occupant's movements and other impact forces caused by braking, turning, or other incidents, including collisions. These forces are absorbed by a self-locking unit, ensuring the same level of safety as other seat systems currently on the market. A seat belt can also be integrated.

While comfort is closely linked to seat design and dynamic seating, it is also influenced by the acoustic environment. Due to its unique design, the Floating Seat is able to suppress almost all road noise. A disruptive speaker system ensures full bandwidth sound rendition for a premium HiFi experience. The strategic location close to the ear enables 20dB road noise cancellation. Furthermore, the sound-in-seat system allows occupants to listen to different audio sources in parallel and set the volume individually. The resulting cocooning effect significantly increases the wellbeing of all occupants.

The combined kinematics, comfort, and Hifi experience increase wellbeing and safety while also offering cost and weight reductions, enabled by combining expertise from Adient, Kostal, and PSS Automotive.

ADIENT

PREMIUM SOUND SOLUTIONS

KOSTAL

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SMEs WINNER

COOPERATION

Electrification Kit

Retrofit kit for commercial diesel vehicles

e-troFit's mission is to offer a climate-friendly, resource saving, easy adaptable and sustainable, and at the same time affordable, mobility concept. Current focus is primarily on developing fully integrated solutions for the electrification of commercial vehicles. The change to emission free public transport is an important matter. The innovative e-troFit electrification kit not only helps to achieve carbon-neutral objectives, it also helps to reduce the costs of electromobility.

The European Union's environmental goals of decarbonising transportation cannot only be met through the purchasing of new electric vehicles. Instead e-troFit converts vehicles that have already, exceeded their carbon and nitrogen values, thus making them climate neutral by replacing certain components.

Retrofitting and refurbishment in the commercial vehicle market are quite familiar. But retrofitting a whole drive system to be zero-emission is unique. The ability to retrofit vehicles, allows the vehicle life cycle to be extended significantly, something which is especially important for many public transit services. Opting for retrofitting also has a major positive impact on a fleet's carbon footprint, as the electrification kit allows a vehicle to produce around 30% fewer CO_2 emissions when compared to the manufacturing process of a new vehicle.

Full-electric commercial vehicles uptake is slowly ramping up, e-troFit with its innovation is ready to offer a series-ready product of the latest technology in larger quantities. The cost-effective e-drive system offers a very competitive alternative to new commercial electric vehicles and diesel commercial vehicles on total cost of ownership. Additionally, customers can get their vehicle based on an individual charging concept, including charging infrastructure.

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ex aequo

COOPERATION

Auto-scan

The vehicle inspection booth

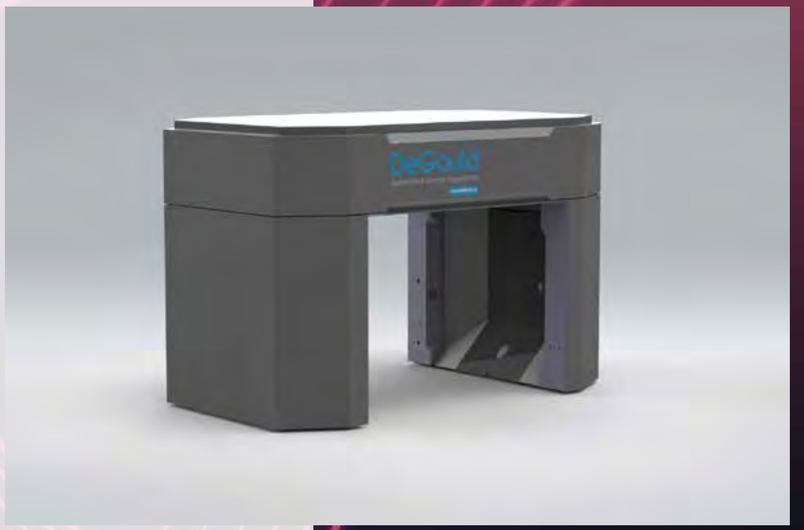
DeGould Auto-scan offers high-quality imaging for exceptional vehicle condition capture. Ultra-high-resolution images, ranging from 61 to 240 mega pixels, are captured using an optimised controlled lighting environment inside the Auto-scan booth, providing a full and accurate vehicle condition record.

Auto-scan also uses DeGould's proven dent-arch lighting system and artificial intelligence algorithms for superior dent and damage detection. Images are recorded for review in a dashboard to determine plant quality and assign damage liability, improving the car manufacturer's supply chain. The accuracy of vehicle inspections is increased, thereby improving finished vehicle quality leaving the manufacturing plants. As systems are increasingly deployed through the logistics chain the car manufacturer can better control the delivery process to the end customer – the ultimate determinant of quality for the brand.

It also saves on money by delivering tangible cost savings in two key areas: first, savings in vehicle inspection by automating a previously manual process, and second, reducing the incidence and cost of warranty claims. With a length of only 3.5m the inspection booth can be installed as an automated drive-through system or sit over a factory conveyer.

Systems are now installed in several manufacturing plants in Europe, the US and China. The business benefits have also led to the systems being deployed further down the finished vehicle logistics chain to validate transit liability and insurance claims. The various installations have already processed over 3 million vehicles, providing the machine learning data to develop an extremely accurate artificial intelligence algorithm, enabled by the quality of the images.

DeGould
Automated Vehicle Inspections
POWERED BY AI



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COOPERATION

Accelerated 3D Xray

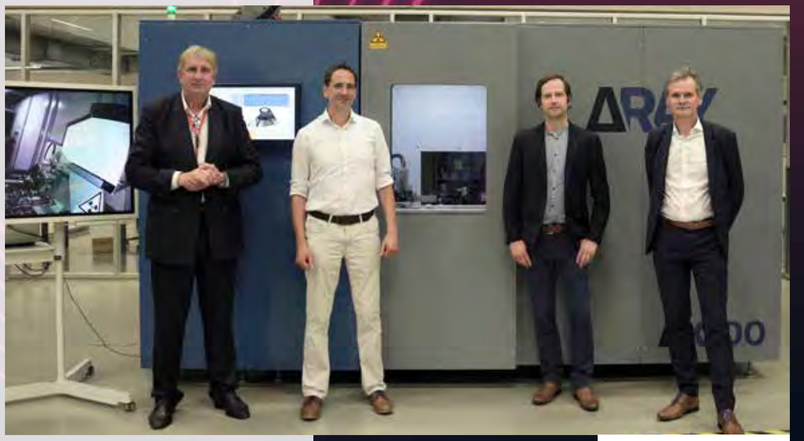
In-line quality inspection

ACCELERATED 3D INSPECTION

Automotive is one of many industry sectors which adheres to high quality standards. The cost of not delivering consistent quality products can have high impact. For inspecting the internal of critical parts, automotive manufacturers are seeking for an X-ray computed tomography (CT) solution that fits the production cycle time and that is sufficiently precise. However, due to the inherent approach of CT, the compromise that one has to take between speed and precision cannot always meet the manufactures expectations. Additionally, quality and safety requirements for autonomous vehicles will be even higher and require a zero-defect mind-set. As a result, 100% automated inspection will become de-facto the automotive inspection standard.

The core of Deltaray's solution is a disruptive Artificial Intelligence X-ray based inspection solution to perform 100% inspection where sampling-based methods are still used today. It offers a full 3D inspection, of both the internal and external of critical parts, at production speed, using a digital twin to verify the quality of all parts produced at the precision level desired by the manufacturers. The solution consists of a modular, hence broadly applicable and versatile system, that can be integrated in Tier1 or Tier2 automotive production processes. The system is 3D image based with a defect detection resolution of 35-100 µm.

Deltaray's technology allows for an affordable quality detection set-up beyond the two methods in place today: in-line human visual inspection or sample-based inspection. It also generates data evidence for every part. Data that can be used as a quality trail to address quality complaints or to feed into the manufacturers Industry 4.0 process analyses system.



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Environment

WINNER

ENVIRONMENT

BorgWarner

800-Volt Silicon Carbide Inverter for Electrified Vehicles

Power and performance boosted by electric propulsion system

Studies show the major factors holding consumers back from purchasing a plug-in hybrid or battery electric vehicle are battery range, charging convenience and costs. Vehicle manufacturers understand all too well the need to overcome these objections. However, the technology to allow them to offer electrified vehicle ownership experiences with few constraints has been largely out of reach, until now.

BorgWarner (formerly Delphi Technologies) provides the perfect solution for this challenge; the 800-Volt Silicon Carbide Inverter for Electrified Vehicles. It's the first 800-Volt inverter to use an innovative, double-side cooled silicon carbide (SiC)-based power switch that delivers the higher power densities and efficiencies needed to extend battery range and performance, and reduce costs. Its patented capabilities give manufacturers the propulsion system design flexibility and performance they need to drive consumer demand – and the vehicle mix and volumes required to meet increasing emissions regulations.

The inverter's specific features include extending electric vehicle range by approximately 5% and enabling faster charging times at 800 volts when compared to today's 400-volt systems. Its patented, dual-sided cooling allows for significantly smaller and lighter inverter designs. It also provides the perfect packaging for the more efficient but pricey silicon carbide. SiC costs significantly more than the most commonly used material, silicon. The double-sided cooling shrinks the amount of SiC needed, thereby cutting costs.

It's engineered to deliver up to a 70% reduction in power losses, along with greater power density, depending upon the drive cycle. Manufacturers can leverage these improved efficiencies when designing their propulsion systems to either boost vehicle range, improve overall performance or reduce sticker shock through less costly batteries. This flexibility gives manufacturers the means to present consumers with a range of performance options – including the ability to trade-off battery size, cost and vehicle range – available at multiple price points, which is similar to the way powertrains are marketed today.

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ENVIRONMENT

48V eAccess

The smart solution for urban mobility

Addressing the question of how to reduce fuel consumption and CO2 emissions of the average vehicle, Valeo's 48V eAccess is designed to integrate seamlessly in the powertrain architecture. It can do this as it does not require the expensive modifications of existing designs, nor the stringent safety standards which go hand in hand with high-voltage solutions. This makes the vehicle more economical than if it were equipped with a high-voltage all electric solution. This is largely due to the fact that it can do without some of the components and systems that a high-voltage system is required to have for user safety reasons. By making electric vehicles more affordable, both to purchase and run, eAccess can drive further momentum for the electrification revolution. Additionally, a low voltage 48V motor is much cheaper than a high-voltage electrical system.

At a changing time where people are more and more concerned about their impact on the environment, the acceleration of electric urban mobility beyond traditional passenger cars, especially on light vehicles' scope, is undeniable and Valeo is offering an affordable and versatile solution.

Valeo's 48V machines are "chameleons" and they can be mounted in different positions within the vehicle, depending on the automaker's requirements. In addition to traditional cars, new small all-electric urban vehicles can be powered solely by the 48V systems, including autonomous shuttles, robotaxis, two- and three-wheelers, and even delivery droids.

The low voltage electric motor can also be combined with a traditional engine for numerous benefits: the energy produced during braking and deceleration is re-used to power the vehicle, while fuel consumption and CO2 emissions are cut by 10%. That's not all: a hybrid vehicle's traditional 12V electrical system can be converted to 48V without major modification costs.

Valeo

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3rd PRIZE

ENVIRONMENT

eTrailer

Modular electric drive system for heavy vehicles

With fuel consumption typically accounting for around 30% of a fleet's operating cost, the commercial transport industry has an obvious incentive to improve fuel efficiency over and above a desire to reduce emissions. Today, energy loss remains the major contributor to fuel inefficiency. An integral part of ZF's global research and development program focuses on optimising energy recovery and reducing vehicle weight.

The eTrailer delivers renewable energy by recuperating kinetic energy from braking or deceleration and downhill manoeuvres that would otherwise be wasted into heat. This breakthrough semitrailer with integrated electric drive system can make every conventional truck a hybrid, saving up to 16% fuel thus significantly reducing CO_2 emissions. The noise reduction that comes along with the trailer electrification helps for better acceptance on parking lots and during urban and night delivery.

The eTrailer integrates e-drive controls into the trailer and therewith integrated e-drive capabilities in the overall truck and trailer electronic braking system. This ensures optimal effectiveness of energy recuperation while maintaining safety and stability of complete vehicle combination at all times. The stored energy also enables unprecedented, revolutionary traction functionalities when using the torque of the eAxle to improve road and vehicle safety.

Supplying the electric power for cooling units of refrigerated vehicles helps with further emission and CO_2 savings and enables downsizing of supportive diesel onboard engines, e.g. by powering a refrigeration unit for up to 12 hours without any external supply.

The eTrailer works with any truck as it can turn a traditional truck-trailer combination into hybrids and is also a complementary solution to electrified trucks. Here the eTrailer can extend the range of the hybrid tractor and offers the possibility to downsize the electrical installation.

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ENVIRONMENT

Automotus

Fully Automated Curb Management Platform

Ending curbside chaos

Curb space is some of the most valuable real-estate in cities. Growing demand and inefficient management of this space lead to serious traffic and parking problems in and around urban areas. 30% of traffic in cities has been found to be drivers searching for parking. This means that, as demand for curb space increases, so does traffic. Managing curb space is only getting more difficult with ride-sharing vehicles, micro-mobility services (scooters), and an increasingly delivery-centric society.

This valued real-estate could benefit greatly from being managed effectively. Currently, many city administrators find it a challenge coordinate compliance and turnover. As curb space data is unavailable for potential users, and administrators assigning policies and pricing, decisions are based on fragments of data or intuition.

Automotus uses computer vision (video analytics) to automate all aspects of curb management: collecting multi-modal transportation data, sharing live availability data, automating parking payment, and enforcing parking and loading zone usage. Multi-modal analytics make it easy for transportation administrators to adjust policies and pricing, and mould their mobility landscapes based on their communities' needs. Data is collected on buses, ride-sharing vehicles, scooters, bikes, delivery trucks, pedestrians, and passenger vehicles.

Sharing live availability data reduces time spent by drivers searching for parking and the impact they have on traffic. Automated payment reduces friction for drivers and boosts turnover. And, automated enforcement captures more than 5x the amount violations caught by market-leading solutions, measurably boosting parking and loading zone turnover.

Beyond these solutions, Automotus also works with communities on additional analytics and compliance tools for more unique mobility operations – this includes monitoring Uber/Lyft pick-up zones, bus loading zones, and scooter parking zones.

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ENVIRONMENT

Range Extender

Overcoming range anxiety

Environmental concerns are steadily pushing society towards electric and hybrid vehicles. However, currently, the autonomy that the batteries guarantee to the cars is not always sufficient to support the needs of modern mobility all over the world. The low recharge speed and the scarce diffusion of the recharging columns also contribute to exacerbating the problem. Range anxiety is the fear that a vehicle has insufficient range to reach its destination and would thus strand the vehicle's occupants. It is considered to be one of the major barriers to large scale adoption of all-electric cars.

A range extender is a fuel-based (gasoline, methane and, in future, hydrogen) auxiliary power unit that extends the range of a battery electric vehicle in case of emergency by driving an electric generator that charges the vehicle's battery. Robby Moto's Range Extender System has a compact endothermic engine and a current generator, both specifically designed together for this application, to kick in when needed, allowing the car to make it to the next charging station stress-free, even if the battery was close to depletion. The objectives are maximum efficiency, minimum cost, minimum bulk and minimum weight. Thanks to its small size, the extender is designed to be housed under the trunk.

The Range Extender system is designed to intervene only in case of emergency. When the battery drops below a certain threshold value, it kicks in with the sole purpose of recharging the batteries so as to allow the passengers to arrive at the next charging station. It helps overcome range anxiety and encourages the worldwide diffusion of a 100% electric car fleet in the next years. Created for the automotive sector, it has been developed to meet a broad implication in the future given the importance that electric traction is acquiring today. The Range Extender system is configured as a low-cost charging unit that can be used by a wide range of vehicles so that it can be housed in the spare wheel compartment of the vehicle.

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2ND PRIZE

ENVIRONMENT

Precise Vehicle Identification System

End-to-end parts traceability

AutoDAP

THE REGIONAL CAR PARC - SIMPLIFIED

AutoDAP's Circular economy initiative addresses waste pools and unlocks significant value of the end-of-life vehicles. A key focus area is precise vehicle identification which allows end-to-end traceability of the parts, and introduced a high degree of efficiency in the flow across the complex global automotive ecosystem. Extending the life of a vehicle is essential to reducing the total cost of ownership for consumers. It is necessary to increase the parts' lives and ensure that parts are utilised in an optimum reusable, recyclable, and recoverable way.

Hence, enhanced Vehicle Identification Number (VIN) data plays a vital role in parts identification. AutoDAP's software simplifies the identification of car parts through enhanced VIN data. The parts catalogues in the EU are based on aftermarket supplier data sets aggregated by multiple data consortiums or aggregation groups. These are usually mapped to vehicle classifiers and parts categories. It renders one model type to have 2-6 parts options for every assembly.

To overcome this challenge, precise vehicle identification mapped to vehicle configuration is very critical, which should result in the exact suitable part for the specific vehicle and not a list of possible parts. In this way the identification system is bridging the gap between "The list of possible parts " and "VIN Precise Part Identification".

Features which this enables include: artificial intelligence-driven smart valuation of vehicles, virtual damage assessment, and smart repair and maintenance. This enables users to enjoy intelligent price comparisons for used cars, faster insurance quotas, and fraud originated by reduced trade-in, incentive or dealer.

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CLEPA Innovation Awards 2020

Safety

WINNER

SAFETY

PictureBeam Monolithic

High-definition LED array solution for automotive lighting systems

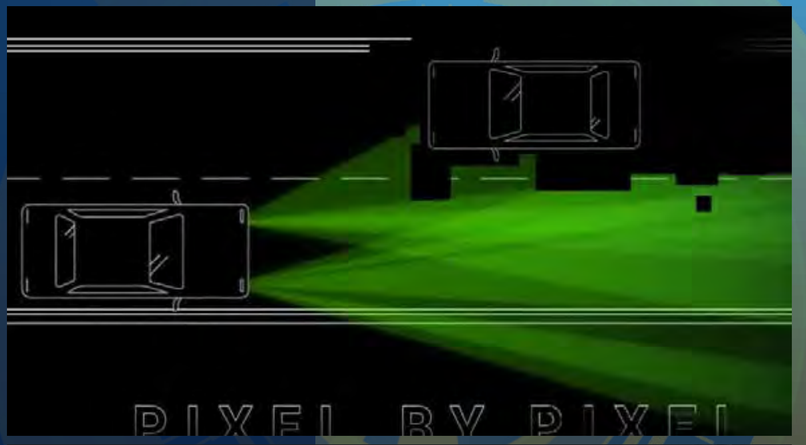
Road marking consists in projecting patterns on the road, with positive or negative contrast. These are to help the driver, as well as other road users, with mostly safety related features. They could be lane marking, highlighting certain areas, road signs projection, information displays. Until now, most of these functions have been observed with projection units using hundreds of thousands of pixels, and barely with a discreet pixelised light source.

Powered by breakthrough Cree LED technology, Valeo PictureBeam Monolithic is the first complete high-definition lighting system that provides both glare free and high beam road marking functions together with high performance low beam and high beam in a single compact solution.

This unique solution incorporates a scalable LED array in which the pixels of the light beam are formed directly at the light source. The module is therefore smaller and weighs less than other HD lighting systems on the market, making it easier to integrate into all vehicle classes. It enables the ability to scale up to thousands of pixels. Under the control of Valeo's electronic system, each pixel can be individually switched on, off or adjusted at will based on driver needs and road conditions.

The PictureBeam system brings the function one step closer to being a real glare-free high beam, with a high accuracy in the cut-off position. Compared to other HD systems, for which the luminous source itself is separated from the light spatial modulator, it is the simplest solution in terms of number of components.

The technology is based on a monolithic LED, with 3,696 pixels to produce a high definition beam on the whole field. The main purpose of this module is to produce a HD beam on the whole field. This module also makes it possible to do road marking for Advanced Driver Assistance Systems (ADAS), but from 15 meters in front of the car.



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2nd PRIZE

SAFETY

Smart-Vision

Smart camera monitoring system

Smart-Vision disrupts the existing rear-view mirrors market by replacing traditional bus and coach side mirrors with wide-angle cameras and interior monitors.

Compared with traditional side mirrors, Smart-Vision offers optimised visibility by expanding the field of view by an estimated 25% and by eliminating lateral blind spots. The interior displays help to reduce driver fatigue by eliminating glare and by requiring less lateral head and eye movement, due to the monitor location on the A-pillar.

Automatic adjustment of the screens' brightness ensures excellent visibility in all lighting conditions, night and day, in every weather and in any driving environment. The cameras re-focus to adapt to rain drops or dirt on the lenses and an optional camera heater keeps them clear of ice or fogging. In addition, Smart-Vision has a camera lens self-cleaning feature that triggers a spray of air to clean its "eyes".

Smart-Vision not only offers greater driving comfort and safety by improving drivers' comfort, but also allows a high return on investment of under 2 years in average. Indeed, the system enables to significantly cut down fuel consumption, by around 5%, thanks to the removal of the mirrors, which lowers wind resistance for improved aerodynamics.

It also eliminates the risk of collision between the mirror and a road user when pulling into bus stops or when cyclists ride along the coach; pedestrians and cyclists are visible from the front to the rear of the vehicle. This minimises the maintenance costs linked to potential injuries and damages, while maximising the vehicle's performance.

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3rd PRIZE

SAFETY

DTS AutoSense Occupant Monitoring Solution

Enhanced in-cabin safety and user experience

As global vehicle safety standards and regulatory requirements become more rigorous, access to a forward-looking, holistic in-cabin monitoring safety system that goes beyond driver monitoring to include all occupants becomes paramount. And, as the level of vehicle automation and the range of occupant activities in-vehicle increases, this need becomes even more pronounced.

DTS AutoSense Occupant Monitoring Solution answers this industry need with a solution that understands the physical and mental state of all vehicle passengers, reports it in real time and does so without cloud connectivity. This is accomplished via edge computing implementation of the solution's advanced computer vision and machine learning techniques.

Xperi's in-cabin monitoring technology equips vehicles with the ability to provide a safer, more personalised and convenient experience for drivers and occupants. The sensing technology can help prevent traffic accidents, by monitoring the driver for signs of exhaustion or distraction. For each human occupant, the technology provides advanced analytics such as passenger authentication, age group, emotional state, and body pose. In addition to monitoring all human occupants of a vehicle, the sensors also detect pets and relevant objects, such as child seats, to prevent these from being accidentally left in the vehicle.

The Occupant Monitoring Solution is extremely lightweight and can run either as part of an existing electronic control unit or in a dedicated one, without the need for any hardware acceleration. It employs a single RGB-IR camera and near infrared illumination. Powered by artificial intelligence, each feature relies on neural networks designed, trained, and tested in-house.

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SMEs WINNER

SAFETY

Imaging Radar for Automotive Safety Applications

Real-time tracking without cameras

Vayyar's intelligent sensors create holistic safety opportunities for in-cabin and Advanced Driver Assistance Systems (ADAS), using automotive-grade 4D imaging radar technology. At the core of these sensors is a high-performance Radar-on-Chip that supports up to 48 transceivers for exceptional resolution. With an ultra-wide field of view, the 60GHz and 79GHz single-chip radar modules cover large areas to reduce the number of sensors in vehicles. They provide comprehensive detection in and around the vehicle, while simultaneously tracking multiple targets and objects. Vayyar technology is multifunctional, affordable and robust in all road conditions, while protecting user privacy.

The in-cabin sensors help prevent the tragedy of hot-car fatalities in locked vehicles. These tragedies are all preventable, by means of our reliable, accurate and affordable technology. Vayyar's intelligent sensor enables Child Presence Detection to prevent hot car incidents, even if the infant is covered by a blanket or hidden in a car seat or in the foot well. Other functions supported by this single-chip automotive solution include smart airbag deployment, occupant status monitoring and intruder alerts.

The sensor solutions go beyond the vehicle interior. As more cars occupy the roads, so do more scooters and pedestrians increasing the need for exterior detection and monitoring capabilities to prevent injuries or deaths. Vayyar's ADAS sensors provide collision avoidance by incorporating cutting edge 4D point cloud imaging, for complete classification of multiple static and dynamic targets such as cars and pedestrians. The high-resolution imaging radar operates effectively in all lighting and weather conditions and supports all autonomous vehicle safety features such as: Collision Warnings, Valet Parking, Blind Spot Detection, Lane Change Assist, Automatic Emergency Braking, Around Vehicle Monitoring, and height obstacle detection.

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SMEs
2ND PRIZE

SAFETY

CMOS-Based SWIR Camera

Solving the low visibility challenge

TRIEYE

Today, driver-assistance systems must deal with the challenges of low light and adverse weather conditions. In fact, most severe road accidents happen in these conditions: Even though the number of kilometres driven at night is substantially lower than during the daytime, more than half of all traffic fatalities occur after dark.

Short-Wave Infrared (SWIR), refers to a specific wavelength range from 1000nm to 1600nm. SWIR allows for a number of applications to be performed that aren't possible using visible light: a SWIR camera has a lower refractive coefficient, meaning that it is significantly less scattered and can perceive what standard cameras in the visible spectrum are not able to see.

Until now, SWIR sensing was extremely expensive because it is based on exotic materials compound, Indium Gallium Arsenide (InGaAs), and mainly used by defence and aerospace verticals to solve the low visibility challenge, which can afford the high price. TriEye's patent-pending technology is able to overcome these obstacles and fabricate SWIR sensing on a CMOS-based (Complementary Metal-Oxide-Semiconductor) sensor, which reduces expenditure a thousand times compared to InGaAs.

TriEye's camera produces HD images of the driving scene, with incomparable efficacy under common low-visibility conditions. Delivering high-resolution image data to enable safer and more reliable assisted driving in low visibility conditions, better mapping of the car surroundings, and a higher object detection rate. This enables assisted driving applications such as emergency braking systems and pedestrian warning features to operate consistently, offering peak visibility day or night and in the most extreme weather.

SWIR image data can be processed with the same algorithms that were developed for regular cameras. Also, it is possible to use existing deep learning algorithms which simplifies the development process, saving significant time and resources, as the algorithms do not need to be developed from scratch which requires driving millions of miles physically and trillions of miles virtually.

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SMEs
3RD PRIZE

SAFETY

Aquaplaning Intelligent Solution

Counteracting the danger of aquaplaning

Aquaplaning is a dangerous phenomenon. It happens when the tyres of the vehicle float on the asphalt excessively wet. The consequences are the loss of grip of the tyre and the loss of control of the vehicle. This is an unsolved issue that compromises the safety of passengers and other travellers, resulting in thousands of injured victims around the world, resulting from aquaplaning accidents.

For this reason, thanks to the ambitious but necessary vision of saving lives, EasyRain has developed the Aquaplaning Intelligent Solution (AIS), a system capable of countering aquaplaning through a simple, small and innovative solution. Conducted tests show an increase in vehicle performance of 35% in straight line and 30% in corners, with a repeatability of 100%.

AIS is a device consisting of a pump and two injectors. A controlled jet of high-pressure water injected onto wet asphalt breaks the water layer, restoring the grip and the vehicle control. The system is activated thanks to a proprietary software. Therefore, AIS avoids accidents, saving lives.

The device does not require new sensors or a dedicated tank. It only uses those already available on the vehicle. Consequently, AIS is an affordable and easy to install solution thanks to its small size and weight. It is also environmentally friendly because it uses only a small amount of water.

AIS is developed and tested as a solution for the automotive market, especially for car maker brands. It is also ready for electric vehicles, applicable to autonomous vehicle and ready to be connected via 5G network. Not only that. AIS can allow the development of a new rolling resistance tyre. In this sense, its benefits are the reduction of CO_2 emissions and the lengthen of the autonomy of electric vehicles.

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