DrivingVisionNews.com
Automotive lighting and driver assistance technologies

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Editorial

DVN LiDAR Conference By The Numbers So Far

26 lectures, two panel discussions, 200 registered attendees…and counting! That's what the numbers look like for the Second International DVN LiDAR Conference to be held on 2–3 December in Frankfurt.

The whole DVN team—myself, Salomon Berner, Ralf Schäfer, Leo Metzemaekers, Daniel Stern, and the rest of us—are working very hard to organise a successful event; you'll receive the agenda as soon as it's complete in a few days. We've just confirmed the commitment of Dr. Mircea Gradu, as keynote speaker. He's President and Chairman of the Board of SAE International as well as Chief Quality Officer at Velodyne Lidar, and his speech is entitled "An ADAS Feature Rating System: Proposing a New Industry Standard".

The docket includes presentations from automakers including Audi and Volvo; from lidar and lighting suppliers like Aeye, AL, Cepton, Continental, Fraunhofer, Ibeo, Jenoptik, Osram, Innoviz, Valeo, Xenomatix, and ZKW; and from a variety of tier-2 suppliers involved in automotive lidar integration like GXC Coatings, Mentor Graphics, Synopsys, and Yole Developpement.

The lecture sessions will be followed by two panel discussions about the speed of adoption of automotive lidar and its impact on the vehicle lighting industry. It's surely going to be a high-value event; have you registered yet? If not, **write in today** and **reserve your place**.

Have you seen th new DVN website yet? If not, do take a few minutes to go see it. It's a whole lot more attractive and versatile, and it's designed for compatibility with any kind of device. Log in with your usual user name and password and **let us know** what you think of it (or if you run into any technical difficulties or need to reset your password). Over 6,000 searchable news articles and more than 140 reports on lighting and ADAS are at your fingertips! We're grateful to all those who've already sent in feedback, and we're still eagerly listening.

Sincerely yours,

DVN President

In Depth Lighting Technology

DVN @Lidar: What to Expect

The second DVN Lidar Conference is happening at the Dorint Hotel Main-Taunus Zentrum in Frankfurt-Sulzbach on the 2nd (there's a gala dinner that evening) and 3rd of December.

With a year since the last Conference, much progress has been made in automotive lidar for ADAS and automatic driving. This year's Lidar Conference will cover applications, technology, integration, testing and release. The event is being organised to facilitate reciprocal access, communication, and business opportunities for stakeholders in the lidar, lighting, and vehicle industries, and to continue building a new ecosystem for automotive lidar integration.

The conference will start at 13:30 with a keynote speech by Dr. Mircea Gradu, President and Chairman of the Board of SAE International as well as Chief Quality Officer at Velodyne Lidar. Dr. Gradu brings over 25 years' experience in the automotive and commercial vehicle industry including deep technical knowledge of design, development, manufacturing, safety, and cybersecurity, and his speech is entitled "An ADAS Feature Rating System: Proposing a New Industry Standard".

Dr. Gradu started his career at Daimler-Benz in Stuttgart, Germany, and most recently headed Engineering and Quality at Hyundai Motor America. At Hyundai, he led the development and implementation of product strategy to improve the initial quality and vehicle dependability, resulting in multiple JD Power quality awards for Hyundai and Genesis models.

There will be six lecture sessions over the course of the day-and-half Conference:
• Applications (PSA, Valeo, Continental, Blickfeld, Cepton);
• Technology I (Ouster, Aeye, Leddartech, Fraunhofer IMS);
• Technology II (CEA-Leti, Innoviz, Osram, IBEO)
• Optics and Cleaning (Jenoptic, Fraunhofer IPT, GXC Coatings, Xenomatix)
• Testing (LiangDao, Velodyne, Vedecom, Aachen University)
• Lighting Integration (Audi, Volvo, ZKW, Marelli/Automotive Lighting)

The second day will be opened by Yole Developpement, after which two panel sessions
• How fast will automotive lidar be adopted? (Moderator: Leo Metzemaekers)
• Will lidar impact vehicle lighting? (Moderator: Ralf Schaeer)

This event will gather over 200 top worldwide experts in automotive lidar and lighting. Lectures will express a wide array of different views about lidar applications and integration
And 12 expo booths will present the newest innovative lidar-based automotive technologies and their integration prospects and progress.There are still a few expo booth spaces available; to reserve yours, contact DVN's Salomon Berner by **email** or by phone on (+33) 60 76 40 502.

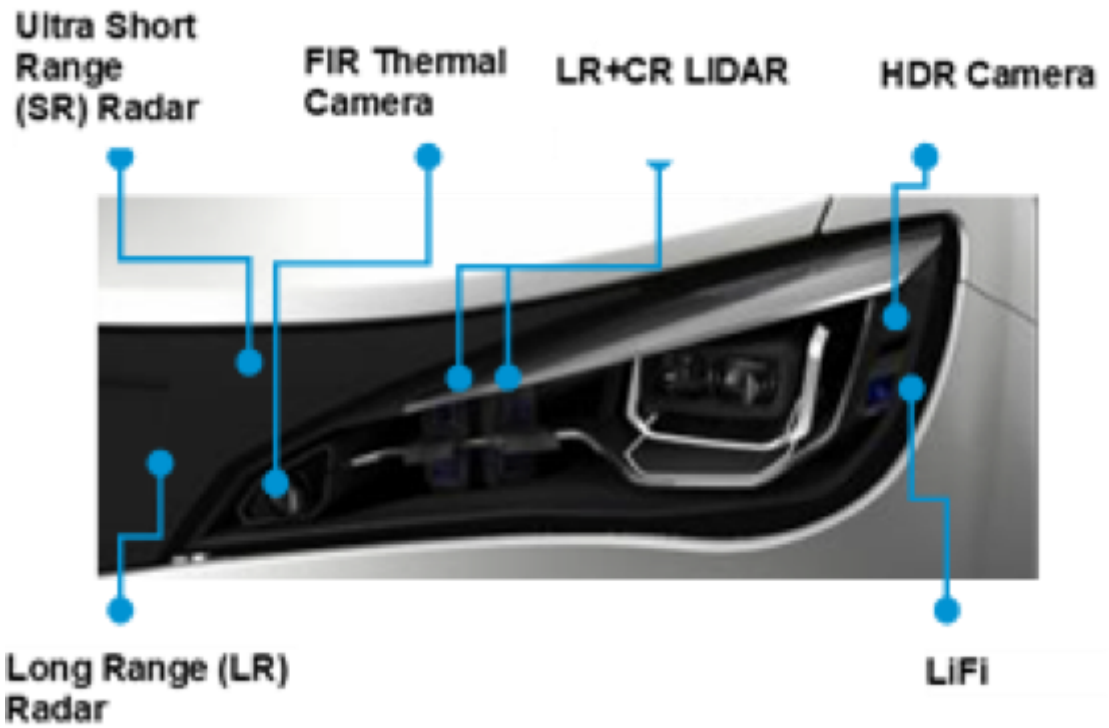
Lighting News

Marelli to Fly New Flag at Tokyo Show

Marelli are exhibiting under their new brand at the 46th Tokyo Motor Show 2019. The company's slogan, "Powering Progress Together", is emblematic of a focus on helping their customers confidently navigate and succeed in an unprecedentedly changing industry.

Marelli is introducing products and services in the areas for Autonomous Driving, Connected Systems, Electrification, and Green Technology.

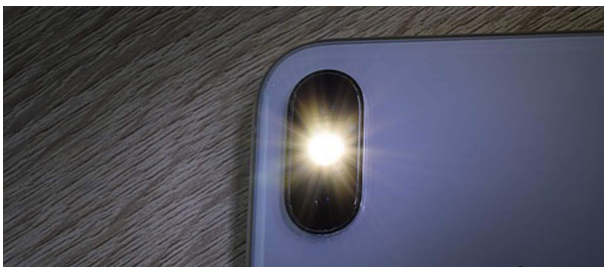
Marelli will be presenting the latest iteration of their Smart Corner™, wherein sensors for autonomous driving are integrated in the headlamp: light-detecting devices using infrared cameras, lidars, and short and long-distance radars) into headlight and rear light units, which are used to create maps of the surrounding environment to support autonomous driving.



In the Interior Experience area, Marelli will present integrated cabin system solutions such as their "Human-Max Cabin" concept model, which maximises the value of the individual transport experience.

Marelli say they imagine cabin of the future is designed to maximise the human element. With a full complement of personalisation functions, passengers can create a cabin of their own, with comfort and convenience tailored to individual needs and wants, by bringing together the interior fittings, electronics, and HVAC.

Impossibly Thin, Lightweight Camera Sees In the Dark



A team of computer and electrical engineering researchers from the University of Utah have created an almost inconceivably thin, low-mass optical camera lens—much lighter and thinner than its currently available counterparts built into smartphones. Oh, and it sees in the dark, too.

The new lens, developed by a research team from the University of Utah, is just a few microns thick versus standard camera lenses that are typically a couple of millimetres thick—that is roughly 1,000 times thinner than standard lenses, or 20 times thinner than a strand of hair. And the Utah optical camera lens iteration is 100 times lower in mass.

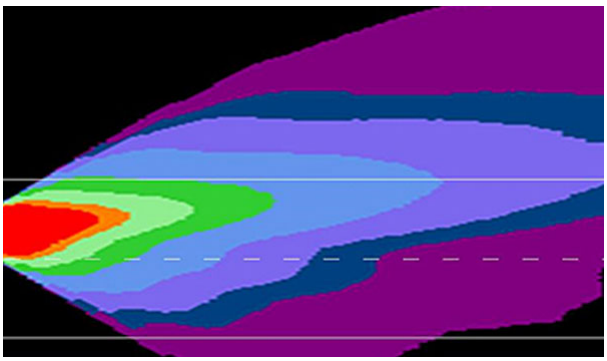
Operationally, a traditional curved camera lens manipulates the light bouncing from objects before reaching the camera sensor responsible for forming a digital picture. Instead, the lens developed by the Utah team is composed of several microstructures, each of which manipulates the light toward the camera sensor. The Utah team set out to make the lens flat, and thus thinner, than standard camera lenses. They devised a method for manufacturing the lens using polymers in combination with algorithms that determine the geometry of microstructures, wherein the microstructures function like the tiny pixels of a lens. Alone these are not a lens, but together they behave as one.

Due to the lens' new design, manufacturing could also become less expensive as it will be possible to produce the lenses using plastic instead of glass.

Although newer smartphones already include highly sophisticated cameras that take high-quality images, their accompanying hardware — notably the thick camera lens that protrudes from the back of most phones — tends to interrupt the phone's design. The developers of the new lens believe that the thinner and lighter lens design will eventually lead to sleeker smartphone designs. And phones are far from the only application for small cameras! We imagine numerous automotive and automotive-adjacent places where cameras such as this will make friends fast.

The work is **published** in the Proceedings of the National Academy of Sciences.

Radiant's New Headlamp Evaluation Module



Radiant Vision Systems are a company developing imaging technologies to solve challenging applications in light measurement, manufacturing integrity, and surface quality for the world's leading industrial makers and suppliers.

Their newest: PM-HL software, which provide a library of tests for headlamp measurement and beam pattern analysis. It quantifies and converts between illuminance distribution, luminous intensity distribution, and roadway illumination.

The software handles high- and low-beam lamps, as well as test points for left- and right-hand traffic. It contains preconfigured points of interest for US and UN photometric standards, and converts headlamp beam patterns into roadway illumination distributions for visualisation on a roadway Illumination plot.

Project Dragonfly: ZKW's AV Lights With Integral Sensors

Headlamp with sensors

Headlight with integrated lidar

ZKW have presented their "Project Dragonfly" for autonomous driving, in a demo vehicle integrating sensors and cameras in headlamps and rear lamps to cater for automated driving functions.

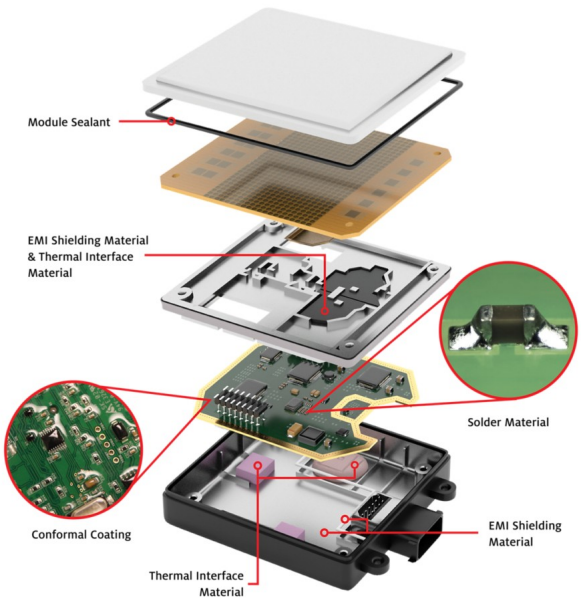
Since this past June, the first autonomous test drives have been completed on four approved routes in Austria. The aim of Project Dragonfly is to promote autonomous driving using an electronic all-round view. The headlamps and rear lamps are placed strategically to provide a 360° view of the vehicle using sensor systems. This is much

like a dragonfly, whose gaze also covers 360°. ZKW has integrated in a first step high-resolution cameras into the headlamps of the Project Dragonfly test vehicle.

The first stage of Project Dragonfly involves the integration of artificial intelligence cameras into the lighting at the 4 strategic corners of the vehicle—in the front and rear lamps—to expand the field of view to 360°, allowing them to safely detect vehicles ahead or in oncoming or cross traffic. By the end of this year, the demo vehicle's headlights will be expanded using lidar systems for optical distance and speed measurement as well as newly-developed digital ligt modules.

In the first experiments, ZKW demonstrated that objects such as pedestrians during the night or in bad weather can be detected by artificial intelligence at an even greater distance with a significantly higher detection rate, without blinding other road users. ZKW are presently working on solutions to integrate sensors into lighting with elegant design and to take advantage of the lighting space, with its ready provisions for power supply, data bus connection, image processing ECUs, and lens condensation management, thawing, and cleaning. Several pre-development projects are being launched with car manufacturers, which will promote the integration of sensors in lighting for AV.

New Generation of Lidars Embedded into Headlamps



New specialised thermoplastics offer greater design freedom to improve sensor performance and packaging, at reduced cost. The current ADAS sensor suite also is evolving rapidly to respond to market demand for improved performance, more efficient packaging, and lower costs. Engineers are exploring the integration of different sensors into a single unit,

And lidar technology, currently focused on autonomous-driving systems more than on ADAS applications, is transitioning to solid state, from today’s electromechanical units. Specialised thermoplastics are being developed to offer greater design freedom than traditional metal, glass, and lower-performing plastics currently used in sensor systems. They’re key to creating the next generation of ADAS technologies that are more compact and cost-effective.

Camera sensors also must be shielded from competing electronic signals. Their housings, which are typically large and made from aluminum, can be replaced with specialty thermoplastics to streamline manufacturing and increase productivity, and aid in weight reduction. In the every-gram-counts mantra of vehicle lightweighting, sensor suites with reduced mass contribute to better fuel economy.

While the mechanical spinning-can lidars typically are roof mounted, the new

generation of solid state lidars will be increasingly embedded into front and rear fascia and are trending into headlight systems. Depending on location, these units are exposed to weathering, road chemicals and debris that can affect their optical transparency and durability.

Many lidar units use glass or standard plastic material for protective lens covers to ensure IR transparency, optical performance and weather resistance. Specialised thermoplastics offer advantages over these traditional materials. Compared to glass, specialty thermoplastics could provide greater freedom to design complex shapes and superior resistance to impact and abrasion.

FCA's Deluxe Driving Simulator

FCA recently launched what they're calling North America's most advanced driving simulator at the automaker's ARDC (Automotive Research and Development Centre) in Windsor, Ontario, Canada. The new VDS (Vehicle Dynamics Simulator) provides nine degrees of freedom and driver-specific calibrations to emulate a vehicle's driving behaviour on a wide range of surfaces and environments. The new hardware-in-the-loop test bench will permit iterating a host of simulated systems between concept and prototype phases to improve the overall product experience.

The VDS came online this past September, with an overall investment of $10m that included support from the Southwest Ontario Development Fund. The simulator technology was developed by VI Grade, a leading supplier of system-level simulation founded in Germany in 2005, and—since September 2018—part of the Spectris technology conglomerate based in the U.K.

FCA's new VDS uses nine actuators to provide three additional degrees of freedom to more closely mimic vehicle dynamics. The entire setup is electrically actuated to minimise latency and provide the massive and instantaneous torque required to reproduce events up to 2g.

The simulator can be fitted with any vehicle body in the FCA lineup, from a Fiat 500 to a Ram HD pickup truck. A curved, 180° screen in front of the pod fills the driver's field of view with five 4K projectors creating the images. The projected image shifts in real time using tracking data correlated to the position of the driver's line of sight; frequent users of the VDS get a personal calibration to account for physiologic variables. Initially the VDS will be used to support chassis development, but in the future it also will be used in ADAS and HMI system development.

U.S. Pedestrian Toll Hits 30-Year High

Traffic deaths in the United States fell 2.4% in 2018 to 36,000, but the number of pedestrians killed rose to its highest level in nearly three decades, according to NHTSA. Despite the decrease in overall deaths, pedestrian and bicyclist fatalities continue to rise, with deaths of those on foot climbing 3.4% to 6,283 last year. The number of people killed on roads while using bicycles and other non-motorised vehicles rose 6.3% to 857.

More pedestrians and cyclists were killed in 2018 than in any year since 1990. Deaths of pedestrians have jumped by 42% in the last decade even as the combined number of all other traffic deaths has fallen by 8 percent. Auto safety experts say the growing number of drivers distracted by mobile devices is at least partly to blame. NHTSA say they are looking for ways to reduce fatalities among pedestrians and bicyclists.

As we **reported** earlier this month, AAA said their research shows automatic emergency braking systems designed to stop vehicles from striking pedestrians frequently don't work effectively and have a significantly higher failure rate at night.

Driver Assistance News

Compact Lidar modules: XenomatiX CEO at Lidar Conference

Filip Geuens, CEO of XenomatiX since 2015, spent over 25 years in optical metrology. Being the former CTO of a business unit of Nikon, he has a strong background in 3D technology.
Since 2012, XenomatiX have been taking a unique approach in developing a true solid-state lidar solution based on automotive requirements. Geuens was kind enough to talk with us:

DVN: What can you tell about your current job in your company?

Filip Geuens: Being CEO of a quickly evolving company requires me to be versatile and flexible. I have a very competent team that works hard on progressing and validating our unique approach. As such, we keep focus on the automotive market very well and on getting a step closer to our goal every single day. Fast decision taking and good communication makes it possible for a technology scale-up to bring excellent value to large automotive players.

DVN: You will be a speaker at the 2nd DVN Conference on automotive lidar; can you give us a short preview on what you will plan to present?

FG: At the DVN conference, we will present compact lidar modules that can be integrated in various locations in vehicles. We will describe the influence of covers and of contamination or damage on these covers. These topics are important for real-life use of automotive Lidar, for an aesthetically pleasing integration and a good longevity. These are all important aspects for technology selection in automotive.

DVN: What is your vision on automotive lidar?

FG: Our cars and road infrastructure are designed for driving based on human, visual screening of the car surroundings. Mimicking this for higher levels of automation requires a perception technology that gives high resolution depth info in all ambient light conditions. Cameras are necessary but insufficient. Humans are not good at estimating absolute distances accurately, but they are good in detecting relative motion and relative distances. This is the part lidar will fill in.

DVN: What will be the ambition of your company with regards to the future of automotive lidar?

FG: The clear goal of XenomatiX is to become an automotive Tier II supplier for solid state lidar. We want our technology to be part of next generation vehicles, offering more safety and comfort.
We have been making good progress on this and expect to become a relevant player in this field.

Hyundai Mobis inVelodyne Pact for L3 Systems

Hyundai Mobis have agreed a partnership with Velodyne Lidar for mass-producing Level 3 autonomous driving lidar system. HM will also invest US$50m in Velodyne to reinforce business coöperation in lidar commercialisation.

The two companies will collaborate on new lidar system supply by integrating Velodyne’s latest lidar sensors with HM's cognitive software, which will process the outside vehicle environment data gathered by lidar sensors. This means that it would recognise and analyse moving or stationary objects, along with road systems such as traffic sign information.

HM plan for a 2021 commercial launch of their first lidar-based L3 system co-developed with Velodyne. The two companies will mark the start by supplying the system to the Asian market and will gradually expand to automakers in North America and Europe.

With this lidar system, Hyundai Mobis will finalise their sensor technology range for L3-4-5 autonomous driving. They successfully developed a short-range radar last year and will secure deep learning-based camera and high-performance radar technology by next year.

General News

New Opel Corsa is "Company Car of the Year"

Technician, courier, or CEO—all kinds of people drive company cars. But which is the best? German magazine *Auto Bild* asked this question, and the magazine's readers answered: the new Opel Corsa, which as a result has been named "Company Car Of The Year" in the small car category. This is the first media-prize to be won by the sixth-generation Corsa, which was presented at the IAA Frankfurt International Motor Show in September.

"Along with the Astra, the Corsa is our most important model in Europe", says Opel VP Harald Hamprecht. "Opel has democratised mobility for 120 years. We make pioneering technologies accessible for everyone. That is what we stand for, that is what the new Corsa stands for, and our customers appreciate it – especially in the company car area".

Depending on the version, the Opel Corsa (which picked up 22% of the votes for "Company Car Of The Year") is ideal for singles and couples, as well as company car drivers and families. Around 14 million units produced in 37 years provide the proof. The Corsa first joined the model range below the Kadett in 1982. The Corsa A, which was originally conceived for first-time buyers and those on an economy budget, became a bestseller, achieving sales of 3.1 million by 1993.
The sixth generation of the practical, stylish and dynamic Corsa made its premiere at the IAA Frankfurt International Motor Show in September 2019.

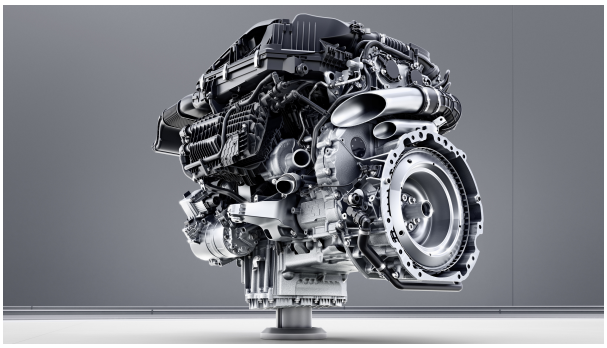
Valeo Expand China Tech Centre For Thinking-Car Parts

French-based supplier Valeo have expanded their tech centrein the central China city of Wuhan to strengthen their development capability of parts and components for intelligent vehicles in China. Last week, the tech centre's phase-two project started operation: a new building covering a ground area of 3,000m^2.

The new building can house more than 1,000 engineers to develop software and hardware for sensors, cameras, radars, lidars, intelligent cockpits and electronic control units used in vehicles.

Before the expansion, Valeo's Wuhan tech center mainly conducted R&D for automotive lighting and driving assistance technologies. Affected by the protracted downturn in the local light-vehicle market, Valeo's sales to automakers in China fell 19% to €860m in the first half of 2019.

Daimler: Goodbye Combustion Engines



In the coming years, the Daimler Group also wants to get more involved with combustion engines in trucks. Already at the IAA, the company made a stir - on the subject of passenger cars.

"Carbon-neutral transport on the roads by 2050 is our ultimate goal," said Martin Daum, head of Daimler Trucks and Buses, at the German Logistics Congress in Berlin. Daimler is thus committed to the goals of the Paris Climate Change Agreement. Since a complete fleet renewal takes about ten years, CO2-neutral new vehicles should be sold from 2039 on the major markets of Europe, North America and Japan. "It is our ambition that by 2039, all our new vehicles in Europe should be" tank-to-wheel "- that is, when driving - CO2-neutral," the manager announced.

There will be battery-powered production vehicles in all core regions by 2022 and by the end of the decade hydrogen-powered trucks and buses, ie fuel cells. The company is convinced that both technologies, electric and hydrogen drive, coexist and complement each other well. In view of the worldwide increase in transport volumes, the industry must act. "We must not stay in the 'continue like this', wait for further regulatory pressure and let us drift into a corner."

Also in the long term more expensive

Even in 2040, the cost of ownership and ownership of trucks and electric buses should still be higher than that of diesel vehicles. "This market will not just come into being - it has to be done." It therefore also required "government intervention", such as a Europe-wide staggering of toll costs by CO2 value. Daum also encouraged a funding program for the development of a nationwide charging and hydrogen infrastructure.

At the IAA, Daimler development chief Markus Schaefer had said that his company after the latest generation of combustion engine would not develop any further. The development efforts will focus on electrification, electric drives and battery development.