SPECIAL EDITION

www.automobil-industrie.de

November 2025 • 70. Jhg. • B 01046

AUTOMOBIL INDUSTRIE

AGRICULTURAL ENGINEERING

Smart and efficient: An opportunity for automotive suppliers?

70 JAHRE

VOGEL COMMUNICATIONS GROUP

DEUTZ SERVICE
FOR DAIMLER TRUCK OFF-HIGHWAY ENGINES

AGRITECHNICA THE WORLD'S NO.

Visit us in Hall 14/15
Booth 15G14
9–15 November 2025,
Hanover

Since January 1, 2025, DEUTZ is your official partner for **spare parts, maintenance, and repair** of selected Daimler Truck Off-Highway engines. Competent, reliable, and authorized.

Find your nearest **DEUTZ service partner** now!

DEUTZ Service Portfolio

Genuine Parts and Liquids
Original parts and operating fluids: precise fit, reliable, long-lasting.

Extended Engine Warranty
Extended warranty of up to five years or 10,000 operating hours.

DPF Cleaning
Professional cleaning, replacement, or renewal of diesel particulate filters.

Lifecycle Solutions
Efficient repair solutions for every phase of an engine's life.

Lifetime Parts Warranty
Extended warranty of five years or 5,000 operating hours on repairs carried out by DEUTZ service partners.

Telematics
Optimized fleet management through remote monitoring and smart service features.

DEUTZ®

DEUTZ AG · Ottostrasse 1 · 51149 Cologne, Germany · info@deutz.com · deutz.com

Look away from the road!

The global population is growing and must be provided with food. At the same time, resources such as soil, water, and fertilizers are dwindling. Climate change directly affects the agricultural industry – higher and rightly ambitious sustainability goals demand new or at least significantly adjusted strategies from traditional agriculture. Meanwhile, energy prices are rising, and trade barriers are emerging.

The agricultural sector feels the global change. Of all the industries related to mobility, it has the least room for maneuver. While there is often unfounded and emotional commotion in the car market about which drive boosts the driver's self-confidence the most, farmers have to calculate: Higher yields are the goal – with fewer natural and economic resources.

A pronounced cost awareness, even higher than that of road-bound commercial vehicles, meets high technical requirements. This is an opportunity for traditional automotive suppliers to diversify their portfolio into another industry. Powertrains, electronics, software-defined vehicles: The know-how for this has long been extensive in traditional automotive suppliers or is currently growing.

The products awarded with the "Innovation Award Agritechnica" impressively show how much is happening "in the field": especially in smart and precision farming and the "digital farm." Reliable sensor data is indispensable, as with cars and commercial vehicles, for functions like autonomous driving – doubly so for agricultural machinery when it is road-approved. In terms of the data ecosystem, however, automotive suppliers can learn from agricultural technology, which has been pursuing the subject longer and more intensively.

Automotive suppliers may not find the usual high volumes in agricultural technology – but variety, flexibility, and consistency are in demand; and: Customers think rationally, and sales are predictable.

My colleague Hartmut Hammer reports in this issue's cover story about where specifically automotive suppliers can get a proverbial foot in the door of the agricultural sector. Additionally, we introduce innovations in the field and at the trade fair – and show where traditional automotive suppliers are already riding along with their car or commercial vehicle technology in agricultural machinery.

Enjoy reading and have fun at Agritechnica 2025!

Source: Gothart Günnel/Technisches Fachzentrum Schmidt

Thomas Günnel

Thomas Günnel
Editor
»Automobil Industrie«

AUTOMOBIL INDUSTRIE

CONTENTS 2025

Source Cover: © Jiraphiphat - stock.adobe.com

Tobias Ehrhard, Managing Director of the VDMA Agricultural Machinery Association, about the powertrains of the future
Page 11

What alternative drives exist for agricultural machinery and how practical are they? A discussion by agricultural engineering.
Page 18

SYSTEMS & COMPONENTS TROPHY

Engineers find that cool

The winners of the "Systems & Components Trophy – Engineers' Choice" have been announced. Three companies stood out with their products from a total of 41 applicants.

Thomas Günnel

The German Agricultural Society awards the "Systems & Components Trophy – Engineers' Choice" at Agritechnica. The trade fair organizer recognizes innovative systems and components "with new or significantly improved concepts that can contribute substantially to the development and realization of products, or new or improved processes."

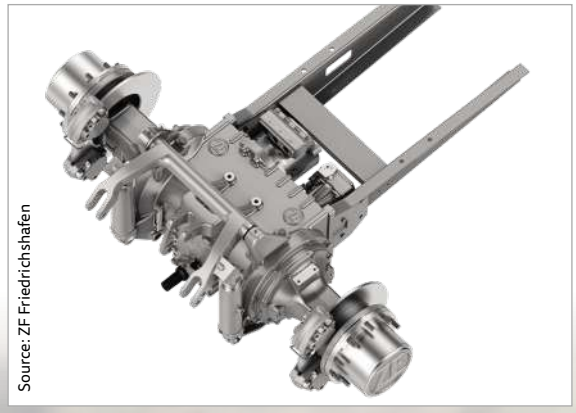
Igus wins the award for its "ReBeL cobot." The articulated arm robot performs highly precise and repetitive tasks: for example, in fruit harvesting, sowing, or indoor farming. Depending on the application, the robot arm is equipped with sensors and tools. For certain harvesting tasks, the robot can be mounted on an autonomous chassis. In a cost- and license-free software testing environment, users can test any kinematics – thus knowing before purchase whether the robot suits their application.

Mach receives an award for "RadX." According to the manufacturer, the radar device is the first of its kind to bring real phased-array technology to agriculture, construction, mining, and land management. It also processes the detected signals internally and makes them available in the OEM's system architecture. The system uses electronically controlled beams and adaptive beam shaping for high-resolution 3D detection in real-time, with no moving parts required. It can differentiate between soil, crop residues, and vegetation while mapping the terrain surface. The sensor is particularly interesting for depth control of tillage, planting, and seeding machinery and in guiding harvester headers. Mach also considers it possible to assess work quality behind the device.

ZF Friedrichshafen receives the award for the "ZF eTD." The modular, highly integrated electric axle system combines traction, power take-off, and hydraulics into a compact design for tractors with up to 100 kilowatts of power. Additionally, central transmissions, hydrostatic units, clutches, and hydraulic systems can be partially eliminated – or replaced by a double electric driveline with energy recovery. The axle system essentially consists of a highly integrated e-drive unit with two oil-cooled electric machines for drive and auxiliary drives. The new basic design concept creates space for batteries or hydrogen tanks – which can benefit range and operating time.

Award ceremony and background

The award ceremony takes place on November 9 on the Expert Stage of Systems & Components in Hall 17 from 5 to 6 p.m. In September, an expert jury created a shortlist of 16 nominated innovations from a total of 41 applications. Development engineers of the agricultural machinery manufacturers exhibiting at the fair selected the three winners. ■



Source: ZF Friedrichshafen

The modular, highly integrated „eTD" electric axle system by ZF Friedrichshafen combines traction, power take-off, and hydraulics into a compact design for tractors with up to 100 kilowatts of power.

Source: Klaus Fritsche-von Welck

The „ReBeL Cobot" by Igus, equipped with sensors and grippers, is suitable for tasks such as fruit harvesting, sowing, or indoor farming.

Source: Mach

Mach's „RadX" radar device brings real phased-array technology to agriculture, processing detected signals internally and making them available in the OEM's system architecture.

Source: Felix Holland

TRADE FAIR

Agritechnica 2025: An Overview

The „Young Farmers Party" at Agritechnica 2023: After spending time at the fair, it's time to celebrate properly.

The Hannover Messe is fully booked: with Agritechnica 2025. The world-leading trade fair for agricultural technology gathers exhibitors from November 9 to 15. An opportunity for traditional automotive suppliers looking to diversify their business.

Thomas Günnel

Touch Smart Efficiency: This year's Agritechnica brings together the key topics of the agricultural technology sector in its leading theme. Sensors, drones, AI, robotics, software, and new drives are transforming agriculture—a chance for traditional automotive suppliers and outfitters.

Of particular interest to suppliers is the B2B marketplace „Systems & Components" – a meeting point for the international supplier industry for agricultural technology and the off-highway sector. In three halls, exhibitors showcase their expertise and products on vehicle electronics, agricultural electronics, drive technology, hydraulics, engines, cabins and linkages, replacement, and wear parts.

Engineers, developers, researchers, procurement managers, dealers, spare parts managers, OEMs, and associations gather information about developments and innovations in components for agricultural machinery and related sectors.

Organized by the German Agricultural Society, DLG, the stage program „Expert Stage" with professional lectures, conversations, and discussions targets developers, engineers, decision-makers, and manufacturers of mobile machines. The focus is on four topics:

- **„Environment and Safety"**: This topic is about higher productivity and a reduced ecological footprint. The transition to a hydrogen economy and e-mobility requires circular value creation in the international off-highway markets. Innovations come from design, material selection, and new marketing strategies.
- **„Innovative Drive Technologies"**: Which drive concept is suitable for which application and which off-highway machine? What contributions do alternative and optimized traditional (diesel) drives make? How will hydrogen combustion engines in agricultural machinery develop? And what can multi- and dual-fuel engines achieve?
- **„Networking and Automation"**: Lidar, cameras, sensor fusion, assistance functions, AI: What software and hardware facilitate the next step towards the full automation of agricultural machines? How does this align with functional safety?
- **„Digital Services"**: How can operational data be captured, evaluated, and analyzed – and conclusions drawn on the performance and profitability of commercial vehicles and mobile work machines? What do condition monitoring and predictive maintenance achieve? Additionally, this section addresses cybersecurity with suppliers.

Tips for Young Engineers and „Engineers' Choice"

Young engineers should note Young Professionals Day on November 14: an exclusive offer on the Expert Stage

Source: DLG

Agricultural machinery can be an opportunity for traditional automotive suppliers to diversify.

with perspectives and tips for career planning and networking opportunities.

Additionally, the DLG is again awarding the „Systems & Components Trophy – Engineers' Choice" – the international prize for components and systems. Development engineers from the agricultural technology select systems and components that can significantly contribute to the development and implementation of new products and procedures. The winners have been announced and will be honored on November 9 on the Expert Stage of Systems & Components. Three companies stood out with their products, with 16 nominees in total.

Automation, AI, and Robotics

For the first time this year, the „Digital Farm Center" takes place, focusing on automation, AI, and robotics. Moderated live demos showcase the data exchange between tractors and implements and practical examples of smart farming. The platform connects farmers, contractors, consultants, manufacturers, startups, technology providers, representatives from science and research, development engineers, and investors.

Seven fair days – seven topics

Also new is the concept „7 Days – 7 Topics". It addresses different specialist visitor groups: from agriculture and agricultural machinery trade to research and development. For this purpose, there are appropriate themes, formats, and contacts for each day of the fair. It kicks off on Sunday, November 9, with the Innovation and Press Day, followed by two Agribusiness Days for dealers, contractors, and large agricultural businesses.

On Wednesday, the „International Farmers Day" focuses on international exchange – with France, Canada, and the Czech Republic as partner countries. Thursday, November 13, is the „Digital Farm Day": Visitors can get information about technologies from digital farming, automation, robotics, and artificial intelligence.

Friday continues with Young Professionals Day and invites you to the Young Farmers Party in the evening. It ends on Saturday, November 15, with Celebrate Farming: then traditionally at 6 p.m. the tractors roll out of the halls, concluding the fair with a horn concert.

International Specialist Program

During the fair, several lecture events take place. They cover new agricultural practices and technical innovations. The focus is on countries including Australia, Canada, the Czech Republic, China, France, Kazakhstan, and Thailand. On November 9, emerging countries are addressed with the case studies China and Thailand. Agricultural machinery companies and industry experts participate. Large-scale agriculture speakers present on November 10, focusing on modern agricultural management practices, including the use of big data. Regenerative agriculture is on the agenda on November 11, focusing on soil health and targeting farms.

On International Farmers Day, November 12, farmers, companies, and organizations from Canada, the Czech Republic, and France can learn about new products in agricultural technology and network with experts and peers. Also on November 12, international trade agreements and their impact on agriculture are discussed. Farmers, entrepreneurs, and industry representatives are invited. The „Agricultural Economics" event on the same day focuses on benchmarking and production costs for farmers.

An AI tool will translate each presentation in real-time and display it on a screen next to the stage. Alternatively, attendees can follow the translated text on their smartphones using a QR code. All in keeping with the exhibition's slogan: „Touch Smart Efficiency". ■

NEW BUSINESS

Auto tech meets agriculture

Agricultural machinery remains a market with strong prospects, but one that is highly challenging at present. Technological shifts offer numerous opportunities to expand businesses or enter this market with effective solutions.

Hartmut Hammer

After mechanisation, the digitalisation of agriculture is now underway.

The boom after the COVID-19 shock of 2020 is over. While the agricultural machinery market recorded strong, almost uninterrupted growth worldwide from 2021 to 2023, figures have been markedly weaker since 2024 – not least because pandemic catch-up effects led meanwhile to high inventory levels.

German agricultural machinery companies are also struggling in this difficult environment, having previously benefited from roughly a decade of growth. Sales of German agricultural machinery and tractor manufacturers fell from 15.4 to 11.1 billion euros from 2023 to 2024 (down 28 per cent). In the first half of 2025, this decline narrowed to around 10 per cent. Tractors and harvesting technology were particularly hard hit.

„The market will remain difficult in 2025 and 202“, Fendt CEO Christoph Gröblinghoff said about a year ago. According to the German Mechanical Engineering Industry Association (VDMA), however, recent surveys indicate that industry sentiment is gradually brightening.

Source: Geringhoff

Scope for technology transfer

Globally, the agricultural sector is caught between the hunger of a growing world population and stress factors such as dwindling resources (land, water, fertilisers), increasing regulation and the sustainability debate, rising energy prices and trade barriers. “The task is to generate higher yields with fewer resources. That can only be achieved with innovative and resource-efficient technologies, which offer the industry attractive growth opportunities,” explains Peter Fintl, Vice President Technology & Innovation at Capgemini Engineering (page 12). He sees particular points of entry for traditional automotive suppliers in the powertrain sector. “Existing know-how can be transferred very well – from the base engine and exhaust aftertreatment through to thermal management.”

Since the entry into force of Stage V for non-road vehicles, internal combustion engine development has focused less on NO_x and particulates and more on enabling drop-in fuels. Many manufacturers have now approved their engines for RME (rapeseed methyl ester) and HVO (hydrotreated vegetable oil). Another alternative is ethanol-capable combustion concepts, which have been widespread in Brazil for years. In parallel, many individual measures are being implemented to increase powertrain efficiency – for example alternative operating maps, or raising engine drag torque on downhill runs to minimise use of the service brakes. For the latter, tractor manufacturers deploy, for example, throttle flaps in the air path, variable-geometry turbochargers, decompression valves and retarder-like hydraulic solutions.

CVT on the rise

Battery-electric driving has now arrived for lower-power tractors and other vehicles with shorter duty cycles. However, high battery costs and still-limited real-world experience mean that – despite foreseeably lower variable costs – total cost of ownership (TCO) does not yet show a cost advantage over combustion powertrains. Those able to “refuel” their electric machines with energy from their own PV systems will, however, run green and cheaply. It is no surprise that Agritechnica will showcase a number of additional battery-electric agricultural machines and e-axles – with outputs up to around 250 kW, voltage levels from 48 to 800 volts, and a preference for LFP over NMC cell chemistry.

In transmissions, continuously variable gearing is spreading into more and more tractor classes –for example Fendt’s VarioDrive concept, hydrostatic-mechanical power-split solutions at CNH, or ZF’s CVTs at JCB. Current innovations in hydraulic systems include electronically controlled load-sensing systems and new coupling concepts for supplying hydraulic oil to implements.

Learning from the road

There are also good entry opportunities for suppliers in electronics – from the on-board electrical system and

Source: Claas

Predictive powertrain management is set to make Claas's continuously variable tractor transmissions even more capable and efficient, with optimal driveability.

Source: Krone

Fully autonomous agricultural machines are possible – but are they already market-ready?

data transmission through to the software-defined vehicle. Here, the innovation pressure on the sector is particularly high. Competent suppliers are in demand especially for autonomous driving, precision farming and digitalising farm operations.

Same Deutz Fahr, for example, has developed a function package that includes features familiar from cars and trucks: lane-keeping assist, turn assist, adaptive cruise control with collision warning, traffic sign recognition, and object/person detection. The functions are designed specifically for tractors and take account, for instance, of front and rear implements, secondary roads without white lane markings, and close-following operation in the field. Trailers, too, are increasingly assisted – for example with automatic trailer braking when pushing on the tractor, and by automatically locking passive steering axles. Even teleoperated driving with large tractors – via joystick, camera-based surround monitoring and cellular connectivity – is already technically possible over long distances.

In principle, the requirements for automated driving functions in field operation are somewhat lower, TÜV Nord notes. But as soon as the agricultural machine is also approved for road use, the extensive testing and driving requirements for automated driving functions in cars and trucks must additionally be met.

The farm is going digital

New electronics architectures and various sensor and camera systems are the basis for electrified drives and driver assistance systems. Sensibly, these are also used for the further digitalisation of agriculture. Crop production, for example, requires sophisticated process control and monitoring, and early fault detection likewise relies on extensive sensors and actuators.

New players in agricultural machinery should also understand the sector's specific challenges. For example, suitably highly qualified personnel are often lacking for the complex operation of machines and other digital systems. Ergo, operating concepts must be as simple as possible, yet still offer very granular machine settings to accommodate all operating parameters and environmental conditions.

Compared with the passenger car and commercial vehicle segments, agricultural machinery is already well advanced in embedding all working and monitoring functions in vehicles – together with, for example, geodata and operating data – into comprehensive management systems. The sector is already deploying artificial intelligence (AI) on a broad scale: for instance in component monitoring via vibration analysis; in evaluating camera images; in management tasks such as maintenance and repair planning; or in efficiency-oriented analysis of vehicle operation. A current flagship example is Claas's cloud-based grain processing analysis for maize silage, which eliminates the need for complex external laboratory analysis. Using an AI-powered camera in the discharge spout to look at the structure of the chopped crop in real-time lets the Claas forage harvester's cracker gap, driving speed, and engine power be changed. The data can also be transferred to the cloud-based farm management system and used there for further services.

Between manual practice and the cyber world

That said, "there's no getting away from people," argues Claas's Arne Bohl. Practitioners in the field also regularly warn against over-engineering in digitalisation, for example in arable processes and machines. Another relevant risk is cyberattacks, as agricultural machinery's digital systems have traditionally been designed for various brand-oriented ecosystems and therefore equipped with manufacturer-independent interfaces. Such extensive digital networks offer ample attack surface for hackers and data theft.

According to TÜV Nord, UN Regulation No. 155 (uniform provisions concerning the approval of vehicles regarding cybersecurity) is not currently mandatory for agricultural machinery. However, the new Machinery Regulation (EU) 2023/1230 sets out cybersecurity requirements that also apply to agricultural machines. In addition, the agricultural machinery sector is currently developing the industry standard ISO 24882 as a future state of the art for cybersecurity in agricultural machines, TÜV Nord says. For functional safety, two sector-specific standards have been in place for several years: ISO 26262 and ISO 25119. ■

„The task is to generate higher yields with fewer resources."

Peter Fintl, Capgemini Engineering

Sustainable productivity takes centre stage

Tobias Ehrhard, Managing Director of the VDMA Agricultural Machinery Association (VDMA Landtechnik), shares his views on the powertrains of the future.

Interview by Simon Hammer

Mr Ehrhard, which transformation processes will change the powertrains of agricultural machinery?
Tobias Ehrhard: For high-power tractors and harvesting machines in arable applications, the internal combustion engine will remain indispensable for the foreseeable future. Sustainable liquid fuels are the best option for effectively reducing CO_2 emissions. Climate-friendly alternatives to fossil diesel therefore top the industry agenda. The key is to create effective incentives that make synthetic or biogenic fuels—such as hydrotreated vegetable oil (HVO)—attractive for arable farming.

To achieve broad adoption of climate-friendly fuels over the long term, the new energy carriers must, of course, be widely available. A decentralised approach is particularly promising here, as many farms with on-farm fuelling stations require little to no additional infrastructure.

And where could electromobility come into play?
For farmyard-based applications—such as stacking and transporting bales of feed with a telehandler or a small tractor—vehicle concepts with electric drives are also suitable. A corresponding portfolio in the lower power classes is now emerging. Given the existing high-voltage electrical infrastructure, electrification is particularly compelling in livestock operations.

In which direction is the sector's innovation activity heading in general?
For our industry, the focus is on sustainable productivity in agriculture. At Agritechnica, technologies that combine field capacity, efficiency and sustainability will take centre stage.

This includes new developments and further refinements in mechanics and hydraulics, underscoring the enduring innovative strength of traditional mechanical engineering. Closely linked to this are solutions in digitalisation, automation and autonomy, all aimed at sustainably increasing process efficiency and intelligence. High-precision arable farming methods simultaneously conserve resources. That is a win both economically and ecologically—for the user as well.

How is collaboration in agricultural machinery organised between equipment manufacturers and suppliers?
Cooperation between agricultural machinery manufacturers and the supplier industry is often built on long-standing relationships. Component suppliers are a key factor in delivering high-quality, innovative machines and system solutions. Close, trust-based collaboration is essential, not least because the shared challenges are becoming more demanding—think of emissions legislation or questions of cybersecurity.

What technical capabilities and soft skills does a typical passenger car supplier need to successfully gain a foothold in agricultural machinery?
Blanket advice is always difficult. Structurally, agricultural machinery traditionally features a high diversity of variants and technologies, coupled with comparatively lower volumes. At the same time, the sector places great value on down-to-earth pragmatism. This combination enables challenges to be tackled quickly and effectively.

A distinctive characteristic of the sector is its exceptionally strong focus on manufacturer-independent technical interfaces and processes. Whether tractor and implement, or cross-system connectivity—for example during harvest—the aim is always to think beyond the ecosystem of one's own product or segment. ■

Source: Sarah Kastner

ABOUT THE PERSON

Dr. Tobias Ehrhard

is Managing Director of VDMA Landtechnik within the German Mechanical Engineering Industry Association (VDMA). VDMA Landtechnik represents a network of 180 leading companies in the European agricultural machinery sector.

TECH TRENDS

„The agritech industry is more connected“

Where does agricultural machinery stand today? Peter Fintl, Vice President Technology & Innovation at Capgemini Engineering, puts the framework conditions and technical trends for tractors, harvesters and more into context.

Interview by Hartmut Hammer

Source: Capgemini

Mr. Fintl, what conflicting pressures is the agricultural machinery industry facing at present?
Peter Fintl: The agricultural sector is caught between the hunger of a growing global population and, on the other hand, stress factors such as dwindling resources (land, water, fertilisers), increasing regulation and the sustainability debate, rising energy prices and trade barriers. The task is to generate higher yields with fewer resources. That can only be achieved with innovative, resource-efficient technologies, which offer the industry attractive growth opportunities.

Where can the agricultural machinery industry continue to grow in future?
The core markets for large agricultural machinery will remain North and South America and, to a lesser extent, Eastern Europe, due to high modernisation potential. Growth markets will continue to be India and Southeast Asia, while in Western Europe the market will move sideways at a high level. The main technical fields of the future are precision farming and digital farm management.

In which areas will traditional passenger car and truck suppliers have the best entry opportunities?
Clearly in the powertrain. Existing know-how can be transferred very well there, from the base engine to exhaust aftertreatment. Thermal management is almost even more important here across all powertrain variants than in road vehicles because many agricultural machines often run at rated load.

There will also need to be many innovations in electronics—from the on-board electrical system and data

ABOUT THE PERSON

Peter Fintl

is Vice President Technology & Innovation at Capgemini Engineering.

transmission through to the software-defined vehicle. Competent suppliers are in demand especially for topics such as autonomous driving, precision farming and the digitalisation of the farm. Even if the requirements differ in detail, object detection on the road must recognise children at play; in the field, it is more important to distinguish crops from weeds.

What different framework conditions do traditional passenger car and truck suppliers need to prepare for in agricultural machinery?
Cost sensitivity is even greater in agricultural machinery. Added to this are the very high availability and reliability of working machines—under sometimes extreme environmental conditions. These also require pronounced ease of operation and high cab comfort. In agriculture, the purchaser is typically also the owner and operator of the machine.

And in what ways do agricultural machinery manufacturers such as AGCO or John Deere operate differently from Mercedes-Benz or Volkswagen?
Compared with passenger cars and even trucks, tractor and harvester manufacturing is a low-volume business, albeit with far more versatile products. Agricultural machinery OEMs work with much more flexible technology platforms and E/E architectures to achieve economies of scale. The large-series mindset of product life cycles and model generations is less prevalent here.

Agricultural machinery OEMs place great value on their data ecosystem, which encompasses not only the various machines and their digitalised operation, but also data management including satellite-based functions, back-office functions and cloud solutions. On this front, the agricultural machinery industry is already thinking in a much more connected way.

Autonomous driving: will it be easier to realise in agriculture than on the road?
In the field, many of the disturbances and risk factors of road traffic (for example, other road users crossing your path or high speeds) are absent. You are working in a closed environment. That is why autonomous driving is easier to implement there—whether for a single tractor, for convoy operation during harvesting or for swarm-intelligent mobile robots. There is also a clearly defined business case behind autonomous driving in agriculture: less labour input and lower wage costs. Not least, agricultural machines offer sufficient installation space for the sensor suite, which is very similar to that in cars and trucks.

Will swarm intelligence catch on in the field?
Starting from electrified, smaller working machines, it depends on advances in electric drives in terms of energy storage and operating efficiency. It also requires a certain degree of robotic intelligence and environment perception. The core question is: can a machine hoe weeds or pick fruit as well and as cheaply as a human? Only then will its use be worthwhile.

What are the key differences between passenger-car and truck powertrains and those for agriculture?
Passenger car and truck powertrains are tailored to a much narrower application field than those for agricultural machines. A tractor must run for hours in the field at maximum load and be just as efficient in part-load operation, for example with a log splitter, or with varying load profiles on the road. The additional working functions together with auxiliary drives make the overall powertrain of the agricultural machine considerably more complex.

Source: Aldo Ferrero

Availability and reliability are basics for agricultural machinery, as seen here in the harvest operation.

What trends do you see in powertrain technology?
Core aspects are always the costs and the availability of the working machines. For that, the diesel engine is a very well-suited power unit because it covers a great many requirements. However, alongside the decarbonisation debate it is also subject to tightening emissions legislation, which leads to higher initial, operating and service costs and thus plays somewhat into the hands of the battery-electric powertrain. Hybrid drives and drop-in fuels for diesel are complementary options. Only if we pull out all the stops will agricultural powertrains become more environmentally friendly while remaining cost-competitive.

How realistic are alternative fuels as a substitute for fossil diesel?
HVO will become an attractive fuel for agriculture—available, well-priced and straightforward to handle. For some other e-fuels, I struggle to imagine that they will be available in sufficient quantities at attractive prices. For all bio- or e-fuels, much will depend on the framework conditions and incentives defined by policy-makers.

Where will battery-electric drives prevail in the medium to long term?
As batteries have already become significantly cheaper and will soon become much more capable, I see opportunities for electric drives in many applications for tractors and other self-propelled machines. Electric machines are robust and low-maintenance. However, not every duty cycle yet suits the electric drive, such as continuous heavy field work at harvest time. But for smaller jobs around the farm, in vineyards or in municipal applications, I already see opportunities today. ■

ECO-FRIENDLY DRIVES

What we do for green farming

Agriculture secures our food supply daily and is directly affected by the impacts of global warming. It is in all of our interests to limit carbon emissions in this sector as much as possible. Deutz AG contributes to this effort with its products and expertise.

Bert van Hasselt, CEO of the New Tech business unit at Deutz AG

Eco-friendly drive systems are a building block of 'green farming' and, in the future, will replace internal combustion engines that run on fossil fuels. It is not yet clear which drive technology will prevail in the market in the long term. Hydrogen in fuel cells and internal combustion engines provides propulsion with very low pollutant emissions, but the technology currently remains too inefficient, complex, and sensitive for tough everyday use. "ReFuels" are at least carbon neutral, but they are set to remain scarce for years to come.

We at Deutz AG believe that, in the medium term, electric mobility promises the best balance between environmental compatibility, suitability for everyday use, cost-efficiency, and technical maturity. Electric drives are low-noise and have zero emissions at the point of use, making them suitable for use in livestock facilities and residential areas.

A complete ecosystem

The Deutz New Tech business unit has a comprehensive portfolio of products and extensive expertise in battery-powered electric drives for agricultural vehicles. The company has evolved into a full-service provider through the development of its own technological expertise, augmented by acquisitions such as Futavis for battery management systems and UMS for the complete integration of electric-drives.

This ecosystem ranges from electric traction motors through batteries, power electronics, and software to charging solutions. Deutz is progressively digitalizing the drivetrain and enhancing it with additional customer-centric software functions.

Thanks to its more than 160-year history of building internal combustion engines, the company has a wealth of experience in designing and integrating drives and is very familiar with the requirements of specific vehicles. In addition, its comprehensive service net-

Telescopic handlers are pioneering applications for electric drives. Pictured here: a Magni telescopic handler with Deutz battery.

work – comprising more than 1,000 service outlets worldwide – is being steadily prepared for the switch to EVs. Experienced specialists with extensive training in high-voltage technology service the electric drives and perform any repairs that may be necessary.

Development in Energy Storage

For batteries, which are the centerpiece of electric drives, Deutz New Tech offers NMC (nickel manganese cobalt) and LFP (lithium iron phosphate) batteries, the two most promising types of battery chemistry at present. Thanks to LFP technology's increasing energy density, higher resistance to thermal runaway, lower cost, and longer cycle life, it appears to be catching up with NMC technology, which has been the preferred choice to date.

The company uses both types of battery chemistry to make batteries of various sizes and operating voltages up to 1,000 volts, offering customers a modular battery toolbox that can be tailored to customers' specific power needs and individual dimension requirements.

Semi-solid and solid-state electrolytes and new anode and cathode materials will cause further leaps in technology and significant advances in energy density. This will further increase the competitiveness of electric drives compared to diesel engines and facilitate deeper market penetration – also in respect of vehicles that require a lot of power when in continuous use.

Should the amount of energy stored in a battery be insufficient to keep a combine harvester, shredder, or other piece of machinery going, however, Deutz also offers swappable battery systems that facilitate the swift replacement of batteries and rapid provision of electrical energy. The company already supplies such swappable batteries for large excavators on a commercial scale.

A future full of energy

Deutz "Power Tree" is a mobile rapid charging system for farms, depots, or construction sites and complements Deutz´ batteries. It comprises a battery storage system complete with full charging infrastructure for 400- or 800-volt batteries with DC power of up to 150 kW.

The rapid charging system, which is housed in a 10- or 20-foot container, has a storage capacity of up to 256 kWh (up to 1 MWh in the future) and can be operated off-grid almost like a power bank or can be connected to the grid. The Power Tree enables having a DC rapid charging station set up on site with minimal effort. Machinery can be recharged in under 30 minutes.

If a farm generates its own electrical energy using photovoltaics, that energy can be stored in the Power Tree and used in the farm's own vehicles at an unbeatably low cost. Over the course of several projects, the company has successfully demonstrated which types of vehicles can be equipped with this technology.

For example, we fitted a high-performance battery in a telescopic handler manufactured by an Italian manufacturer. The telescopic handler is largely used in an agricultural setting and can therefore be routinely charged with the Power Tree. We have already agreed further trials for batteries and/or electric drives in telescopic handlers with other manufacturers.

Source: Deutz AG

Smaller tractors also have the potential to be electrified. In fact, Deutz has already installed batteries in a southern European manufacturer's vineyard tractors. Because they also serve as multifunctional equipment carriers for municipal purposes, small tractors are a promising area of application. But drive systems with a capacity of more than 100 kW are now also being tested in larger tractors for use on construction sites or in agriculture.

In around five to ten years, it will likely be possible to put electric drives into almost all agricultural vehicles, at least from a technical perspective. Whether the service life of the battery storage systems will then be sufficient for use in day-to-day operations remains to be seen. We are working hard on increasing storage capacity by using innovative cell and battery technology.

A further challenge going forward will be replacing hydraulic drives with electric solutions. This is because combining electric traction drives with, for example, hydraulic fluid cycles – such as for vehicle attachments – or mechanically driven water pumps is not necessarily practicable. In this context, electric high-voltage drives and actuators offer interesting potential for efficiency gains – provided they are similarly powerful.

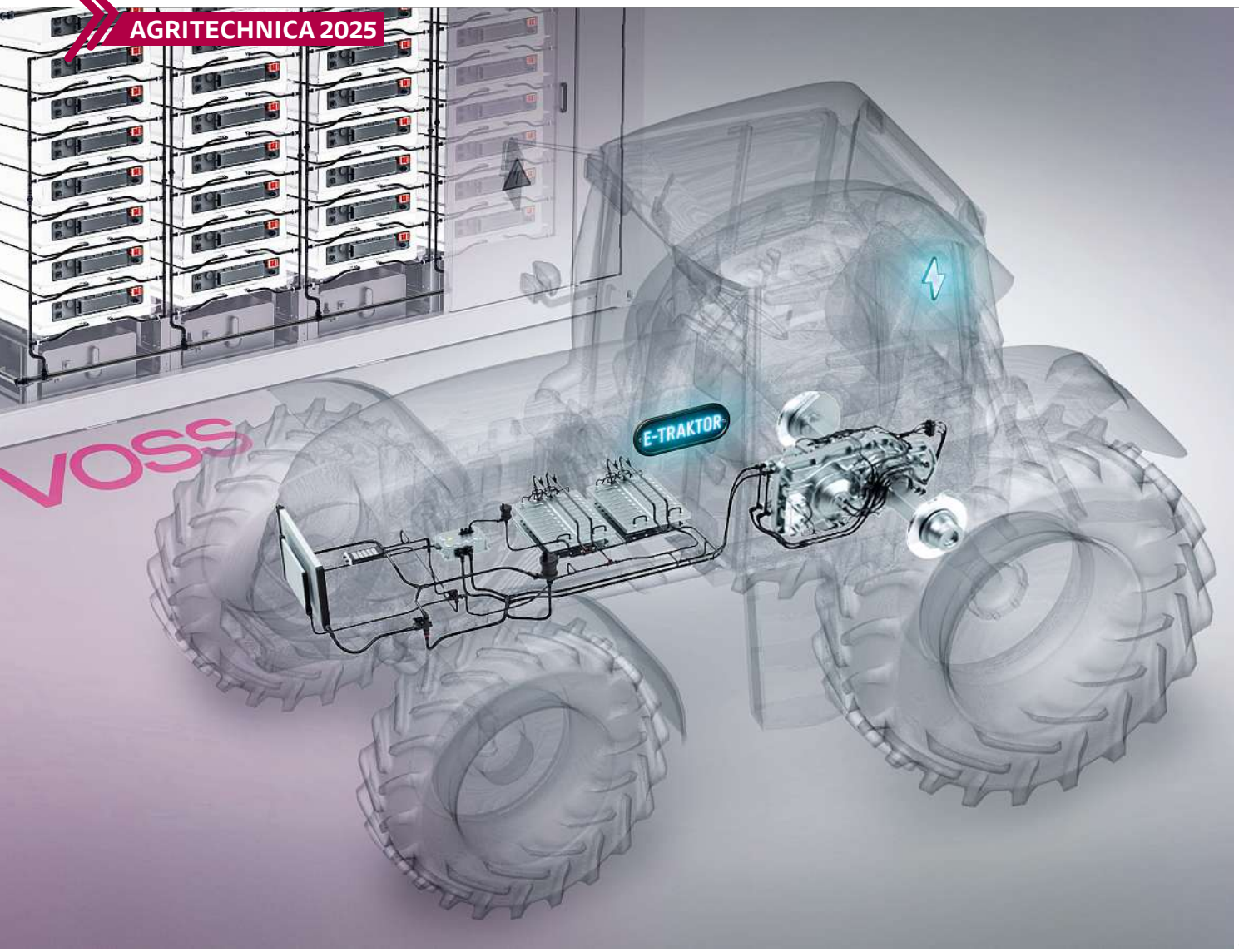
Keeping sight of the entire drivetrain

With its modular drive systems, battery systems, and charging systems, Deutz offers solutions for electrifying a wide range of agricultural machinery. The company keeps the entire drivetrain in mind and is able to fulfill individual requirements in terms of power output, installation space, and infrastructure.

Together with our partners and subsidiaries, we continually trial innovative solutions and – once their potential has been confirmed in practice – methodically develop them into products for volume production. ■

Source: Deutz AG

The modular Deutz battery portfolio comprises LFP and NMC batteries.



Source: Voss

Voss Automotive develops and manufactures line systems, connectors and valves for thermal management systems.

E-MOBILITY

Rethinking thermal management

Thermal management is a crucial interface between vehicle engineering, energy storage and sustainable operation in agriculture. The requirements go beyond conventional vehicle technology and call for holistic solutions.

Michael Ommer, Product Manager Thermal Management, Voss Automotive GmbH

The mobility transition brings new technical challenges, especially in thermal management: whether pass car or agricultural machine, the demands on temperature control for the battery, power electronics and cabin differ markedly by duty cycle. Cars, constrained by package, rely on compact, efficient systems focused on comfort and range, whereas heavy agricultural machines must operate reliably under extreme conditions.

As a system supplier, Voss Automotive develops and manufactures tailored technical solutions matched to each application – such as line systems, connectors and

Source: Voss

Modular valve systems mix or separate coolant flows as required.

valves for differing requirements. Voss thus supports the sector not only in optimising existing systems, but also as a partner in the electrification and transformation of modern agricultural machinery.

The electrification of agriculture is slowly gathering pace. While battery-electric drives are long-established in the automotive sector, the transformation of agricultural machines is still at an early stage. This is due, among other things, to the sector's specific demands: long operating hours, dust, vibration, extreme temperatures and low vehicle speeds at full load. With the right thermal management solution as a key technology, the future of agricultural engineering can be reshaped.

Battery cooling under extreme conditions

Electrically driven agricultural machines must operate reliably under extreme conditions. Stable battery temperature control is vital for performance, safety and service life. As there is no ram air for passive cooling, active systems such as pumps, fans and heat exchangers are indispensable. Added to this are long full-load operating periods, for example during harvest, which cause continuous heat build-up.

These demands make thermal management a key technology for a successful transition. Immersion cooling is particularly well suited: high-performance batteries are directly bathed by an electrically non-conductive fluid, enabling uniform temperature distribution – ideal for continuous operation in the field.

At the same time, this technology places specific demands on material selection: components must not only be electrically conductive, but also meet the highest standards for resistance to ion leaching. In practice, such systems ensure thermal stability even under high continuous loads and are therefore a central building block for the deployability of electrified agricultural machinery. A key part of these immersion-cooling systems are space-optimised connector systems.

They are rated for continuous temperatures from –40 °C to +85 °C and enable safe, intuitive assembly – both at initial installation and during maintenance. Their high mechanical robustness and media compatibility make them equally suitable for cars, commercial vehicles and agricultural machinery.

Valve technology as a key to efficient cooling circuits

In modern vehicles – whether cars, on-highway or off-highway – different cooling circuits must be precisely controlled and matched to changing operating conditions. Electrically actuated valves play a central role in regulating coolant flow and temperature.

Modular valve systems make it possible to mix or separate multiple flows on demand – for example between the battery, power electronics and cabin climate control. What matters is not only hydraulic performance, but also integration into the vehicle architecture.

Another technical aspect is media flexibility: depending on the working fluid (e.g. water-glycol, oil, refrigerant), the valves must meet specific material requirements. This is particularly relevant for multifunctional heating and cooling systems – for example, pre-heating batteries in winter or air-conditioning the cab during long summer shifts.

Thermal management as the link between vehicle and energy system

Alongside the electrification of agricultural and off-highway vehicles, energy storage solutions are increasingly coming into focus – such as stationary battery energy storage systems (BESS).

On farms, these storage systems can take on various tasks. They can store surplus photovoltaic power for on-farm use, or act as buffer storage for fast charging working machines without expanding the existing infrastructure.

A forward-looking approach for such storage systems is the use of second-life batteries: after the use in automotive applications, battery modules can be reused in BESS containers, which in turn have specific temperature-control requirements – for example regarding charge rates, safety and component longevity.

By deploying tailored thermal management systems, the interface between vehicle and stationary storage becomes an integral element of efficient technology transfer.

Sustainability as a transformation trend

Second-life batteries embody sustainability like few other products: instead of disposing of batteries, their life cycle is extended and used productively. The same applies to integrated line systems, which are designed for durability and can span multiple battery life cycles.

Beyond system architecture, the recyclability of materials is crucial. Design-for-recycling components, media-compatible line systems and detachable connections help conserve resources and improve the CO_2 footprint. Combined with efficient system design, ecological and economic goals can be better reconciled. ■

AGRICULTURE

Alternative drives for agricultural machinery in practice

What alternative drives exist for agricultural machinery and how practical are they? This was discussed by agricultural engineering experts at the beginning of July, who also sent a clear demand to the government.

Thomas Günnel

The Lower Saxony Chamber of Agriculture concluded that alternative drives for agricultural vehicles are often already suitable for everyday use, following the „Practical Day on Alternative Drive Energies for Agricultural Machinery".

In early July, agricultural engineering experts and employees from manufacturers and distribution companies met to showcase electrically operated wheel and telehandlers, feed pushers and barn cleaning robots, an electric feed mixer, an electrically operated rider machi-

At the „Practical Day on Alternative Drive Energies for Agricultural Machinery," companies showcased their vehicles.

Source: Wolfgang Ehrecke

ne for barn cleaning and feed delivery, a seed drone, e-tractors, and tractors with combustion engines powered by rapeseed oil and hydrogenated vegetable oil, HVO.

E-models sometimes cheaper in maintenance

„Especially for work in the barn and on the farm premises, as well as for tractors up to about 100 horsepower, electric drives are increasingly considered an interesting alternative to diesel engines," explained Harm Drücker, who heads the agricultural engineering, energy, building, and emissions protection department at the Chamber of Agriculture. Farms producing solar power could use it to charge their e-vehicles and e-machinery. „For agricultural machinery with higher performance, electric drives are currently not feasible – the corresponding batteries would be too heavy, and the required charging times too long," Drücker said. There is already a viable selection of e-models, especially for yard loaders, added Martin Vaupel, an expert in tractor and transport technology at the Chamber of Agriculture.

„Although electrically operated vehicles are generally significantly more expensive than comparable combustion models, we found in our yard loader test in 2023 that some electric models - assuming government subsidies and reasonably priced electricity from own photovoltaic systems – may surpass their combustion counterparts in economic efficiency."

Energy mix of electricity and liquid fuels

According to the Chamber of Agriculture, experts see very good chances of replacing combustion engines with electric drives in machines with lower power – this was made clear in the lectures during the Echem Practical Day. „Small and medium-sized agricultural machines will be battery-powered," said Ludger Frerichs, head of the Institute for Mobile Machines and Commercial Vehicles at the Technical University of Braunschweig. Frerichs foresees an overall energy mix of battery-electric and combustion engine-driven systems: „Every farm is different, and each must find its economically suitable energy mix."

„Fossil diesel has no future"

In addition to electricity, liquid alternatives to fossil diesel fuel will be highly sought after to achieve German and EU climate protection goals – the speakers also agreed on this, according to a statement. „Given today's technical possibilities, liquid renewable fuels will have the greatest importance in the near future for agriculture," said Hartmut Matthes, CEO of the Federal Association of Contractors. „This is especially true for higher performance classes of agricultural machinery, while farm vehicles and lower performance classes can be effectively used with battery-electric drives."

Fossil diesel fuel has no future – quickly and with impactful CO_2 reduction, the focus should be on plant-based fuels, especially HVO and biodiesel, emphasized TU lecturer Frerichs.

„Planning certainty is the basic prerequisite for the agricultural engineering industry," said Johannes Hipp, an agricultural engineering expert at the mechanical engineering association VDMA. Already today, the majority of machines are, for example, HVO-ready, meaning operators can easily switch from fossil to renewable fuels. Effective incentives for the use of bio-based and renewable energy carriers are the first step to initiating the transition in manufacturers and users, Hipp continued.

> *„However, this requires political will to finally take clear and decisive action regarding alternative fuels."*
>
> Johannes Hipp, Technical Speaker at VDMA

„However, the political will is needed to finally take clear and decisive action on alternative fuels." Agriculture itself could support the transition through appropriate cultivation planning, added Frerichs: „We only need a small percentage of agricultural land to replace fossil diesel in agriculture."

Important decisions on farms

Hartmut Matthes sees important criteria for implementing this energy transition in tanks and storage: „This begins with the possibilities for acquiring agricultural machinery and energy carriers – available models and suitable charging infrastructure must be considered," Matthes explained. „Furthermore, the impact of new technologies on production processes, such as compatibility with existing equipment, must be assessed."

Additionally, the effects on labor economy, such as refueling and charging processes and handling of energy carriers, should be considered. "Finally, the economic efficiency of alternative drive energies should be evaluated: This includes aspects such as investment costs and investment security, potential subsidies, impacts on competitiveness, and the ecological footprint of agricultural products."

Demand on the Federal Government

„The Practical Day shows that there are already available machines and a range of alternative drive technologies. There will be no return to vehicles operated solely with fossil fuels," said Agriculture Minister Miriam Staudte during the event. „When fully electric machines are charged directly via photovoltaics on the barn roof, it pays off twice: for the climate and the farm's wallet. Thus, the new federal government must implement appropriate funding instruments to promote momentum, innovation, and willingness to invest," argued Staudte.

The event was organized by the Lower Saxony Chamber of Agriculture, together with the Lower Saxony Ministry of Food, Agriculture, and Consumer Protection in Echem, Lüneburg District. ■

CONTROLS

From the road into the field

The requirements for control units in agricultural machinery differ from those in the automotive industry. This influences the choice of materials and design. However, suppliers can still leverage synergy effects.

Jürgen Jungert, Director Commercial Vehicles, Preh Group

Agricultural environments come with extreme conditions: dirt, dust, moisture, vibration, and significant temperature fluctuations. The need for robust agricultural machinery stands in stark contrast to the refined aesthetics and tactile precision often found in automotive control units. High-gloss surfaces and compact, sensitive actuation are desirable in certain automotive applications, whereas agricultural controls must be durable, offer tactile clarity, and provide clearly defined actuation paths to ensure reliable performance under demanding conditions.

Is it therefore contradictory for a supplier to develop automotive control elements and HMI systems for commercial vehicles? Or can these areas learn from and benefit each other?

Development of automotive control elements and HMI systems for commercial vehicles may include compound effects.

Source:Preh / KI-generiert

Platform Strategy

At first glance, the concept may seem contradictory given the highly specific customer requirements across sectors. A development team cannot easily address automotive surface finishes with finely tuned torque settings while simultaneously meeting the extreme robustness requirements of agricultural machinery. Despite these differences, there are clear points of convergence.

Haptic feedback and visual design remain critical factors for delivering a brand-consistent user experience – whether in passenger cars or commercial vehicles. Technologies that have been successfully implemented and validated in the automotive sector are selectively adapted to meet the operational demands of commercial vehicles. Concepts tailored specifically for the agricultural sector cannot simply be transferred from other areas; they require substantial in-house development.

Control Consoles in Agricultural Vehicles

Modern agricultural machinery encompasses a wide range of functions, and a modern control architecture must integrate these capabilities ergonomically and intuitively. In close collaboration with agricultural machinery manufacturers, Preh has developed multifunctional console systems based on a modular and flexible platform concept.

A core element is the multifunction lever, featuring a button layout that minimizes frequent repositioning during operation. Proportional valves for hydraulic control remain an important part of the design to ensure reliable and user-friendly handling.

In certain configurations, rotary knobs allow for multi-axis input for rotation, press, and tilt functions, enabling precise and efficient navigation. The underlying technology for these rotary controls is derived from automotive applications, allowing for partial technological transfer where appropriate.

Ultimately, these console systems serve as the interface between operator and machine. They consolidate control and monitoring functions into a cohesive, ergonomically optimized platform, facilitating intuitive and precise machine operation under diverse conditions.

Synergy benefits in Development and Manufacturing

Upon closer examination, synergy benefits between industries are not contradictory. However, experience shows that the development and manufacturing of HMI controls for passenger cars and agricultural machinery within a single organizational framework do not automatically lead to synergies. Individual components like multifunction switches or rotary controls can be adapted with manageable effort from a technological perspective. Nonetheless, increasing functional demands in agricultural machinery cockpits require distinct design approaches and development processes that differ significantly from those in the automotive sector.

Here, console systems have proven their effectiveness. Although they can integrate certain automotive-derived technologies, they are predominantly proprietary solutions tailored to the specific requirements of agricultural machinery. Preh's platform strategy enables modularity and scalability.

Collaboration with OEMs allows for products that meet real-world needs – both on the road and in the field. ■

> *„Functional demands in the cockpits of agricultural machinery require unique design approaches and development processes."*
>
> Jürgen Jungert, Director Commercial Vehicles

AGRICULTURAL TECHNOLOGY

AI and Robotics in Agriculture

Source: Wolfgang Ehrecke

The practical project „AI Real Laboratory Agriculture" focuses on artificial intelligence and robotics in agriculture.

How can artificial intelligence and robotics help in agriculture? This is being researched by several partners in practice in the "AI Real Laboratory Agriculture".

Thomas Günnel

Technologies such as artificial intelligence and robotics offer enormous potential to make agriculture more sustainable, describes Professor Tim Römer from the University of Osnabrück. Römer leads the new project „AI Real Laboratory Agriculture", RLA.

In this project, research companies and institutes from the regions of Osnabrück and Braunschweig aim to integrate these technologies into agriculture „to achieve a balance between productivity and environmental protection," says Römer. How exactly? By minimizing the use of water, fertilizers, and pesticides, thereby preserving the soil.

The project is being established, among other places, on an agricultural experimentation farm, the „FieldLab Agriculture". The farm will be expanded into a research location over the coming months. Additionally, the project partners intend to implement application-specific projects. In one project, for instance, they aim to investigate how data from smart cultivation equipment, drones, satellites, and robots can be used to determine plant diversity in fields.

Furthermore, they seek to answer fundamental questions: about the acceptance of new technologies, willingness to invest, economic viability, legal situation, and the

interests of individuals or investors involved in agribusinesses.

Project Location Lower Saxony

According to the University of Osnabrück, Lower Saxony is one of the most significant agricultural regions in Germany in terms of agricultural area and economic output of the „AgriFood" sector. This is one reason why the project is located here. The region between Oldenburg and Münster, with Osnabrück at its center, has developed into one of the most productive agricultural economic areas worldwide, particularly in livestock.

A strong SME sector is closely linked with the University and the University of Applied Sciences Osnabrück. In the Braunschweig region, crop farming predominates, with many research institutions specialized in agriculture.

Sponsored by the Volkswagen Foundation

The project brings together representatives from science, business, society, and politics—in both research and practical implementation. The project participants include the University of Osnabrück as the consortium leader, the German Research Center for Artificial Intelligence, the University of Applied Sciences Osnabrück, the Agrotech Valley Forum e.V., the Technical University of Braunschweig, the Johann Heinrich von Thünen Institute, the Leibniz Institute for Agricultural Engineering and Bioeconomy e.V., and the Network Crop Production Lower Saxony e.V. The project partners have access to fundamental research on AI, Data Science, and Robotics in Osnabrück and Braunschweig, with applications in the agricultural and food industry. The Volkswagen Foundation funds the project with 18.9 million euros over five years. ■

Source: Maschinenfabrik Bernard Krone

Smart mowing robots are a way to farm land more efficiently.

INNOVATION AWARD AGRITECHNICA 2025

These are the best innovations at Agritechnica 2025

The winners of the "Innovation Award Agritechnica" have been announced. The outstanding innovations range from smart farming to flywheel energy storage, drive management, and driver assistance systems.

Thomas Günnel

The German Agricultural Society has awarded the best innovations for Agritechnica 2025.

Source: New Holland

At Agritechnica, manufacturers and suppliers of agricultural machinery technology showcase their innovations. From 250 applications, the German Agricultural Society, the organizer of the fair, has awarded two gold and 22 silver medal winners.

Gold medals at Agritechnica 2025

Müller Landmaschinen GmbH & Aebi & Co. AG Maschinenfabrik receive a gold medal for the "Line Traction" product. The "Line Traction System" in the Aebi Terratrac replaces traditional differentials. Here, all four drive wheels of the vehicle rotate at the same speed. In cornering, the system adjusts the speed using proportional valves in the hydrostatic circuits. This reduces the stress on the turf and increases safety during maneuvers in sloping terrain, as there is less risk of slippage.

Claas receives a gold medal for a 70-ton square baler. In the press, a frame-integrated main gearbox allows direct power flow, while two flywheels, each storing around 200 kilograms of energy, support the stability of the press process. The system includes an intelligent assistance system that continuously detects and adjusts torques based on material characteristics. The adaptive control also ensures optimal driving speed depending on the current loads.

Silver medals at Agritechnica 2025

Same Deutz-Fahr Deutschland is awarded a silver medal for "Deutz-Fahr TAGS." The driver assistance system integrates well-known automotive technologies such as lane-keeping assists and collision warnings for tractors. It takes into account specific conditions of agricultural vehicles, such as the use of front and rear attachments and driving on roads without lane markings.

Another medal for **Claas** is for an adaptive drivetrain management system. The system optimizes the performance of tractors. It uses efficiency maps for the engine and transmission and learning algorithms. It remembers load requirements in the field and adjusts engine speeds to minimize consumption and optimize tractor operation. Additionally, the system offers features like "Auto Load Anticipation" to prevent performance losses.

Source: Claas

Claas has won a gold medal with its square baler.

Grimme receives a silver medal for the "Go-Clean Concept" — a hydraulically openable housing that allows easy access to machine components. This significantly reduces the cleaning time of tillers and prevents the spreading of soil pests between areas of use.

Lemken is awarded for "iQblue Fan Automation." The system automatically adjusts the fan speed of seed drills to match the current airflow required for the seeds. It monitors the intake air volume in real-time, ensuring efficient operation, reducing potential sources of error, and guaranteeing optimal material flow.

Rauch receives an award for "VarioSmart." The system enables precise adjustment of the rotational speed on the spreading discs of fertilizers. The right spreading disc can be targetedly regulated. This maximizes the distribution accuracy of the fertilizer at field edges and minimizes scattering losses.

The **Amazonen-Werke** are recognized for their "ZA-TS 01 AutoSpread." The fertilizer spreader uses radar and AI technology to autonomously control the direction and range of the throw. Spreading discs become redundant, the system can continuously adapt to changing fertilizer qualities and conditions.

Börger receives an award for "Bioselect RC250." The separator uses a "Multi Disc vario," enabling the adjustment of pressure, speed, and direction during the separation process. This flexibility leads to more efficient throughput performance, reduced energy consumption, and wear.

Einböck and **Claas E-Systems** applied with "SmartHill." The system uses a stereo camera to analyze the terrain and align the hoeing elements precisely. This allows reliable weed control even in hilly terrain. The system compensates for the slope and prevents drift.

Horsch receives a medal for its "Proactive BoomControl." The system uses 3D radar sensors to create detailed terrain models and optimize the control of plant protection sprayers. The anticipatory adjustment prevents faulty spraying processes and optimizes target area treatment.

Geringhoff is awarded for "Yield EyeQ." The system uses high-resolution cameras to capture harvest losses. It analyzes real-time data and allows dynamic optimization of machine settings.

Schumacher receives an award for the "EasyCut3 QuickFit Cutting System." It allows a tool-free design of the mower blades for easy replacement.

New Holland is awarded for "Corn Header Automation." The system reduces corn harvest losses through sensor adjustments. The sensor data dynamically control the picking rollers based on harvest conditions.

Arnold Next G receives a silver medal for "Duxalpha." The 3D track guidance system takes terrain heights and profiles into account during track planning. This allows more precise processing and more efficient use of agricultural resources through position-accurate adjustments.

The "Intuitu Smart Pressure Assistant" from **Nokian** optimizes tractor tire pressure to avoid soil compaction and improve traction. The new assistant uses tire sensors to determine the load during driving within minutes. It considers variables such as driving speed, vehicle configuration, and ground conditions, achieving accuracy of +/- five percent in 80 percent of cases, and provides tire pressure recommendations for road and field.

Condition monitoring and image analysis

Another medal for **Claas** goes to the "Jaguar 1000." The forage harvester is designed for high throughput performances of up to 500 tons per hour. It is roadworthy with an overall width of 3.30 m. The drum configurations of the V-Flex chopping drum are flexibly adjustable by exchanging ring segments and knives. A variable drive via quick couplers and a hydraulic drive with speed adjustment power the systems. The "Cemos Auto Header" regulates speeds automatically. Another assistance system monitors the knife condition and automatically reports the need for grinding. As header width increases, angle, load, and gyro sensors optimize the crop flow through hydraulic damping. This minimizes transfer losses and extends component life.

Krone receives an award for "OptiSet." Users can remotely set the spreading angle of all tedders of a rotary tedder centrally and synchronously at the touch of a button, steplessly between 13 and 19 degrees. The system also functions autonomously in automatic operation.

The **Amazonen-Werke** and **Sky Agriculture** receive an award for a similar product: "EasyMatch" fertilizer recognition using AI and "Fertieye-Smartphone Image Analysis." Easy Match uses AI and image analysis to create a digital fingerprint of fertilizer granules from a photo. With over 250 characteristics, the system compares this fingerprint with a fertilizer database – and provides pre-

cise settings for Amazone spreaders, even for unknown fertilizer products.

Ferti Eye combines simple sample preparation with optimized image analysis to individually analyze particles. It calibrates their color and geometry and calculates the ballistic flight properties—for a precise prediction of spreading range and quality.

Claas, **Fendt**, and **New Holland** receive a silver medal for products that determine the so-called Corn Silage Processing Score, CSPS, in real-time. This was previously only possible in the laboratory. CSPS stands for the degree of corn compression. "Cemos Auto Chopping," "ForageQualityCam," and "ForageCam" use cameras in the harvester tower to analyze the structure of the chopped material using AI and determine the corn breakage.

The AI first distinguishes between corn and plant residues and then measures the corn components. These are divided into fractions > 4.75 mm and < 4.75 mm and captured as percentages. The driver receives the CSPS data immediately on a display and can use it to adjust the cracker gap according to the harvest conditions.

Agritechnica Innovation Award Gold

The German Agricultural Society awards companies for innovative products at Agritechnica this year. Companies receive the "Innovation Award Agritechnica" in gold for a product with a new concept. The function must have changed significantly – leading to a new procedure or a substantial improvement of an existing process. Key factors include practical importance, benefits for operational and work management, improvement of the environmental and energy situation, and the impact on work facilitation and safety.

Agritechnica Innovation Award Silver

The Innovation Award Agritechnica in silver is awarded to innovations where a known product has been developed to such an extent that a substantial improvement in function and procedure is expected—without meeting all the requirements for a gold medal.

The criteria for awarding include the economic significance for practice, advantages in work performance and quality, better functional reliability, and positive impacts on the environmental and energy situation. Detailed information on the awarded products is available on the Innovation Award Agritechnica 2025 website. ■

SOCIAL MEDIA

The Agri-Influencer Award 2025

Source: Nina Kleine

With Nina „there's always a wink involved, and the account feels calm and approachable, like watching over the garden fence and chatting with the neighbors."

Agricultural influencers take their followers digitally to the fields, barn, or tractor cabin every day. The "DLG Agri Influencer Award 2025" honors individuals who authentically, expertly, and with wide reach bring agricultural topics into the digital space. This year's winners will receive their awards during the Young Farmers Party on November 14. On the same evening, the DLG will announce the rankings. These are the finalists.

Among the "DLG Best Agri Influencer In Germany" is Nina Kleine. Nina lives with her partner on his farm and shows her followers turkey farming, crop production, and life in the countryside. Topics such as fattening, potato harvesting, and other year-round activities are covered interestingly. "There's always a wink involved, and the account feels calm and approachable, like watching over the garden fence and chatting with the neighbors," describes the German Agricultural Society. Nina Kleine is from Münster in Westphalia and currently has around 40,900 followers. as **@hof_zur_haskenau**.

Patrick Danuser and his family live in the Rhine Valley, where they keep suckler cows, raise poultry for meat, and are involved in arable and vegetable farming. On Instagram, he speaks in Swiss German with German subtitles and good hooks, addressing his audience very authentically and humorously. Besides providing interesting insights into agriculture, he also covers topics like potato theft. Patrick is from Bad Ragaz, Switzerland, and currently has around 45,200 followers as **@danuser_hof**.

Philipp Pelzer manages a farm with his family, focusing on bull fattening, crop production, and energy generation. He has also been engaged in digital public relations for agriculture for years, including for the former Funk-format "Hundred Hectar Hometown." With humor, he incorporates memes and social media trends, adapting them to the green sector, and explains his work understandably for outsiders. Philipp is from Rahden in North Rhine-Westphalia and currently has around 55,400 followers as **@philipps_farmlife**.

In the "DLG Best Agri Influencer International," Franco Speranza is included. Franco is a young farmer working with his family in crop farming. On social media, he showcases this work, sometimes embellished with motorsport events. His content comes across as approachable and light-hearted through friendly interactions with followers. Franco is from Bell Ville, Argentina, and currently has around 228,000 followers as **@franco_speranza**.

Noah Young and his wife founded their own farm, demonstrating gardening, animal husbandry, regenerative farming, and modern family life in the countryside, while also addressing industry issues. His account successfully bridges the gap between producers and consumers with engaging, witty, and, above all, creative storytelling. Noah is from Kenesaw, Nebraska, USA, and currently has around 744,000 followers as **@TheShilohFarm**.

Tom Carlisle and his family run a farm in Northern England with sheep, fodder production, and agritourism. On Instagram, he has developed his own humorously warm-hearted approach to showing his daily agricultural life and work. For example, he writes and performs songs on current topics or turns the herding of lambs into a humorous competition as a sports commentator. Tom is from Cracoe, UK, and currently has around 32,400 followers as **@DalesFarmer**. *(thg)*

IMPRINT

AUTOMOBIL INDUSTRIE

www.automobil-industrie.vogel.de

Reader Service

automobil-industrie.de/hilfe
or an e-mail to
vertrieb@vogel.de mit Betreff „Automobil Industrie".
Please include your customer number from
the address label: *CS-1234567*

Editorial service

Editorial enquiries:
Phone +49 931 418-2333
fachmedien@vogel.de

Editor-in-chief:
Claus-Peter Köth (kt), V.i.S.d.P.

Editors:
Thomas Günnel (thg), Sven Prawitz (sp)

Freelance Editors:
Hartmut Hammer, Tina Rumpelt, Gerald Scheffels

Conceptual Design & Layout:
Alexandra Geißner

Spellings, names of firms and products:
In general we follow the recommendations in Duden.

Legal disclaimer:
The content of individual articles is the responsibility of the authors named and does not necessarily reflect the opinion of editorial staff. Although all published material is checked carefully, no liability can be accepted for possible inaccuracies. No part of this publication can be reproduced in any form or, with the help of electronic systems, processed, copied or distributed, without express written permission.

Sales

Director Sales:
Annika Schlosser
Phone +49 931 418-2982
sales@vogel.de

Order Management:
ordermanagement

Distribution

Circulation Audit:
Member of the Informationsgemeinschaft zur Feststellung der Verbreitung von Werbeträgern – Sicherung der Auflagenwahrheit.
Our current statistics are at: www.ivw.de

ISSN 0005-1306

VOGEL COMMUNICATIONS GROUP

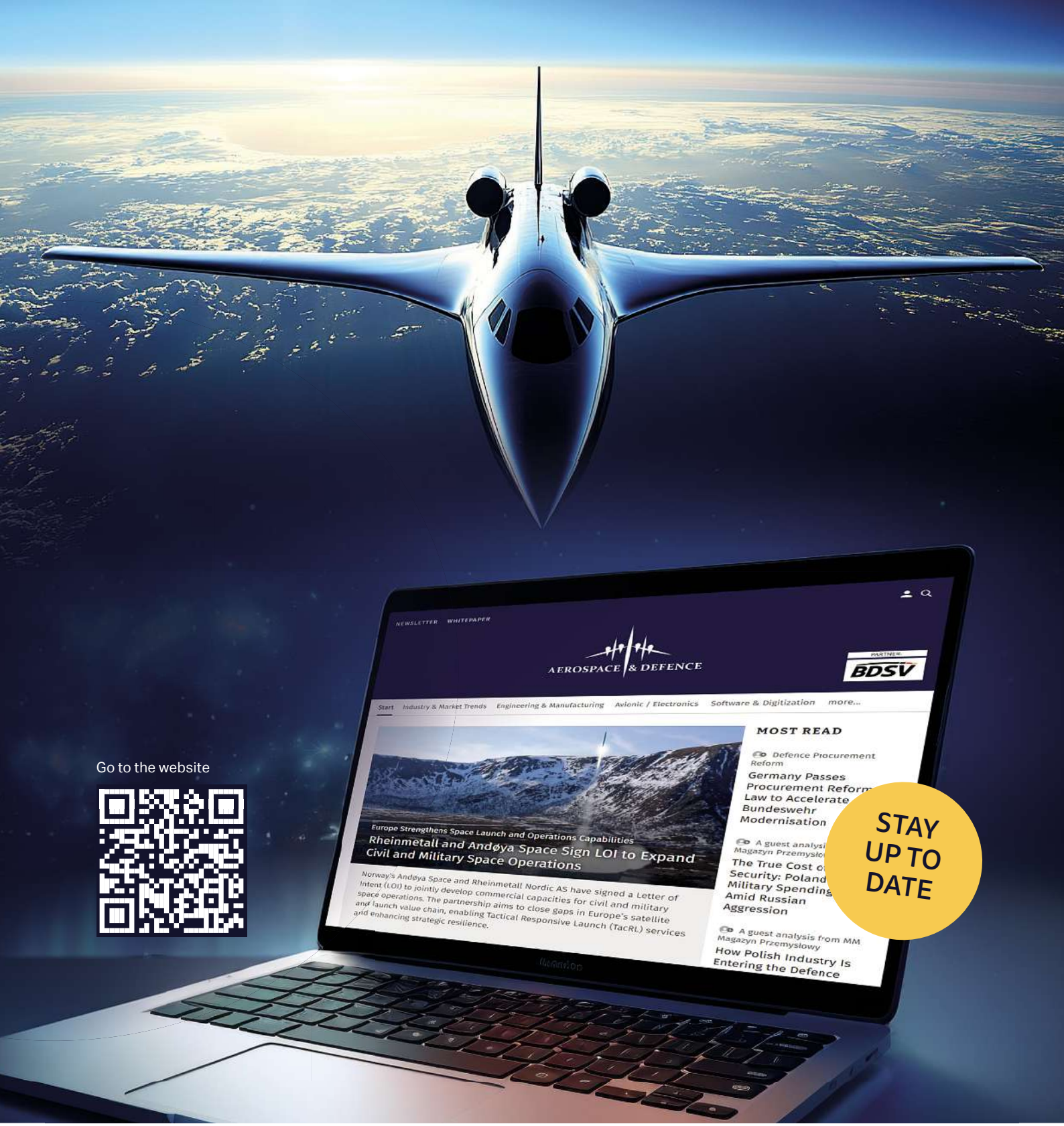
Vogel Communications Group GmbH & Co. KG
Max-Planck-Str. 7/9, 97082 Würzburg, Germany
Phone +49 931 418-0
www.vogel.com

Ownership:
Full liability:
Vogel Communications Group Verwaltungs GmbH
Max-Planck-Straße 7/9, 97082 Würzburg, Germany
Limited partners:
Dr. Kurt Eckernkamp GmbH,
Nina Eckernkamp, Klaus-Ulrich von Wangenheim,
Heiko Lindner, Axel von Kaphengst

Managing Directors:
Matthias Bauer (Chairman), Dennis Hirthammer,
Günter Schürger

Print:
Hoehl-Druck Medien + Service GmbH
Gutenbergstraße 1, 36251 Bad Hersfeld, Germany
Printed on PEFC-certified paper
Printed with mineral oil-free inks

Questions about product safety:
produktsicherheit@vogel.de



AEROSPACE & DEFENCE – THE PORTAL FOR INNOVATION AND SECURITY

Explore the latest innovations in the aerospace and defence industry on our international platform.
Benefit from in-depth analyses, exclusive insights, and extensive expert knowledge.
Connect with industry leaders and help shape the technological future of Europe with us.

www.aerospace-and-defence.com

AEROSPACE & DEFENCE is a brand of VOGEL COMMUNICATIONS GROUP