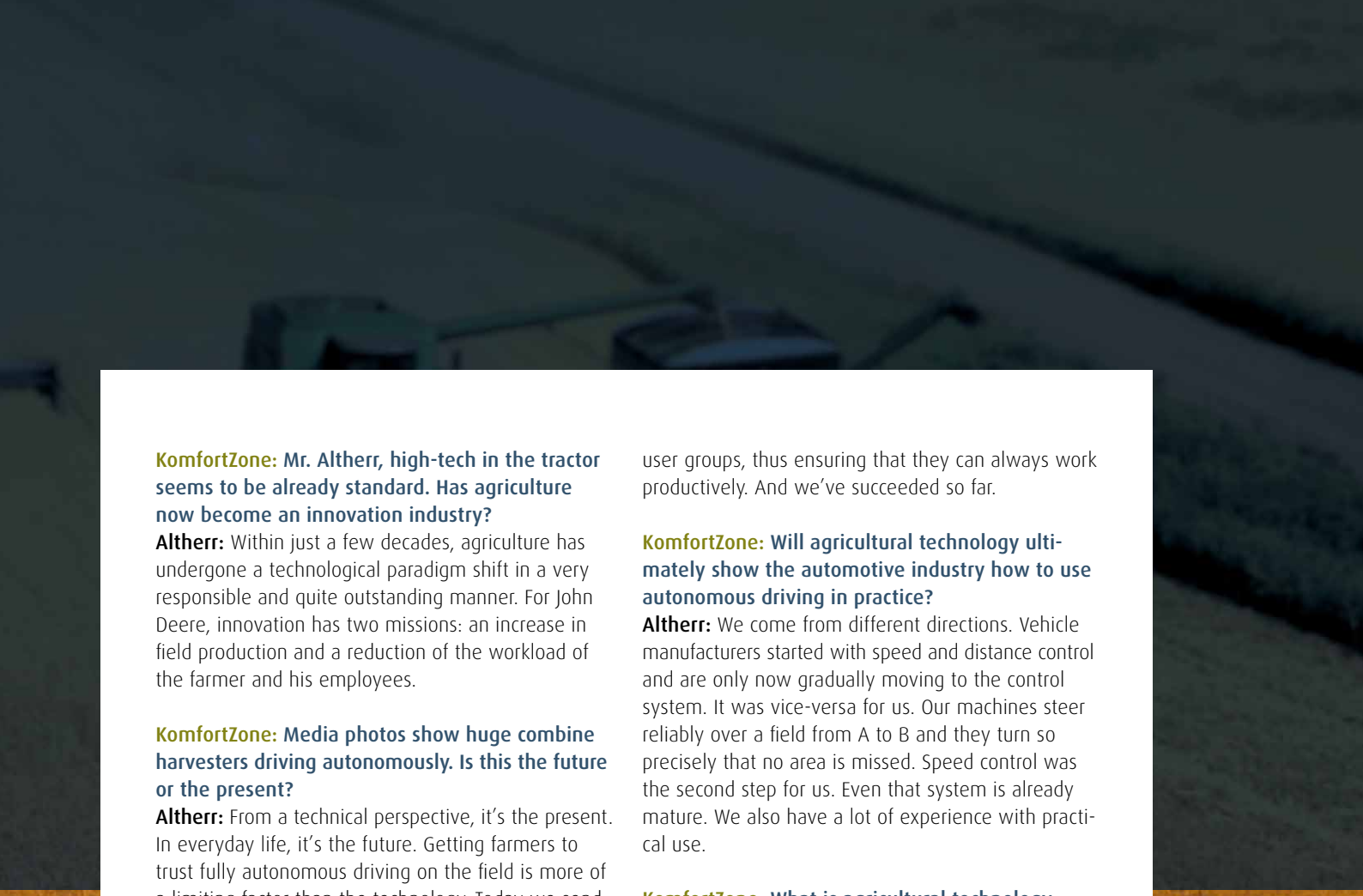
Agriculture runs alone

A traditional industry became a pioneer to sustainably increase its yields... and autonomous driving has long been a "fait accompli" in agriculture. There is hardly anyone who has a better idea of what the future holds for technical possibilities than August Altherr, Director of the European Technology and Innovation Center (ETIC) at Deere & Company. KomfortZone talked to him about autonomously-operating tractors, intelligent field work and the weather.



KomfortZone: Mr. Altherr, high-tech in the tractor seems to be already standard. Has agriculture now become an innovation industry?
Altherr: Within just a few decades, agriculture has undergone a technological paradigm shift in a very responsible and quite outstanding manner. For John Deere, innovation has two missions: an increase in field production and a reduction of the workload of the farmer and his employees.

KomfortZone: Media photos show huge combine harvesters driving autonomously. Is this the future or the present?
Altherr: From a technical perspective, it's the present. In everyday life, it's the future. Getting farmers to trust fully autonomous driving on the field is more of a limiting factor than the technology. Today we send out smaller self-driving machines mostly for weeding.

KomfortZone: The automotive industry is aiming for more safety, environmental friendliness and time efficiency from autonomous driving. Does agriculture also see these as ultimate objectives?
Altherr: Sustainability, efficiency and safety are always on our agenda. However, our overriding objectives are much more specific, and these are to reduce workloads through data management and to increase productivity through precision. Farmers today are highly-skilled entrepreneurs, they manage an operation with a modern machine park – and as a part of smart farming, autonomous driving is an increasingly important profitability factor.

KomfortZone: So the future is only high-tech, even for agriculture?
Altherr: We must first ascertain who drives or monitors the machine. If it's the farmer himself, he needs comprehensive records, data etc., and he can also handle complex IT. If it's a less well-trained employee, he must still be able to start and operate the self-driving forage harvester with hardly any tuition. That is our challenge as manufacturers: to satisfy both user groups, thus ensuring that they can always work productively. And we've succeeded so far.

KomfortZone: Will agricultural technology ultimately show the automotive industry how to use autonomous driving in practice?
Altherr: We come from different directions. Vehicle manufacturers started with speed and distance control and are only now gradually moving to the control system. It was vice-versa for us. Our machines steer reliably over a field from A to B and they turn so precisely that no area is missed. Speed control was the second step for us. Even that system is already mature. We also have a lot of experience with practical use.

KomfortZone: What is agricultural technology doing better?
Altherr: We have completely different conditions, so we can't say we're doing something better. The situation on a field is simpler. It can be measured and assessed by sensors much better than rapidly-changing city traffic. Our products always have a high economic impact as well, so they get to the market faster.

KomfortZone: What direction will the development of John Deere take?
Altherr: Technically, we are already very advanced. The first two stages of autonomous driving on the field have already been implemented. And the third stage, where the vehicles move with virtually no driver or human intervention is technically very advanced. Safety with respect to detecting and identifying obstacles is still an issue, but we're not under any time pressure. Today we're focusing much more on using the intelligence of the machines. Like working without unnecessary overlaps in the reduction of pesticide consumption, or by making the spreading speed of slurry dependent on its nitrogen content. We're also working on the self-learning machine: it learns work sequences and repeats them autonomously.

KomfortZone: In your opinion, what tasks will vehicle interior design have to tackle in agricultural technology?
Altherr: The field of view analysis and seating design will have a whole new quality level. The farmer won't always face forwards, as is the case in cars. His seat will rotate by up to 180 degrees. The operator often looks back for long periods to monitor the machine's line, or he looks to the right and left on the field. It would be exciting to show him that information in the direction he's looking, perhaps with head-up displays. In any case, we must make sure that the view is unobstructed and information can be easily absorbed. So ergonomics plays a major role here. Exchanging ideas about situation awareness with the automotive industry would also be interesting.

KomfortZone: What will the future bring for the driver's cab and the dashboard?
Altherr: A tractor with 15 different displays is a nightmare for me. John Deere will always offer a clear display that shows exactly what is important. Entertainment will also be provided for any employee who doesn't need an office in the driver's cabin – and that will help him to stay focused. In that respect, we're also shoulder-to-shoulder with the automotive industry.

KomfortZone: What would the next technological breakthrough for agriculture be?
Altherr: Optimizing local weather forecasts to make better use of the relevant time windows. We would also bring more rain if we could... but that wouldn't impress my friends very much!

KomfortZone: Mr. Altherr, thank you for the interview

August Altherr heads the European Technology and Innovation Center (ETIC) at Deere & Company.

Deere & Company is one of the world's leading agricultural machinery manufacturers and is one of the most globally-prestigious companies. The John Deere GmbH & Co. KG is Germany's largest agricultural machinery manufacturer, employing around 7,000 people at six sites. At ETIC, engineers, IT and marketing specialists work on "intelligent solutions" for precision agriculture (Intelligent Solutions Group) and on future technologies.

Status quo: Precision agriculture

The farmer enters his field borders electronically on the MyJohnDeere site. These act like an electronic fence for each machine. Position finding can be as accurate as 2.5 cm. The cooperation of two machines can also be cycled. One machine, the forage harvester, is the master; the slave tractor with the trailer always keeps the same distance from the master and drives at the appropriate speed. But the machine doesn't just drive, it also works and thinks for itself. For example, it reacts independently to additional data: If slurry is to be spread, the machine measures the nitrogen content and drives faster or slower according to the results. In the case of plant protection products, the usual 10% track overlap is now unnecessary. That means a 10% reduction in both pesticides and costs, plus more sustainability. Sowing can also be monitored "seed-by-seed".

Status quo: Reducing workloads thanks to intelligent machines and data management

For the farmer, driving is only one basic function. If the machine drives itself, he can monitor the operation on the field much better. John Deere is performing research on more aids, like the learning machine that can carry out a work sequence itself after "seeing it done" only three or four times. The networking of machine and data is yet another topic: In future, the John Deere system will evaluate weather information and make it available for work planning – this will increase efficiency and productivity. Fertilizer is most effective when it rains shortly after it has been spreading – but the opposite is the case for plant protection products. Hay and straw in the fields must be dry when taken in, so no rain for a while is ideal. The intelligent systems in the vehicle also support the farmer with legally-imposed documentation, from the use of fertilizers to recording working time.