



# Media Service

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## **Agritechnica Innovation Awards 2019: Innovations Jury awards one gold and 39 silver medals**

### **A total of 291 innovations registered**

(DLG) The DLG (German Agricultural Society), organiser of Agritechnica, today announced the winners of the Agritechnica Innovation Awards. Overall, the DLG Innovations Jury recognised one innovation with the Agritechnica Gold Innovation Award 2019, and 39 innovations with the Agritechnica Silver Innovation Award 2019. The full list of awards follows:

### **Agritechnica Gold Innovation Award 2019**

- **eAutoPower gearbox e8WD for 8R large tractors**  
**John Deere (Walldorf), Hall 13, stand C40**  
*Joint development with JOSKIN, Hall 4 C12*

Stepless transmissions with a hydrostatic-mechanical power split have been used in agricultural tractors for over 20 years. Up until now, additional generators for electric drives with a higher power requirement were installed on tractors (fan, compressed-air/air conditioner compressor, etc.) or on implements.

The eAutoPower gearbox for the new 8R large tractors from John Deere represents the first electro-mechanical power split gearbox in agricultural technology. Technically, the hydro unit (pump/motor) is completely dispensed with; instead, two electric motors are used as a continuously variable actuator. The electric motors have been specified so that they not only supply the drive, but can also provide up to 100 kW of electric power for external consumption. The resulting possible tractor-implement electrification is demonstrated with a system solution for spreading manure developed together with Joskin, where two axles on a tridem spreader are electrically driven.

On the tractor side, this electrical integration results in improved gearbox efficiencies and reduced maintenance costs. In addition, the surplus power flows occurring at certain operating points can be "tapped" when utilising electric power for external electrical components, which further improves the overall efficiency. Used in combination with an axle drive on a manure spreader, the results in practical use include, among other things, higher traction, reduced slip and improved track guidance on side slopes.

### **Agritechnica Silver Innovation Awards 2019**

- **Fendt IDEALDrive**  
**AGCO International, Hall 20, stand B14**

While harvesting threshing crops, the steering wheel and the steering column impair the view of the harvested crop being pulled-in directly in front of the inclined conveyor. This is particularly true under difficult harvest conditions. Problems with crop flow recognised too late result in the consequence of possible clogging and downtime, and of overall threshing output.

With the Fendt IDEALDrive, AGCO provides an unobstructed view of the area directly in front of the combine harvester by dispensing with the steering column and steering wheel. The driver's seat is equipped with a left-hand armrest with a joystick. All the functions of the steering column – from the steering wheel to the turn signals – are integrated in it. The intensity of the steering commands are conversely proportional to the driving speed, increasing safety when driving on public roads at up to 40 km/h. The system meets the EU requirements for road approval.

The IDEALDrive is the first self-propelled agricultural machine completely operated with a joystick. In addition to the improved view, the manoeuvrability and operating comfort during harvesting work, and the overview when driving on public roads, and with it the safety, are increased. All in all, as in the construction machine sector, the system makes a contribution to increasing the efficiency of combine harvesting.

- **Automated Vehicle and Implement Guidance in Wine-Growing  
Fendt, Hall 20, Stand B14b**

***Joint development with  
Braun Maschinenbau, Hall 20, B14f***

Operating farm machinery under vines requires a high level of concentration from the tractor driver. The tractor must be steered precisely, while at the same time monitoring and controlling the implements.

The automated vehicle and implement guidance system jointly developed by Fendt and Braun considerably increases output in wine-growing tasks – while simultaneously reducing the strain on the driver. The ground contour, vines, poles, etc. are recorded using laser technology and the information is passed on to the Fendt 200V Vario narrow-track tractor via an ISOBUS interface. Furthermore, the 3D position is determined with a gyroscope and the tractor assumes the track and implement guidance based on this information. The height and width of implements mounted on the left and right between the axles can be controlled independently of each other, however the system can also be used for the lateral guidance of rear mulchers.

The combined tractor/implement control system therefore simplifies the operation of farm machinery under vines. In addition to reducing the strain on the driver and increasing output, more exact guidance of these tools also enables the reduced use of other crop protection measures.

- **398 MPT High Speed Flotation Truck Tire  
Alliance Tire Europe, Hall 4, stand C28**

Agricultural trucks, with drive and chassis technology designed for off-road use, are becoming increasingly important in European agriculture and forestry. Up until now, no suitable tyres were available for the rear axles of a large number of these vehicles where the inflation pressure could be reduced to a reasonable level in the field, while also allowing driving speeds of more than 65 km/h on the road at a higher inflation pressure.

The Alliance 398 MPT now enables fast driving on motorways and expressways and, due to the tread design and reduced tyre inflation pressure, offers excellent traction and reduced loading of the ground in fields and off-road. The design, with steel belts and a steel body, enables low heat-up at high driving speeds, driving safety and flexible adjustment to terrain with a reduced tyre inflation pressure.

With tyres like the Alliance 398 MPT, the border between arable land and asphalt is more "permeable", i.e. the lorry technology, which is considerably more energy-efficient on the road compared to tractors, can in some cases also be used for agricultural transport on fields under the more difficult ground conditions there.

- **AmaSelect Row**  
**AMAZONEN-WERKE, Hall 9, Stand H19**

When hoeing row crops, the areas between the rows are processed, however the longitudinal spaces between the plants are not.

Currently, this gap in weed control cannot be closed with purely mechanical methods, however this is possible with a combination of special boom sprayers. Here the operating conditions of both systems must be seen as rather contrary. The hoe operates optimally under dry conditions and the crop protection agents are more effective with corresponding soil moisture.

The AmaSelect Row System enables the user to switch over from area application to boom application, without conversion measures and at any time, with a "standard" field sprayer in field operation in various row crops (sugar beets, maize, potatoes, etc.). For this purpose, the AmaSelect 4-fold nozzle body offers a 50 cm partial width switching and nozzle positions at a 25 cm and 50 cm distance with flexible switching of each individual nozzle. This unique nozzle body design enables row referencing with both 75 cm and 50 cm row widths without conversion measures. A nozzle configuration for the individual farm is equipped and programmed depending on the row width of the crops. The system can be switched over from boom application to the usual area application as desired at the press of a button. The desired application quantity for areas and boom application is stored in the control terminal. As a result, the application quantity is automatically adjusted during a function change, preventing overdosing in the boom.

The basic condition for boom application with this method is, of course, the exact position of the cultivated crop being captured during sowing by means of RTK, as well as exact track guidance. In addition, optimum boom positioning is assumed, as a combination of spraying angle and distance from the ground determines the width of the spray band. Using the special nozzles with a 40 degree spraying angle, a spray width of 25 cm results when it is 35 cm from the ground. This, of course, can be varied depending on the boom height.

Traditionally, boom spraying is often combined with mechanical weed control. With AmaSelect Row a decoupling of the two methods is achieved; each system can be optimally run accordingly, enabling the performance of both systems to be optimally utilised. As a result, the amount of crop protection agents used in row crops is considerably reduced without a loss of performance. That lowers costs while protecting the environment.

- **EasyMix**  
**AMAZONEN-WERKE, Hall 9, stand H19**

Significant amounts of mixed fertilisers are prepared at decentralised locations with the objective of using inexpensive individual fertilisers while at the same time applying several nutrients in the desired ratio. Apart from some mixed fertilisers

produced as standard with a defined nutrient ratio and defined initial components, up until now there have been no aids, e.g. spreading charts, for the majority of these customised fertiliser mixtures that would enable fertiliser spreaders to be optimally adjusted in accordance with the properties of the mixture produced.

With the "EasyMix" app from Amazone, used with the company's two-disc spreaders, it is now possible to estimate the lateral distribution of the individual components and to determine the optimum fertiliser spreader adjustment for the mixture before it is produced. This is achieved by entering the planned mixing components, the fertiliser spread properties and the desired working width. Alternating effects of the individual components on the spreading disc and their varying flight behaviour are taken into account when determining the expected spreading quality.

As a result, the app reduces the danger of uneven nutrient distribution resulting from unsuitable mixture components, an excessively large working width or an incorrect fertiliser spreader adjustment.

- **Automatic All-Round Strapping Trolley  
Agrarsysteme Hornung, Hall 4, Stand A54**

Careful securing of loads is crucial when transporting agricultural bales, but the manual securing of loads with belts involves a high degree of risk for the operator and takes a great deal of time that is in especially short supply during harvest. The all-round strapping trolley from Agrarsysteme Hornung automates the proper securing of loads with straps with comparatively little effort, and requires less than 60 seconds to do so. The automatic lashing straps can be positioned as desired on the trailer. Swing arms at the front and rear wall lay the straps over the load. Then they are automatically tensioned. This securing method also functions with partial loading and imprecisely positioned bales.

Despite tight time schedules, this enables the driver to comply with the requirement to secure the load, while the danger during lashing and for other road users when driving on public roads is considerably reduced.

- **3D Varioflex  
BISO, Hall 5, stand E28**

Additional crop rotations with a higher share of legumes require cutting systems with flexible cutterbars to harvest the crops located close to the surface of the ground with the lowest possible pick-up losses. However, these cutting systems have to be suitable for both grain and rape, as is customary for the ordinary auger cutting systems with a variable cutting table length.

With the 3 D Varioflex cutting system, BISO has combined the advantages of a flexible cutter bar with a variable cutting table length for the first time. The cutterbar is height-adjustable over a total of 25 cm and the contact force of the cutterbar on the ground is measured with force sensors in its parallelogram carriers. The contact pressure range can be adjusted from 0 to 50 kg, so that the carriers connected at the rear with the frame actively guide the cutterbar over bumps in the ground. The vertical movements of the variable cutting table benefit from scale-like overlapping guide plates.

BISO presents provides farmers with an auger cutting system with active adjustment of the cutterbar to the ground for the first time. It can be used instead of a conventional cutting system with a variable cutting table length and a flexible cutting system, therefore reducing costs.

- **APS Synflow Walker**  
**CLAAS, Hall 13, stand C02**

The threshing output of walker combine harvesters cannot be further increased by enlarging the threshing and separating units, as the volume of the machines, and the width in particular, are limited. Consequently, up until now the tangential threshing unit in walker combines was supplemented with a separator drum located downstream of the threshing unit or an upstream pre-accelerator drum. However, each additional drum increasingly destroys the straw and reduces the accessibility to the threshing and separating concaves.

With the APS Synflow Walker, Claas combines the two threshing and separating systems. The familiar accelerator follows a threshing drum increased in diameter to 75.5 cm. An additional separating drum with a 60 cm diameter separates residual grain from the straw, and is followed by the impeller. As a result, despite the reduced threshing concave wrap angle, threshing path length has been increased compared to the previous model. The harvested crop therefore flows straighter in an energy-saving manner that is gentle to the straw. All rotating speeds and concave gaps are synchronised, eliminating the need for additional adjustments, and the intensive threshing segment can be activated with a switch. The threshing and separating concave parts can be pulled out to the side on a tangential system for the first time, which greatly reduces the conversion effort between crops.

The APS Synflow Walker, therefore, increases the threshing output and is gentle on straw, while at the same time improving the quality of work achieved by the tangential threshing and separating system.

- **CEMOS Auto Chopping**  
**CLAAS, Hall 13, stand C02**

Changing the adjustment of the counter-blade and friction bar to match the various properties of straw is frequently neglected, as the combine harvester must be stopped for this purpose. Even when an opportunity for adjustment arises during harvesting work, the operator often lacks the required values for optimising of the control settings according to their agronomic goals.

With CEMOS Auto Chopping, Claas has, for the first time, automated the optimisation of the crop-dependent adjustments of a straw chopper. Sensors in the inclined conveyor measure the straw moisture level. The material layer thickness in the inclined conveyor also serves as an input signal for the automatic unit. As a result, the chopper settings are continually adjusted to the harvesting conditions; on areas with a higher straw moisture level, chopping is more aggressive. Using a slide switch, the operator only specifies the area between the maximum chopping quality and the maximum system efficiency in which the system is to operate. In addition, the system also offers a cleaning and safety function. When material flow is measured, the counter-blade and friction bar are moved back and forth for cleaning, and they swing out in case of a threat of short-term overloading.

With CEMOS Auto Chopping, as much power as necessary, but as little as possible, continually flows to the straw chopper. That saves fuel while at the same time offering advantages for both arable farming and crop growing.

- **CEMOS AUTO Performance**  
**CLAAS, Hall 13, C02**

This system is a combined engine output/forward speed control on forage harvesters.

Capacities and engine powers of forage harvesters have increased during the past few years. Yet, the full engine power that is currently available on a high-performance harvester is only exploited to the full when there is good supply and constant flow of maize or wholecrop silage into the machine. However, only 500-600hp is needed when harvesting wilted silage. Running the engine at full power when this is not required by the work at hand needlessly increases fuel consumption.

CEMOS AUTO Performance matches engine output to the work at hand by altering the power curve. In the field, the operator starts the assistance system and selects an engine speed, a forward speed and one out of 10 engine power curves. After the autopilot is started, the forager and the tractor trailer combination start working. The preset engine speed is accepted directly by the forager and is maintained by the automatic control system. When it turns out that the preset power output is too high for the present crop, the system automatically switches to a lower and more efficient output range while maintaining the current forward speed and engine speed. Vice versa, the system switches to a higher output range when harvesting higher-yielding stands.

The automatic engine output control eases the strain on both the forager and driver in a very convenient way, and leads to environment-friendly fuel savings of up to 15 percent.

- **ISOMAX**  
**CNH Industrial Italy, Pavilion 11, stand C01**  
**Joint development with**  
**OSB AG, Pavillon 11, Stand C02**  
**Fliegl Agrartechnik, Hall 04 Stand A40**  
**Competence Center ISOBUS, Hall 27, stand G33**

The major challenges in implementing new ISOBUS applications are high hardware costs, the cost for software development and the lack of knowledgeable graduate engineers. In particular, the industry lacks an innovative start-up scene of electronics-savvy professionals, pupils and students who are keen to develop marketable solutions that will turn ISOBUS into an integrating and central element on agricultural machines.

ISOMAX from AGXTEND (trademark) represents a new solution for future ISOBUS applications. The fully AEF (Agricultural Industry Electronics Foundation)-certified system is universal, comprehensive and comprises all elements including the connector and the ECU. ISOMAX can be operated via any ISOBUS terminal. As such, it allows owners of older implements to retrofit these with the technology and connect it to the tractor's ISOBUS system. The open-source ISOBUS Dev Kit allows electronics-minded farmers, pupils, students and also electronic professionals to develop ISOBUS-compatible solutions at very little cost. As ISOMAX provides automatic implement recognition and the ISOBUS "TC-GEO" function, it does not require operators to enter the data manually. In addition, it provides the basis for implementing precision farming. For example, the machine dimensions are automatically communicated to the tractor's steering system. A built-in MEMS (micro electro-mechanical systems) sensor logs reliable field and road times, and actual working hours. It is also possible to connect to other systems, e.g. the "Fliegl Counter".

Being part of the ISOBUS evolution, ISOMAX presents a new combinations of ISOBUS platforms and sensor systems connected to it. ISOMAX is a low-cost and attractive option for small businesses to enter the ISOBUS world.

- **ESM system bidux X**  
**ESM Ennepetaler Schneid- und Mähtechnik, Hall 27, stand H47**

Double knives have several in-built shortcomings that affect the efficiency of a mower: they are vulnerable to damage by foreign objects, high-maintenance and are the limiting factor for attaining high work rates. On the other hand, low in weight, requiring less input power and giving precision cuts, they do offer advantages in boggy terrain and mountainous regions.

The new bidux X double knife offers several intriguing and remarkable details. Thanks to a new geometry, the blades of the top and bottom knives are configured in such a way that wear and gap formation is reduced. In addition, the new geometry eliminates the need for regrinding all cutting edges of the blades on the top and bottom knives. The mushroom mounts of both knives and the new guides lead to substantial improvement in gap formation, which in turn results in a longer service life of the sharpened blades. One set of knives for a day's work is the new and important formula in the use of double knives in sustainable farming.

The advantages of this significantly improved cutting system are uncontaminated forage and faster wilts, reduced fuel consumption and less damage to the sward, because the system can be operated with a smaller tractor. Further advantages include faster regrowth and protection of the entire fauna in the pasture. This is the cutting system of choice for farmers with a focus on sustainability, especially in view of the fact that the costs are comparable to those of disc mowers.

- **ModulaJet**  
**Forigo Roter Italia, Hall 21, stand C05**

The use of biodegradable plastic films has quite a long tradition in row cropping. Covering a seed row with plastic film is a practical way of controlling weeds. In addition, film reduces water evaporation rates and heats the topsoil, which in turn encourages early growth and reduces the vegetation period. Many films are punched by the punch hole seeder, or immediately after the seeding pass with mechanical elements so the new plants can shoot through the film without tearing it. Yet these holes also allow weeds to establish, which is not desirable as they are difficult to remove.

The ModulaJet system from Forigo Roter Italia SRL is an innovative seed placement technology for crops grown under film. The seeds are pneumatically singled, then accelerated in an air stream and shot through the film into the soil. This creates a very small hole right above the seed that are too small to allow weeds to develop. The depth of seed placement is controlled by the air flow rate. The seed rate and the application of the film at the end of the field are controlled electronically. The system works best for large seeds such as maize or soya.

Using much smaller holes in the film significantly reduces the degree of weed development after the new plants have broken through, reducing the subsequent row crop work.

- **SmartCut**  
**Gebr. Schumacher, Hall 13, B26b**

With the increasing working widths and harvesting speeds of combine harvesters, as well as changing cutting forces for crops that are to be threshed, the mechanical requirements for the cutting blade drive and cutting technology are also on the rise. Up until now, harvesting was carried out with the blade drive at a constant speed, and defects occurring during the harvest were detected from noises developing, a poor cutting pattern or even from clogging at the cutterbar.

With the SmartCut technology for blade drives, rotating-angle and rotating-force sensors have been integrated in the gearbox for the first time. The rotating-angle sensor indirectly measures the position of the mowing blade; the rotating-force sensor the drive force at the respective position. This enables SmartCut to differentiate between cutting, friction and peak forces. The latter occur when knife blades collide with foreign bodies or against fingers. Increased friction forces occur with bent fingers or knife blades, or other defects. The cutting force is dependent on the crop and the driving speed. For the first time, SmartCut therefore creates the basis for the load-dependent control of the blade drive. The measured cutting force can also serve as an input signal for the combine harvester's throughput controller.

The SmartCut technology enables wear prediction and the early detection of defects. This reduces downtimes and repairs – and with them the variable costs of combine harvesting.

- **Horizon Star III Razor Maize Picker**  
**Gehringhoff, Hall 13, A39**

The European corn borer is spreading increasingly across all of Germany and is the most important pest affecting all maize harvesting methods. Its damaging effect is apparent in the harvest and quality losses through modest cob bases and infestation with fusaria fungi, which can also affect subsequent crops. In addition to insecticides and biological agents, one of the most important control strategies is thorough chopping up of the maize stubble directly following the harvest, i.e. before driving on fields with combine harvesters and removal logistics. Therefore, destruction of the maize stubble directly on the maize picker is required.

That's why the manufacturer Geringhoff has developed a maize picker with an integrated stubble chopper based on the familiar Rota Disk method, with one cutting and two picking rollers. It consists of angled blades on the rotor of the back-picker shredder below the picking units. For maximum destruction of all maize stubble, the rotors must be guided with the shortest distance to the surface of the ground. To achieve this, Geringhoff provides the frame of the Horizon Star III Razor maize picker with a rotary joint in the centre. The central area with the inclined conveyor of the combine harvester and the two side areas are depth-guided with sensors.

As a result, the Horizon Star III maize picker makes a major contribution to improving crop protection in maize production.

- **R-Connect Monitor**  
**ROPA, Hall 25, stand H07**

and

- **SmartView**  
**Grimme, Hall 25, stand G06**

Digital camera technologies on farm machinery open up a wide range of opportunities in the monitoring of tuber processing procedures, documentation and,



in the long term, in remote support/service applications. In this context, ROPA and Grimme have developed innovative solutions for beet and potato harvesters.

"SmartView" from Grimme focuses on monitoring the cleaning and sorting processes on potato harvesters that also involves the pickers and the operator who use and interact via the system. Offering zooming features, live slow motion and customised camera views on the Multi-Touch display screen, the system improves the monitoring of the crop flow and eliminates the need for adjusting cameras by hand. The "R-Connect Monitor" from ROPA focuses on intelligent and fully automated camera feeds from the sugar beet harvester to the so-called "R-Connect" Internet portal that offers a farm management and logistics management platform. The camera feeds of the standing beet crop before harvest and the feeds from the unloading elevator are made available on the Internet platform, helping managers to monitor the processing quality on the harvester, as well as machine data and job assignments, so managers can support operators remotely. The two products represent a first step towards fully automated harvester set-ups. In addition, offering the opportunity to optimise the processes on the harvester, the systems will also save avoidable (travel) costs for service engineers and improve the logistics and consequently the quality of the crop as it is delivered to the factory.

- **Scorpion reach arm mowers**  
**GreenTec, Hall 26, stand F12**

Parallel control and cutting irregular vegetation has not been convenient with reach arm mowers in the past. Switching between control modes has only been possible by swapping reach arms or reprogramming the reach arm control. It has not been possible to switch control modes on the move.

Scorpion mowers now offer both types of cutting head control. On the one hand, it offers parallel control that allows operators to maintain a consistent cutting depth on the hedge with just very little adjustment by the operator. On the other hand, its hybrid arm system comes with a standard control unit that allows operators to control the cutting head flexibly when cutting irregular vegetation. This innovative hybrid arm system makes it possible to switch between the two modes on the move. Parallel control allows operators to keep an eye on the surroundings for increased work safety, while switching to manual mode on the move allows them to carry out specific cuts for boosted productivity.

- **VENTUM**  
**HORTECH, Hall 21, stand F04**

Shortage of labour is a growing concern, especially among vegetable growers. Although the harvesting processes of produce like rocket or baby leaf salad are largely mechanised today, processing and packaging are still carried out manually, which is time consuming.

The VENTUM self-propelled harvester is the first machine to combine the stages of harvesting, processing and packaging into one automated process. After the crop is harvested, it travels on a system of various conveyor belts operating at different speeds to the processing unit. The technology also spreads and scatters the crops. Foreign objects and unwanted particles are separated by blowing the material over a 30 cm gap onto another belt. In a final step, the cleaned, weighed and boxed produce is automatically transferred to a transport vehicle.

The VENTUM self-propelled harvester automates all harvesting, processing and packaging stages, presenting a substantial improvement to efficiency and quality in vegetable harvesting, thereby increasing productivity and reducing costs.

- **Efficiency Package for Large Combine Harvesters**  
**John Deere, Hall 13 stand C40**

Compared to walker combine harvesters, a further increase in performance on more powerful rotor combines is limited by the physical size of the machine. As a result, for further performance increases, the construction volume must be used more efficiently and the entire machine designed for a higher efficiency. This includes not only drive assemblies, but also all other assemblies – from the intake duct to the chopper.

When developing its new dual-axial rotor combine harvester, John Deere has not only revised the assemblies for threshing and separating, but also all other performance-determining assemblies while taking maximum efficiency into account. The goal of the design was to obtain maximum performance stability, with unaltered machine settings wherever possible, under difficult harvesting conditions. This begins with an identical pivot point of inclined conveyors and feed drums in order to always keep the feed angle identical relative to the rotors. This also includes a completely new, slim, belt-based drive concept that enables a transport width of 3.5 m to be adhered to with a current maximum duct width dimension of 1.72 m and 710 mm front tyres. The dual-axial rotor threshing and separating concept was designed for maximum straw throughput and performance stability values. Especially during cleaning, great importance was placed on the discharge of large air volume flows, including via the straw distribution technology in order to minimise the air counter-pressure and maximise air separation. The optimisation ends at the chopper by replacing the familiar angled blades with so-called "dented" blades with a golf ball air-flow effect for maximising the air volume flow.

The overall design contains all currently known technical measures for maximising the efficiency of a combine harvester. These then result in a reduced input with with maximised threshing output and therefore efficiency.

- **Intelligent vibration damping for large square balers**  
**John Deere, Hall 13, stand C40**

Large square balers enable high transport and storage density of plant material and therefore have achieved major importance in agriculture. However, due to high inertial and pressing forces, these big balers induce vibrations that subject the tractor cab to unpleasantly strong pitching movements, which put a strain on the tractor driver.

With intelligent vibration damping, these vibrations are almost completely eliminated on models of the 7R tractor series in conjunction with balers from John Deere. Based on the signals of the acceleration sensors in the GPS receiver and other signals within the tractor, the continuously adjustable drive is adjusted with the plunger frequency of the baler so that a periodic change of the speed setting compensates for the vibrations created. No additional hardware is required for this purpose.

This technology specifically developed for active vibration reduction means a considerable relief for the health and performance of tractor drivers.

- **Proactive throughput controller**

## **John Deere, Hall 13 C40**

Throughput controllers on combine harvesters cannot react to changes in the harvested crop conditions until the material is already in the harvesting header, in the intake duct or in the threshing unit. With extreme changes in harvesting conditions, such as lying crops, partial gaps and weed areas, result in correspondingly high over- or under-loading, and combine driving speeds that change too drastically. The throughput controller is then often deactivated.

John Deere solves this problem with the proactive throughput controller. 3D stereo cameras detect the crop situation in front of the combine just like a proactive driver. Crop heights, lying crop with lying direction, gaps, driving lanes and harvested areas are detected and classified by so-called "machine learning". In addition, the system also uses the data of vegetation models, which consist of biomass maps generated via satellite or other technologies. Camera and biomass signals can also be used alone in each case. As soon as the combine harvester begins harvesting, the system calculates regression models from the real-time and the geo-referenced vegetation data. The harvesting conditions in front of the machine are therefore known, as are the strategies still specified by the driver. The combine harvester merges all sensor values and then adjusts its driving speed and its settings to the harvest situation.

The proactive combine harvester operates automatically for the first time, just like a combine harvester operated by a proactive, experienced driver. With this technology, John Deere has taken a major step in the further development of the automation of threshing crop harvesting.

- **iQblue connect**  
**LEMKEN, Hall 11, stand A42**

By integrating Tractor Implement Management (TIM) into the ISOBUS standard it is possible to use sensor-based implement data to control the tractor or the implement. Although many existing ISOBUS-compatible implements and tractors are able to collect and supply the necessary data to the system, they lack the necessary hardware and software to support the control feature.

iQblue connect is a universal, retrofit and mobile module that automates implement functions via ISOBUS – presenting a simple and cost-effective way to implement TIM functions to the latest AEF (Agricultural Industry Electronics Foundation) standard. This means that the actuators on the implement can be controlled automatically from the tractor. iQblue connect has a GPS receiver and uses a cell phone network and interfaces with the agrirouter. In addition, the system has built-in mobile data connectivity to integrate the implements into digital documentation. The easy-use system connects to various implements via a uniform interface and without tools, configuring itself automatically to the new implement. The module can be extended by further installation kits that were developed for specific implements that allow users to also automate the functions of mechanical actuated machines. iQblue connect can also be retrofitted to existing implements where it makes use of the existing actuators.

iQblue connect allows users to automate a large variety of different agricultural machine applications. The manufacturer will demonstrate various use cases, such as ploughing, cultivating or tilling.

- **Automatic twine remover on stationary Premos pellet presses**  
**Bernhard Krone, Hall 27, stand F24**

This automatic twine remover boosts pelleting efficiency and improves work safety.

Grain, rape seed and maize straw are sought-after raw materials in farming and in the industrial sector. The straw can be marketed as pellets, chopped straw or straw powder. The harvested straw is baled into square bales of various sizes, which have to be broken up before processing them into pellets, for example. The issue here is that the twine needs to be removed first, a tedious manual job in a dusty environment.

The automatic twine remover on the stationary Premos pelleting press cuts the twine, removes it from the bale, coils and places it into a container in an automated sequence. In its first step, a triangular knife cuts the twine at the bottom of the bale while a rake on the top gathers and feeds it to a hydraulic spool. As this rotates, it winds the strings and then places the coil into a container. The auto sequence can be interrupted remotely by the operator.

The system presents a significant improvement in terms of work safety, operator comfort, ease of use and productivity.

- **EasyCut F 400 CV Fold  
Bernhard Krone, stand 27, stand F24**

German traffic laws restrict transport widths of a tractor-mounted machines to 3 m. Due to this restriction, the maximum working width of front mowers cannot exceed 3.2 m depending on the cutting system. However, 3.2 m work widths are quite small for satisfying results and involve the risks of tyres running on the cut grass and of leaving stripes of uncut grass.

The new Krone EasyCut F 400 CV Fold disc mower conditioner offers a work width of 4 m, which cures the above problems by using the machine in combinations with a rear or a butterfly mower, especially when cutting bends and sloping fields. This combination offers larger overlaps that eliminate striping. On the other hand, the foldable cutterbar allows the machine to pivot to the rear for a sub 3 m transport width. Further advantages include the hydraulic folding mechanism that is operated from the cab and gives added road safety.

Another benefit of a large front mower width is the fact that it eliminates the need for fitting complex sensor-based control systems to avoid striping – a costly technology that actually does not contribute to the overall efficiency. Run-over stripes are eliminated and the quality of work is improved.

- **Dino – autonomous robot and precision weed controller  
Naïo Technologies, Pavilion 11, stand B04**

The biggest challenge in mechanical weed control is the removal of weeds within the crop rows. In organic farming, these weeds are removed manually in a time-consuming process.

The Dino robot, in combination with the precision weed controller, is the first autonomous machine for mechanical weed control in lettuce rows. The machine locates the lettuce and activates two electric knives that cut the weeds in the space between two lettuce heads. The controller also produces a digital map that is then used for harvesting.

This technology reduces the cost of manual weed control. The Dino robot, in combination with the precision weed controller, is a low-weight option to tractor-mounted weed controllers, reducing compaction and ensuring extended reliability.

- **Innovative driveline for HD big balers  
CNH Industrial Deutschland GmbH, Hall 3, stand A49c**

Big balers that produce high-density bales require a high-inertia flywheel and a powerful plunger to suit. Therefore, protective start-up systems are required to prevent the tractor from stalling or the PTO shaft from overstraining when the baler swings into action.

The common cure is either using a hydraulic start-up system that operates at a lower torque, or switching from the 540rpm PTO to 1,000rpm. CNH and Walterscheid developed a new driveline where, relative to the current tractor torque, the gearbox shifts up into the desired flywheel speeds. The feature is called "Power Shift Function", and it allowed the developers to increase flywheel speeds and baling output while reducing flywheel inertia and dimensions. The shifts are made by internally cooled multi-plate clutches. A multi-plate brake with internal cooling, which is also integrated in the gearbox, slows down the plunger when this is in its optimum starting position. It also serves as an emergency brake that brings the plunger to a stop within eight seconds. The system also reduces the risk of fire because it removes the flywheel brake from a dusty environment. The necessary service modes are also selected via this intelligent control system.

The new drive concept for big balers assists the tractor PTO in starting the heavy flywheel, thereby protecting the tractor and the PTO clutch. The brake that is now integrated in the gearbox brings the flywheel to a safe and effective halt and significantly reduces the risk of fire.

- **Baler Control System for the T7 Tractor**  
**CNH Industrial Deutschland, Hall 3, stand A49c**

Large square balers enable high transport and storage density of plant material, and therefore have achieved major importance in agriculture. However, due to the high inertial and pressing forces, big balers induce vibrations that subject the tractor cab to unpleasantly strong pitching movements that put a strain on the driver.

To reduce this vibration load, a baling mode can be selected on the New Holland T7 tractor series. This modifies the coordination of the front axle suspension and increases the slope of the limiting curve on the engine map. This then avoids oscillation of the tractor-implement combination, the system decouples and a considerable reduction in the vibration load results. No additional hardware is required for this purpose. This passive system is compatible with balers from any manufacturer.

This technology, specifically developed for active vibration reduction, means a considerable relief for the health and performance of the tractor driver.

- **CX Threshing**  
**CNH Industrial Deutschland GmbH New Holland, Hall 3, stand A49c**

Tangential threshing units are primarily used in walker combine harvesters with high threshing-drum speeds to maximise the grain separation at the threshing concave. Otherwise, the walker losses are greatly increased due to grain separation from the force gravity. However, this reduces the grain quality and increases noise from the threshing unit.

For the first time since the invention of the beater-bar threshing unit, New Holland has segmented the beater bars, which were previously continuous across the entire width, and offset them to each other. This configuration results in a continuous threshing process with a reduced beating and an increased friction effect. This in turn increases the grain separation at the threshing concave and with

it the threshing output. The threshing drum accepts the threshed crops from the inclined conveyor more evenly, and the typical receiving noises are now hardly audible. The mass moment of inertia is increased by the heavier threshing drum, reducing load peaks. In addition, more dust is drawn into the combine harvester. Furthermore, the stainless-steel guide rails on the straw guidance drum are coated with polyurethane for the first time. This softer material creates a more elastic impact against the residual grain, reducing grain cracking.

With these innovations to the CX threshing and separation technology, New Holland increases the threshing output and work quality, and with them the efficiency of walker combine harvesters.

- **Protective screen for tracked forestry tractors**  
**Pfanzelt, Hall 26, stand 22**

Tree fellers are at risk of injury from by falling branches and treetops, especially when felling or cutting dead timber.

The new protective screen is attached to a Moritz crawler tractor and is opened when the tractor is at the tree. Embracing the tree at 2 m from the ground, the screen offers effective protection to fellers, especially in the preparatory phase. For the actual felling, only one half of the screen stays open so that the remaining hydraulic power is available for the actual felling job. Unlike existing solutions where a protective screen is suspended from a forwarder, this solution offers the advantage that fellers are not working under an unpropped crane. Another advantage is that the new screen is used in conjunction with a tracked tractor, which is less expensive to operate than a forwarder.

Especially in view of the increase of dead timber in forests as a consequence of climate change, this screen is a contribution to work safety in forest work. Although, a tractor may not be able to go into any type of terrain, the tractor-based screen presents an effective and comparably cost-effective way of improving work safety for tree fellers.

- **Smart Depth**  
**Precision Planting LLC, Hall 20, stand B14j**

In the past, operators had to guess the optimum drilling depth for a specific seed in a specific soil. Based on this guess, they would then set up the precision drill. Once the settings were made, it was not possible to have them altered automatically on the move and in real time to respond to varying conditions, such as changing moisture levels.

SmartDepth controls the drilling depth automatically and accurately relative to the current soil conditions such as moisture level. To do that, the operator defines a drilling range, i.e. a minimum and maximum depth, and enters the minimum moisture. As the machine is drilling, SmartDepth measures and reads the various moisture levels at various depths in real time. At the same time, it automatically increases the drilling depth as necessary, using an electric actuator. This way, each seed benefits from adequate soil moisture for reliable germination.

Placing the seeds automatically at depths where moisture levels are adequate, the system ensures uniform germination and crop establishment, and a more uniform crop. As the placement of the seeds is adapted to the varying conditions within a field, it reduces the risk of poor germination. The system will presumably save seeds, because operators will not have to factor in extra volumes for potentially higher seed rates that accommodate narrower target spacings and less than optimum crop establishment.

- **MultiRate Dosing System**  
**RAUCH Landmaschinenfabrik, Hall 9, stand D20**

With the MultiRate Dosing System for pneumatic spreaders from RAUCH, the dosing units of each individual fertiliser outlet opening are continuously and independently electronically adjusted.

The 48 Volt electric drive enables extremely short adjustment times, and therefore a fast variation of the fertiliser quantity applied during forward travel. Perpendicular to the driving direction, the fertiliser application can be varied in 1.2 m wide strips, which leads to a considerably higher spatial resolution compared to the possibilities that have existed in the past. For fertilising according to an application map, the specified values are implemented more exactly, and when spreading wedges and in curves, over- and under-dosing are considerably reduced. Boundary spreading can also be optimised by adapting the quantity to the outer fertiliser outlet opening in conjunction with a boundary spreading baffle plate.

With the MultiRate Dosing System, it is therefore possible to apply fertiliser more safely; the crop can be supplied according to need and the level of nutrients finding their way into bodies of water and the ground water can be reduced. In addition, even with large working widths of up to 36 m, small-areas of ecological significance within a field can be specifically excluded from fertilisation.

- **HillControl Control System**  
**RAUCH, Hall 9, Stand D20**

It is possible to vary the fertiliser distribution on disc spreaders by changing the point of application, speed of the discs and dosing quantity; however, up until now no system has been able to compensate for the altered spreading distance and the distorted spreading pattern on a slope. Current solutions attempt to keep the change in the point of application when spreading fertiliser on a slope to a minimum with a low drop height between dosing and the spreading disc or with forced guidance of the fertiliser on the spreading disc. In addition, the spreading pattern at the spreading discs can be detected with radar-supported measurement systems and, if necessary, also corrected during spreading.

The HillControl Control System from Rauch is software that improves the distribution accuracy when spreading fertiliser, especially on hilly terrain. It functions in conjunction with an inclination and yaw rate sensor on disc spreaders by changing the point of application, disc speed and dosing quantity. As a result, the spreading distance and direction of the fertiliser pellets during spreading is changed with a controlled adjustment of the point of application, therefore correcting the distortion in the spreading pattern.

Especially in extremely hilly terrain, the HillControl Control System considerably improves the distribution accuracy when using two-disc spreaders. Furthermore, over- and under-dosing are also reduced when driving over hilltops or through depressions.

- **NEVONEX**  
**Robert Bosch, Pavilion 11, stand C10**

**Joint development with:**

**Topcon Agriculture, pavilion 11, stand C10f and Hall 15, stand H27**  
**RAUCH, pavilion 11 stand C10e and Hall 9, stand D20**

**ZG Raiffeisen eG, pavilion 11, stand C10g**  
**BASF Digital Farming, pavilion 11, stand C10b and Hall 15, stand G48**  
**LEMKEN, pavilion 11, stand C10c and Hall 15 Stand A42**  
**Pessl Instruments, pavilion 11, stand C10d and Hall 15, stand D53**  
**Amazone-Werke, pavilion 11, stand C10a and Hall 9, stand H19**  
**Syngenta Crop Protection LLC, pavilion 11, stand C10h**

Constant innovation in agriculture has led to the appearance of a variety of intelligent machines, implements, sensors and software. This means that implements can be reliably connected and used through ISOBUS. Yet, what has been missing up to now is an open system that provides the basis for importing not only data, but also and above all logic and knowledge into the machines.

NEVONEX is such an open platform. Like an operating system, it forms the basis for software applications (FEATURES) to program new or existing farm machines. Sourced from the automotive industry, NEVONEX is based on reliable and hack-proof technology with end-to-end encryption. Similar to existing apps, it allows users to run FEATURES directly on agricultural machines, requiring only a suitable controller and registration on the NEVONEX platform. An integrated interface management allows smooth access to the platform via the ISOBUS or using proprietary signals.

The innovative aspect of this product is the fact that it defines universal interfaces, provides secure and reliable reading and control rights, and accumulates the collected expertise available in the agricultural industry and in its upstream and downstream sectors.

- **RSM Night Vision System**  
**Rostselmash, Hall 9, stand A31b**  
*Joint development with Irway LLC, Russia, Hall 9, stand A31b*

Night work offers a number of advantages, such as lower temperatures for certain types of field work such as spraying. On the other hand, despite modern and powerful work light systems, night work involves risks including impaired visibility so that operators are strained to view the machine's immediate surroundings and notice obstacles and people in good time.

Like systems used in the automotive industry, the "RSM Night Vision System" uses not only the visible light, but also part of the near-infrared light spectrum of the silicon-based, and thus cost-effective, camera technology. Unlike costly thermal cameras, the RSM Night Vision System illuminates a larger range. As a further advantage, it is not necessarily mounted on the outside of the machine where it is exposed to dust and debris. The electronic pre-processing feature and the algorithms used by the RMS make the system very sensitive and effective in conditions with very little available light. This high level of sensitivity allows users to use this technology together with the regular tractor lights, where it provides visibility in the range of 250 m up to 1,500 m, and also allows operators to work at higher forwards speeds. At the same time it helps them to see people and obstacles sooner. The feeds from the main camera, which is installed in the cab and looks ahead of the machine, are projected onto the front screen, whereas the feeds from the side cameras are displayed on the display screen.

With RSM Night Vision, drivers can "see" obstacles or people in the immediate surroundings of the machine that they would not be able to see with the naked eye.

- **Potato squeezer**  
**ROPA, Hall 25, stand H07**



Large numbers of volunteer potatoes pose a complex problem in the subsequent crop, especially as frost periods become increasingly scarce in warming winters. The new potato squeezer is the first system to rely on two tyres that are driven hydraulically at different speeds, thereby squeezing the potatoes passing between them. One tyre is fitted with angled knives that cut large tubers into pieces before they are crushed. The combined use of knives and tyres makes the squeezer very effective, because the narrow gap is not widened and it still squeezes large tubers. For reliable performance and very quiet running, the unit has spring-loaded impact damage protection and allows users to select separate rotation speeds.

The new potato squeezer damages the tubers that are sorted out by the pickers or the machine, thereby minimising the potential that they survive and grow in the field. The potato squeezer is a retrofit unit for modular Ropa potato harvesters.

- **VarioCHOP**  
**samo Maschinenbau, Hall 13, Stand A52**

Hoeing implements and/or hoeing units are currently usually adjusted mechanically while at a stop. The adjustment procedures are extremely complex and time-consuming, which in practice generally prevents optimised adjustment from taking place.

The VarioCHOP System is a hoeing implement or hoeing units with a variable processing width that can be conveniently adjusted from the tractor cab. With VarioCHOP, an adjustment to various field conditions, crops, weather events, erosion and stages of growth can be quickly carried out. The system operates with a reaction time of approximately five seconds and can be used on hoes with up to 99 rows. The mechanical adjustment to each individual hoeing unit is driven by one precision hydraulic cylinder that is coupled to a heavy-duty steering angle sensor. As a result, it is possible from the tractor cab to adjust the optimum hoeing range. This then makes it possible to always achieve the perfect distance to the crop plant from the first to the last hoeing pass.

With this method, passes for mechanical weed control can be clearly optimised, however the great practical benefit particularly lies in the considerable savings of time when adjusting the hoeing implement. Coupling with camera systems already available on the market to provide automatic range adjustment would be another advantage in practice.

- **NPK Sensor**  
**Samson Agro, Hall 23, stand A35**

Due to increasing specialised legal requirements for precise application of liquid organic fertilisers, an exact analysis of the ingredients relevant for fertilisation has an important role to play. In addition to taking samples, which must then be subjected to wet-chemical analysis, near infrared sensors (NIRS) are currently being used to estimate the nutrient content of manures.

For the first time, Samson now offers a system for determining nitrogen, phosphorus and potash in manure, which is based on an Nuclear Magnetic Resonance (NMR) sensor. It enables an analysis of manure ingredients without matrix-dependent calibration requirements.

Sensors based on NMR technology promise fewer errors in manure analysis. Initial laboratory tests also show a good alignment with laboratory values.

- **WideLining System**

## Väderstad, Hall 12, stand B25

Tramlines in row crops allow any sprayers and spreaders used to run on wider and soil-friendly tyres. In practice, however, this is usually not possible, because the typical row width is as narrow as 75 cm. Existing solutions for creating wider track widths either involve totally different row widths or shutting off individual tramlines – either mechanically or hydraulically.

The WideLining System from Väderstad is the first system to apply a tramline without shutting off individual rows on a precision drill. Instead, this tramlining system creates a track width of 105 cm by automatically shifting the seed rows without shutting them off. This way, the system applies track widths that are wide enough for a slurry tanker without wasting valuable crop land and yield potential. The three seed rows behind the tractor are shifted hydraulically from 75 cm to 60 cm, creating a tramline without increasing the seed rate on the neighbouring seeders, at forward speeds as fast as 12 km/h or more.

Instead of creating the typical 150 cm track widths by shutting off a seeder for 75 cm seed rows, the WideLining System from Väderstad produces 105 cm tramlines, for example, which are wide enough for the slurry tanker to enter the crop on flotation tyres. In addition, the system cuts out higher application rates in the neighbouring seeders when individual seeders are shut off. This in turn eliminates an uneven distribution of the plants in and across the direction of travel.

Agritechnica 2019, the world's leading trade fair for agricultural machinery, takes place at Hanover, Germany, from the 10th to 16th November 2019 (with special preview days on 10th/11th November). More information for international visitors considering a visit to the event can be found online at: [www.agritechnica.com](http://www.agritechnica.com)

The criteria for gold and silver awards can be found here:  
<https://www.agritechnica.com/en/innovation-award-agritechnica/award-criteria>

Pictures for download here

<https://www.agritechnica.com/en/press/photos/agritechnica-innovation-award-2019>

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