



“We’re seeing a 20% increase in productivity using this technology.”

Combines

Mastering harvest

Not only has combine capacity in terms of volume hit new highs recently, but manufacturers are also introducing technology to machines that promises to predict the process. *CPM* delves into some of the latest developments likely to be traversing fields soon.

By Melanie Jenkins

Those who attended the Cereals Event in June will likely have taken a stroll around the sea of green and yellow combines nestled on John Deere’s stand. While *CPM* was given a breakdown at the show, it was also invited to see the combines in action near Frankfurt, Germany, in early August.

A key point to note with John Deere’s new S and T combines (the firm’s dropping the ‘series’) is their uniformity, both with one another, and with the X9 – standardisation is the theme of the moment. “From a visual aspect, the S7 and the T5 and T6 have taken a lot from the X9,” says John Deere’s Jonathan Edwards. “Even those that purchase the entry level combine can get the same harvesting experience as with the X9.”

So why has John Deere done away with ‘series’ in its combine naming?

Jonathan points out that the new name and number system provides an explanation. “The first letter identifies the separator technology – ‘T’ represents a multi-drum walker, ‘S’ a single rotor and ‘X’ a dual rotor. The first number indicates the family while the second number identifies the performance group. Any subsequent numbers will represent the series or generation of machine.”

New names

It’s not just the combines that have a new naming system, the front end equipment is also now identified differently, he adds. “The 622R has become the RA 22 (ridged auger), the 730X is now the XA 30 (extendible bed on the ridged auger), and the 635F has been renamed the FA 25 (flexible auger), with the numbers after each letter indicating the width in feet.”

John Deere’s standardisation of architecture across its different machines is part of its ‘DNA’ – or ‘DeereNA’ as the firm refers to it – approach. “From 2025, there’ll be brand new electrical architecture on the T5, T6, S7 and X9. This has enabled us to include more sensors and better ethernet communication ability to aid in the move from automation towards autonomy.”

Enabling technology has also been improved to tie in with John Deere connected support to help predict any potential downtime and fix problems before they become an issue, explains Jonathan.

Technology on the combines has also been advanced and includes AutoTrac, AuthPath Boundaries, AutoTrac Turn Automation and MachineSync.

“MachineSync allows the combine to communicate with the grain carts to ensure there’s no spillage, and if there’s more than one combine in the field, in-field data share can optimise coverage maps.”

While yield documentation has been available on combines for some time, Jonathan highlights that John Deere has worked to advance this so all machines from 2025 have grain sensing to allow for the quality of grains and oilseeds to be measured on the combine.

“This will allow farmers to make fact-based decisions off the back of what the combine harvests in the field.”



With Ground Speed Automation and Harvest Settings Automation, John Deere’s aiming to allow operators to utilise 100% of the capacity of the combines, says the firm’s Jonathan Edwards.

New Holland

At Agritechnica in 2023, New Holland launched its flagship and largest ever combine, the CR11, and this year the firm has introduced its younger (and slightly smaller) sibling, the CR10. For those familiar with the CR11, the CR10 is essentially a mirror image inside and out – barring a few size-related details – but will suit those who don't quite require the full force of the CR11 on farm.

The CR10 was launched at the Cereals Event, with New Holland's Nigel Honeyman dubbing it the 'baby sister' to the CR11. "It runs on the same architecture as the CR11 including the same rotors, cleaning shoe and residue management system but it's a smaller machine. The CR10 is going to be useful for UK conditions – notably in Scotland – primarily due to its ability to run at 12m for controlled traffic farming."

Designed with a 13-litre FPT Cursor engine, the CR10 produces 635hp and operates a 16,000-litre grain tank. In comparison, the CR11 runs a 16-litre FPT Cursor engine, capable of generating 775hp, and has a 20,000-litre grain tank. Both feature a two-speed hydrostatic transmission and TerraLock semi-automatic diff lock which is engaged manually and disengaged automatically depending on the steering angle and forward speed.

The CR11 has an unloading rate of 210 l/sec while the CR10 tank unloads at 159 l/sec. Cross-auger shut-off allows the unloading auger to be fully emptied even when the grain tank still holds grain. On the CR11, an option allows unloading speed to be reduced by 50% by disengaging the front cross auger, aiding topping-off of trailers.

Nigel points out that although the CR10 is a replacement for the CR10.90, there aren't many components that carry over from this machine. "Instead, the CR10 and CR11 have been built from the ground up to remove bottlenecks in the machine's capabilities."

From the front, these new flagship CR combines are designed to handle greater volumes of crop. Cutterbar widths of 10.6-15.0m (35-50ft) are available in fixed, flexible knife, movable knife and draper formats. Maize heads of 12-16 rows are also available, and unloading auger lengths can be specified to match all header widths. There are three driveline options to meet all header requirements.

Both combines can be equipped with either a standard integrated chopper or a high hood-mounted fine-chop unit. While the first of these is intended for dry conditions, the high hood-mounted unit is targeted at users looking to process high straw volumes to a fine chop and distribute material across a wide cutting width.

The standard integrated chopper features 60 fixed blades which work in



The New Holland CR11 runs a 16-litre FPT Cursor engine capable of generating 775hp and has a 20,000-litre grain tank.

conjunction with 52 counter knives working at 3000rpm for chopping, or at 800rpm for straw swath laying. Manual adjustment of the counter knives is standard and remote hydraulic adjustment is optional.

A driven roller assists straw ejection when swathing or into the spreader impellers when chopping. The two hydraulically driven 800mm impellers, each equipped with three paddles, spread chopped material at widths up to 15m (50ft). An oscillating deflector behind the spreaders creates a dynamic pulsating effect on the residue spreading to ensure even distribution over the full cutting width.

The high hood chopper option leads with a 500mm beater with two rows of spikes and two rows of blades, plus a non-perforated beater pan. This is followed by a six-row chopper with 88 flail knives and 67 counter knives. The chopper can operate at low (900rpm) or high (3600rpm) speed, with a neutral position for free movement when servicing is required. Remote chopper speed selection is optional.

The pair of hydraulically driven 970mm diameter impellers on this unit each feature five paddles, capable of distributing material at up to 18m (61ft). As on the standard unit, an oscillating deflector is again fitted behind the spreaders on the high hood chopper, to dynamically pulse the residue across the full cutting width.

The IntelliSpread option uses radars to continuously assess the full width of the residue spread and automatically adjust left and right spreader speed to guarantee full width spreading. Further options include remote selection of chopper door position, chopper gears and counter knives. Also optional is a chopper load indicator, which provides information on chopper power consumption.

The elevator is equipped as standard with front face adjustment and lateral tilt remote control from the cab. From here, the crop is

fed to New Holland's proven Dynamic Feed Roll system, which can now be reversed – simultaneously with the elevator and the rotors – in the event of a blockage. The DFR accelerates the crop and splits it into two even streams to feed the two longitudinal threshing and separating rotors that follow. A large stone trap in front of the DFR can be emptied either manually or, optionally, remotely via hydraulic activation from the cab.

One aspect the design team has worked to optimise in the new machines is separation power when working with slightly damp or green straw. "We aimed for zero losses, or as close to this as possible," says Nigel. "It's meant a complete redesign of the rotor system and the cleaning shoe. Losses are an insidious cost when combining because you don't sign a cheque for them, they just disappear out the back. So in targeting zero losses, we've aimed to bring down the cost of harvesting."

In the new combines, the two 600mm (24in) rotors have increased diameter and length, providing greater capacity for the crop to circulate and the grain to be threshed and separated. Each rotor features 40 standard rasp bars, eight HX rasp bars and 12 spiked rasp bars. New rotor cages feature a stepped design with a broader cage and higher vanes in the separation area to allow greater crop movement, improved separation and enhanced power efficiency.

The new TwinClean cleaning shoe incorporates multiple features to boost throughput and minimise grain loss. It consists of two sieve systems in sequence, each having its own upper and lower sieve and clean grain auger, and is based around a large grain pan with an increased fall to the first upper sieve.

Airflow is provided by a high-power cleaning shoe fan; two automatic cross distribution mechanisms should guarantee an even cleaning ▶

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New Holland cont.



New Holland's CR10 is going to be useful for UK conditions – notably in Scotland – primarily due to its ability to run at 12m for controlled traffic farming, says the firm's Nigel Honeyman.

► shoe load in all conditions. Two sets of pressure sensors continuously measure the load and detect any anomalies in material distribution between left and right. A side-shake mechanism adds a lateral component to the grain pan and sieve movement which evens out the material over the cleaning shoe's full width. As such, the cleaning shoe can compensate for uneven feeding and side slopes up to 28%.

A further change is the elimination of drive chains in the new machines. “Our previous machines had multiple drive chains that required servicing and replacing, but now these are gone, there are only two chains: the elevator chain and the clean grain elevator chain,” says Nigel.

Operation is made easier

through incorporation of twin Intelliview 12 touchscreen terminals in the cab. With the primary monitor on the right-hand console providing management and monitoring of the combine's key controls, the secondary monitor on the A-pillar is configured for mapping and guidance.

Both combines are equipped with the Core PLM Intelligence package which covers the most commonly specified requirements such as IntelliSense. The second option is an Advanced PLM Intelligence bundle aimed at those with the most complex demands. Correction signal packages for IntelliSteer automated steering and other functions such as yield and moisture mapping are available from the factory in two accuracy levels with three delivery options.



John Deere's T5 and T6 combines have new grain tank options including a 13,500-litre tank option on the T6 and an 11,500-litre tank on the T5.

► Looking specifically at the T combines, 2025 will see an expansion from four models up to eight: with the new machines consisting of the T6 800, T6 700, T6 500, T5 700 and T5 500. “In terms of operator experience, there’ll be a new cab which has been taken from the X9,” says Jonathan. “This is a significant update for the T5 and T6. New LED lights are 25% brighter, the electronic door cinch keeps the cab pressured and doesn’t require force to shut. There’s a new corner post display with the G5 display and extended monitor in the command arm, a new joystick, plus Apple Car Play and Android Auto.”

In terms of grain handling, there are new grain tank options including a 13,500-litre tank option on the T6 and an 11,500-litre tank on the T5. There’s a larger auger diameter – the same as that on the X9 – and an adjustable spout, however the S7 has an unload rate of 150 l/sec, he adds.

The residue management system has also been updated with new knives to improve the quality of the chop, says Jonathan. “The XFC (extra fine cut chopper) T6 has 124 knives while the T5 has 100 and the FC T6 and T5 have 68 and 52 knives, respectively. These machines have moved to a common knife design and are Xcel knife ready,



Residue management on the S7 combine has been updated in line with the X9 concept so it's mechanically driven.

which can save 7-8kW of power. Spread capability is now also achievable at up to 35ft without wind paddles.”

And as far as residue management automation goes, there’s now remote counter knife adjustment, tool-less cross bar (grouser) engagement and residue AutoSwap.

In addition, Terrain Settings Automation (previously Active Terrain Adjustment) brings new features to the T5 and T6 including adjustment of the chaffer, sieve and fan speed while driving up or downhill, taking the pitch from the StarFire receiver.

The S7 combine line-up includes the S7 900, S7 850, S7 800 and S7 700. “When

we looked at bringing something new to market, the two key areas we focused on were automation with optimisation, and productivity with efficiency,” says Jonathan. “The S7 features the JD14X engine (or the JD9X on the S7 700), which has a single turbo and introduces Harvest Motion to optimise drive from the engine to the combine. Users will see that it sustains the power in tougher harvesting conditions, keeping the rpm higher.”

Residue management has been updated in line with the X9 concept so that it’s mechanically driven, has second air vents for the shoe, residue spread performance has increased with the introduction of



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Case IH

Previewed at Agritechnica 2023, Case IH's latest Axial-Flow 260 series will be available for Harvest 2025.

For growers looking to purchase a combine with more than 500hp, the 260 series provides larger, high-resolution displays and automated efficiency. The dual Pro1200 displays enable intuitive automation via Harvest Command technology, as well as new advanced guidance and mapping capabilities. The Pro1200 also offers connectivity to other Pro700-enabled machines within the same field.

The 260 series enables growers to cover more hectares in less time with Axial-Flow rotor and self-levelling cleaning technology. These features are designed to increase throughput, improve grain handling, and simplify maintenance for a more productive harvest. The 260 delivers exclusive Power-Plus CVT rotor reversing capabilities, allowing operators to clear blockages without leaving the cab.

For those requiring slightly less horsepower, the introduction of the 160 series to the Axial-Flow line-up signals the addition of Harvest Command automation to combines with more than 400hp. The proven Harvest



Case IH's Axial-Flow 260 series enables growers to cover more hectares in less time with Axial-Flow rotor and self-levelling cleaning technology.

Command system makes automated adjustments as field conditions change and reduces the number of decisions operators must make, to help ensure consistency.

The 160 series has been designed to retain the simplicity expected from the Axial-Flow combine line while adding additional benefits. Boasting a higher-capacity grain tank, holding up to 12,500 litres (available only on the AF 7160) combined with better fuel efficiency, should allow operators to keep moving during harvest. And while grain is being harvested, the in-cab adjustments and grain-on-grain threshing design maintains

quality of the crop throughout the fields.

The Axial-Flow 160 and 260 series combine models include Safeguard Connect – a comprehensive package of Case IH added-value services. This includes an extended three-year Safeguard warranty and a lifetime subscription to AFS Connect, Case IH's advanced telematics portal. AFS Connect enables remote monitoring and management of the farm, the fleet and the data. Safeguard Connect also includes a three-year subscription to Case IH MaxService – premium access to around the clock dealer service during peak season.



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► Premium Powercast (PPC), and there's also the option of the Xcel chopper knives.

Active Slope Adjustment (ASA), which was introduced at Agritechnica, is the belt system on the cleaning shoe and can be added to models which aren't HillMasters, says Jonathan. "The base machine can deal with slopes up to 7%, while adding the Sidehill Kit will allow it to manage 14%. Including ASA gives it capability on slopes of up to 18% while the full HillMaster can manage 22%," he explains.

"Loss sensing has been updated to provide better delivery to the pad design with one sensor per shoe bay, which increases accuracy for automation and for loss sensing."

Ground Speed Automation

New for 2025, Ground Speed Automation will be included with the T, S and X combines. "This is completely new, and replaces HarvestSmart," says Jonathan. "In the past, the systems were reactive but they now work on a proactive and predictive approach. The new algorithm looks at the loss level of the combine, the engine power and any rotor or variative pressure. This is utilised to send speed commands to the combine. But on top it also looks at the cover maps, header height and terrain information from the GPS receiver to optimise commands."

As far as predictive information is concerned, crop information is collected by satellites and sent via Operations Centre to the combine. "In addition, forward looking cameras work with satellite biomass maps to assess what's happening in front of the combine," says Jonathan. "We're seeing a 20% increase in productivity using this technology."

Harvest Settings Automation is the replacement for AutoMaintain with the new system allowing operators to accept their own acceptance limits, whereas previously they'd have had performance targets to achieve, he adds. "AutoMaintain required very skilled combine operators but with Harvest Settings Automations we're driving towards outcomes, whereby the operator sets the acceptance limits of grain loss, foreign material and broken grain. From these settings the combine will adjust aspects such as the ground speed, engine power, concave, clearance and rotor speed.

"With Ground Speed Automation and Harvest Settings Automation we're aiming to allow operators to utilise 100% of the capacity of the combines," he concludes. ■



John Deere's front end equipment has been renamed with the 622R becoming the RA 22, the 730X is now the XA 30 and the 635F has been renamed the FA 25.

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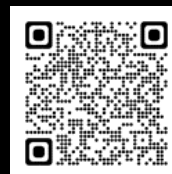
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Combines

Fendt

Fendt's Ideal range, which includes the 7, 8, 9 and 10T models with power outputs starting at 475hp for the 7 and topping out at 790 for the 10, has been kitted out with a number of new developments to help improve harvest. The latest MY24 models feature a plethora of technology and engineering that have been designed to reduce operator fatigue and maintenance while also increasing output and efficiency.

"From the IdealDrive cab concept which removes the steering wheel in favour of joystick mounted controls to improved forward visibility and comfort for operators, to the fully enclosed exhaust system that uses filtered and pressurised air to keep the exhaust clean and cool, the Ideal is packed with features to improve harvest efficiency," says Fendt's Ant Risdon.

Fendt's AirSense, an innovative cooling system fitted as standard on all Fendt Ideal models, is designed to significantly reduce the daily cleaning required around the engine bay and exhaust system.

The AirSense system cuts the requirement for a thorough daily clean near the engine thanks to an eight blade, 950mm reversible fan that engages based on engine temperature and

time parameters. The total ventilated area is 2.7m², and the regularity of fan engagement means that dust and chaff shouldn't have the chance to build up around the engine.

"AirSense has multiple benefits for both operator and machine. Most important is the reduction and shortening of cleaning times to boost productivity and operator efficiency," says Ant.

AirSense enables the fan to invert the air flow, changing it from sucking in air to cool the engine, to blowing air back through the radiators at selected times, to clear any debris. "It inverts by changing the pitch of the fan's paddles. This is activated by parameters including engine temperature or the time since the last inversion, and a visible plume of dust is seen rising from the engine bay when engaged. Manual activation is also possible" he adds.

Fendt has also introduced a new pressurised exhaust box to prevent dust accumulation, which helps reduce cleaning times and chaff build up in the hottest areas of the machine. The new AirBox is available on Ideal 8, 9 and 10 combines. "The key is there are no hot spots because filtered, pressurised air is being blown through



Fendt's AirSense cooling system, which fitted as standard on all Fendt Ideal models, is designed to significantly reduce the daily cleaning required around the engine bay and exhaust system.

the box to keep it clean and cool," he says.

Ant notes this could be a significant advantage in the UK because when harvesting crops, it's common to see temperatures exceed 30°C.

Onboard digital technology in the latest Ideal models has been updated to include TI Turn, a fully automated headland turning system that, once set, requires no operator input. "The machine will switch out of work mode automatically, make the headland turn and resume work mode automatically. This helps reduce operator fatigue but also ensures optimum output from the combine, especially in irregular shaped fields," he adds.



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