

Scottish spectacle

FMJ joined AgXeed's new northern partner SoilEssentials Ltd at a demonstration of the fully-autonomous AgBot track-type tractor in action on a farm in East Lothian

WORDS AND IMAGES DAVID WYLIE

SoilEssentials is a precision farming business set up over two decades ago by farmers Jim Wilson (MD) and his neighbour Robert Ramsey (commercialisation director). Both farmers constantly strive to operate in a sustainable and ecological way, which resulted in them co-founding SoilEssentials Ltd in 2000 and representing Trimble Agriculture since 2010 as the sole agent in the 'Northern UK' territory for precision farming products.

SoilEssentials employs 25 skilled people and has three teams to deliver products and advice to farmers in the areas of precision agronomy, machine

Right: SoilEssentials is co-owned and run by MD Jim Wilson and his neighbouring farmer commercialisation director Robert Ramsey



control and software development & projects. Now, SoilEssentials has made another big technological leap forward as it has been appointed distribution and service partners of AgXeed BV and its range of fully-autonomous track and wheel-type tractors.

Digital competence in service, a strong personality, understanding of local agriculture and the will to be a strong, long-term partner of the

farmers were key characteristics that AgXeed looked at when selecting its distribution partners. SoilEssentials having been appointed for the northern part of England and Scotland, a southern dealer is due to be appointed by the end of the year.

"We are very excited to have been given this opportunity by AgXeed," says Gregor Welsh, SoilEssentials general manager. "The AgBot is a complete game-changer for our farming and contracting customers."

Service from the start

For AgXeed and its partners, the term service means more than just providing assistance in the event of damage or maintenance. Service begins with the consultation and analysis of the farms, up to the complete implementation of the autonomous systems from AgXeed.

With the integrated software tools, farmers can virtually plan their operations in the field in advance. The AgBot will then carry out the pre-planned task fully autonomously. It can operate with standard implements such as cultivators and drills thanks to its front and rear linkage, an electric PTO and a powerful diesel engine connected to a generator to provide electric power to the drivetrain.

With autonomy, AgXeed says size is replaced by continuity and precision in the field. These are

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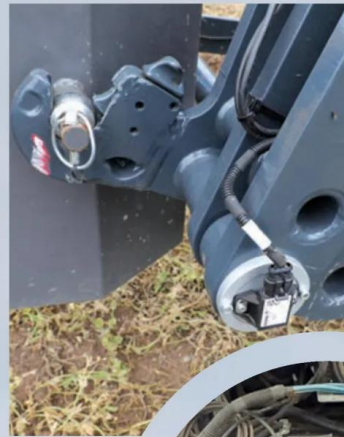
- AgXeed AgBot 5.115T2**
- Engine** 4.1-litre, 4-cylinder Deutz diesel, Stage V
- Power** 156hp
- Max torque** 610Nm
- Diesel tank** 350 litres
- AdBlue tank** 30 litres
- Drivetrain** Electric
- Working speed** 0-13.5kph
- Hydraulics** 85L/min at 210bar
- Valves** Up to 4 double-acting proportional (Load Sensing optional)
- Rear linkage** Cat 3, 8t lift capacity
- Front linkage** Cat 2 (hooks cat 3), 3t lift capacity
- Track widths** 300-910mm
- Track width adjustment** 1.8-3.2m
- Crop clearance** 42cm
- Available** From January 2023
- Starting price** From £225,000

Below: AgXeed currently offers the 5.115T2 tracked version (seen here), plus a 2.055W3 three-wheel robot and recently launched 2.055W4 four-wheel model

Below inset: An easy-to-use remote control like that for model cars is used to move the AgBot around

"The AgBot is a complete game-changer for our farming and contracting customers"





Far left: AgXeed says the hybrid diesel-electric drive offers a performance more like a six-cylinder 160-170hp tractor

Left and inset: Sensors on the three-point linkage and a powerful onboard computer help to control the AgBot

► new approaches that require distribution partners who are close to agriculture, who understand the need to manage resources differently and who believe that autonomy can be a solution.

AgXeed currently offers the 5.115T2 tracked version and the narrow track width 2.055W3 three-wheel robot, and has recently launched a four-wheel, two-wheel drive model with 55kW, called 2.055W4. Pre-orders are now being taken for all three models, and SoilEssentials claims the model seen here - a 5.115T2 tracked version

- is available for Jan 2023 delivery from £225,000.

Quick set-up

On hand to answer questions was Malte Höner from AgXeed, covering everything from how AgBots can significantly reduce soil compaction to complexity and operating costs. Taking the AgBot by remote control off the back of the truck, Malte used a downloadable app on his smart phone and GPS antenna to simply and quickly map the field boundaries with RTK correction. Precise guidance



information is also downloadable over the phone cell network direct from the farmer's PC or other compatible device.

The AgBot is powered by a 4.1-litre, four-cylinder Deutz diesel engine with 156hp and max torque of 610Nm,

however AgXeed says the hybrid diesel-electric drive means the AgBot's performance is more like a high-torque six-cylinder 160-170hp equivalent tractor.

The AgBot is designed to pull and operate implements that are 3m wide, depending on soil, terrain and implement type, which

in some scenarios could allow for wider implements. During the demonstration SoilEssentials operated with ridging ploughs, a deep cultivator and 3m disc harrows on reasonable slopes, all of which the



AgBot tackled with ease.

Fuel consumption-wise, with a 350-litre fuel tank on the demo 5.115T2, AgXeed has shown that at 70 per cent workload this lasts 20 hours. That would approximately work out at 17.5 litres per hour (at a constant 70 per cent workload) and is said to be very favourable in comparison to 'normal' tractors in this horsepower bracket.

It is expected that the AgBot will have significantly less maintenance costs than conventional tractors too, as there is simply less to go wrong - no cab, cabin interiors and controls, and it doesn't have a complicated mechanical transmission, just a well-proven diesel engine with a large capacity generator bolted to the flywheel. Engine maintenance is simple too, the standard Deutz engine requiring 500 to 600-hour oil change intervals.

AgBot in action

During the demonstration, the AgBot worked at two-hour intervals, while onlooking farmers and contractors

Right and inset: Malte used an app on his phone and GPS antenna to simply and quickly map the field boundaries

Below right: Once programmed, the AgBot will carry out pre-planned tasks fully autonomously

"I could use less staff or re-deploy my tractor drivers on to more complicated work"

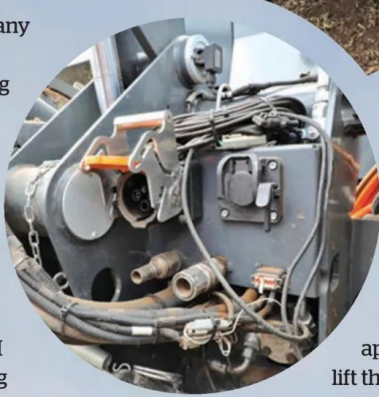
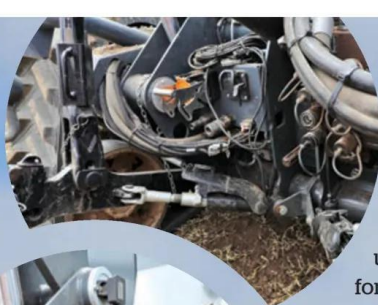
Below: Note the fertiliser pipework on top of the engine hood to blow fertiliser from the front box (3t three-point linkage) to the rear-mounted drill



Right: The AgBot is designed to reliably pull and operate implements that are 3m wide, with a partnership with Amazone

► were complimentary about its overall performance. Many could see the machine working practically on their farm, and one farmer commented: "I could quite easily see the AgBot working for us during harvest time, as I could be working away in the combine and the AgBot could be coming in straight in at the back of me to do tillage or direct drilling of the next crop or cover crop. In this scenario I could keep an eye on it when working in either the same or an adjacent field and I could use less staff and/or re-deploy my tractor drivers on to more complicated work - such as shuttling back and forth to the farm with grain trailers."

The AgBot used its 8t-capacity three-point linkage to pull an Opico 2.7m-wide Sward Lifter subsoiler, which is specifically designed to break up hard pans and surface compaction



while lifting and opening up the subsoil for aeration and drainage.

As you would expect from a GPS-guided tractor, the AgBot's passes were pinpoint accurate. You almost had to pinch yourself to see it automatically slow down on the approach to the headland, lift the implement, slowly sprag the inside track, while rotating the faster outer track to make the turn with the absolute minimum of soil disturbance and compaction. It then quickly lowered the implement again and started to head back down the field at a working speed from 0.1-13.5kph to make the next pass, again and again. It's quite an incredible sight!

Track width is adjustable from 1800mm to 3200mm (with 300mm-wide tracks) and the AgBot has four safety systems starting with LiDAR, a radar system, ultrasonic sensors - similar to those found on modern car parking systems, and finally tactile - a physical touch bar to act as an emergency stop should the other systems fail to detect an object. The AgBot can also have an optional camera mounted on top of the vehicle



Above left inset: Options include an electric-drive PTO (up to 100kW and 700v), a full set of hydraulic valves and high-voltage connectors

Above: The AgBot has four safety systems, including LiDAR, which is a more advanced version of radar

Below: Full technical support is provided by SoilEssentials, whose field engineers will be fully factory trained by the end of the year

Below right inset: The 5.115T2 fits on a standard 2.5m-wide truck or tractor trailer for ease of transporting to the field

so farmers can see in real-time where and what their AgBot is doing on a PC or portable device screen.

Next big thing

"As a technology company, automation is obviously something that we've been looking at for a number of years," says Graham Ralston, SoilEssentials hardware director. "Auto-steering application control and all of our other services are still entirely relevant to our market, and there is still a massive uptake for these products and smart Ag services.

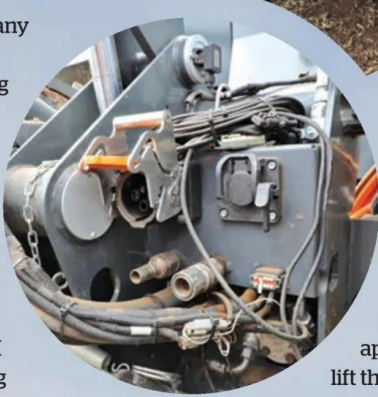
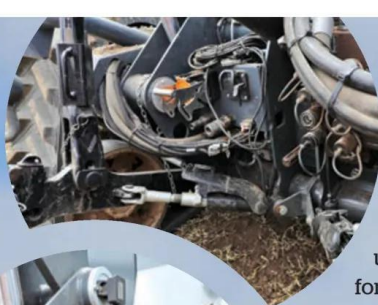
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AgXeed strategic partnerships

In a recent announcement, Claas has entered into a co-operative venture with AgXeed BV and acquired a minority shareholding in the company's international funding round as a mark of its commitment. The aim is to co-operate on the development and commercialisation of autonomous agricultural machines.

Claas says the farming industry must further increase productivity in the decades ahead to meet the needs of a growing global population. At the same time, the number of people employed in the industry, measured in terms of land area, continues to decline, while skilled labour is increasingly difficult to find and farmers still work longer hours than many other sectors.

The machinery industry has come up with various solutions to address these challenges, ranging from operator assistance and machine optimisation systems to precision farming technologies, and even autonomous machines in different size and performance classes. For Claas, collaborating with and investing in AgXeed marks a logical step towards future-proof technologies.

Netherlands-based AgXeed offers a smart, sustainable and fully autonomous system with scalable hardware, virtual planning tools and extensive data models, making it one of Europe's leading companies in this sector today. The aim is for this autonomous field robot with diesel-electric drive, wheels or crawler tracks, up to 156hp and standard three-point linkage, to assist farmers with a wide range of tasks in future.

'Innovative technologies'

"Our involvement provides Claas with access to innovative technologies in a familiar market segment and complements our own expertise in autonomy and robotics," explains Thomas Böck, CEO of the Claas Group. "In turn, AgXeed benefits from our extensive expertise and networks in many areas such as data transfer, interfaces and drivetrain solutions. It's a win-win situation in our view, and one reason why we decided to invest in this start-up company, as well as the fact that the targeted AgXeed technologies are in an advanced state of development. This solution offers farmers and contractors concrete economic added value, and what's more, it will soon be available."

"This type of co-operation reflects exactly what we stand for at AgXeed", adds co-founder Joris Hiddema. "And this means setting up future-orientated alliances between innovative companies striving for sustainable agriculture where farmers are able to optimise productivity, while preserving the soil and the environment. In Claas we have a partner on board that believes in and shares our ideas on the future and will accelerate bringing our solutions to the fields."

From an early stage of development, Amazone was also part of the financing round and with AgXeed will develop implements suitable for autonomy.



front edge of new technology and innovation, so with that in mind in 2018-2019 we started really looking at autonomous machines and began discussions. What grabbed us about AgXeed was the design and most importantly the people behind it all.

"The senior management team at SoilEssentials, including myself and Gregor, are farmers, and we are looking after the interest of other farmers and contractors. That's always been our motto, so we know what works and we know the expectations of the farmers first hand because the technology must be cost effective for us as well as our customers.

"The AgBot is very configurable, with different size tracks and electric PTO options available, and the demo machine has got pretty much

everything. However, as a development machine, it wasn't fitted with the standard anti-collision sensor bar package and track slip monitors."

With skilled labour shortages and wage pressure increases, the AgBot from AgXeed and its dealer partners offers farmers and contractors a high-tech, practical and workable solution to these ongoing issues. The AgBot's front and rear linkages and both mechanical and electrical PTO options, give the opportunity to use a low-operating cost tractor that is future proofed and can tackle a wide range of implements, drills and fertiliser boxes. Once delivered, it can be left in a field to get on with the job safely and productively for many hours unsupervised, leaving farmers and their skilled staff to do other work. **FIM**

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