



BOSCH

Joint News Release

Bosch and BASF found project house for smart seeding and fertilizing solutions

- ▶ System development for target-based placement of seeds and application of fertilizer
- ▶ Farmers profit from increased input efficiency and yield, while gaining sustainability benefits
- ▶ Market launch in South America in 2020

Curitiba (Brazil), Cologne and Stuttgart (Germany) – Bosch and xarvio™ Digital Farming Solutions from BASF are intensifying their successful collaboration in the development of digital farming solutions. For this purpose, the companies have founded a project house in Curitiba, Brazil. It enables the two partners to combine their joint research and development activities at the same location. The goal of the collaboration is to develop an intelligent system for target-based application of fertilizer and intelligent seed placement of seeds. “With our innovative solution, farmers can consider the local conditions such as field topography, soil quality, and precipitation in their work in the future. This minimizes costs, increases yield and protects the environment,” explains Andrew Allen, who is responsible for the Commercial Vehicles and Off-Road business unit at Robert Bosch GmbH.

Digital solutions for optimal crop production

The basis of the joint development provided by Bosch is the IPS – Intelligent Planting Solution (IPS) system for automatic seeding control, which was presented in 2018. The foundation of the intensified collaboration for xarvio is the FIELD MANAGER, available since 2019, with field zone-specific nutrient management and variable application maps for seeds. xarvio FIELD MANAGER is a digital solution that assists farmers to improve and automate their crop production in a sustainable way. Farmers can view

the status of their fields and get notifications and recommendations for the individual field zones. “In daily practical use, the xarvio FIELD MANAGER determines exactly which and how much seed and fertilizer will provide the optimal yield while preserving the environment,” explains Carvin Scheel, Product Engineer at BASF Digital Farming. For this purpose, xarvio brings its profound digital agronomic expertise to the project.

Smart soil sensor enables direct fertilizer dosage

For the IPS system Bosch will develop the necessary components and interfaces and handle the integration of the entire system for use in planting or seeder machines. The currently available system supports farmers working in the field with four functions. Based on the information collected by the respective sensors and digital maps for variable application, the system controls the optimal seed amount, through distance control of each plants for each row. If the fertility of the soil fluctuates across the field, IPS automatically regulates the amount of seeds without the farmer having to intervene. The IPS system also ensures an optimal distribution of seeds on curving topography by adjusting the amount of seeds for the inner and outer furrows in a targeted manner. Double sowing is avoided since the system reliably recognizes previously planted furrows and deactivates line-by-line application when passing over them again. The components of the IPS system – the control unit, the seed/fertilizer actuators, the sensors, and the power box – are all based on proven components from the automotive area. The control unit, which has been adapted specifically for IPS requirements, regulates the amount of inputs applied by the dosing units based on data from speed and seed sensors and from the satellite navigation system. Market launch for the combined seed and fertilizer dosing system is planned within the upcoming weeks.

About BASF's Agricultural Solutions division

With a rapidly growing population, the world is increasingly dependent on our ability to develop and maintain sustainable agriculture and healthy environments. Working with farmers, agricultural professionals, pest management experts and others, it is our role to help make this possible. That's why we invest in a strong R&D pipeline and broad portfolio, including seeds and traits, chemical and biological crop protection, soil management, plant health, pest control and digital farming. With expert teams in the lab, field, office and in production, we connect innovative thinking and down-to-earth action to create real world ideas that work – for farmers, society and the planet. In 2019, our division generated

sales of €7.8 billion. For more information, please visit www.agriculture.basf.com or any of our social media channels.

About xarvio Digital Farming Solutions; a brand by BASF Digital Farming GmbH

xarvio is at the forefront of the digital transformation of agriculture optimizing crop production. xarvio offers digital products, based on a global leading crop model platform, which deliver independent field-zone-specific agronomic advice enabling farmers to produce their crops most efficiently and sustainably. The xarvio products SCOUTING, FIELD MANAGER and HEALTHY FIELDS are being used by farmers in more than 100 countries worldwide. For more information please visit xarvio.com or any of our social media channels. The xarvio FIELD MANAGER is used by 36.000 farmers (total area of more than 3 million ha) in 15 countries, and xarvio SCOUTING is used by over 2.4 million farmers in 120 countries.

About Bosch Group

Mobility Solutions is the largest Bosch Group business sector. It generated sales of 46.8 billion euros in 2019, and thus contributed 60 percent of total sales from operations. This makes the Bosch Group one of the leading automotive suppliers. The Mobility Solutions business sector pursues a vision of mobility that is safe, sustainable, and exciting, and combines the group's expertise in the domains of personalization, automation, electrification, and connectivity. For its customers, the outcome is integrated mobility solutions. The business sector's main areas of activity are injection technology and powertrain peripherals for internal-combustion engines, diverse solutions for powertrain electrification, vehicle safety systems, driver-assistance and automated functions, technology for user-friendly infotainment as well as vehicle-to-vehicle and vehicle-to-infrastructure communication, repair-shop concepts, and technology and services for the automotive aftermarket. Bosch is synonymous with important automotive innovations, such as electronic engine management, the ESP anti-skid system, and common-rail diesel technology. The Bosch Group is a leading global supplier of technology and services. It employs roughly 400,000 associates worldwide (as of December 31, 2019). The company generated sales of 77.7 billion euros in 2019. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology.

As a leading IoT provider, Bosch offers innovative solutions for smart homes, Industry 4.0, and connected mobility. Bosch is pursuing a vision of mobility that is sustainable, safe, and exciting. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is to facilitate connected living with products and solutions that either contain artificial intelligence (AI) or have been developed or manufactured with its help. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is "Invented for life." The Bosch Group comprises Robert Bosch GmbH and its roughly 440 subsidiary and regional companies in 60 countries. Including sales and service partners, Bosch's global manufacturing, engineering, and sales network covers nearly every country in the world.

The basis for the company's future growth is its innovative strength. Bosch employs some 72,600 associates in research and development at 126 locations across the globe, as well as roughly 30,000 software engineers.

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