

Media Information
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Pilot project: Cars manoeuvre in production without drivers

BMW Startup Garage, venture client unit of the BMW Group, joins forces with young tech companies. Software solutions by Seoul Robotics and Embotech enable driverless mobility in plant. Pilot programme with new BMW 7 Series launches in July 2022.

Munich. The BMW Group is launching a unique project that will see cars manoeuvre around production without requiring a driver. The Automated Driving In-Plant project ('Automatisiertes Fahren im Werk', AFW) is being realised in collaboration with two startups and will enhance the efficiency of new-vehicle logistics in plants and distribution centres.

The aim of the AFW pilot project is for vehicles to move autonomously around logistics areas and assembly – safely, efficiently and without requiring a driver. To make this happen, the BMW Group has been collaborating with Seoul Robotics from South Korea and Embotech from Switzerland. Launching in July 2022 at BMW Group Plant Dingolfing, the new system will first be trialled on two cars incorporating breakthrough technologies: the new BMW 7 Series and the fully electric BMW i7 (combined consumption in WLTP: 19.6 – 18.4 kWh/100 km; combined consumption in NEDC: – ; range: 590 – 625 km in WLTP).

Automated manoeuvres from first ignition to onward transportation

"Automated driving within the plant is fundamentally different from autonomous driving for customers. It doesn't use sensors in the vehicle. In fact, the car itself is more or less blind and the sensors for manoeuvring them are integrated along the route through the plant," explains BMW Group project manager **Sascha Andree**. AFW builds on two key technologies: a sensor infrastructure to support vehicle localisation and detect obstacles in the plant environment, and a drive-planning software that transmits controlled commands to the driverless vehicles via mobile communications.

Initially, the vehicles will only move through the assembly area and then to logistics. Fresh off the production line, they will drive themselves to a



parking area, ready for their onward journey by train or truck. Essentially, the technology can be used from the moment the cars are capable of driving independently in production – just after the first ignition of the engine, in other words.

BMW Startup Garage recruits young companies for the project

Seoul Robotics's lidar detection software uses static monitoring sensors to create a digital twin of the environment, including object classification and vehicle localisation, while Embotech's drive-planning software steers, brakes, accelerates and parks the driverless vehicles. Routes are calculated in real-time, and rather than needing to be trained or programmed for the current situation, each car is able to respond independently to its surroundings.

"This collaboration, with two young startups and an OEM like the BMW Group working together on a single project, is probably the first of its kind," says **HanBin Lee**, CEO of Seoul Robotics. It was made possible by the BMW Group's venture client unit, the BMW Startup Garage. Having discovered Seoul Robotics as a potentially interesting supplier of technologies, the BMW Startup Garage initiated the first proof of concept project, with Sasche Andree and team. After a product demonstration, Embotech was welcomed on board as well. "Without the BMW Startup Garage, we would never have been able to evaluate and test our solution," says **Alexander Domahidi**, co-founder and CTO of Embotech.

The pilot project will run for several months. Later it will be rolled out further, initially on additional models at Plant Dingolfing and later in other plants as well.

Venture client approach nurtures innovativeness at the BMW Group

Automated Driving In-Plant is a ground-breaking project in the automotive industry and just one of many success stories by the BMW Startup Garage. The venture client model has been in operation since 2015, working with the startups to evaluate their potential projects. It is a leading instrument for corporate venturing and seeks to purchase their products early on rather than taking over the startups themselves.

The BMW Startup Garage has successfully carried out more than 150 pilot projects with leading startups with this approach, with a cumulative investment volume of more than US\$ 4.5 billion.

The BMW Startup Garage

The BMW Startup Garage is the venture client unit of the BMW Group. In contact with more than 1,000 startups a year worldwide, it seeks innovations that will be of strategic value to BMW Group products, services, systems and processes. The venture client approach secures early access to innovations, which can then be shaped and adapted before reaching market maturity to meet the needs of the BMW Group. For the startups, this offers valuable insights into automotive processes, an opportunity to build up networks in the industry, and support with the further development of their business plans. The aim is to evaluate startups and develop them so they become long-term partners of the BMW Group. The BMW Startup Garage has a global presence, with bases in every BMW Tech Office location: Munich, Mountain View, Shanghai, Seoul, Tokyo and, since 2020, Tel Aviv as well.

The BMW Group

With its four brands BMW, MINI, Rolls-Royce and BMW Motorrad, the BMW Group is the world's leading premium manufacturer of automobiles and motorcycles and also provides premium financial and mobility services. The BMW Group production network comprises over 30 production sites worldwide; the company has a global sales network in more than 140 countries.

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Subject Pilot project: Cars manoeuvre in production without drivers

Page 4

In 2021, the BMW Group sold over 2.5 million passenger vehicles and more than 194,000 motorcycles worldwide. The profit before tax in the financial year 2021 was € 16.1 billion on revenues amounting to € 111.2 billion. As of 31 December 2021, the BMW Group had a workforce of 118,909 employees.

The success of the BMW Group has always been based on long-term thinking and responsible action. The company set the course for the future at an early stage and consistently makes sustainability and efficient resource management central to its strategic direction, from the supply chain through production to the end of the use phase of all products.

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Embotech

Established in 2013, Embotech AG is a spin-off of the ETH Zurich. Embotech – short for 'embedded optimisation technologies' – intends to become the market leader for numerical optimisation solutions by making its core FORCES Pro software an integral component of tomorrow's decision-making systems. It is mainly active in the automotive, aviation and aerospace, and energy industries.

Seoul Robotics

Seoul Robotics is a 3D computer vision company that has developed a detection platform to advance future mobility through AI and machine learning. Founded in 2017, Seoul Robotics works with OEMs, system integrators and government authorities worldwide to diversify the use of 3D data. It has developed its own software, which is compatible with almost all the standard LiDAR and 3D data sensors and increases precision and efficiency while guaranteeing safety in a variety of sectors and applications. Seoul Robotics has branch offices in Seoul, Silicon Valley, Munich and Detroit and has the backing of leading global financial institutions.