

# Driverless transport service for assembly

Using driverless transport vehicles to supply vehicle fitters at assembly stations is not necessarily new in the automotive industry. New, however, will be their future abilities to drive freely through assembly halls, to flexibly accept orders, and to send status data.

COPY — Roger Homrich



Self-organizing driverless transportation systems in Graz bring parts replenishments to assembly stations.

**A**nyone driving through the factory premises of Magna Steyr for the first time in Graz might be surprised. What you would find is a wide range of vehicle models – from the legendary Mercedes-Benz G-Class to the BMW 5 Series as well as the new Jaguar E-PACE and Jaguar I-PACE models. The Austrian automotive company is more than a supplier of vehicle parts. Magna Steyr manufactures complete vehicles in Graz on behalf of well-known car brands. And this presents the company with the following challenge: How to make models for different customers in a single factory as flexibly as possible. Starting in 2018, the factory in Graz will produce around 200,000 vehicles each year. This means higher quantities, more models, and additional time pressure. The solution: the intelligent factory and agile manufacturing, which among other things rely on autonomous transport units for materials. In the intelligent factory of the future, machines and robots will move freely around the premises and travel alongside workers to their workstations.

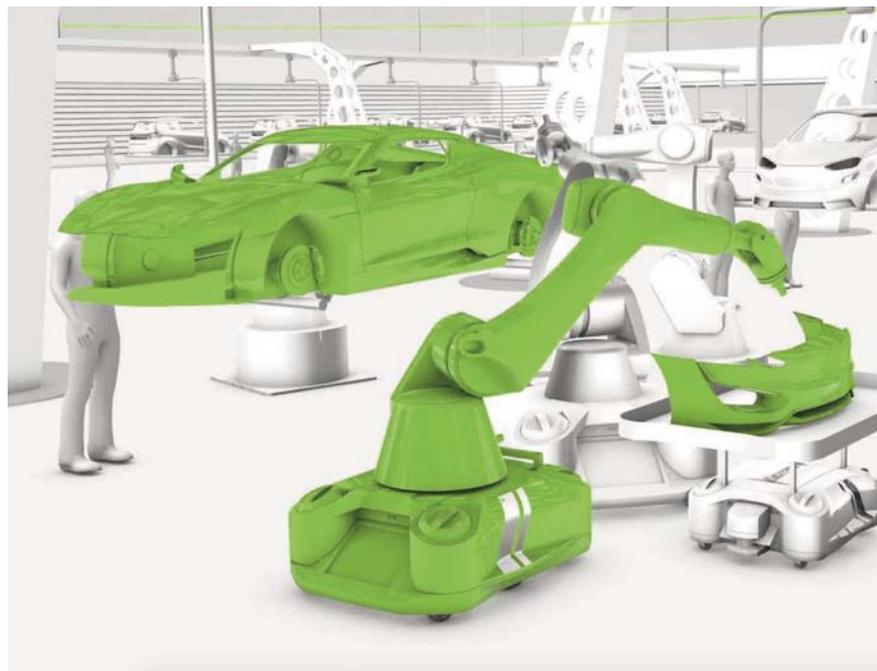
#### REAL-TIME CONTROL IN THE VIRTUAL FACTORY

To accomplish this, Magna Steyr is building a digital image of the real factory, which gathers data from planning, production, logistics, and the after-sales process. The virtual image of the entire product and manufacturing life cycle – from vehicle development to production implementation – as well as the close interconnection of all data enable intelligent manufacturing that adapts quickly, precisely, and flexibly to individual or changing requirements.

Based on this digital factory, Magna Steyr can control processes in real time and, therefore, react directly to deviations during production. To be able to do so more efficiently, the production staff needs the shortest possible paths. The control tools between production and logistics must be closely interlinked and build upon one another to accomplish this. The ability to virtually contrast multiple models not only reduces the need of employees moving around the facility, but also ensures faster production through parts pre-

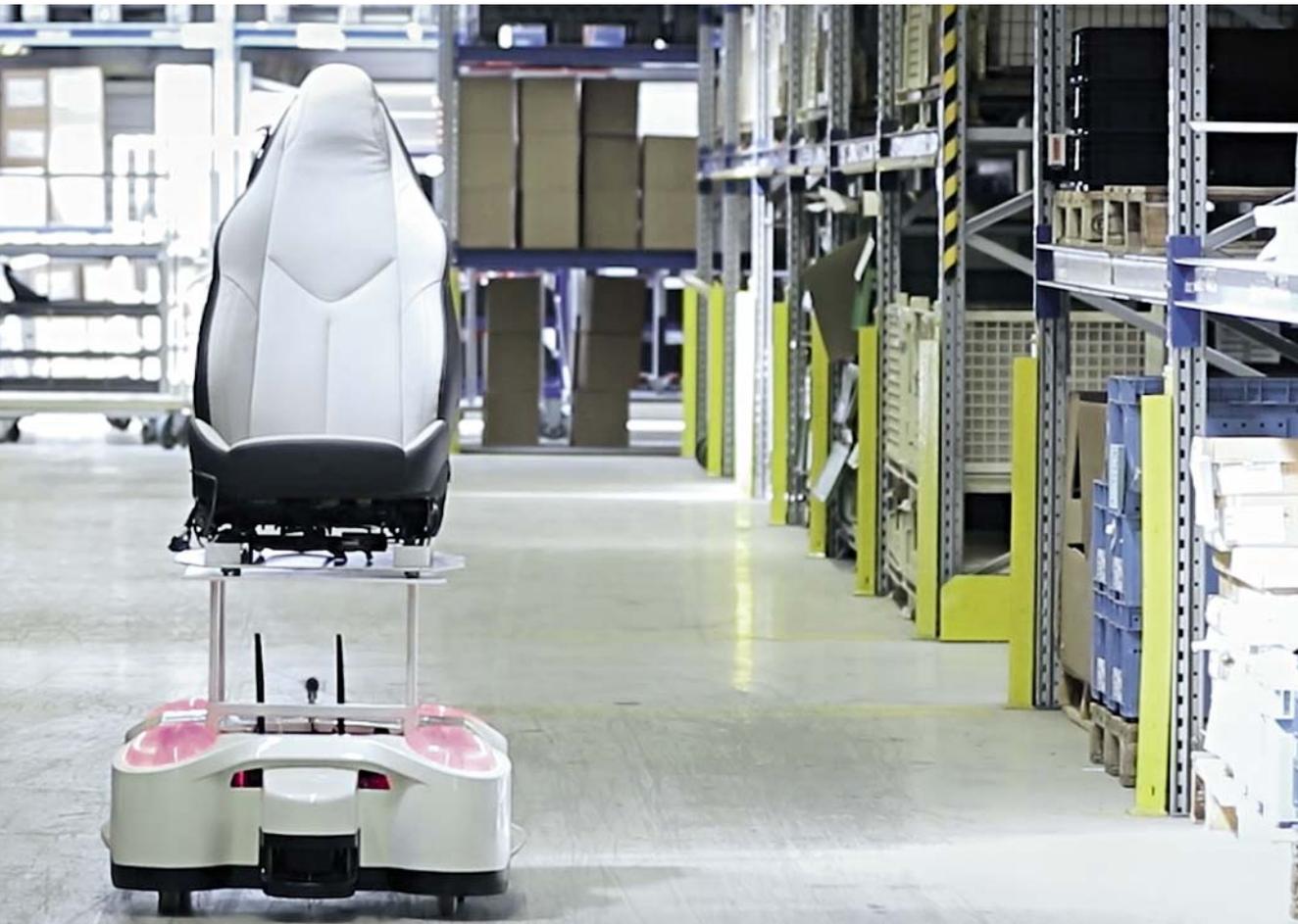
#### MAGNA STEYR

More than 100 years of experience in the automotive industry and its comprehensive range of services make Magna Steyr the world's leading, brand-independent engineering and manufacturing partner for vehicle manufacturers. The company's broad portfolio of services includes engineering services of systems and modules to the overall vehicle, as well as total vehicle production with flexible solutions from niche to volume production on a world-class level. As a contract manufacturer, Magna Steyr has so far produced more than 3.3 million vehicles, comprised of 23 models. Behind all these services are 12,000 employees at more than 25 locations on three continents.



At Magna factories, the parts used in car interiors and exteriors are transported from the warehouse to the robot by autonomous transportation systems.

One big benefit of using autonomous systems is their ability to reduce lead and retooling times, and thus costs, in automotive production.



Magna employs autonomous transport units to supply material to the production lines at its factory in Graz, Austria.

distribution in the planning phase. Self-organizing driverless transport systems ensure the supply flow of the components required in the halls.

**3D MAP OF THE DIGITAL FACTORY**

“Driverless transport systems have been used by the automotive industry for decades,” says Christoph Kramer, technology control specialist for overall vehicle production at Magna Steyr. “However, the previous systems were track-guided, which means they could only move along defined routes, for example, along magnetic strips of tape embedded in the floor of the hall.” Magna Steyr wants to replace this rigid route guidance system to make production even more flexible. If the driverless transport systems were able to move freely in the assembly hall, there would be no further need for rigid production lines. “Autonomous transport units allow more flexibility in terms of variant and model mix while reducing lead time, changeover time, and costs,” explains Kramer.

For driverless transport systems, this means: They transport materials, machines, and robots in the intelligent factory of the future, as well as the car itself in the final stage of development. A 3D map of the digital factory allows the driverless transport systems to move freely. The transport system scans the environment with sensors, overlays the data on the map, and freely determines the position in the room. It can then navigate and travel to destinations along any route without colliding with objects.



**“Autonomous transport units let us be more flexible in our mix of models and options.”**

**CHRISTOPH KRAMMER,**  
Technology Control Contract  
Manufacturing Magna Steyr

**IOT SOLUTION FOR PREDICTIVE MAINTENANCE**

The driverless transport systems have a key role in agile manufacturing. If they fail, the production falters because vehicle parts will be missing at the individual assembly stations. Therefore, Magna Steyr was looking for a solution that records and controls the statuses of the transport systems in real time. “The keyword is predictive maintenance,” says Kramer: “Using the sensor data, we can deduce when it’s time for maintenance, for example. In addition, we record loads to be able to make continuous runs for the thorough checks of the driverless transport system, for example.”

Magna Steyr relies on an IoT solution from T-Systems to capture and send machine status data via radio networks to analysis software. If all driverless transport systems are equipped with sensors that transmit via radio in the future, large amounts of data will be generated that could be sent to the cloud. There, the data are analyzed in real time and provided to the factory control. If the data deviates from optimum conditions, the software triggers an alarm and the transport systems can be maintained in a targeted manner without any loss of production.

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