



ZF is First in Germany to Fly Drones over Plant Premises

- **Receives first approval in Germany for the automated drone flying of spare parts on factory premises**
- **Drone flies replacement parts from central warehouse to maintenance workshops at ZF's Plant 2 in Friedrichshafen**
- **Industry 4.0 solution improves internal logistics on site**
- **Long-term goal is for drones to assist in package deliveries**

Friedrichshafen, Germany. ZF is the first company in Germany to receive official approval for automated drone flights over factory premises. A drone prototype has recently started flying spare parts such as sensors or control cards from the central warehouse to workshops. As soon as the test flights are complete and drones properly deployed, such flights will relieve vehicle traffic at the plant and save time on the up to one kilometer-long delivery routes that are often on the upper floors of buildings. In the long term, packages could even be delivered outside of factory premises, for example to facilitate package delivery in residential areas that are difficult to access.

The six-motor drone can transport up to five kilograms in weight by air – or three kilograms of goods after taking into account the grippers and transport box. This is sufficient for the vast majority of spare parts and tools that need to be transported on company premises. Safety is also a top priority when transporting goods by drone. The 30 km/h hexacopter mainly flies over the roofs of plant buildings and only crosses driveways and sidewalks where there is no alternative. The rechargeable battery, which provides around 30 to 40 minutes of electrical flight operation, is also redundant, just like the propellers and motors. The drone is therefore still maneuverable even if one motor fails.

“At the IAA Commercial Vehicles show in Hanover this year, we showed the technologies which we are developing to enable the autonomous depot. With the drone, we are taking the transport chain to the next



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level," said Fredrik Staedtler, head of ZF's Commercial Vehicle Technology division.

"With approvals for automated drone flights from the Stuttgart Regional Administrative Authority and the German Air Traffic Control DFS, we can accelerate logistics processes in the plant and at the same time strengthen our technological leadership position.

"Chief Maintenance Technician Michael Wiest took advantage of 'agile working' at ZF and very quickly and creatively implemented logistics-by-drone from an initial idea – one which was belittled by some in the beginning. He pushed the project forward when policymakers were only considering allowing fully automated drone flights but had not yet drafted legal provisions," continued Staedtler.

Drones, mostly equipped with cameras, could until now only be used privately or commercially for mapping, monitoring factory fences or surveying, for example. ZF is now the first company in Germany to use automated drones to transport goods on its plant premises.

"We still need to make some adjustments to achieve a completely smooth flight before our delivery drone can be permanently integrated into the logistics process chain," said Matthias Haberstroh, head of Supply Chain Management at ZF's Commercial Vehicle Technology division. "The transport system was extensively tested by our supplier, but we still had to further test a number of different navigation sensors on site in Friedrichshafen which also ensure precise positioning between the plant halls."

Using drones on factory premises is an addition to ZF's activities in the Industry 4.0 sector that makes business sense. In the mid-term, other companies could also use the delivery drones industrialized by ZF on their premises. In the long-term, delivery drones could also be used outside of protected factory premises to support couriers, express and parcel services where their delivery vehicles cannot enter narrow cul-de-sacs or other delivery areas which are difficult to access.



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Captions:

- 1) An automated delivery drone transports an urgently needed spare part to the maintenance workshop by air.
- 2) Transporting up to three kilograms and at 30 km/h – the batteries of the drone, a hexacopter, are sufficient for a 30-40 minute flight.
- 3) Agile project: Michael Wiest not only had the idea for an automated delivery drone, he showed how quickly it could be realized.

Images: ZF

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ZF is a global leader in driveline and chassis technology as well as active and passive safety technology. The company has a global workforce of 146,000 with approximately 230 locations in some 40 countries. In 2017, ZF achieved sales of €36.4 billion and as such, is one of the largest automotive suppliers worldwide.

ZF enables vehicles to see, think and act. The company invests more than six percent of its sales in research and development annually – in particular for the development of efficient and electric drivelines and also in striving for a world without accidents. With its broad portfolio, ZF is advancing mobility and services for passenger cars, commercial vehicles and industrial technology applications.

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