



## **World premiere at Hannover Messe: ZF's highly automated forklift can see, think and act**

- **High-speed innovations: Technology company transfers expertise from other divisions to the Industrial Technology Division**
- **ZF Innovation Forklift is trade fair highlight: networking and highly automated driving functions for forklift trucks**
- **ZF solutions with automation, electrification and digital networking**
- **New ZF Cloud increases the efficiency of industrial applications**

**Hanover/Friedrichshafen. ZF links intelligent mechanical systems with digital solutions. This USP enables ZF to offer attractive industrial technology products. ZF proves this at Hannover Messe by introducing its ZF Innovation Forklift – a highly automated, electrified and fully networked forklift truck. This is the first time the company has transferred the technology that supports its motto "see. think. act." to a materials handling application. This world innovation in the industrial technology sector has embraced current megatrends in the industry, thus ensuring greater efficiency and safety while simultaneously lowering operating costs.**

ZF's Industrial Technology Division has benefited from the Group's broad expertise in the passenger car and commercial vehicle sectors. This is shown by a world premiere at this year's Hannover Messe. With the ZF Innovation Forklift the Group presents the first ever materials handling vehicle that can see, think and act. It is a fully networked electric forklift truck with highly automated driving functions equipped with camera and radar systems that enable it to see its surrounding environment. The data that these systems generate are analyzed by the ZF ProAI central computer, which is based on an artificial intelligence software that has already been proven in other innovative prototype vehicles modeled on passenger cars and tractors. Intelligent actuating elements – such as the ZF electric rear axle steering for forklift trucks –



**PRESSE-INFORMATION**  
**PRESS RELEASE**

Page 2/5, April 23, 2018

and the electric ZF single-wheel drive carry out the control unit's given commands.

**Bundling competencies for industrial technology megatrends**

“We are already playing a leading role when it comes to highly automated and autonomous driving – and that also includes industrial technology. It is no longer just about launching outstanding solutions that offer customers major benefits on the market. It's about speed. The ZF innovation teams have proven this here in Hanover with their new products,” says ZF CEO Wolf-Henning Scheider. “The highly automated ZF Innovation Forklift is the result of bundled know-how to create a unique and comprehensive solution that essentially embraces the main requirements of the industry: reducing costs and making materials handling processes far more efficient.”

The ZF Innovation Forklift bundles digitalization, automation, electrification and networking. It paves the way toward autonomous materials handling vehicles of the future. This highly automated forklift truck completes work orders by independently going to the storage location, picking up the goods and delivering them to the customer. Equipped with an extremely powerful electric drive and featuring a lifting capacity of up to 3.5 tons, the ZF Innovation Truck is coming well within range of the diesel-operated forklift trucks broadly used outdoors; and it generates zero emissions. ZF supplies the purely electric drive as a system solution and has streamlined the forklift truck's energy management so that it can hold a battery charge for at least one shift. This means that operators do not have to have as many replacement batteries on hand and can therefore reduce costs considerably. Intelligent object and pedestrian detection is a major safety bonus when the vehicle is in operation. The ZF Innovation Forklift sensors record people or stationary objects such as pallet cages or simply pallets. The data interpreted in the ZF ProAI central control unit results in a corresponding command that tells the vehicle to either stop or drive around the obstacle. Deep learning algorithms help to anticipate the great variety of potential scenarios in high speed and then trigger adequate reactions. In other words, artificial intelligence can help to



**PRESSE-INFORMATION**  
**PRESS RELEASE**

Page 3/5, April 23, 2018

prevent work accidents and injury to people or material damage. The vehicle can also prioritize orders itself and thus make decisions regarding the optimal sequence and route. An essential factor in this is how the ZF Innovation Forklift is networked. It can operate in a digitalized production network and there communicate both with the materials management system, infrastructure and other vehicles. The cloud-based, dynamic fleet management allows the data from the individual forklift trucks to be efficiently managed and analyzed. The system takes into account, for example, the current battery charge status during all driving operations and schedules the recharge time at which the forklift truck should independently head toward the charging station.

**Internet of Things for all industrial sectors**

When looking at the issues of data management and data analytics, in particular, networking the most diverse systems to one IoT platform is an essential cornerstone for industrial technology in the future. The ZF Cloud is an open, scalable IoT platform that can be flexibly used across many industries. It offers the option of collecting data and analyzing it in real time using the most powerful analysis tools and also networking with a large number of individual functions and participants. The first users of the ZF Cloud include, among others, ropeway operators who prevent unforeseen downtimes using the system's predictive maintenance function. On wind farms, networked wind turbine gearboxes continuously calculate the optimal operating mode using the data available. ZF Cloud users can integrate external information and save it in a protected area. ZF's internal telematics platform called Openmatics is also networked with the ZF Cloud.

ZF will be presenting its comprehensive portfolio in Hall 22, Booth A20 up until the last day of Hannover Messe on April 27, 2018. For more detailed information, please refer to our press kit under <https://www.zf.com/hmi>.



**PRESSE-INFORMATION**  
**PRESS RELEASE**

Page 4/5, April 23, 2018



Captions:

- 1) *ZF Innovation Forklift Image* – World premiere for the materials handling vehicle of the future: The ZF Innovation Forklift connects intelligent mechatronic systems with innovative and networked data management.
- 2) *ZF Innovation Forklift capable of evasive maneuvers* – Highly automated driving functions ensure greater work safety. The ZF Innovation Forklift independently drives around obstacles and comes to a stop if people are in its path.
- 3) *ZF Innovation Forklift system presentation* – Fast industrial technology innovations thanks to technology transfer. ZF's comprehensive technology portfolio enables the ZF Innovation Forklift to see, think and act.
- 4) *Ropeway* – smart data management for uninterrupted winter sports fun. At the Austrian ski area Ötztal, ropeway operator Doppelmayr relies on the ZF Cloud for system monitoring and performance management.
- 5) *Wind farm* – predictive maintenance reduces downtimes and operating costs. As an innovation leader in wind turbine gearboxes, ZF offers wind farm operators digital and networked solutions for predictive maintenance.

Images: ZF



**PRESSE-INFORMATION**  
**PRESS RELEASE**

Page 5/5, April 23, 2018

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**ZF Friedrichshafen AG**

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. ZF is one of the largest automotive suppliers worldwide.

ZF allows 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 in the automobile, truck and industrial technology sectors.

For further press information and photos, please visit: [www.zf.com](http://www.zf.com)