

ZF LIFETEC@ AIRBAG 2024: Speed meets robust paths to market

- **At AIRBAG 2024 from November 25 to 27 in Mannheim, ZF LIFETEC will present system solutions for the international automotive market**
- **Vehicle manufacturers are in the midst of a paradigm shift.**
- **The Chinese automotive market is on its way to becoming a driver of innovation, regulation, and revenue**
- **ZF LIFETEC meets the challenges of its customers**

The global automotive industry is in the midst of a paradigm shift. Megatrends such as electromobility, semi-autonomous driving and new interior concepts are hitting the roads worldwide. In addition, new vehicle manufacturers are entering the market. Today, the Chinese automotive market is not only growing in importance in terms of revenue but is also becoming a driver of innovation and regulation. The result: With the proliferation of brands, competitive pressures on vehicle manufacturers are increasing, development cycles are shortening, and regulatory and consumer rating requirements for vehicles are rising. As a specialist for passive safety technology, ZF LIFETEC specifically addresses the challenges of its customers and will present system solutions for the international automotive market at AIRBAG 2024 in Mannheim.

"Automotive suppliers are in the midst of a paradigm shift and at the same time under enormous pressure in terms of competitiveness, speed and technical complexity," explains Rudolf Stark, CEO of ZF LIFETEC. "While Europe and North America used to shape the essential developments in the past, today the Asian markets are taking the lead. This applies not only to key technologies, but also to the associated specifications and voluntary commitments. In order to support our customers in this dynamic and challenging environment, we are constantly questioning existing approaches, focusing on fast and robust product development, and consistently applying the experience gained from our development work in the Asian markets worldwide," continues Stark.

Different markets have different passive safety requirements

The importance of adaptive restraint systems will continue to grow with global automotive trends such as automated driving and the resulting interior concepts of the future. According to Stark, reliable occupant detection is the key to better adapting restraint systems to real accident situations. That is why ZF LIFETEC has developed a camera-based occupant classification system and algorithms to adjust the restraint systems based on this information. According to the CEO of ZF LIFETEC, the goal is to use adaptive concepts to better protect a wide variety of occupants with different body sizes and seating positions in the event of an accident. Seatbelt forces and airbag settings react to different parameters such as weight and seating position an

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important step toward improving so-called "Real-Life Safety," which aims to adapt safety systems to the actual situation in the vehicle. With the Dual Contour Airbag, ZF LIFETEC has two adaptive system solutions in its portfolio that can help covering these scenarios. These are adaptive airbag solutions for the driver and front passenger that can inflate the airbag with two different volumes within milliseconds, depending on the seating position - either reclined in a relaxed position or upright in a standard seating position. Another adaptive solution from ZF LIFETEC is the ACR8 family of seatbelt retractors, which, equipped with a switchable force limiter, can variably adapt the restraint forces to the size and seating position of the occupants. "With this combination of occupant classification, adaptive actuators, and active bag vents, ZF LIFETEC offers an innovative overall package that allows vehicle manufacturers to prepare for tomorrow's safety requirements," explains Stark.

New comfort demands require new interior concepts

Autonomous driving is not just about innovative and adaptive restraint systems. Vehicle interiors are also changing. In order to expand the design possibilities of forward-looking interior concepts, ZF LIFETEC has developed a concept for a new generation of steering wheels that increases their functionality as an interface between the driver and the vehicle and significantly expands their role as a human-machine interface (HMI). The newly developed steering wheel from ZF LIFETEC picks up on the trend toward seamless designs that has become popular in recent years, especially with smartphones, and is reflected in modern vehicle interiors. As a result, the horizontal spoke of the new steering wheel becomes a continuous surface that can be equipped by vehicle manufacturers with pressure-sensitive controls for entertainment and assistance functions. Since the steering wheel also has a protective function in the event of an accident, ZF LIFETEC has come up with an innovative solution. Since the horizontal spoke is no longer available as a carrier for the driver's airbag due to the new functional elements, ZF LIFETEC places the driver's airbag behind the steering wheel rim instead of in the steering wheel hub. In the event of an accident, the airbag deploys from behind the steering wheel towards the driver. In addition, the new seamless steering wheel can be equipped with established sensor-based technologies such as Hands-On Detection. "With this new concept, we are enabling design freedom for steering wheels without compromising safety," summarizes Stark, "and thus presenting a ready-to-use solution for vehicle manufacturers who are already working on new interior concepts today."

Shortening development cycles with innovative testing methods

In addition to increasing regulatory requirements and automotive megatrends such as automated driving, significantly shortened development cycles are another challenge for vehicle manufacturers. Here, too, ZF LIFETEC is leading the way by introducing the "Hyper Dynamic Response Actuator" (HyDRA®), a new tool for validating and verifying seat belts. This is an electrically driven sled system that can be used to perform highly

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dynamic belt system tests with the highest level of accuracy and reproducibility. The concept of the system allows the combined pre-crash and crash phases to be performed in one test, which is a challenge for traditional sled systems. This capability is becoming increasingly important for the investigation of real-world crash scenarios with hard braking immediately before the crash, triggered by increasingly widespread driver assistance systems such as emergency braking assistants. In combination with detailed numerical simulation models for the same crash scenarios, HyDRA® allows a very efficient validation and verification of adaptive seat belt systems over extensive parameter fields, such as different occupant sizes, weights and positions combined with different crash scenarios and severities. In addition, AI algorithms can be applied to existing HyDRA® test results to identify correlations and characteristics, thereby reducing testing effort. "In this way, we can learn even more from the HyDRA® tests and further accelerate our development in order to shorten the development cycles of vehicle manufacturers," says Stark.

Maintaining competitiveness through process efficiency and safety

To withstand increasing competitive pressure, vehicle manufacturers need reliable partners whose products meet the highest safety standards. This is especially true for gas generators, airbags, and seat belt systems, which save lives worldwide every day and are manufactured by ZF LIFETEC in international markets under the most stringent quality requirements. This is based on a global R&D network, highly automated and standardized production lines, and a worldwide network of static and dynamic test facilities, whose data in turn form the basis for the continuous development of ZF LIFETEC's safety solutions. This enables ZF LIFETEC to offer process reliability for its passive safety solutions that vehicle manufacturers around the world can rely on.

For more information on the products mentioned, please refer to the current press kit at www.zf-lifetec.com/newsroom.

Further innovations from ZF LIFETEC at AIRBAG 2024

In addition to the innovations already mentioned, ZF LIFETEC will present further new developments and improvements in the field of seat belts and airbags:

- Pre Crash Dual Stage Side Airbag
- Bag in Roof Airbag
- Slim IP Passenger Airbag
- SHI3 Gasgenerator
- FI1 Gasgenerator
- PHI7 Gasgenerator

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Captions:

ZF_LIFETEC_Dual_Contour_AIRBAG_2024_1

The dual-contour driver airbag can inflate in two different sizes, depending on the seating position and the size of the driver. ZF LIFETEC will present this and other adaptive system solutions at AIRBAG 2024 in Mannheim, Germany, from November 25 to 27.

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With the increasing variety of brands, competitive pressure is rising, development cycles are getting shorter, and regulatory and consumer protection requirements for vehicles are becoming more stringent. ZF LIFETEC is meeting these challenges by presenting system solutions for the international automotive market at AIRBAG 2024 in Mannheim, Germany, at booth 26.

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About ZF LIFETEC

ZF LIFETEC is a leading passive safety technology provider for enhanced protection of vehicle occupants. Employing around 36,000 employees dedicated to the mission of saving lives with a technology driven approach, the company develops, manufactures and distributes a comprehensive product portfolio including airbag, seat belt and steering wheel systems, covering a wide range from small vehicles in the volume segment up to sophisticated luxury vehicles. Featuring a market share exceeding 20 percent in its core product categories, ZF LIFETEC has a worldwide presence at 51 locations across 22 countries. In the fiscal year 2023, the Group generated sales of EUR 4.6 billion. Based on its strong relationships with a diversified customer base of global OEMs, driven by outstanding quality, long-standing R&D collaborations besides a strong global innovation platform, ZF LIFETEC is well positioned for future growth opportunities arising from the automotive megatrends electrification, (semi-) automated driving, smart interior, as well as increasing safety demands and stepped-up safety regulations worldwide.

Learn more at www.zf-lifetec.com

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