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ZF at UITP Barcelona 2023: Showcasing the Autonomous, Connected and Electrified Future of Public Transportation

- **Europe Premier: Presenting its latest eMobility solutions, ZF's new "CeTrax 2 dual" electric central drive for intercity buses and coaches will be unveiled.**
- **ZF will also exhibit its fully electric next generation shuttle for autonomous driving in urban environments and mixed traffic, advanced SCALAR fleet orchestration platform and Bus Connect digital fleet management solution.**
- **ZF's first Collision Mitigation System (CMS) designed for city buses will be featured in addition to its high performance EcoLife 2 transmission system for buses & coaches.**

Friedrichshafen, Germany and Barcelona, Spain. Focusing on autonomous, connected and electrified systems, ZF will showcase its latest bus and coach technologies at the 65th UITP Global Public Transport Summit 2023 in Barcelona. Through exhibits, digital and live presentations as well as innovation tours organized by the UITP, ZF will present its expanding portfolio of advanced systems and solutions that are setting new industry benchmarks in safety, efficiency and sustainability for buses and coaches as well as the new-generation autonomous Level 4 shuttle. This includes how ZF is helping shape the future of public passenger transport with innovative electrification systems, automated applications and intelligent connectivity solutions.

CeTrax 2 dual Electric Central Drive

ZF will further underline its commitment to the fully electrified future of emission-free public transportation by presenting its latest eMobility technologies. This includes the European premier of ZF's next generation fully integrated, modular CeTrax 2 dual electric central drive



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system for buses. CeTrax 2 dual features an integrated three-speed transmission. This, together with the system's low weight of 385 kg, makes tackling steeper slopes and challenging topographies easier, delivering a high continuous performance of 380 kW.

Full-range supplier for autonomous transport systems

The way of mobility must change in the future if we seriously want to achieve the 1.5 degree target. In addition to a consistent electrification of transport, new mobility concepts are necessary in order for countries and cities to be able to meet the ambitious climate targets – and at the same time offer commuters and residents an attractive living space. With its autonomous transport systems ZF makes an important contribution to mobility change: Autonomous, emission-free ZF Shuttles can operate on defined routes 24 hours a day, 7 days a week. Public transport operators can provide passengers with a mobility service even when demand is low and expand routes to meet increased demand against a backdrop of acute driver shortages.

The new ZF Level 4 shuttle, which is capable to maneuver fully electric in mixed traffic without a safety steward, underlining this support for autonomous, silent and emission-free urban passenger transportation. With selectable battery capacities between 50 and 100 kWh, the next-generation shuttle can cover up to 130 km in purely electric mode. This is at an initial maximum speed of 40 km/h, with further development underway to achieve 80 km/h.

As a technology leader, ZF sees itself as a partner for the entire life cycle of its shuttles. In addition to the autonomous vehicle, ZF offers a reliable overall package of hardware and software as well as services for planning and operating autonomous shuttle fleets in automotive-grade quality. In addition, ZF customers can rely on a global network of 20,000 ZF Aftermarket partners in the future.



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SCALAR Passenger Transportation

Presenting its latest advanced connectivity solutions, ZF will demonstrate its new SCALAR fleet orchestration platform for AD driven vehicles. Offering fleets real-time, AI-based automated decision-making and optimization, SCALAR delivers advanced operational efficiency and can seamlessly “orchestrate” passenger transportation. In the UITP project ULTIMO, ZF’s new SCALAR platform has already been applied.

ZF Bus Connect with Ecolife Health-Check and ITxPT compatibility

ZF Bus Connect is ZF’s digital fleet management solution for city buses and coaches with electric, hybrid or combustion engines. It is designed to help transport companies and bus OEMs to save cost, increase safety and improve bus fleet operations based on data insights and analytics. At UITP World Congress ZF Bus Connect is launching its brand new “EcoLife Health Check” module, which is dedicated to raise vehicle uptime. It is ZF’s entry into remote diagnostics for bus fleets. Health Check gives an indication on the actual condition of the transmission based on data from the transmission system itself (engine speed, gear step, oil temperature, oil pressures, etc.). As the data is collected online, there is no need any more to call the investigated bus back into the depot for analysis. Operators, who make best possible use of the transmission oil, as an example, can avoid early maintenance and thus reduce maintenance cost and increase uptime.

By default, ZF Bus Connect provides many additional features to optimize driving, avoid dangerous situations, optimize energy or fuel consumption, overlook battery charging status as well as break or other systems’ wear in an ITxPT compatible way.

Safety: Braking Assist System for City Buses

ZF will also present its first Collision Mitigation System (CMS) specifically designed for city buses. The pioneering system offers active braking to help mitigate or even avoid the impending collision with



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other road users. Building on ZF's extensive safety systems expertise, ZF's City Bus CMS draws on its latest OnGuardMAX technology for heavy trucks – with specific features and functionalities that are tailored to city bus applications.

Combining the data from its state-of-the-art camera and radar provides continuous analysis of the traffic situation. If an impending collision is detected, the system can issue a Forward Collision Warning (FCW) and automatically apply the brakes to help mitigate or even avoid a collision. Combined with ZF's advanced braking capabilities that are calibrated with the vehicle's speed and weight, the adverse effects of sudden braking on passengers can also be minimized. With seamless interaction between ZF's ADAS and braking system, brake pressure is carefully applied across the braking cascade making unsecured passengers less likely to be jolted and put off-balance.

EcoLife 2 Automatic Transmission

ZF will also demonstrate its EcoLife 2 automatic transmission. With EcoLife 2, further fuel savings of up to three percent can be achieved for buses compared with previous generation transmission. At the same time, the new design is more lightweight, robust and easier to maintain. Modern features include a stop-start capability for all model variants, a rolling function as well as fast, yet gentler and more comfortable, gear switching. The transmission control has many new functions and ZF has also expanded the range of applications. It now provides EcoLife 2 variants that are suitable for coaches up to 2,800 Nm thanks to a slightly higher torque range. EcoLife Coachline sets a new industry benchmark in coach transmission system performance and efficiency.

Visit ZF in Hall 6 at Stand C152

Fira Barcelona Gran Via, Av. Joan Carles 1, Barcelona, Spain
4-7 June 2023. For more information about ZF's participation at UITP Barcelona 2023, please visit www.zf.com/UITP-2023.



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ZF Expert Talk at UITP Barcelona 2023, June 5

ZF expert Bernd Wachter will speak in the Spotlight Forum B (Hall 6) of UITP on the latest technologies and key industry topics between 4.15 p.m. and 5.30 p.m. local time on June 5. This will include an introduction to ZF's expanded technology portfolio for buses and coaches.

Captions:

ZF is showcasing autonomous, connected and electrified public transport solutions at the UITP 2023 World Congress:

- 1) CeTrax 2 dual electric central drive.
- 2) ZF's next shuttle generation
- 3) Digital fleet orchestration with SCALAR
- 4) Digital fleet management solution ZF Bus Connect
- 5) Collision Mitigation System CMS for city buses
- 6) EcoLife 2 automatic transmission

Images: ZF

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About ZF

ZF is a global technology company supplying systems for passenger cars, commercial vehicles and industrial technology, enabling the next generation of mobility. ZF allows vehicles to see, think and act. In the four technology domains of Vehicle Motion Control, Integrated Safety, Automated Driving, and Electric Mobility, ZF offers comprehensive product and software solutions for established vehicle manufacturers and newly emerging transport and mobility service providers. ZF electrifies a wide range of vehicle types. With its products, the company contributes to reducing emissions, protecting the climate and enhancing safe mobility. With some 165,000 employees worldwide, ZF reported sales of €43.8 billion in fiscal 2022. The company operates 168 production



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locations in 32 countries. For further press information and photos, please visit:
www.zf.com

About CVS Division

ZF's Commercial Vehicle Solutions (CVS) division is helping shape the future of commercial transportation ecosystems. Our mission is to be the preferred global technology partner to the commercial vehicle industry. Powerfully combining ZF's commercial vehicle systems expertise, extensive technology portfolio and global operations, the division serves the full commercial vehicle industry value chain. As the automotive industry progresses towards an increasingly autonomous, connected, and electrified (ACE) future, ZF's CVS division innovates, integrates and supplies components and advanced control systems that help make commercial vehicles and fleets operate more safely and sustainably. CVS unites ZF's former Commercial Vehicle Technology and Commercial Vehicle Control Systems divisions, the latter being formed following ZF's acquisition of WABCO in Spring 2020.