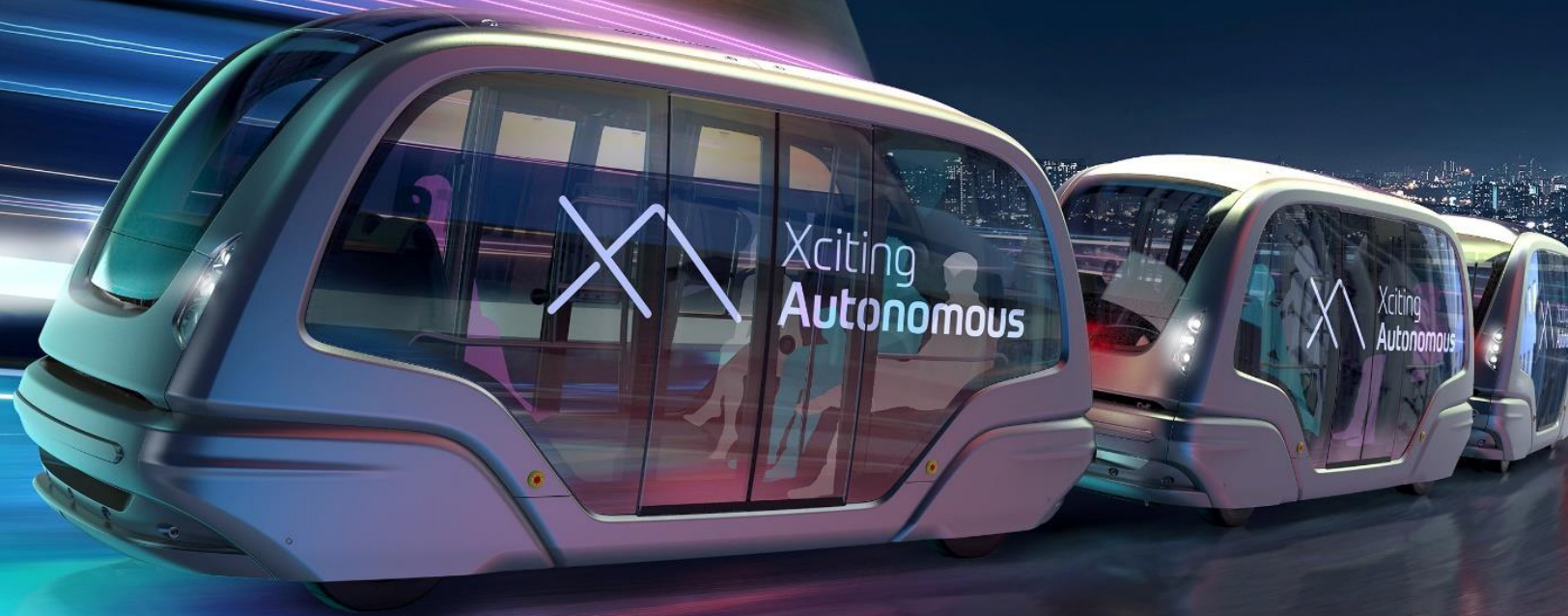


Mobility Solutions

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Exhausted volume of individual traffic



Crowded or empty buses

Challenges of Urban Mobility



Challenge: Connection to rural areas



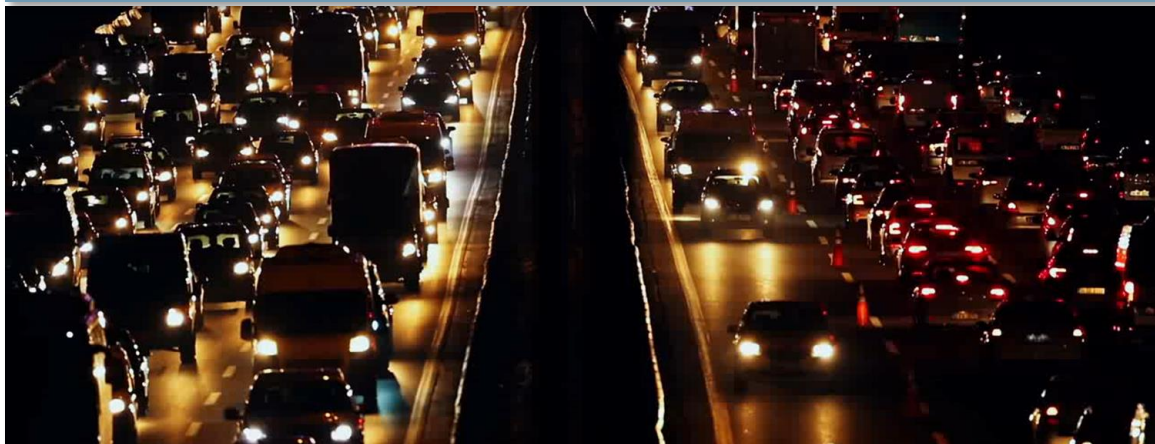
Pollution

The transformation of urban mobility is absolutely necessary

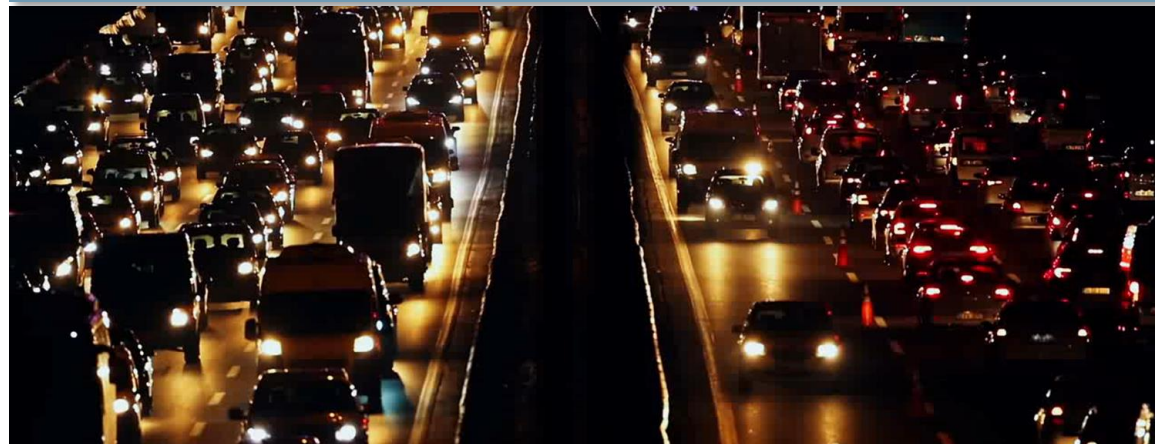


Technology alone will not solve the challenges in mobility

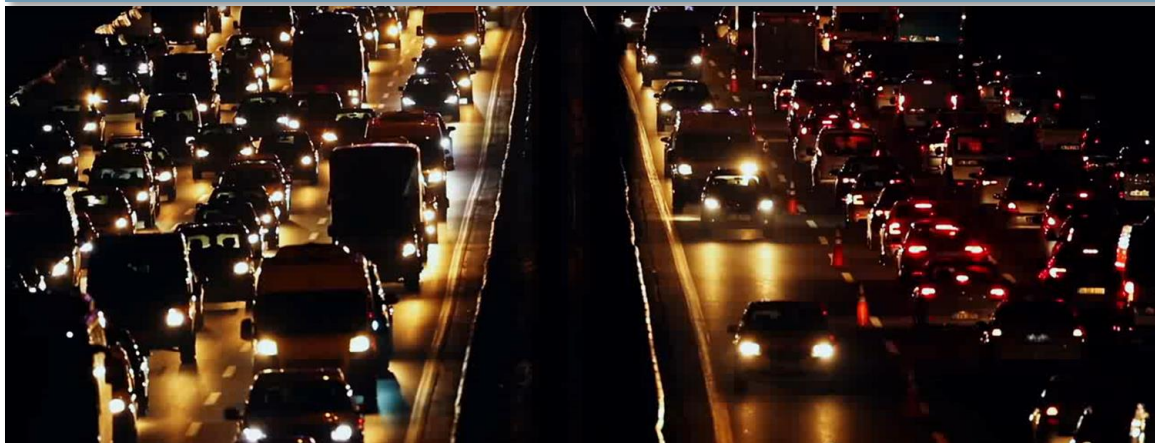
Cars



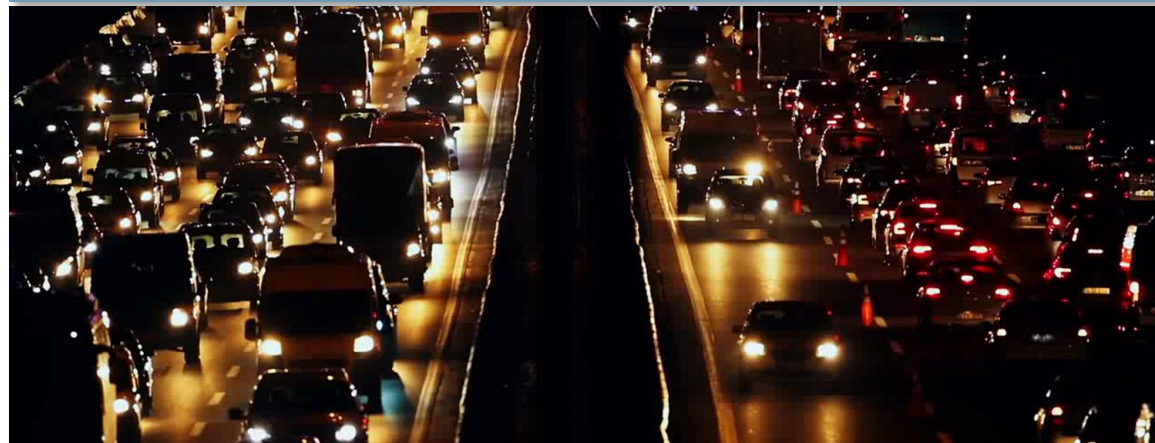
Electric vehicles



Autonomous vehicles



Robotaxis



We help you shaping the future of mobility!

ZF Mobility Solutions is consulting and accompanying mobility providers in the planning and implementation of autonomous mobility systems and MaaS-solutions.

ZF Mobility Solutions realizes automated transit applications able to operate on either segregated infrastructures, dedicated lanes or in mixed traffic.

**Our goal:
Clean, efficient and comfortable transport with autonomous vehicles.**

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ZF Shuttles – goals reached until 2020



Autonomous vehicles
in use since **1997**

>100 millions of
kilometers driven

>14 millions of
passengers carried

Market leader in
autonomous shuttles

System
availability **>99.7 %**

Application: Realization on the basis of existing vehicle solutions



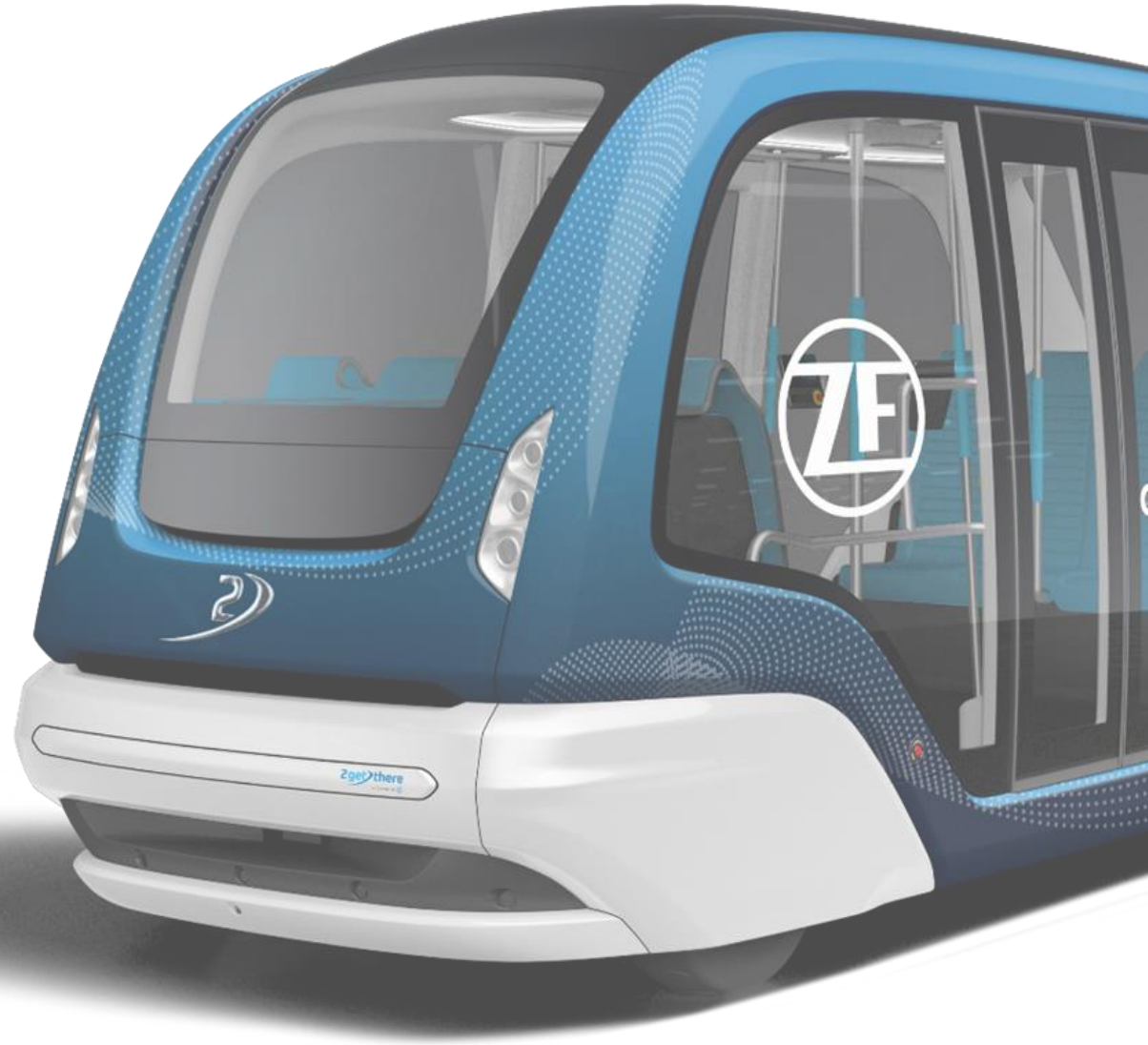
SL - Segregated Lane



DL - Dedicated Lane



MO - Mixed Operations



ZF Strategy: Develop comprehensive new mobility solutions tailormade for customers needs

Autonomous Transport System

Integrated autonomous public transport solutions



Project Planning



Application & Integration



Maintenance



Fleet Management



Localization



AD Components



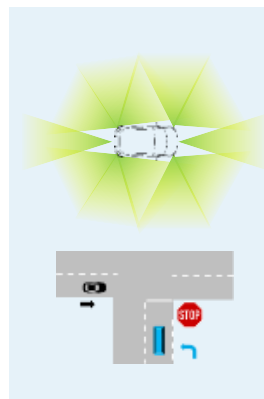
AD System



AD Shuttle



- Automotive Grade AD-Components
- Flexibility & scalability due to modular approach



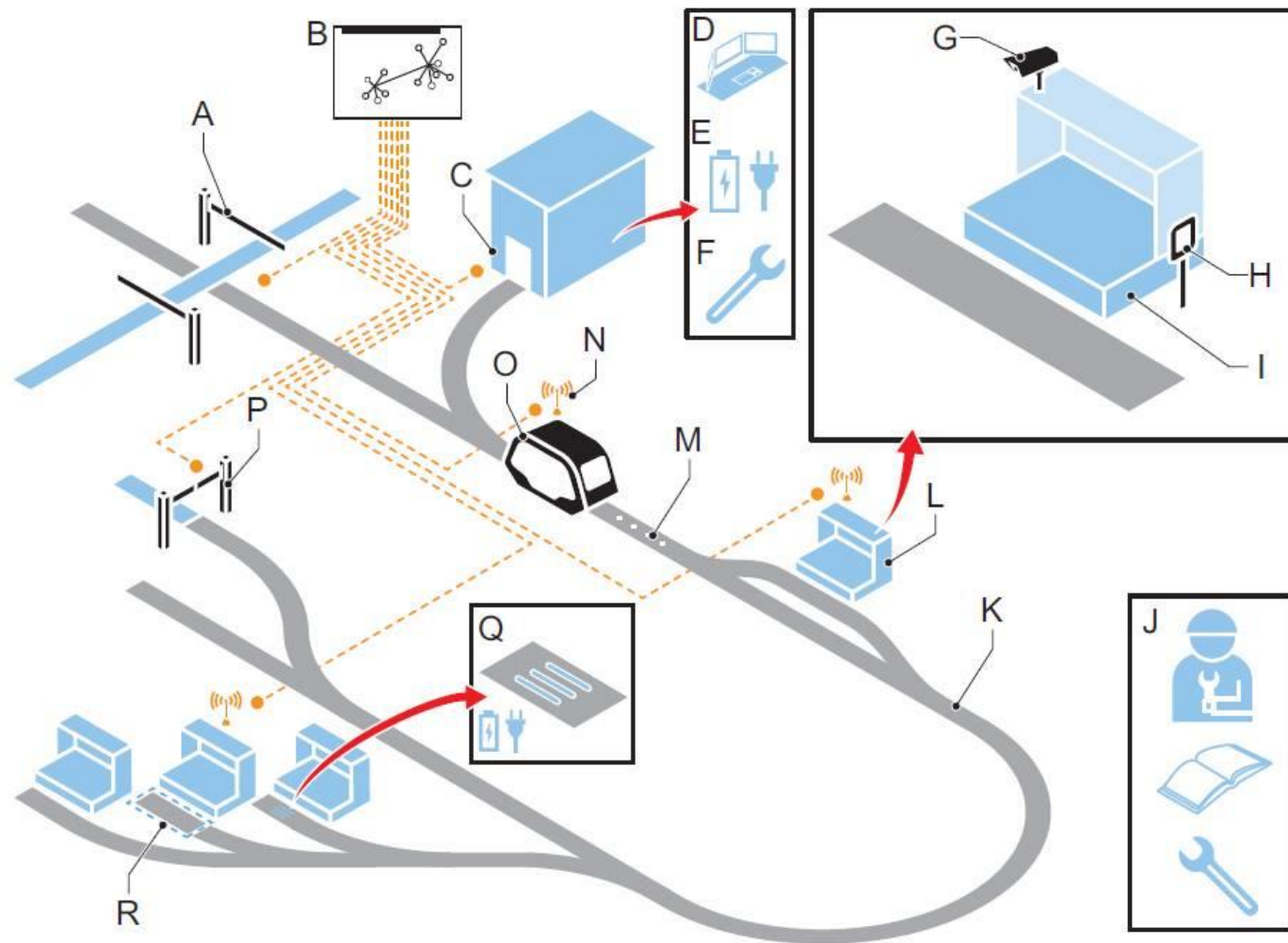
- L4 Perception
- L4 Driving Function based on ODD assessment
- AD System Integration & Validation



- New efficient solution for urban / inter-urban public transportation system
- Selected routes in mixed operation traffic

ATS-Scale: Implementing a complete Autonomous Transport System, or integration in existing infrastructure

A	Barriers (SL application only)
B	Fleet Management (TOMS)
C	Operation and maintenance facilities
D	Control room
E	E-loading area
F	Workshop
G	Surveillance cameras (integrated in TOMS)
H	Information terminal (at each stop)
I	Platform
J	Maintenance
K	Route
L	Stop
M	Magnets (localization technology)
N	WLAN
O	Autonomous Shuttle
P	Barriers (SL application only)
Q	Fast charging system shuttle
R	Parking space



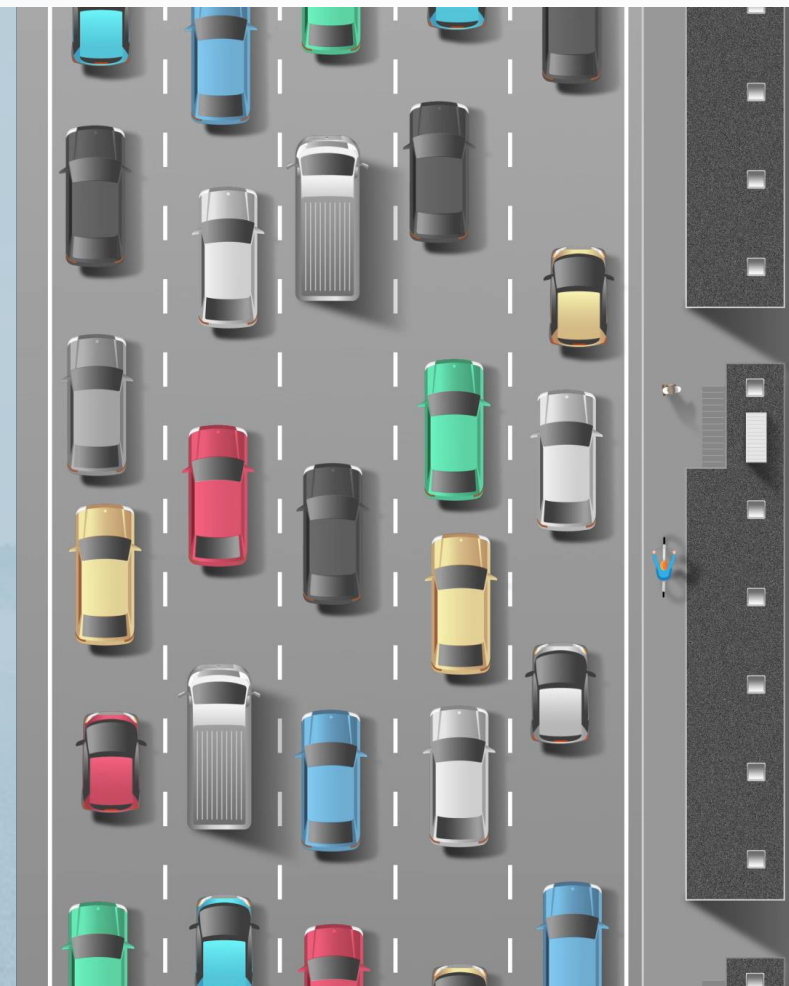
New habitats through sustainable mobility

Technology alone does not solve the challenges in mobility

- Reduction of Individual transport
- Higher and more demand-oriented clocking
- New mobility solutions thanks to autonomos shuttles

 Relief of urban zones

 habitat and space created



Reactivation of Railways – combine AD and bike tracks

Before



After



ZF Autonomous Transport Systems – Benefits to Society

Redefining mobility offerings & increasing their flexibility



Reducing emissions



Making mobility more user-friendly



Creating equal living conditions in urban & rural areas



Solving urban congestion



Increasing the availability of public transport

Why Autonomous Transport Systems from ZF?



No safety steward required

Robust & redundant AD system + magnetic localization to offer service availability above 99.7% without safety steward



High speeds of up to 40 km/h

No obstruction of traffic flow, High passenger frequency possible due to higher clocking (Ideal for segregated lane applications)



Automotive Grade

Compliance with the highest safety & security standards for a robust and safe autonomous transport system



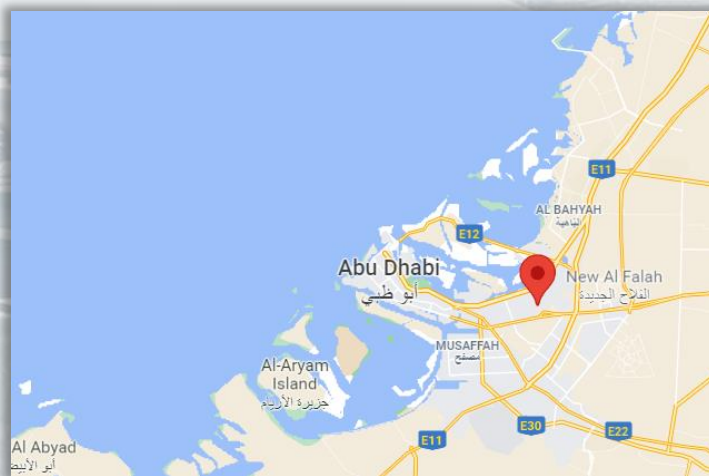
Proximity to the customer

Due to worldwide ZF locations and a broad service network, there is always a contact person nearby & fast response capability

Projects



Masdar City: Small shuttle application in operation since 2009



Project Rivium (Transdev)



RIVIUM – 2022



Dedicated Route:
**Segregated
Lane (SL)**



Worlds-first mixed traffic driverless transit system in operation by Q1/2022 (SL), MO follows

- 6 vehicles supplied by 2getthere
- 3,000 Pax daily ridership
- 2.4 km length of connection



World's first AD-certified Transport System in real operation (no pilot case)

RABus

„Reallabor für den Automatisierten Busbetrieb in der Stadt und auf dem Land“

Publicly funded project

- Funding body: Ministry of Transport BW
 - 2 phases, phase 1 approved
- Phase 1: 01.05.2020-31.12.2022
Phase 2: 01.01.2021-31.12.2023

2 real laboratories (test fields)

- **Mannheim:** Development of a new residential quarter; driverless operation in mixed traffic
- **Friedrichshafen:** inner-city and intercity operation at attractive speeds (>40 km/h)

Consortium

- 6 consortium partners
- Research/science, public transport operators, industry

Goal

- Research development of electric bus shuttles to autonomous level 4
- Sustainable public transport in Baden-Württemberg



ALULA

Demo Project



AlUla: Latest technology meets ancient heritage

- Heritage site:
 - ⇒ demand for electrical and environmental friendly transport system with speed >25km/h
- Pilot to monitor parameters before rolling out the service to additional sites in AlUla
 - ⇒ Demo rides on Segregated Lane
 - ⇒ Circular route links quickly and easily from the south car park to AlUla's Old Town
- Launched by Saudi Arabia's Royal Commission for AlUla in cooperation with RATP Dev
- viable and attractive alternative to using personal cars and SUVs

