DIGITAL AUTOMATIC COUPLING IN INFRASTRUCTURE OPERATIONS

DACIO

Research project to study necessary infrastructure and vehicle based technology to enable efficient shunting and train configuration services based on DAC Technology.

OUR CONTRIBUTION

- Energy Issues
- Data transfer topics
- Forward looking visual information at the head of the train
- Rail vehicle breaking and holding e.g. in shunting or industrial operations.

ABOUT US

While we are an engineering consultancy which started out in Off-Highway Zero-Emission powertrain systems our vision and research extend beyond that to include aspects of autonomous operations.
Senior management combines decades of experience in both alternative drive and energy systems as well as rail engineering but also comprises sensor and measure-ment technology.
Our dynamic team covers all relevant disciplines from vehicle engineering and the related mechanical and electrical subdomains including safety engineering for ESS and hydrogen systems as well as system simulation and controls.
Firmly embedded in a network of research and industrial partners, we deliver advanced solutions tailored to the needs of the sector.

Acknowledgement
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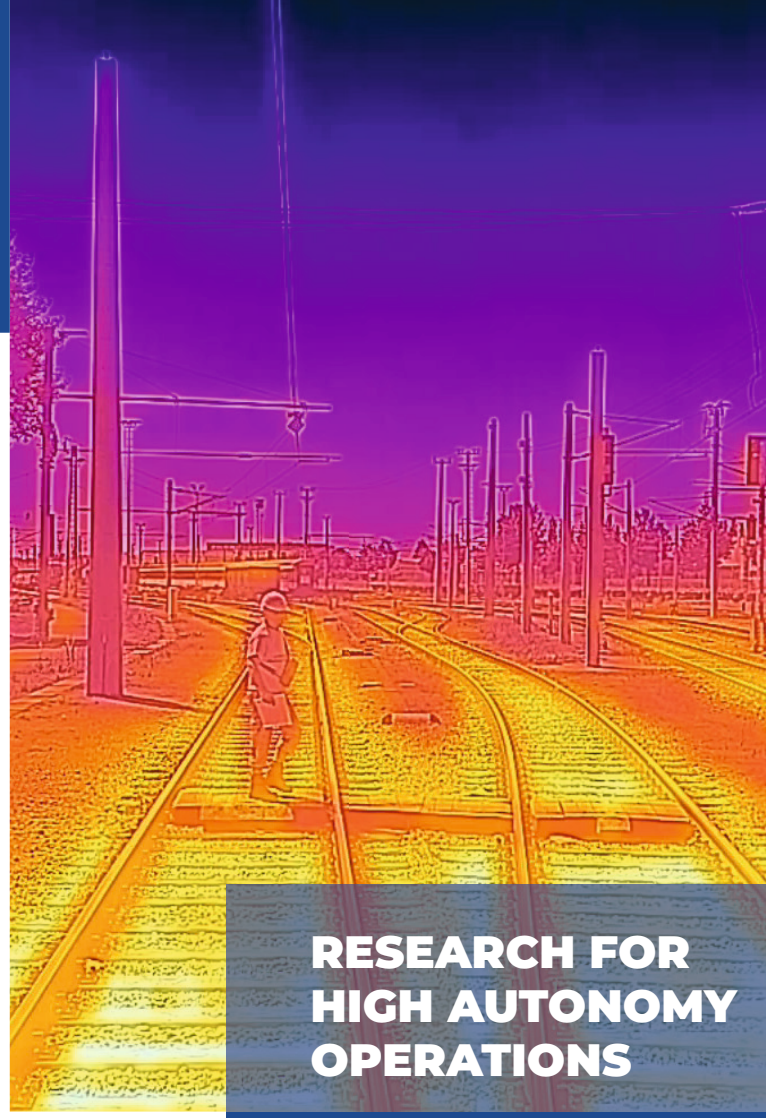


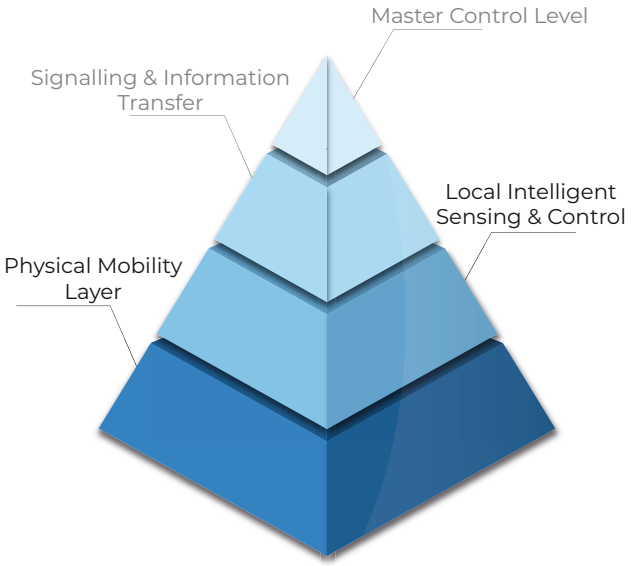
RESEARCH FOR HIGH AUTONOMY OPERATIONS

Rail Vehicles

mZERO

Research driven. Context aware. Results focused.

TECHNOLOGY ENABLING HIGHLY EFFICIENT AUTONOMOUS OPERATIONS



To fully utilize the climate and environmental benefits of zero emission, rail transport will also have to become more efficient in terms of its operational patterns and processes.

Automation as a key factor

Shunting and trunk rail or industrial siding operations are critical processes where rail can only compete with road transport if its degree of automation and autonomy increase significantly.
Thus, the Digital Automated Coupling (DAC) can act as a game changer if it can be combined with automation and intelligence. This is also the case for intra-plant rail systems e.g. shuttling raw inputs or intermediate products on rails inside of sprawling and often legacy industrial sites.

TRAIN HEAD VISION SENSOR RESEARCH

Shunting operations need to quickly come to one-man or fully autonomous operation also in the field. However, this requires the train driver to have full access to the field of view typically communicated to them by shunting staff.

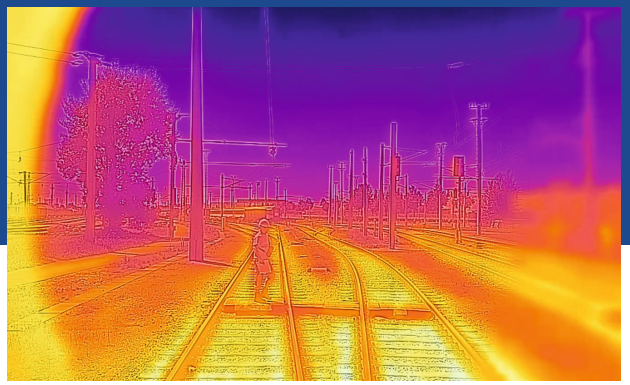
New sensor technology will in a first stage get that information to the train driver´s MMI from the head of the train, e.g. as part of an intelligent DAC. This may be followed by automated assistance or fully autonomous operation.

Critical sensor technology comprises:

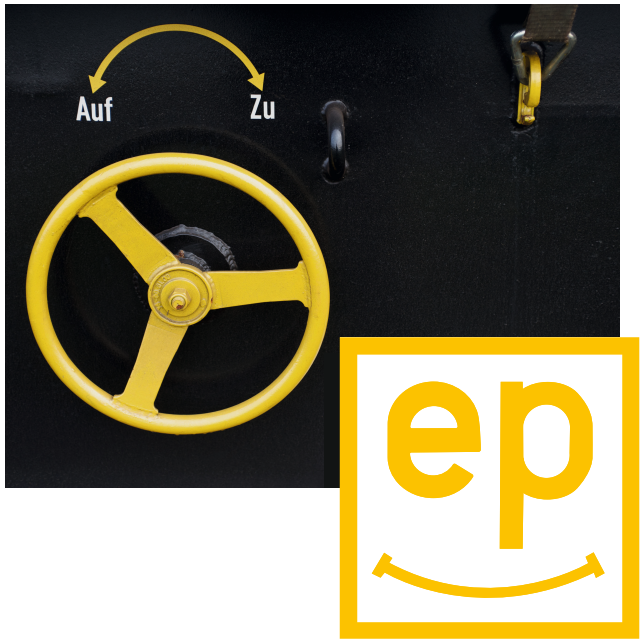
01 Video Technology including Low Light Vision

02 Infrared technology like FLIR or gated versions of IR-sensors

03 LIDAR applications to integrate precise distance information



FULL AUTONOMY REQUIRES BRAKING AND HOLDING



The productivity promise of autonomy in the field hinges on being able to stop a train moving autonomously without resorting to infrastructure based systems like linear track brakes or retarders.

Our research studies how the fact that the Digital Automatic Coupling will necessarily come with both on-board electrical and pneumatic energy storage can be used for autonomous stopping and subsequent holding by working in tandem with our train head vision sensor and advanced on-board controls.