

InnoTrans 2022 – Hall 23, Booth 240

## More than Rail

Rail transport should be fast, safe, reliable, environmentally oriented and committed to the common good, and rail companies should be economically managed – requirements that are often contradictory and yet have to be reconciled.

The Fraunhofer Transport Alliance Working Group Rail is a consortium of several Fraunhofer Institutes that have set themselves the goal of supporting rail companies, infrastructure operators, rail vehicle manufacturers and logistics service providers in meeting these requirements.

The spectrum of research topics ranges from traffic and network planning to the optimization of manufacturing processes in vehicle production, from the improvement of passenger comfort, from the selection of suitable materials to the development of measuring devices and concepts for monitoring infrastructure, rail vehicles and freight.

### Fraunhofer Transport Alliance

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### Training & Certification DIN 6701 and DIN 2304

Fraunhofer IFAM offers internationally recognized certifying training courses in adhesive bonding technology and fiber composite technology. TBBCert as an independent, ISO 17065-accredited certification body provides, in cooperation with Fraunhofer IFAM, company certifications for the use of adhesive bonding technology in rail vehicle construction

(DIN 6701/EN 17460), in industry and trade (DIN 2304/ISO 21368) and for Bundeswehr-relevant products (TL A0023).

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### Automation and Production Technology

In order to reconcile efficiency, sustainability, and ergonomic workplace design in **automated large-scale structure assembly**, Fraunhofer IFAM in Stade is developing mutually compatible technology modules which can be combined in a modular fashion to form partially or fully automated assembly solutions including logistics, robotics, measurement, positioning, machining, and joining technologies.

Based on these technologies, modular system components enable the transfer of industrial assistance systems to other areas such as **service robotics**. At InnoTrans 2022, Fraunhofer IFAM will present for the first time an autonomously navigating cleaning and disinfection robot for use in public transport – a worldwide innovation.

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### Automatic Optical Inspection for Vehicles and Infrastructure

Inspection tasks on trains or infrastructure are performed by modern technologies in motion or at standstill. This applies to the inspection of technically relevant features as well as the recording and evaluation of the visual-optical condition.

With innovative image- and 3D-data-based measurement methods, a multitude of different inspection tasks on rolling stock or infrastructure can be realized. The Fraunhofer ITWM and Fraunhofer IFF offer fully automated system solutions tailored to specific applications.

Terahertz-based measurement technology from the Fraunhofer ITWM can be used to perform non-contact and non-destructive structural inspections, for example, to check adhesions of windows or detect water deposits in the outer shell. Terahertz waves are harmless to humans and, unlike X-rays or UV radiation, do not require radiation protection measures.

The Fraunhofer WKI has technologies for the use of renewable raw materials in the mobility sector. Molded parts made of a multilayer veneer-layer composite are lighter than conventional materials and exhibit high rigidity. In addition, wood-based (multi-material) lightweight solutions enable cost savings as well as a unique environmental balance.

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### LiDAR system for the detection of geometry and moisture of the environment

The Tunnel Inspection System TIS scans its surroundings with 2 million measurements per second. Each measurement generates a 3D coordinate and a surface moisture. The LiDAR system can be used for detecting tunnel surfaces, but also for mobile mapping. Thanks to its compact design and open interfaces, the TIS can be easily integrated on any carrier platforms such as trolleys, measuring vehicles, or road vehicles.

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### Detecting vegetation in the railway track

The measuring system captures the track area using a multi-camera system. It identifies even the smallest areas of vegetation and classifies the plants in real time. Based on the measured values, it is possible to automatically apply hot water or herbicides in a targeted manner, i. e. only where there is unwanted vegetation cover. To this end, the system can be connected to the control technology of carrier vehicles. This enables efficient and effective elimination of weeds in the track area.

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