A NEW RESEARCH INITIATIVE IN GRAZ IS ON TRACK

March 2021
VISION – MISSION – VALUES

Vision

• The Research Cluster Railway Systems is a leading and internationally recognized research institution for the entire system railway.

Mission

• We create a sound understanding of all interactions within the rail system as well as their mapping and replication.
• We increase the competitiveness of the rail system through sustainable overall system optimization.
• We reduce the „time to market“.

Values

Opportunity  Connected  Fairness
Excellence  Teamwork  Inclusiveness
GOALS

Organizational

- Interdisciplinary research cluster in the field of rail vehicle technology, rail infrastructure and rail operations with a focus on overall synergy potentials

- Bundling of technical expertise on railway available in the area of Graz University of Technology in the faculties mechanical engineering, civil engineering in combination with the departments computer science / information technology / measurement technology and the Virtual Vehicle Research GmbH

- Realization of future-oriented research in the areas of vehicle technology, rail infrastructure and operations management using the technological possibilities of digital transformation

- Interdisciplinary training platform for the next generation of engineers for the rail technology of tomorrow

- Accredited testing, inspection and simulation facilities for the validation compliant with rail specific standards and specifications
# GOALS

## Technical

### Long-term goal – Digital twin for the rail system

### Digitization in the railway system

- Further development of sensors & actuators
- Data management & -security
- Monitoring as the basis for predictive maintenance & proactive system design

### Technology & method development

- Development of innovative material, process and component concepts
- Service life assessments of complex mechanical structures
- Description of component / system degradation and failure behavior

### Modeling & simulation

- Development of new simulation tools
- Creation of continuous simulation chains
- Damage and wear calculation (e.g. crack progress calculation)

### Validation & test

- Static & dynamic material, process and component testing
- Dynamic subsystem validation
- Measurement and test rig technology
- Standardized, synthetic railway line profiles / strain collectives

### Operation & service

- Linking test results and field data
- Operational data analysis
- Life Cycle Management

### Overall understanding of the rail system e.g.

- Dynamic behavior and interaction of vehicle and track
- Load distribution (flow of forces), degradation & material models
- Wheel rail interaction
- RAMS Engineering

### Development of new products, manufacturing processes and services

- LCC-optimized
- Highest asset availability (infra, rolling stock)
- Future-oriented sustainable / environment-friendly
PHILOSOPHY OF COLLABORATION

Subject areas
- Operations
- Field testing
- Data provider

Subject areas
- Sustainable mobility
- Funding
- Norms & Standards

Subject areas
- R&D
- Basic development
- Young talent training

Subject areas
- Products
- Systems
- Services

OPERATIONS

PUBLIC

SCIENCE

INDUSTRY
1. **International Scientific Advisory Board (annually)**
   5 international experts
   (TU München, Politecnico Milano, KTH Stockholm, Deutsche Bahn, ÖBB)
   > Advisory body

2. **RCRS Steering Board (bi-annually)**
   1 company representative of ÖBB, Siemens, voestalpine & virtual vehicle each,
   1 representative of the university rectorate, 1 dean
   > Coordination and resolution of the annual research program

3. **RCRS Project Board (approx. monthly)**
   All involved professors (+ career positions) of the involved institutes,
   project managers, participating researchers and company representatives as required
   > Coordination of ongoing activities, partly in parallel sub-teams
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