Accelerating Innovation through Collaboration

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PURPOSE BUILT

MxV RAIL

MOMENTUM   INSIGHT   TEAMWORK   RIGOR   **PURPOSE**

PURPOSE BUILT

We believe that when railways operate with maximum safety, reliability and efficiency, they not only shape our everyday lives, they shape our future, too.

Industry Owned & Independently operated Rail System

Product, Rib Tested & Innovation

1,200+
Engineering & Innovation Professionals

Dedicated Trusted Experts

+20
MILES
New test track infrastructure

913K
SQUARE FEET
Lab, office, training, warehouse, indoor mounting, maintenance space

∞
Possibilities

Professional Engineers (PE)

AMTRAK · BNSF · CN · CPKC · CSX · G&W · Metra · NORFOLK SOUTHERN · RJ Corman Railroad Company · UNION PACIFIC

The Impact of COLLABORATION

MxV RAIL

The Impact of
Collaboration:

TRAINING

The Impact of Collaboration: **RESEARCH & TESTING**

Tie & Fastener Research

GLULAM TESTING

FAST® TESTING

- **Industry-driven research and commercial programs use FAST® to assess tie and fastener designs.**
- **Results guide best practices for maintenance, inspection, and safe revenue service deployment.**
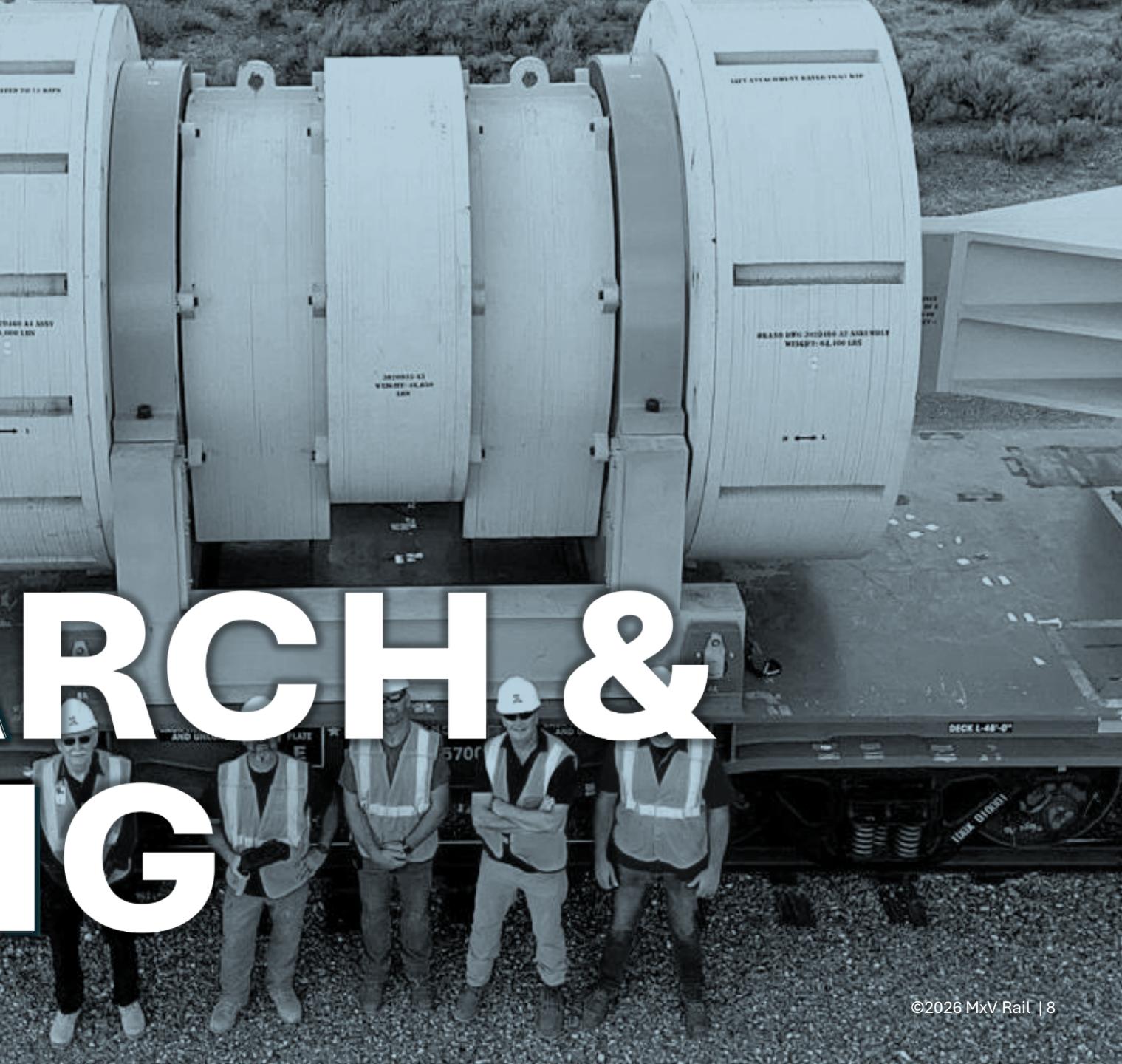
The Impact of Collaboration:

RESEARCH, TESTING & TECHNICAL STANDARDS

Working with Suppliers and Railroads to Advance Wheel Impact Load Detection

Technology Advancement	Alternative WILDs introduced
Standards Gap	AAR Standard S-6101 addressed calibration and validation requirements for standard WILDs
Research	AAR funded research developed methodology to measure impact forces for various types of detectors
Standards Updates	Develop a more generalized specification to support technology progression and implementation
Validation Testing	Suppliers use methodology developed in the research program to validate alternative WILD systems
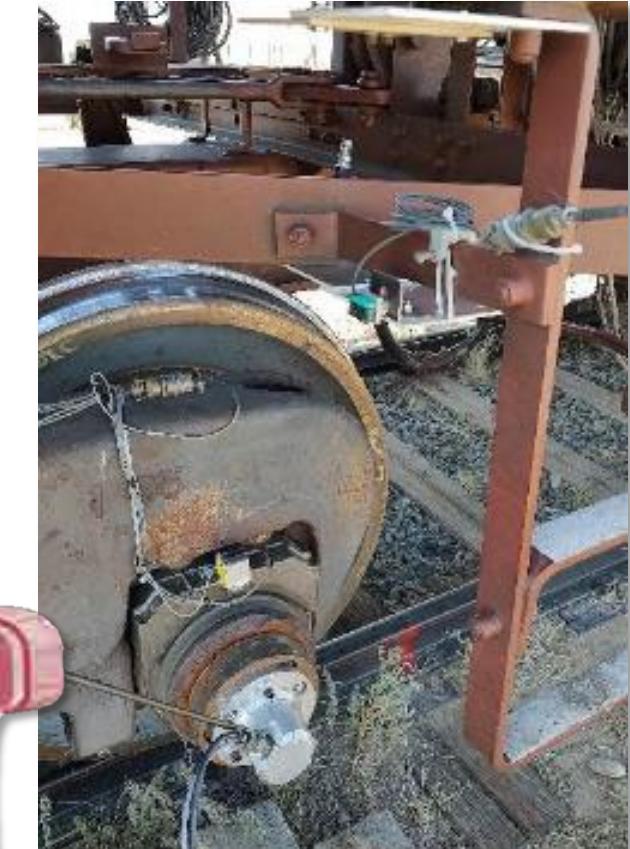
Advancing Train Control and Automation
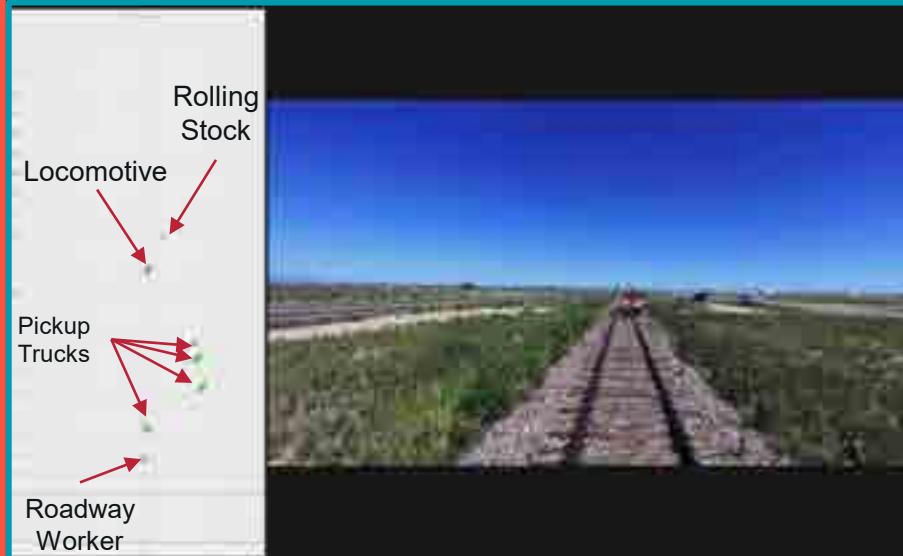
Concept Development	Developed Restricted Speed Enforcement (RSE) concept using the onboard locomotive sensor platform to prevent collisions.
Requirements Development	Defined RSE functional, performance, and interface requirements for PTC and sensor platform technology.
Technology Demonstration	Demonstrate capability of low-cost commercial off-the-shelf (COTS) sensing technology
Product Technology Assessment	Assessment of existing sensor product performance supported by railroads and existing sensor suppliers.
Standards	Refinement of sensor platform requirements and publication as interoperable standards.
Extensibility	Expansion of sensor platform requirements to support future sensor platform applications.

Interoperable Specifications [Complete]

Pre-Integration Sensor Testing [2026-2027]

Integrated RSE Testing [2028-2030]

Sensor Technology Proof-of-Concept [2025]

PTC Standards, Development, and Integration [2027-2030]

Production Deployment [2030-2031]
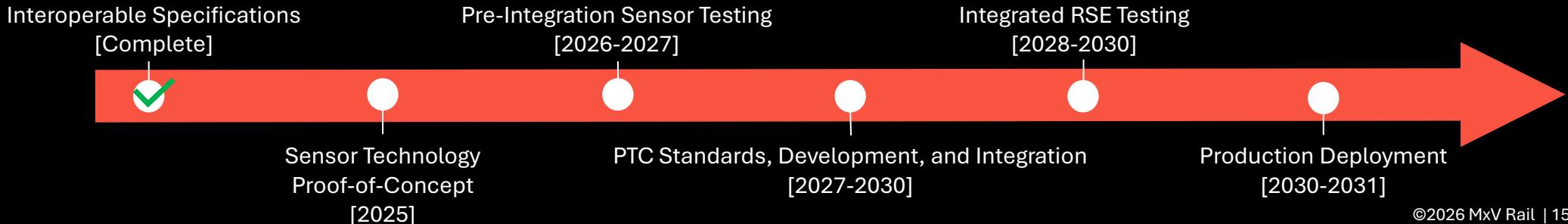
The Impact of
Collaboration:
CONSULTING

BNSF ODIN Enhancing Safety

Locomotive –based track inspection system

Controlled Environment Testing:
- **MxV Rail using BNSF equipped locomotive at FAST®
  to help improve algorithms**

Revenue Service: 65 ODIN units in operation
- **Increased test coverage from ~500,000 to
  +5 million miles per year**
- **Data informing predictive maintenance**
- **Dedicated consist for both attended/unattended
  cars minimizes impact on velocity**

Vehicle Performance Testing

Pitch & Bounce

Adjustable Test Zone

Twist & Roll

Curving Performance

- **AAR Standard Testing: M-976, Chapter IX, S-2043**
- **Suspension & curving validation testing**
- **Track geometry system validation**

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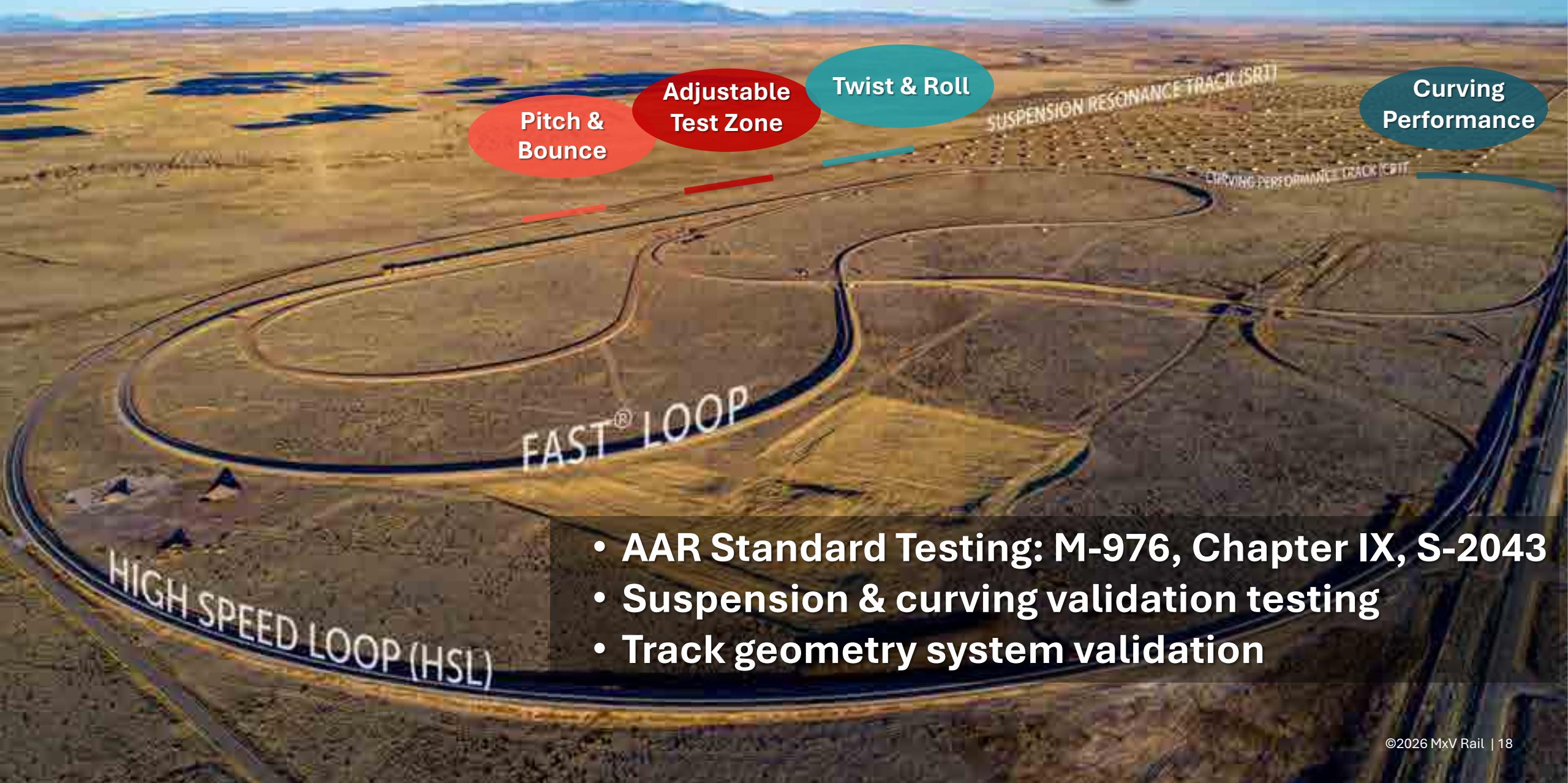
The Impact of
Collaboration:

RESEARCH & WORKFORCE DEVELOPMENT

MxV LEARNING INSTITUTE

Building Tomorrow's Rail Workforce — Together

- Workforce Development
- Industry Knowledge
- Technical Skill Improvement

University Grand Challenge Program
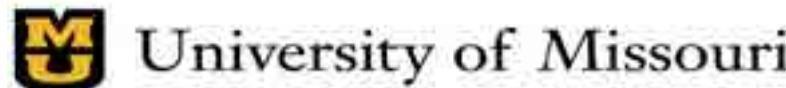
University	Challenge
University of Missouri; University of Illinois Urbana-Champaign; The University of Utah	In-situ Rail Neutral Temperature (RNT) Measurements
Michigan State University	Hybrid Rail Inspection Approaches
SIU Southern Illinois University Carbondale	In-Motion Rail Base Inspection
Virginia Tech	In-Motion Wheel Inspection
UCSD ExpMech/NDT/SHM Lab	3D Imaging of Internal Rail Flaws

Better.Together.