

## LRAIL System Specifications

Requirement	LRAIL Performance Specification
Measurement Method	Contactless, inertially-corrected, 3D laser triangulation for data capture and automated data processing using Artificial Intelligence.
Storage Temperature	-30C to 70C* *in a suitable storage container
Operating Temperature	-25C to 50C* *An appropriate heat shield must be installed above sensors and ventilation provided during extreme heat conditions. Sufficient insulation must be installed around sensors during extreme cold conditions. During extreme hot and cold conditions, it is recommended that the system is started while indoors, under climate-controlled conditions, prior to being deployed for measurement in the field.
Supported Inspection Vehicle Operating Speed	0-120 km/h.
Operating Conditions	Full sunlight, partially-shaded, as well as during night-time and in tunnels. Vibrations, dust and moisture conditions typically experienced in a railroad environment. Sensor enclosures are IP65 rated.
Scan Components	Intensity images. 3D Range images. Inertial data (for motion compensation). Linear position data (from wheel encoder). GPS position.
Field of View and Resolution	3.5 meter-wide field of view. 1mm traverse resolution. 2mm longitudinal sampling interval.
Rail Inspection	Concrete tie/sleeper inspection (count, location, chips, cracks, skew angle) Wooden tie/sleeper inspection (count, location, cracks/splits, skew angle) Joint inspection (location, gap measurement) Joint bar inspection (count, location, bolt count) Fastener inspection (count, location, present/missing/covered status) Ballast inspection (over or under height, presence of fouling)

Rail Wear	Rail longitudinal profile accuracy $\pm 1.0\text{mm}$ (Repeatability $\pm 1.0\text{mm}$ ) Vertical wear accuracy $\pm 1.0\text{mm}$ (Repeatability $\pm 1.0\text{mm}$ ) Flat wear (45 degree wear) $\pm 1.5\text{mm}$ accuracy once wear exceeds 4mm
Motion Compensation	Internal inertial measurement units and proprietary software algorithm.
Supported Output File Formats	JPEG, SHP, XML, CSV
Power Consumption	1,000 watts* without onboard processing. 3,500 watts* with onboard processing. *Excluding climate control systems.



John Laurent

Pavemetrics Systems Inc.

[jlaurent@pavemetrics.com](mailto:jlaurent@pavemetrics.com)