AMBERG OIS LUX

3D TUNNEL POINTCLOUD AT OPERATIONAL SPEED

The Amberg OIS Lux is an ultra-high frequency 3D laser scanning system designed for high-speed tunnel inspection. Mounted on in-service trains or dedicated inspection vehicles, it integrates LiDAR, IMU and DMI positioning to capture high-density 3D tunnel data at speeds of up to 80 km/h, supporting efficient structural assessment without operational downtime.

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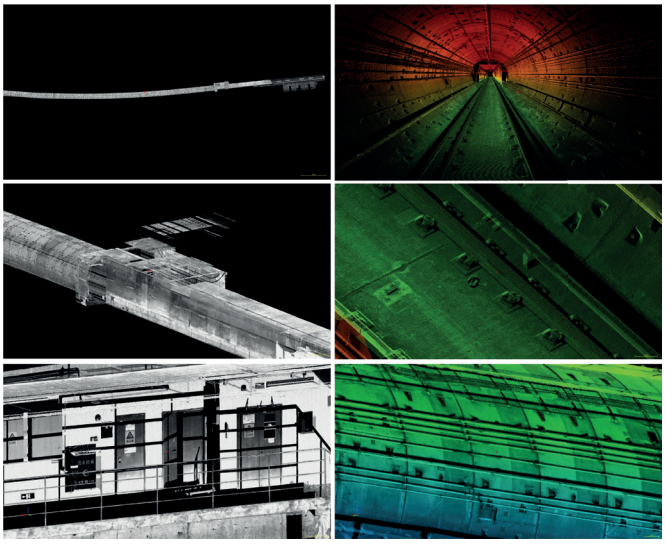
Key Customer Benefits

- **High-Speed Inspection:** Enables tunnel inspection at up to 80 km/h with minimal operational disruption
- **Engineering-Grade Accuracy:** Millimeter-accurate tunnel deformation monitoring
- **True 3D Reconstruction:** Combines LiDAR, IMU and DMI in one inspection workflow for accurate tunnel modeling
- **Comprehensive Outputs:** Generate actionable results for convergence, clearance, ovality, misalignment and cross-section analysis
- **Digital Maintenance Support:** Provides structured 3D data and outputs for maintenance planning, safety assessment and asset management



Inspection Deliverables

- 3D point clouds and tunnel reconstruction data
- Track-level grayscale images, unwrapped tunnel surface images and depth maps
- Engineering analysis results for convergence, clearance, ovality and misalignment
- Structured inspection reports and data outputs for maintenance review

Amberg Technologies AG
Trockenloostrasse 21
8105 Regensdorf

Phone +41 44 870 92 22
info@amberg.ch
ambergtechnologies.com

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SYSTEM PERFORMANCE AND TECHNICAL DATA

System configuration	
System components	Vehicle-front scanning module and in-vehicle cabinet module
Vehicle-front scanning module	43 kg, 520 × 440 × 530 mm
In-vehicle cabinet module	Power conversion unit and server host
In-vehicle cabinet module	23 kg in total
Rack interface	4U + 2U, 19-inch standard cabinet
Ranging method	Pulse-phase laser ranging

System performance	
Max. measuring speed	80 km/h
Automatic segment recognition	≥ 98%
Chainage referencing accuracy	≤ 0.2 m

System accuracy	
Laser scanner	
Laser class	Class 1, eye-safe
Scan frequency	800 lines/s
Effective measurement rate	Up to 8 million points/s
Laser ranging accuracy	≤ 1 mm
Measurement accuracy	2 mm @ 20 m
Angular accuracy	0.001°
Max. measurement range	≥ 30 m
Min. measurement range	≤ 0.5 m
Field of view	360°
Inspection accuracy	
Segment ovality	2 mm
Ring-by-ring horizontal convergence	2 mm
Clearance detection	5 mm
Inter/Intra-segment misalignment	5 mm
Segment spalling detection	Better than 4 cm²
Water leakage detection	Better than 4 cm²

Position performance	
Positioning components	IMU + DMI, optional GNSS
IMU sampling frequency	≥ 200 Hz
IMU gyro bias stability	≤ 0.015 °/h
DMI resolution	≥ 1000 PPR
DMI measurement error	≤ 0.5‰

General technical data	
Vehicle-front scanning module	
Power input	DC 110 V / AC 220 V
Maximum power consumption	650 W
In-vehicle cabinet module	
Power input	DC 110 V / AC 220 V
Maximum power consumption	370 W

Environmental specifications	
Working temperature range	-25 °C to +50 °C
Protection class	IP65
Humidity (non-condensing)	≤ 90%

Data export options	
Database	SQLITE
Point cloud	LAS / TXT
Image	TIFF / PNG / JPEG
Engineering reports	PDF / XLSX / BMP / DXF

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