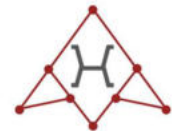


ARCHITA

Rail mobile mapping system



ARCHITA
ETS MOBILE MAPPING SYSTEM

ARCHITA is an innovative multi-dimensional system and consist of various detection devices: laser scanner, georadar, thermal images camera and high-definition digital camera, placed on a unique vehicle. It allows to carry out the survey activity during the railway traffic stop, with average speed 15-30 km/h. It conceived for simultaneous and integrated survey of the condition of the tunnel with short stop of the traffic. ARCHITA consists of linked and integrated different equipments:

1. Leica Pegasus: Two in configuration with: n.8 digital cameras, 1 inertial IMU platform, n.2 profiler Z+F 9012, n.2 GPS antennas, n.1 optical odometer, n.4 thermal imaging sensors in one solution.

2. I.D.S. GPR in three different configurations:

- n.1 radar antenna of 600MHz
- n.3 radar antennas of 400 MHz SRS
- n.1 radar antenna of 2GHz coupled with n. 1 radar antenna of 400-900 MHz (Hi pave/Hi mode).

3. ADTS Tunnel Scan in configuration with: n.3 high-definition digital camera, n.1 profiler Z+F 9012, a LED lighting system composed of n.16 LED light, on steel structure and aligned with the linear cameras. ARCHITA uses the GNSS + IMU sensors to calculate the trajectory in a predefined reference system. Each device is equipped with GPS antenna in order to synchronize the instrumentation in post-processing. ARCHITA can obtain a series of integrated and connected information in a single passage, such as:

1. Geometry: from georeferenced 3D point cloud, in post processing, we can obtain the geometry of detected environment and relative CAD/BIM models (shapes, track, electric supports and contact line).

2. Thicknesses and status of infrastructures: with georadar technology we have information about thickness, cavities, alterations and presence of water along the structures (e.g. tunnel lining, piles, ballast and road paving).

3. Structure condition and the crack or water detection (e.g. tunnel lining): from high-definition photo and thermographic analysis, we obtain the mapping of the lining defects and, more generally, the whole state of preservation of the tunnel. Once detected, the defects are classified accordig to a specific list (from client).

We then compute the indices representative of the structure condition to asses both cracking and water condition. The output documents and the indices allow to plan in a user-friendly way maintenance and management of infrastructure heritage. The system guarantees a quick survey of the existing infrastructure to help design and feasibility studies. Mobile mapping experience is a valid alternative to the traditional survey and diagnostic methods and it is a logic answer of the market to the challenges of the industrialized countries where infrastructure is a fundamental heritage.

ETS s.r.l.

Registered office: Via Appia Nuova, 59 | 00183 | Rome | Italy

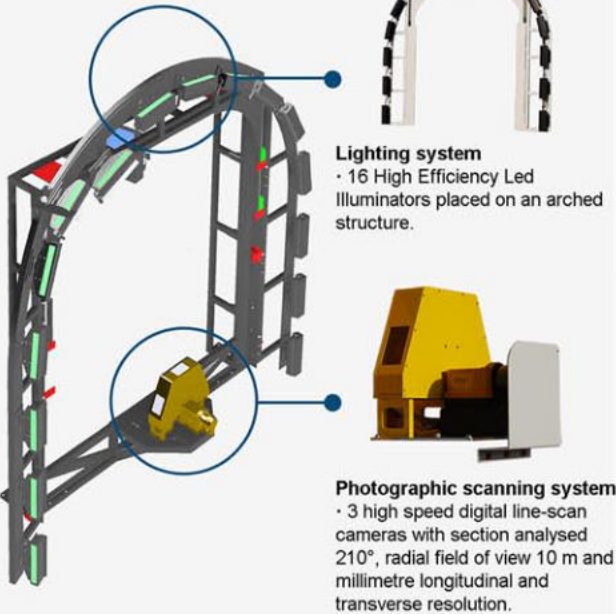
Operational office: Via Belice 9/11 | 04100 | Latina | Italy

Ph +39 07731751640 | Fax +39 07731751641

www.etsingegneria.it - info@etsingegneria.it

ARCHITA technical configuration

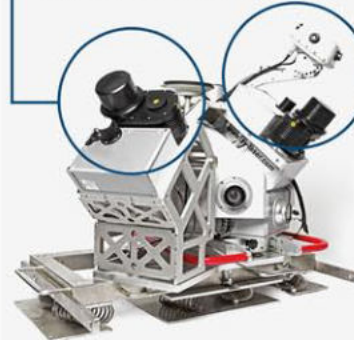
TUNNEL SCAN



LEICA PEGASUS: TWO

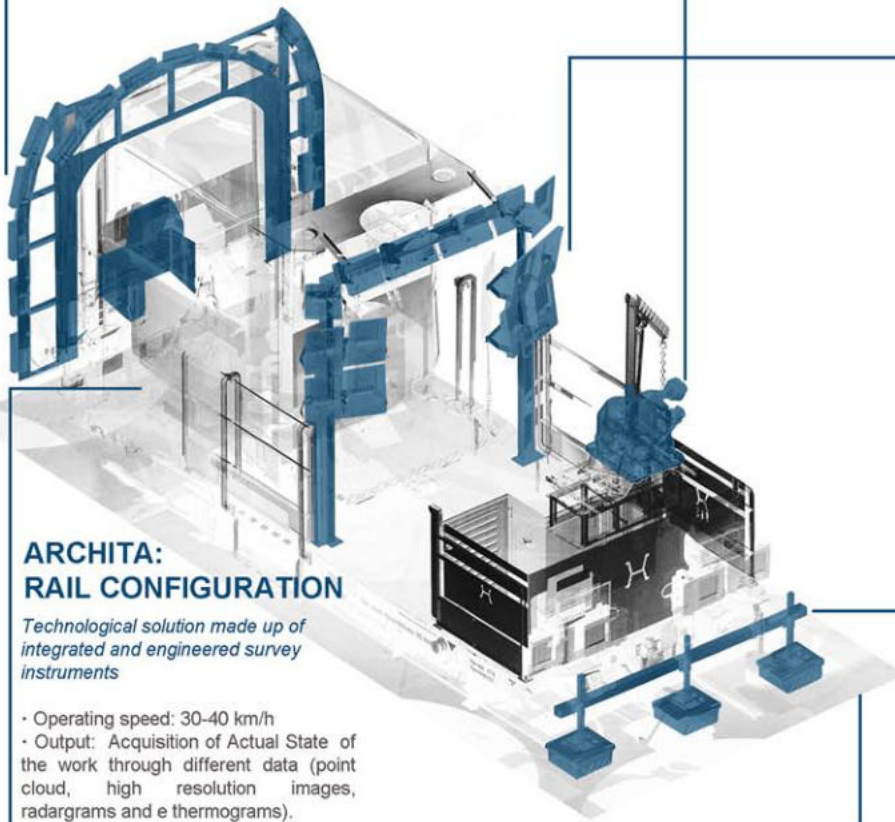
Laser scanning system

- 8 Digital cameras with resolution 2046x2046, lens with 8.0 mm focal, ruggedised; 2.7 mm focal, top coverage 360°x270°
- 1 GNSS system: receiver Novatel OEM6 with 2 antennas 703GGG
- 1 Inertial system (IMU) with sampling rate 200 Hz
- 1 contactless rail odometer HASLER Rail CORRrail 1000
- 1° Profilometer Zoller Fröhlich Z+F 9012 in class 1 with max rotation frequency of 200hz (1Mln pps)
- 2° Profilometer Zoller Fröhlich Z+F 9012 in class 1 with max rotation frequency of 200hz (1Mln pps)



THERMAL IMAGER

- Thermographic scanning system**
- 4 Thermal imagers Tau2LWIR (640x512, spectral band 7.5-13.5 µm, coverage 360°x70°)



LIGHTING

Lighting system

- 14 Rodio LED lights, each with 36 LEDs, to serve digital cameras of Leica Pegasus: Two cameras



GEORADAR

SafeRailSystem

- 3 Antennas Georadar with central frequency 400 MHz



GEORADAR

- 1 Antenna Georadar with central frequency 600 MHz



GEORADAR

Road system

- 1 Antenna Georadar with central frequency 2 GHz
- 1 Antenna Georadar with central frequency 400/900 MHz

