TOOL / SOLUTION

ScanTubes®

Sites
VEILLE SUR VOS STRUCTURES

Inspection and control of coatings geometric of tubular structures

ScanTubes® incorporates 12 calibrated digital cameras attached to a circular mount. This support moves inside the tubes at a speed of up to 5 km/h. During the journey inside the tube, the cameras automatically and dynamically make 360° high resolution photos of the coatings.

The addition of another support with thermal cameras makes it possible to detect the presence of water in the coatings. To move the cameras along the horizontal tunnels, we use dollies. For the inspection of vertical galleries, we use a suspended cable system holding the cameras.

The photos are saved and sent for processing. Through various digital treatments developed by SITES can be provided:360° panoramic photographs with kilometric references;

- **geo-referenced orthophotography (elevation or flat development of the cylinder);**
- **3D models georeferenced through photometric processing;**
- **Creation of scale cracking and deficiency maps**

Benefits

- Speed of execution (several kilometres per night of intervention)
- real-time digital scan of the entire tube (visual and geometric)
- access to data without time restriction;
- remote detailed inspection: objective, quantifiable, rapidly scalable;
- modular system adaptable to any type of trolley

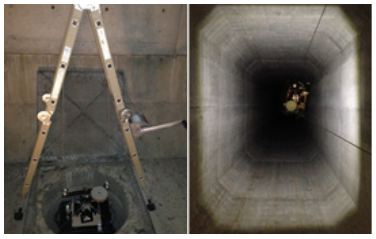
Focus aeras

Visual and geometric inspection of road and rail tunnels, ventilation ducts, bridge piles, silos, wells, chimneys, forced pipes, boreholes…

characteristics

Tube diameter: 0.5 m to 25 m
Rail trolley: 1435 mm gauge with or without short-circuiting
Detection limit: 0.05 mm @ 2m, 0.2 mm @ 6m, 0.4 mm @ 10 m
Longitudinal Linkage Accuracy (PK): 0.1 m
Tube length: horizontal: no limit / vertical: up to 800 m
Speed: horizontal: 3 km/h / vertical (suspended): 0.5 km/h
Xenon lighting (photo): no danger to the eye or the structure
System Weight: Tête : 10 kg, Control box: 10 kg, batteries : 20 kg

ScanTubes by SITES



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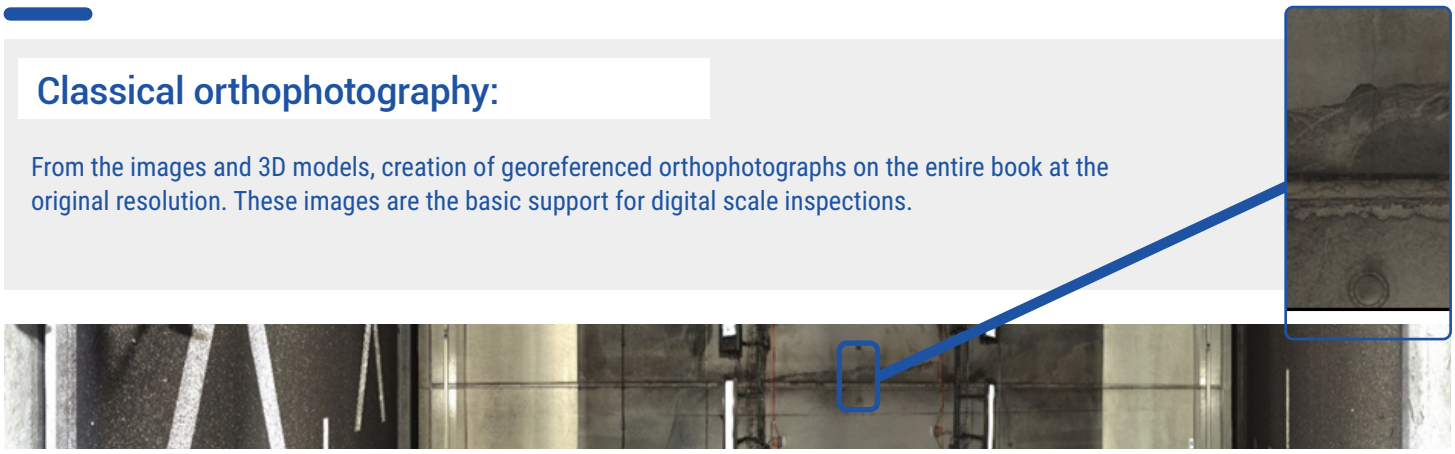
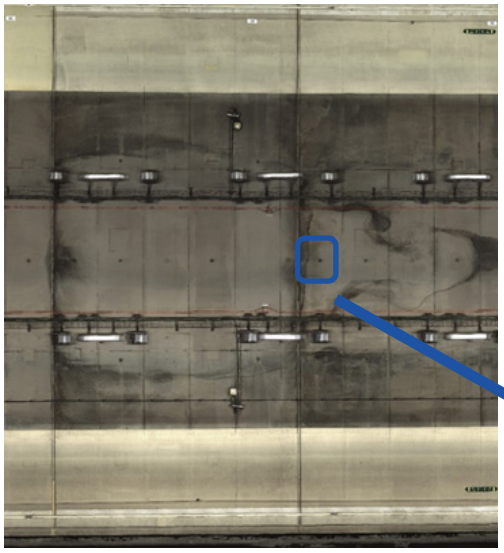
ScanTubes®

Classical orthophotography:

From the images and 3D models, creation of georeferenced orthophotographs on the entire book at the original resolution. These images are the basic support for digital scale inspections.

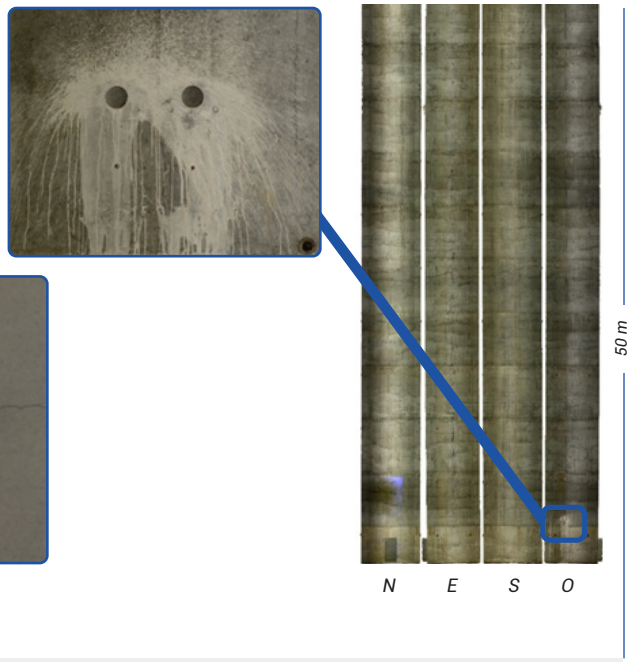


Cylindrical pan of a tunnel section (diameter: 12m) – Zoom at the top of the vault



Cylindrical orthophotography on 20m of a road tunnel

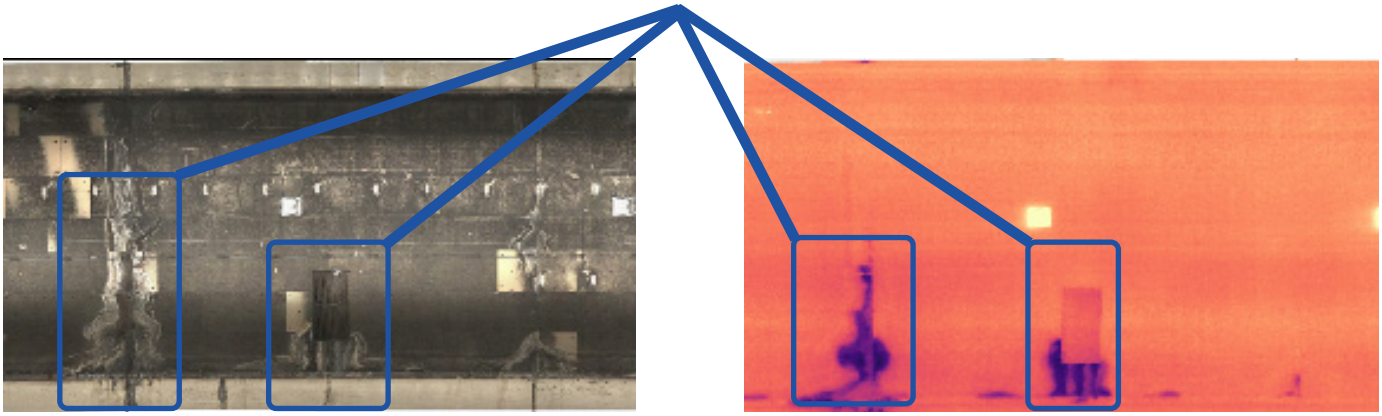
Elevation of the north, east, south and west faces of a bridge pier



Infrared orthophotography:

- Digital treatments identical to those used for orthophotography in the light spectrum
- Overlapping with conventional orthophotography to consolidate analysis

Can detect a small water inlet, and measure its dimensions



TOOL / SOLUTION

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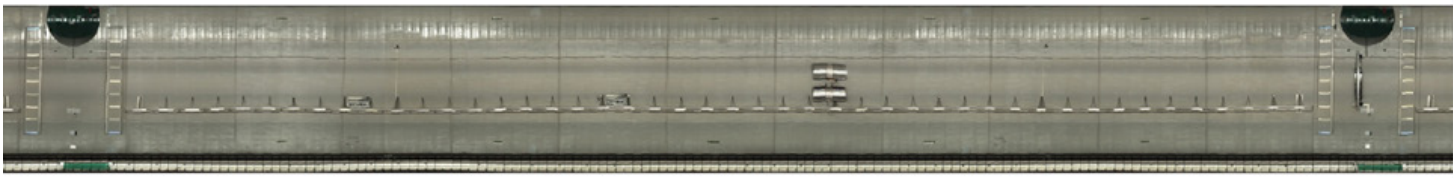
Inspection

Mapping of cracking and defects in an Autocad and/or GIS format (arcgis, Qgis)

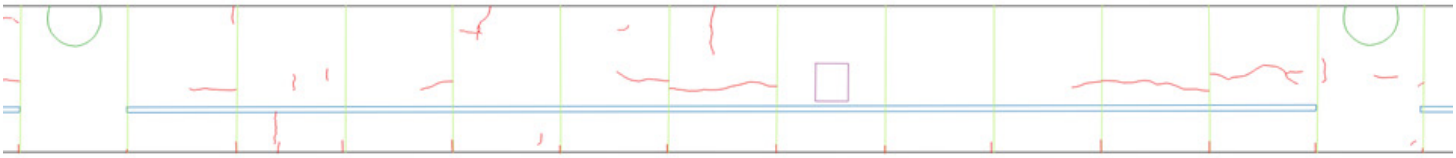
Measurement of the surface of structural defects, crack opening and crack length

Data retention to allow comparison of future inspection results

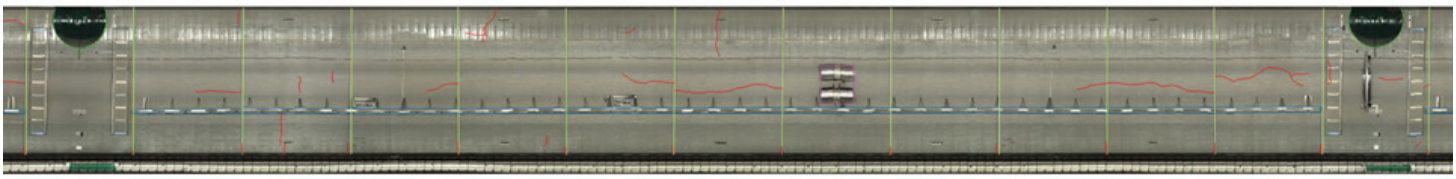
Statistical analysis of defects



Cylindrical orthophotography of a road tunnel



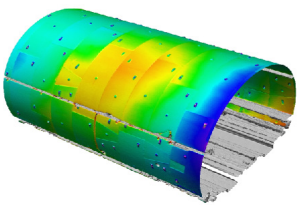
Inspection in the form of "GIS" and/or CAD mapping created from orthophotography



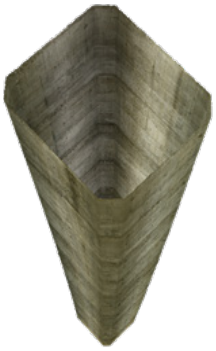
Orthophotography/defects overlay

3D modeling

- Using photos to create a cloud of 3D dots with photometric processing
- Assembling the cloud for a 3D model with centimeter accuracy
- Result equivalent to a LIDAR lift (3D scanner)



Textured 3D Tunnel Model
12m diameter tunnel



Textured 3D model of a bridge stack (internal)
Square section 4m x 4m / 50m deep

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Creation : SITES /1, avenue Edouard Belin - 92500 RUEIL-MALMAISON / SAS with a capital of 552 000 € / RCS Nanterre SIRET 329 727 390 00232 / Septembre 2023