

# AUTOMATED VISUAL INSPECTIONS

LARGE PANORAMA IMAGES OF SURFACES

## WHY IMAGES?

### Because...

... a still picture is the **basis** for any **reliable** evaluation.

... you can determine the **evaluation speed yourself**  
(without being bound to the playback speeds of players or similar).

... a picture is much **easier to archive** than, e.g., video material  
(progress of technology, outdated playback devices or data formats, etc.).

## WHAT IS SUITABLE?

### **Applications for inspection by panorama visualisation**

- cable surfaces
- tunnel surfaces
- long edge beams of bridges etc.
- stacks
- adits
- mine shafts
- facades

### **... any large surface which need to be recorded and visualized:**

- within shortest time,
- in high resolution,
- for inspection,
- for evaluation and
- for direct comparison with earlier or future recordings.

## SITUATION

Visual inspection is the first and major method for maintenance of structures

### **First challenge**

Access to the structure: avoidance of operation interruptions

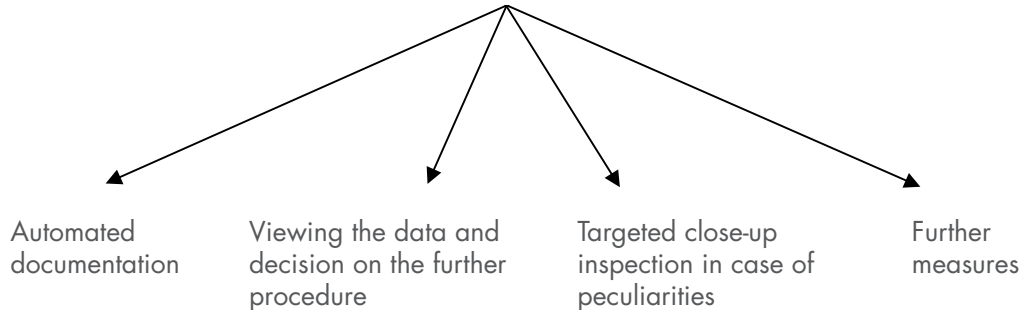
### **Second challenge**

Data acquisition on site: 100 % recording and mapping of all findings

### **Third challenge**

Data handling: fast and easy evaluation of big amount of data

**Splitting the process into work packages that can be efficiently implemented**



**Less** traffic impairment, **more** expert availability for others!

### Avoid interruptions of operation with the ATIS cable robot

The various panorama pictures modules are perfectly aligned with the constructional situation.

- No scaffolding, no crane
- Short erection time (10 – 40 minutes)
- Fast recording time (0,1 m/s – 0,5 m/s)
- Distance to the object bigger 50 cm
- 100% data recording in a consistently high quality



*Tunnel- and facade modul*



*Cable module*



*Stack modul*

### Recording and assignment of all data in one panorama picture

- 200 m cable – 200 m panorama picture of the entire surface (360°)
- 7000 m tunnel – 7000 m panorama picture of the entire surface (360°)
- The panorama picture can be edited by zooming, moving and highlighting.
- All data recorded in a consistently high quality.

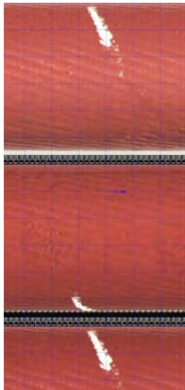


# AUTOMATED VISUAL INSPECTIONS

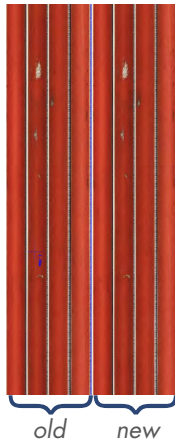
## CONCEPT

### ATIS Viewer – Fast and easy handling

view



compare



measure



document

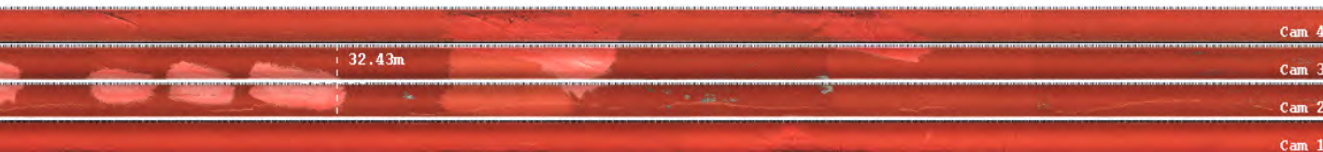




## ATIS VIEWER

### View

- Self-determined working speed.
- Simple handling by pushing on the panorama picture.
- High-resolution illustration across the entire building surface, no quality loss.
- 400% enlarged views possible.



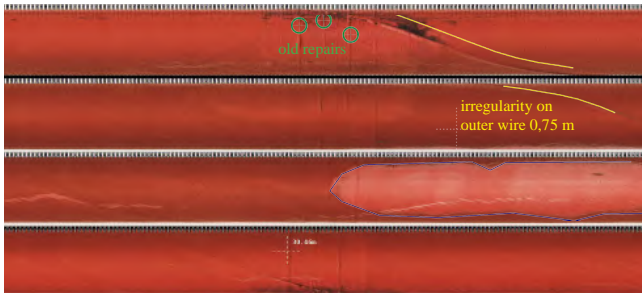
### Compare

- Direct comparison between current and past inspections is possible at all times.
- Damage progress is thus easier to recognise and document.
- Experts can inspect peculiarities on site specifically.
- Particularly helps to assert warranty claims.



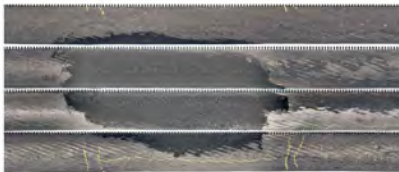
### Measure

- No impairment from weather or lighting.
- No time pressure on site.
- Area calculation of defects possible.
- Several areas with the same kind of damage can be totalled up.
- Traceability of the measurement present at all times.



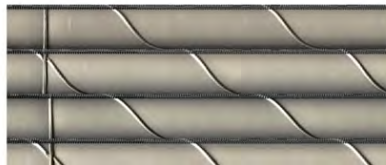
### Document

- Peculiarities can be applied with comments and saved.
- All comments, marks, etc., can be printed out, e.g., for reports.
- Targeted printouts of noticed areas possible, easily, e.g., for experts.
- Creation of PDF files possible, e.g., for emailing.
- Archiving of the actual condition as a basis for, e.g., warranty claims.
- Damage progress can be documented, e.g., for warranty claims.



Date: 06. November 20 12: 2011

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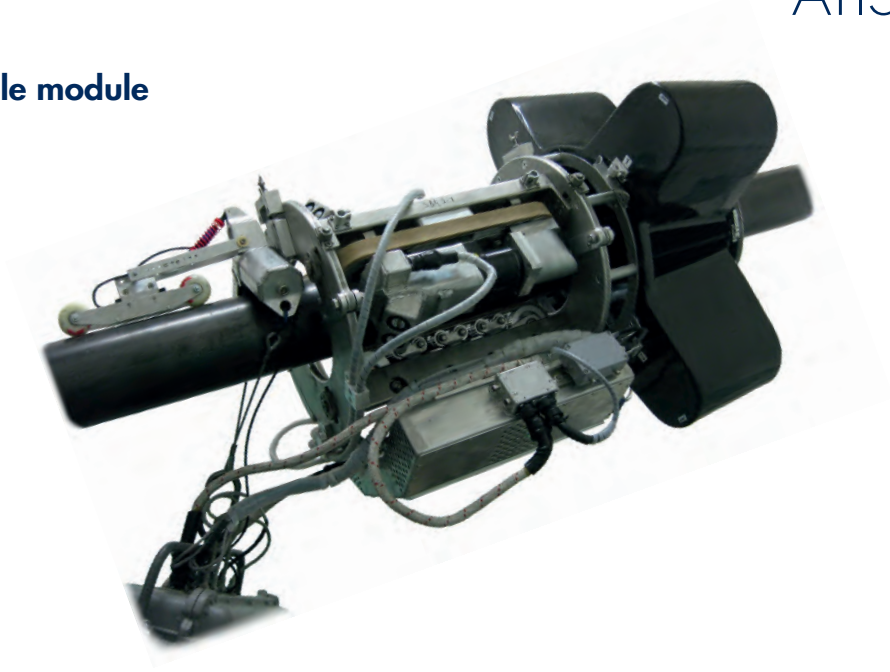
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# AUTOMATED VISUAL INSPECTIONS

ATIS SVT

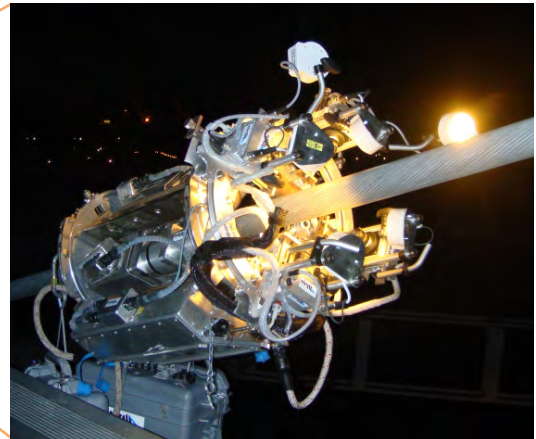
**Cable module**



# AUTOMATED VISUAL INSPECTIONS

## ATIS SVT

### Work at night



# AUTOMATED VISUAL INSPECTIONS

ATIS SVT

## Inspection of full locked and PE-sheathed cables



*Cable inspection on Stonecutters Bridge,  
Hong Kong*

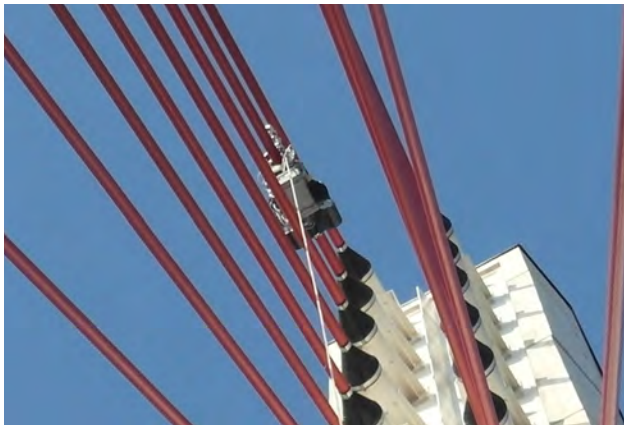


*Cable inspection on Passerelle de deux Rives,  
Kehl/Strasbourg*

# AUTOMATED VISUAL INSPECTIONS

## ATIS SVT

**Efficient**



*Niederwartha Bridge: recording speed 0,3 m/s*



*Neuwied Bridge: erection time approx. 20 minutes*



# AUTOMATED VISUAL INSPECTIONS

ATIS TVT

## Tunnel- and facade module



# AUTOMATED VISUAL INSPECTIONS

ATIS TVT

## Old Elbtunnel, Hamburg

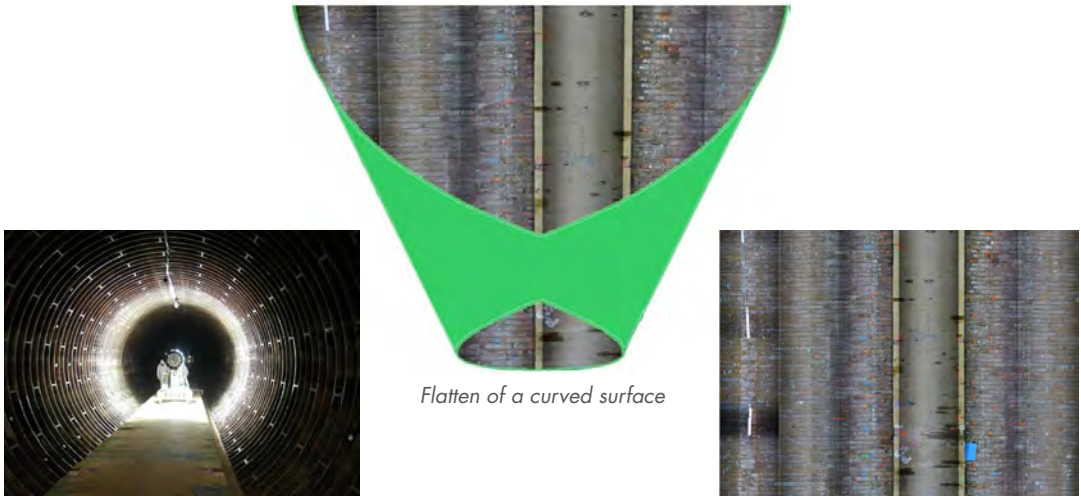


*Inspection of the intact tunnel*



*Inspection of the tunnel under rehabilitation*

### Processing of the panorama image

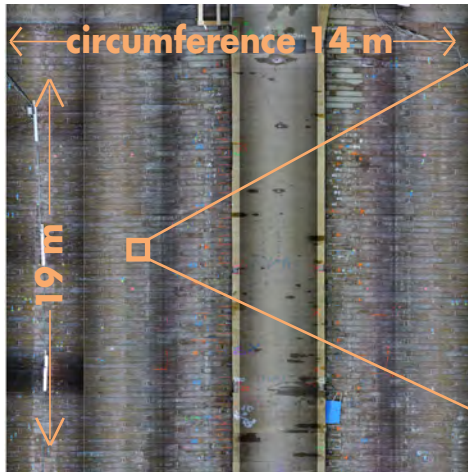


# AUTOMATED VISUAL INSPECTIONS

## ATIS TVT

### Zoom levels

Tunnel panorama



ATIS Viewer - Zoom level 100 %

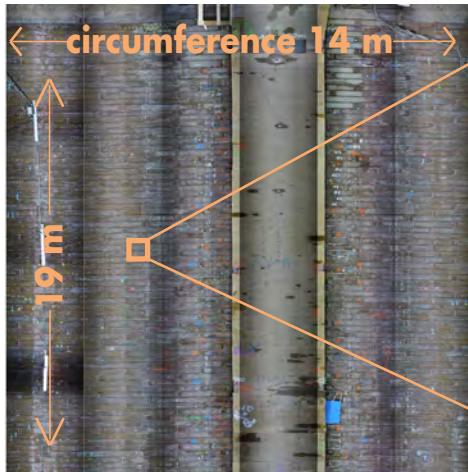


# AUTOMATED VISUAL INSPECTIONS

## ATIS TVT

### Zoom levels

Tunnel panorama



ATIS Viewer - Zoom level 400 %



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