# 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(progress of technology, outdated playback devices or data formats, etc.).

# AUTOMATED VISUAL INSPECTIONS

## 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.

# AUTOMATED VISUAL INSPECTIONS

## 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

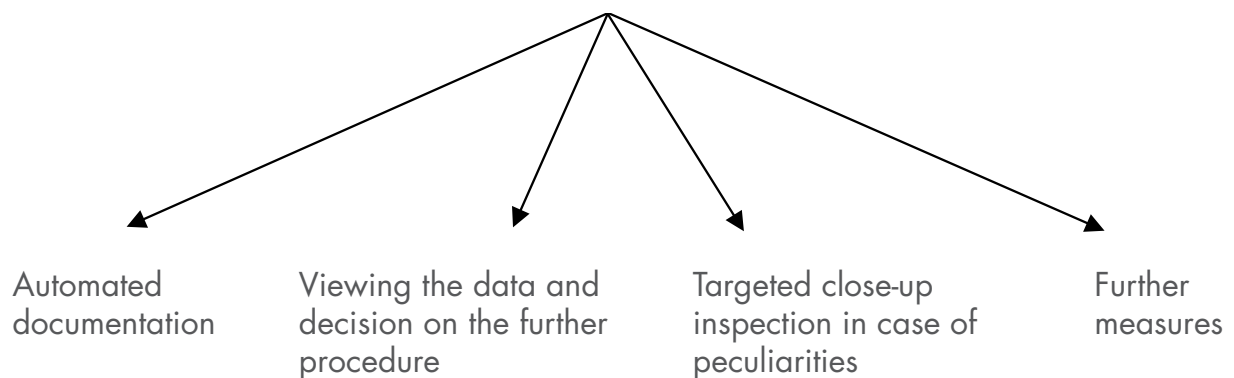Data acquisition on site: 100 % recording and mapping of all findings

### Third challenge

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

## CONCEPT

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

| Automated documentation | Viewing the data and decision on the further procedure | Targeted close-up inspection in case of peculiarities | Further measures |

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

## CONCEPT

### 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 (0,1m/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 module*

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## CONCEPT

**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.
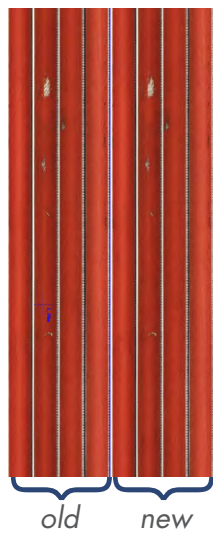- All data recorded in a consistently high quality.

## ATIS Viewer – Fast and easy handling

view
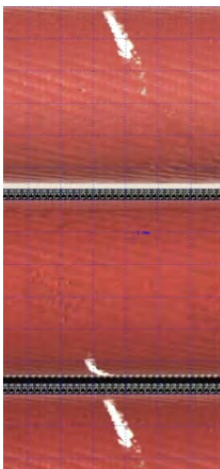
compare

measure

document



old    new
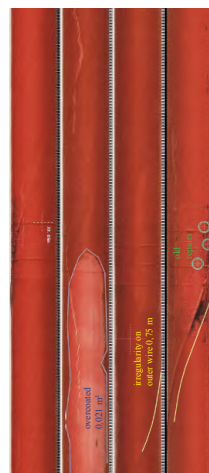
# ATIS VIEWER

## 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.
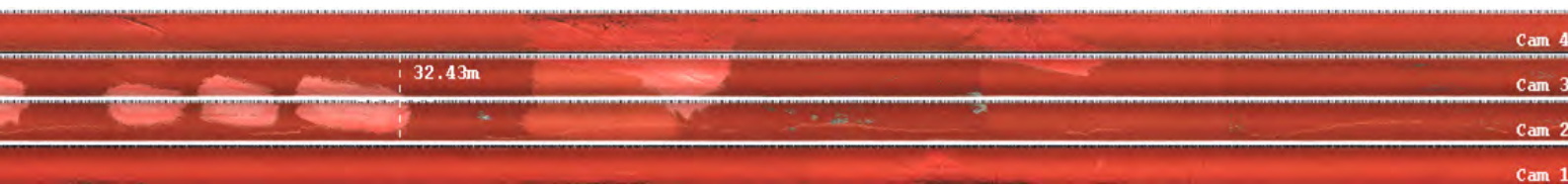
# ATIS VIEWER

## 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.



*old*

*new*

# ATIS VIEWER

## 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.
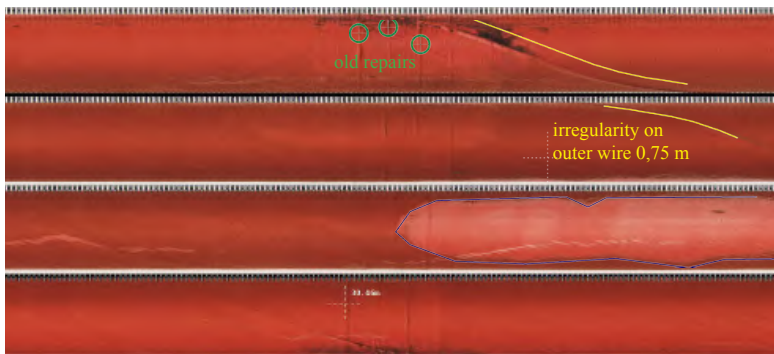
# ATIS VIEWER

## 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.
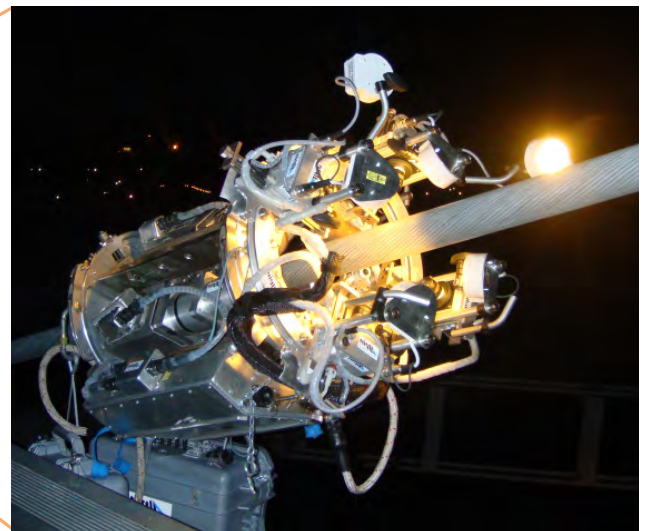- Damage progress can be documented, e.g., for warranty claims.
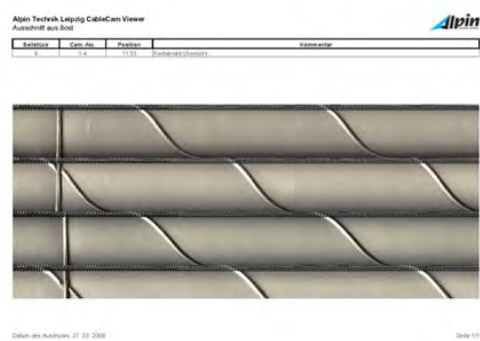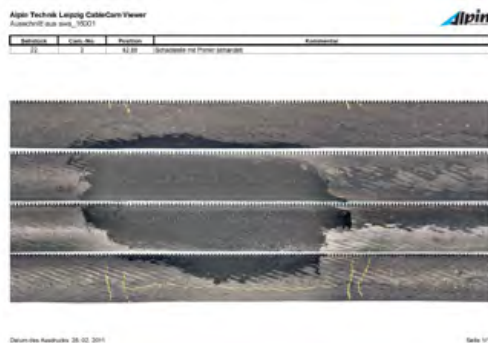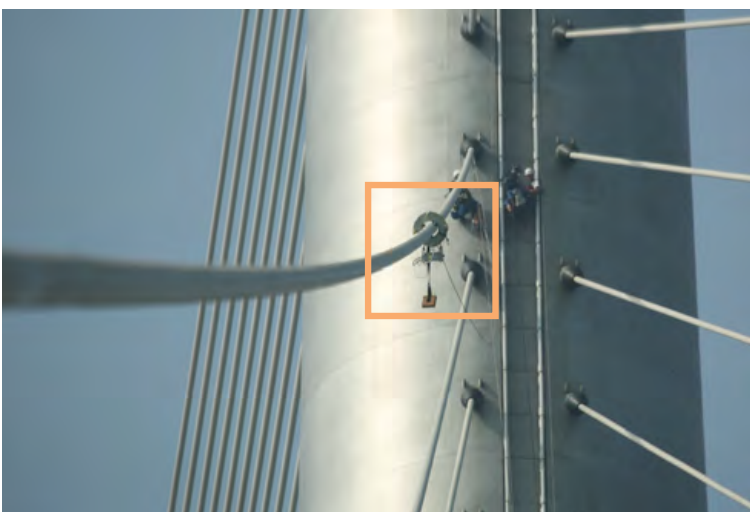
# ATIS SVT

## Cable module
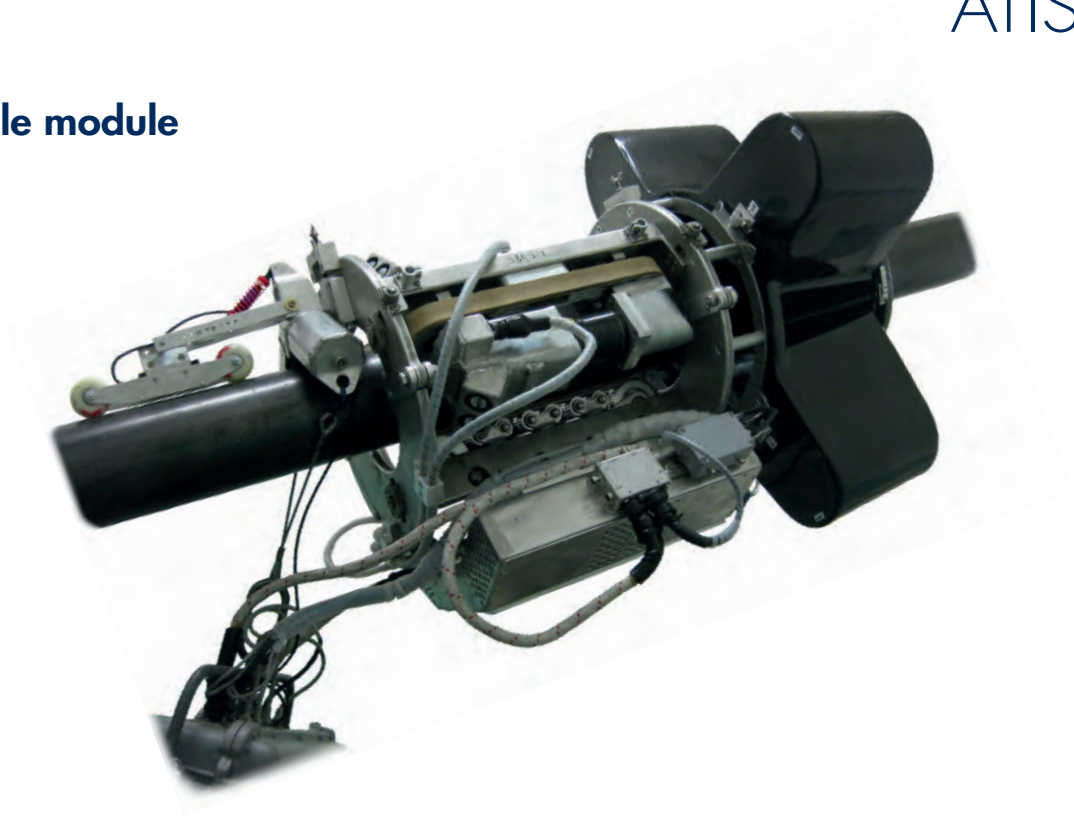
## ATIS SVT

**Work at night**

# AUTOMATED VISUAL INSPECTIONS

## ATIS SVT

### Inspection of full locked and PE-sheathed cables



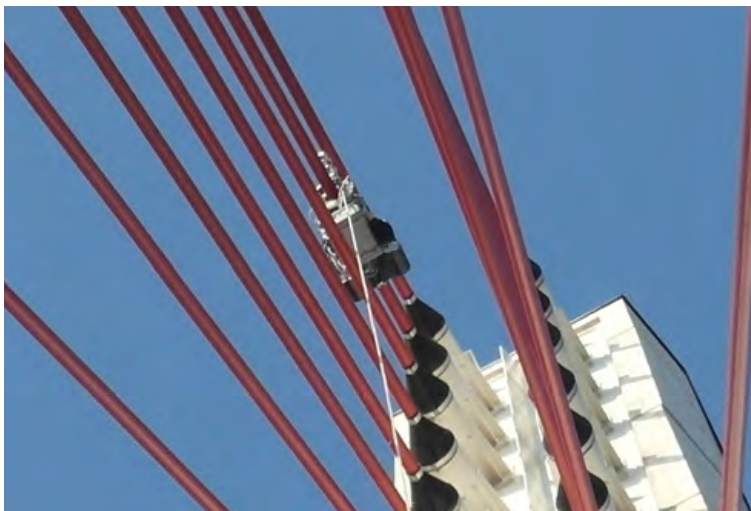*Cable inspection on Stonecutters Bridge, Hong Kong*



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

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## ATIS SVT

### Efficient



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



*Neuwied Bridge: erection time approx. 20 minutes*

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## ATIS TVT

**Tunnel- and facade module**

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## ATIS TVT

### Old Elbtunnel, Hamburg
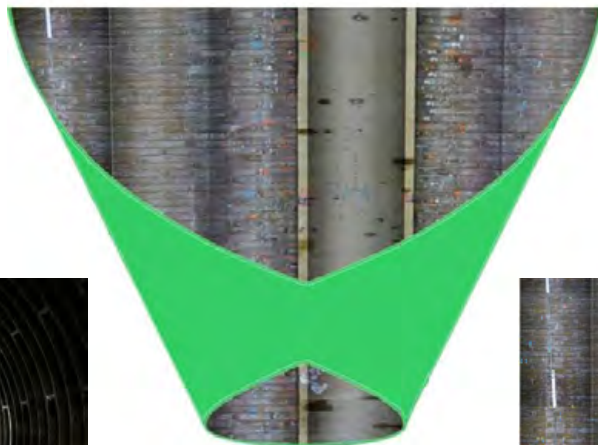


*Inspection of the intact tunnel*


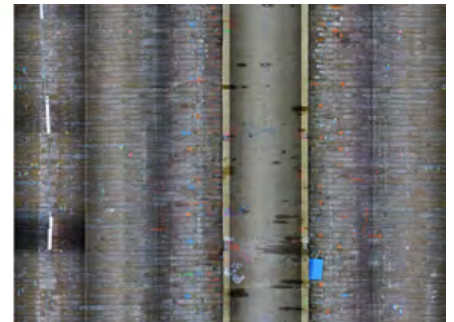
*Inspection of the tunnel under rehabilitation*

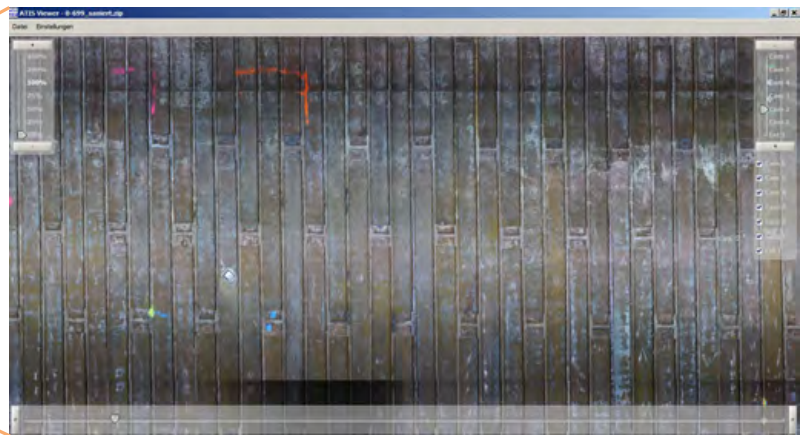## Processing of the panorama image



*Flatten of a curved surface*

# ATIS TVT

## Zoom levels

Tunnel panorama

ATIS Viewer - Zoom level 100 %

# ATIS TVT

## Zoom levels
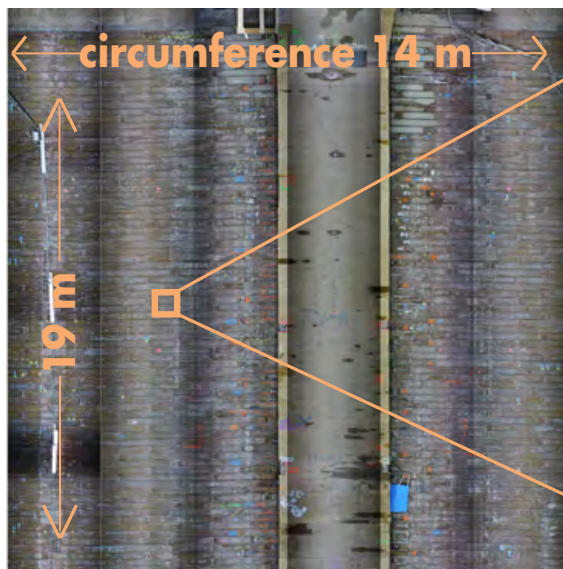
Tunnel panorama

ATIS Viewer - Zoom level 400 %