ASSETS4RAIL

3rd plenary meeting, mid-term conference
08.01.2020
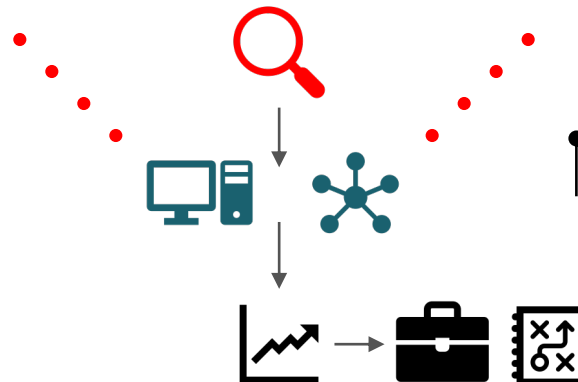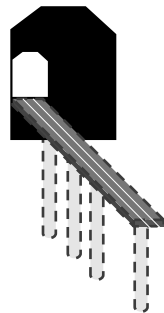**Armando Carrillo Zanuy acarrillo@eurnex.eu**
EURNEX

MAIN OBJECTIVE

To achieve **cost efficient** and **reliable infrastructure**

How?

developing a set of cutting-edge asset-specific **measuring** and **monitoring devices**

WS1

WS2

WS1, BRIDGES AND TUNNELS

Railway tunnel examination technologies for **subsurface defect detection** (bridge and tunnel)

Non-traffic disturbing methods for **cleaning** long tunnel drainage **pipes**

Contactless **measurement of noise**, noise **dampers** for **bridge**

Bridge and tunnel information modelling systems (**BIM**)

Algorithms for bridge information model module

$$p(x) = \prod_{v \in V} p\left(x_v \mid x_{\mathrm{pa}(v)}\right)$$
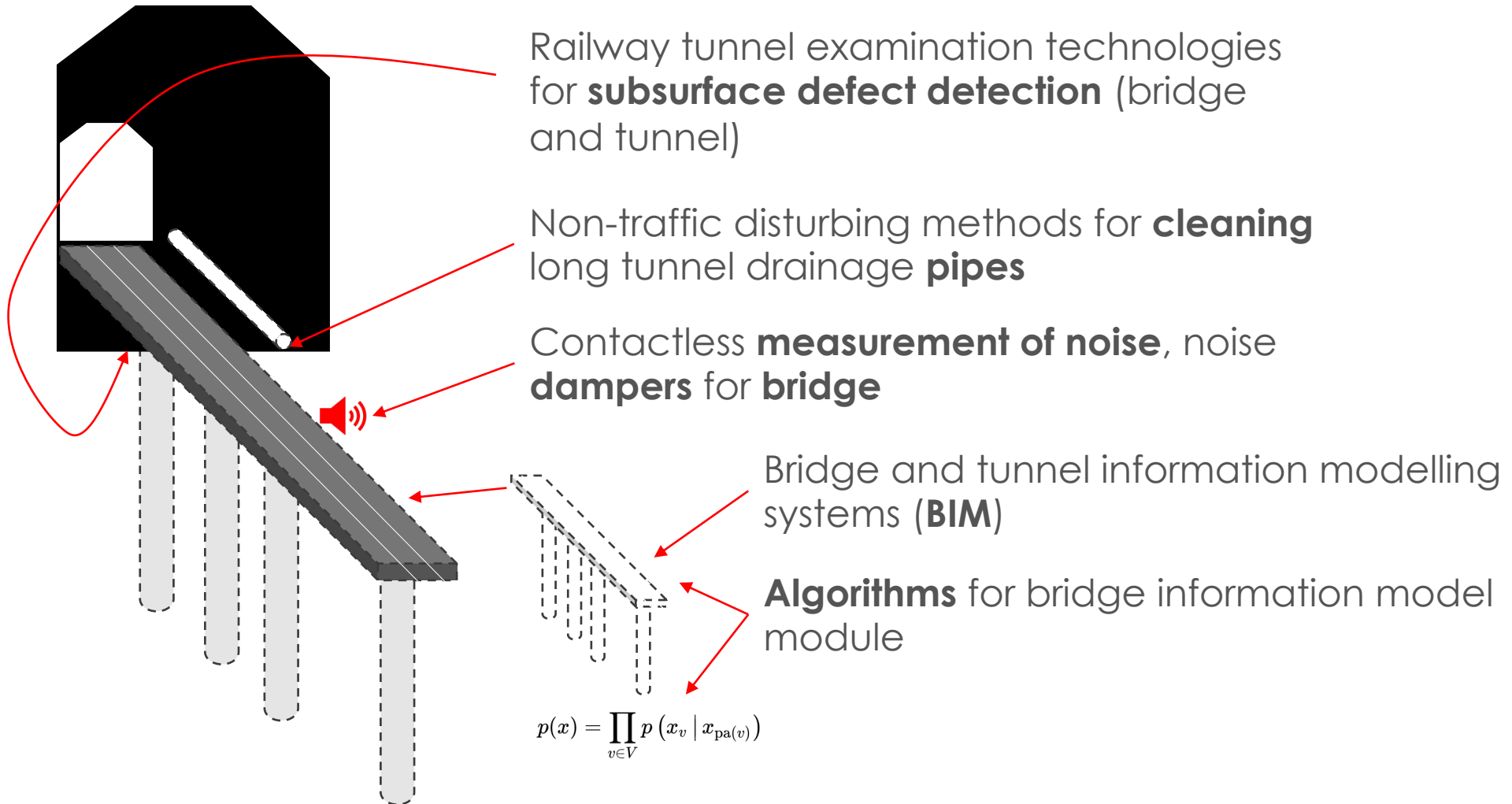
WS2, RAILWAY MEASURING AND MONITORING SYSTEMS

RFID Study, design and development of **"Read/write RFID tags"** for trains

Automatic features **measurement** configuration **tools** and **processes**

Models that quantify the **impact** of a given measured **defect** on the **infrastructure**

Data from **fail-safe systems:** Collection solutions (HD and SW) designed to achieve seamless **safety approval**

Development of **"stereo images"** systems for measurements of **defects** on **rolling stock**

Development of an **underframe image** monitoring system

System/sensor to measure the **transversal** position of the **wheel** in relation to the **rail**

Assets4Rail

Management, exploitation and dissemination

Impact assessment

Workstream 1
Monitoring bridges and tunnels

Validation and demonstration (S2R TD3.5)

Workstream 2
Train, track monitoring and diagnostics data

Validation and demonstration (S2R TD3.7)

Subsurface tunnel defects

Noise and vibrations monitoring

Structural health monitoring

Track geometry monitoring

RFID identification

Cleaning tunnel drainage pipes

Monitoring

Information modelling (BIM)

Noise dampers

Image-based wayside train monitoring

Rolling stock 3D profile and underframe image

Intervention measures

Asset assessments

Data collection from safety systems
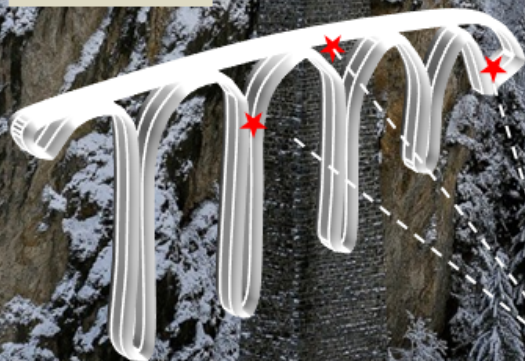
IMPACTS WS1

- **Inspection** methods for tunnels and bridges. **30% decreased track disturbance**
- **Maintenance and upgrade** methods for tunnels (incl. cleaning drainage pipes) and bridges**. 20% decreased track disturbance**
- Noise and vibration damping methods for structures. **15% decrease on noise levels**
- **Codes and standards** to facilitate design construction and maintenance of tunnels and bridges. **>50% increase of capacity** by targeted (positive) cases
- **40% reduction on LCC** due to:
    - 30 % decrease in track disturbances caused by **preventive strengthening of fatigue** details on steel bridges
    - 15% **reduction of noise and vibration** due use of dampers
    - Synergic use of bridge weigh-in-motion and fatigue life calculation for more accurate calculation that enable **administrative upgrade of bridges**: 30%.
    - **30 % increase in fatigue lifetime** of steel bridges, thus reduced LCC
    - monitoring range increase: **reducing** the required **personnel** for the survey execution with saving up to 20%
    - **subsurface defect detection** with new software/hardware technologies would realistically reduce costs by an average 35%
- **50% increase in reliability and punctuality**
- **Accuracy increase**: passing from visual inspections to monitoring with the availability of high resolution digital data (resolution < 1 mm);
- Reliability increase: by reducing subjectivity of human inspections resulting in a **reduction of the diagnostic mistakes of 80%**

IMPACTS WS2

- **Reduction** up to **20%** of the **cost of track inspections**, taking into account:
  - the potential **improvement of productivity** itself (up to **5%**),
  - the increased **responsiveness and accuracy**, reducing time waste and effects of failures on operation (up to **10%**)
  - the **reduced** planned **occupation of track**, thanks to the potential reduction of undue maintenance activities and inspections themselves (up to **5%**).

- Due to more efficient, better organized and more accurate maintenance process the total **labour costs** will be **reduced** by an average of **30%**.

- **Material and equipment** maintenance **costs** will be **reduced** by **5-10%** due to improved, optimized procurement and maintenance process.

- **20% increase** in **operational reliability and safety**