Frauscher Tracking Solutions FTS

Mayank Tripathi

TRACK MORE WITH LESS

FRAUSCHER SENSOR TECHNOLOGY

The Principle of Distributed Acoustic Sensing (DAS)

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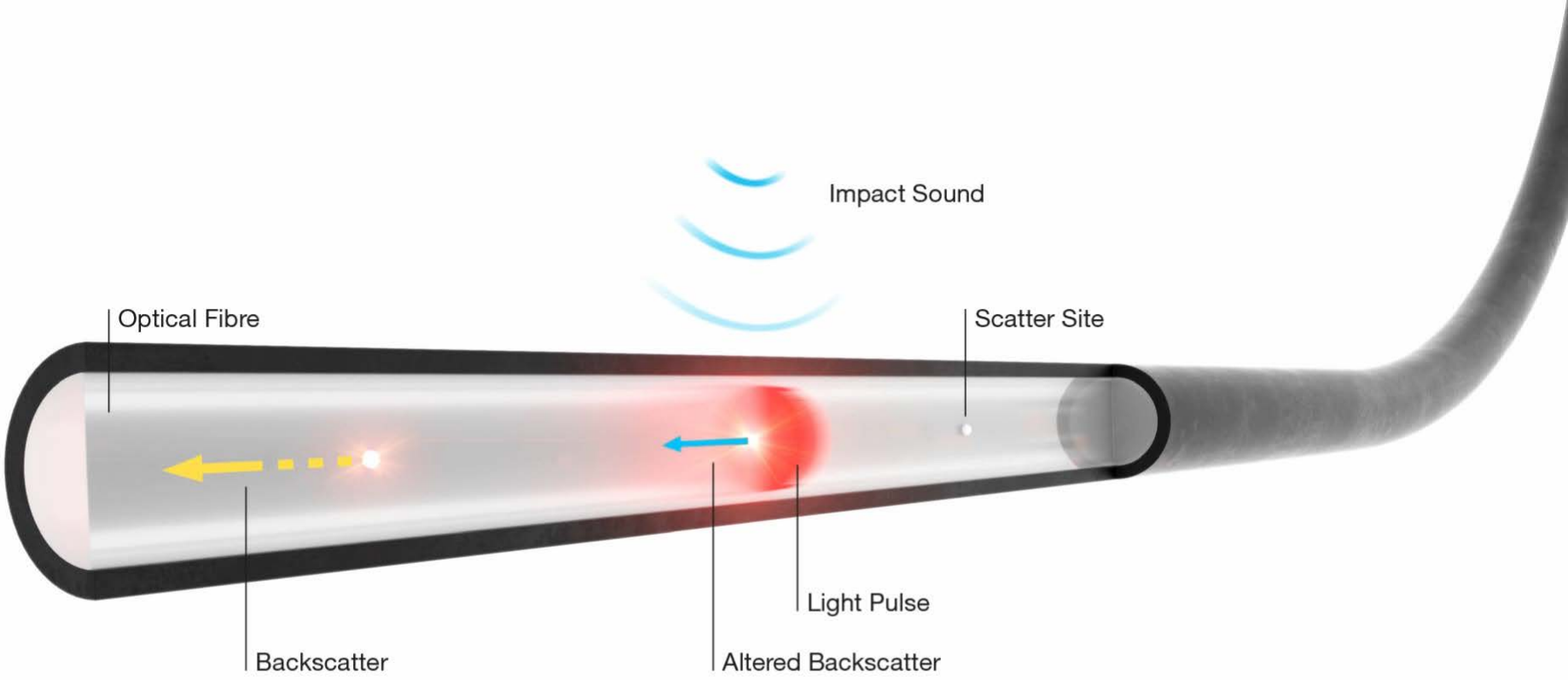
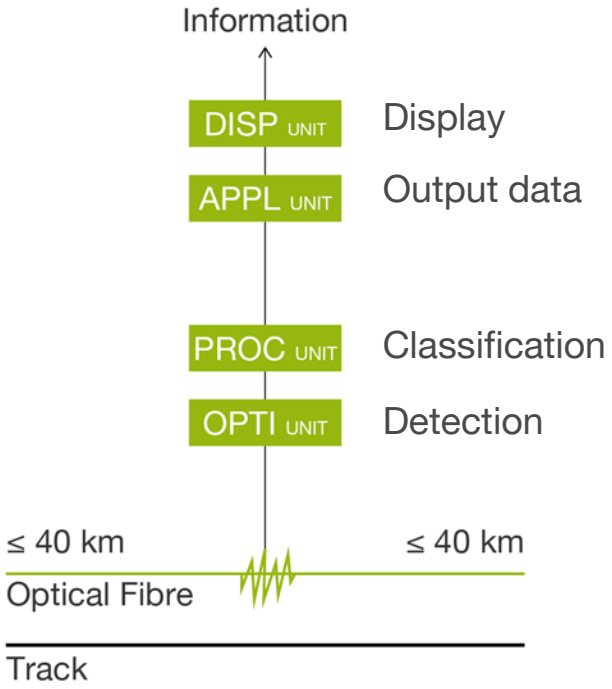
FRAUSCHER SENSOR TECHNOLOGY


Impact Sound
Optical Fibre
Scatter Site
Backscatter
Altered Backscatter
Light Pulse


3
14:29
DEPARTURE - ARRIVAL
ICE

FTS-FAS System



- Covering 80 km of fibre
- Spatial resolution of 10 m
- 2,500 pulses per second in each direction
- Zones possible

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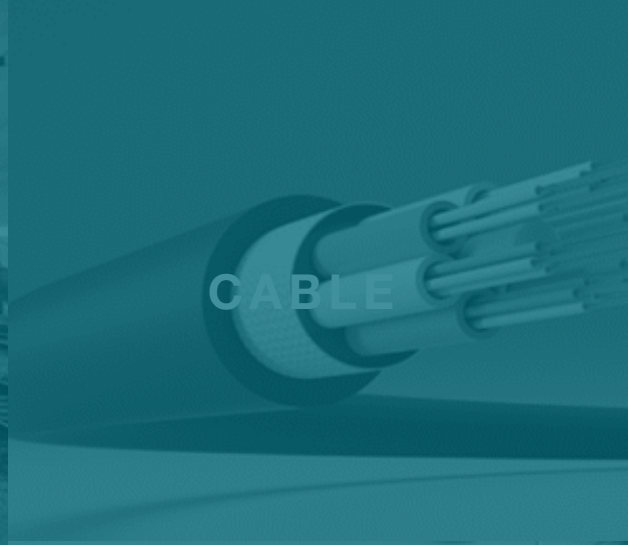
SIGNAL


TRANSMISSION


CABLE


DETECTION


DATA
PROCESSING
CLASSIFICATION


APPLICATION

SIGNAL

TRANSMISSION

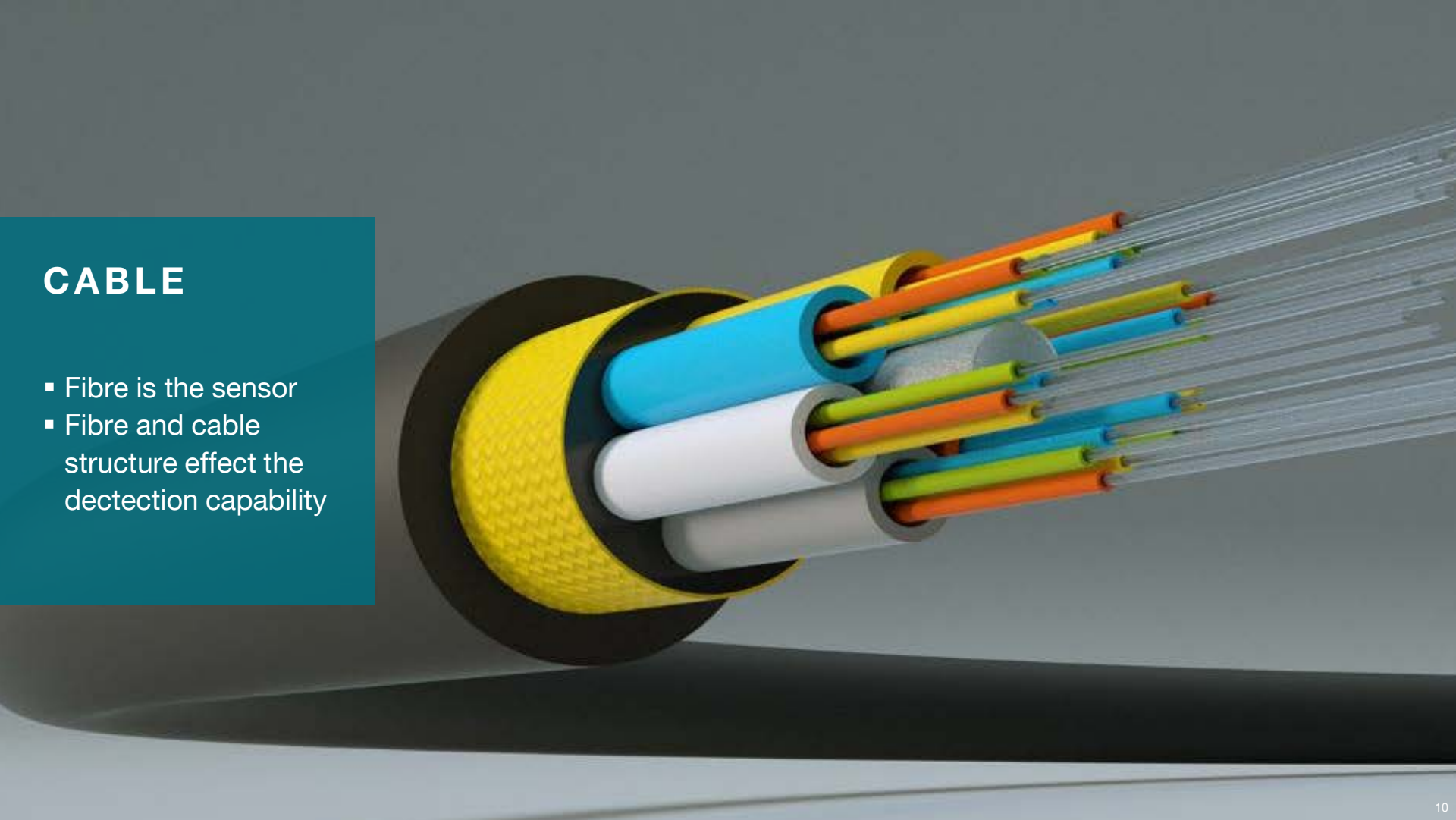
INFLUENCED BY:

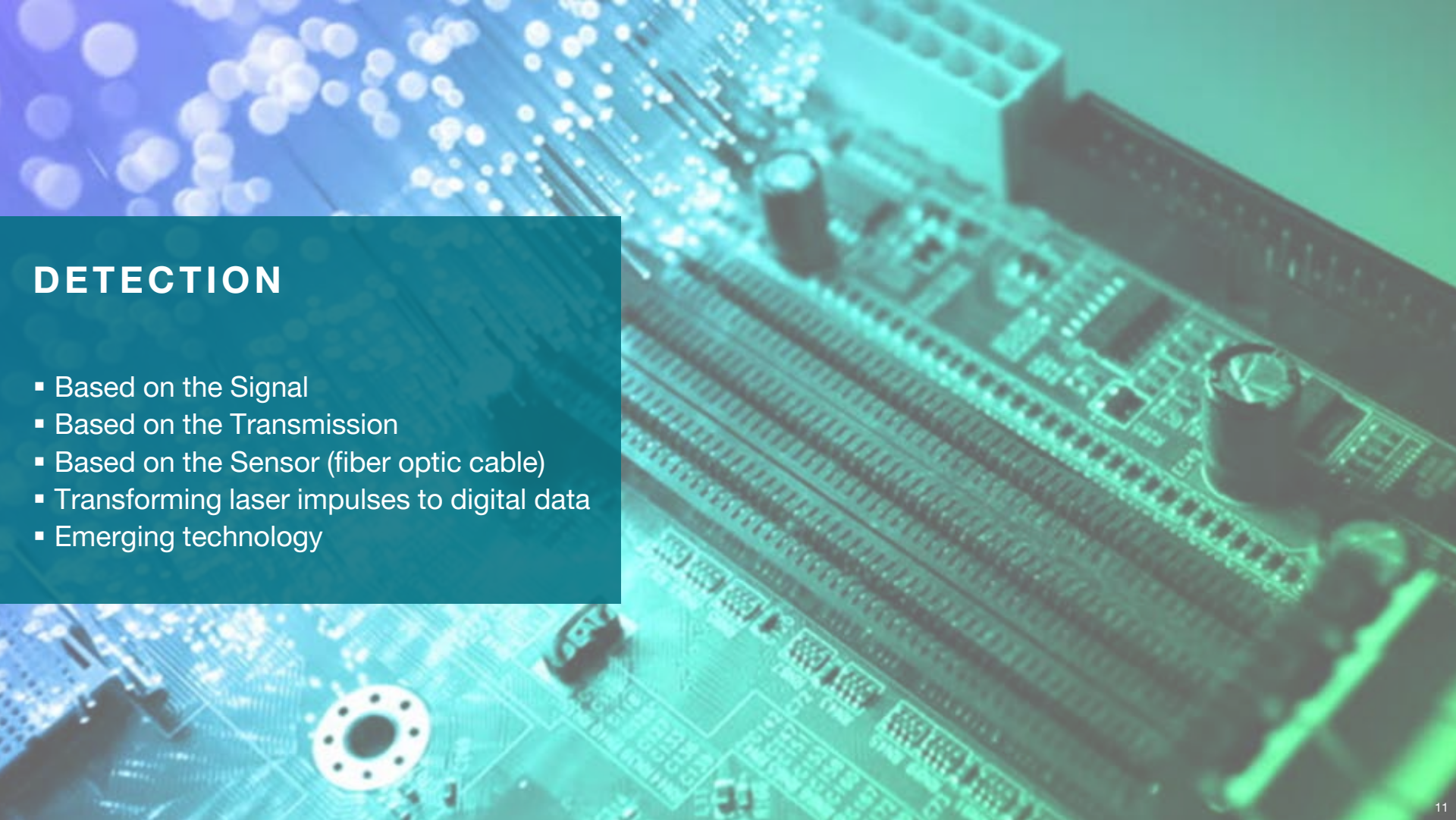
- Location of fibre
- Location of impact
- Ground conditions
- Weather & climate


TRANSMISSION

CABLE

- Fibre is the sensor
- Fibre and cable structure effect the dectection capability





DETECTION

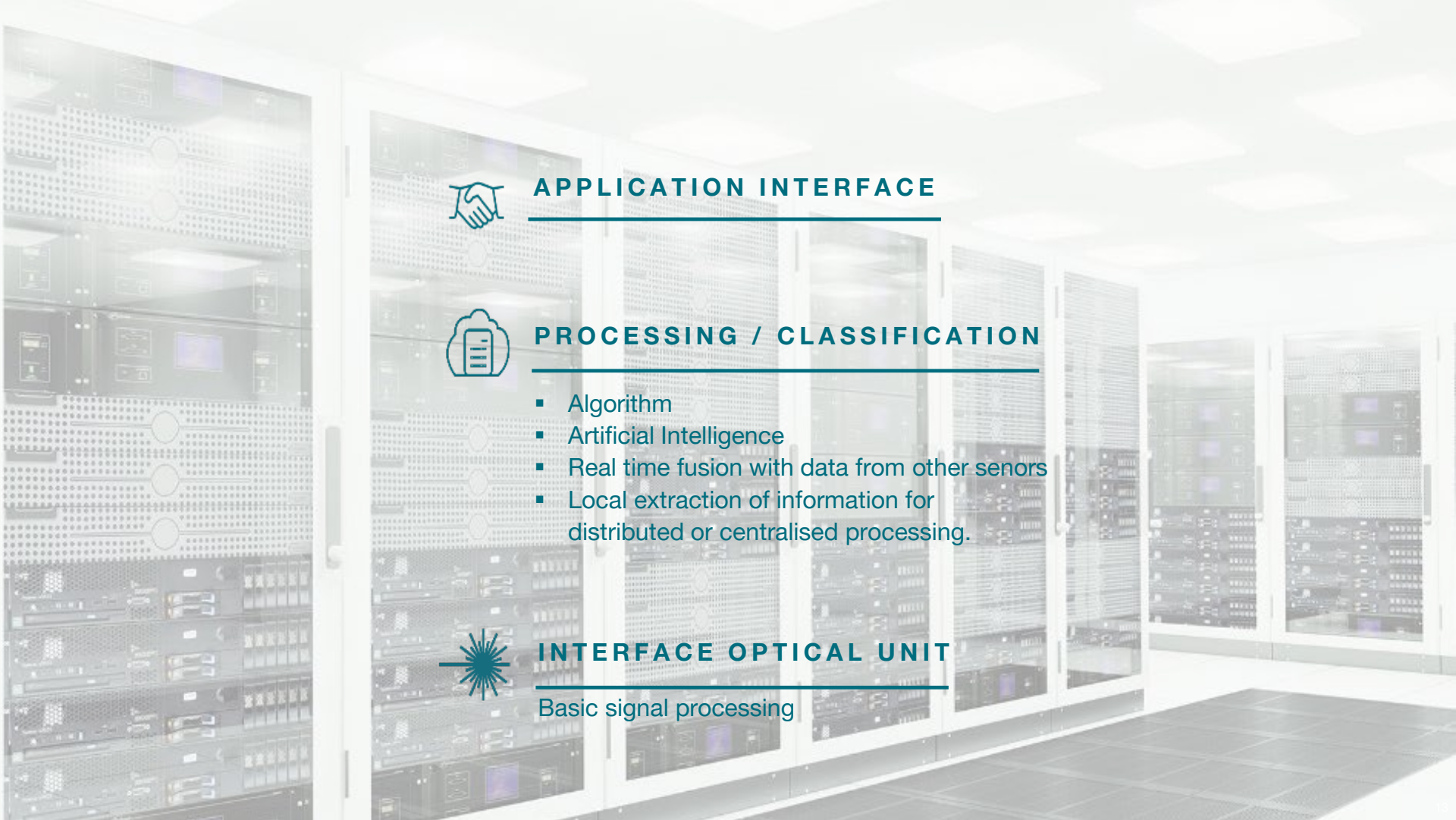
- Based on the Signal
- Based on the Transmission
- Based on the Sensor (fiber optic cable)
- Transforming laser impulses to digital data
- Emerging technology

DATA PROCESSING / CLASSIFICATION

1000 km of track generates

27.25 TB of data / hour

Combination of distributed and centralised processing
Data analytics using AI



APPLICATION INTERFACE

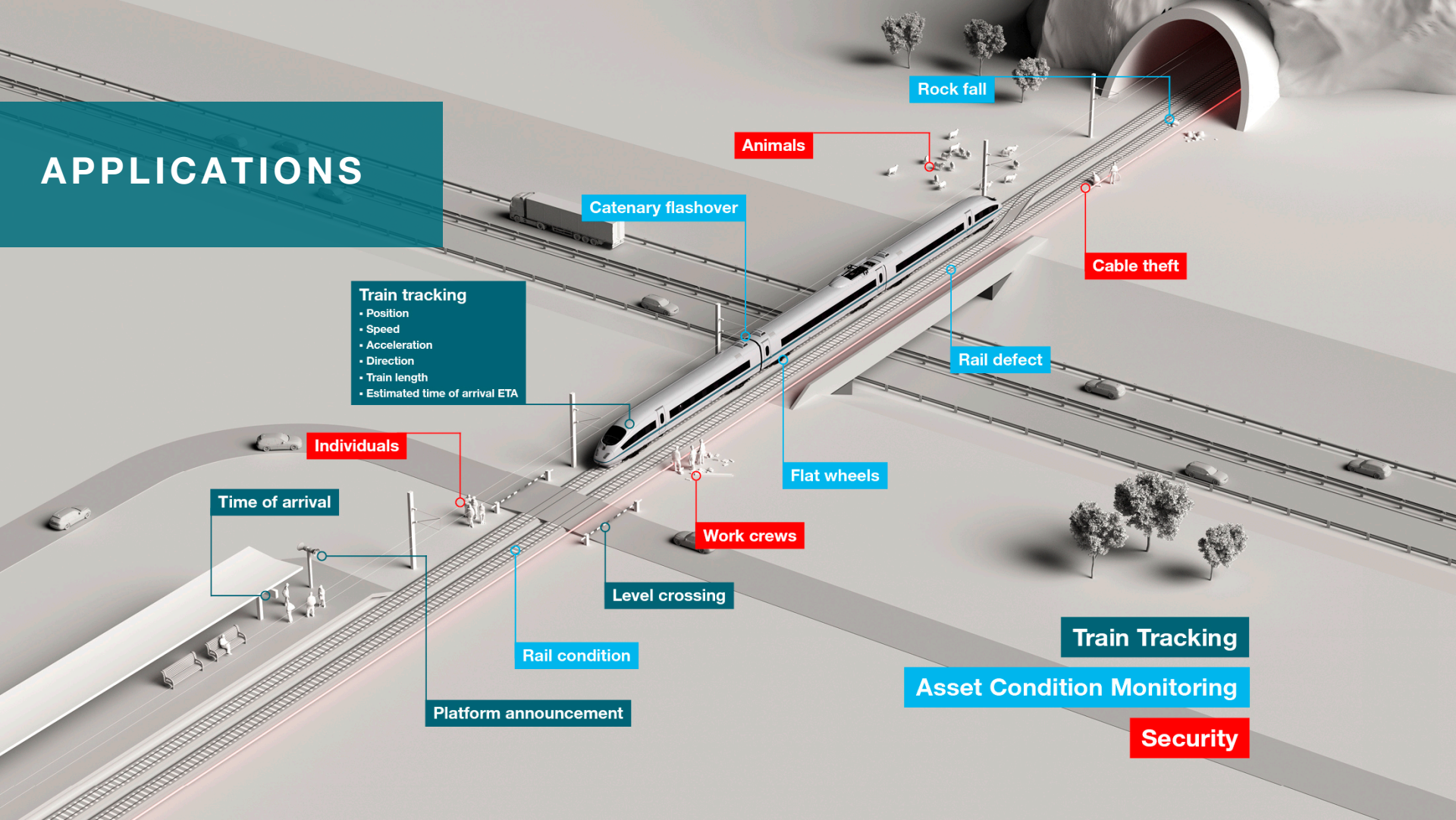
PROCESSING / CLASSIFICATION

- Algorithm
- Artificial Intelligence
- Real time fusion with data from other senors
- Local extraction of information for distributed or centralised processing.

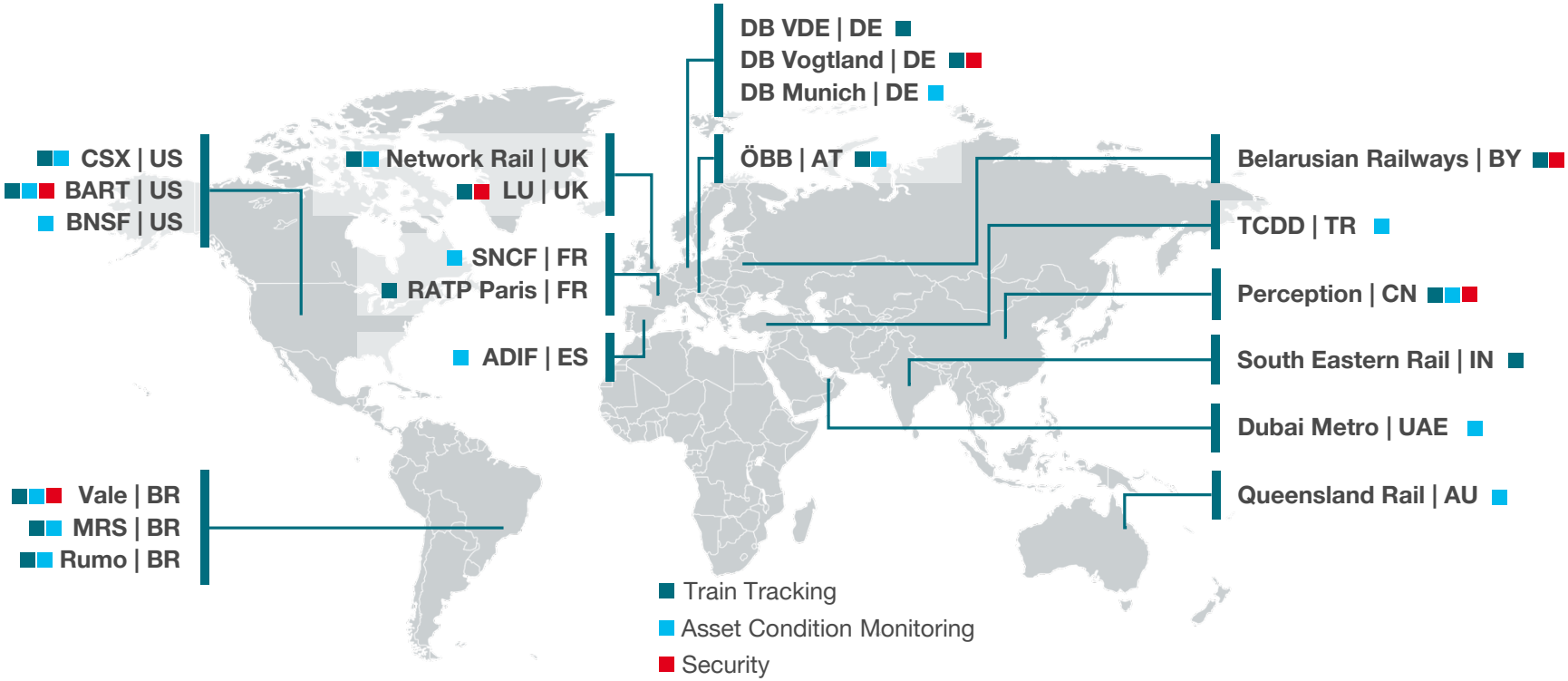
INTERFACE OPTICAL UNIT

Basic signal processing

APPLICATIONS



FTS Projects



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FRAUSCHER SENSOR TECHNOLOGY

FTS – Frauscher Tracking Solutions
Current capabilities

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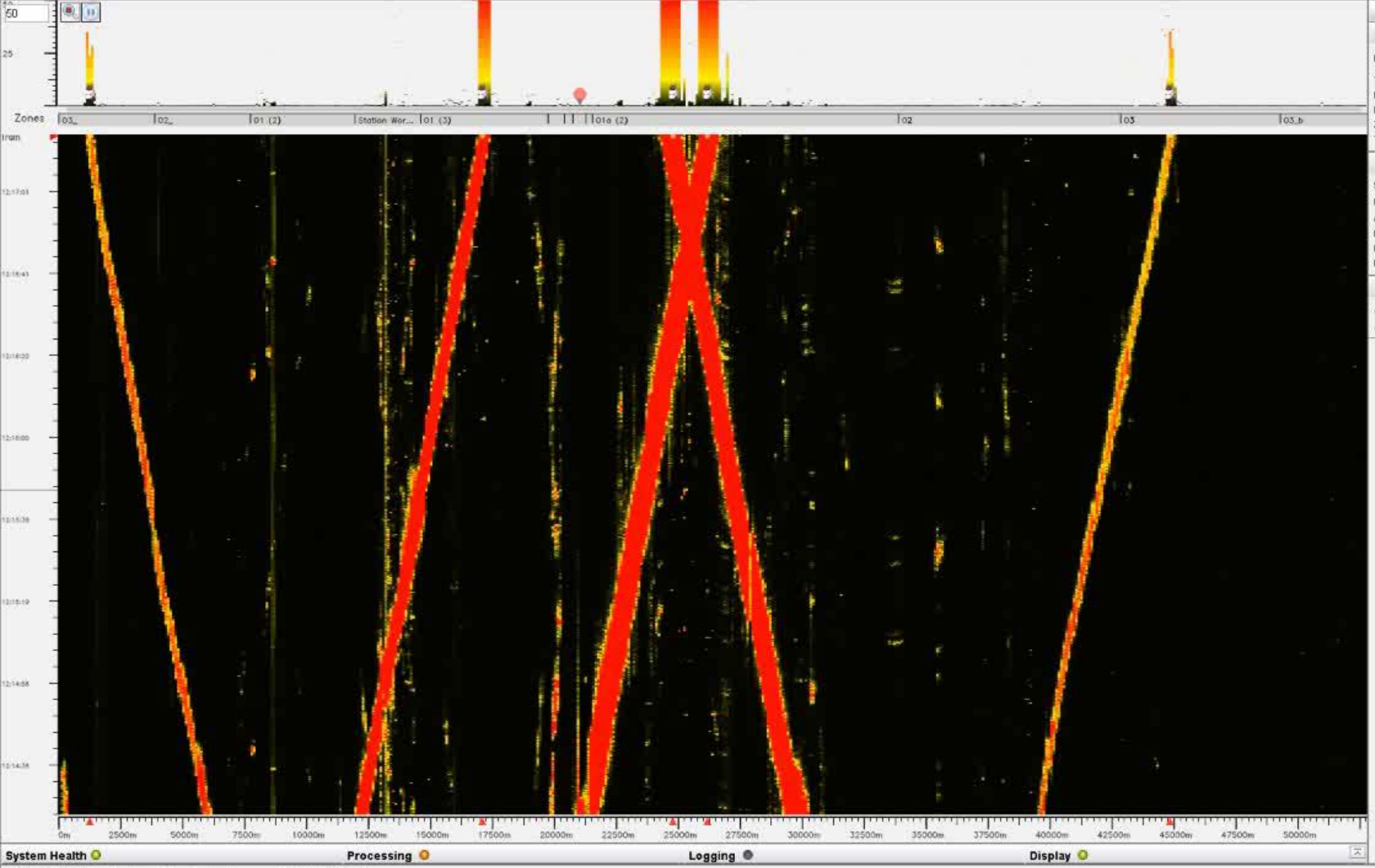
FRAUSCHER SENSOR TECHNOLOGY



Admin Factory

Currently Viewing

Display: Default

Time:

Dist.:

Mag.:

Zones: test

Type:

Data Logging

Status: Not Logging

Raw: /dev/sda1

Acoustic: System Drive

Directory: 20160913_GroundTruth

Filename: Allerd..._Neumarkt_Train4

Format: FDS

FAS Controls

Running

Laser On

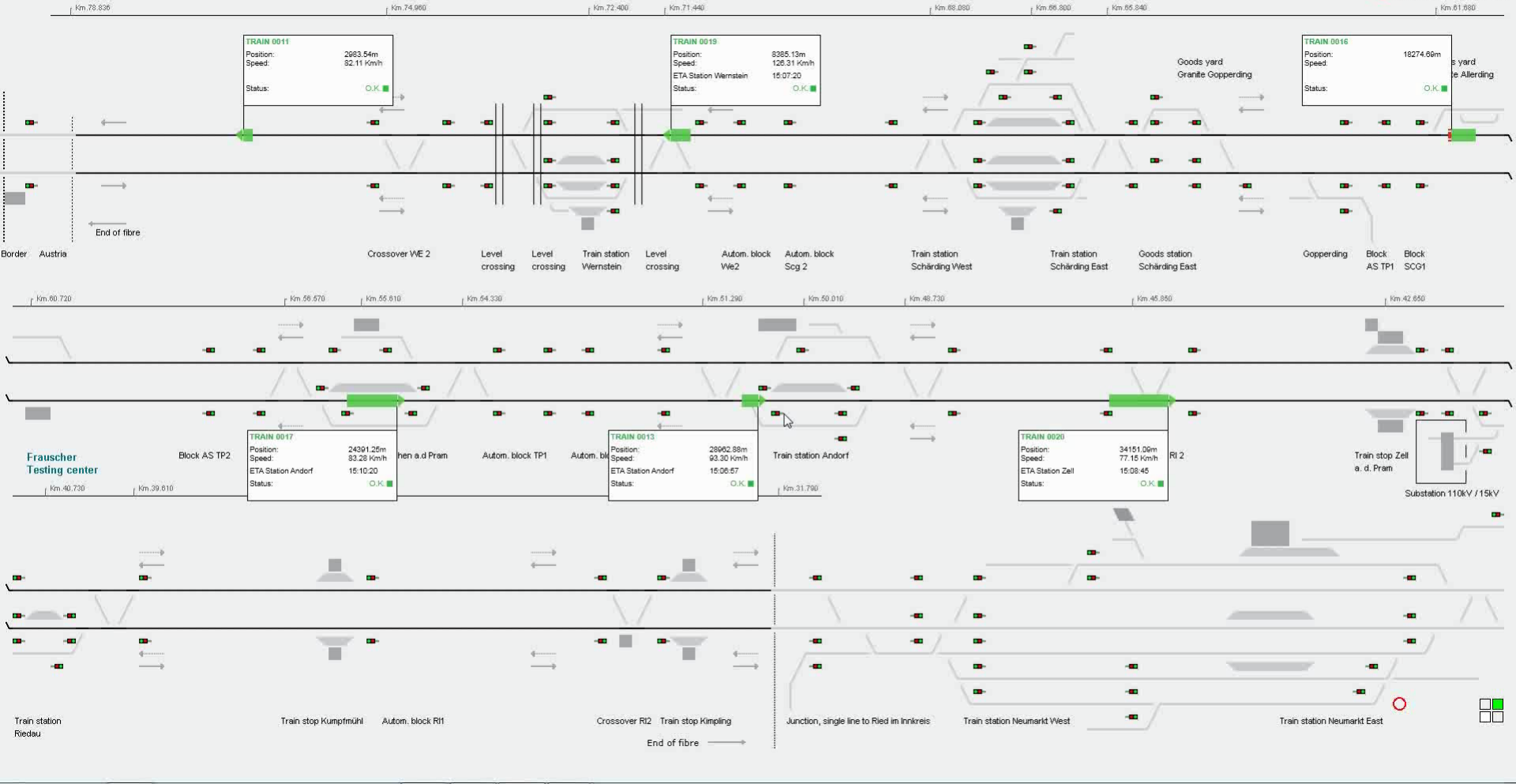
System Health | Processing | Logging | Display

Display Unit

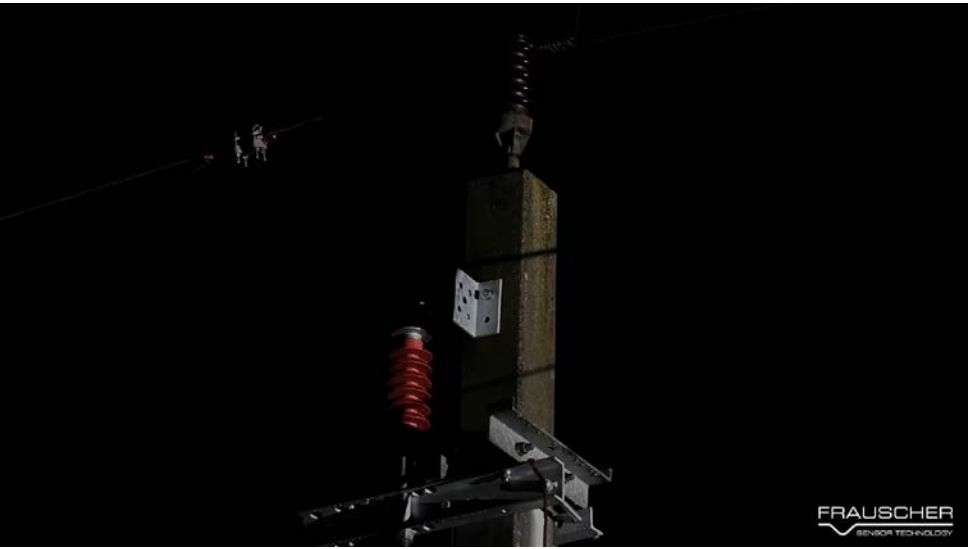
Main Tools About

FRAUSCHER TRACKING SOLUTIONS

FRAUSCHER SENSOR TECHNOLOGY



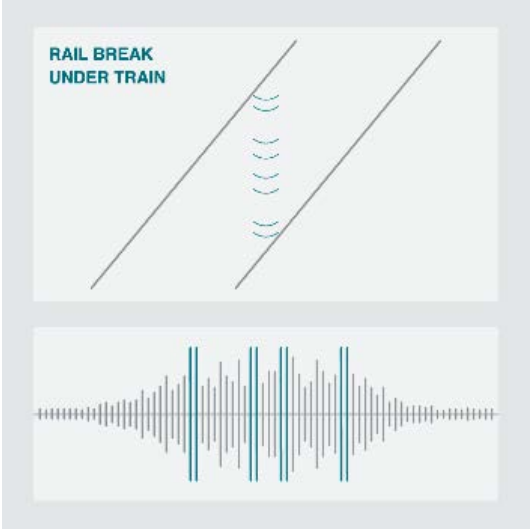
Asset Condition Monitoring

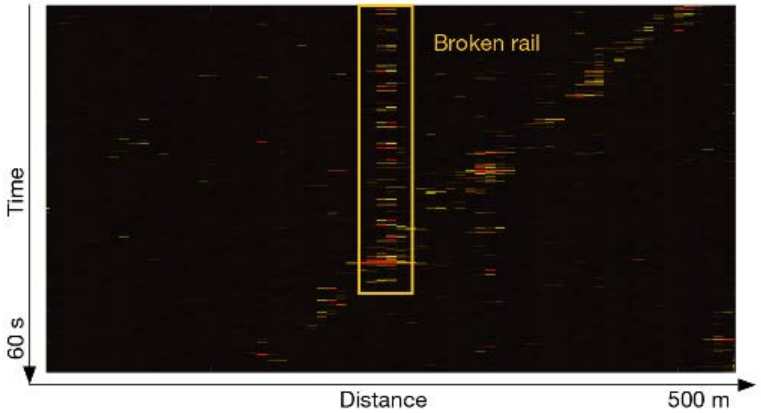


Monitor track condition

- Rail defects
- Rail fixing
- Track bed
- Flat wheels
- Catenary flashover
- Rock fall

Rail defect
FTS approach

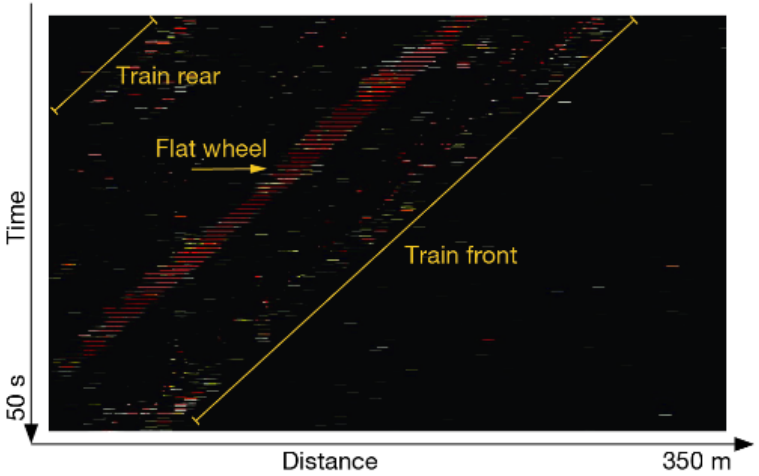




Rail defect
FTS capabilities

- Locating broken rails within a 30-40 m range
- Prevent derailments
- No extra equipment in the track necessary

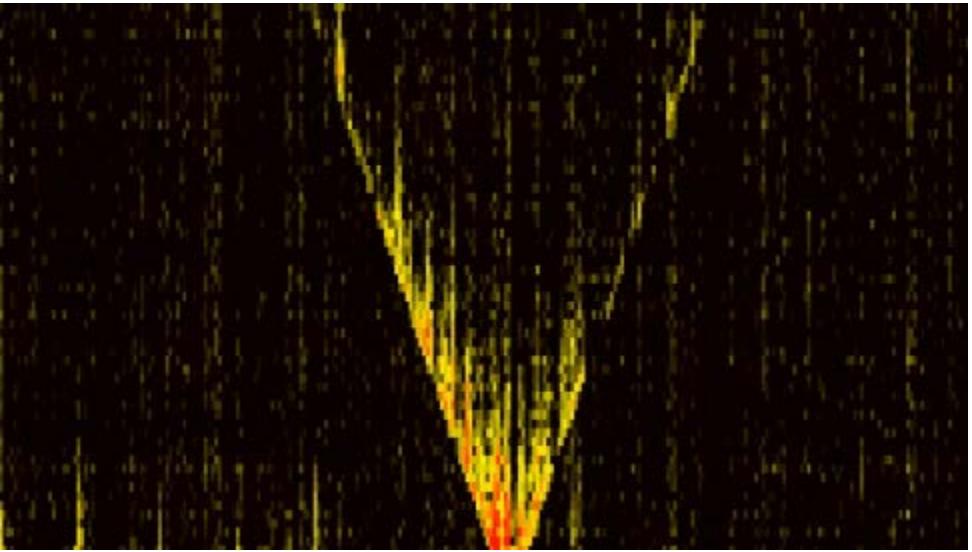
Flat wheel
FTS approach



Catenary flashover
FTS approach

- Detection of
- Sound created by the flashover
- Mechanical vibrations of the pylons and catenary system

Catenary flashover
FTS capabilities



- Location of flash-overs up to 10 m accuracy
- V-Pattern clearly visible due to sound propagation of pop
- Place and time of flash-over indicated at tip of V-Pattern
- Speed of propagation:
  340 m/s (speed of sound)

Digitization strategy in infrastructure

- Providing more information, supporting digitization strategies
  - Trains (location, speed, direction, status)
  - Monitor infrastructure
  - Provide event alarms
  - Analyzing data for predictive information
  - …
- Reduction of components in the field
- Reducing cable
- Reducing maintenance

Emerging technologies are technologies that are perceived as capable of changing the status quo.

They are relatively undeveloped in terms of their optimum performance. These technologies will alter the way we go about business.

DAS in Rail is an emerging technology

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