KISTLER
measure. analyze. innovate.

PUBLIC

THE POWER OF MEASUREMENT SYSTEMS COMBINED WITH DIGITAL PRODUCTS

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IoT Konferenz Baden

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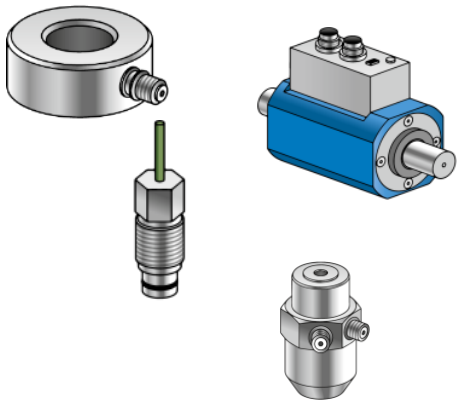
- Introduction to Kistler
  - Evolution of business model
  - Industries & applications
- Role of IoT & digital products for solving customer challenges with measuring systems
- Case highlights
  - Rail monitoring solution for optimizing track conditioning
  - Structural health monitoring for improving bridge safety
  - Data analytics and management platforms for speeding up flight tests
- Summary

BUSINESS MODEL

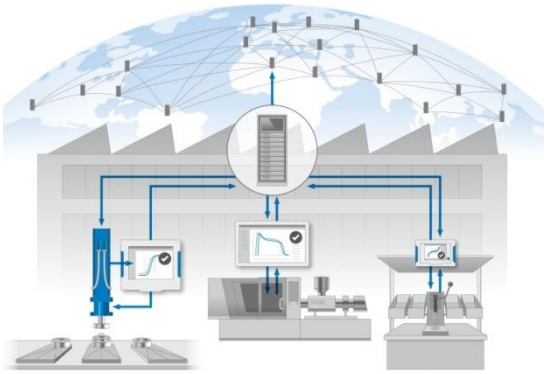
From component manufacturer to information provider

1959 – 2002
Component



2004 – 2012
System

2013 – 2019
Solution



2020 –
Information

Silent Revolution
2003 – 2005

KISTLER NEXT
2011 – 2013

ART IPC ST

KI1000
2020 –

AS DIVERSE AS OUR CUSTOMERS

Spaceflight
Pushing precision and reliability to the physical limits

Automotive industry
Engine development and efficiency

Road traffic
Protecting roads and making them safer

Sport
The key to more efficient training and therapy

Medical
Zero tolerance for production defects

Ind. applications
Process monitoring and quality assurance

Vehicle safety
Improving vehicle safety to protect occupants

INTERNAL

GENERAL ROLE OF DIGITAL PRODUCTS

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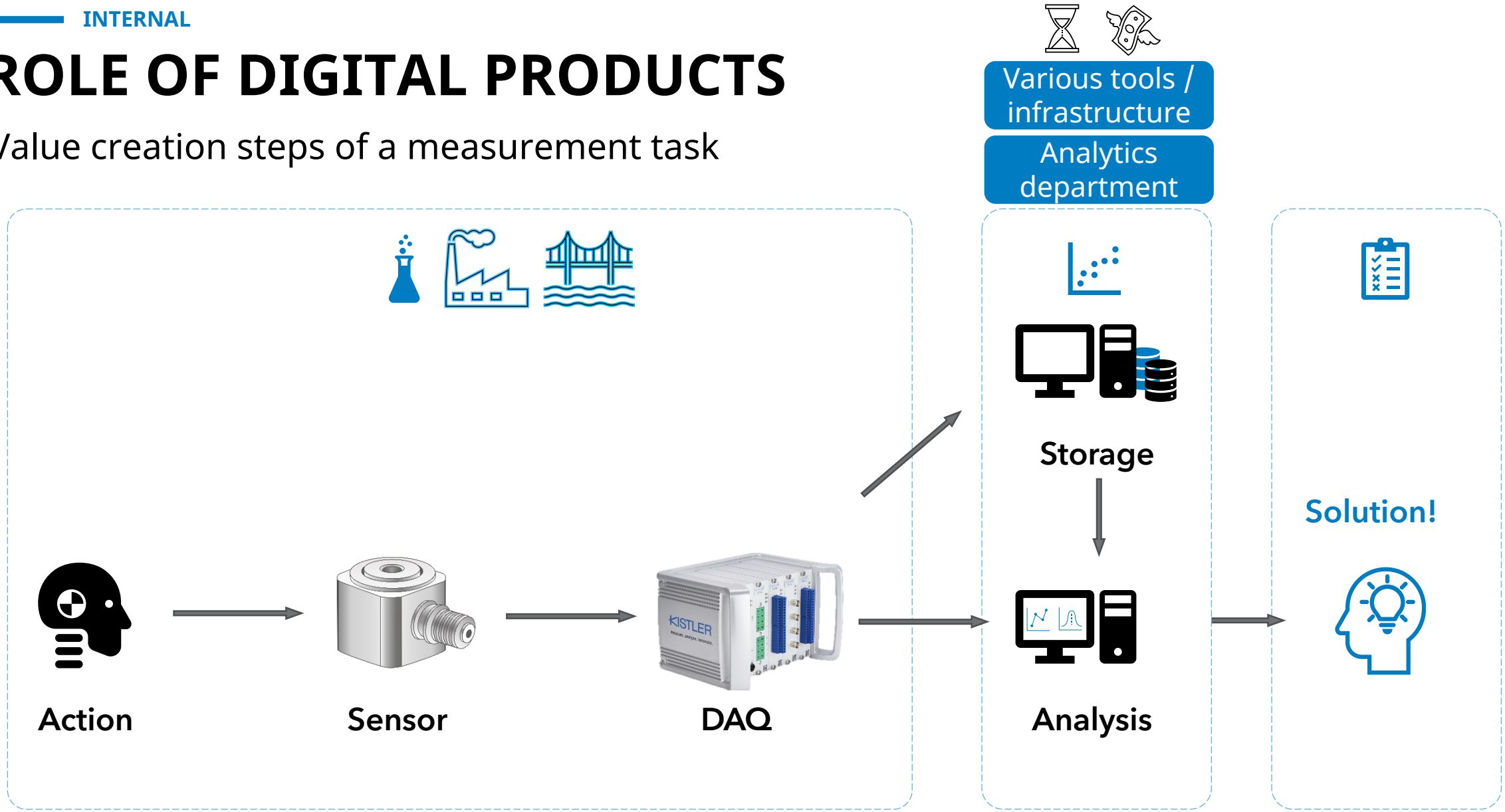
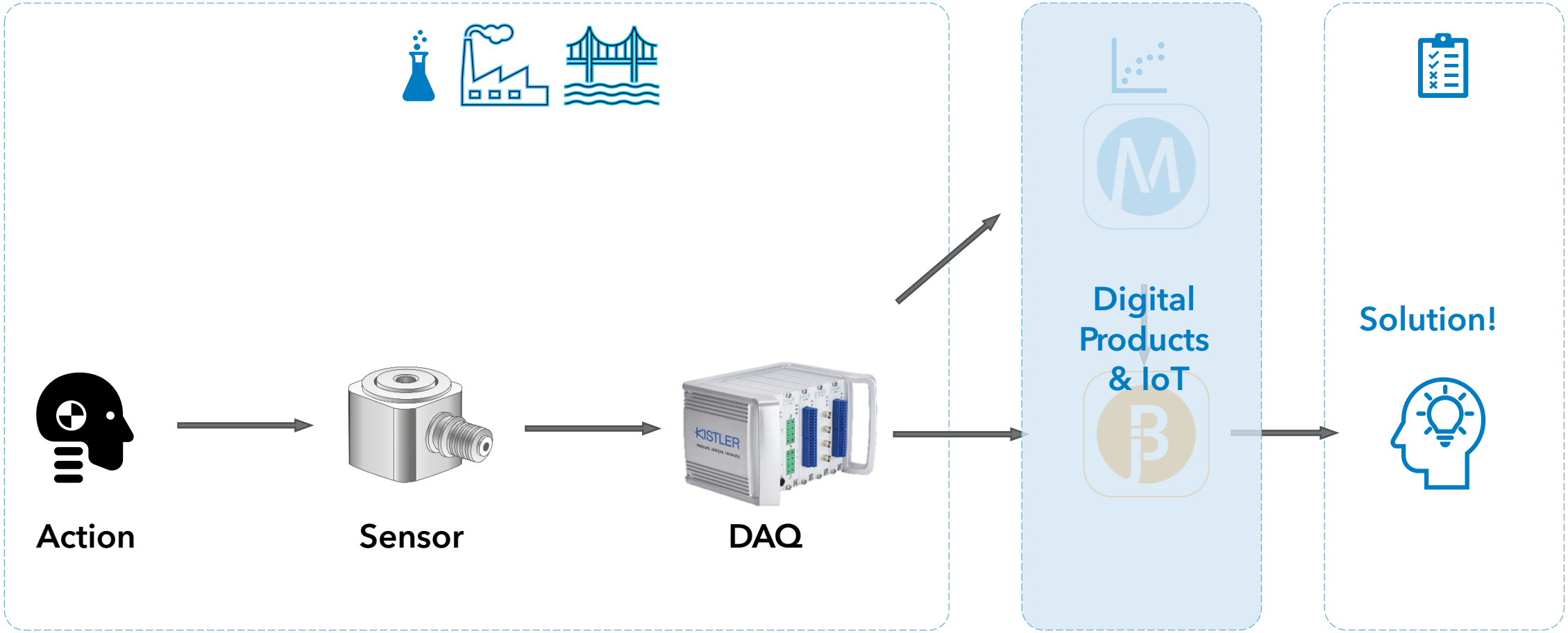
ROLE OF DIGITAL PRODUCTS

Value creation steps of a measurement task



ROLE OF DIGITAL PRODUCTS

We offer generic and specialized tools (incl. IoT) to complete the value chain



RAIL MONITORING

Goals:

Condition based track conditioning → noise reduction, waste reduction, environmental factors

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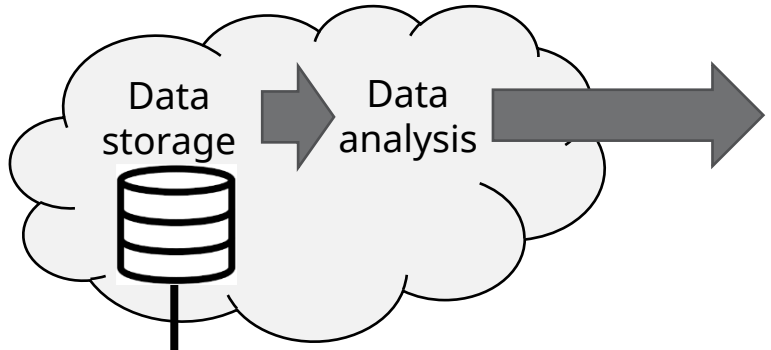
ONBOARD RAIL MONITORING

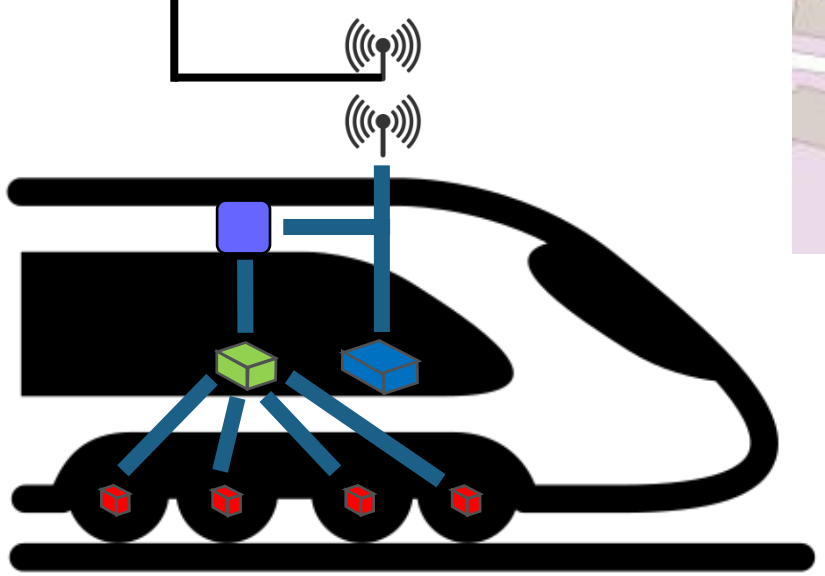
Architecture

Cloud solution



Edge computer

DAQ/GPS



Data visualization / reporting

Project Scope

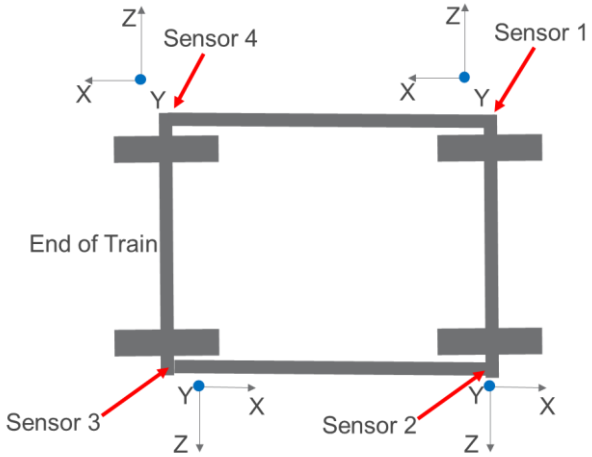
Collaboration between Aargau Verkehr AG (AVA) and Kistler

Idea (AVA): use system for online monitoring of noise for rail-head conditioning control

Track-wheel interactions
-Squeal events
-Flange friction events
-High energy events

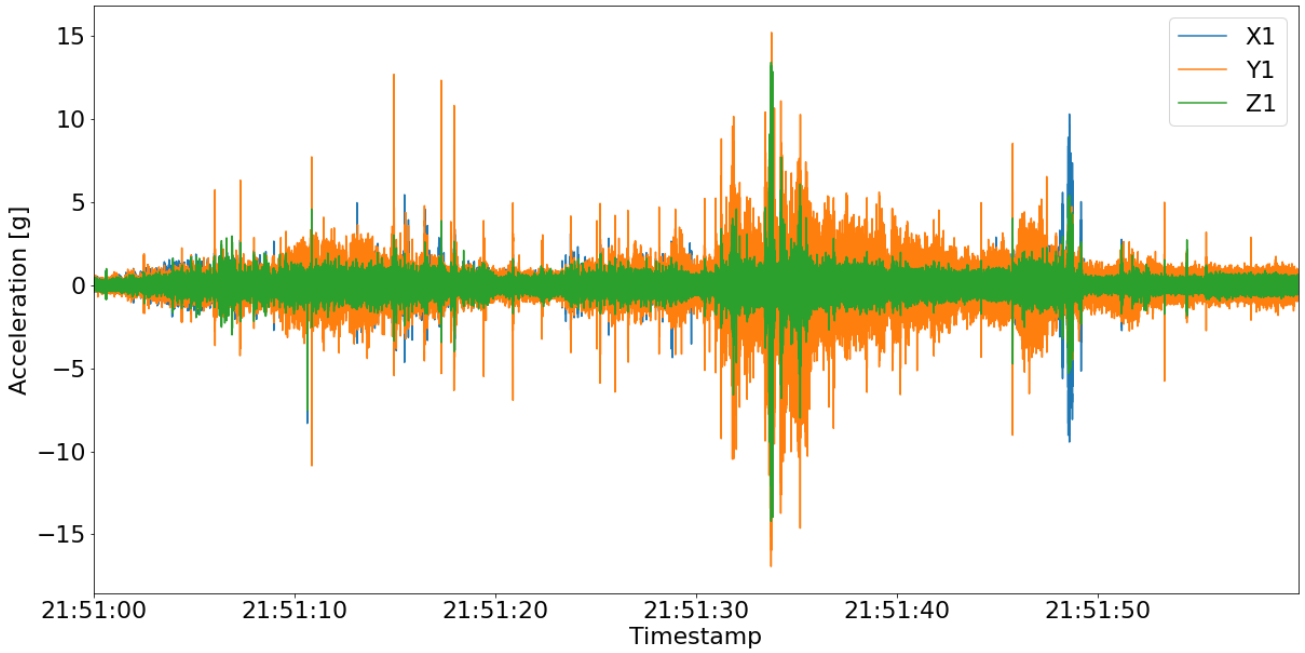
Rolling stock condition
-Wheel health

ONBOARD RAIL MONITORING: RAW DATA

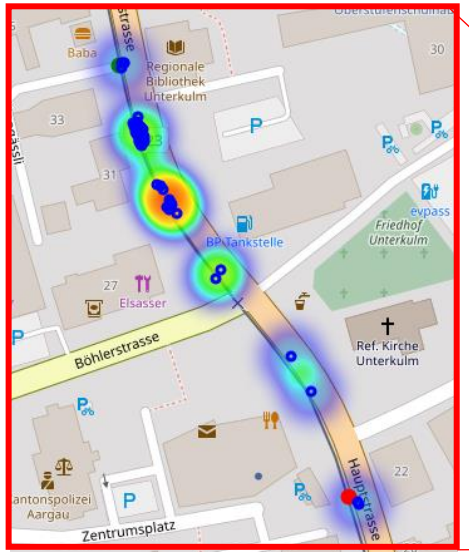


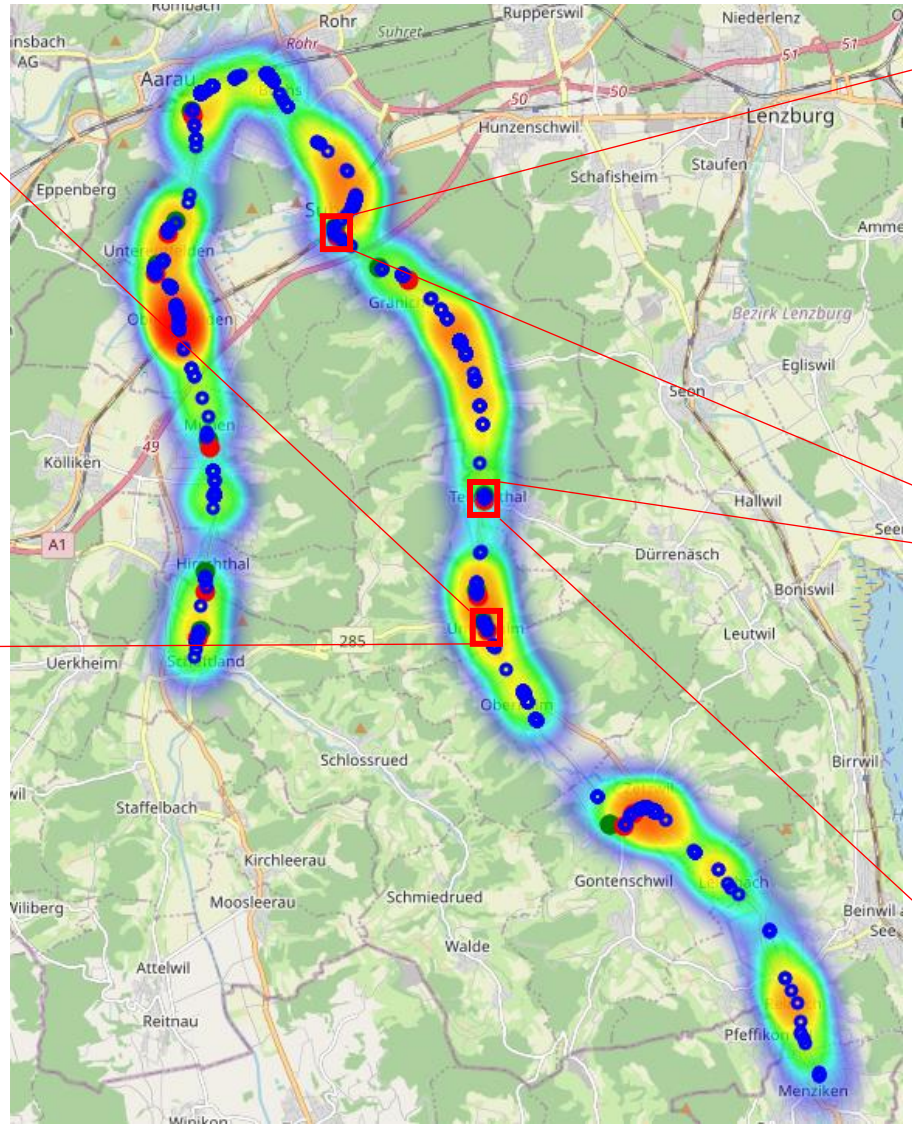
Acceleration Sensor
Sampling Rate: 50 kHz

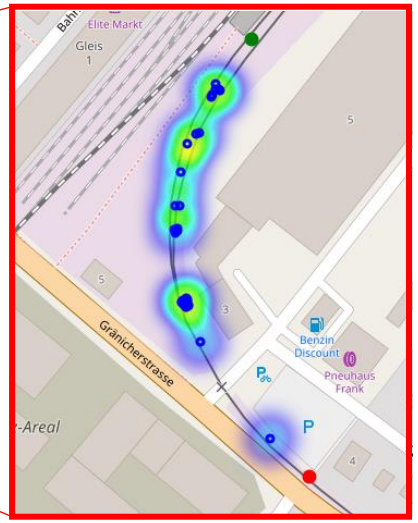
GPS Module
Sampling Rate: 10 Hz



ONBOARD RAIL MONITORING SYSTEM







Exact locations of squeal events in real-time

STRUCTURAL HEALTH MONITORING

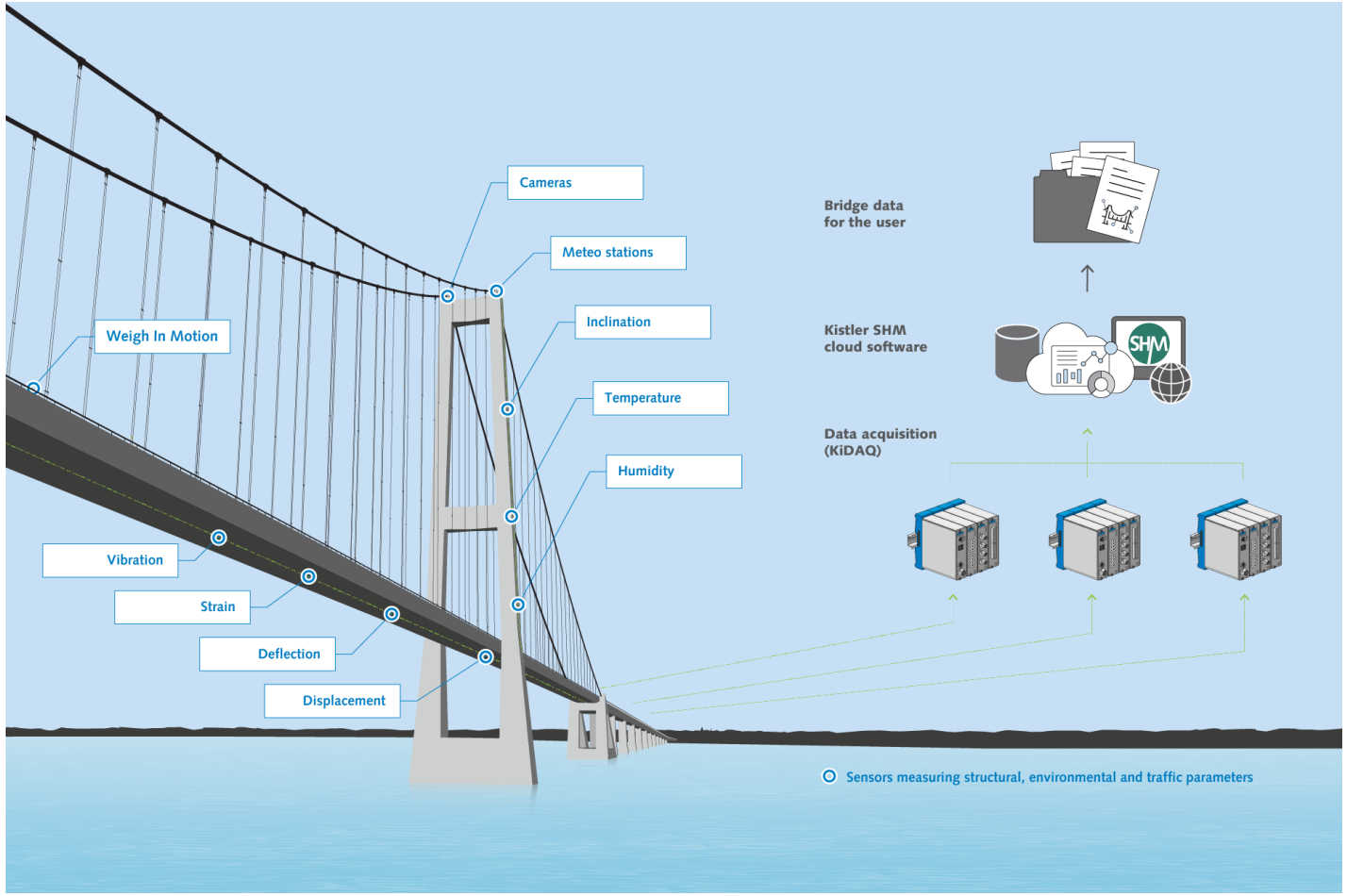
Goals:

Early fault detection → safety
Maintenance optimization

PUBLIC

STRUCTURAL HEALTH MONITORING

IoT Setup



Measurement data storage and visualization

Notifications and alerts

Settings and configuration

Health status monitoring

Customer algorithm runtime

Access rights and security

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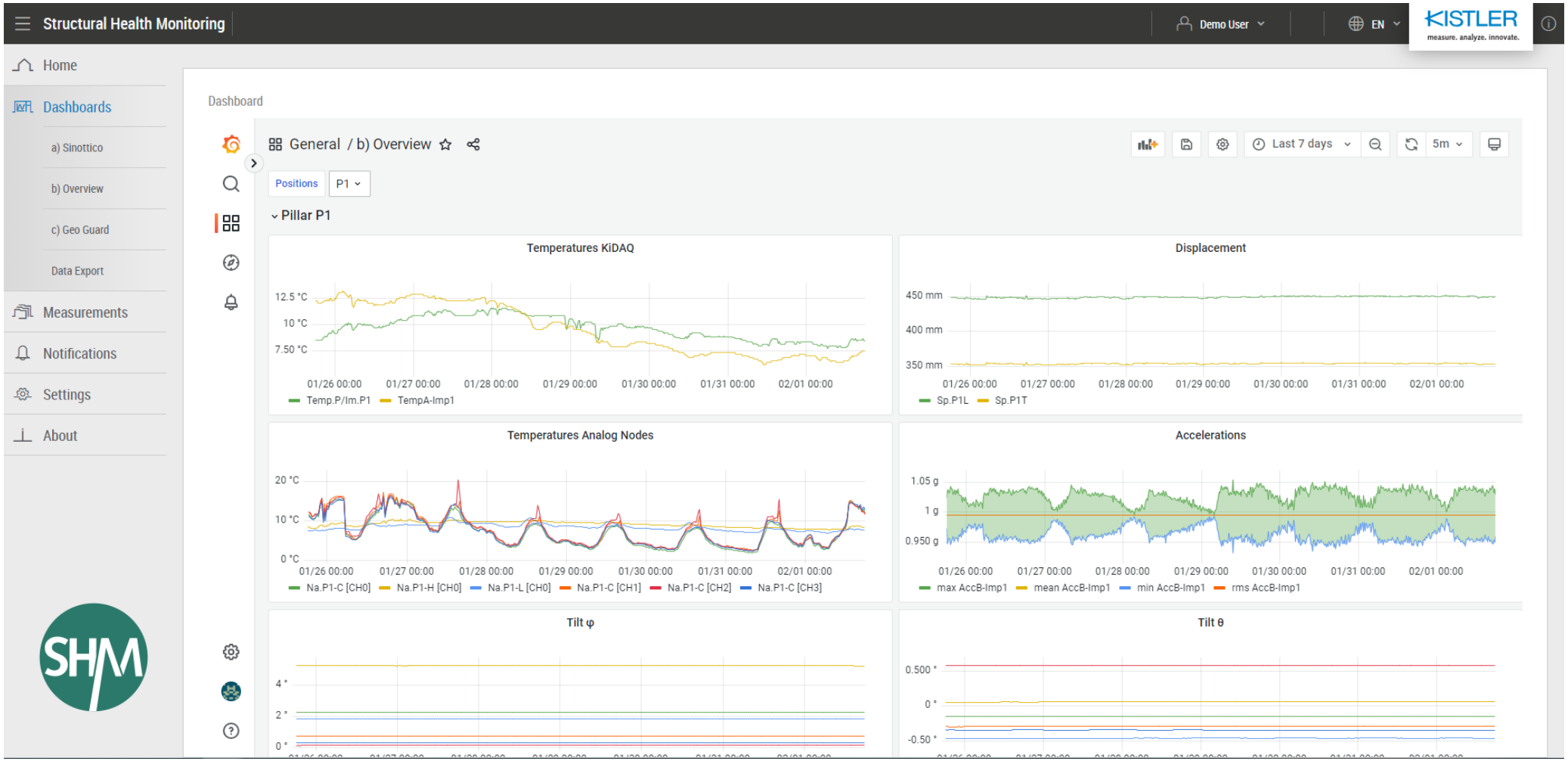
STRUCTURAL HEALTH MONITORING



FLIGHT TESTING

Goal:

Rapid testing → fast time to market, saving on engineering hours

MAIN CHALLENGE

Large amounts of heterogeneous data

- Collected data from sensors & systems:
  - accelerations,
  - power consumption,
  - Forces
  - …

- Accurate, simultaneous evaluation after complete tests as fast as possible. Requirements:
  - High quality data!!
  - Adequate digital tools

- Manual evaluations or the use of multiple / non compatible software tools would make this task cumbersome

SOLUTION: TOOLS TO COMBINE & CONSOLIDATE DATA

1. Generate Data
(Various sources & formats from the aircraft)

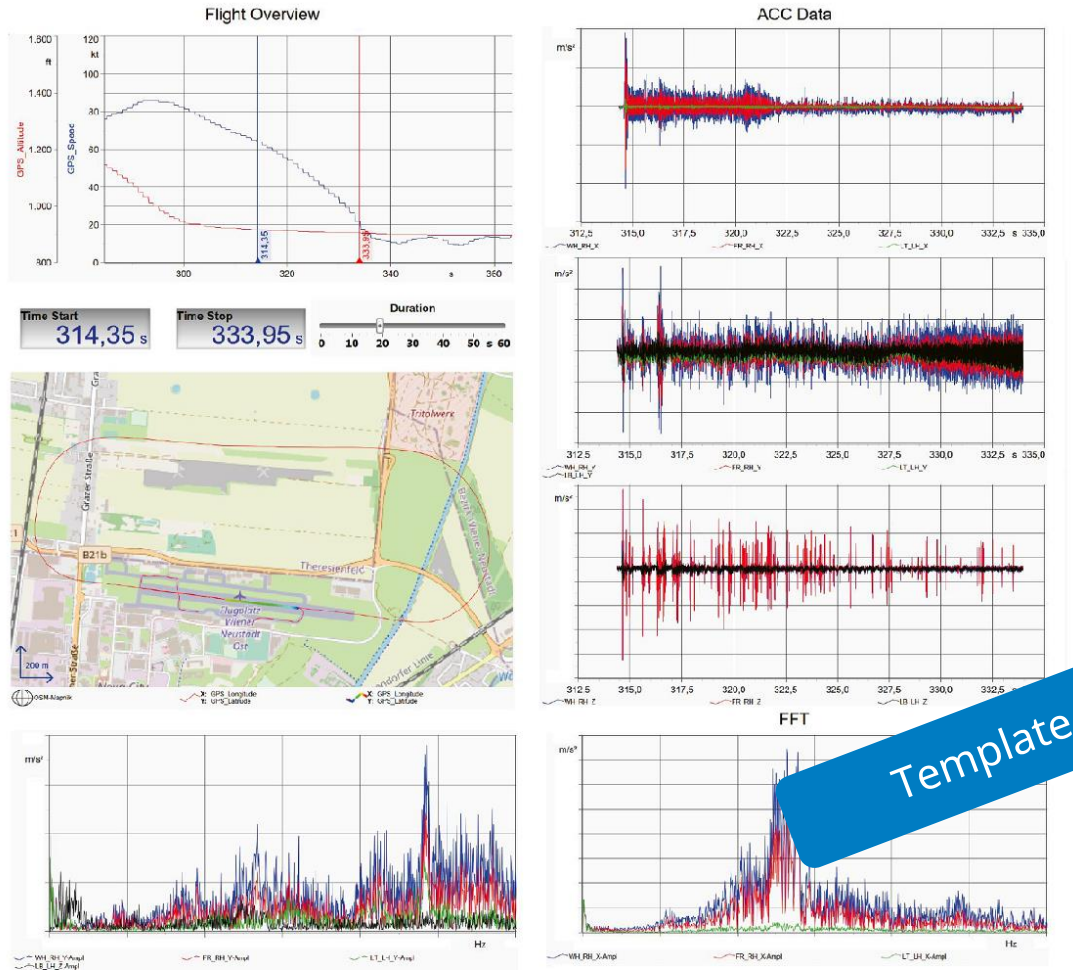
Kistler jBEAM

-Template engine for reports

-No-code, drag-and drop solution from raw data to evaluated graphs and information

-Once ready, provide templates for automated report generation

2. Combine data
(direct & fast analysis)



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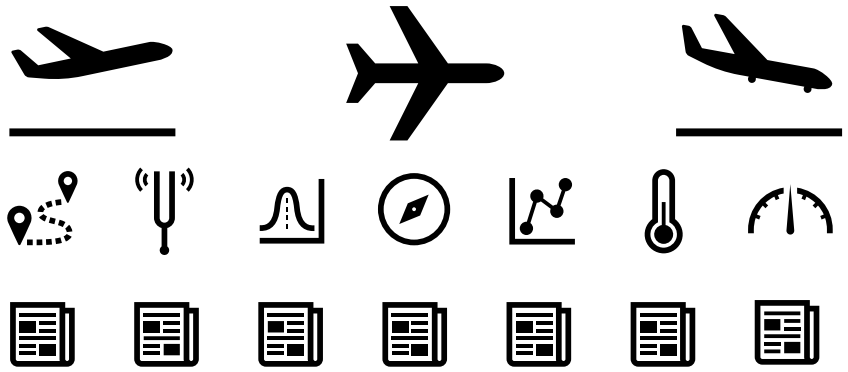

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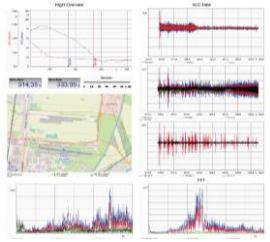

3. Consolidate and
make data accessible

Kistler MaDaM

-Automatic report triggering
on data arrival

-Data indexing (based on data!) and retrievability

«retrieve the raw data set + reports with the highest ever observed engine load»

«retrieve raw data set + reports for all days where wind speeds exceeded 30 km/h»

Saves 500 eng. hours / year /
aircraft type

Campaign
aggregation

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SUMMARY

Sensors & Digital Products / IoT Systems From Kistler for Value Creation

- Digital Products / IoT close the value chain from sensor to information
- Example aircraft R&D:
  - analytics & data management tools for increased speed & lower costs during development processes
- Example Structural health monitoring:
  - sensor network, cloud technologies and analytics for safer bridges
- Example Rail monitoring:
  - remote edge-computing, cloud technologies and analytics for optimized rail conditioning

Curious?

www.Kistler.com