



Pan-European Community of Practice towards standardisation for:

“Digitalisation in inspection,
monitoring and maintenance
of transport infrastructures”



IM-SAFE^{.EU}

Online symposium
24 February 2022, 13:00-16:00 CET

Symposium chair & organizer:

Rizal Sebastian (TNO)
Agnieszka Bigaj-van Vliet (TNO)
Elna Minderman (CROW)

For registration & questions:
elna.minderman@crow.nl



Co-funded by the Horizon 2020
Framework Programme of the European Union

› GET READY !

- Good afternoon and warm welcome to this online symposium!
- When joining, please mute your microphone and switch off your webcam.
- This online session is recorded.
- For questions, please use the Chat function in Zoom.



› WELCOME !

DR. RIZAL SEBASTIAN (SYMPOSIUM CHAIR & DIGITALISATION SCIENTIST | TNO, NL)

Welcome to the online symposium on digitalization.

This activity is part of the Pan-European Community of Practice of IM-SAFE,

a coordination and support action to improve and renew

European standards in monitoring and safety of transport infrastructures.





› **IM-SAFE SYMPOSIUM - OPENING
DIGITALISATION FOR SAFE INFRASTRUCTURE |
MACHTELD DE KROON**

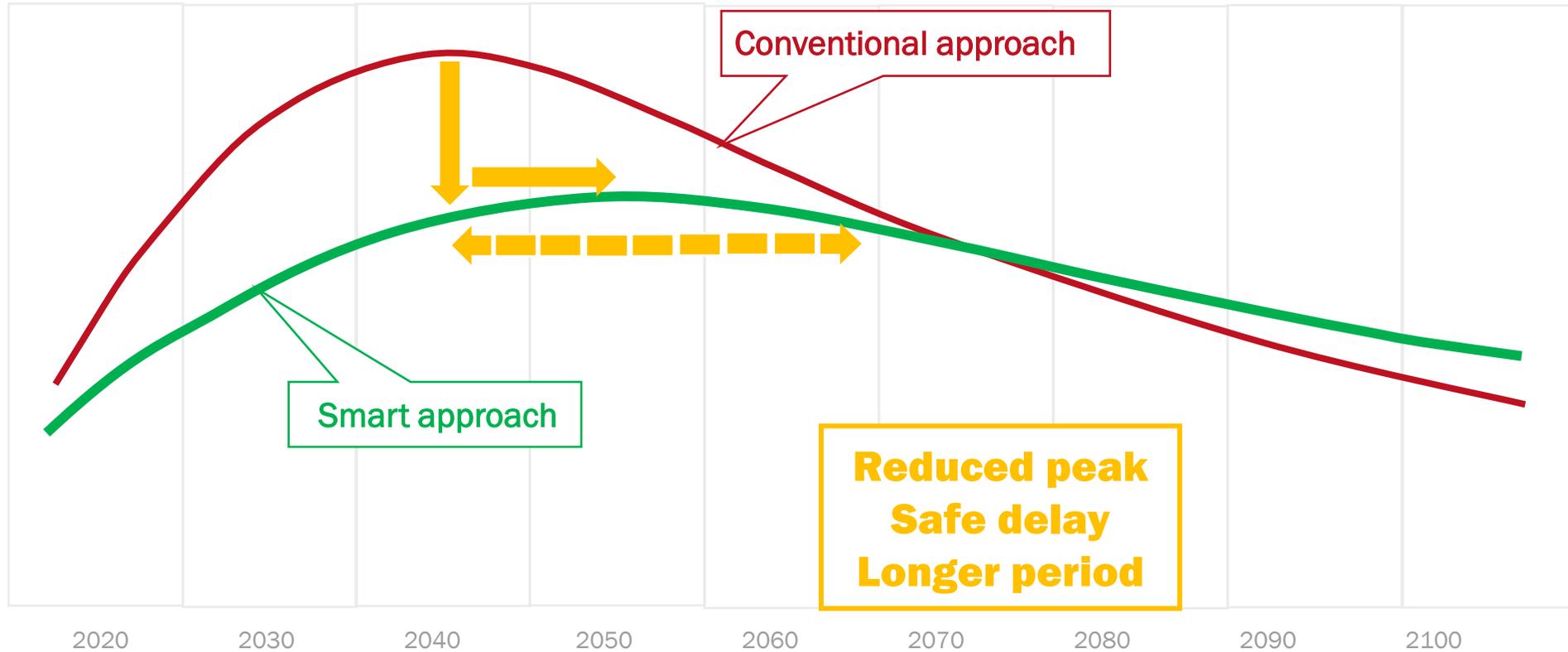
A27 Merwedebrug dicht/closed
>3500kg Utrecht volg/follow
Rotterdam A58/A16

CHALLENGES IN INFRASTRUCTURE IN THE NETHERLANDS

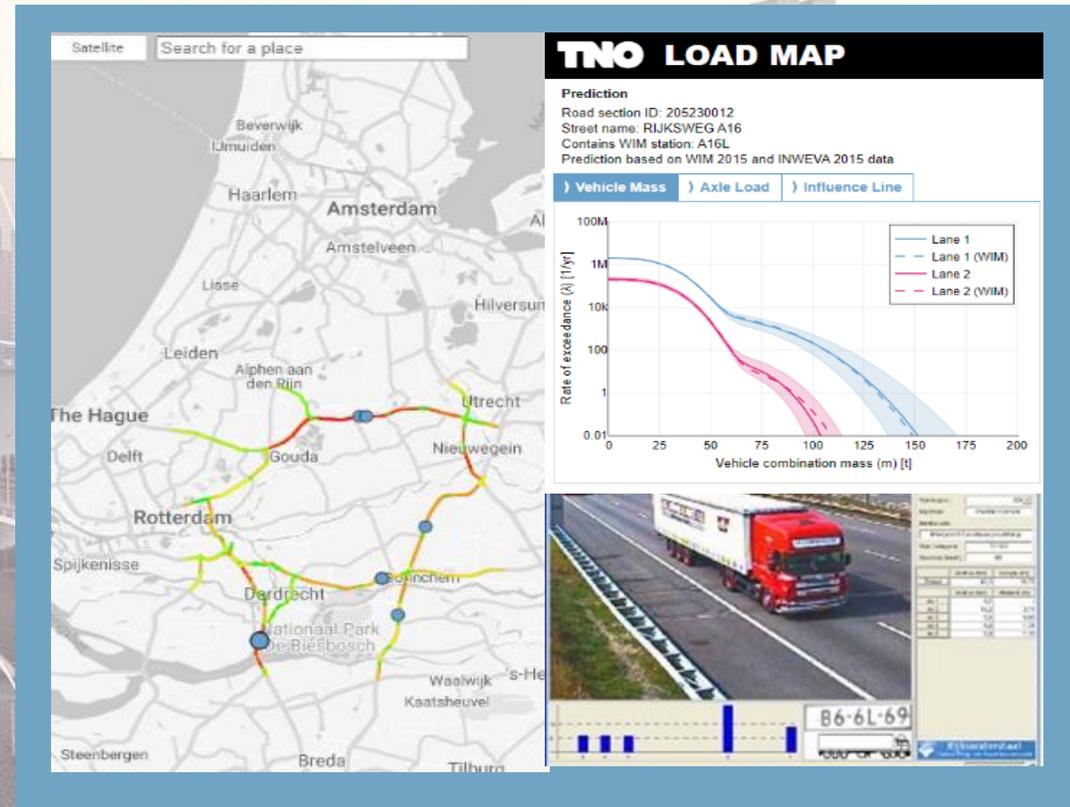


FLATTEN THE CURVE

Replacements and renewals civil infrastructure



SMART SOLUTIONS: MONITORING - MODELLING - DIGITALISATION - AI



EXCHANGE KNOWLEDGE AND EXPERIENCE



THANK YOU

HAVE AN INSPIRING



IM-SAFE^{.EU}

SYMPOSIUM

TNO innovation
for life

› TODAY'S OBJECTIVES

RIZAL SEBASTIAN (TNO, NL)

1. Disseminating the current findings from “IM-SAFE” in particular on the topic of digitalisation
2. Consolidating the views from research, industry and public authorities as input for our advice to EC and CEN

**Please participate actively in the discussions (via Chat in Zoom) with our extraordinary panellists:
industry leaders, public clients, scientists and standardisation experts,
and European Commission officers !**



› AGENDA

Moderator: Rizal Sebastian (TNO, NL)		Activities	Guest speakers and panellists
13:00 – 13:10	Opening	<ul style="list-style-type: none"> Welcome and opening words Objective and agenda 	Machteld de Kroon (TNO, NL) Rizal Sebastian (TNO, NL)
13:10 – 13:55	Session 1: Smart Sensing and Imaging	<ul style="list-style-type: none"> Session introduction Best practice example from INSITU, ES Short technical presentation by SACERTIS, IT Panel discussion & questions from online audience 	Isabella Alovise (SACERTIS, IT) René Schumann (HOCHTIEF ViCon, DE) Sara Cuerva Navas (FERROVIAL, ES) Sverre Kjetil Rød (Norwegian Public Road Authority, NO) Diego Allaix (TNO, NL)
13:55 – 14:05	<i>10-minute break</i>		
14:05 – 14:50	Session 2: Artificial Intelligence	<ul style="list-style-type: none"> Session introduction Best practice example from IBM Research, CH Short technical presentation by IBM Research, CH Panel discussion & questions from online audience 	Ioana Giurgiu & Cristiano Malossi (IBM Research, CH) Meenagi Venkat (KNOWCE, IT) Arnwald Janssen (Rijkswaterstaat/Ministry of Infrastructure, NL)
14:50 – 15:00	<i>10-minute break</i>		
15:00 – 15:45	Session 3: Data interoperability	<ul style="list-style-type: none"> Session introduction Best practice example from TNO, NL & AEC3, DE Short technical presentation by AEC3, DE Panel discussion & questions from online audience 	Matthias Weise (AEC3, DE) Raimar Scherer (TU Dresden, DE) Frank Opitz (Deutsche Bahn, DE) Michel Böhms (TNO, NL) Sanne Jansweijer (NEN, NL)
15:45 – 16:00	Conclusion	<ul style="list-style-type: none"> EC policy initiatives in digitalization and transport infrastructure Concluding remarks 	Rafal Stanecki (European Commission, DG MOVE) Konstantinos Gkoumas (European Commission, JRC) Agnieszka Bigaj-van Vliet (TNO, NL)

› AGENDA SESSION 1

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› SESSION 1 “SMART SENSING AND IMAGING”

AGENDA FOR 13:10 – 13:55

- Session introduction (Rizal Sebastian, TNO)
 - New data acquisition technologies and techniques – from satellite to IoT and fixed-sensors surveying technologies
 - Big data challenge for standardisation: huge amount of collected data *versus* quality/meaningful/useful information
- Best practice example from INSITU, ES
 - Example 1 scanning & software processing for roads
 - Example 2 scanning installations for railways
- Short technical presentation by SACERTIS, IT (Isabella Alovisi)
- Panel discussion & questions from online audience

› **BEST PRACTICE EXAMPLE FROM INSITU, ES**
EXAMPLE 1 SCANNING & SOFTWARE PROCESSING FOR ROADS

Session 1 video 1

› **BEST PRACTICE EXAMPLE FROM INSITU, ES**
EXAMPLE 2 SCANNING INSTALLATIONS FOR RAILWAYS

Session 1 video 2

› **SHORT TECHNICAL PRESENTATION**
ISABELLA ALOVISI – SACERTIS, ITALY

SESSION 1 : SMART SENSING AND IMAGING

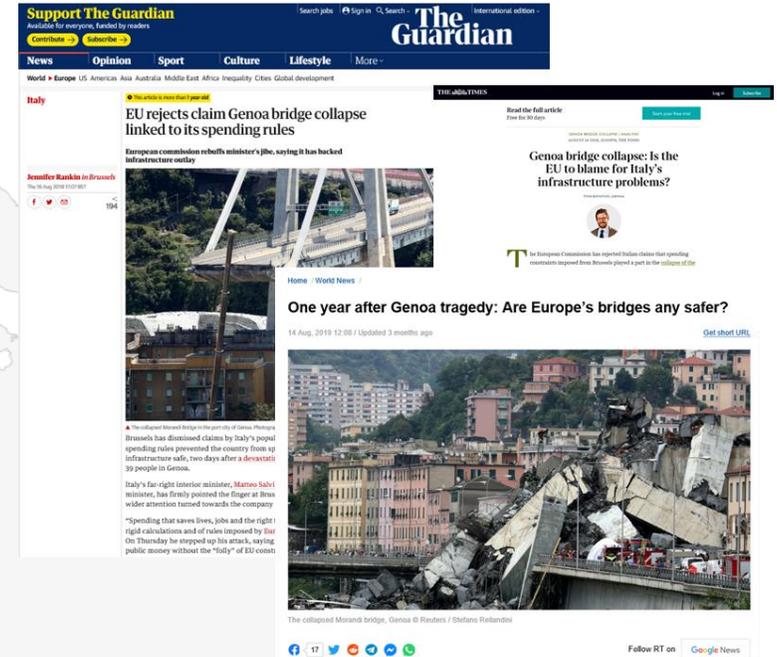
H2020 CSA IM-SAFE CONTEXT

Transport infrastructure is facing major challenges due to ageing, rapid growth of traffic loads and natural and man-made resilience threats.

Safety risks have become critical in the recent years and manifested in major disasters caused a.o. by structural failures due to maintenance deficiencies.

IM-SAFE aims to support the European Commission and the European Committee for Standardization (CEN) to preparing a new standard in monitoring for optimal maintenance and safety of transport infrastructure.

IM-SAFE covers bridges, tunnels and other large infrastructures on the road and railway networks.

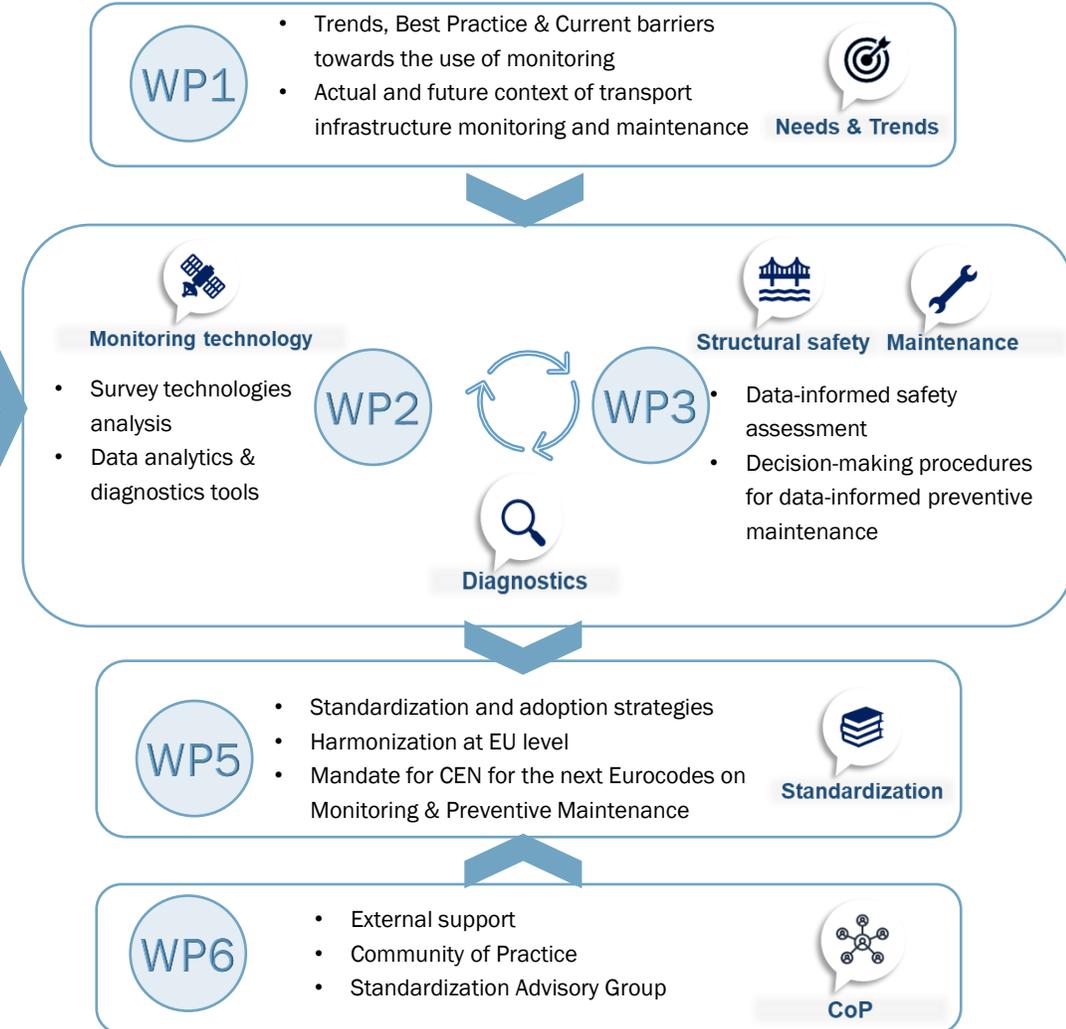
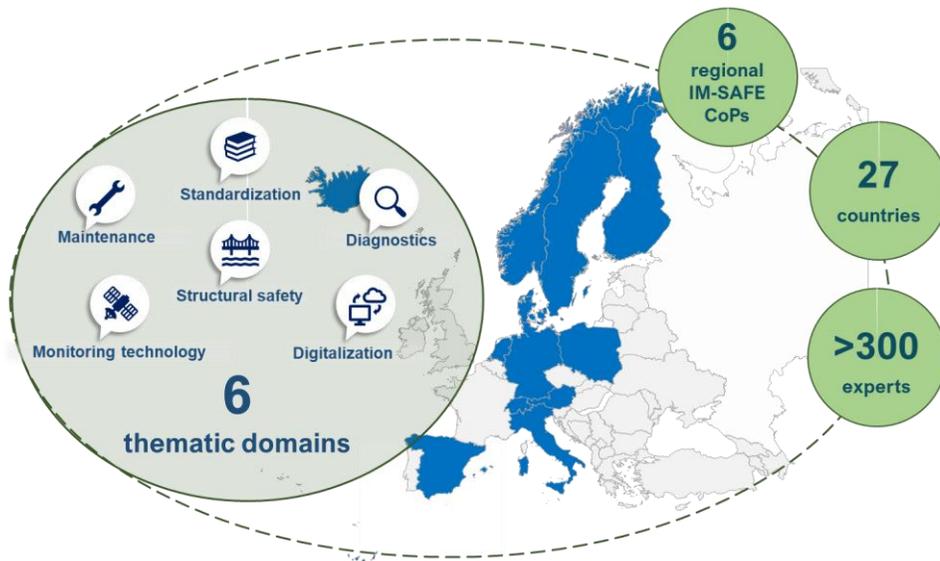


- PROJECT PARTNERS**
- The Netherlands**
 - TNO Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek
 - CROW Kennisplatform voor Infrastructuur, Verkeer, Vervoer en Openbare Ruimte
 - Norway**
 - NTNU Norges Teknisk-Naturvitenskapelige Universitet
 - Spain**
 - UVIGO Universidad De Vigo
 - FER Ferrovial Construction
 - Austria**
 - BOKU Universität für Bodenkultur Wien
 - Italy**
 - SAC SafeCertifiedStructure Ingegneria S.r.l.
 - Germany**
 - AEC AEC 3 Deutschland GMBH
 - Switzerland**
 - IBM IBM Research GmbH
 - Poland**
 - MOW Mostostal Warszawa S.A.

SESSION 1 : SMART SENSING AND IMAGING

H2020 CSA IM-SAFE RESULTS

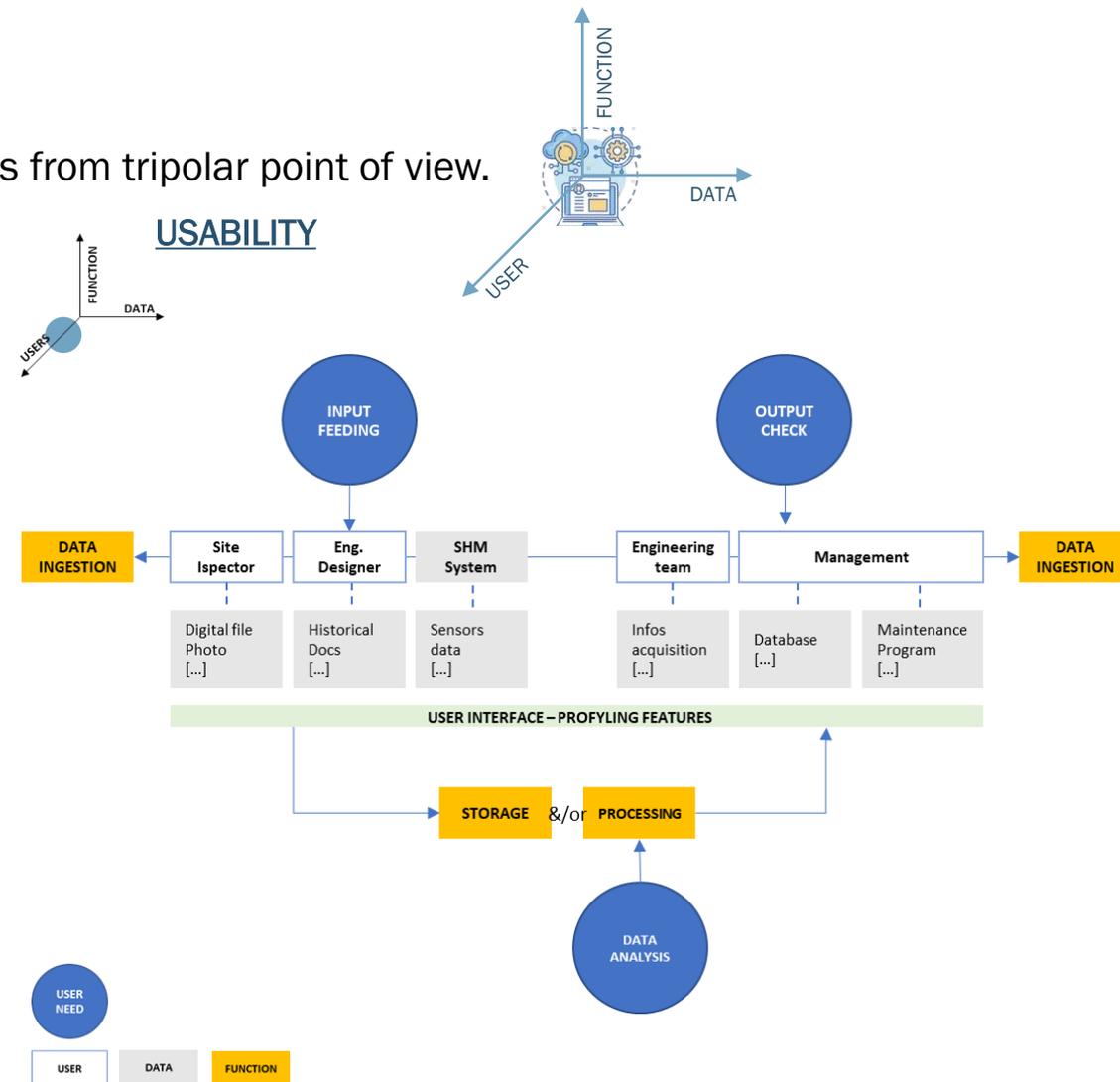
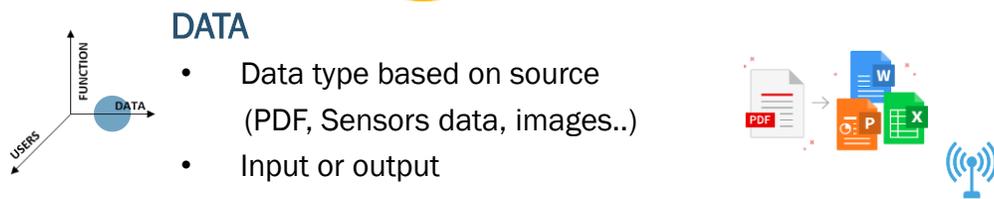
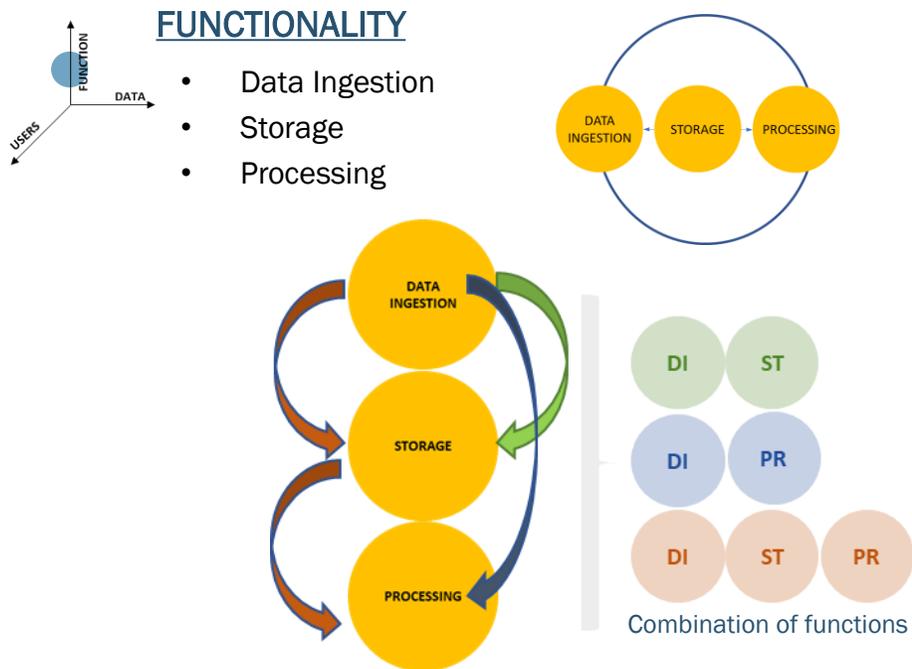
IM SAFE DOMAINS, WORKPACKAGES & RESULTS



SESSION 1 : SMART SENSING AND IMAGING

DIGITALIZATION DRIVERS

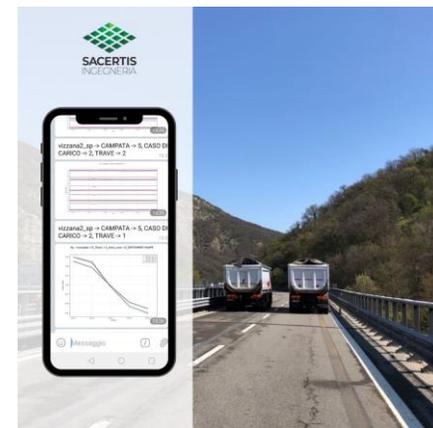
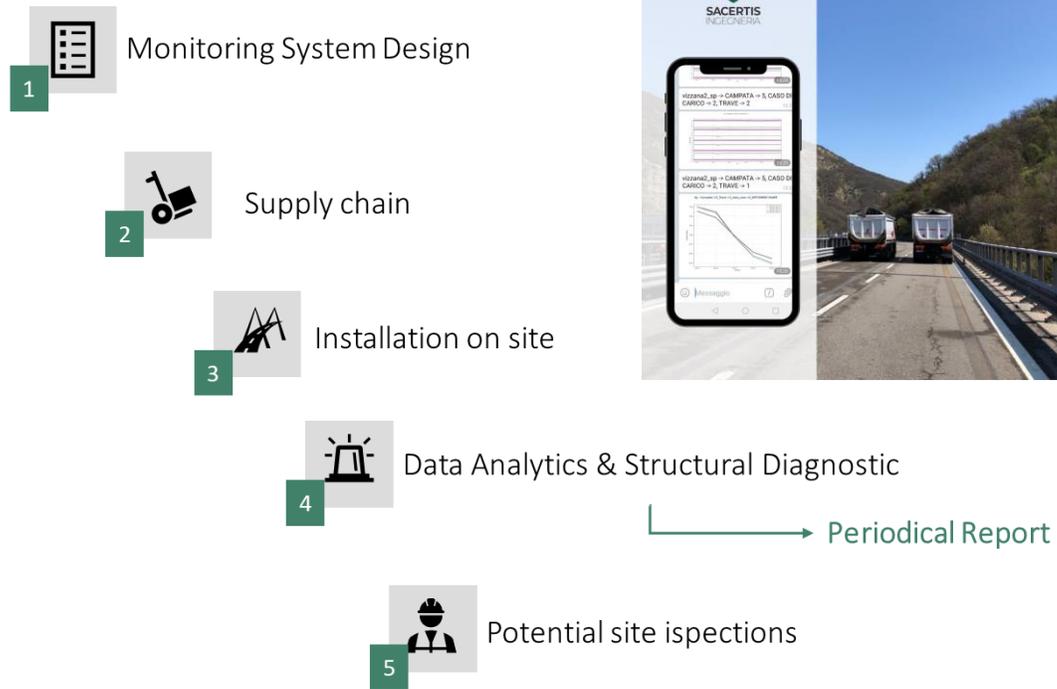
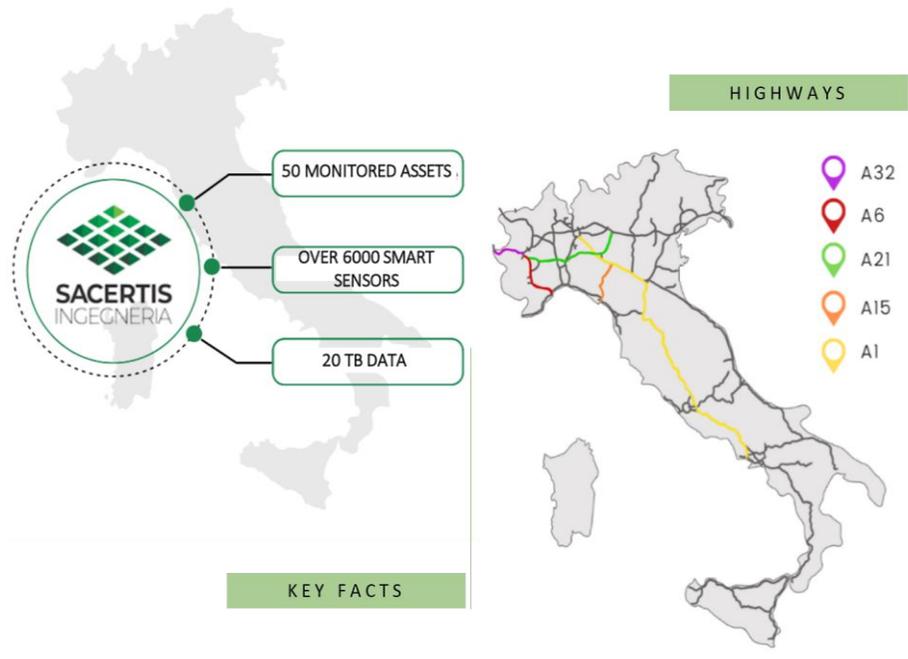
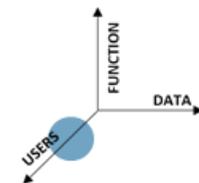
Digitalization has to handle the Infrastructure Management Process from tripolar point of view.



SESSION 1: SMART SENSING AND IMAGING

SACERTIS INGEGNERIA

SACERTIS INGEGNERIA works on the SHM field, it has developed a customized Platform for **Structural Engineers**



SESSION 1: SMART SENSING AND IMAGING

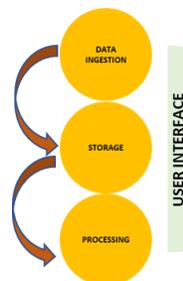
SACERTIS INGEGNERIA - DIGITAL PLATFORM FOR DENSE SENSING

Structural Engineering Monitoring Process

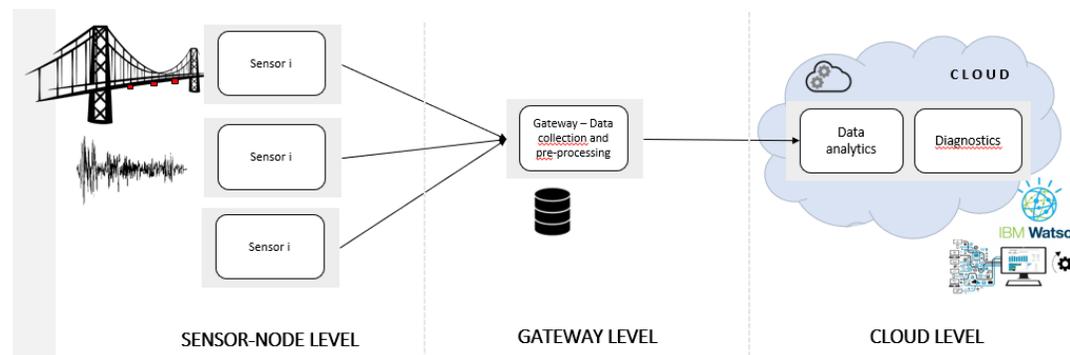


NEEDS

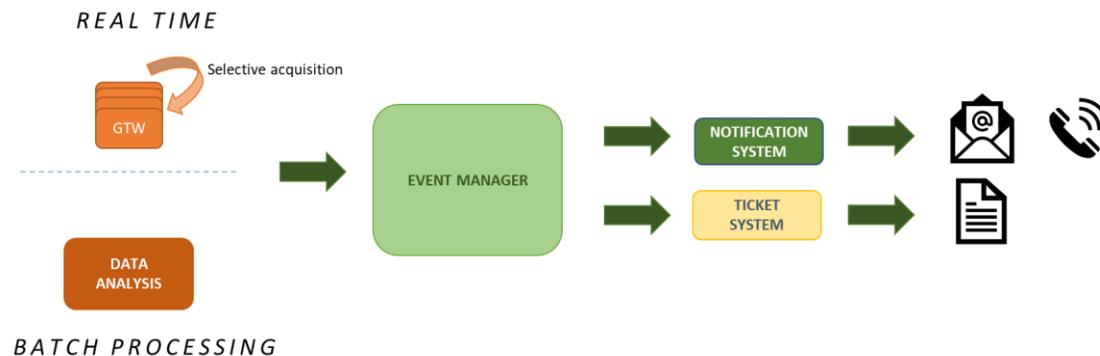
- Input Data: Sensors data
- User: Structural Engineer
- Functions: Data Ingestion, Storage, Processing & Analytics



Monitoring System & Digital Platform for Dense sensing

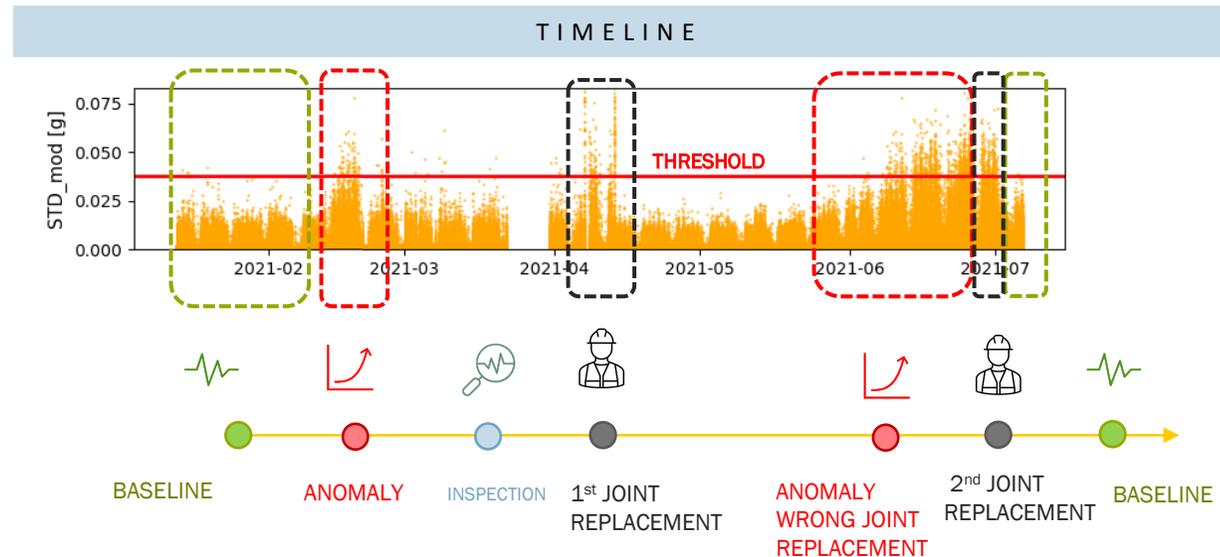
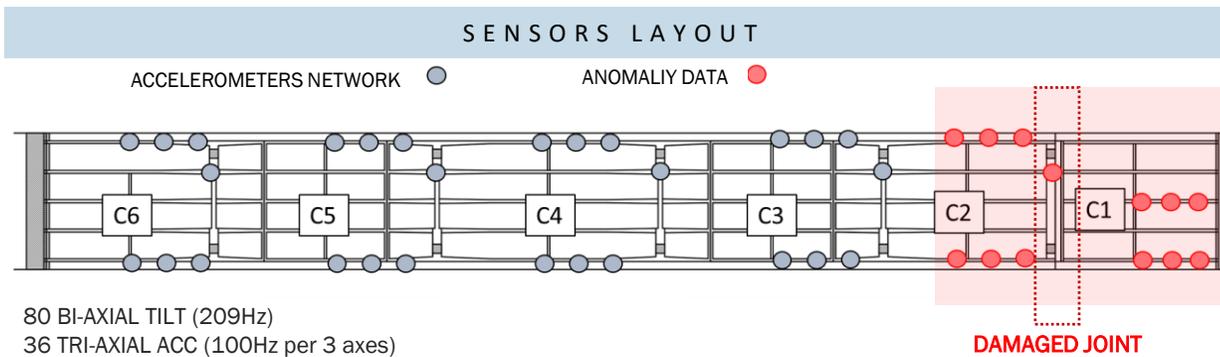


Anomaly & Damage Detection



SESSION 1: SMART SENSING AND IMAGING

SACERTIS INGEGNERIA - CASE STUDY



› SESSION 1 : PANEL DISCUSSION

- **Brief introduction of the panellists:**
 - Sara Cuerva Navas (FERROVIAL, ES)
 - René Schumann (Managing Director, HOCHTIEF ViCon, DE)
 - Sverre Kjetil Rød (Norwegian Public Road Authority, NO)
 - Diego Allaix (TNO, NL)
 - Isabella Alovisei (SACERTIS, IT)
- **Sharing the views on ‘smart sensing and imaging for data acquisition’ (short pitches as prelude for discussions):**
 - What are technology implementation and challenges in the real practice? (Sara Cuerva Navas & Rene Schumann)
 - What are the public client’s needs and expectations? (Sverre Kjetil Rød)
 - What new approach is needed by structural engineers and what is the role of European standardisation? (Diego Allaix)
- **Interactive discussion between the panellists & questions from the online audience**

› **SESSION 1 : PANEL DISCUSSION**
SARA CUERVA NAVAS - FERROVIAL, SPAIN

What are technology implementation and challenges in the real practice?

› **SESSION 1 : PANEL DISCUSSION**

**RENÉ SCHUMANN – MANAGING DIRECTOR, HOCHTIEF VICON,
GERMANY**

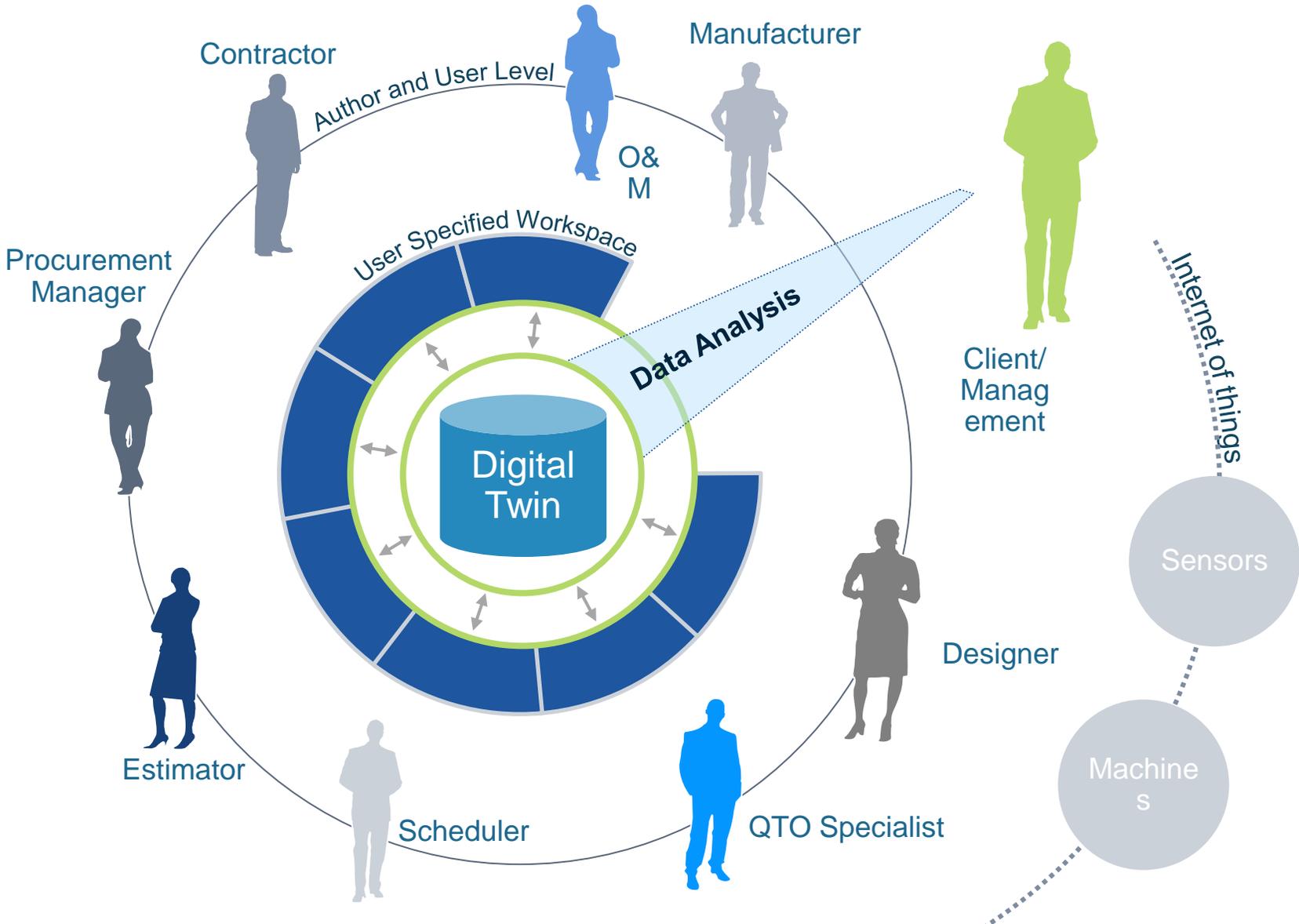
What are technology implementation and challenges in the real practice?

The image features a blue-tinted architectural rendering of a city skyline. In the center, a tall building is highlighted with a white wireframe mesh, indicating a digital construction model. The surrounding buildings are rendered in a semi-transparent, light blue style. The overall scene is set against a dark blue background, creating a futuristic and digital atmosphere.

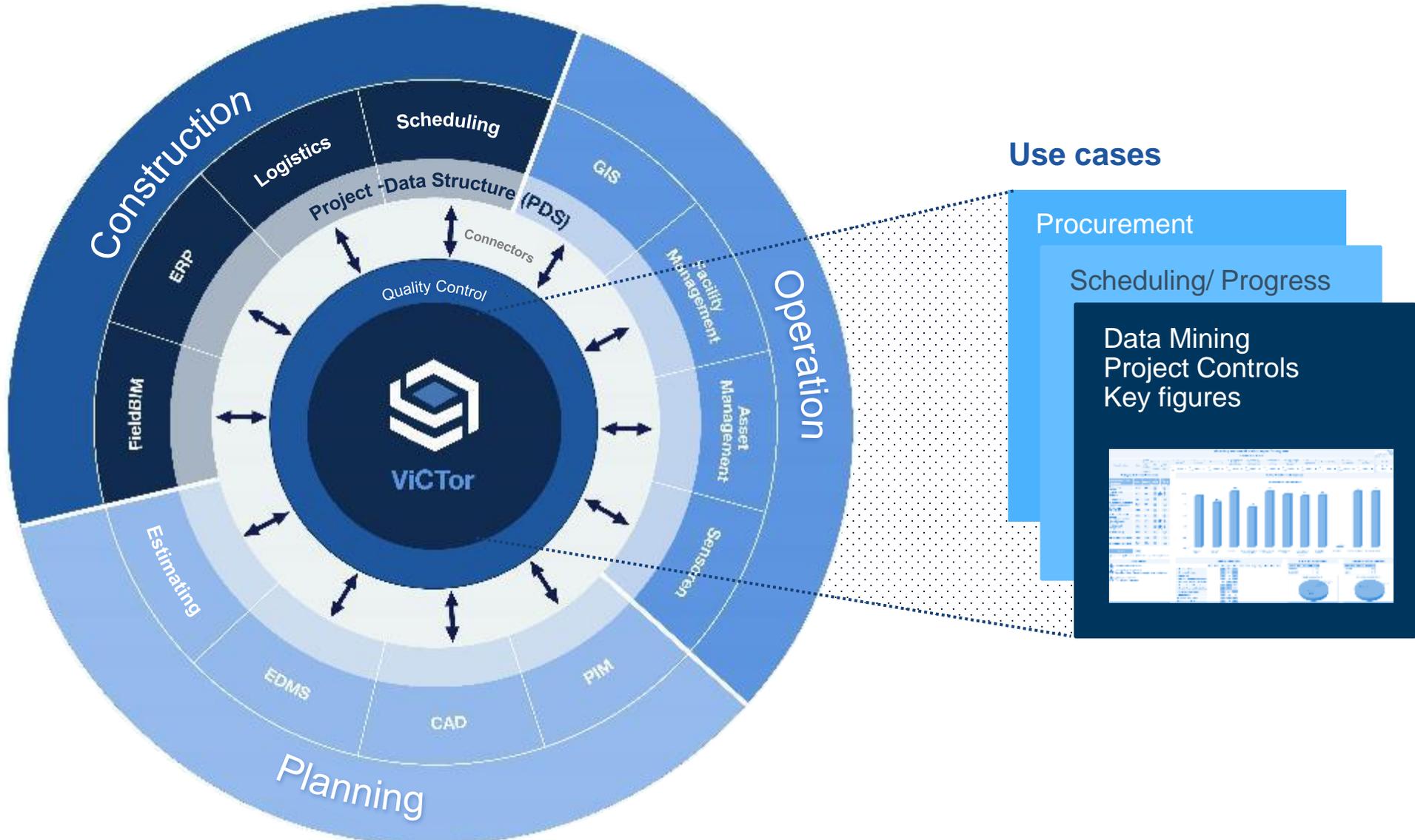
HOCHTIEF ViCon

Build Digitally First

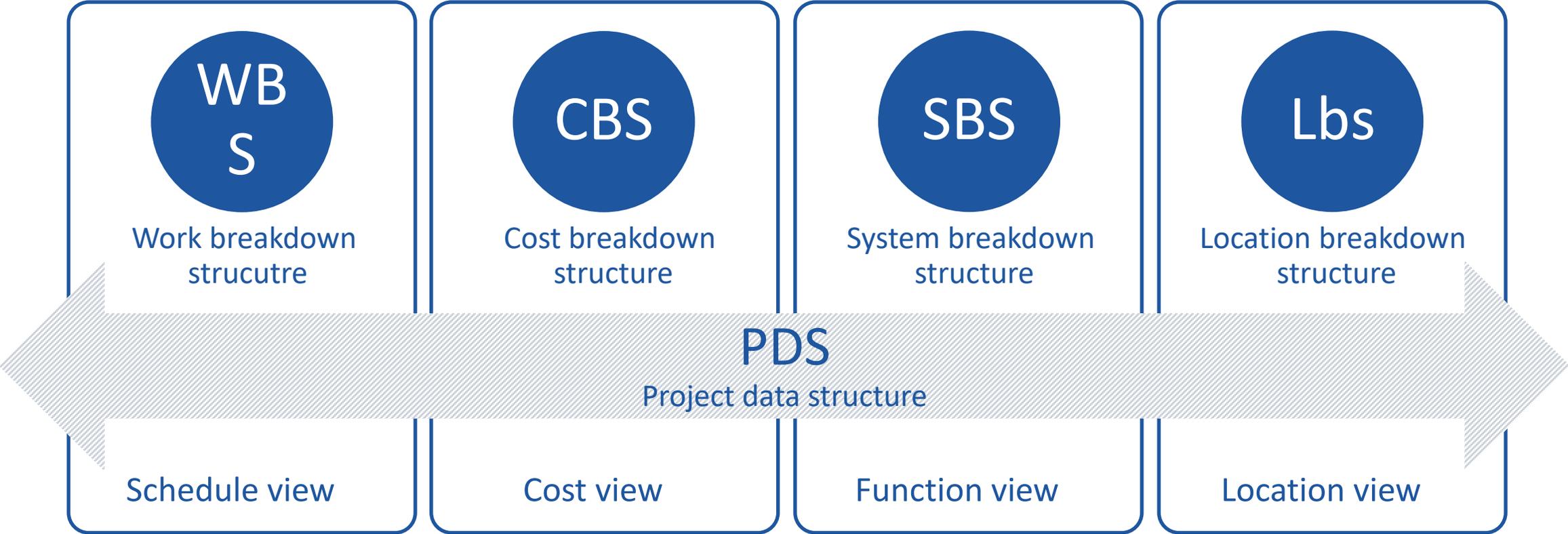
Data Integration Concept – Stakeholder View



Data Integration Concept – Systems View



Project Data Structure



Build digitally first.



René Schumann

Managing Director

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 www.hochtief-vicon.com

› **SESSION 1 : PANEL DISCUSSION**

SVERRE KJETIL RØD – NORWEGIAN PUBLIC ROAD AUTHORITY

What are the public client's needs and expectations?

SESSION 1 : PANEL DISCUSSION



Statens vegvesen
Norwegian Public Roads
Administration



IM-SAFE

Smart sensing and imaging;
Tunnels and bridges

Sverre Kjetil Rød, PhD

Legislation and Regulatory Authority

24.02.2022



Six divisions and one Directorate of Public Roads

Legislation and Regulatory Authority



- Strategic Management and Financial Control
- Communications
- HR and HSE



Road Users and Vehicles

Transport and Society

Construction

**Operations and
Maintenance**

Shared Services

IT

Department of Constructions

- **The Legislation and Regulatory Authority** is a regulatory body that develops rules and regulations for all road owners, carries out inspections, verifications and technical approval, and provides professional advice to the Ministry of Transport and Communications
- Responsible of periodic inspections of the national road tunnels, following up county tunnel inspections, and approval of tunnels prior to building and opening for traffic by auditing samples of safety documentation
- Responsible of following up national and county bridge inspections to determine load capacity
- Responsible of inspections and approvals of bridges, ferry docks and other road related constructions on national -and county roads
- Provides data on all accidents and fires in tunnels for EFTA Surveillance Authority, ESA, in Brussels

The Legislation and Regulatory Authority determines whether rules and regulations are met by the road owners. The authority does not approve safety equipment per se.



Maintenance is essential due to harsh environment





... and exposure to extreme marine environment



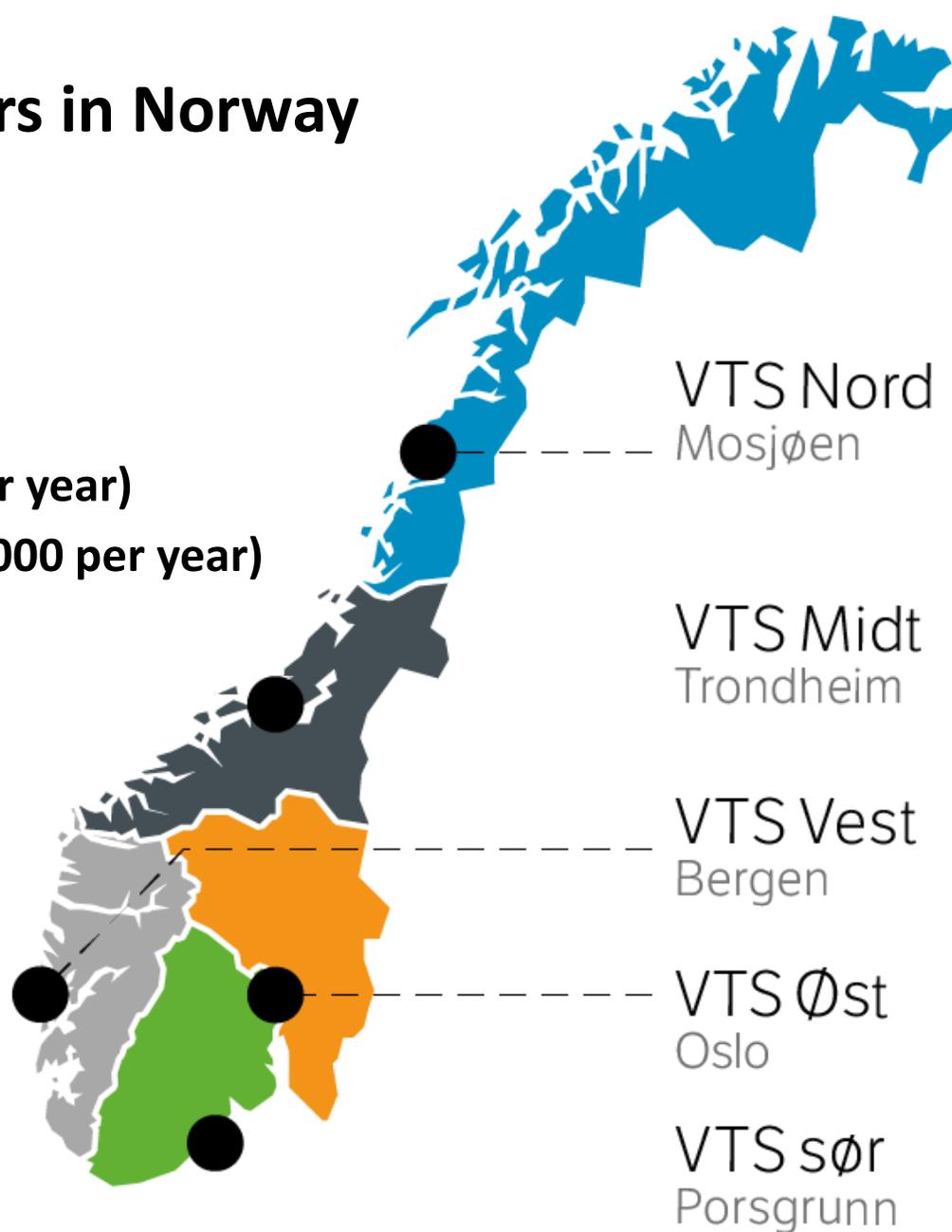
Traffic control centers monitor traffic on the entire road network



Photo: Knut Opeide

Five traffic control centers in Norway

- 24/7/365
- Control and monitoring
- Decision support
- Incident handling (140 000 cases per year)
- Phone response service – 175 (600 000 per year)
- Traffic information
- App. 170 employees

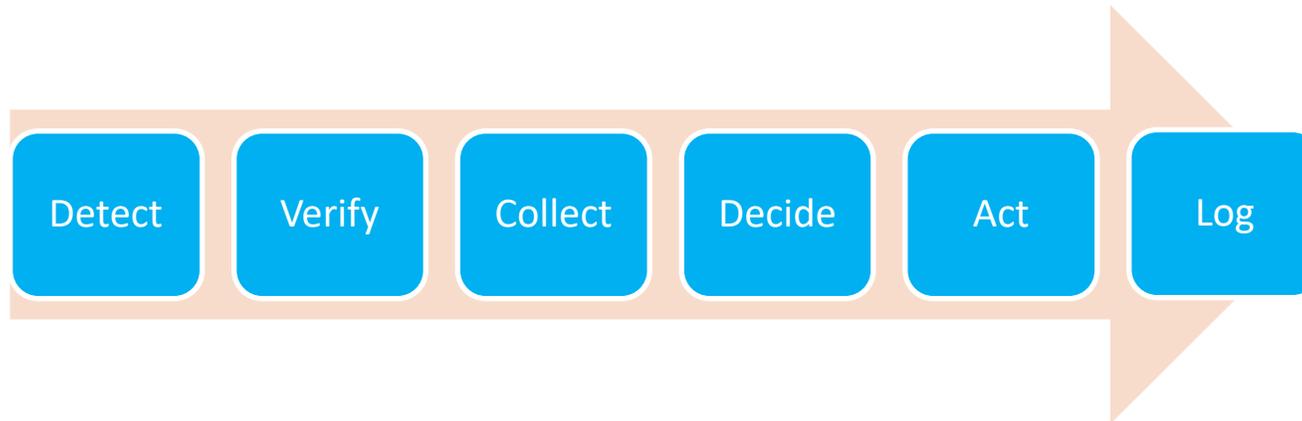


Control centers are monitoring



Incident value chain

- From an incident is detected until normal status is reestablished



Expectations from the Legislation and Regulatory Authority:

The numbing effect of false alarms and “silent” deviations

Out of order

Out of order

Dirty

Nygård 10 Øst So...	Nygård 11 Vest So...	Nygård 11 Øst So...	Nygård 12 Vest So...	Nygård 12 Øst So...	Nygård 13 Vest So...	Nygård 13 Øst So...	Nygård 14 Vest So...	Nygård 14 Øst So...	Nygård 15 Vest So...	Nygård 15 Øst So...
Nygård 16 Vest So...	Nygård 16 Øst So...	Nygård 17 Vest So...	Nygård 50 mot por...	Nygård mot Pudde...						

Dirty

Dirty

› **SESSION 1 : PANEL DISCUSSION**

DIEGO ALLAIX – TNO, NL

What new approach is needed by structural engineers
and what is the role of European standardisation?

› SESSION 1 : DISCUSSION WITH ONLINE AUDIENCE

- Received questions from the online audience:
 - I have seen smart solutions regarding sensors and predictive maintenance for single bridges, but how does one implement this when dealing with over 1800 bridges (of which over 800 bridges for motor vehicles)? And how to do this in a cost-efficient way?

- More questions: ...

Please ask questions to our panellists via Chat in Zoom



Pan-European Community of Practice
towards standardisation for:

“Digitalisation in inspection,
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of transport infrastructures”



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End of session 1

