

Taking Non-Intrusive Inspection to the Next Level

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2nd November 2022

THE UK ENERGY TECHNOLOGY PLATFORM

The online technology platform that supports UK and International Oil, Gas & Energy Operators maintain “Energy Security” and make the most of existing assets while reducing CO2 emissions on our “Energy Transition” journey to Net-Zero



UK Energy Technology Platform

 North Sea Transition Authority

NSTA Technology Survey & Insights

Technology Insights 2020 – Summary findings

Technology Priorities for the Industry

Lifecycle Categories

Seismic and Exploration

Well Drilling & Construction

Subsea systems

Installations and topsides

Reservoir & Well Management

Facilities Management

Well Plugging & Abandonment

Facilities Decommissioning

Functional Categories

Data and Digital

Net Zero



Select your Asset Life Cycle Categories (Aligned to NSTA Strategy, Net-Zero and OEUK led Roadmap 2035 Objectives)



SEISMIC AND EXPLORATION

13 x Technologies



WELL DRILLING AND COMPLETIONS

26 x Technologies



SUBSEA SYSTEMS

37 x Technologies



INSTALLATIONS AND TOPSIDES

247 x Technologies



RESERVOIR AND WELL MANAGEMENT

35 x Technologies



FACILITIES MANAGEMENT

186 x Technologies



WELL PLUG AND ABANDONMENT

31 x Technologies



FACILITIES DECOMMISSIONING

33 x Technologies



HEALTH SAFETY AND ENVIRONMENT

102 x Technologies



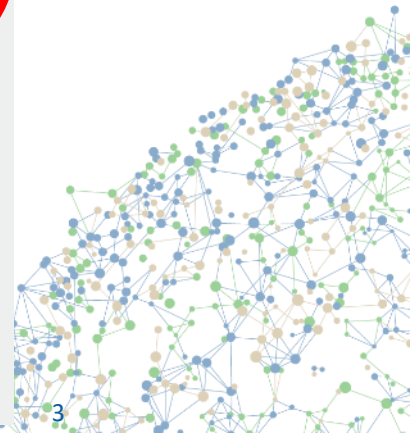
ENERGY TRANSITION

110 x Technologies



OFFSHORE WIND

30 x Technologies



UK Energy Technology Platform Contract Award

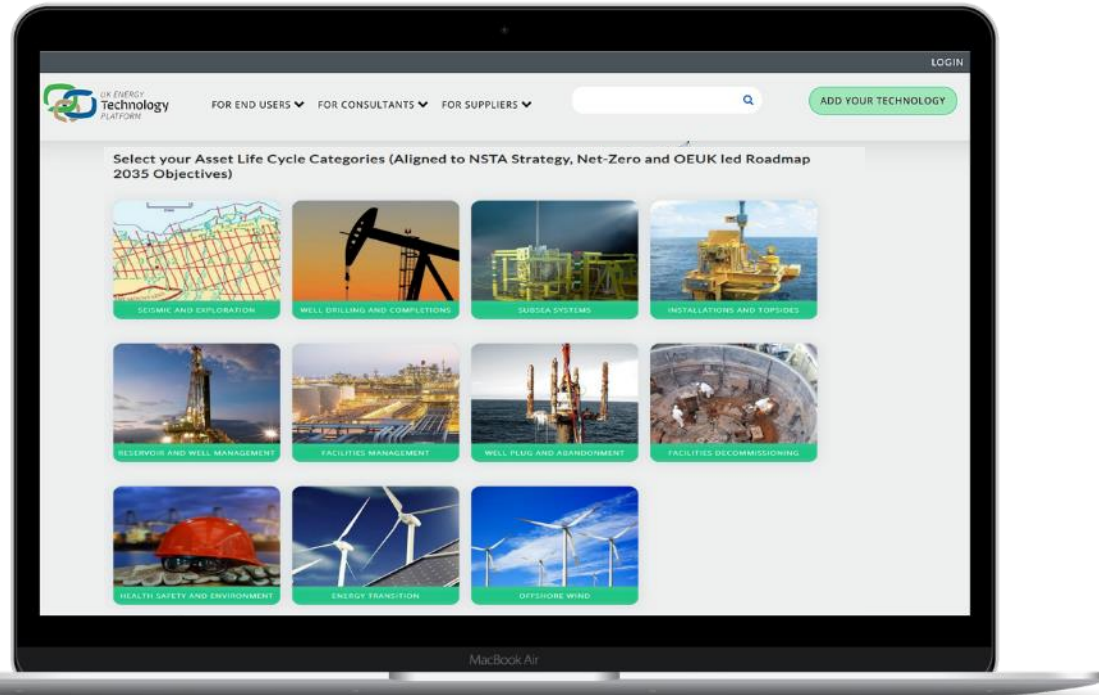
Proven technologies at your finger tips



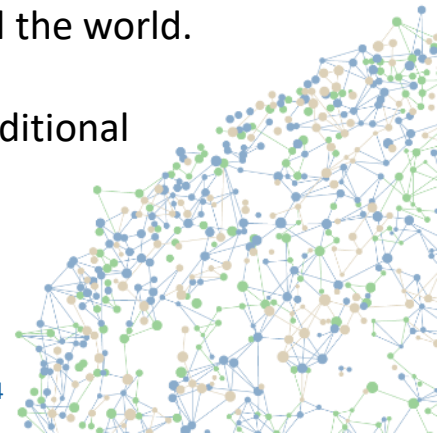
To increase visibility of emerging and field proven technologies and **“Accelerate Deployment”** of solutions that help **“Maximise Economic Recovery”** whilst supporting **“Net-Zero”** objectives, the NSTA have contracted the UK ETP to provide:-

- UK Operators, End-Users & EPC Contractors with “unlimited” use of the “Explorer” subscription to quickly identify relevant technologies and their track record.
- UK Suppliers with “unlimited” use of the “Starter” Subscription.
- UK Technology visibility to End-Users around the world.

In addition to the above, UK ETP can provide additional subscriptions with Advanced Functionality and Analytics to help accelerate “Energy Transition” technology deployment even further.

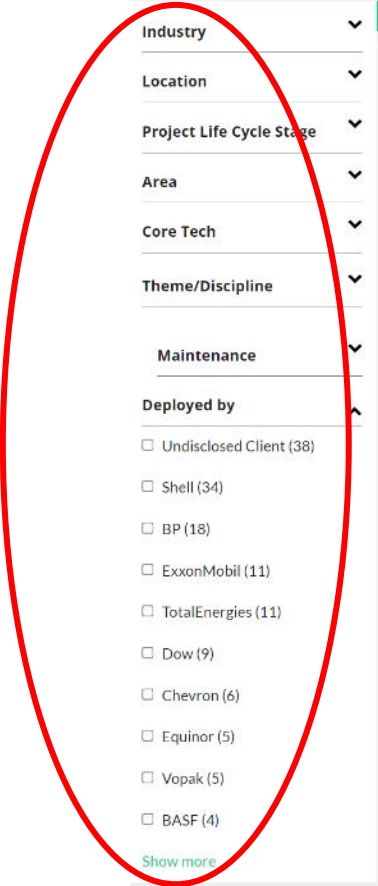


www.uk.energytechnologyplatform.com

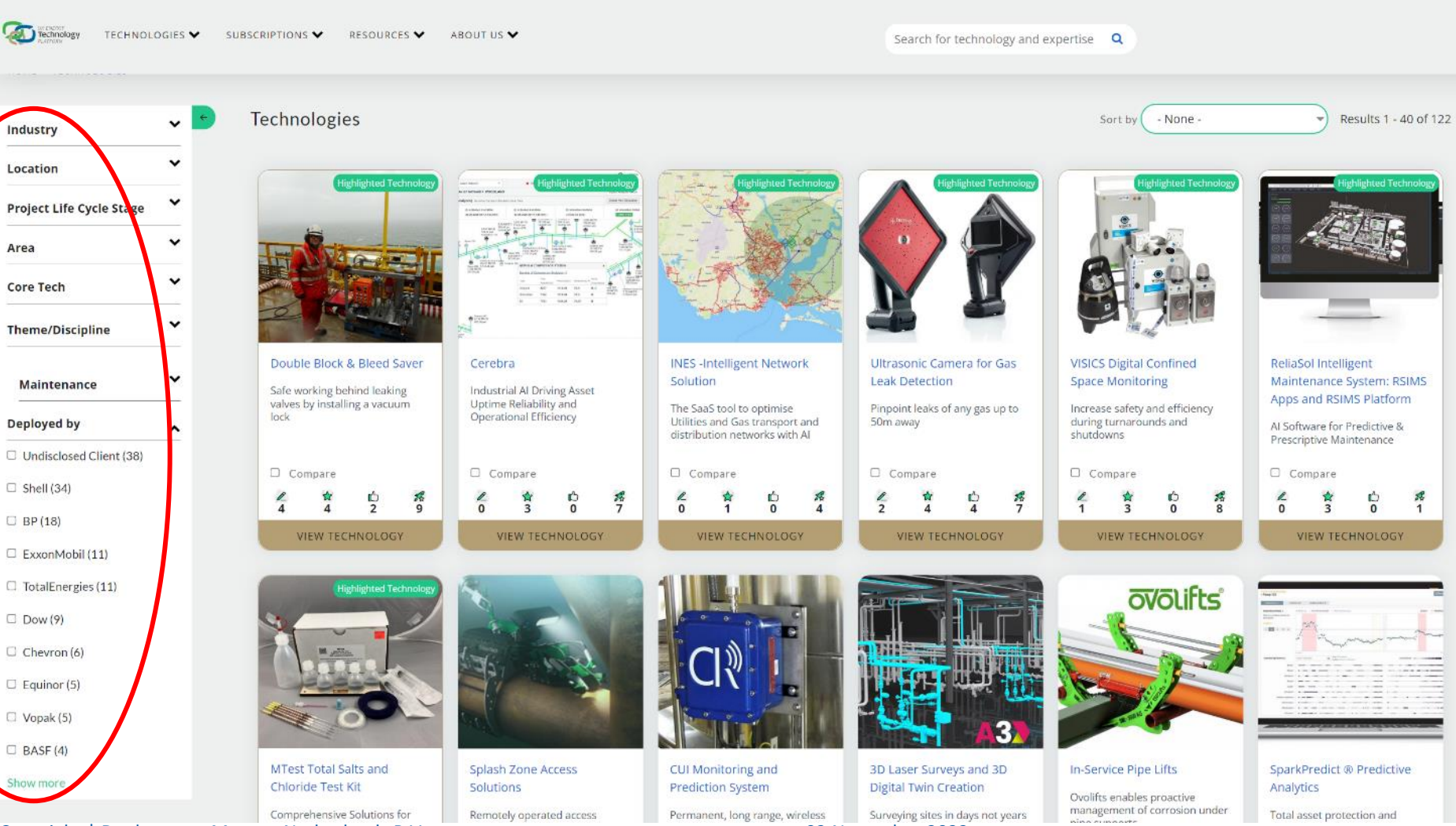


UK Energy Technology Platform

 Premium functionality



- Industry
- Location
- Project Life Cycle Stage
- Area
- Core Tech
- Theme/Discipline
- Maintenance
- Deployed by
 - Undisclosed Client (38)
 - Shell (34)
 - BP (18)
 - ExxonMobil (11)
 - TotalEnergies (11)
 - Dow (9)
 - Chevron (6)
 - Equinor (5)
 - Vopak (5)
 - BASF (4)
- Show more




TECHNOLOGIES ▾ SUBSCRIPTIONS ▾ RESOURCES ▾ ABOUT US ▾

Search for technology and expertise 🔍

Sort by - None - Results 1 - 40 of 122

Technologies

Highlighted Technology



Double Block & Bleed Saver


Safe working behind leaking valves by installing a vacuum lock

Compare

4 4 2 9

VIEW TECHNOLOGY

Highlighted Technology



Cerebra


Industrial AI Driving Asset Uptime Reliability and Operational Efficiency

Compare

0 3 0 7

VIEW TECHNOLOGY

Highlighted Technology



INES -Intelligent Network Solution


The SaaS tool to optimise Utilities and Gas transport and distribution networks with AI

Compare

0 1 0 4

VIEW TECHNOLOGY

Highlighted Technology



Ultrasonic Camera for Gas Leak Detection


Pinpoint leaks of any gas up to 50m away

Compare

2 4 4 7

VIEW TECHNOLOGY

Highlighted Technology



VISICS Digital Confined Space Monitoring


Increase safety and efficiency during turnarounds and shutdowns

Compare

1 3 0 8

VIEW TECHNOLOGY

Highlighted Technology



ReliaSol Intelligent Maintenance System: RSIMS Apps and RSIMS Platform


AI Software for Predictive & Prescriptive Maintenance

Compare

0 3 0 1

VIEW TECHNOLOGY


Highlighted Technology



MTest Total Salts and Chloride Test Kit

Comprehensive Solutions for


Highlighted Technology



Splash Zone Access Solutions

Remotely operated access


Highlighted Technology



CUI Monitoring and Prediction System

Permanent, long range, wireless


Highlighted Technology



3D Laser Surveys and 3D Digital Twin Creation

Surveying sites in days not years


Highlighted Technology



In-Service Pipe Lifts

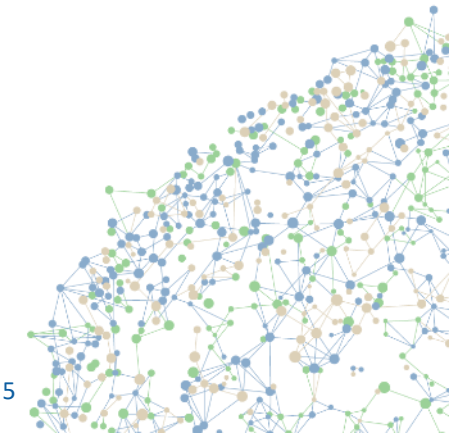
Ovolifts enables proactive management of corrosion under

Highlighted Technology



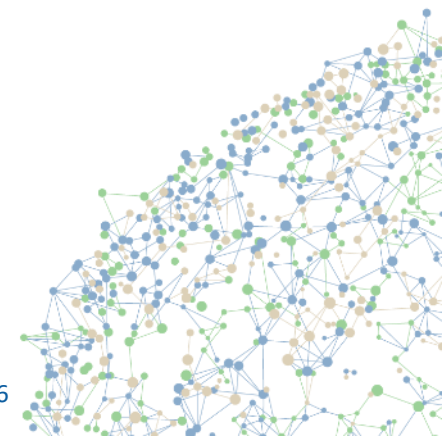
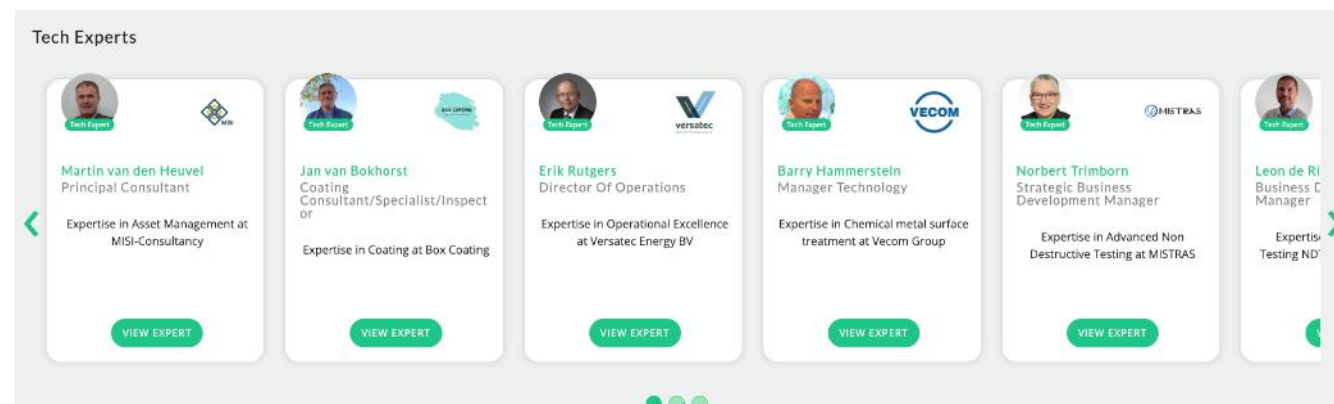
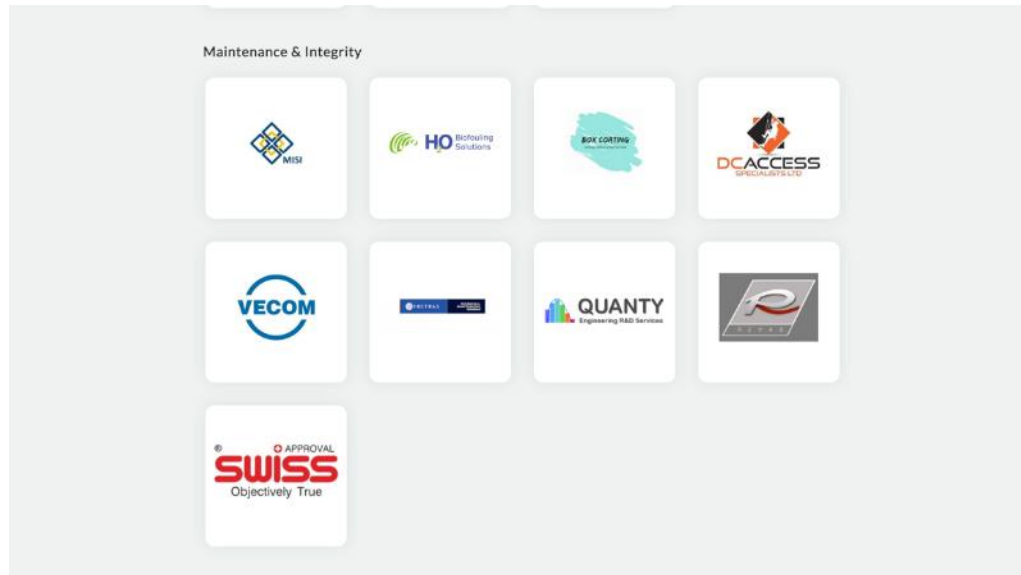
SparkPredict @ Predictive Analytics

Total asset protection and



Tech-Expert support for Non-Intrusive Inspection

Not limited to technologies: Access to experts



Technologies for Non-Intrusive Inspection

Search Example of NII Technologies

non-intrusive inspection



Industry ▾
Location ▾
Project Life Cycle Stage ▾
Area ▾
Core Tech ▾
Theme/Discipline ▾
Deployed by ▾
Deployed in ▾

Technologies

AXIS Asset Management Software

Efficient decision-making in one database

Compare

0 0 0 1

VIEW TECHNOLOGY

High Temperature Hydrogen Attack Inspection

By signal processing and imaging

Compare

0 0 0 1

VIEW TECHNOLOGY

MONPAC

Acoustic Emission (AE) technology package for evaluating the structural integrity of metallic pressure equipment

Compare

0 0 0 6

VIEW TECHNOLOGY

Whole Pro®

Wholly Probabilistic Integrity Assessment Solutions for Cost/Benefit based decision making

Compare

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VIEW TECHNOLOGY

Inspection of partly filled welds at pre-heat temperature

Inspection during welding, to avoid costly and time consuming repairs

Compare

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VIEW TECHNOLOGY

HTHA Inspections

Full integrity approach for your pressure equipment for High Temperature Hydrogen Attack

Compare

1 0 1 0

VIEW TECHNOLOGY

IMS PEI - Pressure Equipment Integrity

Manage equipment integrity through RBI and advanced risk calculations

Compare

2 1 2 5

VIEW TECHNOLOGY

High Temperature Corrosion Mapping and Weld Inspections

Non destructive testing capability up to 500°C (932F)

Compare

1 2 0 1

VIEW TECHNOLOGY

TOFD, PAUT & C-scan at high temperature

The solution for your corrosion mapping and weld inspections

Compare

0 0 1 1

VIEW TECHNOLOGY

CUI Monitoring and Prediction System

Permanent, long range, wireless monitoring

Compare

0 2 0 10

VIEW TECHNOLOGY

Mistras PHAT Scan®

In-service storage tank inspection

Compare

0 0 0 5

VIEW TECHNOLOGY

Offshore well inspections with PEC technology

Avoiding collapsing offshore wells using Pulsed Eddy Current (PEC)

Compare

1 1 0 1

VIEW TECHNOLOGY

Technologies for Non-Intrusive Inspection

Case Study

TOFD, PAUT & C-scan at high temperature

0 Reviews | 0 Followers | 1 Like | 1 Deploy

The solution for your corrosion mapping and weld inspections while your plant is in operation!

Page last modified: Friday, July 15, 2022 - 07:48

Execution of your wall thickness and weld inspections at high temperature up to 485 °C (905 °F), while your plant is in operation! Inspections will be accurately executed with the high temperature UT & TOFD (Time of Flight Diffraction) and high temperature PA (Phased Array) technology. Our high temperature inspections do improve your cost and production performance significantly.

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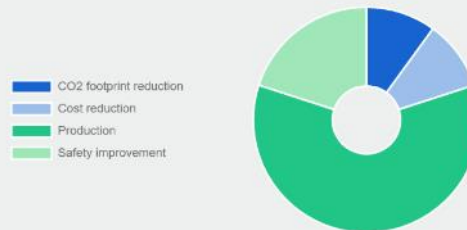
Pro/con

- + Opportunity to revise your maintenance and inspection strategy, based on on-line non-intrusive inspections
- + High detection and accurate sizing capability
- + Also available for partially filled welds at pre-heat temperature ("Golden welds")
- + Mobile flexible teams
- + Standardised and readily available up to 350 °C (662 °F). For high temperatures up to 485 °C (905 °F) and non-standard configurations testing is needed on a sample
- + Safe operation meeting the highest safety standard
- Non-standard configurations to be tested on a sample before deployment

Specification

- Areas of Application ✓ (Pressure) Equipment and piping operating at elevated temperature in refineries | Chemical plants and power generation plants
- Temperature ✓ Weld & Corrosion mapping at high temperature up to 485 °C (905 °F)
- Repeatability ✓ Accurate repeatability of inspection
- Implementation time ✓ Short implementation time, standardised inspections, ready for immediate deployment!
- Non man entry ✓ Non-intrusive inspection (NII) of your assets
- Speed ✓ Fast inspection
- Safety ✓ Execution against the highest safety factors

Relative Business Impact



Technology Readiness Level [9/9]



High Temperature Inspection matrix

Temperature range	UT	PAUT	TOFD	PA	TOFD	PA
UT > 350 °C	Proven	Proven	Proven	Proven	Proven	Proven
PAUT > 350 °C	Proven	Proven	Proven	Proven	Proven	Proven
TOFD > 350 °C	Proven	Proven	Proven	Proven	Proven	Proven
PA > 350 °C	Proven	Proven	Proven	Proven	Proven	Proven
UT > 300 °C	Proven	Proven	Proven	Proven	Proven	Proven
PAUT > 300 °C	Proven	Proven	Proven	Proven	Proven	Proven
TOFD > 300 °C	Proven	Proven	Proven	Proven	Proven	Proven
PA > 300 °C	Proven	Proven	Proven	Proven	Proven	Proven
UT > 250 °C	Proven	Proven	Proven	Proven	Proven	Proven
PAUT > 250 °C	Proven	Proven	Proven	Proven	Proven	Proven
TOFD > 250 °C	Proven	Proven	Proven	Proven	Proven	Proven
PA > 250 °C	Proven	Proven	Proven	Proven	Proven	Proven

About Sonolnspex



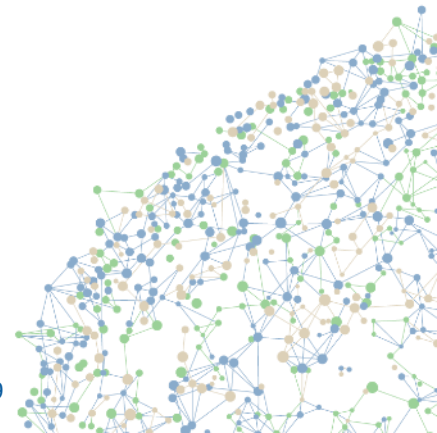
[VISIT WEBSITE](#)

Technologies for Non-Intrusive Inspection

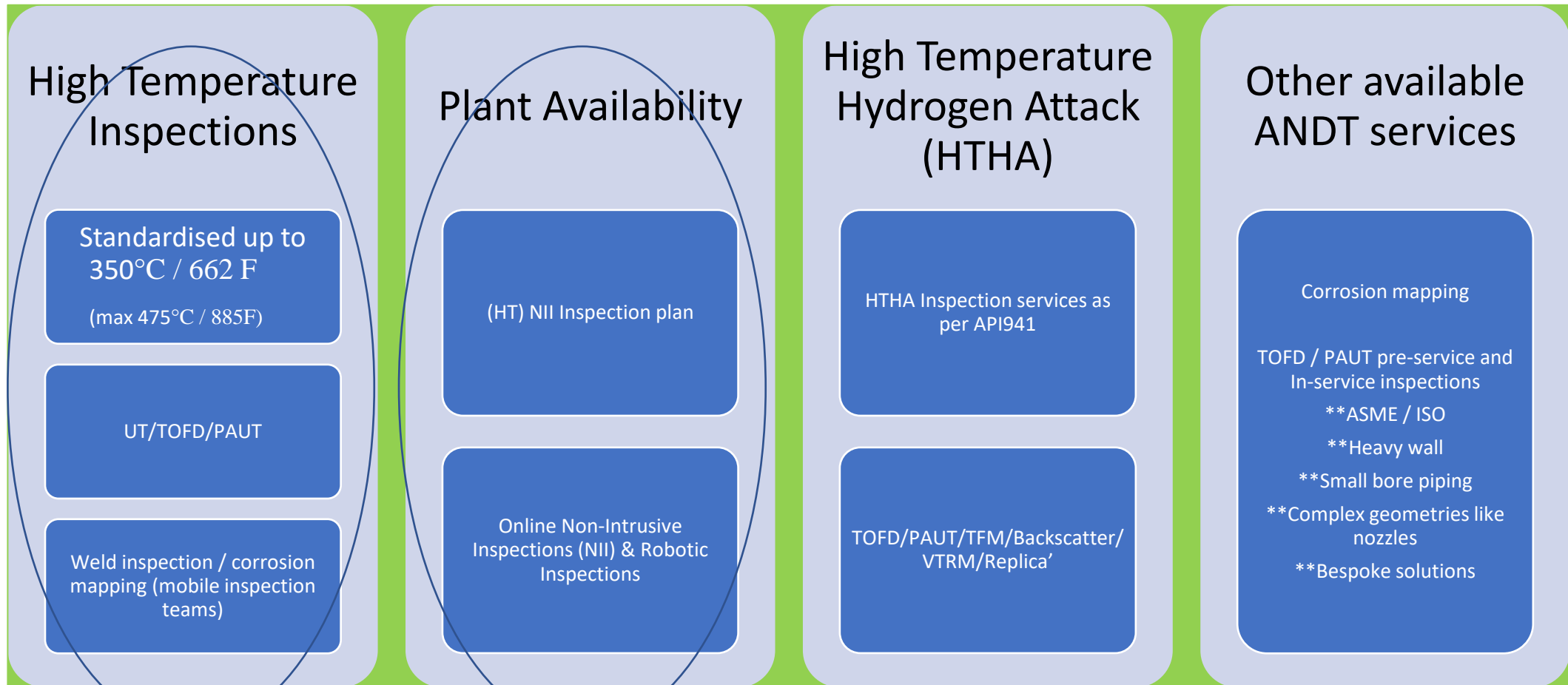
SonoInspect Case Study

NII weld monitoring inspection at high temperature

SonoInspect

The logo for SonoInspect features the word "SonoInspect" in a black, sans-serif font. A magnifying glass icon is positioned over the letter 'o' in "Sono", with a green waveform inside the lens. A horizontal line is drawn beneath the entire word.

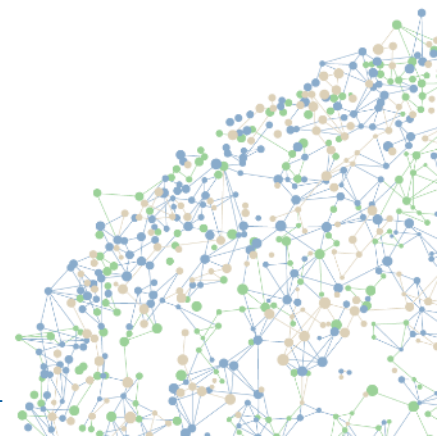
SonoInspect Services Introduction



Introduction high temperature inspections

- Financial considerations demand that Industrial Plant operate for longer periods
- Shutdowns should be kept to a minimum
- Plant integrity should not be compromised

To assist this situation, SonoInspect have developed special high temperature applications to carry out inspections whilst the plant is still in operation (Online Inspection)



High temperature capability matrix

Temperature range	Wall thickness range					
	6-13mm	14-25mm	26-50mm	51-100mm	101-150mm	>150mm
50 > 100 °C	TOFD	TOFD	TOFD	TOFD	TOFD	TOFD
	Phased Array	Phased Array	Phased Array	Phased Array	Phased Array	Phased Array
100 > 150 °C	TOFD	TOFD	TOFD	TOFD	TOFD	TOFD
	Phased Array	Phased Array	Phased Array	Phased Array	Phased Array	Phased Array
150 > 200 °C	TOFD	TOFD	TOFD	TOFD	TOFD	TOFD
	Phased Array	Phased Array	Phased Array	Phased Array	Phased Array	Phased Array
200 > 250 °	TOFD	TOFD	TOFD	TOFD	TOFD	TOFD
	Phased Array	Phased Array	Phased Array	Phased Array	Phased Array	Phased Array
250 > 300 °C	TOFD	TOFD	TOFD	TOFD	TOFD	TOFD
	Phased Array	Phased Array	Phased Array	Phased Array	Phased Array	Phased Array
300 > 350 °C	TOFD	TOFD	TOFD	TOFD	TOFD	TOFD
	Phased Array	Phased Array	Phased Array	Phased Array	Phased Array	Phased Array
350 > 400 °C	TOFD	TOFD	TOFD	TOFD	TOFD	TOFD
	Phased Array	Phased Array	Phased Array	Phased Array	Phased Array	Phased Array
> 400 °C	TOFD	TOFD	TOFD	TOFD	TOFD	TOFD
	Phased Array	Phased Array	Phased Array	Phased Array	Phased Array	Phased Array

Inspection standardised available!
Procedure/setup to be validated on sample
Not possible

Standardised and tested up to 350°C



Inspections above 350 °C

Meeting inspection objective

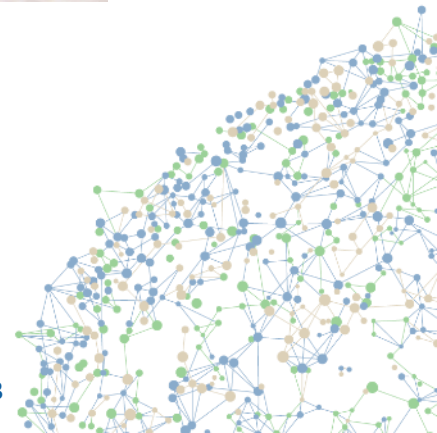
- Smallest defect to be detected/sized
- Temperature
- Wall-thickness
- Material
- Object configuration

Data reproducibility

- Probes
- Wedges
- Couplant

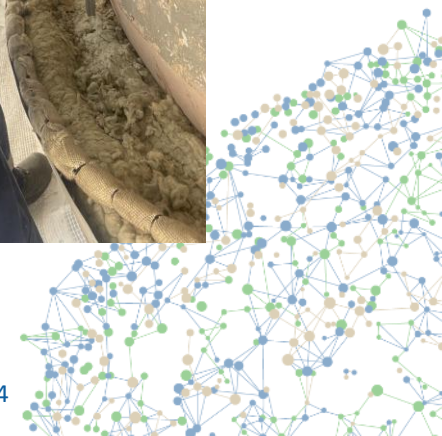
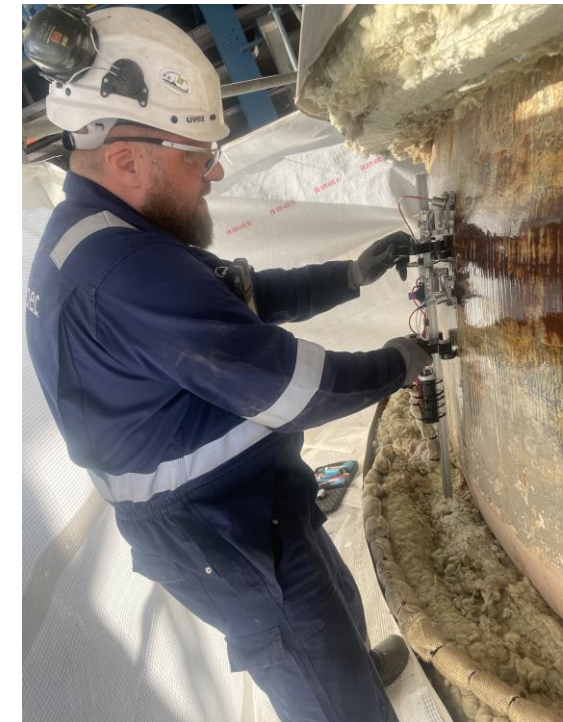
Technique accuracy

Safety of personnel



Safety high temperature inspections

- Task / Risk Analysis
- Gloves
 - Thin / thick
 - Couplant dripping
- Face protection
 - Glasses / full face protection
- Body protection
 - Fire retardant coverall
 - Aluminium heat resistant coveralls
- Extra Safety person
- Semi Mechanised Scanner



Case study inspection 3 reactors

Situation: Short shutdown Fertiliser plant (<1week). 3 heavy wall reactors to be inspected partly (repeat inspection).

Problem: Cooling down of reactors for normal NII inspection would have extended the shutdown.

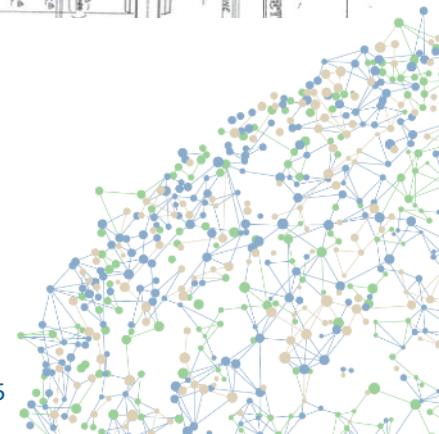
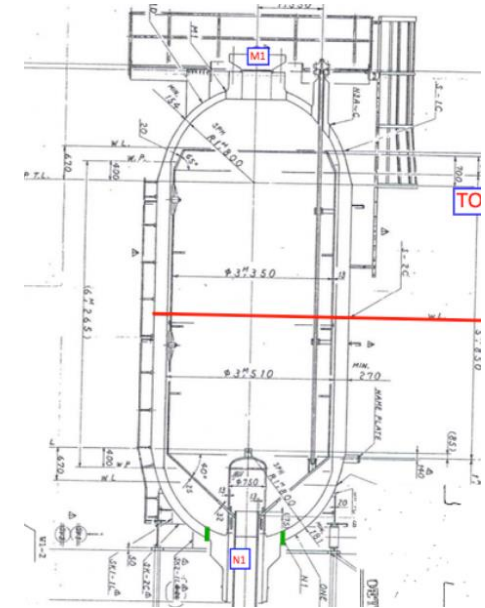
Solution: NII on the reactors at 300°C (partly cooled down) with HT TOFD and backup for detection with HT PAUT

Scope of work:

Reactor 1: Top CW, weld length 10640mm ($\text{\O} \sim 3.6\text{m}$), wall thickness 140mm

Reactor 2: Middle CW, weld length 12760mm ($\text{\O} \sim 4\text{m}$), wall thickness 270mm

Reactor 3: Middle CW, weld length 12760mm ($\text{\O} \sim 4\text{m}$), wall thickness 270mm



Inspection approach

Prepare validation samples:

140mm: EDM notch, length 20mm, height 5mm

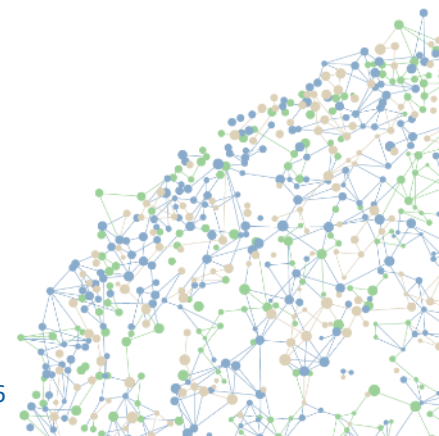
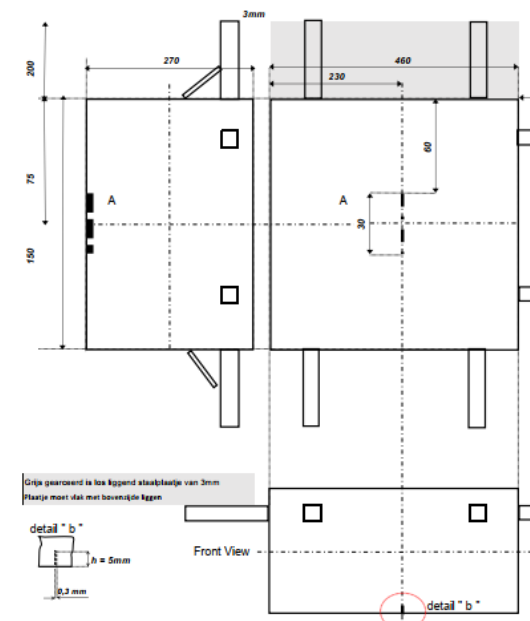
270mm: EDM notch, length 30mm, height 5mm

Testing on samples in workshop, to be able to reliably detect and size the defects on the validation samples. Witnessed by the client.

TOFD: 2Mhz-12mm, 35° HT Wedges

PAUT: 2.25Mhz-32el, 35°-50° angle, HT probe & water cooled Cooled wedge

Couplant: High temperature, fluid (pumpable)

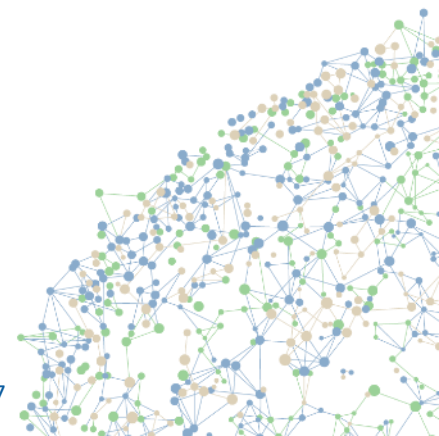
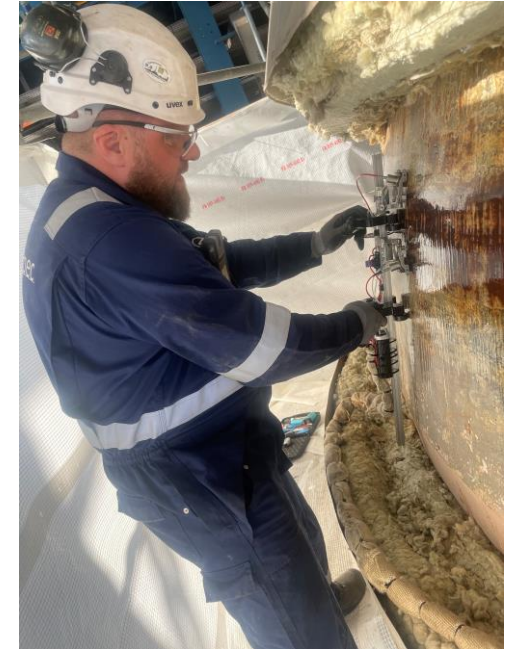


High temperature TOFD testing



High Temperature
TOFD Testing

Son⁺Inspe_c

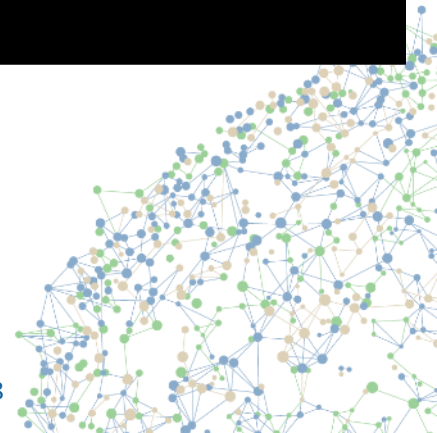


High temperature PAUT testing



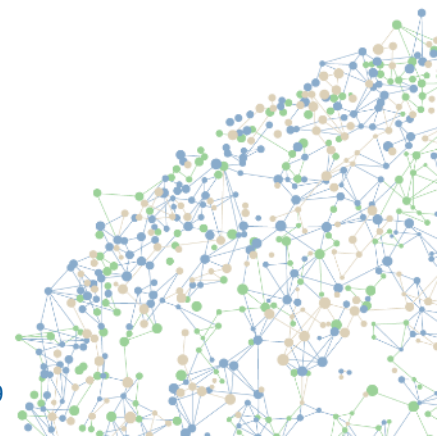
High Temperature Phased Array Testing

Son_oInspe_c



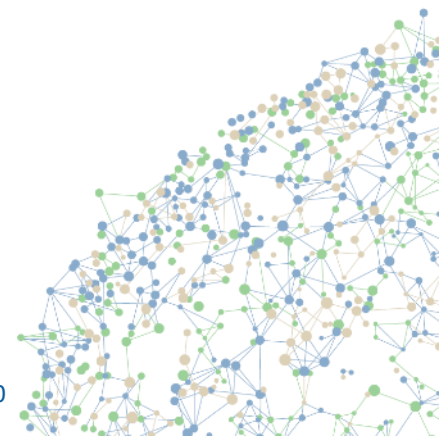
Results of the inspection

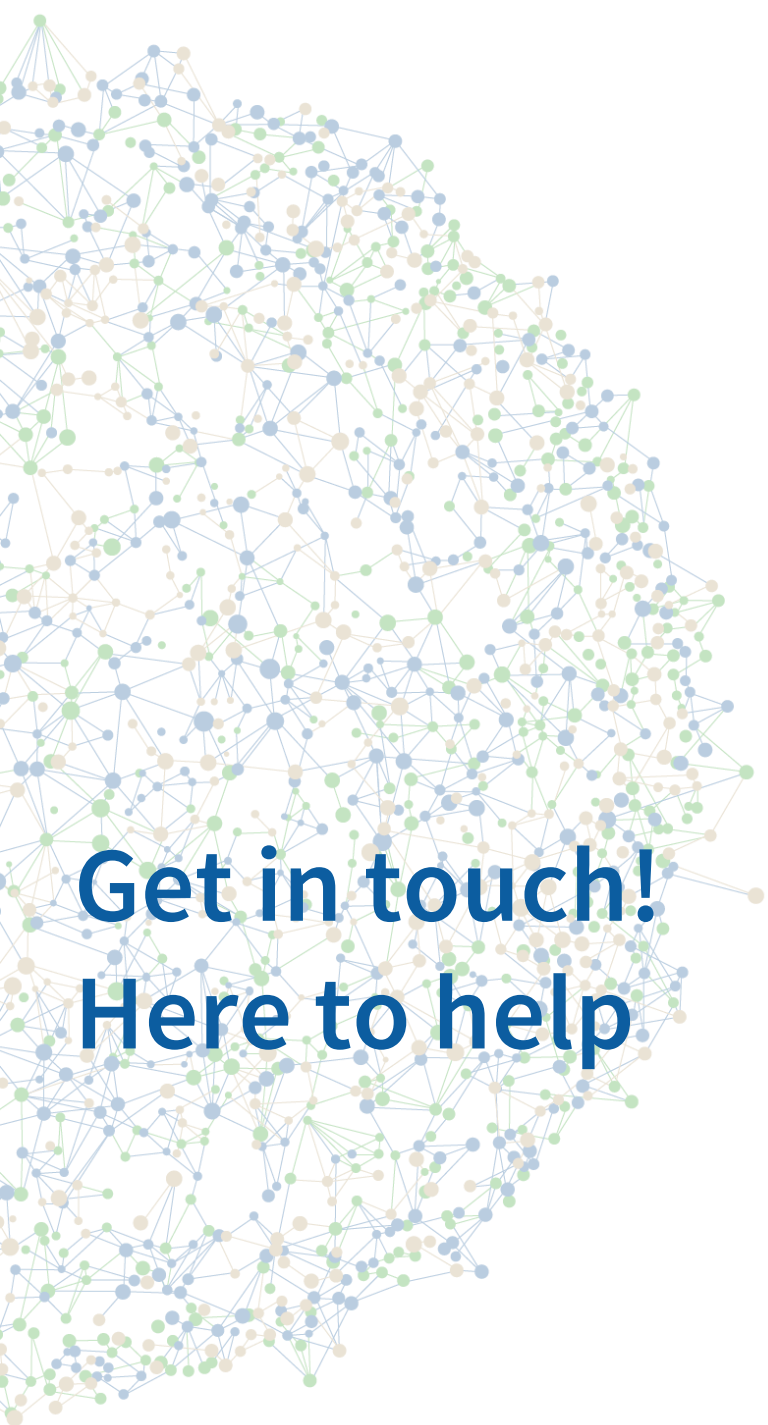
- Inspection February 2022 (monitor inspection)
 - All indications found in validation sample
 - All indications found and sized with HT TOFD on the reactors as in 2016, no significant change
 - All indications detected with HT PAUT. Point indications found with HT TOFD, were not detected with HT PAUT, as expected.



Advantages of NII at elevated temperature

- Avoiding plant shutdown
 - Monitoring known flaws / corrosion.
 - Proven plant integrity for the authorities (extend start of turnaround)
- Pre-information for shutdowns
 - online weld inspections and corrosion monitoring/mapping.
- Reduction turnaround time
 - Execution of inspections during operations at high temperature as a strategic approach
 - Avoid cooling down heavy wall vessels
- Partly filled welds (“golden welds”)
- NII advantages in general; safety and costs improvements





Get in touch!
Here to help



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