CUI Technology Trialling

NIIFTA
Non-Intrusive Inspection Field Trial Accelerator

Topsides UK 2025
12th November 2025

Ernie Lamza – North Sea Transition Authority
Ana Pires de Almeida – Net Zero Technology Centre
Mike Richardson – PX Limited

technology leadership board

technology leadership board

NIIFTA

Non-Intrusive Inspection Field Trial Accelerator

What is NIIFTA?

- A Technology Leadership Board industry collaboration led by Kellas Midstream, supported by NZTC and NSTA.
- 5 onshore terminal Operators, with 9 onshore sites to host field trials.
- Accelerates piloting and testing of NII technologies at lower cost and level of risk versus offshore.
- Delivers verification data to support acceptance of multiple NII technologies by Operators and regulators.
- Each NIIFTA member
  - Hosts field trials
  - Covers their own costs (scaffolding, supervision etc)
  - Shares trial results with other NIIFTA members.
- Technology developers cover their own costs

technology leadership board

NIIFTA

Non-Intrusive Inspection Field Trial Accelerator

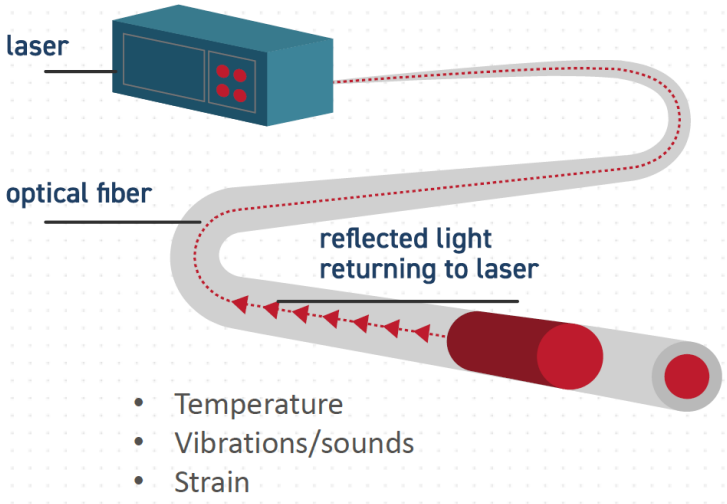
NIIFTA's Initial Focus

- Initial focus is Corrosion Under Insulation (CUI) - a significant safety and cost issue for industry for decades
- Other NII areas, e.g. Vessel Inspection to follow later
- Current CUI practice – strip, inspect, repair/replace, reinstate
- Often risk based, targeting a given percentage each year, but no guarantee all CUI is found and dealt with
- NIIFTA is seeking technologies to detect CUI more simply to contribute to plant integrity and safety at reduced cost
- Initial NSMP St Fergus trials - **Subtera** (sub-terahertz photons) & **Fluves** (DTS/DAS) - wall thickness loss & moisture detection
- ESR Technology providing trials support:
  - Methodologies
  - Independent oversight and reporting

ESR Technology
Engineering, Safety & Risk

Trial Planning

- ESR Technology was responsible for defining the requirements of the trials, identifying an appropriate location, overseeing the trials and assessing the results of the trials
- Each of the technologies were reviewed to understand the claimed capabilities and to allow a trial to be tailored to specifics of the system selected
- Technologies included in the initial round:
  - **Subtera – Pi360**: Uses terahertz waves to detect the presence of moisture or corrosion under insulation;
  - **Fluves Corrosion**: Uses a fibre optic cable attached to the outside of cladding to monitor temperature and infer the presence of moisture.



Trial Requirements

- Broadly similar requirements in terms of pipe specification, with some differences between the two systems
- Complementary techniques – one for monitoring and the other for localised inspection
- Decided to perform both trials at the same site
- Selection of pipes identified at the NSMP-px operated St Fergus terminal
- The trial in summer 2025 with Subtera performing an inspection and the Fluves monitoring system being installed in adjacent pipes in the same pipe trench

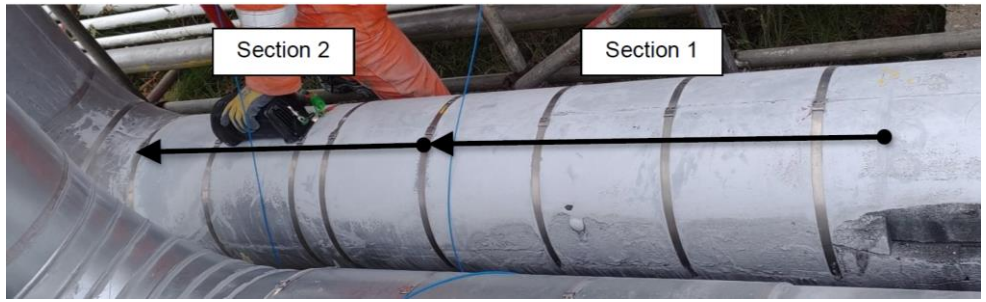
Requirements Summary	Subtera	Fluves
Pipe OD	> 75 mm	>50 mm
Fluid Temperature	>±20 °C from Ambient	>±20 °C from Ambient
Insulation types	Most experience with mineral wool but compatible with others	Shorter calibration period with mineral wool but compatible with others
Other	No conductive cladding or vapour barriers	Minimum of 100 m of pipework to be monitored Minimum 3-month monitoring period Weather data required over duration of monitoring 4G connectivity needed

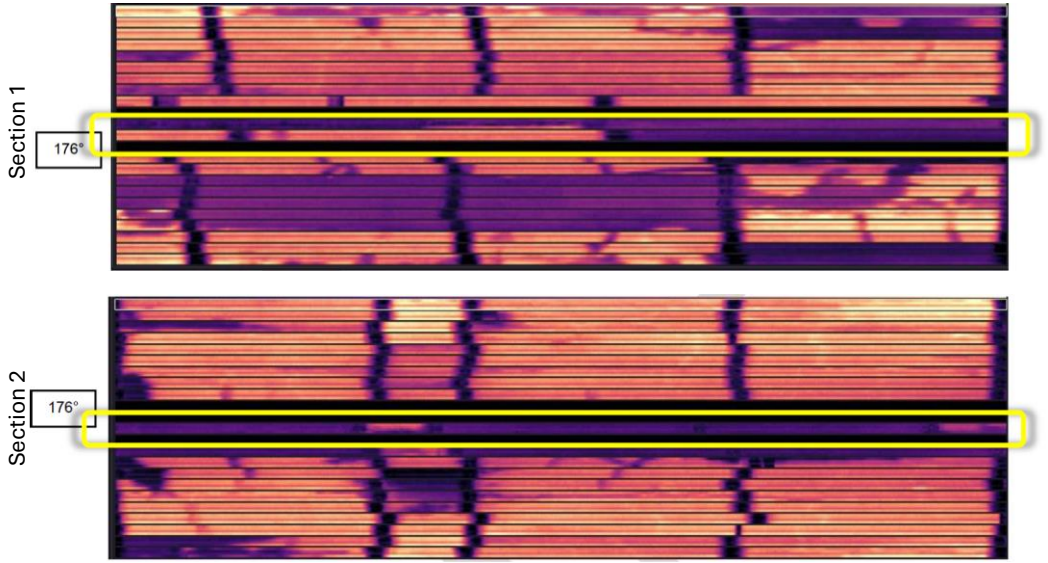
Performing the Trial

- The **Fluves** system was installed on a series of hot oil lines with diameters of 10”, 14” and 16”, including straights and expansion loops
- Installation took 2 people approximately 2 days to instrument 100 m of pipe
- An aerosol “cold spray” was used to align the monitoring data with the physical asset
- A calibration period of 1 month is needed
- **Subtera** inspected four lines, a 2”, two 3” lines and the same Fluves 10” line
- Full coverage of the lines was not feasible, with a sampling approach taken, targeting likely areas for CUI of the four lines over 2.5 days

Initial Results

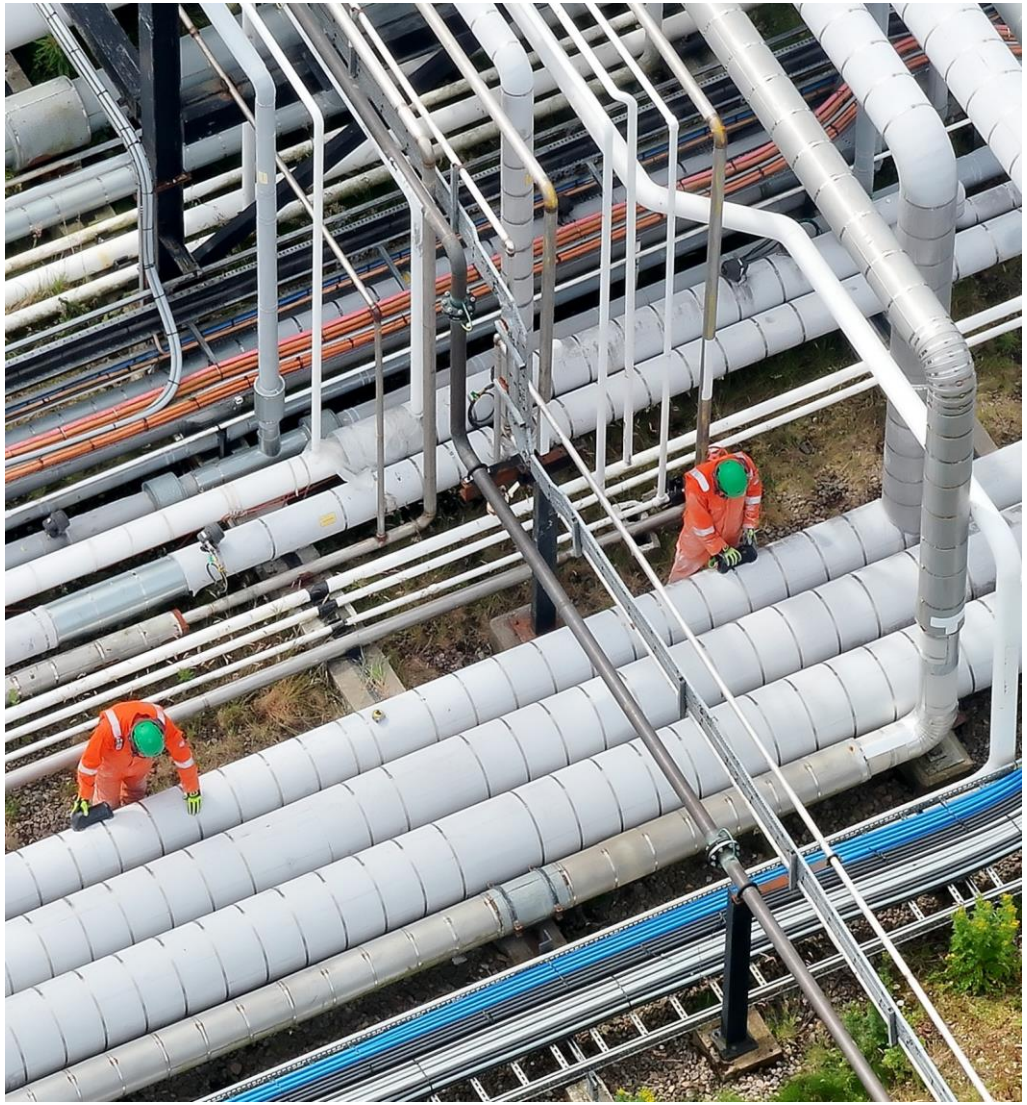
- **Fluves** have concluded the calibration phase and are finalising the processing of inspection data
- **Subtera** report is completed
- Scans are performed axially at a number of points around the circumference of the pipe
- During processing the line scans are stitched together to make an “unwrapped” view of the pipe
- Dark regions correspond to moisture or corrosion
- Metallic strapping also appears as dark vertical bands due to blocking the terahertz signals
- Moisture detected along the bottom of the pipe (~180°) position on many of the lines and some other indications corresponding to potential corrosion





Next Steps

- The analysis of trial results will identify target areas highlighted for benchmarking
- The pipes inspected using the Subtera Pi360, which are not being monitored with the Fluves system, will be stripped and inspected, with all moisture and corrosion noted
- Both the Subtera inspection and benchmarking results will be reviewed, providing an independent evaluation of the trial performance
- A similar analysis will be performed for the Fluves system at the end of the monitoring period and cross referenced with the Subtera data to identify overlap in results

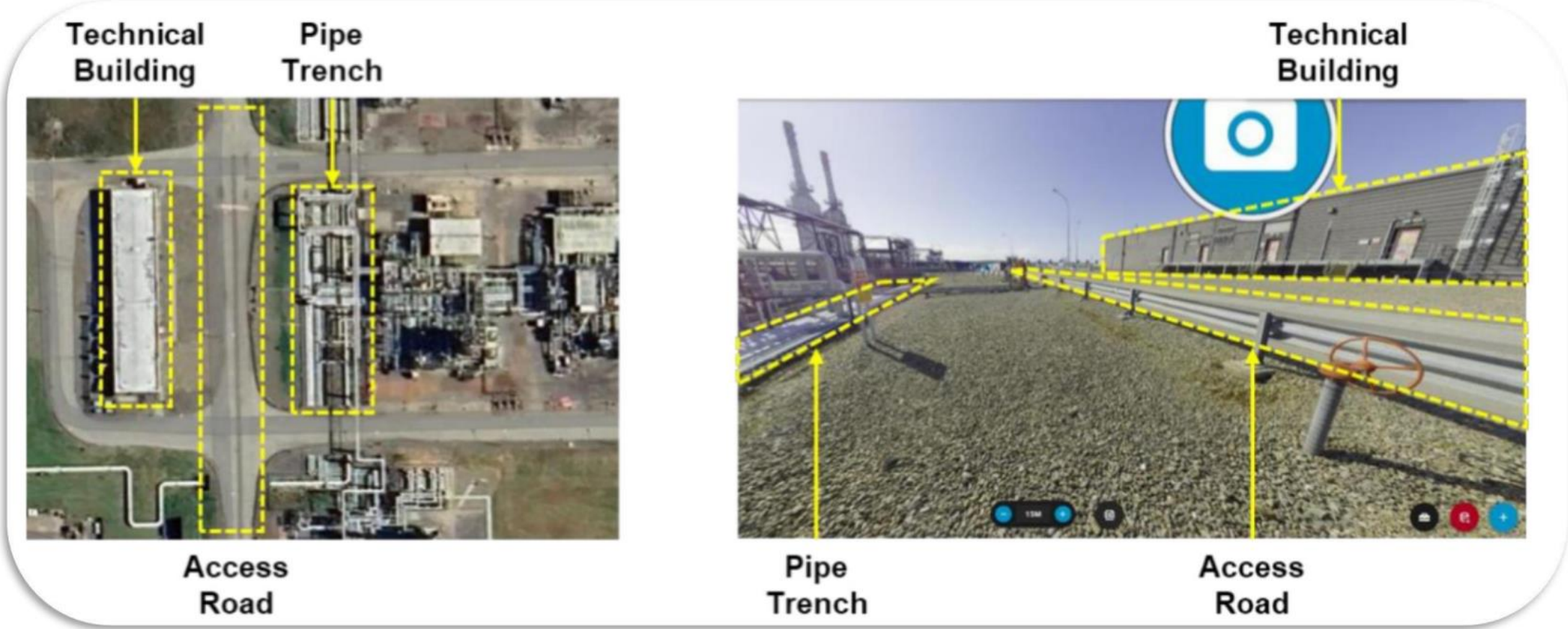


NIIFTA Trials at St. Fergus Gas Terminal Summer 2025

- Introducing NSMP, px Group, and St. Fergus Terminal.
- Why px/NSMP joined NIIFTA.
- How was it to host the NIIFTA trials:
  - Cost and effort
  - Benefits
- What's next?

NIIFTA Trials at St. Fergus Gas Terminal Summer 2025

- Identifying suitable equipment to trial on
- Effort
- Costs
- Benefits



NIIFTA Trials at St. Fergus Gas Terminal Summer 2025

- Insulation removal and inspection for verification of results.

General View of Pipework in Track

Subtera at Work

FLUVES at Work

technology leadership board

NIIFTA

Non-Intrusive Inspection Field Trial Accelerator

NIIFTA: Future Plans

Activity

- Share results of the initial trials with NIIFTA members
- Call for technologies run over the summer – shortlisted applications are being matched with terminal operators for 2nd round of trials
- Target is for ~5 new technologies to be trialled over the period Q4 (2025) – Q3 (2026)
- Seeking additional NIIFTA members with trial hosting capability / capacity (onshore or offshore)

Questions?

Contact: info@the-tlb.com **Website:** https://www.the-tlb.com/sponsored-projects/niifta

technology leadership board

NIIFTA
Non-Intrusive Inspection Field Trial Accelerator

TLB Accelerate Deployment workstream event

technology leadership board

Remote Operations and Robotics Technology Showcase Programme
Wednesday, 19 November 2025, 8.00am to 1:30pm

Hosted by Net Zero Technology Centre

Queens Road, Aberdeen

For a Registration link, email: info@the-tlb.com