

Embedded Passive Wireless Ultrasonic Sensor for Non-Destructive Testing



inductosense



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Outline

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The problem



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Inductosense solution



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Conclusion



We provide an alternative way of non-destructive testing that addresses today's issues

Skilled operators prone to human

- Shortage of skilled UT inspectors (average age 55)
- Subject to human error with varied accuracy and repeatability
- Not aligned with Industry 4.0

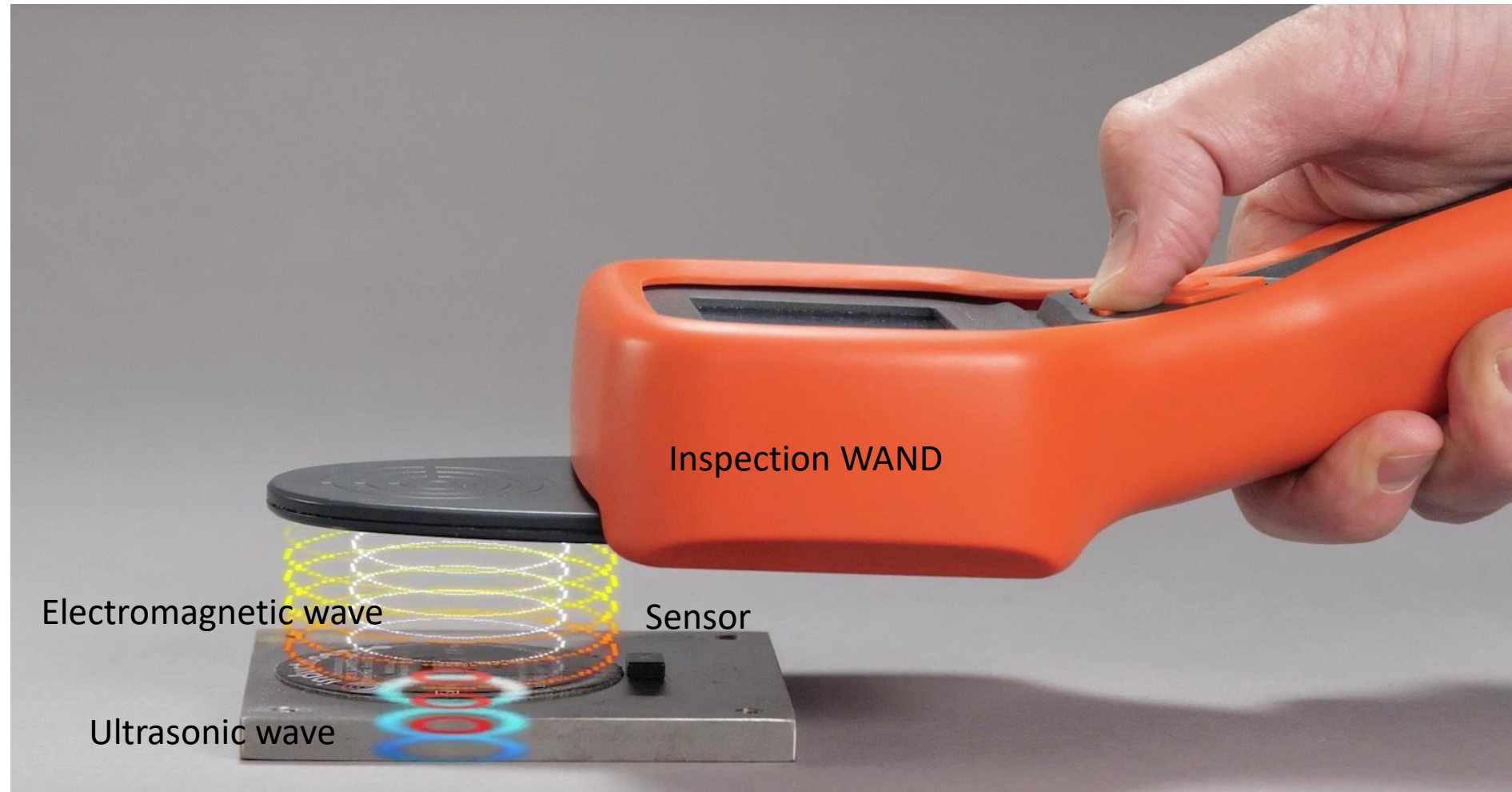
Millions of NDT measurements

- Conventional NDT is slow and expensive
- More points that require monitoring than budget or time allow
- Safety risk with patchy coverage

Difficulty of access

- Requires strip down of structure
- Working at heights poses safety risks and is expensive
- Asset downtime and transportation of inspectors is expensive

WANDs (Wireless And Non-Destructive) system



WAND: corrosion monitoring to enable predictive maintenance



A family of sensors

Battery-free, compact sensors for monitoring internal corrosion



'The Wand' Data Collector

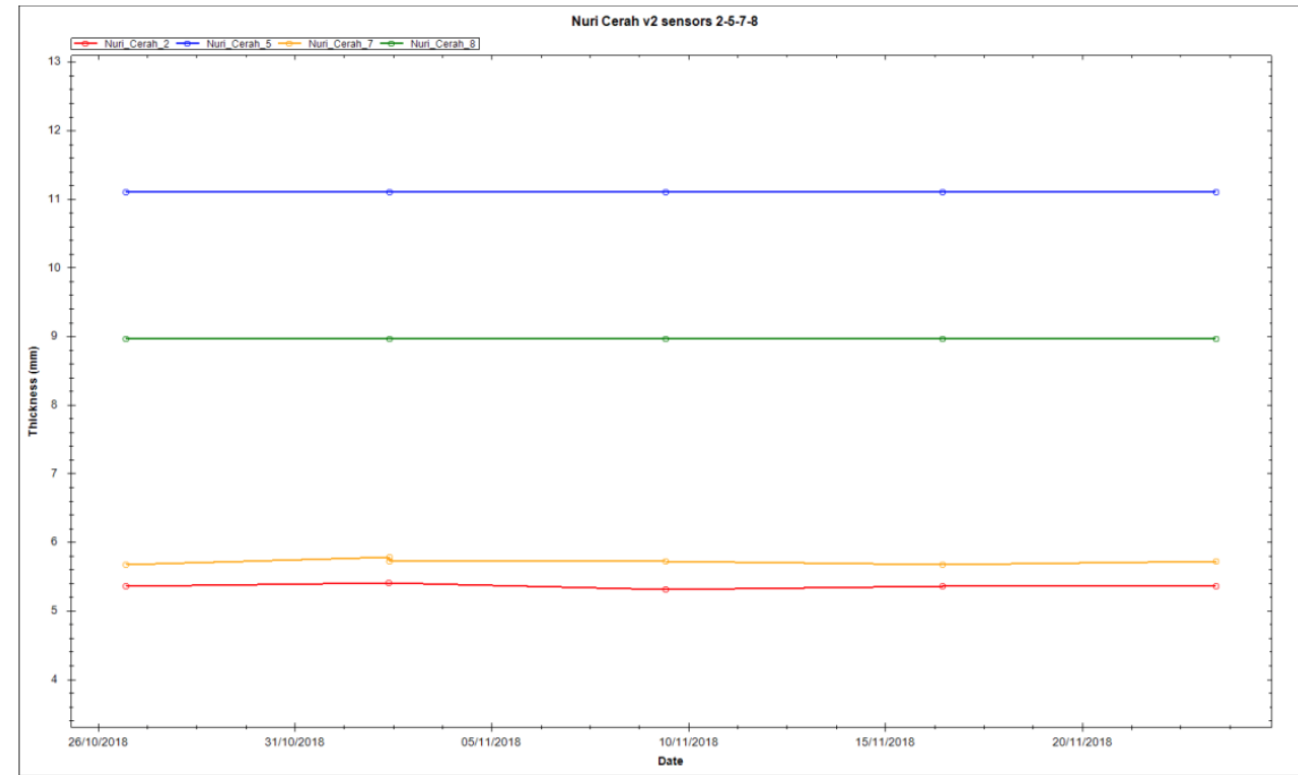
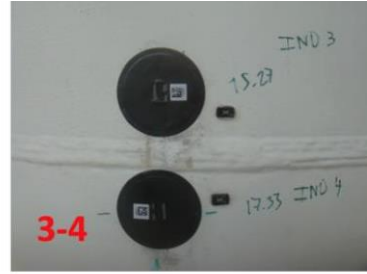
Fast, repeatable, error free data collection with unskilled operators



IDM Software

Remote trending of data to enable predictive maintenance

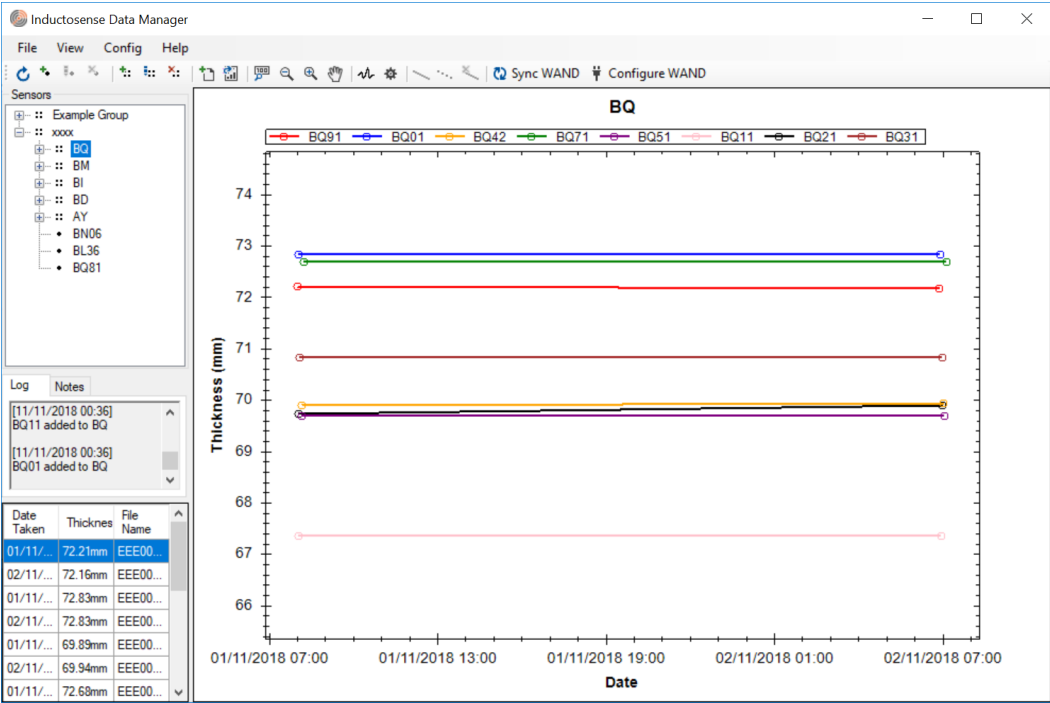
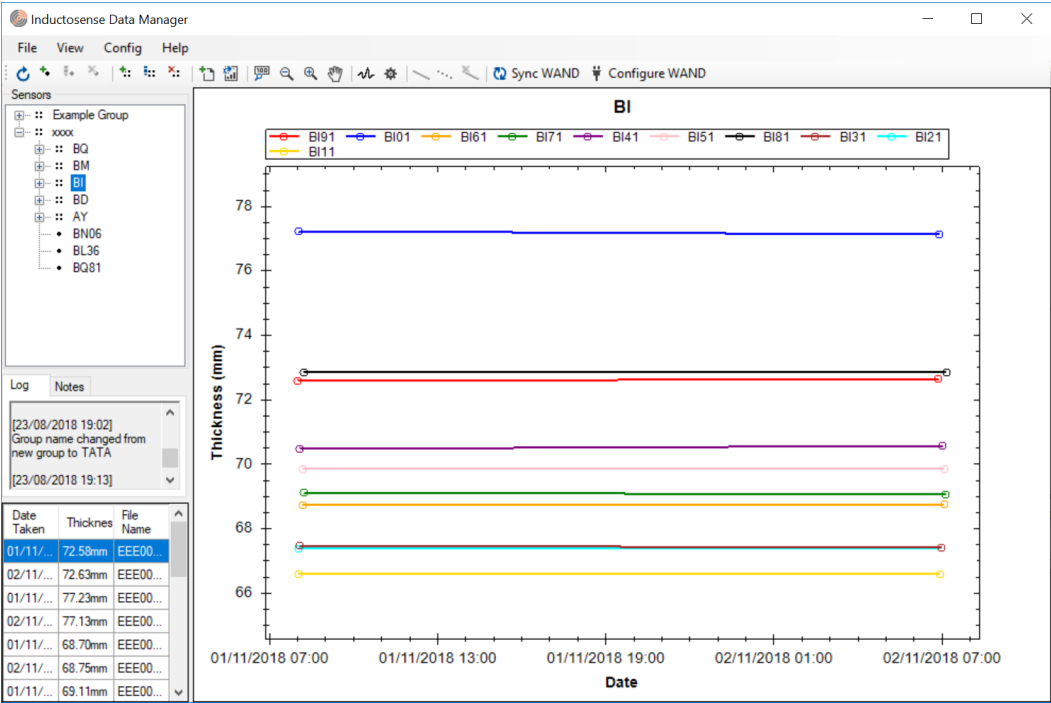
Gas terminal



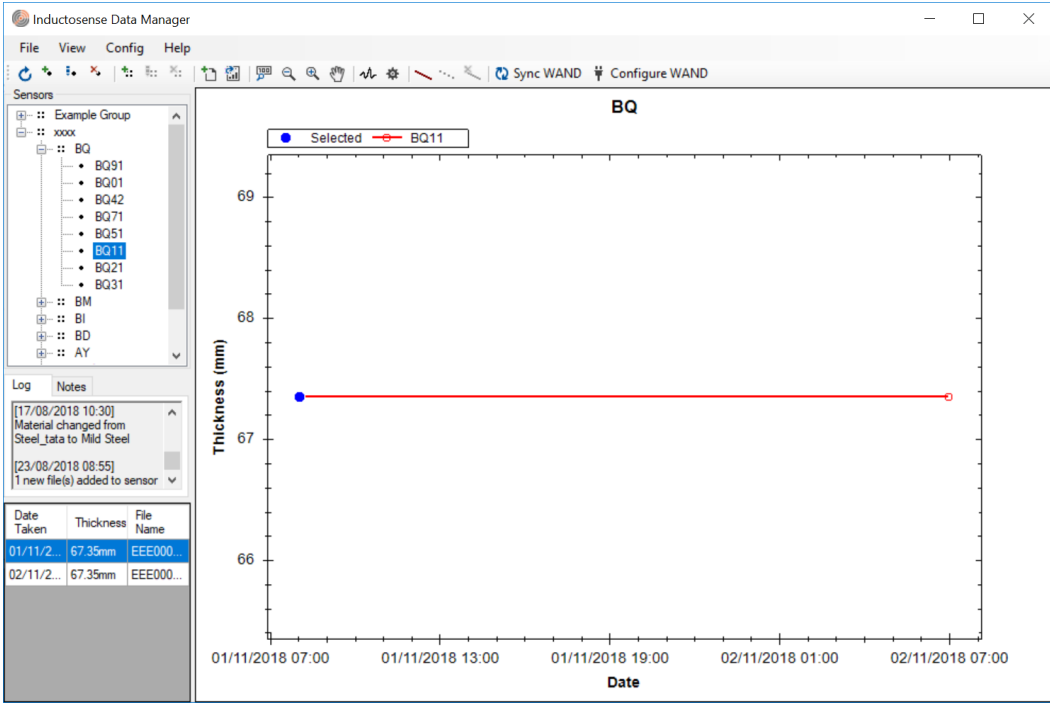
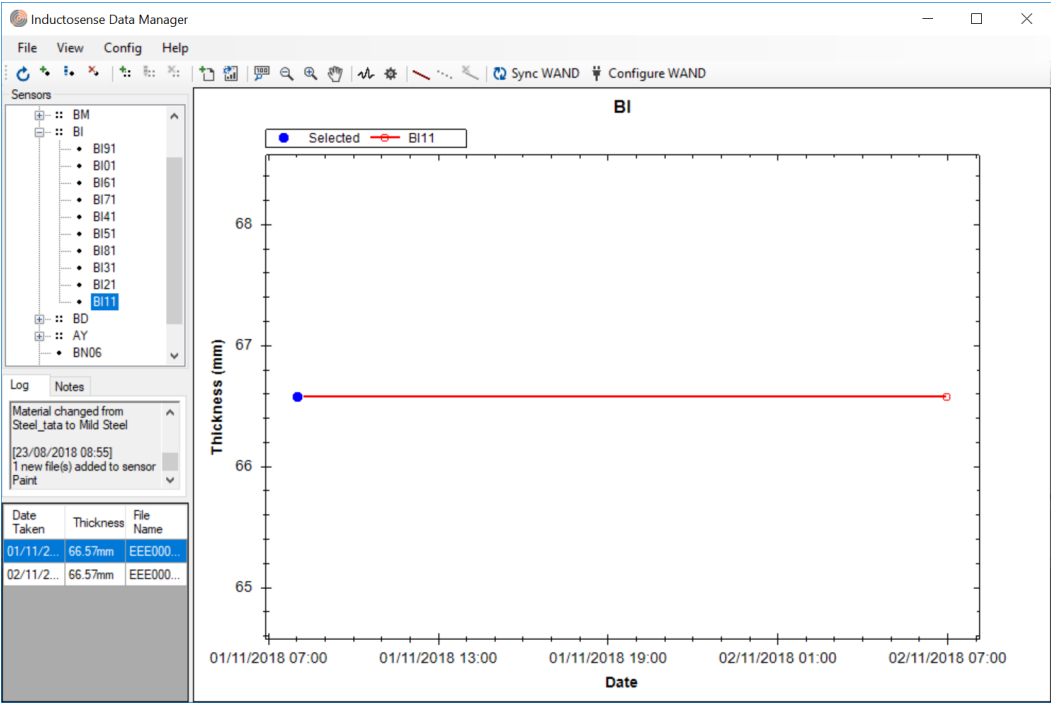
Gas plant CO₂ absorber monitoring (process temperature 100 to 150 °C)



Gas plant CO2 absorber monitoring (process temperature 100 to 150 °C)



Gas plant CO2 absorber monitoring (process temperature 100 to 150 °C)

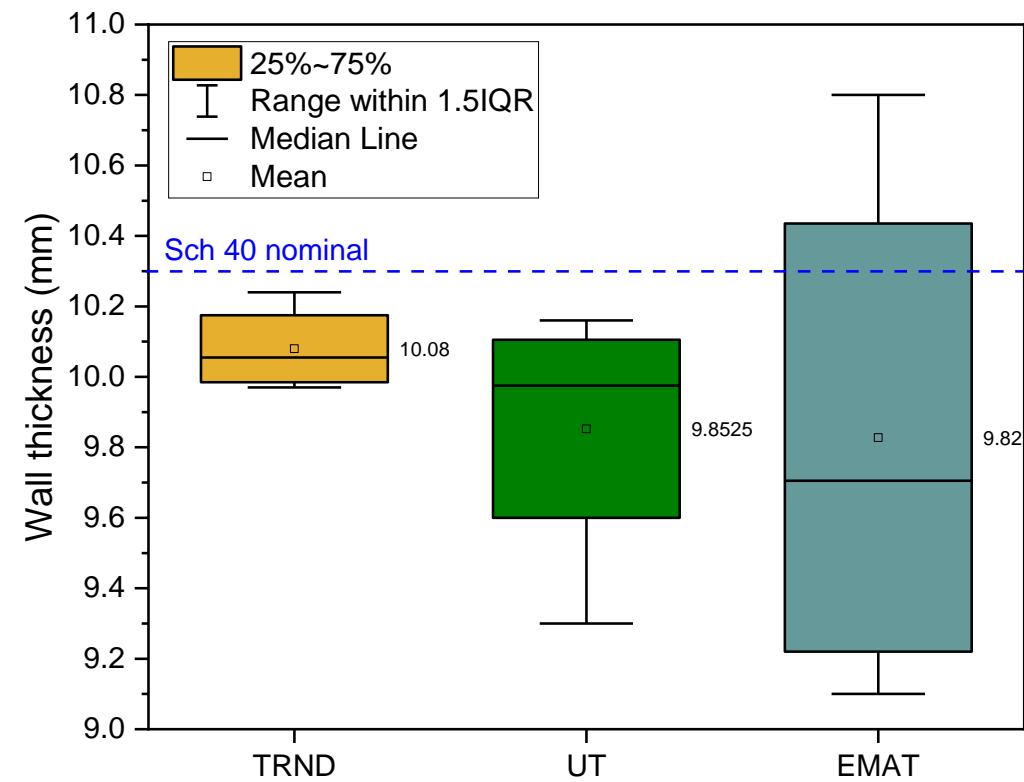
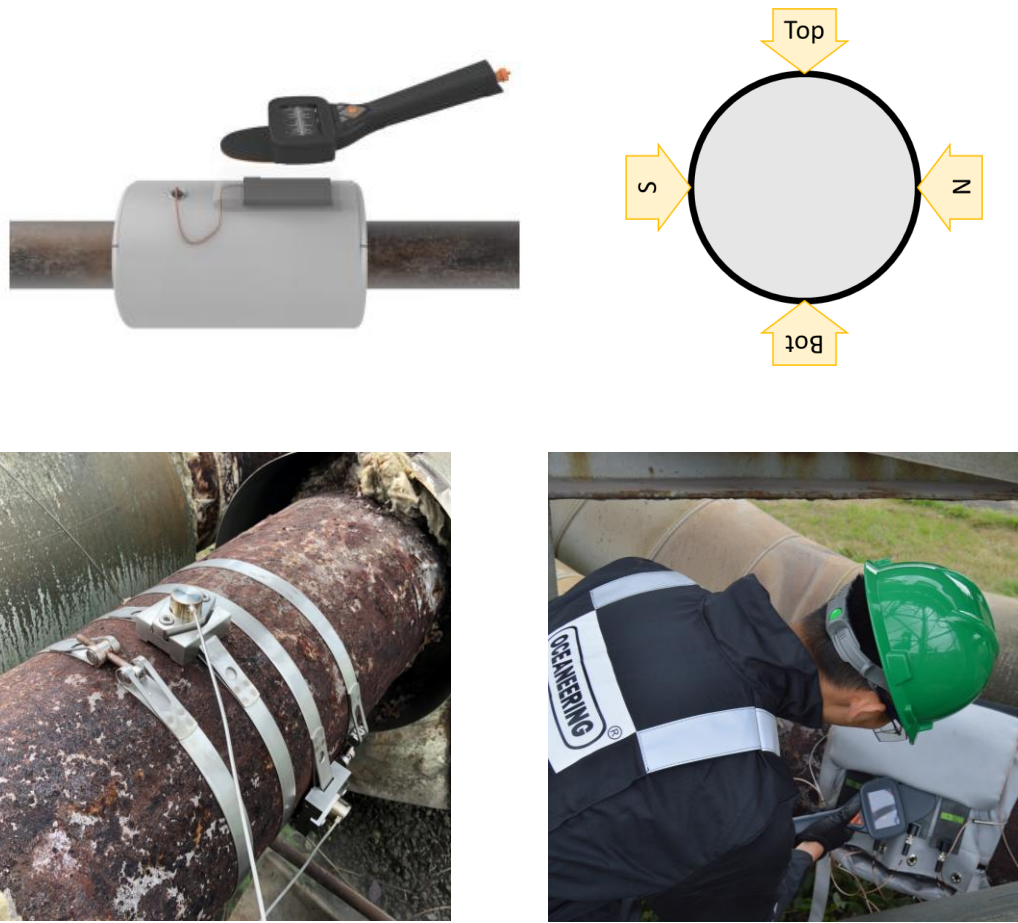


TRND: High temperature (up to 350°C) corrosion monitoring

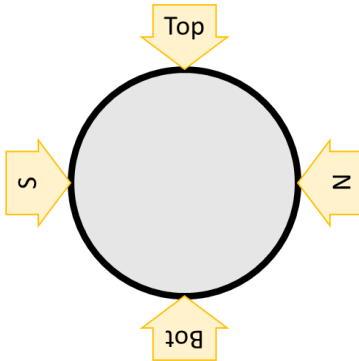
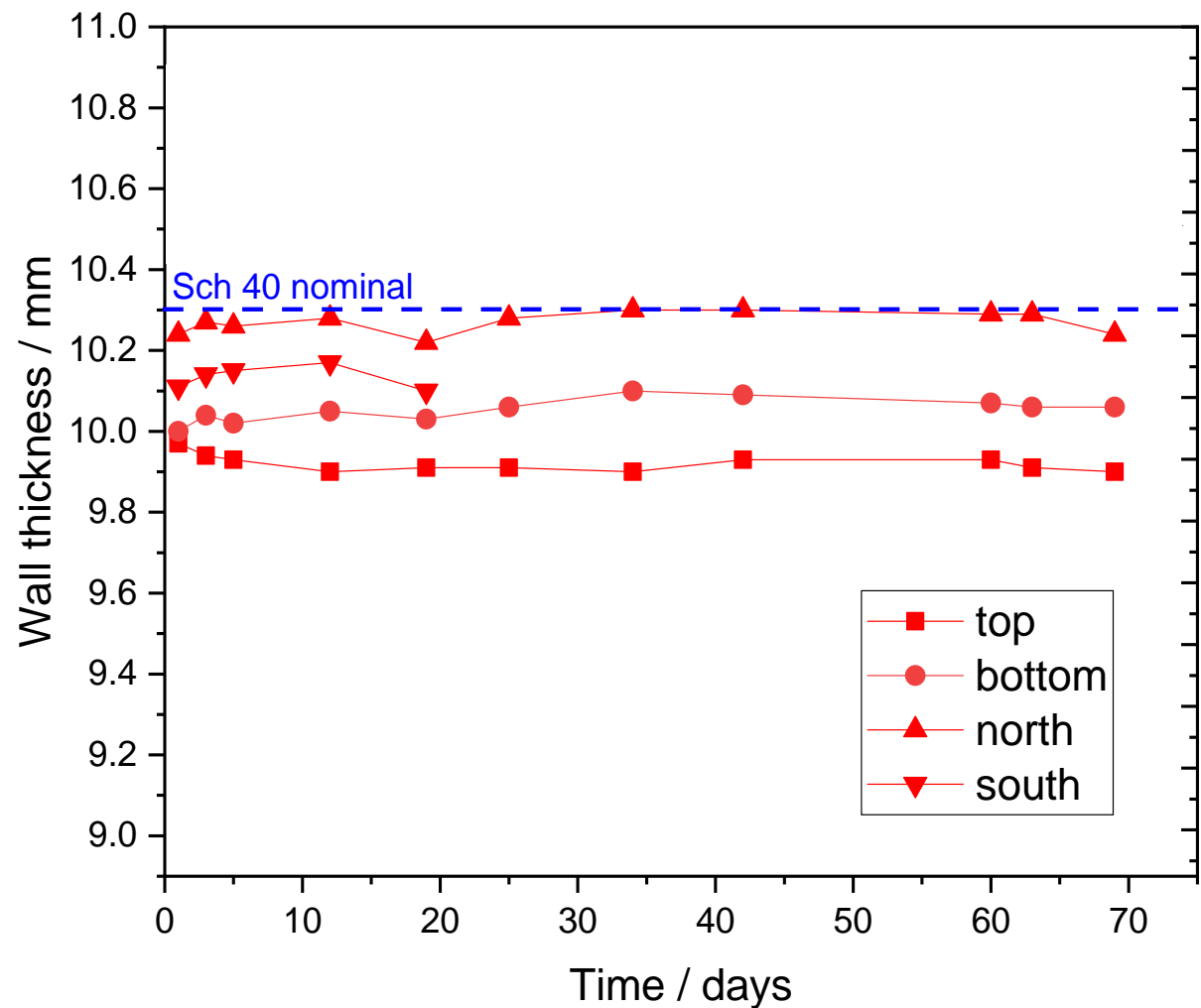


- Ionix HotSense transducer platform
- Inductosense WAND probe and inductively coupled patch

Steam line monitoring (process temperature 230 to 350 °C)



Steam line monitoring (process temperature 230 to 350 °C)



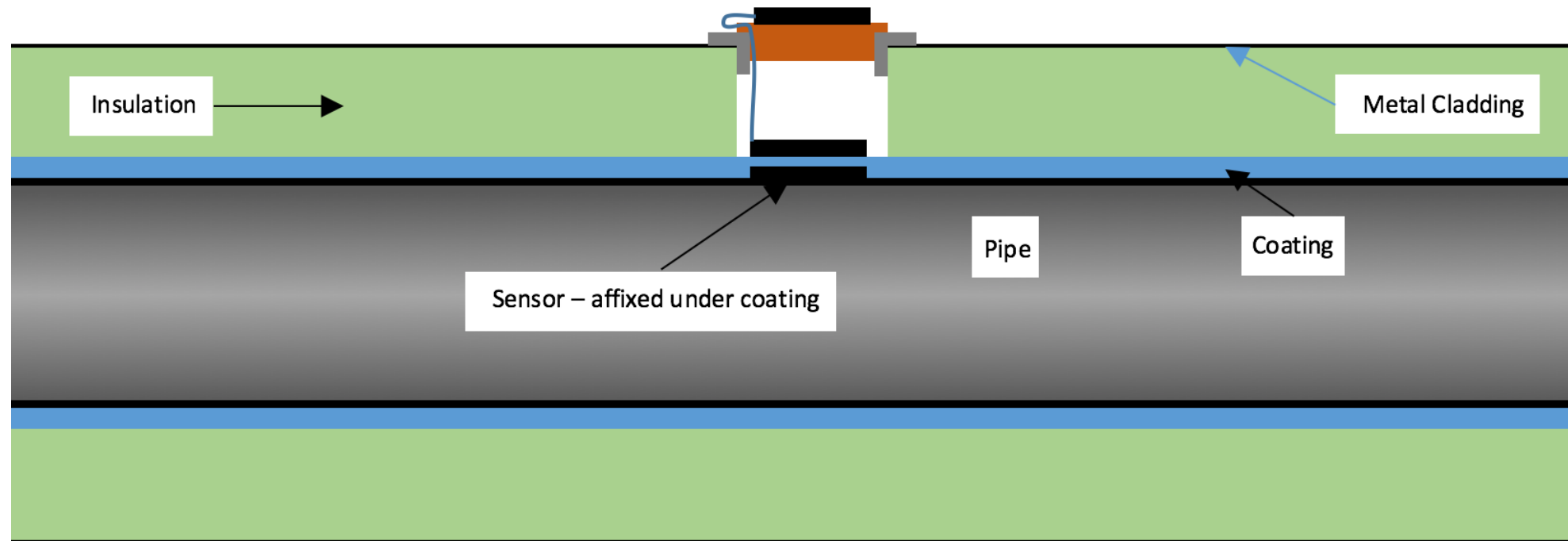
Repeatability

- Good reproducibility shown commensurate with use of installed sensors
- Dynamic temperature compensation

Extendable WAND probe for taking data from sensors at a distance



Intermediate coil solution for thicker insulation or insulation with a metal cladding



Through aluminum honeycomb inspection



Our future products will include additional wireless sensors, data collection solutions and analysis software

Sensors

Range to include:

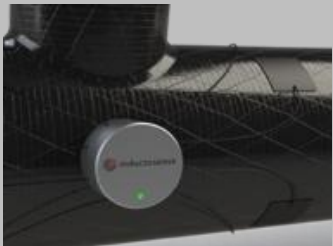
- External corrosion
- Crack detection
- Delamination
- Others



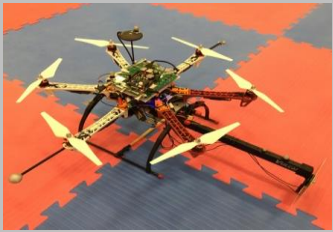
Data Collection



WAND Docking:
Automated upload of data, integration with workflow



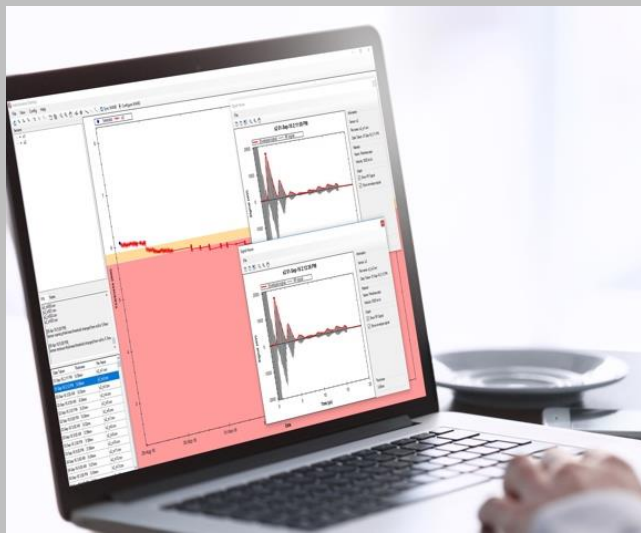
WAND Hub:
Remote data collection IOT module



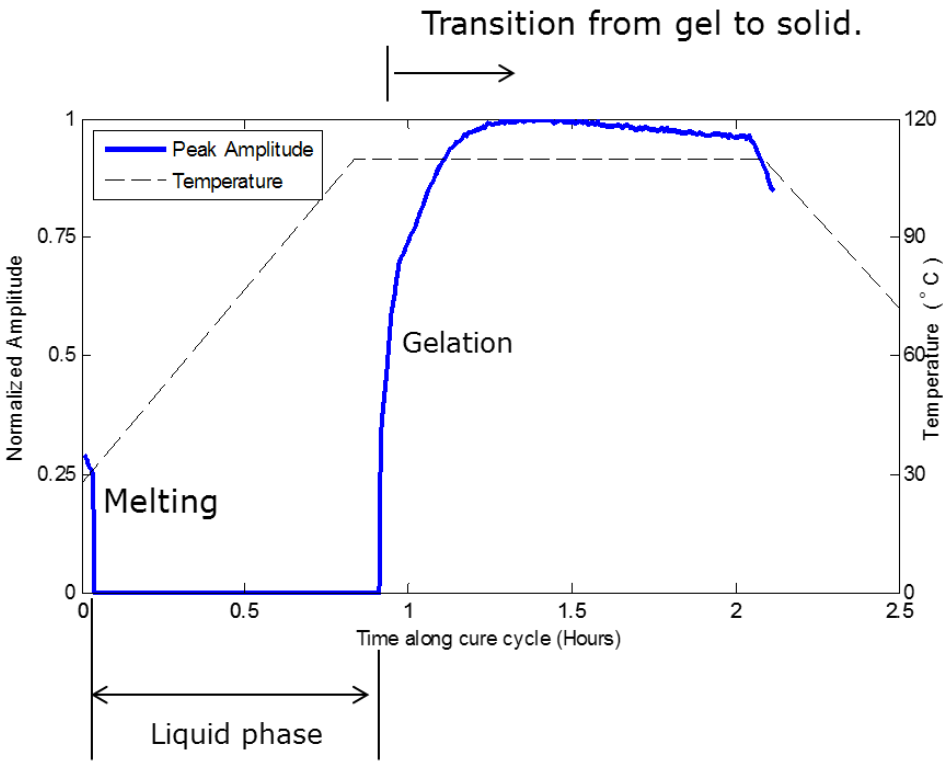
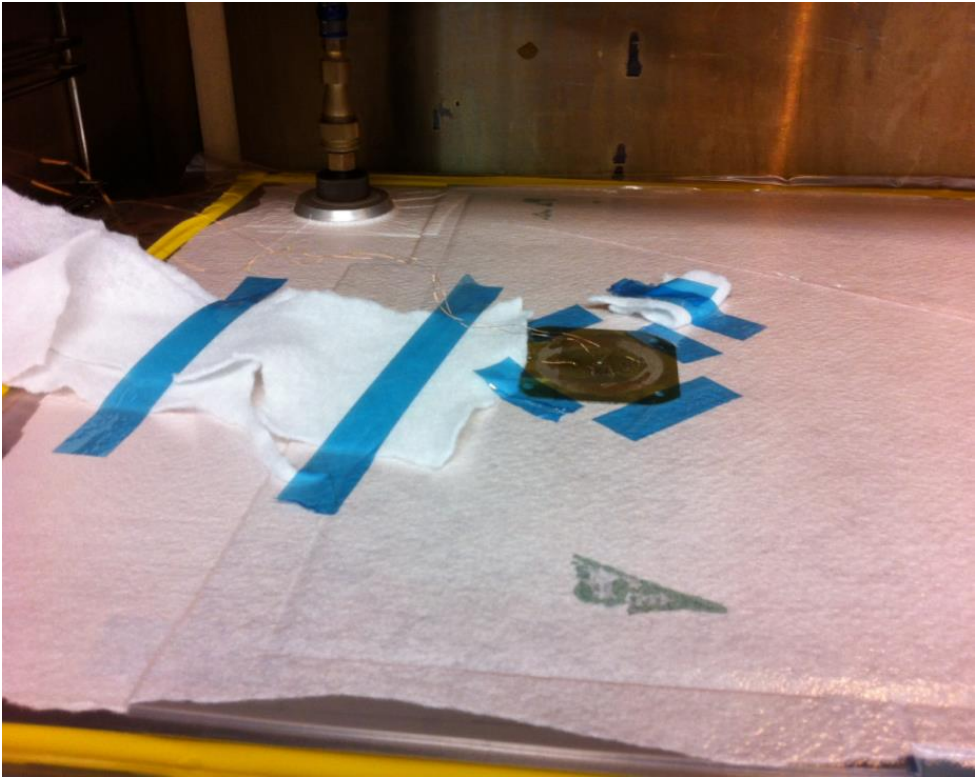
Versatile data collection solutions:
UAV-based and extendable pole

Software

Remote analysis, integration with 3rd party asset management software and predictive maintenance.

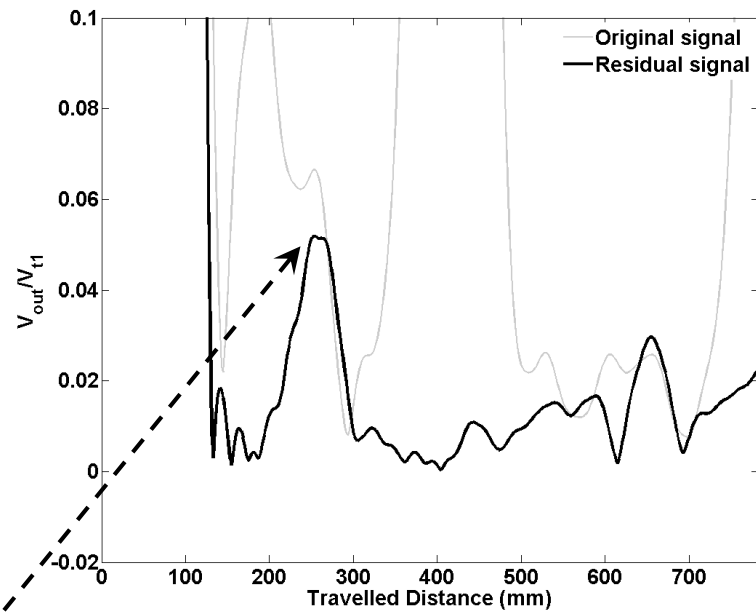
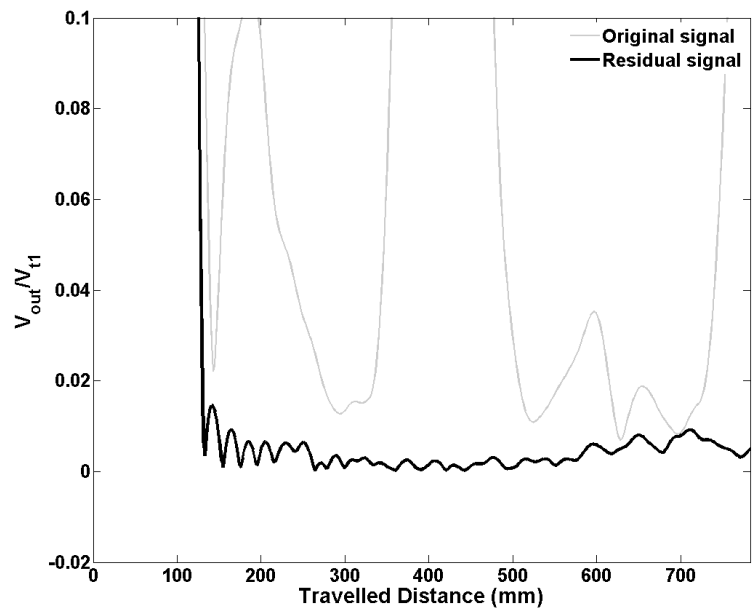
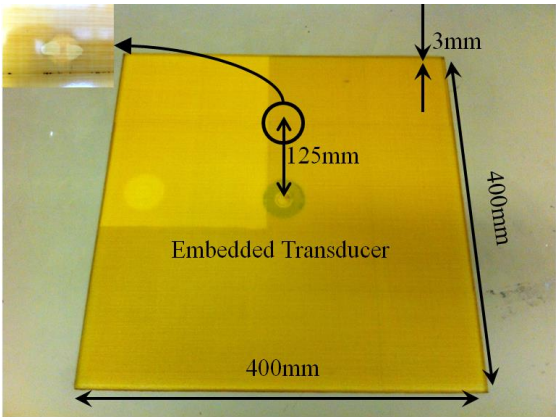


Future products for composites applications



Future products for composites applications

- 10J impact damage detected by embedded sensor
- Model fit with current data leads to potentially 1m radius for inspection



WANDs technology:

- Increased repeatability and reliability over conventional inspection techniques
- Much faster data collection, increased TMLs/day
- Reduced operators hazard / risk from environment
- Reduced inspection overhead, such as scaffolding, bed-space on the asset
- Increased productivity – installation and measurement undertaken in-service
- Maintains signatory compared to autonomous systems