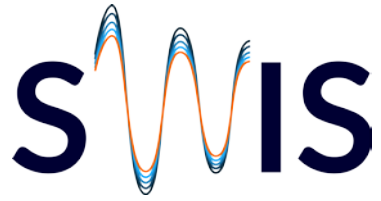


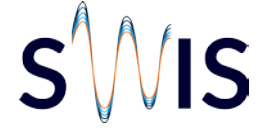
Sound Wave Inspection Systems



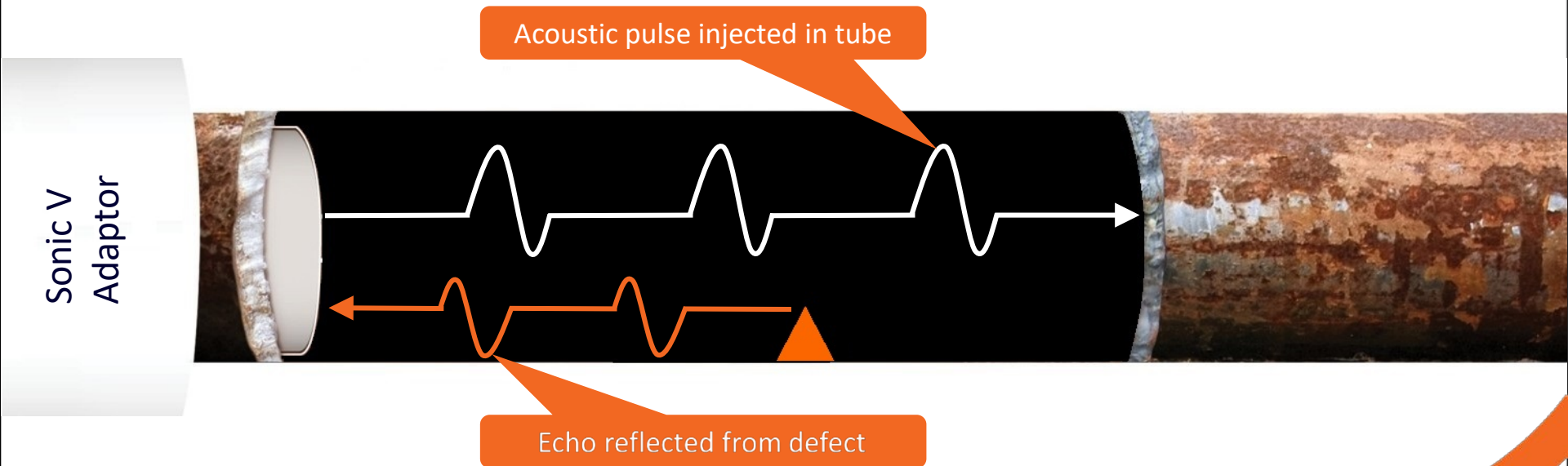
Introducing Sonic V

Fifth generation of Acoustic Pulse Reflectometry technology

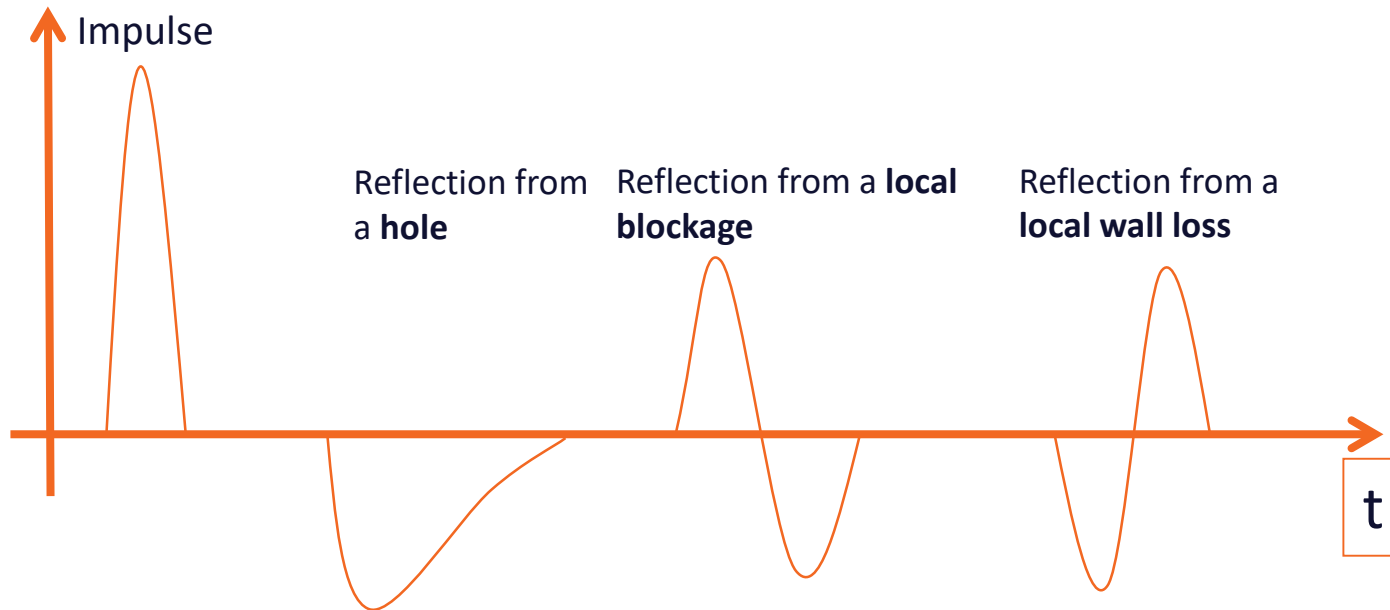
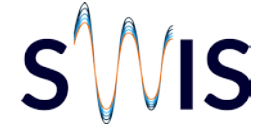
Acoustic Pulse Reflectometry



- Specially formed acoustic pulses are propagated through the air enclosed by tube
- Echoes generated by defects are recorded using cutting edge microphones
- Powerful algorithms are identifying location, type and size of ID defects



APR Signals



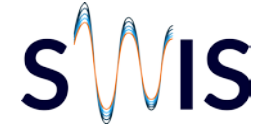
Blockage
deposits, dents,
welding material



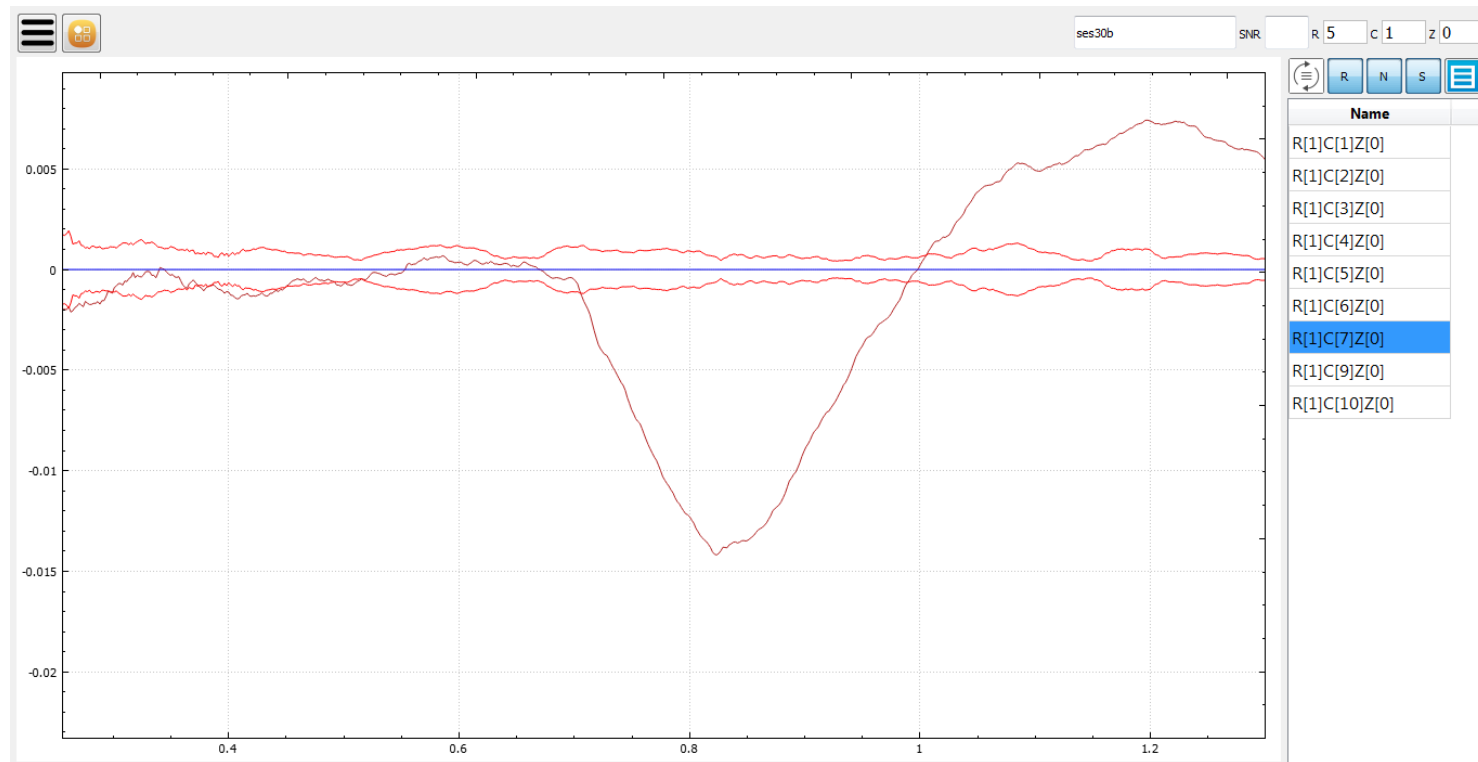
Wall Loss
pitting, erosion



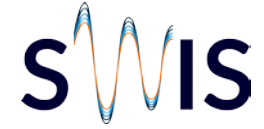
Hole



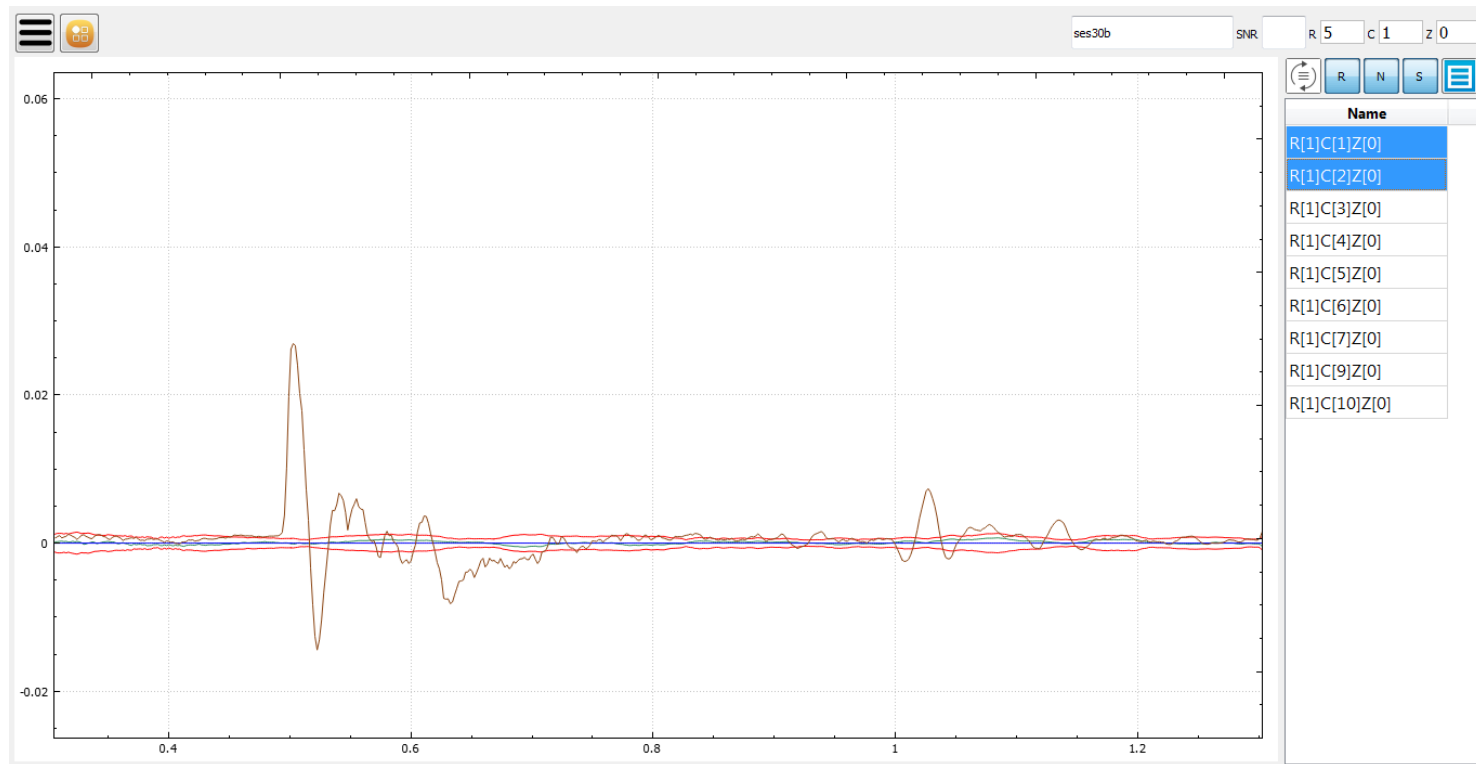
Signature of hole compared to reference and faultless signals



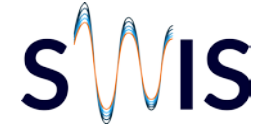
Blockage



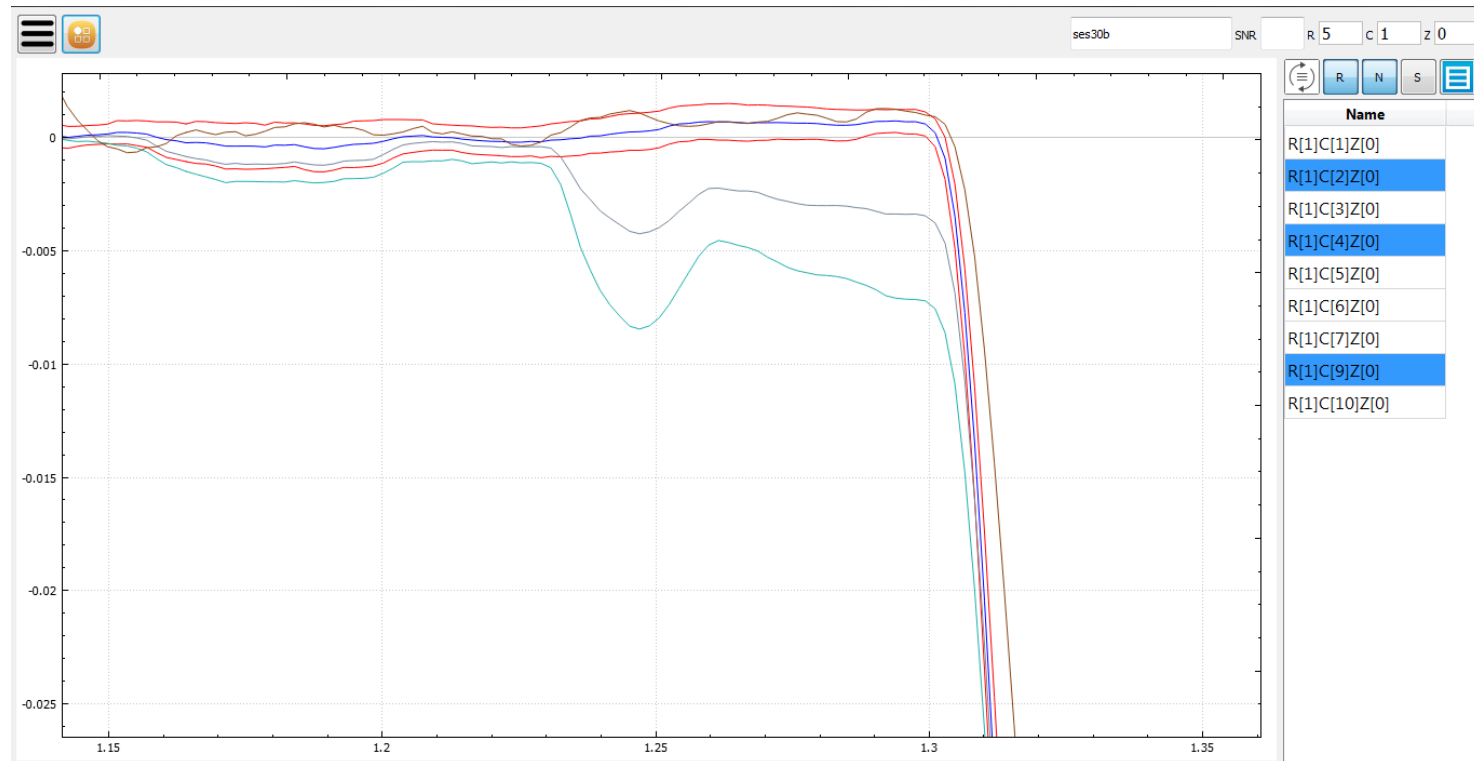
Blockage signal compared to reference and faultless signals



Wall loss



Wall loss signatures near end of the tube compared to reference and faultless signals





APR Advantages

ID defects detection

- Extremely sensitive to holes and blockages/restrictions
- Easy detection of ID wall losses (pitting, erosion)

Practical solution

- Ultra-fast, non-invasive inspection/less than 10 seconds per tube
- No need for inventory of consumable probes or standards
- Easy operation with minimal training

A photograph of an industrial facility at night, featuring a complex network of metal structures, pipes, and scaffolding illuminated by bright lights. The scene is viewed through a semi-circular frame.

APR Limitations

- **No OD defect detection**
- **No crack detection**
- **Sensitive to cleanliness**
 - For leakage detection and blockage detection minimum dry-blowing of tubes in order to blow out dirt
 - For full ID wall loss inspection all dirt / scaling should be removed

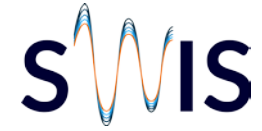
A low-angle, upward-looking photograph of a complex industrial structure at night. Numerous large, metallic pipes are illuminated by bright yellow lights, creating a dense network of vertical and horizontal lines against a dark sky. The pipes are supported by a complex metal framework. In the upper right, a small platform or ladder is visible. The overall scene conveys a sense of scale and industrial complexity.

Applicability

Complete ID coverage of all types of tubes

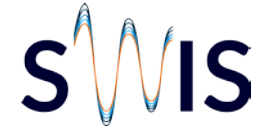
- U-bends, fin-fans, twisted, spiral wound tubes
- Ferromagnetic and non-ferromagnetic metals, graphite and plastics
- ID diameters from 6mm to 50mm
- Up to 20 meters depending on defect size, tube configuration and type

Sonic V Hardware Features



- Completely new, innovative design
- Fits in a small backpack
- Both, battery and electricity operated
- Long battery life
 - 5+ hours on a single charge
 - Battery hot swapping
- No calibration tubes
- No cables
- Two cutting edge microphones
- Touchscreen
- Airline approved
- Extremely fast

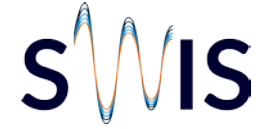
Sonic V Software Features



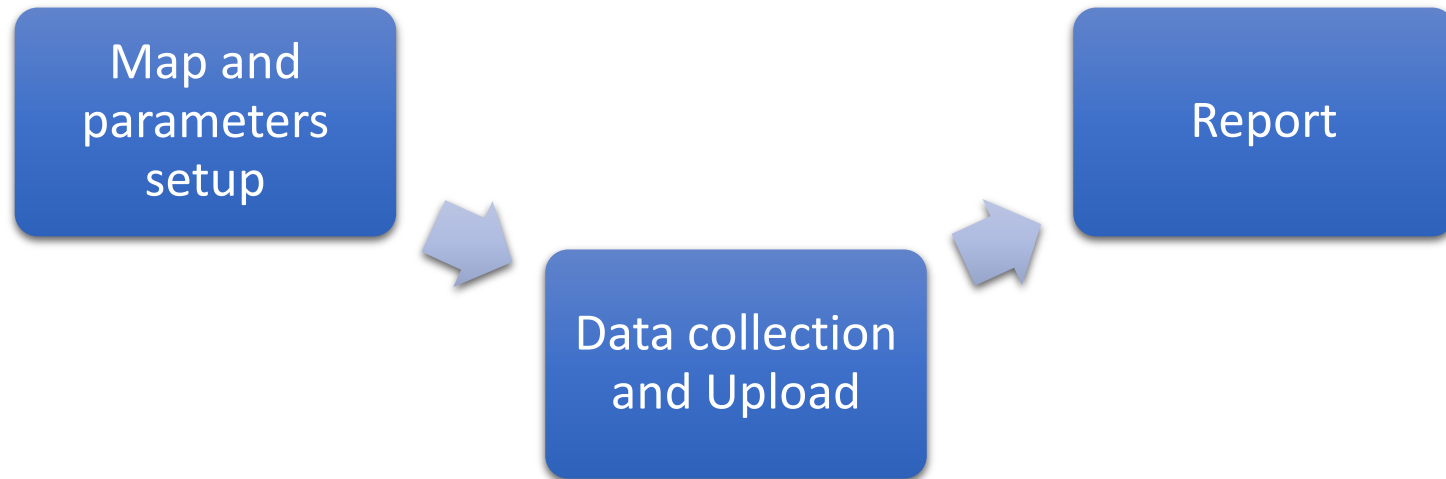
- Effortless mapping process
- User friendly interface
- Automatic session backup
- Data upload directly from Sonic V



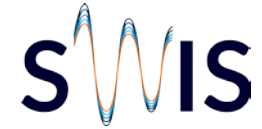
Operation



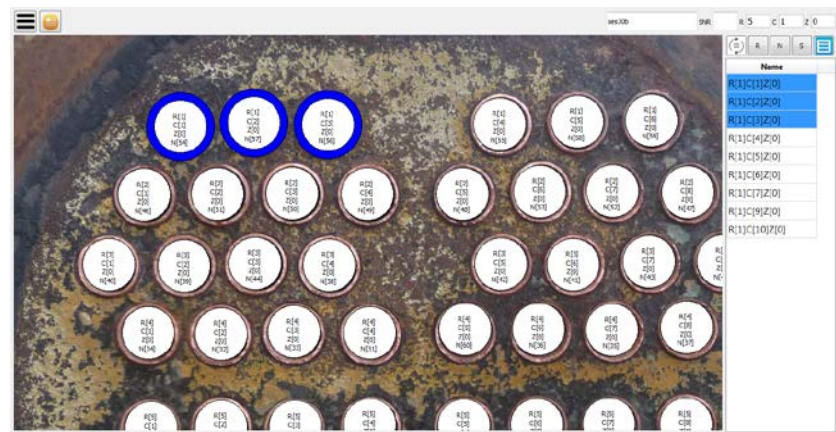
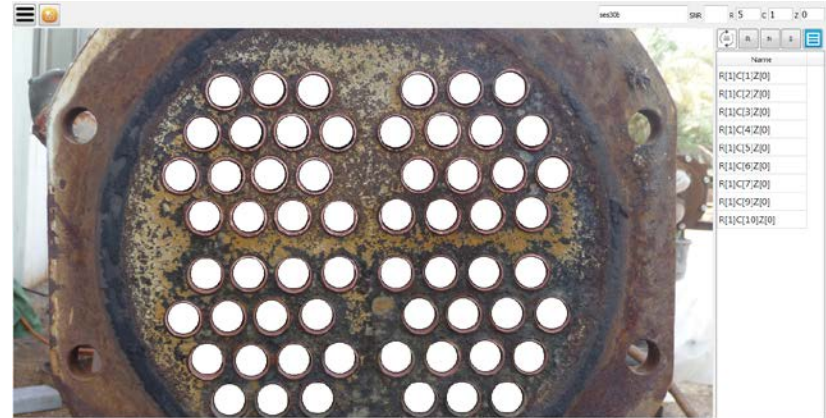
Get the job done in three simple steps



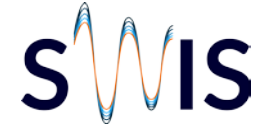
Map and Parameters Setup



- Effortless map creation
 - Using photo, drawing or manually
 - Automatic tube selection and ordering
- Parameters required
 - Length
 - OD diameter
 - Wall thickness
 - Ambient temperature

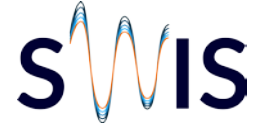


Data Collection and Upload



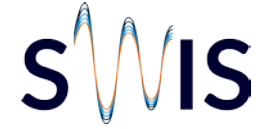
- Hassle-free inspection
 - All information displayed on LCD
 - Easy navigation
 - Bad measurement warnings
- Upload data for analysis using built in tools
 - Directly from the device via Wi-Fi
 - Using USB thumb drive and dedicated software

Report



- Get the top quality final reports within max 24h
- Analysis done by the most experienced analysts
- Report designed according to industry standards

Package Contents



- Protective backpack
- Two battery sets
- Charger
- Adaptors (6mm-50mm)
- Windows/Linux/Android software for easy setup

A photograph of a large industrial facility, likely a refinery or chemical plant, at night. The structure is illuminated by numerous bright yellow lights, creating a high-contrast scene. The facility features complex piping, scaffolding, and large cylindrical storage tanks. The sky is dark, and the overall atmosphere is one of industrial activity.

Industries

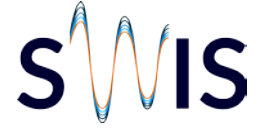
- Oil & Gas (refineries, fuel processing)
- Power generation utilities
- Petrochemicals, chemicals
- Food and beverage
- Air conditioning (HVAC)
- Pulp and paper
- Tube cleaning QA

Standards

- **ASTM** international approved standard ASTM E2906 / E2906M – 13
 - Standard Practice for Acoustic Pulse Reflectometry Examination of Tube Bundles
- **ASME** standard
 - 2015 Boiler & Pressure Vessel codebook article 18, book V (five)



Summary



- Ultra-fast speed
 - Significantly faster than conventional inspection techniques
 - Less than 10 seconds per tube
- Ease of use
 - Single operator inspection
 - Consistent, repeatable results
 - Battery operated
 - Mobility, whole system fits in a small backpack
- Full coverage
 - Any shape (u-bends, “S” shape, twisted)
 - Any material (ferromagnetic, non-ferromagnetic)
 - Up to 50mm ID



Thank you

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