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Welcome!
“NDT Applications” Webinar Series

December 9, 2021

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Educational Materials Developer. ASNT

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NDT Simulators: Safe Hands-On Training Anywhere

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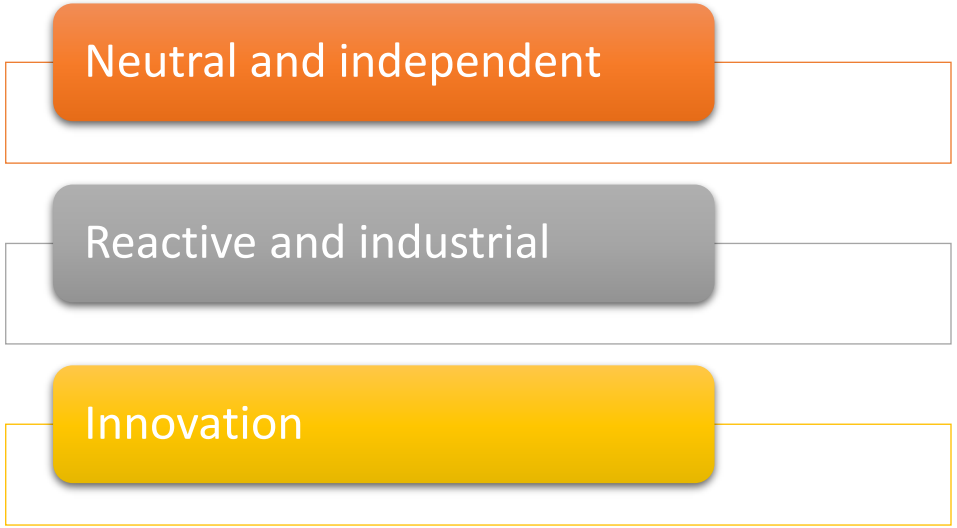
OUR MISSION at EXTENDE

- We believe that **high quality** and **innovative Non Destructive Evaluation (NDE)** will make our world a safer place and will help preserve the environment
- Therefore, our mission is to bring the benefits of **Simulation, innovative tools** and **NDE Development Methodology** to the NDE Community



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Definitions from Merriam-Wester

Definition of *simulator*

: one that simulates especially **:** a device that enables the operator to reproduce or represent under test conditions phenomena likely to occur in actual performance

Examples of *simulator* in a Sentence

a flight *simulator* used by pilots

Time for a Poll on Simulators

What is an NDT simulator and why do we care?

How does an NDT Simulator Work?

1. UT Simulator
2. RT Simulator

Benefits of an NDT Simulator

TRAINING:

- Each student can inspect the same part simultaneously
- Simulators can add training tools not available with real parts, such as superimposed image of flaw to detect
- Less mock-ups: **Saves money and storage space**

PRACTICE:

- Hands on calibration (where applicable) and inspection of parts with flaws
- Multiple virtual parts in one portable unit
- Increase practice time and number of cases studied

TEST:

- By customizing test pieces, including flaw size, shape and location, it may be possible to test proficiency on a simulator

SAFETY:

- Avoid lifting and handling of heavy parts
- Avoid exposure to radiation and other hazard

Where does simulator data come from?

EXPERIMENTAL DATA

- UT scan or x-ray of each position to be evaluated
- Data from not only optimal but sub-optimal setups

Advantage: very realistic data

Disadvantages: time consuming data acquisition and costly

SIMULATED DATA

- Simulation of each UT scan or x-ray position to be evaluated
- Data from both optimal and sub-optimal setups

Advantage: quick data acquisition of many scenarios

Disadvantages: does not account for real life variations in electrical signal

What is in a UT Simulator?

VIRTUAL INSPECTION TOOL (test piece image on touch screen)

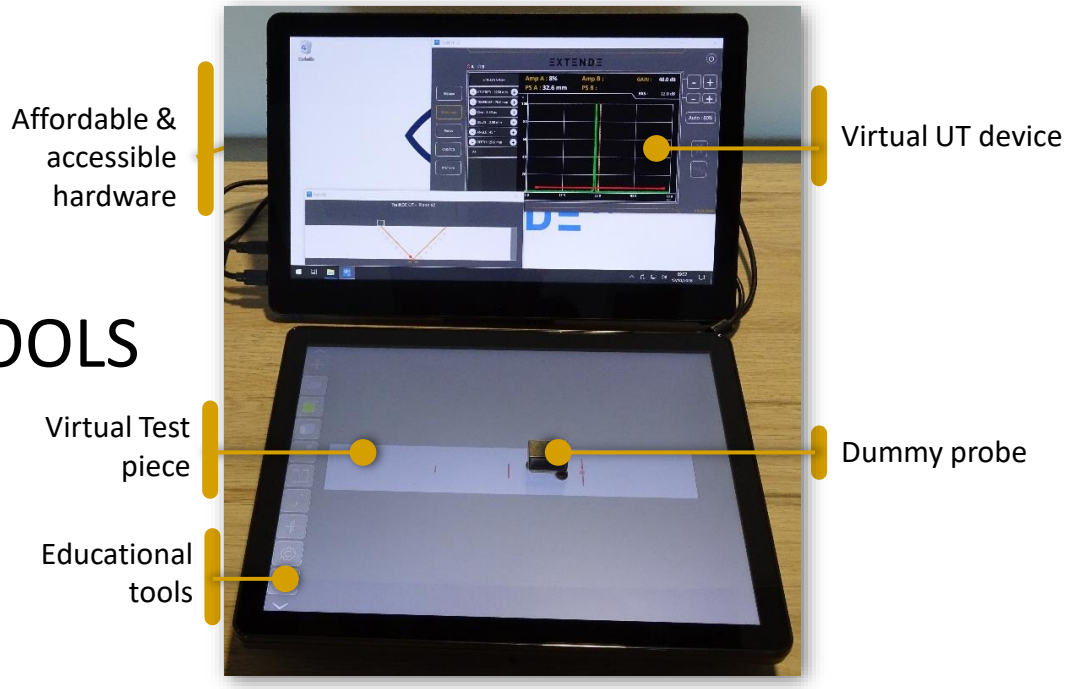
- Dummy probe localized on the screen
- Real time UT signal

APPLICATIONS

- Calibration and sensitivity blocks
- Plates
- Welds

VISUALIZATION & EDUCATIONAL TOOLS

- Side view with sound path visualization
- Covered area mapping
- Flaw visibility on or off



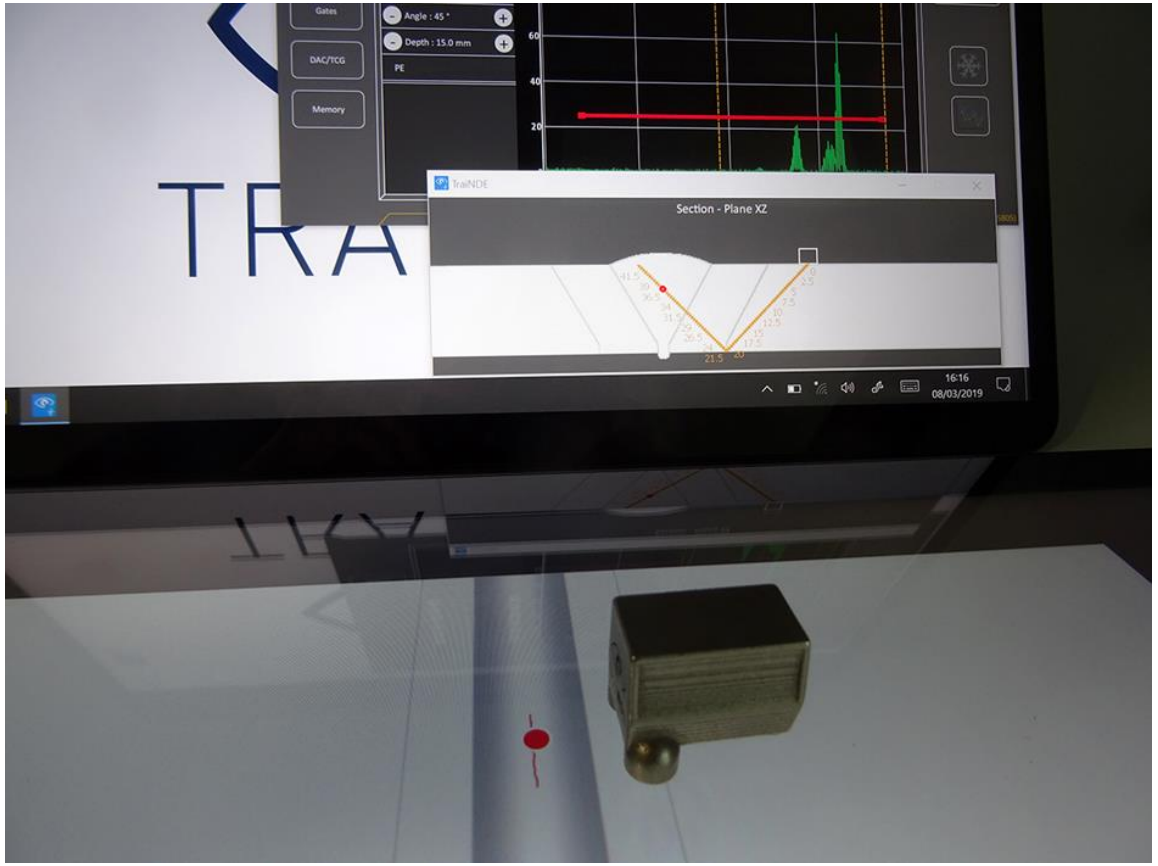
UT Simulator

TEACH

- Setup and calibration
- Physics of UT with sound path sideview visualization
- Effects of probe skew
- Detection of flaws

EVALUATE

- Probe skew
- Zone coverage
- Flaw detection and sizing
- Use of gates



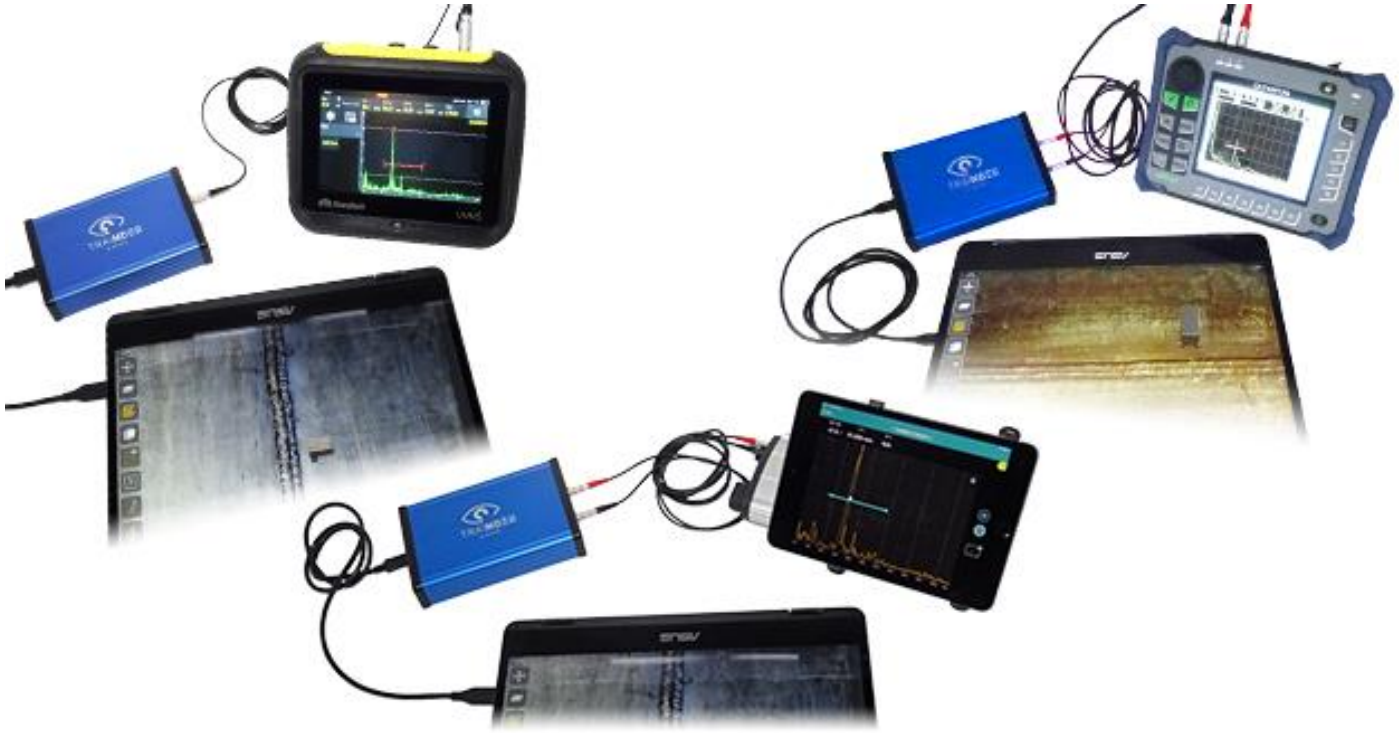
UT Simulator with Device Connected

TEACH

- Practice the controls on a real UT Scope include:
  - Gain
  - Gates
  - Calibration

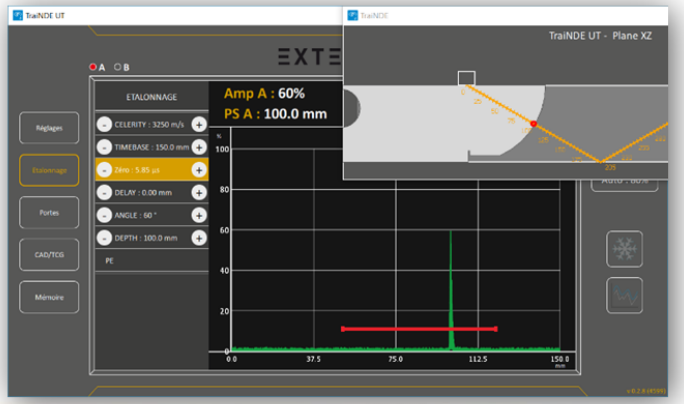
DEMONSTRATE

- Show how equipment works without heavy test blocks



The Benefits of a UT Simulator

- Fast and easy to set-up, saves time **and reduces costs** vs purchasing/renting systems, probes, tests blocks, calibration, consumable items…
- Low hardware cost (basic laptop and touch screen) which don't need periodic calibrations,
- **Increase practice time** and number of studied cases,
- **Realistic** handling (skew) and signal (noise),
- The teacher can show while trainees **work in parallel** on the same cases,
- Easy to transport (all included),
- "See the invisible", understand, learn with the embedded **educational tools.**



What is an RT Simulator?

Software

Virtual Reality

RT CONTROL SIMULATOR IN VIRTUAL REALITY

- Includes the entire radiographic setup
- X-ray and gamma sources
- Incorporates simulated images from databases for the most common techniques
- Displays the image corresponding to user-defined parameters, as well as a report of the RT shot and potential mistakes.

RT Simulator

TEACH

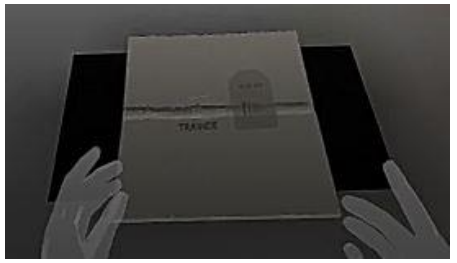
- Setup including distance, angle etc.
- Effects of energy level
- Effects of exposure time

EVALUATE

- Quality level of radiograph
- Coverage of area of interest
- Flaw detection and sizing

The Benefits of an RT Simulator

- Enables **drastically increasing the number of shots** per trainee without fear of mistakes for better training
- No **radiation protection** issues 
- No conflict if the real source is needed onsite during the training course



- **Multiplication of the number of trainees** who can perform RT shots simultaneously
- Easy to carry
- See the invisible, understand, learn with **embedded educational tools**
- helps to **improve NDT exams preparation** for better success rate !

Thank You!

Any Questions?

Additional Resources

https://blog.asnt.org/high-tech-hands-on-training-the-evolution-of-nondestructive-training-simulators/

https://trainde.extende.com/

Thank you for participating!

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