NDTiC 2023

The Benefits of NDT Training Simulators

Presented By:
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Definitions from Merriam-Webster

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

Example of *simulator* in a Sentence

a flight simulator used by pilots

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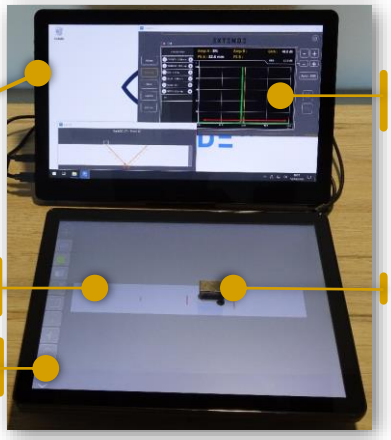
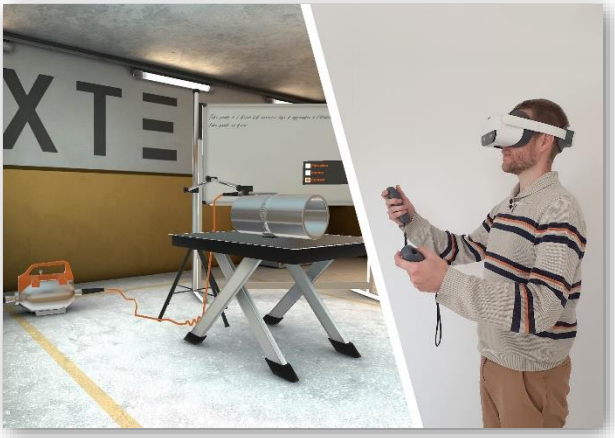
What is an NDT simulator? Why do we care?

How does an NDT Simulator Work?

UT Simulator



RT Simulator



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

Disadvantage: time consuming data acquisition which is costly

SIMULATED DATA

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

Advantage: fast data acquisition of many scenarios

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

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Training and Proficiency Challenges

- Limited Test Pieces
- Safe Access to Equipment
- Limits of Performance Evaluations
- Limited Trainers

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Training and Proficiency Challenges: Limited Test Pieces

- Can be expensive
- Requires extensive storage space
- May require special equipment for handling
- Only one student can utilize a piece at a time

Benefits of Simulators

- Multiple trainees can perform inspections at once
- Easy to switch from setup of one piece to another
- Increases the number of inspections per trainee

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Training and Proficiency Challenges: Safe Access to Equipment

- Limited number of x-ray and scopes per company
- Limited choice of x-ray levels or gamma sources
- Safety courses required before handling radioactive materials
- Risk of environmental and field conditions

Benefits of Simulators

- No conflict if the source or scope is needed onsite
- New hires can start hands on training on day 1
- Virtual sources options make ALARA = Zero

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Training and Proficiency Challenges: Limits of Performance Evaluation

- Instructor has to observe the inspection to give feedback
- Accuracy is based on the experience of the instructor
- Training hours limited to instructor's availability and manufacturing schedule

Benefits of Simulators

- Setup and inspection parameters can be automatically analysed and document in a report
- Training can be preformed without instructor present
- Users can get immediate feedback from the simulator

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Training and Proficiency Challenges: Limits of Performance Evaluation

TRAINDE

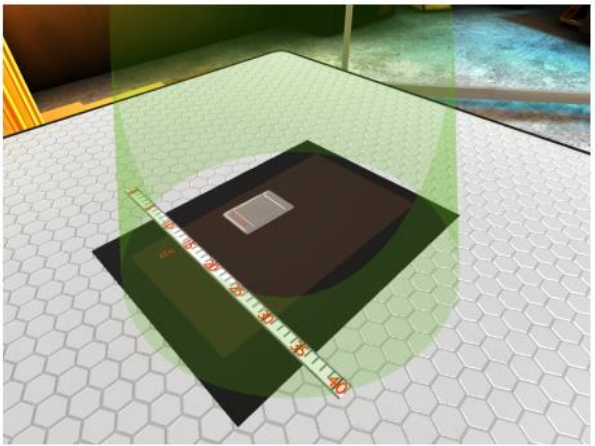
Errors report

Well positioned marker.

IQI

10 AL EN selected
Correct choice of IQI
Correct IQI orientation

Screenshots



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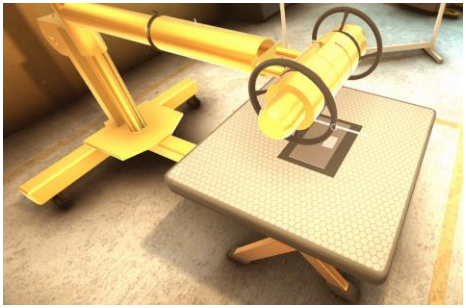
Training and Proficiency Challenges: Limited Trainers

- Aging workforce
- Pressing work schedules
- Lack of new proficient inspectors



Benefits of Simulators

- Predefined training sessions can be created
- Provides immediate feedback while trainer is not present
- Creates a learn at your own pace environment

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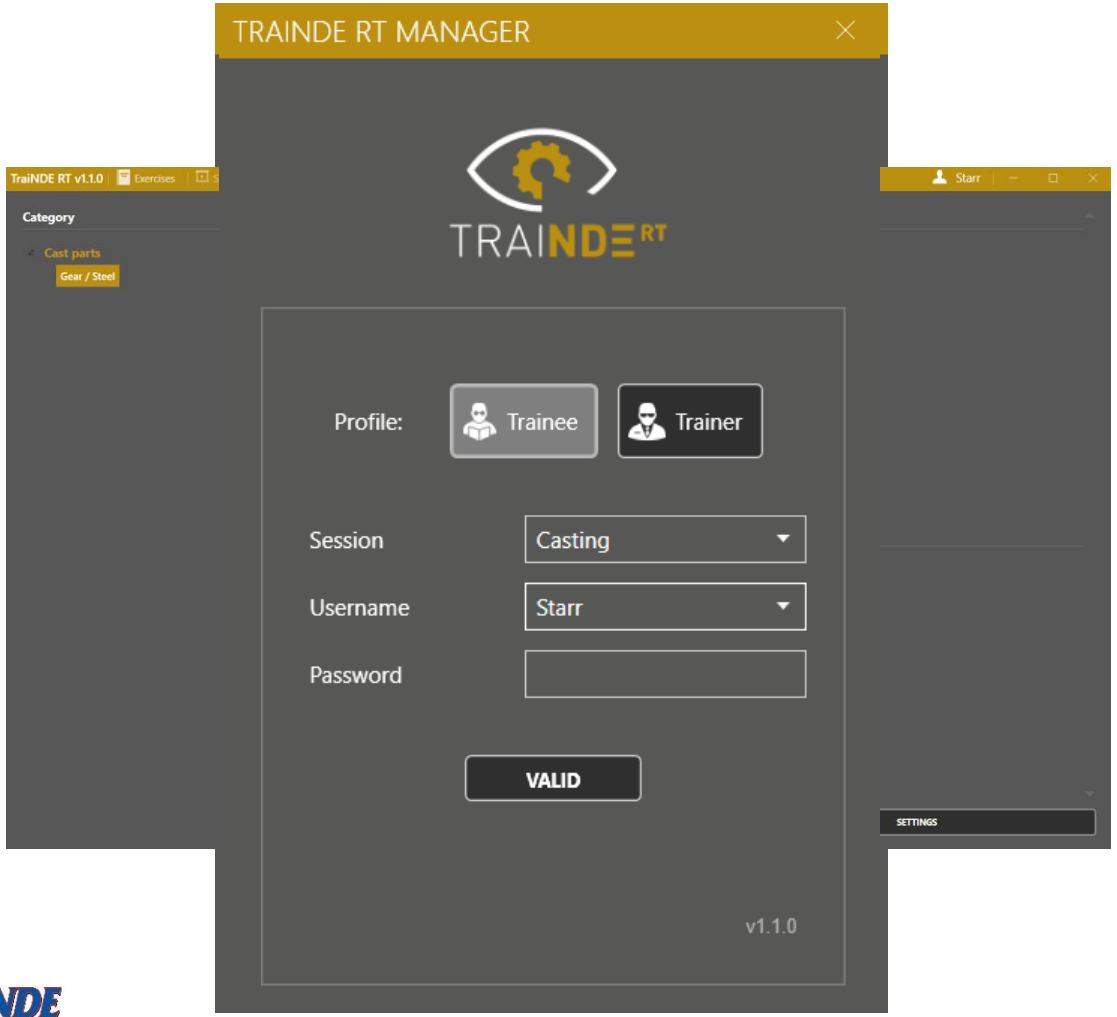

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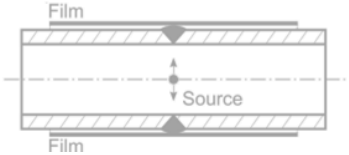
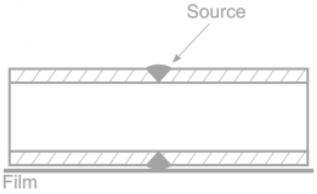
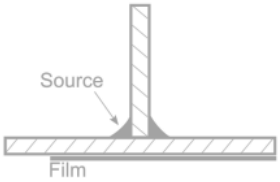
TRAINDERT

The Benefits of an RT Simulator

- **Increases the number of shots** per trainee safely
- No conflict if the real source is needed during training
- Perform RT shots simultaneously
- See the invisible, with **embedded educational tools**
- No **radiation protection** issues
- Easy to transport
- Receive **immediate feedback** about potential mistakes
- **Improves NDT exam prep** for a better success rate!







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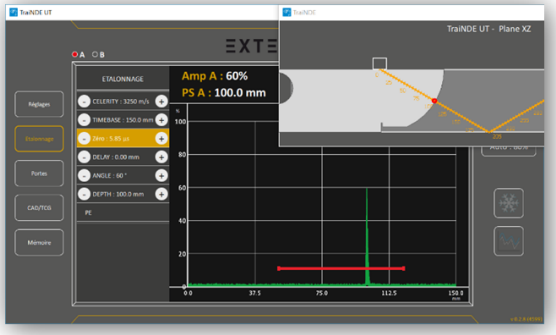
The Benefits of a UT Simulator

- Fast and easy to set-up
- Saves time and **reduces costs**
- Small initial investment
- **Increases practice time** and number of studied cases
- **Realistic** handling (skew) and signal (noise)
- **Work simultaneously** on the same exercise
- Easy to transport (all included)
- "See the invisible" with the embedded **educational tools**



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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 the flaws on the test piece
- 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
- Increases practice time and number of cases studied

TEST:

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

SAFETY:

- Avoid lifting and handling heavy parts
- Avoid exposure to radiation and other hazards

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Thank you!

Questions?

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Additional Resources

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

https://trainde.extende.com/

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