

COMPOSITE PROPELLER INSPECTION

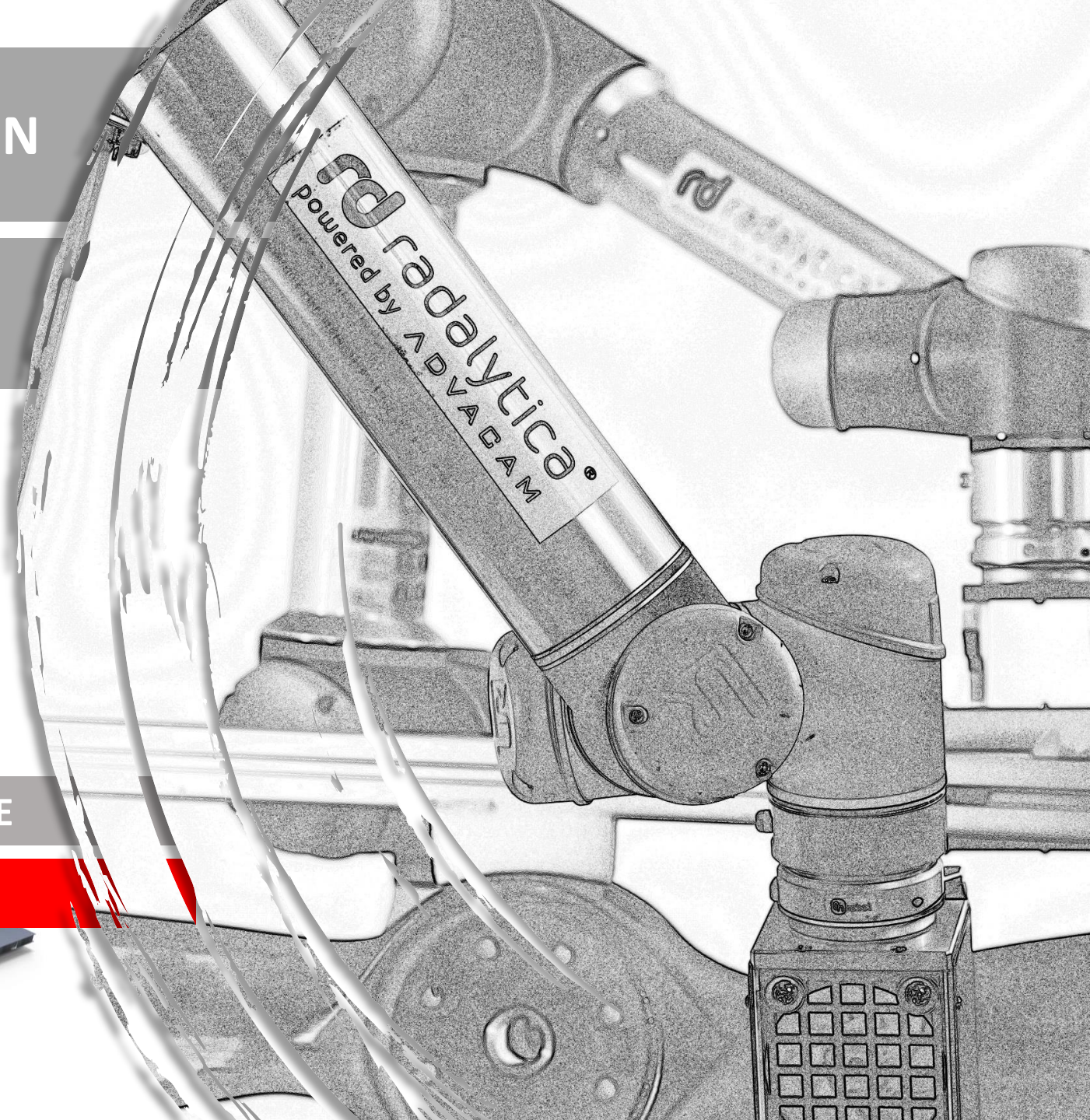
RADALYTICA a.s.



AEROSPACE

CASE STUDY

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CASE DESCRIPTION: COMPOSITE PROPELLERS QUALITY INSPECTION

ONE SOLUTION

Quality/condition must be checked:

- During production
- After production
- Periodically during life time
- After any collision

Used methods:

- Robotic X-Ray 2D scanning
- Robotic X-Ray computed tomography
- Air-coupled ultrasonic inspection
- Robotic laser 3D profiler



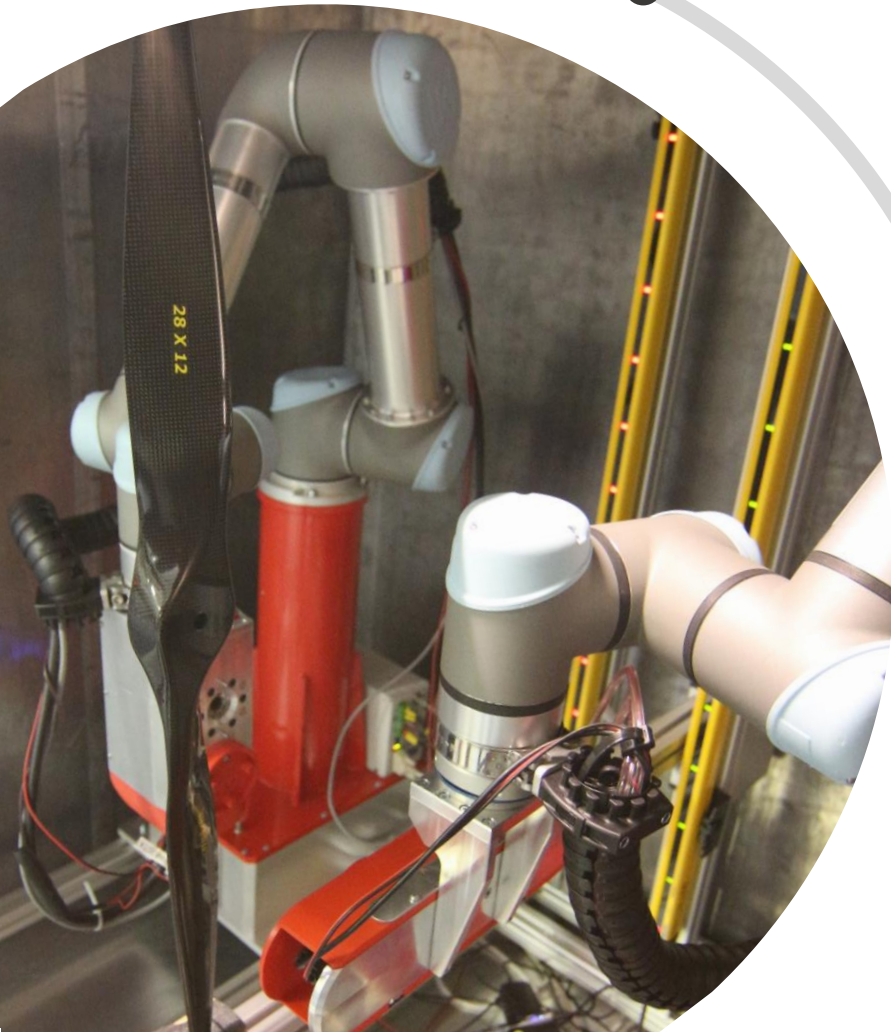
RadalyX - Robotic Imaging System

ROBOTIC IMAGING SYSTEM

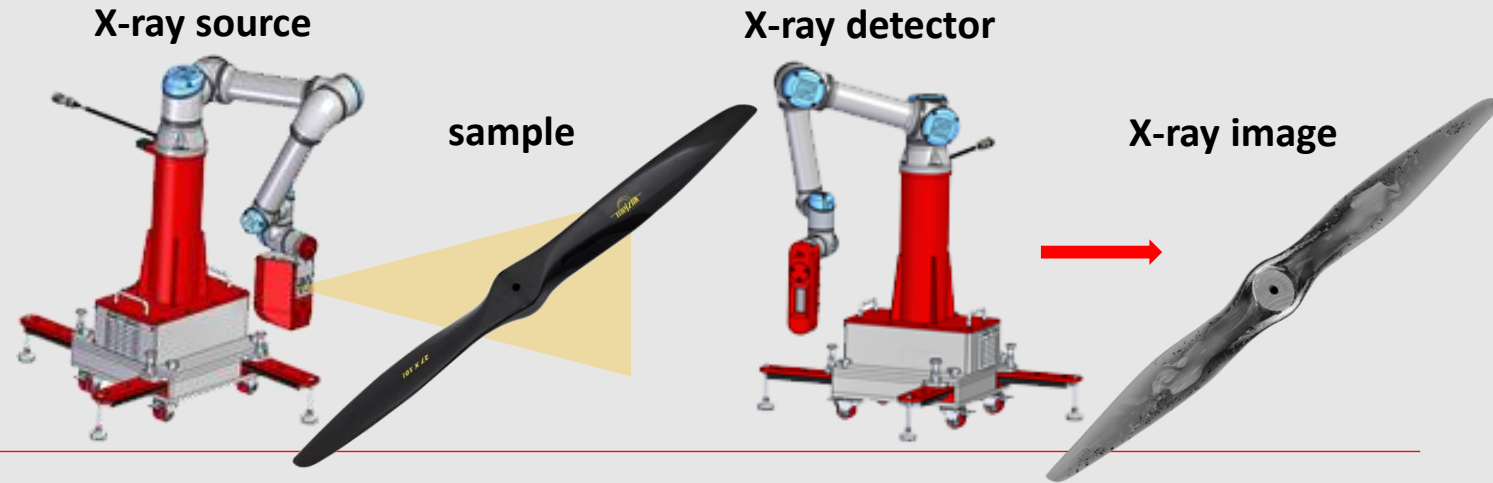
A high-performance platform that is able to combine several imaging techniques.

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RadalyX



The key parts of the scanner are two six-axis robotic arms. The first arm holds an X-ray tube, the second arm holds an imaging detector.



The collaborative robots can move and rotate freely about the sample by precise synchronized movement and provides almost absolute flexibility of viewing angles.

RadalyX allows to measure 3D images using computed tomography or laminography even in the selected area of large object.

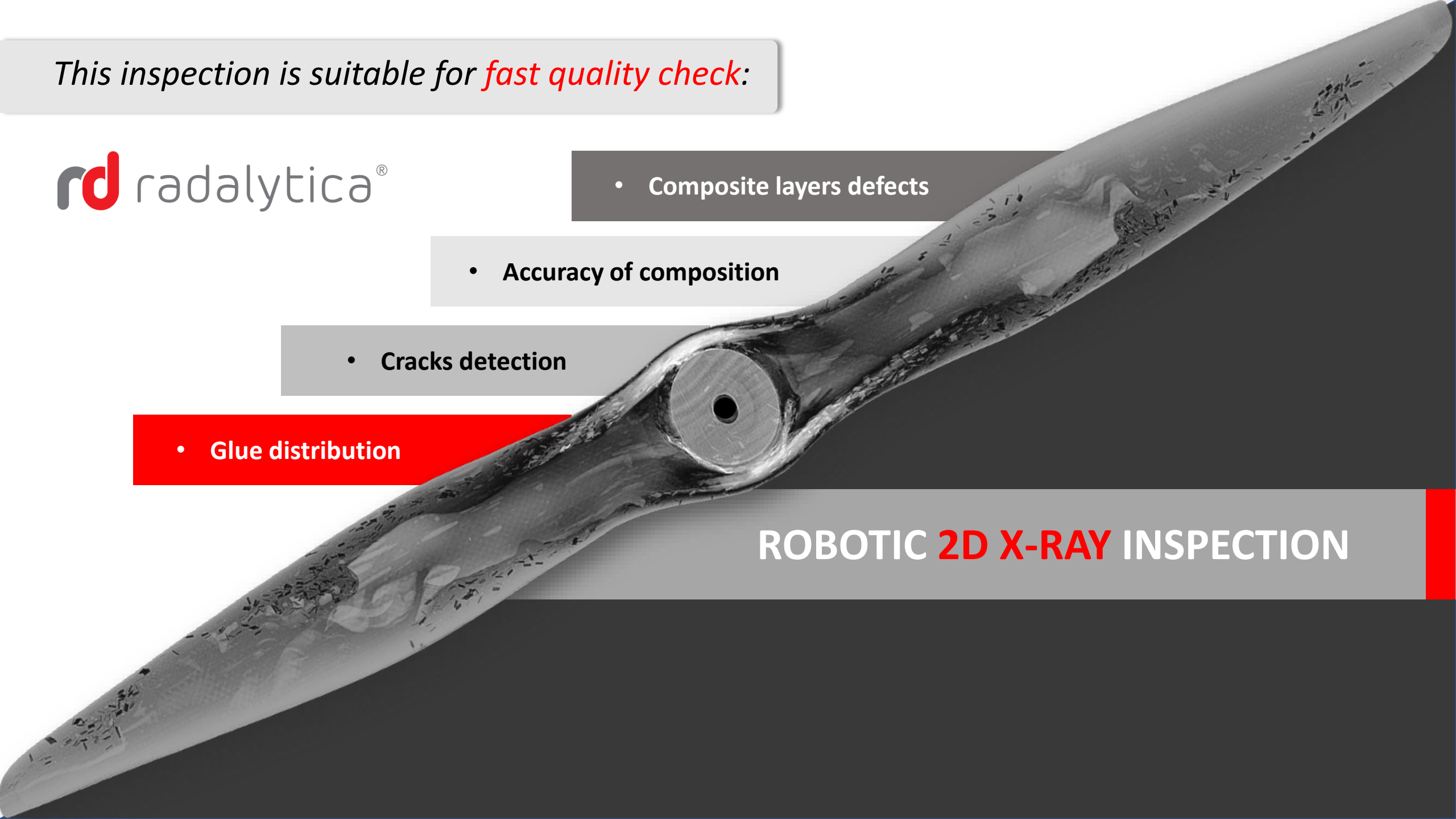
Innovative modular platform is able to combine several imaging techniques such as X-rays, computed tomography, ultrasound, surface profiling, etc.

This inspection is suitable for *fast quality check*:

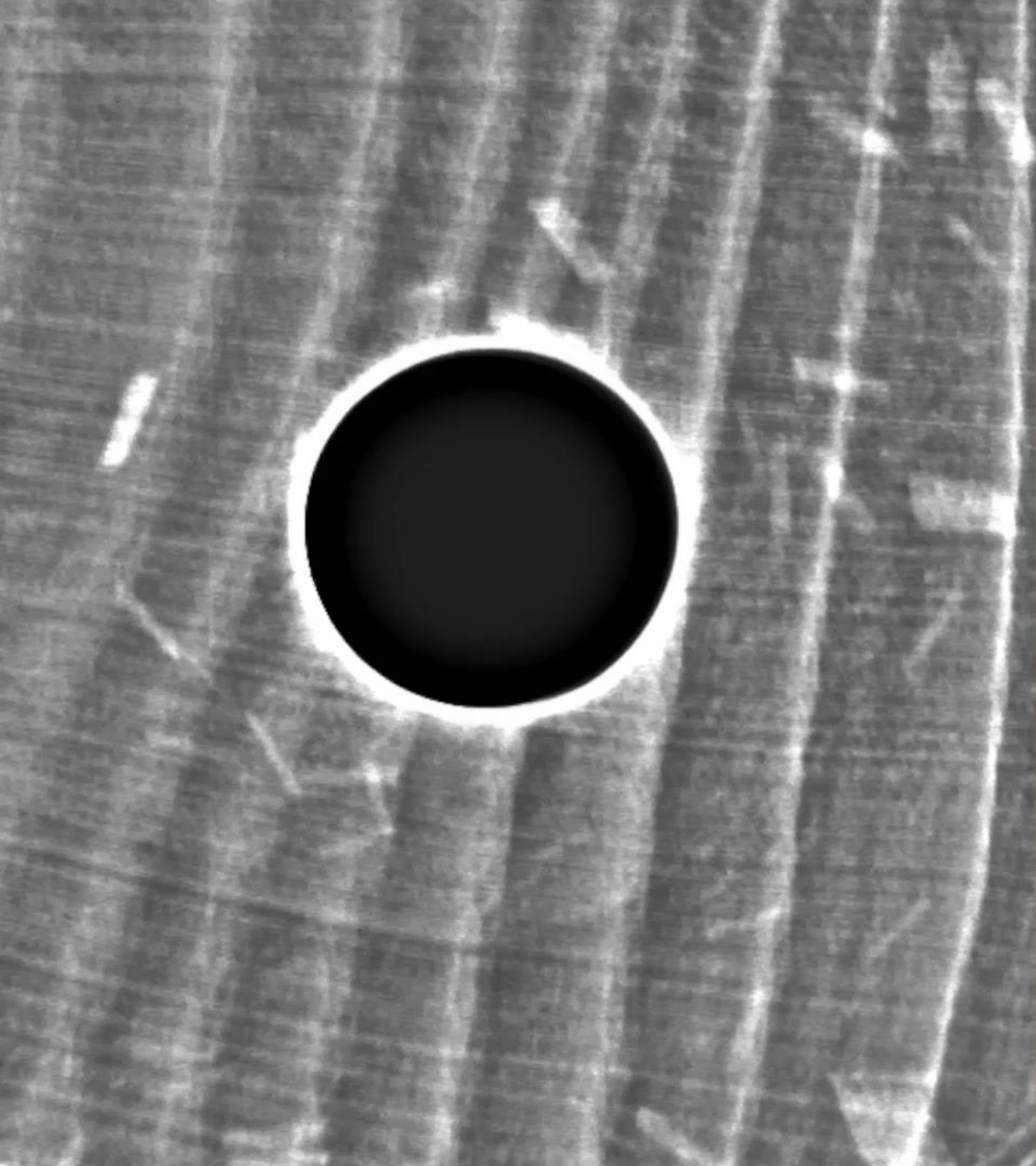
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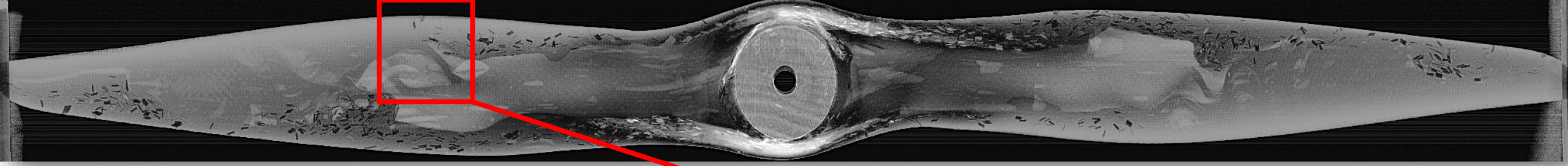
- Composite layers defects
- Accuracy of composition
- Cracks detection
- Glue distribution

ROBOTIC **2D X-RAY** INSPECTION

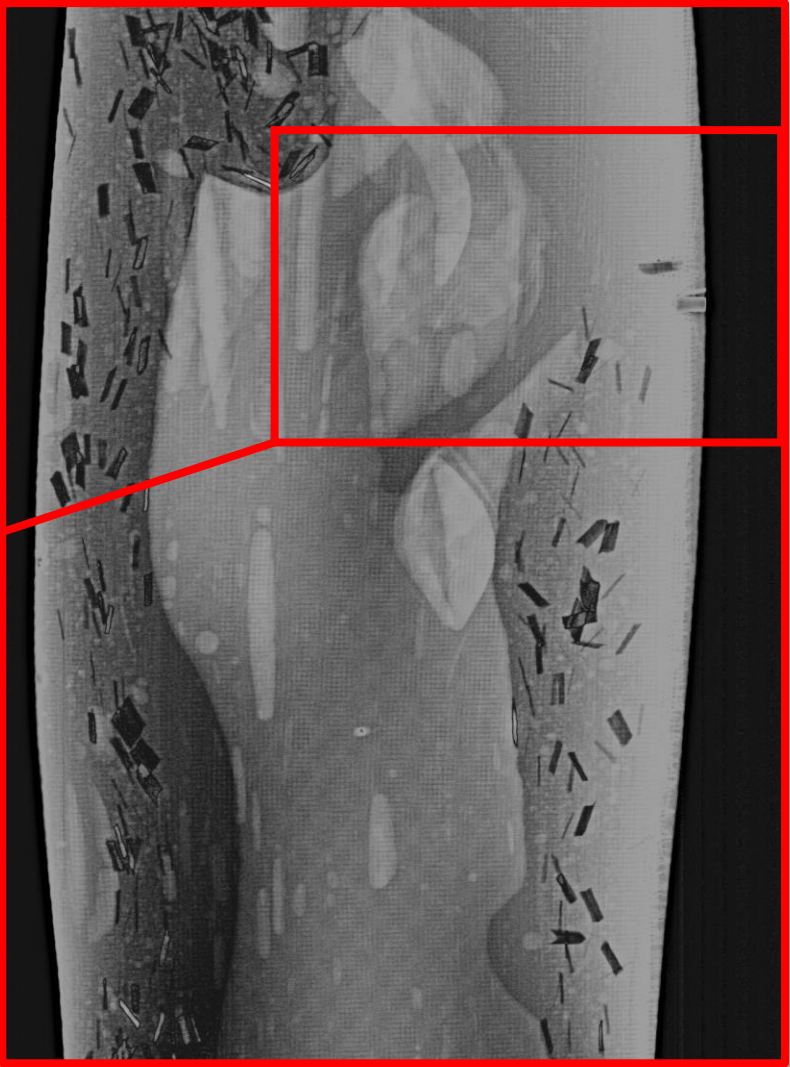
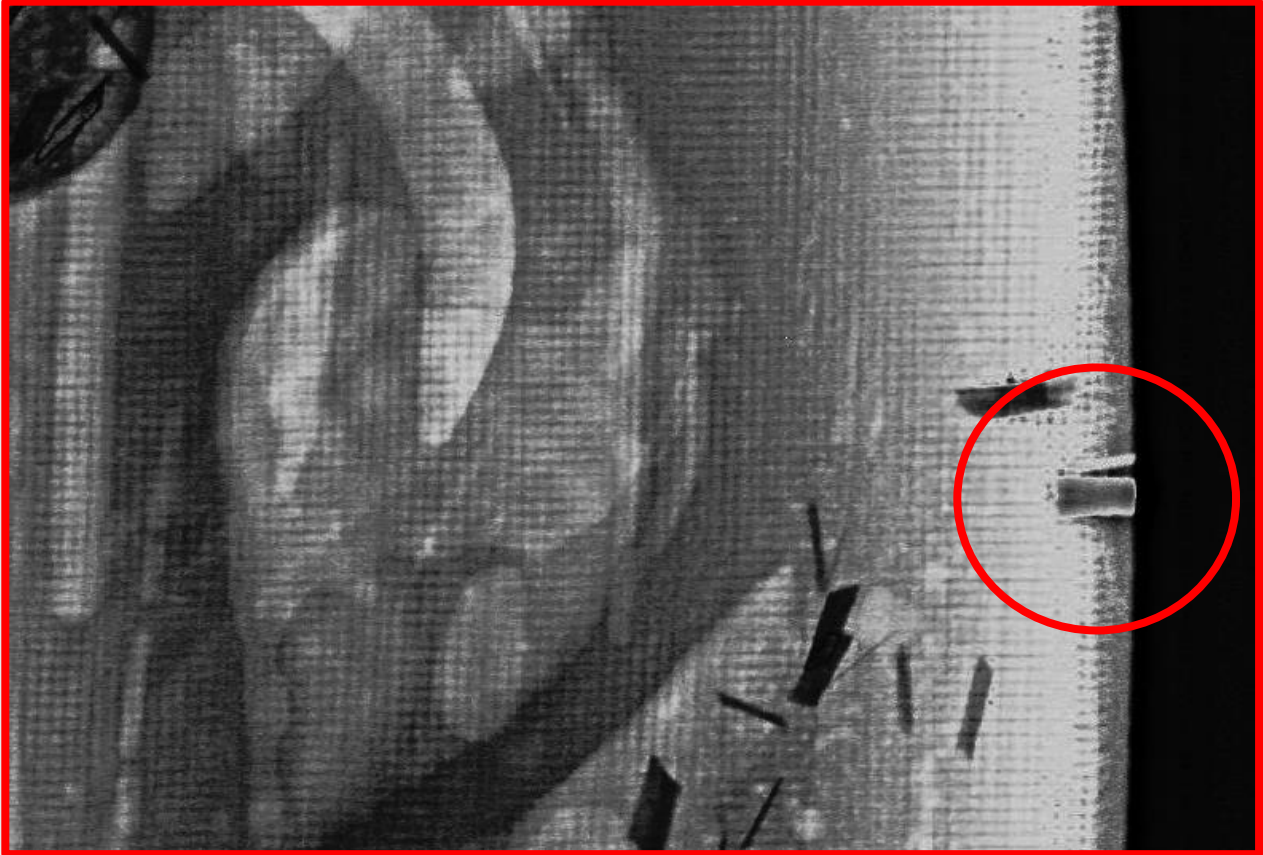


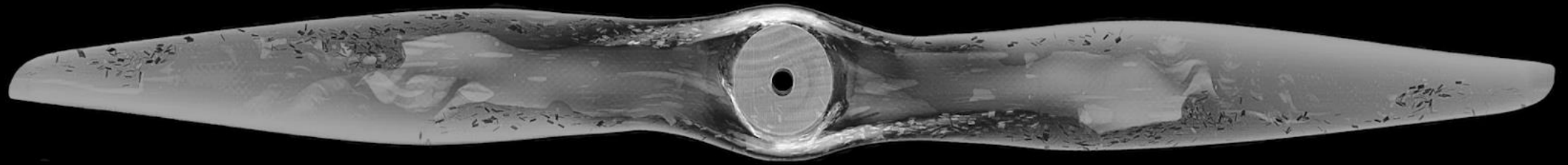
REAL-TIME FAST INSPECTION
with immediate viewing angle and position control





Robotic 2d x-ray inspection is able to make visualization of internal composite structure and each material components in high resolution.

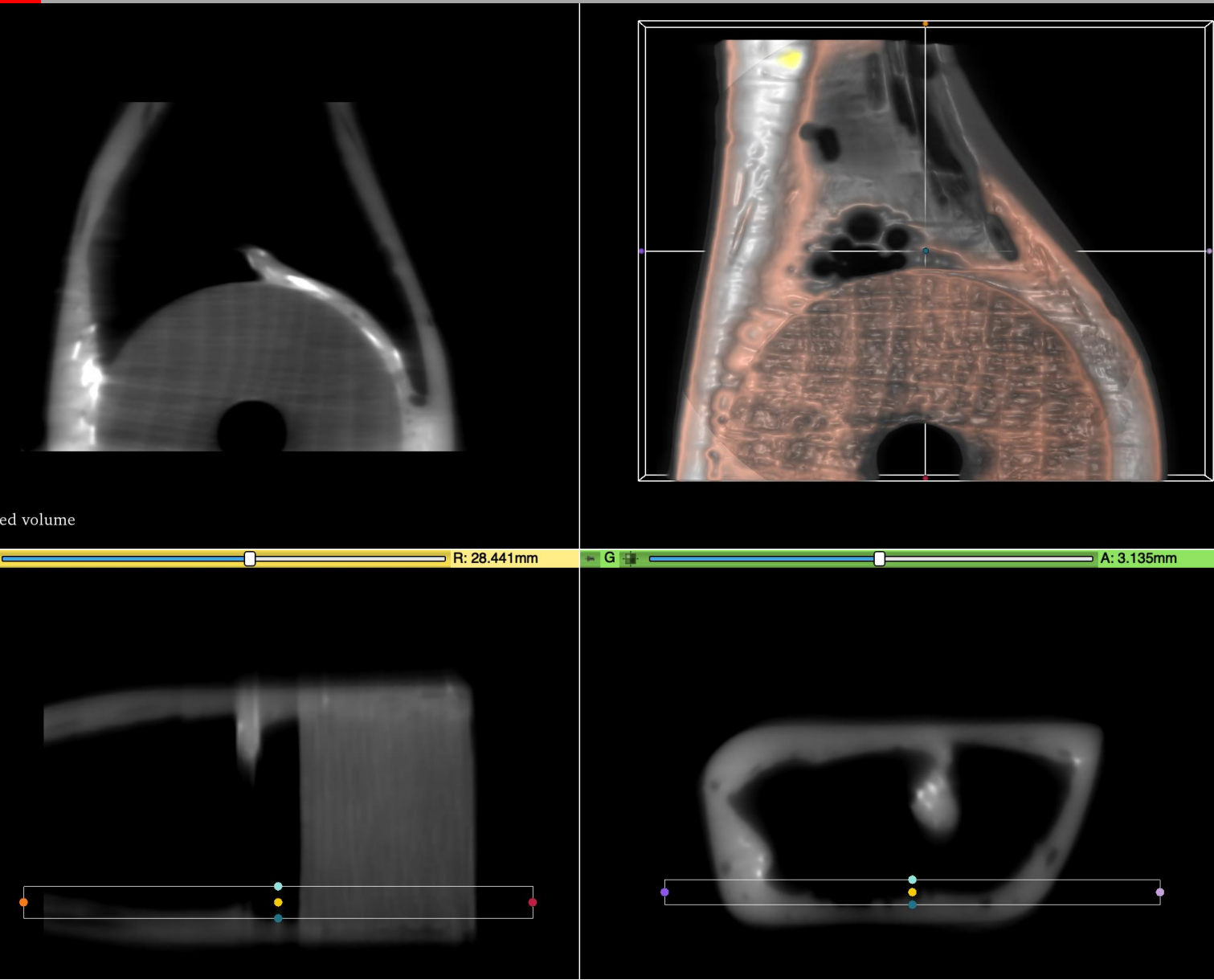




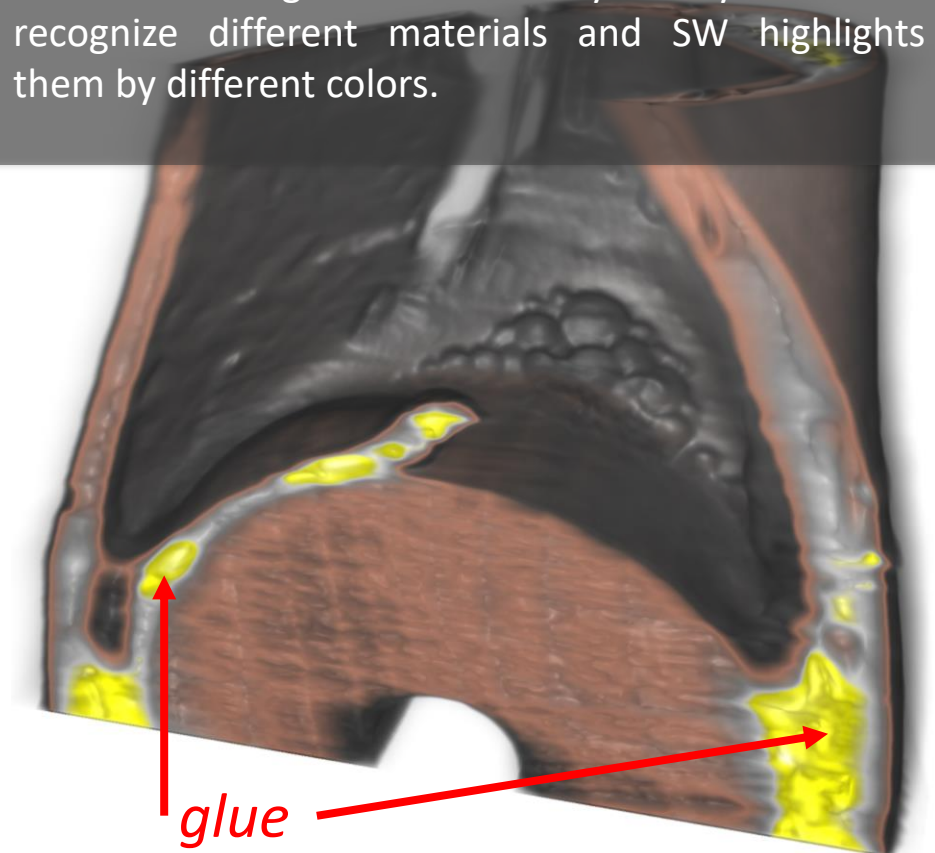
ROBOTIC 3D X-RAY INSPECTION

(computed tomography or laminography)

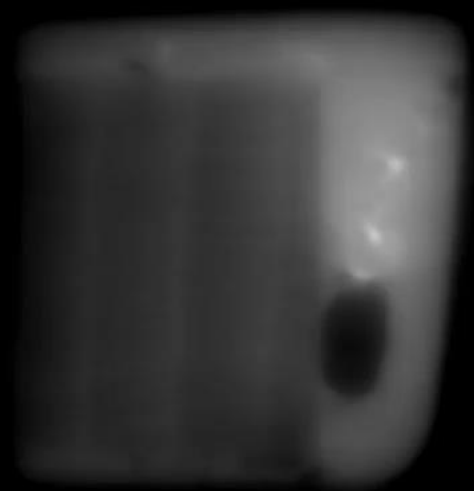
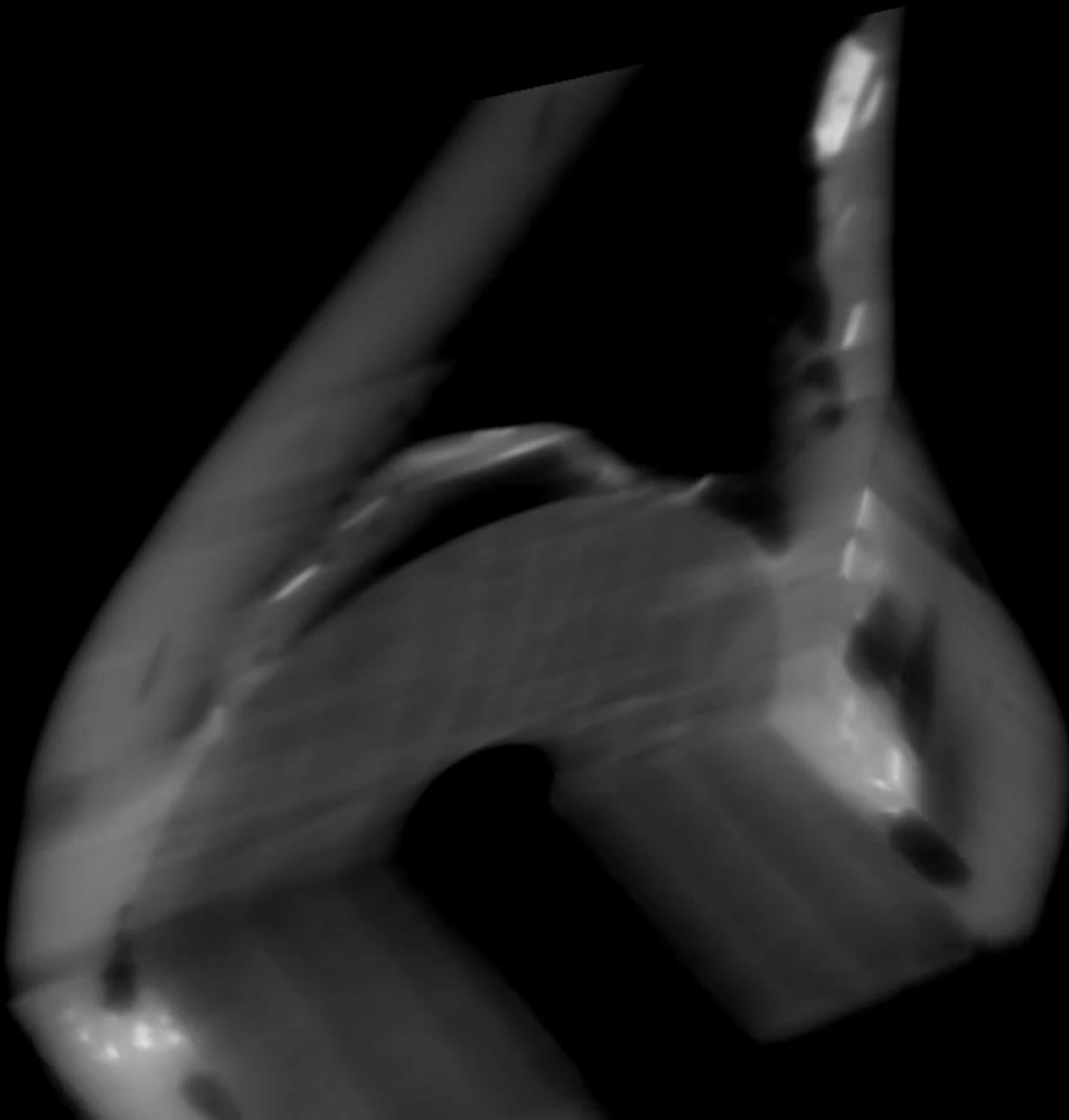
*This inspection is suitable for **detailed inspection***



Spectral scan increase recognition possibility of different materials inside propeller for better evaluation (ex. glue distribution). Photon counting detector used by RadalyX allows to recognize different materials and SW highlights them by different colors.



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ROBOTIC IMAGING PLATFORM: X-RAY vs. UT

X-RAY COMPARISON WITH
ULTRASOUND (UT) ON SAMPLE CFRP

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Impact damaged CFRP

X-Ray

Ultrasound (UT)

Radalytica is the first
company to prove X-Ray
and Ultrasound are
complementary methods
for NDT.

In the example, both UT
and X-Ray detect the
damaged area.

UT detects delamination.

- 
- the damage **is not** seen

ROBOTIC IMAGING

PLATFORM: X-RAY vs. UT

- **Only the combination of X-ray and UT** shows all available data – delaminations, cracks, fibre bundles and even the paint markers on the sample.

THE BEST SOLUTION

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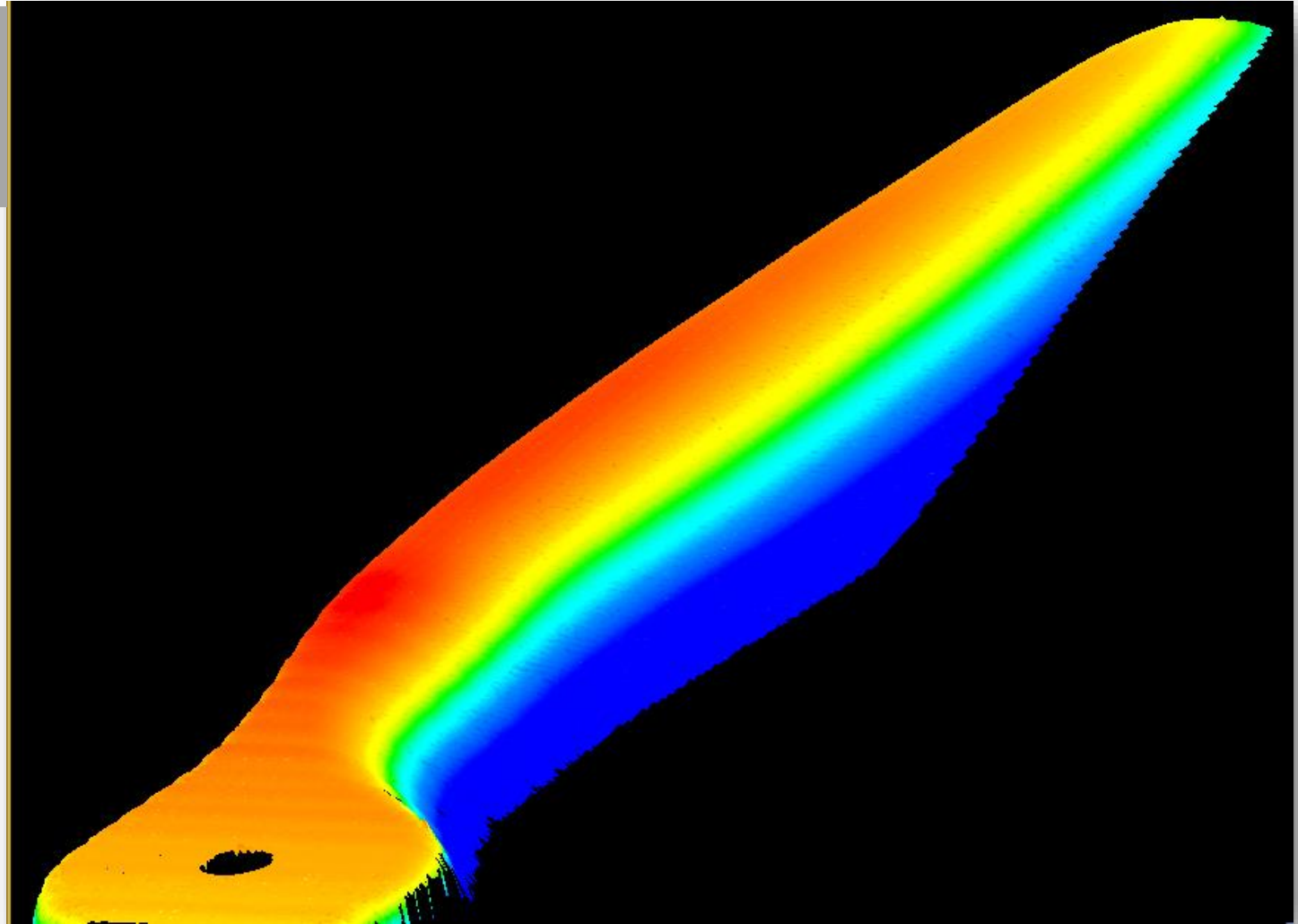
Combination X-ray & Ultrasound (UT)



ROBOTIC 3D LASER PROFILER INSPECTION

- detailed surface inspection
- surface defects detection
- shape inspection
- dimensions inspection

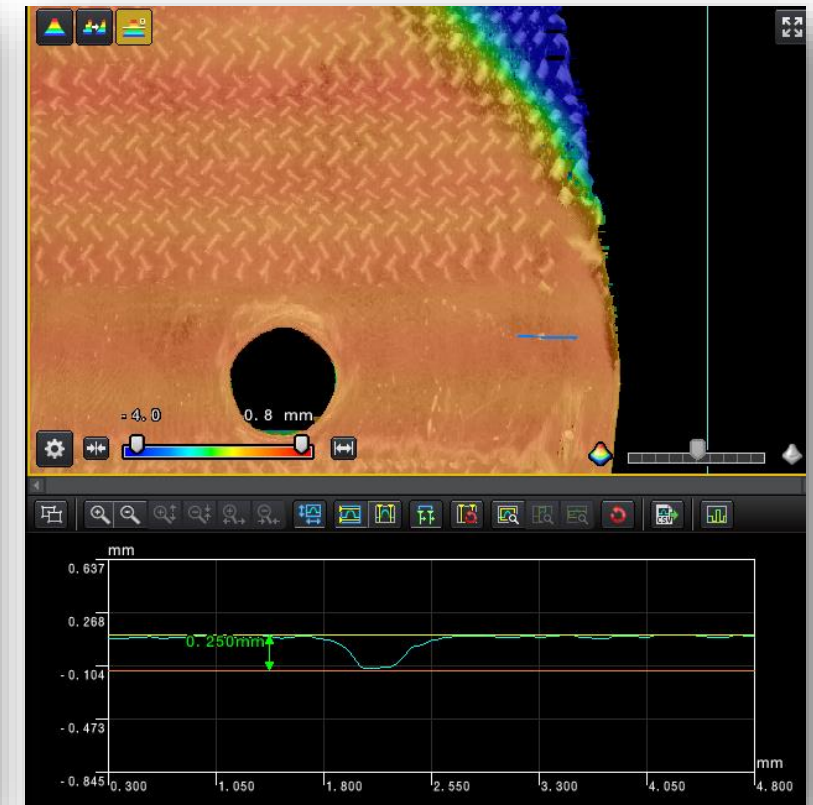
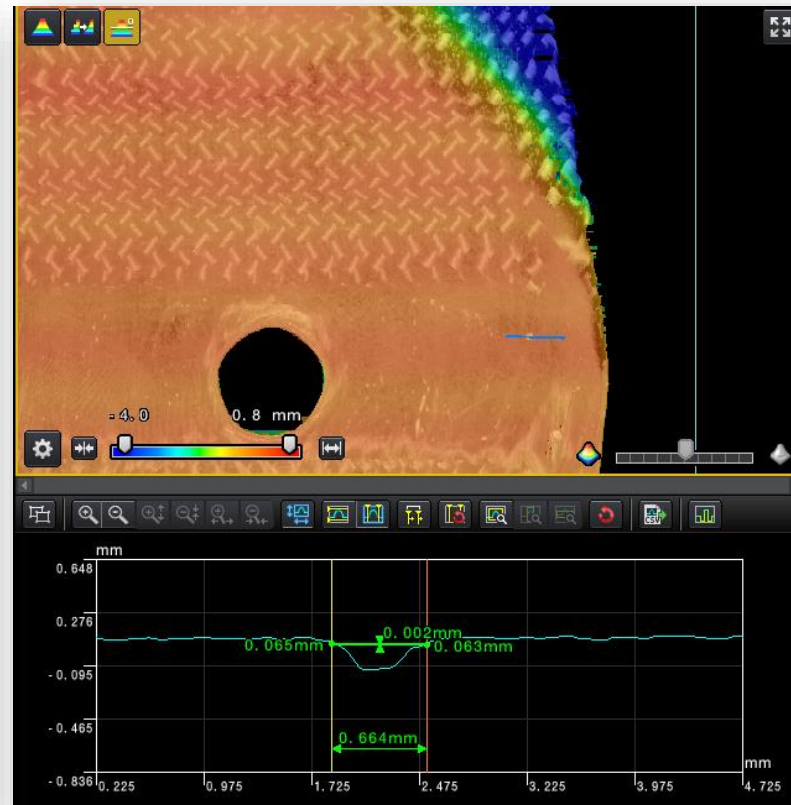
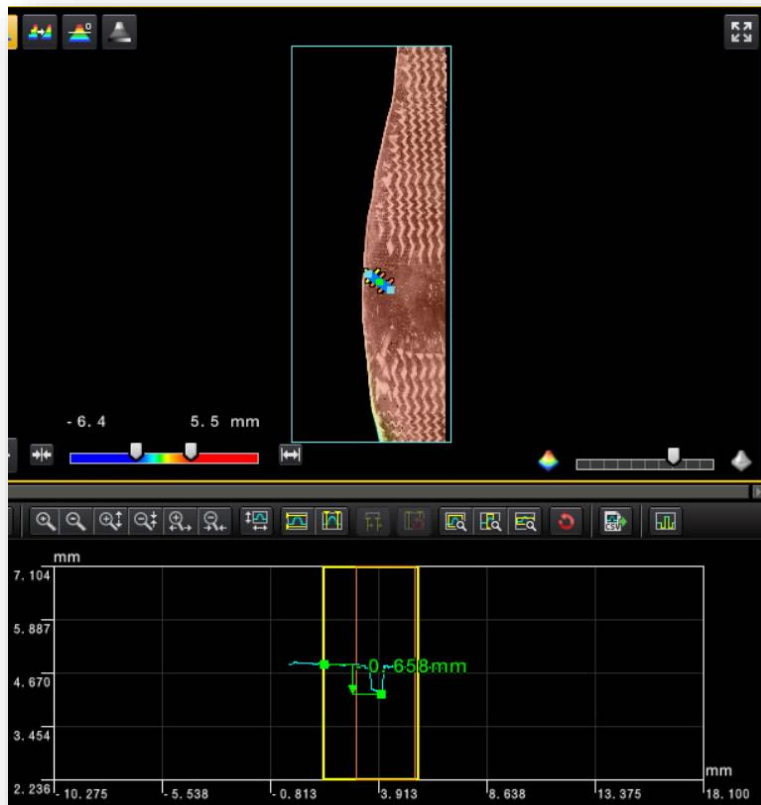
height color map



ROBOTIC 3D LASER PROFILER INSPECTION

- shape and dimensions of defect measurement

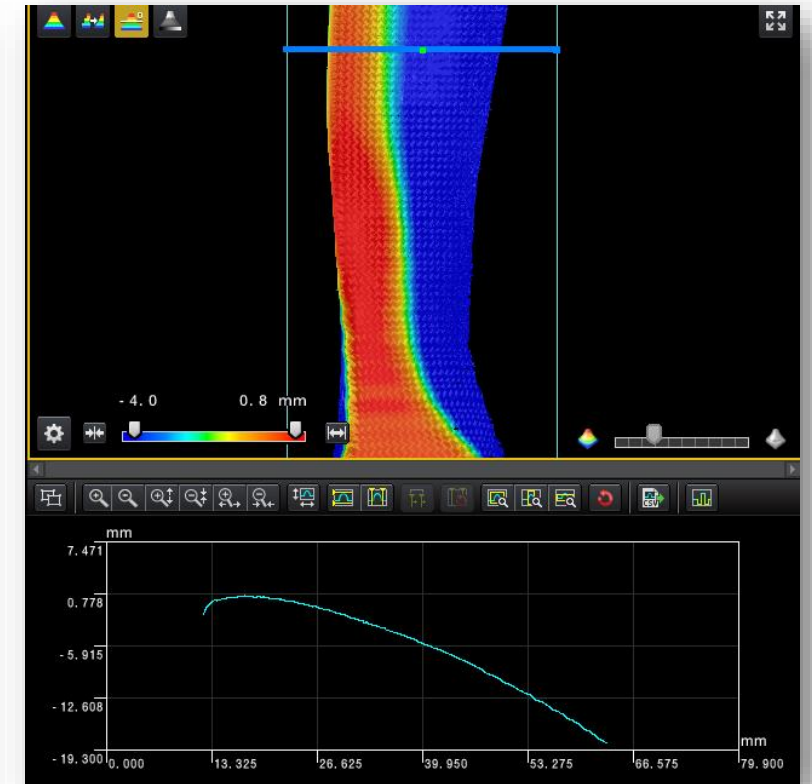
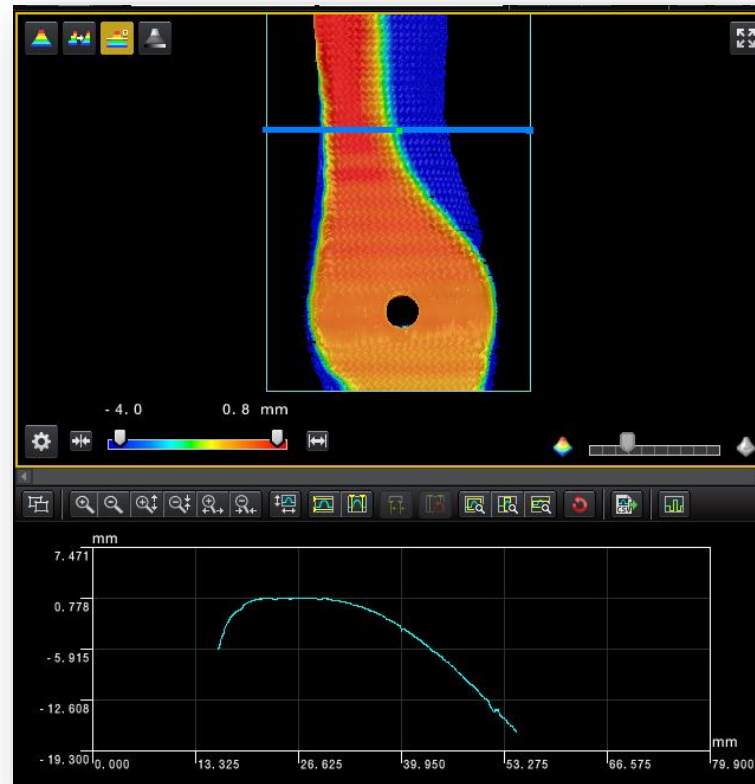
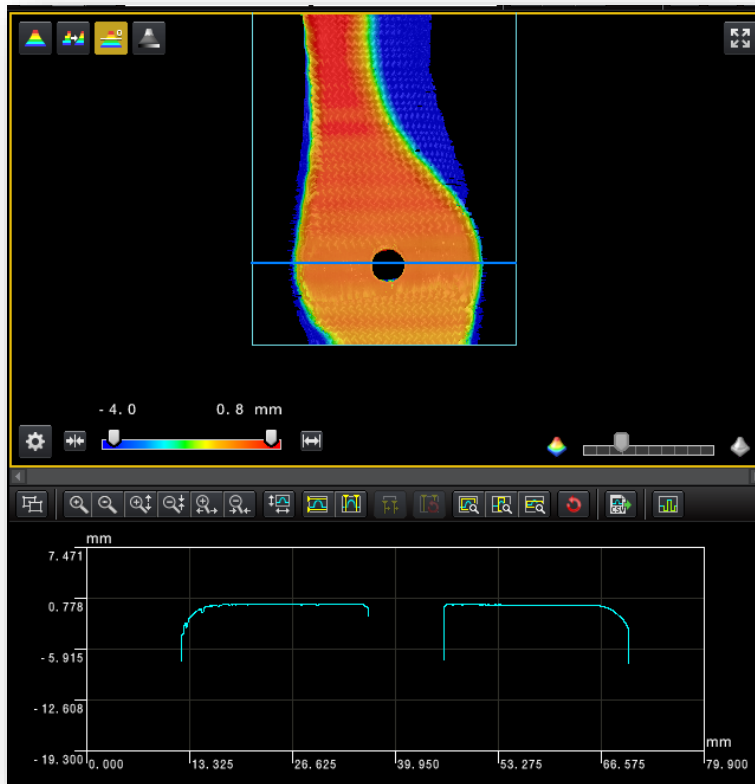
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ROBOTIC 3D LASER PROFILER INSPECTION

- propeller shape inspection

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ROBOTIC 3D LASER PROFILER INSPECTION

- leading edge shape inspection

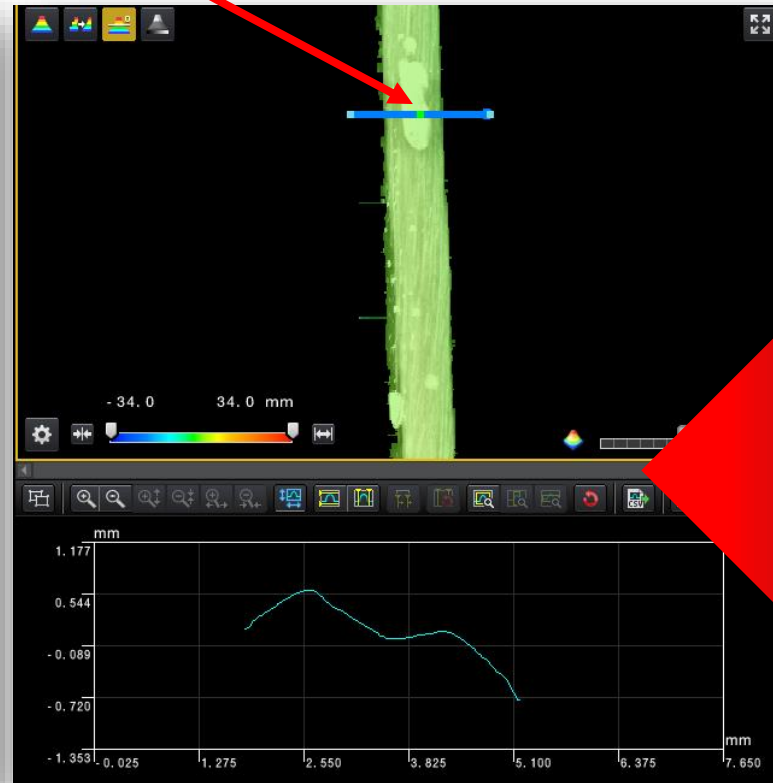
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Defect after impact

correct leading
shape



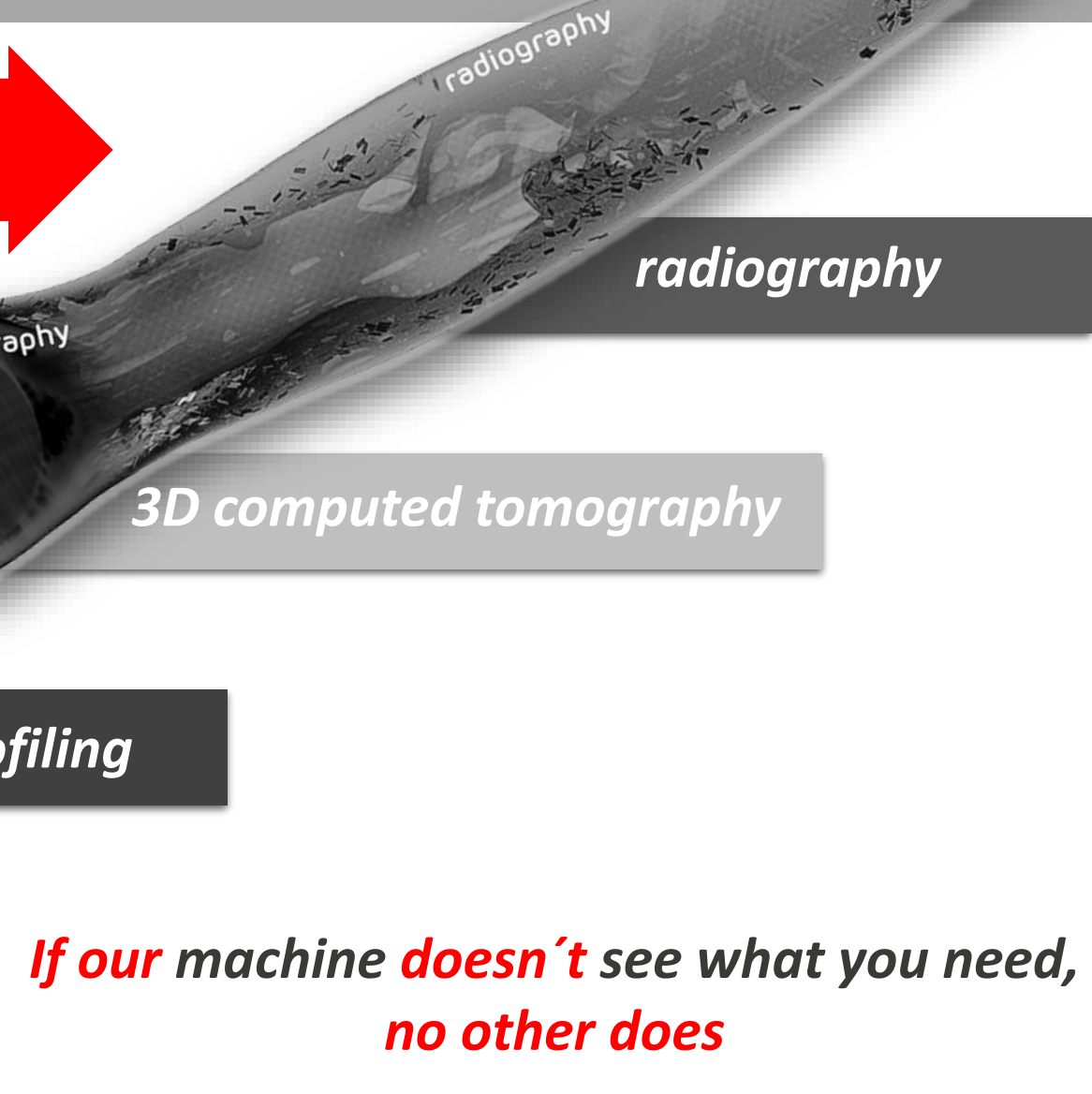
damaged leading
shape



ONE SOLUTION FOR EVERYTHING



RadalyX
Robotic Imaging System



radiography

radiography

3D
computed tomography

3D computed tomography

laser shape profiling

laser shape profiling

surface image

surface image

*If our machine **doesn't** see what you need,
no other does*



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Thank  for providing
the propeller for this case study.

