Digitalization – a matter of sensing and real-life data

Real-time data from real-life processes are key for I4.0, digitalization and process optimization

Green Mountain DigithON – 14.04.2021

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RESEARCH CENTER NON DESTRUCTIVE TESTING

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We're looking into it!

„It is our mission
to gain insight into **materials**,
substances and **processes** in
novel and non-destructive ways."

Industrial Cooperation Partners

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Due to existing non-disclosure agreements not all of our partners are displayed on this page!

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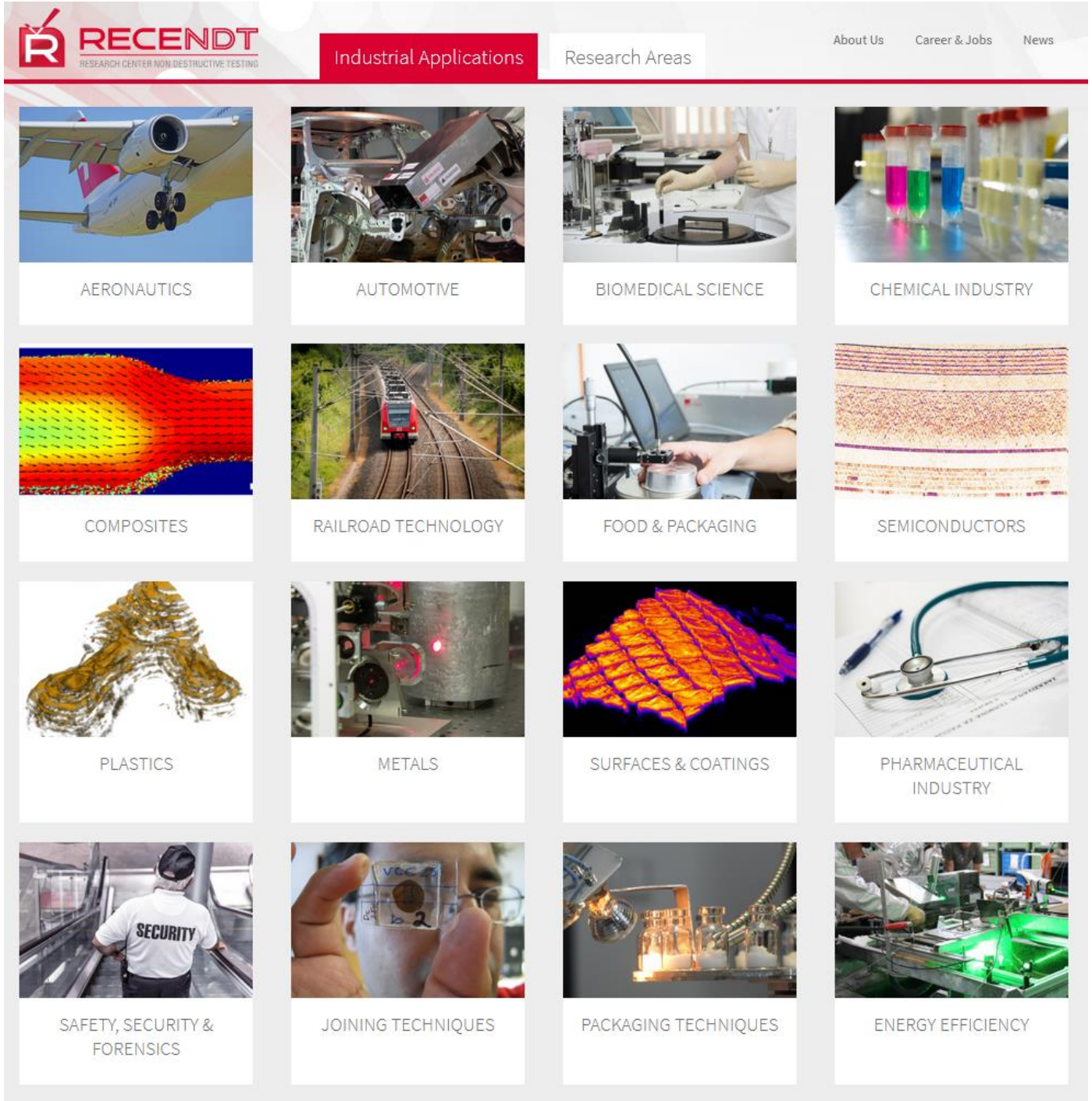


Starting at the end…

Take-home message:

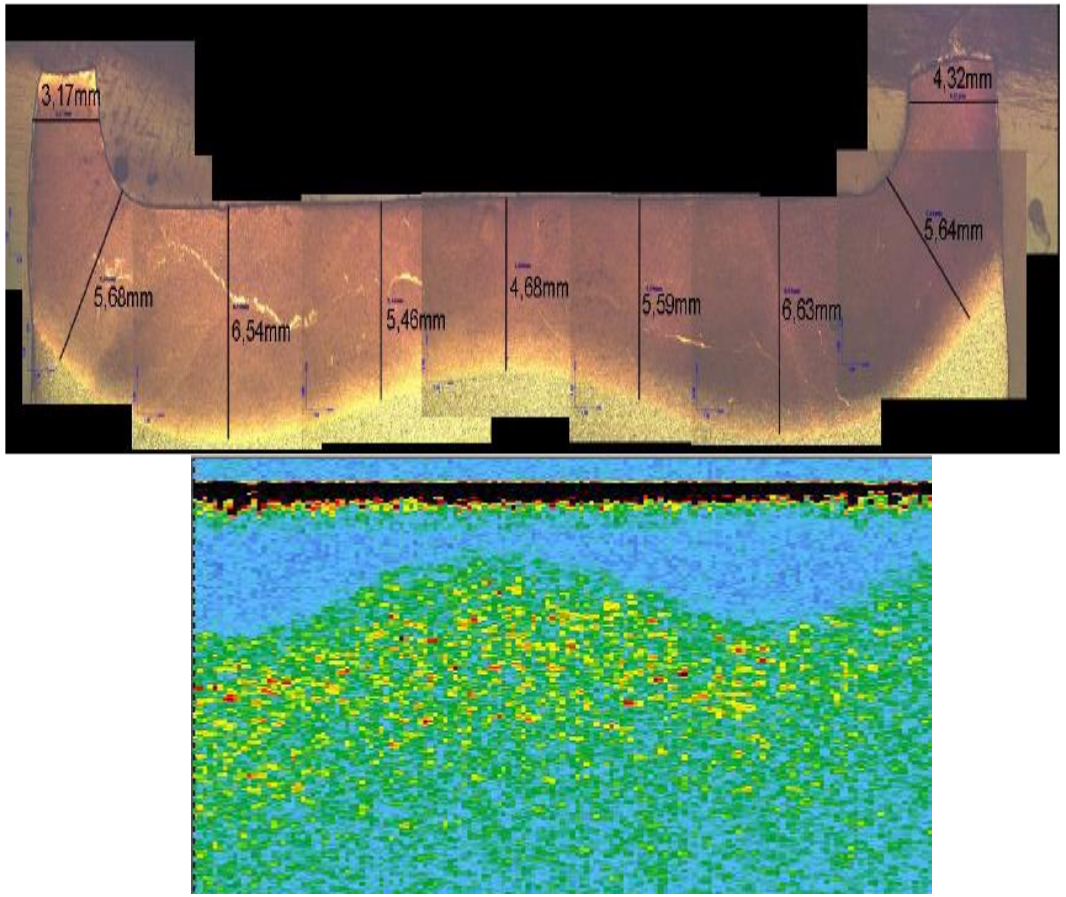
In-line sensing builds the basis for Digitalization → Efficiency → Green Deal:

- Utilize all your "senses" (= sensing technologies)
  (and think beyond time, temperature, pressure, presence / counting / weighing!…)

- Do not only rely on and machine parameters / machine data – if
  you can also obtain real-life data!

Examples: metals – hardening depth / hardness profile

Non-destructive characterization by Laser-Ultrasound



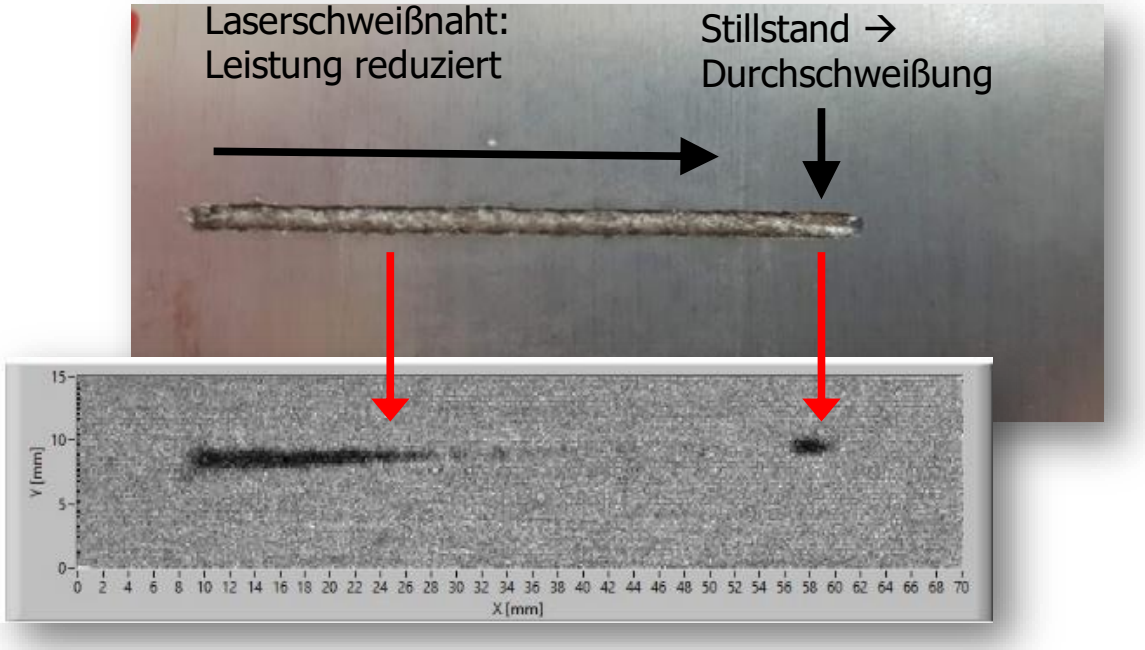
Measurement and interpretation
of ultrasound-echoes
from metal-microstructures

→ identification of areas with
changing micro-structure

→ characterization of hardening depth

Examples: metals – welding

Non-destructive quality-control by Laser-Ultrasound



Examples: polymers – multi-layer films

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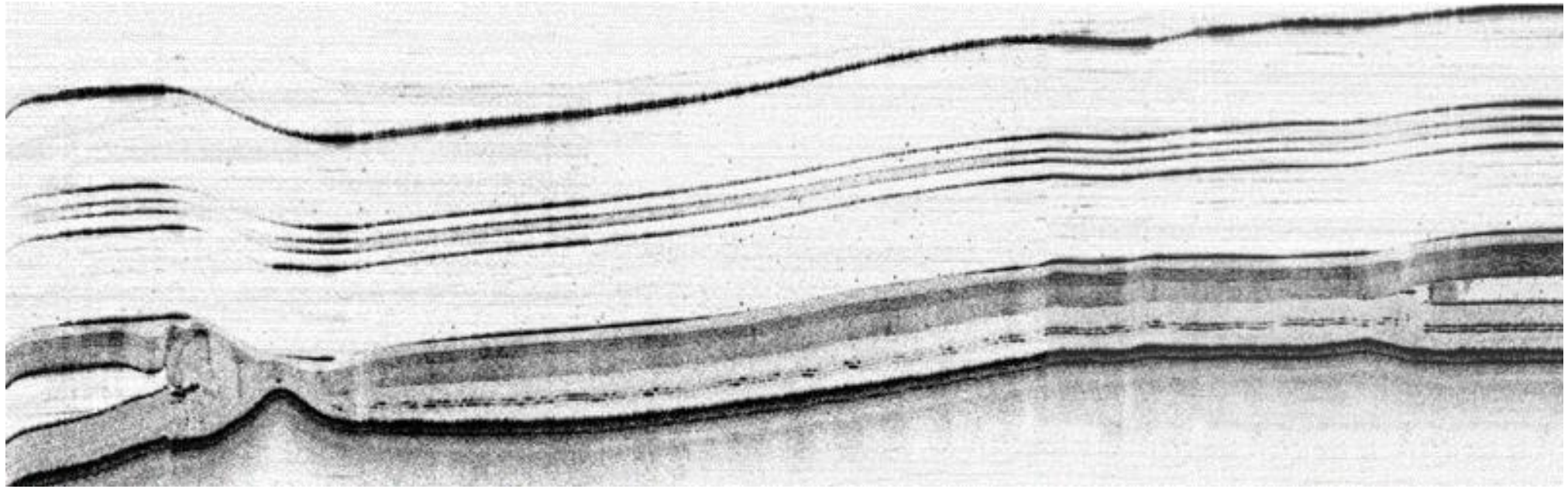
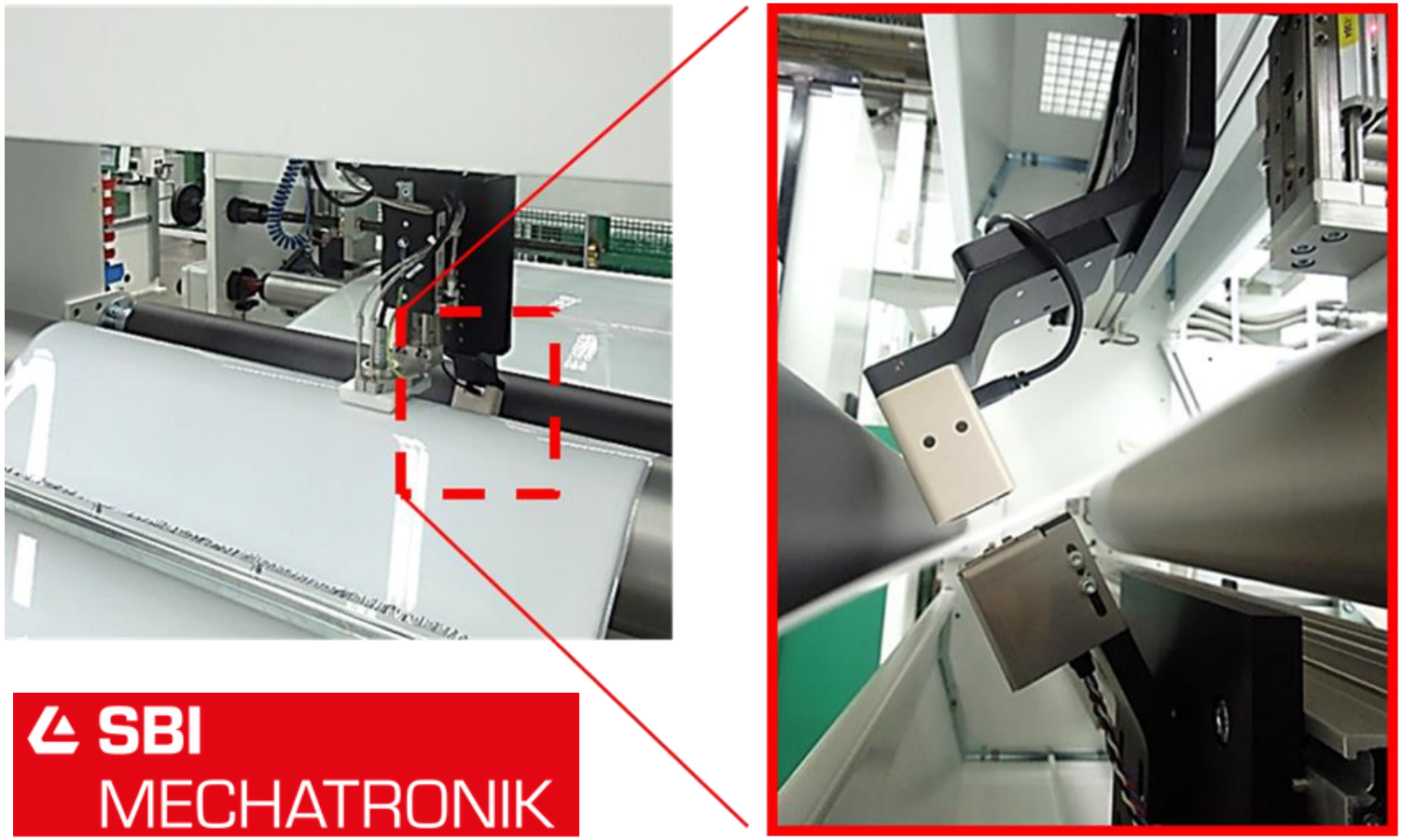
Thickness measurement of inner layers… → OCT (in-line, 50 kEUR)



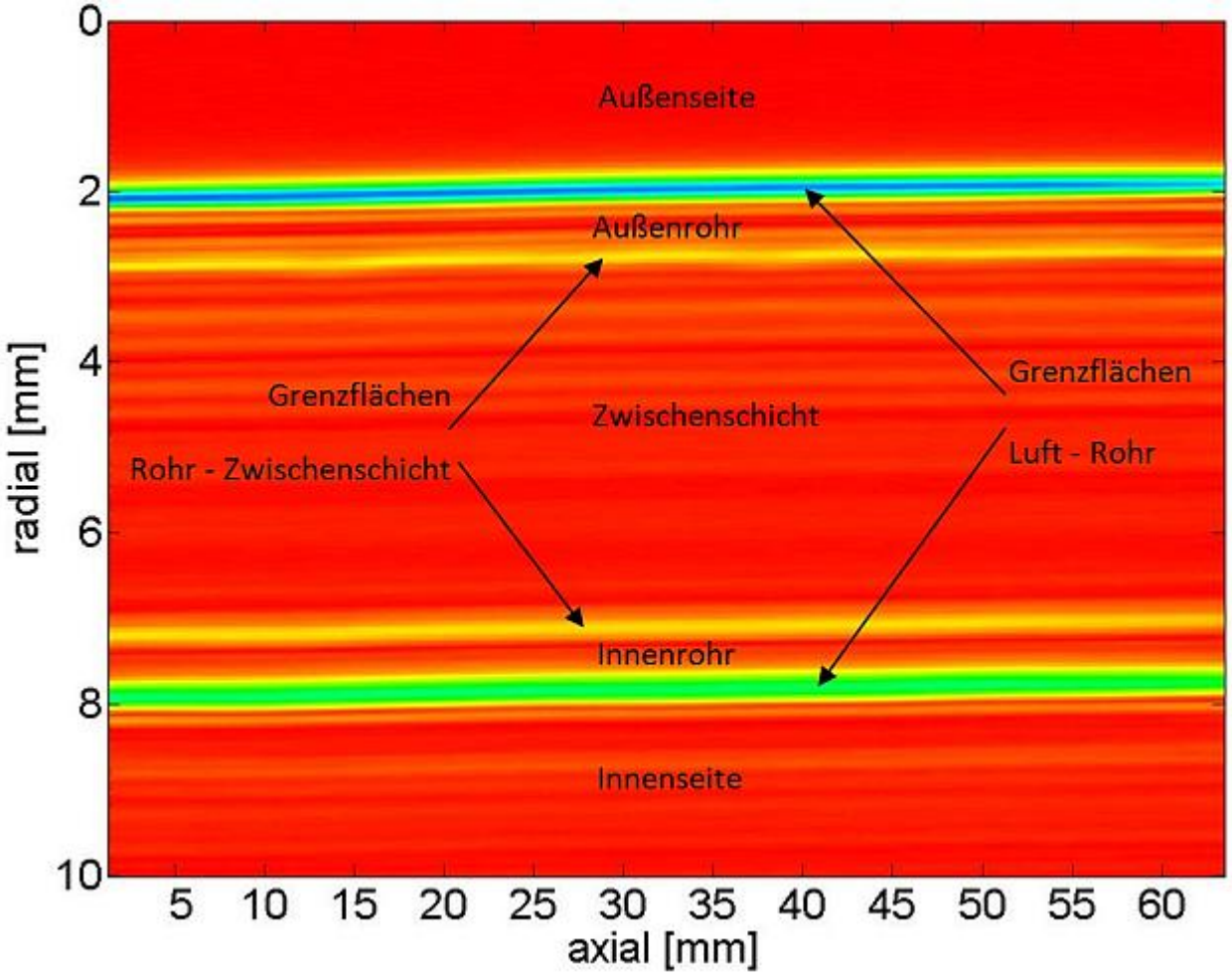
Examples: polymers – multi-layer films

Thickness measurement of inner layers… → IR-spectroscopy (in-line, 4 kEUR)



Examples: polymers – multi-layer extrusion

Terahertz-sensing for non-destructive in-line thickness-measurement in multi-layer systems

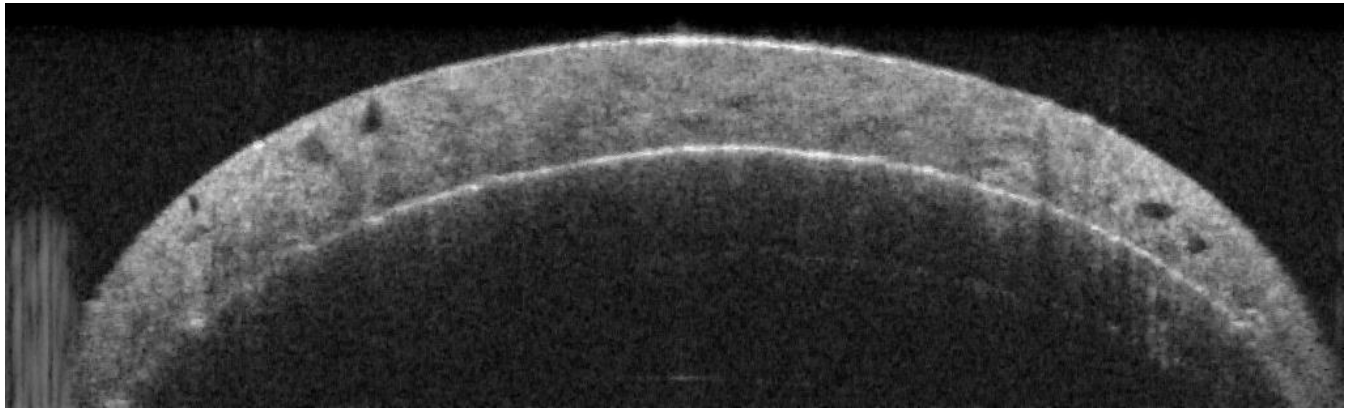


Examples: polymers – coatings

3D-visualization (in-line & real-time) with micrometer-resolution by OCT-technology

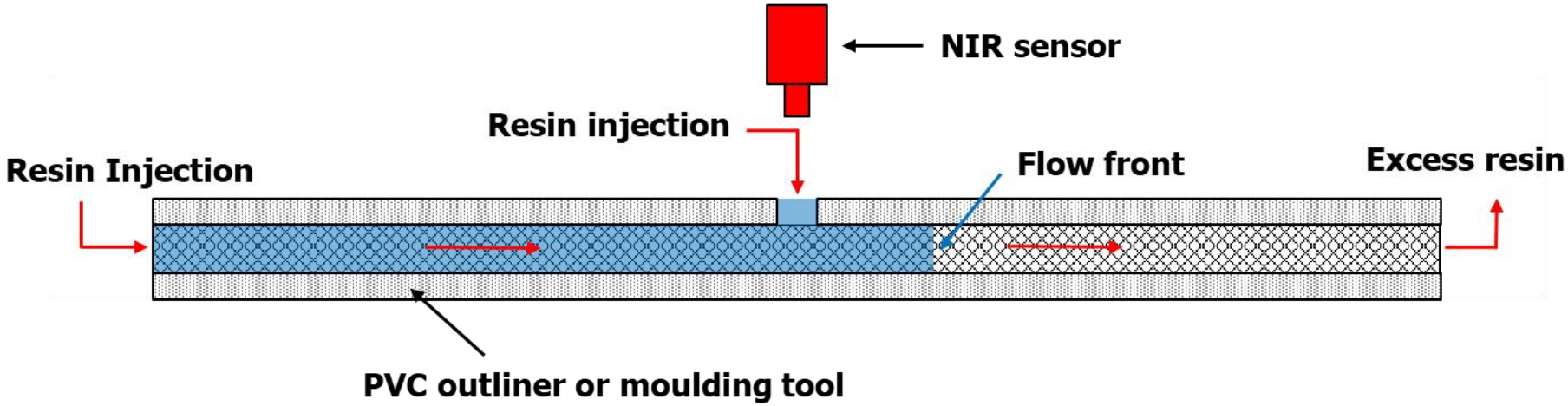
Polymer-coating / insulation of metal wire

Thickness, defects…



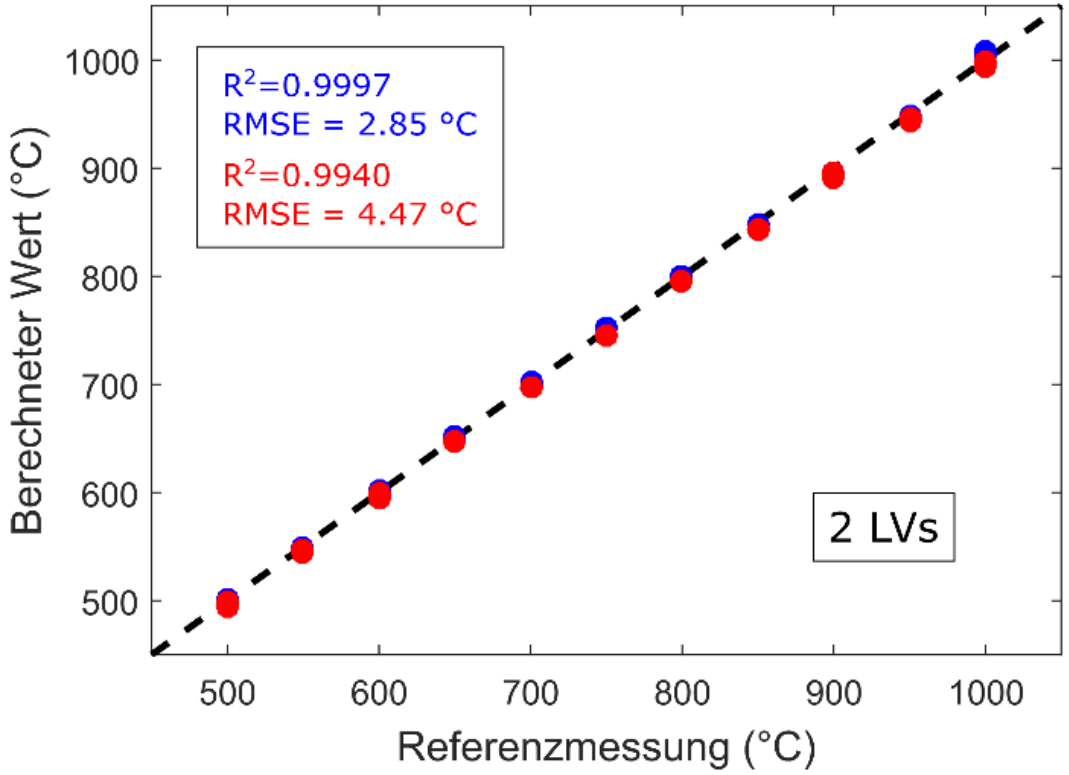
Examples: fibre-reinforced polymers

Monitoring of the hardening of an injected polymer/resin-matrix by IR-spectroscopy



Examples: temperature measurement

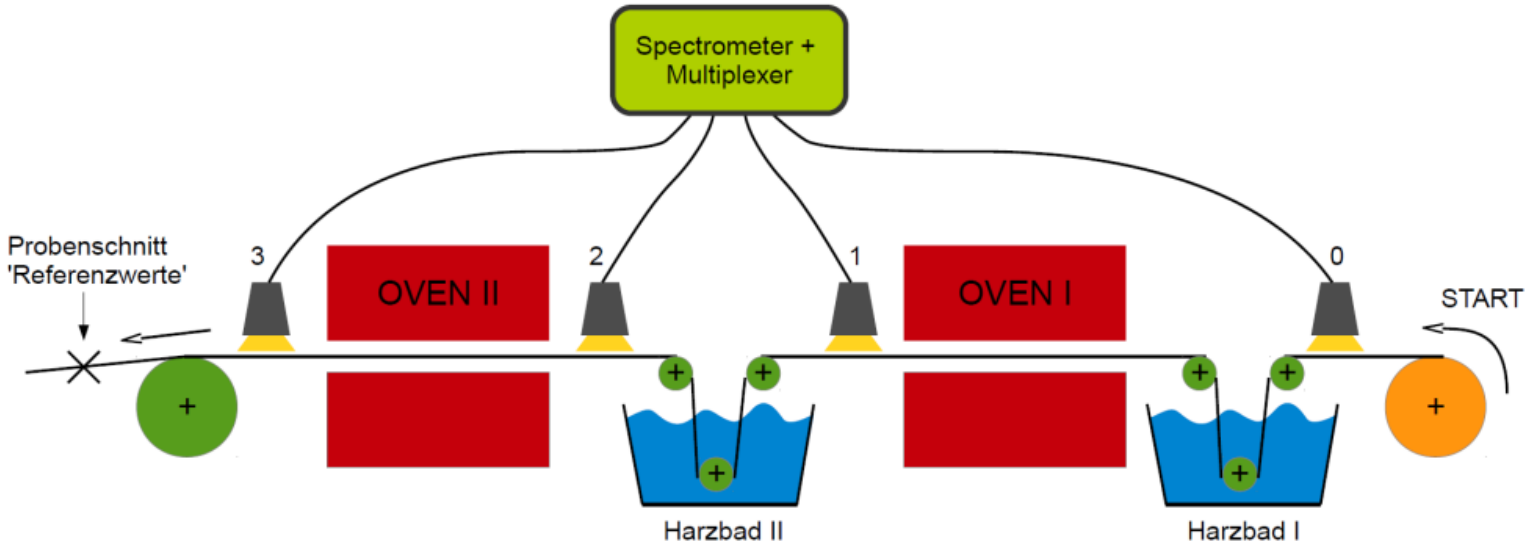
Highest precision non-contact spectroscopic temperature measurement at high temperatures

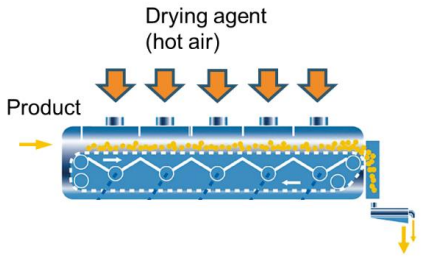


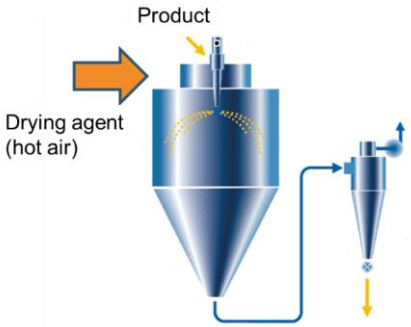
First tests: accuracy better than 5°C in the range 500°C – 1000°C

Examples: drying processes

Process-integrated monitoring of drying processes / of residual moisture by IR-spectroscopy







Examples: pharmaceutical industries

Monitoring of the coating-process in tablet-production

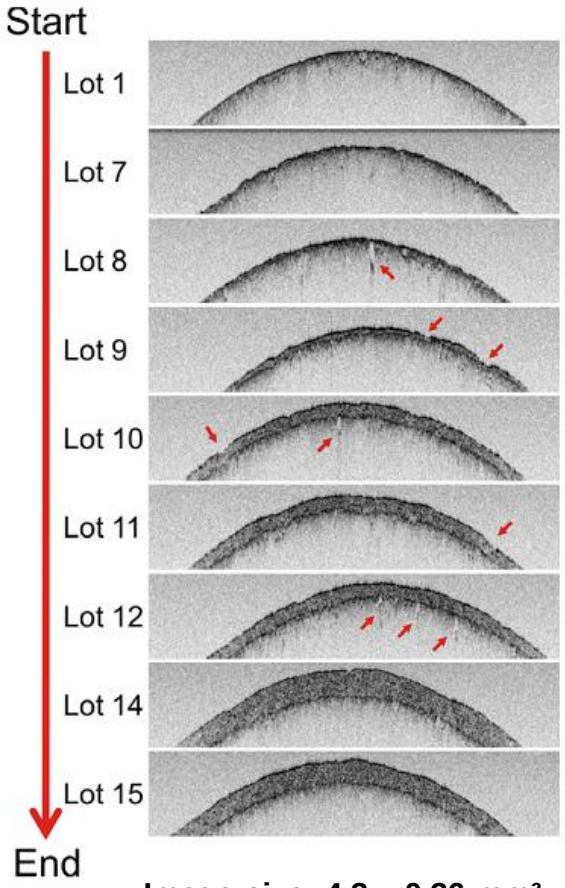


Image size: 4.3 x 0.36 mm²

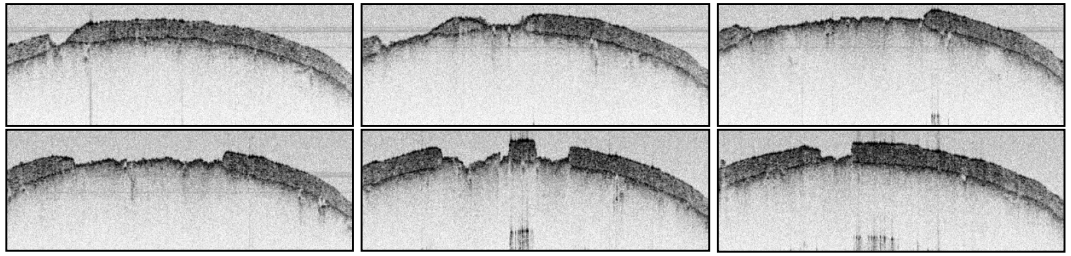


Image size: 5 x 0.6 mm²

Defekt

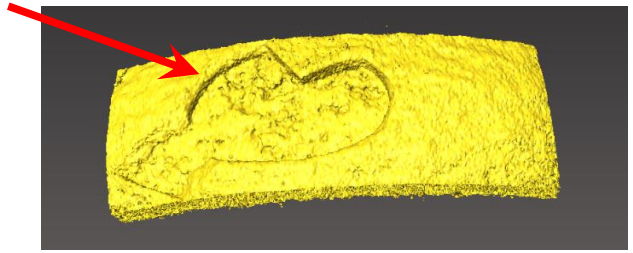


Image size: 5 x 5 x 0.6 mm³

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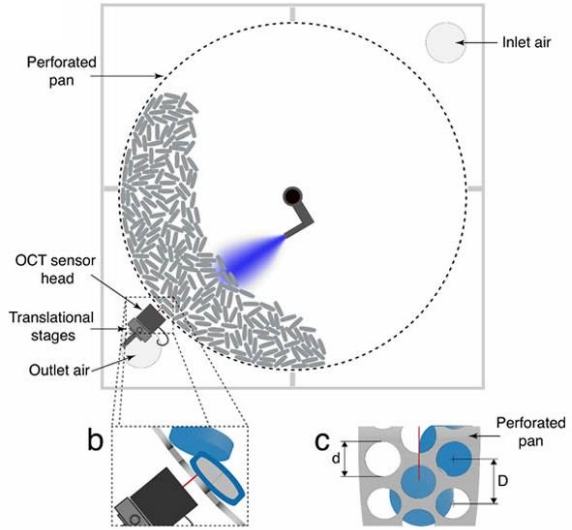
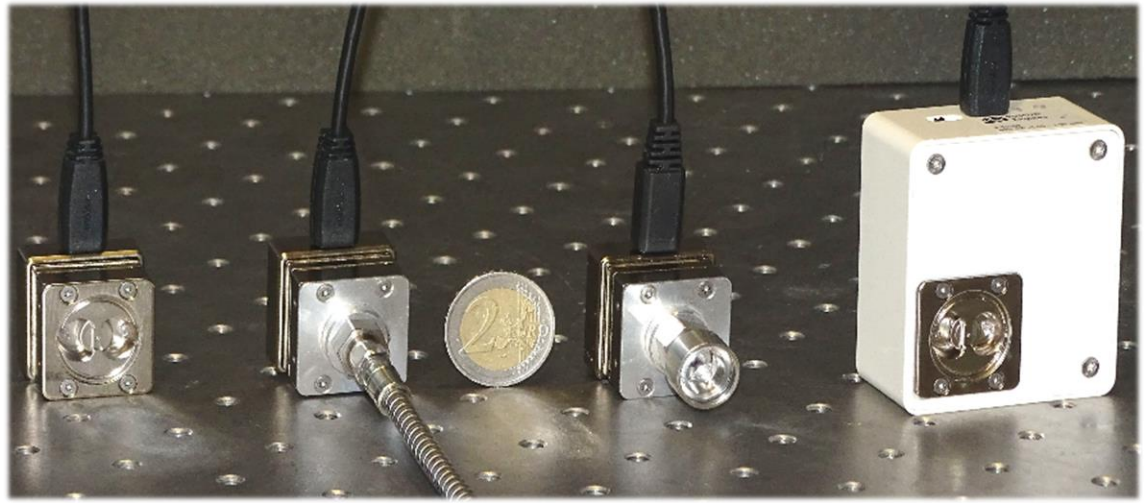


Examples: chemical production

IR-spectroscopy based Process-Analytical Technologies – e.g., for resing-production



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RECENDT RESEARCH CENTER NON DESTRUCTIVE TESTING **develops sensing.**

RECENDT RESEARCH CENTER NON DESTRUCTIVE TESTING **delivers data.**

We are RECENDT GmbH

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Acknowledgements

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PAC Process Analytical Chemistry

FFoQSI Austrian Competence Centre – Feed and Food Quality, Safety and Innovation

PSSP – Photonic Sensing Smarter Processes

CHASE

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EFRE – Europäische Union. Investitionen in Wachstum & Beschäftigung. Österreich.

NEFI NEW ENERGY FOR INDUSTRY

Federal Ministry Republic of Austria Climate Action, Environment, Energy, Mobility, Innovation and Technology

Federal Ministry Republic of Austria Digital and Economic Affairs

FFG Promoting Innovation.

upper austria

Das Land Steiermark – Wirtschaft und Innovation

SFG NEUES DENKEN. NEUES FÖRDERN.

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