

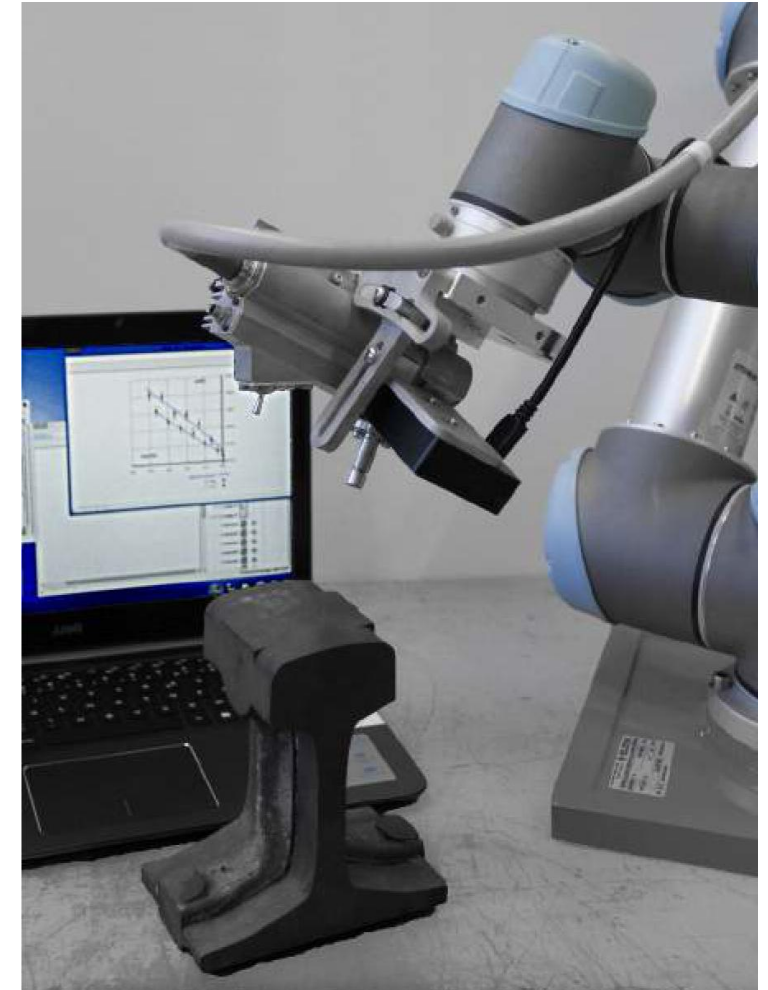
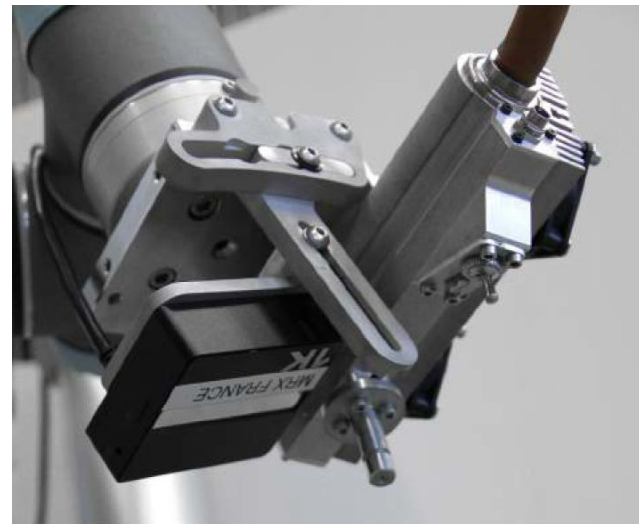


# Portable Robotic XRD

# Introduction



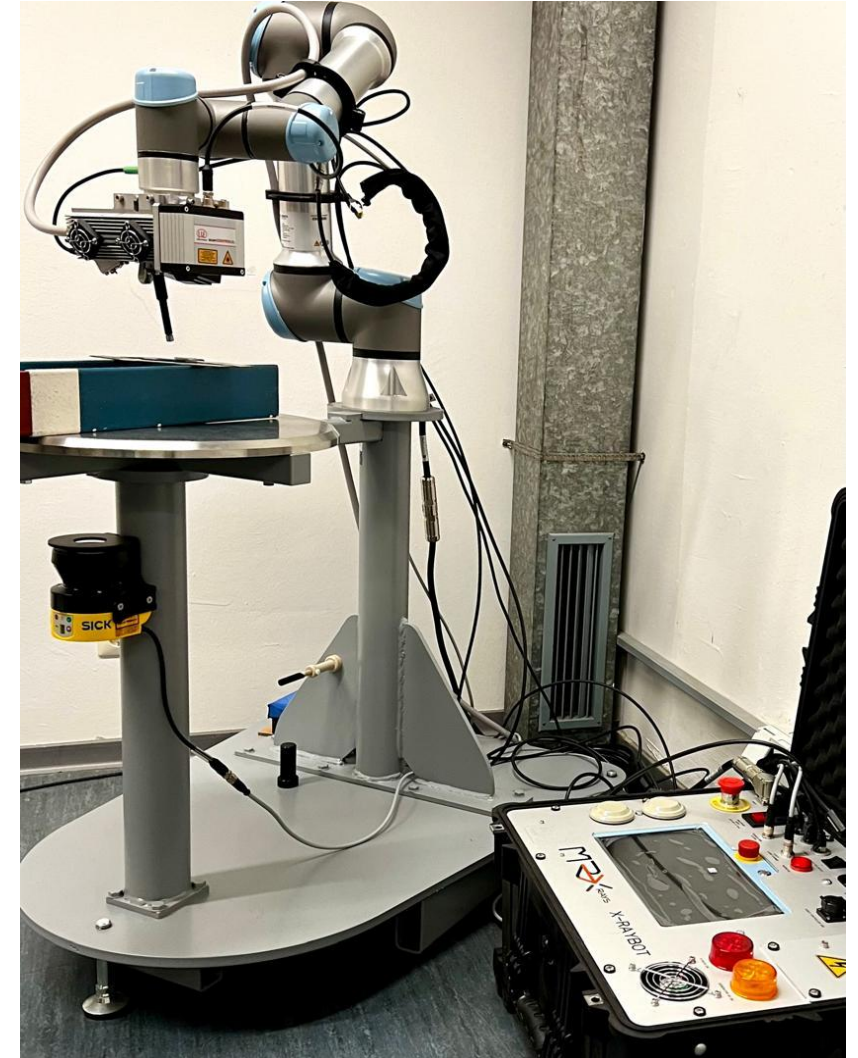
The system combines a 6-axis collaborative robot with an XRD goniometer to deliver rapid, repeatable residual-stress and retained-austenite measurements on small coupons and large structures – in the lab or on-site.



# What makes the system unique



- **Robotic adaptive positioning:** 6-axis UR5E robot (850 mm reach) with laser triangulation/scanning for automatic height and angle setting.
- **Standards-based residual stress:** Results compliant with NF EN 15305 using the  $\sin^2\psi$  approach.
- **High precision and speed:** Positioning within  $\sim 100 \mu\text{m}$  and up to  $10\times$  faster set-up, including curved and hard-to-reach surfaces.
- **Automated mapping and traceability:** Scan the part, select points/areas, and run automated multi-point measurements with graphical documentation; CAD / externally scanned models can be used.
- **Measurement head and safety:** 1280-channel silicon detector ( $\approx 30^\circ$  opening), air-cooled 30 kV / 1 mA tube (Cr / Mn / Cu), plus safety laser perimeter shutdown.



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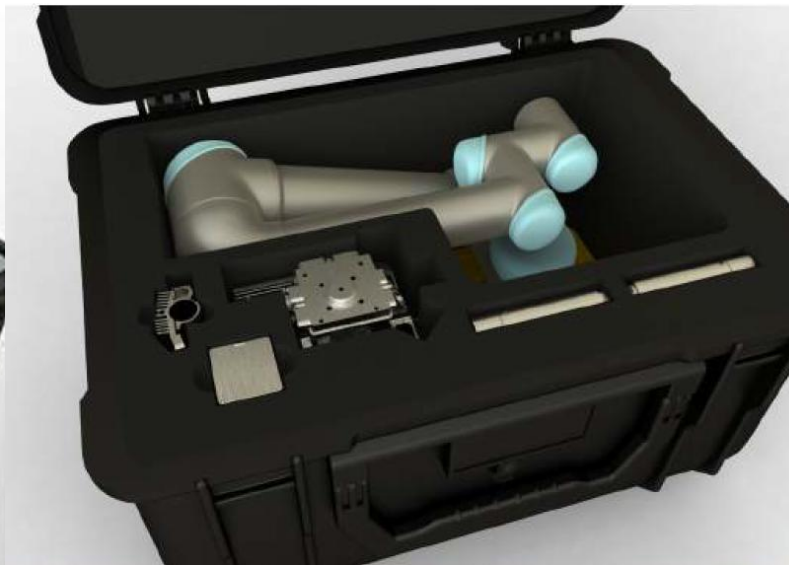
- Scan-based positioning and measurement

X-ray residual stress  
measurement of complex  
surfaces needs accurate  
sample positioning



# Transport and mobility

- Two hard-case units are considered to accommodate all parts
- Total weight: 25 kg per unit
- A tripod for on-site and in-situ measurement



Tripod for in situ use



# Typical applications



- **Welds and WAAM:** In-situ residual stress mapping before/after process steps on complex and large geometries.
- **Fatigue testing:** Monitor stress redistribution and relaxation during cyclic loading on large components.
- **Quality assurance:** Quantify the effects of heat treatment, machining, or surface finishing; include retained-austenite metrics for steels.

