



What we need to proceed

A manufacturers' requirements for welding
process monitoring

BBW LASERTECHNIK TODAY

Family company & leading manufacturing service provider in Germany, Austria and Switzerland

47 laser systems: Laser welding, cutting, drilling and ablation

180 qualified employees, including 14 trainees

Complete processing of assemblies via mechanical processing

€21.0 million turnover (2021)

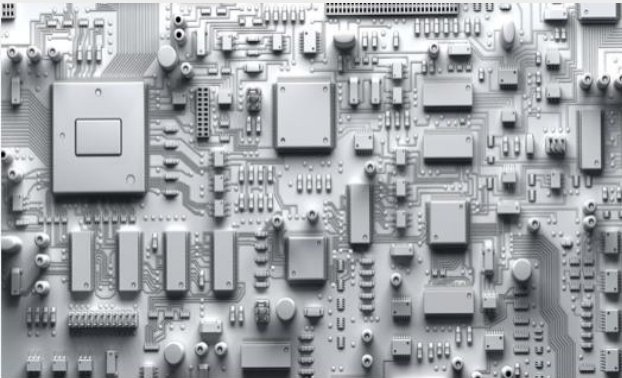
In-house construction department for special fixtures and machines



SECTORS



Automotive



Electronics



Air conditioning & energy technologies



Machinery & construction



Sheet metal work



Aerospace industry



Pharma & biotechnology



Household appliances

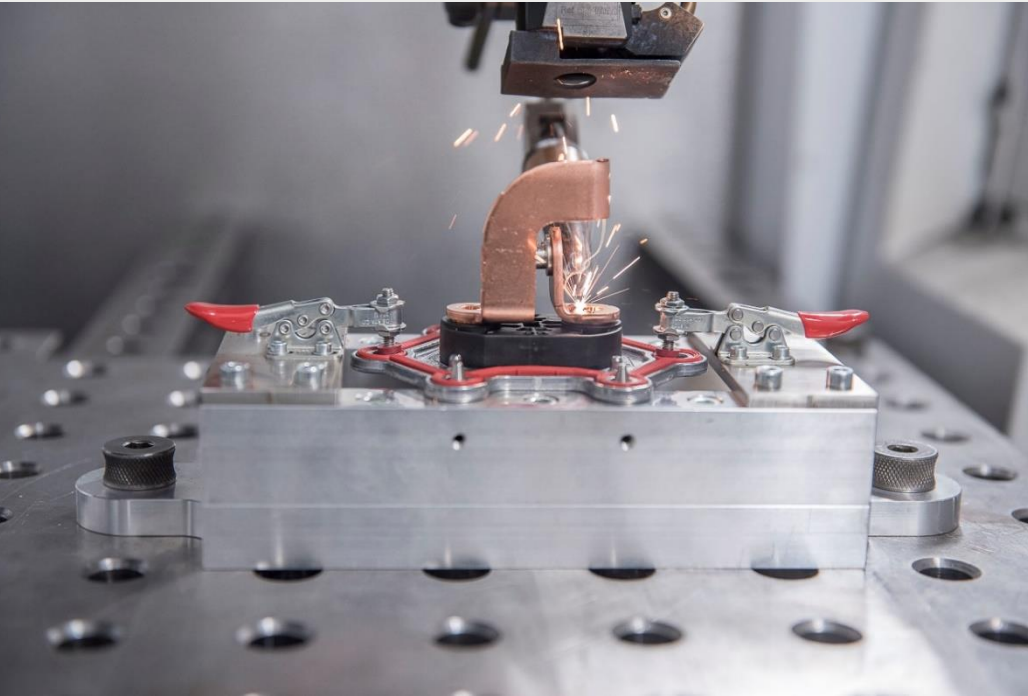
Life as a manufacturing service provider

> 40 different laser machines

- Different laser sources (Disc, fibre, diode, CBC)
- Different handling optics (Focusing optics, scanner, wobble head)
- Different handling systems (Gantry, robot)

> 3.000 different products

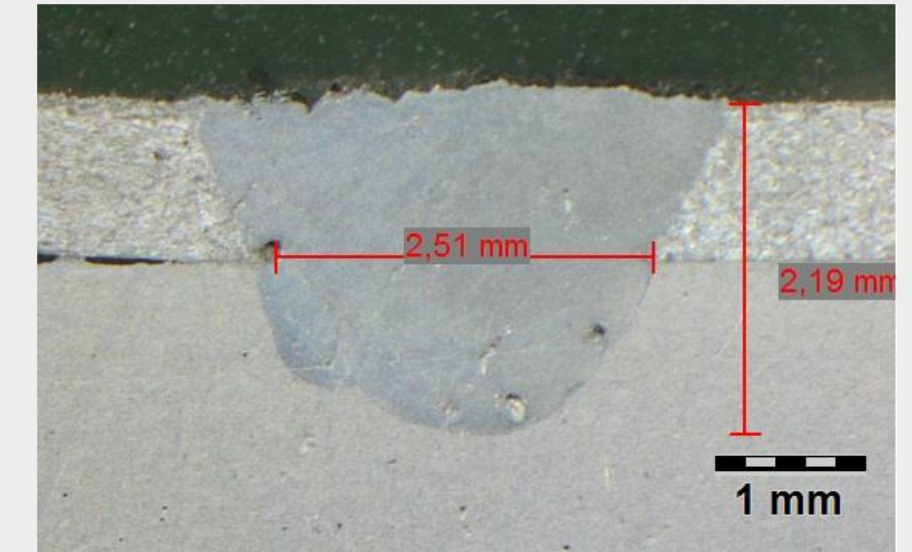
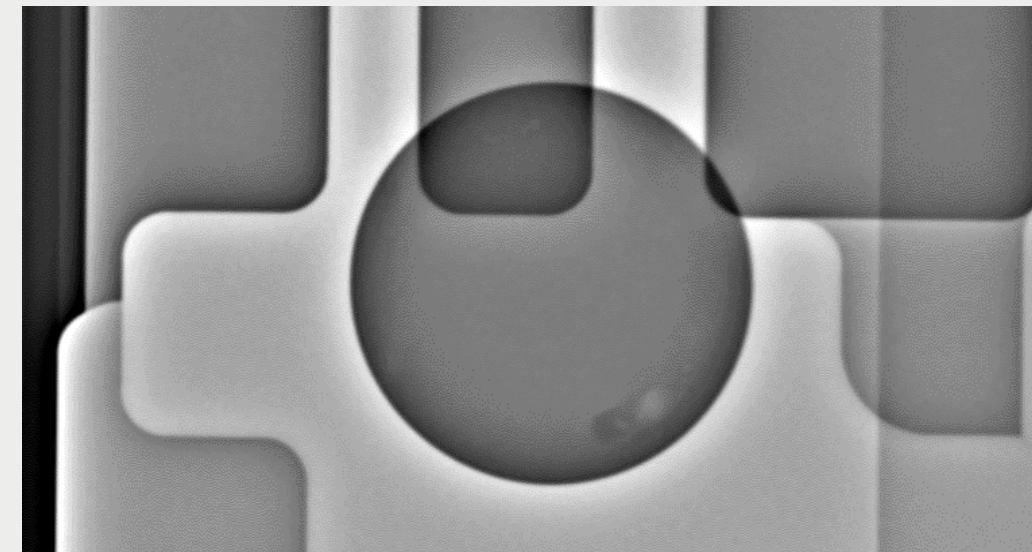
- Small and large parts
- Steel, aluminium, copper, nickel, titanium, ...
- Small and high production volumes (10 - 1m)



We know what we are doing...

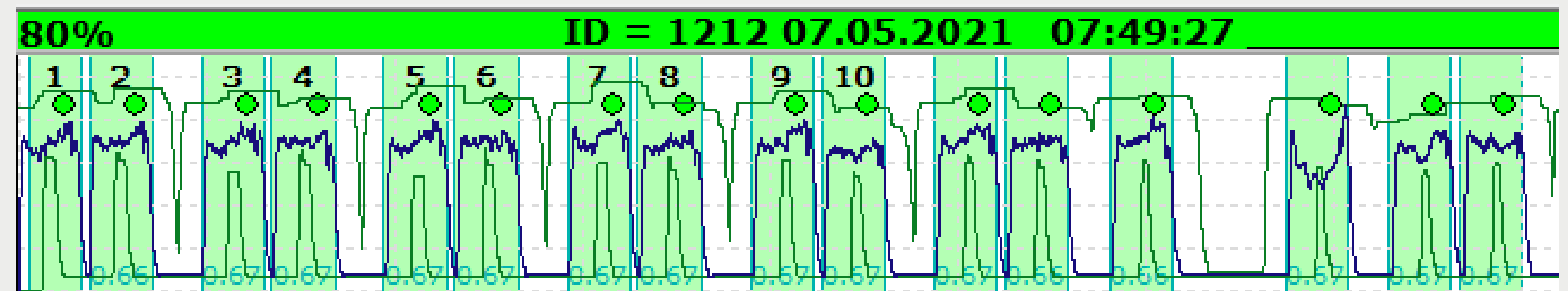
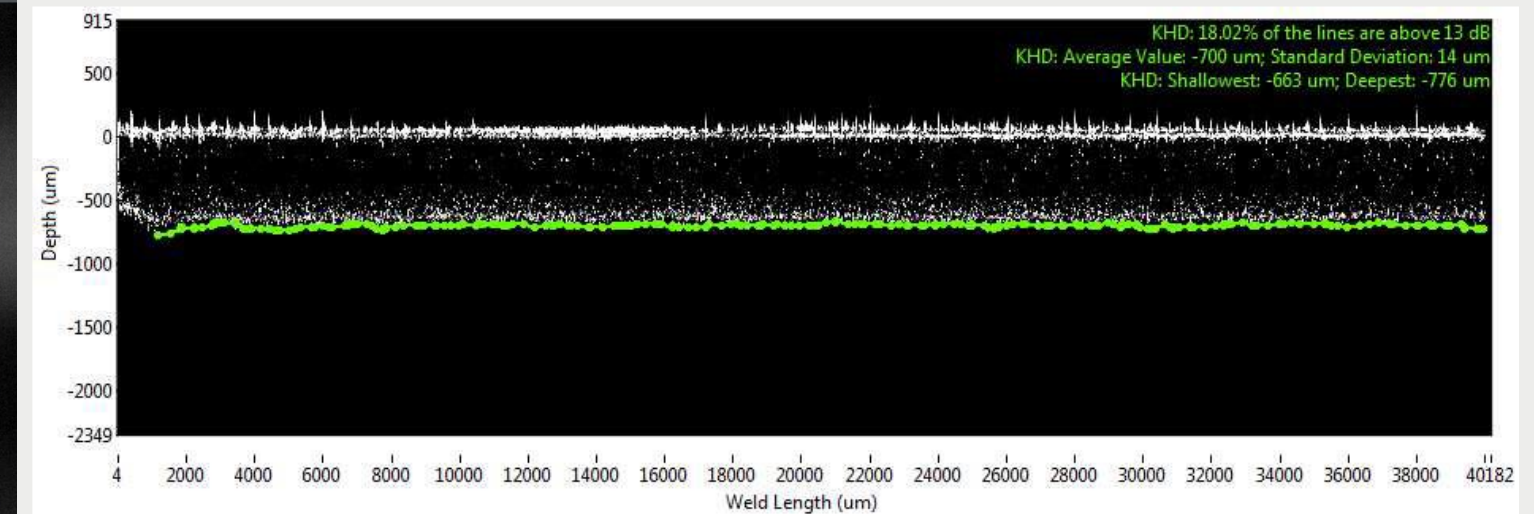
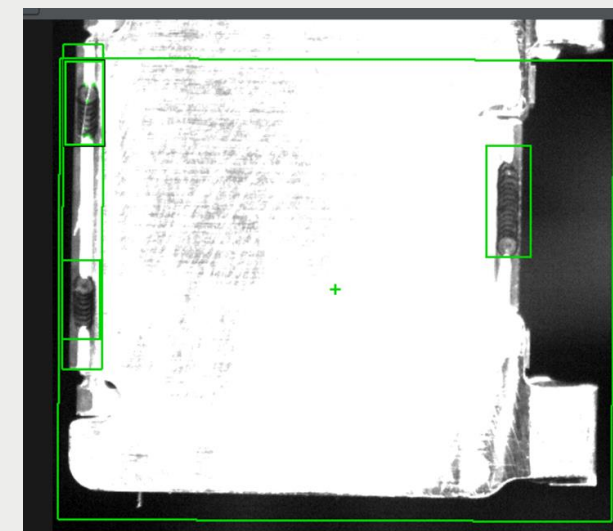
Process qualification by trial and error

- Visual inspection
- Metallographic analysis
- X-Ray analysis
- High speed imaging



High volume “easy” parts: solved

- Online monitoring (OCT, diode based)
- Inline monitoring (Machine vision)



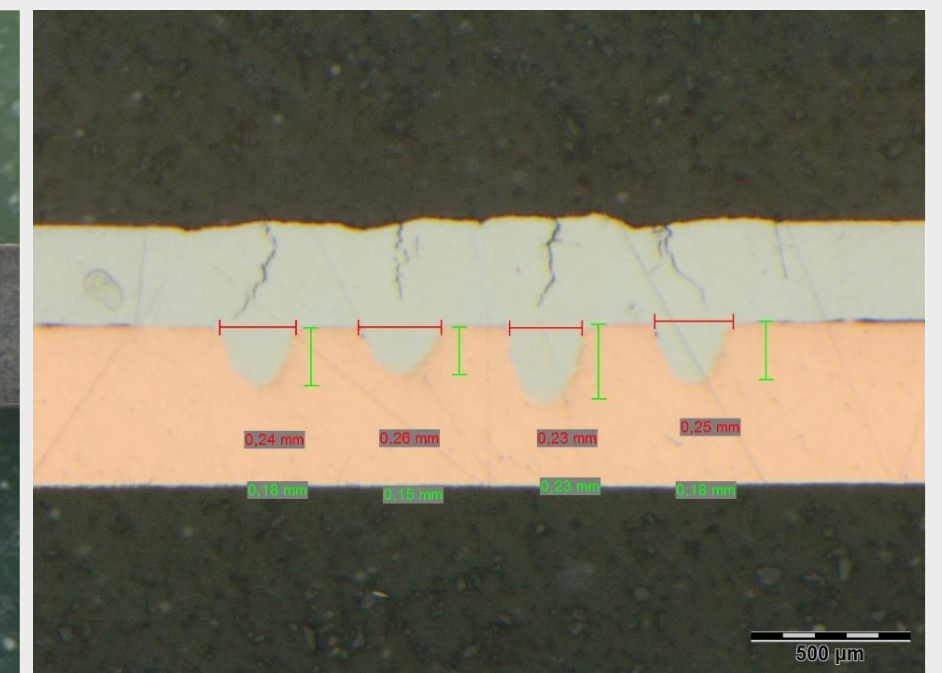
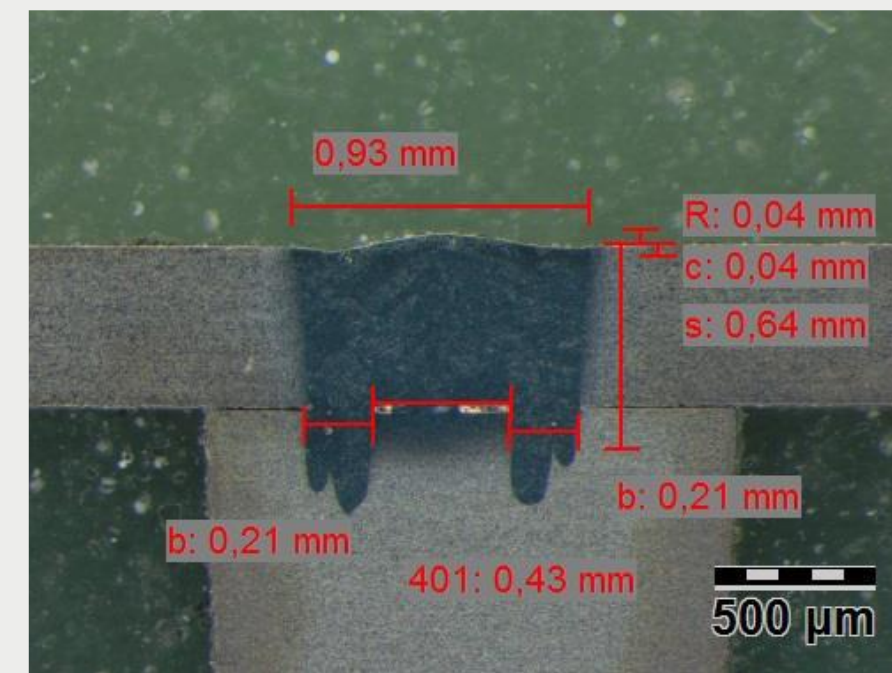
...mostly

Low volume “hard” parts: not solved

- Quantities < 100 pieces: < 10 pieces for development
- Parts with susceptibility to porosity or cracking

Examples

- Aluminium-copper
- Metals with coating
- Aluminium series 5xxx, 6xxx and 7xxx
- High strength steels



Our wish list

Online / inline detection of inner features

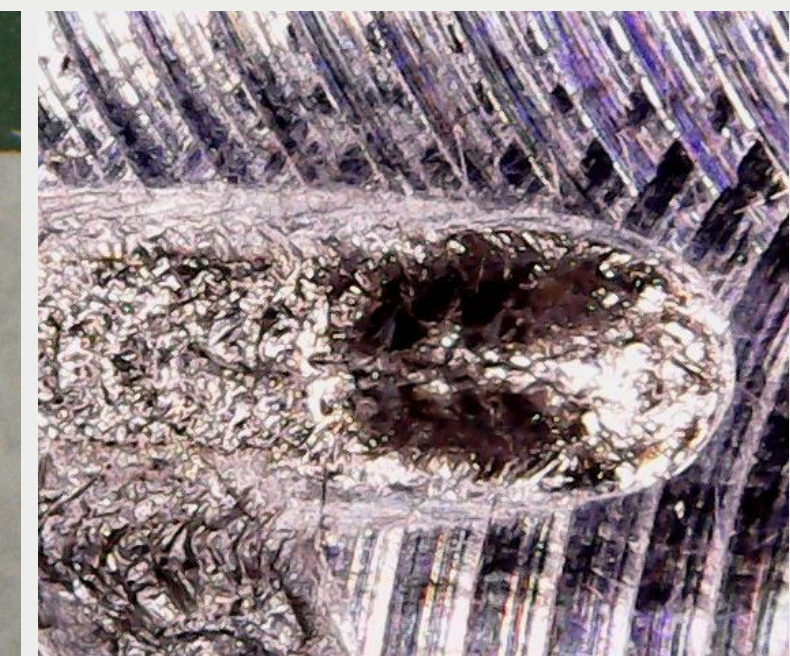
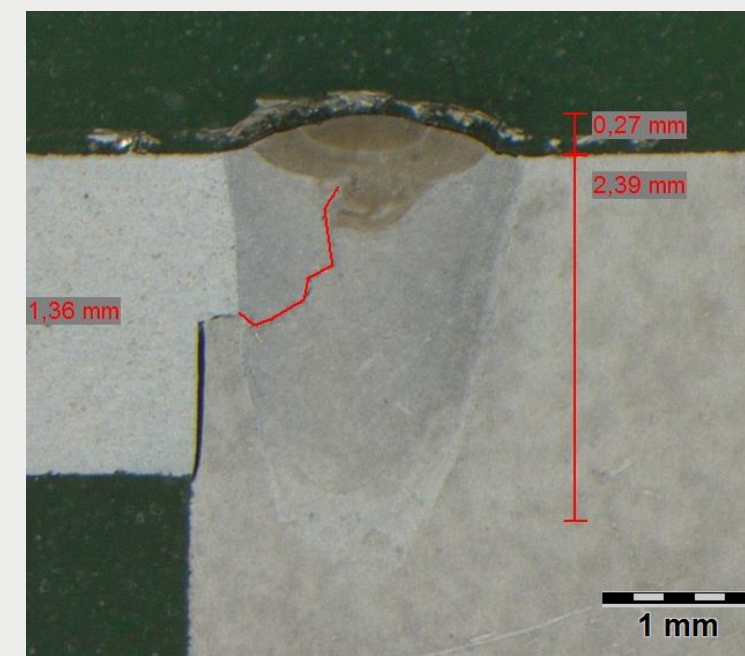
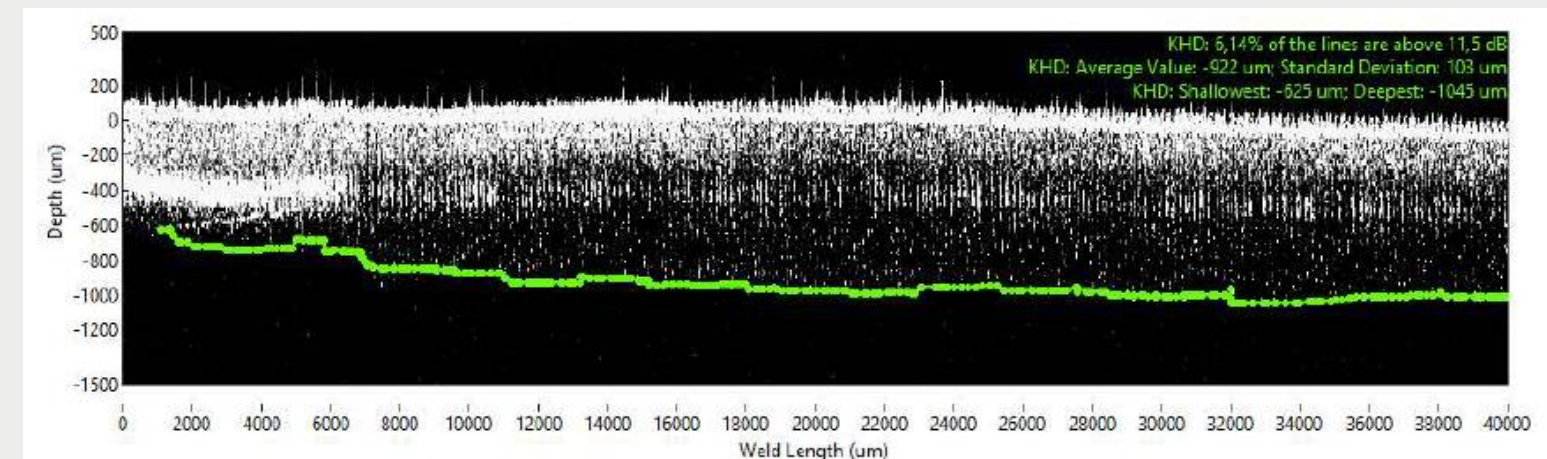
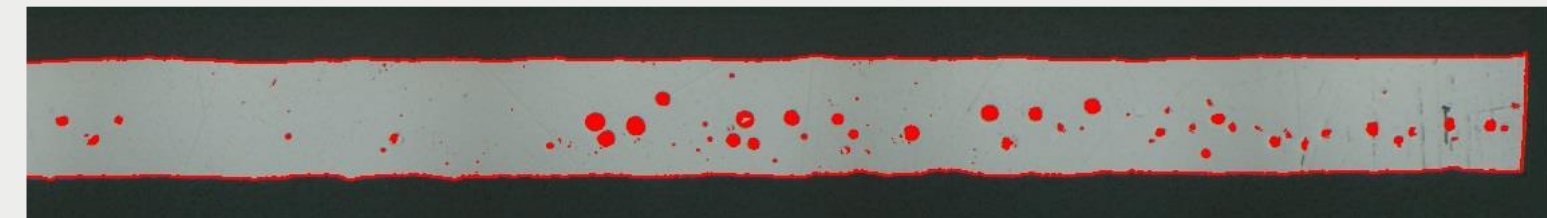
- Porosity (> 5% and > 200 μm)
- Penetration for high speed and dissimilar welds (e.g. copper-steel)
- Inner cracks

Online / inline detection of surface features

- Porosity (> 5%)
- Surface cracks (> 50-100 μm width)

Guidance for process development

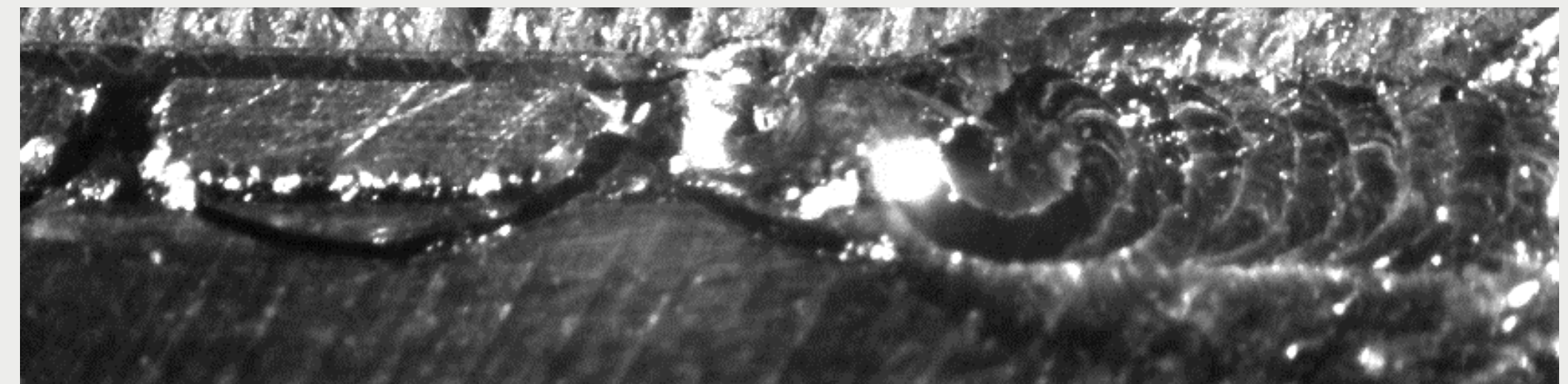
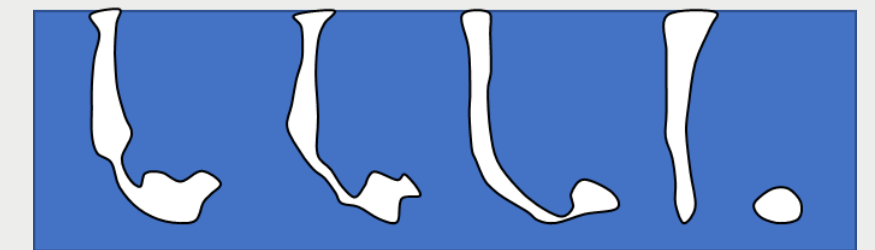
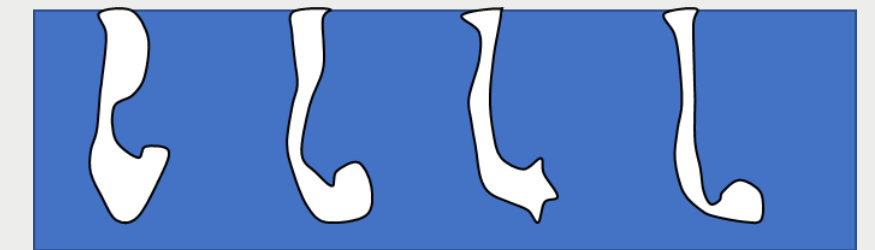
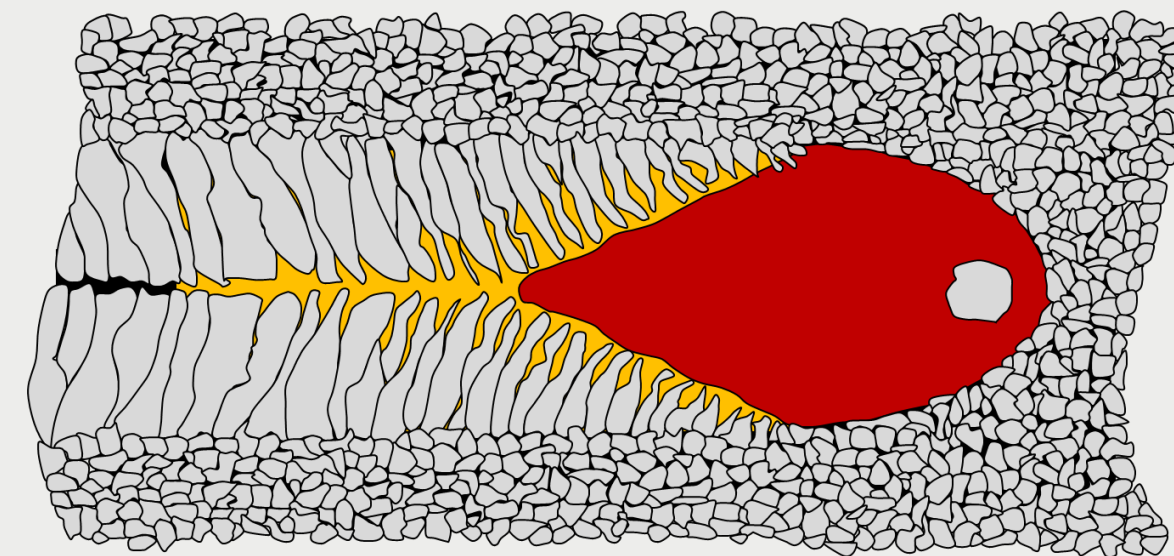
- Correlation of signal and weld seam geometry
- Correlation of signal and irregularity
- Models for interpretation required



We want to help

We do not know how to build a sensor, but we ...

- know the physics
- have the applications
- provide the tools
- are curious and want to proceed



Thank you!

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