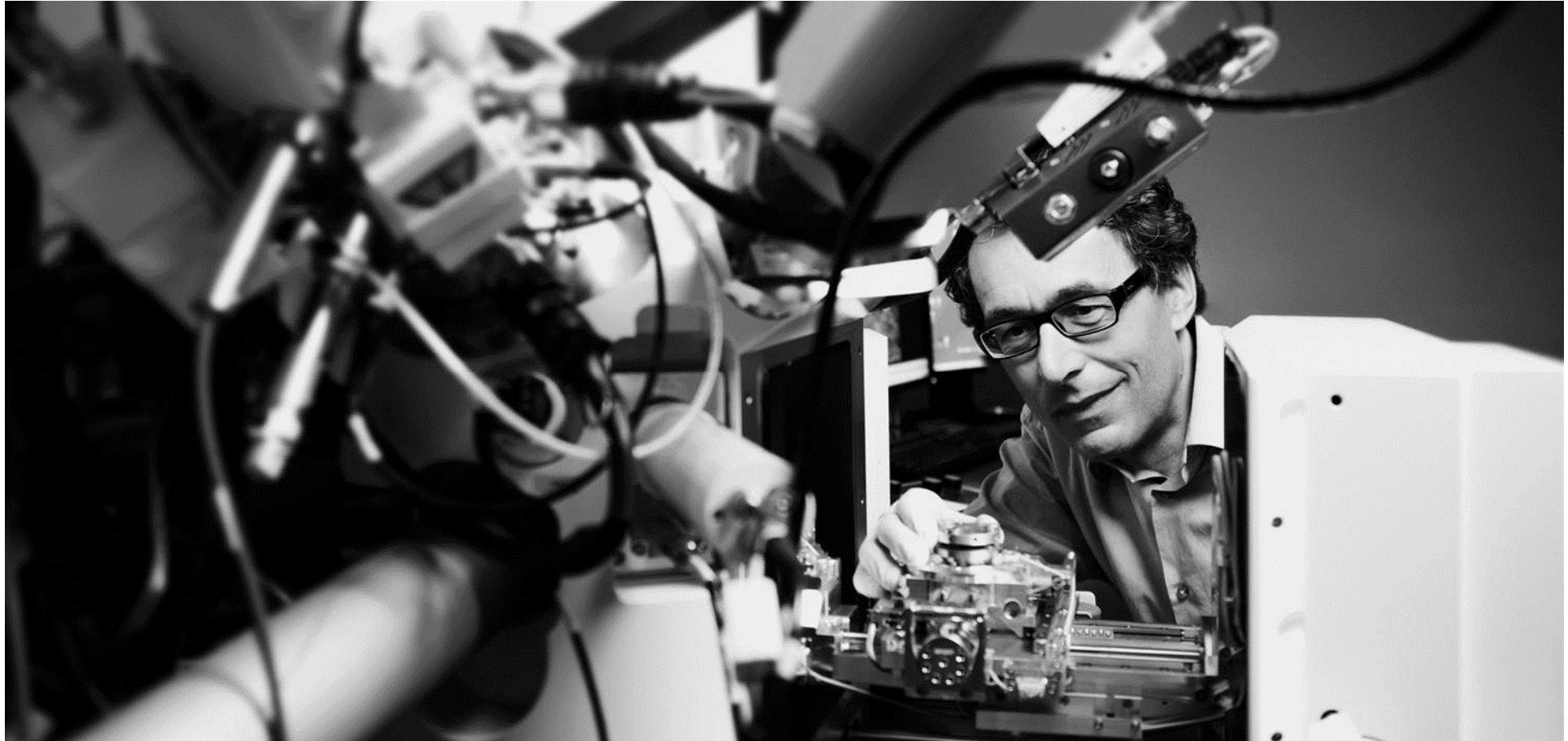# Smartzoom Applications
V 1.4

Jochen Schweizer

Global Sales Support Industry

16.07.2015

Please note …

This presentation is for internal use only. Do not distribute it.
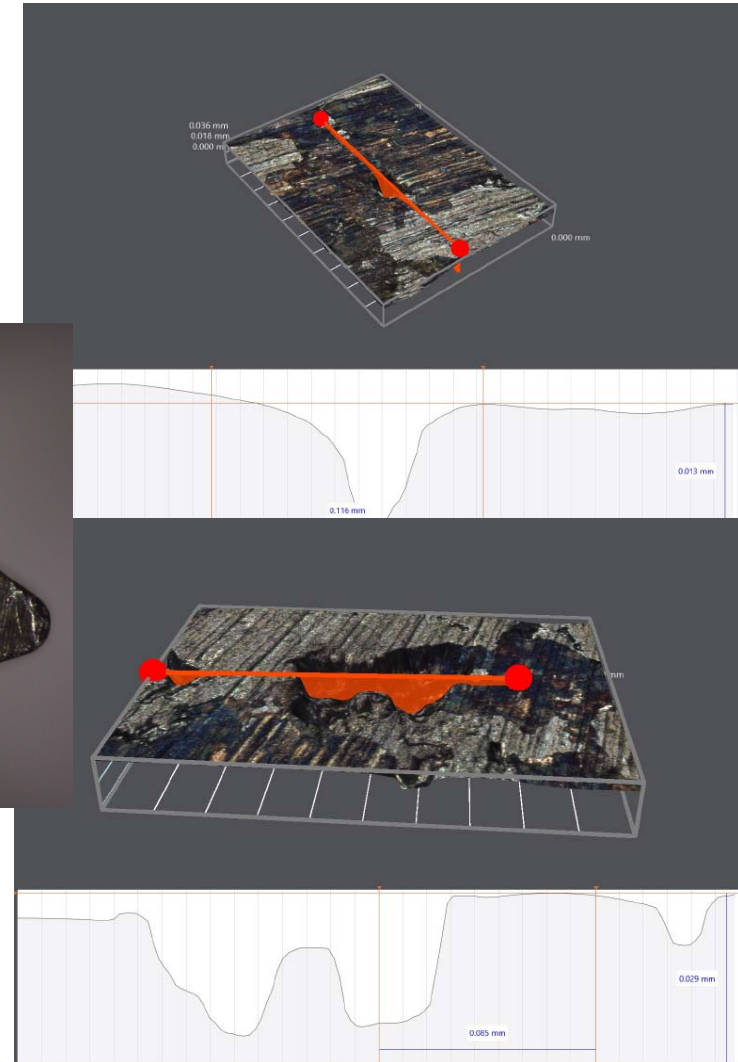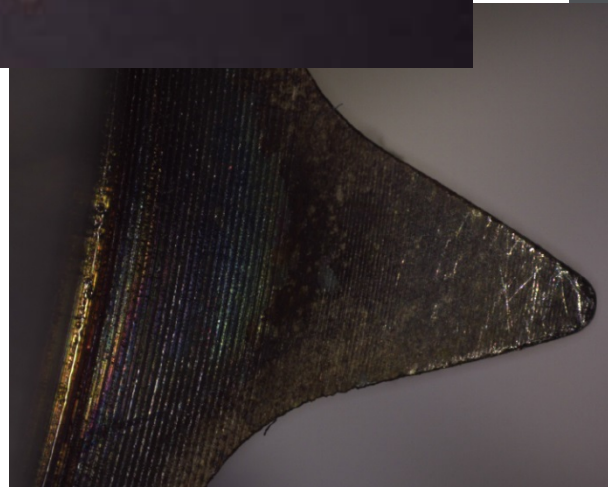
Images / Customers **confidential**.

Metal Working
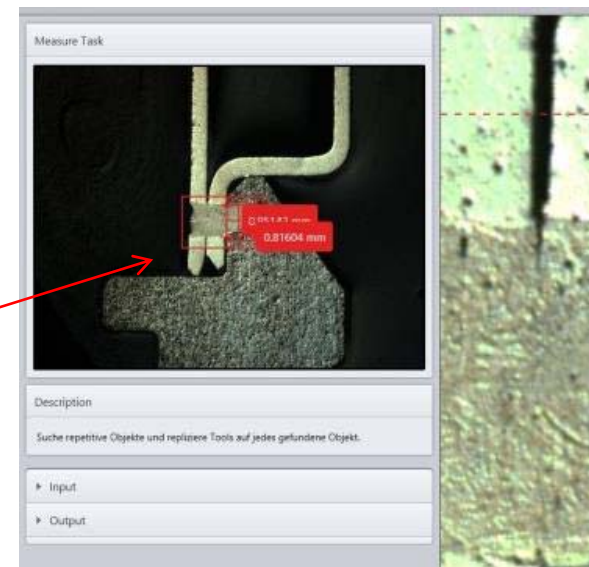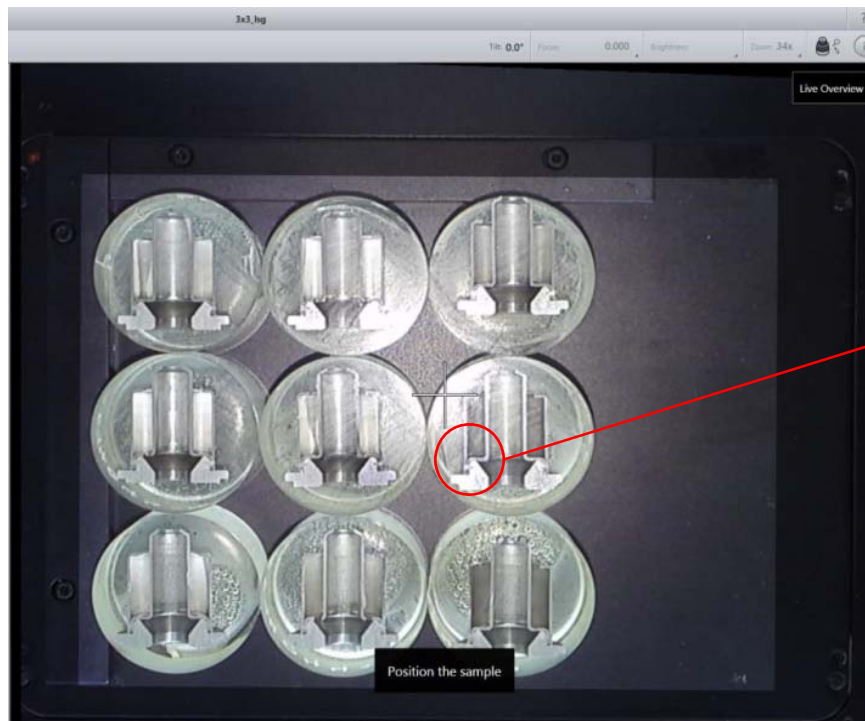## Failure Analysis Corrosion Inspection

- Inspection of corrosion defects on gear-wheels

- Lateral and depth measurement of corrosion impact

- Documentation of images, defect structure, color

- Documentation of measurement results

Welding
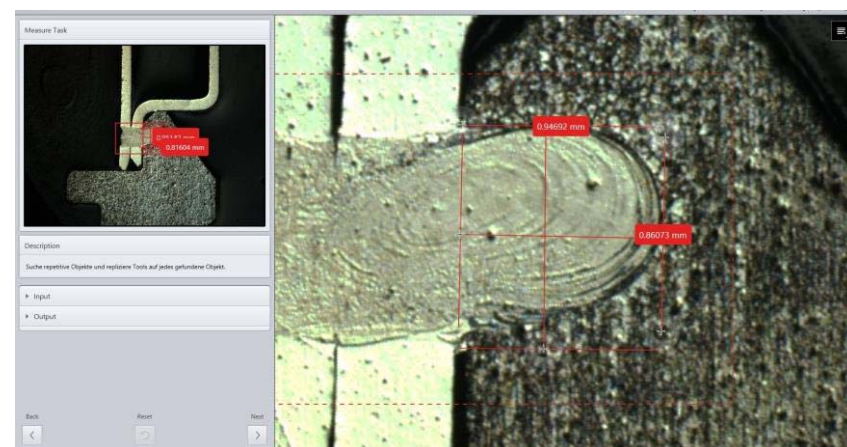## FH Aalen. Serial measurements of welding seams

1. Setting up a routine job by measuring the first weld cut set manually
2. Using the "repetitive object" function
3. Documentation of results

Key advantage:
Smartzoom is analyzing all 9 samples (total of 18 welding seams) within 10 minutes.
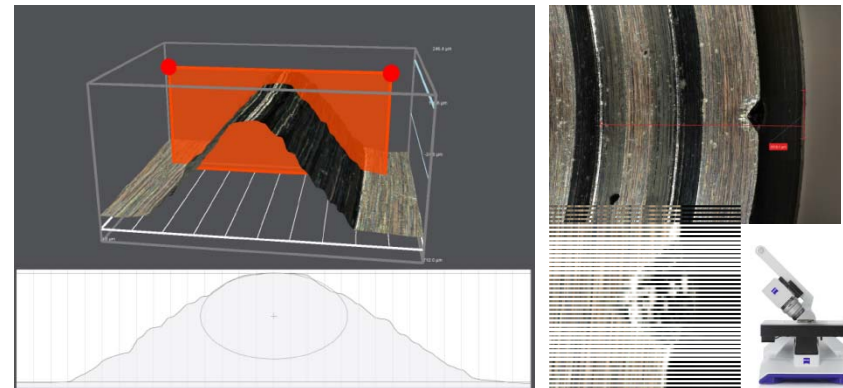(In comparison a conventional system needs ~ 2 hours.)

Metallic work piece
Optical characterization

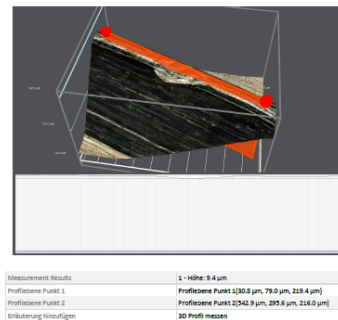**1** Identification and characterization of defects on metallic work pieces

2 Visualize and measure defects by using different views in 2D and 3D

3 Tracable results, automated report

Microsoft Word 2010

ZEISS Smartzoom 5 full report

Smartzoom 5 Features

- Overview image for navigation on work piece and rough identification of relevant areas

- Free mode to perform optical inspection (Best Image, Tilting, Illumination combinations,…)

Injection Molding
Burr evaluation at glued moulding parts
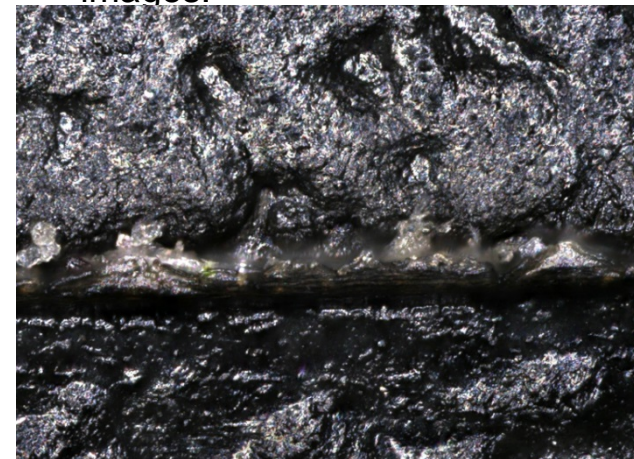
ZEISS

1 Before: Manual evaluation of burr by haptic impression with thumb. Evaluation differs from operator to operator.
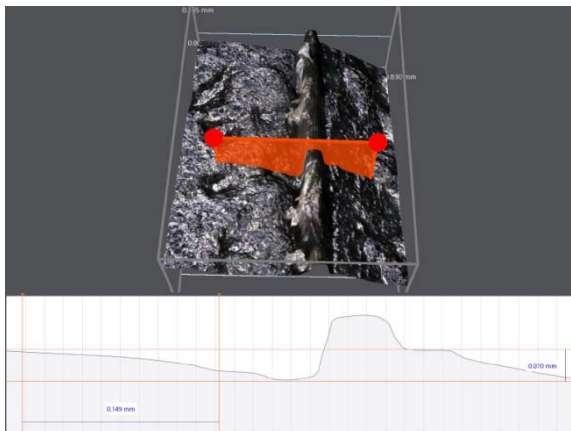

2 Define the inspection plan: set coordinate system, stage position, focus, acquire 3D images.

3 Measure burr at pre-defined spots
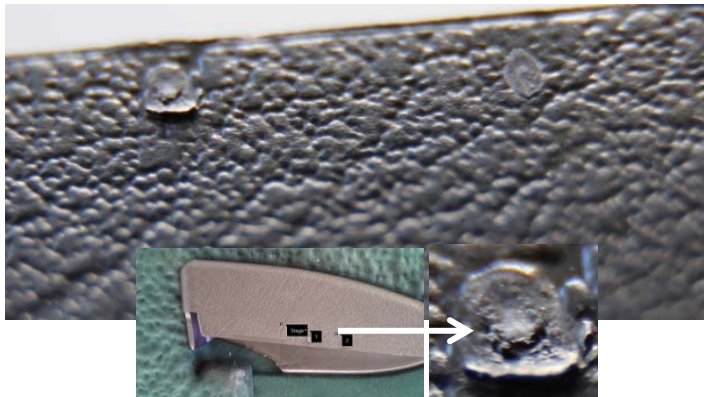

Smartzoom 5 Features

- Automated positioning
- Automated focusing
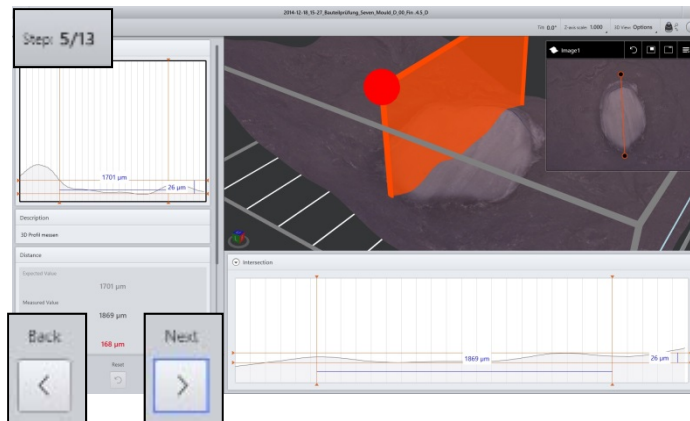- **User independent, reliable results**

Injection Molding
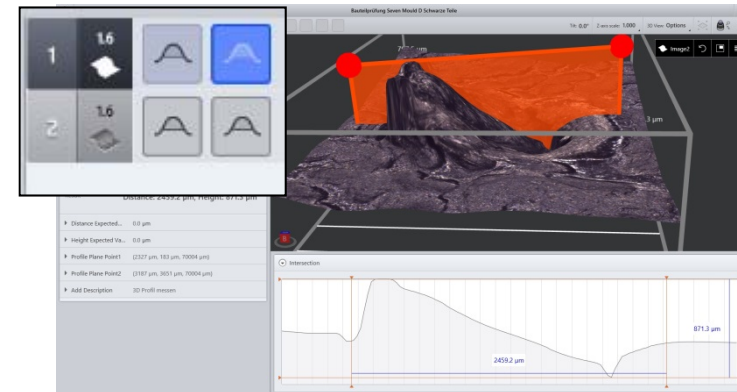## Quality Control of pre-production

ZEISS

1 Box of work pieces:
Injection spots to be qualified

2 Define the inspection plan: set coordinate system, stage position, focus, acquire images, apply tools.

3 Run the semi-automated inspection wizard for **all** work pieces

Smartzoom 5 Features

- Automated positioning
- Automated focusing
- **10x faster** than inspection with a standard microscope

Manufacturing
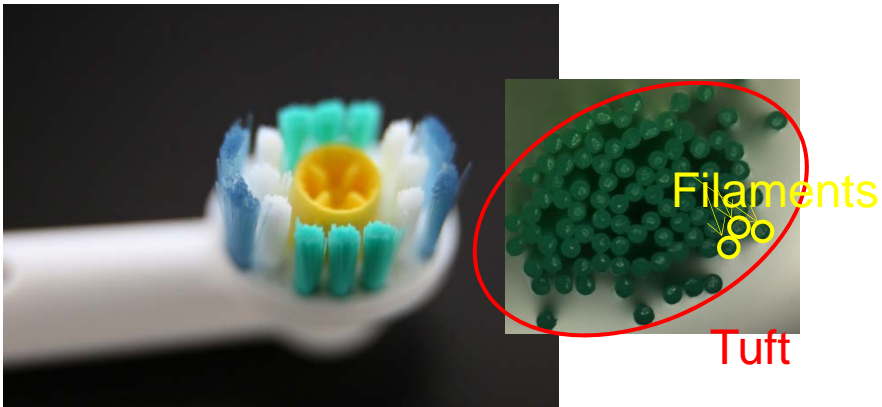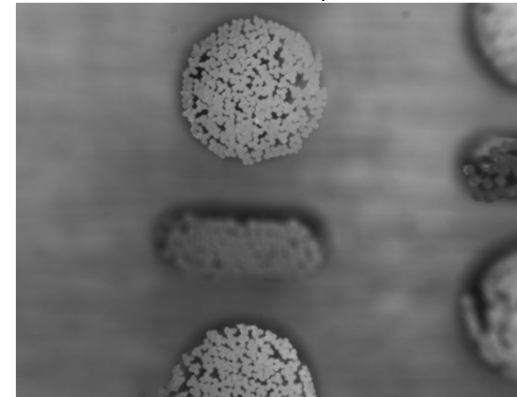## Imaging and counting of tufts filaments

ZEISS

1 Quality Control: assure the correct number of filaments in each tuft
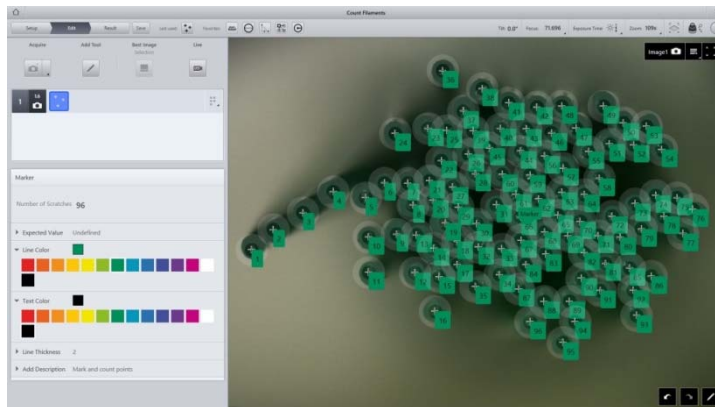
Filaments

Tuft

2 Define the inspection plan for toothbrush head: set coordinate system, teach individual tufts, count filaments

3 All results images of the whole toothbrush will be automatically archived
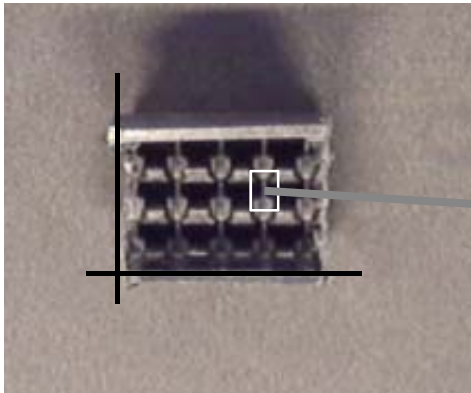
Smartzoom 5 Features

- **Inspection plan** contains all inspection tasks for whole toothbrush head

- Tufts are **positioned and focused automatically**

Injection Molding
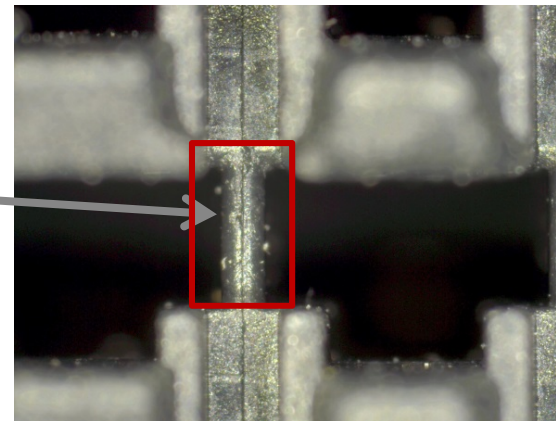## Random Inspection of Inner Bars Of Patch Plug
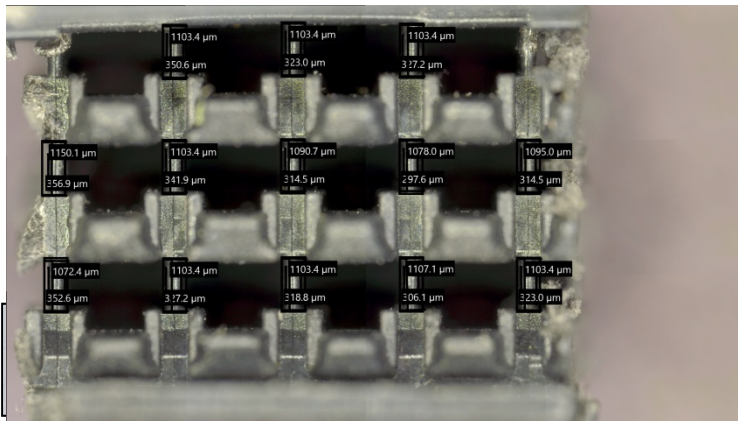
ZEISS

1 Inner bars should be measured

2 Define the inspection plan: set coordinate system, stage position, focus, acquire images, apply tools.

3 Run the semi-automated inspection wizard for **all** bars on **all** work pieces

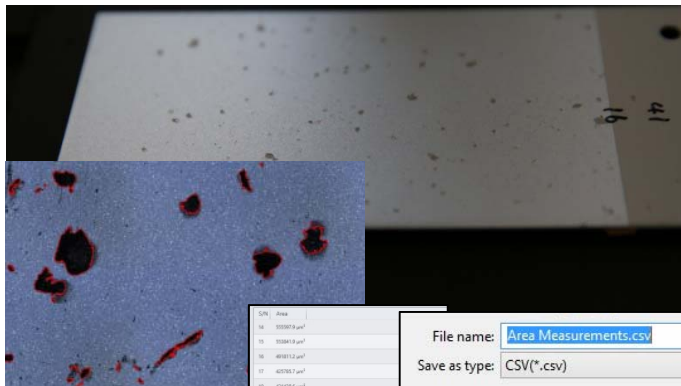| 1103.4 µm | 1103.4 µm | 1103.4 µm | | |
350.6 µm	323.0 µm	317.2 µm		
1150.1 µm	1103.4 µm	1090.7 µm	1078.0 µm	1095.0 µm
356.9 µm	341.9 µm	314.5 µm	297.6 µm	314.5 µm
1072.4 µm	1103.4 µm	1103.4 µm	1107.1 µm	1103.4 µm
352.6 µm	317.2 µm	318.8 µm	306.1 µm	323.0 µm

Smartzoom 5 Features

- Overview camera enables fast navigation
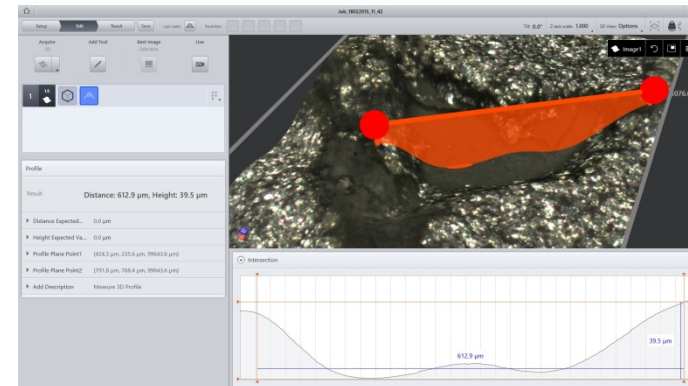- Automated replication of tools on large stitched images on each nest

Automotive
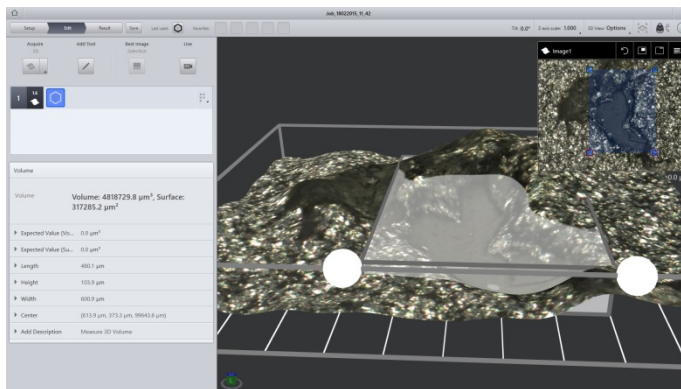## Failure Analysis Car finish Hardness testing

ZEISS

1 Automatic measurement of wholes in car finish and export of results to excel

2 Determine width and height of critical wholes

3 Determine volume of critical wholes

Smartzoom 5 Features

- Easy navigation through overview image

- Optimal settings proposed by Best Image

- Automatic measurement with are measurements
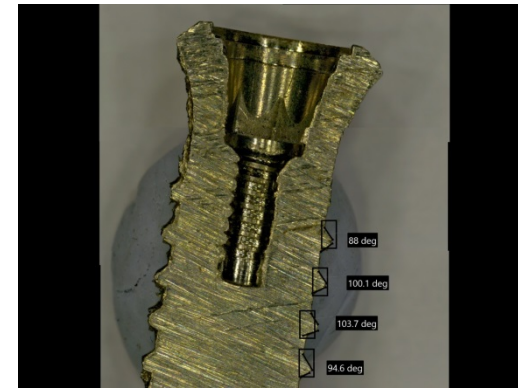
Metal working
Dental implant cut

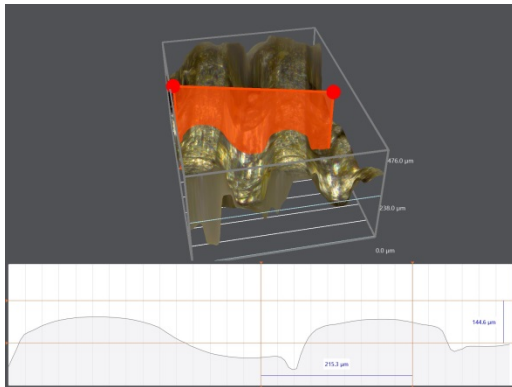**1** Random inspection of dental cuts. 2D measurements at predefined positions

3 Measure 3D profiles in inner thread

2 Replicate tools on repetitive spots: Measure angles on all outer threads.
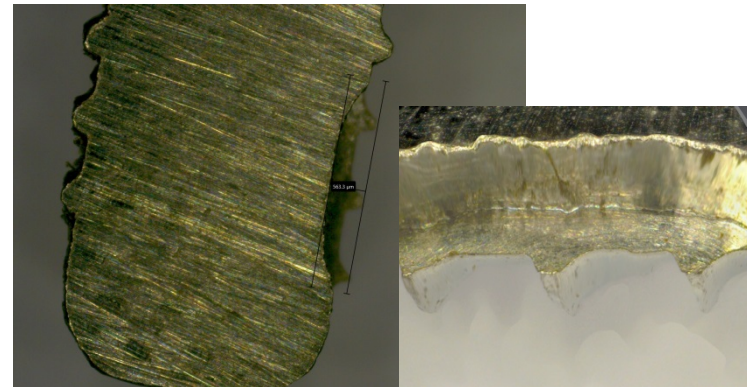

4 Detect and analyze defects in material in 2D and 3D

Coin House
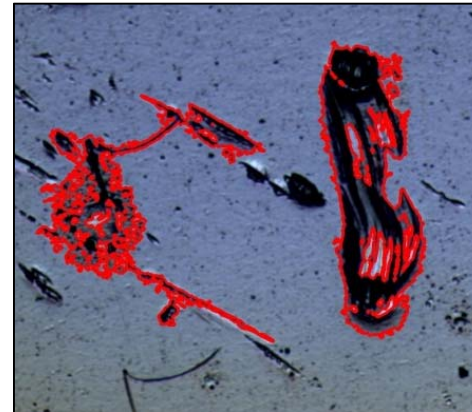## Flexible microscope for multiple optical inspections.

1 Random inspection of polished surface of commemorative coins

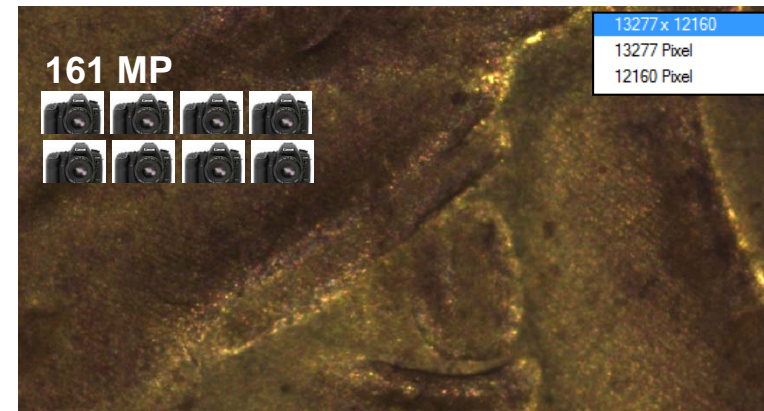**2** Automatic area measurement of scratches

3 Routine inspection of 4x ducat

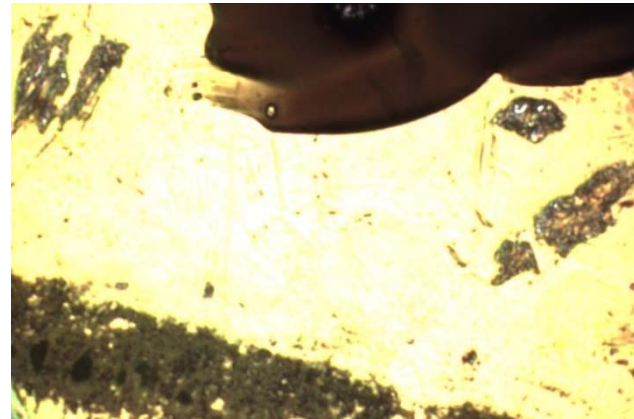**4** Archive high resolution image of complete ducat for documentation

161 MP

13277 x 12160
13277 Pixel
12160 Pixel

Coin House
Random quality check of round blanks

ZEISS

1 Random inspection of round blank

2 Automatic measurement of dark areas

3 Random inspection of round blank

4 Identification of contamination
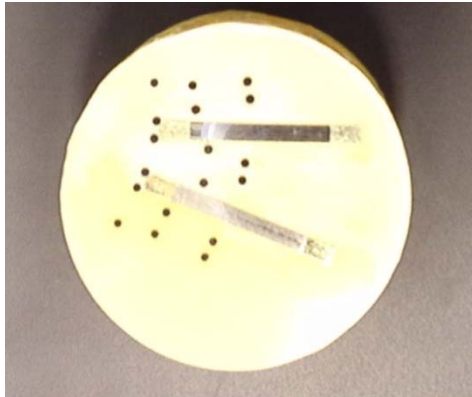
Coin House
Flexible microscope for multiple optical inspections.
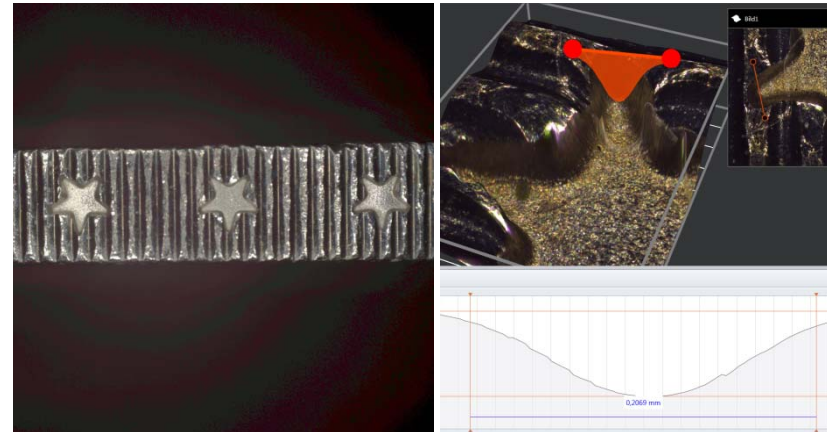
1 Random inspection cross-section polish

2 Measurement of joining area

3 Random inspection of lateral surface

4 Analyse profile of star
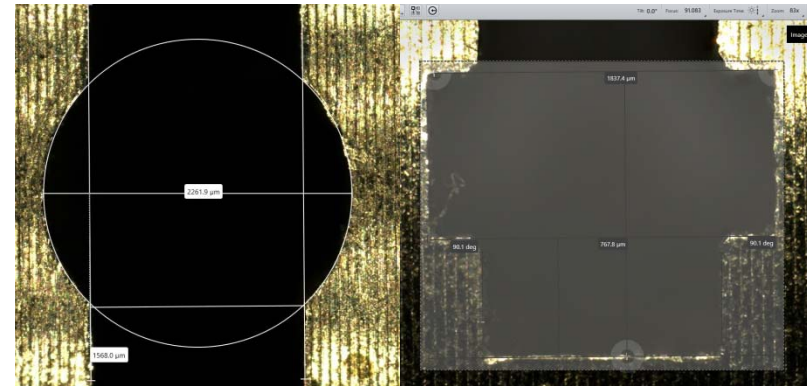
Metal Working
Lock barrel.

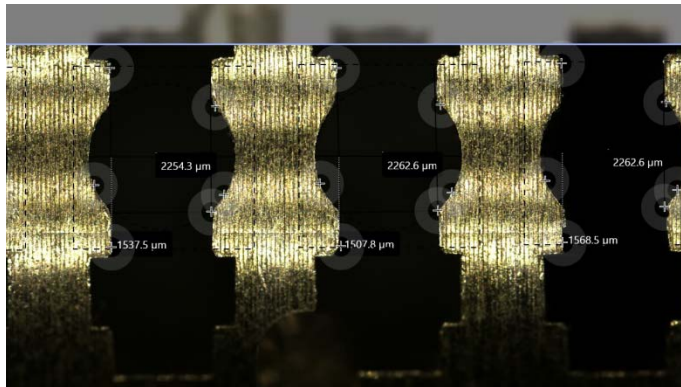**1** Define inspection plan for lock barrel.

2 Teach templates and define inspection plan
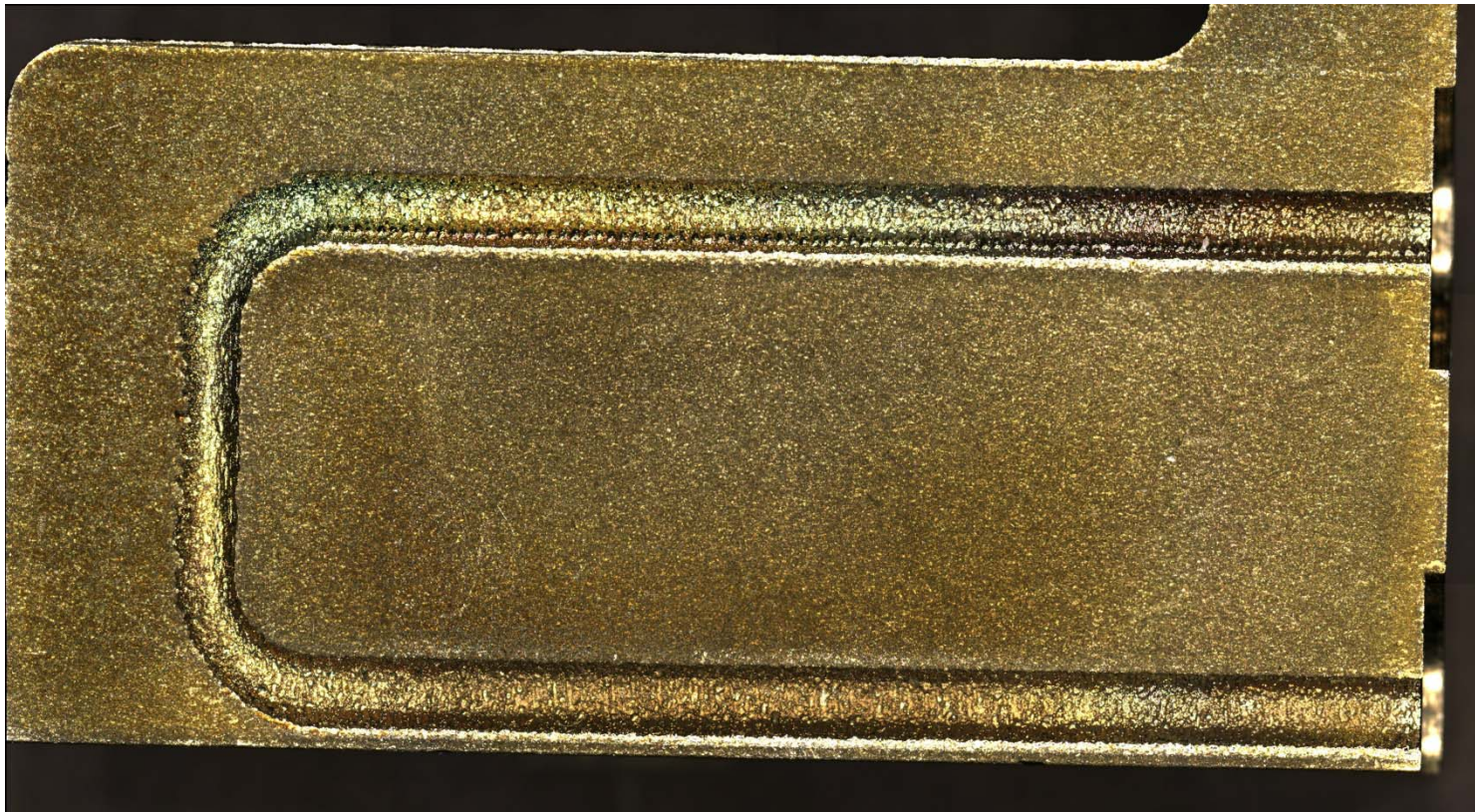

3 Run inspection plan

Smartzoom 5 Features

- Geometry of sample requires EDF

- Automatically replicate tools for each nest

- Use Stitching + EDF to visualize relevant areas

Metal Working
Failure Analysis: Inspect presence of inside coating.

- Best Image for optimal settings
- EDF: Extended Depth of Field, as sample is not flat
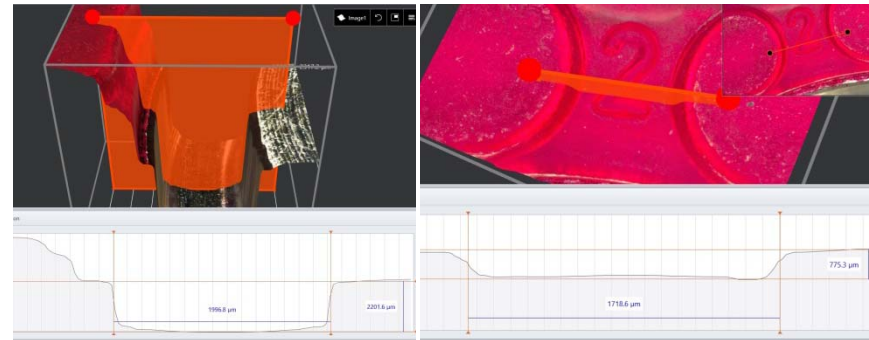- Stitching to display the whole work piece (21MP image)

Injection Moulding
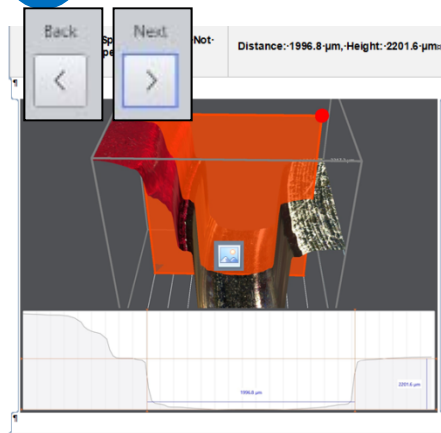## Random Inspection on piston moulding

1 Pistons to be qualified

2 Define inspection plan

3 Run inspection plan
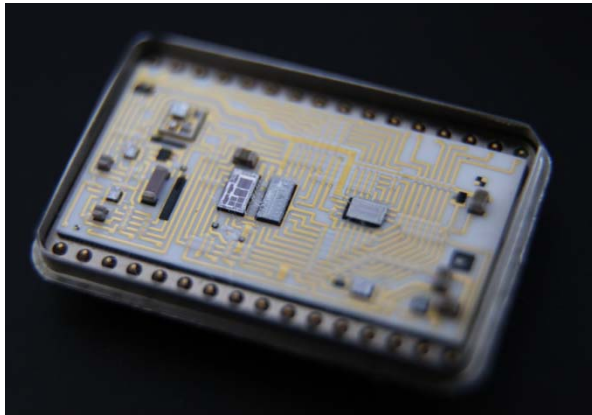

Smartzoom 5 Features

- Live HDR (High Dynamic Range) for reflective samples
- Inspection plan for automatic positioning and focussing
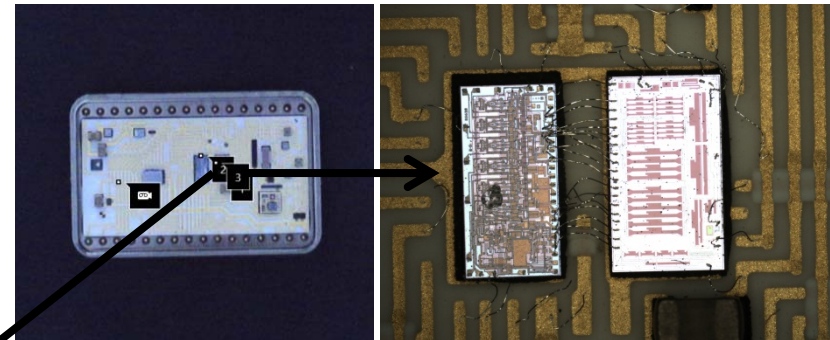- Inspection plan for repeatable results

Electronics
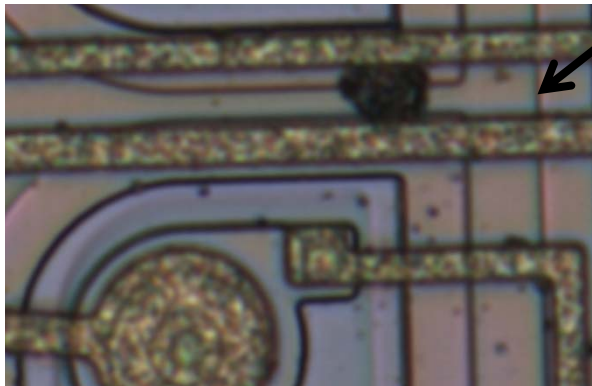## Failure Analysis. Find the root cause of a defective board.

1 Work piece

2 Stitched image with 30x magnification

3 1011x magnification and HighRes Mode (18 MP)

Smartzoom 5 Features

- Overview image for navigation
- Use Stitching to inspect the whole sample
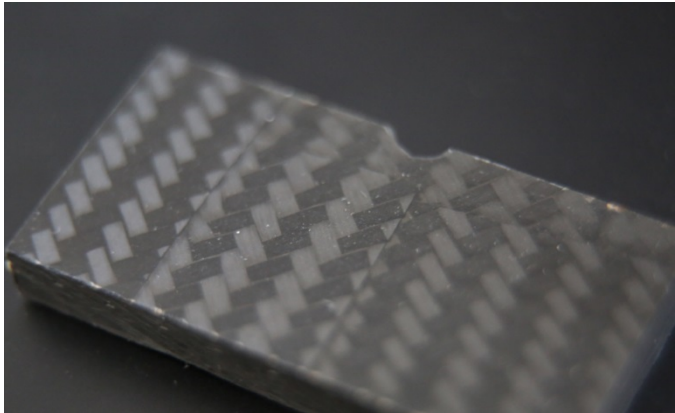- Increase resolution with HighRes Mode

Carbon fiber
FH Rosenheim Failure Analysis. Defective carbon fiber–reinforced polymer thread.

ZEISS
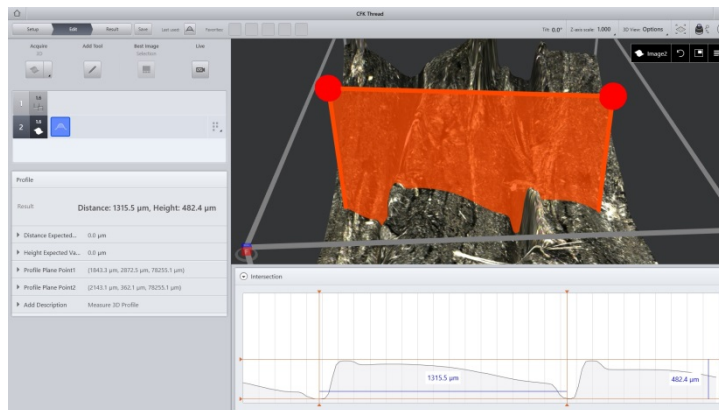
1 Work piece

2 Stitched image. Detail view.

3 Chiped thread profile

Smartzoom 5 Features

- Overview image for navigation
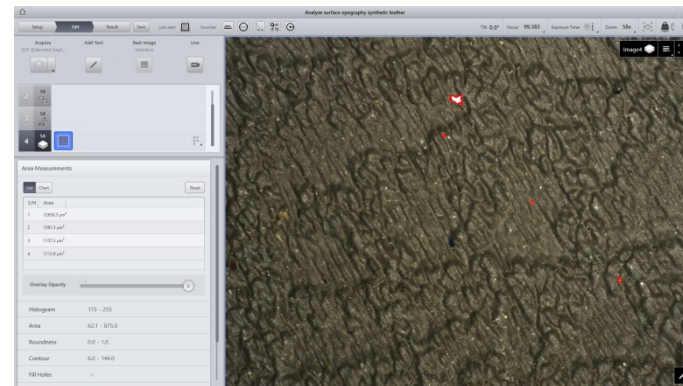- Fast identification of root cause

Dashboard Skin
FH Rosenheim. Dashboard skin. Inspection of synthetic leather.
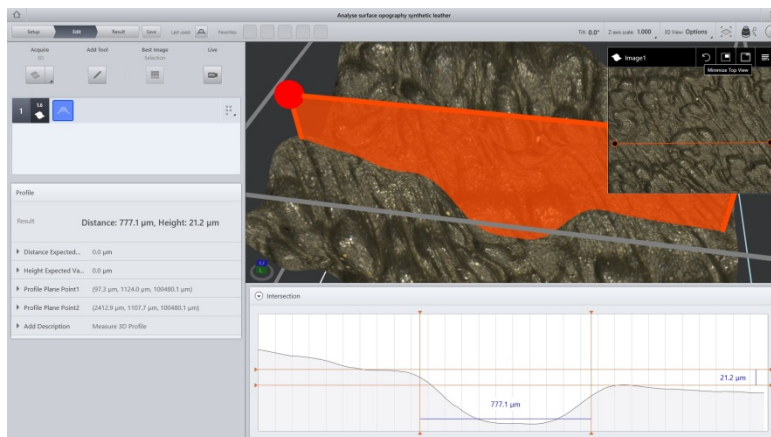
ZEISS

1 Cut of dashboard skin

2 Automatically determine defective areas

3 3D inspection of critical areas

Smartzoom 5 Features

- Easy navigation through overview image
- Automatic measurement of defective areas
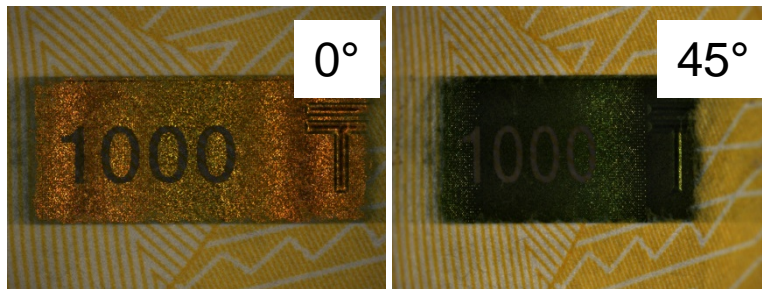- Detailed analysis of defective areas.

National Bank
Random inspection of banknotes during production

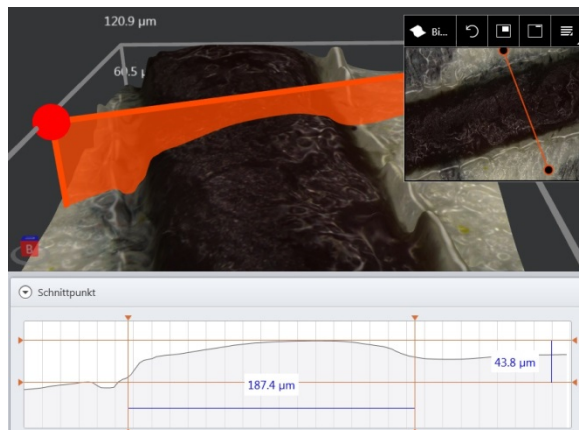**1** Security feature. Color changes according to angle. Tracable results through encoded tilting angle.

0°   45°

2 Feature recognition by repetitive objects tool
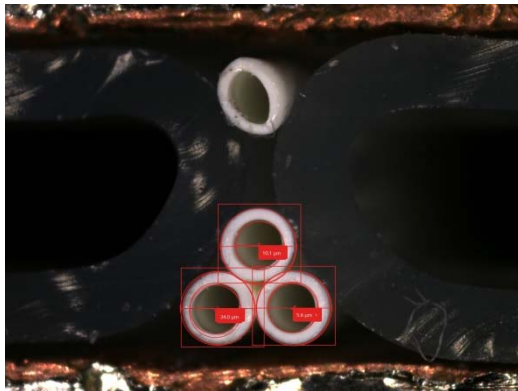

3 Relief of Intaglio printing

Smartzoom 5 Features

- Random quality inspection. Inspection plan ensures tracable results
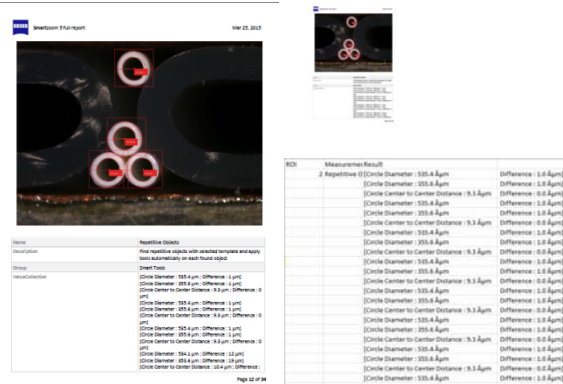
- Automated feature recognition and replication of tools

Random Inspection of Filaments
Automatic detection of fibers

ZEISS

1 Detect filaments automatically, replicate measurements - if not crimped

2 Navigate on overview image
Perform inspection on stitched image

3 Easy Report generation
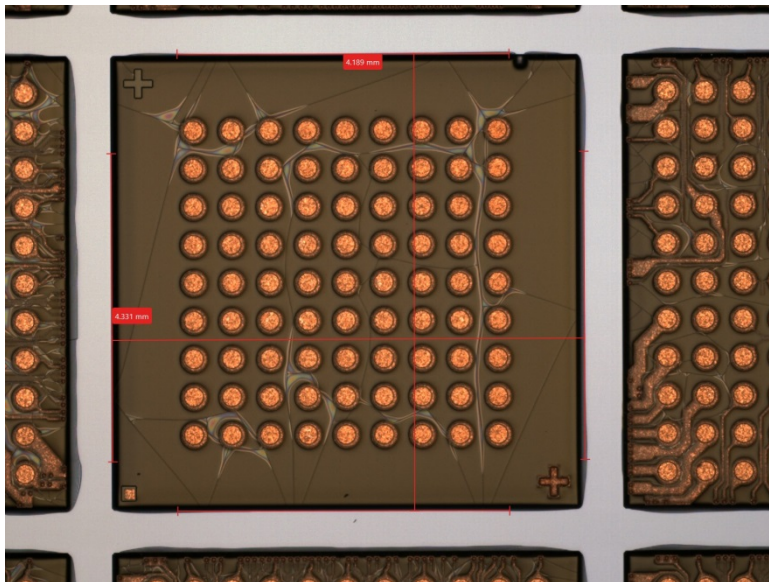Word report, CSV Export

Smartzoom 5 Features

- Overview image enables fast navigation on work piece

- Automated feature recognition and replication of tools speeds up inspection

- False filaments are ignored

Quality Inspection of Wafers
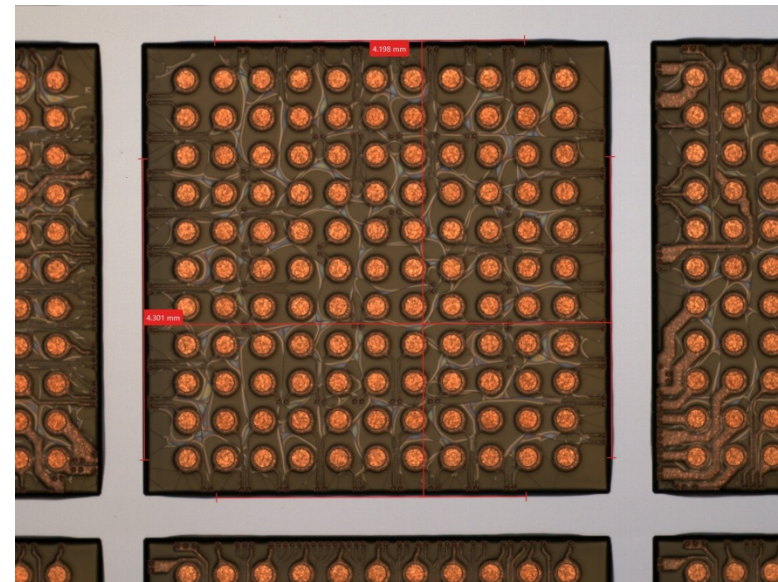## Stage travel range optimal for 4 Inch / 6 Inch Wafers

1 Excellent images through usage of ringlight and coaxial illumination simultanously

2 Repetitive objects tool enables automatical detection of objects and replication of tools
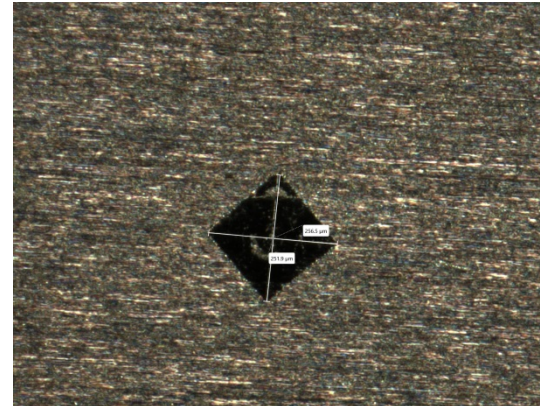
Research
FH Aalen. Semi-automated Vickers imprint measurement.

ZEISS

1 Hardness imprint

2 Determine x/y distance for Vickers imprint

3 Create template and replicate the tools on each imprint on the work piece

Template (12) Zoom: 331x

Back | Next

Smartzoom 5 Features

- Easy navigation through overview image

- Automatic detection of imprints (not scaling invariant) and replication of tools for semi-automated failure analysis
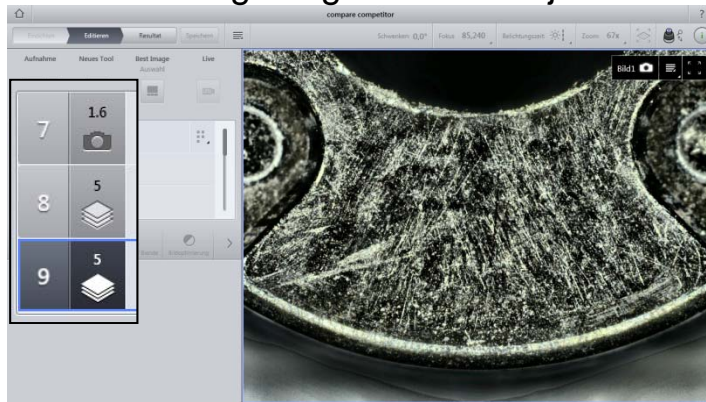
Analysis of competitor's work piece
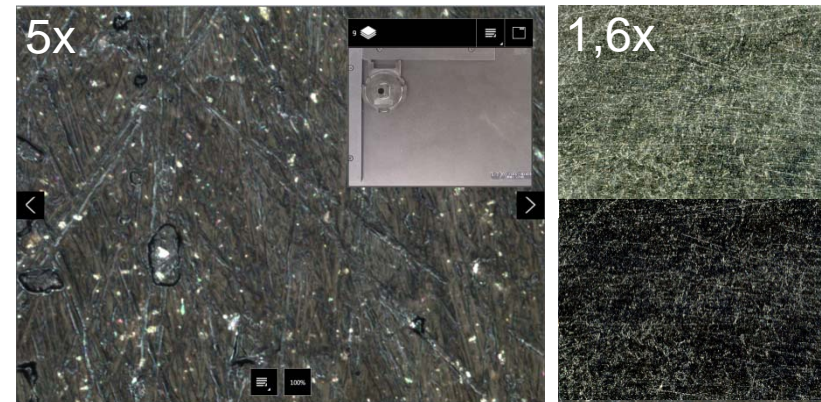## Reliable and fast comparison

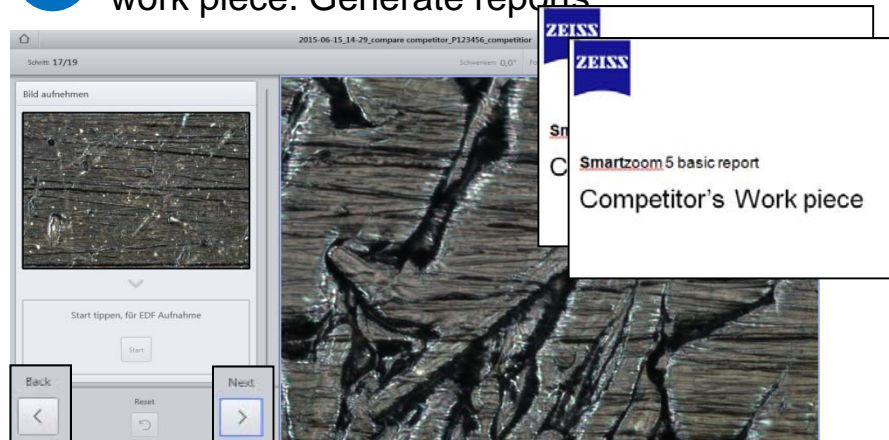**1** Teach inspection plan that contains examination of 9 relevant features, including images from 2 objective lenses

2 Perform surface characterziation by using illumination combinations and filters

3 Run inspection plan on competitor's work piece. Generate reports

Smartzoom 5 Features

- Reliable surface inspection on critical areas, fast inspection through automation

- Comparable results, Reports of customer's and competitior's work piece

Automotive Supplier
EDF image for classification of failure mechanism
without sample preparation.

ZEISS

Breaking edge of metallic work piece

Smartzoom
5 Features
- Easy navigation through overview image
- Seemless tilting function
- No sample preparation needed