Software Manual

ZEISS ZEN core - Custom Applications

Dendritic Arms Spacing

ZEISS ZEN core - Custom Applications

Original Manual

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Content

1 General

NOTICE

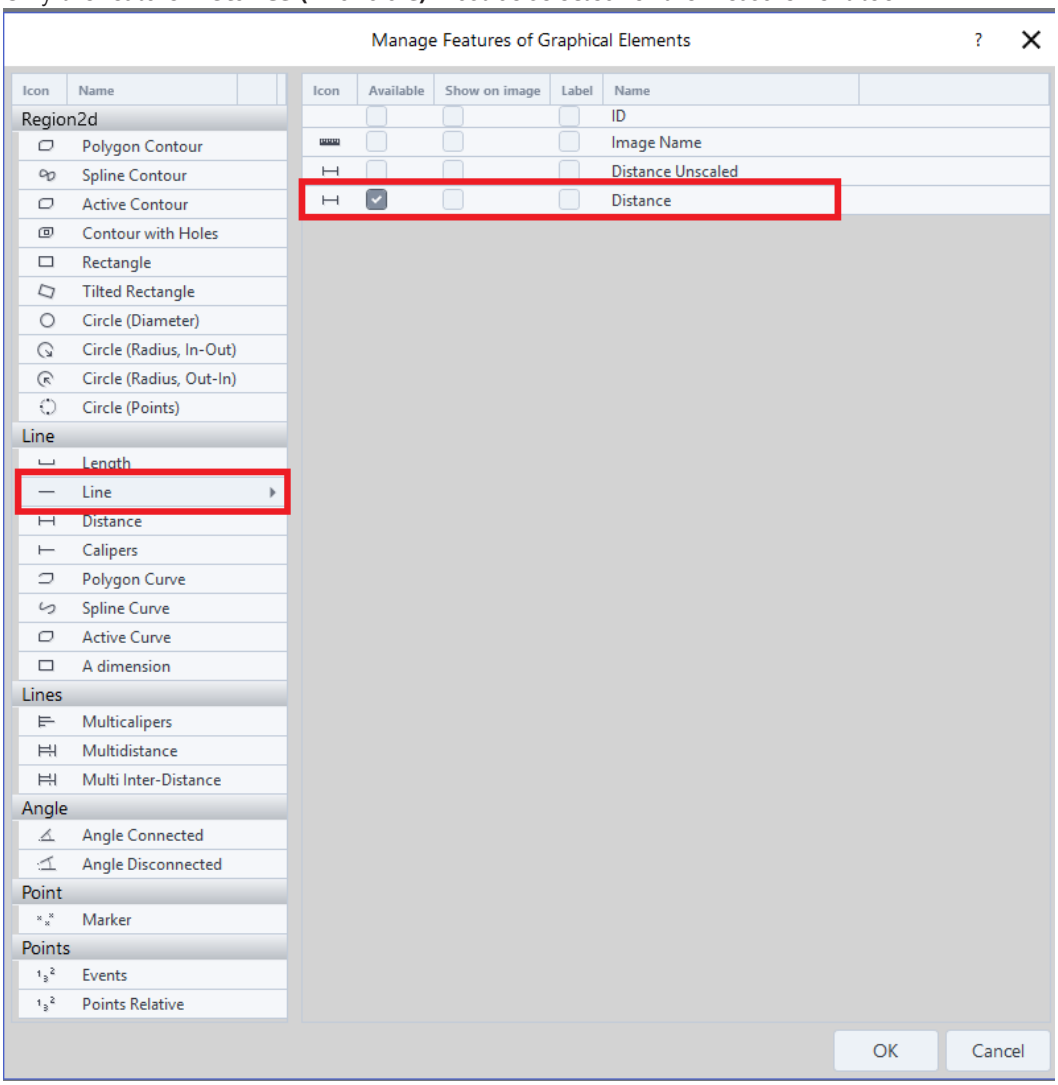
The application works with **ZEN core v2.7** version 2.7.80.00005 and higher.

This application is an extension for **ZEN core** and provides **Dendritic Arms Spacing** measurement.

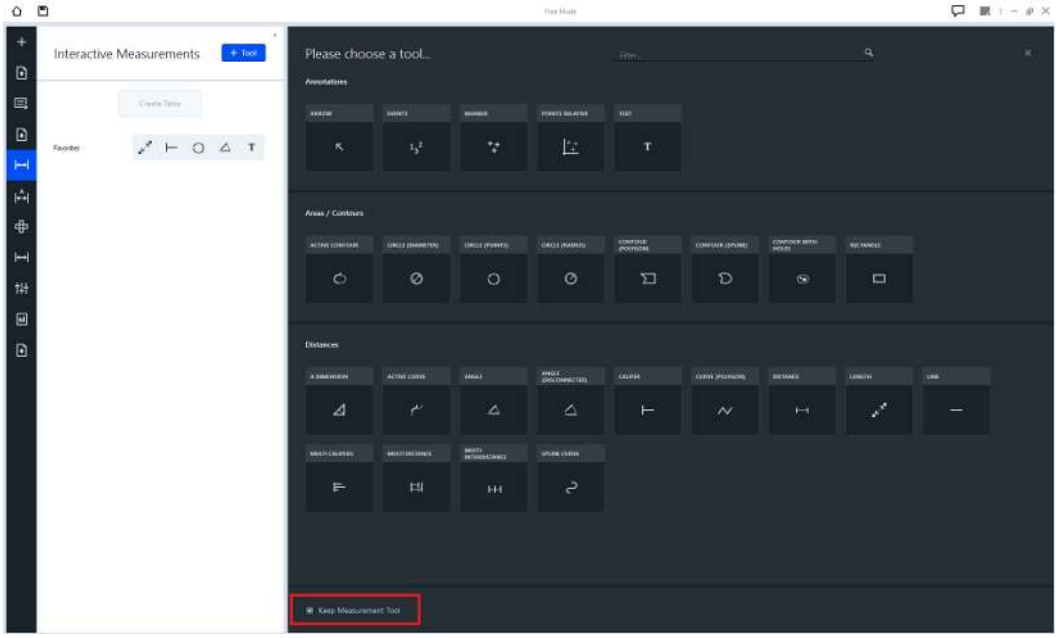
It requires the **ZEN Module Image Analysis**.

2 Prerequisites

- You have setup the **User Management** with a **Supervisor** and an **Operator** account. Refer to the **ZEN core Online Help** topics **Basics of User and Group Management** and **Creating and Managing User Accounts** for detailed information.
- Under **Maintenance**, **Manage Features for Graphical Elements** you have setup the Interactive Measurement Features for the Measurement tool **Line**.
  Only the feature **Distance (Available)** must be selected for the measurement tool.



- You have checked **Keep Measurement Tool** in the **Interactive Measurements** task (**+ Tool**) in **Free Examination**.



3 Content of the application

The job templates have to be imported in **ZEN core**.

The application consists of four job templates and one demo image.

For data presentation with statistical values:
- **Dendritic arms spacing - with Load image.czjob**
- **Dendritic arms spacing - with Acquire image.czjob**

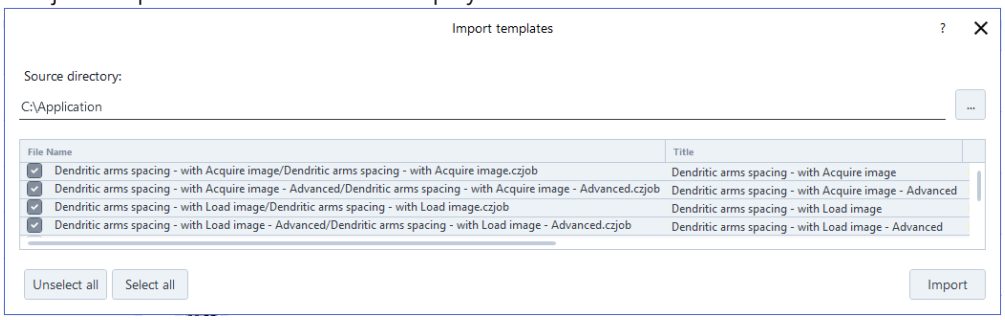
For data presentation
with all individual values and statistical values and
with individual values with minimum count 5 and statistical values:
- **Dendritic arms spacing - with Load image - Advanced.czjob**
- **Dendritic arms spacing - with Acquire image - Advanced.czjob**

Demo image:
- **demoDAS.jpg**

4 Importing Job Templates (Supervisor)

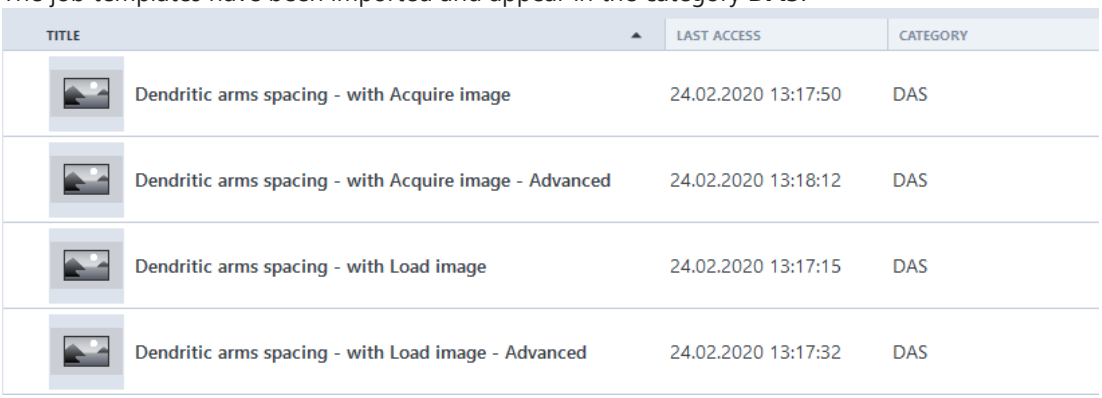
Prerequisite
- ✓ You have started **ZEN core**.
- ✓ You have setup the **User Management**.

1. Click on **Supervisor**.
2. Enter your password and click on **Login**.
3. Click on **Job Mode.**
4. Click on  to import the job templates.
   → The **Import templates** dialog appears.
5. Click on ... and select the folder **Application** of the CD.
   → The job templates of this folder are displayed.



6. Activate the job templates and click on **Import**.

The job templates have been imported and appear in the category **DAS**.

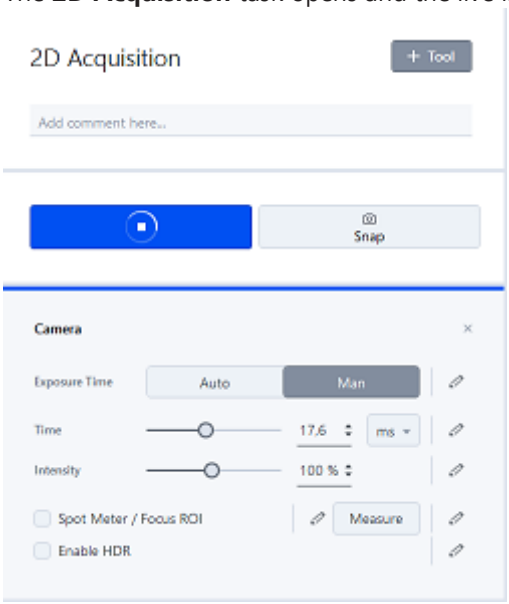


5 Editing Job Templates (Supervisor)

Prerequisite

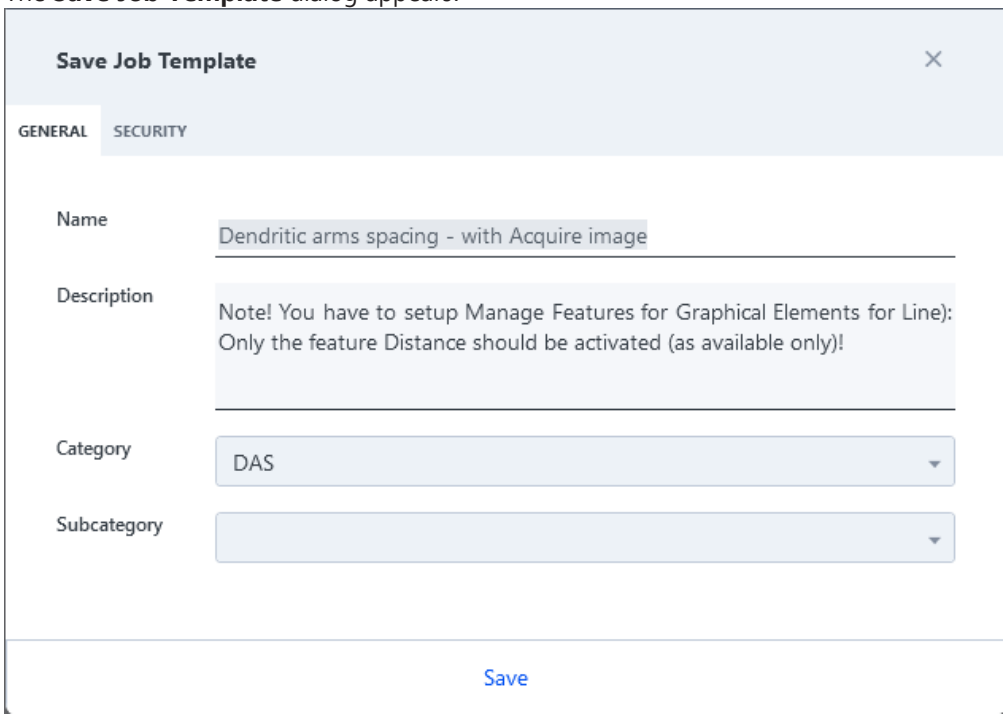
- ✓ You have started **ZEN core**.
- ✓ You have setup the **User Management**.

1. Click on **Supervisor**
2. Enter your password and click on **Login.**
3. Click on **Job mode**.
4. Open the category **DAS**.
5. Open the job template **Dendritic arms spacing - with Acquire image (Dendritic arms spacing - with Acquire image - Advanced)** with **Edit** of the context menu.
   → The job template opens and the hardware initializes.
6. Click on  .
   → The **2D Acquisition** task opens and the live image appears.



7. Setup the camera for your system.
8. Click on  to save the job template.

➔ The **Save Job Template** dialog appears.



9. Click on **Save** to save the modified job template **Dendritic arms spacing - with Acquire image (Dendritic arms spacing - with Acquire image - Advanced).**

10. Click on ⌂ to leave the **Edit** mode.

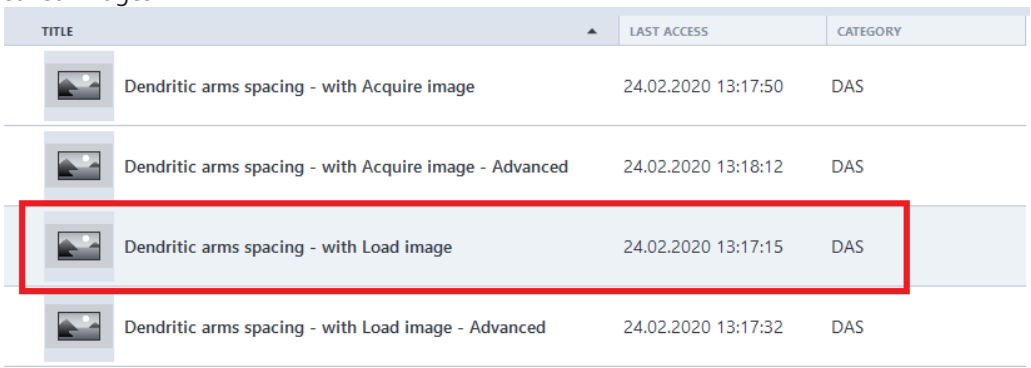
The job template **Dendritic arms spacing - with Acquire image (Dendritic arms spacing - with Acquire image - Advanced)** is ready to be used by the **Operator**.

6 Measuring DAS with Automatic Image Processing (Operator)

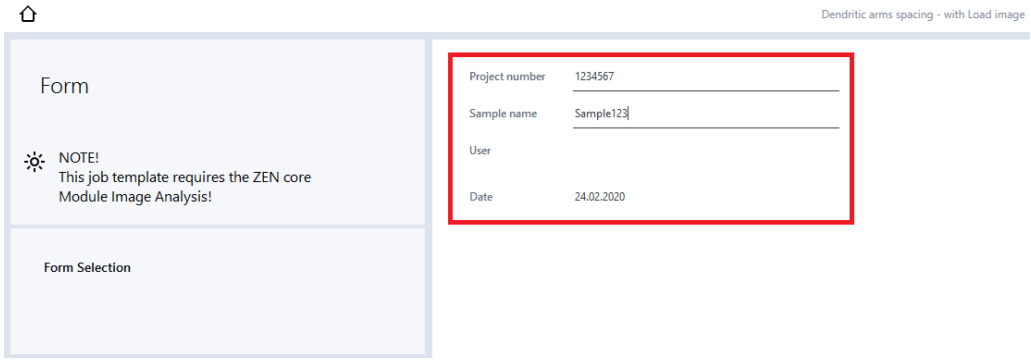
Prerequisite

- ✓ You have started **ZEN core**.
- ✓ You have checked **Keep Measurement Tool** in the **Interactive Measurement** task (**+ Tool**).
- ✓ You have logged in as an **Operator**.

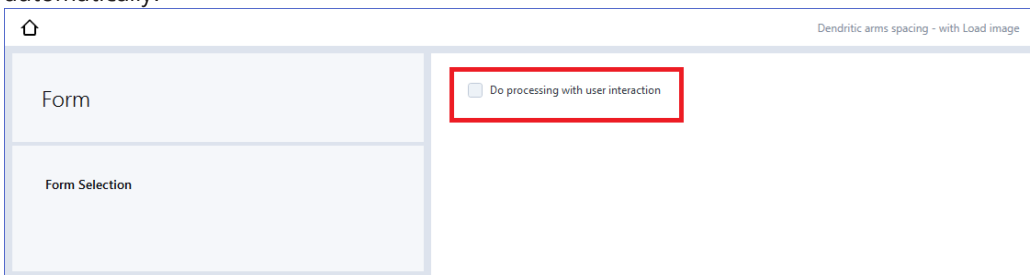
1. Click on **Job Mode**.
   → The list of job templates appear.
2. Select the category **DAS**.
3. Select the job template **Dendritic arms spacing – with Load image** to work with already saved images.



4. Double click on the selected job template or start the job with **Run** of the context menu.
   → The first **Form** task is displayed.
5. Enter the sample information in the form.



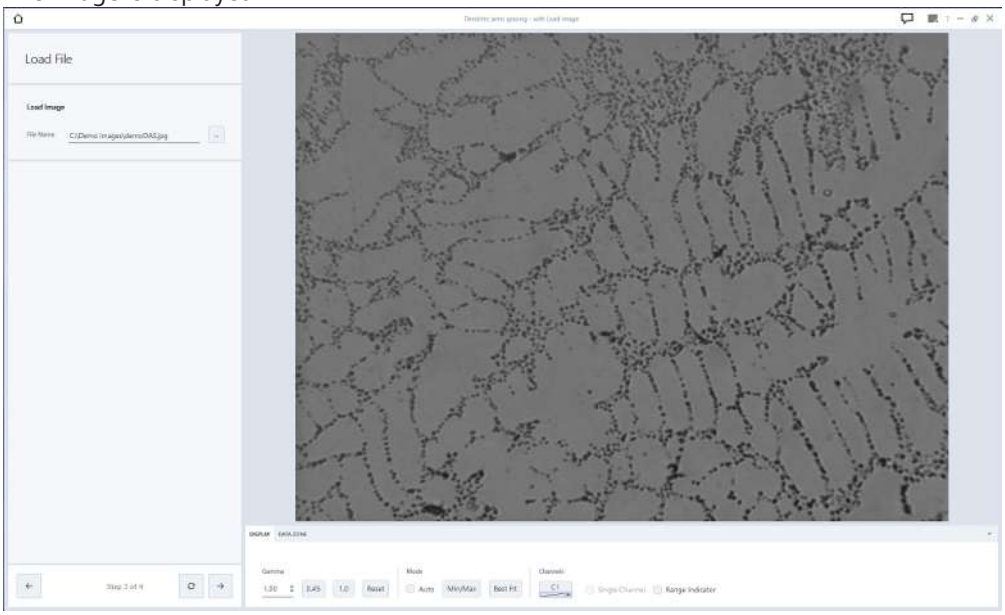
6. Click on → to continue with the next step.
   → The second **Form** task is displayed.
7. Deactivate **Do processing with user interaction** to run the image processing automatically.



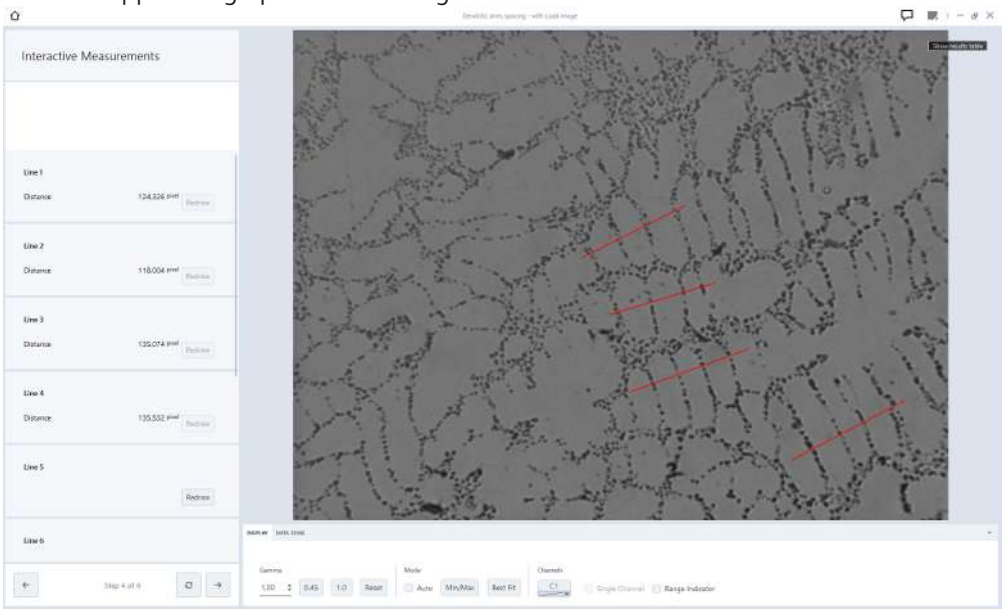
8. Click on → to continue with the next step.

➔ The **Load File** task is displayed.

9. Click on ... and select an image.
10. Click on **Open** to load the image.
    ➔ The image is displayed.

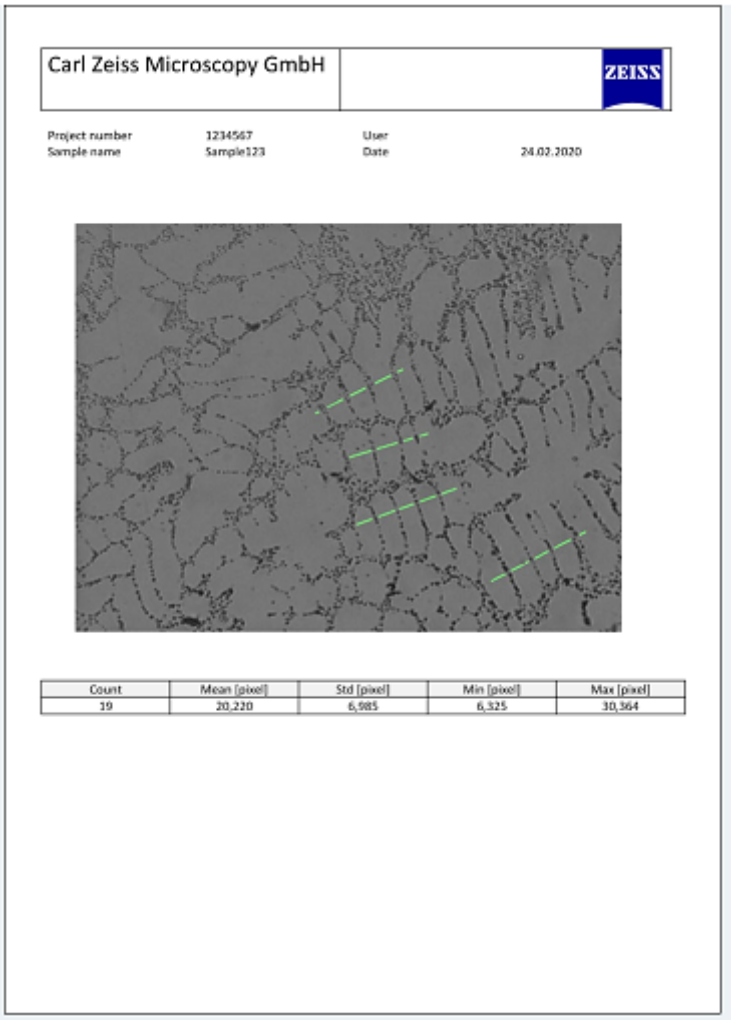


11. Click on → to continue with the next step.
    ➔ The **Interactive Measurement** task is displayed.
12. Click on **Redraw** and draw a line. Repeat this step for all dendrites to be measured.
    ➔ The lines appear as graphics in the image.

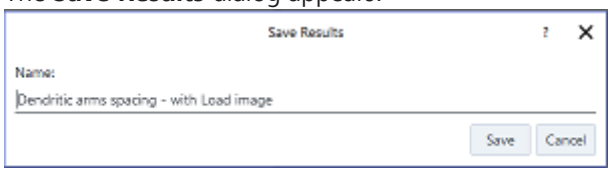


13. Click on → to continue with the next step.

→ The measured image and the datatable with statistics are displayed as results in a report.



14. Click on **Save and Repeat** to save the results in the archive and to repeat the workflow for the next image.
15. Click on **Save and close** to save the results in the archive.
    → The **Save Results** dialog appears.



16. Enter a name or use the default name and click on **Save**.

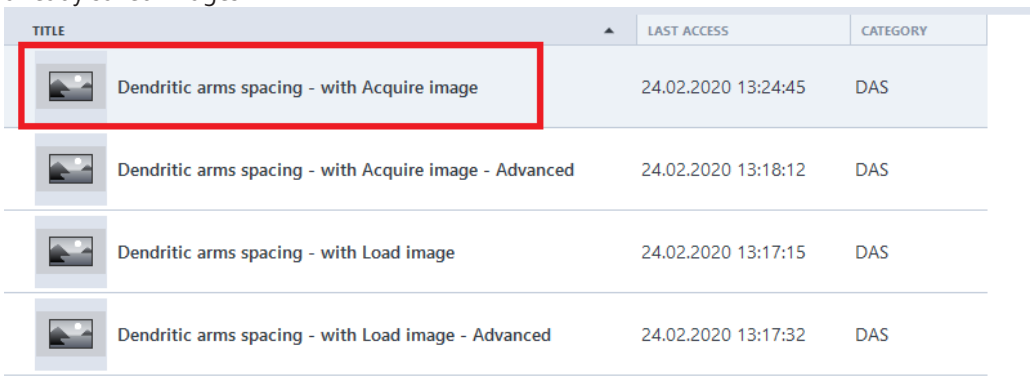
The results have been saved under the defined **Name** in the archive.

7 Measuring DAS with Interactive Image Processing (Operator)

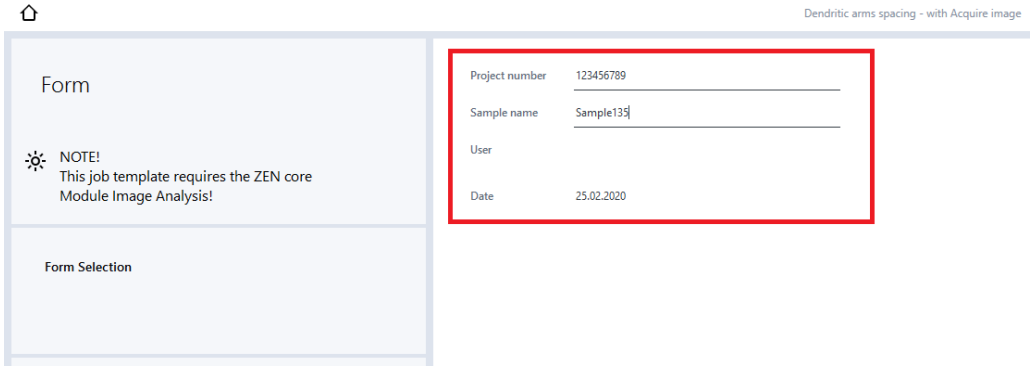
Prerequisite

- ✓ You have started **ZEN core**.
- ✓ You have checked **Keep Measurement Tool** in the **Interactive Measurement** task (**+ Tool**).
- ✓ You have selected **Operator** and logged in with your Operator password.

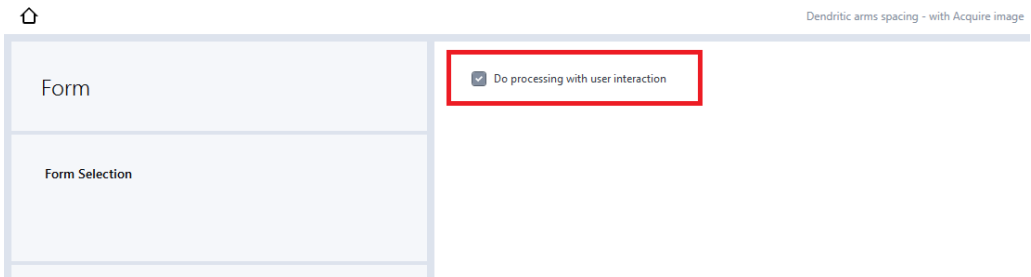
1. Click on **Job mode**.
2. The list of job templates appear.
3. Select the category **DAS**.
4. Select the job template **Dendritic arms spacing – with Acquire image** to work with already saved images.



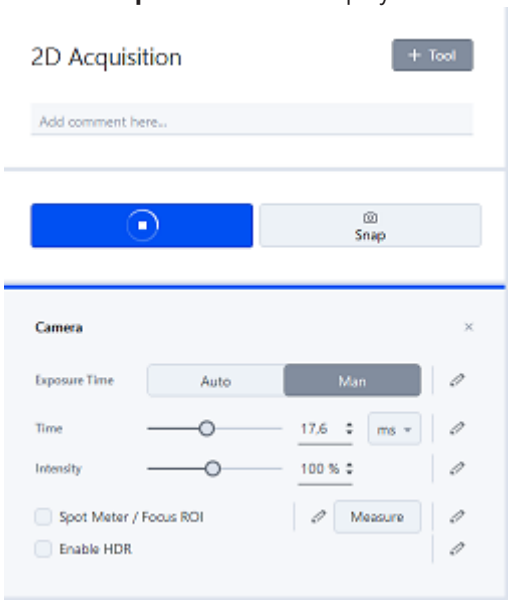
5. Double click on the selected job template or start the job with **Run** of the context menu.
   → The first **Form** task is displayed.
6. Enter the sample information in the form.

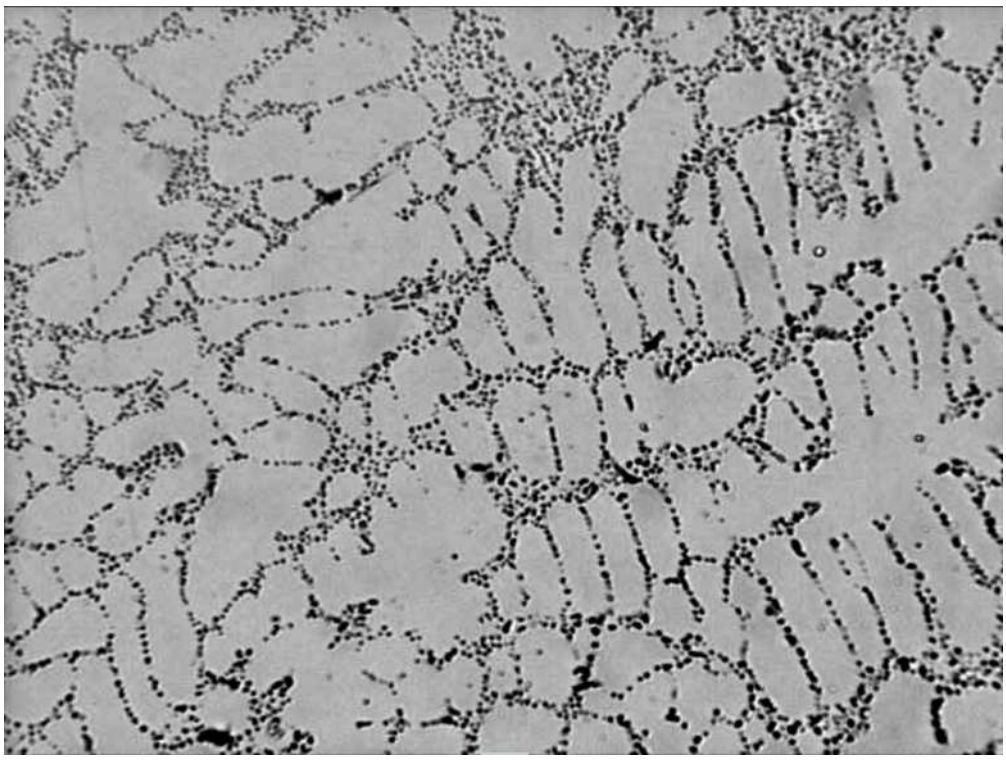


7. Click on → to continue with the next step.
   → The second **Form** task is displayed.
8. Activate the checkbox **Do processing with user interaction** to run the image processing interactively.



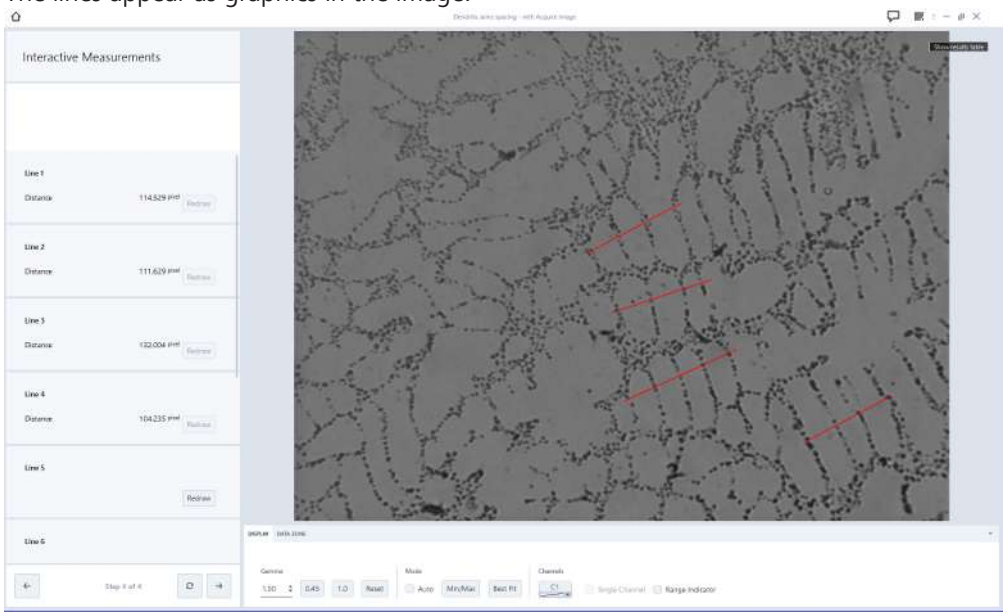
9. Click on → to continue with the next step.
   → The **2D Acquisition** task is displayed with the live image.





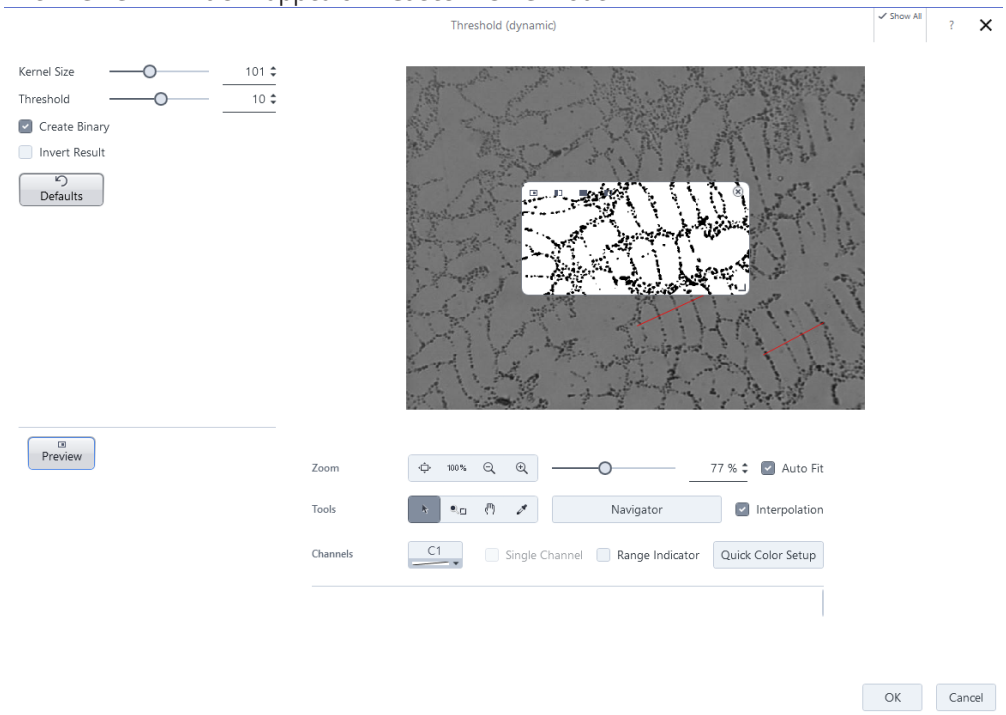
10. Search a field of view and focus the image.
11. Click on **Measure** to adjust the **Exposure Time**.
12. Click on → to continue with the next step.
    → The image has been acquired.
    → The **Interactive Measurement** task is displayed.
13. Click on **Redraw** and draw a line. Repeat this step for all dendrites to be measured.

➔ The lines appear as graphics in the image.



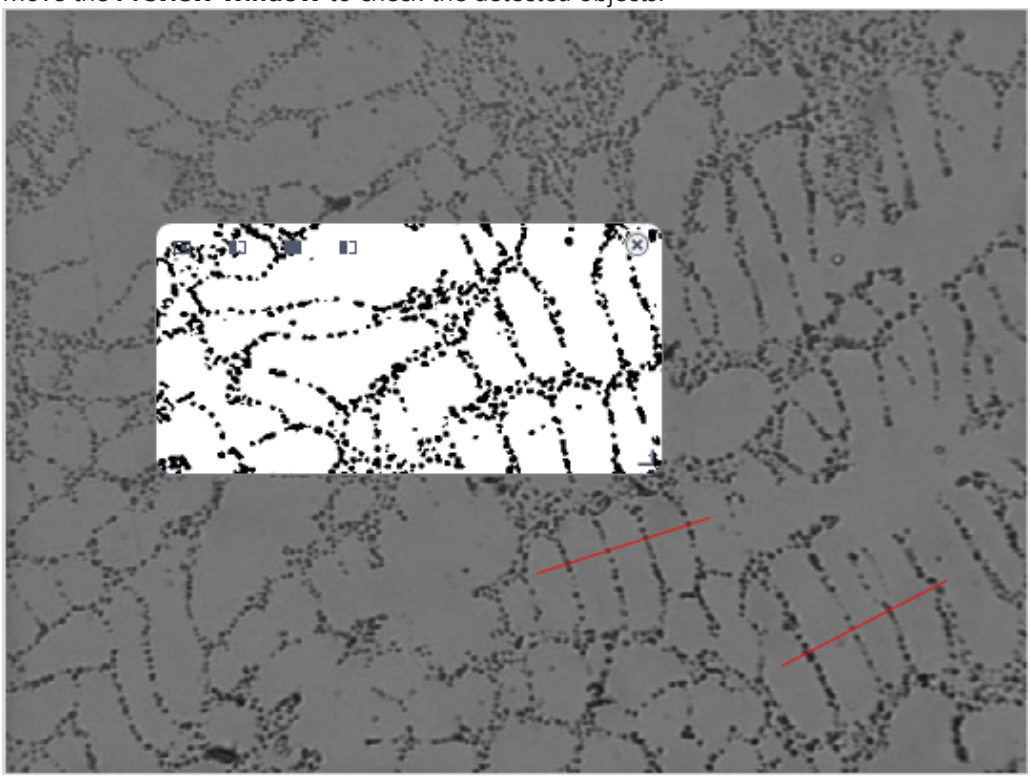
14. Click on → to continue with the next step.
    ➔ The **Threshold (dynamic)** dialog appears.

15. Click on Preview to view the processing.
    ➔ The **Preview window** appears in **Custom Size** mode.

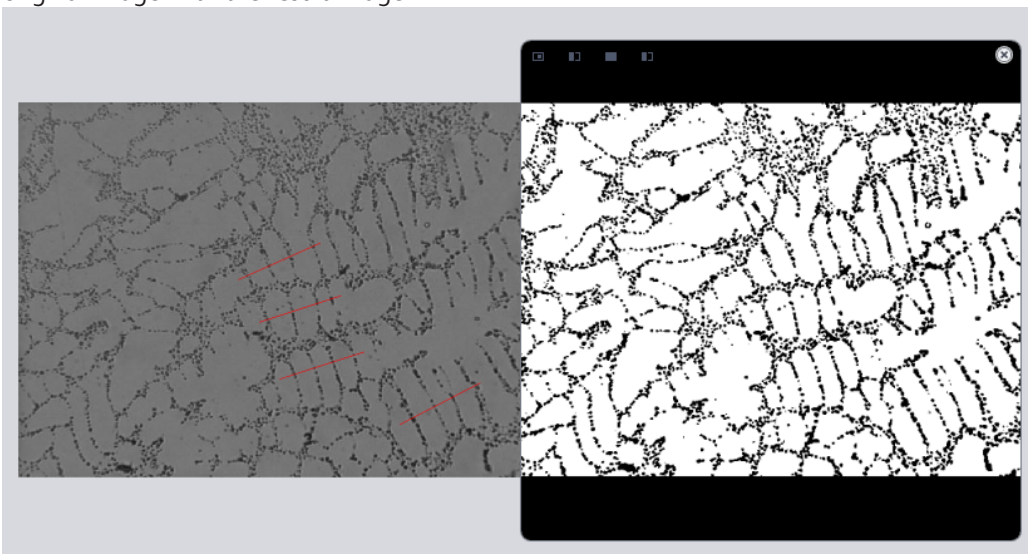


16. Modify **Kernel Size** and **Threshold**, if necessary, to detect the non-dendritic objects.

17. Move the **Preview window** to check the detected objects.



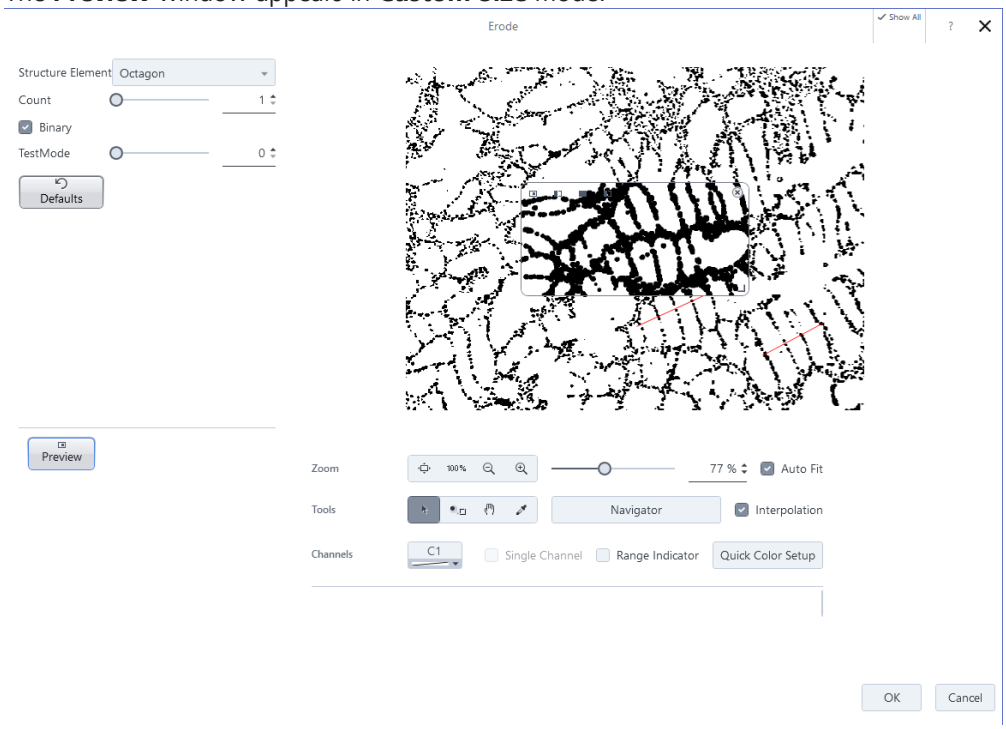
18. Click on  to display the **Split Mode** and compare the whole original image with the result image.



19. Click on  to switch back to the **Custom Size Mode**.
20. Click on **OK** to continue with the next processing function.
    → The **Erode** dialog appears.
21. Click on 

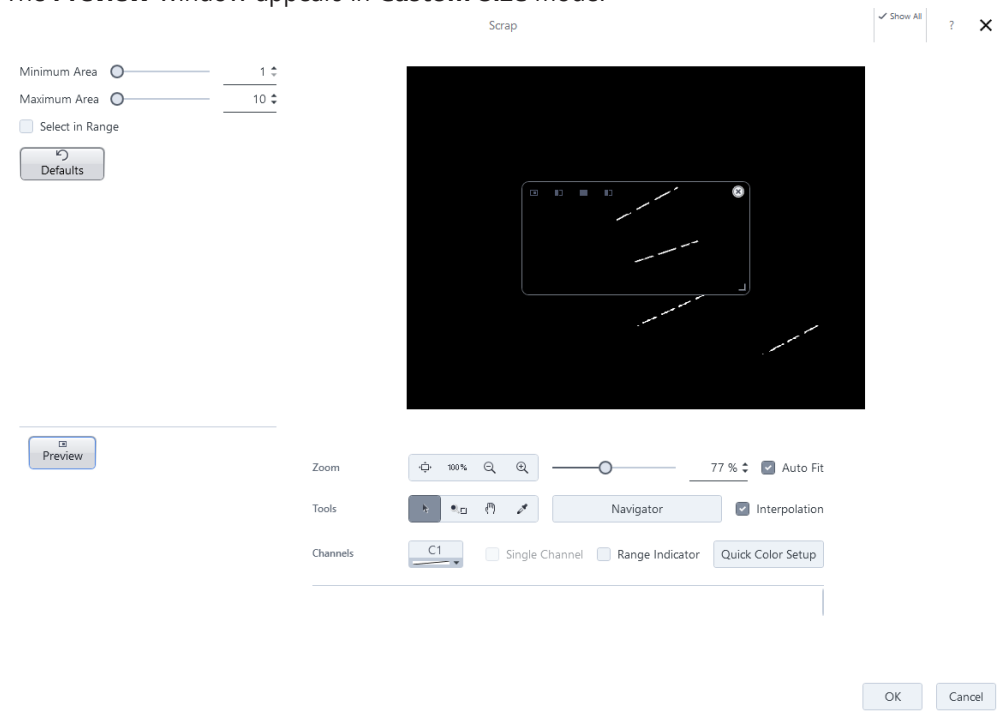
to view the processing.

→ The **Preview** window appears in **Custom Size** mode.



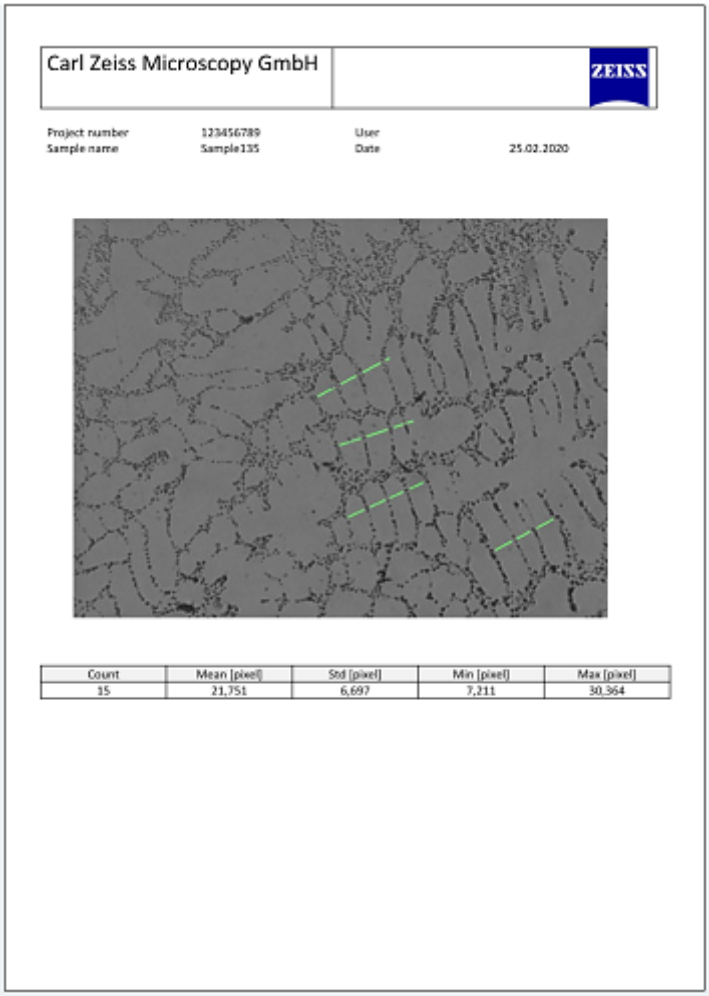
22. Modify **Structure Element** and **Count**, if necessary, to reduce the size of the non-dendritic objects.
23. Click on **OK** to continue with the next processing function.
    → The **Scrap** dialog appears.
24. Click on 

to view the processing.
    → The **Preview** window appears in **Custom Size** mode.



25. Modify **Minimum Area** and **Maximum Area**, if necessary, to remove small artifacts.
26. Click on **OK** to continue with the next step.

→ The measured image and the datatable with statistics are displayed as results in a report.



27. Click on **Save and repeat** to save the results in the archive and to repeat the workflow for the next image.
28. Click on **Save and Close** to save the results in the archive.
    → The **Save Results** dialog appears.

29. Enter a name or use the default name and click on **Save**.

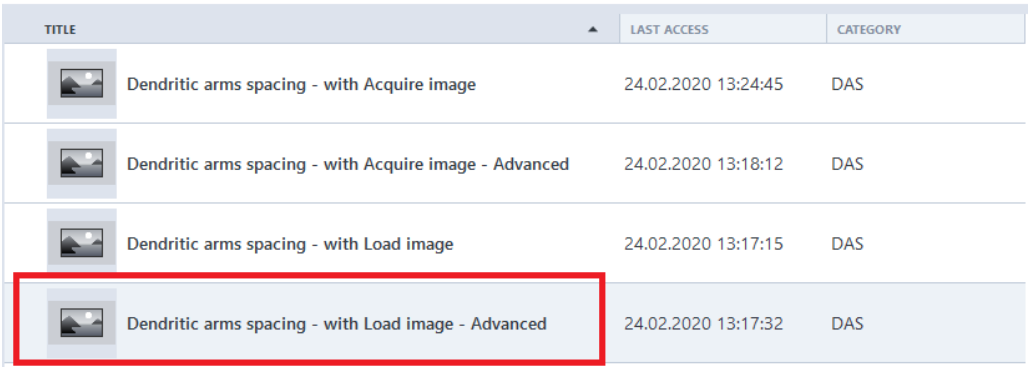
The results have been saved under the defined **Name** in the archive.

8 Measuring DAS with Automatic Image Processing and Individual Values (Operator)

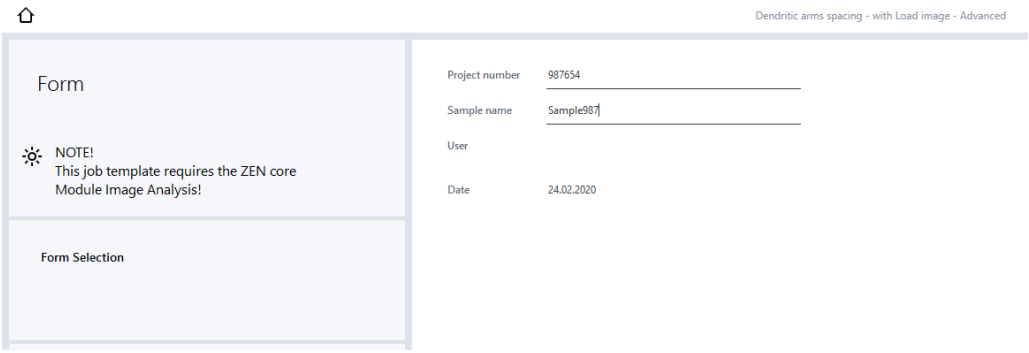
Prerequisite

- ✓ You have started **ZEN core**.
- ✓ You have checked **Keep Measurement Tool** in the **Interactive Measurement** task (**+ Tool**).
- ✓ You have logged in as an **Operator**.

1. Click on **Job mode**.
2. The list of job templates appear.
3. Select the category **DAS**.
4. Select the job template **Dendritic arms spacing - with Load image - Advanced** to work with already saved images.

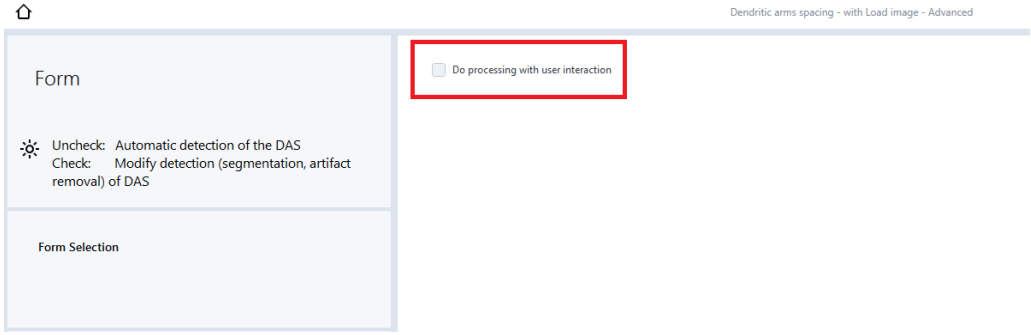


5. Double click on the selected job template or start the job with **Run** of the context menu.
   → The first **Form** task is displayed.
6. Enter the sample information in the form.

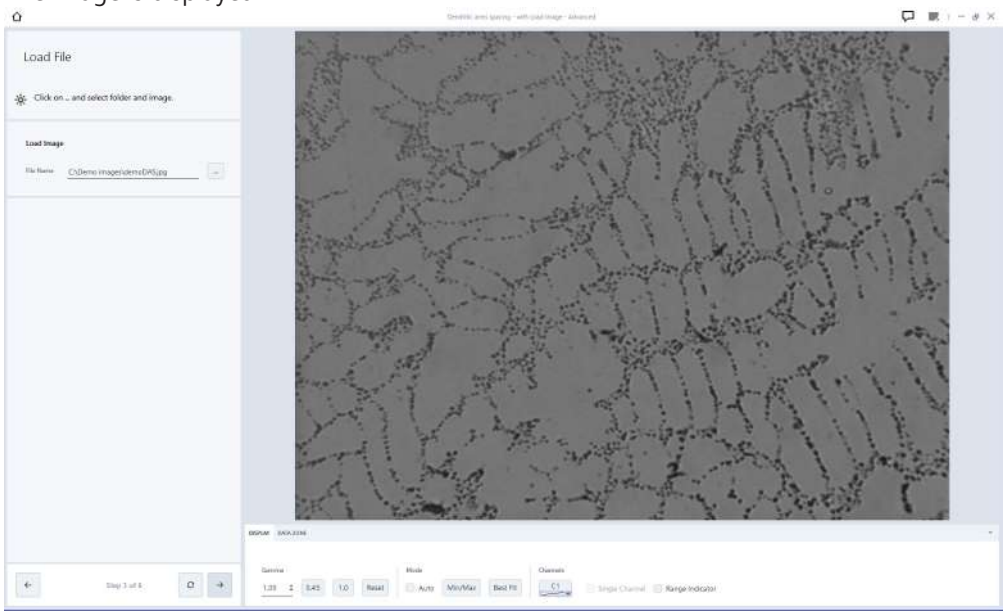


7. Click on → to continue with the next step.
   → The second **Form** task is displayed.

8. Deactivate the checkbox **Do processing with user interaction** to run the image processing automatically.

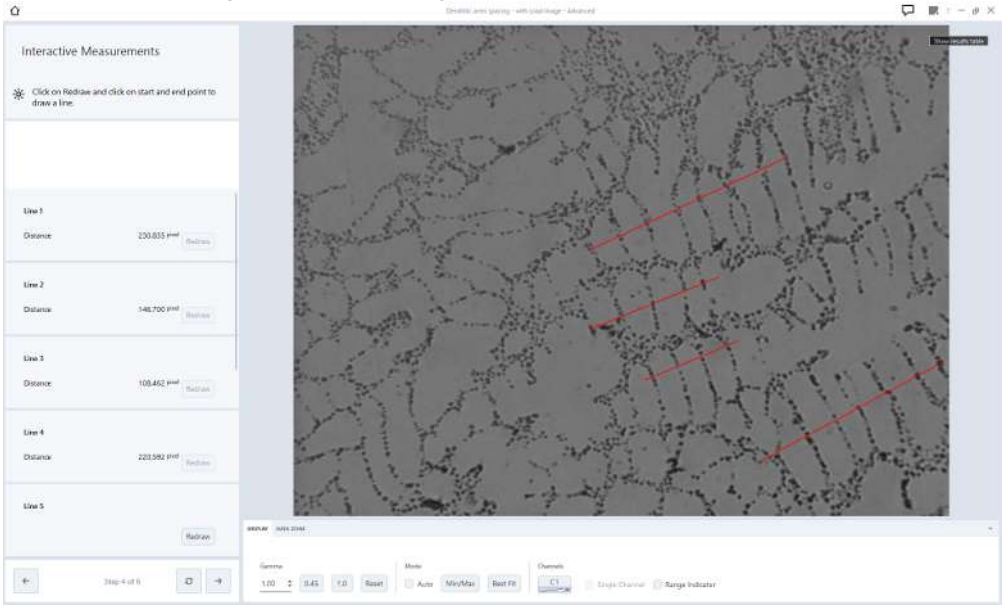


9. Click on → to continue with the next step.
   → The **Load File** task is displayed.
10. Click on ... and select an image.
11. Click on **Open** to load the image.
    → The image is displayed.

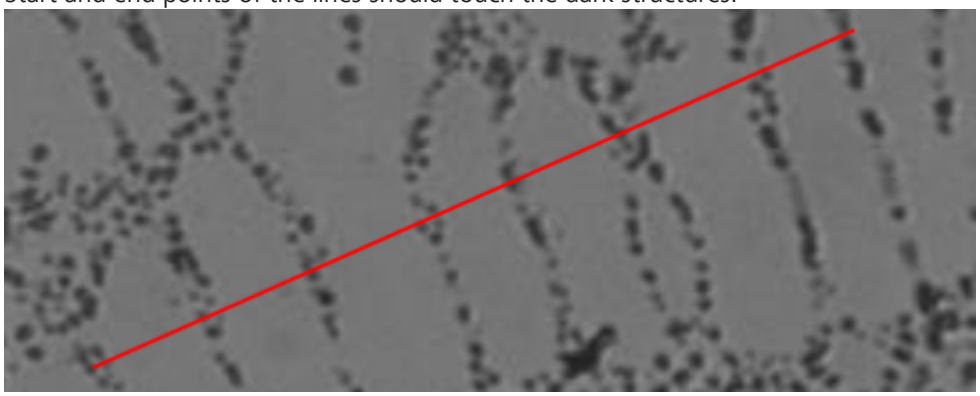


12. Click on → to continue with the next step.
    → The **Interactive Measurement** task is displayed.
13. Click on **Redraw** and draw a line where start and end point touch the dark structures. Repeat this step for all dendrites to be measured.

➔ The lines appear as graphics in the image.

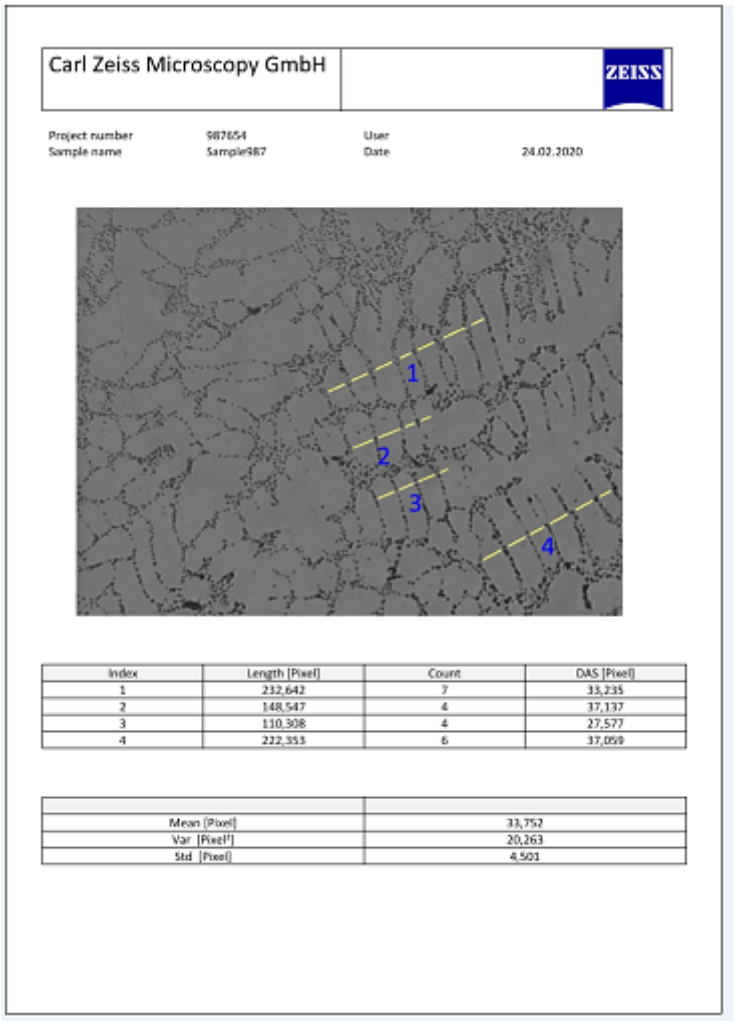


➔ Start and end points of the lines should touch the dark structures.



14. Click on → to continue with the next step.

➔ The results of all measurements (measured image, raw datatable, statistics datatable) are displayed in a report.



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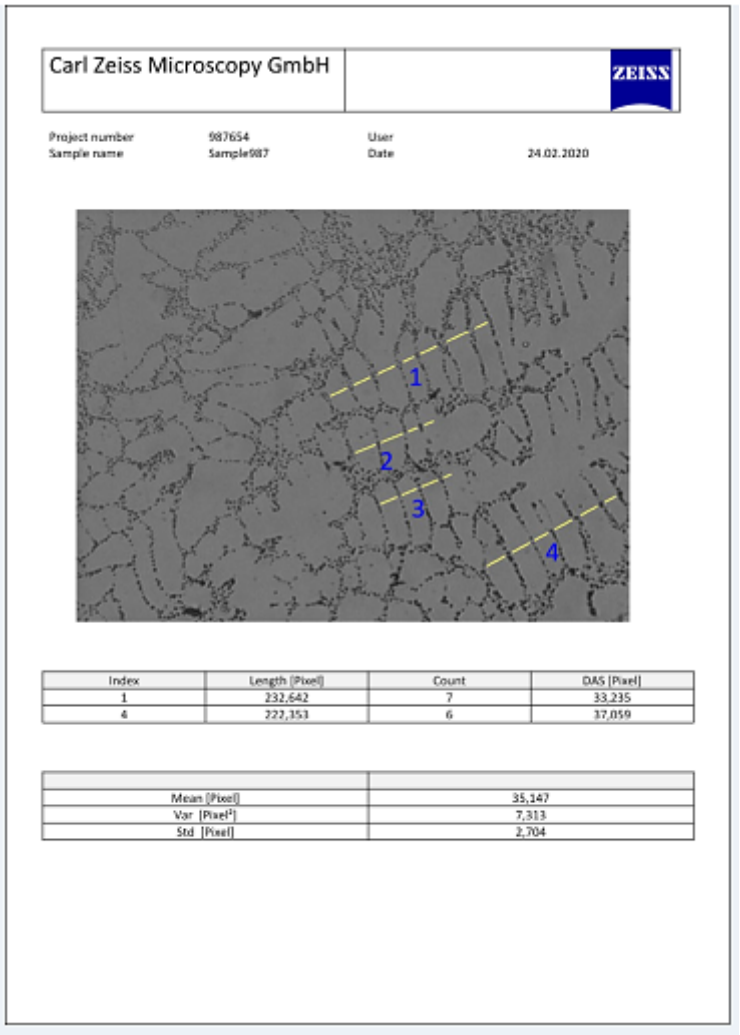
Project number	987654	User	
Sample name	Sample987	Date	24.02.2020

Index	Length [Pixel]	Count	DAS [Pixel]
1	232,642	7	33,235
2	148,547	4	37,137
3	110,308	4	27,577
4	222,353	6	37,059

Mean [Pixel]	33,752
Var [Pixel²]	20,263
Std [Pixel]	4,501

15. Click on → to continue with the next step.

→ The results of measurements with minimum count 5 (measured image, raw datatable, statistics datatable) are displayed in a report.



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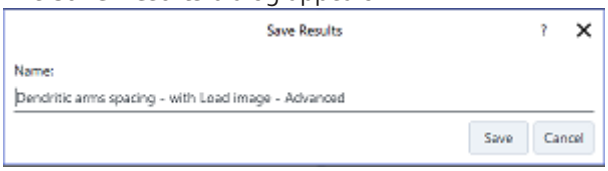
Project number	987654	User	
Sample name	Sample987	Date	24.02.2020

Index	Length [Pixel]	Count	DAS [Pixel]
1	232,642	7	33,235
4	222,353	6	37,059

Mean [Pixel]	35,147
Var [Pixel²]	7,313
Std [Pixel]	2,704

16. Click on **Save and repeat** to save the results in the archive and to repeat the workflow for the next image.
17. Click on **Save and Close** to save the results in the archive.
    → The **Save Results** dialog appears.



18. Enter a name or use the default name and click on **Save**.

The results have been saved under the defined **Name** in the archive.

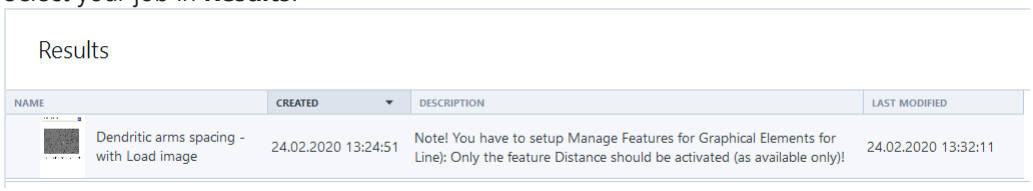
9 Viewing Results

Prerequisite

✓ You have executed one of the following jobs:
- **Dendritic arms spacing - with Load image**
- **Dendritic arms spacing - with Acquire image**
- **Dendritic arms spacing - with Load image - Advanced**
- **Dendritic arms spacing - with Acquire image - Advanced**

✓ The results have been saved in the archive.

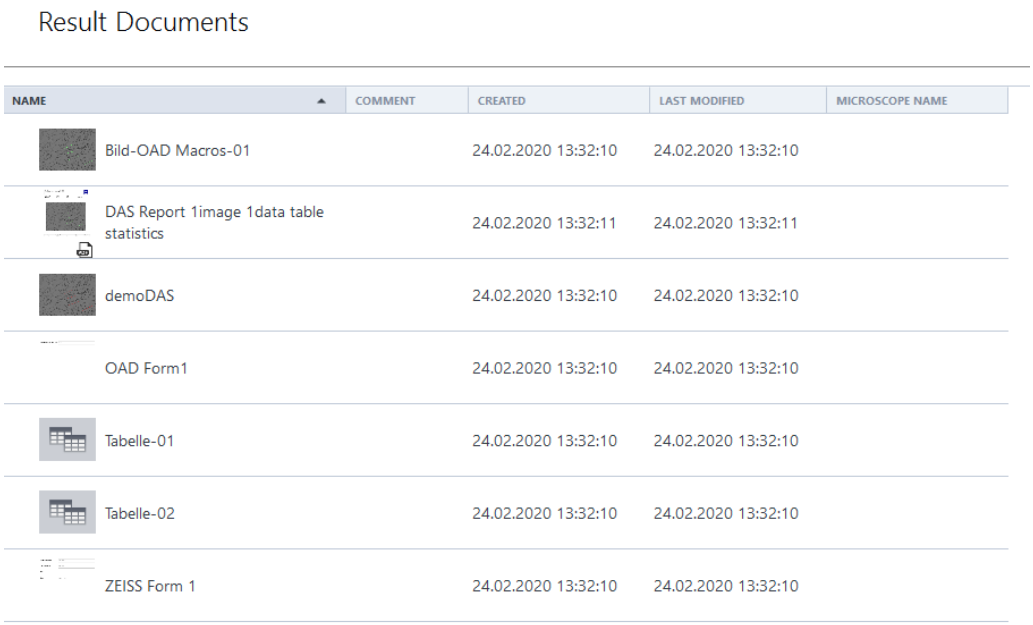
1. Click on **Browse Results**.
2. Select your job in **Results**.



→ All **Result Documents** of the selected job are displayed in the **Preview**.

3. Click on  to export the job results in a folder.

4. Select one of the **Result Documents** of the selected job.



5. Click on ⓘ to view the selected document.

6. Click on ⌂ to leave the **Browse Results** mode.

The results of the processed and saved job have been viewed.

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