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! Important information

1 About this document

This manual forms part of the software. It corresponds to the version of the software and the technical standards valid at the time of installation.



Dürr NDT accepts no liability or responsibility for safe operation of this unit and the software if the notes and instructions contained in this manual are not observed.

1.1 Warnings and symbols

Warnings

The warnings in this document are intended to draw your attention to possible injury to persons or damage to machinery.

The following warning symbols are used:



General warning symbol

The warnings are structured as follows:



SIGNAL WORD

Description of the type and source of danger

Here you will find the possible consequences of ignoring the warning

➤ Follow these measures to avoid the danger.

The signal word differentiates between four levels of danger:

– DANGER

Immediate danger of severe injury or death

– WARNING

Possible danger of severe injury or death

– CAUTION

Risk of minor injuries

– NOTICE

Risk of extensive material/property damage

Other symbols

These symbols are used within this document as follows:



Note, e.g. specific instructions regarding efficient and cost-effective use of the unit.



Refer to Operating Instructions.

Action instructions are identified specifically in this document:

➤ Perform this action.

1.2 Copyright information

All circuits, processes, names, software programs and units mentioned in this document are protected by copyright.

The Installation and Operating Instructions must not be copied or reprinted, neither in full nor in part, without written authorisation from Dürr NDT.

2 Safety

This section contains important safety information.

This section is divided into the following sub-sections:

- „2.1 Functions“
- „2.2 Specialist personnel“
- „2.3 Protection from threats from the Internet“

2.1 Functions

D-Tect X is intended for examination and evaluation of image data with nondestructive material inspection.

D-Tect X is used for the following tasks:

- Acquisition, storage, management, display, analysis, evaluation, and editing of digital/digitised X-ray images
- Filter optimisation of the display of X-ray images for improved evaluation
- Forwarding of images and additional data to external software (third-party software)

The image data for the selected task is saved and can be displayed optimised for evaluation support. Image data can be imported and exported in various graphics formats together with the metadata.

2.2 Specialist personnel

Persons using the software must be able to guarantee safe and correct operation based on their training and experience.

- › Make sure every operator is trained in the use of the software.
- › Installation, configuration, alteration, extension and repair work must be carried out either by DÜRR NDT personnel or by a suitably qualified person approved by DÜRR NDT.

2.3 Protection from threats from the Internet

The software runs on a computer that can be connected to the Internet.

Therefore, the system needs to be protected from threats from the Internet.

- › Use, properly configure and regularly update your firewall.
- › Update the computers operating system regularly.
- › Perform regular data backups.
- › Provide access to computers to authorised users only, e.g. by means of user name and password.
- › Make sure that only trustworthy content is downloaded. Only install software and firmware updates that have been authenticated by the manufacturer.



Installation

This section covers the installation and configuration of the software ready for use in the default configuration.

In addition, uninstallation and data backup are described.



Installation and configuration must only be performed by DÜRR NDT or by a person or company authorised to do so by DÜRR NDT.

This section is divided into the following sub-sections:

- „3 Software“
- „4 Data backup“

Installation is started via the Start menu of the D-Tect X Download installation package ("https://dtectx.com").

3 Software



The Microsoft® Windows® 10 operating system is required for installation and operation of the software.

This section is divided into the following sub-sections:

- „3.1 Installing the software“
- „3.2 Launching the software for the first time“
- „3.3 Uninstalling the software“
- „3.4 Repairing the software“

Before installing the software, we recommend you perform a complete data backup for the software already installed on the computer.

We also recommend that you uninstall any anti-virus software while you are performing the installation.

To prevent accidental triggering of antivirus alarms and in order to increase speed, we recommend excluding the following directory from the antivirus scan after installation:

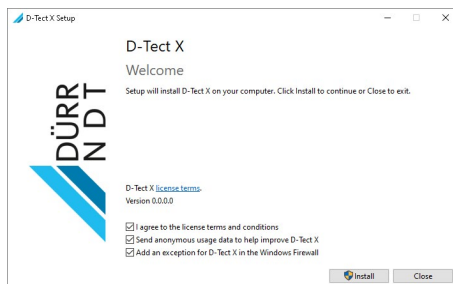
- C:\ProgramData\Duerr NDT\D-Tect X

The directory mentioned refers to the standard installation. This directory may differ, depending on the information entered during installation.

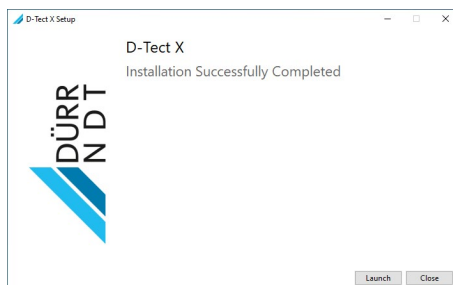
Confirm all Windows security queries, e.g. UAC, firewall, so that the software works properly.

3.1 Installing the software

- › Save the installation file locally.
- › *D-Tect X 1.0.0.1749.exe.*



- › Read the licensing agreement.
- › Confirm agreement with the licensing conditions with ☒. The installation cannot proceed without a declaration of consent.
- › To improve *D-Tect X*, confirm the option "Send anonymised usage data" with ☒.
- › Confirm the option "Add an exception for *D-Tect X* in the Windows firewall" with ☒.
- › Click *Install*.



- › After successful installation, start the software for the first time.

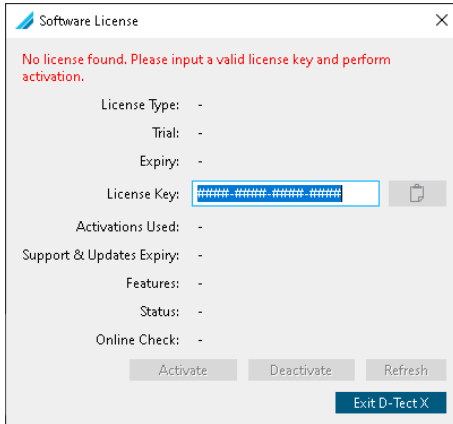
3.2 Launching the software for the first time

After the software is started for the first time, a valid licence key must be entered and activated.

3.2.1. Online activation



An active internet connection is required to activate the licence.



- › Enter a valid licence key.
- › Click **Activate**.
- › After the valid software licence has been confirmed, close the dock.

3.2.2. Offline activation

For PCs that are not connected to the Internet, there is a special offline activation procedure.

You can find more information at:

<https://dectx.com/activation>



For further information on licensing, see „23 Licensing“.

3.3 Uninstalling the software

The D-Tect X software package essentially consists of two components:

- The D-Tect X program software

The directories that need to be backed up may vary depending on your specific installation. You can contact our hotline to make sure that all task data and the databases are backed up.

Proceed as follows to uninstall the software:

- › Start the uninstall process via **Start > Settings > Apps > D-Tect X > Uninstall**.

3.4 Repairing the software

If the software malfunctions, instead of reinstalling it, you can try to repair any damaged components of the software by using the Repair option.

- › Start the process via **Start > Settings > Apps > D-Tect X > Change > Repair**.

4 Data backup

Regular data backup of the D-Tect X image directories is strongly recommended, especially if there is a retention period for X-ray images.

For a complete data backup, the following directory must be backed up:

The directory mentioned refers to the standard installation.

We recommend backing up the above directory via the backup routines in your company. You can request instructions on how to proceed from your system administrator.



First steps

This section describes the initial steps that need to be taken in order to use the software.

This section is divided into the following sub-sections:

- „5 Notes on use“
- „6 Starting the software“
- „7 Configuration settings“
- „13 Arrange docs“

The following configurations are required in order to work with the software:

- „15.1 Create task“
- „14 Devices“

5 Notes on use

Please refer to the following sections on use of the software:

- „5.1 Software interface“
- „5.2 Saving concept“
- „5.3 User support“

Open the software help on the start page:

- Click "Menu > Help".

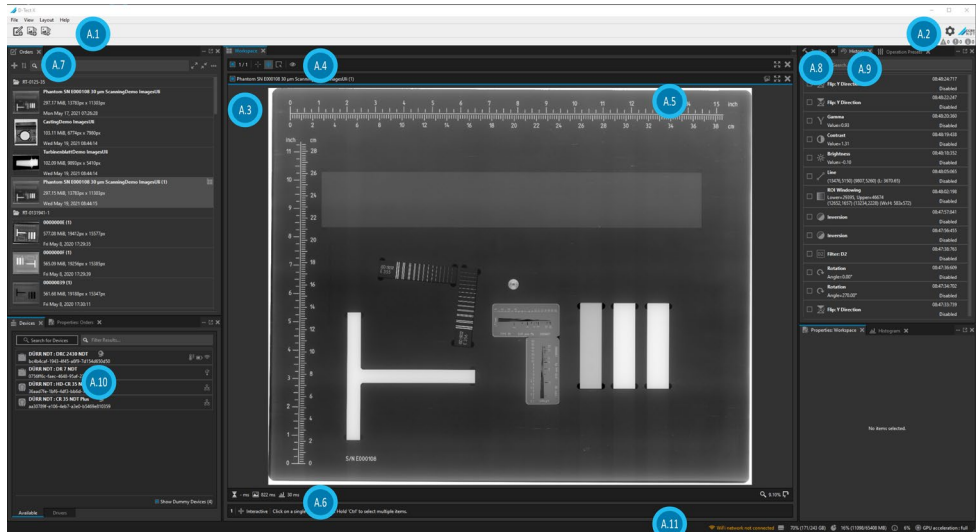


Notice

Risk of data loss due to incorrect configuration

- Have configuration be carried out by DÜRR NDT or a company authorised to do so by DÜRR NDT.

5.1 Software interface



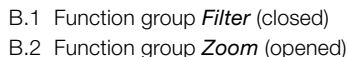
- „A1 Menu bar (left area)“
- „A2 Menu bar (right area)“
- „A3 Working area“
- „A4 Working Area menu“
- „A5 Image menu“
- „A6 Image footer“
- „A7 Tasks“
- „A8 Tools“
- „A9 History“
- „A10 Devices“
- „A11 Status bar“





The software interface is described in the default configuration. Its appearance may differ depending on how it is configured.

The software interface can be reset via the menu **View -> Profile -> Standard**.

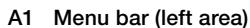
EN



 Expand all

 Close all

If you briefly hover with the mouse cursor over a button the quick information will be displayed.












- *File* menu
- *View* menu
- *Layout* menu
- *Help* menu
- *Create New Task* icon
- *Import Images* icon
- *Export Images* icon

- Configuration
- Errors, warnings, messages







The images selected in the image list can be edited in the working area.

The Working Area menu contains various commands for the images displayed:

 0/2	Select all frames (no frame selected)
 1/2	Select all frames (1 of 2 frames selected)
 2/2	Deselect all frames
	Non-interactive mode
	Interactive mode
	Selection mode
	Fit into selected frames
	Normalise frames
	Close selected frames

A5 Image menu


The Image menu displays buttons for the following actions

	Select frame
	Deselect frame
	Adjust to frame
	Maximise frame
	Restore frame
	Close frame

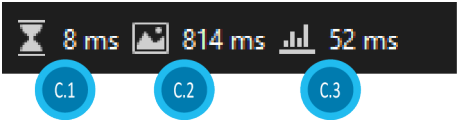
Several images can be opened in the working area.

- › Select image
- › Click on the **Maximise Frame** button:
The selected image is enlarged over the entire working area.
- › Click on the **Normalise Frame** button:
All images opened in the working area are displayed.

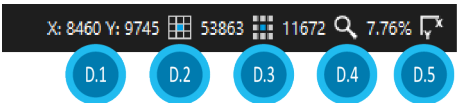
A6 Image footer

 Display of the image footer can be adjusted in the configuration settings (see „7 Configuration settings“).

The following information is displayed:



- Left side:
- C.1 Processing time of the operations
 - C.2 Image load time
 - C.3 Calculation time histogram



- Right side:
- D.1 Mouse cursor coordinates
 - D.2 Original pixel value
 - D.3 Processed pixel value
 - D.4 Zoom factor
 - D.5 Direction of image axes

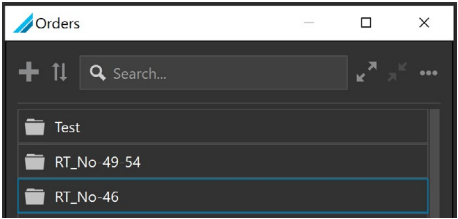
A7 Tasks

In the Tasks dock, newly recorded images are displayed as a preview.
When an image is displayed in the working area, it is marked with a pictogram "**Open in working area**".

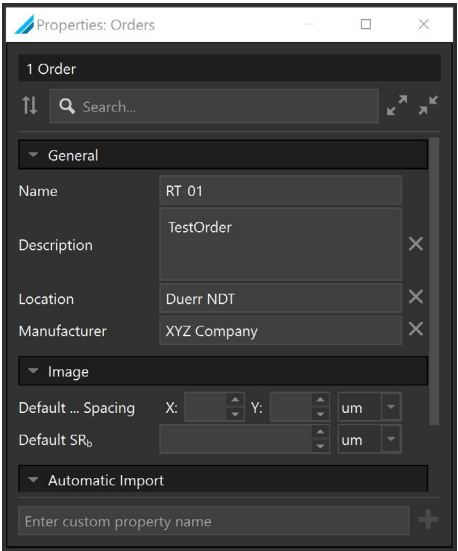
EN

Task Properties

Information on the tasks can be viewed under the *Task Properties* dock.



› Select the task in the list.



› *Select Task Properties dock.*

In the *General* group, changes can be made in the *Name*, *Description* and *Manufacturer* fields.

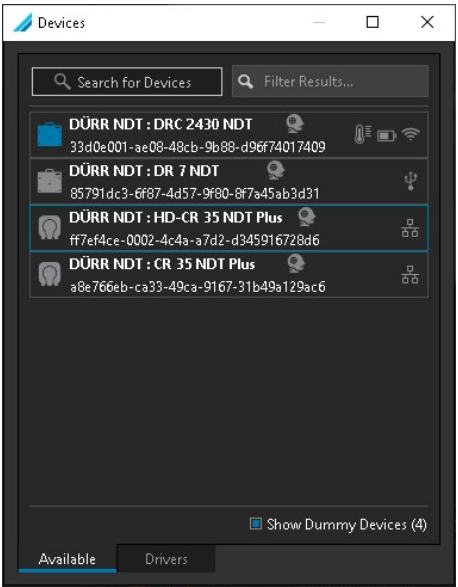
A8 Tools

The working area contains the various tools and filters required for image editing (see „19.2 Tools“). The tools are only shown when an image is open in the working area.

A9 History

All changes to the image in the working area are logged and saved with the image in the *Operations* dock.

A10 Devices



All available devices and the associated device information (drivers) are displayed in the *Devices* dock.

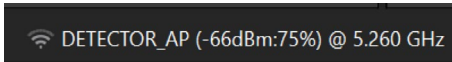
Information on the device status is displayed on the right-hand side:

	Temperature
	Charge level
	WLAN connection
	LAN connection
	USB device

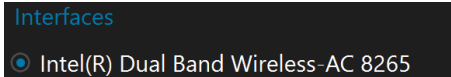
A11 Status bar

The following information is displayed in the status bar at the bottom right:

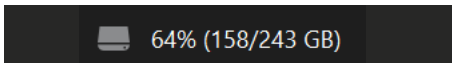
- Network connection



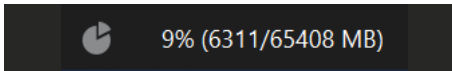
Clicking with the right mouse button displays the interface:



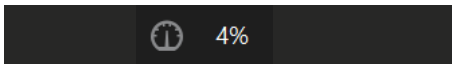
- Storage utilisation (OS)



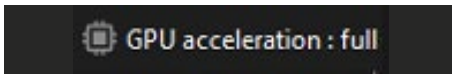
- Memory utilisation (RAM)



- CPU utilisation



- GPU status






The status bar also shows running background processes and their progress at the bottom left (see „5.4 Background processes“).

5.2 Saving concept

The "saving concept" does not require the user to actively save data (e.g. via a Save button). Other, non-image-specific changes are only saved when the software is closed.

5.3 User support

For certain actions, events and warnings, D-Tect X generates notifications via the Windows Message Centre. These are divided into the following categories:




	0	Errors / number of unread messages
	0	Warnings / number
	0	Messages / number

As soon as a notification has been generated, the number of notifications appears next to the corresponding icon.

Reading notifications:

- › Click the **Notifications** dock at the top of the working area. The list of notifications is displayed.

The buttons at the top left can be used to filter the notifications by category:

	Errors
	Warnings
	Messages

The following buttons at the top right can be used to mark or delete notifications:

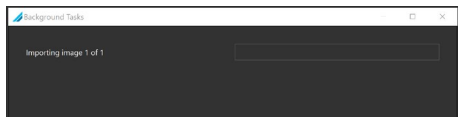
- Mark as read
- Remove all
- Delete message

5.4 Background processes

Running background processes are displayed with a progress bar in the status bar at the bottom left.



Detailed information can be displayed as follows:



- › Click the **Background Processes** dock.



This dock is not active by default. It must first be displayed via the "View" menu.

6 Starting the software

There are two ways to launch the software:

- Via the program icon on the desktop
- Via the entry in the Windows Start menu
 - Start > D-Tect X**
- › Double-click the program icon on the desktop or
- › Select the entry in the Windows Start menu. D-Tect X starts.

The following configurations are required in order to work with the software:

- „14 Devices“
- „15.1 Create task“



Notice

Risk of data loss due to incorrect configuration

- › Have configuration be carried out by DÜRR NDT or a company authorised to do so by DÜRR NDT.



7 Configuration settings

The configuration includes the following main sections:

- „8 Application“
- „9 Working area“
- „10 Histogram“
- „11 Tools“
- „12 Experimental features“



Heed the warning notice!

Activating experimental features is done at your own risk and may lead to malfunction or crashing of the software as well as loss of data. For this reason, experimental features should not be activated in a productive system.

8 Application

8.1 Workstation

Language	The display language can be selected via the selection list. The software needs to be restarted after the change has been made.
Workstation name	Display only, cannot be changed in the configuration.
File with the settings	The location of the settings file. The settings file should not be edited manually!

8.2 Software updates

Automatic check	The automatic check can be activated/deactivated.
Update Channel	Select "Stable" to receive only bug fixes and stable feature updates or "Daily" to always receive the latest software as soon as it is available.

8.3 Output

GPU acceleration	GPU acceleration can significantly improve calculation speed.
CPU threads	Specifies the maximum number of CPU threads that can be used by the application.
OpenMP threads	Specifies the maximum number of OpenMP threads that can be used by the application. These threads are normally used during image processing.

8.4 DRIVE NDT

Drive-NDT	Enables DRIVE NDT integration. When DRIVE NDT integration is enabled, users must log in before they can use the software. Requires an active Internet connection.
URL	URL of the DRIVE NDT server. This setting is required to enable the integration of DRIVE NDT.

9 Working area

9.1 Interactive mode

Mode	The default mode for initial interaction: <ul style="list-style-type: none">– Interactive– Non-interactive mode– Selection
-------------	--

9.2 Image

Photometric interpretation reversal	If activated, the images in the working area are displayed with lower values as whiter pixels and higher values as black pixels.
Pixel smoothing	If activated, the images are smoothed when zooming in (individual pixels are less highlighted).

9.3 Image footer

Display mode	Allows switching between a permanent image footer (shows more extensive information, but requires more space) and an overlay (shows less information, but requires less space). <ul style="list-style-type: none">– Overlay– Permanent– Never
Processing time of the operation	If activated, the processing time of the operation is displayed in the footer of the image (not available in overlay display mode).
Image load time	If activated, the image load time is displayed in the footer of the image (not available in overlay display mode).
Calculation time histogram	If activated, the calculation time histogram is displayed in the footer of the image (not available in overlay display mode).
Mouse cursor coordinates	If activated, the mouse cursor coordinates are displayed in the footer of the image.
Original pixel value	If activated, the original pixel value is displayed in the footer of the image.
Processed pixel values	If activated, the processed pixel value is displayed in the footer of the image.
Zoom factor	If activated, the zoom factor is displayed in the footer of the image (not available in overlay display mode).
Axes	If activated, the image axes are displayed in the footer of the image.

9.4 Device footer

Display mode	Allows switching between a permanent image footer (shows more extensive information, but requires more space) and an overlay (shows less information, but requires less space). – Overlay – Permanent – Never
Mouse cursor coordinates	If activated, the mouse cursor coordinates are displayed in the footer of the image.
Original pixel value	If activated, the original pixel value is displayed in the footer of the image.
Processed pixel values	If activated, the processed pixel value is displayed in the footer of the image.
Zoom factor	If activated, the zoom factor is displayed in the footer of the image (not available in overlay display mode).

9.5 Zoom mode

When loading image	Sets the initial zoom of the element when loading. – Never – Adjusted – 100%
Maximise image	Sets the initial zoom of the element when a picture frame is maximised. – Never – Adjusted – 100%
Normalize image	Sets the initial zoom of the element when a picture frame is normalised. – Never – Adjusted – 100%
Processed pixel values	If activated, the processed pixel value is displayed in the footer of the image.
Zoom factor	If activated, the zoom factor is displayed in the footer of the image (not available in overlay display mode).

9.6 Property designations

Font size	Sets the default size for annotation text.
------------------	--

10 Histogram

10.1 Sketch


Type	Sets the type of histogram display. Normal – Logarithmic
Remove outliers	If activated, new values are assigned to the histogram outliers based on the interquartile range.

11 Tools

11.1 SNR

Type	Sets the default SNR character type. – ISO 16371-1 (20x55) – Freehand rectangle
------	---

12 Experimental features



Warning

Activating experimental features is done at your own risk and may lead to malfunction or crashing of the software as well as loss of data.

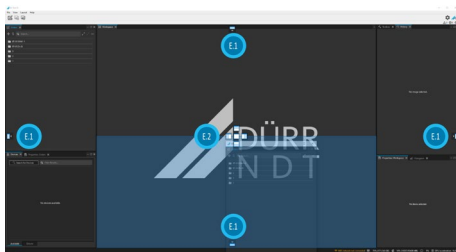
➤ For this reason, experimental features should not be activated in a productive system.

13 Arrange docs

The software interface of D-Tect X can be adapted to different needs. The different docks can be reordered for this purpose (e.g. move tasks from the left to the bottom).

Click and hold the header of the dock to be moved.

As soon as the dock is moved, usable areas within a dock are highlighted in blue and target markers are displayed.



E.1 Target marker on screen

E.2 Target marker on dock

- › Move dock to one of the target markers on the screen:
The dock is placed at the top, bottom, left or right edge of the screen, depending on the selection.
- › Move dock to one of the target markers on the dock:
The dock is placed above, below, to the left or to the right of the dock marked in blue, depending on the selection.



The **Layout > Reset to Default** menu can be used to reset the layout of the docks to the factory settings.

14 Devices

All devices that are available for the software are displayed in the list of devices.

The following conditions must be fulfilled in order to display the devices in the list of devices:

- ✓ Devices are connected to the network/workstation.
- ✓ Devices are switched on.
- ✓ Device drivers are loaded.

14.1 Connecting devices

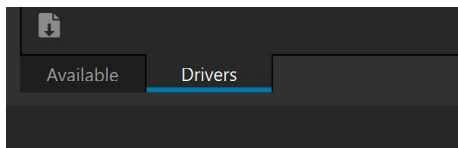
All available devices appear automatically in the list of devices.

(see „14.2 Add device“).

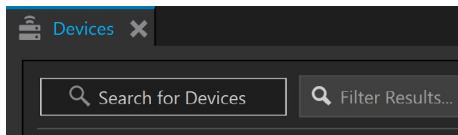


The exact process for installation and configuration of a device is described in the assembly instructions and the instructions for use/installation of the device.

14.2 Add device



- › Select the option **Available**.
- › Click the symbol The data for all available devices is downloaded.



- › Click **Find Devices**.
All available devices are displayed in the list.

14.3 Driver

Devices				
Manufacturer	Name	Type	Version	Supported Devices
DÜRR NDT	CR 35	CR Scanner	1.0.0.2006	CR 35 NDT HD-CR 35 NDT Fujifilm Dynamix SK
	CR 35 Plus	CR Scanner	1.0.0.2006	CR 35 NDT Plus HD-CR 35 NDT Plus HD-CR43 NDT
DÜRR NDT	ScanX	CR Scanner	1.0.0.2006	ScanX Discover HR ScanX Discover HC ScanX Discover GE CRx25p
BIOSENTECH	duraSCAN	DDA	1.0.0.2006	duraSCAN 1417
DÜRR NDT	DR 7	DDA	1.0.0.2006	DR 7 NDT
DÜRR NDT	DRT	DDA	1.0.0.2006	DRC 2430 NDT
				DRC 2430HE NDT
				DRC 1024 NDT
				DRA 3543 NDT
				DRA 4343 NDT
				DRP 2020 NDT (14-15)

- › Select the option **Drivers**:
Information on the drivers of the available devices is displayed.



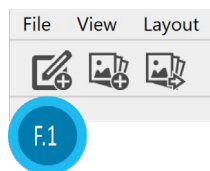
15 Managing tasks

Every image that is managed in the software is assigned to a task.

Task data can be maintained directly in the software.

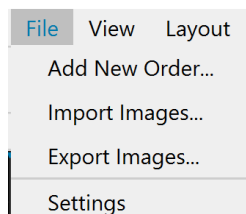
15.1 Create task

A new task can be created by one of the following actions:

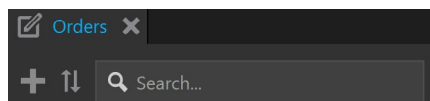



F.1 Create **New Task** icon

› Click the **Create New Task** icon.
or



› In the **File** menu, click **Create New Task**.
or



› Click  in the **Tasks** dock.

The **Create New Job** pop-up appears.

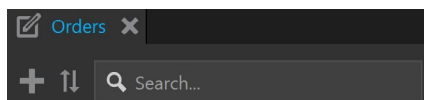
› Fill in all fields, at least the mandatory field.



It is recommended that you fill in all fields to enable an effective search function (see „15.2 Find task“).

› Clicking **Add Task** adds the new task to the list under **Tasks**.

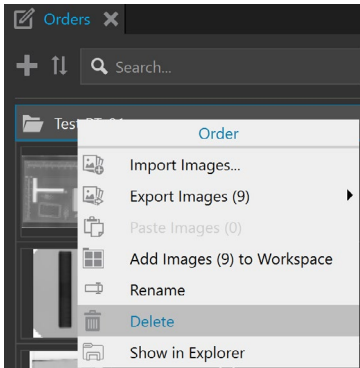
15.2 Find task



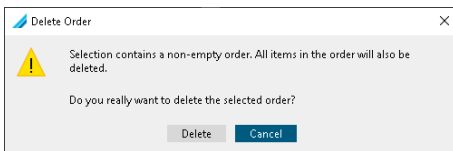
› Enter information about the task (e.g. name, manufacturer or location) in the search field. The search results will be displayed in the list below the search field.

15.3 Delete task

When a task is deleted, its images are deleted with it.



- › Select a task.
- › Select **Task** > **Delete** from the context menu.



- › Confirm the popup question on deleting the task.
The task and all images associated with the task are deleted.



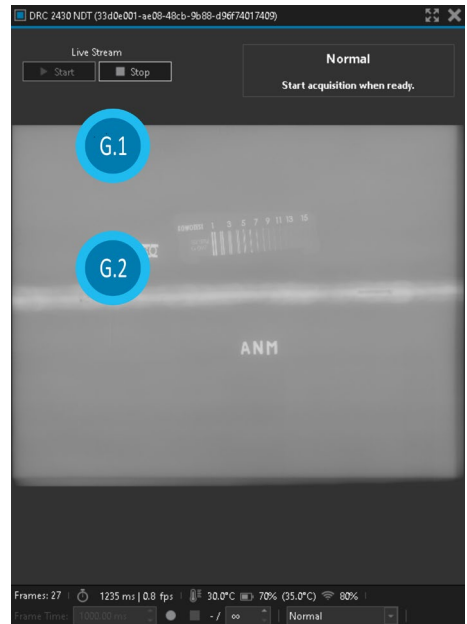
No physical deletion process takes place. The selected task is marked as deleted and removed from the task list.

16 Record an image

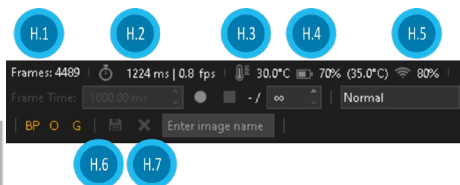
16.1 Acquisition with a panel

Requirements:

- ✓ Task is created and selected.
- ✓ Select the device to connect to the device.
- › A new dock with the device name and view window appears in the working area.
- › Select the option **Properties**.
- › Enter the required parameters.
- › Click **Livestream Start** to start the livestream.



- G.1 Livestream Start/Stop
- G.2 Preview image



H.1 Frames

H.2 Beam time of the last frame

H.3 Temperature (device-dependent)


H.4 Charge level (device-dependent)


H.5 Device connection



H.6 Save image


H.7 Discard image


› Enter the number of frames.

 Application-dependent. Images are averaged; the more images, the better the quality.

› Start acquisition by clicking . Acquisition stops when the number of specified frames is reached.


 Acquisition can be stopped before the maximum number is reached by clicking .

› Save the image acquired by clicking . The image is added to the image list of the task.

› If the result is not OK, discard the image acquired by clicking  and repeat acquisition.

› Import further images if required.

› Click **Livestream Stop** to stop the livestream.

After the last image has been acquired, close the device view dock by clicking  at the right in the dock to end the connection to the device.

16.2 Acquisition with a CR scanner

Requirements:

- ✓ Task is created and selected.
- ✓ Select the device to connect to the device.
- › A new dock with the device name and view window appears in the working area.
- › Select the scanning mode from the "Scanning Modes" selection list.

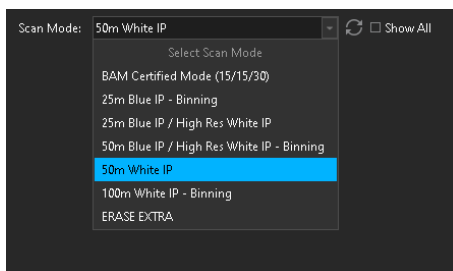
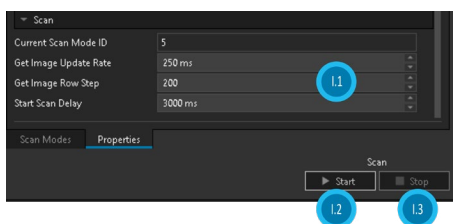


Illustration with example, the selection depends on the device.

› Select the option "**Properties**".



I.1 Input fields for parameters


I.2 Scan **Start**


I.3 Scan **Stop**

Values for the following parameters can be entered:


- Image refresh rate (ms)
- Recall image line step
- Start scan delay (ms)
- › Click Start to start the scanning process.

 The scanning process can be stopped by clicking Stop.

› Save the image acquired by clicking . The image is added to the image list of the task.

› If the result is not OK, discard the image acquired by clicking  and repeat scan.

› Import further images if required.

› After the last image has been acquired, close the device view dock by clicking  at the right in the dock to end the connection to the device.

17 Importing images

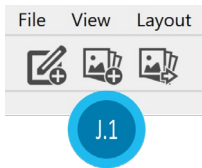
The following file formats can be imported:

- BMP (*.bmp)
- DICOM/DICONDE (*.dcm)
- JPEG 2000 (*.jp2)
- JPEG (*.jpg, *.jpeg, *.jpe)
- PNG (*.png)
- TIFF (*.tiff, *.tif)
- D-Tect Legacy (*.xtf)

17.1 Importing image files

Requirements:

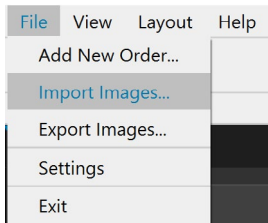
- ✓ Task is created
- ✓ No other image acquisition is in progress



J.1 *Import Images* icon

- Click the *Import Images* icon. Select the desired preset in the context menu.

or



- Or select the context menu *File > Import Images*.
- Select one or more image files.
- Click Open. The images are added to the selected task.

18 Managing images

Previews of all task images are displayed in the image list. The images are sorted according to the date on which they were recorded.

- To view or edit the images, the images are opened in the working area (see „19.1 Working area“).

18.1 Image list

The image list consists of the image archive with all images associated with the task.

The images in the image archive are sorted according to the date on which they were recorded.

When new images are recorded or imported, they are automatically added to the image list.

The following actions can be performed with one or more images in the image list:

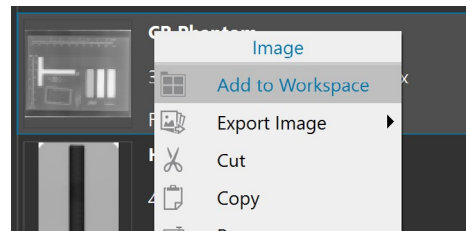
- Add to the working area
- Export
- Cut out (detail)
- Copy
- Rename
- Delete
- Display in Explorer
- Divide

18.2 Load images into the working area

Load images into the working area in succession:

- Double-click the image in the image list to load the image into the working area.

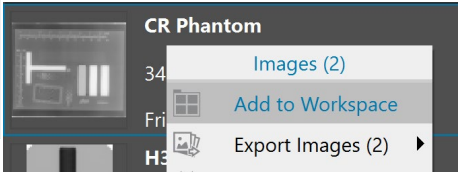
or



- Load the image into the working area via the context menu *Image > Add to Working Area*.

Load several images into the working area simultaneously:

- › Select images in the task list while pressing the Control key.

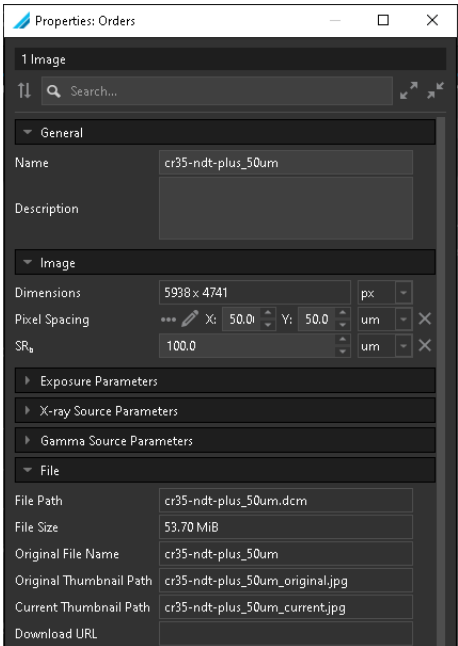


- › Load the images into the working area via the context menu *Images (X) > Add to Working Area*.

18.3 Displaying and editing image information

Displaying and editing image information

Settings in the image information can be changed, depending on the recording device.



- › Select the image in the image list.
- › Select *Task Properties* dock.
- › Enter and/or change the desired parameters. The data that has been entered or changed will automatically be saved.

19 Editing images


The following navigation aids can generally be used:

- Mouse wheel: zoom in/zoom out image section

- Right mouse button: move image section

Reset zoom in/zoom out and move:

- Double-click with the right mouse button

- Click  in the "Image" menu.

The images can be edited using the tools from the toolbox in order to make details easier to recognise and assist evaluation.

The following types of image editing are possible on an X-ray image:

- Filters
- Transformed
- BCG (brightness/contrast, gamma)
- Annotations
- Statistics
- Analysis
- Calibration

- › Select the image in the working area.

- › Edit the image as required using the tools.

The editing of the image is saved.

19.1 Working area

All images selected in the image list are displayed in the working area. The following actions can be performed with the images in the working area:


- „Display Images“
- „Maximise images“
- „Enlarging and moving image details“
- „Close image“
- „Clearing the working area“
- „Displaying and managing the image status“
- „Display/hide annotations and measurements“


Display Images

If several images are open in the working area, they will be displayed next to and above and below one another. Each of these images can be maximised for a detailed view.

Maximise images

If several images have been loaded into the working area, one image can be maximised.

- › In the Image menu, click . The image is maximised over the other images in the working area.


- › In the menu of the maximised image, click .
The image is normalised and all loaded images are displayed in the working area.

Enlarging and moving image details

When opened in the working area, the entire image is displayed. The image can be zoomed for a detailed view. The image detail displayed can be moved around within the frame.

- › Click the desired image in the working area to select it.
- › Use the Zoom tool in the **Tools** dock or turn the mouse wheel to change the image detail.
- › To move the image detail displayed, click and hold the image with the right-hand mouse button and drag it within the frame

Close image


- › In the Image menu, click .

Result:

The image is removed from the working area.

Clearing the working area

If too many images are open in the working area or if the working area needs to be cleared for new images, all images can be removed from the working area.

- › Select all images in the working area.
- › In the working area menu, click . All images are removed from the working area.

Displaying and managing the image status

Depending on the image processing, certain image statuses are saved for every image. These can be displayed for each image. (see „22 History“).

Display/hide annotations and measurements

Depending on whether annotations or messages were added to an image, they can be displayed/hidden (see „22 History“).

19.2 Tools

The tools are divided into the following groups and can be expanded or collapsed by clicking

► or ▼:












on an X-ray image:

- Filters
- Zoom
- Transformed
- BCG (brightness/contrast, gamma)
- Annotations
- Analysis
- Calibration

- › Select the image in the working area.
- › Edit the image as required using the tools.
The editing of the image is saved.

Filters

Filters facilitate evaluation of X-ray images by highlighting interesting structures so that they can be more easily identified.

X-ray		
EN		Castings This increases the contrast for fine structures
		Details 1 Medium-sized structures are enhanced while contrast is reduced
		Details 2 Medium-sized structures are enhanced while contrast is balanced
		Fine structures Contrast of fine structures is increased greatly
		High details Contrast of smaller and medium-sized structures is increased greatly
		Compensating filter: small cell / high compensation Compensating filter over small cell / high compensation
		Compensating filter: large cell / low compensation Compensating filter over large cell / low compensation
		Compensating filter: large cell / high compensation Compensating filter over large cell / high compensation
		High contrast Contrast of medium-sized structures is greatly increased
		Blurred masking Fine structures (<2 mm) are enhanced
		Regular structures Contrast of medium-sized structures is increased

Zoom



The current zoom factor is displayed. A defined zoom factor can be selected.



The zoom can be adjusted to any required setting via the slider. You can also use the mouse wheel to adjust the zoom.

Transformations



Invert.



Reflect: X-direction



Reflect: Y-direction



Rotate 90° Clockwise



Rotate 90° Counterclockwise



ROI windowing



Trimming

BCG



Adjust the image brightness.



Adjust the image contrast.



Adjust the image gamma value
< 1: Bright areas become darker
> 1: Dark areas become brighter

Annotations



Draw a rectangle.



Draw a line.



Draw a polyline



Draw an ellipse.



Draw a spline.



Add text.



Add ruler

Analysis



Line profile



Basic spatial resolution



Wall thickness



Signal noise ratio



ROI statistics



Contrast-to-Noise Ratio

Calibration



Calibration line



Tube calibration

Create line profile (LP)

The selected line visualises the grey scale profile along a drawn line.

Create line profile:

- › Click on .
- › In the image, click and hold on the start point with the left mouse button.
- › Draw a line and release the mouse button at the end point.

The greyscale profile along the drawn line is displayed in the **LP** dock.

Edit line profile

- › Click on a line in the image.
- › Change the width with the counter.
The set value specifies the width of the calculation profile.

Edit line length or direction

- › Click on a line in the image.
The anchor points of the lines are visible.
- › Move the mouse cursor onto one of the anchor points.
- › Press and hold the left mouse button and drag the anchor point to the required position.
- › Release the mouse button.

Move line

- › Click on a line in the image and move it while holding down the left mouse button.
- › Release the mouse button.

Determine SR_B

- › Click on .
- › In the image, click and hold on the start point with the left mouse button.
- › With the mouse button pressed, draw a line to the end point.
- › Release the mouse button.


The profile of the basic spatial resolutions along the drawn line is displayed in the **SR_B** dock.

Calculating the SNR



In order to calculate the signal-to-noise ratio, the basic spatial resolution (SR_B) must have been set beforehand.

Statistical values on an ROI are visualised with this tool. The statistical values and the normalized SNR value are recalculated during plotting of an ROI when the position or size of an ROI is changed.

- › Click on .
- › In the image, click and hold on the start point with the left mouse button.
- › With the mouse button pressed, drag a rectangle to the end point and release the mouse button. The ROI is displayed in the image with the determined SNR value. Several ROIs can be present.

Edit size or/and location of the ROI in the image

- › Click on an ROI in the image.
The anchor points of the ROI are visible.
- › Move the mouse cursor onto one of the anchor points.
- › Press and hold the left mouse button and drag the anchor point to the required position.
- › Release the mouse button.

Delete ROI

- › Activate the ROI to be deleted.
- › Delete by pressing the Delete key.

Histogram

The histogram shows the brightness distribution of the image.

Histogram docking allows you to alter the image's grey scale values. The black limit shows the percentage of grey scale values changing to black, and the white limit shows the percentage of grey scale values changing to white. If a filter is used then the histogram is automatically recalculated.

The type of histogram display and the option "Remove outliers" can be set in the configuration. (see „7 Configuration settings“)

Measurements



In order to estimate lengths and angles in X-ray images, the image must be calibrated with the aid of a reference image object.

Despite calibration, this estimation is not as accurate as a measurement and must not be used as a measured result. The accuracy depends greatly on the projection distortion of the object on the image detector area.




Line measurement (start and end point, angle measurement)



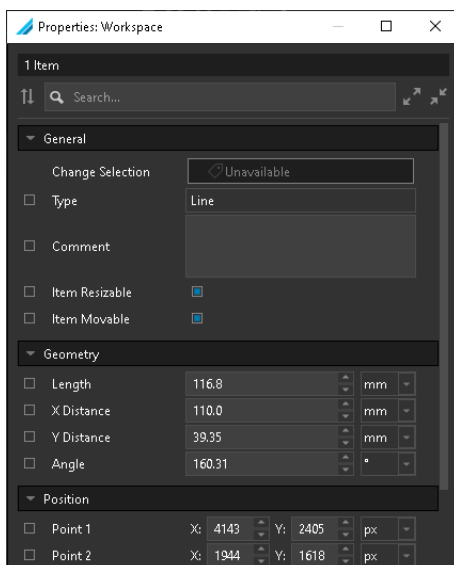
Ruler (start and end point with scale divisions, angle measurement)

Simple line measurement

- › Click on .
- › In the image, click and hold on the start point with the left mouse button.
- › With the mouse button pressed, draw a line to the end point.
- › Release the mouse button.

Changing the display of the line

- › Double-click the line.
The *Properties: Working area* dock is displayed.



The following settings can be displayed and changed:

General

- Name
- Remarks
- Scalable element
- Movable element


Geometry

- Length
- X-distance
- Y-distance
- Angle

Position

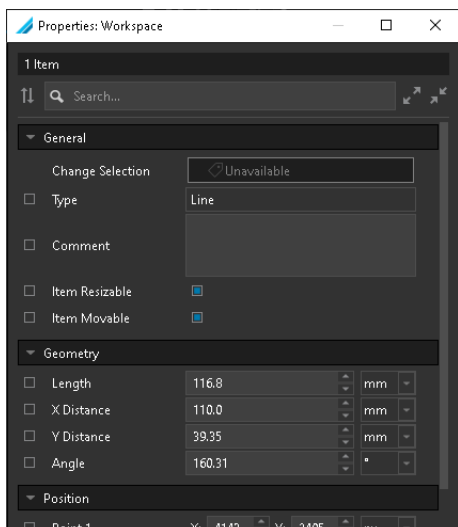
- Point 1 (start point)
- Point 2 (end point)
- Mid-point

Measure with ruler

- › Click on .
- › In the image, click and hold on the start point with the left mouse button.
- › With the mouse button pressed, draw a line to the end point.
- › Release the mouse button.

Changing the display of the line

- › Double-click the line.
The *Properties: Working area* dock is displayed.



The following settings can be displayed and changed:

General

- Name
- Remarks
- Scalable element
- Movable element

Geometry

- Length
- X-distance
- Y-distance
- Angle

Position

- Point 1 (start point)
- Point 2 (end point)
- Mid-point

Display

- Marking length
- Division spacing

Drawings

Drawings can be inserted into the image.

All drawings are saved as operations.

The following drawing tools are available:



Rectangle



Line



Polyline




Spline




Ellipse



Create a rectangle

- › Click on .
- › In the image, click and hold on the start point of the rectangle with the left mouse button.
- › With the mouse button pressed, draw a rectangle to the end point.
- › Release the mouse button.

Create a line

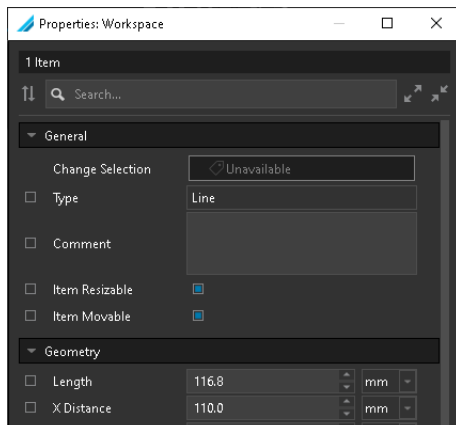
- › Click on .
- › In the image, click and hold on the start point of the line with the left mouse button.
- › With the mouse button pressed, draw the line to the end point.
- › Release the mouse button.

Creating a polyline of spline

- › Click  or .
- › In the image, click and hold on the start point of the line with the left mouse button.
- › With the mouse button pressed, draw the line to the first mid-point and click.
- › With the mouse button released, draw the line to the second mid-point and click.
- › Repeat the process for all additional points.
- › Set the end point by double-clicking with the right mouse button.
- › Release the mouse button.

Changing the display of the line

- › Double-click the line.
The **Properties: Working area** dock is displayed.



The following settings can be displayed and changed:

General

- Name
- Remarks
- Scalable element
- Movable element


Geometry

- Length
- X-distance
- Y-distance
- Angle

Position

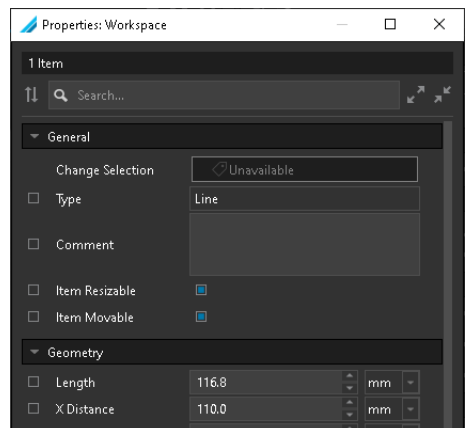
- Point 1 (start point)
- Point 2 (end point)
- Mid-point

Create an ellipse

- › Click on .
- › In the image, click and hold on the start point of the ellipse with the left mouse button.
- › With the mouse button pressed, draw an ellipse to the end point.
- › Release the mouse button.

Changing the rectangle/ellipse display

- › Double-click the object drawn.
The **Properties: Working area** dock is displayed.



The following settings can be displayed and changed:

General

- Name
- Remarks
- Scalable element
- Movable element

Geometry

- Dimension
- Area

Position

- Point 1 (start point)
- Point 2
- Point 3
- Point 4
- Point 4
- Mid-point
- Position

Changing text properties

Also see Presetting the font size:

- „9.6 Property designations“

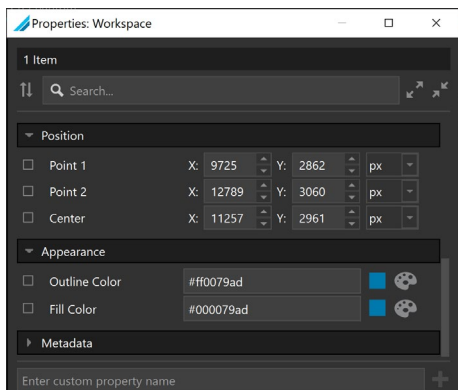
The text size, text colour and text background can be adjusted for all tools in the Annotations group.

Requirements:

- In the *Properties: Working area* dock, the option *"Display property in the working area"* is enabled for at least one parameter.

- › Double-click the text field.

The *Properties: Working area* dock is displayed.



The following settings can be changed:

Font

- Colour
- Filling
- Size

Background


- Colour
- Position

Moving the text field


- › Click on the text field with the left mouse button and move it to the desired position while keeping the mouse button pressed.
- › Release the mouse button.

Calibration

Calibration line

- › Click on .
- › In the image, click and hold on the start point with the left mouse button.
- › With the mouse button pressed, draw a line to the end point.
- › Release the mouse button.

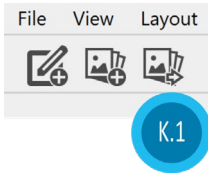
Tube calibration

- › Click on .
- › In the image, click and hold on the start point with the left mouse button.
- › With the mouse button pressed, draw a line to the end point.
- › Release the mouse button.

20 Export image

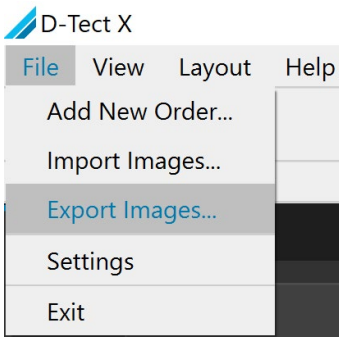
20.1 Default

Various defaults can be defined and saved for image export.



K.1 *Export Images* icon

- › Click the *Export Images* icon.
- › Select *Create New Defaults* in the context menu.



The following settings can be selected during the user-defined export

- Format
- Image options
- Objective
- Export option
- Summary

Format

The following image formats are available:

- JPEG
- PNG
- TIFF
- BMP
- DICONDE

Image options

The selection of image options depends on the image format:

- JPEG/PNG/TIFF/BMP
 - Displaying annotations on the image
 - Export image metadata JSON file
- DICONDE
 - Export image metadata JSON file

Objective

- Select the image export directory

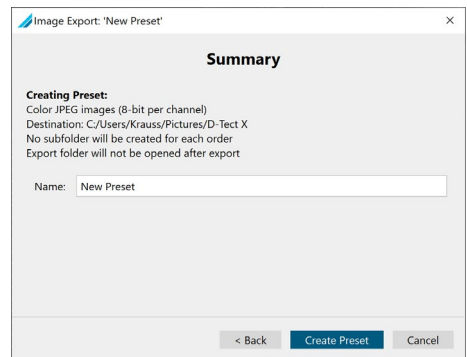
Export options

- Open folder after export
- Create a subfolder for each task

Summary

All selected options are listed.

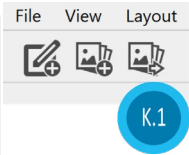
- › Enter a name for the new defaults in the "Name" input field.



- › In the *Summary* dock, click *Create Default*. The selected settings for the user-defined export are saved locally and can be reused during the next export.

20.2 Exporting images

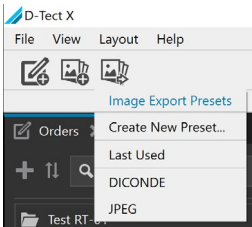
- › Select an image or several images in the Tasks list.



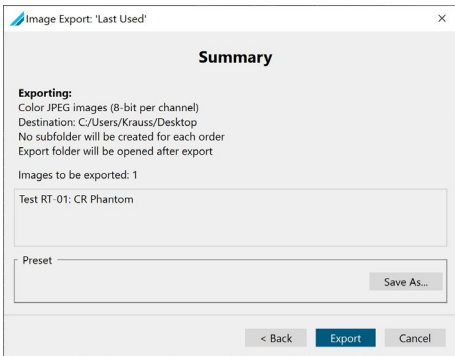
K.1 *Export Images* icon

- › Click the *Export Images* icon.
Select the desired default in the context menu.

or



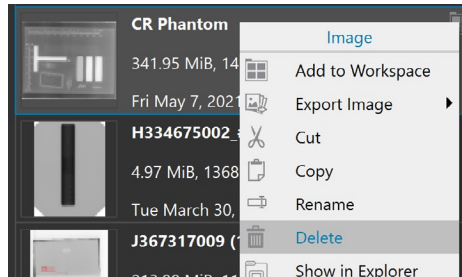
- › Select the image via the context menu *File > Export Images*.



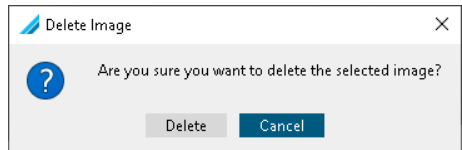
- › In the *Summary* dock, click *Export*.

21 Deleting images

If images are no longer required, they can be deleted.



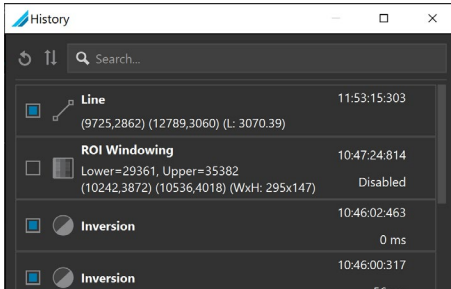
- › Select the image in the image list.
- › Select *Image > Delete* from the context menu.



- › Confirm the question on deleting the image.
The image is deleted.

22 History

All work steps on the image in the workspace are logged and permanently saved with the image in the History dock.

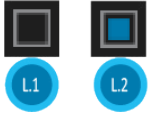


The following data is saved chronologically:

- Tool used
- Date and time
- Editing time
- Current status

Activating/deactivating the status

To the left of the tool icon there is an icon for the current status of a work step.




L.1 Work step enabled

L.2 Work step disabled


An executed work step cannot be undone. It can be disabled via the status. It remains stored and can be re-enabled if necessary.

Enabling a work step

- › Click on .

All operations performed in the work step are applied to the image.

Disabling a work step

- › Click on .

All operations performed in the work step are removed from the image.

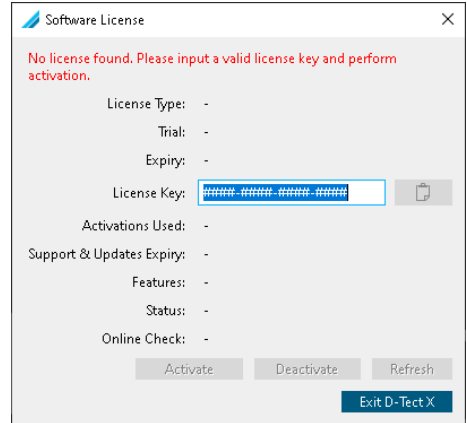
23 Licensing

23.1 Activating a licence online



An active internet connection is required to activate the licence.

- › Open the **Software Licence** dock via the **Help > Licence menu**.



- › Enter a valid licence key.
- › Click **Activate**.

23.2 Activating a licence offline

For PCs that are not connected to the Internet, there is a special offline activation procedure.

You can find more information at:

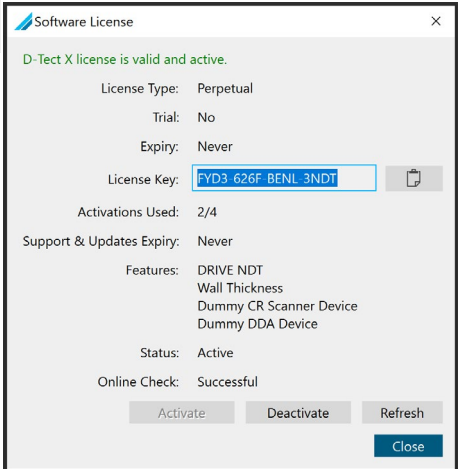
<https://dtectx.com/activation>

23.3 Deactivating a licence online

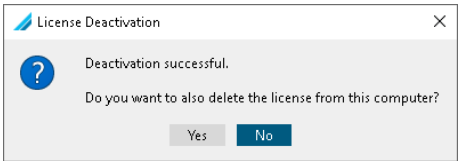


An active internet connection is required to deactivate the licence.

- › Open the **Software Licence** dock via the **Help > Licence** menu.



- › Click the **Deactivate** button.



- › Answer the query:
No Licence is deactivated
Yes Licence is deleted from the computer

23.4 Deactivating a licence offline

For PCs that are not connected to the Internet, there is a special offline deactivation procedure.

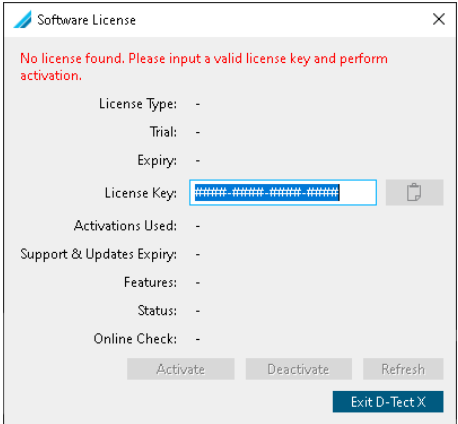
You can find more information at:
<https://dtectx.com/activation>

23.5 Updating a licence



An active internet connection is required to update the licence.

- › Open the **Software Licence** dock via the **Help > Licence** menu.



- › Enter the licence key.
- › Click the **Update** button.

Notes

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