Kinepict Medical Imaging Tool User Manual

Version 6.0.6.

Angiography redefined

CE 2460

Manufacturer's note:

This product bears a CE marking in accordance with the provisions of Regulation (EU) 2017/745 of the European Parliament and of the Council of 5 April 2017 concerning medical devices. The CE marking applies only to medico-technical products/ medical products introduced in connection with the abovementioned comprehensive EC regulation. The original language of this document is English.

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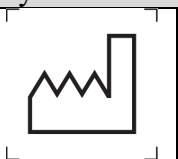
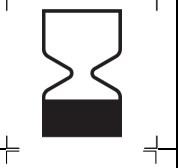
Introduction and Device Information

This manual offers step-by-step instructions for new users to operate the Kinepict Medical Imaging Tool (version 6.0.6), ensuring accurate and efficient evaluation of X-ray angiography images.

A digital version of the manual is available at https://www.kinepict.com following registration.

Version	6.0.6.
Manufacturer Name	Kinepict Health Ltd.
Manufacturer Address	2092 Budakeszi Kelta köz 5
Manufacturer Email	kinepict@kinepict.com
Manufacturer Website	www.kinepict.com
Basic UDI-DI	5999860492KMITSK
UDI-DI	5999860492009
Classification	Kinepict Medical Imaging Tool is a class IIa medical device in accordance with Regulation (EU) 2017/745.
UMDNS Code	16560

Symbols

Symbol	Meaning
Symbols included in the label.	
	Manufacturing Date
	Use by
	Unique Device Identifier
	Manufacturer
	Caution
	Refer to the instructions for use or the electronic version.
CE 2460	CE marking indicating conformity with European standards, certified by Det Norske Veritas (DNV).
MD	Medical Device
Symbols used in the following sections.	
	This symbol highlights critical safety information and potential failures that may result in severe damage, serious injury, or death.
	This symbol highlights important safety information and potential failures that may result in minor damage or financial loss.
i	This symbol provides supplementary information or recommendations.

Acronyms

DVA1 image: The standard Digital Variance Angiography image. This image appears first by default during data processing and is intended to be used with other images.

DVA2 image: A DVA-based image processing method that enhances the contrast-to-noise ratio and reduces motion-related artifacts in lower extremity angiograms.

⚠ *DVA2 alone is not suitable for diagnostic purposes and should always be used with DVA1.*

ccDVA image type 1 and 2: A parametric image processing methods where coloring represents the bolus flow timing, allowing visual estimation of bolus arrival time differences between vessel branches.

ccDVA image type 1: Recommended for iodinated contrast media only.

ccDVA image type 2: Recommended for both iodinated- and CO_2 contrast media.

⚠ *ccDVA alone is not suitable for diagnostic purposes and should always be used with DVA1.*

Anatomical background: An X-ray image that can be overlaid on the DVA image to visualize surrounding anatomy, such as bones.

⚠ *Anatomical background alone is not suitable for diagnostic purposes and should always be used with DVA1.*

DVA video: A DVA movie that displays the movement of the contrast agent bolus front as well as the outflow (run-out phase).

⚠ *DVA video alone is not suitable for diagnostic purposes and should always be used with DVA1.*

cumDVA: A DVA movie that displays the movement of the contrast agent bolus front (cum = cumulative). Due to its cumulative nature, the outflow (run-out phase) is not visible in this video.

⚠ *cumDVA alone is not suitable for diagnostic purposes and should always be used with DVA1.*

ccDVA video: A DVA movie that displays the movement of the contrast agent bolus front and uses color coding to indicate bolus arrival times, making it easier to determine when the bolus reaches specific areas.

⚠ *ccDVA video alone is not suitable for diagnostic purposes and should always be used with DVA1.*

Product Overview

The Kinepict Medical Imaging Tool uses patented technology[1] to extract functional information from a series of X-ray images and generate a Digital Variance Angiography (DVA1) image. In addition to DVA1, the software can overlay anatomical background and create various other image and video types.

This software aims to reduce risks associated with X-ray angiography and is designed with user needs in mind. Your feedback is vital for its ongoing development. For assistance, additional information, or suggestions, contact us at kinepict@kinepict.com.

The Kinepict Medical Imaging Tool is CE marked and available in European countries.

Product Description	The Kinepict Medical Imaging Tool is standalone software for processing and viewing angiography images. It supports real-time viewing, diagnostic review, post-processing, optimization, communication, reporting, and storing medical images and data. The tool is designed for use in operating rooms, image-guided surgeries, interventional oncology, radiology, and neuroradiology, and is compatible with digital radiographic, and angiographic systems.
Intended use	Kinepict Medical Imaging Tool v6.06 enhances angiography by visualizing blood vessels, improving image quality over DSA, or reducing X-ray and/or contrast media doses while preserving DSA image quality.
Indications for use	The Kinepict Medical Imaging Tool aids in evaluating blood vessel health and blood flow, supporting the diagnosis of various vascular conditions.
Clinical benefits	Kinepict Medical Imaging Tool helps diagnose blood vessel issues and reduces risks associated with X-ray angiography, including lowering X-ray and ICM doses.
Processed Data Type	Angiography DICOM image series.
User Profile Characterization	The user should be a medical doctor specializing in radiology, angiology, or vascular surgery. ⚠ *Only professionals trained to use the Kinepict Medical Imaging Tool are authorized to operate it. Kinepict Health Ltd assumes no responsibility for damage caused by improperly trained users.*
Patient Groups	Any adult patient (age ≥ 18 years) eligible for angiography examination and/or therapeutic intervention.
Contraindications	The Kinepict Medical Imaging Tool software has not been validated for thoracic, coronary, or other cardiac interventions, whether diagnostic or therapeutic.
Warnings	1. Test the software without a patient prior to its first use. 2. The software is not intended to replace the DSA imaging provided by the X-ray instrument manufacturer. 3. Respiratory movements may blur vessels, reducing their visibility. 4. Motion artifacts during imaging can complicate the identification

	of intestinal bleeding. 5. Catheter movement can create significant motion artifacts that hinder vessel identification. 6. Contrast media adhering to a ruptured intima leaf is not visible in the summation image; assess the rupture from multiple image frames. 7. Repeated bolus injections within short intervals (seconds) do not affect the imaging algorithms of Kinepict Medical Imaging Tool.
Claims	1. The Kinepict Medical Imaging Tool can visualize blood vessels using non-subtracted X-ray image series obtained with standard-of-care angiography protocol.[1-10] 2. The technology can be used with either iodinated contrast media[2-4] or carbon dioxide[4-6] as a contrast agent. 3. The DVA image generated by the Kinepict Medical Imaging Tool offers a higher signal-to-noise ratio than the DSA image, as defined by the Rose[11] method. Clinical studies have also confirmed improved visual image quality[2-10]. 4. The superior quality of DVA can be utilized for dose management. Clinical studies have demonstrated a reduction in contrast agent volume[8] or radiation exposure[9-10] without compromising angiogram image quality compared to the DSA. ⚠ *The reduction in contrast agent and radiation exposure depends on the angiography instrument and acquisition protocol. Published values are for reference only; each lab must optimize its dose management protocols before routine use.*

List of publications

1. Szigeti et al, 2014. IEEE Trans Med Imaging 3:2031-8.
2. Alizadeh et al 2022 Acad Radiol 2022, DOI: 10.1016/j.acra.2022.05.007
3. Gyano et al, 2019. Radiology, 291:246-53.
4. Thomas et al, 2022. J Vasc Intervent Radiol 33:104-112.
5. Gyano et al, 2020. Cardiovasc Intervent Radiol, 43:1226-1231.
6. Orias et al, 2019 Invest Radiol, 54:428-436.
7. Lucatelli et al, 2023. Cardiovasc Intervent Radiol, 46(5):635-642.
8. Orias et al, 2020. Eur J Radiol Open, 7:100288
9. Gyano et al, 2021. Sci Rep, 11:21790.
10. Sotonyi et al, 2023. J Cardiovasc Dev Dis, 10(5):198
11. Rose A 1953. J Opt Soc Am 43:715-716

Software and Hardware Requirements

For optimal performance, the Kinepict Medical Imaging Tool requires the following software and hardware:

- 64-bit Microsoft Windows operating systems
- A CPU equal to or better than an Intel® Core™ i9-9900K CPU® 3.60GHz
- At least 32GB RAM
- At least a 512 GB SSD
- The installed software itself takes up 270MB of disk space.
- Ensure at least 2GB of free disk space (HDD) for temporary files created by the software, along with additional space for the DICOM files to be processed, to ensure smooth operation.
- These are the minimum requirements. Better hardware will allow the software to run faster and process larger files more efficiently.

Do not use the Kinepict Medical Imaging Tool on a computer that does not fulfil the minimum requirements listed above!

For optimal display, a color monitor with a resolution of at least 1920x1080 is recommended.

License Renewal

During the initial installation, users receive the preinstalled Kinepict Medical Imaging Tool with an active license. Users are responsible for renewing the license on time.

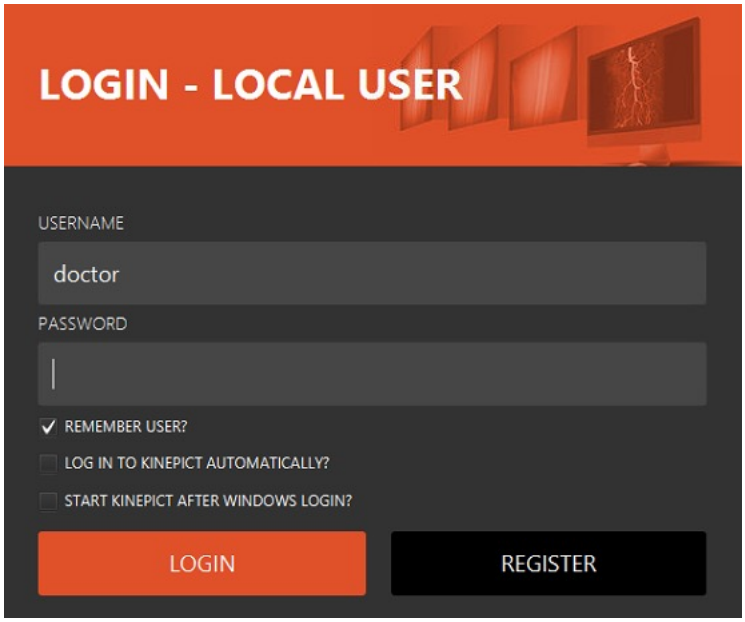
Before the license expires, users receive an email from info@kinepict.com. To request a new license, follow these steps:

- Click on the link in the email.
- Sign in to the website using your username and password.
- Enter the Machine ID, select the license period, and click the ‘Request License’ button.
- After successful login, you will receive an email with an activated license key. Download the attached `.dat` file.
- Open the Kinepict application and use the ‘Browse’ option to locate the `.dat` file in the Downloads folder.
- Click the 'Install' button. After the successful activation, click 'OK'
- Login with username and password.
- The application will start.

Getting started

User Login

Log in with your username and password to access the Kinepict Medical Imaging Tool.



Basic Image Processing

The Kinepict Medical Imaging Tool is typically installed to automatically receive image series from the X-ray angiography instrument in the operating room. Users can also open image series from files. Automatically received images are processed automatically, while manual processing is available for all image series by clicking the image generation button. Image types can be customized in the software menu, and several post-processing tools are also available, as detailed later in this manual.

 Click this button to generate Kinepict images.

i *Users can also open a DICOM file by dragging the image series into the Kinepict main window.*

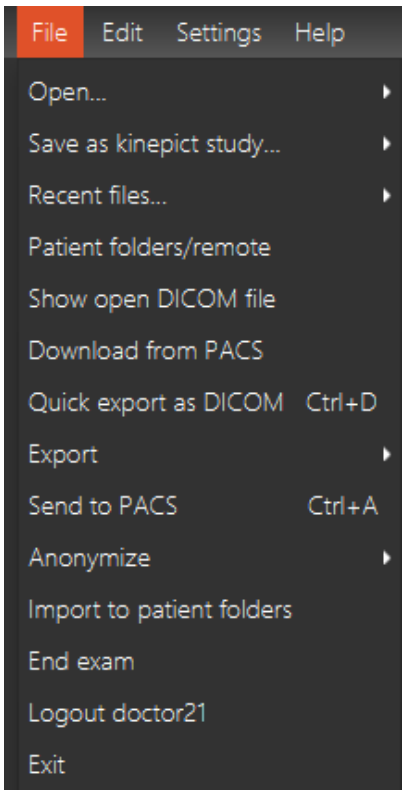
User Interface

The software includes the Main Menu, Image Processing Toolbar, and Workspace, designed intuitively and detailed in the following chapters.

Main Features

The Main Menu includes four submenus: ‘File’, ‘Edit’, ‘Settings’, ‘Help’, and a Language Selection Icon.

‘File’ Menu



‘Open’

There are four options available in the ‘Open’ menu:

‘Open File(s)’

- Users can open a single DICOM file or a Kinepict study file.

‘Open Directory of Frames’

- Users can open DICOM directories.

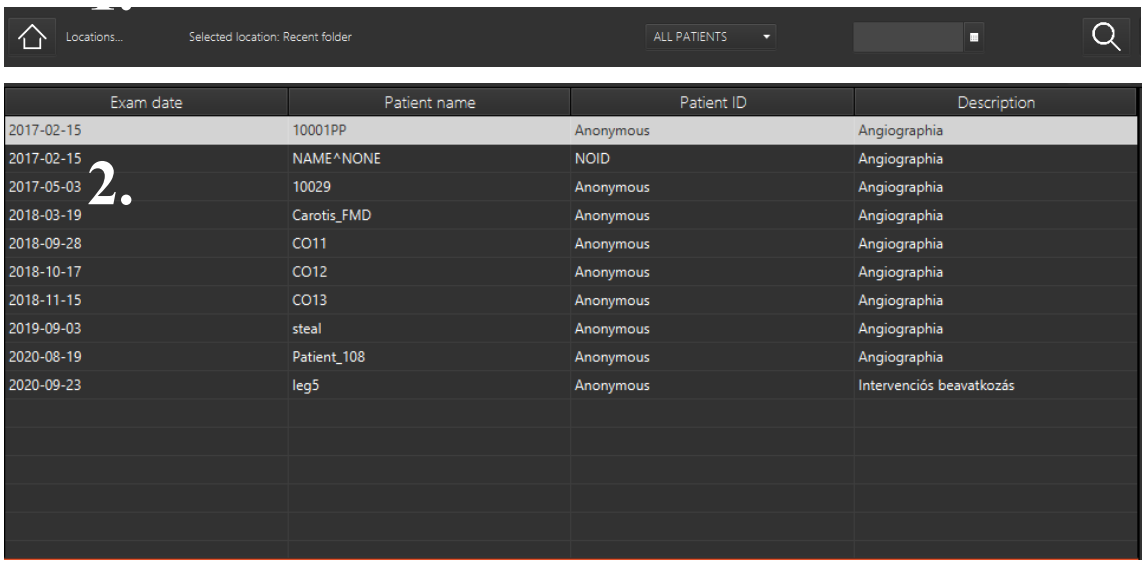
‘Find Multiple DICOM Files’

- Users can select a directory, and KMIT will locate the DICOM files within it.

‘Open Patient Manager Tool’

- Access the Patient Manager Tool to manage and organize patient files.

Select the patient folder



The user can choose the location to import patient images from:

- Default Folder: The most recently used folder.
- Remote Folder: Patient folders stored on a remote location.

- Import from USB/DC/DVD: Patient images stored on external devices.

After selecting the location, the patient images appear in a list. The Patient Manager displays images associated with the selected patient, including sequence name, type, angulations, and frame numbers.

A filter next to the location selection option allows the user to set a specific date range.

 The Home button returns the user to the main menu.

Overview of frames

 This button toggles the view between the frame and the DVA1 preview.

Frames can be individually selected or excluded from the data analysis. A frame selection bar allows easy selection of consecutive frames.

Frame selection scale

Saving files

‘Save as Kinepict study’

- Use these options to save data as a Kinepict study (.kps) to store or reuse the calculated images in the Kinepict workspace later.

‘Save’

- Saves the current study in its existing location.

‘Save As’

- Saves the study with a new name or in a different location.

‘Save Self-Contained Study As’

- Saves the study along with all associated files to ensure portability.

‘Save Anonymized Study As’

- Saves the study with all personal identifiers removed to protect patient privacy.

Advanced File Manipulations

‘Recent Files’

- Recent Files: Displays a list of recently processed files.
- Recent Received Files: Displays a list of DICOM files recently received via the DICOM port.

‘Patient Folders’

- Opens folders where files were recently downloaded or where image series from the X-ray device were automatically stored (if such a connection is configured).

‘Show Open DICOM File’

- Opens the folder containing the currently opened file.

‘Download from PACS Server’

- Allows the user to download images from the PACS server. After clicking this option, a search window appears. After entering the search details, click ‘Find’.

⚠ *If you cannot find what you're looking for, try searching again on your PACS system's own server.*

Exporting Images

‘Quick Export as DICOM’

- Saves data in a DICOM file in the same folder where the previous DICOM was stored. This feature performs the same action as ‘Export’ > ‘As DICOM’ but skips opening the ‘Export’ window.

‘Export’

- Users have multiple options to export processed images:

‘As DICOM’

- Saves selected images in DICOM format, including patient data.

‘As Image’

- Saves image data in various formats, such as PNG, JPG, TIFF, BMP, or GIF.

‘As Text’

- Exports generated images as tab-delimited text files, containing floating-point precision intensity values for each pixel.

‘Send to PACS’

- Sends generated images to a pre-configured PACS server.
- Select the PACS server and images to send.
- Click 'Send.'
- Configure new PACS servers under Settings > Preferences > PACS Servers by providing:

  Host IP address

  Port number

  Application Entity (AE) title
- Use the same tab to edit, delete, cancel, or save PACS server configurations.

‘Anonymize’

Allows users to anonymize DICOM files with the following options:

- Anonymize Input File(s)

  Saves input file(s) as new anonymized DICOM file(s).
- Export as Anonymized DICOM

  Opens the Export window with the DICOM format and Anonymized option pre-selected.
- Anonymize Multiple File(s)

  Anonymizes the selected DICOM file(s) and saves them as new separate files.

‘Import to Patient Folders’

- Quickly places the current file into the automatically generated patient folders.

Termination of the Session

‘End Exam’

- Closes the current workspace. Unsaved data may be lost.

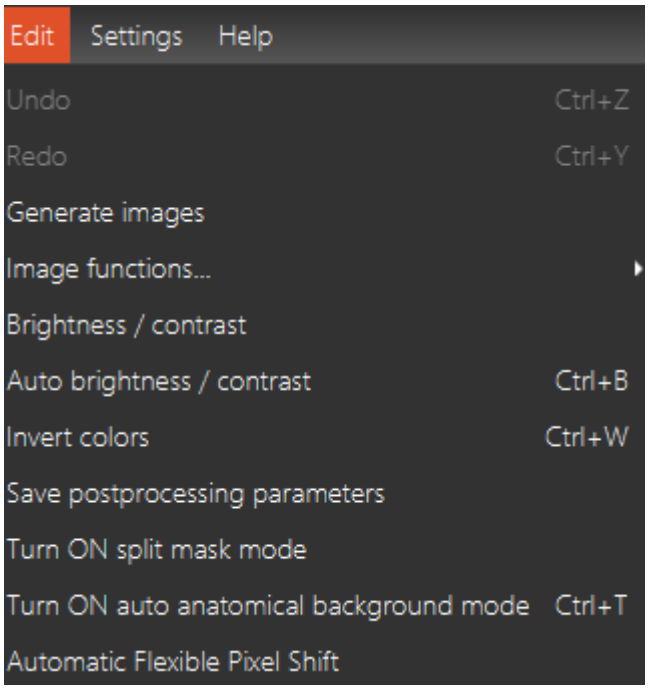
‘Logout’

- Logs the user out of their profile.

‘Exit’

- Closes the program. The user must confirm before quitting.

‘Edit’ Menu



‘Undo’: Reverts the last changes made to the image.

‘Redo’: Reapplies changes that were undone.

‘Generate Images’

- Initiates the calculation of DVA1 and related images.

‘Image Functions’

Offers various post-processing tools within the Kinepict Medical Imaging Tool:

Brightness/Contrast: Adjust the image’s brightness and contrast (default setting).

Zoom In: Magnify the image.

Zoom Out: Reduce the image size.

Crop: Select and retain a specific portion of the image.

Pixel Shift: Adjust pixel alignment to correct for motion artifacts.

Fixed ROI Pixel Shift: Apply pixel shift to a defined region of interest (ROI).

Sharpness: Enhance image clarity by adjusting sharpness.

Apply ccDVA Color: Add color coding to DVA images.

Remove Coloring: Remove any applied color coding from the image.

⚠ *The sharpness function is an image enhancement tool, but using it multiple times will not significantly improve image quality.*

‘Brightness/Contrast’

- Adjust the brightness and contrast of the selected image manually.

‘Auto Brightness/Contrast’

- Automatically set brightness and contrast with a single click, based on a built-in recommendation.

‘Invert Colors’

- Generate an inverted version of the image.

‘Save Post-Processing Parameters’

- Save the current post-processing settings to a file located in C:/Users/Doctor1/kinepict/postprocessingInfo.

Second Screen Visualization

- Calculated images and videos can be displayed on a second screen. The second screen content updates automatically as image generation progresses.

During automated generation, an "Image generation in progress" message indicates that a new data series has been received and is being processed.

‘Turn ON split mask mode’

- The user can enable ‘Split Mask Mode’ from the ‘Edit’ menu. This mode separates the image into left and right sections for selecting distinct pixel shift areas. When Split Mask Mode is active, every pixel in a pixel shift ROI must be on one side (left or right). Each side can use a different pixel shift ROI, enabling both sides of a lower limb image to be viewed without movement artifacts. The software will create two pixel-shifted series and merge them into a single image series, combining the respective sides. Disabling Split Mask Mode reverts to single ROI pixel shift for subsequent operations.

The ‘Turn ON Auto Anatomical Background Mode’

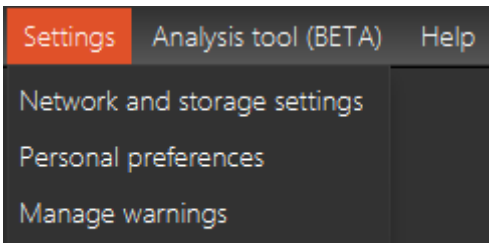
- Enables the visualization of the bone structure in the background.

‘Automatic Flexible Pixel Shift’

- Applies a function to remove movement artifacts. This function processes the entire image.

⚠ *The Automatic Flexible Pixel Shift function is an image enhancement tool designed specifically for lower limb or lower extremity images.*

‘Settings’ Menu



‘Network and storage settings’

‘Networking’

- Use the ‘Networking’ tab to manage DICOM and HTTP port settings.

‘Remote Computers’

- Add other computers to the same network using the Remote Computers tab.

‘PACS Servers’

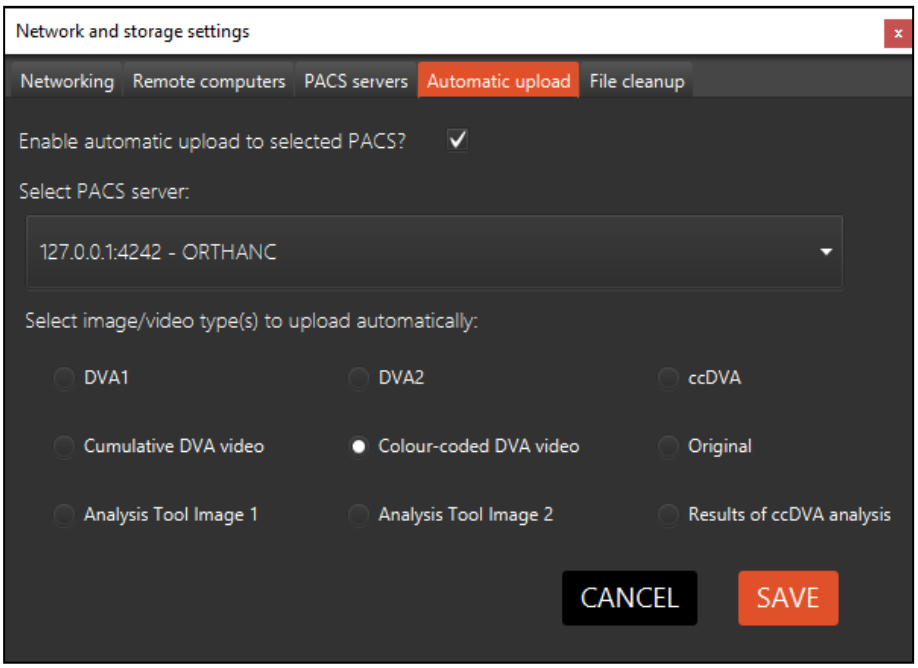
- Use the ‘PACS Servers’ tab to manage the PACS servers for uploading image data. This tab allows users to create, edit, delete, and save PACS server configurations.

‘Automatic Upload’

- To enable automated image uploading, use the ‘Automatic Upload’ tab. Click ‘Enable automatic upload to selected PACS?’ to configure the upload format type and select the desired server.

‘File Cleanup’

- The ‘File Cleanup’ tab helps schedule automated deletion of unnecessary old files.



‘Personal preferences’

Each user can customize their preferences by selecting or deselecting options. Users can:

‘Create a New Profile’

- Configure and save personal preferences.

‘Automated Generation’ Profile

- Automatically generate kinetic images after recording.

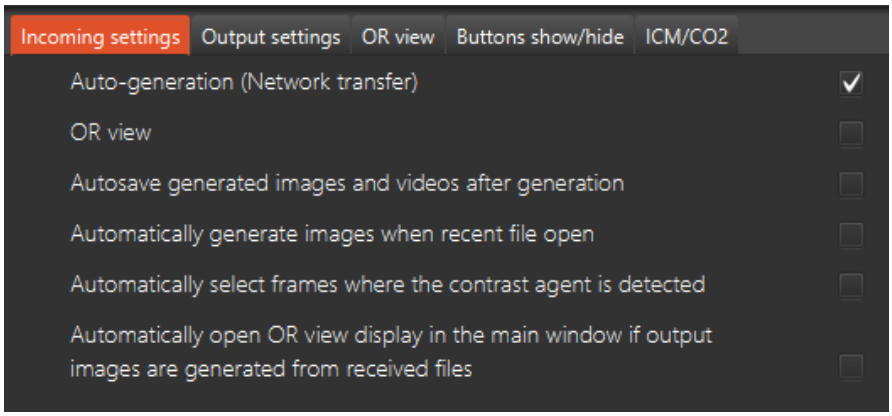
Delete a Profile

- Remove a personal preference profile using the ‘Delete’ button.

‘Reset Settings’

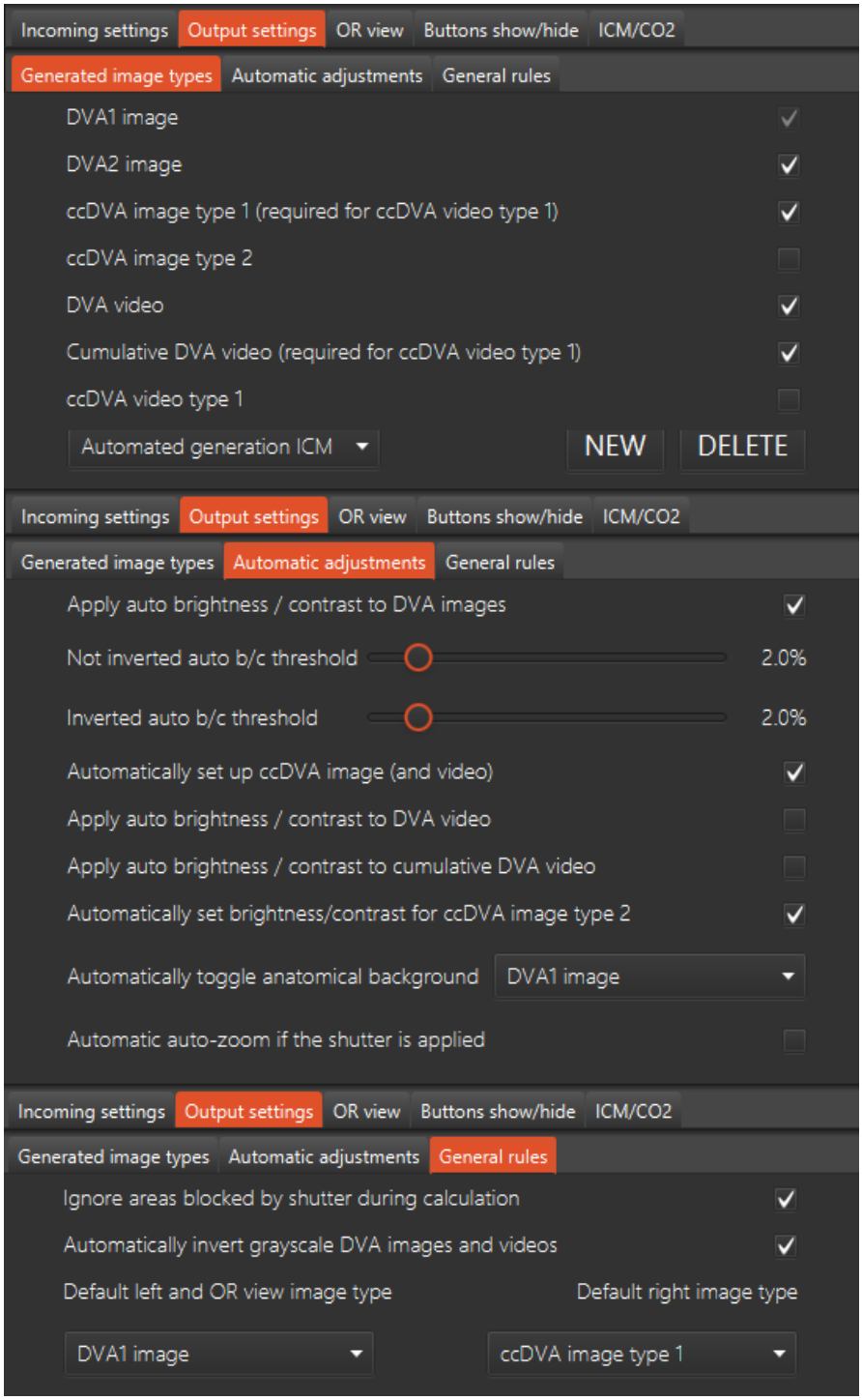
- Restore a predefined personal preference profile to its default settings using the Reset Settings button.

‘Incoming settings’:

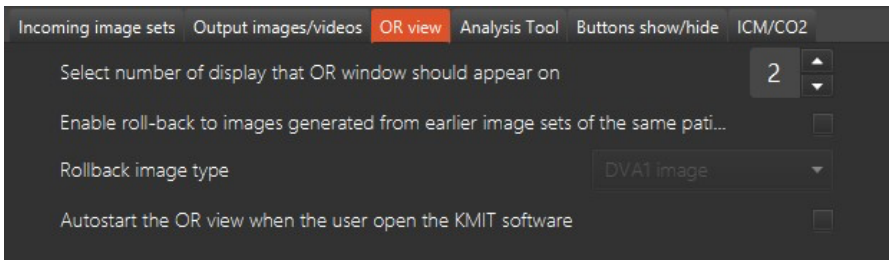


‘Output settings’

This menu allows customization of calculated image types and various automated post-processing options.



‘OR view’



i *Users can customize settings to automatically open the OR view when KMIT software is launched.*

‘Rollback image’

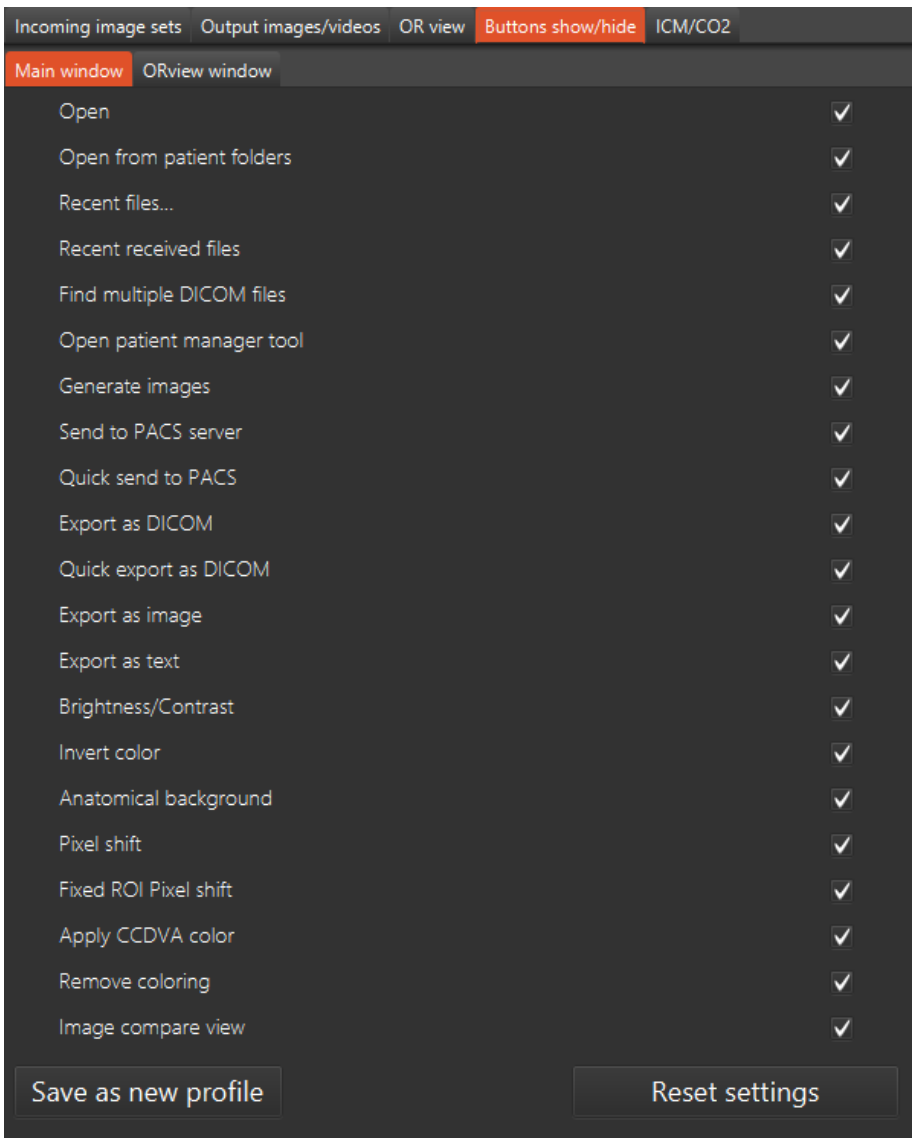
- This function allows users to compare images/videos in the current workspace with those from recent workspaces of the same patient (e.g., to evaluate results of vessel dilation).

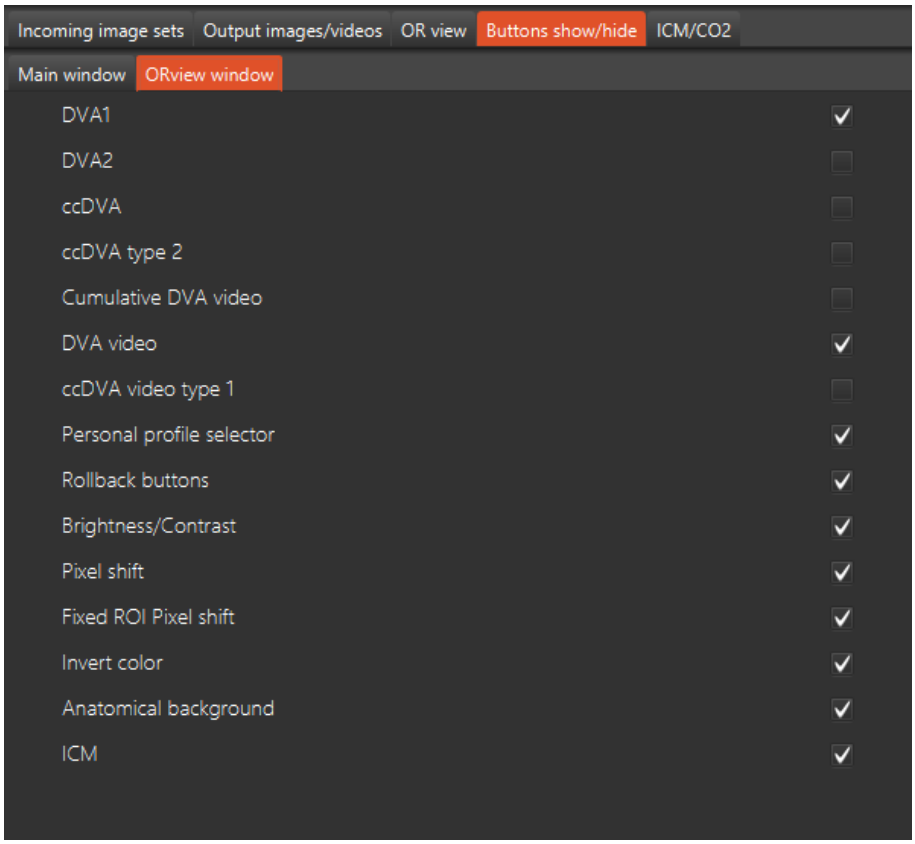
Customization in Personal Preferences allows users to customize the number of recent workspaces available and the types of output images or videos accessible for comparison.

An Icon-Based Navigation enables users to click the ‘–‘ icon to display the image generated from the previous data set or blick the ‘+’ icon to display the image from the next data set in the OR view.

Users can also navigate using the thumbnail images in the left toolbar of the OR view. Clicking a thumbnail replaces the current image with the corresponding earlier one.

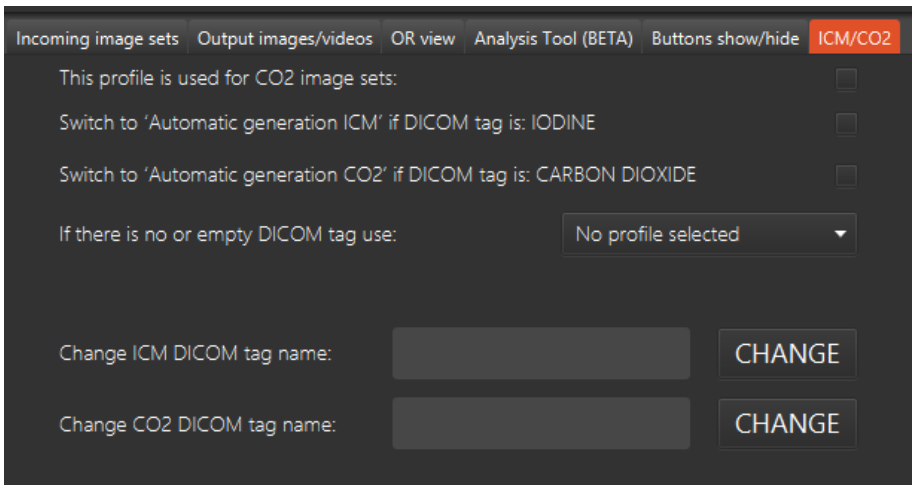
‘Buttons show/hide’:





'ICM/CO2'

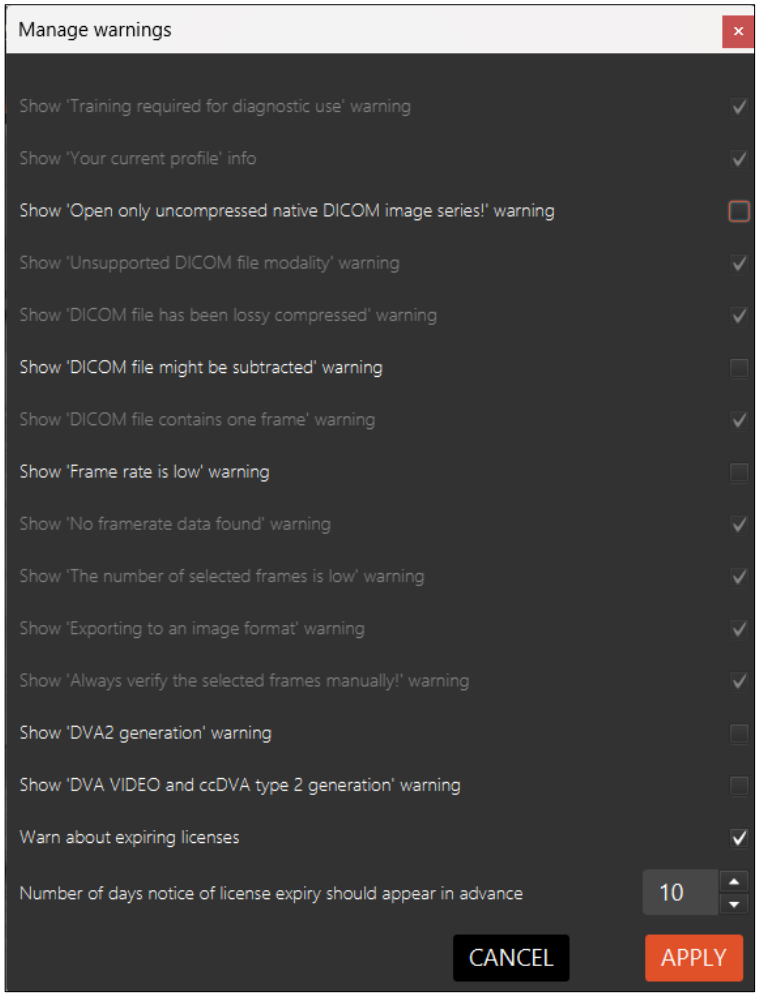
Automatic profile switching between CO2 and ICM interventions can be customized.



The Kinepict software can:

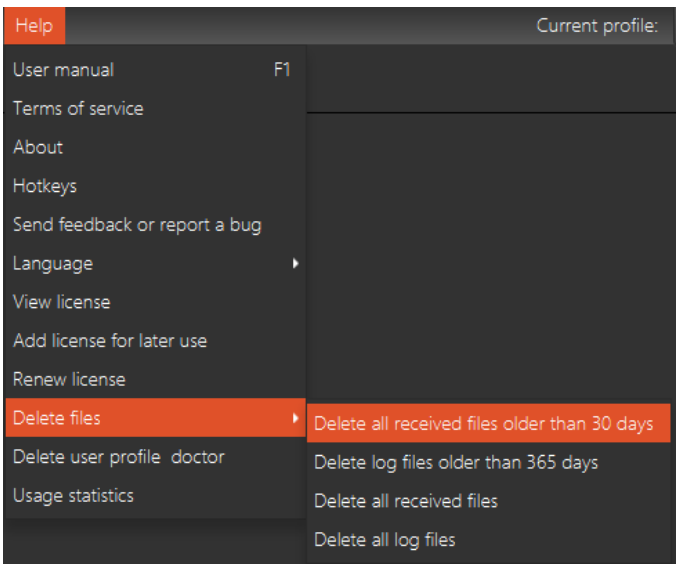
- Identify the contrast material type (ICM or CO2) in the incoming image from the angiography device using the DICOM tag and intensity differences.
- Automatically generate and apply the appropriate image manipulations.

Manage Warnings



Manage warnings by selecting or deselecting the appropriate checkboxes.

'Help' Menu



'User manual'

- This user manual is also available in PDF format by clicking the 'User manual' button.
- The Instructions for Use is available in the following languages: ENG (English), HUN (Hungarian - Magyar), GER (German - Deutsch) and ROM (Romanian - Român).
- User Manuals are also available on the Kinepict's website at https://kinepict.com -> Resources -> Downloads -> User Manuals.
- Documents may be revised periodically. Always refer to the website for the most current version.

‘About’

- Displays the latest software information.

'Hotkeys'

- Opens a table of hotkey combinations for faster operation. Users can customize the hotkeys.

’Send feedback or report a bug’

- Clicking this button allows users to send feedback and bug reports to the support team via email. All fields marked with an asterisk are mandatory, and users can also attach files to the message.

Ensure images are anonymized and free of patient details before attaching them to the feedback.

‘Language’

- The software includes Hungarian and German translations in addition to English. Users can select their preferred language from the flag icon at the top-right corner of the main window.

‘View license’

- Users can view their license details, including the remaining time, license type, and any expired licenses.

’Add license for later use’

- Use this feature to request and store a new license locally. The license will automatically load during the next activation but requires an application restart. If the license expires during operation, the software will continue running without shutting down.

’Renew license’

- Request a new license by logging into the license request site.

’Delete files’

- This function allows users remove received or log files by age or entirely, including patient data.

Clicking 'Delete All Received Files' will also delete patient data!

‘Delete user profile’

- To permanently delete a user, go to the Help menu and select 'Delete User Profile.' You can only delete the profile currently in use, and a password is required to complete this action.

Deletion is irreversible, and a profile with the same username cannot be recreated.

‘Usage statistics’

- The software displays the number of examined patients and the generated DVA images.

Image Processing Toolbar

The image processing toolbar is a vertical toolbar positioned below the main menu.

 This gadget displays the mouse pointer's position.

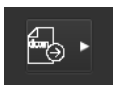
 ‘Open’ (button collection) – Right-click this icon to select an open procedure.

This group includes the following open types:

- ‘Open file(s)’
- ‘Open from patient folders’
- ‘Recent files’
- ‘Recent received files’
- ‘Find multiple DICOM files’
- ‘Open patient manager tool’

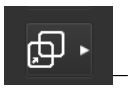
 ‘Generate Images’ – Click this icon to calculate DVA1 and related images based on the settings in Personal Preferences. This icon is located between the ‘Select All’ and ‘Deselect All’ buttons when input images are displayed.

 ‘Send to PACS server’.

 ‘‘Export’ (button collection) – Right-click this icon to select an export procedure from the following export types:

- ‘Export as image’
- ‘Export as DICOM’
- ‘Quick export as DICOM’
- ‘Export as text’

‘Pixel Shift’ (collection of buttons)

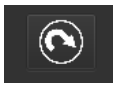
 – Right-click this icon to select a pixel shift procedure from the available types:

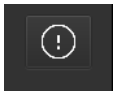
- ‘Pixel shift’
- ‘Fixed ROI Pixel shift’
- ‘Automatic Flexible Pixel Shift’

 Apply ccDVA color

 Brightness/contrast

 Undo

 Redo

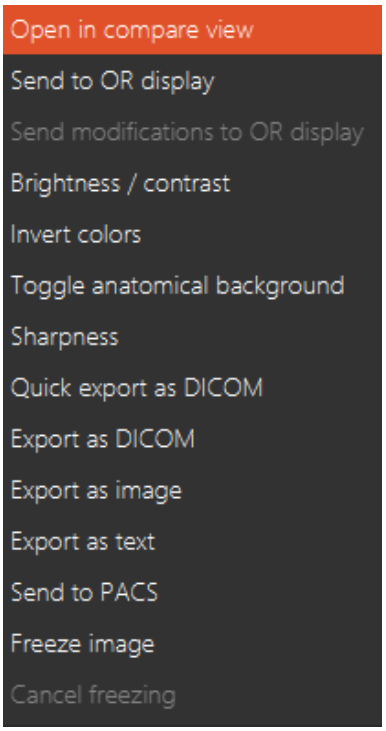
 Warnings/Errors – Displays warnings and errors with timestamps, labels, descriptions, and the

input file's path in the workspace. The exclamation mark button lights up for notifications, and new entries are highlighted.

License Expiration

i *Hovering over the button will make it light up orange.*

Context menu



Right-clicking on the image opens the Context menu with the following functions:

‘Full Size Image’

- Magnifies the image to full size in a separate window.

‘Send to OR Display’

- Sends the image to the operating room display.

‘Send Modifications to OR Display’

- Sends the modified image to the operating room display.

‘Brightness/Contrast’

- Adjusts the brightness and contrast of the images.

‘Invert Colors’

- Creates inverted images via Edit > Invert Colors. The hotkey for this action is Ctrl + W.

‘Toggle Anatomical Background’

- Toggles the anatomical background on the generated kinetic image. Opacity can be adjusted in Personal Preferences using a spinner (0–100), affecting grayscale images, ccDVA images, and videos.

’Sharpness’

- The sharpness function enhances image quality but repeated use will not significantly improve it further.

‘Quick Export as DICOM’

- Exports the image directly in DICOM format.

‘Export as DICOM’

- Saves the generated images in DICOM format.

‘Export as Image’

- Saves results in various picture file formats.

‘Export as Text’

- Saves generated images as tab-delimited text with floating-point precision intensity values for each pixel.

‘Send to PACS’

- Sends images to PACS.

‘Freeze Image’

- Displays the image in its current state, independent of further post-processing, allowing comparison of image states before and after processing. The user can cycle through all stored states since freezing began.

‘Cancel Freezing’

- Restores the original output type and clears stored image states, replacing the frozen image.

Workspace

⚠ *Before first use, the user must test all necessary functions to ensure proper operation before applying them to a patient.*

The workspace is the software's core, where DVA1, ccDVA, and Anatomical background images are generated. Unprocessed DICOM image series are loaded and displayed here along with the patient’s data. ‘Show’ and ‘Hide’ toggle the visibility of unprocessed images, and clicking ‘Details’ reveals additional information about the currently loaded DICOM file.

The number in the lower-left corner of the workspace shows the remaining days before the current license expires. A new license can be requested via 'Request License' in the Help menu.

Post-processing

DICOM data can be imported automatically from the X-ray equipment or manually from saved files via File > Open.

i *For easier navigation in Recent Files and Recent Received Files, the user can view DVA1 image previews before selecting an image to open.*

After loading the selected DICOM data, the file name appears in the title bar. The 'Generate Images' icon is shown in the toolbar between the 'Select All' and 'Deselect All' buttons. Below this, you can navigate the raw image data frame-by-frame or use 'Play/Pause' to view it as a movie.

⚠ *Only unprocessed DICOMs are recommended for generation, as using compressed or modified image series will result in low-quality generated images.*

Frame Selection

Before generating DVA, users can select frames for image and video creation. Click to select or deselect frames. Use 'Select All,' 'Deselect All,' or click individual frames to include or exclude images from data analysis. Selected images are highlighted with an orange frame.

Shift+Left mouse button allows the selection of multiple consecutive frames

Select Range box: The box next to the 'Select All' button on the left side allows users to define frames using numeric input (e.g., 1, 4, 7-10 = 6 frames: 1, 4, 7, 8, 9, 10).

i *Double-click the selected frame to open it in a new, larger window.*

Image processing

Start image processing by clicking on the 'Generate images' icon. Please note, that the Kinepict software supports files only with the (0008) and (0060) modality DICOM attributes:

XA (X-ray Angiography)

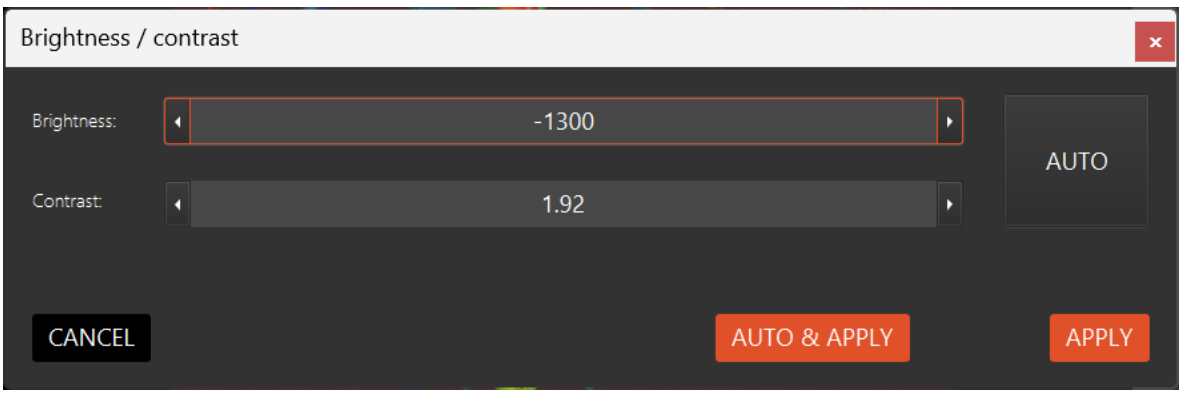
DX (digital radiography/digital X-ray)

RF (radio fluoroscopy).

The software generates DVA1 and other DVA-related images. DVA1 is always generated, while additional images can be configured in the 'Personal Preferences' menu.

In the Brightness/Contrast menu, users can adjust the start and end points of color coding for ccDVA images. The color coding represents the contrast media's arrival latency, following the visible light spectrum: red as the first color and deep blue/purple as the last.

The opacity anatomical background scale allows users to adjust the opacity percentage of the anatomical background.

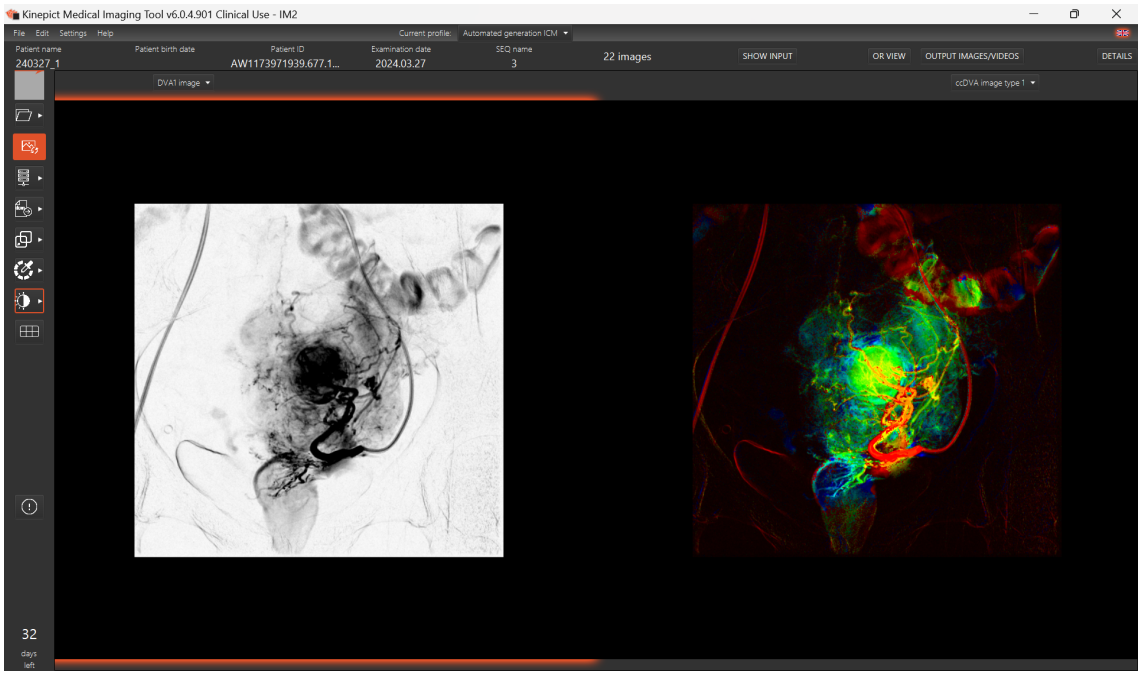


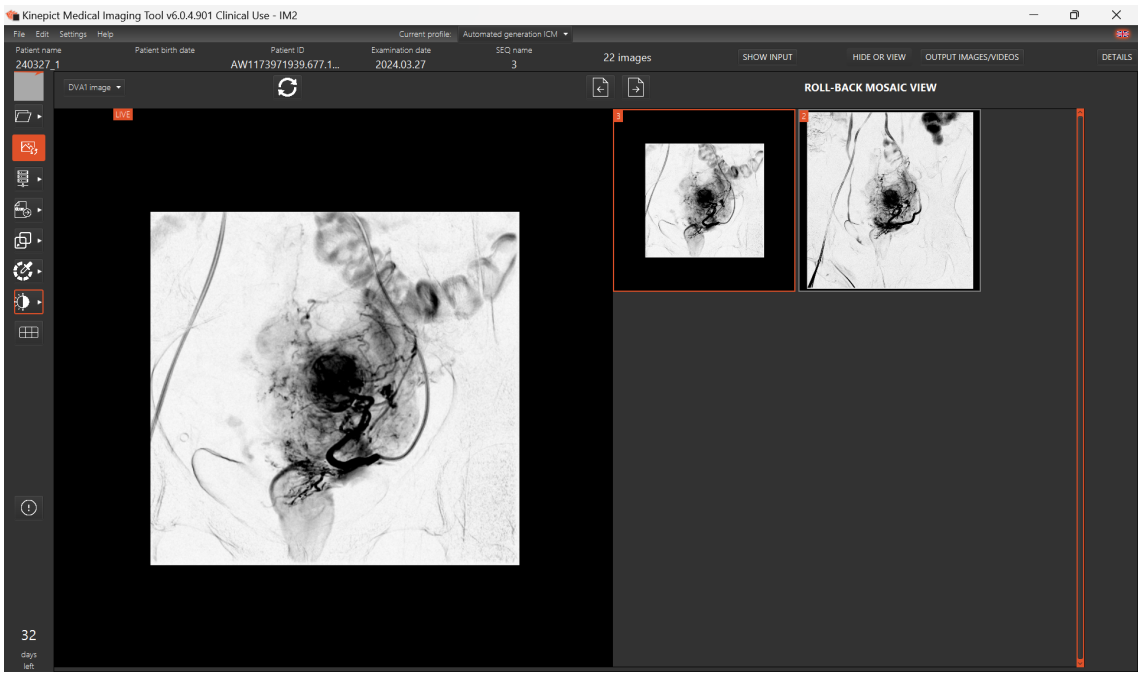
The software displays a warning message if you attempt to generate a DVA1 image from an unsupported modality. However, the calculation can still proceed by bypassing the warning.

i *The active slider button is highlighted in orange.*

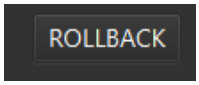
Kinepict Health Ltd assumes no responsibility for images generated from unsupported modalities.

i *The Roll-back Mosaic View is a browser designed to simplify navigation between case records.*

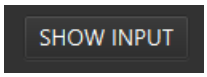




'OR view live': If the user makes image manipulations on the main screen, this button synchronizes the modifications with the OR view window.

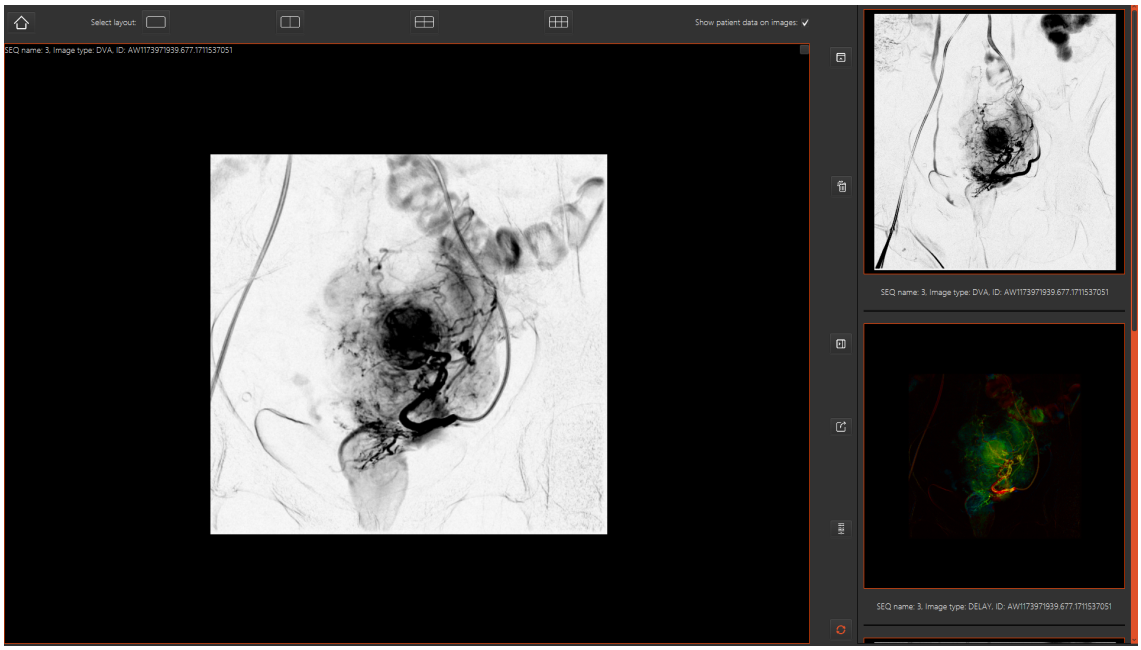


The user can toggle between the frame selection and the main screen window.



The user can toggle between the main screen and the roll-back mosaic window.

i *Double-clicking the image on the main screen opens the compare view.*



Layout selection


Home button


Hide header


Remove selected images from layout


Hide roll-back column


Export screen as…


Send to PACS Server


Refresh images in scrollable list

Adjust brightness and contrast

Modify the brightness and contrast of the generated images by dragging the cursor with the mouse or by using the Brightness/Contrast window.

Dragging the cursor with the mouse:

click-hold in the picture,

drag the cursor horizontally to change brightness,

drag the cursor up and down to improve contrast.

To use the Brightness/contrast window click 'Edit' / 'Brightness/contrast' or click on the 'Brightness/contrast' icon in the Image Processing Toolbar, or right-click in the image and then select the 'Brightness/contrast' option from the pop-up list.

To undo changes, press Ctrl+Z, or use Edit / Undo.

Invert Colors

Create inverted images by selecting ‘Edit’ > ‘Invert Colors’ or using the Ctrl + W hotkey.

Pixel Shift

Use Pixel Shift to remove movement-related artifacts, such as unintended body part movements. Select the critical area by clicking and dragging. Smaller selected areas result in shorter computation times.

i *Pixel Shift adjustments can always be undone.*

Saving Results

There are three ways to save image processing results:

Export as Image

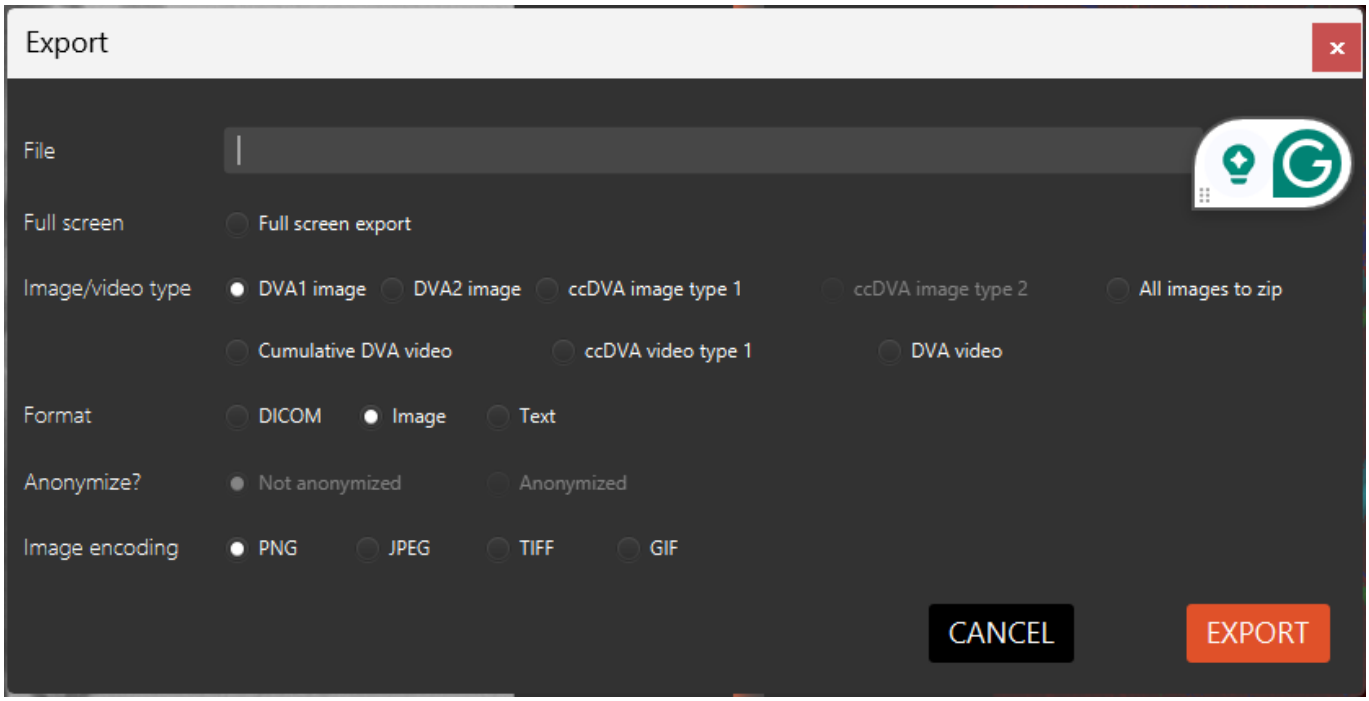
Select 'File' > 'Export' > 'Export as Image' to save the data in a picture file format. Alternatively, right-click on the image and choose 'Export as Image.'

Export as DICOM

Select 'File' > 'Export' > 'Export as DICOM' to save the data as a DICOM file. You can include patient data or save it as an anonymized file. Alternatively, right-click on the image and choose 'Export as DICOM.'

Export as Text File

Select 'File' > 'Export' > 'Export as Text' to save the data as a tab-delimited text file with floating-point precision intensity values for each pixel. Alternatively, right-click on the image and choose 'Export as Text.'



Manage PACS Servers

Manage PACS servers via 'Settings' > 'Network and File Settings' > 'PACS Servers' tab.

To add a new PACS server: Click 'Add New,' enter the host IP address, port number, and AE title, then click 'Save.'

To edit existing PACS server details: Click 'Update' and modify the information.

To send data to a PACS server:

Open the DICOM file or directory.

Generate images.

Select 'File' > 'Send to PACS Server.'

Choose the PACS server and images to send, then click 'Send.'

A confirmation pop-up will appear after saving, allowing you to open the sent image.

Automatic Reception of DICOM Files

The Kinepict Medical Imaging Tool can read DICOM input data directly from the DICOM port of an X-ray angiography machine and display processed images and patient data in the operating room.

Kinepict Software Settings

Go to 'Edit' > 'Network and File Settings' > 'Networking' tab.

Enable the 'DICOM Port Enabled' checkbox.

Set the port number and AE title.

Restart the software after applying changes.

X-ray Machine Software Settings

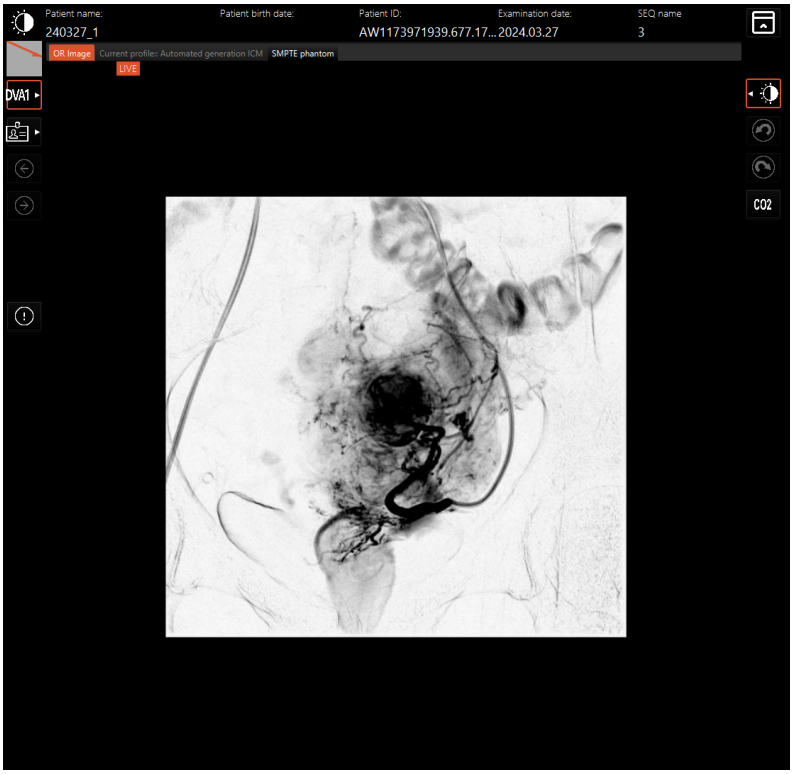
Configure the X-ray machine's IP address to match the port and AE title set in the Kinepict Medical Imaging Tool.

After successful configuration, the software automatically reads the output from the X-ray instrument after each X-ray capture. A popup window notifies the user, allowing them to accept or reject the file.

Once accepted, the workflow proceeds the same as with DICOM files opened from the hard drive. It is recommended to configure the connection between the X-ray machine and the Kinepict Medical Imaging Tool with the assistance of a Kinepict field application scientist, the hospital's IT professional, and the X-ray machine manufacturer's IT expert.

The OR View

The user can view the OR image and the SMPTE phantom.



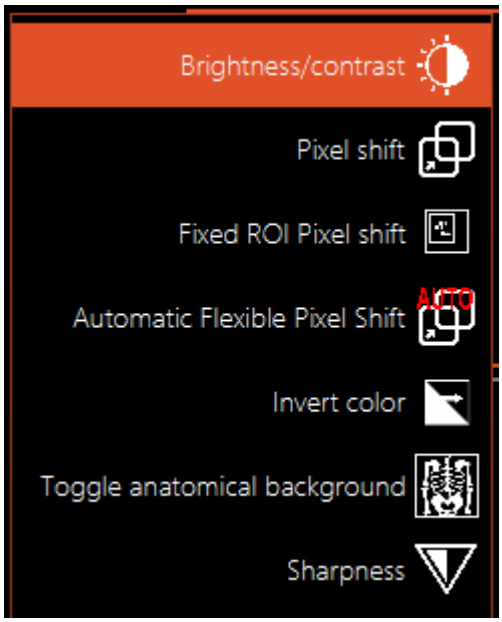
Right-click button groups in the OR view function similarly to those in the main window.


Change ‘Current profile’


Step back and forth through the roll-back images.


Export as PNG, JPG, or TIFF.


Warnings/Errors’ - The warnings and errors list displays timestamps, labels, descriptions, and the file path of the input file in the workspace when the error occurred. The exclamation mark button lights up to notify the user, and new, unseen warnings or errors are highlighted. Users can clear unnecessary items from the list and export the remaining entries in TXT format if desired.



Brightness/Contrast, Pixel Shift, Fixed ROI Pixel Shift, Invert Colors, Toggle Anatomical Background.

 Undo and redo

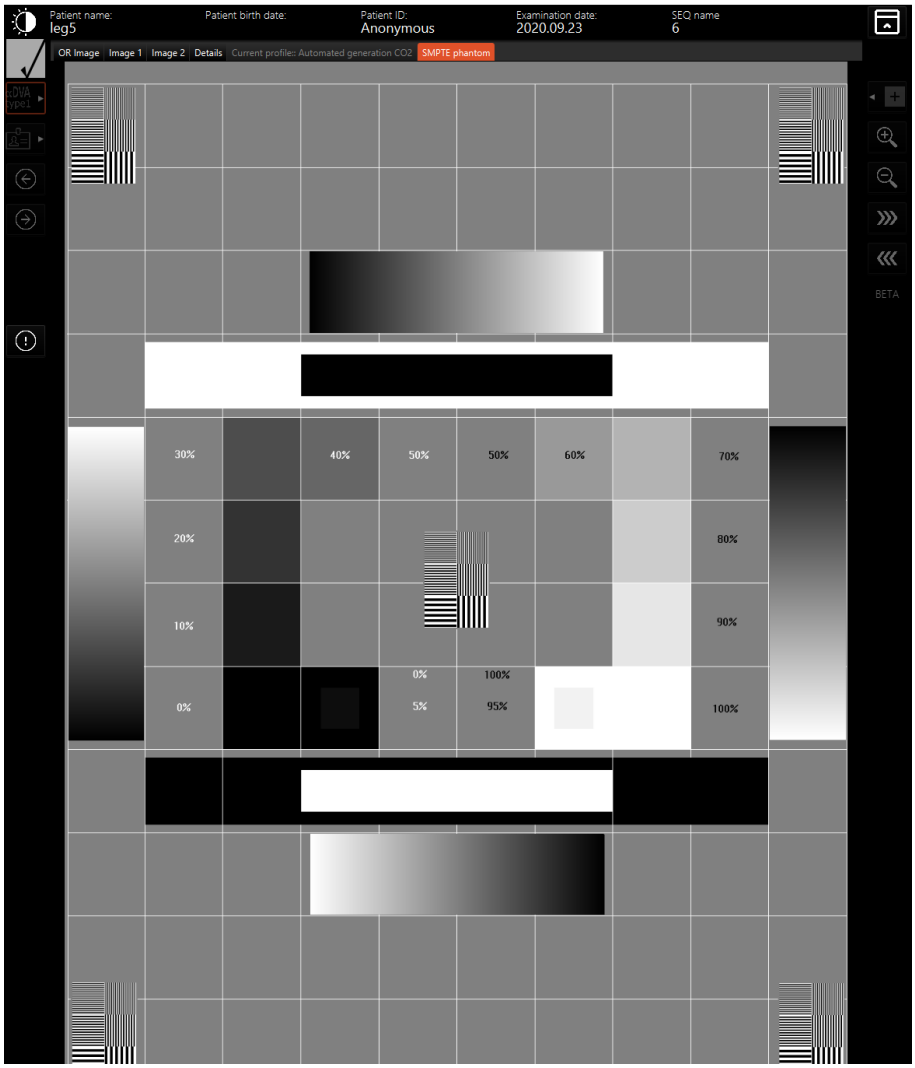
Video frame stepper:

 One Frame Forward and one Frame Backward. Left Mouse Click: Play/Pause.

Frame Forward/Backward: Use mouse scroll or Page Up/Page Down buttons.

 ICM/CO2 Button: Allows toggling between CO2 and ICM settings from the OR view.

SMPTE Phantom: SMPTE pattern for adjusting and controlling the OR view size.



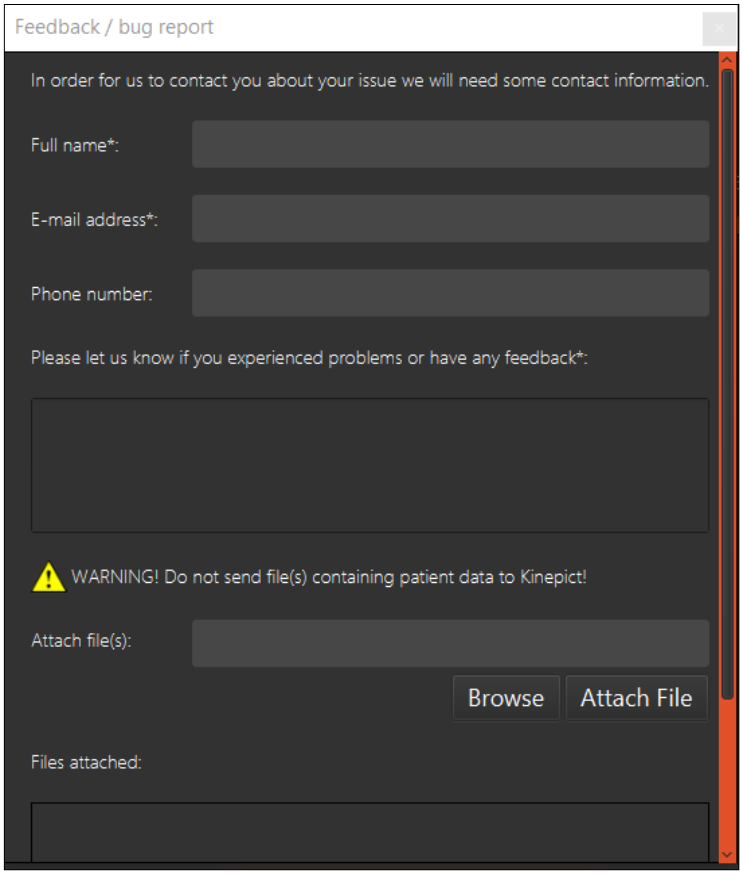
Troubleshooting

For questions or issues with the Kinepict Medical Imaging Tool, contact us at info@kinepict.com or use the 'Send Feedback or Report a Bug' function. You may also find the Frequently Asked Questions helpful.

Send feedback or report a bug

Click ‘Help’ > ‘Send Feedback or Report a Bug’ to report an error, bug, or provide comments about the Kinepict Medical Imaging Tool. Complete the form with the required information.

⚠ *Never share patient data with Kinepict Health Ltd.!*



Reporting incidents

In accordance with MEDDEV 2.12-1 Rev. 8, any serious incident related to the device must be reported to the manufacturer and the competent authority of the Member State where the user and/or patient is located.

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+36317823748

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H-1051 Budapest, Zrínyi u. 3.
+3618869300

Decommissioning and uninstallation

To uninstall the Kinepict Medical Imaging Tool, use the built-in Windows uninstaller:

1. Click the Search field on the Taskbar, type **Control Panel**, and select it from the results.

2. Switch to **Icon View** and click **Programs and Features**. Note that this view shows only standard desktop applications, not Windows Universal apps.

3. Select the Kinepict Medical Imaging Tool, then either right-click and choose **Uninstall** or click **Uninstall** at the top of the list.

Important: During uninstallation, the Kinepict Medical Imaging Tool, all user profiles, and received files will be deleted.

Patient data and user data can be deleted separately before uninstallation. Refer to the **Delete Files** and **Delete User Profile** sections for more details.

Once uninstallation is complete, the Kinepict workstation can be dismantled and decommissioned according to the hospital's policy.

KMIT Usage Summary

DVA image generation during patient treatment.

STAGE	STEPS
System Initialization	1. Turn on the Kinepict workstation in the Cath lab control room. 2. Log in to the Windows user account on the Kinepict workstation. 3. Launch Kinepict Medical Imaging Tool using the desktop shortcut and log in. 4. Kinepict Medical Imaging Tool starts with the 'Automated generation' profile. 5. The software is ready to receive DICOM files and generate DVA images.
In-Procedure Imaging	6. The Kinepict Medical Imaging Tool receives un-subtracted image series from the x-ray angio device and automatically generates and displays the DVA image. 7. The user can apply post-processing adjustments, such as brightness/contrast or pixel-shift, if needed.
Post-Procedure Review and Documentation	8. DVA images can be reviewed on the workstation to prepare patient documentation. 9. DVA images can be sent to the PACS for archiving, as decided by the medical professional. 10. Closes the Kinepict software and power off the Kinepict workstation.

DVA image generation for medical documentation and records.

STAGE	STEPS
System Initialization	1. Turn on the Kinepict workstation in the Cath lab control room. 2. Log in to the Windows user account on the Kinepict workstation. 3. Launch the Kinepict Medical Imaging Tool and log in. 4. The Kinepict Medical Imaging Tool starts with the 'Evaluation' profile. 5. The software is ready to open DICOM files and generate DVA images.
Offline Image Processing and Documentation	6. Open previously received DICOM files stored on the Kinepict workstation to generate DVA images. 7. Use post-processing functions, such as brightness/contrast or pixel-shift, or generate multiple image types, as time is not a limiting factor. 8. Prepare documentation based on the images. 9. Send DVA images to the PACS for archiving or export them, as decided by the medical professional.
System Shutdown	10. Close the Kinepict software and power off the Kinepict workstation.

Frequently Asked Questions

The Kinepict Medical Imaging Tool has been thoroughly tested to ensure superior quality. If you encounter any issues, please contact us at support@kinepict.com. Alternatively, the hospital's IT professional may resolve the problem using this FAQ.

I've installed the Kinepict Medical Imaging software, but it does not start.

- Reinstall the software, carefully following all steps in the Installation chapter of the User Manual.

How do I get the Machine ID for installation?

- Use either of the two methods described in the License Request chapter to obtain the Machine ID.

I have forgotten my username/password for the software login.

- This information cannot be recovered. Please create a new account using 'Register'.

Kinepict Medical Imaging Tool works slowly. What is the problem?

- Verify the minimum system requirements. Better hardware improves performance. Double-check your computer's specifications. If assistance is needed, contact us at info@kinepict.com.

The DICOM file does not open after it has been selected.

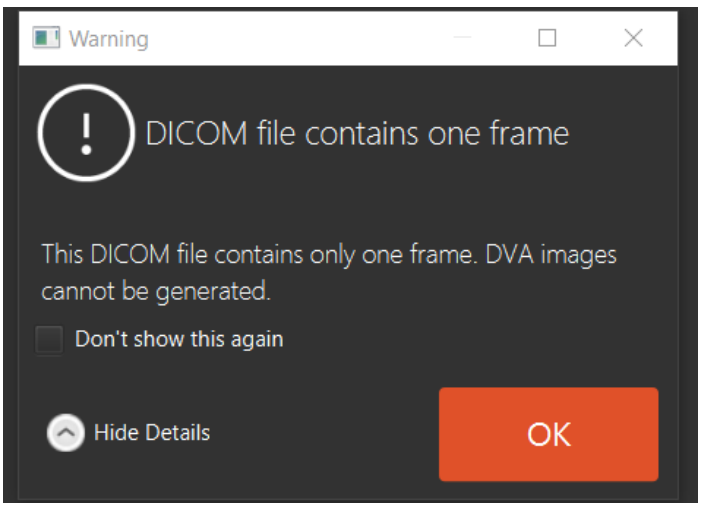
- There are three options to open a DICOM file:

Open DICOM file(s): Open a single DICOM file.

Open Study: Open a Kinepict study file (.kps) from previously processed images.

Open Directory: Open DICOM directories containing related single images.

Using the wrong option will display an error message.



Some DICOM files do not open using 'Recent files…' or 'Recent received files…'.

These functions only open DICOM files containing an image series. Use 'Open directory' to open a series of images saved frame-by-frame in separate DICOM files.

*Why can I only save in *.kps format?*

- The Kinepict Medical Imaging Tool workspace can only be saved in the Kinepict study format (.kps). To save results in DICOM, image, or text formats, use 'Export' under the File menu.

How can I save and export my results in an anonymized format?

- Click the icon below to save original files in anonymized DICOM format.

- To anonymize an exported file, use 'File' / 'Export'. To anonymize a Kinepict study format (.kps), anonymize the DICOM file before opening it in the software.

I receive pop-ups too frequently. Can I turn them off?

- Select 'Do not show this again' when the warning pops up. Alternatively, manage pop-ups in the 'Settings' / 'Manage warnings' window.