Kinepict Medical Imaging Tool
Instructions for Use

Version 7.0

Angiography redefined

CE 2460

Manufacturer's Note:

This product complies with Regulation (EU) 2017/745 of the European Parliament and of the Council on medical devices. The CE marking applies exclusively to medical devices introduced under this comprehensive EU regulation. The original language of this document is English.

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Introduction and Device Information

This manual provides step-by-step guidance for new users on how to operate the Kinepict Medical Imaging Tool (version 7.0), ensuring accurate and efficient evaluation of X-ray angiography images.

The digital version of this manual is available at https://www.kinepict.com.

Version Number	7.0
Manufacturer Name	Kinepict Health Ltd.
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Manufacturer Email	kinepict@kinepict.com
Manufacturer Website	www.kinepict.com
Basic UDI-DI Identifier	5999860492KMITSK
UDI-DI Identifier	5999860492009
Classification	The Kinepict Medical Imaging Tool is a Class IIa medical device according to Regulation (EU) 2017/745.
UMDNS Code	16560

Symbols

Symbol	Meaning
Symbols appearing on the label.	
	Date of manufacture
	Expiration date
	Unique Device Identifier (UDI)
	Manufacturer
	Caution!
	Consult the instructions for use or its electronic version.
CE 2460	CE 2460 – Compliance with European standards certified by Det Norske Veritas (DNV)
MD	Medical Device
Symbols Used in This Document	
	This symbol highlights critical safety information and potential errors that could cause serious harm, severe injury, or death.
	This symbol indicates important safety information and potential issues that may cause minor harm or material damage.
i	This symbol provides supplementary information or recommendations.

Abbreviations

DVA1 Image: The default Digital Variance Angiography image. This is the first image displayed during data processing, and subsequent images should be used to complement it.

DVA2 Image: A DVA-based image-processing method that improves contrast-to-noise ratio and reduces motion artifacts in lower-limb angiograms.

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

Type 1 and Type 2 ccDVA Images: Parameter-based image-processing techniques where color coding indicates the contrast bolus arrival time at each pixel.

Type 1 ccDVA: Recommended only for iodinated contrast agents.

Type 2 ccDVA: Recommended for iodinated and CO_2 contrast agents.

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

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

- ⚠
  - *Not suitable alone for diagnostic purposes and must always be used together with DVA1.*

cumDVA: A DVA video showing the movement of the contrast bolus front. Due to its cumulative nature, the washout phase is not visible.

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

ccDVA Video: A DVA video using color coding to indicate bolus arrival time, helping determine when the bolus reaches specific anatomical regions.

- ⚠
  - *The ccDVA video alone is not suitable for diagnostic purposes and must always be used together with DVA1.*

OR View: OR View (Operating Room View) is the view that the software can display on a screen located in the operating room during medical procedures.

Product Overview

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

The software is designed to reduce the risks associated with X-ray angiography and to meet user needs. For support or feedback, please contact: 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 angiographic images. It supports real-time visualization, diagnostic analysis, post-processing, optimization, communication, reporting, and medical image/data storage. It is intended for use in operating rooms, image-guided procedures, interventional oncology, radiology, and neuroradiology, and is compatible with digital radiography and angiography systems.
Intended Use	Version 7.0 enhances angiography by visualizing vessels, providing better image quality than DSA, or reducing radiation and/or contrast dose while maintaining DSA-level image quality.
Indications for Use	The software assists in assessing vessel condition and blood flow, supporting diagnosis of vascular diseases.
Clinical Benefit	The tool assists in diagnosing vascular problems and reduces risks associated with X-ray angiography, including radiation dose and iodinated contrast use.
Type of Processed Data	Angiographic DICOM image sequences.
User Qualifications	The software may only be used by physicians specialized in radiology, angiology, or vascular surgery. ⚠ *Only trained personnel may operate the software. Kinepict Health Ltd. assumes no responsibility for damage caused by*

	untrained users.
Eligible Patients	Any adult patient (≥ 18 years) eligible for angiography or therapeutic intervention.
Contraindications	The software has not been validated for thoracic, coronary, or other cardiac procedures, whether diagnostic or therapeutic.
Warnings	1. Test the software without a patient before first use. 2. The software does not replace manufacturer-provided DSA imaging. 3. Respiratory motion may obscure vessels. 4. Motion artifacts may hinder identification of gastrointestinal bleeding. 5. Catheter movement may produce artifacts that obstruct vessel visualization. 6. Contrast adhering to a ruptured intimal layer may not appear on cumulative images—review multiple frames. 7. Short-interval bolus injections do not affect the imaging algorithms.
Claims	1. The software can visualize vessels using un-subtracted X-ray image sequences acquired with standard angiographic protocols.[1–10] 2. It can be used with iodinated[2–4] or CO_2[4–6] contrast agents. 3. The DVA image provides higher signal-to-noise ratio (Rose[11] method) than DSA; studies confirm improved diagnostic and visual quality.[2–10] 4. DVA quality enables dose reduction. Clinical studies show that contrast[8] or radiation[9–10] dose may be reduced without degrading image quality. ⚠ *The achievable level of contrast agent and radiation dose reduction depends on the specific angiography system and the imaging protocol used. The published values are for informational purposes only; each operating room must optimize its dose-management protocols before the routine use of the Kinepict Medical Imaging Tool.*

Publications

1. Szigeti et al., 2014. IEEE Trans Med Imaging 3:2031–8.
2. Alizadeh et al., 2022. Acad Radiol. DOI:10.1016/j.acra.2022.05.007

3. Gyánó et al., 2019. Radiology 291:246–53.
4. Thomas et al., 2022. J Vasc Intervent Radiol 33:104–112.
5. Gyánó et al., 2020. Cardiovasc Intervent Radiol 43:1226–1231.
6. Óriás et al., 2019. Invest Radiol 54:428–436.
7. Lucatelli et al., 2023. Cardiovasc Intervent Radiol 46(5):635–642.
8. Óriás et al., 2020. Eur J Radiol Open 7:100288.
9. Gyánó et al., 2021. Sci Rep 11:21790.
10. Sótonyi 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

To ensure optimal performance, the Kinepict Medical Imaging Tool requires the following software and hardware specifications:

- 64-bit Microsoft Windows operating system
- Intel® Core™ i9-9900K CPU @ 3.60 GHz or higher-performance processor
- Minimum 32 GB RAM
- Minimum 512 GB SSD
- Monitor resolution: 1920 × 1080 @ 60 Hz (Full HD)
- Ethernet port
- Built-in Wi-Fi and Bluetooth adapter
- Minimum 2 video output ports
- The installed software occupies 2 GB of disk space
- Ensure at least 60 GB of free storage space for temporary files generated by the software, as well as additional space for processing DICOM files.

Additional hardware requirement for operating-room use:

- Operating-room monitor (recommended minimum resolution: 1920 × 1080)

-  *Do not use the Kinepict Medical Imaging Tool on any computer that does not meet the minimum requirements listed above!*

License Renewal

During the initial installation, users receive the pre-installed Kinepict Medical Imaging Tool with an active license. Users are responsible for renewing the license in a timely manner.

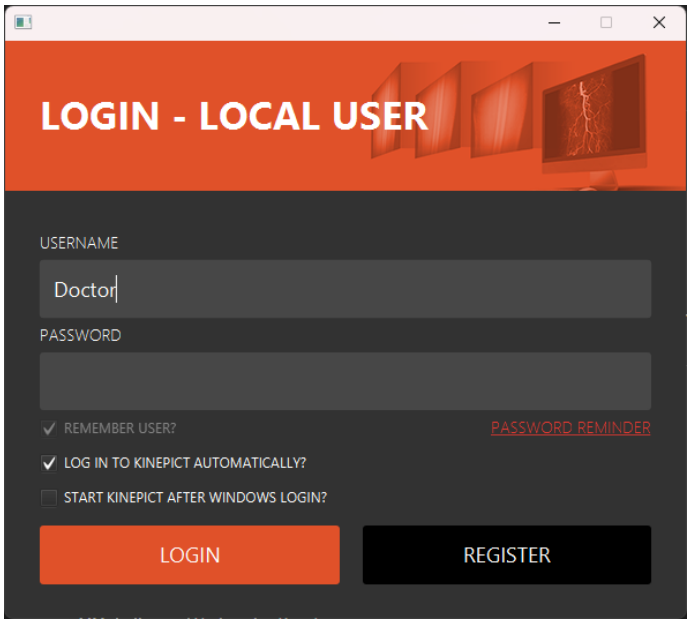
Before the license expires, users will receive an email from info@kinepict.com.
To request a new license:

- Click the link provided in the email.
- Log in using your username and password.
- Enter the machine ID, select the license duration, then click “Request License.”
- After successful authentication, an activated license key will be emailed. Download the attached .dat file.
- Open the Kinepict application and use “Browse” to locate the .dat file.
- Click “Install,” then “OK.”
- Log in with your credentials.
- The application will launch.

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 usually configured to automatically receive image series from the angiography system in the operating room. Users may also open image series from files. Automatically received images are processed by the system, but any image series may be manually processed using the image generation button. Available image types may be customized, and several post-processing tools are available as described later in this manual.

Click this button to generate Kinepict images.

- **i** • *DICOM files may also be opened by dragging the series into the Kinepict main window.*

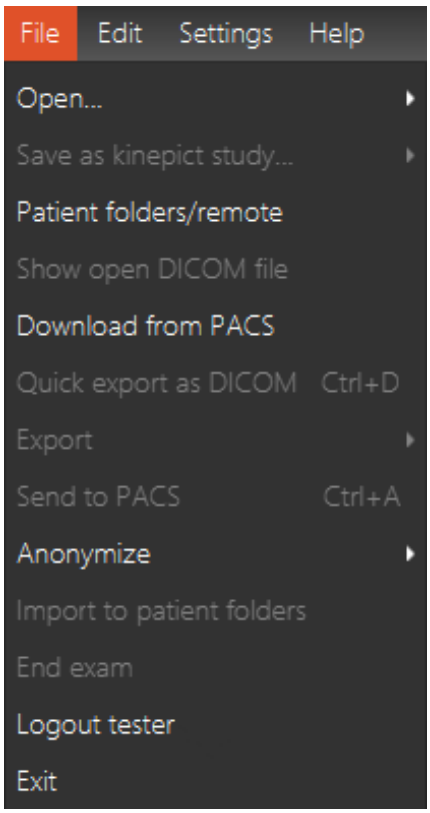
User Interface

The software includes the main menu, the image-processing toolbar, the workspace, and the operating-room display. These components are designed intuitively and are detailed in the following sections.

Main Functions

The main menu contains four submenus: File, Edit, Settings, Help, along with a language-selector icon on the right.

“File” Menu



“Open”

The “Open” menu includes three options:

“Open File(s)”

- Open a DICOM file or a Kinepict study file.

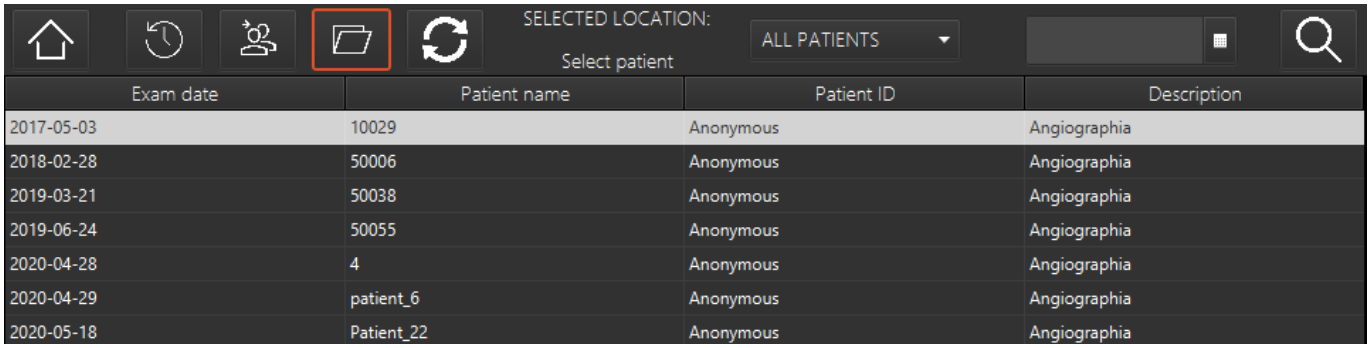
“Open Directory Containing Image Frames”

- Open a DICOM directory.

“Open Patient Browser”

- Access the Patient Browser tool for organizing and managing patient files.

Patient Browser



The user can choose the source from which patient images will be imported:

- Default folder: The most recently used folder.
- Remote folder: Patient folders stored in a remote location.
- Import from USB/CD/DVD: Patient images stored on external devices.

After selecting the location, the patient images will appear in the list. The Patient Manager shows the images and information for the selected patient, including series name, type, and number of frames.

A filter next to the location selector allows setting a specific date range.

The “Change to main window” button returns the user to the main menu.

The “Last examined patient” button reloads the patient files from the most recent session.

The “All patients” button loads image series of previously examined patients.

The “Select patient” button allows browsing for a patient folder.

The “Refresh current folder” button refreshes the folder currently loaded in the Patient Browser.

Search by date

The Patient Browser allows examinations to be filtered by date.

Using the date-picker, the user can specify a particular day or a time interval, upon which the system displays only the examinations performed within the selected period.

- Selecting a single day: Click the date picker, select a date from the calendar, then click “Search by date.” The system will list all patients examined on that day.
- Selecting a date interval: Select a start date, then click another date to set the end date. All

days within the interval will be included. Click “Search by date” to display matching examinations.

- Clearing the selection: Right-click within the date picker to remove the selection and restore the default list.

The dropdown list located below the date picker provides quick access to predefined time periods.

- Today
- Yesterday
- Current Week
- Current Month
- Before Today
- All Patients

Frame review

This button switches between mosaic view and DVA1 preview.

Individual frames can be included or excluded from data analysis in mosaic view.

Frame Selector Bar

The frame selector bar facilitates selecting consecutive frames.

Saving a Kinepict Study

“Save”

- Saves the current study to its existing location.

“Save as”

- Saves the study under a new name or to another location.

“Save self-contained study as”

- Saves the study together with all associated files, making it portable.

“Save anonymized study as”

- Saves the study with all personal identifiers removed.

Advanced File Operations

"Patient folders/remote"

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

"Show open DICOM file"

- Opens the folder that contains the currently opened DICOM file.

"Download from PACS"

- Enables downloading images from a PACS server. After selecting the option, a search window appears; enter the criteria and click "Search."
- Image export

"Quick export as DICOM"

- Saves the data as a DICOM file in the same folder where the previous DICOM was stored. This performs the same action as 'Export' > 'As DICOM,' but skips opening the export dialog window.

"Export"

- Users can choose from several options for exporting the processed images:

  "as DICOM"

  - Saves selected images in DICOM format including patient metadata.

  "as image"

  - Saves images in PNG, JPG, TIFF, BMP, or GIF formats.

  "as text"

  - Exports generated images as tab-separated text files containing floating-point pixel intensity values.

"Send to PACS"

- Sends selected images to a configured PACS server.
- Select the PACS server and the images to be sent.
- Click the "Send" button.

New PACS servers can be added in Settings → Network and storage settings → PACS Servers by providing:

- Host IP address
- Port number
- Application Entity (AE) title.

Servers can be edited, deleted, disconnected, or saved from the same menu.

“Anonymization”

Allows users to anonymize DICOM files using the following options:

“Anonymize input file(s)”

- Saving the input file(s) as new anonymized DICOM files.

“Export as anonymized DICOM”

- Opening the export window with DICOM format and the Anonymized option preselected.

“Anonymize multiple files”

- Anonymizes selected DICOM files and saves them as separate new files.

“Import to patient folders”

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

Ending the Session

“End exam”

- Closes the current workspace; unsaved data may be lost.

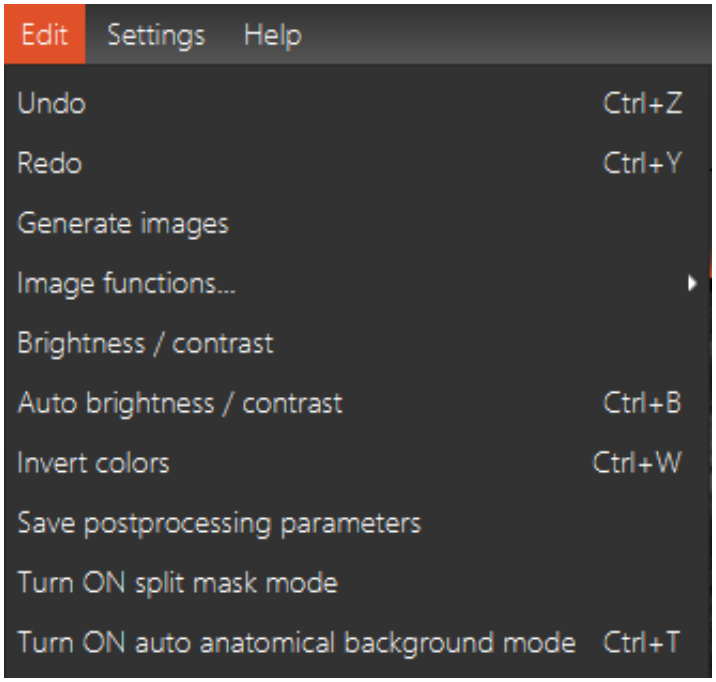
“Logout”

- Logs the user out of the application.

“Exit”

- Closes the program; user confirmation is required.

"Edit" Menu



"Undo"

- Restores the most recent changes made to the image.

"Redo"

- Reapplies the changes that were previously undone.

"Generate images"

- Initiates the calculation of the DVA1 and related image types.

"Image functions"

The Kinepict Medical Imaging Tool provides various post-processing tools:

- "Brightness/Contrast": Adjusts image brightness and contrast (default tool).
- "*Zoom In*": Magnifies the image.
- "*Zoom Out*": Reduces the image size.
- "*Crop*": Selects and keeps a specific region of the image.
- "*Pixel shift*": Adjusts pixel alignment to correct motion artifacts.
- "*Fixed ROI pixel shift*": Applies pixel shift to a defined Region of Interest (ROI).
- "*Automatic Flexible Pixel Shift*": Removes more complex motion artifacts by processing the entire image.
- "*Sharpness*": Enhances image clarity by adjusting sharpness.
- "*Apply ccDVA Color*": Adds color coding to DVA images.
- "*Remove coloring*": Removes applied color coding from the image.

- ⚠ *The sharpening tool is an image enhancement function, but repeated use does not result in substantial further improvement.*
- ⚠ *The Automatic flexible pixel shift tool is specifically designed to improve visualization of the lower extremities.*

“Brightness/contrast”

- Manually adjusts the brightness and contrast of the selected image.

“Auto brightness/contrast”

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

“Invert colors”

- Creates an inverted version of the image.

“Save postprocessing parameters”

- Saves the current post-processing settings to the folder: C:/Users/Doctor1/kinepict/postprocessingInfo.

“Turn ON/OFF split mask mode”

- The user can enable *Split Mask Mode* from the “Edit” menu. This mode divides the image into left and right sections, allowing separate pixel-shift regions to be selected.
- When Split Mask Mode is active, every pixel within the pixel-shift ROI (Region of Interest) must belong either to the left or the right side. Each side may use its own pixel-shift ROI, enabling artifact-free visualization of both lower limbs.

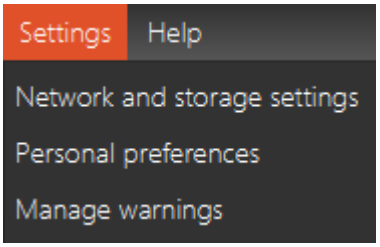
  The software generates two pixel-shift sequences and combines them into a single image series.

  When Split Mask Mode is disabled, the system returns to single-ROI pixel shifting for subsequent operations.

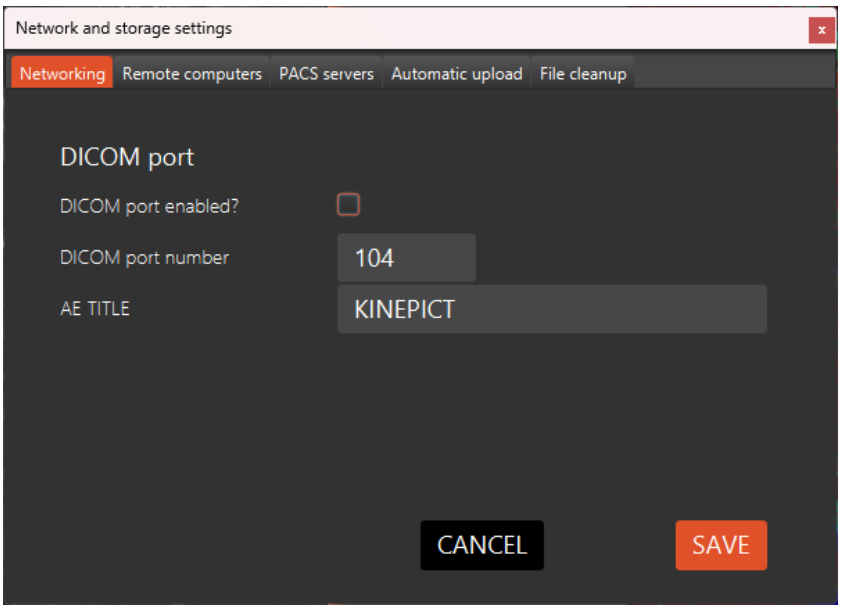
“Turn ON/OFF auto anatomical background mode”

- Enables visualization of the underlying bone structure.

“Settings” Menu



“Network and storage settings”



“Networking”

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

“Remote computers”

- Use the **Remote computers** tab to add other computers to the same network.

“PACS servers”

- Use the **PACS servers** tab to manage PACS servers for uploading image data. In this tab, you can create, edit, delete, and save PACS server configurations.

“Automatic upload”

- Use the **Automatic upload** tab to enable automatic image uploading. Click **“Enable automatic upload to the selected PACS?”** to configure the upload format and select the desired server.

“File cleanup”

- Use the **Clean files** tab to schedule the automatic deletion of unnecessary old files.

“Personal preferences”

Each user can customize the behavior of the software by configuring the available options. Users can perform the following actions:

“Automated generation” profiles

- Automatically generate kinetic images after acquisition. Use the dropdown list to switch between existing profiles.

“New”

- Creates a new profile under the chosen name with default settings.

“Delete”

- Deletes a personal preference profile using the Delete button.

“Save as new Profile”

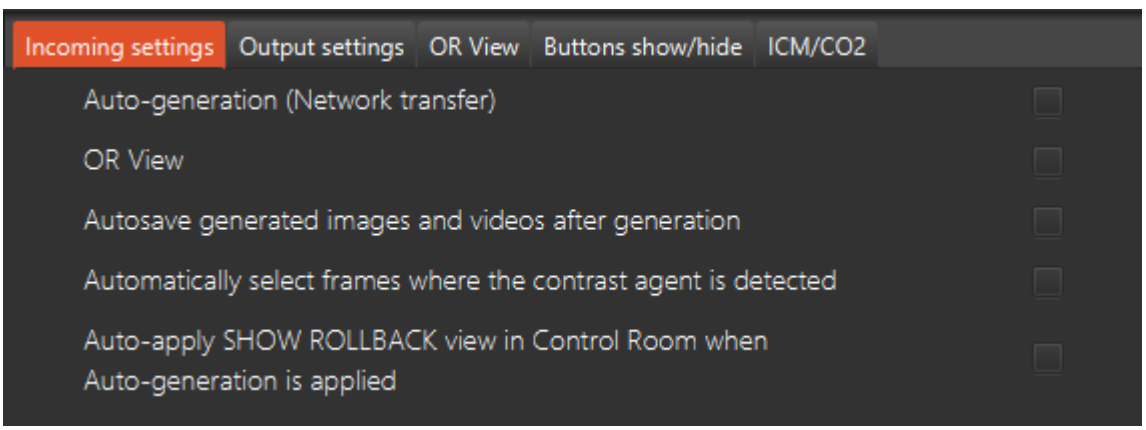
- Creates a new profile based on the current settings, without modifying the settings of the originally selected profile.

“Reset settings”

- Restores a predefined personal preference profile to its default values using the Reset Settings button.

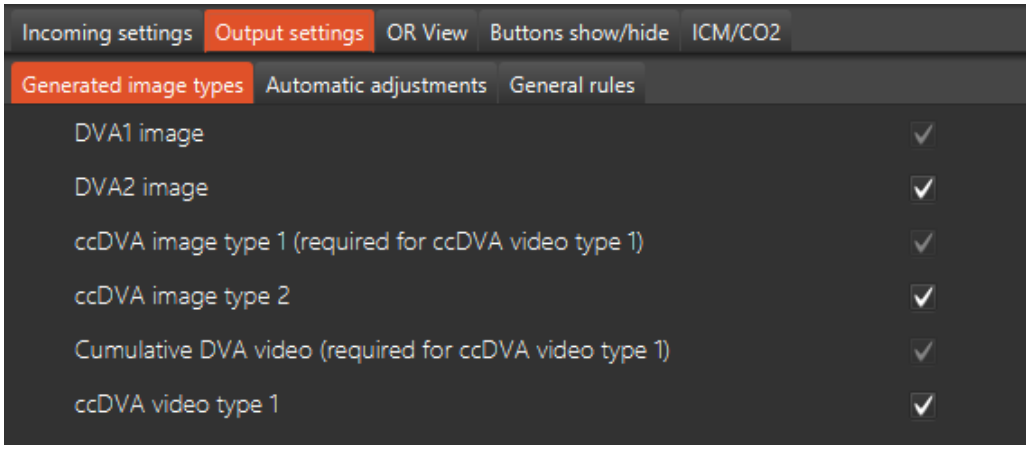
“Incoming settings”:

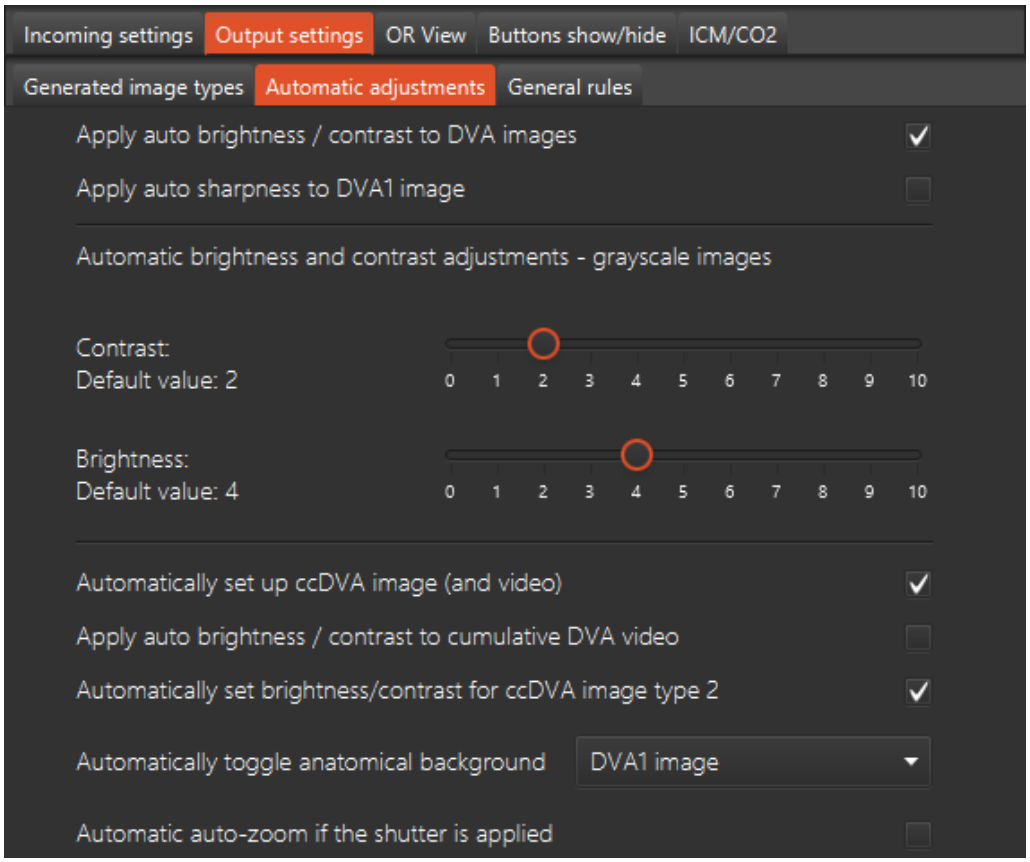
- This menu allows the configuration of options related to the automatic processing, saving, and display of incoming image files.

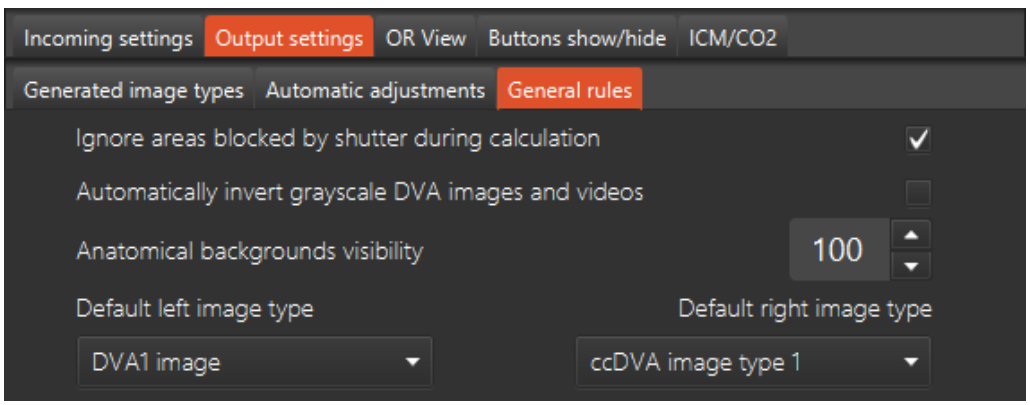


"Output settings"

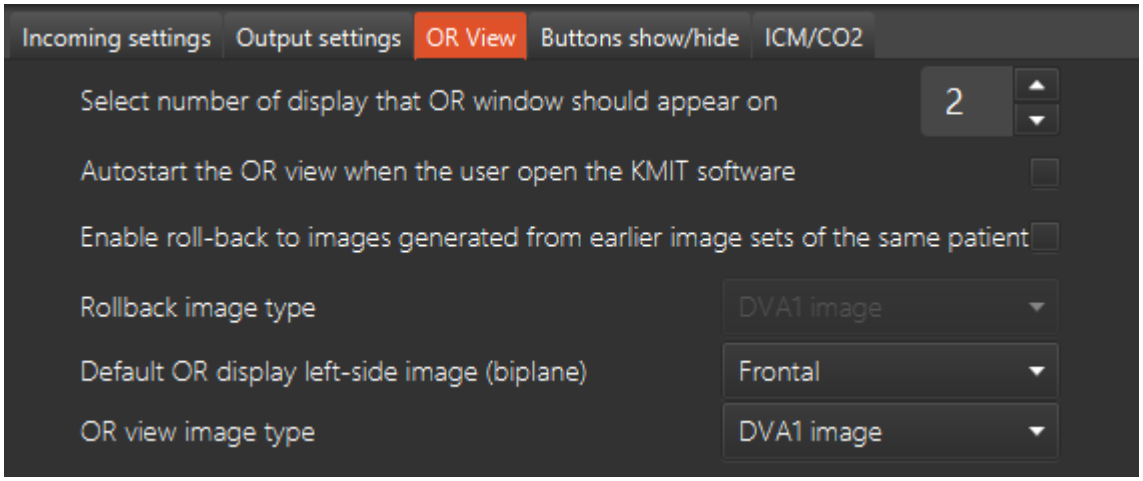
- This menu allows customization of the generated image types and various automatic processing options.





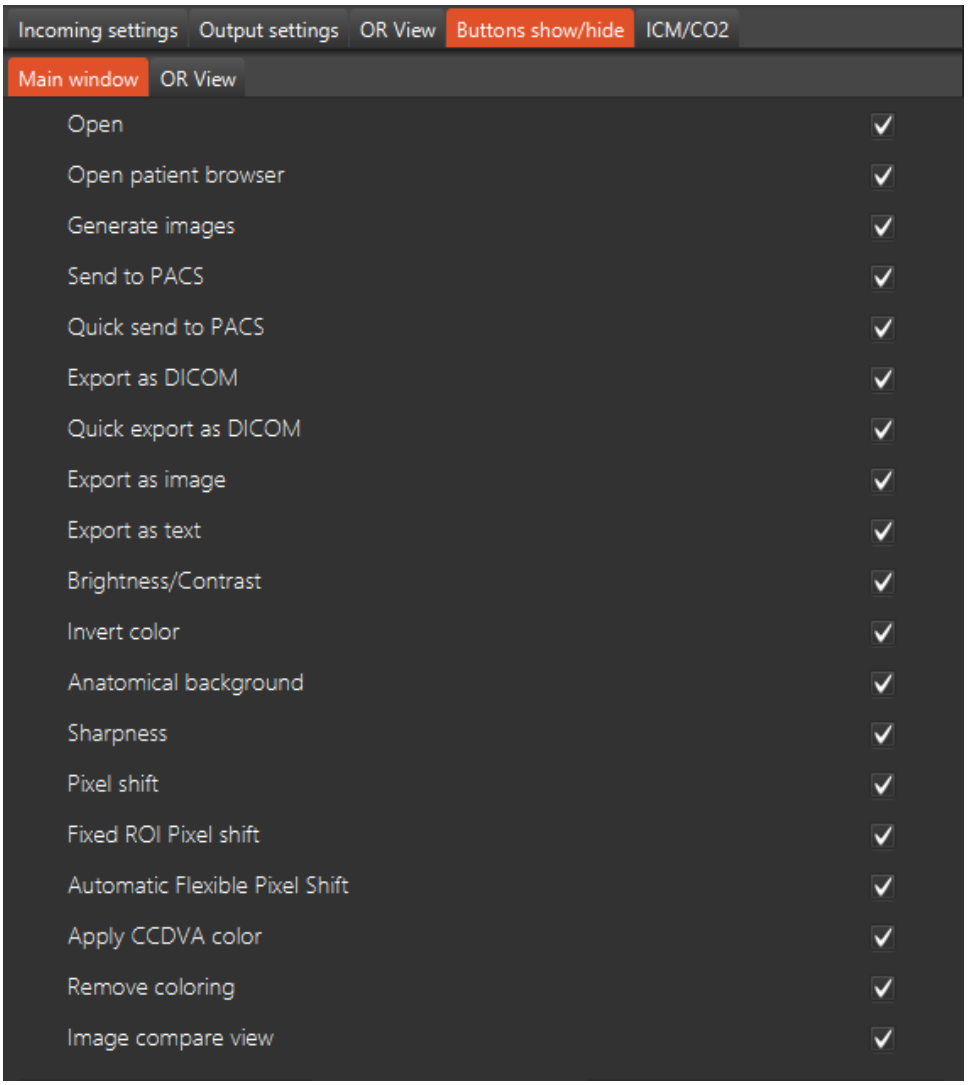


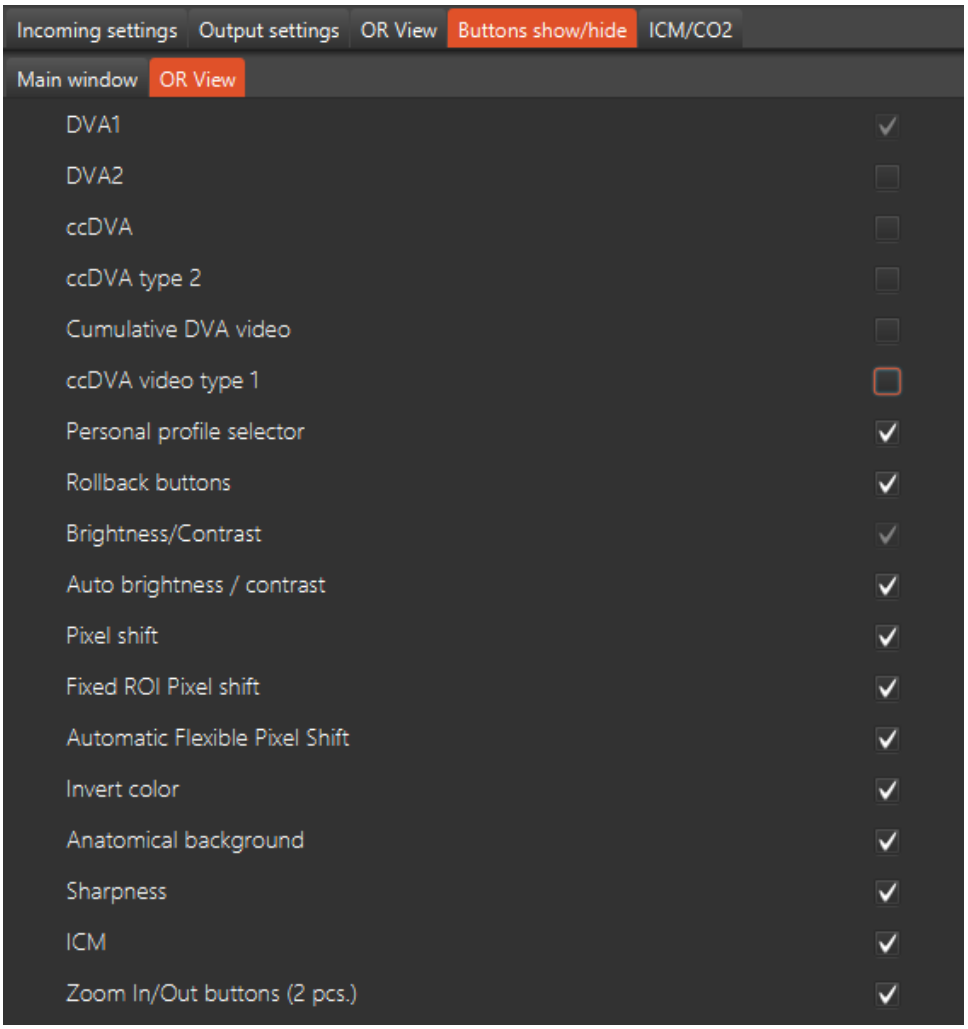
"OR View"



i *Users can choose to have the OR View automatically open when the KMIT software starts.*

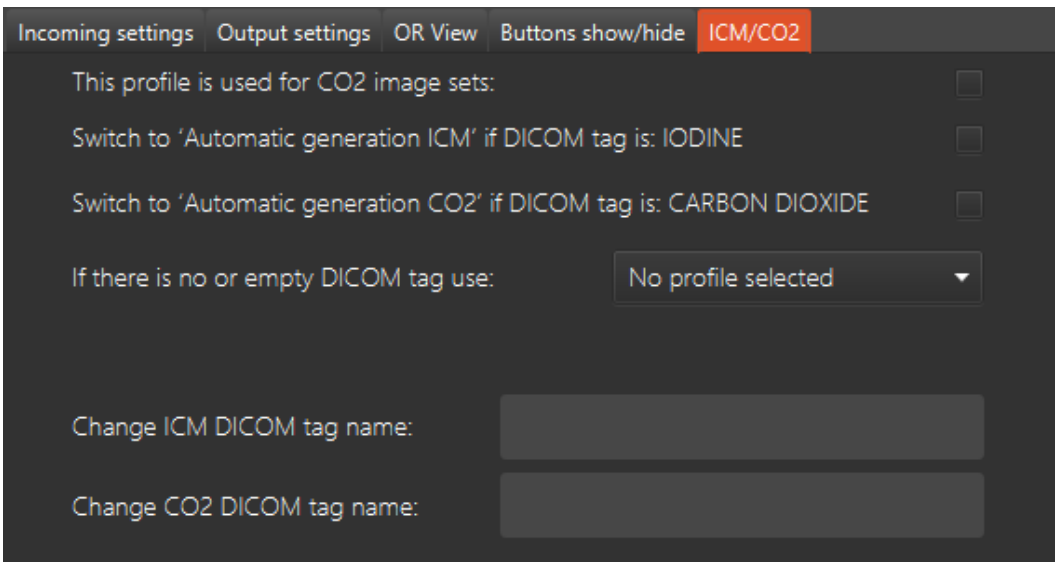
"Buttons show/hide":





"ICM/CO2"

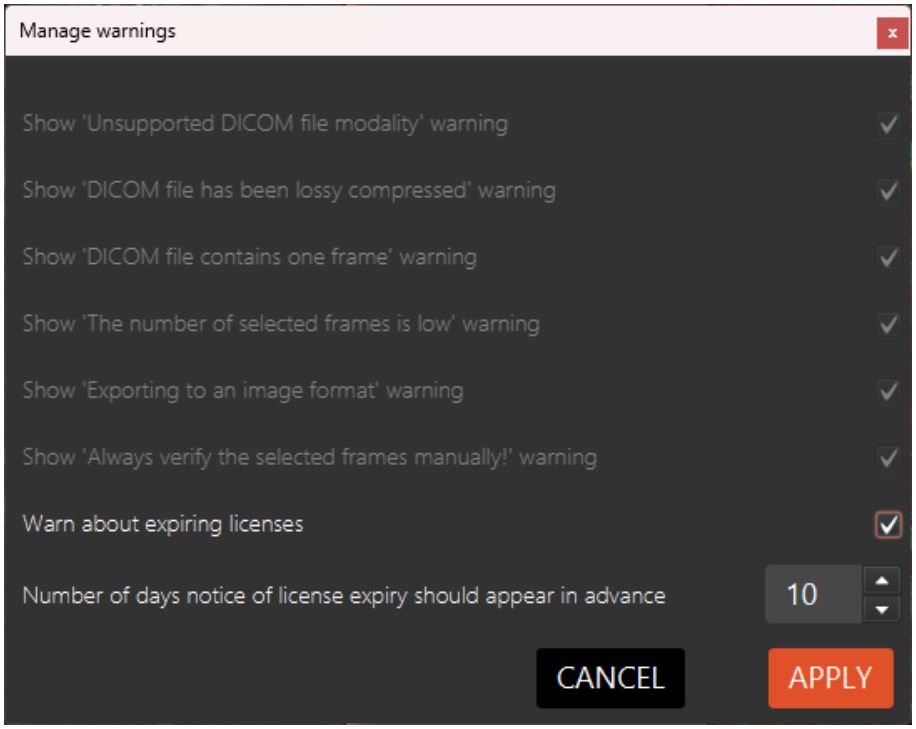
The software is capable of automatically switching between CO_2 and iodinated contrast media (ICM) profiles, and this behavior can be customized.



The Kinepict software is capable of:

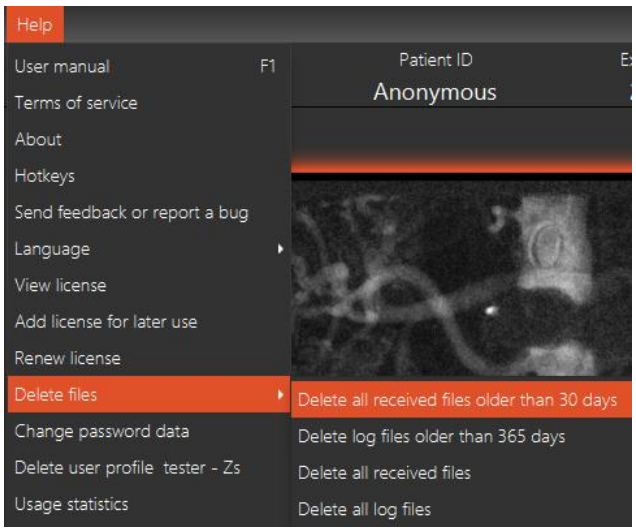
- Identifying the type of contrast agent (ICM or CO_2) in images received from the angiography system, based on the DICOM header and intensity differences.
- Automatically generating and applying the appropriate image-processing settings once the contrast type has been identified.

“Manage warnings”



Managing alerts is done by enabling or disabling the corresponding checkboxes.

“Help” Menu



“User manual”

- This Instructions for Use is also available in PDF format within the software by clicking the User Manual button.
- The user manual is also available on the Kinepict website: https://kinepict.com → Resources → Downloads → Instructions for Use. *https://kinepict.com/downloads.html*

- The documents may be updated periodically. Always refer to the latest version available on the website.

“Terms of service”

- The Terms of service are available in PDF format within the software by clicking the Terms of Use button.

“About”

- Displays the latest software information.

“Hotkeys”

- Opens a table of keyboard shortcuts that allow faster operation. Users may customize the shortcut keys.

“Send feedback or report bug”

- By clicking this button, users can send feedback and error reports via email to the product support team. All fields marked with an asterisk are mandatory. Users may also attach files to the message.
-  *Ensure that all images are anonymized and contain no patient data before attaching them to the feedback message.*

“Language”

- In addition to English, the software includes Hungarian, German, Romanian, and Italian translations. Users can select their preferred language by clicking the flag icon located in the upper-right corner of the main window.

“View license”

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

“Add license for later use”

- This function allows users to request and locally store a new license. The license will load automatically during the next activation, but it requires restarting the application. If the license expires during operation, the software will continue running without shutting down.

“Renew license”

- Users can request a new license by logging in to the license request webpage.

“Delete files”

- This function allows users to delete received or logged files—either based on age or entirely—including patient data.

-  *Clicking "Delete All Received Files" will also delete all patient data!*

"Change password data"

- This function allows users to change their account password.

"Delete user profile"

- To permanently delete a user account, go to the **Help** menu and select **Delete User Profile**. Only the currently active profile can be deleted, and completing the action requires entering the user's password.

-  *Deletion is irreversible, and a new profile cannot be created using the same username.*

"Usage statistics"

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

Image Processing Toolbar

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

This tool displays the current position of the mouse cursor.

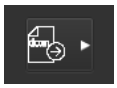
“Open file(s)” (button group) – Right-click this icon to choose from the following options.

- “Open file(s)”
- “Open patient browser”

“Generate images“– Click this icon to calculate the DVA1 and related images according to the settings defined under Personal Settings. This button also appears in the center of the window after opening a file.

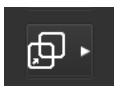
“Send to PACS” (button group) – Right-click this icon to choose from the following options.

- “Send to PACS"
- “Quick send to PACS”



“Export” (button group) – Right-click this icon to choose from the following options.

- “Export as DICOM”
- “Quick export as DICOM”
- “Export as image”
- “Export as text”



“Pixel shift” (button group) – Right-click this icon to choose from the following options.

- “Pixel shift”
- “Fixed ROI pixel shift”
- “Automatic Flexible Pixel Shift”

“Apply or remove CCDVA Color” (button group) – Right-click this icon to choose from the following options.

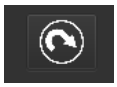
- “Apply ccDVA Color”
- “Remove coloring”
- “Invert color”

"Brightness/contrast" (button group) – Right-click this icon to choose from the following functions.

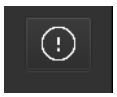
- "Brightness/contrast"
- "Automatically toggle anatomical background"
- "Sharpness"

"Open compare image in big size windows" – Left-click this icon to display the enlarged view of the image in a new window.

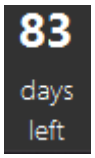
"Undo"



"Redo"



"Warnings/Errors"– Displays warnings and errors with timestamps, labels, descriptions, and the file path of the input file within the workspace. The notification icon lights up when new messages are available, and new entries are highlighted.



Displays the remaining validity period of the license.

Local Menu

Right-clicking on a generated image opens the local menu with the following functions:

"Open in compare view"

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

"Send to OR display"

- • Sends the image to the operating room (OR) display.

"Send modifications to OR display"

- Sends the modified image to the OR display.

"Brightness/contrast"

- Adjusts the brightness and contrast of the images.

"Invert colors"

- Creates inverted images when using the NON-color display mode.

“Toggle anatomical background”

- Toggles the display of anatomical background on the generated kinetic image.

“Sharpness”

- Enhances image clarity; repeated use does not result in substantial additional improvement.

“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 the results in various image formats.

“Export as text”

- Saves the generated images as tab-separated text files containing floating-point intensity values for each pixel.

“Send to PACS”

- Sends images to a PACS server.

“Freeze Image”

- Displays the image in its current state, independent of further post-processing. This enables comparison of the pre- and post-processed states. The user can step through all stored states from the beginning of the acquisition.

“Cancel freezing”

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

Workspace

⚠ *Before first use, the user must test all required functions to ensure proper operation before applying them on patients.*

The workspace is the central component of the software, where the entire image-processing workflow takes place—from loading raw DICOM files to the display of processed images and videos.

This interface displays the unprocessed DICOM image series together with their associated patient information.

The generation of DVA1–2, ccDVA image types, and related videos also takes place here. After processing is completed, the output view appears automatically, showing two generated image types side by side.

A dropdown menu located above the images allows the user to select which image-generation result should be displayed.

A second dropdown menu, located in the center of the top toolbar, enables switching between profiles so the user can quickly adjust settings for different examination protocols.

The header bar also contains additional functional buttons:

- By clicking the “SHOW INPUT” button, the panel displaying the unprocessed DICOM files opens. Here, the user can select which frames of the series should be used for image generation.

  The “SHOW OUTPUT” button or the “HIDE INPUT” option returns the user to the output interface.
- By clicking the “SHOW ROLLBACK” button, the Rollback interface appears, the functionality of which is described in detail later.

  The user can return to the output view using “HIDE ROLLBACK” or “SHOW OUTPUT”.
- The “DETAILS” button displays additional information about the currently loaded DICOM file.

Post-Processing

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

i
- *For easier navigation, the **Recent Files** and **Recently Received Files** lists display a DVA1 image preview before selecting the file to open.*

After the selected DICOM data is loaded, the file name appears at the top of the screen in the title bar. The frames of the image series are displayed side by side in the top frame strip. Each frame is identified by a sequence number and can be selected for processing by clicking on it. Selected frames are highlighted with an orange border.

The large view on the left shows the currently selected frame, while the window on the right displays the DVA1 preview, showing the generated image result.

Navigation between images is possible using the left and right arrow buttons, or by scrolling with the mouse wheel.

At the bottom of the screen, the Play / Pause button allows the entire image series to be viewed as a cine loop, enabling dynamic inspection of contrast flow.

In the top menu bar, the SELECT ALL, CLEAR, and Generate Images buttons are available, allowing the user to select all frames, clear selections, or start the image-generation process.


- *Only unprocessed DICOM files are recommended for image generation, as compressed or modified image series may result in lower-quality generated images.*

Frame Selection

Before generating DVA images, users can select the frames to be used for creating images and videos. Click on frames to select or deselect them. Use the SELECT ALL and CLEAR buttons, or click individual frames to include or exclude them from data analysis.

Selected frames are highlighted with an orange border.

- Shift + Left Mouse Button: Selects multiple consecutive frames.
- Range Selection Field**:** The field next to the CONTRAST button on the left allows users to specify frames numerically (e.g., *1, 4, 7–10* = 6 frames: 1, 4, 7, 8, 9, 10). Press Enter to apply the selection.

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

Image Processing

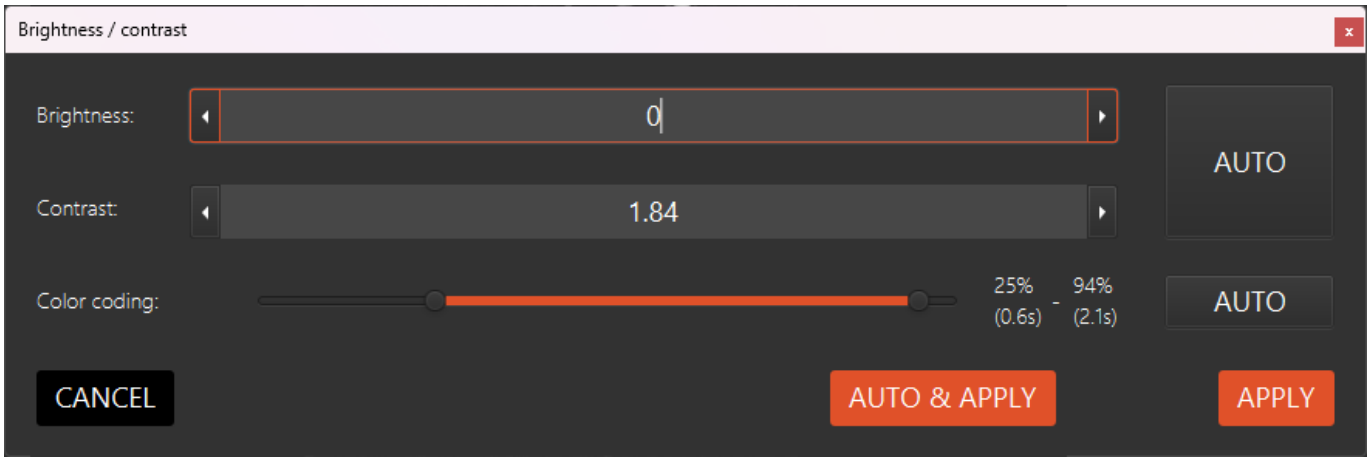
Image processing can be started by clicking the “Generate images” icon.

It is important to note that the Kinepict software only supports DICOM files with the following attributes:

- XA (X-ray Angiography)
- DX (Digital Radiography / Digital X-ray)
- RF (Radiologic Fluoroscopy)

The software generates DVA1 and other DVA-related images. DVA1 is always generated, while additional image types can be configured in the “Personal preferences” menu.

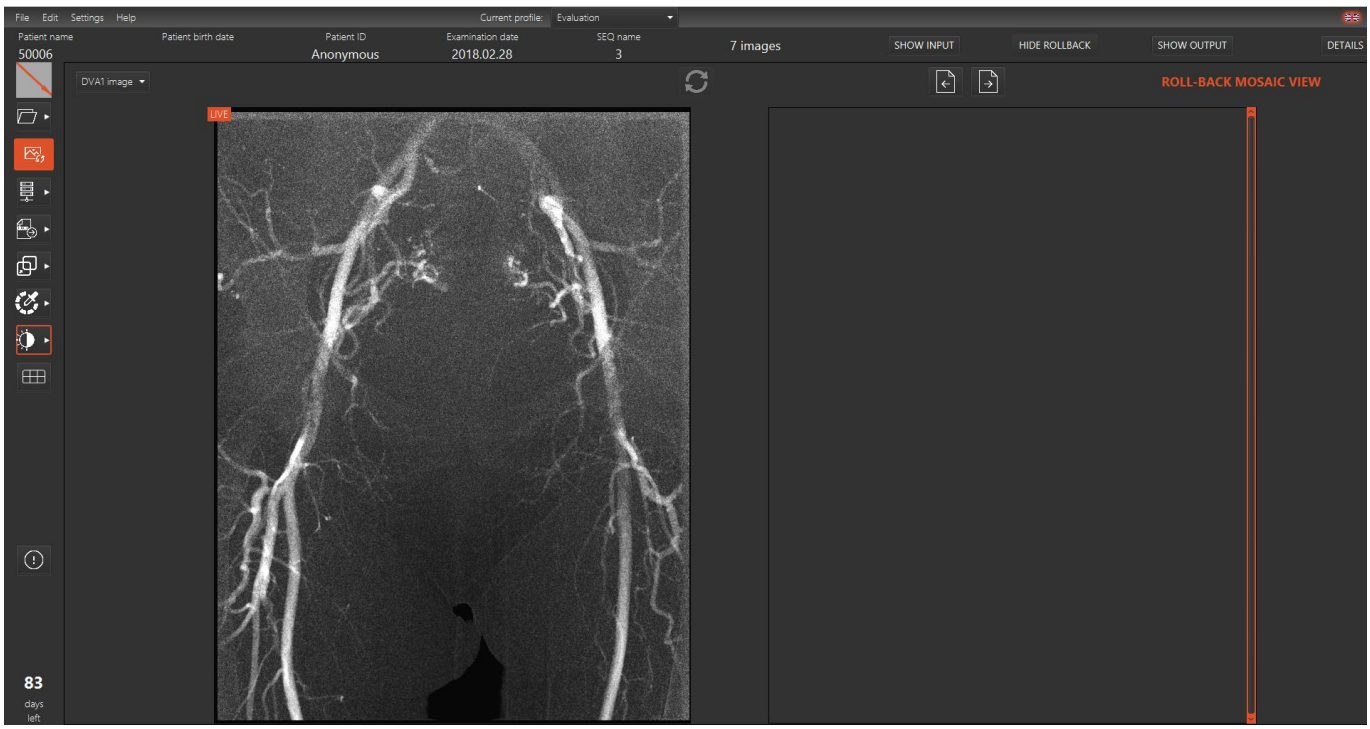
In the Brightness/contrast menu, users can adjust the starting and ending points of the color coding applied to ccDVA images. The color coding represents contrast agent arrival delay, following the visible light spectrum: red appears first, while deep blue appears last.



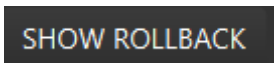
The software displays a warning message if the user attempts to generate a DVA1 image from an unsupported modality. However, the calculation may still proceed if the user chooses to ignore the warning.

- i • *The active slider button is highlighted in orange.*
- ⚠ *Kinepict Health Ltd. assumes no responsibility for images generated from unsupported modalities.*

- i • *The Rollback Mosaic View is a browser that facilitates navigation between images.*



“OR View Live”: When the user performs image modifications on the main screen, this button synchronizes the changes with the OR monitor window.



This button allows the user to switch between the frame-selection view and the main screen.

This button also allows the user to switch between the main screen and the rollback mosaic window.

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

Layout Selection

“Change to main window” button

Hide header

Remove selected images from layout

Hide rollback column

Export screen as…

Send to PACS

Refresh images in scrollable list

Adjusting Brightness and Contrast

The brightness and contrast of the generated images can be modified either by dragging the mouse or by using the Brightness/contrast window.

Adjusting via mouse dragging:

- Click and hold the left mouse button on the image,
- Drag the cursor horizontally to adjust brightness,
- Drag the cursor vertically to adjust contrast.

Using the Brightness/contrast Window:

Click Edit → Brightness/contrast, or click the Brightness/contrast icon in the image processing toolbar, or right-click the image and select Brightness/contrast from the context menu.

Undoing Changes

- Press Ctrl + Z, or use the Edit → Undo option.

Inverting Colors

Creates inverted images by selecting Edit → Invert colors or by using the Ctrl + W keyboard shortcut.

Pixel shift

The Pixel shift function allows removal of motion-related artifacts, such as unintentional patient movement. Select the critical region by clicking and dragging. Smaller selected areas result in shorter calculation time.

- **i** • *Pixel shift modifications can always be undone.*

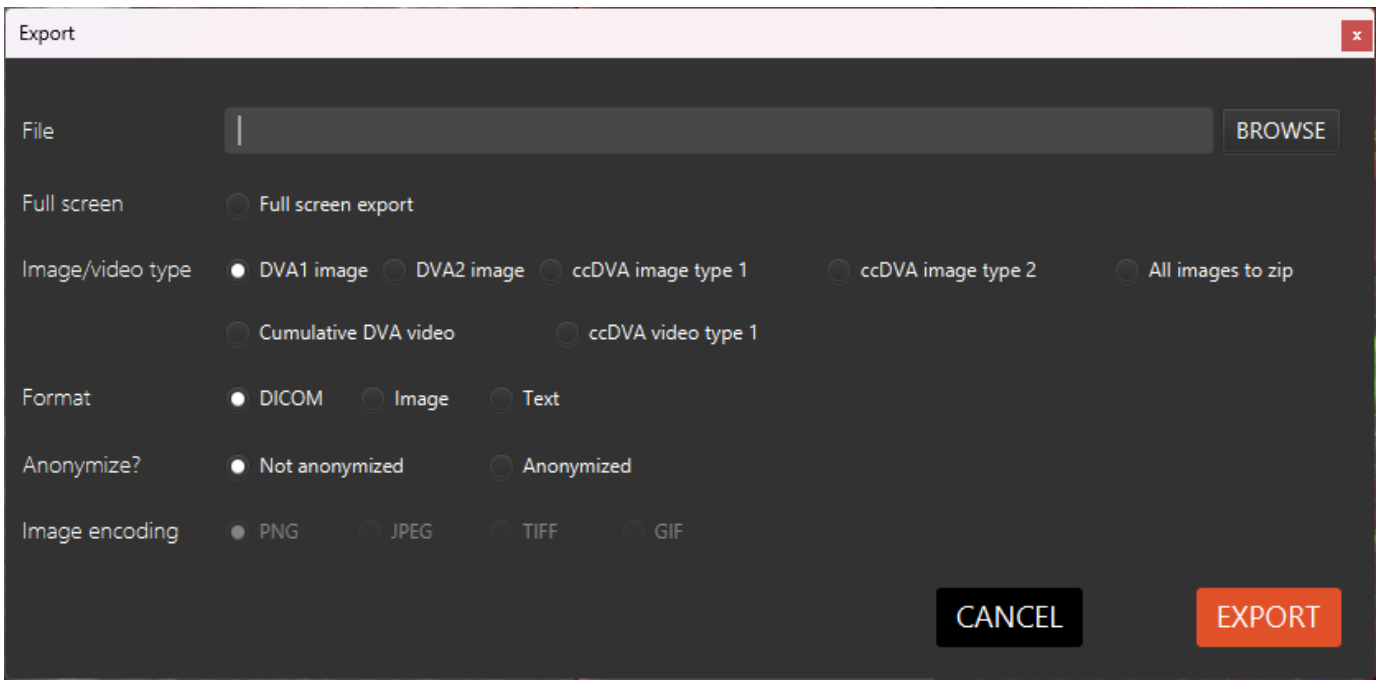
Saving Results

There are three options for saving image-processing results:

Exporting as image – select File → Export → Export as image to save the data in an image format. Alternatively, right-click the image and select Export as Image.

Exporting as DICOM – select File → Export → Export as DICOM to save the data as a DICOM file. The file may include patient information or be saved as an anonymized version. Alternatively, right-click the image and select Export as DICOM.

Exporting as text – select File → Export → Export as text to save the data as a tab-separated text file containing the floating-point intensity value for each pixel. Alternatively, right-click the image and select Export as text.



Managing PACS Servers

PACS servers can be managed under Settings → Network and storage settings → PACS servers.

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

Editing an Existing PACS server: Click edit and modify the required fields.

Sending data to a PACS server:

- Open the DICOM file or directory.
- Generate the images.
- Select File → Send to PACS
- Choose the PACS server and the images to be sent, then click Send.

After saving, a confirmation window appears, providing the option to open the sent image.

Automatic Reception of DICOM Files

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

Kinepict Software Configuration – Go to Edit → Network and storage settings → Network.

Check the “DICOM port enabled?” checkbox.

Set the port number and AE title.

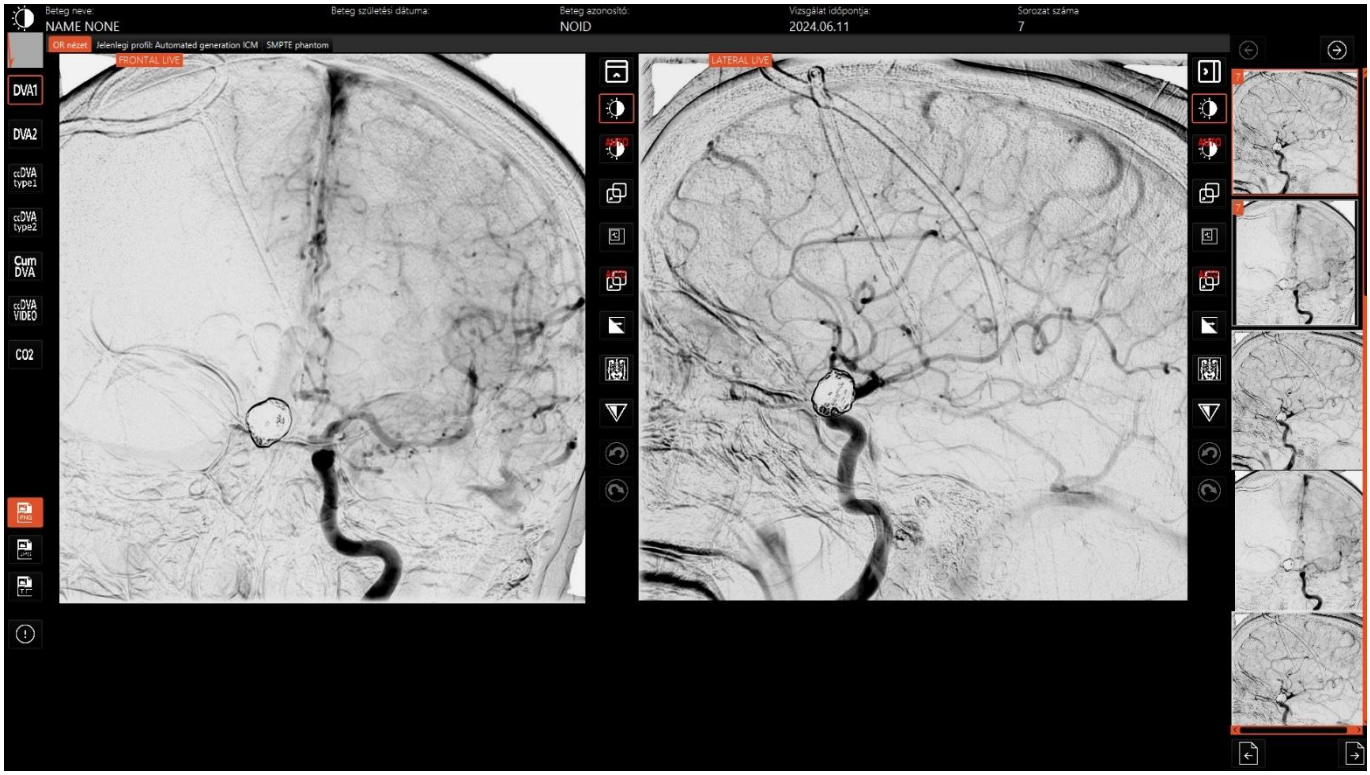
Restart the software after applying the settings.

X-ray system configuration – Configure the X-ray system’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 of the X-ray system after each acquisition. A pop-up window notifies the user, who may accept or reject the file. If accepted, the workflow continues in the same way as when opening DICOM files from the hard drive.

It is recommended that the connection between the X-ray system and the Kinepict Medical Imaging Tool be configured with the involvement of a Kinepict application specialist, the hospital’s IT personnel, and the X-ray system manufacturer’s IT expert.

OR View (Operating Room View)



The user can view the operating room image and the SMPTE phantom.

The OR View is a specialized display mode of the Kinepict Medical Imaging Tool designed for real-time visualization of images during interventions.

The view supports both Single Plane and Biplane display modes.

Biplane mode allows the user to view frontal and lateral plane images simultaneously, displayed side by side.

Biplane mode can be enabled or disabled; to modify this setting, contact the distributor or the Kinepict support team.

The main control elements are located in the left sidebar of the screen:

The cursor position indicator box, which shows the location of the mouse pointer within the image.

The image type selection buttons, which allow the user to directly select the desired image type to be generated.

Clicking the buttons immediately changes the currently displayed image type.

The CO_2 / ICM profile switch button, which allows quick switching between the two contrast agent types.

The quick export buttons (PNG, JPG, TIFF), which automatically save the displayed image to the desktop in the selected format when clicked.

At the bottom of the sidebar is the Warnings and Errors icon. If the system detects an error or warning, the icon turns orange, and the user can view the details on the main screen.

The post-processing tools are located in a vertical toolbar on the right side of the images. In this view, they can only be activated using the left mouse button, making their use in the operating room simpler and safer. In Biplane images, the post-processing tool menu shown below appears next to both images.

Brightness/contrast:

After pressing the button, brightness and contrast can be quickly adjusted by holding down the left mouse button on the image and dragging.

Automatic brightness/contrast:

After pressing the button, automatic brightness and contrast adjustments are applied to the image.

Pixel shift:

After pressing the button, the desired area for applying pixel shift can be selected by holding the left mouse button and dragging to draw a rectangle over the image.

Fixed-size pixel shift:

After pressing the button, a fixed-size square appears, allowing the user to select the area where the pixel shift function should be applied.

Automatic Flexible Pixel Shift:

After pressing the button, automatic pixel shift is performed across the entire image.

Invert colors:

After pressing the button, the colors of the image are inverted. (This function works only for grayscale image types.)

Toggle anatomical background:

After pressing the button, the anatomical background is overlaid onto the image.

Sharpness:

After pressing the button, sharpening is applied to the image.

Undo and Redo:

Use these buttons to undo recent changes or redo previously undone modifications.

Switch to Frontal view / Switch to Lateral view:

After pressing the button, the user can switch between the frontal and lateral views when the software has processed a pair of biplane images but only one image is shown on the screen.

The Rollback panel is located on the right side of the screen and displays thumbnails of previously generated images.

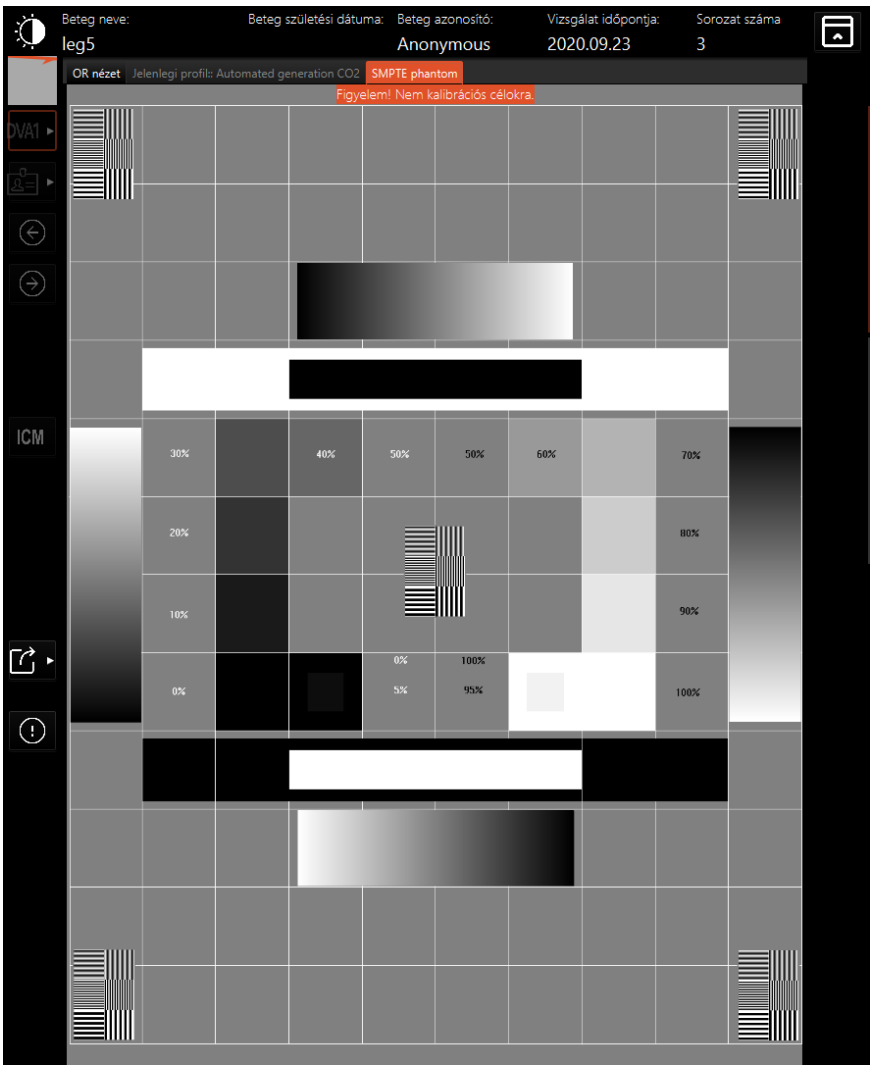
By clicking on the desired image, the system returns to the corresponding earlier processing state.

At the top of the screen is the header bar, which displays patient information (name, ID, date of birth, examination date, series number).

The user can hide or show both the header bar and the right-side Rollback panel using two dedicated buttons, allowing the workspace to be maximized for image display.

SMPTE Phantom

SMPTE pattern used for setting and verifying the size of the OR view.



Troubleshooting

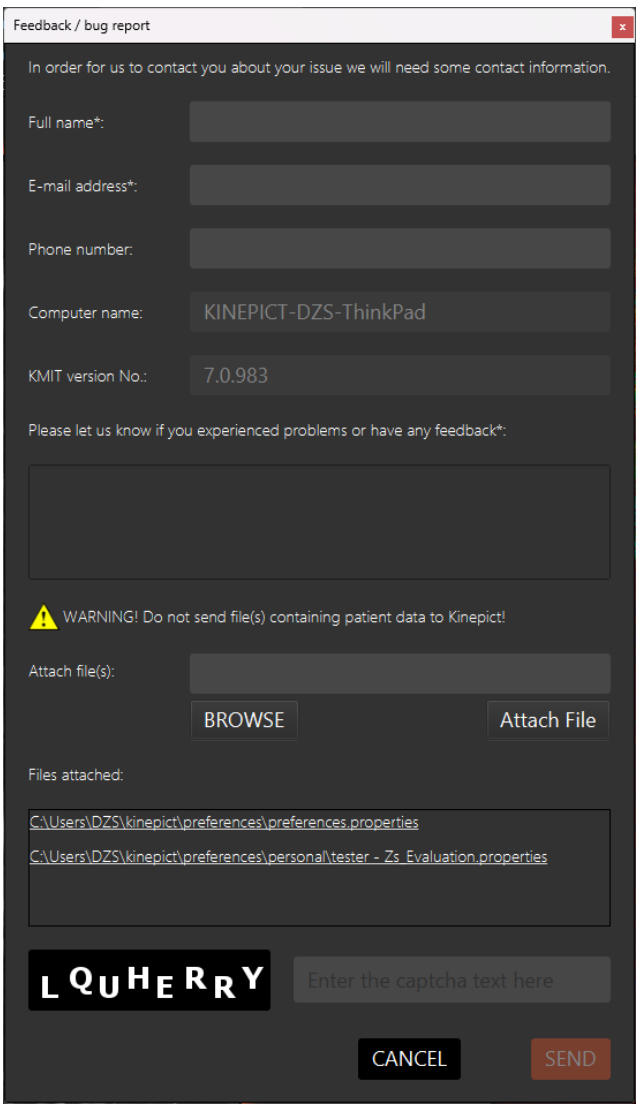
For questions or to report errors detected while using the Kinepict Medical Imaging Tool, please contact us at info@kinepict.com, or use the “Send feedback or report a bug” function.

The Frequently Asked Questions section may also be helpful.

Send Feedback or report a bug

Click Help → Send feedback or report bug to report an issue, submit a problem, or provide comments regarding the Kinepict Medical Imaging Tool. Fill in the form with the required information.

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



Reporting of Incidents

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

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Uninstallation and Removal

To remove 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, then click Programs and Features. Note: This view lists only traditional desktop applications, not Windows Universal Apps.

3. Select Kinepict Medical Imaging Tool, then click Uninstall, or right-click and choose Uninstall.

Important: Uninstalling the Kinepict Medical Imaging Tool will delete all user profiles and all received files. Patient data and user data may also be deleted separately *before* uninstallation. For more information, see the “Delete Files” and “Delete User Profile” sections.

After the uninstallation is complete, the Kinepict workstation may be decommissioned and removed from service in accordance with hospital policy.

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KMIT Usage Summary

DVA image generation during the procedure.

Section	Steps
System Initialization.	1. Turn on the Kinepict workstation in the control room of the catheterization laboratory. 2. Log in to the Windows user account on the Kinepict workstation. 3. Launch the **Kinepict Medical Imaging Tool** using the desktop shortcut, then log in. 4. The Kinepict Medical Imaging Tool starts with the Automatic Generation profile. 5. The software is now ready to receive DICOM files and generate DVA images.
Intraoperative Imaging.	6. The Kinepict Medical Imaging Tool receives the unsubtracted image sequences from the X-ray angiography system and automatically generates and displays the DVA image. 7. If necessary, the user may apply post-processing adjustments, such as brightness/contrast or pixel shift.

Post-Procedure Review and Documentation.	8. The DVA images can be reviewed on the workstation to prepare the patient's documentation. 9. The DVA images may be sent to the PACS system for archiving, based on the decision of the supervising physician. 10. Close the Kinepict software and shut down the Kinepict workstation.

DVA Image Generation for Medical Documentation and Record Keeping.

Section	Steps
System Startup	1. Turn on the Kinepict workstation in the control room of the catheterization laboratory. 2. Log in to the Windows user account on the Kinepict workstation. 3. Launch the Kinepict Medical Imaging Tool, then 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 adjustment or pixel shift—or generate multiple image types, as time is not a limiting factor. 8. Prepare the necessary documentation based on the generated images. 9. Send the DVA images to the PACS system for archiving, or export them according to the decision of the supervising physician.
System Shutdown	10. Close the Kinepict software and shut down the Kinepict workstation.

Frequently Asked Questions (FAQ)

The Kinepict Medical Imaging Tool has undergone extensive testing to ensure high quality. If you experience any issues, please contact us at support@kinepict.com. Alternatively, your hospital's IT personnel may be able to resolve the problem using this FAQ.

I installed the Kinepict Medical Imaging Tool, but it does not start.

- Reinstall the software, carefully following the steps described in the *Installation* section of the IFU.

How can I obtain the machine ID for installation?

- Use one of the two methods described in the *License Request* section to obtain the machine ID.

I forgot my username/password for logging into the software.

- This information cannot be recovered. Please create a new account using the Registration option.

The Kinepict Medical Imaging Tool is running slowly. What could be the problem?

- Check the minimum system requirements. Better hardware improves performance. Verify your computer's specifications. If you need assistance, contact us at info@kinepict.com.

The DICOM file does not open after selection.

- There are three ways to open a DICOM file:

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

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

  Open Directory: Opens DICOM directories that contain associated individual images.

  Using an incorrect option will result in an error message.

Some DICOM files do not open using "Recent Files…" or "Recently Received Files…".

- These functions only open DICOM files that contain an image series. Use the "Open Directory" option to open image series stored as separate DICOM files, one file per frame.

Why can I save only in .kps format?

- The workspace of the Kinepict Medical Imaging Tool can be saved only in the Kinepict study format (*.kps).

  To save results in DICOM, image, or text format, use the Export option in the File menu.

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

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

- To anonymize exported files, use File → Export. To anonymize a Kinepict study file (*.kps), anonymize the DICOM files before opening them in the software.

I receive too many pop-up notifications. Can I disable them?

- Select "Do not show again" when the warning appears. Alternatively, pop-up notifications can be

managed in Settings → Manage warnings.