User Manual for IMV DICOM VIEWER

Version 1.0.12, English version

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0.1. About the Program

IMV DICOM Viewer - software designed for viewing medical studies in DICOM format obtained from diagnostic equipment. Our viewer takes diagnostic and educational capabilities to a new level, allowing for the efficient and timely detection of relevant pathologies, predicting their development, and planning their effective treatment. With the IMS ATLAS, IMV MS, IMV SPINE, IMV GLIOMAS, IMV PIRADS, and IMV Subcortical modules, you can customize the viewer to suit your specific needs. When creating this viewer, we carefully considered and consulted with experts for every click, eliminating unnecessary steps and saving your time during operation.

0.2. Functionality

Features:

- Handling studies (import, export of studies, Dicom Query/Retrieve, etc.)
- Image viewing.
- Image analysis using AI with additional modules.

Tools for image viewing:

- Software opens locally stored DICOM files.
- Software allows opening images in 3D format.
- Software allows multi-planar reconstruction (MPR).
- Software acts as a DICOM client.
- Detailed viewing of medical images of the following modalities: RF, DX, US, CT, MR, MG, SR.
- Software enables recording of studies on CD and DVD discs.
- Software allows saving studies locally.
- Software has functionality for anonymizing studies.
- Software allows taking instant screenshots.
- Software allows viewing studies in cine mode.
- Detailed Viewing Window Features:
- Scaling, horizontal and vertical mirroring, image movement.
- Fast reconstruction.
- Creating contrast agent accumulation graphs.
- Adjusting image brightness and contrast.
- Image inversion.
- Length and angle measurements.
- Placing labels on the study.
- Customizing mouse button actions.
- Calibration of measurements.

Additional functionality for CT modality:

- Changing Hounsfield window width and level.
- Determining Hounsfield values for selected areas.
- Pre-set windows for viewing various organs (lungs, bones, brain, soft tissues, liver, angiography).
- Determining Hounsfield window values for CT modality.

Software Editions:

- **Light**: Designed for recording to physical media, a stripped-down version for launching from a medium.
- **Base**: Contains sufficient functionality for full operation, including storage and network transmission of information. Distributed for free.
- **Commercial**: Contains all the functionality developed up to the current moment. In the user manual, it is marked with "commercial."

Both Base and Commercial versions allow for the addition of paid modules produced by IMV.

System Requirements:

- Windows Operating System Family. Minimum: Windows 10 (1809 or later) and x64 processor or Windows 11 and x64 processor or ARM with x64 emulation support
- Mac OS Operating System Family: macOS 10.14 or later.
- 200 MB of free hard drive space.

Recommended for 3D Visualization Window Operation:

- Graphics card with OpenGL 3.2 or higher support. More than 1 GB of RAM.
- Resolution of at least 1280x720.

Features:	Light	Base	Commercial
Basic functionality	+	+	+
Burning to CD/DVD	-	-	+
TIC	-	+	+
3D	-	+	+
MPR	-	+	+
Local database	-	-	+
Data anonymization	-	-	+
More than 1 connection to PACS	-	-	+
Quick screenshot	-	+	+

Additional modules that can be activated for a separate fee:

Модуль	Функция
IMV ATLAS	Interactive atlas of anatomical zones.
IMV MS	AI analysis of multiple sclerosis.
IMV SPINE	AI analysis of spine
IMV GLIOMAS	AI analysis of brain tumor.
IMV PIRADS	AI analysis of the prostate gland.
IMV Subcortical	AI analysis of subcortical structures.

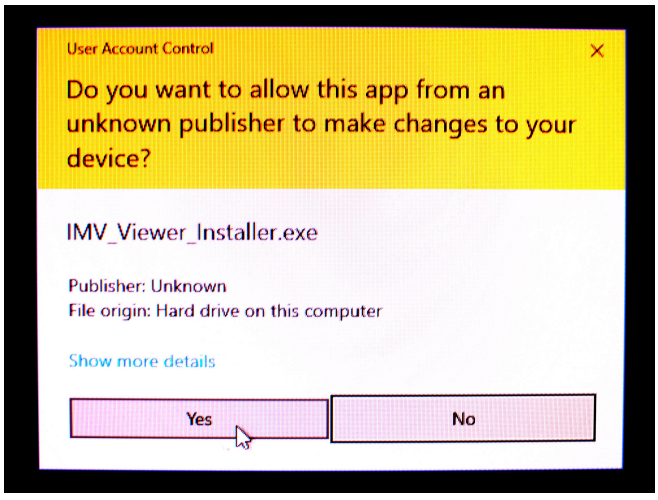
1. Installation and Uninstallation of the Program

1.1. Windows Operating System

To install the program, follow these steps:

Run the .exe file and follow the instructions in the installer.

Note: Your computer's firewall may block the installer. Allow installations from unknown sources.



1.2. Mac OS Operating System

Open the "Viewer.dmg" file.

- Drag the "Viewer.app" file into the "Applications" folder.
- Carefully read the End User License Agreement. If you agree to the terms of the license agreement, select "Accept."

To uninstall the program, simply remove "Viewer.app" from the "Applications" folder.
Note: If you encounter a message with the following content:
"Viewer.app" can't be opened because it is from an unidentified developer.
You can bypass this by following these steps:

- In the Finder on your Mac, locate the "Viewer.app" application.
- Control-click or right-click on "Viewer.app."
- Choose "Open" from the context menu.
- A dialog box will appear warning you about the unidentified developer. Click "Open" to proceed with the installation.

This should allow you to open and install the application even if it's from an unidentified developer.

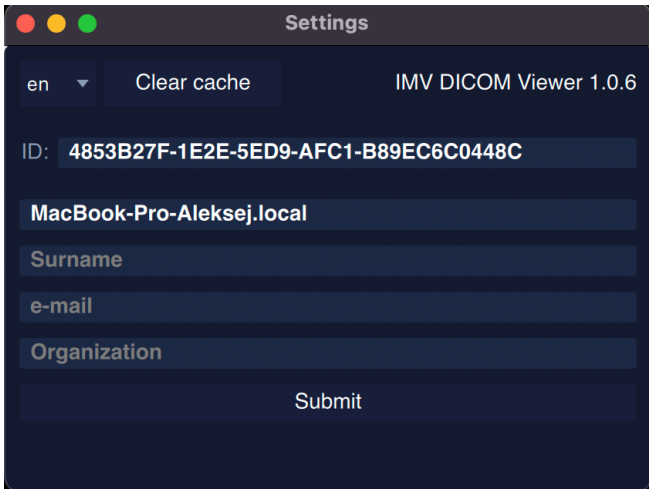
2. License Activation

2.1. Activation of the Free Version

Upon the initial launch of the program without a license, an active window will display the following message until the user activates the program:

To activate the license, click on the settings button.

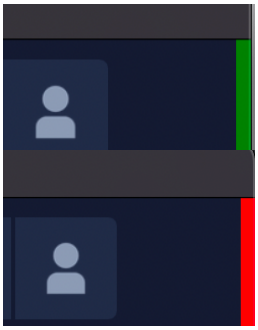
An input window will open for entering the following information:



Enter your information and click "Save." The banner in the active window will disappear.

NB!: To activate the license, internet access is required, and it is essential to check if the firewall or antivirus is blocking data transmission. The status of the program's internet

access can be found in the top right corner of the program:



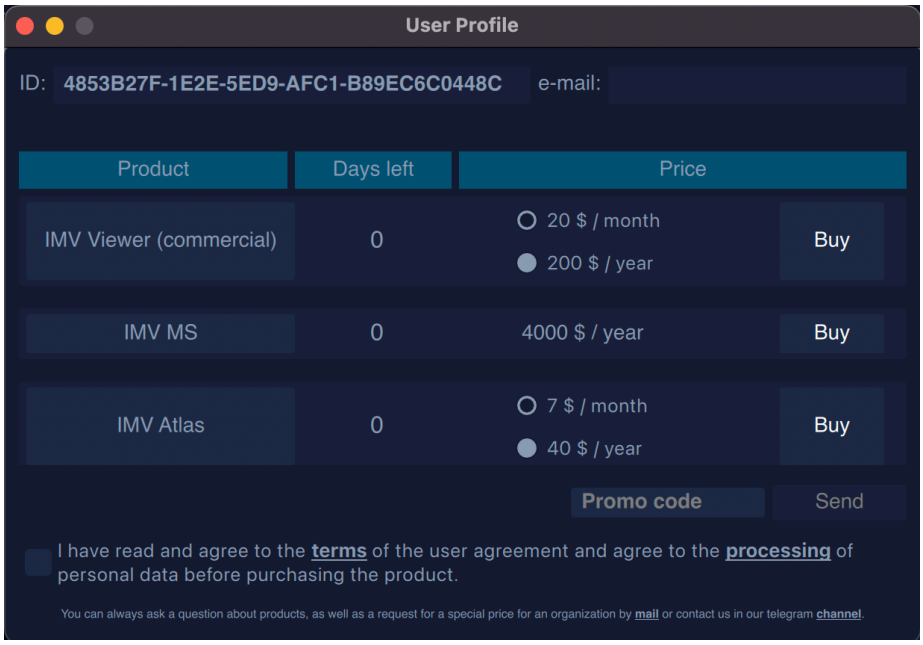
Green indicator - the program is connected to the internet.

Red indicator - the program is not connected to the internet.

2.2. Activation of the Commercial Version and Modules

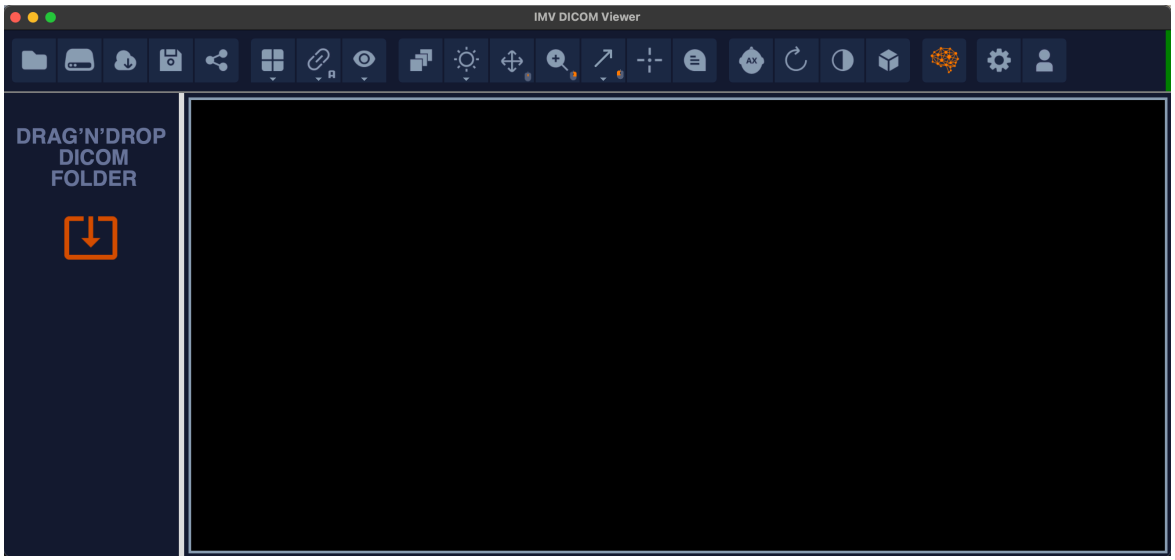
To activate the commercial version or paid modules, click on the profile button in the top panel.

A window for paid subscriptions will open:

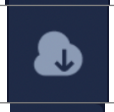
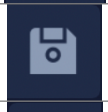
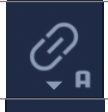
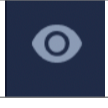


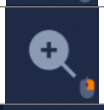
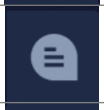
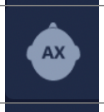
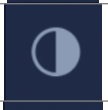
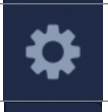
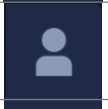
To make a payment, you need to review the user agreement and data processing (the links are clickable), check the box, and follow the instructions for payment via acquiring. After successful payment, restart the program.

3. Main Window



Toolbar:

	Open Study Button.
	Local Database Button.
	Open PACS Button.
	Save Study Button.
	Window Selection Button. Submenu: Series Splitting Function.
	Image Stitching Button. Submenu: Selection of Stitching Category.
	Hide Tags Button.

	Page Turning Mode Button.
	View Window Settings Button. Submenu: Preset Selection.
	Image Movement Button.
	Image Zoom Button.
	Image Angle Measurement Button.
	3D Point Button.
	Ellipse Button. Determination of Hounsfield Window Values.
	Label Placement Button.
	Quick Image Reconstruction Button.
	Length Button.
	Image Flip Button.
	Image Inversion Button.
	Volume Mode Button. Submenu: MPR (Multi-Planar Reconstruction), 3D.
	Button for Working with Additional IMV Modules. Submenu: IMV Atlas, IMV AI
	Program Settings Button.
	Profile and Payment Button.
	Cobb Angle.
	Arrow.

	Share.

4. Importing Studies

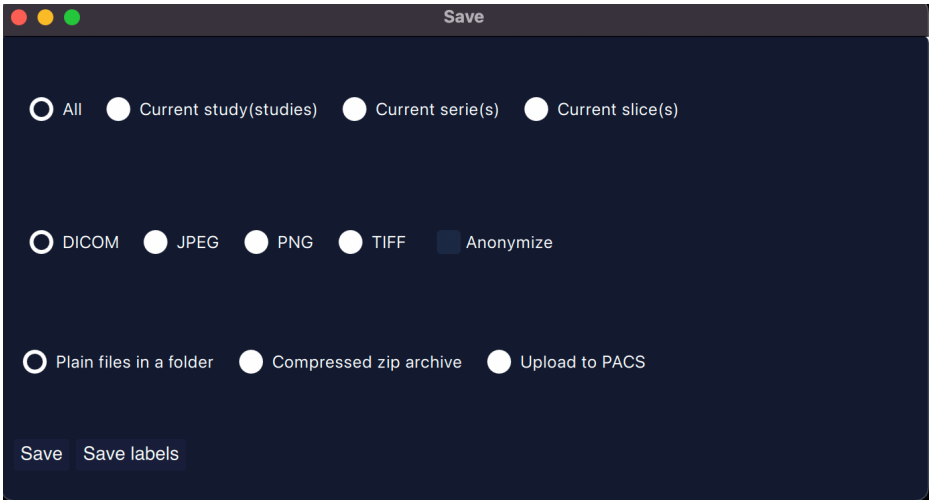
Option 1: Click the "Open Study" button and select the desired folder in the operating system's file explorer.

Option 2: Drag and drop a folder into the left panel. This action adds the study to the list of patients in the left panel.

Option 3: Drag and drop a folder into the right panel (main window). This action opens the transferred study, closing any previously opened studies.

5. Exporting Studies

Exporting is done by clicking the button. This will open the export window where you can select the desired export settings.
When you do this, an export window will open where you can select the desired export settings.

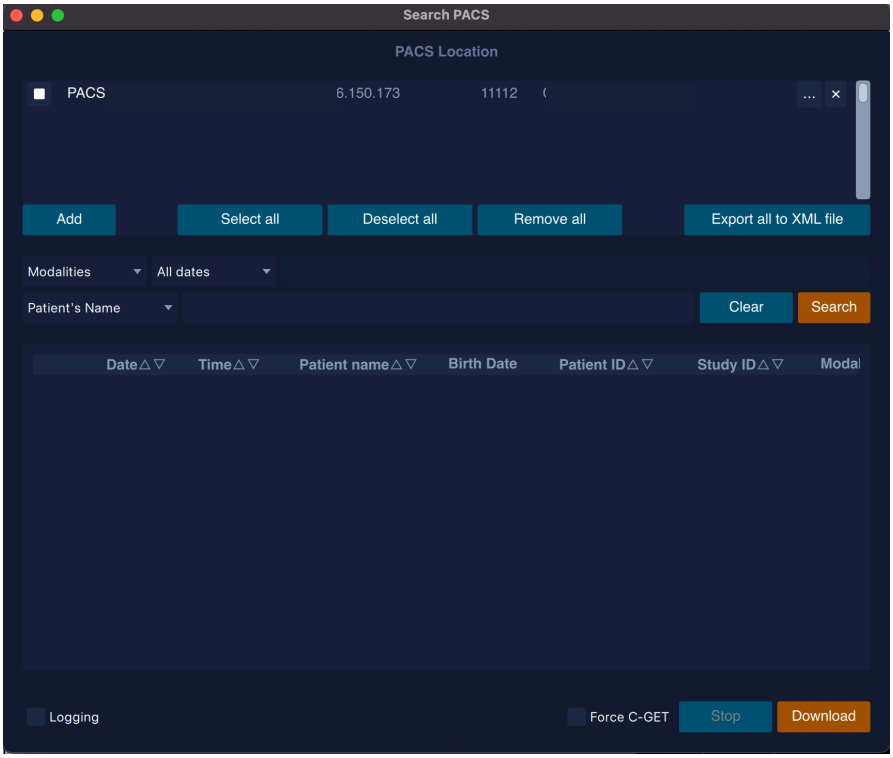


5.1. Export to PACS

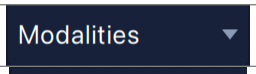
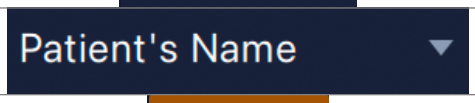
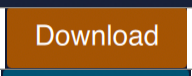
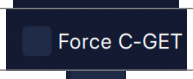
In this version of the program, you can send any image or study to PACS. To do this, click on the "Upload to PACS" button, and a PACS selection window will appear.

6. PACS

6.1. Working Window



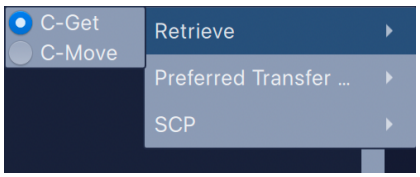
Add	Add PACS Connection Button
Select all	Select All Connections in the List Button
Deselect all	Deselect All Connections in the List Button
Remove all	Remove All Connections from the List Button
Export all to XML file	Export Connections with Settings to XML Format
Clear	Clear Search Settings Button
Search	Search by Parameters in Selected Connection(s) Button
Modalities	Select Modality Button

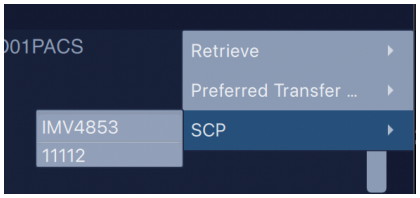
	Select Modality Button
	Select Date
	Select Search Criteria (Patient Name, Patient ID, Study ID) Button
	Download Selected Studies Button
	Abort Download of Selected Study Button
	Log Checkbox
	Force C-Get
	Remove Connection Button
	Configure this Connection Button
	Sort Button

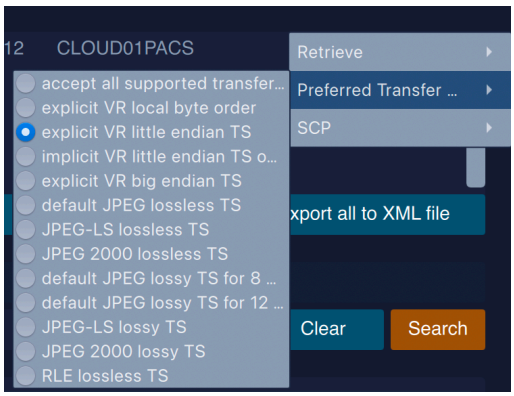
6.2. Settings

Option 1: Drag and drop an XML file with connection settings from another program into the PACS connection list window.
Option 2: Manual configuration. For this, click the settings button in the newly created connection.

Choose PACS settings in the submenu:







Next, enter the address and port in this window:

NB!: If the specified port is in use by another viewer or program, the download will not proceed! You need to select a unique port.

6.3. Errors

Error Codes for C-GET

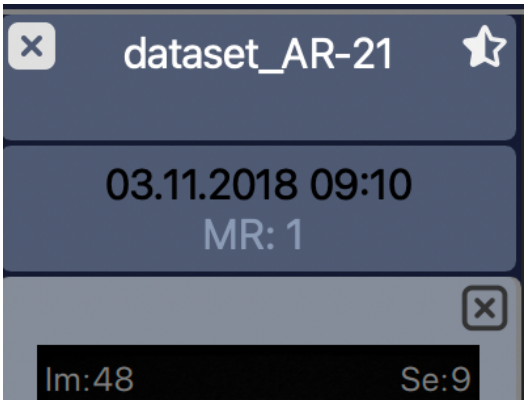
60	Cannot initialize network	Network Initialization Error
61	Cannot negotiate assostiation	Transfer Negotiation Problems
65	Cannot create assoc parameters	Transfer Negotiation Problems
66	No presentation context	Transfer Negotiation Problems
67	Cannot close association	Transfer Negotiation Problems
79	CGET problem	Other C-GET Errors

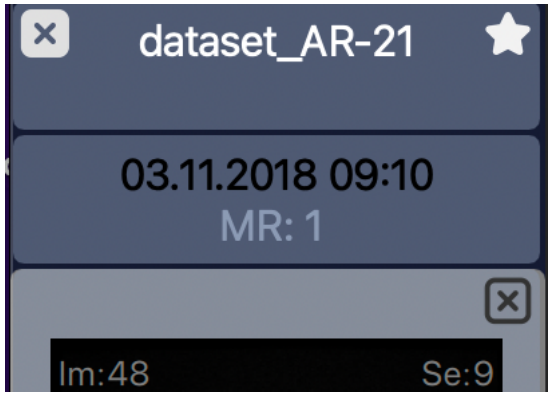
Error Codes for C-MOVE

60	Cannot initialize network	Network Initialization Error
61	Cannot negotiate assostiation	Transfer Negotiation Problems
65	Cannot create assoc parameters	Transfer Negotiation Problems
66	No presentation context	Transfer Negotiation Problems
67	Cannot close association	Transfer Negotiation Problems
68	CMOVE warning	Transfer Negotiation Problems
69	CMOVE error	Other C-MOVE Errors

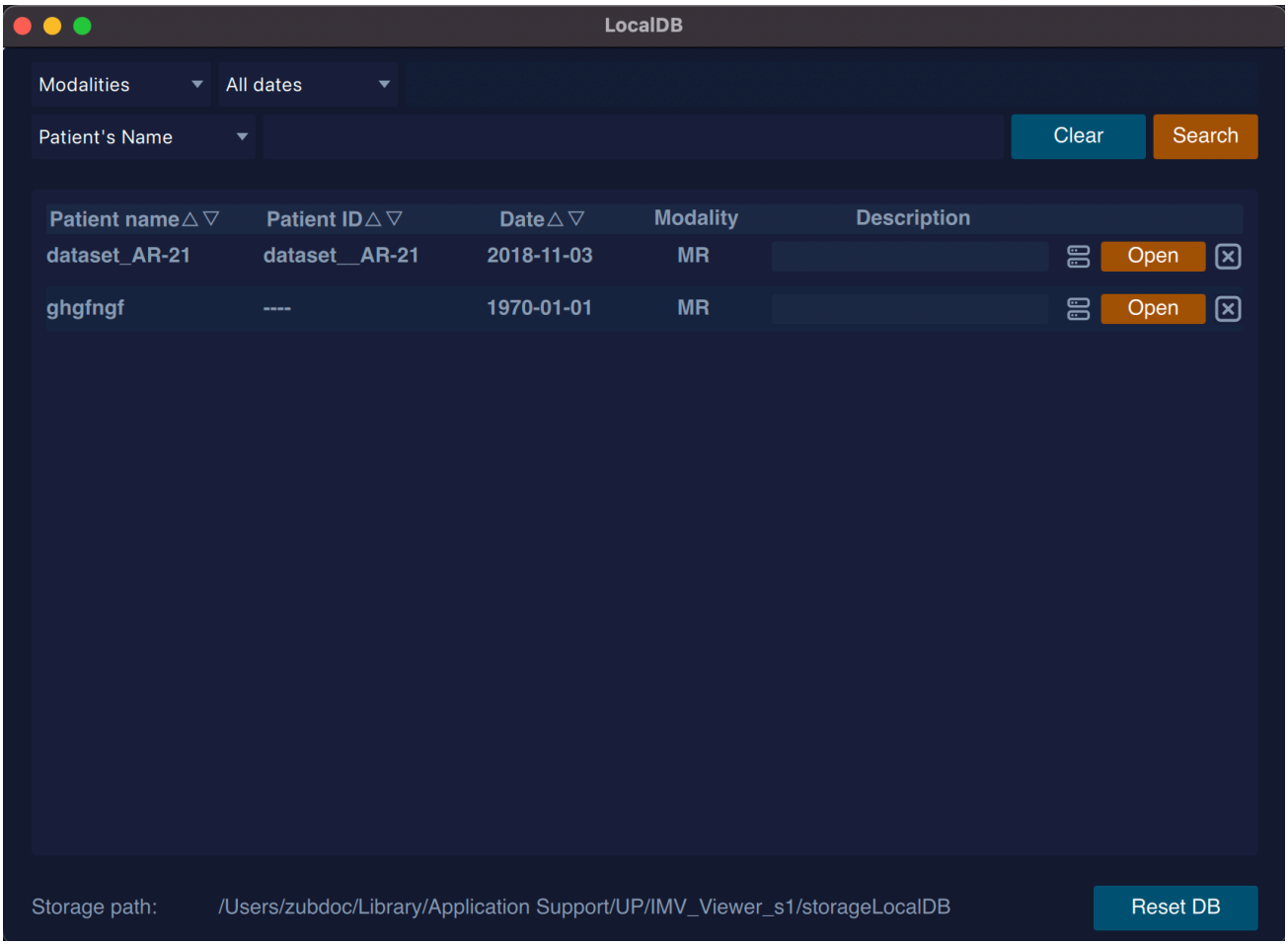
7. Local Database

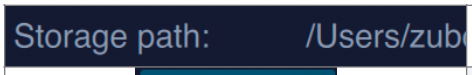
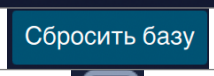
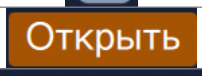
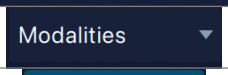
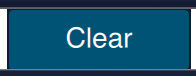
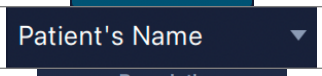
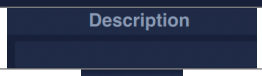
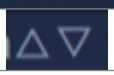
Adding to the database is done by clicking the star button in the left window. One click - half a star - copies the link to the study, two clicks - full star - copies the files to the database.





Main Window of the Local Database



	Clicking on the path allows you to change the file storage location
	Button to delete the entire local database
	Delete a study from the database
	Open a study in the main program window
	Select search by date
	Select search by modality
	Clear the search
	Select search by tag
	In this window, you can write notes about the study
	Sorting in the database

8. Recording to Disk

NB!: Recording to disk is only available for the Windows version of the software.

To record a study, click the "Record" button.

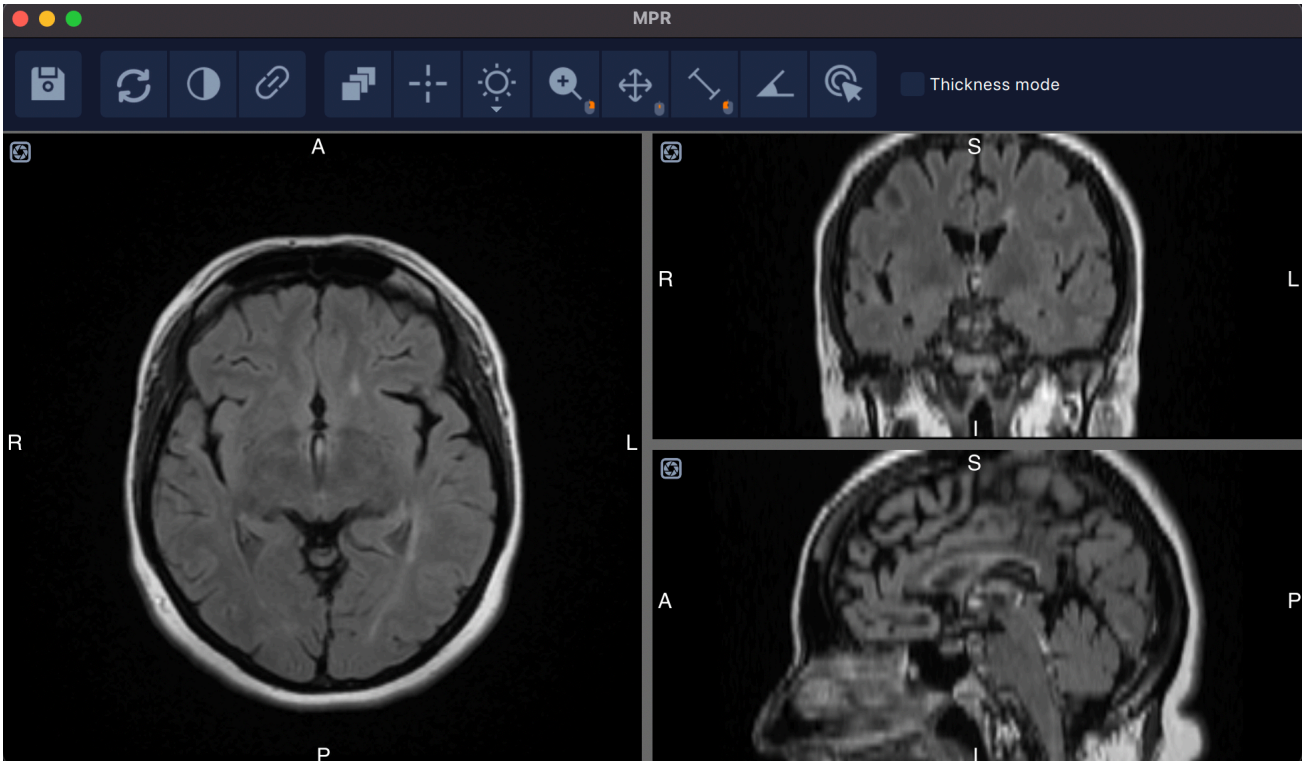
A disk recording menu will open. Select the necessary series and click "Record."

9. 3D Tools

9.1. MPR (Multi-Planar Reconstruction)

To activate this mode, click on the "3D Tools" button and select MPR. The MPR window will open.

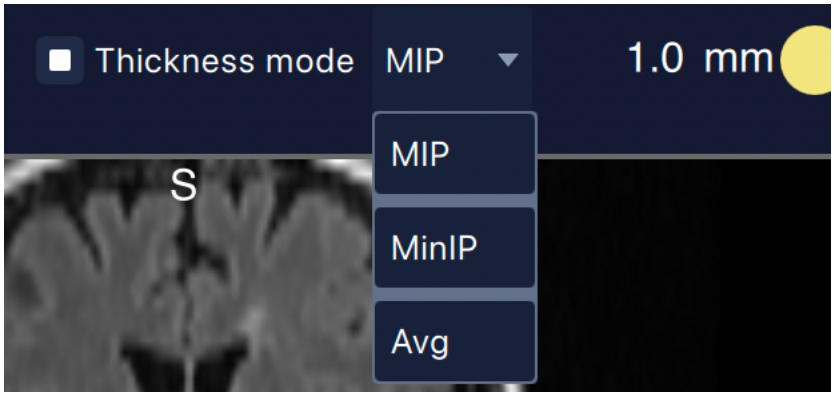
The MPR window will open.



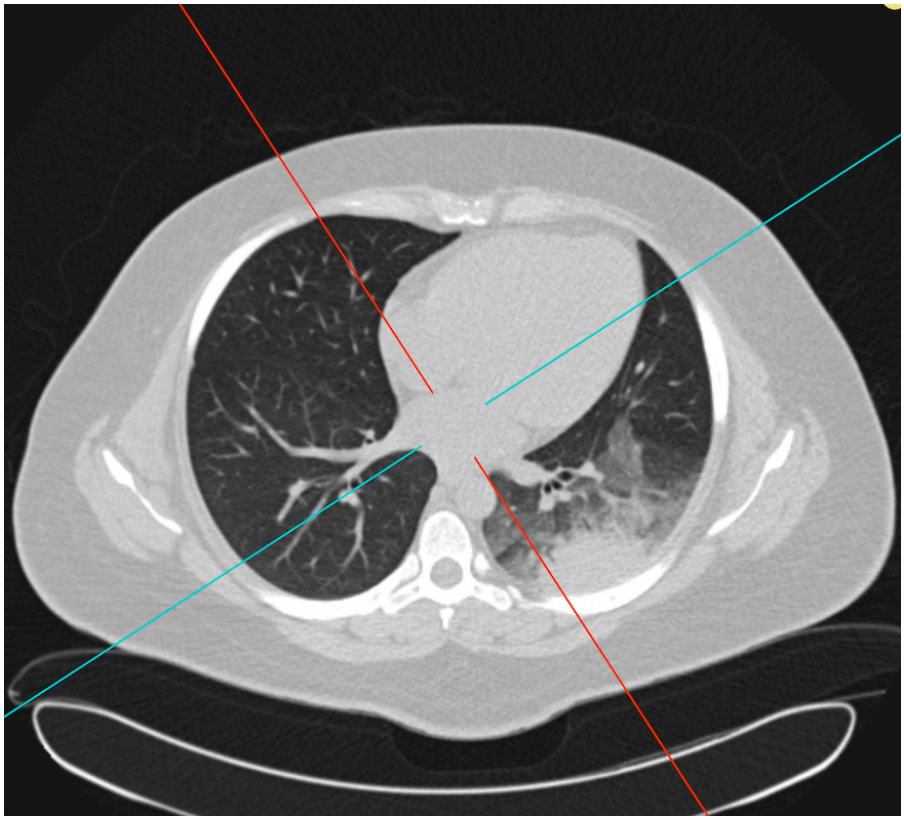
To enable reconstruction lines, you need to click on

To change the reconstruction thickness, you need to click on

When you enable thickness selection, the MPR mode selection (MIP, MinIP, Avg) will appear.



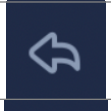
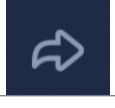
Moving the lines is done by dragging the crosshair (a hand icon will appear), and changing the projection angle is done by moving the lines.

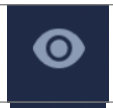
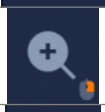


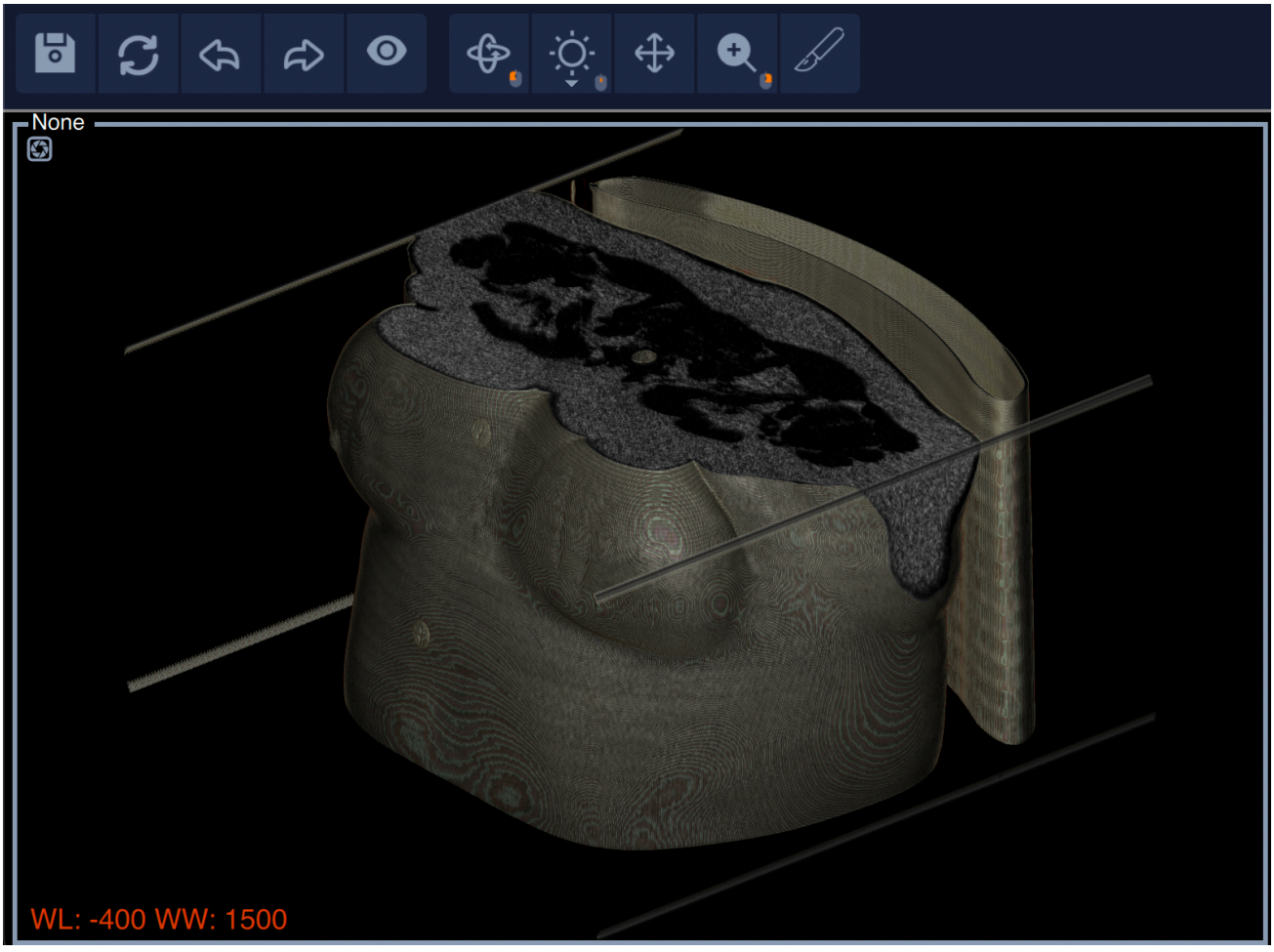
9.2. 3D

To activate this mode, click on the "3D Tools" button and select 3D. The 3D window will open.

The 3D window will open:

	Saving Results
	Return to the Original 3D Model
	Move Back One Step
	Move Forward One Step

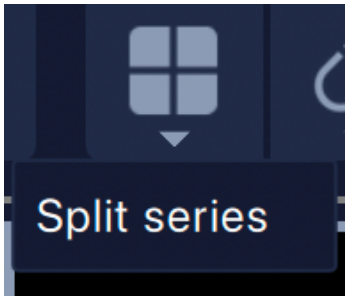
	Hide Tags
	Rotation
	Brightness/Contrast Level Control. Submenu: 3D Preset Selection
	Movement
	Zoom In
	Scalpel



NB!: The scalpel tool works as follows: drawing a zone clockwise deletes the area OUTSIDE the marked zone. Drawing a zone counterclockwise deletes the area INSIDE the marked zone.

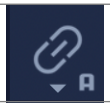
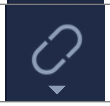
10. Series Splitting Function

To use this function, select "Series Split" from the submenu of the window selection button.

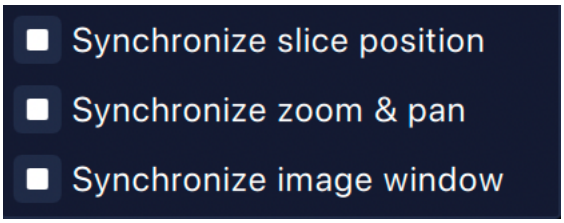


11. Image Stitching Function.

Stitching Modes

			Automatic Stitching Mode
			Manual Stitching Mode
			Custom Mode
			Disabled Stitching

In the software, in the stitching submenu, you can select the level of image stitching:



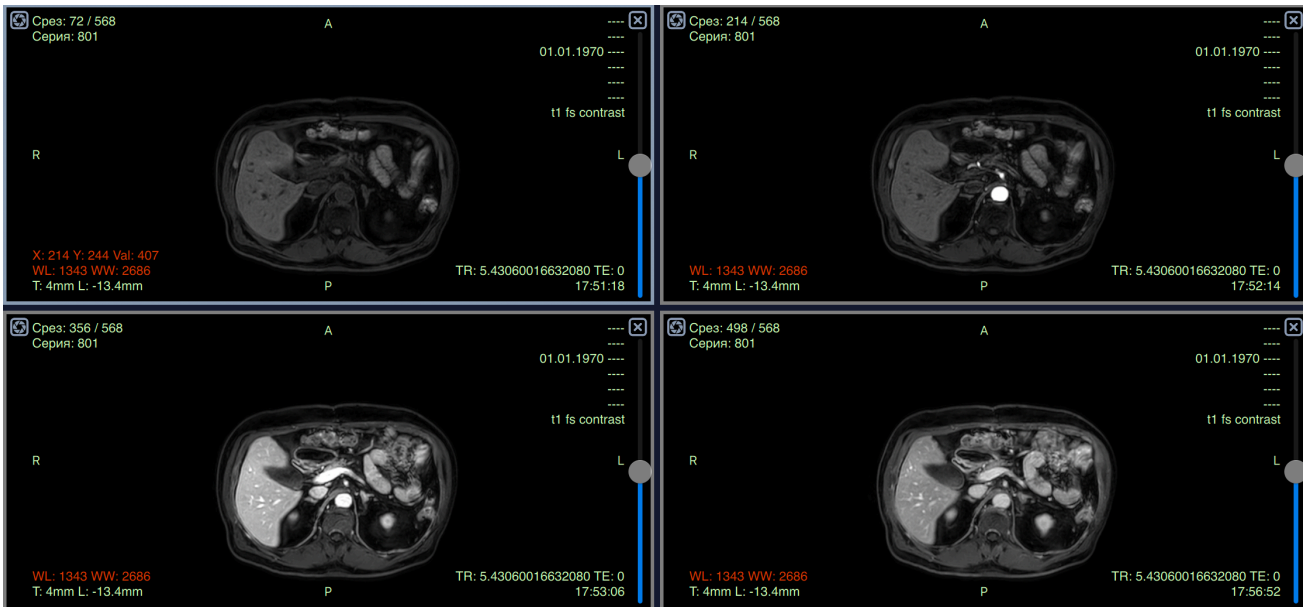
NB!: When matching identical series in the same plane, the program automatically sets the images to auto mode. You can stitch any level of series manually.

12. TIC - Time-Intensity Curve

Two scenarios of interaction with this tool are presented for the user: using the “split series” button and without it.

Scenario 1: When a stitched series is present, click the "Split Series" button.

The series will be split into multiple windows:



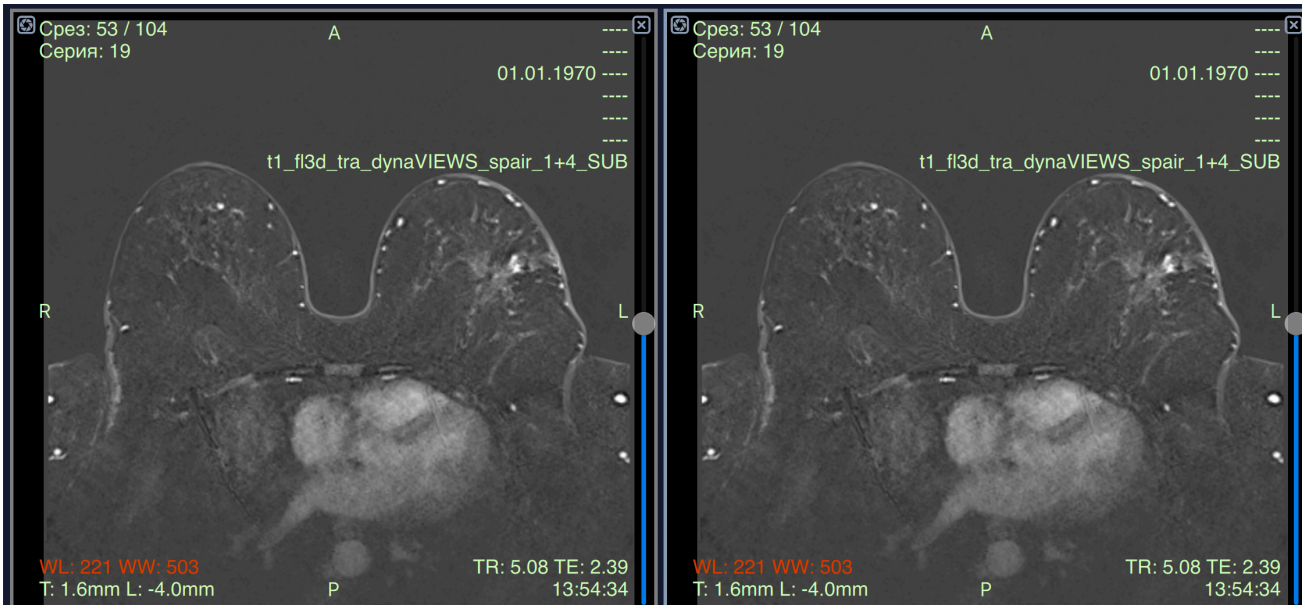
To create a time-intensity curve (TIC), select the ellipse tool.

Start drawing the ellipse, and when you click the left mouse button for the second time, hold down the SHIFT key on your keyboard. The time-intensity curve (TIC) for the selected elliptical region will be automatically generated.

You can move, copy, and paste any elliptical region. Use the keyboard shortcuts Ctrl (Cmd) + C to copy and Ctrl (Cmd) + V to paste.

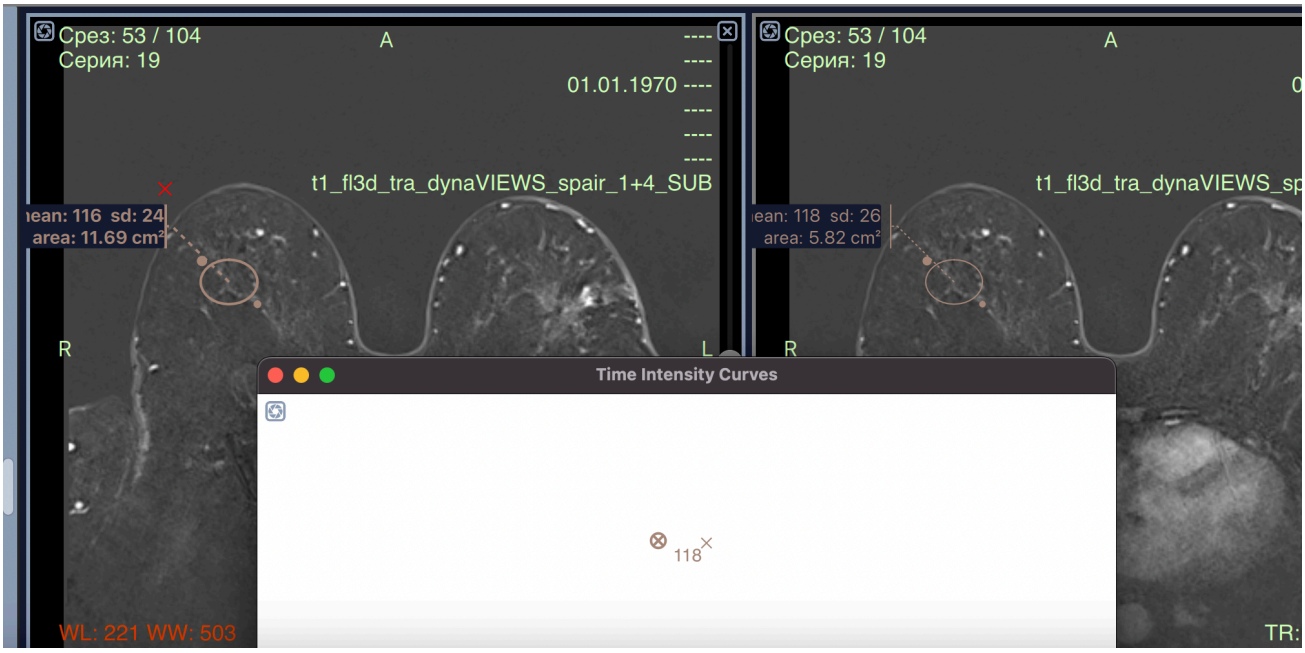
NB!: If the patient "breathed" during the series, and you need to place an ellipse on a neighboring slice, click on the series split button. Then, you copy the ellipse using Ctrl (Cmd) + C, move it to the desired slice, and press Ctrl (Cmd) + V.

Scenario 2: In the second scenario, if there is no combined series, you select the required series in the active window:

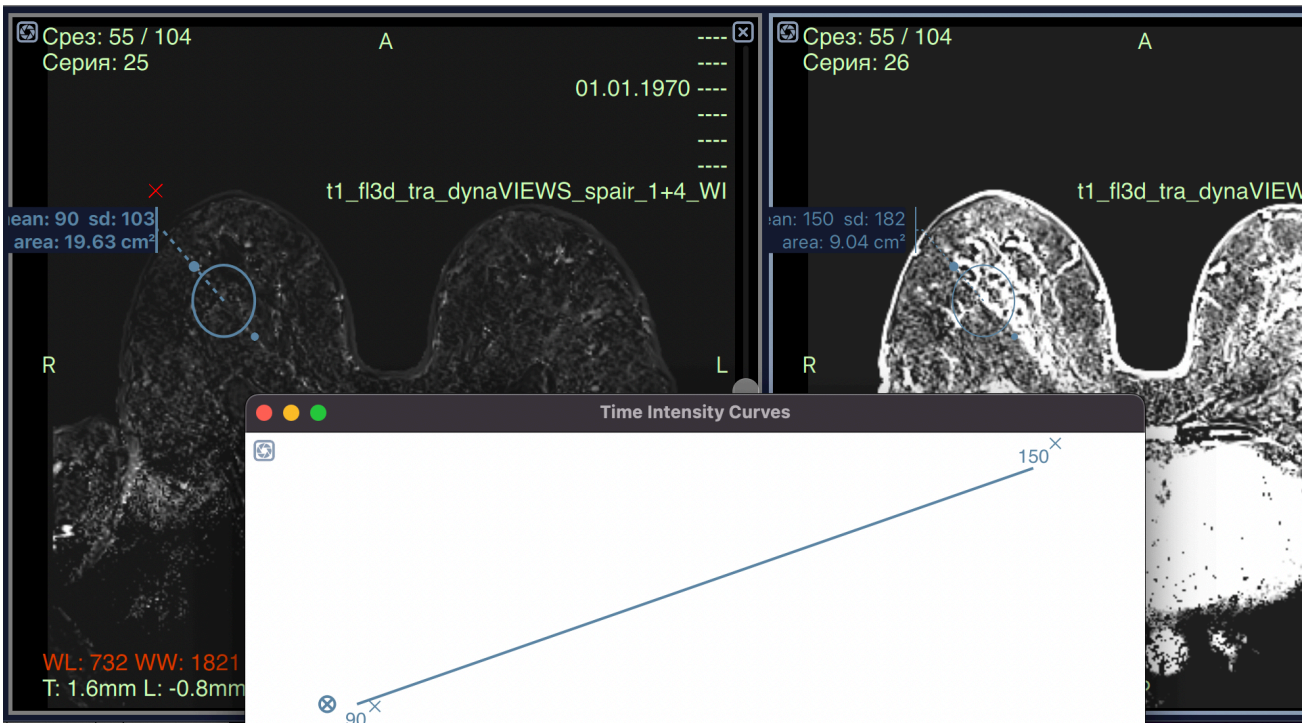


To create a contrast accumulation graph, select the ellipse tool:

Start drawing an ellipse, and when you click the left mouse button again, hold down the SHIFT key simultaneously.



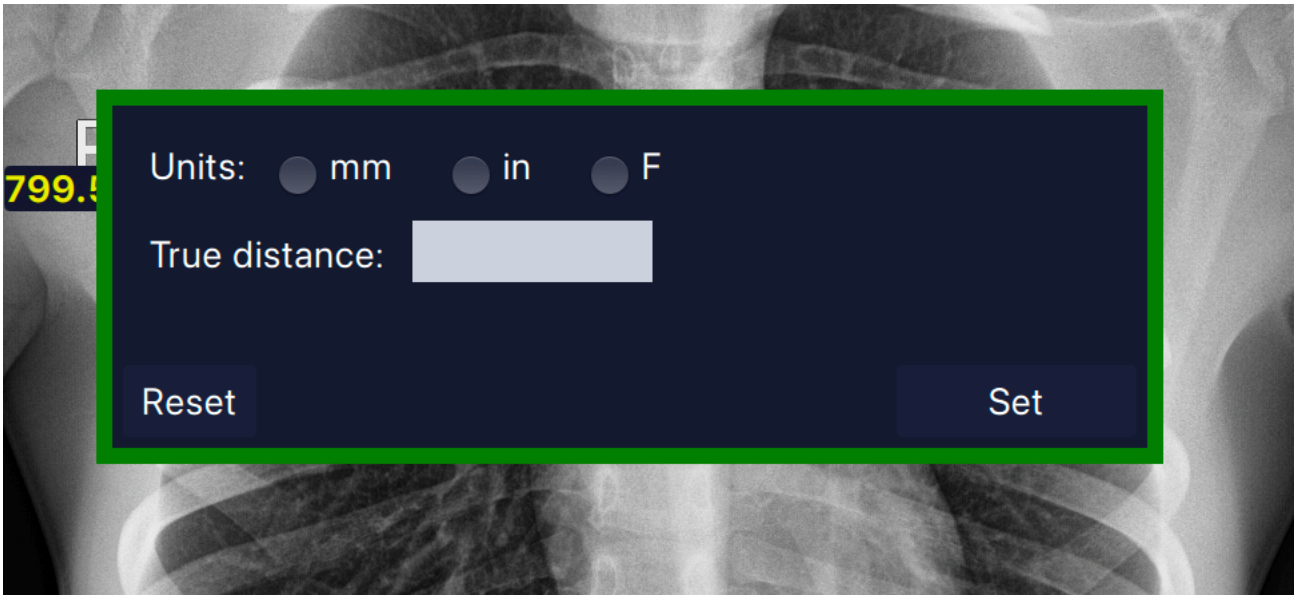
The next point of the graph will be created. To form the next point of the graph, copy the ellipse using the command ctrl(cmd)+c and paste it into the desired window using ctrl(cmd)+v.



You can move, copy, and paste any elliptical zone using the combination ctrl(cmd)+c to copy and ctrl(cmd)+v to paste.

13. Image Calibration

For manual calibration of measurements, draw a measurement line, and double-click on the measurement values. This will open a menu:



Set the desired value and click "Set."

Note: When you reopen the program, the values will be saved, indicated by green measurements. To undo manual calibration, perform the same actions and click "Reset."

14. Quick Screenshot

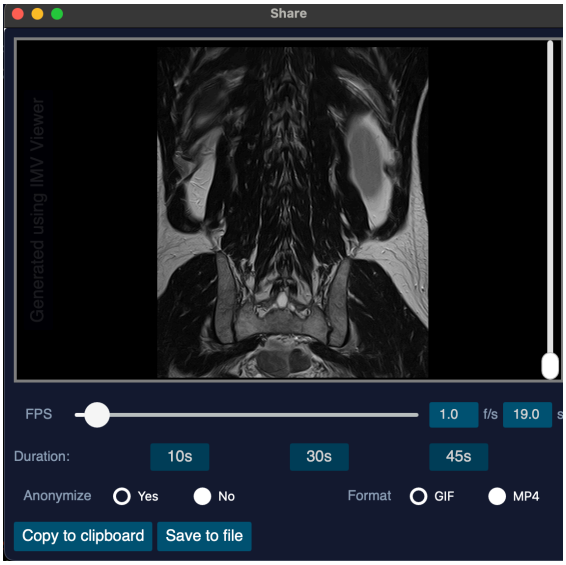
In any part of the program where there is a button in the upper left corner of the image, the user can take a screenshot with any measurements or projections. The image is saved as a separate series within the current image. Exporting the screenshot is possible in all formats applicable to other series.

15. Cine Mode

When you press the spacebar, automatic scrolling of images is activated. You can control it using the arrow keys. The up and down arrows adjust the speed, while the right and left arrows change the slice number.

16. Share

When you click the button, a menu for sending the study will open up:



Using the slider, you can adjust the duration of the output video, or use the quick selection options - 10s, 30s, 45s.

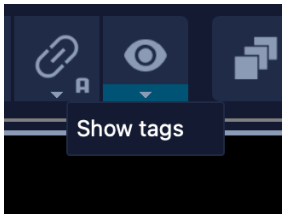
In the free version, you can choose GIF format, while in the paid version, you can select MP4.

In the left field, you can remove the watermark only in the paid version of the program.

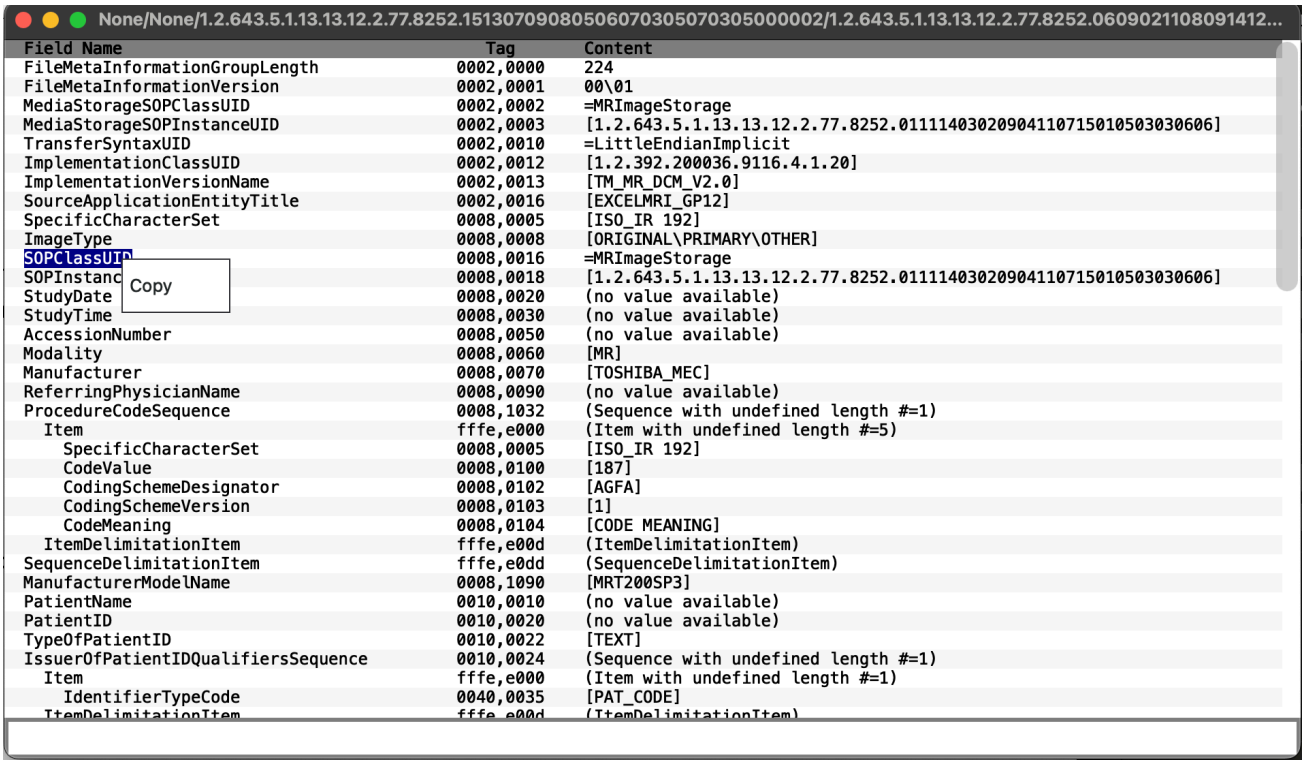
In the program, you can both save the video and copy it to the clipboard for convenient pasting into any location.

17. Tag Viewing

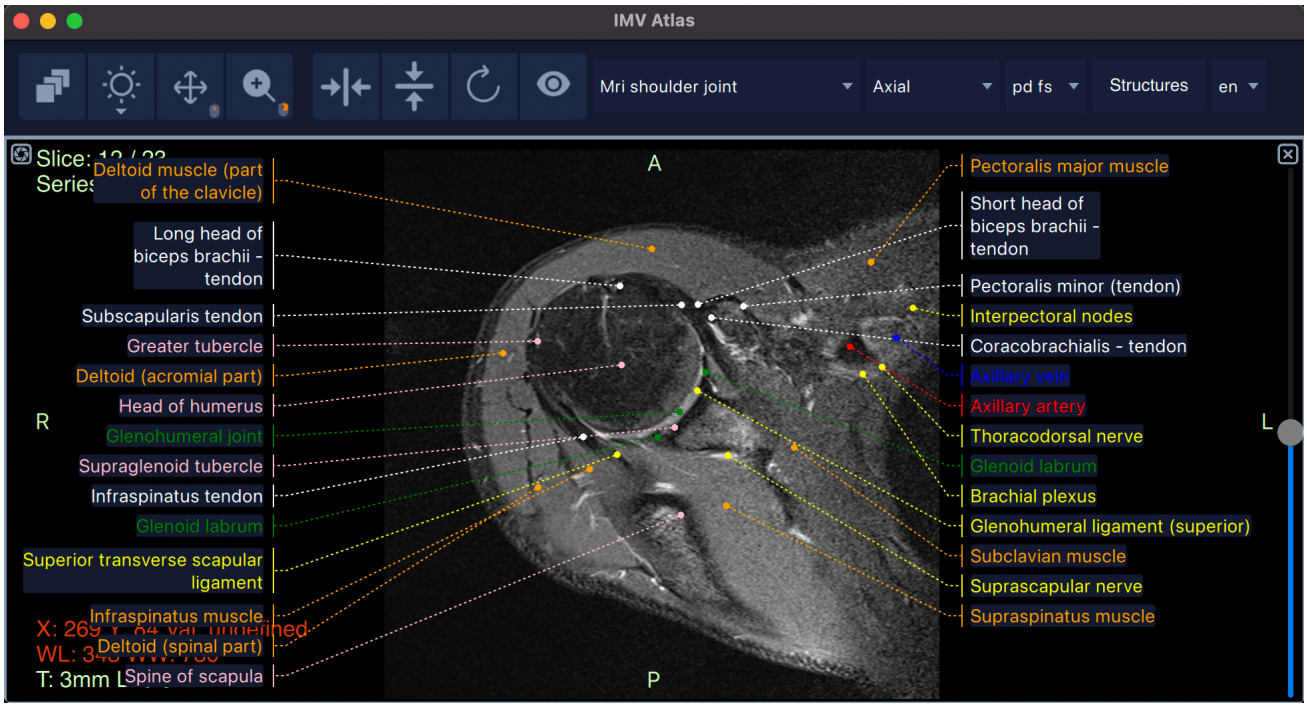
To view the tags of a study, open the selected series and press the submenu button or the hotkey S:

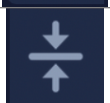
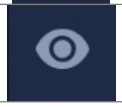
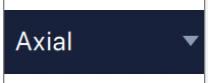
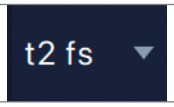
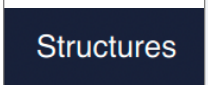


The tags window will open. In this window, there is a search box at the bottom. By right-clicking on the selected window, a window with a copy button will open:



18. IMV Atlas Module



	Mirror horizontally
	Mirror vertically
	Rotate image
	Hide all labels
	Select area
	Choose projection
	Select sequence
	Choose and filter anatomical structures
	Choose the language of anatomical structures

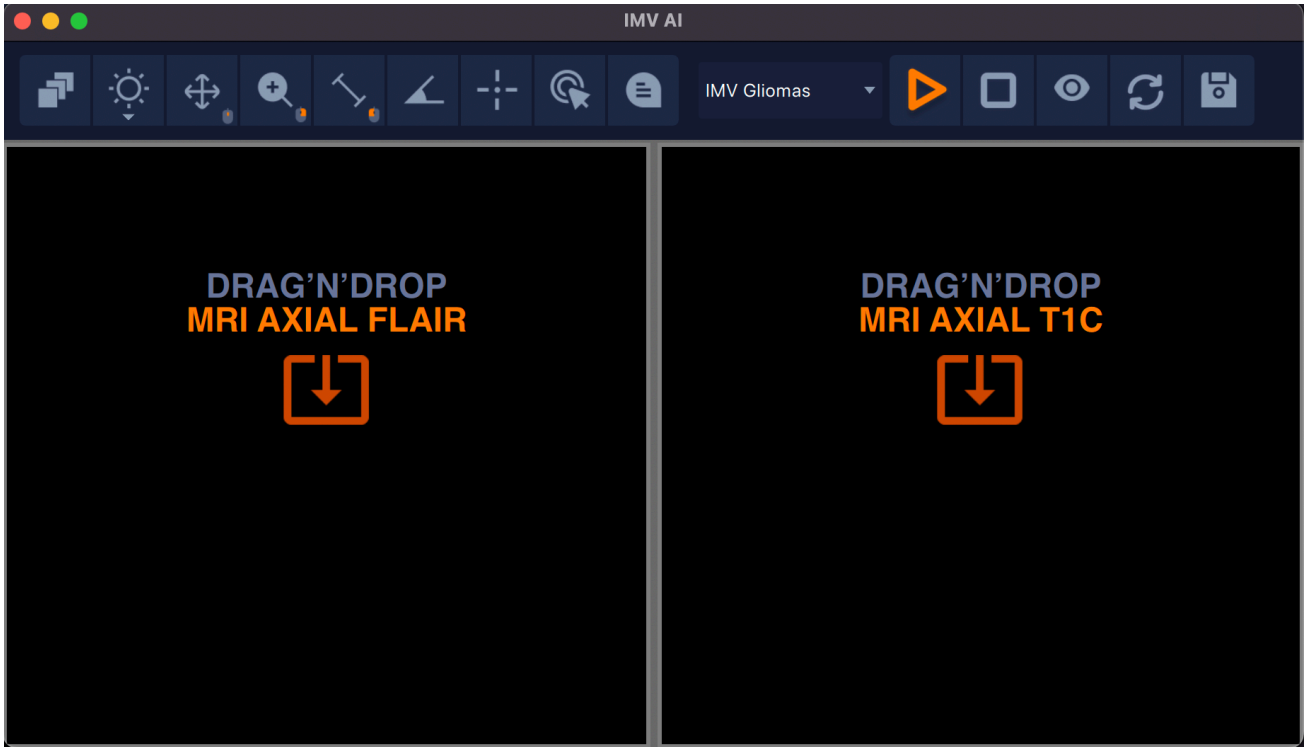
NB!: Double-clicking on a structure filters only that particular structure. Clicking again restores the standard view.

19. IMV AI Modules

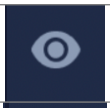
To use artificial intelligence modules, you need to click on the IMV Modules button.

And select the IMV AI modules.

The artificial intelligence module will open.



IMV MS	Module selection
	Start cloud processing
	Stop processing

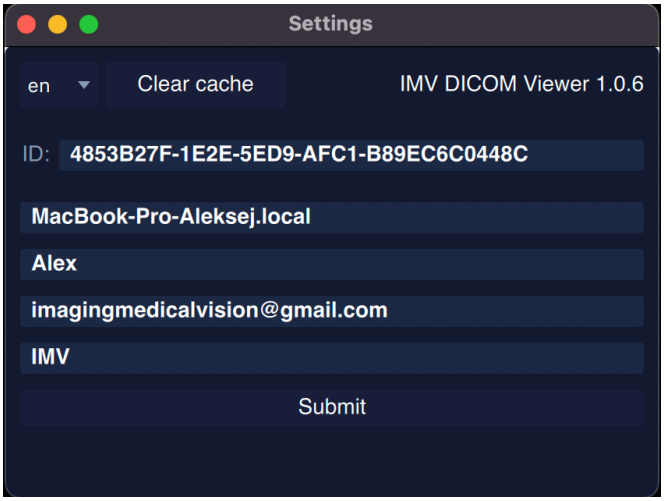
		Hide markup
		Reset study
		Save results

Move the required series into the windows from the main program window and click "Start processing." Wait for the processing to finish. Save the processing results in PDF format.

20. Settings

When you press the settings button

It will open the menu



	Your computer's ID. When you click on the window, the number is copied.

21."Hotkeys" (Keyboard Shortcuts)

0	Reset View Window
2	Abdomen
3	Angio
4	Bones
5	Head
6	Mediastinum
7	Lung
F2	Open MPR Window (subsequent clicks set the slice thickness to 8 mm, further clicks switch slice construction to Min/MinIP/Average)
F5	Stitching
F12	Annotations
Ctrl+O	Open Files
Ctrl+Shift+O	Open Folder
Ctrl+F	PACS Window
Ctrl+E	Save Window
I	Invert
Z	Zoom
F	Rotate
B	Layered Scrolling
W	Brightness
M	Shift

L	Lengths
A	Angle Measurement
Q	3D Cursor
E	Ellipse
Y	Text Note
Ctrl+R	Reset View Settings
R, T, G	Configure the layout of the slice view windows in the 3D MPR window
Ctrl+C	Copy
Ctrl+V	Paste
Backspace	Delete
Ctrl+Z	Undo Last Action
Ctrl+Y	Redo Last Action
Space	Cinema Mode / Start / Pause
Arrows	Cinema Mode Control / Series and Image Flip
C	Cobb Angle
J	Arrow
S	View Tags
Alt/option	To open the series menu of the examination.

20. Technical Support

You can address all technical inquiries to our dedicated Telegram chat at https://t.me/IMVViewerSupport or via email at imagingmedicalvision@gmail.com.