

ZEEROmed View

User Manual

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ZEEROMed View - User Manual

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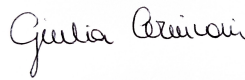
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The product is subject to continuous modifications and updates; the change history can be reviewed in the table provided on the following page.



	NAME	DATE	SIGNATURE
Written/modified by	Sara Giganti Giulia Cernivani	2026-09-21	 
Checked by	Sara Giganti	2026-09-21	
Approved by	Andrea Poli	2026-09-21	

MODIFICATIONS FROM PREVIOUS SYSTEM VERSION	
Modifications	Chapter
Pop-up update (button and background colors)	7.2.5.1 Local export (ZIP archive) 17.8 ROI (Region Of Interest) - Snapshot 17.6.1 Assigning a custom tag to a slide 17.1.4 Layout configuration 7.2.4.1 Key Image Note (KIN) or Key Object Selection (KOS) 7.7.1.1 Report creation 10.3.5 Reformatting a series from the multiplanar reconstruction (MPR) 10.4.2 Reformatting the series from the Volume Rendering (VR) 7.2.5.2 Printing selected images



	7.2.5.3 Performing a DICOM Move 7.5.1 Viewing the content of an SR
Added the "AI indicator" and the relative tooltip for AI-generated series	5.1.2.3 Sequences preview (5 -THE VIEWER)
Include scale indicator	17.8 ROI (Region Of Interest - Snapshot
Added the crosshair in linear measurement	7.3 - Measures (7 - GENERAL TOOLS)
Enabled mouse scrolling through DX and CR images within the same study	8.1 - Scrolling images in radiology studies (8 - RADIOLOGICAL TOOLS (CR, DX))
Update tables	Table 22 : Toolbar (7.2) Table 14 : Header (5.1.1)
Update device labelling	2.2 Device Labelling



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GENERAL INFORMATION

This user manual describes the main features of the Medical Device (DM) ZEEROMed View, developed by O3 Enterprise S.r.l.

To ensure the safety of the patient and the users, please read the user manual carefully and use the software in accordance with its intended use.

DEVICE NAME	ZEEROMED VIEW
INTENDED USE	ZEEROMed View is a software application designed to display and manage diagnostic quality DICOM and NON DICOM medical images, signal and video clips. It allows a trained physician to make a diagnosis and to take clinical decisions on those data. The software runs entirely within a web-browser. The product allows to: • display medical images in diagnostic quality; • display the raw data of ECG signals of different formats which can be used for taking diagnostic decisions; • Reconstruct axial medical images with MPR and Volume Rendering algorithms; • the display of Anatomopathology images (Digital Pathology Slides) which can be used for taking diagnostic decisions. It is a device intended to be used by physicians to make a direct diagnosis, but it is <u>not</u> intended to monitor physiological parameters
CONTRAINDICATIONS / WARNINGS	There are no contraindications, warnings or side effects associated with its use

Table 1: General information

Risks related to its use

All risks related to the use of the product in accordance with its intended use have been evaluated and are considered acceptable by the manufacturer.

Safety

Respect the current national or international regulation (reporting environment, reporting devices...) is necessary for a safe use and correct medical reporting.

Keep ZEEROMed View updated to the latest version. This is recommended to increase safety and functionality.



In case of system performance degradation, please contact the assistance service.

In the event of a system bug, complaint, or malfunction, please contact your system administrator, who will report the issue to our assistance service.

Information regarding incidents

Users must inform the Competent Authorities of the countries where the DM is used and O3 Enterprise Srl upon the occurrence of:

- any malfunction or deterioration in the characteristics or performance of a device made available on the market, including use-error due to ergonomic features, as well as any inadequacy in the information supplied by the manufacturer and any undesirable side-effect;
- any incident that directly or indirectly led, might have led or might lead to any of the following:
 - the death of a patient, user or other person;
 - the temporary or permanent serious deterioration of a patient's, user's or other person's state of health;
 - a serious public health threat;
- any adverse event that led to any of the following:
 - death;
 - serious deterioration in the health of the subject, that resulted in any of the following:
 - life-threatening illness or injury;
 - permanent impairment of a body structure or a body function;
 - hospitalisation or prolongation of patient hospitalisation;
 - medical or surgical intervention to prevent life-threatening illness or injury or permanent impairment to a body structure or a body function;
 - chronic disease;
 - foetal distress, foetal death or a congenital physical or mental impairment or birth defect.

Such incidents or adverse events must be reported to O3 Enterprise s.r.l. at the following email addresses: qualita@o3enterprise.com, claims@o3enterprise.com.

Maintenance

The product is subjected to a continuous maintenance process aimed at correcting any anomalies and constantly improving system performance. O3 Enterprise guarantees the following levels of service for all its products:

- **Planned maintenance:** the execution of periodic tests on a quarterly basis to ensure the correct functioning of the system;



- **Corrective maintenance:** interventions aimed at the timely identification and resolution of defects and malfunctions. In case of need, please contact Support (via email: support@o3enterprise.com).

Availability of documentation

The Instructions For Use (IFU) are provided in electronic format and can be freely consulted via the product label and on the manufacturer's website (<https://zeeromed.com/>).

To request a free hand copy of the manual, please contact the quality team at the email address qualita@o3enterprise.com.

Third-Party AI Integrated Software

The product may be integrated with CE-marked third-party Artificial Intelligence (AI) algorithms. The presence and activation of these algorithms are appropriately signaled by the product during image visualization.

Key to symbols used in the manual

Below are the main safety symbols used in the manual:

SYMBOL	LABEL	MEANING
	WARNING	Indicates a high-risk situation which, if not avoided, could cause injury, damage or compromise the safety of the patient and users
	NOTE	Highlights practical instructions and tips to optimize the use of the software

Table 2: Key to symbols



1 INTRODUCTION

ZEEROMed View is a medical device software designed for the visualization of images, signals, videos and clinical data (DICOM and non-DICOM) to support qualified physicians and radiologists in the diagnostic process.

1.1 Manufacturer Essential Data

NAME	O3 ENTERPRISE SRL
Head Office	AREA Science Park, Padriciano 99, 34149, Trieste, ITALY
Operational Center	AREA Science Park, Padriciano 99, 34149, Trieste, ITALY
Local Unit	• Via Caprin 18, 34170, Gorizia, ITALY; • Via Copernico 38, 20125, Milano, ITALY.
VAT Number	01137150320
Website	https://zeeromed.com/

Table 3: Manufacturer Essential Data

1.2 Minimal and recommended technical requirements

ZEEROMed View incorporates the Pathology Software Development Kit (© 2020 by Koninklijke Philips N.V.) under a license from Philips Medical Systems Nederland B.V.

1.2.1 Minimal server requirements

1.2.1.1 Operating system

The application can run on any 64-bit Linux OS compatible with Docker Engine.

The recommended Linux operating systems are:

- Ubuntu 24.04 LTS, 26.04 LTS, or a more recent LTS release;
- RHEL-based OS.

1.2.1.2 Minimal HW requirements

Hardware sizing might slightly vary based on the modalities used by customers and on concurrent users.



CONCURRENT USERS	CPU CORES*	RAM
10	4 cores	12 GB
20	8 cores	24 GB
50	16 cores	32 GB
50+	+1 core per 10 concurrent users	+4 GB per 10 concurrent users

Table 4: Minimal HW requirements

* Equivalent of 7th generation Intel i5 2.4 GHz CPU core.

⚠ NOTE: to ensure optimal performance, users who heavily MPR/MIP functionalities, tom-synthesis, or digital pathology slide require 1.5 CPU cores and 1.5 GB of RAM per concurrent user

The storage is used for software and temporary data cache. At least 50 GB of storage size is recommended.

Since the network bandwidth directly affects opening speed, we recommend at least 100 Mbit/s.

1.2.1.3 Monitors

It is recommended to use a monitor with a minimum resolution of 1280x1024.

For more information, please contact the O3 Enterprise s.r.l. representative.

1.2.2 Client requirements

DESKTOP WEB HTML5	
CPU	Intel i3 4 core CPU or better
RAM	8+ GB of RAM, 256+ MB of video memory*
Storage space	10+ GB
Network bandwidth	100+ Mbit/s
Web browsers	Google Chrome 112+**, Microsoft Edge 112+, Mozilla Firefox 112+, Safari 16+



Table 5: Minimal client requirements

* For client workstations used to view tomosynthesis or digital pathology exams, a minimum of 16 GB of ram is required.

** To reach the best performance, it is recommended to use **Google Chrome**.

1.2.2.1 Minimal LAN/WAN requirements

MINIMAL REQUIREMENTS		
LAN	<i>minimal</i>	100+ Mbit/s
	<i>recommended</i>	100+ Mbit/s
WAN	<i>minimal</i>	10+ Mbit/s download, 5+ Mbit/s upload
	<i>recommended</i>	50+ Mbit/s download, 20+ Mbit/s upload

Table 6: Minimal LAN and WAN requirements

1.3 User access requirements

The web access is performed by the user through HTTPS protocol (Hypertext Transfer Protocol over Secure Socket Layer).

The access is allowed only with authentication credentials. The credential consists in an authentication code and a key word known only by the users. The password is encrypted.



2 THE DEVICE

2.1 Medical device description and specifications

NAME	ZEEROMED VIEW
<i>Intended use</i>	ZEEROMed View is a software application designed to display and manage diagnostic quality DICOM and NON DICOM medical images, signal and video clips. It allows a trained physician to make a diagnosis and to take clinical decisions on those data. The software runs entirely within a web-browser. The product allows to: • display medical images in diagnostic quality; • display the raw data of ECG signals of different formats which can be used for taking diagnostic decisions; • Reconstruct axial medical images with MPR and Volume Rendering algorithms; • the display of Anatomopathology images (Digital Pathology Slides) which can be used for taking diagnostic decisions. It is a device intended to be used by physicians to make a direct diagnosis, but it is <u>not</u> intended to monitor physiological parameters
<i>General description of the device</i>	Stand-alone MDSW web based that displays diagnostic images and clinical data
<i>Intended patient population</i>	There is not a specific intended patient population designated to be treated with this MDSW because of its intended purpose. All patient populations can indirectly benefit from this MDSW if needed
<i>Intended user</i>	Physicians, radiologists, pathologists
<i>Medical Condition</i>	ZEEROMed View is a MDSW thought for all types of medical conditions that needs a visualization of: • medical images such as CT, MRI, CT-Scan, PET-CT, Ultrasound; • medical signals related to cardiology; • anatomical pathology images. It can't be used on the patient to directly treat a medical condition but it permits the diagnosis



<i>Indication for use</i>	ZEEROMed View is intuitive but it should be used with previous training of personnel involved. O3 Enterprise provides training before the installation of the product. O3 Enterprise also provides a User Manual designated for the end-user which can be downloaded from the software itself.
<i>Use Environment</i>	Trained physicians are allowed to use the system both in a hospital environment and at home, if they own an environment suited for reporting according to National Laws (e.g. in Italy regulated by DPR 14 January 1997) concerning minimum structural, technological and organisational requirements to perform medical activities. Also there shall be an internet connection because of the nature of the product (web based software). Monitor spatial resolution must be adapted to the type of studies to be read. See paragraph 1.2.2 Client requirements for the web browser specifications.
<i>Contraindication</i>	There are NO contraindications related to the use of the medical device
<i>Warning</i>	There are NO warnings related to the use of the medical device
<i>Side effects</i>	There are NO side effects related to the use of the medical device
<i>Lifetime</i>	ZEEROMed View is considered obsolete if it hasn't received any system updates for three years

Table 7: Medical device description and specification

2.2 Device Labelling

The medical device label is drafted in compliance with the CEI EN ISO 15223-1 standard and can be accessed directly from the user interface by clicking the "Information" button  on the information bar (refer to Chapter **5.1.1 Information bar**).

The label contains the following information:

- The medical device logo (specific to each commercial name);
- The medical device symbol;
- The CE mark with the Notified Body (NB) number;
- The release date;
- The serial number;
- The manufacturer's name and address (operational site for this software);
- The device UDI carrier.

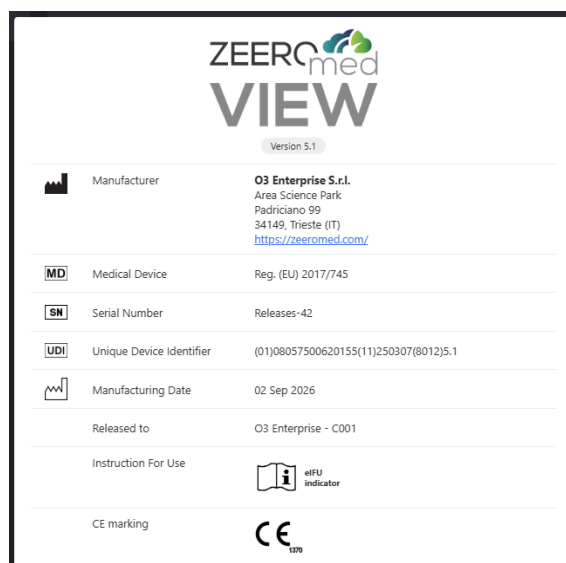


Image 1: Label

NOTE: the label image provided in the manual is for illustrative purposes only. To review up-to-date and accurate information, always refer to the actual label displayed within the software.

2.3 Device accuracy

Calculating the distance in millimetres between two points within a DICOM image is possible only if the file contains information regarding the relationship between the image pixels and actual millimetres. This information is generally available for the following diagnostic modalities: CR and DR (Computed and Digital Radiography), CT (Computed Tomography), MR (Magnetic Resonance), MG (Mammography).

Measurements performed are to be considered accurate only if the acquisition mode has been calibrated, and therefore the DICOM tags PixelSpacing (which contains the calibrated value) and ImagerPixelSpacing are available, and these values are different.

The system also allows measurements to be taken in the absence of calibration; however, in this case, measurement accuracy is not guaranteed, and the user interface will display the warning: "Detection plane not calibrated" (refer to the corresponding Chapter **7.3 Measures**).

A dedicated algorithm has been developed to estimate the error associated with measurements; its technical documentation can be consulted at O3 Enterprise.



3 SEARCHING FOR EXAMS

Users can find exams through both the:

- "Search Exam" panel;
- "Studylist" page.

3.1 "Search Exams" panel

The Panel "Search Exams" allows searching among the exams in DICOM Servers. The panel is divided in two main sections:

- Search section, at the top;
- Results section, at the bottom.

Last Name	First Name	Patient ID	DoB
Study Date ▼	Mod.	#	Acc. Num.
DOE	JOHN	PID001	17/06/1946
03/07/2018	OT,SC	4	6656411236
DOE	JOHN	PID001	17/06/1946
18/01/2018	DX	1	ISU-1801263351-9
DOE	JOHN	PID001	17/06/1946
11/01/2018	DX	1	ISU-1801263351-6

Image 2: Search exams panel

3.1.1 Search Section

Exams can be searched by study or patient information.

Searches always occur at the **study level**: entering only the patient's first and last name will yield as many results as there are studies belonging to that patient.



The following illustration shows the search mask and its corresponding fields:

Image 3: Search Section

3.1.1.1 Search fields

The available fields are:

- **Last Name:** Patient's last name. Free text, * is the wildcard;
- **First Name:** Patient's first name. Free text, * is the wildcard;
- **Birth Date:** Patient's birth date. Clicking on the field a calendar will appear, where the exact date can be chosen;
- **Patient ID:** Patient's unique ID. Free text, * is the wildcard;
- **Ref Phys Name:** Referring physician name [Last name First Name]. Free text, less than 64 characters (see [3.1.1.3 Referring Physician Name](#));
- **Modality:** Type (modality) of the exam. Free text;
- **StudyInstanceUID:** Study Instance UID. Free text;
- **Study Date [From]:** Date after which the exams have been done. Clicking on the field a calendar will appear, where the exact date can be chosen. If "Study Date [To]" is not compiled, then "Study Date [From]" indicates the date of exam;
- **Study Date [To]:** Date before which the exams have been done. Clicking on the field a calendar will appear, where the exact date can be chosen;
- **Accession Number:** Accession Number of the study. Free text;
- **Study Description:** Study description. Free text;
- **AeTitle:** AeTitle. Free text, a punctual search: only studies with AeTitle equal to filtered value will be selected. Search for multiple AeTitle (like "AE*") will be denied;
- **Tag:** Tag of the study (see chapter [7.2 Toolbar](#)).



3.1.1.2 Buttons in the search section

Buttons available in the search section are:

ICON	NAME	DESCRIPTION
	Search on remote nodes	It allows the user to search exams on configured remote nodes
	Logout	It allows the user to logout
	Reset fields	It empties the contents of all query fields
	Search	It allows to search for exams in an archive
	Information	It allows the visualization of the medical label and the user manual

Table 8: Button available in search section

3.1.1.3 Referring Physician Name

Referring Physician Name is the couple of surname-name or just one of them with "*" character. Because of the multiplicity of physicians with same name or surname, for each study is added a list of details including physician name.

Behaviour of referring physician field depending on search string which is described in the following table:

SEARCH STRING	RESULT ON LOCAL SEARCH	RESULT OF REMOTE SEARCH
LastName FirstName	LastName^FirstName	[NOTHING]



LastName*FirstName	LastName^FirstName	LastName^FirstName
LastName%FirstName	LastName^FirstName	LastName^FirstName
LastName_FirstName	LastName^FirstName	LastName^FirstName
[SPACE]	[NOTHING]	[ALL NOT NULL]
*	[ALL NOT NULL]	[ALL]
LastName	[NOTHING]	[NOTHING]
LastName*	LastName^FirstName	LastName^FirstName
LastName[SPACE]	[NOTHING]	[NOTHING]
[SPACE]LastName	[NOTHING]	[NOTHING]
FirstName	[NOTHING]	[NOTHING]
*FirstName	LastName^FirstName	LastName^FirstName
[SPACE]FirstName	[NOTHING]	[NOTHING]
FirstName[SPACE]	[NOTHING]	[NOTHING]

Table 9: Referring Physician Name

3.1.2 Results section

The Result section contains the results of the search. Each row represents a study.

Results can be sorted through the header. When a label is clicked, the list of results is sorted by that field in descending order and the label is updated, indicating the applied order (with an arrow).

3 results found								
Last Name	Study Date ▼	First Name	Mod.	#	Patient ID	Acc. Num.	Study Desc.	DoB
DOE	03/07/2018	JOHN	OT.SC	4	PID001	6656411236	Video sala operatoria	17/06/1946
DOE	18/01/2018	JOHN	DX	1	PID001	ISU-1801263351-9	rx torace a letto	17/06/1946
DOE	11/01/2018	JOHN	DX	1	PID001	ISU-1801263351-6	rx torace a letto	17/06/1946

Image 4: Sorting by Last Name



Each study has the "Details" row. Clicking on this line the user can visualize:

- Study Instance UID;
- Last Name;
- First Name;
- Patient ID;
- Birth Date;
- Gender;
- Study Date;
- Study Time;
- Accession Number;
- Study UID;
- Modalities in study;
- Referring Physician Name.

Last Name Study Date ▼	First Name Mod.	#	Patient ID Acc. Num.	Study Desc.	DoB
001 14/10/2024	MG	4	MNTRFL63L71I929L 159573	Visita Spec. Senologica + Eco Mammaria + Mammografia	31/07/1963
Details					
StudyInstanceUID: 1.2.826.0.1.3680043.9.6116.159573.8583.1728893793					
Last Name: 001					
First Name:					
Patient ID: MNTRFL63L71I929L					
Birth Date: 19630731					
Gender: F					
Study Date: 20241014					
Study Time: 115019					
Accession Number: 159573					
Study ID:					
Modalities in study: MG					
Ref. Phys. Name:					

Image 5: Result section, details

A red line indicates that a study is offline. Clicking on the line provides instructions on how to recover it.

77 risultati trovati				
Cognome Data studio ▼	Nome Mod.	#	ID Paziente Acc. Num.	
NONAME 06/11/2018	NOSURNAME OT	1	1.2.826.0.1.3680 ap2018110610515	
Details				
NONAME 06/11/2018	NOSURNAME OT	1	1.2.826.0.1.3680043.2.619.6002.1541501505989 ap20181106105147	No description 01/01/1900
Details				
NO_SURNAME 29/03/2018	NO_NAME MG	4	MAMMO 384445	MAMMOGRAFIA PER SCREENING - 01/01/1966
Details				
NO_SURNAME 13/03/2018	NO_NAME XA	8	NO_ID 87237711-1	APPLICAZIONE FILTRO CAVALE TEMPORANEO 01/01/1900
Details				
NO_SURNAME 13/03/2018	NO_NAME SRUS	41	NO_ID	01/01/1900
Details				
NO_SURNAME 13/03/2018	NO_NAME XA	3	NO_ID 87233795-1	FISTOLOGRAFIA DELLA PARETE ADDOMINALE E/O DELL' ADDOME(4 RAD 01/01/1900
Details				

Lo studio è offline. Lo studio può essere recuperato da: /opt/storagePacs/2018/06/08/

OK



Image 6: An offline study

A black line on a study provides evidence of a nearline study. Clicking on that line the user can see the study, but the loading might be slower than an online study.

Cognome Data studio	Nome Mod.	#	ID Paziente ▼ Acc. Num.	Desc. studio	DdN
14/01/2018	MUSICA	0	1.2.826.0.1.3680043.2.619.9325.1541501344371		01/01/1900
NONAME	NOSURNAME	0	ap20181106104907	No description	
NONAME	NOSURNAME	1	1.2.826.0.1.3680043.2.619.9049.1508323293894		01/01/1900
18/10/2017	OT	1	ap20171018104135	No description	
NONAME	NOSURNAME	1	1.2.826.0.1.3680043.2.619.7273.1541501508259		01/01/1900
06/11/2018	OT	1	ap20181106105151	No description	

Image 7: A nearline study

To open the desired study, click on the corresponding row.

Once the study is open, the search panel disappears automatically; to recall it, click on its icon in the top left corner.



Image 8: The icon of the search panel

3.1.2.1 Cloud icon

The cloud icon  in the list results indicates that the study is archived either on a bucket or on a remote node. Hovering the mouse cursor over the icon displays its location.

Studies present in cloud storage must be transferred locally to be opened.

NO_SURNAME	NO_NAME	NO_ID		01/01/1900
15/11/2018	MG	8	95625	Standard Screening - Combo
NO_SURNAME	NO_NAME	NO_ID		01/01/1900
25/10/2018	MG	1	06011157W9FkmA	
NO_SURNAME	NO_NAME	NO_ID	1.2.826.0.1.3680043.2.619.7721.1539357605500	01/01/1900
12/10/2018	OT	1	ap20181012172030	23325
NO_SURNAME	NO_NAME	NO_ID	1.2.826.0.1.3680043.2.619.2881.1539354865882	01/01/1900
12/10/2018	OT	1	ap20181012163435	23497

Image 9: Cloud icon

3.2 "Studylist" page

"Studylist" is an external web page linked to the ZEERomed View, allowing users to search and display exams across DICOM servers. The studylist is divided in two main sections:

- Search section (at the top);
- Results section (at the bottom).



AI	Patient name	Patient ID	Birth Date	Study Date	IF	Modalities	Acc. Num.	Study Description	Assigned to
	NO_SURNAME NO_NAME	0350	01/01/1954	04/03/2024 18:20		CR,SR		PELVIS	1 reporter 1
	ANONYMIZE ANONYMIZE	ANON	01/01/1971	28/02/2024 08:37		MR,PR,SR	2240588	RX ARTI INFERIORI E DEL BACINO SOTTO CARICO	
	ANONYMIZE ANONYMIZE	ANON	01/01/1970	31/01/2024 07:58		KO,MG	SCRMG00DC7EGCSD1	MAMMOGRAFIA BILATERALE SCREENING	
	ANONYMIZE ANONYMIZE	ANON	01/01/1970	30/01/2024 16:26		MG	0001125c241a44bf	MAMMOGRAFIA BILATERALE SCREENING	
	ANONYMIZE ANONYMIZE	ANON	01/01/1970	29/01/2024 08:59		MG	00014831a1ee1cf8	MAMMOGRAFIA BILATERALE SCREENING	test
	MORTARA XML	20240125	25/01/2000	25/01/2024		ECG	20240125		test
	ANONYMIZE ANONYMIZE	ANON	01/01/1970	24/01/2024 16:28		MG	0000655d40f6bd3	MAMMOGRAFIA BILATERALE SCREENING	
	NOSURNAME NONAME	1.2.826.0.1.3680043.9...	01/01/1970	19/01/2024 13:10		CR,SR	2024000000059552	RX TORACE	1 reporter 1
	ANONYMIZE ANONYMIZE	ANON	01/01/1970	17/01/2024 08:58		MG	0000655704ea3842	MAMMOGRAFIA BILATERALE SCREENING	
	QUELICHE SARAH	0133	01/01/1954	21/12/2023 17:11		MR,PR		PELVIS	
	BUCKET TEST	1.2.826.985.1	08/11/1982	05/12/2023 12:30		SC	AN-123	AWS-bucket images	
	LOCAL TEST	PID-123	08/11/1982	05/12/2023 12:30		ES,KO,SC,SR	AN-123	File-system images	

Image 10: Studylist

3.2.1 Search Section

Users can search for both study or patient information.

Searches occur always at **study level**, so that specifying only last name of the patient, all studies belonging to the matching patient will be returned, each as a row in the table.

The following illustration shows the query mask and its available filters:

Image 11: Search Section

3.2.1.1 Search fields

The searching can be configured by the user through the "Configuration Layout" popup . Available filters include:

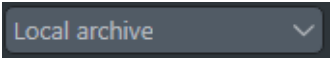
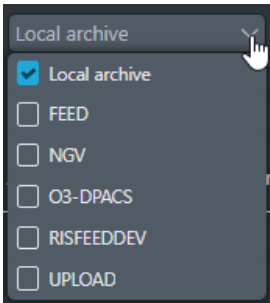
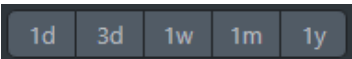
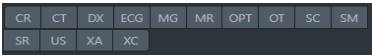
- **Last Name:** Patient's last name. Free text, * is the wildcard;
- **First Name:** Patient's first name. Free text, * is the wildcard;
- **Birth Date:** Patient's birth date. Clicking on the field a calendar will appear, where the exact date can be chosen;
- **Patient ID:** Patient's unique ID. Free text, * is the wildcard;
- **StudyInstanceUID:** Study Instance UID. Free text;
- **Study Date [From] - [To]:** Studies time range. If "Study Date [To]" is not compiled, then "Study Date [From]" indicates the date of exam. Alternatively, user can click on the "1d", "3d", "1w", "1m", "1y" buttons to easily select the date range (see [3.2.1.2 Buttons in the search section](#)).
- **Modality:** Interactive buttons to filter between the different exam modalities (see [3.2.1.2 Buttons in the search section](#));
- **Accession Number:** Accession Number of the study. Free text;



- **Study Description:** Study description. Free text;
- **AeTitle:** AeTitle. Free text, a punctual search: only studies with AeTitle equal to filtered value will be selected. Search for multiple AeTitle (like "AE*") will be denied;
- **Tag:** Tag of the study (see chapter [7.2 Toolbar](#));
- **Assigned to:** physician assigned to the reporting of the study.

3.2.1.2 Buttons in the search section

Buttons available in the search section include:

BUTTON	NAME	DESCRIPTION
	Search on remote nodes	To search exams on configured remote nodes. It is possible to select one or more nodes at the same time. 
	Date range	To quickly select a range date to the current date. Clicking the buttons automatically fills in the "Study Date [From]" and "Study Date [To]" filters.
	Modality	To filter between the different exam modalities. It is possible to filter for more than one modality at the same time.
	Search	To search for exams in an archive
	Open the configuration menu	To open the configuration menu (icons are described below): 



	Configure layout	To choose which search fields, results columns, opening modes and exams modalities to display. See 3.2.1.3 Studylist layout configuration
	Open administrator configurations	(only for an administrator user) It opens the configuration page of the ZEEROMed View
	Information	To view the medical label and the user manual
	Log out	To log out
	Close the configuration menu	To close the configuration menu

Table 10: Buttons available in search section

3.2.1.3 Studylist layout configuration

Clicking the "Configure layout" icon  opens the corresponding panel, allowing the user to define:

- Search filters;
- Columns of the results section;
- Opening modes (see **3.2.2.2 Buttons in the result section**);
- Exam modalities (e.g. CR,CT, DX, ECG,...);

to display in the search and results section.

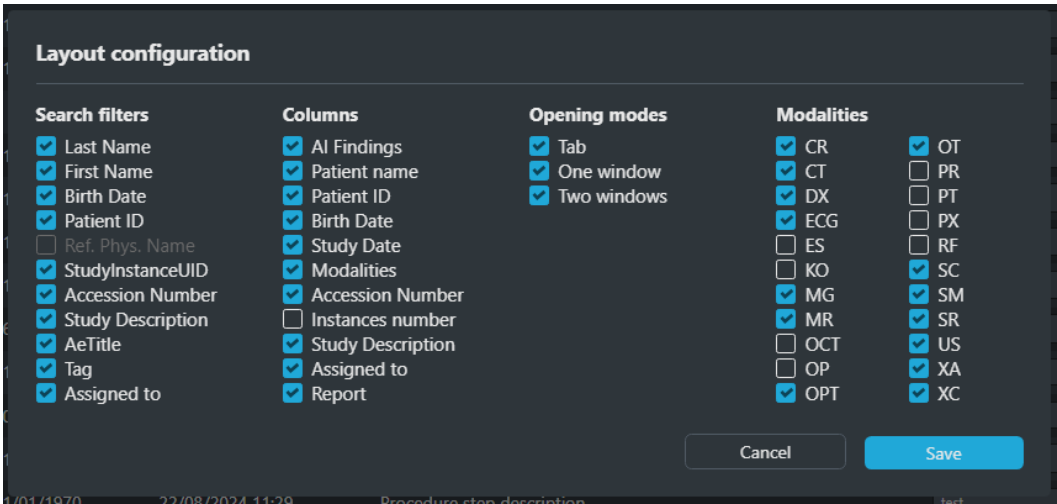


Image 12: Studylist layout configuration

To save the settings, click the "Save" button.

3.2.2 Results section

The Result section contains the results of the search. Each row represents a study.

Results can be sorted through the header. When a label is clicked, the header is highlighted and the list of results is sorted by that field in ascending/descending order (which is indicated by the light blue icon).

AI ▾	Patient name	Birth Date	Study Date	IF	Study Description	Assigned to	📄
	NO_SURNAME NO_NAME	01/01/1954	04/03/2024	18:20	PELVIS	1 reporter	📄
	ANONYMIZE ANONYMIZE	01/01/1971	28/02/2024	08:37	RX ARTI INFERIORI E DEL BACINO SOTTO CARICO	📄	📄
👤	ANONYMIZE ANONYMIZE	01/01/1970	31/01/2024	07:58	MAMMOGRAFIA BILATERALE SCREENING	📄	📄
👤	ANONYMIZE ANONYMIZE	01/01/1970	30/01/2024	16:26	MAMMOGRAFIA BILATERALE SCREENING	📄	📄
👤	ANONYMIZE ANONYMIZE	01/01/1970	29/01/2024	08:59	MAMMOGRAFIA BILATERALE SCREENING	test	📄
	MORTARA XML	25/01/2000	25/01/2024			test	📄
👤	ANONYMIZE ANONYMIZE	01/01/1970	24/01/2024	16:28	MAMMOGRAFIA BILATERALE SCREENING	📄	📄
	NOSURNAME NONAME	01/01/1970	19/01/2024	13:10	RX TORACE	1 reporter	📄

Image 13: Studies results

3.2.2.1 Result rows

Each row contains information regarding the study, including:

- (If AI is implemented) The finding score generated by the artificial intelligence algorithm, along with the AI icon  (see chapter 3.2.2.3.1 Artificial Intelligence and finding scores);
- Patient name;
- Patient ID;
- Birth Date of the patient;

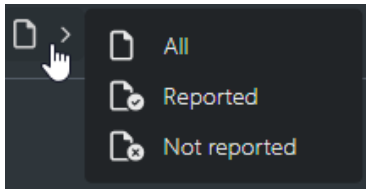


- Study Date;
- Modality;
- Accession Number;
- Instances number;
- Study Description;
- Presence of a medical report (see **3.2.2.3 Icons in the result section**);
- Study storage location, either on the cloud or on a remote node (indicated by the cloud icon , in which case the study must be moved to be opened);
- Study opening modalities: in a new tab, in a new window or across two monitors (see chapter **3.2.2.2 Buttons in the result section**).

These columns can be configured by the user via the "Configure Layout" icon .

3.2.2.2 Buttons in the result section

In the result section, the following buttons are available:

BUTTON	NAME	DESCRIPTION
	Filter	To display only the exams with a "finding score" generated by the Artificial Intelligence software (see paragraph 3.2.2.3.1 Artificial Intelligence and finding scores)
	Reporting filter	It allows to filter for: • All studies • Reported studies • Not reported studies 
	Retrieve this study	To download the study. The study will be queued for download

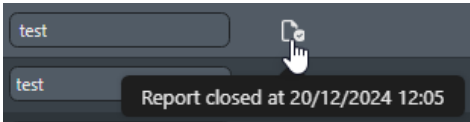
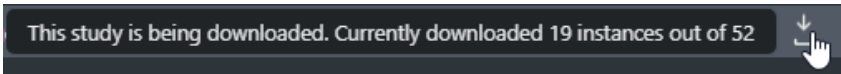


	Open study in a tab	To open the study in a new tab
	Open study on a single window	To open the study in a new window
	Open study on a two windows (multi-monitor)	To open the study using two monitors

Table 11: Buttons available in the result section

3.2.2.3 Icons in the result section

In the result section, the following icons are available:

ICON	DESCRIPTION
	It informs the user of the availability of a "finding score" generated by the Artificial Intelligence software (see paragraph 3.2.2.3.1 Artificial Intelligence and finding scores)
	It indicates the presence of a closed report for the associated study. Hovering over it will display information regarding the date and time the report was closed: 
	It indicates that the study is available on a bucket or a remote node and must be downloaded to be viewed
	It indicates that the download of the study will start shortly. Once it starts, a pop-up will show the progress of the download: 



	It indicates that the study has been downloaded successfully
--	--

Table 12: Icons available in the result section

3.2.2.3.1 Artificial Intelligence and finding scores

WARNING: this functionality is available only if an AI algorithm has been integrated

The icon in the corresponding AI column indicates the availability of a finding score.

By hovering the mouse cursor over the icon, the finding score is displayed:

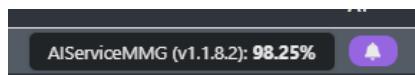


Image 14: Finding score provided by the AI software

To display only exams with a finding score, click on the following icon , present in the header of the "AI" column.

AI	Patient name	Patient ID	Birth Date	Study Date	Modalities	Acc. Num.	Study Description	Assigned to
	ANONYMIZE ANONYMIZE	1.2826.0.1.36800432...	01/01/1970	05/05/2023 19:25	DX,SR	609936848	RX GOMITO DS RX GOMITO DS	
	MAMMO TWO	24577		09/03/2020 16:21	MG,SC	SCR0655000035153	MAMMOGRAFIA BILATERALE SCREENING	
	ANONYMIZE ANONYMIZE	ANON	01/01/1971	31/01/2020 11:50	CT,MG,SC	138763	MG VISITA SENOLOGICA-MAMMOGRAFIA- ECOGRAFIA	
	KNEE	ADULT		03:17	DX	Fracture	Tibia plateau # (beautiful images)	

Image 15: Filtering studies by findings scores

3.2.2.4 Preview panel

Clicking a row displays the associated study with information, including the description, modality, number of instances and a preview at the bottom down.

AI	Patient name	Patient ID	Birth Date	Study Date	Modalities	Acc. Num.	Study Description	Assigned to
	NO_SURNAME NO_NAME	IPM-800	01/01/1900	06/09/2023 11:36	MR	999015045-1	ENCEFALO	test
	CALCARE UNO	20230830	25/11/1996	30/08/2023 10:46	SM	I20-230830	Hierarchy test	
	STAIN CODE	IPV-2822	25/11/1996	30/08/2023 10:34	SM	IPV-2822	Stain code test	
	ANNIO ENNIO	IPV-773	25/11/1996	07/08/2023 10:31	SM	IPM-773	Dep test	
	ANNIO ENNIO	IPV-773	25/11/1996	07/08/2023 09:51	SM	IPM-773	Dep test	

NO_SURNAME NO_NAME (IPM-800), 01/01/1900 // ENCEFALO, 06/09/2023

 Series description: FILT_PHA: 3D Ax SWAN Modality: MR Number of instances: 136	 Series description: ORIG 3D Sag T2 Cube Modality: MR Number of instances: 232	 Series description: ORIG Ax DWI ALL B-1000 Modality: MR Number of instances: 64	 Series description: ORIG 3D Sag T2 FLAIR Cube 1mm Modality: MR Number of instances: 312	 Series description: ORIG 3D Sag T1 Cube 1mm Modality: MR Number of instances: 312
 Series description: ORIG 3D Ax SWAN Modality: MR Number of instances: 136	 Series description: ORIG FILT_PHA: 3D Ax SWAN Modality: MR Number of instances: 136	 Series description: ORIG 3D Sag T2 DIR Cube POST Modality: MR Number of instances: 112	 Series description: 3-Plane Localizer Modality: MR Number of instances: 21	 Series description: Cal Head+ Neck 40 Modality: MR Number of instances: 128
 Series description: 3D Sag T2 Cube Modality: MR Number of instances: 232	 Series description: Cal Head+Neck 48 Modality: MR Number of instances: 128	 Series description: Ax T2 PROPELLER Modality: MR Number of instances: 40	 Series description: Ax DWI ALL B-1000 Modality: MR Number of instances: 64	 Series description: 3D Sag T2 FLAIR Cube 1mm Modality: MR Number of instances: 312

Image 16: Study Preview



A study report is indicated by the "PDF" icon  in the study preview. By clicking on it, the medical report is displayed. More than one medical report can be saved per study.

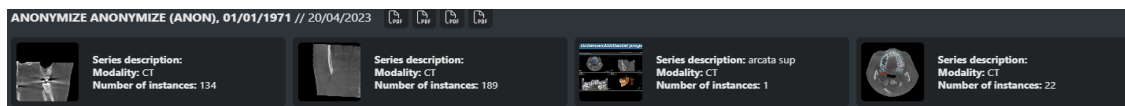


Image 17: Medical reports in the study preview

For more information on medical reports, refer to the chapter **7.7.1 Reporting via the "Create Report" Button**.



4 DIRECT ACCESS

In some integrations, if configured by the system administrator, the viewer can open the selected exam directly (see [5 The Viewer](#)).

In the event that two or more studies have the same Accession Number, ZEEROmed View opens both simultaneously, allowing the user to scroll through the exams using the navigation arrows in the toolbar.

ICON	TOOLTIP	FUNCTIONALITY
	Go to next exam	It allows the user to switch to the next exam with the same accession number
	Go to previous exam	It allows the user to switch to the previous exam with the same accession number

Table 13: Next and previous exam

An alert indicates the displayed exam.

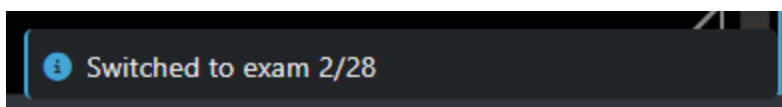


Image 18: Alert which informs the user about the selected exam

5 THE VIEWER

The viewer can be set in horizontal or in vertical preview mode, depending on the needs. This manual explains the features in vertical preview mode, but the same considerations apply for the horizontal preview mode.

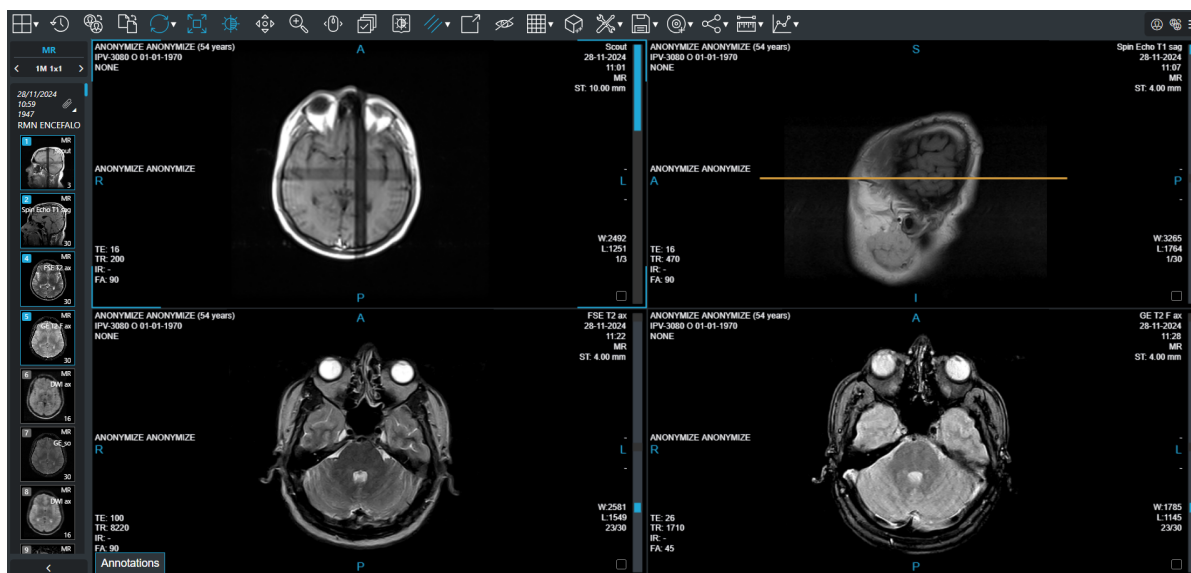


Image 19: Vertical preview mode



Image 20: Horizontal preview mode



5.1 General Description

The viewer displays an exam (images and metadata), allowing operations such as window level, zoom, pan and scrolling among images within a sequence.

A "**sequence**" indicates a group of images; specifically:

- For CTs or MRIs, a sequence matches the concept of a DICOM series;
- For traditional X-Rays, a sequence consists of a single image;
- For other types of exams, a sequence groups images that the viewer has identified (using protocols) as belonging to the same group.

When opening an exam, some sequences will be brought in foreground applying rules ("Hanging Protocols", see paragraph [5.1.2.1 Hanging Protocol navigation component](#)), others will be left in a side bar "Preview of other sequences".

The image viewer is made of three main sections:

- **Information bar:** at the top right (paragraph [5.1.1 Information bar](#));
- **Toolbar:** at the top left (paragraph [7.2 Toolbar](#));
- **Preview series panel:** on the left (paragraph [5.1.2 Preview series panel](#)).

5.1.1 Information bar

The information bar displays the following icons:

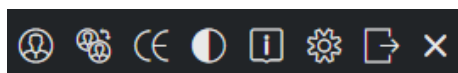


Image 21: Information bar

ICON	NAME	FUNCTIONALITY
	Patient history	Opens the patient's history and allows for changing the current study. For more information, refer to 6 Patient history
	Change secondary exam	Opens the patient's history and allows for changing the secondary study. By activating this mode, user can compare the current study with the selected secondary study. The presence of any previous exams is highlighted by a blue box, which displays the number of available exams inside. For more details, refer to 5.4 Primary and secondary studies



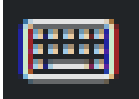
		and 6 Patient history .
	CE/R&D mode	Alert the user whether the system is in diagnostic mode.
	Greyscale mode	Allows users of B/W monitors to have better contrast and better view the user interface.
	Show keyboard shortcuts	Opens the keyboard shortcuts pop-up. See 18 Key Bindings Summary Table
	Information	Displays the pop-up with the label, which includes CE marking information and system version. See 2.2 Device Labelling .
	Open the user guide directly	Allows the user to open the user guide directly
	Close header panel	Closes the information bar

Table 14: Header

5.1.2 Preview series panel

The "Preview series panel" consists of three sections:

- Hanging Protocol navigation component (paragraph **5.1.2.1 Hanging Protocol navigation component**);
- Information related to the exam (paragraph **5.1.2.2 Exam information**);
- Previews of all the exam sequences (paragraph **5.1.2.3 Sequences preview**).

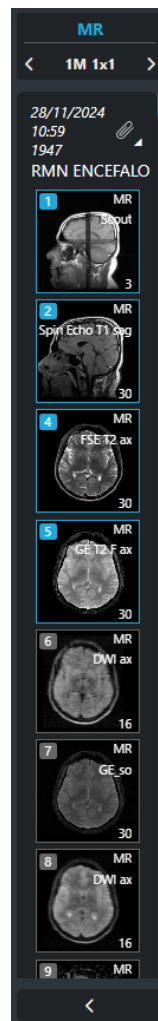


Image 22: Preview of series

5.1.2.1 Hanging Protocol navigation component

The Hanging Protocol (HP) navigation component provides information about the currently displayed HP and allows users to scroll through its various views.

The navigation component includes the following elements:

- HP name (at the top, e.g. 'CR');
- Currently displayed view name (at the bottom, e.g. '1M 2x1');
- Navigation arrows  .

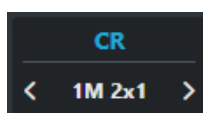




Image 23: HP navigation component

5.1.2.1.1 Changing the Displayed View

To change the currently displayed view, the user can:

- Use the navigation arrows to browse through the available views;
- Use the keyboard arrows $\leftarrow$ $\rightarrow$;
- Click on the view name and select the desired view from the drop-down menu.

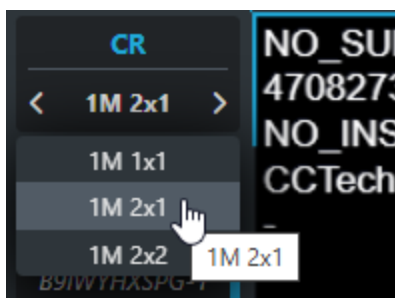


Image 24: View selection from the drop-down menu

5.1.2.1.2 Navigation in Mammography exams

For mammography exams, if a view with **Quadrant Zooming** is available (see paragraph **11.2 Quadrant zoom**), the HP navigation component allows navigation between different quadrants. The view name is updated accordingly to reflect the selected quadrant (e.g. QZ $\rightarrow$ Q1 $\rightarrow$ Q2 $\rightarrow$ Q3 $\rightarrow$ Q4).

5.1.2.2 Exam information

In the "Exam information" section of the sequence preview, the following are reported:

- Timestamp label (see **5.4 Primary and secondary studies**);
- Date and time of the study;
- Accession Number;
- Study description;
- Any attachments associated with the study:

ICON	NAME
	PDF



	GSPS
	KOS
	Attachment NOTE: this icon is present when multiple attachments are associated with the same study and allows opening the pop-up with all attachments:  <i>Image 25: Pop-up with the attachments associated with the study</i>

Table 15: Attachments associated with the study

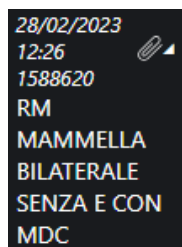


Image 26: Exam information

5.1.2.3 Sequences preview

In the "Sequences preview" all sequences are displayed. For each sequence, the following information is shown:

- Series number (at the top left) *;
- Modality (at the top right);
- Series description (at the center right) **;
- Number of instances of the sequence (at the bottom right);
- Visual indicator (i.e. "AI") for AI-generated series (at the bottom left).

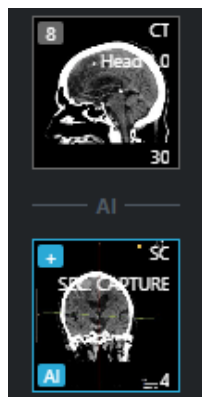


Image 27: Sequence preview

Additionally, the sequences currently being displayed in the system ZEEROmed View are highlighted with a light blue border.

⚠ ***NOTE 1:** in cases where instances from multiple series are grouped together following the application of a Hanging Protocol, a '+' symbol will be shown.

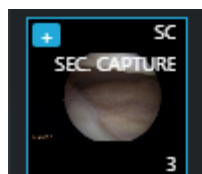


Image 28: '+' symbol for grouping from different series

⚠ ****NOTE 2:** if the study description is too long, it is cut and a tooltip appears by placing the mouse on the preview.

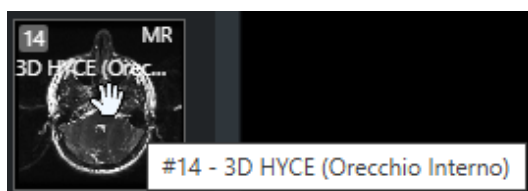


Image 29: Description tooltip

⚠ *****NOTE 3:** for AI-generated series, a dedicated "AI" section is available in the Series Preview. Hovering the cursor over the image displays the tooltip: "Series generated with the support of Artificial Intelligence".

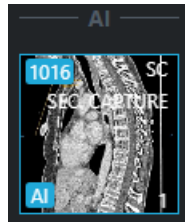


Image 30: AI section of the Series Preview

5.1.2.3.1 Sequence visualization from the series preview

A sequence can be brought to the foreground by dragging it over the one currently in the foreground.

5.2 Select Images

Images can be selected using the checkbox in the bottom right corner.



Image 31: Select images

5.3 Foreground sequences

When opening a study, the sequences are displayed in foreground according to the applied HP.

To view another sequence, drag it from the sequence preview .

To change the display grid, use the 'Layout' button  (see paragraph [7.1.1 Displaying more images of one sequence](#)) or apply another HP view (see paragraph [5.1.2.1 Hanging Protocol navigation component](#)).

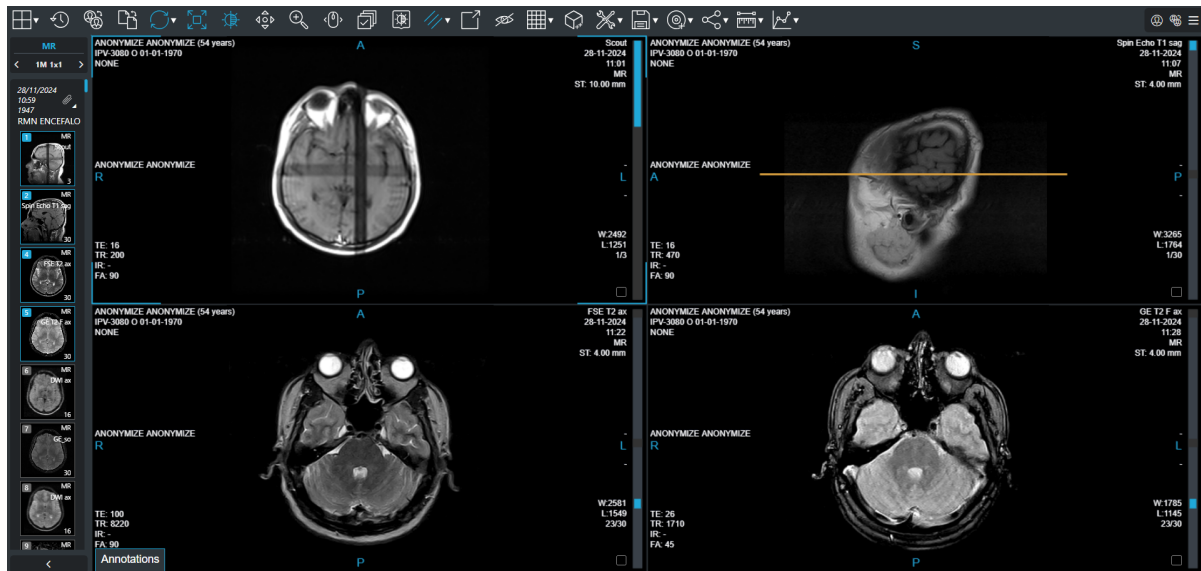


Image 32: Foreground sequences

In a sequence, the user can see the following items:

- The image;
- Patient information;
- Image information;
- The right sidebar, which shows the position of the image currently displayed within a sequence.

The user can choose the position of patient information and image information.

5.4 Primary and secondary studies

Primary or current and secondary studies are available in the "Series preview panel" of the viewer.

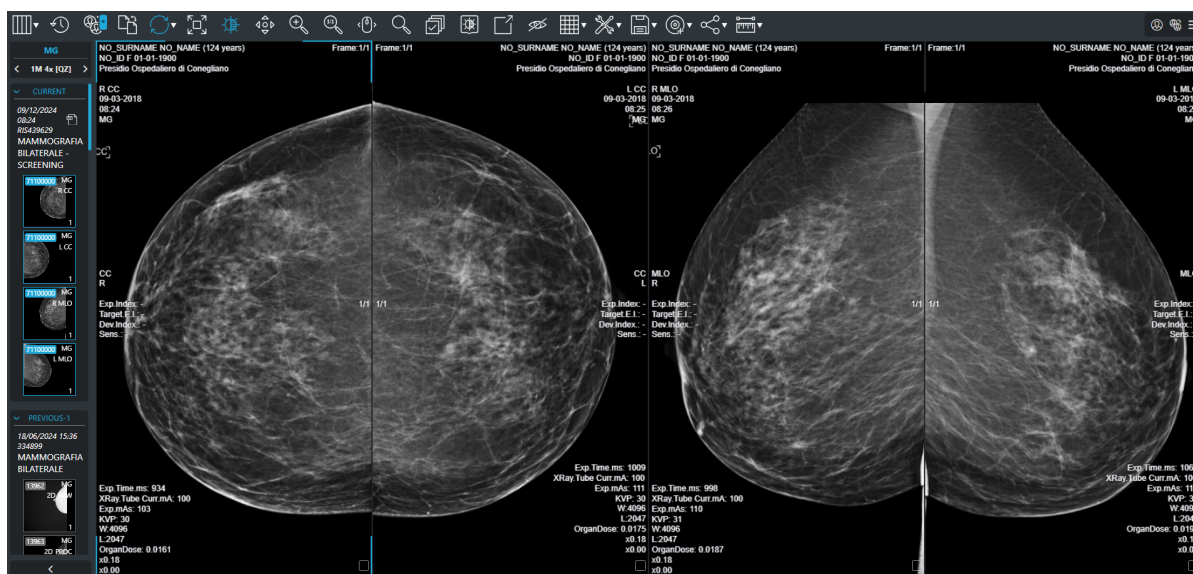


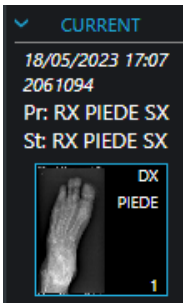
Image 33: Primary and secondary studies in the series preview

A secondary study is any patient study that can be viewed alongside the current study.

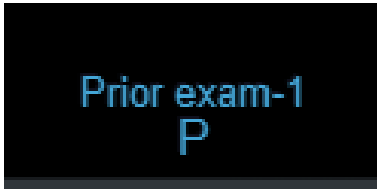
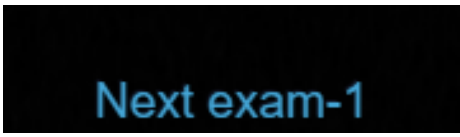
To perform the comparison, the user can:

- Click on the "Change patient history" icon  / , or
- Modify the display protocols.

Primary and secondary studies are identified in the Sequence Preview panel through the following "timestamp labels":

TIMESTAMP LABELS	DEFINITION
Current 	Current or primary study
Previous	Previous secondary study to the primary one



✓ PREVIOUS-1 18/05/2023 17:07 2061094 Pr: RX PIEDE SX St: RX PIEDE SX 	 <i>Image 34: Previous secondary study</i>
Subsequent ✓ SUBSEQUENT-1 12/09/2023 10:21 3332881 RMN RACHIDE LOMBOSACRALE 	Subsequent secondary study to the primary one  <i>Image 35: Subsequent secondary study</i>
Unknown ✓ UNKNOWN-1 10742 	Secondary study without a date
Mismatch	Secondary study from another patient (same Patient ID but different demographic details):

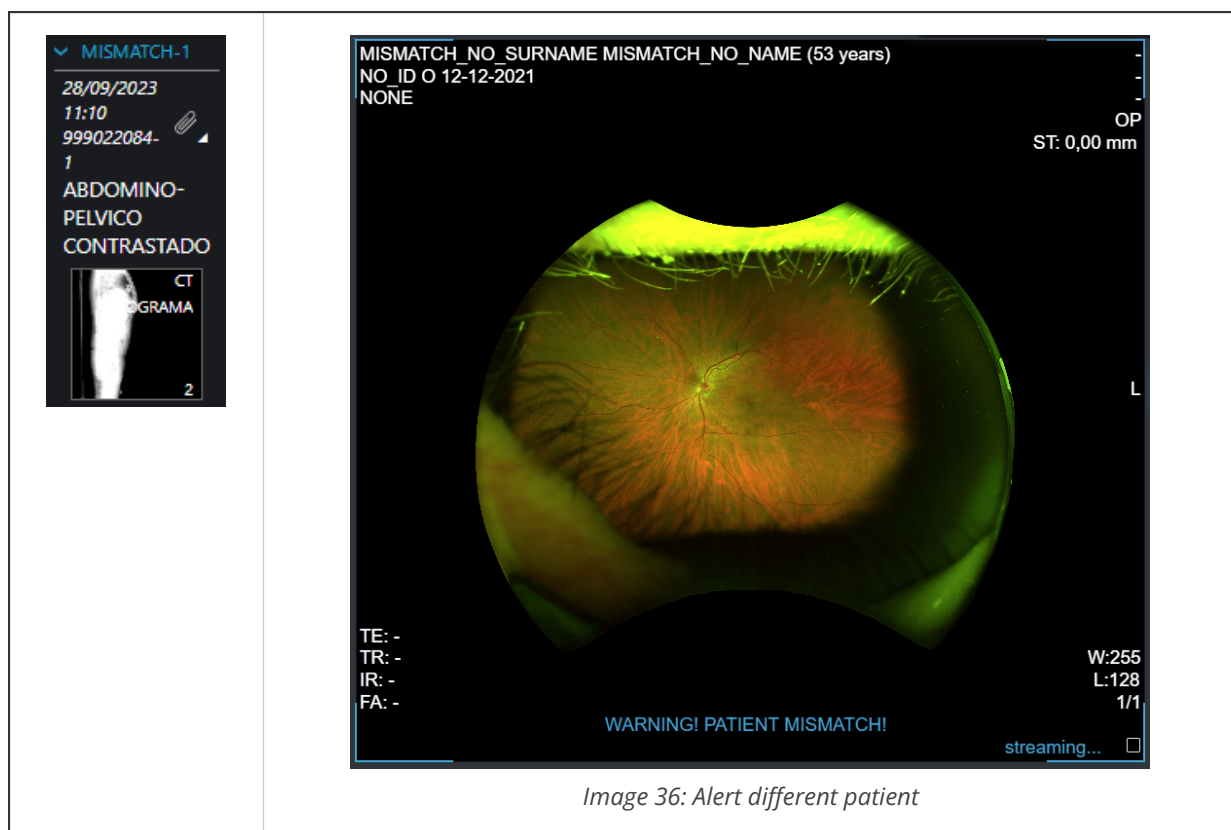


Table 16: Timestamp labels associated with primary and secondary studies

5.4.1 Displaying sequences on a dual monitor

When using a dual-monitor setup, sequences displayed on one monitor are highlighted on the other monitor with a dashed blue box, as shown in the image below.

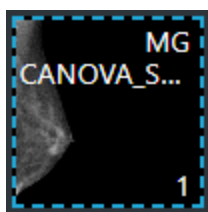


Image 37: Dashed blue box indicating that the sequences are displayed on the other monitor

5.4.2 Comparison with a Previous Study of the Same Patient

Any previous patient exams are highlighted by the "Change secondary exam" icon and the number inside the blue box, which indicates the number of available exams .

Depending on the number of monitors available and the viewing configurations, the previous study obtained with the same modality can be viewed in the following ways:



MONITOR	AUTOMATIC/MANUAL	HOW TO DO
One	Automatic*	Previous and current exams on the same monitor
	Manual	Smart comparison, see 7.2.1 Smart comparison between two exams
		Comparison through patient history, see 6 Patient history
Two	Automatic*	Current exam on main monitor, previous exam on the secondary monitor
		Both previous and current exams on both monitors
	Manual	Comparison through patient history, see 6 Patient history

Table 17: Comparison with a previous study possibilities

*: according to the viewing protocols.

5.5 Operations on selected sequences

The following table summarizes the main operations that can be conducted on the selected sequence:

FEATURE	OPERATION	PRE-CONDITIONS
Window level	"Drag" on the image	Active Operation (*): "Window Level"
Pan	"Drag" on the image	Active Operation (*): "Pan"
	"Drag" on the image with middle mouse button (if configured)	



Zoom		"Drag" on the image	Active Operation (*): "Zoom"
		"Drag" on the image with right mouse button (if configured)	
		"Up arrow" and "Down arrow" on keyboard can be configured to perform zoom	
Scroll of images		"Drag" on the image	Active Operation (*): "Scroll"
		"Drag" on the sidebar	
		"Drag" on the image with right mouse button (if configured)	
		Mouse wheel	
		"Up arrow" and "Down arrow" on keyboard can be configured to perform scroll	
		⚠ WARNING: dragging the image or sidebar too rapidly may cause intermediate images to be skipped. For precise scrolling, it is recommended to use the mouse wheel or, if configured, the "Up Arrow" and "Down Arrow" keys on the keyboard.	
Selection		Click a different sequence than the currently selected	
		Perform an action on a different sequence than the currently selected	
Context menu		Touch the currently selected sequence	
(*) "Active Operation" is selected through the context menu or the toolbar (see below)			

Table 18: Basic operations

5.6 Diagnostic and non-diagnostic quality images

5.6.1 Diagnostic quality images

By default, ZEEROMed View displays images with high diagnostic quality, allowing the user to report on them.



During series reloading, a blue "streaming" label appears in the bottom-right corner of the screen, indicating that the current image quality is low but will shortly be replaced by the diagnostic-quality series.

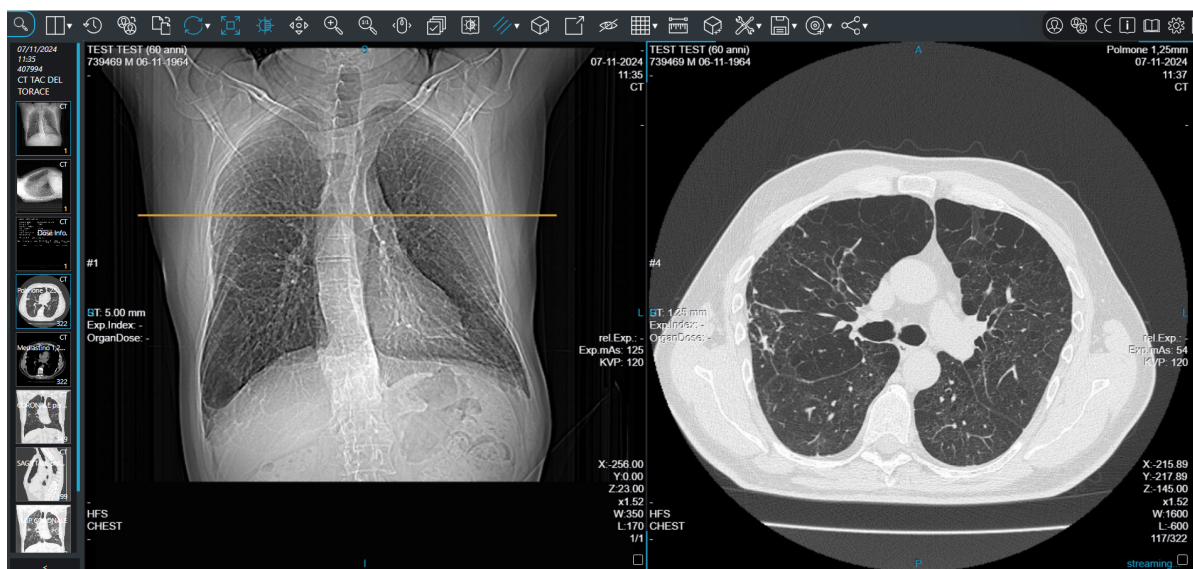


Image 38: Diagnostic quality series and "streaming" label

5.6.2 Non diagnostic quality images

For reducing the bandwidth requirements, ZEEROMed View can be configured to open studies in "low quality" mode.

Non-diagnostic quality images are indicated by the "NOT DIAGNOSTIC" label in the bottom-right corner of the screen.



WARNING: non-diagnostic quality images are NOT intended for diagnostic use.

To view the series in diagnostic-quality mode, the user can click the "HQ" button  located in the top-right corner of the screen. When selected, the button turns blue.

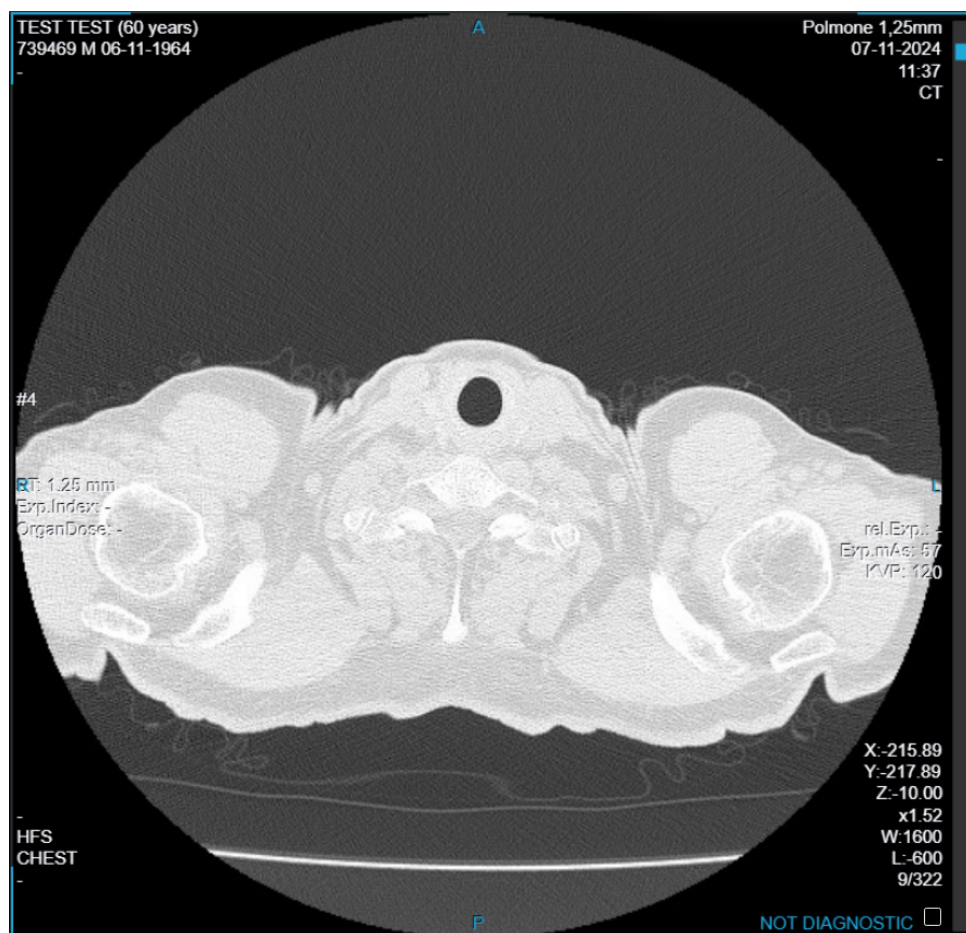


Image 39: "Not diagnostic" label

6 PATIENT HISTORY

ZEEROMed View allows to view and compare all of the patients' studies.

6.1 Patient History icon

By clicking the "Patient History" icon , the user can select and view a study from the "History of patient" pop-up.

The studies can be filtered by node or modality, using the respective drop-down menu.

Displayed studies are highlighted in blue, while other studies appear in gray.

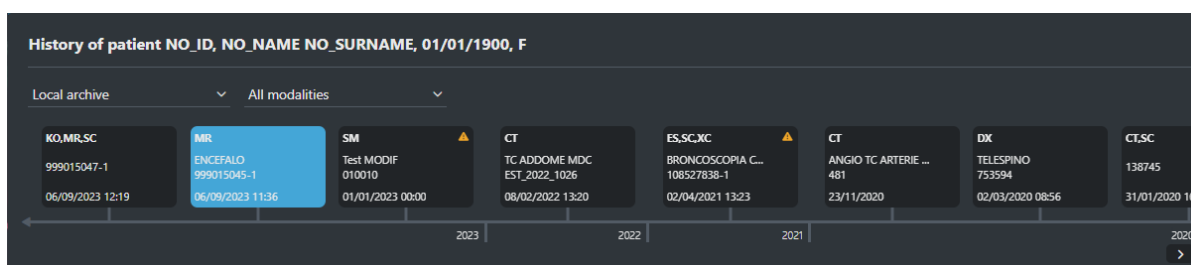


Image 40: "History of patient" for changing the current study

For each study, the pop-up shows information about:

- Modality;
- Study description;
- Date.

A yellow tooltip in the top left warns the user of any demographics mismatch.

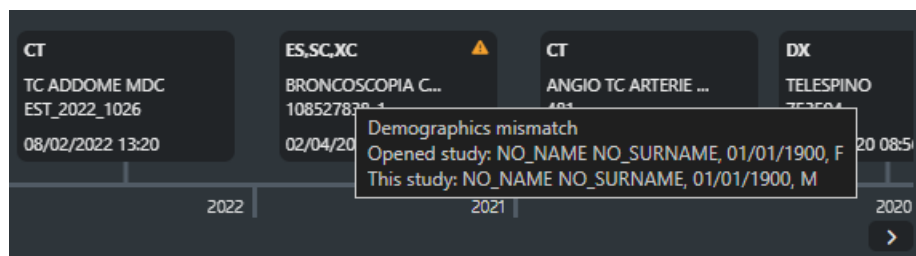


Image 41: "Demographich mismatch" tooltip

6.2 Change secondary study

By clicking the "Change secondary study" icon , the user can open the "History of patient" pop-up and select a secondary study to compare with the current one.



If previous exams are available, this icon will feature a blue box showing the number of prior exams available .

This allows both studies to be viewed simultaneously:

- The primary or current study, which is labeled with the timestamp "Current";
- The secondary study (or studies, depending on the display configuration), which is labeled with one of the following timestamp: "previous", "subsequent", "unknown", "mismatch" (see chapter **5.4 Primary and secondary studies**).

The studies can be filtered by node or modality, using the respective drop-down menu.

Displayed studies are highlighted in blue, while other studies appear in gray.

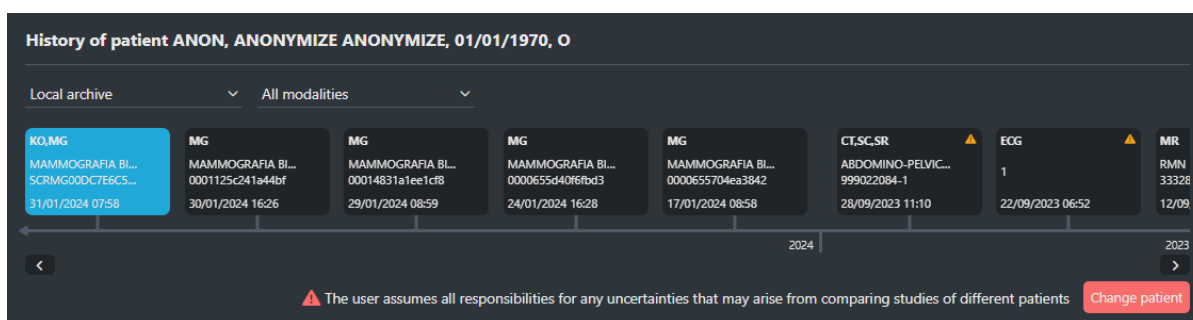


Image 42: "History of patient" pop-up for comparing current and secondary studies

For each study, the pop-up shows information about:

- Modality;
- Study description;
- Date.

A yellow tooltip in the top left warns the user of any demographics mismatch.

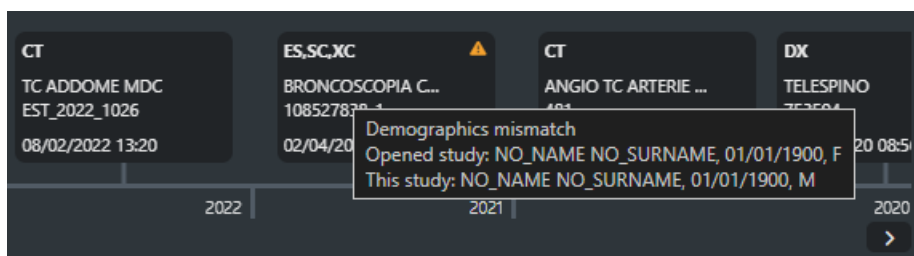


Image 43: "Demographic mismatch" tooltip

Additionally, ZEEROMed View allows the comparison of the current study with one from another patient. To proceed, the user must click on the "Change patient" button, assuming full responsibility for the arising potential risks.

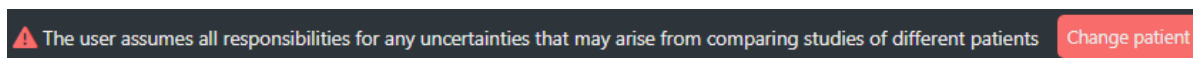




Image 44: "Change patient" button fro comparing studies from different patients

6.2.1 Opening incompatible studies

If the "History of patient" pop-up, accessed through the "Change secondary study" icon, includes ECG or Anatomopathology (AP o SM) exams, they will be displayed in a new window, if using a single monitor, or in a new tab if using two monitors.

7 GENERAL TOOLS

7.1 Context menu

The context menu is accessible by right-clicking the displayed image. The following image and table describe its main features:

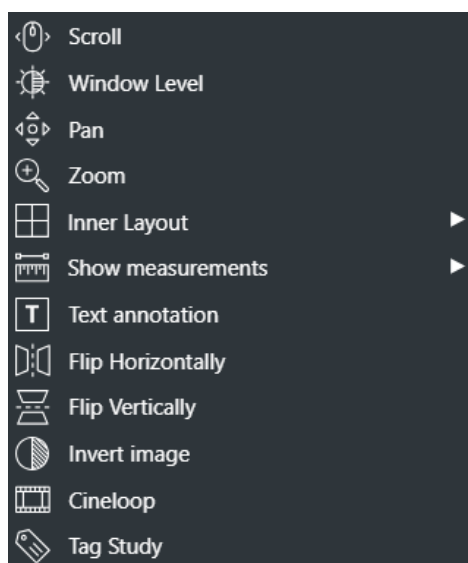


Image 45: Context menu

ICON	FEATURE
Scroll	Allows scrolling the images, as shown in 5.3 Foreground sequences Mutually exclusive to “Window Level”, “Pan”, “Zoom”. Sets “Scroll” as active operation.
Window level	Allows window level, as shown in 5.3 Foreground sequences Mutually exclusive to “Scroll”, “Pan”, “Zoom”. Sets “Window Level” as active operation.
Pan	Allows “pan” of the images, as shown in 5.3 Foreground sequences Mutually exclusive to “Window Level”, “Scroll”, “Zoom”. Sets “Pan” as active operation.
Zoom	Allows “zoom” of the images, as shown in 5.3 Foreground sequences



	Mutually exclusive to "Window Level", "Pan", "Scroll". Sets "Zoom" as active operation. It could be activated also pressing "Z".
Inner Layout	Displays the "Sequence Layout" menu. It allows changing the number of images displayed at the same time in the selected sequence. See 7.1.1 Displaying more images of one sequence
Show measurements	Opens the measurements menu, which includes: • Measurement Panel; • Calibration tool; • Measurement tools such as: ◦ Hounsfield point values; ◦ Linear measurement; ◦ Circular measurement; ◦ Polygon measurement; ◦ Freehand measurement; ◦ Angle measurement; ◦ Angle between lines. Further information at 7.3 Measures
Text annotations	To write annotations on images, in relation to a point of interest. See 7.1.2 Text annotation
Flip Horizontally	To flip right/left the selected series
Flip Vertically	To flip up/down the selected series
Invert image	To invert black and white in the selected image
Cineloop	To view multiframe images or sequence with an appropriate number of instances as a cineloop. It can also be activated by pressing "P". See 7.1.3 Cineloop
Tag study	To associate a specific tag with a study, making it easier study searches

Table 19: Context menu

7.1.1 Displaying more images of one sequence

Through the "Sequence Layout" context menu, the number of images displayed at the same time for one sequence can be changed:

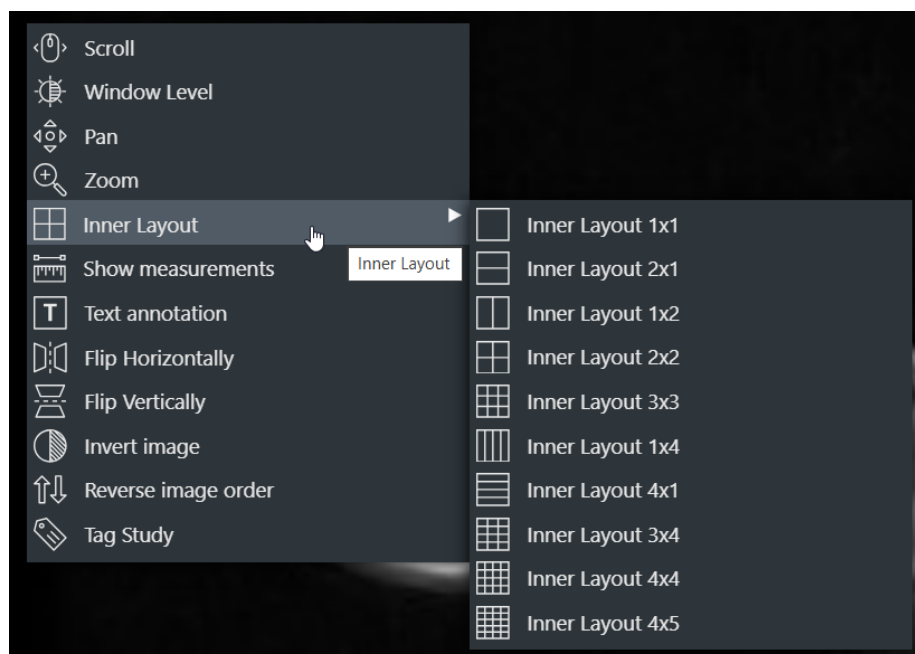


Image 46: Sequence Layout

ICON	FEATURE
1x1	It allows the visualization in 1x1
2x1	It allows the visualization in 2x1
1x2	It allows the visualization in 1x2
2x2	It allows the visualization in 2x2
2x3	It allows the visualization in 2x3
3x2	It allows the visualization in 3x2
3x3	It allows the visualization in 3x3
1x4	It allows the visualization in 1x4
4x1	It allows the visualization in 4x1



4x3	It allows the visualization in 4x3
4x4	It allows the visualization in 4x4
5x4	It allows the visualization in 5x4

Table 20: Inner layout tooltip

The image below shows an exam where two sequences are in foreground, one in 1x1 mode, the other 2x2:

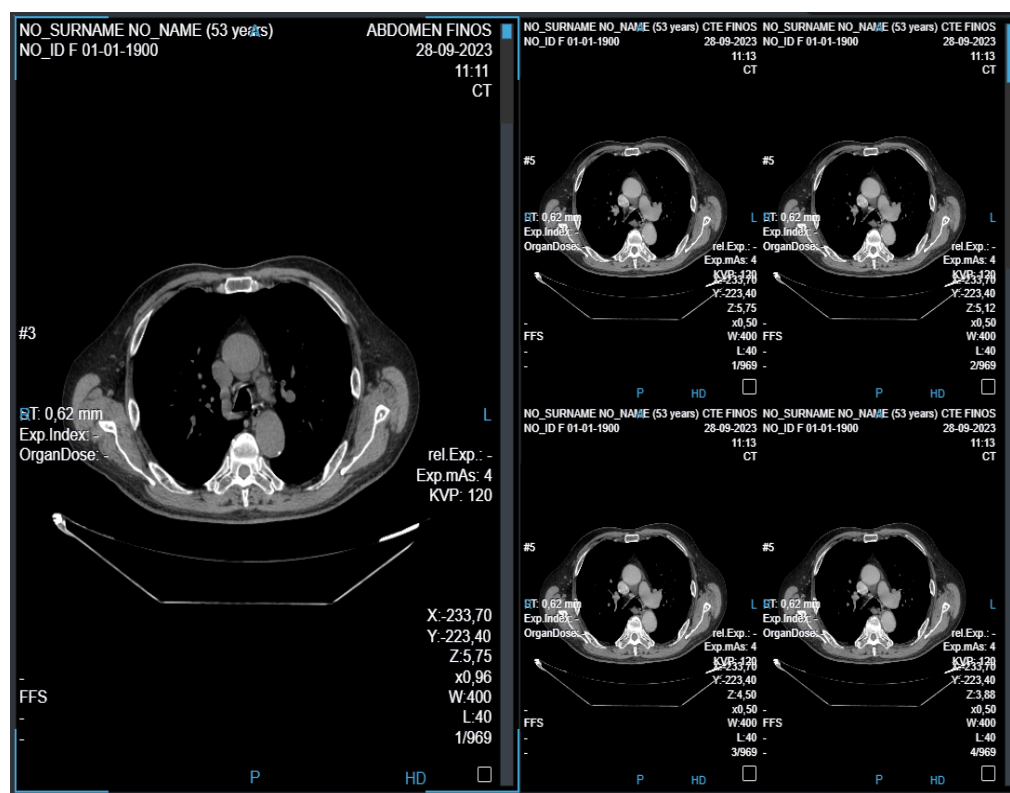


Image 47: Sequence Layout

7.1.2 Text annotation

The “Text Annotation” **T** option in the context menu allows users to insert an annotation on an image at a specif point of interest.

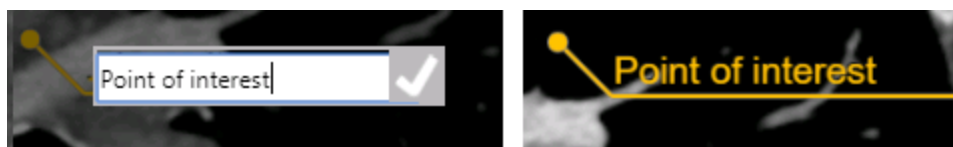




Image 48: Annotation in progress

7.1.2.1 Deleting a text annotation

To remove a text annotation, select it with the left mouse button and press the "Canc" key on the keyboard

7.1.2.2 Moving a text annotation

To move a textual annotation, select it with the left mouse button and drag it to the point of interest.

7.1.3 Cineloop

ZEEROMed View allows viewing multiframe images or instances in a sequence as a cineloop.

7.1.3.1 Instances cineloop

ZEEROMed View allows viewing sequences with an appropriate number of instances as a cineloop.

To start the cineloop, click on the "Cineloop" button from the context menu  or the "P" key from the keyboard and wait for the instances to preload. Once completed, cineloop automatically starts.

To pause the cineloop, click on the icon  or press "P" key from the keyboard.

To disable the cineloop modality, click on the icon  or press the "ESC" key from the keyboard.

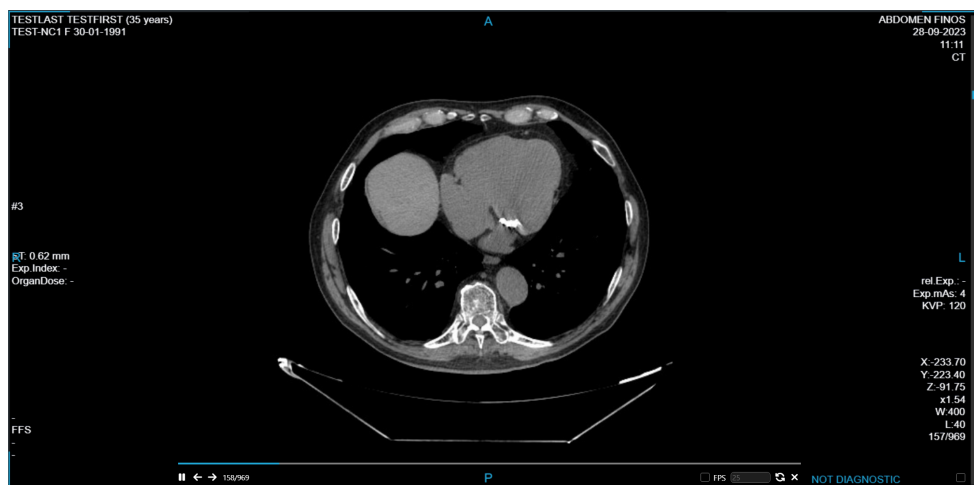


Image 49: Cineloop

The context menu is always available and working during the video.

Toolbar to control the cineloop is displayed at the bottom of the screen. Functionalities are described in the table below.



Image 50: Cineloop toolbar

ICON	FUNCTIONALITY
	Play and pause the cineloop; this functionality is also available by pressing “P” key on the keyboard.
	Move the cineloop to the previous or next instance. Note: if the cineloop is playing, clicking on the arrows pauses the cineloop to visualize the chosen instance.
/	Manually course instances: • Drag the mouse pointer on the timeline • Drag the mouse pointer on the scroll bar
	Adjust the cineloop frame rate. First, select the "FPS" checkbox and then modify the value in the text box:
	Replay the cineloop from the beginning; mutually exclusive with "replay the cineloop in both directions"
	Replay the cineloop in both directions (from the first to the last and, then, from the last to the first instance); mutually exclusive with "replay the cineloop from the beginning"
	Disable the cineloop; this functionality is also available by pressing “ESC” key on the keyboard

Table 21: Cineloop icons and functionalities

7.1.3.2 Multiframe cineloop

ZEEROmed View allows viewing multiframe instances as a cineloop.

Cineloop is automatically available for a multiframe instance.



To start the cineloop, click on the "Play" button  or insert the "P" key from the keyboard and wait for the instances to preload. Once completed, cineloop automatically starts.

To pause the cineloop, click on the icon  or press "P" from the keyboard.

To disable the cineloop modality, press the "ESC" key from the keyboard.

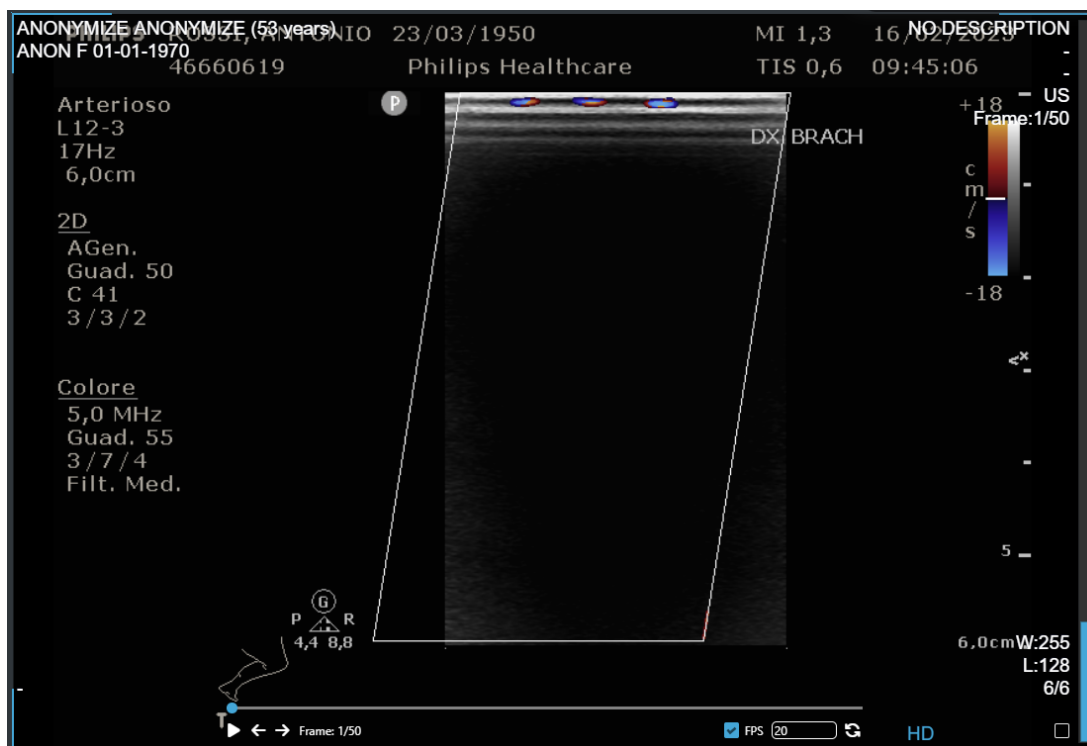


Image 51: Cineloop

The context menu is always available and working during the cineloop.

Toolbar to control the cineloop is displayed at the bottom of the screen. Functionalities are described in the table below.



Image 52: Cineloop toolbar

ICON	FUNCTIONALITY
	Play and pause the cineloop. This functionality is also available by pressing "P" key on the keyboard.



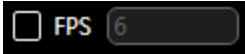
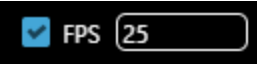
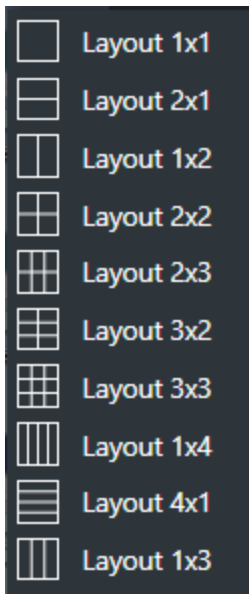
	Move the cineloop to the previous or next frame. Note: if the cineloop is playing, clicking on the arrows pauses it to visualize the chosen frame.
/	Manually course frame by dragging the mouse pointer on the timeline 
	Adjust the cineloop frame rate. First, select the "FPS" checkbox and then modify the value in the text box: 
	Replay the cineloop from the beginning
	Replay the cineloop in both directions (from the first to the last and, then, from the last to the first frame)

Table 22: Cineloop icons and functionalities



7.2 Toolbar

The toolbar exposes the basic operations of the viewer:

ICON	TOOLTIP	FEATURE
	Layout	Changes the number of sequences displayed in foreground. Clicking the button reveals additional layout options to choose from::  For more information see 7.1.1 Displaying more images of one sequence
	Reset	Resets the exam to its initial visualization state.
	Start smart comparison (not available with two monitors)	Allows the user to open the last previous exam of the same modality, in order to make a comparison. See 7.2.1 Smart comparison between two exams
	Start comparison (mutually exclusive with the previous, not	Allows the user to open patient history, in order to make a comparison



	available with two monitors)	
	Link Panels	Opens the panel synchronization menu, as shown in 7.2.2 Panel Synchronization
	Fit to window	Adapts the scale of visualization of the active sequence so that the image fits the containing panel. It could be activated also pressing "F".
	Window level	Allows window level, as shown in 5.3 Foreground sequences Mutually exclusive to "Pan" and "Zoom". Sets "Window Level" as active operation.
	Pan	Allows "pan" the images, as shown in 5.3 Foreground sequences Mutually exclusive to "Windows Level" and "Zoom". Sets "Pan" as active operation.
	Zoom	Allows "zoom" the images, as shown in 5.5 Operations on selected sequences Mutually exclusive to "Windows Level" and "Pan". Sets "Zoom" as active operation. It could be activated also pressing "Z".
	Zoom x1	Allows "zoom" the images at scale 1 with a single click.
	Scroll	Allows scrolling the images, as shown in 5.5 Operations on selected sequences Mutually exclusive to "Window Level", "Pan", "Zoom". Sets "Scroll" as active operation It could be activated also pressing the right mouse button.
	Next image	Shows the next image(s) of the active sequence. The number of images is the same as the number displayed in the sequence.
	Previous image	Shows the previous image(s) of the active sequence.



	Select/deselect all images	Selects/deselects all images in the study. See 7.2.3 Select/deselect all
	Window level pre-sets	Allows to choose from a list of default Window Level values through a pop up.
	Secondary Capture	Saves a secondary capture, which is the current visualization of the active image/frame.
	Send current image to RIS	Sends the current image to ZEEROmed RIS
	Hide/show label	Allows the user to hide labels in order to see the images better.
	Open external web page	Opens an external web page, which can be set by the system administrator.



	Tools section	It opens the specific tools section. It contains the following tools.
---	---------------	---



			<i>Rotate clockwise:</i> Allows the clockwise rotation of the image. Each click allows to rotate CR and DX by 45°, as illustrations, MR by 90°
			<i>Rotate anti-clockwise:</i> Allows the anti-clockwise rotation of the image. Each click allows to rotate CR and DX by 45°, as illustrations, MR by 90°
			<i>Create KOS:</i> Allows the user to create a KOS with the selected images. See 7.2.4.1 Key Image Note (KIN) or Key Object Selection (KOS)
			<i>Create Report:</i> Allows to write a report, which is attached to the exam. See 7.7.1 Reporting via the "Create Report" Button
			<i>View DICOM Tags:</i> Allows to visualize all DICOM tag of a selected instance.
			<i>Add tag to study:</i> Allows the user to add a f to the study. Each tag can be search in the search interface.
			<i>Add reference image:</i> Allows the user to add a reference image
			<i>Show graphic annotations:</i> Enables/ disables the visualization of graphic



			annotation (see 7.5.2 Displaying the graphic annotation present in the SR). This function can also be toggled by pressing the "G" key on the keyboard. If that there are no graphic annotation in the study, the button will be disabled automatically.
	Export section		It opens the saving tools section. It contains the following tools.
			<i>Export:</i> Saves the selected sequence in JPG format
			<i>Export (ZIP archive):</i> Exports a zip archive of key images or videos (see 7.2.5.1 Local export (ZIP archive)) Note: In the digital pathology module, this tool allows you to download the currently displayed slide.
			<i>Print selected images:</i> Prints selected images (PDF or DICOM). (See 7.2.5.2 Print images)
			<i>Perform DICOM Move of the exam:</i> Moves an exam to a known node. (See 7.2.5.3 DICOM move)



	Sharing tools	It opens the sharing tools section. It contains the following tools.	
			<i>Highlight marker:</i> Draws on the images with a transparent yellow thicker brush
			<i>Remove highlight:</i> Removes all markers.
			<i>Share the current exam with someone else:</i> Shares the current session with another user. See 7.2.6 Share Exam
	CD Tools	It opens the CD tools section. It contains the following tools.	
			<i>Start CD upload:</i> Imports CD from ZEEROmed Upload (if configured)
			<i>Download patient CD ISO file:</i> Downloads a Patient CD ISO
			<i>Burn this study to a disc:</i> Burns the exam to a CD
	Show measurements	When selected, it opens the section related to measurements. See 7.3 Measures	
			<i>Measurements panel:</i> Opens the measurement panel
			<i>Hounsfield point value:</i> Returns the Hounsfield value of the selected point. Alternatively, it can be activate by pressing the



			"H" key
			<i>Linear measurement:</i> Allows a linear measurement. Alternatively, it can be activate by pressing the "R" key
			<i>Circular measurement:</i> Returns the area, mean Hounsfield value and standard deviation of a circular region. Alternatively, it can be activate by pressing the "O" key
			<i>Polygon measurement:</i> Returns the area, mean Hounsfield value and standard deviation of a polygon region
			<i>Freehand measurement:</i> Returns the area, mean Hounsfield value and standard deviation of a region drawn by the user
			<i>Angle measurement:</i> Returns the angle in degrees between two lines originating from the same vertex
			<i>Angle between lines:</i> Return the angle in degrees between two lines
			<i>Calibrate:</i> Allows custom calibration
			<i>Remove measurements:</i> Removes existing measurements from the image

Table 23: Toolbar



7.2.1 Smart comparison between two exams

Users can select another study of the same patient or one from a different patient, to perform a comparison.

ICON	MEANING	FEATURE
	A previous exam matches the Hanging Protocol	Comparison starts with the most recent exam that matches the Hanging Protocol. Selection of other exams in the session is possible via the history button. Refer to 6 Patient history .
	A previous exam does not match the Hanging Protocol	Comparison is possible but with different exams. Pressing this button will display the history bar. Refer to 6 Patient history .
	No previous exams	If pressed, the comparison with same exam begins. Pressing this button will display the history button. See 6 Patient history .

Table 24: Exam comparison

7.2.2 Panel Synchronization

By clicking on the "Link Panels" icon , the user can activate the synchronization of the displayed sequences or studies. Clicking the button opens the following menu:

ICON	NAME	FUNCTIONALITY
	Unlink Panels	Removes synchronization between panels
	Link Panels except Window Level	Synchronizes zoom, pan and scroll performed between the displayed sequence. Window Level will not be synchronized.
	Link Panels	Synchronizes zoom, pan, window level and scroll operations between the displayed sequences. NOTE: if applied while comparing different studies, it does not allow scroll synchronization. To activate it, use the "Link panels with different studies".



	Link panels with different studies	Synchronizes zoom, pan, window level and scroll operations on sequences sharing the same reference axis and belonging to <u>different studies</u>. NOTE 1: this button is only available when comparing exams or in multi-monitor modality. NOTE 2: unlike the "Link Panels" button, it allows to synchronize the scrolling of sequences belonging to different studies. For more information, please refer to section 7.2.2.1 Panel synchronization: comparing different studies
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Table 25: Panel synchronization

7.2.2.1 Panel synchronization: comparing different studies

The "Link panels with different studies" icon  enables the scroll synchronization (along with all other operations) for different coplanar studies (i.e. acquired along the same reference axis).

This feature is available when comparing two exams (section **7.2.1 Smart comparison between two exams**) or in multi-monitor mode.

To activate it:

1. Select the instances of the two different studies to compare;
2. Click the "Link panels with different studies" icon .

If the synchronization is applicable, any positioning offset between the instances selected in step 1 will be maintained while scrolling through the sequences.

 **NOTE:** in a multi-monitor configuration, the studies to be compared and synchronized must be placed on the two different monitors

7.2.3 Select/deselect all

The "Select/deselect" button allows users to select all selectable objects within the study (video and images) currently in the viewer. Objects outside the viewer (i.e. PDFs, other reports, KO) will not be selected.

ICON	FEATURE
	Selects all images. Some images can be manually selected.



	Deselects all images, including those that were manually selected
--	---

Table 26: Selection / deselection



Image 53: Selected images alert

7.2.4 Tools section

7.2.4.1 Key Image Note (KIN) or Key Object Selection (KOS)

The "Create Key Object" button on the toolbar  allows users to create a new Key Object Selection / Key Image Not.

The user can choose the category of the KIN/KOS, insert a custom text and decide whether to automatically deselect the selected images once created the KIN.

Image 54: KOS creation

The user can choose one of the following categories from the drop-down menu:

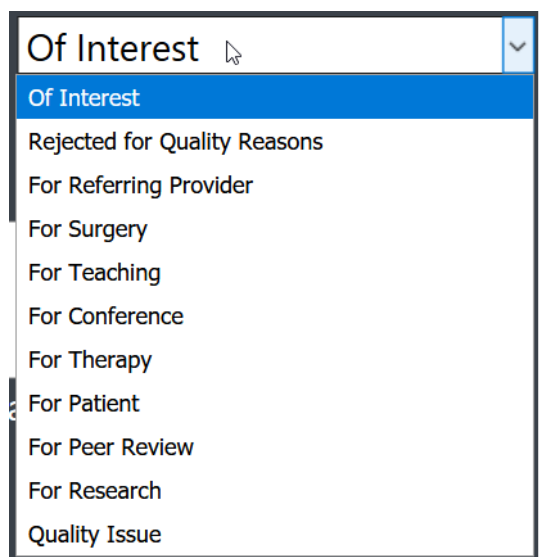


Image 55: Categories for KOS creation

Once the user has created the KIN, ZEEROmed View notifies the correct creation.

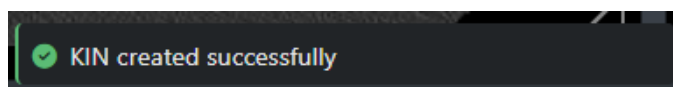


Image 56: KIN created successfully message

7.2.4.1.1 Viewing Key Image Note (KIN) or Key Object Selection (KOS)

If a KIN/KOS has been associated with the images, users can view them in the "Preview of series" section by clicking the "KOS" icon

If multiple attachments are associated with the same study, it is necessary to first select the "Attachment" icon and then the "KOS" icon .

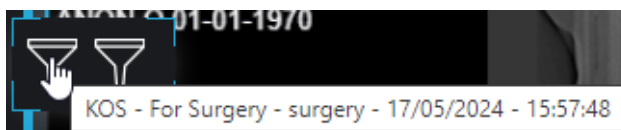


Image 57: Key Image Note icons

7.2.5 Export section

7.2.5.1 Local export (ZIP archive)

Users can download selected images, single frames, or videos by exporting a ZIP archive. During the export phase, the following settings can be defined:



- Output file format : JPEG, video, DICOM (.dcm), anonymized DICOM ;
- Images to export: the entire exam or only the selected images.

Image 58: Local export (ZIP archive)

A blue notification at the bottom right highlights the export progress status.

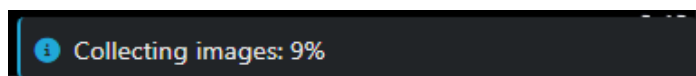


Image 59: Export status notification

7.2.5.2 Print images

Clicking the "Print" icon  allows the user to print the selected images and frames, choosing between PDF format or DICOM format. From the print pop-up it is possible to define:

- the print layout;
- the inclusion of a header;
- the inclusion of labels.

Once all configurations are set, the document will open in a new browser tab.

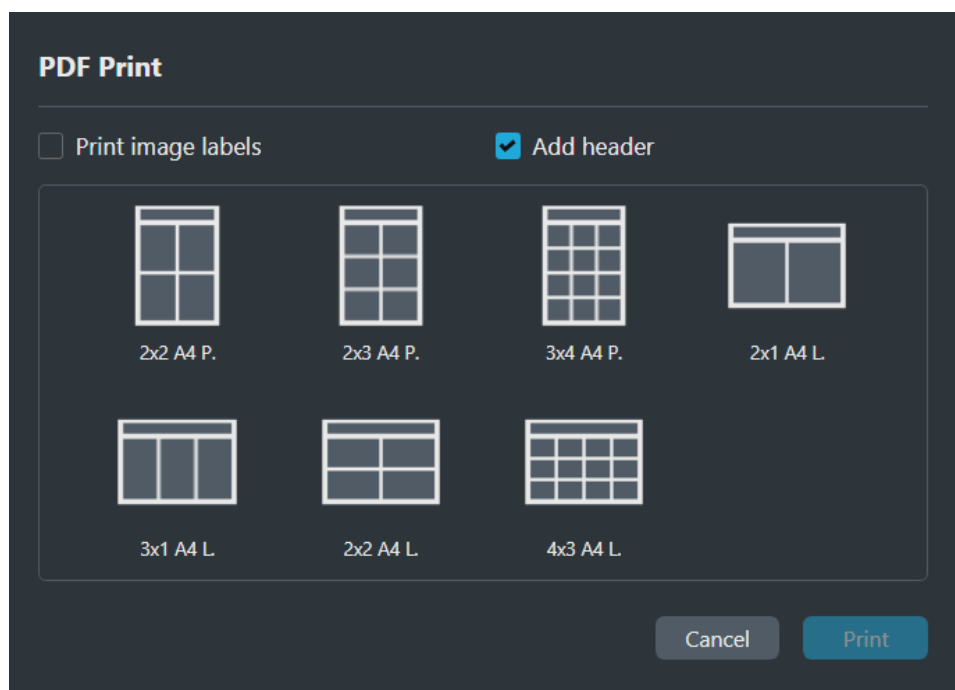


Image 60: PDF print

When choosing DICOM print, the following layouts can be selected.

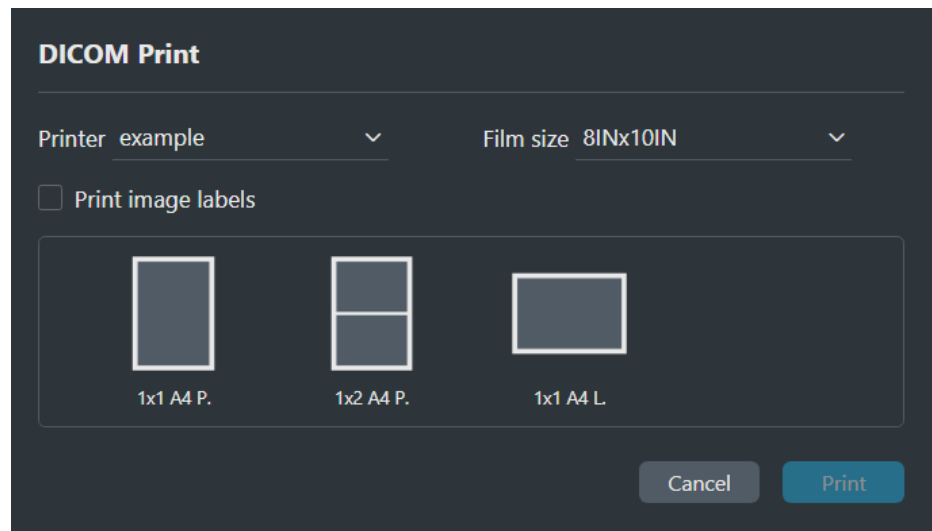


Image 61: DICOM print



WARNING: document printing from the product is not intended for diagnostic purpose

7.2.5.3 DICOM move

The "DICOM move" button  allows users to transfer the study to a defined DICOM node. From the pop-up window, users can:

- select the node by searching the predefined list or using the available filters;
- move the entire study, only a series or selected images.

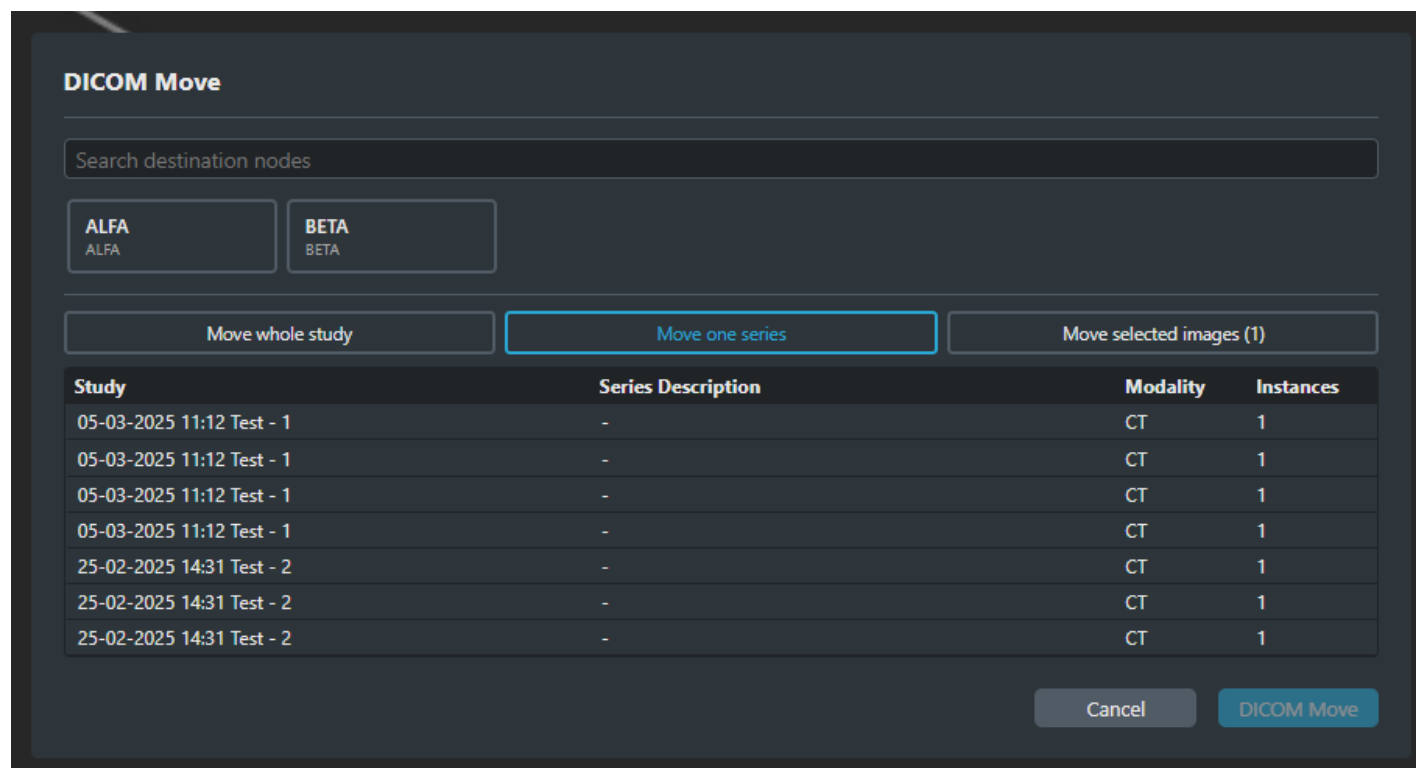


Image 62: Move one series to a DICOM node: choose the series

7.2.6 Share Exam

By selecting the "Share exam" button , the user can start sharing the session ([7.2.6.1 Sharing](#)) or allow selected users to view the exam for a limited period of time ([7.2.6.2 Second Opinion](#)).

7.2.6.1 Sharing

To share a session with specific users, click the icon  and configure the following settings in the pop-up window:

- Sharing options (at the top): define user permissions, such as enabling interactions and granting visibility to patient data, documents and history;
- Sharing modalities (at the bottom):
 - Link: copying the URL to send it directly to other participants;
 - Email: fill in the filters to send an email containing the session link;
 - QR code;
 - Whatsapp: send the QR code via Whatsapp.

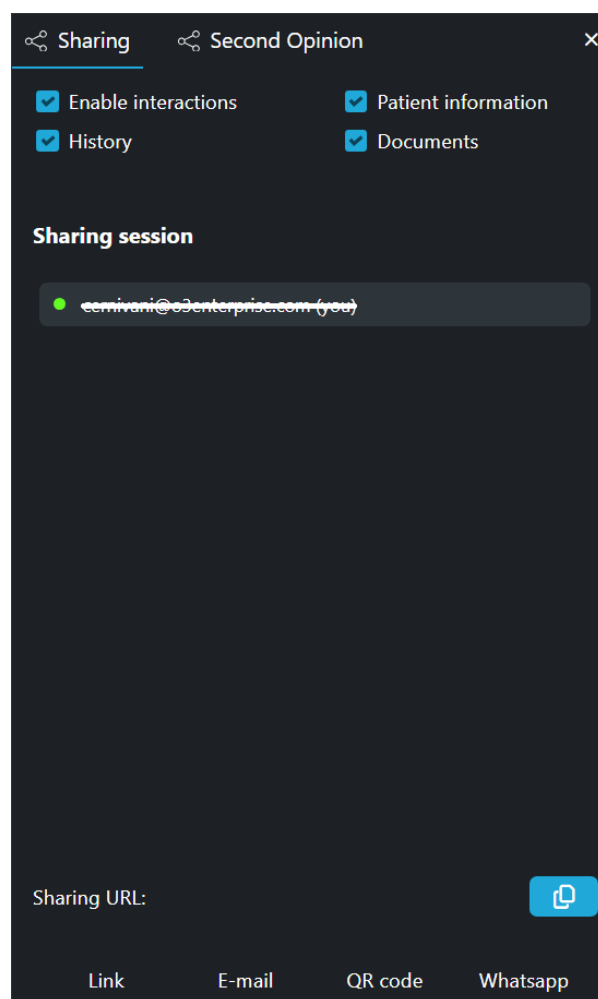


Image 63: Sharing panel

Once the link is shared, the user must admit other participants into the session. To close the session, the user must expell the other participants.

7.2.6.2 Second Opinion

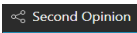
The user can **temporarily** share the exam by selecting the icon  and manually entering the contact's email address. The displayed screen is as follows:



Image 64: Second opinion



WARNING: share the exam only with authorized data processing subjects and secure email addresses

7.3 Measures

Measures in ZEEROMed View conform to the document “DICOM correction Item CP-586 Pixel spacing and calibration in projection radiography”.

If images are created by non-calibrated modalities (CR, DR, XA, MG and DX), the user is notified through an appropriate message, which appears in the status bar of the application:



Detector plane calibration missing



Image 65: Alert "calibration missing"

If measures are imprecise beyond a configurable error threshold (default=0%), the error will be shown near the measured value:

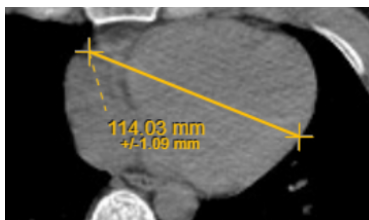


Image 66: Measures

By clicking the "Show measurements" button  from the toolbar or the context menu, the user can:

- Perform a new measurement;
- Edit an existing measurement;
- View saved measurement values and optionally modify their properties (such as color, thickness or label);
- Remove existing measurements.

7.3.1 Performing a measurement

To perform a measurement, click the "Show measurements" button  and select the desired measurement tool from the dropdown menu.

MEASUREMENT TOOL	ICON	PROCEDURE
Hounsfield point value		Click on the point of interest Alternatively, it can be activate by pressing the "H" key
Linear measurement		Hold down the left mouse button from the start to the end of the measurement. Alternatively, it can be activate by pressing the "R" key. NOTE: the <i>crosshair</i> assists the user during the measurement process



Circular urement	meas-		Click on a vertex of the area to be measured and drag the mouse diagonally to cover the region of interest. Alternatively, it can be activate by pressing the "O" key
Polygon urement	meas-		Click on the first vertex of the area to be measured and trace the shape by holding the left mouse button and releasing it at each vertex. The last vertex must coincide with the first to complete the polygon.
Freehand urement	meas-		Trace the shape by holding the left mouse button. The last vertex must coincide with the first to complete the polygon.
Angle urement	meas-		Click on the vertex of the angle to be measured and draw the two lines (see ' Linear Measurement ')
Angle lines	between		Draw the two lines of interest (see ' Linear Measurement ') to calculate the angle NOTE: in this case, the lines are not required to intersect and the starting point of the second line is not constrained.

Table 27: Measurement Tools Settings

To interrupt the measuring operations, press the **Esc** key.

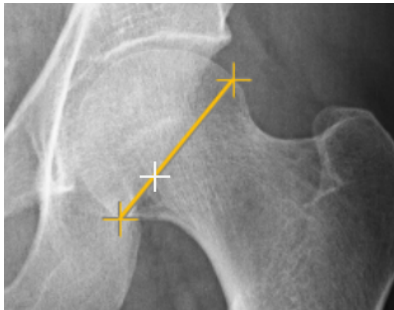
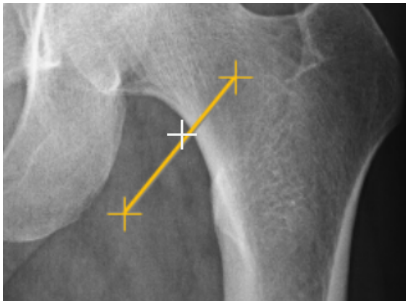
To modify properties such as color and thickness of the measurement *to be inserted*, refer to section **7.3.2.5 Modifying Measurement Style**.

By default, measurements are deleted upon closing the study. To save measurements, refer to section **7.3.3 Saving a Measurement**.

7.3.2 Operations on measurements

OPERATION	PROCEDURE
7.3.2.1 Selection	Click on the measurement or its numerical label. The measurement's vertices (except for the ' <i>Hounsfield Point Value</i> ') will be highlighted, and the numerical label will be temporarily hidden.



	 <i>Image 67: Measurement selection</i>
7.3.2.2 Moving a measurement	Select the measurement and drag it while holding down the left mouse button.  <i>Image 68: Moving a measurement</i> NOTE: a measurement cannot be dragged outside the image area; if this occurs, the measurement is highlighted in red.  <i>Image 69: Moving a measurement outside the image area</i>
7.3.2.3 Moving the label	Select the measurement and drag its numerical label to reposition it



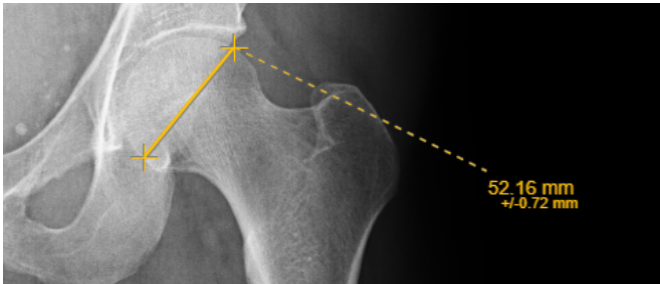
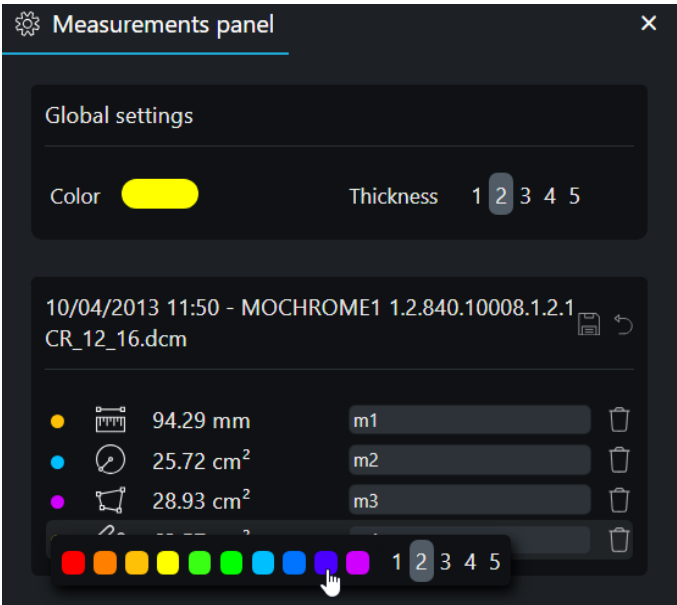
	 Image 70: Moving the label
7.3.2.4 Editing a measurement	Select the measurement and move its vertices to change its shape
7.3.2.5 Modifying Measurement Style	1. Open the "Measurements panel" by clicking the corresponding button ; 2. Click on the colored dot next to the measurement to be modified; 3. Select the desired color and thickness (1-5) from the dropdown menu.  Image 71: Modifying Measurement Style

Table 28: Operations on measurements



7.3.3 Saving a Measurement



WARNING: by default, any measurements added are deleted when the study is closed

To save a measurement:

1. Open the "Measurement Panel" using the dedicated button
2. Assign a name to the measurement in the appropriate field;
3. Click the "Save measurements"

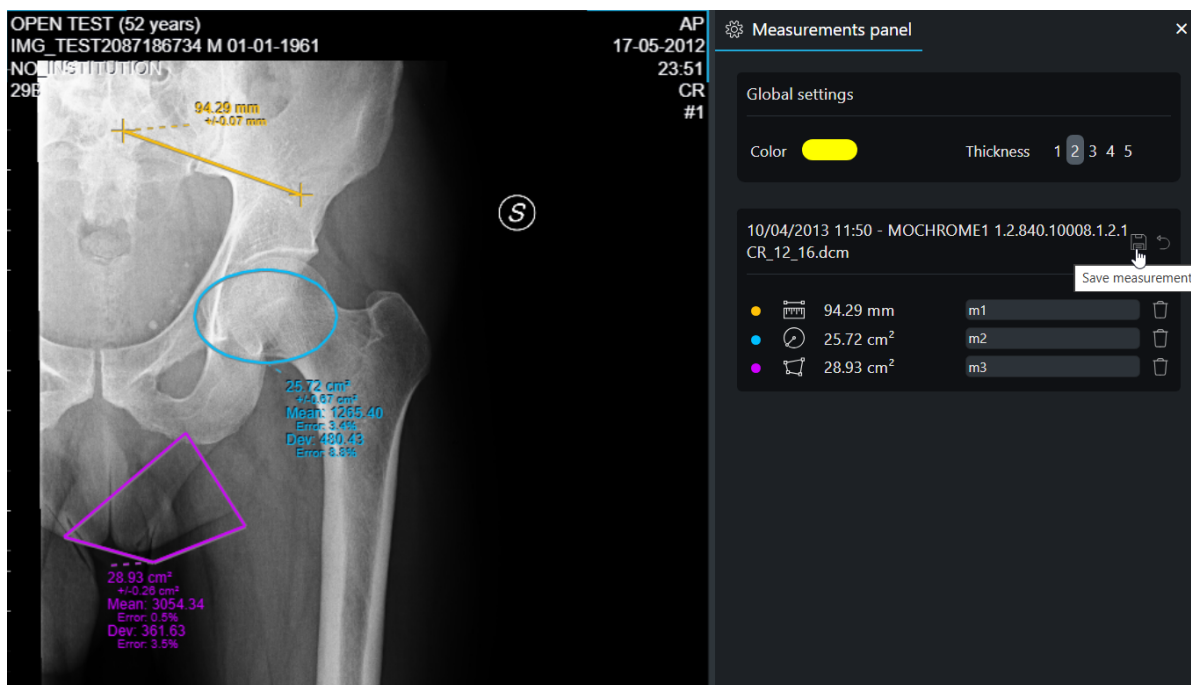


Image 72: Saving a measurement

Clicking the "Rollback measurements to the last save point" icon will delete the current unsaved measurement.

7.3.4 Viewing Measurements

To view saved or inserted measurements, open the "Measurements Panel" using the dedicated button

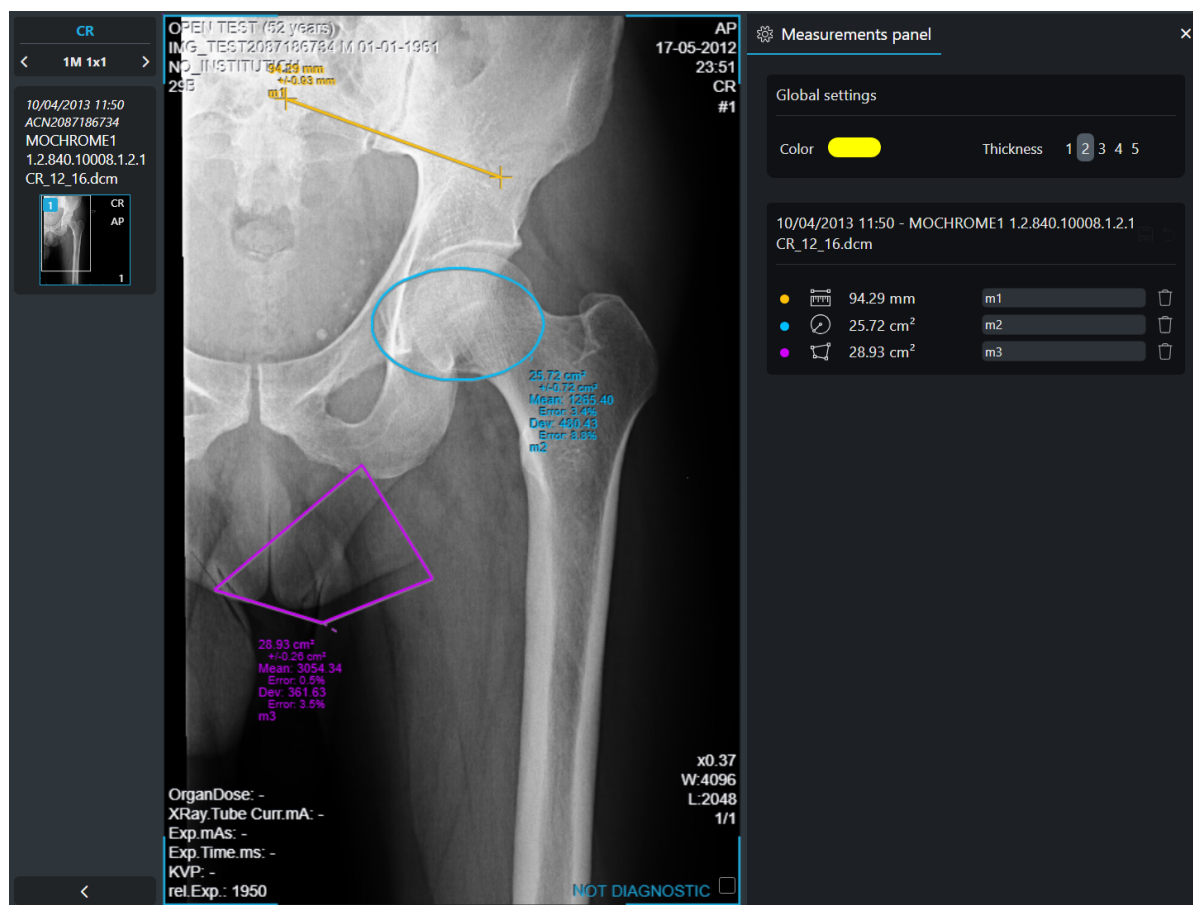


Image 73: Measurements Panel

Clicking on the relevant measurement, ZEEROMed View will bring the user to the image or instance where it was placed.

In this panel, it's also possible to change the measurement's color or thickness, as described in section **7.3.2.5 Modifying Measurement Style**.

7.3.4.1 Viewing a Measurement in a Series Instance

If the measurement was placed in an instance within a series, a marker on the series scrollbar will indicate the relevant instance.

Clicking the marker will return the user to the instance where the measurement was performed.

The marker remains visible until the study is closed or, if the measurement was saved, until it is deleted.



Image 74: Notch in the scrollbar to highlight a measure in an instance

7.3.5 Deleting a measurement

 **NOTE:** unsaved measurements are automatically deleted when the study is closed

A measurement can be deleted via:

- the Measurement Panel (see [7.3.5.1 Deleting a Measurement from the Measurements Panel](#));
- the 'Canc' key on the keyboard;
- the "Remove measurements" button 

 **WARNING:** clicking the "Remove Measurements" button will delete all measurements in the current image or instance

7.3.5.1 Deleting a Measurement from the Measurements Panel

To delete a measurement from the panel:

1. Open the "Measurements Panel" using the dedicated button .
2. Click the 'Delete Measurement' icon  next to the measurement to be removed.

7.4 Advanced Annotation Management

If the Annotation Dashboard is enabled, users taking measures can save them.



When opening a study, the number of annotations is visible on the Annotation Dashboard label, even if minimized.

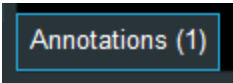


Image 75: Annotation panel minimized

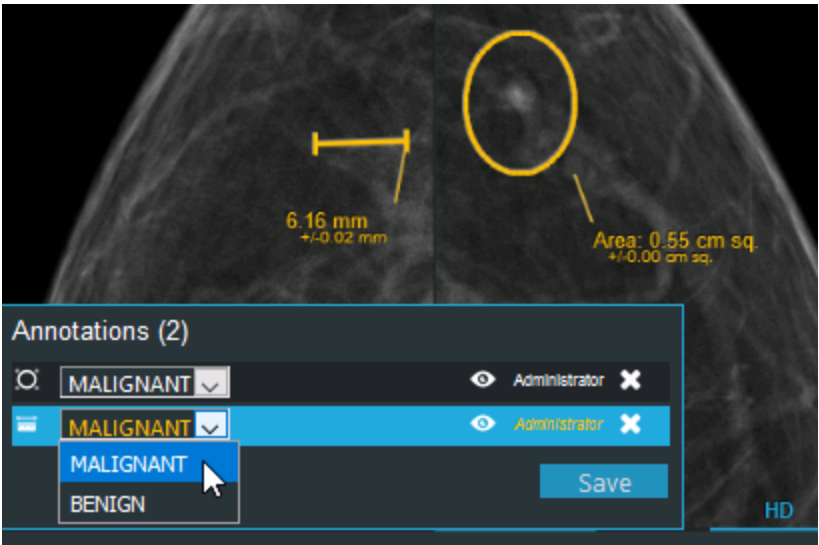


Image 76: Annotations panel

Each annotation panel contains the following parts:

ICON	DESCRIPTION
	The first column represents the type of the annotation (measurement)
	The user can choose if it is Benign or Malignant



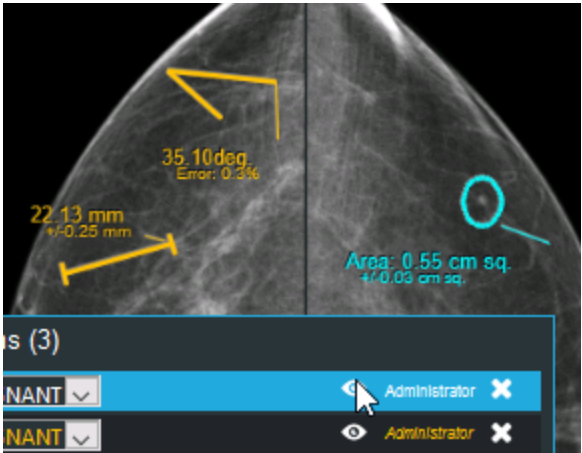
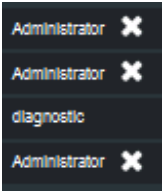
	The eye icon allows the user to show the selected annotation
	Each user can see all annotations, but he/she can edit or delete only him/hers annotations
	It allows the user to save the annotation(s)
	The annotation panel contains the annotation of all the opened studies (even if previous ones). They are placed after the annotation of the main study, and they cannot be saved or deleted

Table 29: Annotation icons

7.5 DICOM Structured Report

ZEEROmed View encompasses support for DICOM Structured Report (SR) files, including any graphical annotations embedded within.

SR files are a specialized format within the DICOM standard, specifically tailored for the comprehensive exchange of clinical data and observations.

Specifically, ZEEROmed View supports the visualization of the following:

1. SR content;
2. Graphical annotations embedded within the SR.



7.5.1 Displaying the content of an SR

To access a DICOM SR within a study, left-click on the SR file instance.

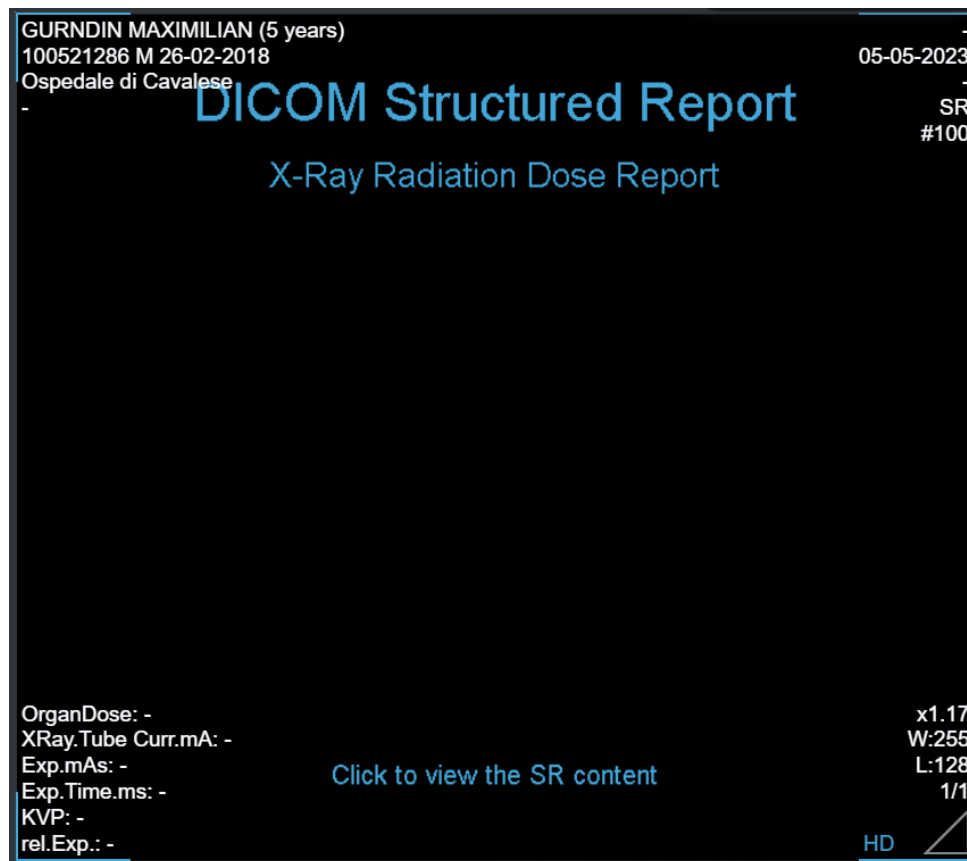


Image 77: Preview of the DICOM SR

Once opened, the file is displayed as follows. All information is conveyed through individual content items, organized as name-value pair.



X-Ray Radiation Dose Report

Language of Content Item and Descendants: Italian
Procedure reported: Mammography
Has Intent: Diagnostic Intent
Observer Type: Person
Person Observer Name: NONE
Person Observer's Organization Name: test
Person Observer's Role in the Organization: Radiologic Technologist
Scope of Accumulation: Study
Study Instance UID: 1.2.826.0.1.3680043.11.2595326.1.16173991

Accumulated X-Ray Dose Data

Acquisition Plane: Single Plane
Accumulated Average Glandular Dose: 9.5875 mGy
Laterality: Right breast
Accumulated Average Glandular Dose: 9.9487 mGy
Laterality: Left breast
Device Role in Procedure: Irradiating Device
Device Name: JPH5487RXL
Device Manufacturer: test
Device Model Name: FDR-4000AWS
Device Serial Number: JPH5487RXL
Device Observer UID: 1.2.392.200036.9125.18.762071244824396.65133104646.10128115

Irradiation Event X-Ray Data

Acquisition Plane: Single Plane
Irradiation Event UID: 1.2.392.200036.9125.16.762071244824396.65133104646.1012895
Irradiation Event Label: 1001
Label Type: Instance Number
DateTime Started: 28/05/2026 09:03:57
Irradiation Event Type: Rotational Acquisition
Acquisition Protocol: TOMO D CC
Image View: cranio-caudal
Patient Table Relationship: anterior first
Patient Orientation: erect
Patient Orientation Modifier: standing
Target Region: Breast
Laterality: Right

Chiudi

Image 78: DICOM SR

To close the SR, simply click on the "Cancel" button.

7.5.2 Displaying the graphic annotation present in the SR

All two-dimensional graphic elements within a SR are represented as "Graphic Annotation" in the ZEEROMed View.

To display the graphic annotation, user can either:

- Click on the "Show graphic annotation" icon .
- Press the "G" key on the keyboard.

The icon and the "G" key automatically enable all graphic annotations present within the study.

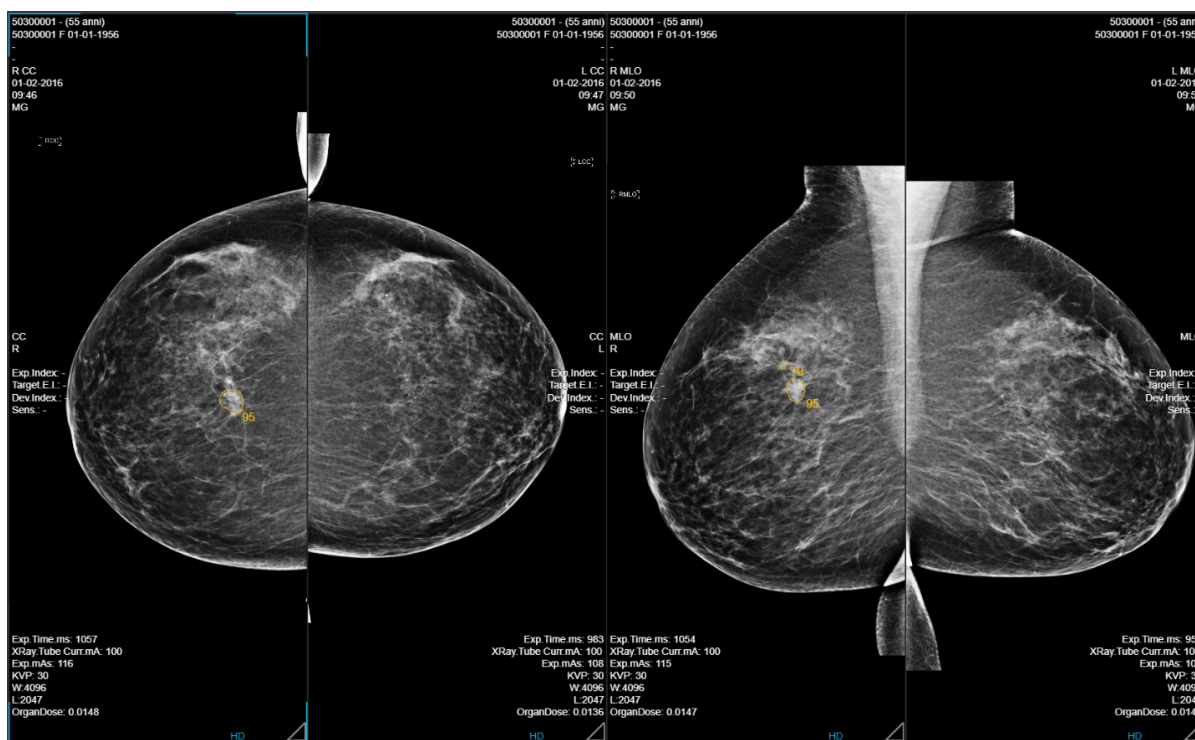


Image 79: Graphic annotation

7.6 GSPS Objects

ZEERomed View supports the visualization of Grayscale Softcopy Presentation State (GSPS).

GSPS is a DICOM object comprising a collection of data that delineates display instructions for radiological imaging in grayscale on a softcopy display.

Specifically, ZEERomed View supports:

- "Shutter module": defines the region of interest (ROI) or masks to apply during imaging visualization, enabling users to hide non-relevant regions or highlight specific structures.
- Graphic annotations.

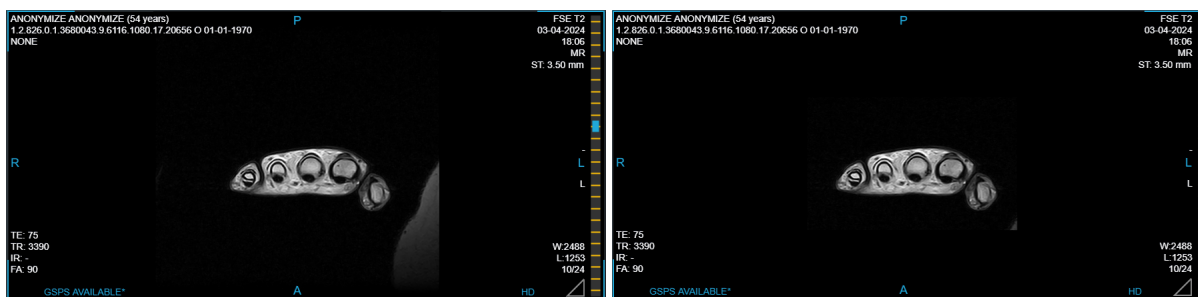


Image 80: Usage of the "Shutter Module"



7.6.1 Indication of "GSPS Availability"

The presence of a GSPS for the currently visualized image is indicated by the light blue label "GSPS AVAILABLE*" in the lower left region of the image.

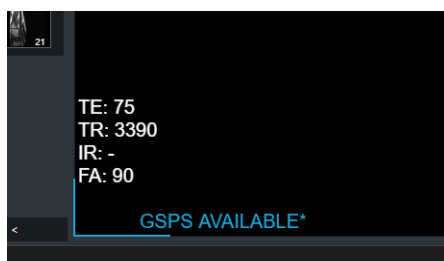


Image 81: Label for GSPS availability notification

A notch on the sequence scroll bar indicates the presence of a GSPS for the specific image. Clicking on the notch navigates the sequence to the instance referenced by the GSPS.

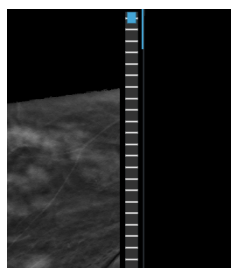


Image 82: Notch in the scroll bar for quickly accessing images with available GSPS

7.6.2 Activation of the GSPS

By default, GSPS are disabled.

To enable or disable GSPS, click the "GSPS" icon  in the "Preview series panel" section.

If multiple attachments are present, left-click the "Attachment" icon  to open the pop-up and select the "GSPS" icon . There will be as many icons as there are GSPS; to enable the GSPS for a specific series, click its corresponding icon.



Image 83: Pop-up with the "GSPS" icon

7.7 Reporting

ZEEROMed View allows reporting of the medical exam through:



- "Create Report" button in the toolbar (paragraph [7.7.1 Reporting via the "Create Report" Button](#));
- Study preview panel in the Studylist (paragraph [7.7.2 Reporting in the Studylist](#)). **WARNING:** ONLY for "reporter" users.

7.7.1 Reporting via the "Create Report" Button

7.7.1.1 Report creation

Using the "Create Report" button , the user can generate the study report through the dedicated text panel:

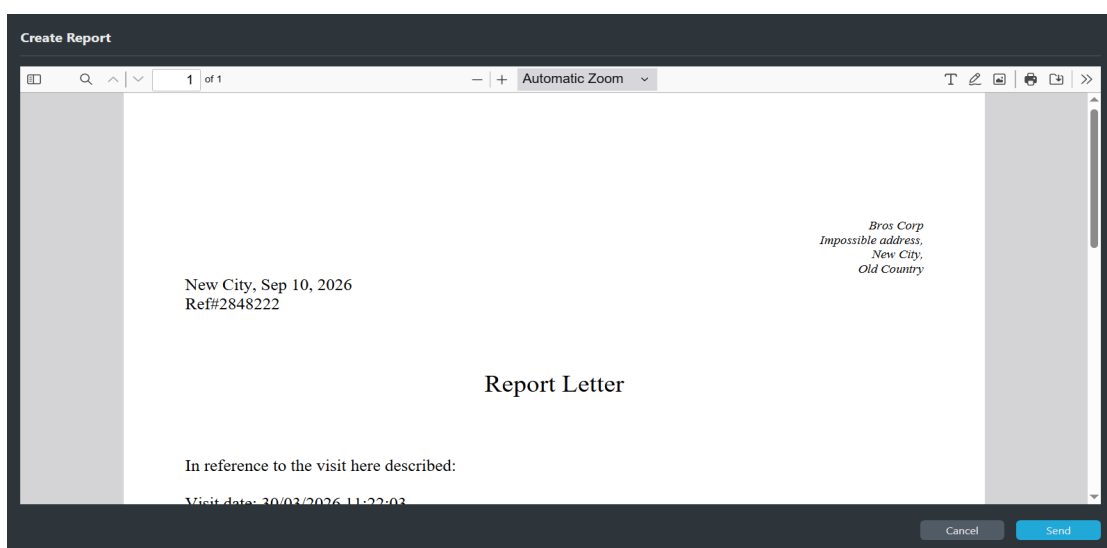


Image 84: Report creation

To **import** a PDF, click on the "Select PDF" button.

To **save and close** the report, click on the "Create Report" button.

If images or frames have been selected (see [5.2 Select Images](#)), they will be included in the report according to the layout chosen via a pop-up. The user must select the report format and decide whether to display headers and labels for each image.





Image 85: Report format setting window

The report is generated and attached to the exam.

7.7.1.2 Report viewing

To view the generated report, click on the "PDF" icon  in the "Preview of series" section.

If multiple attachments are associated with the same study, first select the "Attachment" icon  and then the "PDF" icon. In this case, the most recent report will be highlighted with blue borders and a star icon.



Image 86: PDF reports

7.7.2 Reporting in the Studylist

Users who access the Studylist to view studies can perform study reporting directly from the series preview panel of the Studylist.

7.7.2.1 Report Creation



WARNING: this feature is available only for users defined as "reporters" during product configuration.

A "reporter" user can create a report for a study only if:

- The study has been assigned to the user itself (see section **7.7.2.1.1 Study assignment**), and
- The study has been opened at least once during the session by the user.

In this case, the reporting panel will automatically open within the series preview panel in the Studylist:

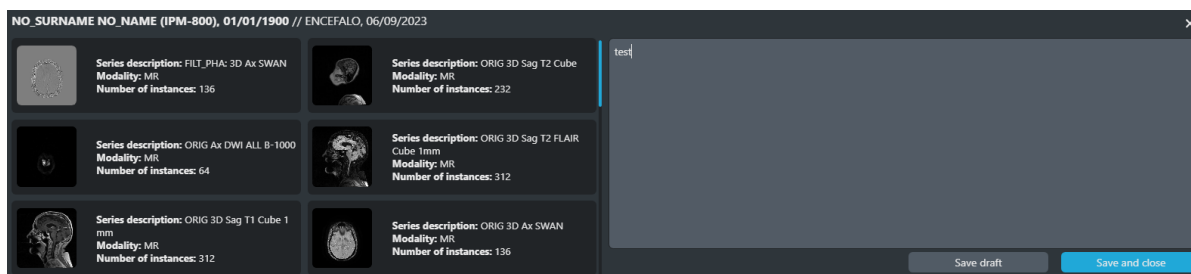


Image 87: Creating a report in the Series Preview Panel of the Studylist

To **save the report as a draft**, click the "Save draft" button.



To **save, sign and close the draft**, click the "Save and close" button and confirm the operation in the "Report Closure" pop-up.

Once the operation is completed, the "Report saved and closed successfully" toaster and the "PDF" tooltip icon, containing information about the date and time the report was closed, will be displayed.

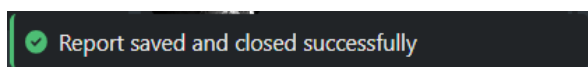


Image 88: "Report saved and closed successfully" toaster

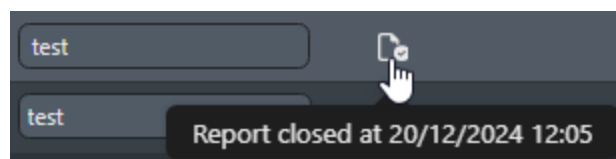


Image 89: PDF tooltip icon

7.7.2.1.1 Study assignment

A study must be assigned to a "reporter" user.

Any user with the role of "reporter" can assign a study to himself or another reporter.

To assign a study to a reported, select the desired name from the dropdown menu in the "Assigned to" column in the Studylist results section.

The name of the user currently logged in and assigned to the study will be highlighted compared to other users.

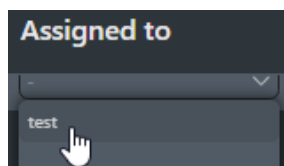


Image 90: Exam assignment

7.7.2.1.2 Study reassignment

An exam that has already been assigned but whose report has not been completed can be reassigned to any other reporter by confirming the operation in the "Reassigning Study" pop-up.

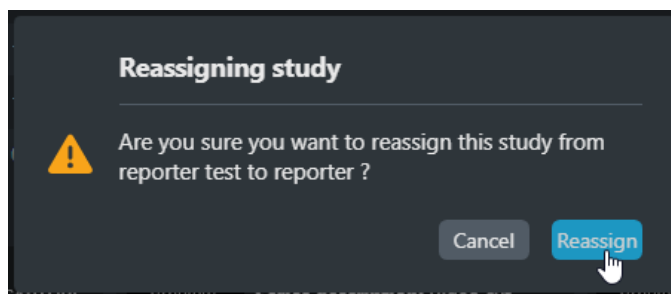


Image 91: "Reassigning study" pop-up



7.7.2.2 Viewing the report

To view the generated report, click on the "PDF" icon  in the study preview panel, as shown in the image below.

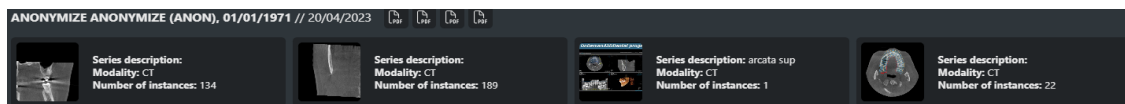


Image 92: Medical reports in the study preview

8 RADIOLOGICAL TOOLS (CR, DX)

8.1 Scrolling images in radiology studies

In radiology studies displayed in a 1x1 layout, users can use the mouse wheel to scroll through the different images of the sequences belonging to the same study. The currently selected image will be highlighted by a blue border.



WARNING: this functionality is exclusive to DX and CR modalities

8.2 Additional buttons in the context menu

ICON	NAME	FEATURE
	Invert image	To invert black and white in the selected image
	Flip horizontally / vertically	To flip the selected image
	Goniometric measure	To measure the length of the femur and tibia, and the angle between them. Note 1: to perform a goniometric measurements, select "Show measurement" form the context menu Note 2: this tool is specific for anthropometric measurements of the thigh and leg

Table 30: Additional buttons in the context menu

8.2.1 Images inversion feature

The images inversion feature inverts bits of the image, as shown in figure.

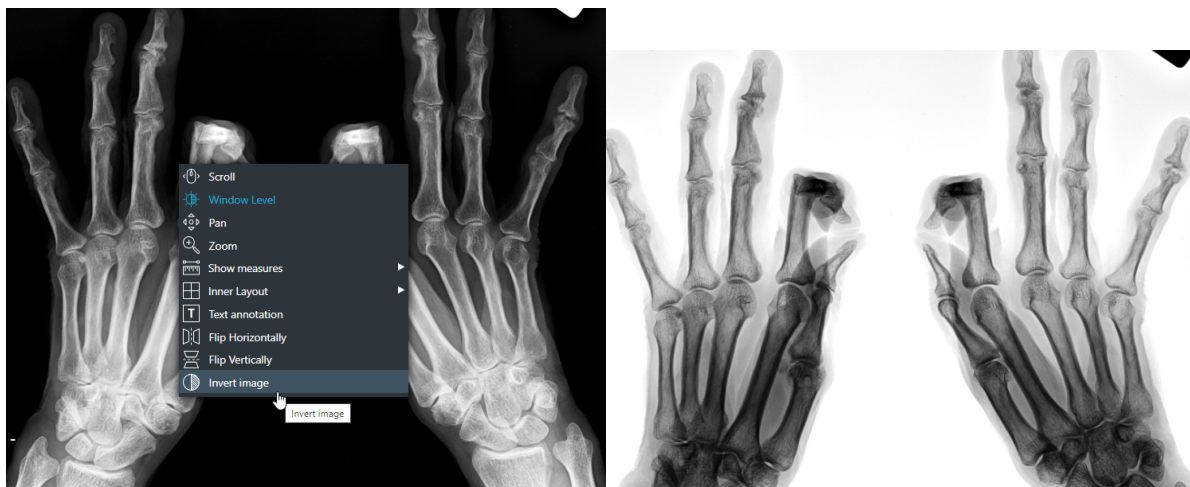


Image 93: Bit inversion

8.2.2 Images rotation

The images rotation allows to rotate the image both clockwise and the counter-clockwise 45° increments.

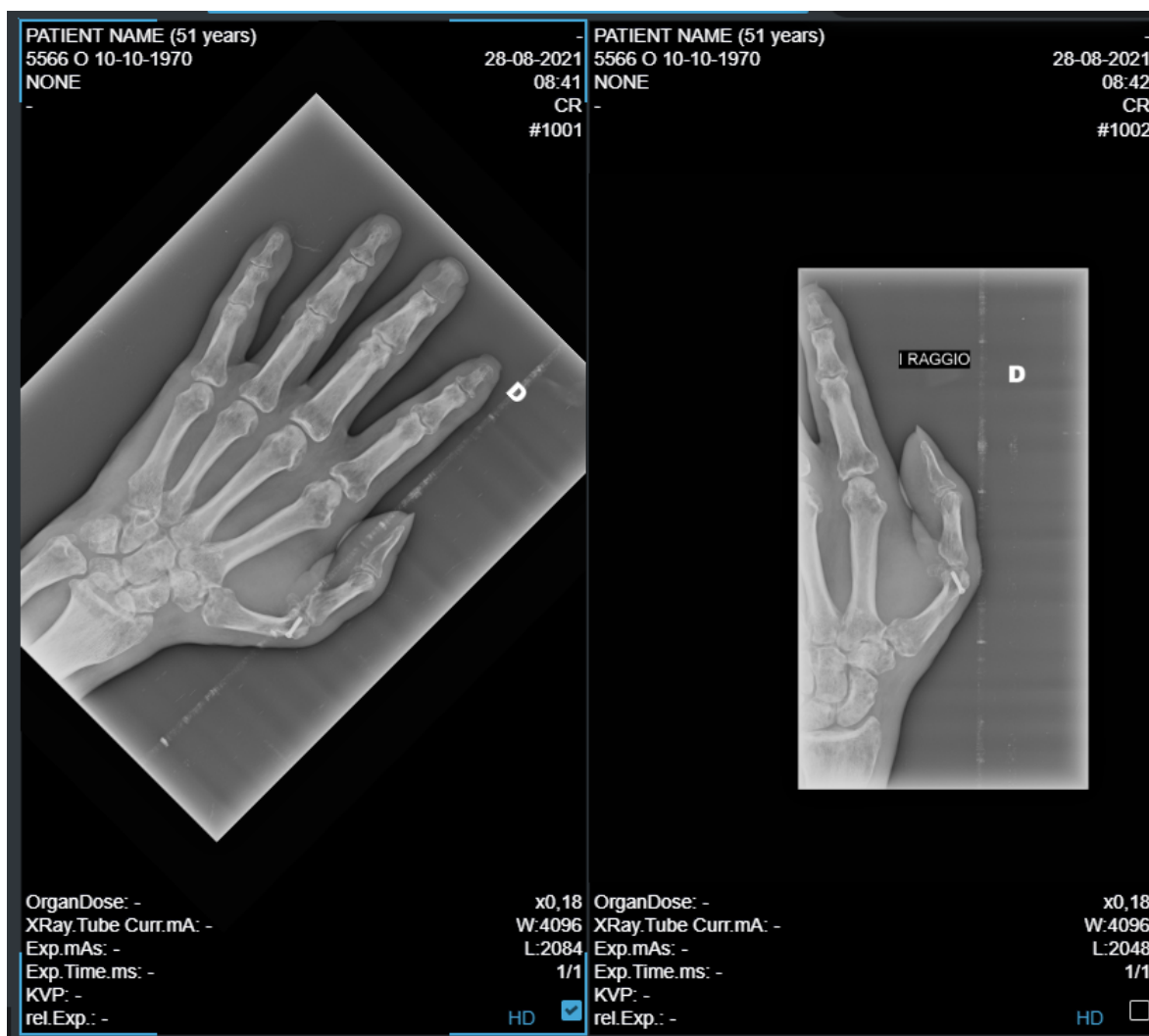


Image 94: Images rotation (45° clockwise)

8.2.3 Perform a goniometric measurement

NOTE: this tool is specific for anthropometric measurements of the thigh and leg

The "Goniometric measure" icon  allows the user to measure the length of the femur and tibia, as well as angular deformities between the femur and tibia (knee varus and valgus).

Steps to follow for a goniometric measurement:



1. Select the "Goniometric measure" icon in the "Show measurement" section of the context menu

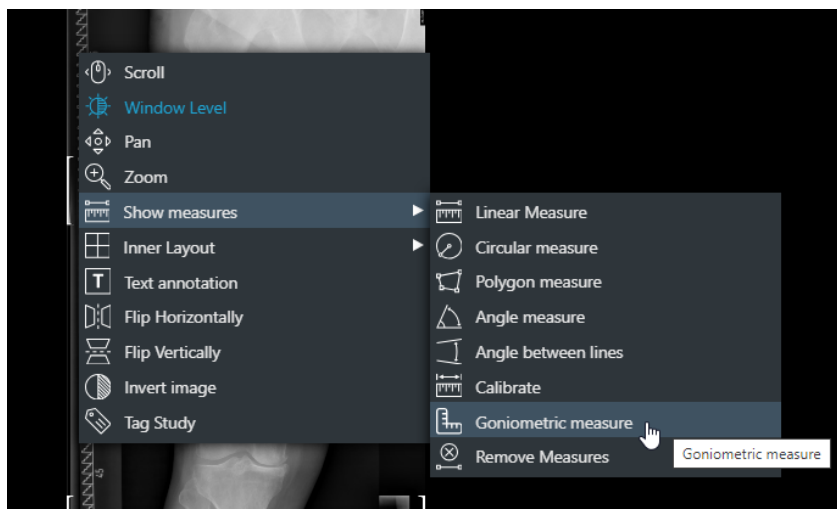


Image 95: "Goniometric measure" icon

2. Draw a circle around the femoral head to define its center.

NOTE: draw the circle starting from the center of the femoral head and move the mouse cursor towards the edge

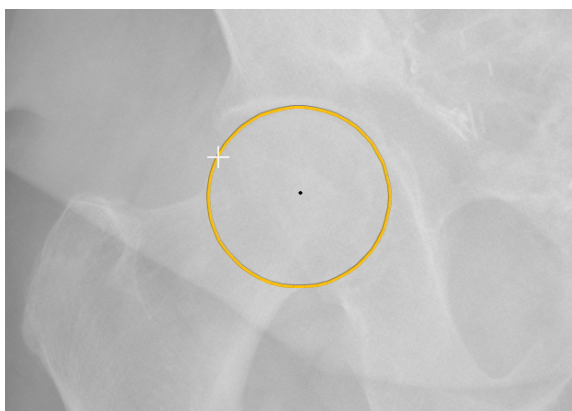


Image 96: Draw a circle around the femoral head

3. Draw the knee transverse line at the level of the tibial plateau to identify the center of the knee.



⚠ NOTE: start from one end to the other of the knee (from the lateral end of the knee towards the medial, or vice versa)

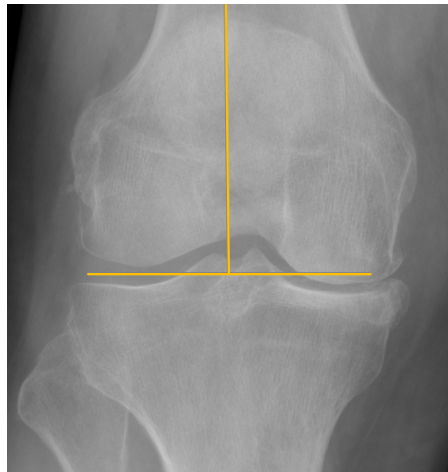


Image 97: Draw the knee transverse line

4. Draw the line at the level of the ankle joint.

⚠ NOTE: start from one end to the other of the ankle (from the lateral malleolus towards the medial, or vice versa)



Image 98: Draw the ankle line

At this point, ZEEROMed View provides:

- length of the femur;
- length of the tibia;
- total length of tibia and femur;
- angle between the axis of the femur and that of the tibia.

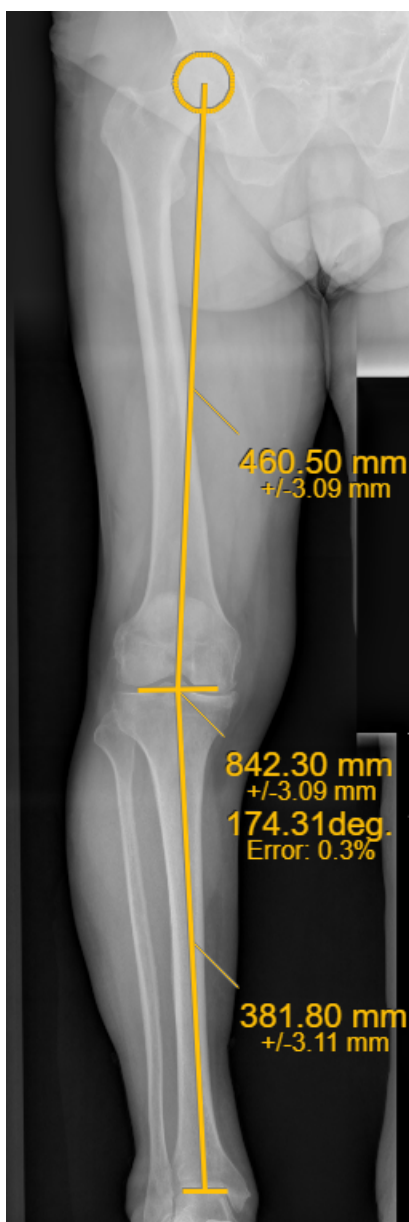


Image 99: Example of goniometric measurement

If necessary, user can move the circle around the femoral head or the transverse lines at the knee and ankle by dragging the elements with the left mouse button. Their dimensions cannot be modified; to update the value, delete the measurement from the context menu.

8.2.4 Keyboard shortcuts

The following keyboard shortcuts are available for radiology measurements:



- Free-hand measurement: "Q" key ;
- Angle measurement: "V" key .

For more information on how to perform measurements, consult chapter **cap**.



9 CT TOOLS

9.1 Additional toolbar

ICON	TOOLTIP	FEATURE
	Reference lines	Shows the reference lines to all sequences. When selected it opens a menu:
		 <i>Show All Ref. Lines</i> Shows all reference lines of a sequence ("stack" modality)
		 <i>Show Single Ref. Lines</i> Shows the reference lines of the selected image (single modality)
		 <i>Disable Ref. Lines</i> Disables reference lines
	MPR	Multiplanar reconstruction
	Enables/Disables space locator	Allows the user to locate a point in space. Selecting a spot on an axial image, the tool shows the user the same point in the associated coronal and sagittal images.

Table 31: Additional CT toolbar

9.1.1 Window Level presets

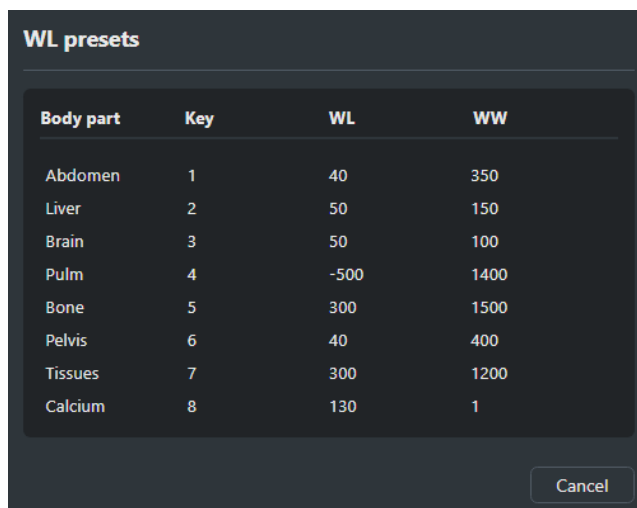
ZEEROmed View provides predefined Window Level presets associated with the keyboard keys 1-9.

To assist in selecting the correct Window Level, an explanatory pop-up window is available and can be displayed by:



- Clicking the WL presets button on the toolbar;
- Pressing the "?" keyboard key.

To apply a preset Window Level, click on the desired row or press the corresponding keyboard key.



Body part	Key	WL	WW
Abdomen	1	40	350
Liver	2	50	150
Brain	3	50	100
Pulm	4	-500	1400
Bone	5	300	1500
Pelvis	6	40	400
Tissues	7	300	1200
Calcium	8	130	1

Image 100: WL presets values

9.1.2 Reference Lines

The reference planes button displays reference lines—shown as yellow vertical lines—over each series, including the side previews.

When single mode is active, if multiple images are displayed, the system draws a yellow line on each displayed image.

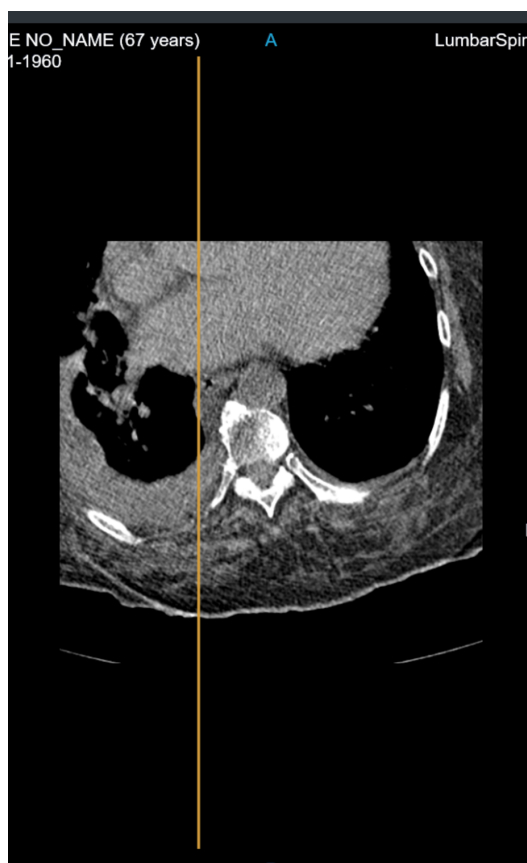


Image 101: Plane reference lines

When stack mode is enabled, if multiple images are displayed, the system draws a series of lines on the other images, representing the projections of the instances from the selected series. The brightest line represents the current view.

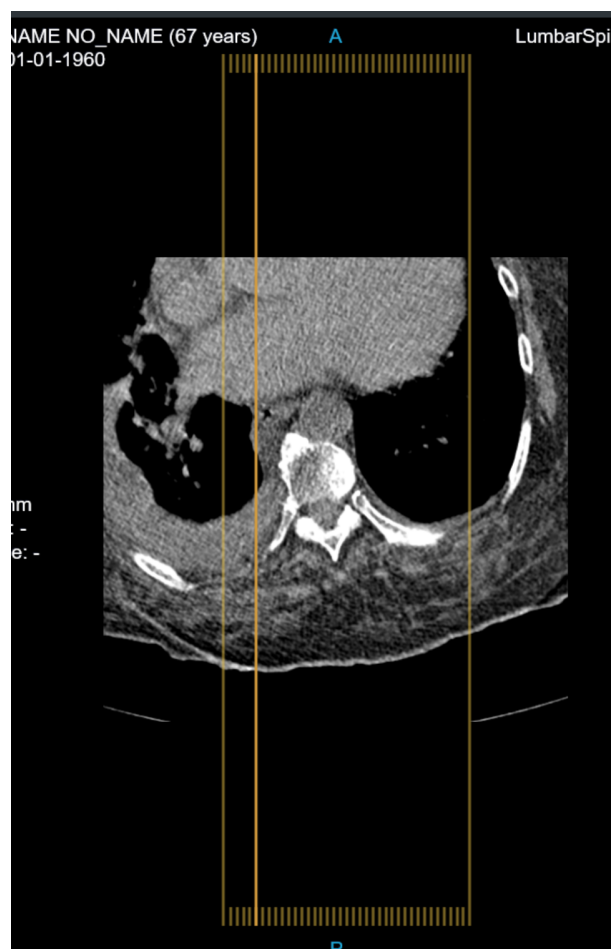


Image 102: Stack reference lines



10 MULTI PLANAR RECONSTRUCTION

ZEEROmed View, if configured, allows the user to visualize multiplanar reconstruction of the exams.

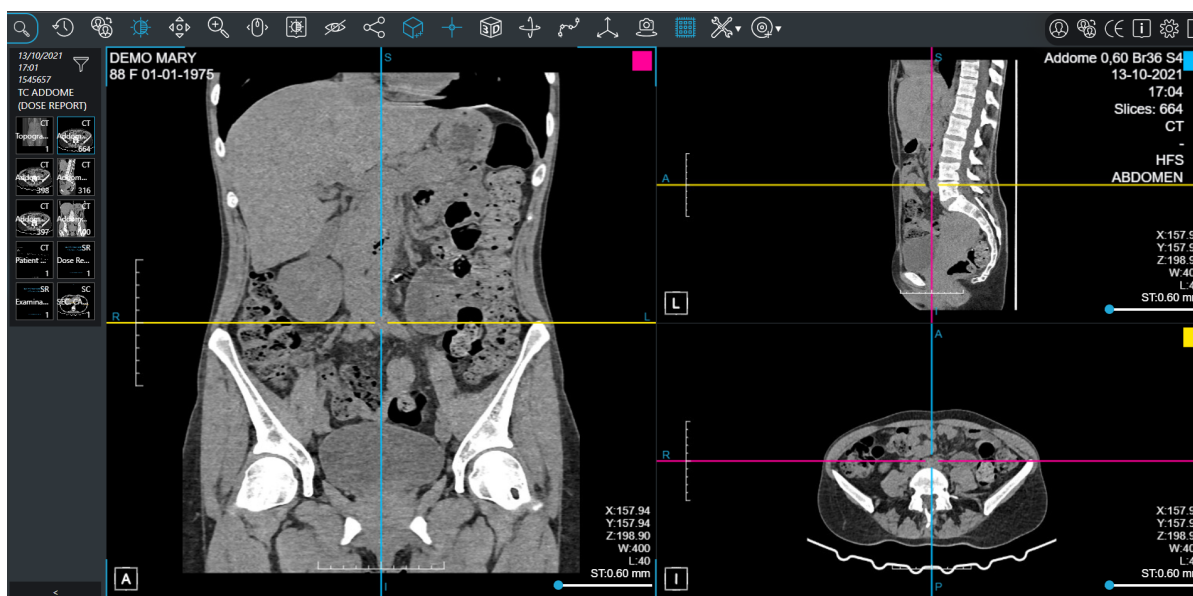


Image 103: MPR viewer

The reconstruction viewer displays the multiplanar reconstruction (MPR, images and metadata) allowing operations such as window level, zoom, pan, scrolling among images of a sequence.

To start a reconstruction, the user should select the MPR reconstruction button  in the sidebar or press the "Space" key from the keyboard.

When the MPR reconstruction is activated, a progress bar will appear, showing progress of reconstruction opening. When slices downsampling is done, the MPR viewer is shown.

The MPR reconstruction viewer is made of four main sections:

- Patient's data (at the top);
- Axial, Sagittal and Coronal MPR (in the middle);
- Preview of other sequences (on the left);
- Toolbar (on the right).



10.1 Toolbar

ICON	NAME	FEATURE
	Exit MPR reconstruction	To exit the MPR reconstruction
	MaxIP, MeanIP, MinIP	To switch between MaxIP, MeanIP, MinIP. See 10.1.1 MaxIP, MeanIP, MinIP
	Opens the specific tools section with the following tools:	
	Volume rendering	Allows the volume rendering of the series. See 10.4 Volume Rendering
	Show/Hide MPR axis	Allows to shows/hide MPR axis
	Orthogonal axis	Allows to make perpendicular the axes, and to block them. If it is disabled, axes move independently.
	Lock/Unlock follow camera	Allows to lock/unlock follow camera. See 10.1.2 Follow Camera
	CPR	Allows the user to perform the curved reconstruction. See 10.6 Curved Planar Reconstruction (CPR)

Table 32: MPR tools



10.1.1 MaxIP, MeanIP, MinIP

Pressing three times the same button the system visualizes:

ICON	FEATURE
	Maximum Intensity Projection (MIP)
	Mean Intensity Projection or Average Intensity Projection (AIP)
	Minimum Intensity Projection (MinIP)

Table 33: MaxIP, MeanIP, MinIP buttons

10.1.2 Follow Camera

"Follow Camera" is enabled by default.

When moving the center of the plane on one view, the remaining views automatically update, centering the camera on the intersection of the planes.

When Follow Camera is deselected, the other views maintain their current image positions while only the plane lines move, meaning the camera will not follow the center of the planes.

10.2 Context Menu

The following image and table describe the MPR context menu.

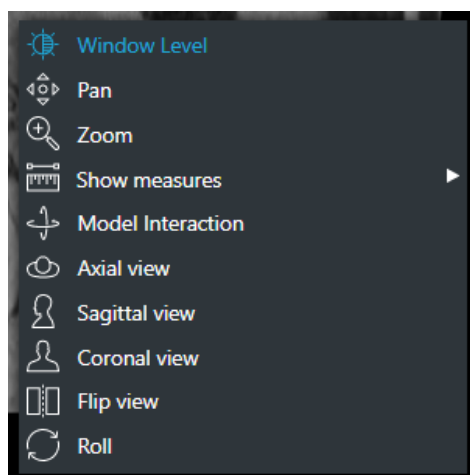


Image 104: MPR context menu

ICON	FEATURE
Coronal view	These buttons allow the selection of the desired projection for that view. They can also be activated pressing: • "C" for Coronal view • "S" for Sagittal view • "A" for Axial view
Sagittal view	
Axial view	
Flip view	Flips the plane, inverting the projection on normal.
Roll	Allows the user to correct the orientation of the projection (for example to rotate a few degrees a distorted view).
Interaction with 3D model	Allows to change the inclination of a plane in one projection. It allows to move one axis if the mouse moves horizontally, the other if the mouse moves vertically

Table 34: Context menu icons

10.2.1 Measures

Measures in ZEEROmed View conform to the document "DICOM correction Item CP-586 Pixel spacing and calibration in projection radiography".

To take a measure, click on the "Show measures" button.

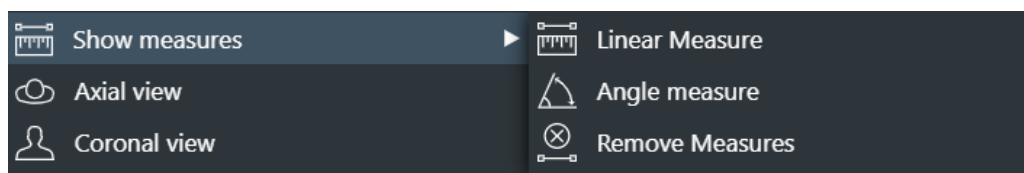


Image 105: Measures menu

NAME	FEATURE
Show measures	Click on the starting point of the measure and drag to the ending point of the measure. It can also be activated by pressing "R".

Table 35: MPR measures

If measures are imprecise beyond a configurable error threshold (default=0%), the error will be shown near the measured value.

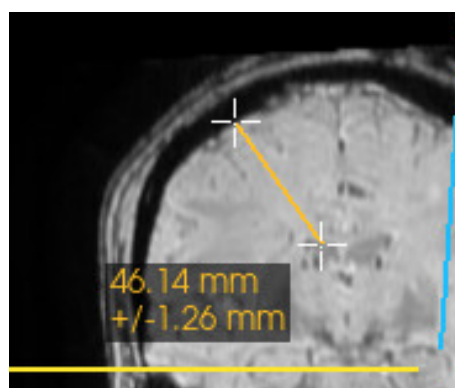


Image 106: Linear measures

10.3 MPR planes

Multiplanar Reconstruction (MPR) allows images to be reconstructed from the original axial plane in either the coronal and sagittal plane. The MPR planes include:

1) Coronal plane

- a) Displayed in the first panel, identified by a pink square in the top right corner;
- b) Represented by a pink line in the second and third panels;
- c) Passes through the body from left to right, dividing it into anterior and posterior sections.

2) Sagittal plane



- a) Displayed in the second panel, identified by a blue square in the top right corner;
- b) Represented by a blue line in the first and third panels;
- c) Passes through the body from anterior to posterior, dividing it into left and right sections.

3) Axial plane

- a) Displayed in the third panel, identified by a yellow square in the top right corner;
- b) Represented by a yellow line in the first and second panels;
- c) Passes through the body horizontally, dividing it into superior and inferior sections.

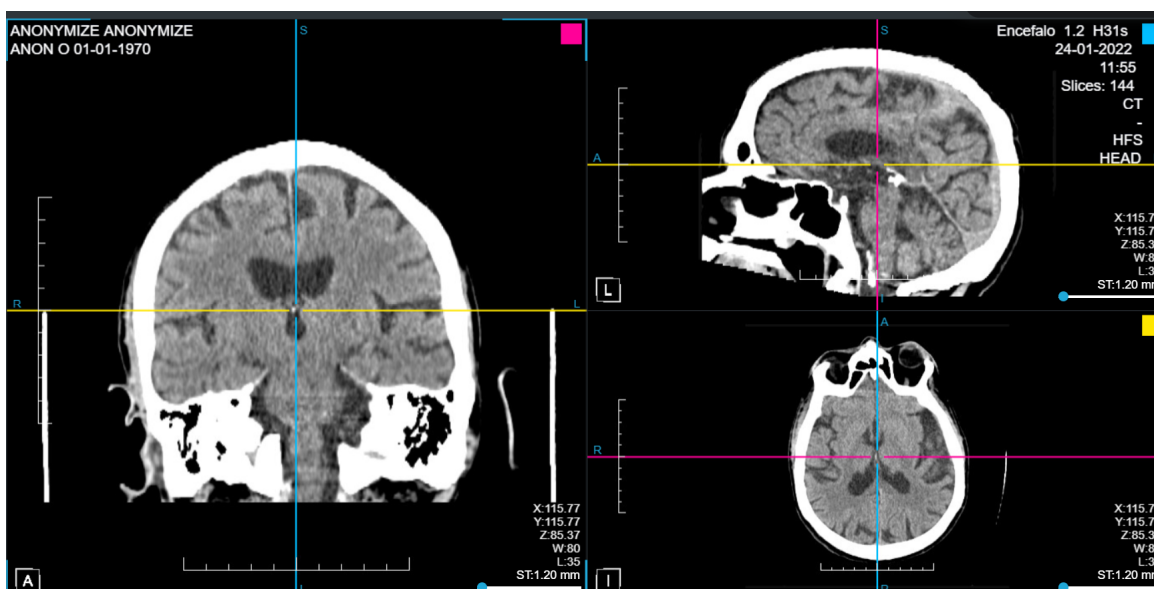


Image 107: MPR planes

In each projection, the user can visualize:

- the reconstruction;
- Window level value and coordinates of the current plan;
- The orientation widget (see **10.3.2 Orientation cube**);
- Slice thickness (see **10.3.3 Slice thickness**);
- A ruler (see **10.3.4 Ruler**);
- Left/right/superior/inferior/anterior/posterior references;
- the plane colours.

Reconstruction is also supported for non-axial series, allowing all projection types.



10.3.1 Rotation of axes

It is possible to rotate the axes in each panel and move their origin by clicking and dragging the intersection point with the mouse.

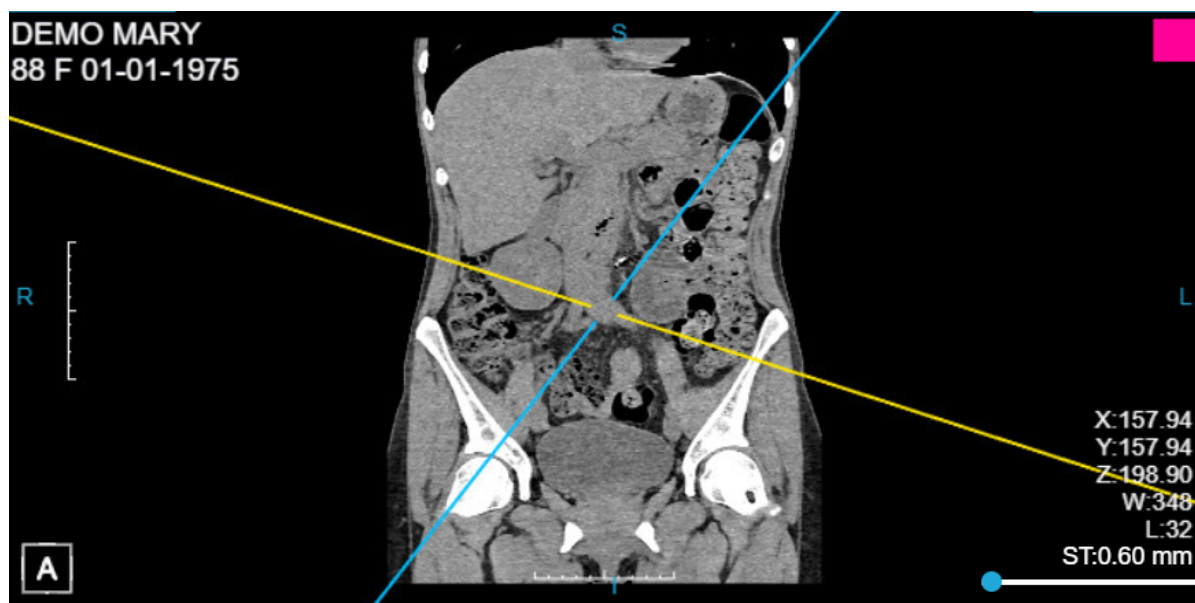


Image 108: Rotate the axes

10.3.2 Orientation cube

The orientation cube located low-left in the image, automatically updates its orientation when the user move axis. The six faces of the cube have the following icons:

ICONS	FUNCTION
	Anterior face
	Inferior face
	Left face



	Right face
	Superior face
	Posterior face

Table 36: Orientation cube

10.3.3 Slice thickness

Slice thickness can be set individually for each view, through the thickness bar.



Image 109: Slice thickness bar

10.3.4 Ruler

A ruler is available to the sides of the image. It has a length of 10 cm and 10 ticks: each tick has 1 cm.



Image 110: Ruler

10.3.5 Reformat series from MPR

The "Save reformatted series" button  allows users to reformat series (axial/coronal/sagittal) from an MPR projection and save them in the storage (PACS/Feed).



10.3.5.1 Procedure for reformatting a series from MPR Steps to reformat a series:

1. During the MPR session, press the "Save reformatted series" button ;
2. A pop-up will appear, allowing the user to enter the following parameters:
 - *Series Description*: series description of the new series (default: "REFORMATTED" followed by the original series description);
 - *Start slice*: number of slices before the center of the MPR axis (default: -10);
 - *Stop slice*: number of slices after the center of the MPR axis (default: 10);
 - *Interval between slice (mm)*: (default:10, range [0:200]).

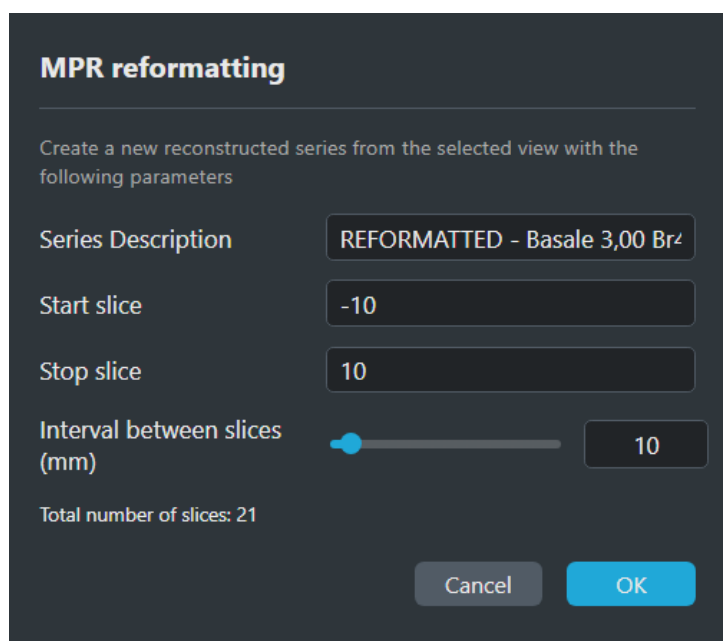
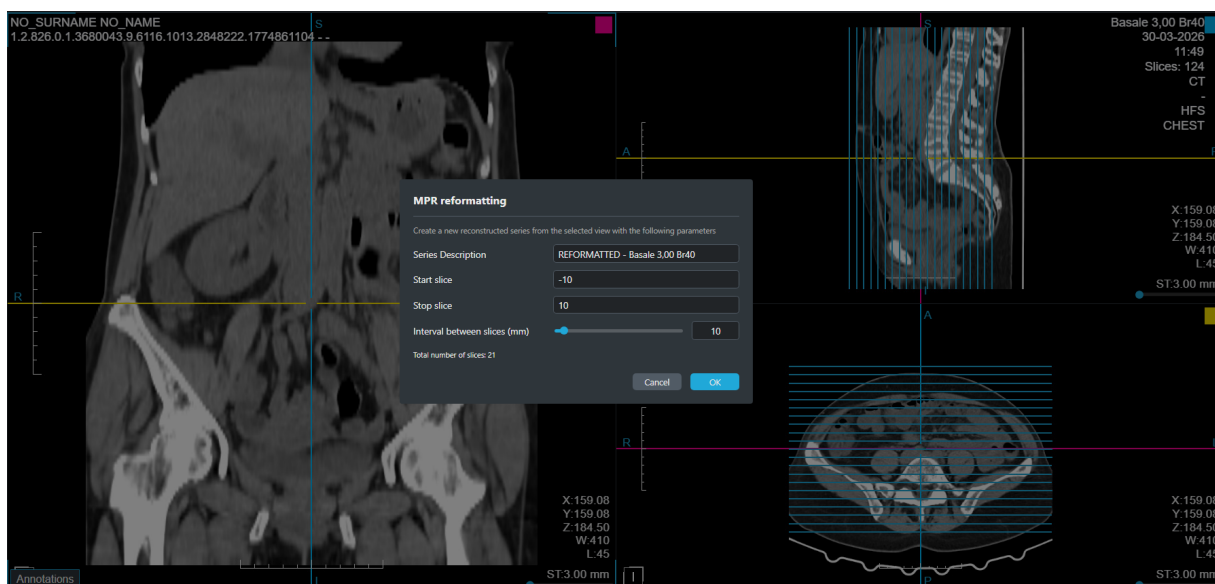


Image 111: MPR reformatting pop-up

Reference lines related to the user-set parameters are displayed in the views and updated in real-time, as can be seen by the following image



3. Press "Ok" to store the new reconstructed series in the system. The pop-up is closed and the reference lines are hidden.
4. The new series, containing the reconstructed slice and a scout image displaying the reference lines, is displayed. The modality of the new series is SC (Secondary Capture).

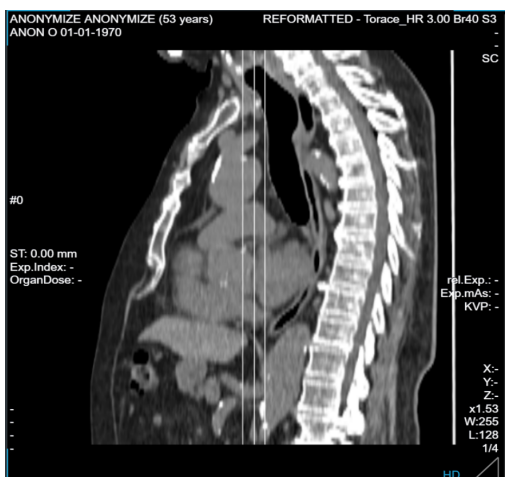


Image 112: Scout image produced by the MPR reformatting

In the new series, slices are automatically fitted into the output image size, while window level, slab mode and slice thickness are maintained.



WARNING: the new series is NOT intended for diagnostic use and for further reconstruction.

10.4 Volume Rendering

Through the "Volume Rendering" button , users can open a panel with volume rendering, which allows operations such as zoom, pan, cut and camera interact.

On the bottom of the panel, it is possible to change the transfer function via a drop-down menu:

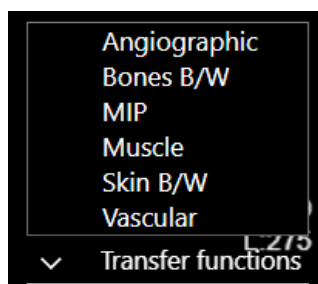


Image 113: Transfer Function

ICON	FEATURE
MIP	MIP reconstruction, which allows the user to see a 3D volume rendering of the MIP
Vascular and Angiographic	Vessels reconstruction, which allows the user to see vessels at best
Bones B/W	Bones reconstruction, which allows the user to see bones at best
Muscles	Muscle reconstruction, which allows the user to see muscular bundles

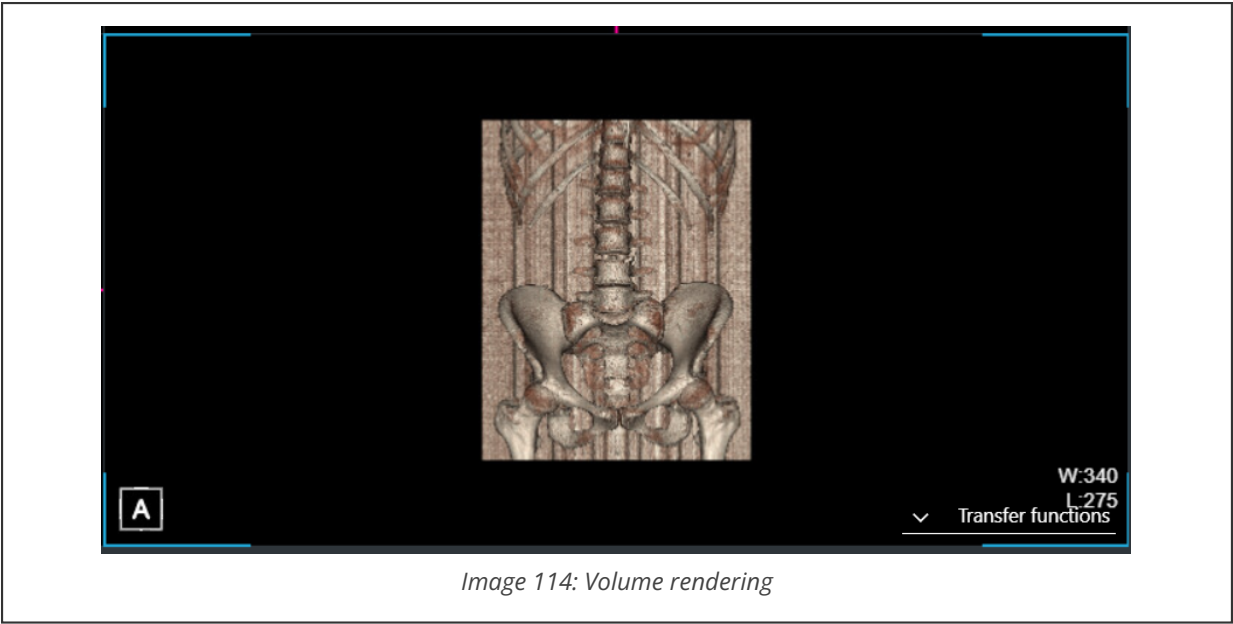


Table 37: Volume rendering functionalities

10.4.1 Volume rendering context menu

The volume rendering context menu includes additional buttons compared to the MPR menu. To open the menu, right-click on the 3D image:

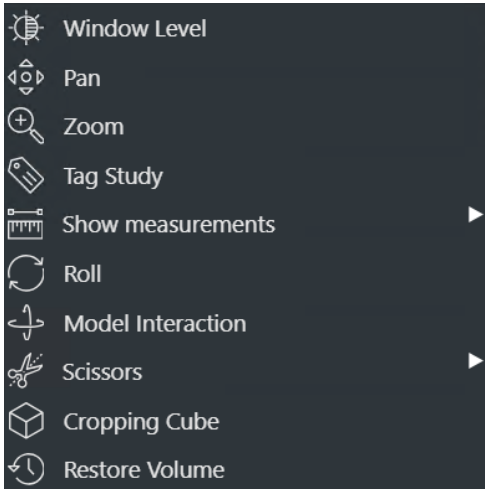


Image 115: Volume rendering context menu

TOOLTIP	FEATURE
---------	---------



Scissors	The scissors tool allows the user to select only the interested volume (See 10.4.2 Scissors)
Cropping cube	Allows resizing the 3D reconstruction cube to cut specific portions of the volume

Table 38: Volume Rendering context menu tools

10.4.2 Scissors

The scissors tool allows the user to select only the interested volume.

The user should select the scissors tool, drag the mouse over the volume and click the "Cut" button:

ICON	NAME	FEATURE
	Cut inside	The region outside the trace is removed
	Cut outside	The region inside the trace is removed

Table 39: Cut tools

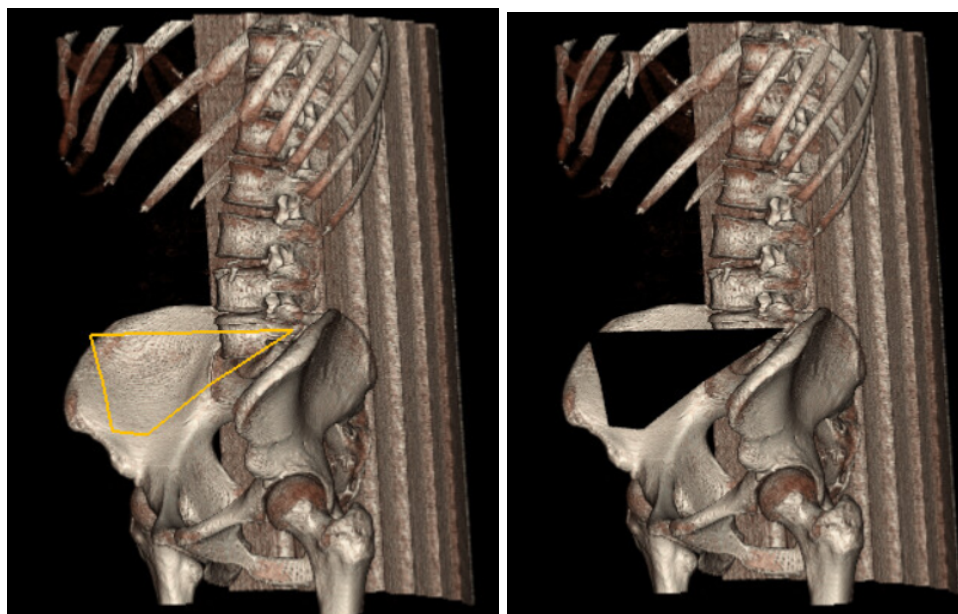


Image 116: Cut inside operation

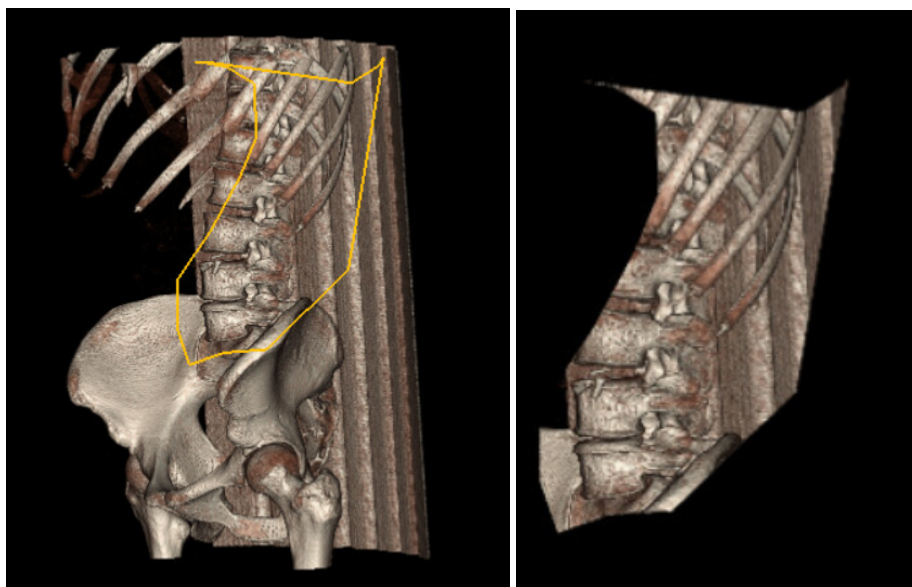


Image 117: Cut outside operation

10.4.3 Reformat series from Volume Rendering

The "Save reformatted series" button  allows users to reformat series (axial/coronal/sagittal) from a VR view and save them in the storage (PACS/ Feed).

10.4.3.1 Procedure for reformatting a series from VR

1. During the VR session, press the "Save reformatted series" button .
2. A pop-up will appear, allowing the user to enter the following parameters:
 - *Series Description*: series description of the new series (default: "REFORMATTED" followed by the original series description);
 - *Rotation*: volume rotation angle (180° or 360°);
 - *Direction*: volume rotation direction (horizontal or vertical);
 - *Angle between frames (degrees)*: (default:1, range [1:45]).

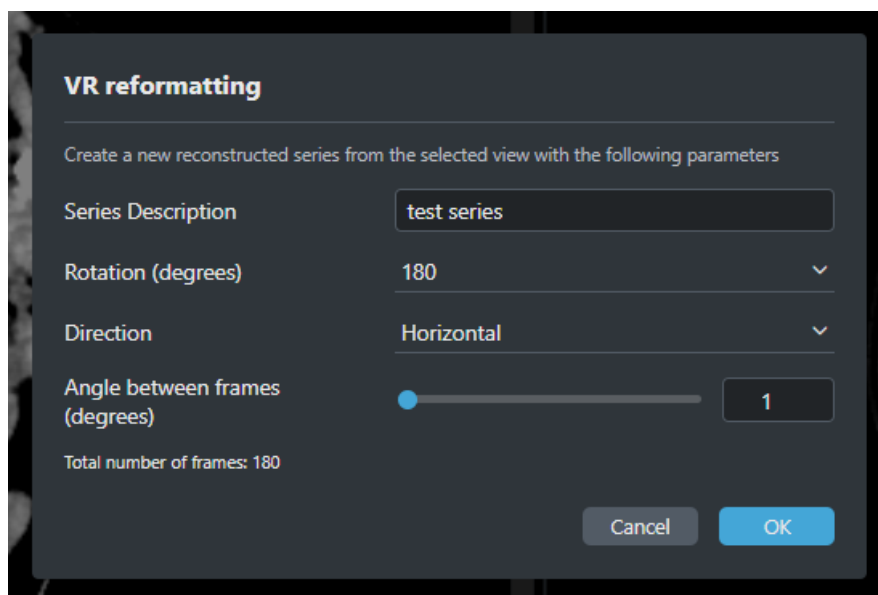


Image 118: VR reformatting pop-up

3. Press "Ok" to store the new reconstructed series in the system. The pop-up is closed.
4. The new series, containing the reconstructed slice, is displayed. The modality of the new series is SC (Secondary Capture).

In the new series, volume is automatically fitted into the output image size, while window level, transfer function, original orientation and volume cuts are maintained.

10.5 Warning "Gantry Tilt"

In some cases, when you click on the MPR, the following message appears:

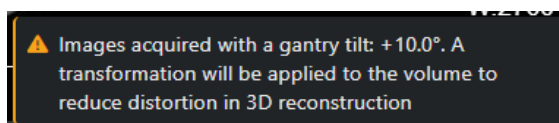


Image 119: Warning "Gantry tilt"

The device automatically makes improvements to the image that allow it to be displayed correctly in 3D.

10.6 Curved Planar Reconstruction (CPR)

The CPR allows following the course of a tortuous vessel over longer distances as it changes direction.



WARNING: CPR requires the centerline to be tracked correctly to avoid artifactual lesions

Manual tracking is performed by clicking on the image and scrolling to follow the vessel.

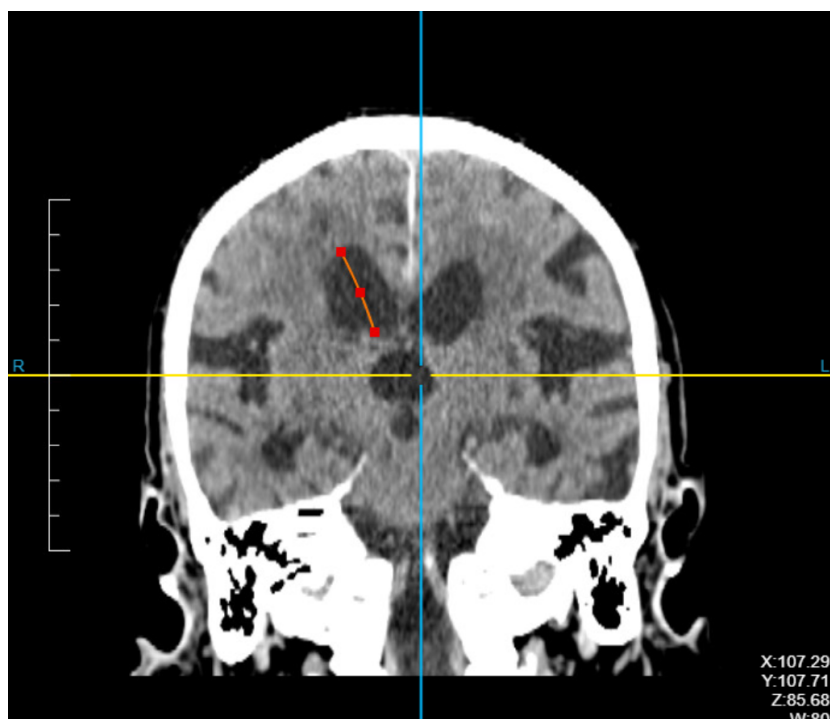


Image 120: The manual tracking

Once the entire vessel has been tracked, the CPR can be started by pressing the "Enter" key.

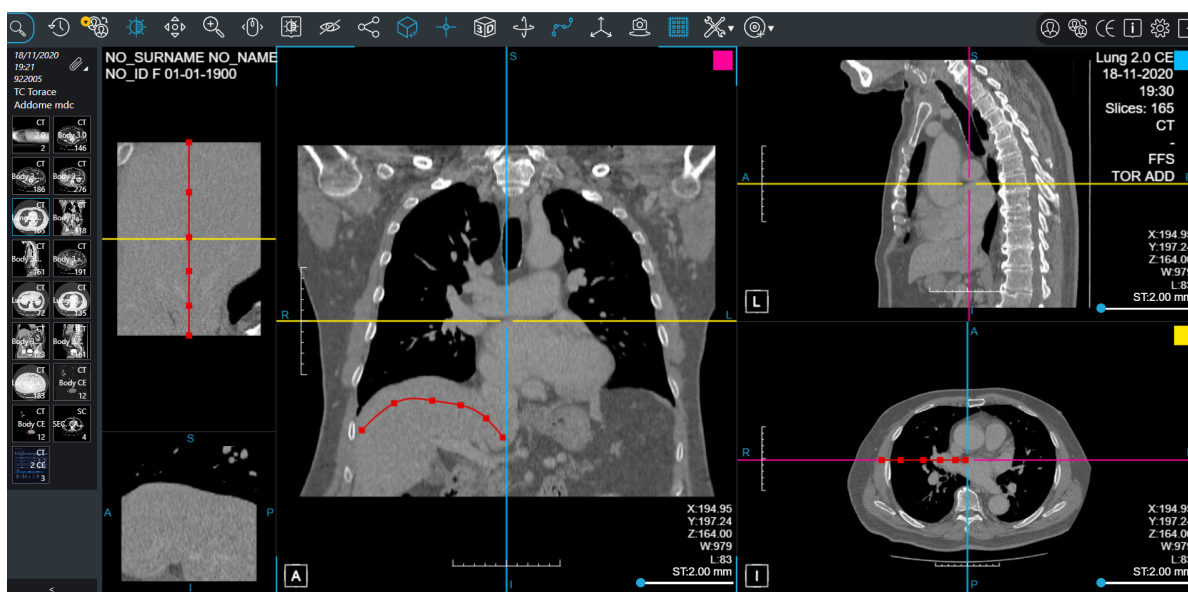


Image 121: The curved reconstruction

The CPR view consists of five sections:



- Axial, Sagittal and Coronal MPR (on the right);
- CPR view: shows the entire vessel (on the top left);
- CPR slice: shows the axial slice for each specific point of the vessel (on the bottom left).

Both the CPR view and CPR slice can be scrolled and rolled in a synchronized way.

Clicking on the red points along the vessel updates the CPR slice to that specific location and aligns the reference line on the CPR view.

Linear measurements can be added to any section.

11 MAMMOGRAPHIC TOOLS

11.1 Additional toolbar

ICON	TOOLTIP	FEATURE
	Toggles magnifier tool	Activates a localized magnifying glass
	Invert B&W	Inverts the grayscale values of the image. It can also be activated by pressing the “I” key
	Flip image	Flips horizontally/vertically the selected image
	/	Indicates the current slice position within the volume

Table 40: Additional toolbar

11.1.1 Magnifier

The user can select the Magnifier tool to enable a magnifying glass, that follows the mouse pointer.

All standard image interactions remain available while the magnifier is active.

The magnifier could also be enabled by pressing the “M” key.

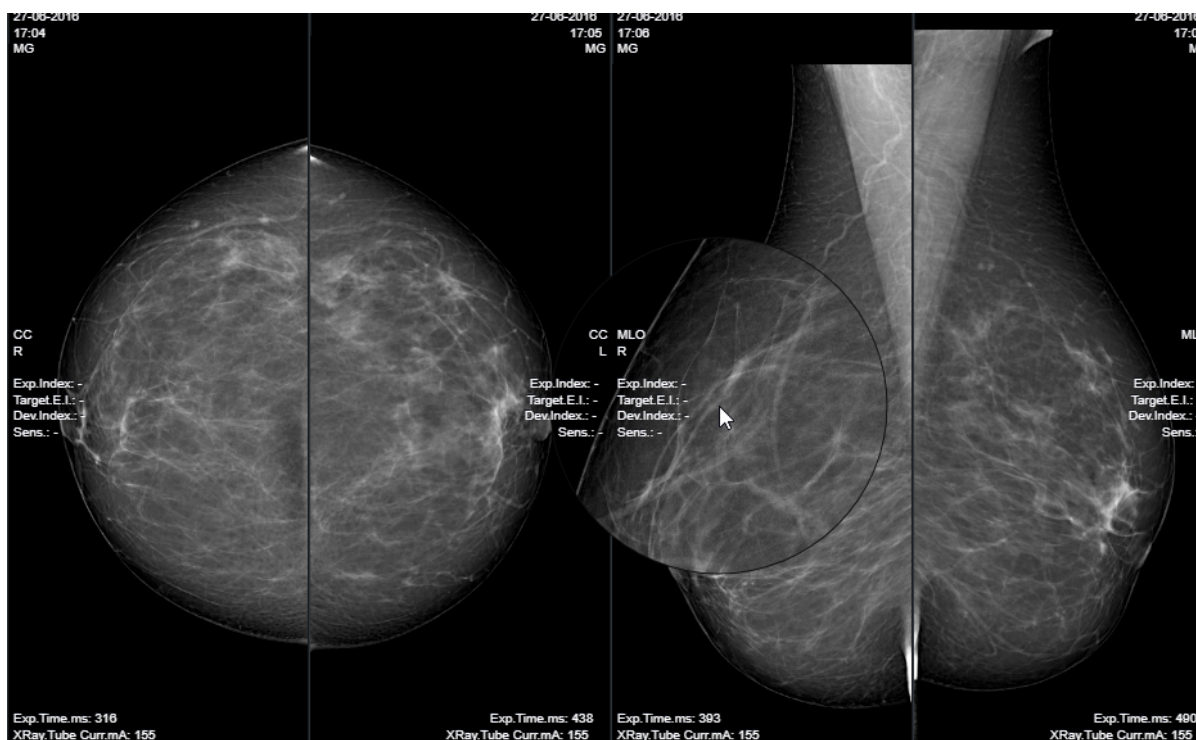


Image 122: Magnifier

11.2 Quadrant zoom

When enabled, a Hanging Protocol can be navigated by viewing quadrants Q0, Q1, Q2, Q3 and Q4 for each instance.

To navigate between the different quadrants, use either the HP navigation component (paragraph [5.1.2.1 Hanging Protocol navigation component](#)) or the keyboard arrows keys ← →.

This feature can be enabled per user, per role or globally for all users.

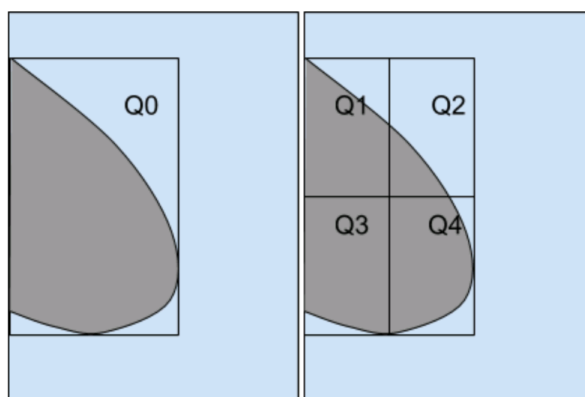


Image 123: Quadrant zooming



11.2.1 Studies processed with Artificial Intelligence (not always implemented)

If artificial intelligence software is integrated into the device, an "*abnormality score*" indicating the probability of the presence or absence of breast cancer can be displayed.

The score is shown below the patient and image information panel:

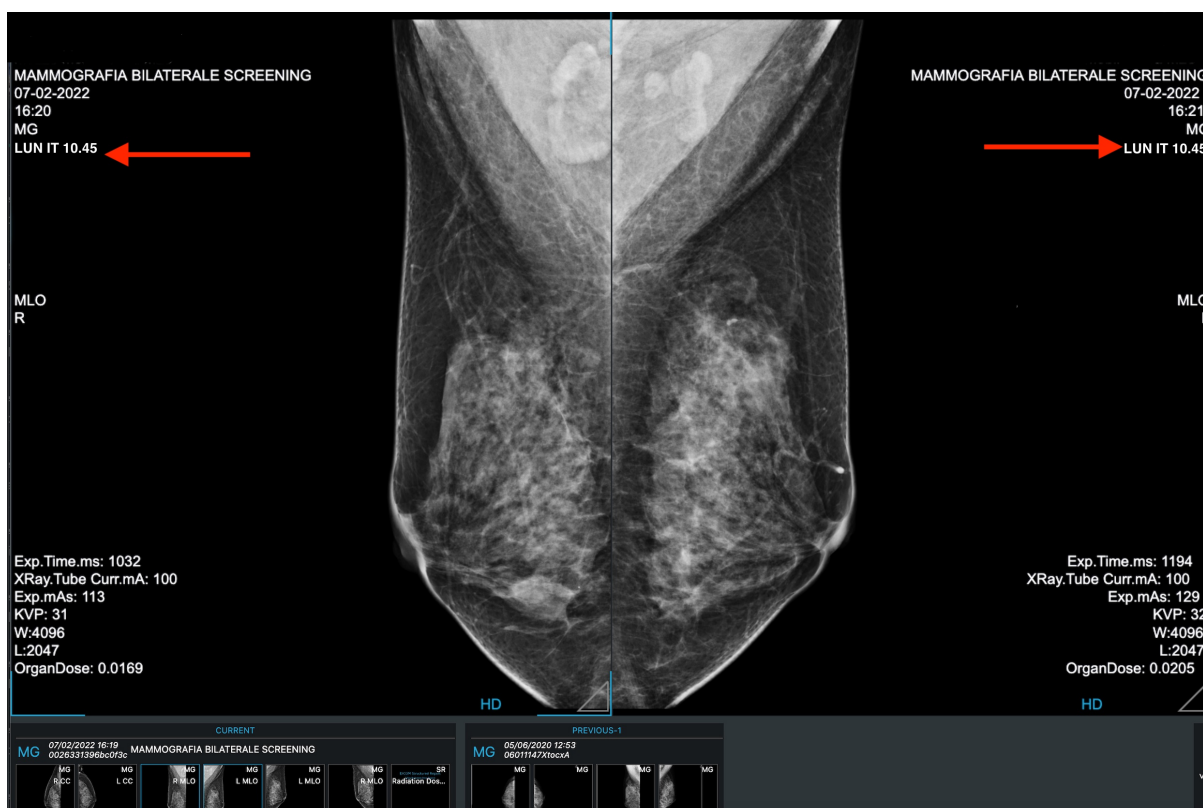


Image 124: Image with finding score

Once the image is opened, it is possible to configure the insertion of the score label onto the image.

ICON	NAME	DESCRIPTION
	Empty label	Label showed on the image when there is no AI score
	Label name with	Label showed on the image when there is an AI score

Table 41: AI label score



11.2.2 Studylist results section

In the studylist result section (see [3.2 "Studylist" page](#)), the "AI" field allows distinguishing studies that present an abnormality score generated by the AI algorithm. Furthermore, an abnormality threshold can be set to determine which alerts to display.

AI	Last Name	First Name	Patient ID	Birth Date	Study Date	Modality
	ANONYMIZE	ANONYMIZE	ANON	01/01/1970	22/08/2024 11:29	MG
	ANONYMIZE	ANONYMIZE	ANON	01/01/1970	15/04/2024 18:56	MG
	ANONYMIZE	ANONYMIZE	ANON	01/01/1970	31/01/2024 07:58	KO, MG

Image 125: Studylist with AI

12 MAGNETIC RESONANCE TOOLS

12.1 Additional buttons in the context menu

ICON	NAME	FEATURE
	Invert image	Inverts the grayscale values of the image.
	Flip horizontally	Flips horizontally the selected series
	Flip vertically	Flips vertically the selected series
	Reverse image order	Reverses the order of the instances

Table 42: Additional buttons in the context menu

12.2 Additional toolbar

ICON	TOOLTIP	FEATURE
	Reference lines	Shows the reference lines to all sequences. When selected it opens a menu:
		 <i>Show All Ref. Lines</i> It shows all reference lines of a sequence ("stack" modality)



			<i>Show Single Ref. Lines</i> It shows the reference lines of the selected image (single modality)
			<i>Disable Ref. Lines</i> It disables reference lines
	MPR	See 10 Multi Planar Reconstruction	
	Enables/Disables space locator	Allows the user to locate a point in space. Selecting a spot on an axial image, the tool shows the user the same point in the associated coronal and sagittal images.	

Table 43: Additional toolbar

12.2.1 Reference Lines

The reference planes button displays reference lines—shown as yellow vertical lines—over each series, including the side previews.

When single mode is active, if multiple images are displayed, the system draws a yellow line on each displayed image.

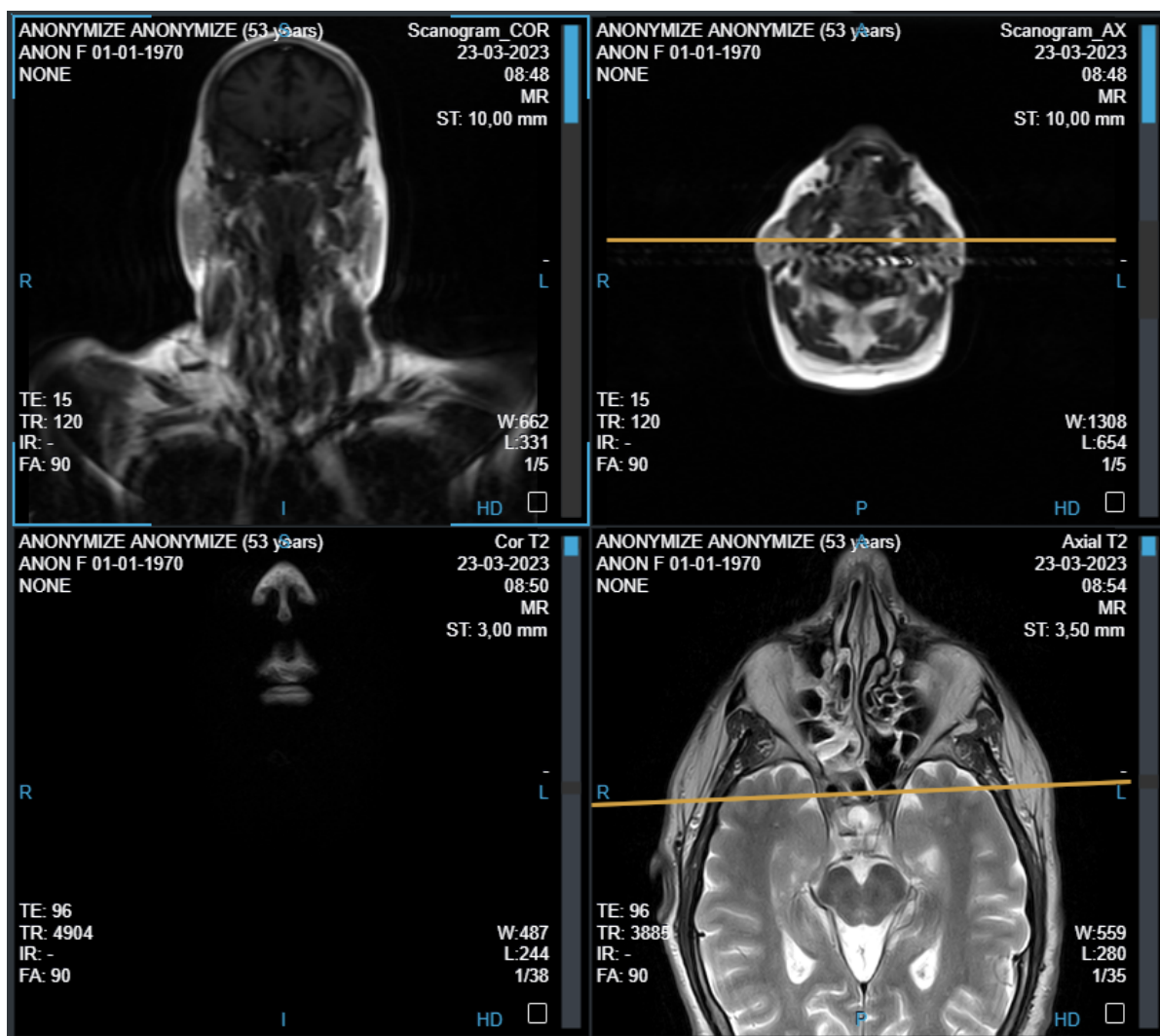


Image 126: Plane reference lines

When stack mode is enabled, if multiple images are displayed, the system draws a series of lines on the other images, representing the projections of the instances from the selected series. The brightest line represents the current view.

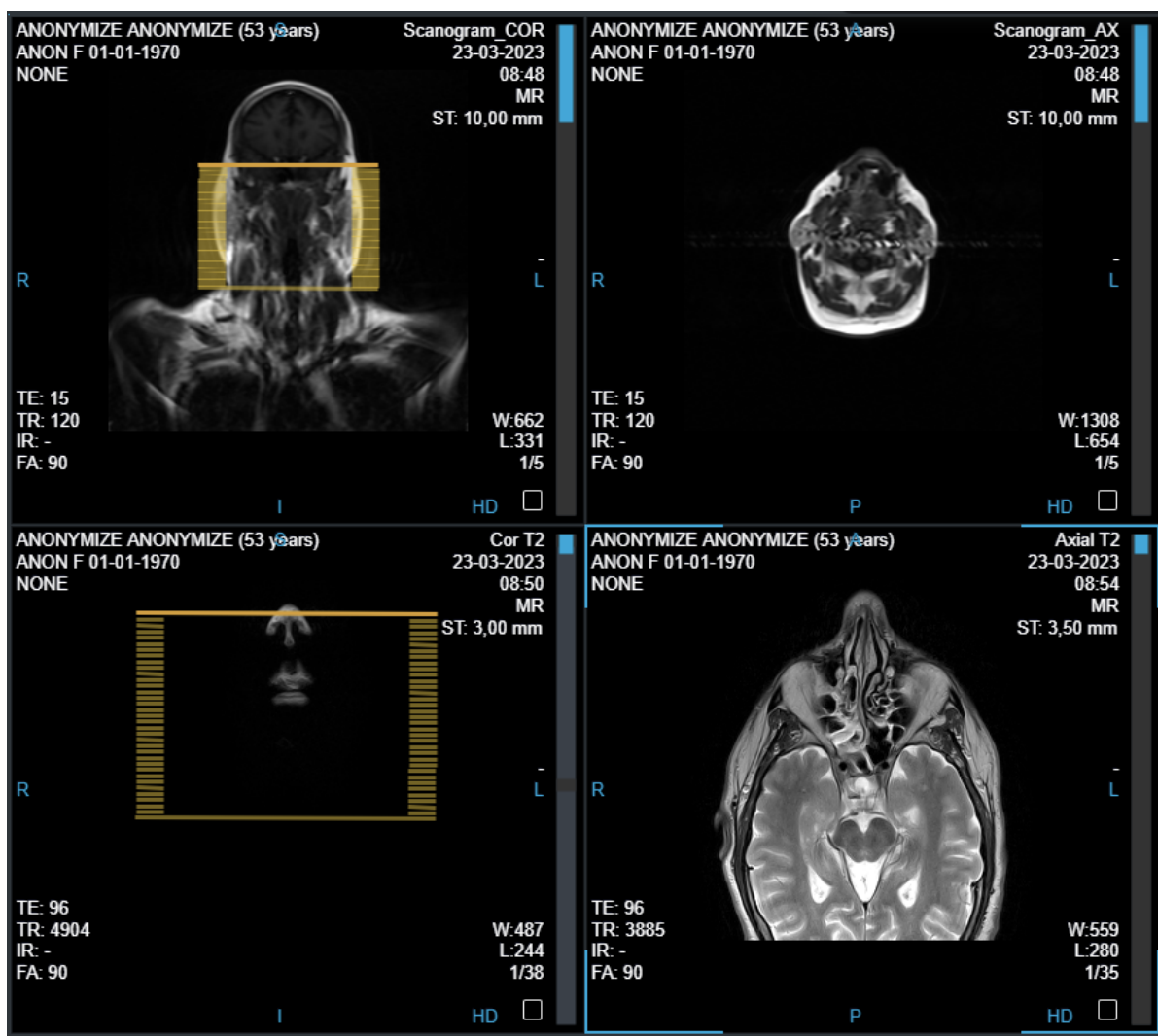


Image 127: Stack reference lines

12.3 Time-Intensity Curve (TIC)

The user can generate Time-Intensity Curves from dynamic Magnetic Resonance sequences.

12.3.1 Toolbar TIC

ICON	TOOLTIP	FEATURE
------	---------	---------



	Time- Intensity Curve Tools	It opens the tools menu for creating and displaying the Time-Intensity Curve on the screen:	
			Open multiple sequences It opens multiple sequences and allows selection of the study (up to 9 sequences)
			Circular measure It allows adding a single circular measurement
			Time-intensity curve It displays the Time-Intensity Curve

Table 44: TIC Toolbar

12.3.2 TIC creation workflow

The Time-Intensity Curve is displayed on the screen by following these steps:

1. Click on the "Time-Intensity Curve Tools" icon 
2. Click on the "Open multiple sequences" icon  to select the study (if more than one has been opened) and the sequences that need to be opened (up to 9):



Image 128: Sequences selection



3. Add a single circular measurement at the location of the lesion to be analyzed by:
 - The dedicated button "Circular measurement" in the Time-Intensity Curve menu ;
 - The 'O' key on the keyboard (if the shortcut is enabled);
 - The dedicated button in the context menu for circular measurement.
4. Press the button "Time Intensity Curve"  to display the curve on the screen:

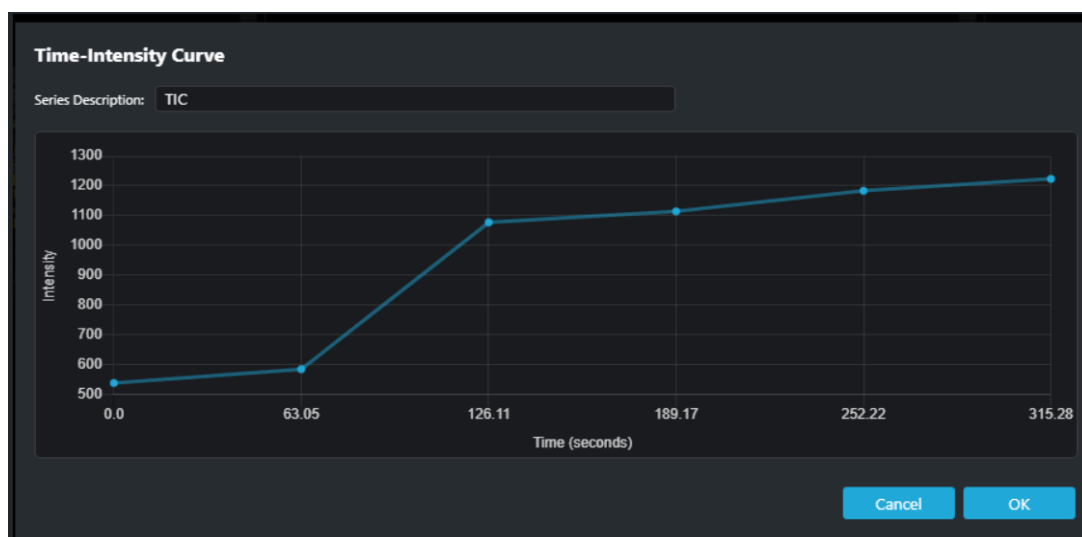
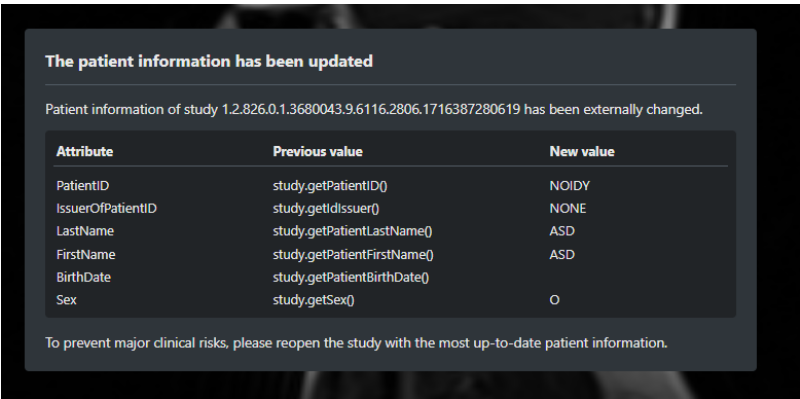
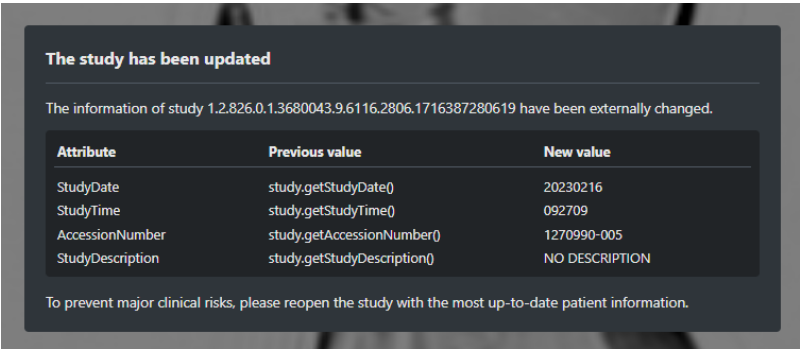


Image 129: Time-intensity Curve

13 INFORMATION UPDATE - POP UP

Updating the study's information triggers the display of various pop-ups in the ZEEROMed View, depending on the changes made.

The following table describes the pop-ups that will be displayed.

POP-UP	DESCRIPTION
Updating patient information  <i>Image 130: Update of the displayed study's patient information</i>	It notifies the user that the patient information of the currently displayed study has been updated in the storage system (e.g. update of the PatientID, First/Last Name, Birth date, sex, issuer of PatientID,...). The user is invited to reopen the study with the most up-to-date patient information to prevent major critical risks.
Updating study information  <i>Image 131: Update of the displayed study's information</i>	It notifies the user that the information of the currently displayed study has been updated in the storage system (e.g. Study date, Study time, Accession Number, Study description,...). The user is invited to reopen the study with the most up-to-date study information to prevent major critical risks.
Removing instances	It notifies the user that some instances of the currently displayed study have



The study has been updated Some instances of study 1.2.826.0.1.3680043.9.6116.2806.1716387280619 have been removed. To prevent major clinical risks, please reopen the study with the most up-to-date study instances. Image 132: Removal of instances from the displayed study	been removed from the stor- age system. The user is invited to reopen the study with the most up- to-date study instances to prevent major critical risks.
Adding new instances New instances available New instances have been added to the study 1.2.826.0.1.3680043.9.6116.2806.1716387280619. Reopen the study to see them or accept the risk and continue without the new instances. Accept the risk and continue* * Please note: by clicking the button, the system will track your choice for this study. Image 133: Addition of instances to the displayed study	It notifies the user that new instances have been added to the currently displayed study. To prevent major critical risks, the user is invited to reopen the study. Alternatively, the user can accept the risk by clicking on the "Accept the risk and con- tinue" button, and continue visualizing the study without the new instances. In this case, the system tracks the user's choice and informs the user accord- ingly: Accept the risk and continue* Image 134: "Accept the risk and continue" button

Table 45: Information update pop-up

14 OPHTHALMOLOGY TOOLS

Ophthalmology exams include the following modalities:

- Ophthalmic Coherence Tomography (OCT);
- Fundus Photography (OP).

In OP images, clicking the 1x2 layout displays a yellow reference line indicating the retina cross-section currently being scrolled in the OPT image.



Image 135: Reference line (Yellow)

14.1 Additional toolbar

Since the pixels of the ophthalmology image are rectangular, the following tools are required:

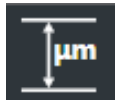
ICONS	TOOLTIP	DESCRIPTION
	PAR (Pixel Aspect Ratio)	Shows the image with rectangular pixels
	Uniformed PAR in line with the scale	Smooths out the pixels making them squares

Table 46: Ophtalmology tools



The scale used for Ophthalmology images is 400 μm and is displayed in the bottom-left of the image.

14.2 Measures

Available measures include:

- Linear;
- Circular;
- Rectangular.

 **NOTE:** angular measure is not available.

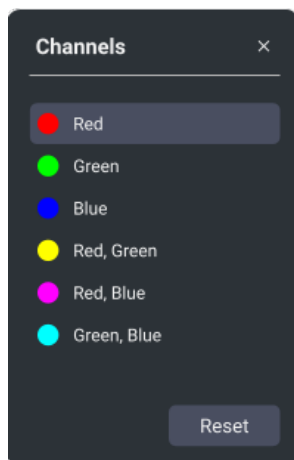
14.3 RGB channels filter

The "Channels picker" icon in the toolbar  allows the user to isolate a specific color component or a combination of two color components in an OP image and display it in a grayscale color map. Users can select from the following channels:

- Red: only the red channel;
- Green: only the green channel;
- Blue: only the blue channel;
- Yellow: sum of red and green channels;
- Magenta: sum of red and blue channels;
- Cyan: sum of green and blue channels.

When a channel is enabled, the button icon is highlighted in the corresponding color, allowing the user to immediately identify the active filter for the image.

For example, when the green channel is selected, the icon will be highlighted in green: .



*Image 136: "Channels picker"
pop-up*

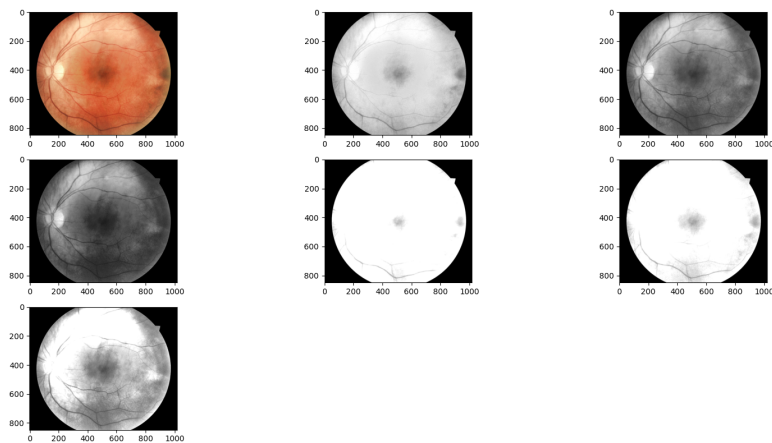


Image 137: Example of RGB filters

To restore the original image without channel isolation, click the "Reset" button.

15 TOOLS TO VIEW AND EDIT VIDEOS

ZEEROMed View allows viewing videos encapsulated in DICOM format.

Videos within in the sequence are displayed as previews in the main screen.

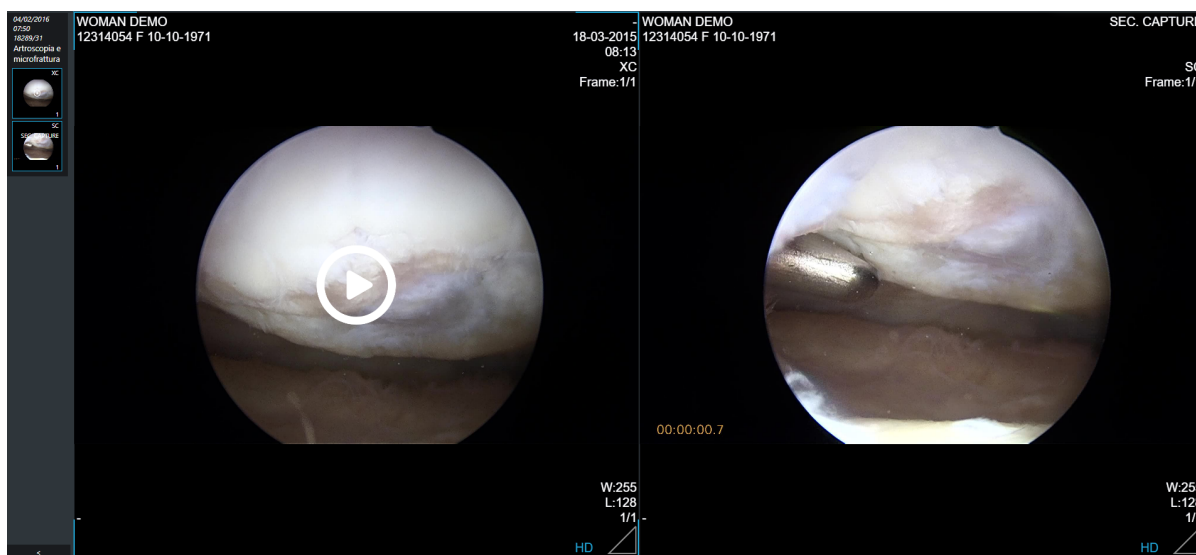


Image 138: Video preview

The "Play" icon  in the video preview enables to play and edit the video:

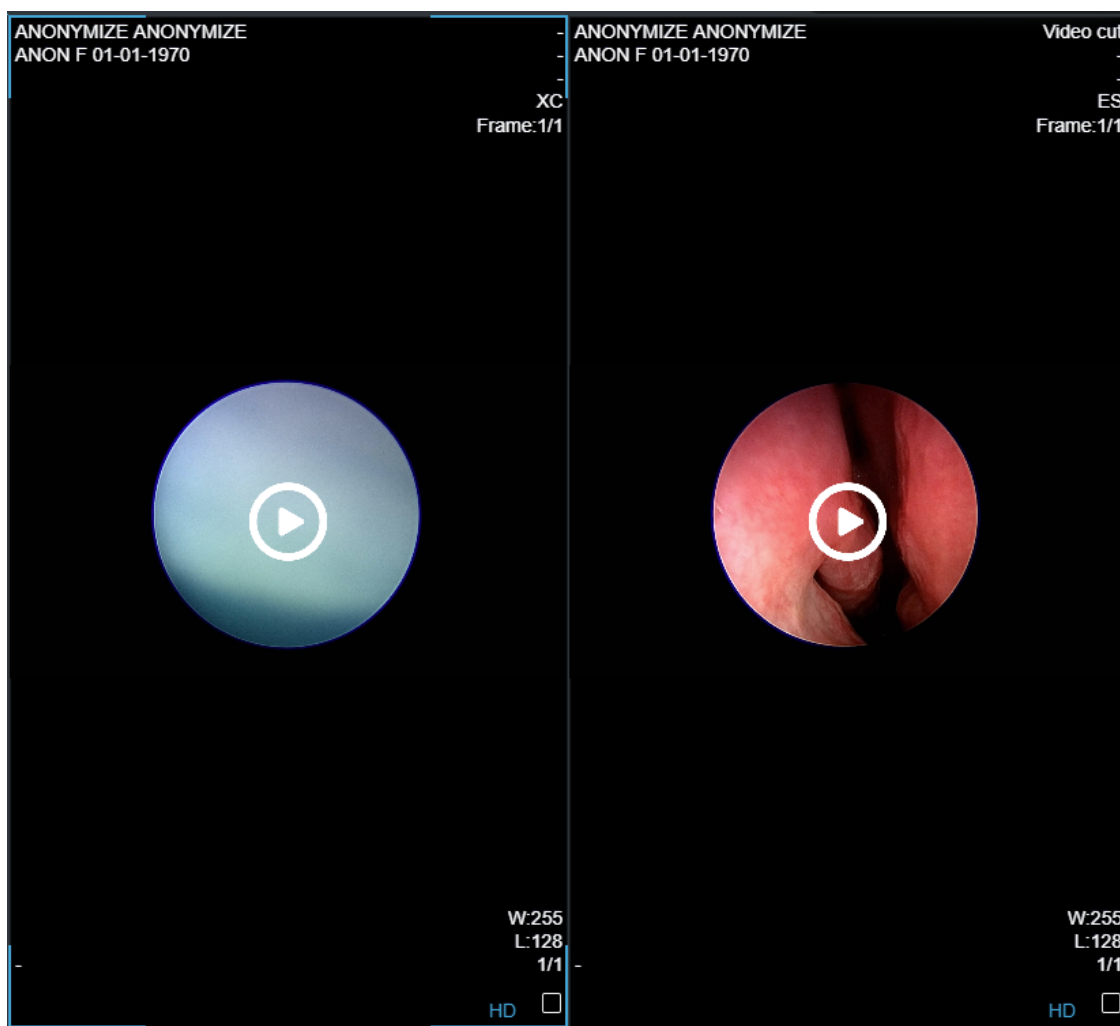


Image 139: Video tools

To navigate quickly to a specific frame of the video, the user can drag the mouse pointer or click on the specific frame of the timeline



Image 140: Navigating into the timeline

Additionally, the "Left" and "Right" arrow key from the keyboard move 10 seconds backward and forward from the current time.

The video tools are present in the toolbar below the video (as can be seen by the image) and they include:



Image 141: Video toolbar



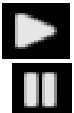
ICON	NAME	FEATURE
	Play / Pause video	Plays and pauses the video. Also the "Space" key on the keyboard toggles the "Play/Pause button".
	Volume	Turns the volume "On" and "Off". To adjust the volume, the user can drag the mouse pointer or click on the desired volume level on the volume bar
	Full- screen mode	Expands the video to full-screen. Pressing "ESC" or the proper button exits full-screen mode. The "F" key on the keyboard toggles full-screen mode.
	Take a snap- shot	Captures a snapshot of the video. See chapter 15.1 Taking a snapshot for more information
	Cut selected range	Cuts the video. See chapter 15.2 Cutting a video for more information

Table 47: Video toolbar buttons

15.1 Taking a snapshot

Clicking on the "Take a snapshot" icon  allows the user to save a snapshot of the video.

Upon clicking on the icon, a pop-up appears on the right of the screen, enabling the user to save ("Save" button) or delete ("Clear all") the snapshot taken.

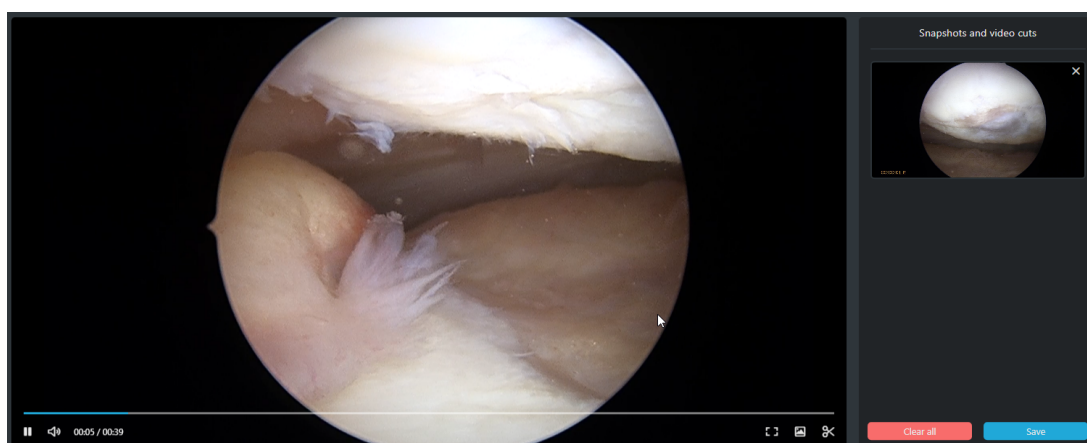




Image 142: Video editing: taking a snapshot

Clicking the "Save" button saves the secondary capture (SC) in DICOM format. A timestamp of the frame (seconds from the start of the video) is added to the bottom left on the saved snapshot.

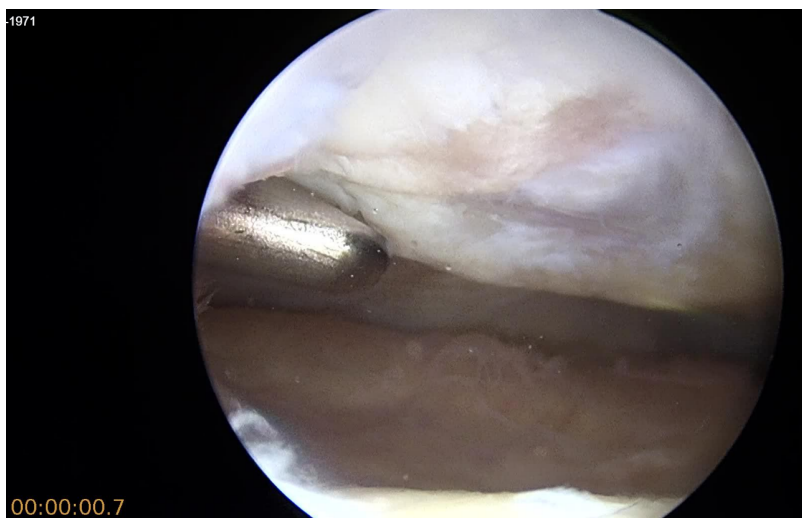


Image 143: Secondary Capture (SC)

15.2 Cutting a video

Clicking on the "Cut selected range" icon  allows the user to cut a portion of the video and save the remaining part as a "video cut" file (ES).

Upon clicking the icon, a pop-up appears, allowing the user to choose the resolution of the video to be cut (original or lower) and save the settings.

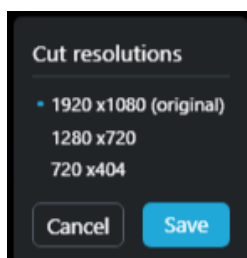


Image 144: Setting for video cutting

Then the "Snapshot and video cuts" pop-up is displayed on the right of the screen, allowing the user to save ("Save" button) or delete ("Clear all") the video portion. A preview of video is displayed in the pop-up.

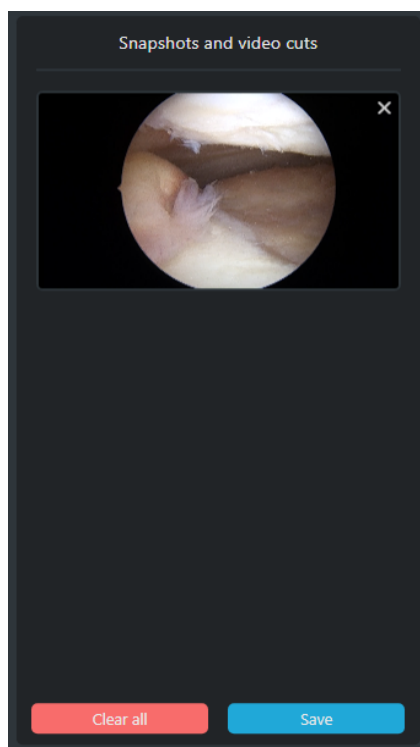


Image 145: Video editing: cutting the video

16 CARDIOLOGICAL TOOLS

ZEEROMed View, if configured, allows the user to visualize two-dimensional DICOM ECG.

The ECG panel includes:

- Menu with additional tools in the upper toolbar (see chapter **16.1 Additional tools**);
- Patient data in the top-left corner;
- Exam data in the top-right corner;
- ECG trace in the center of the screen;
- ECG parameters in the bottom toolbar (e.g. PR, QRSd, QT, QTc, RR, FREQ, ST, PRT Axes, NiBP, HRV RMSSD*, BRT*);
- Reports in the lower section of the screen.

*Only if provided by third parties.

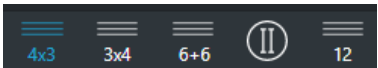


Image 146: ECG viewer

16.1 Additional tools

ICON	NAME	FEATURE
------	------	---------



	Send report	Sends report to the Information System (if configured)
	Save report	Saves the report in a selected folder on the server
	Start comparison	Displays side by side two different exams, in order to make a comparison. Comparing ECGs provides synchronization by default, and sync: • Pan • View (NxM) • Applied filter • Applied voltage
	Link panels	Propagates to all sequences the operations of filtering, visualization, applied voltage, zoom and pan performed on the active sequence
	Fit to window	Adapts the scale of visualization of the active sequence so that its image fits the containing panel
	Pan	Mutually exclusive to "Zoom". Sets "Pan" as active operation
	Zoom	Mutually exclusive to "Pan". Sets "Zoom" as active operation.
	Measures	Allows to take measurements in ms and mV. See 16.1.1 Taking a measurement
	Visualization layout	Allows to view leads in different layouts (4 rows and 3 columns, 3 rows and 4 columns, 6 rows and 2 columns, 12 rows and 1 column).



	Visualization of track II	Allows the visualization of the track II long signal
	Vertical scale	To decide the values of the vertical scale in mm / mV (5, 10, 20 or 40 mm / mV)
	Filter	Enables or disables a 25, 40, 150 or 300 Hz filter. A notch filter at 50Hz/60Hz (it depends on the geographic installation of the system) is always present.
	Report export (PDF)	Exports a report in pdf format, see 16.3 PDF report creation and sending

Table 48: ECG tools

16.1.1 Taking a measurement

16.1.1.1 Measuring an interval (ms)

To measure an interval in ms:

1. Click the "ECG measurement" button ;
2. Drag the mouse horizontally from the beginning to the end of the desired interval



Image 147: Interval measurement (ms)

16.1.1.2 Measuring an amplitude (mV)

To measure the amplitude of a waveform in mV:



1. Click the "ECG measurement (Amplitude)" button 
2. Drag the mouse vertically to measure the desired amplitude

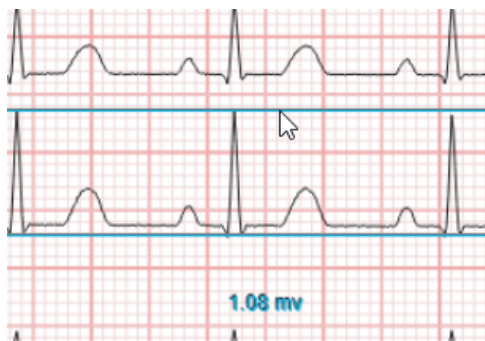


Image 148: Amplitude of a waveform in mV

16.2 Modifying ECG parameters (RR, QT, QRS, PR, ST)

NOTE: when a study is opened, ZEEROMed View automatically displays the parameters provided by the electrocardiograph

To modify a parameter:

1. Select the parameter to be edited from the lower toolbar (it will be highlighted in blue):

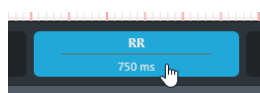


Image 149: Parameter selection

2. Drag the cursor from the start to the end point of the interval to be adjusted

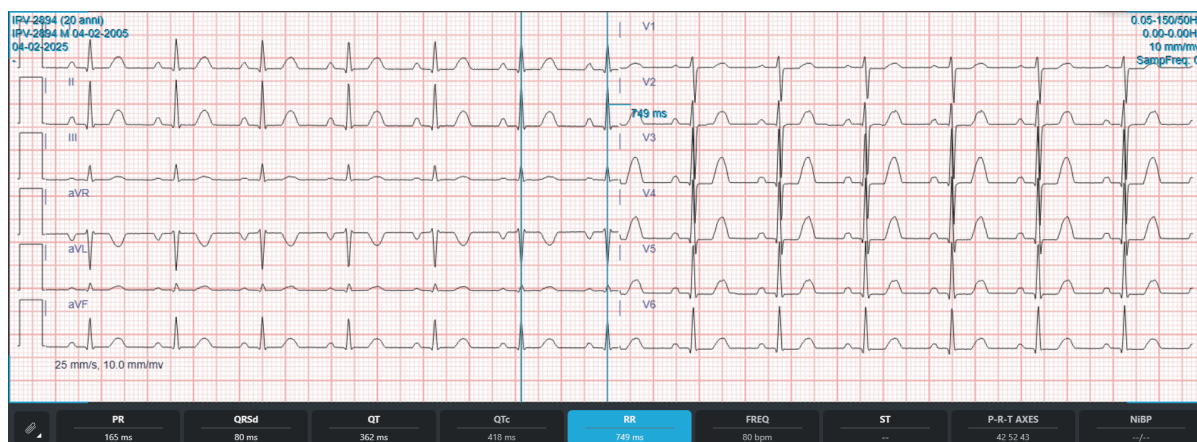


Image 150: Parameter modification

ZEEROMed View automatically updates the related parameters.



WARNING: to correctly display the **QTc** of an interval, both the RR and QT values must be adjusted

16.2.1 Selecting, editing and moving an interval

To **view and select** the interval endpoints, click inside the interval.

To **adjust an endpoint**, select the interval and drag the endpoint holding down the left mouse button.

To **move the entire interval**, select the interval and drag it using the left mouse button.

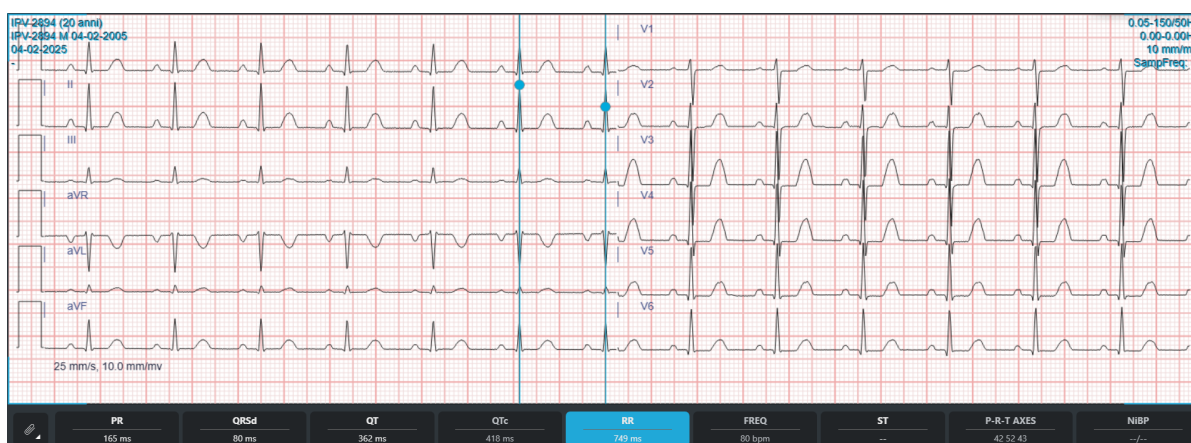


Image 151: Range measurement endpoints

16.3 PDF report creation and sending

Users can generate PDF report using free-text box located at the bottom of the panel.

The PDF report is structured as follows:

- Header:
 - Customer logos and data;
 - Patient data (name, surname, birthdate, sex, age);
 - Examination date and time, visualization scale and eventual applied filter;
- Body:
 - ECG signal tracing;
 - Measures (PR, QRSd, QT, QTC, RR, Freq, ST, QRS axis);
- At the bottom:
 - Medical report;
 - Report generation date and time.

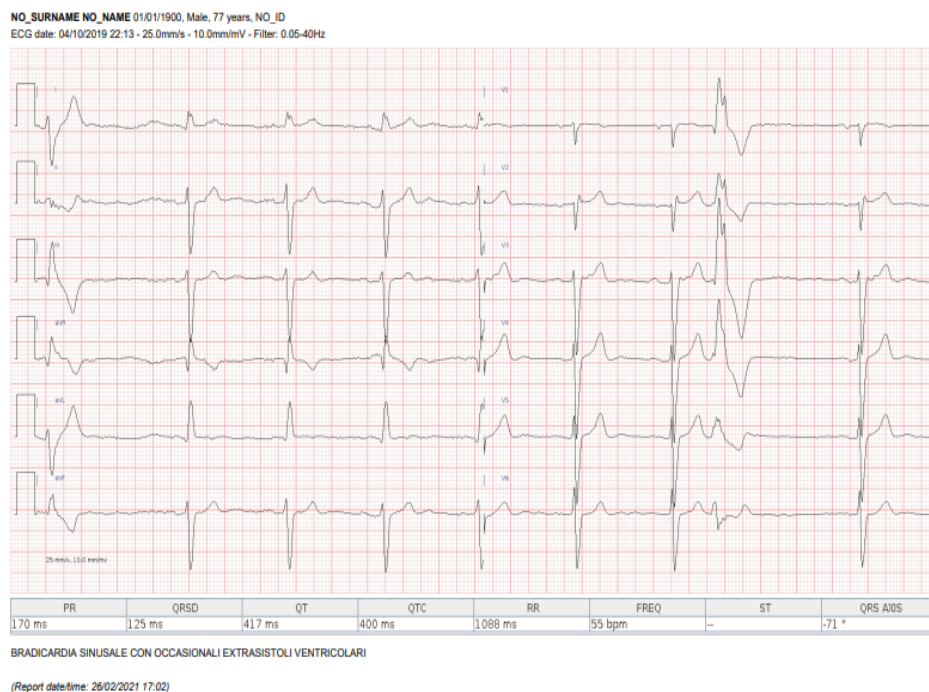


Image 152: Pdf report

16.3.1 Reporting macro

If configured ZEEROMed View enables communication with the Information System.

The user can configure the following options:

- display automatic ECG interpretation; if disabled, the initial report will be empty.
- insert macros: users can create predefined macros consisting of a title and a text. The title appears on the buttons located at the bottom left (see **Image 153: Macros configuration**), and clicking a button automatically inserts the corresponding text into the report.

If a previous finalized (closed) report is available, it will be displayed as read-only and cannot be modified by the user.



Image 153: Macros configuration



16.4 Holter/Stress test Viewer

If configured, ZEEROmed View allows the user to visualize holter and stress tests in PDF format.

The Holter/Stress panel consists of three sections:

- **Study history navigator** (at the top center of the screen)
 - hovering the mouse cursor over the PDF icon displays a tooltip with the date and time of the report;
 - clicking the yellow arrows allows the user to navigate through the various report of the study;
- **Patient history and label** (at the top-right of the screen);
- **PDF viewer** (in the center).

The screenshot displays a web-based form titled "Informazioni Paziente" for a patient named Sofia Esposito. The form is organized into several sections:

- Header:** Patient name "Esposito, Sofia 2002" and date/time "16/06/2015 18:47:32".
- Identification:** ID: 2002, ID Secondario: , ID Ammissione: 3002.
- Personal Data:**

Nato/a il: 18/09/1934	Altezza: 160 cm	Indirizzo:	Città:	Prov:
Età: 80 Anni	Peso: 50 kg	CAP:	Nazione:	Email:
Sesso: Femmina	Razza: N.D.	Tel. Casa:	Tel. Ufficio:	Cell.:
- Medical History:**

Angina: N.D.	Post-Infarto: N.D.	Indicazioni:	Terapia:
Bypass Cor.: N.D.	Interv. Prec.: N.D.		
Diabetico: N.D.	Fumatore: N.D.		
Storia Fam.: N.D.			
- Procedure:** Medico Richiedente: Russo Franco, Localione: MRE, Tipo Procedura: .
- Technical Data:** FC Target: 140 bpm, Motivi dell'Interruzione: , Sintomi: .
- Diagnosis and Notes:** Fields for "Diagnosi" and "Note".
- Conclusions:** A text area containing a template for the test conclusion, mentioning protocol name, duration, heart rate, and ST segment analysis.
- Signatures:** "Rivisto da:" and "Firmato da: Paolo Rossi".
- Date:** 16/06/2015.

Image 154: Holter/stress test

The digital pathology module dashboard consists of the following sections:

- Toolbar (top-left);
- Virtual Tray (left, see paragraph **17.2 Virtual Tray**);
- Slide (center);
- Slide's macro and label (bottom-left, see **17.1.4 Layout configuration**);
- Slide's navigation map (bottom-right, **17.4 Navigation map**).



17.1 Toolbar

Image 156: Toolbar

ICON	NAME	DESCRIPTION
------	------	-------------



	Research	Return to the product home screen and select another patient or study
	Layout	Displays the " <i>sequence layout</i> " menu; allows to view one or more images (up to 12 images) at the same time and change their layout (paragraph 7.1.1 Displaying more images of one sequence)
	Reset	Resets the studio's initial display status
	Start smart comparison	Allows to make a comparison the last examination of the patient obtained with the same modality (paragraph 7.2.1 Smart comparison between two exams). NOTE: this button is not present in case of double monitor
	Start comparison (mutually exclusive with the previous)	Displays the patient history and choose the exam to open for comparison (paragraph 7 General Tools). NOTE: this button is not present in case of double monitor
	Fit to screen	Changes the display scale of the selected sequence to fit the image size to the panel. Can be activated by pressing the button " F "
	Show/Hide color correction window	Opens a panel that allows the user to correct the range, brightness, contrast, and to balance the color of the image (paragraph 17.1.5 Color correction)
	Show/Hide labels	Allows the label and navigation map to be displayed in the lower section
	View DICOM Tag	Displays the DICOM Tags of the selected instance
	Export displayed region	Saves a secondary capture of the visualized image (paragraph 17.7 ROI (Region Of Interest) - Snapshot)



	Share the current exam with someone else	Opens the sharing section of the study (7.2.6 Share Exam)
	Align images	Grid for manually aligning images in the screen (paragraph 17.1.3 Images alignment)
	Show/Hide layout configuration window	Allows the user to displays the layout configuration menu (paragraph 17.1.4 Layout configuration)
	Rotate left 90°	Rotates the image counterclockwise (paragraph 17.1.2 Images rotation)
	Rotate right 90°	Rotates the image clockwise (paragraph 17.1.2 Images rotation)
	Link panels	Enables the panels synchronization. By default, the images are not synchronized (the icon is gray); by clicking the button, the images synchronize and the icon turns blue (paragraph 17.1.1 Link panels)
	Cell counter (Open the cell counter popup)	It automatically returns the number of cells manually highlighted by the user. By activating the icon, a pop-up opens and the number of selected cells present in the slide or in a specific area defined by the user is displayed (paragraph 17.1.6 Cell counter)
	Flip Horizontally	Flips horizontally the slide. It is a toggle-style button; once selected, the icon turns blue and the slide is flipped right/left
	Flip Vertically	Flips vertically the slide. It is a toggle-style button; once selected, the icon turns blue and the slide is flipped up/down

Table 49: Anatomo Pathology tools

17.1.1 Link panels

Users can choose to synchronize the images in the panel.



By default, images are not synchronized and the icon present in the toolbar appears grey . Zoom, slide navigation and images rotation are not synchronized and they are applied only to the selected image.

By clicking the button, the icon turns blue , the images are synchronized and all the functionalities are automatically applied to both slides.

17.1.2 Images rotation

ICON/KEY	FUNCTION
	Rotate 90° clockwise
	Rotate 90° counterclockwise
→	Rotate 15° clockwise
←	Rotate 15° counterclockwise

Table 50: Icons and keys for image rotation

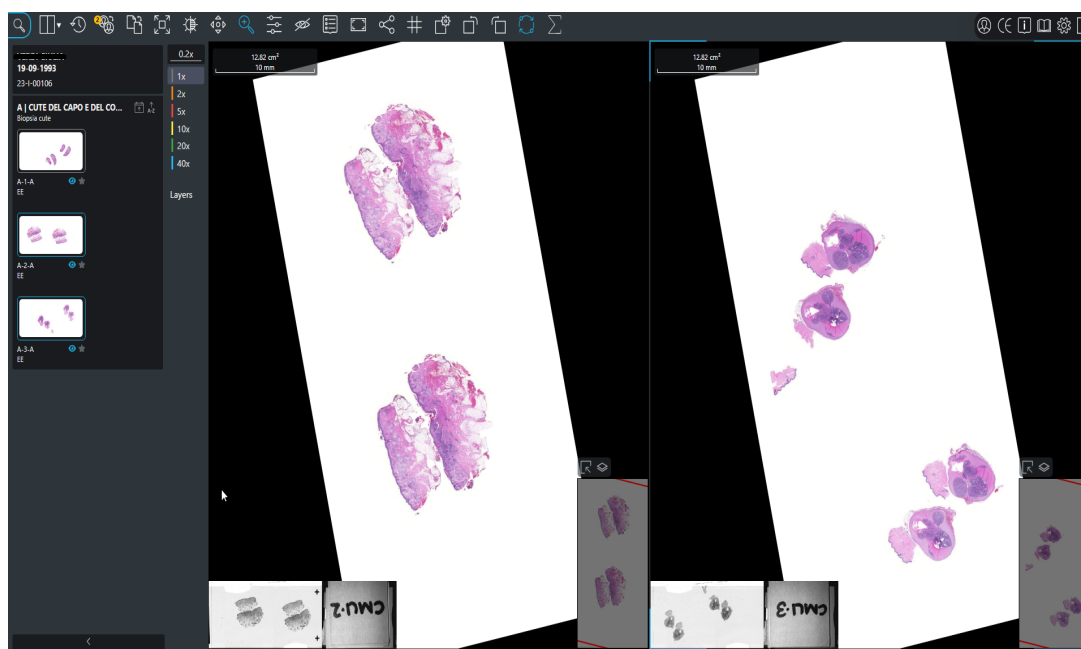


Image 157: Images rotation



17.1.3 Images alignment

ZEEROMed View allows the simultaneous display of multiple digital slides belonging to the same case, up to a maximum of 12 images. The images in the different panels are not synchronized and can be aligned manually by clicking on the icon  present in the toolbar.

By selecting this button, the user, with the help of the blue reference grid, can align the images manually (dragging and/or rotating the image).

Deselecting the icon will preserve the alignment introduced between the images.

 **NOTE:** to proceed with image alignment, user must ensure that the panel synchronization icon is deactivated (gray).

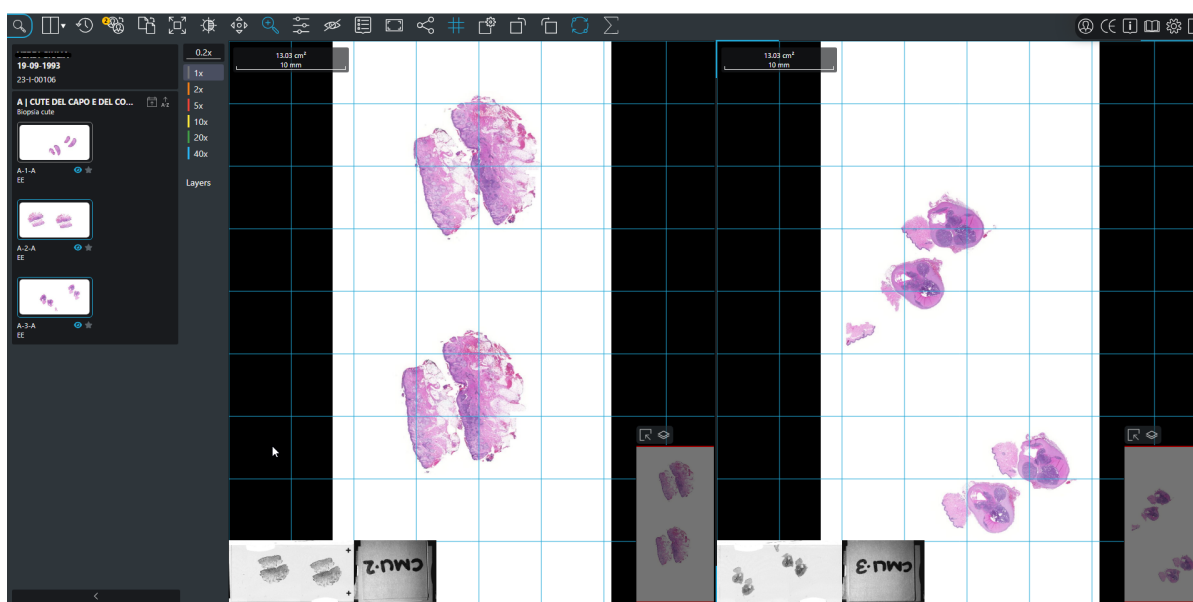


Image 158: Images alignment

17.1.4 Layout configuration

Clicking the icon "Show/Hide layout configuration window"  in the toolbar opens the layout configuration panel:

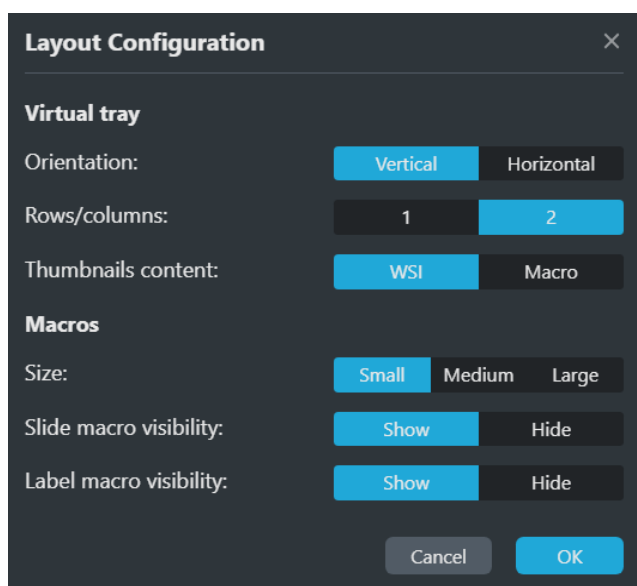


Image 159: Configuration layout panel

Within the configuration panel, the user can configure:

	OPTION	FUNCTIONALITIES
Virtual Tray (see 17.2 Virtual Tray)	Orientation	User can choose whether to display slides horizontally or vertically
	Number of slides per row / column	User can choose if display 1 or 2 slides for each row or column
	Preview content	User can choose whether to display slides or labels in previews
Macros	Dimension	User can choose the magnification level (large, medium or small) of the label/slide at mouse hover
	Macro slide visibility	User can decide whether to display the slide macro in the bottom left
	Label slide visibility	User can decide whether to display the slide label on the bottom left

Table 51: Layout configuration



WARNING: these changes are saved on the system and apply whenever the user opens a studio with ZEEROMed View. They can be changed again at any time

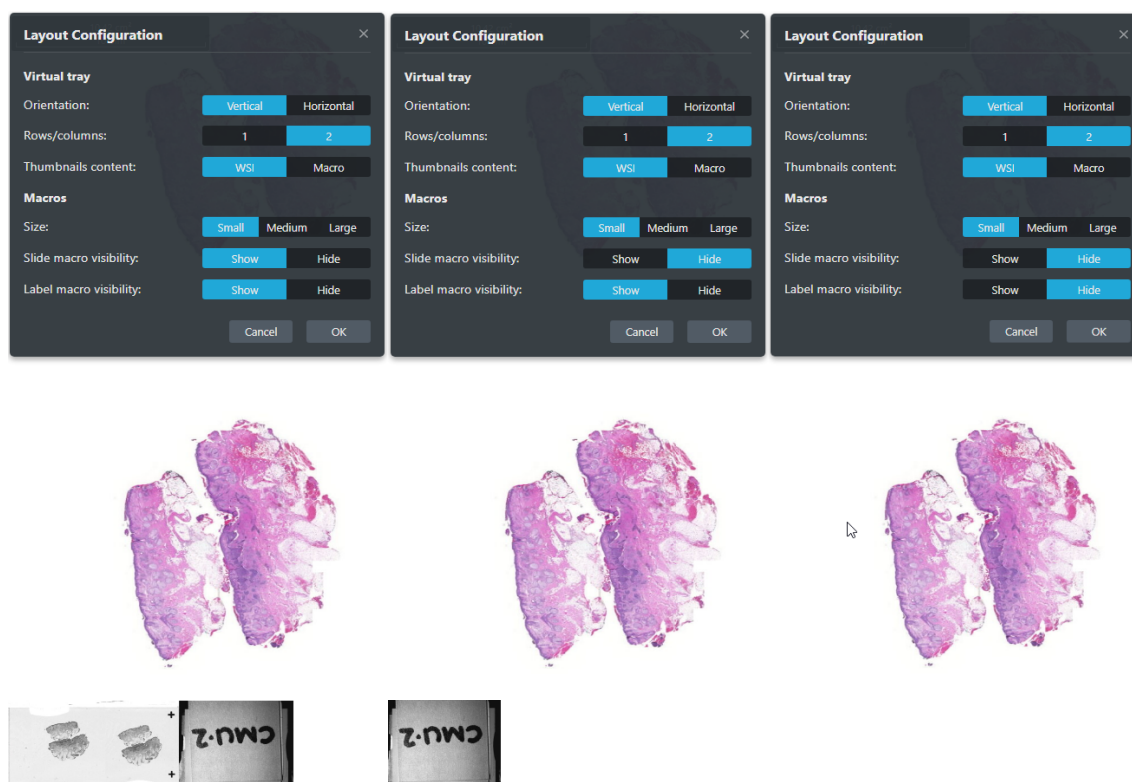


Image 160: Various layout configurations

17.1.5 Color correction

17.1.5.1 ICC Profile

For SVS slides containing ICC profiles, ZEEROMed View automatically applies the embedded ICC profile.

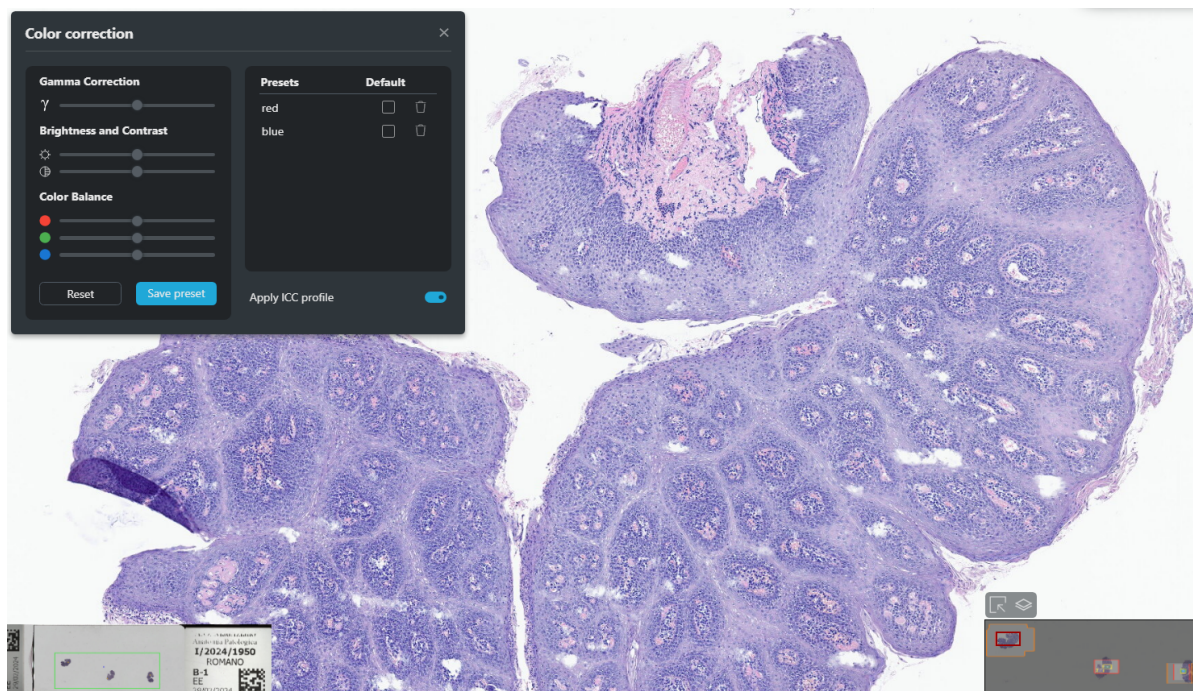


Image 161: Application of ICC profile

To **disable** the ICC profile:

1. Click the "Show/Hide Color Correction window" button  to open the "Color correction" panel;
2. Deselect the "Apply ICC profile" option.

This setting remains in effect only for the current slide and until the study is closed.

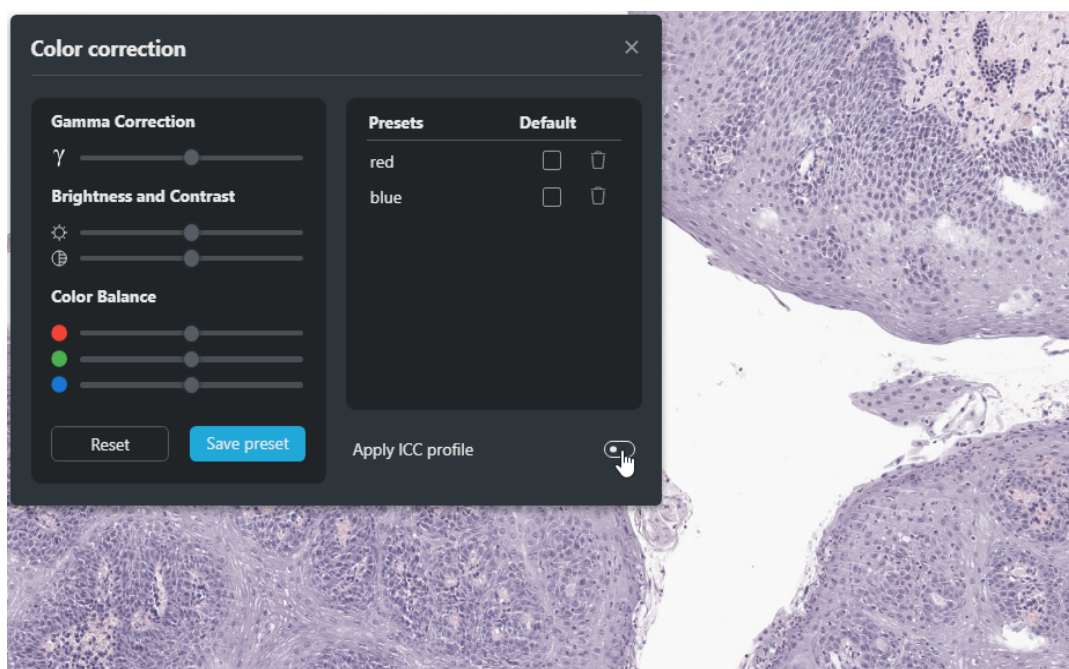


Image 162: ICC profile disabling

17.1.5.2 Temporary color correction

Selecting the "Show/Hide Color Correction window" button , the user can **temporary** correct the brightness, contrast, color balance and perform gamma correction.

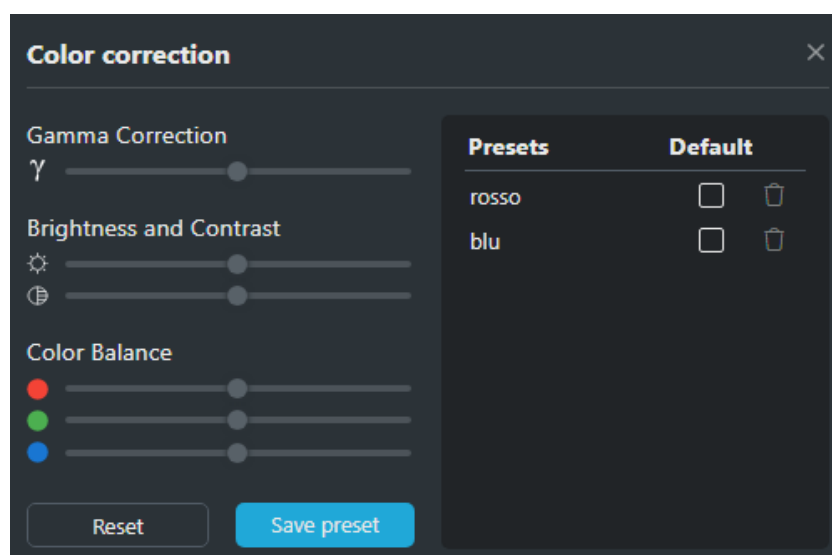


Image 163: Colour window panel



WARNING: Changes remain active until the end of the session on the specific slide

To **restore** the image to the initial condition, select the "Reset" button of the panel itself or the "Reset" icon of the toolbar .

17.1.5.3 Save a preset

1. Set the desired levels of gamma correction, brightness and contrast, and color balance;
2. Click on the "Save preset" button;
3. Assign a unique name to the *preset* in the provided pop-up: ;
4. Press the "**Enter**" key to save the preset.

To cancel the operation, press the "Esc" key.

The following toaster will notify the user that the preset has been saved:

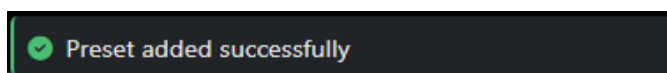


Image 164: Toaster "Preset added"

17.1.5.4 Apply a saved preset to another slide

To apply the color correction parameters to another slide, simply select the corresponding preset from the panel.

To restore the image to the initial condition, select the "Reset" button of the panel itself or the "Reset" icon of the toolbar .

17.1.5.5 Default color correction application

To save a preset and apply automatically to all anatomopathology images across, check the box in the "Default" column of the panel.

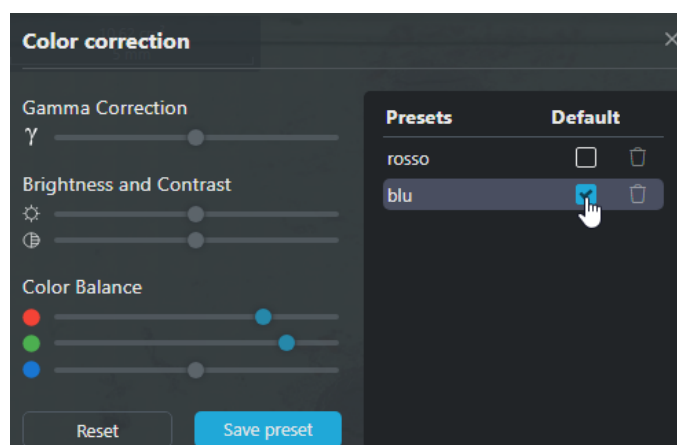




Image 165: Marking a preset as "default"

A toaster notification will inform the user that a preset has been automatically applied to the images.

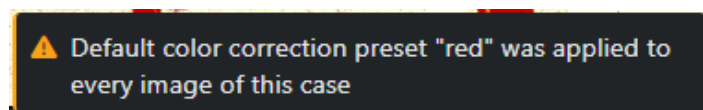


Image 166: "Filter applied" Toaster notification

NOTE: in this scenario, the color profile is applied at the user level rather than at the "case" level.

17.1.5.6 Delete a preset

1. In the panel, click on the "Delete" icon  in the row of the preset to be deleted;
2. Confirm the operation in the related pop-up.

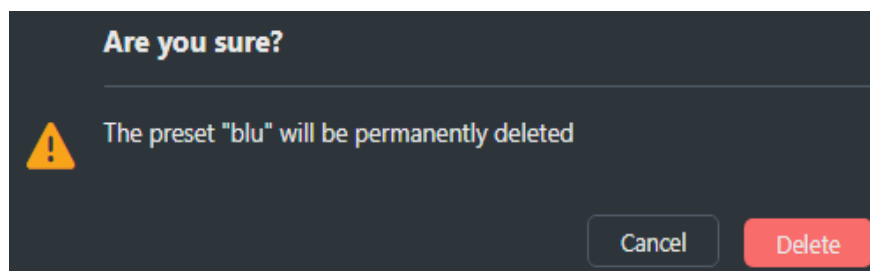


Image 167: "Delete preset" pop-up

17.1.6 Cell counter

The "Cell counter" tool automatically returns the number of markers manually placed by the user in a portion of the image.

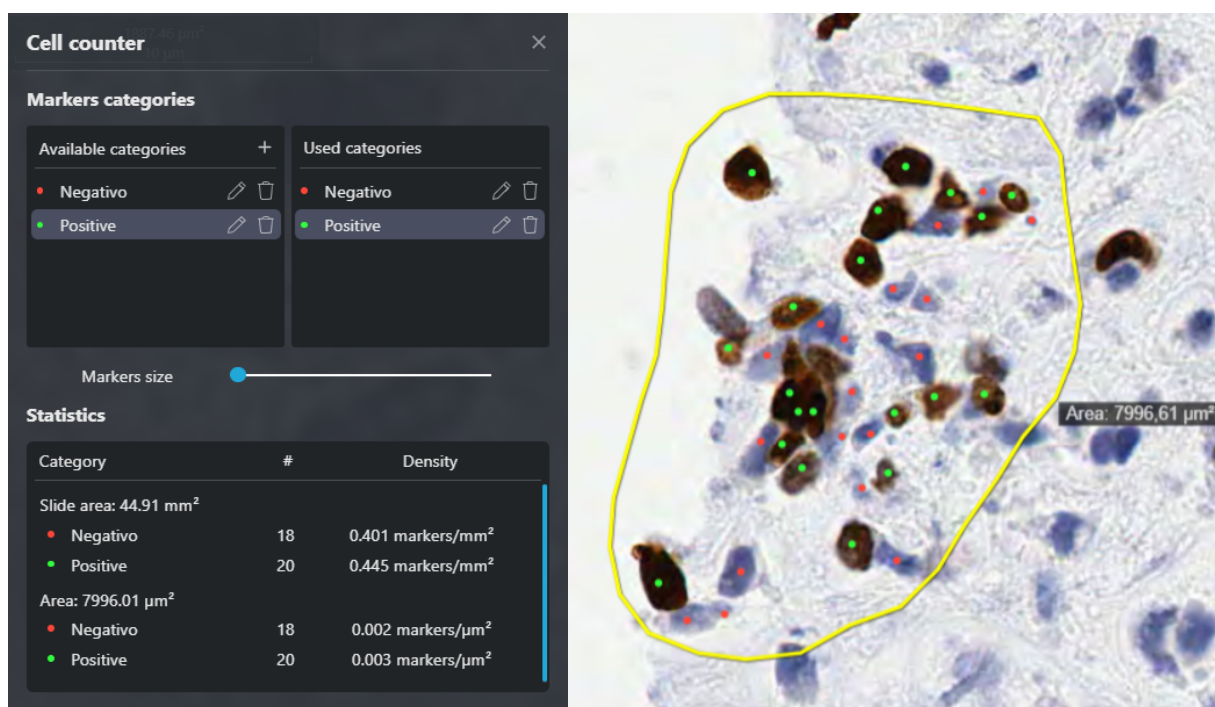


Image 168: Cell counter tool

17.1.6.1 Definitions

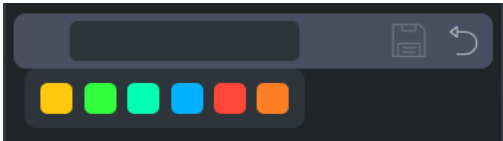
- **Marker:** a single point placed on an image;
- **Category:** unique grouping of markers defined by a name and color customizable by the user. There are two types of categories: "available" and "used".
 - **Available categories:** contain the types of markers defined by the user; by default the categories present are ● Positive and ● Negative
 - **Used categories:** contain the types of markers present on the selected image.

17.1.6.2 Operations on "Categories"

The table below outlines the main steps to customize the "Categories".

ICON	NAME	FUNCTIONALITY
	Create a new marker category	User can add a new category to the list of available categories. As soon as the icon is selected, a pop-up opens to enter the category name and the color to be used.



		 To save the new category, it is necessary to click on the "Save Changes" icon , while to cancel, click on the "Revert changes" button . ⚠ Attention: both fields, name and color, must be filled to save the new marker category.
	Update category	Available categories: by clicking on the icon of an "Available categories", the user can update the name and/or color of the selected category. ⚠ Attention: this operation does not imply the update of markers already positioned on the images; only the "new" markers will have the updated name and color. To save the changes, it is necessary to click on the "Save Changes" icon , while to discard them and restore the initial state, click on the "Revert changes" button . Used categories: by clicking on the icon of an "Used categories", the user can update the name and/or color of the selected category. ⚠ Attention: this operation implies updating the name and/or color of markers previously placed on the image. To save the changes, it is necessary to click on the "Save Changes" icon , while to discard them and restore the initial state, click on the "Revert changes" button .
	Delete category	Available categories: by clicking on the icon of an "Available categories" the selected category is deleted. ⚠ Attention: this operation does not imply the deletion of markers already placed on the images. Used categories: by clicking on the icon of an "Used categories", the selected category is deleted along with all markers already placed on the current image.



		⚠ Attention: this operation does not imply the deletion of markers from this category previously placed on other images.
--	--	--

Table 52: Cell counter buttons

17.1.6.3 How to place a Marker

1. Select the "Open the cell counter popup" icon ;
2. Choose the marker's category from the "Available categories" or "Used categories" list.
3. Click on the image point where the user wants to place the marker.

At this point, the "Statistics" section of the popup will automatically populate with information regarding the number of markers present and cell density.

⚠ WARNING: it is not possible to delete individual marker, but only the associated category (see paragraph **17.1.6.2 Operations on "Categories"**). Additionally, it is not possible to modify the placement of markers

17.1.6.4 Marker grouping with Area Measurement

Once markers have been placed (see paragraph **17 Anatomo Pathology tools**), it is possible to group them using any area measurement (see paragraph **17 Anatomo Pathology tools**: circular measure, rectangular measure, polygon measure, free hand measure).

This operation updates the "Statistics" panel in the popup:

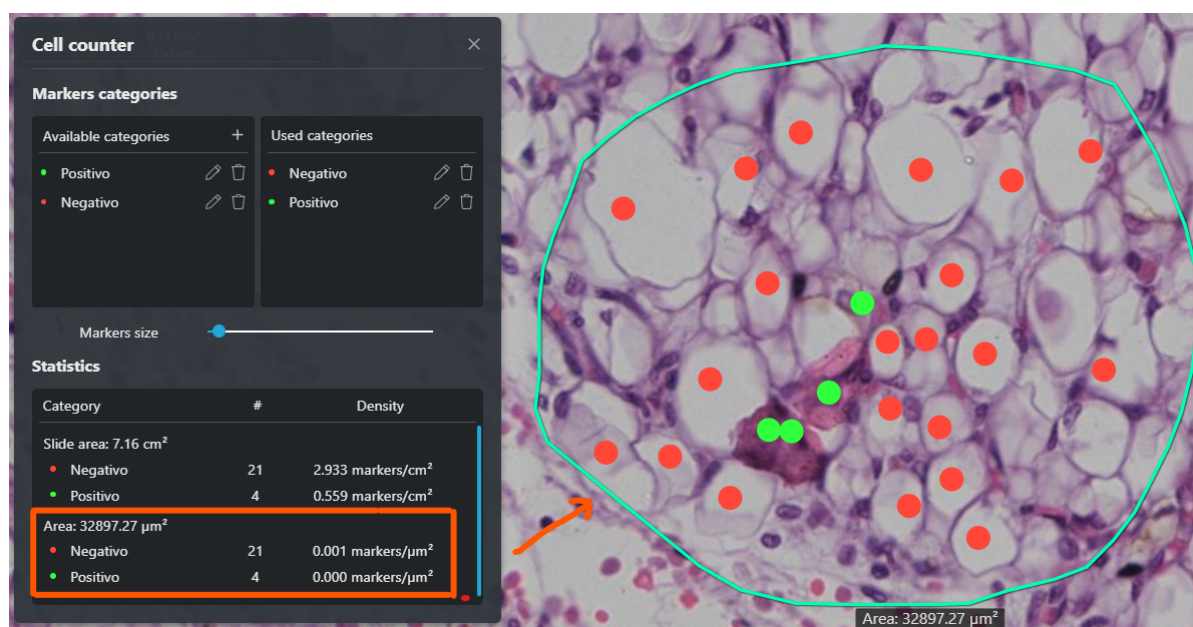




Image 169: Cell counter statistics

Each row in the "Statistics" panel contains the following data grouped by area measurements:

- Category: name and color of the category;
- #: number of markers contained within the area;
- Density: density of markers within the area (unit of measurement: *markers/area unit*).

NOTE: the "Slide area" measurement, corresponding to the total slide area, is always available. All placed markers are automatically grouped under this measurement as well.

All measurements are interactive: clicking on them automatically shifts the viewer to the corresponding area of interest.

17.2 Virtual Tray

The virtual tray, present in the left portion of the screen, allows the user to select the digital slides to be displayed.

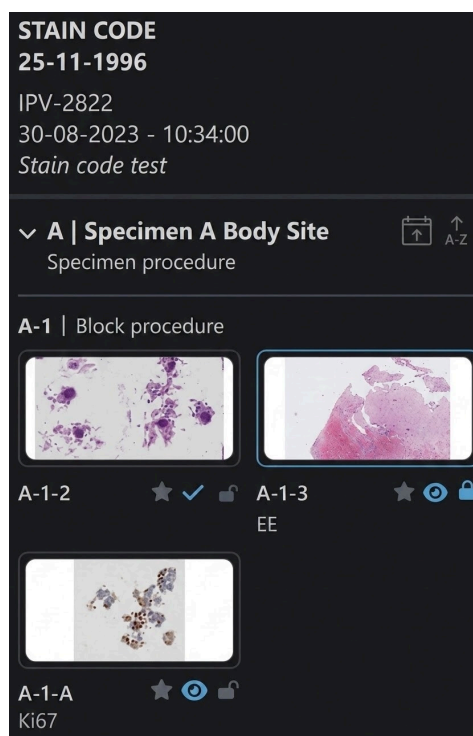


Image 170: Virtual Tray

As shown in the image, the slide previews of the case are organised according to hierarchical levels *Specimen / Block / Slide* or *Part / Slide* (for cytology).

The virtual tray allows viewing:



ELEMENT	ICON
• Surname, first name and date of birth of the patient • Accession Number of the case	
• Specimen: ◦ Code (e.g. "A") ◦ Topography (e.g. "Specimen A Body Site") ◦ Description (e.g. "Specimen procedure") NOTE: this section of the virtual tray can be "collapsed" using the relative icon	
• Block: ◦ Code (e.g. "A-1") ◦ Description (e.g. "Block procedure")	
• Slide: ◦ Identification code (e.g. "A-1-3") ◦ Colour used (e.g. "EE"); ◦ Symbols/visual indicator: ▪ Marker for "favorites" slides ▪ Review status (see paragraph 17.2.1 Keeping track of image opening) ▪ Retention lock (see paragraph 17.2.2 Retention lock for slides)	

Table 53: Virtual Tray description

By clicking on the preview of each slide, the user can view the digital image in the navigation panel (layout 1x1); otherwise the user can drag the slide with the left mouse button.

The displayed slide is highlighted in virtual tray while an opacity filter is applied to any slide not currently shown in any panel.

The table below defines the functionality of all icons in the virtual tray:



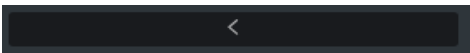
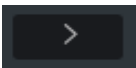
ICON	FUNCTIONALITY
	Sorts the slide previews according to the date of the slide scan; the sorting can be ascending or descending. The user can view the scan date by hovering over the slide preview.
	Sorts the slide previews according to the slide identification; the sorting can be ascending or descending. The user can view the identifier by hovering over the slide preview.
	Allows to mark one or more slides deemed to be of interest as "Favorites"; by clicking on the gray star icon, this will be colored blue and the slide will be added to favorites.
	Hides the virtual tray
	Displays the virtual tray

Table 54: Virtual tray icons

It is possible to change the organization of the virtual tray via the icon in the toolbar; for more information, see the [17.1.4 Layout configuration](#).

17.2.1 Keeping track of image opening

The "Review status" icon  allows to track the status of image viewing. Three statuses can be associated with the icon:

STATUS	DESCRIPTION	ICON
Not viewed	This status is assigned to every slide if no operations have ever been performed on it	
Started	This status is <u>automatically</u> triggered when any operation is performed by the user on a slide	



Completed	This status is <u>manually</u> assigned by the user by clicking on the icon; to revert to the "started" status, click on the icon again	
------------------	---	---

Table 55: Image viewing tracking

17.2.2 Retention lock for slides



WARNING: this functionality is not enabled by default; to request its activation, contact your project manager.

To prevent specific digital slides from being deleted during automatic or manual deletion processes, users can change their retention status using the following icons:

ICON	STATUS	DESCRIPTION
	Unlocked	The slide is subjected to standard deletion and retention processes
	Locked	The slide is excluded from standard deletion processes

Table 56: Slides retention lock



NOTE: this feature is available depending on the user's role.

17.3 Slide navigation

The user can view a digital slide either by double-clicking its preview in the Virtual Tray or by dragging and dropping the preview into the viewer.

Once the image is opened, the user can navigate through the slide using the **mouse** as follows:

- **Mouse scroll:** adjust magnification (zoom in/zoom out);
- **Left-click and drag:** Move inside the slide;
- **Double left-click:** zoom with a factor of 1.5x.

Alternatively, use the **WASD controls** and **keyboard arrows**:

KEY	FUNCTIONALITY
-----	---------------



W	Move up (North)
S	Move down (South)
D	Move right (East)
A	Move left (West)
↑	Zoom in
↓	Zoom out

Table 57: Arrow keys to navigate within the slide

17.4 Navigation map

The navigation map, displayed at the bottom-right corner of the panel, provides a low resolution overview of the entire slide to facilitate orientation.

The navigation map allows the user to:

- **Identify the current position:** view which portion of the image is currently being displayed within the whole slide;
- **Navigate quickly:** move rapidly to different areas inside the slide;
- **Track viewing history:** keep track of the image portions already viewed and the magnification levels used (based on the color coding for discrete magnification levels found in the vertical tool-bar).

In the top-right corner of the map there are two buttons:

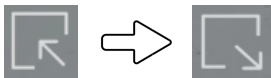
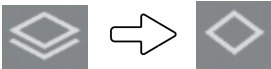
ICON	FUNCTIONALITY
	Zoom in and out of the map
	Hide and display tracking

Table 58: Navigation map tools

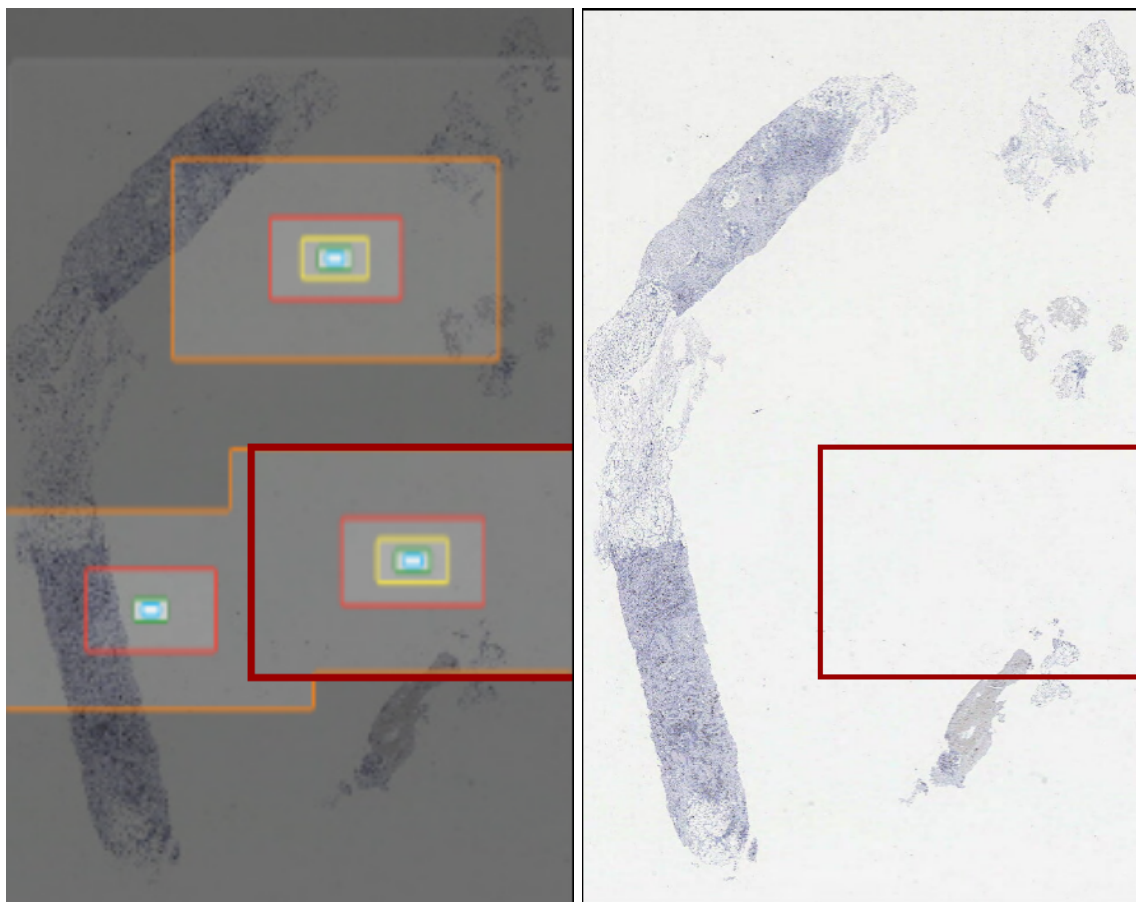


Image 171: Map enlarged with and without tracking

17.4.1 Zoom Levels

The zoom panel, located to the right of the virtual tray, includes:

- **Current magnification:** displays the currently applied zoom level;
- **1:1 button:** allows the image to be viewed at the acquisition magnification level (and therefore at the maximum possible resolution);
- **Preset buttons (1x, 2x, 5x, 10x, 20x, 40x):** allow the user to quickly scale the slide magnification to the corresponding values.

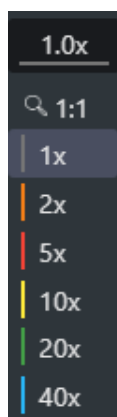


Image 172: Zoom Panel

The color code identifying the image magnification level is reproduced for the tracking in the navigation map.

 **NOTE:** Using the mouse scroll, the user can enlarge the image to the maximum allowed resolution plus 10%.

17.4.2 Scale and area indicator

The scale indicator and the currently displayed area are displayed in the top-left corner of the navigation panel.

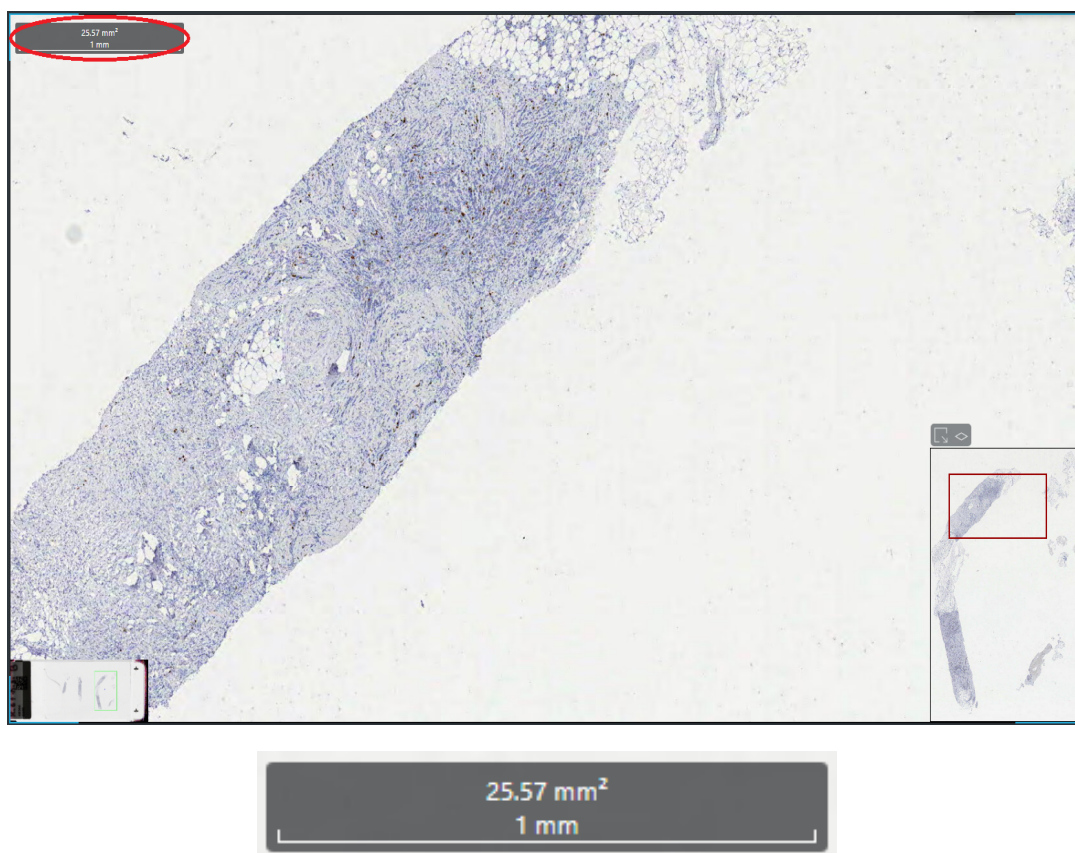


Image 173: Focus on the scale indicator and the currently visualized area

17.5 Measures and annotation

To insert measurements and annotations, right-clicking on the image to open the context menu.

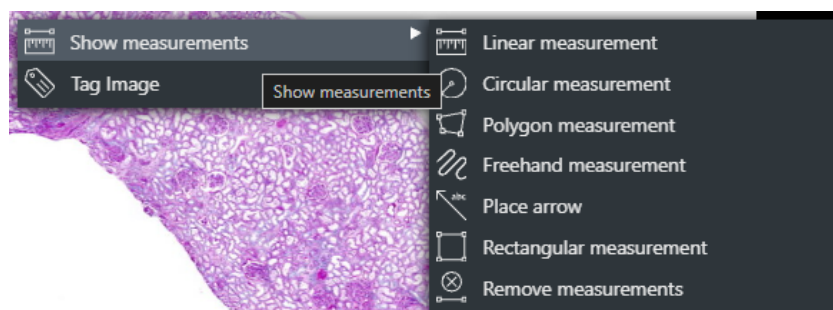


Image 174: Context menu

17.5.1 Measures

Available measurements include:



- Linear measure (or "R" key);
- Circular measure (or "O" key);
- Rectangular size;
- Polygon measure;
- Free hand measure (or "Q" key);
- Place arrow (or "Y" key).

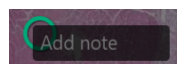
To **enter** or **modify** a measure, refer to chapter **7.3 Measures**.

To **save** a measurements click on the "Save layer" icon  on the vertical toolbar (see paragraph **17.5.3 Saving measures and annotation: Layer**).

17.5.2 Annotations

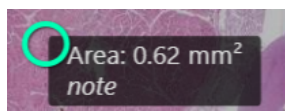
17.5.2.1 Adding a text note

1. Add a measurement (any measurement from the context menu);
2. Left-clicking within the box displaying the measurement value; the popup that opens is as follows:



3. Write the note and click the "Enter" key on the keyboard.

The text note is inserted in italics below the measurement value, as shown below.



17.5.2.2 Deleting a text note and/or a measurement

1. Right-click any point on the image;
2. Select "Remove Measures" from the context menu.

Alternatively, user can click the "Revert changes" icon  on the vertical toolbar.



WARNING: it is not possible to delete a single measurement. All measurements belonging to the same layer will be removed simultaneously (see paragraph **17.5.3 Saving measures and annotation: Layer**).

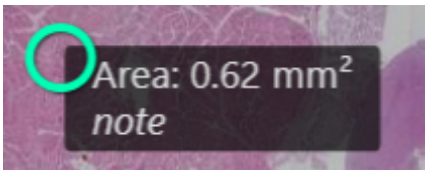
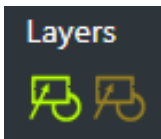
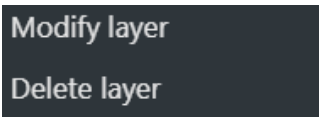


17.5.3 Saving measures and annotation: Layer

Measurements and/or annotations can be saved using the “Save layer” icon  on the vertical toolbar.

A **layer** is a grouping of measurements and annotations saved in the slide image.

The table below summarizes the main functionality of the icons related to the layers of an image.

ICON	FUNCTIONALITY / DESCRIPTION
	Saves layer in processing
	Reverts changes made
	By clicking on the label of the measurement, the user can add a text note (see paragraph 17 Anatomo Pathology tools)
	By clicking on the icon corresponding to the level you can view or hide the measurements and annotations of that level. By re-enabling the display of a layer, the system automatically positions itself on its image area. The mouse movement over the icon allows viewing information about the user and the date and time of its creation
	A click on the layer icon with the right mouse button opens the menu that allows to: Modify level: allows the user to add new measures, modify/delete existing ones and update their description. At the end of the changes the user will need to click on the icon  to save the changes. Delete level: allows the user to remove all measures and annotations related to the specific layer. A confirmation pop-up appears and the operation is irreversible.

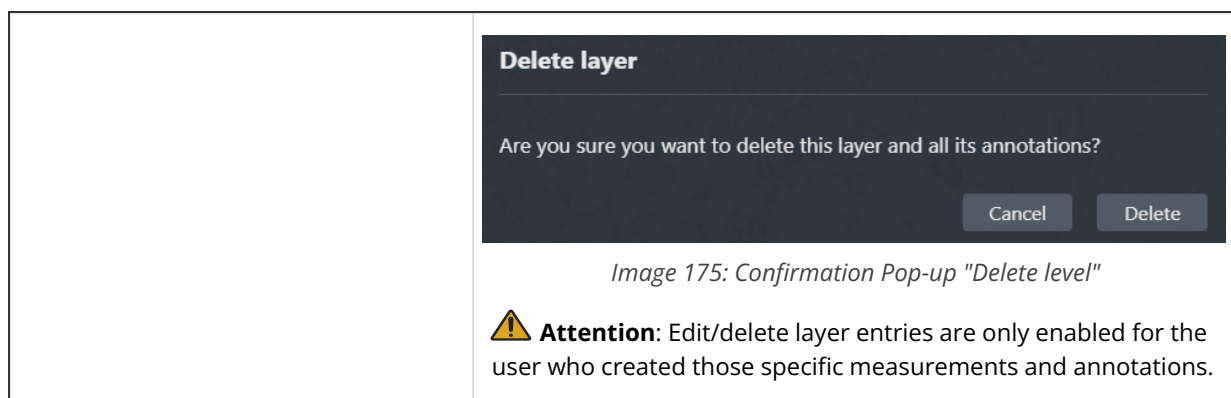


Table 59: Layer tools

17.6 Apply a custom TAG to a wholeslide

To streamline the search for a wholeslide in the "Search Exams panel", the user can assign a custom tag to it.

17.6.1 Assigning a custom tag to a slide

1. Right-click on the slide and select the "Tag image" from the context menu;
2. Enter the tag name in the pop-up field and click the "Add" button to save it.

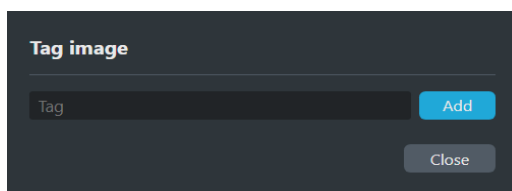


Image 176: Adding the tag to the slide

⚠️ NOTE: the allowed number of characters is limited to 64.

3. Left-clicking anywhere on the slide to close it.

The assigned tag can be viewed by moving the mouse cursor over the selected image preview.

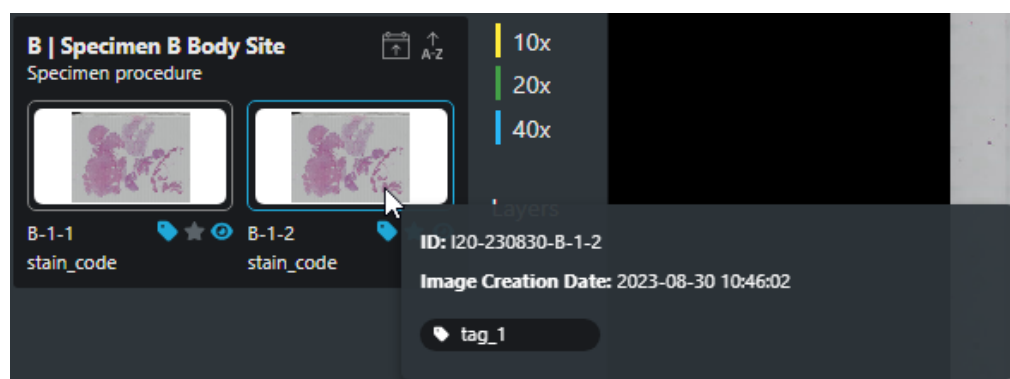


Image 177: Viewing the tag in the virtual tray

NOTE: Additional tags can be assigned to the same slide by following the process desined above.

17.6.2 Tag deletion

1. Open the context menu and select the "Tag image" option;
2. Press the "X" icon of the tag to be removed 
3. Click on the "Delete" icon in the tag removal pop-up:

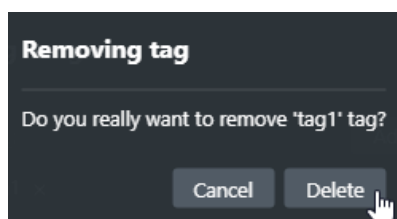


Image 178: Tag removal pop-up

17.6.3 Searching for a slide by tag

Introducing tags significantly streamlines the search for the slide. User can simply enter the tag name in the "Tag" field of the "Search Exams" panel.

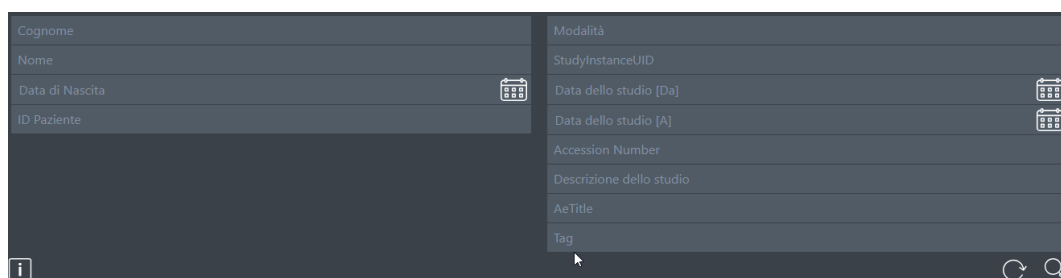


Image 179: Searching for a slide by tag



17.7 ROI (Region Of Interest) - Snapshot

The "Export region displayed" button  in the toolbar captures the currently displayed image portion to save it locally as a JPEG or send it to a LIS for report insertion.

Clicking the button opens the exporting pop-up in which users can insert an image description and choose the export destination (to the LIS or locally).

It is also possible to include a scale indicator in the exported image by selecting the 'Include scale indicator' option.

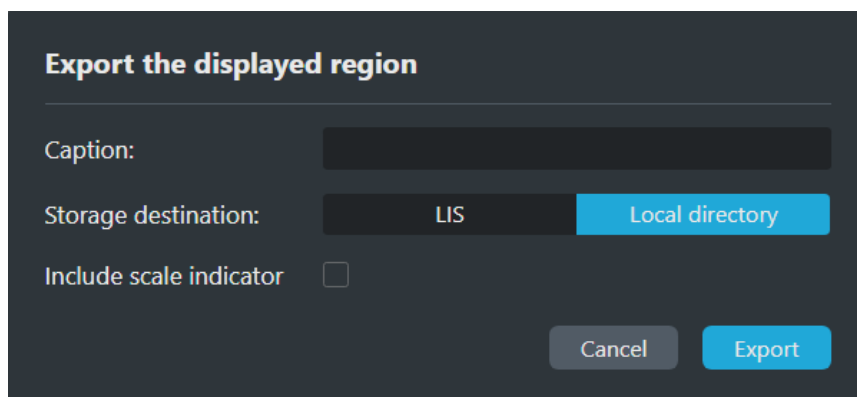


Image 180: Export panel of the displayed region

When a portion of the image is exported, the system tracks it by displaying a new icon in the "ROI" section of the vertical toolbar  and a black box in the navigation map.

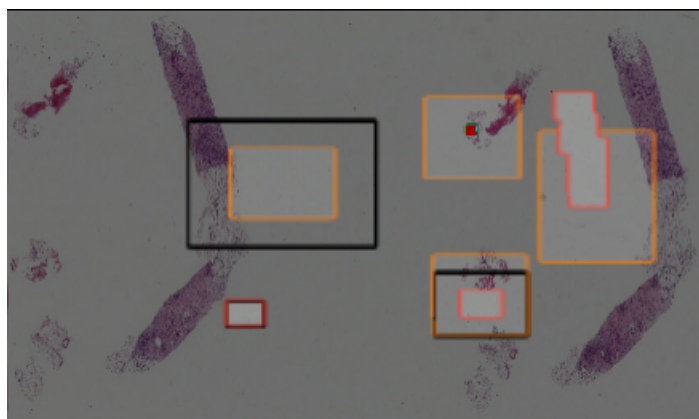


Image 181: Black box in navigation map after ROI acquisition



Hovering the mouse over the ROI icon  displays information about the date and time of creation, the user, the magnification used, the area and the caption, and highlights in blue the relevant box in the navigation map.

In addition, clicking on the icon automatically repositions the viewer on the region of interest, setting the same magnification level used during export.

According to the project specification, the user permissions can be configured so that the user can view only the measurements/annotations and ROI saved by themselves, or all the ones associated with a given image, regardless of the user who entered them.



18 KEY BINDINGS SUMMARY TABLE

To view the list of shortcuts directly from ZEEROmed View, click on the 'Show keyboard shortcuts'



from the 'Information bar' (chapter [5.1.1 Information bar](#)).



NOTE: the displayed shortcuts are related to the currently open study.

Below is a summary table of the keyboard shortcuts:

KEY	OPERATION
↑	Zoom in
Pag ↑	Previous page
Pag ↓	Next page
←	Previous protocol
→	Next protocol
↓	Zoom out
O	Circular measurement
R	Linear measurement
G	Show graphic annotations
H	Activation of Hounsfield Point Value
Q	Free-hand measurement (for Radiology and Anatomopathology tools)
V	Angle measurement (only for Radiological tools)
Y	Arrow (only for Anatomopathology tools)



Space	Start multiplanar reconstruction (hydra)
Volume cut	Volume cut
A	Axial view
C	Coronal view
S	Sagittal view
L	Enable/Disable spatial locator
M	Toogles magnifies tool
F	Fit
?	Open Window Level (WL) configuration
P	Start/Stop the cineloop
Z	Set 'Zoom' as active tool
I	Invert image (white/black)
K	Send current image to the RIS
D	View DICOM Tags
0...9	Window Level (WL) preset

Table 60: Key binding table