MedDream DICOM Viewer

USER MANUAL

(version 7.5.1)
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General information

This user’s manual describes MedDream DICOM Viewer (hereinafter – MedDream) functionalities and operation with MedDream.

Seeking to ensure patient safety, software should be used by intended use. You should therefore ensure that you are thoroughly familiar with the user manual before setting up and using MedDream for the first time.

MedDream does not replace medical professionals and could be used only as an additional tool.

Please note that medical images quality, sharpness, accuracy and other parameters, relevant to the users, directly depends on the technical capabilities of medical device, which is generating medical images, on the monitor and printer technical capabilities.

Indications for Use: MedDream is a software medical imaging system used to receive DICOM images, scheduling information and textual reports, organize and store them in an internal format, and to make that information available across a network via web and customized user interfaces. Software is intended for use as a diagnostic, review and analysis tool by trained professionals such as radiologists, physicians, clinicians.

Note: The MedDream is not intended for intensive care monitoring of vital physiological parameters, where the nature of variations is such that it could result in immediate danger to the patient.

Contraindications are applicable ONLY in USA market: The MedDream is not intended for the acquisition of mammographic image data and is meant to be used by qualified medical personnel only who are qualified to create and diagnose medical image data.

WARNING! Software usage not by intended use may cause patient death, potential injury or serious health impairment, requiring professional medical intervention.

Risk and Benefit: Using MedDream by its intended use does not cause risk, which could influence patient health status or health changes, but facilitate work of medical professionals, provide a better opportunity for accurate diagnosis.

Clinical data are collected, stored and managed as described below:

- By implementing post market clinical follow-up studies;
- By analyzing results of collected preclinical data;
- By implementing competitor analysis and literature analysis;
- By managing risk;
- By managing complaints and problems;
- By collection vigilance system data;
- By implementing biomedical research.

MedDream is continually tested. All critical issues are corrected immediately and users are informed about software functionality limitations and risks.

In case of MedDream bugs please immediately contact to Softneta support at this email: support@softneta.com.
Personal data security breach

In case of personal data breach (including but not limited to cybersecurity breach) please immediately (but not later than during 24 hours) inform medical software Manufacturer Softneta UAB by using below mentioned contacts:

SOFTNETA Data Protection Officer (contacts of Data Protection Officer are public available www.softneta.com).

Name, Surname: Raimundas Mikalauskas
Tel. +370 630 06808
Mail: dpo@softneta.com

Serious incidents reporting

Any serious incident that has occurred in relation to the device should be reported to the manufacturer (via email: support@softneta.com) and the competent authority of the Member State in which the user and/or patient is established.

Availability of documentation

Electronic version of MedDream User Manual in Lithuanian and English is free available on the Softneta UAB website (www.softneta.lt / www.softneta.com in the “Products” section) as well as access to the supporting software versions. Instructions are included in the “Product description” part in the section “Downloads”. User Manual could be opened in a browser or saved in pdf format and downloaded to Your computer.

Software Install Manual is added as a separate document to the User Manual.

If You require paper version of User Manual, please ask us by email: support@softneta.com. Paper version of User Manual will be sent not later than in 48 hours after receiving Your request (to the address You specify).

Questions

Please visit out F.A.Q. in Softneta UAB webpage for answers to frequently asked questions or problems.

WARNING! In the event of malfunction of the device or changes in its performance that may affect safety, contact to manufacturer.

CAUTION! Incorrectly installed software could cause inconvenience to medical professionals using the software and disruption of the medical professional activities.

If you have any questions or comments regarding MedDream functionalities or this user’s manual, please contact Softneta UAB Customer support: support@softneta.com.
Explanation of symbols used

During MedDream usage please pay attention to important information, related to patient safety, which is warning about software functions, whose implementation errors may pose a risk to patient health.

The symbols in this User Manual are intended to alert user about possible errors in the software or its use. Please read the information carefully as you see the symbols described below.

**WARNING!** This indicates a hazardous situation which may cause patient death, potential injury or serious health impairment, requiring professional medical intervention.

**CAUTION!** This indicates a hazardous situation which may cause minor potential injury, not requiring professional medical intervention, or simply cause inconvenience to medical professionals using software without affecting patient health status or health changes.

**NOTE!** Information, hints and advice for a better understanding of the instructions to be observed in the operation of the instrument.

Summary of clinical evaluation report

The device's risks were managed according to UAB “Softneta” internal risk management work instruction, which is based on the ISO 14971:2007 standard. During the risk management activities, the device was:

- Classified according to the EU 93/42/ECC directive’s Annex IX as a CLASS IIa medical device (the device's risk management file);
- Identified according to the EU 2007/47/EC directive and requirements defined in the ISO 14971:2007 standard’s Appendix C (the device’s risk management file);
- Ensured risk managed (implemented risk analysis, risk mitigation actions, residual risks verification) (the device’s risk management file);
- Tested and verified for residual risks (retested) according to the risk management results and UAB “Softneta” Testing work instruction (software tests, user acceptance tests, clinical tests), (the device’s risk management file).
- All the risk management activities were carried out by the risk management team.

Softneta gathers production and post-production information using the following Quality management system’s areas: product realization; measurement analysis and improvement; change and problem management; auditing; post market data results. The above-mentioned activities ensure, that internal and external environments (in which the product exists) are constantly monitored and if changes occur all associated risks are re-managed.

Residual risks (hazard) with the “minor” severity (Results in injury or impairment requiring professional medical intervention) are mentioned in the section „Warning regarding residual risks“. We don’t have any residual risk with “serious” (or higher) severity.

Allowed max risk score in faulty conditions is: 40. Allowed overall residual risk score is: 560. Overall residual risk score in faulty conditions post mitigations: 100. Calculated Risk / Benefit score: 0.00003 (the benefits outweigh the risks).
## Warnings regarding residual risks

<table>
<thead>
<tr>
<th>No</th>
<th>Hazard</th>
<th>Warning/ Caution/ Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Illegal access</td>
<td><strong>WARNING!</strong> If integrated Viewer is used, the login window may be disabled in configuration.</td>
</tr>
</tbody>
</table>
| 2  | Inadequate filtration process               | **WARNING!** It is not possible to search for Ideographic and Phonetic versions of patient names. The search is performed only against the basic version (Alphabetic), even if the image contains the other two versions and the PACS supports them.  
**WARNING!** One date interval value can be picked at a time. The ends of picked interval are displayed in the date fields on the left of the interval pick list. The fields are empty if no specific interval (Any) is picked.  
**WARNING!** The search according the picked modalities is performed automatically on any change in pick list.  
**WARNING!** The default selection on search window open is All and filtering by modality is not performed.  
**WARNING!** Patient history search is performed according to the Patient ID.  
**WARNING!** The mobile mode has the following search limitations comparing to desktop version: search according accession number and source AE title is not allowed; search according custom date interval is not allowed; the customization of modalities pick list and search according custom modality is not allowed.|
| 3  | Incorrect configuration                     | **WARNING!** If integrated Viewer is used, the search window may be disabled in configuration.  
**WARNING!** The first image opens, if AutoOpen First Image conditions are met (see description in Settings).  
**WARNING!** In case the first study image should be opened according to Settings, the image is opened in the first (top right) viewport and only if this viewport is empty.  
**WARNING!** Key objects functionality may be disabled in configuration.  
**WARNING!** Share files via DICOM Library function should be enabled and the required parameters should be set in configuration.  
**WARNING!** Forward function should be enabled and the required parameters (list of forward destination machines) should be set in configuration.  
**WARNING!** Export function should be enabled and the required parameters (path to DICOMDIR viewer and size of ISO archive) should be set in configuration.  
**WARNING!** The media sizes may be supplemented or replaced with other values by system administrator.  
**WARNING!** The viewer may be included in ISO archive, if the appropriate viewer software is provided and system administrator configures to enclose it in export archive. |
| 4  | 3rd party libraries / internal components work incorrectly / not available | **WARNING!** The section described how to open the studies in Viewer window from the Search results list in Search window. For a description of opening studies in mobile mode, see the Opening studies in MedDream Mobile mode section. If Viewer is used in an integrated solution, the window is opened by an integrating information system, such as a hospital information system or a patient portal.  
**WARNING!** Annotation saving is implemented according to DICOM standard. The function is available only if the used study storage provides DICOM saving functionality.  
**WARNING!** Key object saving is implemented according to DICOM standard. The function is available only if the used study storage provides DICOM saving functionality.  
**WARNING!** PDF file is opened with default PDF reader. Some Web browsers have built-in readers. In other cases, the additional software for pdf reading and displaying, like Adobe Acrobat Reader, should be deployed in user workplace. |
<table>
<thead>
<tr>
<th>Page</th>
<th>Component / function is missing</th>
</tr>
</thead>
</table>
| 5    | WARNING! The tools in Measure button menu may vary depending on license type, active image type and system settings:  
- Measure button is not displayed for structure reports (SR).  
- ECG studies have a different set of Measure tools (see Special views).  
- Cobb Angle, TPA, Norberg Angle, and VHS measuring is intended for veterinary usage. By default settings, these tools are not shown in Measure menu for other than VET license types.  
- VTI measuring is applicable and displayed only for US modality.  
WARNING! Access to Export, Forward, and Settings functionality may not be allowed either by Settings, or by user rights.  
WARNING! Systems menu options may also be not allowed by user rights.  
WARNING! Annotations functionality may be disabled in configuration.  
WARNING! The Register button is visible only if user has administrator right granted by user rights and Settings menu is enabled in system settings.  
WARNING! License registration is required for legal software use. The license registration function is accessible only for users having administrator rights. |
| 6    | WARNING! You cannot change the size of particular image that is opened as one of multi images. If the viewport size is changed, the size of multi images is automatically adjusted.  
WARNING! The localization tools are mainly used for CT, MR and PT studies, that contains several series taken in several planes.  
WARNING! VTI measuring tool is applicable only for the images of "US" modality with visible blood velocity profile.  
WARNING! TPA, Norberg Angle, and VHS measuring is intended for veterinary usage. By default settings, these tools are not shown in Measure menu for other than VET license types.  
WARNING! Saved Annotations can only be viewed.  
WARNING! If Key object image is opened from thumbnail, Key object filter is not activated. To activate the filter, expand the key object menu by clicking the key object icon on the right of the image, and click the filter menu.  
WARNING! Windowing, Pan and Zoom functions are available during cine mode (see pages 19-20 on Manipulating and analyzing images).  
WARNING! Forward and Export functions are not available in Search window if working in mobile mode.  
WARNING! JPEG/MP4/pdf and TIFF/MP4/pdf formats are disabled in the following conditions:  
- At least one study contains object of SR or ECG type, if study export (Save study) is selected.  
- The active series contains object of SR or ECG type, if series export (Save active series) is selected.  
- The active image is SR or ECG type, if image export (Save active image/video) is selected.  
WARNING! Save active image/video and Save active series scopes are enabled only for active study export from Viewer window.  
WARNING! In Hanging protocol alpha version, the setting Do not fetch metadata for these modalities can only be modified in settings file. Note that for large-scale studies (for example CT, MRI) it is recommended not to use metadata due to long loading time.  
WARNING! Note, that browser's zoom function changes resolution and the software may automatically switch to mobile mode. |
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
|   | WARNING! Forward and Export functions are not available in Search results window if working in mobile mode.  
|   | WARNING! Software usage not by intended use may cause patient death, potential injury or serious health impairment, requiring professional medical intervention. |
|   | WARNING! Running MedDream software on shared user’s account can lead to unauthorised access to patient’s medical data.  
|   | WARNING! For proper forward functioning the forward destination should be properly configured and the device should support DICOM saving functionality.  
|   | CAUTION! Incorrectly installed software could cause inconvenience to medical professionals using the software and disruption of the medical professional activities.  
|   | CAUTION! Please notice, that closing the program without Log Off (using browser window close ‘x’ button) is not safe and may lead to unauthorized access to medical data.  
|   | WARNING! MedDream cannot guarantee the accuracy of calibration data received from the modality. Note, that MedDream cannot guarantee that the manual calibration which is performed by users is done accurately.  
|   | WARNING! Note, that measuring functions in MedDream is approximate.  

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**Vulnerability of e-PHI (electronic personal health information)**

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**Measurements inaccurate**
Introduction

MedDream DICOM Viewer is a HTML based package for PACS server which is designed to aid professionals in every day’s decision-making process, connecting all the medical data into a unified and fast performing network. MedDream ensures a fast and reliable way to search, present and analyze the medical data (images and video files) on various devices: computers, smart phones, tablets and so forth.

MedDream covers: radiology, cardiology, oncology, gastroenterology and many other fields of medical application. It seamlessly integrates with various medical imaging devices, such as: ultrasound (US), magnetic resonance (MRI), positron emission tomography (PET), computed tomography (CT), endoscopy (ES), mammography (MG), digital radiography (DR), computed radiography (CR), ophthalmology, and so forth.

Core MedDream DICOM Viewer uses are:

- Replacement of hard copies, e.g. film archives, paper documents, etc.
- Remote access. MedDream provides a possibility to be mobile and work from any place in the world where the Internet is accessible. More than one person can access and view medical records at one time. Such functionality speeds up the collaboration among the professionals. So, that a doctor in the hospital and a doctor that is in the different location may view the medical data and discuss about it simultaneously. The patient’s medical history, various studies and images are found much faster comparing to the conventional paper-based methods.
- MedDream can be used as a standalone WEB Viewer or integrated into PacsOne PACS, dcm4chee Archive, Conquest PACS, ClearCanvas PACS systems. Moreover, MedDream can be adapted to client’s PACS system and easily integrated into RIS/HIS workflow.
- MedDream has multiple functions such as search of studies, viewing, analyzing, saving, exporting, forwarding images and videos, etc.

Features of MedDream software:

- Multi language support (EN, RU);
- System administration via WEB interface;
- User identification by username and password, user rights;
- Ability to save image viewing settings;
- Secure data transfer (SSL support);
- Ability to open more than one study at a time;
- Zoom in or out;
- Image inversion;
- Image rotation;
- Intensity (density of the point) measurement;
- Changing the Level/Window values;
- Image zooming;
- Distance measurement;
- Angle measurement;
- Tools for localization of the images in intersecting planes.
Workplace desktop system requirements

Minimal hardware requirements

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>2.33GHz or higher x64-compatible (2 CPUs)</td>
</tr>
<tr>
<td>Memory</td>
<td>4+ GB</td>
</tr>
<tr>
<td>Network Interface</td>
<td>100 Mbit/s</td>
</tr>
</tbody>
</table>

Minimal software requirements

- Windows 7/8/10 (32 and 64 bit), Linux (32 bit and 64 bit).
- Microsoft Edge 16 or later, Mozilla Firefox 58 or later, Google Chrome 63 or later.

>Note! Hardware acceleration should be enabled in web browser for better performance.

Minimal memory requirements

Minimal memory requirements for the best performance of the software:

- 8 GB of RAM if you plan to open more than 800 images at a time (CT & MRI, PET-CT).
- 12 GB of RAM if you plan to open more than 1500 images at a time (multi-slice CT & PET-CT).
- 16 GB of RAM if you plan to open more than 3000 images at a time (cardiac or functional imaging).
Installation verification

The detail instructions, how to verify the MedDream functioning after system installation or restart, are provided in Install Manual.

Current section provides short check list for verifying, that the user can access MedDream service from his workplace, view studies and use MedDream tools, required for daily operations:

• Open study in MedDream Viewer.

  Use your usual way to connect to MedDream service and open the MedDream Viewer: execute the known valid study open URL, or login with your credentials and select the study in MedDream search window.

  If you usually are working with studies from several network storages, try opening studies from all the used network places.

• Check, that study is correctly opened: thumbnails are displayed instead of exclamation marks, the chosen images opens as well.

• Check the Viewer toolbar for the opened image: make sure, that you usually used tools are displayed in common place and accessible.

• Verify the working of functions and tools, that are critical to you daily operations (like measuring, patient history, zoom, pan).
**IT security measures**

The “Security considerations” section in the Install Manual provides detail recommendations, how to install and configure the MedDream software in order to ensure the system security.

Current section describes actions, that should be taken by MedDream user, in order to secure his workplace and user’s account against unauthorized access:

- It is highly recommended to run MedDream only from the devices and accounts, that are authorized for the user by company’s security policy. Company’s security policy should ensure, that work network and user’s workplace is secure – servers and workplaces have on time security patches and updates, required antivirus software, firewalls and other protection means.

  **WARNING!** Running MedDream software on shared user’s account can lead to unauthorised access to patient’s medical data.

- It is recommended to use the browser, that is authorized according company’s security policy, and is compatible with MedDream software. If company’s security policy does not give recommendation for browser, we would recommend considering the Google Chrome or Mozilla Firefox as the most secure browser alternatives in the market at the moment.

- The authentication is required for MedDream software. However, the authentication ways may vary. If you are using login and password authentication, keep the password safe from unauthorized access:
  - do not expose the password to other persons;
  - do not allow the browser to save the password.

- Use MedDream log off function, after finishing your work and before closing browser window. Closing the program without Log Off (using browser window close ‘x’ button) is not safe and may lead to unauthorized access to medical data.

NOTE for user, that share the computer and user’s account. MedDream is designed with “zero footprint” concept, meaning that no patient data is left on a client machine: after the end user logs out from MedDream, its cache does not contain any server responses with patient data. However, there are known browser’s security bug’s, that allows to extract potentially sensitive data from browser’s memory cache after the user logs out and doesn’t close the entire browser application. Therefore, it is recommended to also close the entire browser (not just a particular tab or one of the windows) after logout.
Logging on to MedDream

WARNING! If integrated Viewer is used, the login window may be disabled in configuration.

To log on to MedDream, please do the following:

- Enter the address given by your administrator in your Internet Browser. The following screen will appear:
- Enter the username you were given in the field **Username**.
- Enter the password in the field **Password**. If you forgot your password, please contact your system administrator.
- Press **Log in** button.

![Login Window](image)

*Figure 1. Log in window*

**NOTE!** On the right upper corner of the login window you can change the language by selecting the language code from drop-down list.

![Language Selection](image)

*Figure 2. Language selection in a log in window*

**NOTE!** The list of supported language is defined in configuration.

**NOTE!** The language selection is saved in browser local storage.
Search of studies

The list of icons that will be used in this section.

- Tick box
- Search
- Export
- Forward
- View icon
- Ascending/Descending
- System menu
- Language menu

The Search menu will help you quickly find the studies you need. We recommend using all possible search menu options in order to get the most accurate search results and save your time. Search parameters are accessible from Search window that is opened after the successful login.

![Search window](image)

**Figure 3. Search window**

**WARNING!** If integrated Viewer is used, the search window may be disabled in configuration.

Description of search menu parameters:

1. Search for studies according the search criteria listed below can be done by selecting the criteria entry field and entering the text in it:
   - **ID** - enter patient's ID number
   - **Name** - enter the patient's name or surname
   - **Accession** – enter the study accession number
• **Modality** - enter the method which was used to obtain the study images
• **Description** – enter a few keywords from the study description
• **Source AE** – enter title of the device from where the study was sent to the PACS.

*Figure 4. Search criteria entry fields in search results list*

**WARNING!** It is not possible to search for Ideographic and Phonetic versions of patient names. The search is performed only against the basic version (Alphabetic), even if the image contains the other two versions and the PACS supports them.

**NOTE!** Search criteria entry field is marked with a loupe sign at the right. The loupe sign is highlighted when the field is selected.

**NOTE!** To perform the search click **Search** icon after the criteria is entered.

---

2. Search for studies having the study date in the specified date interval can be done. There are two ways for defining the date interval:

- To select the **date interval** from the quick pick list: “1d” (current day), “3d” (3 days interval), “1w” (1 week interval), “1m” (1 month interval), “1y” (1 year interval) or “Any” (no specific date interval):

  *Figure 5. Quick pick list for choosing the study date interval*

**WARNING!** One date interval value can be picked at a time. The ends of picked interval are displayed in the date fields on the left of the interval pick list. The fields are empty if no specific interval (Any) is picked.

**NOTE!** The default **date interval** is defined in **Settings**. The search according the picked date interval is performed automatically on search window open and on any interval change in pick list.

- To specify one or both ends of the **date interval** in the date fields on the left of the interval pick list: click on the interval start or end entry field and choose the date from the pop-up window.
NOTE! To perform the search according the entered date interval click Search icon after the interval ends are entered.

3. The search can also be done by the method which was used to obtain the study images (modalities). You can pick one or more modalities from the modalities that are visible in modalities pick list:

WARNING! The search according the picked modalities is performed automatically on any change in pick list.

WARNING! The default selection on search window open is All and filtering by modality is not performed.

You can customize the modalities pick list: expand the modalities list with triangle on the right side of the list and pick the modalities that you want to appear in modalities pick list.

The list of modalities:
Search of studies

CR – Computed Radiography
CT – Computed Tomography
DX – Digital Radiography
ECG – Electrocardiography
ES – Endoscopy
IO – Intra-Oral Radiography
MG – Mammography
MR – Magnetic Resonance
NM – Nuclear Medicine
OT – Other
OP – Ophthalmic Photography
PT – Positron emission tomography (PET)
PX – Panoramic X-Ray
RF – Radio Fluoroscopy
RG – Radiographic Imaging
XA – X-Ray Angiography
US – Ultrasound
XC – External camera photography
LIVE – live stream

NOTE! If you are searching for some rare modality that has no corresponding button here, try to enter its abbreviation directly into the search criteria Modality. The system searches for all the modalities that are picked in modalities control and entered in Modality search criteria.

NOTE! The primary list of modalities that are displayed in modalities selection control is defined in Settings. The customized modalities list is saved in browser local storage after the customization is done.

4. The search for study in particular storage can be done. You can pick a particular storage from drop-down storage list:

![Figure 9. Picking the storage](image)

NOTE! The storage selection control is visible only if multiple storages are configured. The storage list includes all the configured storages.

NOTE! The default selection on search window open is All storages and searching is done in all configured storages. The search according the picked storage is performed automatically on selection change.

After the search is performed, the studies, that correspond to the search parameters, are displayed in search results list. The results list displays the following study information:

- **ID** - patient's ID number.
- **Name** - patient's name and surname.
- **Accession** – study accession number.
- **Modality** - method which was used to obtain the study images.
- **Description** – study description.
- **Date Time** – study date and time.
- **Received On** – the date and time when the study was received by PACS.
• **Source AE** – title of the device from where the study was sent to the PACS.

**NOTE!** The field is empty if the DICOM file or PACS does not have the particular data.

In the search results list, you can do the following:

1. To sort the result list by any of data fields. Each field has **Ascending/Descending** button. You can arrange each of them in ascending or descending order. Click once and the order of the selected field will change from ascending to descending and vice versa.

2. To navigate through result list by picking the required page or using **Previous** and **Next** in page navigation controls:

   ![Page navigation](image10.png)

   *Figure 10. Page navigation in the search results list*

   **NOTE!** The number of studies per page is defined in **Settings**.

3. To mark the studies for forward or export by checking the tick box in first column of the results list:

   ![Marking the study](image11.png)

   *Figure 11. Marking the study*

   The forward and export functionality is activated by selecting the appropriate menu in the search window. See section **Export and Forward** for detail description.

   **NOTE!** The Tick box selection status is reset to unselected on Search window reload, for example when the sort order is changed, the page is refreshed, the user navigates to the other page.

4. To open the study in viewer by clicking the study in the search results list. See **Opening studies** section for detail description.

You can do the following using the buttons in the top right corner of the search window:
1. Clicking the **Export** button opens the export window. Before doing so, mark the studies you want to export. See [Export and Forward](#) section for detail description.

2. Clicking the **Forward** button opens the forward window. Before doing so, mark the studies you want to forward. See [Export and Forward](#) section for detail description.

3. **Language** menu enables language change by picking language code in expandable list.

4. **System** menu in Search window contains the following options: About; License Agreement; Help; Setting; Log Off. See [System menu functions](#) section for detail description of each option.

---

**WARNING!** Access to Export, Forward, and Settings functionality may be not allowed either by [Settings](#), or by user rights.
**MedDream DICOM Viewer**

Viewing and analyzing the study images is done in Viewer window. Viewer window contains several zones.

![Viewer window zones](image)

*Figure 13. Viewer window zones*

The description of Viewer window zones, starting from the top left, follows:

1. System logo is displayed in the top left corner of Viewer window.

2. Image manipulation tools are displayed at the top of the Viewer window. In section **Toolbar Properties** you can configure what buttons and in what order are shown on toolbar. If there is not enough space for the buttons to be displayed, the **Etc** button is displayed at the end of the toolbar. Click the **Etc** button to see the missing tool buttons.

![Expanded toolbar](image)

*Figure 14. Expanded toolbar.*

**NOTE!** The tools displayed on the toolbar depend on the image being uploaded in the active viewport.

In the toolbar you can also enable mouse usage for a particular tool. To enable the mouse usage for a tool, perform the following:

- Hover the mouse pointer over the tool icon: in the example, the cursor is over the Windowing icon

![Windowing icon](image)

- Press the mouse key that you want to use for the mouse action

- Tool icon displays the activated mouse button: in example ![image], the left mouse button is activated to change the brightness level.
NOTE! The mouse button assignment is saved in browser’s local storage. If local storage does not contain the saved values, the default assignment is used: left mouse button is assigned to **Windowing** tool, middle mouse button is assigned to **Pan** tool, and right mouse button is assigned for **Zoom** tool.

The active mouse key is deleted by pressing the same key over the tool icon once more or by activating the same mouse key for another tool.

You can activate and deactivate the left mouse button usage for tools’ mouse action with keyboard: press the letter displayed in tooltip. Pressing ‘W’ activates the left mouse button usage for windowing function. Clicking the triangle on the right of tool icon expands the tool menu:

You can activate the menu option by clicking it. If the option has an assigned shortcut, the key combination is written on the right: for example, pressing ‘SHIFT’ and ‘T’ keys simultaneously, aligns the active image left.

3. The system tools zone contains two buttons:
   - **Language** menu that enables language change by selecting the language in expandable list.
   - Expandable **System** menu with the following options: About; License Agreement; Help; Shortcuts; Settings; Log Off. See System menu functions section for detail description.

   **WARNING!** System menu options may be disabled in **Settings**. The Settings option may also be not allowed by user rights.

   NOTE! Log Off functionality in Viewer window is available only for integrated viewer with disabled Search window. If the Log Off is not available in Viewer window, use Log Off in Search window.

4. The thumbnails zone is on the left side of the window. In **Settings** you can configure if the thumbnails zone is displayed in viewer window and its position. The Thumbnail holds the studies that are opened in Viewer window.

   In thumbnail zone you can perform the following:
• Expand or collapse the study description by clicking the chevron button at the top left corner of the study description.

• Open patients' studies modal by clicking the icon on the right side of the study description. See detail description section in Patient.

• Preload the data by clicking the preload icon . Clicking the preload icon on the right side of series description, preloads the series. Clicking the preload icon on the right side of study description, preloads the whole study. Study or series preload allows to scroll through the images much faster.

Once you click the preload icon, preloading starts and progress bar is displayed. The preload icon is not displayed after the series or study images are loaded. The stored series can be scrolled interactively in the form of scrollable image stacks.

• Remove the study from Viewer window if you are done with it. To remove the study from Viewer window, click on Close study – x button at the top right corner of the study description.

• Remove all the studies from Viewer window by clicking on Close studies button at the bottom of the Thumbnail zone.

To view the image of the opened study, find the image thumbnail and drag it to viewport. If the image is currently viewed, the image picture is highlighted;

![Figure 15. Action controls in Thumbnail](image)

![Figure 16. Preload progress bar](image)

NOTE! Use the Study window (see description in section Series) as an alternative way to perform the actions: view study description and image thumbnails, preload series images, view the selected image, close the selected study.
5. The view zone takes the largest part of the Viewer window and is designated to view and analyze the images. The view zone may be divided to several sections, each section (dashed line in figure) working as separate viewport. The manipulation is allowed in one active viewport at a time. To activate the viewport, click on the viewport area – the active viewport is highlighted. The toolbar and context menu are automatically adjusted according the content of the active viewport.

At the right side of the viewport a scroll bar is shown. A scroll cursor is scrolled respectively to the position of the active image in the series. At the bottom of the scroll bar the total number of images in the series and the number of the active image are shown. Dragging the cursor along the scroll bar scrolls through the images of the series. Clicking on scroll bar displays the image corresponding to the scroll position.

![Figure 17. Image scroll bar](image)

A context menu appears with a right-click mouse operation on the viewports’ area. A context menu offers tools that have been chosen to be included in a quick menu via Settings (refer to the Settings chapter for more information).

![Figure 18. Context menu](image)

**Opening studies**

**WARNING!** The section described how to open the studies in Viewer window from the Search results list in Search window. For a description of opening studies in mobile mode, see the Opening studies in MedDream Mobile mode section. If Viewer is used in an integrated solution, the window is opened by an integrating information system, such as a hospital information system or a patient portal.
NOTE! To view the image of the study that is already opened in Viewer’s window, drag the image picture from thumbnail or use the Series menu (see Series).

If you need to open the study, please do the following:

1. Find the study in search results list (the active line is highlighted when scrolling through list) and click on it.

   ![Figure 19. Study selection in the search results list](image)

2. A new browser tab will pop up and Viewer window with selected study opens in it:

   ![Figure 20. Viewer window in new tab](image)

   **WARNING!** The first image opens, if AutoOpen First Image conditions are met (see description in Settings).

3a. If you need to open more than one study in the same Viewer window (e.g. to compare images from different studies), please do the following:

   - From Viewer window tab go back to the Search window tab.
   - Find and click the study in search results, as described in step 1.
   - The Viewer tab automatically activates and the selected study is opened in Viewer window. The study description is displayed at the bottom of the thumbnail zone and expanded. Descriptions of all the previously added studies are collapsed:
**WARNING!** In case the first study image should be opened according to Settings, the image is opened in the first (top right) viewport and only if this viewport is empty.

**NOTE!** Repeat the actions of this step, if you need to open the third or more studies in the same Viewer window.

3b. If you need to open the study in a new Viewer window, please do the following:

- From Viewer window tab go back to the Search window tab.
- Find the study in search results and click it holding the CTRL key pressed down.
- The new browser tab pops-up and the new Viewer window with selected study opens in it.

**Patient history**

**Patient study list** provides a quick overview of all patient research history. The Patient history window opens by clicking on the icon in the thumbnail zone:

**Figure 22. Opening the Patient history window**

Patient history window displays all patient studies that are available in the MedDream DICOM Viewer:
The following information is provided in Patient history window:

- method which was used to obtain the study images (Modality),
- study description,
- study date & time.

You can do the following action in Patient history window:

- Filter the history list by modality. Possible filter options:
  - The modality of the study from which the Patient history window was opened (MR in the figure). This option is the default value when you open history window;
  - All patient historical studies.

- Sort the patient study history list: sorting is possible with all columns in the list. To sort the list according to the selected column, you need to click the sort button in the heading of the selected column.

- Perform the search: search in the patient history window is allowed in columns with a search icon. To perform a search, click on the column name and enter a search phrase in the highlighted input field - the system automatically filters the list based on the text you enter.

- Open the historical study for viewing by clicking on the eye icon in the first column of the studies list. To open multiple studies at once, mark the tick-box next to the study you want to open and click the Add studies to viewer button. All the studies, that are already opened in Viewer, are highlighted as Added and haven’t controls for opening.

**WARNING!** Patient history search is performed according to the Patient ID.
Tools for image manipulation and analysis

NOTE! In section Toolbar Properties you can configure, what buttons and in what order are shown in toolbar.

To adjust and to analyze the study images according to the criteria you need, use the image manipulation tools:

![Image manipulation tools](image.png)

*Figure 25. Image manipulation tools*

**Windowing**

*Windowing* button is used to adjust image contrast and brightness (Level and Window values). You can change the brightness using the mouse or from menu.

For changing the brightness with mouse, assign the mouse button to Windowing function. Hold down the assigned button and drag the mouse upwards or downwards (to change Level values), and right or left to change Window values.

Also, you can click the red triangle on the right of the button and select the windowing from the menu:

![Window button menu example](window_menu.png)

*Figure 26. Window button menu example*

The brightness level menu consists of static and dynamic elements - groups and options. Dynamic menu elements are only displayed if they are applicable to the active image.
The description of Windowing menu elements:

- **Static group DICOM Windowing.** Group contains the following options:
  - **Auto** – the system analyses the image and adjusts the brightness and contrast automatically. Static menu option. Auto windowing is applied, if no other options available in DICOM Windowing group.
  - Dynamic menu options - all the Window and Level value pairs from image DICOM data: windowing title, w value, and l value are displayed. The first option is automatically applied, if available.

- **VOI LUT (Value Of Interest Look-Up Table) dynamic group** is displayed only if VOI LUT configurations are found in image DICOM file. This transformation gives greater weight to the range of values of interest. The DICOM Standard Window Center and Window Width are linear VOI LUT where only 2 parameters are specified - center and width of the interval. Meanwhile, the non-linear VOI LUT uses a free shape curve in the form of a table. In MedDream user environment VOI LUT is called non-linear transformation.
  - The VOI LUT group displays all VOI LUT configurations that are available in the active image DICOM file. The names of VOI LUT configurations specified in the DICOM file are displayed. If VOI LUT configurations exist, the first VOI LUT configuration is automatically applied, along with Auto w and l values.

- The **Color LUT** group displays the COLOR PALETTE menu, if COLOR PALETTE is found in image DICOM file. If there is a Color Palette, it will be applied during the study loading process. After applying another Window Leveling perfusion, the Color palette will not be applied automatically. To apply the color palette after changing the windowing level, click the COLOR PALETTE menu.

- **Custom Windowing** dynamic group holds the custom windowing options that are define in settings (see section Windowing settings), if the active image modality adheres to settings.

- **Invert** – the static option that is used to invert the image.

---

**Pan**

Pan button allows you to position images within the pane. You can change the image position using the mouse or alignment option from menu. This feature is especially useful when the image is larger than the pane, as it usually is after zooming in.

For changing the image position with mouse, assign the mouse button to Pan function. To move an image within the pane:

- Press the selected mouse button on the image and drag the cursor to desired place or position.
- Release the mouse button to leave the image in its new position.

You can use the Pan menu for changing the image alignment:

![Figure 27. Image alignment options in Pan menu](image-url)
Zoom

Zoom button allows you to enlarge or reduce the image size. You can change the image size using the mouse or zoom option from menu.

For changing the image size with mouse, assign the mouse button to Zoom function. To zoom the image, do the following:

- choose which part of the image you want to zoom in/out,
- place the mouse cursor on the chosen part,
- click the selected mouse button and drag up or down,
- the chosen part will be zoomed in/out.

Zoom button menu is used to choose between Fit to Screen or Original resolution:

- When you click Fit to Screen button, the size of the image is automatically adjusted so that the image would fill the entire viewport. So, if the image is too large, it is zoomed out, and if it is too small, it is zoomed in.
- Clicking Original resolution button, the size of the image changes into original size.

Channels

Channels highlights a color component or two colors combination component in the image by showing selected color in white shades and other colors in black. This tool is enabled for image view. By default, no color component is highlighted. Click the red arrow in order to choose color(s) from the list:

To remove the color highlighting, select the Default menu option in Channels button menu.
Scroll

Scroll tool enables easy image scrolling with mouse and changing the active series using button’s drop-down menu. You can scroll the series images by scrolling the mouse wheel in the desired direction.

For scrolling the series images with mouse without wheel function, assign the mouse button to Scroll function. Once tapped it enables you to scroll through the series of images by using a vertical drag gesture: drag upwards to scroll towards the series beginning, and drag downwards to scroll towards the series ending.

By default, scrolling is done in scope of current series. To enable the scroll between series, use the Activate fast scroll between series menu.

NOTE! Scrolling between series apply for scrolling with mouse and does not apply for scroll bar function.

Scroll button can be extended:

- To change the active series, use menu option Go to previous series (shortcut - Left Arrow in keyboard) or Go to next series (shortcut - Right Arrow in keyboard). In settings this functionality can be included in context menu, for faster browsing through study series.
- To activate/deactivate of fast scrolling between series with mouse, use Activate fast scroll between series option.

Series scrolling is enabled if the scroll icon on the left side of the menu is highlighted. Series scrolling settings are stored in your browser’s local storage and only apply to the same browser.

Magnifier

Magnifier button is used to magnify (enlarge) a certain area of the image.

Assign the mouse button to Magnifier function. Click the selected mouse button on the desired image place - image area is enlarged. to enlarge it. The enlarged area can be dragged to other place of the image in order to magnify it.

You can change magnification in this area with the help of mouse wheel from 1 time (no enlargement) to 50 times. In order to enlarge, press the selected mouse button and scroll the mouse wheel until the desired magnification is reached. The actual magnification value is displayed on the bottom left corner of the active viewport (M x [magnification coefficient]):
Layout and Multi image

Layout and Multi image functions allow dividing the view zone of the Viewer window for displaying the separate images in each division. It helps in analyzing and comparing the images.

Layout button divides the Viewers’ view zone into viewports. Select the desired layout under the extendible Layout menu and the view zone will be divided in the selected number of identical size viewports. To change the viewports size, point the mouse cursor to division line (the cursor should obtain the divider look), hold the mouse button down and drag the line:

NOTE! Double-click the left mouse button on the image for temporary viewing it on top of layout. Double-clicking the right mouse button on the enlarged image, returns to the previous layout.

NOTE! The layout selection is saved in browser’s local storage. If local storage does not contain the layout value, the layout is displayed according the system settings.
Select the menu from Multi image button drop down list to open the selected number of series images in the active viewport. The viewport is automatically divided to required number of sections. Each section has the same size and shows the separate image, starting from the active image and following towards the end of the series.

**WARNING!** You cannot change the size of particular image that is opened as one of multi images. If the viewport size is changed, the size of multi images is automatically adjusted.

**NOTE!** Image manipulation functions (ex. Scroll, Windowing, Rotate, Pan, Zoom) affect the entire set of multi images that are opened in one viewport. For example, if you select Bone contrast mode for one of multi images, it will apply the Bone mode to all images that are viewed as multiple images in viewport though the changes do not apply to the image in other viewports.

**Reset**

Reset button is used to reset the image, after using manipulations like Windowing, Rotate, Pan, Zoom, and clear measurements that you have been working on. You can choose to reset all images (Reset All), or to reset only active image (Reset Selected).

![Reset button](image_url)
NOTE! Multi-planar reconstruction (MPR) may be applied for CT, PT and MR series having more than 2 images in series.

To start the multi-planar reconstruction, expand the MPR button menu and select the desired option in it:

![Figure 35. MPR button menu](image)

By selecting the corresponding menu option, you can launch the series image reconstruction in one of three planes: Axial, Coronal, or Sagittal. The program performs the following steps:

- Preloads the series images. The progress bar appears in the viewport during image preload process.
- Applies the required image transformation, if the selected plane differs from the original series data set. The transformation tag is displayed in the viewport, if applied.
- Displays the selected view (Axial, Coronal, or Sagittal) in active viewport. The scroll cursor is moved in the middle of the initial or calculated set of images.

![Figure 36. Steps of Coronal image reconstruction from axial series of images: axial series preload and calculated coronal view](image)
Once the image reconstruction process is finished, you can use scroll bar or scroll function to see the images (slices) of the view (axial, sagittal, coronal) you have selected.

Selecting the **Orthogonal** menu allows to get the series image reconstruction in two planes that are perpendicular to the original series plane. The program automatically applies the layout for displaying the original series and two reconstructed planes in separate viewports:

![Orthogonal reconstruction from axial series of images](image)

**Figure 37. Orthogonal reconstruction from axial series of images**

NOTE! To analyze images of the reconstructed series, use tools: **Windowing, Zoom, Pan, Scroll** | **Measure, Reference Lines, Crosshair**.

The **Oblique** menu launches 3D view reconstruction of series images.

NOTE! The 3D reconstruction module is an additional module and should be granted by license.

Images of one selected series are used for 3D reconstruction. To start the 3D reconstruction, open the series image in the selected viewport and click the **Oblique** menu. The system divides the active viewport into four sections, and start the series preload and reconstruction process:
Once the reconstruction process is done, you will see the 3D and three orthogonal planes view in viewports’ divisions:

**Figure 39. Oblique reconstruction**

The value of the slab thickness in millimeters and the rendering mode are displayed in the bottom right corner of each orthogonal view. By default, the orthogonal planes display the image of single slice, and the slab thickness value is undefined: "-". To render the orthogonal view from several image slices, do the following:

- Specify the slab thickness from which you want to generate the image. You can do this in two ways:
  - Expand the slab thickness selection list by clicking the arrow on the right and select the slab thickness:
Figure 40. Slab thickness selection in oblique MPR view

- Or, if the required value is not in the list, select Other in drop-down list, enter the value in Slab Thickness entry window, and press Apply button:

Figure 41. Slab thickness entry window

The entered slab thickness is displayed on image. All the images (slices) that get in the slab are used for rendering the displayed resulting image.

- Select the rendering method from drop-down list:

Figure 42. Rendering method selection in oblique MPR view.

The following rendering methods may be used:

- **MIP** (Maximum Intensity Projection): the pixel gray value in rendered image is the maximum value of all images (slices) of the slab;

- **AVG** (Average Intensity Projection): the pixel gray value in rendered image is the average value of all images (slices) of the slab;
- **MinIP** (Minimum Intensity Projection): the pixel gray value in rendered image is the minimum value of all images (slices) of the slab.

- The system automatically renders images of orthogonal planes according the specified slab thickness and rendering method values:

  ![Image](image_url)

  **Figure 43.** Oblique MPR view with adjusted slab thickness and rendering method

  **NOTE!** The same slab thickness and rendering method values are applied in all orthogonal planes views.

  ![Image](image_url)

  **NOTE!** To analyze images of the reconstructed series, use tools: **Windowing, Zoom, Pan, Scroll, Measure.** functions are available during MPR Oblique mode. The **Crosshair** function is automatically applied in orthogonal planes and may be rotated.

The 3D view and orthogonal planes views are displayed in separate divisions of the same viewport (as in multi-image case). You cannot manually adjust the size or position of oblique view divisions, but you can add additional viewports using Layout function and open the other studies or series images in them.

Reconstructed 3D studies comparison:
Multi-Modality comparison:

**Figure 44. Comparison of two reconstructed 3D studies**

**Figure 45. MPR 3D Oblique view and Multi-Modality comparison**

**Reference Line and Crosshair**

Reference Line and Crosshair tools help to localize the images in intersecting planes.

**WARNING!** The localization tools are mainly used for CT, MR and PT studies, that contains several series taken in several planes.

Overlaying reference lines allow you to indicate the location of an image slice on another image of an intersecting plane.

- Prepare Layout for image comparison. Move into viewports the images that you want to compare.
• Activate viewport with the image you want to know the location of in regard to other images.

• Click the button **Reference Line**. The button highlights that indicates activation of reference line function in all the opened viewports.

• Yellow lines, indicating the location of the active image, appear in the images that are in the planes intersecting with an active image plane:

![Figure 46. Image reference line in intersecting planes](image)

• Scroll the active image series to see the reference line moving in intersecting planes.

![NOTE! Reference line function is automatically applied in all active viewports if **Reference line** tool is activated (tool icon is highlighted). If the function is not needed, click the highlighted **Reference line** button to deactivate the tool.](image)

The dashed rectangle near the reference line indicates the slope of intersecting plane in case the image plane and intersecting plane is not orthogonal:

![Figure 47. Not orthogonal intersecting plane view](image)
Crosshair tool allows you to locate the images (slices) of the intersecting planes for the selected point on the active image:

- Prepare Layout for image comparison. Select the images from series that you are interested in and move them into viewports. You can also use the MPR function to generate the wanted axial reconstruction from the series.

- Activate the crosshair function by assigning the wanted mouse button. Hover over the point of interest for the image being analyzed and click the selected mouse button.

- The system automatically displays the intersection lines and locates the corresponding images (slices) in the viewports displaying series from intersecting planes. The intersection plane and plane's intersection line are marked with the same color (red, green or blue).

![Figure 48. Crosshair tool](image)

- Hold the mouse button pressed and drag the crosshair through the image to see the slices changing in intersecting planes.

NOTE! In Oblique views, you can rotate the crosshair by holding the mouse button pressed and dragging one of the lines.

**Rotate**

*Rotate* button allows you to rotate and flip the image. You can rotate the image using the mouse or rotate option from menu.

To rotate the image with mouse, assign the mouse button to Rotate function. To rotate the image, hold the selected mouse button pressed on the any side of the image and drag it clockwise or counterclockwise wise. The rotation angle is displayed on the bottom left corner and changes when the image is rotated.

Use the *Rotate* button menu to rotate or flip the image:
- **Rotate Right** – to rotate the image 90° clockwise.
- **Rotate Left** – to rotate the image 90° counter-clockwise.
- **Flip Horizontal** – to flip an image 180° about the horizontal axis.
- **Flip Vertical** – to flip an image 180° about the vertical axis.
- **Clear Transform** – revert to original image orientation.

**DICOM**

Click **DICOM** button to open the modal with DICOM tags of the active image:

![DICOM tag window](image)

You can search the DICOM tag by selecting the appropriate criteria entry field and entering the text in it. Search according to **Tag**, **Value**, **Type**, and **Name** parameters can be done. The system filters the data automatically at the text entry:
‘+’ sign on the left of SQ tags indicates the container tag, that holds the other tags. Click the ‘+’ sign to expanded the list and see the internal tags:

![Figure 51. Search according DICOM tag name in DICOM tag window](image1)

![Figure 52. Expanding the SQ tags in DICOM tag window](image2)

**Link**

**Link** button is intended for making comparison on image slice location. Linking may be applied to currently viewed series with the same Frame of Reference UID (DICOM attribute (0020,0052)). There are three types of this button: **Automatic**, **Manual** and **Disabled**.

**Automatic** mode synchronizes different series according to image orientation, image position and slice thickness automatically. Series consisting of images with the same Frame of Reference UID are automatically synchronized by default. Tap the icon once in order to enable the Automatic mode.

**Manual** mode allows to compare the images from the study series manually. Series acquired in similar planes and having the same Frame of Reference UID can be synchronized manually. Tap the icon twice in order to enable the Manual mode.

**Disabled** mode disables synchronization modes.

**Tools for measuring, annotation saving and study exchange**

**Measuring images**

**Measure** button allows you to measure and analyze the images in number of ways. To pick the measure tool, use the **Measure** button drop-down menu:
WARNING! The tools in Measure button menu may vary depending on license type, active image type and system settings:

- **Measure** button is not displayed for structure reports (SR).
- ECG studies has different set of Measure tools (see Special views).
- **Cobb Angle, TPA, Norberg Angle, and VHS** measuring is intended for veterinary usage. By default settings these tools are not shown in Measure menu for other than VET license types.
- **VTI** measuring is applicable and displayed only for US modality.

The top group of Measure menu contains the measuring tools. To use the measuring tool, assign mouse button to measure function: the mouse pictogram with assigned button is displayed. The highlighted tool pictogram indicates that tool is ready for measuring. You can change the active measuring tool by selecting the other tool in menu – the selected tool icon is displayed in Measure button:

#### NOTE!
The measuring tools is automatically deactivated after one measurement is finished: Click the mouse button on Measure icon to use the same tool once more:
The divider line in expandable **Measure** button menu separates the measuring tools from supporting functions. The detail measuring tools and supporting functions description is provided in following sub-sections.

**WARNING!** MedDream cannot guarantee the accuracy of calibration data received from the modality. Note, that MedDream cannot guarantee that the manual calibration which is performed by users is done accurately.

**WARNING!** Note, that measuring functions in MedDream is approximate.

### Line

The **Line** tool helps to measure the distance between objects:

- select **Line** tool in **Measure** menu;
- place the mouse cursor on the starting point, click and release the selected mouse button;
- move the cursor to the end point, click the selected mouse button and release it;
- the distance will be displayed in yellow:

![Figure 54. Distance measurement](image)

### Angle

**Angle** tool is used to measure the angle:

- select **Angle** tool in **Measure** menu;
- position the mouse pointer on the point from which you want to measure the angle, click and release the selected mouse button;
- move the pointer to the second point (the apex), click and release the selected mouse button again;
- move the pointer to the end point and click the selected mouse button again – the angle is displayed on the image:
The **Polyline** tool is used to measure the distance or perimeter of a region of interest:

- select **Polyline** tool in **Measure** menu;
- position the mouse pointer on the point from which you want to start measuring, click and release the selected mouse button;
- then move the cursor to the second, third, fourth, etc. points and each time click the selected mouse button once and release it;
- when the cursor is moved to the last point, double click the selected mouse button, and the total length of all the lines is displayed. If you place the last point on top of the first point, you will get the perimeter:

![Figure 56. Perimeter measurement](image)

**Area**

The **Area** tool is used to measure the area of a region of interest:

- select **Area** tool in **Measure** menu;
- mark points around the area of interest, as described in Polyline tool section;
- when you reach the last point, double click the selected mouse button twice - the area (in square millimeters) will be displayed:
The Volume button is used to measure the volume of the object:

- select Volume tool in Measure menu;
- place the mouse cursor on the start point of the rotation axis, click and release the selected mouse button;
- then move the cursor to the second, third, fourth, etc. points and each time click the selected mouse button once and release it;
- when you reach the end point of the rotation axis, double click the selected mouse button – program fixes the rotation axis;
- continue marking points on the other side of rotation axis, clicking the selected mouse button once and releasing it at each point;
- when you reach the last point, double click the selected mouse button, and the perimeter (mm), area (mm²), and volume (mm³) of marked object are displayed.

The spatial pattern is created by rotation: the vertical line is the rotation axis, around which the left and the right curves are rotated half of the circle.

The VTI (Velocity Time Integral) button is used to measure the distance over which the blood was ejected per interval of time:
• select VTI tool in Measure menu;
• place the mouse cursor on the point from which you want to measure the velocity time integral, click and release the selected mouse button;
• then move the cursor to the second, third, fourth, etc. points of measured blood velocity profile and each time click the selected mouse button once and release it;
• when you reach the last point, double click the selected mouse button, and measurements of marked velocity profile are displayed:

![Figure 59. VTI measurement](image)

**WARNING!** VTI measuring tool is applicable only for the images of "US" modality with visible blood velocity profile.

**Ellipse**

**Ellipse** is used to measure area, length, width, Min and Max brightness in HU units and STD measurement in cm.

![Figure 60. Ellipse measurement](image)
Cobb Angle

The **Cobb angle** button is used to measure angle between lines. To measure angle:

- select **Cobb angle** tool in **Measure** menu;
- click on image and draw two lines, parallel to the most tilted vertebrae,
- the Cobb angle (angle between lines) measure will appear:

![Figure 61. Cobb angle measurement](image)

- you can drag lines and line points, or the whole measurement object by dragging the white dotted line.

Tibial Plateau Angle

The **TPA** button is used to measure angle between two lines: the tibial plateau slope line and the line that is perpendicular to tibia axis line.

To measure angle:

- select **TPA** tool in **Measure** menu;
- click on image and draw two lines: first, the tibia axis line (A) and then the tibial plateau slope line (B);
- through lines intersection point the program draws the line (dashed line C), that is perpendicular to the tibia axis line A, and displays the angle between the line C and tibial plateau slope line B:
you can drag the line points or the whole measurement object simultaneously.

**WARNING! TPA, Norberg Angle, and VHS measuring is intended for veterinary usage. By default settings these tools are not shown in Measure menu for other than VET license types.**

**Norberg Angle**

The *Norberg Angle* button is used to evaluate canine hips. To measure the angle:

- zoom in the selected image and select *Norberg Angle* tool in *Measure* menu;
- point the mouse cursor on the surface of femoral head, click the selected mouse button, and draw the circle, fitting the femoral head - the first circle of the Norberg angle:

![Figure 63. Norberg angle circle with the center in femoral head](image)

- repeat the same process on other femoral head – draw the second circle of the Norberg angle;
- actions with other click the selected mouse button over the selected image point to place the first circle of the Norberg angle,
- the program joins the circle centers with a line and draws a line from each center at 105.0 degrees - the Norberg angle for good hip:
• drag the upper points of lines to fit the cranial acetabular rim for measuring the actual Norberg angle:

![Figure 64. Norberg angle measurement](image)

• you can adjust the circle size by dragging the dot on the circle, or adjust circle position by dragging the circle center, or the whole measurement object by dragging the center line.

![Figure 65. Adjusted Norberg angle measurement](image)

**WARNING!** TPA, Norberg Angle, and VHS measuring is intended for veterinary usage. By default settings these tools are not shown in Measure menu for other than VET license types.

**Verbal Heart Scale**

The VHS (Vertebral Heart Scale) button is used to measure heart size and provide an accurate assessment of true cardiac enlargement. To perform a VHS measurement:

- select VHS tool in Measure menu;
- place the mouse cursor and click the selected mouse button on the point from which you want to start measuring Long Axis (L);
- move the cursor to the end point of long axis and click the selected mouse button again - the Long Axis line will appear:
• place the mouse cursor and click the selected mouse button on the point from which you want to start measuring Short Axis (S);

• move the cursor to the end point of short axis and click the selected mouse button again – the Short Axis line will appear:

You can rotate lines by dragging the ends of the line (dots) according to your needs. Click the left mouse button on the yellow dot (highlighted in red) and drag the line into a position where you want it to be. Middle vertical line (S and L line intersection point) allows to move S and L lines at the same time:
WARNING! TPA, Norberg Angle, and VHS measuring is intended for veterinary usage. By default settings these tools are not shown in Measure menu for other than VET license types.

Text annotations

The Text tool is used to save the annotations of the measurements.

- select Text tool in Measure menu;
- to insert text box with arrow pointing to an object or image location, click the mouse button at the arrow end and drag the mouse to the place of text box;
- to insert only text box, simply click at the desired image place;
- an annotation text window with an arrow (if selected) will appear on the selected image place and the text entry field (white field) will appear at the bottom of the image;
- enter the text in the text entry field and press Enter button;
- the entered text will appear in the text box and the box will be resized accordingly.
- yellow arrow can be pointed to any place of the image by dragging its end point.
- yellow–border text window can be placed with a drag and drop motion anywhere on the image, for example, next to the measurement you want to add text to;
- double-click the text box for opening the text entry field and changing the entered text.
**Region Of Interest**

The ROI (Region Of Interest) is the same as area measurement only without measurements.

**Calibration line**

The Calibration line button is used to change the scale of measurement:

- select **Calibration line** tool in Measure menu;
- draw a line between two points at a known distance:

![Figure 71. Calibration line](image)

- indicate line length in millimeters in a pop-up window:

![Figure 72. Entering the Calibration line length](image)

- once the data is entered, click **Apply** button – data will appear on the left bottom corner of the screen:

![Figure 73. Calibration ratio result](image)

**NOTE! Use default** button resets to default calibration settings.

**Show Angles**

Use the **Show Angles** function to see the angles between any intersecting lines. To display the angle measurements:
• select **Show Angles** tool in **Measure** menu to activate the function: the highlighted icon indicates that function is activated.

• if **Show Angles** function is active, the angles between intersecting lines are displayed:

![Angle measurement between intersecting lines](image)

Figure 74. Angle measurement between intersecting lines

• Click the activated **Show Angles** menu once more to deactivate the function.

**Intensity**

The **Intensity** button is used to measure the density of a CT image. To measure the density:

• select **Intensity** tool in **Measure** menu to activate the function: the highlighted icon indicates that function is activated.

• move the mouse cursor over the point you want;

• the density of the point (in Hounsfield units, HU) and its coordinates are displayed at the bottom left corner:

![Intensity measurement](image)

Figure 75. Intensity measurement

• click the activated **Intensity** menu once more to deactivate the function.
Delete measurements

The **Delete All** menu is used to remove all measurements of an active image at once.

To remove the measurements:

- select the image from which you want to remove all measurements;
- select **Delete All** in **Measure** menu – all measurements will be deleted from the active image.

**Delete Selected** menu is used to remove only selected measurements:

- select the image from which you want to remove some measurement;
- select the measurements on the image;
- select **Delete Selected** in **Measure** menu – the selected measurement will be deleted.

Save Annotation

The **Save Annotation** menu allows to save the measurements for later usage and sharing. All measurements including text can be saved as annotation. See description how to save and to review saved annotations in section **Annotations**.

Annotations

Annotations can be created, saved, and viewed.

**WARNING!** Annotations functionality may be disabled in configuration.

To create and save annotation:

- Open the image that you want to annotate.
- Do the required manipulations, for example, change windowing, rotate, or other (see description of manipulation tools in section **Tools for image manipulation and analysis**).
- Add the measurements, text annotations (see description in section **Measuring images**).
- Save actual presentation state either with **Save Annotation** menu, or with **Quick save KO, PR** button, as described below:
  - select **Save Annotation** in **Measure** menu - save presentation state window will appear:
Enter the required description, creator name, if desired, and click **Save** button.

- Click the **Quick save KO, PR** button at the bottom right side of the image. The current date and time are used as description of presentation state.

  **NOTE!** Please notice, that **Quick save KO, PR** button initiates double action: saves the presentation state and saves key objects.

- System saves annotation with the following information:
  - the date and time of annotation saving;
  - the annotation description, creator name, if entered;
  - any drawn measurements;
  - written text.

  **WARNING!** Annotation saving is implemented according to DICOM standard. The function is available only if the used study storage provides DICOM saving functionality.

  **NOTE!** Several annotations may be saved for the same image. Each annotation is saved as separate series of PR modality.

Once the annotation has been saved, the annotation icon (pencil) will appear on image thumbnail:
To view saved annotation:

- drag and drop the annotated image (the one that has the annotation icon) to the viewport - the annotation button is displayed on the image:

![Figure 78. Annotation button on image](image)

- move your mouse cursor to the **Annotation** button and click it. If there are several annotations, you can choose which one to review from the list. Hold the cursor over the menu item to see the tooltip with annotation description, creator name and saving date and time:

![Figure 79. List of annotations and annotation description](image)

NOTE! QS_PRESENTATION indicates annotations saved with Quick Save KO, PR button. PRESENTATION indicates annotations saved with Save Annotation menu.

- click on the annotation you have chosen to view and the saved annotation will appear on the screen with an information that has been saved previously:
WARNING! Saved Annotations can only be viewed.

NOTE! Currently viewed annotation is highlighted. Select option None to return to the image.

Key Objects

Key Objects concept is used in order to mark most interesting instances and save them for later review. Marked instances as Key Objects are stored in DICOM file of KO modality. Instances from different series can be stored in one Key Object selection. All instances marked as key objects are annotated with small star symbol.

WARNING! Key objects functionality may be disabled in configuration.

To create key object:

- Open the image that you want to include in key object.
- Expand the Key objects menu and select “Mark image as KO” from the list.
- The image marking as key object window will appear:

![Mark Key Object Window](image)

Figure 81. Mark image as key object window
• Enter the key object title or select the one from dropdown list of not saved key objects in the Title field, and click the Mark button.

• System adds the active image into selected key object. The unsaved key object (star empty) button is displayed on the active image in viewport and thumbnail. The key object title is displayed in extendable menu of Key Objects tool.

![Figure 82. Not saved Key Object](image)

**NOTE!** You can have several unsaved key objects at a time.

To **save** created (marked) key object:

• Expand the Key objects menu and select “Save study key objects” from the list. The key object saving window with all unsaved key objects listed will appear:

![Figure 83. Save study key object window](image)

• You can do the following actions in the window:
  - change the name of Key object by clicking the entry field and editing text in it,
  - delete the not needed Key object clicking Dispose button on the right of the key object title,
  - After making the desired changes, save the Key objects by clicking the Save button.
• System saves the key objects with all the marked images in it. The saved key object icon (star solid) is displayed on the image in viewport and thumbnail. The key object title is displayed in Saved key objects group of extendable Key Objects button's menu.

![Image of MedDream DICOM Viewer interface with saved key object highlighted]

**Figure 84. Saved Key Object**

**WARNING!** Key object saving is implemented according to DICOM standard. The function is available only if the used study storage provides DICOM saving functionality.

You can use Quick save KO, PR button at the bottom right of the image to save the current image as key object. In this case, the current date and time are used as title of key object.

**NOTE!** Please notice, that Quick save KO, PR button initiates double action: saves the presentation state and saves key objects.

**NOTE!** Quick save can be used only one time per image and saves key object only if the image is not included in any other saved or unsaved key object.

To view not saved key object or saved key object:

• Open the key object's image in viewport. You can do this either by selecting the title of the Key object from the drop-down menu of the Key Objects tool, or by dragging a key object image, that is marked with star icon, from thumbnail bar to viewport. Important object icon image from the thumbnail bar to the viewport.

**NOTE!** Use the drop-down menu of the Key Objects tool, to see the key object's images from several series of the study. If Key object, that contains images from several series, is opened from menu, each series is opened in a separate viewport, starting from the first viewport. Key object filter is automatically activated in each viewport. If the number of series exceeds the maximum possible number of viewports, the warning is displayed.
WARNING! If Key object image is opened from thumbnail, Key object filter is not activated. To activate the filter, expand the key objects filter menu by clicking the key object icon on the right of the image, and click the Key object title in filter menu.

- Scroll through the images of the activated key object with mouse as described in section Scroll.

NOTE! The scroll is performed only in one series.

Figure 85. Selection of Key object filter in context menu

NOTE! Key object filter displays all key objects that contain the active image. The half-filled star indicates that image is included in both, saved and unsaved, key objects. If filter is applied, the title of active key object and the star icon are highlighted.

Share files via DICOM Library

Share files via DICOM Library tool is used to send files to DICOM Library. Select the image you want to share and press the button. A pop-up window will appear on the screen. Please enter e-mail of the sender and recipient, subject, and message for recipient. Please indicate, what are you going to send to DICOM Library: active image, all series images (active series), whole study (active study) or images from viewports (non-empty layout areas). In order to finalize sending process, click Send button.
WARNING! Share files via DICOM Library function should be enabled and the required parameters should be set in configuration.

**Forward**

The tool **Forward** is used to send the selected study to the remote device.

You can select the studies for forwarding:

- To forward one currently viewed image, or series, or study, activate the viewport with series/studies image and click **Forward** button;
- To forward all the studies, that are currently opened in viewer, activate the empty viewport and click the **Forward** tool button.

Clicking the **Forward** button opens the forward window with the list of forwarded studies in it. See detail forward window description in section **Export and Forward**.

WARNING! **Forward** function should be enabled and the required parameters (list of forward destination machines) should be set in configuration.
Export

The Export tool lets you save an active image, series, or entire study as an archive or as an ISO image for recording on CD / DVD media.

Please, select the studies for export:

- To export one currently viewed image, series, or study, activate the viewport with series/studies image and click Export tool's button;
- To export all the studies, that are currently opened in viewer, activate the empty viewport and click Export tool's button.

Clicking the Export button opens the export window with the list of exported studies in it. See detail export window description in section Export and Forward.

**WARNING! Export** function should be enabled and the required parameters (path to DICOMDIR viewer and size of ISO archive) should be set in configuration.

Fusion function for Positron Emission Tomography (PET CT)

The Fusion function allows you to combine the series of PET and CT types (attach the selected PET series to the displayed CT series), thus linking the sites of radioactive drug concentrations with the anatomical patient structure. The series fusion function can be selected only after loading the series into the active window. The Fusion function is achieved by selecting the Fusion icon in the main toolbar or by pressing the F keyboard shortcut button.

**NOTE!** If there is no PET series in the open study (-ies), notification will appear on the screen:

![Figure 87. PET series not found notification](image)

**NOTE!** The ability to choose a PET series from another study allows the user to combine series of different studies. This function also allows the user to combine magnetic resonance imaging (MR) series with PET series.

To start fusion:

- Select or open the image from CT series that you want to combine with PET series.
- Click Fusion button and the following pop-up window with positron emission tomography (PET) will appear on the screen:
The PET series selection dialog allows the user to select PET series from an active study (a study that has a CT series open in the active viewport) or from a series of PET in other open studies. Select the PET series you want to combine with an active CT series and click the **Start Fusion** button.

The program preloads CT series, if not loaded earlier, and then fuses them. The preload process progress is seen on the screen:

Once the fusion process is finished, the fusion series and the toolbar of fusion series are displayed in the active viewport:
NOTE! The time of selected CT and PET series preload process depends on the size of series and the connection speed.

Manipulating fusion series

The functionality of the fusion series toolbar is described below.

1. Changing the color range

By default, the Hot iron color range is applied to the PET series of fusion series. However, according to the specificities of the anatomical body sections analyzed, different color range can be used. The choice of the color selection is performed by expanding the list of color schemes and choosing the desired color range. The selected color range is automatically applied for the fusion PET series immediately after selection.

2. Changing the fusion ratio

In the analysis of fusion series, it is important to have the ability to change the fusion ratio. You can change the ratio in fusion ration bar by dragging the marker to the PET or CT series side. In this way, one or the other series is highlighted and a clearer view is provided. By default, the 50% to 50% ration is applied.
3. **Upper layer data adjustment**

If the fusion of the series is not completely symmetrical, then the **Pan** tool in the fusion series toolbar can be used. This tool allows you to change position of the upper fusion series (PET) and visually anatomically link the fusion series.

![Figure 94. Pan tool in fusion series toolbar](image)

**NOTE!** To change the position of the whole fusion images, use the **Pan** tool located on the main Viewer's toolbar.

4. **Adjust the contrast and brightness of the upper layer**

By choosing the **Windowing** tool in the fusion toolbar, the user can change the contrast and brightness of the upper fusion series (PET). If the **Windowing** tool is selected from the Viewer’s main toolbar, then the overall brightness level (PET and CT series) is changed.

![Figure 95. Pan tool in fusion series toolbar](image)

5. **Upper layer zoom function**

By choosing the **Zoom** tool in the fusion toolbar, the user can change the scale of the upper fusion series (PET). If the **Zoom** tool is selected from the Viewer’s main toolbar, in this case the overall (PET and CT series) scaling is changed.

![Figure 96. Zoom tool in fusion series toolbar](image)

6. **Upper layer rotation**

By choosing the **Rotate** tool in the fusion toolbar, the user can rotate the image of the upper fusion series (PET). If the **Rotate** tool is selected from the Viewer’s main toolbar, in this case the whole fusion image (PET and CT series) is rotated.

![Figure 97. Rotate tool in fusion series toolbar](image)

7. **Upper layer image overlay**

If there is a mismatch between the fusion series, the series images can be overlaid with the **Manual Adjustment** tool in the fusion series toolbar. The overlay is possible by changing the image of the upper fusion series (PET) to the next (by clicking the + button) or by changing the image of the upper fusion series (PET) to the previous one (by clicking the – button).
8. **Standard Uptake Value (SUV)**

The main measurement used in the fusion series is the standard uptake value (SUV). The standard uptake value is calculated according to the formula:

\[
SUV_{bw} = \frac{\text{weight in grams}}{\text{injected dose}}
\]

The Standard Uptake Value is calculated by choosing **Ellipse** measurement (see description in section **Ellipse**) from the **Measure** expandable menu in the Viewer’s main toolbar and marking the location in the fused image. Three standard uptake values (average, minimum and maximum) are calculated:

![Figure 99. Standard uptake value measurement in fusion series](image)

9. **Reset PET manipulations**

**Reset** button in fusion series toolbar cancels all the manual adjustments that were done with the upper fusion series (PET) and restores the fused series to the original state.

![Figure 100. Reset button in fusion series toolbar](image)

10. **Closing fusion series**

To close the fusion series, click on **Close** button (X icon) at the end of the fusion series toolbar.

![Figure 101. Close button in fusion series toolbar](image)
Cine mode

Using Cine mode, you may put all series images into one movie. Click on the Cine mode tool in Viewer’s main toolbar wait until the series images preload is done, if not loaded earlier:

![Preload of series images](image1.png)

*Figure 102. Preload of series data for cine mode*

When images are preloaded, the function allows you to play series images as movie (one image corresponds to one frame):

![Cine mode movie playing](image2.png)

*Figure 103. Cine mode movie playing*
To turn the Cine mode off, just open an image from a different series in the same viewport, or click the Cine button once more time.

**WARNING!** Windowing, Pan and Zoom functions are available during cine mode (see Manipulating and analyzing images).

### Other Viewer tools

#### Series

The **Series** button opens the **Study** window:

![Study window](image)

*Figure 104. Study window*

At the top of the window the patient name and study date are displayed. The study information is followed by the list of study’s series. The series description displays the following: the thumbnail of the first image, series description, modality and number of images in series.

In Study window you can perform the following:

- Expand or collapse the series images list by clicking the chevron button at the right of the series description;
- Open the image in viewer window by clicking the image thumbnail in series description or expanded series image list;
- Delete the study from the viewer’s window and study window by clicking the Close button (icon X) at the right of the study description.
Plugins

Plugins button extendable menu holds links to external systems and services. The plugins are displayed in expandable menu of Plugins button, if configured by system administrator.

Full Screen

Full Screen button is used to turn on the full screen mode. Move mouse cursor on Full Screen icon and click it - the Full Screen mode will be enabled. Click either the icon once again or ESC button in the keyboard in order to exit the Full Screen Mode.

Theme

Theme changes MedDream default color (red color in standard product version) to the blue color that is clearly visible on black and white monitors.

NOTE! The default color may be different if the product is used in an integrated solution and rebranded to meet the colors of the integrating system.

Thumbnails

Thumbnails button enables changing the thumbnail place in viewer window. You can select the desired place from dropdown menu: Left; Top; Bottom; Right.

NOTE! The user selection is saved in browser’s local storage and used when starting the viewer. If local storage does not contain the thumbnail position value, the position is set according the system settings.

Preload Series

The Preload Series button preloads the series images, so scrolling the images with mouse wheel works much faster. Once you click the preload icon, preloading starts and preload progress bar appears in the viewport:
NOTE! The Preload series button is not displayed if the series data is already loaded.

Print

To print images, click Print button (enabled for images and disabled for videos, multi-frame, ECG, and SR documents). There are two print options:

Click on one of Print options (Print Active Layout Area or Print Non-Empty Layout Areas) in order to print the view of selected viewport.

Hanging protocols

NOTE! Hanging protocol is automatically applied only to the first study that is opened in the viewer.
Clicking the **Hanging protocol** button opens Hanging protocol options window.

![Hanging protocol options window](image)

**Figure 107. Hanging protocol options window**

You can see the currently applied hanging protocol and apply the other hanging protocol in **Manual hanging protocol selection** section.

To apply other hanging protocol:

- select the hanging protocol group from **Hanging protocol group** drop-down list;
- select the hanging protocol from **Hanging protocol** drop-down list;
- click **Apply** button.

**NOTE!** Manual hanging protocol selection section is shown only for the studies with automatically applied hanging protocol.

**NOTE!** Only the hanging protocol groups and the hanging protocols that can be applied to the active study according to the group and study conditions are available for manual selection.

In **Current workspace settings** section, you can see and change the setting of automatic apply in workspace:

- to change device setting select the device from **Current device** drop-down list;
- to change the **Automatically apply hanging protocol** setting select **Enable** or **Disable** button;
- click **Apply** button to save the settings.

**NOTE!** The workspace settings are saved in browser’s storage and are applicable only for the same browser.
Hanging protocol button’s pop-up menu provides quicker access to some information and functions of Hanging protocol options window:

- menu **Automatically apply hanging protocol** shows the current property value – highlighted icon means that automatic apply is enabled. Clicking the menu inverts the value and highlighting;

- menu **Applied hanging protocol** show the currently applied hanging protocol. Clicking the menu opens Hanging protocol options window.

Shortcut CTRL+ALT+n can be used to apply the next hanging protocol from current hanging protocol group.

### Special views

The section describes the image types that may be included in DICOM file and that needs the special handling when opened in viewer’s window.

### ECG module

This module allows you to view DICOM ECG wave data.

The section describes ECG measurements and ECG viewport toolbar. See the description of main Viewer window toolbar for other tools.

ECG Viewer window has different **Measure** menu:
The **Measurement** button is used to measure the duration (first number, 0.75 s in the example) and amplitude (second number, in this case 1.18 mV) of the selected ECG segment, and to calculate the heart rate per minute (third number in the example, 80 bpm). To measure the values:

- select **Measurement** tool,
- hover the mouse cursor on the point where you want to start the measuring,
- press the selected mouse button and drag the cursor to desired position,
- release the mouse button when the cursor is on the point where you want to end measuring.

![Figure 110. ECG measure tools](image)

The **QT points** tool (duration of the electrical systole) is used to measure the QT intervals (RR, QT, QTc) of a selected ECG fragment. To measure the intervals:

- select **QT points** tool,
- hover the mouse cursor over the start-point of the Q wave and click the selected mouse button,
- hover the mouse cursor over the end-point of the T wave and click the selected mouse button,
- hover the mouse cursor over the start-point of the next Q wave and click the selected mouse button.

![Figure 111. Using Measurement (mV, s) tool](image)
The button **HR** is designated to measure heart rate and visually estimate its irregularity. To measure:

- select **HR** measurement tool;
- hover the mouse cursor over the peak of the R wave and click the selected mouse button,
- hover the mouse cursor over the peak of next R wave and click the selected mouse button,
- now you can compare given interval with other R waves.

---

The **QRS Axis** is used to measure cardiac interventricular partition and ventricular depolarization spreading. Measurement is performed on one or more complete segments of lead I and aVF lead. To measure:

- select **QRS axis** measurement tool,
- hover the mouse cursor over the isoelectric line before P wave and click the selected mouse button,
- hover the mouse cursor over the isoelectric line after T wave and click the selected mouse button.
The **Delete All** menu is used to remove all measurements.

Description of ECG viewport toolbar’s tools:

![Filter](image)

**Filter** function is used for the following:

- to trim the edges of unnecessary points (points to the first spike that has no importance);
- to trim high and low frequency signals applying low-pass and high-pass frequency filters under the “Filter Low Frequency” (003A,0220) and “Filter High Frequency” (003A,0221) tags;
- to eliminate baseline wandering interference;
- filters out specified frequency signals adjusting band-stop filter by **Notch Filter Frequency** (003A, 0222) tag.
Change horizontal scale (mm per second).

Change vertical scale (mm per mV).

ECG view scrollbar.

**SR view**

SR view enables to view structured reports.

SR window displays standard DICOM Structured Reports.

**PDF view**

PDF view enables to view PDF files encapsulated in DICOM format.
WARNING! PDF file is opened with default PDF reader. Some Web browsers have built-in readers. In other cases, the additional software for pdf reading and displaying, like Adobe Acrobat Reader, should be deployed in user workplace.

Video view

Software enables to view video files, MPEG2 and MPEG4 (H.264), encapsulated in DICOM format.

Video is played with the standard video player available.

MedDream DICOM Viewer Chrome browser extension for multi-monitors

Requirements

- MedDream DICOM Viewer multi display browser extension requires Google Chrome browser version 52 or newer.
- Multi display requires more than one display.
- Recommended to have monitors with the same resolution (and Windows PC - the same scale), to expand browser content to correct size and position.

**Extension installation**

1. Extension can be found here:
   

   ![Chrome properties](image)

   *Figure 119 Chrome properties*

   In opened window select Extensions (in the left upper corner) -> Open Chrome Web Store

   ![Chrome web store](image)

   *Figure 120 Chrome web store*

   1.2. Go directly to Google Chrome extensions website -> [https://chrome.google.com/webstore/category/extensions](https://chrome.google.com/webstore/category/extensions)

2. Search for MedDream browser extension: **type “meddream” in the search.**

   ![Filtering MedDream extension](image)

   *Figure 121 Filtering MedDream extension*

3. Add to chrome MedDream browser extension.

   ![Adding MedDream extension](image)

   *Figure 122 Adding MedDream extension*
4. MedDream browser chrome extension has been successfully added to Chrome.

Figure 123 Successful MedDream extension’s addition

Extension configuration

1. In Google Chrome browser’s right upper corner you will find Softneta logo with added MedDream extension.

Figure 124 MedDream extension’s indication

Please note, that parameters are stored in browser local storage, thus after deleting temporary files should be set up again.

2. The user has to set up:
   2.1. Appropriate URL context path for version 7.5 and later should be ”/view”:

   NOTE! If user will leave empty URL context path, it will be filled by default value ”/md5/index” that is used for versions earlier than v7.5.

2.2. Specify desired monitors which will be used for MedDream DICOM Viewer and click save button.

2.3. Example of configured extension:

   Figure 125 Configured extension’s example

   NOTE! Parameters are stored in browser local storage, thus should be set up again if deleting temporary files.
2.4. When MedDream DICOM Viewer will be opened, the extension detects context path and automatically seizures web browser window in specified displays. It is recommended to use appropriate thumbnail layout like Thumbnail Top or Thumbnail Down.

Figure 126 MedDream DICOM Viewer on 2 displays

Figure 127 MedDream DICOM Viewer on 3 displays
Export and Forward

Clicking the export menu in Search window or Viewer window opens the Export window. Clicking the forward menu in Search window or Viewer window opens the Forward window.

WARNING! Forward and Export functions are not available in Search results window if working in mobile mode.

You should select the studies that you are going to export or forward in advance. The study selection in Search window is done by marking the tick-box as described in section Search of studies. The study selection in Viewer window is done by activating the required viewport as described in sections Forward and Export. The selected studies are displayed in export or forward window. The studies list contains the following information about the study:

- **ID** - patient's identification number,
- **Name** - patient's name and surname,
- **Modality** - the method which was used to obtain the study images (modality),
- **Description** – the study description,
- **Date Time** – study date and time,
- **Source AE** – device from where the study was sent to the PACS.

Forward window

To send the selected studies to the remote DICOM device, click the **Forward** button. The Forward window is displayed:

![Forward window](image)

Studies list at the top of the window contains the studies that are selected for forwarding. If no studies are selected, the "Empty list" message is displayed.

The forward destination devices are listed below the studies list. Devices that are configured in system settings are displayed. The "No recipient found" message is displayed, if no forward device is configured. To search for specific device, enter the text in recipient search entry field above the devices list: the list is automatically filtered according to the entered text. To select the device, click the button near the device name.

Click the **Forward** button in forward window to start the study forwarding process:
• if either studies, or device list is empty, the process is not started and the error is displayed;
• if the process is started, the Forward process progress window is displayed:

![Forward progress window](image)

Figure 129. Forward progress window

Any other user actions are disabled until the forward process is in progress. If the forward is ended successfully, the forward progress window automatically closes. If the forward process fails, the error messages is displayed in Forward window.

**WARNING!** For proper forward functioning the forward destination should be properly configured and the device should support DICOM saving functionality.

### Export / Burn to CD/DVD window

To export the selected studies, click the Export button. The system displays the Export window:

![Export window](image)

Figure 130. Export window

Studies list at the top of the window contains the studies that you have selected for export. If no studies were selected, the “Empty list” message is displayed.

1. **Export**

To save the selected for export studies in the archive file, do the following:

1. Select the file saving format in the **Format** field:
   - if DICOM format is selected, the output archive contains DICOM files;
   - if JPEG/MP4/pdf format is selected, the output archive contains jpg, mp4(mpg) or pdf files, depending on image format;
   - if TIFF/MP4/pdf format is selected, the output archive contains tiff, mp4(mpg) or pdf files, depending on image format.
WARNING! JPEG/MP4/pdf and TIFF/MP4/pdf formats are disabled in the following conditions:
- At least one study contains object of SR or ECG type, if study export (Save study) is selected.
- The active series contains object of SR or ECG type, if series export (Save active series) is selected.
- The active image is SR or ECG type, if image export (Save active image/video) is selected.

2. Select the export scope in the Save active field:
- selecting the Save active image/video, exports the image from the active viewport;
- selecting the Save active series, exports the series of the active image;
- selecting Save study, exports all the selected studies.

WARNING! Save active image/video and Save active series scopes are enabled only for active study export from Viewer window.

3. Click the Export button.

The system launches export process and displays the export progress window:

![Export progress window](image)

Figure 131. Export progress window

Any other user actions are disabled until the export process is in progress. If the export to file is ended, the export progress window automatically closes and returns to export window. In case of export process failure, the error message is displayed. In case of export process success, the created archive (.zip file) is saved in browser’s download catalog.

II. **Burn to CD/DVD**

To burn the selected for export studies in CD or DVD, do the following:

1. Select media in the Media size field. The following media sizes are provided in default system configuration:
   - select Unlimited (a single volume) format for image saving in a single file;
   - select CD format for image split to 650 MB volumes;
   - select DVD format for image split to 4.7 GB volumes;
   - select Dual-Layer DVD format for image split to 8.5 GB volumes.

WARNING! The media sizes may be supplemented or replaced with other values by system administrator.

2. Click the Burn button.
The system launches export process and displays the export progress window:

![Export progress window](image)

*Figure 132. Export progress window*

Any other user actions are disabled until the export process is in progress. If the export is ended, the export progress window automatically closes and returns to export window. In case of export process failure, the error message is displayed. In case of export process success, the controls for saving the created volumes are displayed in Export window:

![ISO volumes saving buttons](image)

*Figure 133. ISO volumes saving buttons*

3. To save the created volume as ‘*.iso’ file, click the **Download ISO** button. The system creates the ‘*.iso’ archive and the downloaded file is saved in browser’s download catalog.

4. To burn the created volume, click the **Burn Now** button. The system creates the ‘*.burn’ archive and the downloaded file is saved in browser’s download catalog. The automatic burning software launch must be configured on user’s machine.

**NOTE!** Do not close the export dialog until each created volume is not downloaded or burned. The exported volumes could not be saved, if the export dialog is closed.

**WARNING!** The viewer may be included in ISO archive, if the appropriate viewer software is provided and system administrator configures to enclose it in export archive.
System menu functions

The section describes all the options that may be displayed under expandable System menu.

The system menu in the Search window contains options: About, License Agreement, Help, Settings and Log Off. The system menu in the Viewer window contains options: About, License Agreement, Help, Shortcuts, Settings and Log Off. Read the conditions, under which the one or more options are not shown, in the Search window and the Viewer window description.

About

Clicking About menu opens the information window:

![Information window](image)

Figure 134. Information window

The description of displayed information:

- **Product** provides the official product name.
- Fields **Version** and **Release date** holds information about the installed version. The versions’ release notes are accessible by clicking the **Release notes** link. If updates are available, the notification is be displayed in place of ‘(version is up to date)’.
- **UDI** – Unique Device Identification number.
- Fields **Medical device class**, **ID of the notified body**, and **FDA cleared mark** holds the products’ certification data. The certification information is not applicable for VET installation.
- **License to** contains the information about organization that owns the license of current product installation.
- **Concurrent connections** describe the number of concurrent connections that is issued for the license and the number of currently used connections. The text ‘unlimited’ indicates that number of connections is unlimited.
- Field **Modules** shows the software modules that are granted by the license (for example, 3D module).
- Fields **Valid to** and **Updates to** indicates dates, until the current license is valid and will receive updates.
- Contacts of product manufacturer.

You can open the release notes modal by clicking the **Release notes** link near the version number:

![Figure 135. Release notes window](image)

You can initiate the license registration or update by clicking the **Register** button (see description in section **License registration**).

![WARNING! The Register button is visible only if user has administrator right granted by user rights and Settings menu is enabled in system settings.](image)

**License Agreement**

**License Agreement** menu opens the **Software License Agreement (EULA)** modal:

![Figure 136. EULA window](image)

**Help**

**Help** menu forwards you to the user manual of MedDream WEB DICOM Viewer.
Shortcuts

Shortcuts menu will display modal with keyboard shortcuts. A keyboard shortcut is a sequence or combination of keystrokes on a computer keyboard which invokes commands in a software.

Settings

To change MedDream viewer’s settings, click button Settings and it will lead you to the settings window. For more information (see Settings).
NOTE! The Settings menu is visible only if user has administrator right granted by user rights and Settings menu is enabled in system settings.

Log Off

Use Log Off option, if you finished working with the program. Logging off from the Search window, closes all the Viewer windows that were opened from Search window and destroys the browser session.

In case the integrated solution is used and the Search window is disabled, Log Off is available under the System menu in Viewer window.

CAUTION! Please notice, that closing the program without Log Off (using browser window close ‘x’ button) is not safe and may lead to unauthorized access to medical data.
License registration

**WARNING!** License registration is required for legal software use. The license registration function is accessible only for users having administrator rights.

You can open the license registration window in such ways:

- By clicking the **Register** button in demo notification window. The demo notification window is displayed, if the system runs without registered license (in demo mode):

  ![Demo version notification](image1)

  *Figure 139. Demo version notification*

- By click the **Register** button in About window (see description in section **About**).

  ![Registration window](image2)

  *Figure 140. Registration window, if EULA is not read*

You should enter the organization and license number that you were given by system administrator or system provider in license registration window. To start registration, you should read the end user license agreement. Click EULA link to open and read the end user license agreement, and check the confirmation box after the reading - the **Register** button is activated:
After the **Register** button is clicked, the system connects to the license server, verifies the entered license data, and registers the license. You can view the registered license data in About window.

**WARNING!** The internet connection and access to license server should be ensured for successful license registration.
**Settings**

System settings allow you to customize the appearance and functionality of the system according to the user's needs. To change your MedDream settings, select Settings from the system drop-down menu (this menu is available only to users who have system administrator rights). The settings window is opened in a separate browser tab or window.

System settings are grouped by system windows and / or functions. Each set of settings is in a separate tab, which is opened by clicking on the tab name.

![Figure 142. Settings window](image)

The **Save settings** button at the bottom of each tab saves the settings’ values into the settings storage. The saved settings are applied after the system restart.

- **NOTE!** You will lose the changes that you've made if you exit the tab or close the settings window without clicking Save Settings at the bottom of the tab.

- **NOTE!** Note that system settings are shared by all users. If you save your changes, the setting, that you or other users have previously saved, will be lost and cannot be restored.

- **NOTE!** Note that user can change some of settings and these changes are saved in browser’s local storage. If the browser’s local storage contains setting values, the system used these values instead of settings file. To use the settings file, you should clean the browser’s local storage on user machine.

A detailed description of each tab is provided in the subsections of this section.

**General settings**

![Figure 143. Settings window: general settings](image)
On **General** tab you can modify the following settings:

- **Auto logout after** – you can enter the time frame in minutes when the system will logout automatically in case you forget to logout and close the system window. The default value is 60 minutes.

- **Date format** – you can specify the date display format. The default value is `yyyy-mm-dd`.

### Search window settings

![Search window settings](image)

On **Search** tab you can modify the following settings:

- **Day Filter** – you can create day filter that will be applied by default when Search window opens. The filter options are: any, 1d, 3d, 1w, 1m, 1y. The default day filter is 3d.

  **NOTE!** This filter is for compatibility with some PACSes (in MedDream "DICOM" PACS integration mode) that require a date range in all queries. It can also be used in direct integration modes if the database is too slow and accidental activation of the "Any" date choice results in unexpectedly long response times that disrupt the ordinary workflow.

- **Default modalities** – you can select modalities which buttons will be shown on the main search window for quick access. Click the modality button and it is highlighted. To change the selections status, click the modality button once more. The default selection is: CR; CT; DX; MR.

  **NOTE!** The user can change the default modalities in Search window. The changes are saved in browser’s local storage and will be applied when the user opens the Search window in the same browser.

  **NOTE!** The default modalities setting is not applicable in mobile mode. In mobile layout all modalities are displayed in Search criteria window and this list cannot be configured.

- **Study paging** – this setting allows you to set the number of studies shown on the page of the main search window. Select the studies per page that you wish to be shown as a default setting from the drop-down list values: 10, 20, 30, 40, 50, 100. The default value is 20 records per page.

### Viewer window settings

In **Viewer** tab you can edit general Viewer settings, info label settings, toolbar settings and custom windowing settings.
In Viewer tab of the Settings window, you can change the following Viewer settings:

- **Cine mode FPS** – number of frames per second when playing multiframe images. The default value is 7 fps.

- **AutoOpen First Image** – automatically opens the first image according to your choices:
  
  - **No** The first image does not open automatically when the study is opened in Viewer.
  
  - **Single** The first image is opened automatically only if the study consists of one image.
  
  - **Always** The first image is always opened automatically.

  The default selection is **Single**.

  **NOTE!** Automatic image opening is applied only if opening study in new Viewer window and in desktop mode.

- **AutoStart Multi-Frame Images** - automatically start playing multi-frame images, if enabled. The default selection is **Disabled**.

- **Activate fast scroll between series** – if option is enabled, the fast scroll function scrolls throughout all the series of the study, that is the first image of the next series is opened when the end of the current series is reached. The default selection is **Disabled**.
NOTE! The user can activate or deactivate the fast scroll between series in Viewer window. The changes are saved in browser's local storage and will be applied when the user opens the Viewer window in the same browser next time.

- **DICOM flow (preload all study images sequentially)** – cache all images in advance. After an image is cached, scrolling through adjacent images takes very little time, but the entire study must fit into browser's memory. The default selection is Disabled.

- **Mobile mode layout** forces mobile view used in desktop mode. The Auto options applies the mobile layout if working in mobile mode. The software automatically switches to mobile mode, if detects the mobile devise on startup or desktop window resolution is resized to less than 992 pixels. If you need the Viewer’s window mobile layout in desktop mode, use Always option. The default selection is Auto.

- **Thumbnails position** – allows to modify position of thumbnails with four possible options: Left, Bottom, Right, Top. The default selection is Left.

- **Thumbnails Single-Click** - once the option is enabled, a single click on an image icon will open the image (otherwise a double click is required). The default selection is Enable.

- **Thumbnail size** - indicates the size of the thumbnail image from minimum size equal to 50px to maximum size equal to 150px. The default value is 50 px.

- **Layout Size** – indicates the number of viewports in the Viewer window:
  - **Columns** - indicates the layout’s number of columns. The values from 1 to 6 are allowed. The default value is 2.
  - **Rows** - indicates the layout’s number of rows. The values from 1 to 3 are allowed. The default value is 1.

NOTE! The user can change the layout size in Viewer window. The changes are saved in browser's local storage and will be applied when the user opens the Viewer window in the same browser next time.

---

### Info Label Properties

The **Info Label properties** section of Viewer tab in Settings window is used to indicate DICOM tags containing the information that should be displayed over the image.

**Figure 146. Setting window: Info Label properties in Viewer tab**

In order to add new info label:

- Select the label place (Left Side Information or Right Side Information) and click **Add Field** in the appropriate section. The system shows the entry field:
- Enter the label. The DICOM tag should be enclosed in parentheses using format (xxxx,xxxx). Label example: Patient position (0018,5100): (0020,1040).
- Save settings.

**NOTE!** Only first level DICOM tags may be used in labels.

After restart the system loads the new settings and shows the label on the image:

![Image showing info label on image]

**Figure 148. Showing Info Label on image**

The default info labels are (see labels' view in the picture above):

- **Left Side Information**
  - (0020,0010) Study ID
  - (0028,0011) x (0028,0010) Image size in pixels Columns x Rows

- **Right Side Information**
  - (0010,0010) Patient's name
  - (0010,0020) Patient's ID
  - (0008,103E) Series Description
  - (0008,0020) (0008,0030) Study date Study time

To remove the label:
- click **Remove** on the right side of the label entry field,
- confirm the action,
- save settings.
**Toolbar Properties**

In the **Toolbar properties** section of Viewer tab in Settings window you can customize the Viewer toolbar’s tools and the order in which they are displayed.

![Toolbar properties](image)

*Figure 149. Setting window: Toolbar properties in Viewer tab*

Use toolbar properties for:

- Changing the order of toolbar’s tools.
- Showing or hiding the tool.
- Customizing the context menu.

To change the place of tool (or tools group) in toolbar, press the right mouse button on the tool and drag the tool on top of the desired place (line). After releasing the mouse button, the tool will be inserted above the line.

![Toolbar properties](image)

*Figure 150. Changing the tool’s position in toolbar*

**NOTE!** You can change the tool (or tools group) place in toolbar. You cannot change the item place in tool group (tool’s expandable menu).
To customize the toolbar view for different modes, select in what mode the tool should be shown in toolbar:

![Figure 151. Selecting the tool's showing mode](image)

- **Show in all layout modes** – the tool is always shown in toolbar.
- **Show in desktop mode** – the tool is shown in toolbar only if working in desktop mode.
- **Show in mobile mode** – the tool is shown in toolbar only if working in mobile mode.
- **Hide** – the tool is never shown in toolbar.

⚠️ **NOTE!** If working in desktop mode with mobile layout (Mobile mode layout set to Always), the desktop toolbar is used.

⚠️ **NOTE!** You can change the display mode selection for all levels: the toolbar’s tool, options group and menu option in tool’s expandable menu. Verify the visibility of higher hierarchy items (like tool’s group, or tool’s) when changing the item’s visibility mode: the option in expandable menu is displayed only if the tool group and tool are visible in the selected mode.

To include the item in context menu, use the context menu customization settings. **Include in quick menu** selection adds the item in quick menu, and **Disable** selection removes it from quick menu. You can include in quick menu the following:

- the menu option from expandable tool’s menu, for example the **Line** option from **Measure** tool’s menu;
- the group of generated menu options – all the generated menu options will be included in context menu. For example, the **DICOM Windowing** menu group from **Windowing** tool’s menu.

⚠️ **NOTE!** The system generates two-level context menu, if you specify to include the tool itself in the context menu. Otherwise (the tool (for example, **Measure**) include in quick menu is disabled, and its menu option (for example, **Line**) include in quick menu is enabled) the **Line** option is included in first level context menu.
Windowing settings

The Windowing settings of Viewer tab in Settings window allows users to create a custom window level preset for a selected modality list. The custom windowing options will be shown in expandable Windowing menu under Custom Windowing group.

![Figure 152. Quick context menu: default settings](image1)

![Figure 153. Quick context menu: Measure tool included in context menu and measure option moved to second context menu level](image2)

![Figure 154. Custom windowing options: default values](image3)
The default settings after system deployment contain the following options for CT modality:

- **CT Abdomen** – a preset setting for abdomen studies.
- **CT Bone** – a preset setting for bone studies.
- **CT Cerebrum** – a preset setting for cerebrum studies.
- **CT Liver** – a preset setting for the liver studies.
- **CT Lung** – a preset setting used for studying the images of the lungs.
- **CT Mediastinum** – a preset setting for mediastinum studies.
- **CT Pelvis** – a preset setting for pelvis studies.
- **CT Posterior Fossa** – a preset setting for Posterior Fossa studies.

To create custom windowing option:

- click **Add new**;
- enter values for the custom windowing option: **Label**, **Width** and **Center**. Select modalities of your choice in order to assign the new window level function to certain modality (-ies). All four fields are mandatory:

![Custom Windowing creation window](image)
*Figure 155. Custom Windowing creation window*

- once done that, click on **Create** button.

New predefined Windowing level will appear on the Windowing menu, if the modality of the active image corresponds to the custom windowing modalities. To apply the custom windowing, click its title in drop-down menu.
Figure 156. Custom windowing in the drop-down Windowing menu

You can remove the custom windowing by clicking the **Remove** button on the right of the record. You can **Edit** the custom windowing values, if desired.

**Hanging protocol settings**

On **Hanging protocol** tab, you can create new hanging protocols, review and modify existing hanging protocols.

![Hanging protocol settings](image)

*Figure 157. Hanging protocol settings*

**NOTE!** All the data changes that are done in Hanging protocol list, group and protocol child windows (like create group window, create protocol window) are saved in the temporary storage. That means the changes are not accessible to the other users and would be lost in case of program accidental close. The permanent data saving is done only when the **Save settings** is done.
Figure 158. Modality filter for metadata fetching

By default, “Do not fetch metadata for these modalities” are set for modalities CT, ES, MR, NM, OT, OP, PT, PX, RF, RG, XA, US, XC. If metadata is not used, only the conditions with following tags are executed:

- Special tags: series_count, instances_count, no.
- In conditions with DICOM tags (0020,0011) SeriesNumber and (0020,0013) InstanceNumber, the system correspondingly uses the series or image serial number, starting from 0, instead of the tag’s value from DICOM file.

If the Hanging protocol includes conditions with tags other than those listed above, such conditions are ignored.

**WARNING!** In Hanging protocol alpha version, the setting Do not fetch metadata for these modalities can only be modified in settings file. Note that for large-scale studies (for example CT, MRI) it is recommended not to use metadata due to long loading time.

Clicking the Add new group button on Hanging protocol tab opens the Create group window:

![Create group window](image)

Figure 159. Create hanging protocol group window

To create a new hanging protocol group:

- Enter the required group name in Name field. The group name is used for protocol identification and is shown to the users in MedDream viewer.
- If you need, enter the group description in Description field. The group description is only visible in settings.
- Select the Devices for which the group’s protocols should be applied. Clicking the button with device name enables or disables selection.
- Specify the Group conditions.

**Entering the Hanging protocol condition**
Condition is an expression that could be evaluated as true or false and is used for automatic applying of Hanging Protocol. Condition consist of special tag or DICOM tag that is evaluated against static value according the specified 'operand. An example of condition: 'Modality equals to 'XA'. Several conditions are joined using AND operand, that means all conditions in the group should be met.

A Tag, Operand and Value fields for new condition entry is displayed if Add condition is clicked:

![Figure 160. Hanging protocol condition's entry fields](image)

To enter the condition:
- select DICOM or special tag in Tag drop-down list. In group conditions the special tags series_count (number of series in study) and instances_count (number of images in study ) can be used;
- select the evaluation operand in Operand drop-down list. The operands list is automatically adjusted to the type of selected tag. The operands list for numeric tags: “=”, “>”, “<”, “>=”, “<=”, “!”. The operands list for string tags: “match”, “not_match”, “begins_with”, “end_with”, “contain”;  
- enter the value in Value field. The string value should be entered for string tag, and the numeric value should be entered for numeric tag.

To remove the entered condition, click the Remove button below the condition entry fields.

- Activate hanging protocol group by selecting Enable or Disable buttons in the Active field. The disabled groups and its protocols are not used for automatic or manual apply.
- Click the Create button when all the group data is entered. The Create group window is closed, the entered group data is saved in temporary storage and is shown at the end of hanging protocol list on Hanging protocol setting tab.

Clicking the Add new protocol button on Hanging protocol tab opens the Create protocol window:

![Create protocol window](image)
To create a new hanging protocol:

- Select the group of the hanging protocol in **Group** drop-down list.
- Enter the required protocol name in **Name** field. The protocol name is used for protocol identification and is shown to the users in MedDream viewer.
- If needed, enter the protocol description in **Description** field.
- Define the layout by entering the number of columns in **Layout columns** field and the number of rows in **Layout rows** field.
- Specify the **Study conditions**, that will be used to select whether the protocol should be applied to the study. See description of condition entering on page 104.
- Specify the image selection and display data for each view:

  **NOTE!** The view is identified by number [row number][column number], that is identifier “1x2” indicates the view in the first row and second column. The arrow near the view indicator can be used to expand or collapse the data entry fields for the view.

- specify the **Prior conditions** if you want the image from other study in patient history to be loaded in the view. The special tag no (the number of prior study from patient's history, starting from the most recent as "1") can be used. If no not specified, the most recent prior study that meats the other conditions is taken. See description of condition entering on page 104;
- specify the **Instance condition** for selecting the image from the study, that you are opening (or prior study, if prior study conditions are entered), to display in the view. See detail description of condition entering on page 104;
- enter the values for image display: windowing, rotation, scale, alignment.

- Click the **Create** button when all the protocol and views data is entered. The Create protocol window is closed, a new protocol is saved in temporary storage and is shown as the last protocol of selected group in protocols list on Hanging protocol setting tab.
The Hanging protocol list is two level expandable list with the hanging protocol group in the first level and the hanging protocols of the group in the second level.

![Hanging protocols list](image)

**Figure 163. Hanging protocols list**

You can perform the following in the hanging protocols list:

- To expands or collapse the list of group’s protocols with chevron icon at the left of group’s name.
- To enable the group’s protocols by selecting the Enable/Disable buttons. The disabled groups and its protocols are not used for automatic or manual apply.
- The controls at the end of each group’s and protocol’s line provides access to group’s or protocol’s data review and edit:
  - clicking the Copy button makes the copy of hanging protocol or group of protocols. The protocol is placed at the end of the group protocols list and postfix “-copy” is added to the name of the copied protocol. The group is placed at the at the end of the group list and postfix “-copy” is added to the name of the copied group and all its protocols;
  - Clicking the Edit button at the end of group line opens the Edit group window with group data filled in the entry fields. You can review and edit the group’s data. See detail fields description on page 104;
  - Clicking the Edit button at the end of protocol line opens the Edit protocol window with protocol data filled in the entry fields. You can review and edit the protocol’s data. See detail fields description on page 105;
  - Clicking the Remove button at the end of group or protocol line deletes the item. If the group is removed, all the protocols of this group are also deleted.
- The drag-and-drop functionality for changing the order of group in the list and for changing the order of protocols in the group. To change the place of the group or protocol item, press the right mouse button on the item and drag the item to the desired place. The items order is important in automatic hanging protocol apply: the first group, that meets the group conditions, is chosen and the first protocol of this group, that meets the study conditions, is applied.
MedDream Mobile mode

You do not need a separate MedDream software version to use it on mobile devices. MedDream software automatically switches to mobile mode, if detects the mobile device on startup or desktop window resolution is resized to less than 992 pixels.

**WARNING!** Note, that browser’s zoom function changes resolution and the software may automatically switch to mobile mode.

Features of MedDream mobile mode:

- Adjusted Search window layout;
- Adjusted Viewer window layout;
- Adjusted Settings window menu;
- Some functional limitations.

Further subsections describe Search window, Viewer window, and Settings window mobile layout and mobile mode functional limitations. For detail functionality and usage description see Logging on to MedDream, Search of studies, MedDream DICOM Viewer, and Settings sections of this manual.

**Search of studies in mobile mode**

Search for studies mobile layout consist of two windows:

- Search criteria window;
- Search results window.

If successfully logged in, the **Search criteria** window opens:
The following search criteria are supported in mobile mode:

- **ID** – patient's ID,
- **Name** - patient's name and/or surname,
- **Description** – study description,
- **Date Time** - date interval, selected in pick list,
- **Modality** – modalities selected in pick list,
- **Storage** – the PACS or other configured storage, selected in drop-down list.

See the detail description of search criteria in section **Search of studies**.

**WARNING!** The mobile mode has the following search limitations comparing to desktop version:

- search according accession number and source AE title is not allowed;
- search according custom date interval is not allowed;
- the customization of modalities pick list and search according custom modality is not allowed.

To find the study, enter **search criteria** and press the **Search** button. System displays the studies list in the **Search results** window.
The results list displays the following study information:

- Patient's name and surname in the first line.
- Patient's ID number in next line.
- **Modality** – field shows method which was used to obtain the study images (modality).
- **Description** – field shows study description
- **Date Time** – field shows study date and time
- **Source AE** – field shows title of the device from where the study was sent to the PACS.

NOTE! The field is empty if the DICOM file or PACS does not have the particular data.

In the search results window, you can do the following:

1. To navigate through result list, use scrolling or dragging up and down. The number of currently loaded studies and total number of search results are displayed at the bottom of the list:
2. To load more studies, press **Load more studies** button – next page is loaded.

![Figure 166. Page navigation in the search results in mobile mode](image)

NOTE! The number of studies per page is defined in system settings.

NOTE! The **Load more studies** button is not displayed if all the studies are loaded.

3. To open the study in viewer, press at any place of study description. The selected study opens in Viewer (see Opening studies in MedDream Mobile mode section for detail description).

4. To return to the Search criteria window, press the search button at the top left corner of the search results window.

The description of the other buttons in the **Search criteria** window and **Search results** window:

1. To change the language, press the **Language** button at the top left corner of the **Search criteria** window and press the language option in drop-down menu.

2. **System** menu at the top left corner of the **Search criteria** window and **Search results** enables access detailed system information and functionality description (see System menu functions section for detail description).

WARNING! Systems menu options may be disabled in Settings. The Settings options may also be not allowed by user rights.

WARNING! The Forward and Export functions in search results list are not available in mobile mode.

**Viewer window in mobile mode**

The Viewer window mobile layout contains the following zones:
Figure 167. Viewer window zones in mobile mode

1. Image manipulation tools zone is shown at the bottom left side of the window. What buttons and in what order are shown in toolbar is described in system settings (see section Toolbar Properties).

NOTE! The tools set may vary depending on content of the active viewport.

If there is not enough space for all toolbar buttons, the toolbar is extended and horizontal scroll bar is displayed under the toolbar:

Figure 168. Toolbar's scrollbar in mobile mode.

Drag the toolbar to get the required tools.

In toolbar you can activate tool usage, if the tool can be operated on the touch screen. To activate the tool, follow these steps:

- Press on the icon of inactive tool.
The tool is activated and tool icon is highlighted. In the example, the activated Windowing tool can be used on the touch screen: dragging upwards or downwards changes Level values, and dragging right or left changes Window values.

The tool activation is deleted by pressing the tool icon once more or by activating another tool.

**NOTE!** Mobile mode does not support middle and right mouse button actions and only the tool, that is associated with the left mouse button (indicated by mouse icon 🖱️), is activated.

For a description of image manipulation tools in mobile mode, see the section [Manipulating images in MedDream Mobile](#).

Press the triangle on the left of tool icon or long press tool icon to open the modal with tool’s menu:

![Figure 169. Tool’s menu in Viewer window in mobile mode](image)

You can activate the menu option by pressing it. If the option has an assigned shortcut, the key combination is written on the right: pressing ‘SHIFT’ and ‘T’ keys aligns the active image left.

2. The system tools zone at the bottom right corner of the window contains language selection button and system menu button, that function identically as in desktop mode (see description on page 23).
3. The view zone takes the largest part of the Viewer window and is designated to view and analyze the images. The view zone may be divided to several sections, each section (dashed line in figure) working as separate viewport for image viewing. The manipulation is allowed in one active viewport at a time. To activate the viewport, press on the viewport area – the active viewport is highlighted. The image manipulation toolbar is automatically adjusted according the content of the active viewport.

At the right side of the viewport the scroll bar with the scroll cursor, that is scrolled respectively to the position of the active image in the series, is shown. At the bottom of the scroll bar is the total number of images in the series and the number of the active image. Dragging the cursor along the scroll bar or pressing on the desired scroll bar position changes the image.

NOTE! Viewer window mobile layout does not support thumbnail. To open the image use toolbar’s button Series (see description in section Series). To preload the series images, use toolbar’s button Preload Series (see description in section Preload Series).

NOTE! The patient history functionality is not supported in mobile mode.

NOTE! The context menu is not supported in mobile mode.

Opening studies in MedDream Mobile mode

If you need to open the study, please do the following:

1. Find the required study in Search results window and press on the study description area:

![Figure 170. Study description area in Search results window in mobile mode](image)

2. A new browser tab with a Viewer window will pop up and the Study window automatically opens in it:
NOTE! The first image automatically opens in background, if the first image opening conditions are met (see description in Settings).

3. Find and press the image in the Study window (see detail description in section Series) to open it in Viewer. Or close the Study window by pressing Close button to the first study image, that was opened in background.
4. If you need to open more than one study (e.g. to compare the images from different studies) in the same Viewer window, please do the following:

- Change the Viewer window layout (see description in [Layout and Multi image](#)) and press on the viewport in which you want to open other study. The viewport is activated:

![Figure 173. 2x1 Screen layout with active bottom viewport in Viewer window mobile mode](image)

- Go back to the search results window by pressing MedDream search browser's tab.
- Find and select the study in search results, as described in step 1.
- The program navigates to MedDream viewer browser’s tab ant pop-ups the Study window. The Study window contains all the studies that were opened in Viewer’s window. The selected study is displayed in the first position of studies list:

![Figure 174. New study added at the top of the studies list of the viewer window](image)
NOTE! Use Series button to open the Study window and select the other image from the studies that are already opened in Viewer’s window.

- Find and press the image thumbnail to open it in an active viewport:

![Multiple images opened in mobile mode](image)

**Figure 175. Multiple images opened in mobile mode**

**Manipulating images in MedDream Mobile mode**

The section describes the specifics of using the image manipulation tools with touch screens. See detail description of particular tool in the following sections:

- **Tools for image manipulation and analysis** section describes tools: Windowing, Pan, Zoom, Channels, Scroll, Magnifier, Layout, Multi image, Reset, MPR, Reference Line, Crosshair, Rotate, DICOM, and Link;

- **Tools for measuring, annotation saving and study exchange** section describes Annotations, Key Objects, Share files via DICOM Library, Forward, Export, and measure menu tools: Line, Angle, Polyline, Area, Volume, Velocity Time Integral (VTI), Ellipse, Cobb Angle, Tibial Plateau Angle, Norberg Angle, Verbal Heart Scale, Text annotations, Region Of Interest, Calibration line, Show Angles, Intensity, Delete measurements, Save Annotation;

- **Fusion function for Positron Emission Tomography (PET CT)** section describes the fusion tool;

- **Cine mode** section describes the playing as video tool;

- **Other Viewer tools** for tools Series, Plugins, Full Screen, Theme, Preload Series, Print, and Hanging protocols;

- **ECG module** for ECD manipulation toolbar and measure tools.
The table below describes what finger actions should be used on touch screens instead of mouse actions.

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<tr>
<td>Double press</td>
<td>Mouse right button double click action</td>
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<tr>
<td>Rapidly touch the screen twice with finger</td>
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<tr>
<td>Long press</td>
<td>Used only in mobile layout to open tool’s expandable menu.</td>
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<tr>
<td>Touch the screen with finger for longer period of time</td>
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</tr>
<tr>
<td>Drag</td>
<td>Mouse drag</td>
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<tr>
<td>Touch the screen and move finger towards required direction without losing contact</td>
<td></td>
</tr>
<tr>
<td>Zoom</td>
<td>Used only in mobile layout to zoom image in or out.</td>
</tr>
<tr>
<td>Touch the screen with two fingers and move them closer or further each other without losing contact</td>
<td></td>
</tr>
<tr>
<td>NOTE! Two fingers zoom is not working if any of Measure tools is activated.</td>
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</tr>
<tr>
<td>Scroll</td>
<td>Used only in mobile layout to scroll the list.</td>
</tr>
<tr>
<td>Touch the screen with the finger and quickly slide up or down, releasing the finger</td>
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Setting window in mobile mode

The Settings in mobile mode are grouped by system windows and / or functions as in desktop mode.

![General settings](image1)

*Figure 176. Settings window in mobile mode: General settings*

To open the required setting group, do the following:

- Press the menu button on the top left corner of the Settings window. The system displays the settings window menu:

![Settings window menu](image2)

*Figure 177. Settings window menu in mobile mode*

- Press the menu item. The selected settings tab is opened:
Figure 178. Settings window in mobile mode: Viewer settings

See detail settings groups and fields description in section Settings.
# List of applicable standards

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<td>Guidance on the biomedical research forms approval: for of request for permission to implement biomedical research; biomedical research ethical evaluation form.</td>
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MedDream is manufactured by Softneta UAB.

Medical device class: Directive 93/42/EEC and amendment 2007/47/EC

Class IIa medical device

FDA cleared

ID of the notified body: 2460

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